Fort Bend County
Engineering Department
301 Jackson Suite 401
Richmond, Texas 77469
281.633.7500
Permits@fortbendcountytx.gov

REVIEW BY FORT BEND COUNTY COMMISSIONERS COURT

[X] **Right of Way Permit**
[ ] **Commercial Driveway Permit**

Permit No: 2017-15271

Applicant: **Harris Construction Company, LTD.**

Job Location Site: **Oyster Creek at Highway 99, Richmond, TX 77407**

Bond No. [redacted] **Date of Bond:** **7/17/2017** **Amount:** **$264,300.65**

The above applicant came to make use of certain Fort Bend County property subject to, "The Order Regulating the Laying, Construction, Maintenance, and Repair of Buried Cables, Conduits, and Pole Lines, In, Under, Across or Along Roads, Streets, Highways, and Drainage Ditches in Fort Bend County, Texas, Under the Jurisdiction of the Commissioners Court of Fort Bend County, Texas," as passed by the Commissioners Court of Fort Bend County, Texas, of the Minutes of the Commissioners Court of Fort Bend County, Texas, to the extent that such order is not inconsistant with Chapter 181, Vernon's Texas Statutes and Codes Annoted.

Notes:

1. Evidence of review by the Commissioners Court must be kept on the job site and failure to do so constitutes grounds for job shutdown.
2. Written notices are required:
   a. 48 hours in advance of construction start up, and
   b. When construction is completed and ready for final inspection, submit notification to Permit Administrator thru MyGovernmentOnline.org portal.
3. This permit expires one (1) year from date of permit if construction has not commenced.

On this 8th day of August, 2017, Upon Motion of Commissioner Meyer, seconded by Commissioner Morales, duly put and carried, it is ORDERED, ADJUDGED AND DECREED that said notice of said above purpose is hereby acknowledged by the Commissioners Court of Fort Bend County, Texas, and that said notice be placed on record according to the regulation order thereof.

Signature

By: Charles O. Dean
for County Engineer

By: N/A
Drainage District Engineer/Manager

Presented to Commissioners Court and approved.

Date Recorded 8-11-2017 Comm. Court No. 12B

Clerk of Commissioners Court

By: Linda Willis
Deputy

8-11-2017 Original sent to Charles Dean, Engineering dept.

Fort Bend County
Engineering Department
301 Jackson Suite 401
Richmond, Texas 77469
281.633.7500
Permits@fortbendcountytx.gov

PERMIT APPLICATION REVIEW FORM FOR CABLE, CONDUIT, AND POLE LINE ACTIVITY IN FORT BEND COUNTY

[X] **Right of Way Permit**

[ ] **Commercial Driveway Permit**

Permit No: 2017-15271

The following "Notice of Proposed Cable, Conduit, and/or Pole Line activity in Fort Bend County" and accompanying attachments have been reviewed and the notice conforms to appropriate regulations set by Commissioner's Court of Fort Bend County, Texas.

(1) COMPLETE APPLICATION FORM:

- [X] a. Name of road, street, and/or drainage ditch affected.
- [X] b. Vicinity map showing course of directions
- [X] c. Plans and specifications

(2) BOND:

- [ ] County Attorney, approval when applicable.
- [ ] Perpetual bond currently posted. Bond No: _____ Amount: _____
- [X] Performance bond submitted. Bond No: [redacted] Amount: $264,300.65
- [ ] Cashier's Check Check No: _____ Amount: _____

(3) DRAINAGE DISTRICT APPROVAL (WHEN APPLICABLE):

_____ _____
Drainage District Approval Date

We have reviewed this project and agree it meets minimum requirements.

Charles O. Ay
Permit Administrator

8/1/17
Date

4 PGS
BOND

2017090250

34

PERFORMANCE BOND COVERING ALL CABLE, CONDUIT AND/OR POLE LINE ACTIVITY IN, UNDER, ACROSS OR ALONG FORT BEND COUNTY ROAD

AUTHORIZED

BOND NO [redacted]

THE STATE OF TEXAS §

KNOW ALL MEN BY THESE PRESENTS:

COUNTY OF FORT BEND §

West Aliana Trace Bridge - APP 16810

THAT WE, Harris Construction Company, Ltd. **whose address is** 6602 Guhn Rd., Houston, TX 77040 **Texas, hereinafter called the Principal, And** Liberty Mutual Insurance Company **, a Corporation existing under and by virtue of the laws of the state of** Massachusetts **and authorized to do an indemnifying business in the state of Texas, and whose principal office is located at** 175 Berkeley St., Boston, MA 02117 **, whose officer residing in the State of Texas, authorized to accept service in all suits and actions brought whining said state is and Whose address is** 13201 NW Freeway, Ste. 810, Houston, TX 77040 **, hereinafter called the Surety, and held and firmly bound unto , Robert e. Hebert, County Judge of Fort Bend County, Texas, or his successors in office, in the full sum of** Two Hundred Sixty Four Thousand Three Hundred & 65/00 **Dollars ($** 264,300.65 **) current, lawful money of the United Stated of America, to be paid to said Robert E. Hebert, County Judge of Fort Bend County, Texas, or his successors in office, to which payment well and truly to be made and done, we, the undersigned, bind ourselves and each of us, our heirs, executors, administrators, successors, assigns, and legal representatives, jointly and severally, by these presents.**

THE CONDITION OF THIS BOND IS SUCH THAT, WHEREAS, the above bounden principal contemplates laying, constructing, maintaining and/or repairing one or more cables, conduits, and/or pole lines in, under, across and/or along roads, streets and highways, commercial driveway and median openings or modifications in the County of Fort Bend, and the State of Texas, under the jurisdiction of the Commissioners' Court of Fort Bend County, Texas, pursuant to the Commissioners' Court order adopted on the 1st day of December, A.D. 1980, recorded in Volume 13, of the Commissioners' Court Minutes of Fort Bend County, Texas, regulating same, which Commissioners' Court order is hereby referred to and made a part hereof for all purposes as though fully set out herein;

AND WHEREAS, the principal desires to provide Fort Bend County with a performance bond covering all such cable, conduit and/or pole line activity, commercial driveway and median openings or modifications;

NOW, THEREFORE, if the above bounden principal shall faithfully perform all its cable, conduit and/or pole line activity (including, but not limited to the laying, construction, maintenance and/or repair of cables, conduits and/or pole lines) in, under, across and/or along roads, streets and highways, commercial driveway and median openings or modifications in the County of Fort Bend and State of Texas, under the jurisdiction of the Commissioners Court of Fort Bend County, Texas, pursuant to and in accordance with minimum requirements and conditions of the above mentioned Commissioners' Court order set forth and specified to be by said principal done and performed, at the time and in the manner therein specified, and shall pay over and make good and reimburse Fort Bend County, all loss and damages which Fort Bend County may sustain by reason of any failure or default on the part of said principal, then this obligation shall be null and void, otherwise to remain in full force and effect.

This bond is payable at the County Courthouse in the County of Fort Bend and State of Texas.

It is understood that at any time Fort Bend County deems itself insecure under this bond, it may require further and/or additional bonds of the principal.

EXECUTED this 17th **day of** July **,20** 17 **.**

Harris Construction Company, Ltd.
PRINCIPAL It's General Partner GHCC LLC

BY Glenn S. Harris, President

Liberty Mutual Insurance Company
SURETY

Michelle Ulery, Attorney in Fact

C:\Documents and Settings\cel.FORTBEND\Local Settings\Temporary Internet Files\Content.Outlook\080X5MWJ\ROW Application.doc

CCM 8-8-2017 #12B
Fort Bend County Clerk
Return Admin Serv Coord

RAC

THIS POWER OF ATTORNEY IS NOT VALID UNLESS IT IS PRINTED ON RED BACKGROUND.
This Power of Attorney limits the acts of those named herein, and they have no authority to bind the Company except in the manner and to the extent herein stated.

Certificate No. 7222300

American Fire and Casualty Company
The Ohio Casualty Insurance Company
Liberty Mutual Insurance Company
West American Insurance Company

POWER OF ATTORNEY

KNOWN ALL PERSONS BY THESE PRESENTS: That American Fire & Casualty Company and The Ohio Casualty Insurance Company are corporations duly organized under the laws of the State of New Hampshire, that Liberty Mutual Insurance Company is a corporation duly organized under the laws of the State of Massachusetts, and West American Insurance Company is a corporation duly organized under the laws of the State of Indiana (herein collectively called the "Companies"), pursuant to and by authority herein set forth, does hereby name, constitute and appoint, C.A. McClure; Kelly J. Brooks; Kenneth L. Meyer; Michelle Ulery

all of the city of CYPRESS, state of TX each individually if there be more than one named, its true and lawful attorney-in-fact to make, execute, seal, acknowledge and deliver, for and on its behalf as surety and as its act and deed, any and all undertakings, bonds, recognizances and other surety obligations, in pursuance of these presents and shall be as binding upon the Companies as if they have been duly signed by the president and attested by the secretary of the Companies in their own proper persons.

IN WITNESS WHEREOF, this Power of Attorney has been subscribed by an authorized officer or official of the Companies and the corporate seals of the Companies have been affixed thereto this 5th day of January, 2016.

AMERICAN FIRE AND CASUALTY COMPANY INCORPORATED 1906 NEW HAMPSHIRE
THE OHIO CASUALTY INSURANCE COMPANY INCORPORATED 1919 NEW HAMPSHIRE
LIBERTY MUTUAL INSURANCE COMPANY INCORPORATED 1912 MASSACHUSETTS
WEST AMERICAN INSURANCE COMPANY INCORPORATED 1991 INDIANA

American Fire and Casualty Company
The Ohio Casualty Insurance Company
Liberty Mutual Insurance Company
West American Insurance Company

By: _____
David M. Carey, Assistant Secretary

STATE OF PENNSYLVANIA ss
COUNTY OF MONTGOMERY

On this 5th day of January, 2016, before me personally appeared David M. Carey, who acknowledged himself to be the Assistant Secretary of American Fire and Casualty Company, Liberty Mutual Insurance Company, The Ohio Casualty Insurance Company, and West American Insurance Company, and that he, as such, being authorized so to do, execute the foregoing instrument for the purposes therein contained by signing on behalf of the corporations by himself as a duly authorized officer.

IN WITNESS WHEREOF, I have hereunto subscribed my name and affixed my notarial seal at Plymouth Meeting, Pennsylvania, on the day and year first above written.

TERESA PASTELLA COMMONWEALTH OF PENNSYLVANIA NOTARY PUBLIC

COMMONWEALTH OF PENNSYLVANIA
Notarial Seal
Teresa Pastella, Notary Public
Plymouth Twp., Montgomery County
My Commission Expires March 28, 2017
Member, Pennsylvania Association of Notaries

By: _____
Teresa Pastella, Notary Public

This Power of Attorney is made and executed pursuant to and by authority of the following By-laws and Authorizations of American Fire and Casualty Company, The Ohio Casualty Insurance Company, Liberty Mutual Insurance Company, and West American Insurance Company which resolutions are now in full force and effect reading as follows:

ARTICLE IV – OFFICERS – Section 12. Power of Attorney. Any officer or other official of the Corporation authorized for that purpose in writing by the Chairman or the President, and subject to such limitation as the Chairman or the President may prescribe, shall appoint such attorneys-in-fact, as may be necessary to act in behalf of the Corporation to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations. Such attorneys-in-fact, subject to the limitations set forth in their respective powers of attorney, shall have full power to bind the Corporation by their signature and execution of any such instruments and to attach thereto the seal of the Corporation. When so executed, such instruments shall be as binding as if signed by the President and attested to by the Secretary. Any power or authority granted to any representative or attorney-in-fact under the provisions of this article may be revoked at any time by the Board, the Chairman, the President or by the officer or officers granting such power or authority.

ARTICLE XIII – Execution of Contracts – SECTION 5. Surety Bonds and Undertakings. Any officer of the Company authorized for that purpose in writing by the chairman or the president, and subject to such limitations as the chairman or the president may prescribe, shall appoint such attorneys-in-fact, as may be necessary to act in behalf of the Company to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations. Such attorneys-in-fact subject to the limitations set forth in their respective powers of attorney, shall have full power to bind the Company by their signature and execution of any such instruments and to attach thereto the seal of the Company. When so executed such instruments shall be as binding as if signed by the president and attested by the secretary.

Certificate of Designation – The President of the Company, acting pursuant to the Bylaws of the Company, authorizes David M. Carey, Assistant Secretary to appoint such attorneys-in-fact as may be necessary to act on behalf of the Company to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations.

Authorization – By unanimous consent of the Company's Board of Directors, the Company consents that facsimile or mechanically reproduced signature of any assistant secretary of the Company, wherever appearing upon a certified copy of any power of attorney issued by the Company in connection with surety bonds, shall be valid and binding upon the Company with the same force and effect as though manually affixed.

I, Gregory W. Davenport, the undersigned, Assistant Secretary, of American Fire and Casualty Company, The Ohio Casualty Insurance Company, Liberty Mutual Insurance Company, and West American Insurance Company do hereby certify that the original power of attorney of which the foregoing is a full, true and correct copy of the Power of Attorney executed by said Companies, is in full force and effect and has not been revoked.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed the seals of said Companies this 17th day of July, 20 17.

AMERICAN FIRE AND CASUALTY COMPANY INCORPORATED 1906 NEW HAMPSHIRE
THE OHIO CASUALTY INSURANCE COMPANY INCORPORATED 1919 NEW HAMPSHIRE
LIBERTY MUTUAL INSURANCE COMPANY INCORPORATED 1912 MASSACHUSETTS
WEST AMERICAN INSURANCE COMPANY INCORPORATED 1991 INDIANA

By: _____
Gregory W. Davenport, Assistant Secretary

Not valid for mortgage, note, loan, letter of credit, currency rate, interest rate or residual value guarantees.

To confirm the validity of this Power of Attorney call 1-610-832-8240 between 9:00 am and 4:30 pm EST on any business day.

LMS_12873_122013

Liberty Mutual.
SURETY

TEXAS
IMPORTANT NOTICE

To obtain information or make a complaint:

You may call toll-free for information or to make a complaint at
1-877-751-2640

You may also write to:

2200 Renaissance Blvd., Ste. 400
King of Prussia, PA 19406-2755

You may contact the Texas Department of Insurance to obtain information on companies, coverages, rights or complaints at
1-800-252-3439

You may write the Texas Department of Insurance
Consumer Protection (111-1A)
P. O. Box 149091
Austin, TX 78714-9091
FAX: (512) 490-1007
Web: http://www.tdi.texas.gov
E-mail: ConsumerProtection@tdi.texas.gov

PREMIUM OR CLAIM DISPUTES:

Should you have a dispute concerning your premium or about a claim you should first contact the agent or call 1-800-843-6446. If the dispute is not resolved, you may contact the Texas Department of Insurance.

ATTACH THIS NOTICE TO YOUR POLICY:

This notice is for information only and does not become a part or condition of the attached document.

TEXAS
AVISO IMPORTANTE

Para obtener informacion o para someter una queja:

Usted puede llamar al numero de telefono gratis para informacion o para someter una queja al
1-877-751-2640

Usted tambien puede escribir a:

2200 Renaissance Blvd., Ste. 400
King of Prussia, PA 19406-2755

Puede comunicarse con el Departamento de Seguros de Texas para obtener informacion acerca de companias, coberturas, derechos o quejas al
1-800-252-3439

Puede escribir al Departamento de Seguros
de Texas Consumer Protection (111-1A)
P. O. Box 149091
Austin, TX 78714-9091
FAX # (512) 490-1007
Web: http://www.tdi.texas.gov
E-mail: ConsumerProtection@tdi.texas.gov

DISPUTAS SOBRE PRIMAS O RECLAMOS:

Si tiena una disputa concerniente a su prima o a un reclamo, debe comunicarse con el agente o primero. Si no se resuelve la disputa, puede entonces comunicarse con el departamento (TDI)

UNA ESTE AVISO A SU POLIZA:

Este aviso es solo para proposito de informacion y no se convierte en parte o condicion del documento adjunto.

Ret
FBC Clerk Admin Serv Coord

FILED AND RECORDED
OFFICIAL PUBLIC RECORDS

Laura Richard

Laura Richard, County Clerk
Fort Bend County, Texas
August 11, 2017 01:55:27 PM
FEE: $0.00 JE
BOND

2017090250

FORT BEND COUNTY MUNICIPAL UTILITY DISTRICT NO. 134 B & 134C
FORT BEND COUNTY, TEXAS

CONSTRUCTION PLANS FOR

12" WATERLINE & PAVING AND APPURTENANCES

TO SERVE

WEST ALIANA TRACE DRIVE BRIDGE

CITY OF HOUSTON E.T.J.

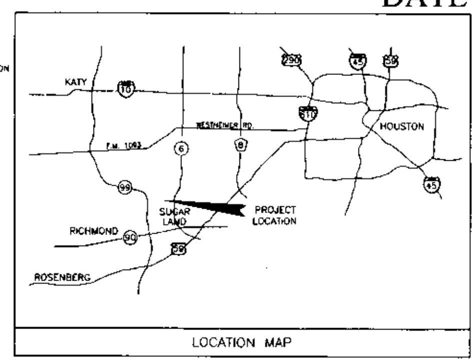
RECEIVED JUL 27 2017 BY KJT
APPROVED

JOB NO. 1968-1050

DATE : MARCH 2017

NOTES

1. THESE PLANS WERE PREPARED TO MEET OR EXCEED FORT BEND COUNTY AND CITY OF HOUSTON SUBDIVISION RULES AND REGULATIONS (AS APPLICABLE) AS CURRENTLY AMMENDED.
2. CONSTRUCTION WILL BE MONITORED BY A PROFESSIONAL ENGINEER TO INSURE COMPLIANCE WITH THE CONSTRUCTION PLANS AND SPECIFICATIONS.
3. CONTRACTOR SHALL NOTIFY THE FOLLOWING ENTITIES AT LEAST 48 HOURS PRIOR TO COMMENCEMENT OF CONSTRUCTION.
   CITY OF HOUSTON PUBLIC WORKS DEPARTMENT (713) 837-0050
   FORT BEND COUNTY DRAINAGE DISTRICT (DWAYNE GRIGAR) (281) 342-2863
   ASSISTANT TO THE FORT BEND COUNTY ENGINEER (281) 633-7500
4. ONLY AUTHORIZED INDIVIDUALS FROM EITHER THE TESTING COMPANY OR A REPRESENTATIVE OF LJA ENGINEERING, INC. HAVE THE AUTHORITY TO ADD WATER TO A CONCRETE TRUCK
5. CONTRACTOR SHALL CONTACT ANY PERTINENT UTILITY COMPANIES AT LEAST 48 HOURS PRIOR TO COMMENCEMENT OF EXCAVATION OR CONSTRUCTION IN THE VICINITY OF THEIR EASEMENTS AND/OR RIGHT-OF-WAYS.
6. THE OPENING AND CLOSING OF ALL VALVES ON EXISTING WATER LINES MUST BE PERFORMED EXCLUSIVELY BY THE DISTRICT OPERATOR
7. THE DISTRICT OPERATOR MUST PERFORM ALL WATER LINE BACTERIOLOGICAL TESTS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING THE DISTRICT.
8. PRIOR TO CONSTRUCTION OF THIS FACILITY WITHIN OR BY THE DISTRICT, THE DISTRICT OR THE ENGINEER WILL GIVE A WRITTEN NOTICE BY REGISTERED OR CERTIFIED MAIL TO THE DIRECTOR OF PUBLIC WORKS AND ENGINEERING, CITY OF HOUSTON, STATING THE DATE SUCH CONSTRUCTION WILL COMMENCE.
9. CONTRACTOR SHALL NOTIFY THE CITY OF HOUSTON, DEPARTMENT OF PUBLIC WORKS AND ENGINEERING, OFFICE OF THE CITY ENGINEER, 48 HOURS BEFORE STARTING WORK ON THIS PROJECT. TELEPHONE NO. (832) 394-9098
10. BRIDGE IS DESIGNED ACCORDING TO AASHTO LRFD SPECIFICATIONS. ALL BRIDGE ITEMS SHALL BE GOVERNED BY THE TEXAS DEPARTMENT OF TRANSPORTATION NOVEMBER 1, 2014 SPECIFICATIONS EXCLUDING ITEMS 1 THROUGH 9.



LOCATION MAP

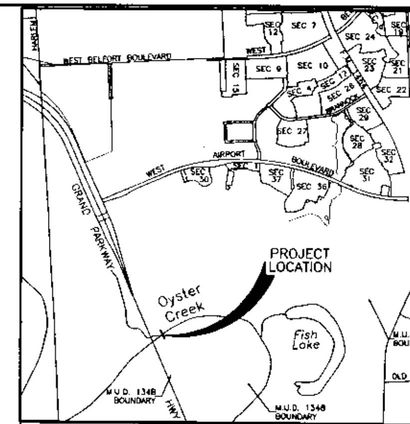
ONE-CALL NOTIFICATION SYSTEM
CALL BEFORE YOU DIG!!!
(713)223-4567 (IN HOUSTON)
(NEW STATEWIDE NUMBER OUTSIDE HOUSTON)
1-800-545-6005

FIRM
FLOOD INSURANCE MAP
PANEL 140 OF 575
MAP# 48157C0140L
FLOOD ZONE "AE"

ETJ DETENTION PLANS INFORMATION
1) STORM WATER DETENTION PLANS IS PROVIDED IN OYSTER CREEK DRAINAGE IMPROVEMENTS PHASE 3 AND OYSTER CREEK DRAINAGE IMPROVEMENTS PHASE 4
ENGINEERING FIRM LJA ENGINEERING & SURVEYING
DATE SIGNED MAY 2007, JANUARY 2012, DECEMBER 2013, FEBRUARY 2014, APRIL 2015
APPROVED BY FORT BEND COUNTY ENGINEERING DEPARTMENT
2) STORM WATER DRAINAGE DESIGN REPORT
REPORT TITLE MASTER DRAINAGE PLAN FOR ALIANA DEVELOPMENT
DATE JANUARY 2012 (UPDATED APRIL 2015) ENGINEERING FORM REPORT
DATE OF ACKNOWLEDGEMENT BY FBC DRAINAGE DISTRICT, JULY 2015
3) INCREASED IMPERVIOUS COVER = 1122.80 ACRES
DETENTION RATE REQUIRED = 0.52 ACRE-FEET/ACRE
DETENTION RATE PROVIDED = 0.52 ACRE-FEET/ACRE

FORT BEND COUNTY ENGINEER

ENGINEER: [signature] for RICHARD W. STOLLEIS, P.E.
DATE: 7/24/17
THESE SIGNATURES ARE VOID IF CONSTRUCTION HAS NOT COMMENCED IN ONE (1) YEAR FROM DATE OF APPROVAL.
APPROVED: [signature]
DEVELOPMENT COORDINATOR
DATE: 7/24/17



VICINITY MAP
FT BEND COUNTY KEY MAP - 527W & 567A
GIMS TILE NO. 4853-C & 4652-A
ZIP CODE: 77498

SHEET INDEX

NOTE: CITY SIGNATURES VALID FOR ONE YEAR ONLY AFTER DATE OF SIGNATURES

LJA Engineering, Inc.
SURVEYED BY:
FB NO.:

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
[signatures] 7/23/17; 7-23-17; 7/23/17
CITY ENGINEER
DIRECTOR OF PUBLIC WORKS AND ENGINEERING [signature]
FOR CITY OF HOUSTON USE ONLY
SHEET No: 1 of 50A

DEVELOPER:
ALIANA DEVELOPMENT COMPANY
11200 RICHMOND AVENUE SUITE 280
HOUSTON, TEXAS 77082

RECORD DRAWING
I CERTIFY THAT THIS DRAWING REFLECTS THE IMPROVEMENTS CONSTRUCTED AS TO SIZE, LOCATION AND GRADE AND THAT THE CONSTRUCTION WAS IN FULL COMPLIANCE WITH THE CONTRACT DOCUMENTS
BY ________ DATE ________
TITLE ________

STATE OF TEXAS — JASON M. KELLY — 91021 — LICENSED PROFESSIONAL ENGINEER
[signature] 3/20/17
APPROVED FOR CONSTRUCTION
BY ________ DATE ________

ENGINEER:
LJA Engineering, Inc.
2929 Briarpark Drive
Suite 600
Houston, Texas 77042
Phone 713.953.5200
Fax 713.953.5026
FRN-F-1386

12" WATER LINE - PAVING WEST ALIANA TRACE DRIVE BRIDGE #1707

GENERAL CONSTRUCTION NOTES:

1. Water lines, wastewater collection systems, and drainage systems shall be constructed and tested in accordance with the City of Houston, Department of Public Works and Engineering "Standard Construction Specifications" dated October 2002, and "Standard Construction Details for Wastewater Collection Systems, Water Lines, Storm Drainage and Street Paving" dated October 2002 unless otherwise noted and approved on these plans. The design is consistent with the minimum standards established in the "City of Houston Department of Public Works and Engineering Infrastructure Design Manual" dated January 2011.
Note that plan signatures expire after 1 year and the latest editions of design rules, specifications & manuals shall govern as of the date of resigning.
2. The contractor shall be fully responsible for any and all damage to existing public or private utility lines, including but not limited to paving, water lines, wastewater collection systems and storm sewers during construction. All damages shall be repaired in accordance with City of Houston Department of Public Works and Engineering "Standard Construction Specifications" dated July 2011 with latest addenda and amendments thereto, with no cost to the public.
3. The Contractor shall notify the following at least 48 hours prior to beginning construction:
City of Houston Engineer, Dept. of Public Works & Engineering .....(832) 395-2511
The City of Houston Engineer ....(713) 316-3581
Fort Bend County Engineering Dept....... Email: CONSTRUCTION@FORTBENDCOUNTYTX.GOV
Texas One-Call – Houston Metropolitan Area..........(713) 223-4567
NOTE: A verification number is required from the L.S.N.C.
Attell ....(281) 490-9432
(S.B.C., Reliant, Warner Cable, etc.) or (800) 245-4545
Notification to City of Houston Engineer shall be followed up with a letter, a copy of which shall be sent to the Engineer.
4. Existing utility information shown is not guaranteed to be accurate and all inclusive. All existing utility locations are approximate and should be verified by the Contractor in advance of his construction. Any conflict or discrepancy discovered must be immediately brought to the Engineer's attention.
5. WARNING: Overhead lines may exist on the property. We have not attempted to mark those lines since they are clearly visible, but the contractor should locate them prior to beginning any construction. Texas Law, Section 752, Health and Safety Code, prohibits all activities in which persons or equipment may come within six feet of energized overhead power lines, and federal regulations, Title 29, Part 1910.180(1) and Part 1926.550(A)(15) require a minimum clearance of ten feet from facilities. The above laws carry both criminal and civil liabilities, with Contractors and Owners being legally responsible for the safety of workers under the laws. If the Contractor must work near overhead power lines, call (713) 228-7400 for the lines to be de-energized and/or moved at his expense.
6. Caution: Underground gas facilities. Location of Entex facilities are shown in an approximate location only. Service lines are usually not shown. The Contractor shall contact the One-Call Lone Star Notification Center at (713) 223-4567 a minimum of 48 hours prior to construction to have utilities field located. The Contractor shall determine the exact location before commencing work and agrees to be fully responsible for any damages caused by his failure to exactly locate and preserve these underground facilities.
7. Any damage to any of the existing pavement and/or utilities must be repaired immediately. The Contractor must notify the appropriate utility owner, who will make the repairs at the Contractor's expense.
8. The Contractor, on behalf of the Owner, is to obtain all permits required by Fort Bend County and The City of Houston, Texas, prior to starting construction of utilities and/or culverts within County road rights-of-way.
9. Guidelines 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.
10. The work areas with direct public access shall be barricaded and illuminated during darkness and periods of inactivity.
11. The Contractor shall be responsible for safeguarding and protecting all material and equipment stored on the job site. The Contractor shall be responsible for the storage of materials in a safe and workmanlike manner to prevent injuries, during and after working hours, until project completion and Owner acceptance.
12. The contractor shall be responsible for the shipping of all materials, the loading and unloading of all pipe, valves, hydrants, manholes and other accessories shall be in accordance with the manufacturer's recommended practices and shall at all times be performed with care to avoid any damage to the material. It shall be the contractor's responsibility to examine such material at the point of delivery and to reject all defective material. The defective material must be replaced with sound material.
13. The Contractor shall be responsible for the shipping and storing of all materials. It shall be the Contractor's responsibility to examine such material at the point of delivery and to reject all defective material. Any defective material incorporated into the work shall be removed and replaced at the Contractor's expense. There shall be no payment made for stored material.
14. All pipe and reinforcement steel shall be kept free of dirt and other debris. Any damage to the coating of the various materials must be repaired.
15. Contractor shall be responsible for maintaining adequate and positive drainage at all times during construction of proposed facilities. Natural ground adjacent to utility trench excavation to be grubbed prior to placement of excess trench material. (No separate payment.)
16. Access to all existing streets and driveways shall be maintained at all times.
17. The Contractor is required to follow all applicable OSHA rules and regulations. Trench safety shall be done in accordance with OSHA 29 CFR Part 1926, as published in the Federal Register October 31,1989, and effective January 2, 1990.
18. Unless otherwise noted, placement of utilities in easements shall be governed by the standard 10' and 14' easements as adopted by the Utility Coordinating Committee for the Houston Metropolitan Area, as currently ammended or revised.
19. No connections shall be made to existing water lines or sanitary sewers until all proposed lines or sewers have been thoroughly cleaned, tested, and approved by the Engineer.
20. All stations are centerline of street right-of-way unless otherwise noted.
21. All geotechnical reports for this project (if any) are available for reference at the office of the Engineer.
22. Surface restoration: At the end of all construction projects, the Contractor shall restore the existing facilities, i.e., the property, equal to or better than existing site conditions prior to construction.
23. Final acceptance of the utilities will not be given to the Contractor until they are inspected and approved by The FBC MUD 134C. Final acceptance of the paving will not be given to the Contractor until it is inspected and approved by Fort Bend County.
24. See the Erosion Control Plan and Sediment Control Layout for additional environmental notes and details.
25. These plans were prepared to meet or exceed City of Houston and Fort Bend County subdivision rules and regulations as currently amended.
26. Construction will be monitored by a registered Professional Engineer to insure compliance with the construction plans and specifications.
27. Approval by City of Houston will be deemed void if construction is not begun within one year of approval.
28. Contractor shall prepare a set of "Record" drawings showing any field changes made to the approved engineering plans and submit to the Design Engineer for submission to City Engineer.
29. All utilities presented on these drawings are shown based on the best available information. contractor shall verify in the field the exact locations prior to commencing construction. contractor shall notify Texas one call at 713-223-4567 at least 48 hours before proceeding with any excavation.
30. Manholes shall be City of Houston Standard Precast as per City of Houston Standard Drawings 02082-02 and 02082-03 or as currently amended. All manholes must be precast with the base slab reinforced with No. 4 re-bars (grade 40) at 12" on center, each way. Brick manholes are not allowed.
31. Contractor shall take necessary precautions to protect root systems of shrubs, plants and trees along the area of excavation.
32. All unsatisfactory and\or waste materials including vegetation, roots, concrete and debris shall be disposed of offsite by the contractor. no direct payment will be made, but shall be considered as incidental to the various bid proposal items.
33. All manholes are to be constructed to allow for a minimum of 1 foot of vertical adjustment.
34. All sewer trenches under or within one foot of proposed and/or future pavement or curb shall be backfilled with 1-1/2 sacks of cement per cubic yard cement-stabilized sand to a point one foot below pavement subgrade. the remaining backfill shall be made with compacted suitable material.
35. Contractor shall remove all mud, dirt and debris deposited or dropped on existing pavement due to his construction activity daily.
36. The use of well point systems, when required by trench conditions, shall be requested by the contractor and approved by the engineer.
37. Contractor shall protect all trees adjacent to work area. no trees shall be removed without permission of owner.
38. Contractor shall provide 12" minimum clearance at storm sewer, sanitary sewer and water line crossings.
39. All areas disturbed along side and back-of-lot easements or other unnecessary disturbances as a result of construction work shall be seeded and fertilized in accordance with seeding specifications (no separate pay).
40. Rim elevations shown on the plans are approximate only. utility contractor shall adjust rim elevations to 3.5 inches above the finished grade at each manhole location after pavement contractor has completed final grading (no separate pay). sloped fill shall be added for storm water drainage away from the manhole rim.
41. Contractor shall be responsible for providing adequate flag men, signing, striping and warning devices, etc., during construction both day and night in accordance with the "manual on uniform traffic control devices."
42. Water, sanitary sewer, and drainage contractor shall at completion of his work fill and grade all utility easements (wet and dry) as well as low spots in lots for positive drainage, as directed by the owner. (no separate pay)
43. Utility contractor shall provide temporary silt barrier fence on all non-curb inlets which will remain in place after underground contract is complete.
44. Utility contractor shall provide silt barrier fence on all stage I curb inlets. (no separate pay)

SANITARY SEWER CONSTRUCTION NOTES:

1. Manholes shall be City of Houston Standard Precast as per City of Houston Standard Drawings as currently amended. All manholes must be precast with the base slab reinforced with No. 5 re-bars (grade 40) at 6" on center, each way. Brick manholes are not allowed.
2. All sanitary sewer pipe and associated appurtenances shall conform to the following requirements:
SINGLE WALL PVC
Pipe: 6" through 12" PVC, SDR 26, ASTM D-3034 (PS 160)
Fittings: 6" through 24" PVC, SDR 26, ASTM D-3034
Gaskets: Elastomeric gaskets conforming to the requirements of ASTM F-477
Joints: shall be push-on, rubber gasket joints of the integral bell and spigot type and ASTM D-3212 for 15" through 24" pipe.
PVC Material: cell classification 12454B as defined in ASTM D-1784.
DUCTILE IRON PIPE
Ductile Iron (D.I.P.) shall be used only when specifically called for in the plans and shall conform with AWWA C151 and AWWA C111 with bell and spigot push-on joints. D.I.P. shall have an interior coating of 40 mils polyethylene. Special thickness class 50 for pipes less than 30' deep and class 52 for pipes greater than 30' deep.
DOUBLE WALL PVC 30" A2000 ASTM F949
Polyvinyl Chloride (PVC) sanitary sewer fittings shall be manufactured and tested in accordance with AASHTO Specification M304-91.Corrugated polyethylene pipe and fittings shall be manufactured and tested in accordance with AASHTO Specification M294-91, Type S.
The structural design of thermoplastic pipes shall be in accordance with AASHTO Standard Specifications for Highway Bridges: Section 18 titled: "Soil-Thermoplastic Pipe Interaction Systems". To ensure long term design strength properties, polyethylene pipe shall be manufactured from 335434C, 315412C or 334433C cell class material per ASTM D3350. PVC pipe shall be manufactured from 12454B, 12454C or 12364C cell class material per ASTM D1784.
3. All P.V.C. sanitary sewer pipes shall be installed per City of Houston Standard Drawing 02317-03 unless noted otherwise. No separate pay.
4. All D.I.P. for the proposed pipes should be encased in 8 mil polyethylene tubing. Where polyethylene tubing cannot be used, coat outside of pipe with polyethylene. No separate pay.
5. Sanitary sewers located under or within one-foot of proposed or future paving shall be backfilled with cement stabilized sand (1.5 sacks/cubic yard) to within one foot of pavement. Lab verification shall be submitted to City of Houston Engineer prior to pavement construction.
6. All gravity sanitary sewers shall be air tested per specifications.
7. Deflection tests shall be performed on all flexible and semi-rigid pipe, except service leads. The test shall be conducted after the final backfill has been in place at least 30 days. No pipe shall exceed a deflection of 5%. The test is to be run using a mandrel having an outside diameter equal to 95% of the average inside diameter of the pipe. The mandrel shall have a minimum of 9 runners, with the contact length of each runner equal to or greater than the pipe's nominal diameter. The test shall be performed without mechanical pulling devices.
8. All sanitary sewer manhole rims shall to be set 3" to 6" above surrounding finished grade, with sloped fill added for storm water drainage away from the manhole rim and only pre-cast manholes are allowed in this project.
9. All sanitary sewer manholes shall have inflow protectors installed after final adjustment of manhole rims. (No Separate Pay.)
10. Sanitary lines parallel to water lines shall be installed with at least a 9-foot clearance and in separate trenches.
(A) If clearance is less than 2 feet:
1) Minimum 18-foot joint of AWWA C-900 DR18 pvc pipe centered at the water line, 1-foot absolute minimum clearance.
(B) If clearance is between 2 to 9 feet:
1) Use cement stabilized sand backfill for the wastewater line (minimum 2.5 sacks cement per cubic yard of sand) starting at a point 6 inches below the bottom of sanitary sewer to 6 inches above the top of sanitary sewer. Center one joint of sanitary sewer pipe about the water line.
11. All sanitary service leads shall be 6" dia. min. and laid with a minimum grade of 0.70%.
12. In wet sand construction, bedding and backfill for wet sand construction of sanitary sewer as per City of Houston Dwg. No. 02317-01.
13. All manholes shall be tested for leakage in accordance with the Technical Specifications.
14. Prior to sanitary sewer construction, the contractor shall contact the Department of Public works and Engineering at (713) 535-7675 or (713) 535-7660 and comply with all requirements for the issuance of necessary permits/work orders.
15. When making a connection to an existing sanitary sewer manhole the contractor shall plug down stream and at the proposed sanitary sewer. The sewer shall remain plugged until final acceptance by City of Houston.
16. Where a new sanitary pipe crosses a new, pressure rated waterline, one segment of the sanitary pipe shall be centered over the water line such that the joints of the sanitary pipe are equidistant and at least nine feet horizontally from the centerline of the water line. The sanitary sewer pipe in this instance shall be constructed of AWWA C-900 DR18 pvc. Where AWWA C-900 pvc pipe will be connected to SDR26, ASTM 3034 sanitary sewer pipe. The contractor shall provide a suitable adapter to make the proper connection.
17. Sanitary sewer bedding at waterline crossings must contain cement stabilized sand backfill (2.5 sack cement per cubic yard min), 9-feet on either side of the waterline crossing.
18. All pavement shall be 5 1/2 sack – 3500 psi ; concrete 28 days.

STORM DRAINAGE CONSTRUCTION NOTES:

1. All storm sewers shall be reinforced concrete pipe, ASTM C-76, Class III and shall be installed, bedded, and backfilled in accordance with the City of Houston drawing Nos. 02317-02, 02317-03, 02317-05, 02317-06, and 02317-07(Oct. 2002) as applicable unless otherwise shown on the drawings.
2. All storm sewer constructed in side lot easement shall be R.C.P. (C-76, Class III) and shall be bedded in accordance with the City of Houston drawing Nos. 02317-02, 02317-03, 02317-05, 02317-06 and 02317-07 as applicable.
3. All sewer under proposed or future pavement and to a point (1) foot back of all proposed or future curbs shall be backfilled with 1-1/12 sack cement per c.y. stabilized sand to within one (1) foot of subgrade. The remaining depth of trench shall be backfilled with suitable earth material.
4. All trench backfills shall be in 8" lifts, with tests taken at 100 foot intervals on each lift, and mechanically compacted to a density of not less than 95% of the maximum dry density as determined by the standard proctor compaction test (ASTM D-698/AASHTO T99).
5. Circular and elliptical reinforced concrete pipe shall be installed using rubber gasket joints conforming to ASTM C443 and ASTM C877 respectively.
6. All storm sewer pipes and inlet leads shall be 24-inch and larger R.C.P. (C-76, Class III) unless otherwise noted on plans.
7. All proposed pipe stub-outs from manholes and inlets are to be plugged with 8" brick walls unless otherwise noted.
8. Contractor shall provide 12" minimum clearance at storm sewer and water line crossings.
9. Adjust Manhole covers to grade conforming to requirements of section 02086-adjusting manholes, inlets and valve boxes to grade.(No separate pay)
10. The contractor shall be responsible for protecting, maintaining, and restoring any back slope drainage system disturbed as a result of his/her work.
11. All ditches shall be regraded to proposed elevations to insure proper drainage. All outfalls shall be properly backfilled and compacted. All disturbed area shall be regraded, seeded, and fertilized.
12. All driveways shall be located to avoid existing curb inlet structures.

PAVING CONSTRUCTION NOTES:

1. All paving shall be constructed in accordance with Fort Bend County and Fort Bend County requirements for hot-mix asphalt pavement as currently amended.
2. All temporary and permanent signage must comply with the "Texas Manual on Uniform Traffic Control Devices" as currently amended. All R1-1 stop signs shall be 30"x30" with diamond grade sheeting.
3. All road widths, curb radii, and curb alignment shown indicate back of curb. T.C. indicates top of curb. T.P. indicates top of pavement elevations.
4. All intersection curb return radii shall be 25 feet and all cul-de-sac return radii shall be 35 feet unless noted otherwise.
5. Transverse expansion joints shall be installed at each curb return and at a maximum spacing of 60 feet.
6. When a 6" thick concrete roadway intersects with a 6" thick concrete roadway, 6" thick concrete shall be constructed for the entire intersection, to the ends of all curb returns.
7. The paving Contractor shall protect all utilities and shall repair or replace at his expense any facilities damaged during paving or grading operations. All manholes and valves within the pavement area shall be adjusted to finished grade by the paving Contractor.
8. The paving Contractor shall clear and strip all lots and street rights-of-way of all organics (vegetation, roots 2" and greater, organic soil layer) at no separate pay. The vegetation, roots, etc. must be properly disposed of offsite. The organic soil (top soil) must be stockpiled during construction and used as top dressing to provide the minimum lot elevations shown on the Grading Plan.
9. Areas to be filled shall be scarified and compacted to at least 95% of maximum density per ASTM D-698, to a depth of 6" prior to fill placement. Fill material shall be placed in maximum 8" thick lifts (measured loose) and compacted to at least 95% of maximum density per ASTM D-698. Moisture content shall be within +3% of optimum unless otherwise directed by owner's testing lab or the Engineer. Fill shall be clean earth, sand, or a combination, and be free from trash, vegetation and large stones.
10. The 8-inch subgrade is to be scarified, lime stabilized (amount as determined by lab test) and compacted to 95% standard proctor density per ASTM D698.
11. Necessary testing of subgrade and asphalt pavement to prove that these items meet requirements shall be done by a commercial testing laboratory approved by the Engineer.
12. Reinforcement steel for pavement shall be supported with plastic chairs at 24-inch maximum spacing, each way.
13. A continuous longitudinal reinforcing bar shall be used in the curbs.
14. Street name signs (for all streets) shall be located atop each stop sign at all intersections. Refer to recorded plat for correct spelling of street names. Street Names shall be upper and lower case letters w/diamond grade sheeting.
15. Concrete design mix and test data shall be submitted to Fort Bend County Engineer for approval.
16. Double reflectorized blue traffic markers shall be placed 6 inches offset of the centerline at all flushing valve locations by the paving contractor. Flushing valves located at intersections shall have a button placed on each street. No separate pay.
17. ADA – Handicap Ramps shall be installed with street paving at all intersections and comply to current A.D.A. regulations. Specification PED-12A.
18. The only authority permitted to add water to a concrete truck must come from the testing company or a representative of LJA Engineering Inc. Inc.
19. Concrete curb shall be 6" curb unless otherwise noted. See detail sheet title "PAVING DETAILS") 4"x12" Conc. Curb. to be placed in front of single family lots only.
20. Paving shall be in accordance with FORT BEND COUNTY "Rules, Regulations and Requirements Relating to the Approval and Acceptance of Improvements in Subdivisions or Resubdivisions" and or amendments of same.
21. Contractor shall notify Steve Evans (281-633-7514), Fort Bend County Engineer, 48 hours prior to construction and 24 hours prior to paving operation including sub-grade preparation, lime stabilization and placement of concrete pavement.

PERMIT NOTES

1. CONTRACTOR TO OBTAIN ALL PERMITS REQUIRED BY REGULATION OF CITY OF HOUSTON AND FORT BEND COUNTY, TEXAS FOR FLOOD PLAIN MANAGEMENT PRIOR TO STARTING CONSTRUCTION.
2. OWNER TO OBTAIN ALL PERMITS REQUIRED BY CITY OF HOUSTON AND FORT BEND COUNTY, TEXAS PRIOR TO STARTING CONSTRUCTION OF UTILITY AND/OR CULVERTS WITHIN FORT BEND COUNTY ROAD RIGHTS-OF-WAY. CONTACT JOHNNY ORTEGA 281-633-7502

CAUTION: UNDERGROUND GAS FACILITIES

LOCATIONS OF CENTERPOINT ENERGY MAIN LINES (TO INCLUDE CENTERPOINT ENERGY, INTRASTATE PIPELINE LLC. WHERE APPLICABLE) ARE SHOWN IN AN APPROXIMATE LOCATION ONLY. SERVICE LINES ARE USUALLY NOT SHOWN. CENTERPOINT SIGNATURES ON THESE PLANS ONLY INDICATES THAT ITS FACILITIES ARE SHOWN IN APPROXIMATE LOCATION. IT DOES NOT IMPLY THAT A CONFLICT ANALYSIS HAS BEEN MADE. THE CONTRACTOR SHALL CONTACT THE UTILITY COORDINATING COMMITTEE AT (713) 223-4567 OR 1-800-669-8344 A MINIMUM OF 48 HOURS PRIOR TO CONSTRUCTION TO HAVE MAIN AND SERVICE LINES FIELD LOCATED.

- WHEN CENTERPOINT ENERGY PIPELINE MARKINGS ARE NOT VISIBLE, CALL (713) 967-8037 (7:00 A.M. TO 4:30 P.M.) FOR STATUS OF LINE LOCATION REQUEST BEFORE EXCAVATION BEGINS.
- WHEN EXCAVATING WITHIN EIGHTEEN INCHES (18") OF THE INDICATED LOCATION OF CENTERPOINT ENERGY FACILITIES, ALL EXCAVATION MUST BE ACCOMPLISHED USING NON-MECHANIZED EXCAVATION PROCEDURES.
- WHEN CENTERPOINT ENERGY FACILITIES ARE EXPOSED, SUFFICIENT SUPPORT MUST BE PROVIDED TO THE FACILITIES TO PREVENT EXCESSIVE STRESS ON THE PIPING.

THE CONTRACTOR IS FULLY RESPONSIBLE FOR ANY DAMAGES CAUSED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE THESE UNDERGROUND FACILITIES.

WARNING: OVERHEAD ELECTRICAL FACILITIES

OVERHEAD LINES MAY EXIST ON THE PROPERTY. WE HAVE NOT ATTEMPTED TO MARK THOSE LINES SINCE THEY ARE CLEARLY VISIBLE. BUT YOU SHOULD LOCATE THEM PRIOR TO BEGINNING ANY CONSTRUCTION. TEXAS LAW, SECTION 752, HEALTH AND SAFETY CODE, FORBIDS ALL ACTIVITIES IN WHICH PERSONS OR THINGS MAY COME WITHIN SIX (6) FEET OF LIVE OVERHEAD HIGH VOLTAGE LINES. PARTIES RESPONSIBLE FOR THE WORK, INCLUDING CONTRACTORS, ARE LEGALLY RESPONSIBLE FOR THE SAFETY OF CONSTRUCTION WORKERS UNDER THIS LAW. THIS CARRIES BOTH CRIMINAL AND CIVIL LIABILITY. TO ARRANGE FOR LINES TO BE TURNED OFF OR REMOVED CALL CENTERPOINT ENERGY AT (713) 207-2222

REVISED 2008

CAUTION: AT&T FACILITIES

The Location of Southwestern Bell Telephone Company utility are no longer provided by AT&T and are NOT shown on these drawings. The contractor shall determine the exact location of these utilities prior to commencing work and agrees to be fully responsible for any and all damages caused by its failure to exactly locate and preserve these underground facilities. To have these facilities located call the Utility Coordinating Committee at (713) 223-4567, or toll free at 1-(800) 669-8344 at least 48 hours prior to any construction.

WARNING: UNDERGROUND ELECTRICAL FACILITIES

Underground electrical facilities exist in the area of this project. Do not begin construction until these facilities have been located and staked. To have these underground facilities staked call the Utility Coordinating Committee at (713) 223-4567, or toll free at 1-(800) 669-8344, at least 48 hours prior to any construction.

TRAFFIC NOTES

1. CONTRACTOR SHALL PROVIDE AND INSTALL TRAFFIC CONTROL DEVICES IN CONFORMANCE WITH PART VI OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TEXAS MUTCD, MOST RECENT EDITION WITH REVISIONS) DURING CONSTRUCTION.
2. LANE CLOSURE PERMITS ARE TO BE OBTAINED WHEN REQUIRED (SEE NOTE 7)
a. NO LANES SHALL BE CLOSED DURING THE HOURS OF 5:30 AM TO 7:00 PM MONDAY THRU FRIDAY IN DOWNTOWN/MIDTOWN AREA.
b. NO LANES SHALL BE CLOSED DURING THE HOURS OF 7:00 AM TO 9:00 AM AND 4:00 PM TO 6:00 PM MONDAY THRU FRIDAY.
c. NO LANES SHALL BE CLOSED IN RESIDENTIAL AREA FROM 7:00 PM TO 7:00 AM.
3. CONTRACTOR SHALL COVER EXCAVATIONS WITH STEEL PLATES, ANCHORED PROPERLY, DURING NON-WORKING HOURS AND OPEN LANES FOR TRAFFIC FLOWS.
4. IF THE CONTRACTOR DESIRES TO BLOCK A LANE FOR WHICH NO "TRAFFIC CONTROL PLANS" WERE SUBMITTED, (S)HE SHALL SUBMIT REPRODUCIBLE MYLARS SEALED AND SIGNED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF TEXAS TO PLAN REVIEW SECTION WITH THE ENTIRE APPROVED SET OF DRAWINGS FOR APPROVAL TEN WORKING DAYS PRIOR TO CONSTRUCTION.
5. IF THE CONTRACTOR CHOOSES TO USE A DIFFERENT METHOD OF "TRAFFIC CONTROL PLANS" DURING CONSTRUCTION THAN WHAT IS OUTLINED IN THE CONTRACT DRAWINGS, (S)HE SHALL BE RESPONSIBLE TO SUBMIT AN ALTERNATE SET OF REPRODUCIBLE MYLARS SEALED AND SIGNED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF TEXAS WITH THE ENTIRE APPROVED SET OF DRAWINGS TO PLAN REVIEW SECTION FOR APPROVAL TEN WORKING DAYS PRIOR TO IMPLEMENTATION.
6. APPROVED COPIES OF "TRAFFIC CONTROL PLANS" AND LANE/SIDEWALK CLOSURE PERMITS SHALL BE AVAILABLE FOR INSPECTION AT JOB SITE ALL TIMES.
7. THE REQUEST MUST BE MADE AT LEAST THREE DAYS PRIOR TO THE DATE FOR WHICH THE CLOSURE IS SOUGHT. CALL 281-633-7502 FOR AN APPLICATION.

SPECIAL TRENCH BACKFILL NOTE:

All trench backfill for utilities shall be compacted to at least 95% of maximum density per ASTM D-698. Moisture content shall be within + 3% of optimum. Densities shall be taken at approximate 100-foot intervals for each lift, or as recommended by the testing lab,or as otherwise directed by the Engineer. The testing lab shall be paid by the owner except retests required due to the failure of the first test shall be paid by the Contractor. Lifts shall be 8-inch maximum, measured loose. All trench backfill shall be considered subsidiary to the pipe.

WATERLINE CONSTRUCTION NOTES:

1. PRIOR TO WATER MAIN ADJUSTMENT, THE INSTALLATION OF WATER METERS AND LEADS OR UNMETERED SPRINKLER LINES, THE CONTRACTOR SHALL CONTACT WATER TAPS AND METERS SECTION AT 713-535-7875 FOR DETAILS OF PERMITS AND BONDS.
2. PRIOR TO WATER MAIN CONSTRUCTION, THE CONTRACTOR SHALL CONTACT THE DEPARTMENT OF PUBLIC WORKS AND ENGINEERING AT 713-837-7024 AND COMPLY WITH ALL REQUIREMENTS NECESSARY FOR THE ISSUANCE OF A WORK ORDER FOR THEISSUANCE OF A WORK ORDER FOR THE WATER MAIN CONSTRUCTION.
3. Unless otherwise noted, all water lines 12" and smaller shall have a minimum of 4' of cover, and water lines 16" and larger shall have a minimum of 5' of cover.
4. All waterlines, after installation, shall be thoroughly disinfected according to AWWA Specification C-651 and then flushed before being placed into service. Water samples will be collected for bacteriologic analysis and must meet the Texas State Department of Health and City of Houston requirements prior to placing the lines into service.
5. All waterlines are to be hydrostatically tested by the Contractor at 125 psi in accordance with City of Houston.
6. Pipe material (if not a steel section) shall be either PVC AWWA C-900 or mortar-lined ductile iron AWWA C-151 and AWWA C-111, with bell and spigot push-on joints. PVC shall be DR 18, Class 150. DIP 4" and larger shall be standard Class 350. DIP 4" is not allowed.
7. All water mains under street pavement, if not steel section, shall be PVC pipe.
8. Concrete thrust blocks shall be provided at all underground tees, bends and laterals. They shall be built as per the details provided to prevent pipe movement.
9. All above ground ductile iron pipe connections shall be flanged. Underground ductile iron pipe connections shall be boltless and push-on after the first flanged fitting below grade unless noted otherwise on the plans.
10. All flanges below grade shall have stainless steel bolts and nuts.
11. All water valves shall open clockwise. All water valves shall be supplied and installed in accordance with the latest edition of AWWA C-500 and shall be of the resilient seat type.
12. All below grade valves shall be gasketed, hub-end gate valves with a cast iron box, except where flanges are called out on the plans.
13. All flanges below grade shall be insulated.
14. All waterlines shall be encased in bank sand to at least 6" above the pipe. Cost of bank sand to be included in unit price of waterline.
15. Waterline trenches under pavement or within one foot of proposed curbs shall be backfilled with cement stabilized sand (1-1/2 sacks/cubic yard) up to within one foot of pavement. Cost of backfill shall not be paid directly but shall be included in the unit price of waterline.
16. Maintain minimum 9-foot horizontal clearance between outside of sanitary sewer manhole and waterline.
17. Water lines parallel to sanitary lines shall be installed with at least a 9-foot clearance and in separate trenches.
18. Center of fire hydrant to be located 3'-0" from back of curb with center line of steamer nozzle 22-inches above finished grade, unless otherwise shown.
19. Waterline shall be constructed such that all crosses and tees will not be located under proposed or future paving.
20. Utility contractor to turn fire hydrants and make all final adjustments after completion of paving. No separate pay.
21. Reclaimed waterline pipe material shall be PVC AWWA C-900 with bell and spigot push-on joints. PVC shall be dr18, Class 150 ("Purple Pipe").
22. It is the Contractor's obligation to ensure proper product selection in order to meet design radii shown in the plans for water line bends whilst not exceeding manufacturer's specifications for bending and deflection.

FORT BEND COUNTY CONSTRUCTION – GENERAL NOTES

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@FORTBENDCOUNTYTX.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 5 ½ SACK CEMENT WITH A MINIMUM COMPRESSIVE STRENGTH OF 3500 PSI AT 28 DAYS. TRANSVERSE EXPANSION JOINT 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"X12" REINFORCED CONCRETE CURB SHALL BE PLACED IN FRONT OF SINGLE FAMILY LOTS ONLY. ALL OTHER AREAS SHALL BE 6" REINFORCED CONCRETE CURB.
10. AT ALL INTERSECTION LOCATIONS, TYPE 7 RAMPS SHALL BE PLACE IN ACCORDANCE WITH TXDOT PED-12A STANDARD DETAIL SHEET. A.D.A. – HANDICAP RAMPS SHALL BE INSTALLED WITH STREET PAVING AT ALL INTERSECTIONS AND COMPLY WITH CURRENT A.D.A. REGULATIONS.
11. CURB HEADERS ARE REQUIRED AT CURB CONNECTIONS TO HANDICAP RAMPS, WITH NO CONSTRUCTION JOINT WITHIN 5' OF RAMPS.
12. ALL INTERSECTIONS UTILIZING TRAFFIC CONTROL MEASURES SHALL HAVE A.D.A. WHEEL CHAIR RAMPS INSTALLED.
13. 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.
14. ALL R1-1 STOP SIGNS SHALL BE 30"X30" WITH DIAMOND GRADE SHEETING. STREET NAME SIGNS SHALL BE UPPER AND LOWER CASE LETTERS WITH DIAMOND GRADE SHEETING.
15. 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.
16. 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.

NOTE: FORT BEND COUNTY NOTES SUPERSEDE ANY CONFLICTING NOTES.

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, REQUIREMENTS AND SPECIFICATIONS OF FORT BEND COUNTY OR ANY PROVISIONS OF THIS PROJECT SHALL BE CONSTRUED TO IMPLY AN ACCEPTANCE OF SUCH WORK OR TO RELIEVE THE CONTRACTOR OF ANY OF ITS OBLIGATIONS HEREUNDER.

GULF COAST WATER AUTHORITY – GENERAL NOTES

1. CONTRACTOR MUST CONTACT DAVID SAUER AT 281-932-1039 14 DAYS PRIOR TO MOBILIZATION.
2. CONTRACTOR MAY NOT RESTRICT OR IMPEDE FLOW OF WATER IN OYSTER CREEK.
3. CONTRACTOR TO PROVIDE ACCESS TO OYSTER CREEK AS NECESSARY DURING CONSTRUCTION.
4. GCWA TO BE INVITED TO ALL PRE-CONSTRUCITON AND PROGRESS MEETINGS.
5. GCWA USES OYSTER CREEK TO CONVEY THE WATER SUPPLY TO SEVERAL DRINKING WATER PURIFICATION PLANTS. COORDINATE TEMPORARY DIVERSION OF THE FLOW OF WATER IN OYSTER CREEK WITH GCWA. DO NOT INSTALL DAMS OR TEMPORARY CULVERTS FOR CROSSINGS WITHOUT PRIOR APPROVAL FROM GCWA.

STATE OF TEXAS
JASON M. KELLY
91021
LICENSED PROFESSIONAL ENGINEER

BENCHMARK:
A-1212 – BRASS DISK, STAMPED A-1212 1973, SET IN THE TOP OF A CONCRETE HEADWALL ON THE WEST BOUND LANES OF HWY 90A, APPROX. 4.1 MILES WEST ALONG HWY 90A FROM THE JUNCTION OF HWY 6, IN SUGARLAND, TEXAS. THE DISK IS SET 2.0 FEET EAST OF THE WEST END, OF THE NORTH CONCRETE HEADWALL, AND 27.0 FEET NORTH OF THE CENTERLINE OF THE WESTBOUND LANES, AND ½FOOT LOWER THAN THE ROAD.

ELEV. = 78.85 FEET (NGVD-29) 1973 ADJ.

TBM: 6-TOP OF A CHISELED BOX SET ON THE NORTHERN NOSE OF A MEDIAN AT FM 1464. THE POINT IS LOCATED ± 1,460 FEET NORTH OF THE CENTERLINE OF THE INTERSECTION OF FM 1464 AND W AIRPORT BLVD AND ± 40 FEET EAST OF THE WEST EDGE OF CONCRETE PAVEMENT FOR THE SOUTHBOUND LANE OF FM 1464.

ELEV. = 88.55 FEET (NGVD-29) 1973 ADJ.

NOTES:
HL 93 LOADING

RECORD DRAWING
I CERTIFY THAT THIS DRAWING REFLECTS THE IMPROVEMENTS CONSTRUCTED AS TO SIZE, LOCATION AND GRADE AND THAT THE CONSTRUCTION WAS IN FULL COMPLIANCE WITH THE CONTRACT DOCUMENTS
BY ____________ DATE ________
TITLE ____________

FORT BEND COUNTY ENGINEERING DEPARTMENT
APPROVED: [signature]
DEVELOPMENT COORDINATOR
DATE: 7/31/17

DATE	REVISION	BY

PLAT NAME:
WEST ALIANA TRACE DRIVE
CPC 101 FILE NO.
C.O.H. LOG NO. 16-

ALIANA DEVELOPMENT COMPANY

WEST ALIANA TRACE DRIVE BRIDGE

GENERAL NOTES

LJA Engineering, Inc.
2929 Briarpark Drive
Suite 600
Houston, Texas 77042
Phone 713.953.5200
Fax 713.953.5026
FRN - F-1386

LJA PROJECT NO.: 1968-1050

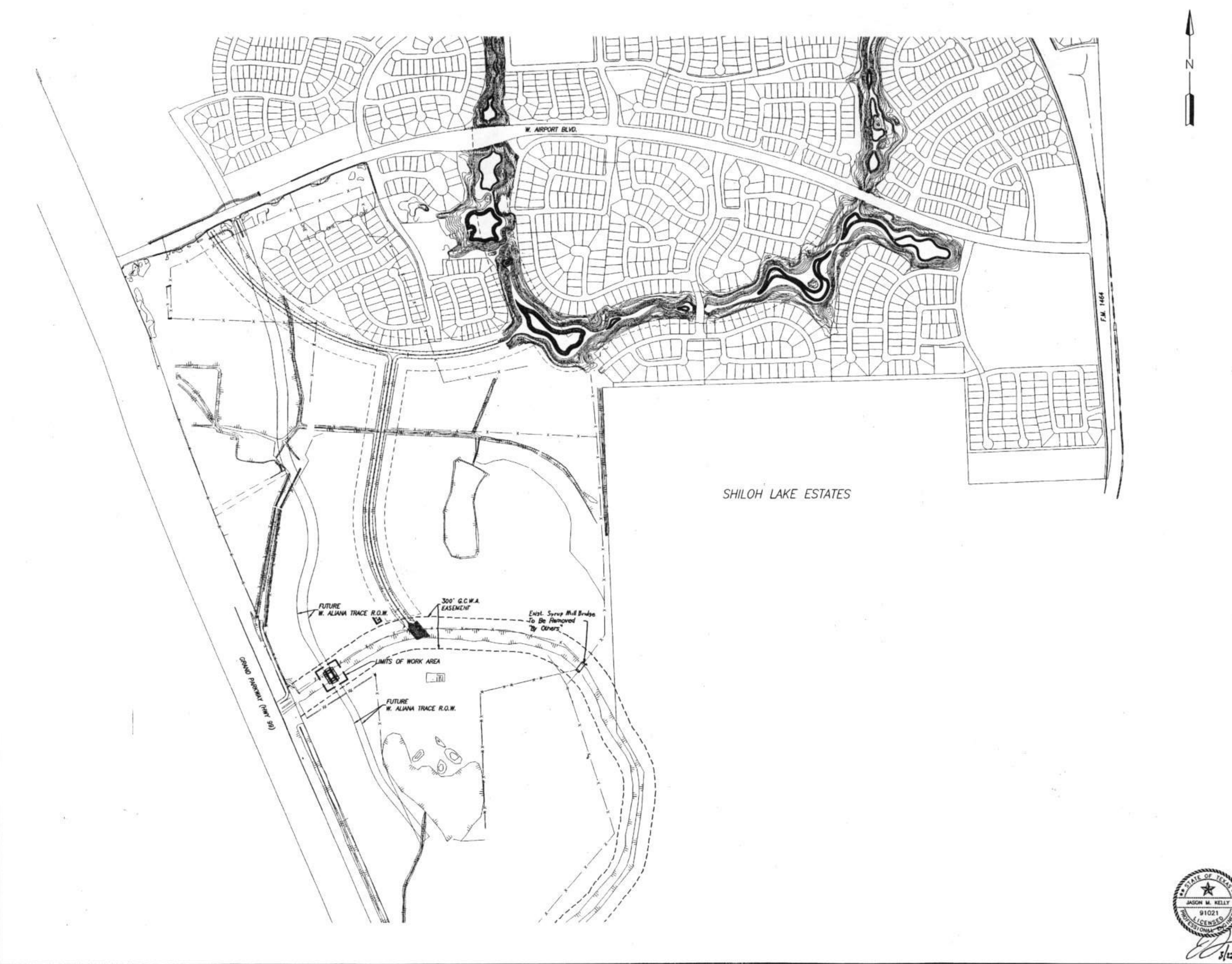
DESIGNED BY:	DRAWN BY:	DATE:
AA	AA	

NOTE: CITY SIGNATURES VALID FOR ONE YEAR ONLY AFTER DATE OF SIGNATURES

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
WATER: [signature] 03/23/17 — STREET & BRIDGE
WASTEWATER: [signature] 3-23-17 — TRAFFIC
STORM: [signature] 3/23/17 — STORM WATER QUALITY
FACILITIES

FILE NO. — FOR CITY OF HOUSTON USE ONLY
DRAWING SCALE
SCALE: NONE
SHEET NO. 2 of 50

Date\Time : Wed, 22 Mar 2017 – 11:26am User Name: aapiesse
Path\Name : F:\Proj\1968\1050\ACAD_Sheet_Files\02-WAliana_Trace-Notes.dwg



BENCHMARK:

A-1212 - BRASS DISK, STAMPED A-1212 1973, SET IN THE TOP OF A CONCRETE HEADWALL ON THE WEST BOUND LANES OF HWY 90A, APPROX. 4.1 MILES WEST ALONG HWY 90A FROM THE JUNCTION OF HWY 6, IN SUGARLAND, TEXAS. THE DISK IS SET 2.0 FEET EAST OF THE WEST END, OF THE NORTH CONCRETE HEADWALL, AND 27.0 FEET NORTH OF THE CENTERLINE OF THE WESTBOUND LANES, AND ½FOOT LOWER THAN THE ROAD.

ELEV. = 78.65 FEET (NGVD-29) 1973 ADJ.

TBM:

TBM 6-TOP OF A CHISSLED BOX SET ON THE NORTHERN NOSE OF A MEDIAN AT FM 1464. THE POINT IS LOCATED ± 1,460 FEET NORTH OF THE CENTERLINE OF THE INTERSECTION OF FM 1464 AND W AIRPORT BLVD AND ± 40 FEET EAST OF THE WEST EDGE OF CONCRETE PAVEMENT FOR THE SOUTHBOUND LANE OF FM 1464.

ELEV. = 88.55 FEET (NGVD-29) 1973 ADJ.

NOTES:

HL 93 LOADING

RECORD DRAWING

I CERTIFY THAT THIS DRAWING REFLECTS THE IMPROVEMENTS CONSTRUCTED AS TO SIZE, LOCATION AND GRADE AND THAT THE CONSTRUCTION WAS IN FULL COMPLIANCE WITH THE CONTRACT DOCUMENTS

BY __________ DATE __________

TITLE __________

FORT BEND COUNTY ENGINEERING DEPARTMENT

APPROVED: [signature]
DEVELOPMENT COORDINATOR

DATE: 7/24/17

DATE	REVISION	BY

PLAT NAME:
WEST ALIANA TRACE DRIVE
CPC 101 FILE NO.
C.O.H. LOG NO. 16-

ALIANA DEVELOPMENT COMPANY

WEST ALIANA TRACE DRIVE BRIDGE

OVERALL LAYOUT

LJA Engineering, Inc.
2929 Briarpark Drive
Suite 600
Houston, Texas 77042
Phone 713.953.5200
Fax 713.953.5026
FRN - F-1386

LJA PROJECT NO.: 1968-1050

DESIGNED BY: AA | DRAWN BY: AA | DATE:

NOTE: CITY SIGNATURES VALID FOR ONE YEAR ONLY AFTER DATE OF SIGNATURES

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER: [signature] 03/23/17 | STREET & BRIDGE
WASTEWATER: [signature] 3-22-17 | TRAFFIC
FACILITIES: [signature] 3/23/17 | STORM WATER QUALITY

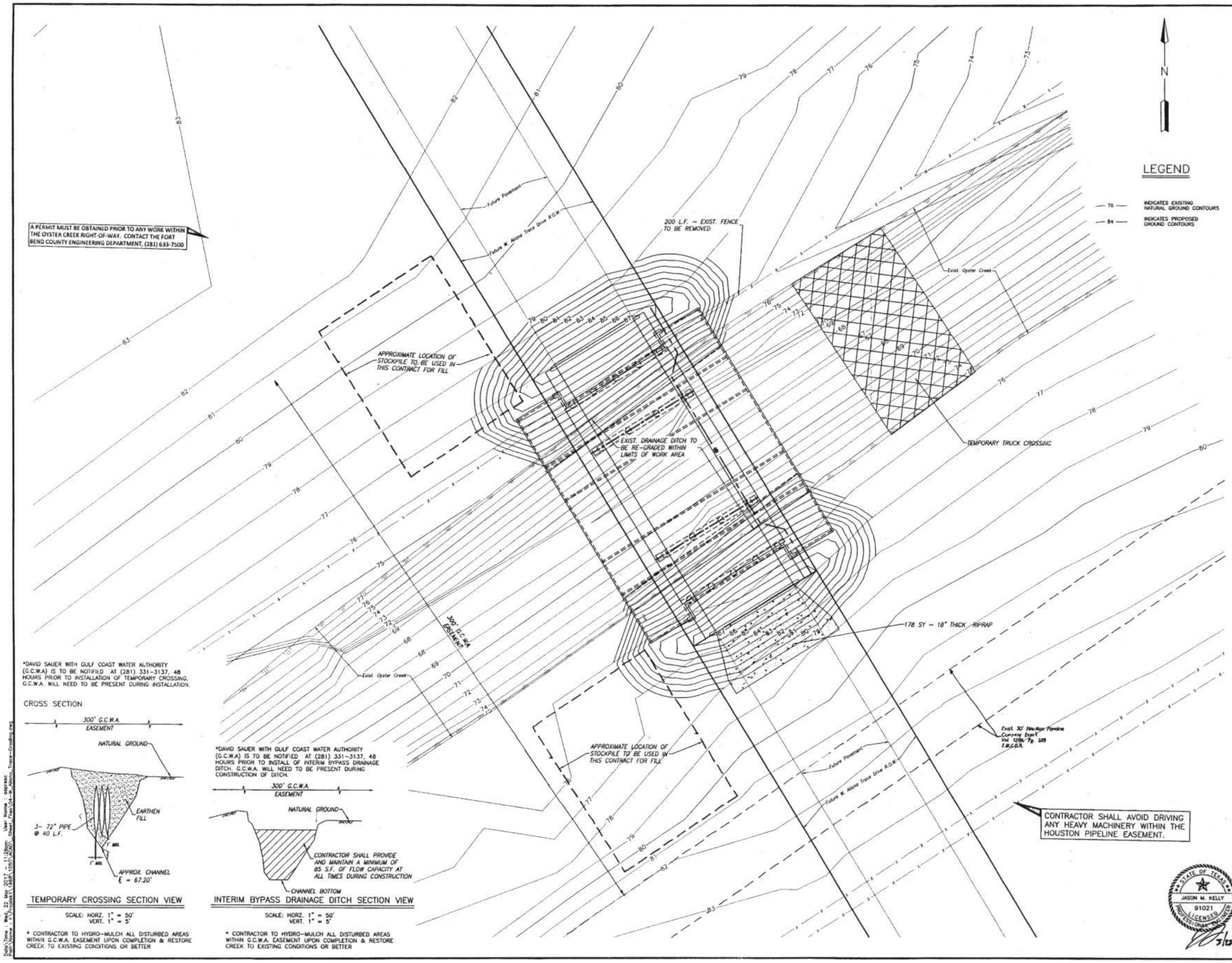
FILE NO. | FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS
JASON M. KELLY
91021
LICENSED
PROFESSIONAL ENGINEER
3/22/17

57913

DRAWING SCALE
SCALE: 1" = 400'

SHEET NO. 3 OF 50



BENCHMARK:

A-1212 – BRASS DISK, STAMPED A-1212 1973, SET IN THE TOP OF A CONCRETE HEADWALL ON THE WEST BOUND LANES OF HWY 90A, APPROX. 4.1 MILES WEST ALONG HWY 90A FROM THE JUNCTION OF HWY 6, IN SUGARLAND, TEXAS. THE DISK IS SET 2.0 FEET EAST OF THE WEST END, OF THE NORTH CONCRETE HEADWALL, AND 27.0 FEET NORTH OF THE CENTERLINE OF THE WESTBOUND LANES, AND ½FOOT LOWER THAN THE ROAD.

ELEV. = 78.65 FEET (NGVD-29) 1973 ADJ.

TBM:

TBM 6–TOP OF A CHISSLED BOX SET ON THE NORTHERN NOSE OF A MEDIAN AT FM 1464. THE POINT IS LOCATED ± 1,460 FEET NORTH OF THE CENTERLINE OF THE INTERSECTION OF FM 1464 AND W AIRPORT BLVD AND ± 40 FEET EAST OF THE WEST EDGE OF CONCRETE PAVEMENT FOR THE SOUTHBOUND LANE OF FM 1464.

ELEV. = 88.55 FEET (NGVD-29) 1973 ADJ.

NOTES:

HL 93 LOADING

RECORD DRAWING

I CERTIFY THAT THIS DRAWING REFLECTS THE IMPROVEMENTS CONSTRUCTED AS TO SIZE, LOCATION AND GRADE AND THAT THE CONSTRUCTION WAS IN FULL COMPLIANCE WITH THE CONTRACT DOCUMENTS

BY ______ DATE ______

TITLE ______

FORT BEND COUNTY ENGINEERING DEPARTMENT

APPROVED: [signature] DEVELOPMENT COORDINATOR

DATE: 7/24/17

DATE	REVISION	BY

PLAT NAME: WEST ALIANA TRACE DRIVE
CPC 101 FILE NO.
C.O.H. LOG NO. 16–

ALIANA DEVELOPMENT COMPANY

WEST ALIANA TRACE DRIVE BRIDGE

GRADING PLAN

LJA Engineering, Inc.
2929 Briarpark Drive, Suite 600, Houston, Texas 77042
Phone 713.953.5200 Fax 713.953.5026 FRN - F-1386

LJA PROJECT NO.: 1968–1050

DESIGNED BY: AA | DRAWN BY: AA | DATE:

NOTE: CITY SIGNATURES VALID FOR ONE YEAR ONLY AFTER DATE OF SIGNATURES

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER: [signature] 03/23/17 | STREET & BRIDGE
WASTEWATER: [signature] 3-23-17 | TRAFFIC
[signature] 3/23/17 | STORM WATER QUALITY
FACILITIES

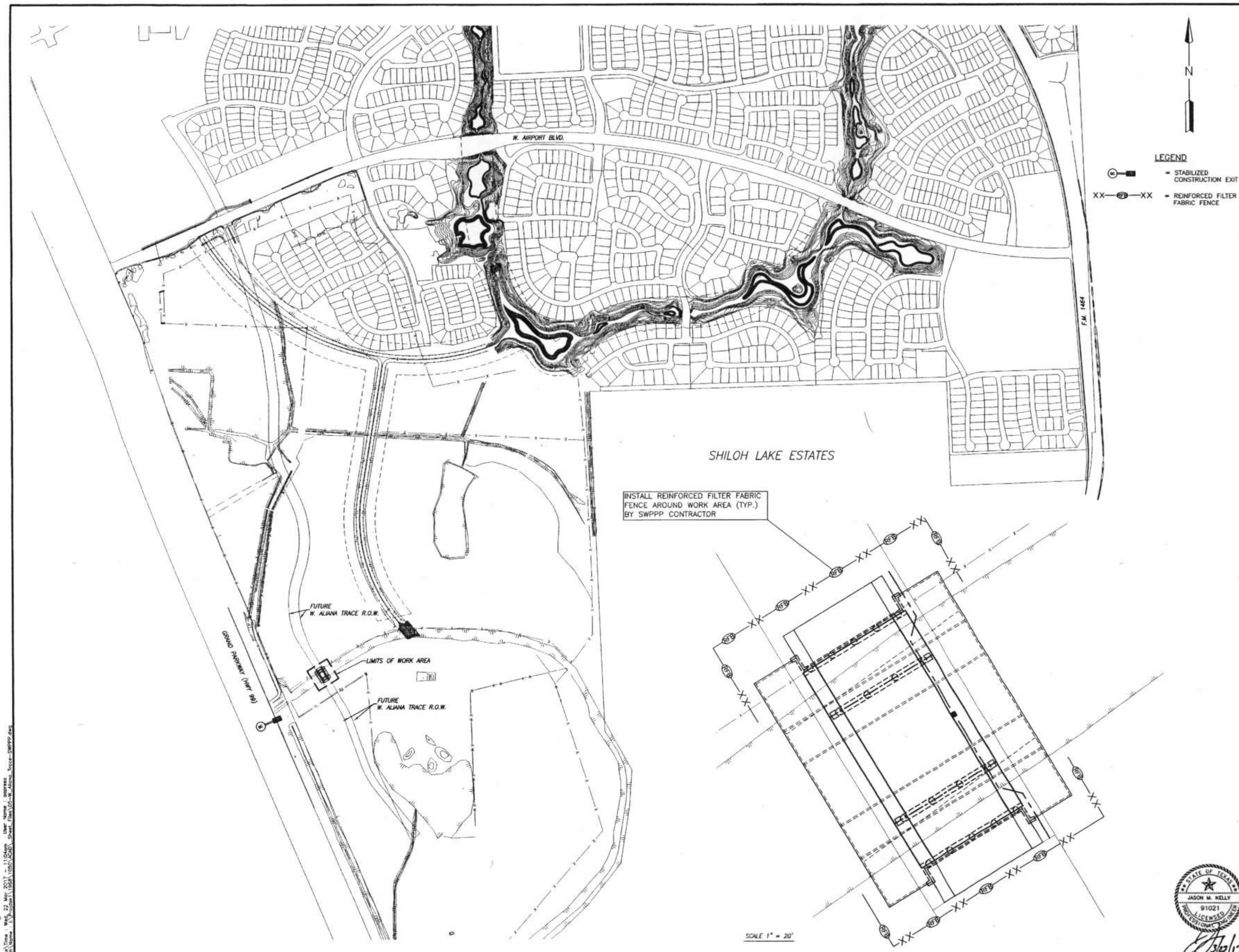
FILE NO. | FOR CITY OF HOUSTON USE ONLY

DRAWING SCALE
SCALE: 1" = 20'

SHEET NO. 4 of 50

57913

WEST ALIANA TRACE DRIVE BRIDGE – JOB NO. 1968–1050



BENCHMARK:

A-1212 – BRASS DISK, STAMPED A-1212 1973, SET IN THE TOP OF A CONCRETE HEADWALL ON THE WEST BOUND LANES OF HWY 90A, APPROX. 4.1 MILES WEST ALONG HWY 90A FROM THE JUNCTION OF HWY 6, IN SUGARLAND, TEXAS. THE DISK IS SET 2.0 FEET EAST OF THE WEST END, OF THE NORTH CONCRETE HEADWALL, AND 27.0 FEET NORTH OF THE CENTERLINE OF THE WESTBOUND LANES, AND ½FOOT LOWER THAN THE ROAD.

ELEV. = 78.65 FEET (NGVD-29) 1973 ADJ.

TBM:

TBM 6–TOP OF A CHISSLED BOX SET ON THE NORTHERN NOSE OF A MEDIAN AT FM 1464. THE POINT IS LOCATED ± 1,460 FEET NORTH OF THE CENTERLINE OF THE INTERSECTION OF FM 1464 AND W AIRPORT BLVD AND ± 40 FEET EAST OF THE WEST EDGE OF CONCRETE PAVEMENT FOR THE SOUTHBOUND LANE OF FM 1464.

ELEV. = 88.55 FEET (NGVD-29) 1973 ADJ.

NOTES:

HL 93 LOADING

RECORD DRAWING

I CERTIFY THAT THIS DRAWING REFLECTS THE IMPROVEMENTS CONSTRUCTED AS TO SIZE, LOCATION AND GRADE AND THAT THE CONSTRUCTION WAS IN FULL COMPLIANCE WITH THE CONTRACT DOCUMENTS

BY ______ DATE ______

TITLE ______

FORT BEND COUNTY ENGINEERING DEPARTMENT

APPROVED: ______
DEVELOPMENT COORDINATOR

DATE: 7/24/17

DATE	REVISION	BY

PLAT NAME:
WEST ALIANA TRACE DRIVE
CPC 101 FILE NO.
C.O.H. LOG NO. 16-

ALIANA DEVELOPMENT COMPANY

WEST ALIANA TRACE DRIVE BRIDGE

STORM WATER POLLUTION PREVENTION PLAN

LJA Engineering, Inc.
2929 Briarpark Drive
Suite 600
Houston, Texas 77042
Phone 713.953.5200
Fax 713.953.5026
FRN - F-1386

LJA PROJECT NO.: 1968-1050

DESIGNED BY: AA | DRAWN BY: AA | DATE:

NOTE: CITY SIGNATURES VALID FOR ONE YEAR ONLY AFTER DATE OF SIGNATURES

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER | STREET & BRIDGE
WASTEWATER | TRAFFIC
STORM WATER QUALITY
FACILITIES

FILE NO. | FOR CITY OF HOUSTON USE ONLY

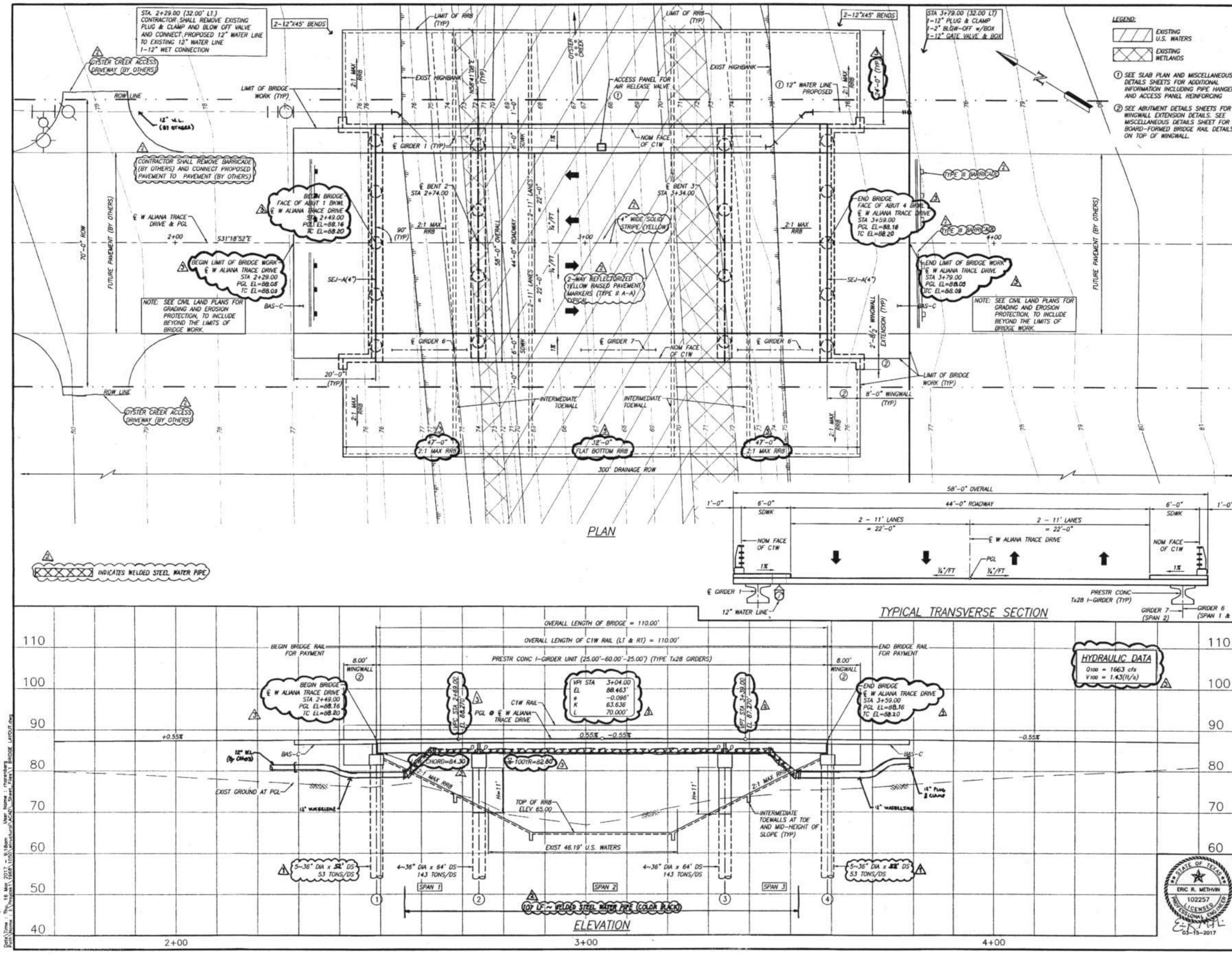
DRAWING SCALE
SCALE: 1" = 400'

SHEET NO. 5 of 50

STATE OF TEXAS
JASON M. KELLY
91021
LICENSED
PROFESSIONAL ENGINEER

WEST ALIANA TRACE DRIVE BRIDGE – JOB NO. 1968-1050

Date\Time : Wed, 22 Mar 2017 – 11:04am User Name : aapreso
Path\Name : I:\Projdsk1\1968\1050\ACAD_Sheet_Files\05-W_Aliana_Trace-SWPPP.dwg



BENCHMARK:

A-1212 – BRASS DISK, STAMPED A-1212 1973, SET IN THE TOP OF A CONCRETE HEADWALL ON THE WEST BOUND LANES OF HWY 90A, APPROX. 4.1 MILES WEST ALONG HWY 90A FROM THE JUNCTION OF HWY 6, IN SUGARLAND, TEXAS. THE DISK IS SET 2.0 FEET EAST OF THE WEST END OF THE NORTH CONCRETE HEADWALL, AND 27.0 FEET NORTH OF THE CENTERLINE OF THE WESTBOUND LANES, AND ½FOOT LOWER THAN THE ROAD.

ELEV. = 78.65 FEET (NGVD-29) 1973 ADJ.

TBM:

TBM 6-TOP OF A CHISSLED BOX SET ON THE NORTHERN NOSE OF A MEDIAN AT FM 1464. THE POINT IS LOCATED ± 1,460 FEET NORTH OF THE CENTERLINE OF THE INTERSECTION OF FM 1464 AND W AIRPORT BLVD AND ± 40 FEET EAST OF THE WEST EDGE OF CONCRETE PAVEMENT FOR THE SOUTHBOUND LANE OF FM 1464.

ELEV. = 88.55 FEET (NGVD-29) 1973 ADJ.

NOTES:

HL 93 LOADING

1. DESIGNED ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 7TH EDITION (2014) WITH 2015 & 2016 INTERIMS REVISIONS.
2. BEAM END CONDITIONS:
   D: DENOTES DOWEL AT EXTERIOR GIRDERS
   BLANK – DENOTES NO DOWEL
3. "H" VALUES SHOWN ARE ESTIMATED COLUMN HEIGHTS. CONTRACTOR IS RESPONSIBLE TO ADJUST COLUMN HEIGHTS BASED ON FIELD CONDITIONS.
4. SEE GEOTECHNICAL REPORT FOR BORING INFORMATION AND SPECIAL FOUNDATION NOTES.

RECORD DRAWING

I CERTIFY THAT THIS DRAWING REFLECTS THE IMPROVEMENTS CONSTRUCTED AS TO SIZE, LOCATION AND GRADE AND THAT THE CONSTRUCTION WAS IN FULL COMPLIANCE WITH THE CONTRACT DOCUMENTS

BY ____________ DATE ________

TITLE ____________

FORT BEND COUNTY ENGINEERING DEPARTMENT

APPROVED: ____________ DEVELOPMENT COORDINATOR

DATE: 7/24/17

PLAT NAME: WEST ALIANA TRACE DRIVE

CPC 101 FILE NO.

C.O.H. LOG NO. 16-

ALIANA DEVELOPMENT COMPANY

WEST ALIANA TRACE DRIVE BRIDGE

BRIDGE LAYOUT

OYSTER CREEK BRIDGE

LJA Engineering, Inc.
2929 Briarpark Drive, Suite 600, Houston, Texas 77042
Phone 713.953.5200 Fax 713.953.5026 FRN-F-1386

LJA PROJECT NO.: 1968-1050

DESIGNED BY: EM | DRAWN BY: MS | DATE: MARCH 2017

NOTE: CITY SIGNATURES VALID FOR ONE YEAR ONLY AFTER DATE OF SIGNATURES

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

FILE NO. | FOR CITY OF HOUSTON USE ONLY

DRAWING SCALE

SCALE: 1" = 10'

SHEET NO. 6 OF 50

WEST ALIANA TRACE DRIVE BRIDGE – JOB NO. 1968–1050

SUMMARY OF BRIDGE QUANTITIES - W ALIANA TRACE OYSTER CREEK BRIDGE

ITEM - DESCRIPTION CODE	0400 6005	0416 6004	0420 6013	0420 6025	0422 6001	0422 6015	0425 6035	0432 6002	0442 6007	0450 6029	0454 6001	0422 6013
DESCRIPTION	CEM STABIL BKFL	DRILL SHAFT (36 IN)	CL C CONC (ABUT) (1) (2)	CL C CONC (BENT) (1)	REINF CONC SLAB	APPROACH SLAB	PRESTR CONC GIRDER (Tx28)	RIPRAP (CONC)(5 IN)	STR STEEL (MISC NON - BRIDGE)*	RAIL (TY C1W)	SEALED EXPANSION JOINT (4 IN)(SEJ A)	BRIDGE SIDEWALK
	CY	LF	CY	CY	SF	CY	LF	CY	LB	LF	LF	SF
ABUTMENT 1	61.0	260 △	30.3			53.6		105.0 △				
BENT 2		256		37.1								
BENT 3		256		37.1								
ABUTMENT 4	61.0	260 △	30.3			53.6		105.0 △				
PRESTR CONC I-GIRDER UNIT					6380		710.50		308	220.0	91	1540
TOTAL	121.9	1032 △	60.6	74.2	6380	107.2	710.50	210.0 △	308	220.0	91	1540

* BRIDGE SIDEWALK EXPANSION JOINT COVER PLATES

(1) QUANTITY INCLUDES SHEAR KEY

(2) QUANTITY INCLUDES BOARD-FORMED RAIL ON TOP OF WINGWALL

BEARING SEAT ELEVATIONS

		GIRDER 1	GIRDER 2	GIRDER 3	GIRDER 4	GIRDER 5	GIRDER 6	GIRDER 7
ABUT 1	(FWD)	84.187	84.404	84.620	84.620	84.404	84.187	
BENT 2	(BK)	84.312	84.529	84.745	84.745	84.529	84.312	
	(FWD)	84.322	84.502	84.683	84.863	84.683	84.502	84.322
BENT 3	(BK)	84.322	84.502	84.683	84.863	84.683	84.502	84.322
	(FWD)	84.312	84.529	84.745	84.745	84.529	84.312	
ABUT 4	(BK)	84.187	84.404	84.620	84.620	84.404	84.187	

△

BENCHMARK:

A-1212 - BRASS DISK, STAMPED A-1212 1973, SET IN THE TOP OF A CONCRETE HEADWALL ON THE WEST BOUND LANES OF HWY 90A, APPROX. 4.1 MILES WEST ALONG HWY 90A FROM THE JUNCTION OF HWY 6, IN SUGARLAND, TEXAS. THE DISK IS SET 2.0 FEET EAST OF THE WEST END, OF THE NORTH CONCRETE HEADWALL, AND 27.0 FEET NORTH OF THE CENTERLINE OF THE WESTBOUND LANES, AND ½FOOT LOWER THAN THE ROAD.

ELEV. = 78.65 FEET (NGVD-29) 1973 ADJ.

TBM:

TBM 6-TOP OF A CHISELED BOX SET ON THE NORTHERN NOSE OF A MEDIAN AT FM 1464. THE POINT IS LOCATED ± 1,460 FEET NORTH OF THE CENTERLINE OF THE INTERSECTION OF FM 1464 AND W AIRPORT BLVD AND ± 40 FEET EAST OF THE WEST EDGE OF CONCRETE PAVEMENT FOR THE SOUTHBOUND LANE OF FM 1464.

ELEV. = 88.55 FEET (NGVD-29) 1973 ADJ.

NOTES:

HL 93 LOADING

RECORD DRAWING

I CERTIFY THAT THIS DRAWING REFLECTS THE IMPROVEMENTS CONSTRUCTED AS TO SIZE, LOCATION AND GRADE AND THAT THE CONSTRUCTION WAS IN FULL COMPLIANCE WITH THE CONTRACT DOCUMENTS

BY ______ DATE ______

TITLE ______

FORT BEND COUNTY ENGINEERING DEPARTMENT

APPROVED: [signature]

DEVELOPMENT COORDINATOR

DATE: 7/24/17

DATE	REVISION	BY
4-11-17	△ REVISED DRILL SHAFT QUANTITY	am
7-15-17	△ REVISED FOR 0.5' RAISED PROFILE	RH

PLAT NAME:
WEST ALIANA TRACE DRIVE

CPC 101 FILE NO.

C.O.H. LOG NO. 16-

ALIANA DEVELOPMENT COMPANY

WEST ALIANA TRACE DRIVE BRIDGE

SUMMARY OF QUANTITIES & BEARING SEAT ELEVATIONS

OYSTER CREEK BRIDGE

LJA Engineering, Inc.
2929 Briarpark Drive
Suite 600
Houston, Texas 77042
Phone 713.953.5200
Fax 713.953.5026
FRN - F-1386

LJA PROJECT NO.: 1968-1050

DESIGNED BY: EM | DRAWN BY: MS | DATE: MARCH 2017

NOTE: CITY SIGNATURES VALID FOR ONE YEAR ONLY AFTER DATE OF SIGNATURES

CITY OF HOUSTON

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER [signature] 03/23/17 | STREET & BRIDGE
WASTEWATER [signature] 3-23-17 | TRAFFIC
STORM [signature] 3/23/17 | STORM WATER QUALITY
FACILITIES

FILE NO.

FOR CITY OF HOUSTON USE ONLY

DRAWING SCALE

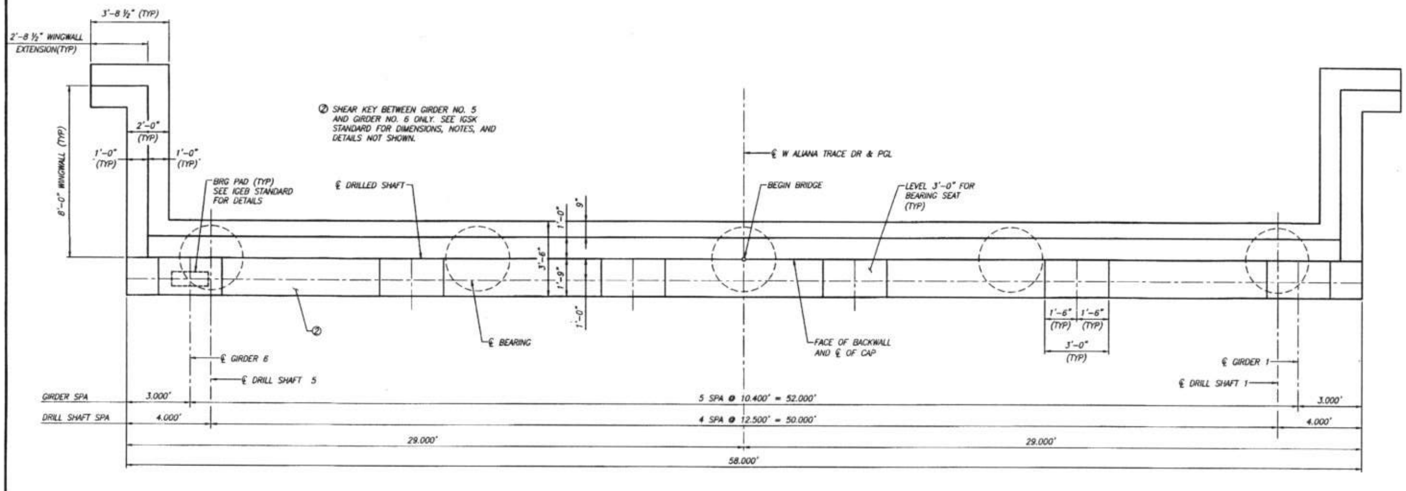
SHEET NO. 7 OF 50

STATE OF TEXAS — ERIC R. METHVIN — 102257 — LICENSED PROFESSIONAL ENGINEER — 03-15-2017

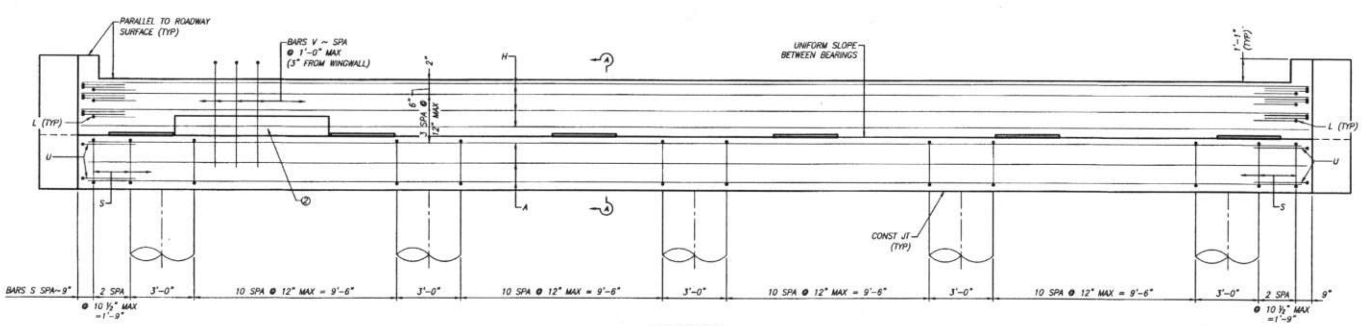
TABLE OF ESTIMATED QUANTITIES (PER ABUTMENT)

BAR	NO	SIZE	LENGTH	WEIGHT
A	10	#11	57'-0"	3029
H	8	#6	57'-8"	693
L	42	#6	4'-0"	253
M ***	2	#5	7'-3"	16
N ***	12	#5	5'-5"	68
S	50	#5	11'-6"	600
U	4	#6	8'-1"	49
V	57	#5	9'-9"	583
wH1	14	#6	10'-5"	220
wH2	14	#6	3'-5"	71
wH3	20	#6	7'-8"	231
wH4	20	#6	2'-5"	72
wS	26	#4	7'-10"	137
wV	24	#5	9'-12"	250
REINFORCING STEEL (LB) *				6,272
CLASS "C" CONC (ABUT) (CY) **				30.3

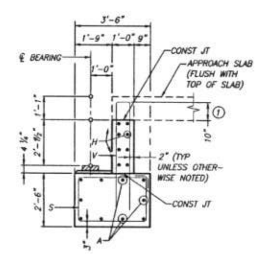
* FOR CONTRACTOR'S INFORMATION ONLY.
** INCLUDES SHEAR KEY, WINGWALL EXTENSION, AND BOARD-FORMED RAIL ON TOP OF WINGWALL
*** SEE IGSK STANDARD DETAILS



PLAN
SCALE: ⅛"=1'-0"
SHOWING ABUTMENT 1. ABUTMENT 4 SYMMETRICAL BY OPPOSITE HAND



ELEVATION
SCALE: ⅛"=1'-0"



SECTION A-A

① INCREASE AS REQUIRED TO MAINTAIN 3" FROM FINISHED GRADE.

BENCHMARK:
A-1212 - BRASS DISK, STAMPED A-1212 1973, SET IN THE TOP OF A CONCRETE HEADWALL ON THE WEST BOUND LANES OF HWY 90A, APPROX. 4.1 MILES WEST ALONG HWY 90A FROM THE JUNCTION OF HWY 6, IN SUGARLAND, TEXAS. THE DISK IS SET 2.0 FEET EAST OF THE WEST END OF THE NORTH CONCRETE HEADWALL, AND 27.0 FEET NORTH OF THE CENTERLINE OF THE WESTBOUND LANES, AND ½FOOT LOWER THAN THE ROAD.

ELEV. = 78.65 FEET (NGVD-29) 1973 ADJ.

TBM:
TBM 6-TOP OF A CHISSLED BOX SET ON THE NORTHERN NOSE OF A MEDIAN AT FM 1464. THE POINT IS LOCATED ± 1,460 FEET NORTH OF THE CENTERLINE OF THE INTERSECTION OF FM 1464 AND W AIRPORT BLVD AND ± 40 FEET EAST OF THE WEST EDGE OF CONCRETE PAVEMENT FOR THE SOUTHBOUND LANE OF FM 1464.

ELEV. = 88.55 FEET (NGVD-29) 1973 ADJ.

NOTES:
HL 93 LOADING

GENERAL NOTES:

1. DESIGNED ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 7TH EDITION (2014) WITH 2015 & 2016 INTERIMS REVISIONS.
2. SEE COMMON FOUNDATION DETAILS (FD) STANDARD SHEET, FOR ALL FOUNDATION DETAILS AND NOTES NOT SHOWN.
3. SEE CONCRETE RIPRAP (CRR) STANDARD SHEET, FOR RIPARP ATTACHMENT DETAILS.
4. SEE C1W RAILING STANDARD AND MISCELLANEOUS DETAILS SHEETS FOR RAIL ANCHORAGE IN WINGWALLS.

COVER DIMENSIONS ARE CLEAR DIMENSION, UNLESS NOTED OTHERWISE
REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR

MATERIAL NOTES:

1. PROVIDE CLASS C CONCRETE (f'c = 3600 psi)
2. PROVIDE GRADE 60 REINFORCING STEEL

RECORD DRAWING
I CERTIFY THAT THIS DRAWING REFLECTS THE IMPROVEMENTS CONSTRUCTED AS TO SIZE, LOCATION AND GRADE AND THAT THE CONSTRUCTION WAS IN FULL COMPLIANCE WITH THE CONTRACT DOCUMENTS

BY ____________ DATE ________

TITLE ____________

FORT BEND COUNTY ENGINEERING DEPARTMENT
APPROVED: [signature]
DEVELOPMENT COORDINATOR
DATE: 7/24/17

DATE	REVISION	BY

PLAT NAME:
WEST ALIANA TRACE DRIVE
CPC 101 FILE NO.
C.O.H. LOG NO. 16-

ALIANA DEVELOPMENT COMPANY

WEST ALIANA TRACE DRIVE BRIDGE

ABUTMENT 1 & 4
SHEET 1 OF 2
OYSTER CREEK BRIDGE

LJA Engineering, Inc.
2929 Briarpark Drive, Suite 600, Houston, Texas 77042
Phone 713.953.5200, Fax 713.953.5026, FRN - F-1386

LJA PROJECT NO.: 1968-1050

DESIGNED BY:	DRAWN BY:	DATE:
EM	MS	MARCH 2017

NOTE: CITY SIGNATURES VALID FOR ONE YEAR ONLY AFTER DATE OF SIGNATURES

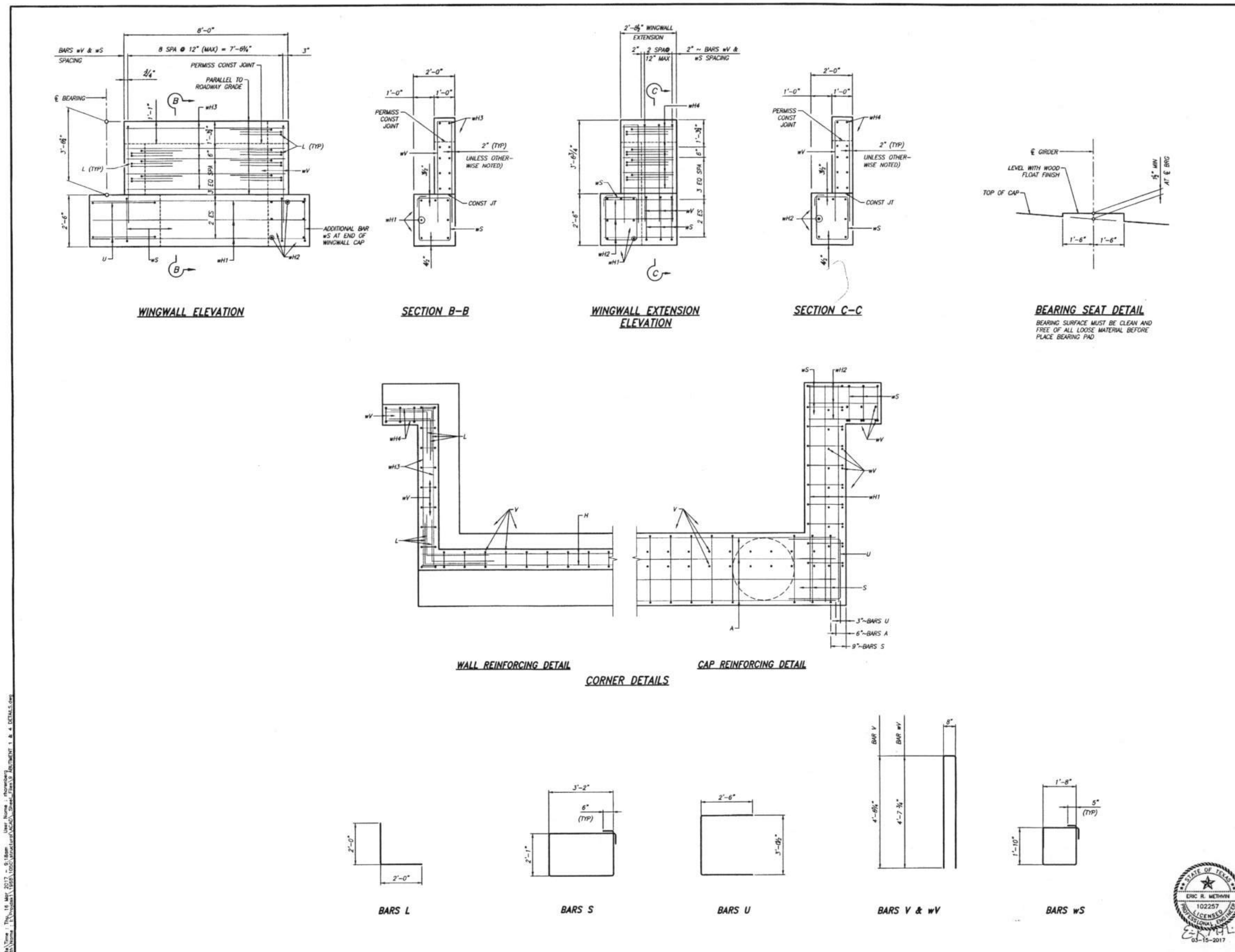
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
WATER [signature] 03/23/17 — STREET & BRIDGE
[signature] 3-23-17 — TRAFFIC
[signature] 3/23/17 — STORM WATER QUALITY
FACILITIES

FILE NO. — FOR CITY OF HOUSTON USE ONLY

DRAWING SCALE

ERIC R. METHVIN 102257 LICENSED PROFESSIONAL ENGINEER, STATE OF TEXAS, 03-15-2017

SHEET NO. 8 OF 50



BENCHMARK:

A-1212 – BRASS DISK, STAMPED A-1212 1973, SET IN THE TOP OF A CONCRETE HEADWALL ON THE WEST BOUND LANES OF HWY 90A, APPROX. 4.1 MILES WEST ALONG HWY 90A FROM THE JUNCTION OF HWY 6, IN SUGARLAND, TEXAS. THE DISK IS SET 2.0 FEET EAST OF THE WEST END, OF THE NORTH CONCRETE HEADWALL, AND 27.0 FEET NORTH OF THE CENTERLINE OF THE WESTBOUND LANES, AND ½FOOT LOWER THAN THE ROAD.

ELEV. = 78.65 FEET (NGVD-29) 1973 ADJ.

TBM:

TBM 6-TOP OF A CHISSLED BOX SET ON THE NORTHERN NOSE OF A MEDIAN AT FM 1464. THE POINT IS LOCATED ± 1,460 FEET NORTH OF THE CENTERLINE OF THE INTERSECTION OF FM 1464 AND W AIRPORT BLVD AND ± 40 FEET EAST OF THE WEST EDGE OF CONCRETE PAVEMENT FOR THE SOUTHBOUND LANE OF FM 1464.

ELEV. = 88.55 FEET (NGVD-29) 1973 ADJ.

NOTES:

HL 93 LOADING

1. FOR GENERAL NOTES AND MATERIAL NOTES SEE SHEET 1 OF 2.

RECORD DRAWING

I CERTIFY THAT THIS DRAWING REFLECTS THE IMPROVEMENTS CONSTRUCTED AS TO SIZE, LOCATION AND GRADE AND THAT THE CONSTRUCTION WAS IN FULL COMPLIANCE WITH THE CONTRACT DOCUMENTS

BY ______ DATE ______

TITLE ______

FORT BEND COUNTY ENGINEERING DEPARTMENT

APPROVED: [signature] DEVELOPMENT COORDINATOR

DATE: 7/24/17

DATE	REVISION	BY

PLAT NAME: WEST ALIANA TRACE DRIVE

CPC 101 FILE NO.

C.O.H. LOG NO. 16-

ALIANA DEVELOPMENT COMPANY

WEST ALIANA TRACE DRIVE BRIDGE

ABUTMENT 1 & 4
SHEET 2 OF 2
OYSTER CREEK BRIDGE

LJA Engineering, Inc.
2929 Briarpark Drive, Suite 600, Houston, Texas 77042
Phone 713.953.5200 Fax 713.953.5026 FRN-F-1386

LJA PROJECT NO.: 1968-1050

DESIGNED BY:	DRAWN BY:	DATE:
EM	MS	MARCH 2017

NOTE: CITY SIGNATURES VALID FOR ONE YEAR ONLY AFTER DATE OF SIGNATURES

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER 03/23/17 — STREET & BRIDGE
WASTEWATER 3-23-17 — TRAFFIC
FACILITIES 3/23/17 — STORM WATER QUALITY

FILE NO. — FOR CITY OF HOUSTON USE ONLY

DRAWING SCALE

SHEET NO. 9 OF 50

STATE OF TEXAS — ERIC R. METHVIN — 102257 — LICENSED PROFESSIONAL ENGINEER — 03-15-2017

WEST ALIANA TRACE DRIVE BRIDGE – JOB NO. 1968-1050

Date\Time : Thu, 16 Mar 2017 - 9:18am User Name : rhorenberg
Path\Name : t:\Prosdsk1\1968\1050\structural\ACAD_Sheet_Files\9 ABUTMENT 1 & 4 DETAILS.dwg

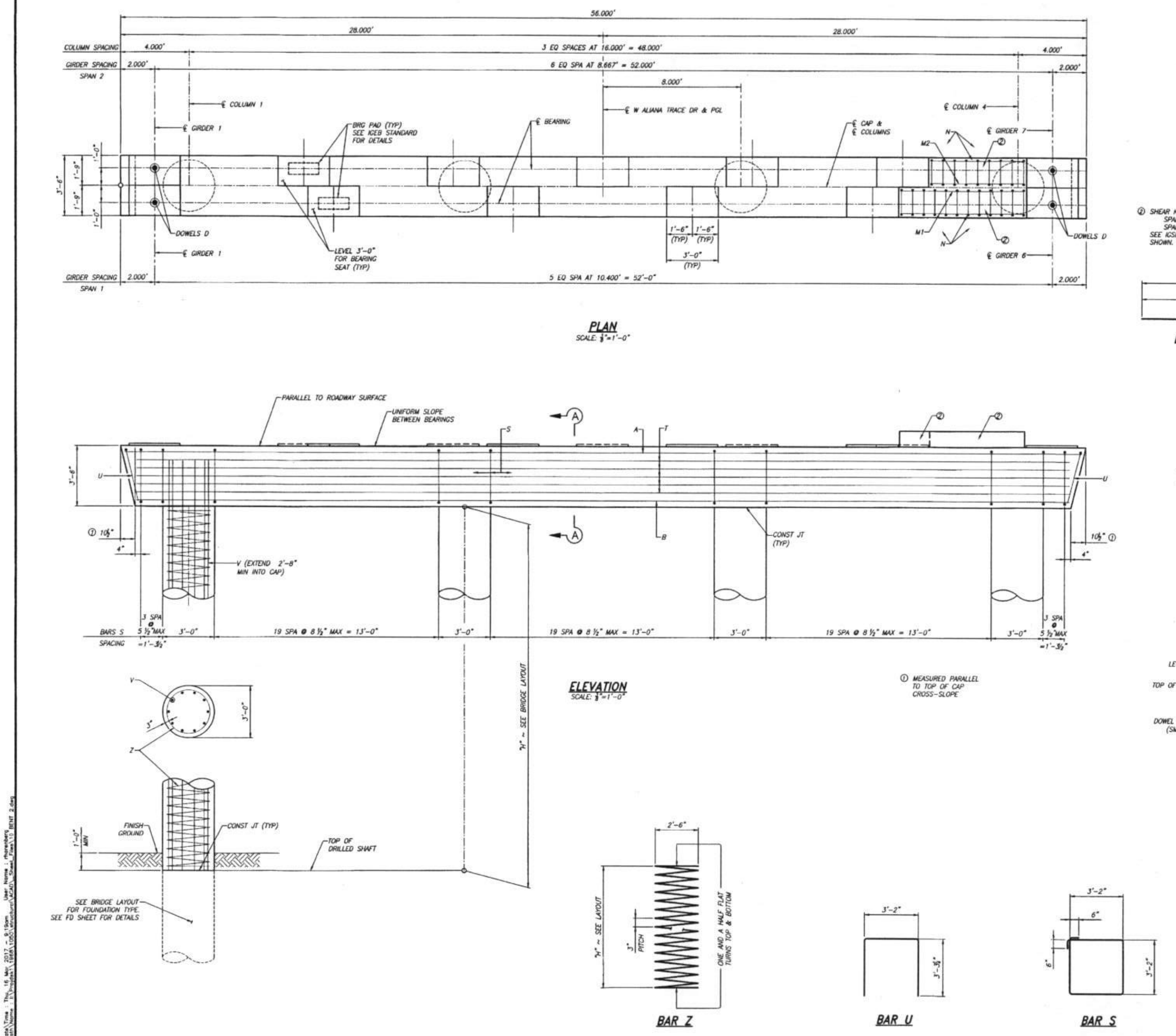
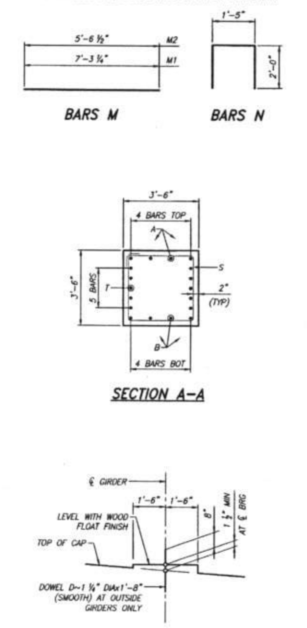


TABLE OF ESTIMATED QUANTITIES BENT 2

BAR	NO	SIZE	LENGTH	WEIGHT
A	4	#11	55'-6"	1180
B	4	#11	54'-0"	1148
D	4	1 1/4"D	1'-8"	28
M1	2	#5	7'-3"	16
M2	2	#5	5'-7"	12
N	21	#5	5'-5"	119
S	68	#5	13'-8"	970
T	10	#5	54'-0"	564
U	2	#5	9'-8"	21
V	40	#9	13'-8"	1859
Z	4	#4	369'-7"	988
REINFORCING STEEL (LB) *				6,905
CLASS "C" CONC (BENT) (CY) **				37.1

* FOR CONTRACTOR'S INFORMATION ONLY.
** INCLUDES SHEAR KEY

② SHEAR KEY:
SPAN 1: BETWEEN GIRDER NO. 5 AND GIRDER NO. 6 ONLY.
SPAN 2: BETWEEN GIRDER NO. 6 AND GIRDER NO. 7 ONLY.
SEE ICSK STANDARD FOR DIMENSIONS, NOTES, AND DETAILS NOT SHOWN. ADJUST BARS M AND N AS SHOWN ON THIS SHEET.



BEARING SEAT DETAIL
BEARING SURFACE MUST BE CLEAN AND FREE OF ALL LOOSE MATERIAL BEFORE PLACE BEARING PAD

BENCHMARK:
A-1212 - BRASS DISK, STAMPED A-1212 1973, SET IN THE TOP OF A CONCRETE HEADWALL ON THE WEST BOUND LANES OF HWY 90A, APPROX. 4.1 MILES WEST ALONG HWY 90A FROM THE JUNCTION OF HWY 6, IN SUGARLAND, TEXAS. THE DISK IS SET 2.0 FEET EAST OF THE WEST END, OF THE NORTH CONCRETE HEADWALL, AND 27.0 FEET NORTH OF THE CENTERLINE OF THE WESTBOUND LANES, AND 1/2 FOOT LOWER THAN THE ROAD.

ELEV. = 78.65 FEET (NGVD-29) 1973 ADJ.

TBM:
TBM 6-TOP OF A CHISSLED BOX SET ON THE NORTHERN NOSE OF MEDIAN AT FM 1464. THE POINT IS LOCATED ± 1,460 FEET NORTH OF THE CENTERLINE OF THE INTERSECTION OF FM 1464 AND W AIRPORT BLVD AND ± 40 FEET EAST OF THE WEST EDGE OF CONCRETE PAVEMENT FOR THE SOUTHBOUND LANE OF FM 1464.

ELEV. = 88.55 FEET (NGVD-29) 1973 ADJ.

NOTES:
HL 93 LOADING

GENERAL NOTES:

1. DESIGNED ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 7TH EDITION (2014) WITH 2015 & 2016 INTERIMS REVISIONS.

2. SEE COMMON FOUNDATION DETAILS (FD) STANDARD SHEET, FOR ALL FOUNDATION DETAILS AND NOTES NOT SHOWN.

COVER DIMENSIONS ARE CLEAR DIMENSION, UNLESS NOTED OTHERWISE
REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR

MATERIAL NOTES:

1. PROVIDE CLASS C CONCRETE (f'c = 3600 psi)

2. PROVIDE GRADE 60 REINFORCING STEEL

RECORD DRAWING
I CERTIFY THAT THIS DRAWING REFLECTS THE IMPROVEMENTS CONSTRUCTED AS TO SIZE, LOCATION AND GRADE AND THAT THE CONSTRUCTION WAS IN FULL COMPLIANCE WITH THE CONTRACT DOCUMENTS

BY ______ DATE ______

TITLE ______

FORT BEND COUNTY ENGINEERING DEPARTMENT
APPROVED: DEVELOPMENT COORDINATOR
DATE: 7/24/17

DATE	REVISION	BY

PLAT NAME:
WEST ALIANA TRACE DRIVE
CPC 101 FILE NO.
C.O.H. LOC NO. 16-

ALIANA DEVELOPMENT COMPANY

WEST ALIANA TRACE DRIVE BRIDGE

BENT 2

OYSTER CREEK BRIDGE

LJA Engineering, Inc.
2929 Briarpark Drive
Suite 600
Houston, Texas 77042
Phone 713.953.5200
Fax 713.953.5026
FRN - F-1386

LJA PROJECT NO.: 1968-1050

DESIGNED BY:	DRAWN BY:	DATE:
EM	MS	MARCH 2017

NOTE: CITY SIGNATURES VALID FOR ONE YEAR ONLY AFTER DATE OF SIGNATURES

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
WATER 03/23/17 STREET & BRIDGE
WASTEWATER 3-23-17 TRAFFIC
STORM WATER QUALITY 3/23/17
FACILITIES

FILE NO. FOR CITY OF HOUSTON USE ONLY

DRAWING SCALE

STATE OF TEXAS
ERIC R. METHVIN
102257
LICENSED PROFESSIONAL ENGINEER
03-15-2017

SHEET NO. 10 OF 50

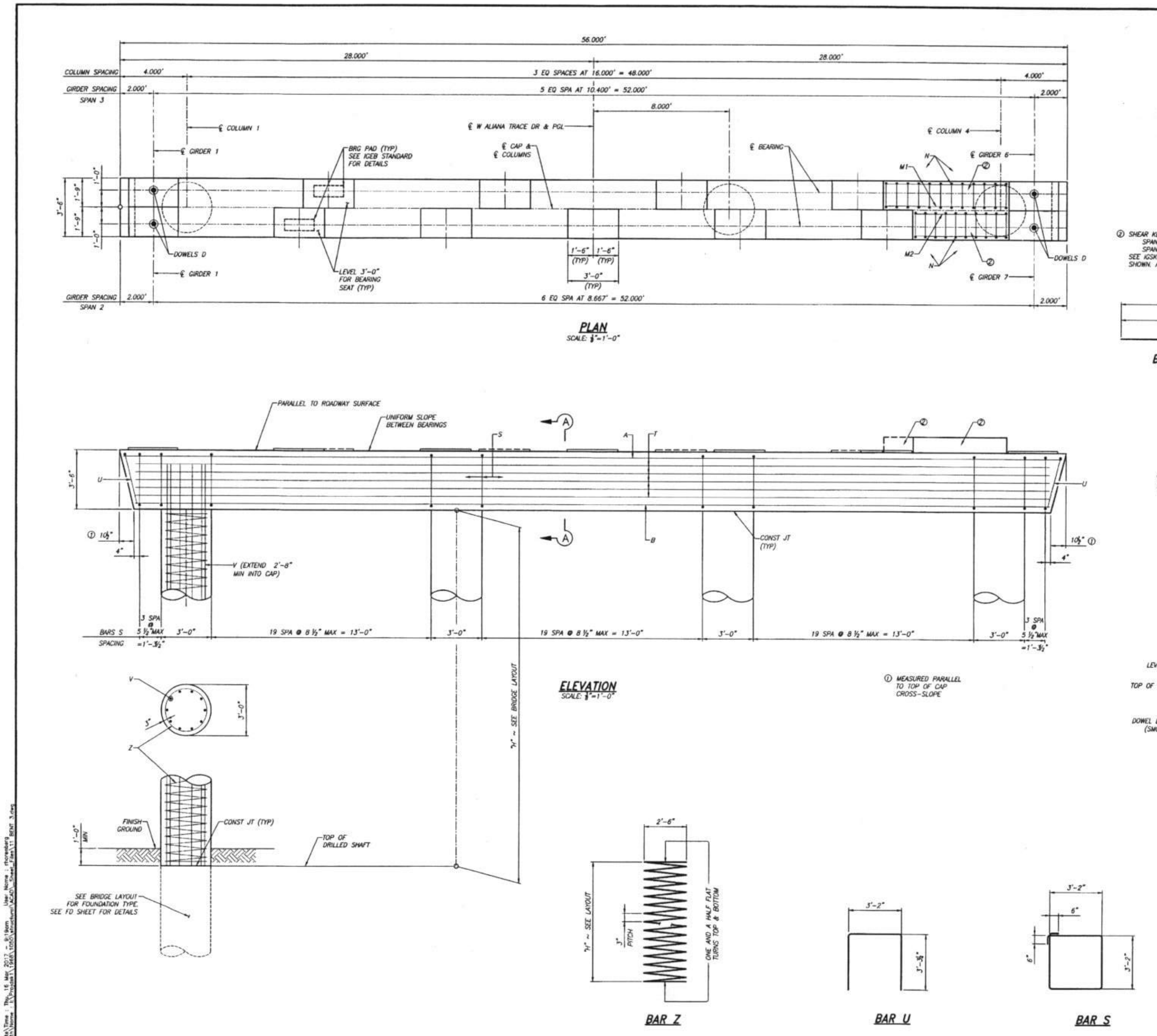
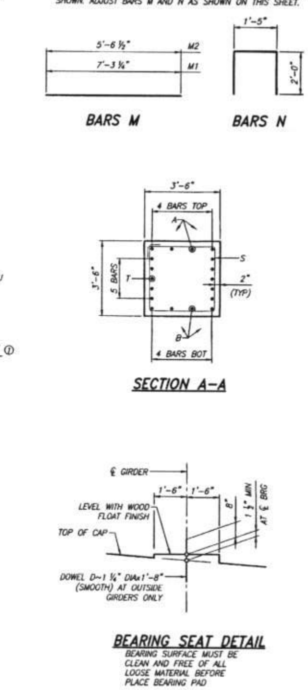


TABLE OF ESTIMATED QUANTITIES BENT 3

BAR	NO	SIZE	LENGTH	WEIGHT
A	4	#11	55'-6"	1180
B	4	#11	54'-0"	1148
D	4	1 1/4"D	1'-8"	28
M1	2	#5	7'-3"	16
M2	2	#5	5'-7"	12
N	21	#5	5'-5"	119
S	68	#5	13'-8"	970
T	10	#5	54'-0"	564
U	2	#5	9'-8"	21
V	40	#9	13'-8"	1859
Z	4	#4	369'-7"	988
REINFORCING STEEL (LB) *				6,905
CLASS "C" CONC (BENT) (CY) **				37.1

* FOR CONTRACTOR'S INFORMATION ONLY.
** INCLUDES SHEAR KEY

② SHEAR KEY:
SPAN 2: BETWEEN GIRDER NO. 6 AND GIRDER NO. 7 ONLY.
SPAN 3: BETWEEN GIRDER NO. 5 AND GIRDER NO. 6 ONLY.
SEE IGSK STANDARD FOR DIMENSIONS, NOTES, AND DETAILS NOT SHOWN. ADJUST BARS M AND N AS SHOWN ON THIS SHEET.



BENCHMARK:
A-1212 - BRASS DISK, STAMPED A-1212 1973, SET IN THE TOP OF A CONCRETE HEADWALL ON THE WEST BOUND LANES OF HWY 90A, APPROX. 4.1 MILES WEST ALONG HWY 90A FROM THE JUNCTION OF HWY 6, IN SUGARLAND, TEXAS. THE DISK IS SET 2.0 FEET EAST OF THE WEST END, OF THE NORTH CONCRETE HEADWALL, AND 27.0 FEET NORTH OF THE CENTERLINE OF THE WESTBOUND LANES, AND ½FOOT LOWER THAN THE ROAD.

ELEV. = 78.65 FEET (NGVD-29) 1973 ADJ.

TBM:
TBM 6-TOP OF A CHISSLED BOX SET ON THE NORTHERN NOSE OF A MEDIAN AT FM 1464. THE POINT IS LOCATED ± 1,460 FEET NORTH OF THE CENTERLINE OF THE INTERSECTION OF FM 1464 AND W AIRPORT BLVD AND ± 40 FEET EAST OF THE WEST EDGE OF CONCRETE PAVEMENT FOR THE SOUTHBOUND LANE OF FM 1464.

ELEV. = 88.55 FEET (NGVD-29) 1973 ADJ.

NOTES:
HL 93 LOADING

GENERAL NOTES:

1. DESIGNED ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 7TH EDITION (2014) WITH 2015 & 2016 INTERIMS REVISIONS.

2. SEE COMMON FOUNDATION DETAILS (FD) STANDARD SHEET, FOR ALL FOUNDATION DETAILS AND NOTES NOT SHOWN.

COVER DIMENSIONS ARE CLEAR DIMENSION, UNLESS NOTED OTHERWISE
REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR

MATERIAL NOTES:

1. PROVIDE CLASS C CONCRETE (f'c = 3600 psi)

2. PROVIDE GRADE 60 REINFORCING STEEL

RECORD DRAWING
I CERTIFY THAT THIS DRAWING REFLECTS THE IMPROVEMENTS CONSTRUCTED AS TO SIZE, LOCATION AND GRADE AND THAT THE CONSTRUCTION WAS IN FULL COMPLIANCE WITH THE CONTRACT DOCUMENTS

BY ____________ DATE ______

TITLE ____________

FORT BEND COUNTY ENGINEERING DEPARTMENT
APPROVED: [signature]
DEVELOPMENT COORDINATOR
DATE: 7/24/17

DATE	REVISION	BY

PLAT NAME:
WEST ALIANA TRACE DRIVE
CPC 101 FILE NO.
C.O.H. LOG NO. 16-

ALIANA DEVELOPMENT COMPANY

WEST ALIANA TRACE DRIVE BRIDGE

BENT 3

OYSTER CREEK BRIDGE

LJA Engineering, Inc.
2929 Briarpark Drive
Suite 600
Houston, Texas 77042
Phone 713.953.5200
Fax 713.953.5026
FRN-F-1386

LJA PROJECT NO.: 1968-1050

DESIGNED BY:	DRAWN BY:	DATE:
EM	MS	MARCH 2017

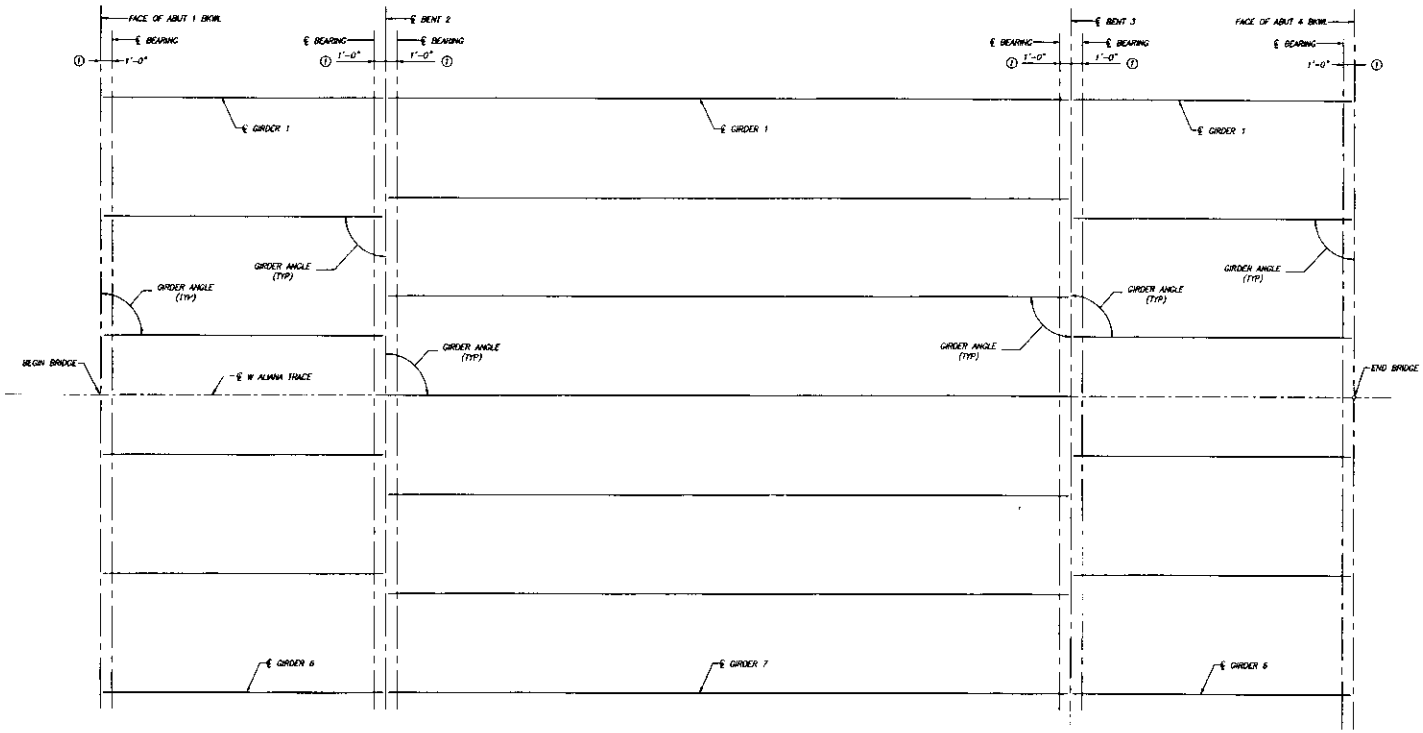
NOTE: CITY SIGNATURES VALID FOR ONE YEAR ONLY AFTER DATE OF SIGNATURES

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
WATER / STREET & BRIDGE / TRAFFIC / STORM WATER QUALITY / FACILITIES
[signatures] 3/23/17

FILE NO. | FOR CITY OF HOUSTON USE ONLY

DRAWING SCALE

STATE OF TEXAS — ERIC R. METHVIN — 102257 — LICENSED PROFESSIONAL ENGINEER — 03-15-2017



PLAN
(TX28 GIRDER)

BENT REPORT

ABUT NO. 1 (S 58 41 7.92 W)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 26.000 L

		GIRDER SPA. (C.L. BENT)	GIRDER ANGLE D	M	S
SPAN 1	GIRDER 1	0.000	90	0	0
	GIRDER 2	10.400	90	0	0
	GIRDER 3	10.400	90	0	0
	GIRDER 4	10.400	90	0	0
	GIRDER 5	10.400	90	0	0
	GIRDER 6	10.400	90	0	0
	TOTAL	52.000			

BENT NO. 2 (S 58 41 7.92 W)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 26.000 L

		GIRDER SPA. (C.L. BENT)	GIRDER ANGLE D	M	S
SPAN 1	GIRDER 1	0.000	90	0	0
	GIRDER 2	10.400	90	0	0
	GIRDER 3	10.400	90	0	0
	GIRDER 4	10.400	90	0	0
	GIRDER 5	10.400	90	0	0
	GIRDER 6	10.400	90	0	0
	TOTAL	52.000			
SPAN 2	GIRDER 1	0.000	90	0	0
	GIRDER 2	8.667	90	0	0
	GIRDER 3	8.667	90	0	0
	GIRDER 4	8.667	90	0	0
	GIRDER 5	8.667	90	0	0
	GIRDER 6	8.667	90	0	0
	GIRDER 7	8.667	90	0	0
	TOTAL	52.000			

BENT NO. 3 (S 58 41 7.92 W)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 26.000 L

		GIRDER SPA. (C.L. BENT)	GIRDER ANGLE D	M	S
SPAN 2	GIRDER 1	0.000	90	0	0
	GIRDER 2	8.667	90	0	0
	GIRDER 3	8.667	90	0	0
	GIRDER 4	8.667	90	0	0
	GIRDER 5	8.667	90	0	0
	GIRDER 6	8.667	90	0	0
	GIRDER 7	8.667	90	0	0
	TOTAL	52.000			
SPAN 3	GIRDER 1	0.000	90	0	0
	GIRDER 2	10.400	90	0	0
	GIRDER 3	10.400	90	0	0
	GIRDER 4	10.400	90	0	0
	GIRDER 5	10.400	90	0	0
	GIRDER 6	10.400	90	0	0

ABUT NO. 4 (S 58 41 7.92 W)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 26.000 L

		GIRDER SPA. (C.L. BENT)	GIRDER ANGLE D	M	S
SPAN 3	GIRDER 1	0.000	90	0	0
	GIRDER 2	10.400	90	0	0
	GIRDER 3	10.400	90	0	0
	GIRDER 4	10.400	90	0	0
	GIRDER 5	10.400	90	0	0
	GIRDER 6	10.400	90	0	0
	TOTAL	52.000			

GIRDER REPORT

GIRDER REPORT, SPAN 1

	HORIZONTAL DISTANCE C-C BENT	C-C BRG.	TRUE DISTANCE BOT. BM. FLG.②	GIRDER SLOPE
GIRDER 1	25.000	23.000	24.50	0.5445
GIRDER 2	25.000	23.000	24.50	0.5445
GIRDER 3	25.000	23.000	24.50	0.5445
GIRDER 4	25.000	23.000	24.50	0.5445
GIRDER 5	25.000	23.000	24.50	0.5445
GIRDER 6	25.000	23.000	24.50	0.5445

GIRDER REPORT, SPAN 2

	HORIZONTAL DISTANCE C-C BENT	C-C BRG.	TRUE DISTANCE BOT. BM. FLG.②	GIRDER SLOPE
GIRDER 1	60.000	53.000	59.50	0.0000
GIRDER 2	60.000	53.000	59.50	0.0000
GIRDER 3	60.000	53.000	59.50	0.0000
GIRDER 4	60.000	53.000	59.50	0.0000
GIRDER 5	60.000	53.000	59.50	0.0000
GIRDER 6	60.000	53.000	59.50	0.0000
GIRDER 7	60.000	53.000	59.50	0.0000

GIRDER REPORT, SPAN 3

	HORIZONTAL DISTANCE C-C BENT	C-C BRG.	TRUE DISTANCE BOT. BM. FLG.②	GIRDER SLOPE
GIRDER 1	25.000	23.000	24.50	-0.5445
GIRDER 2	25.000	23.000	24.50	-0.5445
GIRDER 3	25.000	23.000	24.50	-0.5445
GIRDER 4	25.000	23.000	24.50	-0.5445
GIRDER 5	25.000	23.000	24.50	-0.5445
GIRDER 6	25.000	23.000	24.50	-0.5445

① SEE TXDOT STANDARD FOR ORIENTATION OF DIMENSIONS.

② GIRDER LENGTHS SHOWN ARE BOTTOM GIRDER FLANGE LENGTHS WITH ADJUSTMENTS MADE FOR GIRDER SLOPE.

ERIC R. METHVIN
102257
LICENSED
PROFESSIONAL ENGINEER
STATE OF TEXAS
05-19-2017

BENCHMARKS:
A-1212 – BRASS DISK, STAMPED A-1212 1973, SET IN THE TOP OF A CONCRETE HEADWALL ON THE WEST BOUND LANES OF HWY 90A, APPROX. 4.1 MILES WEST ALONG HWY 90A FROM THE JUNCTION OF HWY 6, IN SUGARLAND, TEXAS. THE DISK IS SET 2.0 FEET EAST OF THE WEST END, OF THE NORTH CONCRETE HEADWALL AND 77.0 FEET NORTH OF THE CENTERLINE OF THE WESTBOUND LANES, AND 3/10OT LOWER THAN THE ROAD.

ELEV. = 78.85 FEET (NGVD-29) 1973 ADJ.

TBM 5-TOP OF A CHISELED BOX SET ON THE NORTHERN NOSE OF A METHANE AT FM 1464. THE POINT IS LOCATED 3.1,480 FEET NORTH OF THE CENTERLINE OF THE INTERSECTION OF FM 1464 AND S. AIRPORT BLVD AND 5.40 FEET EAST OF THE WEST SIDE OF CONCRETE PAVEMENT FOR THE SOUTHBOUND LANE OF FM 1464.

ELEV. = 86.55 FEET (NGVD-29) 1973 ADJ.

NOTES:
HL 93 LOADING

RECORD DRAWING
I CERTIFY THAT THIS DRAWING REFLECTS THE IMPROVEMENTS CONSTRUCTED AS TO SIZE, LOCATION AND GRADE AND THAT THE CONSTRUCTION WAS IN FULL COMPLIANCE WITH THE CONTRACT DOCUMENTS

BY _____ DATE _____

TITLE _____

FORT BEND COUNTY ENGINEERING DEPARTMENT

APPROVED: _____ DEVELOPMENT COORDINATOR

DATE: 7/24/17

DATE	REVISION	BY

PLAT NAME:
WEST ALIANA TRACE DRIVE
CPC 101 FILE NO.
C.O.H. LOG NO. 16-

ALIANA DEVELOPMENT COMPANY

WEST ALIANA TRACE DRIVE BRIDGE

GIRDER LAYOUT

OYSTER CREEK BRIDGE

L.I.A Engineering, Inc.
2929 Briarpark Drive
Suite 600
Houston, Texas 77042
Phone 713 953 5200
Fax 713 953 5078
FRN - F-1386

L.I.A PROJECT NO.: 1968-1050

DESIGNED BY:	DRAWN BY:	DATE:
EM	MS	MARCH 2017

NOTE: CITY SIGNATURES VALID FOR ONE YEAR ONLY AFTER DATE OF SIGNATURES

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	STREET & DRAIN
WASTEWATER	TRAFFIC
STORM	STORM WATER QUALITY
FACILITIES	

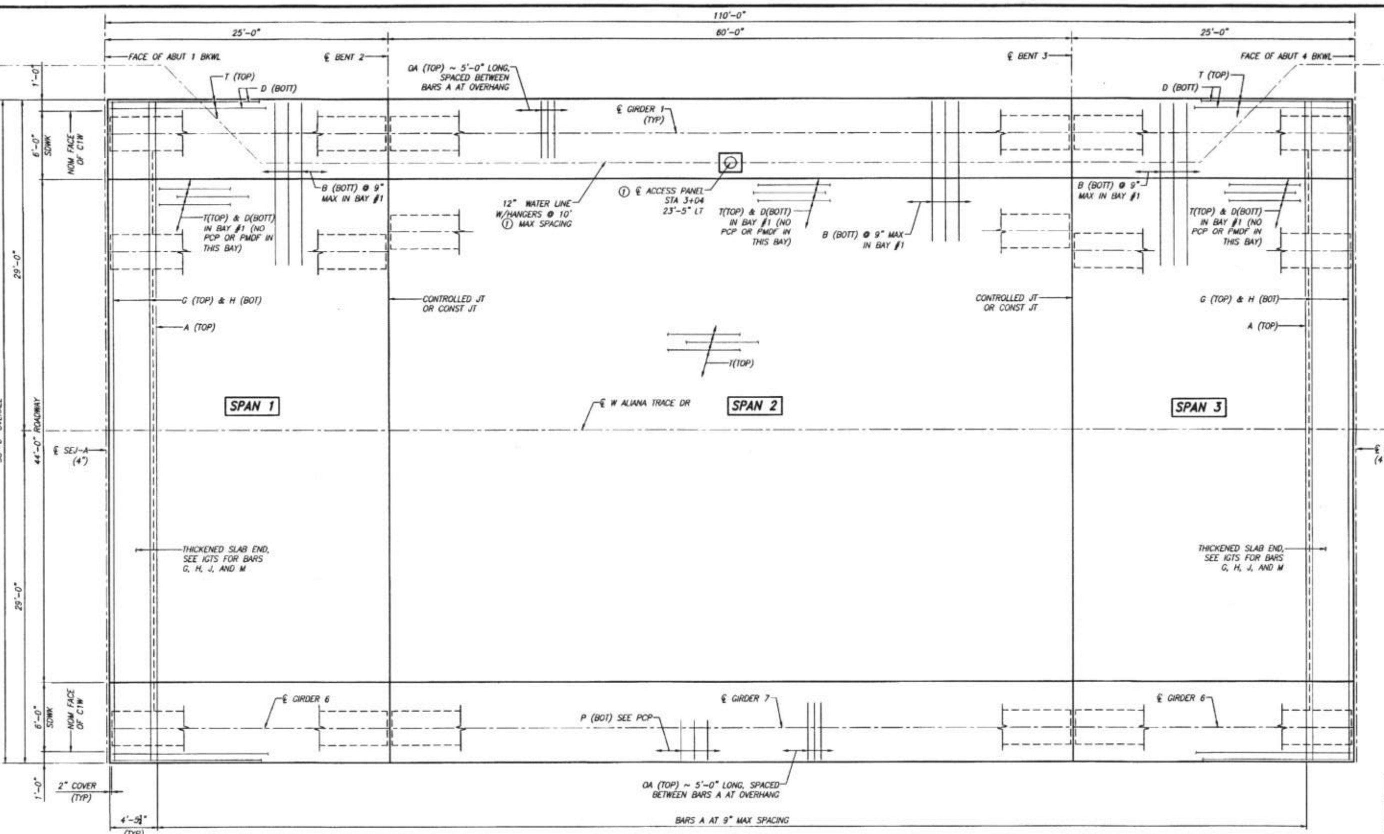
FILE NO.

DRAWING SCALE

FOR CITY OF HOUSTON USE ONLY

SHEET NO. 12 OF 50

WEST ALIANA TRACE DRIVE BRIDGE - JOB NO. 1968-1050



PLAN
SCALE: 1"=5'

① SEE MISCELLANEOUS DETAILS SHEET FOR ADDITIONAL INFORMATION

TABLE OF ESTIMATED QUANTITIES

SPAN	REINF CONC SLAB	BRIDGE SIDEWALK	PRESTR CONC GIRDERS (Tx28)	*TOTAL REINF STEEL
	SF	SF	LF	LB
1	1,450	350	147.0	3,895
2	3,480	840	416.5	9,348
3	1,450	350	147.0	3,895
TOTAL	6,380	1,540	710.5	17,138

* FOR CONTRACTOR'S INFORMATION ONLY. REINF STEEL QUANTITY IS CALCULATED USING APPROX 2.3 LB/SF OF BRIDGE DECK AND 1.6 LB/SF OF SIDEWALK.

BAR TABLE

BAR	SIZE
A	#4
B	#4
D	#4
G	#4
H	#4
J	#4
M	#4
P	#4
T	#4
OA	#5

GENERAL NOTES:

1. DESIGNED ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 7TH EDITION (2014) WITH 2015 & 2016 INTERIMS REVISIONS.
2. SEE PCP AND PCP-FAB FOR PANEL DETAILS NOT SHOWN.
3. SEE IGTS STANDARD FOR THICKENED SLAB END DETAILS AND QUANTITY ADJUSTMENTS.
4. SEE IGMS STANDARD FOR MISCELLANEOUS DETAILS.
5. SEE RAILING STANDARD FOR RAIL ANCHORAGE IN SLAB.
6. SEE PMDF STANDARD FOR DETAILS AND QUANTITY ADJUSTMENTS IF THIS OPTION IS USED.
7. COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE.

MATERIAL NOTES:

1. PROVIDE CLASS S CONCRETE (f'c = 4000 psi).
2. PROVIDE GRADE 60 REINFORCING STEEL.
3. PROVIDE BAR LAPS, WHERE REQUIRED, AS FOLLOWS:
   UNCOATED ~ #4 = 1'-5"

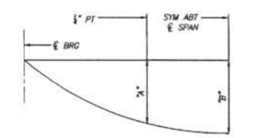
TABLE OF SECTION DEPTHS

SPAN	GIRDER No.	"X" AT ℄ BRG	"Y" AT ℄ BRG	"Z" AT ℄ SPAN *
1	ALL	10 1/2"	3-2 1/2"	10 1/2"
2	ALL	10 1/2"	3-2 1/2"	10"

* THEORETICAL DIMENSION

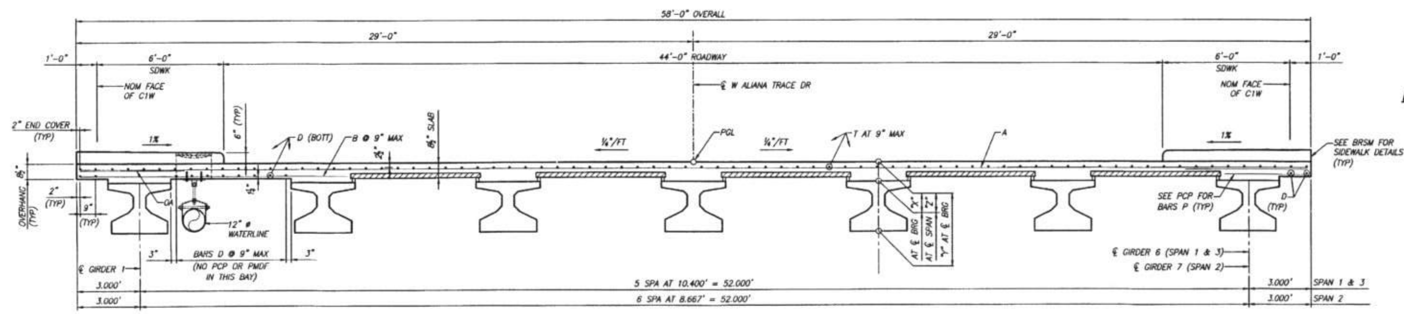
TABLE OF DEAD LOAD DEFLECTIONS

SPAN	GIRDER No	"A" (FT)	"B" (FT)
1 & 3	ALL	0.001	0.002
2	1	0.045	0.063
	2-6	0.053	0.074
	7	0.045	0.063



DEAD LOAD DEFLECTION DIAGRAM

DEFLECTION SHOWN ARE DUE TO PRESTRESSED CONCRETE PANELS AND CAST-IN-PLACE SLAB ONLY (Ec=5000 ksi). ADJUST DEFLECTIONS BASED ON FIELD OBSERVATION AS NEEDED



TYPICAL TRANSVERSE SECTION
SCALE: ⅜"=1'-0"

BENCHMARK:
A-1212 – BRASS DISK, STAMPED A-1212 1973, SET IN THE TOP OF A CONCRETE HEADWALL ON THE WEST BOUND LANES OF HWY 90A, APPROX. 4.1 MILES WEST ALONG HWY 90A FROM THE JUNCTION OF HWY 6, IN SUGARLAND, TEXAS. THE DISK IS SET 2.0 FEET EAST OF THE WEST END, OF THE NORTH CONCRETE HEADWALL, AND 27.0 FEET NORTH OF THE CENTERLINE OF THE WESTBOUND LANES, AND ½FOOT LOWER THAN THE ROAD.

ELEV. = 78.65 FEET (NGVD-29) 1973 ADJ.

TBM:
TBM 6-TOP OF A CHISSLED BOX SET ON THE NORTHERN NOSE OF A MEDIAN AT FM 1464. THE POINT IS LOCATED ± 1,460 FEET NORTH OF THE CENTERLINE OF THE INTERSECTION OF FM 1464 AND W AIRPORT BLVD AND ± 40 FEET EAST OF THE WEST EDGE OF CONCRETE PAVEMENT FOR THE SOUTHBOUND LANE OF FM 1464.

ELEV. = 88.55 FEET (NGVD-29) 1973 ADJ.

NOTES:
HL 93 LOADING

RECORD DRAWING
I CERTIFY THAT THIS DRAWING REFLECTS THE IMPROVEMENTS CONSTRUCTED AS TO SIZE, LOCATION AND GRADE AND THAT THE CONSTRUCTION WAS IN FULL COMPLIANCE WITH THE CONTRACT DOCUMENTS

BY ________ DATE ________

TITLE ________

FORT BEND COUNTY ENGINEERING DEPARTMENT
APPROVED: [signature]
DEVELOPMENT COORDINATOR
DATE: 7/24/17

DATE	REVISION	BY

PLAT NAME:
WEST ALIANA TRACE DRIVE
CPC 101 FILE NO.
C.O.H. LOG NO. 16–

ALIANA DEVELOPMENT COMPANY

WEST ALIANA TRACE DRIVE BRIDGE

SLAB PLAN
OYSTER CREEK BRIDGE

LJA Engineering, Inc.
2929 Briarpark Drive
Suite 600
Houston, Texas 77042
Phone 713.953.5200
Fax 713.953.5026
FRN-F-1386

LJA PROJECT NO.: 1968–1050
DESIGNED BY: EM | DRAWN BY: MS | DATE: MARCH 2017

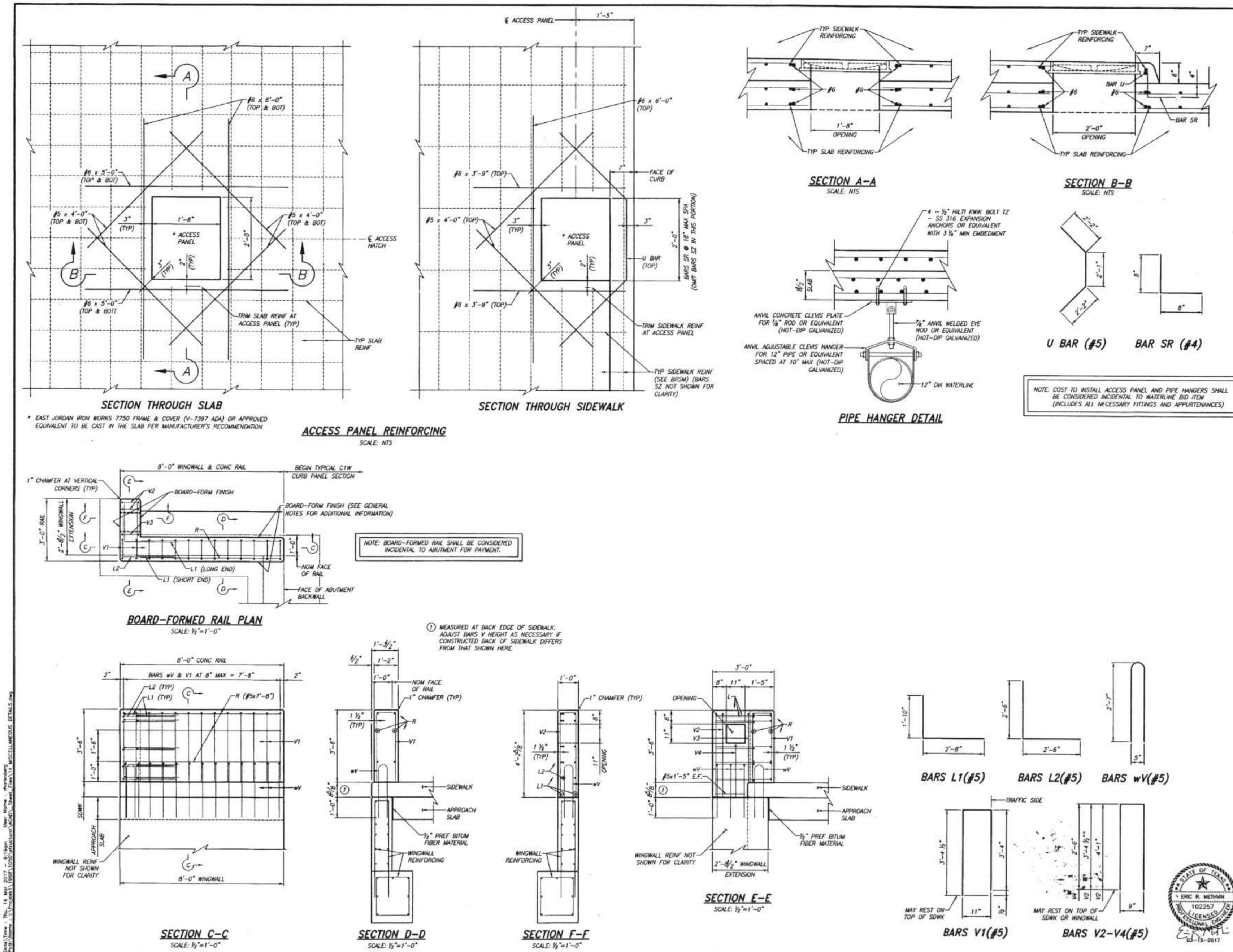
NOTE: CITY SIGNATURES VALID FOR ONE YEAR ONLY AFTER DATE OF SIGNATURES

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
WATER | STREET & BRIDGE | TRAFFIC | STORM WATER QUALITY | FACILITIES
[signatures] 3-23-17

FILE NO.
FOR CITY OF HOUSTON USE ONLY
DRAWING SCALE

STATE OF TEXAS
ERIC R. METHVIN
102257
LICENSED PROFESSIONAL ENGINEER
03-15-2017

SHEET NO. 13 OF 50



BENCHMARK:

A-1212 – BRASS DISK, STAMPED A-1212 1973, SET IN THE TOP OF A CONCRETE HEADWALL ON THE WEST BOUND LANES OF HWY 90A, APPROX. 4.1 MILES WEST ALONG HWY 90A FROM THE JUNCTION OF HWY 6, IN SUGARLAND, TEXAS. THE DISK IS SET 2.0 FEET EAST OF THE WEST END, OF THE NORTH CONCRETE HEADWALL, AND 27.0 FEET NORTH OF THE CENTERLINE OF THE WESTBOUND LANES, AND ½FOOT LOWER THAN THE ROAD.

ELEV. = 78.65 FEET (NGVD-29) 1973 ADJ.

TBM:

TBM 6-TOP OF A CHISSLED BOX SET ON THE NORTHERN NOSE OF A MEDIAN AT FM 1464. THE POINT IS LOCATED ± 1,460 FEET NORTH OF THE CENTERLINE OF THE INTERSECTION OF FM 1464 AND W AIRPORT BLVD AND ± 40 FEET EAST OF THE WEST EDGE OF CONCRETE PAVEMENT FOR THE SOUTHBOUND LANE OF FM 1464.

ELEV. = 88.55 FEET (NGVD-29) 1973 ADJ.

NOTES:

HL 93 LOADING

MATERIAL NOTES:

1. PROVIDE CLASS S CONCRETE (f'c = 4000 psi).
2. PROVIDE GRADE 60 REINFORCING STEEL.
3. SEE ARCHITECTURAL SHEETS FOR BOARD-FORM FINISH AND 3-FORM PANEL REQUIREMENTS ON THE BRIDGE RAIL.

COVER DIMENSIONS ARE CLEAR DIMENSION, UNLESS NOTED OTHERWISE
REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR

RECORD DRAWING

I CERTIFY THAT THIS DRAWING REFLECTS THE IMPROVEMENTS CONSTRUCTED AS TO SIZE, LOCATION AND GRADE AND THAT THE CONSTRUCTION WAS IN FULL COMPLIANCE WITH THE CONTRACT DOCUMENTS

BY ________ DATE ____

TITLE ________

FORT BEND COUNTY ENGINEERING DEPARTMENT

APPROVED: [signature]
DEVELOPMENT COORDINATOR

DATE: 7/24/17

DATE	REVISION	BY

PLAT NAME:
WEST ALIANA TRACE DRIVE
CPC 101 FILE NO.
C.O.H. LOG NO. 16–

ALIANA DEVELOPMENT COMPANY

WEST ALIANA TRACE DRIVE BRIDGE

MISCELLANEOUS DETAILS
OYSTER CREEK BRIDGE

LJA Engineering, Inc.
2929 Briarpark Drive, Suite 600, Houston, Texas 77042
Phone 713.953.5200 Fax 713.953.5026 FRN - F-1386

LJA PROJECT NO.: 1968–1050

DESIGNED BY:	DRAWN BY:	DATE:
EM	MS	MARCH 2017

NOTE: CITY SIGNATURES VALID FOR ONE YEAR ONLY AFTER DATE OF SIGNATURES

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

[signature] 03/23/17 — STREET & BRIDGE
[signature] 3-23-17 — TRAFFIC
[signature] 3/23/17 — STORM WATER QUALITY

FILE NO. — FOR CITY OF HOUSTON USE ONLY

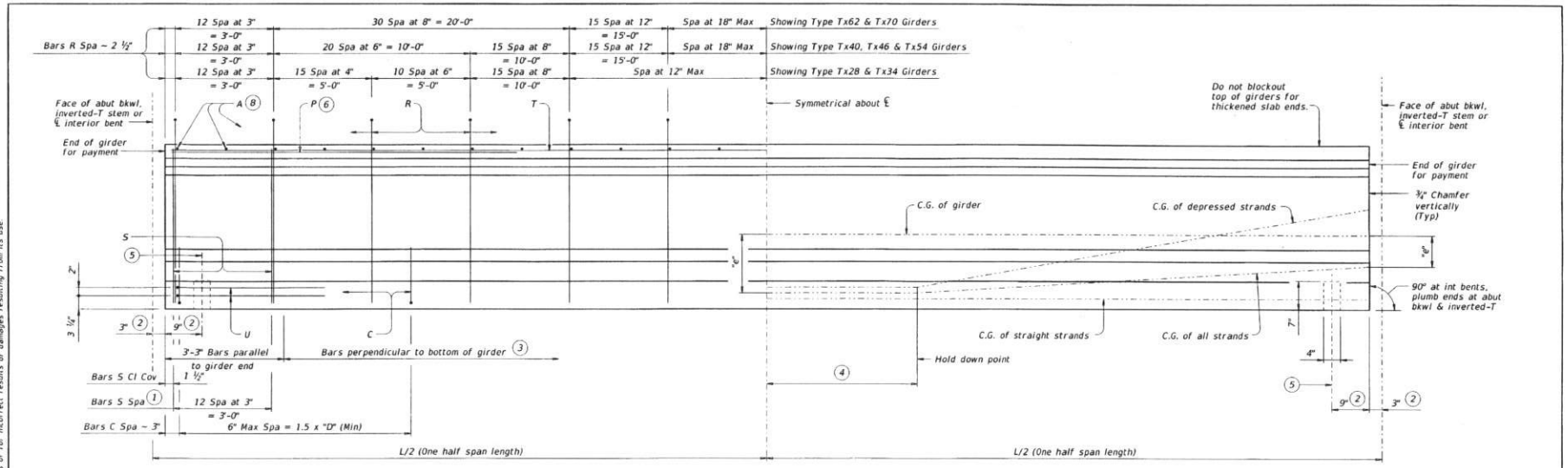
DRAWING SCALE

SHEET NO. 14 OF 50

STATE OF TEXAS — ERIC R. METHVIN — 102257 — LICENSED PROFESSIONAL ENGINEER — 03-15-2017

57913

WEST ALIANA TRACE DRIVE BRIDGE – JOB NO. 1968–1050



GIRDER ELEVATION

(1) Bundle with Bars R.

(2) Measured along ℄ Girder at interior bents; perpendicular to abutment bkwl or inverted-T stem.

(3) The average of the top and bottom spacing of Bars R cannot exceed the required spacing.

(4) L/20, but not less than 5'-0" (-0,+2").

(5) ℄ 4" x 1 ½" Vertical Slotted Hole at doweled girder end [labeled (D) on Bridge Layout]. Required for outside girder only or as shown on substructure details. Anchorage holes may be tapered (4 ¾" x 1 ⅝") at base. If holes are formed with sheet metal, forms may be left in place.

(6) Bars P (#6 x 15'-0") are only required when "e" at girder ends exceeds 0.25 x "D". At the fabricator's option bars larger than #6 may be used. When L is less than 50 ft, Bars P are to be the same length as Bars T.

(7) 1 ⅜" Clear Cover to Bars S.

(8) Space Bars A at 6" Max for girders requiring overhang bracket hangers. Space at 12" Max for all other girders. Tie to Bars R as necessary. See standard IGMS for "Deck Forming Notes".

(9) Based on 155 pcf total weight of concrete and reinforcing steel.

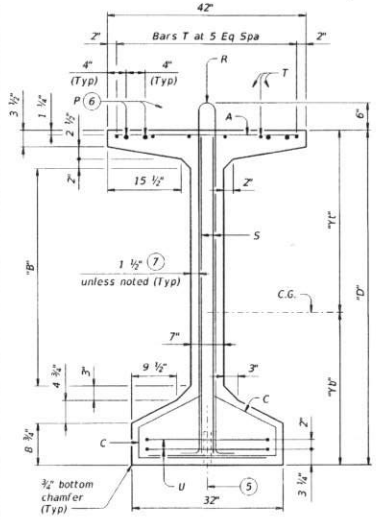
GIRDER DIMENSIONS AND SECTION PROPERTIES

Girder Type	"D" (in.)	"B" (in.)	"Yt" (in.)	"Yb" (in.)	Area ($in.^2$)	"Ix" ($in.^4$)	"Iy" ($in.^4$)	Weight (9) (plf)
Tx28	28	6	15.02	12.98	585	52,772	40,559	630
Tx34	34	12	18.49	15.51	627	88,355	40,731	675
Tx40	40	18	21.90	18.10	669	134,990	40,902	720
Tx46	46	22	25.90	20.10	761	198,089	46,478	819
Tx54	54	30	30.49	23.51	817	299,740	46,707	880
Tx62	62	37 ½"	33.72	28.28	910	463,072	57,351	980
Tx70	70	45 ½"	38.09	31.91	966	628,747	57,579	1,040

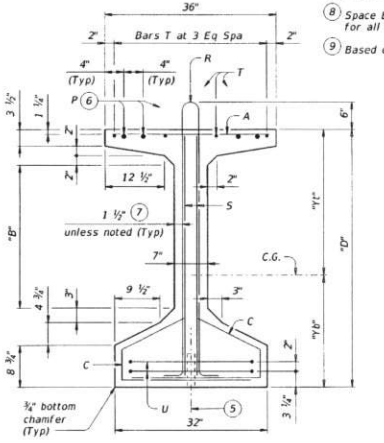
GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
Provide Class H concrete.
Provide Grade 60 reinforcing steel.
An equal area of deformed Welded Wire Reinforcement (WWR) (ASTM A1064) may be substituted for Bars A, C, R or T unless otherwise noted.
It is permissible for bars or strands to come in contact with materials used in forming anchor holes.

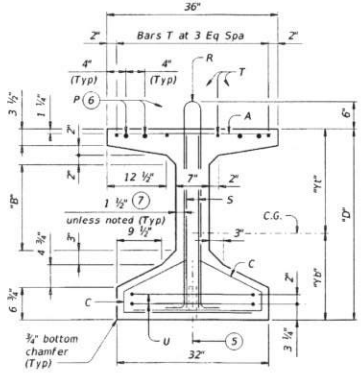
Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing bar dimensions shown are out-to-out of bar.



TYPE Tx62 & Tx70



TYPE Tx46 & Tx54



TYPE Tx28, Tx34 & Tx40

HL93 LOADING

SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

PRESTRESSED CONCRETE I-GIRDER DETAILS

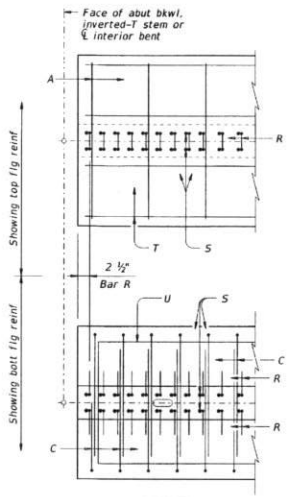
IGD

FILE: igdstds1.dgn	DN: TxDOT	CK: JNH	DW: JTR	CK: JNH
©TxDOT October 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	DIST	COUNTY		SHEET NO. 15

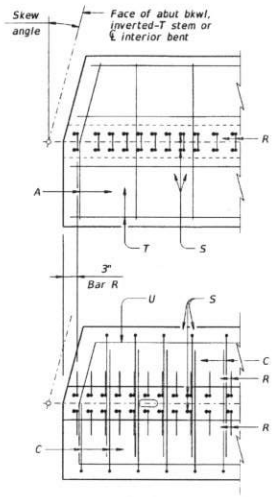
7/24/17

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 this standard to other formats or for incorrect results or damages resulting from its use.

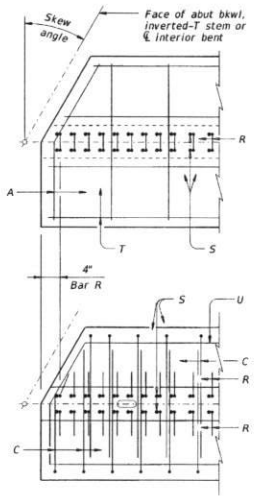
DATE:
FILE:



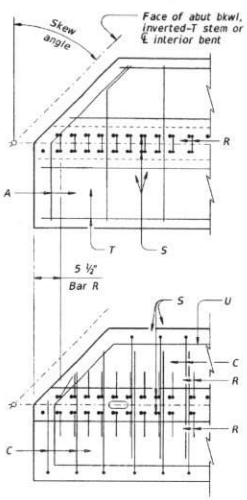
0° SKEW



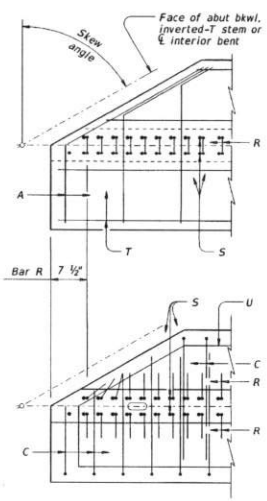
15° SKEW



30° SKEW

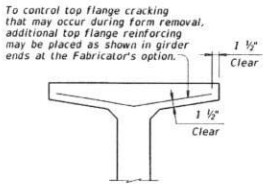


45° SKEW

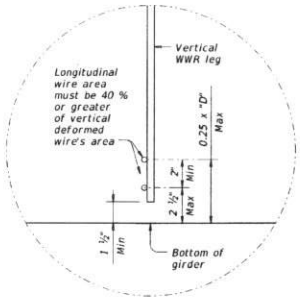


60° SKEW

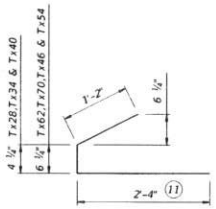
PLAN OF GIRDER ENDS (10)



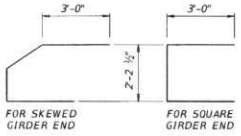
OPTIONAL TOP FLANGE REINFORCING DETAIL



OPTIONAL WELDED WIRE REINFORCEMENT (WWR) DETAIL

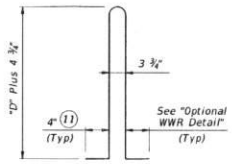


BARS C (#4)

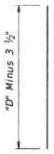


BARS U (#5)

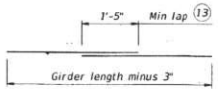
BARS A (#3)



BARS R (#4) (14)



BARS S (#6)



BARS T (#4)

(10) Reinforcing patterns shown are provided as guides to determine reinforcement placement in skewed ends. Place Bars S as close to girder end as cover requirements permit, which may prevent them to be bundled with Bars R.

(11) Bars may be cut or bent at skewed end as required.

(12) Increase as necessary for bars at skewed end.

(13) No portion of bar less than 10 ft.

(14) For Welded Wire Reinforcement (WWR) option, area of Bars R may be reduced in proportion to the increase in reinforcement yield strength over 60 ksi. Yield strength of WWR is limited to 75 ksi.

7/24/17

HL93 LOADING

SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

PRESTRESSED CONCRETE I-GIRDER DETAILS

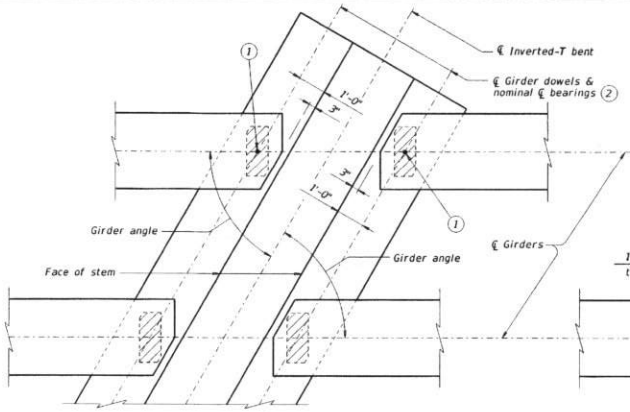
IGD

FILE: igdstds1.dgn	DN: TxDOT	CK: JMH	DW: JTR	CK: JMH
©TxDOT October 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	DIST	COUNTY		SHEET NO. 16

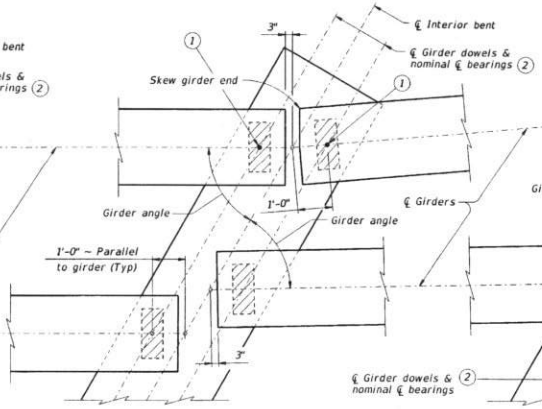
DISCLAIMER:
"The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE:
FILE:

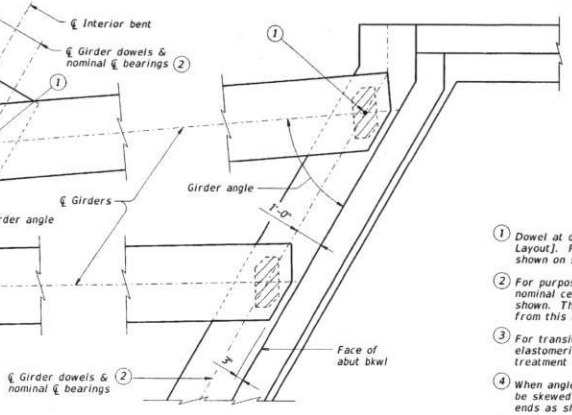
DATE:
FILE:



AT INVERTED-T BENT W/SKEW



AT CONVENTIONAL INTERIOR BENT W/SKEW



AT ABUTMENT W/SKEW (3)

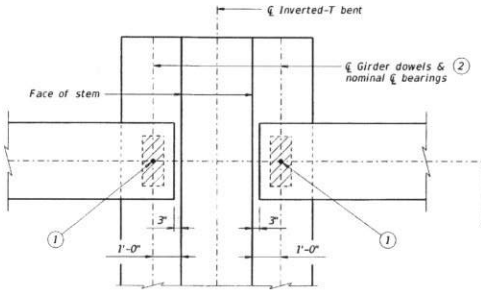
(1) Dowel at doweled girder end (labeled (D) on Bridge Layout). Required for outside girder only or as shown on substructure details.

(2) For purposes of computing bearing seat elevations, nominal centerline of bearing must be defined as shown. The actual center of bearing pad may vary from this line.

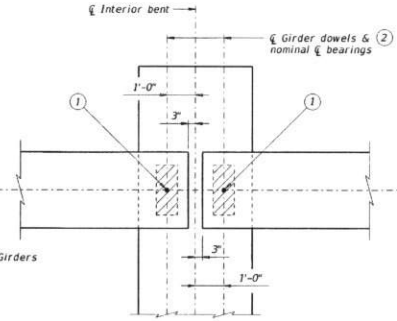
(3) For transition bents with backwall, girder and elastomeric bearings must receive the same treatment as shown for abutments.

(4) When angle exceeds 0°, one or both girders ends must be skewed to maintain the clearance between girder ends as shown in view.

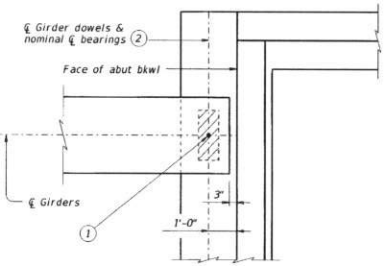
(5) See Table of Bearing Pad Dimensions for bearing size. Girder end skew angles in Table not applicable for this situation. Table reflects girder conflicts of this type on radial bents only.



AT INVERTED-T BENT



AT CONVENTIONAL INTERIOR BENT



AT ABUTMENT (3)

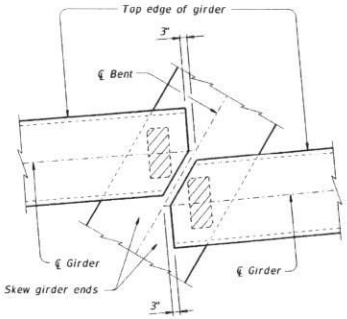
GIRDER END DETAILS

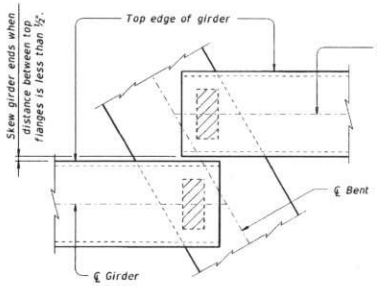
GENERAL NOTES:

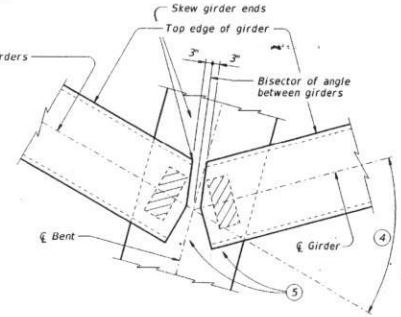
These details accommodate skew angles up to 60°. Shop drawings for approval are required.

A bearing layout which identifies location and orientation of all bearings must be developed by the bearing fabricator. Permanently mark each bearing in accordance with the bearing layout. A copy of the bearing layout is to be provided to the Engineer.

Cost of furnishing and installing elastomeric bearings, including beveled and embedded steel plates, must be included in unit price bid for "Prestressed Concrete Girders".







GIRDER CONFLICT DETAILS

57243

7/24/17

HL93 LOADING

SHEET 1 OF 3

Texas Department of Transportation

Bridge Division Standard

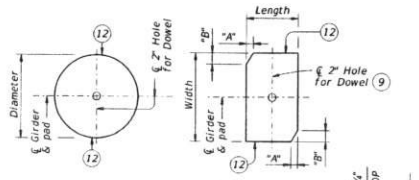
ELASTOMERIC BEARING AND GIRDER END DETAILS

PRESTR CONCRETE I-GIRDERS

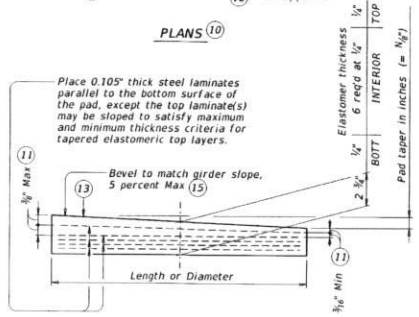
IGEB

FILE: igebsts1.dgn	DN: AEE	CK: JMH	DW: SFS	CK: TxDOT
©TxDOT October 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	DIST	COUNTY		SHEET NO. 17

DATE:
FILE:



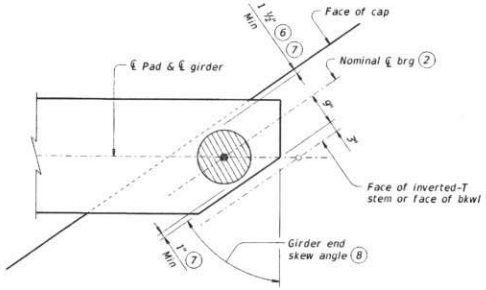
PLANS (10)



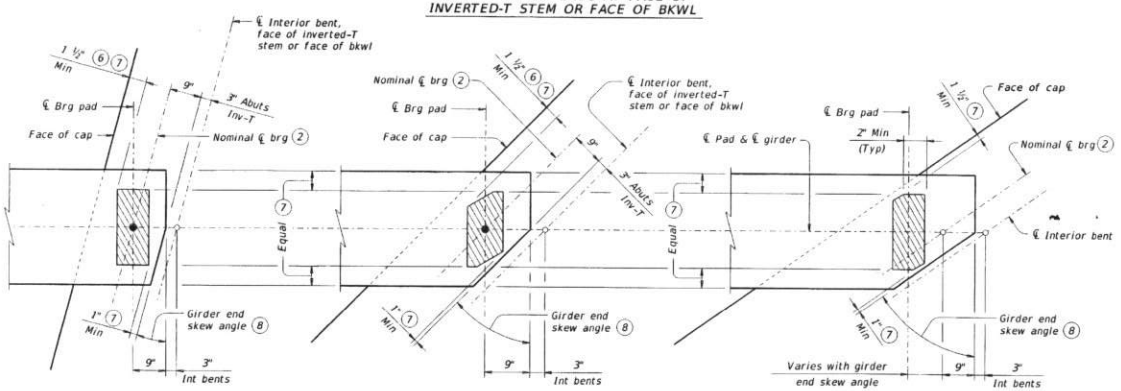
ELEVATION

LAMINATED ELASTOMERIC BEARING PAD

(50 DUROMETER)



ROUND BEARINGS FOR SKEWED GIRDER ENDS AT FACE OF INVERTED-T STEM OR FACE OF BKWL



SKEWED GIRDER ENDS AT INT BENTS, FACE OF INVERTED-T STEM OR FACE OF BKWL

SKEWED GIRDER ENDS AT CONVENTIONAL INTERIOR BENTS (16)

(NO GIRDER DOWELS)

BEARING PAD PLACEMENT DIAGRAMS

TABLE OF MINIMUM SUBSTRUCTURE DIMENSIONS (14)

Girder Type	Abutments: Face of Bkwl to Face of Cap	Int Bents: Overall Cap Width	Inv-T Bents: Corbel Width
Tx28 thru Tx54	1'-9"	3'-6"	1'-10 ½"
Tx62 & Tx70	2'-0"	4'-0"	2'-1 ½"

TABLE OF BEARING PAD DIMENSIONS

Bent Type	Girder Type	Bearing Type (13)	Girder End Skew Angle Range	Pad Size Lgth x Wdth	Pad Clip Dimensions "A"	Pad Clip Dimensions "B"
ABUTMENTS, INVERTED-T AND TRANSITION BENTS WITH BACKWALLS	Tx28,Tx34, Tx40,Tx46 & Tx54	G-1-"N"	0° thru 21°	8" x 21"	---	---
		G-2-"N"	21°+ thru 30°	8" x 21"	1 ½"	2 ½"
		G-3-"N"	30°+ thru 45°	9" x 21"	4 ½"	4 ½"
		G-4-"N"	45°+ thru 60°	15" Dia	---	---
	Tx62 & Tx70	G-5-"N"	0° thru 21°	9" x 21"	---	---
		G-6-"N"	21°+ thru 30°	9" x 21"	1 ½"	2 ½"
		G-7-"N"	30°+ thru 45°	10" x 21"	4 ½"	4 ½"
		G-8-"N"	45°+ thru 60°	10" x 21"	7 ¼"	4 ¼"
CONVENTIONAL INTERIOR BENTS	Tx28,Tx34, Tx40,Tx46 & Tx54	---	---	---	---	---
		---	---	---	---	---
		G-1-"N"	0° thru 60°	8" x 21"	---	---
	Tx62 & Tx70	G-5-"N"	0° thru 60°	9" x 21"	---	---
CONVENTIONAL INTERIOR BENTS WITH SKEWED GIRDER ENDS (GIRDER CONFLICTS) (16)	Tx28,Tx34, Tx40,Tx46 & Tx54	G-1-"N"	0° thru 18°	8" x 21"	---	---
		G-2-"N"	18°+ thru 30°	8" x 21"	1 ½"	2 ½"
		G-9-"N"	30°+ thru 45°	8" x 21"	3"	3"
		G-10-"N"	45°+ thru 60°	9" x 21"	6"	3 ½"
	Tx62 & Tx70	G-5-"N"	0° thru 18°	9" x 21"	---	---
		G-5-"N"	18°+ thru 30°	9" x 21"	---	---
		G-11-"N"	30°+ thru 45°	9" x 21"	1 ½"	1 ½"
		G-12-"N"	45°+ thru 60°	9" x 21"	3"	1 ¾"

(2) For purposes of computing bearing seat elevations, nominal centerline of bearing must be defined as shown. The actual center of bearing pad may vary from this line.

(6) 3" for inverted-T.

(7) Place centerline pad as near nominal centerline bearing as possible between limits shown.

(8) Girder end skew angle is equal to 90° minus the girder angle except at some conflicting girders.

(9) Provide 2" dia hole only at locations required. See Substructure details for location.

(10) See Table of Bearing Pad Dimensions for dimensions.

(11) Maximum and minimum layer thicknesses shown are for elastomer only, on tapered layers.

(12) Locate Permanent Mark here.

(13) Indicate BEARING TYPE on all pads. For tapered pads, locate BEARING TYPE on the high side. The Fabricator must include the value of "N" (amount of taper in 1/8" increments) in this mark.
Examples: N=0, (for 0" taper)
N=1, (for ⅛" taper)
N=2, (for ¼" taper)
(etc.)
Fabricated pad top surface slope must not vary from plan girder slope by more than $\left(\frac{0.0625"}{\text{Length or Dia}}\right)$ IN/IN.

(14) Substructure dimensions must satisfy the minimums provided to accommodate the elastomeric bearings shown on this standard.

(15) See sheet 3 of 3 for beveled plate use when slopes exceed 5 percent.

(16) If girder end is skewed for a girder conflict at an interior bent and a beveled sole plate is required, use bearing type for abutments at this location. Location of bearing centerline is to be set as for abutments in this case.

HL93 LOADING

SHEET 2 OF 3

Texas Department of Transportation

Bridge Division Standard

ELASTOMERIC BEARING AND GIRDER END DETAILS

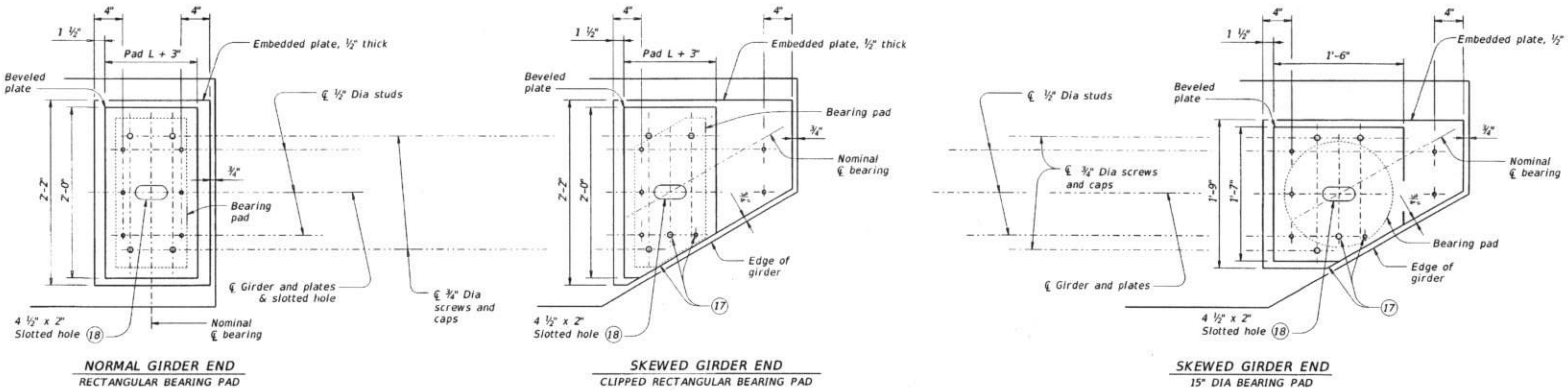
PRESTR CONCRETE I-GIRDERS

IGEB

FILE: igebsts1.dgn	DN: AEE	CK: JMH	DW: SFS	CK: TxDOT
©TxDOT October 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	DIST	COUNTY		SHEET NO. 18

7/24/17

DATE:
FILE:

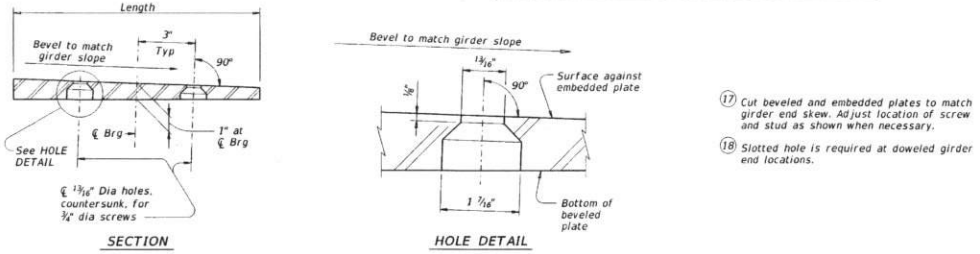


NORMAL GIRDER END
RECTANGULAR BEARING PAD

SKEWED GIRDER END
CLIPPED RECTANGULAR BEARING PAD

SKEWED GIRDER END
15" DIA BEARING PAD

PLAN VIEW OF SOLE PLATE DETAILS



SECTION

HOLE DETAIL

BEVELED PLATE DETAILS

(17) Cut beveled and embedded plates to match girder end skew. Adjust location of screw and stud as shown when necessary.

(18) Slotted hole is required at doweled girder end locations.

SOLE PLATE NOTES:

Provide constant thickness elastomeric bearings with beveled and embedded steel sole plates in accordance with these details when the girder slope exceeds 5 percent or if otherwise required in the plans. Provide for all girders in the span.

On the shop drawings, dimension sole plates to the nearest 1/16" based on required thickness at centerline of bearing and slope of girder. Thickness tolerance variation from the approved shop drawings is 1/16"+/-, except variation from a plane parallel to the theoretical top surface can not exceed 1/16" total. Bearing surface tolerances listed in Item 424 apply to embedded and beveled plates.

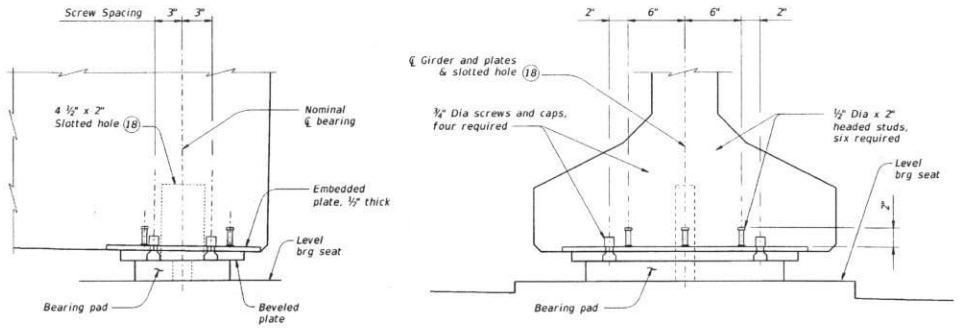
Steel plate must conform to ASTM A36, A572 Gr 50, or A709 Gr 36 or Gr 50. Hot dip galvanize both the embedded plate and beveled sole plate after fabrication. Seal weld caps to embedded plate before galvanizing.

When determining if relocation of screw holes and studs are necessary for skewed girder ends, minimum clearance from screw or stud centerline to plate edge is 1.25".

Tap threads in the embedded plate only. Drill and tap prior to galvanizing.

¾" Dia screws must be electroplated, socket flat head countersunk cap screws conforming to ASTM F835. Electroplating must conform to ASTM B633, SC 2, Type I. Provide screws long enough to maintain a ¾" minimum embedment into the embedded plate and galvanized cap. Provide galvanized steel caps (16 ga Min) with a nominal 1" inside diameter and deep enough to accommodate the screws, but not less than ½" deep or deeper than 1".

Install beveled sole plates prior to shipping girders. Installed screw heads must not protrude below the bottom of the beveled plate.



SIDE ELEVATION

END ELEVATION

GIRDER DETAILS

7/29/15

HL93 LOADING SHEET 3 OF 3

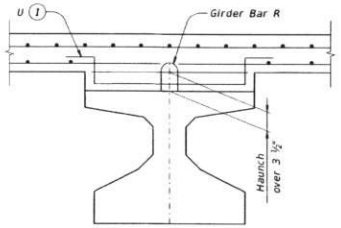
Texas Department of Transportation | Bridge Division Standard

ELASTOMERIC BEARING AND GIRDER END DETAILS
PRESTR CONCRETE I-GIRDERS

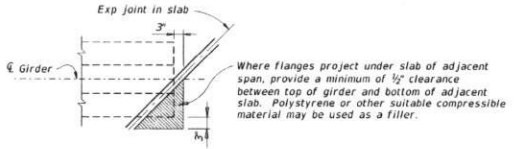
IGEB

FILE: igebdet1.dgn	DN: AEE	CK: JMH	DW: SFS	CK: TxDOT
©TxDOT October 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	DIST	COUNTY		SHEET NO. 19

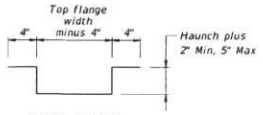
DATE:
FILE:



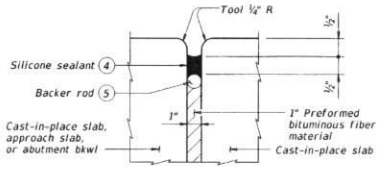
HAUNCH REINFORCING DETAIL



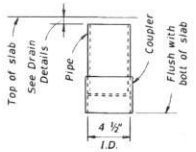
TREATMENT AT GIRDER END FOR SKEWED SPANS



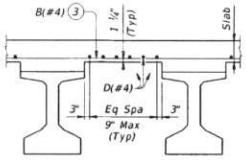
BARS U (#4)



TYPE A JOINT DETAIL (6)

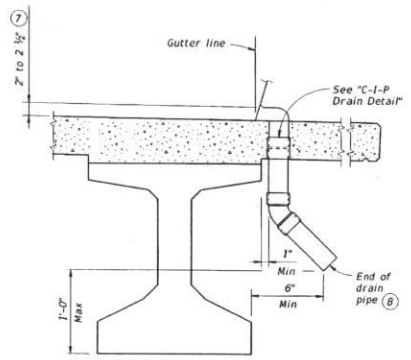


C-I-P DRAIN DETAIL (2)



TYPICAL PART TRANSVERSE SLAB SECTION WITHOUT PCP

Top reinforcing steel not shown for clarity.



DRAIN DETAIL (9)

(1) Space Bars U with girder Bars R in all areas where measured haunch exceeds 3 ½".

(2) Roughen outside of PVC with coarse rasp or equal to ensure bond with cast-in-place concrete.

(3) Bars B(#4) spaced at 9" Max with 2" end cover. Overhang option, Contractor's may end alternating bars B(#4) at centerline outside girder.

(4) Class 7 silicone sealant that conforms to DMS-6310. Install when ambient temperature is between 55°F and 85°F and rising. Engineer to determine allowable hours for sealant application.

(5) 1 ¼" backer rod must be compatible with joint sealant. Use of multiple pieces to create a backer rod cross section is not permitted. Top of backer rod must be convex as shown.

(6) The maximum distance between Type A expansion joints is 100'. See Bridge Layout for location of joints. Type A joints are subsidiary to Item 422, "Concrete Superstructures".

(7) Drain entrance formed in rail or sidewalk.

(8) Water may not be discharged onto girders.

(9) All drain pipe and fittings to be 4" diameter (Sch 40) PVC. See Item 481 "Pipe for Drains" for pipe, connections and solvent welding. Bend reinforcing steel to clear PVC 1". Drain length and location is as directed by the Engineer. Drains are not permitted over roadways or railways, or within 10'-0" of bent caps. Degrease outside of exposed PVC, apply acrylic water base primer, then coat with same surface finishing material as used for outside girder face. Variations of the above designs, as required for the type of rail used and its location on the structure, may be installed with the approval and direction of the Engineer.

GENERAL NOTES:
Designed according to AASHTO LRFD Bridge Design Specifications.
All items (reinforcing steel, drains, joint formers, etc.) shown on this sheet are subsidiary to other bid items.

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.

DECK FORMWORK NOTES:
Overhang bracket hangers are limited to a safe working load of 3,600 lbs, applied to and along the axis of a coil rod at 45 degrees from vertical, regardless of higher loads permitted by hanger manufacturers. Do not place a hanger less than 12" from girder end. Space hangers accordingly.

7/24/17

SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

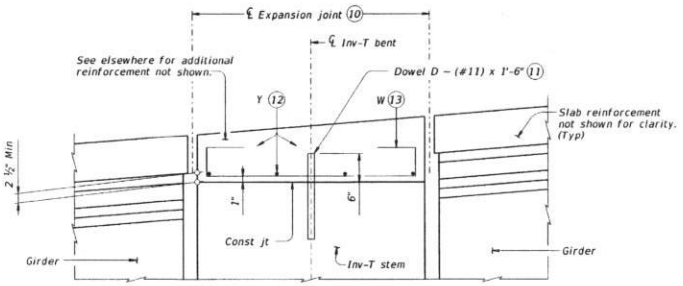
MISCELLANEOUS SLAB DETAILS PRESTR CONCRETE I-GIRDERS

IGMS

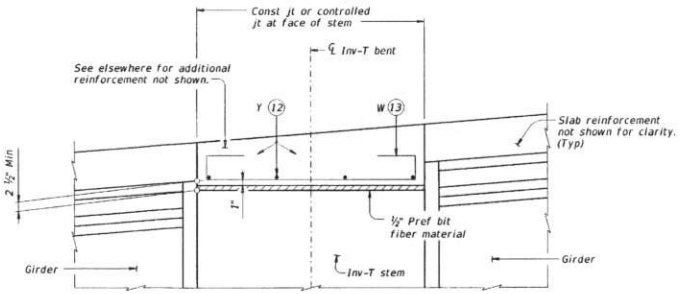
FILE: igmsslts1.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT October 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	DIST	COUNTY		SHEET NO. 20

20

DATE:
FILE:

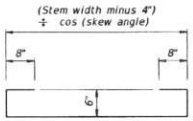


SHOWING EXPANSION JOINTS

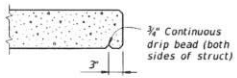


SHOWING CONST JTS OR CONTROLLED JTS

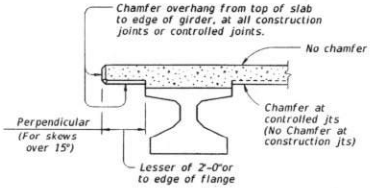
REINFORCEMENT OVER INV-T BENTS



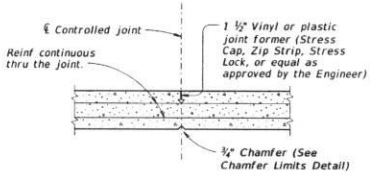
BARS W (#4)



DRIP BEAD DETAIL



CHAMFER LIMITS DETAIL (14)



CONTROLLED JOINT DETAIL

(Saw-cutting is not allowed)

(10) See Layout for joint type.

(11) Dowels D (#11) spaced at 5 Ft Max. See Inv-T bents for quantity and location.

(12) Space Bars Y (#4) at 12" Max. Use 2" end cover. Number of Bars Y must satisfy spacing limit. Place parallel to bent.

(13) Space Bars W at 12" Max (3" from end of cap). Tilt if necessary to maintain cover requirements. Place parallel to longitudinal slab reinforcement.

(14) See Span details for type of joint and joint locations.

7/24/15

SHEET 2 OF 2

Texas Department of Transportation | Bridge Division Standard

MISCELLANEOUS SLAB DETAILS
PRESTR CONCRETE I-GIRDERS

IGMS

FILE: igmsslts1.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT October 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	DIST	COUNTY		SHEET NO. 21

57913

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 this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 3:21:09 PM 3/15/2017
FILE: I:\Projdsk1\1968\1050\Structural\Microstation\BRDG-STR\Standards\04-igndsts1.dgn

DESIGNED GIRDERS / STRAIGHT STRAND PATTERN / DEPRESSED STRAND PATTERN ① / CONCRETE / OPTIONAL DESIGN

STRUCTURE	SPAN NO.	GIRDER NO.	GIRDER TYPE	PRESTRESSING STRANDS: NON-STD STRAND PATTERN	TOTAL NO.	SIZE (in)	STRGTH fpu (ksi)	"e" ℄ (in)	"e" END (in)	TOT NO. DEB	DIST FROM BOTTOM (in)	NO. OF STRANDS: TOTAL	NO. OF STRANDS: DE-BONDED	NUMBER OF STRANDS DEBONDED TO (ft from end): 3	6	9	12	15	DEPRESSED NO.	TO END (in)	TO ℄ (in)	RELEASE STRGTH ② f'ci (ksi)	MINIMUM 28 DAY COMP STRGTH f'c (ksi)	DESIGN LOAD COMP STRESS (TOP ℄) (SERVICE I) fct(ksi)	DESIGN LOAD TENSILE STRESS (BOTT ℄) (SERVICE III) fcb(ksi)	REQUIRED MINIMUM ULTIMATE MOMENT CAPACITY (STRENGTH I) (ft-kips)	LIVE LOAD DISTRIBUTION FACTOR ③ Moment	Shear
WEST ALIANA TRACE DRIVE OYSTER CREEK BRIDGE	1 & 3	6	Tx28		8	0.6	270	10.48	10.48													4.000	5.000	0.470	-0.840	1094	1.019	0.978
	2	7	Tx28		24	0.6	270	7.98	7.98										2	24.5	24.5	5.300	6.300	2.576	-3.403	2633	0.693	0.861

NON-STANDARD STRAND PATTERNS

PATTERN	STRAND ARRANGEMENT AT ℄ OF GIRDER

① When TO END (in) equals TO ℄ (in), place these straight strands at the defined TO values. Fill the lower rows with the remainder of the total number of strands in accordance with the Debonded Strand Designs notes.

② Based on the following allowable stresses (ksi):

Compression = 0.65 f'ci

Tension = $0.24\sqrt{f'ci}$

Optional designs must likewise conform.

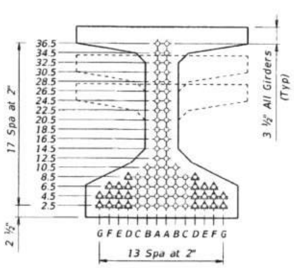
③ Portion of full HL93.

DESIGN NOTES:
Designed according to AASHTO LRFD Bridge Design Specifications.
Optional designs for girders 120 feet or longer must have a calculated residual camber equal to or greater than that of the designed girder.
Prestress losses for the designed girders have been calculated for a relative humidity of 80 percent. Optional designs must likewise conform.

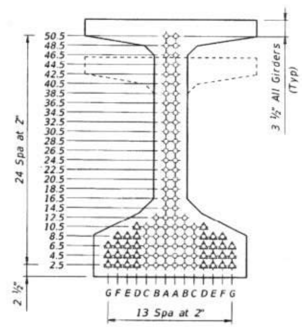
FABRICATION NOTES:
Provide Class H concrete.
Provide Grade 60 reinforcing steel bars.
Use low relaxation strands, each pretensioned to 75 percent of fpu.
Strand debonding must comply with Item 424.4.2.2.2.4. Full-length debonded strands are only permitted in positions marked △. Double wrap full-length debonded strands in outer most position of each row.
When shown on this sheet, the Fabricator has the option of furnishing either the designed girder or an approved optional design. All optional design submittals must be signed, sealed and dated by a Professional Engineer registered in the State of Texas.

DEBONDED STRAND DESIGNS:
Locate strands for the designed girder as low as possible on the 2" grid system unless a non-standard strand pattern is indicated. Fill row "2.5", then row "4.5", then row "6.5", etc. Place strands within a row as follows:
1) Locate a strand in each "A" and "G" positions.
2) Place strand symmetrically about vertical centerline of girder.
3) Space strands as equally as possible across the entire width.
Do not debond strands in position "G". Distribute debonded strands symmetrically about the vertical centerline. Increase debonded lengths working outward, with debonding staggered in each row.

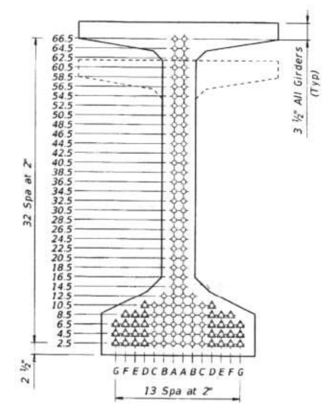
DEPRESSED STRAND DESIGNS:
Locate strands for the designed girder as low as possible on the 2" grid system unless a non-standard strand pattern is indicated. Fill row "2.5", then row "4.5", then row "6.5", etc., beginning each row in the "A" position and working outward until the required number of strands is reached. All strands in the "A" position must be depressed, maintaining the 2" spacing so that, at the girder ends, the upper two strands are in the position shown in the table.



TYPE Tx28, Tx34 & Tx40



TYPE Tx46 & Tx54



TYPE Tx62 & Tx70

HL93 LOADING

Texas Department of Transportation — Bridge Division Standard

PRESTRESSED CONCRETE I-GIRDER DESIGNS (NON-STANDARD SPANS)

LJA Engineering, Inc. LJA

57913

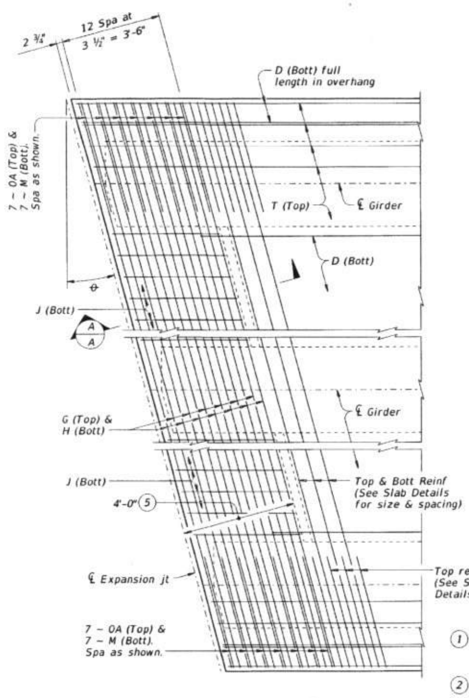
ERIC R. MEYMAN 102257 LICENSED 03-15-2017

IGND

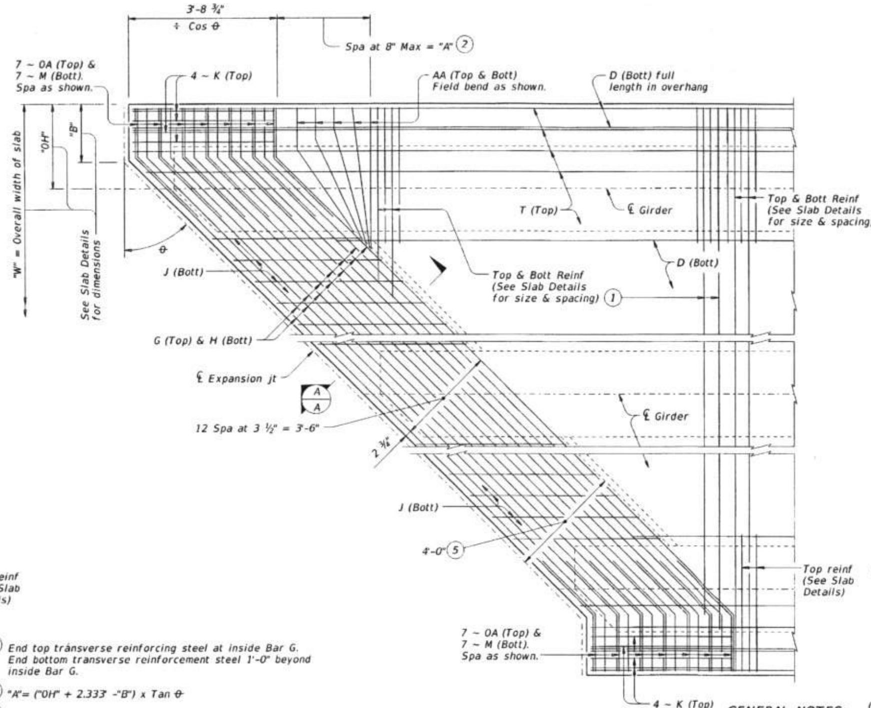
FILE: igndsts1.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TAR
©TxDOT October 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS 01-16: Notes. 05-16: Addition of debonded straight strand designs.	DIST	COUNTY		SHEET NO. 22

7/24/17

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 this standard to other formats or for incorrect results or damages resulting from its use.



PARTIAL PLAN FOR SLABS WITHOUT BREAKBACK



PARTIAL PLAN FOR SLABS WITH BREAKBACK

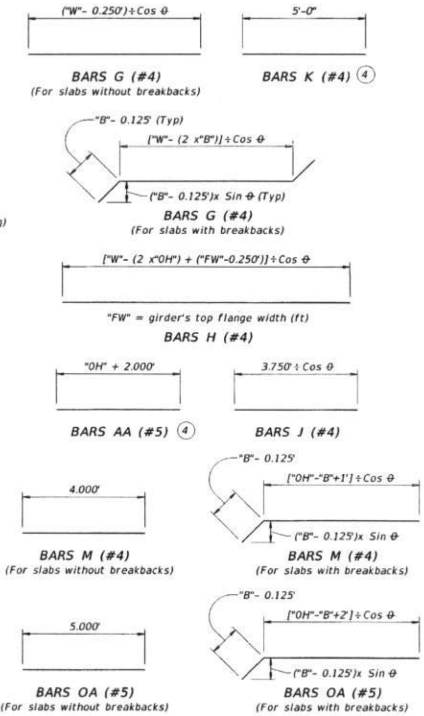
(1) End top transverse reinforcing steel at inside Bar G. End bottom transverse reinforcement steel 1'-0" beyond inside Bar G.

(2) "A"= ("OH" + 2.333' -"B") x Tan θ

(3) Provide clear cover as indicated unless otherwise shown on Span Details.

(4) Only required on slabs with breakbacks.

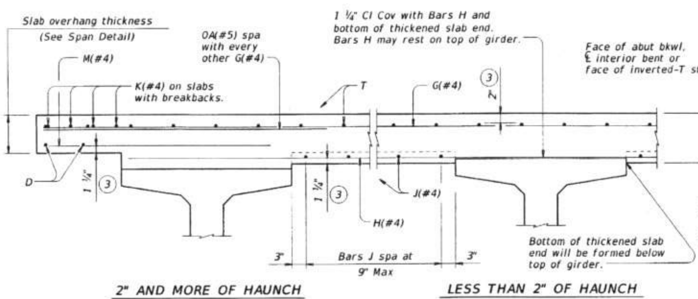
(5) Thickened slab end dimensioned perpendicular to face of bkwl, centerline interior bent or face of inverted-T stem.



GENERAL NOTES:
Designed according to AASHTO LRFD Bridge Design Specifications.
These details are restricted to Prestressed Concrete I-Girder Spans.
These details are to be used in conjunction with the Span Details and PCP standard (if prestressed concrete panels are used).
When Option 2 from PCP standard is used, provide Bars AA, G, K and OA in the slab.

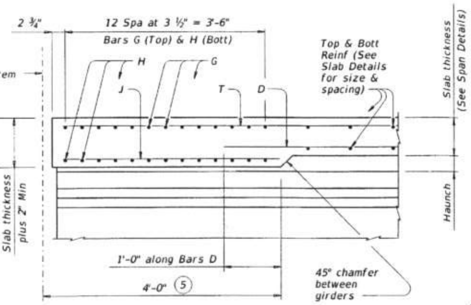
MATERIAL NOTES:
Provide Grade 60 reinforcing steel.
If slab reinforcing steel is shown on the Slab Details to be epoxy coated, then Bars AA, G, K, H, J, M and OA must be epoxy coated.
Provide bar laps, where required, as follows:
Uncoated ~ #4 = 1'-5"
Epoxy Coated ~ #4 = 2'-1"

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.



TYPICAL TRANSVERSE SECTION

(Showing Prestressed Conc I-Girders at ℄ Brg)



SECTION A-A

(Showing with 2" and more of haunch)

HL93 LOADING

Texas Department of Transportation | Bridge Division Standard

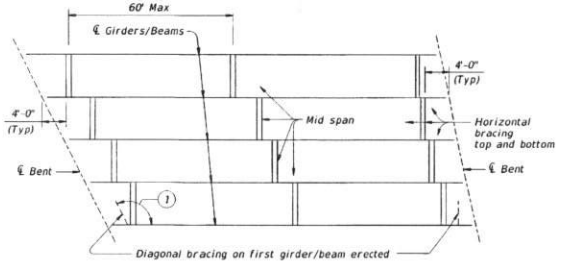
THICKENED SLAB END DETAILS

PRESTRESSED CONCRETE I-GIRDER SPANS

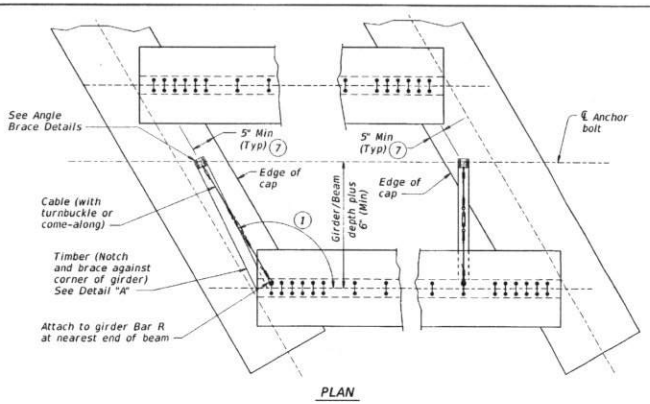
IGTS

FILE: igtsste1.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
© TxDOT October 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	DIST		COUNTY	SHEET NO. 23

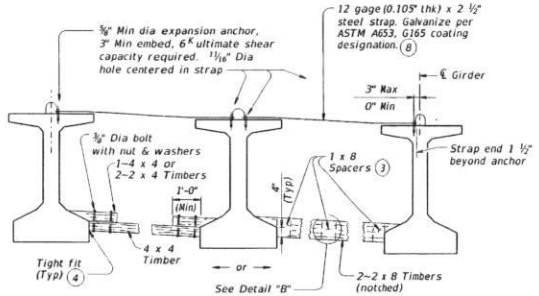
DATE:
FILE:



ERECTION BRACING

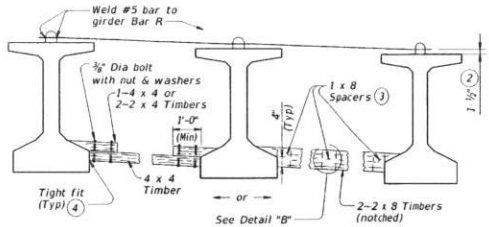


PLAN



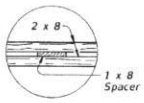
FOR ERECTION BRACING, OPTION 1

(This option is not allowed when slab is formed with PMDF or plywood.)



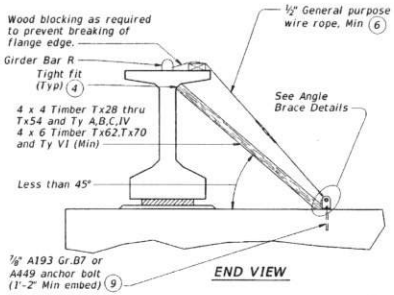
FOR ERECTION BRACING, OPTION 2

HORIZONTAL BRACING DETAILS (5)



PLAN

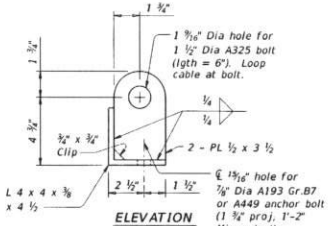
DETAIL "B"



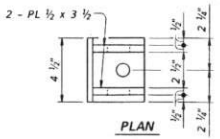
END VIEW

DIAGONAL BRACING DETAILS (5)

(To be used on both ends of the first girder/beam erected in the span in each phase.)



ELEVATION



PLAN

ANGLE BRACE DETAILS

HAULING & ERECTION:

The Contractor's attention is directed to the possible lateral instability of prestressed concrete girders and beams over 130' long, especially during hauling and erection. The use of the following methods to improve stability is encouraged: Locate lifting devices at the maximum practical distance from girder ends; use external lateral stiffening devices during hauling and erection; lift with vertical lines using two machines; and take care in handling to minimize inertial and impact forces.

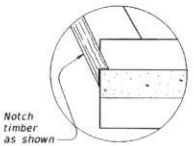
ERECTION BRACING:

Erection bracing details shown are considered the minimum for fulfilling the bracing requirements of Item 425.

Required erection bracing must be placed immediately after erection of each girder and remain in place until additional bracing as required for slab placement is in place. This standard is needed in all cases to meet requirements for Slab Placement Bracing.

PHASED CONSTRUCTION:

Place erection and slab placement bracing for all girders in a phase as shown in these details. For phases after first, also place erection and slab placement bracing between outer girder of completed phase and adjacent girder of current phase. When the phase construction joint is between girders, top bracing can be omitted.



DETAIL "A"

(1) If angle shown exceeds 120 degrees, move diagonal brace to other side of girder/beam and place square to girder/beam. This may prevent exterior girder from being erected first.

(2) Place and weld #5 bars as shown during erection. If forming deck with prestressed panels, bars can be temporarily removed, one at a time, during panel erection. Re-install bar prior to additional panel erection. Bars can rest on panels and be bent down and welded to girder Bars R (See Sheet 2 of 2).

(3) Clear distance between spacers must not exceed 3'. Nail together with 16d nails.

(4) Use wedges as necessary to obtain tight fit. Nail wedges to timbers.

(5) Pressure treated landscape timbers can not be used.

(6) All hardware used with cable must be able to develop a minimum 25 kips breaking strength. Use thimbles at all loops in cable. Install cable clamps with saddles bearing against the live end and U-bolts bearing aginst the dead end.

(7) It is acceptable to tie anchor bolts to cap reinforcement.

(8) Prior to installing, field bend strap to lay flush on both girders' top flange and slope between flange tips.

(9) Anchor bolt may be drilled and epoxied in place. Provide 25k minimum pullout. Core drill hole.

DATE:
FILE:

Texas Department of Transportation

Bridge Division Standard

MINIMUM ERECTION AND BRACING REQUIREMENTS

PRESTRESSED CONCRETE I-GIRDERS AND I-BEAMS

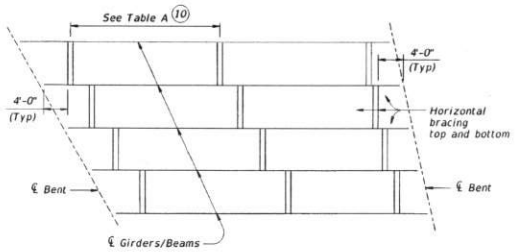
MEBR(C)

FILE: mebcsts1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	DIST	COUNTY		SHEET NO. 24

7/24/17

57913

DATE:
FILE:

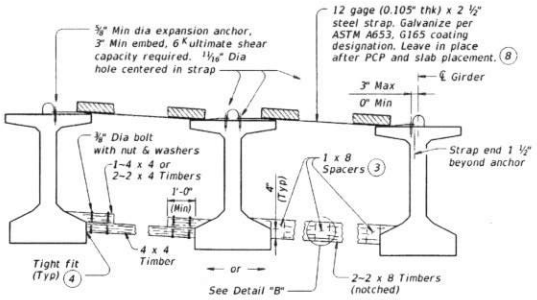


SLAB PLACEMENT BRACING

TABLE A

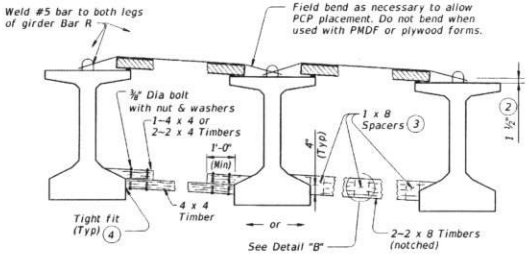
OPTION 1-RIGID BRACING (STEEL STRAP)		
Girder or Beam Type	Maximum Bracing Spacing	
	Slab Overhang less than 4'-0" (11)	Slab Overhang 4'-0" and greater (11)
Tx28	¼ points	¼ points
Tx34	⅓ points	¼ points
Tx40	¼ points	⅛ points
Tx46	¼ points	⅛ points
Tx54	¼ points	⅛ points
Tx62	¼ points	⅛ points
Tx70	¼ points	⅛ points
A	⅛ points	⅛ points
B	⅛ points	⅛ points
C	⅛ points	⅛ points
IV	¼ points	⅛ points
VI	¼ points	⅛ points

OPTION 2-FLEXIBLE BRACING (NO. 5 OVER PCP)		
Girder or Beam Type	Maximum Bracing Spacing	
	Slab Overhang less than 4'-0" (11)	Slab Overhang 4'-0" and greater (11)
Tx28	¼ points	⅛ points
Tx34	¼ points	⅛ points
Tx40	¼ points	⅛ points
Tx46	¼ points	⅛ points
Tx54	¼ points	⅛ points
Tx62	¼ points	⅛ points
Tx70	¼ points	⅛ points
A	2.0 ft	1.5 ft
B	3.0 ft	2.0 ft
C	4.5 ft	2.0 ft
IV	¼ points	4.0 ft
VI	¼ points	4.0 ft



FOR SLAB PLACEMENT BRACING, OPTION 1 - RIGID

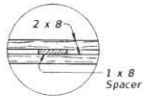
(Showing slab formed with PCP. This option is not allowed when slab is formed with PMDF or plywood.)



FOR SLAB PLACEMENT BRACING, OPTION 2 - FLEXIBLE

(Showing slab formed with PCP.)

HORIZONTAL BRACING DETAILS (5)



PLAN

DETAIL "B"

(2) Place and weld #5 bars as shown during erection. If forming deck with prestressed panels, bars can be temporarily removed, one at a time, during panel erection. Re-install bar prior to additional panel erection. Bars can rest on panels and be bent down and welded to girder Bars R.

(3) Clear distance between spacers must not exceed 3'. Nail together with 16d nails.

(4) Use wedges as necessary to obtain tight fit. Nail wedges to timbers.

(5) Pressure treated landscape timbers can not be used.

(8) Prior to installing, field bend strap to lay flush on both girders' top flange and slope between flange tips.

(10) Bracing spacing (¼ and ⅛ points) measured between first and last typical brace location.

(11) Measure slab overhang from centerline of girder or beam. When overhang varies in span, determine bracing spacing based on largest overhang.

SLAB PLACEMENT BRACING:

The details for slab placement bracing are considered minimum for fulfilling the requirements of Specification Items 422 and 425.

Required slab placement bracing must remain in place until slab concrete has attained a compressive strength of 3000 psi.

GENERAL NOTES:

Bracing details for spans longer than 150' are not provided. The Contractor must submit proposed bracing details for such conditions to the Engineer for approval prior to erection.

Systems equal to or better than those shown may be used provided details of such systems are submitted to and approved by the Engineer prior to erection.

Use of these systems or details does not relieve the Contractor of the responsibility for the adequacy of the bracing and the safety of the structure.

Removal of bracing for short periods of time to align girders and beams is permissible.

All turn-buckles, come-alongs, anchors and other connections must be capable of developing the full strength of the cable shown.

Furnish anchor bolts and nuts in accordance with Item 449, "Anchor Bolts".

SHEET 2 OF 2

Texas Department of Transportation — Bridge Division Standard

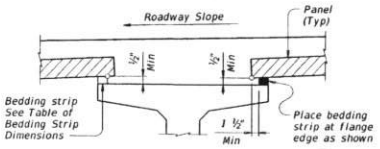
MINIMUM ERECTION AND BRACING REQUIREMENTS
PRESTRESSED CONCRETE I-GIRDERS AND I-BEAMS

MEBR(C)

FILE: mebcsis1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
				25

7/24/15

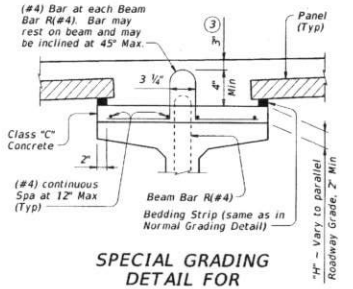
DATE:
FILE:



NORMAL GRADING DETAIL (1)

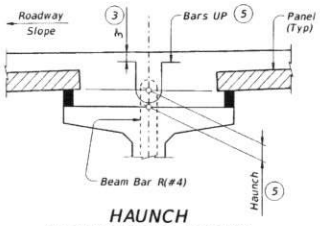
Showing Prestressed Concrete I-Girders.
(Other Beam Types Similar)

TABLE OF BEDDING STRIP DIMENSIONS		
WIDTH	HEIGHT (2)	
	Min	Max
1" (Min)	½"	2"
1 ¼"	½"	2 ½"
1 ½"	½"	3"
1 ¾"	½"	3 ½"
2" (Max)	½"	4"



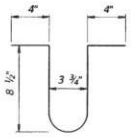
SPECIAL GRADING DETAIL FOR CONCRETE BEAMS

Showing Prestressed Concrete I-Girders.
(Other Beam Types Similar)



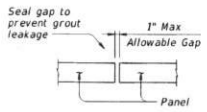
HAUNCH REINFORCING DETAIL

Showing Prestressed Concrete I-Girders.
(Other Beam Types Similar)



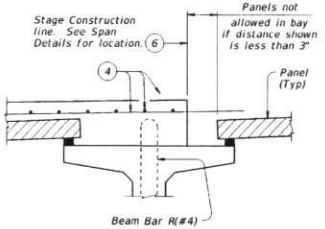
BARS UP (#4) (5)

1. To reduce the quantity of cast-in-place concrete, bedding strip thickness may be increased in ¼" increments. Bedding strips must be comprised of one layer. Bond bedding strips to the beams with an adhesive compatible with bedding strips. Bedding strips over 2.5" high may need to be bonded to panels. The same thickness strip must be used under any one panel edge and the maximum change in thickness between adjacent panels is ½". Alternatively, bedding strips may be cut to grade. Panels may be supported by an alternate method, using a commercial product, if approved by the Engineer of Bridge Design, Bridge Division. If bedding strips exceed 4" high, use Special Grading Detail for Concrete Beams or submit an alternate method to the Bridge Division for approval.
2. Height must not exceed twice the width.
3. Provide clear cover as indicated unless otherwise shown on Span Details.
4. See Span Details and Thickened Slab End Details for top slab reinforcement and clear cover. Transverse top slab reinforcement may rest on top of prestressed concrete panels if necessary to maintain clear cover.
5. Space Bars UP(#4) with Beam Bars R(#4) in all areas where measured haunch exceeds 3" or 3 ½" with Prestressed Concrete I-Girders. Epoxy coating for Bars UP is not required.
6. Do not locate construction Joints on top of a panel.
7. Butt adjacent bedding strips together with adhesive. Cut v-notches, approx ¼" deep, in the top of the bedding strips at 8' o.c..

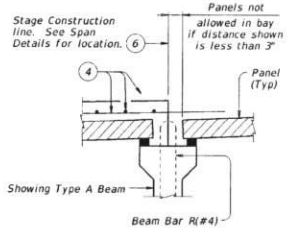


TYPICAL SECTION AT PANEL JOINT

(Panel reinforcing not shown for clarity.)
The gap cannot be considered as a panel fabrication tolerance.



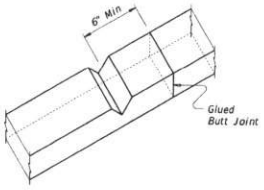
PRESTR CONC I-GIRDERS



PRESTR CONC I-BEAMS

STAGE CONSTRUCTION LIMITATIONS

(Other Beam Types Similar)



BEDDING STRIP DETAIL (7)

CONSTRUCTION NOTES:

Erected panels must bear uniformly on bedding strips of extruded polystyrene placed along top flange edges.

If additional blocking is needed, special grading details for supporting the panels and extra reinforcing between beam and slab will be considered subsidiary to deck construction.

Bars U, shown on PCP-FAB, may be bent over or cut off if necessary.

Care must be taken to ensure proper cleaning of construction debris and consolidation of concrete mortar under the edges of the panels. Bedding strips must be placed at beam flange edges so that adequate space is provided for the mortar to flow a minimum of 1 ½" under the panels as the slab concrete is placed.

To allow the proper amount of mortar to flow between beam and panel, the minimum vertical opening must be at least ½". Roadway cross-slope reduces the opening available for entry of the mortar. Bedding strips varying in thickness across the beam are therefore required.

For clear span between U-beams less than or equal to 18', see Permissible Slab Forming Detail on Miscellaneous Slab Detail sheets, UBMS.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel in the cast-in-place slab. See Table of Reinforcing Steel for size and spacing of reinforcement.

If the top and bottom layer of reinforcing steel is shown on the Span Details to be epoxy coated, then the D, E, P, & Z bars must be epoxy coated.

Provide bar Laps, where required, as follows:
Uncoated ~ #4 = 1'-5"
Epoxy Coated ~ #4 = 2'-1"

GENERAL NOTES:

Designed according to AASHTO LRFD Specifications.

Panel placement may follow either Option 1 or Option 2 except Option 1 must be used if the skew exceeds 45 degrees.

Use of Prestressed Concrete Panels is not permitted for horizontally curved steel plate or tub girders. See Span Details for other possible restrictions on their use.

These details are to be used in conjunction with the Span Details, PCP-FAB and other applicable Standard drawings.

Any additional reinforcement or concrete required on this standard is considered subsidiary to the bid item "Reinforced Concrete Slab".

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.

7/24/17

HL93 LOADING

SHEET 1 OF 4

Texas Department of Transportation

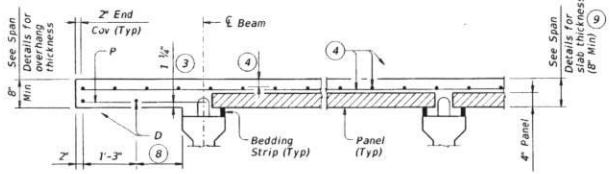
Bridge Division Standard

PRESTRESSED CONCRETE PANELS
DECK DETAILS

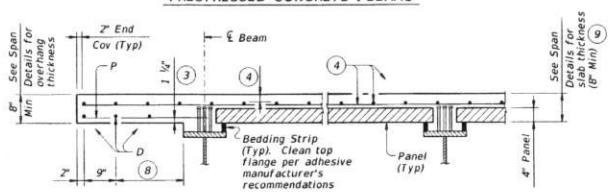
PCP

FILE: pcpstdet.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT January 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	DIST	COUNTY		SHEET NO. 26

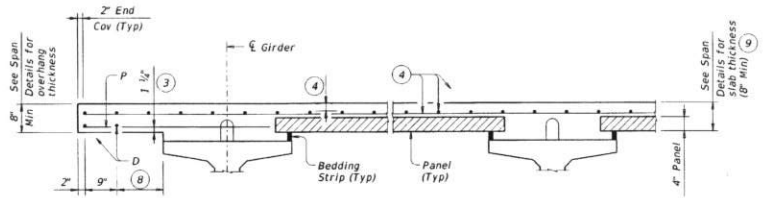
DATE:
FILE:



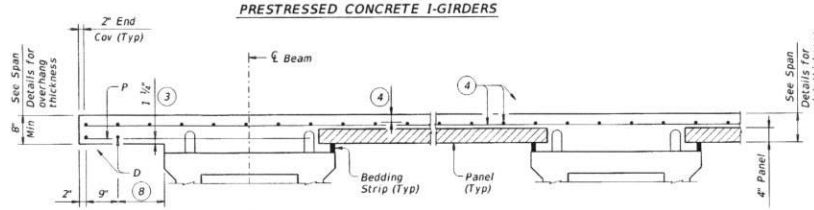
PRESTRESSED CONCRETE I-BEAMS



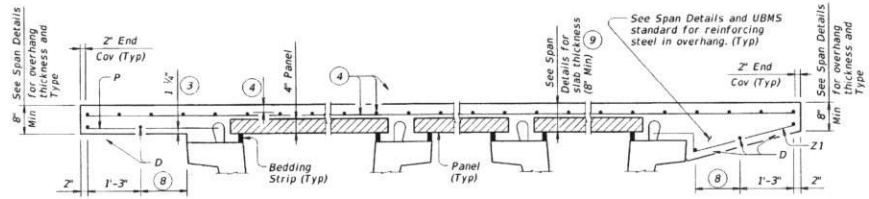
STEEL BEAMS



PRESTRESSED CONCRETE I-GIRDERS



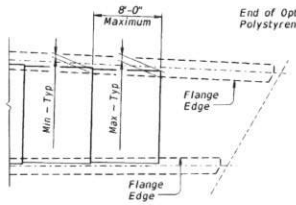
PRESTRESSED CONCRETE X-BEAMS



NORMAL OVERHANG WITH PRESTR CONC U-BEAMS

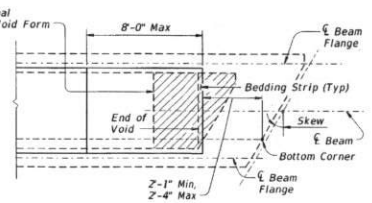
TYPICAL PART TRANSVERSE SECTIONS

SLOPED OVERHANG WITH PRESTR CONC U-BEAMS

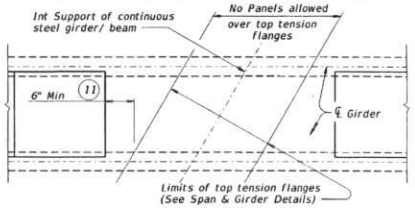


AT FLARED BEAMS OR GIRDERS

See PCP-FAB standard for Min and Max dimensions based on Bm/Girder type.



OVER CONC U-BEAMS



AT INT SUPPORTS OF CONTINUOUS STEEL GIRDERS

PART PLANS OF PANEL PLACEMENT

(3) Provide clear cover as indicated unless otherwise shown on Span Details.

(4) See Span Details and Thickened Slab End Details for top slab reinforcement and clear cover. Transverse top slab reinforcement may rest on top of prestressed concrete panels if necessary to maintain clear cover.

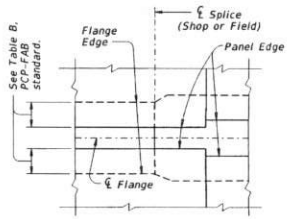
(7) Butt adjacent bedding strips together with adhesive. Cut v-notches, approx ¼" deep, in the top of the bedding strips at 8' o.c..

(8) Equally space additional bar if more than 1'-3" Max.

(9) The actual thickness constructed may exceed the slab thickness shown on the Span Details but the extra thickness may be no more than 2" (1" for Prestressed Concrete U-Beams and Steel Beams). Bearing Seat Elevations or finished grade may be adjusted.

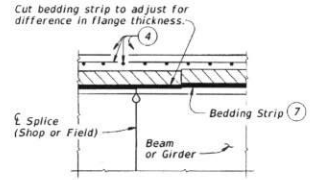
(10) Field adjust Bars Z1(#4) to match actual slope of slab overhangs. Width of slab overhang will vary along span with curved slab edges. Adjust Bar Z1(#4) dimensions to maintain proper cover. Bars Z2(#4) are located at Inv-T stems only.

(11) Location of concrete placement sequence boundaries and bolted field splices should be considered by the contractor in determining panel limits.



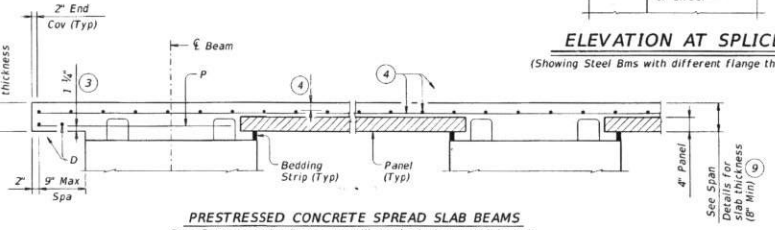
PLAN AT SPLICE

(Showing Steel Bms with flange width transition)



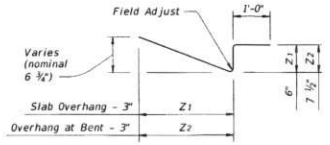
ELEVATION AT SPLICE

(Showing Steel Bms with different flange thickness)



PRESTRESSED CONCRETE SPREAD SLAB BEAMS

Bars P over exterior beams are still required when no overhang is used. In this case, only one Bar D, 2" from slab edge, is required.



BARS Z (#4) (10)

HL93 LOADING

SHEET 2 OF 4

Texas Department of Transportation — Bridge Division Standard

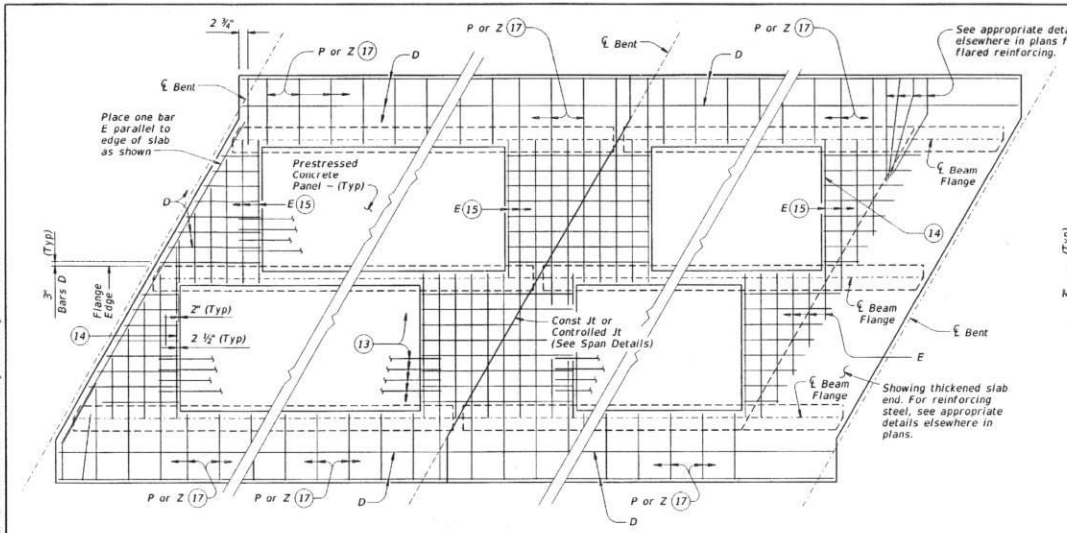
PRESTRESSED CONCRETE PANELS
DECK DETAILS

PCP

FILE: pcpstdet1.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JRH
©TxDOT January 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	DIST	COUNTY		SHEET NO. 27

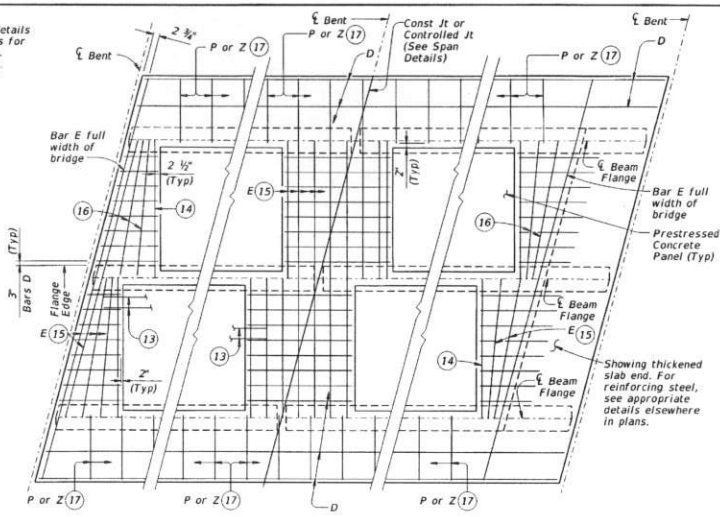
7/24/17

DATE:
FILE:



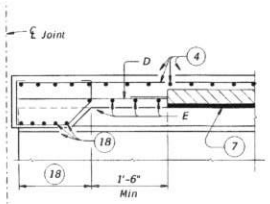
AT ALL SPAN ENDS UNLESS NOTED OTHERWISE | AT INTERIOR BENTS | AT THICKENED END SLABS

OPTION 1 ~ PLAN OF SLABS WITH NORMAL REINFORCEMENT

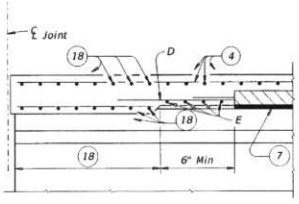


AT ALL SPAN ENDS UNLESS NOTED OTHERWISE | AT INTERIOR BENTS | AT THICKENED END SLABS

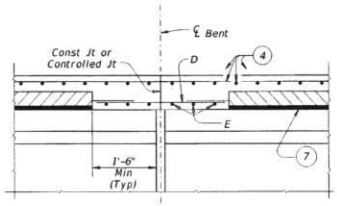
OPTION 1 ~ PLAN OF SLABS WITH SKEWED REINFORCEMENT



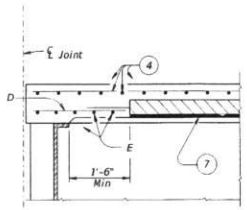
AT THICKENED SLAB ENDS FOR PRESTR CONC U-BMS



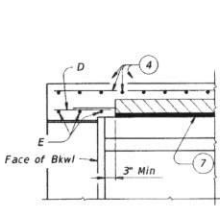
AT THICKENED SLAB ENDS FOR PRESTR CONC I-BMS AND STEEL BMS



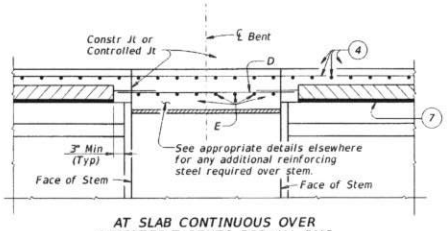
AT SLAB CONTINUOUS OVER CONVENTIONAL INTERIOR BENTS FOR ALL SIMPLE SPAN BMS



AT CONVENTIONAL END DIAPHRAGMS FOR STEEL BMS



AT SLAB OVER ABUTMENT BACKWALL FOR ALL BMS



AT SLAB CONTINUOUS OVER INVERTED-T BENTS FOR ALL BMS

OPTION 1 ~ ELEVATIONS AT BEAM ENDS

(4) See Span Details and Thickened Slab End Details for top slab reinforcement and clear cover. Transverse top slab reinforcement may rest on top of prestressed concrete panels if necessary to maintain clear cover.

(7) Butt adjacent bedding strips together with adhesive. Cut v-notches, approx ¼" deep, in the top of the bedding strips at 8' o.c.

(12) Max Spacing as listed unless otherwise shown.

(13) At connection with cast-in-place slab, extend longitudinal panel reinforcement. See PCP-FAB for details.

(14) Maintain one Bar E(#4) parallel to panel ends (Typ).

(15) Bars E(#4) not continuous over beam flanges must overlap beam flange 6" Min.

(16) Add flared Bars E(#4) (Min Spa = 6", Max Spa = 12") as required at panel ends.

(17) Where possible, Bars E(#4) may be extended into overhangs to replace Bars P(#4). Bars Z(#4) are required for sloped overhangs with U-Beams.

(18) See appropriate thickened slab end details for reinforcing and limits of thickened slab end.

TABLE OF REINFORCING STEEL (12)

BAR	SIZE	Max Spa (in.)
D	#4	9
E	#4	9
P	#4	18
UP	#4	~
Z	#4	18

HL93 LOADING

Texas Department of Transportation — Bridge Division Standard

PRESTRESSED CONCRETE PANELS
DECK DETAILS

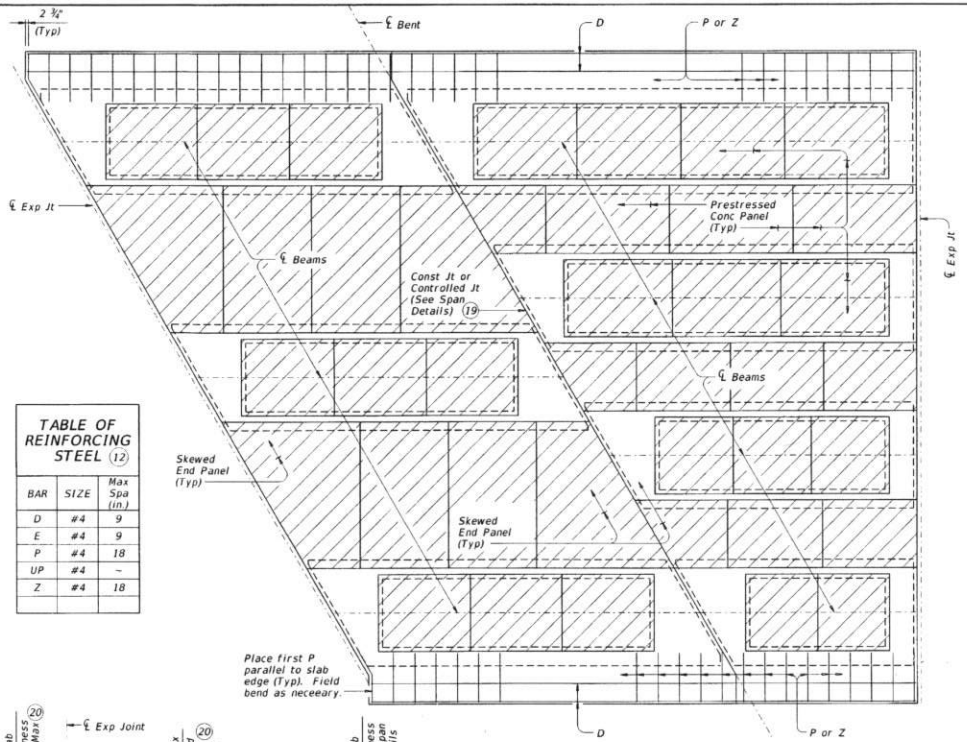
PCP

FILE: pcpstdel.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT January 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	DIST	COUNTY		SHEET NO. 28

7/24/15

87013

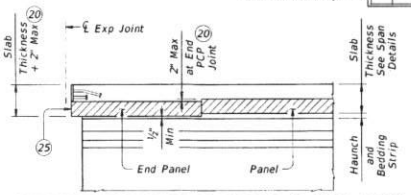
DATE:
FILE:



OPTION 2 ~ PLAN OF SLAB

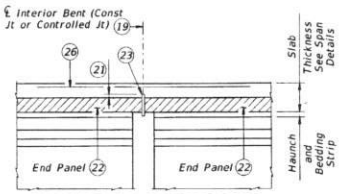
(Showing U-Beams; other beams similar)

TABLE OF REINFORCING STEEL (12)		
BAR	SIZE	Max Spa (in.)
D	#4	9
E	#4	9
P	#4	18
UP	#4	~
Z	#4	18



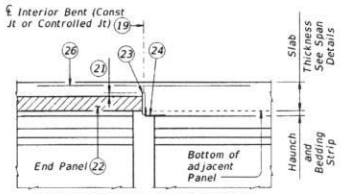
JOINTS (BETWEEN BEAMS/GIRDERS OR AT INV-T STEM)

For SEJ-A, SEJ-S(0), AJ and Type A Expansion Joints only.



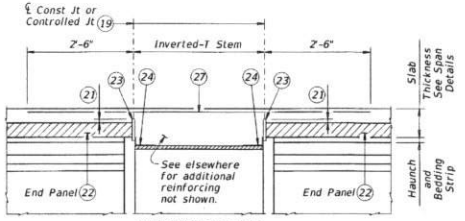
CONVENTIONAL INTERIOR BENT

Panel against Panel between Bms/Girders.



CONVENTIONAL INTERIOR BENT

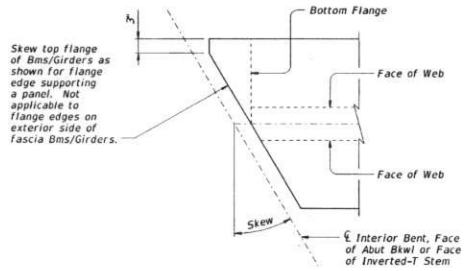
Panel against Bm/Girder End in Adacent Span.



INVERTED-T BENT

Panels against Inverted-T Stem

OPTION 2 ~ ELEVATIONS AT BEAM ENDS (4)



OPTION 2 ~ SHOWING MODIFICATION TO BEAM/GIRDER TOP FLANGE FOR SKEWS OVER 5°

Showing I-Bm/I-Girder, U-Bms and Steel Bms similar.

(4) See Span Details and Thickened Slab End Details for top slab reinforcement and clear cover. Transverse top slab reinforcement may rest on top of prestressed concrete panels if necessary to maintain clear cover.

(12) Max Spacing as listed unless otherwise shown.

(19) Top Plastic Joint Former at Controlled Joints (Stress Cap, Zip Strip, Stress Lock, etc.) is not required with these Details.

(20) End panel may be set up to 2" lower to accommodate expansion joint hardware, provided bedding strip is not less than ½" thick.

(21) 1" Min, 1 ½" Max, support as necessary.

(22) Place panel within ½" of ¾" thick board.

(23) ¾" thick timber board, leave in place. Place straight, within ¼" of Centerline of Bent or face of Invt-T, across bridge width and end board at exterior flange edge of fascia beams/girders. Do not extend into overhang.

(24) Permanent galvanized steel sheet form. Removable formwork is acceptable.

(25) Place end panel within ½" of expansion joint opening. End panel cannot encroach on required expansion joint opening.

(26) Place additional (#4) bar 5'-0" in length between every slab bars T. Center (#4) bar on Joint.

(27) Place additional (#4) bar continuous 2'-6" beyond each side of Inverted-T Stem between every slab bars T.

SPECIAL OPTION 2 CONSTRUCTION NOTES:

Placing panels adjacent to expansion joints and bent centerlines prior to completing interior panel placement is recommended. Saw cutting panels to fit is acceptable when approved by the Engineer. Minimum distance from a saw cut edge to a panel strand is 1 ½".

Do not extend the longitudinal panel reinforcement into the cast-in-place slab.

Top flanges of beams and girders on skewed bridges must be modified as shown on this drawing. The Contractor is responsible for coordinating this modification with the beam fabricator prior to submitting shop drawings for approval.

Fabricator may optionally skew the whole end. When electing to skew whole end, girder end details and bearing type at conventional interior bent must be changed to use condition at abutment. Fabricator must coordinate change in bearing type, bearing centerline location, and dowel location with Engineer and Contractor. Show appropriate changes on girder and bearing shop drawings.

Bending of anchor studs of expansion joints shown on standards AJ, SEJ-A and SEJ-S(0) is permissible if necessary to clear top of end panels. The Contractor is responsible for coordinating modifications with the joint fabricator. Submit shop drawings for approval when modifications to expansion joint hardware are made.

Bedding strips under skewed end panels must conform to the requirements of Item 425 except their minimum compressive strength must be 60 psi.

Provide Bars AA, G, K and OA from standard IGTS(MOD) in the slab.

HL93 LOADING

SHEET 4 OF 4

Texas Department of Transportation

Bridge Division Standard

PRESTRESSED CONCRETE PANELS
DECK DETAILS

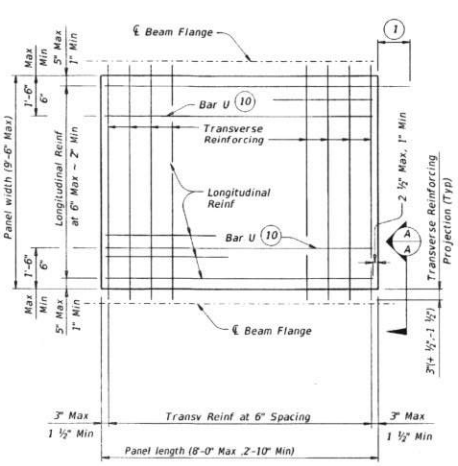
PCP

FILE: pcpstde1.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT January 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	DIST	COUNTY		SHEET NO. 29

57913

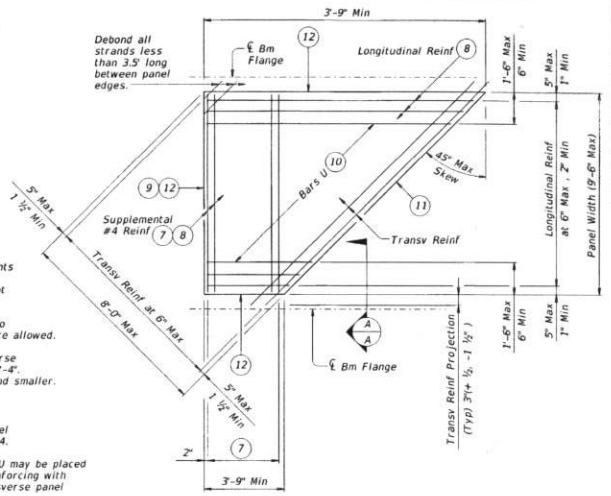
7/24/17

DATE:
FILE:



TYPICAL NON-SKEWED PANEL PLAN

1. At connection with cast-in-place slab, extend longitudinal panel reinforcement 1'-0" (+2",-0") past panel end. Alternatively, provide (#3) x 2'-0" dowels at 6" Max Spacing and extend dowels 1'-0" past panel end.
2. Four loops required per panel.
3. Four loops required per panel. ⅜" or ½" strands may be used.
4. Normal dimensions must be used on spans with parallel beams. Maximum and Minimum dimensions apply only to spans with flared beams.
5. See Normal Grading Detail on PCP standard for lap requirements and bedding strip dimensions. Some laps shown in tables cannot utilize all bedding strip widths.
6. One Splice allowed per panel. No more than two sheets of WWR are allowed.
7. Provide (#4) bars under transverse reinforcing, 10 Spaces at 4" = 3'-4". 0mit for 5 degree (1:12) skew and smaller.
8. End Cover 2 ½" Max, 1" Min.
9. Recess strands on indicated panel edge in accordance with Item 424.
10. At the fabricator's option, Bars U may be placed parallel to transverse panel reinforcing with horizontal legs in plane of transverse panel reinforcing.
11. Use length of indicated panel edge as panel width for purpose of determining type of transverse reinforcing.
12. Timber form work permissible this edge.

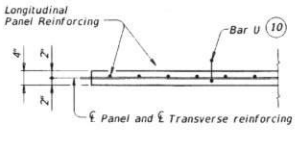


TYPICAL SKEWED END PANEL PLAN

(Only to be used with details shown elsewhere in the plans.)

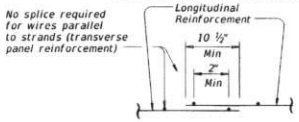
TABLE A (4) (5)			
Beam Type	Normal (In.)	Min (In.)	Max (In.)
A	3	2 ½	3 ½
B	3	2 ½	3 ½
C	4	3	4 ½
IV	6	4	7 ½
VI	6 ½	4 ½	8 ½
U40 - 54	5 ½	5 ½	7
Tx28-70	6	4	7 ½
XB20 - 40	4	3	4 ½
XSB12 - 15	4	3	4 ½

TABLE B (4) (5)			
Top Flange Width	Normal (In.)	Min (In.)	Max (In.)
11" to 12"	2 ¾	2 ½	2 ¾
Over 12" to 15"	3 ¼	3	3 ¼
Over 15" to 18"	4	3	4 ¾
Over 18"	5	3 ½	6 ¼



SECTION A-A

(Not Showing supplemental #4 bars for Skewed End Panels.)



WELDED WIRE REINFORCEMENT (WWR) SPLICE DETAIL (6)

GENERAL NOTES:

Provide Class H concrete for panels. Release strength f'ci=3500 psi. Minimum 28 day strength f'c=5000 psi.

Do not use epoxy-coated reinforcing steel bar or strand in panels.

Remove laitance from top panel surface.

Finish top of panel to a roughness between a No.6 and No.9 concrete surface profile, inclusive, as specified by the International Concrete Repair Institute (ICRI).

Shop drawings for the fabrication of panels will not require the Engineer's approval if fabrication is in accordance with the details shown on this standard.

A panel layout which identifies location of each panel must be developed by the Fabricator. Permanently mark each panel in accordance with the panel layout. A copy of the layout is to be provided to the Engineer.

TRANSVERSE PANEL REINFORCEMENT:

For panel widths over 5', use ⅜" or ½" Dia (270k) prestressing strands with a tension of 14.4 kips per strand.

For panel widths over 3'-6" up to and including 5', use ⅜" or ½" Dia (270k) prestressing strands with a tension of 14.4 kip per strand. Optionally, #4 Grade 60 reinforcing bars may be used in lieu of prestressed strands.

For panel widths up to 3'-6", use #4 Grade 60 reinforcing bars (prestressed strands alone are not allowed).

Place transverse panel reinforcement at panel centroid and space at 6" Max.

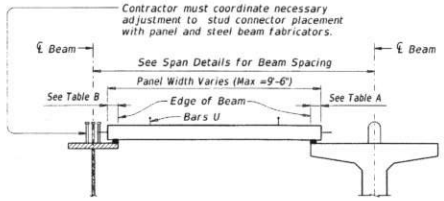
LONGITUDINAL PANEL REINFORCEMENT:

Any of the following options may be used for longitudinal panel reinforcement:

1. (#3) Grade 60 reinforcing steel at 6" Max Spacing. No splices allowed.
2. ⅜" Dia prestressing strands at 4 ½" Max Spacing (unstressed). No splices allowed.
3. ½" Dia prestressing strands at 6" Max Spacing (unstressed). No splices allowed.
4. Deformed Welded Wire Reinforcement (WWR) (ASTM A1064) providing 0.22 sq in per foot of panel width. Wires larger than D11 not permitted. Provide transverse wires to ensure proper handling of reinforcing. One splice per panel is allowed. See WWR Splice Detail.

No combination of longitudinal reinforcement options in a panel is allowed.

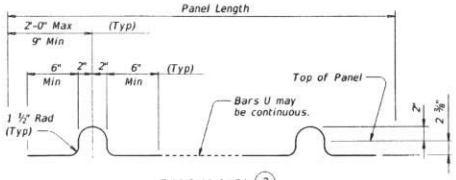
Place longitudinal panel reinforcement above or below transverse panel reinforcement. Must be placed above transverse panel reinforcement for skewed end panels with supplemental #4 reinforcement.



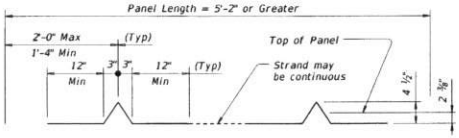
STEEL BEAMS

PRESTRESSED CONCRETE BEAMS OR GIRDERS

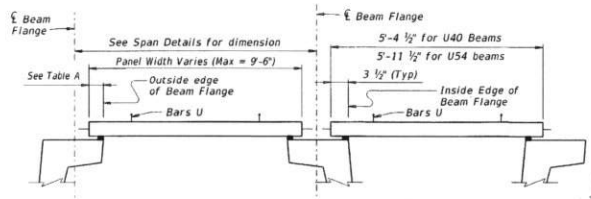
Typ unless noted otherwise



BARS U (#3) (2)



OPTIONAL STRAND FOR BARS U (3)



PRESTRESSED CONCRETE U-BEAMS

TYPICAL SECTIONS FOR DETERMINING PANEL WIDTH

5/24/17

HL93 LOADING

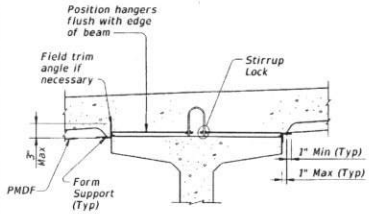
Texas Department of Transportation | Bridge Division Standard

PRESTRESSED CONCRETE PANEL FABRICATION DETAILS

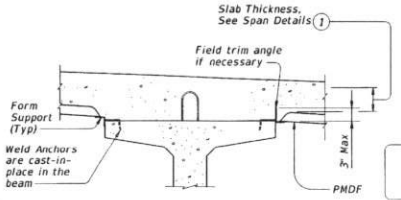
PCP-FAB

FILE: pcpstde2.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: AES
©TxDOT January 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	DIST	COUNTY		SHEET NO. 30

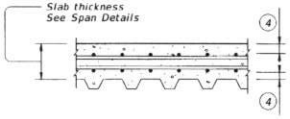
DATE:
FILE:



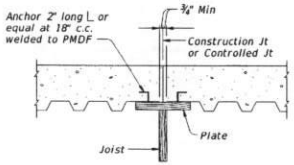
PRESTR CONC I-BEAMS AND I-GIRDERS WITH STIRRUP LOCKS



PRESTR CONC I-BEAMS AND I-GIRDERS WITH WELD ANCHORS

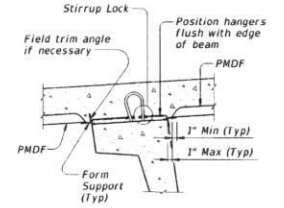


TYP LONGITUDINAL SLAB SECTION

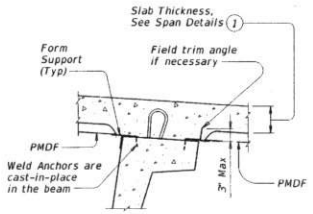


Note: In spans where PMD forms are used, timber forms must be used at construction joints. Adequate provision must be made to support edge of metal form and to provide anchorage of metal form to slab concrete where joined to wood forms.

SECTION THRU CONSTRUCTION JOINT

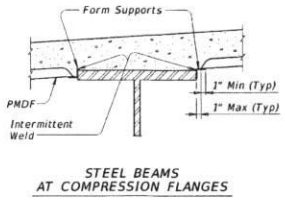


U-BEAMS WITH STIRRUP LOCKS

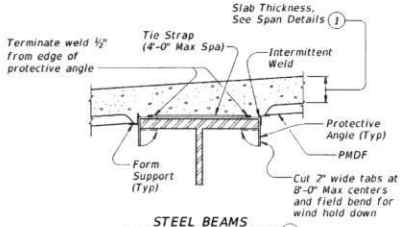


U-BEAMS WITH WELD ANCHORS

FOR PRESTR CONC U-BEAM BRIDGES:
Size, spacing, and orientation of bottom mat of slab reinforcement must match the top mat of reinforcing shown on the span details except all bottom mat bars are to be #5.

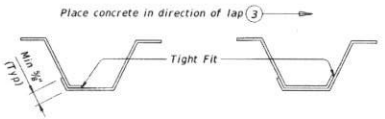


STEEL BEAMS AT COMPRESSION FLANGES



STEEL BEAMS AT TENSION FLANGES (2)

TYPICAL TRANSVERSE SECTIONS



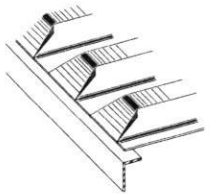
SIDE LAP DETAILS

(1) Slab thickness minus ⅜" if corrugations match reinforcing bars.

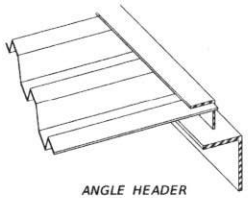
(2) Welding of form supports to tension flanges will not be permitted. Other methods of providing wind hold down resistance for PMDF in tension flange zones will be considered. At least one layer of sheet metal must be provided between the flange and the weld joint.

(3) The direction of concrete placement will be such that the upper layer of the form overlap is loaded first.

(4) See Span details for cover requirements.



PRECLOSED



ANGLE HEADER

NOTE: This type is to be used for skewed ends only.

TYPES OF END CLOSURES

GENERAL NOTES:
Steel for Permanent Metal Deck Forms (PMDF) and support angles shall conform to ASTM A653, Structural Steel (SS), with coating designation G165. Steel must have a minimum yield strength of 33 ksi. Minimum thickness of PMDF is 20 gage and that of support angles and protective angles is 12 gage.

Submit two copies of forming plans for PMDF to the Engineer. These plans must show all essential details of proposed form sheets, closures, fasteners, supports, connectors, special conditions and size and location of welds. These plans must clearly show areas of tension flanges for steel beams and provisions for protecting the tension flanges from welding notch effects by inclusion of separating sheet metal or other positive method. These plans must be designed, signed, and sealed by a licensed professional engineer. Department approval of these plans is not required, but the Department reserves the right to require modifications to the plans. The Contractor is responsible for the adequacy of these plans.

The details and notes shown on this standard are to be used as a guide in preparation of the forming plans.

All material, labor, tools and incidentals necessary to form a bridge deck with Permanent Metal Deck Forms is considered subsidiary to Item 422, "Concrete Superstructures".

DESIGN NOTES:
As a minimum, PMDF and support angles must be designed for the dead load of the form, reinforcement and concrete plus 50 psf for construction loads. Flexural stresses due to these design loads must not exceed 75 percent of the yield strength of the steel. Allowable stress for weld metal must be 12,400 psi.

Maximum deflection under the weight of forms, reinforcement and concrete or 120 psf, whichever is greater, shall not exceed the following:

1/180 of the form design span, but not more than 0.50", for design spans of 10' or less.

1/240 of the form design span, but not more than 0.75", for design spans greater than 10'.

The form design span must not be less than the clear distance between beam flanges, measured parallel to the form flutes, minus 2".

CONSTRUCTION NOTES:
Form sheets must not be permitted to rest directly on the top of beam flanges. Form sheets must be securely fastened to form supports and must have a minimum bearing length of one inch at each end. Form supports must be placed in direct contact with beam flanges.

All attachments must be made by permissible welds, screws, bolts, clips or other means shown on the the forming plans. All sheet metal assembly screws must be installed with torque-limiting devices to prevent stripping. Only welds or bolts must be used to support vertical loads.

Welding and welds must be in accordance with the provisions of Item 448, "Structural Field Welding", pertaining to fillet welds. All welds must be made by a qualified welder in accordance with Item 448.

All permanently exposed form metal, where the galvanized coating has been damaged, must be thoroughly cleaned and repaired in accordance with Item 445, "Galvanizing". Minor heat discoloration in areas of welds need not be touched up.

Flutes must line up uniformly across the entire width of the structure where main reinforcing steel is located in the flute.

Construction joints will not be permitted unless shown on the plans. The location of and forming details for any construction joint used must be shown on the forming plans. Forms below a construction joint must be removed after curing of the slab.

A sequence for uniform vibration of concrete must be approved by the Engineer prior to concrete placement. Attention must be given to prevent damage to the forms, yet provide proper vibration to prevent voids or honeycomb in the flutes and at headers and/or construction joints.

7/24/17

SHEET 1 OF 2

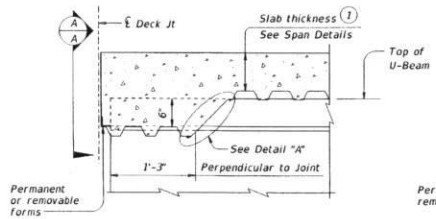
Texas Department of Transportation | Bridge Division Standard

PERMANENT METAL DECK FORMS

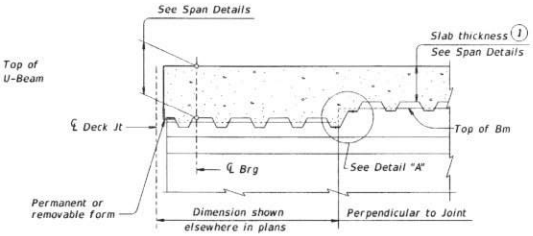
PMDF

FILE: pmdfstel.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	DIST	COUNTY		SHEET NO. 31

DATE:
FILE:

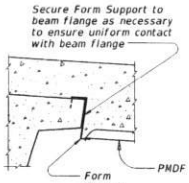


AT THICKENED SLAB END FOR U-BEAMS

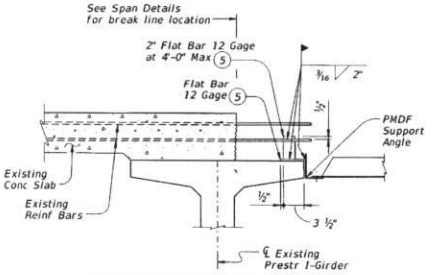


AT THICKENED SLAB END FOR PRESTRESSED I-BEAMS, I-GIRDERS AND STEEL BEAMS

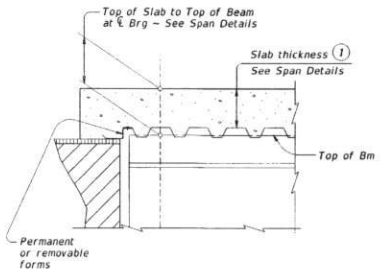
Showing I-Beam block-out. No block-out for I-Girders or Steel Beams.



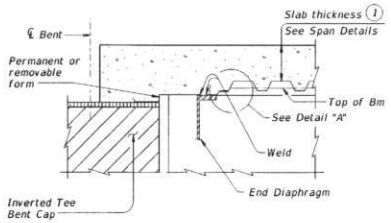
SECTION A-A



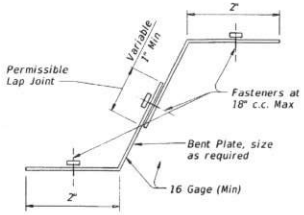
SHOWING PRESTRESSED CONCRETE I-BEAMS, I-GIRDERS AND U-BEAMS



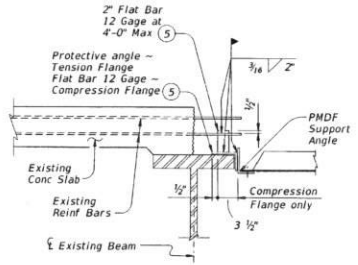
AT SLAB OVER ABUT BKWL OR INV TEE STEM FOR CONC BEAMS WITHOUT THICKENED SLAB END



AT SLAB OVER INV TEE STEM FOR STEEL BEAMS WITHOUT THICKENED SLAB END

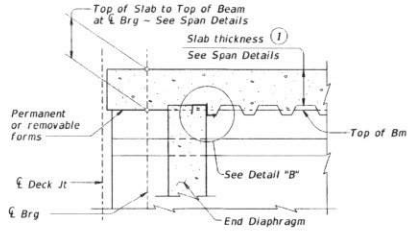


DETAIL "A"

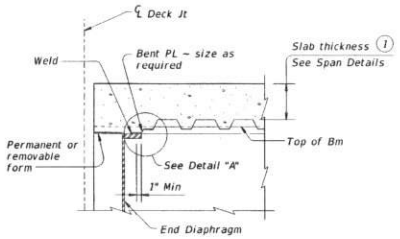


SHOWING STEEL BEAMS

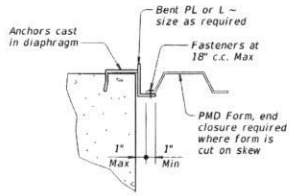
WIDENING DETAILS



AT CONC END DIAPHRAGM FOR PRESTRESSED I-BEAMS AND STEEL BEAMS



AT END DIAPHRAGM FOR STEEL BEAMS WITHOUT THICKENED SLAB END



DETAIL "B"

(1) Slab thickness minus 3/16" if corrugations match reinforcing bars

(5) Minimum yield stress of 12 Gage bars shall be 40 ksi

DETAILS AT ENDS OF BEAMS

7/24/17

SHEET 2 OF 2

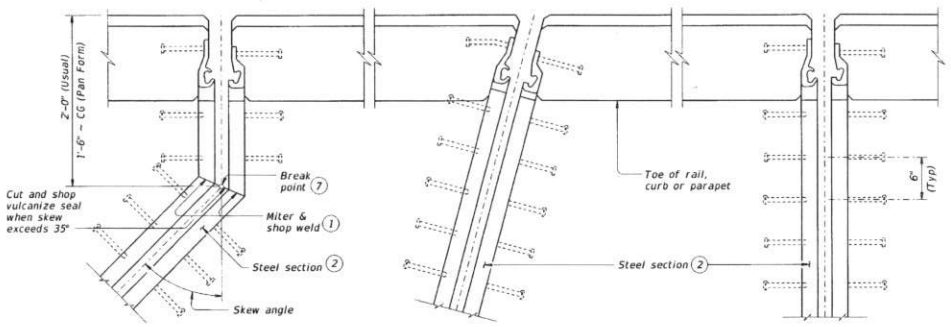
Texas Department of Transportation | Bridge Division Standard

PERMANENT METAL DECK FORMS

PMDF

FILE: pmdfste1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	DIST	COUNTY		SHEET NO.
				32

DATE:
FILE:



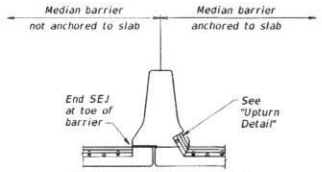
SHOWING SKEWS WITH SLAB BREAKBACKS

SHOWING SKEWS WITHOUT SLAB BREAKBACKS

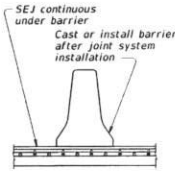
SHOWING WITHOUT SKEWS AND SLAB BREAKBACKS

PLANS OF END CONDITIONS

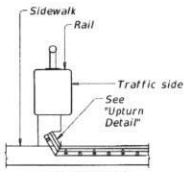
Used for Watson Bowman Acme (SE-400 or SE-500) and D.S. Brown (A2R-400 or A2R-XTRA) joint systems. Shown with upturns



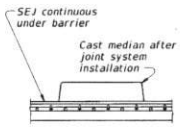
WITH OPEN DECK JOINT BELOW MEDIAN BARRIER



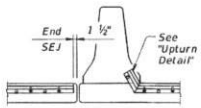
AT MEDIAN BARRIER



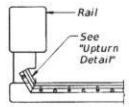
AT SIDEWALK BEHIND BRIDGE RAIL



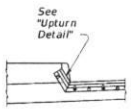
AT RAISED MEDIAN



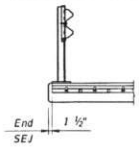
WITH OPEN DECK JOINT ADJACENT TO MEDIAN BARRIER



AT CONCRETE BRIDGE RAIL



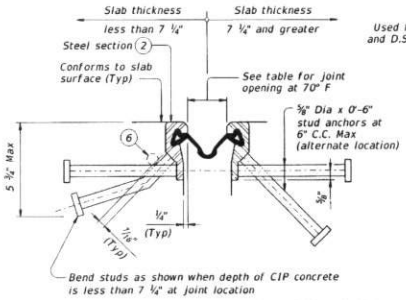
AT SIDEWALK



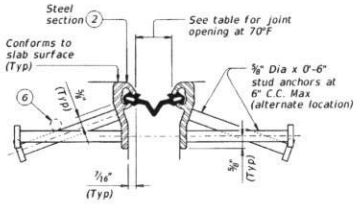
AT STEEL POST BRIDGE RAIL

TYPICAL SECTIONS (5)

Used for Watson Bowman Acme (SE-400 or SE-500) and D.S. Brown (A2R-400 or A2R-XTRA) joint systems.



SECTION THRU WATSON BOWMAN ACME (SE-400 OR SE-500) JOINTS



SECTION THRU D.S. BROWN (A2R-400 OR A2R-XTRA) JOINTS

TABLE OF SEALED EXPANSION JOINT INFORMATION

MANUFACTURER	STEEL SECTION (2)	STRIP SEAL			
		4" JOINT		5" JOINT	
		Seal Type	Joint Opening (3)	Seal Type	Joint Opening (3)
D.S. Brown	Type SSCM2	A2R-400	1 ¾"	A2R-XTRA	2"
Watson Bowman Acme	Type R	SE-400	1 ¾"	SE-500	2"
Watson Bowman Acme	As Shown	SPS-400	2"	N/A	N/A
R.J. Watson	As Shown	SF-400	2 ½"	N/A	N/A

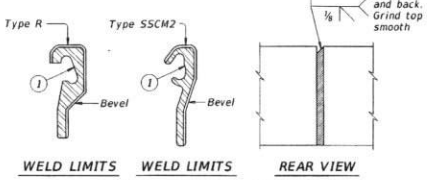
REDUCED LONGITUDINAL MOVEMENT RANGE

SKEW (deg)	JOINT SIZE	
	4"	5"
0	4.0"	5.0"
15	4.0"	5.0"
30	3.5"	4.3"
45	2.8"	3.5"

DESIGN NOTES:

Joints installed on a skew have reduced ability to accommodate longitudinal movement. Use table values to determine the correct joint size for skewed installations.

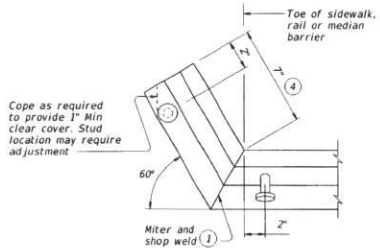
For other skews over 25 degrees, calculate reduced movement range by multiplying joint size by cosine (skew).



WELD LIMITS WELD LIMITS REAR VIEW

FIELD SPLICE DETAIL

Used for Watson Bowman Acme (SE-400 or SE-500) and D.S. Brown (A2R-400 or A2R-XTRA) joint systems.



UPTURN DETAIL

Used for Watson Bowman Acme (SE-400 or SE-500) and D.S. Brown (A2R-400 or A2R-XTRA) joint systems.

FABRICATION NOTES:

Temporarily shop assemble corresponding sections of Sealed Expansion Joints, check for fit, and match mark for shipment. Secure corresponding sections together for shipment with shipping angle. Do not use erection bolts.

The seal must be continuous and included in the price bid for Sealed Expansion Joint.

Ship steel sections in convenient lengths of 10'-0" Min and 24'-0" Max unless necessary for staged construction or widenings. One shop splice is permitted in each shipping length provided no piece is less than 2'-0" long and sufficient studs are added to limit the stud to shop splice distance to 2" Min and 4" Max.

Weld studs in accordance with AWS D1.1.

Butt weld all shop and field splices and grind smooth areas in contact with seal. Make all necessary field splice joint preparations in the shop.

Paint portions of steel sections not in contact with concrete with the primer specified for System II paint.

Shop drawings for the fabrication of Sealed Expansion Joints will not require the Engineer's approval if fabrication is in accordance with the details shown on this standard.

CONSTRUCTION NOTES:

Secure the Sealed Expansion Joint in position and place to the proper grade and alignment by welding braces to adjacent reinforcing steel, to prestressed beam stirrups, or to anchors cast in concrete diaphragms. Include cost of temporary bracing in the price bid for Sealed Expansion Joint.

Remove shipping angle immediately after each joint half is secured in place. Grind smooth, and touch up with organic zinc-rich paint.

Clean and prepare seal cavity for seal installation as per the Manufacturer's installation procedures.

GENERAL NOTES:

Provide Sealed Expansion Joints in the size and at locations shown on the plans.

Minimum slab and overhang thickness required for the use of SEJ-A is 6 ½".

(1) Remove all burrs which will be in contact with seal prior to making splice.

(2) Shape of steel section shown is typical. Variations in sections must be approved by the Engineer.

(3) These openings are also the recommended minimum installation openings.

(4) Reduce for sidewalk or parapet heights less than 6".

(5) Other conditions affecting the joint profile should be noted elsewhere.

(6) Move transverse bars that are in conflict with SEJ studs, in either the bridge slab or approach slab, to rest at the junction of the studs.

(7) See span details for location of break point.

7/24/17

SHEET 1 OF 2

Texas Department of Transportation

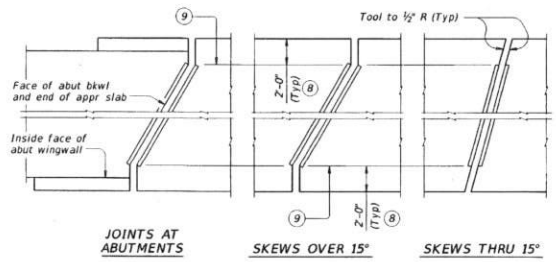
Bridge Division Standard

SEALED EXPANSION JOINT TYPE A WITHOUT OVERLAY

SEJ-A

FILE: sejaste1.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JKH
©TxDOT January 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS				
01-16: Addition of strip seal type, dimension anchor plate, Joint Seal splice note.	DIST	COUNTY		SHEET NO. 33

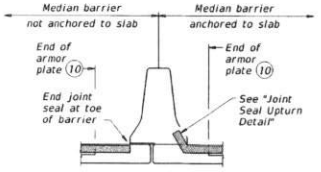
DATE:
FILE:



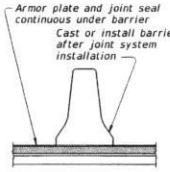
JOINTS AT ABUTMENTS | SKEWS OVER 15° | SKEWS THRU 15°

PLANS OF ARMOR PLATES

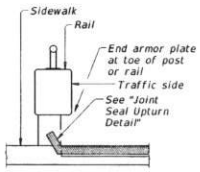
Used for R.J. Watson (SF-400) and Watson Bowman Acme (SPS-400) joint systems



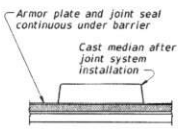
WITH OPEN DECK JOINT BELOW MEDIAN BARRIER



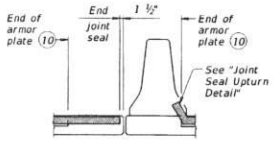
AT MEDIAN BARRIER



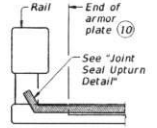
AT SIDEWALK BEHIND BRIDGE RAIL



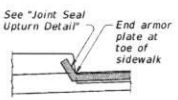
AT RAISED MEDIAN



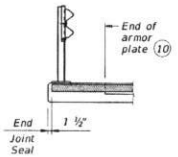
WITH OPEN DECK JOINT ADJACENT TO MEDIAN BARRIER



AT CONCRETE BRIDGE RAIL



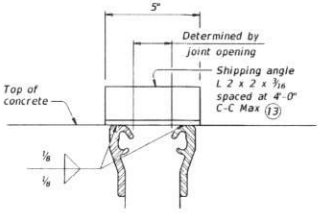
AT SIDEWALK



AT STEEL POST BRIDGE RAIL

TYPICAL SECTIONS OF ARMOR PLATES & SEALS (5)

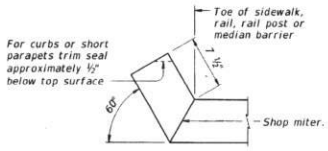
Used for R.J. Watson (SF-400) and Watson Bowman Acme (SPS-400) joint systems



SHOWING D.S. BROWN (Ty SSCM2)
All joints similar

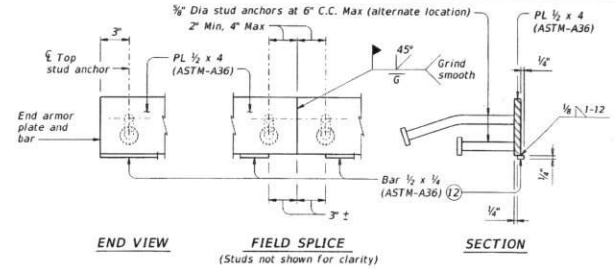
SHIPPING ANGLE

An alternate method of securing joint sections may be used if approved by the Bridge Division. Erection bolts are not allowed.



JOINT SEAL UPTURN DETAIL

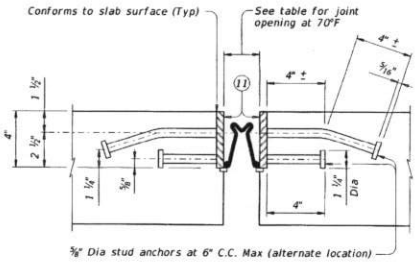
Used for R.J. Watson (SF-400) and Watson Bowman Acme (SPS-400) joint systems. Upturn seal only. Terminate armor plates as shown in "Plans of Armor Plates" and "Typical Sections of Armor Plates & Seals."



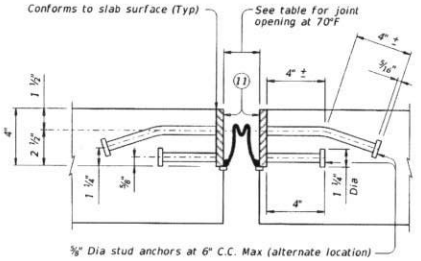
END VIEW | FIELD SPLICE (Studs not shown for clarity) | SECTION

ELEVATION OF ARMOR PLATE

Used for R.J. Watson (SF-400) and Watson Bowman Acme (SPS-400) joint systems



SECTION THRU R J WATSON (SF-400) JOINT



SECTION THRU WATSON BOWMAN ACME (SPS-400) JOINT

CONSTRUCTION NOTE FOR R.J. WATSON (SF-400) AND WATSON BOWMAN ACME (SPS-400) JOINTS:
Splice and install seal in accordance with the Manufacturer's directions and with the adhesive provided by the Manufacturer. Splice in joint seal may be performed in the field.

(5) Other conditions affecting the joint profile should be noted elsewhere.

(8) Unless shown otherwise, terminate armor plate at slab break point if break is more than 2'-0" from slab edge.

(9) At Fabricator's option, armor plate may extend up to 6" beyond this point for skews through 15°.

(10) See "Plans of Armor Plates".

(11) Coat with Manufacturer's supplied epoxy primer above bar before installing sealant.

(12) In lieu of bar, use ¾", 16 gauge, stainless steel strap. Attach to armor plate with a fastener for attaching steel to steel base material, such as Hilti X-EGN or X-S13.

(13) Align shipping angle perpendicular to joint.

7/24/17

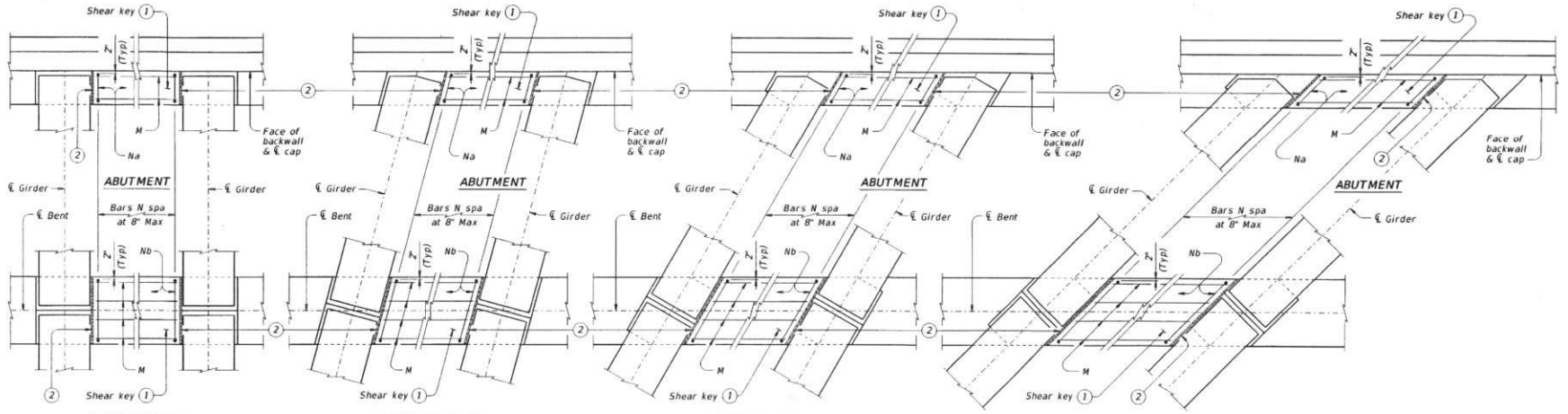
SHEET 2 OF 2

Texas Department of Transportation | Bridge Division Standard

SEALED EXPANSION JOINT TYPE A WITHOUT OVERLAY

SEJ-A

FILE: sejastel.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT January 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS				
03-16: Addition of strip seal type, dimension armor plate, Joint Seal splice note.	DIST	COUNTY		SHEET NO. 34



PARTIAL PLANS WITH NO SKEW

Showing shear keys on 3'-6" wide caps. 4'-0" caps similar.

PARTIAL PLANS WITH 15° SKEW

Showing shear keys on 3'-6" wide caps. 4'-0" caps similar.

PARTIAL PLANS WITH 30° SKEW

Showing shear keys on 3'-6" wide caps. 4'-0" caps similar.

PARTIAL PLANS WITH 45° SKEW

Showing shear keys on 3'-6" wide caps. 4'-0" caps similar.

(1) Place shear keys on the upstream side of structure between outside girder and next adjacent girder, unless shown otherwise on plans.

(2) UHMW polyethylene wear pad. (Typ)

(3) Leave a ¼" gap plus or minus between girder and face of wear pad. Cast wear pad with shear key, smooth side facing girder. Care must be taken to keep concrete from flowing under girder. Slope top of shear keys in accordance with Item 420.4.9, "Treatment and Finishing of Horizontal Surfaces."

(4) Measure at higher bearing seat elevation forward or back. Dimension based on typical bearing pad and bearing seat. Increase as necessary to maintain 5" overlap.

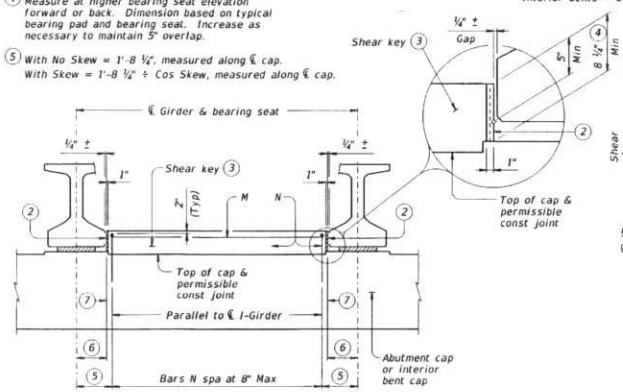
(5) With No Skew = 1'-8 ¼", measured along ℄ cap.
With Skew = 1'-8 ¼" ÷ Cos Skew, measured along ℄ cap.

(6) With No Skew = 1'-4 ¼", measured along ℄ cap.
With Skew = 1'-4 ¼" ÷ Cos Skew, measured along ℄ cap.

(7) Face of UHMW polyethylene wear pad. Smooth side of pad facing girder.

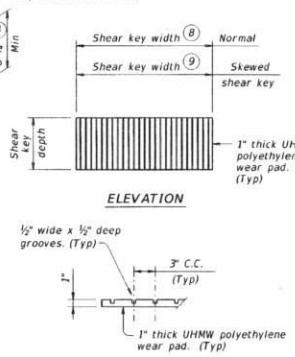
(8) Abutments = ½ Cap width.
Interior bents = Cap width.

(9) Abutments = ½ Cap width ÷ Cos Skew.
Interior bents = Cap width ÷ Cos Skew.

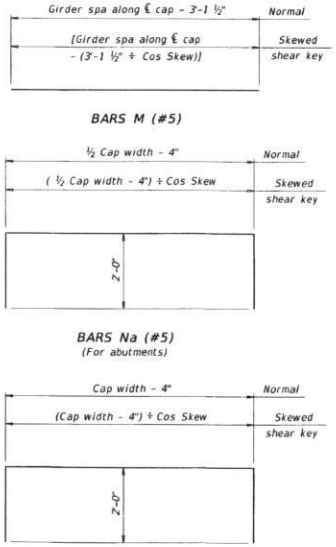


PARTIAL ELEVATION OF ABUTMENT OR INTERIOR BENT CAP (1)

Showing shear key with girder Type Tx46.
Other I-Girder types similar.



ULTRA HIGH MOLECULAR WEIGHT (UHMW) POLYETHYLENE WEAR PAD DETAILS



CONSTRUCTION NOTES:

Provide Class "C" concrete (f'_c = 3,600 psi). Provide Class "C" (HPC) if shown elsewhere on the plans.
Provide Grade 60 reinforcing steel.
Provide epoxy coated reinforcing steel for shear key if abutment or interior bent reinforcing steel is epoxy coated.
Provide Ultra High Molecular Weight (UHMW) polyethylene wear pads in accordance with ASTM D6712.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
Details showing skew are drawn showing right forward skew. See Bridge Layout for actual skew direction.
These details are limited to bridges skewed 45 degrees and less.
This standard is only applicable for I-Girders.
Modify details for bearing conditions, and girder spacing not shown on this standard. Details do not account for sole plate or pedestal bearing seat.
Include shear key concrete in abutment or bent concrete for payment.
UHMW polyethylene wear pads are subsidiary to Class "C" concrete.

Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing bar dimensions shown are out-to-out of bar.

7/24/15

57913

Texas Department of Transportation — Bridge Division Standard

SHEAR KEY DETAILS
PRESTR CONCRETE I-GIRDERS

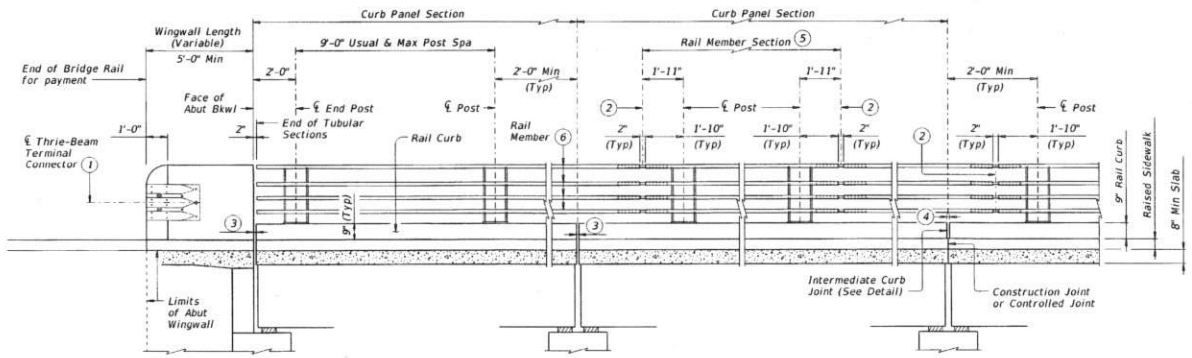
IGSK

FILE: igsksts5.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: AES
©TxDOT October 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	DIST	COUNTY		SHEET NO. 35

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 this standard to other formats or for incorrect results or damages resulting from its use.

DATE:
FILE:

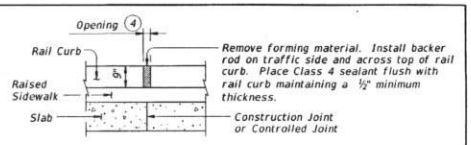
DATE:
FILE:



AT ABUTMENTS | AT BENTS WITH SLAB EXP JOINTS | AT BENTS WITHOUT SLAB EXP JOINTS

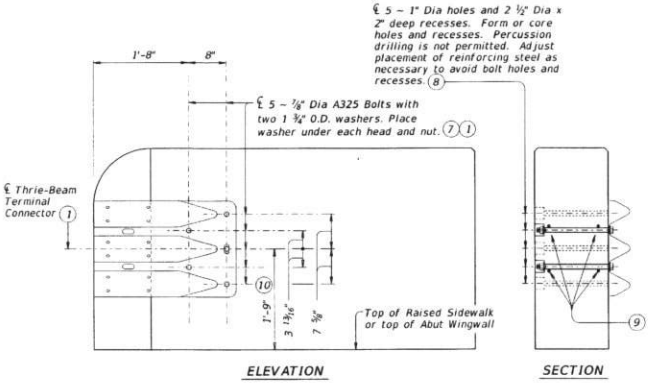
ROADWAY ELEVATION OF RAIL

Showing combination rail on a raised sidewalk.



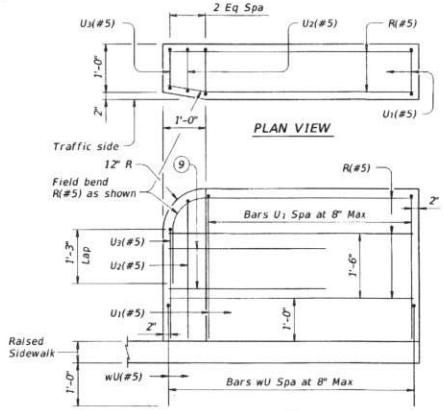
INTERMEDIATE CURB JOINT DETAIL

Provide at all interior bents without slab expansion joints. Location independent of rail member splices.

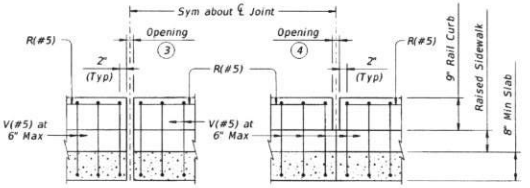


ELEVATION | SECTION

TERMINAL CONNECTION DETAILS



AT ABUTMENT WINGWALL



AT BENTS WITH SLAB EXPANSION JOINTS | AT BENTS WITHOUT SLAB EXP JOINTS

ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT

Showing with raised sidewalk

(1) Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence". Attach Metal Beam Guard Fence Transitions to the bridge rail and extend along the embankment unless otherwise shown in the plans.

(2) ℄ Expansion Joint or Splice Joint as required.

(3) Same as slab joint opening. (5" Max Expansion Joint).

(4) ¼" Min, ¾" Max.

(5) Rail member sections must have at least two posts but not more than four.

(6) HSS 6 x 2 x ¼ (ASTM-A1085 or A500 Grade B).

(7) Provide bolts of sufficient length to extend ½" to ¾" beyond nut.

(8) Bolt recesses are only required when pedestrian sidewalks are adjacent to back of rail.

(9) Place 4 additional Bars R(#5) 3'-8" in length inside Bars U(#5) and centered 2'-0" from end of rail when Terminal Connections are required. Field bend as needed.

(10) Increase 2" for structures with Overlay.

7/24/17

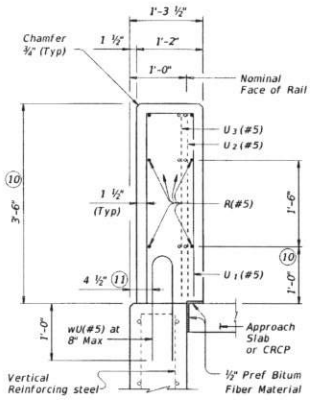
SHEET 1 OF 4

Texas Department of Transportation | Bridge Division Standard

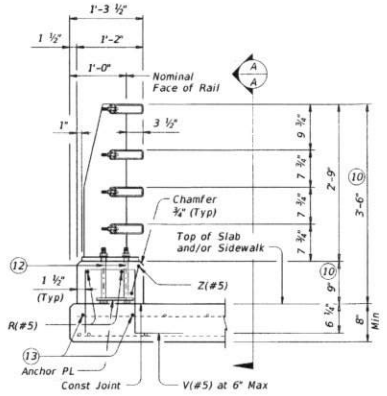
COMBINATION RAIL

TYPE C1W

FILE:	rlstds17.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT	July 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS					
03-16: Moved chamfer note to Construction Notes.		DIST	COUNTY		SHEET NO.
					36

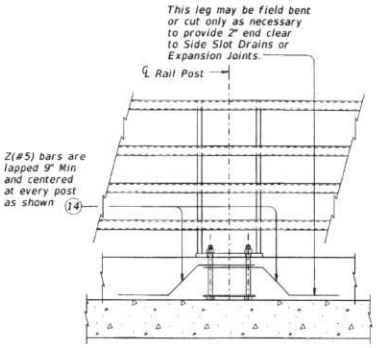


ON ABUTMENT WINGWALLS OR CIP RETAINING WALLS



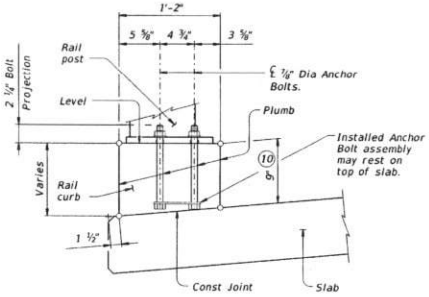
ON BRIDGE SLAB

SECTIONS THRU RAIL WITHOUT RAISED SIDEWALK

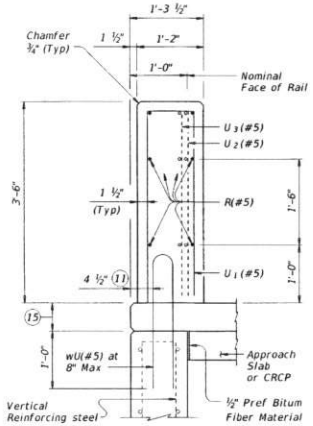


VIEW A-A

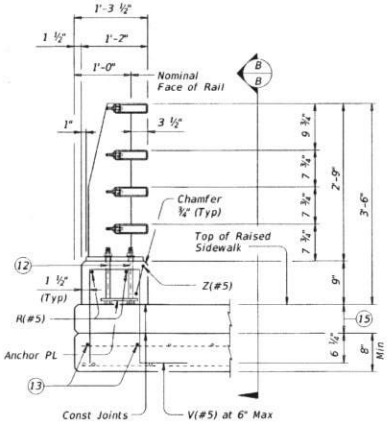
Bars V and R omitted for clarity. Showing without raised sidewalk.



WITHOUT RAISED SIDEWALK

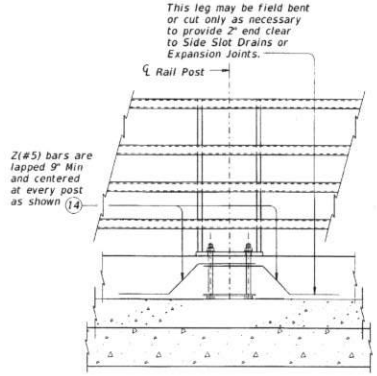


ON ABUTMENT WINGWALLS OR CIP RETAINING WALLS



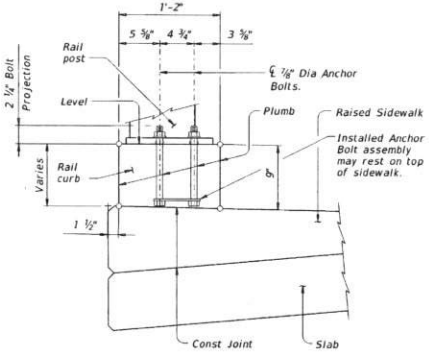
ON BRIDGE SLAB

SECTIONS THRU RAIL WITH RAISED SIDEWALK



VIEW B-B

Bars V and R omitted for clarity. Showing with raised sidewalk.



WITH RAISED SIDEWALK

RAIL CURB FORMING DETAIL

Reinforcing steel and rail curb chamfers not shown for clarity.

(10) Increase 2" for structures with Overlay.

(11) 5 ¼" when vertical reinforcing has closer clear cover over horizontal reinforcing in abutment wingwalls or retaining walls on traffic side of wall.

(12) ℄ ⅞" Dia Anchor Bolts. See "Anchor Bolt Assembly Details".

(13) Top longitudinal slab bar may be adjusted laterally 3" plus or minus to tie reinforcing.

(14) Adjust Bars Z(#5) as necessary to avoid Bars V(#5).

(15) Raised Sidewalk.

7/24/17

57913 LICENSED PROFESSIONAL ENGINEER HOUSTON, TEXAS

SHEET 2 OF 4

Texas Department of Transportation | Bridge Division Standard

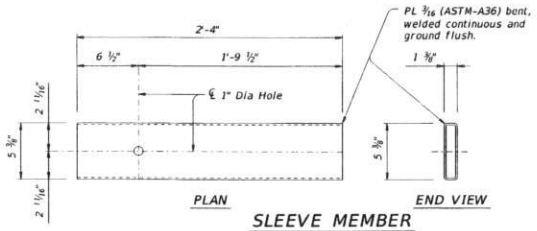
COMBINATION RAIL

TYPE C1W

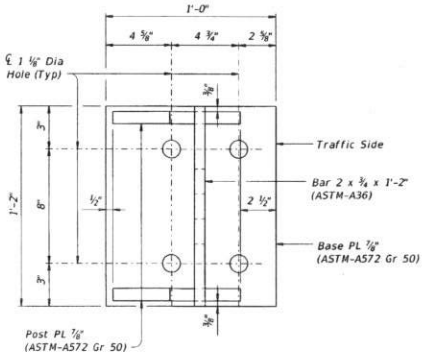
FILE:	rlstds17.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JNH
©TxDOT	July 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS					
03-16: Moved chamfer note to Construction Notes.		DIST	COUNTY		SHEET NO. 37

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 misuse of this standard to other formats or for incorrect results or damages resulting from its use.

DATE:
FILE:

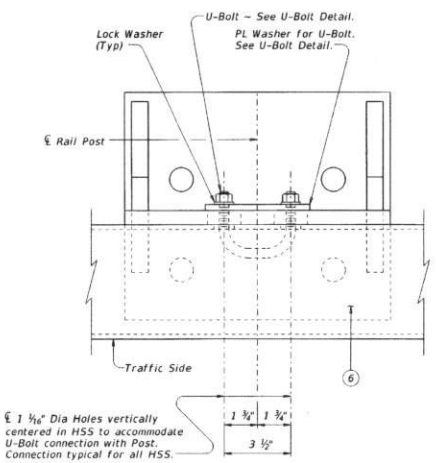


SLEEVE MEMBER



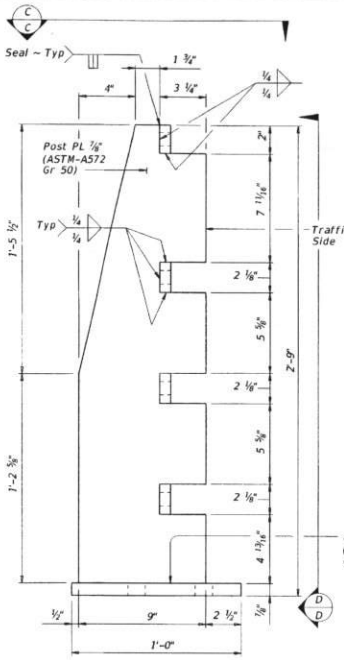
VIEW C-C

(Showing Hole location in Base PL)

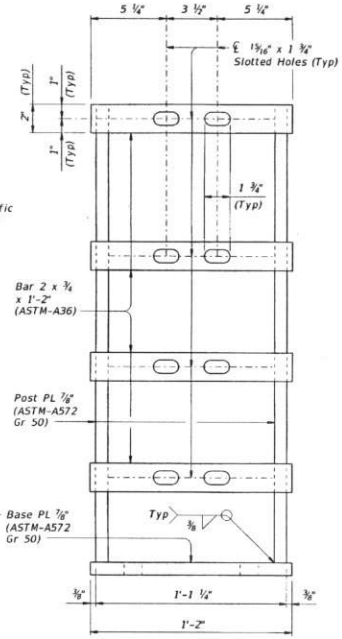


TOP VIEW OF RAIL POST

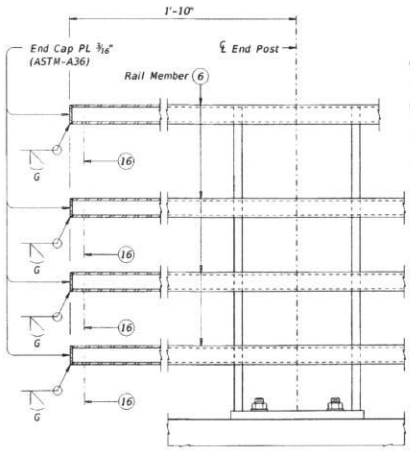
(Showing connection for rail post and HSS.)



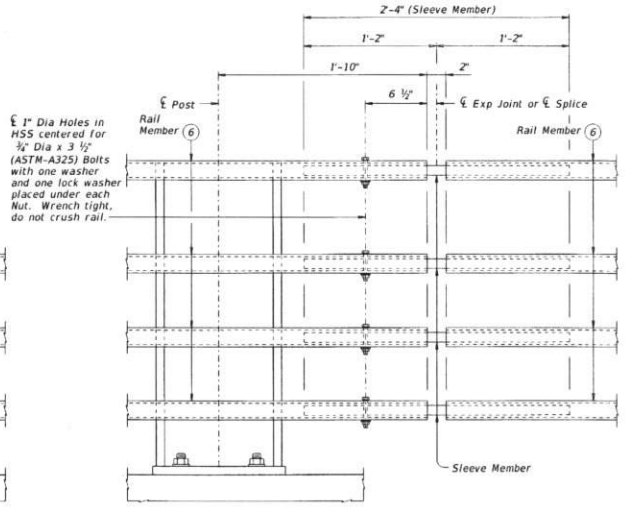
POST DETAIL



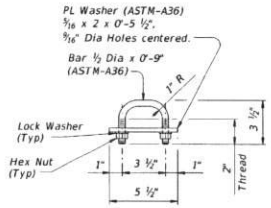
VIEW D-D



END CAPS ON HSS AT END POST



EXPANSION JOINT OR SPLICE



U-BOLT DETAIL

(Showing U-Bolt for rail post and HSS.)

⑥ HSS 6 x 2 x ¼ (ASTM-A1085 or A500 Grade B).

⑯ ℄ 3/8" Dia Drain Hole in bottom of HSS.

DATE:
FILE:

7/24/14

SHEET 3 OF 4

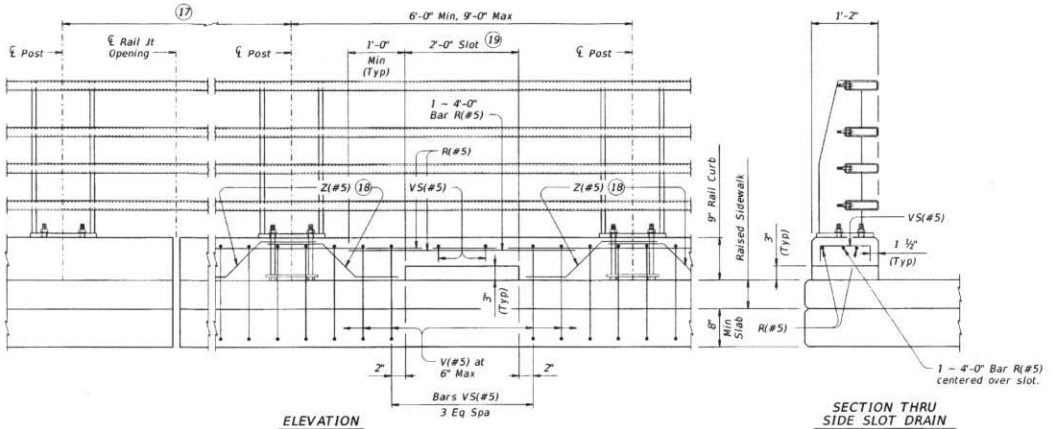
Texas Department of Transportation | Bridge Division Standard

COMBINATION RAIL

TYPE C1W

FILE: rlstds17.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT July 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS 03-16: Moved chamfer note to Construction Notes.	DIST	COUNTY		SHEET NO. 38

DATE:
FILE:

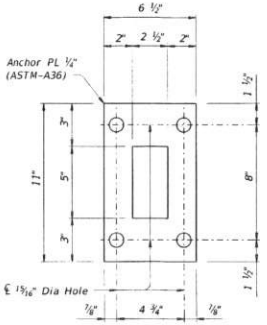


ELEVATION

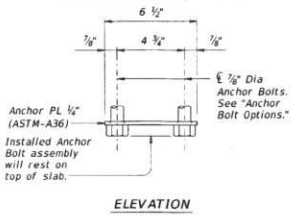
SECTION THRU SIDE SLOT DRAIN

OPTIONAL SIDE SLOT DRAIN DETAILS (20)

Showing side slot drain on raised sidewalk, without raised sidewalk similar.



PLAN OF ANCHOR PLATE (24)



ELEVATION

ANCHOR BOLT ASSEMBLY DETAILS

(10) Increase 2" for structures with Overlay.

(17) Side slot drains are not allowed in areas where there is a joint in the concrete curb between rail posts.

(18) Bars Z(#5). See "Section Thru Rail" and "View A-A or B-B" for Bar Z placement and spacing.

(19) Center side slot drain between posts within the limits shown.

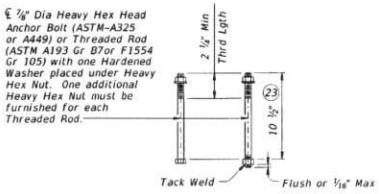
(20) Side slot drains may be used where shown elsewhere on the plans or as directed by the Engineer. Do not place drains over railroad tracks, lower roadways, or sidewalks. When this rail is used as a separator between a roadway and a sidewalk, side slot drains are not permitted.

(21) For raised sidewalks, add sidewalk height to total bar height. Use sidewalk height at rail's location.

(22) Increase 2 ¾" for structures with Overlay.

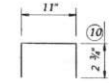
(23) When rail is used as a traffic barrier protecting the pedestrian walkway with no raised sidewalk, increase 2" for structures with overlay.

(24) Galvanizing Anchor Plate is not required.

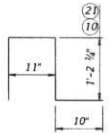


ANCHOR BOLT OPTIONS

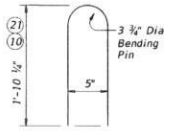
(Showing Anchor Bolts for Base Plate)



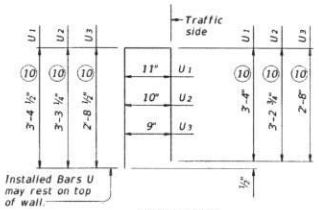
BARS VS(#5)



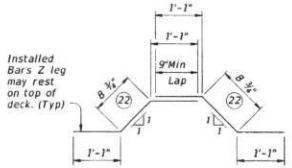
BARS V(#5)



BARS wU(#5)



BARS U(#5)



BARS Z(#5)

CONSTRUCTION NOTES:

The face of tubular sections and rail curb must be plumb unless otherwise approved by the Engineer. Steel posts must be square to the top of curb. Use Type VIII epoxy mortar under post base plates if gaps larger than 1⁄16" exist.

Bend tubes to required radius for curved rails. Shop drawings for approval are required for curved rails.

One shop splice per rail member section is permitted with minimum 85 percent penetration. The weld may be square groove or single vee groove. Grind smooth.

Round or chamfer exposed edges of rail members and rail posts must be rounded or chamfered to approximately 1⁄16" by grinding.

Chamfer all exposed concrete corners.

MATERIAL NOTES:

Galvanize all steel components except reinforcing steel and anchor plate unless noted otherwise.

When plans require painted steel, follow the requirements for painting galvanized steel in Item 446, "Field Cleaning and Painting Steel". Do not paint sleeve members until after they are installed.

Anchor bolts for base plate must be ⅞" Dia ASTM A325 or A449 bolts (or ASTM-A193 Gr B7 or F1554 Gr 105 threaded rods with one tack welded heavy hex nut each) with one hardened washer placed under each heavy hex nut. Nuts must conform to A563 requirements.

Provide Class "S" concrete. When Class "S" concrete for slab is HPC, include a minimum of 3 gallons of calcium nitrite inorganic corrosion inhibitor per cubic yard of Class "S" concrete.

Provide Grade 60 reinforcing steel.

Epoxy coat all rail reinforcement if slab bars are epoxy coated.

Provide bar laps, where required, as follows:
Uncoated ~ #5 = 1'-9"
Epoxy coated ~ #5 = 2'-7"

GENERAL NOTES:

This rail has been evaluated and accepted to be of equal strength to railings with like geometry, which have been crash tested to meet NCHRP Report 350 TL-3 criteria. This rail can be used for speeds of 50 mph and greater when a TL-3 rated guard fence transition is used. When a TL-2 rated guard fence transition is used, this rail can only be used for speeds of 45 mph and less.

Do not use this railing on bridges with expansion joints providing more than 5" movement.

Rail anchorage details shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.

Submit erection drawings showing panel lengths, rail post spacing, and anchor bolt setting, to the Engineer for approval.

Average weight of railing with no overlay:
205 plf total
131 plf (Conc)
74 plf (Steel).

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.

Texas Department of Transportation

Bridge Division Standard

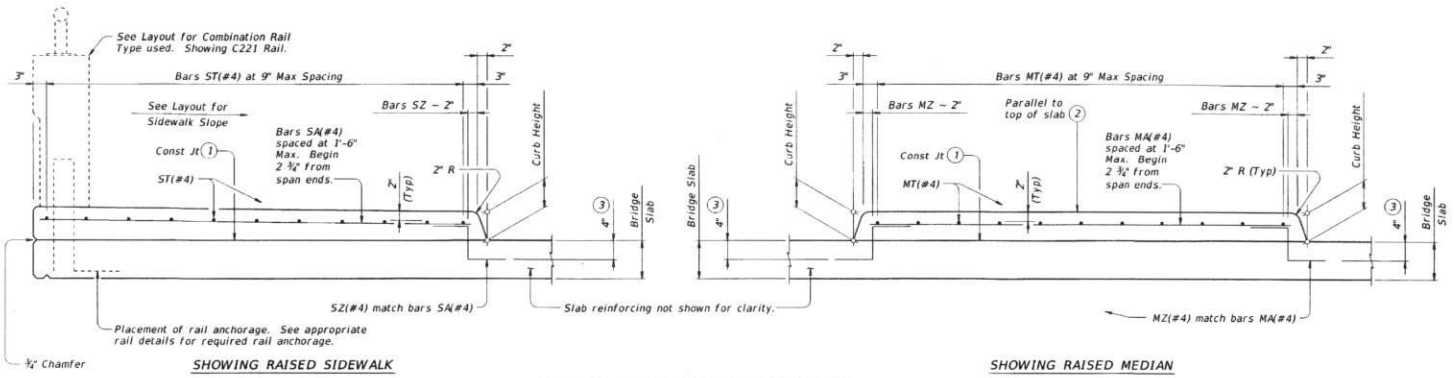
COMBINATION RAIL

TYPE C1W

FILE:	rlstds17.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT	July 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS					
03-16: Moved chamfer note to Construction Notes.		DIST	COUNTY		SHEET NO.
					39

7/24/17

DATE:
FILE:



SHOWING RAISED SIDEWALK

SHOWING RAISED MEDIAN

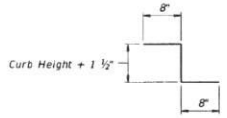
TYPICAL TRANSVERSE SECTIONS

See Span Details for dimensions not shown.

(1) Provide broom finish to top of bridge slab where raised sidewalk or raised median area is defined.

(2) Unless noted otherwise on the span details.

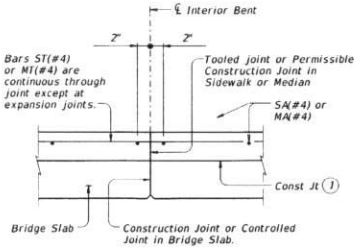
(3) Bars may rest on top of PCPs.



BARS SZ(#4) AND MZ(#4)

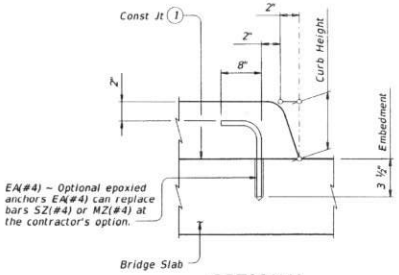
APPROVED SLIP RESISTANT PLATE	
Product	Manufacturer Website
Mebac® #3, Steel	www.harscoikg.com
Algrip™, Steel	www.algrip.com
SlipNOT® Grade 2, Steel	www.slipnot.com

Drain cover plates must be fabricated with a product from this list. No exceptions are permitted.



LONGITUDINAL SECTION AT INTERIOR BENT

At Bents with expansion joints, provide an open joint in the sidewalk/median matching the deck's joint width.



OPTIONAL EPOXY ANCHORS

Embed EA(#4) bar into concrete with a Type III (Class C) epoxy meeting the requirements of DMS-6100, "Epoxies and Adhesives". Follow manufacturer's directions for installing the epoxied anchor bars.

MATERIAL NOTES:

Provide the same concrete required for the bridge deck, Class S or Class S (HPC).

Provide Grade 60 reinforcement. Welded wire reinforcement (WWR) meeting ASTM A1064 of equivalent size and spacing may be substituted for bars SA, ST, MA, and MT.

Epoxy coat reinforcement if bridge deck reinforcement is required to be epoxy coated.

Hot-dip galvanize slip resistant steel plate after fabrication in accordance with Item 445, "Galvanizing". Chamfer or round edges approximately 1/16" prior to galvanizing.

GENERAL NOTES:

Designed according to AASHTO LRFD Specifications.

Provide the following bar or wire lap lengths when required:
- Uncoated, 1'-5" Min
- Coated, 2'-1" Min

Submittal and approval of drain cover plate shop drawings is not required if fabrication is accordance with these details.

Raised sidewalks will be paid under Item 422 by the SF of Bridge Sidewalk or Bridge Sidewalk (HPC). Raised medians will be paid under Item 422 by the SF of Bridge Median or Bridge Median (HPC).

Payment for drain cover plates will be by the pound of "Structural Steel (Misc Non-Bridge)" as per Item 442, "Metal for Structures". Weight of one drain cover plate is 48 plf.

DESIGNER NOTES:

These details do not apply for longitudinal grades exceeding 5 percent.

Cover dimensions are clear dimensions, unless noted otherwise.

Reinforcing bar dimensions shown are out-to-out of bar.

7/24/17

SHEET 1 OF 2

Texas Department of Transportation — Bridge Division Standard

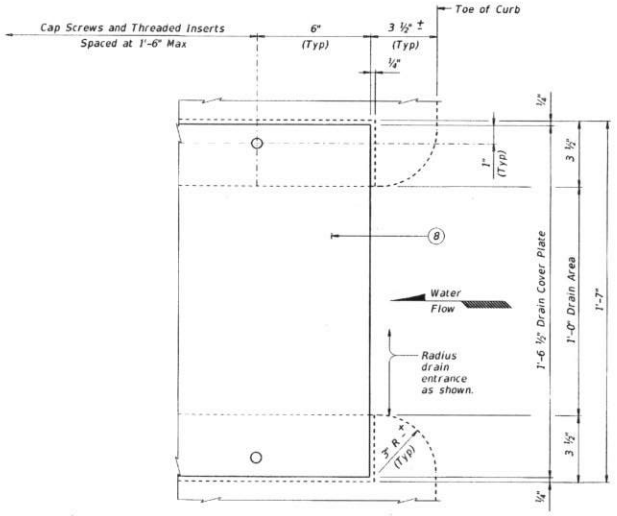
BRIDGE RAISED SIDEWALK AND MEDIAN DETAILS

BRSM

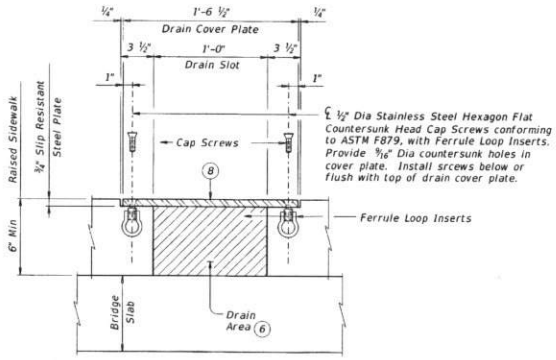
FILE: brsmstel.dgn	DN: JMH	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT January 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	DIST	COUNTY		SHEET NO.
				40

57913

DATE:
FILE:



PARTIAL PLAN CURB DRAIN



SECTION B-B

Reinforcing not shown for clarity.

(1) Provide broom finish to top of bridge slab where raised sidewalk or raised median area is defined.

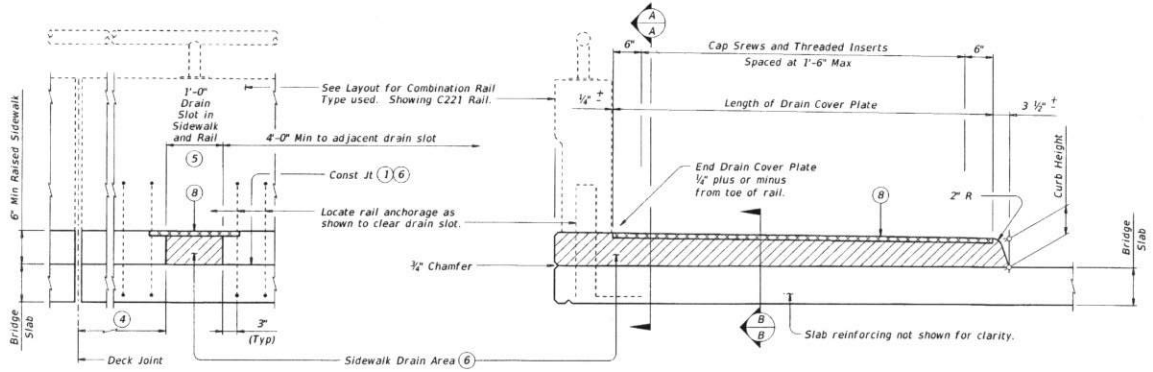
(4) 3'-0" Min at Deck Expansion Joints, Deck Construction Joints or Controlled Joints, Rail Intermediate Wall Joints or from face of substructure.

(5) For rail Type C1W, center drain slots between posts.

(6) Steel trowel top surface of bridge deck in drain locations.

(7) Provide sidewalk drains where shown elsewhere on the plans or as directed by the Engineer. Do not place drains over railroad tracks, lower roadways, or sidewalks. Place Drain and Cover Plate perpendicular to toe of rail.

(8) Drain Cover Plate (PL ¾ x 18 ½ Slip Resistant Steel Plate). Install flush with top of sidewalk.



SECTION A-A

SHOWING RAISED SIDEWALK WITH DRAIN SLOT

OPTIONAL DRAIN DETAILS (7)

SHEET 2 OF 2

Texas Department of Transportation

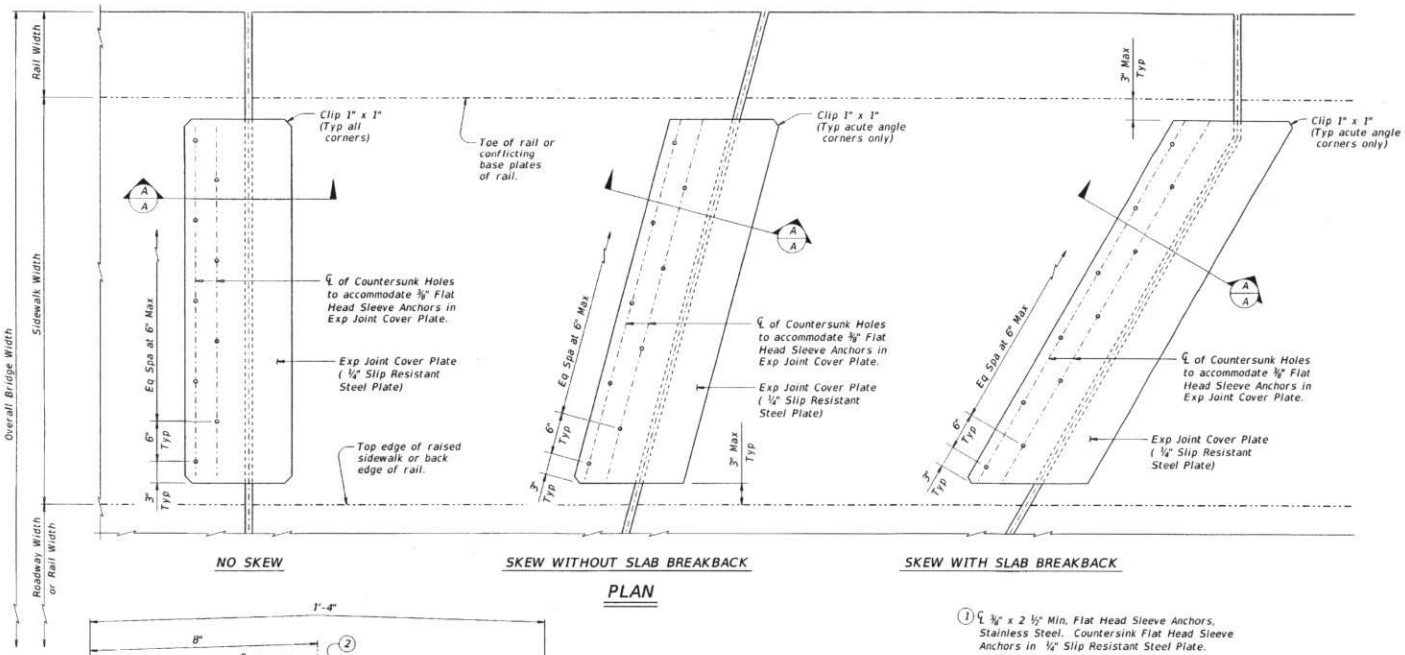
Bridge Division Standard

BRIDGE RAISED SIDEWALK AND MEDIAN DETAILS

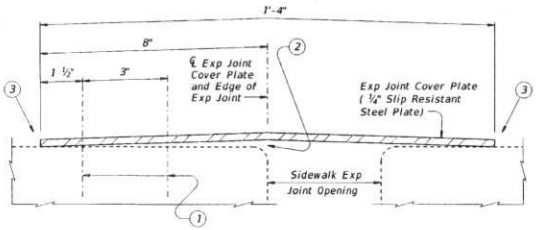
BRSM

FILE: brsmste1.dgn	DN: JMH	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT January 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	DIST	COUNTY		SHEET NO. 41

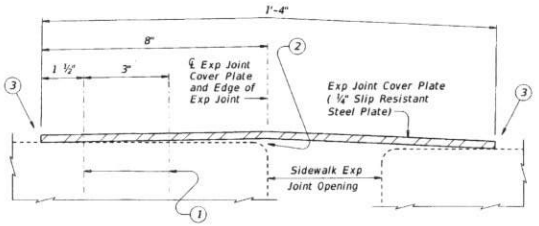
DATE:
FILE:



PLAN

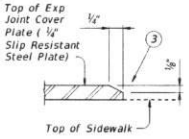


SHOWING LEVEL EXP JOINT



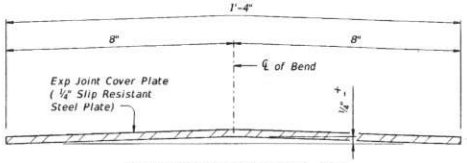
SHOWING UNLEVEL EXP JOINT
(Install Sleeve Anchors on high side of Exp Joint)

SECTION A-A



EXP JOINT COVER PLATE BEVEL DETAIL

Bevel all plate edges as shown.



BENDING DIAGRAM OF EXP JOINT COVER PLATE

① ℄ ⅜" x 2 ½" Min, Flat Head Sleeve Anchors, Stainless Steel. Countersink Flat Head Sleeve Anchors in ¼" Slip Resistant Steel Plate.

② It is not necessary to remove plate crown provided the plate is firmly secured to the sidewalk.

③ Transverse edges must be in contact with sidewalk surface after installation.

APPROVED SLIP RESISTANT PLATE	
Product	Manufacturer Website
Mebac® #3, Steel	www.harscoikg.com
Algrip™, Steel	www.algrip.com
SlipNOT® Grade 2, Steel	www.slipnot.com

FABRICATION NOTES:

Shop drawings for the fabrication of Sidewalk Expansion Joint Cover Plate will not require the Engineer's approval if fabrication is in accordance with the details shown on this standard.

A Bridge Sidewalk Expansion Joint Cover Plate Layout which identifies location side of sleeve anchors and orientation of all cover plate sections must be developed by the fabricator. Mark each steel section in accordance with the Bridge Sidewalk Expansion Joint Cover Plate Layout. A copy of the Bridge Sidewalk Expansion Joint Cover Plate Layout is to be provided to the Engineer.

Sidewalk expansion joint cover plates must be hot-dipped galvanized ¼" slip resistant steel plate. Checker plate or diamond plate is not allowed nor are slip resistant tapes, films and non-metallic coatings.

Minimum required yield strength of steel plate is 36 ksi.

Hot-dip galvanize slip resistant steel plate after fabrication in accordance with Item 445, "Galvanizing".

Provide stainless steel flat head sleeve anchors meeting the requirements of ASTM F 593, Group I, Alloy 304. Countersink holes in slip-resistant plate for sleeve anchors. Drill holes in sidewalk as per sleeve anchor manufacturer's recommendations. Install sleeve anchors flush with, or slightly recessed below, top surface of sidewalk expansion joint cover plate.

GENERAL NOTES:

Sidewalk expansion joint cover plates can only accommodate up to a 7" maximum expansion joint.

Details provided are applicable to concrete walkway surfaces only.

Payment for sidewalk expansion joint cover plates must be by the pound of "Structural Steel (Misc Non-Bridge)" as per Item 442, "Metal for Structures".

Estimated weight of one sidewalk expansion joint cover plate is 14 plf.

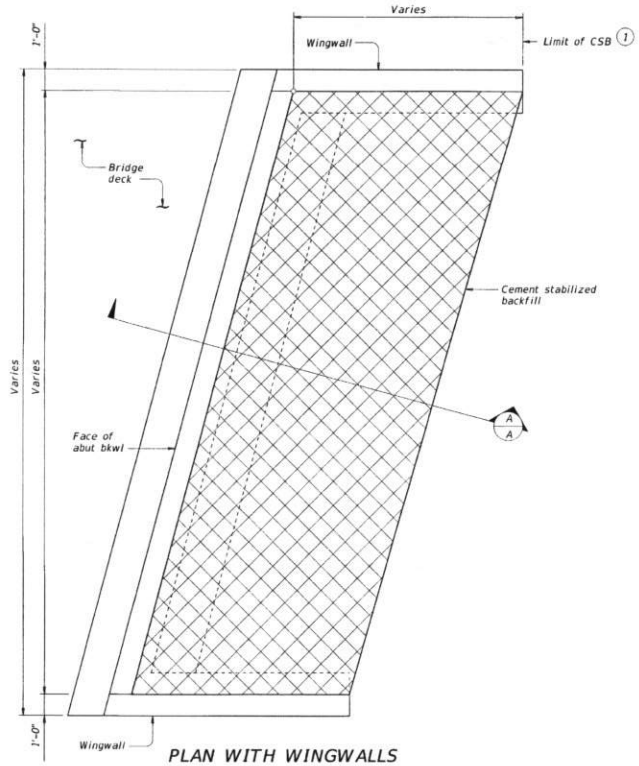
7/24/17

Texas Department of Transportation — Bridge Division Standard

BRIDGE SIDEWALK EXPANSION JOINT COVER PLATE (ALL SKEWS)

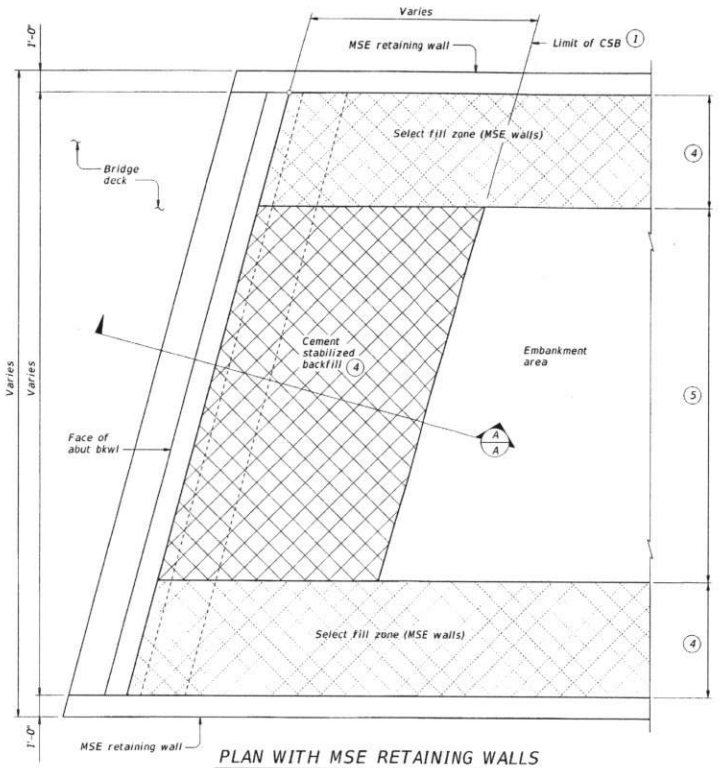
BS-EJCP

FILE: bsejstel.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
				42



PLAN WITH WINGWALLS

Cast-in-place retaining walls similar.



PLAN WITH MSE RETAINING WALLS

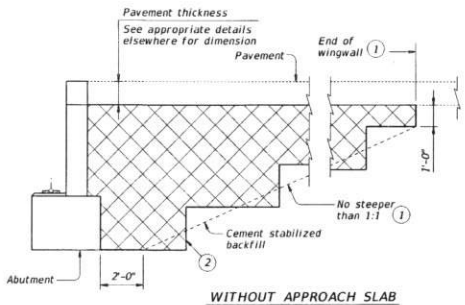
(1) Usual limit of Cement Stabilized Backfill is at end of wingwall. Extend CSB limits as required to maintain a slope no steeper than 1:1 at bottom of backfill.

(2) Bench backfill as shown with 12" (approximate) bench depths.

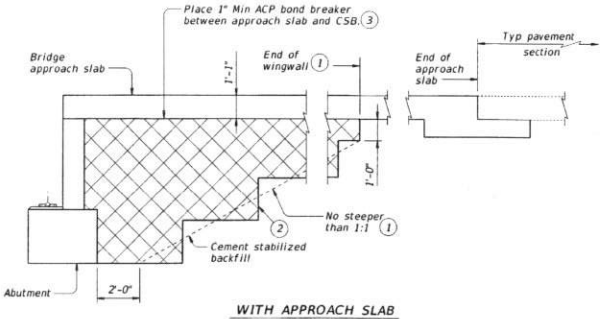
(3) Other materials can be used as a bond breaker if permitted by the Engineer. 2 layers of 30 Lb roofing felt or 2 layers of heavy mil polyethylene sheeting are examples.

(4) Where MSE retaining walls are present, adjust CSB limits to accommodate the select fill zone. See retaining wall details for additional information.

(5) When distance between select fill zones is less than 5'-0", MSE select fill may be substituted for cement stabilized backfill with approval from the Engineer.



WITHOUT APPROACH SLAB



WITH APPROACH SLAB

SECTION A-A

GENERAL NOTES:

Provide Cement Stabilized Backfill (CSB) meeting the requirements of Item 400, "Excavation and Backfill for Structures", to the limits shown at bridge abutments.

Details are drawn showing left forward skew. See Bridge Layout for actual skew direction.

These details do not apply when Concrete Block retaining walls are used in lieu of wingwalls.

7/24/17

Texas Department of Transportation

Bridge Division Standard

CEMENT STABILIZED ABUTMENT BACKFILL

BRIDGE ABUTMENT

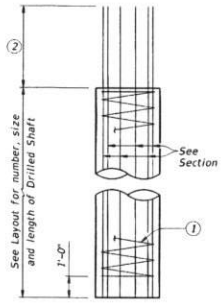
CSAB

FILE: csabste1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS 01-16 Add MSE wall details.	DIST	COUNTY		SHEET NO. 43

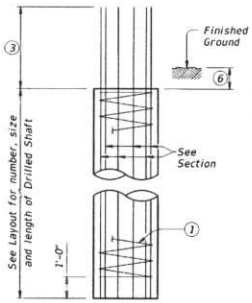
DATE:
FILE:

44

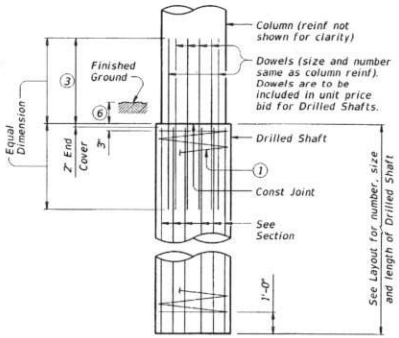
DATE:
FILE:



ABUTMENTS, WINGWALLS AND MULTI-DRILLED SHAFT FOOTINGS

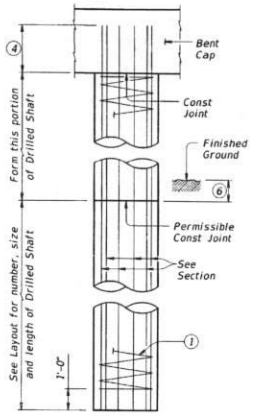


INTERIOR BENTS DRILLED SHAFT DIA EQUAL TO COLUMN DIA

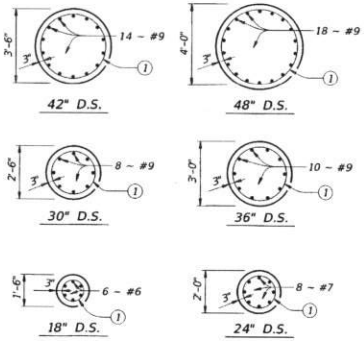


INTERIOR BENTS DRILLED SHAFT DIA GREATER THAN COLUMN DIA

DRILLED SHAFT DETAILS



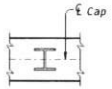
OPTIONAL INTERIOR BENT DRILLED SHAFT DETAIL (5)



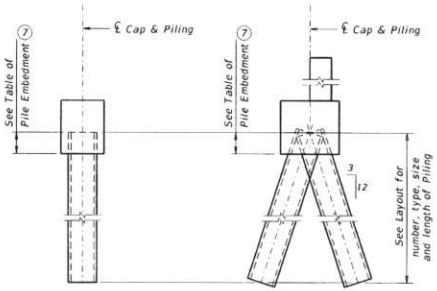
DRILLED SHAFT SECTIONS

TABLE OF PILE EMBEDMENT	
Pile Type	Embedment Depth (Ft)
16" Sq Concrete 18" Sq Concrete HP14 Steel HP16 Steel	1'-0"
20" Sq Concrete 24" Sq Concrete HP18 Steel	1'-6"

See standard CP for additional details on concrete pile embedment.

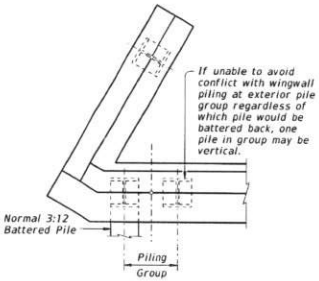


ORIENTATION OF STEEL H-PILING



VERTICAL PILE BATTERED PILE

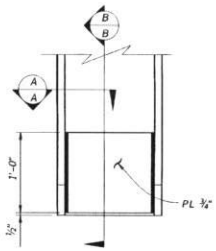
PILING DETAILS
(Concrete or Steel H)



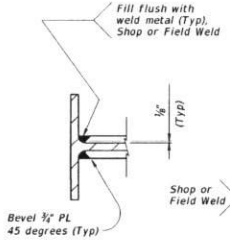
DETAIL "A"
(Showing Plan View of a 30° Skewed Abutment)

1. #3 Spiral at 6" pitch (One and a half flat turns top & bottom).
2. Min extension into supported element:
   #6 Bars = 1'-6"
   #7 Bars = 1'-8"
   #9 Bars = 2'-3"
3. Min lap with Column reinf:
   #7 Bars = 2'-9"
   #9 Bars = 4'-6"
4. Min extension into supported element:
   #6 Bars = 1'-6"
   #7 Bars = 1'-8"
   #9 Bars = 2'-8"
5. Drilled Shafts may extend to the bottom of bent caps for "H" heights of 6 ft and less (as shown on the Bridge Layout), if approved. This option can only be used when the Drilled Shaft diameter equals the Column diameter. Obtain approval of the forming method above the ground line prior to construction. No adjustments in payment will be made if this option is used.
6. 1'-0" Min
7. Or as shown on plans.

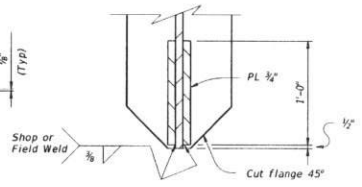
7/24/17



ELEVATION



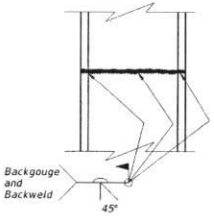
SECTION A-A



SECTION B-B

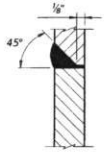
STEEL H-PILE TIP REINFORCEMENT

See Item 407 "Steel Piling" to determine when tip reinforcement is required and for options to the details shown.



STEEL H-PILE SPLICE DETAIL

Use when required.



SECTION THRU FLANGE OR WEB

SHEET 1 OF 2

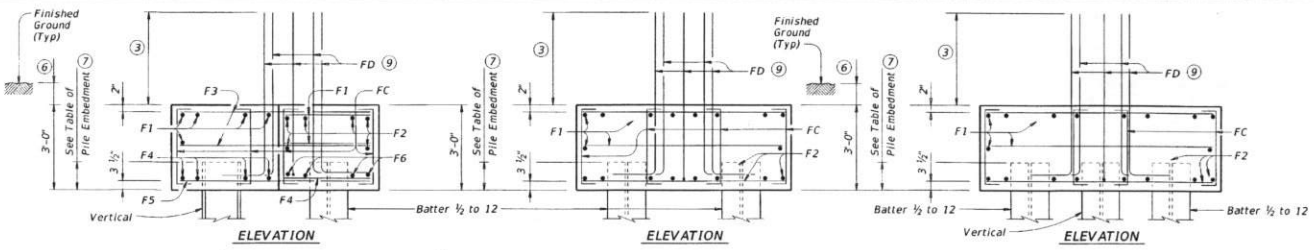
Texas Department of Transportation | Bridge Division Standard

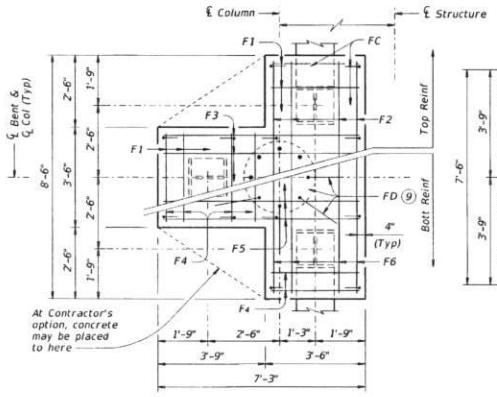
COMMON FOUNDATION DETAILS

FD

FILE: fdsldet01.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	DIST	COUNTY		SHEET NO. 44

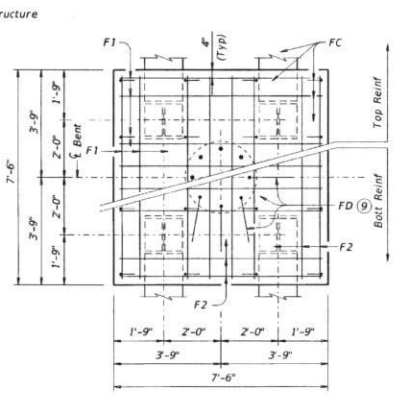
DATE:
FILE:





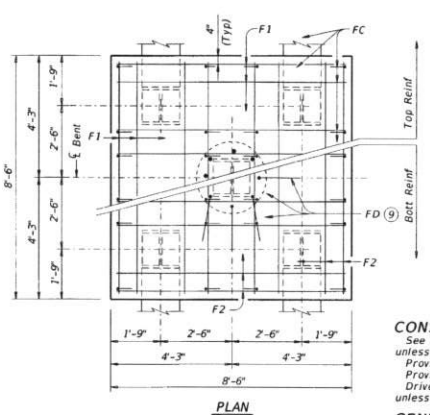
THREE PILE FOOTING (8)

For 36" Dia and smaller columns.



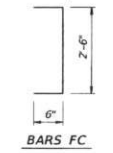
FOUR PILE FOOTING (8)

For 42" Dia and smaller columns.



FIVE PILE FOOTING (8)

For 42" Dia and smaller columns.



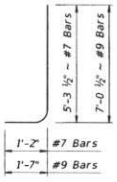


TABLE OF FOOTING QUANTITIES FOR 30" COLUMNS

ONE 3 PILE FOOTING				
Bar	No.	Size	Length	Weight
F1	11	#4	3'- 2"	23
F2	6	#4	8'- 2"	33
F3	6	#4	6'- 11"	28
F4	8	#9	3'- 2"	86
F5	4	#9	6'- 11"	94
F6	4	#9	8'- 2"	111
FC	12	#4	3'- 6"	28
FD (10)	8	#9	8'- 8"	236
Reinforcing Steel			Lb	639
Class "C" Concrete			CY	4.8

ONE 4 PILE FOOTING				
Bar	No.	Size	Length	Weight
F1	20	#4	7'- 2"	96
F2	16	#8	7'- 2"	306
FC	16	#4	3'- 6"	37
FD (11)	8	#9	8'- 8"	236
Reinforcing Steel			Lb	675
Class "C" Concrete			CY	6.3

ONE 5 PILE FOOTING				
Bar	No.	Size	Length	Weight
F1	20	#4	8'- 2"	109
F2	16	#9	8'- 2"	444
FC	24	#4	3'- 6"	56
FD (11)	8	#9	8'- 8"	236
Reinforcing Steel			Lb	845
Class "C" Concrete			CY	8.0

CONSTRUCTION NOTES:

See Bridge Layout for foundation type required. Use these foundation details unless shown otherwise.
Provide Class C Concrete (f'c = 3600 psi), unless shown otherwise.
Provide Grade 60 reinforcing steel.
Drive piling under abutment wingwalls to a minimum resistance of 10 Tons/Pile unless shown otherwise.

GENERAL NOTES:

Designed according to AASHTO LRFD Specifications.

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.

DESIGNER NOTES:

Do not use the Drilled Shaft details shown on this standard for retaining wall, noise wall, barrier or sign foundations without structural evaluation.
Do not use the footings shown on this standard in direct contact with salt water or exposed to salt water spray.
Maximum allowable pile loads for the footings shown are :
72 Tons/Pile with 24" Dia Columns
80 Tons/Pile with 30" Dia Columns
100 Tons/Pile with 36" Dia Columns
120 Tons/Pile with 42" Dia Columns

(3) Min lap with Column reinf:
#7 Bars = 2'-9"
#9 Bars = 4'-6"

(6) 1'-0" Min

(7) Or as shown on plans.

(8) See Layout for Type, Size and length of Piling.

(9) Number and size of FD bars must match Column reinforcing. Tie FD bars to the top of the bottom reinforcing mat.

(10) For 24" Columns, use #7 FD bars (6'-6") in place of #9 bars and deduct 130 lbs. For 36" Columns, add 2 FD bars (59 lbs).

(11) For 24" Columns, use #7 FD bars (6'-6") in place of #9 bars and deduct 130 lbs. For 36" Columns, add 2 FD bars (59 lbs). For 42" Columns, add 6 FD bars (177 lbs) (42" Columns disallowed on 3 Pile Footings)

7/24/17

57913

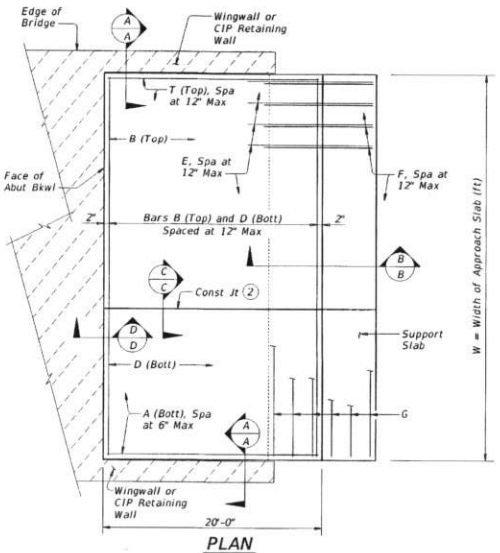
Texas Department of Transportation | Bridge Division Standard

COMMON FOUNDATION DETAILS

FD

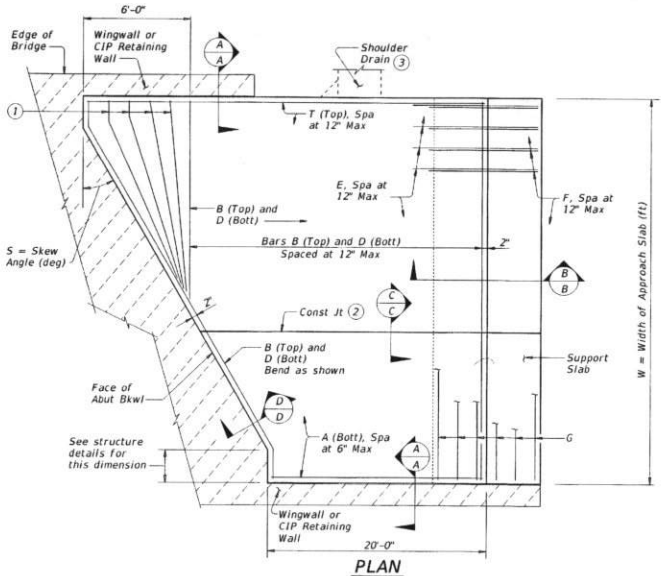
FILE: fdstde01.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	DIST	COUNTY		SHEET NO. 45

DATE:
FILE:



PLAN

(Showing Non-Skewed Approach Slab)



PLAN

(Showing Skewed Approach Slab)

BAR TABLE	
BAR	SIZE
A	#8
B	#5
D	#5
E	#5
F	#5
G	#5
T	#5

APPROXIMATE QUANTITIES (4)

Reinf steel weight = 8.5 Lbs/SF of Approach Slab
= 18.4 Lbs/LF of Support Slab

Vol of Appr Slab Conc (CY) = 1.052W - 0.093W x T + 0.02W² Tan S
(Includes Support Slab)

W = Width of Approach Slab (ft)

T = Conc Pavement Thickness (in)

S = Skew Angle (deg)

(1) Flare Bars B and D in this region (1'-6" Max Spa, 3" Min Spa). Minimum flared bar length = 2'-6". Bend bars as necessary.

(2) Provide longitudinal construction joints that align with longitudinal construction joints in the bridge slab with bridges built in stages. Other longitudinal construction joints must receive approval of the Engineer.

(3) See details elsewhere in plans for shoulder drain location and details.

(4) For Contractor's information only.

(5) On portion of support slab that supports the concrete pavement, adjust top surface elevation, if required, to accommodate concrete pavement thickness. Smooth trowel finish. Oil top of support slab with 60 grade oil and apply heavy coat of powdered graphite. Press down one layer of 30# roofing felt.

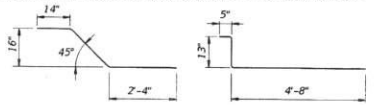
(6) Multiple piece tie bars are acceptable at longitudinal construction joints provided minimum laps shown are achieved.

(7) See details elsewhere in plans for required cross-slope.

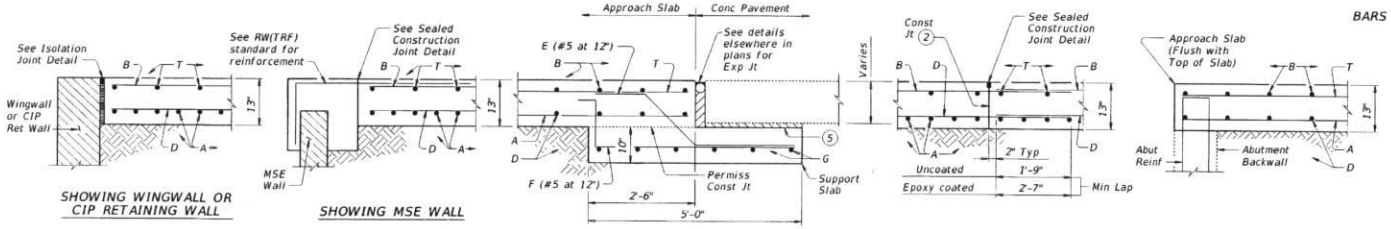
(8) Place in accordance with Item 438.

(9) Backer rod shall be 25% larger than joint opening and shall be compatible with the sealant.

(10) Place ½" Preformed Bituminous Fiber Material between concrete railing and top of approach slab as shown when concrete railing projects over the approach slab.



BARS E (#5) BARS F (#5)



SHOWING WINGWALL OR CIP RETAINING WALL

SHOWING MSE WALL

SECTION A-A

SECTION B-B

SECTION C-C (6)

SECTION D-D

GENERAL NOTES:

Construct approach slab in accordance with Item 422.

Provide Class "S" concrete with a minimum compressive strength of 4,000 psi.

Provide Grade 60 reinforcing steel.

Construct the subgrade or subbase from the bridge for a minimum distance of 100 feet prior to the approach slab, unless otherwise indicated on the plans.

Compact and finish the subgrade or foundation for the approach slab to the typical cross-section and to the lines and grades shown on the plans.

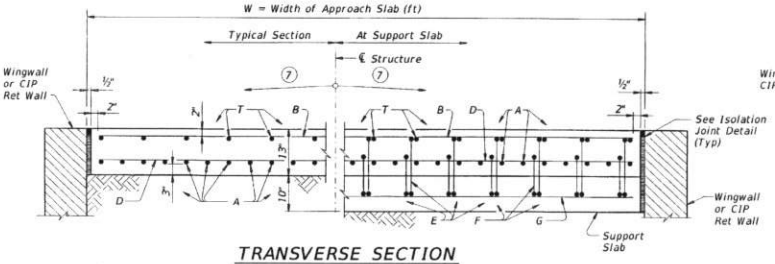
Cure for 4 days using water or membrane curing per Item 422.

Sealant, backer rod and preformed bituminous fiber material are subsidiary to approach slab concrete.

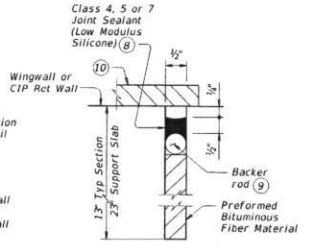
Provide a 1" bondbreaker (asphaltic concrete pavement or asphalt stabilized base) between the approach slab and cement stabilized backfill or cement treated base. Other bondbreakers may be used if approved by the Engineer.

Cover dimensions are clear dimensions, unless noted otherwise.

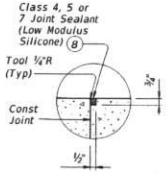
Reinforcing bar dimensions shown are out-to-out of bar.



TRANSVERSE SECTION



ISOLATION JOINT DETAIL



SEALED CONSTRUCTION JOINT DETAIL

57913

Texas Department of Transportation

Bridge Division Standard

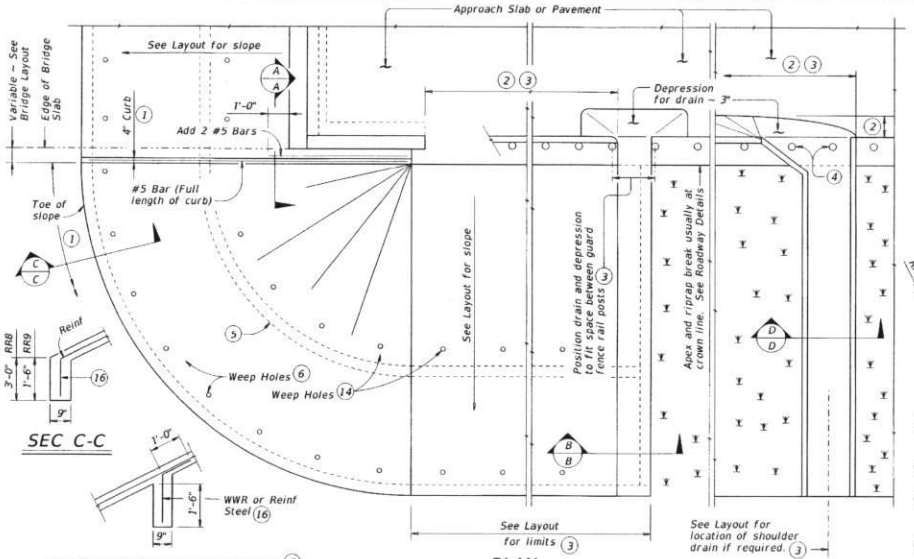
BRIDGE APPROACH SLAB

CONCRETE PAVEMENT

BAS-C

FILE:	bascstel.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	January 2015	CONT	SECT	JOB	HIGHWAY
	REVISIONS	DIST	COUNTY		SHEET NO.
					46

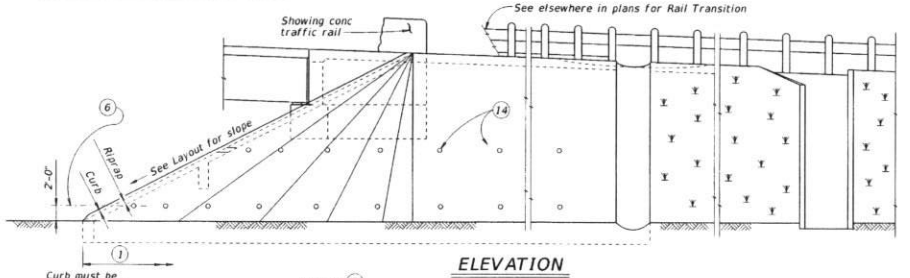
7/24/14



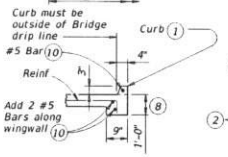
SEC C-C

INTERMEDIATE TOEWALL (5)

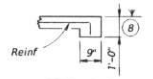
PLAN



ELEVATION

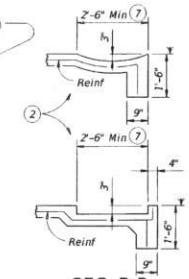


SEC A-A



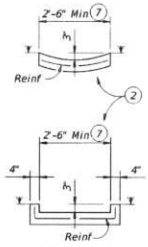
SEC B-B

(No Drain)



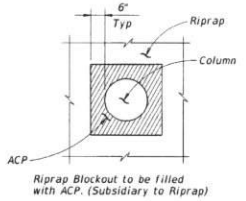
SEC B-B

(Shoulder Drain integral with riprap)



SEC D-D

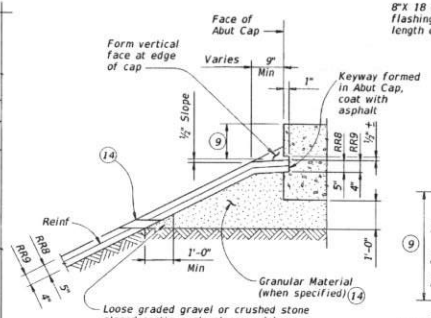
(Shoulder Drain)



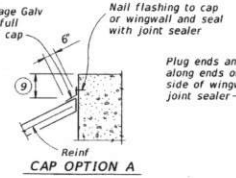
Riprap Blockout to be filled with ACP. (Subsidiary to Riprap)

RIPRAP DETAIL AT COLUMNS

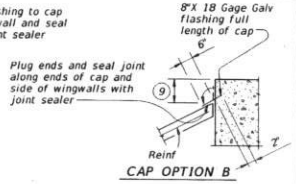
(As directed by the Engineer)



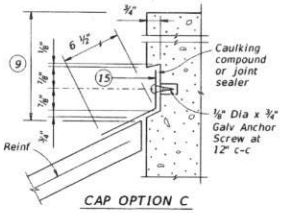
SHOWING KEYWAY OPTION



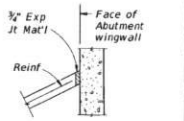
CAP OPTION A



CAP OPTION B

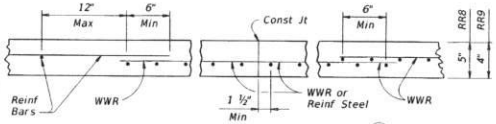


CAP OPTION C



SECT THRU RIPRAP AT WINGWALL (12)

SECTIONS THRU RIPRAP AT CAP (11)



REINFORCEMENT DETAILS (13)

See General Notes for optional sythetic fiber reinforcement.

(1) When riprap is shown extended around header on layout, extend slab and toewall as shown and eliminate 4" curb.

(2) Limits and configuration of drains and depressions are as shown elsewhere in plans or as directed by the Engineer.

(3) Location of shoulder drain must consider limitations imposed by rail transition. Do not locate shoulder drains at expansion joints between approach slab and concrete pavement.

(4) See details elsewhere in plans for installation of guard fence posts through concrete riprap.

(5) Provide intermediate toewall only when designated elsewhere in the plans or included in the specifications.

(6) Provide lower level of 2" Dia weep holes at 10' c-c backed by 1 CF packet of gravel and galvanized hardware cloth at all locations unless directed by the Engineer to eliminate.

(7) Use wider or other drain configurations if shown elsewhere in plans or if directed by the Engineer.

(8) Wall extension may be reduced or modified if approved by the Engineer. Increase wall extension to 1'-6" whenever the optional intermediate toewall is called for in the plans.

(9) Top of cap to top of riprap dimension varies as directed by the Engineer. Should be 9" Min for beam/slab type bridges and 1'-6" for slab span, box beam, or slab beam bridges.

(10) #5 bars shown are required even when synthetic fiber reinforcing option is selected.

(11) Provide sealing option for joint between the face of cap and riprap as designated by the Engineer or as shown elsewhere on plans.

(12) Flashing (shown in Cap Option A) may be used at wingwall in addition to Exp Jt Mat'l if shown on plans or directed by the Engineer.

(13) Provide #3 reinforcing bars at 18" Spa c-c. Provide Welded Wire Reinforcement (WWR) as 6x6-D3xD3. Combinations of WWR and reinforcing bars may be used if both are permitted. Use lap splices of a minimum 6 inches, measured from the transverse wire of WWR, and the ends of reinforcing bars.

(14) If granular material is specified, provide upper level of 2" Dia weep holes at 10' c-c backed by galvanized hardware cloth.

(15) 8" x 18 Gage Galv Sheet Metal

(16) Provide WWR or #3 bars, with 1'-0" extension into slope.

GENERAL NOTES:

Provide Class "B" concrete with a minimum compressive strength of 2,000 psi unless noted elsewhere in plans.

Provide Grade 60 reinforcing steel.

Provide synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) in lieu of steel reinforcing in riprap concrete unless noted otherwise.

Install construction joints or grooved joints extending the full slant slope height at intervals of approximately 20 feet unless otherwise directed by the Engineer.

Hardware cloth, loose grade stone behind weep holes, flashing, or other sealing material are subsidiary to the bid item "Riprap".

Use reinforcing bars, deformed Welded Wire Reinforcing (WWR), or any suitable combination of both types for riprap reinforcing, unless specified elsewhere in the plans.

See Layout for limits of riprap.

RR8 is to be used on stream crossings.

RR9 is to be used on other embankments.

FOR CONTRACTOR'S INFORMATION ONLY:
5" of RR8 = 0.015 CY/SF
4" of RR9 = 0.012 CY/SF
#3 Reinf at 18" c-c = 0.501 Lbs/SF
6x6-D3xD3 = 0.408 Lbs/SF

7/24/17

Texas Department of Transportation

Bridge Division Standard

CONCRETE RIPRAP AND SHOULDER DRAINS EMBANKMENTS AT BRIDGE ENDS (TYPES RR8 & RR9)

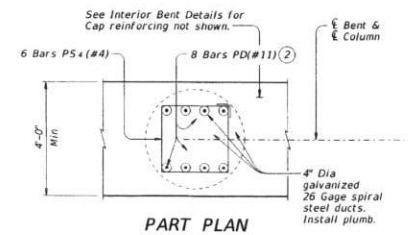
CRR

FILE: crrstde1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	DIST	COUNTY		SHEET NO. 47

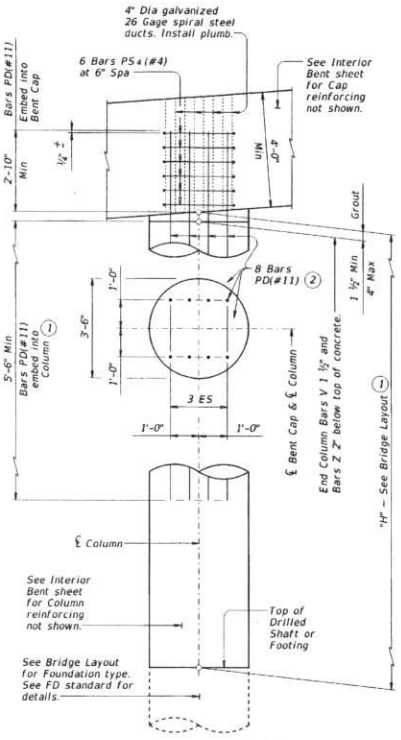
DISCLAIMER:
The use of this standard is governed by the Texas Engineering Practice Act. No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT disclaims responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE:
FILE:

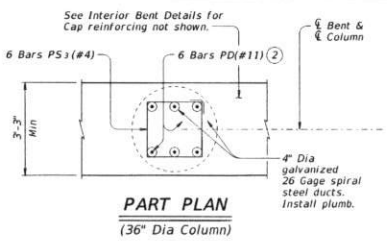
DATE:
FILE:



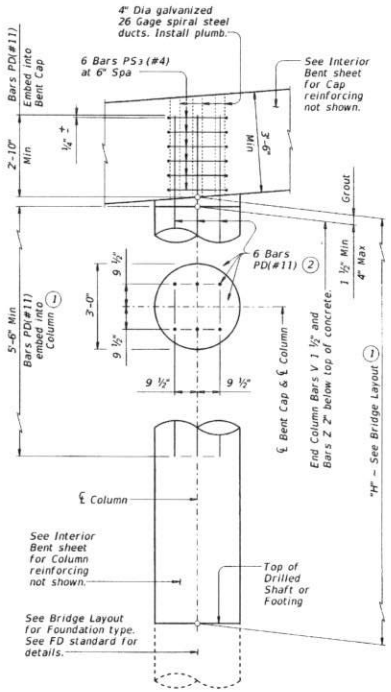
PART PLAN
(42" Dia Column)



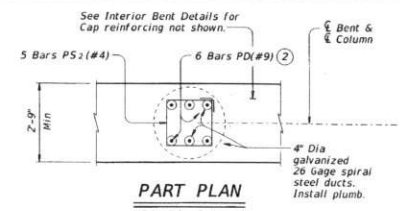
PART ELEVATION
(42" Dia Column)



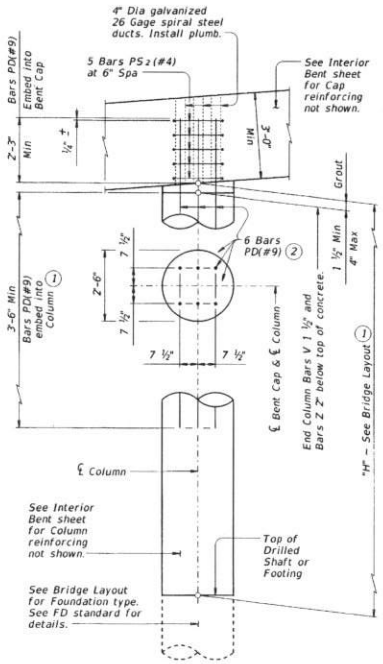
PART PLAN
(36" Dia Column)



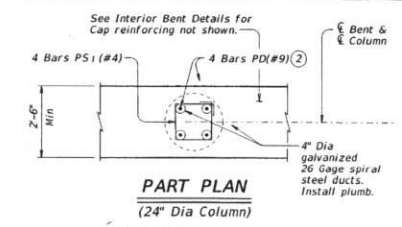
PART ELEVATION
(36" Dia Column)



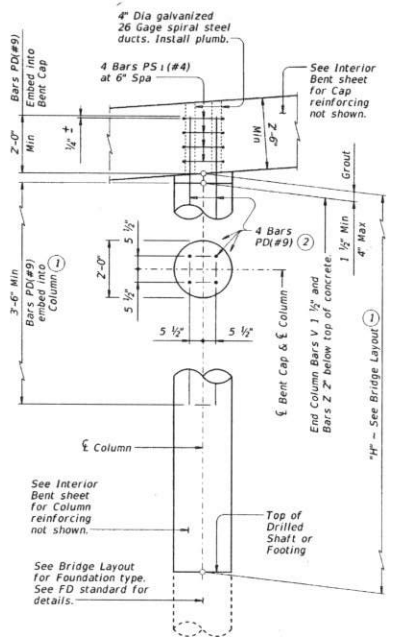
PART PLAN
(30" Dia Column)



PART ELEVATION
(30" Dia Column)



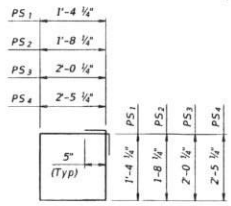
PART PLAN
(24" Dia Column)



PART ELEVATION
(24" Dia Column)

(1) Bars PD may need to be embedded in footing or drilled shaft for short columns.

(2) Location tolerance of dowels in columns/drilled shafts is ¼" from plan location, transversely and longitudinally.



BARS PS (#4)

7/24/17

57913

HL93 LOADING

SHEET 1 OF 2

Texas Department of Transportation

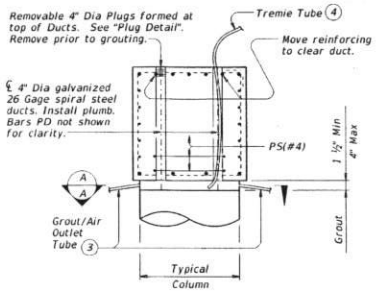
Bridge Division Standard

PRECAST CONCRETE BENT CAP OPTION FOR ROUND COLUMNS

PBC-RC

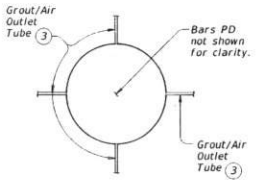
FILE: pbcstd01.dgn	DN: TxDOT	CK: JMH	DW: JTR	CK: TxDOT
©TxDOT January 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	DIST	COUNTY		SHEET NO. 48

DATE:
FILE:

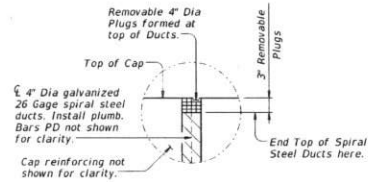


TYPICAL SECTION THRU CAP

(Showing Example of Ducts and Cap Reinforcing)



SECTION A-A



PLUG DETAIL

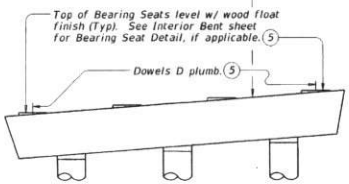
(To keep concrete out of ducts during concrete placement. Remove prior to grouting)

(3) Provide at least 4 grout/air outlet tubes equally spaced around the perimeter of the column. Install at bottom of cap to avoid air entrapment. Seal off tubes sequentially when a steady flow of grout without air occurs. Secondary tubes to help drain water, located at top of column, may also be installed.

(4) Continuous gravity-flow grouting through a tremie tube is recommended. With this method, lower a flexible tremie tube through one of the vertical ducts to the bottom of the bedding layer and fill the connection from the bottom upward with a continuous flow of grout. This method requires a sufficient amount of grout to be mixed prior to grouting and that the funnel connected to the tremie tube have adequate volume capacity (4 quarts Min is recommended). A valve may be used to stop the flow during grouting to allow refilling the funnel or to tamp the grout. The tube should remain within the grout and gradually withdrawn as the level of the grout rises in the ducts. It is critical to ensure a continuous flow of grout to avoid air entrapment. Alternative methods, including pressure grouting with low pressure pumps, may be used provided they are proved effective in providing void-free connections during the mock-up phase.

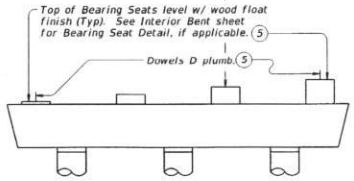
(5) Unless otherwise shown.

Slope top of cap between bearing seats in accordance with Item 420.4.9 "Treatment and Finishing of Horizontal Surfaces", unless directed otherwise by the Engineer.



CAP SET AT SLOPE

Reinforce bearing seats over 3" tall and slope top of cap between bearing seats in accordance with Item 420.4.9 "Treatment and Finishing of Horizontal Surfaces", unless directed otherwise by the Engineer.



CAP SET LEVEL

EXAMPLES OF PRECAST BENTS WITH DOWELS D

CONSTRUCTION NOTES:

Make a trial batch of grout using the same material, equipment and personnel to be used for actual grouting operations and grout a mock-up of the connection at least one week before grouting and in the presence of the Engineer. This mock-up test must demonstrate the reliability of the Contractor's grouting procedures to provide a connection free of voids. Field test the trial batch grout to the same level required for the actual grouting.

Caps may be placed on columns/drilled shafts after column/drilled shaft concrete has achieved a flexural strength of 355 psi (or 2,500 psi compressive strength). Use plastic shims or friction collars to support the cap at the proper elevation prior to grouting. Total area of plastic shims used on top of each column may not exceed 6 percent of the column area. Column/drilled shaft curing may be interrupted a maximum of 2 hours for placement of plastic shims or friction collars and cap placement.

Surfaces in contact with grout must be clean and in a saturated, surface-dry condition, immediately prior to grouting. Provide water tight forms. Fill the forms with water and drain just prior to grouting. Ponding or free-standing water is not permitted. Use compressed air to blow out excess water.

Mix grout in accordance with the manufacturer's directions. Evidence of frothing, foaming, or segregation is cause for rejection. Transport grout from mixer to final location by wheel barrow, bucket or pumping.

Trowel finish top surface of cap anchorage ducts flush with top of cap. Wet mat cure these locations for at least 48 hours. When lifting loops are removed, remove them to a point 1" below cap surface and patch with a pre-qualified material conforming to DMS-4655, "Concrete Repair Materials".

Friction collars may be removed, if used, and beams placed on the cap after the grout obtains a compressive strength of 2,500 psi. Subsequent loading can occur when the grout reaches its final required 28 day compressive strength.

MATERIAL NOTES:

Provide a pre-qualified grout from TxDOT's Material Producer List "Cementitious Grouts and Mortars for Miscellaneous Applications", conforming to DMS-4675.

Use semi-rigid spirally crimped, corrugated duct of galvanized, cold rolled steel conforming to ASTM A 653. Corrugations must have a minimum amplitude of 0.094".

Grout tubes and forms must be approved prior to grouting.

All reinforcing must be Grade 60. Epoxy coat all reinforcement if column reinforcement is epoxy coated.

GENERAL NOTES:

Designed in accordance with AASHTO LRFD Bridge Design Specifications.

The Contractor has the option to provide precast bent caps in accordance with the details shown. No additional payment will be made if the Contractor uses precast caps. Perform sampling and testing of grout by trained personnel at the Contractor's expense and while witnessed by the Engineer. Grouted connections must be free of voids.

Submit shop drawings of precast caps for approval prior to construction. Indicate lifting attachments and locations on the shop drawings.

Construct and cure cap in accordance with Item 420, "Concrete Substructures". Secure ducts to prevent their movement during concrete placement. Location tolerance of ducts is ¼" from plan location, transversely and longitudinally. Seal ducts to prevent intrusion of concrete.

Bearing seats may be precast with the cap. Bearing seats over 3" in height must be reinforced as per Item 420.4.9. Do not locate lift points at bearing seats if bearing seats are precast.

Cap concrete must achieve a compressive strength of 2,500 psi prior to lifting. Limit flexural stress in cap to 250 psi during handling and storage. Store and handle caps in accordance with Item 424, "Precast Concrete Structural Members (Fabrication)". Do not stack caps. Caps that become cracked or otherwise damaged may be rejected.

Precast Bent Cap Option shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.

See Bent Details for details and notes not shown.

Reinforcing bar dimensions shown are out-to-out of bar.

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

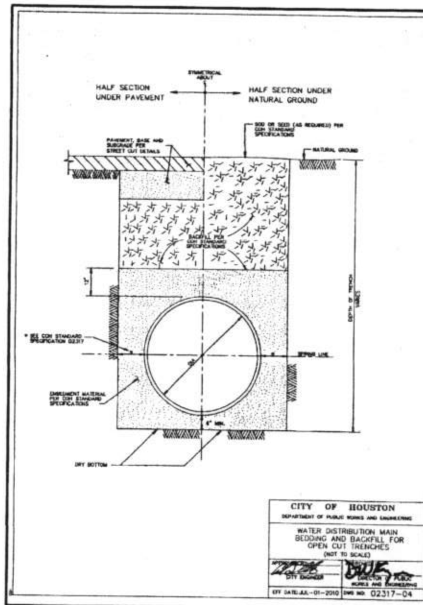
PRECAST CONCRETE BENT CAP OPTION FOR ROUND COLUMNS

PBC-RC

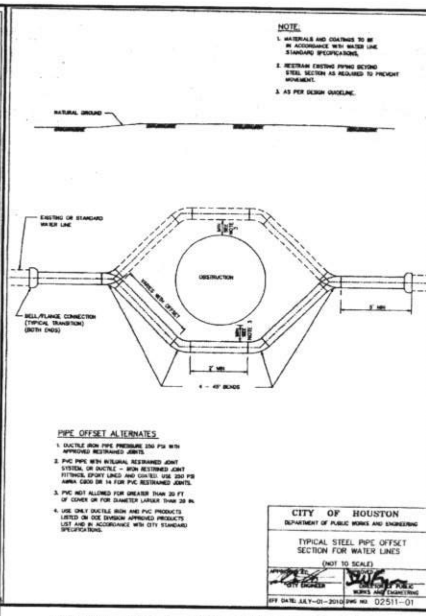
FILE: pbcstd01.dgn	DN: TxDOT	CK: JMH	DW: JTR	CK: TxDOT
©TxDOT January 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	DIST	COUNTY		SHEET NO. 49

7/24/17

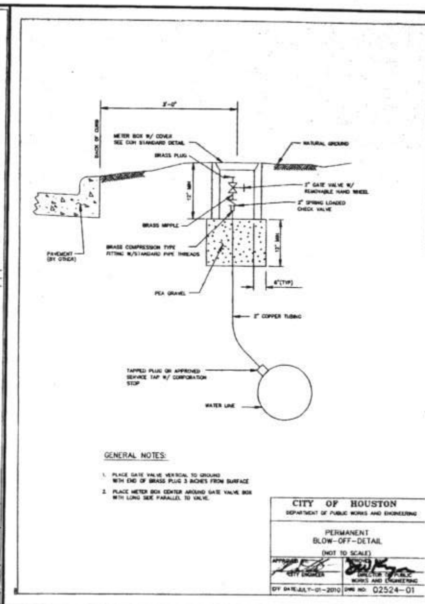
57913



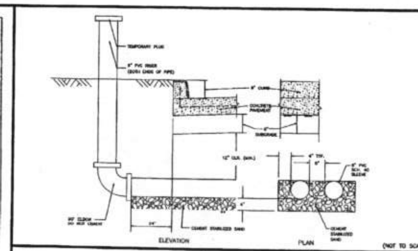
WATER DISTRIBUTION MAIN BEDDING AND BACKFILL FOR OPEN CUT TRENCHES



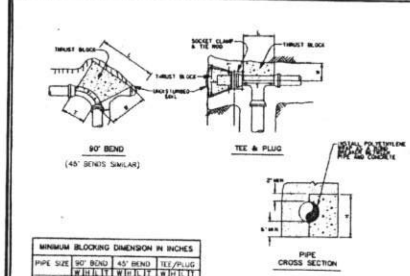
TYPICAL STEEL PIPE OFFSET SECTION FOR WATER LINES



PERMANENT BLOW-OFF DETAIL



IRRIGATION SLEEVES



MINIMUM BLOCKING DIMENSION IN INCHES												
PIPE SIZE	90° BEND				45° BEND				TEE/PLUG			
	W	H	L	T	W	H	L	T	W	H	L	T
4"	6	12	14	10	6	8	11	8	6	10	12	12
6"	8	14	26	12	8	14	14	12	8	14	19	19
8"	10	18	43	16	10	18	20	16	10	18	26	26
10"	12	24	42	18	12	22	25	18	12	24	30	30
12"	14	36	40	30	14	26	30	22	14	26	40	40

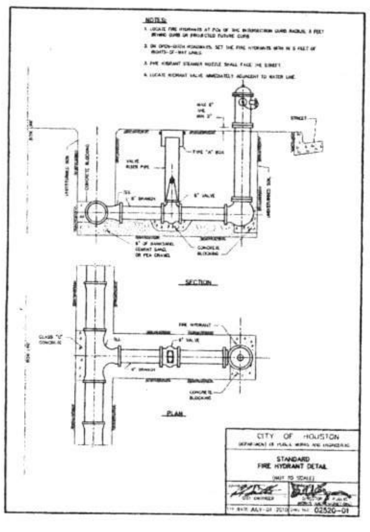
CORRECTION FACTORS		
SOIL TYPE	SOIL BEARING STRENGTH S_b (lb/ft²)	MULTIPLY "L" AND "H" BY
SOFT CLAY	1000	1.73
SILT	1500	1.41
SANDY SILT	3000	1.00
SAND	4000	0.87
SANDY CLAY	6000	0.71
HARD CLAY	9000	0.58

NOTES:

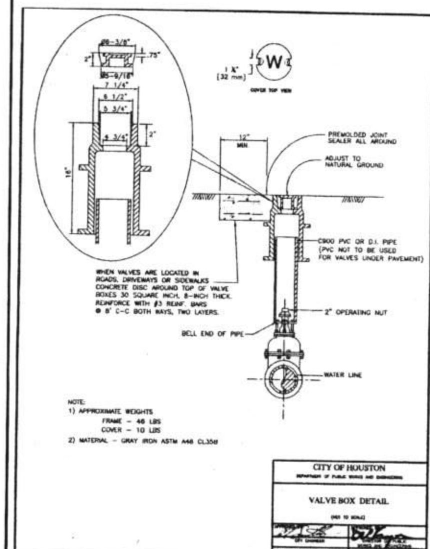
1. DEPTH "H" MAY BE GREATER THAN SPECIFIED TO ALLOW WORKING SPACE.
2. BLOCKING MUST BE PLACED AGAINST UNDISTURBED EARTH. WHERE THIS IS NOT POSSIBLE, THE FILL BETWEEN THE BEARING SURFACE AND UNDISTURBED SOIL MUST BE COMPACTED TO AT LEAST 95% STANDARD PROCTOR DENSITY.
3. PROVIDE CONCRETE IN ACCORDANCE WITH STANDARD SPECIFICATION SECTION 03315 – CONCRETE FOR UTILITY CONSTRUCTION.
4. BLOCKING DIMENSIONS SHOWN ARE BASED ON 3000 PSF SOIL BEARING STRENGTH AND 125 PSI INTERNAL WATER PRESSURE. FOR OTHER SOIL CONDITIONS, MULTIPLY DIMENSIONS "L" AND "H" BY THE APPROPRIATE CORRECTION FACTOR.

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
THRUST BLOCK DETAIL FOR WATER LINES (4-INCH TO 12 INCH)
(NOT TO SCALE)
EFF DATE: JULY-01-2010 DWG NO. 02511-02

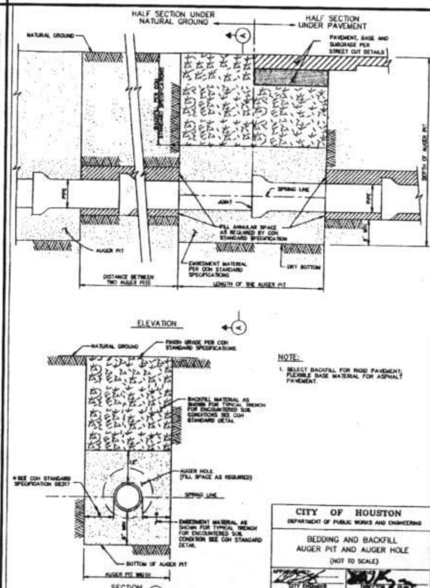
THRUST BLOCK DETAIL FOR WATER LINES (4-INCH TO 12-INCH)



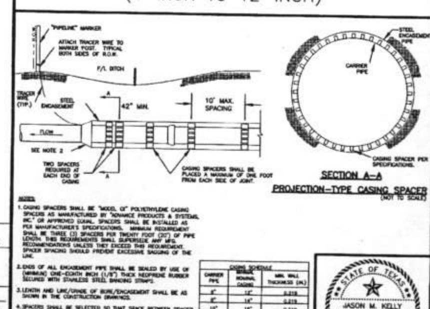
STANDARD FIRE HYDRANT DETAIL



VALVE BOX DETAIL



BEDDING AND BACKFILL AUGER PIT AND AUGER HOLE



WATER MAIN ENCASEMENT

JASON M. KELLY 91021 LICENSED PROFESSIONAL ENGINEER — STATE OF TEXAS
3/10/17

BENCHMARK:

A-1212 – BRASS DISK, STAMPED A-1212 1973, SET IN THE TOP OF A CONCRETE HEADWALL ON THE WEST BOUND LANES OF HWY 90A, APPROX. 4.1 MILES WEST ALONG HWY 90A FROM THE JUNCTION OF HWY 6, IN SUGARLAND, TEXAS. THE DISK IS SET 2.0 FEET EAST OF THE WEST END, OF THE NORTH CONCRETE HEADWALL, AND 27.0 FEET NORTH OF THE CENTERLINE OF THE WESTBOUND LANES, AND ½FOOT LOWER THAN THE ROAD.

ELEV. = 78.65 FEET (NGVD-29) 1973 ADJ.

TBM:

TBM 6-TOP OF A CHISSLED BOX SET ON THE NORTHERN NOSE OF A MEDIAN AT FM 1464. THE POINT IS LOCATED ± 1,460 FEET NORTH OF THE CENTERLINE OF THE INTERSECTION OF FM 1464 AND W AIRPORT BLVD AND ± 40 FEET EAST OF THE WEST EDGE OF CONCRETE PAVEMENT FOR THE SOUTHBOUND LANE OF FM 1464.

ELEV. = 88.55 FEET (NGVD-29) 1973 ADJ.

NOTES:

HL 93 LOADING

RECORD DRAWING

I CERTIFY THAT THIS DRAWING REFLECTS THE IMPROVEMENTS CONSTRUCTED AS TO SIZE, LOCATION AND GRADE AND THAT THE CONSTRUCTION WAS IN FULL COMPLIANCE WITH THE CONTRACT DOCUMENTS

BY ________ DATE ________

TITLE ________

FORT BEND COUNTY ENGINEERING DEPARTMENT

APPROVED: DEVELOPMENT COORDINATOR

DATE: 7/24/17

DATE	REVISION	BY

PLAT NAME:
WEST ALIANA TRACE DRIVE
CPC 101 FILE NO.
C.O.H. LOG NO. 16-

ALIANA DEVELOPMENT COMPANY

WEST ALIANA TRACE DRIVE BRIDGE

WATER MAIN CONSTRUCTION DETAILS

LJA Engineering, Inc.
2929 Briarpark Drive
Suite 600
Houston, Texas 77042
Phone 713.953.5200
Fax 713.953.5026
FRN - F-1386

LJA PROJECT NO.: 1968-1050

DESIGNED BY:	DRAWN BY:	DATE:
AA	AA	MARCH 2017

NOTE: CITY SIGNATURES VALID FOR ONE YEAR ONLY AFTER DATE OF SIGNATURES

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER 03/03/17 — STREET & BRIDGE
WASTEWATER 3-23-17 — TRAFFIC
STORM — STORM WATER QUALITY
FACILITIES 3/27/17

FILE NO. — FOR CITY OF HOUSTON USE ONLY

DRAWING SCALE

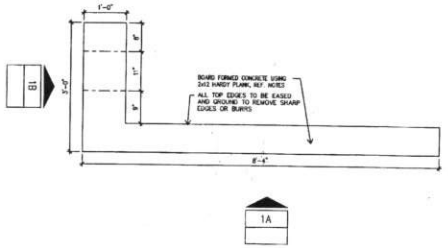
SCALE: NONE

SHEET NO. 50 OF 50

57913

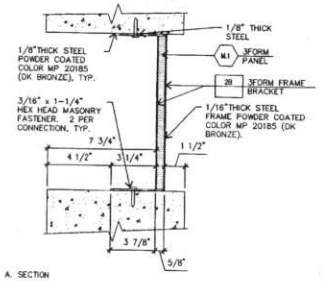
MATERIALS SCHEDULE

KEY	DESCRIPTION /MODEL NUMBER	COLOR	FINISH	CONTACT	REMARKS
MISCELLANEOUS					
M.1	3FORM KODA XT ACRYLIC PANEL	GARDENIA AND SPRINGTIME	STUCCO	CONTACT: RACHEL SEWELL COMPANY: 3form www.3-form.com PHONE: (512) 348-0760	-INSTALL PER MANUFACTURER'S RECOMMENDATION -CONTRACTOR TO SUBMIT SHOP DRAWINGS FOR APPROVAL PRIOR TO FABRICATION AND INSTALLATION -CONTRACTOR TO SUBMIT COLOR SAMPLE FOR APPROVAL

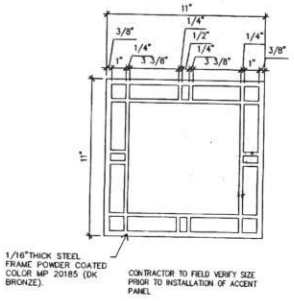


3 BRIDGE WING WALL
PLAN

SCALE: 3/4"=1'-0"



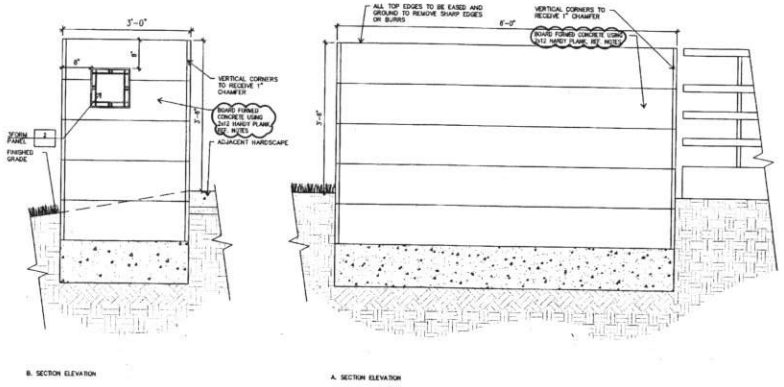
A. SECTION



B. METAL FRAME ELEVATION

2 3 FORM PANNEL
SECTION/ELEVATION

SCALE: 3"=1'-0"



B. SECTION ELEVATION

A. SECTION ELEVATION

BOARD FORM CONCRETE NOTES:
1.) FORM WORK SHOULD BE CONSTRUCTED WITH 2X12 HARDY PLANK BOARDS

2.) JOINTS TO BE A TIGHT FIT AND MINIMIZE FINS BETWEEN BOARDS

3.) ALL COURSES TO BE CONSTRUCTED USING 2X12 HARDY PLANK.

4.) FINISH SHOULD SHOW WOOD GRAIN TEXTURE OF FORM BOARDS. SANDBLAST BOARDS PRIOR TO FORMING TO EXPOSE HARDER WOOD AND ENHANCE GRAIN TEXTURE.

5.) ALL SIDES OF WALL TO RECEIVE A BOARD FORM FINISH.

6.) SEE SHEET 9 & 14 FOR STRUCTURAL STEEL REINFORCEMENT

1 BRIDGE WING WALL
SECTION/ELEVATION

7/24/17

SHEET NO. 50A OF 50

SCALE: 3/4"=1'-0"

WEST ALIANA TRACE BRIDGE

TBG RICHMOND ,TX ■ ADC