

*Fort Bend County, Texas
Invitation for Bid*



*Ransom Road Widening and Reconstruction
for Fort Bend County Mobility Bond Project No. 17102
BID 24-037*

SUBMIT BIDS TO:

Fort Bend County
Purchasing Department
Travis Annex
301 Jackson, Suite 201
Richmond, TX 77469

Note: All correspondence must include the term
“Purchasing Department” in address to assist in
proper delivery

SUBMIT NO LATER THAN:

Tuesday, March 12, 2024
2:00 PM (Central)

LABEL ENVELOPE:

BID 24-037
Ransom Road

***ALL BIDS MUST BE RECEIVED IN AND TIME/DATE STAMPED BY THE PURCHASING OFFICE
OF FORT BEND COUNTY ON OR BEFORE THE SPECIFIED TIME/DATE STATED ABOVE.***

BIDS RECEIVED AS REQUIRED WILL THEN BE OPENED AND PUBLICLY READ.

BIDS RECEIVED AFTER THE SPECIFIED TIME, WILL BE RETURNED UNOPENED.

Results will not be given by phone.
Results will be provided to bidder in writing
after Commissioners Court award.

Requests for information must be in
writing and directed to:
Brooke Lindemann
Senior Buyer
Brooke.Lindemann@fortbendcountytexas.gov

Vendor Responsibilities:

- Download and complete any addendums. (Addendums will be posted on the Fort Bend County website no
Later than 48 hours prior to bid opening)
- Submit response in accordance with requirements stated on the cover of this document.
- DO NOT submit responses via email or fax.



COUNTY PURCHASING AGENT
Fort Bend County, Texas

Vendor Information

Jaime Kovar
Purchasing Agent

Office (281) 341-8640

Legal Company Name (top line of W9)					
Business Name (if different from legal name)					
Type of Business		Corporation/LLC Sole Proprietor/Individual	Partnership Tax Exempt	Age in Business?	
Federal ID # or S.S. #			SAM.gov Unique Entity ID #		
SAM.gov CAGE / NCAGE					
Publicly Traded Business		___ No ___ Yes Ticker Symbol _____			
Remittance Address					
City/State/Zip					
Physical Address					
City/State/Zip					
Phone Number					
E-mail					
Contact Person					
Check all that apply to the company listed above and provide certification number.		DBE-Disadvantaged Business Enterprise ___ SBE-Small Business Enterprise ___ HUB-Texas Historically Underutilized Business ___ WBE-Women's Business Enterprise ___	Certification # _____ Certification # _____ Certification # _____ Certification # _____	<u>Cert Date</u> _____ _____ _____ _____	<u>Exp Date</u> _____ _____ _____ _____
Company's gross annual receipts		<\$500,000 _____	\$500,000-\$4,999,999 _____		
		\$5,000,000-\$16,999,999 _____	\$17,000,000-\$22,399,999 _____		>\$22,400,000 _____
NAICs codes (Please enter all that apply)					
Signature of Authorized Representative					
Printed Name					
Title					
Date					

THIS FORM MUST BE SUBMITTED WITH THE SOLICITATION RESPONSE

1.0 GENERAL REQUIREMENTS:

- 1.1 Read this entire document carefully. Follow all instructions. You are responsible for fulfilling all requirements and specifications. Be sure you understand them.
- 1.2 General Requirements apply to all advertised bids; however, these may be superseded, whole or in part, by the scope, special requirements, specifications, special specifications or other data contained herein.
- 1.3 Governing Law: Bidder is advised that these requirements shall be fully governed by the laws of the State of Texas and that Fort Bend County may request and rely on advice, decisions and opinions of the Attorney General of Texas and the County Attorney concerning any portion of these requirements.
- 1.4 Bid Form Completion: Fill out, sign, and return to the Fort Bend County Purchasing Department one (1) complete bid form. An authorized representative of the bidder must sign the Contract Sheet. The Contract will be binding only when signed by the County Judge, Fort Bend County and a purchase order authorizing the item(s) desired has been issued. The use of corrective fluid is not acceptable and may result in the disqualification of bid. If an error is made, the bidder must draw a line through error and initial each change.
- 1.5 Bid Returns: Bidders must return all completed bids to the Fort Bend County Purchasing Department at 301 Jackson, Suite 201 Richmond Texas no later than 2:00 P.M. on the date specified. Late bids will not be accepted. Bids must be submitted in a sealed envelope, addressed as follows: Fort Bend County Purchasing Agent, Travis Annex, 301 Jackson, Suite 201 Richmond, Texas 77469.
- 1.6 Addenda: No interpretation of the meaning of the drawings, specifications or other bid documents will be made to any bidder orally. All requests for such interpretations must be made in writing addressed to Brooke Lindemann, Senior Buyer, 301, Jackson, Suite 201, Richmond, Texas, 77469, E-mail: Brooke.Lindemann@fortbendcountytexas.gov. Any and all interpretations and any supplemental instructions will be in the form of written addenda to the contract documents which will be posted on Fort Bend County's website. Addenda will **ONLY** be issued by the Fort Bend County Purchasing Agent. It is the sole responsibility of each bidder to insure receipt of any and all addenda. All addenda issued will become part of the contract documents. Bidders must sign and include it in the returned bid package. Deadline for submission of questions and/or clarification is no later than **Tuesday, March 5, 2024 at 9:30AM (central)** Requests received after the deadline will not be responded to due to the time constraints of this bid process.
- 1.7 References: All bidders must submit, **WITH BID**, at least three (3) references from clients for whom a project similar to that specified herein has been

Initials of Bidder: _____

successfully accomplished. References must include clients name, contact person and telephone number.

- 1.8 Bid Bond: All bidders must submit, **WITH BID**, a cashier's check or certified check for at least five percent (5%) of the total bid price, payable to the order of Fort Bend County, or a Bid Bond in the same amount issued by a surety, acceptable to Fort Bend County, authorized to do business in the State of Texas, as a guarantee that the Bidder will do the work described herein at the rates stated herein. Unsuccessful bidder's Cashier's Check or Certified Check will be returned only after a written request to do so have been received in the Office of the Fort Bend County Purchasing Agent.
- 1.9 Material Safety Data Sheets: Under the "Hazardous Communication Act", commonly known as the "Texas Right to Know Act", a bidder must provide to Fort Bend County and using departments, with each delivery, material safety data sheets, which are, applicable to hazardous substances defined in the Act. Bidders are obligated to maintain a current, updated file in the Fort Bend County Purchasing Department. Failure of the bidder to maintain such a file will be cause to reject any bid applying thereto.
- 1.10 Pricing: Prices for all goods and/or services shall be firm for the duration of this Contract and shall be stated on the bid sheet. Prices shall be all inclusive. No price changes, additions, or subsequent qualifications will be honored during the course of the Contract. All prices must be written in ink or typewritten. If there are any additional charges of any kind, other than those mentioned above, specified or unspecified, bidder **MUST** indicate the items required and attendant costs or forfeit the right to payment for such items.
- 1.11 Term Contracts: If the Contract is intended to cover a specific time period, said time will be given in the specifications under scope.
- 1.12 Recycled Materials: Fort Bend County encourages the use of products made of recycled materials and shall give preference in purchasing to products made of recycled materials if the products meet applicable specifications as to quantity and quality. Fort Bend County will be the sole judge in determining product preference application.
- 1.13 Evaluation: Evaluation shall be used as a determinant as to which bid items or services are the most efficient and/or most economical for Fort Bend County. It shall be based on all factors which have a bearing on price and performance of the items in the user environment. All bids are subject to tabulation by the Fort Bend County Purchasing Department and recommendation to Fort Bend County Commissioners Court. Compliance with all bid requirements, delivery and needs of the using department are considerations in evaluating bids. Pricing is **NOT** the only criteria for making a recommendation. The Fort Bend County Purchasing Department reserves the right to contact any bidder, at any time, to clarify, verify or request information with regard to any bid.

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- 1.14 Disqualification of Bidder: Upon signing this bid document, a bidder offering to sell supplies, materials, services, or equipment to Fort Bend County certifies that the bidder has not violated the antitrust laws of this state codified in section 15.01, et seq., Business & Commerce Code, or the federal antitrust laws, and has not communicated directly or indirectly the bid made to any competitor or any other person engaged in such line of business. Any or all bids may be rejected if Fort Bend County believes that collusion exists among the bidders. Bids in which the prices are obviously unbalanced may be rejected. If multiple bids are submitted by a bidder and after the bids are opened, one of the bids is withdrawn, the result will be that all of the bids submitted by that bidder will be withdrawn; however, nothing herein prohibits a vendor from submitting multiple bids for different products or services.

- 1.15 Awards: Fort Bend County reserves the right to award this Contract on the basis of lowest and best bid in accordance with the laws of the State of Texas, to waive any formality or irregularity, to make awards to more than one bidder, to reject any or all bids. In the event the lowest dollar bidder meeting specifications is not awarded a contract, the bidder may appear before the Commissioners Court and present evidence concerning its responsibility.

- 1.16 Contract Obligation: Fort Bend County Commissioners Court must award the Contract and the County Judge or other person authorized by the Fort Bend County Commissioners Court must sign the Contract before it becomes binding on Fort Bend County or the bidders. Department heads are not authorized to sign agreements for Fort Bend County. Binding agreements shall remain in effect until all products and/or services covered by this purchase have been satisfactorily delivered and accepted.

2.0 SCOPE:

It is the intent of Fort Bend County to contract with one (1) vendor for all materials, supplies, equipment, tools, services, labor and supervision necessary to complete the Ransom Road Widening and Reconstruction, hereinafter referred to as the “Project,” as specified herein.

- 2.1 *Work* means the procurement, delivery and proper construction and/or installation of all materials and facilities and associated appurtenances necessary to fulfill the winning bidder’s obligations (hereinafter the “Contractor”) under the Contract as awarded for the Project specified herein, including the coordination and administration of all services necessary for Contractor, and/or its agents and/or subcontractors, to fulfill Contractor’s obligations under the Contract.

3.0 PRE-BID CONFERENCE:

A pre-bid conference will be conducted on **Tuesday, February 27, 2024 at 9:00 AM (CST)**. The pre-bid conference will be held at the Fort Bend County Purchasing Department located in the Travis Annex at 301 Jackson, Suite 201, Richmond, Texas 77469. All bidders are encouraged to

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attend.

4.0 LIQUIDATED DAMAGES:

The County and the Contractor recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by the County if the work is not complete on time. Accordingly, instead of requiring any such proof, the County and the Contractor agree that as liquidated damages for delay (but not as a penalty) the Contractor shall pay the County \$1,500.00 for each day that expires after the time specified herein for completion until the Work is complete, unless contract time has been adjusted by extension of time approved by Commissioner's Court.

The Contractor will be placed on one (1) year probation if liquidated damages are accrued. During the probation period, if the Contractor accrues liquidated damages on another project, they will be disqualified from being awarded any County work for two (2) years.

5.0 COMPLETION TIME & PAYMENT:

- 5.1 Fort Bend County shall pay the Contractor in current funds for the Contractor's performance of the Contract the contract sum, as stated herein, after receipt of notice to proceed and a purchase order issued by the Fort Bend County Purchasing Agent.
- 5.2 Based upon Applications for payment submitted to the County Auditor, Fort Bend County shall make progress payments on account of the contract sum to the Contractor as provided below and elsewhere in the contract documents.
 - 5.2.1 The period covered by each application for payment shall be one calendar month ending on the last day of the month.
 - 5.2.2 Provided a customary, accurate and complete application for payment is received by the County Auditor not later than the 15th day of a month, Fort Bend County shall make payment of all undisputed amounts to the Contractor not later than the 15th day of the next month. If an application for payment is received by the County Auditor after the application deadline fixed above, payment shall be made by Fort Bend County not later than 30 days after the County Auditor receives the application for payment.
 - 5.2.3 Application for payment shall indicate the percentage of completion of each portion of the Project as of the end of the period covered by the application for payment.
 - 5.2.4 Subject to the provisions of the contract documents, the amount of each progress payment shall be computed as follows:

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5.2.4.1 Take that portion of the contract sum properly allocable to completed Project less retainage of ten percent (10%).

5.2.4.2 Add that portion of the contract sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction (or, if approved by Fort Bend County, suitably stored off the site at a location agreed upon in writing), less retainage of ten percent (10%).

5.2.4.3 Subtract the aggregate of previous payments made by Fort Bend County.

5.2.4.4 The progress payment amount as determined in above shall be further modified under the following circumstances:

Upon substantial completion of the Project, add a sum sufficient to increase the total payments to one hundred percent (100%) of the contract sum, less such amounts as Fort Bend County shall determine should be deducted for incomplete work and unsettled claims.

5.2.4.5 Final payment, constituting the entire unpaid undisputed balance of the contract sum, shall be made by Fort Bend County to the Contractor when Fort Bend County and the Contractor agree that the Contract has been fully performed by the Contractor.

5.3 Before the first application for payment, the Contractor shall submit to the Facilities Management and Planning Department a schedule of values allocated to various portions of the work, prepared in such form and supported by such data to substantiate its accuracy as the Facilities Management and Planning Department may require. This schedule, unless objected to by the Facilities Management and Planning Department shall be used as a basis for reviewing the Contractor's application for payment.

5.4 Contractor must provide with each application for payment a contractor's affidavit certifying bills against the Contractor for labor, material and expendable equipment employed in the performance of Contractor have been paid in full prior to acceptance of final payment from Fort Bend County.

5.5 The Contractor will permit Fort Bend County, or any duly authorized agent of Fort Bend County, to inspect and examine the books and records of the Contractor for the purpose of verifying the amount of work performed under the Contract. Fort Bend County's right to inspect survives the termination of the Contract for a period of five years.

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6.0 LIMIT OF APPROPRIATION:

Prior to the execution of this Contract, Contractor has been advised by County, and Contractor clearly understands and agrees, such understanding and agreement being of the absolute essence to this Contract, that County shall have available only those funds specifically allocated in this Contract to fully discharge any and all liabilities which may be incurred by County in bringing this Project to an absolute conclusion, resulting in a complete, fully furnished, fully equipped and fully usable facility, and that the total of any and all basic construction costs, costs of providing the required services and materials, all fees and compensation of any sort to the Contractor, and any and all costs for any and all things or purposes coming inuring under or out of this Contract, irrespective of the nature thereof, shall not exceed said specifically allocated sum, notwithstanding any word, statement or thing contained in or inferred from the preceding provision of this Contract which might in any light by any person be interpreted to the contrary.

7.0 RIGHT TO ASSURANCE:

Whenever Fort Bend County in good faith has reason to question the Contractor's intent or ability to perform, Fort Bend County may demand that the Contractor give written assurance of its intent to perform and its plan to properly continue performance, including a reasonably detailed timeline. In the event that a demand is made and no assurance is given within five (5) business days, Fort Bend County may treat this failure as an anticipatory repudiation of the Contract.

8.0 PERFORMANCE & PAYMENT BONDS:

Performance and Payment Bonds: In the event the total accepted bid price exceeds \$25,000 the Contractor must provide to the Office of the County Purchasing Agent, a performance bond and a payment bond, each in the amount of 100% of the total contract sum within ten (10) calendar days after receipt of notification of bid award. Such bonds shall be executed by a corporate surety duly authorized and admitted to do business in the State of Texas and licensed in the State of Texas to issue surety bonds with a Best Rating of "A" or better. Fort Bend County reserves the right to accept or reject any surety company proposed by the Contractor. In the event Fort Bend County rejects, the proposed surety company, the Contractor will be afforded five (5) additional days to submit the required bonds issued by a surety company acceptable to Fort Bend County.

9.0 POWER OF ATTORNEY:

An attorney-in-fact who signs a bid bond, performance bond or payment bond must file with each bond a certified and effectively dated copy of his or her power of attorney.

10.0 INSURANCE:

10.1 All respondents shall submit, with response, a current certificate of insurance indicating coverage in the amounts stated below. In lieu of submitting a certificate of insurance, respondents may submit, with response, a notarized

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statement from an Insurance company, authorized to conduct business in the State of Texas, and acceptable to Fort Bend County, guaranteeing the issuance of an insurance policy, with the coverage stated below, to the firm named therein, if successful, upon award of this Contract.

- 10.2 At contract execution, contractor shall furnish County with properly executed certificates of insurance which shall evidence all insurance required and provide that such insurance shall not be canceled, except on 30 days prior written notice to County. Contractor shall provide certified copies of insurance endorsements and/or policies if requested by County. Contractor shall maintain such insurance coverage from the time Services commence until Services are completed and provide replacement certificates, policies and/or endorsements for any such insurance expiring prior to completion of Services. Contractor shall obtain such insurance written on an Occurrence form (or a Claims Made form for Professional Liability insurance) from such companies having Best's rating of A/VII or better, licensed or approved to transact business in the State of Texas, and shall obtain such insurance of the following types and minimum limits:
 - 10.2.1 Workers' Compensation insurance. Substitutes to genuine Workers' Compensation Insurance will not be allowed.
 - 10.2.2 Employers' Liability insurance with limits of not less than \$1,000,000 per injury by accident, \$1,000,000 per injury by disease, and \$1,000,000 per bodily injury by disease.
 - 10.2.3 Commercial general liability insurance with a limit of not less than \$1,000,000 each occurrence and \$2,000,000 in the annual aggregate. Policy shall cover liability for bodily injury, personal injury, and property damage and products/completed operations arising out of the business operations of the policyholder.
 - 10.2.4 Business Automobile Liability coverage with a combined Bodily Injury/Property Damage limit of not less than \$1,000,000 each accident. The policy shall cover liability arising from the operation of licensed vehicles by policyholder.
- 10.3 County and the members of Commissioners Court shall be named as additional insured to all required coverage except for Workers' Compensation and Professional Liability (if required). All Liability policies including Workers' Compensation written on behalf of contractor, excluding Professional Liability, shall contain a waiver of subrogation in favor of County and members of Commissioners Court.
- 10.4 If required coverage is written on a claims-made basis, contractor warrants that any retroactive date applicable to coverage under the policy precedes the effective date of the contract; and that continuous coverage will be maintained or an

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extended discovery period will be exercised for a period of two (2) years beginning from the time that work under the agreement is completed.

- 10.5 Contractor shall not commence any portion of the work under this Contract until it has obtained the insurance required herein and certificates of such insurance have been filed with and approved by Fort Bend County.
- 10.6 No cancellation of or changes to the certificates, or the policies, may be made without sixty (60) days prior, written notification to Fort Bend County.
- 10.7 Approval of the insurance by Fort Bend County shall not relieve or decrease the liability of the Contractor.

11.0 INDEMNIFICATION:

Respondent shall save harmless County from and against all claims, liability, and expenses, including reasonable attorney's fees, arising from activities of respondent, its agents, servants or employees, performed under this agreement that result from the negligent act, error, or omission of respondent or any of respondent's agents, servants or employees.

- 11.1 Respondent shall timely report all such matters to Fort Bend County and shall, upon the receipt of any such claim, demand, suit, action, proceeding, lien or judgment, not later than the fifteenth day of each month; provide Fort Bend County with a written report on each such matter, setting forth the status of each matter, the schedule or planned proceedings with respect to each matter and the cooperation or assistance, if any, of Fort Bend County required by Respondent in the defense of each matter.
- 11.2 Respondent's duty to defend, indemnify and hold Fort Bend County harmless shall be absolute. It shall not abate or end by reason of the expiration or termination of any contract unless otherwise agreed by Fort Bend County in writing. The provisions of this section shall survive the termination of the contract and shall remain in full force and effect with respect to all such matters no matter when they arise.
- 11.3 In the event of any dispute between the parties as to whether a claim, demand, suit, action, proceeding, lien or judgment appears to have been caused by or appears to have arisen out of or in connection with acts or omissions of Respondent, Respondent shall never-the-less fully defend such claim, demand, suit, action, proceeding, lien or judgment until and unless there is a determination by a court of competent jurisdiction that the acts and omissions of Respondent are not at issue in the matter.
- 11.4 Respondent's indemnification shall cover, and Respondent agrees to indemnify Fort Bend County, in the event Fort Bend County is found to have been negligent for having selected Respondent to perform the work described in this request.

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- 11.5 The provision by Respondent of insurance shall not limit the liability of Respondent under an agreement.
- 11.6 Respondent shall cause all trade contractors and any other contractor who may have a contract to perform construction or installation work in the area where work will be performed under this request, to agree to indemnify Fort Bend County and to hold it harmless from all claims for bodily injury and property damage that may arise from said Respondent's operations. Such provisions shall be in form satisfactory to Fort Bend County.
- 11.7 Loss Deduction Clause - Fort Bend County shall be exempt from, and in no way liable for, any sums of money which may represent a deductible in any insurance policy. The payment of deductibles shall be the sole responsibility of Respondent and/or trade contractor providing such insurance.

12.0 PREVAILING WAGES:

This project is subject to the prevailing wage rate requirements of Chapter 2258 of the Government Code. All persons employed by Contractor shall be compensated at not less than the rates shown below. Contractor shall keep detailed records of each of its workers and said records shall be made available to County for inspection at all reasonable times. The Contractor shall pay Fort Bend County sixty dollars (\$60.00) for each worker employed by the Contractor for the provision of services described herein for each calendar day or part of the day that the worker is paid less than the below stated rates. Contractors may also visit www.wdol.gov/dba.aspx.

General Decision Number: TX20240038 01/05/2024
Superseded General Decision Number: TX20230038

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: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022, Executive Order 14026 generally

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applies to the contract. The contractor must pay all covered workers at least \$17.20 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2024.

If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022, Executive Order 13658 generally applies to the contract. The contractor must pay all covered workers at least \$12.90 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2024.

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/05/2024

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	**

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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 Tandem 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.

** Workers in this classification may be entitled to a higher minimum wage under Executive Order 14026 (\$17.20) or 13658 (\$12.90). Please see the Note at the top of the wage

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determination for more information. Please also note that the minimum wage requirements of Executive Order 14026 are not currently being enforced as to any contract or subcontract to which the states of Texas, Louisiana, or Mississippi, including their agencies, are a party.

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) (iii)).

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

A four letter classification abbreviation identifier enclosed 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.

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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

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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.

13.0 PERMITS:

It shall be the sole responsibility of the successful bidder to obtain all required permits in the name of Fort Bend County.

14.0 CONTRACTOR'S RESPONSIBILITY FOR WORK:

14.1 Preconstruction Work. Contractor shall do (or cause to be done) the following as preconstruction work:

14.1.1 On written demand as requested by Fort Bend County, cause the Contractor's personnel to meet with Fort Bend County and the Engineer to discuss the status of the Project.

14.1.2 On written demand as requested by Fort Bend County, review drawings and specifications with the Engineer to permit the Contractor and the Engineer to determine the compliance of the proposed facility with applicable building codes.

14.2 Construction Work. Contractor shall do (or cause to be done) the following as construction work:

14.2.1 Perform (or cause to be performed) all preparatory work at the construction site required herein, including (without limitation) soil and

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concrete testing and demolition of improvements existing at the construction site and all actions necessary for compliance with all laws and regulations as to actions to be taken by owners or contractors before construction begins, including without limitation those in regard to archaeological and environmental requirements.

14.2.2 Construct and install (or cause to be constructed and installed) the Project on the construction site in accordance with this Contract and the drawings and specifications approved by Fort Bend County.

14.2.3 Furnish (or cause to be furnished) all materials, supplies, equipment, tools, labor, supervision, utilities, transportation, and other materials and services necessary to complete the Project described herein.

14.2.4 Materials testing necessary for the Project and required by laws and regulations, construction industry standards as approved by Fort Bend County and this Contract; the frequency of testing shall be approved by Fort Bend County. **It is the contractor's responsibility to engage a material testing laboratory to perform testing on the structural concrete to be used for foundation work in this project. The cost of testing shall be incidental to bid item for drill shaft foundation. Testing of concrete shall comply with current TXDOT criteria. Contractor has to submit the name of the testing laboratory, intended to be used by the contractor for this project, for County's approval.**

14.3 Standards for Review and Approval. Fort Bend County acknowledges that in order to meet the deadlines for the completion of the Project, and in order to accomplish the efficient completion of the Project, the Contractor may submit matters to Fort Bend County in stages for approval or consent. Upon receipt of any matter submitted by the Contractor for review and approval, Fort Bend County shall review the same and shall diligently and promptly (but in any event within 14 calendar days for any such matter, other than a proposed change order, and within 28 calendar days for a proposed change order) give the Contractor notice of Fort Bend County's approval or disapproval, setting forth in detail all reasons for any disapproval. Fort Bend County's right to disapprove any such matter submitted (other than a proposed change order) shall be limited to the elements thereof (a) which do not conform substantially to matters previously approved, (b) which are new elements not previously presented and approved and the Contractor is unable to demonstrate that such new element is reasonably necessary for completion of the Project, or (c) which depict matters that are violations of this Contract or applicable laws and regulations.

14.3.1 If Fort Bend County disapproves of a particular matter or Proposed Change Order, the Contractor shall have the right to resubmit such matter or Proposed Change Order to Fort Bend County, altered to satisfy Fort Bend County's basis for disapproval. Any resubmission shall be subject to review and approval by Fort Bend County.

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14.3.2 Fort Bend County and the Contractor shall attempt in good faith to resolve any disputes concerning the approval of any aspect of the Project expeditiously, so as not to delay the completion of the Project in accordance with this Contract.

14.3.3 Expedited Approvals. Fort Bend County recognizes the importance of expeditious action upon all matters submitted to Fort Bend County for review and approval and of expeditious response to those aspects of the Project requiring approval by governmental authorities having jurisdiction there over. Fort Bend County agrees to exercise its rights of review and approval hereunder with due diligence, reasonableness, and good faith. Fort Bend County shall use its reasonable efforts to expedite any required review of the Project or other matters by any governmental authority.

14.4 Changes.

14.4.1 General. Fort Bend County may make changes to the Project by altering, adding to, or deducting from the Project. All changes in the Project which (a) require an adjustment in the contract sum or an adjustment in the final completion date or (b) involve a material change in the overall scope or function of the Project shall be requested and authorized before commencing such changes by use of written change order notices, Proposed Change Orders and Change Orders, which change order procedure shall be the exclusive means to effect such changes in the Project.

14.4.2 Change Order Procedure. If at any time Fort Bend County desires to make any change in the Project requiring the issuance of a Change Order, Fort Bend County shall so advise the Contractor in writing by delivery to the Contractor of a written notice describing the change. Upon receipt of such notice initiated by Fort Bend County, the Contractor shall within a reasonable period of time advise Fort Bend County of the Contractor's proposal for the adjustments, if any, in the contract sum, the schedule of values, and the final completion date attributable to such change by delivering a written notice thereof (the "Proposed Change Order") to Fort Bend County. Such Proposed Change Order shall contain a description of the proposed change and shall set forth the Contractor's estimate of the increase or decrease, if any, in the contract sum and the change, if any, in the schedule of values and the final completion date attributable to such change. If the Contractor desires to make a change in the Project requiring the issuance of a change order, the Contractor shall deliver to Fort Bend County a Proposed Change Order. Upon execution by Fort Bend County, a Proposed Change Order shall constitute (and be defined herein as) a "Change Order" for purposes of this Contract. The Contractor shall forthwith perform the work as changed in accordance with such Change Order. All work performed pursuant to a Change Order shall be performed in accordance with the terms of this Contract. All Proposed Change Orders

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shall be submitted for approval by Fort Bend County. No action, acquiescence or inaction by Fort Bend County or any representative of Fort Bend County shall be construed to be a waiver of requirements set forth in this Contract in regard to Change Orders or ratification of a violation of such requirements, and all acts in violation of this provision shall be considered void.

14.4.3 Change Order Authorization. Each Change Order shall be signed by Fort Bend County and an authorized representative of the Contractor.

14.4.4 Contract Sum Adjustments. The contract sum and the schedule of values shall be adjusted only as a result of a Change Order requiring such adjustment. Any extra work performed without a proper Change Order shall be considered voluntary and not subject to additional compensation. The Contractor shall not be entitled to an adjustment in the contract sum (or a Change Order permitting such adjustment) or to damages as a result of any delays in the Project caused by the acts or omissions of Fort Bend County, provided that this sentence is not applicable to delays that constitute more than 90 days in any 365-day period or cause the Project to be interrupted for a continuous period of 45 days through no fault of the Contractor.

14.4.5 When Fort Bend County and the Contractor agree upon the adjustments in the contract sum, the schedule of values, and the final completion date attributable to such adjustment, such agreement will be documented by preparation and if approved by the Fort Bend County Commissioners Court, execution of an appropriate Change Order.

14.5 Site Access. Prior to the transfer date, Fort Bend County and the Contractor shall have uninterrupted access to the construction site. Subsequent to the transfer date, Fort Bend County will permit the Contractor, the Engineer, and their representatives and subcontractors to enter upon the Project at times reasonably necessary to complete the punch list items.

14.6 Applicable Laws and Regulations. Contractor shall in its performance of the Project comply with all applicable laws and regulations. Any delays in the prosecution of the Project caused by any changes in the laws and regulations or the application or enforcement of the laws and regulations may entitle the Contractor to an extension of time.

14.7 Familiarity with Project. The Contractor represents and accepts that it has: (a) visited the property(ies), (b) taken such other steps as may be necessary to ascertain the nature and location of the Project and the general and local conditions which affect the Project or the cost thereof, (c) investigated the labor situation as regards to the Project, (d) examined the property(ies), the obstacles which may be encountered and all other observable conditions having a bearing upon the performance of the Project, the superintendence of the Project, the time of completion and all other relevant matters, and (e) reported to Fort Bend County

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the results of all of the foregoing. The Contractor represents that it is familiar with all phases of the Project and the matters that may affect the Project or its prosecution under this Contract.

- 14.8 Standard of Performance. The Contractor shall prosecute (or cause to be prosecuted) the Project in accordance with the best efforts for the construction and development of projects similar to the Project in the State of Texas, using qualified, careful, and efficient contractors and workers and in conformity with the provisions of this Contract. The Contractor shall perform the work in a good and workmanlike manner.
- 14.9 Warranty of Contractor. The Contractor warrants to Fort Bend County that: (i) the Contractor possesses the skill and knowledge ordinarily possessed by well-informed members of its trade or profession and the Contractor will use its best efforts to ensure that the services provided under this Contract will be performed, delivered, and conducted in accordance with the best professional standards and in accordance with industry standards, and (ii) the Contractor is fully experienced and properly qualified to perform the class of work provided for herein, and that it is properly equipped, organized and financed to perform such work, and (iii) following the date of acceptance of this Contract, the services provided by the Contractor to Fort Bend County will conform to the representations contained in this Contract, including all attachments, schedules and exhibits. All warranties provided by the Contractor in this Contract shall be cumulative, shall be deemed consistent and not in conflict, are intended to be given full force and effect and to be interpreted expansively to give the broadest warranty protection to Fort Bend County.
- 14.10 Contractor's Personnel. Contractor shall employ only competent, skilled personnel for the Project. Prior to the final completion date, the Contractor shall maintain a superintendent who shall be authorized to act on behalf of the Contractor and with whom Fort Bend County may consult at all reasonable times. The superintendent shall not be transferred from the Project without Fort Bend County's consent (which shall not be unreasonably withheld or delayed); provided, however, the superintendent shall not be assigned solely to the Project and shall be entitled to spend reasonable time working on matters unrelated to the Project so long as such work on other matters does not render the superintendent unavailable to the Project or unavailable to Fort Bend County. However, such obligation to furnish the superintendent and such staff personnel shall not be construed (a) to preclude the promotion within the Contractor's organization of any person assigned to the Project or (b) to give rise to any liability of the Contractor if any person assigned to the Project (including, without limitation, the superintendent) leaves the Contractor's employment. If the superintendent is transferred from the Project, Fort Bend County shall have the right to approve the replacement superintendent (which approval will not be unreasonably withheld or delayed). The Contractor, the Architect, and the other subcontractors shall comply with all applicable health, safety, and loss prevention rules of applicable governmental authorities. The

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Contractor shall, at its own expense, remove from the Project any person who fails to comply with such rules and instructions. The Contractor shall at all times enforce strict discipline and good order among its employees and shall not employ on the Project any unfit person or anyone not skilled in the work assigned to him. Fort Bend County may, upon written notice to the Contractor, require the Contractor to remove an individual immediately from providing services for the following reasons: violation of the terms and conditions of this Contract; violation of Fort Bend County's or the Contractor's work rules and regulations; criminal activity; or violation of state, federal, or municipal statutes. Fort Bend County may, upon thirty (30) days written notice to the Contractor, require the removal of any individual from providing services without cause.

- 14.11 Inspection. The Project and all parts thereof shall be subject to inspection from time to time by inspectors designated by Fort Bend County. No such inspections shall relieve The Contractor of any of its obligations hereunder. Neither failure to inspect nor failure to discover or reject any of the work as not in accordance with the drawings and specifications or any provision of this Contract shall be construed to imply an acceptance of such work or to relieve the Contractor of any of its obligations hereunder. Fort Bend County agrees that its right of inspection shall be used reasonably and in a timely manner so as not to delay orderly completion of the Project.
- 14.12 Protection Against Risks. The Contractor shall take all precautions which are necessary and adequate, against conditions created during the progress of the Project which involve a risk of bodily harm to persons or a risk of damage or loss to any property. The Contractor shall regularly inspect all work, materials and equipment to discover and determine any such conditions and shall be responsible for discovery, determination, and correction of any such conditions. The Contractor shall comply with all federal, state, and local occupational hazard and safety standards, codes and regulations applicable in the jurisdiction where the Project is being performed. The Contractor shall include the substance of this clause in its entirety in all subcontracts for any work to be performed at the construction site.
- 14.13 Equipment. Except as expressly provided herein to the contrary, the Contractor shall furnish (or cause to be furnished) all construction, transportation, installation, tools, and other equipment and facilities required for the performance of the Project within the times specified herein. Such equipment and facilities shall be serviceable and kept fit for the uses intended. Defective items shall be removed from the construction site promptly and at the Contractor's cost. The Contractor shall schedule (or cause to be scheduled) its other operations so as to not interfere with its duty to timely furnish the necessary equipment and facilities and personnel to operate the same at the times necessary for the orderly completion of the Project.

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- 14.14 Materials. Except as may be specifically provided otherwise in the Contract or approved in advance by Fort Bend County, the Contractor shall provide Fort Bend County with copies of material testing reports and to cause all materials, equipment, and fabricated items incorporated in the Project to be new and of a suitable grade of their respective kinds for their intended use.
- 14.15 Delay, Disruption or Hindrance Damages. Contractor and the County contemplate that Contractor's performance may be delayed, disrupted or interfered with by unanticipated causes including but not limited to the following:
- a) Severe and unavoidable natural disasters such as fires, floods, epidemics and earthquakes;
 - b) Abnormal weather conditions;
 - c) Acts or failures to act of the County , third party utility owners or other third – party entities; and
 - d) Acts of war or terrorism.

Contractor and the County agree and stipulate that an extension of the Contract Time shall be the sole remedy of Contractor for delays in performance of the Work, whether or not such delays are foreseeable, except for delays caused solely by acts of the County that constitute fraud, intentional misrepresentation, gross negligence, intentional arbitrary or capricious acts and/or omissions or intentional interference with Contractor's performance of the Work and then only to the extent such acts continue after Contractor notifies Owner in writing of such conduct. For delays caused by any act(s) other than fraud, intentional misrepresentation, gross negligence, intentional arbitrary or capricious acts and/or omissions or intentional interference with Contractor's performance of the Work Contractor shall not be entitled to any compensation or recovery of any damages including, without limitation, those damages prohibited or limited in Sections 14.15.1 – 14.15.8 below. The County's exercise of any of its rights or remedies under the Contract including, without limitation, ordering changes in the Work or directing suspension, rescheduling, or correction of the Work, in response to any breach or failure by the Contractor to comply with the terms of the Contract Documents or the Contractor's obligations arising therefrom, shall not be construed as intentional interference with Contractor's performance of the Work regardless of the extent or frequency of the County's exercise of such rights or remedies.

Without limiting the foregoing, except as otherwise expressly provided in this Agreement in calculating the amount of any claim recoverable by Contractor, the following limitations on the recovery of damages shall apply:

14.15.1 No indirect or consequential damages will be allowed.

14.15.2 No recovery shall be based on a comparison of planned expenditures to

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total actual expenditures, or on estimated losses of labor efficiency, or on a comparison of planned manloading to actual manloading, or any other analysis that is used to show damages indirectly.

- 14.15.3 Damages, to the extent recoverable, are limited to the additional, actual costs specifically shown to have been directly incurred by the Contractor and solely caused by the proven wrong.
- 14.15.4 No damages will be allowed for home office overhead or other home office charges.
- 14.15.5 No exemplary damages or unjust enrichment damages shall be recoverable.
- 14.15.6 No recovery of attorney's fees shall be recoverable except as expressly permitted under the Agreement.
- 14.15.7 No profit will be allowed on any damage claim, except as expressly recoverable under the Agreement as Fee on Cost of the Work incurred.
- 14.15.8 Notwithstanding any other damage limitation herein the County and the Contractor recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by the Contractor if the County is found to have intentionally interfered with Contractor's performance of the Work by fraud, misrepresentation, gross negligence, or intentional arbitrary or capricious acts and/or omissions. Accordingly, instead of requiring any such proof, the County and the Contractor agree that as liquidated damages (in lieu of any other remedy or damages) for delay, disruption or hindrance (but not as a penalty) the County shall pay the Contractor \$1,500.00 for each day that a court of competent jurisdiction finds the County's conduct referenced in Section 14.15 (above) is the sole cause of Contractor's delay in completing the Work.

15.0 TERMINATION:

- 15.1 Fort Bend County may terminate the Contract for cause if the Contractor:
 - 15.1.1 Persistently or repeatedly refuses or fails to supply enough properly skilled workers or proper materials.
 - 15.1.2 Fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractor.

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- 15.1.3 Persistently disregards laws, ordinances, or rules, regulations or orders of a public authority having jurisdiction.
- 15.1.4 Otherwise commits substantial breach of a provision of the Contract Documents.
- 15.2 When any of the above reasons exists, Fort Bend County may, without prejudice to any other rights or remedies of Fort Bend County and after giving the Contractor and the Contractor's surety, if any, seven days' written notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:
 - 15.2.1 Take possession of the site and of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor.
 - 15.2.2 Finish the Project by whatever reasonable method Fort Bend County may deem expedient.
 - 15.2.3 When Fort Bend County terminates the Contract for one of the reasons stated in this section, the Contractor shall not be entitled to receive further payment until the Project is finished. Therefore, the Contractor shall be promptly paid for all work actually and satisfactorily completed.

15.3 Termination for Convenience of Fort Bend County

Fort Bend county reserves the right, without breach, to terminate the Contract prior to, or during the performance of the Work, for any reason. Upon such an occurrence, the following shall apply.

- 15.3.1 The County will notify Contractor in writing of the county's determination to terminate the contract for convenience and the effective date of the Contract termination. The notice may also contain instructions necessary for the protection, storage or decommissioning of incomplete work or systems, and for safety.
- 15.3.2 Upon receipt of the notice of termination, Contractor shall immediately proceed with the following obligations, regardless of any dispute in determining or adjusting any amounts due at that point in the Contract:
 - 15.3.2.1 Stop all work.
 - 15.3.2.2 Place no further subcontracts or orders for materials or services.
 - 15.3.2.3 Terminate all subcontracts for convenience.
 - 15.3.2.4 Cancel all materials and equipment orders as applicable.

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15.3.2.5 Take appropriate action that is necessary to protect and preserve all property related to the Contract which is in the possession of Contractor.

15.3.2.6 When the Contract is terminated for Owner's convenience, Contractor may recover from Owner payment for all Work executed. Contractor may not claim lost profits or lost business opportunities.

15.4 Settlement on Termination. When the Contract is terminated by the County under 15.3, at any time prior to one hundred eighty (180) days after the effective date of termination, Contractor shall submit a final termination settlement proposal to the County based upon recoverable costs as provided under the Contract. If Contractor fails to submit the proposal within the time allowed, the County may unilaterally determine the amount due to Contractor because of the termination and pay the determined amount to Contractor.

16.0 COMPLETION, TRANSFER, & ACCEPTANCE:

16.1 Final Completion. Upon the occurrence of the final completion date, the punch list items shall be promptly commenced and thereafter completed within thirty (30) days after final completion.

16.2 Transfer and Acceptance. Upon the occurrence of final completion, care, custody and control of the Project shall pass to Fort Bend County. As referenced herein, the "Transfer Date" shall mean the date on which the care, custody and control of the Project passes to Fort Bend County. Subsequent to the Transfer Date all risk of loss with respect to the Project shall be by Fort Bend County and the Contractor shall be thereafter obligated to cover the Project with their Insurance.

17.0 SUSPENSION BY FORT BEND COUNTY FOR CONVENIENCE:

17.1 Fort Bend County may, without cause, order the Contractor in writing to suspend, delay or interrupt the Project in whole or in part for such period of time as Fort Bend County may determine.

17.2 An adjustment shall be made for increase in the cost of performance, caused by suspension, delay or interruption. No adjustment shall be made to the extent:

17.2.1 That performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible.

17.2.2 That an equitable adjustment is made or denied under another provision of this Contract.

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- 17.3 Adjustments made in the cost of performance may have a mutually agreed fixed or percentage fee.

18.0 INDEPENDENT CONTRACTOR:

The Contractor shall be an independent contractor and any provisions of this Contract that may appear to give Fort Bend County the right to direct the Contractor as to the details of the manner of doing the Project shall be deemed to mean that the Contractor shall follow the desires of Fort Bend County in the results of the Project only and not in the means whereby the Project is to be accomplished. The Contractor shall be responsible as to the details of completing the Project. Neither the agents, representatives, nor employees of the Contractor, shall be deemed to be the agents, representatives, or employees of Fort Bend County. The Contractor further represents that it accepts a fiduciary role and responsibility with respect to Fort Bend County and will, to its best abilities, act in the best interests of Fort Bend County and the timely completion of the Project. The Contractor agrees and understands that neither it nor any of its agents or employees may act in the name of Fort Bend County except and unless specifically authorized in writing by Fort Bend County to do so. The Contractor shall furnish construction administration and management services and use the Contractor's best efforts to complete the Project in an expeditious and economical manner consistent with the interests of Fort Bend County.

19.0 NOTICE

- 19.1 All written notices, demands, and other papers or documents to be delivered to Fort Bend County under this Contract shall be delivered to the Engineering Department, 301 Jackson, Richmond, Texas 77469, or at such other place or places as Fort Bend County may from time to time designate by written notice delivered to the Contractor. For purposes of notice under this Contract, a copy of any notice or communication hereunder shall also be forwarded to the following address: Fort Bend County, 301 Jackson Street, Richmond, Texas 77469, Attention: County Judge.
- 19.2 All written notices, demands, and other papers or documents to be delivered to the Contractor under this Contract shall be delivered to the Authorized Representative identified in the Contract documents or such other place or places as the Contractor may designate by written notice delivered to Fort Bend County.

20.0 RECORDS:

- 20.1 Fort Bend County shall be the absolute and unqualified owner of all drawings, preliminary layouts, record drawings, sketches and other documents prepared pursuant to the Contract by Contractor.
- 20.2 The Contractor agrees to maintain and preserve for a period of at least five years after the earlier of the expiration of the defects period or termination of this Contract, accurate and complete records relating to the performance of the

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Project. The Contractor agrees to, upon request, provide Fort Bend County with such records.

21.0 SUCCESSORS & ASSIGNS:

- 21.1 Fort Bend County and the Contractor bind themselves and their successors, executors, administrators and assigns to the other party of this Contract and to the successors, executors, administrators and assigns of such other party, in respect to all covenants of this Contract.
- 21.2 Neither Fort Bend County nor the Contractor shall assign, sublet or transfer its interest in this Contract without the prior written consent of the other.
- 21.3 Nothing herein shall be construed as creating any personal liability on the part of any officer or agent of any public and/or governmental body that may be a party hereto.

22.0 PUBLIC CONTACT:

Contact with the news media, citizens of Fort Bend County or governmental agencies shall be the sole responsibility of Fort Bend County. Under no circumstances, whatsoever, shall Contractor release any material or information developed in the performance of its services hereunder without the express written permission of Fort Bend County, except where required to do so by law.

23.0 MODIFICATIONS:

This instrument contains the entire Contract between the parties relating to the rights herein granted and obligations herein assumed. Any oral or written representations or modifications concerning this instrument shall be of no force and effect excepting a subsequent written modification signed by both parties hereto.

24.0 SILENCE OF SPECIFICATIONS:

The apparent silence of specifications as to any detail, or the apparent omission from it of a detailed description concerning any point, shall be regarded as meaning that only the best commercial practice is to prevail and that only material and workmanship of the finest quality are to be used. All interpretations of specifications shall be made on the basis of this statement. The items furnished under this contract shall be new, unused of the latest product in production to commercial trade and shall be of the highest quality as to materials used and workmanship. Manufacturer furnishing these items shall be experienced in design and construction of such items and shall be an established supplier of the item bid.

25.0 SEVERABILITY:

In the event one or more of the provisions contained in these requirements or the specifications shall for any reason be held to be invalid, illegal or unenforceable in any respect, such invalidity,

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illegality, or unenforceability shall not affect any other provision hereof and these requirements or the specifications shall be construed as if such invalid, illegal, or unenforceable provision had never been contained herein.

26.0 GOVERNING FORMS:

In the event of any conflict between the terms and provisions of these requirements and the specifications, the specifications shall govern. In the event of any conflict of interpretation of any part of this overall document, Fort Bend County's interpretation shall govern.

27.0 TAX EXEMPT:

Fort Bend County is exempt from state and local sales and use taxes under Section 151.309 of the Texas Tax Code. This Contract is deemed to be a separate contract for Texas tax purposes, and as such, Fort Bend County hereby issues its Texas Exemption for the purchase of any items qualifying for exemption under this Contract. Contractor is to issue its Texas Resale Certificate to vendors and subcontractors for such items qualifying for this exemption, and further, contractor should state these items at cost.

28.0 ENTIRE AGREEMENT:

The Parties agree that this Contract contains all of the terms and conditions of the understanding of the parties relating to the subject matter hereof. All prior negotiations, discussions, correspondence and preliminary understandings between the parties and others relating hereto are superseded by this Contract. By entering into this Contract, the parties do not intend to create any obligations, express or implied, other than those specifically set out in this Contract.

29.0 APPLICABLE LAW & VENUE

This Contract shall be construed under and in accord with the laws of the State of Texas, and all obligations of the parties created hereunder are performable in Fort Bend County, Texas, and that venue for any litigation arising out of or related to this Contract shall lie solely in the court of appropriate jurisdiction located in Fort Bend County, Texas.

30.0 ENCLOSURE:

The following being incorporated herein by reference for all purposes as though fully set forth herein word for word.

Enclosure #1 – Specifications and Plans

31.0 PRICING: Complete excel unit pricing form.

32.0 PROJECT DURATION:

Bidder agrees, if awarded the contract, to complete all work required by the contract documents **within _____ calendar days (maximum 365 days)** after issuance of a purchase order by the

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County Purchasing Agent and notice to proceed by the Engineering Department.

33.0 AWARD:

This contract will be awarded to the overall lowest and best bid.

34.0 TEXAS ETHICS COMMISSION FORM 1295:

34.1 Effective January 1, 2016 all contracts executed by Commissioners Court, regardless of the dollar amount, will require completion of Form 1295 "Certificate of Interested Parties", per the new Government Code Statute §2252.908. All vendors submitting a response to a formal Bid, RFP, SOQ or any contracts, contract amendments, renewals or change orders are required to complete the Form 1295 online through the State of Texas Ethics Commission website. Please visit: <https://www.ethics.state.tx.us/filinginfo/1295/>

34.2 On-line instructions:

34.2.1 Name of governmental entity is to read: Fort Bend County.

34.2.2 Identification number used by the governmental entity is: B24-037.

34.2.3 Description is the title of the solicitation: Ransom Road Widening and Reconstruction.

34.3 Apparent low bidder(s) will be required to provide the Form 1295 within three (3) calendar days from notification; however, if your company is publicly traded you are not required to complete this form.

35.0 STATE LAW REQUIREMENTS FOR CONTRACTS:

The contents of this section are required by Texas Law and are included by County regardless of content.

35.1 Agreement to Not Boycott Israel Chapter 2271 Texas Government Code: Contractor verifies that if Contractor employs ten (10) or more full-time employees and this Agreement has a value of \$100,000 or more, Contractor does not boycott Israel and will not boycott Israel during the term of this Agreement.

35.2 Texas Government Code Section 2251.152 Acknowledgment: By signature on vendor form, Contractor represents pursuant to Section 2252.152 of the Texas Government Code, that Contractor is not listed on the website of the Comptroller of the State of Texas concerning the listing of companies that are identified under Section 806.051, Section 807.051 or Section 2253.153.

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36.0 HUMAN TRAFFICKING:

By acceptance of this contract, Contractor acknowledges that Fort Bend County is opposed to human trafficking and that no County funds will be used in support of services or activities that violate human trafficking laws

37.0 INDEMNITY FOR BODILY INJURY OR DEATH CLAIMS

Indemnity for certain bodily injury or death claims. To the fullest extent permitted by law, contractor shall indemnify, defend and hold harmless the county from and against all claims, losses, expenses, costs, demands, suits, causes of action, and damages, including without limitation, attorneys' fees and expenses, for bodily injury or death of any employee of contractor, its agents, or its subcontractors of every tier, even if the bodily injury or death is caused by or alleged to have been caused by the sole or partial negligence, fault or strict liability of any indemnitee.

Indemnity for all other claims. For all claims not addressed in the preceding section or section 11.0 above , including, without limitation, claims for damage to or loss of use of property and claims for bodily injury to or death of any person other than that addressed in the immediately preceding section, to the fullest extent permitted by law, contractor shall indemnify, defend and hold harmless the county from and against all claims, losses, expenses, costs, demands, suits, causes of action, and damages, including without limitation, attorneys' fees and expenses, of any nature whatsoever arising out of or related to this contract or the work to be performed under this contract, but only to the extent of the negligence or other fault of the contractor, its agents, representatives, employees or subcontractors of any tier.

38.0 AGREEMENT TO ARBITRATE UNDER THE FEDERAL ARBITRATION ACT

To the maximum extent allowed by law, any controversy or claim arising out of or relating to this contract, or the breach thereof, shall be settled by arbitration under the Federal Arbitration Act, 9 U.S.C. § 1, et seq. administered by the American Arbitration Association under its Construction Industry Arbitration Rules, and judgment on the award rendered by the arbitrator(s) may be entered in any court having jurisdiction thereof. For cases in which the amount in controversy is less than \$250,000, there shall be no discovery other than an expeditious and complete exchange of documents relative to the dispute. For cases in which the amount in controversy is between \$250,000 and \$1,000,000, there shall be no discovery except for an expeditious and complete exchange of such documentary information and up to three (3) depositions per side (including expert depositions, if any). For cases in which the amount in controversy exceeds \$1,000,000, there shall be no discovery except for an expeditious and complete exchange of such documentary information up to five (5) depositions per side (including expert depositions, if any). No formal interrogatories, request for admissions or formal request for production of documents shall be allowed in the arbitration process. The hearing on the merits will be completed no later than ninety (90) days after the initial demand for arbitration is made for disputes involving amounts in controversy of up to \$250,000; no later than no later than one hundred twenty (120) days after the initial demand for arbitration is made for disputes involving amounts in controversy of between \$250,000 and \$1,000,000; and, no

Initials of Bidder: _____

later than three hundred sixty five (365) days after the initial demand for arbitration is made for disputes involving amounts in controversy of over \$1,000,000.

39.0 ADDITIONAL REQUIRED FORMS:

All vendors submitting are required to complete and return with submission

- 39.1 Vendor Form
- 39.2 W9 Form
- 39.3 Tax Form/Debt/Residence Certification
- 39.4 Contractor Acknowledgement of Stormwater Management Program

**Contract Sheet
Bid 24-037**

**THE STATE OF TEXAS
COUNTY OF FORT BEND**

This memorandum of agreement made and entered into on the _____ day of _____, 20____, by and between Fort Bend County in the State of Texas (hereinafter designated County), acting herein by County Judge KP George, by virtue of an order of Fort Bend County Commissioners Court, and _____ (hereinafter designated Contractor).

(company name)

WITNESSETH:

The Contractor and the County agree that the bid and specifications for the **Ransom Road Widening and Reconstruction for Fort Bend County Mobility Bond Project No. 17102** which are hereto attached and made a part hereof, together with this instrument and the bond (when required) shall constitute the full agreement and contract between parties and for furnishing the items set out and described; the County agrees to pay the prices stipulated in the accepted bid.

It is further agreed that this contract shall not become binding or effective until signed by the parties hereto and a purchase order authorizing the items desired has been issued.

Executed at Richmond, Texas this _____ day of _____, 20_____.

Fort Bend County, Texas

By: _____
County Judge, KP George

By: _____
Signature of Contractor

By: _____
Printed Name and Title

Request for Taxpayer Identification Number and Certification

**Give Form to the
 requester. Do not
 send to the IRS.**

Print or type See Specific Instructions on page 2.	1 Name (as shown on your income tax return). Name is required on this line; do not leave this line blank.	
	2 Business name/disregarded entity name, if different from above	
	3 Check appropriate box for federal tax classification; check only one of the following seven boxes: <input type="checkbox"/> Individual/sole proprietor or single-member LLC <input type="checkbox"/> C Corporation <input type="checkbox"/> S Corporation <input type="checkbox"/> Partnership <input type="checkbox"/> Trust/estate <input type="checkbox"/> Limited liability company. Enter the tax classification (C=C corporation, S=S corporation, P=partnership) ▶ _____ Note. For a single-member LLC that is disregarded, do not check LLC; check the appropriate box in the line above for the tax classification of the single-member owner. <input type="checkbox"/> Other (see instructions) ▶ _____	4 Exemptions (codes apply only to certain entities, not individuals; see instructions on page 3): Exempt payee code (if any) _____ Exemption from FATCA reporting code (if any) _____ <i>(Applies to accounts maintained outside the U.S.)</i>
	5 Address (number, street, and apt. or suite no.)	Requester's name and address (optional)
	6 City, state, and ZIP code	
	7 List account number(s) here (optional)	

Part I Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. The TIN provided must match the name given on line 1 to avoid backup withholding. For individuals, this is generally your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the Part I instructions on page 3. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN* on page 3.

Social security number									
				-			-		
or									
Employer identification number									
				-					

Note. If the account is in more than one name, see the instructions for line 1 and the chart on page 4 for guidelines on whose number to enter.

Part II Certification

Under penalties of perjury, I certify that:

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

Certification instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the certification, but you must provide your correct TIN. See the instructions on page 3.

Sign Here	Signature of U.S. person ▶	Date ▶
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General Instructions

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

Future developments. Information about developments affecting Form W-9 (such as legislation enacted after we release it) is at www.irs.gov/fw9.

Purpose of Form

An individual or entity (Form W-9 requester) who is required to file an information return with the IRS must obtain your correct taxpayer identification number (TIN) which may be your social security number (SSN), individual taxpayer identification number (ITIN), adoption taxpayer identification number (ATIN), or employer identification number (EIN), to report on an information return the amount paid to you, or other amount reportable on an information return. Examples of information returns include, but are not limited to, the following:

- Form 1099-INT (interest earned or paid)
- Form 1099-DIV (dividends, including those from stocks or mutual funds)
- Form 1099-MISC (various types of income, prizes, awards, or gross proceeds)
- Form 1099-B (stock or mutual fund sales and certain other transactions by brokers)
- Form 1099-S (proceeds from real estate transactions)
- Form 1099-K (merchant card and third party network transactions)

- Form 1098 (home mortgage interest), 1098-E (student loan interest), 1098-T (tuition)
- Form 1099-C (canceled debt)
- Form 1099-A (acquisition or abandonment of secured property)

Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN.

If you do not return Form W-9 to the requester with a TIN, you might be subject to backup withholding. See What is backup withholding? on page 2.

By signing the filled-out form, you:

1. Certify that the TIN you are giving is correct (or you are waiting for a number to be issued),
2. Certify that you are not subject to backup withholding, or
3. Claim exemption from backup withholding if you are a U.S. exempt payee. If applicable, you are also certifying that as a U.S. person, your allocable share of any partnership income from a U.S. trade or business is not subject to the withholding tax on foreign partners' share of effectively connected income, and
4. Certify that FATCA code(s) entered on this form (if any) indicating that you are exempt from the FATCA reporting, is correct. See *What is FATCA reporting?* on page 2 for further information.

Note. If you are a U.S. person and a requester gives you a form other than Form W-9 to request your TIN, you must use the requester's form if it is substantially similar to this Form W-9.

Definition of a U.S. person. For federal tax purposes, you are considered a U.S. person if you are:

- An individual who is a U.S. citizen or U.S. resident alien;
- A partnership, corporation, company, or association created or organized in the United States or under the laws of the United States;
- An estate (other than a foreign estate); or
- A domestic trust (as defined in Regulations section 301.7701-7).

Special rules for partnerships. Partnerships that conduct a trade or business in the United States are generally required to pay a withholding tax under section 1446 on any foreign partners' share of effectively connected taxable income from such business. Further, in certain cases where a Form W-9 has not been received, the rules under section 1446 require a partnership to presume that a partner is a foreign person, and pay the section 1446 withholding tax. Therefore, if you are a U.S. person that is a partner in a partnership conducting a trade or business in the United States, provide Form W-9 to the partnership to establish your U.S. status and avoid section 1446 withholding on your share of partnership income.

In the cases below, the following person must give Form W-9 to the partnership for purposes of establishing its U.S. status and avoiding withholding on its allocable share of net income from the partnership conducting a trade or business in the United States:

- In the case of a disregarded entity with a U.S. owner, the U.S. owner of the disregarded entity and not the entity;
- In the case of a grantor trust with a U.S. grantor or other U.S. owner, generally, the U.S. grantor or other U.S. owner of the grantor trust and not the trust; and
- In the case of a U.S. trust (other than a grantor trust), the U.S. trust (other than a grantor trust) and not the beneficiaries of the trust.

Foreign person. If you are a foreign person or the U.S. branch of a foreign bank that has elected to be treated as a U.S. person, do not use Form W-9. Instead, use the appropriate Form W-8 or Form 8233 (see Publication 515, Withholding of Tax on Nonresident Aliens and Foreign Entities).

Nonresident alien who becomes a resident alien. Generally, only a nonresident alien individual may use the terms of a tax treaty to reduce or eliminate U.S. tax on certain types of income. However, most tax treaties contain a provision known as a "saving clause." Exceptions specified in the saving clause may permit an exemption from tax to continue for certain types of income even after the payee has otherwise become a U.S. resident alien for tax purposes.

If you are a U.S. resident alien who is relying on an exception contained in the saving clause of a tax treaty to claim an exemption from U.S. tax on certain types of income, you must attach a statement to Form W-9 that specifies the following five items:

1. The treaty country. Generally, this must be the same treaty under which you claimed exemption from tax as a nonresident alien.
2. The treaty article addressing the income.
3. The article number (or location) in the tax treaty that contains the saving clause and its exceptions.
4. The type and amount of income that qualifies for the exemption from tax.
5. Sufficient facts to justify the exemption from tax under the terms of the treaty article.

Example. Article 20 of the U.S.-China income tax treaty allows an exemption from tax for scholarship income received by a Chinese student temporarily present in the United States. Under U.S. law, this student will become a resident alien for tax purposes if his or her stay in the United States exceeds 5 calendar years. However, paragraph 2 of the first Protocol to the U.S.-China treaty (dated April 30, 1984) allows the provisions of Article 20 to continue to apply even after the Chinese student becomes a resident alien of the United States. A Chinese student who qualifies for this exception (under paragraph 2 of the first protocol) and is relying on this exception to claim an exemption from tax on his or her scholarship or fellowship income would attach to Form W-9 a statement that includes the information described above to support that exemption.

If you are a nonresident alien or a foreign entity, give the requester the appropriate completed Form W-8 or Form 8233.

Backup Withholding

What is backup withholding? Persons making certain payments to you must under certain conditions withhold and pay to the IRS 28% of such payments. This is called "backup withholding." Payments that may be subject to backup withholding include interest, tax-exempt interest, dividends, broker and barter exchange transactions, rents, royalties, nonemployee pay, payments made in settlement of payment card and third party network transactions, and certain payments from fishing boat operators. Real estate transactions are not subject to backup withholding.

You will not be subject to backup withholding on payments you receive if you give the requester your correct TIN, make the proper certifications, and report all your taxable interest and dividends on your tax return.

Payments you receive will be subject to backup withholding if:

1. You do not furnish your TIN to the requester,
2. You do not certify your TIN when required (see the Part II instructions on page 3 for details),

3. The IRS tells the requester that you furnished an incorrect TIN,

4. The IRS tells you that you are subject to backup withholding because you did not report all your interest and dividends on your tax return (for reportable interest and dividends only), or

5. You do not certify to the requester that you are not subject to backup withholding under 4 above (for reportable interest and dividend accounts opened after 1983 only).

Certain payees and payments are exempt from backup withholding. See *Exempt payee code* on page 3 and the separate Instructions for the Requester of Form W-9 for more information.

Also see *Special rules for partnerships* above.

What is FATCA reporting?

The Foreign Account Tax Compliance Act (FATCA) requires a participating foreign financial institution to report all United States account holders that are specified United States persons. Certain payees are exempt from FATCA reporting. See *Exemption from FATCA reporting code* on page 3 and the Instructions for the Requester of Form W-9 for more information.

Updating Your Information

You must provide updated information to any person to whom you claimed to be an exempt payee if you are no longer an exempt payee and anticipate receiving reportable payments in the future from this person. For example, you may need to provide updated information if you are a C corporation that elects to be an S corporation, or if you no longer are tax exempt. In addition, you must furnish a new Form W-9 if the name or TIN changes for the account; for example, if the grantor of a grantor trust dies.

Penalties

Failure to furnish TIN. If you fail to furnish your correct TIN to a requester, you are subject to a penalty of \$50 for each such failure unless your failure is due to reasonable cause and not to willful neglect.

Civil penalty for false information with respect to withholding. If you make a false statement with no reasonable basis that results in no backup withholding, you are subject to a \$500 penalty.

Criminal penalty for falsifying information. Willfully falsifying certifications or affirmations may subject you to criminal penalties including fines and/or imprisonment.

Misuse of TINs. If the requester discloses or uses TINs in violation of federal law, the requester may be subject to civil and criminal penalties.

Specific Instructions

Line 1

You must enter one of the following on this line; **do not** leave this line blank. The name should match the name on your tax return.

If this Form W-9 is for a joint account, list first, and then circle, the name of the person or entity whose number you entered in Part I of Form W-9.

a. **Individual.** Generally, enter the name shown on your tax return. If you have changed your last name without informing the Social Security Administration (SSA) of the name change, enter your first name, the last name as shown on your social security card, and your new last name.

Note. ITIN applicant: Enter your individual name as it was entered on your Form W-7 application, line 1a. This should also be the same as the name you entered on the Form 1040/1040A/1040EZ you filed with your application.

b. **Sole proprietor or single-member LLC.** Enter your individual name as shown on your 1040/1040A/1040EZ on line 1. You may enter your business, trade, or "doing business as" (DBA) name on line 2.

c. **Partnership, LLC that is not a single-member LLC, C Corporation, or S Corporation.** Enter the entity's name as shown on the entity's tax return on line 1 and any business, trade, or DBA name on line 2.

d. **Other entities.** Enter your name as shown on required U.S. federal tax documents on line 1. This name should match the name shown on the charter or other legal document creating the entity. You may enter any business, trade, or DBA name on line 2.

e. **Disregarded entity.** For U.S. federal tax purposes, an entity that is disregarded as an entity separate from its owner is treated as a "disregarded entity." See Regulations section 301.7701-2(c)(2)(iii). Enter the owner's name on line 1. The name of the entity entered on line 1 should never be a disregarded entity. The name on line 1 should be the name shown on the income tax return on which the income should be reported. For example, if a foreign LLC that is treated as a disregarded entity for U.S. federal tax purposes has a single owner that is a U.S. person, the U.S. owner's name is required to be provided on line 1. If the direct owner of the entity is also a disregarded entity, enter the first owner that is not disregarded for federal tax purposes. Enter the disregarded entity's name on line 2, "Business name/disregarded entity name." If the owner of the disregarded entity is a foreign person, the owner must complete an appropriate Form W-8 instead of a Form W-9. This is the case even if the foreign person has a U.S. TIN.

Line 2

If you have a business name, trade name, DBA name, or disregarded entity name, you may enter it on line 2.

Line 3

Check the appropriate box in line 3 for the U.S. federal tax classification of the person whose name is entered on line 1. Check only one box in line 3.

Limited Liability Company (LLC). If the name on line 1 is an LLC treated as a partnership for U.S. federal tax purposes, check the "Limited Liability Company" box and enter "P" in the space provided. If the LLC has filed Form 8832 or 2553 to be taxed as a corporation, check the "Limited Liability Company" box and in the space provided enter "C" for C corporation or "S" for S corporation. If it is a single-member LLC that is a disregarded entity, do not check the "Limited Liability Company" box; instead check the first box in line 3 "Individual/sole proprietor or single-member LLC."

Line 4, Exemptions

If you are exempt from backup withholding and/or FATCA reporting, enter in the appropriate space in line 4 any code(s) that may apply to you.

Exempt payee code.

- Generally, individuals (including sole proprietors) are not exempt from backup withholding.
- Except as provided below, corporations are exempt from backup withholding for certain payments, including interest and dividends.
- Corporations are not exempt from backup withholding for payments made in settlement of payment card or third party network transactions.
- Corporations are not exempt from backup withholding with respect to attorneys' fees or gross proceeds paid to attorneys, and corporations that provide medical or health care services are not exempt with respect to payments reportable on Form 1099-MISC.

The following codes identify payees that are exempt from backup withholding. Enter the appropriate code in the space in line 4.

- 1—An organization exempt from tax under section 501(a), any IRA, or a custodial account under section 403(b)(7) if the account satisfies the requirements of section 401(f)(2)
- 2—The United States or any of its agencies or instrumentalities
- 3—A state, the District of Columbia, a U.S. commonwealth or possession, or any of their political subdivisions or instrumentalities
- 4—A foreign government or any of its political subdivisions, agencies, or instrumentalities
- 5—A corporation
- 6—A dealer in securities or commodities required to register in the United States, the District of Columbia, or a U.S. commonwealth or possession
- 7—A futures commission merchant registered with the Commodity Futures Trading Commission
- 8—A real estate investment trust
- 9—An entity registered at all times during the tax year under the Investment Company Act of 1940
- 10—A common trust fund operated by a bank under section 584(a)
- 11—A financial institution
- 12—A middleman known in the investment community as a nominee or custodian
- 13—A trust exempt from tax under section 664 or described in section 4947

The following chart shows types of payments that may be exempt from backup withholding. The chart applies to the exempt payees listed above, 1 through 13.

IF the payment is for . . .	THEN the payment is exempt for . . .
Interest and dividend payments	All exempt payees except for 7
Broker transactions	Exempt payees 1 through 4 and 6 through 11 and all C corporations. S corporations must not enter an exempt payee code because they are exempt only for sales of noncovered securities acquired prior to 2012.
Barter exchange transactions and patronage dividends	Exempt payees 1 through 4
Payments over \$600 required to be reported and direct sales over \$5,000 ¹	Generally, exempt payees 1 through 5 ²
Payments made in settlement of payment card or third party network transactions	Exempt payees 1 through 4

¹ See Form 1099-MISC, Miscellaneous Income, and its instructions.

² However, the following payments made to a corporation and reportable on Form 1099-MISC are not exempt from backup withholding: medical and health care payments, attorneys' fees, gross proceeds paid to an attorney reportable under section 6045(f), and payments for services paid by a federal executive agency.

Exemption from FATCA reporting code. The following codes identify payees that are exempt from reporting under FATCA. These codes apply to persons submitting this form for accounts maintained outside of the United States by certain foreign financial institutions. Therefore, if you are only submitting this form for an account you hold in the United States, you may leave this field blank. Consult with the person requesting this form if you are uncertain if the financial institution is subject to these requirements. A requester may indicate that a code is not required by providing you with a Form W-9 with "Not Applicable" (or any similar indication) written or printed on the line for a FATCA exemption code.

A—An organization exempt from tax under section 501(a) or any individual retirement plan as defined in section 7701(a)(37)

B—The United States or any of its agencies or instrumentalities

C—A state, the District of Columbia, a U.S. commonwealth or possession, or any of their political subdivisions or instrumentalities

D—A corporation the stock of which is regularly traded on one or more established securities markets, as described in Regulations section 1.1472-1(c)(1)(i)

E—A corporation that is a member of the same expanded affiliated group as a corporation described in Regulations section 1.1472-1(c)(1)(i)

F—A dealer in securities, commodities, or derivative financial instruments (including notional principal contracts, futures, forwards, and options) that is registered as such under the laws of the United States or any state

G—A real estate investment trust

H—A regulated investment company as defined in section 851 or an entity registered at all times during the tax year under the Investment Company Act of 1940

I—A common trust fund as defined in section 584(a)

J—A bank as defined in section 581

K—A broker

L—A trust exempt from tax under section 664 or described in section 4947(a)(1)

M—A tax exempt trust under a section 403(b) plan or section 457(g) plan

Note. You may wish to consult with the financial institution requesting this form to determine whether the FATCA code and/or exempt payee code should be completed.

Line 5

Enter your address (number, street, and apartment or suite number). This is where the requester of this Form W-9 will mail your information returns.

Line 6

Enter your city, state, and ZIP code.

Part I. Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. If you are a resident alien and you do not have and are not eligible to get an SSN, your TIN is your IRS individual taxpayer identification number (ITIN). Enter it in the social security number box. If you do not have an ITIN, see *How to get a TIN* below.

If you are a sole proprietor and you have an EIN, you may enter either your SSN or EIN. However, the IRS prefers that you use your SSN.

If you are a single-member LLC that is disregarded as an entity separate from its owner (see *Limited Liability Company (LLC)* on this page), enter the owner's SSN (or EIN, if the owner has one). Do not enter the disregarded entity's EIN. If the LLC is classified as a corporation or partnership, enter the entity's EIN.

Note. See the chart on page 4 for further clarification of name and TIN combinations.

How to get a TIN. If you do not have a TIN, apply for one immediately. To apply for an SSN, get Form SS-5, Application for a Social Security Card, from your local SSA office or get this form online at www.ssa.gov. You may also get this form by calling 1-800-772-1213. Use Form W-7, Application for IRS Individual Taxpayer Identification Number, to apply for an ITIN, or Form SS-4, Application for Employer Identification Number, to apply for an EIN. You can apply for an EIN online by accessing the IRS website at www.irs.gov/businesses and clicking on Employer Identification Number (EIN) under Starting a Business. You can get Forms W-7 and SS-4 from the IRS by visiting IRS.gov or by calling 1-800-TAX-FORM (1-800-829-3676).

If you are asked to complete Form W-9 but do not have a TIN, apply for a TIN and write "Applied For" in the space for the TIN, sign and date the form, and give it to the requester. For interest and dividend payments, and certain payments made with respect to readily tradable instruments, generally you will have 60 days to get a TIN and give it to the requester before you are subject to backup withholding on payments. The 60-day rule does not apply to other types of payments. You will be subject to backup withholding on all such payments until you provide your TIN to the requester.

Note. Entering "Applied For" means that you have already applied for a TIN or that you intend to apply for one soon.

Caution: A disregarded U.S. entity that has a foreign owner must use the appropriate Form W-8.

Part II. Certification

To establish to the withholding agent that you are a U.S. person, or resident alien, sign Form W-9. You may be requested to sign by the withholding agent even if items 1, 4, or 5 below indicate otherwise.

For a joint account, only the person whose TIN is shown in Part I should sign (when required). In the case of a disregarded entity, the person identified on line 1 must sign. Exempt payees, see *Exempt payee code* earlier.

Signature requirements. Complete the certification as indicated in items 1 through 5 below.

1. Interest, dividend, and barter exchange accounts opened before 1984 and broker accounts considered active during 1983. You must give your correct TIN, but you do not have to sign the certification.

2. Interest, dividend, broker, and barter exchange accounts opened after 1983 and broker accounts considered inactive during 1983. You must sign the certification or backup withholding will apply. If you are subject to backup withholding and you are merely providing your correct TIN to the requester, you must cross out item 2 in the certification before signing the form.

3. Real estate transactions. You must sign the certification. You may cross out item 2 of the certification.

4. Other payments. You must give your correct TIN, but you do not have to sign the certification unless you have been notified that you have previously given an incorrect TIN. "Other payments" include payments made in the course of the requester's trade or business for rents, royalties, goods (other than bills for merchandise), medical and health care services (including payments to corporations), payments to a nonemployee for services, payments made in settlement of payment card and third party network transactions, payments to certain fishing boat crew members and fishermen, and gross proceeds paid to attorneys (including payments to corporations).

5. Mortgage interest paid by you, acquisition or abandonment of secured property, cancellation of debt, qualified tuition program payments (under section 529), IRA, Coverdell ESA, Archer MSA or HSA contributions or distributions, and pension distributions. You must give your correct TIN, but you do not have to sign the certification.

What Name and Number To Give the Requester

For this type of account:	Give name and SSN of:
1. Individual	The individual
2. Two or more individuals (joint account)	The actual owner of the account or, if combined funds, the first individual on the account ¹
3. Custodian account of a minor (Uniform Gift to Minors Act)	The minor ²
4. a. The usual revocable savings trust (grantor is also trustee) b. So-called trust account that is not a legal or valid trust under state law	The grantor-trustee ¹ The actual owner ¹
5. Sole proprietorship or disregarded entity owned by an individual	The owner ³
6. Grantor trust filing under Optional Form 1099 Filing Method 1 (see Regulations section 1.671-4(b)(2)(i)(A))	The grantor*
For this type of account:	Give name and EIN of:
7. Disregarded entity not owned by an individual	The owner
8. A valid trust, estate, or pension trust	Legal entity ⁴
9. Corporation or LLC electing corporate status on Form 8832 or Form 2553	The corporation
10. Association, club, religious, charitable, educational, or other tax-exempt organization	The organization
11. Partnership or multi-member LLC	The partnership
12. A broker or registered nominee	The broker or nominee
13. Account with the Department of Agriculture in the name of a public entity (such as a state or local government, school district, or prison) that receives agricultural program payments	The public entity
14. Grantor trust filing under the Form 1041 Filing Method or the Optional Form 1099 Filing Method 2 (see Regulations section 1.671-4(b)(2)(i)(B))	The trust

¹ List first and circle the name of the person whose number you furnish. If only one person on a joint account has an SSN, that person's number must be furnished.

² Circle the minor's name and furnish the minor's SSN.

³ You must show your individual name and you may also enter your business or DBA name on the "Business name/disregarded entity" name line. You may use either your SSN or EIN (if you have one), but the IRS encourages you to use your SSN.

⁴ List first and circle the name of the trust, estate, or pension trust. (Do not furnish the TIN of the personal representative or trustee unless the legal entity itself is not designated in the account title.) Also see *Special rules for partnerships* on page 2.

*Note. Grantor also must provide a Form W-9 to trustee of trust.

Note. If no name is circled when more than one name is listed, the number will be considered to be that of the first name listed.

Secure Your Tax Records from Identity Theft

Identity theft occurs when someone uses your personal information such as your name, SSN, or other identifying information, without your permission, to commit fraud or other crimes. An identity thief may use your SSN to get a job or may file a tax return using your SSN to receive a refund.

To reduce your risk:

- Protect your SSN,
- Ensure your employer is protecting your SSN, and
- Be careful when choosing a tax preparer.

If your tax records are affected by identity theft and you receive a notice from the IRS, respond right away to the name and phone number printed on the IRS notice or letter.

If your tax records are not currently affected by identity theft but you think you are at risk due to a lost or stolen purse or wallet, questionable credit card activity or credit report, contact the IRS Identity Theft Hotline at 1-800-908-4490 or submit Form 14039.

For more information, see Publication 4535, Identity Theft Prevention and Victim Assistance.

Victims of identity theft who are experiencing economic harm or a system problem, or are seeking help in resolving tax problems that have not been resolved through normal channels, may be eligible for Taxpayer Advocate Service (TAS) assistance. You can reach TAS by calling the TAS toll-free case intake line at 1-877-777-4778 or TTY/TDD 1-800-829-4059.

Protect yourself from suspicious emails or phishing schemes. Phishing is the creation and use of email and websites designed to mimic legitimate business emails and websites. The most common act is sending an email to a user falsely claiming to be an established legitimate enterprise in an attempt to scam the user into surrendering private information that will be used for identity theft.

The IRS does not initiate contacts with taxpayers via emails. Also, the IRS does not request personal detailed information through email or ask taxpayers for the PIN numbers, passwords, or similar secret access information for their credit card, bank, or other financial accounts.

If you receive an unsolicited email claiming to be from the IRS, forward this message to phishing@irs.gov. You may also report misuse of the IRS name, logo, or other IRS property to the Treasury Inspector General for Tax Administration (TIGTA) at 1-800-366-4484. You can forward suspicious emails to the Federal Trade Commission at: spam@uce.gov or contact them at www.ftc.gov/idtheft or 1-877-IDTHEFT (1-877-438-4338).

Visit IRS.gov to learn more about identity theft and how to reduce your risk.

Privacy Act Notice

Section 6109 of the Internal Revenue Code requires you to provide your correct TIN to persons (including federal agencies) who are required to file information returns with the IRS to report interest, dividends, or certain other income paid to you; mortgage interest you paid; the acquisition or abandonment of secured property; the cancellation of debt; or contributions you made to an IRA, Archer MSA, or HSA. The person collecting this form uses the information on the form to file information returns with the IRS, reporting the above information. Routine uses of this information include giving it to the Department of Justice for civil and criminal litigation and to cities, states, the District of Columbia, and U.S. commonwealths and possessions for use in administering their laws. The information also may be disclosed to other countries under a treaty, to federal and state agencies to enforce civil and criminal laws, or to federal law enforcement and intelligence agencies to combat terrorism. You must provide your TIN whether or not you are required to file a tax return. Under section 3406, payers must generally withhold a percentage of taxable interest, dividend, and certain other payments to a payee who does not give a TIN to the payer. Certain penalties may also apply for providing false or fraudulent information.

Job No.: _____

TAX FORM/DEBT/RESIDENCE CERTIFICATION
(for Advertised Projects)

Taxpayer Identification Number (T.I.N.): _____

Company Name submitting Bid/Proposal: _____

Mailing Address: _____

Are you registered to do business in the State of Texas? Yes No

If you are an individual, list the names and addresses of any partnership of which you are a general partner or any assumed name(s) under which you operate your business

I. **Property:** List all taxable property in Fort Bend County owned by you or above partnerships as well as any d/b/a names. Include real and personal property as well as mineral interest accounts. (Use a second sheet of paper if necessary.)

Fort Bend County Tax Acct. No.*

Property address or location**

* This is the property account identification number assigned by the Fort Bend County Appraisal District.

** For real property, specify the property address or legal description. For business personal property, specify the address where the property is located. For example, office equipment will normally be at your office, but inventory may be stored at a warehouse or other location.

II. **Fort Bend County Debt** - Do you owe any debts to Fort Bend County (taxes on properties listed in I above, tickets, fines, tolls, court judgments, etc.)?

Yes No

If yes, attach a separate page explaining the debt.

III. **Residence Certification** - Pursuant to Texas Government Code §2252.001 *et seq.*, as amended, Fort Bend County requests Residence Certification. §2252.001 *et seq.* of the Government Code provides some restrictions on the awarding of governmental contracts; pertinent provisions of §2252.001 are stated below:

(3) "Nonresident bidder" refers to a person who is not a resident.

(4) "Resident bidder" refers to a person whose principal place of business is in this state, including a contractor whose ultimate parent company or majority owner has its principal place of business in this state.

I certify that _____ is a Resident Bidder of Texas as defined in Government Code §2252.001.
[Company Name]

I certify that _____ is a Nonresident Bidder as defined in Government Code §2252.001 and our principal place of business is _____.

[City and State]

Mandatory Form



Contractor Acknowledgement of Storm Water Management Program

I hereby acknowledge that I am aware of the stormwater management program and standard operating procedures developed by Fort Bend County in compliance with the TPDES General Permit No. TXR040000. I agree to comply with all applicable best management practices and standard operating procedures while conducting my services for Fort Bend County. I agree to conduct all services in a manner that does not introduce illicit discharges of pollutants to streets, stormwater inlets, drainage ditches or any portion of the drainage system. The following materials and/or pollutant sources must not be discharged to the drainage system as a result of any services provided:

1. Grass clippings, leaves, mulch, rocks, sand, dirt or other waste materials resulting from landscaping activities, (except those materials resulting from ditch mowing or maintenance activities)
2. Herbicides, pesticides and/or fertilizers, (except those intended for aquatic use)
3. Detergents, fuels, solvents, oils and/or lubricants, other equipment and/or vehicle fluids,
4. Other hazardous materials including paints, thinners, chemicals or related waste materials,
5. Uncontrolled dewatering discharges, equipment and/or vehicle wash waters,
6. Sanitary waste, trash, debris, or other waste products
7. Wastewater from wet saw machinery,
8. Other pollutants that degrade water quality or pose a threat to human health or the environment.

Furthermore, I agree to notify Fort Bend County immediately of any issue caused by or identified by:

(Company/Contractor)

that is believed to be an immediate threat to human health or the environment.

Contractor Signature

Date

Printed Name

Title

SCOPE OF WORK

WIDENING AND RECONSTRUCTION OF RANSOM ROAD

The scope of work for the Widening and Reconstruction of Ransom Road project consists of widening the existing two-lane, open ditch roadway to a three-lane, curb and gutter roadway with an underground storm sewer system. The length of work along Ransom Road is approximately 2,465 feet. Additionally, the connector road between I-69 and Ransom Road will be reconstructed with curb inlets and intersection modifications. The length of work along this connector is approximately 500 feet.

The scope of the paving includes removing the existing asphalt roadway within the project limits. The new pavement structure will be 8" concrete pavement over 8" lime treated subgrade on the west side of the I-69 connector (approximately 1900 feet). For the project limits within TxDOT right-of-way (the east side of Ransome and the I-69 connector), the pavement section will be 8" concrete pavement over 1" asphalt stabilized base over 6" cement treated base over 6" lime treated subgrade. The intersections of Ransom Road at Indigo River Lane and at the I-69 connector are to be constructed with fast-track pavement. The typical section includes 12-foot travel lanes and a 14-foot two-way left turn lane in the center of the roadway. At the completion of the paving work, permanent pavement markings will be added for the full length of the project.

The storm sewer system will be comprised of 24" reinforced concrete pipe laterals connected to a concrete box culvert varying in size between 4'x2' and 4'x3'. Eight junction boxes are to be installed along the main trunkline to connect the drainage swale inlets to the storm system.

For pedestrian improvements, a crosswalk is to be added on the west side of the Ransom Road and I-69 connector intersection, connecting to new sidewalks via ADA-compliant ramps.

In concordance with an agreement with the City of Sugar Land, a 12" water line will be installed on the north side of Ransom Road, beginning at Indigo River Lane and crossing under SH 99 to a connection on the east side. The water line is approximately 2,165 feet of open cut installation and 260 feet to be bored and jacked under SH 99.

Contractor is responsible for establishing and maintaining a traffic control plan in accordance to the latest version of Texas Manual on Uniform Traffic Control Devices (TxMUTCD) and measures shown in the plans.

This description of the scope of work is general in nature and is intended as an overview of the project only. The complete detailed scope of work and bid items are contained in the construction drawings and specifications.

TECHNICAL SPECIFICATIONS

Technical Specification are to the latest version of specifications from Texas Department of Transportation (TxDOT), Harris County Engineering Department (HC), and City of Sugar Land (COSL). These referenced specification are incorporated herein as if they are copied verbatim including any supplementary specification or amendments hereto and related specification herein unless otherwise indicated in the drawings or specifications. Specifications can be found in the following links: <https://www.txdot.gov/business/resources/txdot-specifications.html>, <https://www.eng.hctx.net/Consultants/Standards-Specifications/Standard-Engineering-Design-Specifications>, and <https://www.sugarlandtx.gov/263/Standards-Permits>.

Spec Used	Spec #	Description
TxDOT	100	Preparing Right-of-Way
TxDOT	104	Removing Concrete
TxDOT	162	Sodding for Erosion Control
TxDOT	164	Seeding for Erosion Control
TxDOT	247	Flexible Base
TxDOT	260	Lime Treatment (Road-Mixed)
TxDOT	275	Cement Treatment (Road-Mixed)
TxDOT	360	Concrete Pavement
TxDOT	432	Riprap
TxDOT	464	Reinforced Concrete Pipe
TxDOT	465	Junction Boxes, Manholes, and Inlets
TxDOT	466	Headwalls and Wingwalls
TxDOT	467	Safety End Treatment
TxDOT	502	Barricades, Signs, and Traffic Handling
TxDOT	529	Concrete Curb, Gutter, and Combined Curb and Gutter
TxDOT	530	Intersections, Driveways, and Turnouts
TxDOT	531	Sidewalks
TxDOT	536	Concrete Medians and Directional Islands
TxDOT	540	Metal Beam Guard Fence
TxDOT	636	Signs
TxDOT	662	Work Zone Pavement Markings
TxDOT	666	Retroreflectorized Pavement Markings
TxDOT	672	Raised Pavement Markers
HC	105	Removing Base and Asphalt Pavement
HC	108	Removing Structures
HC	110	Excavation
HC	130	Borrow
HC	132	Embankment
HC	140	Eliminating Existing Pavement Markings and Markers
HC	160	Topsoil
HC	401	Flowable Backfill
HC	402	Trench Excavation Protection
HC	462	Reinforced Concrete Box Culverts
HC	465	Concrete Manholes and Junction Boxes
HC	466	Inlets
HC	502	Traffic Signs, Roadside Signs, and Mailboxes
HC	528	Colored Concrete for Median Noses
HC	591	Temporary Erosion, Sedimentation, and Environmental Controls
HC	696	Barricades
HC	697	Constructing Detours
COSL	01 56 26	Fencing for Excavations
COSL	01 71 13	Mobilization
COSL	31 23 33	Excavation Backfill and Compaction for Utilities
COSL	33 11 13	Water Lines
COSL	33 11 13.11	Wet Connections
COSL	33 12 16.23	Gate Valves
COSL	33 12 19	Fire Hydrants

**GEOTECHNICAL EXPLORATION REPORT
FORT BEND COUNTY MOBILITY PROJECT:
RANSOM ROAD IMPROVEMENT
IN RICHMOND, TX**

Reported to

**MR. PATRICK ROSS, P.E.
HOUSTON, TEXAS.**

Prepared By



*down to earth solutions
for your complex projects*

**EARTH ENGINEERING, INC.
HOUSTON, TEXAS**



Project No: EE-1818706-G

November 27, 2018



down to earth solutions
for your complex projects

EARTH ENGINEERING, INC.

Geotechnical, Materials Testing & Environmental Consultants
4877 Langfield Road • Houston, TX 77040 • T: (713) 681-5311 • F: (713) 681-5411 • www.eartheng.com

November 27, 2018

Mr. Patrick Ross, P.E.
RG Miller Engineers
16340 Park Ten Place Ste. 350
Houston, TX 77084

Report No.: EE-1818706-G

Subject: GEOTECHNICAL EXPLORATION REPORT FOR FORT BEND COUNTY MOBILITY PROJECT, RANSOM ROAD IMPROVEMENT IN RICHMOND, TX

Dear Mr. Ross:

Earth Engineering, Inc. is pleased to submit the results of the geotechnical exploration study for the above-referenced project. This "draft version" report briefly presents the findings of the study along with our conclusions and recommendations for the design of the foundation for the above project.

We appreciate the opportunity to serve you and look forward to working with you in other future projects. We also look forward to providing the materials testing inspection phase on this project.

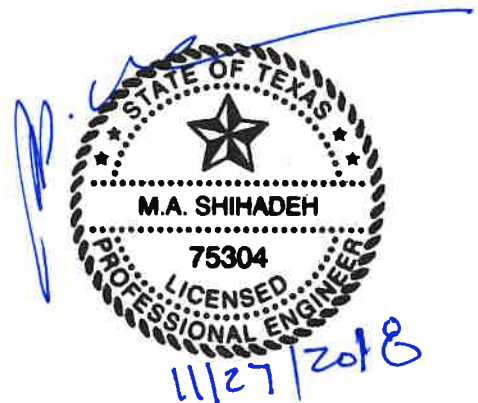
Should you have any questions regarding this report or any questions pertaining to soils engineering or materials testing, please do not hesitate to call me at (713) 681-5311 or email me at wu@eartheng.com at any time.

Yours very truly,
EARTH ENGINEERING, INC.


Haitam Alageli, MSc.
Geotechnical Engineer


Moe A. Shihadeh, P.E., D.GE
Principal - Diplomate Geotechnical Engineering

MAS/ha



Earth Engineering, Inc # F-5045

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APPENDICES

Appendix A

Generalized Soil Profile

Appendix B

California Bearing Ratio Test Results

Appendix C

City of Houston Drawing Number 02317-02, 02317-03, 02751-01 and 02741-01

Appendix D

Site Survey Map

Appendix E

Pavement Design Parameters and Calculations

1.0 INTRODUCTION

Planning is underway for construction and reconstruction of Fort Bend County, Ransom Road Project, Number 17102. The road is located off Highway 59 partially in city of Richmond and the city of Sugarland, Texas.

Furnished information by the client indicated that the project scope includes transitioning the three (3) lane Ransom Road into a four (4) lane Concrete road with an open ditch. The approximate proposed road length is 3,600 feet.

The contents of this report are in compliance with "Guidelines for Consultants Performing Geotechnical Investigation for Projects Maintained by Harris County", therefore, borings were drilled at least 500-feet apart linear distance along the utilities and paving alignments.

This report was issued under a signed contract between RG Miller Engineering, INC and Mr Moe A. Shihdeh dated on June 21, 2018, and as per **Earth Engineering Inc.** accepted scope of work stated in proposal P-EE-1815504-G, dated on April 16, 2018.

eight (8) borings were drilled to a 20 feet depth at the subject roads utilizing a truck-mounted drilling rig.

2.0 SCOPE OF WORK

The scope of our services was provided by the client:

- Cut eight (8) cores prior to drilling for soil samples at Ransom Road.
- Drilling and sampling eight (8) borings to a depth of 20-feet at Ransom Road.
- Obtaining continuous soil samples to a depth of 15 feet, and then at five (5) foot intervals thereafter to the borings' termination depths.
- **Earth Engineering** will perform granular soil sampling utilizing the Standard Penetration Test (split spoon sampler) by driving. Blow counts will be recorded as produced by a 140-pound weight falling 30 inches (ASTM D-1558). Cohesive soils will be sampled using a thin walled sampler (Shelby Tube) hydraulically pushed into the soil (ASTM D-1587).
- Performing laboratory tests on selected representative soil samples to develop the engineering properties of the soil. These tests may include: pocket penetrometers, unconfined compression, present moisture content, percent passing 200 sieves, dry densities, Atterberg Limits, Unconsolidated-Undrained Triaxial test, California Bearing Ratio (CBR), and OMD Standard Compaction as deemed appropriate.



- Utilizing the results of observations both in the field and in limited laboratory tests, **Earth Engineering** will author a report that will include the following subjects:
 - soil stratigraphy: soil encountered up to 20 feet
 - groundwater conditions and groundwater control during construction
 - boring log information will include all laboratory test results and field observations
 - develop design recommendations for the underground utilities. The recommendations will include buried structures such as manhole etc.
 - classify the soils types in accordance to OSHA requirements based on the characteristics of the soils along the alignment
 - recommend the utilities bedding in accordance with City of Houston specifications
 - present subgrade stabilization option such as lime/fly-ash for cohesion-less soils and lime for cohesive soils
 - Equivalent Single Axle Load (ESAL) calculation (Traffic counts must be provided by the client)
 - recommend construction considerations, as deemed necessary
 - recommend back-fill material specifications
 - discuss effects of poor drainage and presence of trees on the performance of the structures and pavement
- Incorporating all of the above into a geotechnical engineering report which is performed under the direction of, and signed by, a professional engineer registered in the State of Texas.



3.0 SUBSURFACE EXPLORATION

3.1 Sampling Techniques

The subsurface conditions were explored by a total of eight (8) borings. All borings were drilled by a truck mounted drilling rig. Boring locations are shown on Plate 2.

Samples in cohesive and semi-cohesive soils (clays, sandy clays, and silty clays) were obtained using a three-inch diameter Shelby Tube sampler advanced hydraulically by one stroke in accordance with the procedures outlined in ASTM D-1587. Samples were extruded in the field, visually classified, and a strength estimate obtained with a pocket penetrometer. Penetrometer readings are tabulated on the logs of borings. Representative portions of the samples were wrapped with aluminum foil and sealed for transport to the laboratory for further testing.

3.2 Sample Disposal

In general, samples tested or not tested will be discarded 30 days subsequent to submittal of the final report unless if otherwise notified by the client.

4.0 LABORATORY TESTING

The laboratory-testing program was designed and directed towards evaluating the physical and engineering properties of the subsoils. Physical properties include Atterberg limits (liquid limits and plastic limits), moisture content for clays and percent passing #200 sieve for sands. Engineering properties include shear strength of the soil, compressibility of the soils, and the swell characteristics of the soils. It should be noted that the testing program varies for each project and depends solely on the project budget and emphasis. Typically, Earth Engineering, Inc. specifies the anticipated testing program in each proposal. The tests undertaken in this program included the following:



Laboratory Test	Applicable Test Standard	Number of Tests
Liquid Limit, Plastic Limit, and Plasticity Index of Soil	ASTM D-4318 Method B	32
Moisture Content	ASTM D-2216	48
Percent Passing Finer than No. 200 (75)- μ m sieve	ASTM D-1140	8
Unconfined Compressive Strength	ASTM D-2166	8
Unconsolidated Undrain	ASTM D-2850	8
California Bearing Ratio (CBR)	ASTM D1883 - 16	2
OMD Standard Compaction	ASTM D698	2

Laboratory test results are presented on the Logs of Borings, Plates 3 through 10. A Key to Log Terms and Symbols is presented on Plate 11. It should be noted that the soils were classified in accordance with the Unified Soil Classification System (ASTM D-2487).

5.0 SUBSURFACE STRATIGRAPHY

5.1 Site Conditions

The site is located off of Highway 59 on Ransom Road in Richmond/Sugarland, Texas. Please refer to Plate 1 for a map designating the location of the site.

Based on our visual observation during drilling operations, it appears that the site and the surrounding area exhibit topographic variations of less than six (6) feet.

5.2 Existing Pavement Conditions

In order to evaluate the existing pavement and subgrade conditions, eight (8) cores were collected along the existing roadway. The coring was performed on July 2, 2018 and July 7, 2018.

Two (2) paving material were observed; Concrete paving at B-1 and B-2 of an average thickness of 8.12 inches and Asphalt paving of an average thickness of 7.7 inches at B-3 through B-8. The subgrade underlying the existing pavement was examined in the field and was determined to consist of mostly fat clays.



The table below summarizes the pertinent information regarding the cores.

Coring Number	Asphalt Thickness (Inches)	Material
B-1	8.12	Concrete
B-2	8.12	Concrete
B-3	8	Asphalt
B-4	8	Asphalt
B-5	5	Asphalt
B-6	9	Asphalt
B-7	9	Asphalt
B-8	8	Asphalt

5.3 Subsurface Conditions

The subsurface conditions at the project site were evaluated based on eight (8) borings. Soil stratigraphy details are presented on the Log of Borings, Plates (3) through (10).

The soils strata listed below are general in nature and highlight major subsurface soils. The boring logs include a summary of soil properties at certain depths. The stratifications shown on each boring log represent the conditions and approximate boundaries between strata at that actual boring location only. The actual transitions between strata may be gradual. Variations will occur and should be expected at locations away from each boring location.

The following table presents the borings coordinates and their elevations “As Drilled”. Please refer to Appendix D for site survey map.

Borings	Northing	Easting	Elevation
B-1	TBD	TBD	TBD
B-2	TBD	TBD	TBD
B-3	TBD	TBD	TBD
B-4	TBD	TBD	TBD
B-5	TBD	TBD	TBD
B-6	TBD	TBD	TBD
B-7	TBD	TBD	TBD
B-8	TBD	TBD	TBD

Please refer to plate (2) for approximate boring location and generalized subsoil profile on Appendix (A)

Due to close similarities of the subsoil condition across all drilled borings in terms of soil description and classification, one generalized subsoil stratigraphy is presented.

Based on field logs and laboratory test results the subsoil stratigraphy presented below.

Borings B-1 through B-8:

Stratum No.	Range* of Depth, ft. Measured below ground surface	Soil Description and Classification (Based on Unified Soil Classification System and Harris County Geotechnical Guidelines)
I	0-20 at B-1 through B-8	SANDY LEAN CLAY (CL)/ FAT CLAY (CH), firm to very stiff, medium to very plastic, brownish gray with ferrous stains and sand pockets.

*These stratum depths are based on measurements referenced from ground surface at the time of our drilling activities on July 2, 2018 and July 7, 2018. Please note that the depths of the stratum changes vary; please refer to the boring log presented on Plate (3) through Plate (10) for stratum changes at specific locations. Also, please refer Appendix (A) for generalized subsoil profiles.

Stratum I consists of firm to very stiff, sandy lean clays/fat clay. These soils are medium to very plastic with plasticity indices (PI) ranging from 16 to 54. Soils with PI exceed 25 are expected to experience swell and shrink movements due to change in the seasonal moisture content.



5.4 Groundwater Conditions

The borings were drilled using flight auger (dry method) to better assess the groundwater conditions. Groundwater was not encountered during drilling operations.

Groundwater generally fluctuates due to seasonal rainfall quantity, the presence of wells in the vicinity of the site, location (upstream or downstream) and the close proximity of the site to a bayou, or a stream, if any.

Accurate groundwater measurements can be measured only using piezometers or monitor wells. Piezometer installation was beyond the scope of this project.

The groundwater level should be verified before the commencement of detention pond and utility construction.

6.0 UNDERGROUND UTILITIES RECOMMENDATIONS

6.1 General

The final depths of sanitary and storm sewer lines are not known at present time. It is anticipated that the depths of the utility lines will be less than 20 feet.

6.2 Soil Stratigraphy and Groundwater Conditions

Soil stratigraphy consists of sandy lean/ clays and fat clays. Groundwater was not encountered during drilling operations.

Groundwater generally fluctuates due to seasonal rainfall quantity, the presence of wells in the vicinity of the site, location (upstream or downstream) and the close proximity of the site to a bayou, or a stream, if any.

Accurate groundwater measurements can be measured only using piezometers or monitor wells. Piezometer installation was beyond the scope of this project.

The groundwater level should be verified before the commencement of utility construction.

6.3 Storm Sewer Lines

The storm sewers should be constructed in accordance with the following City of Houston specifications:



Storm Sewer Diameter, Inches	Soil Conditions	Drawing Number
24 - 36 inches	Satisfactory	02317-03 (Refer Appendix C)
42 and Larger	Unsatisfactory*	02317-02 (Refer Appendix C)
42 and Larger	Satisfactory	02317-03 (Refer Appendix C)

* Unsatisfactory: wet sands at the bearing depth.

6.4 Sanitary Sewers

The sanitary sewers should be installed in accordance with City of Houston Drawing Number 02317-03 or equivalent.

6.5 Manhole Design Recommendations

6.5.1 Uplift (Buoyancy) Forces

The manhole should be designed to resist the imposed uplift pressures. The uplift pressures are functions of the excavation depth and the groundwater level. The manhole should be designed to resist the maximum anticipated uplift pressure during a flood condition where the water level is at the ground level. The following formula can be used to calculate the uplift pressure:

$$\sigma_{\text{uplift}} = 62.4 \times h_{\text{groundwater}}$$

where:

σ_{uplift} = Uplift pressure in psf

$h_{\text{groundwater}}$ = Depth to the bottom of manhole (in flood conditions)

The most critical uplift occurs when the water level is at the ground surface and the manhole is empty.

The weight of the structure and the weight of the backfill soil above it can resist the uplift pressures. The following formula can be used to calculate the vertical stress induced by the weight of the soils above the manhole:

$$\sigma_{\text{vertical}} = \gamma_{\text{soil}} \times h_{\text{soil above manhole}}$$

Where:

σ_{vertical} = Vertical stress, psf

γ_{soil} = 125 pcf for non-flood conditions (i.e., hydrostatic groundwater level below the bottom of the manhole)

γ_{soil} = 63 pcf for flood conditions (i.e., hydrostatic groundwater



level at the ground surface level)

In order to increase the uplift resistance of the manhole, one or more of the following options can be used:

- 1) Increase the thickness of the base slab.
- 2) From the walls at least 18 inches inside the bottom slab perimeter to create a heal.

7.5.2 Lateral Earth Pressures

The manhole walls should be designed to resist both lateral earth pressures from the surrounding soil and from hydrostatic water pressure. The following equation can be used:

$$\sigma_{\text{Lateral}} = \{ (\gamma_{\text{soil}} \times h_{\text{soil}}) \times K_o \} + (\gamma_{\text{water}} \times h_{\text{water}}) \}$$

where:

σ_{lateral} = Total lateral earth pressure on the wall, psf

γ_{soil} = Buoyant unit weight of the soil = 63 pcf

h_{soil} = Depth to the bottom of the manhole, ft.

K_o = At-rest soil earth pressure coefficient = 0.6 for silty sands
= 0.9 for clay soils

γ_{water} = Unit weight of water = 62.4 pcf

h_{water} = Depth to the groundwater level, ft

6.6 Excavations

Please refer to section 9.2 of this report for details.

6.7 Groundwater Control

Please refer to section 9.3 for details.



7.0 ENGINEERING ANALYSIS AND RECOMMENDATIONS

7.1 General

Pavement design analyses were performed in accordance with the American Association of State Highway and Transportation Officials (AASHTO) "Guide for Design of Pavement Structures" dated 1993.

7.2 Rigid Pavement Recommendations

Furnished information by the client indicated that the proposed pavement will be a rigid pavement except for the transition areas where rigid (concrete) pavement meets the existing flexible (asphalt) paving.

As per city of Houston Street Paving Design requirement, the concrete pavement thickness and reinforcement has been designed for 50 years life span.

7.2.1 Engineering Parameters for Rigid Pavement Design

Concrete pavement design recommendations provided in Section 7.2.3 of this report are based upon the following design parameters:



TERMS	INPUT
Initial Serviceability Index (p_o)	4.5
Terminal Serviceability Index (p_t)	2.5
Level of Reliability, (R)	95%
Overall Standard Deviation (S_o)	0.35
28-day Concrete Flexural Strength (S'_c) / Modulus of Rupture	580 psi for $f'_c=4000$ psi
Elastic Modulus of Concrete, E_c	3.712×10^6 psi
California Bearing Ratio of Subgrade	5
Soil Resilient Modulus (M_R) of the Subgrade	5,842
Effective Modulus of Subgrade Reaction (k)	301 pci
Load Transfer Coefficient (J)	3.2
Drainage Coefficient (C_d)	1.20

7.2.2 Guidelines to Convert Mixed Traffic to ESALs

Converting the expected mixed traffic (cars, trucks, etc.) with different axle loads and configurations into an equivalent total number of standard 18-kip single axle loads or ESALs determines the design traffic. The procedure of converting the traffic is based on the equivalent damaging effect that an individual vehicle type has on the pavement.

For your convenience, the following table provides the ESAL conversion factors for various vehicle types commonly operated on roads. The ESAL conversion factors shown for both flexible and rigid pavements correspond to the number of passes for each type of vehicle.



Vehicle Type	Axle Load, kips			Number of Passes	ESAL Factor	
	Front	Middle	Rear		Rigid	Flexible
Cars, Light Pickup Trucks	2	-	2 ^b	2500	1.00	0.88
Heavy Pickup Trucks or Flat Beds	2	-	5 ^{a or b}	200	1.00	1.00
Light Delivery Vans or School Busses	12	-	18 ^b	1	1.17	1.18
Heavy Single Axle Trucks	12	-	24 ^b	1	3.68	3.51
Tandem Axle Trucks, Concrete Trucks	12	-	34 ^c	1	2.13	1.26
16-Wheeler Trucks	12	16 ^b	34 ^c	1	2.73	1.87
18-Wheeler Trucks	12	34 ^c	34 ^c	1	4.09	2.34

Note: AASHTO ESAL conversion assumptions: D=10 in., SN = 4.0, and S_t = 2.0

a. Single Wheel Single Axle Load
b. Dual Wheel Single Axle Load
c. Dual Wheel Tandem Axle Load

7.2.3 Rigid Pavement Thickness

At the present time, the anticipated traffic is unknown. The ESAL has been calculated based on total 24-Hr traffic volume of 7,955 vehicles.

Based on the data, the estimated ESAL'S (equivalent to 18-kip single axle load) will be 4,174,905 by using the American Concrete Pavement Association (ACPA) online ESAL calculator by assuming 98% passenger traffic and 2% truck traffic for 50 years with 2% growth rate.

Based on the design data the pavement design section is as follows:

Material	Minimum Thickness, inches
Reinforced Concrete Pavement	8.0
Stabilized ⁽¹⁾ and Compacted Subgrade	8.0

(1) 7% Lime stabilization for sandy clay / fat clay soils and/or cement or 2% lime-8% flyash stabilization for cohesionless (silt/sands) soils.

All related civil design factors such as drainage, cross-sectional configurations, surface elevations, and environmental factors that will significantly affect the



service life of the pavement should be included in the preparation of the construction drawings and specifications.

7.2.4 Reinforcement for Concrete Pavement

Reinforcements for the proposed concrete pavement may be obtained by using the recommendations provided below.

7.2.4.1 Longitudinal and Transverse Reinforcement

The required cross-sectional area of the reinforcing steel per foot width slab for longitudinal and transverse reinforcement may be calculated from the following formula:

$$P_s = \frac{F * L * W}{2 * f_s}$$

Where:

- P_s = cross-sectional area of steel, in² per foot width slab
- F = coefficient of resistance between slab and subgrade
(1.8 for lime stabilized subgrade, AASHTO 1993 Guide II-28 Table 2.8.)
- L = expansion joint spacing, ft.
- W = weight of pavement per foot width slab, psf.
- f_s = working stress of steel (use 75% of yield strength)

7.2.4.2 Reinforcement Spacing for 9" Thick Pavement

Reinforcement spacing may be calculated using the following formula:

$$RS = \frac{A_s * 100}{P_s * D}$$

Where:

- RS = reinforcement spacing
- A_s = cross-sectional area of rebar, in²
- P_s = required cross-sectional area of steel, in² per foot of width
- D = depth of pavement, in

The following table includes relevant information for transverse and longitudinal reinforcing for No. 4 bars with yield strength of 60,000 psi. The cross-sectional area is 0.2 in².



Expansion Joint Spacing (L), feet	Area of Steel Required per Foot Width Slab, P _s , in ²	Recommended Maximum Transverse Rebar Spacing, in.	Lane Slab Width, ft.	Area of Steel Required per Foot Length Slab, P _s , in ²	Recommended Maximum Longitudinal Rebar Spacing, in.
40	0.054	40	25	0.087	25
60	0.076	25	35	0.130	15
80	0.097	20	45	0.174	12

The table listed below includes relevant information for transverse and longitudinal reinforcing for No. 5 bars with yield strength of 60,000 psi. The cross-sectional area = 0.31 in².

Expansion Joint Spacing (L), feet	Area of Steel Required per Foot Width Slab, P _s , in ²	Recommended Maximum Transverse Rebar Spacing, in.	Lane Slab Width, ft.	Area of Steel Required per Foot Length Slab, P _s , in ²	Recommended Maximum Longitudinal Rebar Spacing, in.
40	0.054	60	25	0.087	35
60	0.076	45	35	0.130	25
80	0.097	35	45	0.174	15

7.2.4.3 Tie Bars

For a 9-inch thick concrete pavement, we recommend the use of at least a #4 bar with a minimum length of 36 inches and spaced at about 30 to 36 inches on center.

7.2.4.4 Load Transfer Devices

A commonly used load-transfer device is the plain round steel dowel conforming to AASHTO M31, Grade 60 or higher. Other mechanical devices that have proven satisfactory in field installation may be used. For a 9-inch thick concrete pavement, we recommend the use of at least a #9 round dowel with a minimum length of 18 inches and a spacing of 12-inches on center.

7.2.5 Pavement Subgrade Soil Stabilization

since highly plastic, cohesive soils were encountered at all borings, we recommend that the subgrade be stabilized with 7% lime (50 lbs/sy per 8 inches of depth) by dry weight in accordance to City of Houston Specifications. The amount of lime should be determined in the field after the site is stripped of top loose soil and the subgrade soils are exposed. The lime used should confirm to City of Houston Specifications. The subgrade should be compacted to 95% of the Standard Moisture Density Relationship (ASTM D-698) as specified in the Site Preparation Section of this report.



Subgrade soil stabilization requirements for the proposed pavements were developed based upon the results of laboratory testing (Atterberg Limits, percent soil particles passing a No. 200 sieve, and unit weight determinations). These requirements should be verified based on laboratory tests performed as part of the construction quality control program.

7.3 Flexible Pavement Recommendations

The flexible pavement has been designed for 20 years life span.

7.3.1 Engineering Parameters for Flexible Pavement Design

Asphalt pavement design recommendations provided in Section 7.3.2 of this report are based upon the following design parameters:

TERMS	INPUT
Initial Serviceability Index (p_o)	4.2
Terminal Serviceability Index (p_t)	2.5
Level of Reliability, (R)	95%
Overall Standard Deviation (S_o)	0.45
California Bearing Ratio of Subgrade	5
Soil Resilient Modulus (M_R) of the Subgrade	5,842
Drainage Coefficient (m_i) for Modifying Structural Layer Coefficient in Flexible Pavements	1.0
Structural Layer Coefficient for HMA Surface Material	0.44
Structural Layer Coefficient for Raw Limestone	0.14
Structural Layer Coefficient for Lime-Fly Ash Stabilized Earth	0.11
ESAL	1,199,337

7.3.2 Flexible Pavement Thickness

Asphalt pavement thickness is dependent on several factors. The factors include reliability, traffic loads, and the effective subgrade resilient modulus.

Based on the previous design data the pavement design section is as follows:



Material	Minimum Thickness, inches
Hot Mix Asphaltic Concrete	3.0
Limestone / Crushed Concrete Base	8.0
Lime-Fly Ash Stabilized and Compacted Subgrade at 95% ASTM D-698	8.0

All related civil design factors such as drainage, cross-sectional configurations, surface elevations, and environmental factors that will significantly affect the service life of the pavement should be included in the preparation of the construction drawings and specifications.

7.3.3 Subgrade Stabilization

Please refer to section 7.2.5 for details.

7.3.4 Hot Mix Asphaltic Concrete Course

The asphalt surface should be mixed in a batch plant and laid hot (Fine Graded Surface Course) in accordance with TxDOT Item 340 Type D (Hot Mix Asphaltic Concrete Pavement) and specific criteria for the job mix design formula. The mix should be designed for a stability of at least 40 and should be compacted to 95 percent of the maximum theoretical density as measured by ASTM D 2041. The compacted asphaltic surface should contain air voids between 5% and 9%. The asphalt cement content of total mixture weight should be within ± 0.3 percent asphalt cement from the specific mix.

7.3.5 Limestone / Crushed Concrete Base

The base material should consist of crushed limestone / concrete in accordance with TxDOT item 247 Type A for limestone and Type D for crushed concrete, Grade 1 requirements. The base should be compacted to 95% of the maximum dry density as determined by the modified moisture/density relationship (ASTM D 1557) within -2 to $+3$ percent of the optimum moisture content.

8.0 CONSTRUCTION CONSIDERATIONS

8.1 Site Preparation

- Soft soils should be removed until firm soil is reached. The soft soils can be aerated and placed back in eight-inch loose lifts and compacted to 95% as specified by ASTM D-698.
- Tree stumps, tree roots, old slabs, old foundations and existing pavements should be removed from the structure area. If the tree stumps and roots are left in place, settlement and termite infestation may occur. Once a root system is removed, a void is created in the subsoil. It is recommended to fill these voids with structural fill or cement-stabilized sand and compact to 95% as specified by ASTM D-698.
- Any low-lying areas including ravines, ditches, swamps, etc. should be filled with structural fill and placed in eight-inch lifts. Each lift should be compacted to 95% of the maximum dry density as specified by ASTM D-698.
- The exposed subgrade should be scarified to a minimum depth of six (6) inches in the driveway and slab areas. The subgrade should then be compacted to 95% of the maximum density as determined by the Standard Moisture Density Relationship (ASTM D-698). In the event that the upper six (6) inches cannot be compacted due to excessive moisture, we recommend that these soils be excavated and removed or chemically stabilized to provide a firm base for fill placement.
- Proof rolling should be performed using a heavy tired loaded truck or pneumatic rubber-tired weighting about 15 to 20 tons equipment.
- The fill soils placed on the site should consist of low plasticity sandy clays with plasticity indices ranging between 12 and 20.
- Sands or silts are not considered fill and therefore, should not be used in lieu of sandy clays.
- The fill soils should be placed in loose eight-inch lifts and compacted to 95% of the maximum density as determined by ASTM D-698.
- The fill soils should extend at least five feet beyond the perimeter of the structure. In addition, the floor slab should be placed as soon as possible after the structure pad is prepared. If the structure pad is left exposed to rainfall, perched groundwater conditions may develop which will undermine the integrity of the slab. All trenches (water, cable, electrical) should be properly backfilled and compacted to 95% of the maximum dry densities. Sand or permeable materials should not be used as backfill. Improperly



backfilled and improperly compacted trench, if left exposed will also be another source for perched groundwater conditions. In general, perched water tends to be trapped within the fill. The trapped groundwater tends to soften the subgrade. Positive drainage should be maintained across the entire building pad.

- A qualified soil technician should monitor all earthwork operations. Field density tests should be conducted on each lift using a nuclear density gauge. The gauge should be calibrated every day.
- Prior to field density tests, a 50-pound sample from the subgrade soils should be obtained. A similar sample should be obtained from the fill soils. A Standard Moisture Density Relationship (ASTM D-698) should be performed on each sample in order to obtain an optimum moisture content and a maximum dry density. The field density tests should be compared to these results every time the soils are tested in the field.

The above recommendations are applicable to slabs, driveways, pavements and any structures that are supported directly on-grade.

8.2 Excavations

8.2.1 General

At the present time, furnished information indicates that the depths of underground utilities (sanitary and storm sewers) as well as detention ponds will not exceed 20 feet.

8.2.2 Excavations Regulations

Excavation or trenching operations should be performed in accordance with the Occupational Safety and Health Act (OSHA) requirements as detailed in 29 CFR part 1926, subpart p, as amended, including rules published in accordance with the Federal Register, Volume 54, number 209, dated October 31, 1989 as a minimum. In addition, the provisions of the Legislature (H. B. No. 662 and H. B. No. 665) should be satisfied.

The OSHA classification system accounts for soil and rock as follows:

- in-situ soil properties (shear strength)
- the presence of fissures in the soil matrix
- the classification of the soil (sands, clay, rock)
- construction considerations, including vibrations from heavy traffic, pile driving, or similar effects
- submerged soil and seepage



The OSHA system classifies the soils into three categories: A, B, and C. It should be noted that OSHA classification categories are valid for trenches with maximum depth of 20 feet. Maximum allowable slopes are presented below.

MAXIMUM ALLOWABLE SLOPES

OSHA Classification	Short-Term Slope ¹ (H:V)	Long-Term Slope ² (H:V)
A	½ : 1	¾ : 1
B	¾ : 1	1 : 1
C	1 ½ : 1	2 : 1

1) 48 hours or less

2) up to 72 hours

Based on the above discussion, most of the soils encountered in this site can be classified as follows:

Soil Description	OSHA Classification
Silty Sands / Clayey Sands	C
Sandy Lean Clays / Fat Clays	B

8.3 Groundwater Control

In general, the bottom of the excavations should be dry prior to placement of sanitary and storm sewers. The groundwater level should be lowered at least 3 feet below the bottom of the excavation.

The excavations should be dry until all concrete and mortar is set. At most of the boring locations, any surface water in-flow may be removed using sump-pumps. At any excavation locations where water is encountered, de-watering using well points will be required.

It should be noted that de-watering and groundwater control, if required, are the contractor's responsibility. The comments and suggestions given in this report are for informational purposes only and may be used to review the contractor's proposed construction procedures.

8.4 Excavation Backfill

Sand backfill used in the cement-stabilized sand and sand backfill sections should be free of deleterious materials and clay lumps. For random fill zones



above the pipe and box culvert should be placed in loose eight inch lifts and compacted to 95% of the maximum dry density in accordance with ASTM D-698. The moisture content of these soils should be $\pm 2\%$ of the optimum moisture content as determined by ASTM D-698.

8.5 Site Drainage

Site drainage should be established during the first phase of construction. Water should not be allowed to collect or pond on the construction site. The site should be graded in such a manner to shed all rainwater away from the construction site. Positive site drainage should be maintained throughout the life of the residential development.

9.0 DESIGN REVIEW

EARTH ENGINEERING, INC. should be given the opportunity to review the construction design documents prior to release for bid to assure that our recommendations are interpreted as intended in our report. If we are not given the opportunity to review the slab design and other related documents, EARTH ENGINEERING, INC. will not be responsible for misinterpretations of our recommendations by other parties. The design review is not part of our scope of work and would be an additional charge.

10.0 LIMITATIONS

Our site exploration was based eight (8) borings at pre-designated locations. Soil stratigraphy may change within the site. In the event that different soil conditions are encountered in the field, EARTH ENGINEERING, INC. should be immediately notified.

This study was performed in accordance with generally accepted geotechnical engineering practices for design purposes only under the supervision of a licensed professional engineer in the State of Texas. Fault study was not included in our current scope of work.

Recommendations provided herein the report are valid for one year from the date of submission of the report. After one year, Earth Engineering, Inc. should be contacted to review the validity of the recommendations.

In the event that any changes in the nature, design or location of the Ransom Pavement and Utilities are made, the conclusions or recommendations presented in this report are not valid until the changes are reviewed by EARTH ENGINEERING, INC. and the conclusions and recommendations are modified in writing.

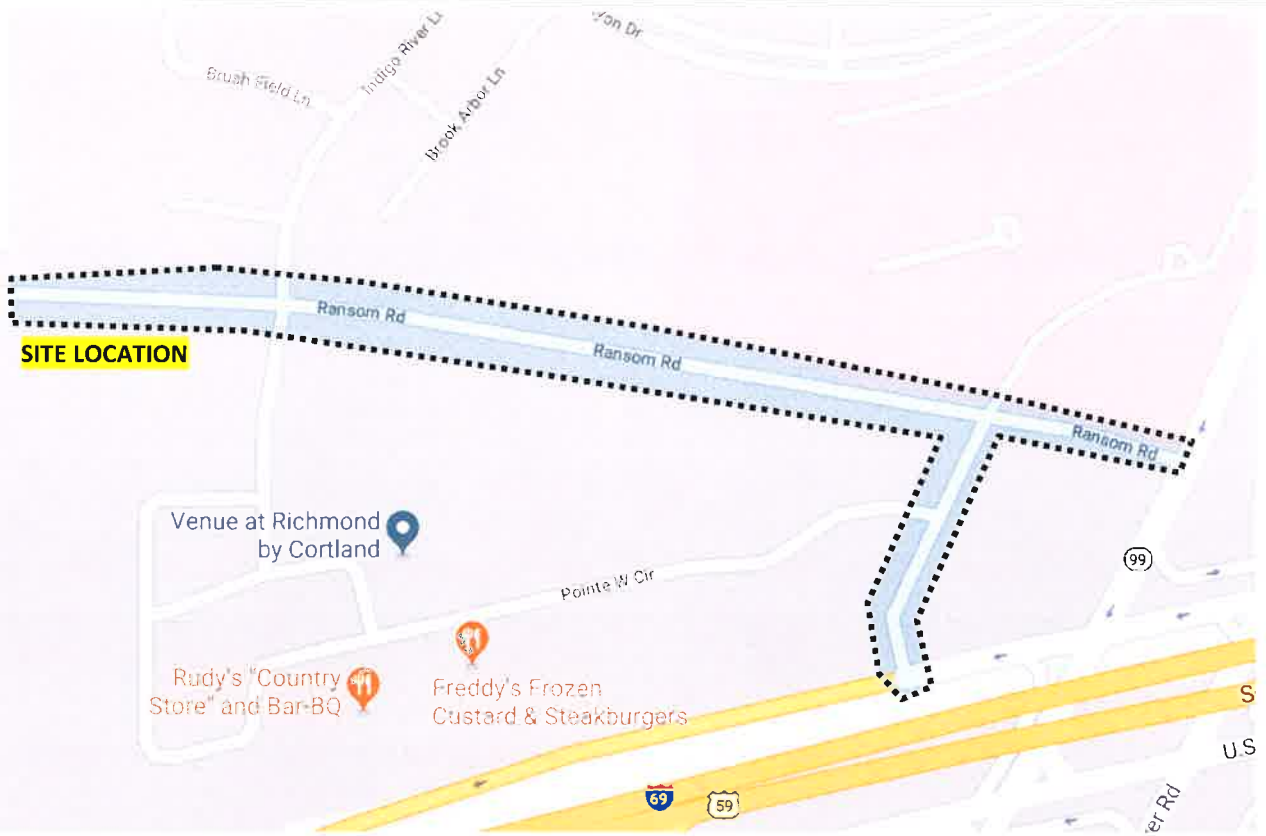


11.0 CONSTRUCTION MATERIALS TESTING

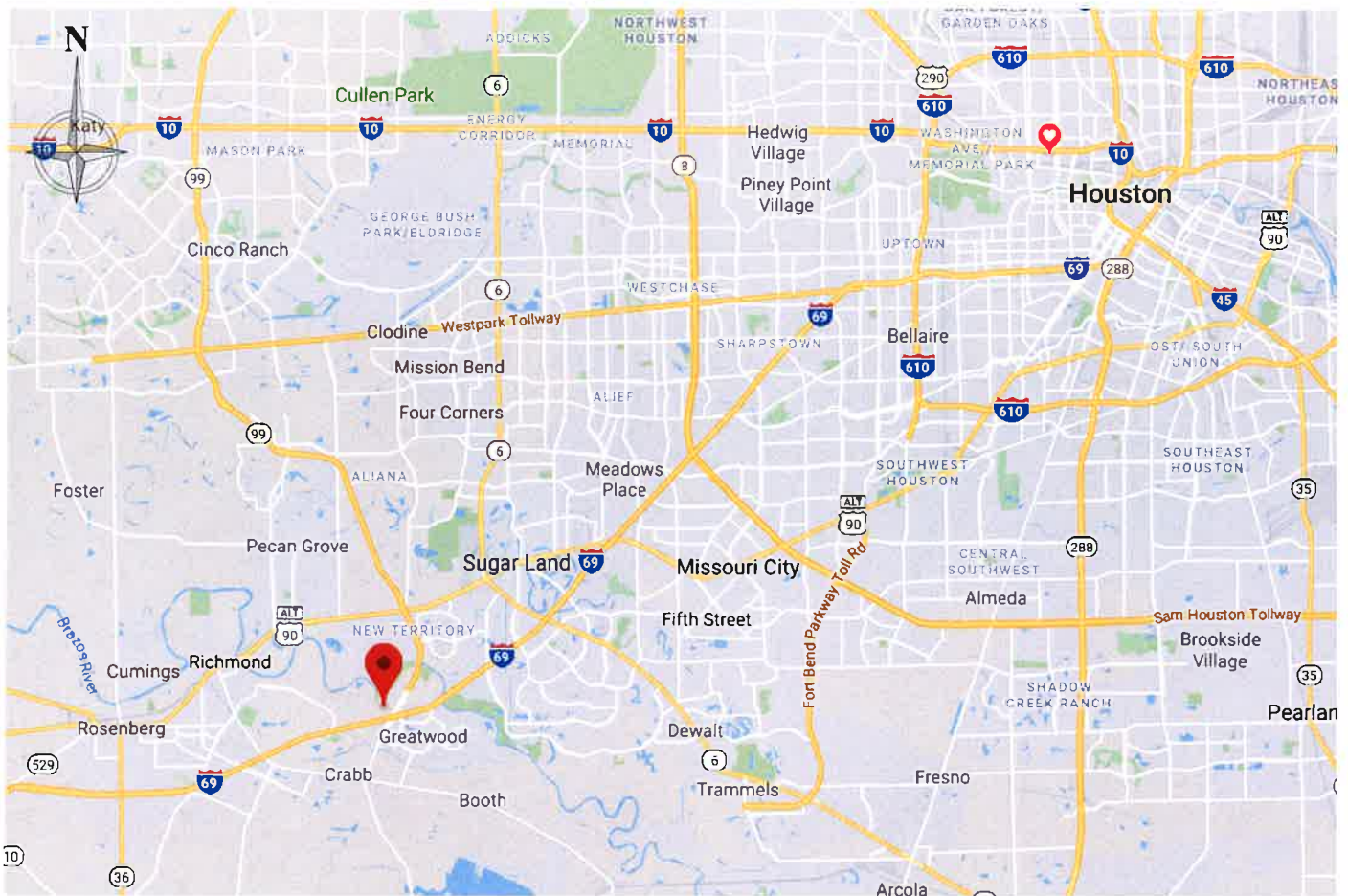
Quality control (QC) is extremely important in the construction industry. A quality control program should be initiated at the beginning of the project. The program should be designed by an accredited laboratory to cover all stages of construction from the ground up. EARTH ENGINEERING, INC. will be pleased to provide you with a proposal for these services:

- Soil Compaction (fill under-slab, utility backfill, etc.)
- Soil Stabilization (lime or lime/fly-ash)
- Foundation Inspection and Monitoring (drilled piers, drilled shafts, auger cast piles, spread footings, driven piles and spread footings)
- Concrete Inspection & Monitoring
- Rebar Inspection
- Structural Steel Welding Visual Inspection and Non-Destructive Testing
- Fire-Proofing Inspection
- Floor Flatness
- Maturity Probes and Thermocouplers to Measure Concrete Temperature and Strength





SITE LOCATION



SITE LOCATION

**Proposed Ransom Road improvement,
Fort Bend County in Richmond, Texas**



EARTH ENGINEERING INC

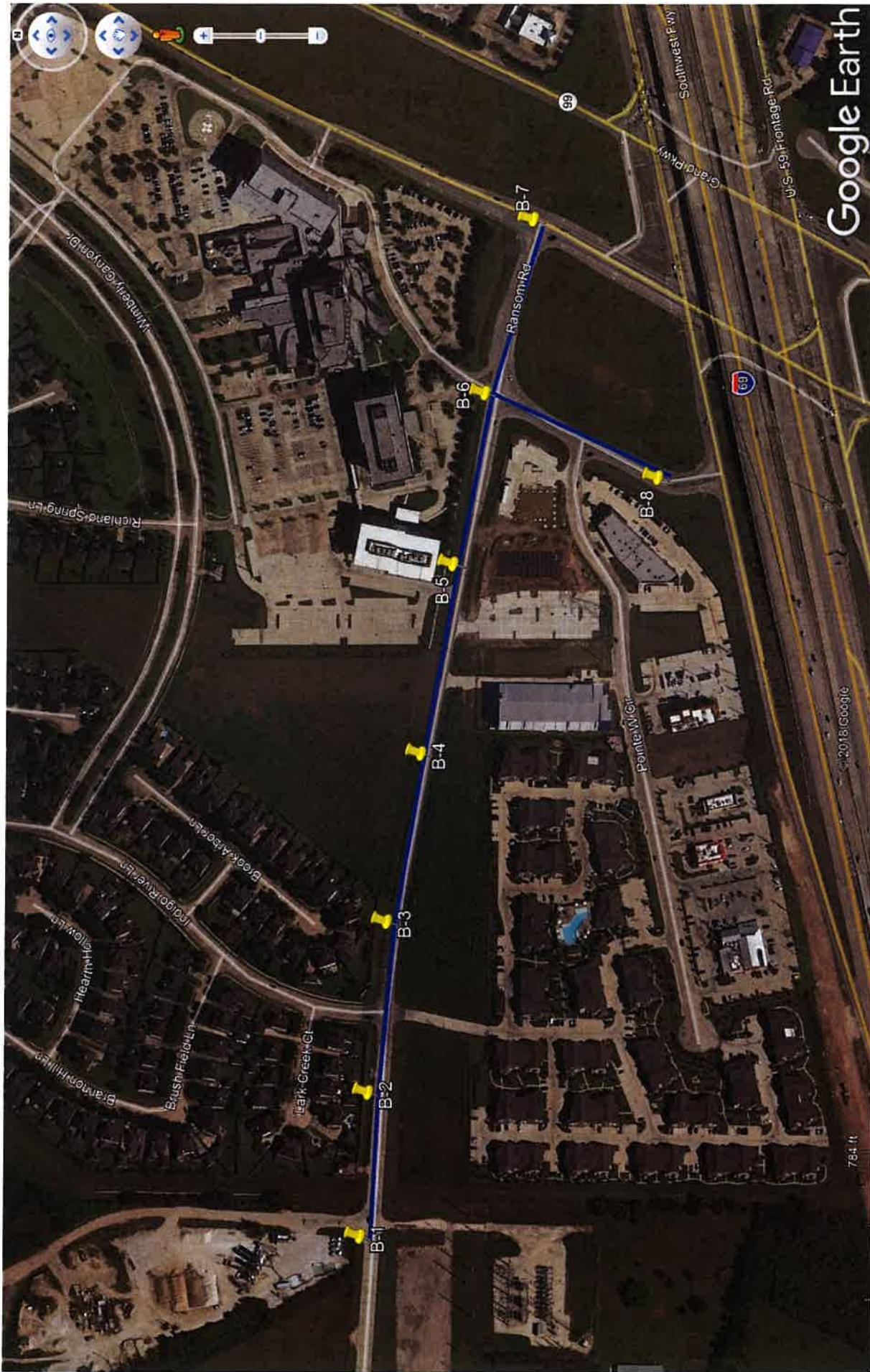
Geotechnical, Environmental and Material Testing

Scale: N.T.S.

Project: EE-1818706-G

Date: 7/19/2018

Plate 1



Plan of Borings (Site Plan)

EARTH ENGINEERING INC
 Geotechnical, Environmental and Material Testing

Scale: N.T.S. Date: 7/19/2018
 Project: EE-1818706-G Plate 2

Proposed Ransom Road improvement, Fort Bend County in Richmond, Texas

LOG OF BORING: B-1

Project: Fort Bend County Mobility Bond Project Richmond, TX
Client: Mr. Patric Ross
Location: See Plate 2
Driller: GXP
Easting: Northing:

Project NO.: EE-1818706-G
Drilling Depth (ft): 20.67
Elevation (ft):
Logged By: Mike
Weather:

DEPTH (ft)	GRAPHIC LOG	SAMPLERS	Description Surface Elevation: Existing	USCS	Test Result Curves				PPEN Curve				PPEN (tsf)	SPT (Blows/ft)	M. Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Cohesion (KSF)	Dry Density (PCF)	>#200 Sieve
					Plastic Limit △	Liquid Limit ○	Blow Counts ⊕	Moisture Content ●	1	2	3	4									
0	8.12" concrete																				
0 - 2	FAT CLAY, stiff, very plastic, drak brown, dry			CH	△	○	●	⊕	●	●	●	●	2.5	34	76	23	53				99
2 - 4	Roots from (0.67-2.67) feet Ferrous stains and sand pockets from (0.67- 15.67) feet				△	○	●	⊕	●	●	●	●	2.25	32							
4 - 6	-- stiff below 4.67 feet				△	○	●	⊕	●	●	●	●	2.0	33	73	22	51	1.8			86
6 - 8	-- very stiff from (8.67-12.67) feet				△	○	●	⊕	●	●	●	●	2.5	30					1.2		92
8 - 10					△	○	●	⊕	●	●	●	●	3.5	29	71	22	49				
10 - 12					△	○	●	⊕	●	●	●	●	4.0								
12 - 14					△	○	●	⊕	●	●	●	●	2.5	25	67	21	46				
14 - 16	-- stiff, with calcareous nodules from (13.67-20.67) feet				△	○	●	⊕	●	●	●	●	2.5								
16 - 18					△	○	●	⊕	●	●	●	●	2.5								
18 - 20					△	○	●	⊕	●	●	●	●	2.5								
20			Boring terminated at 20.67 feet.																		

This information pertains only to this boring location and should not be interpreted as being indicative of the whole site

WATER LEVEL MEASUREMENTS

DATE DRILLED: 7/7/2018

▽ Initial: Dry

▼ After 24hr: Dry

Plate: 3



LOG OF BORING: B-2

Project: Fort Bend County Mobility Bond Project Richmond, TX
Client: Mr. Patricl Ross
Location: See Plate 2
Driller: GXP
Easting:

Project NO.: EE-1818706-G
Drilling Depth (ft): 20.67
Elevation (ft):
Logged By: Mike
Weather:

Northing:

DEPTH (ft)	GRAPHIC LOG	SAMPLERS	Description Surface Elevation: Existing	USCS	Test Result Curves					PPEN Curve	PPEN (tsf)	SPT (Blows/ft)	M. Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Cohesion (KSF)	Dry Density (PCF)	>#200 Sieve
					Plastic Limit △	Liquid Limit ○	Blow Counts ⊕	Moisture Content ●	1										
0	8.12" concrete																		
0 - 2	FAT CLAY		FAT CLAY, stiff, very plastic, drak brown, dry Roots from (0.67-2) feet Ferrous stains and sand pockets from (0.67-15.67) feet -- firm from (2.67-4.67) feet	CH							2.0	33							
2 - 4	SANDY LEAN CLAY		SANDY LEAN CLAY, stiff, high plastic, drak brown, dry -- very stiff from (8.67-10.67) feet	CL							1.25	32	67	21	46	1	88	99	
4 - 6	SANDY LEAN CLAY		SANDY LEAN CLAY, stiff, high plastic, drak brown, dry -- very stiff from (8.67-10.67) feet	CL							2.0	32				2	89		
6 - 8	SANDY LEAN CLAY		SANDY LEAN CLAY, stiff, high plastic, drak brown, dry -- very stiff from (8.67-10.67) feet	CL							2.0	17	36	17	19				
8 - 10	SANDY LEAN CLAY		SANDY LEAN CLAY, stiff, high plastic, drak brown, dry -- very stiff from (8.67-10.67) feet	CL							3.5	19							
10 - 12	SANDY LEAN CLAY		SANDY LEAN CLAY, stiff, high plastic, drak brown, dry -- very stiff from (8.67-10.67) feet	CL							1.0	23	43	18	25				
12 - 14	SANDY LEAN CLAY		SANDY LEAN CLAY, stiff, high plastic, drak brown, dry -- very stiff from (8.67-10.67) feet	CL							2.5								
14 - 16	SANDY LEAN CLAY		SANDY LEAN CLAY, stiff, high plastic, drak brown, dry -- very stiff from (8.67-10.67) feet	CL							3.5	20	45	18	27				
16 - 18	SANDY LEAN CLAY		SANDY LEAN CLAY, stiff, high plastic, drak brown, dry -- very stiff from (8.67-10.67) feet	CL															
18 - 20	SANDY LEAN CLAY		SANDY LEAN CLAY, stiff, high plastic, drak brown, dry -- very stiff from (8.67-10.67) feet	CL															
20			Boring terminated at 20.67 feet.																

This information pertains only to this boring location and should not be interpreted as being indicative of the whole site

WATER LEVEL MEASUREMENTS

DATE DRILLED: 7/7/2018



Initial: Dry



After 24hr: Dry

Plate: 4



LOG OF BORING: B-3

Project: Fort Bend County Mobility Bond Project Richmond, TX
Client: Mr. Patricl Ross
Location: See Plate 2
Driller: GXP
Easting:

Project NO.: EE-1818706-G
Drilling Depth (ft): 20.75
Elevation (ft):
Logged By: Mike
Weather:

Northing:

DEPTH (ft)	GRAPHIC LOG	SAMPLERS	Description Surface Elevation: Existing	USCS	Test Result Curves					PPEN Curve	PPEN (tsf)	SPT (Blows/ft)	M. Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Cohesion (KSF)	Dry Density (PCF)	>#200 Sieve
					Plastic Limit △	Liquid Limit ○	Blow Counts ◆	Moisture Content ●	1										
0			8" 100% type (D) and 3" reddish brown cement sand (subbase)	CH							1.75	24	61	21	40				
2			FAT CLAY, stiff, very plastic, brown, dry								1.75	25							
4			Trace of gravel from (0-2) feet								2.5	22	65	21	44			97	
6			Ferrous stains from (2.75-20.75) feet								2.0	27							
8			Calcareous nodules from (2.75-8.75) feet								2.5	26	66	21	45	1.4	99		
10			-- stiff below 6.75 feet								1.5					1.1	98		
12			-- firm from (10.75-12.75) feet								3.0	29	70	22	48				
14			-- very stiff below 13.75 feet																
16																			
18																			
20			Boring terminated at 20.75 feet.																

This information pertains only to this boring location and should not be interpreted as being indicative of the whole site

	WATER LEVEL MEASUREMENTS		DATE DRILLED: 7/2/2018
	Initial: Dry	After 24hr: Dry	Plate: 5

LOG OF BORING: B-4

Project: Fort Bend County Mobility Bond Project Richmond, TX
Client: Mr. Patricl Ross
Location: See Plate 2
Driller: GXP
Easting:

Project NO.: EE-1818706-G
Drilling Depth (ft): 20.91
Elevation (ft):
Logged By: Mike
Weather:

Northing:

DEPTH (ft)	GRAPHIC LOG	SAMPLERS	Description Surface Elevation: Existing	USCS	Test Result Curves					PPEN Curve				PPEN (tsf)	SPT (Blows/ft)	M. Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Cohesion (KSF)	Dry Density (PCF)	>#200 Sieve		
					Plastic Limit △	Liquid Limit ○	Blow Counts ◇	Moisture Content ●	1	2	3	4												
0			8" 100% type (D) and 3" reddish brown cement sand (subbase)	CL									3.25	17										
2			SANDY LEAN CLAY, very stiff, high plastic, dark brown, dry	CH									2.25	23	71	22	49							
4			FAT CLAY, stiff, very plastic, dark brown, dry										2.0											
6			Ferrous stains from (4.91-20.91) feet Sand pockets from (4.91-6.91) feet										2.5	20	56	20	36	1.75	105	94				
8			-- brown from (6.91-20.91) feet Calcareous nodules from (6.91-10.91) feet										2.5	27				1.5	98					
10													2.5	28	72	22	50							
12																								
14			--- very stiff below 13.91 feet										3.0											
16																								
18																								
20													3.25	25										
			Boring terminated at 20.91 feet.																					

This information pertains only to this boring location and should not be interpreted as being indicative of the whole site

WATER LEVEL MEASUREMENTS

DATE DRILLED: 7/2/2018

▽ Initial: Dry

▼ After 24hr: Dry

Plate: 6



LOG OF BORING: B-5

Project: Fort Bend County Mobility Bond Project Richmond, TX
Client: Mr. Patric Ross
Location: See Plate 2
Driller: GXP
Easting:

Project NO.: EE-1818706-G
Drilling Depth (ft): 20.67
Elevation (ft):
Logged By: Mike
Weather:

Northing:

DEPTH (ft)	GRAPHIC LOG	SAMPLERS	Description	USCS	Test Result Curves					PPEN Curve	PPEN (tsf)	SPT (Blows/ft)	M. Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Cohesion (KSF)	Dry Density (PCF)	>#200 Sieve
					Plastic Limit	Liquid Limit	Blow Counts	Moisture Content											
0			5" 100% type (D) and 3" reddish brown cement sand (subbase)	CH															
2			FAT CLAY, stiff, very plastic, dark gray, dry Rotts from (0.67-20.67)																
4			Sand pockets from (0.67-2) feet Calcareous nodules from (0.67-20) feet -- firm from (4.67-6.67) feet																
6																			
8																			
10			-- dark brown from (8.67-20.67) feet -- very stiff from (10.67-15.67) feet																
12																			
14																			
16																			
18																			
20			-- stiff below 18.67 feet																
			Boring terminated at 20.67 feet.																

This information pertains only to this boring location and should not be interpreted as being indicative of the whole site

	WATER LEVEL MEASUREMENTS		DATE DRILLED: 7/2/2018
	Initial: Dry	After 24hr: Dry	Plate: 7




LOG OF BORING: B-6

Project: Fort Bend County Mobility Bond Project Richmond, TX
Client: Mr. Patricl Ross
Location: See Plate 2
Driller: GXP
Easting: Northing:

Project NO.: EE-1818706-G
Drilling Depth (ft): 21
Elevation (ft):
Logged By: Mike
Weather:

DEPTH (ft)	GRAPHIC LOG	SAMPLERS	Description Surface Elevation: Existing	USCS	Test Result Curves					PPEN Curve				SPT (Blows/ft)	M. Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Cohesion (KSF)	Dry Density (PCF)	>#200 Sieve
					Plastic Limit △	Liquid Limit ○	Blow Counts ◇	Moisture Content ●	1	2	3	4									
0			9" 100% type (D) and 3" reddish brown cement sand (subbase)																		
2			FAT CLAY, stiff, very plastic, brown, dry Roots from (1-3) feet	CH																	
4			Calcareous nodules from (1-2) feet																		
6			-- firm, from (5-7) feet Ferrous stains from (5-21) feet																		
8																					
10			Calcarous nodules from (9-13) feet																		
12																					
14																					
16																					
18																					
20			--firm belwo 19 feet																		
			Boring terminated at 21 feet.																		

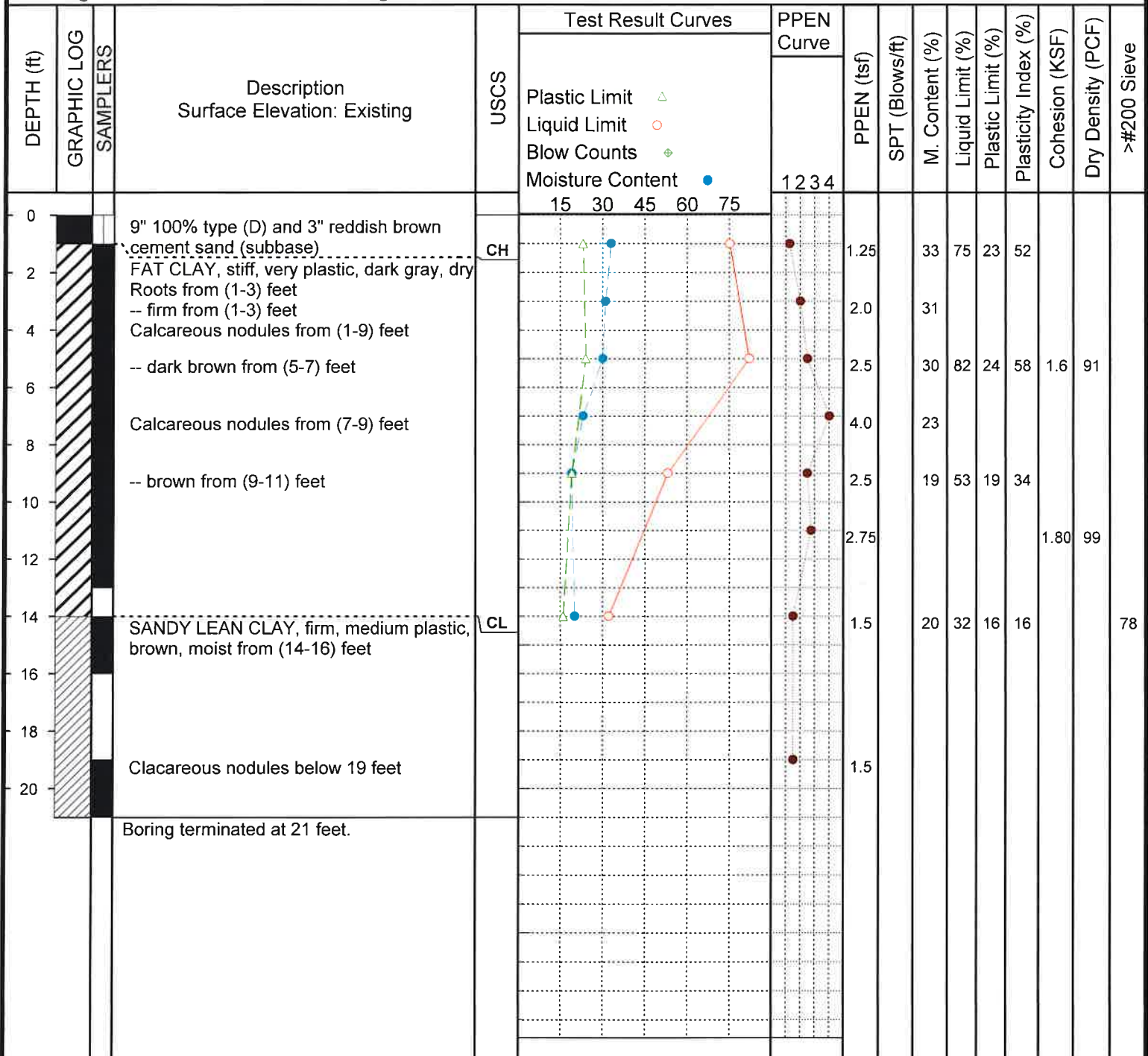
This information pertains only to this boring location and should not be interpreted as being indicative of the whole site

	WATER LEVEL MEASUREMENTS		DATE DRILLED: 7/2/2018
	 Initial: Dry	 After 24hr: Dry	Plate: 8

LOG OF BORING: B-7

Project: Fort Bend County Mobility Bond Project Richmond, TX
Client: Mr. Patrick Ross
Location: See Plate 2
Driller: GXP
Easting: Northing:

Project NO.: EE-1818706-G
Drilling Depth (ft): 21
Elevation (ft):
Logged By: Mike
Weather:



This information pertains only to this boring location and should not be interpreted as being indicative of the whole site

 <small>— offers the most solutions for your complex projects</small>	WATER LEVEL MEASUREMENTS		DATE DRILLED: 7/2/2018
	 Initial: Dry	 After 24hr: Dry	Plate: 9




LOG OF BORING: B-8

Project: Fort Bend County Mobility Bond Project Richmond, TX
Client: Mr. Patricl Ross
Location: See Plate 2
Driller: GXP
Easting: Northing:





















Project NO.: EE-1818706-G
Drilling Depth (ft): 20.91
Elevation (ft):
Logged By: Mike
Weather:

DEPTH (ft)	GRAPHIC LOG	SAMPLERS	Description Surface Elevation: Existing	USCS	Test Result Curves					PPEN Curve	PPEN (tsf)	SPT (Blows/ft)	M. Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Cohesion (KSF)	Dry Density (PCF)	>#200 Sieve
					Plastic Limit △	Liquid Limit ○	Blow Counts ◆	Moisture Content ●	1										
0			8" 100% type (D) and 3" reddish brown cement sand (subbase)	CH							2.0	35							
2			FAT CLAY, stiff, very plastic, dark gray, moist	CH							2.0	31	68	22	46				
4			Roots from (0.91-2.91) feet Calcareous nodules from (0.91-6.91) feet -- dark brown from (4.91-8.91) feet									2.0					1.5	90	
6			Calcareous nodules from (6.91-8.91) feet									2.5	28	62	21	41			
8																			
10			SANDY LEAN CLAY, firm, medium plastic, brown, moist.	CL							1.0					1.0	115		
12				CH							1.0	22	45	18	27				
14			FAT CLAY, very plastic, stiff, dark brown, dry									2.5	28						
16			Sand pockets from (13.91-15.91) feet																
18				CH							2.5	27	68	22	46				
20			-- stiff with calcareous nodules below 18.91 feet																
20.91			Boring terminated at 20.91 feet.								2.75								

This information pertains only to this boring location and should not be interpreted as being indicative of the whole site

	WATER LEVEL MEASUREMENTS		DATE DRILLED: 7/2/2018
	 Initial: Dry	 After 24hr: Dry	Plate: 10

KEY TO LOG TERMS AND SYMBOLS

SOIL TYPE						SAMPLER TYPE			
 ROCK	 GRAVEL	 SAND	 SILT	 CLAY	 PEAT	 NO SAMPLE	 AUGER SAMPLE	 SHELBY TUBE	 SPLIT SPOON
MODIFIERS									
 STONE	 GRAVELLY	 SANDY	 SILTY	 CLAYEY	 FILL	 NO RECOVERY	 ROCK CORE	 2" SHELBY TUBE	 TXDOT CONE

UNIFIED SOIL CLASSIFICATION SYSTEM - ASTM D 2487

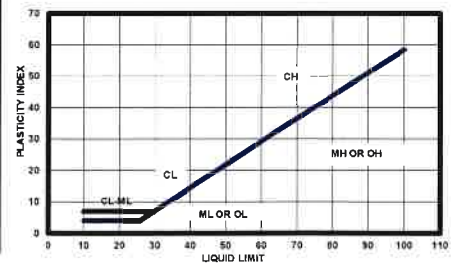
MAJOR DIVISIONS		LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS LESS THAN 50% PASSING NO. 4 SIEVE	GRAVEL & CLEAN GRAVELS (LITTLE OR NO FINES)	GW	WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
	GRAVELLY SOILS (LITTLE OR NO FINES)		POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
	LESS THAN 50% PASSING NO. 4 SIEVE	GP	MIXTURES WITH LITTLE OR NO FINES
	SANDS (LITTLE FINES)	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
	SANDS WITH APPRECIABLE FINES	GC	CLAYEY GRAVELS GRAVEL-SAND-CLAY MIXTURES
	SANDS (LITTLE FINES)	SW	WELL GRADED SAND, GRAVELLY SAND (LITTLE FINES)
	SANDS WITH LITTLE FINES	SP	POORLY GRADED SANDS, GRAVELLY SAND (L. FINES)
	SANDS WITH APPRECIABLE FINES	SM	SILTY SANDS, SAND-SILT MIXTURES
FINE GRAINED SOILS MORE THAN 50% PASSING NO. 200 SIEVE	SILTS AND CLAYS (LIQUID LIMIT LESS THAN 50)	ML	INORGANIC SILTS & VERY FINE SANDS, ROCK FLOUR
	SILTS AND CLAYS (LIQUID LIMIT LESS THAN 50)		SILTY OR CLAYEY FINE SANDS OR CLAYEY SILT WITH
	SILTS AND CLAYS (LIQUID LIMIT LESS THAN 50)		INORGANIC CLAY OF LOW TO MEDIUM PL, LEAN CLAY
	SILTS AND CLAYS (LIQUID LIMIT LESS THAN 50)	CL	GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS
	SILTS AND CLAYS (LIQUID LIMIT LESS THAN 50)	OL	ORGANIC SILTS & ORGANIC SILTY CLAYS OF LOW PI
	SILTS AND CLAYS (LIQUID LIMIT GREATER THAN 50)	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS
SILTS AND CLAYS (LIQUID LIMIT GREATER THAN 50)	FINE SANDY OR SILTY SOILS, ELASTIC SILTS		
SILTS AND CLAYS (LIQUID LIMIT GREATER THAN 50)	INORGANIC CLAYS OF HIGH PLASTICITY		
HIGHLY ORGANIC SOIL	CH	FAT CLAYS	
UNCLASSIFIED FILL MATERIALS	OH	ORGANIC CLAYS OF MED TO HIGH PI, ORGANIC SILT	
UNCLASSIFIED FILL MATERIALS	PT	PEAT AND OTHER HIGHLY ORGANIC SOILS	
UNCLASSIFIED FILL MATERIALS		ARTIFICIALLY DEPOSITED AND OTHER UNCLASSIFIED SOILS	
UNCLASSIFIED FILL MATERIALS		FILL MATERIALS	

CONSISTENCY OF COHESIVE SOILS

CONSISTENCY	UNCONFINED COMP. STRENGTH IN TSF
VERY SOFT	0 TO 0.25
SOFT	0.25 TO 1.0
FIRM	1.0 TO 1.75
STIFF	1.75 TO 3
VERY STIFF	3.0 TO 4.5
HARD	4.5+

RELATIVE DENSITY - GRANULAR SOILS

CONSISTENCY	N-VALUE (BLOWS PER FT)
VERY LOOSE	0-4
LOOSE	4-9
MEDIUM DENSE	10-29
DENSE	30-49
VERY DENSE	> 50 OR 50+



CLASSIFICATION OF GRANULAR SOILS

U.S. STANDARD SIEVE SIZE(S)

		6"	3"	3/4"	4	10	40	200			
BOUL- -DERS	COBBLES	GRAVEL				SAND				SILT OR CLAY	CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE					
		152	76.2	19.1	4.76	2.0	0.42	0.074			0.002
GRAIN SIZE IN MM											



EARTH ENGINEERING, INC.

Geotechnical, Materials and Environmental Consultants



Pic. 1: Drilling at B-4



Pic. 2: Drilling at B-5



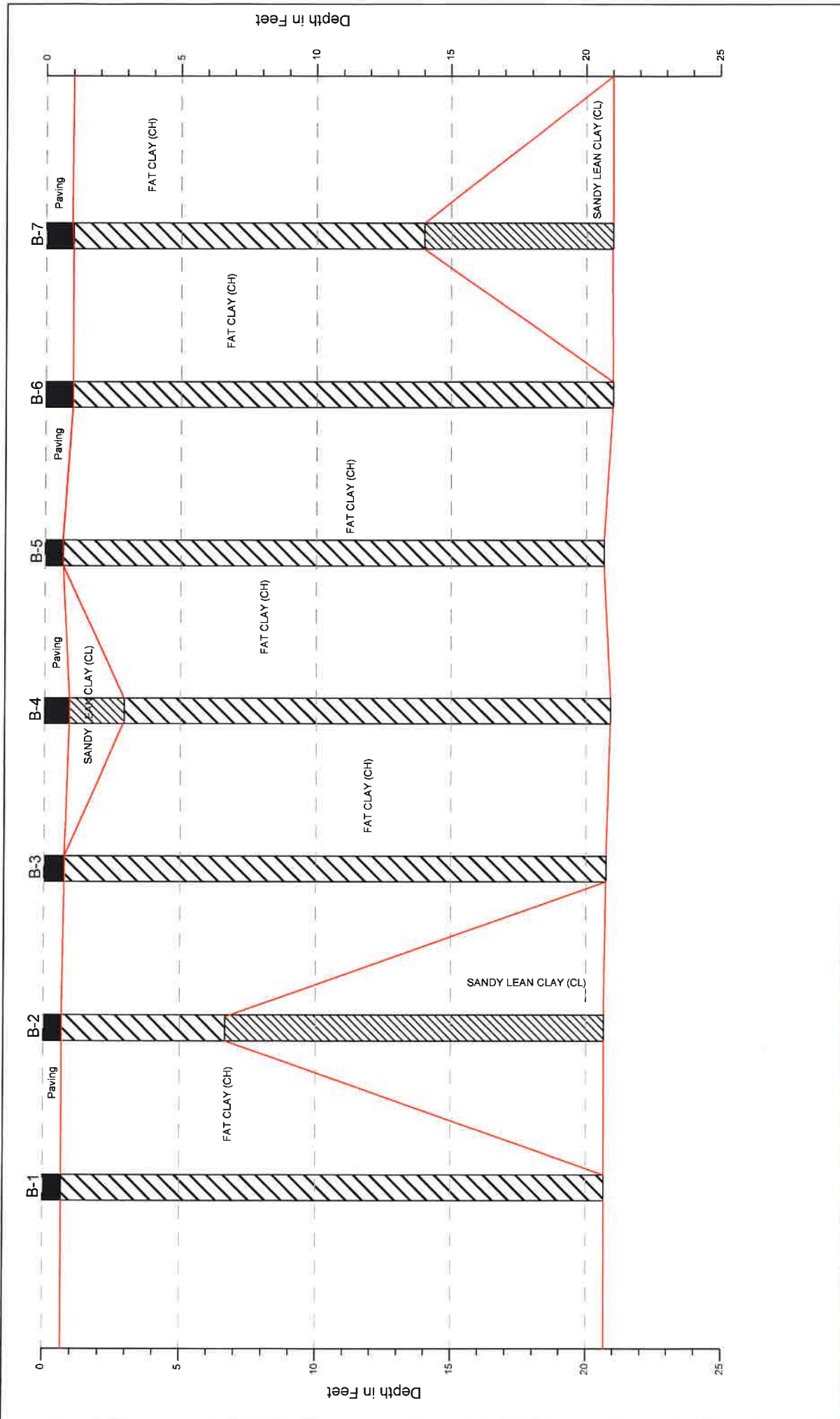
Pic. 3: Drilling at B-7






Pic. 4: Drilling at B-7


Appendix A

Generalized Soil Profile



Strata symbols

-  Paving
-  High plasticity clay
-  Low plasticity clay

 <p>EARTH ENGINEERING, INC. GENERALIZED SOIL PROFILE</p>	
HORIZONTAL SCALE: _____ VERTICAL SCALE: 1"=5'	DRAWN BY/APPROVED BY: _____ DATE DRAWN: 7/18/2018
Fort Bend County Mobility Bond Project, Richmond, TX	
PROJECT NO. EE-1818706-G	PLATE : --

Appendix B

California Bearing Ratio Test Results

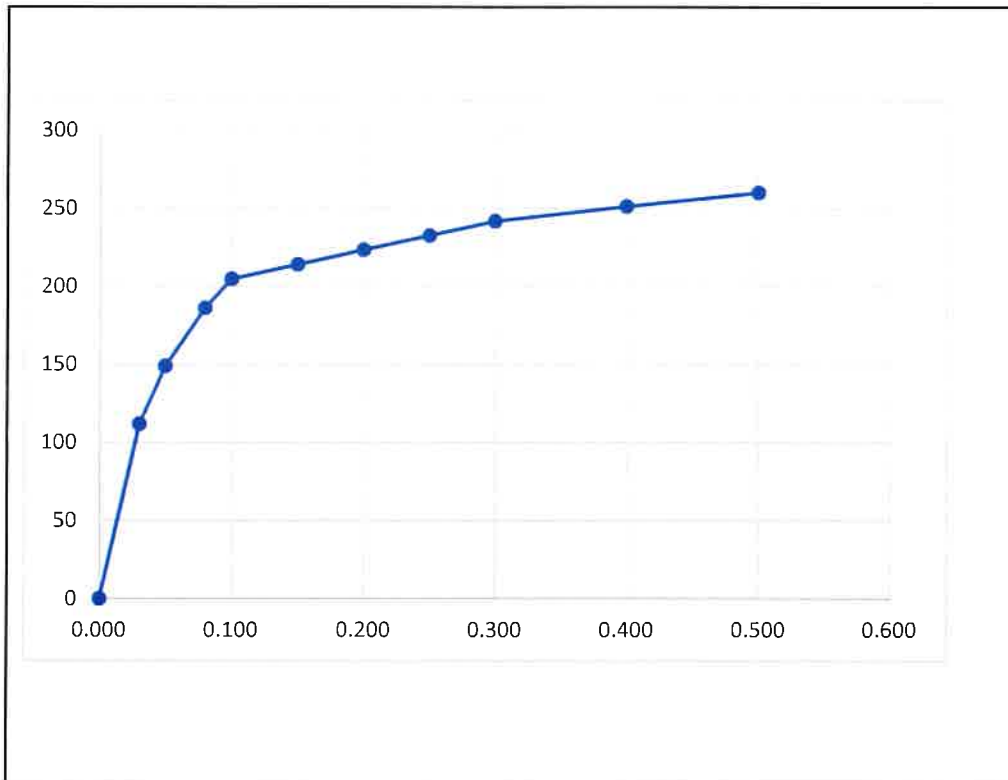


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CALIFORNIA BEARING RATIO - ASTM D1883 -16

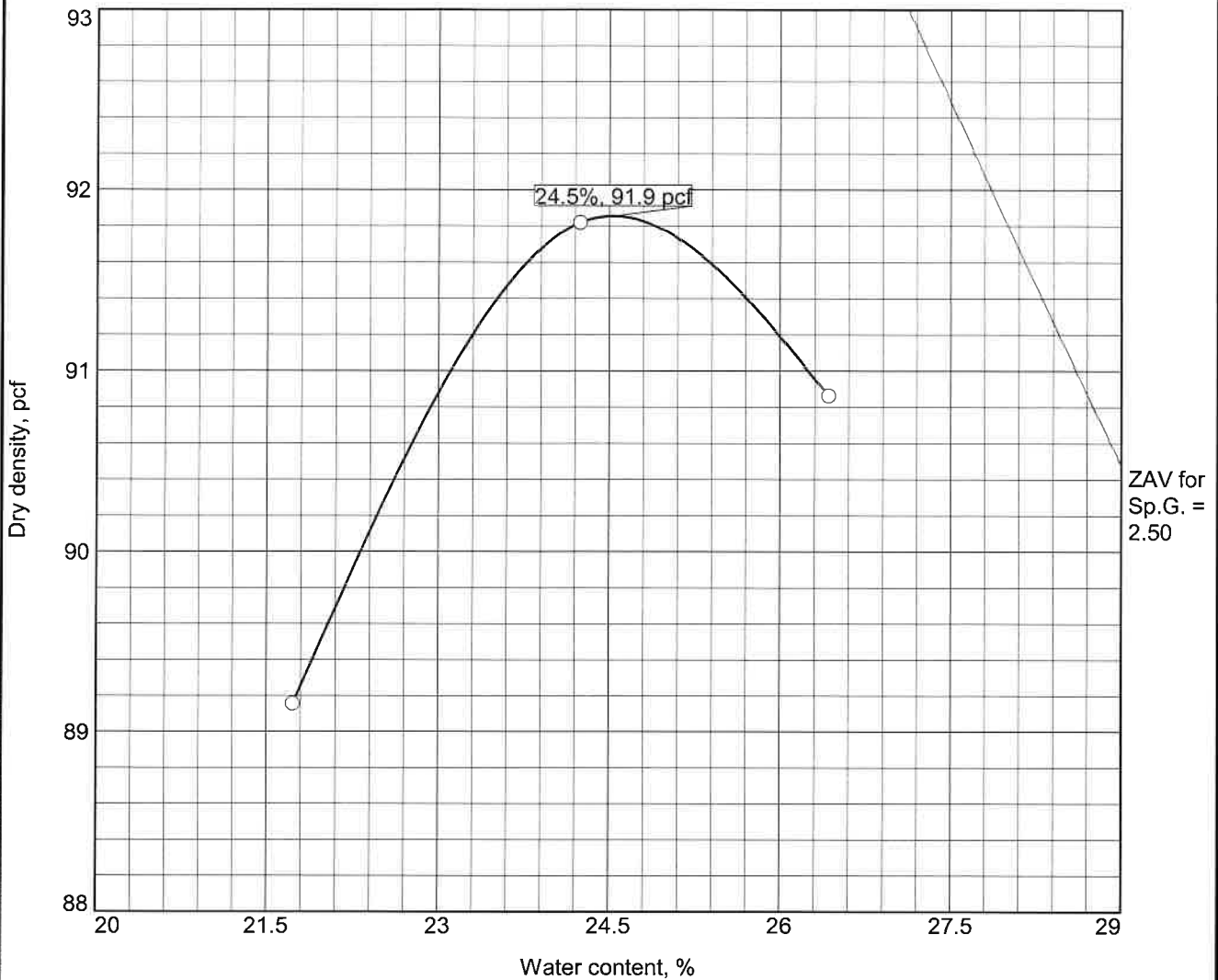
Project# <u>EE-1818706-G</u>	Test Date: <u>7/10/2018</u>
Client: <u>RG Miller Engineering Inc</u>	Tested by: <u>Max-A</u>
Project: <u>Ransom Road Fort Bend County Mobility Project</u>	Comapction Method: <u>D698-C</u>
Location: <u>B-4</u>	Yes <u> </u> Soaked CBR
Lab No.: <u>EE-402</u>	No <u> </u> Unsoaked CBR



CBR @ 0.1 in. Penetration :	<u>20</u>	
CBR @ 0.2 in. Penetration :	<u>15</u>	
Swell (%)	<u>0.7000</u>	
Dry Unit Wgt Before Soaking (%)	<u>94.76</u>	
Water Content After Soaking, Top In (%)	<u>26.74</u>	
Maximum Dry Unit Wgt (lb/ft ³)	<u>94.76</u>	Retained No. 4 Sieve <u>0</u>
Optimum Water Content (%):	<u>24.50%</u>	

Reviewed by: HA

COMPACTION TEST REPORT



These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicative of apparently identical samples.

Test specification: ASTM D 698-12 Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
			21.7	2.5	69	47	N/A	N/A

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 91.9 pcf Optimum moisture = 24.5 %	Dark Gray Fat Clay

Project No. EE1818706G Client: RG Miller Engineering Inc. Project: Ransom Road- FBC Mobility Project <input type="radio"/> Source of Sample: On-Site Sample Number: Ransom Road	Remarks: CBR Testing
--	--------------------------------

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---	---

Figure

Tested By: Dejai A. **Checked By:** Stan D.

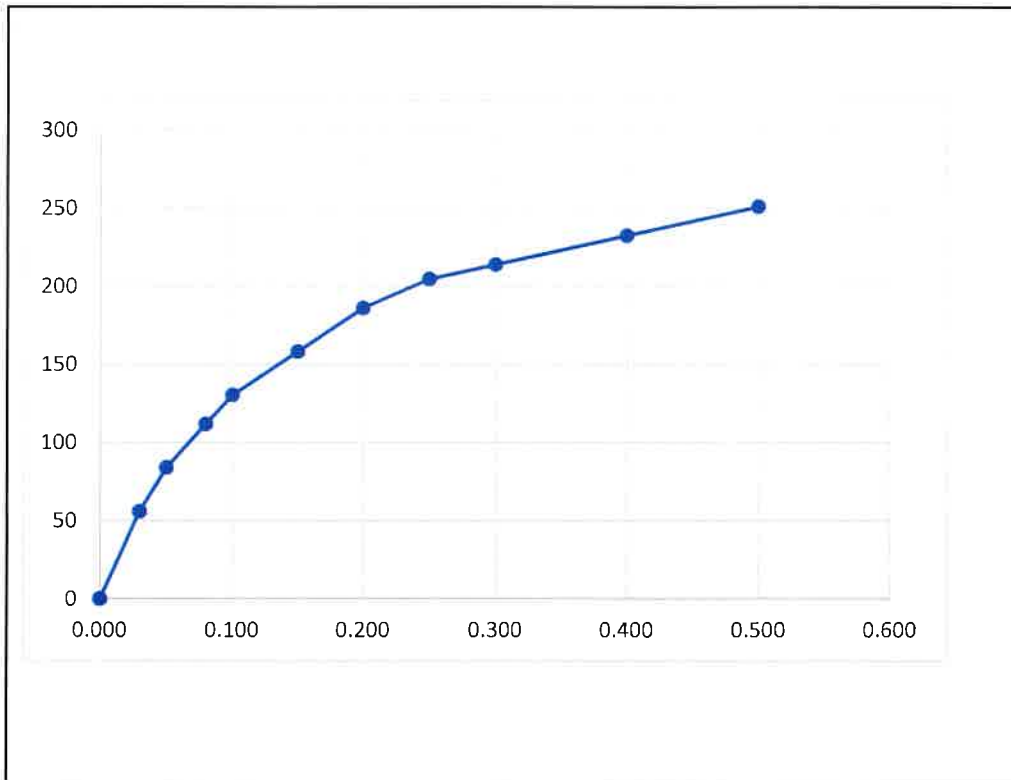


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CALIFORNIA BEARING RATIO - ASTM D1883 -16

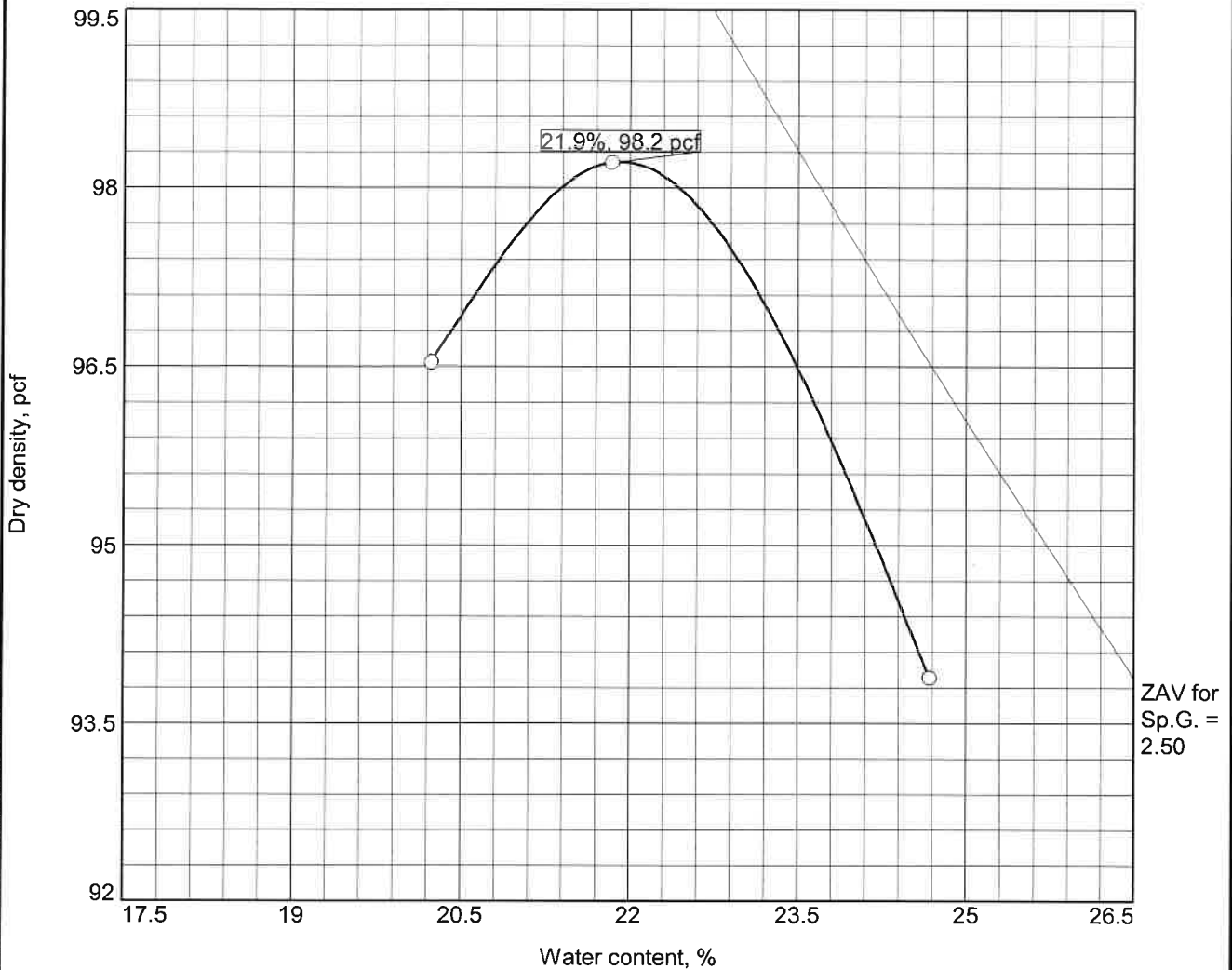
Project#	<u>EE-1818706-G</u>	Test Date:	<u>7/10/2018</u>
Client:	<u>RG Miller Engineering Inc</u>	Tested by:	<u>Max-A</u>
Project:	<u>Ransom Road Fort Bend County Mobility Project</u>	Comapction Method:	<u>D698-C</u>
Location:	<u>B-8</u>	Yes <u> </u> Soaked CBR	
Lab No.:	<u>EE-403</u>	No <u> </u> Unsoaked CBR	



CBR @ 0.1 in. Penetration :	<u>13</u>	
CBR @ 0.2 in. Penetration :	<u>12</u>	
Swell (%)	<u>0.5000</u>	
Dry Unit Wgt Before Soaking (%)	<u>100.59</u>	
Water Content After Soaking, Top In (%)	<u>22.13</u>	
Maximum Dry Unit Wgt (lb/ft3)	<u>100.59</u>	Retained No. 4 Sieve <u>0</u>
Optimum Water Content (%):	<u>21.90%</u>	

Reviewed by: HA

COMPACTION TEST REPORT



These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicative of apparently identical samples.

Test specification: ASTM D 698-12 Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
			20.2	2.5	47	29	N/A	N/A

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 98.2 pcf	Dark Gray Sandy Lean Clay
Optimum moisture = 21.9 %	

Project No. EE1818706G Client: RG Miller Engineering Inc. Project: Ransom Road- FBC Mobility Project <input type="checkbox"/> Source of Sample: On-Site Sample Number: Ransom Road	Remarks: CBR Test
---	-----------------------------

	EARTH ENGINEERING, INC. Geotechnical, Materials Testing & Environmental Consultants 4877 Langfield Road • Houston, TX 77040 • (713) 681-5311		Figure
---	---	--	---------------

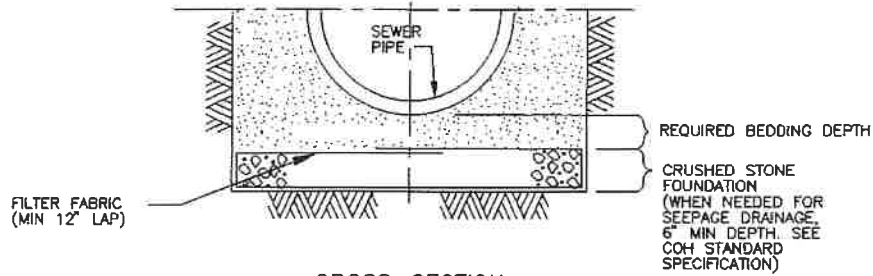
Tested By: Dejai A. **Checked By:** Stan D.

Appendix C

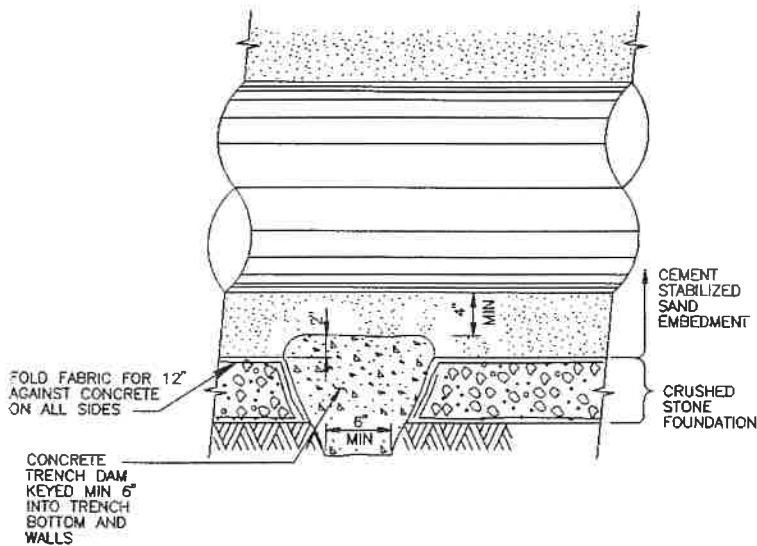
City of Houston Drawing Number 02317-02, 02317-03, 02751-01 and 02741-01

NOTES:

1. ACTUAL SHAPE OF CONCRETE TRENCH DAM CROSS SECTION MAY BE DETERMINED BY CONTRACTOR IN FIELD, MEETING MINIMUM THICKNESS AND KEY DEPTH REQUIREMENTS.
2. THIS DETAIL SHALL BE USED WITH CEMENT STABILIZED SAND EMBEDMENT, OR OTHER CLASS II EMBEDMENT, IN WET STABLE TRENCH CONDITIONS.
3. PLACE TRENCH DAMS IN CLASS I EMBEDMENTS AT THE MIDPOINT OF LINE SEGMENTS LONGER THAN 100 FEET BETWEEN MANHOLES.



CROSS-SECTION OF CRUSHED STONE FOUNDATION



LONGITUDINAL SECTION ALONG PIPE ϕ AT FOUNDATION TRENCH DAM

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
ENGINEERING, CONSTRUCTION AND REAL ESTATE DIVISION

SANITARY OR STORM SEWER
CRUSHED STONE FOUNDATION
FOR WET STABLE TRENCH

(NOT TO SCALE)

APPROVED BY:
Snoudakis
CITY ENGINEER

APPROVED BY:
[Signature]
DIRECTOR OF PUBLIC
WORKS AND ENGINEERING

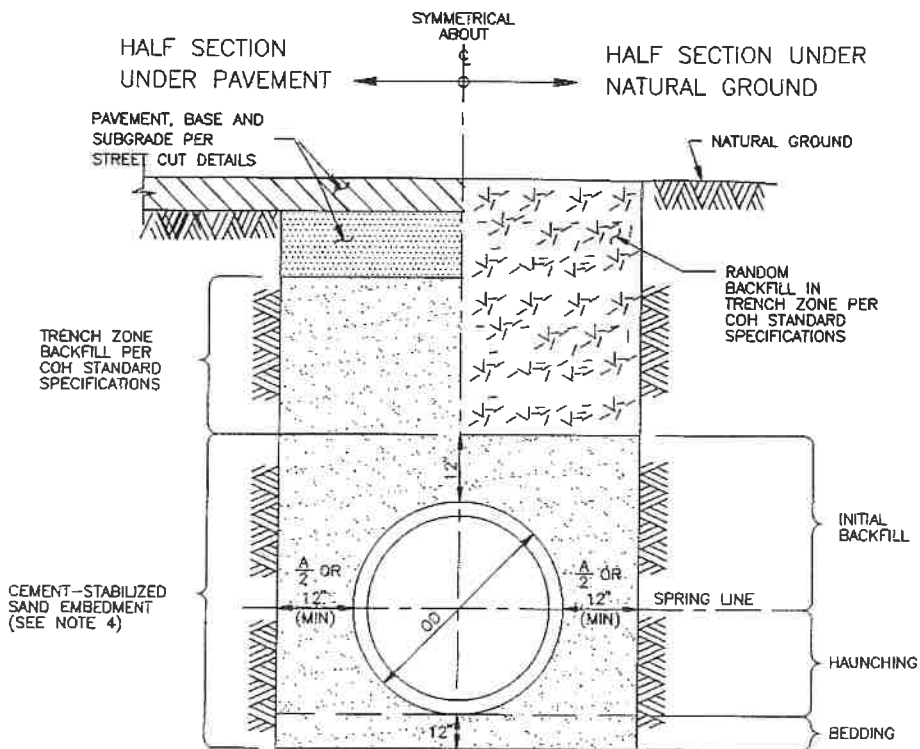
EFF DATE: OCT-01-2002

DWG NO: 02317-02

NOTES:

1. THIS DETAIL MAY BE USED ONLY FOR DRY STABLE TRENCH CONDITIONS PER COH STANDARD. SEE COH STANDARD SPECIFICATION FOR REQUIREMENTS IN OTHER CONDITIONS.
2. MIN TRENCH WIDTH SHALL BE PIPE OD PLUS AN ALLOWANCE "A" FOR THE NOMINAL PIPE SIZE:

NOMINAL PIPE SIZE	"A"
18" TO 30"	24"
OVER 30"	36"
3. MAX TRENCH WIDTH SHALL BE NOT GREATER THAN MIN TRENCH WIDTH PLUS 24 INCHES, UNLESS OTHERWISE NOTED.
4. ALTERNATIVE EMBEDMENT BACKFILL MATERIALS FOR FORCE MAINS MAY BE ALLOWED. SEE COH STANDARD SPECIFICATIONS.



TYPICAL CROSS-SECTION

CITY OF HOUSTON DEPARTMENT OF PUBLIC WORKS AND ENGINEERING ENGINEERING, CONSTRUCTION AND REAL ESTATE DIVISION	
SANITARY OR STORM SEWER BEDDING AND BACKFILL FOR DRY STABLE TRENCH (NOT TO SCALE)	
APPROVED BY: <i>Frank J. ...</i> CITY ENGINEER	APPROVED BY: <i>...</i> DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT-01-2002	DWG NO: 02317-03

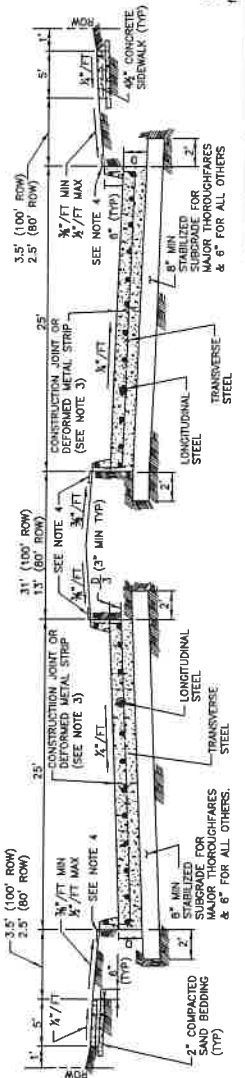


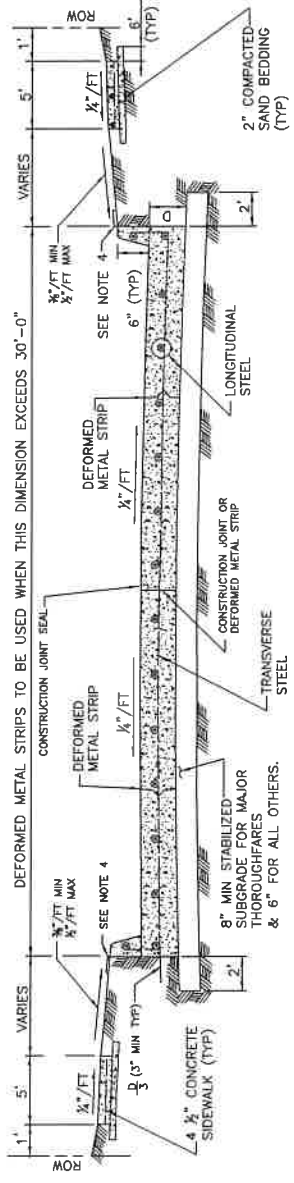
TABLE 1
REINFORCING STEEL BAR SIZES AND SPACINGS
FOR VARIOUS PAVEMENT THICKNESSES (D) WITH
MAXIMUM EXPANSION JOINT SPACING = 60 FT.
f_c' = 3,500 PSI/28 DAYS AND F_y = 60,000 PSI

PAVEMENT THICKNESS (D) (IN)	LONGITUDINAL STEEL			TRANSVERSE STEEL		
	NUMBER OF BARS	SPACING (IN)	NUMBER OF BARS	SPACING (IN)	NUMBER OF BARS	SPACING (IN)
4	2	20.50	4	—	—	—
5	2	17.00	4	—	—	—
6	2	14.00	4	—	—	—
7	3	11.75	4	—	—	—
8	3	9.45	4	—	—	—
9	3	7.15	4	—	—	—
10	3	4.85	4	—	—	—
11	3	2.55	4	—	—	—
12	3	0.25	4	—	—	—
13	3	0.00	4	—	—	—
14	3	0.00	4	—	—	—
15	3	0.00	4	—	—	—
16	3	0.00	4	—	—	—
17	3	0.00	4	—	—	—
18	3	0.00	4	—	—	—
19	3	0.00	4	—	—	—
20	3	0.00	4	—	—	—
21	3	0.00	4	—	—	—
22	3	0.00	4	—	—	—
23	3	0.00	4	—	—	—
24	3	0.00	4	—	—	—
25	3	0.00	4	—	—	—
26	3	0.00	4	—	—	—
27	3	0.00	4	—	—	—
28	3	0.00	4	—	—	—
29	3	0.00	4	—	—	—
30	3	0.00	4	—	—	—
31	3	0.00	4	—	—	—
32	3	0.00	4	—	—	—
33	3	0.00	4	—	—	—
34	3	0.00	4	—	—	—
35	3	0.00	4	—	—	—
36	3	0.00	4	—	—	—
37	3	0.00	4	—	—	—
38	3	0.00	4	—	—	—
39	3	0.00	4	—	—	—
40	3	0.00	4	—	—	—
41	3	0.00	4	—	—	—
42	3	0.00	4	—	—	—
43	3	0.00	4	—	—	—
44	3	0.00	4	—	—	—
45	3	0.00	4	—	—	—
46	3	0.00	4	—	—	—
47	3	0.00	4	—	—	—
48	3	0.00	4	—	—	—
49	3	0.00	4	—	—	—
50	3	0.00	4	—	—	—

TYPICAL DOUBLE ROADWAY SECTION FOR CONCRETE PAVEMENT WITH CURBS NOTES:

1. THE MAXIMUM WIDTH BETWEEN LONGITUDINAL JOINTS SHALL NOT EXCEED 15'-0".
2. ALL EARTHEN AREAS ARE TO BE HYDROMULCHED UNLESS SHOWN OTHERWISE ON DRAWINGS.
3. CONTRACTOR MAY SAW CUT IN LIEU OF DEFORMED METAL STRIP.
4. USE STRIP OF SOD GRASS TO PREVENT EROSION UNTIL STAND OF GRASS IS ESTABLISHED.
5. AN EQUAL OR LARGER AREA OF WELDED REINFORCEMENT BAR CONFORMING TO ASTM A497, MAY BE SUBSTITUTED FOR REBARS LISTED IN TABLE 1.
6. IF AVAILABLE ROW IS NOT SUFFICIENT TO ACCOMMODATE A 5-FOOT SIDEWALK, ENGINEER SHALL OBTAIN A VARIANCE FROM THE CITY ENGINEER FOR A 4-FOOT WIDE SIDEWALK.

MINIMUM LAP LENGTHS (L):
 A. # 4 BARS: L = 22 INCHES
 B. # 5 BARS: L = 27 INCHES
 C. # 6 BARS: L = 32 INCHES



TYPICAL SINGLE ROADWAY SECTION FOR CONCRETE PAVEMENT WITH CURBS

CITY OF HOUSTON
 DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

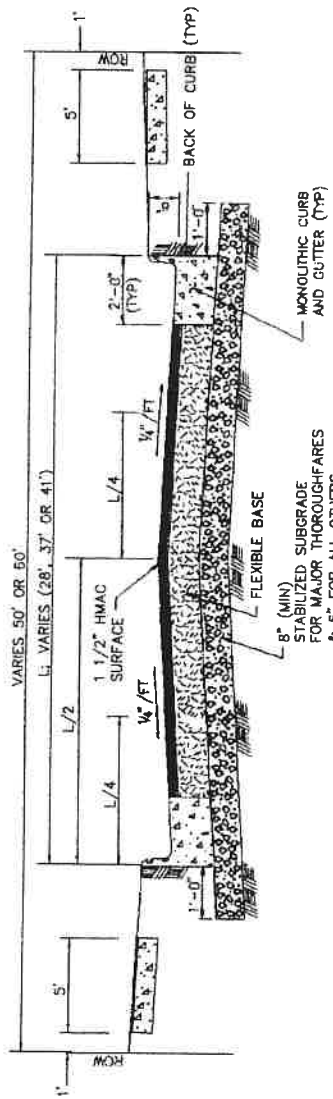
CONCRETE PAVEMENT
 DETAILS

APPROVED BY: *[Signature]*
 CITY ENGINEER

APPROVED BY: *[Signature]*
 DIRECTOR OF PUBLIC
 WORKS AND ENGINEERING

(NOT TO SCALE)

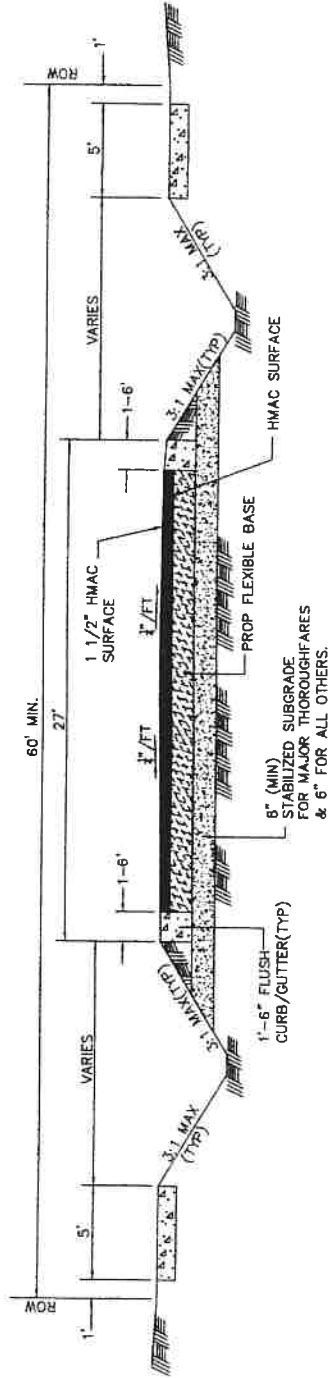
EFF DATE: JULY-01-2009 DWG NO. 02751-01



FLEXIBLE BASE PAVEMENT - CURB & GUTTER SECTION
(NOT APPLICABLE TO ETJ OF CITY OF HOUSTON)

NOTE:
FLEXIBLE BASE SHALL BE:

- ALTERNATES: 1. 6" (MIN) HOT MIX ASPHALTIC CONCRETE.
- 2. 8" (MIN) CRUSHED CONCRETE.



FLEXIBLE BASE PAVEMENT - DITCH SECTION
(NOT APPLICABLE TO ETJ OF CITY OF HOUSTON)

NOTE:
FLEXIBLE BASE SHALL BE:

- ALTERNATES: 1. 6" (MIN) HOT MIX ASPHALTIC CONCRETE.
- 2. 8" (MIN) CRUSHED CONCRETE.

CITY OF HOUSTON DEPARTMENT OF PUBLIC WORKS AND ENGINEERING	
HOT-MIX ASPHALTIC CONCRETE PAVEMENT DETAILS	
APPROVED BY: <i>Michael M. M... ..</i> CITY ENGINEER	(NOT TO SCALE) APPROVED BY: <i>Michael M. M... ..</i> DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JULY-01-2009 DWG NO: 02741-01	

Appendix D
Site Survey Map

Appendix E

Pavement Design Parameters and Calculations



Please choose page

/// TOTAL ESAL CALCULATOR ///

TRAFFIC CALCULATION

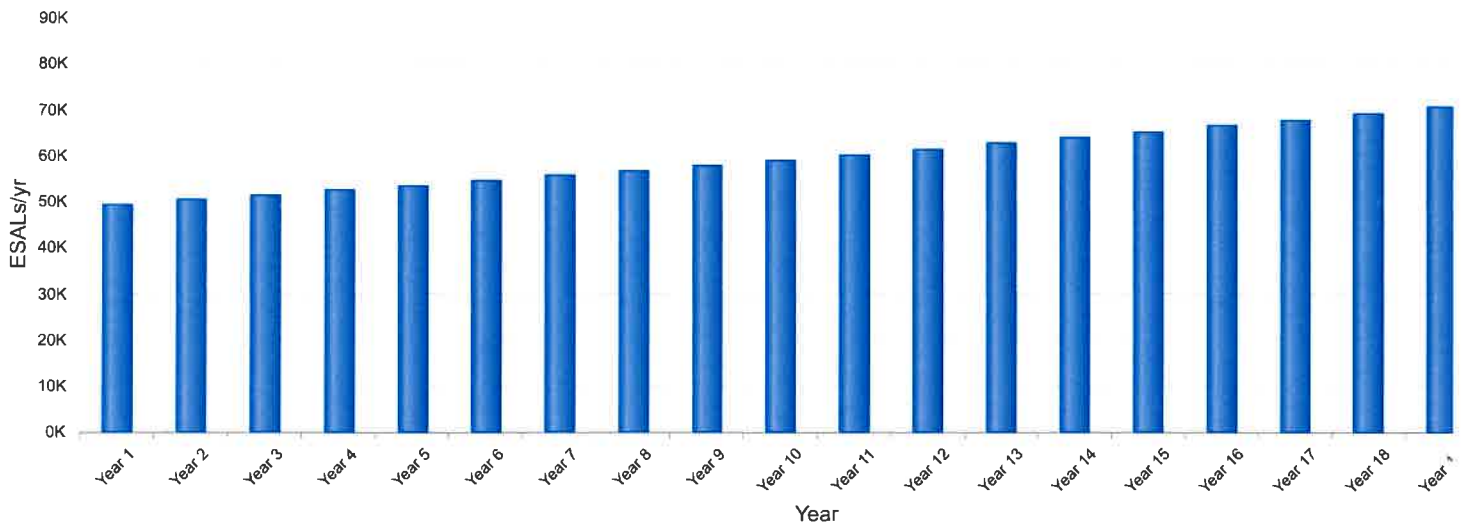
<input checked="" type="radio"/> No. of Years to Project Traffic (yrs):	20
<input type="radio"/> Determine Past and Future ESALs	
Two-Way Average Daily Traffic (ADT):	7,955
Directional Distribution Factor (%):	50
Design Lane Distribution Factor (%):	100
Growth Rate (%):	2.00
Percent Trucks (%):	2.00
Truck Factor (ESALs/Truck):	1.70

Calculate

Save Inputs

ESAL CALCULATION

TOTAL ESALS: 1,199,337



/// STAY IN TOUCH

Find out what's happening:



Login

App:

Resources

Design Software

Training

Please choose page

/// TOTAL ESAL CALCULATOR ///

TRAFFIC CALCULATION

No. of Years to Project Traffic (yrs): 50

Determine Past and Future ESALs

Two-Way Average Daily Traffic (ADT): 7,955

Directional Distribution Factor (%): 50

Design Lane Distribution Factor (%): 100

Growth Rate (%): 2.00

Percent Trucks (%): 2.00

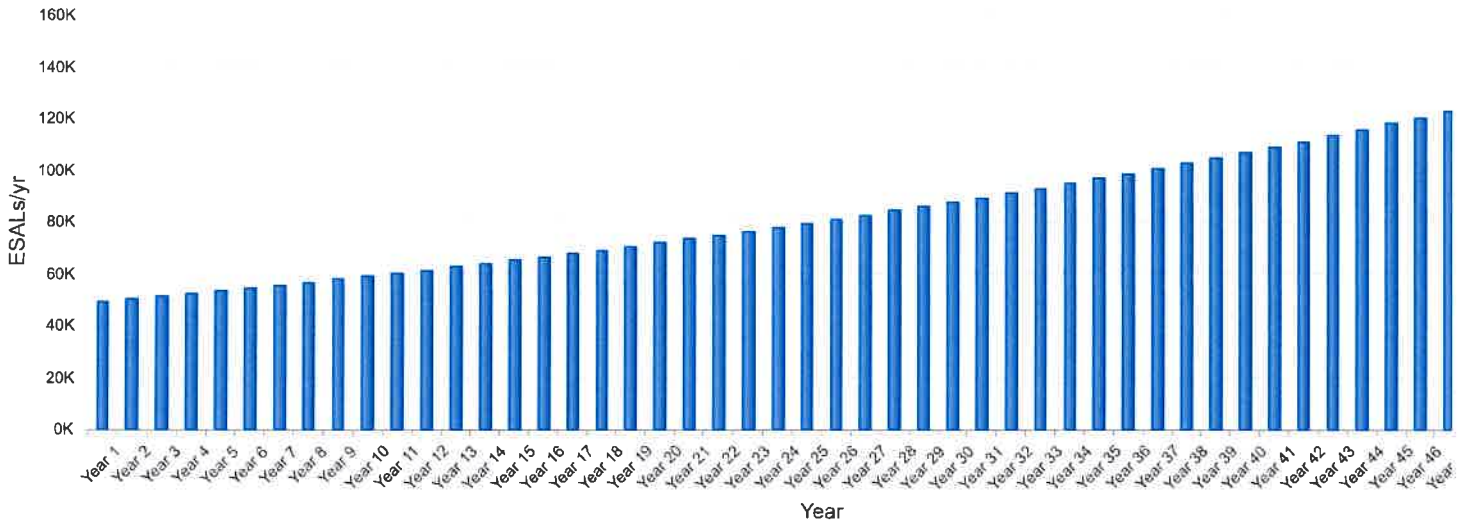
Truck Factor (ESALs/Truck): 1.70

Calculate

Save Inputs

ESAL CALCULATION

TOTAL ESALS: 4,174,905



/// STAY IN TOUCH

Find out what's happening:

WinPAS

Pavement Thickness Design According to
1993 AASHTO Guide for Design of Pavements Structures
American Concrete Pavement Association

Rigid Design Inputs

Agency:
Company: RG Miller Engineering
Contractor:
Project Description: Fort Bend County Mobility Project
Location: Ransom Road, Richmond, TX

Rigid Pavement Design/Evaluation

PCC Thickness	8.98 inches	Load Transfer, J	3.20
Design ESALs	4,174,905.00	Mod. Subgrade Reaction, k	95 psi/in
Reliability	95.00 percent	Drainage Coefficient, Cd	1.20
Overall Deviation	0.35	Initial Serviceability	4.50
Modulus of Rupture	580 psi	Terminal Serviceability	2.50
Modulus of Elasticity	3,712,000 psi		

Modulus of Subgrade Reaction (k-value) Determination

Resilient Modulus of the Subgrade	6,618.50 psi
Resilient Modulus of the Subbase	0.00 psi
Subbase Thickness	8.00 inches
Depth to Rigid Foundation	0.00 feet
Loss of Support Value (0,1,2,3)	0.00

Modulus of Subgrade Reaction	95.00 psi/in
------------------------------	--------------

WinPAS

Pavement Thickness Design According to
1993 AASHTO Guide for Design of Pavements Structures
 American Concrete Pavement Association

Flexible Design Inputs

Agency:
 Company: RG Miller Engineering
 Contractor:
 Project Description: Fort Bend County Mobility Project
 Location: Ransom Road, Richmond, TX

Flexible Pavement Design/Evaluation

Structural Number	3.90	Soil Resilient Modulus	5,842.00 psi
Design ESALs	1,199,337.00	Initial Serviceability	4.50
Reliability	95.00 percent	Terminal Serviceability	2.50
Overall Deviation	0.40		

Layer Pavement Design/Evaluation

Layer Material	Layer Coefficient	Drainage Coefficient	Layer Thickness	Layer SN
Asphalt Cement Concrete	0.30	1.25	2.00	0.75
Crushed Stone Base	0.14	0.40	8.00	0.45
	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00
			Σ SN	1.20

FORT BEND COUNTY ENGINEERING DEPARTMENT

PLANS TO DESIGN THE WIDENING AND
RECONSTRUCTION OF RANSOM ROAD FROM
SUGAR LAND CITY LIMIT TO SH 99

100% SUBMITTAL

PROJECT NO. 17102

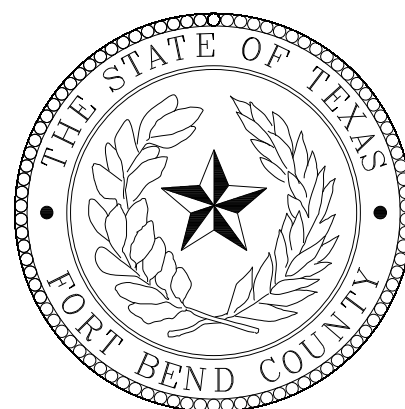
VINCENT M. MORALES, JR.
COMMISSIONER PRECINCT 1

GRADY PRESTAGE
COMMISSIONER PRECINCT 2

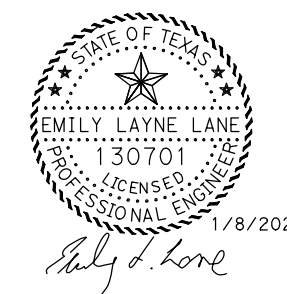
KP GEORGE
COUNTY JUDGE

ANDY MEYERS
COMMISSIONER PRECINCT 3

DEXTER L. McCOY
COMMISSIONER PRECINCT 4

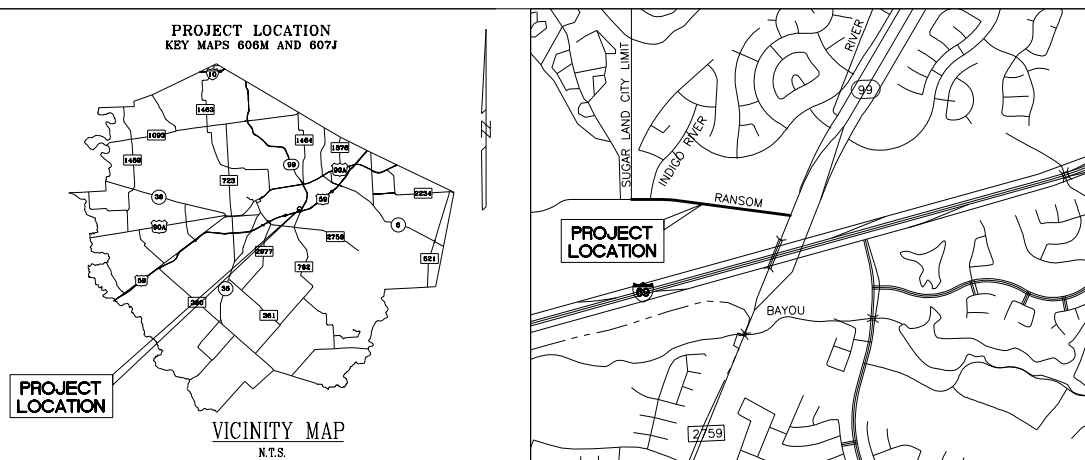


JANUARY 2024
PRECINCT 4
Fort Bend County, Texas



APPROVED: *J. Stacy Slawinski* 01/08/2024
COUNTY ENGINEER J. STACY SLAWINSKI, P.E. DATE

T:\04399.000 fbc-01 ransom road\dgn\ransom rd_cov_01.dgn



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No.	Date	Revisions	App.

**RANSOM RD
SHEET INDEX**



r.g.miller engineers SINCE 1966 16340 Park Ten Place
 Suite 350
 Houston, Texas 77084
 (713) 461-9600
 TEXAS FIRM REGISTRATION NO. F-487

Approved By: r.g. miller Job No. **4399**
 Date: _____

SUBMITTED BY: R.G. MILLER DESIGNED BY: E.L.L.
 SCALE: 1"=100' DRAWN BY: C.G.

DATE: 5/4/2023 SHEET 1 OF 1 SHEETS
 SURV BY: MILLER SURVEY
 F. B. NO.: 17102 DWG. NO. 2

J:\1704\1601\Fort Bend County Standards\Fort Bend County STD\FBC GENERAL NOTES\FORT BEND CO GENERAL NOTES.dwg

CONSTRUCTION

1. FORT BEND COUNTY MUST BE INVITED TO THE PRE-CONSTRUCTION MEETING.
2. CONTRACTOR SHALL NOTIFY FORT BEND COUNTY ENGINEERING DEPARTMENT 48 HOURS PRIOR TO COMMENCING CONSTRUCTION AND 48 HOUR NOTICE TO ANY CONSTRUCTION ACTIVITY WITHIN THE LIMITS OF THE PAVING AT CONSTRUCTION@FBCTX.GOV.
3. CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL PERMITS REQUIRED FROM FORT BEND COUNTY PRIOR TO COMMENCING CONSTRUCTION OF ANY IMPROVEMENTS WITHIN COUNTY ROAD RIGHT OF WAYS.
4. ALL PAVING IMPROVEMENTS SHALL BE CONSTRUCTED IN ACCORDANCE WITH FORT BEND COUNTY "RULES, REGULATIONS AND REQUIREMENTS" RELATING TO THE APPROVAL AND ACCEPTANCE OF IMPROVEMENTS IN SUBDIVISIONS AS CURRENTLY AMENDED.
5. ALL ROAD WIDTHS, CURB RADII AND CURB ALIGNMENT SHOWN INDICATES BACK OF CURB.
6. A CONTINUOUS LONGITUDINAL REINFORCING BAR SHALL BE USED IN THE CURBS.
7. ALL CONCRETE PAVEMENT SHALL BE 5½ SACK CEMENT WITH A MINIMUM COMPRESSIVE STRENGTH OF 3500 PSI AT 28 DAYS. TRANSVERSE EXPANSION JOINTS SHALL BE INSTALLED AT EACH CURB RETURN AND AT A MAXIMUM SPACING OF 60 FEET.
8. ALL WEATHER ACCESS TO ALL EXISTING STREETS AND DRIVEWAYS SHALL BE MAINTAINED AT ALL TIMES.
9. 4" X 12" REINFORCED CONCRETE CURB SHALL BE PLACED IN FRONT OF SINGLE FAMILY LOTS ONLY. ALL OTHER AREAS SHALL BE 6" REINFORCED CONCRETE CURB.
10. CURB HEADERS ARE REQUIRED AT CURB CONNECTIONS TO HANDICAP RAMPS, WITH NO CONSTRUCTION JOINT WITHIN 5' OF RAMPS.
11. GUIDELINES ARE SET FORTH IN THE TEXAS "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES", AS CURRENTLY AMENDED, SHALL BE OBSERVED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ADEQUATE FLAGMEN, SIGNING, STRIPING AND WARNING DEVICES, ETC., DURING CONSTRUCTION – BOTH DAY AND NIGHT.
12. ALL R1-1 STOP SIGNS SHALL BE A MINIMUM OF 36"X36" WITH DIAMOND GRADE SHEETING PER TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
13. STREET NAME SIGNAGE SHALL BE ON A 9" HIGH SIGN FLAT BLADE W/REFLECTIVE GREEN BACKGROUND. STREET NAMES SHALL BE UPPER AND LOWERCASE LETTERING WITH UPPERCASE LETTERS OF 6" MINIMUM AND LOWERCASE LETTERS OF 4.5" MINIMUM. THE LETTERS SHALL BE REFLECTIVE WHITE. STREET NAME SIGNS SHALL BE MOUNTED ON STOP SIGN POST.
14. A BLUE DOUBLE REFLECTORIZED BUTTON SHALL BE PLACED AT ALL FIRE HYDRANT LOCATIONS. THE BUTTON SHALL BE PLACED 12 INCHES OFF OF THE CENTERLINE OF THE STREET ON THE SAME SIDE AS THE HYDRANT.
15. THE PROJECT AND ALL PARTS THEREOF SHALL BE SUBJECT TO INSPECTION FROM TIME TO TIME BY INSPECTORS DESIGNATED BY FORT BEND COUNTY. NO SUCH INSPECTIONS SHALL RELIEVE THE CONTRACTOR OF ANY OF ITS OBLIGATIONS HEREUNDER. NEITHER FAILURE TO INSPECT NOR FAILURE TO DISCOVER OR REJECT ANY OF THE WORK AS NOT IN ACCORDANCE WITH THE DRAWINGS AND SPECIFICATIONS, REQUIREMENTS AND SPECIFICATIONS OF FORT BEND COUNTY OR ANY PROVISION OF THIS PROJECT SHALL BE CONSTRUED TO IMPLY AN ACCEPTANCE OF SUCH WORK OR TO RELIEVE THE CONTRACTOR OF ANY OF ITS OBLIGATIONS HEREUNDER.
16. STABILIZED SUBGRADE: DETERMINE THE THICKNESS OF THE STABILIZED SUBGRADE AFTER CURING AND COMPACTION. IF THE SUBGRADE DEPTH IS GREATER THAN THE PROPOSED THICKNESS BY 20% OR MORE, THE CMT LAB MUST PROVIDE VERIFICATION THE PERCENTAGE OF MATERIAL BEING USED TO STABILIZE THE SUBGRADE MEETS OR EXCEEDS PROJECT REQUIREMENTS. TEST RESULTS REQUIRED.

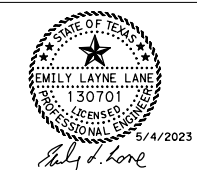
NOTE: FORT BEND COUNTY NOTES SUPERSEDE ANY CONFLICTING NOTES.

NO.	REVISIONS	DATE	NAME
▲	ORIGINAL STANDARD ISSUED	3-1-22	RJS
▲			
▲			
▲			
▲			

FORT BEND COUNTY
ENGINEERING DEPARTMENT



r.g.miller
engineers
16340 Park Ten Place
Suite 350
Houston, Texas 77084
(713) 461-9600
TEXAS FIRM REGISTRATION NO. F-487



PROJECT TITLE: WIDENING AND RECONSTRUCTION OF RANSOM ROAD		
DRAWN BY: INIT	FROM SUGAR LAND CITY LIMIT TO SH 99	FBCED STANDARD
CK'D BY: INIT	SHEET DESCRIPTION: CONSTRUCTION GENERAL NOTES	02
SCALE: NONE		SHEET NO: 3 /123
DATE: 3-1-22	APPROVED BY:	

J:\1704\1601\Fort Bend County Standards\Fort Bend County STD\FBC GENERAL NOTES\FORT BEND CO GENERAL NOTES.dwg

GENERAL

1. THE CONTRACTOR SHALL FIELD VERIFY EXISTING CONDITIONS BEFORE BEGINNING CONSTRUCTION.
2. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING SECURITY TO PROTECT THE PROJECT SITE, CONTRACTOR PROPERTY, EQUIPMENT, AND WORK.
3. THE CONTRACTOR IS RESPONSIBLE FOR CLEANING STREETS OF CONSTRUCTION DIRT AND DEBRIS AT CLOSE OF EACH WORK DAY.
4. THE CONDITION OF THE ROAD AND/OR RIGHT-OF-WAY, UPON COMPLETION OF THE JOB SHALL BE AS GOOD AS OR BETTER THAN PRIOR TO STARTING WORK.
5. PRIOR TO CONSTRUCTION, THE CONTRACTOR, ALONG WITH CONCURRENCE FROM THE FIELD ENGINEER, SHALL DETERMINE HIS/HER LAY-DOWN AND/OR STAGING AREA LOCATIONS.
6. THE CONTRACTOR SHALL NOTIFY ALL PROPERTY OWNERS A MINIMUM OF 24 HOURS PRIOR TO BLOCKING DRIVEWAYS OR ENTERING UTILITY EASEMENTS.
7. TRAFFIC INGRESS AND EGRESS FOR DRIVEWAYS AND PEDESTRIAN ACCESS FACILITIES SHALL BE MAINTAINED THROUGHOUT CONSTRUCTION WITH ALL WEATHER SURFACES.
8. THE CONTRACTOR SHALL REMOVE ANY FENCES, POSTS, MAILBOXES, PLANTERS, PERMANENT TRASH CONTAINERS, CULVERTS, ETC. OR SECTIONS THEREOF, THAT ENCR OACH WITHIN THE COUNTY'S RIGHT-OF-WAY. NOTE: PRIOR TO CONSTRUCTION, THE PROPERTY OWNER WAS PAID TO RELOCATE OR REPLACE THESE ITEMS OUTSIDE OF THE COUNTY'S RIGHT-OF-WAY. IF THE OWNER HAS FAILED TO DO SO, THE CONTRACTOR WILL REPLACE THEM WITH THE MINIMUM LEVEL OF QUALITY NEEDED TO SECURE THE PROPERTY AND/OR MAINTAIN MAIL DELIVERY. IN THAT CASE, PAYMENT FOR THESE INSTALLATIONS WILL BE INCLUDED AS EXTRA WORK ITEMS OR AS OVERRUNS TO EXISTING PAY ITEMS.

ANY DAMAGE CAUSED BY THE CONTRACTOR TO SUCH ITEMS LOCATED OUTSIDE OF THE COUNTY'S RIGHT-OF-WAY, SHALL BE REPLACED WITH LIKE-KIND OR BETTER AT THE CONTRACTOR'S EXPENSE.

ALSO, IF THESE ITEMS ARE LOCATED WITHIN THE PROJECT RIGHT-OF-WAY AND ARE DESIGNATED TO REMAIN, ANY DAMAGE CAUSED BY THE CONTRACTOR TO SUCH ITEMS, SHALL BE REPLACED WITH LIKE-KIND OR BETTER AT THE CONTRACTOR'S EXPENSE.

TREES, BUSHES, SHRUBBERY AND OTHER DAMAGED PLANTINGS DESIGNATED TO REMAIN SHALL BE REPLACED WITHIN 72 HOURS OF REMOVAL AND ARE TO BE THOROUGHLY WATERED-IN. NO SEPARATE PAY.
9. PAVED SURFACES, PAVEMENT MARKERS AND MARKINGS SHALL BE PROTECTED FROM DAMAGE BY TRACKED EQUIPMENT.
10. IRON RODS DISTURBED DURING CONSTRUCTION ARE TO BE REPLACED BY A REGISTERED PROFESSIONAL LAND SURVEYOR FOR THE ORIGINAL PROPERTY OWNER AT NO SEPARATE PAY.
11. CONSTRUCTION STAKING WILL BE PROVIDED BY THE CONTRACTOR. TWO COPIES OF STAKING NOTES TO BE PROVIDED TO THE ENGINEER PRIOR TO CONSTRUCTION.
12. THE COUNTY OR THE COUNTY'S SURVEYOR SHALL PROVIDE A BENCHMARK OR TEMPORARY BENCHMARK AND SURVEY CONTROLS.
13. THE CONTRACTOR SHALL MAINTAIN UPDATED RED-LINED RECORD DRAWINGS ON SITE FOR INSPECTION BY THE ENGINEER.
14. MOWING, MAINTENANCE, AND CLEAN-UP OF THE PROJECT SHALL MEET THE REQUIREMENT OF SPECIFICATION ITEM 560 (NO SEPARATE PAY). MOWING, MAINTENANCE, AND CLEAN-UP IS REQUIRED FOR THE PROJECT LIMITS AND DURATION, REGARDLESS OF THE CONTRACTOR'S SCOPE OF ACTIVITIES WITHIN THE PROJECT LIMITS.
15. THE REMOVAL OF ANY ABANDONED UTILITIES REQUIRED TO COMPLETE THE WORK SHALL BE INCIDENTAL AND NO SEPARATE PAYMENT SHALL BE MADE.
16. IT IS THE CONTRACTOR'S RESPONSIBILITY TO STOCKPILE NECESSARY MATERIAL ON-SITE OR AT A SECURED OFF-SITE LOCATION AT NO ADDITIONAL EXPENSE TO FORT BEND COUNTY. ANY SUITABLE EXCAVATED MATERIAL ON THE PROJECT WHICH IS AVAILABLE AT THE TIME OF NEED; WHETHER FROM STORM SEWER, ROADWAY, AND/OR CHANNEL EXCAVATION, SHALL BE USED BEFORE BORROW IS BROUGHT ON-SITE.
17. MANHOLES, JUNCTION BOXES, INLETS, AND RISERS ARE TO BE PRE-CAST OR CAST IN PLACE.
18. THE FOLLOWING DETAILS ARE MINIMUM REQUIREMENTS AND MAY BE SUPERSEDED BY GEOTECHNICAL ENGINEER RECOMMENDATIONS OR MORE STRINGENT REQUIREMENTS FROM THE CITY'S ETJ PROJECT IS WITHIN.
19. POP UP DRAINS ARE NOT ALLOWED IN FORT BEND COUNTY RIGHT OF WAY.

TRAFFIC SIGNAL

1. ALL ITEMS RELATING TO THE CONSTRUCTION OF TRAFFIC SIGNAL INSTALLATIONS, EXCEPT FOR PUNCHLIST ITEMS, SHALL BE COMPLETED PRIOR TO THE ACTIVATION OF THE SIGNAL SYSTEM(S), UNLESS OTHERWISE REQUIRED BY THE CONTRACT.
2. THE CONTRACTOR SHALL MEET WITH THE FORT BEND COUNTY TRAFFIC SIGNAL MAINTENANCE GROUPS FIELD INSPECTOR, HEREAFTER REFERRED TO AS THE TRAFFIC INSPECTOR, ONE-WEEK PRIOR TO THE DESIRED ACTIVATION OF ANY NEW TRAFFIC SIGNALS. THE CONTRACTOR SHALL OBTAIN VERBAL CONCURRENCE FROM THE TRAFFIC INSPECTOR THAT ADEQUATE PROGRESS HAS BEEN ACHIEVED AND THAT ADEQUATE PREPARATIONS ARE IN PLACE TO SCHEDULE A PRE-"TURN ON" WALK-THROUGH INSPECTION MEETING. IF IN THE OPINION OF THE TRAFFIC INSPECTOR, REQUIRED PROGRESS AND ADEQUATE PREPARATIONS ARE NOT COMPLETE, THE PRE-"TURN ON" WALK-THROUGH INSPECTION MEETING WILL BE POSTPONED TO ALLOW ADEQUATE TIME FOR INCOMPLETE CONSTRUCTION ITEMS AND PREPARATIONS TO BE COMPLETED. AFTER THE CONTRACTOR HAS COMPLETED ALL INCOMPLETE ITEMS AND PREPARATIONS, THE CONTRACTOR SHALL REQUEST THE TRAFFIC INSPECTOR REVIEW AND APPROVE ITEMS PREVIOUSLY IDENTIFIED. IF, IN THE OPINION OF THE TRAFFIC INSPECTOR, ALL ITEMS HAVE BEEN ADDRESSED SATISFACTORILY, THE DATE OF THE PRE-"TURN ON" WALK-THROUGH INSPECTION SHALL BE ESTABLISHED. TIME EXTENSIONS TO THE CONTRACT TIME WILL NOT BE GRANTED FOR DELAYS CAUSED BY INCOMPLETE CONSTRUCTION OR INADEQUATE CONTRACTOR PREPARATIONS REQUIRED TO COMPLETE TRAFFIC SIGNAL SYSTEM WITHIN THE TIMEFRAME SET FORTH IN THE CONTRACT.
3. PRIOR TO ACTIVATING A NEW TRAFFIC SIGNAL, THE CONTRACTOR SHALL REQUEST A PRE-TURN ON WALK-THROUGH INSPECTION MEETING, IN ACCORDANCE WITH ITEM 2. THE PURPOSE OF THE MEETING WILL BE TO ESTABLISH THAT THE TRAFFIC SIGNAL SYSTEM HAS BEEN CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT, AND IN A MANNER THAT DOES NOT ADVERSELY IMPACT PUBLIC SAFETY. THIS MEETING SHALL BE ATTENDED BY THE TRAFFIC INSPECTOR, THE ENGINEER OF RECORD, AND THE CONTRACTOR. AS A MINIMUM, ANY DEFICIENCIES THAT ADVERSELY IMPACT PUBLIC SAFETY WILL BE IDENTIFIED FOR CORRECTION PRIOR TO ESTABLISHING THE "TURN ON" DATE FOR THE TRAFFIC SIGNAL SYSTEM. ITEMS THAT HAVE AN IMPACT ON PUBLIC SAFETY INCLUDE, BUT ARE NOT LIMITED TO: PAVEMENT MARKINGS AND SIGNAGE, PROPER AND ACCEPTABLE BONDING OF EARTH GROUNDS, PROPERLY ALIGNED TRAFFIC SIGNALS, FULLY OPERATIONAL VEHICULAR AND PEDESTRIAN DETECTION, COMPLETED CABINET-TO-FIELD WIRING, AND PROPERLY TERMINATED ELECTRICAL SERVICE CONDUCTORS. FAILURE TO ADDRESS THE PUNCHLIST ITEMS IDENTIFIED AS BEING CRITICAL TO PUBLIC SAFETY PRIOR TO THE PRE-TURN ON WALK-THROUGH MEETING WILL RESULT IN THE "TURN ON" BEING POSTPONED TO ALLOW ADEQUATE TIME FOR THE INCOMPLETE ITEMS TO BE COMPLETED. AT SUCH TIME AS MEETING ATTENDEES AGREE THAT THE TRAFFIC SIGNAL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT, AND THAT THE TRAFFIC SIGNAL, AS IT EXISTS, IS NOT A THREAT TO PUBLIC SAFETY, A "TURN ON" DATE WILL BE ESTABLISHED.
4. THE CONTRACTOR SHALL HAVE 10 DAYS FROM THE DATE THE TRAFFIC SIGNAL SYSTEM IS TURNED ON TO COMPLETE ANY PUNCHLIST ITEMS IDENTIFIED AT THE PRE-"TURN ON" WALK-THROUGH MEETING OR AT THE TIME THE SIGNAL SYSTEM IS ACTIVATED THAT ARE NOT OTHERWISE ADDRESSED PRIOR TO ACTIVATION OF THE TRAFFIC SIGNAL SYSTEM.
5. THE CONTRACTOR'S ATTENTION IS DIRECTED TO STANDARD SPECIFICATION ITEM 1000, TRAFFIC SIGNAL INSTALLATION AND MODIFICATION, WHICH INCLUDES PROCEDURES AND REQUIREMENTS REGARDING ACTIVATION OF TRAFFIC SIGNAL CONTROL SYSTEMS. THE PROJECT MANUAL MAY INCLUDE SPECIAL SPECIFICATIONS AND/OR SPECIAL PROVISIONS RELATED TO PROPOSED TRAFFIC CONTROL SIGNAL SYSTEM INSTALLATION(S) AND MODIFICATION(S) REQUIRING THE CONTRACTOR'S ADHERENCE TO DEFINED CHECKLISTS, PROCEDURES AND/OR REPORTS AT NO ADDITIONAL COST TO THE COUNTY BEYOND THE ESTABLISHED BID ITEMS OF THE CONTRACT.
6. ALL SIGNAL ALTERATIONS MUST BE APPROVED AND COORDINATED THROUGH FBC ENGINEERING AND ROAD & BRIDGE.

TRAFFIC CONTROL

1. THE CONTRACTOR SHALL PROVIDE AND INSTALL TRAFFIC CONTROL DEVICES IN CONFORMANCE WITH PART VI OF THE MOST RECENT EDITION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES AND THE APPROVED TRAFFIC CONTROL PLAN.
2. THE CONTRACTOR SHALL MAINTAIN AT LEAST ONE LANE OF TRAFFIC IN EACH DIRECTION DURING WORKING HOURS EXCEPT DURING FLAGGING OPERATION
3. LANE CLOSURES SHALL BE DURING OFF-PEAK HOURS ONLY (MONDAY THROUGH FRIDAY 9 A.M. TO 4 P.M.) UNIFORMED PEACE OFFICERS OR FLAGGERS IN RADIO CONTACT ARE REQUIRED TO DIRECT TRAFFIC DURING LANE CLOSURES.
4. DETOURS REQUIRE PRIOR APPROVAL OF THE FIELD ENGINEER AND PRECINCT. DETOUR PLANS, IF ALLOWED, MUST INCLUDE APPROPRIATE DETOUR SIGNAGE, PUBLIC NOTICE VIA SIGNAGE TWO WEEKS IN ADVANCE STATING THE DATES OF THE AGREED UPON DATE OF CLOSURE AND DATE THE ROAD WILL RE-OPEN TO TRAFFIC. CONTRACTOR TO USE (WITH PRIOR APPROVAL OF THE FIELD ENGINEER) HIGH EARLY STRENGTH CONCRETE AND OTHER RELATED CONSTRUCTION METHODS TO MINIMIZE THE DURATION OF THE DETOUR AND TO ENSURE THAT THE ROADWAY IS OPEN ON, OR PRIOR TO, THE AGREED UPON DATE.
5. ONE DAY PRIOR TO THE IMPLEMENTATION OF A TRAFFIC CONTROL PLAN PHASE OR STEP, OR THE IMPLEMENTATION OF AN ADDITIONAL, REVISED, OR NEW TRAFFIC CONTROL ELEMENT, THE CONTRACTOR SHALL MEET WITH THE ENGINEER TO GIVE A DETAILED DESCRIPTION OF THE CONTRACTOR'S PLAN AND PREPARATIONS. THE CONTRACTOR SHALL OBTAIN WRITTEN CONCURRENCE FROM THE ENGINEER THAT ADEQUATE PROJECT PROGRESS HAS BEEN ACHIEVED AND THAT ADEQUATE PREPARATIONS ARE IN PLACE PRIOR TO SWITCHING TRAFFIC. IF, IN THE OPINION OF THE ENGINEER, REQUIRED PROGRESS AND ADEQUATE PREPARATIONS ARE NOT COMPLETE, THE CONTRACTOR SHALL NOT IMPLEMENT THE NEXT PHASE, STEP, OR ELEMENT OF TRAFFIC CONTROL UNTIL INCOMPLETE CONSTRUCTION ITEMS OR PREPARATIONS ARE COMPLETED. TIME EXTENSIONS WILL NOT BE GRANTED FOR DELAYS CAUSED BY THE INCOMPLETE CONSTRUCTION ITEMS OR INADEQUATE CONTRACTOR PREPARATIONS REQUIRED TO IMPLEMENT TRAFFIC CONTROL.
6. TRAFFIC CONTROL PER THE CONTRACT IS REQUIRED FOR THE ENTIRE DURATION OF THE PROJECT, INCLUDING THE PUNCHLIST PERIOD. PAYMENT FOR TRAFFIC CONTROL THAT IS PROPERLY INSTALLED FOR LESS THAN A FULL MONTH SHALL BE BASED ON A PERCENTAGE BASIS OF THE TIME INSTALLED. TRAFFIC CONTROL PAYMENTS TO THE CONTRACTOR SHALL END 10 DAYS AFTER SUBSTANTIAL COMPLETION, ALTHOUGH PROPER TRAFFIC CONTROL MUST BE MAINTAINED UNTIL PUNCHLIST COMPLETION.
7. THE PURPOSE OF THE CONSTRUCTION SEQUENCE AND TRAFFIC HANDLING OUTLINED HEREIN IS TO DOCUMENT A VIABLE TCP THAT CAN BE UTILIZED TO CONSTRUCT THE PROJECT. IT IS THE BASIS OF ESTIMATION FOR THE TRAFFIC CONTROL BID ITEMS, AND IS TO BE UTILIZED AND IMPLEMENTED, UNLESS OTHERWISE DIRECTED BY THE ENGINEER. IF THE CONTRACTOR CHOOSES TO USE A DIFFERENT TCP, HE/SHE SHALL PREPARE AND SUBMIT THE ALTERNATIVE TCP TO THE COUNTY FOR APPROVAL NO LESS THAN 10 WORKING DAYS PRIOR TO THE PROPOSED IMPLEMENTATION DATE. THE TCP SHALL BE DRAWN TO SCALE AND SIGNED & SEALED BY A PROFESSIONAL ENGINEER LICENSED TO PRACTICE IN THE STATE OF TEXAS. UPON APPROVAL BY FORT BEND COUNTY, THE ALTERNATIVE PLAN SHALL BECOME THE BASIS FOR A "CHANGE IN CONTRACT" TO REVISE THE TRAFFIC CONTROL BID ITEMS ACCORDINGLY AND BECOME PART OF THE CONTRACT DOCUMENTS.
8. ALL TEMPORARY PAVEMENT MARKINGS ON PERMANENT PAVEMENT SHOULD BE RPMS OR TABS.
9. TRAFFIC PATTERN CHANGES REQUIRE CHANGEABLE MESSAGE BOARDS PLACED AT LEAST 2 WEEKS IN ADVANCE OF PROPOSED CHANGE. QUANTITY, PLACEMENT AND WORDING TBD BY FBC.

NO.	REVISIONS	DATE	NAME
△	ORIGINAL STANDARD ISSUED	3-1-22	RJS
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△			
△			

FORT BEND COUNTY
ENGINEERING DEPARTMENT



r.g. miller
engineers
16340 Park Ten Place
Suite 350
Houston, Texas 77084
(713) 461-9600
TEXAS FIRM REGISTRATION NO. F-487



PROJECT TITLE: WIDENING AND RECONSTRUCTION OF RANSOM ROAD		
DRAWN BY: INIT	FROM SUGAR LAND CITY LIMIT TO SH 99	FBCED STANDARD
CK'D BY: INIT	SHEET DESCRIPTION: PUBLIC WORKS AND SUBDIVISION	03
SCALE: NONE	GENERAL NOTES	SHEET NO:
DATE: 3-1-22	APPROVED BY:	4 / 123

PLOT TIME:

GENERAL NOTES:

- 1. CONTACT THE ENGINEERING INSPECTORS WITH THE CITY'S ENGINEERING DEPARTMENT AT (281) 275-2780 PRIOR TO STARTING WORK TO SCHEDULE A PRE-CONSTRUCTION MEETING.
2. CONTRACTOR IS RESPONSIBLE FOR HAVING ALL BURIED UTILITIES IDENTIFIED, PROTECTED, REPLACED AND/OR PROPERLY REPAIRED IF DAMAGED. REPAIRS/REPLACEMENT SHALL BE AT CONTRACTOR'S EXPENSE.
3. CONTRACTOR SHALL OBTAIN AND MAINTAIN ON SITE ALL APPLICABLE PERMITS AND AN APPROVED COPY OF THE PLANS AND SPECIFICATIONS. NOTIFY THE CITY'S ENGINEERING DEPARTMENT 48 HOURS PRIOR TO COMMENCEMENT OF WORK.
4. CONTRACTOR IS RESPONSIBLE FOR NOTIFYING THE CITY'S ENGINEERING DEPARTMENT 24 HOURS PRIOR TO WEEKDAY WORK REQUIRING INCLUDING, BUT NOT LIMITED TO, LIMING, PAVING OPERATIONS, CONCRETE PLACEMENT, FORMING AND SET-UP, DENSITIES, PIPE INSTALLATION, AND ANY TESTING BY LABORATORIES. THE ENGINEERING DEPARTMENT MAY BE REACHED AT 281-275-2780 OR BY CONTACTING THE ASSIGNED INSPECTOR.
5. ALL SATURDAY WORK SHALL BE REQUESTED, IN WRITING, WITH THE CITY'S ENGINEERING DEPARTMENT AT LEAST 48-HOURS IN ADVANCE. SUNDAY AND HOLIDAY WORK REQUIRES 72 HR. WRITTEN REQUESTS AND MUST BE APPROVED BY THE CITY ENGINEER. FAXES MAY BE SENT TO (281) 275-2771. REQUIRED INSPECTIONS MAY BE SUBJECT TO INSPECTION FEES. NON-NOTIFICATIONS MAY RESULT IN NON-COMPLIANCE, WORK ORDERED STOPPAGE AND DOUBLE INSPECTION FEES.
6. FULL-TIME RESIDENT INSPECTION BY THE PROJECT ENGINEER'S REPRESENTATIVE SHALL BE PROVIDED AT ALL CRITICAL POINTS OF CONSTRUCTION OR AS DEEMED NECESSARY BY THE CITY OF SUGAR LAND.
7. FOLLOW-UP INSPECTIONS OF ALL PUBLIC INFRASTRUCTURE SHALL BE SCHEDULED WITHIN 60 DAYS OF THE INITIAL INSPECTION. A COMPLETE RE-INSPECTION AND A NEW PUNCH LIST MAY BE REQUIRED AFTER THE 60 DAY PERIOD.
8. DESIGN AND CONSTRUCTION SHALL CONFORM TO THE TEXAS COMMISSION OF ENVIRONMENTAL QUALITY RULES AND REGULATIONS FOR PUBLIC WATER SYSTEMS, THE CITY OF SUGAR LAND DESIGN MANUAL (ISSUED 2007), AND THE CITY OF SUGAR LAND STANDARD DETAIL SHEETS. THE CITY OF SUGAR LAND DESIGN STANDARDS SHALL BE ACQUIRED (AND USED) FROM THE ENGINEERING DEPARTMENT, THE LATEST REVISIONS AND/OR AMENDMENTS SHALL BE OBSERVED. WHERE CONFLICT MAY ARISE BETWEEN INFORMATION ON APPROVED CONSTRUCTION DRAWINGS AND/OR PROJECT SPECIFICATIONS AND CITY OF SUGAR LAND STANDARDS, THEN THE CITY DESIGN STANDARDS SHALL GOVERN.
9. ALL STATIONS ARE CENTERLINE OF STREET RIGHT-OF-WAY UNLESS OTHERWISE NOTED ON THE PLANS EXCEPT IN SIDE OR BACK LOT EASEMENTS WHERE CENTERLINE IS CENTER OF PIPE. IN EASEMENTS WHERE SANITARY AND STORM SEWER ARE PRESENT PARALLEL, STATIONS SHALL BE BASED ON CENTERLINE OF STORM SEWER PIPING.
10. ADEQUATE DRAINAGE SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION. ANY DRAINAGE AREA OR STRUCTURE DISTURBED, DURING CONSTRUCTION, SHALL BE RESTORED TO THE SATISFACTION OF THE CITY OF SUGAR LAND. ALL CONSTRUCTION STORM RUNOFF SHALL COMPLY WITH THE REQUIREMENTS OF THE CITY OF SUGAR LAND DESIGN STANDARDS. IF NON-COMPLIANCE OCCURS, CONTRACTOR SHALL REMEDY IMMEDIATELY AT HIS OWN EXPENSE.
11. ANY POLLUTION CONTROL DEVICE, SOD, OR SEEDED AREA DAMAGED, DISTURBED, OR REMOVED SHALL BE REPLACED OR REPAIRED AT THE CONTRACTOR'S EXPENSE. THE CONTRACTOR IS RESPONSIBLE FOR WATERING ANY SEED OR SOD WHICH HE HAS INSTALLED UNTIL ADEQUATE GROWTH IS ACHIEVED TO PREVENT EROSION.
12. STORM WATER POLLUTION PROTECTION SHALL BE DESIGNED, CONSTRUCTED, MAINTAINED AND SHALL BE IN TOTAL COMPLIANCE WITH THE STORM WATER QUALITY MANUAL OF THE CITY OF SUGAR LAND.
13. ANY MATERIALS OR WORKMANSHIP NOT MEETING OR EXCEEDING CITY OF SUGAR LAND STANDARDS IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND WILL BE REPAIRED OR REPLACED AT THE CONTRACTOR'S EXPENSE.
14. THE CONTRACTOR SHALL KEEP THE STREETS, RIGHT-OF-WAY, AND WORK AREA CLEAN OF DIRT, MUD, AND DEBRIS AS NEEDED OR AS REQUIRED BY CITY STAFF.
15. THE CONTRACTOR SHALL PROVIDE AND MAINTAIN ALL REQUIRED TRAFFIC SAFETY CONTROL DEVICES UP TO AND INCLUDING FLAGMEN OR POLICE OFFICERS, IF DEEMED NECESSARY BY THE CITY OF SUGAR LAND.
16. THE CONTRACTOR SHALL CONTACT THE CITY OR LOCAL MUD AS APPROPRIATE TO OPERATE EXISTING UTILITIES AND PRIOR TO MAKING TIES.
17. ALL BACKFILL WITHIN PUBLIC RIGHTS-OF-WAY OR EASEMENTS SHALL BE COMPACTED TO 95% STANDARD PROCTOR DENSITY (IN 8 INCH LIFTS) AND TESTED FOR +/-2% OPTIMUM MOISTURE BY AN APPROVED LAB.
18. IT IS PERMISSIBLE TO USE A BACKHOE FOR TRENCH EXCAVATION IN LIEU OF A TRENCHING MACHINE.
19. THE CONTRACTOR SHALL NEVER UNLOAD ANY TRACK-TYPE VEHICLE OR EQUIPMENT ON ANY EXISTING PAVEMENT OR CROSS OVER ANY EXISTING PAVEMENT OR CURB.
20. ALL FINISH GRADES ARE TO CONFORM TO A MINIMUM SLOPE OF 6" PER 100 FT. POSITIVE DRAINAGE IS DEPICTED BY ARROWS.
21. CONTRACTOR SHALL UNCOVER EXISTING UTILITIES AT ALL "POINTS OF CROSSING" TO DETERMINE IF CONFLICTS EXIST BEFORE COMMENCING ANY CONSTRUCTION. NOTIFY THE ENGINEER AT ONCE OF ANY CONFLICT.
22. ALL FINISHED GRADES SHALL VARY UNIFORMLY BETWEEN FINISHED ELEVATIONS.
23. ALL TESTING PROCEDURES SHALL CONFORM TO THE CITY OF SUGAR LAND STANDARDS. THE INITIAL TESTING EXPENSE SHALL BE BORNE BY THE OWNER. IF ANY OF THE TESTS DO NOT MEET THE TESTING STANDARDS, IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO REMOVE OR REPLACE SUCH MATERIAL SO THE TESTING STANDARDS CAN BE MET. ADDITIONAL TESTING TO MEET COMPLIANCE SHALL BE AT THE CONTRACTOR'S EXPENSE.
24. CONTRACTOR SHALL PROVIDE SHEETING, SHORING, AND BRACING AS NECESSARY TO PROTECT WORKMEN AND EXISTING UTILITIES DURING ALL PHASES OF CONSTRUCTION AS PER O.S.H.A. REQUIREMENTS.
25. ALL MATERIALS AND WORKMANSHIP NOT GOVERNED BY CITY STANDARDS SHALL CONFORM TO THE LATEST VERSION OF THE TXDOT STANDARD SPECIFICATIONS AND THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, AND ANY REVISIONS THERE TO.
26. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SAFEGUARDING AND PROTECTING ALL MATERIALS AND EQUIPMENT STORED ON THE JOBSITE IN A SAFE AND WORKMAN-LIKE MANNER (DURING AND AFTER WORKING HOURS), UNTIL JOB COMPLETION.
27. THE LOADING AND UNLOADING OF ALL PIPE, VALVES, HYDRANTS, MAN-HOLES, AND OTHER ACCESSORIES SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDED PRACTICES AND SHALL BE PERFORMED WITH CARE TO AVOID ANY DAMAGE TO THE MATERIAL. THE CONTRACTOR SHALL LOCATE AND PROVIDE THE NECESSARY STORAGE AREAS FOR MATERIAL AND EQUIPMENT.
28. THE CONTRACTOR SHALL FURNISH ALL MATERIALS, EQUIPMENT, AND LABOR FOR EXCAVATION, INSTALLATION, AND COMPLETION OF THE PROJECT AS SHOWN ON THE PLANS AND SPECIAL PROVISIONS TO COMPLY WITH CITY OF SUGAR LAND STANDARDS.
29. NO PRIVATE UTILITIES (I.E., PHONE, CABLE T.V., ELECTRICITY, ETC.) SHALL BE INSTALLED WITHIN 4 FEET BACK OF CURB.
30. PLANS DO NOT EXTEND TO OR INCLUDE DESIGNS OR SYSTEMS PERTAINING TO THE SAFETY OF THE CONTRACTOR OR ITS EMPLOYEES, AGENTS, OR REPRESENTATIVES IN THE PERFORMANCE OF THE WORK. THE SEAL OF THE REGISTERED PROFESSIONAL ENGINEER(S) HEREON DOES NOT EXTEND TO ANY SUCH SYSTEMS THAT MAY NOW OR HEREAFTER BE INCORPORATED IN THE PLANS. THE CONTRACTOR SHALL PREPARE OR OBTAIN THE APPROPRIATE SAFETY SYSTEMS, INCLUDING CURRENT OSHA STANDARDS FOR TRENCH SAFETY SYSTEMS, SEALED BY A LICENSED PROFESSIONAL ENGINEER. APPROPRIATE TRENCH SAFETY PLANS SHALL BE SUBMITTED BY THE CONTRACTOR PRIOR TO EXECUTION OF A CONTRACT FOR HIS WORK.
31. FOR TRAFFIC SIGNAL CONSTRUCTION, CONTACT THE CITY OF SUGAR LAND INFORMATION TECHNOLOGY DEPARTMENT TO OBTAIN IP ADDRESSES FOR SIGNAL CABINET EQUIPMENT. ALLOW 5 WORKING DAYS FOR THE ADDRESS. ONCE EQUIPMENT HAS BEEN INSTALLED AND COMMUNICATIONS ESTABLISHED WITH THE TRAFFIC MANAGEMENT CENTER, IT WILL COMMISSION THE COMMUNICATION LINK. ALLOW 10 WORKING DAYS FOR COMMISSIONS.

CONCRETE/PAVING NOTES:

- 1. CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL PERMITS AND AUTHORIZATION REQUIRED BY CITY OF SUGAR LAND.
2. CONTRACTOR SHALL HAVE ALL UTILITIES LOCATED PRIOR TO CONSTRUCTION AND WILL REPAIR OR REPLACE ANY DAMAGE AT CONTRACTOR'S EXPENSE.
3. PAVING CONTRACTOR SHALL PROTECT WATER, SEWER, AND DRAINAGE FACILITIES AND WILL REPLACE ANY DAMAGED FACILITIES AT HIS OWN EXPENSE. ALL MAN-HOLES AND VALVES WITHIN THE PAVEMENT AREA SHALL BE ADJUSTED TO FINISH GRADE BY THE PAVING CONTRACTOR WITH THE USE OF APPROVED BLOCKOUTS.
4. WHEN THE TOP OF CURB OR BOTTOM OF SIDEWALK SLAB ELEVATION VARIES FROM THE NATURAL GROUND, THE PAVING CONTRACTOR SHALL BACKFILL IN LAYERS NOT EXCEEDING 8-INCHES IN DEPTH. EACH LAYER WILL BE COMPACTED TO A MINIMUM OF 95% STANDARD PROCTOR DENSITY. THE DISTURBED AREA SHALL BE SEED, SODDED, FERTILIZED, AND/OR SILT BARRIER FENCED WITHIN 10 WORKING DAYS. THE TYPE OF POLLUTION CONTROL WILL BE DETERMINED BY THE APPROVED PLANS AND/OR THE CITY OF SUGAR LAND CITY ENGINEER.
5. ALL PAVING SHALL BE IN ACCORDANCE WITH THE CITY OF SUGAR LAND DESIGN STANDARDS, APPROVED PLANS AND SPECIFICATIONS WITH THE LATEST REVISIONS OR AMENDMENTS. IN THE EVENT OF A CONFLICT, THE CITY OF SUGAR LAND DESIGN STANDARDS GOVERNS.
6. PAVING CONTRACTOR SHALL PROVIDE AND MAINTAIN SILT PROTECTION FENCES ON ALL STAGE I CURB INLETS. THE PAVING CONTRACTOR SHALL MAINTAIN ANY OTHER POLLUTION CONTROLS ESTABLISHED, I.E., ADDITIONAL SILT BARRIERS, SAND BAGS, ETC., FOR THE DURATION OF THE PROJECT. ANY DAMAGED OR MISSING DEVICES SHALL BE REPAIRED OR REPLACED AT THE CONTRACTOR'S EXPENSE.
7. EXISTING PAVEMENTS, CURBS, SIDEWALKS, DRIVEWAYS, ETC., DAMAGED OR REMOVED DURING CONSTRUCTION SHALL BE REPLACED TO THE CITY OF SUGAR LAND STANDARDS AT THE CONTRACTOR'S EXPENSE.
8. CONDITION OF THE WORK AREA (INCLUDING ROADS, RIGHT-OF-WAYS, ETC.) UPON COMPLETION OF THE JOB SHALL BE AS GOOD OR BETTER THAN THE CONDITION PRIOR TO STARTING THE WORK.
9. ALL DRIVEWAYS WILL BE LOCATED TO AVOID EXISTING CURB INLET STRUCTURES.
10. REDWOOD AND KEYWAYS SHALL NOT INTERSECT WITHIN 2 FEET OF AN INLET.
11. AT INITIAL AND FINAL INSPECTIONS THE PAVEMENT WILL BE FLOODED TO CHECK FOR BIRDBATHS AND CRACKS. FLOODING OF STREETS SHALL OCCUR 1 HOUR PRIOR TO INSPECTION.
12. ALL CONCRETE PLACED SHALL BE UNIFORMLY SPRAYED WITH A MEMBRANE CURING COMPOUND AS DESCRIBED IN ITEM 526 IN THE TXDOT STANDARD SPECIFICATIONS FOR CONSTRUCTION. IMPROPER APPLICATION WILL RESULT IN THE REJECTION OF THE CONCRETE.
13. SIX (6) INCH, 5.5 SK, 3500 PSI @ 28 DAYS, REINFORCED WITH #4 REBAR, 24" C.C. EACH WAY IS THE MINIMUM ACCEPTABLE CONSTRUCTION FOR LOCAL STREETS.
14. SEVEN (7) INCH, 5.5 SK, 3500 PSI @ 28 DAYS, REINFORCED WITH #4 REBAR, 18" C.C. EACH WAY IS THE MINIMUM ACCEPTABLE CONSTRUCTION FOR COLLECTOR STREETS.
15. EIGHT (8) INCH, 5.5 SK, 3500 PSI @ 28 DAYS, REINFORCED WITH #4 18" C.C. EACH WAY IS THE MINIMUM ACCEPTABLE FOR ARTERIAL STREETS.
16. WHEN CONCRETE PAVEMENT INTERSECTS THICKER PAVEMENT, THE THICKER PAVEMENT SHALL BE CONSTRUCTED TO THE ENDS OF ALL CURB RETURNS.
17. ALL RETURNS SHALL HAVE A MIN. 25 FT. RADIUS AT THE FACE OF CURB UNLESS OTHERWISE NOTED.
18. ALL INTERSECTIONS SHALL BE CONSTRUCTED WITH WHEELCHAIR RAMPS IN ACCORDANCE WITH THE TEXAS ACCESSIBILITY STANDARD, THE AMERICAN DISABILITIES ACT, AND THE CITY OF SUGAR LAND STANDARDS (LATEST REVISIONS). (NO BLOCKOUTS)
19. CONCRETE SIDEWALKS SHALL BE CONSTRUCTED WITHIN EACH STREET RIGHT-OF-WAY IN ACCORDANCE WITH CITY OF SUGAR LAND, THE A.D.A., AND THE T.A.S. STANDARDS (LATEST REVISIONS).
20. CRACKS LARGER THAN 1/16-INCH ARE NOT ACCEPTABLE IN NEW PAVEMENT. CRACKS 1/16-INCH OR LESS SHALL BE ADDRESSED ON AN INDIVIDUAL BASIS BY DRILL AND EPOXY INJECTION, SUBJECT TO APPROVAL OR REJECTION.
21. PROPER TESTING AND LAB DOCUMENTATION IS REQUIRED. FAILURE TO MEET THE MINIMUM PAVEMENT REQUIREMENTS WILL RESULT IN THE REJECTION OF SAID PAVEMENT. IMMEDIATE REMOVAL AND REPLACEMENT OF SUBSTANDARD PAVEMENT SECTIONS WILL BE NECESSARY TO SATISFY THESE REQUIREMENTS.
22. 4-CONCRETE CYLINDERS, SLUMP, AND AIR ENTRAINMENT TESTS ARE REQUIRED FOR EACH 100 CUBIC YARDS OF CONCRETE PAVING WITH A MINIMUM OF ONE SET OF 4 PER PLACEMENT. THE CITY OF SUGAR LAND RESERVES THE RIGHT TO REQUEST ANY ADDITIONAL TESTS AT THE CONTRACTOR'S EXPENSE, IF ANY MATERIAL APPEARS BELOW STANDARDS.
23. NO. 3 REBAR, 18-INCH C.C. E.W. IS THE MINIMUM ACCEPTABLE FOR SIDEWALKS, NUMBER 4-REBAR, 24-INCH C-C, EACH WAY IS THE MINIMUM ACCEPTABLE FOR COMMERCIAL APPROACHES, HANDICAP RAMPS, RESIDENTIAL APPROACHES AND DRIVEWAYS.
24. COLD WEATHER PRECAUTIONS. CONCRETE PAVEMENT SHALL NOT BE PLACED WHEN THE AMBIENT TEMPERATURE IS 40F AND FALLING. CONCRETE MAY BE PLACED IF THE AMBIENT TEMPERATURE IS 35F AND RISING. CONTRACTOR SHALL PROVIDE AN APPROVED COVERING MATERIAL (COTTON MATS, POLYETHYLENE SHEETING, ETC.) IN THE EVENT TEMPERATURE SHOULD FALL BELOW 32F. NO SALT OR OTHER CHEMICALS SHALL BE ADDED TO CONCRETE TO PREVENT FREEZING.
25. HOT WEATHER. NO CONCRETE PAVEMENT MIXTURE SHALL BE PLACED IF THE MIXTURE TEMPERATURE IS ABOVE 95F. AIR AND WATER REDUCER ARE REQUIRED IF MIXTURE TEMPERATURE REACHES 85F OR ABOVE.
26. IF NO AIR AND WATER REDUCER HAS BEEN ADDED, NO CONCRETE SHALL BE PLACED IF MORE THAN 60 MINUTES PAST BATCH TIME. IF AIR AND WATER REDUCER HAS BEEN ADDED, NO CONCRETE SHALL BE PLACED IF MORE THAN 90 MINUTES PAST BATCH TIME.
27. STRUCTURE TEMPERATURES AND TIMING FOR CONCRETE PLACEMENT MAY VARY. REFER TO TXDOT STANDARDS ITEM 420 FOR DETAILS.
28. TRANSVERSE EXPANSION JOINTS SHALL BE PLACED AT ALL POINTS OF CURVATURE, POINTS OF TANGENCY AND ALL INTERSECTION CURB RETURN POINTS. MAXIMUM SPACING SHALL BE 200' AND BE SEALED WITH SEALANT CONFORMING TO TXDOT ITEM 360 (& ITEM 438) AND TXDOT DMS-6310, CLASS-2.
29. CONTROL JOINTS SHALL BE PLACED AT 20' C-C.
30. EXPANSION JOINT LAYOUT FOR INTERSECTIONS SHALL BE PROVIDED BY ENGINEER FOR CITY APPROVAL.
31. NO WIRE MESH IS ALLOWED IN ANY CONCRETE WITHIN THE CITY LIMITS OR ETJ.
32. ALL REBAR SHALL BE 100% TIED. OVERLAPS SHALL BE DOUBLE TIED MINIMUM. REINFORCED STEEL BE A MINIMUM 60% COVERAGE.
33. ALL NEW CURB REQUIRES 3,000 P.S.I. @ 28-DAYS. 4 CONCRETE CYLINDERS, SLUMP, AND AIR ENTRAINMENT TESTS ARE REQUIRED FOR EACH 50 CUBIC YARDS OF CONCRETE CURB WITH A MINIMUM OF ONE SET OF 4 PER PLACEMENT.
34. A CITY INSPECTOR MUST BE PRESENT ON ALL PROOF ROLLS, LIME DEPTH CHECKS AND DENSITY TESTS AND MUST BE CONTACTED AT LEAST 24 HOURS PRIOR TO THE TEST.
35. CONCRETE MIX DESIGN MUST BE SENT TO THE CITY FOR APPROVAL A MINIMUM 72 HOURS BEFORE THE FIRST CONCRETE POUR.
36. FOR A REGULAR MIX, SLUMP SHALL BE A MAXIMUM OF 5". FOR A MIX WITH A WATER REDUCER, SLUMP SHALL BE A MAXIMUM OF 6".
37. VEHICLES OF ALL TYPES ARE PROHIBITED FROM DRIVING ON NEW PAVEMENTS SEVEN (7) DAYS AFTER THE CONCRETE POUR AND UNTIL THE CONCRETE HAS REACHED A MINIMUM OF 3,000 PSI. PAVEMENT PROTECTION SUCH AS A DIRT LAYER OF AT LEAST 12" IS REQUIRED FOR TRACK EQUIPMENT AT PAVEMENT CROSSINGS.
38. IN LIEU OF MECHANICALLY CONTROLLED VIBRATORS CONTROLLED BY A SLIP-FORM PAVING MACHINE, HAND MANIPULATED MECHANICAL VIBRATORS SHALL BE USED FOR PROPER CONSOLIDATION OF CONCRETE IN ALL PAVEMENT AREAS (ALONG FORMS, AT JOINTS, ETC.)
39. ALL CONCRETE STREETS AND BRIDGE SURFACES SHALL HAVE A "BAKER BROOM" FINISH, WHILE ALL OTHER CONCRETE PLACEMENT SHALL HAVE A MEDIUM BROOM FINISH.
40. ALL PAVEMENT MARKINGS TO BE DONE IN CONFORMANCE WITH THE LATEST VERSION OF TMUTCD AND TXDOT STANDARD SPECIFICATIONS AND ANY REVISIONS THERE TO.
41. REFER TO GENERAL NOTES.

CEMENT STABILIZED SAND:

- 1. ALL STABILIZED SAND SHALL BE A MINIMUM OF 1.5 SK PER CUBIC YARD.
2. CEMENT STABILIZED SAND (C.S.S.) SHALL ACHIEVE A MINIMUM OF 100 PSI WITHIN 48 HOURS.
3. A MINIMUM OF 2 RANDOM SAMPLES SHALL BE TAKEN EACH WEEK. (FOR SMALLER PROJECTS, ONE SAMPLE MAY SUFFICE WITH CITY OF SUGAR LAND APPROVAL.) THE CITY OF SUGAR LAND RESERVES THE RIGHT TO REQUIRE ADDITIONAL TESTS, AT THE CONTRACTORS EXPENSE IF IT IS DEEMED NECESSARY.
4. ANY C.S.S. NOT MEETING CITY OF SUGAR LAND STANDARDS SHALL BE REMOVED AND REPLACED AT THE CONTRACTOR'S EXPENSE.
5. BOTH CEMENT CONTENT AND COMPRESSIVE TESTS SHALL BE CONDUCTED ON C.S.S. SAMPLES.
6. ALL C.S.S. SHALL BE COMPACTED IN MAXIMUM OF 8-INCH LIFTS AND REQUIRED TO REACH A MINIMUM DENSITY OF 95%. 7. REFER TO GENERAL NOTES.

BANK SAND:

- 1. BANK SAND IS DEFINED AS A WELL-GRADED SAND, FREE OF SILT, CLAY, FRIABLE OR SOLUBLE MATERIALS AND ORGANIC MATER, MEETING THE UNIFIED SOILS CLASSIFICATIONS SYSTEM GROUP SYMBOL SW CRITERIA WITH A PLASTICITY INDEX OF LESS THAN 10. NO MORE THAN 12% OF MATERIAL CAN PASS THE No. 200 SIEVE.

ASPHALT - OILS AND EMULSIONS:

- 1. CONTRACTOR SHALL VERIFY LINES AND GRADES AND THAT COMPACTED BASE IS READY TO SUPPORT LOADS.
2. BASE MATERIAL SHALL BE DRY AND THOROUGHLY CLEAN OF LOOSE MATERIAL PRIOR TO APPLICATION.
3. OILS & EMULSION SHALL BE DISTRIBUTED EVENLY AND SMOOTHLY UNDER PRESSURE NECESSARY FOR PROPER DISTRIBUTION.
4. MAINTAIN REQUIRED SURFACE CONDITIONS UNTIL ACCEPTED BY THE CITY OF SUGAR LAND.
5. PRIME COAT SHALL BE M.C.-30, M.C.-70 OR E.P.R.1 PRIME AND SHALL COMPLY WITH TXDOT STANDARD SPECIFICATIONS FOR CONSTRUCTION OF HIGHWAYS, STREETS, AND BRIDGES (1993) AND ITS LATEST REVISIONS.
6. TACK COAT SHALL BE SS-1 AND SHALL COMPLY TO TXDOT, S.S.C.H.S. & B. (1993) AND ITS LATEST REVISIONS.
7. M.C.-30 AND M.C.-70 AND EPR-1 PRIME SHALL BE DISTRIBUTED AT A RATE OF .25 TO .35 GALLONS PER SQUARE YARD. AND MAY NOT BE APPLIED WHEN AMBIENT TEMPERATURE IS 50F AND FALLING. (NOTICE: CUTBACK ASPHALTS MAY NOT BE USED DURING THE PERIOD OF APRIL 16 THROUGH SEPT. 15 AS PER ASTM D-244).
8. EPR-1 MAXIMUM WATER DILUTION IS 3 PARTS WATER TO ONE PART EPR-1.
9. SS-1 TACK COAT SHALL BE APPLIED AT A RATE NOT TO EXCEED 0.06 GAL. PER SQUARE YARD OF SURFACE AREA. CONTACT JOINTS, CURBS, ETC. SHALL BE PAINTED WITH AN EVEN THIN COAT APPLIED BY BRUSH OR BROOM. COATING MATERIAL SHALL BE HEATED TO 125F TO 180F WHEN APPLIED. TACK COAT MAY BE APPLIED WHEN AMBIENT TEMPERATURES ARE 40F AND RISING. TACK COAT MAY NOT BE APPLIED IF AMBIENT AIR IS 50F AND FALLING.

LIMING SUBGRADE:

- 1. LIME SHALL BE A "SLURRY" AS PER TXDOT 260 UNLESS SPECIFICALLY RECOMMENDED BY THE GEOTECHNICAL ENGINEER AND APPROVED BY THE CITY ENGINEER.
2. ALL LIME SLURRIES SHALL BE FURNISHED AT OR ABOVE THE MINIMUM "DRY SOLIDS" CONTENTS AS APPROVED BY THE ENGINEER.
3. SUBGRADES SHALL BE STABILIZED WITH A MINIMUM SIX PERCENT (6%) LIME BY WEIGHT, EIGHT INCHES (8") THICK THE INITIAL MIX TO REDUCE PLASTICITY INDEX (PI) TO 20 OR LESS AS DETERMINED BY THE LIME SERIES. THE FINAL MIX SHALL BE AT SIX INCHES (6") THICK.
4. LIME DRY SOLID CONTENT TESTS SHALL BE CONDUCTED ON SITE, ONCE PER ONE-HUNDRED (100) TONS OF MATERIAL DISTRIBUTED, UNLESS OTHERWISE NOTED.
5. THE SUBGRADE SHALL BE SHAPED AND GRADED TO CONFORM TO THE TYPICAL SECTIONS, AS SHOWN ON THE PLANS, PRIOR TO TREATING THE EXISTING MATERIAL.
6. UNLESS APPROVED BY THE CITY ENGINEER, LIME OPERATIONS SHALL NOT BE STARTED WHEN THE AMBIENT AIR TEMPERATURE IS BELOW 40F. AND FALLING. LIMING MAY, WITH APPROVAL, BE STARTED WHEN THE AMBIENT AIR TEMPERATURE IS 35F AND RISING. LIME SHALL NOT BE PLACED WHEN WEATHER CONDITIONS, IN THE ENGINEER'S OPINION, ARE UNSUITABLE.
7. THE SUBGRADE MATERIAL AND SLURRY SHALL BE THOROUGHLY MIXED, BROUGHT TO THE PROPER MOISTURE CONTENT (+/-) AND LEFT TO CURE USUALLY 3 DAYS (72 HRS.) MINIMUM AS APPROVED BY THE CITY ENGINEER.
8. AFTER CURING, THE SUBGRADE SHALL BE REMIXED UNTIL PULVERIZATION REQUIREMENTS ARE MET, AS PER TXDOT.
9. PERCENT MINIMUM PASSING 1-3/4" SIEVE.....100
PERCENT MINIMUM PASSING 3/4" SIEVE.....85
PERCENT MINIMUM PASSING No. 4 SIEVE.....80
10. SIEVE TESTS SHALL BE CONDUCTED EVERY 150 LF ON ALTERNATING LANES OF TRAFFIC OR EVERY 300 LF ON SINGLE LANES AS REQUIRED. AT LEAST ONE TEST SHALL BE CONDUCTED ON EACH ROADWAY OR CUL-DE-SAC.
11. THE MATERIAL SHALL BE AERATED OR MOISTENED TO + OR -2% OPTIMUM PRIOR TO COMPACTION. COMPACTION TO A MINIMUM 95% DENSITY SHALL BEGIN IMMEDIATELY AFTER ALL PULVERIZATION AND MOISTURE REQUIREMENTS ARE MET. THROUGHOUT THIS ENTIRE OPERATION, THE SURFACE SHALL BE SMOOTH AND IN CONFORMITY WITH THE LINES AND GRADES ON THE PLANS.
12. WHEN THE SUBGRADE FAILS TO MEET DENSITY REQUIREMENTS OR SHOULD IT LOSE THE REQUIRED STABILITY, DENSITY OR FINISH, IT SHALL BE REWORKED IN ACCORDANCE WITH TXDOT SUBARTICLE 260.4(7) "REWORKING A SECTION", WHICH MAY REQUIRE AN ADDITIONAL 25% OF THE SPECIFIED LIME AMOUNT.
13. THE TREATED SUBGRADE SHALL BE KEPT MOIST AND PREVENTED FROM DRYING. IN THE EVENT OF A ONE-HALF (1/2) INCH RAINFALL AND/OR IF THE MATERIAL BECOMES DRY AND IS NOT IN COMPLIANCE WITH THE +/-2% OPTIMUM MOISTURE, DENSITY AND MOISTURE TESTS SHALL BE RETAKEN.
14. LIME DEPTH DETERMINATIONS WILL BE CONDUCTED AT EACH LOCATION OF DENSITY TESTING, LIME-STABILIZED SUBGRADE SHALL BE A MINIMUM OF 6% AT 8" UNLESS OTHERWISE DIRECTED BY CITY ENGINEER. DENSITY TESTING SHALL BE DONE IMMEDIATELY PRIOR TO PLACEMENT OF REINFORCING STEEL, AND SHALL BE COMPACTED TO A MINIMUM OF 95%. LIME DEPTH TESTS SHALL BE CONDUCTED AT EVERY 150 LF OF ROADWAY ON ALTERNATING LANES OR EVERY 300 LF OF SINGLE LANE. AT LEAST ONE TEST SHALL BE CONDUCTED ON EACH ROADWAY AND/OR CUL-DE-SAC.
15. NO SUBGRADE SHALL BE COVERED WITH ANOTHER MATERIAL UNLESS APPROVED BY THE CITY OF SUGAR LAND AND LIME DEPTH TESTS HAVE BEEN COMPLETED.

HOT MIX ASPHALTIC BASE COURSE:

- 1. NO HOT MIX ASPHALTIC BASE MAY BE INSTALLED UNTIL THE SUBGRADE HAS BEEN PROPERLY PREPARED AND TESTED AS PER THE PLANS AND SPECIFICATIONS. THE SUBGRADE SHALL BE INSPECTED AND APPROVED BY THE CITY OF SUGAR LAND BEFORE ANY BASE MATERIALS ARE INSTALLED.
2. HOT MIX ASPHALTIC BASE MATERIALS, HANDLING, AND INSTALLATION SHALL COMPLY WITH TXDOT STANDARDS FOR CONSTRUCTION OF HIGHWAYS, STREETS, AND BRIDGES 1995 (SECTION 02711) AND ITS LATEST REVISIONS.
3. HOT MIX ASPHALTIC MATERIALS SHALL BE AT TEMPERATURES BETWEEN 250F AND 325F WHEN PLACED.
4. MATERIALS MAY NOT BE PLACED IN WET CONDITIONS OR IF THE AMBIENT TEMPERATURE IS BELOW 50F AND FALLING. MATERIALS MAY BE INSTALLED IF THE AMBIENT TEMPERATURE IS TAKEN IN THE SHADE AND IS 40F AND RISING.
5. PLACE BASE COURSES 4 INCHES OR GREATER IN THICKNESS IN TWO OR MORE LAYERS, EACH HAVING A COMPACTED THICKNESS OF NOT GREATER THAN 4 INCHES.
6. BASE MATERIAL MAY ONLY BE PLACED AGAINST CLEAN, STRAIGHT EDGES. SAW CUTTING, FULL DEPTH, IS REQUIRED IF EXISTING EDGES ARE ROUGH OR UNEVEN.
7. COMPACTION SHALL BEGIN WHILE MATERIAL IS STILL HOT AND AS SOON AS IT WILL BEAR THE ROLLER OR COMPACTOR WEIGHT WITHOUT UNDUE DISPLACEMENT OR HAIR CRACKING.
8. COMPACT SURFACE UNIFORMLY WITH ROLLERS OR TAMPERS IN LOCATIONS NOT READILY ACCESSIBLE (I.E., ALONG CURBS, WALLS, ETC.).
9. UNLESS OTHERWISE SPECIFIED, COMPACT DENSITY TO NOT LESS THAN 95% OF MAXIMUM POSSIBLE DENSITY.
10. A CERTIFIED LAB SHALL BE ON SITE AT ALL TIMES TO TEST AND PROPERLY DOCUMENT THE CONSTRUCTION METHODS AND QUALITY OF MATERIALS.
11. ALL MATERIALS AND WORKMANSHIP SHALL COMPLY TO A.S.T.M. ASPHALT INSTITUTE AND CITY OF SUGAR LAND REQUIREMENTS. FAILURE TO COMPLY WILL RESULT IN REJECTION OF SAID MATERIALS AND SUCH SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.
12. DO NOT OPEN BASE TO TRAFFIC UNTIL IT CAN BE MAINTAINED IN GOOD CONDITION AND IS CAPABLE OF SUPPORTING VEHICLE WEIGHT WITHOUT DAMAGE OR DEGRADATION.
13. DENSITIES SHALL BE TAKEN AT A MINIMUM OF AT LEAST ONCE PER 300 LF OF DRIVE LANE OR ONCE PER 250 SQ. YD., WHICHEVER MAY APPLY AND SHALL BE STAGGERED RELATIVE TO TESTING SITES IN ADJUTING TRAFFIC LANES. FAILURE TO MEET MINIMUM REQUIREMENTS SHALL RESULT IN THE REPLACEMENT OF SAID MATERIAL AT CONTRACTOR'S EXPENSE.

REVISION DATE: OCTOBER 2021

Professional Engineer Seal for Emily Layne Lane, State of Texas, License No. 130701, dated 5/4/2023. City of Sugar Land, Texas Engineering Department. Construction Plans for Widening & Reconstruction of Ransom Rd. General Construction Notes I. Job No. SL-01, Sheet 5 of 120.

ASPHALTIC CONCRETE PAVEMENT:

- 1. ASPHALTIC MATERIAL AND WORKMANSHIP SHALL COMPLY WITH ASTM C 33, ASTM C 131, ASTM C 136, AND TXDOT STANDARD SPECIFICATIONS FOR CONSTRUCTION OF HIGHWAYS, STREETS AND BRIDGES (1993) AND ITS LATEST REVISIONS. ASPHALT SHALL BE TYPE D-100 UNLESS SPECIFICALLY NOTED AND APPROVED BY CITY OF SUGAR LAND ENGINEER.
2. CONTRACTOR SHALL VERIFY ELEVATIONS AND GRADES AND THAT BASE COURSE IS READY TO SUPPORT IMPOSED LOADS.
3. APPLY A PRIME COAT AS PER CITY OF SUGAR LAND AND TXDOT STANDARDS. DO NOT APPLY TACK COAT UNTIL PRIMED BASE COURSE HAS CURED AND IS APPROVED BY THE CONSTRUCTION INSPECTOR.
4. TACK COAT SHALL COMPLY TO CITY OF SUGAR LAND AND TXDOT STANDARDS.
5. DO NOT USE CUTBACK ASPHALT APRIL 16 THROUGH SEPTEMBER 15.
6. DO NOT PLACE ASPHALT WHEN AMBIENT TEMPERATURE IS BELOW 50°F AND FALLING. MIXTURE MAY BE PLACED WHEN AMBIENT TEMPERATURE IS 40°F AND RISING.
7. ON PUBLIC ROADS, STREETS, AND RIGHT-OF-WAY, ASPHALT SHALL BE PLACED IN MAXIMUM 2-INCH LIFTS. IN THE EVENT MORE THAN ONE LIFT IS REQUIRED, EACH LIFT SHALL BE COMPACTED, TESTED, AND GIVEN ADEQUATE TIME FOR THE PREVIOUS LIFT TO CURE AND DRY BEFORE THE NEXT LIFT IS PLACED. IF COMPLETELY CURED AND DRIED, A TACK COAT WILL BE REQUIRED BETWEEN LIFTS.
8. A CERTIFIED LAB SHALL BE ON SITE AT ALL TIMES TO TEST AND PROPERLY DOCUMENT THE CONSTRUCTION METHODS AND QUALITY OF MATERIALS.
9. ROLLING PATTERNS SHALL BE ESTABLISHED BY THE CONTRACTOR, AS RECOMMENDED BY THE LAB, TO ACHIEVE THE MAXIMUM COMPACTION. THE SELECTED ROLL PATTERN SHALL BE FOLLOWED UNLESS CHANGES IN THE PLACEMENT OR MIXTURE OCCUR, WHICH AFFECT COMPACTION. COMPACTION OF 95% SHALL BE ACHIEVED.
10. ASPHALT SHALL NOT BE PLACED ON WET BASE.
11. NO "BIRDBATHS" ARE ALLOWED.
12. IF THE SURFACE RAVELS (SEPARATES), FLUSHES, RUTS, OR DETERIORATES IN ANY MANNER PRIOR TO FINAL ACCEPTANCE, THE CONTRACTOR WILL CORRECT THIS CONDITION AT HIS EXPENSE TO THE SATISFACTION OF THE CITY OF SUGAR LAND ENGINEER.
13. THE CONTRACTOR SHALL PROTECT THE PAVEMENT UNTIL DIRECTED BY THE CITY ENGINEER TO OPEN SAID PAVEMENT TO TRAFFIC.
14. RIDE QUALITY SHALL COMPLY WITH TXDOT ITEM 585, "RIDE QUALITY FOR PAVEMENT SURFACES".
15. SPECIAL NOTE: CONTRACTOR, WHILE MAXIMIZING COMPACTION, SHALL USE CAUTION NOT TO "OVER-ROLL" ASPHALT. PAVEMENT STRETCHED OR OVER-ROLLED, WHERE COMPACTION IS BROKEN, SHALL NOT BE ACCEPTED AND SHALL BE REPAIRED OR REPLACED TO THE CITY ENGINEER'S SATISFACTION AT THE CONTRACTOR'S EXPENSE.
16. CORE SAMPLES SHALL BE TAKEN RANDOMLY AT A MINIMUM OF EVERY 300 LF PER LANE OF ROADWAY OR ONE PER EVERY 250 SQ. YD., WHICHEVER IS APPLICABLE AND SHALL BE STAGGERED RELATIVE TO TESTING SITES IN ADJUTING TRAFFIC LANES.
17. ALL ASPHALTIC CONCRETE PAVEMENT REPAIRS SHALL BE SAW CUT TO FULL ASPHALT DEPTH. REFER TO ASPHALT, STABILIZED BASE, FLEXIBLE BASE, ASPHALT BASE, AND OIL AND EMULSION NOTES. ALL DAMAGED BASE AND SUBGRADES SHALL BE REMOVED AND REPLACED TO THE CITY ENGINEER'S SATISFACTION, AT THE CONTRACTOR'S EXPENSE. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY AREA DAMAGED DURING CONSTRUCTION, INCLUDING AREAS OUTSIDE THE DESIGNATED REPAIR.

STABILIZED CRUSHED CONCRETE:

- 1. TEST AND ANALYSIS OF AGGREGATE AND BINDER MATERIALS WILL BE PERFORMED IN ACCORDANCE WITH ASTM D 1557 AND ASTM D 4318. CEMENT SHALL BE ASTM C 150 TYPE I.
2. ALL MATERIALS AND WORKMANSHIP SHALL COMPLY WITH TXDOT STANDARD SPECIFICATIONS FOR CONSTRUCTION OF HIGHWAYS, STREETS AND BRIDGES (1993) AND ITS LATEST REVISIONS AND CITY OF SUGAR LAND STANDARDS.
3. PRIME COAT SHALL BE M.C. 30 OR EPR-1 PRIME.
4. DESIGN MIX FOR MINIMUM AVERAGE COMPRESSIVE STRENGTH OF 200 PSI IN 48 HRS. PROVIDE MINIMUM CEMENT CONTENT OF 2 SK PER TON OF MIX. CEMENT CONTENT MAY BE RAISED AT THE CONTRACTOR'S EXPENSE IF TESTS ON FIELD SAMPLES FALL BELOW 200 PSI.
5. THREE SAMPLES SHALL BE MOLDED EACH DAY FOR EACH 300 TONS OF PRODUCTION. COMPRESSIVE STRENGTH SHALL BE THE AVERAGE OF THREE TESTS FOR EACH PRODUCTION LOT. CONTRACTOR SHALL REPLACE, AT HIS OWN EXPENSE, ANY MATERIAL BELOW MINIMUM REQUIREMENTS.
6. CONTRACTOR SHALL VERIFY LINES, GRADES, AND COMPACTED SUBGRADING AS READY TO RECEIVE MATERIALS PRIOR TO ITS PLACEMENT.
7. CEMENT STABILIZED BASE MAY NOT BE PLACED IF AMBIENT TEMPERATURE IS 40°F AND FALLING. BASE MATERIAL MAY BE PLACED IF AMBIENT TEMPERATURE IS 35°F AND RISING.
8. MATERIAL MAY NOT BE PLACED IN LIFTS EXCEEDING 6 INCHES IN DEPTH. EACH LIFT SHALL HAVE DENSITIES TAKEN.
9. CEMENT STABILIZED BASE MAY NOT BE STORED FOR LONG PERIODS. DELIVERY OF MATERIAL AND UTILIZATION SHOULD BE TIMED ACCORDINGLY. MAXIMUM TIME ALLOWED 3 HRS. FROM BATCH TIME TO HAVING BEEN INSTALLED.
10. CEMENT STABILIZED BASE SHALL NOT BE INSTALLED IN WET OR SOFT AREAS.
11. COMPACT TO MINIMUM DENSITY OF 95% OF MAXIMUM DRY DENSITY, UNLESS OTHERWISE INDICATED ON DRAWINGS, MOISTURE SHALL BE BETWEEN + OR -2% OPTIMUM AS DETERMINED BY ASTM D 698.
12. AFTER COMPACTING FINAL COURSE, BLADE SURFACE TO FINAL GRADE. ANY IRREGULARITIES, WEAK SPOTS, AREAS OF EXCESSIVE WETNESS, OR SURFACE HAIR LINE CRACKING SHALL BE REPAIRED AND/OR REPLACED AT CONTRACTOR'S EXPENSE.
13. A CERTIFIED LAB SHALL BE ON SITE AT ALL TIMES TO TEST AND PROPERLY DOCUMENT THE CONSTRUCTION METHODS AND QUALITY OF MATERIALS.
14. COMPACTION TESTING WILL BE PERFORMED IN ACCORDANCE WITH ASTM D 1556 OR ASTM D 2922 AND ASTM D 3017 AT RANDOMLY SELECTED LOCATIONS AS DIRECTED BY CITY OF SUGAR LAND CONSTRUCTION INSPECTOR.
15. A MINIMUM OF ONE CORE SHALL BE TAKEN AT RANDOM LOCATIONS PER 300 LF PER LANE OF ROADWAY OR ONE PER 250 SQ. YD., WHICHEVER MAY APPLY AND SHALL BE STAGGERED RELATIVE TO TESTING SITES IN ADJUTING TRAFFIC LANES. CURE FOR A MINIMUM OF 7 DAYS BEFORE ADDING ASPHALT PAVEMENT COURSES.
17. COVER SURFACE WITH CURING MEMBRANES AT THE FOLLOWING RATES: MC-30-.01 GAL. PER SQ. YD., OR EPR-1 PRIME-.015 GAL. PER SQ. YD. DO NOT USE CUTBACK ASPHALT APRIL 16 TO SEPTEMBER 15. PROTECT THE MEMBRANE BY ALLOWING MEMBRANE TO FULLY CURE PRIOR TO PERMITTING TRAFFIC TO DRIVE ON IT.
18. UNSTABILIZED CRUSHED CONCRETE MAY NOT BE USED ON PUBLIC STREETS, ROADS, OR RIGHTS-OF-WAY.
19. STABILIZED LIMESTONE BASE MAY BE SUBSTITUTED FOR STABILIZED CRUSHED CONCRETE IF SUBMITTED AND APPROVED BY THE CITY ENGINEER.

STORM SEWER NOTES:

- 1. STORM SEWERS SHALL BE DESIGNED AND CONSTRUCTED WITH CITY OF SUGAR LAND'S STANDARD CONSTRUCTION SPECIFICATIONS AND IN ACCORDANCE WITH CITY OF SUGAR LAND STANDARD DETAILS SHEET AND LATEST REVISIONS.
2. ALL PIPE STORM SEWERS SHALL BE INSTALLED, BEDDED, AND BACKFILLED IN ACCORDANCE WITH CITY OF SUGAR LAND STANDARD DETAIL DRAWINGS.
3. ALL CEMENT STABILIZED SAND (C.S.S.) SHALL BE 1-1/2 SK PER CUBIC YD. AND MEET MINIMUM C.S.S. STANDARDS COMPACTED TO 95%.
4. ALL PROPOSED PIPE STUB-OUTS FROM MANHOLES OR INLETS ARE TO BE PLUGGED WITH 8" BRICK WALLS WITH FULL MORTAR HEAD AND BED JOINTS AND GROUTED WITH A MINIMUM OF 1/2-INCH NON-SHRINK GROUT INSIDE AND OUTSIDE, UNLESS OTHERWISE NOTED.
5. AVOID TO MAXIMUM EXTENT, MANHOLES IN HANDICAP RAMPS.
6. ALL STORM SEWER MANHOLES SHALL BE OF SUGAR LAND TYPE "C" UNLESS OTHERWISE NOTED AND SHALL BE LOCATED A MINIMUM OF THREE (3) FEET BACK OF CURB. IF CONFLICT EXISTS, RACK OVER MANHOLE TO MISS PROPOSED CURB.
7. RIM ELEVATIONS SHOWN ON THE PLANS ARE APPROXIMATE ONLY. UTILITY CONTRACTOR SHALL ADJUST RIM ELEVATIONS TO 0.4 FEET ABOVE THE FINISH GRADE AT EACH LOCATION AFTER CONTRACTOR HAS COMPLETED FINAL GRADING. SLOPED FILL SHALL BE ADDED FOR STORM WATER DRAINAGE AWAY FROM RIM.
8. RIM ELEVATIONS SHALL BE PROPERLY ADJUSTED TO GRADE IN PAVEMENT AND SIDEWALKS. APPROVED BLOCKOUTS SHALL BE USED IN PAVEMENT.
9. ALL STORM SEWER MANHOLE COVERS MUST INCLUDE "STORM SEWER" AND "DUMP NO WASTE", "DRAINS TO WATERWAYS" WITH CITY OF SUGAR LAND EMBLEM AS DEPICTED IN THE DETAIL SHEETS.
10. MINIMUM STORM SEWER SIZE SHALL BE 24-INCH DIAMETER. ALL STORM SEWER PIPES 24" AND LARGER ARE TO BE REINFORCED CONCRETE PIPE ASTM C-76 CLASS III, INCLUDING INLET LEADS CROSSING UNDER EXISTING OR PROPOSED PAVEMENTS. ALL INLET LEADS SHALL BE 24" R.C.P. OR LARGER. ALL STORM SEWER PIPE SHALL BE RUBBER GASKETED. ALL CMP PIPE SHALL BE IN ACCORDANCE WITH C.O.S.L. APPROVED PRODUCT LIST AND STANDARD DETAILS.
11. CONTRACTOR SHALL VERIFY NATURAL GROUND SHOTS PRIOR TO MANHOLE CONSTRUCTION.
12. CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING LOCATION OF ALL EXISTING UTILITIES PRIOR TO EXCAVATION. DURING THE COURSE OF ANY AND ALL CLEARING, GRUBBING, FILL, GRADING, EXCAVATION OR OTHER CONSTRUCTION, CONTRACTOR SHALL ENSURE THAT STORM DRAINAGE PATHWAYS ARE MAINTAINED AND REMAIN OPEN TO ENSURE POSITIVE DRAINAGE AND THAT SUCH CONVEYANCES ARE NOT IMPEDED OR BLOCKED IN ANY WAY. STORM SEWER INLETS SHALL BE PROTECTED FROM ENTRY OF SILT, TRASH, DEBRIS AND ANY SUBSTANCES DELETERIOUS TO THE STORM SEWER SYSTEM AND/OR WATERWAYS RECEIVING STORM WATER RUNOFF. CONTRACTOR SHALL AT COMPLETION OF WORK, FILL LOW SPOTS AND GRADE ALL RIGHTS-OF-WAY AND UTILITY EASEMENTS AND REGRADE/RESTORE DITCHES AS NECESSARY TO MAINTAIN AND/OR ESTABLISH POSITIVE DRAINAGE.
13. CONTRACTOR TO PROVIDE A MINIMUM OF 6-INCHES CLEARANCE AT UTILITY CROSSINGS AND A MINIMUM OF TWELVE (12) INCHES AT SANITARY SEWER CROSSING.
14. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING, MAINTAINING, AND RESTORING ANY BACKSLOPE DRAINAGE SYSTEM DISTURBED AS A RESULT OF HIS WORK.
15. ALL DITCHES SHALL BE RESTORED TO PROPOSED ELEVATIONS TO INSURE PROPER DRAINAGE. ALL OUTFALLS SHALL BE COMPACTED AND ALL DISTURBED AREAS SHALL BE RESEDED OR RESODDED WITHIN TO WORKING DAYS OF EACH OCCURRENCE (NO SEPARATE PAY).
16. THE UTILITY CONTRACTOR SHALL ROUGH CUT ALL ROADSIDE SWALES IN PROPER ALIGNMENT AND SLOPE TO WITHIN 0.2 FT. OF FINISH GRADE. THE PAVING CONTRACTOR, UPON COMPLETION OF PAVING, SHALL COMPLETE FINAL GRADING ALIGNMENT OF SWALES AND RESTORE ALL AREAS WITHIN RIGHT-OF-WAY FOR SEEDING OR SODDING AND FERTILIZATION.
17. ALL STORM SEWERS MUST BE CLEAN/FREE OF DIRT AND DEBRIS AT THE TIME AND INITIAL AND FINAL ACCEPTANCE.
18. REFER TO GENERAL NOTES AND C.S.S. NOTES.

SANITARY SEWER NOTES:

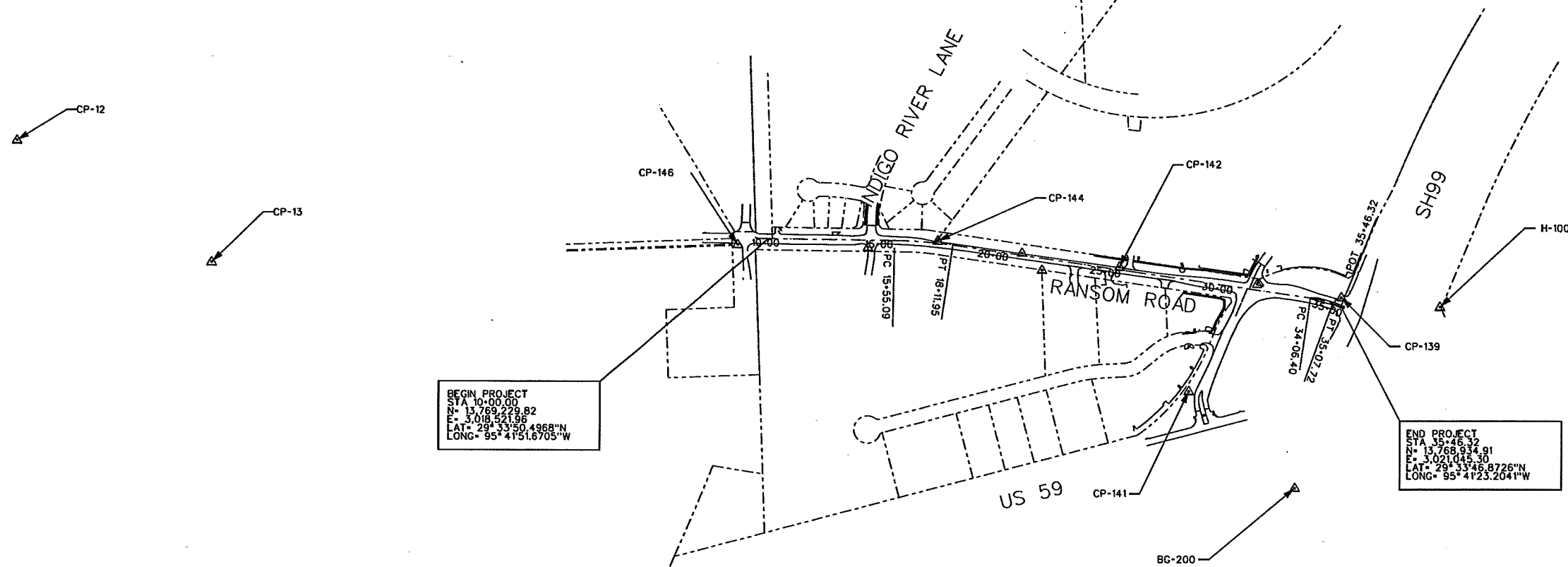
- 1. SANITARY SEWERS, FORCE MAINS, MANHOLES, LIFT STATIONS AND WASTEWATER TREATMENT PLANTS SHALL BE DESIGNED AND CONSTRUCTED AS PER THE REQUIREMENTS OF THE CITY OF SUGAR LAND DESIGN STANDARDS AND CORRESPONDING STANDARD CONSTRUCTION DETAILS SHEETS AND AS PER THE REQUIREMENTS OF THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY "DESIGN CRITERIA FOR SEWERAGE SYSTEMS". SHOULD A CONFLICT ARISE BETWEEN INFORMATION DEPICTED ON APPROVED CONSTRUCTION DRAWINGS AND/OR INFORMATION INCLUDED IN PROJECT SPECIFICATIONS, CITY OF SUGAR LAND DESIGN STANDARDS SHALL GOVERN. ALL MATERIALS AND PRODUCTS USED IN THE CONSTRUCTION OF SANITARY SEWERS, FORCE MAINS, MANHOLES, LIFT STATIONS AND WASTEWATER TREATMENT PLANTS SHALL COMPLY WITH THE CITY OF SUGAR LAND DESIGN STANDARDS AND THE CURRENT APPROVED PRODUCTS LIST.
2. STACKS SHALL BE BUILT IN ACCORDANCE WITH THE CITY OF SUGAR LAND STANDARD DETAIL DRAWING REQUIREMENTS. EXACT LOCATION OF THE STACK SHALL BE SUPPLIED TO THE CITY ENGINEER OF SUGAR LAND BY THE PROJECT ENGINEER ON SEALED AS-BUILT DRAWINGS AT COMPLETION OF CONSTRUCTION. ALL STACKS SHALL BE INSTALLED WITHIN 3% OF PLUMB RELATIVE TO VERTICAL PLANE AND WILL BE CAPPED AND TERMINATED AT A DEPTH OF 4 FEET BELOW FINISHED GRADE, UNLESS OTHERWISE DIRECTED BY THE CITY ENGINEER.
3. EACH SANITARY SEWER SERVICE LEAD STUB, PLUGGED WYE BRANCH OUTLET AND STACK SHALL BE MARKED IN ACCORDANCE WITH THE DETAILS AT THE TIME OF CONSTRUCTION, BEGINNING AT THE INVERT ELEVATION OF THE STUB OR WYE AND AT AN ELEVATION TWO FEET BELOW THE CAPPED TERMINATION POINT OF THE STACK AND EXTENDING TWO FEET ABOVE FINISHED GRADE.
4. SANITARY SEWER MANHOLES SHALL BE CONSTRUCTED AS PER DRAWINGS INCORPORATED IN CITY OF SUGAR LAND STANDARD CONSTRUCTION DETAILS SHEETS. SUCH MANHOLES SHALL BE CONSTRUCTED A MINIMUM OF ONE FOOT FROM BACK OF CURB ON CURB AND GUTTER ROADWAYS AND THREE FEET FROM EDGE OF TRAVELLED ROADWAY ON THOSE THOROUGHFARES HAVING NO CURBING. MEASURED FROM OUTSIDE DIAMETER OF MANHOLE. ALL SANITARY SEWER MANHOLES SHALL INCORPORATE INFLOW PROTECTORS. SANITARY SEWER MANHOLES SHALL NOT BE INSTALLED BENEATH STREET PAVING EXCEPT WHERE SPECIFICALLY AUTHORIZED BY CITY ENGINEER AND SO DESIGNATED ON APPROVED CONSTRUCTION DRAWINGS. BRICK MANHOLES AND FIBERGLASS MANHOLES ARE PROHIBITED. MANHOLES DEEPER THAN EIGHT FEET SHALL HAVE ECCENTRIC CONES.
5. SANITARY SEWER MANHOLE COVERS SHALL BE MINIMUM OF 32 INCHES IN DIAMETER. ALL SUCH MANHOLE COVERS SHALL HAVE THE CITY OF SUGAR LAND EMBLEM AND THE WORDS "SUGAR LAND" AND "SANITARY SEWER" CAST IN RAISED RELIEF AS DEPICTED IN CITY OF SUGAR LAND STANDARD CONSTRUCTION DETAILS SHEETS.
6. MANHOLE RIM ELEVATIONS SHOWN ON PLANS ARE APPROXIMATE ONLY. UTILITY CONTRACTORS SHALL ADJUST RIM ELEVATIONS TO 0.4 FEET ABOVE FINISHED GRADE, AND 0.5 FEET ABOVE NATURAL GROUND WITHIN RIGHTS-OF-WAY AND EASEMENTS AT EACH MANHOLE LOCATION AFTER PAVEMENT CONTRACTOR HAS COMPLETED FINAL GRADING. THE AREA ADJACENT TO SANITARY SEWER MANHOLE LOCATIONS SHALL BE GRADED AWAY FROM SUCH MANHOLES SO AS PREVENT ENTRY OF STORM WATER RUNOFF TO THE SANITARY SEWER SYSTEM.
7. MINIMUM SEPARATION DISTANCES AS REQUIRED BY TCEQ SECTION 317.13, APPENDIX E MUST BE MAINTAINED BETWEEN POTABLE WATER LINES AND SANITARY SEWERS, FORCE MAINS, MANHOLES, LIFT STATIONS AND WASTEWATER TREATMENT PLANTS. INSTALLATION OF FIRE HYDRANTS WITHIN NINE FEET OF A SANITARY SEWER SYSTEM IS PROHIBITED. REFER TO THE CITY OF SUGAR LAND INFRASTRUCTURE STANDARDS AND CORRESPONDING STANDARD CONSTRUCTION DETAILS SHEETS FOR CONSTRUCTION REQUIREMENTS OF OTHER INSTALLATIONS WHERE SEPARATION DISTANCES OF GREATER THAN NINE FEET CANNOT BE MAINTAINED.
8. TESTING OF SANITARY SEWERS, FORCE MAINS, MANHOLES, LIFT STATIONS AND WASTEWATER TREATMENT PLANTS SHALL BE CONDUCTED AS NOTED IN SANITARY SEWER CHAPTER OF THE CITY OF SUGAR LAND DESIGN STANDARDS AND AS PER THE REQUIREMENTS OF THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY "DESIGN CRITERIA FOR SEWERAGE SYSTEMS".
9. ALL SANITARY SEWER PIPING AND BEDDING SHALL BE INSPECTED BY CITY CONSTRUCTION INSPECTOR FOR CONFORMANCE WITH CITY DESIGN STANDARDS PRIOR TO BACKFILLING OF PIPING IN TRENCH. CONTRACTOR SHALL NOT COVER PIPING UNTIL SUCH TIME AS INSPECTOR HAS NOTIFIED CONTRACTOR THAT RESULTS OF PIPING INSPECTION ARE SATISFACTORY AND THAT BACKFILLING MAY BE ACCOMPLISHED. ANY PIPING INSTALLED AND/OR BACKFILLED WITHOUT INSPECTOR'S SPECIFIC APPROVAL SHALL BE UNCOVERED AT INSPECTOR'S DIRECTION AND INSPECTED ACCORDINGLY. CONTRACTOR SHALL NOTIFY INSPECTOR 24-HOURS PRIOR TO INSPECTION.
10. ALL COMMERCIAL DEVELOPMENTS WITH A FAR SIDE SANITARY SERVICE LEAD ACROSS THE STREET SHALL PROVIDE A SIX (6) INCH RISER AND CLEAR OUT ON THE PROPERTY SIDE. PUBLIC MAINTENANCE OF THE FAR SIDE LEAD SHALL END AT THIS RISER.

WATER DISTRIBUTION NOTES:

- 1. WATER MAINS, WATER SERVICE LINES AND ASSOCIATED APPURTENANCES SHALL BE DESIGNED AND CONSTRUCTED AS PER REQUIREMENTS OF THE CITY OF SUGAR LAND DESIGN STANDARDS AND CORRESPONDING STANDARD CONSTRUCTION DETAILS SHEETS AND AS PER THE REQUIREMENTS OF THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY. SHOULD A CONFLICT ARISE BETWEEN INFORMATION DEPICTED ON APPROVED CONSTRUCTION DRAWINGS AND/OR INFORMATION INCLUDED IN PROJECT SPECIFICATIONS, CITY OF SUGAR LAND DESIGN STANDARDS SHALL GOVERN.
2. ALL MATERIALS AND PRODUCTS USED IN THE CONSTRUCTION OF WATER MAINS, WATER SERVICE LINES AND ASSOCIATED APPURTENANCES SHALL COMPLY WITH THE CITY OF SUGAR LAND DESIGN STANDARDS AND THE CURRENT APPROVED PRODUCTS LIST AS MAINTAINED BY THE CITY'S ENGINEERING DEPARTMENT.
3. ALL GATE VALVES INSTALLED BELOW GRADE SHALL BE OF NON-RISING STEM DESIGN.
4. ALL FIRE HYDRANTS SHALL BE PAINTED AND/OR REPAINTED WITH GEO-GLEN 301 BRIGHT SILVER POLYURETHANE ENAMEL MANUFACTURED BY GEO-GLEN ENTERPRISES, INC. SURFACE PREPARATION SHALL INCLUDE REMOVAL OF OIL, GREASE AND MOISTURE, FOLLOWED BY MEDIA BLASTING TO SSPC-SP15-10-63 SPECIFICATIONS (NEAR WHITE METAL) AS PER MANUFACTURER'S RECOMMENDATIONS. PRIME BARE METAL WITH TP-251 EPOXY PRIMER EPOXY PRIMER OR WITH TP-221, TP-231 OR TP-241 UNIVERSAL PRIMER. 80°F AND 50% RELATIVE HUMIDITY ARE OPTIMAL CONDITIONS FOR APPLICATION OF PRIMER AND OF PAINT. DO NOT APPLY PRIMER AND/OR PAINT WHEN SURFACE TO BE PAINTED IS LESS THAN 5° ABOVE THE DEW POINT IN ORDER TO PREVENT MOISTURE FROM CONDENSING ON THE SURFACE TO BE PRIMED AND/OR PAINTED. A BLUE TRAFFIC BUTON SHALL BE INSTALLED ON THE STREET 12" OFF THE CENTER LINE FOR EACH HYDRANT. MINIMUM SEPARATION DISTANCES AS REQUIRED BY TCEQ SECTION 317.13, 290 APPENDIX E MUST BE MAINTAINED BETWEEN POTABLE WATER LINES AND SANITARY SEWERS, FORCE MAINS, LIFT STATIONS AND WASTEWATER TREATMENT PLANTS. INSTALLATION OF FIRE HYDRANTS WITHIN 9' (FT) OF A SANITARY SEWER SYSTEM IS PROHIBITED. REFER TO C.O.S.L. STANDARDS FOR CONSTRUCTION REQUIREMENTS OF OTHER INSTALLATIONS WHERE DISTANCES ARE GREATER THAN 9' (NINE) FT. CANNOT BE MAINTAINED.
5. EACH WATER SERVICE LEAD STUB SHALL BE MARKED WITH A PRESSURE TREATED 4 X 4 TIMBER OR PVC PIPE AT THE TIME OF CONSTRUCTION, BEGINNING AT THE INVERT ELEVATION OF THE STUB AND EXTENDING TWO FEET ABOVE FINISHED GRADE. EACH TIMBER MARKER SHALL BE PAINTED BLUE AND LABELED "POTABLE WATER" WITH PIPE SIZE NOTED.
6. TESTING OF WATER MAINS, WATER SERVICE LINES AND ASSOCIATED APPURTENANCES SHALL BE CONDUCTED AS PER REQUIREMENTS OF AWWA C605-94.
7. DISINFECTION OF WATER MAINS, WATER SERVICE LINES AND ASSOCIATED APPURTENANCES SHALL BE CONDUCTED AS PER REQUIREMENTS OF AWWA C651 AND TCEQ. NO CONNECTIONS SHALL BE MADE TO EXISTING WATER LINES UNTIL NEWLY CONSTRUCTED WATER LINES HAVE BEEN THOROUGHLY DISINFECTED, TESTED, FLUSHED, AND SAMPLED AND CONNECTION HAS BEEN AUTHORIZED BY THE CITY ENGINEER.
8. ALL WATER PIPING AND BEDDING SHALL BE INSPECTED BY THE CITY INSPECTOR FOR CONFORMANCE TO DESIGN STANDARDS PRIOR TO BACKFILLING OF PIPING IN TRENCH. CONTRACTOR SHALL NOT COVER PIPING UNTIL SUCH TIME AS INSPECTOR HAS NOTIFIED CONTRACTOR THAT RESULTS OF PIPING INSPECTION ARE SATISFACTORY AND THAT BACKFILLING MAY BE ACCOMPLISHED. ANY PIPING INSTALLED AND/OR BACKFILLED WITHOUT INSPECTOR'S SPECIFIC APPROVAL SHALL BE UNCOVERED AT INSPECTOR'S DIRECTION AND INSPECTED ACCORDINGLY. 24-HOUR NOTICE REQUIRED.
9. ALL MECHANICALLY RESTRAINED FITTINGS MUST BE MEGALUG RESTRAINED JOINTS OR APPROVED EQUAL.
10. THE CITY OF SUGAR LAND MUST HAVE A COPY OF THE BACTERIOLOGICAL TEST RESULTS AT LEAST 24 HOURS PRIOR TO THE INITIAL INSPECTION. IF NOT, THEN THE INSPECTION WILL BE RESCHEDULED.

REVISION DATE: OCTOBER 2021

Professional engineering stamp for R.G. Miller Engineers, Inc. Includes fields for No., Date, Revision, and a signature block for Emily Layne Lane, State of Texas Professional Engineer No. 130701, dated 5/4/2023. Also includes the City of Sugar Land, Texas logo and project title: CONSTRUCTION PLANS FOR: WIDENING & RECONSTRUCTION OF RANSOM RD. GENERAL CONSTRUCTION NOTES II. Job No. SL-02, Sheet 6 of 120.



BEGIN PROJECT
 STA 10+00.00
 N= 13,769,229.82
 E= 3,018,521.96
 LAT= 29° 33' 50.4968" N
 LONG= 95° 41' 51.6705" W

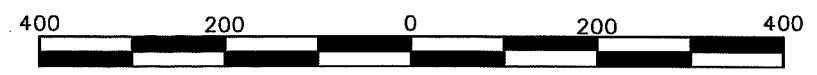
END PROJECT
 STA 35+46.32
 N= 13,768,934.91
 E= 3,021,045.30
 LAT= 29° 33' 46.8726" N
 LONG= 95° 41' 23.2041" W

SGR-RM 010

THIS SURVEY WAS PERFORMED ON THE GROUND
 UNDER MY SUPERVISION IN JULY, 2017
 BY TEJAS SURVEYING, INC.



10.08.2020



SCALE IN FEET
 SCALE: 1" = 100' (22" x 34" SHEET)
 SCALE: 1" = 200' (11" x 17" SHEET)

CENTERLINE OF INTERSECTING STREETS AT PROJECT BASELINE			
STREET	N	E	STA
INDIGO RIVER LANE	13,769,222.94	3,018,971.83	14+49.93
SH 99 CONNECTOR	13,769,012.85	3,020,632.47	31+25.10
MEMORIAL HERMON CONNECTOR	13,769,011.66	3,020,640.66	31+33.38

CONTROL TABLE				
POINT NO.	N	E	ELEV	DESCRIPTION
CP-12	13,769,657.55	3,015,208.95	84.69	FND 5/8" IR W/ CIVILCORP CAP
CP-13	13,769,122.62	3,016,071.18	84.30	FND 5/8" IR W/ CIVILCORP CAP
CP-146	13,769,203.54	3,018,386.38	85.02	SET 2" FBC BRASS DISK IN CONC.
CP-144	13,769,220.19	3,019,268.09	74.11	SET 2" FBC BRASS DISK IN CONC.
CP-142	13,769,107.95	3,020,067.90	73.10	SET 2" FBC BRASS DISK IN CONC.
CP-139	13,768,974.95	3,021,047.86	72.64	SET 2" FBC BRASS DISK IN CONC.
CP-141	13,768,561.12	3,020,375.64	74.03	SET 2" FBC BRASS DISK IN CONC.
BG-200	13,768,136.05	3,020,044.80	74.28	CHISLED "X" IN CONC.
BG-201	13,767,205.25	3,020,471.33	74.38	FND 5/8" IR WITH PLASTIC CAP
BG-202	13,766,304.08	3,020,037.35	71.75	FND 5/8" IR WITH PLASTIC CAP
H-100	13,768,932.74	3,021,482.42	72.29	FND 3" FBCPTRA DISK
SGR-RM 010	13,769,306.71	3,023,728.07	72.89	FND 3" BRASS DISK

CONTROL INVERSE - RANSOM ROAD			
FROM	TO	BEARING	DISTANCE
CP-12	CP-13	S 58° 11' 02" E	1,014.69'
CP-13	CP-146	N 87° 59' 53" E	2,316.61'
CP-146	CP-144	N 88° 55' 06" E	881.87'
CP-144	CP-142	S 82° 00' 43" E	807.65'
CP-142	CP-139	S 82° 15' 54" E	988.16'
CP-139	CP-141	S 58° 21' 10" W	788.71'
CP-141	BG-200	S 47° 49' 22" E	633.09'
BG-200	BG-201	S 21° 51' 45" W	1,002.93'
BG-201	BG-202	S 25° 42' 52" W	1,000.22'
CP-139	H-100	S 84° 27' 41" E	437.40'
H-100	SGR-RM 010	N 80° 32' 42" E	2,276.57'

NOTES:

1. ALL BEARINGS AND COORDINATES SHOWN HEREON ARE BASED ON THE TEXAS COORDINATE SYSTEM, SOUTH CENTRAL ZONE (4204), NORTH AMERICAN DATUM OF 1983, 2011 ADJUSTMENT, EPOCH 2010.00.
2. COORDINATES AND DISTANCES ARE US SURVEY FEET, DISPLAYED IN SURFACE VALUES AND MAY BE CONVERTED TO GRID BY DIVIDING BY THE TxDOT COMBINED SURFACE ADJUSTMENT FACTOR OF 1.00013.
3. HORIZONTAL CONTROL VALUES WERE DERIVED USING STATIC GPS OBSERVATION TIED TO THE NORTH AMERICAN DATUM OF 1983 (2011), EPOCH 2010.00
4. ALL PROJECT ELEVATIONS ARE BASED NAVD '88, 2011 ADJUSTMENT, (GEOID MODEL 12A), DERIVED BY DIGITAL LEVELING THROUGH THE PUBLISHED VALUES FOR FBCPTRA SEGMENT C SURVEY CONTROL MONUMENT 201, ESTABLISHED BY BROWN & GAY IN APRIL, 2015. SECONDARY SURVEY CONTROL WAS ESTABLISHED BY TEJAS SURVEYING, INC. IN JULY, 2018
5. FIELD SURVEYING IN THE RANSOM ROAD ROW WAS COMPLETED IN AUGUST, 2018

TEJAS SURVEYING, INC.
 FIRM NO. 10031300
 1810 FIRST OAKS ST., SUITE 220
 RICHMOND, TEXAS 77406
 Ph: 281-240-9099 Fax: 281-240-2791

RANSOM RD
 CONTROL INDEX SHEET

FORT BEND COUNTY ENGINEERING DEPARTMENT

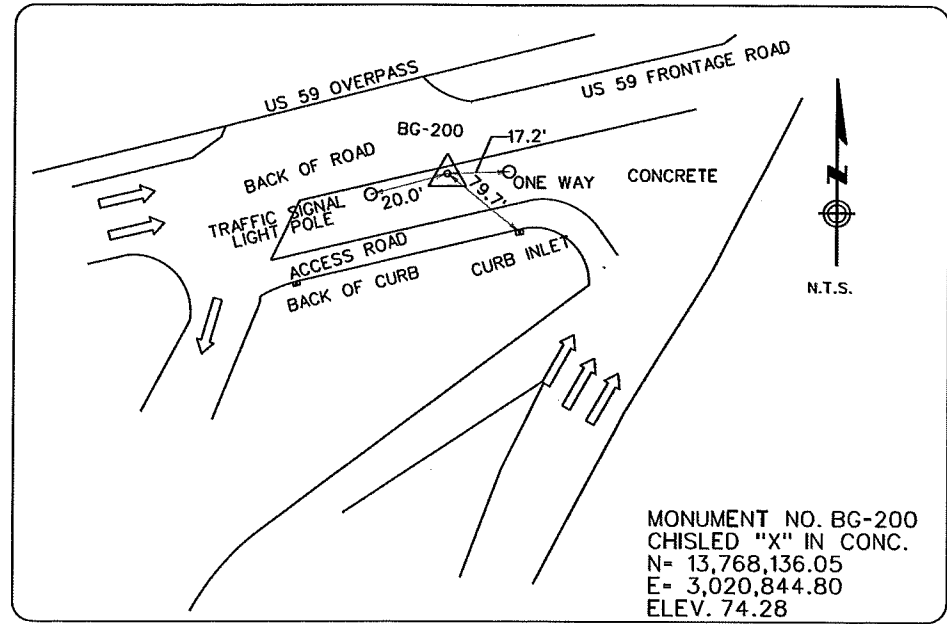
APPROVAL IS IMPLIED FOR IMPROVEMENTS
 WITHIN FORT BEND COUNTY RIGHTS-OF-WAY
 ONLY. UTILITY LINES APPROVED AS TO
 LOCATION ONLY. AUTHORIZATION IS VALID
 FOR ONE YEAR ONLY.

APPROVED: _____
 ASSISTANT TO THE COUNTY ENGINEER

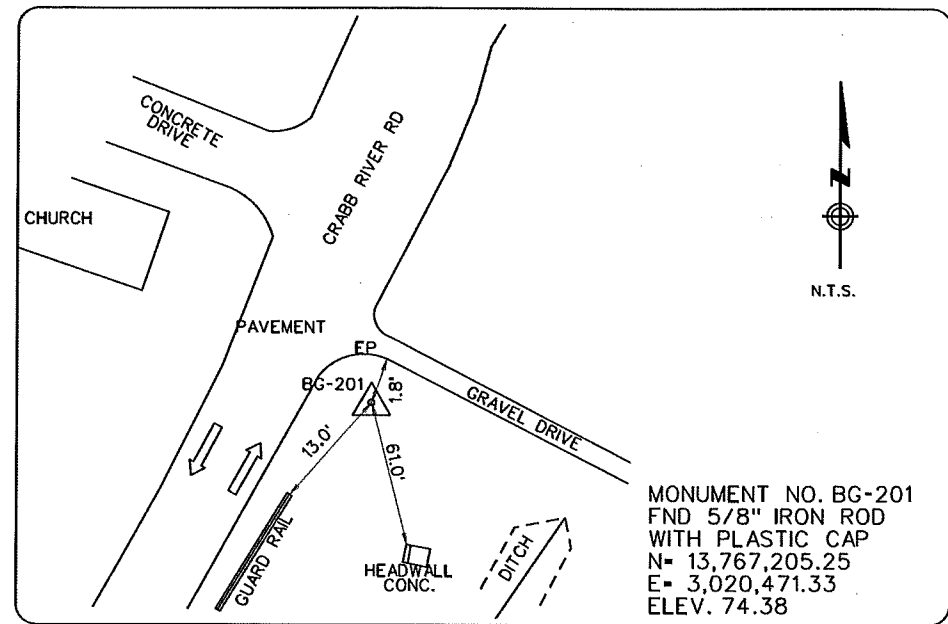
DATE: _____

SUBMITTED BY: R.S.M.
 SCALE: 1"=100'
 DATE: 10/08/20
 SURV BY: TEJAS SURVEYING, INC.
 P. & NO.: _____

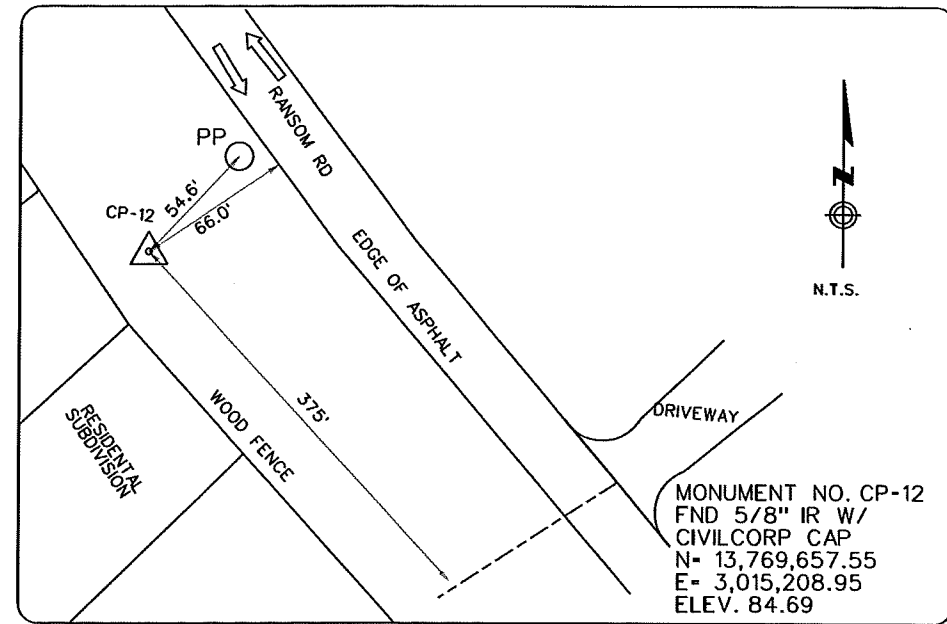
DESIGNED BY: R.S.M.
 DRAWN BY: C.R.
 SHEET 8 OF 112 SHEETS
 DWG. NO. 61-1801



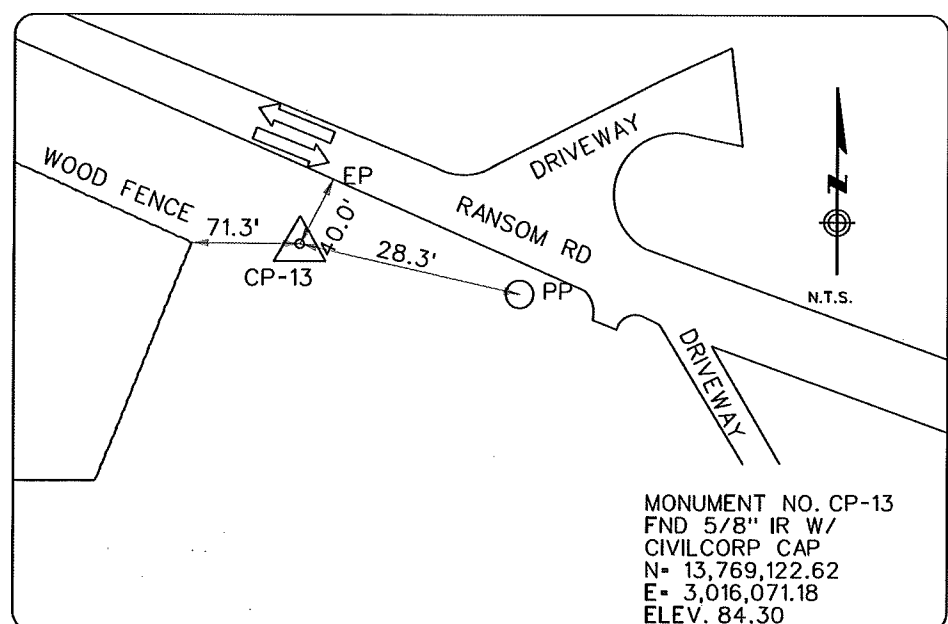
MONUMENT NO. BG-200
CHISLED "X" IN CONC.
N= 13,768,136.05
E= 3,020,844.80
ELEV. 74.28



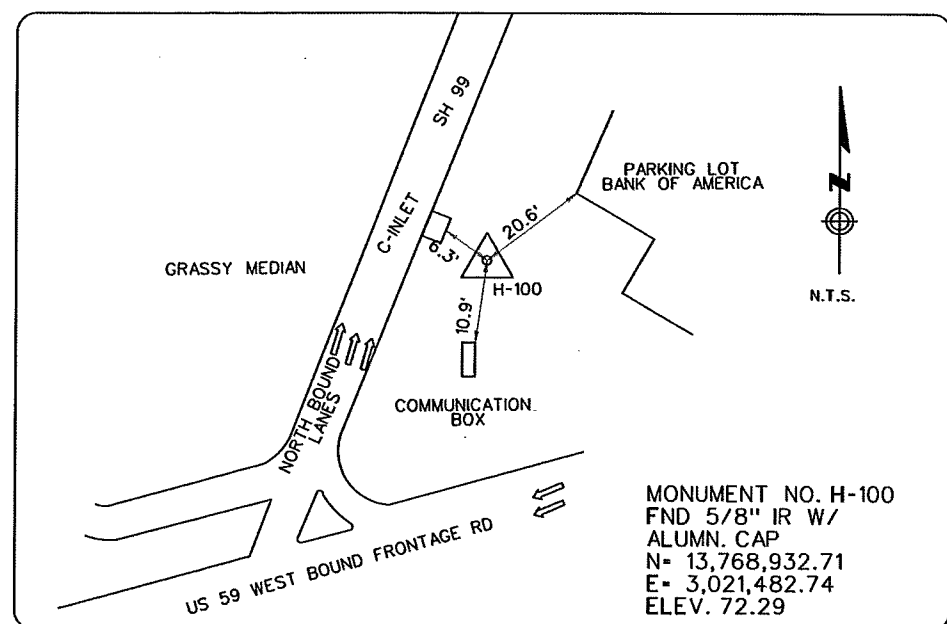
MONUMENT NO. BG-201
FND 5/8" IRON ROD
WITH PLASTIC CAP
N= 13,767,205.25
E= 3,020,471.33
ELEV. 74.38



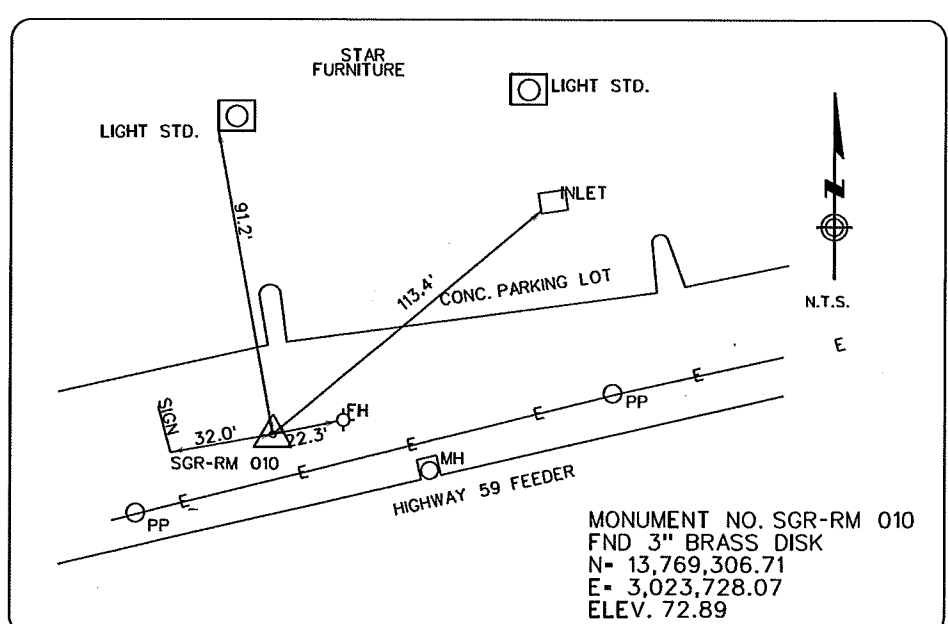
MONUMENT NO. CP-12
FND 5/8" IR W/
CIVILCORP CAP
N= 13,769,657.55
E= 3,015,208.95
ELEV. 84.69



MONUMENT NO. CP-13
FND 5/8" IR W/
CIVILCORP CAP
N= 13,769,122.62
E= 3,016,071.18
ELEV. 84.30



MONUMENT NO. H-100
FND 5/8" IR W/
ALUMN. CAP
N= 13,768,932.71
E= 3,021,482.74
ELEV. 72.29



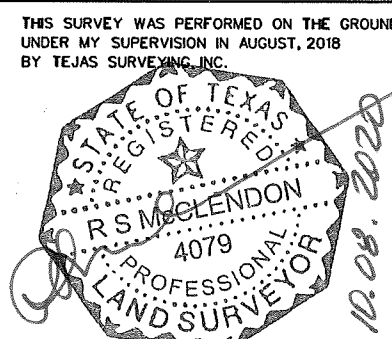
MONUMENT NO. SGR-RM 010
FND 3" BRASS DISK
N= 13,769,306.71
E= 3,023,728.07
ELEV. 72.89

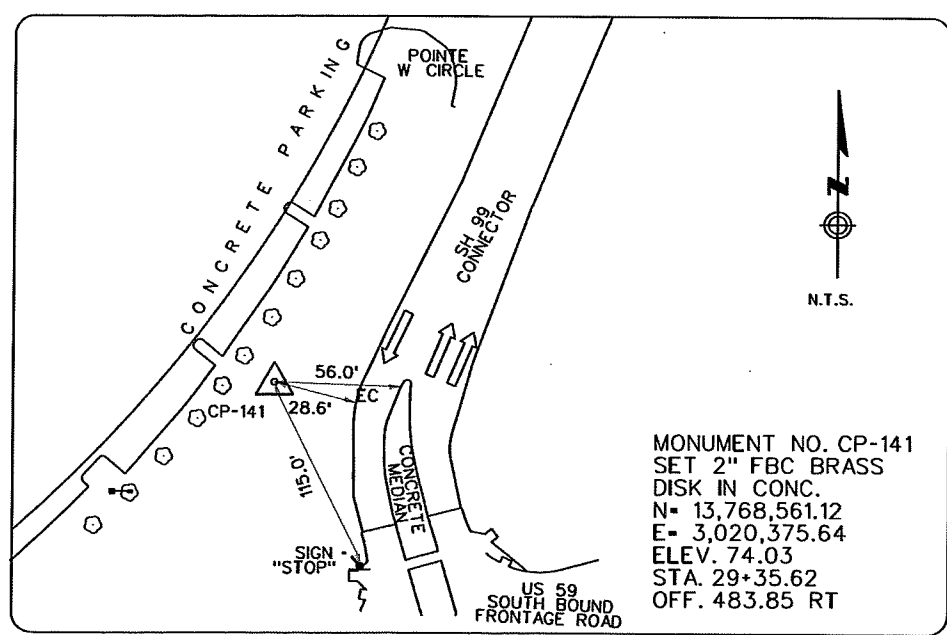
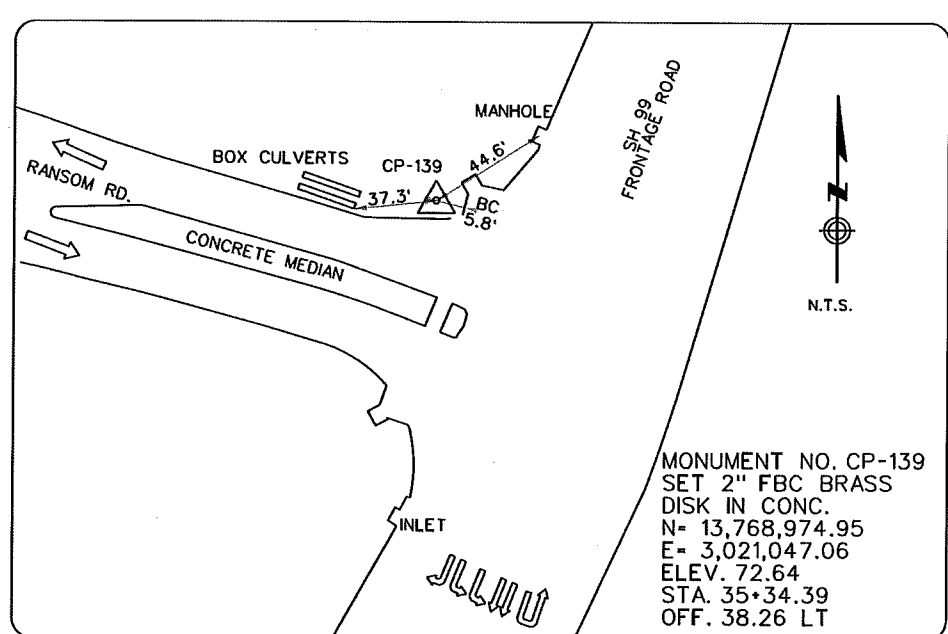
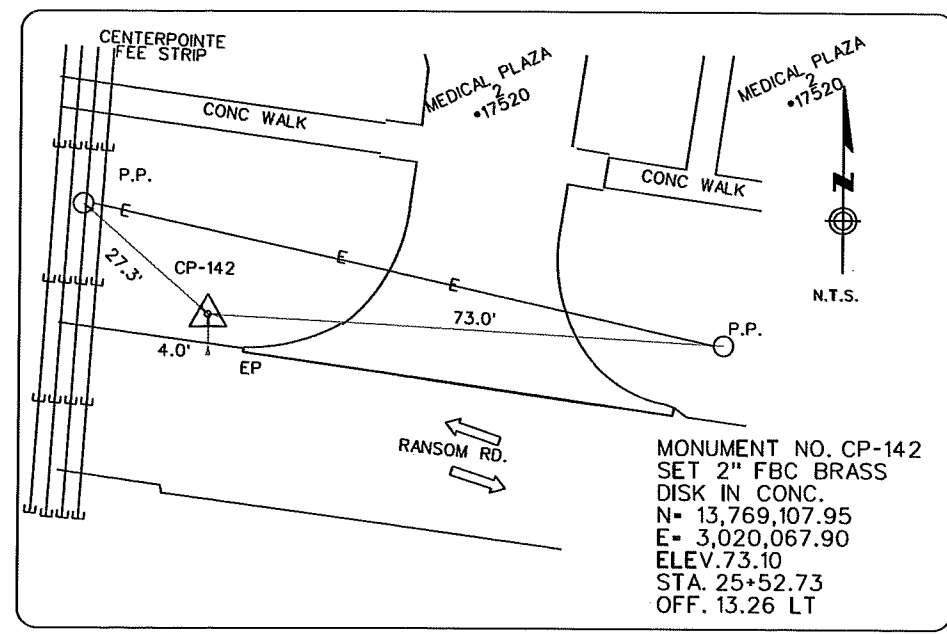
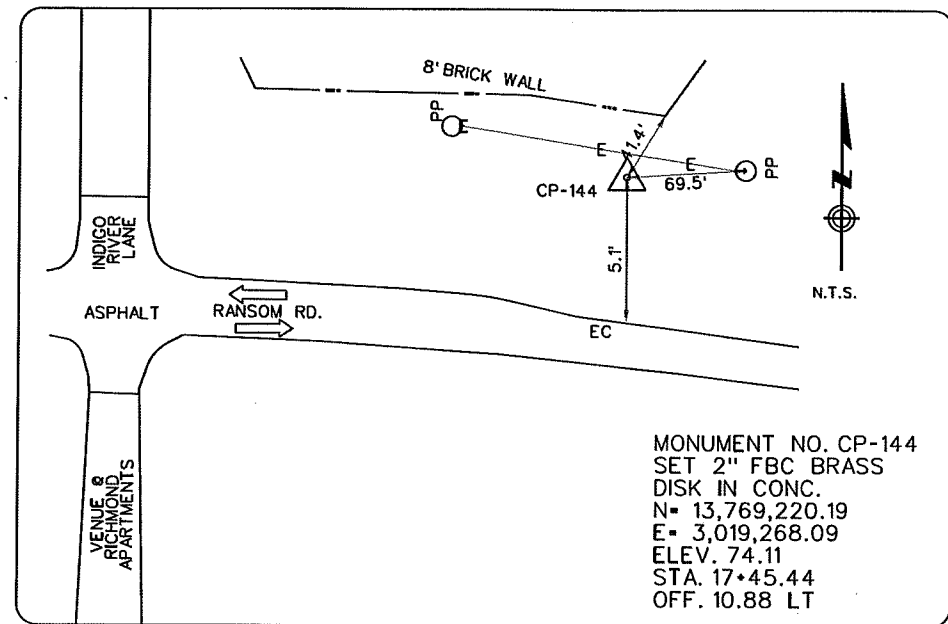
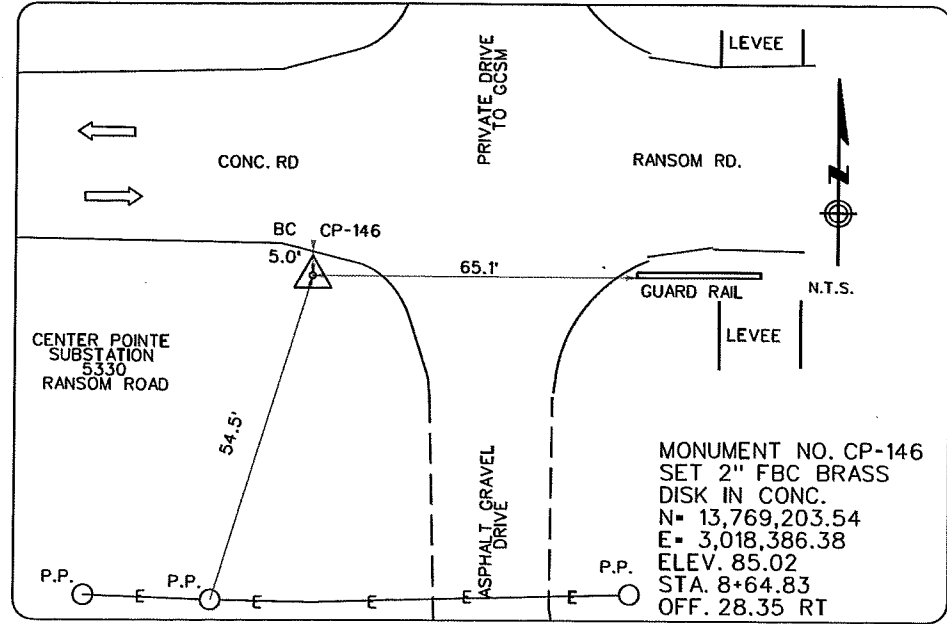
NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET ROW, OR
EASEMENTS CALL THE ONE STOP VERIFICATION 713-222-4667.
PRIVATE UTILITY LINES SHOWN
AT&T TEXAS/NET UTILITY LINES SHOWN DATE:
APPROVED FOR AT&T TEXAS/NET UNDERGROUND CONDUIT FACILITIES ONLY
SIGNATURE VALID FOR ONE YEAR
TO ARRANGE FOR LINES TO BE TURNED OFF OR COVERED, CALL CENTERPOINT ENERGY AT 713-261-2222
NOTICE:
For your safety, you are required by Texas Law to call 811 at least 48 hours before you dig
so that underground lines can be marked. This Verification does not fulfill your obligation to call 811.
VERIFICATION OF PRIVATE UTILITY LINES
CenterPoint Energy/Natural Gas Facilities Verification ONLY.
(This signature verifies that you have shown CHP Natural Gas Lines correctly - not to be used
for conflict verification.) (Gas service lines are not shown.)
Signature Valid for six months.
CenterPoint Energy/Underground Electrical Facilities Verification ONLY.
(This signature verifies existing underground facilities - not to be used for conflict verification.)
Signature Valid for six months.

NOTES:

1. ALL BEARINGS AND COORDINATES SHOWN HEREON ARE BASED ON THE TEXAS COORDINATE SYSTEM, SOUTH CENTRAL ZONE (4204), NORTH AMERICAN DATUM OF 1983, 2011 ADJUSTMENT, EPOCH 2010.00.
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5. FIELD SURVEYING IN THE RANSOM ROAD ROW WAS COMPLETED IN AUGUST, 2018

No.	Date	Revisions	App.
TEJAS SURVEYING, INC. FIRM NO. 10031300 1810 FIRST OAKS ST., SUITE 220 RICHMOND, TEXAS 77406 Ph: 281 240-9099 Fax: 281-240-2791			
Approved By:		Date:	
RANSOM RD HORIZONTAL AND VERTICAL CONTROL FORT BEND COUNTY ENGINEERING DEPARTMENT APPROVAL IS IMPLIED FOR IMPROVEMENTS WITHIN FORT BEND COUNTY RIGHTS-OF-WAY ONLY. UTILITY LINES APPROVED AS TO LOCATION ONLY. AUTHORIZATION IS VALID FOR ONE YEAR ONLY.			
APPROVED:		ASSISTANT TO THE COUNTY ENGINEER	
DATE:			
THIS SURVEY WAS PERFORMED ON THE GROUND UNDER MY SUPERVISION IN AUGUST, 2018 BY TEJAS SURVEYING, INC.			
SUBMITTED BY: R.S.M. SCALE: N.T.S. DATE: 10/08/20 SURV BY: TEJAS SURVEYING, INC. P. B. NO.:		DESIGNED BY: R.S.M. DRAWN BY: C.R. SHEET 9 OF 112 SHEETS DWG. NO. 61-1801	



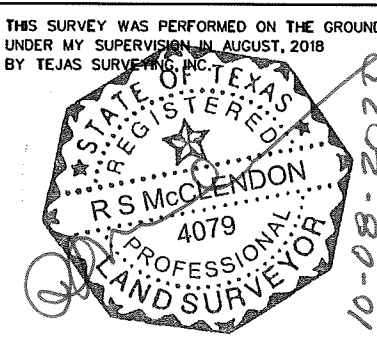


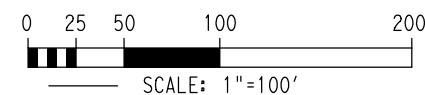
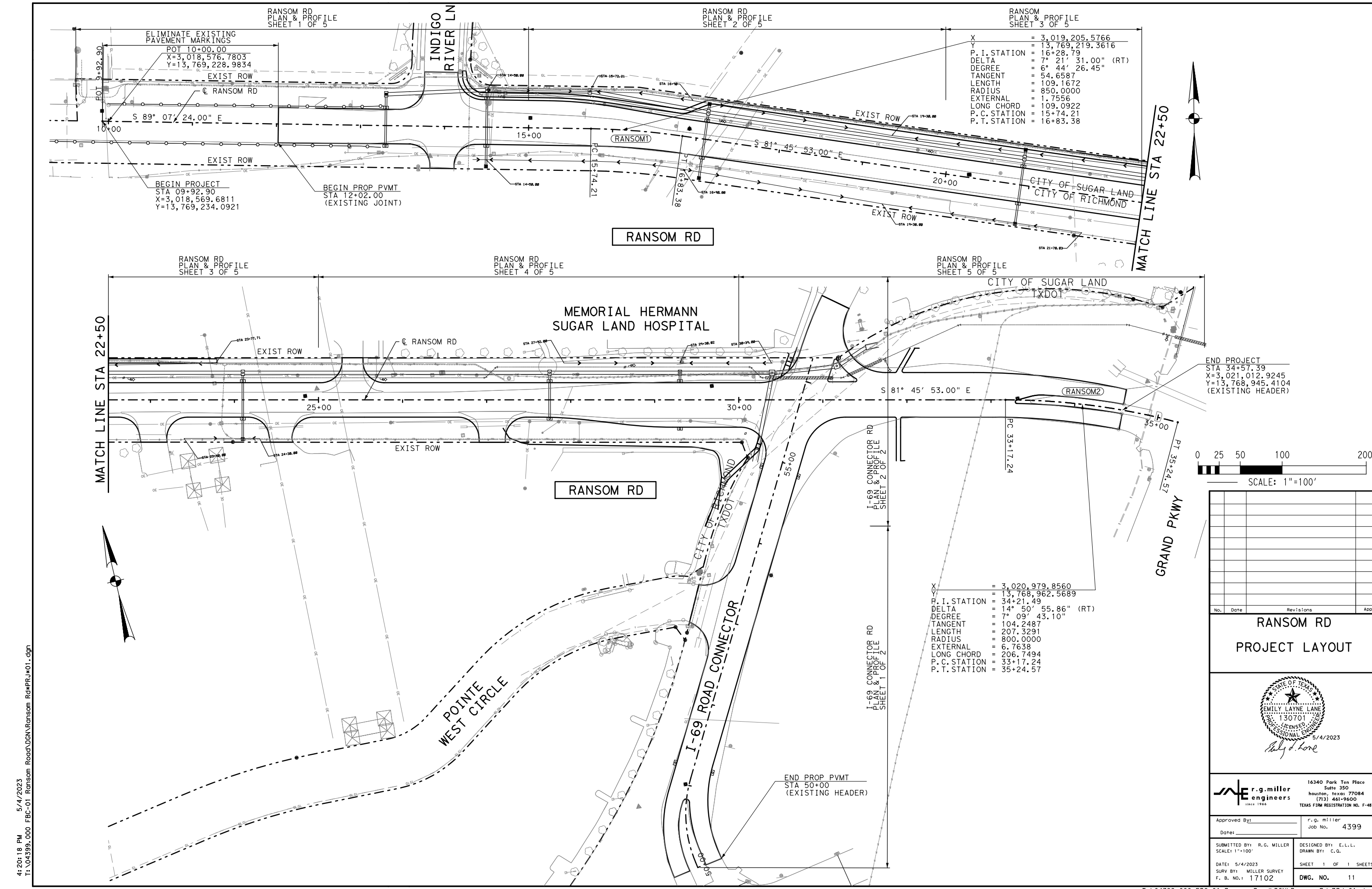
NOTES:

1. ALL BEARINGS AND COORDINATES SHOWN HEREON ARE BASED ON THE TEXAS COORDINATE SYSTEM, SOUTH CENTRAL ZONE (4204), NORTH AMERICAN DATUM OF 1983, 2011 ADJUSTMENT, EPOCH 2010.00.
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5. FIELD SURVEYING IN THE RANSOM ROAD ROW WAS COMPLETED IN AUGUST, 2018

NOTICE:
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PRIVATE UTILITY LINES SHOWN
AT&T TEXAS/WT UTILITY LINES SHOWN
APPROVED FOR AT&T TEXAS/WT UNDERGROUND CONDUIT FACILITIES ONLY. SIGNATURE VALID FOR ONE YEAR.
TO ARRANGE FOR LINES TO BE TURNED OFF OR MOVED, CALL CENTERPOINT ENERGY AT 713-261-2222
NOTICE:
For your safety, you are required by Texas Law to call 811 at least 48 hours before you dig so that underground lines can be marked. This Verification does not fulfill your obligation to call 811.
VERIFICATION OF PRIVATE UTILITY LINES
CenterPoint Energy/Natural Gas Facilities Verification ONLY.
(This Signature verifies that you have shown CNP Natural Gas lines correctly - not to be used for conflict verification.) (Gas service lines are not shown.)
Signature Valid for six months.
(This signature verifies existing underground facilities - not to be used for conflict verification.)
Signature Valid for six months.

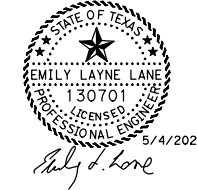
No.	Date	Revisions	App.
TEJAS SURVEYING, INC.			
FIRM NO. 10031300 1810 FIRST OAKS ST., SUITE 220 RICHMOND, TEXAS 77406 Ph: 281-240-9099 Fax: 281-240-2791			
Approved By:		Date:	
RANSOM RD			
HORIZONTAL AND VERTICAL CONTROL			
FORT BEND COUNTY ENGINEERING DEPARTMENT			
APPROVAL IS IMPLIED FOR IMPROVEMENTS WITHIN FORT BEND COUNTY RIGHTS-OF-WAY ONLY. UTILITY LINES APPROVED AS TO LOCATION ONLY. AUTHORIZATION IS VALID FOR ONE YEAR ONLY.			
APPROVED:		ASSISTANT TO THE COUNTY ENGINEER	
DATE:			
THIS SURVEY WAS PERFORMED ON THE GROUND UNDER MY SUPERVISION IN AUGUST, 2018 BY TEJAS SURVEYING, INC.			
SUBMITTED BY: R.S.M. SCALE: N.T.S.		DESIGNED BY: R.S.M. DRAWN BY: C.R.	
DATE: 10/08/20 SURV BY: TEJAS SURVEYING, INC. F. B. NO.:		SHEET 10 OF 112 SHEETS DWG. NO. 61-1801	





No.	Date	Revisions	App.

**RANSOM RD
PROJECT LAYOUT**



r.g.miller engineers
 16340 Park Ten Place
 Suite 350
 Houston, Texas 77084
 (713) 461-9600
 TEXAS FIRM REGISTRATION NO. F-487

Approved By: _____ Date: _____
 Job No. 4399

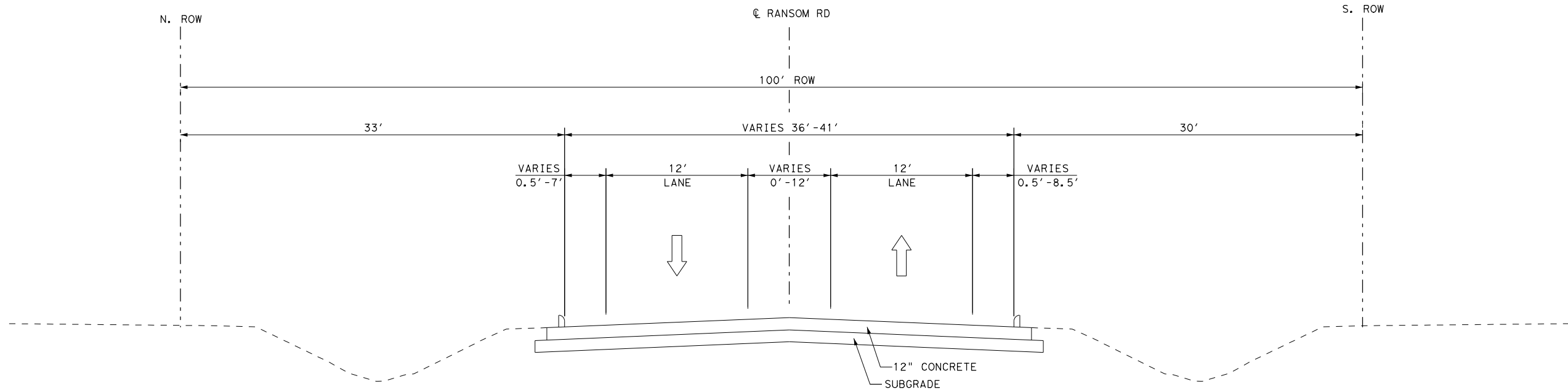
SUBMITTED BY: R.G. MILLER
 SCALE: 1"=100'
 DATE: 5/4/2023
 SURV BY: MILLER SURVEY
 F. B. NO.: 17102

DESIGNED BY: E.L.L.
 DRAWN BY: C.G.
 SHEET 1 OF 1 SHEETS
 DWG. NO. 11

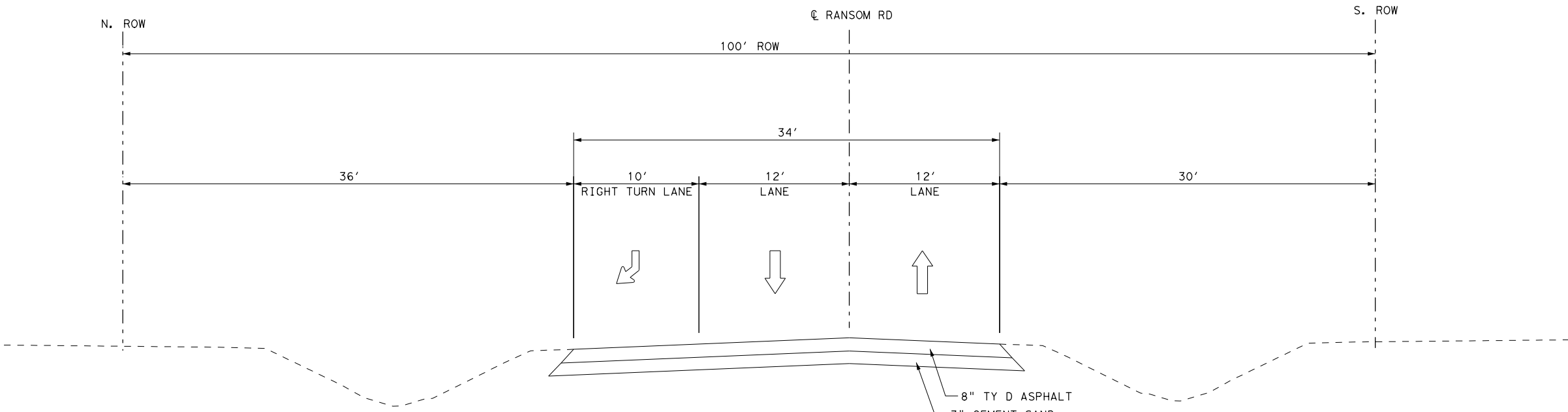
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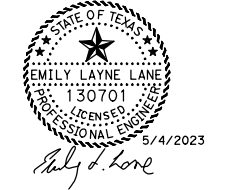
**RANSOM RD
EXISTING TYPICAL SECTION**
STA. 9+92.90 (BOP) TO STA. 13+24.00



**RANSOM RD
EXISTING TYPICAL SECTION**
STA. 14+45.00 TO STA 16+62.00

No.	Date	Revisions	App.

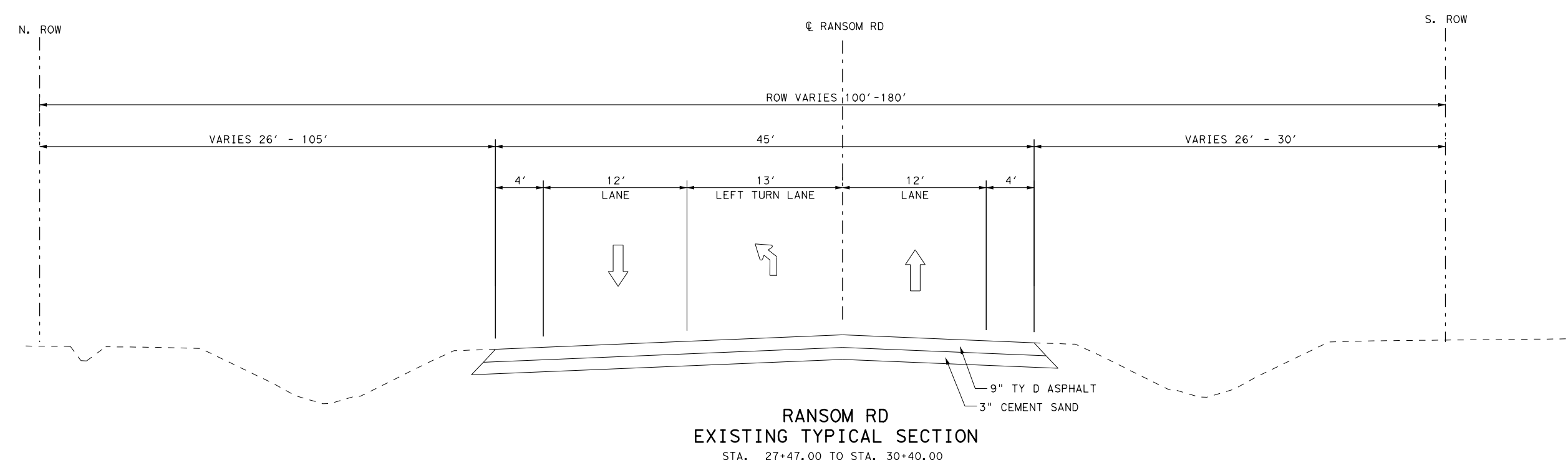
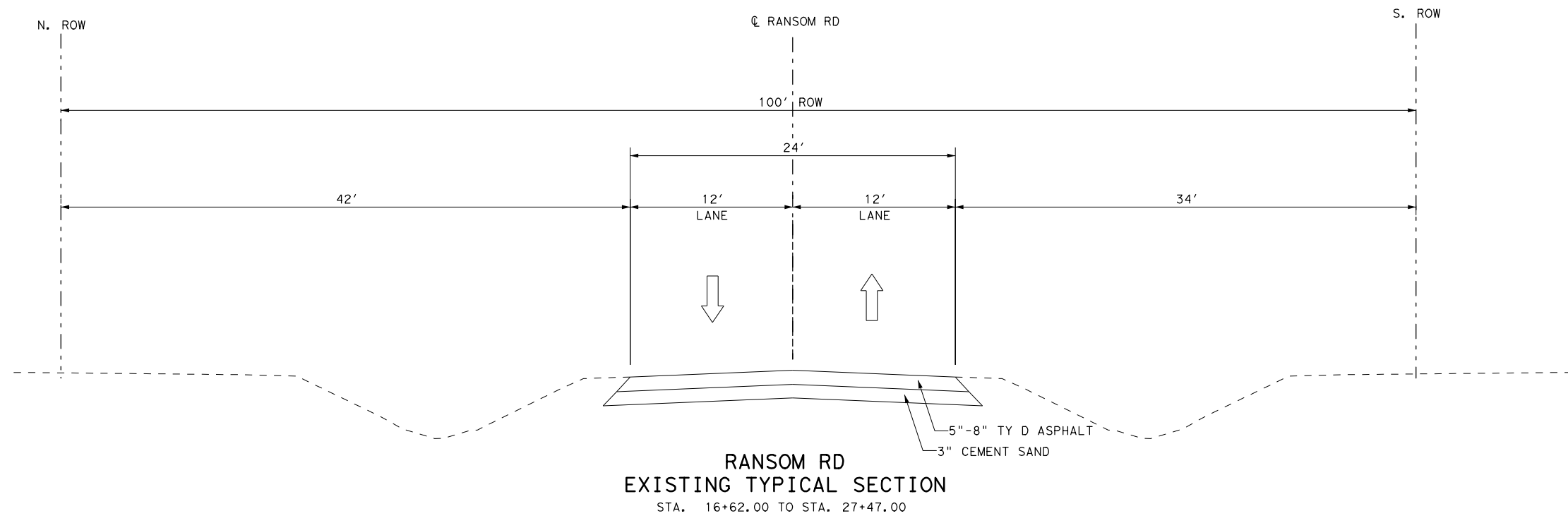
**RANSOM RD
EXISTING
TYPICAL SECTION**



**r.g. miller
engineers** 16340 Park Ten Place
Suite 350
Houston, Texas 77084
(713) 461-9600
TEXAS FIRM REGISTRATION NO. F-487

Approved By: _____ Date: _____
r.g. miller Job No. 4399

SUBMITTED BY: R.G. MILLER SCALE: 1"=10'
DESIGNED BY: E.L.L.
DRAWN BY: C.G.
DATE: 5/4/2023 SHEET 1 OF 3 SHEETS
SURV BY: MILLER SURVEY F. B. NO.: 17102 DWG. NO. 12



No.	Date	Revisions	App.

**RANSOM RD
EXISTING
TYPICAL SECTION**

Professional Engineer Seal for Emily Layne Lane, License No. 130701, State of Texas. The seal is dated 5/4/2023 and includes a signature.

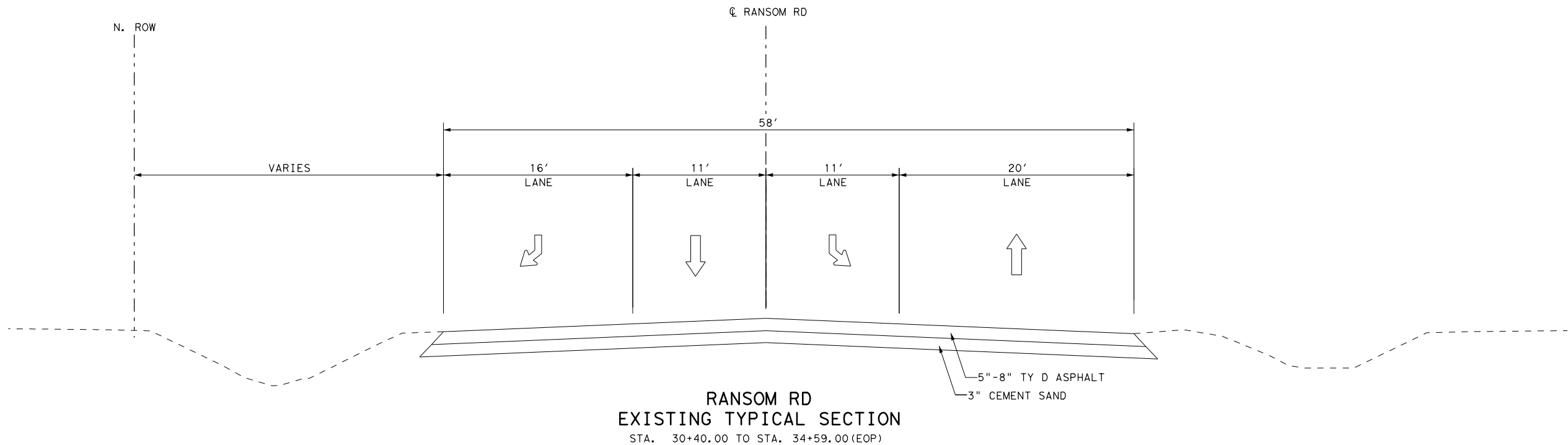
r.g. miller engineers
16340 Park Ten Place, Suite 350, Houston, Texas 77084
(713) 461-9600
TEXAS FIRM REGISTRATION NO. F-487

Approved By: _____ Date: _____
r.g. miller Job No. 4399

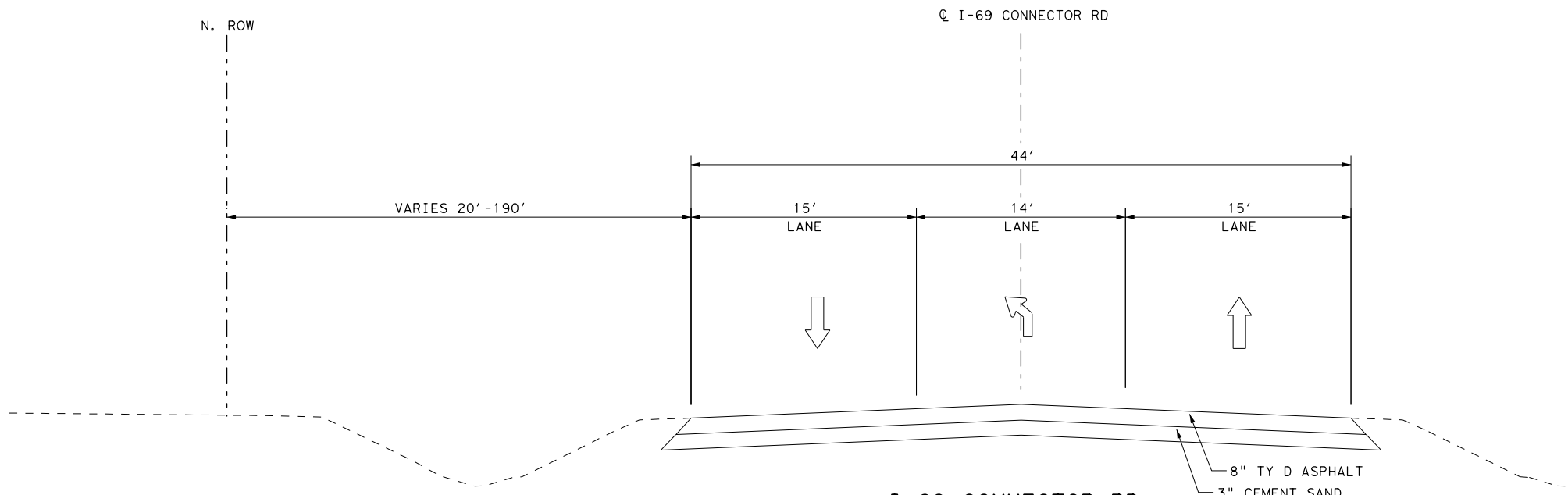
SUBMITTED BY: R.G. MILLER SCALE: 1"=10'
DESIGNED BY: E.L.L.
DRAWN BY: C.G.

DATE: 5/4/2023 SURV BY: MILLER SURVEY F. B. No.: 17102
SHEET 2 OF 3 SHEETS DWG. NO. 13

4:20:20 PM 5/4/2023 T:\04399.000\FBC-01_Ransom_Road\DGN\Ransom_Rd\EXT TYP_SECT#02.dgn



**RANSOM RD
EXISTING TYPICAL SECTION**
STA. 30+40.00 TO STA. 34+59.00 (EOP)

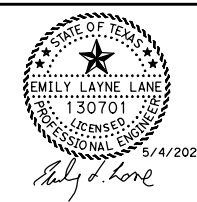


**I-69 CONNECTOR RD
EXISTING TYPICAL SECTION**
STA. 50+00.00 TO STA 55+00.00

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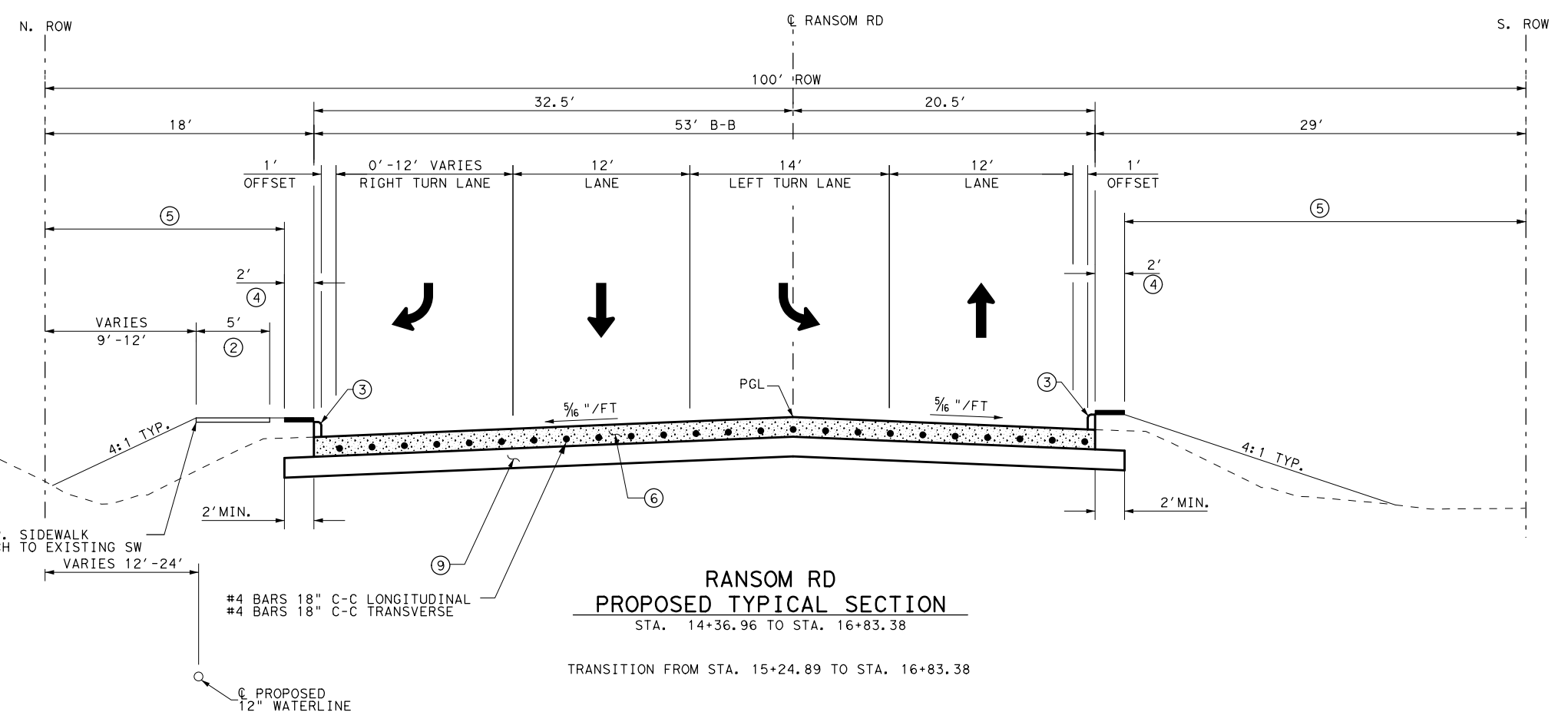
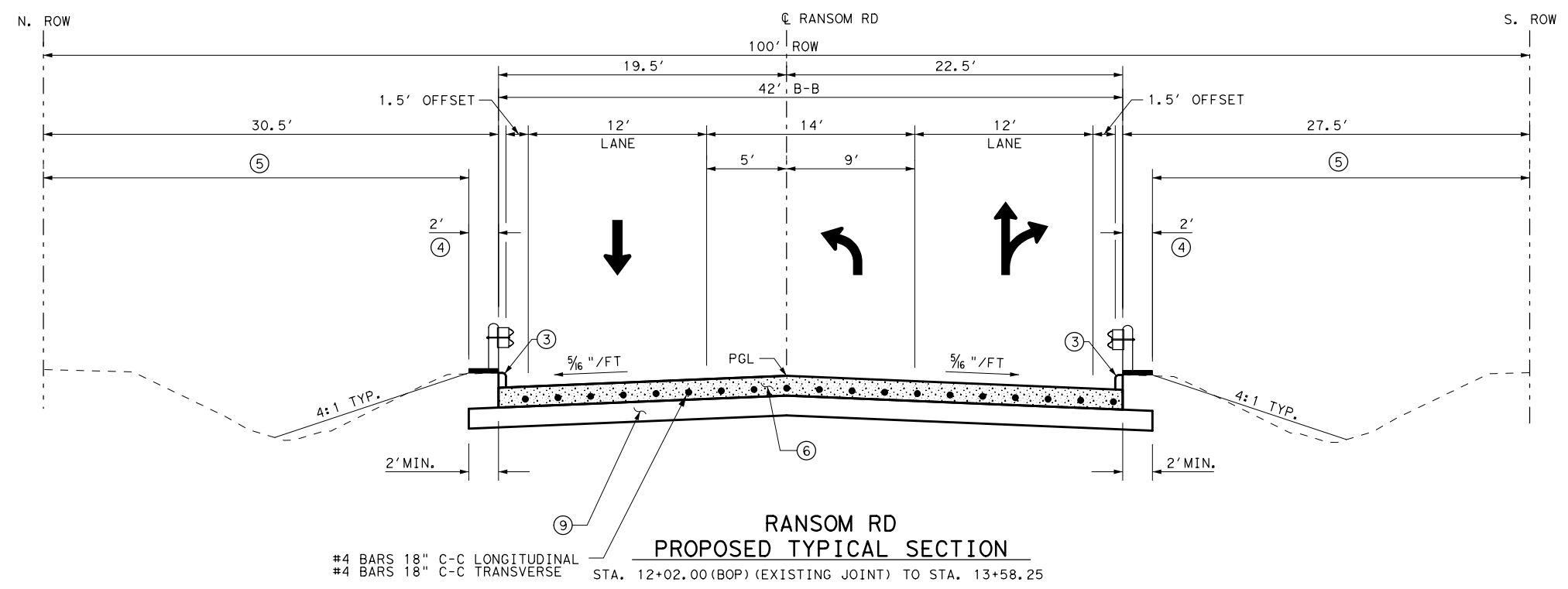
No.	Date	Revisions	App.

**RANSOM RD
EXISTING
TYPICAL SECTION**



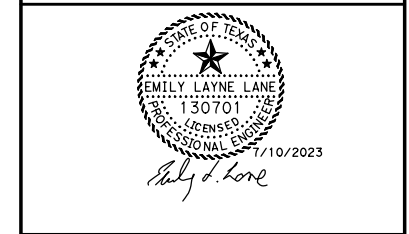
		16340 Park Ten Place Suite 350 Houston, Texas 77084 (713) 461-9600 TEXAS FIRM REGISTRATION NO. F-487	
Approved By:	r.g. miller	Job No.	4399
Date:			
SUBMITTED BY: R.G. MILLER	DESIGNED BY: E.L.L.	DRAWN BY: C.G.	
SCALE: 1"=10'	SHEET 3 OF 3 SHEETS		
DATE: 5/4/2023	SURV BY: MILLER SURVEY	F. B. NO.: 17102	DWG. NO. 14

- LEGEND**
- ① RIPRAP (CONC) (6IN)
 - ② PROP. 5' CONCRETE SIDEWALK (4" THICK)
 - ③ 6" CURB (TY II)
 - ④ BLOCK SODDING
 - ⑤ HYDRO-MULCH SEEDING
 - ⑥ 8" CONCRETE PVMT
 - ⑦ 1" ASPHALT STABILIZED BASE
 - ⑧ 6" CEMENT TREATED BASE
 - ⑨ 8" LIME TREATED SUBGRADE
 - ⑩ 6" LIME TREATED SUBGRADE
- ← DIRECTION OF TRAFFIC



No.	Date	Revisions	App.

**RANSOM RD
PROPOSED
TYPICAL SECTION**



r.g.miller engineers
16340 Park Ten Place
Suite 350
Houston, Texas 77084
(713) 461-9600
TEXAS FIRM REGISTRATION NO. F-487

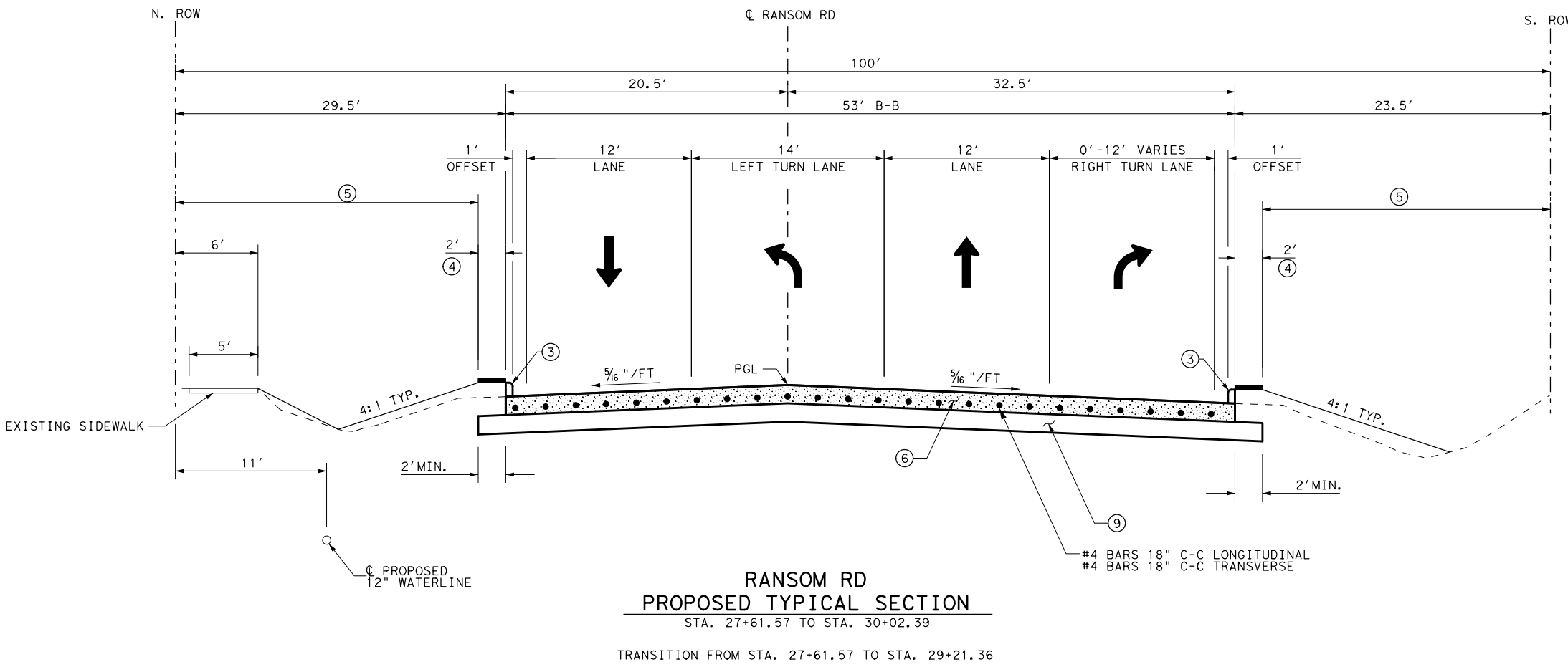
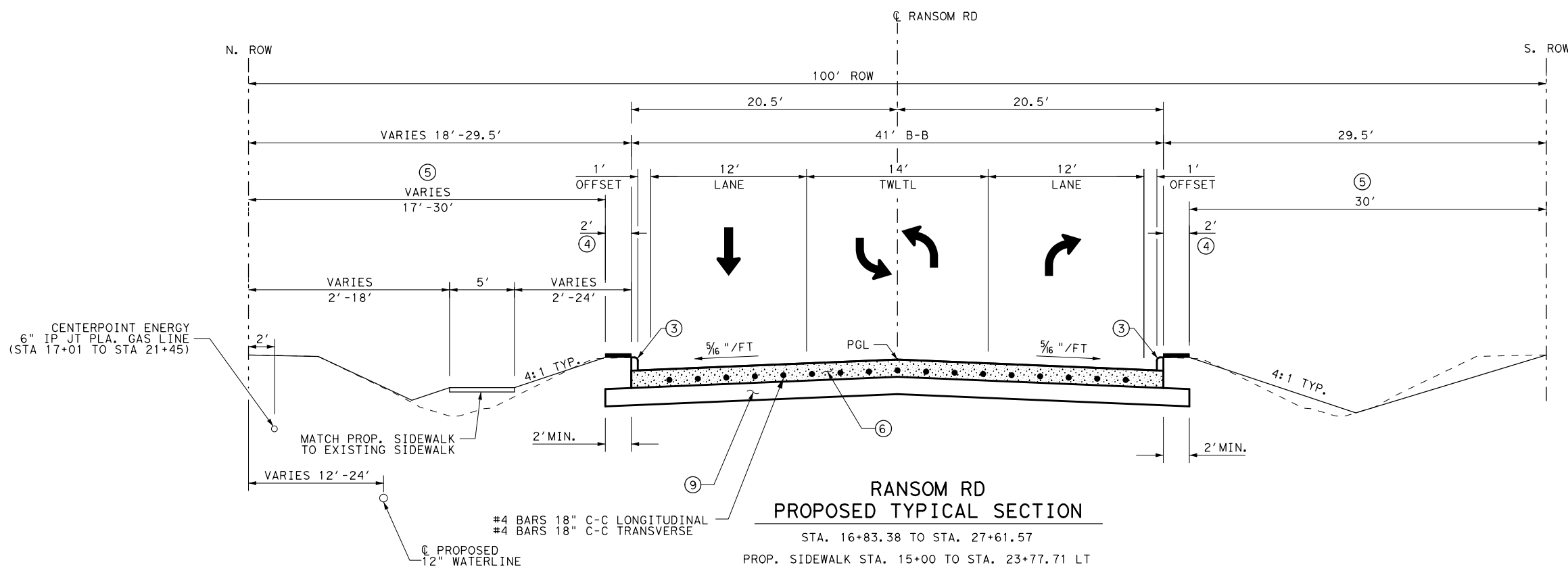
Approved By: _____ Date: _____
r.g.miller Job No. 4399

SUBMITTED BY: R.G. MILLER SCALE: 1"=10'
DATE: 7/10/2023
SURV BY: MILLER SURVEY F. B. NO.: 17102

DESIGNED BY: E.L.L.
DRAWN BY: C.G.
SHEET 1 OF 4 SHEETS
DWG. NO. 15

10:44:26 AM 7/10/2023
T:\04399.000 FBC-01 Ransom Road\DGN\Ransom Rd\PROP TYP SECT#01.dgn

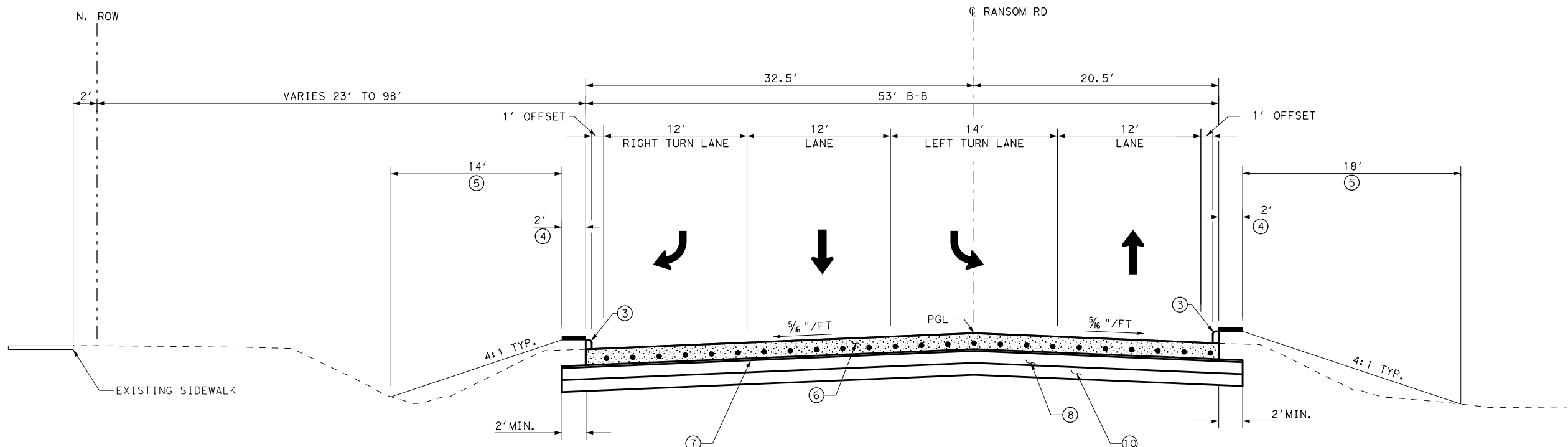
- LEGEND**
- ① RIPRAP (CONC) (6IN)
 - ② PROP. 5' CONCRETE SIDEWALK (4" THICK)
 - ③ 6" CURB (TY II)
 - ④ BLOCK SODDING
 - ⑤ HYDRO-MULCH SEEDING
 - ⑥ 8" CONCRETE PVMT
 - ⑦ 1" ASPHALT STABILIZED BASE
 - ⑧ 6" CEMENT TREATED BASE
 - ⑨ 8" LIME TREATED SUBGRADE
 - ⑩ 6" LIME TREATED SUBGRADE
- ← DIRECTION OF TRAFFIC



No.	Date	Revisions	App.
RANSOM RD PROPOSED TYPICAL SECTION			
		16340 Park Ten Place Suite 350 Houston, Texas 77084 (713) 461-9600 TEXAS FIRM REGISTRATION NO. F-487	
Approved By: _____		r.g. miller	
Date: _____		Job No. 4399	
SUBMITTED BY: R.G. MILLER		DESIGNED BY: E.L.L.	
SCALE: 1"=10'		DRAWN BY: C.G.	
DATE: 7/10/2023		SHEET 2 OF 4 SHEETS	
SURV BY: MILLER SURVEY		DWG. NO. 16	
F. B. NO.: 17102			

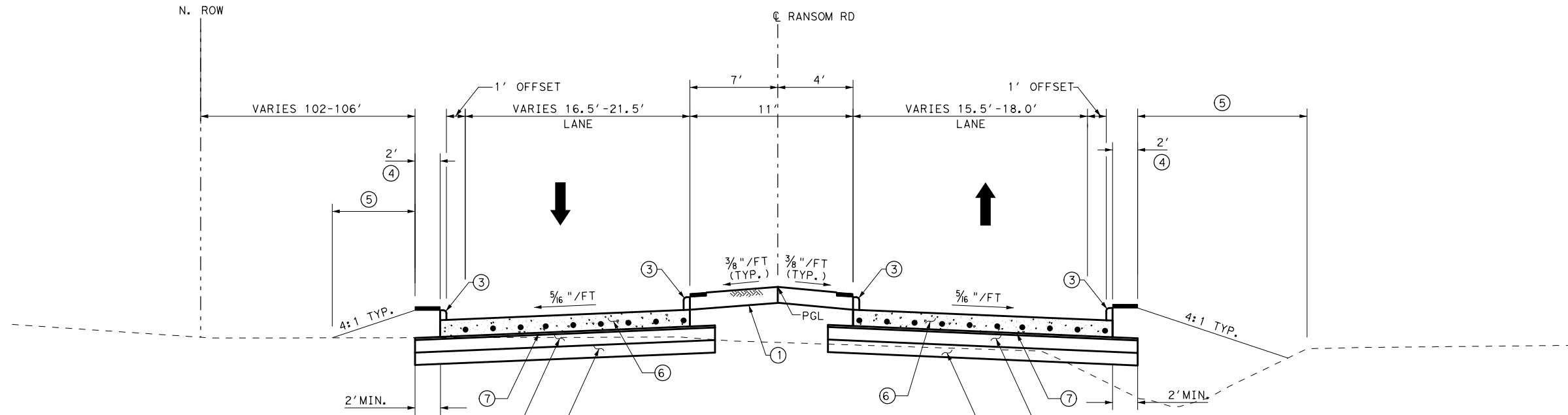
10:44:27 AM 7/10/2023
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- LEGEND**
- ① RIPRAP (CONC) (6IN)
 - ② PROP. 5" CONCRETE SIDEWALK (4" THICK)
 - ③ 6" CURB (TY II)
 - ④ BLOCK SODDING
 - ⑤ HYDRO-MULCH SEEDING
 - ⑥ 8" CONCRETE PVMT
 - ⑦ 1" ASPHALT STABILIZED BASE
 - ⑧ 6" CEMENT TREATED BASE
 - ⑨ 8" LIME TREATED SUBGRADE
 - ⑩ 6" LIME TREATED SUBGRADE
- ← DIRECTION OF TRAFFIC



**RANSOM RD
PROPOSED TYPICAL SECTION**

STA. 31+25.66 TO STA. 33+29.07

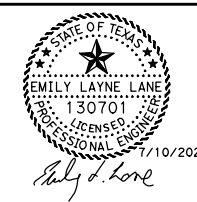


**RANSOM RD
PROPOSED TYPICAL SECTION**

STA. 33+29.07 TO STA. 34+57.39 (EOP)

No.	Date	Revisions	App.

**RANSOM RD
PROPOSED
TYPICAL SECTION**



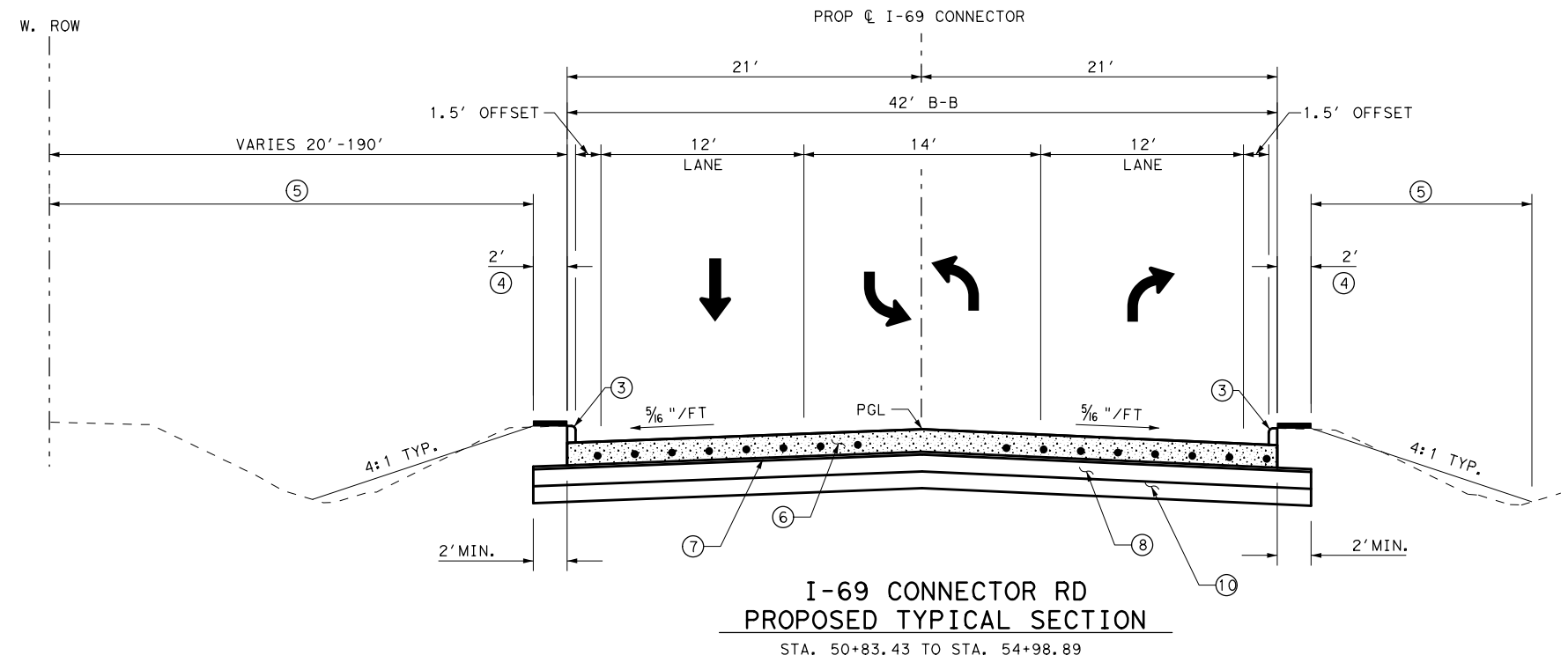
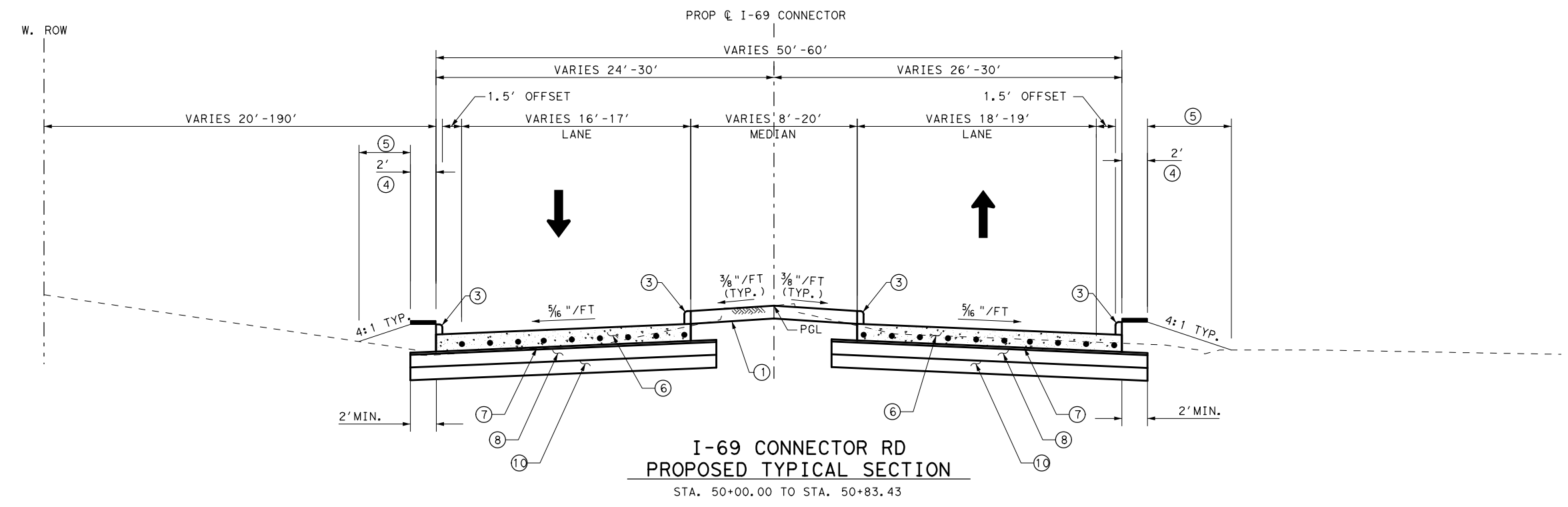
r.g. miller
engineers
16340 Park Ten Place
Suite 350
Houston, Texas 77084
(713) 461-9600
TEXAS FIRM REGISTRATION NO. F-487

Approved By: _____ Date: _____
R. G. Miller Job No. 4399

SUBMITTED BY: R. G. MILLER SCALE: 1"=10'
DATE: 7/10/2023 SURV BY: MILLER SURVEY F. B. NO.: 17102
DESIGNED BY: E. L. L. DRAWN BY: C. G.
SHEET 3 OF 4 SHEETS
DWG. NO. 17

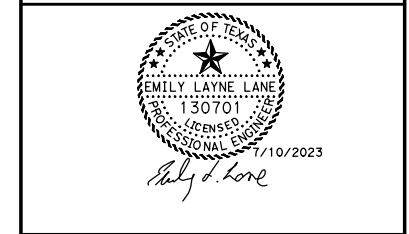
10:44:28 AM 7/10/2023
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- LEGEND**
- ① RIPRAP (CONC) (6IN)
 - ② PROP. 5' CONCRETE SIDEWALK (4" THICK)
 - ③ 6" CURB (TY II)
 - ④ BLOCK SODDING
 - ⑤ HYDRO-MULCH SEEDING
 - ⑥ 8" CONCRETE PVMT
 - ⑦ 1" ASPHALT STABILIZED BASE
 - ⑧ 6" CEMENT TREATED BASE
 - ⑨ 8" LIME TREATED SUBGRADE
 - ⑩ 6" LIME TREATED SUBGRADE
- ← DIRECTION OF TRAFFIC



No.	Date	Revisions	App.

**RANSOM RD
PROPOSED
TYPICAL SECTION**



r.g. miller engineers
16340 Park Ten Place
Suite 350
Houston, Texas 77084
(713) 461-9600
TEXAS FIRM REGISTRATION NO. F-487

Approved By: _____ Date: _____
 Submitted By: R.G. MILLER SCALE: 1"=10'
 Date: 7/10/2023 SURV BY: MILLER SURVEY F. B. NO.: 17102

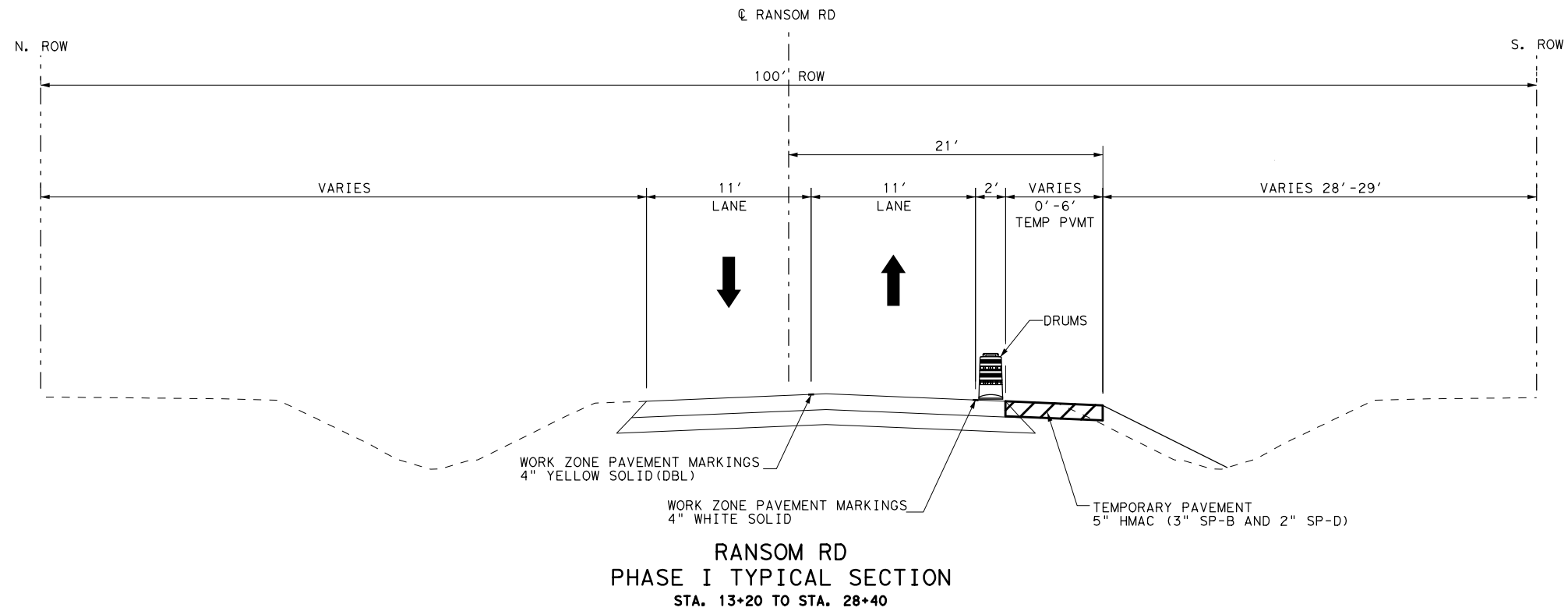
DESIGNED BY: E.L.L.
DRAWN BY: C.G.
SHEET 4 OF 4 SHEETS
DWG. NO. 18

Job No. 4399

10:44:30 AM 7/10/2023 T:\04399_000 FBC-01 Ransom Road\DGN\Ransom Rd\PROP TYP SECT#04.dgn

LEGEND

- WORK ZONE
- TEMPORARY PAVEMENT
- FAST TRACK PAVEMENT
- PREVIOUSLY CONSTRUCTED TEMPORARY PAVEMENT
- PREVIOUSLY CONSTRUCTED PERMANENT PAVEMENT
- TEMP GROUND MOUNTED SIGN
- CHANNELIZING DEVICE
- TYPE III BARRICADE
- TRAFFIC FLOW ARROW

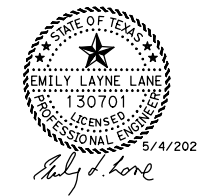


**PHASE I
TEMPORARY PAVEMENT**

1. PLACE PORTABLE MESSAGE SIGNS AND ADVANCE SIGNING.
2. PLACE WORK ZONE SIGNS AS REQUIRED.
3. CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL TURNING MOVEMENTS AT ALL TIMES.
4. CONSTRUCT PHASE I TEMPORARY PAVEMENT.

No.	Date	Revisions	App.

**RANSOM RD
TCP PHASE I
TYPICAL SECTION**

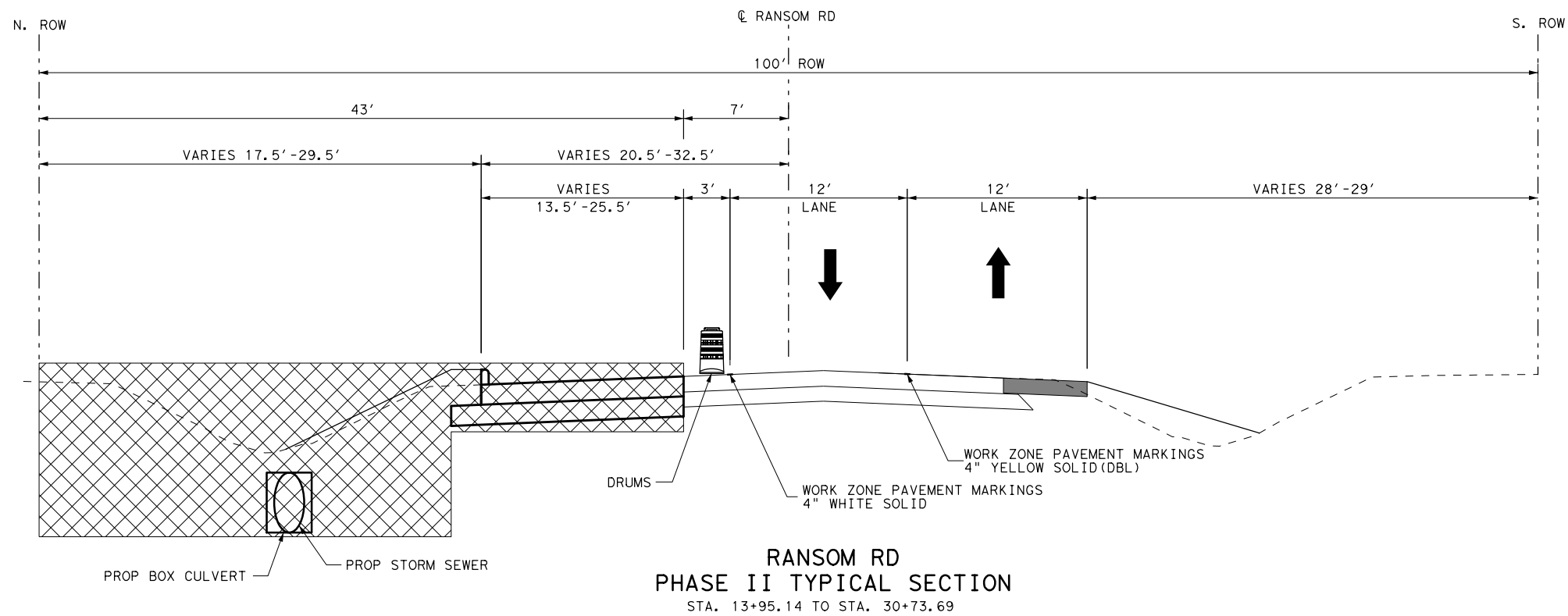


r.g. miller engineers
SINCE 1968

16340 Park Ten Place
Suite 350
Houston, Texas 77084
(713) 461-9600
TEXAS FIRM REGISTRATION NO. F-487

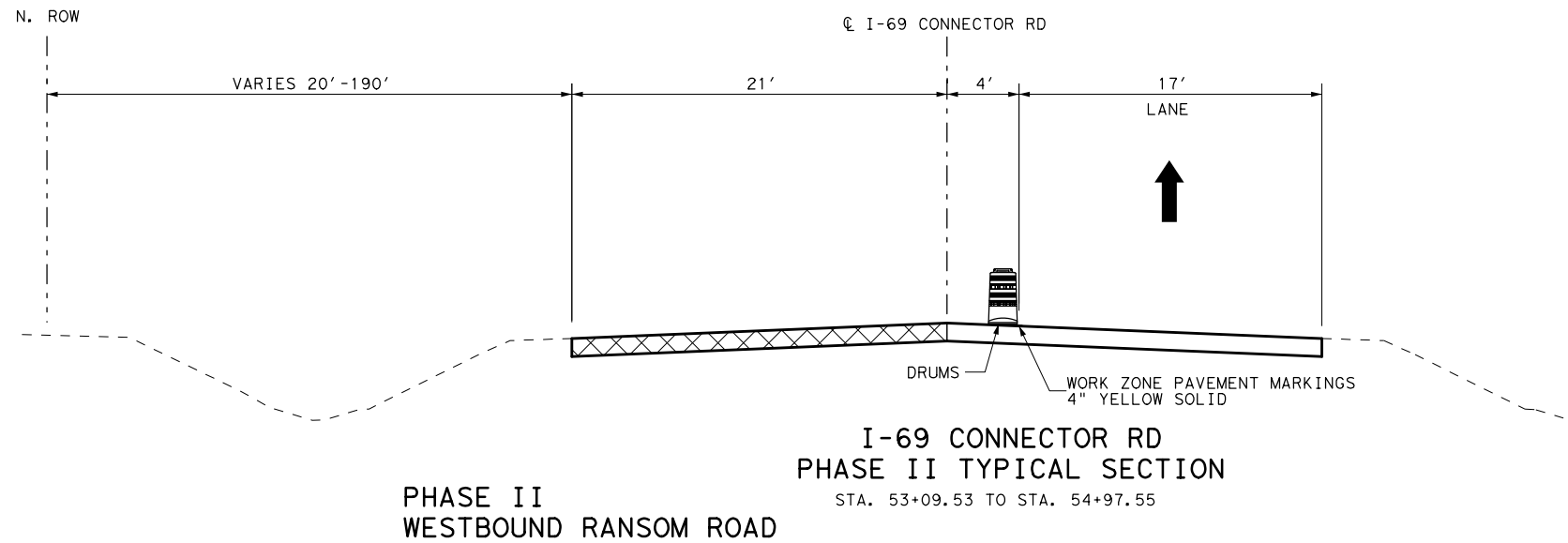
Approved By: _____ Date: _____	r.g. miller Job No. 4399
SUBMITTED BY: R.G. MILLER SCALE: 1"=10'	DESIGNED BY: E.L.L. DRAWN BY: C.G.
DATE: 5/4/2023 SURV BY: MILLER SURVEY F. B. NO.: 17102	SHEET 1 OF 8 SHEETS DWG. NO. 19

4:20:28 PM 5/4/2023
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LEGEND

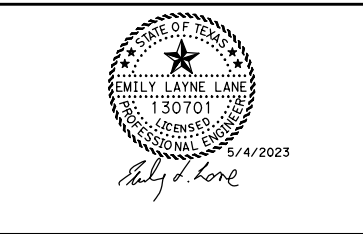
	WORK ZONE
	TEMPORARY PAVEMENT
	FAST TRACK PAVEMENT
	PREVIOUSLY CONSTRUCTED TEMPORARY PAVEMENT
	PREVIOUSLY CONSTRUCTED PERMANENT PAVEMENT
	TEMP GROUND MOUNTED SIGN
	CHANNELIZING DEVICE
	TYPE III BARRICADE
	TRAFFIC FLOW ARROW



1. CHANGE PORTABLE MESSAGE SIGNS AND ADVANCE SIGNING.
2. PLACE WORK ZONE SIGNS, WORK ZONE PAVEMENT MARKINGS, AND BARRICADES AS REQUIRED.
3. INSTALL SW3P IN ACCORDANCE WITH SW3P LAYOUT SHEETS.
4. CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL TURNING MOVEMENTS AT ALL TIMES.
5. CONSTRUCT PHASE II IMPROVEMENTS INCLUDING, BUT NOT LIMITED TO:
 - DRAINAGE STRUCTURES
 - CITY OF SUGAR LAND WATER LINE
 - EXCAVATION/EMBANKMENT
 - CONCRETE PAVEMENT
 - CURB AND GUTTER SECTION
 - NORTHEAST QUADRANT OF INDIGO RIVER LANE WITH FAST-TRACK CONCRETE
 - NORTHWEST QUADRANT OF HOSPITAL DRIVEWAY WITH FAST-TRACK CONCRETE
 - I-69 CONNECTOR RD BETWEEN POINT W CIRCLE AND RANSOM RD
 - COMMERCIAL DRIVEWAY

No.	Date	Revisions	App.

**RANSOM RD
TCP PHASE II
TYPICAL SECTION**



r.g.miller engineers
16340 Park Ten Place, Suite 350
Houston, Texas 77084
(713) 461-9600
TEXAS FIRM REGISTRATION NO. F-487

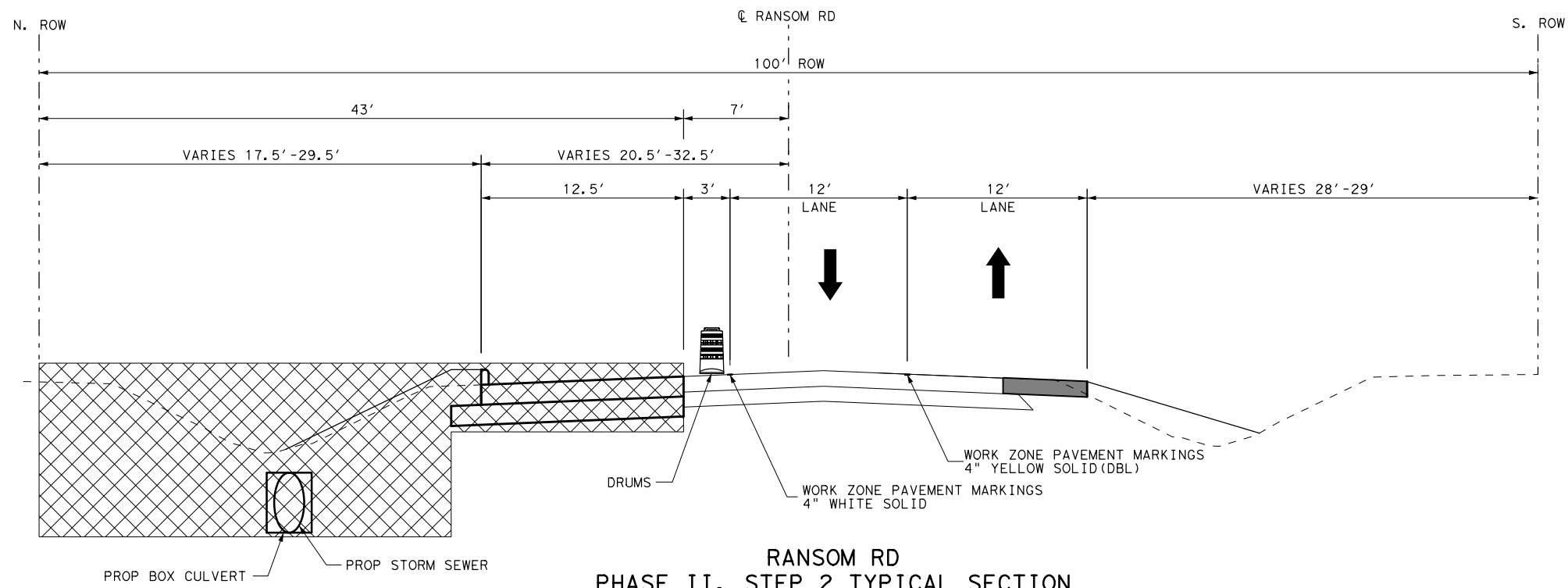
Approved By: _____ Date: _____
r.g.miller Job No. 4399

SUBMITTED BY: R.G. MILLER SCALE: 1"=10'
DATE: 5/4/2023 SURV BY: MILLER SURVEY F. B. NO.: 17102
DESIGNED BY: E.L.L. DRAWN BY: C.G.
SHEET 2 OF 8 SHEETS DWG. NO. 20

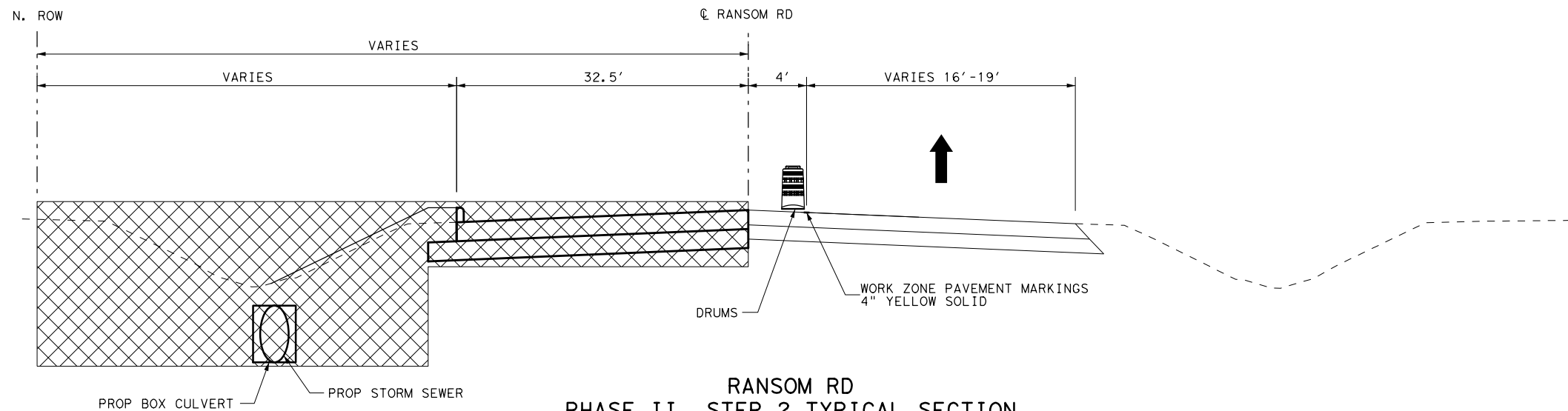
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LEGEND

- WORK ZONE
- TEMPORARY PAVEMENT
- FAST TRACK PAVEMENT
- PREVIOUSLY CONSTRUCTED TEMPORARY PAVEMENT
- PREVIOUSLY CONSTRUCTED PERMANENT PAVEMENT
- TEMP GROUND MOUNTED SIGN
- CHANNELIZING DEVICE
- TYPE III BARRICADE
- TRAFFIC FLOW ARROW



RANSOM RD
 PHASE II, STEP 2 TYPICAL SECTION
 STA. 12+02.20 TO STA. 13+95.14



RANSOM RD
 PHASE II, STEP 2 TYPICAL SECTION
 STA. 30+73.69 TO STA. 34+57.39

PHASE II, STEP 2
 WESTBOUND RANSOM ROAD

1. CHANGE PORTABLE MESSAGE SIGNS AND ADVANCE SIGNING.
2. PLACE WORK ZONE SIGNS, WORK ZONE PAVEMENT MARKINGS, AND BARRICADES AS REQUIRED.
3. INSTALL SW3P IN ACCORDANCE WITH SW3P LAYOUT SHEETS.
4. CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL TURNING MOVEMENTS AT ALL TIMES.
5. CONSTRUCT PHASE II IMPROVEMENTS INCLUDING, BUT NOT LIMITED TO:
 - DRAINAGE STRUCTURES
 - CITY OF SUGAR LAND WATER LINE
 - EXCAVATION/EMBANKMENT
 - CONCRETE PAVEMENT
 - CURB AND GUTTER SECTION
 - NORTHWEST QUADRANT OF INDIGO RIVER LANE WITH FAST-TRACK CONCRETE
 - NORTHEAST QUADRANT OF HOSPITAL DRIVEWAY

No.	Date	Revisions	App.

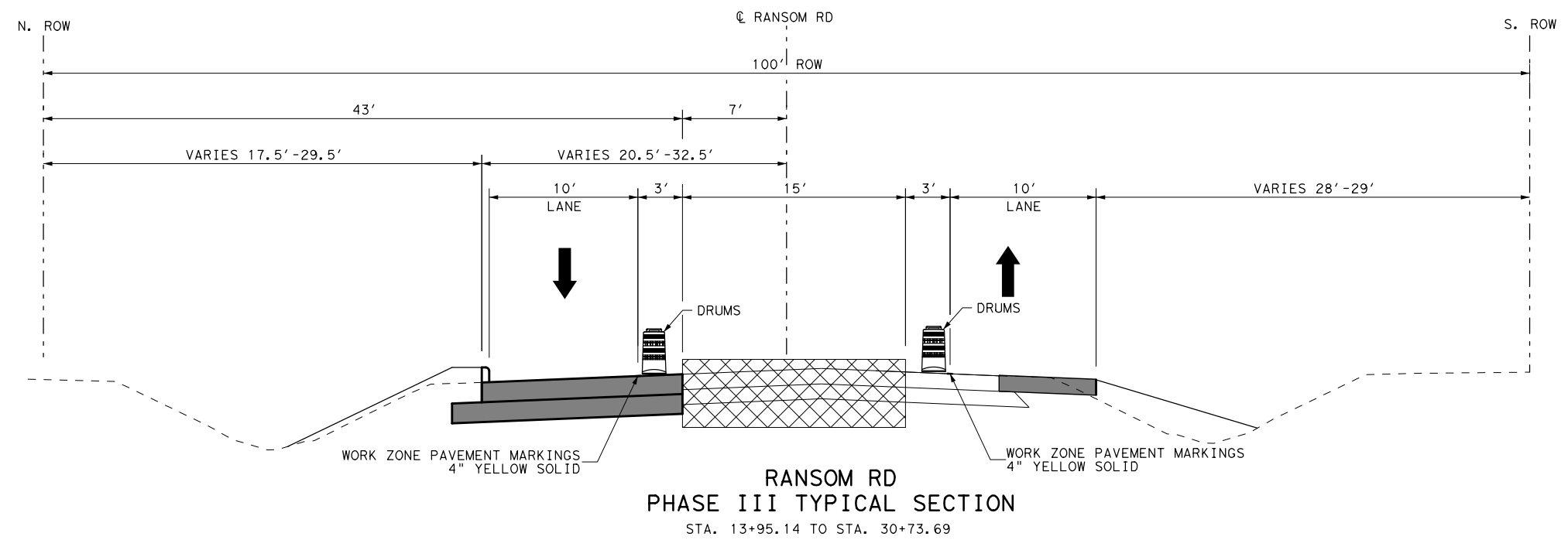
RANSOM RD
 TCP PHASE II
 STEP 2
 TYPICAL SECTION



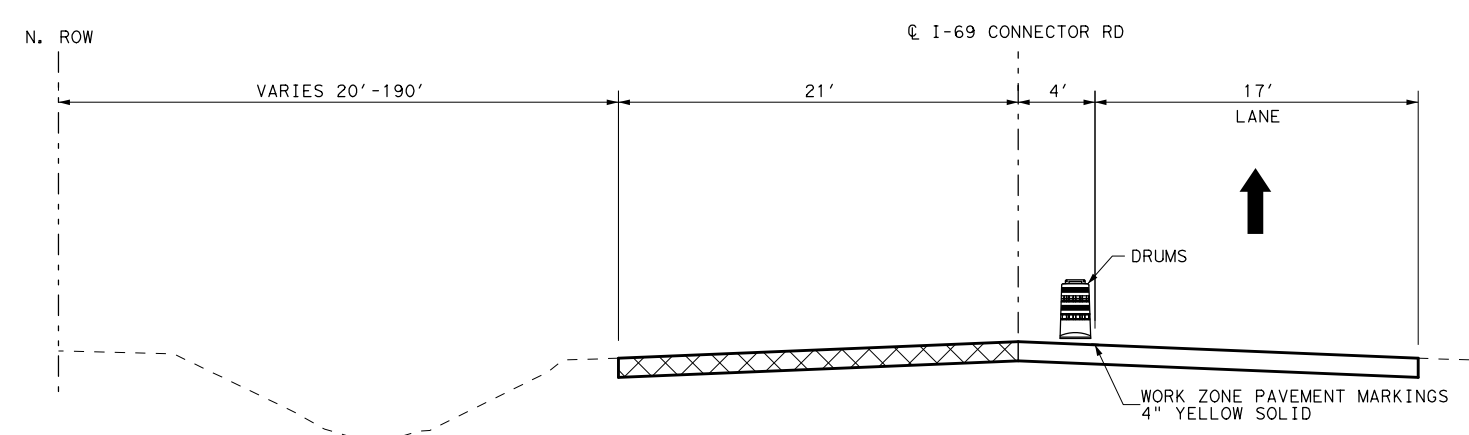
r.g.miller engineers 16340 Park Ten Place
 Suite 350
 Houston, Texas 77084
 (713) 461-9600
 TEXAS FIRM REGISTRATION NO. F-487

Approved By: Job No. 4399
 Date:

SUBMITTED BY: R.G. MILLER DESIGNED BY: E.L.L.
 SCALE: 1"=10' DRAWN BY: C.G.
 DATE: 5/4/2023 SHEET 3 OF 8 SHEETS
 SURV BY: MILLER SURVEY F. B. NO.: 17102 DWG. NO. 21



**RANSOM RD
PHASE III TYPICAL SECTION**
STA. 13+95.14 TO STA. 30+73.69



**I-69 CONNECTOR RD
PHASE III TYPICAL SECTION**
STA. 50+00 TO STA. 53+09.53

**PHASE III
RANSOM ROAD/SOUTHBOUND I-69 CONNECTOR ROAD**

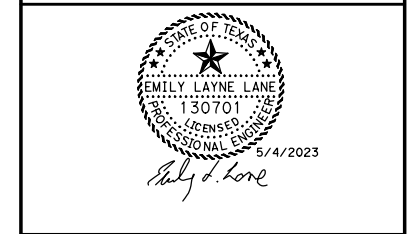
1. CHANGE PORTABLE MESSAGE SIGNS AND ADVANCE SIGNING.
2. PLACE WORK ZONE SIGNS, WORK ZONE PAVEMENT MARKINGS, AND BARRICADES AS REQUIRED.
3. INSTALL SW3P IN ACCORDANCE WITH SW3P LAYOUT SHEETS.
4. CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL TURNING MOVEMENTS AT ALL TIMES.
5. CONSTRUCT PHASE III IMPROVEMENTS INCLUDING, BUT NOT LIMITED TO:
 - DRAINAGE STRUCTURES
 - EXCAVATION/EMBANKMENT
 - CONCRETE PAVEMENT
 - CURB AND GUTTER SECTION
 - TWO-WAY LEFT TURN LANE
 - SOUTHBOUND I-69 CONNECTOR ROAD BETWEEN I-69 SBFR AND POINTE W CIRCLE
 - COMMERCIAL DRIVEWAYS

LEGEND

	WORK ZONE
	TEMPORARY PAVEMENT
	FAST TRACK PAVEMENT
	PREVIOUSLY CONSTRUCTED TEMPORARY PAVEMENT
	PREVIOUSLY CONSTRUCTED PERMANENT PAVEMENT
	TEMP GROUND MOUNTED SIGN
	CHANNELIZING DEVICE
	TYPE III BARRICADE
	TRAFFIC FLOW ARROW

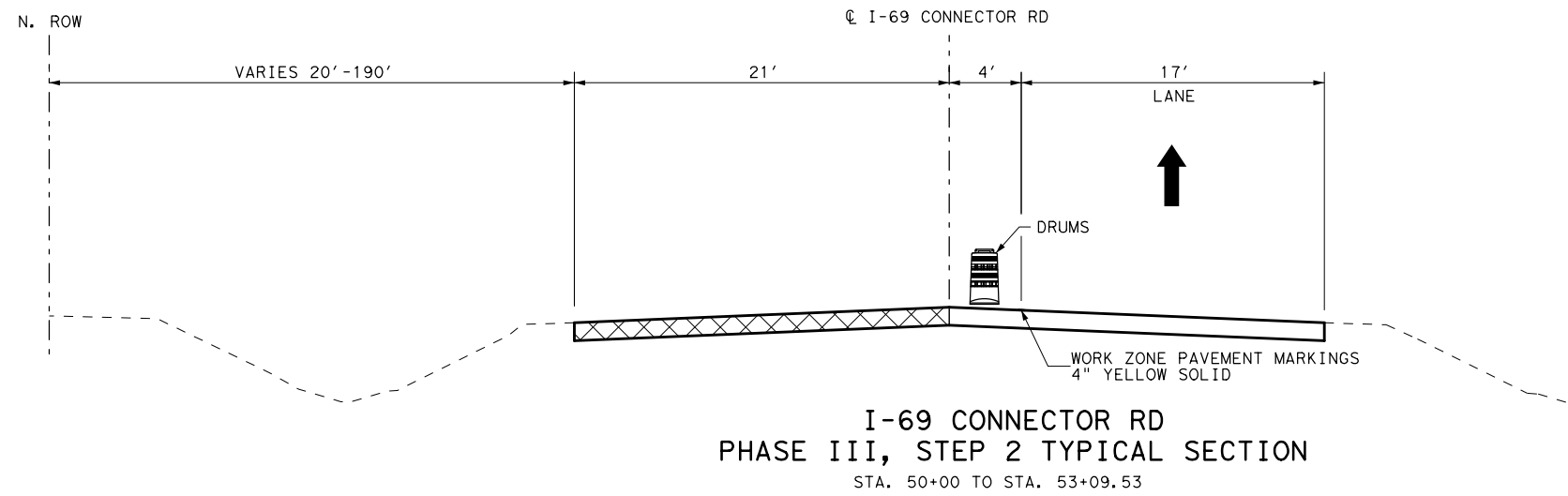
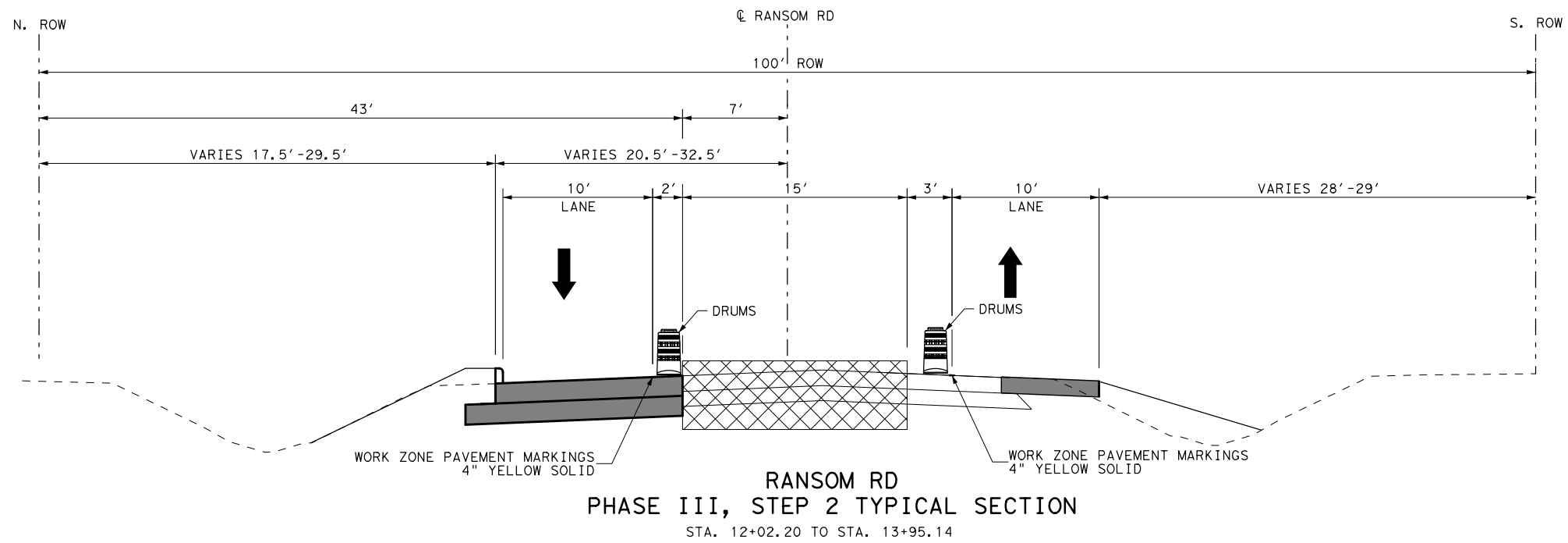
No.	Date	Revisions	App.

**RANSOM RD
TCP PHASE III
TYPICAL SECTION**



r.g.miller engineers <small>16340 Park Ten Place Suite 350 Houston, Texas 77084 (713) 461-9600 TEXAS FIRM REGISTRATION NO. F-487</small>	
Approved By: _____ Date: _____	r.g. miller Job No. 4399
SUBMITTED BY: R.G. MILLER SCALE: 1"=10'	DESIGNED BY: E.L.L. DRAWN BY: C.G.
DATE: 5/4/2023 SURV BY: MILLER SURVEY F. B. No.: 17102	SHEET 4 OF 8 SHEETS DWG. NO. 22

4:20:31 PM 5/4/2023
 T:\04399.000 FBC-01 Ransom Road\DGN\Sheets\TCP\Ransom Rd\TCP TYP SECT PH 03.dgn



PHASE III, STEP 2
RANSOM ROAD/SOUTHBOUND I-69 CONNECTOR ROAD

1. CHANGE PORTABLE MESSAGE SIGNS AND ADVANCE SIGNING.
2. PLACE WORK ZONE SIGNS, WORK ZONE PAVEMENT MARKINGS, AND BARRICADES AS REQUIRED.
3. INSTALL SW3P IN ACCORDANCE WITH SW3P LAYOUT SHEETS.
4. CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL TURNING MOVEMENTS AT ALL TIMES.
5. CONSTRUCT PHASE III IMPROVEMENTS INCLUDING, BUT NOT LIMITED TO:
 - DRAINAGE STRUCTURES
 - EXCAVATION/EMBANKMENT
 - CONCRETE PAVEMENT
 - CURB AND GUTTER SECTION
 - TWO-WAY LEFT TURN LANE

No.	Date	Revisions	App.

RANSOM RD
TCP PHASE III
STEP 2
TYPICAL SECTION

r.g. miller
engineers
 SINCE 1968

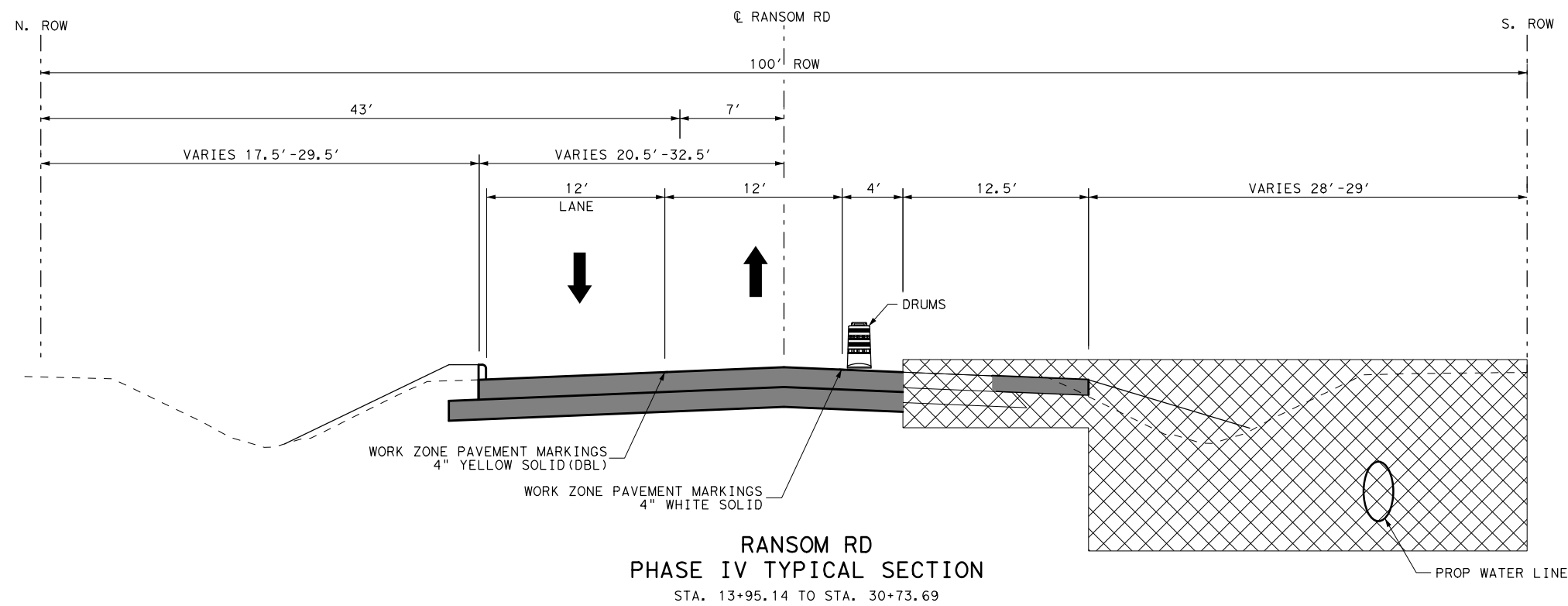
16340 Park Ten Place
 Suite 350
 Houston, Texas 77084
 (713) 461-9600
 TEXAS FIRM REGISTRATION NO. F-487

Approved By: _____ Date: _____ Job No. 4399

DESIGNED BY: E.L.L.
 DRAWN BY: C.G.

DATE: 5/4/2023
 SURV BY: MILLER SURVEY
 F. B. NO.: 17102

SHEET 5 OF 8 SHEETS
 DWG. NO. 23



LEGEND

	WORK ZONE
	TEMPORARY PAVEMENT
	FAST TRACK PAVEMENT
	PREVIOUSLY CONSTRUCTED TEMPORARY PAVEMENT
	PREVIOUSLY CONSTRUCTED PERMANENT PAVEMENT
	TEMP GROUND MOUNTED SIGN
	CHANNELIZING DEVICE
	TYPE III BARRICADE
	TRAFFIC FLOW ARROW

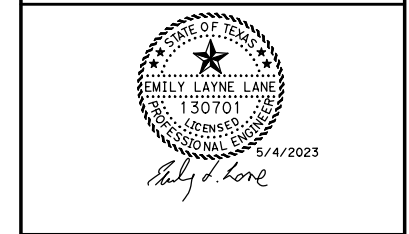
**RANSOM RD
PHASE IV TYPICAL SECTION**
STA. 13+95.14 TO STA. 30+73.69

**PHASE IV
INTERSECTION QUADRANTS/EASTBOUND RANSOM RD**

1. CHANGE PORTABLE MESSAGE SIGNS AND ADVANCE SIGNING.
2. PLACE WORK ZONE SIGNS, WORK ZONE PAVEMENT MARKINGS, AND BARRICADES AS REQUIRED.
3. INSTALL SW3P IN ACCORDANCE WITH SW3P LAYOUT SHEETS.
4. CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL TURNING MOVEMENTS AT ALL TIMES.
5. CONSTRUCT PHASE IV IMPROVEMENTS INCLUDING, BUT NOT LIMITED TO:
 - SOUTHEAST QUADRANT OF APARTMENT ROAD WITH FAST-TRACK CONCRETE
 - SOUTHWEST QUADRANT OF 1-69 CONNECTOR WITH FAST-TRACK CONCRETE
 - CONCRETE PAVEMENT
 - DRAINAGE STRUCTURES
 - CITY OF SUGAR LAND WATER LINE
 - CURB AND GUTTER SECTION
 - COMMERCIAL DRIVEWAYS

No.	Date	Revisions	App.

**RANSOM RD
TCP PHASE IV
TYPICAL SECTION**






		16340 Park Ten Place Suite 350 Houston, Texas 77084 (713) 461-9600 TEXAS FIRM REGISTRATION NO. F-487
Approved By:	r.g. miller	
Date:	Job No. 4399	
SUBMITTED BY: R.G. MILLER SCALE: 1"=10'	DESIGNED BY: E.L.L. DRAWN BY: C.G.	SHEET 6 OF 8 SHEETS
DATE: 5/4/2023 SURV BY: MILLER SURVEY F. B. No.: 17102	DWG. NO. 24	

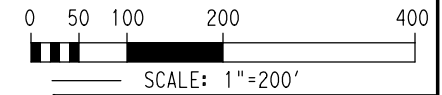
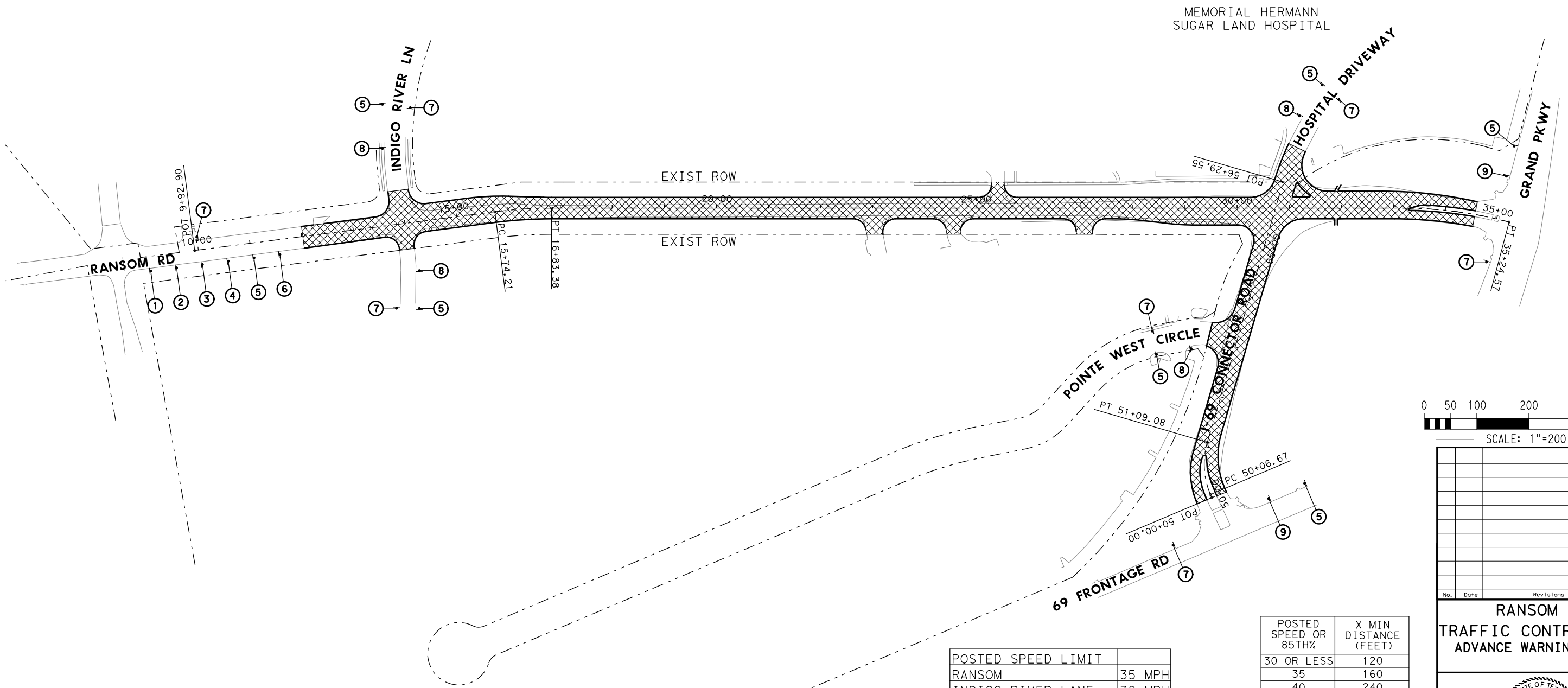
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NOTES:

1. ADVANCE WARNING SIGNS SHOWN SHALL REMAIN IN PLACE UNTIL CONSTRUCTION IS COMPLETE. SIGNS MAY BE RELOCATED AS DIRECTED BY THE ENGINEER.
2. REFER TO BC(2)-21 FOR CURRENT SIGNING REQUIREMENTS.

LEGEND

-  WORK ZONE
-  SIGN
-  SIGNS LOCATION



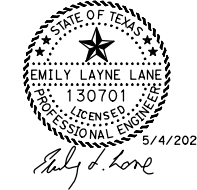
POSTED SPEED LIMIT	
RANSOM	35 MPH
INDIGO RIVER LANE	30 MPH
SH 99 FRONTAGE ROAD	45 MPH

POSTED SPEED OR 85TH%	X MIN DISTANCE (FEET)
30 OR LESS	120
35	160
40	240
45	320
50	400
55	500
65	750

X = SIGN SPACING

No.	Date	Revisions	App.








**RANSOM RD
TRAFFIC CONTROL PLAN
ADVANCE WARNING SIGNS**



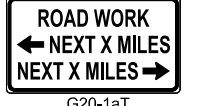



r.g. miller engineers
16340 Park Ten Place, Suite 350, Houston, Texas 77084
(713) 461-9600
TEXAS FIRM REGISTRATION NO. F-487

Approved By: _____ Date: _____
 Submitted By: R.G. MILLER Date: 5/4/2023
 Scale: _____
 SURV BY: MILLER SURVEY
 F. B. No.: 17102










Designed By: E.L.L.
 Drawn By: C.G.
 Job No. 4399
 SHEET 1 OF 1 SHEETS
 DWG. NO. 27

①  R20-3T (48X42)	②  G20-10T 60"x48"	③  G20-9TP 24x24  R20-5T 24x30  R20-5aTP 24x12	④  R2-1 30"x36"	⑤  CW20-1D (36X36)
---	--	--	---	---

⑥  G20-6T 48"x30" G20-5T 48"x24" NAME _____ ADDRESS _____ CITY _____ STATE _____ CONTRACTOR _____	⑦  G20-2 36"x18"	⑧  G20-1aT 72"x36"	⑨  G20-1bTR 72"x24"
--	--	--	---

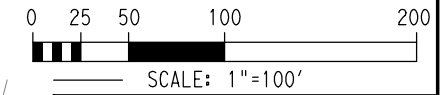
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LEGEND

-  WORK ZONE
-  TEMPORARY PAVEMENT
-  FAST TRACK PAVEMENT
-  PREVIOUSLY CONSTRUCTED TEMPORARY PAVEMENT
-  PREVIOUSLY CONSTRUCTED PERMANENT PAVEMENT
-  TEMP GROUND MOUNTED SIGN
-  CHANNELIZING DEVICE
-  TYPE III BARRICADE
-  TRAFFIC FLOW ARROW

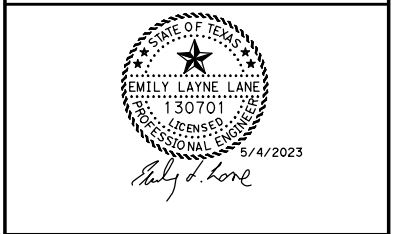
NOTES

1. CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL TURNING MOVEMENTS AT ALL TIMES.
2. REFER TO TCP ADVANCE WARNING SIGNS FOR SIGN DETAILS.
3. REFER TO TCP TYPICAL SECTIONS FOR DETAILS.



No.	Date	Revisions	App.

RANSOM RD
TRAFFIC CONTROL PLAN
PHASE I

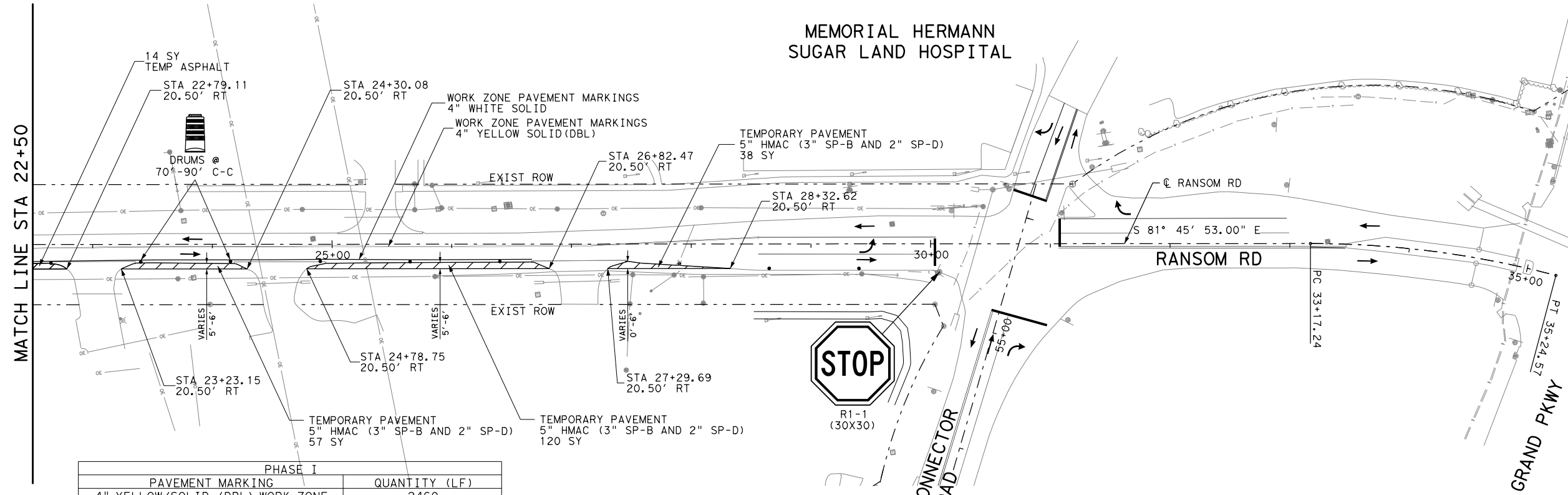
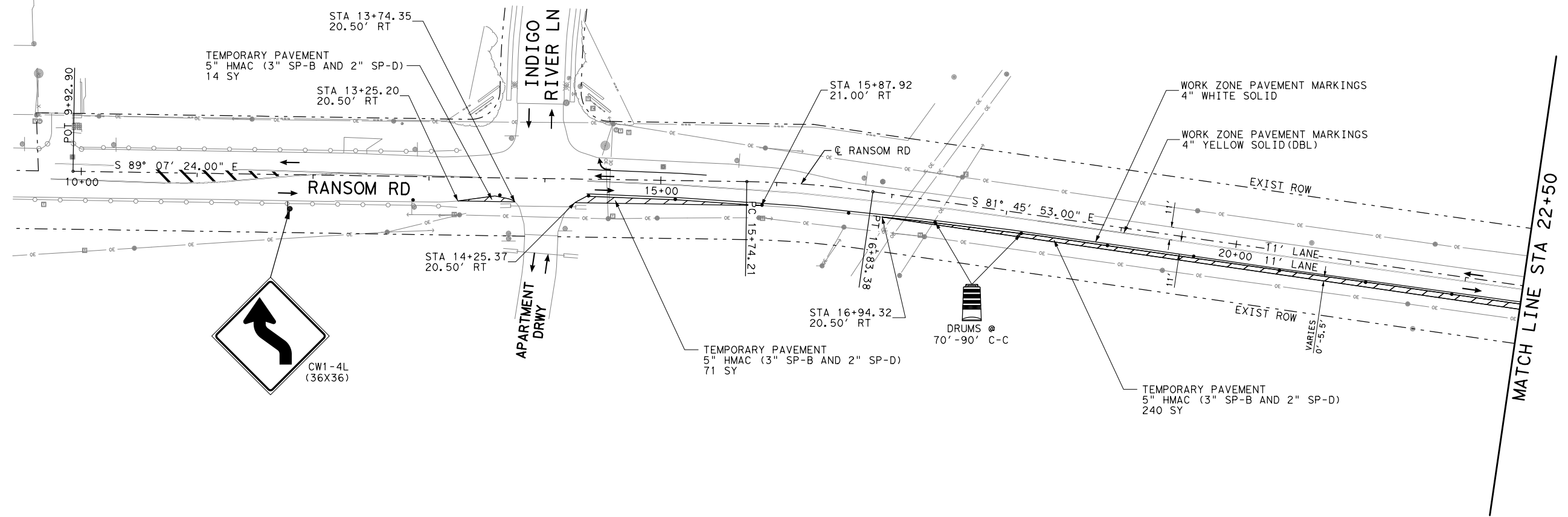


r.g. miller engineers
16340 Park Ten Place
Suite 350
Houston, Texas 77084
(713) 461-9600
TEXAS FIRM REGISTRATION NO. F-487

Approved By: _____ Date: _____
r.g. miller Job No. 4399

SUBMITTED BY: R.G. MILLER SCALE: 1"=100'
DESIGNED BY: E.L.L.
DRAWN BY: C.G.










DATE: 5/4/2023 SHEET 1 OF 15 SHEETS
SURV BY: MILLER SURVEY
F. B. No.: 17102 DWG. NO. 28

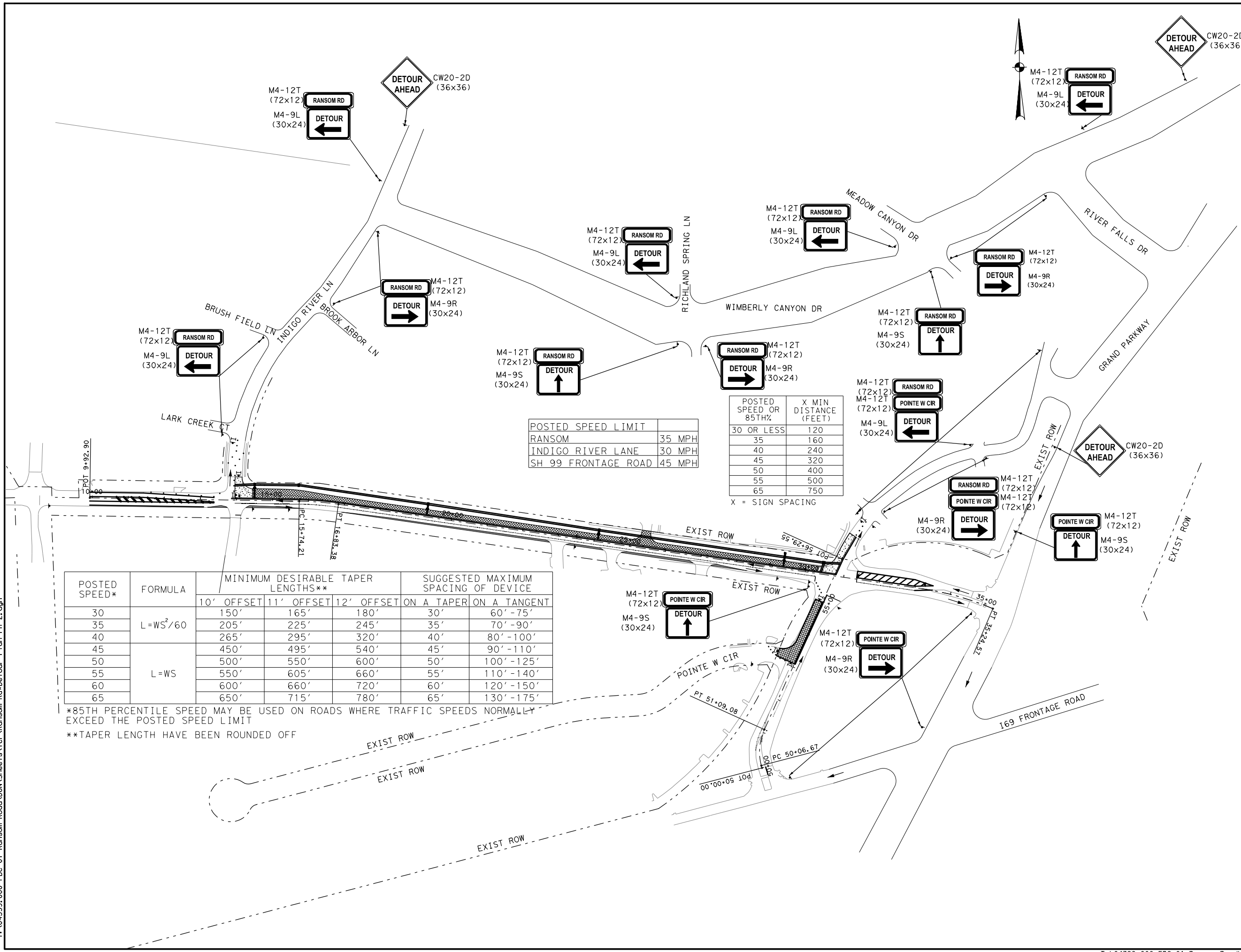


PHASE I	
PAVEMENT MARKING	QUANTITY (LF)
4" YELLOW/SOLID (DBL) WORK ZONE	2460
4" WHITE/SOLID WORK ZONE	1230
TEMP. ASPHALT PAVEMENT	540 SY

4:20:38 PM 5/4/2023 T:\04399.000 FBC-01 Ransom Road\DGN\Sheets\TCP\01\Ransom Rd*TCP PH 1.dgn

LEGEND

-  WORK ZONE
-  TEMPORARY PAVEMENT
-  FAST TRACK PAVEMENT
-  PREVIOUSLY CONSTRUCTED TEMPORARY PAVEMENT
-  PREVIOUSLY CONSTRUCTED PERMANENT PAVEMENT
-  TEMP GROUND MOUNTED SIGN
-  CHANNELIZING DEVICE
-  TYPE III BARRICADE
-  TRAFFIC FLOW ARROW



POSTED SPEED LIMIT	
RANSOM	35 MPH
INDIGO RIVER LANE	30 MPH
SH 99 FRONTAGE ROAD	45 MPH

POSTED SPEED OR 85TH%	X MIN DISTANCE (FEET)
30 OR LESS	120
35	160
40	240
45	320
50	400
55	500
65	750

X = SIGN SPACING

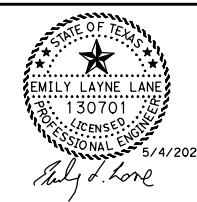
POSTED SPEED*	FORMULA	MINIMUM DESIRABLE TAPER LENGTHS**			SUGGESTED MAXIMUM SPACING OF DEVICE	
		10' OFFSET	11' OFFSET	12' OFFSET	ON A TAPER	ON A TANGENT
30	L = WS ² /60	150'	165'	180'	30'	60' - 75'
35		205'	225'	245'	35'	70' - 90'
40		265'	295'	320'	40'	80' - 100'
45	L = WS	450'	495'	540'	45'	90' - 110'
50		500'	550'	600'	50'	100' - 125'
55		550'	605'	660'	55'	110' - 140'
60		600'	660'	720'	60'	120' - 150'
65		650'	715'	780'	65'	130' - 175'

*85TH PERCENTILE SPEED MAY BE USED ON ROADS WHERE TRAFFIC SPEEDS NORMALLY EXCEED THE POSTED SPEED LIMIT
 **TAPER LENGTH HAVE BEEN ROUNDED OFF

SCALE: N.T.S.

No.	Date	Revisions	App.

RANSOM RD
 TRAFFIC CONTROL PLAN
 PHASE II DETOUR



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 Suite 350
 Houston, Texas 77084
 (713) 461-9600
 TEXAS FIRM REGISTRATION NO. F-487

Approved By: _____ Date: _____
 Job No. 4399

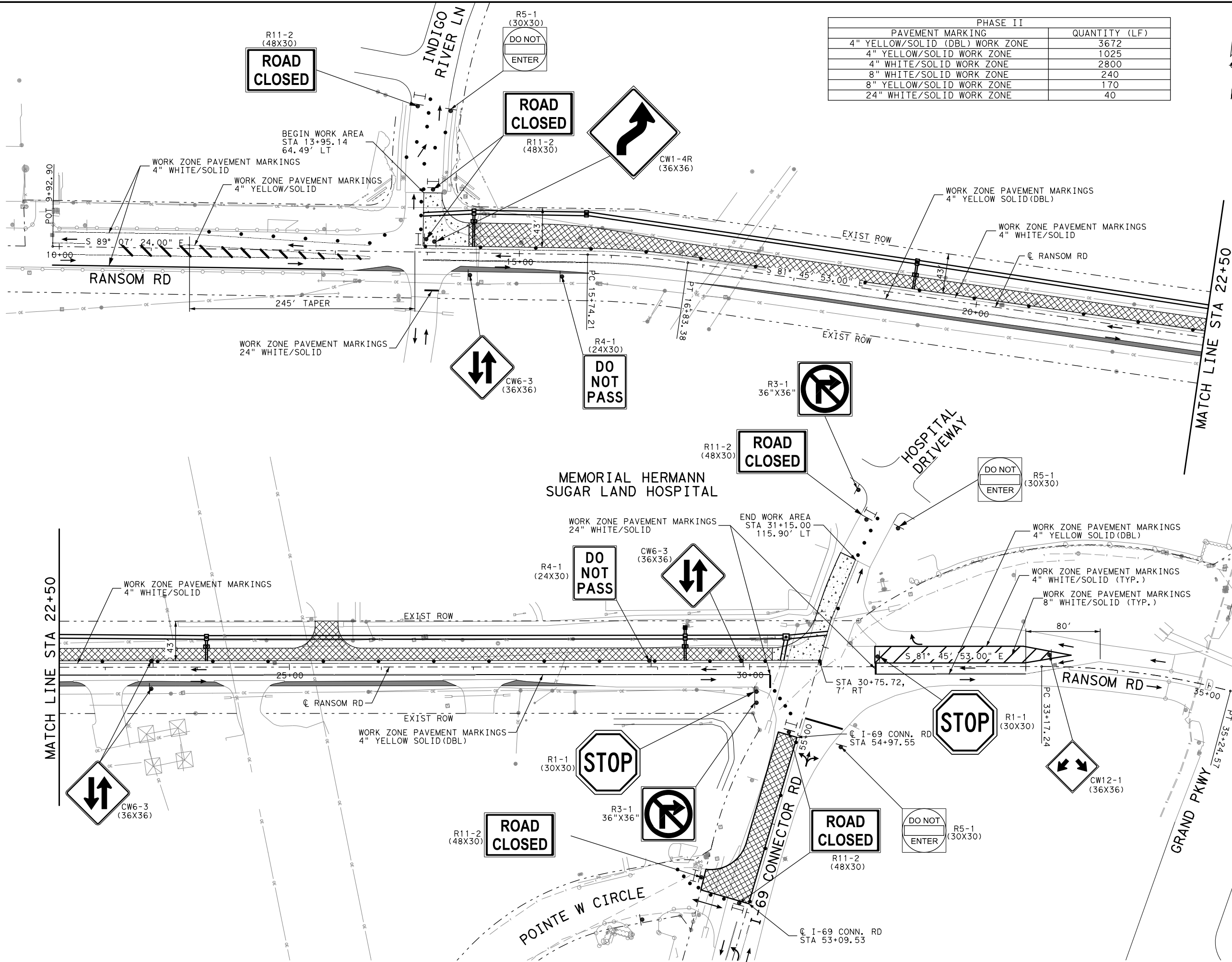
DESIGNED BY: E.L.L.
 DRAWN BY: C.G.

DATE: 5/4/2023
 SURV BY: MILLER SURVEY
 F. B. NO.: 17102

SHEET 2 OF 15 SHEETS
 DWG. NO. 29

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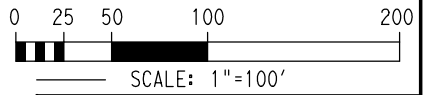


PHASE II	
PAVEMENT MARKING	QUANTITY (LF)
4" YELLOW/SOLID (DBL) WORK ZONE	3672
4" YELLOW/SOLID WORK ZONE	1025
4" WHITE/SOLID WORK ZONE	2800
8" WHITE/SOLID WORK ZONE	240
8" YELLOW/SOLID WORK ZONE	170
24" WHITE/SOLID WORK ZONE	40

LEGEND

- WORK ZONE
- TEMPORARY PAVEMENT
- FAST TRACK PAVEMENT
- PREVIOUSLY CONSTRUCTED TEMPORARY PAVEMENT
- PREVIOUSLY CONSTRUCTED PERMANENT PAVEMENT
- TEMP GROUND MOUNTED SIGN
- CHANNELIZING DEVICE
- TYPE III BARRICADE
- TRAFFIC FLOW ARROW

- NOTES**
- CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL TURNING MOVEMENTS AT ALL TIMES.
 - REFER TO TCP ADVANCE WARNING SIGNS FOR SIGN DETAILS.
 - REFER TO TCP TYPICAL SECTIONS FOR DETAILS.
 - PAVEMENT MARKINGS NOT CALLED OUT ARE PERMANENT/TO REMAIN FROM PREVIOUS PHASE. REFER TO PAVEMENT MARKING SHEETS FOR DETAILS.
 - CONTRACTOR SHALL USE ONE-LANE ROAD CLOSURE AND DETOUR ROUTING FOR OVERNIGHT LANE CLOSURES.



No.	Date	Revisions	App.

**RANSOM RD
 TRAFFIC CONTROL PLAN
 PHASE II**

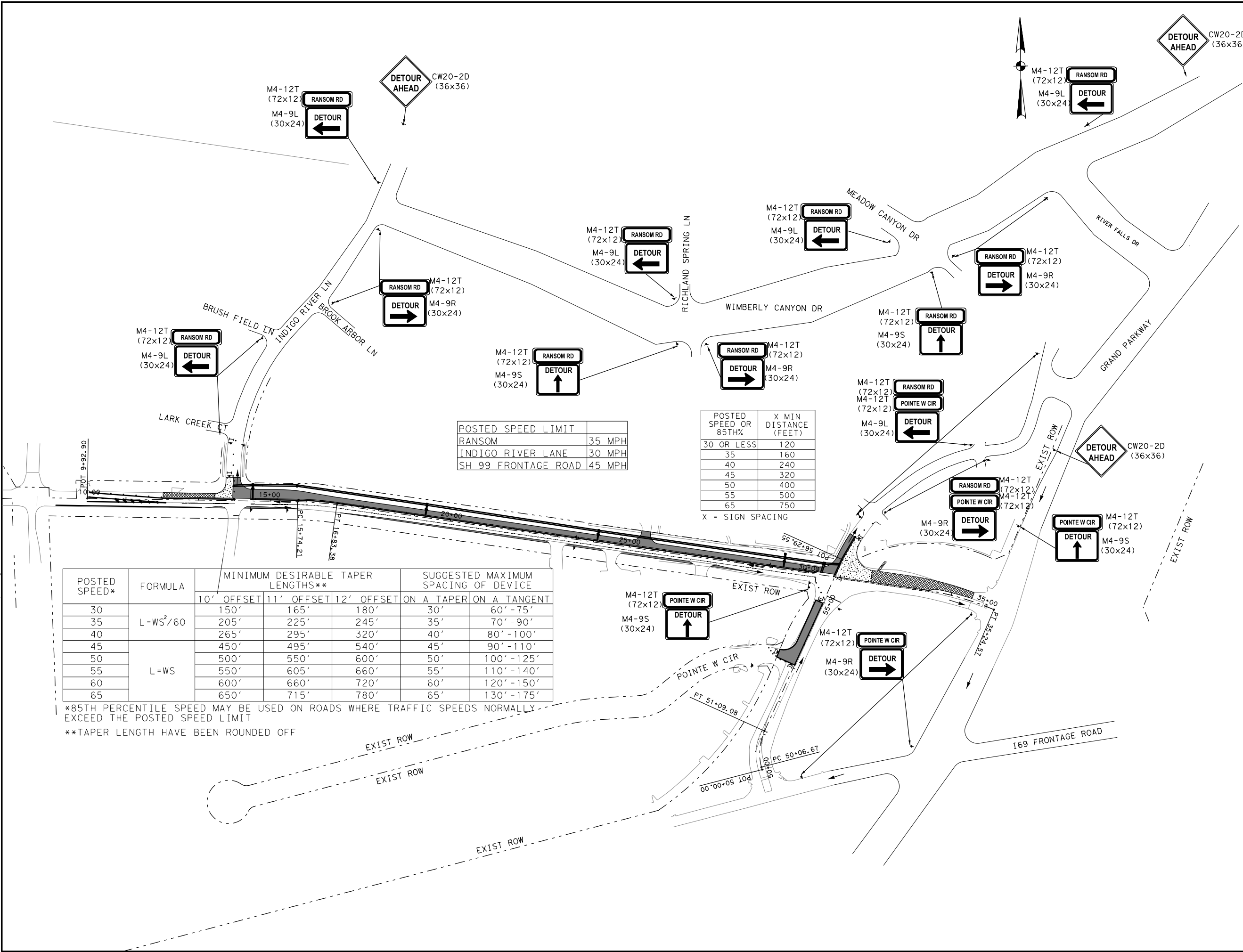
r.g. miller engineers
 16340 Park Ten Place, Suite 350, Houston, Texas 77084, (713) 461-9600, TEXAS FIRM REGISTRATION NO. F-487

Approved By: _____ Date: _____
 Job No. 4399

Submitted By: R.G. MILLER, Scale: 1"=100'
 Date: 5/4/2023, Surv: MILLER SURVEY, F.B. No.: 17102

Designed By: E.L.L., Drawn By: C.G.
 Sheet 3 of 15 Sheets, Dwg. No. 30

4:21:10 PM 5/4/2023
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LEGEND

- WORK ZONE
- TEMPORARY PAVEMENT
- FAST TRACK PAVEMENT
- PREVIOUSLY CONSTRUCTED TEMPORARY PAVEMENT
- PREVIOUSLY CONSTRUCTED PERMANENT PAVEMENT
- TEMP GROUND MOUNTED SIGN
- CHANNELIZING DEVICE
- TYPE III BARRICADE
- TRAFFIC FLOW ARROW

POSTED SPEED LIMIT	
RANSOM	35 MPH
INDIGO RIVER LANE	30 MPH
SH 99 FRONTAGE ROAD	45 MPH

POSTED SPEED OR 85TH%	X MIN DISTANCE (FEET)
30 OR LESS	120
35	160
40	240
45	320
50	400
55	500
65	750

X = SIGN SPACING

POSTED SPEED*	FORMULA	MINIMUM DESIRABLE TAPER LENGTHS**			SUGGESTED MAXIMUM SPACING OF DEVICE	
		10' OFFSET	11' OFFSET	12' OFFSET	ON A TAPER	ON A TANGENT
30	L = WS ² /60	150'	165'	180'	30'	60' - 75'
35		205'	225'	245'	35'	70' - 90'
40		265'	295'	320'	40'	80' - 100'
45	L = WS	450'	495'	540'	45'	90' - 110'
50		500'	550'	600'	50'	100' - 125'
55		550'	605'	660'	55'	110' - 140'
60		600'	660'	720'	60'	120' - 150'
65		650'	715'	780'	65'	130' - 175'

*85TH PERCENTILE SPEED MAY BE USED ON ROADS WHERE TRAFFIC SPEEDS NORMALLY EXCEED THE POSTED SPEED LIMIT
 **TAPER LENGTH HAVE BEEN ROUNDED OFF

SCALE: N.T.S.

No.	Date	Revisions	App.

**RANSOM RD
 TRAFFIC CONTROL PLAN
 PHASE II,
 STEP 2 DETOUR**

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 16340 Park Ten Place
 Suite 350
 Houston, Texas 77084
 (713) 461-9600
 TEXAS FIRM REGISTRATION NO. F-487

Approved By: _____ Date: _____
 Submitted By: R.G. MILLER
 Scale: N.T.S.
 Date: 5/4/2023
 Survey By: MILLER SURVEY
 F. B. No.: 17102

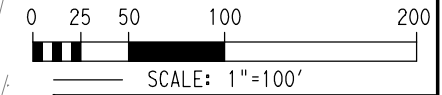
Designed By: E.L.L.
 Drawn By: C.G.
 Sheet 4 of 15 Sheets
 DWG. NO. 31

LEGEND

- WORK ZONE
- TEMPORARY PAVEMENT
- FAST TRACK PAVEMENT
- PREVIOUSLY CONSTRUCTED TEMPORARY PAVEMENT
- PREVIOUSLY CONSTRUCTED PERMANENT PAVEMENT
- TEMP GROUND MOUNTED SIGN
- CHANNELIZING DEVICE
- TYPE III BARRICADE
- TRAFFIC FLOW ARROW

NOTES

1. CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL TURNING MOVEMENTS AT ALL TIMES.
2. REFER TO TCP ADVANCE WARNING SIGNS FOR SIGN DETAILS.
3. REFER TO TCP TYPICAL SECTIONS FOR DETAILS.
4. PAVEMENT MARKINGS NOT CALLED OUT ARE PERMANENT/TO REMAIN FROM PREVIOUS PHASE. REFER TO PAVEMENT MARKING SHEETS FOR DETAILS.
5. CONTRACTOR SHALL USE ONE-LANE ROAD CLOSURE AND DETOUR ROUTING FOR OVERNIGHT LANE CLOSURES.



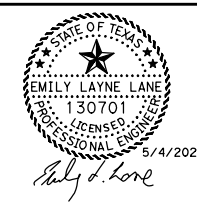
PHASE II STEP 2	
PAVEMENT MARKING	QUANTITY (LF)
4" YELLOW/SOLID (DBL) WORK ZONE	400
4" YELLOW/SOLID WORK ZONE	725
4" WHITE/SOLID WORK ZONE	500

TCP PHASE II Step 2 INDIGO RIVER LANE - LEVEL UP			
POINT	STATION	OFFSET	ELEVATION
1	13+95.14	7.00 LT	74.51
2	14+20.01	7.00 LT	74.42
3	14+44.89	7.00 LT	74.33
4	14+44.89	14.92 RT	75.06
5	14+20.01	26.00 RT	75.12
6	14+14.08	39.36 RT	75.48
7	13+95.14	39.65 RT	75.64

TCP PHASE II Step 2 HOSPITAL DRIVEWAY - LEVEL UP			
POINT	STATION	OFFSET	ELEVATION
1	30+24.64	7.00 LT	73.64
2	30+75.72	7.00 LT	73.35
3	30+24.64	21.38 RT	72.90
4	30+64.33	32.16 RT	72.70

No.	Date	Revisions	App.

RANSOM RD
TRAFFIC CONTROL PLAN
PHASE II, STEP 2



r.g. miller engineers
16340 Park Ten Place
Suite 350
Houston, Texas 77084
(713) 461-9600
TEXAS FIRM REGISTRATION NO. F-487

Approved By: _____ Date: _____
 Submitted By: R.G. MILLER SCALE: 1"=100'
 Date: 5/4/2023 SURV BY: MILLER SURVEY F. B. NO.: 17102
 Designed By: E.L.L. DRAWN BY: C.G.
 SHEET 5 OF 15 SHEETS
 DWG. NO. 32

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T:\04399.000 FBC-01 Ransom Road\DGN\Sheets\TCP\02*Ransom Rd*TCP PH 2*Step 2.dgn

LEGEND

- WORK ZONE
- TEMPORARY PAVEMENT
- FAST TRACK PAVEMENT
- PREVIOUSLY CONSTRUCTED TEMPORARY PAVEMENT
- PREVIOUSLY CONSTRUCTED PERMANENT PAVEMENT
- TEMP GROUND MOUNTED SIGN
- CHANNELIZING DEVICE
- TYPE III BARRICADE
- TRAFFIC FLOW ARROW

POSTED SPEED LIMIT	
RANSOM	35 MPH
INDIGO RIVER LANE	30 MPH
SH 99 FRONTAGE ROAD	45 MPH

POSTED SPEED OR 85TH%	X MIN DISTANCE (FEET)
30 OR LESS	120
35	160
40	240
45	320
50	400
55	500
65	750

X = SIGN SPACING

POSTED SPEED*	FORMULA	MINIMUM DESIRABLE TAPER LENGTHS**			SUGGESTED MAXIMUM SPACING OF DEVICE	
		10' OFFSET	11' OFFSET	12' OFFSET	ON A TAPER	ON A TANGENT
30	L=WS ² /60	150'	165'	180'	30'	60' - 75'
35		205'	225'	245'	35'	70' - 90'
40		265'	295'	320'	40'	80' - 100'
45		450'	495'	540'	45'	90' - 110'
50	L=WS	500'	550'	600'	50'	100' - 125'
55		550'	605'	660'	55'	110' - 140'
60		600'	660'	720'	60'	120' - 150'
65		650'	715'	780'	65'	130' - 175'

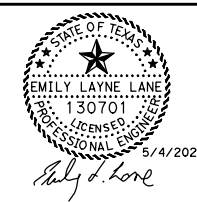
*85TH PERCENTILE SPEED MAY BE USED ON ROADS WHERE TRAFFIC SPEEDS NORMALLY EXCEED THE POSTED SPEED LIMIT

**TAPER LENGTH HAVE BEEN ROUNDED OFF

SCALE: N.T.S.

No.	Date	Revisions	App.

RANSOM RD
TRAFFIC CONTROL PLAN
PHASE III DETOUR



r.g.miller engineers
16340 Park Ten Place
Suite 350
Houston, Texas 77084
(713) 461-9600
TEXAS FIRM REGISTRATION NO. F-487

Approved By: _____ Date: _____
r.g.miller Job No. 4399

SUBMITTED BY: R.G. MILLER SCALE: N.T.S.
DATE: 5/4/2023 SURV BY: MILLER SURVEY F. B. NO.: 17102
DESIGNED BY: E.L.L. DRAWN BY: C.G.
SHEET 6 OF 15 SHEETS
DWG. NO. 33

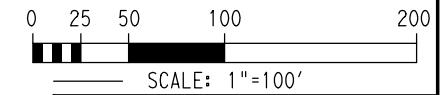
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LEGEND

- WORK ZONE
- TEMPORARY PAVEMENT
- FAST TRACK PAVEMENT
- PREVIOUSLY CONSTRUCTED TEMPORARY PAVEMENT
- PREVIOUSLY CONSTRUCTED PERMANENT PAVEMENT
- TEMP GROUND MOUNTED SIGN
- CHANNELIZING DEVICE
- TYPE III BARRICADE
- TRAFFIC FLOW ARROW

NOTES

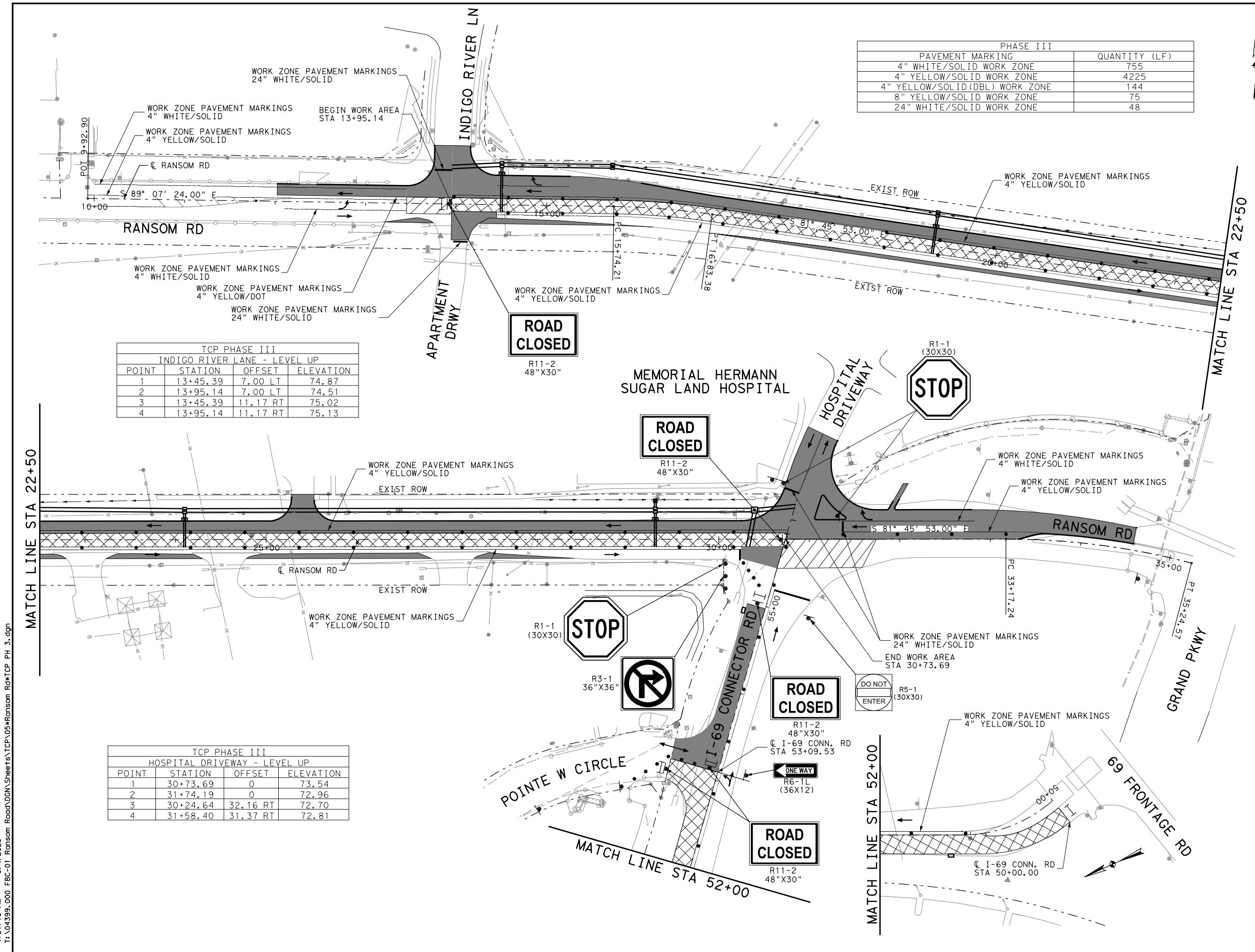
1. CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL TURNING MOVEMENTS AT ALL TIMES.
2. REFER TO TCP ADVANCE WARNING SIGNS FOR SIGN DETAILS.
3. REFER TO TCP TYPICAL SECTIONS FOR DETAILS.
4. PAVEMENT MARKINGS NOT CALLED OUT ARE PERMANENT/TO REMAIN FROM PREVIOUS PHASE. REFER TO PAVEMENT MARKING SHEETS FOR DETAILS.
5. CONTRACTOR SHALL USE ONE-LANE ROAD CLOSURE AND DETOUR ROUTING FOR OVERNIGHT LANE CLOSURES.



PHASE III	
PAVEMENT MARKING	QUANTITY (LF)
4" WHITE/SOLID WORK ZONE	755
4" YELLOW/SOLID WORK ZONE	4225
4" YELLOW/SOLID (DBL) WORK ZONE	144
8" YELLOW/SOLID WORK ZONE	75
24" WHITE/SOLID WORK ZONE	48

TCP PHASE III			
INDIGO RIVER LANE - LEVEL UP			
POINT	STATION	OFFSET	ELEVATION
1	13+45.39	7.00 LT	74.87
2	13+95.14	7.00 LT	74.51
3	13+45.39	11.17 RT	75.02
4	13+95.14	11.17 RT	75.13

TCP PHASE III			
HOSPITAL DRIVEWAY - LEVEL UP			
POINT	STATION	OFFSET	ELEVATION
1	30+73.69	0	73.54
2	31+74.19	0	72.96
3	30+24.64	32.16 RT	72.70
4	31+58.40	31.37 RT	72.81



No.	Date	Revisions	App.

RANSOM RD
TRAFFIC CONTROL PLAN
PHASE III

r.g.miller engineers
16340 Park Ten Place
Suite 350
Houston, Texas 77084
(713) 461-9600
TEXAS FIRM REGISTRATION NO. F-487

Approved By: _____ Date: _____
Job No. 4399

Submitted By: R.G. MILLER
Scale: 1"=100'










Designed By: E.L.L.
Drawn By: C.G.

Date: 5/4/2023
SHEET 7 OF 15 SHEETS

Surv By: MILLER SURVEY
F. B. No.: 17102
DWG. NO. 34

4:21:15 PM 5/4/2023 T:\04399.000 FBC-01 Ransom Road\DN\Sheets\TCP\05\Ransom Rd*TCP PH 3.dgn

LEGEND

-  WORK ZONE
-  TEMPORARY PAVEMENT
-  FAST TRACK PAVEMENT
-  PREVIOUSLY CONSTRUCTED TEMPORARY PAVEMENT
-  PREVIOUSLY CONSTRUCTED PERMANENT PAVEMENT
-  TEMP GROUND MOUNTED SIGN
-  CHANNELIZING DEVICE
-  TYPE III BARRICADE
-  TRAFFIC FLOW ARROW



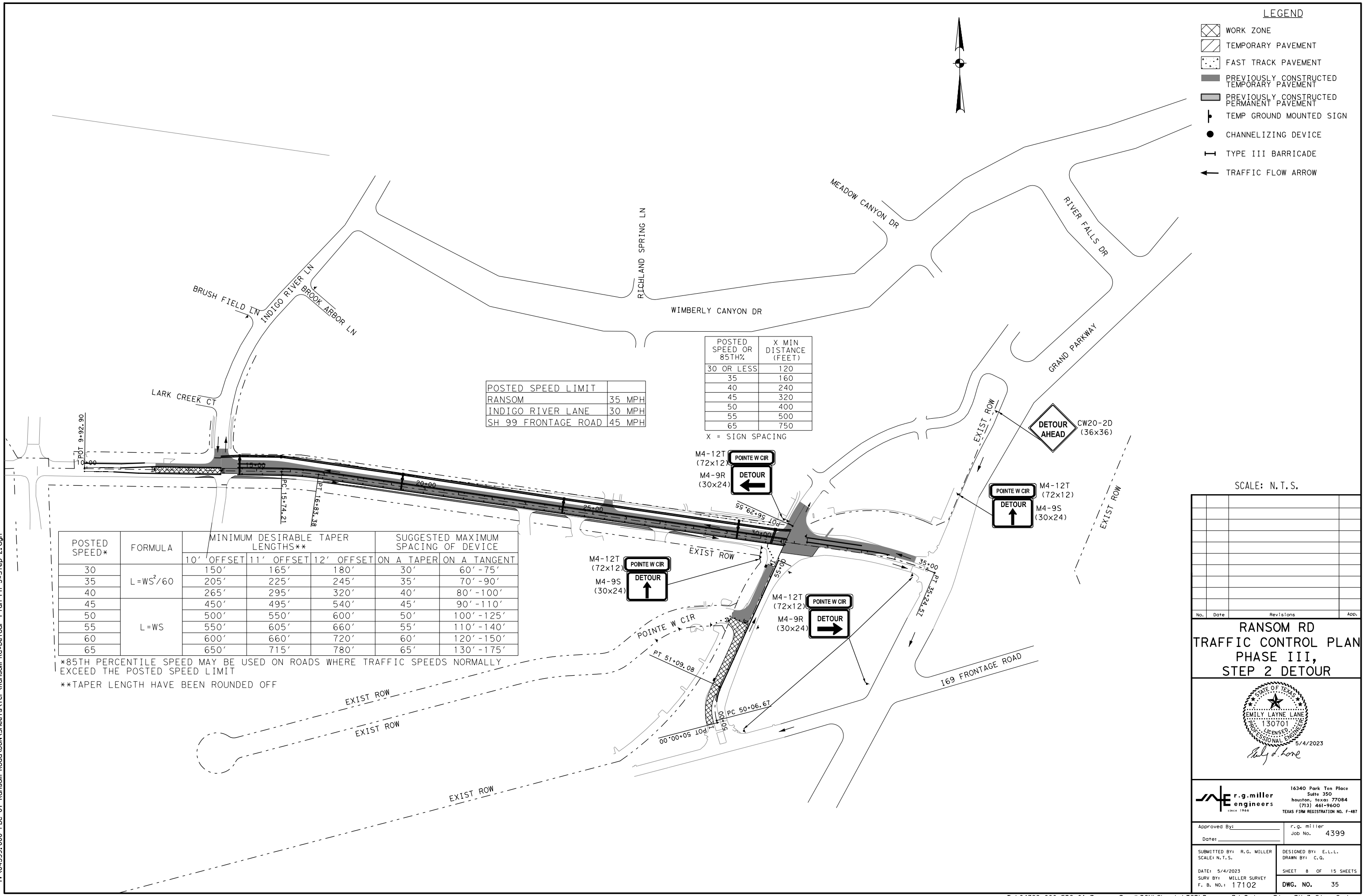
POSTED SPEED LIMIT	
RANSOM	35 MPH
INDIGO RIVER LANE	30 MPH
SH 99 FRONTAGE ROAD	45 MPH

POSTED SPEED OR 85TH%	X MIN DISTANCE (FEET)
30 OR LESS	120
35	160
40	240
45	320
50	400
55	500
65	750

X = SIGN SPACING

POSTED SPEED*	FORMULA	MINIMUM DESIRABLE TAPER LENGTHS**			SUGGESTED MAXIMUM SPACING OF DEVICE	
		10' OFFSET	11' OFFSET	12' OFFSET	ON A TAPER	ON A TANGENT
30	L = WS ² /60	150'	165'	180'	30'	60' - 75'
35		205'	225'	245'	35'	70' - 90'
40		265'	295'	320'	40'	80' - 100'
45	L = WS	450'	495'	540'	45'	90' - 110'
50		500'	550'	600'	50'	100' - 125'
55		550'	605'	660'	55'	110' - 140'
60		600'	660'	720'	60'	120' - 150'
65		650'	715'	780'	65'	130' - 175'

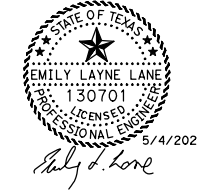
*85TH PERCENTILE SPEED MAY BE USED ON ROADS WHERE TRAFFIC SPEEDS NORMALLY EXCEED THE POSTED SPEED LIMIT
 **TAPER LENGTH HAVE BEEN ROUNDED OFF



SCALE: N.T.S.

No.	Date	Revisions	App.

RANSOM RD
 TRAFFIC CONTROL PLAN
 PHASE III,
 STEP 2 DETOUR



r.g.miller engineers
 16340 Park Ten Place, Suite 350
 Houston, Texas 77084
 (713) 461-9600
 TEXAS FIRM REGISTRATION NO. F-487

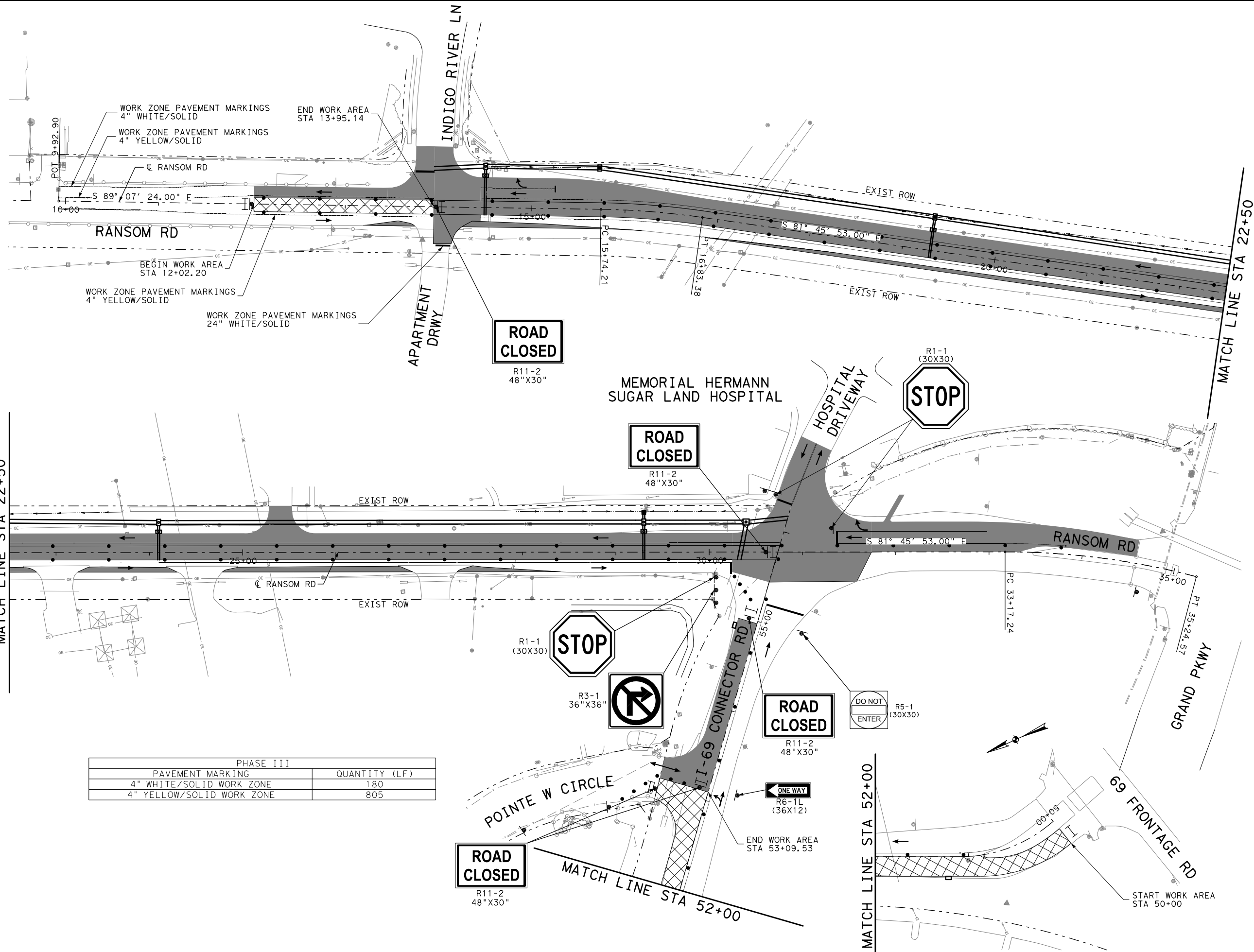
Approved By: _____ Date: _____
 Job No. 4399

Submitted By: R.G. MILLER
 Scale: N.T.S.
 Date: 5/4/2023
 Survey By: MILLER SURVEY
 F.B. No.: 17102

Designed By: E.L.L.
 Drawn By: C.G.
 Sheet 8 of 15 Sheets
 DWG. NO. 35

4:21:17 PM 5/4/2023
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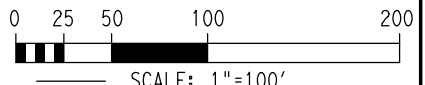


PHASE III	
PAVEMENT MARKING	QUANTITY (LF)
4" WHITE/SOLID WORK ZONE	180
4" YELLOW/SOLID WORK ZONE	805

LEGEND

- WORK ZONE
- TEMPORARY PAVEMENT
- FAST TRACK PAVEMENT
- PREVIOUSLY CONSTRUCTED TEMPORARY PAVEMENT
- PREVIOUSLY CONSTRUCTED PERMANENT PAVEMENT
- TEMP GROUND MOUNTED SIGN
- CHANNELIZING DEVICE
- TYPE III BARRICADE
- TRAFFIC FLOW ARROW

- NOTES**
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No.	Date	Revisions	App.

**RANSOM RD
 TRAFFIC CONTROL PLAN
 PHASE III, Step 2**

Emily Layne Lane
 130701
 5/4/2023

r.g.miller engineers
 16340 Park Ten Place, Suite 350, Houston, Texas 77084
 (713) 461-9600
 TEXAS FIRM REGISTRATION NO. F-487

Approved By: _____ Date: _____
 Job No. 4399

DESIGNED BY: E.L.L.
 DRAWN BY: C.G.

DATE: 5/4/2023
 SURV BY: MILLER SURVEY
 F. B. NO.: 17102

SHEET 9 OF 15 SHEETS
 DWG. NO. 36

LEGEND

- WORK ZONE
- TEMPORARY PAVEMENT
- FAST TRACK PAVEMENT
- PREVIOUSLY CONSTRUCTED TEMPORARY PAVEMENT
- PREVIOUSLY CONSTRUCTED PERMANENT PAVEMENT
- TEMP GROUND MOUNTED SIGN
- CHANNELIZING DEVICE
- TYPE III BARRICADE
- TRAFFIC FLOW ARROW



POSTED SPEED LIMIT	
RANSOM	35 MPH
INDIGO RIVER LANE	30 MPH
SH 99 FRONTAGE ROAD	45 MPH

POSTED SPEED OR 85TH%	X MIN DISTANCE (FEET)
30 OR LESS	120
35	160
40	240
45	320
50	400
55	500
65	750

X = SIGN SPACING

M4-12T (72x12)
M4-9R (30x24)

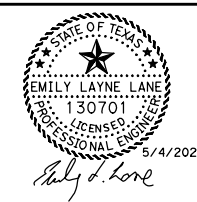
POSTED SPEED*	FORMULA	MINIMUM DESIRABLE TAPER LENGTHS**			SUGGESTED MAXIMUM SPACING OF DEVICE	
		10' OFFSET	11' OFFSET	12' OFFSET	ON A TAPER	ON A TANGENT
30	L = WS ² /60	150'	165'	180'	30'	60' - 75'
35		205'	225'	245'	35'	70' - 90'
40		265'	295'	320'	40'	80' - 100'
45	L = WS	450'	495'	540'	45'	90' - 110'
50		500'	550'	600'	50'	100' - 125'
55		550'	605'	660'	55'	110' - 140'
60		600'	660'	720'	60'	120' - 150'
65		650'	715'	780'	65'	130' - 175'

*85TH PERCENTILE SPEED MAY BE USED ON ROADS WHERE TRAFFIC SPEEDS NORMALLY EXCEED THE POSTED SPEED LIMIT
**TAPER LENGTH HAVE BEEN ROUNDED OFF

SCALE: N.T.S.

No.	Date	Revisions	App.

RANSOM RD
TRAFFIC CONTROL PLAN
PHASE IV DETOUR



r.g.miller engineers
16340 Park Ten Place
Suite 350
Houston, Texas 77084
(713) 461-9600
TEXAS FIRM REGISTRATION NO. F-487

Approved By: _____ Date: _____
r.g.miller Job No. 4399

SUBMITTED BY: R.G. MILLER
SCALE: N.T.S.
DATE: 5/4/2023
SURV BY: MILLER SURVEY
F. B. NO.: 17102

DESIGNED BY: E.L.L.
DRAWN BY: C.G.
SHEET 10 OF 15 SHEETS
DWG. NO. 37

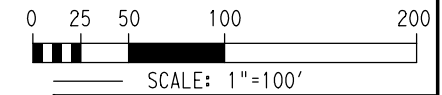
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LEGEND

- WORK ZONE
- TEMPORARY PAVEMENT
- FAST TRACK PAVEMENT
- PREVIOUSLY CONSTRUCTED TEMPORARY PAVEMENT
- PREVIOUSLY CONSTRUCTED PERMANENT PAVEMENT
- TEMP GROUND MOUNTED SIGN
- CHANNELIZING DEVICE
- TYPE III BARRICADE
- TRAFFIC FLOW ARROW

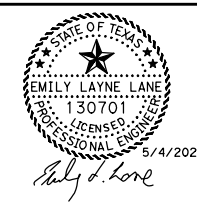
NOTES

1. CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL TURNING MOVEMENTS AT ALL TIMES.
2. REFER TO TCP ADVANCE WARNING SIGNS FOR SIGN DETAILS.
3. REFER TO TCP TYPICAL SECTIONS FOR DETAILS.
4. PAVEMENT MARKINGS NOT CALLED OUT ARE PERMANENT/TO REMAIN FROM PREVIOUS PHASE. REFER TO PAVEMENT MARKING SHEETS FOR DETAILS.
5. CONTRACTOR SHALL USE ONE-LANE ROAD CLOSURE AND DETOUR ROUTING FOR OVERNIGHT LANE CLOSURES.



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RANSOM RD
TRAFFIC CONTROL PLAN
PHASE IV

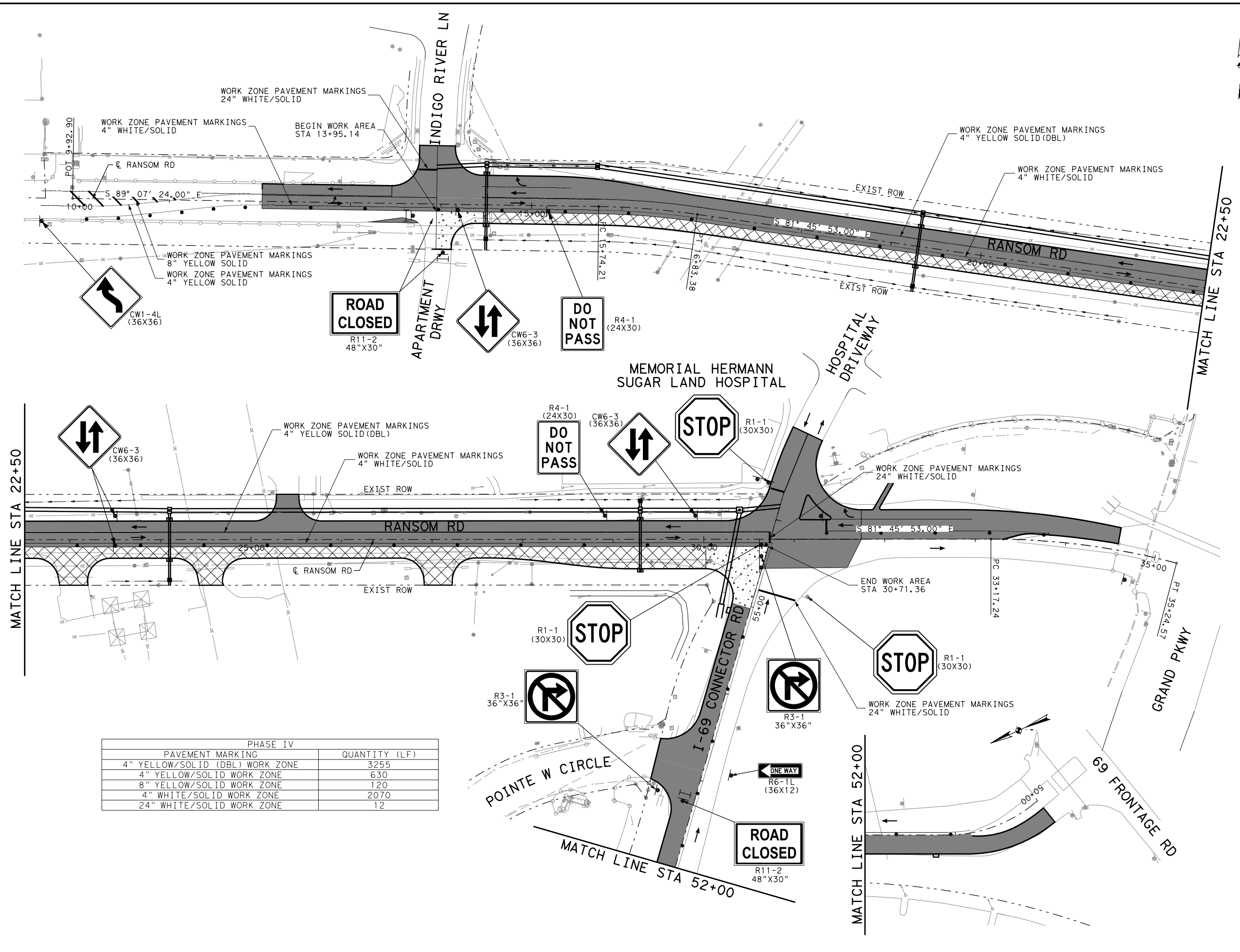


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(713) 461-9600
TEXAS FIRM REGISTRATION NO. F-487

Approved By: _____ Date: _____
r.g. miller
Job No. 4399

SUBMITTED BY: R.G. MILLER
SCALE: 1"=100'
DATE: 5/4/2023
SURV BY: MILLER SURVEY
F. B. No.: 17102

DESIGNED BY: E.L.L.
DRAWN BY: C.G.
SHEET 11 OF 15 SHEETS
DWG. NO. 38



PHASE IV	
PAVEMENT MARKING	QUANTITY (LF)
4" YELLOW/SOLID (DBL) WORK ZONE	3255
4" YELLOW/SOLID WORK ZONE	630
8" YELLOW/SOLID WORK ZONE	120
4" WHITE/SOLID WORK ZONE	2070
24" WHITE/SOLID WORK ZONE	12

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LEGEND

- WORK ZONE
- TEMPORARY PAVEMENT
- FAST TRACK PAVEMENT
- PREVIOUSLY CONSTRUCTED TEMPORARY PAVEMENT
- PREVIOUSLY CONSTRUCTED PERMANENT PAVEMENT
- TEMP GROUND MOUNTED SIGN
- CHANNELIZING DEVICE
- TYPE III BARRICADE
- TRAFFIC FLOW ARROW



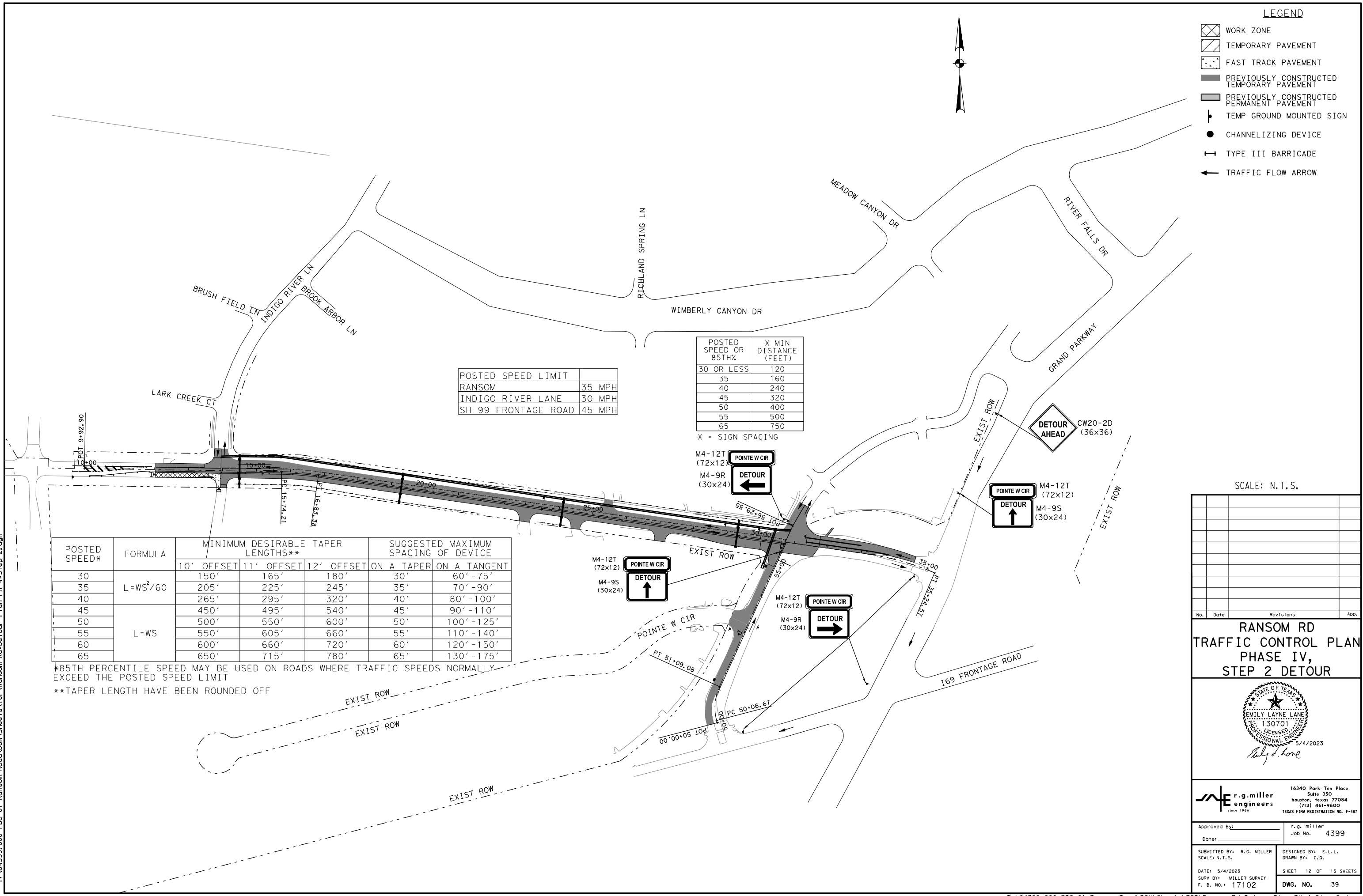
POSTED SPEED LIMIT	
RANSOM	35 MPH
INDIGO RIVER LANE	30 MPH
SH 99 FRONTAGE ROAD	45 MPH

POSTED SPEED OR 85TH%	X MIN DISTANCE (FEET)
30 OR LESS	120
35	160
40	240
45	320
50	400
55	500
65	750

X = SIGN SPACING

POSTED SPEED*	FORMULA	MINIMUM DESIRABLE TAPER LENGTHS**			SUGGESTED MAXIMUM SPACING OF DEVICE	
		10' OFFSET	11' OFFSET	12' OFFSET	ON A TAPER	ON A TANGENT
30	L=WS ² /60	150'	165'	180'	30'	60' - 75'
35		205'	225'	245'	35'	70' - 90'
40		265'	295'	320'	40'	80' - 100'
45		450'	495'	540'	45'	90' - 110'
50	L=WS	500'	550'	600'	50'	100' - 125'
55		550'	605'	660'	55'	110' - 140'
60		600'	660'	720'	60'	120' - 150'
65		650'	715'	780'	65'	130' - 175'

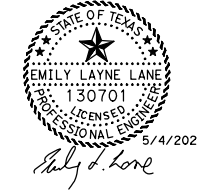
*85TH PERCENTILE SPEED MAY BE USED ON ROADS WHERE TRAFFIC SPEEDS NORMALLY EXCEED THE POSTED SPEED LIMIT
 **TAPER LENGTH HAVE BEEN ROUNDED OFF



SCALE: N.T.S.

No.	Date	Revisions	App.

RANSOM RD
 TRAFFIC CONTROL PLAN
 PHASE IV,
 STEP 2 DETOUR



r.g.miller engineers 16340 Park Ten Place Suite 350 Houston, Texas 77084 (713) 461-9600 TEXAS FIRM REGISTRATION NO. F-487

Approved By: _____ Date: _____

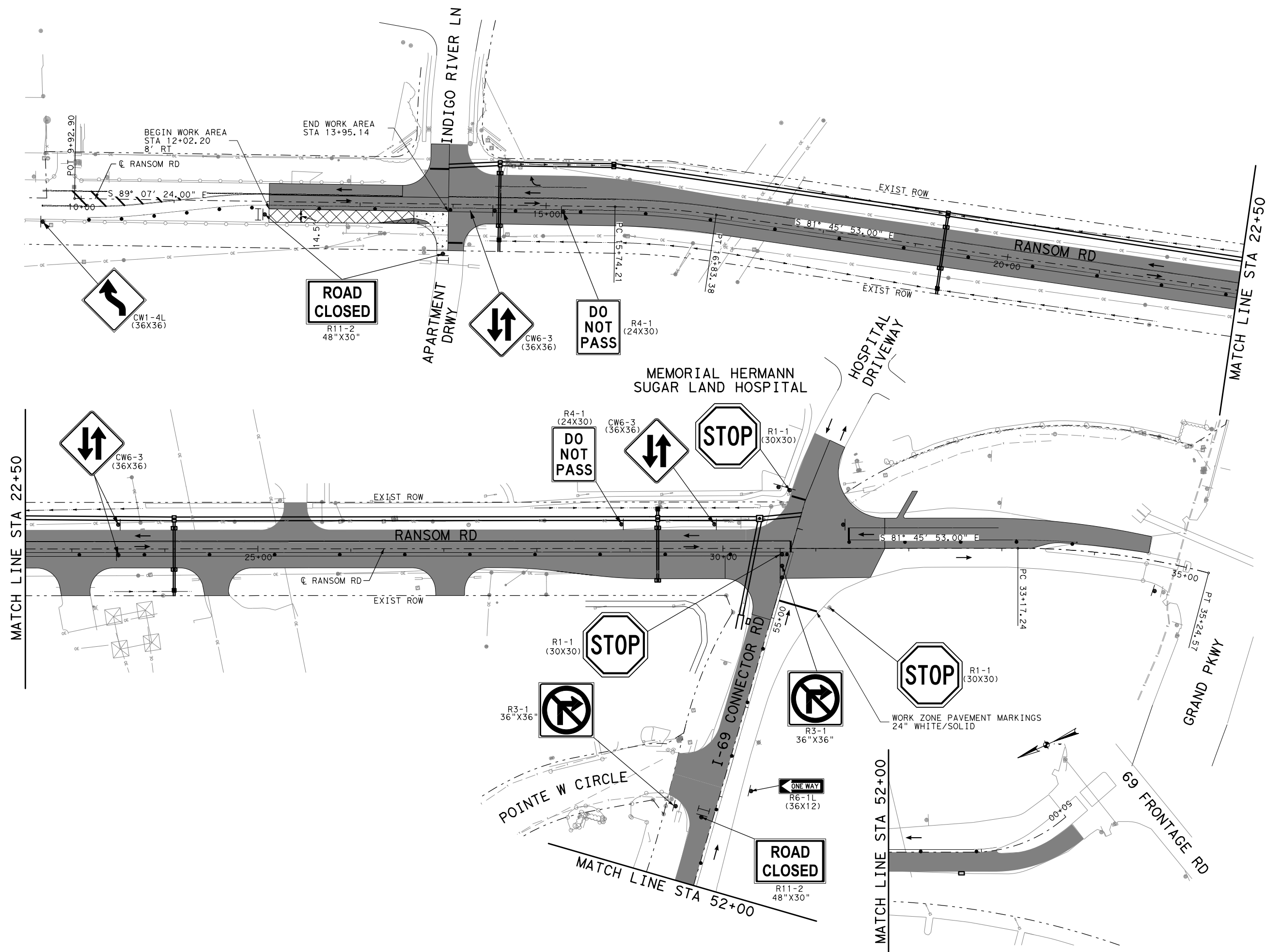
DESIGNED BY: E.L.L. DRAWN BY: C.G.

DATE: 5/4/2023 SURV BY: MILLER SURVEY F. B. NO.: 17102

SHEET 12 OF 15 SHEETS DWG. NO. 39

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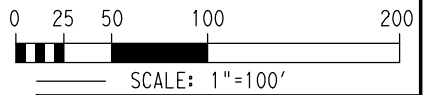
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LEGEND

- WORK ZONE
- TEMPORARY PAVEMENT
- FAST TRACK PAVEMENT
- PREVIOUSLY CONSTRUCTED TEMPORARY PAVEMENT
- PREVIOUSLY CONSTRUCTED PERMANENT PAVEMENT
- TEMP GROUND MOUNTED SIGN
- CHANNELIZING DEVICE
- TYPE III BARRICADE
- TRAFFIC FLOW ARROW

- NOTES**
1. CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL TURNING MOVEMENTS AT ALL TIMES.
 2. REFER TO TCP ADVANCE WARNING SIGNS FOR SIGN DETAILS.
 3. REFER TO TCP TYPICAL SECTIONS FOR DETAILS.
 4. PAVEMENT MARKINGS NOT CALLED OUT ARE PERMANENT/TO REMAIN FROM PREVIOUS PHASE. REFER TO PAVEMENT MARKING SHEETS FOR DETAILS.
 5. CONTRACTOR SHALL USE ONE-LANE ROAD CLOSURE AND DETOUR ROUTING FOR OVERNIGHT LANE CLOSURES.



No.	Date	Revisions	App.

**RANSOM RD
 TRAFFIC CONTROL PLAN
 PHASE IV, Step 2**

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 (713) 461-9600
 TEXAS FIRM REGISTRATION NO. F-487

Approved By: _____	r.g. miller Job No. 4399
Date: _____	
SUBMITTED BY: R.G. MILLER SCALE: 1"=100'	DESIGNED BY: E.L.L. DRAWN BY: C.G.
DATE: 5/4/2023 SURV BY: MILLER SURVEY F. B. NO.: 17102	SHEET 13 OF 15 SHEETS DWG. NO. 40

LEGEND

- WORK ZONE
- TEMPORARY PAVEMENT
- FAST TRACK PAVEMENT
- PREVIOUSLY CONSTRUCTED TEMPORARY PAVEMENT
- PREVIOUSLY CONSTRUCTED PERMANENT PAVEMENT
- TEMP GROUND MOUNTED SIGN
- CHANNELIZING DEVICE
- TYPE III BARRICADE
- TRAFFIC FLOW ARROW

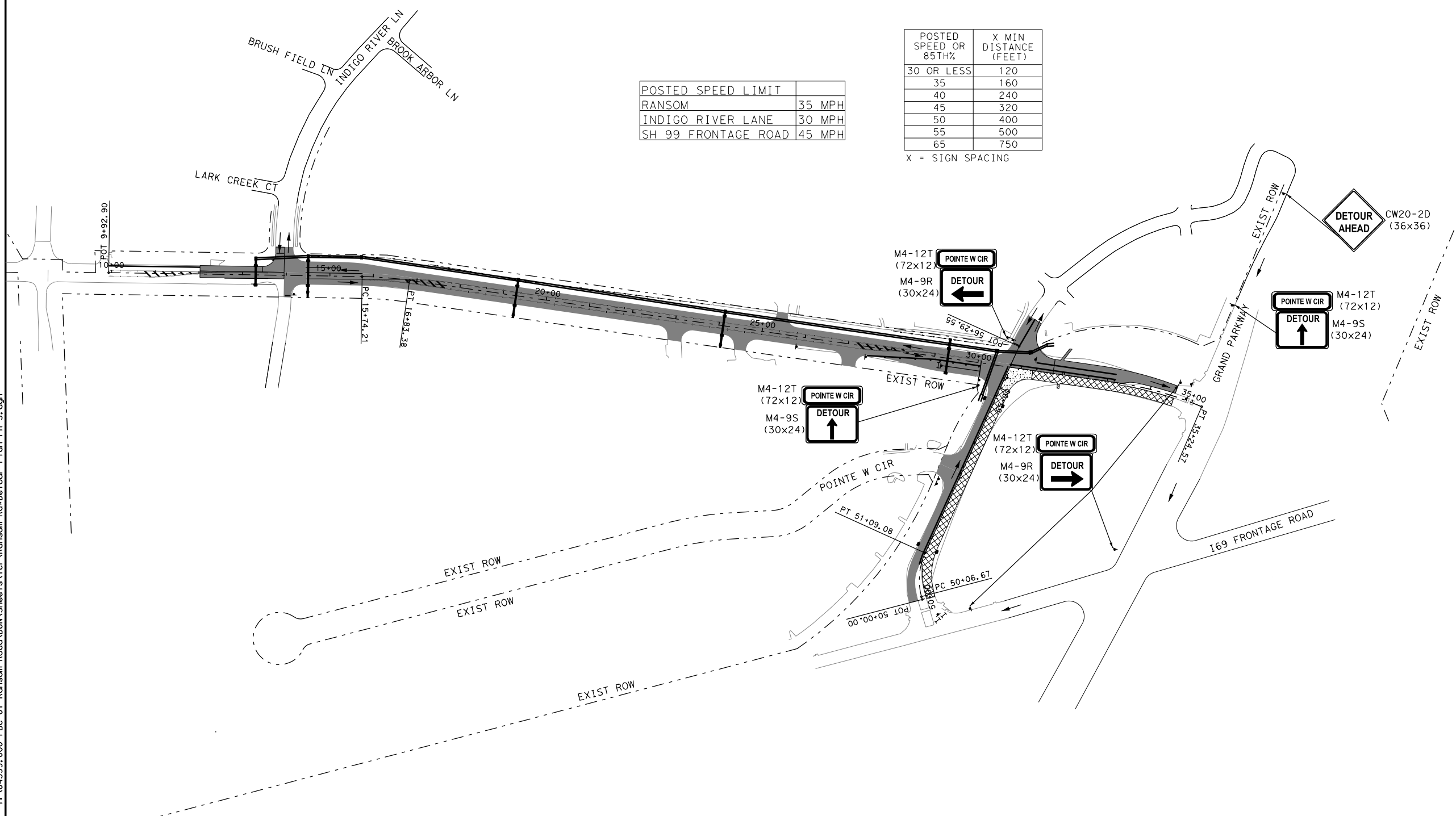
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		10' OFFSET	11' OFFSET	12' OFFSET	ON A TAPER	ON A TANGENT
30	L = WS ² /60	150'	165'	180'	30'	60' - 75'
35		205'	225'	245'	35'	70' - 90'
40		265'	295'	320'	40'	80' - 100'
45	L = WS	450'	495'	540'	45'	90' - 110'
50		500'	550'	600'	50'	100' - 125'
55		550'	605'	660'	55'	110' - 140'
60		600'	660'	720'	60'	120' - 150'
65		650'	715'	780'	65'	130' - 175'

*85TH PERCENTILE SPEED MAY BE USED ON ROADS WHERE TRAFFIC SPEEDS NORMALLY EXCEED THE POSTED SPEED LIMIT
 **TAPER LENGTH HAVE BEEN ROUNDED OFF

POSTED SPEED LIMIT	
RANSOM	35 MPH
INDIGO RIVER LANE	30 MPH
SH 99 FRONTAGE ROAD	45 MPH

POSTED SPEED OR 85TH%	X MIN DISTANCE (FEET)
30 OR LESS	120
35	160
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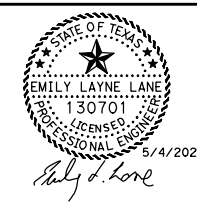
X = SIGN SPACING



SCALE: N.T.S.

No.	Date	Revisions	App.

RANSOM RD
 TRAFFIC CONTROL PLAN
 PHASE V DETOUR



r.g.miller engineers
 16340 Park Ten Place
 Suite 350
 Houston, Texas 77084
 (713) 461-9600
 TEXAS FIRM REGISTRATION NO. F-487

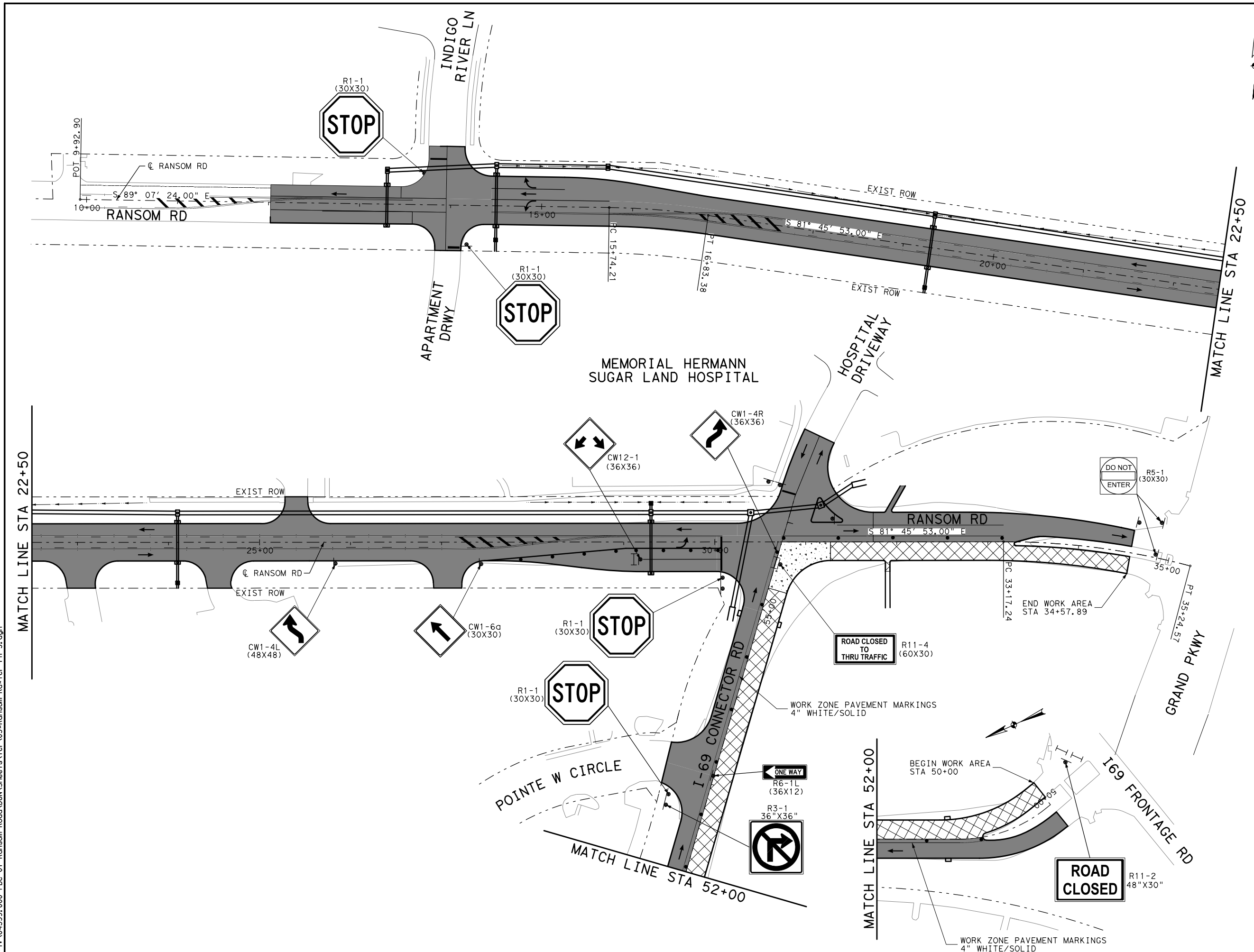
Approved By: _____ Date: _____
 Job No. 4399

SUBMITTED BY: R.G. MILLER
 SCALE: N.T.S.
 DATE: 5/4/2023
 SURV BY: MILLER SURVEY
 F. B. NO.: 17102

DESIGNED BY: E.L.L.
 DRAWN BY: C.G.
 SHEET 14 OF 15 SHEETS
 DWG. NO. 41

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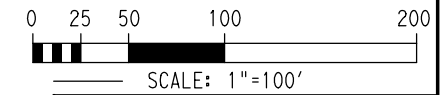
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LEGEND

- WORK ZONE
- TEMPORARY PAVEMENT
- FAST TRACK PAVEMENT
- PREVIOUSLY CONSTRUCTED TEMPORARY PAVEMENT
- PREVIOUSLY CONSTRUCTED PERMANENT PAVEMENT
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- TYPE III BARRICADE
- TRAFFIC FLOW ARROW

- NOTES**
1. CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL TURNING MOVEMENTS AT ALL TIMES.
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No.	Date	Revisions	App.

**RANSOM RD
 TRAFFIC CONTROL PLAN
 PHASE V**

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 Suite 350
 Houston, Texas 77084
 (713) 461-9600
 TEXAS FIRM REGISTRATION NO. F-487

Approved By: r.g. miller Job No. **4399**
 Date: _____

SUBMITTED BY: R.G. MILLER DESIGNED BY: E.L.L.
 SCALE: 1"=100' DRAWN BY: C.G.

DATE: 5/4/2023 SHEET 15 OF 15 SHEETS
 SURV BY: MILLER SURVEY DWG. NO. 42
 F. B. NO.: 17102

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BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

1. The Barricade and Construction Standard Sheets (BC sheets) are intended to show typical examples for placement of temporary traffic control devices, construction pavement markings, and typical work zone signs. The information contained in these sheets meet or exceed the requirements shown in the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
2. The development and design of the Traffic Control Plan (TCP) is the responsibility of the Engineer.
3. The Contractor may propose changes to the TCP that are signed and sealed by a licensed professional engineer for approval. The Engineer may develop, sign and seal Contractor proposed changes.
4. The Contractor is responsible for installing and maintaining the traffic control devices as shown in the plans. The Contractor may not move or change the approximate location of any device without the approval of the Engineer.
5. Geometric design of lane shifts and detours should, when possible, meet the applicable design criteria contained in manuals such as the American Association of State Highway and Transportation Officials (AASHTO), "A Policy on Geometric Design of Highways and Streets," the TxDOT "Roadway Design Manual" or engineering judgment.
6. When projects abut, the Engineer(s) may omit the END ROAD WORK, TRAFFIC FINES DOUBLE, and other advance warning signs if the signing would be redundant and the work areas appear continuous to the motorists. If the adjacent project is completed first, the Contractor shall erect the necessary warning signs as shown on these sheets, the TCP sheets or as directed by the Engineer. The BEGIN ROAD WORK NEXT X MILES sign shall be revised to show appropriate work zone distance.
7. The Engineer may require duplicate warning signs on the median side of divided highways where median width will permit and traffic volumes justify the signing.
8. All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition. Sign details not shown in this manual shall be shown in the plans or the Engineer shall provide a detail to the Contractor before the sign is manufactured.
9. The temporary traffic control devices shown in the illustrations of the BC sheets are examples. As necessary, the Engineer will determine the most appropriate traffic control devices to be used.
10. Where highway construction or maintenance work is being undertaken, other than mobile operations as defined by the Texas Manual on Uniform Traffic Control Devices, CSJ limit signs are required. CSJ limit signs are shown on BC(2). The OBEY WARNING SIGNS STATE LAW sign, STAY ALERT TALK OR TEXT LATER and the WORK ZONE TRAFFIC FINES DOUBLE sign with plaque shall be erected in advance of the CSJ limits. The BEGIN ROAD WORK NEXT X MILES, CONTRACTOR and END ROAD WORK signs shall be erected at or near the CSJ limits. For mobile operations, CSJ limit signs are not required.
11. Traffic control devices should be in place only while work is actually in progress or a definite need exists.
12. The Engineer has the final decision on the location of all traffic control devices.
13. Inactive equipment and work vehicles, including workers' private vehicles must be parked away from travel lanes. They should be as close to the right-of-way line as possible, or located behind a barrier or guardrail, or as approved by the Engineer.

WORKER SAFETY NOTES:

1. Workers on foot who are exposed to traffic or to construction equipment within the right-of-way shall wear high-visibility safety apparel meeting the requirements of ISEA "American National Standard for High-Visibility Apparel," or equivalent revisions, and labeled as ANSI 107-2004 standard performance for Class 2 or 3 risk exposure. Class 3 garments should be considered for high traffic volume work areas or night time work.
2. Except in emergency situations, flagger stations shall be illuminated when flagging is used at night.

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

1. Only pre-qualified products shall be used. The "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources.
2. Work zone traffic control devices shall be compliant with the Manual for Assessing safety Hardware (MASH).

THE DOCUMENTS BELOW CAN BE FOUND ON-LINE AT http://www.txdot.gov
COMPLIANT WORK ZONE TRAFFIC CONTROL DEVICES LIST (CWZTCD)
DEPARTMENTAL MATERIAL SPECIFICATIONS (DMS)
MATERIAL PRODUCER LIST (MPL)
ROADWAY DESIGN MANUAL - SEE "MANUALS (ONLINE MANUALS)"
STANDARD HIGHWAY SIGN DESIGNS FOR TEXAS (SHSD)
TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD)
TRAFFIC ENGINEERING STANDARD SHEETS

SHEET 1 OF 12



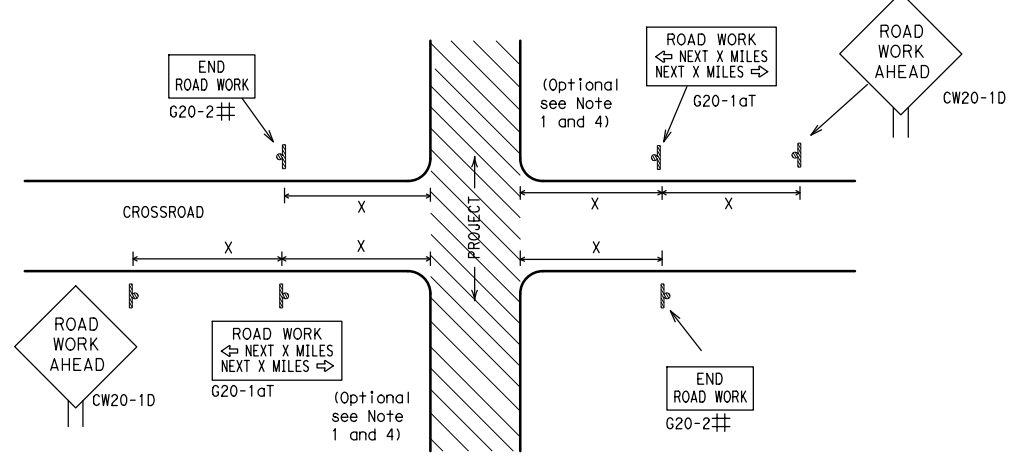
**BARRICADE AND CONSTRUCTION
GENERAL NOTES
AND REQUIREMENTS**

BC (1) - 21

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© TxDOT	November 2002	CONT	SECT	JOB	HIGHWAY				
REVISIONS									
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9-07	8-14	DIST	COUNTY		SHEET NO.				
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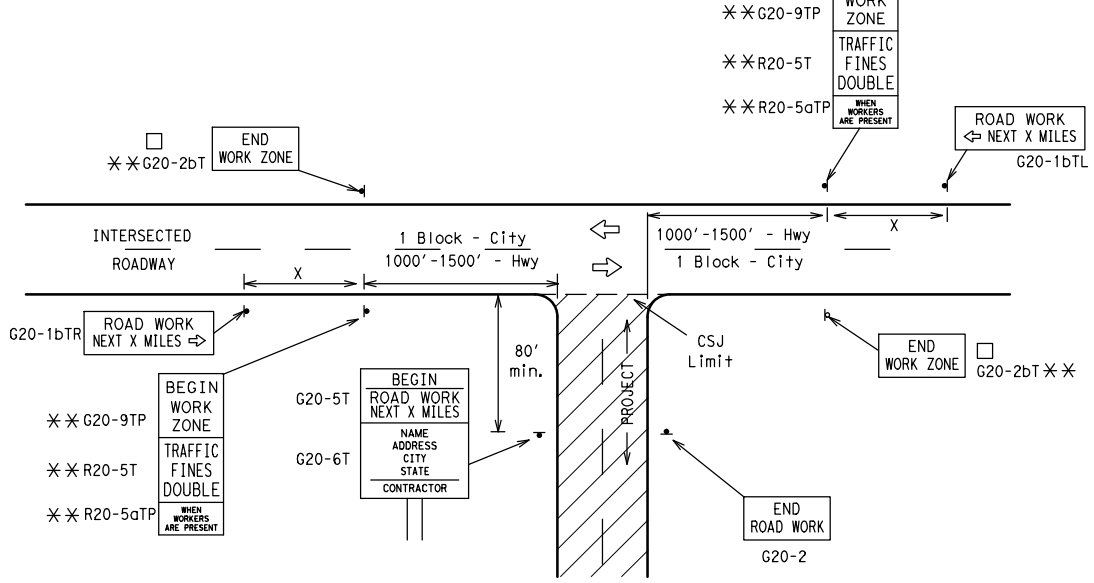
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TYPICAL LOCATION OF CROSSROAD SIGNS



- ## May be mounted on back of "ROAD WORK AHEAD" (CW20-1D) sign with approval of Engineer. (See note 2 below)
- The typical minimum signing on a crossroad approach should be a "ROAD WORK AHEAD" (CW20-1D) sign and a (G20-2) "END ROAD WORK" sign, unless noted otherwise in plans.
 - The Engineer may use the reduced size 36" x 36" ROAD WORK AHEAD (CW20-1D) sign mounted back to back with the reduced size 36" x 18" "END ROAD WORK" (G20-2) sign on low volume crossroads (see Note 4 under "Typical Construction Warning Sign Size and Spacing"). See the "Standard Highway Sign Designs for Texas" manual for sign details. The Engineer may omit the advance warning signs on low volume crossroads. The Engineer will determine whether a road is low volume as per TMUTCD Part 5. This information shall be shown in the plans.
 - Based on existing field conditions, the Engineer/Inspector may require additional signs such as FLAGGER AHEAD, LOOSE GRAVEL, or other appropriate signs. When additional signs are required, these signs will be considered part of the minimum requirements. The Engineer/Inspector will determine the proper location and spacing of any sign not shown on the BC sheets, Traffic Control Plan sheets or the Work Zone Standard Sheets.
 - The "ROAD WORK NEXT X MILES" (G20-1aT) sign shall be required at high volume crossroads to advise motorists of the length of construction in either direction from the intersection. The Engineer will determine whether a roadway is considered high volume.
 - Additional traffic control devices may be shown elsewhere in the plans for higher volume crossroads.
 - When work occurs in the intersection area, appropriate traffic control devices, as shown elsewhere in the plans or as determined by the Engineer/Inspector, shall be in place.

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

- The Engineer will determine the types and location of any additional traffic control devices, such as a flagger and accompanying signs, or other signs, that should be used when work is being performed at or near an intersection.
- If construction closes the road at a T-intersection, the Contractor shall place the "CONTRACTOR NAME" (G20-6T) sign behind the Type 3 Barricades for the road closure (see BC(10) also). The "ROAD WORK NEXT X MILES" left arrow (G20-1bTL) and "ROAD WORK NEXT X MILES" right arrow (G20-1bTR) signs shall be replaced by the detour signing called for in the plans.

TYPICAL CONSTRUCTION WARNING SIGN SIZE AND SPACING^{1,5,6}

Sign Number or Series	SIZE		SPACING	
	Conventional Road	Expressway/Freeway	Posted Speed MPH	Sign Δ Spacing "X" Feet (Apprx.)
CW20 ⁴	48" x 48"	48" x 48"	30	120
CW21			35	160
CW22			40	240
CW23			45	320
CW1, CW2, CW7, CW8, CW9, CW11, CW14	36" x 36"	48" x 48"	50	400
CW3, CW4, CW5, CW6, CW8-3, CW10, CW12	48" x 48"	48" x 48"	60	600 ²
			65	700 ²
			70	800 ²
			80	1000 ²
*			*	* ³

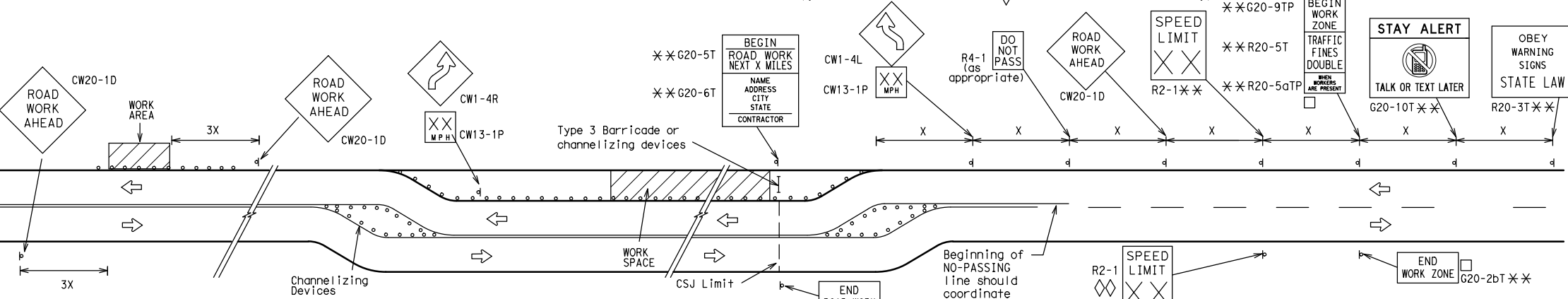
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

Δ Minimum distance from work area to first Advance Warning sign nearest the work area and/or distance between each additional sign.

GENERAL NOTES

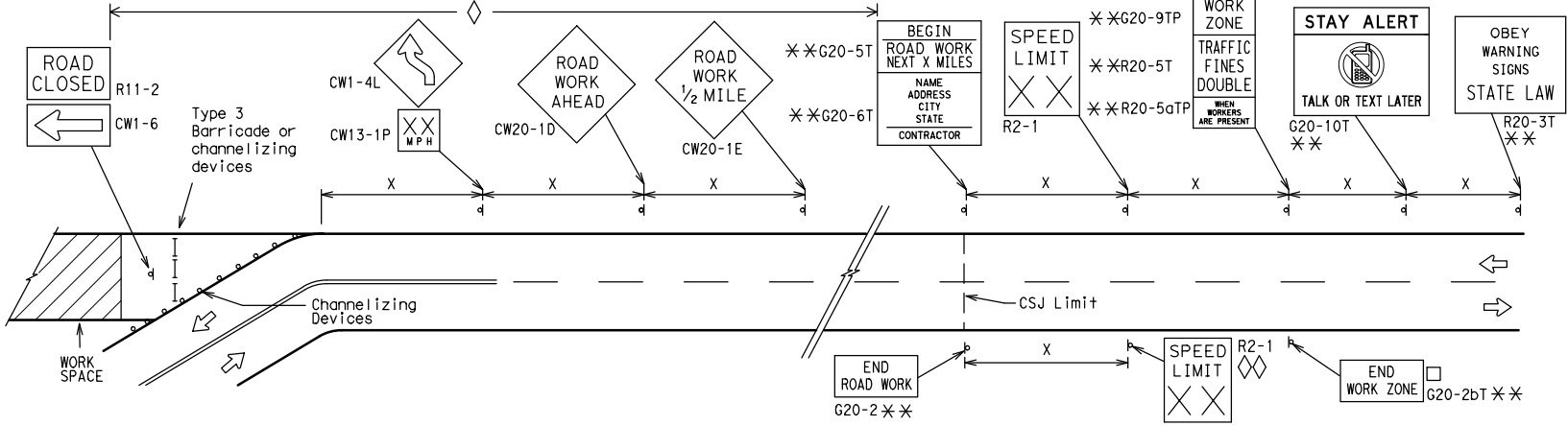
- Special or larger size signs may be used as necessary.
- Distance between signs should be increased as required to have 1500 feet advance warning.
- Distance between signs should be increased as required to have 1/2 mile or more advance warning.
- 36" x 36" "ROAD WORK AHEAD" (CW20-1D) signs may be used on low volume crossroads at the discretion of the Engineer as per TMUTCD Part 5. See Note 2 under "Typical Location of Crossroad Signs".
- Only diamond shaped warning sign sizes are indicated.
- See sign size listing in "TMUTCD", Sign Appendix or the "Standard Highway Sign Designs for Texas" manual for complete list of available sign design sizes.

WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS

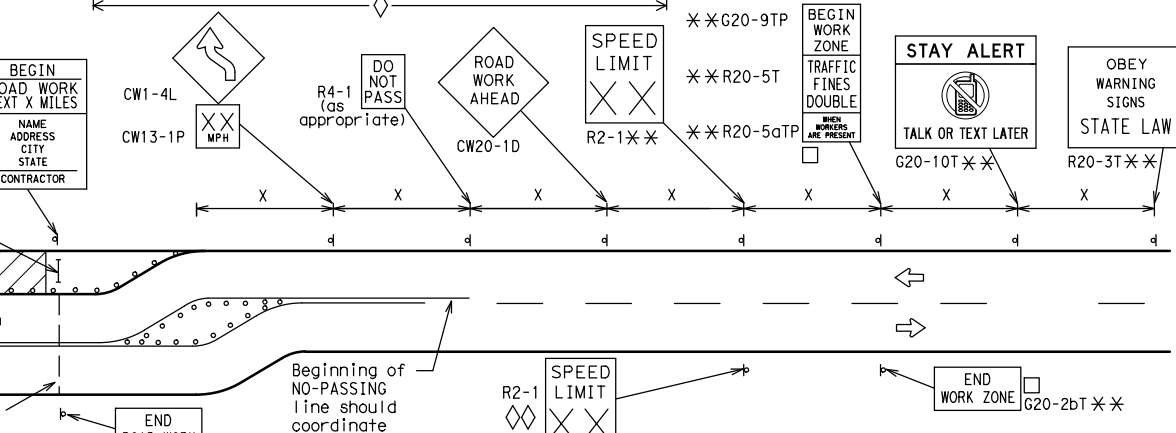


When extended distances occur between minimal work spaces, the Engineer/Inspector should ensure additional "ROAD WORK AHEAD" (CW20-1D) signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCP sheets for exact location and spacing of signs and channelizing devices.

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING DOWNSTREAM OF THE CSJ LIMITS



SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS



NOTES

- The Contractor shall determine the appropriate distance to be placed on the G20-1 series signs and "BEGIN ROAD WORK NEXT X MILES" (G20-5T) sign for each specific project. This distance shall replace the "X" and shall be rounded to the nearest whole mile with the approval of the Engineer. No decimals shall be used.
- The "BEGIN WORK ZONE" (G20-9TP) and "END WORK ZONE" (G20-2bT) shall be used as shown on the sample layout when advance signs are required outside the CSJ Limits. They inform the motorist of entering or leaving a part of the work zone lying outside the CSJ Limits where traffic fines may double if workers are present.
 - ** CSJ limit signing is required for highway construction and maintenance work, with the exception of mobile operations.
 - ◇ Area for placement of "ROAD WORK AHEAD" (CW20-1D) sign and other signs or devices as called for on the Traffic Control Plan.
 - ◇◇ Contractor will install a regulatory speed limit sign at the end of the work zone.

LEGEND

—	Type 3 Barricade
○ ○ ○	Channelizing Devices
■	Sign
X	See Typical Construction Warning Sign Size and Spacing chart or the TMUTCD for sign spacing requirements.

SHEET 2 OF 12



BARRICADE AND CONSTRUCTION PROJECT LIMIT

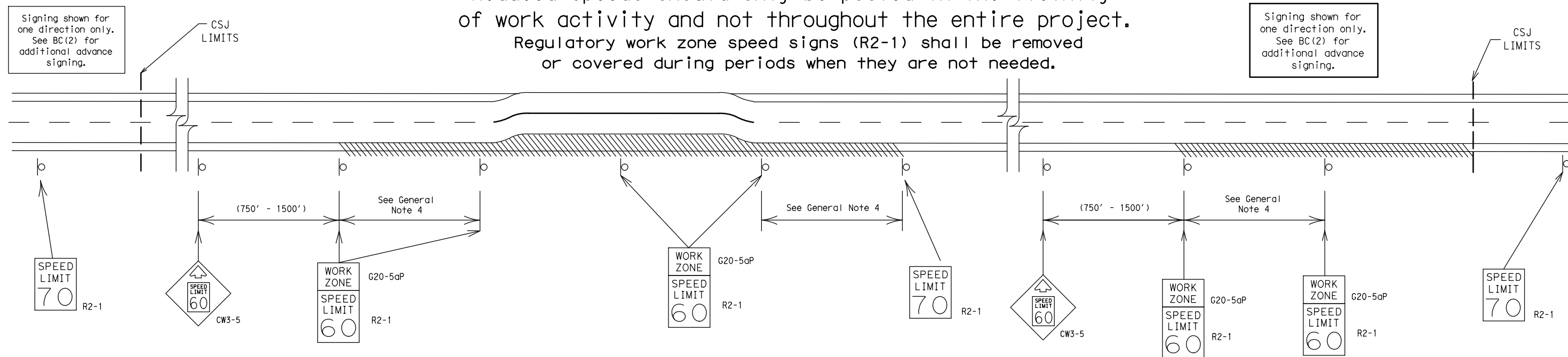
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TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

Work zone speed limits shall be regulatory, established in accordance with the "Procedures for Establishing Speed Zones," and approved by the Texas Transportation Commission, or by City Ordinance when within Incorporated City Limits.

Reduced speeds should only be posted in the vicinity of work activity and not throughout the entire project. Regulatory work zone speed signs (R2-1) shall be removed or covered during periods when they are not needed.



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

This type of work zone speed limit should be included on the design of the traffic control plans when restricted geometrics with a lower design speed are present in the work zone and modification of the geometrics to a higher design speed is not feasible.

Long/Intermediate Term Work Zone Speed Limit signs, when approved as described above, should be posted and visible to the motorist when work activity is present. Work activity may also be defined as a change in the roadway that requires a reduced speed for motorists to safely negotiate the work area, including:

- rough road or damaged pavement surface
- substantial alteration of roadway geometrics (diversions)
- construction detours
- grade
- width
- other conditions readily apparent to the driver

As long as any of these conditions exist, the work zone speed limit signs should remain in place.

SHORT TERM WORK ZONE SPEED LIMITS

This type of work zone speed limit may be included on the design of the traffic control plans when workers or equipment are not behind concrete barrier, when work activity is within 10 feet of the traveled way or actually in the traveled way.

Short Term Work Zone Speed Limit signs should be posted and visible to the motorists only when work activity is present. When work activity is not present, signs shall be removed or covered. (See Removing or Covering on BC(4)).

GENERAL NOTES



- Regulatory work zone speed limits should be used only for sections of construction projects where speed control is of major importance.
- Regulatory work zone speed limit signs shall be placed on supports at a 7 foot minimum mounting height.
- Speed zone signs are illustrated for one direction of travel and are normally posted for each direction of travel.
- Frequency of work zone speed limit signs should be:

40 mph and greater	0.2 to 2 miles
35 mph and less	0.2 to 1 mile
- Regulatory speed limit signs shall have black legend and border on a white reflective background (See "Reflective Sheeting" on BC(4)).
- Fabrication, erection and maintenance of the "ADVANCE SPEED LIMIT" (CW3-5) sign, "WORK ZONE" (G20-5aP) plaque and the "SPEED LIMIT" (R2-1) signs shall not be paid for directly, but shall be considered subsidiary to Item 502.
- Turning signs from view, laying signs over or down will not be allowed, unless as otherwise noted under "REMOVING OR COVERING" on BC(4).
- Techniques that may help reduce traffic speeds include but are not limited to:
 - Law enforcement.
 - Flagger stationed next to sign.
 - Portable changeable message sign (PCMS).
 - Low-power (drone) radar transmitter.
 - Speed monitor trailers or signs.
- Speeds shown on details above are for illustration only. Work Zone Speed Limits should only be posted as approved for each project.
- For more specific guidance concerning the type of work, work zone conditions and factors impacting allowable regulatory construction speed zone reduction see TxDOT form #1204 in the TxDOT e-form system.

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SHEET 3 OF 12

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC (3) - 21

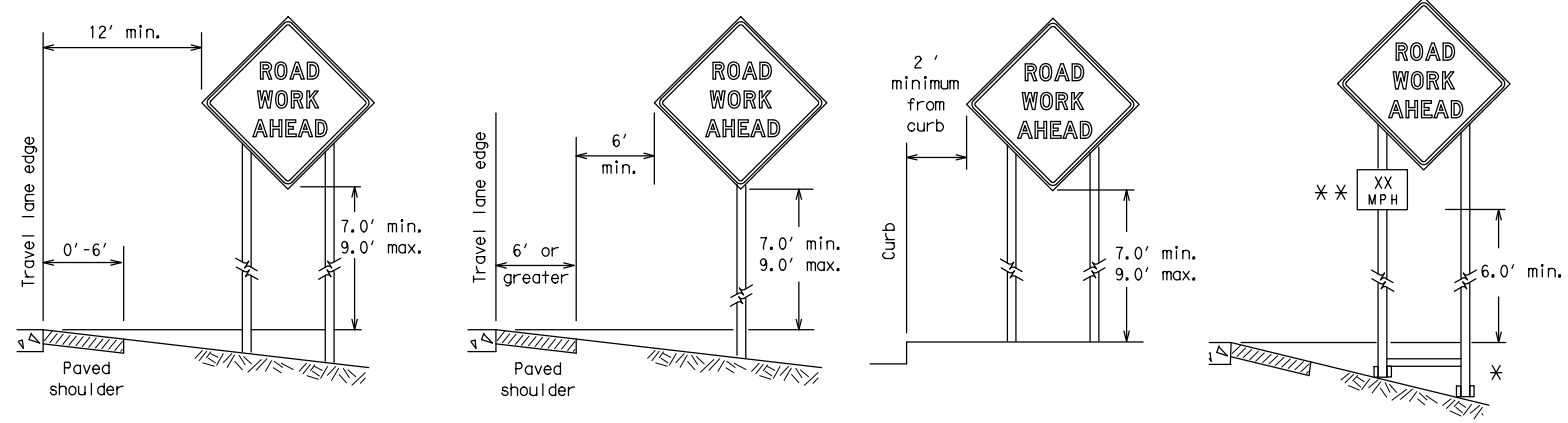
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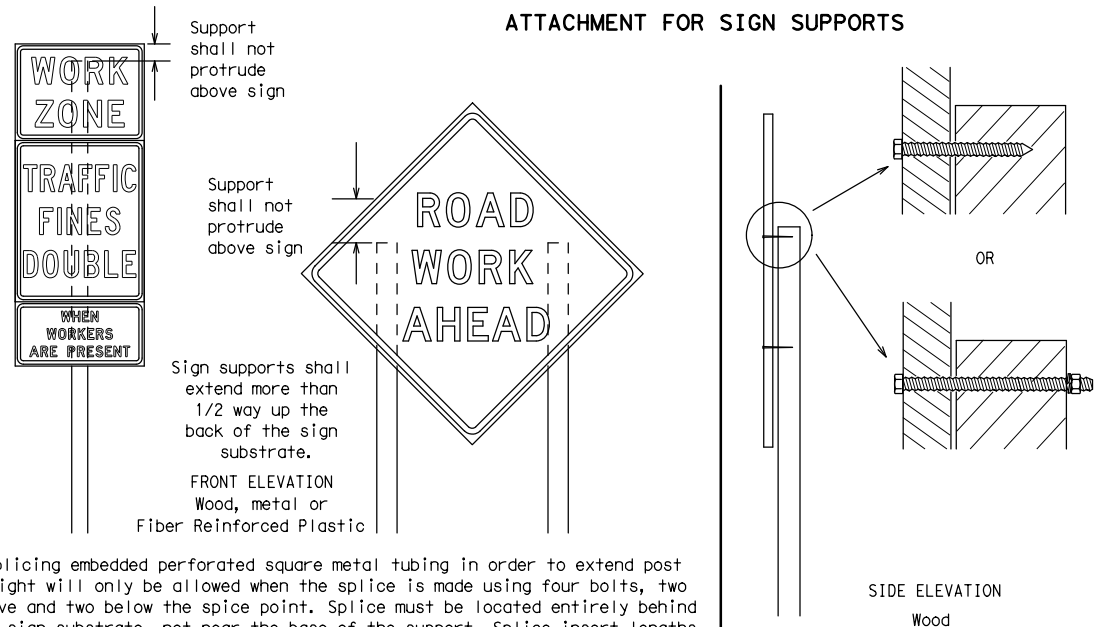
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

** When plaques are placed on dual-leg supports, they should be attached to the upright nearest the travel lane. Supplemental plaques (advisory or distance) should not cover the surface of the parent sign.

ATTACHMENT FOR SIGN SUPPORTS



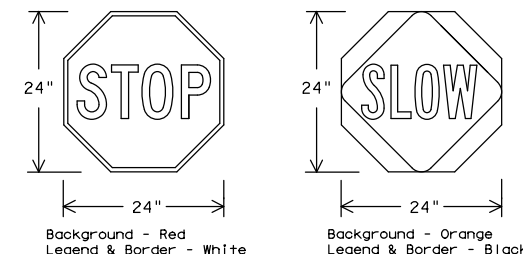
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

Nails shall NOT be allowed.
 Each sign shall be attached directly to the sign support. Multiple signs shall not be joined or spliced by any means. Wood supports shall not be extended or repaired by splicing or other means.

Splicing embedded perforated square metal tubing in order to extend post height will only be allowed when the splice is made using four bolts, two above and two below the splice point. Splice must be located entirely behind the sign substrate, not near the base of the support. Splice insert lengths should be at least 5 times nominal post size, centered on the splice and of at least the same gauge material.

STOP/SLOW PADDLES

1. STOP/SLOW paddles are the primary method to control traffic by flaggers. The STOP/SLOW paddle size should be 24" x 24".
2. STOP/SLOW paddles shall be retroreflectORIZED when used at night.
3. STOP/SLOW paddles may be attached to a staff with a minimum length of 6' to the bottom of the sign.
4. Any lights incorporated into the STOP or SLOW paddle faces shall only be as specifically described in Section 6E.03 Hand Signaling Devices in the TMUTCD.



SHEETING REQUIREMENTS (WHEN USED AT NIGHT)		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	ORANGE	TYPE B _{FL} OR C _{FL} SHEETING
LEGEND & BORDER	WHITE	TYPE B OR C SHEETING
LEGEND & BORDER	BLACK	ACRYLIC NON-REFLECTIVE FILM

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

1. Permanent signs are used to give notice of traffic laws or regulations, call attention to conditions that are potentially hazardous to traffic operations, show route designations, destinations, directions, distances, services, points of interest, and other geographical, recreational, specific service (LOGO), or cultural information. Drivers proceeding through a work zone need the same, if not better route guidance as normally installed on a roadway without construction.
2. When permanent regulatory or warning signs conflict with work zone conditions, remove or cover the permanent signs until the permanent sign message matches the roadway condition. For details for covering large guide signs see the TS-CD standard.
3. When existing permanent signs are moved and relocated due to construction purposes, they shall be visible to motorists at all times.
4. If existing signs are to be relocated on their original supports, they shall be installed on crashworthy bases as shown on the SMD Standard sheets. The signs shall meet the required mounting heights shown on the BC Sheets or the SMD Standards. This work should be paid for under the appropriate pay item for relocating existing signs.
5. If permanent signs are to be removed and relocated using temporary supports, the Contractor shall use crashworthy supports as shown on the BC standard sheets, TLRs standard sheets or the CWZTCD list. The signs shall meet the required mounting heights shown on the BC, or the SMD standard sheets during construction. This work should be paid for under the appropriate pay item for relocating existing signs.
6. Any sign or traffic control device that is struck or damaged by the Contractor or his/her construction equipment shall be replaced as soon as possible by the Contractor to ensure proper guidance for the motorists. This will be subsidiary to Item 502.

GENERAL NOTES FOR WORK ZONE SIGNS

1. Contractor shall install and maintain signs in a straight and plumb condition and/or as directed by the Engineer.
2. Wooden sign posts shall be painted white.
3. Barricades shall NOT be used as sign supports.
4. All signs shall be installed in accordance with the plans or as directed by the Engineer. Signs shall be used to regulate, warn, and guide the traveling public safely through the work zone.
5. The Contractor may furnish either the sign design shown in the plans or in the "Standard Highway Sign Designs for Texas" (SHSD). The Engineer/Inspector may require the Contractor to furnish other work zone signs that are shown in the TMUTCD but may have been omitted from the plans. Any variation in the plans shall be documented by written agreement between the Engineer and the Contractor's Responsible Person. All changes must be documented in writing before being implemented. This can include documenting the changes in the Inspector's TxDOT diary and having both the Inspector and Contractor initial and date the agreed upon changes.
6. The Contractor shall furnish sign supports listed in the "Compliant Work Zone Traffic Control Device List" (CWZTCD) for small roadside signs. Supports for temporary large roadside signs shall meet the requirements detailed on the Temporary Large Roadside Signs (TLRS) standard sheets. The Contractor shall install the sign support in accordance with the manufacturer's recommendations. If there is a question regarding installation procedures, the Contractor shall furnish the Engineer a copy of the manufacturer's installation recommendations so the Engineer can verify the correct procedures are being followed.
7. The Contractor is responsible for installing signs on approved supports and replacing signs with damaged or cracked substrates and/or damaged or marred reflective sheeting as directed by the Engineer/Inspector.
8. Identification markings may be shown only on the back of the sign substrate. The maximum height of letters and/or company logos used for identification shall be 1 inch.
9. The Contractor shall replace damaged wood posts. New or damaged wood sign posts shall not be spliced.

DURATION OF WORK (as defined by the "Texas Manual on Uniform Traffic Control Devices" Part 6)

1. The types of sign supports, sign mounting height, the size of signs, and the type of sign substrates can vary based on the type of work being performed. The Engineer is responsible for selecting the appropriate size sign for the type of work being performed. The Contractor is responsible for ensuring the sign support, sign mounting height and substrate meets manufacturer's recommendations in regard to crashworthiness and duration of work requirements.
 - a. Long-term stationary - work that occupies a location more than 3 days.
 - b. Intermediate-term stationary - work that occupies a location more than one daylight period up to 3 days, or nighttime work lasting more than one hour.
 - c. Short-term stationary - daytime work that occupies a location for more than 1 hour in a single daylight period.
 - d. Short, duration - work that occupies a location up to 1 hour.
 - e. Mobile - work that moves continuously or intermittently (stopping for up to approximately 15 minutes.)

SIGN MOUNTING HEIGHT

1. The bottom of Long-term/Intermediate-term signs shall be at least 7 feet, but not more than 9 feet, above the paved surface, except as shown for supplemental plaques mounted below other signs.
2. The bottom of Short-term/Short Duration signs shall be a minimum of 1 foot above the pavement surface but no more than 2 feet above the ground.
3. Long-term/Intermediate-term Signs may be used in lieu of Short-term/Short Duration signing.
4. Short-term/Short Duration signs shall be used only during daylight and shall be removed at the end of the workday or raised to appropriate Long-term/Intermediate sign height.
5. Regulatory signs shall be mounted at least 7 feet, but not more than 9 feet, above the paved surface regardless of work duration.

SIZE OF SIGNS

1. The Contractor shall furnish the sign sizes shown on BC (2) unless otherwise shown in the plans or as directed by the Engineer.

SIGN SUBSTRATES

1. The Contractor shall ensure the sign substrate is installed in accordance with the manufacturer's recommendations for the type of sign support that is being used. The CWZTCD lists each substrate that can be used on the different types and models of sign supports.
2. "Mesh" type materials are NOT an approved sign substrate, regardless of the tightness of the weave.
3. All wooden individual sign panels fabricated from 2 or more pieces shall have one or more plywood cleat, 1/2" thick by 6" wide, fastened to the back of the sign and extending fully across the sign. The cleat shall be attached to the back of the sign using wood screws that do not penetrate the face of the sign panel. The screws shall be placed on both sides of the splice and spaced at 6" centers. The Engineer may approve other methods of splicing the sign face.

REFLECTIVE SHEETING

1. All signs shall be retroreflective and constructed of sheeting meeting the color and retro-reflectivity requirements of DMS-8300 for rigid signs or DMS-8310 for roll-up signs. The web address for DMS specifications is shown on BC(1).
2. White sheeting, meeting the requirements of DMS-8300 Type A, shall be used for signs with a white background.
3. Orange sheeting, meeting the requirements of DMS-8300 Type B_{FL} or Type C_{FL}, shall be used for rigid signs with orange backgrounds.

SIGN LETTERS

1. All sign letters and numbers shall be clear, and open rounded type uppercase alphabet letters as approved by the Federal Highway Administration (FHWA) and as published in the "Standard Highway Sign Design for Texas" manual. Signs, letters and numbers shall be of first class workmanship in accordance with Department Standards and Specifications.

REMOVING OR COVERING

1. When sign messages may be confusing or do not apply, the signs shall be removed or completely covered.
2. Long-term stationary or intermediate stationary signs installed on square metal tubing may be turned away from traffic 90 degrees when the sign message is not applicable. This technique may not be used for signs installed in the median of divided highways or near any intersections where the sign may be seen from approaching traffic.
3. Signs installed on wooden skids shall not be turned at 90 degree angles to the roadway. These signs should be removed or completely covered when not required.
4. When signs are covered, the material used shall be opaque, such as heavy mil black plastic, or other materials which will cover the entire sign face and maintain their opaque properties under automobile headlights at night, without damaging the sign sheeting.
5. Burlap shall NOT be used to cover signs.
6. Duct tape or other adhesive material shall NOT be affixed to a sign face.
7. Signs and anchor stubs shall be removed and holes backfilled upon completion of work.

SIGN SUPPORT WEIGHTS

1. Where sign supports require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand should be used.
2. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
3. Rock, concrete, iron, steel or other solid objects shall not be permitted for use as sign support weights.
4. Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs.
5. Sandbags shall be made of a durable material that tears upon vehicular impact. Rubber (such as tire inner tubes) shall NOT be used.
6. Rubber ballasts designed for channelizing devices should not be used for ballast on portable sign supports. Sign supports designed and manufactured with rubber bases may be used when shown on the CWZTCD list.
7. Sandbags shall only be placed along or laid over the base supports of the traffic control device and shall not be suspended above ground level or hung with rope, wire, chains or other fasteners. Sandbags shall be placed along the length of the skids to weigh down the sign support.
8. Sandbags shall NOT be placed under the skid and shall not be used to level sign supports placed on slopes.

FLAGS ON SIGNS

1. Flags may be used to draw attention to warning signs. When used, the flag shall be 16 inches square or larger and shall be orange or fluorescent red-orange in color. Flags shall not be allowed to cover any portion of the sign face.



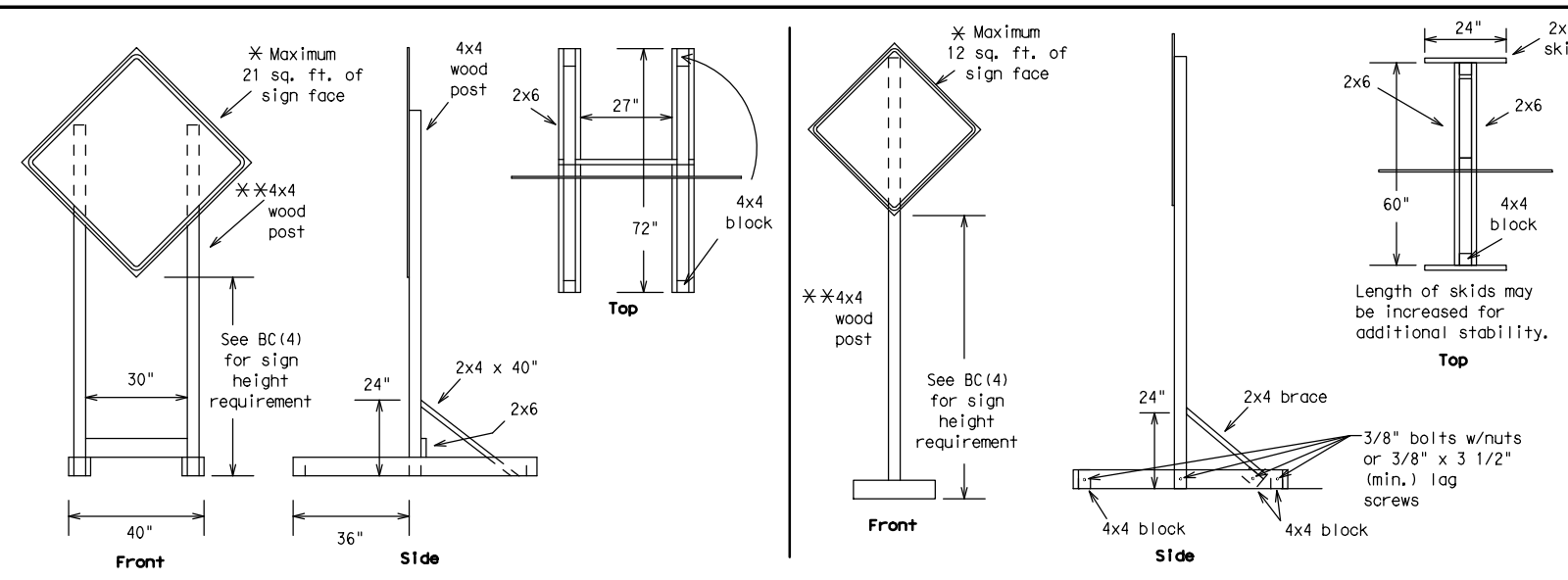
BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

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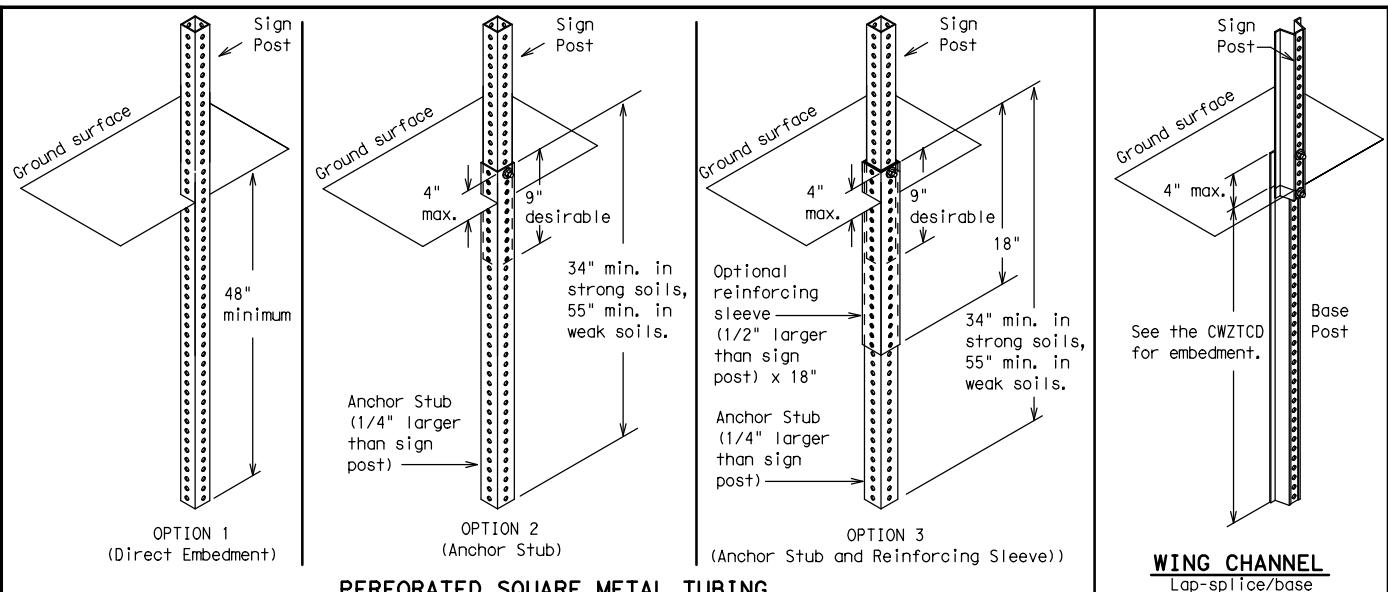
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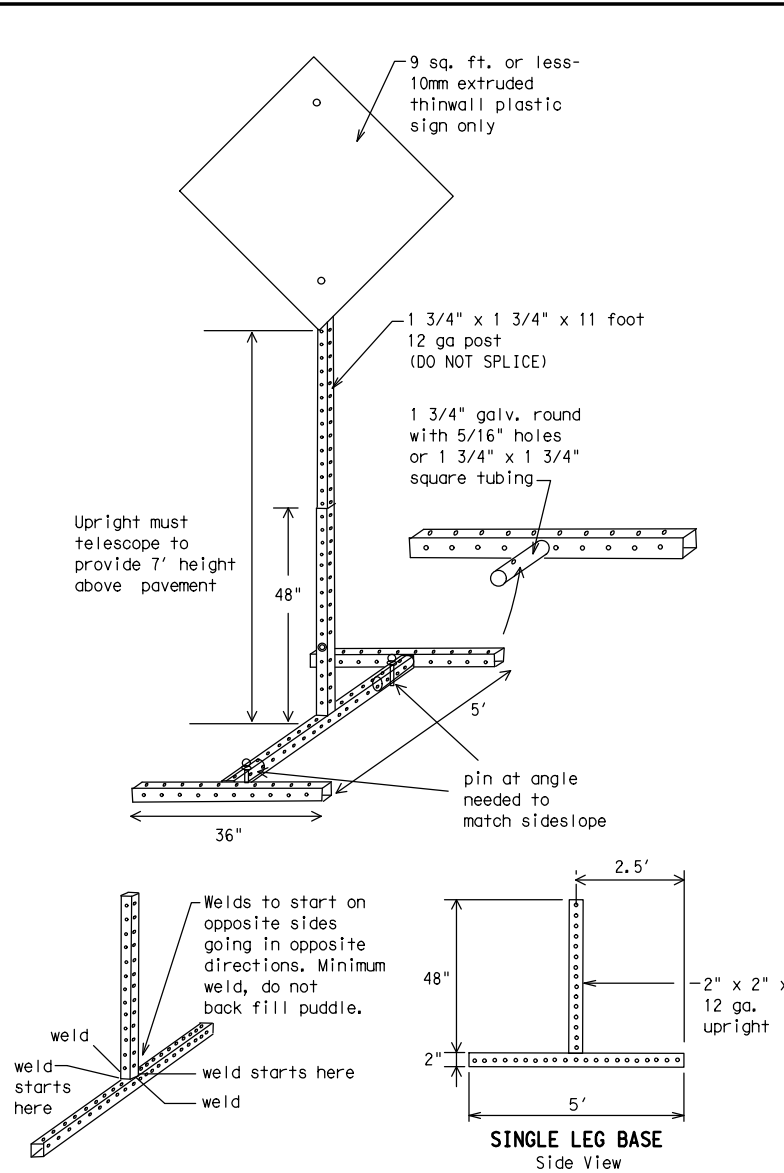
SKID MOUNTED WOOD SIGN SUPPORTS

* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS



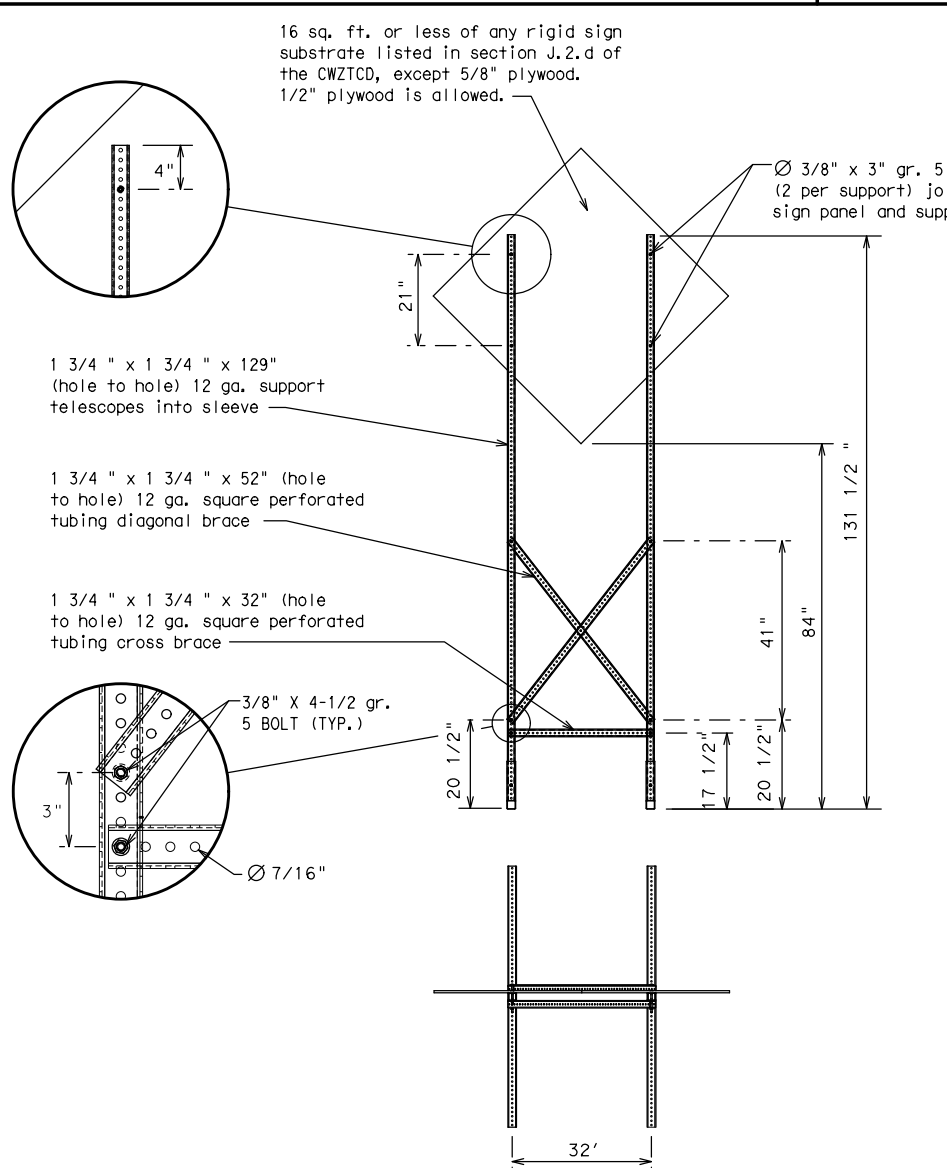
GROUND MOUNTED SIGN SUPPORTS

Refer to the CWZTCD and the manufacturer's installation procedure for each type sign support. The maximum sign square footage shall adhere to the manufacturer's recommendation. Two post installations can be used for larger signs.



SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS



WEDGE ANCHORS

Both steel and plastic Wedge Anchor Systems as shown on the SMD Standard Sheets may be used as temporary sign supports for signs up to 10 square feet of sign face. They may be set in concrete or in sturdy soils if approved by the Engineer. (See web address for "Traffic Engineering Standard Sheets" on BC(1)).

OTHER DESIGNS

MORE DETAILS OF APPROVED LONG/INTERMEDIATE AND SHORT TERM SUPPORTS CAN BE FOUND ON THE CWZTCD LIST. SEE BC(1) FOR WEBSITE LOCATION.

GENERAL NOTES

- Nails may be used in the assembly of wooden sign supports, but 3/8" bolts with nuts or 3/8" x 3 1/2" lag screws must be used on every joint for final connection.
 - No more than 2 sign posts shall be placed within a 7 ft. circle, except for specific materials noted on the CWZTCD List.
 - When project is completed, all sign supports and foundations shall be removed from the project site. This will be considered subsidiary to Item 502.
- * See BC(4) for definition of "Work Duration."
 - ** Wood sign posts MUST be one piece. Splicing will NOT be allowed. Posts shall be painted white.
 - See the CWZTCD for the type of sign substrate that can be used for each approved sign support.

SHEET 5 OF 12



BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

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WHEN NOT IN USE, REMOVE THE PCMS FROM THE RIGHT-OF-WAY OR PLACE THE PCMS BEHIND BARRIER OR GUARDRAIL WITH SIGN PANEL TURNED PARALLEL TO TRAFFIC

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

(The Engineer may approve other messages not specifically covered here.)

PORTABLE CHANGEABLE MESSAGE SIGNS

- The Engineer/Inspector shall approve all messages used on portable changeable message signs (PCMS).
- Messages on PCMS should contain no more than 8 words (about four to eight characters per word), not including simple words such as "TO," "FOR," "AT," etc.
- Messages should consist of a single phase, or two phases that alternate. Three-phase messages are not allowed. Each phase of the message should convey a single thought, and must be understood by itself.
- Use the word "EXIT" to refer to an exit ramp on a freeway; i.e., "EXIT CLOSED." Do not use the term "RAMP."
- Always use the route or interstate designation (IH, US, SH, FM) along with the number when referring to a roadway.
- When in use, the bottom of a stationary PCMS message panel should be a minimum 7 feet above the roadway, where possible.
- The message term "WEEKEND" should be used only if the work is to start on Saturday morning and end by Sunday evening at midnight. Actual days and hours of work should be displayed on the PCMS if work is to begin on Friday evening and/or continue into Monday morning.
- The Engineer/Inspector may select one of two options which are available for displaying a two-phase message on a PCMS. Each phase may be displayed for either four seconds each or for three seconds each.
- Do not "flash" messages or words included in a message. The message should be steady burn or continuous while displayed.
- Do not present redundant information on a two-phase message; i.e., keeping two lines of the message the same and changing the third line.
- Do not use the word "Danger" in message.
- Do not display the message "LANES SHIFT LEFT" or "LANES SHIFT RIGHT" on a PCMS. Drivers do not understand the message.
- Do not display messages that scroll horizontally or vertically across the face of the sign.
- The following table lists abbreviated words and two-word phrases that are acceptable for use on a PCMS. Both words in a phrase must be displayed together. Words or phrases not on this list should not be abbreviated, unless shown in the TMUTCD.
- PCMS character height should be at least 18 inches for trailer mounted units. They should be visible from at least 1/2 (.5) mile and the text should be legible from at least 600 feet at night and 800 feet in daylight. Truck mounted units must have a character height of 10 inches and must be legible from at least 400 feet.
- Each line of text should be centered on the message board rather than left or right justified.
- If disabled, the PCMS should default to an illegible display that will not alarm motorists and will only be used to alert workers that the PCMS has malfunctioned. A pattern such as a series of horizontal solid bars is appropriate.

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

FREEWAY CLOSED X MILE	FRONTAGE ROAD CLOSED
ROAD CLOSED AT SH XXX	SHOULDER CLOSED XXX FT
ROAD CLSD AT FM XXXX	RIGHT LN CLOSED XXX FT
RIGHT X LANES CLOSED	RIGHT X LANES OPEN
CENTER LANE CLOSED	DAYTIME LANE CLOSURES
NIGHT LANE CLOSURES	I-XX SOUTH EXIT CLOSED
VARIOUS LANES CLOSED	EXIT XXX CLOSED X MILE
EXIT CLOSED	RIGHT LN TO BE CLOSED
MALL DRIVEWAY CLOSED	X LANES CLOSED TUE - FRI
XXXXXXXX BLVD CLOSED	

Other Condition List

ROADWORK XXX FT	ROAD REPAIRS XXXX FT
FLAGGER XXXX FT	LANE NARROWS XXXX FT
RIGHT LN NARROWS XXXX FT	TWO-WAY TRAFFIC XX MILE
MERGING TRAFFIC XXXX FT	CONST TRAFFIC XXX FT
LOOSE GRAVEL XXXX FT	UNEVEN LANES XXXX FT
DETOUR X MILE	ROUGH ROAD XXXX FT
ROADWORK PAST SH XXXX	ROADWORK NEXT FRI-SUN
BUMP XXXX FT	US XXX EXIT X MILES
TRAFFIC SIGNAL XXXX FT	LANES SHIFT *

* LANES SHIFT in Phase 1 must be used with STAY IN LANE in Phase 2.

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

MERGE RIGHT	FORM X LINES RIGHT
DETOUR NEXT X EXITS	USE XXXXX RD EXIT
USE EXIT XXX	USE EXIT I-XX NORTH
STAY ON US XXX SOUTH	USE I-XX E TO I-XX N
TRUCKS USE US XXX N	WATCH FOR TRUCKS
WATCH FOR TRUCKS	EXPECT DELAYS
EXPECT DELAYS	PREPARE TO STOP
REDUCE SPEED XXX FT	END SHOULDER USE
USE OTHER ROUTES	WATCH FOR WORKERS
STAY IN LANE *	

Location List

AT FM XXXX
BEFORE RAILROAD CROSSING
NEXT X MILES
PAST US XXX EXIT
XXXXXXXX TO XXXXXXX
US XXX TO FM XXXX

Warning List

SPEED LIMIT XX MPH
MAXIMUM SPEED XX MPH
MINIMUM SPEED XX MPH
ADVISORY SPEED XX MPH
RIGHT LANE EXIT
USE CAUTION
DRIVE SAFELY
DRIVE WITH CARE

** Advance Notice List

TUE-FRI XX AM-X PM
APR XX-XX X PM-X AM
BEGINS MONDAY
BEGINS MAY XX
MAY X-X XX PM - XX AM
NEXT FRI-SUN
XX AM TO XX PM
NEXT TUE AUG XX
TONIGHT XX PM-XX AM

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

- Only 1 or 2 phases are to be used on a PCMS.
- The 1st phase (or both) should be selected from the "Road/Lane/Ramp Closure List" and the "Other Condition List".
- A 2nd phase can be selected from the "Action to Take/Effect on Travel, Location, General Warning, or Advance Notice Phase Lists".
- A Location Phase is necessary only if a distance or location is not included in the first phase selected.
- If two PCMS are used in sequence, they must be separated by a minimum of 1000 ft. Each PCMS shall be limited to two phases, and should be understandable by themselves.
- For advance notice, when the current date is within seven days of the actual work date, calendar days should be replaced with days of the week. Advance notification should typically be for no more than one week prior to the work.

WORDING ALTERNATIVES

- The words RIGHT, LEFT and ALL can be interchanged as appropriate.
- Roadway designations IH, US, SH, FM and LP can be interchanged as appropriate.
- EAST, WEST, NORTH and SOUTH (or abbreviations E, W, N and S) can be interchanged as appropriate.
- Highway names and numbers replaced as appropriate.
- ROAD, HIGHWAY and FREEWAY can be interchanged as needed.
- AHEAD may be used instead of distances if necessary.
- FT and MI, MILE and MILES interchanged as appropriate.
- AT, BEFORE and PAST interchanged as needed.
- Distances or AHEAD can be eliminated from the message if a location phase is used.

PCMS SIGNS WITHIN THE R.O.W. SHALL BE BEHIND GUARDRAIL OR CONCRETE BARRIER OR SHALL HAVE A MINIMUM OF FOUR (4) PLASTIC DRUMS PLACED PERPENDICULAR TO TRAFFIC ON THE UPSTREAM SIDE OF THE PCMS, WHEN EXPOSED TO ONE DIRECTION OF TRAFFIC. WHEN EXPOSED TO TWO WAY TRAFFIC, THE FOUR DRUMS SHOULD BE PLACED WITH ONE DRUM AT EACH OF THE FOUR CORNERS OF THE UNIT.

FULL MATRIX PCMS SIGNS

- When Full Matrix PCMS signs are used, the character height and legibility/visibility requirements shall be maintained as listed in Note 15 under "PORTABLE CHANGEABLE MESSAGE SIGNS" above.
- When symbol signs, such as the "Flagger Symbol" (CW20-7) are represented graphically on the Full Matrix PCMS sign and, with the approval of the Engineer, it shall maintain the legibility/visibility requirement listed above.
- When symbol signs are represented graphically on the Full Matrix PCMS, they shall only supplement the use of the static sign represented, and shall not substitute for, or replace that sign.
- A full matrix PCMS may be used to simulate a flashing arrow board provided it meets the visibility, flash rate and dimming requirements on BC(7), for the same size arrow.

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WORD OR PHRASE	ABBREVIATION	WORD OR PHRASE	ABBREVIATION
Access Road	ACCS RD	Major	MAJ
Alternate	ALT	Miles	MI
Avenue	AVE	Miles Per Hour	MPH
Best Route	BEST RTE	Minor	MNR
Boulevard	BLVD	Monday	MON
Bridge	BRDG	Normal	NORM
Canot	CANT	North	N
Center	CTR	Northbound	(route) N
Construction Ahead	CONST AHD	Parking	PKING
CROSSING	XING	Road	RD
Detour Route	DETOUR RTE	Right Lane	RT LN
Do Not	DONT	Saturday	SAT
East	E	Service Road	SERV RD
Eastbound	(route) E	Shoulder	SHLDR
Emergency	EMER	Slippery	SLIP
Emergency Vehicle	EMER VEH	South	S
Entrance, Enter	ENT	Southbound	(route) S
Express Lane	EXP LN	Speed	SPD
Expressway	EXPWY	Street	ST
XXXX Feet	XXXX FT	Sunday	SUN
Fog Ahead	FOG AHD	Telephone	PHONE
Freeway	FRWY, FWY	Temporary	TEMP
Freeway Blocked	FWY BLKD	Thursday	THURS
Friday	FRI	To Downtown	TO DWNTN
Hazardous Driving	HAZ DRIVING	Traffic	TRAF
Hazardous Material	HAZMAT	Travelers	TRVLR
High-Occupancy Vehicle	HOV	Tuesday	TUES
Highway	HWY	Time Minutes	TIME MIN
Hour(s)	HR, HRS	Upper Level	UPR LEVEL
Information	INFO	Vehicles (s)	VEH, VEHS
It Is	ITS	Warning	WARN
Junction	JCT	Wednesday	WED
Left	LFT	Weight Limit	WT LIMIT
Left Lane	LFT LN	West	W
Lane Closed	LN CLOSED	Westbound	(route) W
Lower Level	LWR LEVEL	Wet Pavement	WET PVMT
Maintenance	MAINT	Will Not	WONT

Roadway designation # IH-number, US-number, SH-number, FM-number



BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

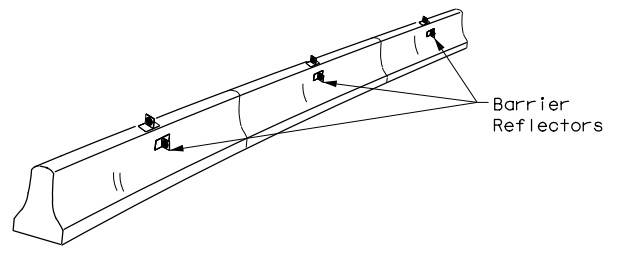
BC (6) - 21

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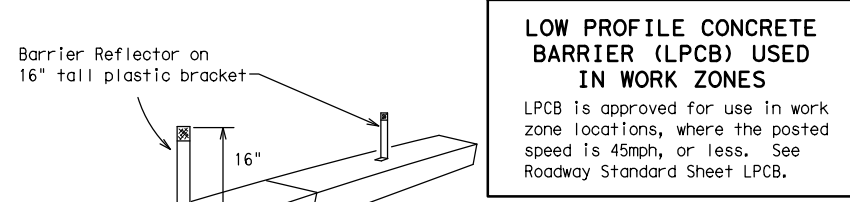
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- Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
- Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost of the reflectors shall be considered subsidiary to Item 512.



CONCRETE TRAFFIC BARRIER (CTB)

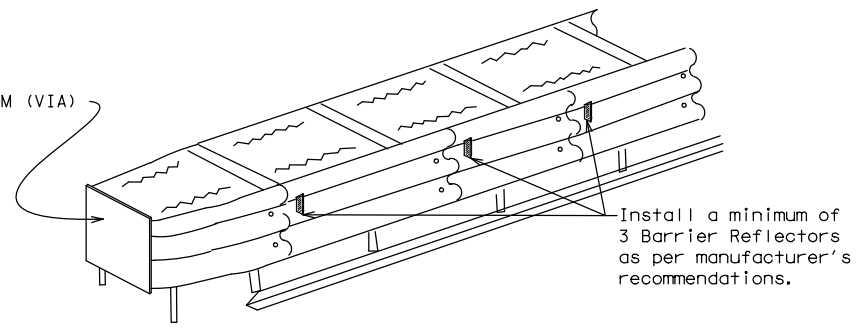
- Where traffic is on one side of the CTB, two (2) Barrier Reflectors shall be mounted in approximately the midsection of each section of CTB. An alternate mounting location is uniformly spaced at one end of each CTB. This will allow for attachment of a barrier grapple without damaging the reflector. The Barrier Reflector mounted on the side of the CTB shall be located directly below the reflector mounted on top of the barrier, as shown in the detail above.
- Where CTB separates two-way traffic, three barrier reflectors shall be mounted on each section of CTB. The reflector unit on top shall have two yellow reflective faces (Bi-Directional) while the reflectors on each side of the barrier shall have one yellow reflective face, as shown in the detail above.
- When CTB separates traffic traveling in the same direction, no barrier reflectors will be required on top of the CTB.
- Barrier Reflector units shall be yellow or white in color to match the edgeline being supplemented.
- Maximum spacing of Barrier Reflectors is forty (40) feet.
- Pavement markers or temporary flexible-reflective roadway marker tabs shall NOT be used as CTB delineation.
- Attachment of Barrier Reflectors to CTB shall be per manufacturer's recommendations.
- Missing or damaged Barrier Reflectors shall be replaced as directed by the Engineer.
- Single slope barriers shall be delineated as shown on the above detail.



LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

LPCB is approved for use in work zone locations, where the posted speed is 45mph, or less. See Roadway Standard Sheet LPCB.

LOW PROFILE CONCRETE BARRIER (LPCB)



DELINEATION OF END TREATMENTS

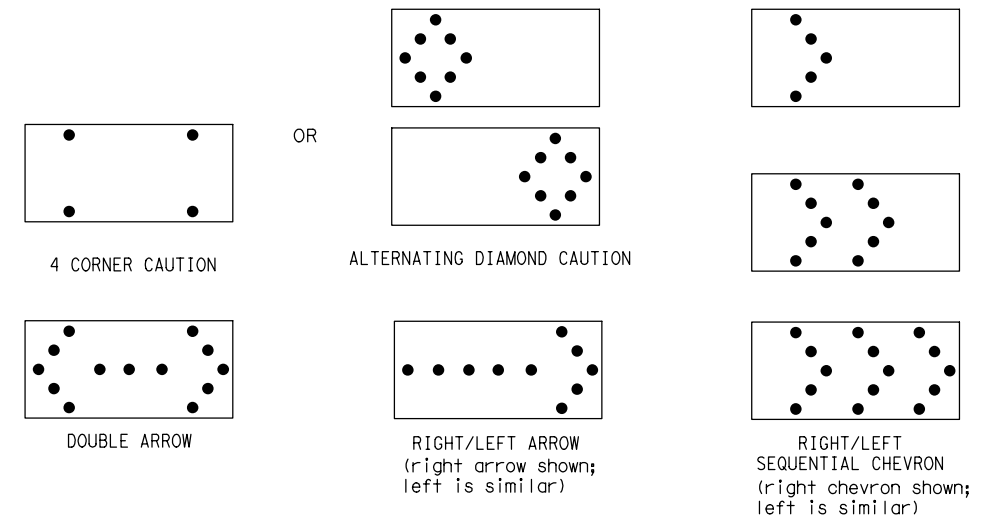
END TREATMENTS FOR CTB'S USED IN WORK ZONES

End treatments used on CTB's in work zones shall meet the appropriate crashworthy standards as defined in the Manual for Assessing Safety Hardware (MASH). Refer to the CWZTCD List for approved end treatments and manufacturers.

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS

Arrow Boards may be located behind channelizing devices in place for a shoulder taper or merging taper, otherwise they shall be delineated with four (4) channelizing devices placed perpendicular to traffic on the upstream side of traffic.

- The Flashing Arrow Board should be used for all lane closures on multi-lane roadways, or slow moving maintenance or construction activities on the travel lanes.
- Flashing Arrow Boards should not be used on two-lane, two-way roadways, detours, diversions or work on shoulders unless the "CAUTION" display (see detail below) is used.
- The Engineer/Inspector shall choose all appropriate signs, barricades and/or other traffic control devices that should be used in conjunction with the Flashing Arrow Board.
- The Flashing Arrow Board should be able to display the following symbols:



- The "CAUTION" display consists of four corner lamps flashing simultaneously, or the Alternating Diamond Caution mode as shown.
- The straight line caution display is NOT ALLOWED.
- The Flashing Arrow Board shall be capable of minimum 50 percent dimming from rated lamp voltage. The flashing rate of the lamps shall not be less than 25 nor more than 40 flashes per minute.
- Minimum lamp "on time" shall be approximately 50 percent for the flashing arrow and equal intervals of 25 percent for each sequential phase of the flashing chevron.
- The sequential arrow display is NOT ALLOWED.
- The flashing arrow display is the TxDOT standard; however, the sequential chevron display may be used during daylight operations.
- The Flashing Arrow Board shall be mounted on a vehicle, trailer or other suitable support.
- A Flashing Arrow Board SHALL NOT BE USED to laterally shift traffic.
- A full matrix PCMS may be used to simulate a Flashing Arrow Board provided it meets visibility, flash rate and dimming requirements on this sheet for the same size arrow.
- Minimum mounting height of trailer mounted Arrow Boards should be 7 feet from roadway to bottom of panel.

REQUIREMENTS			
TYPE	MINIMUM SIZE	MINIMUM NUMBER OF PANEL LAMPS	MINIMUM VISIBILITY DISTANCE
B	30 x 60	13	3/4 mile
C	48 x 96	15	1 mile

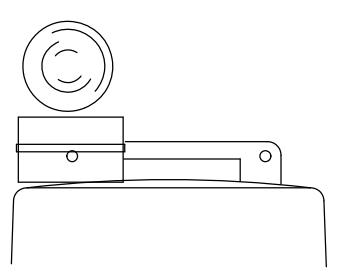
ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

WHEN NOT IN USE, REMOVE THE ARROW BOARD FROM THE RIGHT-OF-WAY OR PLACE THE ARROW BOARD BEHIND CONCRETE TRAFFIC BARRIER OR GUARDRAIL.

FLASHING ARROW BOARDS

SHEET 7 OF 12



WARNING LIGHTS

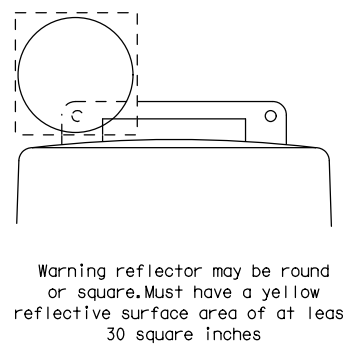
- Warning lights shall meet the requirements of the TMUTCD.
- Warning lights shall NOT be installed on barricades.
- Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of or mark a potentially hazardous area. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "FL". The Type A Warning Lights shall not be used with signs manufactured with Type B_{FL} or C_{FL} Sheeting meeting the requirements of Departmental Material Specification DMS-8300.
- Type-C and Type D 360 degree Steady Burn Lights are intended to be used in a series for delineation to supplement other traffic control devices. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "SB".
- The Engineer/Inspector or the plans shall specify the location and type of warning lights to be installed on the traffic control devices.
- When required by the Engineer, the Contractor shall furnish a copy of the warning lights certification. The warning light manufacturer will certify the warning lights meet the requirements of the latest ITE Purchase Specifications for Flashing and Steady-Burn Warning Lights.
- When used to delineate curves, Type-C and Type D Steady Burn Lights should only be placed on the outside of the curve, not the inside.
- The location of warning lights and warning reflectors on drums shall be as shown elsewhere in the plans.

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

- Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
- Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
- A series of sequential flashing warning lights placed on channelizing devices to form a merging taper may be used for delineation. If used, the successive flashing of the sequential warning lights should occur from the beginning of the taper to the end of the merging taper in order to identify the desired vehicle path. The rate of flashing for each light shall be 65 flashes per minute, plus or minus 10 flashes.
- Type C and D steady-burn warning lights are intended to be used in a series to delineate the edge of the travel lane on detours, on lane changes, on lane closures, and on other similar conditions.
- Type A, Type C and Type D warning lights shall be installed at locations as detailed on other sheets in the plans.
- Warning lights shall not be installed on a drum that has a sign, chevron or vertical panel.
- The maximum spacing for warning lights on drums should be identical to the channelizing device spacing.

WARNING REFLECTORS MOUNTED ON PLASTIC DRUMS AS A SUBSTITUTE FOR TYPE C (STEADY BURN) WARNING LIGHTS

- A warning reflector or approved substitute may be mounted on a plastic drum as a substitute for a Type C, steady burn warning light at the discretion of the Contractor unless otherwise noted in the plans.
- The warning reflector shall be yellow in color and shall be manufactured using a sign substrate approved for use with plastic drums listed on the CWZTCD.
- The warning reflector shall have a minimum retroreflective surface area (one-side) of 30 square inches.
- Round reflectors shall be fully reflectorized, including the area where attached to the drum.
- Square substrates must have a minimum of 30 square inches of reflectorized sheeting. They do not have to be reflectorized where it attaches to the drum.
- The side of the warning reflector facing approaching traffic shall have sheeting meeting the color and retroreflectivity requirements for DMS 8300-Type B or Type C.
- When used near two-way traffic, both sides of the warning reflector shall be reflectorized.
- The warning reflector should be mounted on the side of the handle nearest approaching traffic.
- The maximum spacing for warning reflectors should be identical to the channelizing device spacing requirements.



TRUCK-MOUNTED ATTENUATORS

- Truck-mounted attenuators (TMA) used on TxDOT facilities must meet the requirements outlined in the Manual for Assessing Safety Hardware (MASH).
- Refer to the CWZTCD for the requirements of Level 2 or Level 3 TMAs.
- Refer to the CWZTCD for a list of approved TMAs.
- TMAs are required on freeways unless otherwise noted in the plans.
- A TMA should be used anytime that it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the work performance.
- The only reason a TMA should not be required is when a work area is spread down the roadway and the work crew is an extended distance from the TMA.



BARRICADE AND CONSTRUCTION ARROW PANEL, REFLECTORS, WARNING LIGHTS & ATTENUATOR

BC (7) -21

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GENERAL NOTES

- For long term stationary work zones on freeways, drums shall be used as the primary channelizing device.
- For intermediate term stationary work zones on freeways, drums should be used as the primary channelizing device but may be replaced in tangent sections by vertical panels, or 42" two-piece cones. In tangent sections, one-piece cones may be used with the approval of the Engineer but only if personnel are present on the project at all times to maintain the cones in proper position and location.
- For short term stationary work zones on freeways, drums are the preferred channelizing device but may be replaced in tapers, transitions and tangent sections by vertical panels, two-piece cones or one-piece cones as approved by the Engineer.
- Drums and all related items shall comply with the requirements of the current version of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
- Drums, bases, and related materials shall exhibit good workmanship and shall be free from objectionable marks or defects that would adversely affect their appearance or serviceability.
- The Contractor shall have a maximum of 24 hours to replace any plastic drums identified for replacement by the Engineer/Inspector. The replacement device must be an approved device.

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

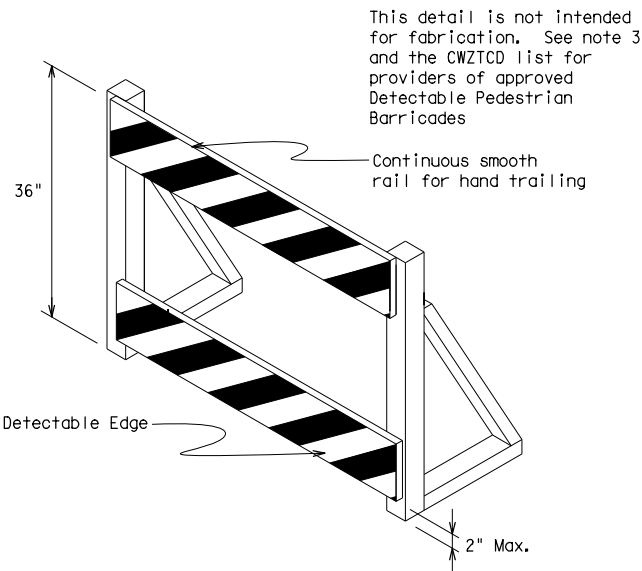
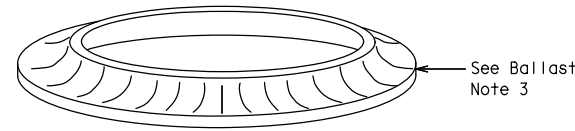
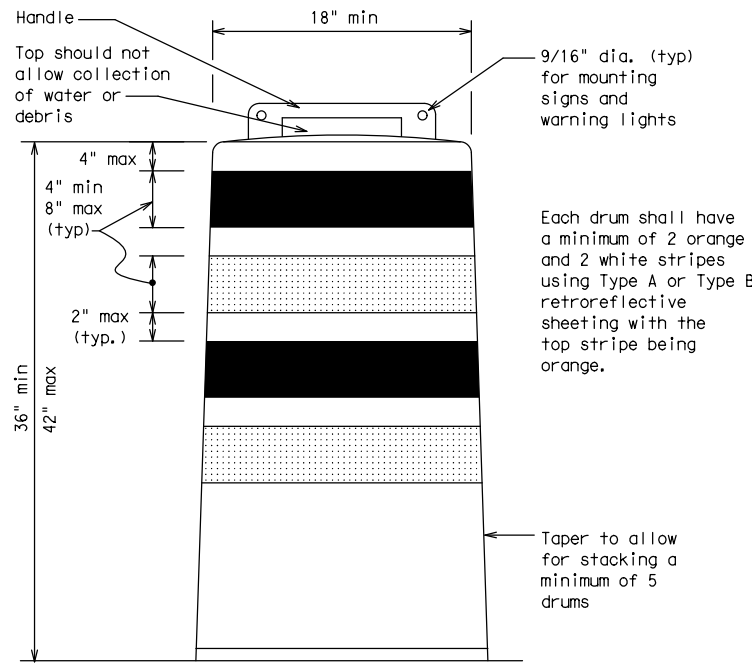
- Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
- The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents accidental separation due to normal handling and/or air turbulence created by passing vehicles.
- Plastic drums shall be constructed of lightweight flexible, and deformable materials. The Contractor shall NOT use metal drums or single piece plastic drums as channelization devices or sign supports.
- Drums shall present a profile that is a minimum of 18 inches in width at the 36 inch height when viewed from any direction. The height of drum unit (body installed on base) shall be a minimum of 36 inches and a maximum of 42 inches.
- The top of the drum shall have a built-in handle for easy pickup and shall be designed to drain water and not collect debris. The handle shall have a minimum of two widely spaced 9/16 inch diameter holes to allow attachment of a warning light, warning reflector unit or approved compliant sign.
- The exterior of the drum body shall have a minimum of four alternating orange and white retroreflective circumferential stripes not less than 4 inches nor greater than 8 inches in width. Any non-reflectORIZED space between any two adjacent stripes shall not exceed 2 inches in width.
- Bases shall have a maximum width of 36 inches, a maximum height of 4 inches, and a minimum of two footholds of sufficient size to allow base to be held down while separating the drum body from the base.
- Plastic drums shall be constructed of ultra-violet stabilized, orange, high-density polyethylene (HDPE) or other approved material.
- Drum body shall have a maximum unballasted weight of 11 lbs.
- Drum and base shall be marked with manufacturer's name and model number.

RETROREFLECTIVE SHEETING

- The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
- The sheeting shall be suitable for use on and shall adhere to the drum surface such that, upon vehicular impact, the sheeting shall remain adhered in-place and exhibit no delaminating, cracking, or loss of retroreflectivity other than that loss due to abrasion of the sheeting surface.

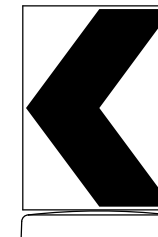
BALLAST

- Unballasted bases shall be large enough to hold up to 50 lbs. of sand. This base, when filled with the ballast material, should weigh between 35 lbs (minimum) and 50 lbs (maximum). The ballast may be sand in one to three sandbags separate from the base, sand in a sand-filled plastic base, or other ballasting devices as approved by the Engineer. Stacking of sandbags will be allowed, however height of sandbags above pavement surface may not exceed 12 inches.
- Bases with built-in ballast shall weigh between 40 lbs. and 50 lbs. Built-in ballast can be constructed of an integral crumb rubber base or a solid rubber base.
- Recycled truck tire sidewalls may be used for ballast on drums approved for this type of ballast on the CWZTCD list.
- The ballast shall not be heavy objects, water, or any material that would become hazardous to motorists, pedestrians, or workers when the drum is struck by a vehicle.
- When used in regions susceptible to freezing, drums shall have drainage holes in the bottoms so that water will not collect and freeze becoming a hazard when struck by a vehicle.
- Ballast shall not be placed on top of drums.
- Adhesives may be used to secure base of drums to pavement.

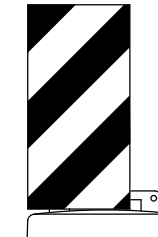


DETECTABLE PEDESTRIAN BARRICADES

- When existing pedestrian facilities are disrupted, closed, or relocated in a TTC zone, the temporary facilities shall be detectable and include accessibility features consistent with the features present in the existing pedestrian facility. Refer to WZ(BTS-2) for Pedestrian Control requirements for Sidewalk Diversions, Sidewalk Detours and Crosswalk Closures.
- Where pedestrians with visual disabilities normally use the closed sidewalk, a Detectable Pedestrian Barricade shall be placed across the full width of the closed sidewalk instead of a Type 3 Barricade.
- Detectable pedestrian barricades similar to the one pictured above, longitudinal channelizing devices, some concrete barriers, and wood or chain link fencing with a continuous detectable edging can satisfactorily delineate a pedestrian path.
- Tape, rope, or plastic chain strung between devices are not detectable, do not comply with the design standards in the "Americans with Disabilities Act Accessibility Guidelines (ADAAG)" and should not be used as a control for pedestrian movements.
- Warning lights shall not be attached to detectable pedestrian barricades.
- Detectable pedestrian barricades should use 8" nominal barricade rails as shown on BC(10) provided that the top rail provides a smooth continuous rail suitable for hand trailing with no splinters, burrs, or sharp edges.



18" x 24" Sign
(Maximum Sign Dimension)
Chevron CW1-8, Opposing Traffic Lane
Divider, Driveway sign D70a, Keep Right
R4 series or other signs as approved
by Engineer



12" x 24"
Vertical Panel
mount with diagonals
sloping down towards
travel way

Plywood, Aluminum or Metal sign
substrates shall NOT be used on
plastic drums

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

- Signs used on plastic drums shall be manufactured using substrates listed on the CWZTCD.
- Chevrons and other work zone signs with an orange background shall be manufactured with Type B_{FL} or Type C_{FL} Orange sheeting meeting the color and retroreflectivity requirements of DMS-8300, "Sign Face Material," unless otherwise specified in the plans.
- Vertical Panels shall be manufactured with orange and white sheeting meeting the requirements of DMS-8300 Type A or Type B. Diagonal stripes on Vertical Panels shall slope down toward the intended traveled lane.
- Other sign messages (text or symbolic) may be used as approved by the Engineer. Sign dimensions shall not exceed 18 inches in width or 24 inches in height, except for the R9 series signs discussed in note 8 below.
- Signs shall be installed using a 1/2 inch bolt (nominal) and nut, two washers, and one locking washer for each connection.
- Mounting bolts and nuts shall be fully engaged and adequately torqued. Bolts should not extend more than 1/2 inch beyond nuts.
- Chevrons may be placed on drums on the outside of curves, on merging tapers or on shifting tapers. When used in these locations, they may be placed on every drum or spaced not more than on every third drum. A minimum of three (3) should be used at each location called for in the plans.
- R9-9, R9-10, R9-11 and R9-11a Sidewalk Closed signs which are 24 inches wide may be mounted on plastic drums, with approval of the Engineer.

SHEET 8 OF 12



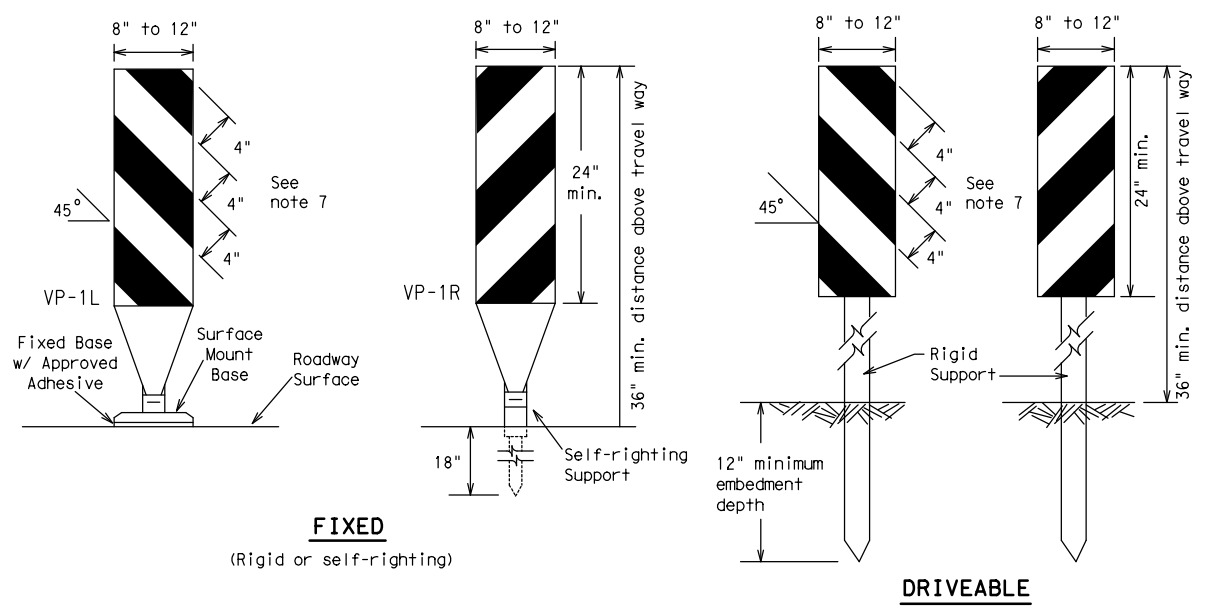
BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

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9-07	5-21	DIST	COUNTY	SHEET NO.					
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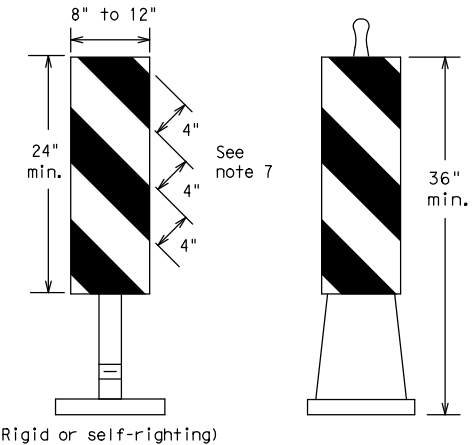
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FIXED
(Rigid or self-righting)

DRIVEABLE

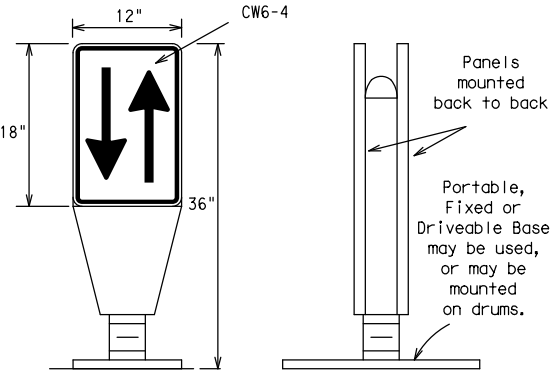


(Rigid or self-righting)

PORTABLE

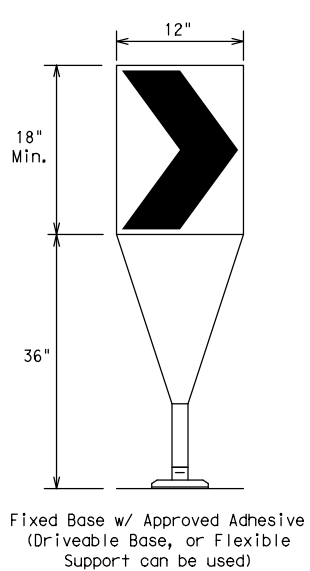
VERTICAL PANELS (VPs)

- Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
- VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is required. The Engineer/Inspector shall refer to the Roadway Design Manual for additional requirements on the use VP's for drop-offs.
- VP's should be mounted back to back if used at the edge of cuts adjacent to two-way two lane roadways. Stripes are to be reflective orange and reflective white and should always slope downward toward the travel lane.
- VP's used on expressways and freeways or other high speed roadways, may have more than 270 square inches of retroreflective area facing traffic.
- Self-righting supports are available with portable base. See "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
- Sheeting for the VP's shall be retroreflective Type A or Type B conforming to Departmental Material Specification DMS-8300, unless noted otherwise.
- Where the height of reflective material on the vertical panel is 36 inches or greater, a panel stripe of 6 inches shall be used.



OPPOSING TRAFFIC LANE DIVIDERS (OTLD)

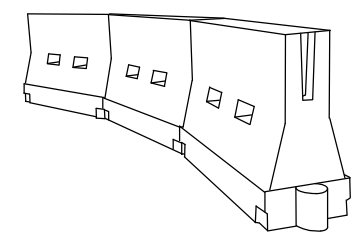
- Opposing Traffic Lane Dividers (OTLD) are delineation devices designed to convert a normal one-way roadway section to two-way operation. OTLD's are used on temporary centerlines. The upward and downward arrows on the sign's face indicate the direction of traffic on either side of the divider. The base is secured to the pavement with an adhesive or rubber weight to minimize movement caused by a vehicle impact or wind gust.
- The OTLD may be used in combination with 42" cones or VPs.
- Spacing between the OTLD shall not exceed 500 feet. 42" cones or VPs placed between the OTLD's should not exceed 100 foot spacing.
- The OTLD shall be orange with a black non-reflective legend. Sheeting for the OTLD shall be retroreflective Type B_{FL} or Type C_{FL} conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.



Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

- The chevron shall be a vertical rectangle with a minimum size of 12 by 18 inches.
- Chevrons are intended to give notice of a sharp change of alignment with the direction of travel and provide additional emphasis and guidance for vehicle operators with regard to changes in horizontal alignment of the roadway.
- Chevrons, when used, shall be erected on the outside of a sharp curve or turn, or on the far side of an intersection. They shall be in line with and at right angles to approaching traffic. Spacing should be such that the motorist always has three in view, until the change in alignment eliminates its need.
- To be effective, the chevron should be visible for at least 500 feet.
- Chevrons shall be orange with a black nonreflective legend. Sheeting for the chevron shall be retroreflective Type B_{FL} or Type C_{FL} conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.
- For Long Term Stationary use on tapers or transitions on freeways and divided highways, self-righting chevrons may be used to supplement plastic drums but not to replace plastic drums.

CHEVRONS



LONGITUDINAL CHANNELIZING DEVICES (LCD)

- LCDs are crashworthy, lightweight, deformable devices that are highly visible, have good target value and can be connected together. They are not designed to contain or redirect a vehicle on impact.
- LCDs may be used instead of a line of cones or drums.
- LCDs shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
- LCDs should not be used to provide positive protection for obstacles, pedestrians or workers.
- LCDs shall be supplemented with retroreflective delineation as required for temporary barriers on BC(7) when placed roughly parallel to the travel lanes.
- LCDs used as barricades placed perpendicular to traffic should have at least one row of reflective sheeting meeting the requirements for barricade rails as shown on BC(10). Place reflective sheeting near the top of the LCD along the full length of the device.

WATER BALLASTED SYSTEMS USED AS BARRIERS

- Water ballasted systems used as barriers shall not be used solely to channelize road users, but also to protect the work space per the appropriate Manual for Assessing Safety Hardware (MASH) crashworthiness requirements based on roadway speed and barrier application.
- Water ballasted systems used to channelize vehicular traffic shall be supplemented with retroreflective delineation or channelizing devices to improve daytime/nighttime visibility. They may also be supplemented with pavement markings.
- Water ballasted systems used as barriers shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
- Water ballasted systems used as barriers should not be used for a merging taper except in low speed (less than 45 MPH) urban areas. When used on a taper in a low speed urban area, the taper shall be delineated and the taper length should be designed to optimize road user operations considering the available geometric conditions.
- When water ballasted systems used as barriers have blunt ends exposed to traffic, they should be attenuated as per manufacturer recommendations or flared to a point outside the clear zone.

If used to channelize pedestrians, longitudinal channelizing devices or water ballasted systems must have a continuous detectable bottom for users of long canes and the top of the unit shall not be less than 32 inches in height.

HOLLOW OR WATER BALLASTED SYSTEMS USED AS LONGITUDINAL CHANNELIZING DEVICES OR BARRIERS

GENERAL NOTES

- Work Zone channelizing devices illustrated on this sheet may be installed in close proximity to traffic and are suitable for use on high or low speed roadways. The Engineer/Inspector shall ensure that spacing and placement is uniform and in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
- Channelizing devices shown on this sheet may have a driveable, fixed or portable base. The requirement for self-righting channelizing devices must be specified in the General Notes or other plan sheets.
- Channelizing devices on self-righting supports should be used in work zone areas where channelizing devices are frequently impacted by errant vehicles or vehicle related wind gusts making alignment of the channelizing devices difficult to maintain. Locations of these devices shall be detailed elsewhere in the plans. These devices shall conform to the TMUTCD and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
- The Contractor shall maintain devices in a clean condition and replace damaged, nonreflective, faded, or broken devices and bases as required by the Engineer/Inspector. The Contractor shall be required to maintain proper device spacing and alignment.
- Portable bases shall be fabricated from virgin and/or recycled rubber. The portable bases shall weigh a minimum of 30 lbs.
- Pavement surfaces shall be prepared in a manner that ensures proper bonding between the adhesives, the fixed mount bases and the pavement surface. Adhesives shall be prepared and applied according to the manufacturer's recommendations.
- The installation and removal of channelizing devices shall not cause detrimental effects to the final pavement surfaces, including pavement surface discoloration or surface integrity. Driveable bases shall not be permitted on final pavement surfaces. The Engineer/Inspector shall approve all application and removal procedures of fixed bases.

Posted Speed	Formula	Minimum Desirable Taper Lengths *X			Suggested Maximum Spacing of Channelizing Devices	
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent
30	L = WS ² / 60	150'	165'	180'	30'	60'
35		205'	225'	245'	35'	70'
40		265'	295'	320'	40'	80'
45	L = WS	450'	495'	540'	45'	90'
50		500'	550'	600'	50'	100'
55		550'	605'	660'	55'	110'
60		600'	660'	720'	60'	120'
65		650'	715'	780'	65'	130'
70		700'	770'	840'	70'	140'
75		750'	825'	900'	75'	150'
80		800'	880'	960'	80'	160'

*X Taper lengths have been rounded off.
 L=Length of Taper (FT.) W=Width of Offset (FT.)
 S=Posted Speed (MPH)

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

SHEET 9 OF 12



BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC (9) - 21

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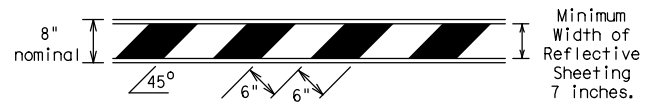
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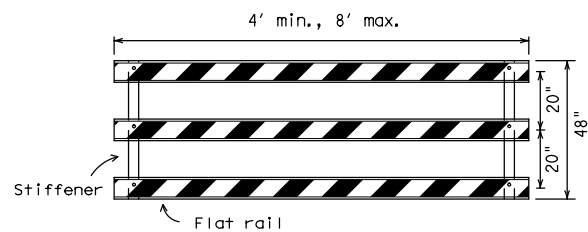
TYPE 3 BARRICADES

- Refer to the Compliant Work Zone Traffic Control Devices List (CWZTCD) for details of the Type 3 Barricades and a list of all materials used in the construction of Type 3 Barricades.
- Type 3 Barricades shall be used at each end of construction projects closed to all traffic.
- Barricades extending across a roadway should have stripes that slope downward in the direction toward which traffic must turn in detouring. When both right and left turns are provided, the chevron striping may slope downward in both directions from the center of the barricade. Where no turns are provided at a closed road, striping should slope downward in both directions toward the center of roadway.
- Striping of rails, for the right side of the roadway, should slope downward to the left. For the left side of the roadway, striping should slope downward to the right.
- Identification markings may be shown only on the back of the barricade rails. The maximum height of letters and/or company logos used for identification shall be 1".
- Barricades shall not be placed parallel to traffic unless an adequate clear zone is provided.
- Warning lights shall NOT be installed on barricades.
- Where barricades require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand is recommended. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight. Sand bags shall not be stacked in a manner that covers any portion of a barricade rails reflective sheeting. Rock, concrete, iron, steel or other solid objects will NOT be permitted. Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs. Sandbags shall be made of a durable material that tears upon vehicular impact. Rubber (such as tire inner tubes) shall not be used for sandbags. Sandbags shall only be placed along or upon the base supports of the device and shall not be suspended above ground level or hung with rope, wire, chains or other fasteners.
- Sheeting for barricades shall be retroreflective Type A or Type B conforming to Departmental Material Specification DMS-8300 unless otherwise noted.

Barricades shall NOT be used as a sign support.

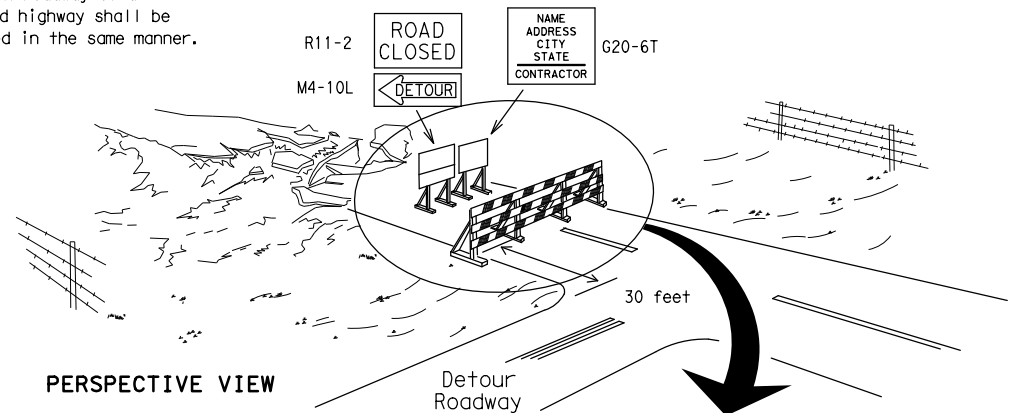


TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



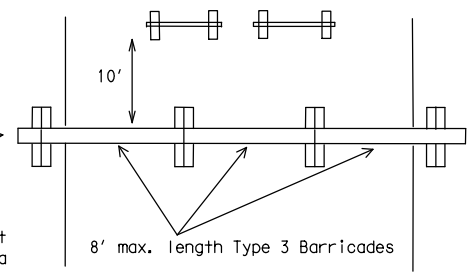
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

Each roadway of a divided highway shall be barricaded in the same manner.



PERSPECTIVE VIEW

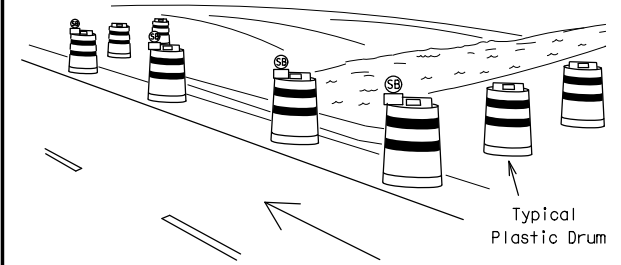
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic. Barricade striping should slant downward in the direction of detour.



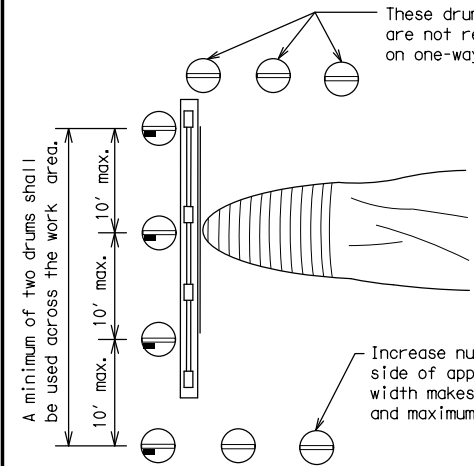
PLAN VIEW

- Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
- Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW



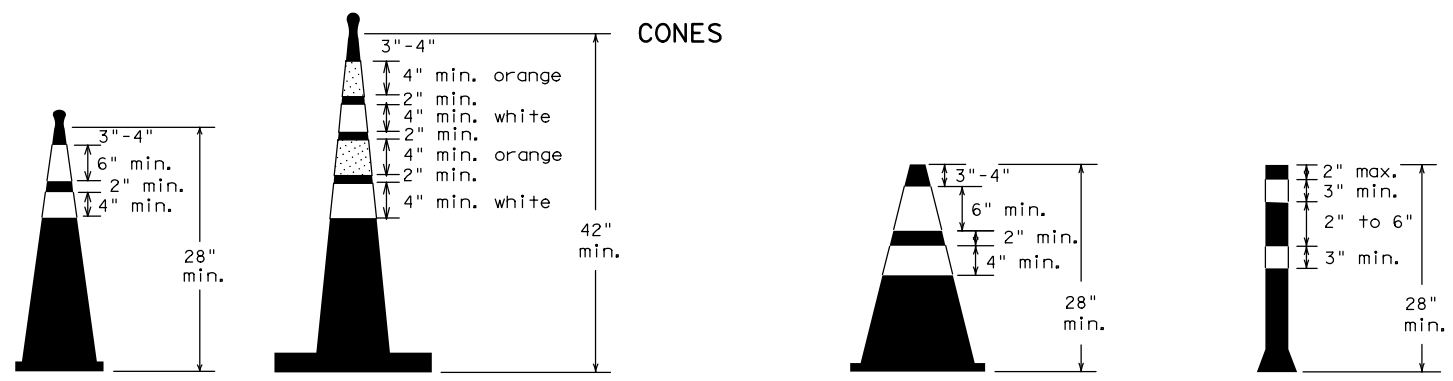
PLAN VIEW

Increase number of plastic drums on the side of approaching traffic if the crown width makes it necessary. (minimum of 2 and maximum of 4 drums)

- Where positive redirection capability is provided, drums may be omitted.
- Plastic construction fencing may be used with drums for safety as required in the plans.
- Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
- When the shoulder width is greater than 12 feet, steady-burn lights may be omitted if drums are used.
- Drums must extend the length of the culvert widening.

LEGEND	
	Plastic drum
	Plastic drum with steady burn light or yellow warning reflector
	Steady burn warning light or yellow warning reflector

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



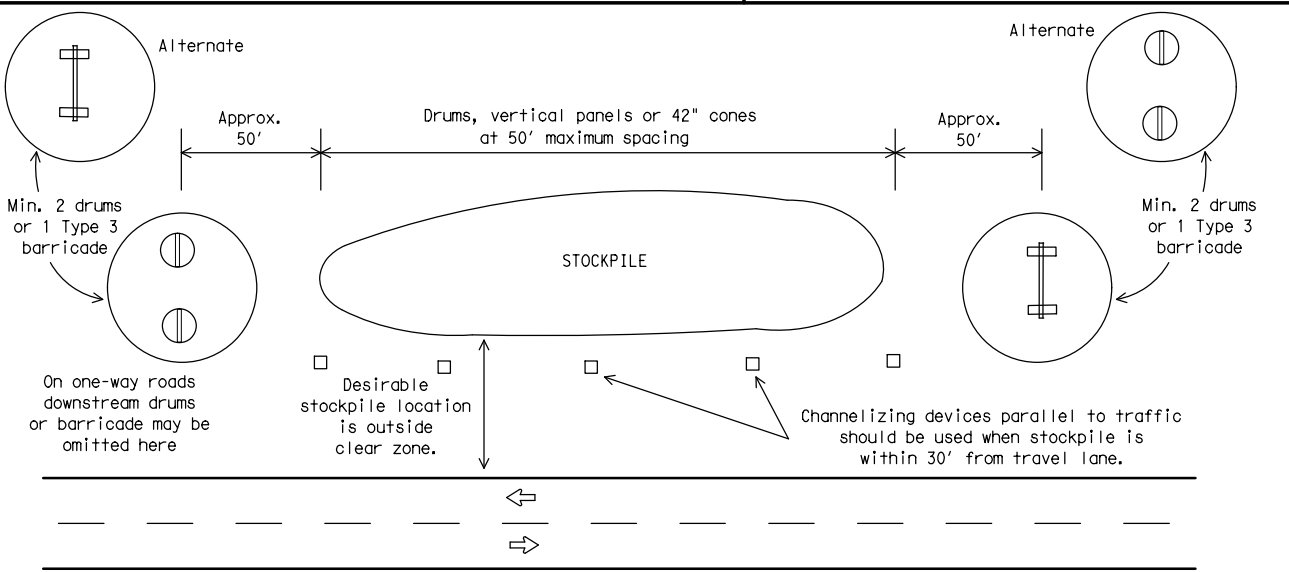
Two-Piece cones

One-Piece cones

Tubular Marker

28" Cones shall have a minimum weight of 9 1/2 lbs.
 42" 2-piece cones shall have a minimum weight of 30 lbs. including base.

- Traffic cones and tubular markers shall be predominantly orange, and meet the height and weight requirements shown above.
- One-piece cones have the body and base of the cone molded in one consolidated unit. Two-piece cones have a cone shaped body and a separate rubber base, or ballast, that is added to keep the device upright and in place.
- Two-piece cones may have a handle or loop extending up to 8" above the minimum height shown, in order to aid in retrieving the device.
- Cones or tubular markers shall have white or white and orange reflective bands as shown above. The reflective bands shall have a smooth, sealed outer surface and meet the requirements of Departmental Material Specification DMS-8300 Type A or Type B.
- 28" cones and tubular markers are generally suitable for short duration and short-term stationary work as defined on BC(4). These should not be used for intermediate-term or long-term stationary work unless personnel is on-site to maintain them in their proper upright position.
- 42" two-piece cones, vertical panels or drums are suitable for all work zone durations.
- Cones or tubular markers used on each project should be of the same size and shape.



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

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WORK ZONE PAVEMENT MARKINGS

GENERAL

- The Contractor shall be responsible for maintaining work zone and existing pavement markings, in accordance with the standard specifications and special provisions, on all roadways open to traffic within the CSJ limits unless otherwise stated in the plans.
- Color, patterns and dimensions shall be in conformance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
- Additional supplemental pavement marking details may be found in the plans or specifications.
- Pavement markings shall be installed in accordance with the TMUTCD and as shown on the plans.
- When short term markings are required on the plans, short term markings shall conform with the TMUTCD, the plans and details as shown on the Standard Plan Sheet WZ(STPM).
- When standard pavement markings are not in place and the roadway is opened to traffic, DO NOT PASS signs shall be erected to mark the beginning of the sections where passing is prohibited and PASS WITH CARE signs at the beginning of sections where passing is permitted.
- All work zone pavement markings shall be installed in accordance with Item 662, "Work Zone Pavement Markings."

RAISED PAVEMENT MARKERS

- Raised pavement markers are to be placed according to the patterns on BC(12).
- All raised pavement markers used for work zone markings shall meet the requirements of Item 672, "RAISED PAVEMENT MARKERS" and Departmental Material Specification DMS-4200 or DMS-4300.

PREFABRICATED PAVEMENT MARKINGS

- Removable prefabricated pavement markings shall meet the requirements of DMS-8241.
- Non-removable prefabricated pavement markings (foil back) shall meet the requirements of DMS-8240.

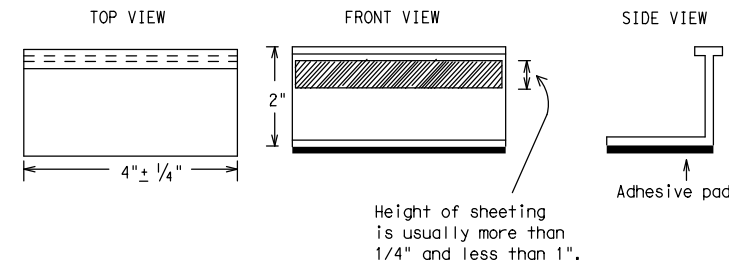
MAINTAINING WORK ZONE PAVEMENT MARKINGS

- The Contractor will be responsible for maintaining work zone pavement markings within the work limits.
- Work zone pavement markings shall be inspected in accordance with the frequency and reporting requirements of work zone traffic control device inspections as required by Form 599.
- The markings should provide a visible reference for a minimum distance of 300 feet during normal daylight hours and 160 feet when illuminated by automobile low-beam headlights at night, unless sight distance is restricted by roadway geometrics.
- Markings failing to meet this criteria within the first 30 days after placement shall be replaced at the expense of the Contractor as per Specification Item 662.

REMOVAL OF PAVEMENT MARKINGS

- Pavement markings that are no longer applicable, could create confusion or direct a motorist toward or into the closed portion of the roadway shall be removed or obliterated before the roadway is opened to traffic.
- The above shall not apply to detours in place for less than three days, where flaggers and/or sufficient channelizing devices are used in lieu of markings to outline the detour route.
- Pavement markings shall be removed to the fullest extent possible, so as not to leave a discernable marking. This shall be by any method approved by TxDOT Specification Item 677 for "Eliminating Existing Pavement Markings and Markers".
- The removal of pavement markings may require resurfacing or seal coating portions of the roadway as described in Item 677.
- Subject to the approval of the Engineer, any method that proves to be successful on a particular type pavement may be used.
- Blast cleaning may be used but will not be required unless specifically shown in the plans.
- Over-painting of the markings SHALL NOT BE permitted.
- Removal of raised pavement markers shall be as directed by the Engineer.
- Removal of existing pavement markings and markers will be paid for directly in accordance with Item 677, "ELIMINATING EXISTING PAVEMENT MARKINGS AND MARKERS," unless otherwise stated in the plans.
- Black-out marking tape may be used to cover conflicting existing markings for periods less than two weeks when approved by the Engineer.

Temporary Flexible-Reflective Roadway Marker Tabs



**STAPLES OR NAILS SHALL NOT BE USED TO SECURE
TEMPORARY FLEXIBLE-REFLECTIVE ROADWAY MARKER
TABS TO THE PAVEMENT SURFACE**

- Temporary flexible-reflective roadway marker tabs used as guidemarks shall meet the requirements of DMS-8242.
- Tabs detailed on this sheet are to be inspected and accepted by the Engineer or designated representative. Sampling and testing is not normally required, however at the option of the Engineer, either "A" or "B" below may be imposed to assure quality before placement on the roadway.
 - Select five (5) or more tabs at random from each lot or shipment and submit to the Construction Division, Materials and Pavement Section to determine specification compliance.
 - Select five (5) tabs and perform the following test. Affix five (5) tabs at 24 inch intervals on an asphaltic pavement in a straight line. Using a medium size passenger vehicle or pickup, run over the markers with the front and rear tires at a speed of 35 to 40 miles per hour, four (4) times in each direction. No more than one (1) out of the five (5) reflective surfaces shall be lost or displaced as a result of this test.
- Small design variances may be noted between tab manufacturers.
- See Standard Sheet WZ(STPM) for tab placement on new pavements. See Standard Sheet TCP(7-1) for tab placement on seal coat work.

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

- Raised pavement markers used as guidemarks shall be from the approved product list, and meet the requirements of DMS-4200.
- All temporary construction raised pavement markers provided on a project shall be of the same manufacturer.
- Adhesive for guidemarks shall be bituminous material hot applied or butyl rubber pad for all surfaces, or thermoplastic for concrete surfaces.

Guidemarks shall be designated as:
 YELLOW - (two amber reflective surfaces with yellow body).
 WHITE - (one silver reflective surface with white body).

DEPARTMENTAL MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
TRAFFIC BUTTONS	DMS-4300
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY REMOVABLE, PREFABRICATED PAVEMENT MARKINGS	DMS-8241
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS	DMS-8242

A list of prequalified reflective raised pavement markers, non-reflective traffic buttons, roadway marker tabs and other pavement markings can be found at the Material Producer List web address shown on BC(1).

SHEET 11 OF 12



BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

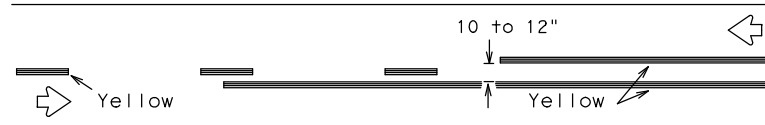
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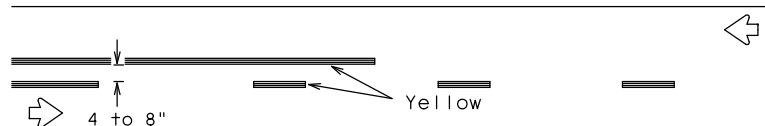
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PAVEMENT MARKING PATTERNS

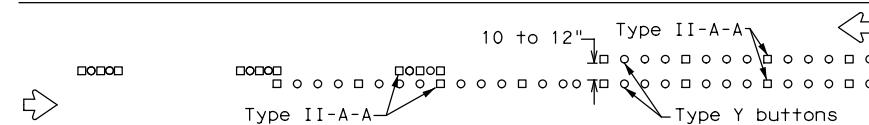


REFLECTORIZED PAVEMENT MARKINGS - PATTERN A

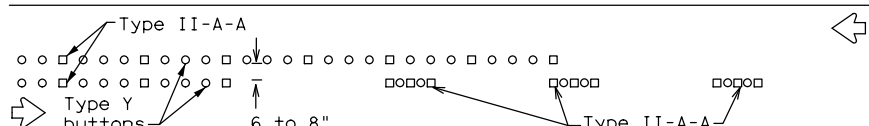


REFLECTORIZED PAVEMENT MARKINGS - PATTERN B

Pattern A is the TXDOT Standard, however Pattern B may be used if approved by the Engineer. Prefabricated markings may be substituted for reflectORIZED pavement markings.

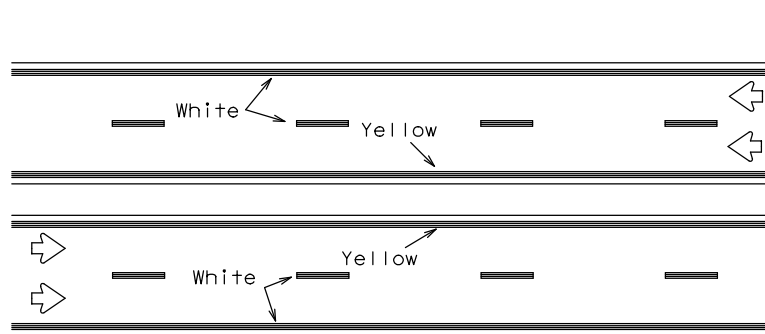


RAISED PAVEMENT MARKERS - PATTERN A



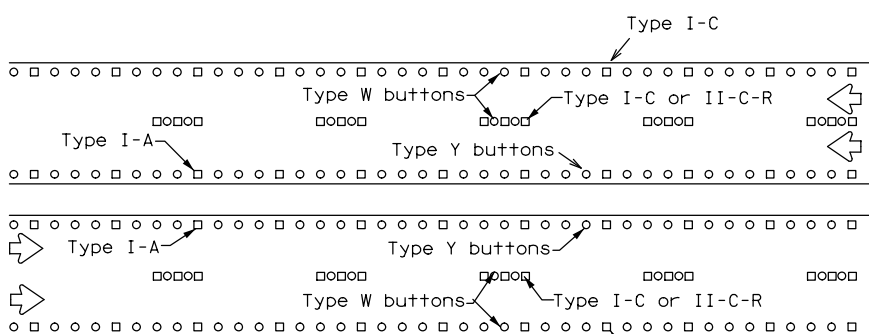
RAISED PAVEMENT MARKERS - PATTERN B

CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO-LANE, TWO-WAY HIGHWAYS



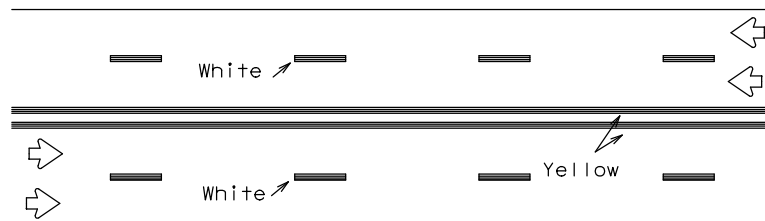
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectORIZED pavement markings.



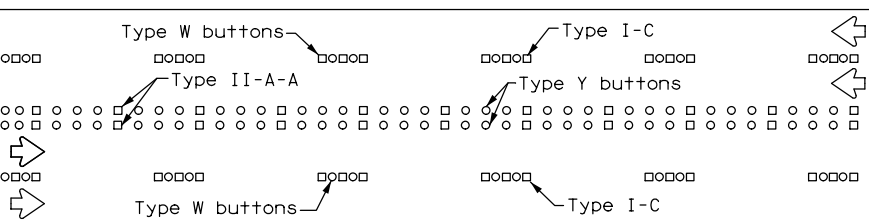
RAISED PAVEMENT MARKERS

EDGE & LANE LINES FOR DIVIDED HIGHWAY



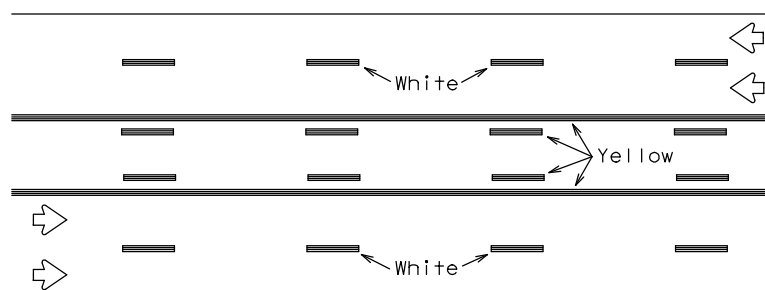
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectORIZED pavement markings.



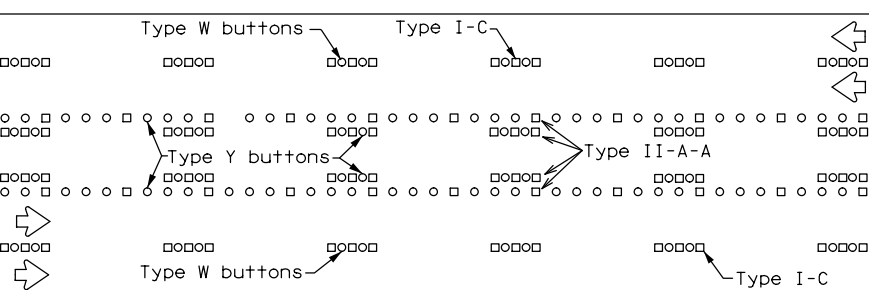
RAISED PAVEMENT MARKERS

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS

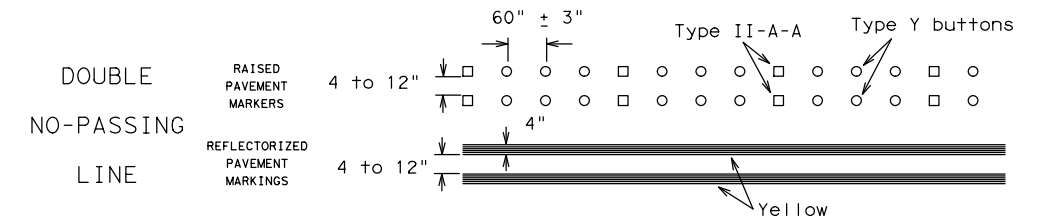
Prefabricated markings may be substituted for reflectORIZED pavement markings.



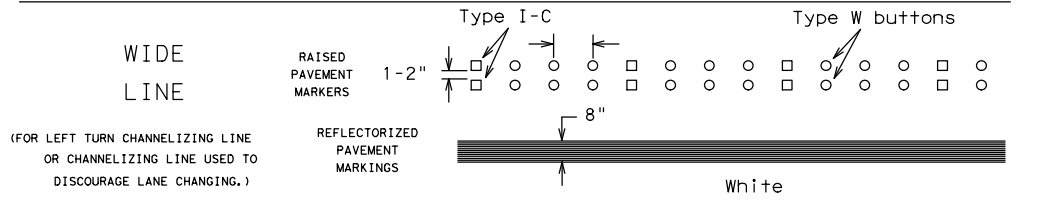
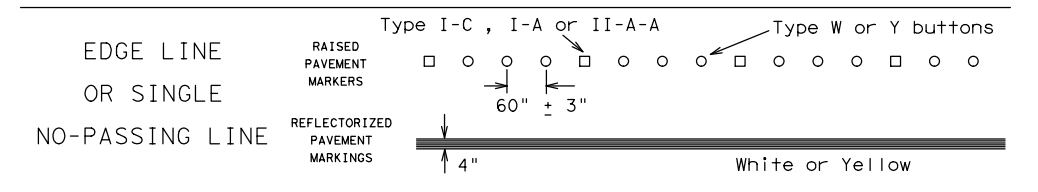
RAISED PAVEMENT MARKERS

TWO-WAY LEFT TURN LANE

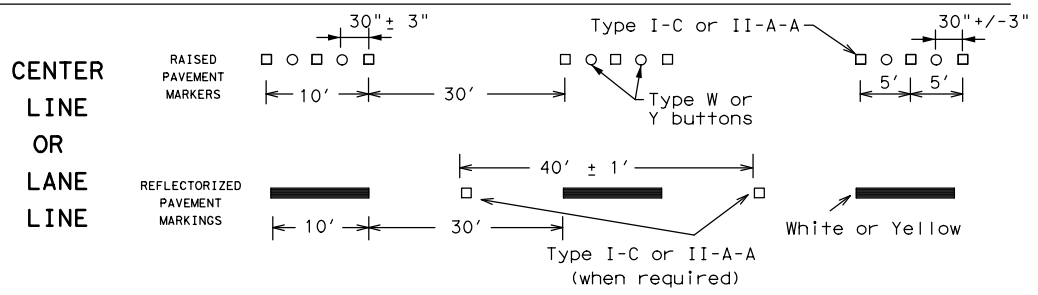
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS



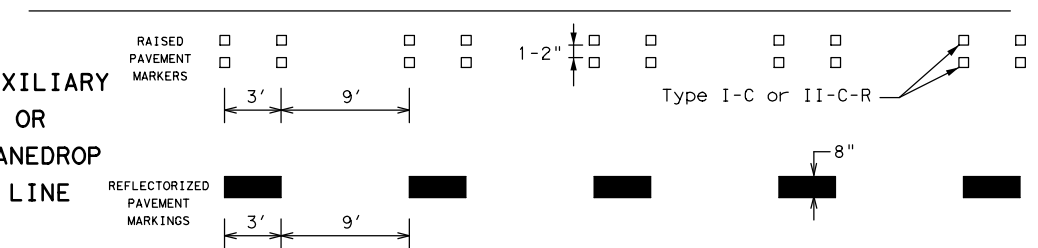
SOLID LINES



BROKEN LINES

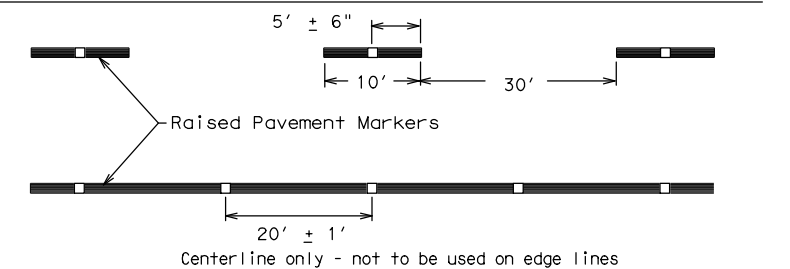


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

If raised pavement markers are used to supplement REMOVABLE markings, the markers shall be applied to the top of the tape at the approximate mid length of tape used for broken lines or at 20 foot spacing for solid lines. This allows an easier removal of raised pavement markers and tape.



SHEET 12 OF 12



BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

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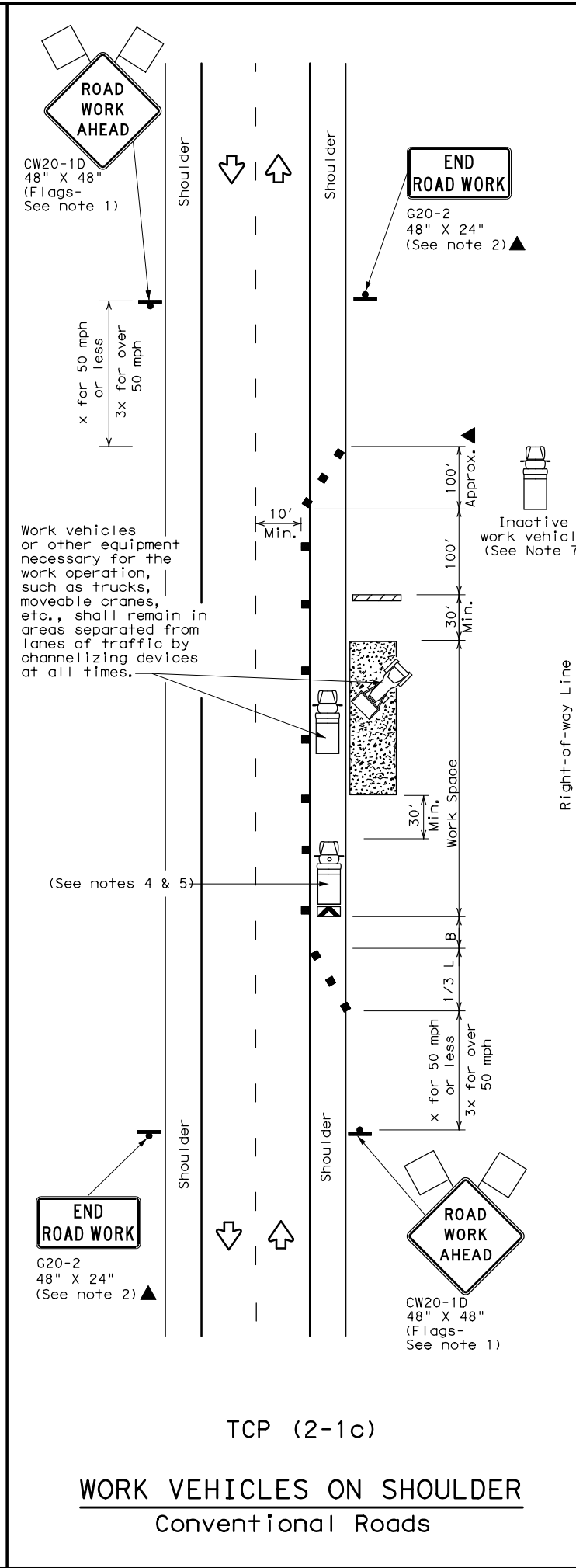
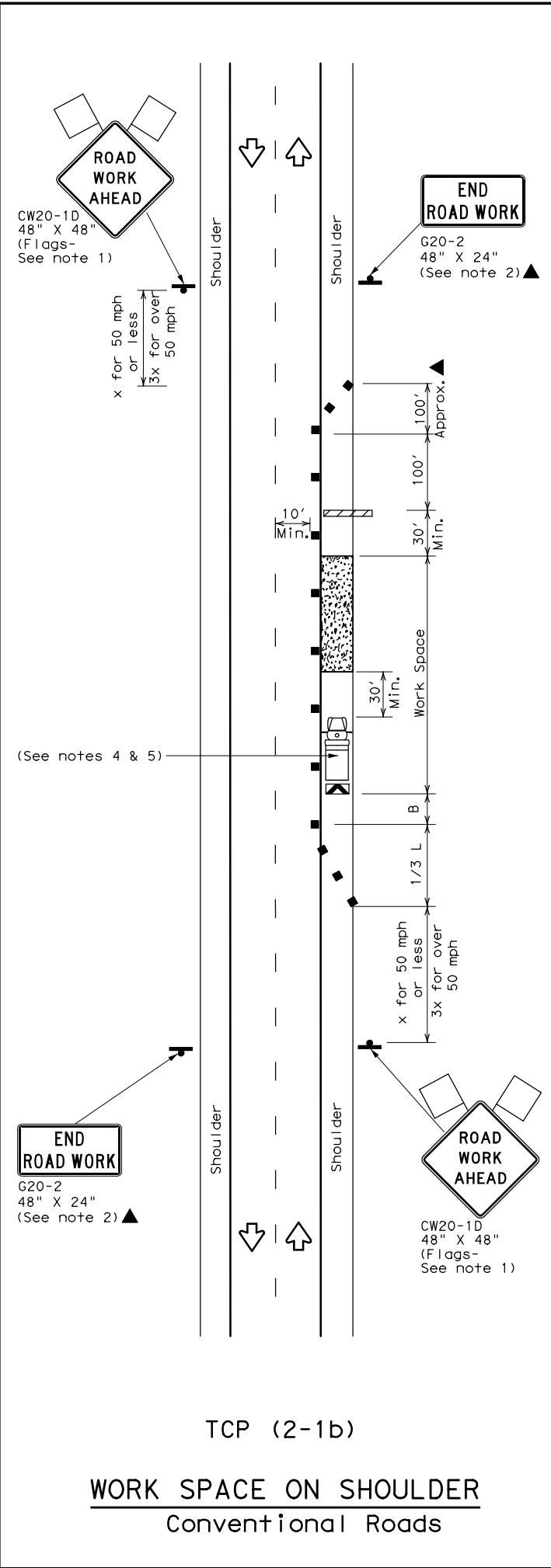
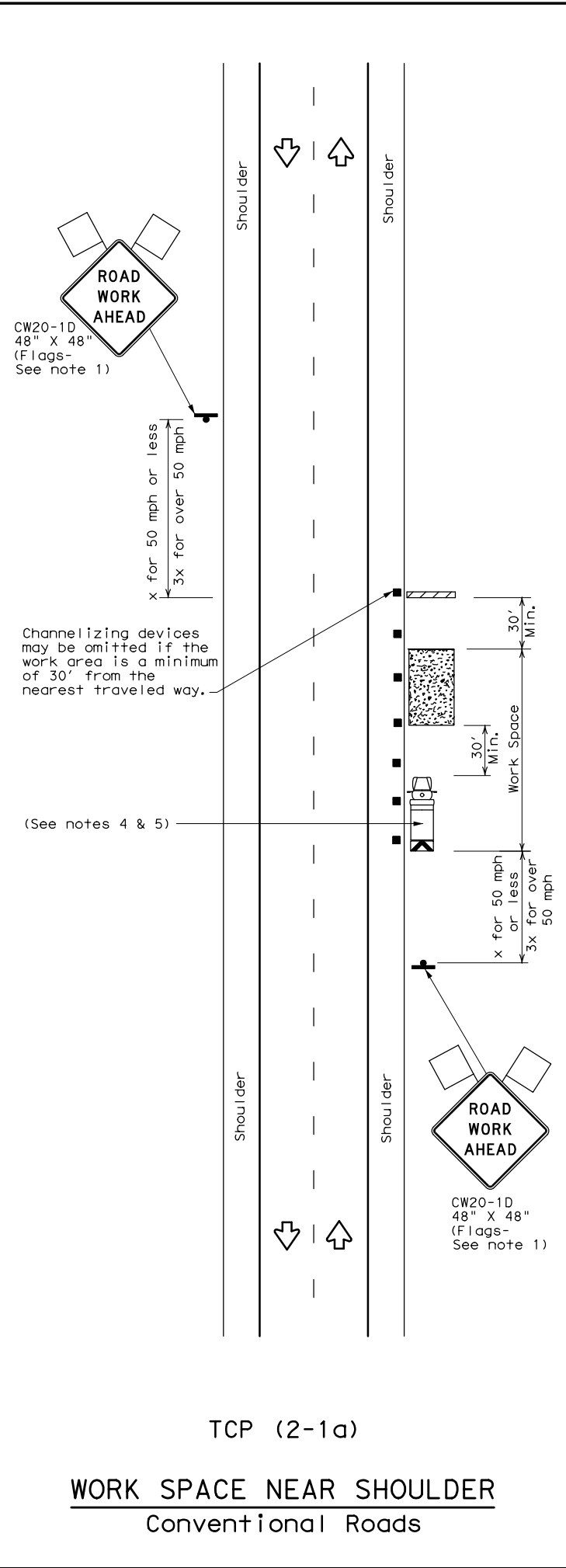
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Raised pavement markers used as standard pavement markings shall be from the approved products list and meet the requirements of Item 672 "RAISED PAVEMENT MARKERS."

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LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board		Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L = WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only
 ** Taper lengths have been rounded off.
 L=Length of Taper (FT) W=Width of Offset (FT) S=Posted Speed (MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓	✓	✓

- GENERAL NOTES**
- Flags attached to signs where shown, are REQUIRED.
 - All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated in the plans, or for routine maintenance work, when approved by the Engineer.
 - Stockpiled material should be placed a minimum of 30 feet from nearest traveled way.
 - Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
 - Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.
 - See TCP(5-1) for shoulder work on divided highways, expressways and freeways.
 - Inactive work vehicles or other equipment should be parked near the right-of-way line and not parked on the paved shoulder.
 - CW21-5 "SHOULDER WORK" signs may be used in place of CW20-1D "ROAD WORK AHEAD" signs for shoulder work on conventional roadways.

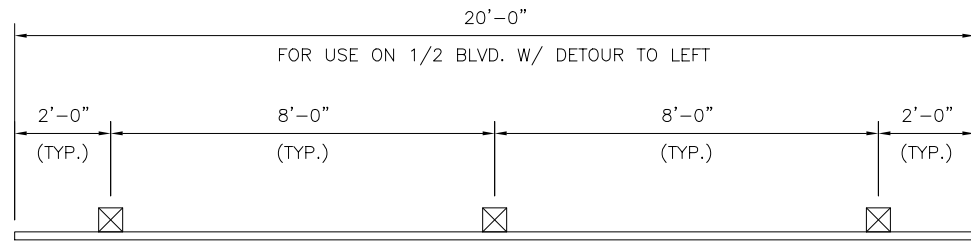


TRAFFIC CONTROL PLAN
CONVENTIONAL ROAD
SHOULDER WORK

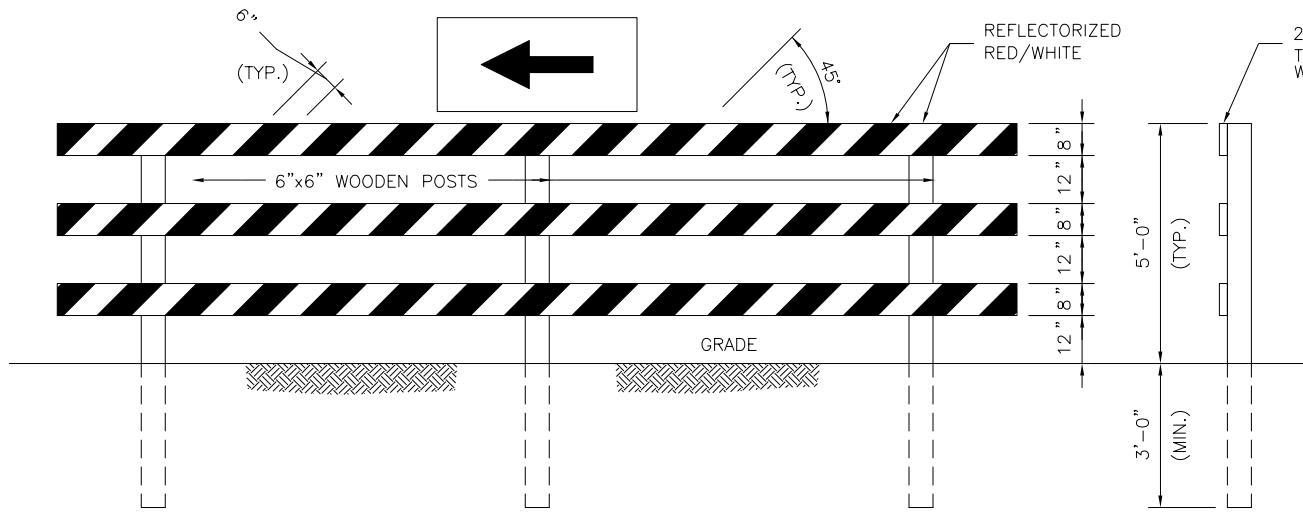
TCP (2-1) - 18

FILE: tcp2-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CON:	SECT:	JOB:	HIGHWAY:
REVISIONS				
2-94 4-98	-	-	-	-
8-95 2-12	-	-	-	-
1-97 2-18	-	-	-	55

J:\1704\1601\Fort Bend County Standards\Fort Bend County STD\DONE\FBC TYPE III BARRICADE DETAILS\TYPE III_BARRICADE_DETAILS.dwg

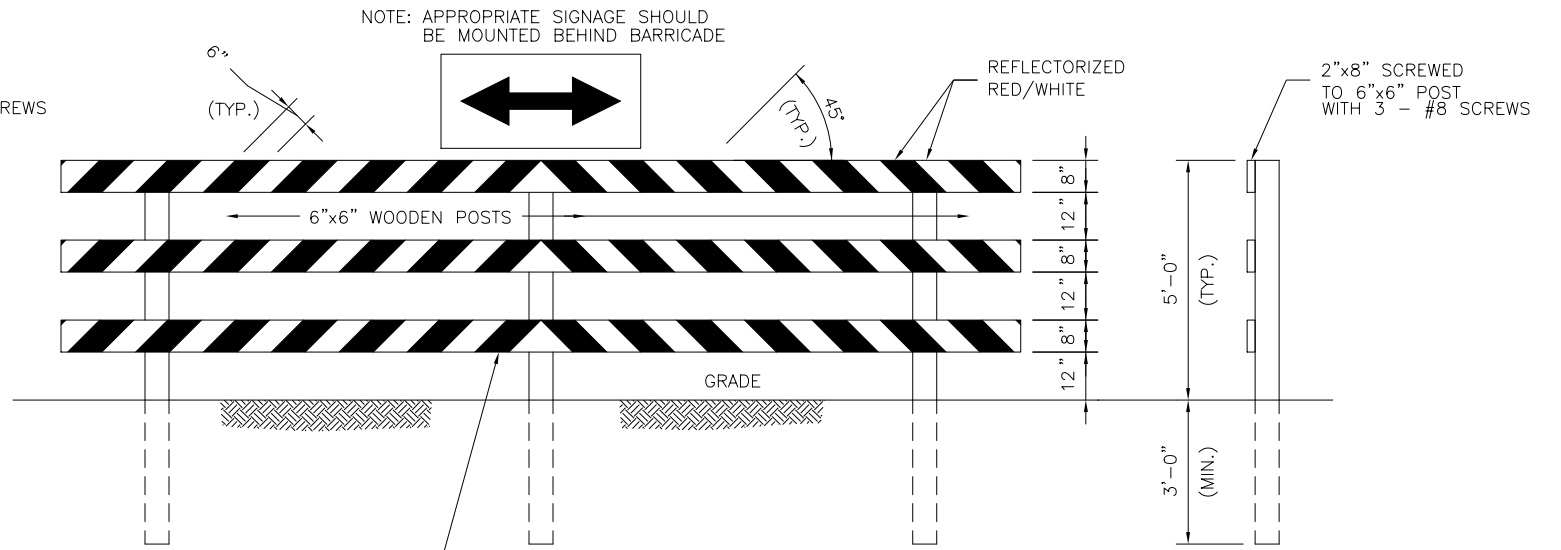


PLAN VIEW



FRONT VIEW
DETOUR ROUTE

SIDE VIEW

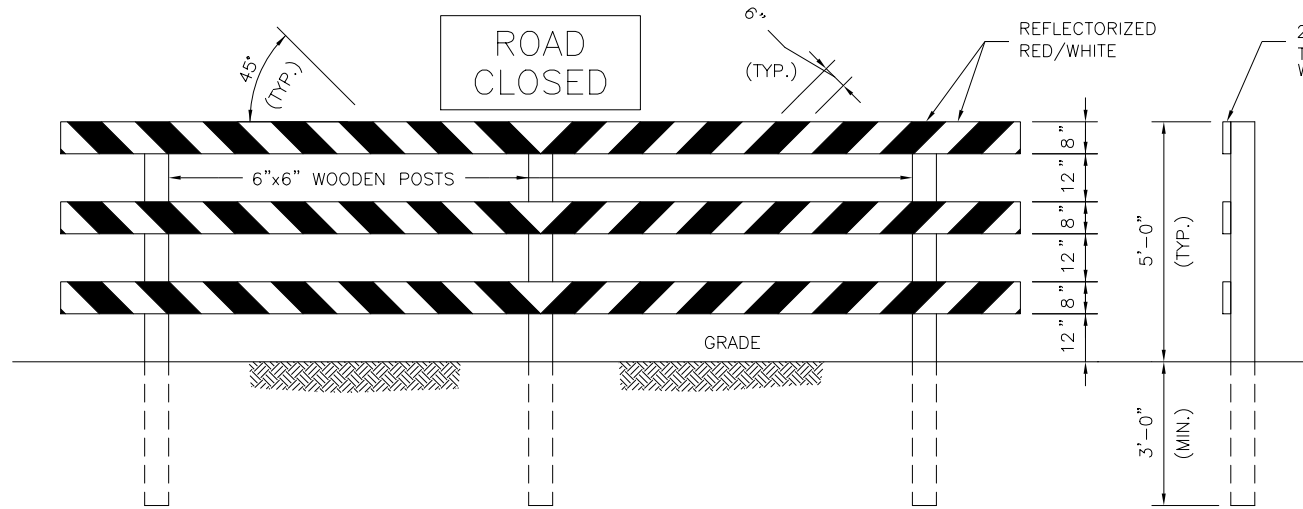


FRONT VIEW
T-INTERSECTION

SIDE VIEW

NOTE: APPROPRIATE SIGNAGE SHOULD BE MOUNTED BEHIND BARRICADE

STRIPING, COLOR, ANGLE AND DIRECTION IN ACCORDANCE WITH M.U.T.C.D.



FRONT VIEW
ROAD CLOSED - NO OUTLET

SIDE VIEW

APPLICATION: PERMANENT AND SEMI-PERMANENT CLOSURE OF ROADWAY OR ROADWAY TERMINATION

NO.	REVISIONS	DATE	NAME
△	ORIGINAL STANDARD ISSUED	3-1-22	RJS
△			
△			
△			

FORT BEND COUNTY
ENGINEERING DEPARTMENT

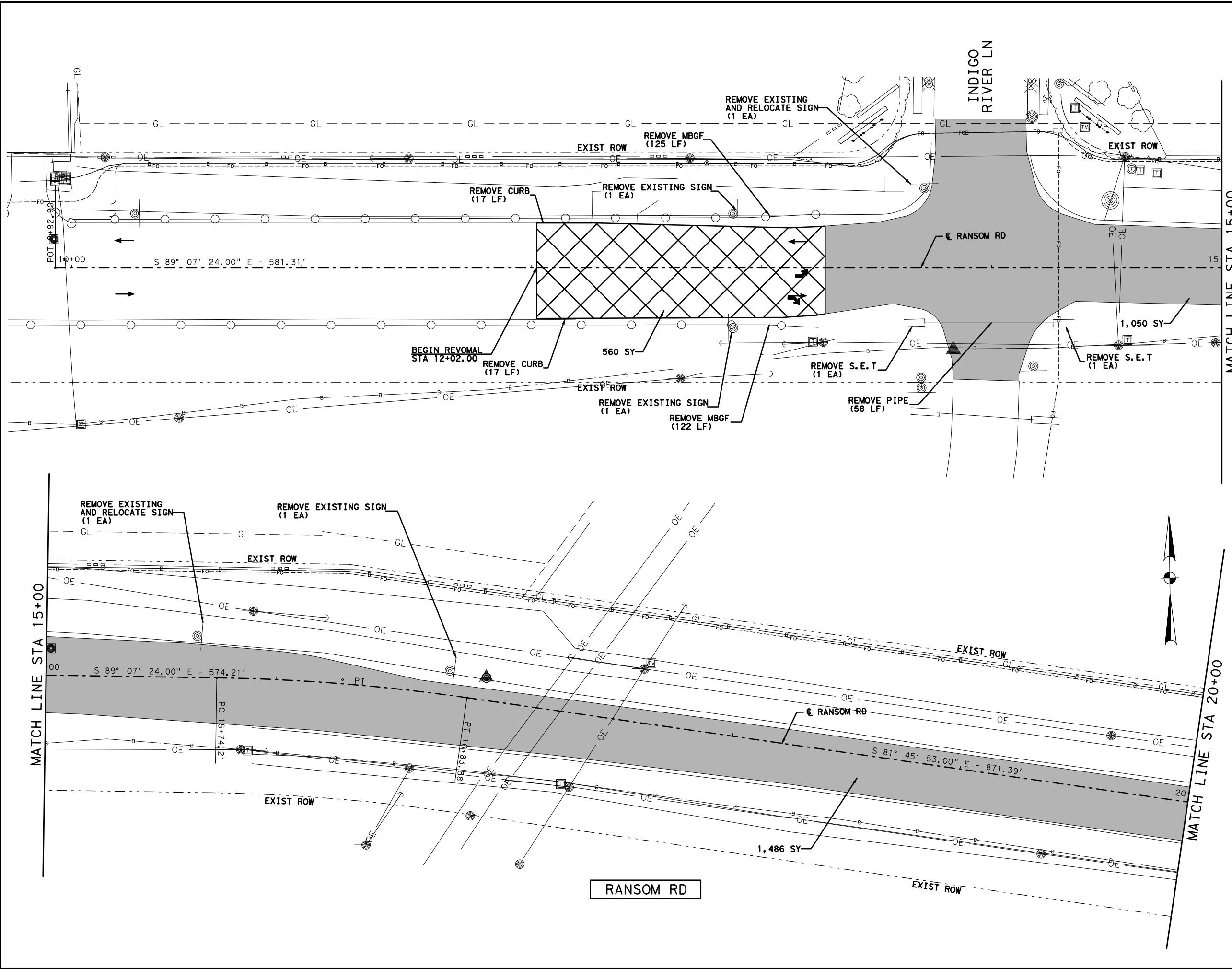


r.g.miller
engineers
16340 Park Ten Place
Suite 350
Houston, Texas 77084
(713) 461-9600
TEXAS FIRM REGISTRATION NO. F-487



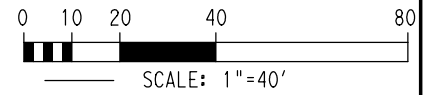
PROJECT TITLE: WIDENING AND RECONSTRUCTION OF RANSOM ROAD		
DRAWN BY: INIT	FROM SUGAR LAND CITY LIMIT TO SH 99	FBCED STANDARD
CK'D BY: INIT	SHEET DESCRIPTION: TYPE III BARRICADE DETAILS	51
SCALE: 1"=2'-0"		SHEET NO:
DATE: 3-1-22	APPROVED BY:	56 / 123

4:21:43 PM 5/4/2023
 T:\04399.000 FBC-01 Ransom Road\DGN\Ransom Rd*Removal*01.dgn



LEGEND

- CONC. PAVEMENT REMOVAL
- CONC. DRIVEWAY REMOVAL
- ASPHALT AND BASE REMOVAL (ALL DEPTHS)



No.	Date	Revisions	App.

**RANSOM RD
 REMOVAL PLAN**

EMILY LAYNE LANE
 130701
 LICENSED PROFESSIONAL ENGINEER
 5/4/2023
Emily L. Lane

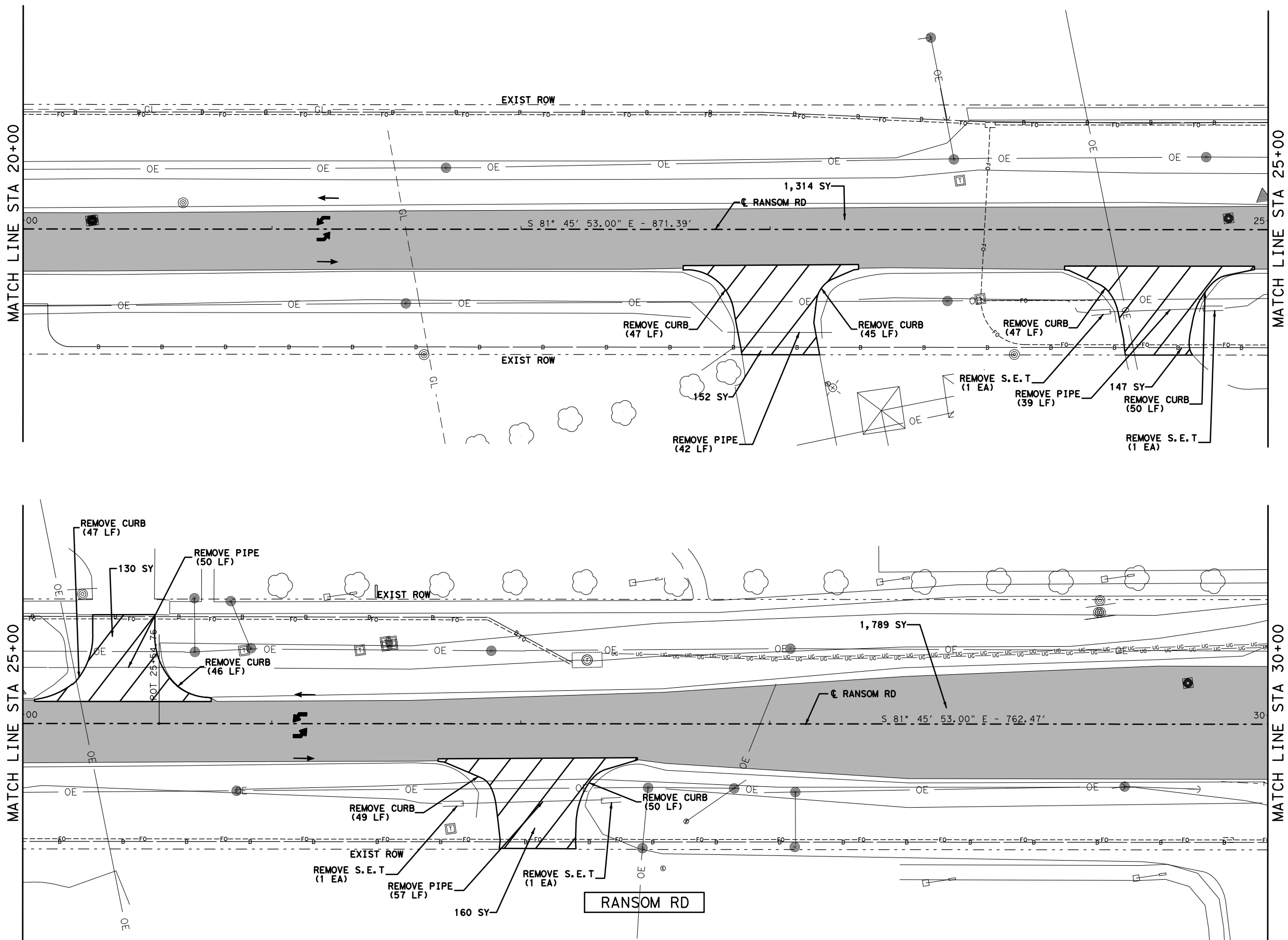
r.g.miller engineers
 16340 Park Ten Place
 Suite 350
 Houston, Texas 77084
 (713) 461-9600
 TEXAS FIRM REGISTRATION NO. F-487

Approved By: _____ Date: _____
 Job No. 4399

Submitted By: R.G. MILLER
 SCALE: 1"=40' (H), 1"=4' (V)
 DATE: 5/4/2023
 SURV BY: MILLER SURVEY
 F. B. No.: 17102

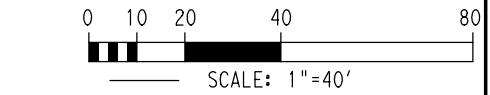
DESIGNED BY: E.L.L.
 DRAWN BY: C.G.
 SHEET 1 OF 3 SHEETS
 DWG. NO. 58

4:21:45 PM 5/4/2023
 T:\04399.000 FBC-01 Ransom Road\DGN\Ransom Rd*Removal*02.dgn



LEGEND

- CONC. PAVEMENT REMOVAL
- CONC. DRIVEWAY REMOVAL
- ASPHALT AND BASE REMOVAL (ALL DEPTHS)



No.	Date	Revisions	App.

**RANSOM RD
 REMOVAL PLAN**

Emily Layne Lane
 5/4/2023

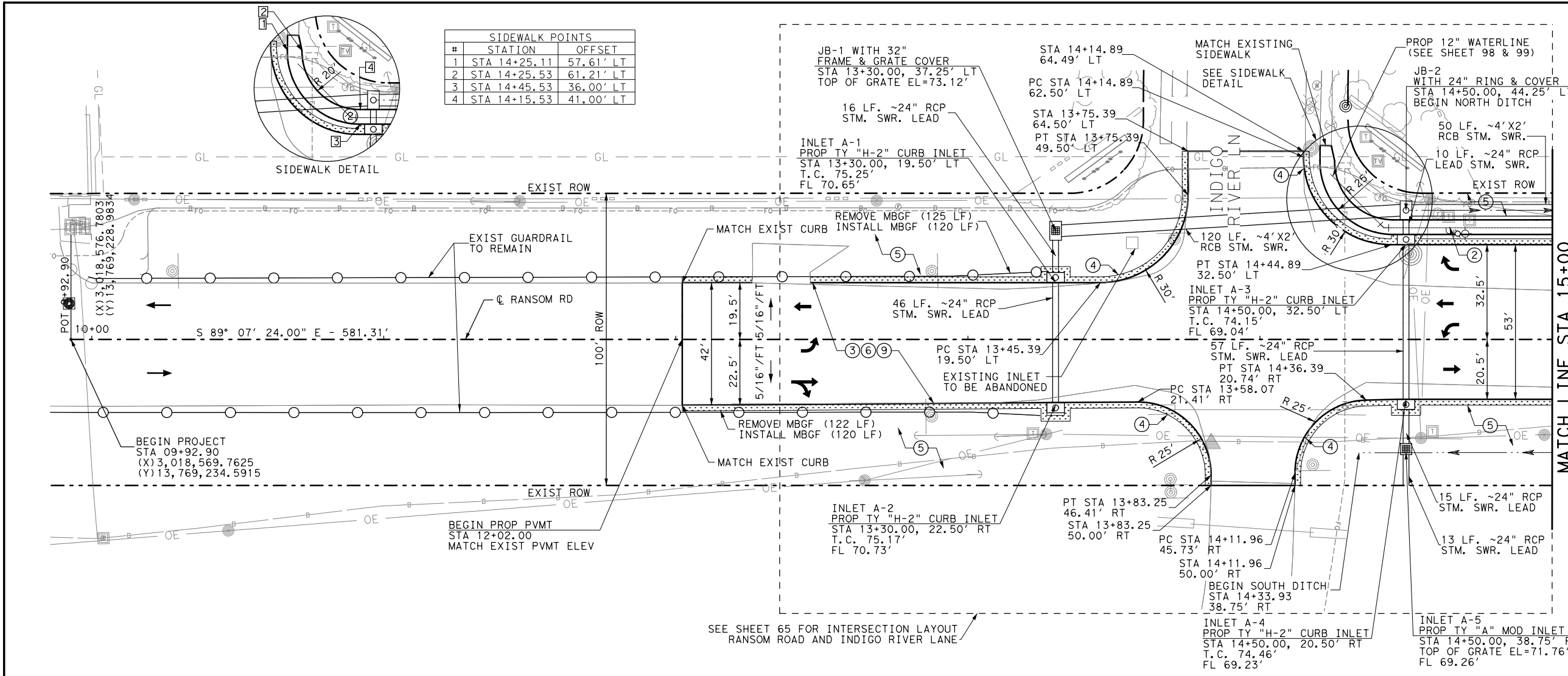
r.g.miller engineers
 16340 Park Ten Place
 Suite 350
 Houston, Texas 77084
 (713) 461-9600
 TEXAS FIRM REGISTRATION NO. F-487

Approved By: _____ Date: _____
 Job No. 4399

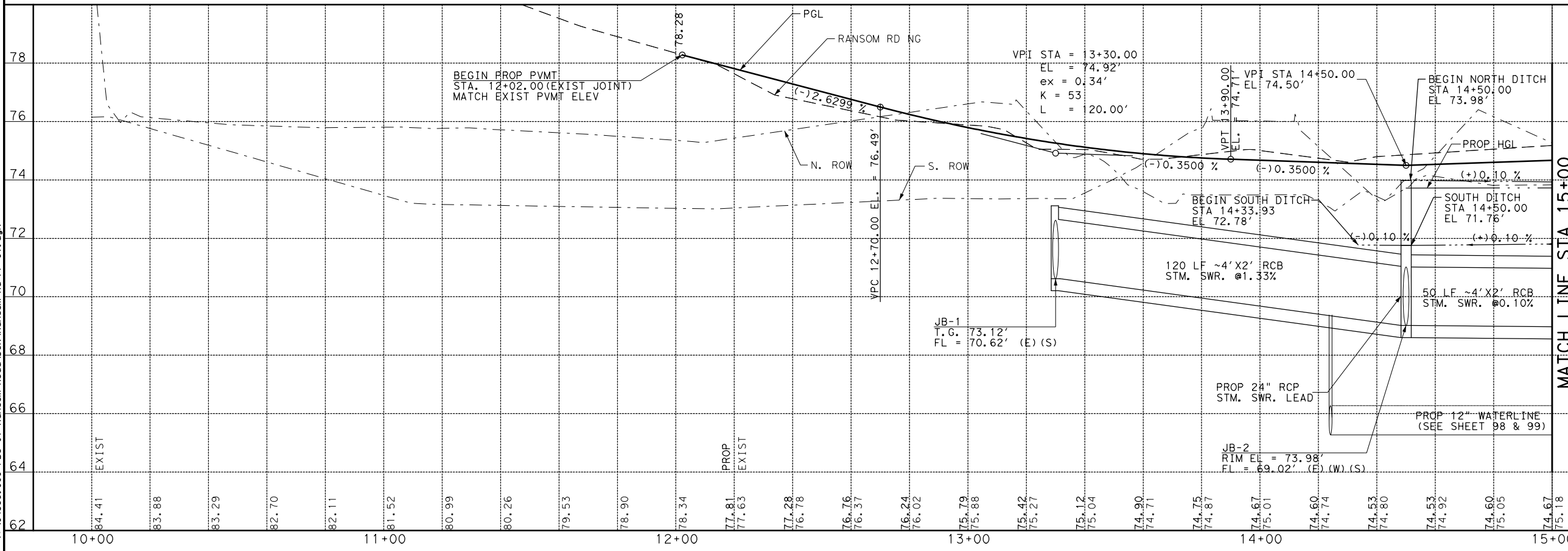
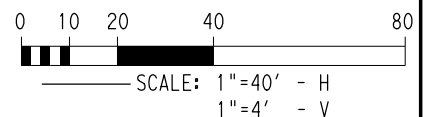
Submitted By: R.G. MILLER
 SCALE: 1"=40' (H), 1"=4' (V)
 DATE: 5/4/2023
 SURV BY: MILLER SURVEY
 F. B. No.: 17102

Designed By: E.L.L.
 Drawn By: C.G.
 SHEET 2 OF 3 SHEETS
 DWG. NO. 59

10:44:34 AM 7/10/2023
T:\04399.000 FBC-01 Ransom Road\DGN\Ransom Rd\PP#01.dgn

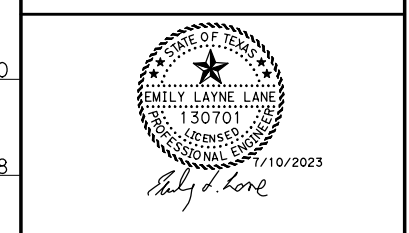


- LEGEND**
- ① RIPRAP (CONC) (6IN)
 - ② 5' CONC SIDEWALK (4" THICK)
 - ③ 6" CURB (TY II)
 - ④ BLOCK SODDING
 - ⑤ HYDRO-MULCH SEEDING
 - ⑥ 8" CONCRETE PVMT
 - ⑦ 1" ASPHALT STABILIZED BASE
 - ⑧ 6" CEMENT TREATED BASE
 - ⑨ 8" LIME TREATED SUBGRADE
 - ⑩ 6" LIME TREATED SUBGRADE
 - (X) DRIVEWAY NUMBER
- NOTES:**
- SEE PROJECT LAYOUT FOR ALL BASELINE AND CURVE DATA.
 - FOR SODDING LIMITS SEE TYPICAL SECTIONS.
 - ALL DIMENSIONS ARE TO BACK OF CURB UNLESS NOTED OTHERWISE.
 - IF RELIABLE REINFORCEMENT IS PROTRUDING, THEN CONTRACTOR SHALL DOWEL INTO EXISTING CONCRETE PAVEMENT, OTHERWISE SAWCUT 2" OF EXISTING EDGE OF PAVEMENT TO EXPOSE STEEL.
 - STORM SEWER LENGTHS SHOW ARE FROM CENTERLINE TO CENTERLINE WHICH DIFFER FROM PAY LENGTHS.



No.	Date	Revisions	App.

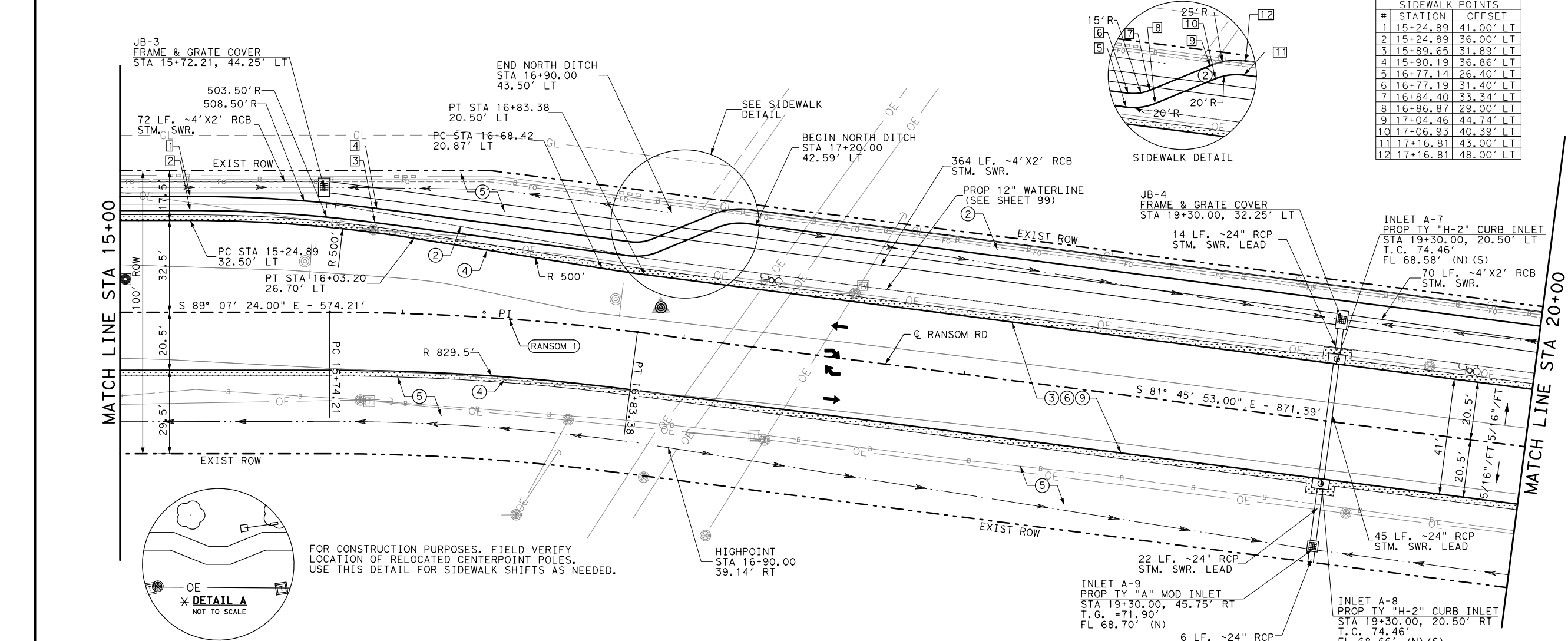
**RANSOM RD
PLAN & PROFILE
BEGIN TO STA 15+00**



r.g. miller engineers
16340 Park Ten Place, Suite 350, Houston, Texas 77084, (713) 461-9600, TEXAS FIRM REGISTRATION NO. F-487

Approved By: _____ Job No. 4399

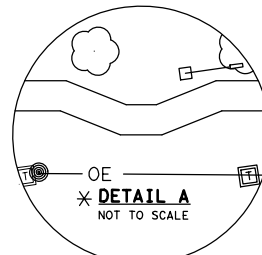
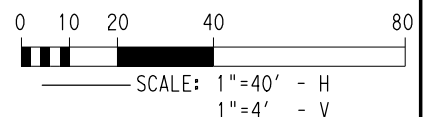
DATE: 7/10/2023 SHEET 1 OF 5 SHEETS
SURV BY: MILLER SURVEY F. B. NO.: 17102 DWG. NO. 61



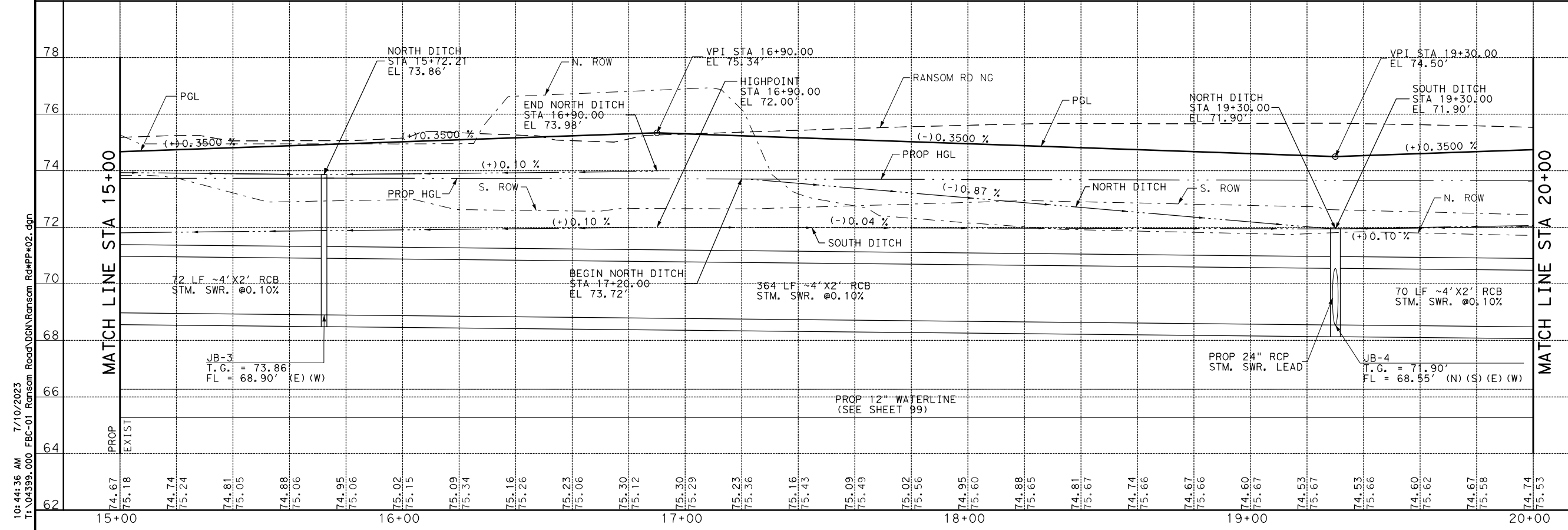
#	STATION	OFFSET
1	15+24.89	41.00' LT
2	15+24.89	36.00' LT
3	15+89.65	31.89' LT
4	15+90.19	36.86' LT
5	16+77.14	26.40' LT
6	16+77.19	31.40' LT
7	16+84.40	33.34' LT
8	16+86.87	29.00' LT
9	17+04.46	44.74' LT
10	17+06.93	40.39' LT
11	17+16.81	43.00' LT
12	17+16.81	48.00' LT

- LEGEND**
- ① RIPRAP (CONC) (6IN)
 - ② 5' CONC SIDEWALK (4" THICK)
 - ③ 6" CURB (TY II)
 - ④ BLOCK SODDING
 - ⑤ HYDRO-MULCH SEEDING
 - ⑥ 8" CONCRETE PVMT
 - ⑦ 1" ASPHALT STABILIZED BASE
 - ⑧ 6" CEMENT TREATED BASE
 - ⑨ 8" LIME TREATED SUBGRADE
 - ⑩ 6" LIME TREATED SUBGRADE
 - (X) DRIVEWAY NUMBER
- ← DIRECTION OF TRAFFIC

- NOTES:**
- SEE PROJECT LAYOUT FOR ALL BASELINE AND CURVE DATA.
 - FOR SODDING LIMITS SEE TYPICAL SECTIONS.
 - ALL DIMENSIONS ARE TO BACK OF CURB UNLESS NOTED OTHERWISE.
 - IF RELIABLE REINFORCEMENT IS PROTRUDING, THEN CONTRACTOR SHALL DOWEL INTO EXISTING CONCRETE PAVEMENT, OTHERWISE SAWCUT 2" OF EXISTING EDGE OF PAVEMENT TO EXPOSE STEEL.
 - STORM SEWER LENGTHS SHOW ARE FROM CENTERLINE TO CENTERLINE WHICH DIFFER FROM PAY LENGTHS.

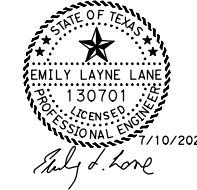


FOR CONSTRUCTION PURPOSES, FIELD VERIFY LOCATION OF RELOCATED CENTERPOINT POLES. USE THIS DETAIL FOR SIDEWALK SHIFTS AS NEEDED.



No.	Date	Revisions	App.

**RANSOM RD
PLAN & PROFILE
STA 15+00 TO STA 20+00**



r.g. miller engineers
16340 Park Ten Place, Suite 350, Houston, Texas 77084, (713) 461-9600, TEXAS FIRM REGISTRATION NO. F-487

Approved By: _____ Job No. 4399

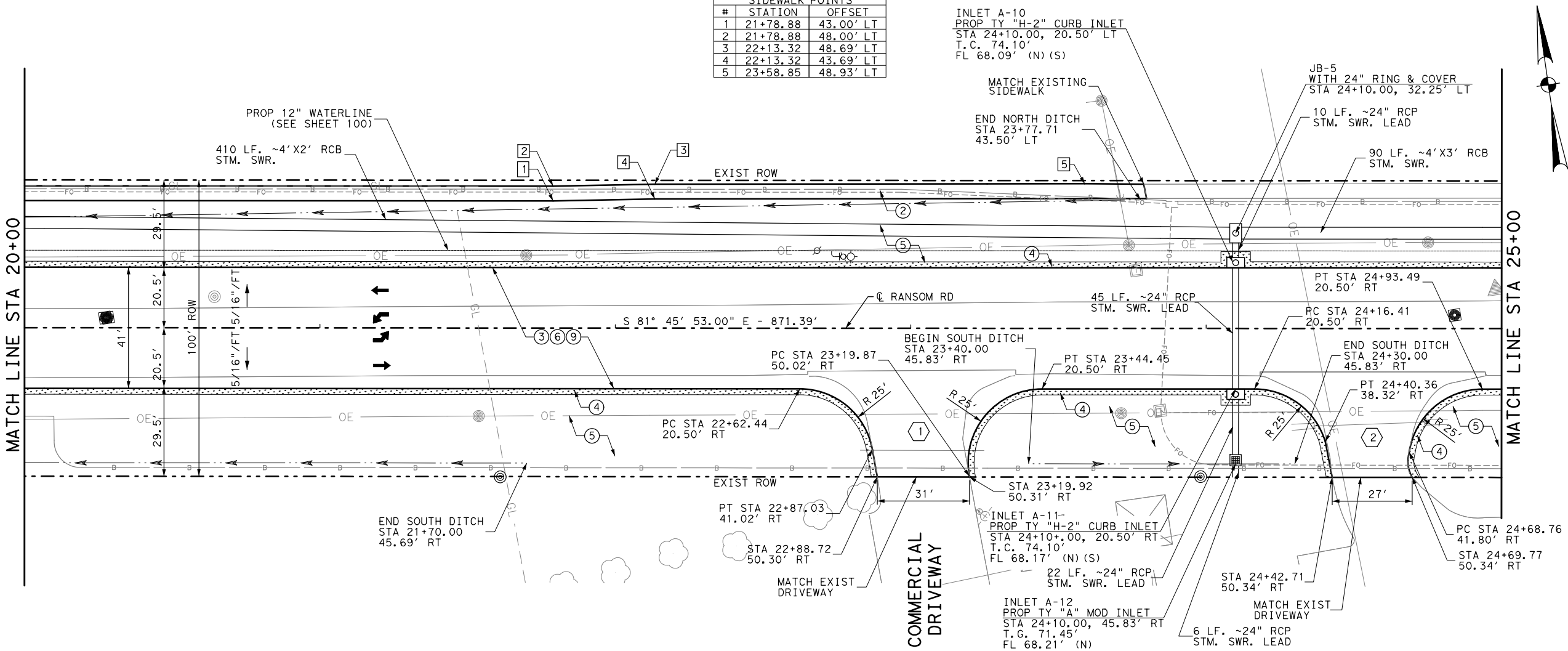
DATE: 7/10/2023 SHEET 2 OF 5 SHEETS
 SURV BY: MILLER SURVEY F. B. NO.: 17102 DWG. NO. 62

10:44:36 AM 7/10/2023 T:\04399.000 FBC-01 Ransom Road\DGN\Ransom Rd\PP#02.dgn

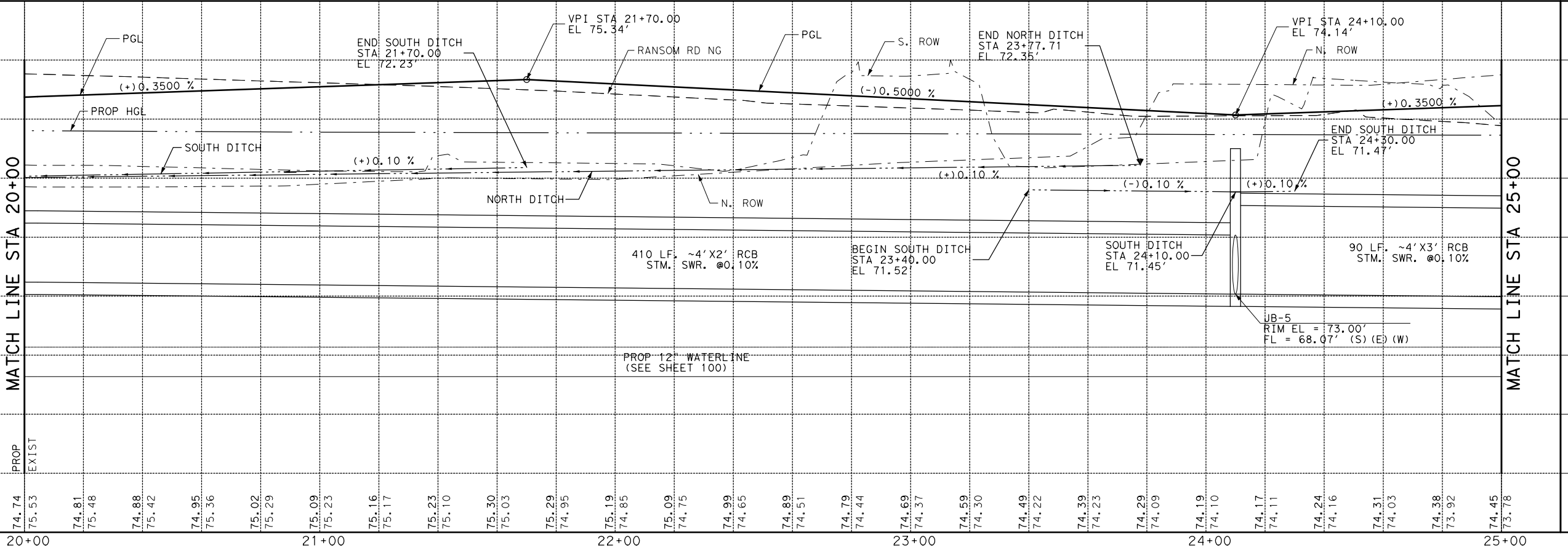
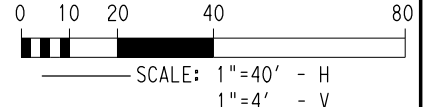
SIDEWALK POINTS		
#	STATION	OFFSET
1	21+78.88	43.00' LT
2	21+78.88	48.00' LT
3	22+13.32	48.69' LT
4	22+13.32	43.69' LT
5	23+58.85	48.93' LT

MATCH LINE STA 20+00

MATCH LINE STA 25+00



- LEGEND**
- ① RIPRAP (CONC) (6IN)
 - ② 5' CONC SIDEWALK (4" THICK)
 - ③ 6" CURB (TY II)
 - ④ BLOCK SODDING
 - ⑤ HYDRO-MULCH SEEDING
 - ⑥ 8" CONCRETE PVMT
 - ⑦ 1" ASPHALT STABILIZED BASE
 - ⑧ 6" CEMENT TREATED BASE
 - ⑨ 8" LIME TREATED SUBGRADE
 - ⑩ 6" LIME TREATED SUBGRADE
 - (X) DRIVEWAY NUMBER
- NOTES:**
- SEE PROJECT LAYOUT FOR ALL BASELINE AND CURVE DATA.
 - FOR SODDING LIMITS SEE TYPICAL SECTIONS.
 - ALL DIMENSIONS ARE TO BACK OF CURB UNLESS NOTED OTHERWISE.
 - IF RELIABLE REINFORCEMENT IS PROTRUDING, THEN CONTRACTOR SHALL DOWEL INTO EXISTING CONCRETE PAVEMENT, OTHERWISE SAWCUT 2" OF EXISTING EDGE OF PAVEMENT TO EXPOSE STEEL.
 - STORM SEWER LENGTHS SHOW ARE FROM CENTERLINE TO CENTERLINE WHICH DIFFER FROM PAY LENGTHS.



No.	Date	Revisions	App.

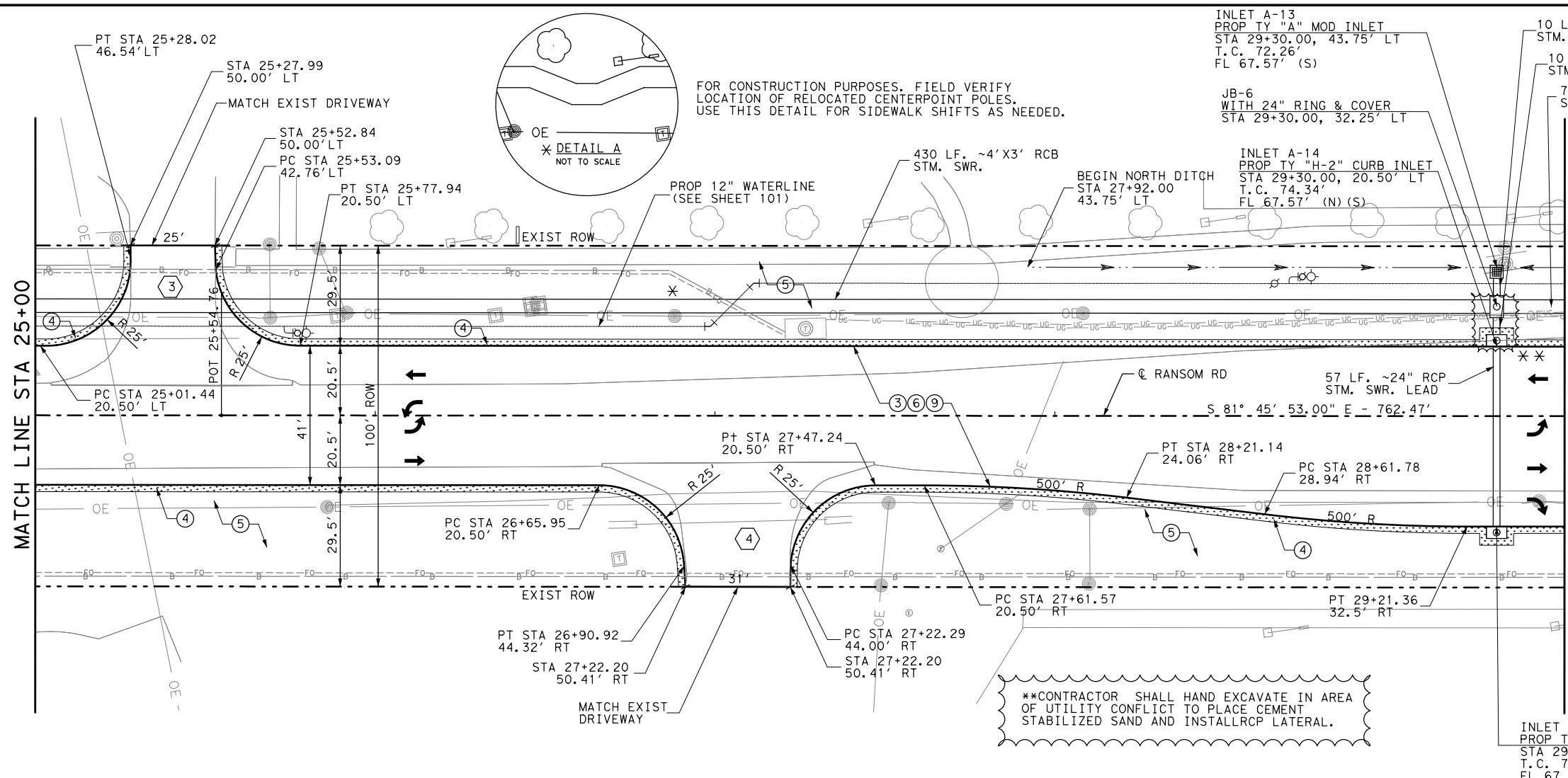
**RANSOM RD
PLAN & PROFILE
STA 20+00 TO STA 25+00**

Approved By: _____ Date: _____
 R.G. Miller Job No. 4399

SUBMITTED BY: R.G. MILLER SCALE: 1"=40' (H), 1"=4' (V)
 SURV BY: MILLER SURVEY F. B. NO.: 17102
 DESIGNED BY: E.L.L. DRAWN BY: C.G.
 SHEET 3 OF 5 SHEETS
 DATE: 7/10/2023
 DWG. NO. 63

10:44:38 AM 7/10/2023 T:\04399.000 FBC-01 Ransom Road\DGN\Ransom Rd\PP*03.dgn

10:44:40 AM 7/10/2023
T:\04399.000 FBC-01 Ransom Road\DGN\Ransom Rd\PP#04.dgn



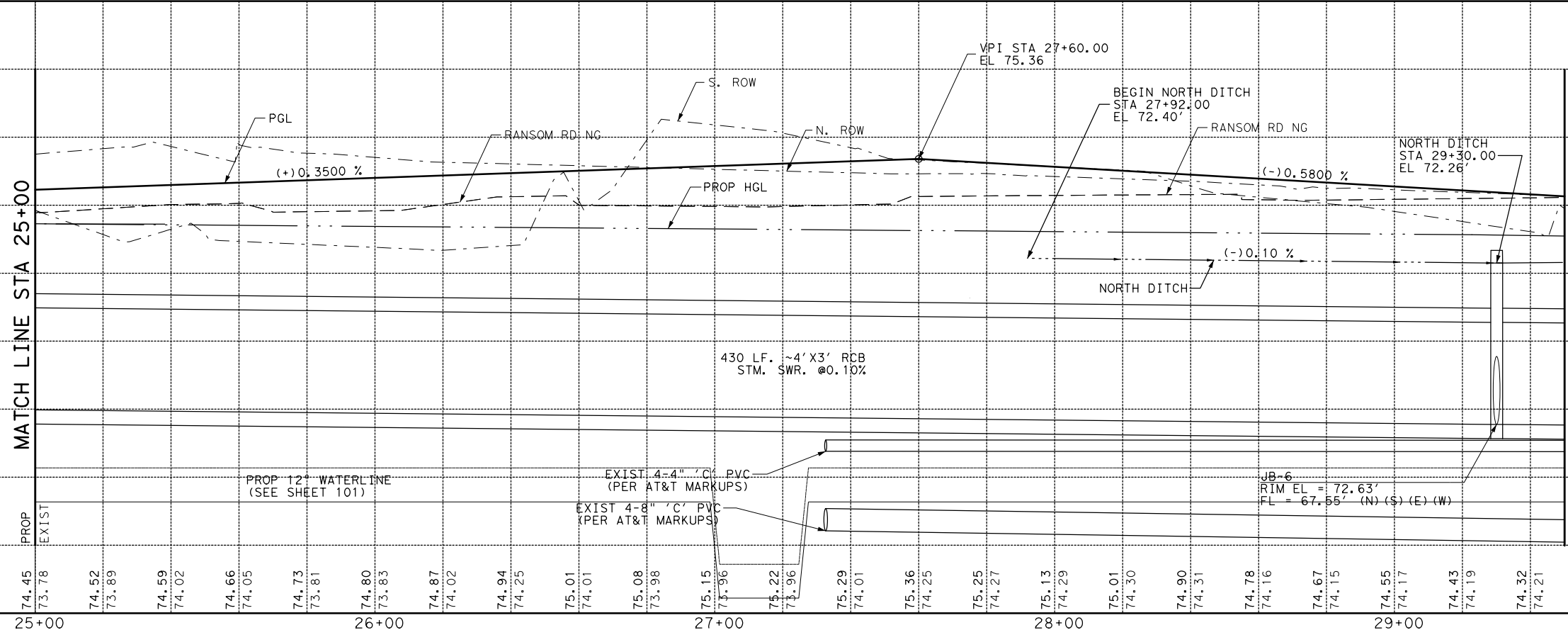
LEGEND

- ① RIPRAP (CONC) (6IN)
- ② 5' CONC SIDEWALK (4" THICK)
- ③ 6" CURB (TY II)
- ④ BLOCK SODDING
- ⑤ HYDRO-MULCH SEEDING
- ⑥ 8" CONCRETE PVMT
- ⑦ 1" ASPHALT STABILIZED BASE
- ⑧ 6" CEMENT TREATED BASE
- ⑨ 8" LIME TREATED SUBGRADE
- ⑩ 6" LIME TREATED SUBGRADE
- (X) DRIVEWAY NUMBER

NOTES:

1. SEE PROJECT LAYOUT FOR ALL BASELINE AND CURVE DATA.
2. FOR SODDING LIMITS SEE TYPICAL SECTIONS.
3. ALL DIMENSIONS ARE TO BACK OF CURB UNLESS NOTED OTHERWISE.
4. IF RELIABLE REINFORCEMENT IS PROTRUDING, THEN CONTRACTOR SHALL DOWEL INTO EXISTING CONCRETE PAVEMENT, OTHERWISE SAWCUT 2" OF EXISTING EDGE OF PAVEMENT TO EXPOSE STEEL.
5. STORM SEWER LENGTHS SHOW ARE FROM CENTERLINE TO CENTERLINE WHICH DIFFER FROM PAY LENGTHS.

SCALE: 1"=40' - H
1"=4' - V

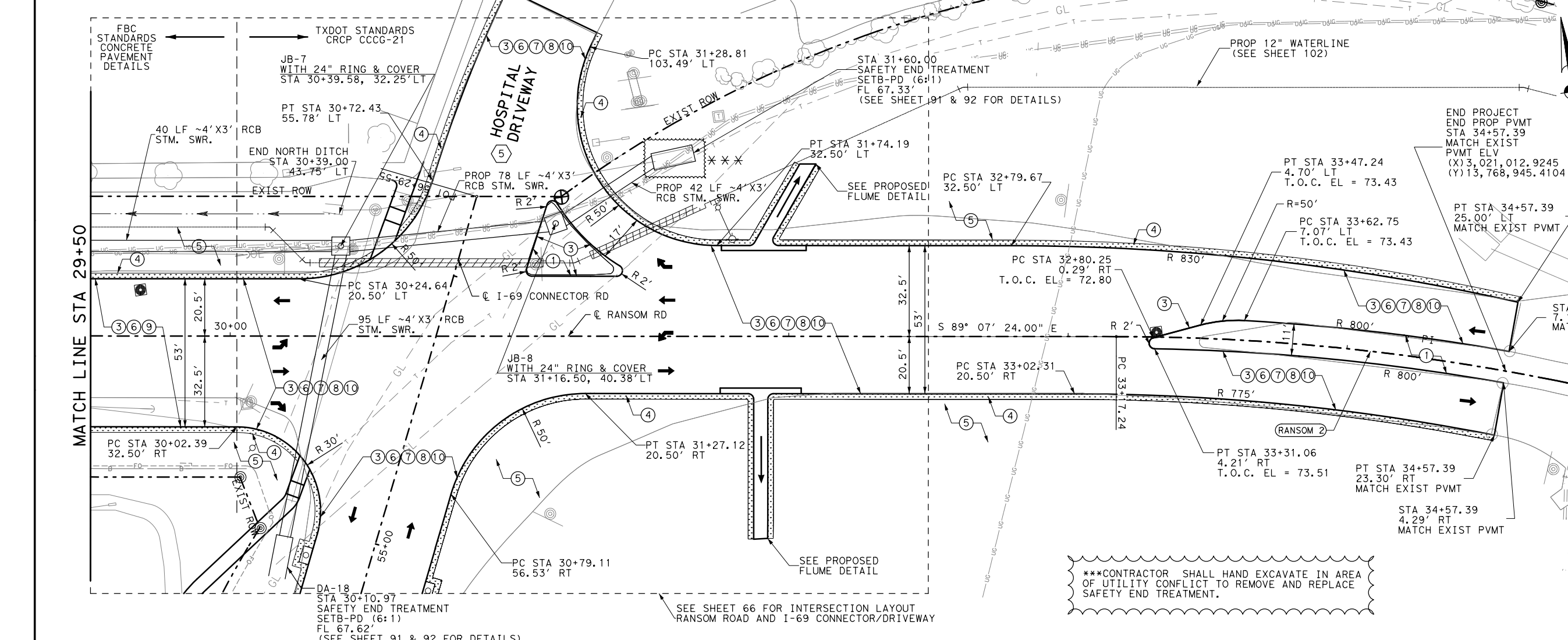


**RANSOM RD
PLAN & PROFILE
STA 25+00 TO STA 30+00**

Approved By: _____ Date: _____

DESIGNED BY: E.L.L.
DRAWN BY: C.G.

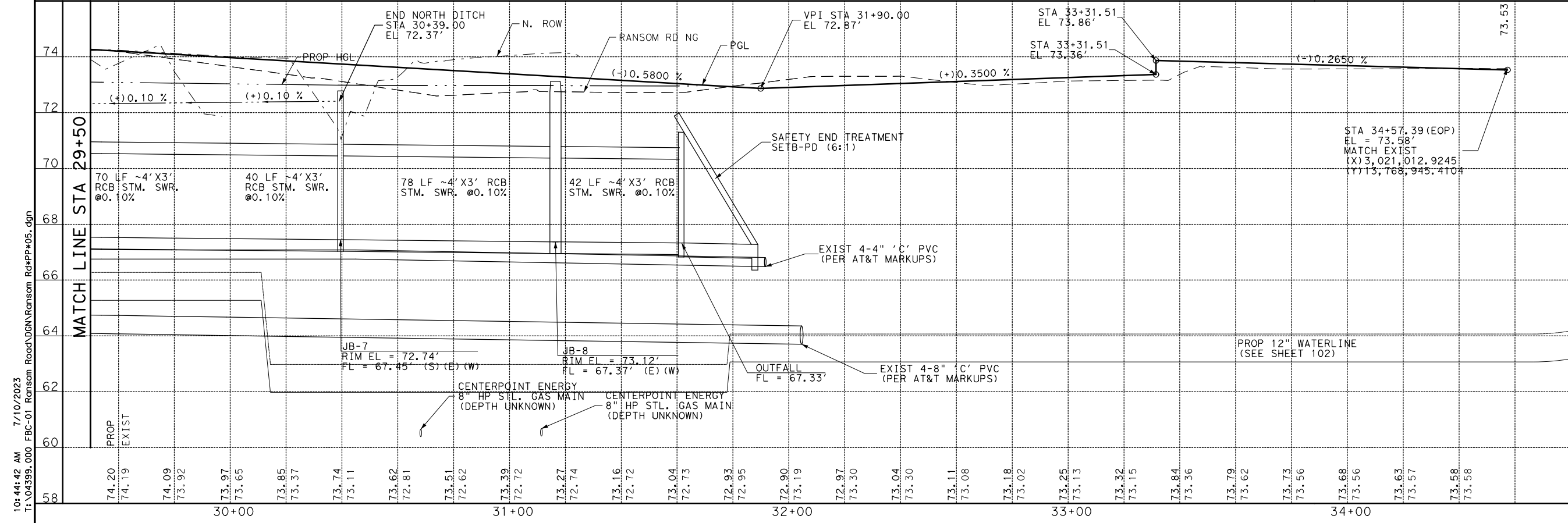
SHEET 4 OF 5 SHEETS
DWG. NO. 64



- LEGEND**
- ① RIPRAP (CONC) (6IN)
 - ② 5' CONC SIDEWALK (4" THICK)
 - ③ 6" CURB (TY II)
 - ④ BLOCK SODDING
 - ⑤ HYDRO-MULCH SEEDING
 - ⑥ 8" CONCRETE PVMT
 - ⑦ 1" ASPHALT STABILIZED BASE
 - ⑧ 6" CEMENT TREATED BASE
 - ⑨ 8" LIME TREATED SUBGRADE
 - ⑩ 6" LIME TREATED SUBGRADE
 - (X) DRIVEWAY NUMBER
 - ← DIRECTION OF TRAFFIC

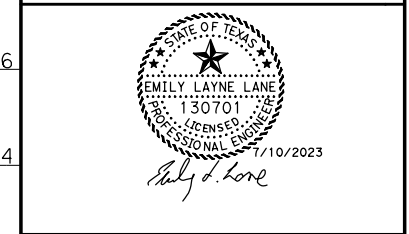
- NOTES:**
1. SEE PROJECT LAYOUT FOR ALL BASELINE AND CURVE DATA.
 2. FOR SODDING LIMITS SEE TYPICAL SECTIONS.
 3. ALL DIMENSIONS ARE TO BACK OF CURB UNLESS NOTED OTHERWISE.
 4. IF RELIABLE REINFORCEMENT IS PROTRUDING, THEN CONTRACTOR SHALL DOWEL INTO EXISTING CONCRETE PAVEMENT, OTHERWISE, SAWCUT 2' OF EXISTING EDGE OF PAVEMENT TO EXPOSE STEEL.
 5. STORM SEWER LENGTHS SHOW ARE FROM CENTERLINE TO CENTERLINE WHICH DIFFER FROM PAY LENGTHS.
- 0 10 20 40 80
- SCALE: 1"=40' - H
1"=4' - V

***CONTRACTOR SHALL HAND EXCAVATE IN AREA OF UTILITY CONFLICT TO REMOVE AND REPLACE SAFETY END TREATMENT.



No.	Date	Revisions	App.

**RANSOM RD
PLAN & PROFILE
STA 30+00 TO END**



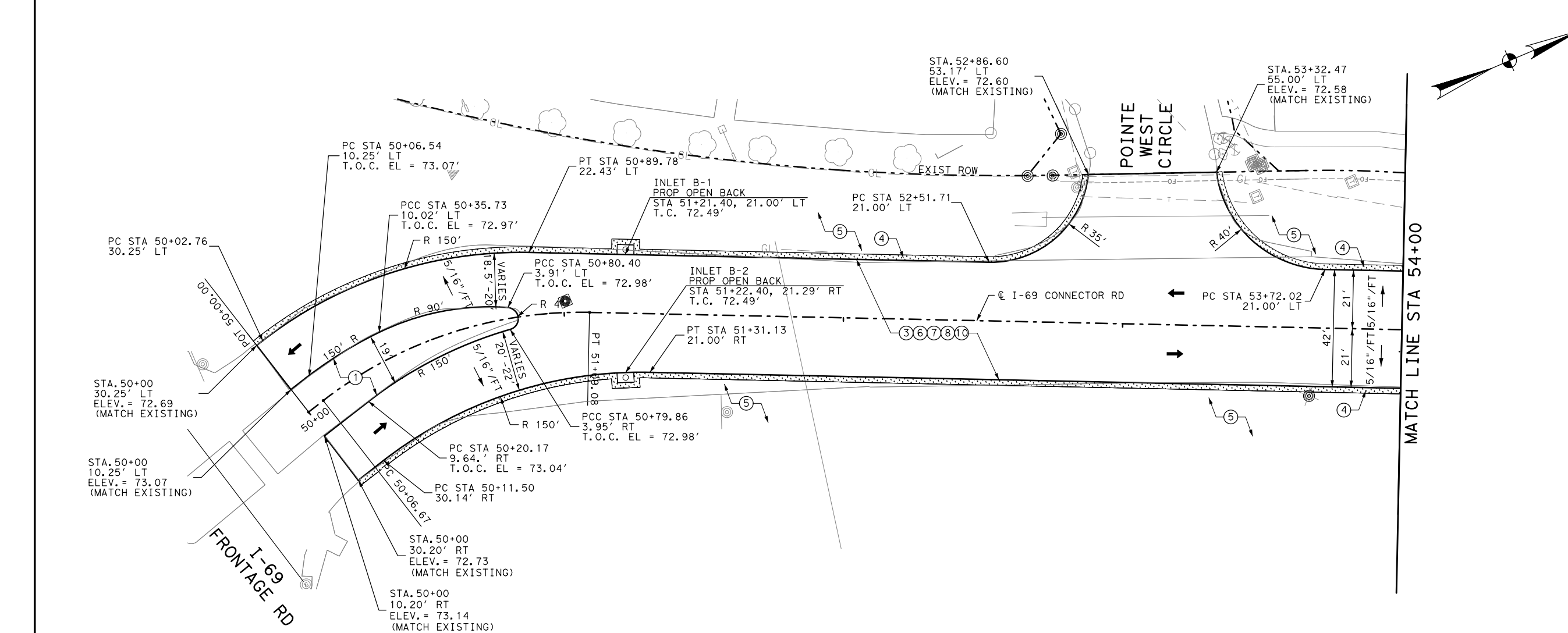
r.g. miller engineers
16340 Park Ten Place
Suite 350
Houston, Texas 77084
(713) 461-9600
TEXAS FIRM REGISTRATION NO. F-487

Approved By: _____ Job No. 4399
Date: _____

SUBMITTED BY: R.G. MILLER
SCALE: 1"=40' (H), 1"=4' (V)
DATE: 7/10/2023
SHEET 5 OF 5 SHEETS
DWG. NO. 65

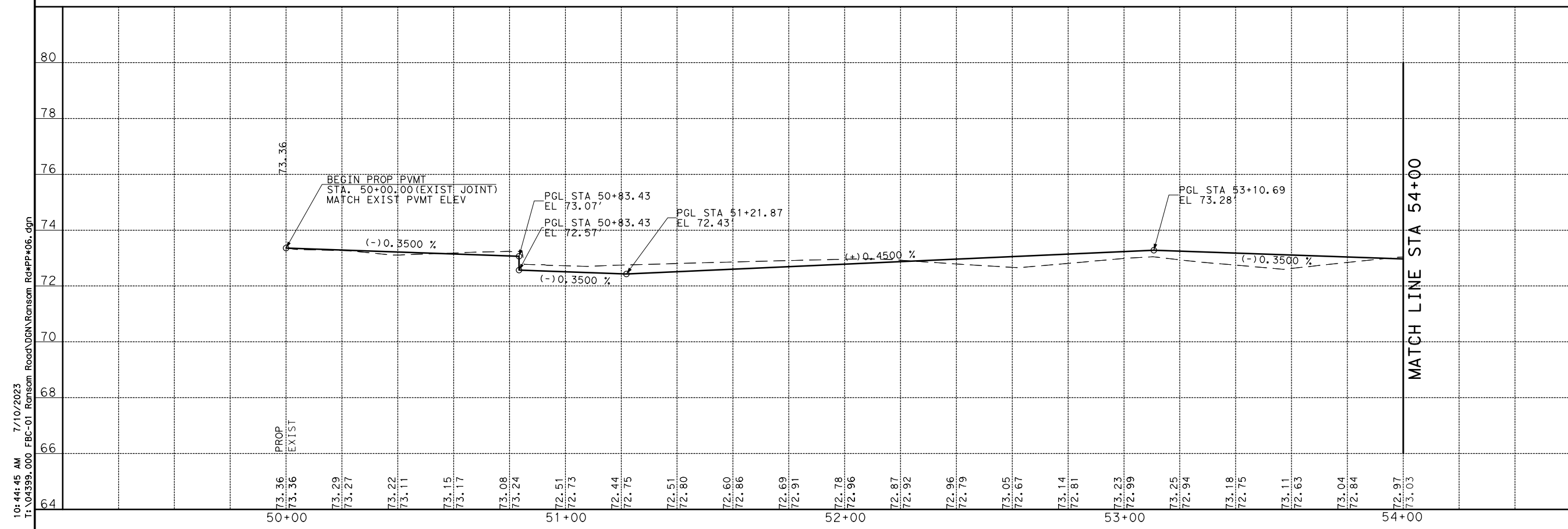
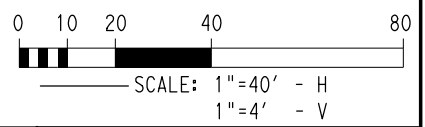
DESIGNED BY: E.L.L.
DRAWN BY: C.G.
DATE: 7/10/2023
SHEET 5 OF 5 SHEETS
DWG. NO. 65

10:44:42 AM 7/10/2023
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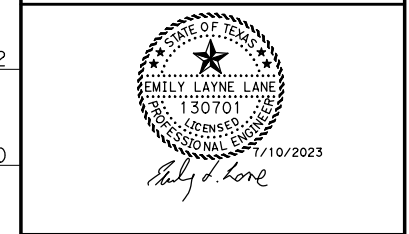
- LEGEND**
- ① RIPRAP (CONC) (6IN)
 - ② 5' CONC SIDEWALK (4" THICK)
 - ③ 6" CURB (TY II)
 - ④ BLOCK SODDING
 - ⑤ HYDRO-MULCH SEEDING
 - ⑥ 8" CONCRETE PVMT
 - ⑦ 1" ASPHALT STABILIZED BASE
 - ⑧ 6" CEMENT TREATED BASE
 - ⑨ 8" LIME TREATED SUBGRADE
 - ⑩ 6" LIME TREATED SUBGRADE
 - (X) DRIVEWAY NUMBER
 - ← DIRECTION OF TRAFFIC

- NOTES:**
1. SEE PROJECT LAYOUT FOR ALL BASELINE AND CURVE DATA.
 2. FOR SODDING LIMITS SEE TYPICAL SECTIONS.
 3. ALL DIMENSIONS ARE TO BACK OF CURB UNLESS NOTED OTHERWISE.
 4. IF RELIABLE REINFORCEMENT IS PROTRUDING, THEN CONTRACTOR SHALL DOWEL INTO EXISTING CONCRETE PAVEMENT, OTHERWISE, SAWCUT 2' OF EXISTING EDGE OF PAVEMENT TO EXPOSE STEEL.



No.	Date	Revisions	App.

**RANSOM RD
I-69 CONNECTOR RD
PLAN & PROFILE
STA 50+00 TO STA 54+00**



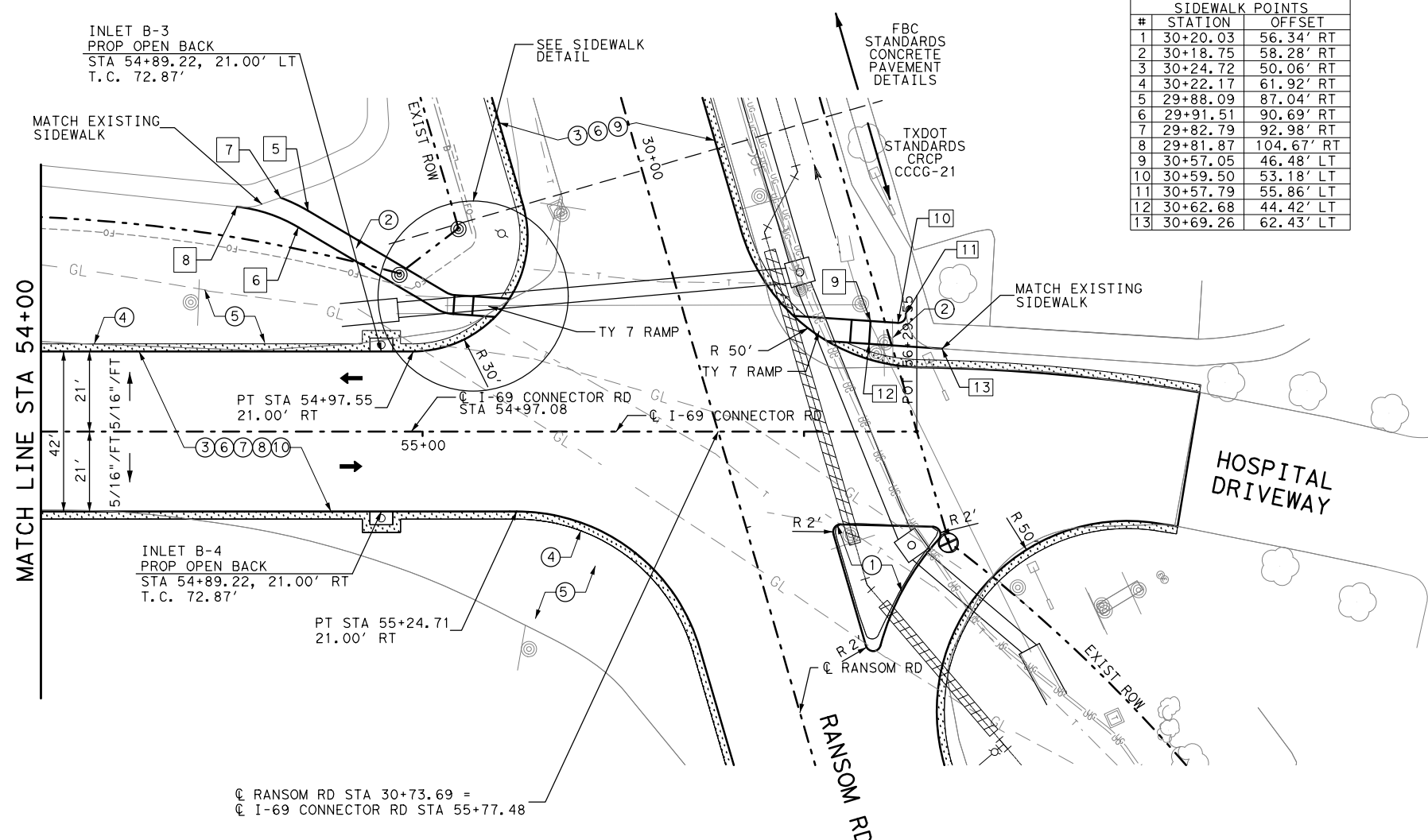
r.g. miller engineers
16340 Park Ten Place
Suite 350
Houston, Texas 77084
(713) 461-9600
TEXAS FIRM REGISTRATION NO. F-487

Approved By: _____ Date: _____
Job No. 4399

Submitted By: R.G. MILLER
Scale: 1"=40' (H), 1"=4' (V)
Date: 7/10/2023
SHEET 1 OF 2 SHEETS
DWG. NO. 66

Designed By: E.L.L.
Drawn By: C.G.

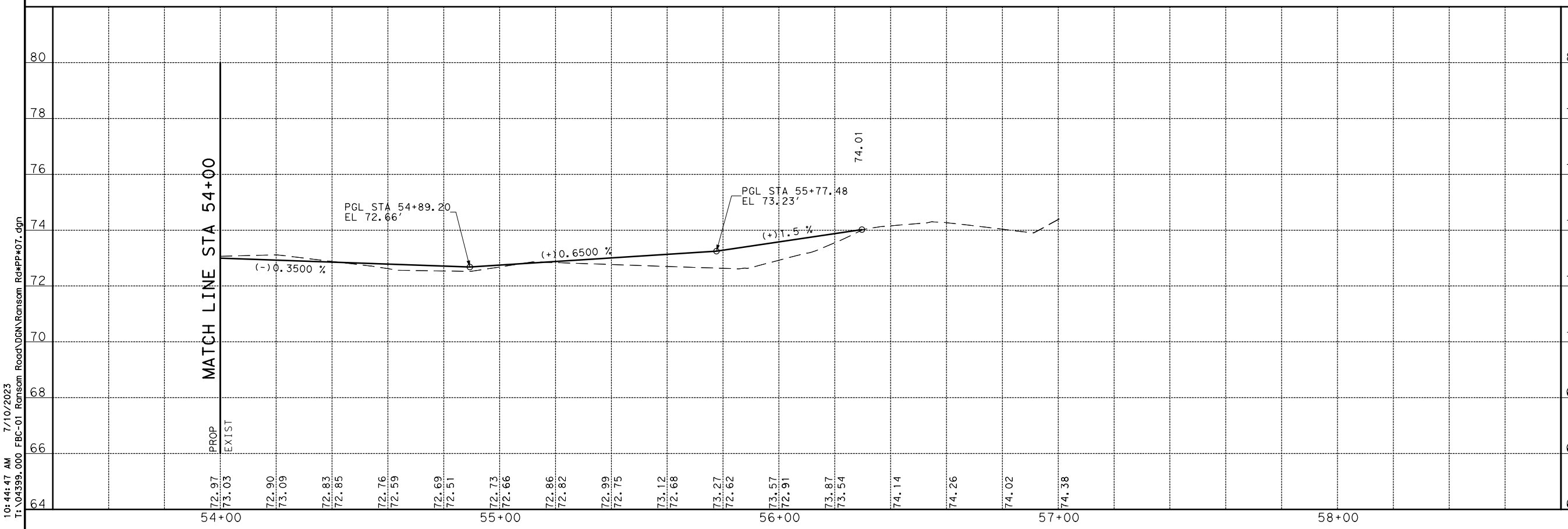
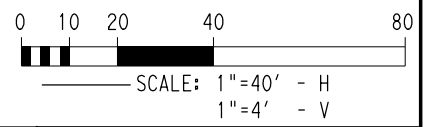
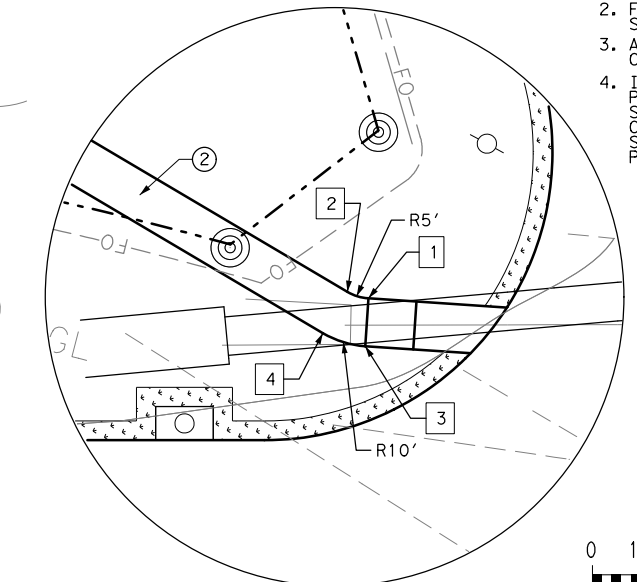
10:44:45 AM 7/10/2023
T:\04399.000 FBC-01 Ransom Road\DGN\Ransom Rd\PP*06.dgn



#	STATION	OFFSET
1	30+20.03	56.34' RT
2	30+18.75	58.28' RT
3	30+24.72	50.06' RT
4	30+22.17	61.92' RT
5	29+88.09	87.04' RT
6	29+91.51	90.69' RT
7	29+82.79	92.98' RT
8	29+81.87	104.67' RT
9	30+57.05	46.48' LT
10	30+59.50	53.18' LT
11	30+57.79	55.86' LT
12	30+62.68	44.42' LT
13	30+69.26	62.43' LT

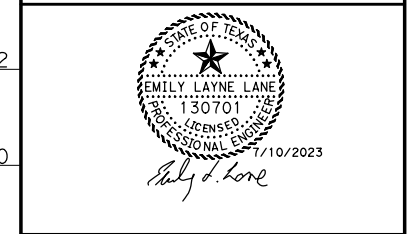
- LEGEND**
- ① RIPRAP (CONC) (6IN)
 - ② 5' CONC SIDEWALK (4" THICK)
 - ③ 6" CURB (TY II)
 - ④ BLOCK SODDING
 - ⑤ HYDRO-MULCH SEEDING
 - ⑥ 8" CONCRETE PVMT
 - ⑦ 1" ASPHALT STABILIZED BASE
 - ⑧ 6" CEMENT TREATED BASE
 - ⑨ 8" LIME TREATED SUBGRADE
 - ⑩ 6" LIME TREATED SUBGRADE
 - (X) DRIVEWAY NUMBER
 - ← DIRECTION OF TRAFFIC

- NOTES:**
1. SEE PROJECT LAYOUT FOR ALL BASELINE AND CURVE DATA.
 2. FOR SODDING LIMITS SEE TYPICAL SECTIONS.
 3. ALL DIMENSIONS ARE TO BACK OF CURB UNLESS NOTED OTHERWISE.
 4. IF RELIABLE REINFORCEMENT IS PROTRUDING THEN CONTRACTOR SHALL DOWEL INTO EXISTING CONCRETE PAVEMENT. OTHERWISE SAWCUT 2' OF EXISTING EDGE OF PAVEMENT TO EXPOSE STEEL.



No.	Date	Revisions	App.

**RANSOM RD
I-69 CONNECTOR RD
PLAN & PROFILE
STA 54+00 TO END**



r.g. miller engineers
16340 Park Ten Place
Suite 350
Houston, Texas 77084
(713) 461-9600
TEXAS FIRM REGISTRATION NO. F-487

Approved By: _____ Date: _____ Job No. 4399

Submitted By: R.G. MILLER
Scale: 1"=40' (H), 1"=4' (V)

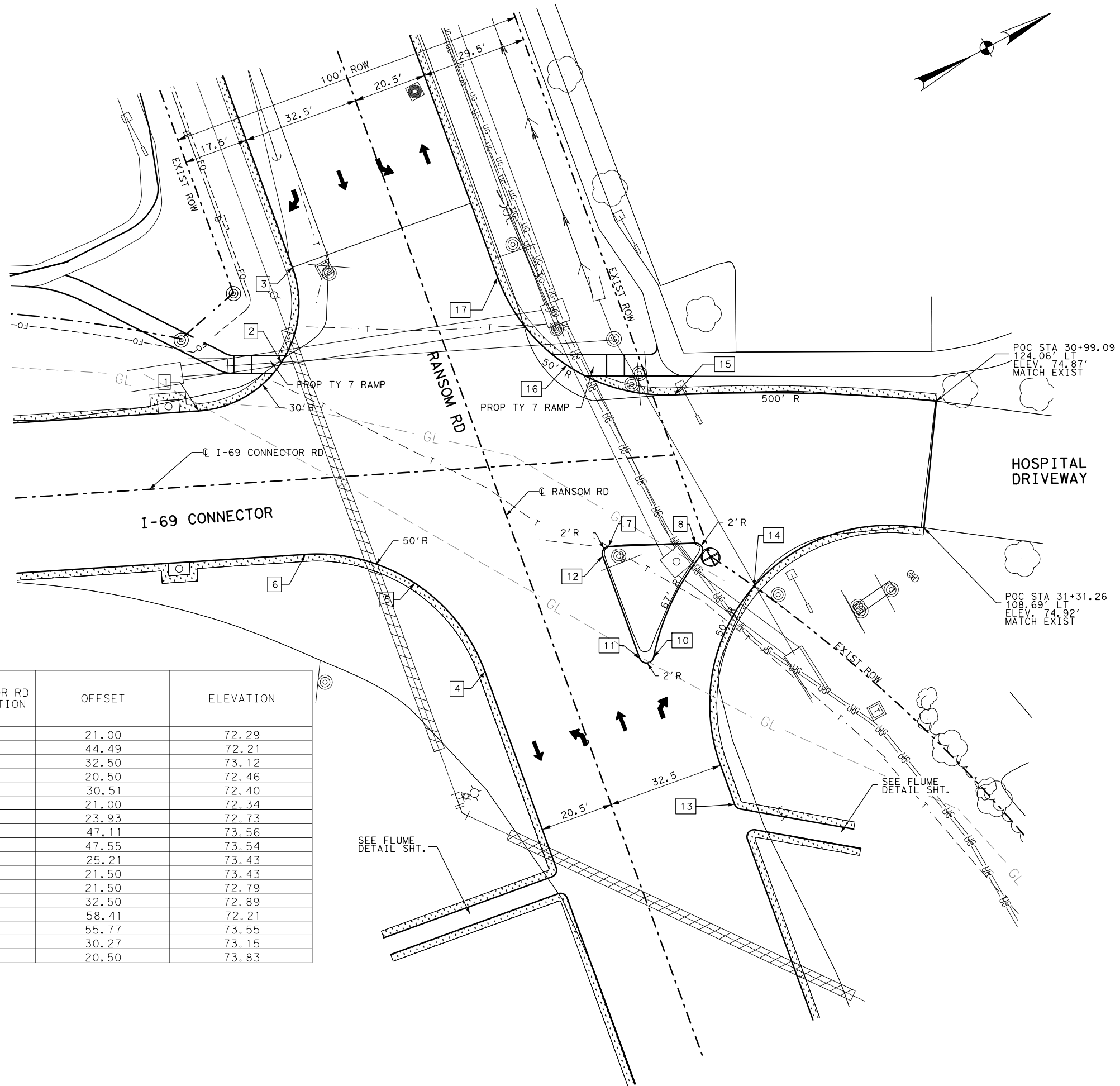
Designed By: E.L.L.
Drawn By: C.G.

Date: 7/10/2023
SHEET 2 OF 2 SHEETS

Surv By: MILLER SURVEY
F. B. No.: 17102
DWG. NO. 67

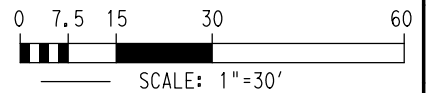
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10:44:51 AM 7/10/2023
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- LEGEND**
- ① RIPRAP (CONC) (6IN)
 - ② 5' CONC SIDEWALK (4" THICK)
 - ③ 6" CURB (TY II)
 - ④ BLOCK SODDING
 - ⑤ HYDRO-MULCH SEEDING
 - ⑥ 8" CONCRETE PVMT
 - ⑦ 1" ASPHALT STABILIZED BASE
 - ⑧ 6" CEMENT TREATED BASE
 - ⑨ 8" LIME TREATED SUBGRADE
 - ⑩ 6" LIME TREATED SUBGRADE
 - (X) DRIVEWAY NUMBER
 - ← DIRECTION OF TRAFFIC

- NOTES:**
1. SEE PROJECT LAYOUT FOR ALL BASELINE AND CURVE DATA.
 2. FOR SODDING LIMITS SEE TYPICAL SECTIONS.
 3. ALL DIMENSIONS ARE TO BACK OF CURB UNLESS NOTED OTHERWISE.
 4. IF RELIABLE REINFORCEMENT IS PROTRUDING, THEN CONTRACTOR SHALL DOWEL INTO EXISTING CONCRETE PAVEMENT, OTHERWISE SAWCUT 2" OF EXISTING EDGE OF PAVEMENT TO EXPOSE STEEL.
 5. STORM SEWER LENGTHS SHOW ARE FROM CENTERLINE TO CENTERLINE WHICH DIFFER FROM PAY LENGTHS.



POINT	RANSOM RD BASELINE STATION	I-69 CONNECTOR RD BASELINE STATION	OFFSET	ELEVATION
1	-	54+97.55	21.00	72.29
2	30+26.38	-	44.49	72.21
3	30+02.39	-	32.50	73.12
4	31+27.12	-	20.50	72.46
5	30+97.11	-	30.51	72.40
6	-	50+86.90	21.00	72.34
7	31+06.01	-	23.93	72.73
8	31+13.42	-	47.11	73.56
9	31+17.03	-	47.55	73.54
10	31+39.45	-	25.21	73.43
11	31+38.41	-	21.50	73.43
12	31+07.96	-	21.50	72.79
13	31+85.88	-	32.50	72.89
14	31+30.38	-	58.41	72.21
15	30+72.43	-	55.77	73.55
16	30+54.34	-	30.27	73.15
17	30+24.64	-	20.50	73.83

No.	Date	Revisions	App.

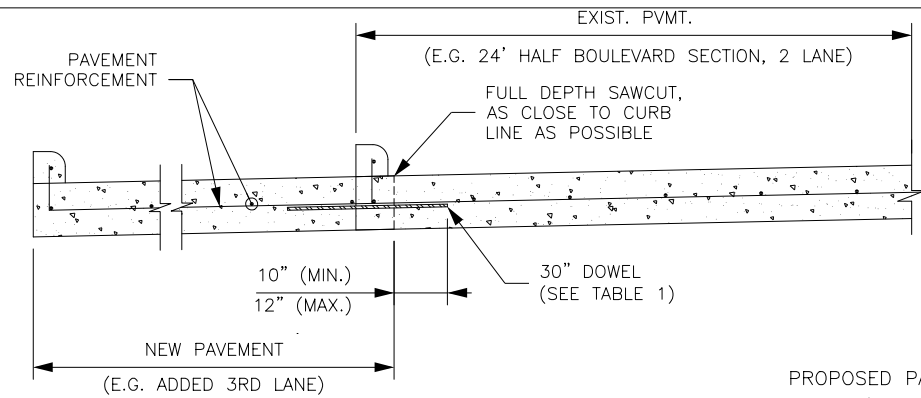
**RANSOM RD
 INTERSECTION LAYOUT
 RANSOM ROAD AND
 I-69 CONNECTOR/DRIVEWAY**

**r.g.miller
 engineers**
 16340 Park Ten Place
 Suite 350
 Houston, Texas 77084
 (713) 461-9600
 TEXAS FIRM REGISTRATION NO. F-487

Approved By: _____ Date: _____
 r.g.miller Job No. 4399

SUBMITTED BY: R.G. MILLER SCALE: 1"=30'
 DESIGNED BY: E.L.L. DRAWN BY: C.G.
 DATE: 7/10/2023 SHEET 2 OF 2 SHEETS
 SURV BY: MILLER SURVEY F. B. NO.: 17102 DWG. NO. 69

J:\1704\1601\Fort Bend County Standards\Fort Bend County STD\DONE\FBC CONCRETE PAVEMENT DETAILS\CONCRETE_PAVEMENT_DETAILS-1of2.dwg



TYPICAL CONCRETE ROADWAY WIDENING DETAIL
SCALE: 1" = 1'-6"

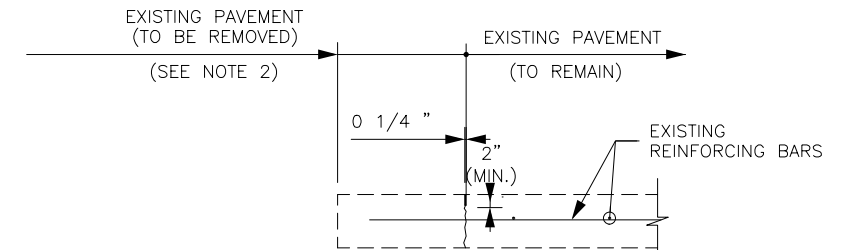
TABLE 1 (CONSTRUCTION JOINT DOWELS)

DOWEL SIZE	PAVEMENT DEPTH
#4 BAR	< 6"
#5 BAR	6" ≤ D < 9"
#6 BAR	≥ 9"

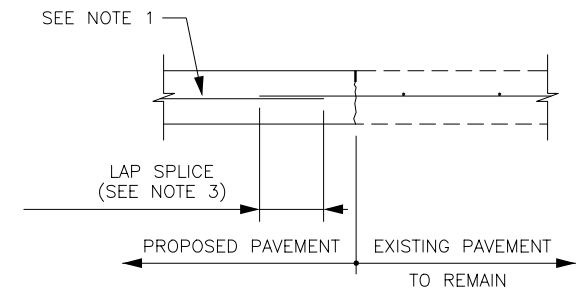
DOWEL SHALL BE DRILLED INTO EXISTING PAVEMENT (MIN. 10", MAX. 12") AND EPOXIED. (SEE ITEM 361.3).

EXPANSION JOINT DOWELS 12" O.C.

PAVEMENT THICKNESS (D)	DOWEL DIA.
6"	3/4"
7"	1"
8"	1"
9" & 10"	1 1/4"



STEP 1 DEMOLITION OF EXISTING PAVEMENT

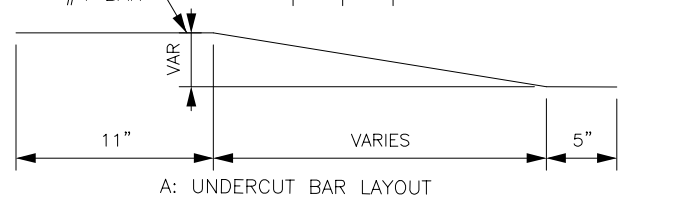
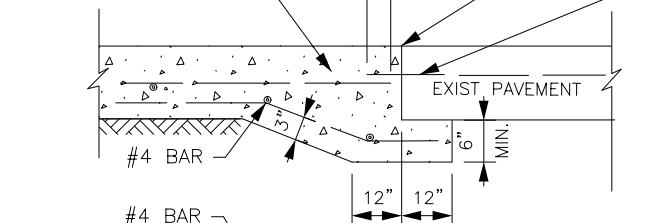
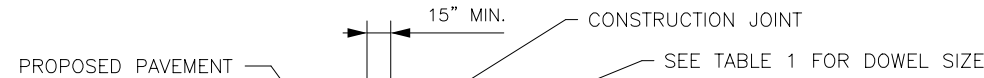


STEP 2 CONSTRUCTION OF NEW PAVEMENT

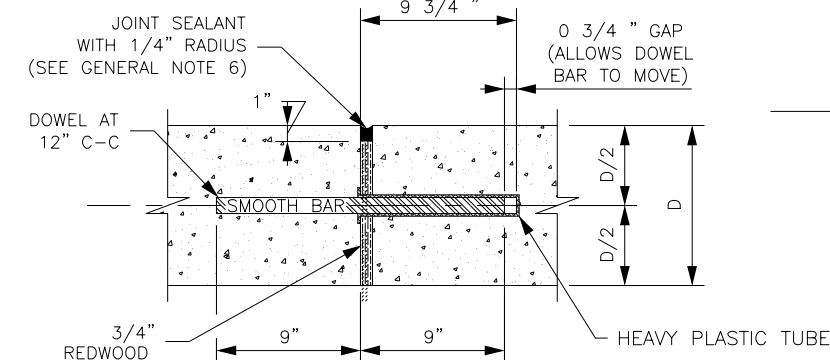
CONCRETE TO CONCRETE STANDARD PAVEMENT TIE-IN
SCALE: 1" = 1'-6"

NOTES FOR STANDARD PAVEMENT TIE-IN:

1. REINFORCING CENTERED IN PROPOSED PAVEMENT, 3" CLEAR AT EDGES.
2. ONLY FULL DEPTH SAWCUTS WILL BE ALLOWED
3. USE FULL DEPTH SAWCUT WITH DRILLED IN DOWELS (AS SHOWN IN THE "TYPICAL CONCRETE ROADWAY WIDENING DETAIL" ON THIS SHEET. THE SAWCUTTING AND DOWELS WILL BE AT CONTRACTOR'S EXPENSE.
4. ALL PAVEMENT CONCRETE SHALL BE 5 1/2 SACK PER CY, 3500, PSI AT 28 DAYS
5. SIZE OF DOWEL BARS SHALL CONFORM TO TABLE 1. DOWELS SHALL BE PLACED 24" CENTER TO CENTER OR MATCH EXISTING, IF CLOSER



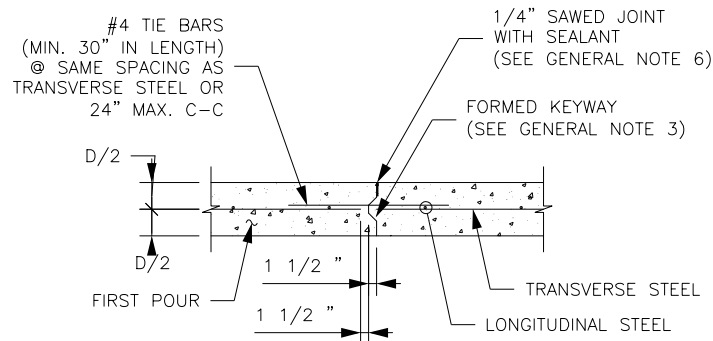
PAVEMENT HEADER/ UNDERCUT
N.T.S.



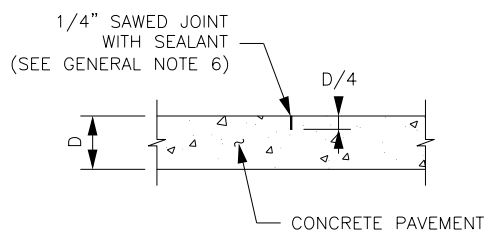
DOWEL TYPE EXPANSION JOINT
SCALE: 1" = 6"

NOTES FOR DOWEL EXPANSION JOINT:

1. EXPANSION JOINT SHALL BE PLACED AT THE END OF EACH CURB RADIUS AND SPACED AT A MAXIMUM DISTANCE OF 60 FEET.
2. CENTER DOWEL HORIZONTALLY ON JOINT.
3. EXPANSION JOINT BARS SHALL BE HELD PARALLEL TO THE FINISHED CONCRETE SURFACE.



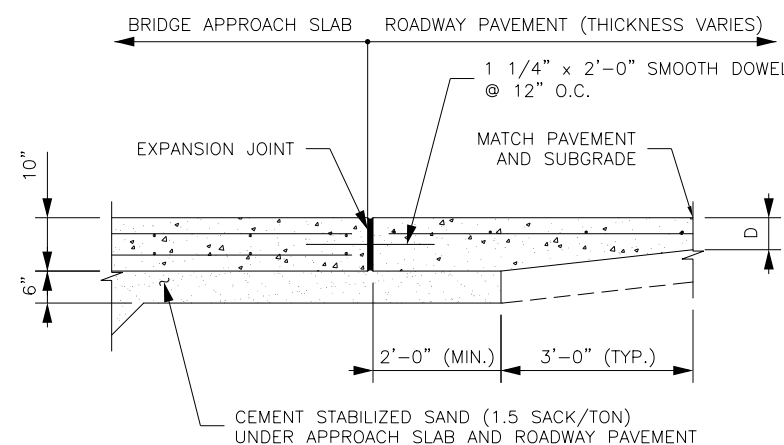
LONGITUDINAL CONSTRUCTION JOINT
SCALE: 1" = 1'-6"



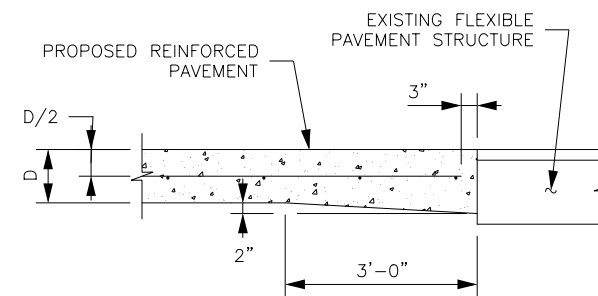
CONTRACTION JOINT (SAWED)
SCALE: 1" = 1'-6"

NOTE FOR CONTRACTION JOINT:

1. 20'-0" MAXIMUM SPACING BETWEEN JOINTS.



TYPICAL SECTION PAVING TIE-IN TO BRIDGE APPROACH SLAB
SCALE: 1" = 1'-6"



TYPICAL PAVING HEADER
SCALE: 1" = 1'-6"

NOTES FOR PAVING HEADER:

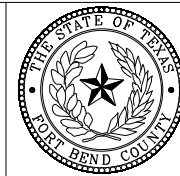
1. ADDITIONAL CONCRETE FOR PAVING HEADER SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAVING BID ITEMS.
2. DISTURBED MATERIAL IN THE FLEXIBLE PAVEMENT WILL BE BACKFILLED WITH ASPHALT CONCRETE PAVEMENT (ACP). THE ACP WILL BE CONSIDERED INCIDENTAL TO VARIOUS PAVING BID ITEMS.

GENERAL NOTES:

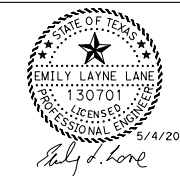
1. FOR FURTHER INFORMATION REGARDING THE PLACEMENT OF CONCRETE AND REINFORCING, REFER TO ITEM 360 HARRIS COUNTY SPECIFICATIONS
2. THE CHAIRS USED TO SUPPORT THE BAR MATS SHALL BE OF SUFFICIENT STRUCTURAL QUALITY AND NUMBER TO HOLD THE MAT WITHIN THE PLACEMENT HEIGHT, AND SHALL BE OF A TYPE APPROVED BY THE ENGINEER. SPACING OF BAR SUPPORT CHAIRS SHALL BE 3'-0" MAXIMUM. KEYED CONSTRUCTION JOINTS SHALL BE USED AT ALL OTHER JOINTS.
3. SAWED CONTRACTION JOINTS SHALL BE USED FOR LONGITUDINAL JOINTS WHEREVER MORE THAN ONE LANE WIDTH IS PLACED IN A SINGLE POUR. KEYED CONSTRUCTION JOINTS SHALL BE USED AT ALL OTHER JOINTS.
4. ALL SAW CUTTING SHOWN ON THIS DETAIL SHALL BE INCIDENTAL TO ITEM 360 "CONCRETE PAVEMENT".
5. D = THICKNESS OF CONCRETE PAVEMENT.
 - FOR DEVELOPMENT PROJECTS SEE REGULATIONS OF FORT BEND COUNTY, TEXAS FOR THE APPROVAL AND ACCEPTANCE OF INFRASTRUCTURE.
6. ALL CONSTRUCTION JOINTS SHALL BE SEALED. JOINT SEALANT SHALL CONFORM TO THE REQUIREMENTS OF ITEM 360
7. NO TRAFFIC ON CONCRETE PAVEMENT UNTIL 7 DAYS CURE TIME AND 3,500 PSI HAS BEEN REACHED.

NO.	REVISIONS	DATE	NAME
▲	ORIGINAL STANDARD ISSUED	3-1-22	RJS
▲			
▲			
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FORT BEND COUNTY
ENGINEERING DEPARTMENT

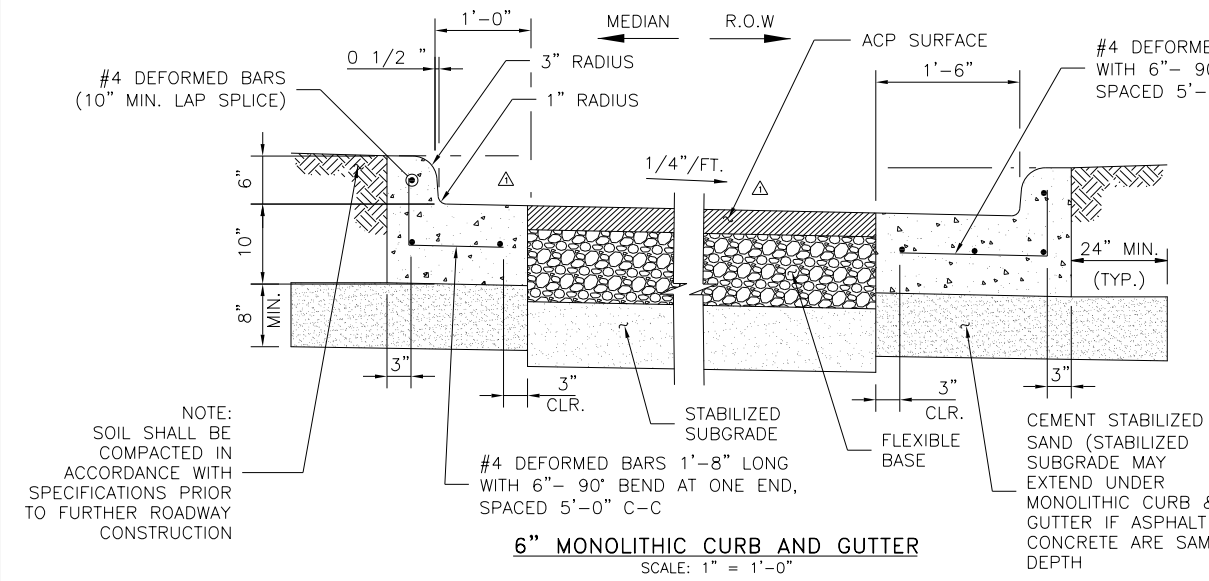


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TEXAS FIRM REGISTRATION NO. F-487

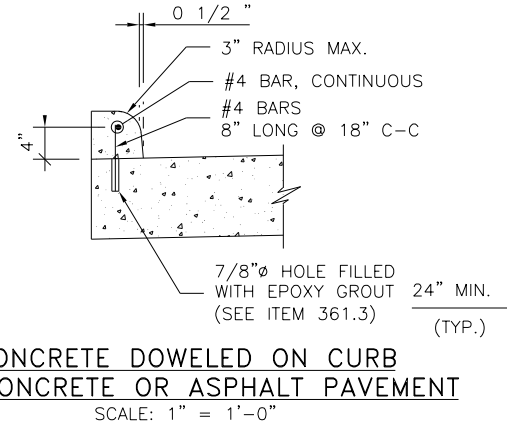
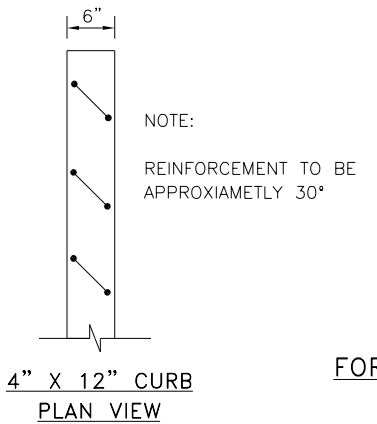
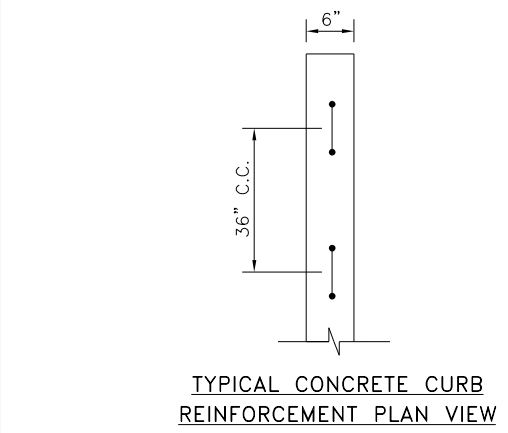
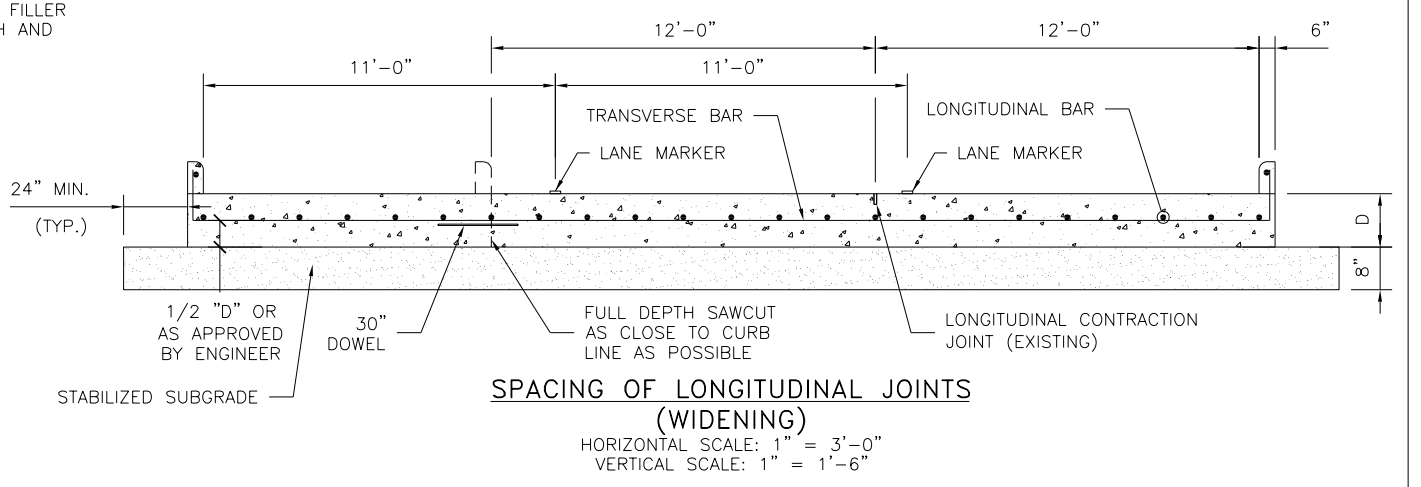
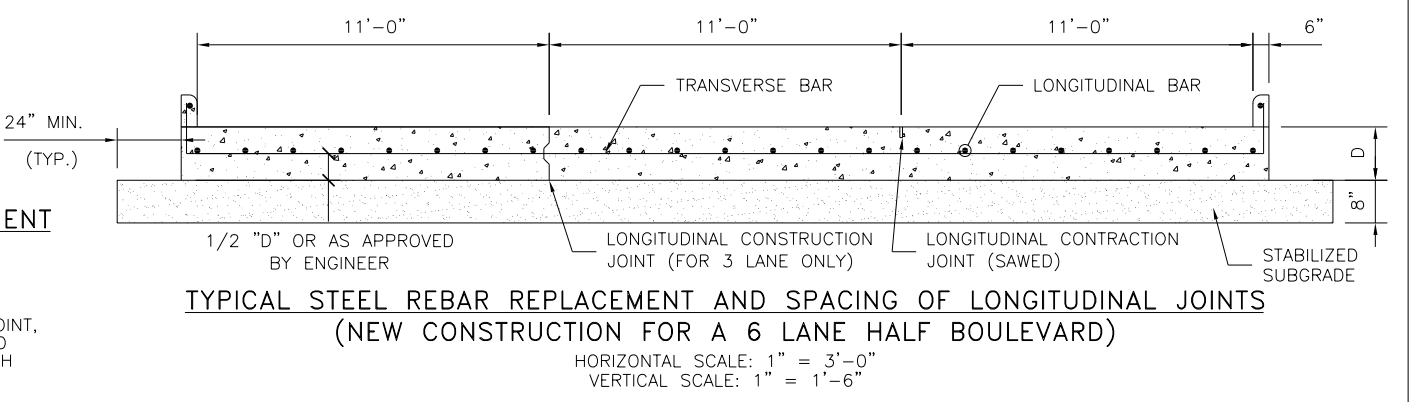
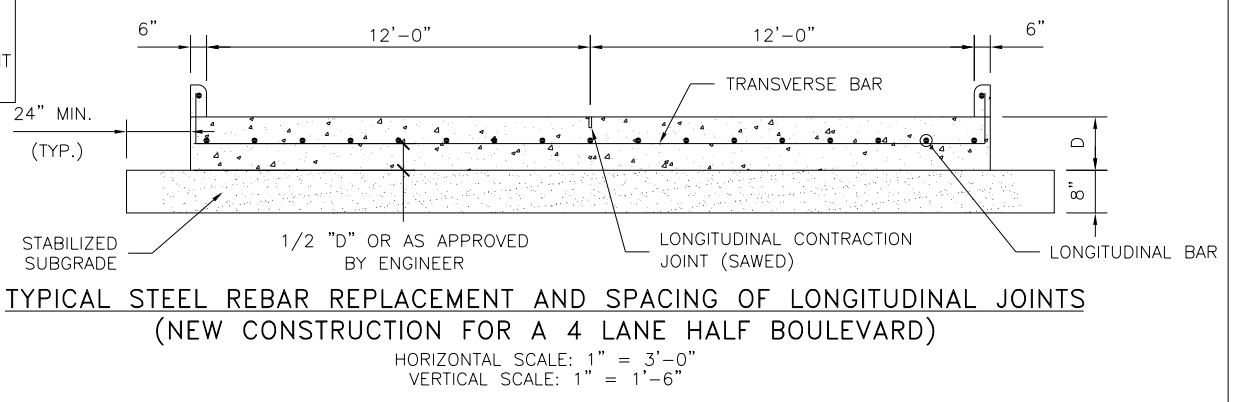
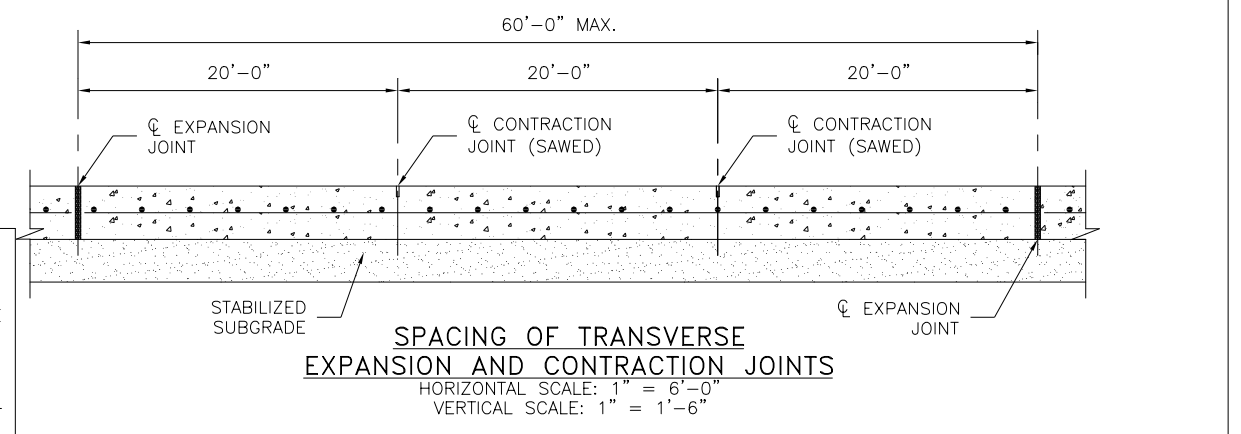


PROJECT TITLE:		
WIDENING AND RECONSTRUCTION OF RANSOM ROAD		
DRAWN BY:	INIT	FROM SUGAR LAND CITY LIMIT TO SH 99
CK'D BY:	INIT	SHEET DESCRIPTION:
		CONCRETE PAVEMENT DETAILS
SCALE:	AS NOTED	SHEET 1 OF 3
DATE:	3-1-22	APPROVED BY:
		71 / 123

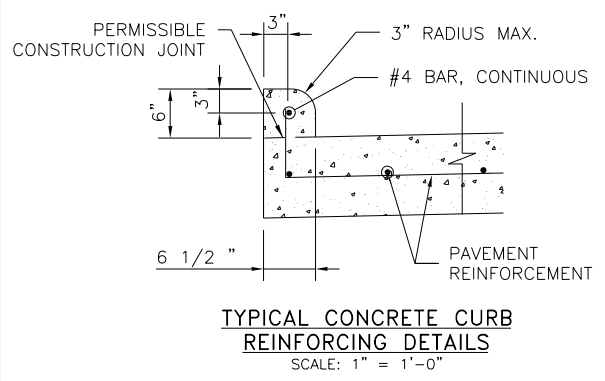
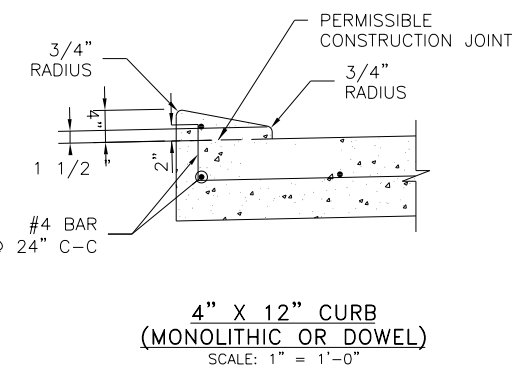
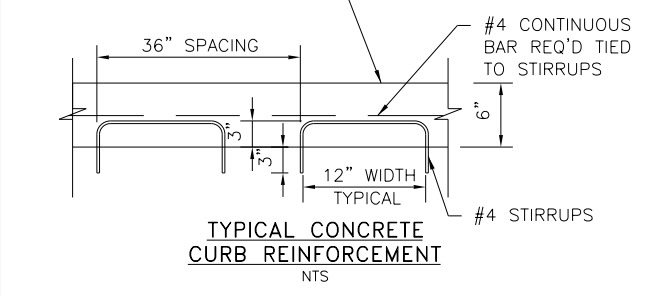
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- SLAB AND REBAR NOTES:**
1. TYPICAL SLAB THICKNESS D=8"
 2. TYPICAL REBAR SIZE AND SPACING ARE:
a. #4 BAR @ 18" C-C LONGITUDINAL
b. #4 BAR @ 18" C-C TRANSVERSE
 3. REBAR SIZE FOR PAVEMENT LESS THAN 8" THICK
a. #4 BAR @ 24" C-C LONGITUDINAL
b. #4 BAR @ 24" C-C TRANSVERSE
 4. REBAR SHALL NOT BE PLACED WITHIN 3" FROM THE EDGE OF PAVEMENT.
 5. TYPICAL STABILIZED SUBGRADE THICKNESS IS 8 INCHES.
 6. FOR HEAVY INDUSTRIAL TRAFFIC, SLAB THICKNESS AND REBAR SIZE AND SPACING WILL BE AS PER GEOTECHNICAL RECOMMENDATION.
 7. ALL BENT BARS SHALL BE GRADE 40 STEEL, ALL OTHER SHALL BE GRADE 60.
 8. MINIMUM LAP SPLICE 16".
 9. LAP SPLICES SHOULD BE ON ALTERNATING BARS, ADJACENT LAP SPLICES ARE NOT ACCEPTABLE.

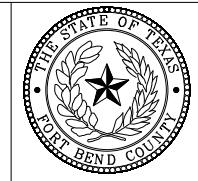


- NOTES FOR CURB:**
1. AT EACH PAVEMENT CONTRACTION JOINT, PROVIDE A 1/4" THICK PRE-MOLDED EXPANSION JOINT AT THE FULL WIDTH AND HEIGHT OF THE CURB.
 2. FOR EACH PAVEMENT EXPANSION JOINT, THE PRE-MOLDED EXPANSION JOINT FILLER MATERIAL SHALL BE THE FULL WIDTH AND HEIGHT OF THE CURB.

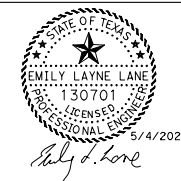


NO.	REVISIONS	DATE	NAME
1	ORIGINAL STANDARD ISSUED	3-1-22	RJS

FORT BEND COUNTY ENGINEERING DEPARTMENT



r.g. miller engineers
16340 Park Ten Place Suite 350 Houston, Texas 77084 (713) 461-9600 TEXAS FIRM REGISTRATION NO. F-487



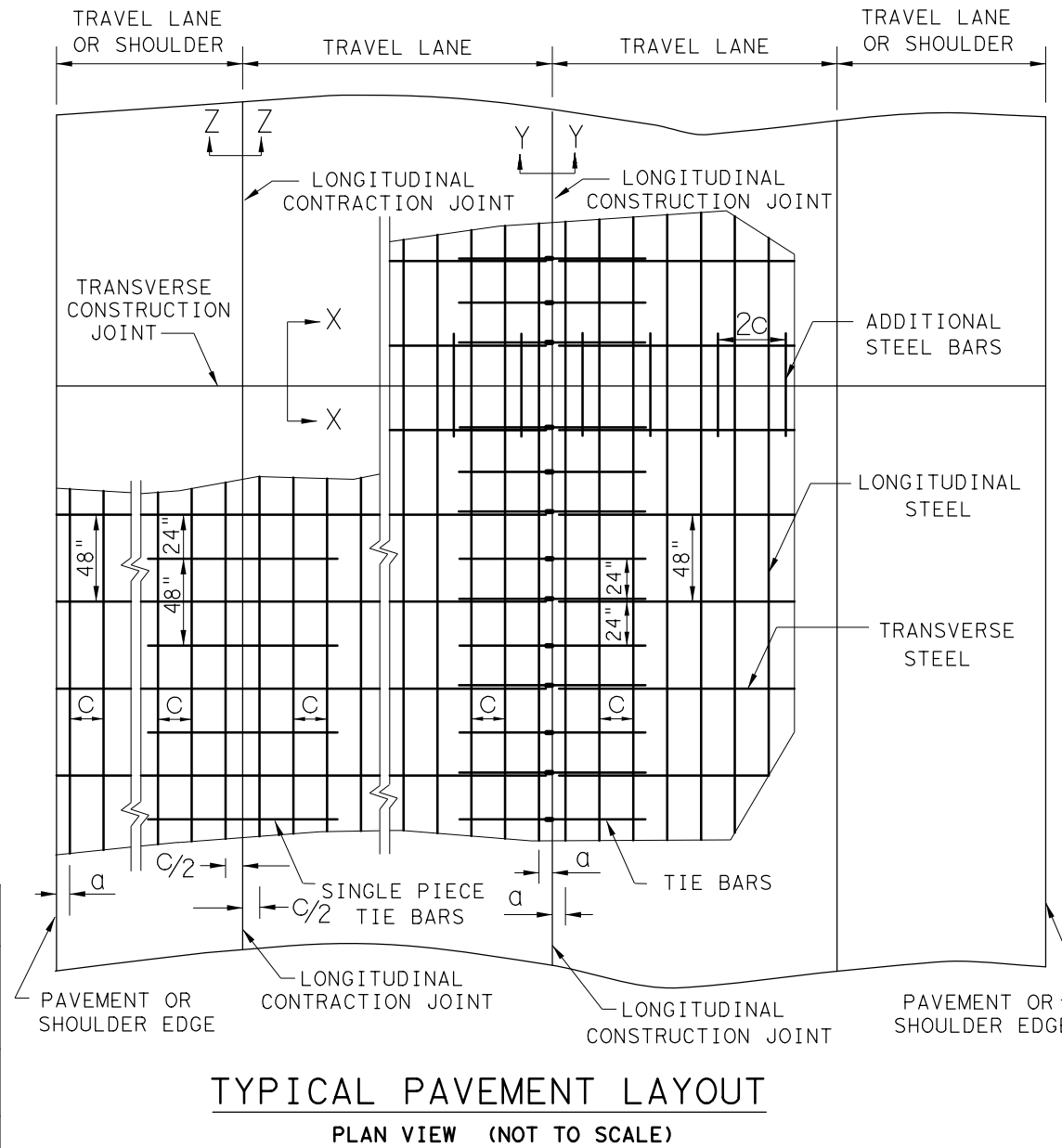
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DRAWN BY: INIT	FROM SUGAR LAND CITY LIMIT TO SH 99	FBCD STANDARD
CK'D BY: INIT	SHEET DESCRIPTION: CONCRETE PAVEMENT DETAILS	06
SCALE: AS NOTED	SHEET 2 OF 3	SHEET NO: 72 / 123
DATE: 3-1-22	APPROVED BY:	

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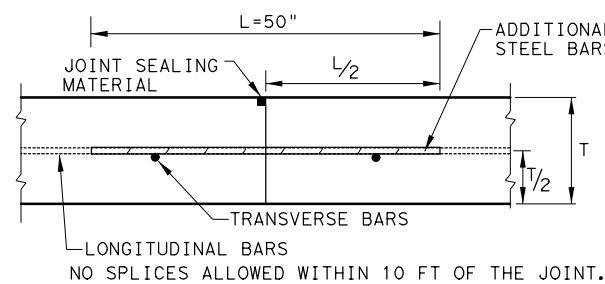
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TABLE NO.1 LONGITUDINAL STEEL					
SLAB THICKNESS AND BAR SIZE		REGULAR STEEL BARS	FIRST SPACING AT EDGE OR JOINT	ADDITIONAL STEEL BARS AT TRANSVERSE CONSTRUCTION JOINT (SECTION X-X)	
T (IN.)	BAR SIZE	SPACING C (IN.)	SPACING a (IN.)	SPACING 2 X C (IN.)	LENGTH L (IN.)
7.0	#5	6.5	3 TO 4	13	50
7.5	#5	6.0	3 TO 4	12	50
8.0	#6	9.0	3 TO 4	18	50
8.5	#6	8.5	3 TO 4	17	50
9.0	#6	8.0	3 TO 4	16	50
9.5	#6	7.5	3 TO 4	15	50
10.0	#6	7.0	3 TO 4	14	50
10.5	#6	6.75	3 TO 4	13.5	50
11.0	#6	6.5	3 TO 4	13	50
11.5	#6	6.25	3 TO 4	12.5	50
12.0	#6	6.0	3 TO 4	12	50
12.5	#6	5.75	3 TO 4	11.5	50
13.0	#6	5.5	3 TO 4	11	50

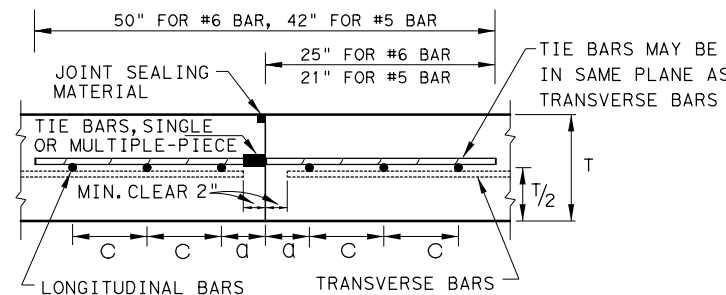
TABLE NO.2 TRANSVERSE STEEL AND TIE BARS						
SLAB THICKNESS (IN.)	TRANSVERSE STEEL		TIE BARS AT LONGITUDINAL CONSTRUCTION JOINT (SECTION Z-Z)		TIE BARS AT LONGITUDINAL CONSTRUCTION JOINT (SECTION Y-Y)	
	BAR SIZE	SPACING (IN.)	BAR SIZE	SPACING (IN.)	BAR SIZE	SPACING (IN.)
7.0 - 7.5	#5	48	#5	48	#5	24
8.0 - 13.0	#5	48	#6	48	#6	24



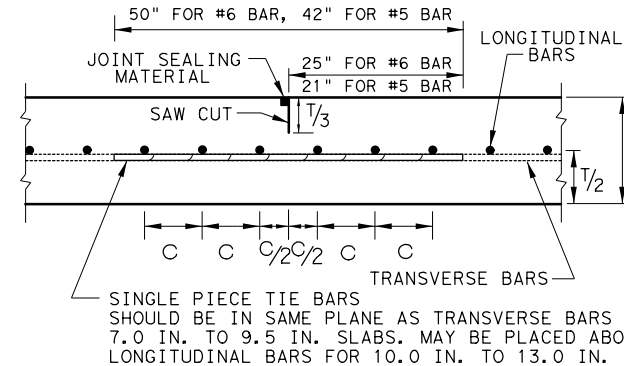
1. DETAILS FOR PAVEMENT WIDTH, PAVEMENT THICKNESS AND THE CROWN CROSS-SLOPE SHALL BE SHOWN ELSEWHERE IN THE PLANS. PAVEMENTS WIDER THAN 100 FT. WITHOUT A FREE LONGITUDINAL JOINT ARE NOT COVERED BY THIS STANDARD.
2. USE COARSE AGGREGATES WITH A RATED COEFFICIENT OF THERMAL EXPANSION (COTE) OF NOT MORE THAN 5.5×10^{-6} IN/IN/°F AS LISTED IN THE CONCRETE RATED SOURCE QUALITY CATALOG (CRSQC).
3. ALL THE REINFORCING STEEL AND TIE BARS SHALL BE DEFORMED STEEL BARS CONFORMING TO ASTM A 615 (GRADE 60) OR ASTM A 996 (GRADE 60) OR ABOVE. STEEL BAR SIZES AND SPACINGS SHALL CONFORM TO TABLE NO.1 AND TABLE NO.2.
4. STEEL BAR PLACEMENT TOLERANCE SHALL BE +/- 1 IN. HORIZONTALLY AND +/- 0.5 IN. VERTICALLY. CALCULATED AVERAGE BAR SPACING (CONCRETE PLACEMENT WIDTH / NUMBER OF LONGITUDINAL BARS) SHALL CONFORM TO TABLE NO.1
5. PAVEMENT WIDTHS OF MORE THAN 15 FT. SHALL HAVE A LONGITUDINAL JOINT (SECTION Z-Z OR SECTION Y-Y). THESE JOINTS SHALL BE LOCATED WITHIN 6 IN. OF THE LANE LINE UNLESS THE JOINT LOCATION IS SHOWN ELSEWHERE ON THE PLANS.
6. THE SAW CUT DEPTH FOR THE LONGITUDINAL CONTRACTION JOINT (SECTION Z-Z) SHALL BE ONE THIRD OF THE SLAB THICKNESS (T/3).
7. WHEN TYING CONCRETE GUTTER AT A LONGITUDINAL JOINT, THE TIE BAR LENGTH OR POSITION MAY BE ADJUSTED. PROVIDE 3 IN. OF CONCRETE COVER FROM THE BACK OF GUTTER TO THE END OF TIE BAR.
8. REPLACE MISSING OR DAMAGED TIE BARS WITHOUT ADDITIONAL COMPENSATION BY DRILLING MIN.10 IN. DEEP AND GROUTING TIE BARS WITH TYPE III, CLASS C EPOXY. MEET THE PULL-OUT TEST REQUIREMENTS IN ITEM 361.
9. OMIT TIE BARS LOCATED WITHIN 18-IN. OF THE TRANSVERSE CONSTRUCTION JOINTS (SECTION X-X). USE HAND-OPERATED IMMERSION VIBRATORS TO CONSOLIDATE THE CONCRETE ADJACENT TO ALL FORMED JOINTS.
10. LONGITUDINAL REINFORCING STEEL SPLICES SHALL BE A MINIMUM OF 25 IN. STAGGER THE LAP LOCATIONS SO THAT NO MORE THAN 1/3 OF THE LONGITUDINAL STEEL IS SPLICED IN ANY GIVEN 12-FT. WIDTH AND 2-FT. LENGTH OF THE PAVEMENT.
11. THE DETAIL FOR THE JOINT SEALANT AND RESERVOIR IS SHOWN ON STANDARD SHEET "CONCRETE PAVING DETAILS, JOINT SEALS."



TRANSVERSE CONSTRUCTION JOINT
SECTION X - X



LONGITUDINAL CONSTRUCTION JOINT
SECTION Y - Y



LONGITUDINAL CONTRACTION JOINT
SECTION Z - Z

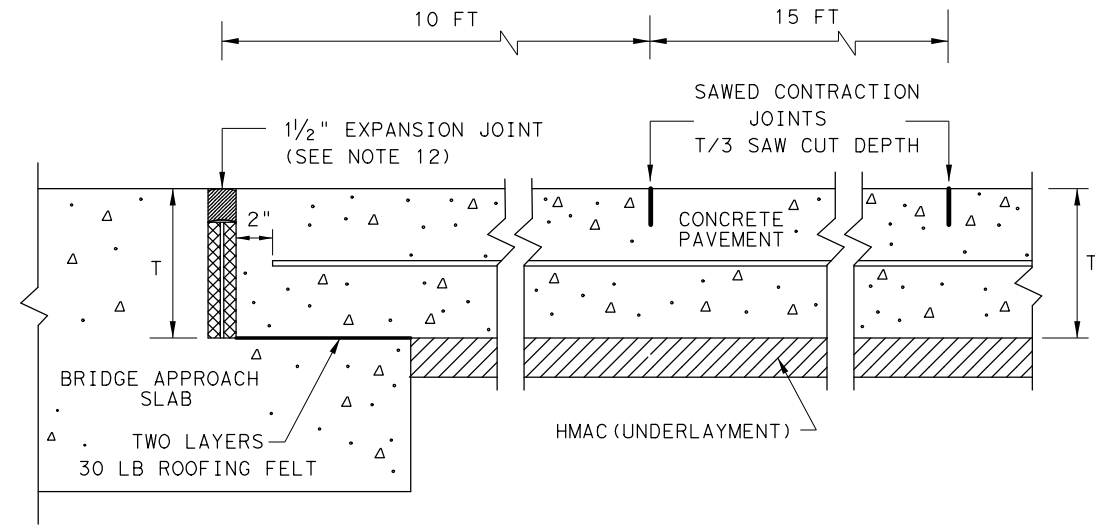
GENERAL NOTES

SHEET 1 OF 2

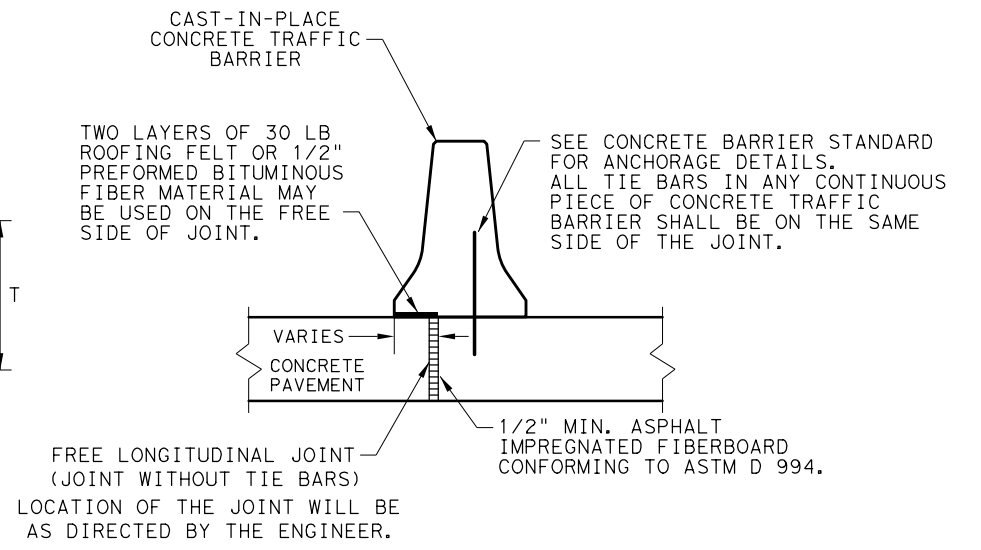
		Design Division Standard	
CONTINUOUSLY REINFORCED CONCRETE PAVEMENT ONE LAYER STEEL BAR PLACEMENT T - 7 to 13 INCHES CRCP (1) - 20			
FILE: crcp120.dgn	DN: TxDOT	CK: KM	DW: AN
© TxDOT: APRIL 2020	CONT	SECT	JOB
10/10/2011 ADD GN #12	-	-	-
04/09/2013 REMOVE 6" AND 6.5" ADD CTE REQUIREMENTS	DIST	COUNTY	SHEET NO.
05/05/2017 COTE AS RATED 4.3	-	-	73

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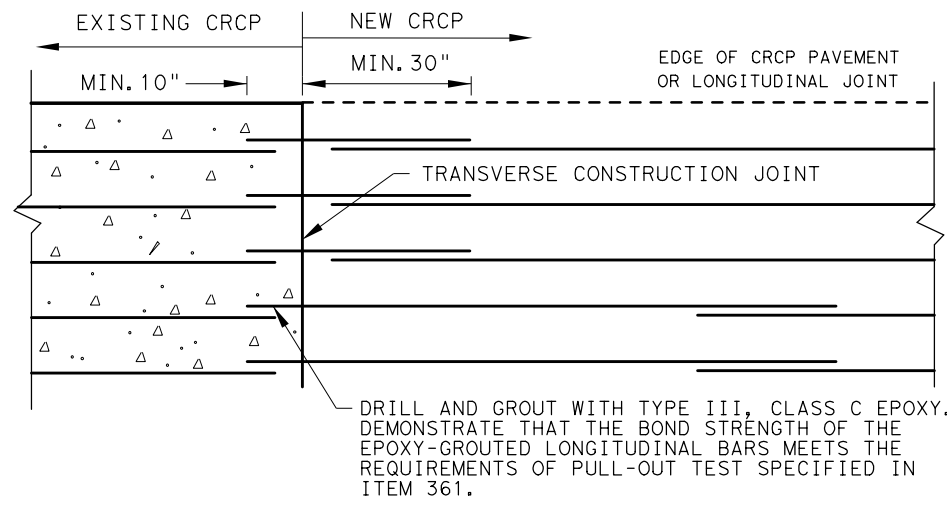
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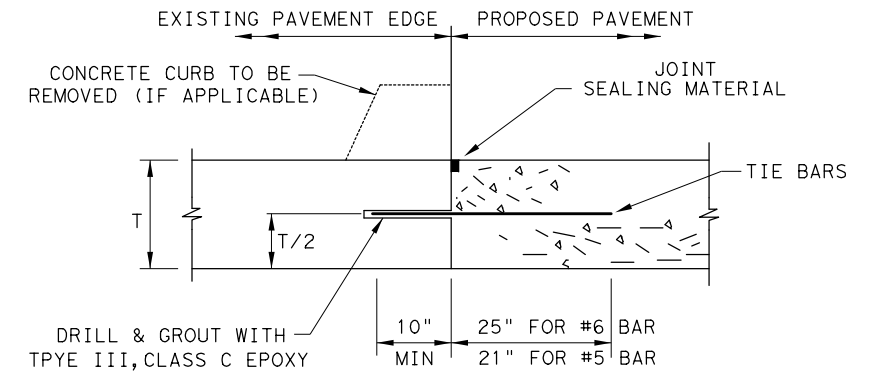
**TRANSVERSE EXPANSION JOINT DETAIL
AT BRIDGE APPROACH**



FREE LONGITUDINAL JOINT DETAIL

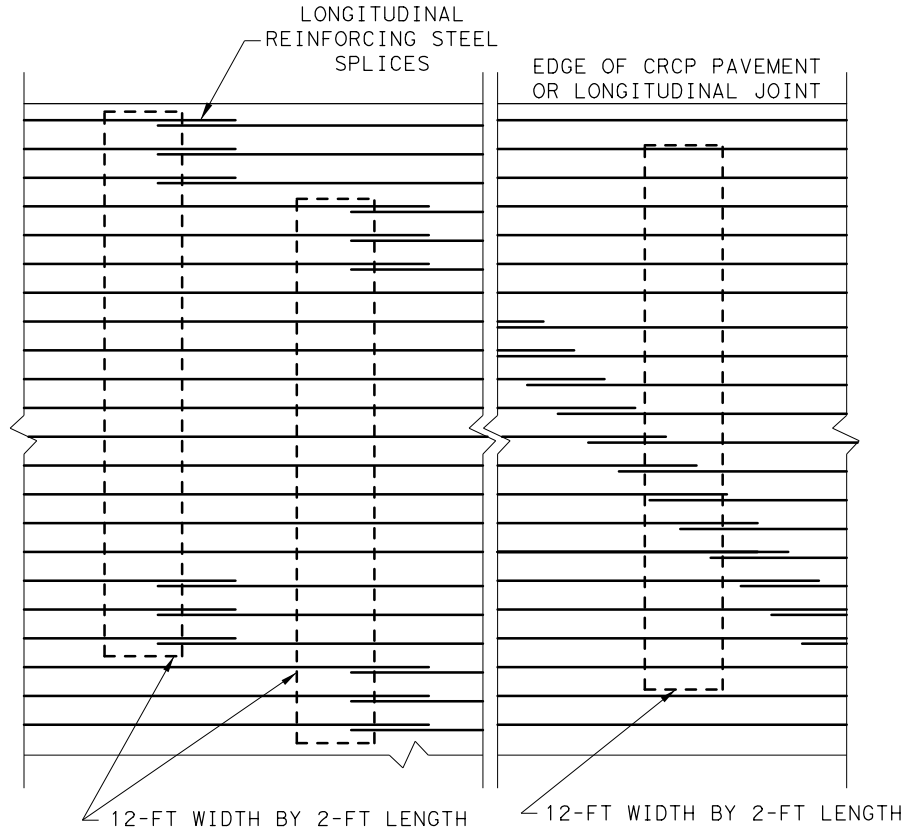


**OPTION A: DRILL AND EPOXY
PLAN VIEW (NOT TO SCALE)**



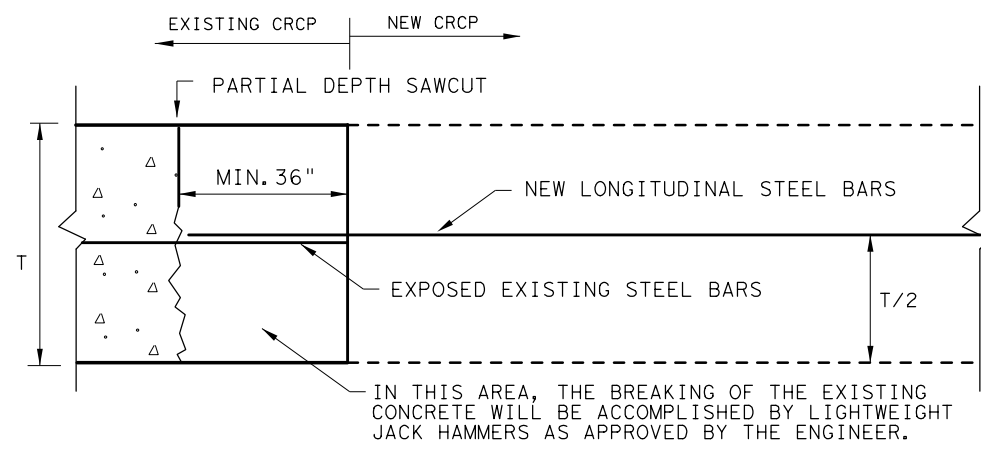
1. BEFORE WIDENING WORK, DEMONSTRATE THAT THE BOND STRENGTH OF THE EPOXY-GROUTED TIE BARS MEETS THE REQUIREMENTS OF PULL-OUT TEST SPECIFIED IN ITEM 361.
2. SPACE TIE BARS AT 24" SPACING. USE #6 TIE BARS FOR 8" AND THICKER SLABS, USE #5 TIE BARS FOR LESS THAN 8" THICK SLABS.

LONGITUDINAL WIDENING JOINT DETAIL



STAGGER THE LAP LOCATIONS SO THAT NO MORE THAN 1/3 OF THE LONGITUDINAL STEEL IS SPLICED IN ANY GIVEN 12-FT. WIDTH AND 2-FT. LENGTH OF THE PAVEMENT. ANY OTHER LAP CONFIGURATION MEETING THIS REQUIREMENT WILL BE ALLOWED.

**EXAMPLES OF LAP CONFIGURATION
PLAN VIEW (NOT TO SCALE)**



**OPTION B: BREAKBACK AND LAP
TRANSVERSE TIE JOINT DETAIL
EXISTING CRCP TO NEW CRCP**

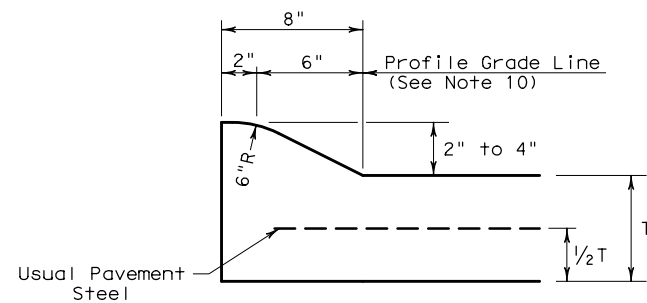


**CONTINUOUSLY REINFORCED
CONCRETE PAVEMENT
ONE LAYER STEEL BAR PLACEMENT
T - 7 to 13 INCHES
CRCP (1) - 20**

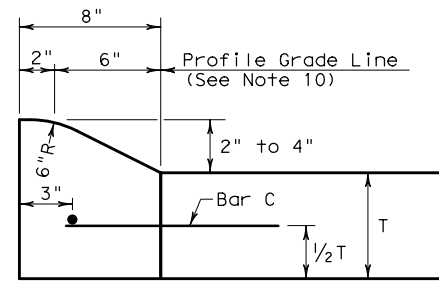
FILE: crcp120.dgn	DN: TxDOT	CK: KM	DW: AN	CK: VP
© TxDOT: APRIL 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	-	-	-	-
03/16/2020 REMOVED TABLE 1A	DIST	COUNTY	SHEET NO.	
	-	-	74	

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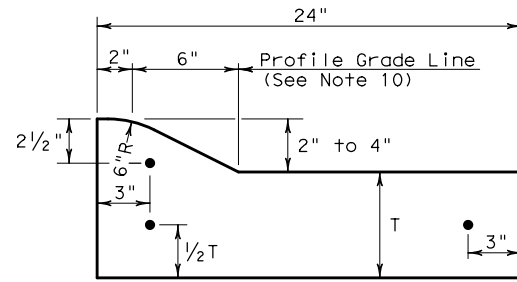
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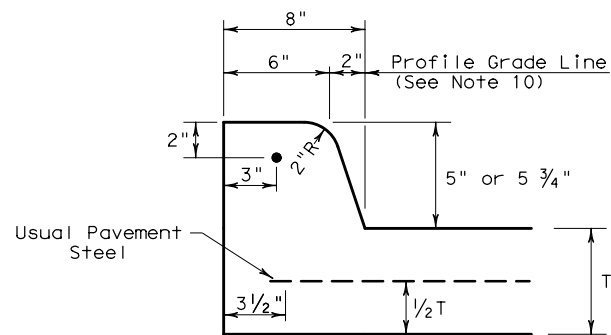
TYPE I CURB (MONOLITHIC)
 2" - 4" HEIGHT



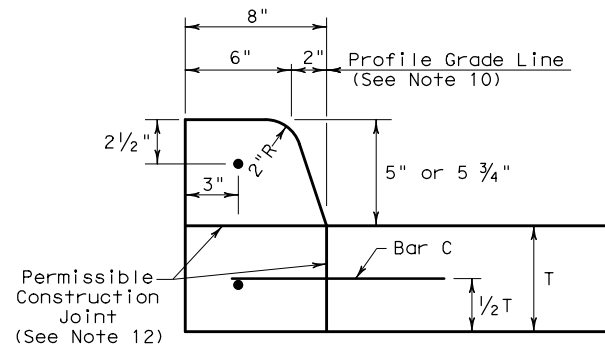
TYPE I CURB
 2" - 4" HEIGHT



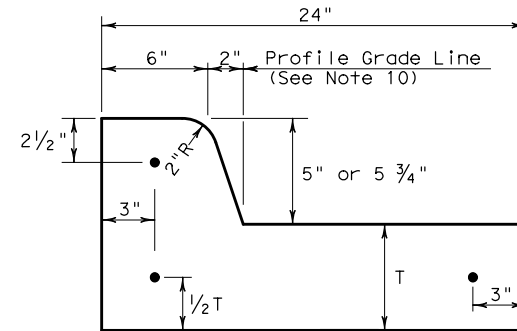
TYPE I CURB AND GUTTER
 2" - 4" HEIGHT



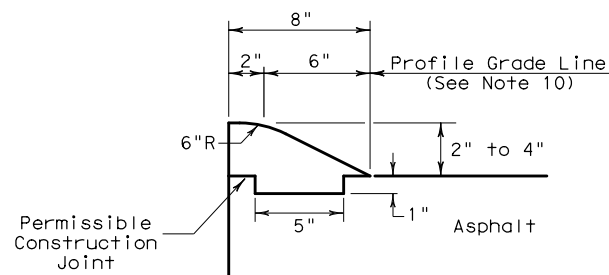
TYPE II CURB (MONOLITHIC)
 5" - 5 3/4" HEIGHT



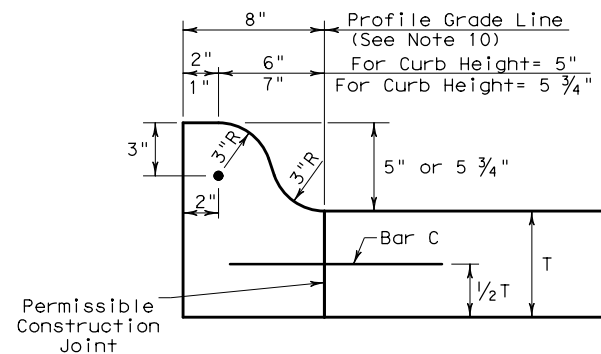
TYPE II CURB
 5" - 5 3/4" HEIGHT



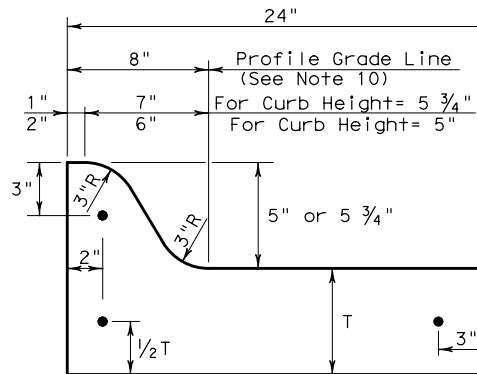
TYPE II CURB AND GUTTER
 5" - 5 3/4" HEIGHT



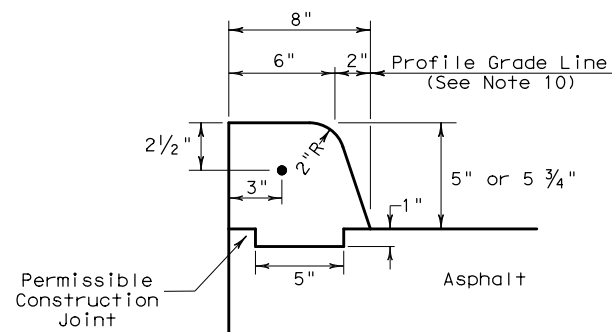
TYPE III CURB (KEYED)
 2" - 4" HEIGHT



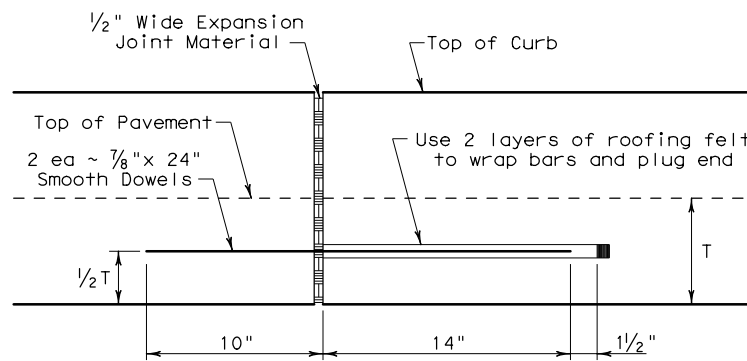
TYPE IIa CURB
 5" - 5 3/4" HEIGHT



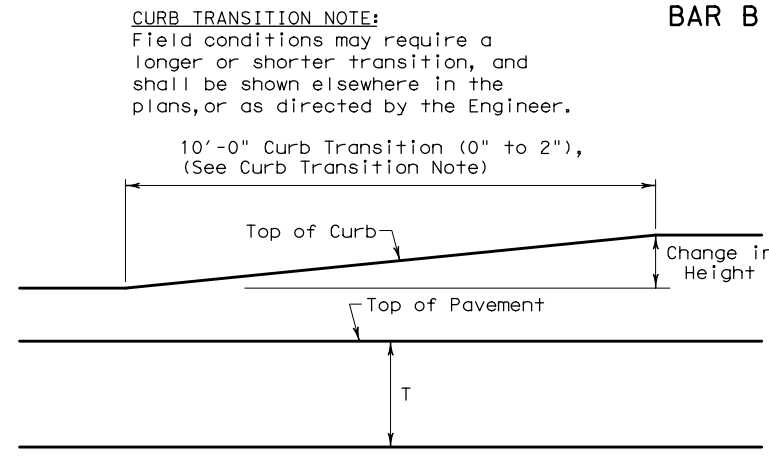
TYPE IIa CURB AND GUTTER
 5" - 5 3/4" HEIGHT



TYPE IV CURB (KEYED)
 5" - 5 3/4" HEIGHT



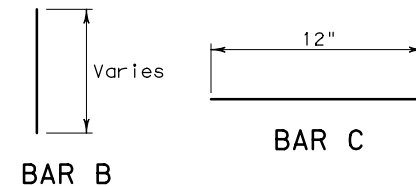
EXPANSION JOINT DETAIL



CURB TRANSITION
 Note: To be paid for as Highest Curb

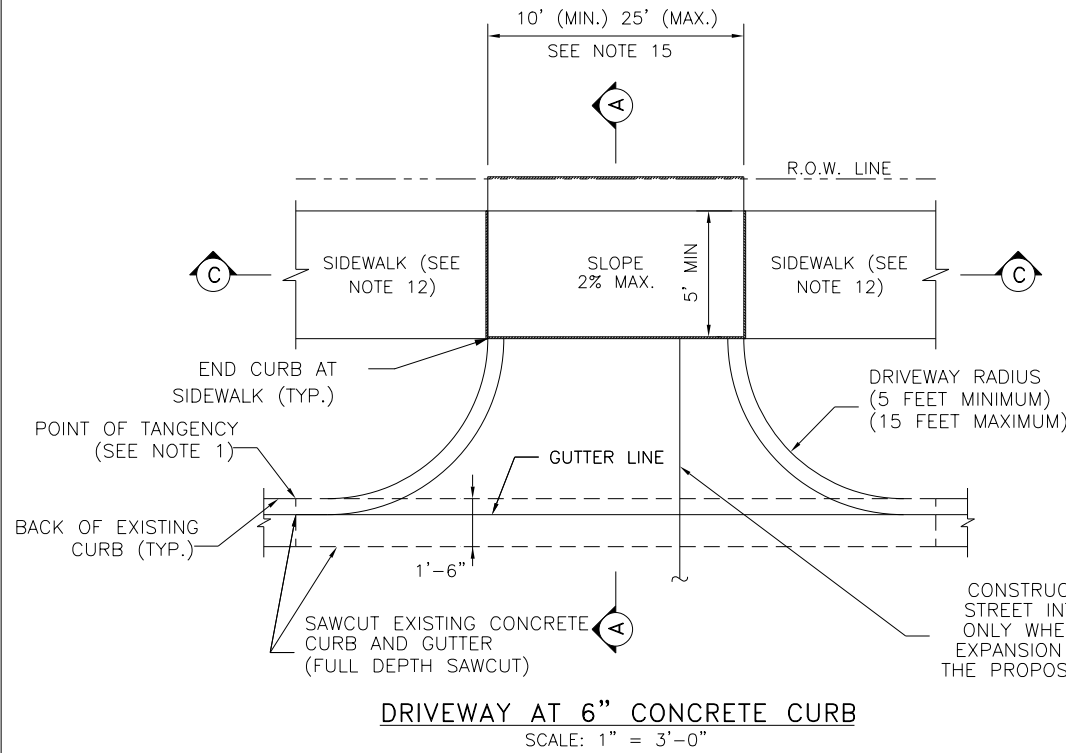
GENERAL NOTES

- All materials and construction shall be in accordance with Item 529, "Concrete Curb, Gutter, and Combined Curb and Gutter."
- Concrete shall be Class A.
- When reinforcing bars are used, they shall be No.4 unless otherwise shown. The use of fiber reinforced concrete in lieu of reinforcing steel is acceptable. Use fibers meeting the requirements of DMS 4550, "Fibers for Concrete," and dose fibers in accordance with Material Producers List (MPL) "Fibers for Class A and B Concrete Applications."
- Round exposed sharp edges with a rounding tool, to a minimum radius of 1/4 inch.
- All existing curbs and driveways to be removed shall be sawed or removed at existing joints.
- Where concrete curb is to be placed on existing concrete pavement, Bar B may be drilled and the grouted in place, or may be inserted into fresh concrete.
- Expansion and contraction joints shall be constructed to match pavement joints in all curbs and curb and gutter adjacent to jointed concrete pavement. Where placement of curb or curb and gutter is not adjacent to concrete pavement, expansion joints shall be provided at structures, curb returns at streets, and at locations directed by The Engineer.
- Vertical and horizontal dowel bars and transverse reinforcing bars shall be placed at four feet C-C.
- Dimension 'T' shown is the thickness of concrete pavement. When curb is installed adjacent to flexible pavement dimension 'T' is 8" maximum.
- Usual profile grade line. Refer to typical sections and plan-profile sheets for exact locations.
- One-half inch expansion joint material shall be provided where curb or curb and gutter is adjacent to sidewalk or riprap.
- When horizontal permissible construction joints are used, the longitudinal pavement steel shall be placed in accordance with pavement details shown elsewhere in the plans. Reinforcing steel for curb section shall then conform to that required for concrete curb.
- Bar B used as needed to support curb reinforcing steel during concrete placement.

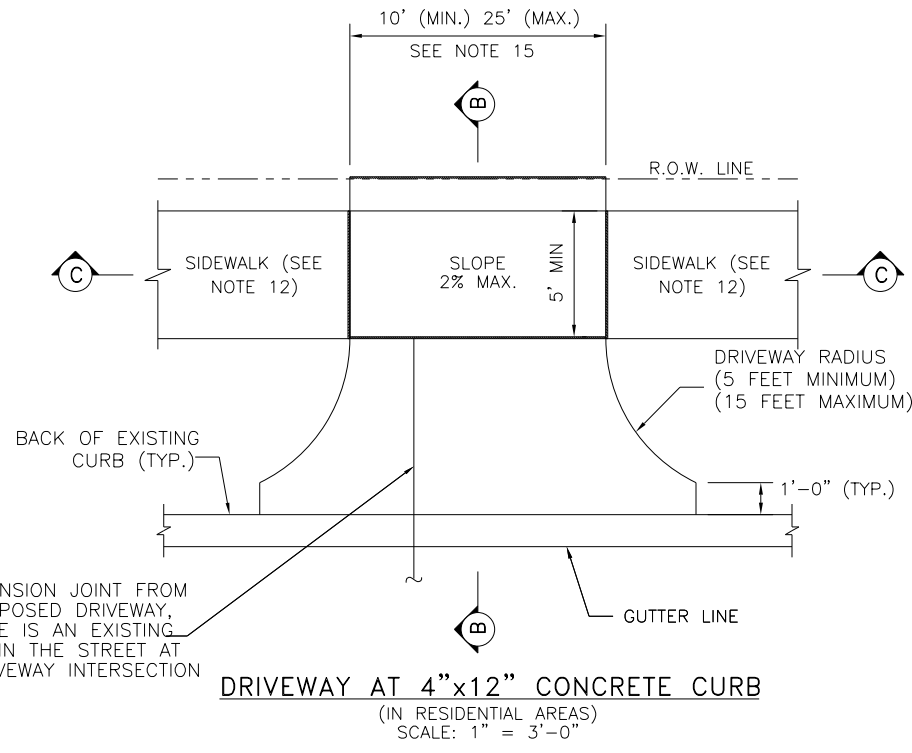


					Design Division Standard
CONCRETE CURB AND GUTTER					
CCCG-21					
FILE: cccg21.dgn	DN: TxDOT	CK: AN	DW: SS	CK: KM	
© TxDOT: FEBRUARY 2021	CONT	SECT	JOB	HIGHWAY	
REVISTONS	-	-	-	-	
	DIST	COUNTY		SHEET NO.	
	-	-		75	

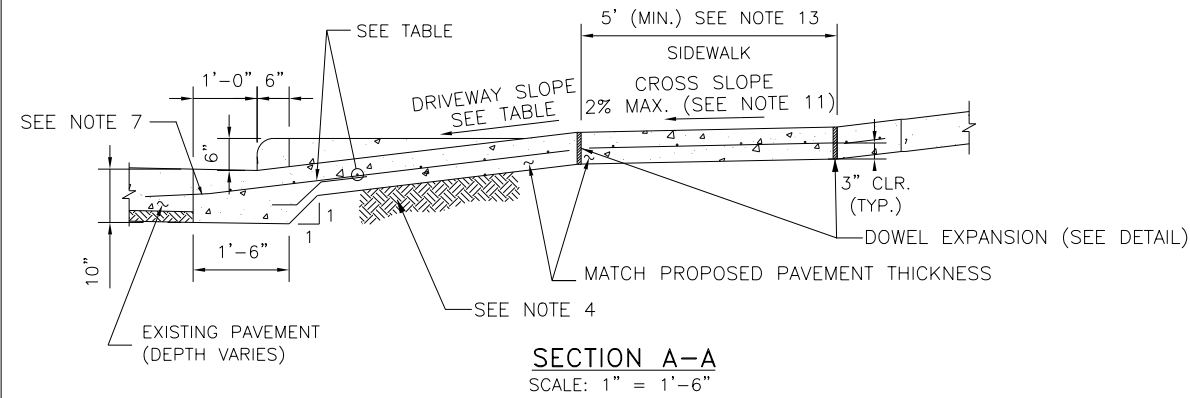
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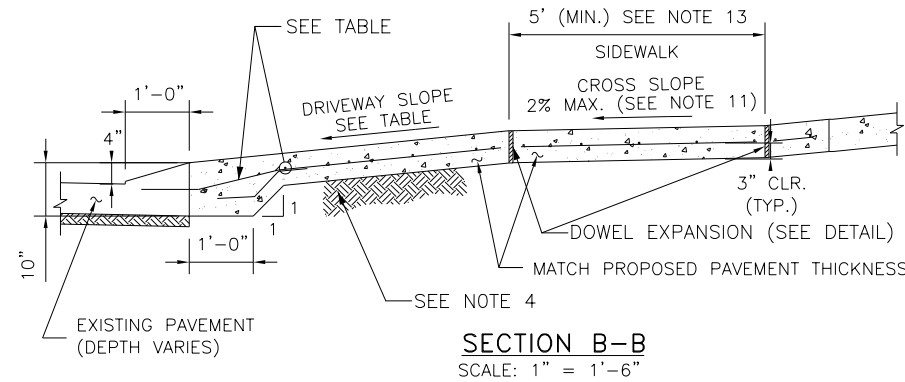
DRIVEWAY AT 6" CONCRETE CURB
SCALE: 1" = 3'-0"



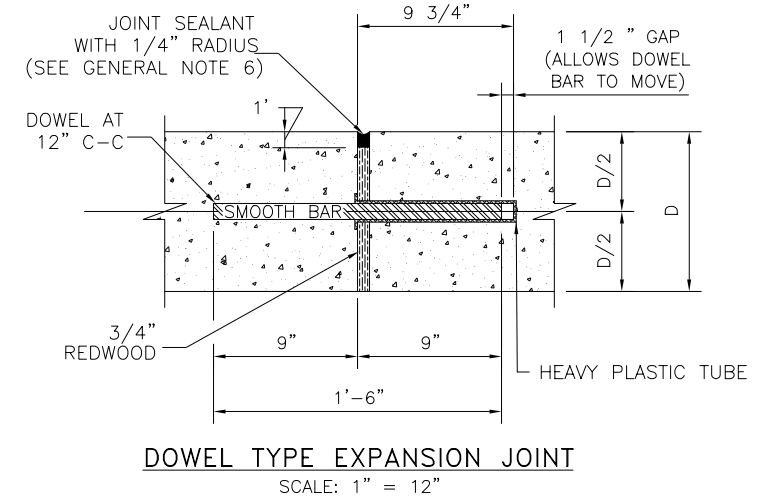
DRIVEWAY AT 4"x12" CONCRETE CURB
(IN RESIDENTIAL AREAS)
SCALE: 1" = 3'-0"



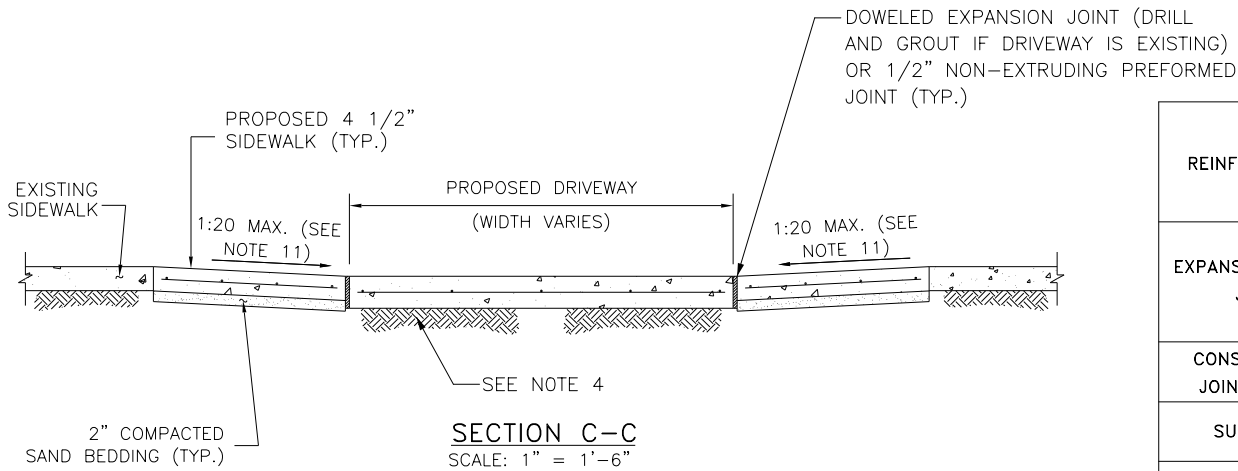
SECTION A-A
SCALE: 1" = 1'-6"



SECTION B-B
SCALE: 1" = 1'-6"



DOWEL TYPE EXPANSION JOINT
SCALE: 1" = 12"



SECTION C-C
SCALE: 1" = 1'-6"

	PAVEMENT THICKNESS	COLLECTOR/MAJOR	RESIDENTIAL (MAJOR THOROUGHFARE)	RESIDENTIAL (COLLECTORS AND LOCAL STREETS)
REINFORCEMENT	6"	#4 @ 24" O.C.E.W.	N/A	#4 @ 24" O.C.E.W.
	7"	#4 @ 24" O.C.E.W.	#4 @ 24" O.C.E.W.	#4 @ 24" O.C.E.W.
	8"	#4 @ 18" O.C.E.W.	#4 @ 18" O.C.E.W.	#4 @ 18" O.C.E.W.
	9"-10"	#5 @ 18" O.C.E.W.	#5 @ 18" O.C.E.W.	#5 @ 18" O.C.E.W.
EXPANSION DOWEL JOINT	6"	3/4" DIA. SMOOTH BAR	3/4" DIA. SMOOTH BAR	3/4" DIA. SMOOTH BAR
	7"	1" DIA. SMOOTH BAR	1" DIA. SMOOTH BAR	1" DIA. SMOOTH BAR
	8"	1" DIA. SMOOTH BAR	1" DIA. SMOOTH BAR	1" DIA. SMOOTH BAR
CONSTRUCTION JOINT DOWEL	ALL	#5 REBAR	#5 REBAR	#5 REBAR
	ALL	6" CEMENT-STABILIZED SAND	2" BANK SAND	2" BANK SAND
DRIVEWAY SLOPE	ALL	2% TO 4%	2% TO 6%	2% TO 10%*

*10% ALLOWABLE ON PRIVATELY CONSTRUCTED PROJECTS
6% MAX ON PUBLIC PROJECTS

NOTES:

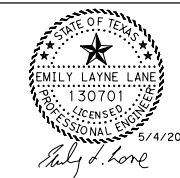
- PROPOSED DRIVEWAY AT 6" CONCRETE CURB SHALL MATCH EXISTING CURB AT POINT OF TANGENCY.
- PROPOSED DRIVEWAY SHALL BE BUILT WITH PORTLAND CEMENT CONCRETE, 5 1/2 SACK MINIMUM PER CUBIC YARD. 3,500 PSI STRENGTH AT 28 DAYS. THIS DRIVEWAY INSTALLATION IS GOVERNED BY HARRIS COUNTY ITEM 530.
- COMPACTION OF SUBGRADE TO 95% OF STANDARD PROCTOR DENSITY (ASTM D698) (± 2% OPTIMUM MOISTURE) FOR PROPOSED DRIVEWAY CONNECTION. THE COUNTY ENGINEER RESERVES THE RIGHT TO INSPECT AND REQUIRE LABORATORY TEST TO BE CONDUCTED.
- FOR COMMERCIAL DRIVEWAYS, USE 6" OF COMPACTED CEMENT STABILIZED SAND. FOR RESIDENTIAL DRIVEWAYS, USE 2" OF COMPACTED BANK SAND.
- A PROPOSED DRIVEWAY TO BE BUILT ON A CORNER LOT CANNOT BE LOCATED WITHIN ANY PORTION OF THE PUBLIC STREET CURB RADIUS. (THE POINTS OF TANGENCY MAY BE THE SAME POINT ALONG THE STREET CURB LINE)
- PROPOSED DRIVEWAY REINFORCING STEEL SHALL BE TIED TO EXISTING CONCRETE PAVEMENT WITH A MINIMUM LAP OF 16 INCHES.
- IF EXISTING STREET REBAR IS CUT OFF, THEN #4 DOWEL BARS (18" LONG) NEED TO BE INSTALLED AT 24" SPACING, EMBEDDED 9 INCHES AND EPOXIED OR MATCH EXISTING SPACING IF TIGHTER.
- 3" NON-METALLIC CHAIRS ARE REQUIRED.
- FOR CAPITAL IMPROVEMENT PROJECTS, THE SUBGRADE SHALL BE STABILIZED ACCORDING TO THE GEOTECHNICAL REPORT RECOMMENDATIONS.
- SAW AND SEAL ALL CONSTRUCTION JOINTS.
- SIDEWALK SLOPES SHALL COMPLY WITH THE TEXAS ACCESSIBILITY STANDARDS 403.3 "SLOPE"
- IF SIDEWALK IS EXISTING, SEE SECTION C-C.
- SIDEWALKS MAY BE REDUCED TO 4' IN FRONT OF SINGLE-FAMILY RESIDENTIAL LOTS WHEN A 5' PASSING AREA IS PROVIDED IN THE DRIVEWAY.
- FOR SIDEWALK DETAILS SEE SIDEWALK DETAILS SHEET
- DRIVEWAY WIDTHS ARE MEASURED AT THE ROW LINE

NO.	REVISIONS	DATE	NAME
1	ORIGINAL STANDARD ISSUED	3-1-22	RJS
2			
3			
4			

FORT BEND COUNTY
ENGINEERING DEPARTMENT

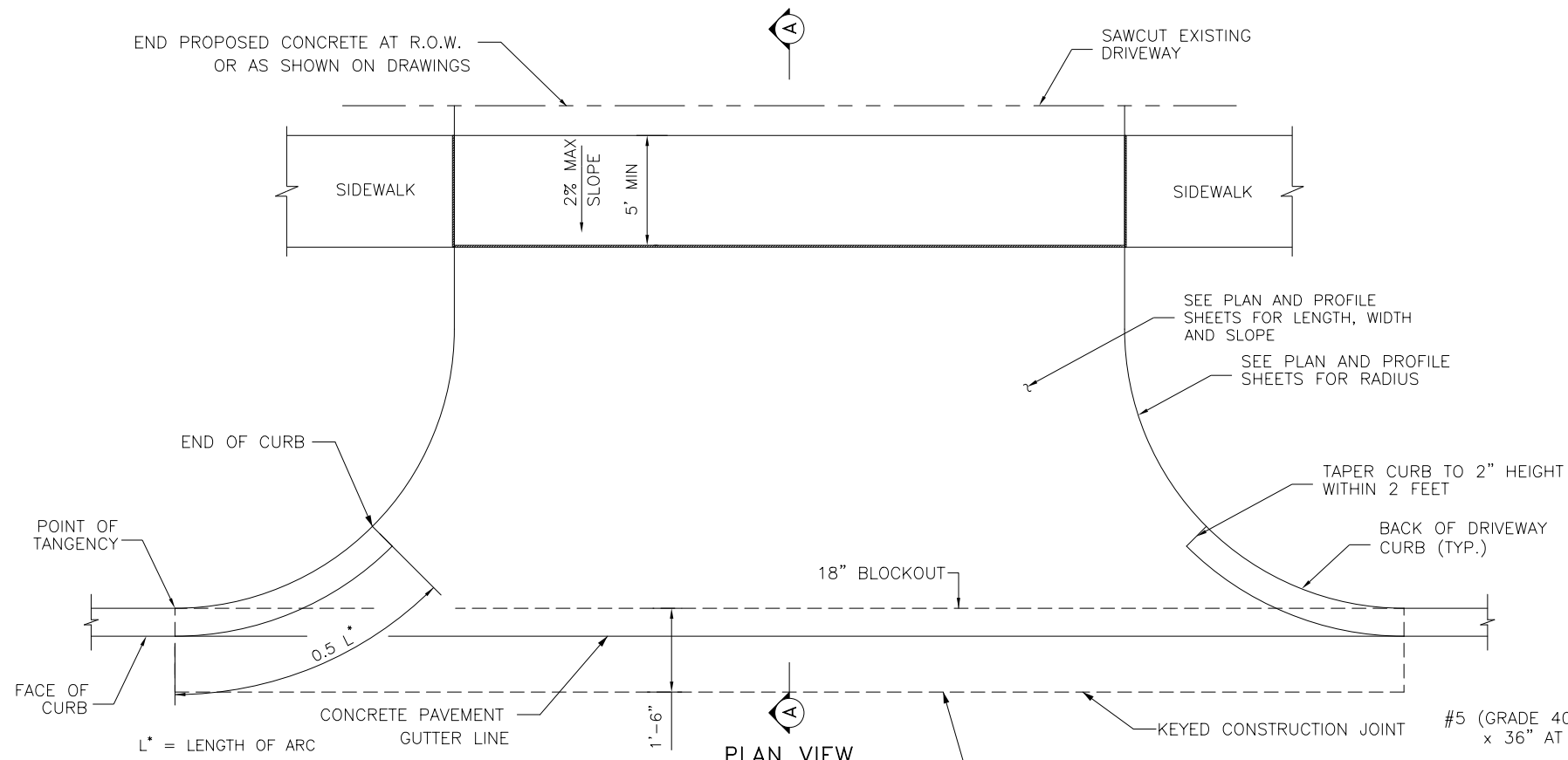


r.g. miller
engineers
16340 Park Ten Place
Suite 350
Houston, Texas 77084
(713) 461-9600
TEXAS FIRM REGISTRATION NO. F-487

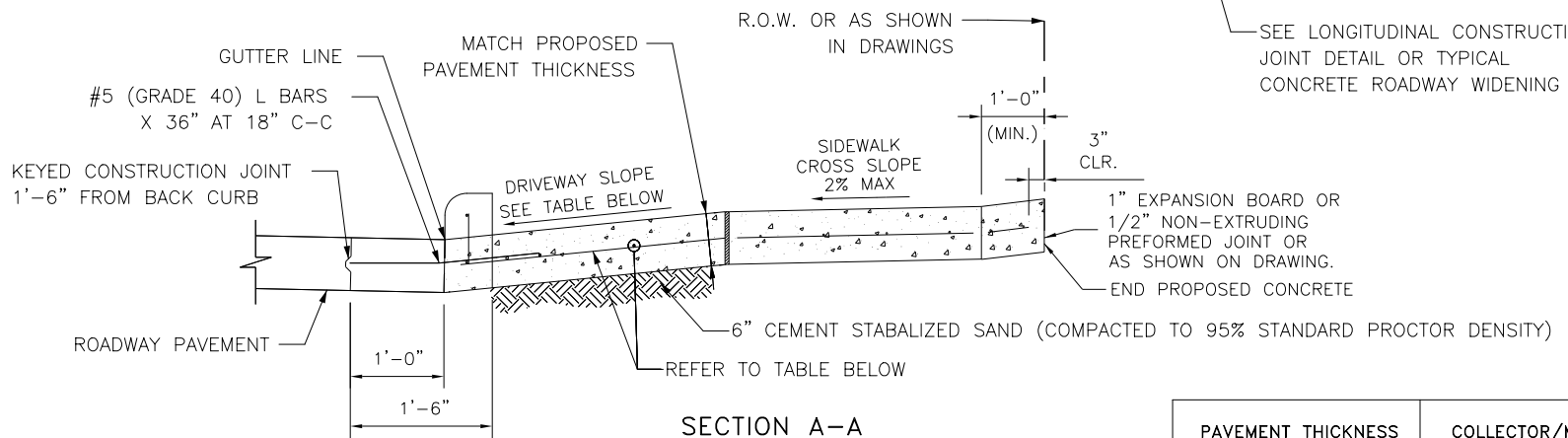


PROJECT TITLE: WIDENING AND RECONSTRUCTION OF RANSOM ROAD		
DRAWN BY: INIT	FROM SUGAR LAND CITY LIMIT TO SH 99	FRCD STANDARD
CK'D BY: INIT	SHEET DESCRIPTION: DRIVEWAY DETAILS FOR	11
SCALE: AS NOTED	RESIDENTIAL DRIVEWAYS	SHEET NO:
DATE: 3-1-22	APPROVED BY:	76 /123

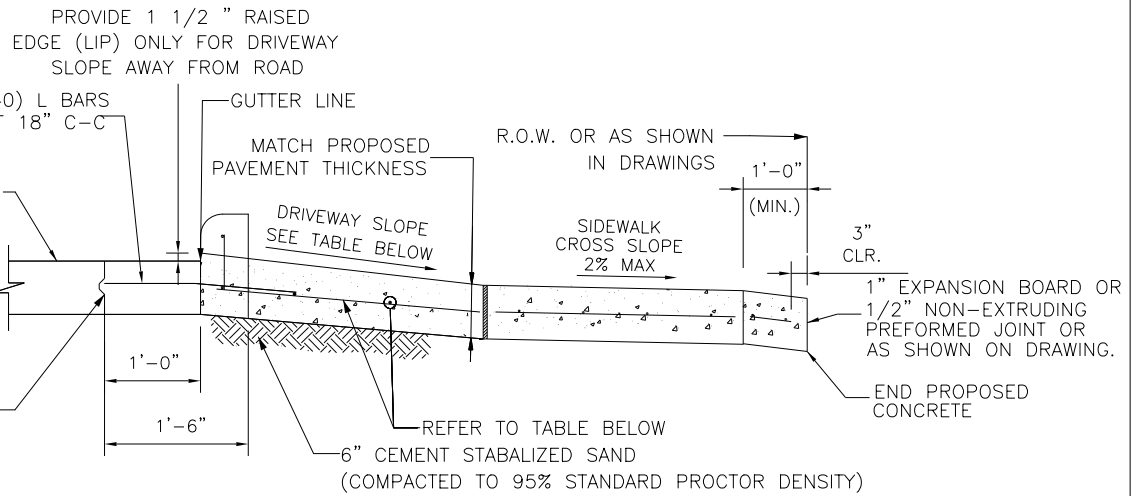
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PLAN VIEW



SECTION A-A
(DRIVEWAY SLOPES TO ROADWAY)



SECTION A-A
(DRIVEWAY SLOPES AWAY FROM ROADWAY)

NOTES:

1. SAWCUT EXISTING DRIVEWAY AT R.O.W. LINE OR AS SHOWN ON DRAWING AND REMOVE EXISTING DRIVEWAY TO SAWCUT LINE.
2. IF THERE IS EXISTING CURB ON DRIVEWAY, CONNECT PROPOSED CURB TO EXISTING CURB; OTHERWISE TAPER CURB HEIGHT AS SHOWN.
3. SEE PAVEMENT DETAIL SHEET FOR CONCRETE CURB REINFORCEMENT.
4. THIS DRIVEWAY INSTALLATION IS GOVERNED BY HARRIS COUNTY ITEM 360.
5. DRIVEWAY WIDTHS ARE MEASURED AT THE ROW LINE

MINIMUM RADII REQUIREMENTS - DRIVEWAYS

	LOCAL	COLLECTOR	MAJOR
RESIDENTIAL	5'	5'	-
COMMERCIAL	10'	10'	25'

DRIVEWAY WIDTHS

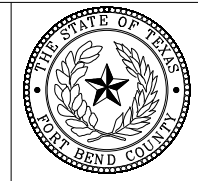
	MINIMUM	MAXIMUM
RESIDENTIAL	10'	25'
COMMERCIAL	20'	40'

	PAVEMENT THICKNESS	COLLECTOR/MAJOR	RESIDENTIAL (MAJOR THOROUGHFARE)	RESIDENTIAL (COLLECTORS AND LOCAL STREETS)
REINFORCEMENT	6"	#4 @ 24" O.C.E.W.	N/A	#4 @ 24" O.C.E.W.
	7"	#4 @ 24" O.C.E.W.	#4 @ 24" O.C.E.W.	#4 @ 24" O.C.E.W.
	8"	#4 @ 18" O.C.E.W.	#4 @ 18" O.C.E.W.	#4 @ 18" O.C.E.W.
	9"-10"	#5 @ 18" O.C.E.W.	#5 @ 18" O.C.E.W.	#5 @ 18" O.C.E.W.
EXPANSION DOWEL JOINT	6"	3/4" DIA. SMOOTH BAR	3/4" DIA. SMOOTH BAR	3/4" DIA. SMOOTH BAR
	7"	1" DIA. SMOOTH BAR	1" DIA. SMOOTH BAR	1" DIA. SMOOTH BAR
	8"	1" DIA. SMOOTH BAR	1" DIA. SMOOTH BAR	1" DIA. SMOOTH BAR
CONSTRUCTION JOINT DOWEL	9"-10"	1 1/4" DIA. SMOOTH BAR	1 1/4" DIA. SMOOTH BAR	1 1/4" DIA. SMOOTH BAR
	ALL	#5 REBAR	#5 REBAR	#5 REBAR
SUBGRADE	ALL	6" CEMENT-STABILIZED SAND	2" BANK SAND	2" BANK SAND
DRIVEWAY SLOPE	ALL	2% TO 4%	2% TO 6%	2% TO 10%*

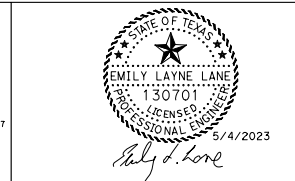
*10% ALLOWABLE ON PRIVATELY CONSTRUCTED PROJECTS
6% MAX ON PUBLIC PROJECTS

NO.	REVISIONS	DATE	NAME
1	ORIGINAL STANDARD ISSUED	3-1-22	RJS

FORT BEND COUNTY
ENGINEERING DEPARTMENT



r.g. miller engineers
16340 Park Ten Place
Suite 350
Houston, Texas 77084
(713) 461-9600
TEXAS FIRM REGISTRATION NO. F-487



PROJECT TITLE: WIDENING AND RECONSTRUCTION OF RANSOM ROAD		
DRAWN BY: INIT	FROM SUGAR LAND CITY LIMIT TO SH 99	FBCD STANDARD
CK'D BY: INIT	SHEET DESCRIPTION: DRIVEWAY DETAILS FOR	10
SCALE: 1"=1'-6"	MAJOR ROADWAY CONSTRUCTION	SHEET NO: 77/123
DATE: 3-1-22	APPROVED BY:	

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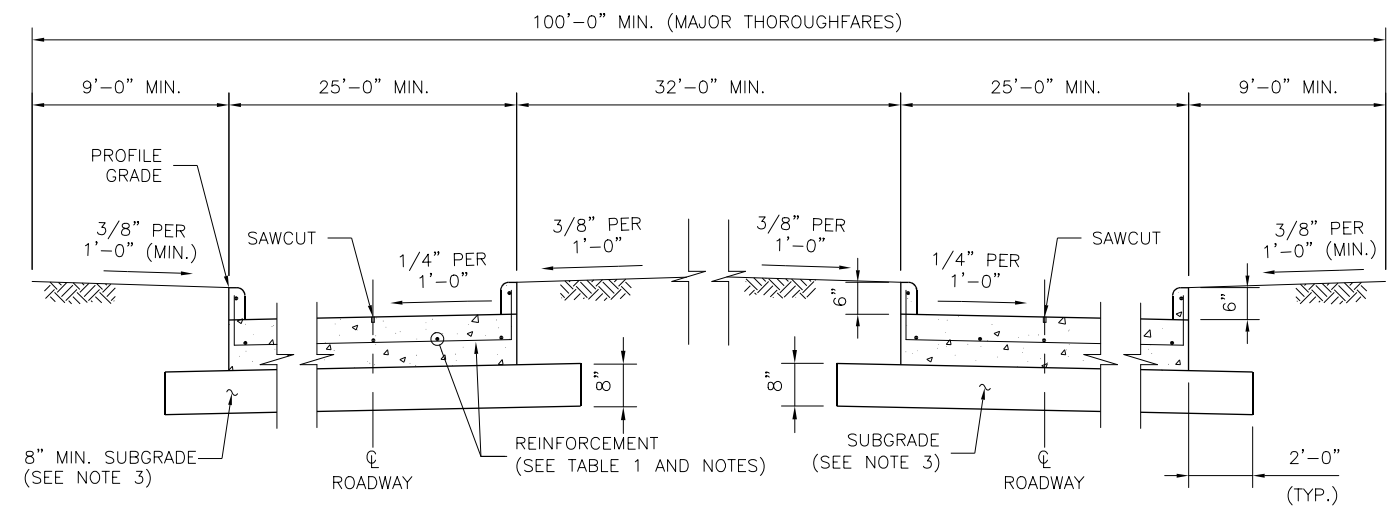
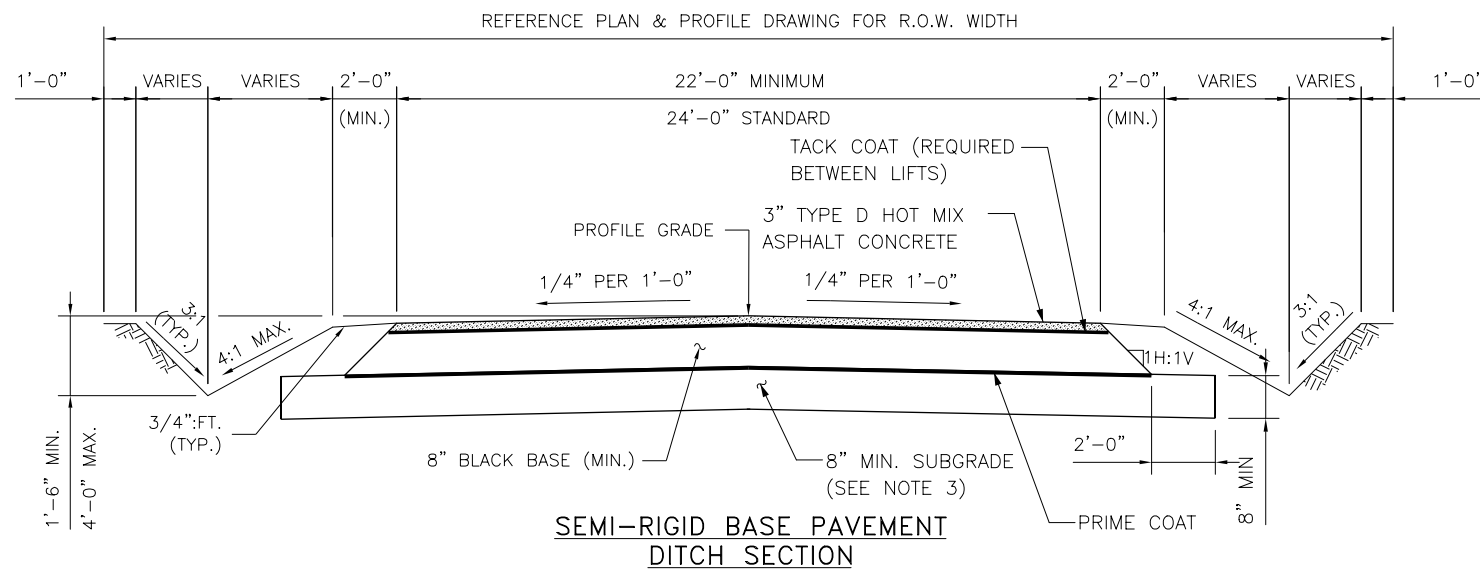
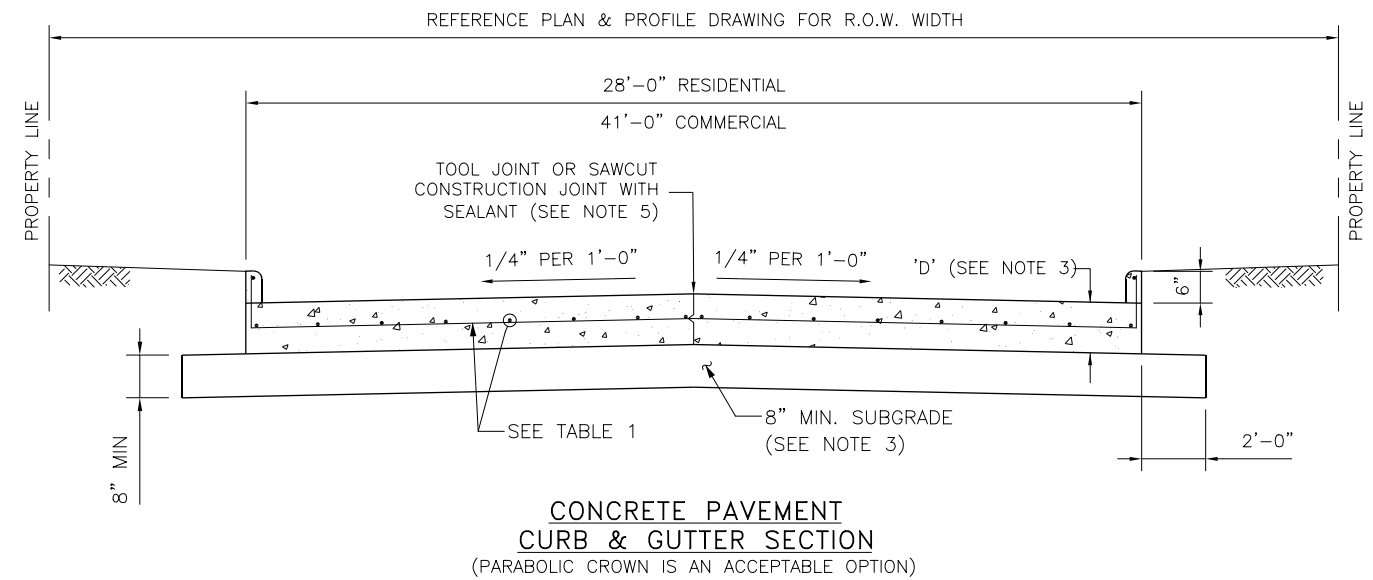
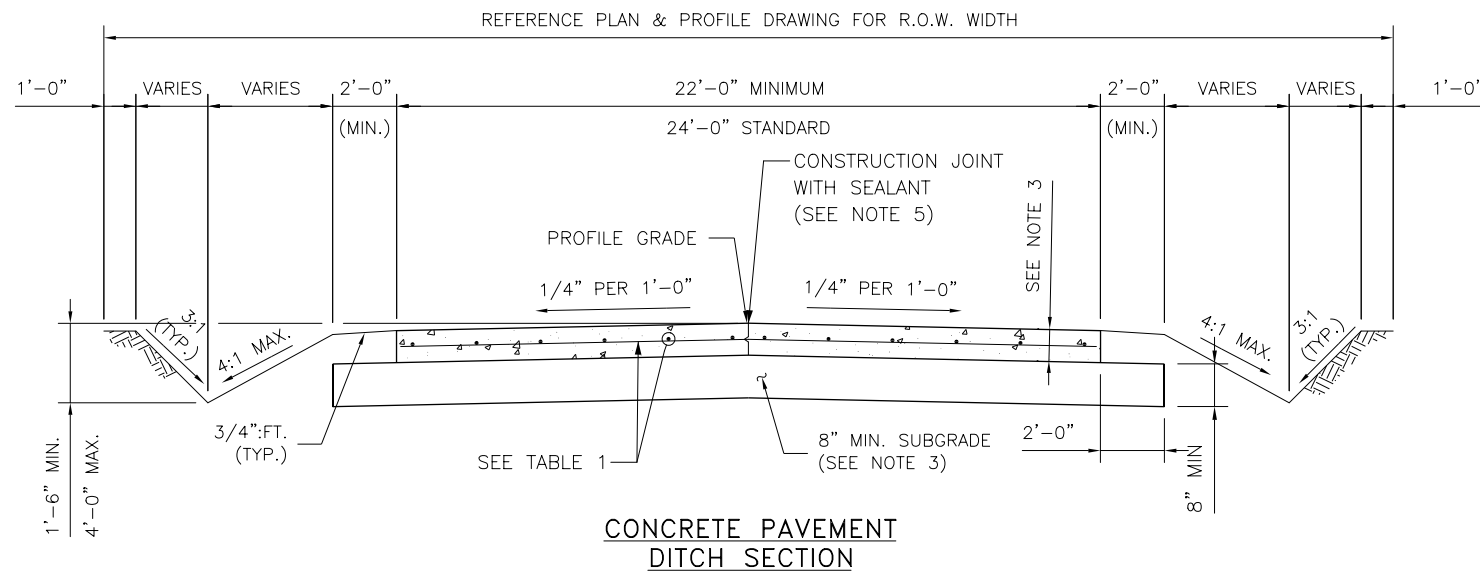


TABLE 1
(CONSTRUCTION JOINT DOWELS)

DOWEL SIZE	PAVEMENT DEPTH
#4 BAR	< 6"
#5 BAR	6" ≤ D < 9"
#6 BAR	≥ 9"

DOWEL SHALL BE DRILLED INTO EXISTING PAVEMENT (MIN. 10", MAX. 12") AND EPOXIED. (SEE ITEM 361.3).

NOTES:

- PAVEMENT SECTIONS SHOWN ARE INTENDED FOR DEVELOPMENT PROJECTS AND NOT FOR PUBLIC PROJECTS, WHERE WIDTH OF R.O.W. MAY VARY.
- PAVEMENT SECTIONS SHALL BE LOCATED IN CENTER OF R.O.W.
- SUBGRADE TREATMENT AND PAVEMENT THICKNESS AS DESIGNATED IN PLANS
- REFERENCE CONSTRUCTION JOINT DETAIL ON THE STANDARD CIVIL DRAWING "CONCRETE PAVEMENT DETAILS - SHEET 1 OF 2" FOR JOINT AND SEALANT REQUIREMENTS.
- NO TRAFFIC ON CONCRETE PAVEMENT FOR 7 DAYS AND COMPRESSIVE STRENGTH OF 3,500 psi HAS BEEN REACHED.
- ALL CONSTRUCTION JOINTS SHALL BE SEALED

TYPICAL SECTIONS FOR MAJOR THOROUGHFARES

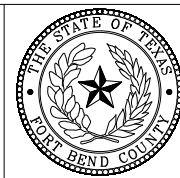
HORIZONTAL SCALE: 1"=3'-0"
VERTICAL SCALE: 1"=1'-6"

SLAB AND REBAR NOTES:

- TYPICAL SLAB THICKNESS D=8"
- TYPICAL REBAR SIZE AND SPACING ARE:
 - #4 BAR @ 18" C-C LONGITUDINAL
 - #4 BAR @ 18" C-C TRANSVERSE
- REBAR SIZE FOR PAVEMENT LESS THAN 8" THICK
 - #4 BAR @ 24" C-C LONGITUDINAL
 - #4 BAR @ 24" C-C TRANSVERSE
- REBAR SHALL NOT BE PLACED WITHIN 3" FROM THE EDGE OF PAVEMENT.
- TYPICAL STABILIZED SUBGRADE THICKNESS IS 8 INCHES.
- FOR HEAVY INDUSTRIAL TRAFFIC, SLAB THICKNESS AND REBAR SIZE AND SPACING WILL BE AS PER GEOTECHNICAL RECOMMENDATION.
- ALL BENT BARS SHALL BE GRADE 40 STEEL, ALL OTHER SHALL BE GRADE 60.
- MINIMUM LAP SPLICE 16".
- LAP SPLICES SHOULD BE ON ALTERNATING BARS, ADJACENT LAP SPLICES ARE NOT ACCEPTABLE.

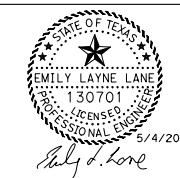
NO.	REVISIONS	DATE	NAME
1	ORIGINAL STANDARD ISSUED	3-1-22	RJS

FORT BEND COUNTY
ENGINEERING DEPARTMENT



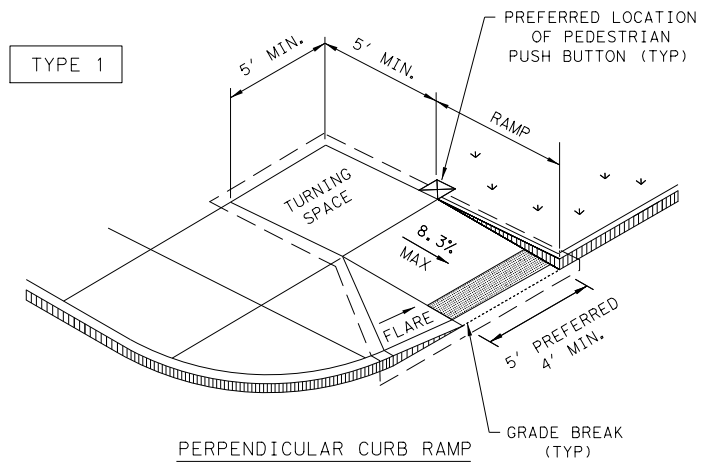
r.g. miller
engineers
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16340 Park Ten Place
Suite 350
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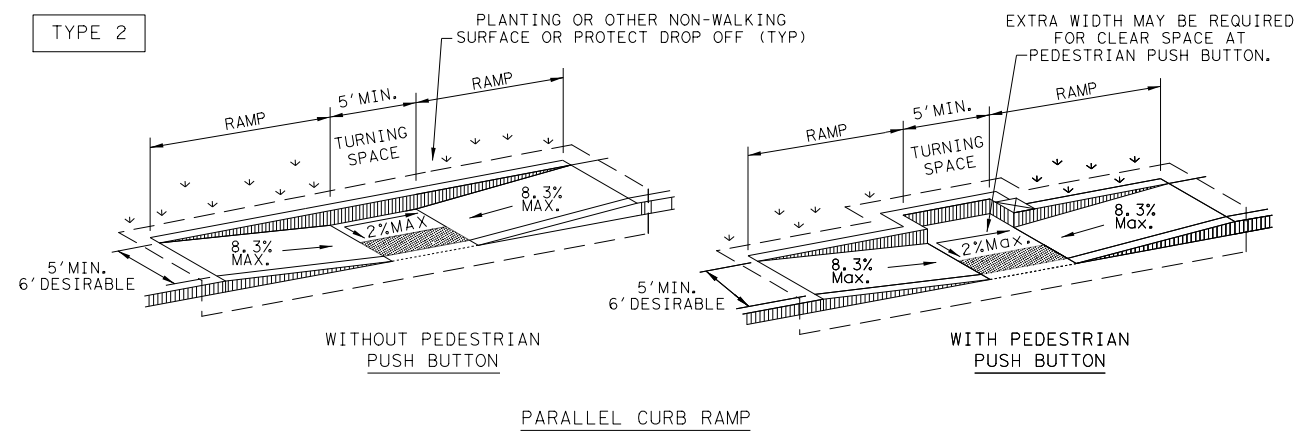


PROJECT TITLE: WIDENING AND RECONSTRUCTION OF RANSOM ROAD		
DRAWN BY: INIT	FROM SUGAR LAND CITY LIMIT TO SH 99	FBCD STANDARD
CK'D BY: INIT	SHEET DESCRIPTION: TYPICAL PAVEMENT SECTIONS	09
SCALE: AS NOTED	FOR DEVELOPMENT PROJECTS	SHEET NO:
DATE: 3-1-22	APPROVED BY:	78 / 123

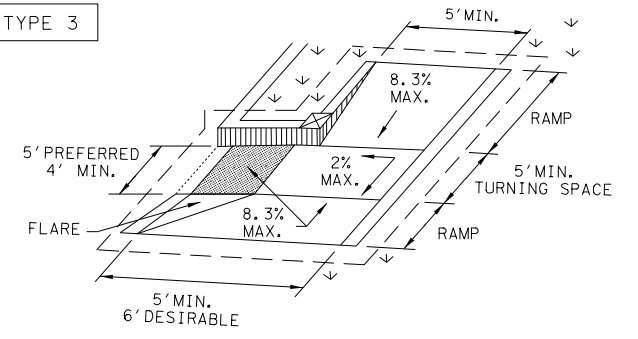
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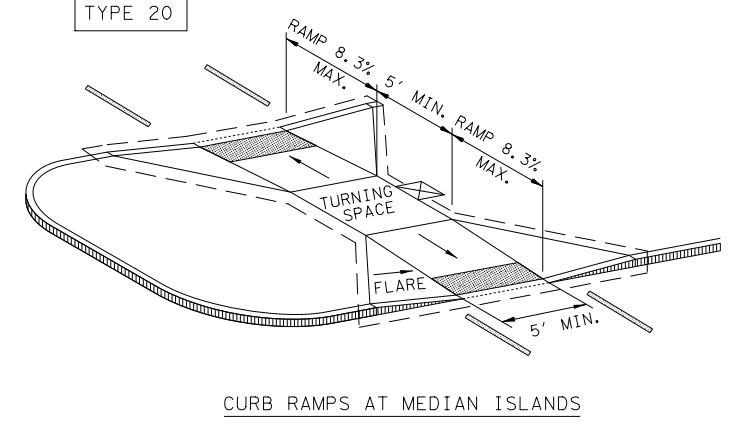
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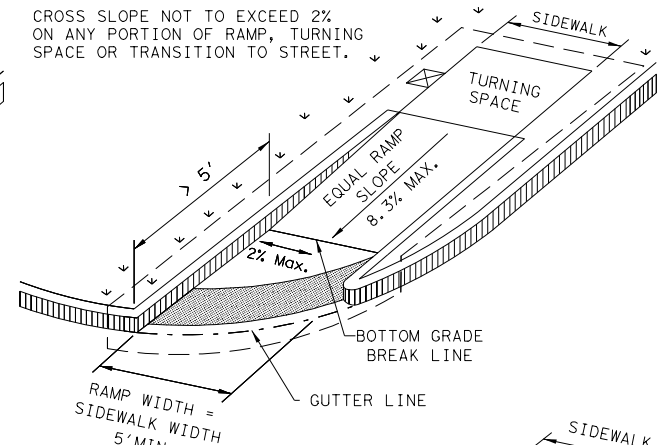
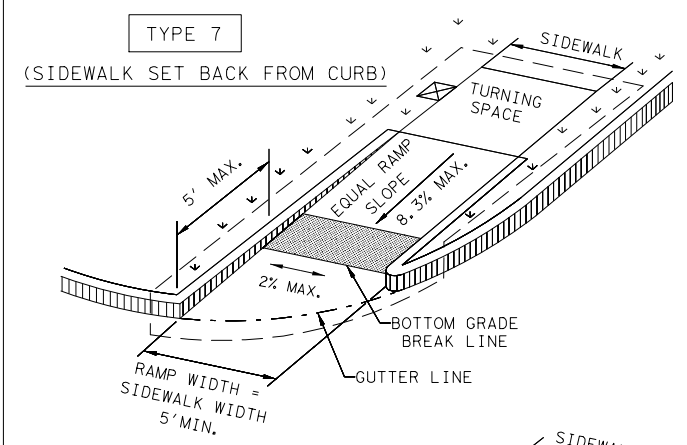
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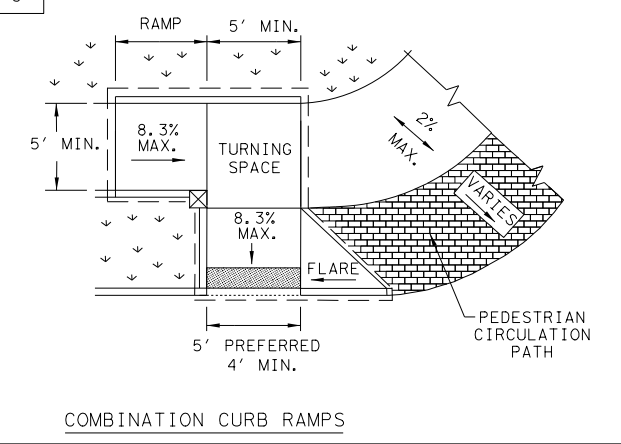
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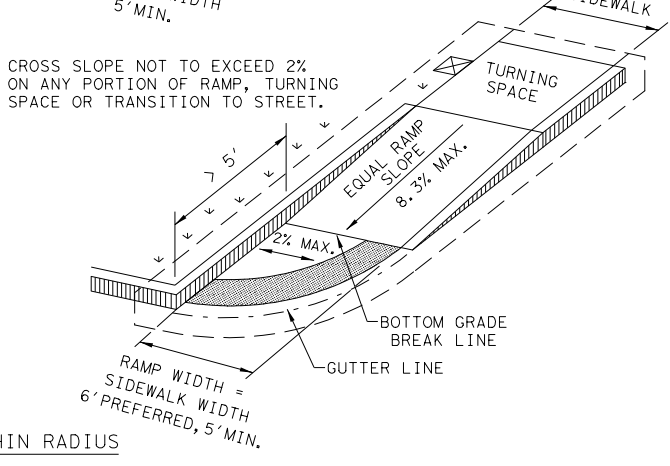
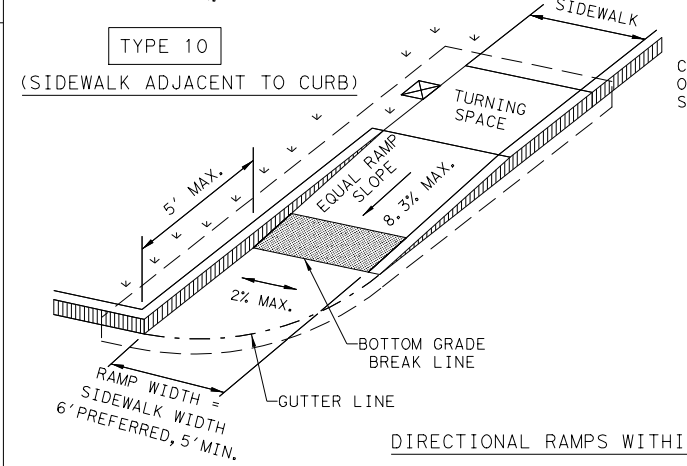
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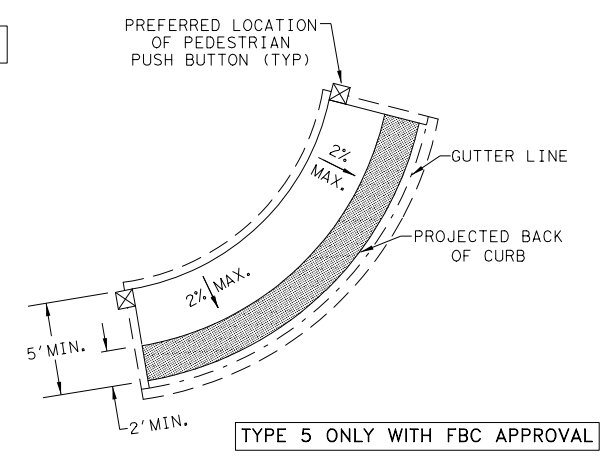
TYPE 6



TYPE 10

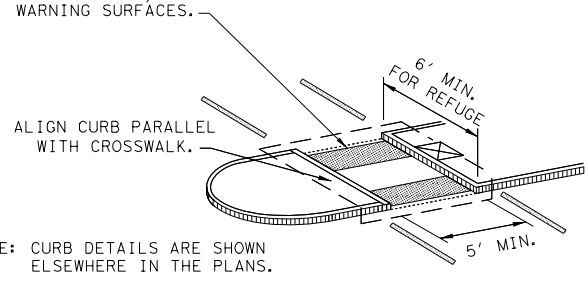


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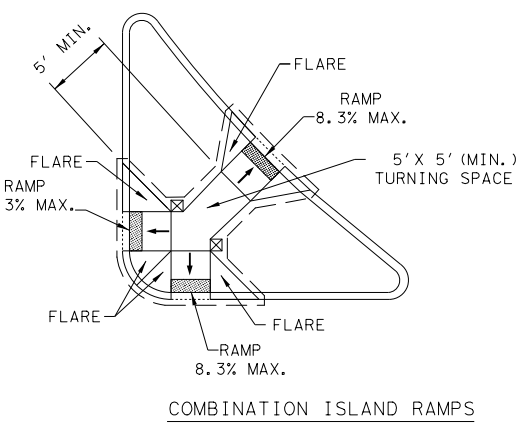


INSTALL DETECTABLE WARNING SURFACE AT EACH END OF THE CUT-THROUGH RAMP WITH A MINIMUM 2' USUAL SIDEWALK SURFACE BETWEEN. IF MEDIAN IS LESS THAN 6' WIDE, ELIMINATE DETECTABLE WARNING SURFACES.

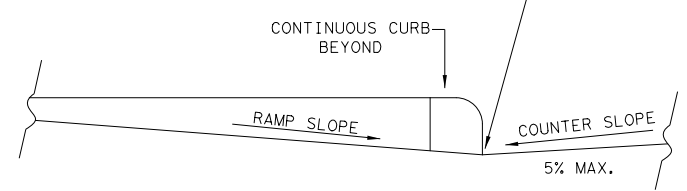
TYPE 21



TYPE 22



BOTTOM GRADE BREAK OF CURB RAMP WILL NORMALLY BE AT GUTTER LINE. SURFACE SLOPES AT GRADE BREAKS SHALL BE FLUSH.



NOTES / LEGEND:

SEE GENERAL NOTES ON SHEET 2 OF 4 FOR MORE INFORMATION.

DENOTES PLANTING OR NON-WALKING SURFACE NOT PART OF PEDESTRIAN CIRCULATION PATH.



GUTTER LINE



DETECTABLE WARNING SURFACE



GRADE BREAK



DENOTES PREFERRED LOCATION OF PEDESTRIAN PUSH BUTTON IF APPLICABLE.



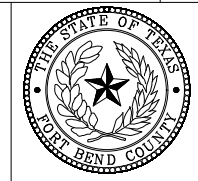
RAMP LIMITS OF PAYMENT



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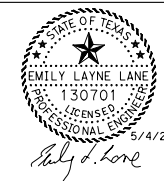
NO.	REVISIONS	DATE	NAME
1	ORIGINAL STANDARD ISSUED	3-1-22	RJS
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FORT BEND COUNTY
ENGINEERING DEPARTMENT



r.g. miller
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PROJECT TITLE: WIDENING AND RECONSTRUCTION OF RANSOM ROAD		
DRAWN BY: INIT	FROM SUGAR LAND CITY LIMIT TO SH 99	FBCD STANDARD
CK'D BY: INIT	SHEET DESCRIPTION: PED-18 RAMP DETAILS	14
SCALE: 1" = 1'	SHEET 1 OF 4	SHEET NO: 79 /123
DATE: 3-1-22	APPROVED BY:	

GENERAL NOTES

CURB RAMPS

1. Install a curb ramp or blended transition at each pedestrian street crossing.
2. All slopes shown are maximum allowable. Cross slopes of 1.5% and lesser running should be used. Adjust curb ramp length or grade of approach sidewalks as directed.
3. Maximum allowable cross slope on sidewalk and curb ramp surfaces is 2%.
4. The minimum sidewalk width is 5'. Where the sidewalk is adjacent to the back of curb, a 6' sidewalk width is desirable. Where a 5' sidewalk cannot be provided due to site constraints, sidewalk width may be reduced to 4' for short distances. 5' x 5' passing areas at intervals not to exceed 200' are required.
5. Turning Spaces shall be 5' x 5' minimum. Cross slope shall be maximum 2%.
6. Clear space at the bottom of curb ramps shall be a minimum of 4' x 4' wholly contained within the crosswalk and wholly outside the parallel vehicular travel path.
7. Provide flared sides where the pedestrian circulation path crosses the curb ramp. Flared sides shall be sloped at 10% maximum, measured parallel to the curb. Returned curbs may be used only where pedestrians would not normally walk across the ramp, either because the adjacent surface is planted, substantially obstructed, or otherwise protected.
8. Additional information on curb ramp location, design, light reflective value and texture may be found in the latest draft of the Proposed Guidelines for Pedestrian Facilities in the Public Right of Way (PROWAG) as published by the U.S. Architectural and Transportation Barriers Compliance Board (Access Board).
9. To serve as a pedestrian refuge area, the median should be a minimum of 6' wide, measured from back of curbs. Medians should be designed to provide accessible passage over or through them.
10. Small channelization islands, which do not provide a minimum 5' x 5' landing at the top of curb ramps, shall be cut through level with the surface of the street.
11. Crosswalk dimensions, crosswalk markings and stop bar locations shall be as shown elsewhere in the plans. At intersections where crosswalk markings are not required, curb ramps shall align with theoretical crosswalks unless otherwise directed.
12. Provide curb ramps to connect the pedestrian access route at each pedestrian street crossing. Handrails are not required on curb ramps.
13. Curb ramps and landings shall be constructed and paid for in accordance with Item 531 "Sidewalks".
14. Place concrete at a minimum depth of 5" for ramps, flares and landings, unless otherwise directed.
15. Furnish and install No. 3 reinforcing steel bars at 18" o.c. both ways, unless otherwise directed.
16. Provide a smooth transition where the curb ramps connect to the street.
17. Curbs shown on sheet 1 within the limits of payment are considered part of the curb ramp for payment, whether it is concrete curb, gutter, or combined curb and gutter.
18. Existing features that comply with applicable standards may remain in place unless otherwise shown on the plans.

DETECTABLE WARNING MATERIAL

19. Curb ramps must contain a detectable warning surface that consists of raised truncated domes complying with PROWAG. The surface must contrast visually with adjoining surfaces, including side flares. Furnish and install an approved cast-in-place dark brown or dark red detectable warning surface material adjacent to uncolored concrete, unless specified elsewhere in the plans.
20. Detectable Warning Materials must meet TxDOT Departmental Materials Specification DMS 4350 and be listed on the Material Producer List. Install products in accordance with manufacturer's specifications.
21. Detectable warning surfaces must be firm, stable and slip resistant.
22. Detectable warning surfaces shall be a minimum of 24 inches in depth in the direction of pedestrian travel, and extend the full width of the curb ramp or landing where the pedestrian access route enters the street.
23. Detectable warning surfaces shall be located so that the edge nearest the curb line is at the back of curb and neither end of that edge is greater than 5 feet from the back of curb. Detectable warning surfaces may be curved along the corner radius.
24. Shaded areas on Sheet 1 of 4 indicate the approximate location for the detectable warning surface for each curb ramp type.

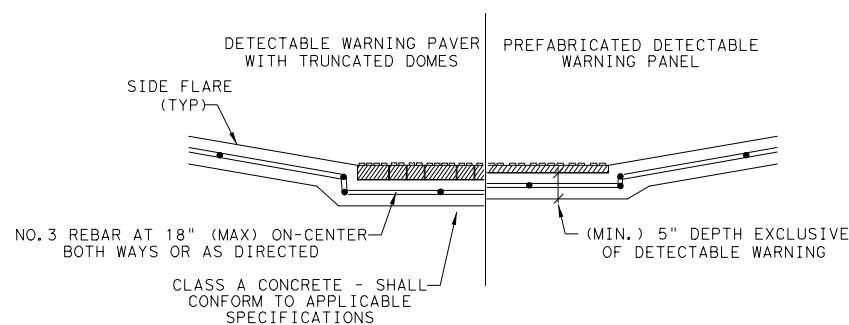
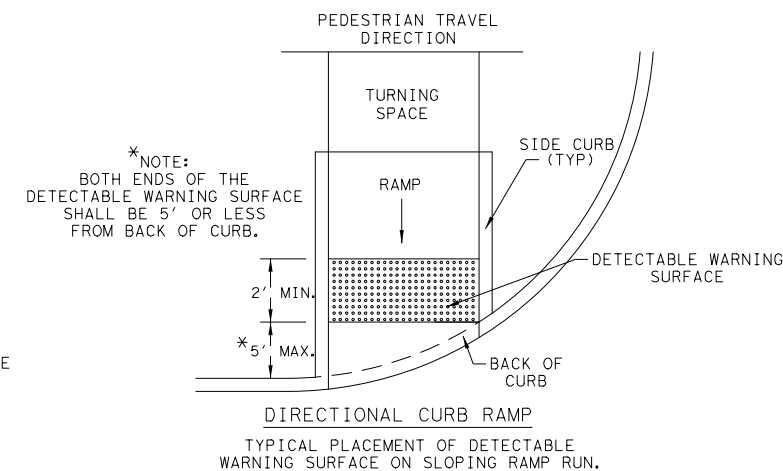
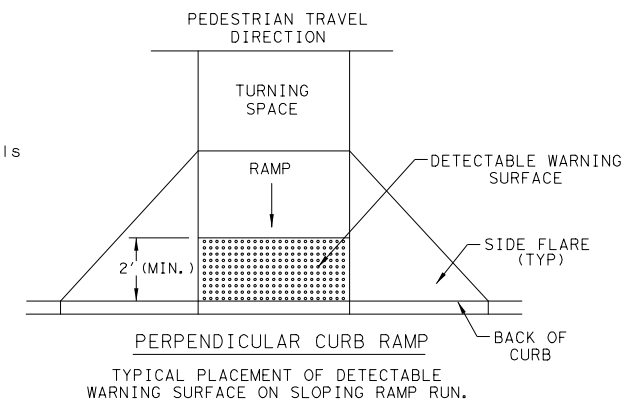
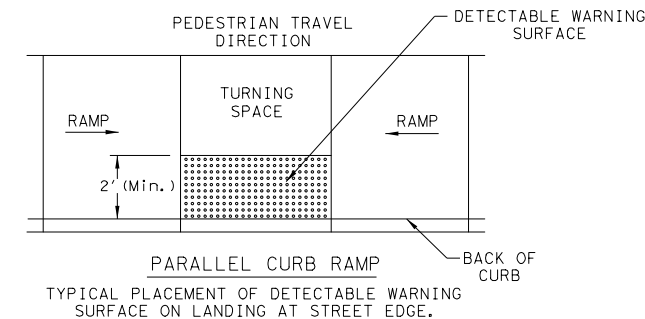
DETECTABLE WARNING PAVERS (IF USED)

25. Furnish detectable warning paver units meeting all requirements of ASTM C-936, C-33. Lay in a two by two unit basket weave pattern or as directed.
26. Lay full-size units first followed by closure units consisting of at least 25 percent (25%) of a full unit. Cut detectable warning paver units using a power saw.

SIDEWALKS

27. Provide clear ground space at operable parts, including pedestrian push buttons. Operable parts shall be placed within unobstructed reach range specified in PROWAG section R406.
28. Place traffic signal or illumination poles, ground boxes, controller boxes, signs, drainage facilities and other items so as not to obstruct the pedestrian access route or clear ground space.
29. Street grades and cross slopes shall be as shown elsewhere in the plans.
30. Changes in level greater than 1/4 inch are not permitted.
31. The least possible grade should be used to maximize accessibility. The running slope of sidewalks and crosswalks within the public right of way may follow the grade of the parallel roadway. Where a continuous grade greater than five percent (5%) must be provided, handrails may be desirable to improve accessibility. Handrails may also be needed to protect pedestrians from potentially hazardous conditions. If provided, handrails shall comply with PROWAG R409.
32. Handrail extensions shall not protrude into the usable landing area or into intersecting pedestrian routes.
33. Driveways and turnouts shall be constructed and paid for in accordance with Item "Intersections, Driveways and Turnouts". Sidewalks shall be constructed and paid for in accordance with Item, "Sidewalks".
34. Sidewalk details are shown elsewhere in the plans.

DETECTABLE WARNING SURFACE DETAILS



SECTION VIEW DETAIL
CURB RAMP AT DETECTABLE WARNINGS

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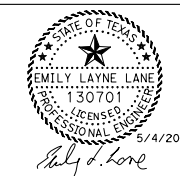
NO.	REVISIONS	DATE	NAME
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FORT BEND COUNTY
ENGINEERING DEPARTMENT



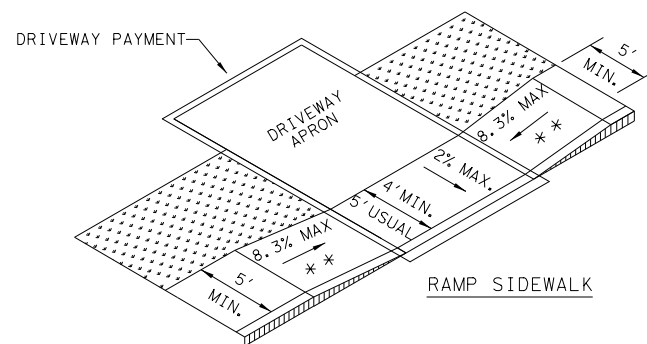
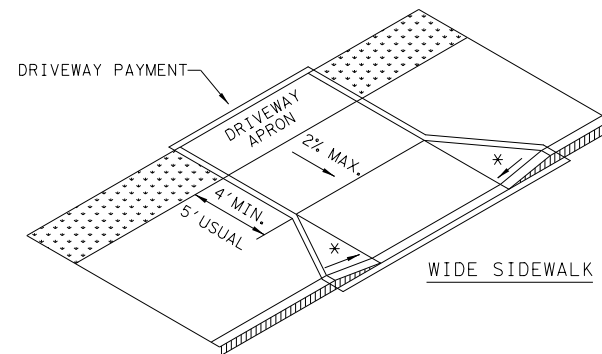
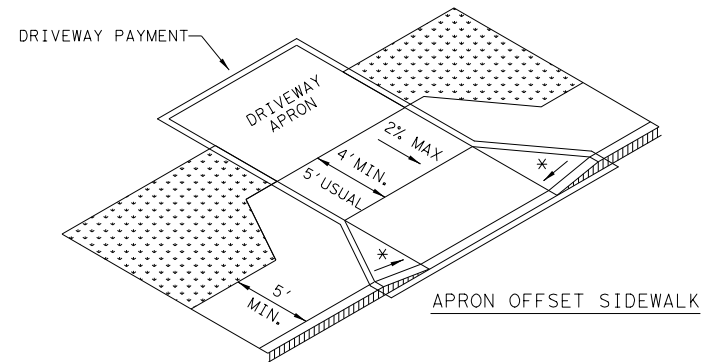
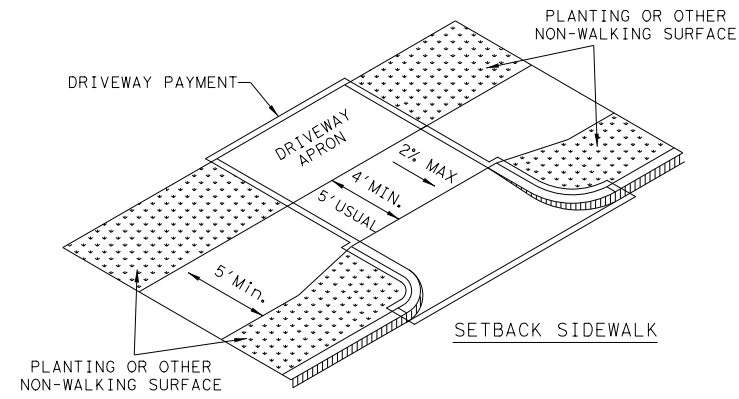
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TEXAS FIRM REGISTRATION NO. F-487

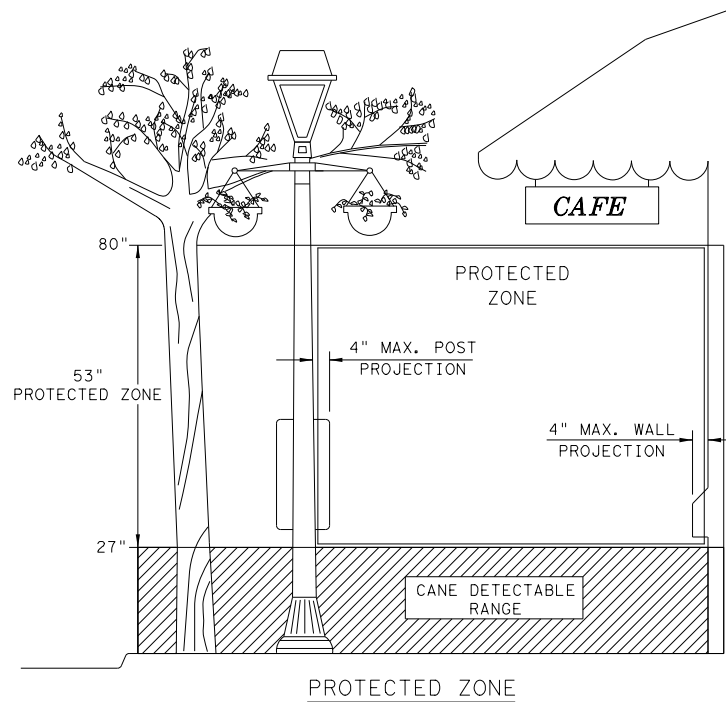


PROJECT TITLE: WIDENING AND RECONSTRUCTION OF RANSOM ROAD		
DRAWN BY: INIT	FROM SUGAR LAND CITY LIMIT TO SH 99	FBCD STANDARD
CK'D BY: INIT	SHEET DESCRIPTION: PED-18 RAMP DETAILS	15
SCALE: 1" = 1'	SHEET 2 OF 4	SHEET NO:
DATE: 3-1-22	APPROVED BY:	80 / 123

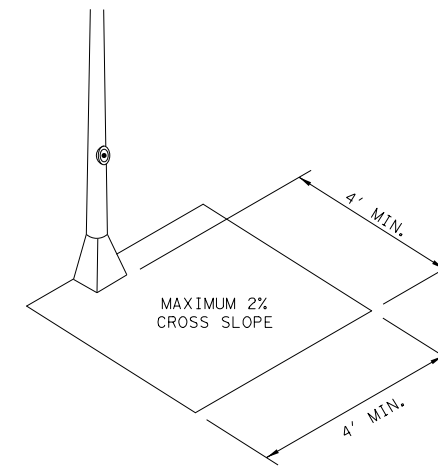
SIDEWALK TREATMENT AT DRIVEWAYS



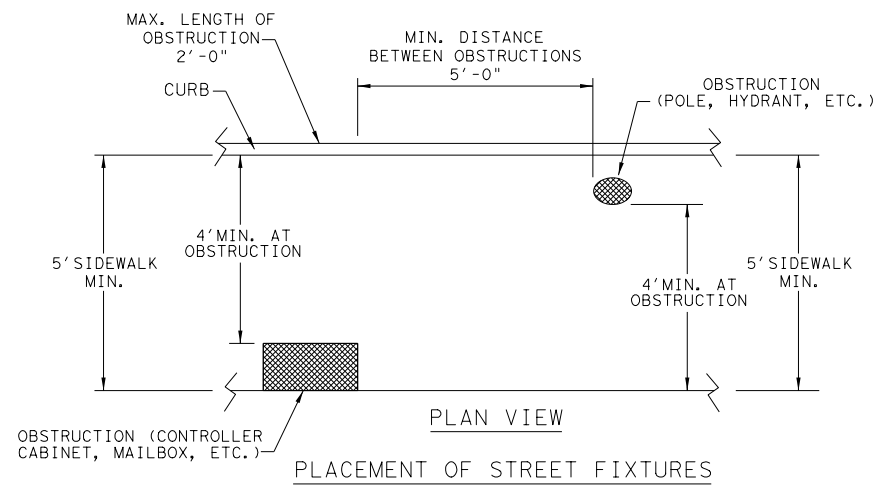
NOTES:
 * WHERE DRIVEWAYS CROSS THE PEDESTRIAN ROUTE, SIDES SHALL BE FLARED AT 10% MAX SLOPE.
 * * IF CURB HEIGHT IS GREATER THAN 6 INCHES, USE GRADE LESS THAN OR EQUAL TO 5%. HANDRAIL AND DETECTABLE WARNING ARE NOT REQUIRED.



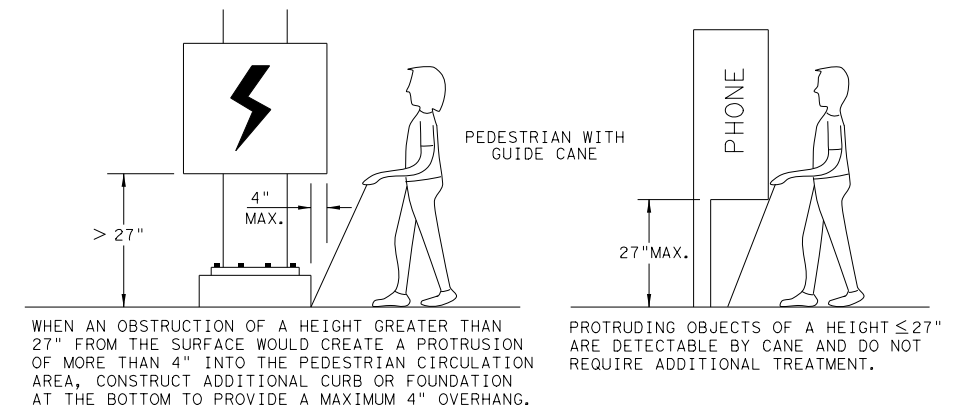
NOTE: IN PEDESTRIAN CIRCULATION AREA, MAXIMUM 4" PROJECTION FOR POST OR WALL MOUNTED OBJECTS BETWEEN 27" AND 80" ABOVE THE SURFACE.



CLEAR SPACE ADJACENT TO PEDESTRIAN PUSH BUTTON



NOTE: ITEMS NOT INTENDED FOR PUBLIC USE. MINIMUM 4' X 4' CLEAR GROUND SPACE REQUIRED AT PUBLIC USE FIXTURES.



DETECTION BARRIER FOR VERTICAL CLEARANCE < 80"

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NO.	REVISIONS	DATE	NAME
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THE STATE OF TEXAS
 FORT BEND COUNTY

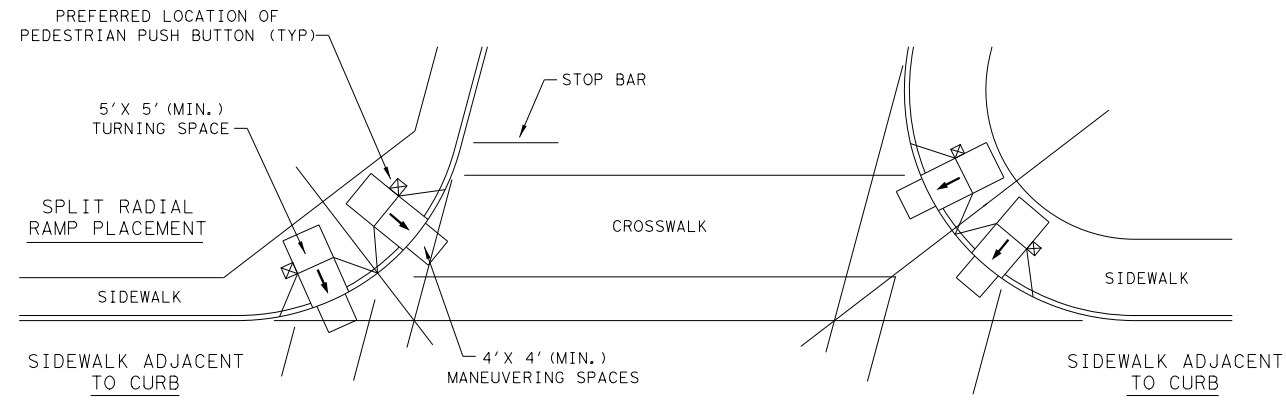
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 TEXAS FIRM REGISTRATION NO. F-487

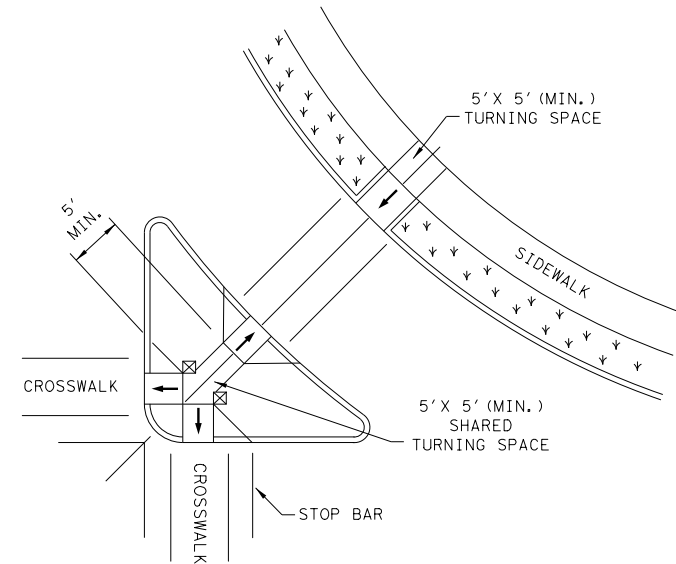
STATE OF TEXAS
 PROFESSIONAL ENGINEER
 130701
 FAMILLY LAYNE LANE
 HOUSTON, TEXAS 77058
 5/4/2023
July D. Love

PROJECT TITLE: WIDENING AND RECONSTRUCTION OF RANSOM ROAD		
DRAWN BY: INIT	FROM SUGAR LAND CITY LIMIT TO SH 99	FBCED STANDARD
CK'D BY: INIT	SHEET DESCRIPTION: PED-18 RAMP DETAILS	16
SCALE: 1" = 1'	SHEET 3 OF 4	SHEET NO:
DATE: 3-1-22	APPROVED BY:	81 /123

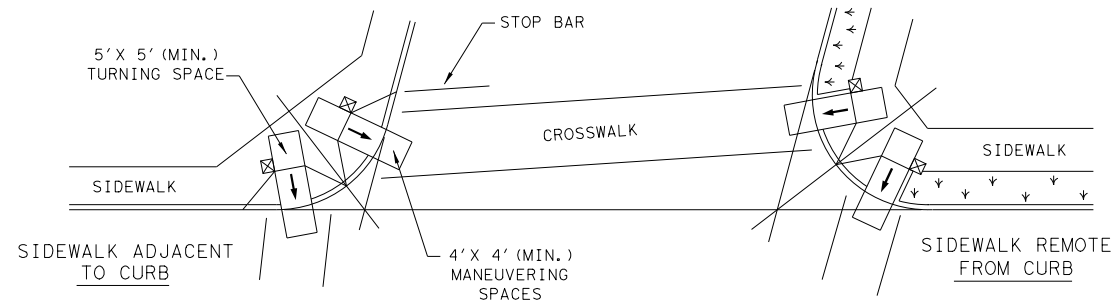
TYPICAL CROSSING LAYOUTS
SEE SHEET 1 OF 4 FOR DETAILS AND DIMENSIONS



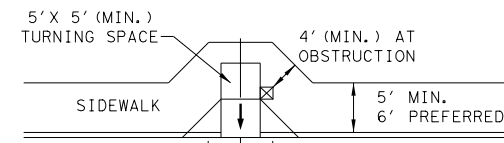
SKEWED INTERSECTION WITH "LARGE" RADIUS
REQUIRES FBC APPROVAL



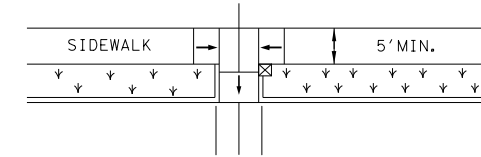
AT INTERSECTION
W/FREE RIGHT TURN & ISLAND



SKEWED INTERSECTION WITH "SMALL" RADIUS
REQUIRES FBC APPROVAL

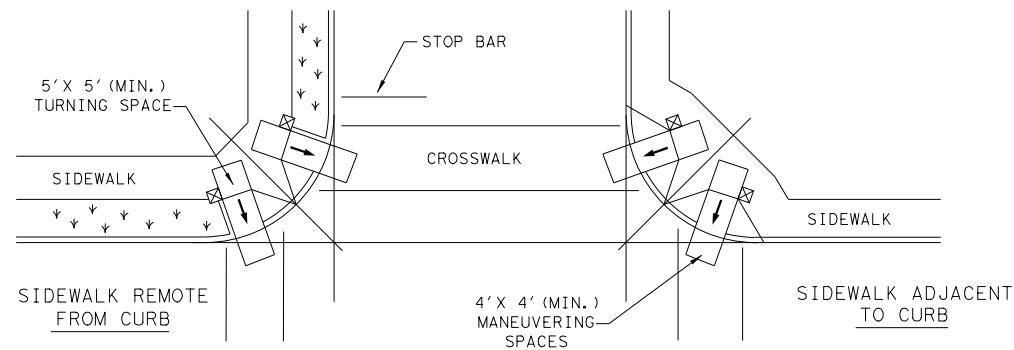


SIDEWALK ADJACENT TO CURB



SIDEWALK REMOTE FROM CURB

MID-BLOCK PLACEMENT
PERPENDICULAR RAMP



NORMAL INTERSECTION WITH "SMALL" RADIUS
REQUIRES FBC APPROVAL

LEGEND:

SHOWS DOWNWARD SLOPE. →

DENOTES PREFERRED LOCATION OF PEDESTRIAN PUSH BUTTON (IF APPLICABLE). ☒

DENOTES PLANTING OR NON-WALKING SURFACE NOT PART OF PEDESTRIAN CIRCULATION PATH. ↙ ↘ ↙ ↘ ↙ ↘

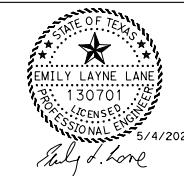
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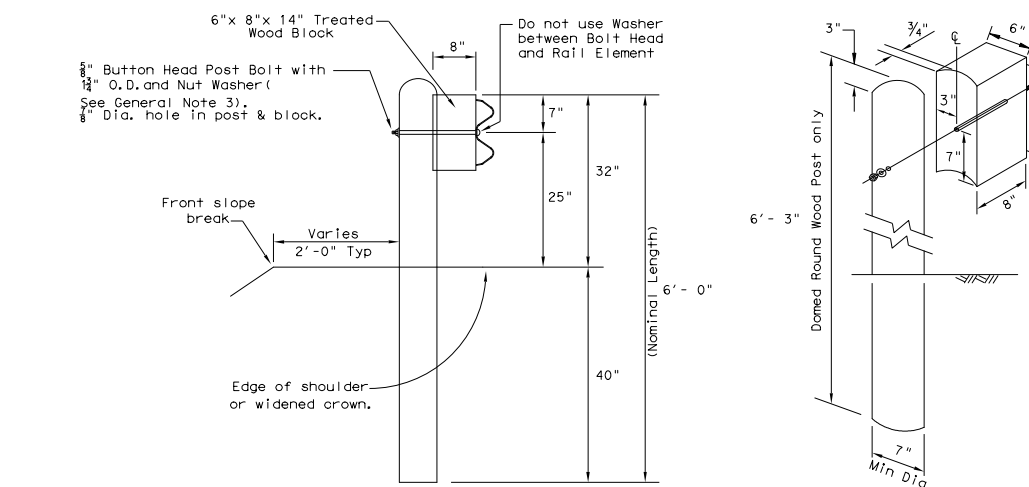


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DRAWN BY: INIT	FROM SUGAR LAND CITY LIMIT TO SH 99	FBCED STANDARD
CK'D BY: INIT	SHEET DESCRIPTION: PED-18 RAMP DETAILS	17
SCALE: 1" = 1'	SHEET 4 OF 4	SHEET NO:
DATE: 3-1-22	APPROVED BY:	82 / 123

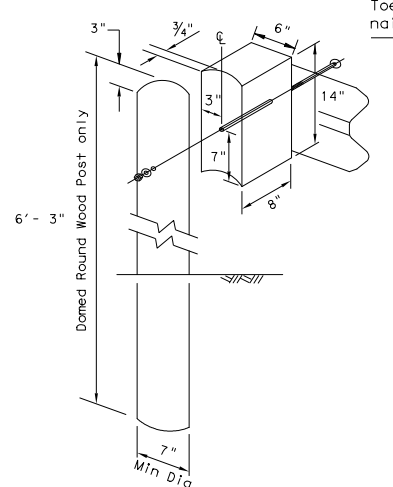
J:\1704\1601\Fort Bend County Standards\Fort Bend County STD\FBC FLEX BEAM GUARDRAIL DETAILS-2of2.dwg

GENERAL NOTES

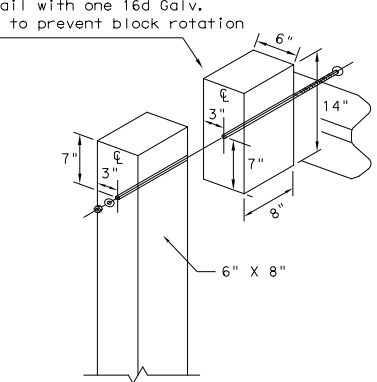
- The type of post (round wood post, rectangular wood post, or steel post) will be as shown in the plans. The exact position of MBGF shall be shown in the plans or as directed by the Engineer. Steel posts to be galvanized in accordance with Item 445, "Galvanizing."
- Rail element shall meet the requirements of Item 540, "Metal Beam Guard Fence" except as modified in the plans. The Contractor may furnish rail elements of 25'-0", or 12'-6" (nom.) lengths. Rail elements may have slotted holes at 3'-1/2" C-C or 6'-3" C-C. A special length of rail may be manufactured to accommodate the downstream anchor terminal (DAT) and the transition sections of guardrail.
- Button head "post" bolts (ASTM A307) shall be of sufficient length to extend through the full thickness of the nut (ASTM A563) and 3/8" washer and not more than 1" beyond it. Button head "splice" bolts (ASTM A307) are 5/8" x 1 1/4" (or 2" long at triple rail splices) with a 3/8" double recessed nut (ASTM A563). Three beam "connection" 3/8" dia. (ASTM A325) hex bolts shall be of sufficient length to extend through the full thickness of the rail, washers, and nuts.
- Fittings (bolts, nuts, and washers) shall be galvanized in accordance with Item 445, "Galvanizing." Fittings shall be subsidiary to the bid item.
- Crown shall be widened to accommodate the Metal Beam Guard Fence.
- The lateral approach to the guard fence, shall have a maximum slope of 1V:10H.
- If shown elsewhere in the plans or as directed by the Engineer, the guard fence may be flared at a rate of 25:1 or flatter.
- Unless otherwise shown in the plans, guard fence placed in the vicinity of curbs shall be positioned so that the face of curb is located directly below or behind the face of the rail. Rail placed over curbs shall be installed so that the post bolt is located approximately 25 inches above the gutter pan or edge of shoulder.
- If solid rock is encountered within 0 to 18" of the finished grade, drill a 22" dia. hole, or drill two 12" dia. front to back overlapping holes, 24" into the rock. If solid rock is encountered below 18", drill a 12" dia. hole, 12" into the rock or to the standard embedment depth, whichever may be less. Any excess post length, after meeting these depths, may be field cut to ensure proper guardrail mounting height. Backfill with a cohesionless material.
- Posts shall not be set in concrete, of any depth.
- Special fabrication will be required at installations having a curvature of less than 150 ft. radius.
- Unless otherwise shown in the plans, a composite material post and/or block that meets the requirements of DMS-7210, "Composite Material Posts and Blocks for Metal Beam Guard Fence" may be substituted for posts and/or blocks of similar dimensions. The Construction Division, TxDOT maintains a Material Producer List (MPL) for producers of materials conforming to DMS-7210. Only producers on the MPL may furnish composite material posts and/or blocks.
- For posts located partially or wholly between precast box culvert units, the use of a cast-in-place concrete closure between boxes is required. See Detail "A" on TxDOT Bridge Standards SCP-MD.



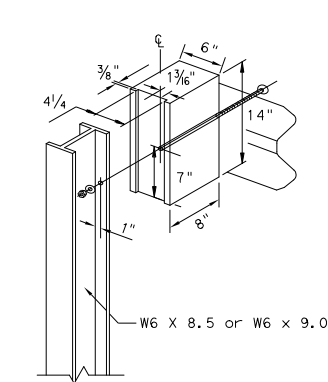
TYPICAL POST



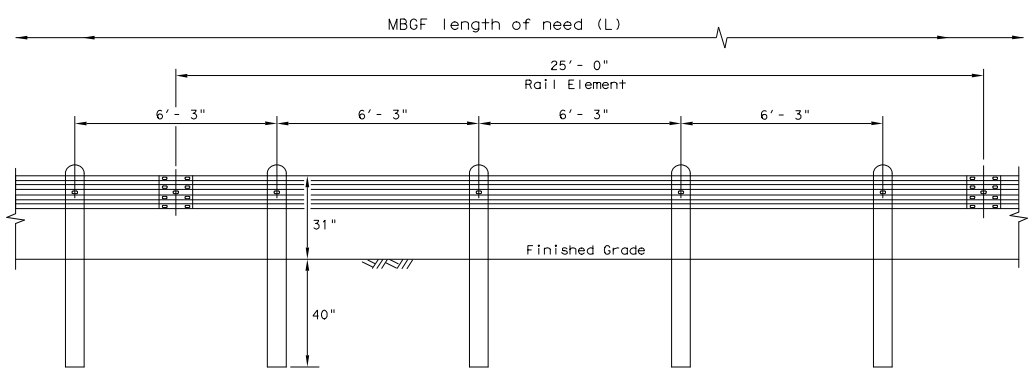
WOOD BLOCK TO ROUND WOOD POST



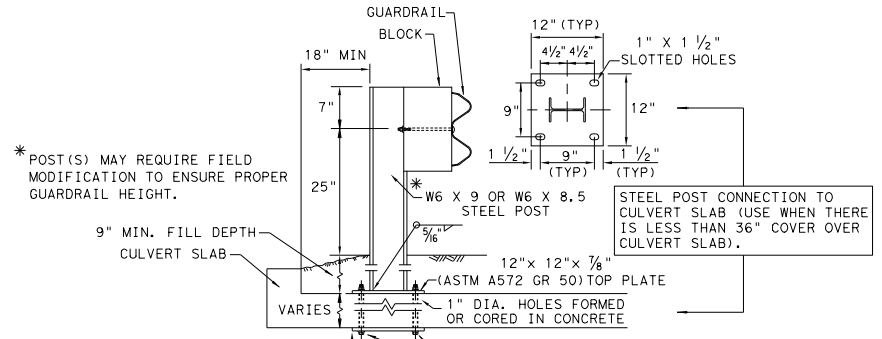
WOOD BLOCK TO RECTANGULAR WOOD POST



WOOD BLOCK TO STEEL POST



ELEVATION MID-SPAN RAIL SPLICE



* POST(S) MAY REQUIRE FIELD MODIFICATION TO ENSURE PROPER GUARDRAIL HEIGHT.

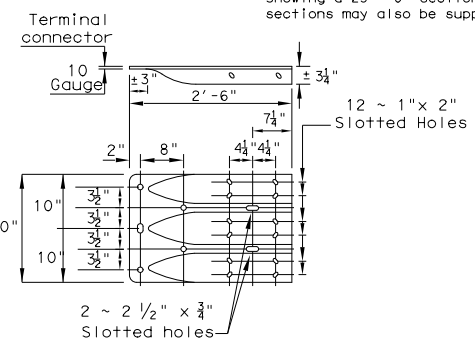
NOTE: TWO INSTALLATION OPTIONS.

1. BOLT-THROUGH OPTION: REQUIRES A 6" MIN. SLAB THICKNESS. 7/8" DIA (ASTM A449) HEAVY HEX BOLTS WITH TWO HARDENED WASHER EACH AND HEAVY HEX NUTS. NOTE: BOLT LENGTH = SLAB PLUS 2 1/4" MIN.

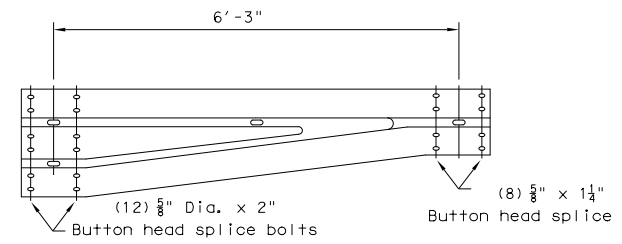
2. EPOXY ANCHOR OPTION: THIS OPTION MAY ONLY BE USED IF THE CULVERT SLAB IS 8" MIN. THICK. THREADED ANCHOR RODS MUST BE 7/8" DIA. ASTM A449 OR A193 GRADE B7 WITH HEAVY HEX NUT, AND ONE HARDENED WASHER EACH. EMBED ANCHOR RODS 6" WITH HILTI HIT RE 500 EPOXY ADHESIVE. OTHER TYPE III CLASS C EPOXY ADHESIVES MEETING THE REQUIREMENTS OF DMS-6100, "EPOXIES AND ADHESIVES", MAY BE USED IF IT CAN BE DEMONSTRATED THAT THEY MEET OR EXCEED THE STRENGTH OF HILTI HIT RE 500 WITH THE SAME EMBEDMENT DEPTH AND THREADED ROD DIA. FOLLOW THE MANUFACTURER'S REQUIREMENTS FOR INSTALLING EPOXIED THREADED RODS. EXTEND RODS 1/4" MIN. BEYOND NUT.

LOW FILL CULVERT POST

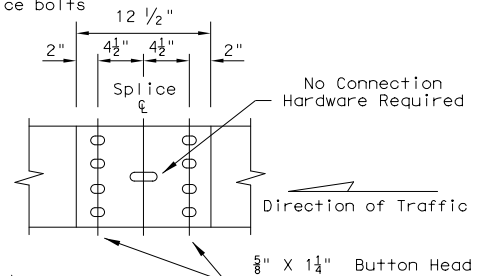
Culverts of 25 ft. or less, see TxDOT GF(31)LS standard for "Long Span" option.



THREE-BEAM TERMINAL CONNECTION (SEE GENERAL NOTES 9 FOR REQUIRED HARDWARE)



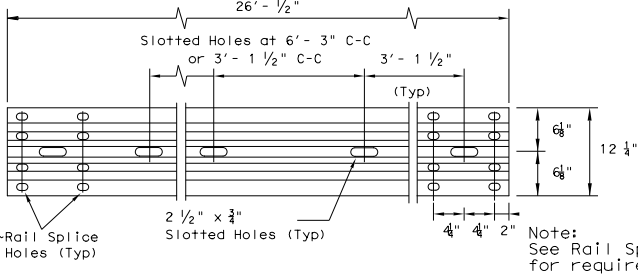
NON-SYMMETRICAL TRANSITION TO W-BEAM (10 GAUGE)



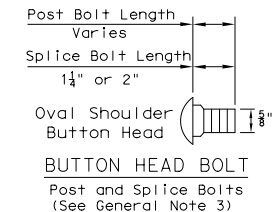
Note: Mid-Span rail splices are required with 6'-3" post spacings.

5/8" X 1 1/4" Button Head Splice Bolts and Nuts (See General Note 3)

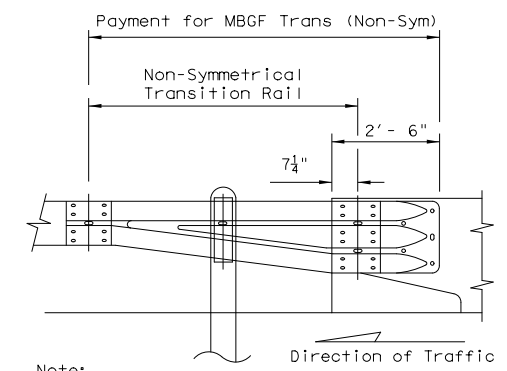
MID-SPAN RAIL SPLICE DETAIL



ELEVATION 25'-0" (NOM.) W-BEAM SECTION 12'-6" RAIL SECTIONS MAY ALSO BE SUPPLIED (SEE GENERAL NOTE 2)

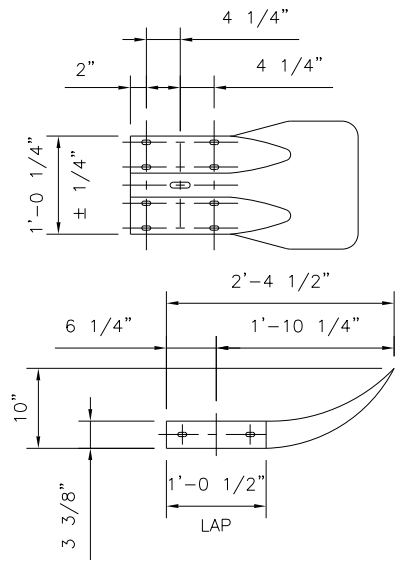


BUTTON HEAD BOLT Post and Splice Bolts (See General Note 3)



Note: All rail elements shall be lapped in the direction of adjacent traffic.

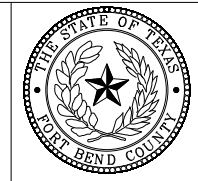
DOWNSTREAM RAIL ATTACHMENT



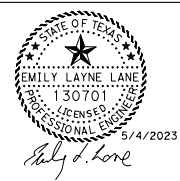
TERMINAL SECTION

NO.	REVISIONS	DATE	NAME
1	ORIGINAL STANDARD ISSUED	3-1-22	RJS

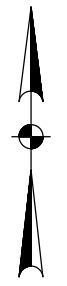
FORT BEND COUNTY ENGINEERING DEPARTMENT



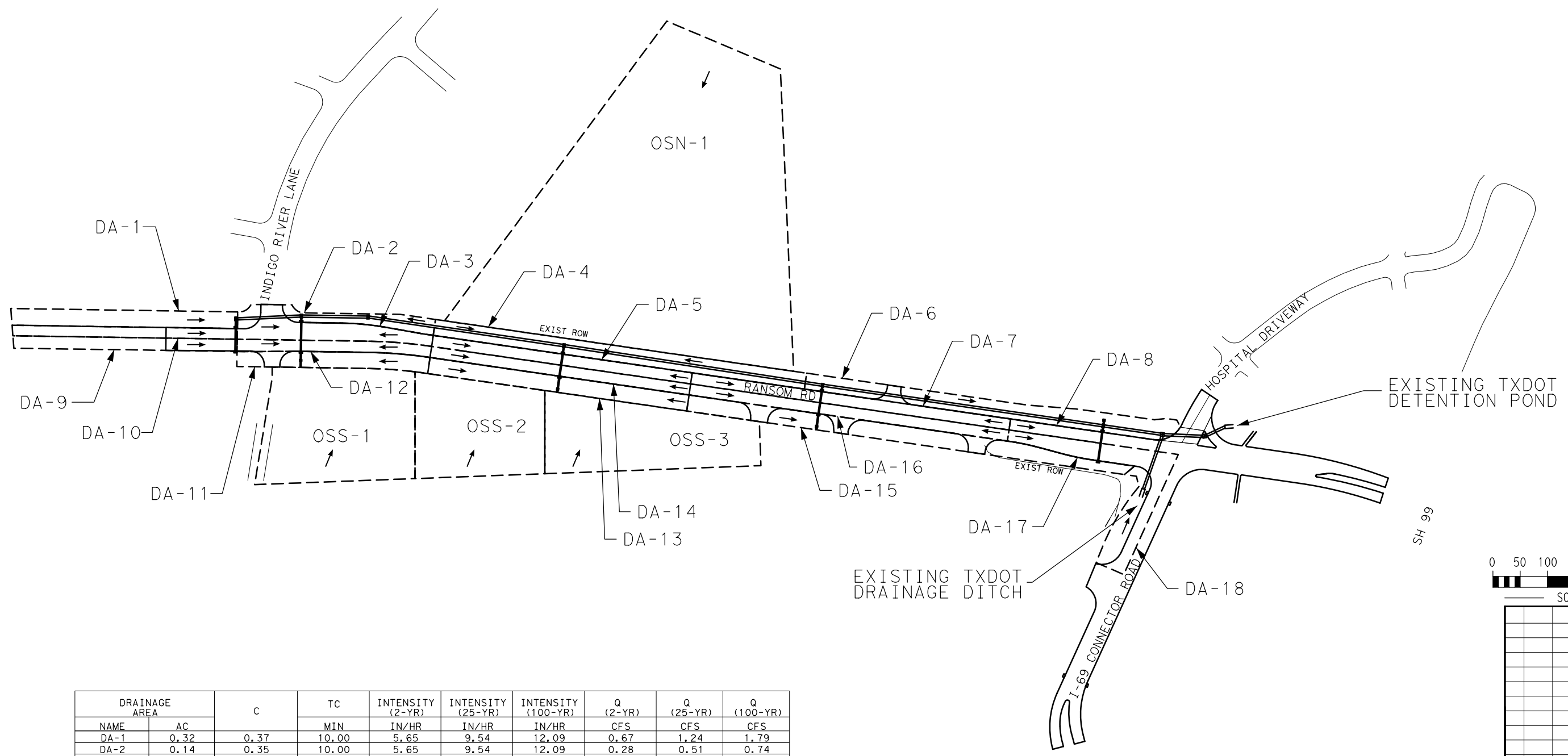
r.g. miller engineers
16340 Park Ten Place Suite 350 Houston, Texas 77084 (713) 461-9600 TEXAS FIRM REGISTRATION NO. F-487



PROJECT TITLE: WIDENING AND RECONSTRUCTION OF RANSOM ROAD		
DRAWN BY: INIT	FROM SUGAR LAND CITY LIMIT TO SH 99	FBCD STANDARD
CK'D BY: INIT	SHEET DESCRIPTION: METAL BEAM GUARD FENCE	34
SCALE: NONE	SHEET 1 OF 1	SHEET NO:
DATE: 3-1-22	APPROVED BY:	83/123



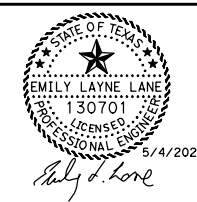
LEGEND
 OSN - OFFSITE NORTH
 OSS - OFFSITE SOUTH
 DA - DRAINAGE AREA
 → FLOW ARROW



DRAINAGE AREA		C	TC	INTENSITY			Q		
NAME	AC			(2-YR)	(25-YR)	(100-YR)	(2-YR)	(25-YR)	(100-YR)
			MIN	IN/HR	IN/HR	IN/HR	CFS	CFS	CFS
DA-1	0.32	0.37	10.00	5.65	9.54	12.09	0.67	1.24	1.79
DA-2	0.14	0.35	10.00	5.65	9.54	12.09	0.28	0.51	0.74
DA-3	0.27	0.90	10.00	5.65	9.54	12.09	1.37	2.55	3.67
DA-4	0.47	0.35	10.00	5.65	9.54	12.09	0.92	1.71	2.46
DA-5	0.23	0.90	10.00	5.65	9.54	12.09	1.15	2.13	3.07
DA-6	0.50	0.46	10.00	5.65	9.54	12.09	1.30	2.41	3.47
DA-7	0.28	0.90	10.00	5.65	9.54	12.09	1.41	2.62	3.78
DA-8	0.17	0.90	10.00	5.65	9.54	12.09	0.87	1.61	2.31
DA-9	0.21	0.90	10.00	5.65	9.54	12.09	1.07	1.98	2.86
DA-10	0.18	0.90	10.00	5.65	9.54	12.09	0.92	1.70	2.45
DA-11	0.24	0.42	10.00	5.65	9.54	12.09	0.56	1.04	1.50
DA-12	0.17	0.90	10.00	5.65	9.54	12.09	0.87	1.61	2.32
DA-13	0.33	0.35	10.00	5.65	9.54	12.09	0.65	1.20	1.73
DA-14	0.23	0.90	10.00	5.65	9.54	12.09	1.15	2.13	3.07
DA-15	0.52	0.43	10.00	5.65	9.54	12.09	1.28	2.38	3.42
DA-16	0.28	0.90	10.00	5.65	9.54	12.09	1.41	2.62	3.78
DA-17	0.18	0.90	10.00	5.65	9.54	12.09	0.92	1.70	2.45
DA-18	0.13	0.35	10.00	5.65	9.54	12.09	0.26	0.48	0.69
OSN-1	5.77	0.35	30.10	3.35	5.63	7.01	6.77	12.52	17.70
OSS-0	2.63	0.40	36.20	3.01	5.09	6.37	3.17	5.89	8.38
OSS-1	1.32	0.38	25.40	3.67	5.22	7.62	1.84	3.40	4.78
OSS-2	0.95	0.35	20.50	4.10	5.83	8.49	1.37	2.51	3.54
OSS-3	1.06	0.38	59.10	2.25	3.24	4.95	0.90	1.70	2.47

No.	Date	Revisions	App.

**RANSOM RD
DRAINAGE AREA MAP**

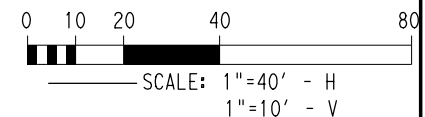
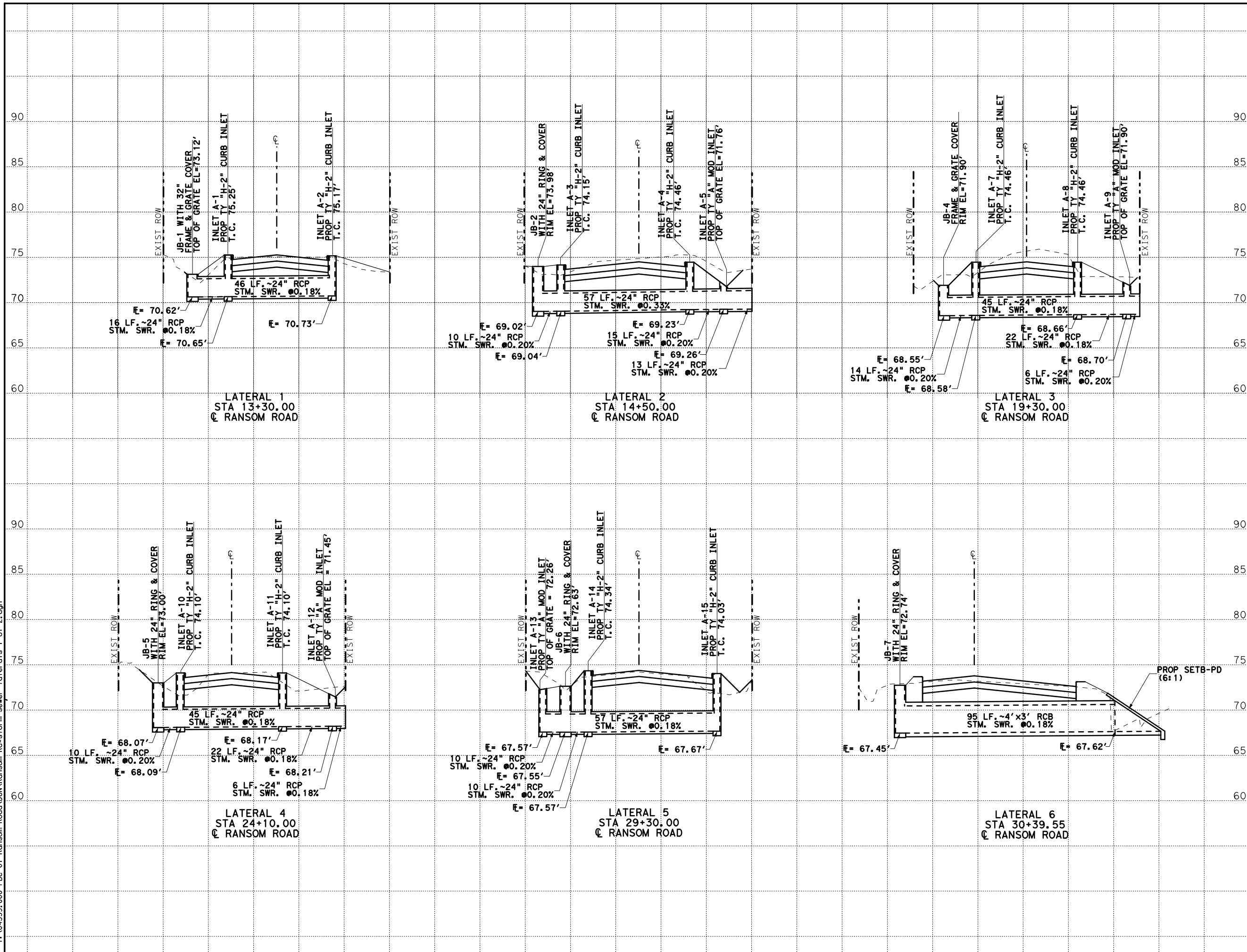


r.g. miller engineers
 16340 Park Ten Place
 Suite 350
 Houston, Texas 77084
 (713) 461-9600
 TEXAS FIRM REGISTRATION NO. F-487

Approved By: _____ Date: _____
 r.g. miller
 Job No. 4399

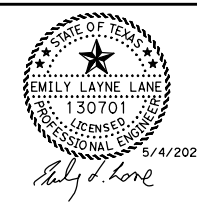
SUBMITTED BY: R.G. MILLER
 SCALE: 1"=200'
 DATE: 5/4/2023
 SURV BY: MILLER SURVEY
 F. B. No.: 17102

DESIGNED BY: E.L.L.
 DRAWN BY: C.G.
 SHEET 1 OF 1 SHEETS
 DWG. NO. 84



No.	Date	Revisions	App.

**RANSOM RD
 STORM SEWER
 LATERAL PROFILES**

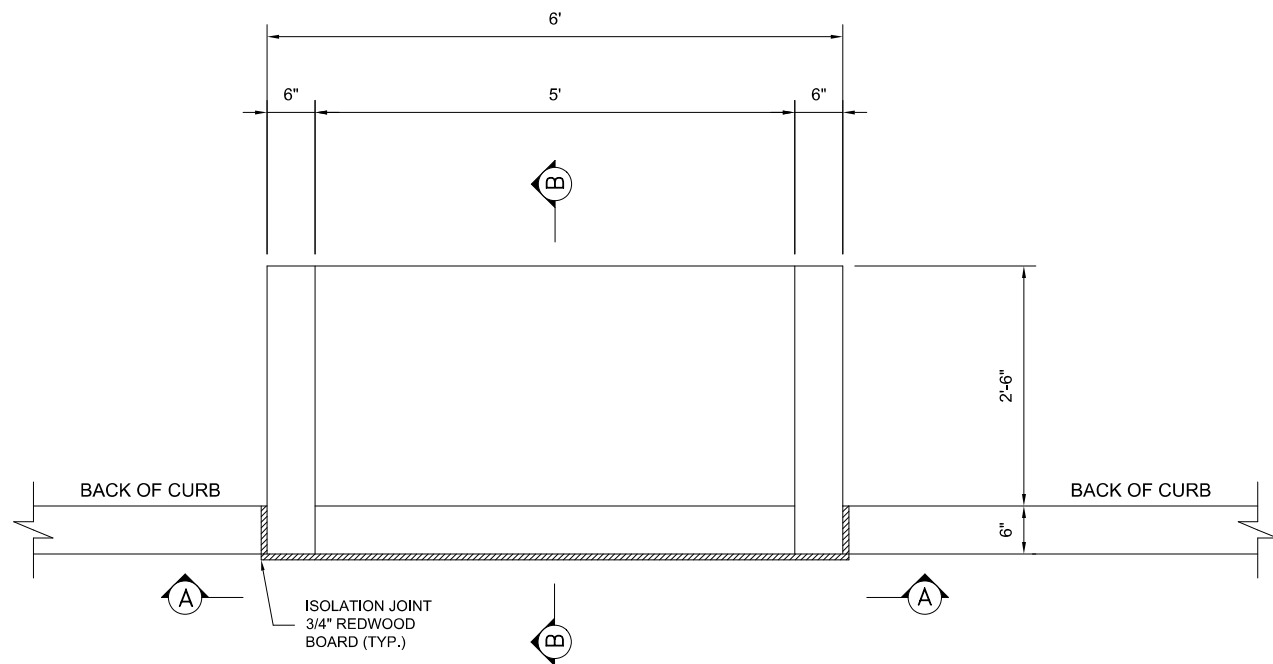


r.g.miller engineers
 16340 Park Ten Place
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 (713) 461-9600
 TEXAS FIRM REGISTRATION NO. F-487

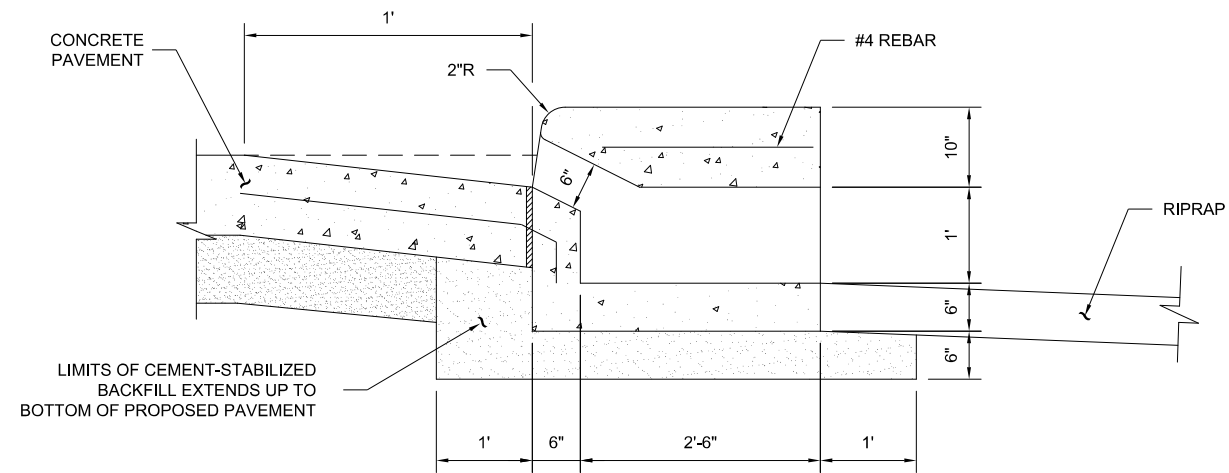
Approved By: _____ Job No. 4399
 Date: _____

SUBMITTED BY: R.G. MILLER DESIGNED BY: E.L.L.
 SCALE: _____ DRAWN BY: C.G.

DATE: 5/4/2023 SHEET 1 OF 1 SHEETS
 SURV BY: MILLER SURVEY DWG. NO. 87
 F. B. No.: 17102



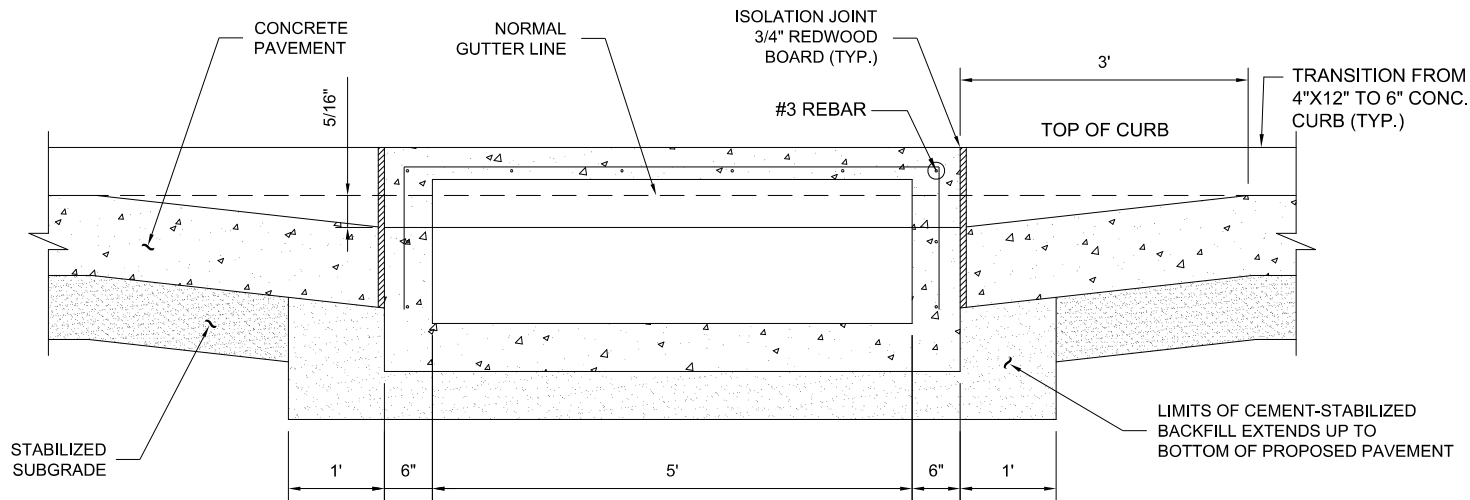
PLAN VIEW



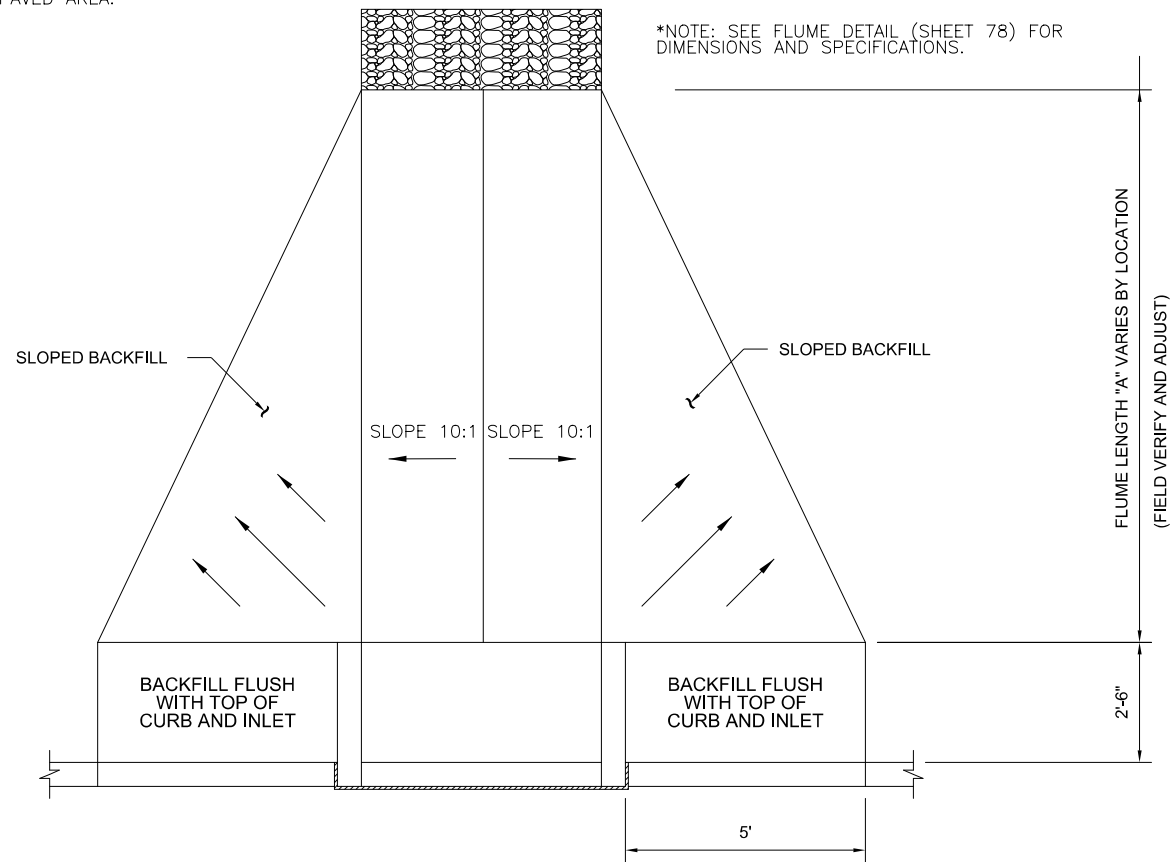
SECTION B-B

INLET NOTES:

1. CONSTRUCTION AND MATERIALS SHALL MEET REQUIREMENTS OF ITEM 466 "INLETS".
2. CONCRETE FOR INLET: MINIMUM 4,000 PSI IN 28 DAY PRECAST STRUCTURE TO MEET ASTM C913.
3. CEMENT-STABILIZED BACKFILL SHALL EXTEND TO THE BOTTOM OF PAVEMENT OR RIPRAP, OR 12 INCHES BELOW THE SURFACE IF INLET IS LOCATED IN AN UNPAVED AREA.



SECTION A-A



PLAN VIEW
(BACKFILL REQUIREMENTS)
N.T.S.

NO.	REVISIONS	DATE	NAME

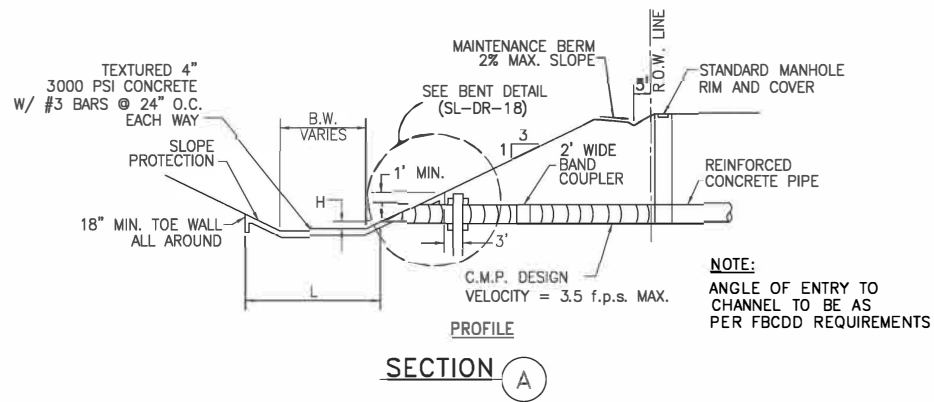
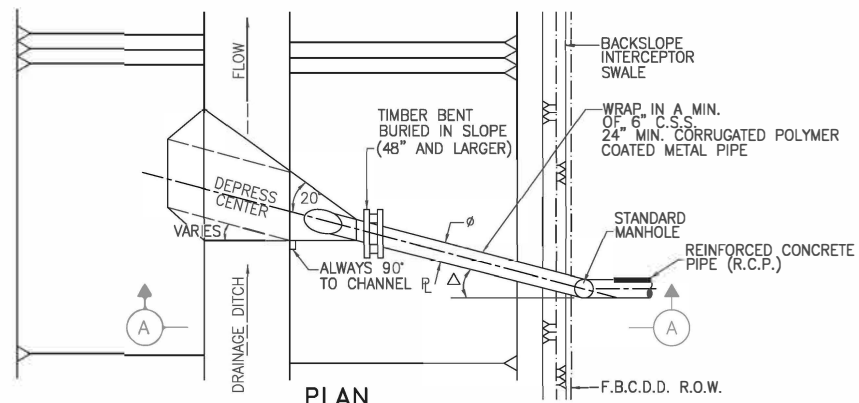
FORT BEND COUNTY
ENGINEERING DEPARTMENT



r.g.miller
engineers
16340 Park Ten Place
Suite 350
Houston, Texas 77084
(713) 461-9600
TEXAS FIRM REGISTRATION NO. F-487



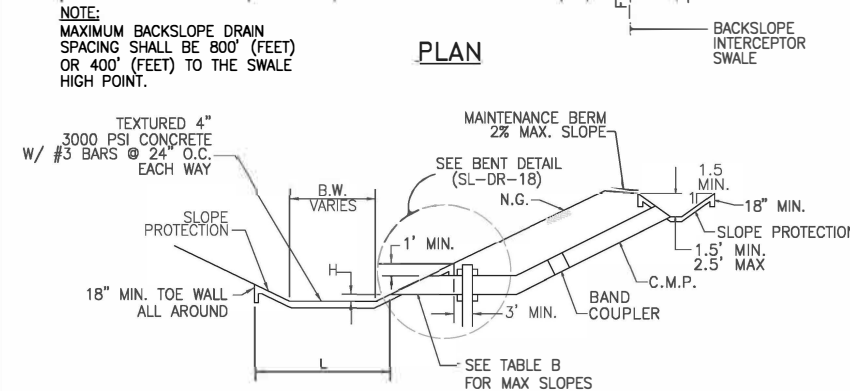
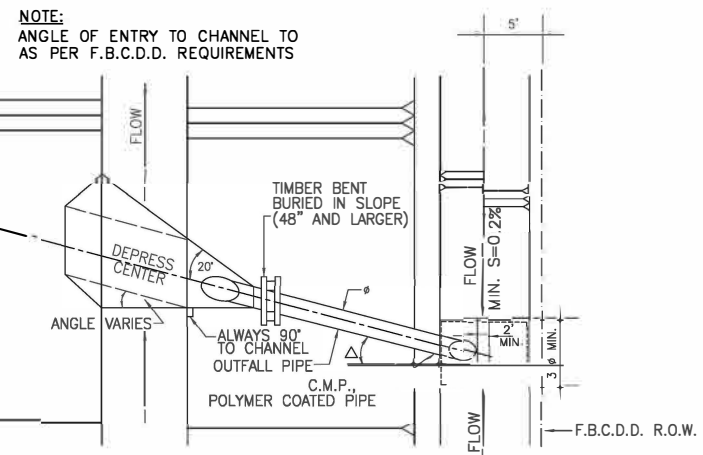
PROJECT TITLE: WIDENING AND RECONSTRUCTION OF RANSOM ROAD FROM SUGAR LAND CITY LIMIT TO SH 99	
SHEET DESCRIPTION: FALSE BACK INLET DETAILS	
DRAWN BY: FMR	DATE: 5/4/2023
CK'D BY: AJF	SCALE: NONE
SHEET NO: 88 / 123	



STORM SEWER OUTFALL

N.T.S.

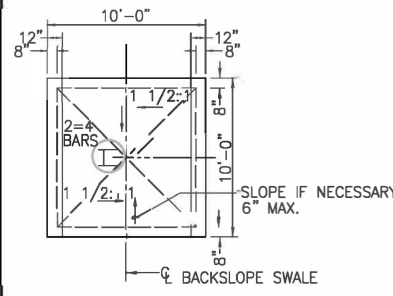
SL-DR-15



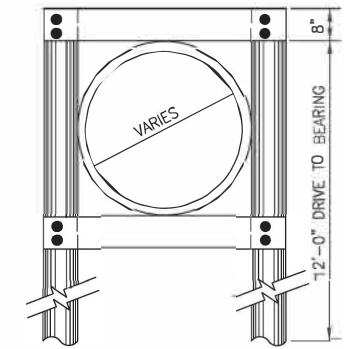
BACKSLOPE INLET & OUTFALL

N.T.S.

SL-DR-16



SL-DR-20



END VIEW OF OUTFALL

TABLE A

SIZE 2 2/3" X 1/2" CORRUGATION	PIPE GAUGE	BAND COUPLER GAUGE	SIZE 3'X1' & 5'X1' CORRUGATION	PIPE GAUGE	BAND COUPLER GAUGE
24"	12	16			
30"	12	16			
36"	12	16			
42"	12	16			
48"	12	16			
54"	12	14	48"	16	18
60"	12	14	54"	16	18
66"	10	12	60"	16	18
72"	10	12	66"	16	18
78"	8	10	72"	16	18
84"	8	10	78"	14	16
			84"	14	16

TABLE B

PIPE DIA.	SLOPE	VELOCITY
24"	0.6%	3.25 f.p.s
36"	0.3%	3.00 f.p.s
42"	0.2%	2.75 f.p.s
48"	0.2%	3.00 f.p.s
54"	0.2%	3.25 f.p.s

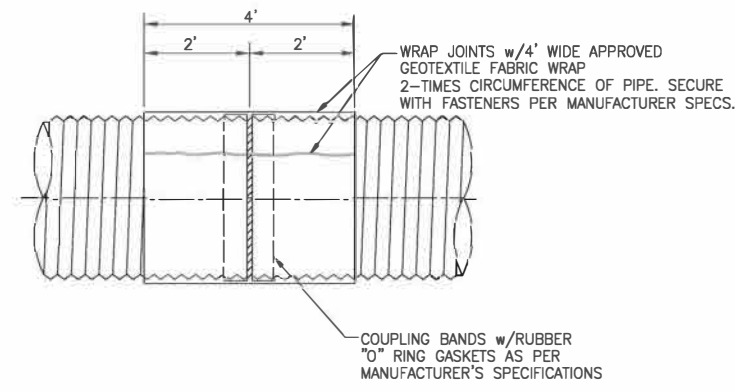
SL-DR-19

CONSTRUCTION NOTES:

L : $\frac{B.W.}{PIPE \phi} \leq 7'-6"$ → LENGTH WILL EXTEND ONE-HALF PIPE ϕ ABOVE \bar{r} ON OPPOSITE BANK (MIN. 36") OR A MINIMUM OF 6-PIPE ϕ TOWARDS OPPOSITE BANK OF CHANNEL. WHICH EVER IS THE LESSER.

Δ : PROP. 24" TO 42" $\Delta = 15'$
PROP. 48" AND LARGER $\Delta = 30'$

H : FOR PIPE SIZES 24" TO 42"
H=3' MAX. AND 1' MIN.
FOR PIPE SIZES 48" AND LARGER
H=1' MAX. AND MIN.



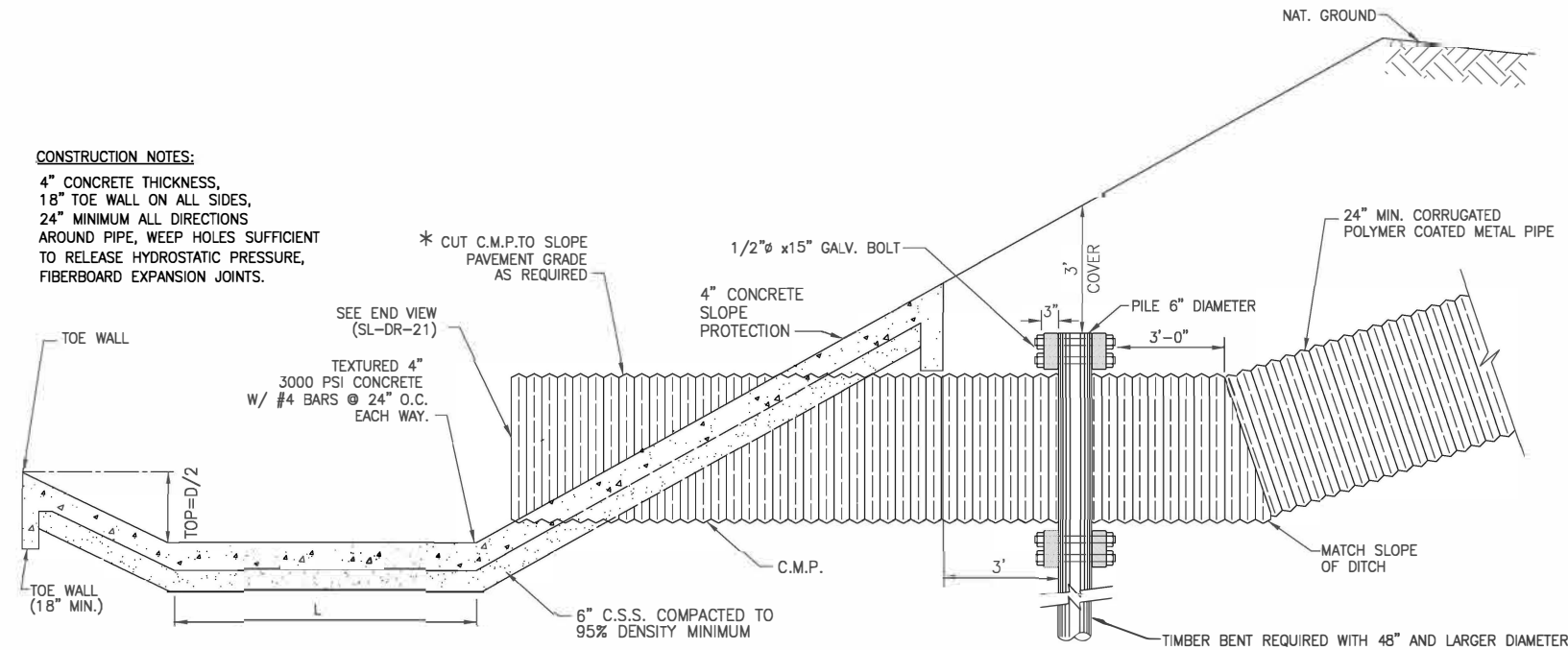
- NOTES:**
1. ANY PIPE DEFLECTED MORE THAN 2% SHALL BE REJECTED AND REPLACED AT CONTRACTOR'S EXPENSE.
 2. INSTALLATION SHALL BE AS PER MANUFACTURER'S RECOMMENDATIONS INCLUDING ITEMS AS DETAILED IN INSTALLATION MANUAL FOR CORRUGATED STEEL DRAINAGE STRUCTURES.

STORM SEWER JOINT WRAP DETAIL

N.T.S.

SL-DR-17

- CONSTRUCTION NOTES:**
- 4" CONCRETE THICKNESS, 18" TOE WALL ON ALL SIDES, 24" MINIMUM ALL DIRECTIONS AROUND PIPE, WEEP HOLES SUFFICIENT TO RELEASE HYDROSTATIC PRESSURE, FIBERBOARD EXPANSION JOINTS.



- NOTES:**
1. OUTFALL PIPE SHALL BE POLYMER-COATED, CORRUGATED, METAL PIPE. ALUMINUM PIPE OR ALUMINIZED COAT IS NOT ALLOWED.
 2. STONE RIP RAP IS NOT ALLOWED.
 3. SEE GENERAL, C.S.S. AND CONCRETE NOTES.
 4. SEE END VIEW DETAIL (THIS SHEET).
 5. ALL CONNECTING BANDS MUST HAVE AN APPROVED RUBBER GASKET.

TIMBER BENT DETAIL FOR CORRUGATED METAL PIPE OUTFALL

N.T.S.

SL-DR-18

No.	DATE	REVISION

16340 Park Ten Place
 Suite 350
 Houston, Texas 77084
 (713) 461-9600
 TEXAS FIRM REGISTRATION NO. F-487

SEAL:

DESIGN ENGINEER: DATE: _____

CITY OF SUGAR LAND, TEXAS
 ENGINEERING DEPARTMENT

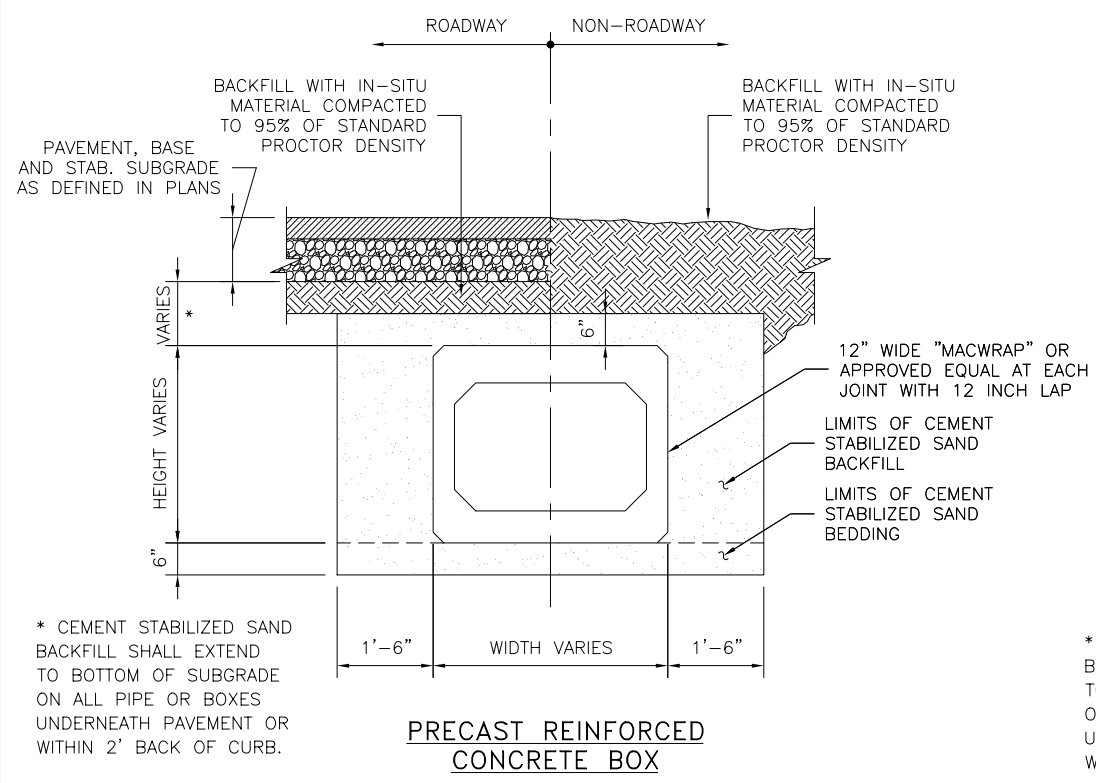
CONSTRUCTION PLANS FOR:
WIDENING & RECONSTRUCTION
OF RANSOM ROAD

STORM SEWER OUTFALL
CONSTRUCTION DETAILS

JOB No.: _____
 DATE: _____
 DESIGNED BY: _____
 DRAWN BY: _____
 CHECKED BY: _____
 SCALE: _____

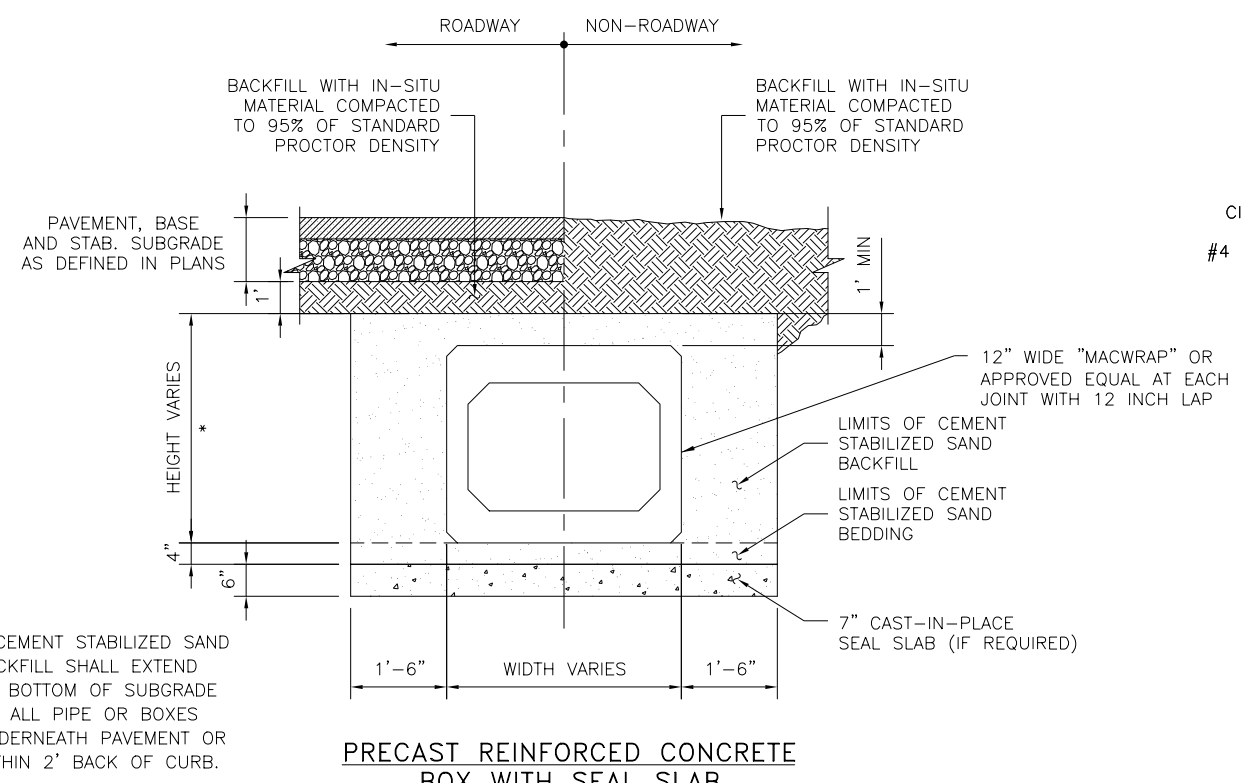
SL-06
 SHEET 90 OF 123

J:\1704\1601\Fort Bend County Standards\Fort Bend County STD\DONE\FBC STORM SEWER CONSTRUCTION DETAILS\STORM_SEWER_CONSTRUCTION_DETAILS.dwg



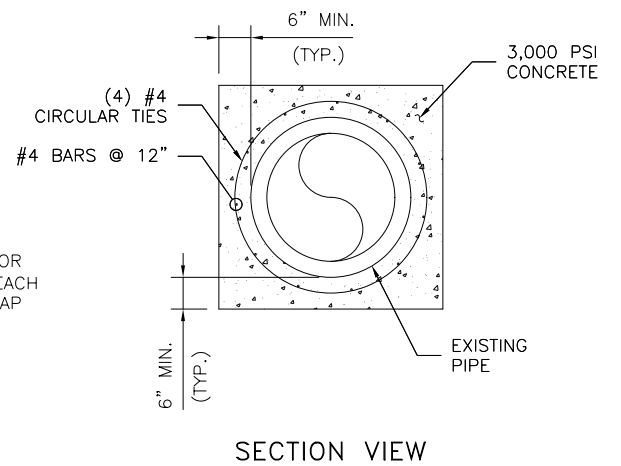
PRECAST REINFORCED CONCRETE BOX

* CEMENT STABILIZED SAND BACKFILL SHALL EXTEND TO BOTTOM OF SUBGRADE ON ALL PIPE OR BOXES UNDERNEATH PAVEMENT OR WITHIN 2' BACK OF CURB.

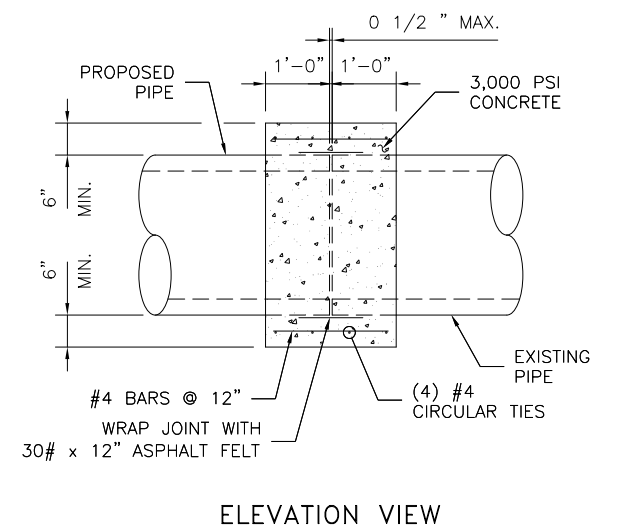


PRECAST REINFORCED CONCRETE BOX WITH SEAL SLAB

* CEMENT STABILIZED SAND BACKFILL SHALL EXTEND TO BOTTOM OF SUBGRADE ON ALL PIPE OR BOXES UNDERNEATH PAVEMENT OR WITHIN 2' BACK OF CURB.

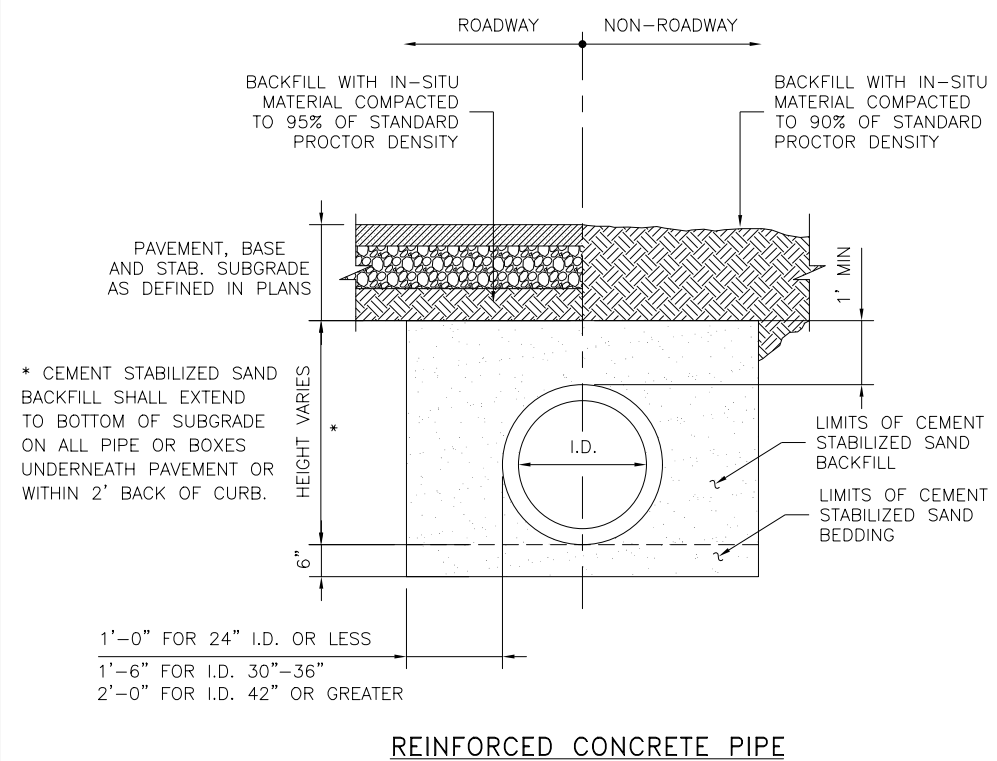


SECTION VIEW



ELEVATION VIEW

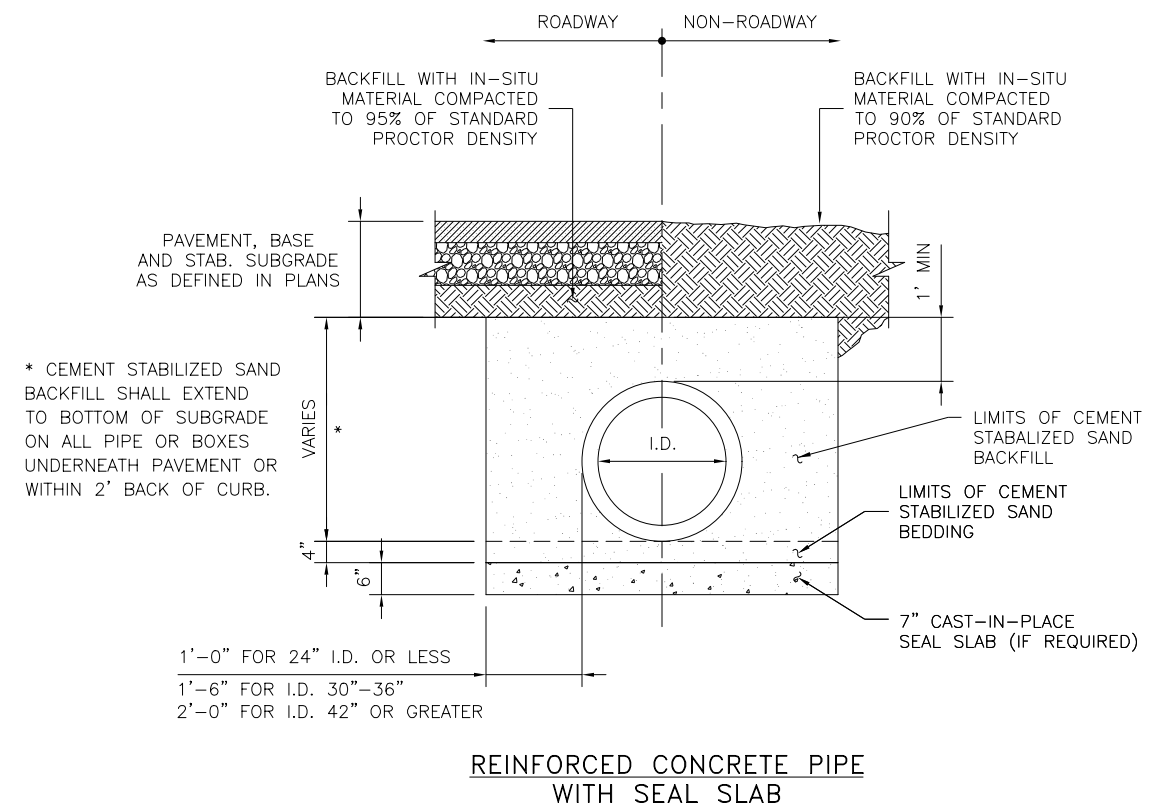
TYPICAL CONCRETE COLLAR FOR 36" & SMALLER RCP



REINFORCED CONCRETE PIPE

* CEMENT STABILIZED SAND BACKFILL SHALL EXTEND TO BOTTOM OF SUBGRADE ON ALL PIPE OR BOXES UNDERNEATH PAVEMENT OR WITHIN 2' BACK OF CURB.

1'-0" FOR 24" I.D. OR LESS
1'-6" FOR I.D. 30"-36"
2'-0" FOR I.D. 42" OR GREATER



REINFORCED CONCRETE PIPE WITH SEAL SLAB

* CEMENT STABILIZED SAND BACKFILL SHALL EXTEND TO BOTTOM OF SUBGRADE ON ALL PIPE OR BOXES UNDERNEATH PAVEMENT OR WITHIN 2' BACK OF CURB.

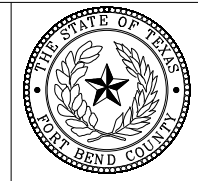
1'-0" FOR 24" I.D. OR LESS
1'-6" FOR I.D. 30"-36"
2'-0" FOR I.D. 42" OR GREATER

GENERAL NOTES:

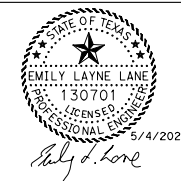
- FOR RCP LARGER THAN 36" DIAMETER, CONCRETE COLLARS MUST BE DESIGNED BY THE ENGINEER OF RECORD.
- ALL TRENCHES IN ROW SHALL BE BACKFILLED WITH 1.5 SACK CEMENT STABILIZED SAND TO WITHIN 1' OF SUBGRADE. COMPACTED TO 95% STANDARD PROCTOR DENSITY

NO.	REVISIONS	DATE	NAME
1	ORIGINAL STANDARD ISSUED	3-1-22	RJS

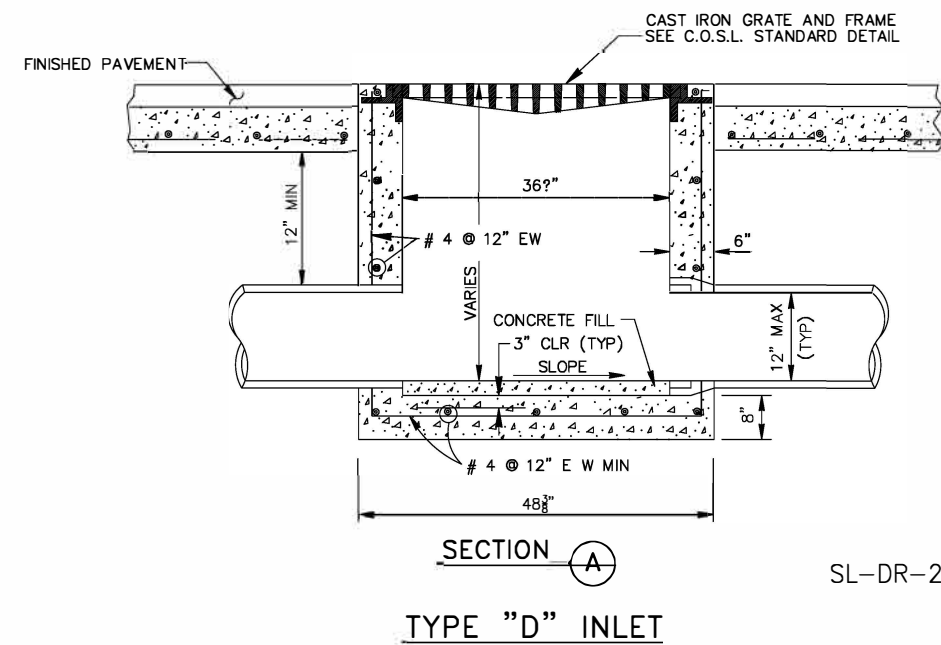
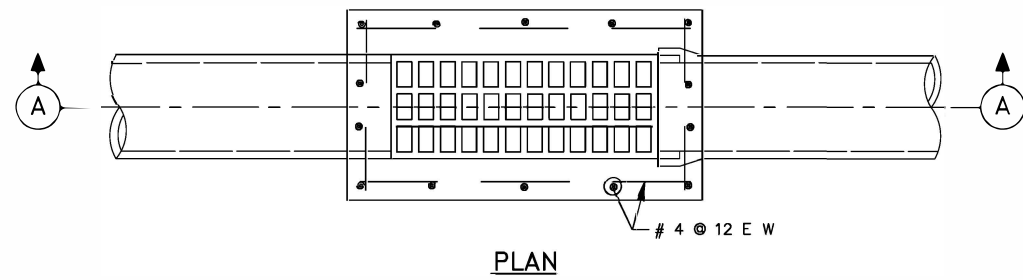
FORT BEND COUNTY
ENGINEERING DEPARTMENT



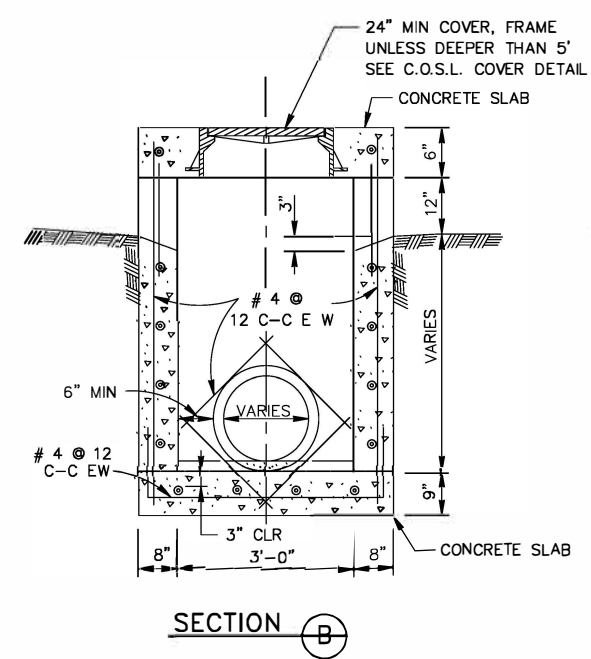
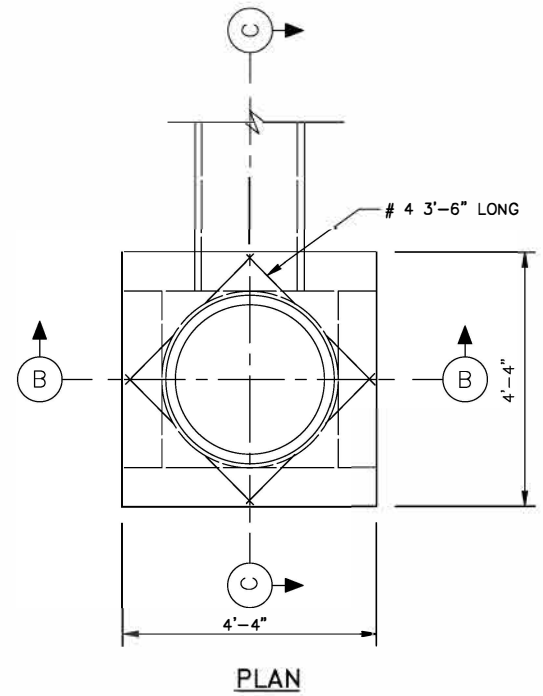
16340 Park Ten Place
Suite 350
Houston, Texas 77084
(713) 461-9600
TEXAS FIRM REGISTRATION NO. F-487



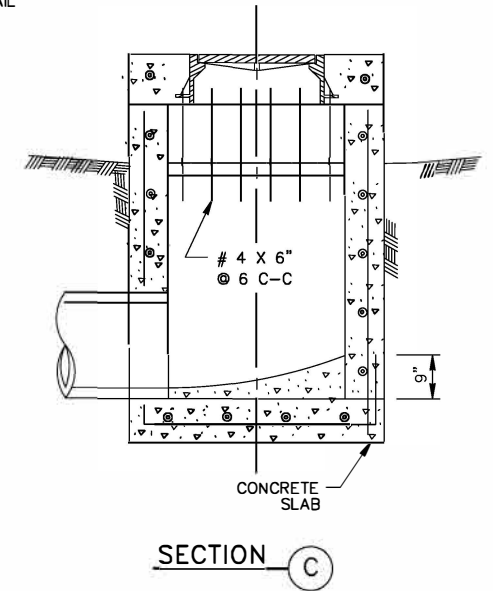
PROJECT TITLE: WIDENING AND RECONSTRUCTION OF RANSOM ROAD		
DRAWN BY: INIT	FROM SUGAR LAND CITY LIMIT TO SH 99	FBCD STANDARD
CK'D BY: INIT	SHEET DESCRIPTION: STORM SEWER CONSTRUCTION	18
SCALE: 1"=1'-6"	DETAILS	SHEET NO: 91 / 123
DATE: 3-1-22	APPROVED BY:	



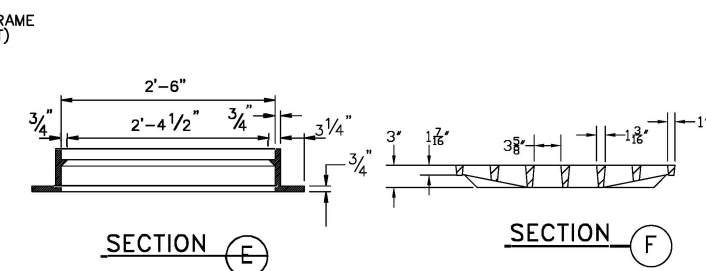
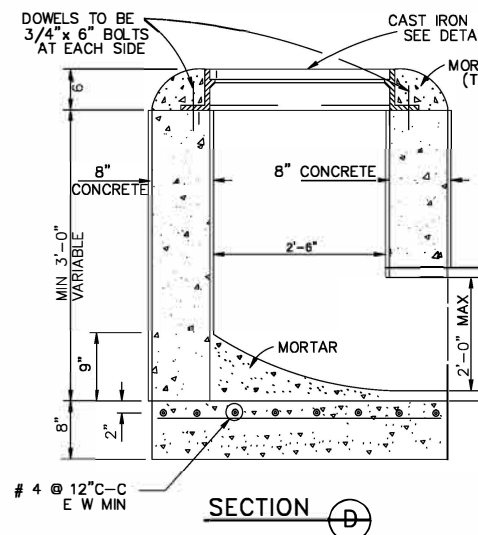
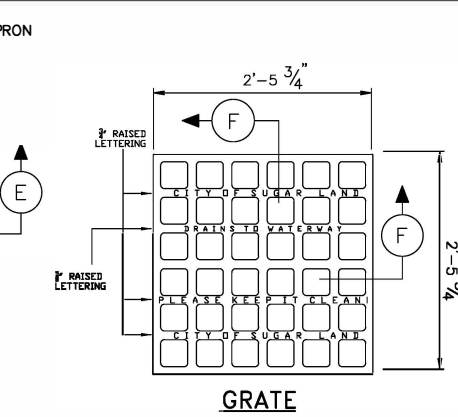
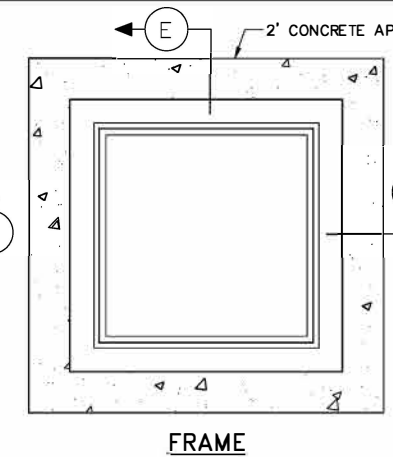
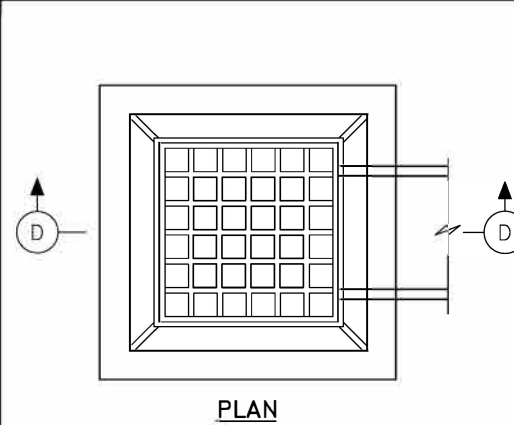
SL-DR-24



TYPE "E" INLET
N.T.S.



SL-DR-22



TYPE "A" INLET
N.T.S.

SL-DR-23

- REFER TO:
1. GENERAL NOTES, C.S.S. & CONCRETE NOTES
 2. STORM SEWER NOTES

No.	DATE	REVISION

r.g. miller engineers
16340 Park Ten Place
Suite 350
Houston, Texas 77084
(713) 461-9400
TEXAS FIRM REGISTRATION NO. C-467

SEAL:
DESIGN ENGINEER: *Robert L. Lane* DATE: 3/19/2021

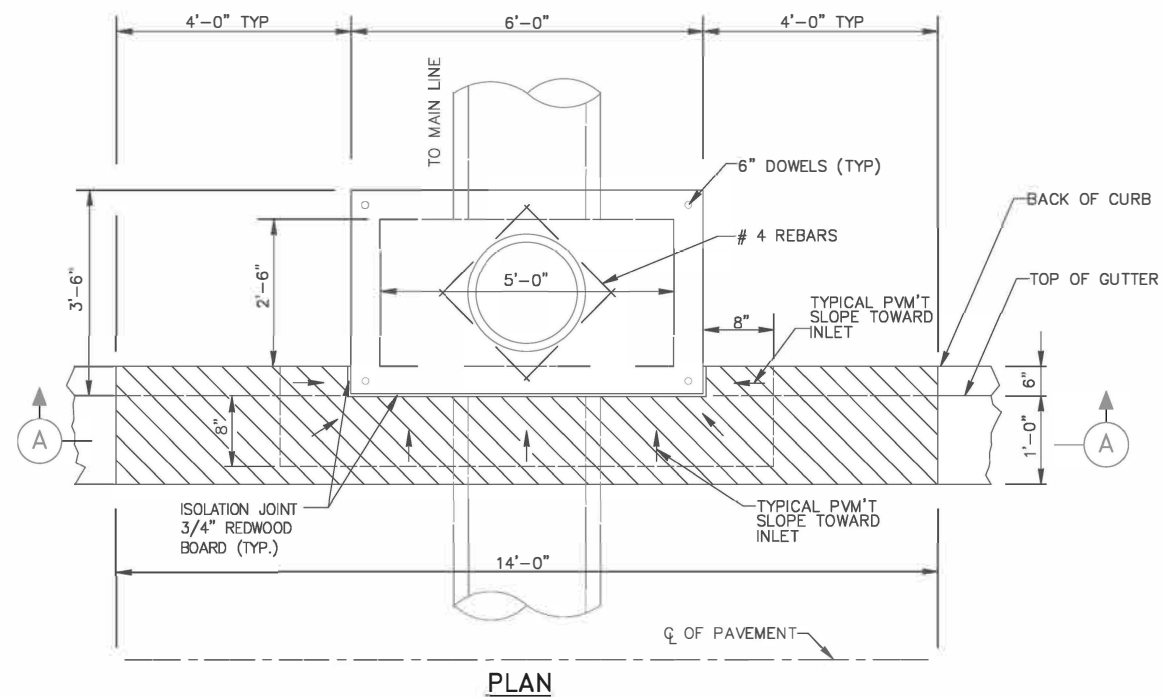
CITY OF SUGAR LAND TEXAS
CITY OF SUGAR LAND, TEXAS
ENGINEERING DEPARTMENT

CONSTRUCTION PLANS FOR:
WIDENING & RECONSTRUCTION
OF RANSOM ROAD

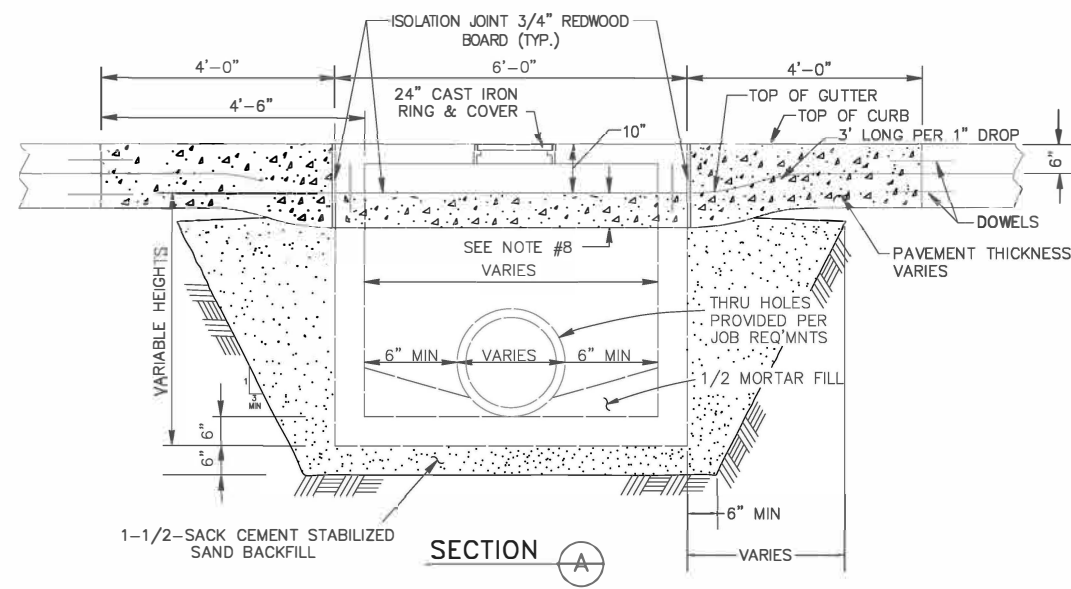
STORM SEWER INLET
CONSTRUCTION DETAILS I

JOB No.:
DATE:
DESIGNED BY:
DRAWN BY:
CHECKED BY:
SCALE:

SL-07
SHEET 92 OF 123



PLAN

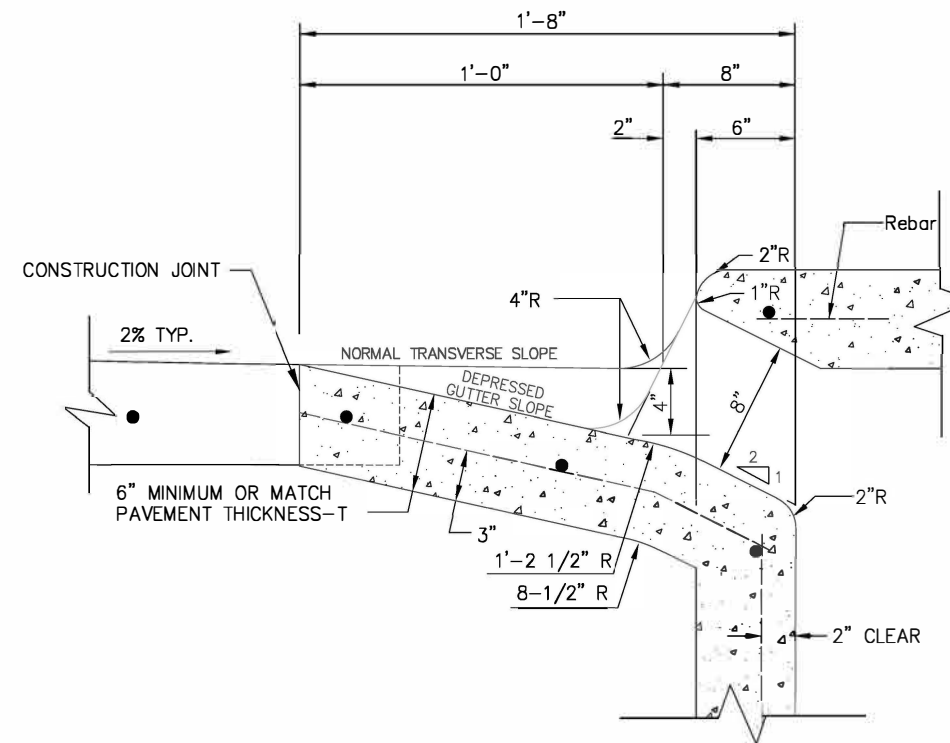


TYPE "H-2" INLET

SL-DR-25

NOTES:

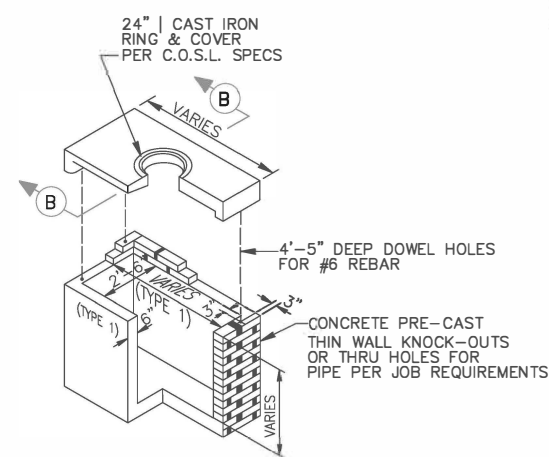
1. INLET WALLS MAY BE EXTENDED USING PRECAST RISER SECTION.
2. INLET TOPS MUST BE SECURED TO THE INLET WALL USING #6 DOWELS DRILLED AND GROUTED A MINIMUM DEPTH OF 5" INTO THE INLET WALL. A PLAN PREPARED BY THE MANUFACTURER MUST BE SUBMITTED FOR APPROVAL PRIOR TO INSTALLATION. THE PLAN SHOULD DETAIL CONNECTIONS AND SEALING OF JOINTS.
3. PRECAST INLET TOPS SHALL NOT UTILIZE MULTIPLE ONE-FOOT SECTIONS TO ACHIEVE GRADE.
4. INLET BACKFILL SHALL BE CEMENT STABILIZED SAND TO THE TOP OF THE INLET FIRST STAGE.
5. GRADE 60 REINFORCEMENT. #4 STEEL REBAR TO CONFORM TO ASTM A615 ON REQUIRED CENTERS OR EQUAL.
6. PRECAST INLET MUST BE CONSTRUCTED TO SPECIFICATIONS REQUIRED BY APPROVED DRAWINGS. (SEE GENERAL NOTES).
7. TOPS POURED-IN-PLACE REQUIRE #4 REBAR @ 12" C-C EACH WAY, 4,500 PSI CONCRETE MINIMUM AND 3" THICK MINIMUM.
8. PAVEMENT DEPTH AT INLET SHALL BE EQUAL TO OR GREATER THAN REQUIRED PAVEMENT DEPTH.
9. DEPRESS GUTTER TO INLET.
10. ALL SIDES OF ALL INLETS MUST BE COMPACTED.
11. REFER TO GEOTECHNICAL REPORTS FOR RECOMMENDED TRENCH SIDE SLOPES.



THROAT DETAIL FOR STANDARD INLETS ON CONCRETE STREETS

N.T.S.

SL-DR-40



NOTE:
REFER TO INSTALLATION FOR TYPE H-2 5'-0" CURB INLET ON PAVING DETAIL SHEET

SECTION B

TYPE "H-2" PRECAST INLET

N.T.S.

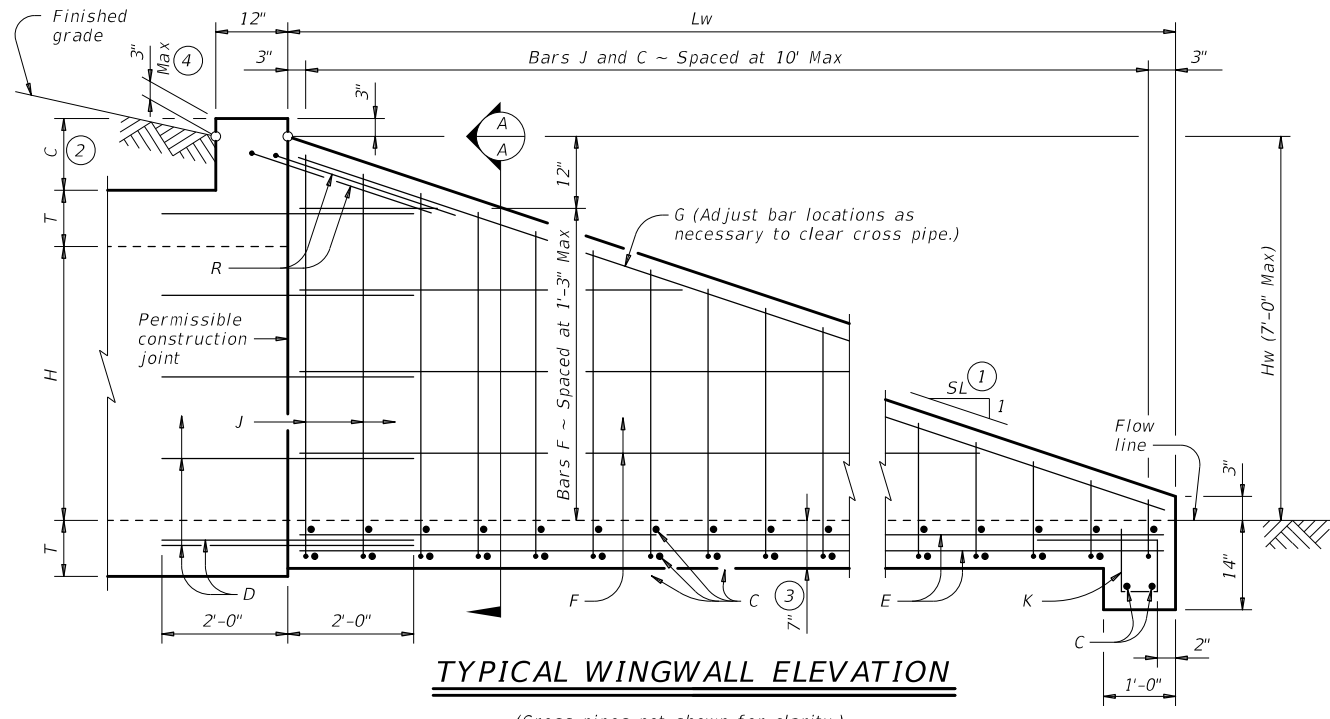
SL-DR-26

REFER TO:

1. GENERAL NOTES
2. C.S.S PAVEMENT NOTES

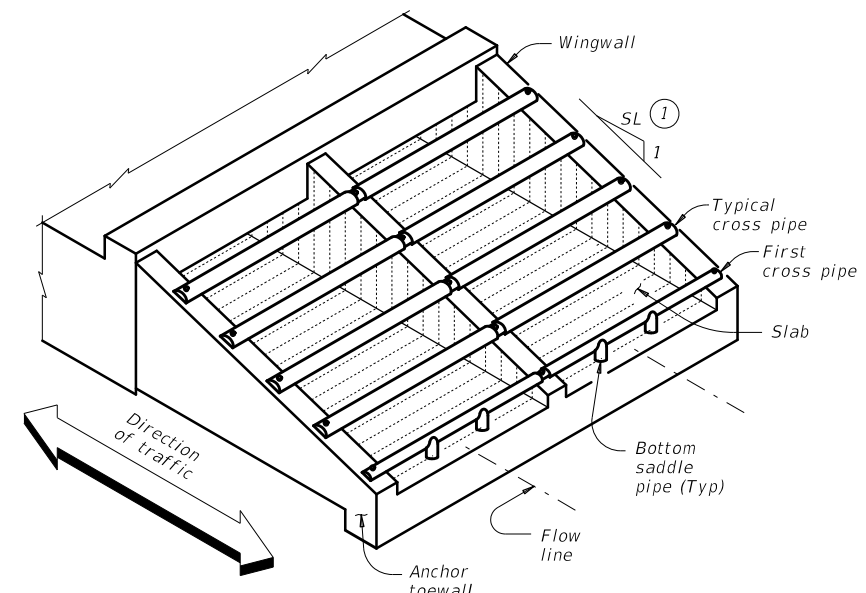
<p>16340 Park Ten Place Suite 350 Houston, Texas 77084 (713) 461-9400 TEXAS FIRM REGISTRATION NO. E-487</p>
<p>SEAL:</p> <p>DESIGN ENGINEER: <i>Emily Layne Lane</i> DATE: _____</p>
<p>CITY OF SUGAR LAND, TEXAS ENGINEERING DEPARTMENT</p>
<p>CONSTRUCTION PLANS FOR: WIDENING & RECONSTRUCTION OF RAMSON ROAD</p>
<p>STORM SEWER INLET CONSTRUCTION DETAILS II</p>
<p>JOB No.: DATE: DESIGNED BY: DRAWN BY: CHECKED BY: SCALE:</p>
<p>SL-08 SHEET 93 OF 123</p>

DATE: 5/4/2023 4:22:31 PM
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 DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TXDOT for any purpose whatsoever. TXDOT assumes no responsibility for the conversion of drawings to PDF format.



TYPICAL WINGWALL ELEVATION

(Cross pipes not shown for clarity.)



ISOMETRIC VIEW OF TYPICAL INSTALLATION

(Showing bolted anchor option.)

WING DIMENSION CALCULATIONS:

$$Hw = H + T + C - 0.250'$$

$$Lw = (Hw - 0.333') (SL)$$

For cast-in-place culverts:
 $Atw = (N) (S) + (N + 1) (U)$

For precast culverts:
 $Atw = (N) (2U + S) + (N - 1) (0.500')$

$$\text{Total Wingwall Area (SF)} = (0.5) (Hw + 0.333') (Lw) (N - 1)$$

$$\text{Total Concrete Volume (CY)} = [(\text{Wingwall Area}) (0.583') + (Lw) (Atw) (0.583') + (Atw) (1.167') (1.167' - 0.583')] \div (27)$$

PIPE RUNNER DIMENSION CALCULATIONS:

$$\text{Pipe Runner Length (feet)} = (Lw) (K1) = (1.917')$$

$$\text{Total Reinforcing (Lb)} = (1.55) (Lw) (Atw) + (4.43) (Atw) + (K2) (Hw) (N + 1) (\sqrt{Lw})$$

C = Height of curb above top of top slab (feet)
 Hw = Height of wingwall (feet)
 K = Constant value for use in formulas

Slope SL:1	K1	K2
3:1	~ 1.054	~ 7.45
4:1	~ 1.031	~ 8.49
6:1	~ 1.014	~ 10.30

Atw = Anchor toewall length (feet)
 Lw = Length of wingwall (feet)
 N = Number of culvert barrels
 SL:1 = Side slope ratio (horizontal : 1 vertical)

See applicable box culvert standard for H, S, T, and U values.

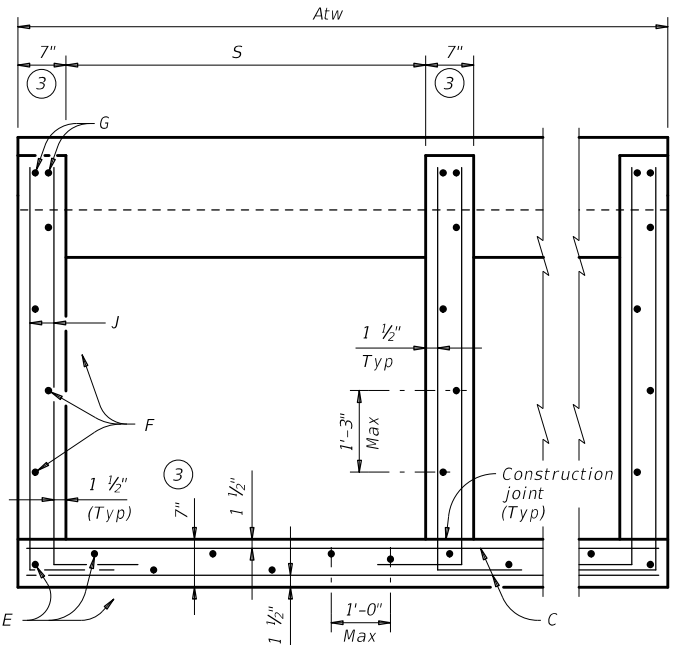
MATERIAL NOTES:

Provide Grade 60 reinforcing steel.
 Provide galvanized reinforcing steel if required elsewhere in the plans. Adjust reinforcing as necessary to provide a minimum clear cover of 1 1/2".
 Provide Class "C" concrete (f'c = 3,600 psi).
 Provide pipe runners, cross pipes, and anchor pipes meeting the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 Gr B, or API 5LX52.
 Provide ASTM A307 bolts.
 Galvanize all steel components, except the concrete reinforcing, unless required elsewhere in the plans, after fabrication.
 Repair galvanizing damaged during transport or construction in accordance with Item 445, "Galvanizing."

GENERAL NOTES:

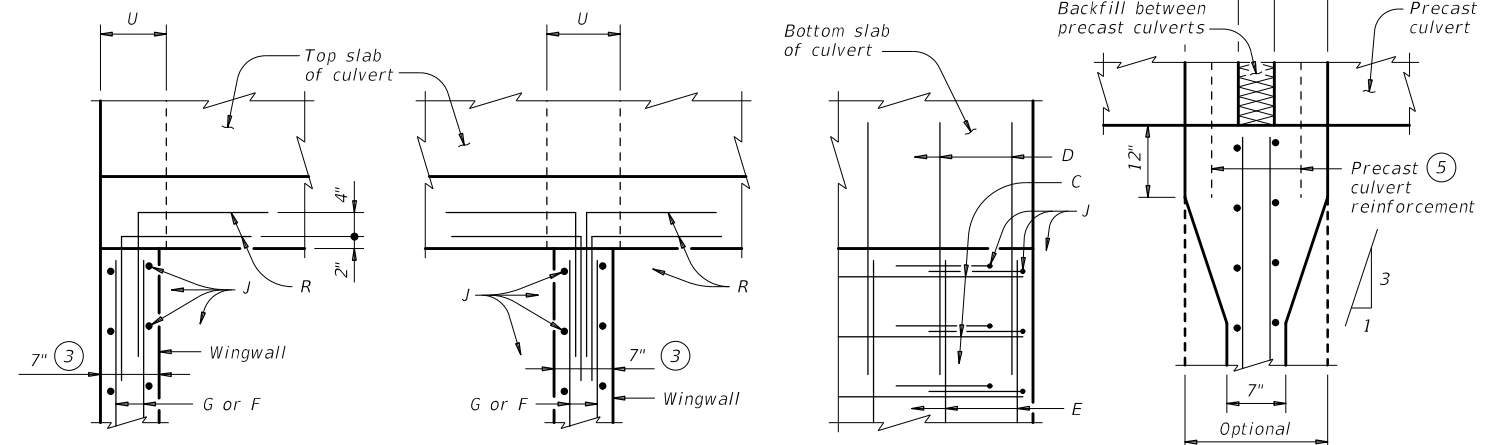
Designed according to AASHTO LRFD Bridge Design Specifications.
 The safety end treatments shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the cross pipes.
 Cross pipes are designed for a traversing load of 10,000 pounds at yield as recommended by Research Report 280-2F, "Safety Treatment of Roadside Parallel-Drainage Structures", Texas Transportation Institute, March 1981.
 The quantities for concrete, reinforcing steel, and cross pipes resulting from the formulas given herein are for Contractor's information only.
 See the Box Culvert Supplement (BCS) standard sheet for additional dimensions and information.
 Alternate design drawings bearing the seal of a professional engineer will be acceptable for precast construction of the safety end treatments.

Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing dimensions are out-to-out of bars.



SECTION A-A

(Showing typical wingwall and wing slab reinforcing. Pipe runners not shown for clarity.)

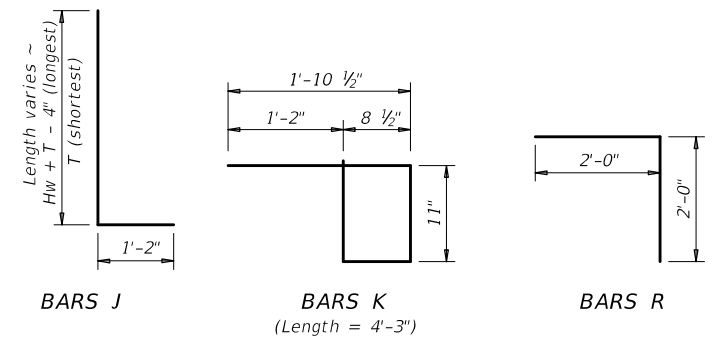


PLAN VIEWS OF CORNER DETAILS

TABLE OF REINFORCING BAR SIZES AND SPACING

Bar	Size	Spacing
C	#4	10" Max
D	#4	Match F and E
E	#4	1'- 0" Max
F	#4	1'- 3" Max
G	#6	As shown
J	#4	10" Max
K	#4	1'- 0" Max
R	#4	As shown

- Provide 6:1 or flatter slope.
- 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures without railing and curbs taller than 1'-0", refer to Extended Curb Details the Extended Curb Details (ECD) standard sheet.
- Wingwall and slab thicknesses may be the same as the adjacent culvert wall and slab thicknesses (7" Minimum). If thicknesses greater than the minimum (7") are used, no changes will be made in quantities and no additional compensation will be allowed.
- For vehicle safety, reduce height, if necessary, to provide a maximum 3" projection above finished grade. No changes will be made in quantities and no additional compensation will be allowed for this work.
- For culverts with C = 0", the precast culvert reinforcing may extend 1'-0" minimum into wingwall. Wingwall bars D and R may be omitted. Otherwise, refer to the Wingwall Connection detail on the Box Culvert Precast Miscellaneous Details (SCP-MD) standard sheet.



SHEET 1 OF 2

Bridge Division Standard

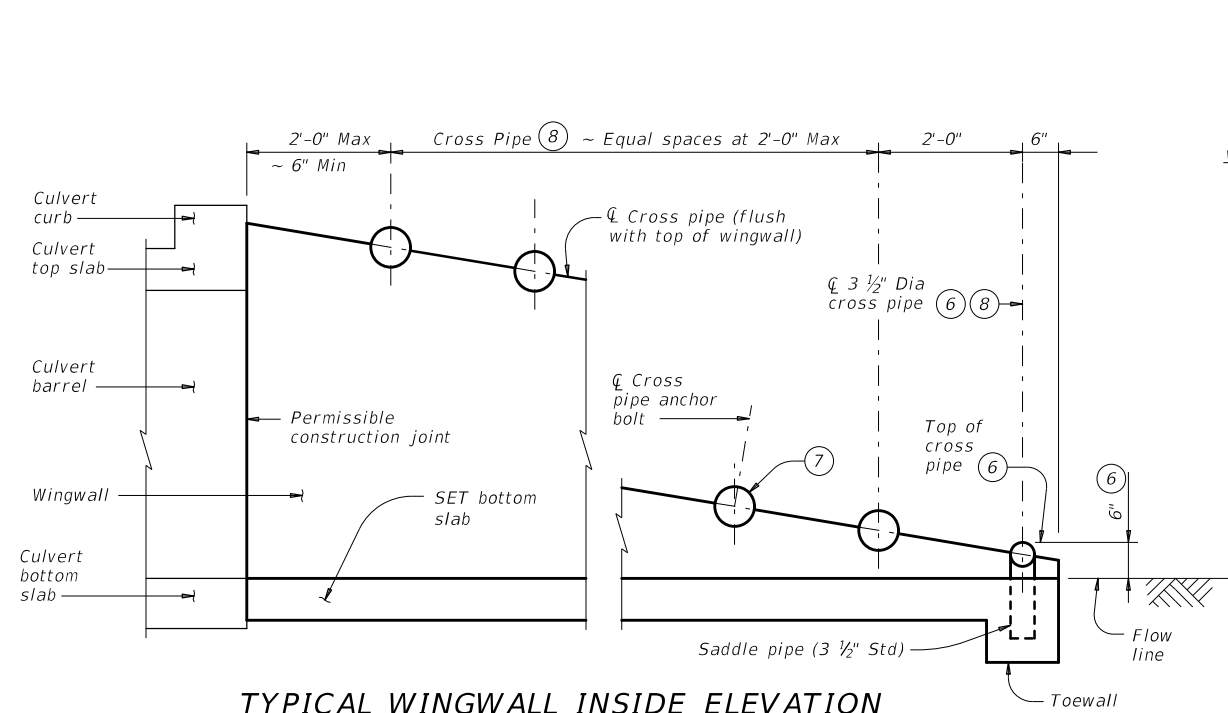
SAFETY END TREATMENT FOR BOX CULVERTS (MAXIMUM Hw = 7'-0") TYPE I ~ PARALLEL DRAINAGE

SETB-PD

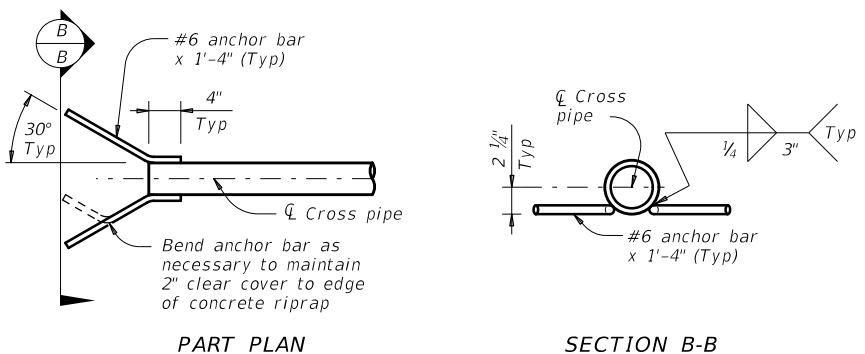
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©TXDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	-	-	-	-
	DIST	COUNTY		SHEET NO.
	-	-		94

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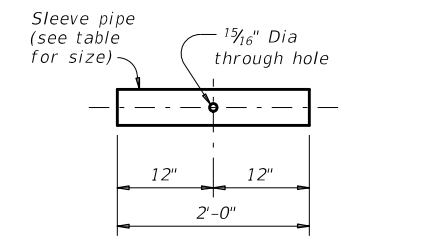
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TYPICAL WINGWALL INSIDE ELEVATION
 (Showing installation of cross pipes.)



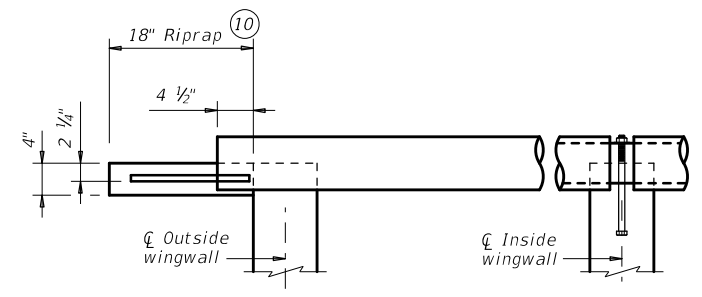
OPTIONAL ANCHOR BAR DETAILS



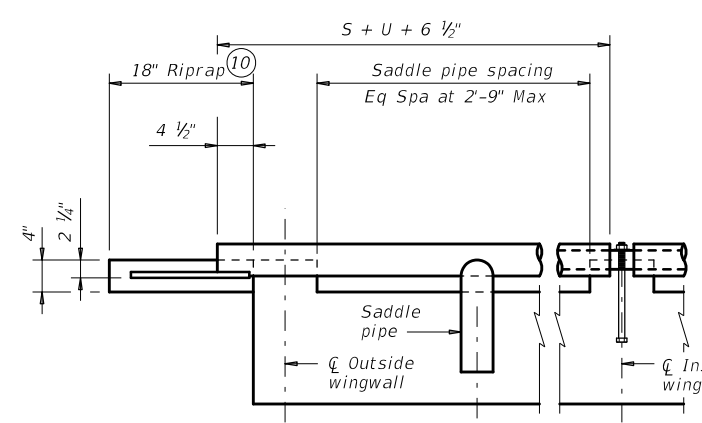
SLEEVE PIPE DETAILS

REQUIRED PIPE SIZES (8)			STANDARD PIPE SIZES		
Culvert Span Sizes	Cross Pipe Size	Sleeve Pipe Size (9)	Pipe Size	Pipe O.D.	Pipe I.D.
First Pipe	3 1/2" STD	2 1/2" STD	2 1/2" STD	2.875"	2.469"
30" to 42"	4" STD	3" STD	3" STD	3.500"	3.068"
48" to 72"	5" STD	4" STD	3 1/2" STD	4.000"	3.548"
78" to 120"	6" STD	5" STD	4" STD	4.500"	4.026"
			5" STD	5.563"	5.047"
			6" STD	6.625"	6.065"

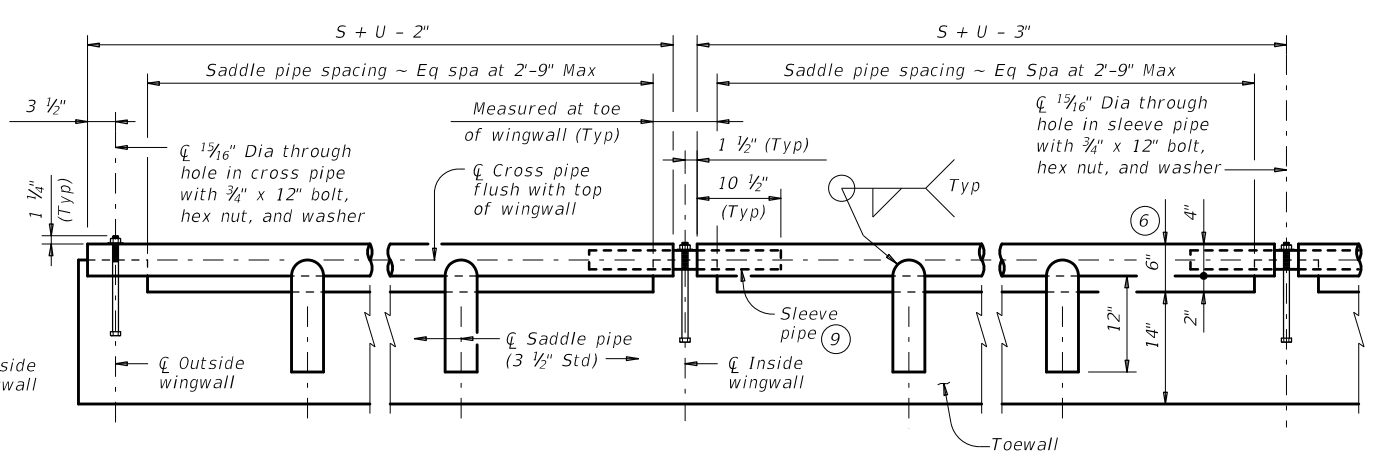
- The proper installation of the first cross pipe is critical for vehicle safety. Place the top of the first cross pipe at no more than 6" above the flow line.
- Always install the third cross pipe from the bottom of the culvert using a bolted connection. Take care to ensure that concrete does not flow into this cross pipe so as to permit disassembly of the bolted connection to allow cleanout access.
- Provide cross pipes and sleeve pipes (if required) as shown in the Required Pipe Sizes table. Provide 3 #2" saddle pipes for the 3 #2" first cross pipe.
- At Contractor's option, make the cross pipe continuous across the inside wingwalls. If this option is selected, omit the sleeve pipe and make a 15/16" diameter through hole in the cross pipe to accept the anchor bolt at the centerline of each interior wingwall.
- Provide riprap when using the Optional Anchor Bar details. Riprap is included in the bid price for Safety End Treatment. Provide riprap in accordance with Item 432, "Riprap".



SECTION THROUGH INSTALLATION OF TYPICAL FULL CROSS PIPE
 (Anchor details and dimensions are similar to those shown below in Section Through Installation of 3 1/2" First Cross Pipe detail.)



OUTSIDE CULVERT BARREL WITH OPTIONAL ANCHOR BARS & RIPRAP



SECTION THROUGH INSTALLATION OF 3 1/2" FIRST CROSS PIPE

OUTSIDE CULVERT BARREL WITH BOLTED ANCHOR

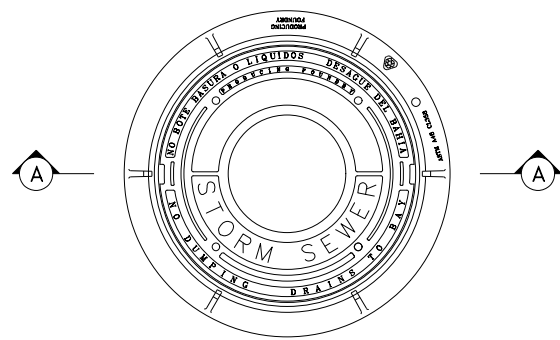
INSIDE CULVERT BARREL

CROSS PIPE INSTALLATION DETAILS

SHEET 2 OF 2

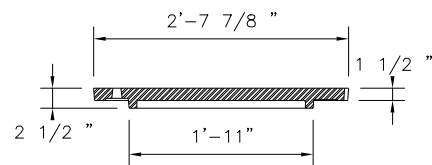
		Bridge Division Standard	
SAFETY END TREATMENT FOR BOX CULVERTS (MAXIMUM Hw = 7'-0") TYPE I ~ PARALLEL DRAINAGE			
SETB-PD			
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©TxDOT February 2020	CONT	SECT	JOB
REVISIONS	-	-	-
DIST	COUNTY	SHEET NO.	
-	-	95	

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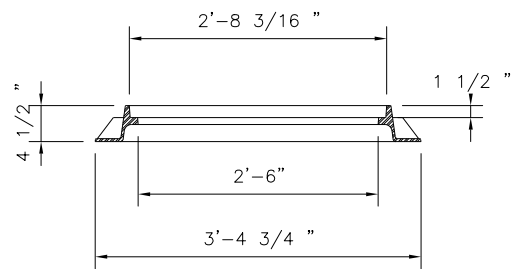


PLAN VIEW
FRAME AND COVER
SCALE: 1" = 1'-0"

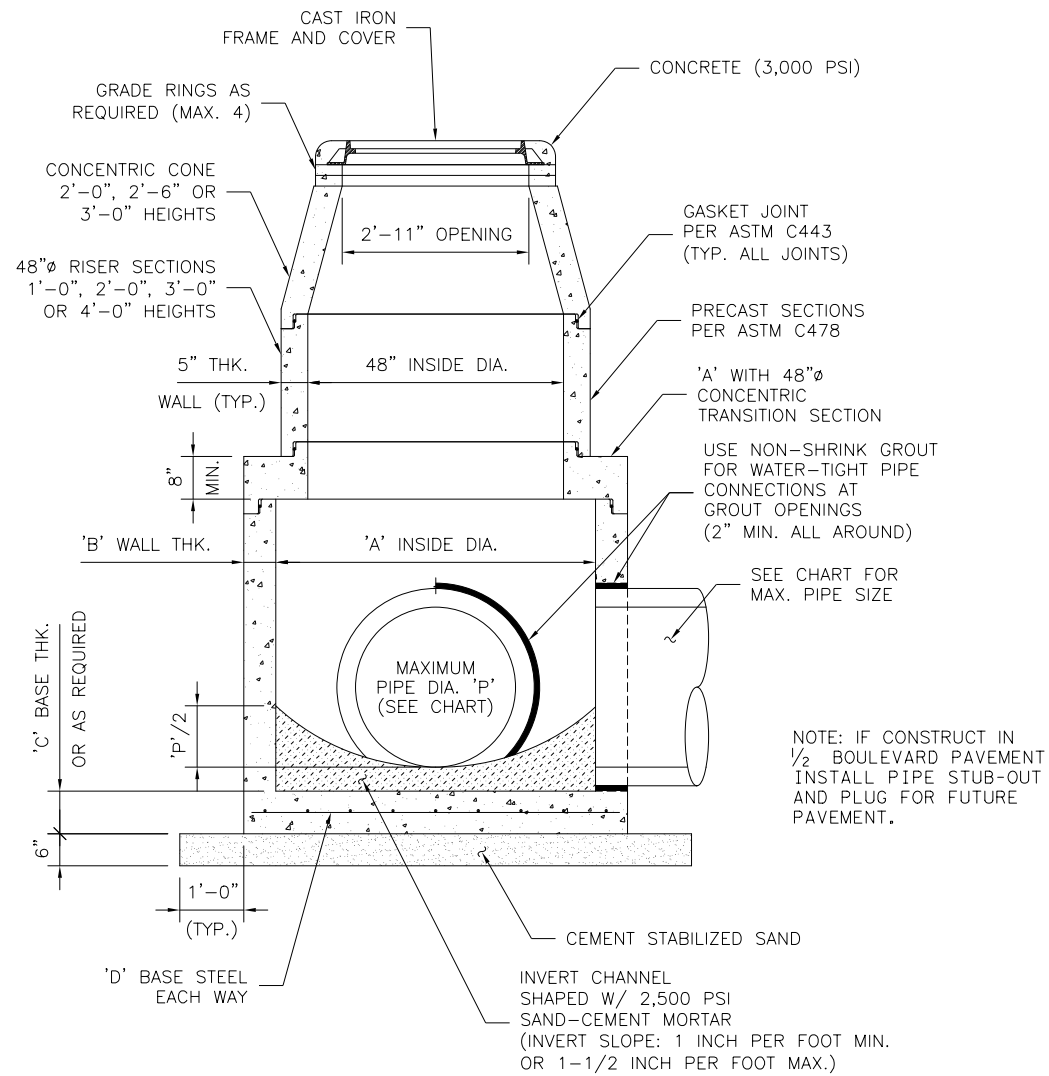
NOTE: IF PROJECT IS WITHIN A CITY ETJ OR CITY LIMITS, USE CITY'S STD MANHOLE COVER



COVER SECTION A-A
SCALE: 1" = 1'-0"

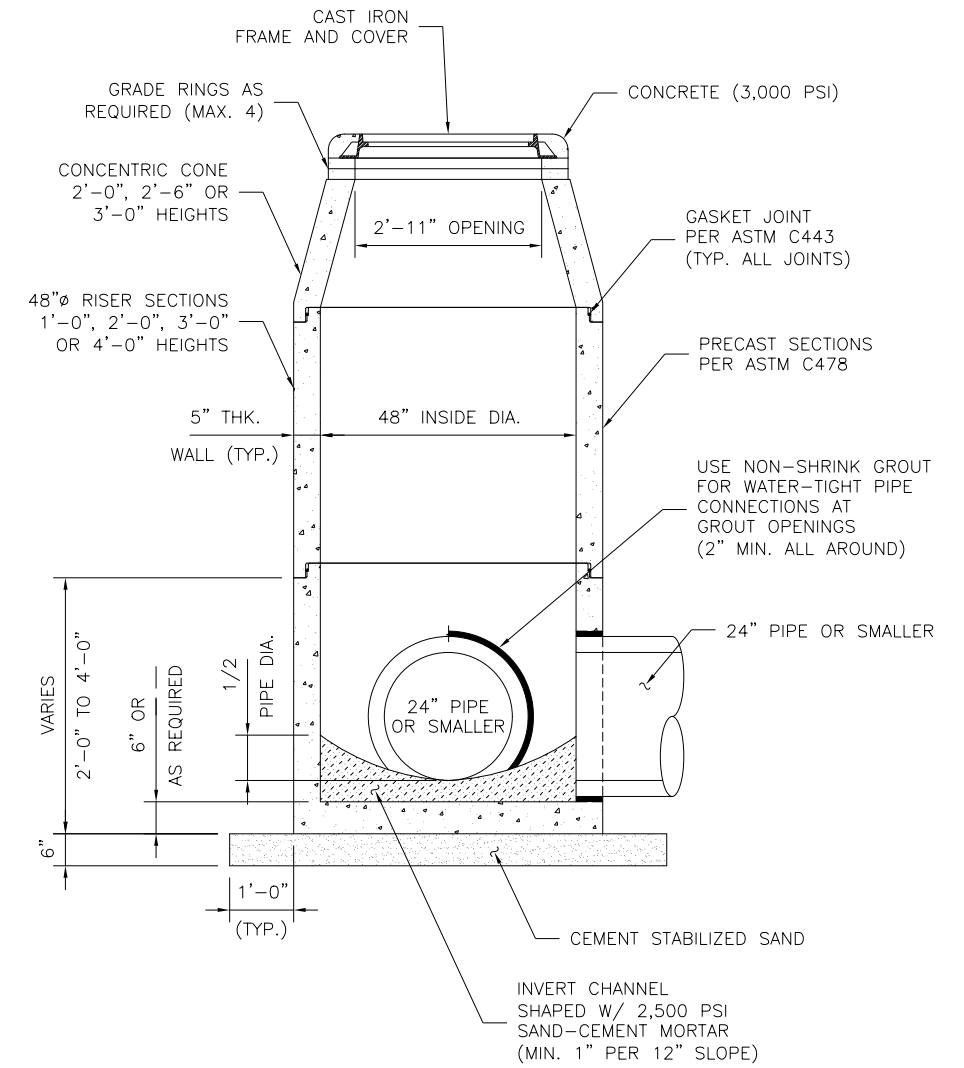


FRAME SECTION A-A
SCALE: 1" = 1'-0"



PRECAST CONCENTRIC MANHOLE
FOR PIPE SIZES GREATER THAN 24"
SCALE: 1" = 1'-6"

MAXIMUM PIPE DIA. 'P'	INSIDE DIA. 'A'	WALL THICKNESS 'B'	BASE THICKNESS 'C'	BASE STEEL 'D'
30"	5'-0"	6"	8"	#5 @ 8"
42"	6'-0"	7"	8"	#5 @ 8"
54"	7'-0"	8"	10"	#6 @ 12" (2 LAYERS)
60"	8'-0"	9"	10"	#6 @ 12" (2 LAYERS)



48"Ø PRECAST CONCENTRIC MANHOLE
FOR PIPE SIZES 24" OR SMALLER
SCALE: 1" = 1'-6"

GENERAL NOTES:

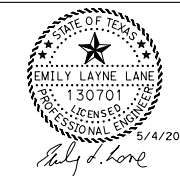
- CONSTRUCTION AND MATERIALS SHALL MEET REQUIREMENTS OF ITEM 471 "PRECAST CONCRETE MANHOLES".
- CONCRETE FOR MANHOLE: MINIMUM 4,000 PSI IN 28 DAYS
- HS-20 LOADING; MANHOLE DESIGN SHALL MEET OR EXCEED ASTM C478 REQUIREMENTS.
- GASKET JOINT: PER ASTM C443
- FRAME AND COVER SHALL BE EAST JORDAN IRON WORKS MODEL V-1420 OR APPROVED EQUAL.
- SHOP DRAWINGS WITH MANUFACTURER'S CERTIFICATION SHALL BE SUBMITTED FOR ENGINEER'S APPROVAL.

NO.	REVISIONS	DATE	NAME
1	ORIGINAL STANDARD ISSUED	3-1-22	RJS

FORT BEND COUNTY
ENGINEERING DEPARTMENT



r.g.miller
engineers
16340 Park Ten Place
Suite 350
Houston, Texas 77084
(713) 461-9600
TEXAS FIRM REGISTRATION NO. F-487

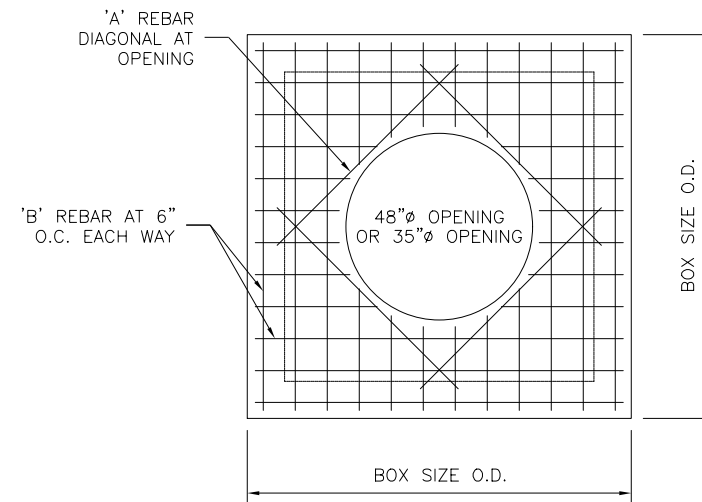


PROJECT TITLE: WIDENING AND RECONSTRUCTION OF RANSOM ROAD		
DRAWN BY: INIT	FROM SUGAR LAND CITY LIMIT TO SH 99	FBCD STANDARD
CK'D BY: INIT	SHEET DESCRIPTION: PRECAST CONCRETE STORM SEWER	20
SCALE: AS NOTED	MANHOLE DETAILS	SHEET NO:
DATE: 3-1-22	APPROVED BY:	96 /123

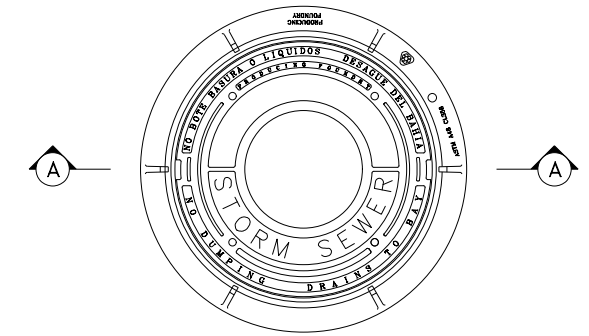
J:\1704\1601\Fort Bend County Standards\Fort Bend County Standards\FBC PRECAST CONCRETE JUNCTION BOX MANHOLE DETAIL\PRECAST_CONCRETE_JUNCTION_BOX_MANHOLE_DETAILS.dwg

BOX SIZE I.D.	MAX. OPENING SIZE	FLAT SLAB THK.	WALL THK.	BASE THK.	BAR 'A'	BAR 'B'	BAR 'C'	*BAR 'D'
4'X4'	48"	8"	6"	6"	#4	#4	#4	#4
5'X5'	60"	10"	6"	8"	#5	#5	#4	#4
6'X6'	72"	10"	8"	8"	#5	#5	#5	#5
7'X7'	84"	10"	8"	8"	#5	#5	#5	#5
8'X8'	96"	10"	8"	8"	#5	#5	#5	#5

* FOR 7'X7' AND 8'X8' BOX SIZE: TWO LAYERS OF STEEL REQUIRED. (FOR DEPTHS GREATER THAN 15')

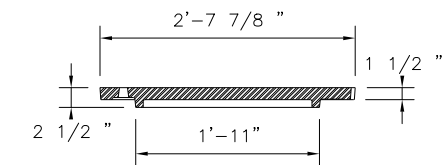


PLAN VIEW
FLAT SLAB WITH OPENING
SCALE: 1"=1'-6"

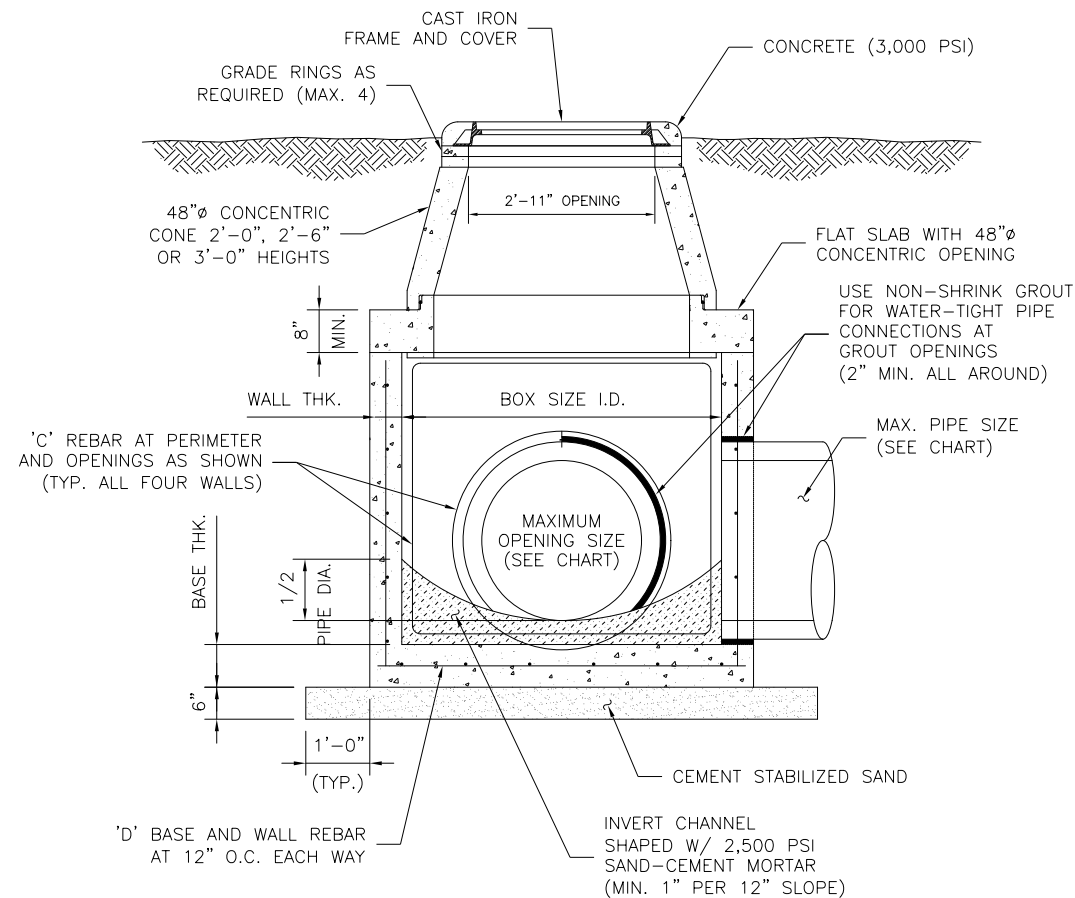


PLAN VIEW
FRAME AND COVER
SCALE: 1"=1'-0"

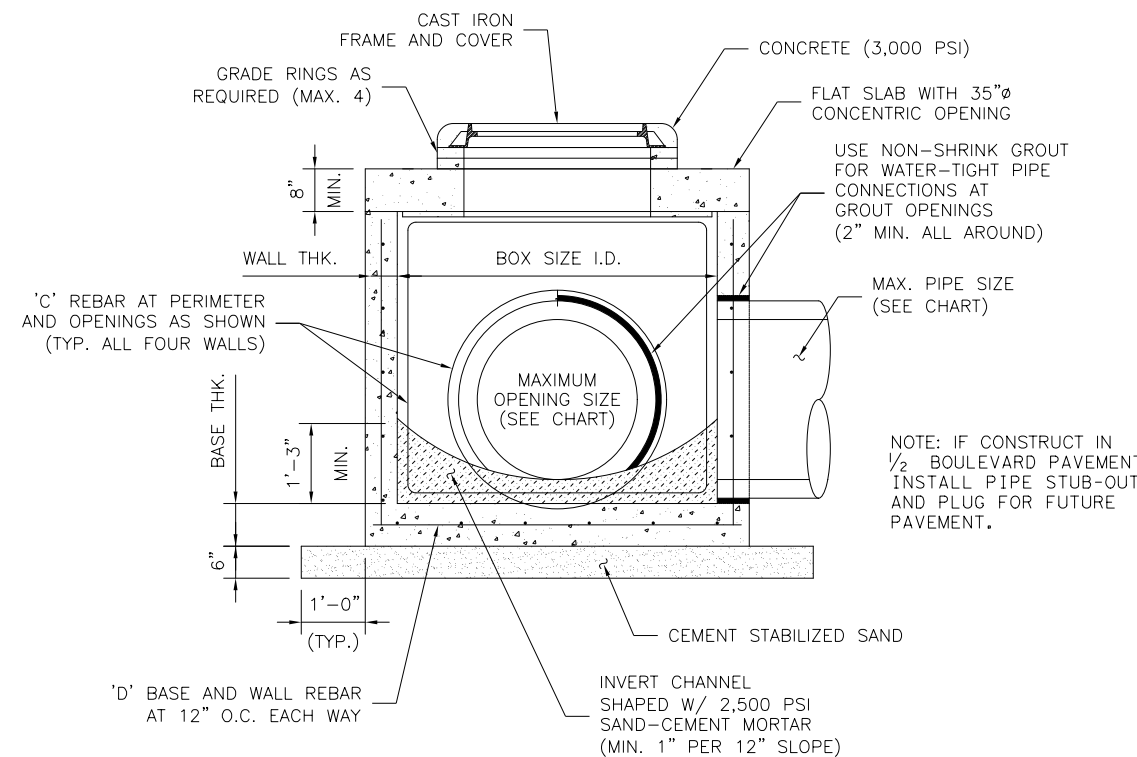
NOTE: IF PROJECT IS WITHIN A CITY ETJ USE CITY'S STD MANHOLE COVER



COVER SECTION A-A
SCALE: 1"=1'-0"



JUNCTION BOX/MANHOLE
WITH CONCENTRIC CONE
SCALE: 1"=1'-6"



JUNCTION BOX/MANHOLE
WITH FLAT SLAB
SCALE: 1"=1'-6"

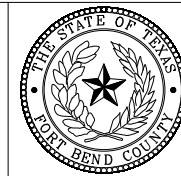
NOTE: IF CONSTRUCT IN 1/2 BOULEVARD PAVEMENT INSTALL PIPE STUB-OUT AND PLUG FOR FUTURE PAVEMENT.

GENERAL NOTES:

1. CONSTRUCTION AND MATERIALS SHALL MEET REQUIREMENTS OF ITEM 471 "PRECAST CONCRETE MANHOLES".
2. CONCRETE FOR JUNCTION BOX: MINIMUM 4,000 PSI IN 28 DAYS
3. HS-20 LOADING; MANHOLE DESIGN SHALL MEET OR EXCEED ASTM C478 AND ASTM C913 REQUIREMENTS.
4. JOINT SEALANT: RAM-NEK GASKET MATERIAL
5. FRAME AND COVER SHALL BE EAST JORDAN IRON WORKS MODEL V-1420 OR APPROVED EQUAL.
6. SHOP DRAWINGS WITH MANUFACTURER'S CERTIFICATION SHALL BE SUBMITTED FOR ENGINEER'S APPROVAL.

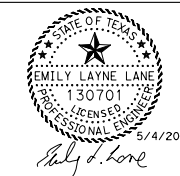
NO.	REVISIONS	DATE	NAME
1	ORIGINAL STANDARD ISSUED	3-1-22	RJS

FORT BEND COUNTY
ENGINEERING DEPARTMENT



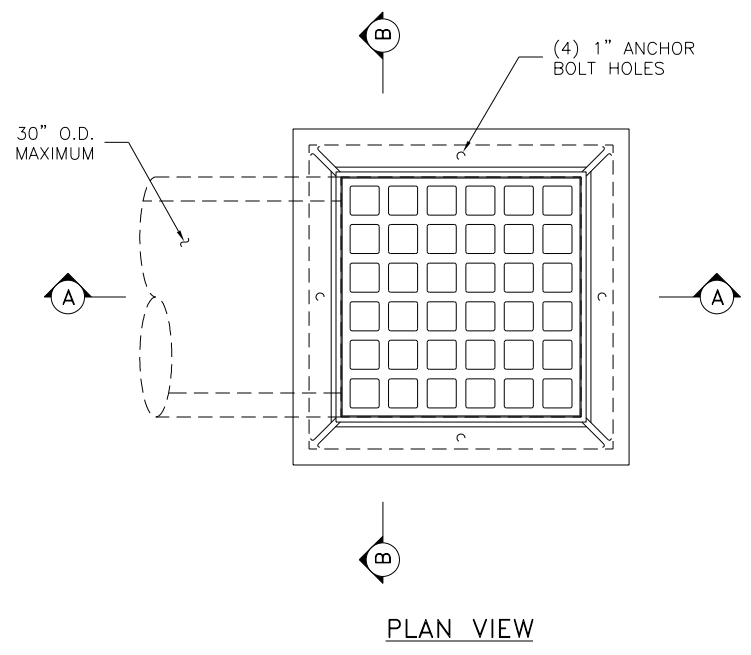
r.g. miller
engineers
SINCE 1968

16340 Park Ten Place
Suite 350
Houston, Texas 77084
(713) 461-9600
TEXAS FIRM REGISTRATION NO. F-487

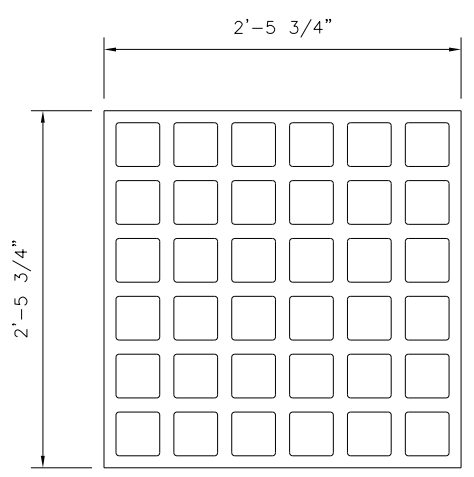


PROJECT TITLE: WIDENING AND RECONSTRUCTION OF RANSOM ROAD		
DRAWN BY: INIT	FROM SUGAR LAND CITY LIMIT TO SH 99	FBCD STANDARD
CK'D BY: INIT	SHEET DESCRIPTION: JUNCTION BOX/ MANHOLE	21
SCALE: AS NOTED	DETAILS	
DATE: 3-1-22	APPROVED BY:	SHEET NO: 97/123

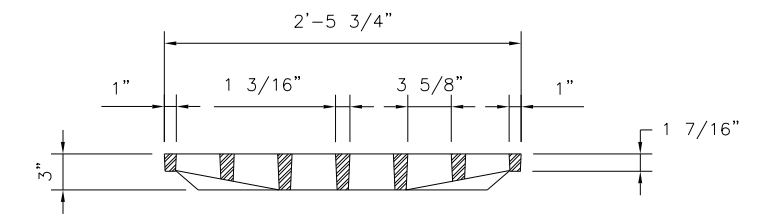
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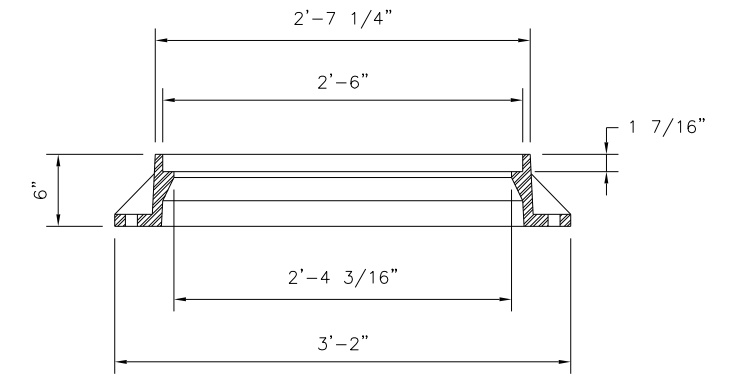
PLAN VIEW



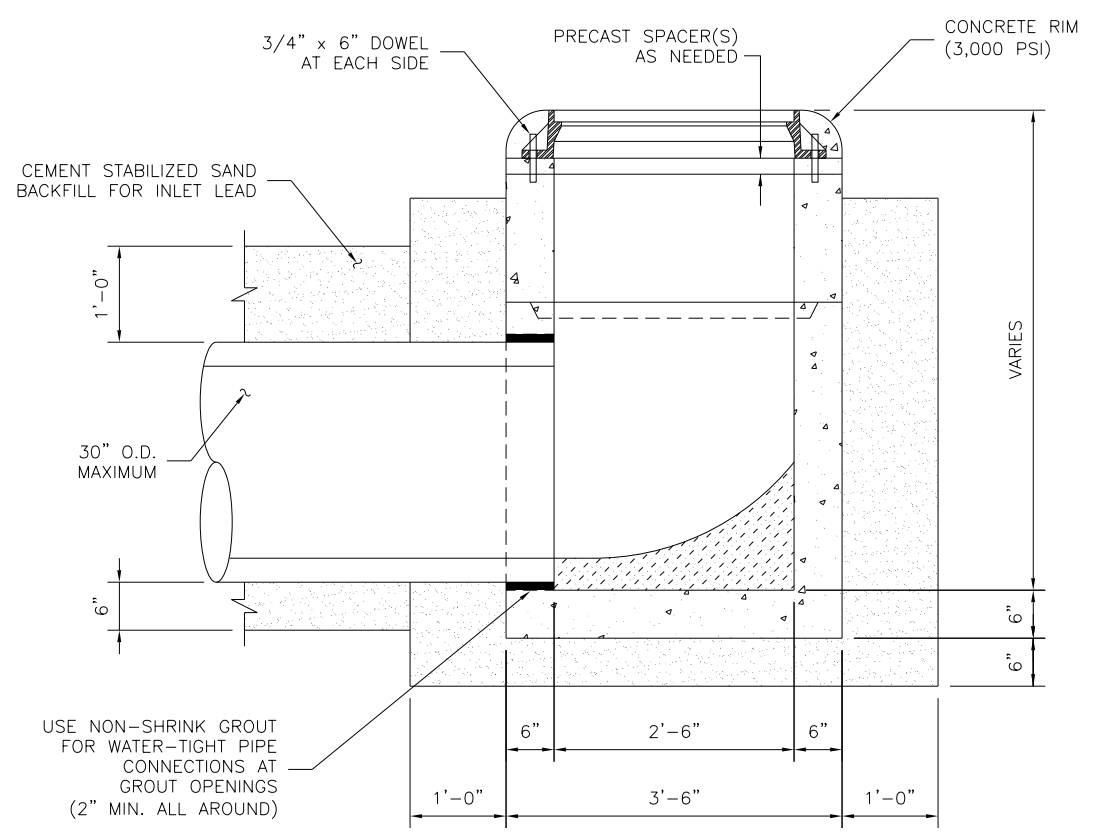
GRATE PLAN VIEW



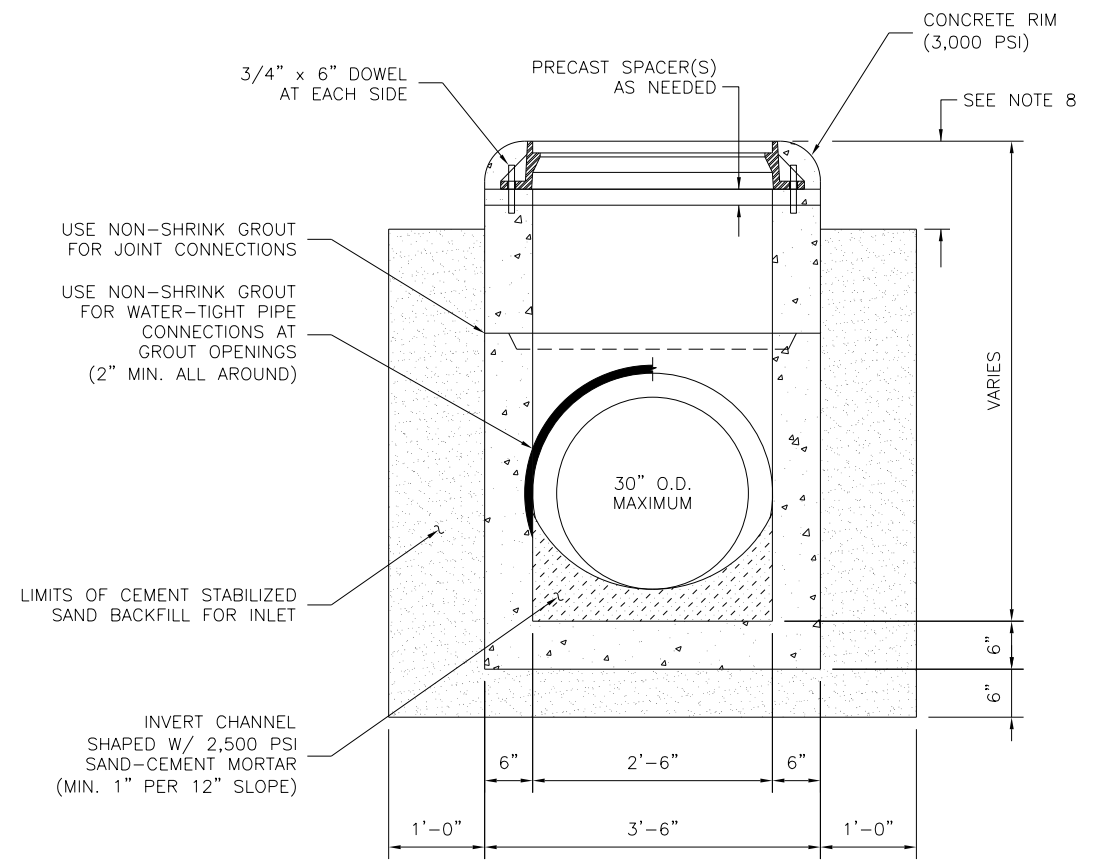
GRATE SECTION A-A



FRAME SECTION A-A



SECTION A-A



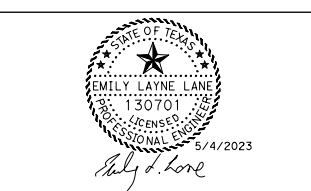
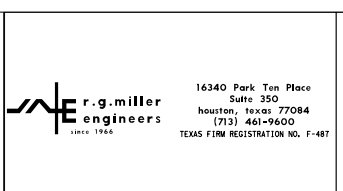
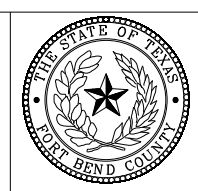
SECTION B-B

GENERAL NOTES:

1. CONSTRUCTION AND MATERIALS SHALL MEET REQUIREMENTS OF ITEM 472 "INLETS".
2. CONCRETE FOR INLET: MINIMUM 4,000 PSI IN 28 DAYS
3. PRECAST STRUCTURE TO MEET ASTM C913
4. FRAME AND GRATE SHALL BE EAST JORDAN IRON WORKS MODEL V-4880-1 (OPEN AREA 473 SQ. IN.) OR APPROVED EQUAL.
5. IF THE ENGINEER OF RECORD SPECIFIES A CAST-IN-PLACE INLET, HE/SHE SHALL INCORPORATE A DETAILED DRAWING INTO THE CONTRACT DOCUMENTS. HOWEVER, IF THE CONTRACTOR ELECTS TO CONSTRUCT A CAST-IN-PLACE INLET, THE CONTRACTOR WILL BE RESPONSIBLE FOR PROVIDING A DETAILED DRAWING, SIGNED AND SEALED BY A REGISTERED PROFESSIONAL ENGINEER LICENSED TO PRACTICE IN THE STATE OF TEXAS.
6. SHOP DRAWINGS SHALL BE REQUIRED FOR PRECAST CONSTRUCTION OF INLET.
7. KNOCK-OUTS ARE NOT PERMISSIBLE FOR PRECAST CONSTRUCTION OF INLET.
8. CEMENT STABILIZED SAND SHALL EXTEND TO THE BOTTOM OF PAVEMENT OR SLOPE PAVING, OR 12 INCHES BELOW THE SURFACE IF INLET IS LOCATED IN AN UNPAVED AREA.

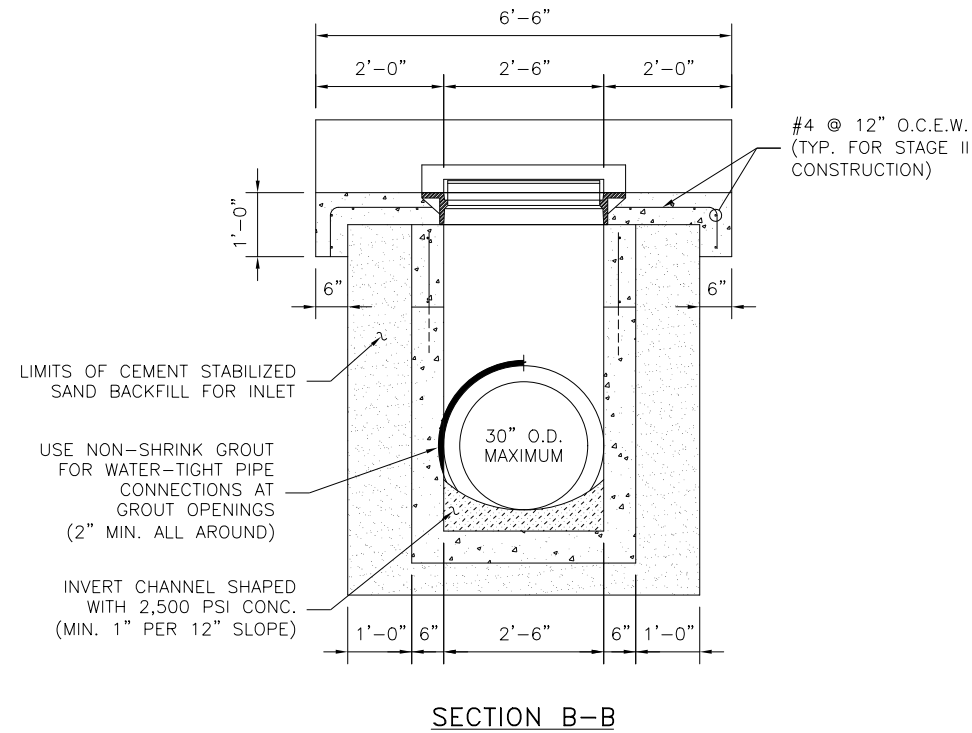
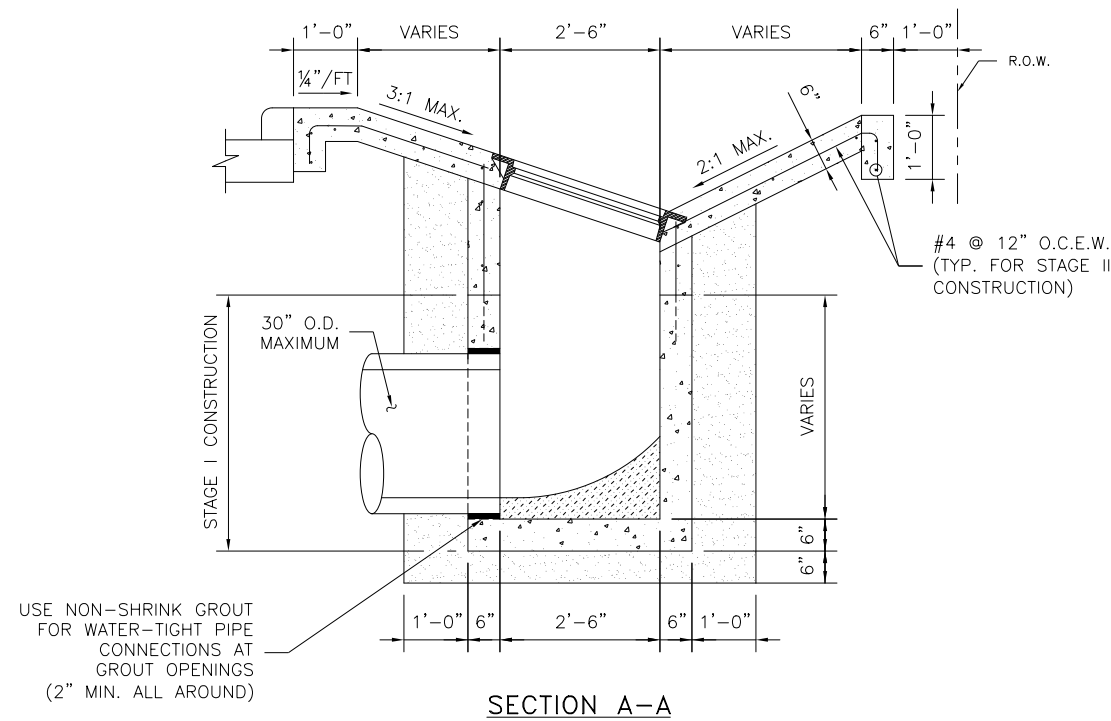
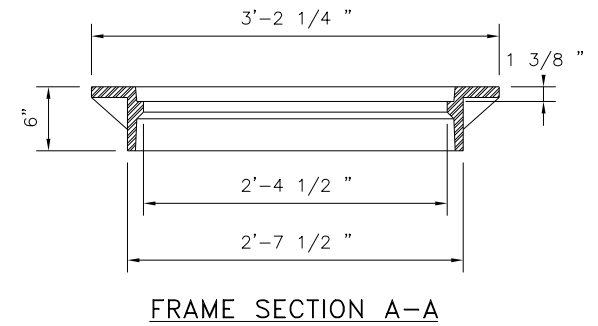
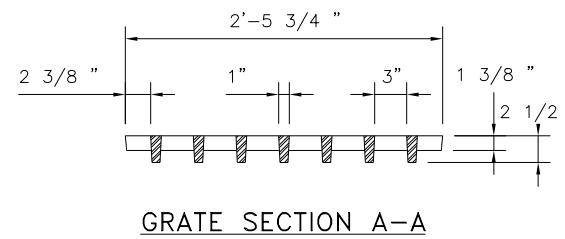
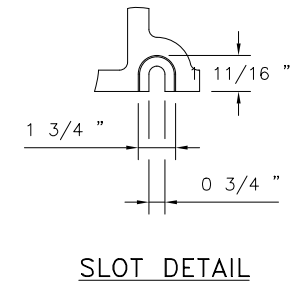
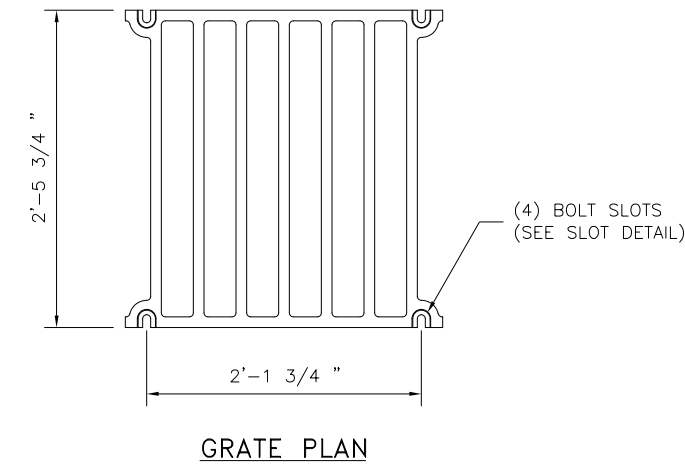
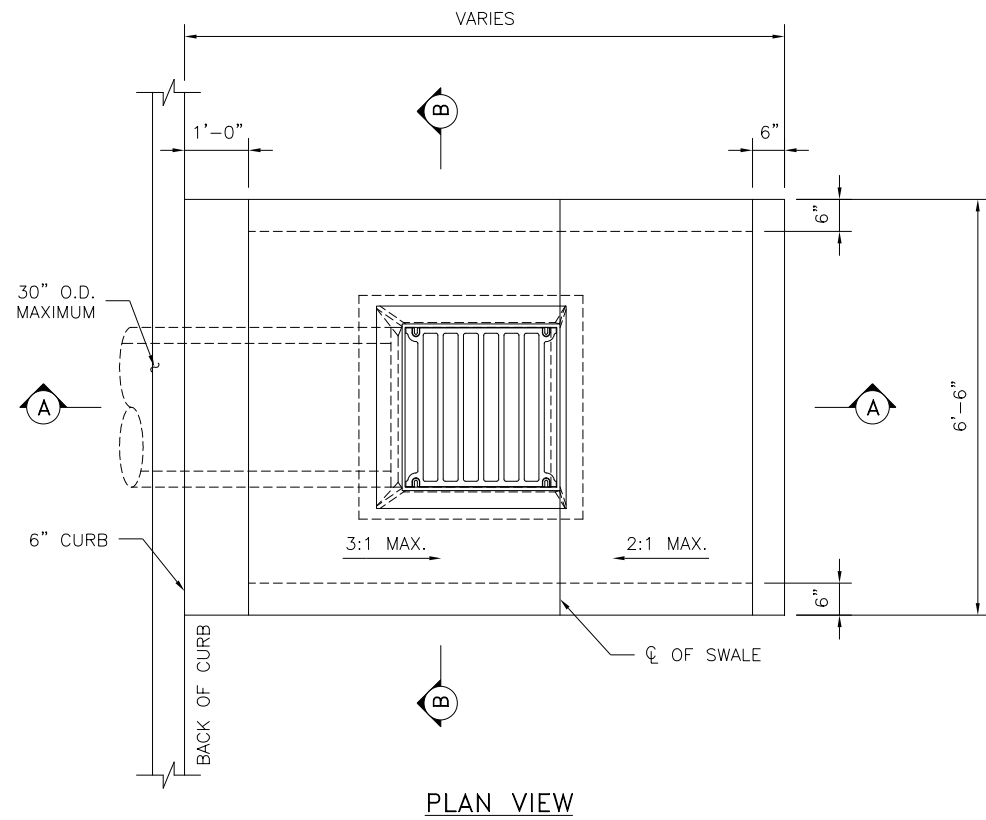
NO.	REVISIONS	DATE	NAME
▲	ORIGINAL STANDARD ISSUED	3-1-22	RJS
▲			
▲			
▲			

FORT BEND COUNTY
ENGINEERING DEPARTMENT



PROJECT TITLE: WIDENING AND RECONSTRUCTION OF RANSOM ROAD		
DRAWN BY: INIT	FROM SUGAR LAND CITY LIMIT TO SH 99	FBCD STANDARD
CK'D BY: INIT	SHEET DESCRIPTION: TYPE "A" INLET DETAILS	22
SCALE: 1"=1'-0"	FOR MAXIMUM 30" O.D. PIPE	SHEET NO:
DATE: 3-1-22	APPROVED BY:	98/123

J:\1704\1601\Fort Bend County Standards\Fort Bend County STD\DONE\FBC MODIFIED THYPE A INLET DETAILS\TYPE A INLET DETAILS.dwg



GENERAL NOTES:

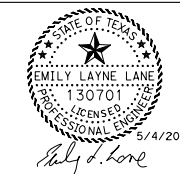
1. CONSTRUCTION AND MATERIALS SHALL MEET REQUIREMENTS OF ITEM 472 "INLETS".
2. CONCRETE: MINIMUM 4,000 PSI IN 28 DAYS
3. PRECAST STRUCTURE TO MEET ASTM C913.
4. FRAME AND GRATE SHALL BE EAST JORDAN IRON WORKS MODEL V-4882-3 FRAME AND V-4880-2 GRATE WITH (4) BOLT SLOT GRATE OR APPROVED EQUAL.
5. IF THE ENGINEER OF RECORD SPECIFIES A CAST-IN-PLACE INLET; HE/SHE SHALL INCORPORATE A DETAILED DRAWING INTO THE CONTRACT DOCUMENTS. HOWEVER, IF THE CONTRACTOR ELECTS TO CONSTRUCT A CAST-IN-PLACE INLET, THE CONTRACTOR WILL BE RESPONSIBLE FOR PROVIDING A DETAILED DRAWING, SIGNED AND SEALED BY A REGISTERED PROFESSIONAL ENGINEER LICENSED TO PRACTICE IN THE STATE OF TEXAS.
6. USE PRECAST UNITS FOR STAGE I CONSTRUCTION. CAST IN PLACE MAY BE REQUIRED DURING STAGE II CONSTRUCTION. SHOP DRAWINGS WILL BE REQUIRED FOR PRECAST CONSTRUCTION OF INLET.
7. KNOCK-OUTS ARE NOT PERMISSIBLE FOR PRECAST CONSTRUCTION OF INLET.
8. CONCRETE SLOPE PAVING SHALL CONFORM TO ITEM 491 "REINFORCED CONCRETE SLOPE PAVING", BUT IS INCIDENTAL TO THE INLET.
9. STAGE I OF THE INLET SHALL BE PRECAST. STAGE II SHALL BE CAST-IN-PLACE.
10. MINIMUM CLEARANCE FOR REINFORCING STEEL IN SLOPE PAVING SHALL BE TWO INCHES.

NO.	REVISIONS	DATE	NAME
▲	ORIGINAL STANDARD ISSUED	3-1-22	RJS
▲			
▲			
▲			

FORT BEND COUNTY
ENGINEERING DEPARTMENT



r.g.miller
engineers
SINCE 1968
16340 Park Ten Place
Suite 350
Houston, Texas 77084
(713) 461-9600
TEXAS FIRM REGISTRATION NO. F-487



PROJECT TITLE: WIDENING AND RECONSTRUCTION OF RANSOM ROAD		
DRAWN BY: INIT	FROM SUGAR LAND CITY LIMIT TO SH 99	FBCD STANDARD
CK'D BY: INIT	SHEET DESCRIPTION: MODIFIED TYPE "A" INLET DETAILS	23
SCALE: 1"=1'-6"	FOR BEHIND CURB SWALES	SHEET NO:
DATE: 3-1-22	APPROVED BY:	99 /123



NOTICE:
 FOR YOUR SAFETY, YOU ARE REQUIRED BY TEXAS LAW TO CALL 811 AT LEAST 48 HOURS BEFORE YOU DIG SO THAT UNDERGROUND LINES CAN BE MARKED. THIS SIGNATURE DOES NOT FULFILL YOUR OBLIGATION TO CALL 811.

VERIFICATION OF PRIVATE UTILITY LINES

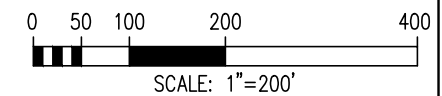
Date: _____
 CenterPoint Energy natural gas utilities shown.
 (Gas service lines are not shown). This signature not to be used for conflict verification.
 Signature Valid for six months.

Date: _____
 CenterPoint Energy/UNDERGROUND Electrical Facilities Verification ONLY.
 (This signature verifies existing underground facilities-not to be used for conflict verification.)
 Signature Valid for six months.


Date: _____
 Approved for AT&T underground conduit facilities only. Signature valid for one year.

LEGEND

- ROW _____
- EASEMENT _____
- PROP. WATER _____
- EXIST. WATER _____
- FUTURE PAVEMENT _____
- EXIST. PAVEMENT _____



No.	Date	Revisions	App.


 16340 Park Ten Place
 Suite 350
 Houston, Texas 77084
 (713) 461-9800
 TEXAS FIRM REGISTRATION NO. F-487

Approved By: _____ r.g. miller
 Date: _____ Job No. 4399

**RANSOM RD
 WATERLINE LAYOUT**

FORT BEND COUNTY ENGINEERING DEPARTMENT

APPROVAL IS IMPLIED FOR IMPROVEMENTS WITHIN FORT BEND COUNTY RIGHTS-OF-WAY ONLY. UTILITY LINES APPROVED AS TO LOCATION ONLY. AUTHORIZATION IS VALID FOR ONE YEAR ONLY.

APPROVED: _____
 FORT BEND COUNTY ENGINEER

DATE: _____

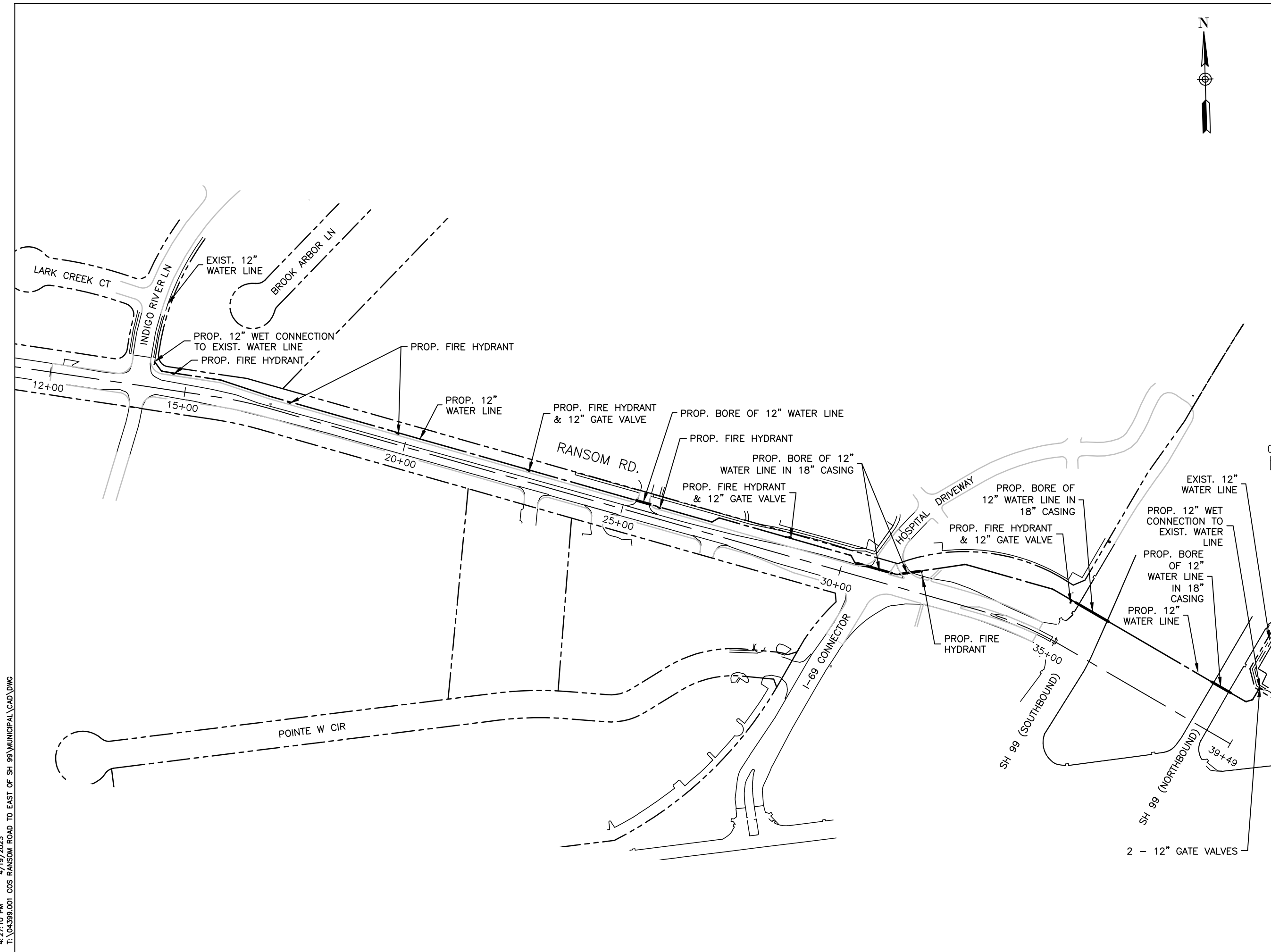


SUBMITTED BY: R.G. MILLER
 SCALE: 1"=40'(H), 1"=4'(V)

DESIGNED BY: M.J.
 DRAWN BY: E.G.

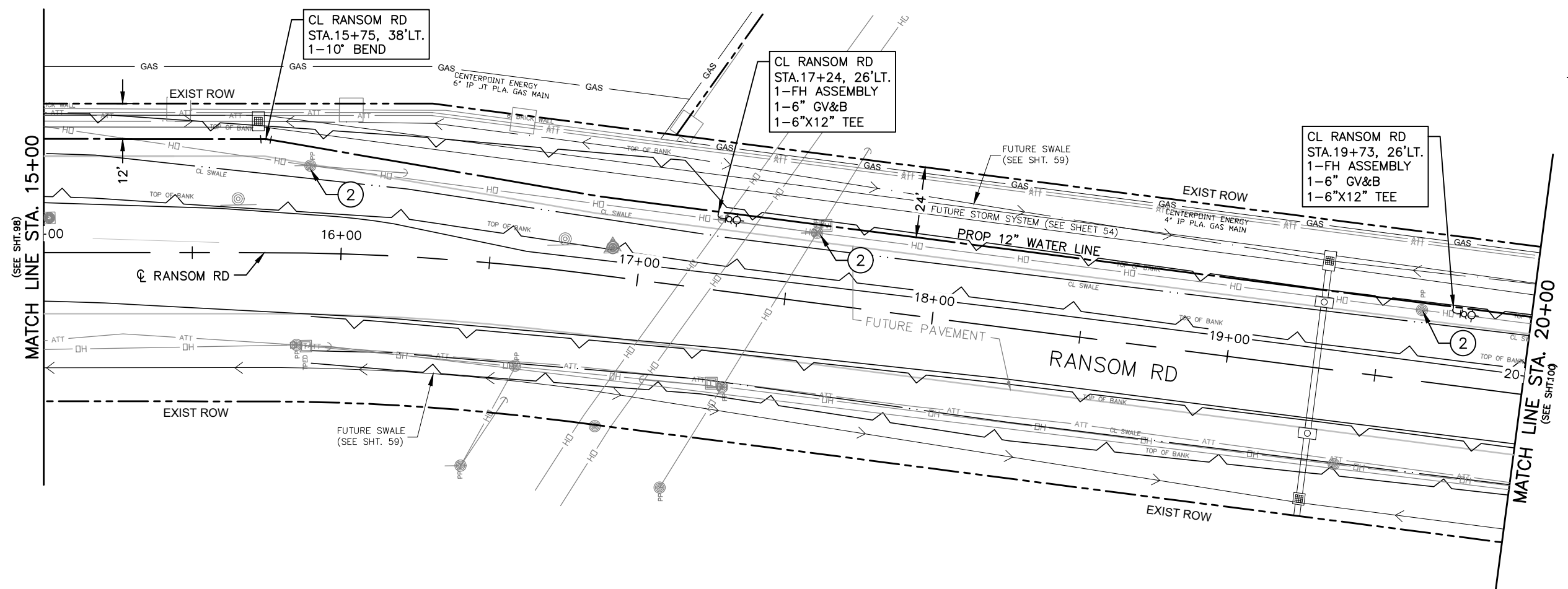
DATE: 06/29/2022
 SURV BY: MILLER SURVEY
 F. B. NO.: _____

SHEET 01 OF 01 SHEETS
 DWG. NO. 100



4:27:10 PM 4/19/2023 T:\04399.001 COS RANSOM ROAD TO EAST OF SH 99\MUNICIPAL\CAD\DWG

4:27:43 PM 4/19/2023
 T:\04399.001 COS RANSOM ROAD TO EAST OF SH 99\MUNICIPAL\CAD\DWG



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 Signature Valid for six months.

Date: _____
 Approved for AT&T underground conduit facilities only. Signature valid for one year.

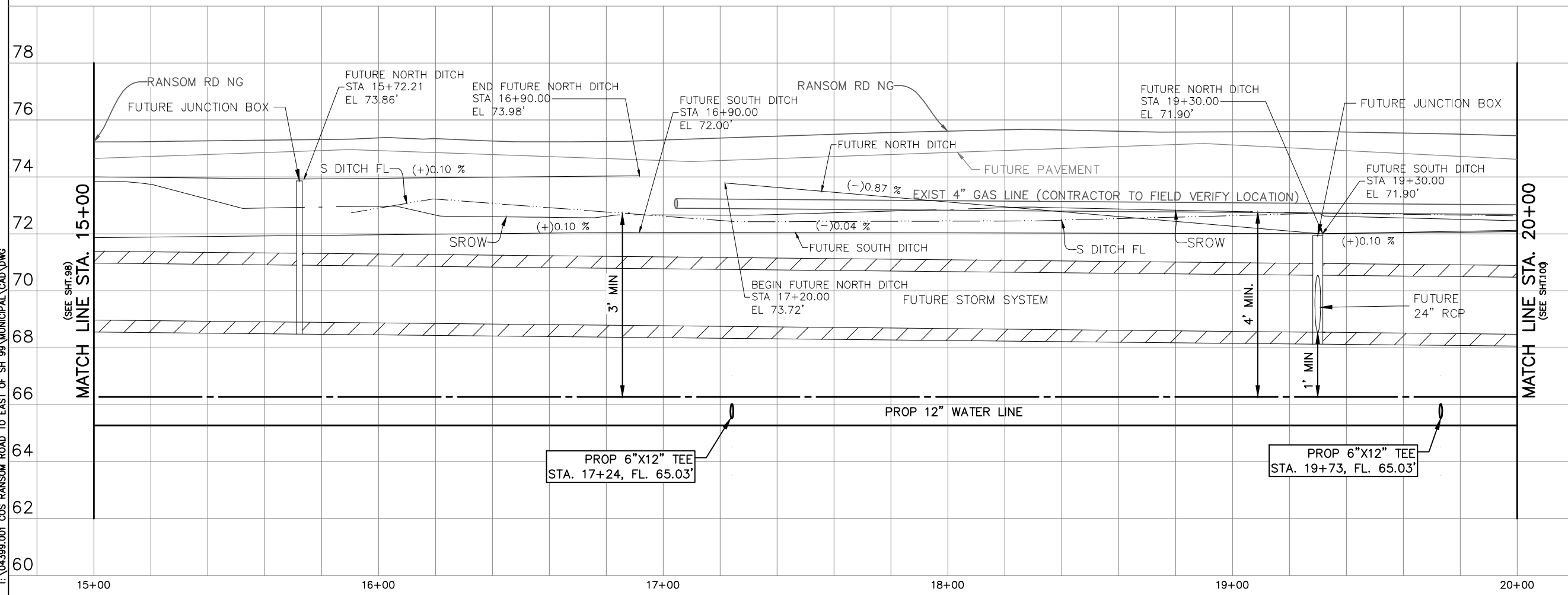
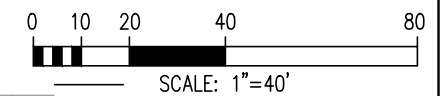
NOTE:
 CONTRACTOR TO AVOID DISCHARGING INTO TXDOT ROW

LEGEND

PROP. WATER LINE
 PROP WATER LINE CASING

KEYNOTE

① CONTRACTOR TO PROVIDE TEMPORARY BRACING FOR RELOCATED POWER POLE
 ② RELOCATE POWER POLE BY OTHERS.



No.	Date	Revisions	App.

Approved By: _____ Date: _____

r.g.miller engineers since 1998
 16340 Park Ten Place Suite 350 Houston, Texas 77084 (713) 461-9000 TEXAS FIRM REGISTRATION NO. F-487

Job No. 4399

RANSOM RD WATER LINE P&P STA 15+00 TO STA 20+00

FORT BEND COUNTY ENGINEERING DEPARTMENT

APPROVAL IS IMPLIED FOR IMPROVEMENTS WITHIN FORT BEND COUNTY RIGHTS-OF-WAY ONLY. UTILITY LINES APPROVED AS TO LOCATION ONLY. AUTHORIZATION IS VALID FOR ONE YEAR ONLY.

APPROVED: _____ FORT BEND COUNTY ENGINEER

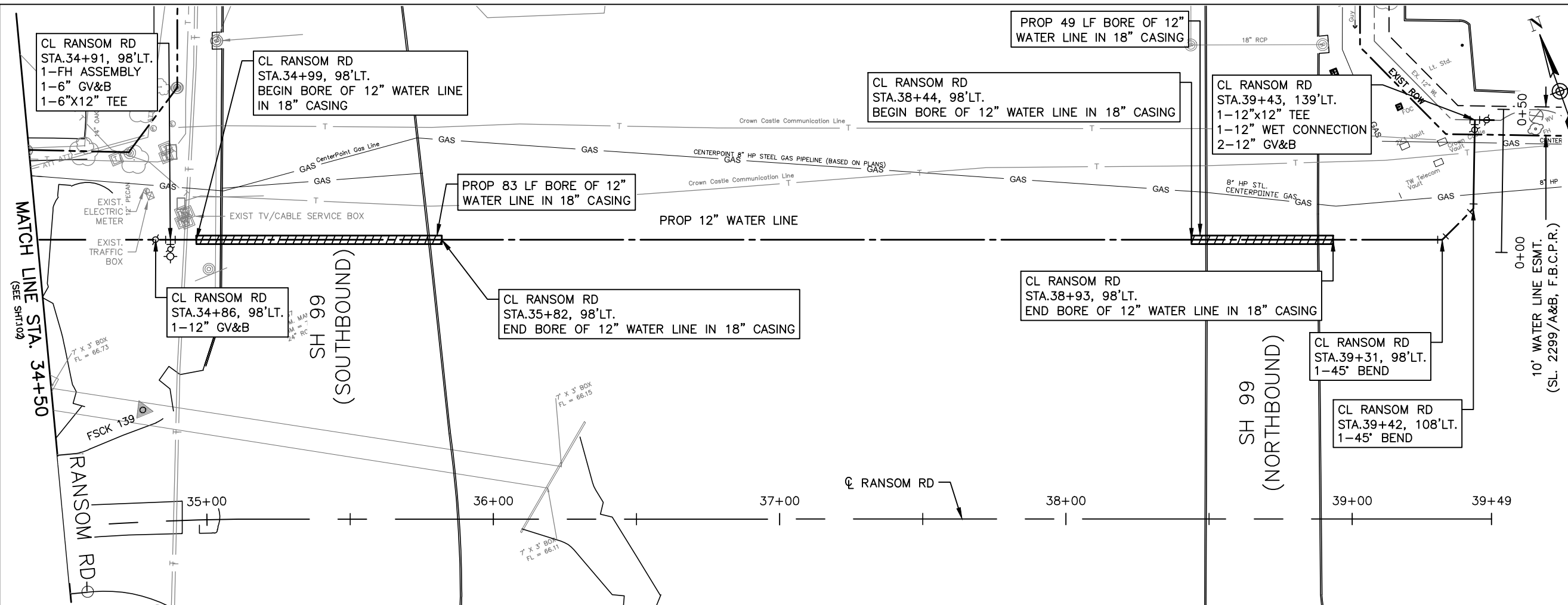
DATE: _____

MENGYANG JIANG
 LICENSED PROFESSIONAL ENGINEER
 138195

04/19/2023

SUBMITTED BY: R.G. MILLER SCALE: 1"=40'(H), 1"=4'(V)
 DATE: 06/29/2022 SURV BY: MILLER SURVEY F. B. NO.: _____

DESIGNED BY: M.J. DRAWN BY: E.G.
 SHEET 03 OF 08 SHEETS DWG. NO. 102



NOTICE:
FOR YOUR SAFETY, YOU ARE REQUIRED BY TEXAS LAW TO CALL 811 AT LEAST 48 HOURS BEFORE YOU DIG SO THAT UNDERGROUND LINES CAN BE MARKED. THIS SIGNATURE DOES NOT FULFILL YOUR OBLIGATION TO CALL 811.

VERIFICATION OF PRIVATE UTILITY LINES

Date: _____
CenterPoint Energy natural gas utilities shown. (Gas service lines are not shown). This signature not to be used for conflict verification.
Signature Valid for six months.

Date: _____
CenterPoint Energy/UNDERGROUND Electrical Facilities Verification ONLY. (This signature verifies existing underground facilities-not to be used for conflict verification.)
Signature Valid for six months.

Date: _____
Approved for AT&T underground conduit facilities only. Signature valid for one year.

NOTE:
CONTRACTOR TO AVOID DISCHARGING INTO TXDOT ROW

LEGEND

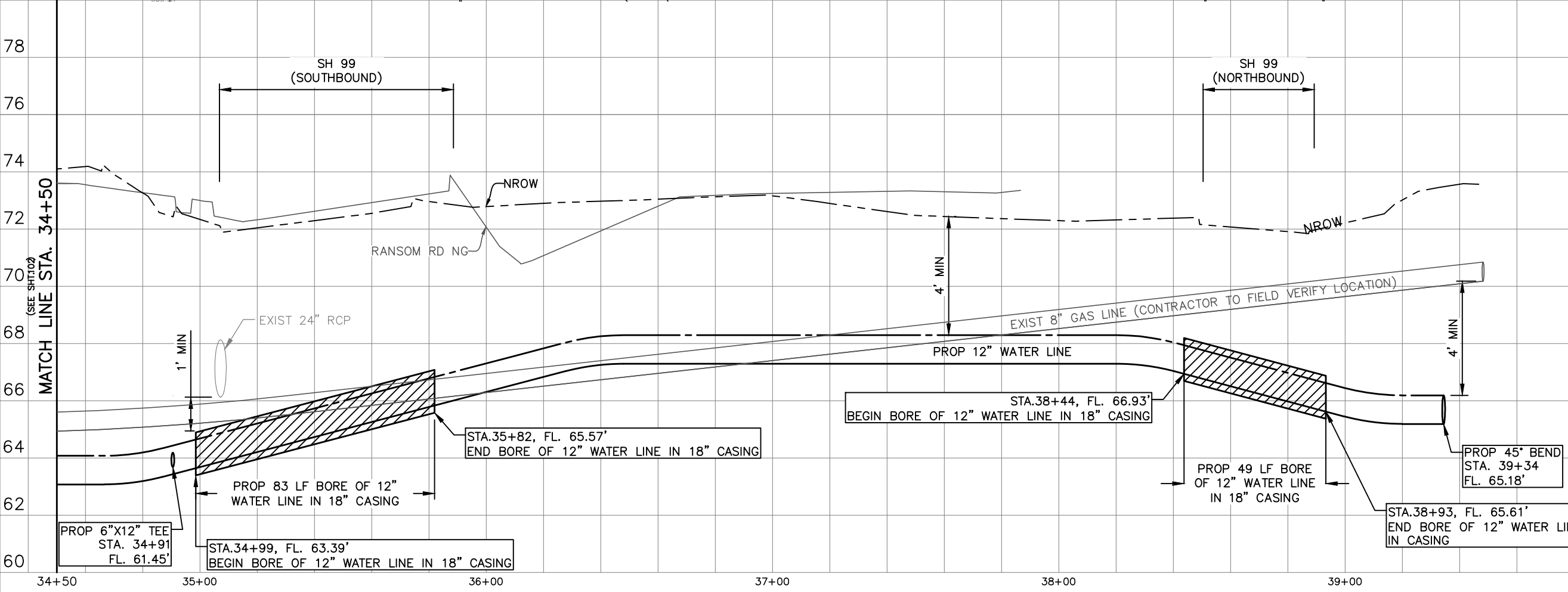
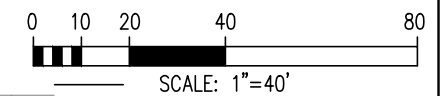
PROP. WATER LINE

PROP WATER LINE CASING

KEYNOTE

① CONTRACTOR TO PROVIDE TEMPORARY BRACING FOR RELOCATED POWER POLE

② RELOCATE POWER POLE BY OTHERS.



No.	Date	Revisions	App.

r.g.miller
engineers
since 1966
16340 Park Ten Place
Suite 350
Houston, Texas 77084
(713) 461-9800
TEXAS FIRM REGISTRATION NO. F-487

Approved By: _____ r.g. miller
Date: _____ Job No. 4399

RANSOM RD
WATER LINE P&P
STA 34+50 TO STA 39+50

FORT BEND COUNTY ENGINEERING DEPARTMENT

APPROVAL IS IMPLIED FOR IMPROVEMENTS WITHIN FORT BEND COUNTY RIGHTS-OF-WAY ONLY. UTILITY LINES APPROVED AS TO LOCATION ONLY. AUTHORIZATION IS VALID FOR ONE YEAR ONLY.

APPROVED: _____
FORT BEND COUNTY ENGINEER

DATE: _____

STATE OF TEXAS
MENG YANG JIANG
Professional Engineer
138195
04/19/2023

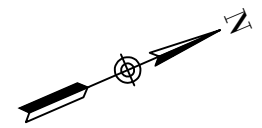
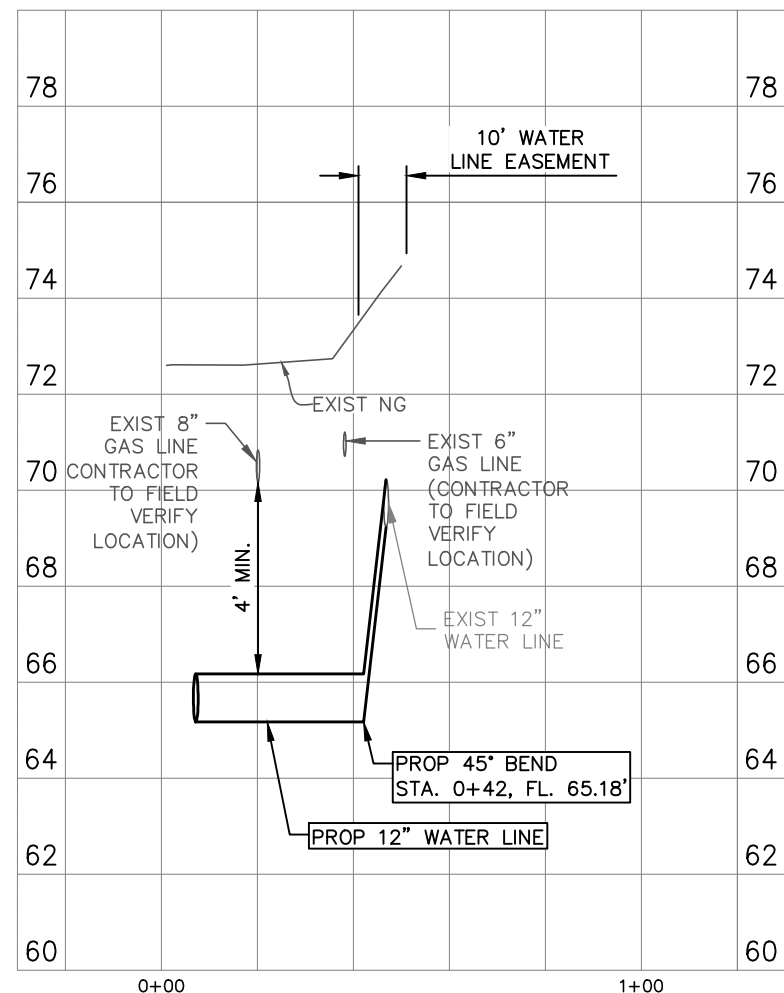
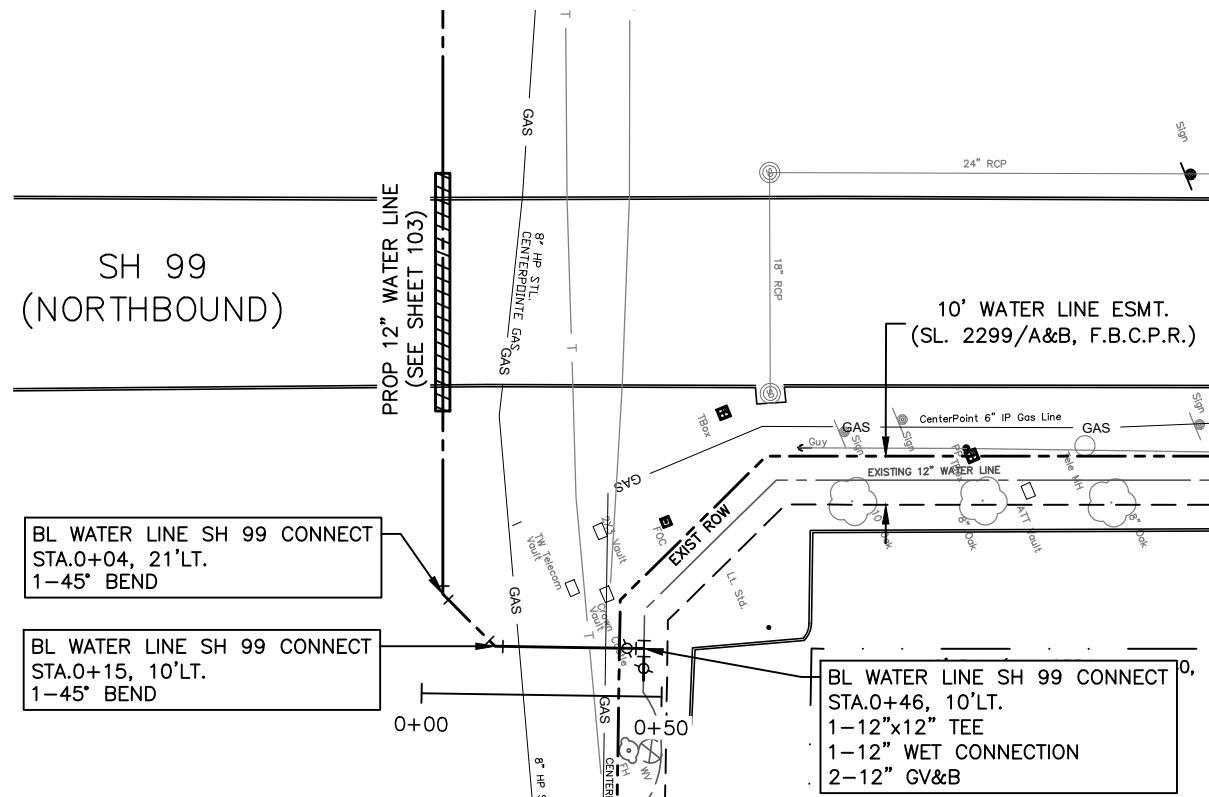
SUBMITTED BY: R.G. MILLER
SCALE: 1"=40'(H), 1"=4'(V)

DESIGNED BY: M.J.
DRAWN BY: E.G.

DATE: 06/29/2022
SURV BY: MILLER SURVEY
F. B. NO.: _____

SHEET 07 OF 08 SHEETS
DWG. NO. 106

4:28:03 PM 4/19/2023 COS RANSOM ROAD TO EAST OF SH 99\MUNICIPAL\CAD\DWG T:\04399.001



NOTICE:
 FOR YOUR SAFETY, YOU ARE REQUIRED BY TEXAS LAW TO CALL 811 AT LEAST 48 HOURS BEFORE YOU DIG SO THAT UNDERGROUND LINES CAN BE MARKED. THIS SIGNATURE DOES NOT FULFILL YOUR OBLIGATION TO CALL 811.

VERIFICATION OF PRIVATE UTILITY LINES

Date: _____
 CenterPoint Energy natural gas utilities shown.
 (Gas service lines are not shown). This signature not to be used for conflict verification.
 Signature Valid for six months.

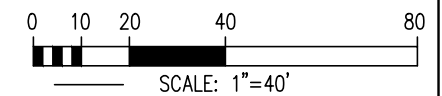
Date: _____
 CenterPoint Energy/UNDERGROUND Electrical Facilities Verification ONLY.
 (This signature verifies existing underground facilities-not to be used for conflict verification.)
 Signature Valid for six months.

Date: _____
 Approved for AT&T underground conduit facilities only. Signature valid for one year.

NOTE:
 CONTRACTOR TO AVOID DISCHARGING INTO TXDOT ROW

LEGEND

- PROP. WATER LINE
- PROP WATER LINE CASING
- KEYNOTE
- ① CONTRACTOR TO PROVIDE TEMPORARY BRACING FOR RELOCATED POWER POLE
- ② RELOCATE POWER POLE BY OTHERS.



No.	Date	Revisions	App.

r.g.miller engineers
 since 1966

16340 Park Ten Place
 Suite 350
 Houston, Texas 77084
 (713) 461-9800
 TEXAS FIRM REGISTRATION NO. F-487

Approved By: _____
 Date: _____

r.g. miller
 Job No. 4-399

RANSOM RD
WATER LINE P&P
 SH 99 STA 0+00 TO STA 0+50

FORT BEND COUNTY ENGINEERING DEPARTMENT

APPROVAL IS IMPLIED FOR IMPROVEMENTS WITHIN FORT BEND COUNTY RIGHTS-OF-WAY ONLY. UTILITY LINES APPROVED AS TO LOCATION ONLY. AUTHORIZATION IS VALID FOR ONE YEAR ONLY.

APPROVED: _____
 FORT BEND COUNTY ENGINEER

DATE: _____

STATE OF TEXAS
 MENG YANG JIANG
 LICENSE NO. 138195
 PROFESSIONAL ENGINEER

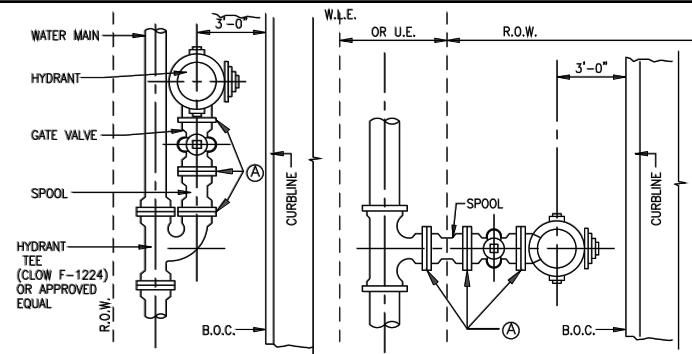
Meng Yang Jiang
 04/19/2023

SUBMITTED BY: R.G. MILLER
 SCALE: 1"=40'(H), 1"=4'(V)

DESIGNED BY: M.J.
 DRAWN BY: E.G.

DATE: 06/29/2022
 SURV BY: MILLER SURVEY

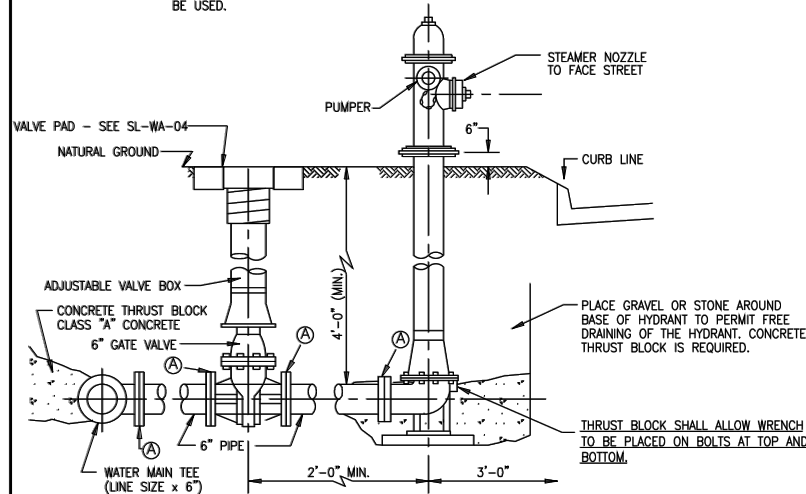
SHEET 08 OF 08 SHEETS
 DWG. NO. 107



R.O.W. INSTALLATION
N.T.S.

EASEMENT INSTALLATION
N.T.S.

NOTE:
WHEN WATER LINE IS LOCATED IN EASEMENT, STANDARD TEE MAY BE USED.



FLUSHING VALVE COLOR CODE

MAIN LINE DIAMETER	BONNET, PUMPER CAP AND STEAMER CAP
6 INCHES (AND LESS)	YELLOW
8 INCHES	WHITE
12 TO 16 INCHES	GREEN
GREATER THAN 16 INCHES	ORANGE

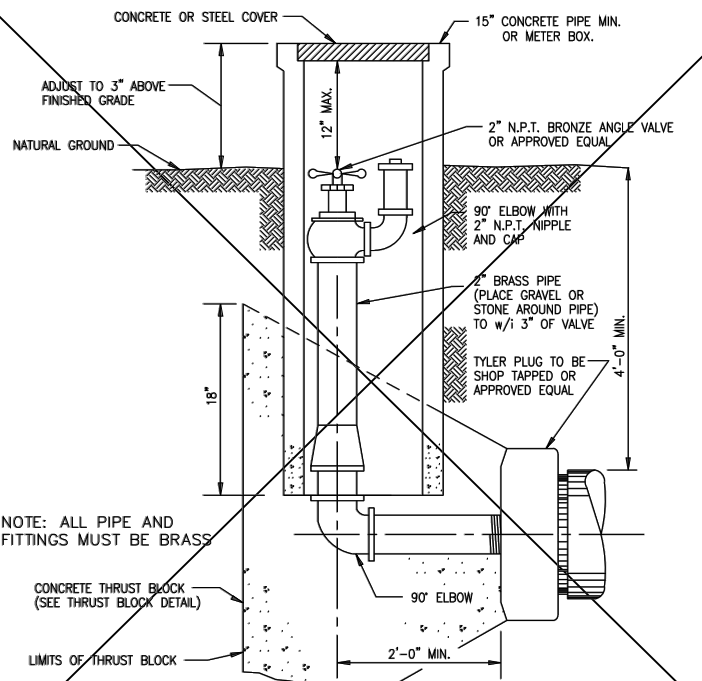
FIRE HYDRANT BODY TO BE PAINTED GEO-GLEN 301 BRIGHT SILVER ALUMINUM POLYURETHANE ENAMEL, BY GEO-GLEN ENTERPRISES OR APPROVED EQUAL.

NOTE:
ALL FIRE HYDRANTS SHALL BE MUELLER, KENNEDY, AMERICAN, M & H OR APPROVED EQUAL WITH STEAMER NOZZLE SIZE 4.125" PUMPER 2.5" N.T.S.

ALL FLUSHING VALVES TO BE SAND BLASTED AND PAINTED AS PER C.O.S.L. DESIGN STANDARDS.

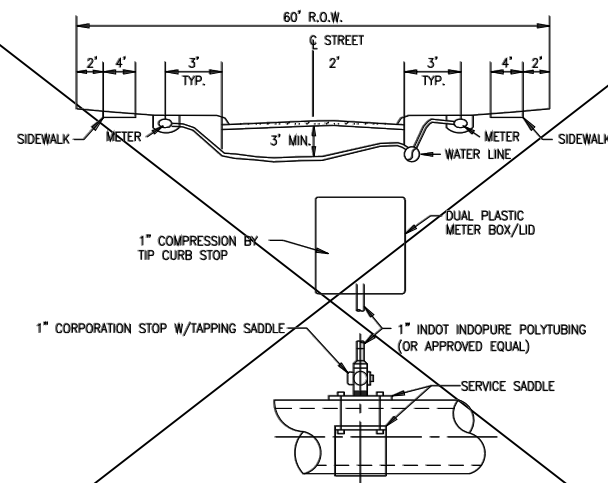
TYPICAL GATE & FIRE HYDRANT INSTALLATION
N.T.S.

SL-WA-01



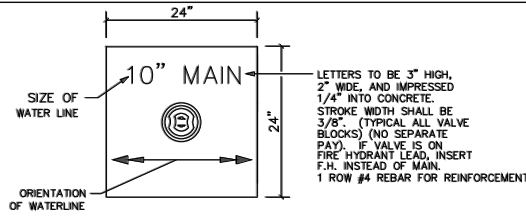
2" BLOW OFF VALVE ASSEMBLY
N.T.S.

SL-WA-02



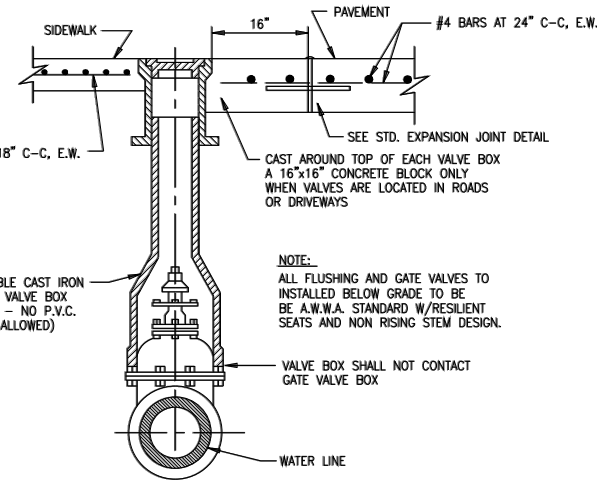
WATER SERVICE CONNECTION AND WATER SERVICE TAPPING ASSEMBLY DETAIL
N.T.S.

SL-WA-03



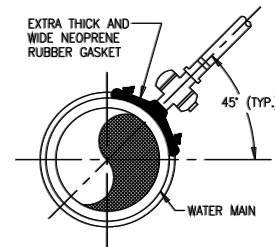
CONCRETE PAD
N.T.S.

NOTE: ALL VALVES MUST HAVE CONCRETE PAD



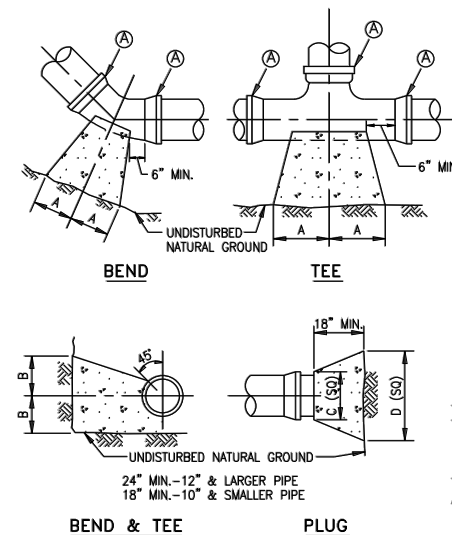
VALVE BOX INSTALLATION DETAIL
N.T.S.

SL-WA-04



TAPPING SLEEVE & VALVE DETAIL
N.T.S.

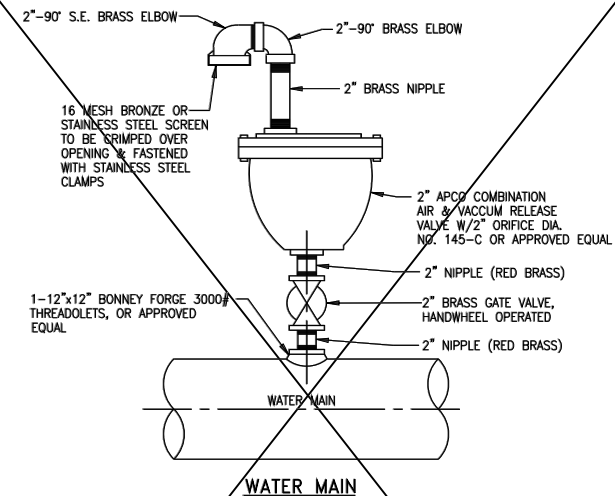
SL-WA-07



THRUST BLOCK DETAIL
N.T.S.

(A) = RESTRAINED JOINT

SL-WA-05



AIR RELEASE VALVE DETAIL
N.T.S.

SL-WA-06

NOTES:
POLYETHYLENE WRAP FOR IRON PIPE

- NOTE:
- POLYETHYLENE FILM SHALL BE USED AS A WRAP TO PROTECT CAST IRON AND OTHER METALS IN A CORROSIVE SOIL ENVIRONMENT.
 - AN 8 MIL POLYETHYLENE FILM WRAP SHALL BE REQUIRED AROUND ALL METAL PIPE AND APPURTENANCES (EXCEPT FIRE HYDRANTS).
 - POLYETHYLENE FILM SHALL BE FURNISHED AND INSTALLED EITHER IN TUBULAR FORM PRIOR TO LOWERING THE PIPE IN TRENCH OR IN SHEET FORM.
 - POLYETHYLENE TUBE ENCASUREMENT SHALL CONFORM WITH THE MINIMUM REQUIREMENTS OF "POLYETHYLENE ENCASUREMENT FOR GRAY AND DUCTILE CAST-IRON PIPING FOR WATER AND OTHER LIQUIDS", ANSI/AWWA C105, CURRENT REVISION. SOILS WITHIN A PROJECT SHALL BE TESTED IN ACCORDANCE WITH APPENDIX A OF ANSI/AWWA C105 TO ADEQUATELY DETERMINE THE REQUIREMENTS FOR ENCASUREMENT.
 - ALL FITTINGS AND PIPE JOINTS WITHIN 10' OF A FITTING SHALL HAVE RESTRAINT JOINTS

SIZE	90° BEND		45° BEND		22 1/2° BEND		TEES		PLUGS	
	A	B	A	B	A	B	A	B	A	B
2 1/2"	12"	7"	6"	7"	6"	6"	7"	8"	8"	14"
6"	16"	10"	9"	10"	6"	12"	10"	12"	10"	21"
8"	22"	13"	12"	13"	8"	10"	13"	16"	12"	29"
10"	26"	17"	14"	17"	10"	13"	16"	20"	14"	36"
12"	29"	21"	16"	21"	11"	16"	18"	24"	16"	41"
14"	35"	24"	19"	24"	12"	20"	22"	27"	18"	48"
16"	38"	27"	21"	27"	12"	24"	24"	30"	20"	54"
20"	50"	40"	30"	40"	18"	30"	30"	40"	30"	*78"
24"	50"	40"	30"	40"	18"	30"	30"	40"	30"	*78"
30"	60"	48"	36"	48"	20"	36"	36"	48"	36"	*96"

BENDS, TEES & PLUGS FOR PIPE OF VARIOUS SIZES

SL-WA-08

CONSTRUCTION NOTES:

- WATER LINES 12" (IN.) AND LESS SHALL BE AWWA C-900 DR18 WATER LINE GREATER THAN 12" (IN.) IN Ø SHALL BE AWWA C-905 DR 18
- ALL FLUSHING VALVES AND GATE VALVES TO BE AMERICAN WATER WORKS ASSOC. (AWWA) STANDARD COUNTERCLOCKWISE OPENING WITH NON-RISING STEM DESIGN.
- ALL DUCTILE IRON PIPE SHALL BE CLASS 50 MORTAR LINED. NO A.C. PIPE WILL BE ALLOWED AND ALL DUCTILE IRON FITTINGS SHALL BE MORTAR LINED PUSHON OR MECHANICAL JOINTS.
- ALL BACKFILL WITHIN THE R.O.W. SHALL BE COMPACTED TO 95% STANDARD PROCTOR DENSITY.
- MINIMUM SPACING BETWEEN TAPS SHALL BE 2' AT ALTERNATING TAP ANGLES.

SL-WA-08

16340 Park Ten Place
Suite 350
Houston, Texas 77084
(713) 461-9600
TEXAS REG. REGISTRATION NO. F-427

erg.miller
Engineers
since 1984

SEAL:

STATE OF TEXAS
MENG YANG JIANG
138195
LICENSED PROFESSIONAL ENGINEER

04/19/2023

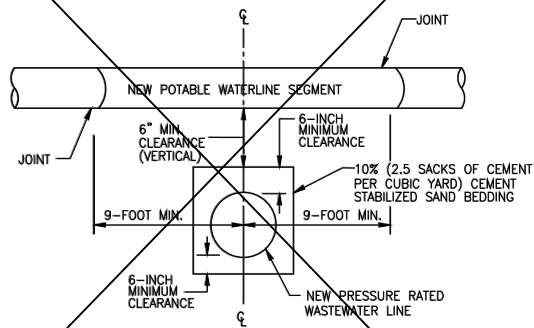
CITY OF SUGAR LAND, TEXAS
ENGINEERING DEPARTMENT

CONSTRUCTION PLANS FOR:
WATER LINE CONSTRUCTION DETAILS

JOB No.:
DATE:
DESIGNED BY:
DRAWN BY:
CHECKED BY:
SCALE:

SL-15
SHEET 108

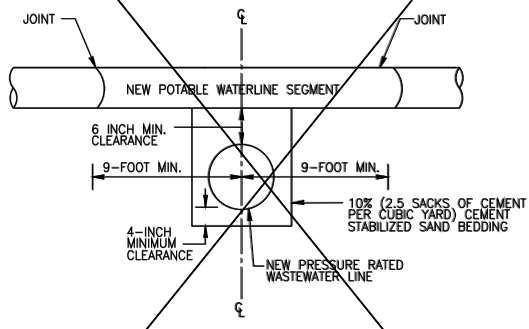
I
NEW POTABLE WATERLINE CROSSING NEW PRESSURE RATED WASTEWATER LINE WITH SEGMENT LENGTHS OF EIGHTEEN (18) FEET OR GREATER, HAVING 6 INCHES OF VERTICAL CLEARANCE AND 4 FEET OF HORIZONTAL CLEARANCE



- WHENEVER POSSIBLE, THE CROSSING SHALL BE CENTERED BETWEEN JOINTS OF THE WASTEWATER LINE.
- MINIMUM WASTEWATER PIPE STIFFNESS OF 115 PSI AT 5% DEFLECTION.
- EMBED WASTEWATER LINE IN CEMENT STABILIZED SAND TO AT LEAST 12" INCHES BEYOND EACH JOINT OF CROSSED SECTION OF PIPE.

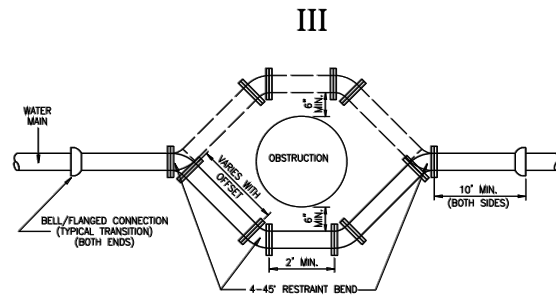
SL-WA-09

II
NEW POTABLE WATERLINE CROSSING NEW PRESSURE RATED WASTEWATER LINE



- WHENEVER POSSIBLE, THE CROSSING SHALL BE CENTERED BETWEEN JOINTS OF THE WASTEWATER LINE.
- MINIMUM WASTEWATER PIPE STIFFNESS OF 115 PSI AT 5% DEFLECTION.
- EMBED WASTEWATER LINE IN CEMENT STABILIZED SAND TO AT LEAST 12" INCHES BEYOND EACH JOINT OF CROSSED SECTION OF PIPE.

SL-WA-10



FOR A LINE TO PASS OVER AN OBSTRUCTION RATHER THAN UNDER, IT MUST HAVE ADEQUATE COVER AND BE APPROVED BY THE ENGINEERING DEPARTMENT.

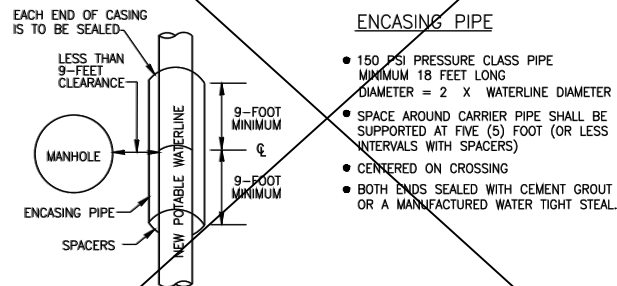
- NOTES:
- PIPE MATERIAL SHALL BE AWWA C900 PVC, DR-14, 200 PSI WITH INTEGRAL PVC RESTRAINED JOINTS.
 - OFFSET ASSEMBLY MUST PASS OVER THE OBSTRUCTION AS LONG AS THE MINIMUM CLEARANCE IS MAINTAINED. SPECIFIC APPROVAL FROM THE UTILITIES DEPARTMENT MUST BE GRANTED FOR THE OFFSET TO PASS UNDER THE OBSTRUCTION.
 - MATERIAL AND COATINGS SHALL BE IN ACCORDANCE WITH WATER MAIN STANDARD SPECIFICATIONS.
 - RESTRAIN EXISTING PIPING BEYOND OFFSET SECTION AS REQUIRED TO PREVENT MOVEMENT.
 - ALL PVC PRODUCTS MUST BE LISTED ON CITY OF SUGAR LAND'S APPROVED PRODUCTS LIST.

MIN. PIPE WALL THICKNESS	
4"	- 0.250"
6"	- 0.280"
8"	- 0.322"
12"	- 0.375"
AND LARGER	

PVC WATER PIPE OFFSET ASSEMBLY

SL-WA-11

DETAIL OF WATER LINE CROSSING WASTEWATER FACILITIES WHERE SEPARATION IS LESS THAN 9' (NINE FEET)

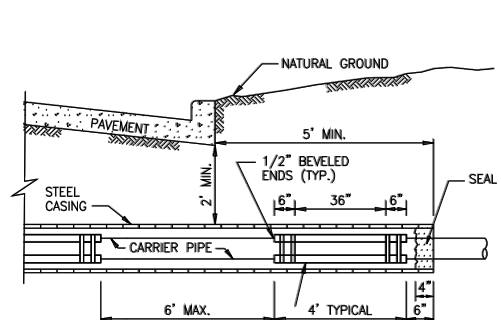


ENCASING PIPE

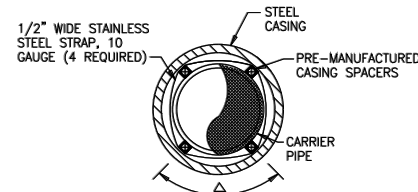
- 150 PSI PRESSURE CLASS PIPE MINIMUM 18 FEET LONG DIAMETER = 2 X WATERLINE DIAMETER
- SPACE AROUND CARRIER PIPE SHALL BE SUPPORTED AT FIVE (5) FOOT (OR LESS INTERVALS WITH SPACERS)
- CENTERED ON CROSSING
- BOTH ENDS SEALED WITH CEMENT GROUT OR A MANUFACTURED WATER TIGHT SEAL.

MANHOLE CLEARANCE

SL-WA-12



ELEVATION

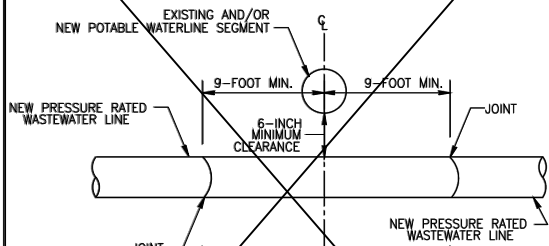


CARRIER PIPE	NOMINAL CASING	MIN. WALL THICKNESS (IN.)
6"	12"	0.11
8"	14"	0.15
10"	16"	0.18
12"	18"	0.20

- CASING SIZE AND THICKNESS SHALL CONFORM TO THE MINIMUM REQUIREMENTS AS SHOWN ON CASING SCHEDULE, OTHER PERMITS AS REQUIRED.
- MAINTAIN 1/2" MINIMUM CLEARANCE BETWEEN THE MAXIMUM OUTSIDE DIAMETER OF CARRIER PIPE AND CASING AT ALL LOCATIONS.
- DIMENSIONS ARE APPROXIMATE ONLY. CONTRACTOR SHALL INSTALL ADEQUATELY SIZED CASING TO ACCOMMODATE THE CARRIER PIPE.

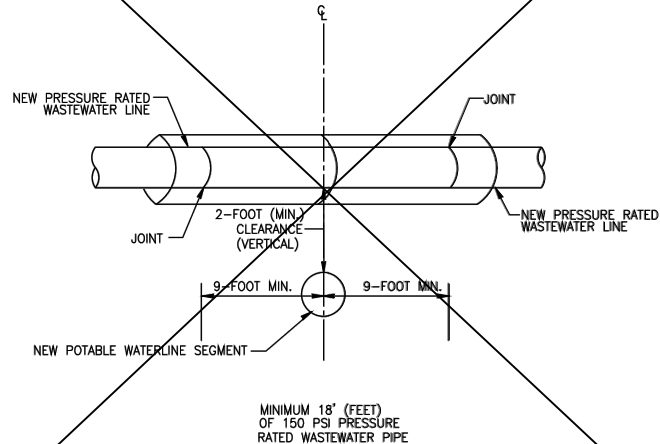
SL-WA-13

ALTERNATIVE A:
PRESSURE RATED WASTEWATER PIPE



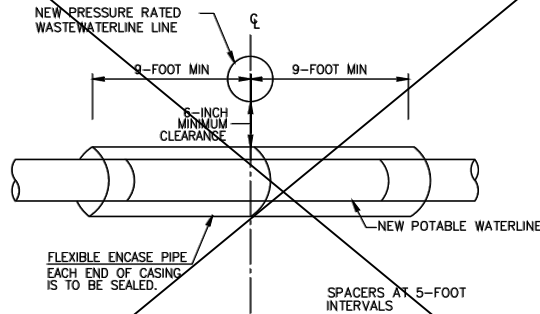
SL-WA-14

ALTERNATIVE B:
EXISTING POTABLE WATERLINE CROSSING EXISTING PRESSURE RATED WASTEWATER LINE



SL-WA-15

ALTERNATIVE C:
ENCASE NEW POTABLE WATERLINE UNDER A NEW PRESSURE RATED WASTEWATER LINE

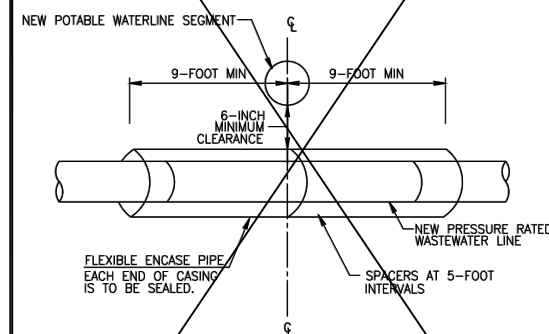


- SAME ENCASMENT CRITERIA AS "ALTERNATIVE B" OR
- NEW WATERLINE (WITHOUT CASING) TO BE CONSTRUCTED OF PVC C-900 (DR-18), DUCTILE IRON WITH MECHANICAL JOINT OR STEEL PIPE WITH WELDED JOINTS.
- BOTH WATERLINE AND WASTEWATER LINE MUST PASS A PRESSURE AND LEAKAGE TEST AS SPECIFIED IN AWWA C600 STANDARDS.

SL-WA-16

IV
ENCASED WASTEWATER LINE

NEW POTABLE WATERLINE CROSSING NEW PRESSURE RATED WASTEWATER LINE WITH SEGMENT LENGTHS OF LESS THAN EIGHTEEN (18) FEET



- MINIMUM CASING PIPE STIFFNESS OF 115 PSI AT 5% DEFLECTION.
- MINIMUM CASING PIPE DIAMETER * 2 X WASTEWATER LINE DIAMETER.
- THE SPACE AROUND THE CARRIER PIPE SHALL BE SUPPORTED AT FIVE (5) FOOT (OR LESS) INTERVALS WITH SPACERS
- EACH END CASING IS TO BE SEALED WITH WATER TIGHT NO-SHRINK GROUT OR MANUFACTURED WATER TIGHT SEAL.

SL-WA-17

GENERAL NOTES:

- CONTRACTOR SHALL CONTACT CITY OF SUGAR LAND ENGINEERING DEPARTMENT AT (281) 275-2780 IF WET SAND OR OTHER UNSTABLE SOIL CONDITIONS, HIGH WATER TABLE AND/OR UNDERGROUND OBSTRUCTIONS ARE ENCOUNTERED.
- SHOULD A CONFLICT ARISE BETWEEN INFORMATION DEPICTED ON APPROVED CONSTRUCTION DRAWINGS AND INFORMATION INCLUDED IN PROJECT SPECIFICATIONS, CITY OF SUGAR LAND DESIGN STANDARDS SHALL GOVERN.
- ALL NEW POTABLE WATER LINES AND SANITARY SEWER FORCE MAINS SHALL BE BEDDED IN COMPACTED BANK SAND A MINIMUM OF 6 INCHES BELOW, ABOVE AND TO EITHER SIDE OF SUCH PIPING.
- ALL NEW SANITARY SEWER GRAVITY DRAIN LINES SHALL BE BEDDED IN CEMENT STABILIZED SAND CONFORMING TO THE REQUIREMENTS FOR EITHER CLASS "A" STANDARD BEDDING OR CLASS "A-A" BEDDING AS APPLICABLE. USE OF MODIFIED "A" OR MODIFIED "A-A" BEDDING FOR SANITARY SEWER INSTALLATIONS WHERE WET SAND CONDITIONS ARE ENCOUNTERED AND SEPARATION DISTANCE TO POTABLE WATER LINES IS LESS THAN 9 FEET REQUIRES APPROVAL BY CITY ENGINEER.
- CEMENT STABILIZED BEDDING SHALL BE A MINIMUM 1.5 SACK PER CUBIC YARD C.S.S., INSTALLED IN MAXIMUM LIFTS OF 8 INCHES AND MECHANICALLY TAMPED TO 95% PROCTOR.
- WHERE REQUIRED, SLEEVING (ENCASMENT) OF POTABLE WATER PIPING AND/OR SANITARY SEWER GRAVITY DRAIN LINES AND FORCE MAINS SHALL BE PROVIDED. SUCH SLEEVING (ENCASMENT) SHALL BE CONSTRUCTED OF APPROVED PIPING MATERIALS HAVING A MINIMUM PRESSURE RATING OF 150 PSI AND ANNULAR SPACES AT EACH END SHALL BE SEALED WITH A MATERIAL APPROVED FOR SUCH USE.
- ALL NEW POTABLE WATER LINES SHALL BE SLEEVED (ENCASED) WHERE A MINIMUM OF 9 FEET SEPARATION DISTANCE TO EXISTING OR PROPOSED SANITARY SEWER MANHOLE, LIFT STATION OR WASTEWATER TREATMENT PLANT CANNOT BE MAINTAINED. SLEEVING SHALL BE A MINIMUM OF 18 FEET IN LENGTH AND CENTERED ON THE POINT OF CLOSEST PROXIMITY.
- ALL NEW POTABLE WATER LINES SHALL BE SLEEVED (ENCASED) WHERE LESS THAN 2 FEET VERTICAL OR 4 FEET HORIZONTAL CLEARANCE TO EXISTING OR PROPOSED SANITARY SEWER GRAVITY LINES OR FORCE MAINS CANNOT BE MAINTAINED. SLEEVING SHALL BE A MINIMUM OF 18 FEET IN LENGTH AND CENTERED ON THE POINT OF CROSSING. WHERE PIPING IS LAID PARALLEL AND MINIMUM SEPARATION DISTANCES CANNOT BE MAINTAINED, SLEEVING SHALL EXTEND AT LEAST 9 FEET PAST THE POINT WHERE MINIMUM SEPARATION DISTANCES ARE ACHIEVED.
- ALL NEW POTABLE WATER LINES SHALL BE CONSTRUCTED ABOVE EXISTING OR PROPOSED SANITARY SEWER GRAVITY LINES OR FORCE MAINS WHERE POSSIBLE. WHERE INSTALLATION BENEATH SANITARY SEWER GRAVITY LINES OR FORCE MAINS IS UNAVOIDABLE AT POINTS OF CROSSING, SLEEVING (ENCASMENT) IS REQUIRED FOR ALL NEW POTABLE WATER LINES CONSTRUCTED OF PVC PIPING MATERIALS, REGARDLESS OF SEPARATION DISTANCE. SLEEVING SHALL BE A MINIMUM OF 18 FEET IN LENGTH AND CENTERED ON THE POINT OF CROSSING.
- ALL NEW SANITARY SEWER GRAVITY LINES AND/OR FORCE MAINS CONSTRUCTED OF PVC PIPING MATERIALS SHALL BE SLEEVED (ENCASED) WHERE LESS THAN 2 FEET VERTICAL OR 4 FEET HORIZONTAL CLEARANCE TO EXISTING POTABLE WATER PIPING CANNOT BE MAINTAINED. SLEEVING SHALL BE A MINIMUM OF 18 FEET IN LENGTH AND CENTERED ON THE POINT OF CLOSEST PROXIMITY.
- ALL NEW SANITARY SEWER GRAVITY LINES AND/OR FORCE MAINS SHALL BE CONSTRUCTED BELOW EXISTING POTABLE WATER LINES WHERE POSSIBLE. WHERE INSTALLATION ABOVE POTABLE WATER LINES IS UNAVOIDABLE, SLEEVING (ENCASMENT) IS REQUIRED FOR ALL SUCH SANITARY SEWER LINES CONSTRUCTED OF PVC PIPING MATERIALS, REGARDLESS OF SEPARATION DISTANCE. SLEEVING SHALL BE A MINIMUM OF 18 FEET IN LENGTH AND CENTERED ON THE POINT OF CROSSING.
- WHERE NEW SANITARY SEWER SIZING (24 INCH AND GREATER) PRECLUDES THE USE OF PVC PIPING MATERIALS AND SLEEVING (ENCASMENT) OF THE SANITARY SEWER WOULD OTHERWISE BE REQUIRED BUT IS IMPRACTICAL, THE EXISTING POTABLE WATER PIPING SHALL EITHER BE OFFSET TO PROVIDE THE REQUIRED MINIMUM CLEARANCES OR SLEEVED (ENCASED) IN LIEU OF SLEEVING (ENCASING) THE SANITARY SEWER LINE. SLEEVING SHALL BE A MINIMUM OF 18 FEET IN LENGTH AND CENTERED ON THE POINT OF CROSSING.
- IN NO INSTANCE SHALL A FIRE HYDRANT BE INSTALLED WITHIN 9 LINEAR FEET OF A SANITARY SEWER SYSTEM.
- NOTE: SEPARATION DISTANCES ARE MEASURED FROM THE OUTSIDE DIAMETERS OF EACH PIPE AND FROM THE EXTERIOR SURFACES OF MANHOLES, LIFT STATIONS, WASTEWATER TREATMENT PLANTS AND ASSOCIATED APPURTENANCES.
- BELL STOPS SHALL BE USED WHEN WATER LINES ARE BORED.
- REFER TO GENERAL SANITARY, WATER AND C.S.S. NOTES.

SL-WA-18

No.	DATE	REVISION

r.g.miller
Engineers
16340 Park Ten Place
Suite 350
Houston, Texas 77084
(713) 461-9600
SINCE 1984
TEXAS REG. REGISTRATION NO. F-427

SEAL:
STATE OF TEXAS
MENGYANG JIANG
138195
PROFESSIONAL ENGINEER
04/19/2023



CITY OF SUGAR LAND, TEXAS
ENGINEERING DEPARTMENT

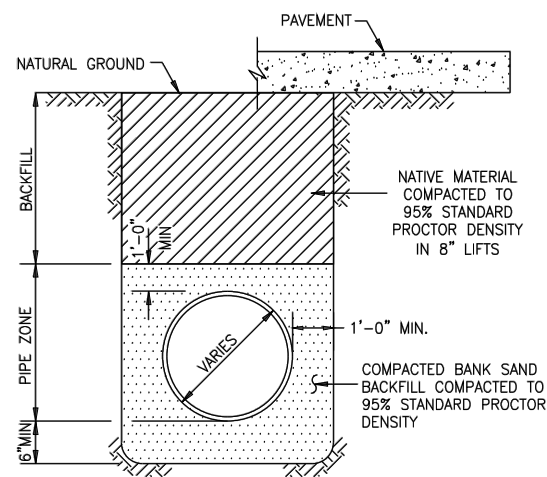
CONSTRUCTION PLANS FOR:

WATER LINE CROSSING DETAILS

JOB No.:
DATE:
DESIGNED BY:
DRAWN BY:
CHECKED BY:
SCALE:

SL-16

SHEET 109

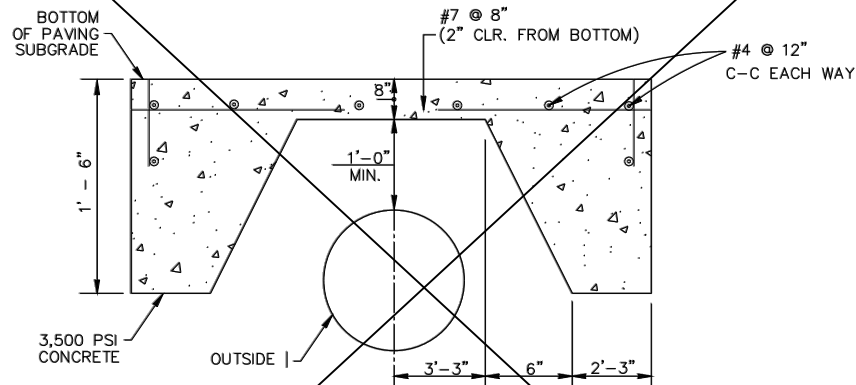


P.V.C. PIPE BEDDING & BACKFILL

N.T.S.
*SEE CONSTRUCTION NOTES

SANITARY FORCE MAIN & WATER LINE
BEDDING AND BACKFILL

SL-BB-01



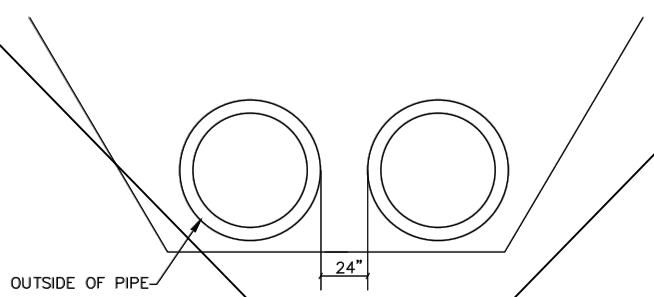
PROTECTIVE SLAB DETAIL
ZERO LOAD TRANSFER CONCRETE SLAB

SL-BB-04

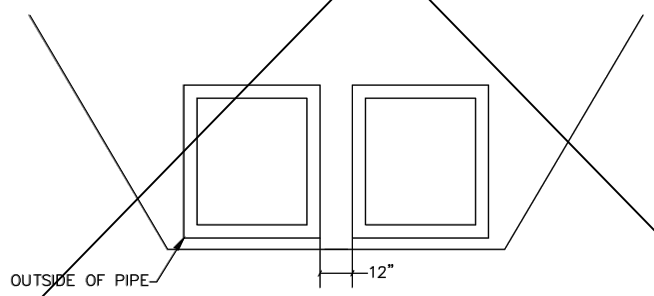
CONSTRUCTION NOTES

1. CONTRACTOR SHALL CONTACT SUGAR LAND ENGINEERING DEPARTMENT IMMEDIATELY IF WET SAND CONDITIONS ARE ENCOUNTERED.
2. LIMESTONE AND RECYCLED CONCRETE DIMENSIONS SHOWN ARE TYPICAL BUT MAY BE VARIED BY ORDER OF CITY ENGINEER.
3. LIMESTONE OR RECYCLED CONCRETE SHALL BE IN ACCORDANCE WITH TXDOT SPECIFICATION No. 248 FLEXIBLE BASE, TYPE A, GRADE 2 AGGREGATE.
4. NO BEDDING SHALL BE INSTALLED IN WET CONDITIONS. WHEN WELL POINTING OR IN WET SAND CONDITIONS, MAINTAIN GROUND WATER 1 (FT) BELOW BOTTOM OF TRENCH FOR A MINIMUM OF 24-HRS AFTER BEDDING AND BACKFILL IS IN PLACE.
5. ALL MATERIALS SHALL BE FROM THE APPROVED PRODUCTS LIST UNLESS SPECIFICALLY APPROVED BY THE CITY ENGINEER.
6. SANITARY SEWER BEDDING FOR WET SAND CONDITIONS SHALL BE AS PER MODIFIED "A".
7. ALL SAND BEDDING FOR WATER LINES SHALL BE CLEAN, MECHANICALLY COMPACTED BANK SAND.
8. REFER TO: MANHOLE DETAILS, SANITARY, C.S.S., GENERAL, WATER CROSSING, WATER DISTRIBUTION DETAILS AND NOTES.
9. ALL BEDDING WILL BE COMPACTED TO 95% STANDARD PROCTOR DENSITY.
10. A GEOTECHNICAL REPORT MAY BE REQUIRED TO ANALYZE THE BEARING CAPACITY OF EXISTING SOILS AND MAKE A DETERMINATION IF ADDITIONAL BEDDING AND BACKFILL IS APPROPRIATE.

SL-BB-05

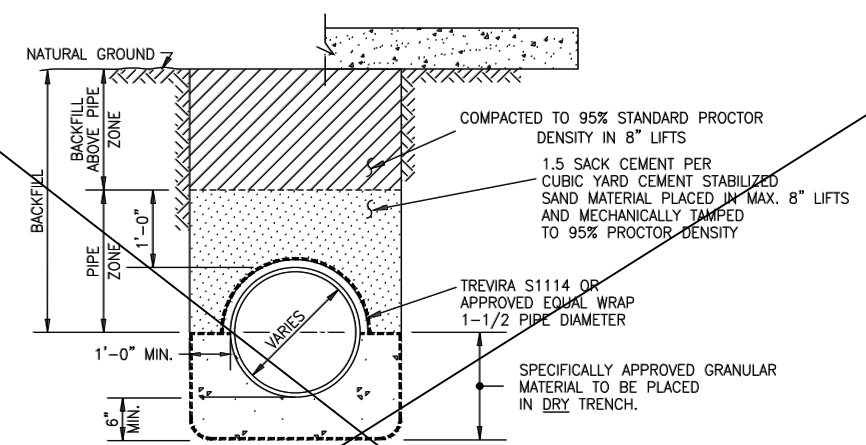


PIPE SEPARATION



RCB SEPARATION

SL-BB-16



MODIFIED "A"
N.T.S.

NOTE: C.S.S. SHALL BE INSTALLED A MIN. 1' ABOVE TOP OF PIPE.

SANITARY SEWER
BEDDING AND BACKFILL

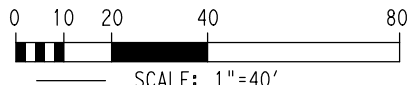
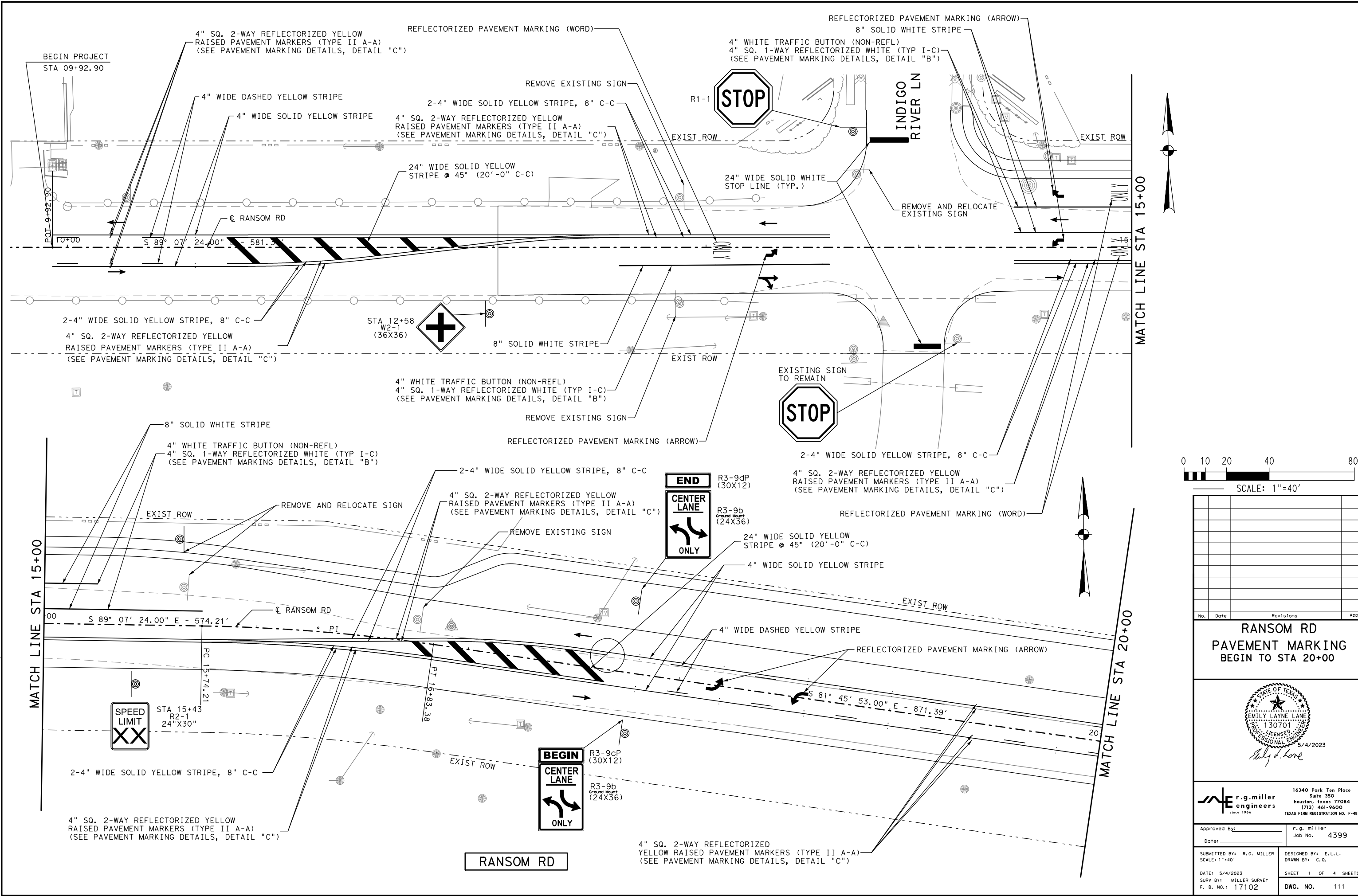
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REFER TO:

1. GENERAL NOTES
2. C.S.S. NOTES

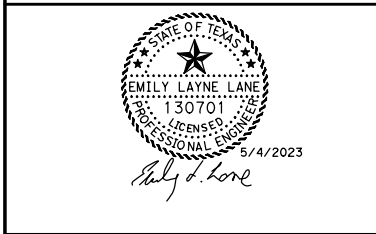
No.	DATE	REVISION
		16340 Park Ten Place Suite 350 Houston, Texas 77084 (713) 461-9600 TEXAS REG. REGISTRATION NO. F-427
		Mengyang Jiang 04/19/2023
CITY OF SUGAR LAND, TEXAS ENGINEERING DEPARTMENT		
CONSTRUCTION PLANS FOR:		
WATER LINE, SANITARY SEWER FORCE MAIN BEDDING DETAILS		
JOB No.: DATE: DESIGNED BY: DRAWN BY: CHECKED BY: SCALE:	SL-19 SHEET 110	

4:22:40 PM 5/4/2023
T:\04399.000 FBC-01 Ransom Road\DGN\Ransom Rd*SPM#01.dgn



No.	Date	Revisions	App.

**RANSOM RD
PAVEMENT MARKING
BEGIN TO STA 20+00**

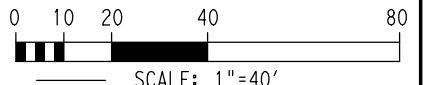
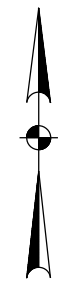
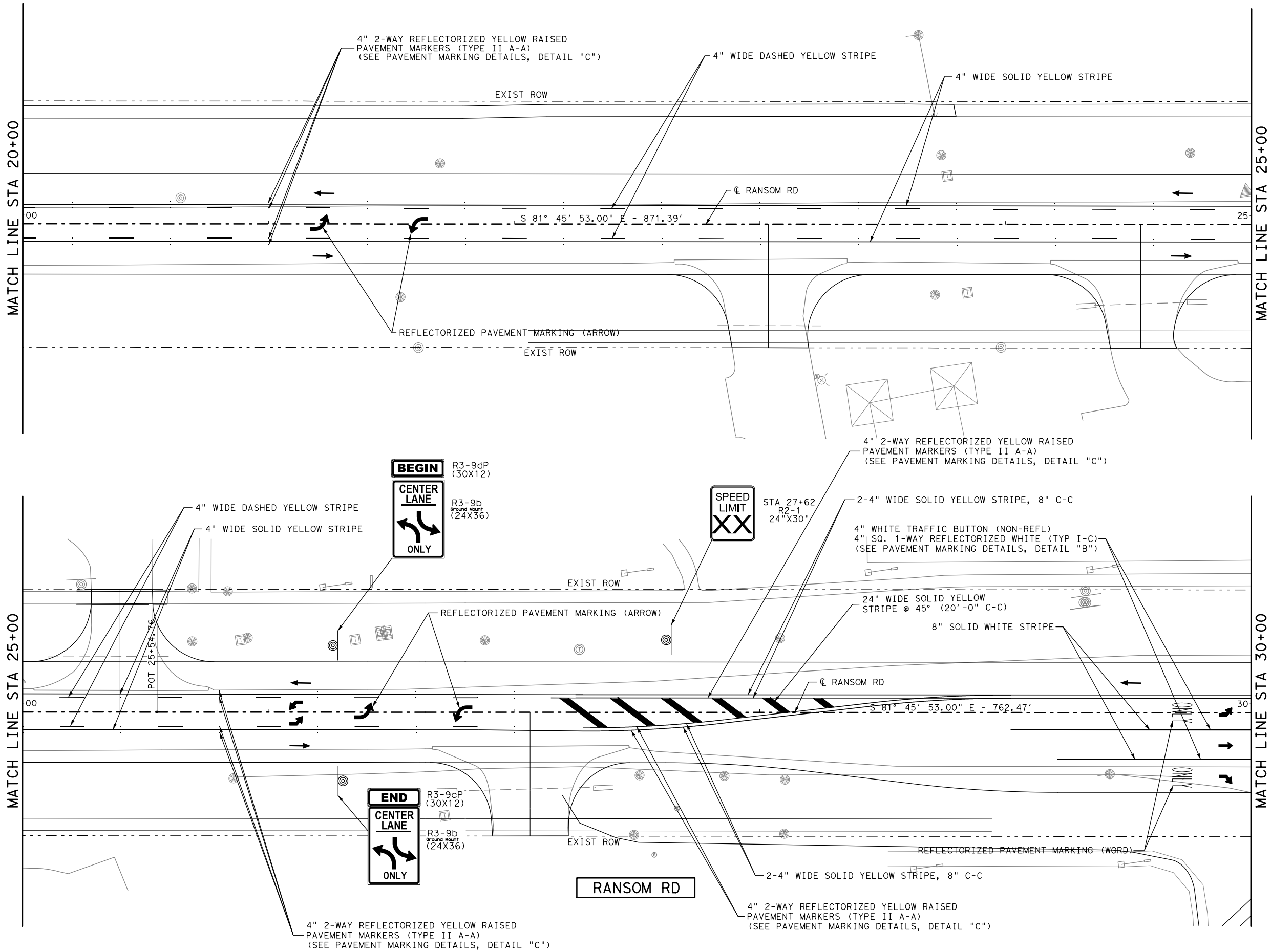


r.g.miller engineers
16340 Park Ten Place
Suite 350
Houston, Texas 77084
(713) 461-9600
TEXAS FIRM REGISTRATION NO. F-487

Approved By: _____ Date: _____
Submitted By: R.G. MILLER SCALE: 1"=40'
Date: 5/4/2023
Surr By: MILLER SURVEY
F. B. No.: 17102

r.g. miller Job No. 4399
Designed By: E.L.L.
Drawn By: C.G.
Sheet 1 OF 4 SHEETS
DWG. NO. 111

4:22:45 PM 5/4/2023
 T:\04399.000 FBC-01 Ransom Road\DGN\Ransom Rd*SPM#02.dgn



No.	Date	Revisions	App.

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 STA 20+00 TO STA 30+00**

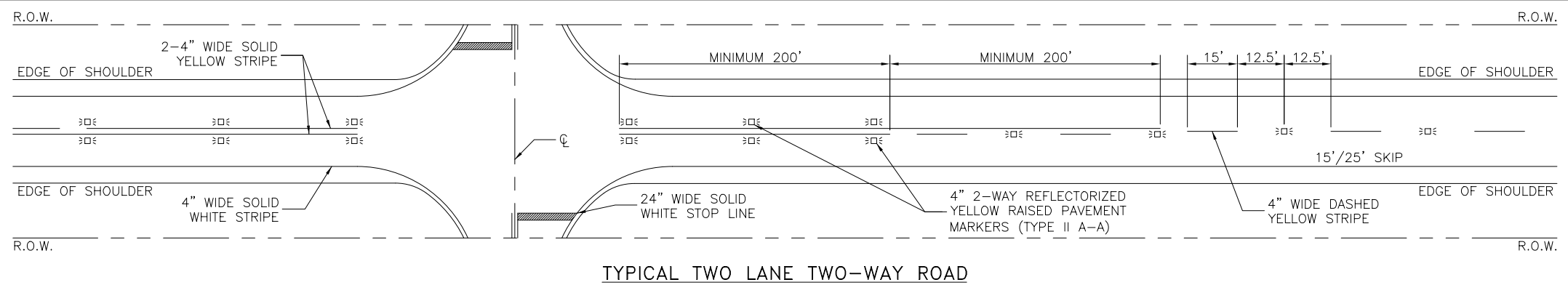
r.g.miller engineers
 16340 Park Ten Place
 Suite 350
 Houston, Texas 77084
 (713) 461-9600
 TEXAS FIRM REGISTRATION NO. F-487

Approved By: _____ Date: _____
 Job No. 4399

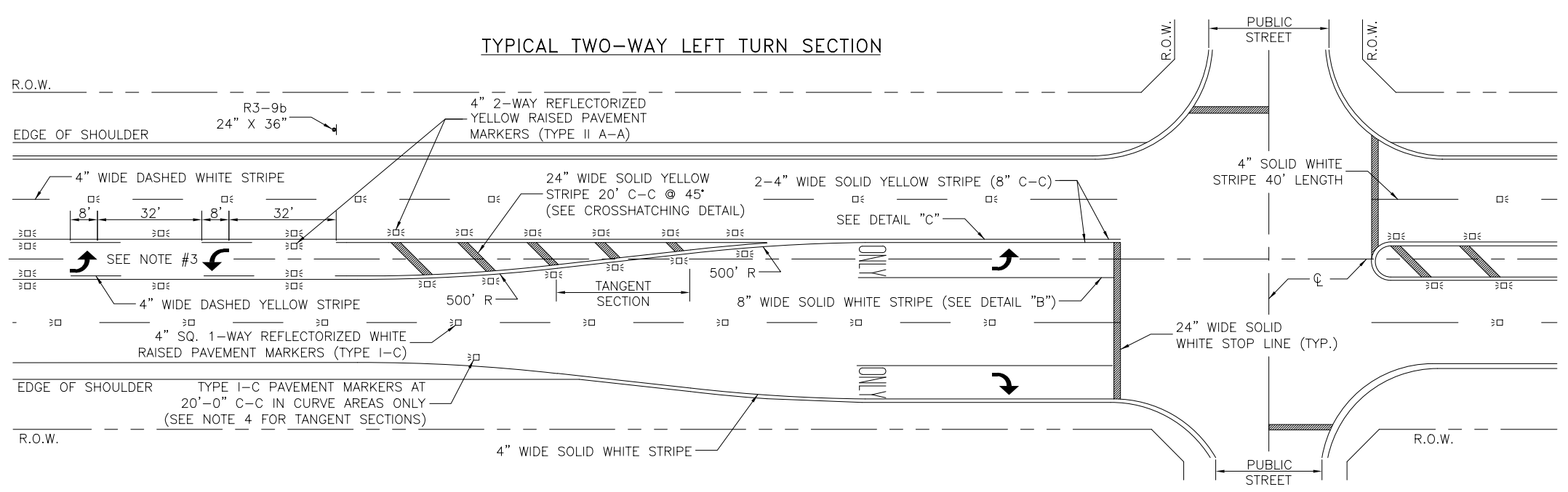
Submitted By: R.G. MILLER SCALE: 1"=40'
 Date: 5/4/2023
 SURV BY: MILLER SURVEY
 F. B. No.: 17102

Designed By: E.L.L.
 Drawn By: C.G.
 SHEET 2 OF 4 SHEETS
 DWG. NO. 112

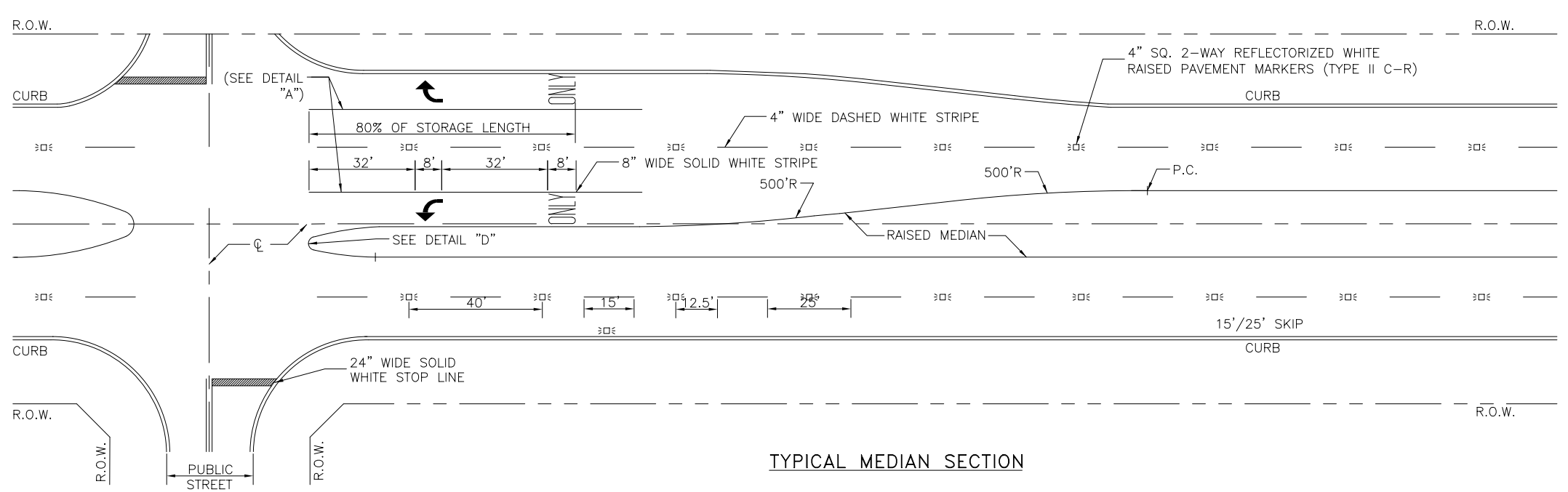
J:\1704\1601\Fort Bend County Standards\Fort Bend County STD\DONE\FBC PAVEMENT MARKINGS DETAILS\PAVEMENT_MARKING_DETAILS-1of2.dwg



TYPICAL TWO LANE TWO-WAY ROAD



TYPICAL TWO-WAY LEFT TURN SECTION

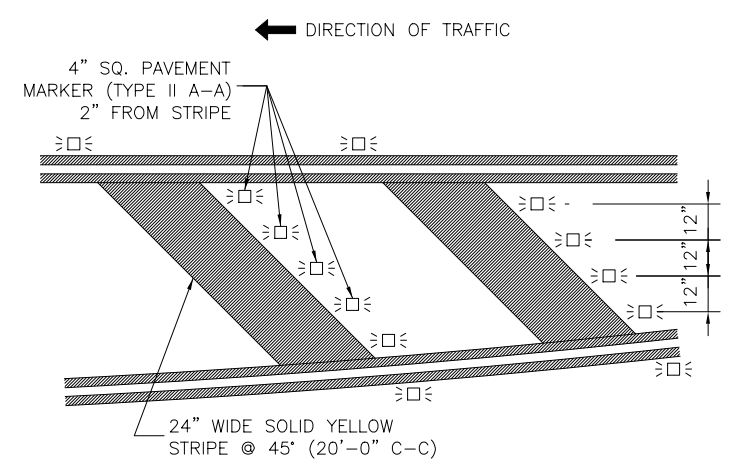


TYPICAL MEDIAN SECTION

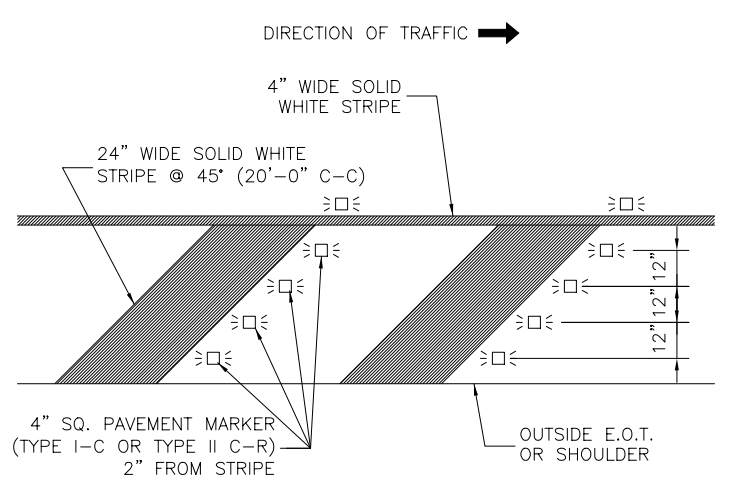
NOTES:

1. ALL PAVEMENT MARKINGS SHALL CONFORM TO THE LATEST EDITION OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS (TMUTCD).
2. ALL TRAFFIC BUTTONS AND MARKERS SHALL BE INSTALLED ADJACENT TO STRIPES (APPROXIMATELY 2").
3. REPEAT ARROWS AT APPROXIMATELY 1000' INTERVALS WITHIN TWO-WAY LEFT TURN SECTION.
4. WITHIN A TANGENT SECTION THE TYPE I-C PAVEMENT MARKERS SHALL BE PLACED AT 40' C-C ON ROADWAYS WITHOUT CURB AND GUTTERS.
5. WHEN PAVEMENT MARKINGS EXTEND INTO OR CONTINUE THROUGH AN INTERSECTION AREA, THEY SHALL BE THE SAME COLOR AND AT LEAST THE SAME WIDTH AS THE LINE MARKINGS THEY EXTEND.
6. WHEN CROSSWALK MARKINGS ARE USED WITHIN AN ESTABLISHED SCHOOL ZONE, MID-BLOCK, OR AT UNCONTROLLED INTERSECTIONS, CROSSWALK SHALL BE CONTINENTAL STYLE.
7. ADDITIONAL SET OF "WORD" AND "ARROW" PAVEMENT MARKINGS SHALL BE USED WHEN TURN LANE STORAGE LENGTH IS 160 FEET OR GREATER.

CROSSHATCHING DETAIL



OUTSIDE EDGE CROSSHATCHING DETAIL

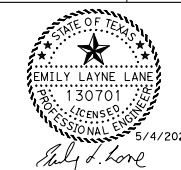


NO.	REVISIONS	DATE	NAME
1	ORIGINAL STANDARD ISSUED	3-1-22	RJS

FORT BEND COUNTY
ENGINEERING DEPARTMENT

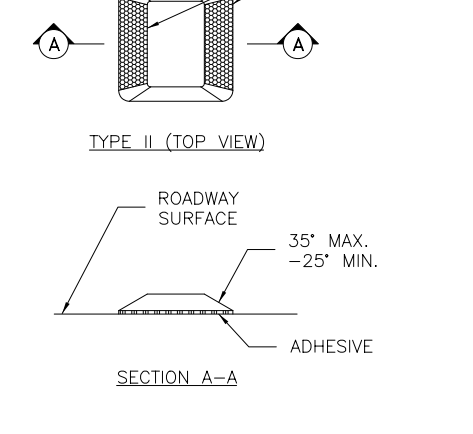
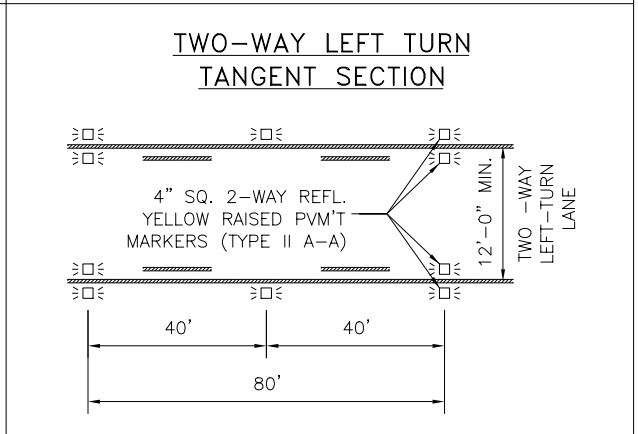
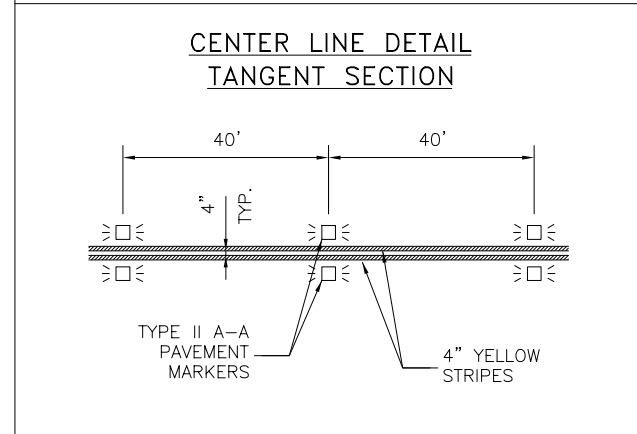
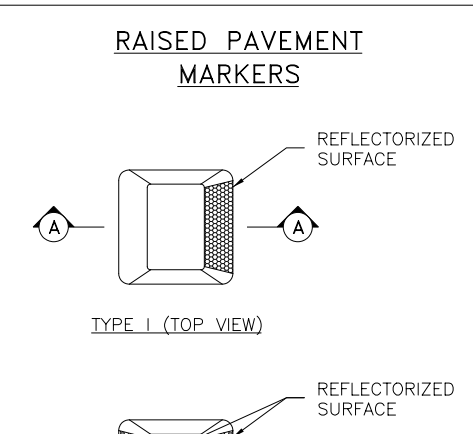
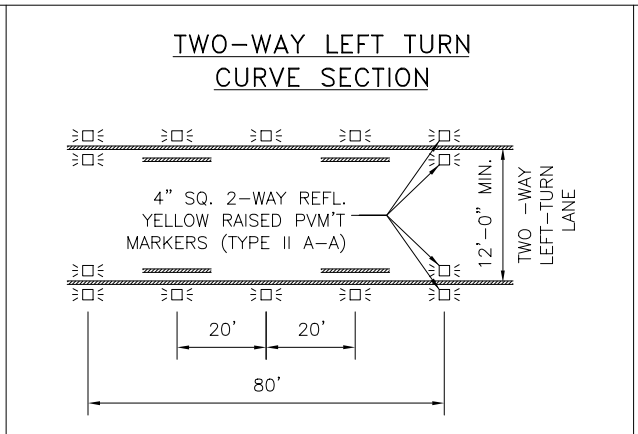
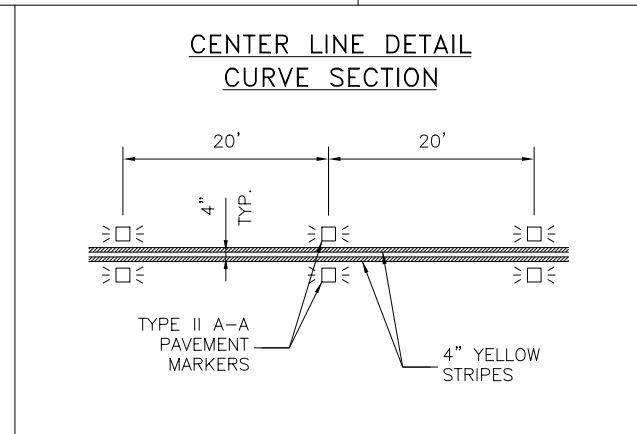
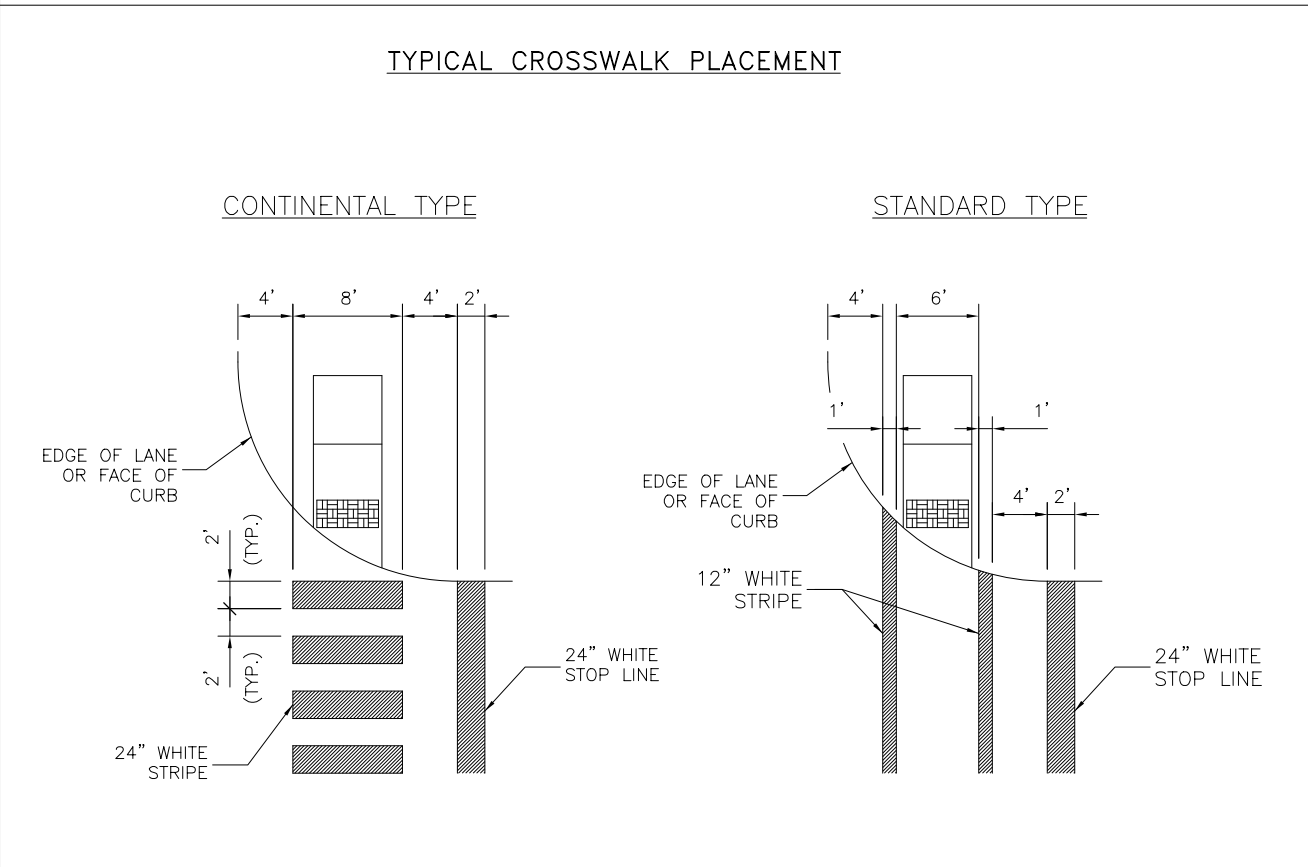
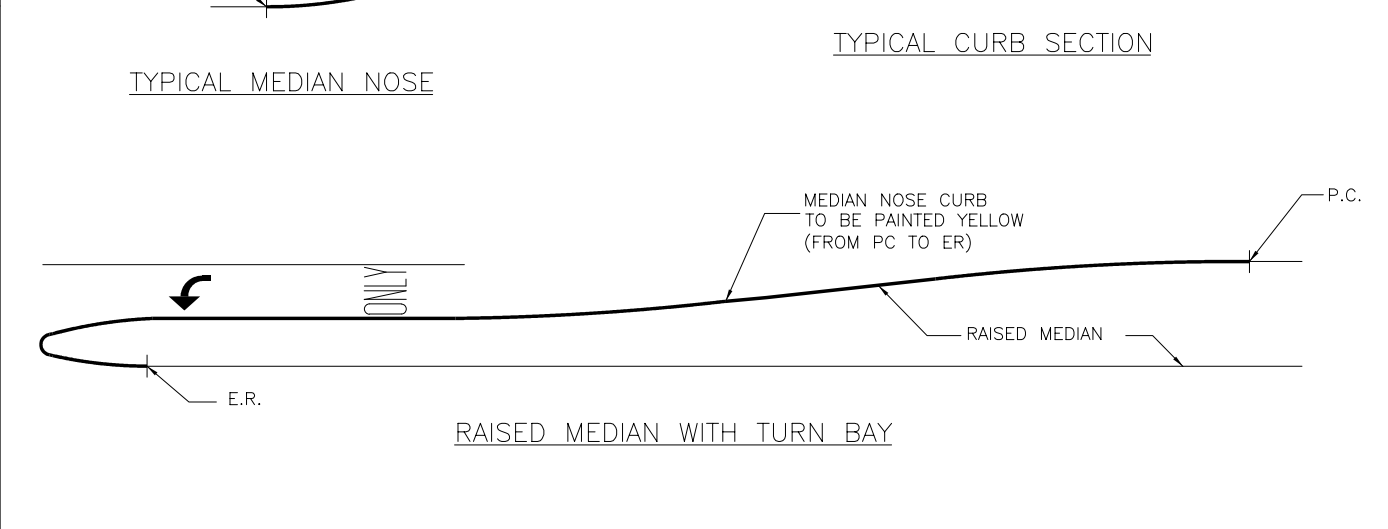
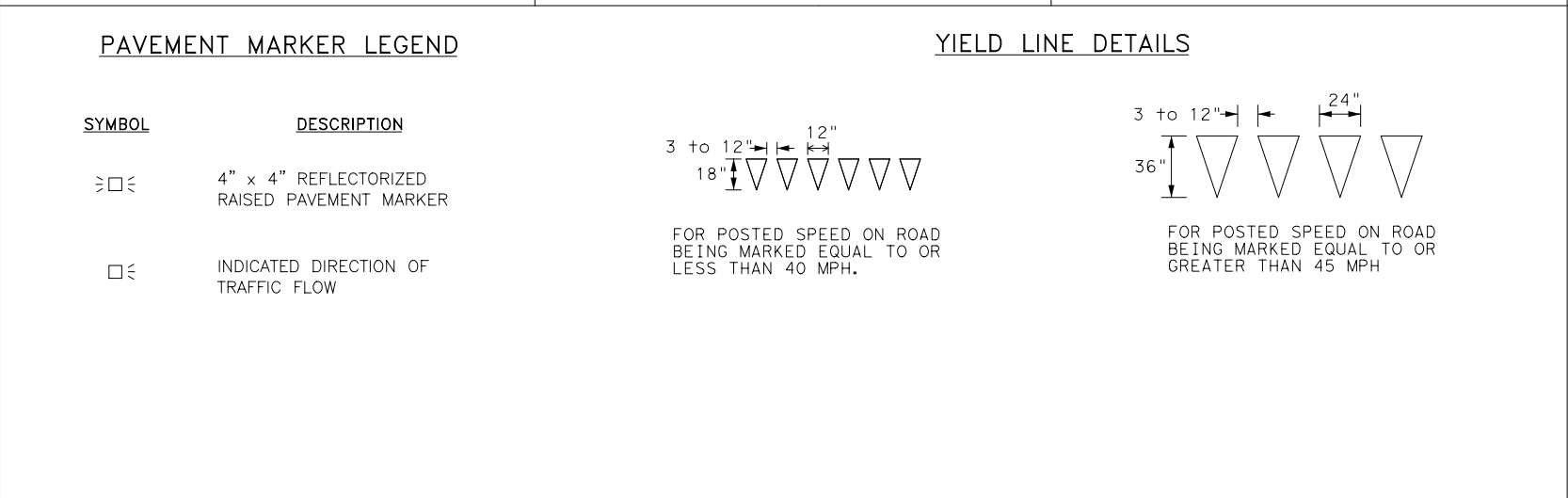
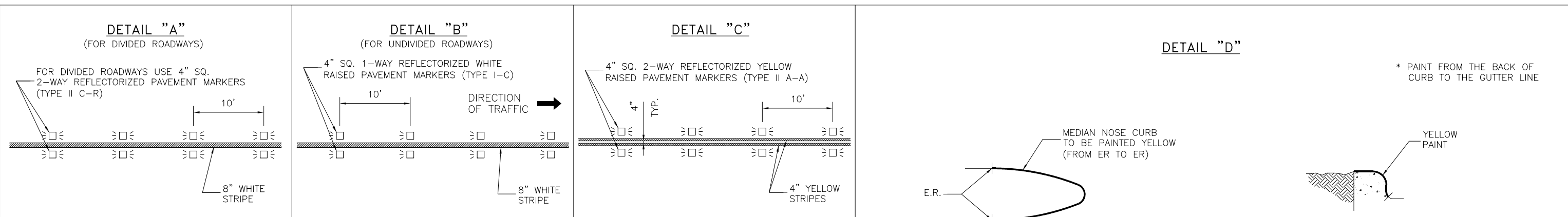


r.g. miller
engineers
16340 Park Ten Place
Suite 350
Houston, Texas 77084
(713) 461-9600
TEXAS FIRM REGISTRATION NO. F-487



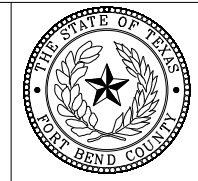
PROJECT TITLE: WIDENING AND RECONSTRUCTION OF RANSOM ROAD		
DRAWN BY: INIT	FROM SUGAR LAND CITY LIMIT TO SH 99	FBCD STANDARD
CK'D BY: INIT	SHEET DESCRIPTION: PAVEMENT MARKING DETAILS	46
SCALE: NONE	SHEET 1 OF 2	SHEET NO:
DATE: 3-1-22	APPROVED BY:	115 /123

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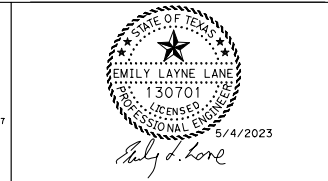


NO.	REVISIONS	DATE	NAME
1	ORIGINAL STANDARD ISSUED	3-1-22	RJS

FORT BEND COUNTY
ENGINEERING DEPARTMENT



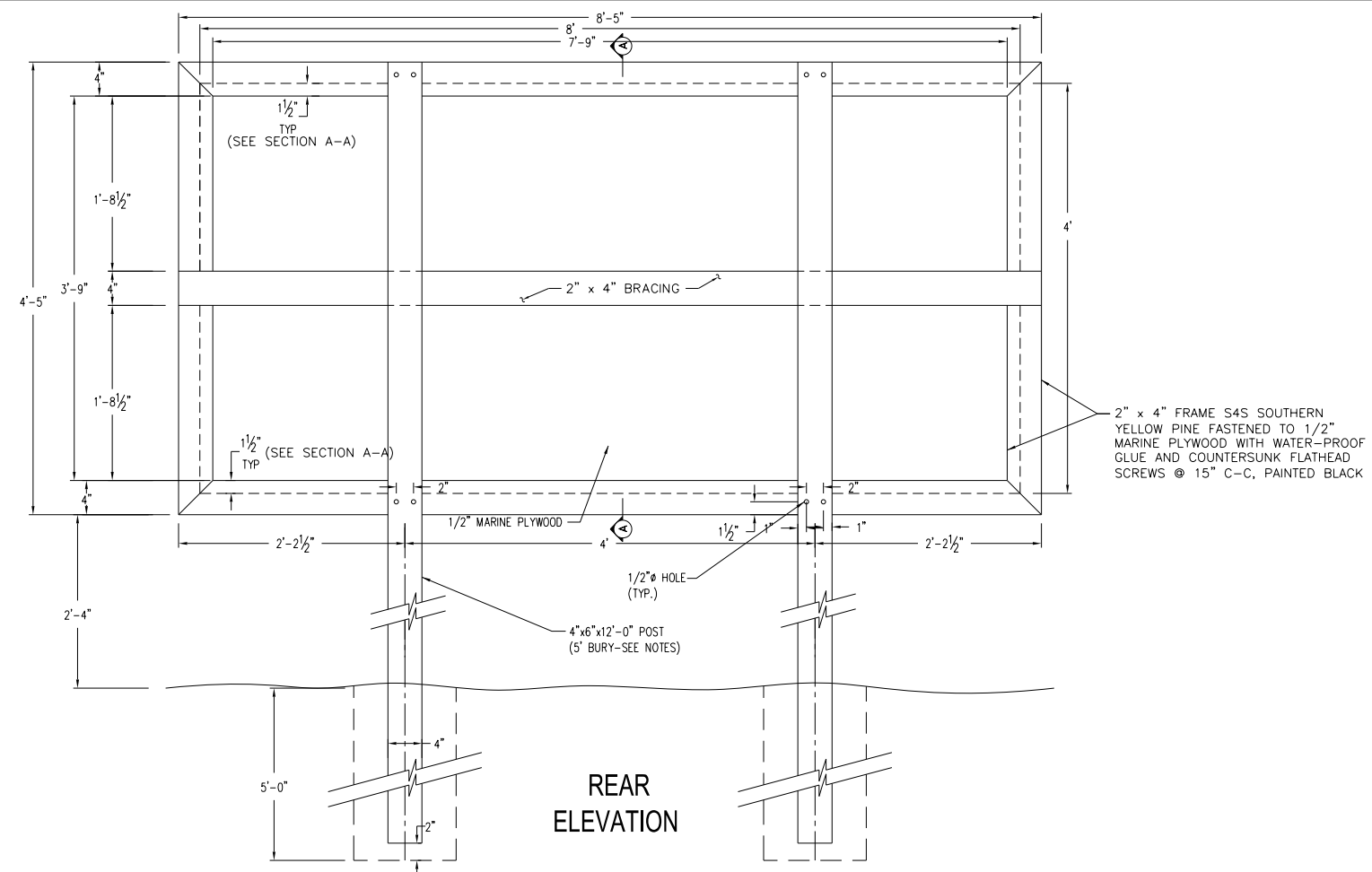
r.g.miller engineers
16340 Park Ten Place
Suite 350
Houston, Texas 77084
(713) 461-9600
TEXAS FIRM REGISTRATION NO. F-487



PROJECT TITLE: WIDENING AND RECONSTRUCTION OF RANSOM ROAD

DRAWN BY: INIT	FROM SUGAR LAND CITY LIMIT TO SH 99	FBCD STANDARD
CK'D BY: INIT	SHEET DESCRIPTION: PAVEMENT MARKING DETAILS	47
SCALE: NONE	SHEET 2 OF 2	SHEET NO: 116 /123
DATE: 3-1-22	APPROVED BY:	

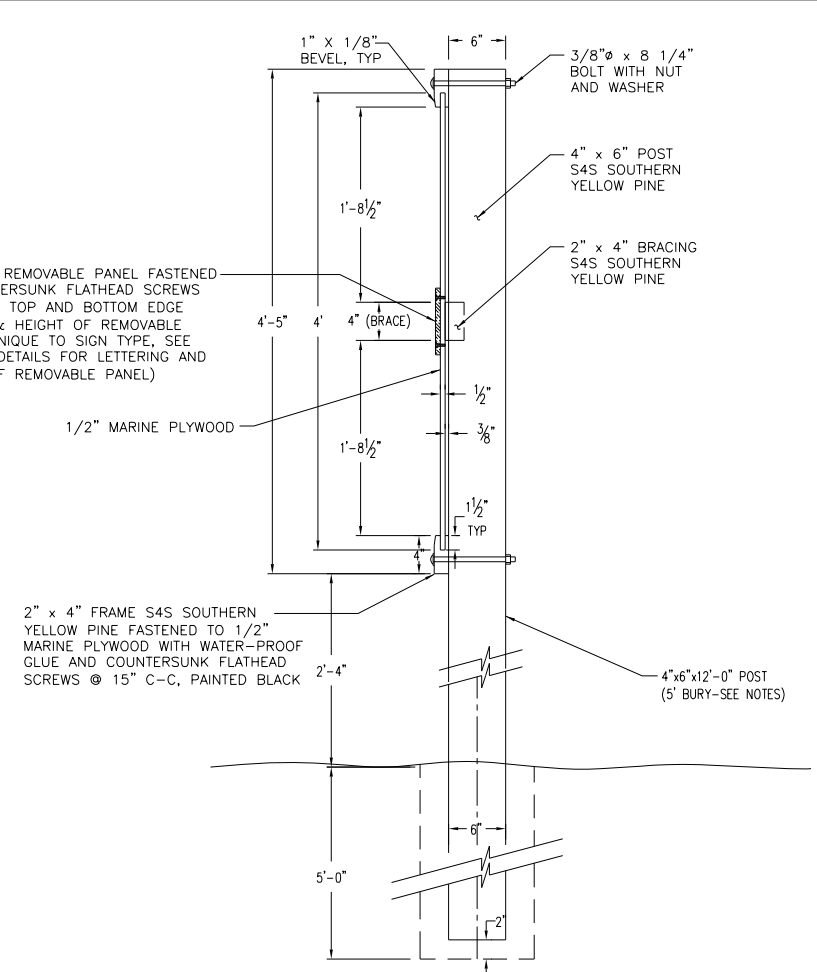
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2" x 4" FRAME S4S SOUTHERN YELLOW PINE FASTENED TO 1/2" MARINE PLYWOOD WITH WATER-PROOF GLUE AND COUNTERSUNK FLATHEAD SCREWS @ 15" C-C, PAINTED BLACK

1/2" THICK REMOVABLE PANEL FASTENED WITH COUNTERSUNK FLATHEAD SCREWS 18" C-C AT TOP AND BOTTOM EDGE (LOCATION & HEIGHT OF REMOVABLE PANEL IS UNIQUE TO SIGN TYPE, SEE SIGN TYPE DETAILS FOR LETTERING AND LOCATION OF REMOVABLE PANEL)

2" x 4" FRAME S4S SOUTHERN YELLOW PINE FASTENED TO 1/2" MARINE PLYWOOD WITH WATER-PROOF GLUE AND COUNTERSUNK FLATHEAD SCREWS @ 15" C-C, PAINTED BLACK

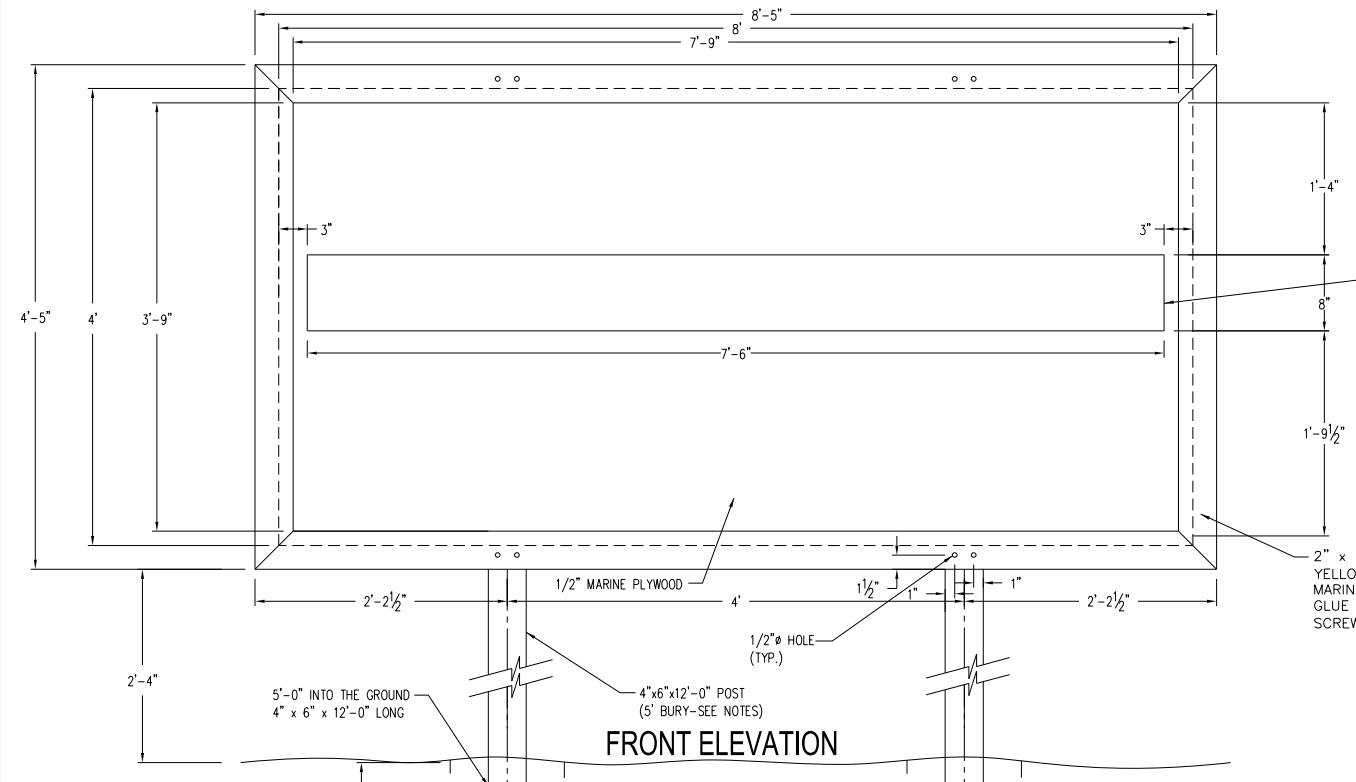


1/2" THICK REMOVABLE PANEL FASTENED WITH COUNTERSUNK FLATHEAD SCREWS 18" C-C AT TOP AND BOTTOM EDGE (LOCATION & HEIGHT OF REMOVABLE PANEL IS UNIQUE TO SIGN TYPE, SEE SIGN TYPE DETAILS FOR LETTERING AND LOCATION OF REMOVABLE PANEL)

2" x 4" FRAME S4S SOUTHERN YELLOW PINE FASTENED TO 1/2" MARINE PLYWOOD WITH WATER-PROOF GLUE AND COUNTERSUNK FLATHEAD SCREWS @ 15" C-C, PAINTED BLACK

GENERAL NOTES:

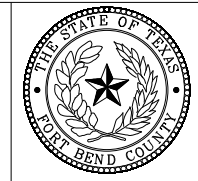
1. THE SIGN SHALL HAVE BLACK LETTERS WITH WHITE BACKGROUND.
2. ALL LETTERING SHALL BE EITHER AERIAL FONT OR HELVETICA FONT.
3. SIGN SHALL BE MOUNTED ON 4" x 6" POSTS AND LOCATED BY THE ENGINEER.
4. REMOVABLE PANEL SHALL BE 1/2" MARINE PLYWOOD.
5. ALL BOLTS, SCREWS, NAILS, NUTS AND WASHERS SHALL BE GALVANIZED OR CADMIUM PLATED.
6. 4" x 6" POST SHALL BE WOLMANIZED OR PENTACHLOROPHENOL TREATED.
7. ALL WOOD SURFACES SHALL HAVE PRIME COAT AND TWO (2) COATS OF SHERWIN-WILLIAMS KEM-LUSTRA ENAMEL OR EQUAL.



4" x 6" x 12'-0" POST (5' BURY-SEE NOTES)

NO.	REVISIONS	DATE	NAME
1	ORIGINAL STANDARD ISSUED	3-1-22	RJS

FORT BEND COUNTY
ENGINEERING DEPARTMENT

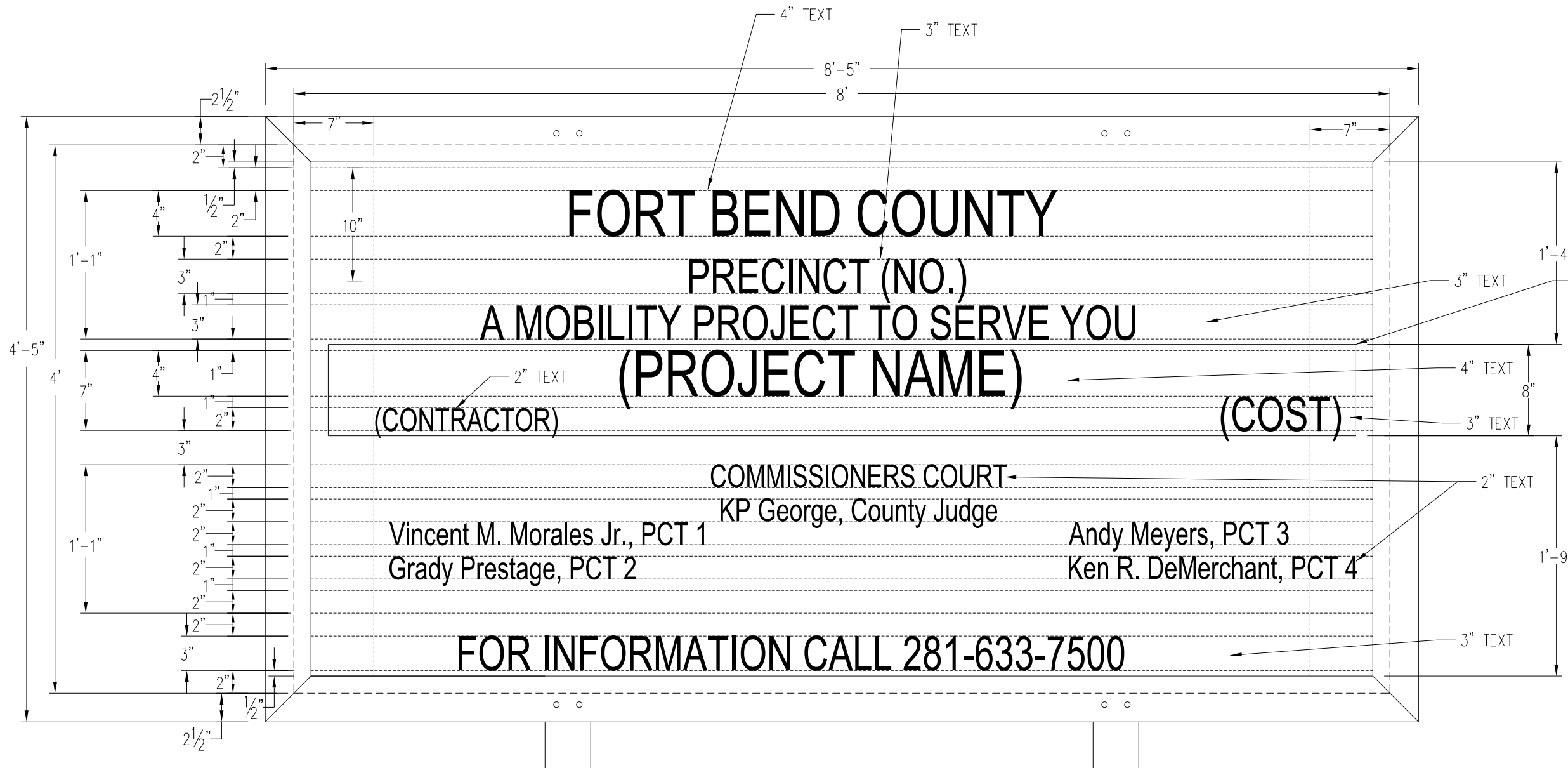


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TEXAS FIRM REGISTRATION NO. F-487

STATE OF TEXAS
EMILY LAVINE LANE
130701
PROFESSIONAL ENGINEER
5/4/2023
Emily D. Lane

PROJECT TITLE: WIDENING AND RECONSTRUCTION OF RANSOM ROAD		
DRAWN BY: INIT	FROM SUGAR LAND CITY LIMIT TO SH 99	FBCED STANDARD
CK'D BY: INIT	SHEET DESCRIPTION: PROJECT SIGN DETAILS	35
SCALE: NONE	SHEET 1 OF 4	SHEET NO:
DATE: 3-1-22	APPROVED BY:	117 /123

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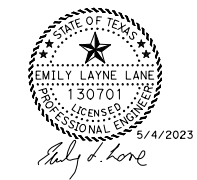
1/2" THICK REMOVABLE PANEL FASTENED WITH COUNTERSUNK FLATHEAD SCREWS 18" C-C AT TOP AND BOTTOM EDGE (LOCATION & HEIGHT OF REMOVABLE PANEL IS UNIQUE TO SIGN TYPE, SEE SIGN TYPE DETAILS FOR LETTERING AND LOCATION OF REMOVABLE PANEL)

NO.	REVISIONS	DATE	NAME
△	ORIGINAL STANDARD ISSUED	3-1-22	RJS
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FORT BEND COUNTY
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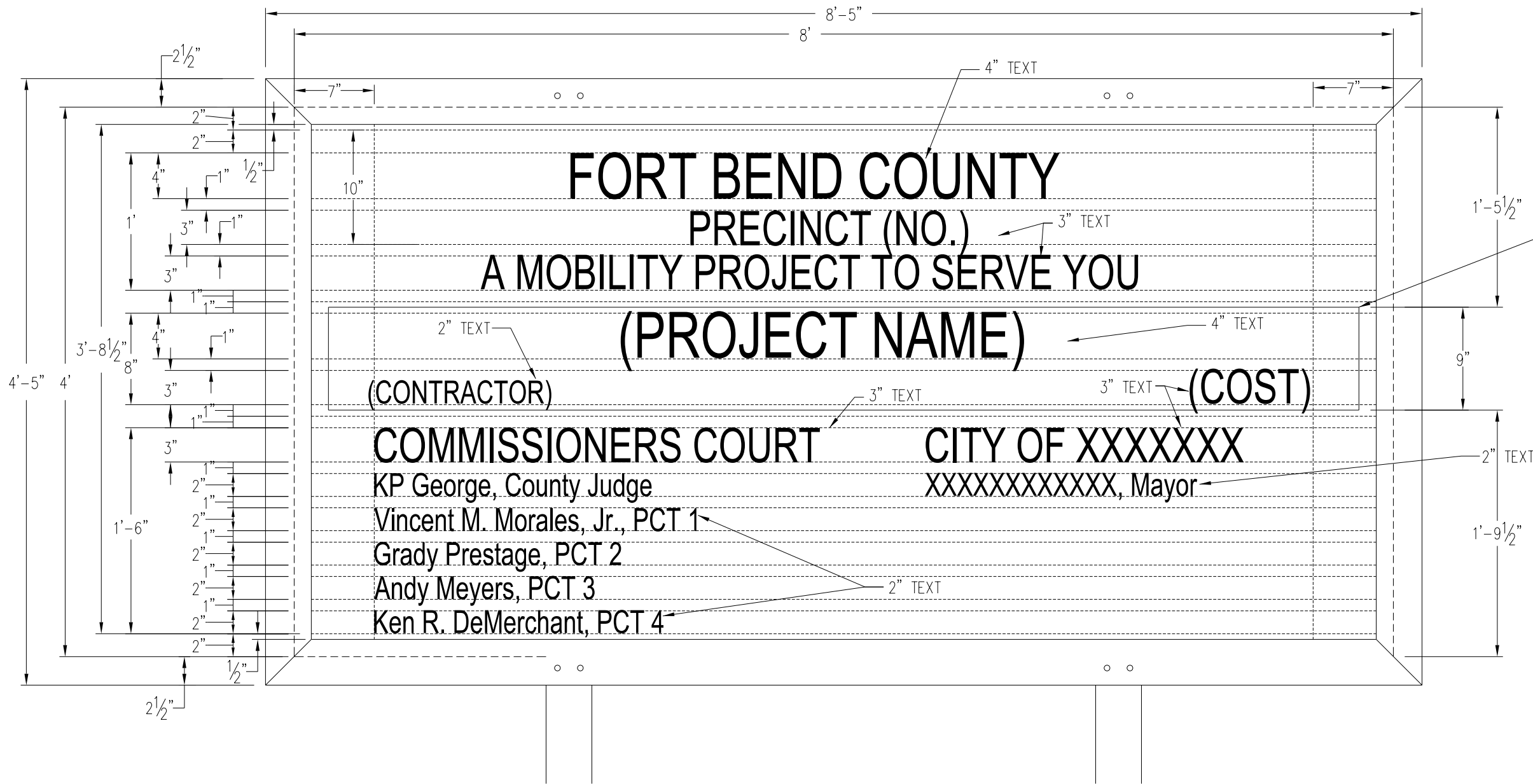


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PROJECT TITLE: WIDENING AND RECONSTRUCTION OF RANSOM ROAD		
DRAWN BY: INIT	FROM SUGAR LAND CITY LIMIT TO SH 99	FBCED STANDARD
CK'D BY: INIT	SHEET DESCRIPTION: COUNTY FUNDED PROJECT SIGN	36
SCALE: NONE	(FOR PCNT. 1, 2, & 4) SHEET 2 OF 4	SHEET NO:
DATE: 3-1-22	APPROVED BY:	118/123

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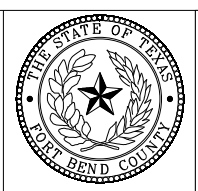
1/2" THICK REMOVABLE PANEL FASTENED WITH COUNTERSUNK FLATHEAD SCREWS 18" C-C AT TOP AND BOTTOM EDGE (LOCATION & HEIGHT OF REMOVABLE PANEL IS UNIQUE TO SIGN TYPE, SEE SIGN TYPE DETAILS FOR LETTERING AND LOCATION OF REMOVABLE PANEL)

GENERAL NOTES:

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2. ALL LETTERING SHALL BE EITHER AERIAL FONT OR HELVETICA FONT.
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NO.	REVISIONS	DATE	NAME
△	ORIGINAL STANDARD ISSUED	3-1-22	RJS
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FORT BEND COUNTY
ENGINEERING DEPARTMENT



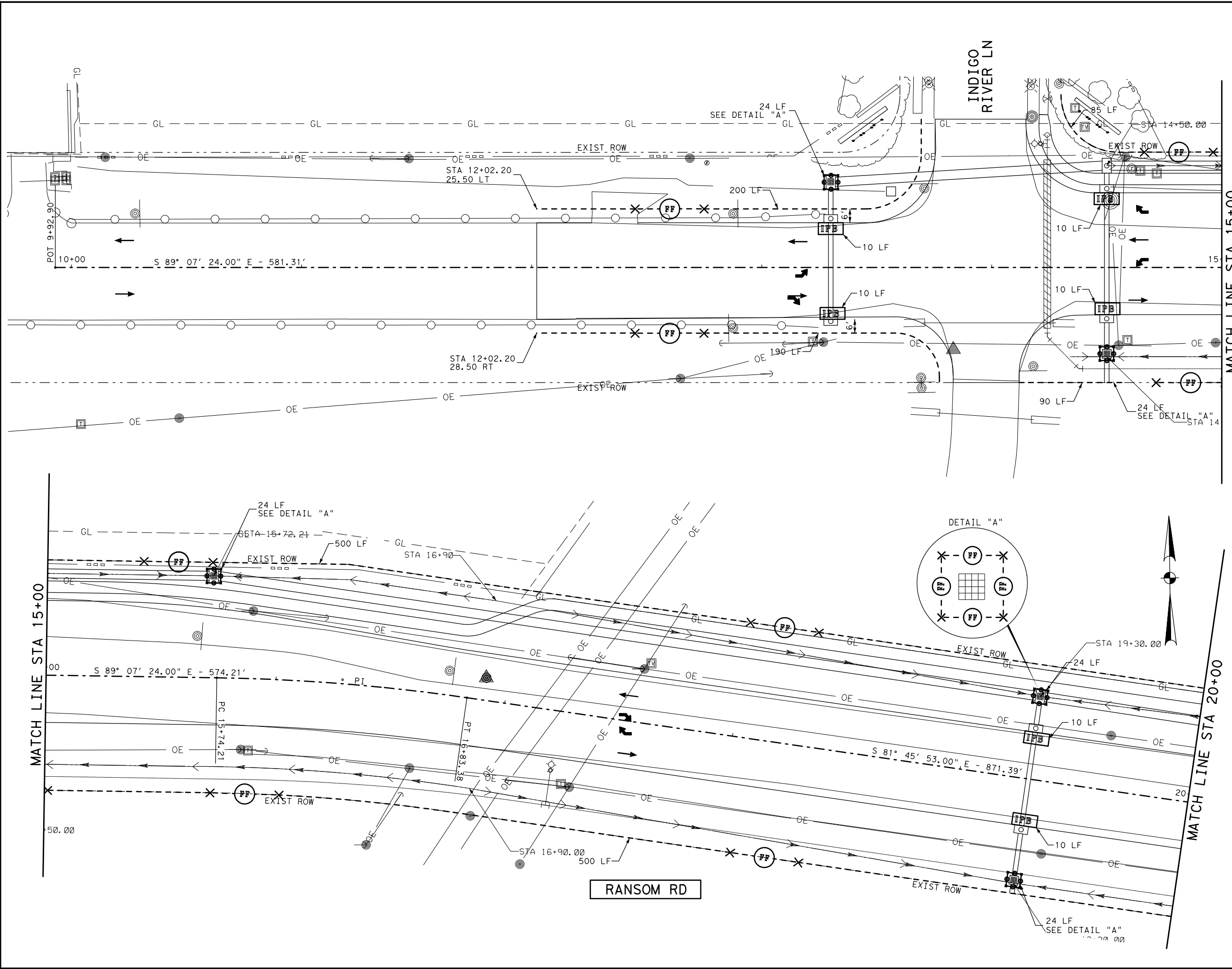
r.g. miller
engineers
since 1966

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TEXAS FIRM REGISTRATION NO. F-487

THE STATE OF TEXAS
EMILY LAYNE LANE
130701
LICENSED PROFESSIONAL ENGINEER
5/4/2023
Emily L. Lane

PROJECT TITLE: WIDENING AND RECONSTRUCTION OF RANSOM ROAD		
DRAWN BY: INIT	SHEET DESCRIPTION: COUNTY FUNDED PROJECT SIGN	FBCED STANDARD: 38
SCALE: NONE	SHEET 4 OF 4	SHEET NO: 119/123
DATE: 3-1-22	APPROVED BY:	

4:22:54 PM 5/4/2023
 T:\04399_000 FBC-01 Ransom Road\DGN\Ransom Rd*SW3P*01.dgn



LEGEND

- FILTER FABRIC FENCE
- INLET PROTECTION BARRIER (STAGE II) (FILTER FABRIC) BEFORE CONCRETE PAVEMENT IS POURED.
- TRAFFIC DIRECTIONAL DURING CONSTRUCTION

No.	Date	Revisions	App.

**RANSOM RD
 STORM WATER
 POLLUTION PREVENTION
 PLAN**

Emily Layne Lane
 5/4/2023

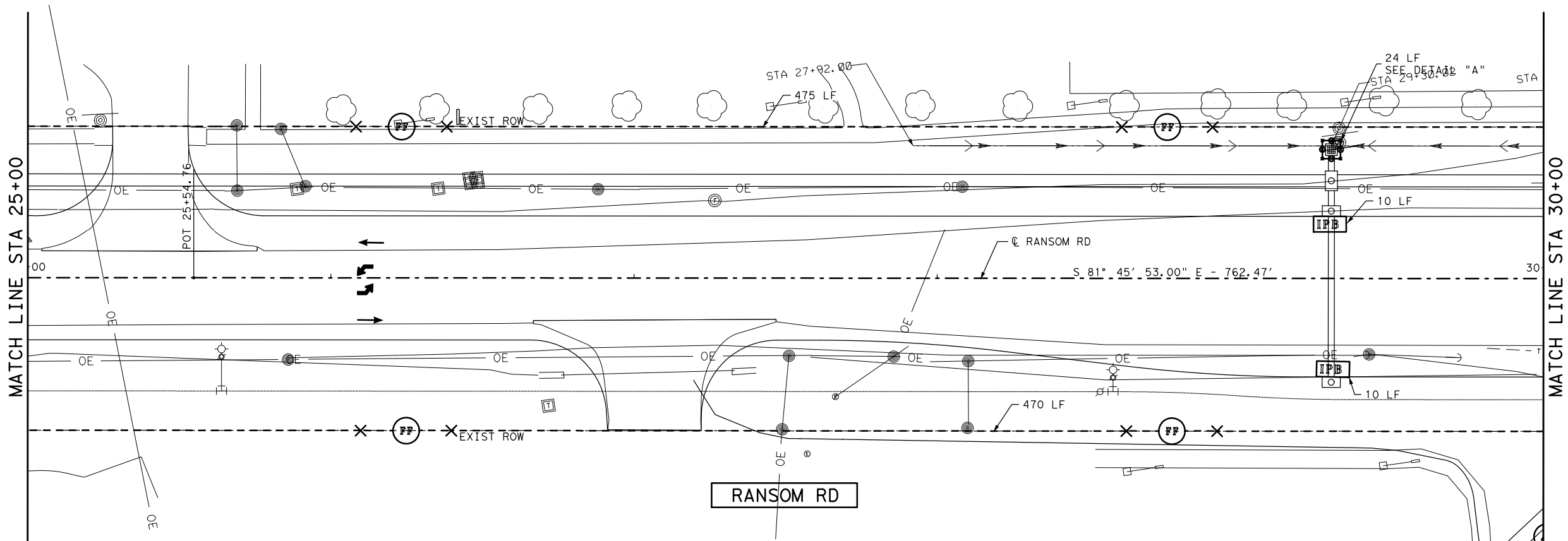
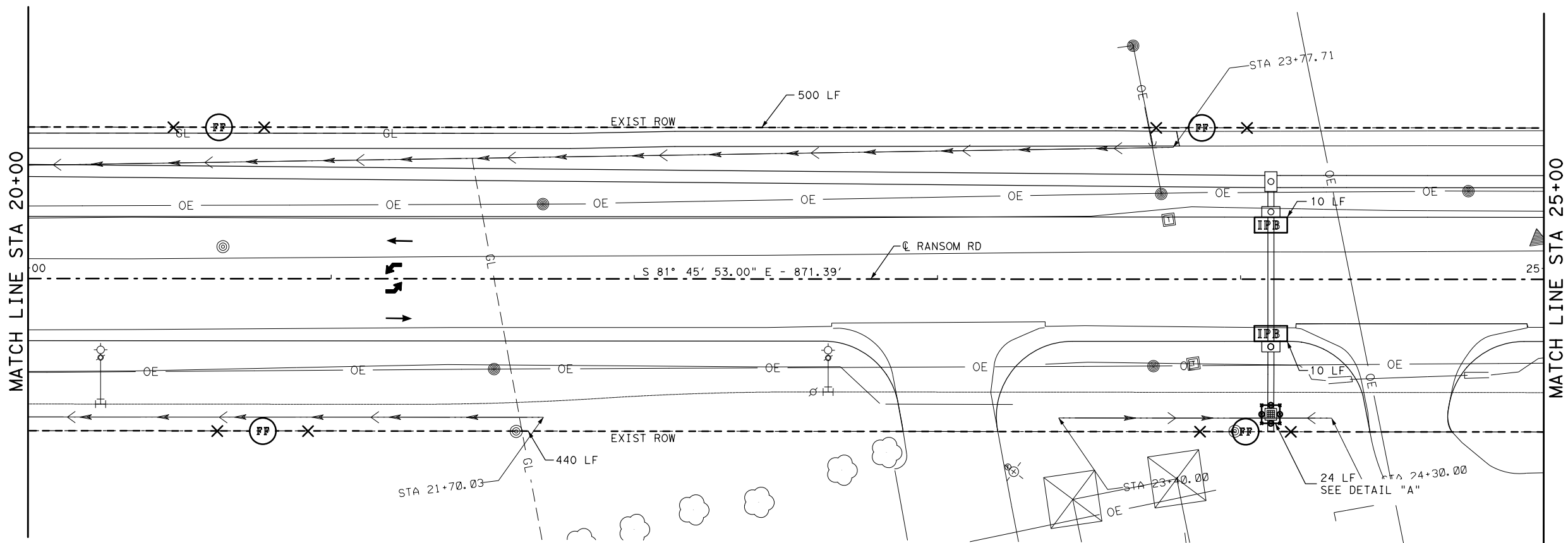
r.g.miller engineers
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 Suite 350
 Houston, Texas 77084
 (713) 461-9600
 TEXAS FIRM REGISTRATION NO. F-487

Approved By: _____ Date: _____
 r.g. miller Job No. 4399

SUBMITTED BY: R.G. MILLER SCALE: 1"=40' (H), 1"=4' (V)
 DATE: 5/4/2023 SURV BY: MILLER SURVEY F. B. NO.: 17102

DESIGNED BY: E.L.L. DRAWN BY: C.G.
 SHEET 1 OF 3 SHEETS
 DWG. NO. 120

4:22:56 PM 5/4/2023
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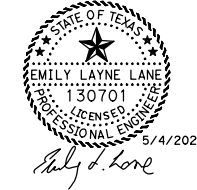


LEGEND

- FILTER FABRIC FENCE
- INLET PROTECTION BARRIER (STAGE II) (FILTER FABRIC) BEFORE CONCRETE PAVEMENT IS POURED.
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No.	Date	Revisions	App.

**RANSOM RD
 STORM WATER
 POLLUTION PREVENTION
 PLAN**



r.g.miller engineers
 16340 Park Ten Place
 Suite 350
 Houston, Texas 77084
 (713) 461-9600
 TEXAS FIRM REGISTRATION NO. F-487

Approved By: _____ Date: _____
 Job No. 4399

Submitted By: R.G. MILLER
 Scale: 1"=40' (H), 1"=4' (V)
 Date: 5/4/2023
 Surv By: MILLER SURVEY
 F. B. No.: 17102

Designed By: E.L.L.
 Drawn By: C.G.
 Sheet 2 OF 3 SHEETS
 DWG. NO. 121

