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TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

July 28, 2016

RECEIVED
AUG 02 2016
COUNTY ENGINEER

Mr. Mario Jorge, P.E.
San Antonio District
Texas Department of Transportation
4615 NW Loop 410
San Antonio, Texas 78229

Re: Edwards Aquifer, Comal County
SH 46 Passing Lanes; From Kendall County Line to Bulverde; Bulverde, Texas
Request for Approval of a Contributing Zone Plan (CZP)
30 Texas Administrative Code (TAC) Chapter 213 Subchapter B Edwards Aquifer
Edwards Aquifer Protection Program ID No. 13000191; RN109248682

Dear Mr. Jorge:

The Texas Commission on Environmental Quality (TCEQ) has completed its review of the CZP application for the referenced project submitted to the Austin Regional Office by the Texas Department of Transportation on June 21, 2016. As presented to the TCEQ, the Temporary and Permanent Best Management Practices (BMPs) and construction plans were prepared by a Texas licensed professional engineer to be in general compliance with the requirements of 30 TAC Chapter 213. These planning materials were sealed, signed, and dated by a Texas licensed professional engineer. Therefore, based on the engineer's concurrence of compliance, the planning materials for construction of the proposed project and pollution abatement measures are hereby approved subject to applicable state rules and the conditions in this letter. The applicant or a person affected may file with the chief clerk a motion for reconsideration of the executive director's final action on this Contributing Zone Plan. A motion for reconsideration must be filed no later than 23 days after the date of this approval letter. *This approval expires two (2) years from the date of this letter unless, prior to the expiration date, more than 10% of the construction has commenced on the project or an extension of time has been requested.*

PROJECT DESCRIPTION

The proposed addition to the current roadway project consists of roadway modifications to occur within 21.3 acres of the acquired 30.8 acre right-of-way (ROW). The project will occur along 2.1 miles of SH 46 (that portion within Comal County), and includes widening to accommodate passing lanes and one center turn lane, each approximately 10-foot in width. The impervious cover in these segments collectively will be increased from approximately 11.9 acres to 15.9 acres (51.0%). Portions of the project in Kendall County are not contemplated under Chapter 213 Edwards rules.

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The project is within the Contributing Zone and approves:

- Adding passing lanes within appropriate sections of Segments C and D within Comal County,
- Adding a center turn lane near Station 810 in Segment D,
- Installing Permanent BMPs consisting of grassy swale (GS) and vegetative filter strips (VFS) for any additional pavement and resurfacing, excluding driveways,
- Re-stabilizing the ROW after construction.

In addition to the described activities, temporary erosion and sedimentation controls will be installed prior to commencing site disturbance and maintained during construction. No wastewater will be generated by this roadway project.

PERMANENT POLLUTION ABATEMENT MEASURES

The selected BMP for this project is the roadway receiving VFS in selected areas. One grassy swale will be used in basin C3. Existing culverts will cross under SH 46 and continue to carry and divert off-site runoff around the project. The approved measures meet the required 80 percent removal of the increased load in total suspended solids caused by the project. Design calculations were sealed by Martin Palacios, P.E., on November 4, 2014 to demonstrate the total treatment load removal in the affected watershed areas.

SPECIAL CONDITIONS

I. Since this is a roadway construction project, deed recordation of this approval letter is not required.

II. A staging area was not proposed for this project. If the contractor desires a staging area, information indicating the proposed location and placement of appropriate temporary erosion and sedimentation controls must be submitted to the TCEQ for review and approved prior to its installation.

STANDARD CONDITIONS

1. Pursuant to Chapter 7 Subchapter C of the Texas Water Code, any violations of the requirements in 30 TAC Chapter 213 may result in administrative penalties.

Prior to Commencement of Construction:

2. All contractors conducting regulated activities at the referenced project location shall be provided a copy of this notice of approval. At least one complete copy of the approved CZP and this notice of approval shall be maintained at the project until all regulated activities are completed.

3. Any modification to the activities described in the referenced CZP application following the date of approval may require the submittal of a plan to modify this approval, including the payment of appropriate fees and all information necessary for its review and approval prior to initiating construction of the modifications.

Change in Responsibility for Maintenance
on Permanent Best Management Practices and Measures

The applicant is no longer responsible for maintaining the permanent best management practice (BMP) and other measures. The project information and the new entity responsible for maintenance is listed below.

Customer: _____

Regulated Entity Name: _____

Site Address: _____

City, Texas, Zip: _____

County: _____

Approval Letter Date: _____

BMPs for the project: _____

New Responsible Party: _____

Name of contact: _____

Mailing Address: _____

City, State: _____ Zip: _____

Telephone: _____ FAX: _____

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_____ _____

Signature of New Responsible Party Date

I acknowledge and understand that I am assuming full responsibility for maintaining all permanent best management practices and measures approved by the TCEQ for the site, until another entity assumes such obligations in writing or ownership is transferred.

If you have questions on how to fill out this form or about the Edwards Aquifer protection program, please contact us at 210/490-3096 for projects located in the San Antonio Region or 512/339-2929 for projects located in the Austin Region.

Individuals are entitled to request and review their personal information that the agency gathers on its forms. They may also have any errors in their information corrected. To review such information, contact us at 512/239-3282.

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

June 24, 2016

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COUNTY ENGINEER

Mr. Thomas H. Hornseth, P.E.
Comal County Engineer
195 David Jonas Drive
New Braunfels, Texas 78132

Re: Edwards *Aquifer*, ***Comal County***
PROJECT NAME: **SH 46 Passing Lanes**; SH 46 at Comal Kendall County Line and SH 46 at Limestone Ledge; Comal County, Texas; Bulverde, Texas
PLAN TYPE: Application for Approval of a Contributing Zone Plan (CZP); 30 Texas Administrative Code (TAC) Chapter 213 Subchapter B; Edwards Aquifer Protection Program
ID No. 13000191

Dear Mr. Hornseth:

The enclosed CZP application is being forwarded to you pursuant to the Edwards Aquifer Protection Rules. The Texas Commission on Environmental Quality (TCEQ) is required by 30 TAC Chapter 213 to provide copies of all applications to affected incorporated cities, groundwater conservation districts, and counties in which the proposed regulated activity is located.

Please forward any comments to this office by **July 24, 2016.**

Should you have any questions concerning this matter, please contact Mr. Kevin Smith, P.E. of the Edwards Aquifer Protection Program at the Austin Regional Office (512) 339-2929.

Sincerely,

Carolyn D. Runyon
Water Section Manager
Austin Regional Office

CDR/lcw
Enclosure

CONTRIBUTING ZONE PLAN

Comal Co.

SH 46 Passing Lanes Project

SH 46
From the Comal/Kendall County Line
To 0.5852 mile east of Comal/Kendall County Line; Comal County, Texas

and

SH 46
From 0.8977 mile west of Limestone Ledge
To 0.5824 mile east of Limestone Ledge, Bulverde, Comal County, Texas

CSJ: 0215-07-022

Texas Department of Transportation

June 2016

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8 ½ x 11 Enclosures

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Contributing Zone Plan Application

Texas Commission on Environmental Quality

for Regulated Activities on the Contributing Zone to the Edwards Aquifer and Relating to 30 TAC §213.24(1), Effective June 1, 1999

To ensure that the application is administratively complete, confirm that all fields in the form are complete, verify that all requested information is provided, consistently reference the same site and contact person in all forms in the application, and ensure forms are signed by the appropriate party.

Note: Including all the information requested in the form and attachments contributes to more streamlined technical reviews.

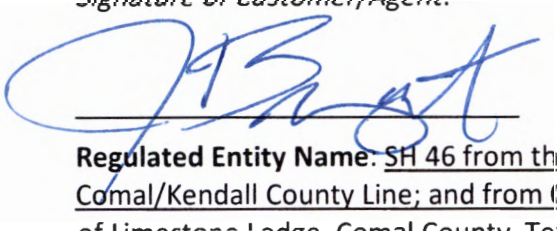
Signature

To the best of my knowledge, the responses to this form accurately reflect all information requested concerning the proposed regulated activities and methods to protect the Edwards Aquifer. This **Contributing Zone Plan Application** is hereby submitted for TCEQ review and Executive Director approval. The application was prepared by:

Print Name of Customer/Agent: John Bryant

Date: June 17, 2016

Signature of Customer/Agent:



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Regulated Entity Name: SH 46 from the Comal/Kendall County Line to 0.5852 mile east of Comal/Kendall County Line; and from 0.8977 mile west of Limestone Ledge to 0.5824 mile east of Limestone Ledge, Comal County, Texas

Project Information

1. County: Comal
2. Stream Basin: Cibolo Creek (tributary to San Antonio River) and the Guadalupe River
3. Groundwater Conservation District (if applicable): Edwards Aquifer Authority
4. Customer (Applicant):

   Contact Person: Mario Jorge, P.E.
   Entity: Texas Department of Transportation
   Mailing Address: 4615 NW Loop 410
   City, State: San Antonio, Texas Zip: 78229

Telephone: 210 615 1110 Fax: _____
Email Address: _____

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5. Agent/Representative (If any):

Contact Person: John Bryant
Entity: Texas Department of Transportation
Mailing Address: 4615 NW Loop 410
City, State: San Antonio, Texas Zip: 78229
Telephone: 210 615 5838 Fax: _____
Email Address: john.bryant@txdot.gov

6. Project Location:

☒ The project site is located inside the city limits of Bulverde.
☐ The project site is located outside the city limits but inside the ETJ (extra-territorial jurisdiction) of _____.
☒ The project site is not located within any city's limits or ETJ.

7. ☒ The location of the project site is described below. Sufficient detail and clarity has been provided so that the TCEQ's Regional staff can easily locate the project and site boundaries for a field investigation.

See Attachment A narrative.

8. ☒ **Attachment A - Road Map**. A road map showing directions to and the location of the project site is attached. The map clearly shows the boundary of the project site.

9. ☒ **Attachment B - USGS Quadrangle Map**. A copy of the official 7 ½ minute USGS Quadrangle Map (Scale: 1" = 2000') is attached. The map(s) clearly show:

☒ Project site boundaries.
☒ USGS Quadrangle Name(s).

10. ☒ **Attachment C - Project Narrative**. A detailed narrative description of the proposed project is attached. The project description is consistent throughout the application and contains, at a minimum, the following details:

☒ Area of the site
☒ Offsite areas
☒ Impervious cover
☒ Permanent BMP(s)
☒ Proposed site use
☒ Site history
☒ Previous development
☒ Area(s) to be demolished

11. Existing project site conditions are noted below:

☐ Existing commercial site
☐ Existing industrial site
☐ Existing residential site
☒ Existing paved and/or unpaved roads
☐ Undeveloped (Cleared)
☐ Undeveloped (Undisturbed/Not cleared)
☐ Other: _____

12. The type of project is:

☐ Residential: # of Lots: _____
☐ Residential: # of Living Unit Equivalents: _____
☐ Commercial
☐ Industrial
☒ Other: TxDOT Road

13. Total project area (size of site): 30.8 Acres

Total disturbed area: 10 Acres

14. Estimated projected population: 0

15. The amount and type of impervious cover expected after construction is complete is shown below:

Table 1 - Impervious Cover

Impervious Cover of Proposed Project	*Sq. Ft.*	*Sq. Ft./Acre*	*Acres*
Structures/Rooftops		÷ 43,560 =	
Parking		÷ 43,560 =	
Other paved surfaces		÷ 43,560 =	15.85
Total Impervious Cover		÷ 43,560 =	15.85

Total Impervious Cover 15.85 **÷ Total Acreage** 30.8 **X 100 =** 51**% Impervious Cover**

16. ☒ **Attachment D - Factors Affecting Surface Water Quality**. A detailed description of all factors that could affect surface water quality is attached. If applicable, this includes the location and description of any discharge associated with industrial activity other than construction.

17. ☒ Only inert materials as defined by 30 TAC 330.2 will be used as fill material.

For Road Projects Only

Complete questions 18 - 23 if this application is exclusively for a road project.

☐ N/A

18. Type of project:

☒ TXDOT road project.
☐ County road or roads built to county specifications.
☐ City thoroughfare or roads to be dedicated to a municipality.
☐ Street or road providing access to private driveways.

19. Type of pavement or road surface to be used:

☐ Concrete
☒ Asphaltic concrete pavement
☐ Other: _____

20. Right of Way (R.O.W.):

Length of R.O.W.: varies feet.
Width of R.O.W.: varies feet.
L x W = varies Ft^2 ÷ 43,560 Ft^2/Acre = 30.8 acres.

21. Pavement Area:

Length of pavement area: varies feet.
Width of pavement area: varies feet.
L x W = varies Ft^2 ÷ 43,560 Ft^2/Acre = 15.85 acres.
Pavement area 15.85 acres ÷ R.O.W. area 30.8 acres x 100 = 51% impervious cover.

22. ☐ A rest stop will be included in this project.

☒ A rest stop will not be included in this project.

23. ☐ Maintenance and repair of existing roadways that do not require approval from the TCEQ Executive Director. Modifications to existing roadways such as widening roads/adding shoulders totaling more than one-half (1/2) the width of one (1) existing lane require prior approval from the TCEQ.

Stormwater to be generated by the Proposed Project

24. ☒ **Attachment E - Volume and Character of Stormwater.** A detailed description of the volume (quantity) and character (quality) of the stormwater runoff which is expected to occur from the proposed project is attached. The estimates of stormwater runoff quality and quantity are based on area and type of impervious cover. Include the runoff coefficient of the site for both pre-construction and post-construction conditions.

Wastewater to be generated by the Proposed Project

25. ☐ Wastewater is to be discharged in the contributing zone. Requirements under 30 TAC §213.6(c) relating to Wastewater Treatment and Disposal Systems have been satisfied.

☒ N/A

26. Wastewater will be disposed of by:

☐ On-Site Sewage Facility (OSSF/Septic Tank):

☐ **Attachment F - Suitability Letter from Authorized Agent**. An on-site sewage facility will be used to treat and dispose of the wastewater from this site. The appropriate licensing authority's (authorized agent) written approval is attached. It states that the land is suitable for the use of private sewage facilities and will meet or exceed the requirements for on-site sewage facilities as specified under 30 TAC Chapter 285 relating to On-site Sewage Facilities.

☐ Each lot in this project/development is at least one (1) acre (43,560 square feet) in size. The system will be designed by a licensed professional engineer or registered sanitarian and installed by a licensed installer in compliance with 30 TAC Chapter 285.

☐ Sewage Collection System (Sewer Lines):

The sewage collection system will convey the wastewater to the _____ (name) Treatment Plant. The treatment facility is:

☐ Existing.
☐ Proposed.

☐ N/A

Permanent Aboveground Storage Tanks(ASTs) ≥ 500 Gallons

Complete questions 27 - 33 if this project includes the installation of AST(s) with volume(s) greater than or equal to 500 gallons.

☒ N/A

27. Tanks and substance stored:

Table 2 - Tanks and Substance Storage

AST Number	*Size (Gallons)*	*Substance to be Stored*	*Tank Material*
1			
2			
3			

AST Number	Size (Gallons)	Substance to be Stored	Tank Material
4			
5			

Total x 1.5 = _____ Gallons

28. ☐ The AST will be placed within a containment structure that is sized to capture one and one-half (1 1/2) times the storage capacity of the system. For facilities with more than one tank system, the containment structure is sized to capture one and one-half (1 1/2) times the cumulative storage capacity of all systems.

☐ **Attachment G - Alternative Secondary Containment Methods**. Alternative methods for providing secondary containment are proposed. Specifications showing equivalent protection for the Edwards Aquifer are attached.

29. Inside dimensions and capacity of containment structure(s):

Table 3 - Secondary Containment

Length (L)(Ft.)	Width(W)(Ft.)	Height (H)(Ft.)	L x W x H = (Ft3)	Gallons

Total: _____ Gallons

30. Piping:

☐ All piping, hoses, and dispensers will be located inside the containment structure.
☐ Some of the piping to dispensers or equipment will extend outside the containment structure.
☐ The piping will be aboveground
☐ The piping will be underground

31. ☐ The containment area must be constructed of and in a material impervious to the substance(s) being stored. The proposed containment structure will be constructed of: _____.

32. ☐ **Attachment H - AST Containment Structure Drawings**. A scaled drawing of the containment structure is attached that shows the following:

☐ Interior dimensions (length, width, depth and wall and floor thickness).
☐ Internal drainage to a point convenient for the collection of any spillage.
☐ Tanks clearly labeled
☐ Piping clearly labeled

☐ Dispenser clearly labeled

33. ☐ Any spills must be directed to a point convenient for collection and recovery. Spills from storage tank facilities must be removed from the controlled drainage area for disposal within 24 hours of the spill.

☐ In the event of a spill, any spillage will be removed from the containment structure within 24 hours of the spill and disposed of properly.

☐ In the event of a spill, any spillage will be drained from the containment structure through a drain and valve within 24 hours of the spill and disposed of properly. The drain and valve system are shown in detail on the scaled drawing.

Site Plan Requirements

Items 34 - 46 must be included on the Site Plan.

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34. ☒ The Site Plan must have a minimum scale of 1" = 400'.

Site Plan Scale: 1" = 100'.

35. 100-year floodplain boundaries:

☐ Some part(s) of the project site is located within the 100-year floodplain. The floodplain is shown and labeled.

☒ No part of the project site is located within the 100-year floodplain.

The 100-year floodplain boundaries are based on the following specific (including date of material) sources(s): FEMA Panels 48259CO450F dated 12/17/10; the rest are dated 9/2/09 48091CO185F; 48091CO195F; 4891CO215F..

36. ☐ The layout of the development is shown with existing and finished contours at appropriate, but not greater than ten-foot contour intervals. Lots, recreation centers, buildings, roads, etc. are shown on the site plan.

☒ The layout of the development is shown with existing contours at appropriate, but not greater than ten-foot contour intervals. Finished topographic contours will not differ from the existing topographic configuration and are not shown. Lots, recreation centers, buildings, roads, etc. are shown on the site plan.

37. ☒ A drainage plan showing all paths of drainage from the site to surface streams.

38. ☒ The drainage patterns and approximate slopes anticipated after major grading activities.

39. ☒ Areas of soil disturbance and areas which will not be disturbed.

40. ☒ Locations of major structural and nonstructural controls. These are the temporary and permanent best management practices.

41. ☒ Locations where soil stabilization practices are expected to occur.

42. ☒ Surface waters (including wetlands).

☐ N/A

43. ☒ Locations where stormwater discharges to surface water.

☐ There will be no discharges to surface water.

44. ☐ Temporary aboveground storage tank facilities.

☒ Temporary aboveground storage tank facilities will not be located on this site.

45. ☐ Permanent aboveground storage tank facilities.

☒ Permanent aboveground storage tank facilities will not be located on this site.

46. ☒ Legal boundaries of the site are shown.

Permanent Best Management Practices (BMPs)

Practices and measures that will be used during and after construction is completed.

47. ☒ Permanent BMPs and measures must be implemented to control the discharge of pollution from regulated activities after the completion of construction.

☐ N/A

48. ☒ These practices and measures have been designed, and will be constructed, operated, and maintained to insure that 80% of the incremental increase in the annual mass loading of total suspended solids (TSS) from the site caused by the regulated activity is removed. These quantities have been calculated in accordance with technical guidance prepared or accepted by the executive director.

☒ The TCEQ Technical Guidance Manual (TGM) was used to design permanent BMPs and measures for this site.

☐ A technical guidance other than the TCEQ TGM was used to design permanent BMPs and measures for this site. The complete citation for the technical guidance that was used is: _____.

☐ N/A

49. ☒ Owners must insure that permanent BMPs and measures are constructed and function as designed. A Texas Licensed Professional Engineer must certify in writing that the permanent BMPs or measures were constructed as designed. The certification letter must be submitted to the appropriate regional office within 30 days of site completion.

☐ N/A

50. Where a site is used for low density single-family residential development and has 20 % or less impervious cover, other permanent BMPs are not required. This exemption from permanent BMPs must be recorded in the county deed records, with a notice that if the percent impervious cover increases above 20% or land use changes, the exemption for the whole site as described in the property boundaries required by 30 TAC §213.4(g) (relating to

Application Processing and Approval), may no longer apply and the property owner must notify the appropriate regional office of these changes.

- ☐ The site will be used for low density single-family residential development and has 20% or less impervious cover.
- ☐ The site will be used for low density single-family residential development but has more than 20% impervious cover.
- ☒ The site will not be used for low density single-family residential development.

51. The executive director may waive the requirement for other permanent BMPs for multi-family residential developments, schools, or small business sites where 20% or less impervious cover is used at the site. This exemption from permanent BMPs must be recorded in the county deed records, with a notice that if the percent impervious cover increases above 20% or land use changes, the exemption for the whole site as described in the property boundaries required by 30 TAC §213.4(g) (relating to Application Processing and Approval), may no longer apply and the property owner must notify the appropriate regional office of these changes.

- ☐ **Attachment I - 20% or Less Impervious Cover Waiver**. The site will be used for multi-family residential developments, schools, or small business sites and has 20% or less impervious cover. A request to waive the requirements for other permanent BMPs and measures is attached.
- ☐ The site will be used for multi-family residential developments, schools, or small business sites but has more than 20% impervious cover.
- ☒ The site will not be used for multi-family residential developments, schools, or small business sites.

52. ☐ **Attachment J - BMPs for Upgradient Stormwater**.

- ☐ A description of the BMPs and measures that will be used to prevent pollution of surface water, groundwater, or stormwater that originates upgradient from the site and flows across the site is attached.
- ☐ No surface water, groundwater or stormwater originates upgradient from the site and flows across the site, and an explanation is attached.
- ☒ Permanent BMPs or measures are not required to prevent pollution of surface water, groundwater, or stormwater that originates upgradient from the site and flows across the site, and an explanation is attached.

53. ☐ **Attachment K - BMPs for On-site Stormwater**.

- ☒ A description of the BMPs and measures that will be used to prevent pollution of surface water or groundwater that originates on-site or flows off the site, including pollution caused by contaminated stormwater runoff from the site is attached.
- ☐ Permanent BMPs or measures are not required to prevent pollution of surface water or groundwater that originates on-site or flows off the site, including pollution caused by contaminated stormwater runoff, and an explanation is attached.

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54. ☒ **Attachment L - BMPs for Surface Streams**. A description of the BMPs and measures that prevent pollutants from entering surface streams is attached.

☐ N/A

55. ☒ **Attachment M - Construction Plans**. Construction plans and design calculations for the proposed permanent BMPs and measures have been prepared by or under the direct supervision of a Texas Licensed Professional Engineer, and are signed, sealed, and dated. Construction plans for the proposed permanent BMPs and measures are attached and include: Design calculations, TCEQ Construction Notes, all proposed structural plans and specifications, and appropriate details.

☐ N/A

56. ☒ **Attachment N - Inspection, Maintenance, Repair and Retrofit Plan**. A site and BMP specific plan for the inspection, maintenance, repair, and, if necessary, retrofit of the permanent BMPs and measures is attached. The plan fulfills all of the following:

☒ Prepared and certified by the engineer designing the permanent BMPs and measures
☒ Signed by the owner or responsible party
☒ Outlines specific procedures for documenting inspections, maintenance, repairs, and, if necessary, retrofit.
☒ Contains a discussion of record keeping procedures

☐ N/A

57. ☐ **Attachment O - Pilot-Scale Field Testing Plan**. Pilot studies for BMPs that are not recognized by the Executive Director require prior approval from the TCEQ. A plan for pilot-scale field testing is attached.

☒ N/A

58. ☒ **Attachment P - Measures for Minimizing Surface Stream Contamination**. A description of the measures that will be used to avoid or minimize surface stream contamination and changes in the way in which water enters a stream as a result of the construction and development is attached. The measures address increased stream flashing, the creation of stronger flows and in-stream velocities, and other in-stream effects caused by the regulated activity, which increase erosion that result in water quality degradation.

☐ N/A

Responsibility for Maintenance of Permanent BMPs and Measures after Construction is Complete.

59. ☒ The applicant is responsible for maintaining the permanent BMPs after construction until such time as the maintenance obligation is either assumed in writing by another entity having ownership or control of the property (such as without limitation, an

owner's association, a new property owner or lessee, a district, or municipality) or the ownership of the property is transferred to the entity. Such entity shall then be responsible for maintenance until another entity assumes such obligations in writing or ownership is transferred.

60. ☒ A copy of the transfer of responsibility must be filed with the executive director at the appropriate regional office within 30 days of the transfer if the site is for use as a multiple single-family residential development, a multi-family residential development, or a non-residential development such as commercial, industrial, institutional, schools, and other sites where regulated activities occur.

Administrative Information

61. ☒ Submit one (1) original and one (1) copy of the application, plus additional copies as needed for each affected incorporated city, groundwater conservation district, and county in which the project will be located. The TCEQ will distribute the additional copies to these jurisdictions.

62. ☒ Any modification of this Contributing Zone Plan may require TCEQ review and Executive Director approval prior to construction, and may require submission of a revised application, with appropriate fees.

63. ☒ The site description, controls, maintenance, and inspection requirements for the storm water pollution prevention plan (SWPPP) developed under the EPA NPDES general permits for stormwater discharges have been submitted to fulfill paragraphs 30 TAC §213.24(1-5) of the technical report. All requirements of 30 TAC §213.24(1-5) have been met by the SWPPP document.

☒ The Temporary Stormwater Section (TCEQ-0602) is included with the application.

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NARRATIVES FOR ATTACHMENTS A - P

ATTACHMENT A - Road Map

From Austin drive south on IH 35. On the north side of New Braunfels, exit and proceed west on SH 46 for a substantial distance, travelling west of US 281 (Bulverde). On SH continue west of US 281 approximately 5.5 miles to the St Joseph Catholic Church (pictured). This is near the middle of roadway Section D. From the church, it is another 3.4 miles west to the Kendall/Comal County line, which is within Section C.

ATTACHMENT B - USGS Quadrangle Map

See attached USGS Topo Map

ATTACHMENT C - Project Narrative

TxDOT plans to widen four sections (Sections A, B, C and D) of SH 46 in Kendall and Comal Counties to accommodate passing lanes. Sections A, B and part of Section C are in Kendall county, which is a county not subject to the TCEQ's Edwards Aquifer rules (30 TAC 213). No further information on Kendall County areas is presented in this application. This application is to permit the portion of Section C that is within Comal County, and Section D which is entirely within Comal County.

The portion of Section C subject to the Edwards Rules is located in Comal County and it begins at the Comal/Kendall County line (which is marked by signs) and extends 0.5852 mile (3,090 feet) east of the county line. It is in an unincorporated portion of Comal County, within the Cibolo Creek watershed.

Section D begins 0.8977 mile (4,470 feet) west of Limestone Ledge (easily identifiable private driveway) to 0.5824 mile (3,075 feet) east of Limestone Ledge, Bulverde, Comal County, Texas. The western end of Section D is in the Guadalupe River watershed but the majority of Section D is within the Cibolo Creek watershed.

None of the roadway work in Comal County crosses the floodplain, perennial streams or intermittent streams but there are some ephemeral stream crossings and off-site ephemeral ponds. The project limits are located on Glen Rose limestone.

The proposed roadway work would add passing lanes to improve traffic flow and safety along SH 46. Section D would also include a center turn lane in proximity to a church. In general, the roadway would be widened by scabbing additional pavement onto the edges of the existing roadway, placing a new surface coating upon the entire widened sections, and then restriping the roadway. The *typical sections* attached to this application generally illustrate the existing and

proposed conditions. In Section C, most of the widening would be approximately 10 feet wide along the south side of the road. In Section D, most of the widening would add 10 feet of pavement to each side of the road. The proposed roadway improvements would be constructed within the existing State-owned right of way (ROW).

A storm water pollution prevention plan (SW3P) would be implemented in accordance with a TPDES Construction General Permit. A Notice of Intent would be submitted to TCEQ to obtain permit coverage. The SW3P would utilize approximate temporary BMPs such as silt fence, rock filter dams and other measures to control pollutants during the construction phase.

The project would include ancillary features such as adding and relocating guardrails as slopes and obstacles dictate, relocating signs and minor modifications of existing culverts (lengthening or adding safety end treatments). In the areas where the road is widened, the roadside slopes and ditches would generally have to be re-graded. Topsoil, seed and soil retention blankets would be used to stabilize these temporary impact areas.

Sections C and D cumulatively have 11.94 acres of existing impervious cover (IC) and the project would add 3.91 acres of IC, bringing the total IC after construction to 15.85 acres. Adding 3.91 acres of IC requires a treatment system capable of removing 3,510 lbs of total suspended solids (TSS) each year. In Section C, two vegetated filter strips (VFS) and one swale would filter runoff from the pavement. In Section D, nine VFS would filter runoff from the pavement. These BMPs would remove 3,977 lbs TSS per year, exceeding the minimum requirement by 467 lbs.

There are no offsite areas or existing permanent BMPs. The site history is a rural highway.

ATTACHMENT D - Factors Affecting Surface Water Quality.

The project would disturb soils adjacent to the existing roadway and make them vulnerable to erosion. Materials used to build the new bridge and widen the road, and construction equipment are potential sources of storm water pollutants. Construction materials include roadway base material, new topsoil, and asphalt products which are sprayed onto the widened pavement surface. Concrete products may also be pollutant sources. Concrete washout pits would be established to contain rinse waters from concrete handling equipment. Construction equipment would run on diesel or gasoline fuels and contain lubricating oils, engine coolants, and hydraulic oils. Incidental releases or accidents may cause construction material and equipment releases into soils, which could then be carried to receiving streams. Newly seeded or sodded soils would be fertilized. A storm water pollution prevention plan implemented per the TCEQ's Construction General Permit TXR150000 would minimize the incorporation of construction related pollutants into storm water runoff during the construction phase. After construction is complete, the additional impervious cover would generate an increase in total suspended solids (TSS) as calculated by TCEQ's technical guidance. The increase in TSS would be mitigated with vegetated filter strips and swales.

ATTACHMENT E - Volume and Character of Stormwater

The runoff coefficient describes the ratio of runoff to rainfall. Storm water discharging from the

project limits is a combination of runoff from the paved and unpaved portions of the State ROW. Runoff quality is influenced by numerous factors including natural soil chemistry, on-site land use (roadway) and area land use. The project would not cause any significant long term change in the character of the runoff.

ATTACHMENT F - Suitability Letter from Authorized Agent
Not applicable because the project does not involve sewerage facilities.

ATTACHMENT G - Alternative Secondary Containment Methods
Not applicable because the project does not involve ASTs.

ATTACHMENT H - AST Containment Structure Drawings
Not applicable because the project does not involve ASTs.

ATTACHMENT I - 20% or Less Impervious Cover Waiver
Not applicable because the project exceeds 20% impervious cover.

ATTACHMENT J - BMPs for Upgradient Stormwater
The project does not include features to provide post-construction treatment of runoff from upgradient locations, but the SW3P is designed to protect streams that cross the roadway via culverts.

ATTACHMENT K - BMPs for On-site Stormwater
Vegetated filter strips (VFS) and swales will be used to prevent pollution of surface water. VFS and swale locations are shown on the CZP Layouts

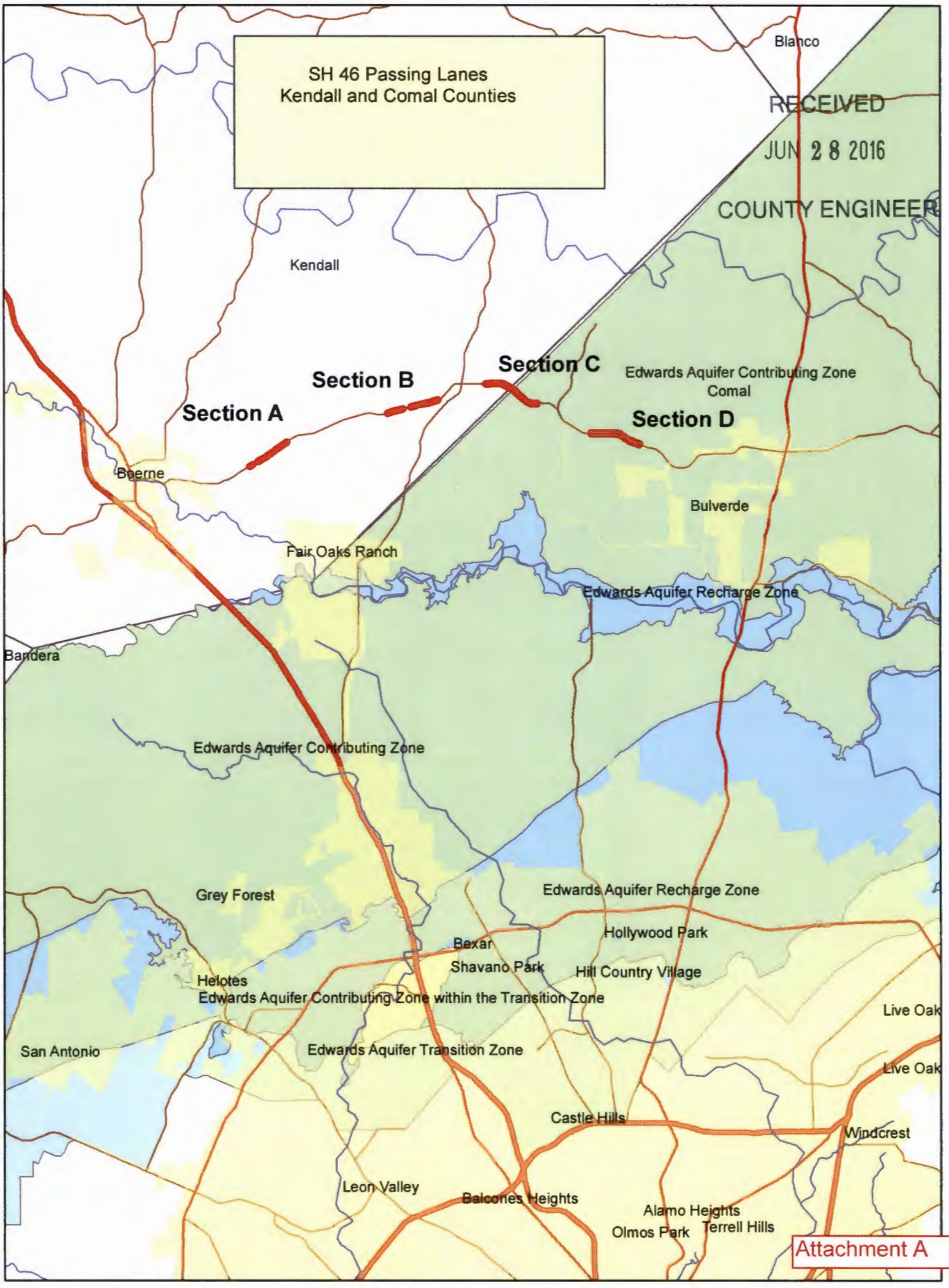
ATTACHMENT L - BMPs for Surface Streams
Protective measures during the construction phase are shown on the SW3P sheets. Appropriate erosion, sedimentation and post construction stabilization controls would be utilized to protect all surface streams during construction. Post construction protective measures are shown on the CZP Layouts.

ATTACHMENT M - Construction Plans
Roadway plan sheets illustrated the areas of proposed widening.

ATTACHMENT N - Inspection, Maintenance, Repair and Retrofit Plan
See list of attachments below.

ATTACHMENT O - Pilot-Scale Field Testing Plan. – Not applicable

ATTACHMENT P - Measures for Minimizing Surface Stream Contamination.
The project would not change the way in which water enters a stream as a result of the construction and development. The project would not directly impact any surface streams. The project represents only a minor change from existing conditions and would not substantially impact stream flashing, the creation of stronger flows and in-stream velocities.


SH 46 Passing Lanes
Kendall and Comal Counties
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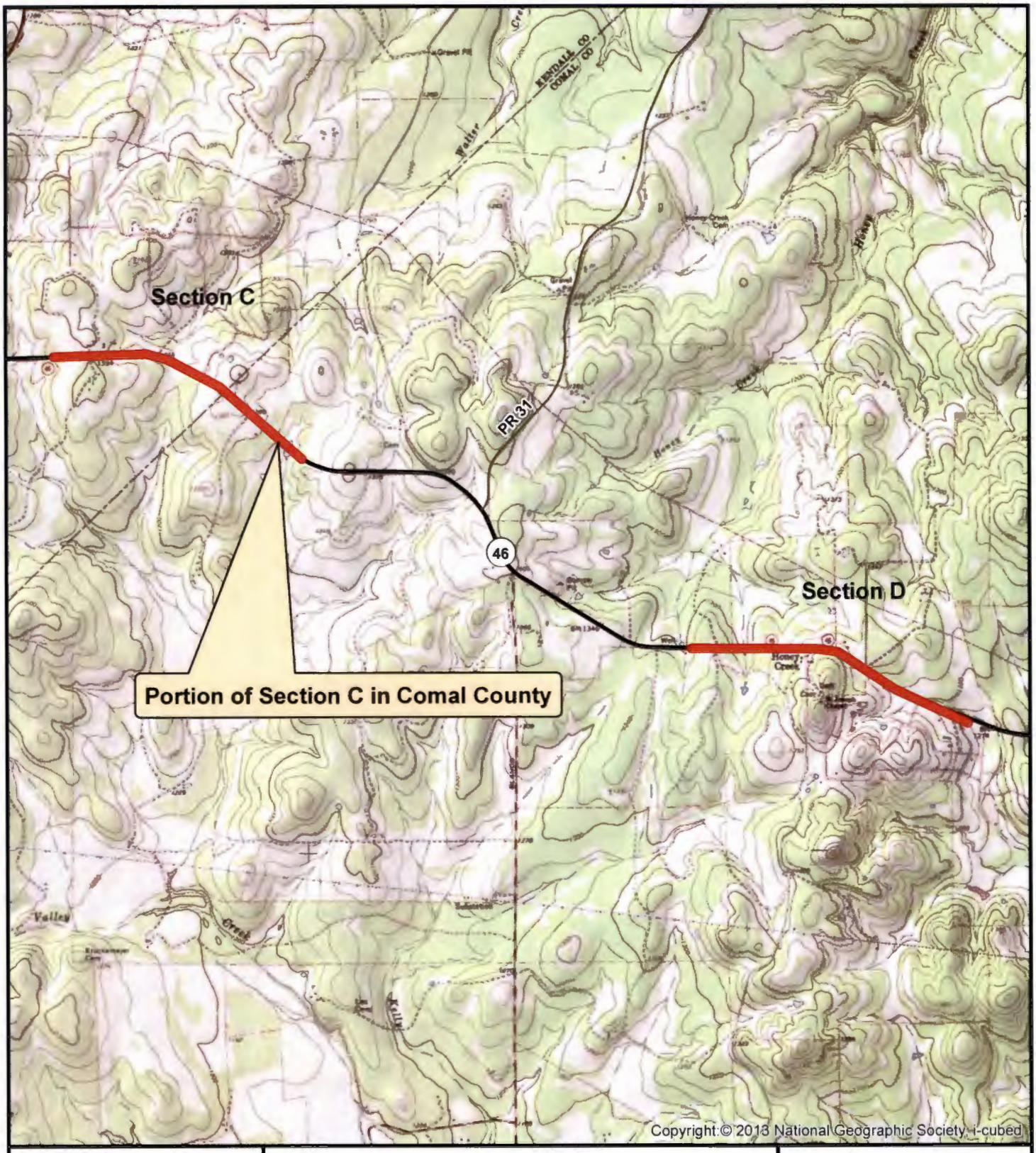
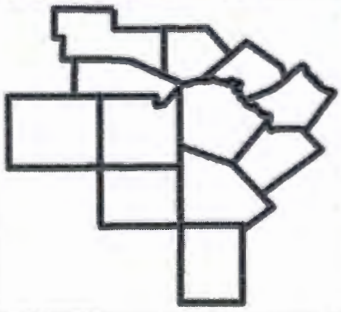
COUNTY ENGINEER
Blanco
Kendall
Section A
Section B
Section C
Section D
Edwards Aquifer Contributing Zone
Comal
Boerne
Bulverde
Fair Oaks Ranch
Edwards Aquifer Recharge Zone
Bandera
Edwards Aquifer Contributing Zone
Grey Forest
Edwards Aquifer Recharge Zone
Hollywood Park
Bexar
Shavano Park
Hill Country Village
Helotes
Edwards Aquifer Contributing Zone within the Transition Zone
Live Oak
San Antonio
Edwards Aquifer Transition Zone
Live Oak
Castle Hills
Windcrest
Leon Valley
Balcones Heights
Alamo Heights
Olmos Park
Terrell Hills
Attachment A





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N

0 0.8

Miles

USGS TOPO MAP

Attachment B

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COUNTY ENGINEER

Design Calculations

Project Name: SH 46 Passing Lanes

The following calculation sheets have been completed to meet the requirements of the TCEQ as stated in "Complying with the Edwards Aquifer Rules – Technical Guidance on Best Management Practices" (Revised July 2005).

Martin Palacios 11-4-14

NAME DATE

Martin Palacios, P.E. No. 111619
Bain Medina Bain, Inc.
TBPE Firm Registration F-001712

Loading Summary Analysis

Project Name: SH 46 Passing Lanes

Summary:	TSS reduction requirements for this project =	3,510 lbs/yr
	Load removed by grassy swales that meet width and slope criteria =	259 lbs/yr
	Load removed by vegetated filter strips that meet the width and slope criteria =	3,718 lbs/yr
	Load removed by vegetated filter strips and grassy swales that meet width and slope criteria =	3,977 lbs/yr

Conclusion: The required TSS load reduction from the project is 3,510 lbs/yr. The calculated TSS reduction resulting from the proposed vegetative filter strips and grassy swales that meet slope and width criteria is 3,977 lbs/yr. These BMPs would provide the required TSS load removal requirement for the project.

Martin Palacios — NAME

11-4-14 — DATE

SH46 TOTAL IMPERVIOUS TREATED AREAS WITH GRASSY SWALES

	A_C	A_C	A_I	A_I
NAME	TOTAL TREATMENT AREA SQ FT	TOTAL TREATMENT AREA ACRES	IMPERVIOUS TREATMENT AREA SQ FT	IMPERVIOUS TREATMENT AREA ACRES
C3-1	23791	0.55	13920	0.32

DRAINAGE BASIN TOTAL (GRASSY SWALES)

	TOTAL		IMPERVIOUS	
	SQ FT	ACRES	SQ FT	ACRES
C3	23791	0.55	13920	0.32
TOTAL	23791	0.55	13920	0.32

SH46 TOTAL IMPERVIOUS TREATED AREAS WITH VEGETATIVE FILTER STRIPS

	A_C	A_C	A_I	A_I
NAME	TOTAL TREATMENT AREA SQ FT	TOTAL TREATMENT AREA ACRES	IMPERVIOUS TREATMENT AREA SQ FT	IMPERVIOUS TREATMENT AREA ACRES
C3-2	10545	0.24	7418	0.17
C3-3	6940	0.16	4854	0.11
D1-1	14739	0.34	8751	0.20
D2-1	11182	0.26	8193	0.19
D2-2	11184	0.26	8186	0.19
D2-3	11224	0.26	8480	0.19
D3-1	3777	0.09	3286	0.08
D3-2	7539	0.17	6589	0.15
D4-1	50992	1.17	43319	0.99
D4-2	86490	1.99	60421	1.39
D5-1	10741	0.25	6626	0.15

DRAINAGE BASIN TOTAL (VEGETATIVE FILTER STRIPS)

	TOTAL		IMPERVIOUS	
	SQ FT	ACRES	SQ FT	ACRES
C3	17485	0.40	12272	0.28
D1	14739	0.34	8751	0.20
D2	33590	0.77	24859	0.57
D3	11316	0.26	9875	0.23
D4	137482	3.16	103740	2.38
D5	10741	0.25	6626	0.15
TOTAL	225353	5.17	166123	3.81

All values calculated from microstation Contributing Zone Plan sheets

Impervious Cover Calculations

Project Name: SH46 Passing Lanes
County: Comal County
Length of Project: SEG C(Comal) = 3012 linear feet; SEG D(Comal) = 7816 linear feet

Drainage Basin	**C3**	**D1**	**D2**	**D3**	**D4**	**D5**	**Total**
Existing ROW (acres)*	7.28	1.59	5.50	1.71	11.00	3.72	30.8
Existing Roadway (acres)*	3.39	0.68	2.42	0.74	2.70	1.69	
Total Existing Impervious Cover(acres)*	3.55	0.68	2.43	0.75	2.76	1.77	11.94
Proposed ROW (acres)*	7.28	1.59	5.50	1.71	11.00	3.72	30.8
Proposed Roadway (acres)*	3.77	0.81	3.55	0.92	3.80	2.29	
Total Proposed Impervious Cover(acres)*	3.82	0.81	3.81	1.12	3.97	2.32	15.85
Pre-Const. % of Impervious Cover	48.76%	42.77%	44.18%	43.86%	25.09%	47.58%	
Post-Const. % of Impervious Cover	52.47%	50.94%	69.27%	65.50%	36.09%	62.37%	
Net increase of Impervious Area	0.27	0.13	1.38	0.37	1.21	0.55	3.91
Increase Percentage in Impervious Cover	3.71%	8.18%	25.09%	21.64%	11.00%	14.78%	12.69%

** All area were measured in microstation*

Pre-Construction IC = 0.3877
Post-Construction IC = 0.5146

Runoff Coefficient Calculations:

Pre-Construction Runoff

$Rv = 1.72x(IC)^3 - 1.97x(IC)^2 + 1.23x(IC) + 0.02$

Rv = 0.30

Post-Construction Runoff

$Rv = 1.72x(IC)^3 - 1.97x(IC)^2 + 1.23x(IC) + 0.02$

Rv = 0.37

All area calculations were completed in microstation

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: SH 46
Date Prepared: 10/7/2014

Additional information is provided for cells with a red triangle in the upper right corner. Place the cursor over the cell.
Text shown in blue indicate location of instructions in the Technical Guidance Manual - RG-348.
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1. The Required Load Reduction for the total project: Calculations from RG-348 Pages 3-27 to 3-30

Page 3-29 Equation 3 3: $L_M = 27.2(A_N \times P)$

where

$L_{M\ TOTAL\ PROJECT}$ = Required TSS removal resulting from the proposed development = 80% of increased lo
A_N = Net increase in impervious area for the project
P = Average annual precipitation, inches

Site Data: Determine Required Load Removal Based on the Entire Project

County =	Comal	
Total project area included in plan * =	30.80	acres
Predevelopment impervious area within the limits of the plan * =	11.94	acres
Total post-development impervious area within the limits of the plan* =	15.85	acres
Total post-development impervious cover fraction * =	0.51	
P =	33	inches
$L_{M\ TOTAL\ PROJECT}$ =	3510	lbs

* The values entered in these fields should be for the total project area

Number of drainage basins / outfalls areas leaving the plan area = 6

2. Drainage Basin Parameters (This information should be provided for each basin):

Drainage Basin/Outfall Area No. = C3-1

Total drainage basin/outfall area =	7.28	acres
Predevelopment impervious area within drainage basin/outfall area =	3.55	acres
Post-development impervious area within drainage basin/outfall area =	3.82	acres
Post-development impervious fraction within drainage basin/outfall area =	0.52	
$L_{M\ THIS\ BASIN}$ =	242	lbs

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Grassy Swale
Removal efficiency = 70 percent

Aqualogic Cartridge Filter
Bioretention
Contech StormFilter
Constructed Wetland
Extended Detention
Grassy Swale
Retention / Irrigation
Sand Filter
Stormceptor
Vegetated Filter Strips
Vortechs
Wet Basin
Wet Vault

4. Calculate Maximum TSS Load Removed (L_R) for this Drainage Basin by the selected BMP Type.

RG-348 Page 3-33 Equation 3 7: $L_R = (\text{BMP efficiency}) \times P \times (A_I \times 34.6 + A_P \times 0.54)$

where

A_C = Total On-Site drainage area in the BMP catchment area
A_I = Impervious area proposed in the BMP catchment area
A_P = Pervious area remaining in the BMP catchment area
L_R = TSS Load removed from this catchment area by the proposed BMP

A_C =	0.55	acres
A_I =	0.32	acres
A_P =	0.23	acres
L_R =	259	lbs

5. Calculate Fraction of Annual Runoff to Treat the drainage basin / outfall area

Desired $L_{M\ THIS\ BASIN}$ =	259	lbs
F =	1.00	

6. Calculate Capture Volume required by the BMP Type for this drainage basin / outfall area. Calculations from RG-348 Pages 3-34 to 3-36

Rainfall Depth =	4.00	inches
Post Development Runoff Coefficient =	0.41	
On-site Water Quality Volume =	3254	cubic feet

Calculations from RG-348 Pages 3-36 to 3-37

Off-site area draining to BMP =	0.00	acres
Off-site impervious cover draining to BMP =	0.00	acres
Impervious fraction of off-site area =	0	
Off-site Runoff Coefficient =	0.00	
Off-site Water Quality Volume =	0	cubic feet
Storage for Sediment =	651	
Total Capture Volume (required water quality volume(s) x 1.20) =	3905	cubic feet

The following sections are used to calculate the required water quality volume(s) for the selected BMP
The values for BMP Types not selected in cell C45 will show NA.

7. Retention/Irrigation System Designed as Required in RG-348 Pages 3-42 to 3-46

Required Water Quality Volume for retention basin =	NA	cubic feet	
Irrigation Area Calculations			
Soil infiltration/permeability rate =	0.1	in/hr	Enter determined permeability rate or assumed value
Irrigation area =	NA	square feet	
	NA	acres	

8. Extended Detention Basin System Designed as Required in RG-348 Pages 3-46 to 3-51

Required Water Quality Volume for extended detention basin =	NA	cubic feet

9. Filter area for Sand Filters Designed as Required in RG-348 Pages 3-58 to 3-63

9A. Full Sedimentation and Filtration System

Water Quality Volume for sedimentation basin =	NA	cubic feet	
Minimum filter basin area =	NA	square feet	
Maximum sedimentation basin area =	NA	square feet	For minimum water depth of 2 feet
Minimum sedimentation basin area =	NA	square feet	For maximum water depth of 8 feet

9B. Partial Sedimentation and Filtration System

Water Quality Volume for combined basins =	NA	cubic feet	
Minimum filter basin area =	NA	square feet	
Maximum sedimentation basin area =	NA	square feet	For minimum water depth of 2 feet
Minimum sedimentation basin area =	NA	square feet	For maximum water depth of 8 feet

10. Bioretention System Designed as Required in RG-348 Pages 3-63 to 3-65

Required Water Quality Volume for Bioretention Basin =	NA	cubic feet

11. Wet Basins Designed as Required in RG-348 Pages 3-66 to 3-71

Required capacity of Permanent Pool =	NA	cubic feet	Permanent Pool Capacity is 1.20 times the WQV
Required capacity at WQV Elevation =	NA	cubic feet	Total Capacity should be the Permanent Pool Capacity plus a second WQV

12. Constructed Wetlands Designed as Required in RG-348 Pages 3-71 to 3-73

Required Water Quality Volume for Constructed Wetlands =	NA	cubic feet

13. AquaLogic™ Cartridge System — Designed as Required in RG-348 — Pages 3-74 to 3-78

** 2005 Technical Guidance Manual (RG-348) does not exempt the required 20% increase with maintenance contract with AquaLogic™.

Required Sedimentation chamber capacity =	NA	cubic feet
Filter canisters (FCs) to treat WQV =	NA	cartridges
Filter basin area (RIA_F) =	NA	square feet

14. Stormwater Management StormFilter® by CONTECH

Required Water Quality Volume for Contech StormFilter System =	NA	cubic feet

THE SIZING REQUIREMENTS FOR THE FOLLOWING BMPs / LOAD REMOVALS ARE BASED UPON FLOW RATES - NOT CALCULATED WATER QUALITY VOL

15. Grassy Swales — Designed as Required in RG-348 — Pages 3-51 to 3-54

Design parameters for the swale:

Drainage Area to be Treated by the Swale = A =	0.55 acres
Impervious Cover in Drainage Area =	0.32 acres
Rainfall Intensity = i =	1.1 in/hr
Swale Slope =	0.014 ft/ft
Side Slope (z) =	3
Design Water Depth = y =	0.33 ft
Weighted Runoff Coefficient = C =	0.57

A_{CS} = cross-sectional area of flow in Swale =	0.82 sf
P_W = Wetted Perimeter =	3.58 feet
R_H = hydraulic radius of flow cross-section = A_{CS}/P_W =	0.23 feet
n = Manning's roughness coefficient =	0.2

15A. Using the Method Described in the RG-348

Manning's Equation: $Q = \frac{1.49}{n} A_{CS} R_H^{2/3} S^{0.5}$

$b = \frac{0.134 \times Q}{y^{1.67} S^{0.5}} - zy$ = 1.49 feet

Q = CIA = 0.34 cfs

To calculate the flow velocity in the swale.

V (Velocity of Flow in the swale) = Q/A_{CS} = 0.42 ft/sec

To calculate the resulting swale length.

L = Minimum Swale Length = V (ft/sec) * 300 (sec) = 126.03 feet

If any of the resulting values do not meet the design requirement set forth in RG-348, the design parameters must be modified and the solver rerun

15B. Alternative Method using Excel Solver

Design Q = CIA =	0.34 cfs		
Manning's Equation Q =	0.88 cfs	Error 1 =	-0.54
Swale Width=	6.00 ft		

Instructions are provided to the right (green comments)

Flow Velocity	0.42 ft/s
Minimum Length =	126.03 ft

Instructions are provided to the right (blue comments).

Design Width =	6 ft		
Design Discharge =	0.90 cfs	Error 2 =	-0.55
Design Depth =	0.33 ft		

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: SH 46
Date Prepared: 10/7/2014

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Page 3-29 Equation 3 3: $L_M = 27.2(A_N \times P)$

where

$L_{M\ TOTAL\ PROJECT}$ = Required TSS removal resulting from the proposed development = 80% of increased lo
A_N = Net increase in impervious area for the project
P = Average annual precipitation, inches

Site Data Determine Required Load Removal Based on the Entire Project

County =	Comal	
Total project area included in plan * =	30.80	acres
Predevelopment impervious area within the limits of the plan * =	11.94	acres
Total post-development impervious area within the limits of the plan* =	15.85	acres
Total post-development impervious cover fraction * =	0.51	
P =	33	inches
$L_{M\ TOTAL\ PROJECT}$ =	3510	lbs.

* The values entered in these fields should be for the total project area

Number of drainage basins / outfalls areas leaving the plan area = 6

2. Drainage Basin Parameters (This information should be provided for each basin):

Drainage Basin/Outfall Area No. = C3-2

Total drainage basin/outfall area =	7.28	acres
Predevelopment impervious area within drainage basin/outfall area =	3.55	acres
Post-development impervious area within drainage basin/outfall area =	3.82	acres
Post-development impervious fraction within drainage basin/outfall area =	0.52	
$L_{M\ THIS\ BASIN}$ =	242	lbs

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Vegetated Filter Strips
Removal efficiency = 85 percent

Aqualogic Cartridge Filter
Bioretention
Contech StormFilter
Constructed Wetland
Extended Detention
Grassy Swale
Retention / Irrigation
Sand Filter
Stormceptor
Vegetated Filter Strips
Vortechs
Wet Basin
Wet Vault

4. Calculate Maximum TSS Load Removed (L_R) for this Drainage Basin by the selected BMP Type.

RG-348 Page 3-33 Equation 3 7: $L_R = (\text{BMP efficiency}) \times P \times (A_I \times 34.6 + A_P \times 0.54)$

where

A_C = Total On-Site drainage area in the BMP catchment area
A_I = Impervious area proposed in the BMP catchment area
A_P = Pervious area remaining in the BMP catchment area
L_R = TSS Load removed from this catchment area by the proposed BMP

A_C =	0.24	acres
A_I =	0.17	acres
A_P =	0.07	acres
L_R =	166	lbs

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Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: SH 46
Date Prepared: 10/7/2014

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Total post-development impervious area within the limits of the plan* =	15.85	acres
Total post-development impervious cover fraction * =	0.51	
P =	33	inches
$L_{M\ TOTAL\ PROJECT}$ =	3510	lbs

* The values entered in these fields should be for the total project area

Number of drainage basins / outfalls areas leaving the plan area = 6

2. Drainage Basin Parameters (This information should be provided for each basin):

Drainage Basin/Outfall Area No. = C3-3

Total drainage basin/outfall area =	7.28	acres
Predevelopment impervious area within drainage basin/outfall area =	3.55	acres
Post-development impervious area within drainage basin/outfall area =	3.82	acres
Post-development impervious fraction within drainage basin/outfall area =	0.52	
$L_{M\ THIS\ BASIN}$ =	242	lbs

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Vegetated Filter Strips
Removal efficiency = 85 percent

Aqualogic Cartridge Filter
Bioretention
Contech StormFilter
Constructed Wetland
Extended Detention
Grassy Swale
Retention / Irrigation
Sand Filter
Stormceptor
Vegetated Filter Strips
Vortechs
Wet Basin
Wet Vault

4. Calculate Maximum TSS Load Removed (L_R) for this Drainage Basin by the selected BMP Type.

RG-348 Page 3-33 Equation 3 7 L_R = (BMP efficiency) x P x (A_I x 34.8 + A_P x 0.54)

where:

A_C = Total On-Site drainage area in the BMP catchment area
A_I = Impervious area proposed in the BMP catchment area
A_P = Pervious area remaining in the BMP catchment area
L_R = TSS Load removed from this catchment area by the proposed BMP

A_C =	0.16	acres
A_I =	0.11	acres
A_P =	0.05	acres
L_R =	108	lbs

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

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Date Prepared: 10/7/2014

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where:

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Total post-development impervious cover fraction * =	0.51	
P =	33	inches
$L_{M\ TOTAL\ PROJECT}$ =	3510	lbs

* The values entered in these fields should be for the total project area

Number of drainage basins / outfalls areas leaving the plan area = 6

2. Drainage Basin Parameters (This information should be provided for each basin):

Drainage Basin/Outfall Area No. = D1-1

Total drainage basin/outfall area =	1.59	acres
Predevelopment impervious area within drainage basin/outfall area =	0.68	acres
Post-development impervious area within drainage basin/outfall area =	0.81	acres
Post-development impervious fraction within drainage basin/outfall area =	0.51	
$L_{M\ THIS\ BASIN}$ =	117	lbs

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Vegetated Filter Strips
Removal efficiency = 85 percent

Aqualogic Cartridge Filter
Bioretention
Contech StormFilter
Constructed Wetland
Extended Detention
Grassy Swale
Retention / Irrigation
Sand Filter
Stormceptor
Vegetated Filter Strips
Vortechs
Wet Basin
Wet Vault

4. Calculate Maximum TSS Load Removed (L_R) for this Drainage Basin by the selected BMP Type.

RG-348 Page 3-33 Equation 3.7: $L_R = (\text{BMP efficiency}) \times P \times (A_I \times 34.6 + A_P \times 0.54)$

where

A_C = Total On-Site drainage area in the BMP catchment area
A_I = Impervious area proposed in the BMP catchment area
A_P = Pervious area remaining in the BMP catchment area
L_R = TSS Load removed from this catchment area by the proposed BMP

A_C =	0.34	acres
A_I =	0.20	acres
A_P =	0.14	acres
L_R =	196	lbs

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: SH 46
Date Prepared: 10/7/2014

Additional information is provided for cells with a red triangle in the upper right corner. Place the cursor over the cell.
Text shown in blue indicate location of instructions in the Technical Guidance Manual - RG-348.
Characters shown in red are data entry fields.
Characters shown in black (Bold) are calculated fields. Changes to these fields will remove the equations used in the spreadshee

1. The Required Load Reduction for the total project: Calculations from RG-348 Pages 3-27 to 3-30

Page 3-29 Equation 3.3: $L_M = 27.2(A_N \times P)$

where:

$L_{M\ TOTAL\ PROJECT}$ = Required TSS removal resulting from the proposed development = 80% of increased lo
A_N = Net increase in impervious area for the project
P = Average annual precipitation, inches

Site Data: Determine Required Load Removal Based on the Entire Project

County =	Comal	
Total project area included in plan * =	30.80	acres
Predevelopment impervious area within the limits of the plan * =	11.94	acres
Total post-development impervious area within the limits of the plan* =	15.85	acres
Total post-development impervious cover fraction * =	0.51	
P =	33	inches
$L_{M\ TOTAL\ PROJECT}$ =	3510	lbs

* The values entered in these fields should be for the total project area

Number of drainage basins / outfalls areas leaving the plan area = 6

2. Drainage Basin Parameters (This information should be provided for each basin):

Drainage Basin/Outfall Area No. = D2-1

Total drainage basin/outfall area =	5.50	acres
Predevelopment impervious area within drainage basin/outfall area =	2.43	acres
Post-development impervious area within drainage basin/outfall area =	3.81	acres
Post-development impervious fraction within drainage basin/outfall area =	0.69	
$L_{M\ THIS\ BASIN}$ =	1239	lbs

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Vegetated Filter Strips
Removal efficiency = 85 percent

Aqualogic Cartridge Filter
Bioretention
Contech StormFilter
Constructed Wetland
Extended Detention
Grassy Swale
Retention / Irrigation
Sand Filter
Stormceptor
Vegetated Filter Strips
Vortechs
Wet Basin
Wet Vault

4. Calculate Maximum TSS Load Removed (L_R) for this Drainage Basin by the selected BMP Type.

RG-348 Page 3-33 Equation 3.7 $L_R = (\text{BMP efficiency}) \times P \times (A_I \times 34.6 + A_P \times 0.54)$

where

A_C = Total On-Site drainage area in the BMP catchment area
A_I = Impervious area proposed in the BMP catchment area
A_P = Pervious area remaining in the BMP catchment area
L_R = TSS Load removed from this catchment area by the proposed BMP

A_C =	0.26	acres
A_I =	0.19	acres
A_P =	0.07	acres
L_R =	185	lbs

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: SH 46
Date Prepared: 10/7/2014

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where:

$L_{M\ TOTAL\ PROJECT}$ = Required TSS removal resulting from the proposed development = 80% of increased lo
A_N = Net increase in impervious area for the project
P = Average annual precipitation, inches

Site Data: Determine Required Load Removal Based on the Entire Project

County =	Comal	
Total project area included in plan * =	30.80	acres
Predevelopment impervious area within the limits of the plan * =	11.94	acres
Total post-development impervious area within the limits of the plan* =	15.85	acres
Total post-development impervious cover fraction * =	0.51	
P =	33	inches
$L_{M\ TOTAL\ PROJECT}$ =	3510	lbs

* The values entered in these fields should be for the total project area

Number of drainage basins / outfalls areas leaving the plan area = 6

2. Drainage Basin Parameters (This information should be provided for each basin):

Drainage Basin/Outfall Area No. = D2-2

Total drainage basin/outfall area =	5.50	acres
Predevelopment impervious area within drainage basin/outfall area =	2.43	acres
Post-development impervious area within drainage basin/outfall area =	3.81	acres
Post-development impervious fraction within drainage basin/outfall area =	0.69	
$L_{M\ THIS\ BASIN}$ =	1239	lbs

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Vegetated Filter Strips
Removal efficiency = 85 percent

Aqualogic Cartridge Filter
Bioretention
Contech StormFilter
Constructed Wetland
Extended Detention
Grassy Swale
Retention / Irrigation
Sand Filter
Stormceptor
Vegetated Filter Strips
Vortechs
Wet Basin
Wet Vault

4. Calculate Maximum TSS Load Removed (L_R) for this Drainage Basin by the selected BMP Type.

RG-348 Page 3-33 Equation 3.7: $L_R = (\text{BMP efficiency}) \times P \times (A_I \times 34.6 + A_P \times 0.54)$

where:

A_C = Total On-Site drainage area in the BMP catchment area
A_I = Impervious area proposed in the BMP catchment area
A_P = Pervious area remaining in the BMP catchment area
L_R = TSS Load removed from this catchment area by the proposed BMP

A_C =	0.26	acres
A_I =	0.19	acres
A_P =	0.07	acres
L_R =	185	lbs

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: SH 46
Date Prepared: 10/7/2014

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where:

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A_N = Net increase in impervious area for the project
P = Average annual precipitation, inches

Site Data: Determine Required Load Removal Based on the Entire Project

County =	Comal	
Total project area included in plan * =	30.80	acres
Predevelopment impervious area within the limits of the plan * =	11.94	acres
Total post-development impervious area within the limits of the plan* =	15.85	acres
Total post-development impervious cover fraction * =	0.51	
P =	33	inches
$L_{M\ TOTAL\ PROJECT}$ =	3510	lbs

* The values entered in these fields should be for the total project area

Number of drainage basins / outfalls areas leaving the plan area = 6

2. Drainage Basin Parameters (This information should be provided for each basin):

Drainage Basin/Outfall Area No. = D2-3

Total drainage basin/outfall area =	5.50	acres
Predevelopment impervious area within drainage basin/outfall area =	2.43	acres
Post-development impervious area within drainage basin/outfall area =	3.81	acres
Post-development impervious fraction within drainage basin/outfall area =	0.69	
$L_{M\ THIS\ BASIN}$ =	1239	lbs

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Vegetated Filter Strips
Removal efficiency = 85 percent

Aqualogic Cartridge Filter
Bioretention
Contech StormFilter
Constructed Wetland
Extended Detention
Grassy Swale
Retention / Irrigation
Sand Filter
Stormceptor
Vegetated Filter Strips
Vortechs
Wet Basin
Wet Vault

4. Calculate Maximum TSS Load Removed (L_R) for this Drainage Basin by the selected BMP Type.

RG-348 Page 3-33 Equation 3.7 $L_R = (\text{BMP efficiency}) \times P \times (A_I \times 34.6 \div A_P \times 0.54)$

where

A_C = Total On-Site drainage area in the BMP catchment area
A_I = Impervious area proposed in the BMP catchment area
A_P = Pervious area remaining in the BMP catchment area
L_R = TSS Load removed from this catchment area by the proposed BMP

A_C =	0.26	acres
A_I =	0.19	acres
A_P =	0.07	acres
L_R =	185	lbs

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: SH 46
Date Prepared: 10/7/2015

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where:

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A_N = Net increase in impervious area for the project
P = Average annual precipitation, inches

Site Data. Determine Required Load Removal Based on the Entire Project

County =	Comal	
Total project area included in plan * =	30.80	acres
Predevelopment impervious area within the limits of the plan * =	11.94	acres
Total post-development impervious area within the limits of the plan* =	15.85	acres
Total post-development impervious cover fraction * =	0.51	
P =	33	inches
$L_{M\ TOTAL\ PROJECT}$ =	3510	lbs

* The values entered in these fields should be for the total project area

Number of drainage basins / outfalls areas leaving the plan area = 6

2. Drainage Basin Parameters (This information should be provided for each basin):

Drainage Basin/Outfall Area No. = D3-1

Total drainage basin/outfall area =	1.71	acres
Predevelopment impervious area within drainage basin/outfall area =	0.75	acres
Post-development impervious area within drainage basin/outfall area =	1 12	acres
Post-development impervious fraction within drainage basin/outfall area =	0.65	
$L_{M\ THIS\ BASIN}$ =	332	lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Vegetated Filter Strips
Removal efficiency = 85 percent

Aqualogic Cartridge Filter
Bioretention
Contech StormFilter
Constructed Wetland
Extended Detention
Grassy Swale
Retention / Irrigation
Sand Filter
Stormceptor
Vegetated Filter Strips
Vortechs
Wet Basin
Wet Vault

4. Calculate Maximum TSS Load Removed (L_R) for this Drainage Basin by the selected BMP Type.

RG-348 Page 3-33 Equation 3 7 L_R = (BMP efficiency) x P x (A_I x 34.6 + A_P x 0.54)

where

A_C = Total On-Site drainage area in the BMP catchment area
A_I = Impervious area proposed in the BMP catchment area
A_P = Pervious area remaining in the BMP catchment area
L_R = TSS Load removed from this catchment area by the proposed BMP

A_C =	0.09	acres
A_I =	0.08	acres
A_P =	0.01	acres
L_R =	78	lbs

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: SH 46
Date Prepared: 10/7/2014

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Page 3-29 Equation 3.3: $L_M = 27.2(A_N \times P)$

where

$L_{M\ TOTAL\ PROJECT}$ = Required TSS removal resulting from the proposed development = 80% of increased lo
A_N = Net increase in impervious area for the project
P = Average annual precipitation inches

Site Data Determine Required Load Removal Based on the Entire Project

County =	Comal	
Total project area included in plan * =	30.80	acres
Predevelopment impervious area within the limits of the plan * =	11.94	acres
Total post-development impervious area within the limits of the plan* =	15.85	acres
Total post-development impervious cover fraction * =	0.51	
P =	33	inches
$L_{M\ TOTAL\ PROJECT}$ =	3510	lbs

* The values entered in these fields should be for the total project area

Number of drainage basins / outfalls areas leaving the plan area = 6

2. Drainage Basin Parameters (This information should be provided for each basin):

Drainage Basin/Outfall Area No =	D3-2	
Total drainage basin/outfall area =	1.71	acres
Predevelopment impervious area within drainage basin/outfall area =	0.75	acres
Post-development impervious area within drainage basin/outfall area =	1.12	acres
Post-development impervious fraction within drainage basin/outfall area =	0.65	
$L_{M\ THIS\ BASIN}$ =	332	lbs

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Vegetated Filter Strips
Removal efficiency = 85 percent

Aqualogic Cartridge Filter
Bioretention
Contech StormFilter
Constructed Wetland
Extended Detention
Grassy Swale
Retention / Irrigation
Sand Filter
Stormceptor
Vegetated Filter Strips
Vortechs
Wet Basin
Wet Vault

4. Calculate Maximum TSS Load Removed (L_R) for this Drainage Basin by the selected BMP Type.

RG-348 Page 3-33 Equation 3.7: $L_R = (\text{BMP efficiency}) \times P \times (A_I \times 34.6 + A_P \times 0.54)$

where

A_C = Total On-Site drainage area in the BMP catchment area
A_I = Impervious area proposed in the BMP catchment area
A_P = Pervious area remaining in the BMP catchment area
L_R = TSS Load removed from this catchment area by the proposed BMP

A_C =	0.17	acres
A_I =	0.15	acres
A_P =	0.02	acres
L_R =	148	lbs

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JUN 28 2016

COUNTY ENGINEER

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: SH 46
Date Prepared: 10/7/2014

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1. The Required Load Reduction for the total project: Calculations from RG-348 Pages 3-27 to 3-30

Page 3-29 Equation 3.3: $L_M = 27.2(A_N \times P)$

where:

$L_{M\ TOTAL\ PROJECT}$ = Required TSS removal resulting from the proposed development = 80% of increased lo
A_N = Net increase in impervious area for the project
P = Average annual precipitation, inches

Site Data: Determine Required Load Removal Based on the Entire Project

County =	Comal	
Total project area included in plan * =	30.80	acres
Predevelopment impervious area within the limits of the plan * =	11.94	acres
Total post-development impervious area within the limits of the plan* =	15.85	acres
Total post-development impervious cover fraction * =	0.51	
P =	33	inches
$L_{M\ TOTAL\ PROJECT}$ =	3510	lbs

* The values entered in these fields should be for the total project area

Number of drainage basins / outfalls areas leaving the plan area = 6

2. Drainage Basin Parameters (This information should be provided for each basin):

Drainage Basin/Outfall Area No. = D4-1

Total drainage basin/outfall area =	11.00	acres
Predevelopment impervious area within drainage basin/outfall area =	2.76	acres
Post-development impervious area within drainage basin/outfall area =	3.97	acres
Post-development impervious fraction within drainage basin/outfall area =	0.36	
$L_{M\ THIS\ BASIN}$ =	1086	lbs

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Vegetated Filter Strips
Removal efficiency = 85 percent

Aqualogic Cartridge Filter
Bioretention
Contech StormFilter
Constructed Wetland
Extended Detention
Grassy Swale
Retention / Irrigation
Sand Filter
Stormceptor
Vegetated Filter Strips
Vortechs
Wet Basin
Wet Vault

4. Calculate Maximum TSS Load Removed (L_R) for this Drainage Basin by the selected BMP Type.

RG-348 Page 3-33 Equation 3.7 L_R = (BMP efficiency) x P x (A_I x 34.6 + A_P x 0.54)

where

A_C = Total On-Site drainage area in the BMP catchment area
A_I = Impervious area proposed in the BMP catchment area
A_P = Pervious area remaining in the BMP catchment area
L_R = TSS Load removed from this catchment area by the proposed BMP

A_C =	1.17	acres
A_I =	0.99	acres
A_P =	0.18	acres
L_R =	964	lbs

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: SH 46
Date Prepared: 10/7/2014

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where:

$L_{M\ TOTAL\ PROJECT}$ = Required TSS removal resulting from the proposed development = 80% of increased lo
A_N = Net increase in impervious area for the project
P = Average annual precipitation, inches

Site Data: Determine Required Load Removal Based on the Entire Project

County =	Comal	
Total project area included in plan * =	30.80	acres
Predevelopment impervious area within the limits of the plan * =	11.94	acres
Total post-development impervious area within the limits of the plan* =	15.85	acres
Total post-development impervious cover fraction * =	0.51	
P =	33	inches
$L_{M\ TOTAL\ PROJECT}$ =	3510	lbs

* The values entered in these fields should be for the total project area

Number of drainage basins / outfalls areas leaving the plan area = 6

2. Drainage Basin Parameters (This information should be provided for each basin):

Drainage Basin/Outfall Area No. = D4-2

Total drainage basin/outfall area =	11.00	acres
Predevelopment impervious area within drainage basin/outfall area =	2.76	acres
Post-development impervious area within drainage basin/outfall area =	3.97	acres
Post-development impervious fraction within drainage basin/outfall area =	0.36	
$L_{M\ THIS\ BASIN}$ =	1086	lbs

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Vegetated Filter Strips
Removal efficiency = 85 percent

Aqualogic Cartridge Filter
Bioretention
Contech StormFilter
Constructed Wetland
Extended Detention
Grassy Swale
Retention / Irrigation
Sand Filter
Stormceptor
Vegetated Filter Strips
Vortechs
Wet Basin
Wet Vault

4. Calculate Maximum TSS Load Removed (L_R) for this Drainage Basin by the selected BMP Type.

RG-348 Page 3-33 Equation 3.7 L_R = (BMP efficiency) x P x (A_I x 34.6 + A_P x 0.54)

where:

A_C = Total On-Site drainage area in the BMP catchment area
A_I = Impervious area proposed in the BMP catchment area
A_P = Pervious area remaining in the BMP catchment area
L_R = TSS Load removed from this catchment area by the proposed BMP

A_C =	1.99	acres
A_I =	1.39	acres
A_P =	0.60	acres
L_R =	1358	lbs

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: SH 46
Date Prepared: 10/7/2014

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where:

$L_{M\ TOTAL\ PROJECT}$ = Required TSS removal resulting from the proposed development = 80% of increased l
A_N = Net increase in impervious area for the project
P = Average annual precipitation, inches

Site Data Determine Required Load Removal Based on the Entire Project

County =	Comal	
Total project area included in plan * =	30.08	acres
Predevelopment impervious area within the limits of the plan * =	11.94	acres
Total post-development impervious area within the limits of the plan* =	15.85	acres
Total post-development impervious cover fraction * =	0.53	
P =	33	inches
$L_{M\ TOTAL\ PROJECT}$ =	3510	lbs

* The values entered in these fields should be for the total project area

Number of drainage basins / outfalls areas leaving the plan area = 6

2. Drainage Basin Parameters (This information should be provided for each basin):

Drainage Basin/Outfall Area No. =	D5-1	
Total drainage basin/outfall area =	3.72	acres
Predevelopment impervious area within drainage basin/outfall area =	1.77	acres
Post-development impervious area within drainage basin/outfall area =	2 32	acres
Post-development impervious fraction within drainage basin/outfall area =	0.62	
$L_{M\ THIS\ BASIN}$ =	494	lbs

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Vegetated Filter Strips
Removal efficiency = 85 percent

Aqualogic Cartridge Filter
Bioretention
Contech StormFilter
Constructed Wetland
Extended Detention
Grassy Swale
Retention / Irrigation
Sand Filter
Stormceptor
Vegetated Filter Strips
Vortechs
Wet Basin
Wet Vault

4. Calculate Maximum TSS Load Removed (L_R) for this Drainage Basin by the selected BMP Type.

RG-348 Page 3-33 Equation 3 7: L_R = (BMP efficiency) x P x (A_I x 34.6 + A_P x 0.54)

where

A_C = Total On-Site drainage area in the BMP catchment area
A_I = Impervious area proposed in the BMP catchment area
A_P = Pervious area remaining in the BMP catchment area
L_R = TSS Load removed from this catchment area by the proposed BMP

A_C =	0.25	acres
A_I =	0.15	acres
A_P =	0.10	acres
L_R =	147	lbs

ATTACHMENT G
INSPECTION, MAINTENANCE, REPAIR AND RETROFIT PLAN

Edwards Aquifer Contributing Zone Maintenance Guidelines

Roadway: SH 46 from the Comal/Kendall County Line to 0.5852 mile east of Comal/Kendall County Line; and SH 46 from 0.8977 mile west of Limestone Ledge to 0.5824 mile east of Limestone Ledge, Bulverde, Comal County.
CSJ: 0215-07-022

These maintenance guidelines were prepared at the request of the Texas Commission on Environmental Quality (TCEQ) with regard to their approval of an Edwards Aquifer Protection Plan for the above referenced project. These guidelines apply to the portions of the project limits that are subject to the Edwards Aquifer Rules.

Pest management: Any vegetated areas that have noxious vegetation, insects, or other pests will be remedied with the minimum amount of selective pesticide necessary to control the pest. All chemicals are EPA labeled, registered, and approved. Personnel licensed and/or trained according to Texas Department of Agriculture (TDA) laws and regulations will apply pesticides. Records are kept for each application in accordance with TDA laws and regulations.

Seasonal mowing and vegetation management: Right-of-way areas, which include vegetated filter strips and swales for this project, will be mowed by contract. The cutting height is usually 5-7 inches for all areas.

Inspection cycles: Maintenance forces will review roadways and roadsides on regular basis, most of which are visited within a weekly cycle. Drainage ditches and structures are inspected after large storms with consideration for any damage to grass cover, litter accumulation, or erosion. Any problem areas are duly noted particularly if there is an absence of vegetation, any accumulation of brush, debris or litter, and/or any areas of significant erosion. These items will then be scheduled for repair on priority basis.

Debris and litter removal: Litter, debris and brush accumulation is assessed not only for aesthetic reasons but also for the tendency to clog drainage paths or impede the intended flow of a structure's hydraulic design. Areas are cleaned periodically by state forces or by an outside contractor. Areas documented as trouble spots are scheduled on a priority basis.

Sediment removal: During inspections if sediment has accumulated to a depth that hinders original design characteristics it will be removed. Excessive sedimentation, or a significant load of silt, does not normally occur in filter strip areas, grassy swale areas, or in permanent pond structures after project completion, but it may occur from other drainage areas or construction underway beyond State right-of-way.

Maintenance Contact

The Maintenance Supervisor may be contacted for questions or concerns pertaining to maintenance of the facility. The current Maintenance Supervisor whose maintenance section is in charge of this project area may be contacted at the following location:

Mr. Chad Lux
Maintenance Supervisor
TxDOT Department of Transportation
1375 N Main
Boerne, Texas 78006
Tel: (830) 249-2262

12-03-14

DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			1
STATE	STATE DIST.	COUNTY	
TEXAS	SAT	KENDALL	
CONT.	SECT.	JOB	HIGHWAY NO.
0215	06	037, ETC	SH 46

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

FEDERAL AID PROJECT

HIGHWAY: SH 46
COUNTY: KENDALL, ETC.
PROJECT NUMBER: STP
CONTROL: 0215-06-037, ETC

DESIGN SPEED = 40 MPH
AREA OF DISTURBED SOIL = 21.3 AC
ADT: 8,800 (2017)
14,200 (2037)

INDEX OF SHEETS

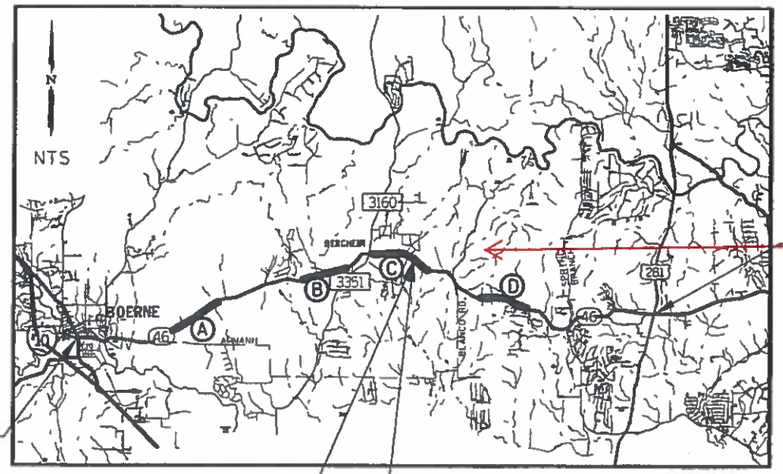
SHEET NO.	DESCRIPTION
REFER TO SHEET 2 "INDEX OF SHEETS"	

FROM: US 87 TO: KENDALL/COMAL COUNTY LINE
CSJ: 0215-06-037
ROADWAY LENGTH: 20,516.53 FT = 3.866 MI
BRIDGE LENGTH : 104.47 FT = 0.019 MI
TOTAL LENGTH: 20,621.00 FT = 3.905 MI

FROM: KENDALL/COMAL COUNTY LINE TO: US 281
CSJ: 0215-07-022
ROADWAY LENGTH: 10,857 FT = 2.056 MI
BRIDGE LENGTH : 0.000 FT = 0.000 MI
TOTAL LENGTH: 10,857 FT = 2.056 MI

FOR THE WORK CONSISTING OF WIDEN ROADWAY TO PROVIDE PASSING LANES

NET LENGTH OF PROJECT= 20.503 MI.



Note: Only the portion of Section C in Comal County and Section D are subject to 30 TAC 213.

BEGIN PROJECT
BEGIN CSJ: 0215-06-037
STA. 10+76.16

END CSJ: 0215-06-037
STA. 628+68.00

BEGIN CSJ: 0215-07-022
STA. 628+68.00

END PROJECT
CSJ: 0215-07-022
STA. 1092+47.52

FINAL PLANS

LETTING DATE: _____

DATE CONTRACTOR BEGAN WORK: _____

DATE WORK WAS ACCEPTED: _____

FINAL CONTRACT COST: $ _____

CONTRACTOR: _____

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BAIN MEDINA BAIN, INC.
Engineer:
LORI DULLNIG-WARLEN, PE 2/17/2016
P.E. No: 83520 Date:

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COUNTY ENGINEER

Ⓐ SEGMENTS: SEE PROJECT LAYOUTS
EXCEPTIONS: STA. 10+76.16 TO STA. 192+00.00
STA. 272+00.00 TO STA. 423+32.00
STA. 503+35.00 TO STA. 582+50.00
STA. 658+80.00 TO STA. 773+60.00
STA. 851+75.00 TO STA. 1092+47.52
EQUATIONS: NONE
RR X-ING'S: NONE

FINAL PLANS STATEMENT:

THE CONSTRUCTION WORK WAS PERFORMED IN ACCORDANCE WITH THE PLANS.

THIS AREA IS RESERVED FOR THE PE'S SEAL

AREA ENGINEER P.E. DATE

TEXAS DEPARTMENT OF TRANSPORTATION

SUBMITTED FOR LETTING

DISTRICT DESIGN SUPPORT DIRECTOR

APPROVED FOR LETTING

DISTRICT ENGINEER

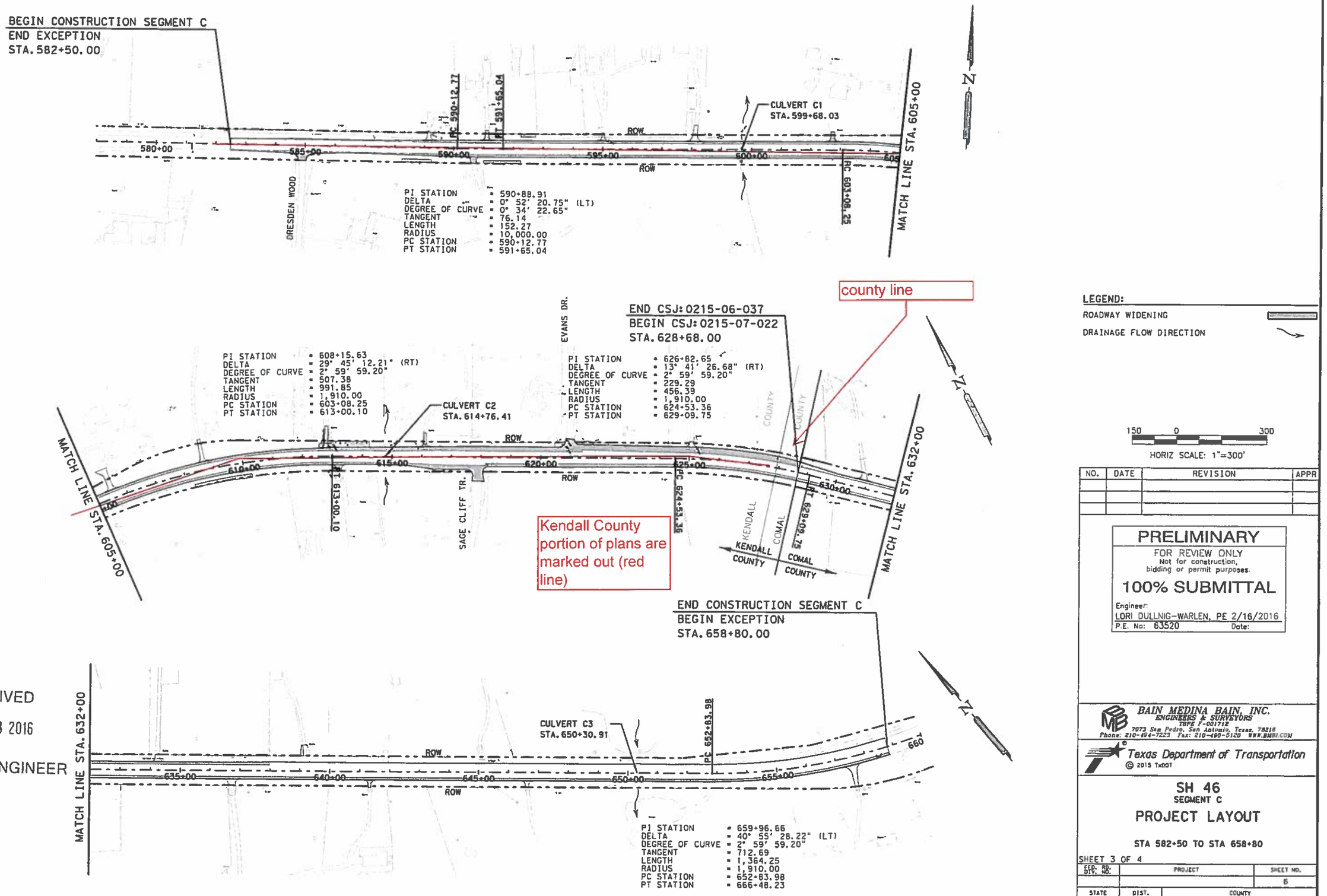
SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, JUNE 1, 2004 AND THE SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS, SHALL GOVERN ON THIS PROJECT:
REQUIRED CONTRACT PROVISIONS FOR ALL FEDERAL-AID CONSTRUCTION CONTRACTS (FORM FHWA 1273, MAY 1, 2012).

BAIN MEDINA BAIN, INC.
ENGINEERS & SURVEYORS
TBPE F-001712
7073 San Pedro, San Antonio, Texas, 78216
Phone: 210-494-7223 Fax: 210-490-5120 WWW.BMBI.COM

COUNTY _____ PROJ. NO. _____
HWY. NO. _____ LETTING DATE _____
DATE ACCEPTED _____

LEVELS DISPLAYED

T:\C-1373-01 SH 46 Passing Lanes\GENERAL\SH46+TITLE01.dgn
2/17/2016 11:55:29 PM



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COUNTY ENGINEER

NO.	DATE	REVISION	APPR

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100% SUBMITTAL
Engineer: LORI DULLNIG-WARLEN, PE 2/16/2016
P.E. No: 63520 Date:

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ENGINEERS & SURVEYORS
TBPE F-001712
7073 San Pedro, San Antonio, Texas, 78216
Phone: 210-494-7223 Fax: 210-480-5120 WWW.BMBI.COM

SH 46
SEGMENT C
PROJECT LAYOUT
STA 582+50 TO STA 658+80

SHEET 3 OF 4

FED. RD. DIV. NO.	PROJECT	SHEET NO.
		6

STATE	DIST.	COUNTY
TEXAS	SAT	KENDALL, ETC

CONT.	SECT.	JOB	HIGHWAY NO.
0215	06	037, ETC	SH 46

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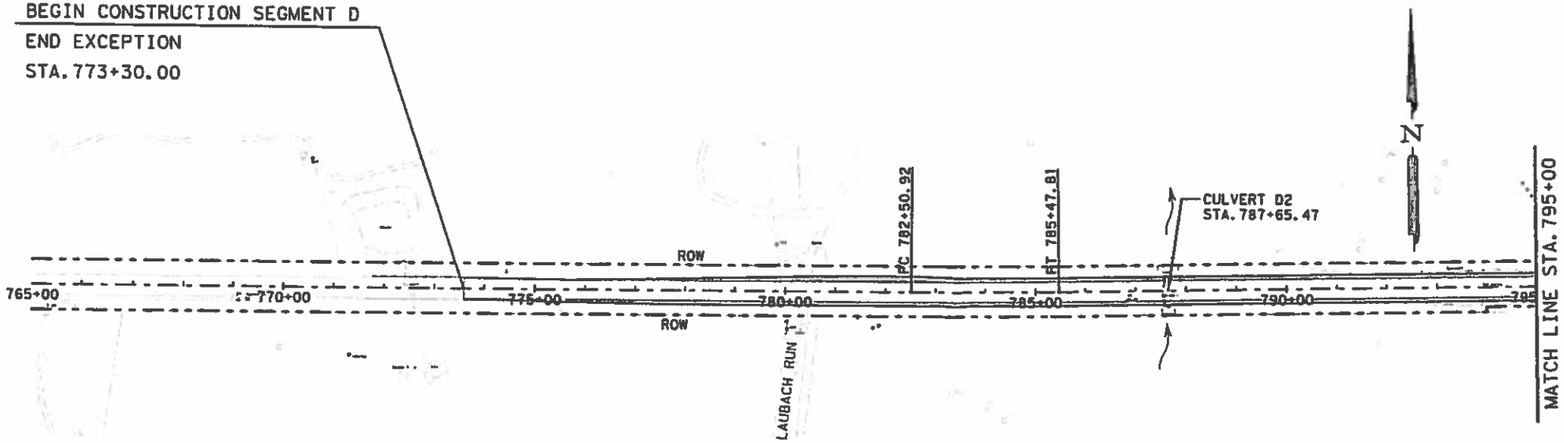

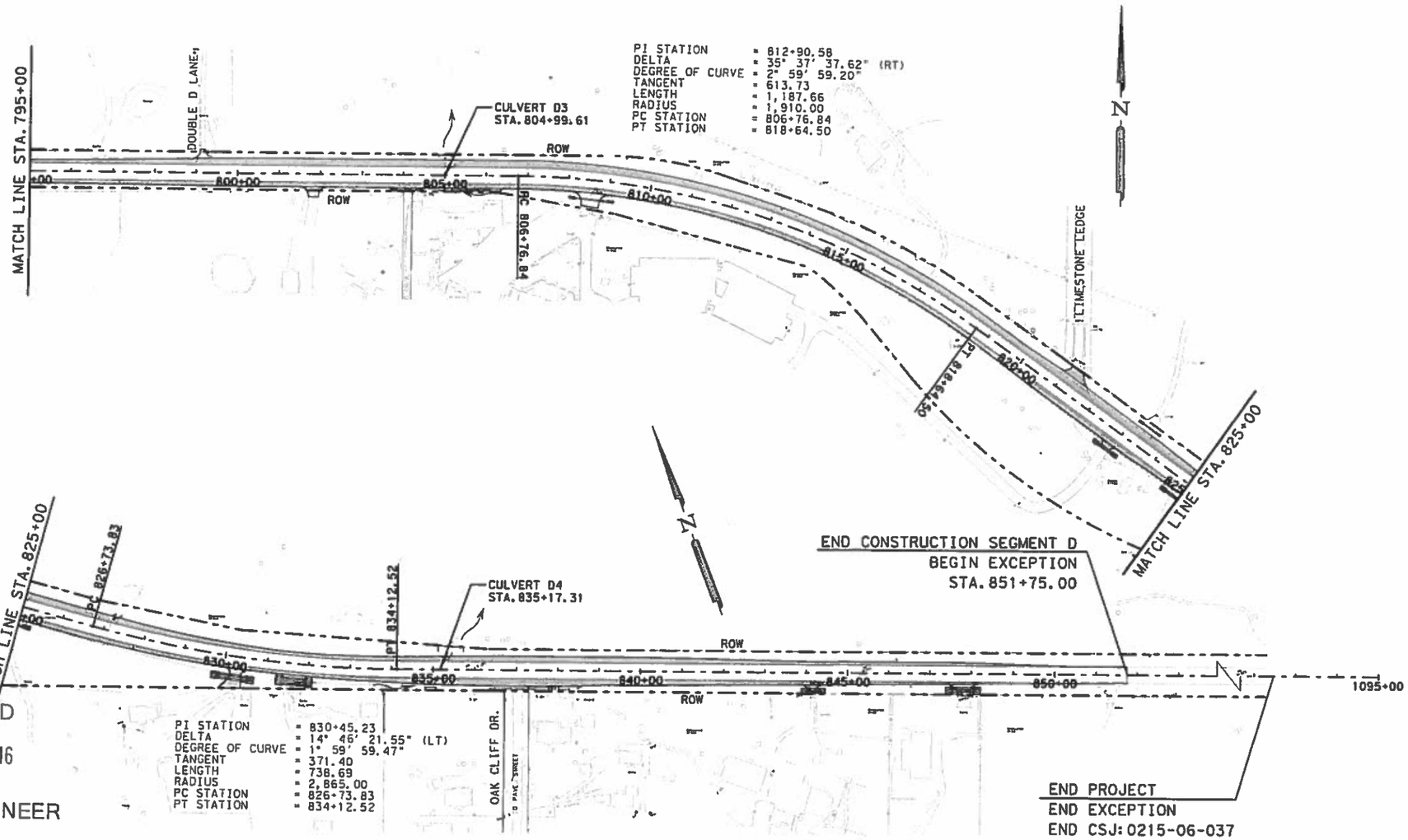

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COUNTY ENGINEER

LEGEND:

ROADWAY WIDENING

DRAINAGE FLOW DIRECTION

150 0 300

HORIZ SCALE: 1"=300'

NO.	DATE	REVISION	APPR

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100% SUBMITTAL

Engineer:
LORI DULLNIG-WARLEN, PE 2/16/2016
P.E. No: 63520 Date:

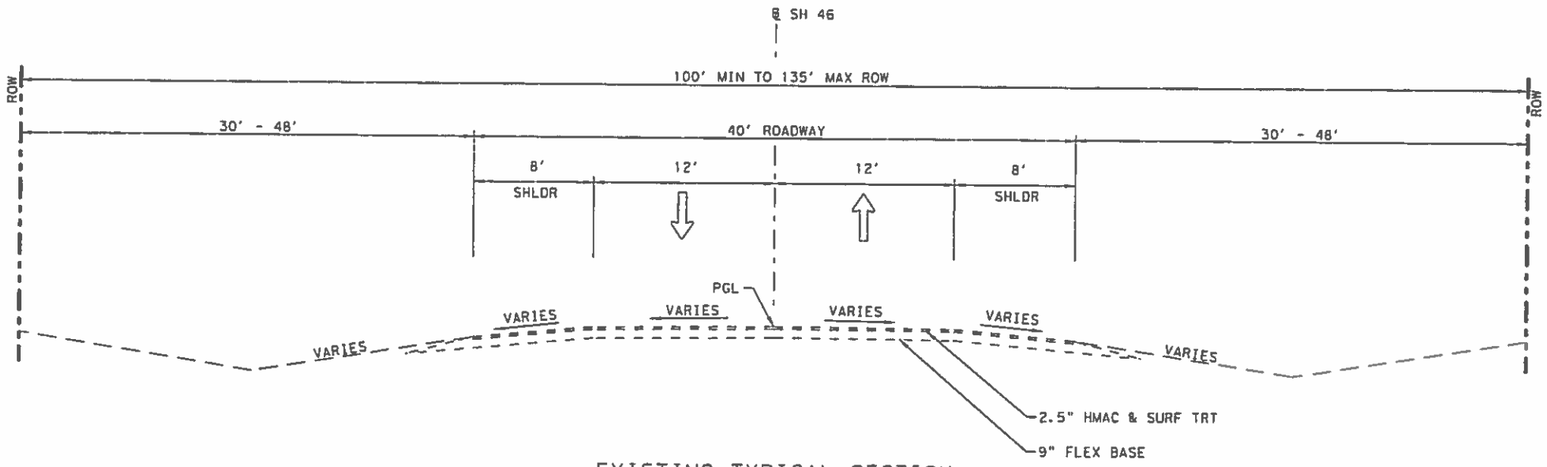
BAIN MEDINA BAIN, INC.
ENGINEERS & SURVEYORS
TBPE F-001712
7073 San Pedro, San Antonio, Texas, 78216
Phone: 210-494-7223 Fax: 210-490-5120 WWW.BMBI.COM

SH 46
SEGMENT D
PROJECT LAYOUT
STA 768+00 TO STA 851+75

SHEET 4 OF 4

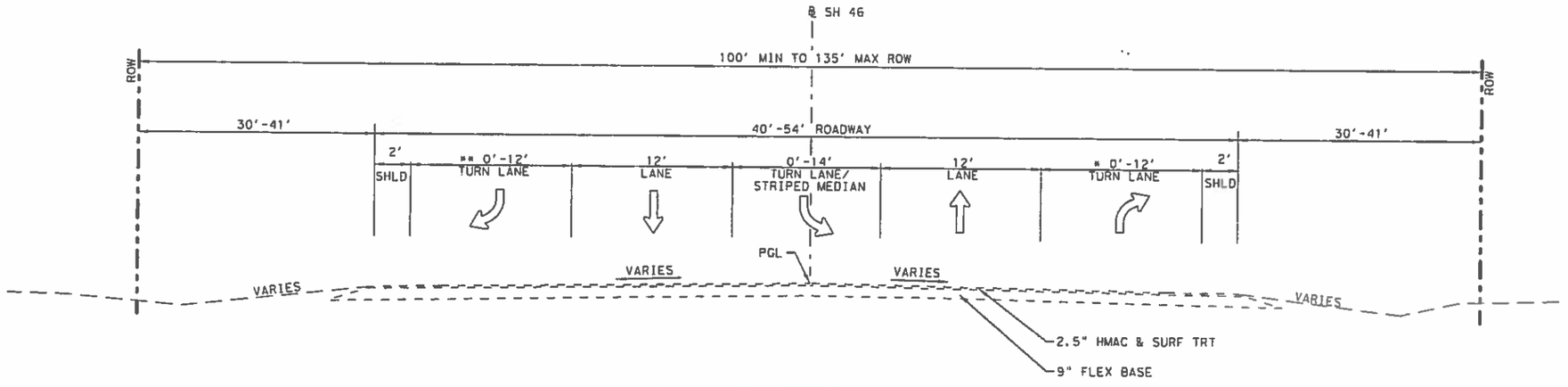
FED. RD. DIV. NO.	PROJECT	SHEET NO.
		7

STATE	DIST.	COUNTY	
TEXAS	SAT	KENDALL, ETC	
CONT.	SECT.	JOB	HIGHWAY NO.
0215	06	037, ETC	SH 46



EXISTING TYPICAL SECTION

STA 582+50.00 TO STA 614+22.00
STA 627+05.00 TO STA 658+00.00
(N.T.S.)



EXISTING TYPICAL SECTION

STA 614+22.00 TO STA 627+05.00
TRANSISTIONS:
* 615+88.00 - 617+60.00
** 621+43.00 - 627+05.00
(N.T.S.)

RECEIVED

JUN 28 2016

COUNTY ENGINEER

NO.	DATE	REVISION	APPR

PRELIMINARY

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Engineer:
LORI DULLNIG-WARLEN, PE 2/16/2016
P.E. No: 63520 Date:

BAIN MEDINA BAIN, INC.
ENGINEERS & SURVEYORS
TBPE F-001712
7073 San Pedro, San Antonio, Texas, 78216
Phone: 210-494-7223 Fax: 210-490-5120 WWW.BMBI.COM

SH 46
SEGMENT C
TYPICAL SECTIONS

SHEET 1 OF 3

FED. RD. DIV. NO.	PROJECT	SHEET NO.
		13

STATE	DIST.	COUNTY	
TEXAS	SAT	KENDALL, ETC	
CONT.	SECT.	JOB	HIGHWAY NO.
0215	06	037, ETC	SH 46

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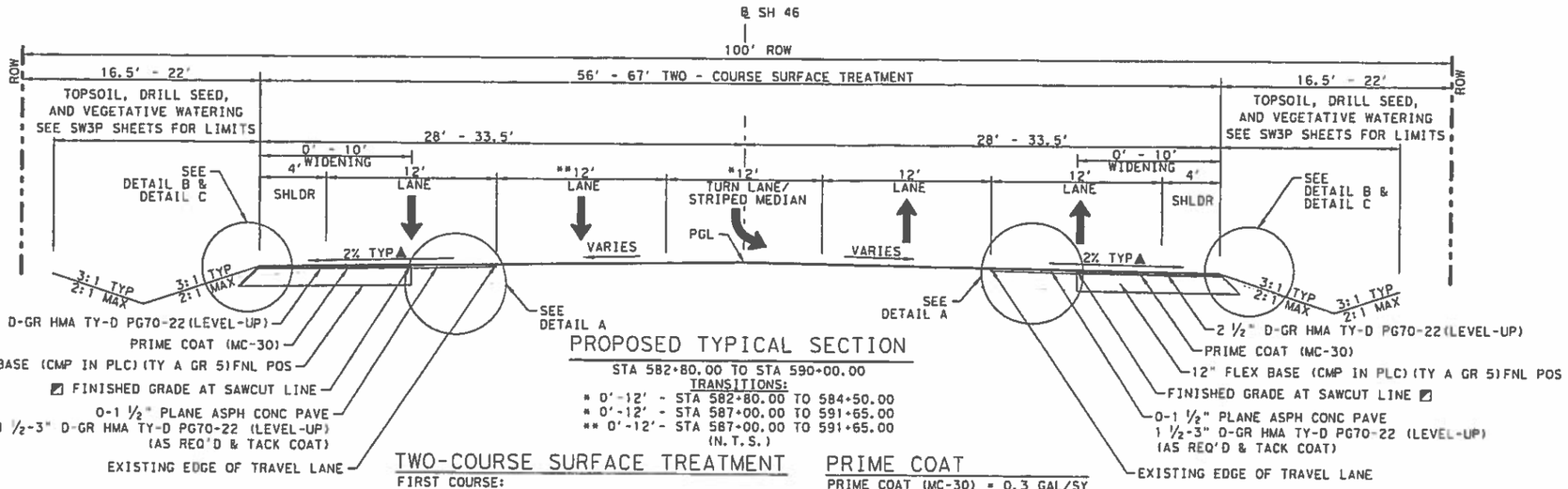


PROPOSED TYPICAL SECTION

STA 582+80.00 TO STA 590+00.00
TRANSITIONS:
* 0'-12' - STA 582+80.00 TO 584+50.00
* 0'-12' - STA 587+00.00 TO 591+65.00
** 0'-12'- STA 587+00.00 TO 591+65.00
(N.T.S.)

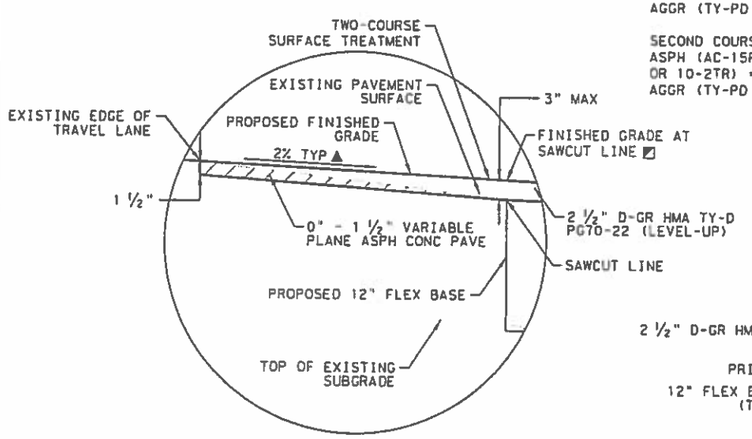
TWO-COURSE SURFACE TREATMENT

FIRST COURSE:
ASPH (AC-15P OR 20-5TR OR 20XP OR 10-2TR) = 0.3 GAL/SY
AGGR (TY-PD GR-3) = 110 SY/CY

SECOND COURSE:
ASPH (AC-15P OR 20-5TR OR 20XP OR 10-2TR) = 0.3 GAL/SY
AGGR (TY-PD GR-4 SAC-B) = 90 SY/CY

PRIME COAT

PRIME COAT (MC-30) = 0.3 GAL/SY



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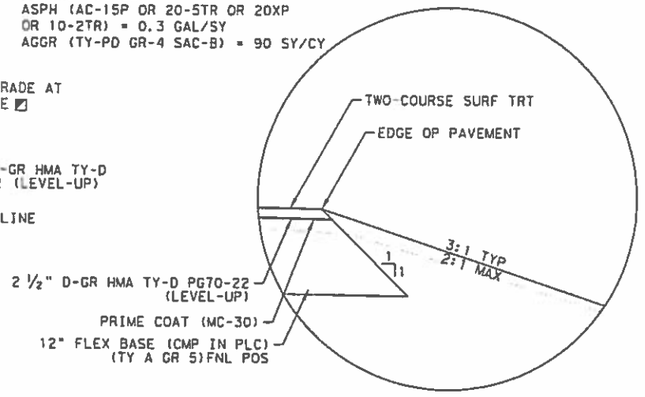
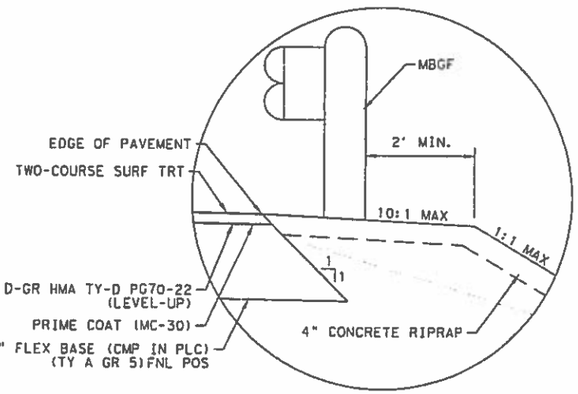
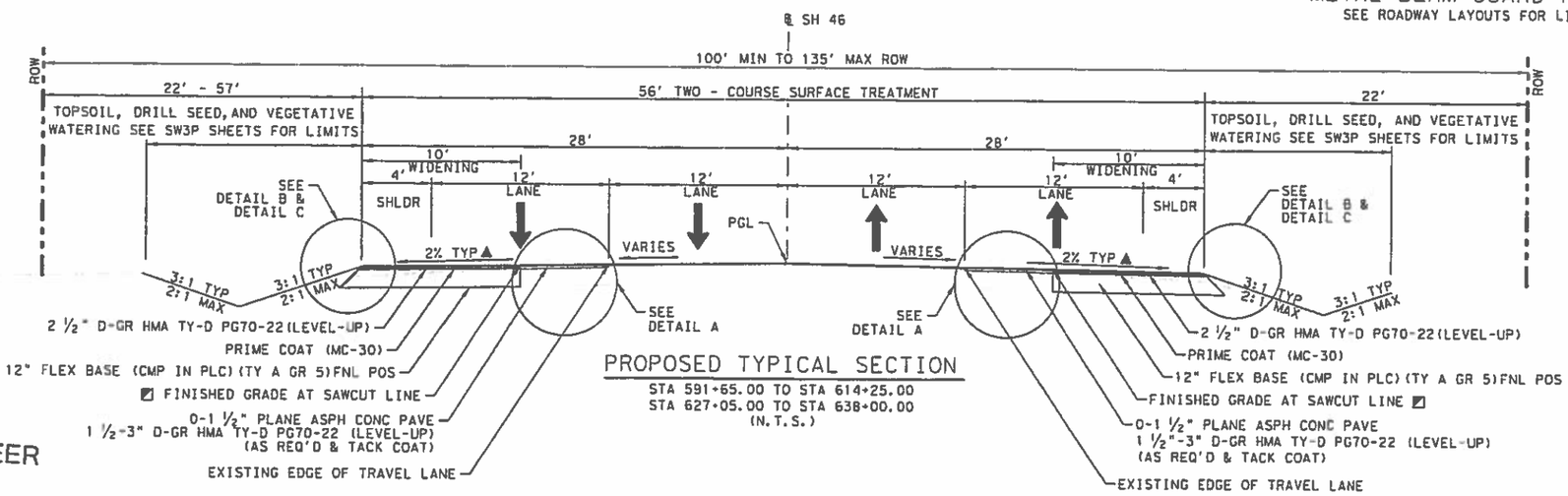


DETAIL B



DETAIL C
METAL BEAM GUARD FENCE
SEE ROADWAY LAYOUTS FOR LIMITS



PROPOSED TYPICAL SECTION

STA 591+65.00 TO STA 614+25.00
STA 627+05.00 TO STA 638+00.00
(N.T.S.)

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COUNTY ENGINEER

NOTES:

TYPICAL SECTIONS SHOWN DEPICT THE MOST COMMON CASES. REFER TO CROSS SECTIONS FOR ALL SPECIAL CASES.

ALL GRADING SHALL BE WITHIN THE EXISTING RIGHT OF WAY LIMITS.

THE SUBGRADE SHALL BE SHAPED, BLADED, ROLLED AND PROOF ROLLED A MINIMUM DISTANCE OF 24" BEYOND THE EDGE OF THE PROPOSED BASE COURSE.

PROOF ROLLING WILL NOT BE PAID FOR DIRECTLY BUT SHALL BE CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.

ENGINEER OR OWNER MUST BE PRESENT WHEN PROOF ROLLING SUBGRADE. CHECK FOR PUMPING OR OTHER IRREGULARITIES IN SUBGRADE. IF UNSUITABLE MATERIAL IS FOUND, CONTRACTOR SHALL REMOVE AND FILL WITH SUITABLE MATERIAL AND RECOMPACT AT NO ADDITIONAL PAY.

SAWCUT SHALL BE SUBSIDIARY TO THE PERTINENT BID ITEMS.

ONE STATION IS EQUAL TO 100 FEET.

IF AREAS BEYOND THE CONSTRUCTION LIMITS ARE DISTURBED OR DAMAGED BY CONTRACTOR, THE CONTRACTOR SHALL REPAIR OR BRING BACK AS CLOSE AS POSSIBLE TO PRE-CONSTRUCTION CONDITIONS TO THE SATISFACTION OF THE ENGINEER. THERE WILL BE NO SEPARATE PAY FOR THIS WORK AND/OR MATERIALS.

PGL IS BASED ON EXISTING GRADE ELEVATION AT SH 46 BASELINE.

◪ FINISHED GRADE AT SAWCUT LINE IS BASED ON THE PGL ELEVATION AT THE SH 46 BASELINE PROJECTED TO THE SAWCUT LINE LOCATION AT THE EXISTING CROSS SLOPE OF THE ADJOINING TRAVEL LANE. REFER TO WIDENING TABLES ON PLAN SHEETS FOR ELEVATION INFORMATION.

▲ CROSS SLOPE TO MATCH EXISTING CROSS SLOPE OF THE ADJOINING TRAVEL LANE. REFER TO WIDENING TABLES ON PLAN SHEETS FOR ELEVATION INFORMATION.

NO.	DATE	REVISION	APPR

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Engineer: LORI DULLNIG-WARLEN, PE 2/16/2016
P.E. No: 63520 Date:

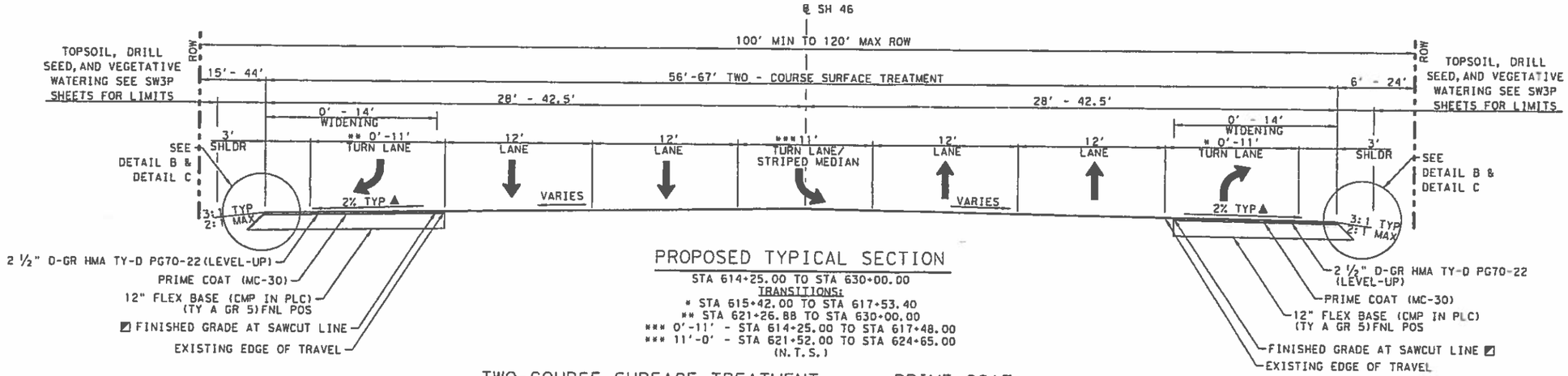
BAIN MEDINA BAIN, INC.
ENGINEERS & SURVEYORS
TBPE F-001712
7073 San Pedro, San Antonio, Texas, 78216
Phone: 210-494-7223 Fax: 210-490-5120 WWW.BMBI.COM

SH 46
SEGMENT C
TYPICAL SECTIONS

SHEET 2 OF 3

FED. RD. DIV. NO.	PROJECT	SHEET NO.
		14

STATE	DIST.	COUNTY	
TEXAS	SAT	KENDALL, ETC	
CONT.	SECT.	JOB	HIGHWAY NO.
0215	06	037, ETC	SH 46



PROPOSED TYPICAL SECTION

STA 614+25.00 TO STA 630+00.00
TRANSITIONS:
* STA 615+42.00 TO STA 617+53.40
** STA 621+26.88 TO STA 630+00.00
*** 0'-11' - STA 614+25.00 TO STA 617+48.00
*** 11'-0' - STA 621+52.00 TO STA 624+65.00
(N.T.S.)

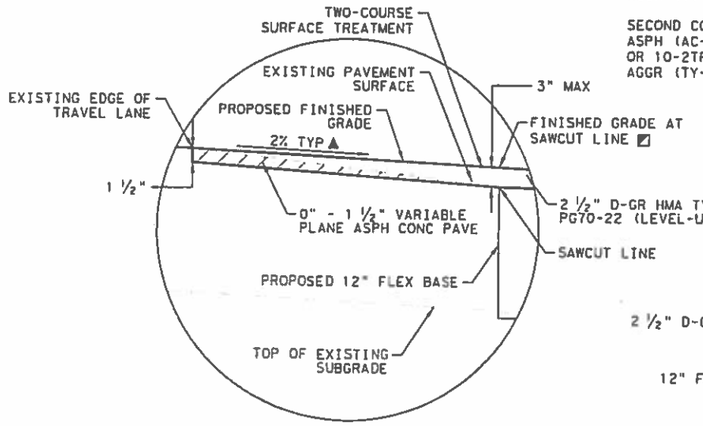
TWO-COURSE SURFACE TREATMENT

FIRST COURSE:
ASPH (AC-15P OR 20-5TR OR 20XP OR 10-2TR) = 0.3 GAL/SY
AGGR (TY-PD GR-3) = 110 SY/CY

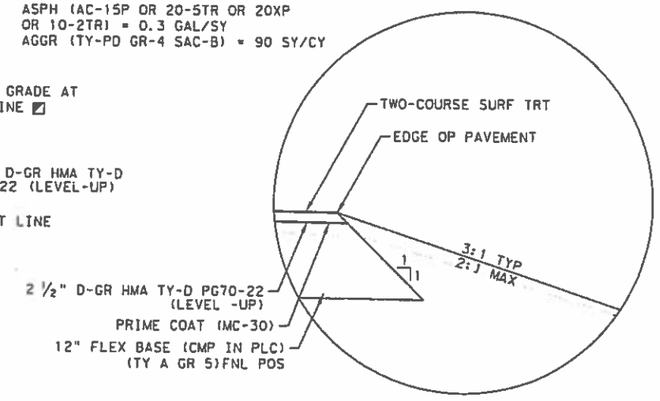
SECOND COURSE:
ASPH (AC-15P OR 20-5TR OR 20XP OR 10-2TR) = 0.3 GAL/SY
AGGR (TY-PD GR-4 SAC-B) = 90 SY/CY

PRIME COAT

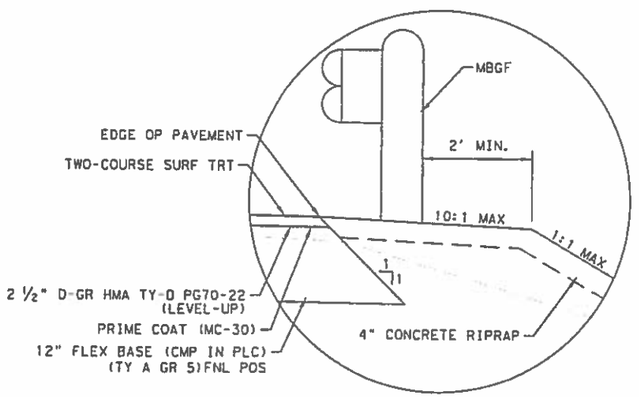
PRIME COAT (MC-30) = 0.3 GAL/SY



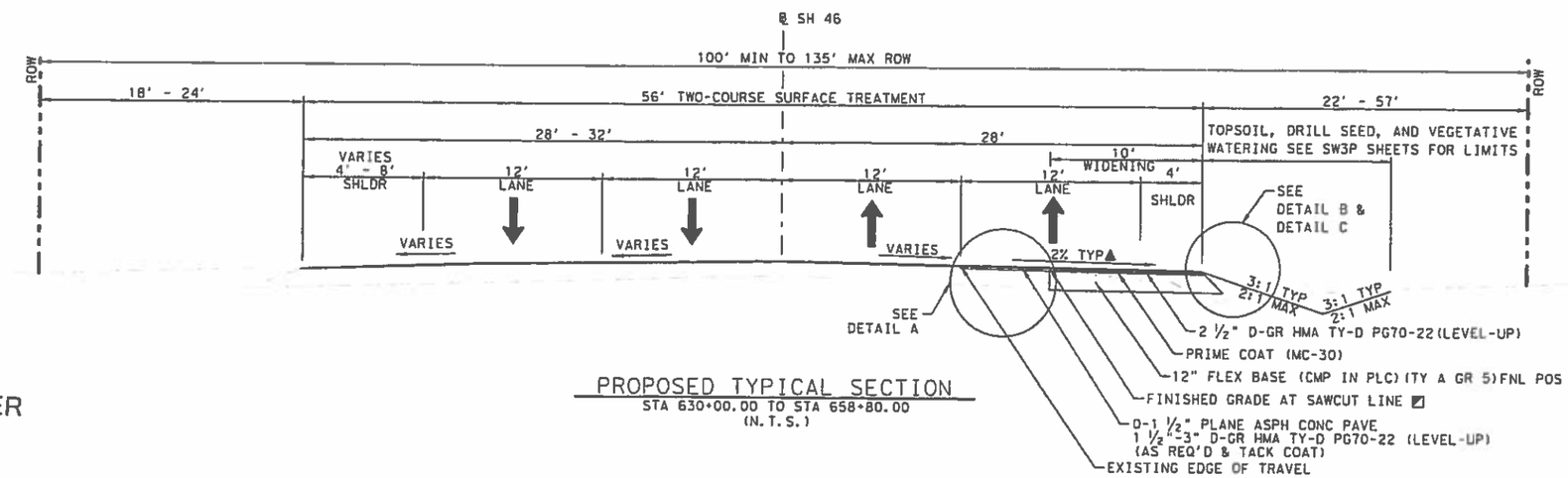
DETAIL A



DETAIL B



DETAIL C
METAL BEAM GUARD FENCE
SEE ROADWAY LAYOUTS FOR LIMITS



PROPOSED TYPICAL SECTION

STA 630+00.00 TO STA 658+80.00
(N.T.S.)

NOTES:

TYPICAL SECTIONS SHOWN DEPICT THE MOST COMMON CASES. REFER TO CROSS SECTIONS FOR ALL SPECIAL CASES.

ALL GRADING SHALL BE WITHIN THE EXISTING RIGHT OF WAY LIMITS.

THE SUBGRADE SHALL BE SHAPED, BLADED, ROLLED AND PROOF ROLLED A MINIMUM DISTANCE OF 24" BEYOND THE EDGE OF THE PROPOSED BASE COURSE.

PROOF ROLLING WILL NOT BE PAID FOR DIRECTLY BUT SHALL BE CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.

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PGL IS BASED ON EXISTING GRADE ELEVATION AT SH 46 BASELINE.

◪ FINISHED GRADE AT SAWCUT LINE IS BASED ON THE PGL ELEVATION AT THE SH 46 BASELINE PROJECTED TO THE SAWCUT LINE LOCATION AT THE EXISTING CROSS SLOPE OF THE ADJOINING TRAVEL LANE. REFER TO WIDENING TABLES ON PLAN SHEETS FOR ELEVATION INFORMATION.

▲ CROSS SLOPE TO MATCH EXISTING CROSS SLOPE OF THE ADJOINING TRAVEL LANE. REFER TO WIDENING TABLES ON PLAN SHEETS FOR ELEVATION INFORMATION.

NO.	DATE	REVISION	APPR

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100% SUBMITTAL
Engineer:
LORI DULLNIG-WARLEN, PE 2/16/2016
P.E. No: 83520 Date:

BAIN MEDINA BAIN, INC.
ENGINEERS & SURVEYORS
TBPE F-001712
7073 San Pedro, San Antonio, Texas, 78216
Phone: 210-494-7233 Fax: 210-490-5120 WWW.BMBI.COM

SH 46
SEGMENT C
TYPICAL SECTIONS

SHEET 3 OF 3

FED. AID:	PROJECT	SHEET NO.
		15

STATE	DIST.	COUNTY
TEXAS	SAT	KENDALL, ETC

CONT.	SECT.	JOB	HIGHWAY NO.
0215	06	037,ETC	SH 46

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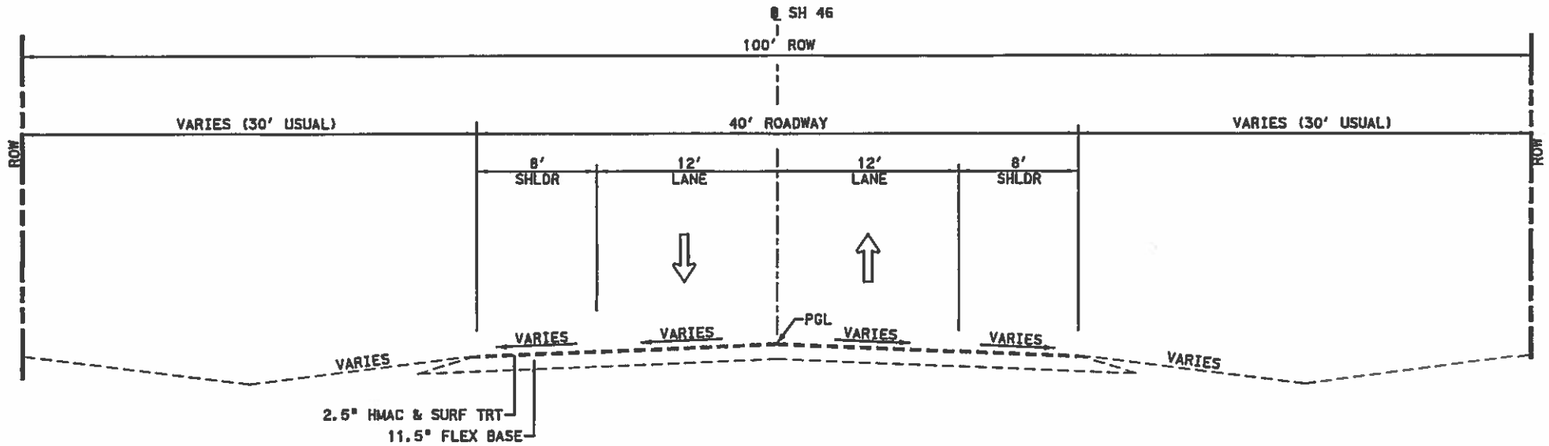
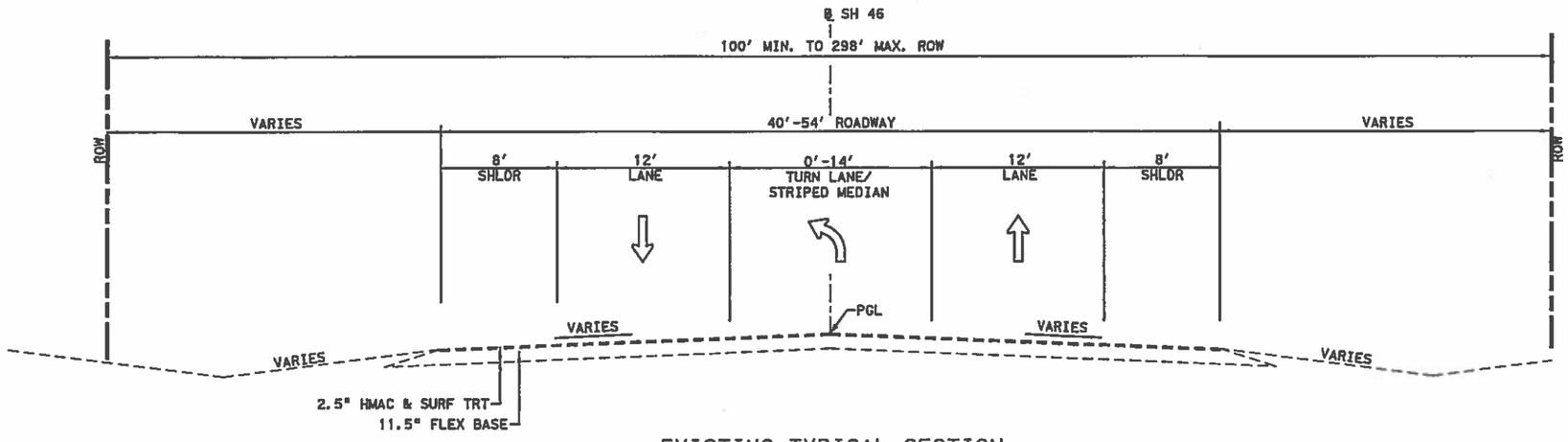
COUNTY ENGINEER



EXISTING TYPICAL SECTION

STA. 773+00.00 TO 804+50.00
STA. 844+00.00 TO STA. 851+75.64
(N.T.S.)



EXISTING TYPICAL SECTION

STA. 804+50.00 TO STA. 844+00.00
(N.T.S.)

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COUNTY ENGINEER

NO.	DATE	REVISION	APPR

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100% SUBMITTAL

Engineer:
LARRY ZAMORA, PE
P.E. No: 88698 Date: 2/16/2016

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY
TBPE REGISTRATION No. F-2614

BAIN MEDINA BAIN, INC.
ENGINEERS & SURVEYORS
TBPE F-001718
7073 San Pedro, San Antonio, Texas, 78216
Phone: 210-494-7223 Fax: 210-496-3139 WWW.BMBI.COM

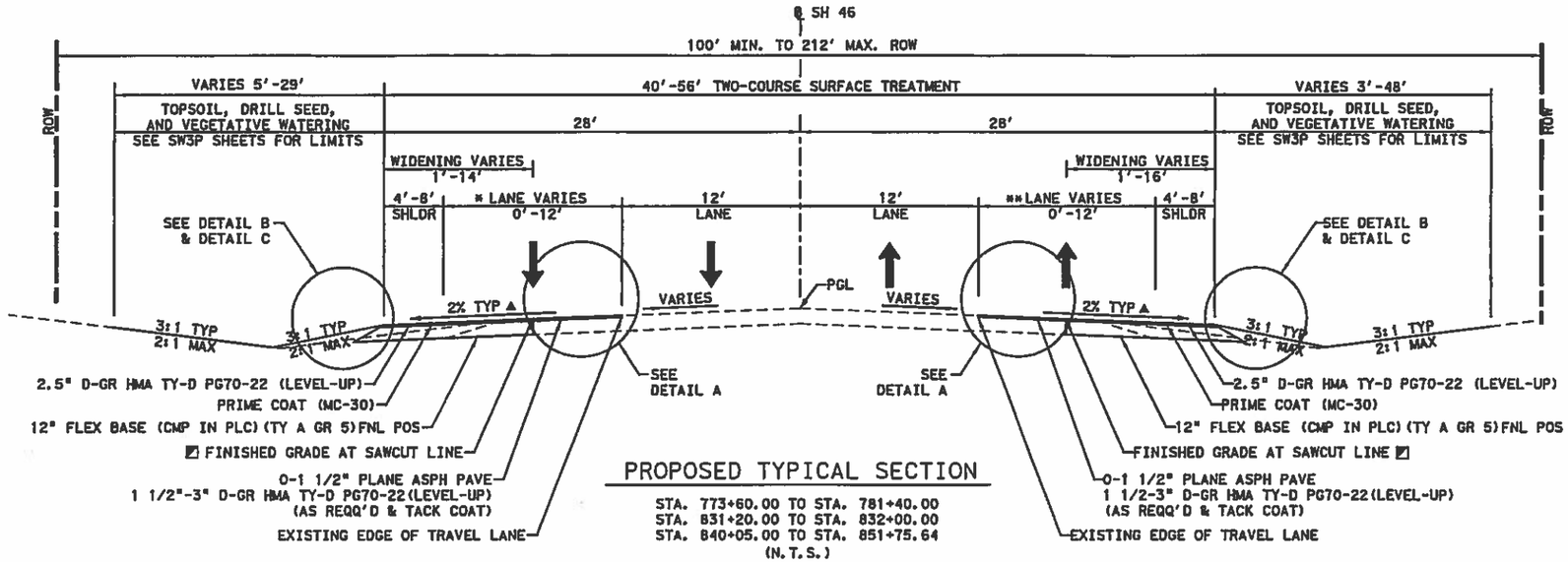
Texas Department of Transportation

SH 46
SEGMENT D

TYPICAL SECTIONS

SHEET 1 OF 3

DIV. DIR.	PROJECT		SHEET NO.
			16
STATE	DIST.	COUNTY	
TEXAS	SAT	KENDALL, ETC	
CONT.	SECT.	JOB	HIGHWAY NO.
0215	06	037, ETC	SH 46



PROPOSED TYPICAL SECTION

STA. 773+60.00 TO STA. 781+40.00
STA. 831+20.00 TO STA. 832+00.00
STA. 840+05.00 TO STA. 851+75.64
(N.T.S.)

TRANSITIONS:

** STA. 773+60 TO STA. 777+50
* STA. 773+60 TO STA. 781+40
* STA. 840+05 TO STA. 844+00
* STA. 847+75 TO STA. 850+34
** STA. 840+05 TO STA. 851+65

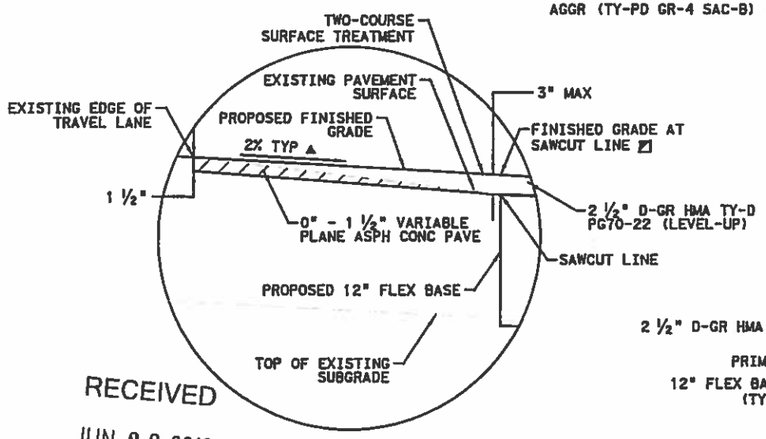
TWO-COURSE SURFACE TREATMENT

FIRST COURSE:
ASPH (AC-15P OR 20-5TR OR 20XP OR 10-2TR) = 0.3 GAL/SY
AGGR (TY-PD GR-3) = 110 SY/CY

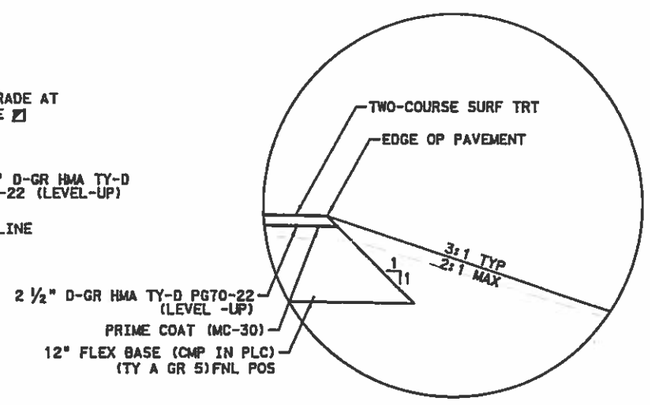
SECOND COURSE:
ASPH (AC-15P OR 20-5TR OR 20XP OR 10-2TR) = 0.3 GAL/SY
AGGR (TY-PD GR-4 SAC-B) = 90 SY/CY

PRIME COAT

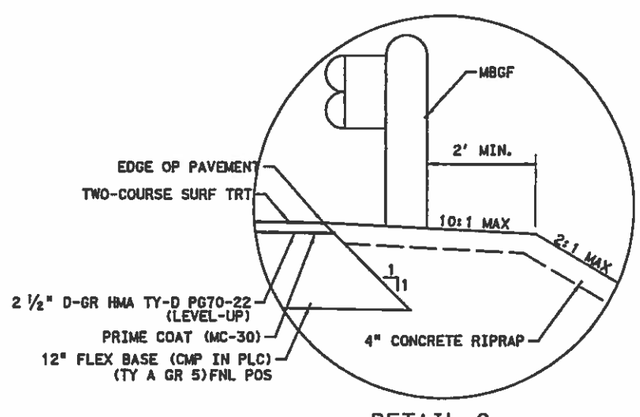
PRIME COAT (MC-30) = 0.3 GAL/SY



DETAIL A



DETAIL B



DETAIL C
METAL BEAM GUARD FENCE
SEE ROADWAY LAYOUTS FOR LIMITS

RECEIVED
JUN 28 2016
COUNTY ENGINEER

NOTES:

TYPICAL SECTIONS SHOWN DEPICT THE MOST COMMON CASES. REFER TO CROSS SECTIONS FOR ALL SPECIAL CASES.

ALL GRADING SHALL BE WITHIN THE EXISTING RIGHT OF WAY LIMITS.

THE SUBGRADE SHALL BE SHAPED, BLADED, ROLLED AND PROOF ROLLED A MINIMIM OISTANCE OF 24" BEYOND THE EDGE OF THE PROPOSED BASE COURSE.

PROOF ROLLING WILL NOT BE PAID FOR DIRECTLY, BUT SHALL BE CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.

ENGINEER OR OWNER MUST BE PRESENT WHEN PROOF ROLLING SUBGRADE. CHECK FOR PUMPING OR OTHER IRREGULARITIES IN SUBGRADE. IF UNSUITABLE MATERIAL IS FOUND, CONTRACTOR SHALL REMOVE AND FILL WITH SUITABLE MATERIAL AND RECOMPACT AT NO ADDITIONAL PAY.

SAWCUT SHALL BE SUBSIDIARY TO THE PERTINENT BID ITEMS.

ONE STATION IS EQUAL TO 100 FEET.

IF AREAS BEYOND THE CONSTRUCTION LIMITS ARE DISTURBED OR DAMAGED BY CONTRACTOR, THE CONTRACTOR SHALL REPAIR OR BRING BACK AS CLOSE AS POSSIBLE TO PRE-CONSTRUCTION CONDITIONS TO THE SATISFACTION OF THE ENGINEER. THERE WILL BE NO SEPERATE PAY FOR THIS WORK AND/OR MATERIALS.

PGL IS BASED ON EXISTING GRADE ELEVATION AT SH 46 BASELINE.

◩ FINISHED GRADE AT SAWCUT LINE IS BASED ON THE PGL ELEVATION AT THE SH 46 BASELINE PROJECTED TO THE SAWCUT LINE LOCATION AT THE EXISTING CROSS SLOPE OF THE ADJOININGTRAVEL LANES. REFER TO WIDENING TABLES ON PLAN SHEETS FOR ELEVATION INFORMATION.

▲ CROSS SLOPE TO MATCH EXISTING CROSS SLOPE OF THE ADJOINING TRAVEL LANE. REFER TO WIDENING TABLES ON PLAN SHEETS FOR ELEVATION INFORMATION.

NO.	DATE	REVISION	APPR

PRELIMINARY
FOR REVIEW ONLY
Not for construction, bidding or permit purposes.
100% SUBMITTAL
Engineer: LARRY ZAMORA, PE
P.E. No: 88698 Date: 2/16/2016

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY
TBPE REGISTRATION No. F-2614

BAIN MEDINA BAIN, INC.
ENGINEERS & SURVEYORS
TBPE F-001718
7073 San Pedro, San Antonio, Texas, 78216
Phone: 210-494-7283 Fax: 210-490-8120 WWW.BMBI.COM

SH 46
SEGMENT 0

TYPICAL SECTIONS

SHEET 2 OF 3

DIV. NO.	PROJECT	SHEET NO.
		17

STATE	DIST.	COUNTY	
TEXAS	SAT	KENDALL, ETC	
CONT.	SECT.	JOB	HIGHWAY NO.
0215	06	037, ETC	SH 46

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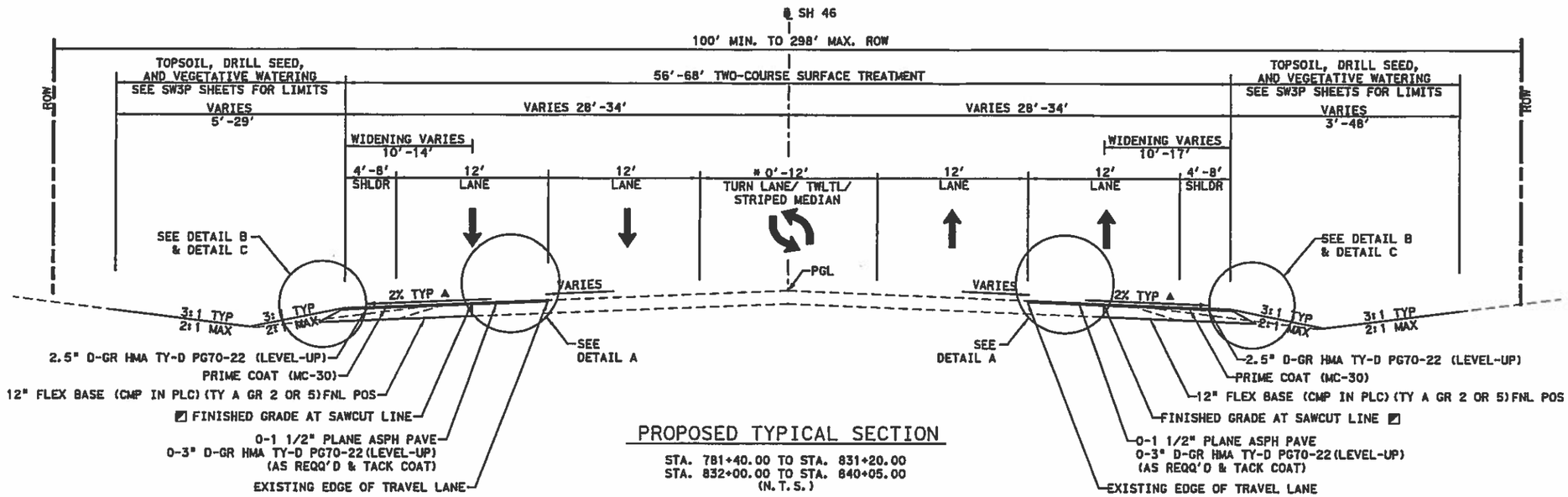


PROPOSED TYPICAL SECTION

STA. 781+40.00 TO STA. 831+20.00
STA. 832+00.00 TO STA. 840+05.00
(N.T.S.)

TRANSITIONS:

* STA. 794+45 TO STA. 800+45
* STA. 826+73.83 TO STA. 831+20
* STA. 832+00 TO STA. 836+55
* STA. 840+05 TO STA. 844+00

NOTES:

TYPICAL SECTIONS SHOWN DEPICT THE MOST COMMON CASES. REFER TO CROSS SECTIONS FOR ALL SPECIAL CASES.

ALL GRADING SHALL BE WITHIN THE EXISTING RIGHT OF WAY LIMITS.

THE SUBGRADE SHALL BE SHAPED, BLADED, ROLLED AND PROOF ROLLED A MINIMIM DISTANCE OF 24" BEYOND THE EDGE OF THE PROPOSED BASE COURSE.

PROOF ROLLING WILL NOT BE PAID FOR DIRECTLY, BUT SHALL BE CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.

ENGINEER OR OWNER MUST BE PRESENT WHEN PROOF ROLLING SUBGRADE. CHECK FOR PUMPING OR OTHER IRREGULARITIES IN SUBGRADE. IF UNSUITABLE MATERIAL IS FOUND, CONTRACTOR SHALL REMOVE AND FILL WITH SUITABLE MATERIAL AND RECOMPACT AT NO ADDITIONAL PAY.

SAWCUT SHALL BE SUBSIDIARY TO THE PERTINENT BID ITEMS.

ONE STATION IS EQUAL TO 100 FEET.

IF AREAS BEYOND THE CONSTRUCTION LIMITS ARE DISTURBED OR DAMAGED BY CONTRACTOR, THE CONTRACTOR SHALL REPAIR OR BRING BACK AS CLOSE AS POSSIBLE TO PRE-CONSTRUCTION CONDITIONS TO THE SATISFACTION OF THE ENGINEER. THERE WILL BE NO SEPERATE PAY FOR THIS WORK AND/OR MATERIALS.

PGL IS BASED ON EXISTING GRADE ELEVATION AT SH 46 BASELINE.

◩ FINISHED GRADE AT SAWCUT LINE IS BASED ON THE PGL ELEVATION AT THE SH 46 BASELINE PROJECTED TO THE SAWCUT LINE LOCATION AT THE EXISTING CROSS SLOPE OF THE ADJOININGTRAVEL LANES. REFER TO WIDENING TABLES ON PLAN SHEETS FOR ELEVATION INFORMATION.

▲ CROSS SLOPE TO MATCH EXISTING CROSS SLOPE OF THE ADJOINING TRAVEL LANE. REFER TO WIDENING TABLES ON PLAN SHEETS FOR ELEVATION INFORMATION.

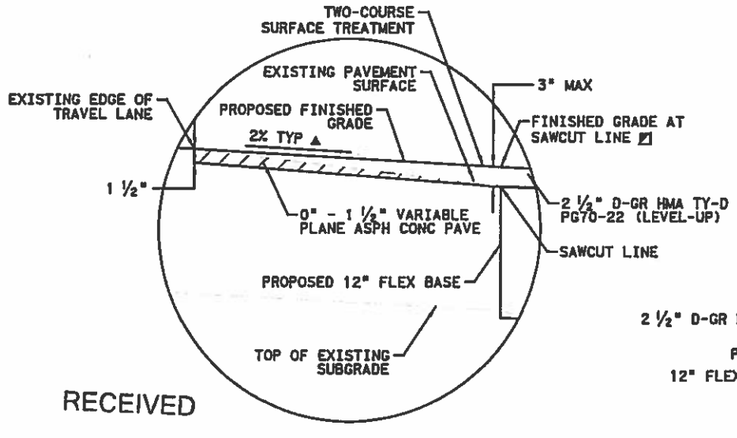
TWO-COURSE SURFACE TREATMENT

FIRST COURSE:
ASPH (AC-15P OR 20-5TR OR 20XP
OR 10-2TR) = 0.3 GAL/SY
AGGR (TY-PD GR-3) = 110 SY/CY

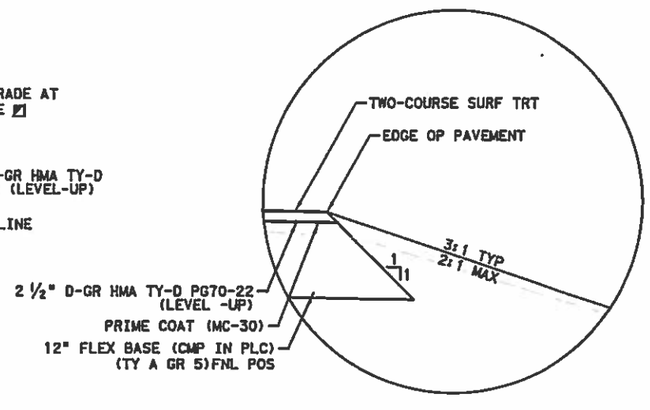
SECOND COURSE:
ASPH (AC-15P OR 20-5TR OR 20XP
OR 10-2TR) = 0.3 GAL/SY
AGGR (TY-PD GR-4 SAC-B) = 90 SY/CY

PRIME COAT

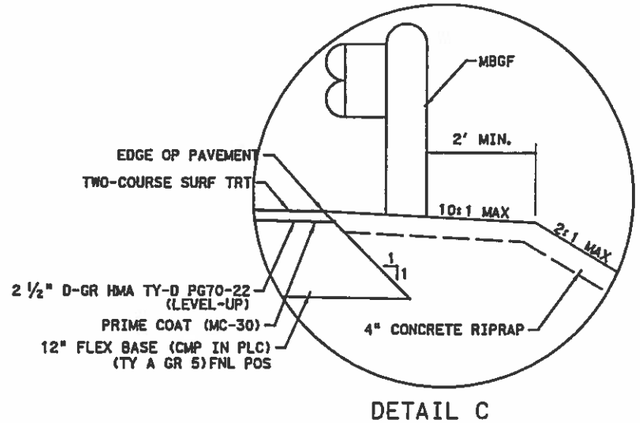
PRIME COAT (MC-30) = 0.3 GAL/SY



DETAIL A



DETAIL B



DETAIL C
METAL BEAM GUARD FENCE
SEE ROADWAY LAYOUTS FOR LIMITS

RECEIVED
JUN 28 2016
COUNTY ENGINEER

NO.	DATE	REVISION	APPR

PRELIMINARY
FOR REVIEW ONLY
Not for construction, bidding or permit purposes.
100% SUBMITTAL
Engineer: LARRY ZAMORA, PE
P.E. No: 88698 Date: 2/16/2016

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY
TBPE REGISTRATION No. F-2614
RAIN MEDINA RAIN, INC.
ENGINEERS & SURVEYORS
TBPE F-001718
7073 San Pedro, San Antonio, Texas, 78216
Phone: 210-494-7233 Fax: 210-490-8120 WWW.RMRI.COM

SH 46
SEGMENT D

TYPICAL SECTIONS

SHEET 3 OF 3

DIST. NO:	PROJECT	SHEET NO.
		18

STATE	DIST.	COUNTY	
TEXAS	SAT	KENDALL, ETC	
CONT.	SECT.	JOB	HIGHWAY NO.
0215	06	037, ETC	SH 46

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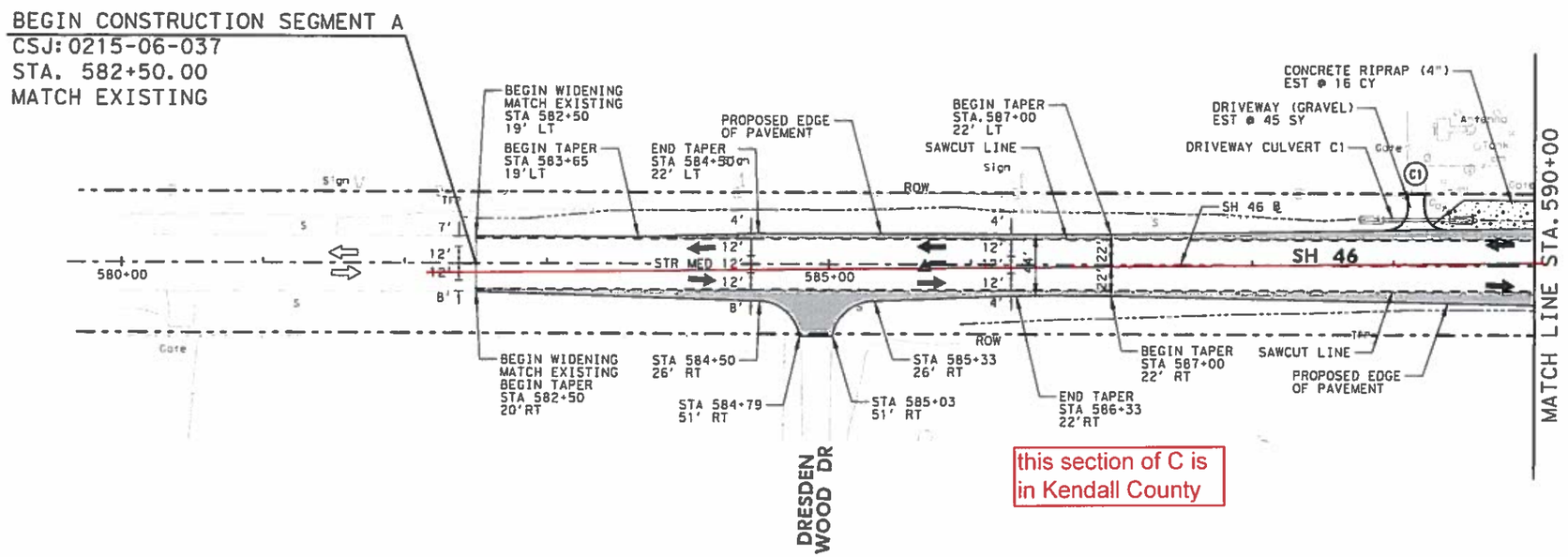


ESTIMATED QUANTITIES			215-6-37
ITEM	DESCRIPTION	UNIT	QTY
0100 6002	PREPARING ROW	STA	7.50
0110 6001	EXCAVATION (ROADWAY)	CY	572
0132 6001	EMBANKMENT (FINAL) (ORD COMP) (TY A)	CY	95
0247 6366	FL BS(CMP IN PLC) (TY A GR 5)FNL POS	CY	354
0310 6009	PRIME COAT (MC-30)	GAL	294
0316 6240	AGGR(TY-PD GR-4 SAC-B)	CY	44
0316 6410	ASPH(AC-15P, AC-20-5TR, AC-20XP, AC10-2TR)	GAL	2388
0316 XXX1	AGGR(TY-PD GR-3)	CY	36
0341 6064	D-GR HMA TY-D PG 70-22 (LEVEL-UP)	TON	177
0354 6051	PLANE ASPH CONC PAV (0" TO 1 1/2")	SY	1000
0432 6001	RIPRAP (CONC)(4 IN)	CY	16
0432 6045	RIPRAP (MOW STRIP)(4 IN)	CY	
0530 6005	DRIVEWAYS (ACP)	SY	
0530 6006	DRIVEWAYS (SURF TREAT)	SY	
0530 6008	TURNOUTS (ACP)	EA	
0530 6009	TURNOUTS (SURF TREAT)	EA	
0530 XXX1	DRIVEWAYS (GRAVEL)	SY	45
0540 6001	MTL W-BEAM GD FEN (TIM POST)	LF	
0540 6014	MTL W-BEAM GD FEN(TIM POST)SHORT RADIUS	LF	
0540 6016	DOWNSTREAM ANCHOR TERMINAL SECTION	EA	
0544 6001	GUARDRAIL END TREATMENT (INSTALL)	EA	
0560 6001	MAILBOX INSTALL-S (TWG-POST) TY 1	EA	
0560 6002	MAILBOX INSTALL-D (TWG-POST) TY 1	EA	
0560 6003	MAILBOX INSTALL-M (TWG-POST) TY 1	EA	

LEGEND:

- EXIST EDGE OF ROADWAY
- EXIST FENCE
- EXIST UTILITY
- RIGHT OF WAY (ROW)
- MAIL BOX
- DRIVEWAY NUMBER (A1)
- ROADWAY WIDENING
- CONCRETE RIPRAP (4")
- DIRECTION OF TRAFFIC

50 0 100
HORIZ SCALE: 1"=100'

NO.	DATE	REVISION	APPR

PRELIMINARY
FOR REVIEW ONLY
Not for construction, bidding or permit purposes.
100% SUBMITTAL
Engineer: LORI DULLNIG-WARLEN, PE 2/16/2016
P.E. No: 63520 Date:

SH 46 WIDENING TABLE								
STATION	LT EOP		LT SAWCUT LINE		RT SAWCUT LINE		RT EOP	
	OFFSET	ELEV	OFFSET	ELEV	OFFSET	ELEV	OFFSET	ELEV
582+50	19.37' LT	1376.18	18' LT	1376.20	18' RT	1376.20	19.85' RT	1376.16
583+00	19.4' LT	1377.70	18' LT	1377.76	18' RT	1377.80	21.51' RT	1377.72
583+50	19.43' LT	1379.28	18' LT	1379.30	18' RT	1379.31	23.01' RT	1379.21
584+00	20.51' LT	1380.84	18' LT	1380.88	18' RT	1380.98	24.51' RT	1380.91
584+50	22' LT	1382.17	18' LT	1382.27	18' RT	1382.47	26.01' RT	1382.36
585+00	22' LT	1383.62	18' LT	1383.72	18' RT	1383.87	50.64' RT	1383.32
585+50	22' LT	1385.01	18' LT	1385.10	18' RT	1385.22	25.3' RT	1385.09
586+00	22' LT	1386.42	18' LT	1386.48	18' RT	1386.43	23.3' RT	1386.34
586+50	22' LT	1387.50	18' LT	1387.56	18' RT	1387.51	22' RT	1387.45
587+00	22' LT	1388.53	18' LT	1388.57	18' RT	1388.64	22' RT	1388.61
587+50	22.77' LT	1389.13	18' LT	1389.23	18' RT	1389.33	22.96' RT	1389.26
588+00	23.54' LT	1389.85	18' LT	1389.94	18' RT	1389.89	23.92' RT	1389.78
588+50	24.31' LT	1390.39	18' LT	1390.51	18' RT	1390.41	24.88' RT	1390.24
589+00	25.08' LT	1390.87	18' LT	1390.96	18' RT	1390.85	25.84' RT	1390.71
589+50	25.85' LT	1391.21	18' LT	1391.27	18' RT	1391.25	26.8' RT	1391.18
590+00	26.62' LT	1391.28	18' LT	1391.41	18' RT	1391.54	27.76' RT	1391.46

NOTES:

1. SAWCUT TO BE SUBSIDIARY TO THE PERTINENT BID ITEMS.
2. ALL STATIONS, OFFSETS, AND ELEVATIONS SHOWN IN THE WIDENING TABLES ARE REFERENCED FROM SH 46 BASELINE ALIGNMENT.

BAIN MEDINA BAIN, INC.
ENGINEERS & SURVEYORS
TBPE F-001718
7073 San Pedro, San Antonio, Texas, 78216
Phone: 210-494-7223 Fax: 210-490-3120 WWW.BMBI.COM

Texas Department of Transportation

SH 46
SEGMENT C

ROADWAY LAYOUTS

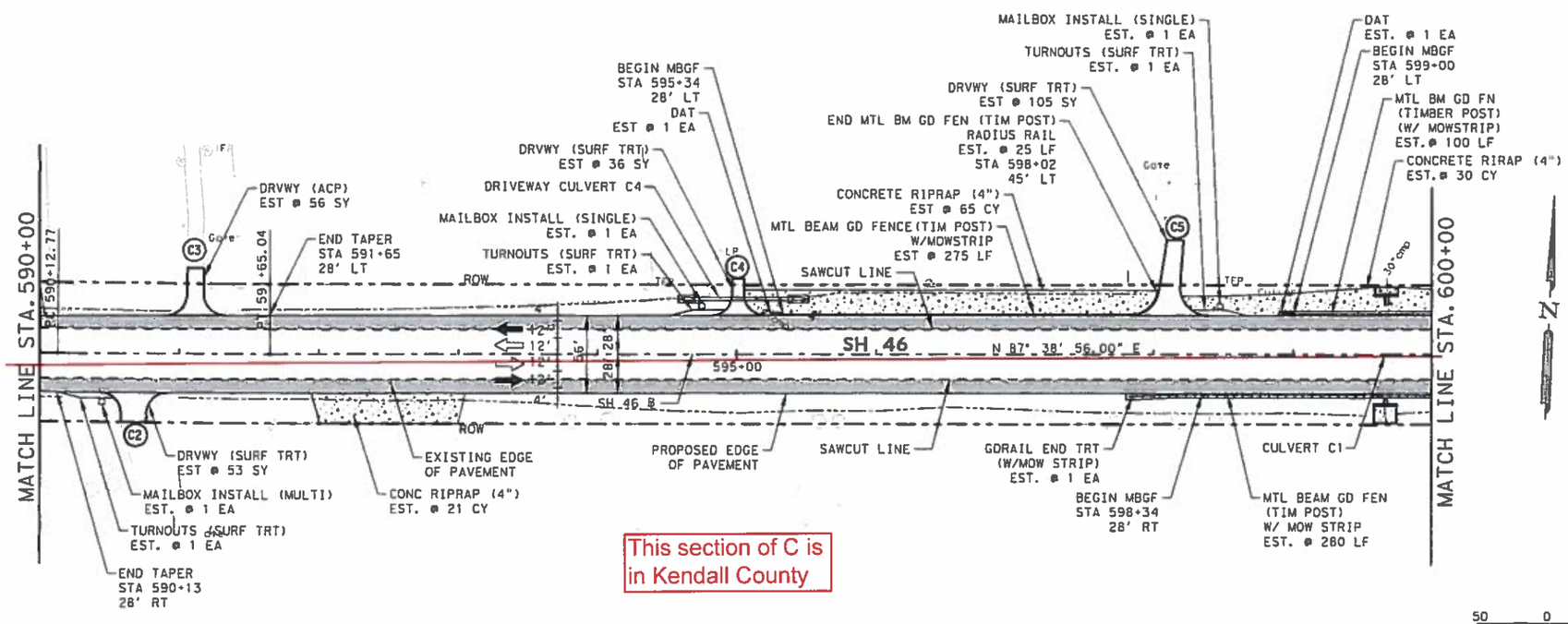
STA 580+00 TO STA 590+00

SHEET 1 OF 8

FED. RD. DIV. NO.	PROJECT	SHEET NO.
		201

STATE	DIST.	COUNTY
TEXAS	SAT	KENDALL, ETC

CONT.	SECT.	JOB	HIGHWAY NO.
0215	06	037, ETC	SH 46



This section of C is in Kendall County

ESTIMATED QUANTITIES			215-6-37
ITEM	DESCRIPTION	UNIT	QTY
0100 6002	PREPARING ROW	STA	10
0110 6001	EXCAVATION (ROADWAY)	CY	672
0132 6001	EMBANKMENT (FINAL) (ORD COMP) (TY A)	CY	675
0247 6366	FL BS (CMP IN PLC) (TY A GR 5) FNL POS	CY	775
0310 6009	PRIME COAT (MC-30)	GAL	664
0316 6240	AGGR (TY-PD GR-4 SAC-B)	CY	69
0316 6410	ASPH (AC-15P, AC-20-5TR, AC-20XP, AC10-2TR)	GAL	3728
0316 XXX1	AGGR (TY-PD GR-3)	CY	56
0341 6064	D-GR HMA TY-D PG 70-22 (LEVEL-UP)	TON	372
0354 6051	PLANE ASPH CONC PAV (0" TO 1 1/2")	SY	1333
0432 6001	RIPRAP (CONC) (4 IN)	CY	116
0432 6045	RIPRAP (MOW STRIP) (4 IN)	CY	38
0530 6005	DRIVEWAYS (ACP)	SY	56
0530 6006	DRIVEWAYS (SURF TREAT)	SY	194
0530 6008	TURNOUTS (ACP)	EA	
0530 6009	TURNOUTS (SURF TREAT)	EA	3
0530 XXX1	DRIVEWAYS (GRAVEL)	SY	
0540 6001	MTL W-BEAM GD FEN (TIM POST)	LF	655
0540 6014	MTL W-BEAM GD FEN (TIM POST) SHORT RADIUS	LF	25
0540 6016	DOWNSTREAM ANCHOR TERMINAL SECTION	EA	2
0544 6001	GUARDRAIL END TREATMENT (INSTALL)	EA	1
0560 6001	MAILBOX INSTALL-S (TWG-POST) TY 1	EA	2
0560 6002	MAILBOX INSTALL-D (TWG-POST) TY 1	EA	
0560 6003	MAILBOX INSTALL-M (TWG-POST) TY 1	EA	1

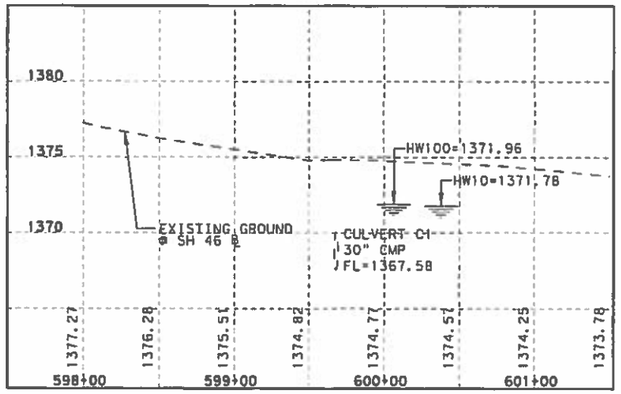
LEGEND:

- EXIST EDGE OF ROADWAY
- EXIST FENCE
- EXIST UTILITY
- RIGHT OF WAY (ROW)
- MAIL BOX
- DRIVEWAY NUMBER (A1)
- ROADWAY WIDENING
- CONCRETE RIPRAP (4")
- DIRECTION OF TRAFFIC

50 0 100
HORIZ SCALE: 1"=100'

5 0 10
VERT SCALE: 1"=10'

SH 46 WIDENING TABLE								
STATION	LT EOP		LT SAWCUT LINE		RT SAWCUT LINE		RT EOP	
	OFFSET	ELEV	OFFSET	ELEV	OFFSET	ELEV	OFFSET	ELEV
590+00	26.62' LT	1391.28	18' LT	1391.41	18' RT	1391.54	27.76' RT	1391.46
590+50	27.32' LT	1391.25	18' LT	1391.45	18' RT	1391.57	28' RT	1391.42
591+00	27.78' LT	1391.53	18' LT	1391.52	18' RT	1391.23	28' RT	1391.08
591+50	27.99' LT	1391.12	18' LT	1391.17	18' RT	1390.78	28' RT	1390.52
592+00	28' LT	1390.65	18' LT	1390.70	18' RT	1390.39	28' RT	1390.19
592+50	28' LT	1390.07	18' LT	1390.15	18' RT	1390.00	28' RT	1389.84
593+00	28' LT	1389.34	18' LT	1389.47	18' RT	1389.56	28' RT	1389.47
593+50	28' LT	1388.47	18' LT	1388.63	18' RT	1388.82	28' RT	1388.77
594+00	28' LT	1387.69	18' LT	1387.79	18' RT	1387.87	28' RT	1387.82
594+50	28' LT	1386.69	18' LT	1386.78	18' RT	1386.88	28' RT	1386.85
595+00	28' LT	1385.39	18' LT	1385.52	18' RT	1385.78	28' RT	1385.79
595+50	28' LT	1384.30	18' LT	1384.37	18' RT	1384.42	28' RT	1384.37
596+00	28' LT	1382.84	18' LT	1382.95	18' RT	1383.21	28' RT	1383.24
596+50	28' LT	1381.29	18' LT	1381.41	18' RT	1381.31	28' RT	1381.13
597+00	28' LT	1379.63	18' LT	1379.77	18' RT	1379.81	28' RT	1379.70
597+50	28' LT	1378.10	18' LT	1378.27	18' RT	1378.32	28' RT	1378.18
598+00	28' LT	1376.88	18' LT	1377.02	18' RT	1377.06	28' RT	1376.94
598+50	28' LT	1375.73	18' LT	1375.93	18' RT	1376.12	28' RT	1376.04
599+00	28' LT	1375.08	18' LT	1375.24	18' RT	1375.39	28' RT	1375.32
599+50	28' LT	1374.86	18' LT	1374.84	18' RT	1375.00	28' RT	1375.10
600+00	28' LT	1374.47	18' LT	1374.58	18' RT	1374.62	28' RT	1374.53



STA. 599+68

NOTES:

1. SAWCUT TO BE SUBSIDIARY TO THE PERTINENT BID ITEMS.
2. ALL STATIONS, OFFSETS, AND ELEVATIONS SHOWN IN THE WIDENING TABLES ARE REFERENCED FROM SH 46 BASELINE ALIGNMENT.

RECEIVED
JUN 28 2016
COUNTY ENGINEER

NO.	DATE	REVISION	APPR

PRELIMINARY
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Not for construction, bidding or permit purposes.
100% SUBMITTAL
Engineer: LORI DULLNIG-WARLEN, PE 2/16/2016
P.E. No: 63520 Date:

BAIN MEDINA BAIN, INC.
ENGINEERS & SURVEYORS
TBPE F-001712
7073 San Pedro, San Antonio, Texas, 78216
Phone: 210-494-7223 Fax: 210-490-3120 WWW.BMBI.COM

SH 46
SEGMENT C

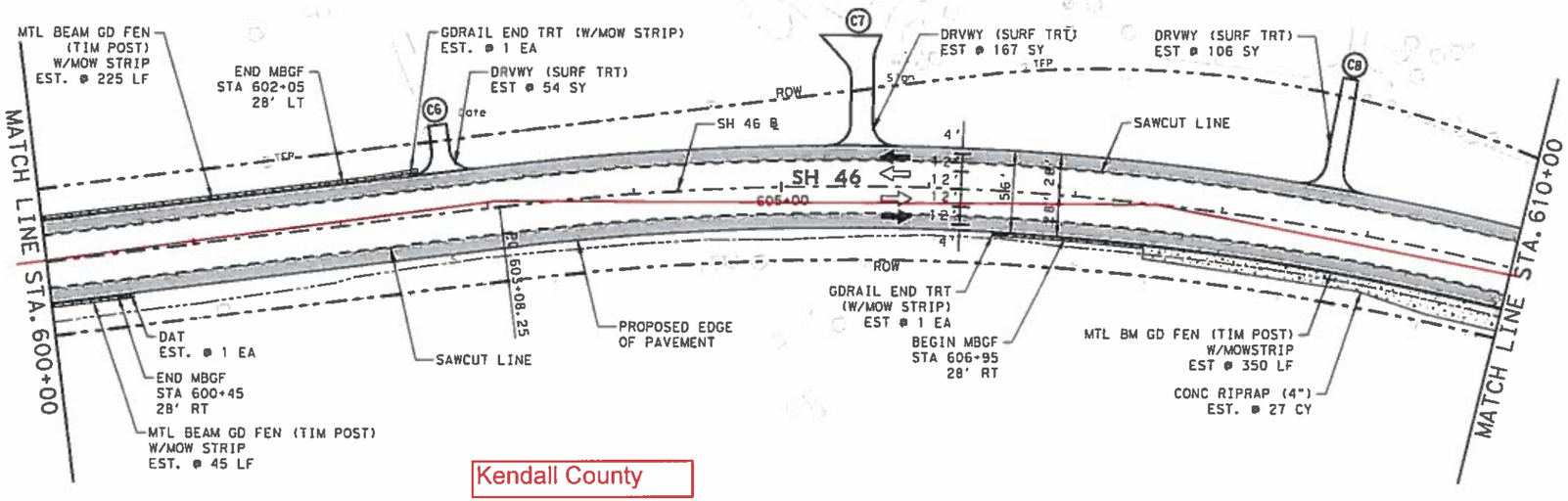
ROADWAY LAYOUTS
STA 590+00 TO STA 600+00

SHEET 2 OF 8

FED. RD. DIV. NO.	PROJECT	SHEET NO.
		202

STATE	DIST.	COUNTY
TEXAS	SAT	KENDALL, ETC

CONT.	SECT.	JOB	HIGHWAY NO.
0215	06	037, ETC	SH 46



Kendall County

SH 46 WIDENING TABLE								
STATION	LT EOP		LT SAWCUT LINE		RT SAWCUT LINE		RT EOP	
	OFFSET	ELEV	OFFSET	ELEV	OFFSET	ELEV	OFFSET	ELEV
600+00	28' LT	1374.47	18' LT	1374.58	18' RT	1374.62	28' RT	1374.53
600+50	28' LT	1374.23	18' LT	1374.35	18' RT	1374.33	28' RT	1374.20
601+00	28' LT	1373.84	18' LT	1373.99	18' RT	1374.03	28' RT	1373.90
601+50	28' LT	1373.31	18' LT	1373.48	18' RT	1373.39	28' RT	1373.18
602+00	28' LT	1372.88	18' LT	1372.97	18' RT	1372.71	28' RT	1372.48
602+50	28' LT	1372.44	18' LT	1372.41	18' RT	1371.88	28' RT	1371.61
603+00	28' LT	1371.73	18' LT	1371.79	18' RT	1370.78	28' RT	1370.34
603+50	28' LT	1371.52	18' LT	1371.17	18' RT	1369.66	28' RT	1369.18
604+00	28' LT	1370.96	18' LT	1370.36	18' RT	1368.29	28' RT	1367.75
604+50	28' LT	1369.49	18' LT	1368.97	18' RT	1367.04	28' RT	1366.49
605+00	28' LT	1367.96	18' LT	1367.44	18' RT	1365.64	28' RT	1365.16
605+50	27.88' LT	1366.48	18' LT	1365.98	18' RT	1363.97	28' RT	1363.36
606+00	28' LT	1365.04	18' LT	1364.47	18' RT	1362.40	28' RT	1361.81
606+50	28' LT	1363.45	18' LT	1362.92	18' RT	1360.86	28' RT	1360.25
607+00	28' LT	1361.92	18' LT	1361.35	18' RT	1359.31	28' RT	1358.74
607+50	28' LT	1360.30	18' LT	1359.79	18' RT	1357.85	28' RT	1357.28
608+00	28' LT	1358.66	18' LT	1358.17	18' RT	1356.42	28' RT	1355.94
608+50	27.99' LT	1357.10	18' LT	1356.56	18' RT	1354.75	28' RT	1354.29
609+00	28' LT	1355.53	18' LT	1355.00	18' RT	1353.29	28' RT	1352.87
609+50	28' LT	1354.09	18' LT	1353.53	18' RT	1351.70	28' RT	1351.23
610+00	28' LT	1352.64	18' LT	1352.06	18' RT	1350.13	28' RT	1349.64

ESTIMATED QUANTITIES			215-6-37
ITEM	DESCRIPTION	UNIT	QTY
0100 6002	PREPARING ROW	STA	10
0110 6001	EXCAVATION (ROADWAY)	CY	659
0132 6001	EMBANKMENT (FINAL) (ORD COMP) (TY A)	CY	779
0247 6366	FL BS (CMP IN PLC) (TY A GR 5) FNL POS	CY	777
0310 6009	PRIME COAT (MC-30)	GAL	666
0316 6240	AGGR (TY-PD GR-4 SAC-B)	CY	69
0316 6410	ASPH (AC-15P, AC-20-5TR, AC-20XP, AC10-2TR)	GAL	3733
0316 XXX1	AGGR (TY-PD GR-3)	CY	57
0341 6064	D-GR HMA TY-D PG 70-22 (LEVEL-UP)	TON	352
0354 6051	PLANE ASPH CONC PAV (0" TO 1 1/2")	SY	1333
0432 6001	RIPRAP (CONC) (4 IN)	CY	27
0432 6045	RIPRAP (MOW STRIP) (4 IN)	CY	43
0530 6005	DRIVEWAYS (ACP)	SY	
0530 6006	DRIVEWAYS (SURF TREAT)	SY	327
0530 6008	TURNOUTS (ACP)	EA	
0530 6009	TURNOUTS (SURF TREAT)	EA	
0530 XXX1	DRIVEWAYS (GRAVEL)	SY	
0540 6001	MTL W-BEAM GD FEN (TIM POST)	LF	620
0540 6014	MTL W-BEAM GD FEN (TIM POST) SHORT RADIUS	LF	
0540 6016	DOWNSTREAM ANCHOR TERMINAL SECTION	EA	1
0544 6001	GUARDRAIL END TREATMENT (INSTALL)	EA	2
0560 6001	MAILBOX INSTALL-S (TWG-POST) TY 1	EA	
0560 6002	MAILBOX INSTALL-D (TWG-POST) TY 1	EA	
0560 6003	MAILBOX INSTALL-M (TWG-POST) TY 1	EA	

LEGEND:

- EXIST EDGE OF ROADWAY
- EXIST FENCE
- EXIST UTILITY
- RIGHT OF WAY (ROW)
- MAIL BOX
- DRIVEWAY NUMBER (A1)
- ROADWAY WIDENING
- CONCRETE RIPRAP (4")
- DIRECTION OF TRAFFIC

50 0 100
HORIZ SCALE: 1"=100'

NO.	DATE	REVISION	APPR

PRELIMINARY
FOR REVIEW ONLY
Not for construction, bidding or permit purposes.
100% SUBMITTAL
Engineer:
LORI DULLNIG-WARLEN, PE 2/16/2016
P.E. No: 63520 Date:

BAIN MEDINA BAIN, INC.
ENGINEERS & SURVEYORS
TBPE F-001718
7073 San Pedro, San Antonio, Texas, 78216
Phone: 210-494-7223 Fax: 210-490-5120 WWW.BMBI.COM

SH 46
SEGMENT C

ROADWAY LAYOUTS

STA 600+00 TO STA 610+00

SHEET 3 OF 8

FED. RD. DIV. NO.	PROJECT	SHEET NO.
		203

STATE	DIST.	COUNTY
TEXAS	SAT	KENDALL, ETC

CONT.	SECT.	JOB	HIGHWAY NO.
0215	06	037, ETC	SH 46

NOTES:

1. SAWCUT TO BE SUBSIDIARY TO THE PERTINENT BID ITEMS.
2. ALL STATIONS, OFFSETS, AND ELEVATIONS SHOWN IN THE WIDENING TABLES ARE REFERENCED FROM SH 46 BASELINE ALIGNMENT.

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JUN 28 2016
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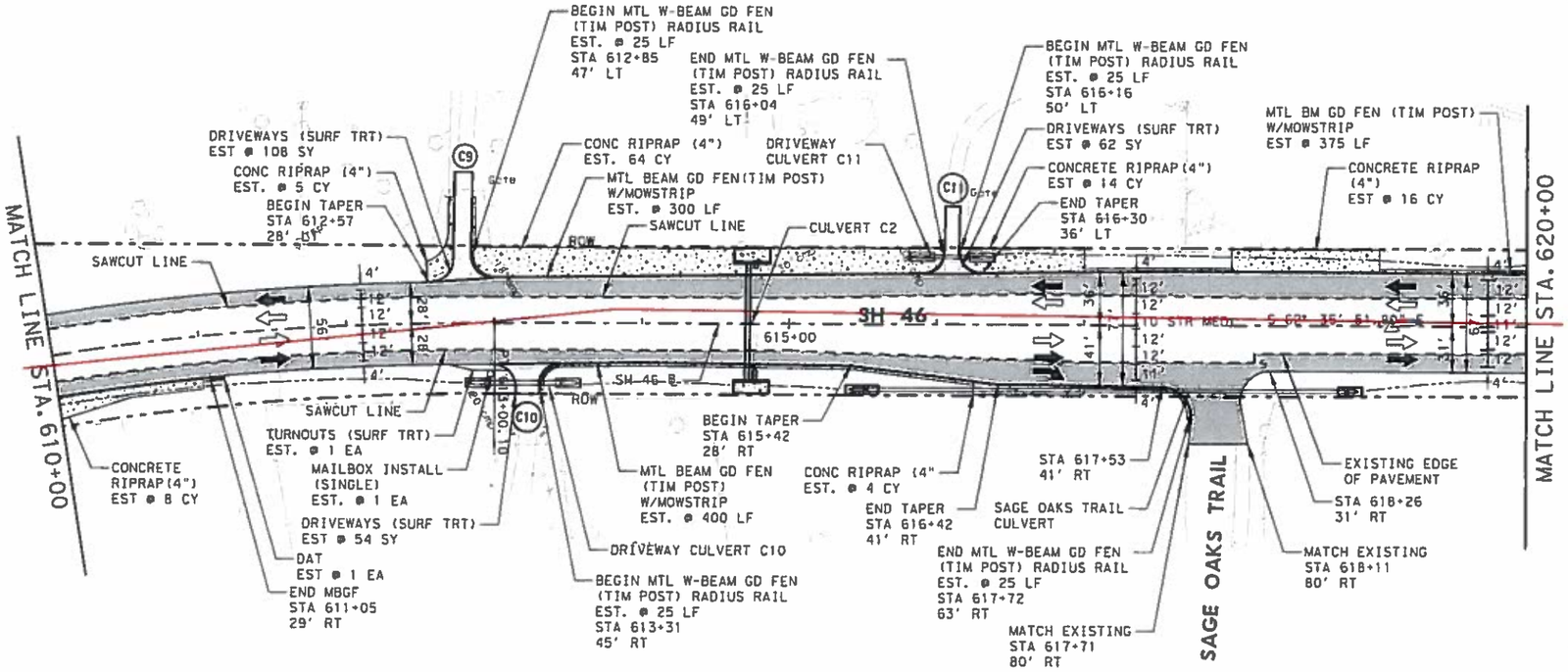


ESTIMATED QUANTITIES			215-6-37
ITEM	DESCRIPTION	UNIT	QTY
0100 6002	PREPARING ROW	STA	10
0110 6001	EXCAVATION (ROADWAY)	CY	819
0132 6001	EMBANKMENT (FINAL) (ORD COMP) (TY A)	CY	1180
0247 6366	FL BS (CMP IN PLC) (TY A GR 5) FNL POS	CY	1024
0310 6009	PRIME COAT (MC-30)	GAL	922
0316 6240	AGGR (TY-PD GR-4 SAC-B)	CY	80
0316 6410	ASPH (AC-15P, AC-20-5TR, AC-20XP, AC10-2TR)	GAL	4334
0316 XXX1	AGGR (TY-PD GR-3)	CY	66
0341 6064	D-GR HMA TY-D PG 70-22 (LEVEL-UP)	TON	466
0354 6051	PLANE ASPH CONC PAV (0" TO 1 1/2")	SY	1333
0432 6001	RIPRAP (CONC) (4 IN)	CY	102
0432 6045	RIPRAP (MOW STRIP) (4 IN)	CY	69
0530 6005	DRIVEWAYS (ACP)	SY	
0530 6006	DRIVEWAYS (SURF TREAT)	SY	217
0530 6008	TURNOUTS (ACP)	EA	
0530 6009	TURNOUTS (SURF TREAT)	EA	1
0530 XXX1	DRIVEWAYS (GRAVEL)	SY	
0540 6001	MTL W-BEAM GD FEN (TIM POST)	LF	1255
0540 6014	MTL W-BEAM GD FEN(TIM POST) SHORT RADIUS	LF	125
0540 6016	DOWNSTREAM ANCHOR TERMINAL SECTION	EA	1
0544 6001	GUARDRAIL END TREATMENT (INSTALL)	EA	
0560 6001	MAILBOX INSTALL-S (TWG-POST) TY 1	EA	1
0560 6002	MAILBOX INSTALL-D (TWG-POST) TY 1	EA	
0560 6003	MAILBOX INSTALL-M (TWG-POST) TY 1	EA	

LEGEND:

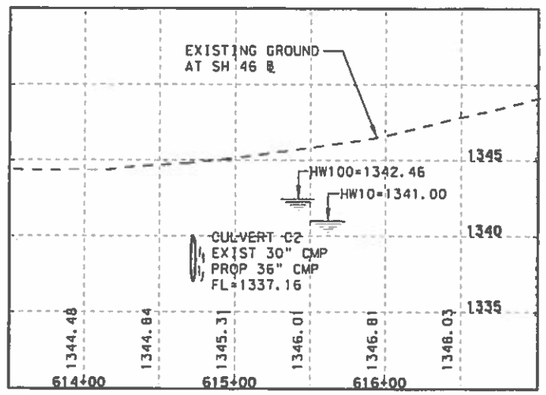
- EXIST EDGE OF ROADWAY
- EXIST FENCE
- EXIST UTILITY
- RIGHT OF WAY (ROW)
- MAIL BOX
- DRIVEWAY NUMBER (A1)
- ROADWAY WIDENING
- CONCRETE RIPRAP (4")
- DIRECTION OF TRAFFIC

50 0 100
HORIZ SCALE: 1"=100'

5 0 10
VERT SCALE: 1"=10'

Kendall County

SH 46 WIDENING TABLE								
STATION	LT EOP		LT SAWCUT LINE		RT SAWCUT LINE		RT EOP	
	OFFSET	ELEV	OFFSET	ELEV	OFFSET	ELEV	OFFSET	ELEV
610+00	28' LT	1352.64	18' LT	1352.06	18' RT	1350.13	28' RT	1349.64
610+50	28' LT	1351.13	18' LT	1350.57	18' RT	1348.67	28' RT	1348.18
611+00	28' LT	1349.57	18' LT	1349.14	18' RT	1347.17	28' RT	1346.59
611+50	28' LT	1348.39	18' LT	1347.87	18' RT	1346.04	28' RT	1345.55
612+00	28' LT	1347.40	18' LT	1346.88	18' RT	1345.04	28' RT	1344.55
612+50	28' LT	1346.61	18' LT	1346.16	18' RT	1344.37	28' RT	1343.86
613+00	30.61' LT	1345.66	18' LT	1345.38	18' RT	1344.11	27.98' RT	1343.77
613+50	31.24' LT	1344.88	18' LT	1344.75	18' RT	1344.06	26.88' RT	1343.81
614+00	31.86' LT	1344.71	18' LT	1344.61	18' RT	1344.24	25.86' RT	1344.14
614+50	32.48' LT	1344.65	18' LT	1344.74	18' RT	1344.55	26.48' RT	1344.40
615+00	33.1' LT	1344.84	18' LT	1345.06	18' RT	1345.12	27.1' RT	1345.02
615+50	33.73' LT	1345.35	18.8' LT	1345.64	19.75' RT	1345.83	28.61' RT	1345.75
616+00	34.35' LT	1346.44	19.8' LT	1346.59	21.5' RT	1346.72	34.75' RT	1346.67
616+50	34.97' LT	1347.68	20.8' LT	1347.82	23.25' RT	1347.71	39.98' RT	1347.48
617+00	35.6' LT	1349.15	20.53' LT	1349.20	25' RT	1349.09	40.6' RT	1348.98
617+50	36.22' LT	1350.48	19.94' LT	1350.55	25' RT	1350.60	41.22' RT	1350.58
618+00	36.38' LT	1352.05	19.35' LT	1352.24	25' RT	1352.21	80' RT	1352.42
618+50	36.16' LT	1354.01	19' LT	1354.21	18.9' RT	1354.18	30.84' RT	1354.02
619+00	35.94' LT	1356.16	19' LT	1356.34	18.75' RT	1356.33	31.06' RT	1356.18
619+50	35.72' LT	1358.24	19' LT	1358.40	18.6' RT	1358.37	31.28' RT	1358.22
620+00	35.5' LT	1360.20	19' LT	1360.40	18.45' RT	1360.43	31.5' RT	1360.28



STA. 614+76

NOTES:

1. SAWCUT TO BE SUBSIDIARY TO THE PERTINENT BID ITEMS.
2. ALL STATIONS, OFFSETS, AND ELEVATIONS SHOWN IN THE WIDENING TABLES ARE REFERENCED FROM SH 46 BASELINE ALIGNMENT.

NO.	DATE	REVISION	APPR

PRELIMINARY

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100% SUBMITTAL

Engineer:
LORI DULLNIG-WARLEN, PE 2/16/2016
P.E. No: 63520 Date:

BAIN MEDINA BAIN, INC.
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Texas Department of Transportation

SH 46
SEGMENT C

ROADWAY LAYOUTS

STA 610+00 TO STA 620+00

SHEET 4 OF 8

FED. RD. DIV. NO.	PROJECT	SHEET NO.
		204

STATE	DIST.	COUNTY
TEXAS	SAT	KENDALL, ETC

CONT.	SECT.	JOB	HIGHWAY NO.
0215	06	037, ETC	SH 46

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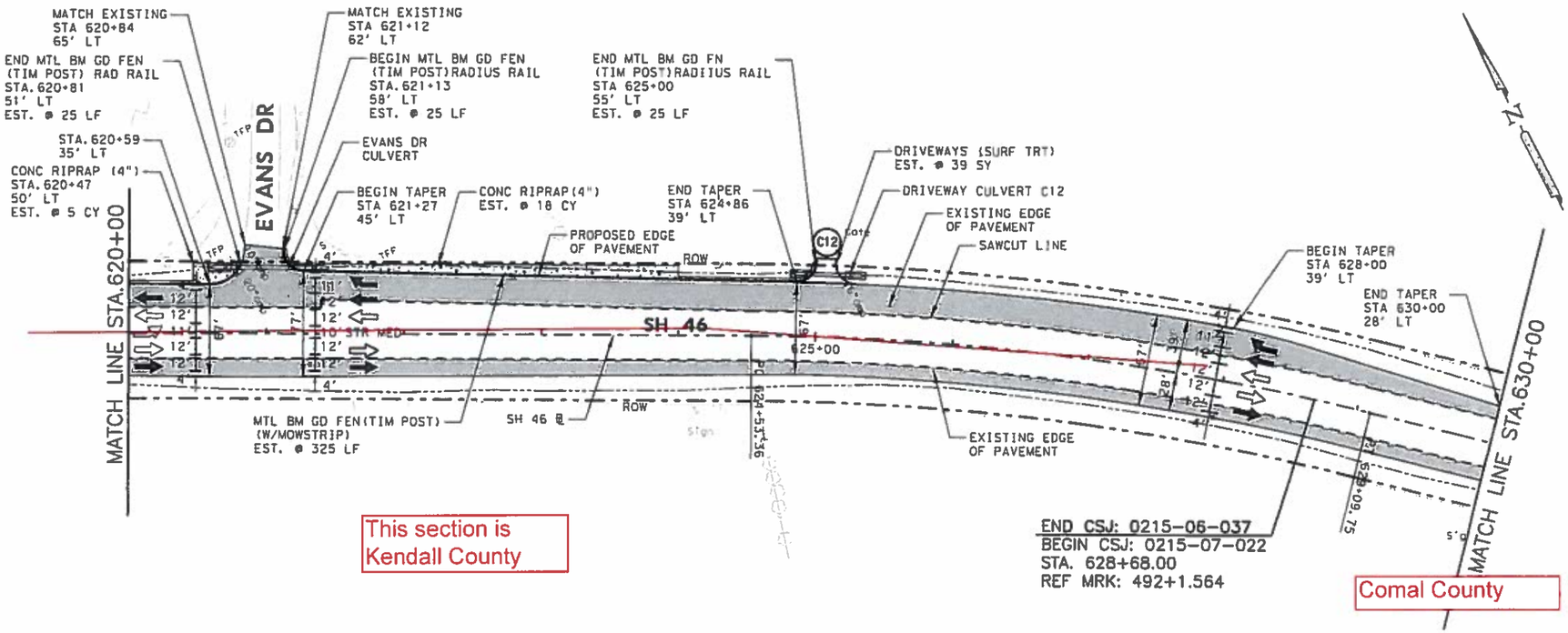

ESTIMATED QUANTITIES			215-6-37	215-7-22
ITEM	DESCRIPTION	UNIT	QTY	QTY
0100 6002	PREPARING ROW	STA	8.7	1.3
0110 6001	EXCAVATION (ROADWAY)	CY	875	80
0132 6001	EMBANKMENT (FINAL) (ORD COMP) (TY A)	CY	393	59
0247 6366	FL BS (CMP IN PLC) (TY A GR 5) FNL POS	CY	1097	121
0310 6009	PRIME COAT (MC-30)	GAL	958	104
0316 6240	AGGR (TY-PD GR-4 SAC-B)	CY	77	10
0316 6410	ASPH (AC-15P, AC-20-5TR, AC-20XP, AC10-2TR)	GAL	4143	526
0316 XXX1	AGGR (TY-PD GR-3)	CY	63	8
0341 6064	D-GR HMA TY-D PG 70-22 (LEVEL-UP)	TON	468	53
0354 6051	PLANE ASPH CONC PAV (0" TO 1 1/2")	SY	1160	173
0432 6001	RIPRAP (CONC) (4 IN)	CY	18	
0432 6045	RIPRAP (MOW STRIP) (4 IN)	CY	20	
0530 6005	DRIVEWAYS (ACP)	SY		
0530 6006	DRIVEWAYS (SURF TREAT)	SY	39	
0530 6008	TURNOUTS (ACP)	EA		
0530 6009	TURNOUTS (SURF TREAT)	EA		
0530 XXX1	DRIVEWAYS (GRAVEL)	SY		
0540 6001	MTL W-BEAM GD FEN (TIM POST)	LF	325	
0540 6014	MTL W-BEAM GD FEN(TIM POST)SHORT RADIUS	LF	75	
0540 6016	DOWNSTREAM ANCHOR TERMINAL SECTION	EA		
0544 6001	GUARDRAIL END TREATMENT (INSTALL)	EA		
0560 6001	MAILBOX INSTALL-S (TWG-POST) TY 1	EA		
0560 6002	MAILBOX INSTALL-D (TWG-POST) TY 1	EA		
0560 6003	MAILBOX INSTALL-M (TWG-POST) TY 1	EA		

LEGEND:

- EXIST EDGE OF ROADWAY
- EXIST FENCE
- EXIST UTILITY
- RIGHT OF WAY (ROW)
- MAIL BOX
- DRIVEWAY NUMBER (A1)
- ROADWAY WIDENING
- CONCRETE RIPRAP (4")
- DIRECTION OF TRAFFIC

50 0 100
HORIZ SCALE: 1"=100'

NO.	DATE	REVISION	APPR

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LORI DULLNIG-WARLEN, PE 2/16/2016
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SH 46
SEGMENT C

ROADWAY LAYOUTS

STA 620+00 TO STA 630+00

SHEET 5 OF 8

FED. RD. DIV. NO.	PROJECT	SHEET NO.
		205

STATE	DIST.	COUNTY
TEXAS	SAT	KENDALL, ETC

CONT.	SECT.	JOB	HIGHWAY NO.
0215	06	037, ETC	SH 46

SH 46 WIDENING TABLE								
STATION	LT EOP		LT SAWCUT LINE		RT SAWCUT LINE		RT EOP	
	OFFSET	ELEV	OFFSET	ELEV	OFFSET	ELEV	OFFSET	ELEV
620+00	35.5' LT	1360.20	19' LT	1360.40	18.45' RT	1360.43	31.5' RT	1360.28
620+50	35.29' LT	1362.25	19' LT	1362.58	18.3' LT	1362.46	31.72' RT	1362.27
621+00	63.21' LT	1363.56	19' LT	1364.52	18.15' LT	1364.50	31.7' RT	1364.36
621+50	44.94' LT	1365.59	24.78' LT	1366.34	18' LT	1366.47	31.27' RT	1366.32
622+00	44.04' LT	1367.86	23.66' LT	1368.19	18' RT	1368.25	30.84' RT	1368.01
622+50	43.15' LT	1369.96	22.54' LT	1370.13	18' RT	1370.11	30.4' RT	1369.97
623+00	42.25' LT	1371.96	21.43' LT	1372.03	18' RT	1371.79	29.97' RT	1371.58
623+50	41.35' LT	1373.49	20.31' LT	1373.62	18' RT	1373.26	29.53' RT	1372.96
624+00	40.46' LT	1375.62	19.19' LT	1375.38	18' RT	1374.60	29.1' RT	1374.25
624+50	39.56' LT	1377.88	18.08' LT	1377.18	18' RT	1375.84	28.66' RT	1375.48
625+00	39.39' LT	1379.67	18' LT	1378.66	18' RT	1377.07	28' RT	1376.59
625+50	39.5' LT	1381.45	18' LT	1380.23	18' RT	1378.31	28' RT	1377.81
626+00	39.5' LT	1382.73	18' LT	1381.70	18' RT	1379.70	28' RT	1379.14
626+50	39.5' LT	1384.26	18' LT	1383.03	18' RT	1381.10	28' RT	1380.60
627+00	39.5' LT	1385.61	18' LT	1384.40	18' RT	1382.34	28' RT	1381.75
627+50	39.5' LT	1386.99	18' LT	1385.80	18' RT	1383.71	28' RT	1383.11
628+00	39.5' LT	1388.48	18' LT	1387.20	18' RT	1385.10	28' RT	1384.53
628+50	37.2' LT	1389.34	18' LT	1388.38	18' RT	1386.50	28' RT	1385.95
629+00	33.55' LT	1389.80	18' LT	1389.23	18' RT	1387.86	28' RT	1387.47
629+50	30.76' LT	1389.96	18' LT	1389.77	18' RT	1388.92	28' RT	1388.59
630+00	28' LT	1390.38	18' LT	1390.31	18' RT	1389.63	28' RT	1389.33

NOTES:

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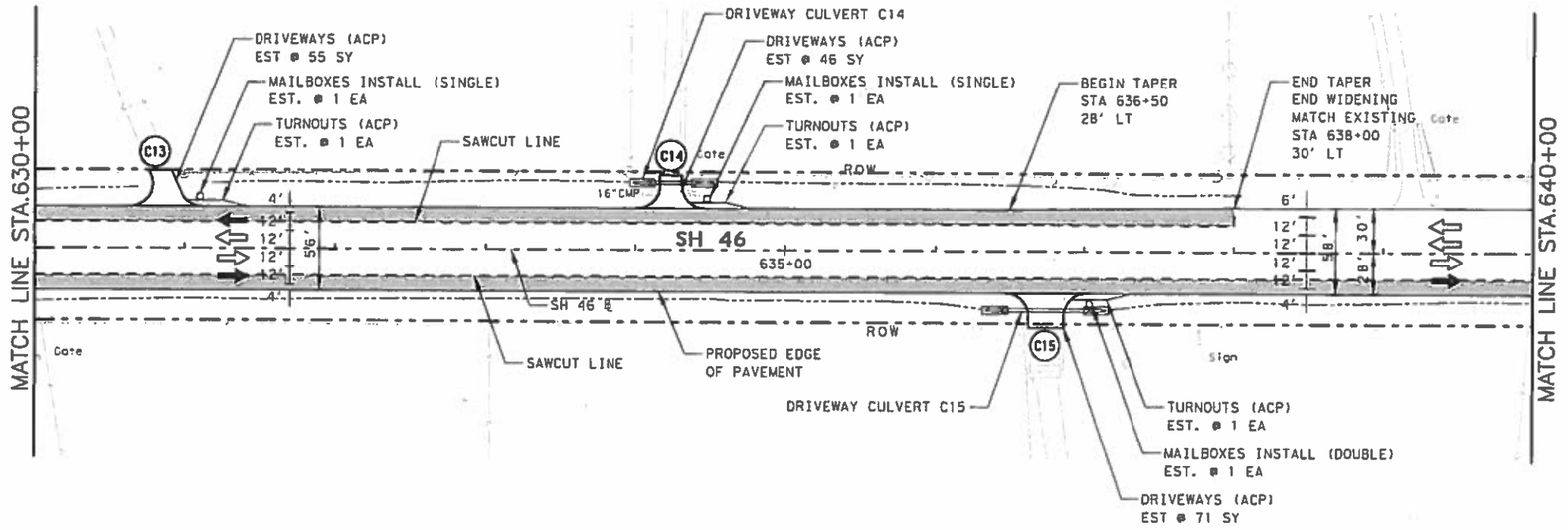

ESTIMATED QUANTITIES			215-7-22
ITEM	DESCRIPTION	UNIT	QTY
0100 6002	PREPARING ROW	STA	10
0110 6001	EXCAVATION (ROADWAY)	CY	712
0132 6001	EMBANKMENT (FINAL) (ORD COMP) (TY A)	CY	453
0247 6366	FL BS(CMP IN PLC) (TY A GR 5)FNL POS	CY	704
0310 6009	PRIME COAT (MC-30)	GAL	604
0316 6240	AGGR(TY-PD GR-4 SAC-B)	CY	70
0316 6410	ASPH(AC-15P, AC-20-5TR, AC-20XP, AC10-2TR)	GAL	3762
0316 XXX1	AGGR(TY-PD GR-3)	CY	57
0341 6064	D-GR HMA TY-D PG 70-22 (LEVEL-UP)	TON	312
0354 6051	PLANE ASPH CONC PAV (0" TO 1 1/2")	SY	1200
0432 6001	RIPRAP (CONC) (4 IN)	CY	
0432 6045	RIPRAP (MOW STRIP) (4 IN)	CY	
0530 6005	DRIVEWAYS (ACP)	SY	172
0530 6006	DRIVEWAYS (SURF TREAT)	SY	
0530 6008	TURNOUTS (ACP)	EA	3
0530 6009	TURNOUTS (SURF TREAT)	EA	
0530 XXX1	DRIVEWAYS (GRAVEL)	SY	
0540 6001	MTL W-BEAM GD FEN (TIM POST)	LF	
0540 6014	MTL W-BEAM GD FEN(TIM POST)SHORT RADIUS	LF	
0540 6016	DOWNSTREAM ANCHOR TERMINAL SECTION	EA	
0544 6001	GUARDRAIL END TREATMENT (INSTALL)	EA	
0560 6001	MAILBOX INSTALL-S (TWG-POST) TY 1	EA	2
0560 6002	MAILBOX INSTALL-D (TWG-POST) TY 1	EA	1
0560 6003	MAILBOX INSTALL-M (TWG-POST) TY 1	EA	

LEGEND:

- EXIST EDGE OF ROADWAY
- EXIST FENCE
- EXIST UTILITY
- RIGHT OF WAY (ROW)
- MAIL BOX
- DRIVEWAY NUMBER (A1)
- ROADWAY WIDENING
- CONCRETE RIPRAP (4")
- DIRECTION OF TRAFFIC

50 0 100

HORIZ SCALE: 1"=100'

SH 46 WIDENING TABLE								
STATION	LT EOP		LT SAWCUT LINE		LT SAWCUT LINE		LT EOP	
	OFFSET	ELEV	OFFSET	ELEV	OFFSET	ELEV	OFFSET	ELEV
630+00	28' LT	1390.38	18' LT	1390.31	18' RT	1389.63	28' RT	1389.33
630+50	28' LT	1390.18	18' LT	1390.28	18' RT	1390.18	28' RT	1390.02
631+00	28' LT	1390.13	18' LT	1390.29	18' RT	1390.28	28' RT	1390.12
631+50	28' LT	1390.16	18' LT	1390.29	18' RT	1390.24	28' RT	1390.09
632+00	28' LT	1389.77	18' LT	1389.94	18' RT	1389.90	28' RT	1389.71
632+50	28' LT	1389.15	18' LT	1389.34	18' RT	1389.39	28' RT	1389.23
633+00	28' LT	1388.51	18' LT	1388.65	18' RT	1388.67	28' RT	1388.53
633+50	28' LT	1387.66	18' LT	1387.85	18' RT	1387.86	28' RT	1387.68
634+00	28' LT	1386.80	18' LT	1387.00	18' RT	1386.96	28' RT	1386.78
634+50	28' LT	1385.91	18' LT	1386.10	18' RT	1386.09	28' RT	1385.90
635+00	28' LT	1385.25	18' LT	1385.30	18' RT	1385.20	28' RT	1385.11
635+50	28' LT	1384.01	18' LT	1384.21	18' RT	1384.25	28' RT	1384.06
636+00	28' LT	1382.78	18' LT	1382.96	18' RT	1383.00	28' RT	1382.85
636+50	28' LT	1381.24	18' LT	1381.48	18' RT	1381.46	28' RT	1381.27
637+00	28.52' LT	1379.58	18' LT	1379.73	18' RT	1379.71	28' RT	1379.56
637+50	29.03' LT	1377.55	18' LT	1377.72	18' RT	1377.78	28' RT	1377.67
638+00	29.54' LT	1375.43	18' LT	1375.60	18' RT	1375.63	28' RT	1375.50
638+50					18' RT	1373.53	28' RT	1373.41
639+00					18' RT	1371.32	28' RT	1371.12
639+50					18' RT	1369.16	28' RT	1368.92
640+00					18' RT	1367.06	28' RT	1366.88

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NOTES:

1. SAWCUT TO BE SUBSIDIARY TO THE PERTINENT BID ITEMS.
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NO.	DATE	REVISION	APPR

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Texas Department of Transportation

SH 46
SEGMENT C

ROADWAY LAYOUTS

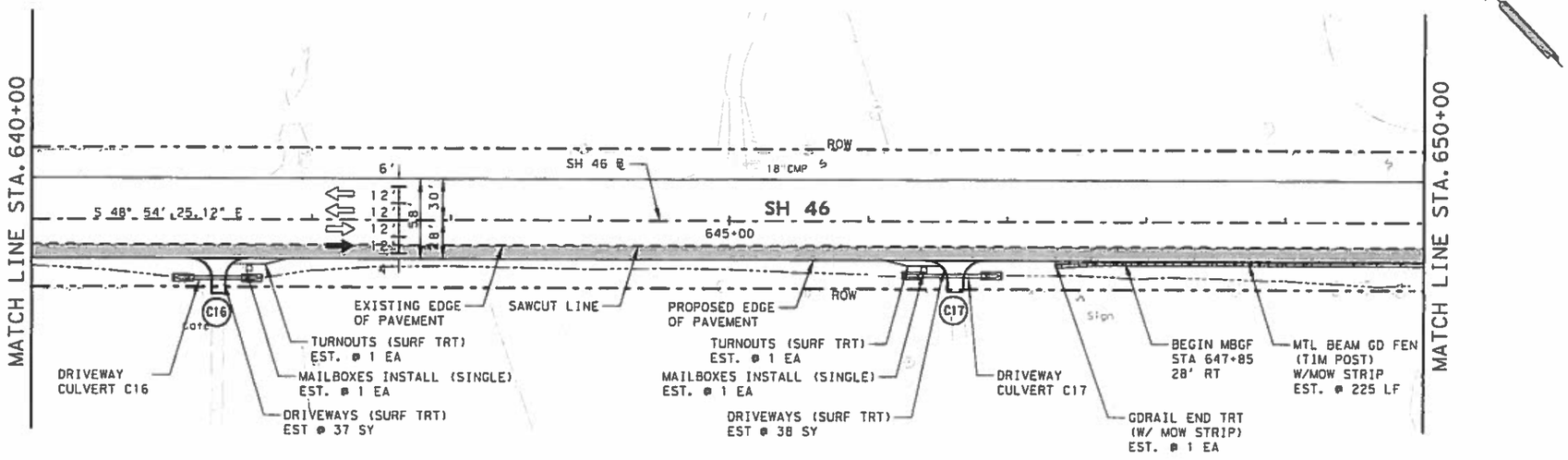
STA 630+00 TO STA 640+00

SHEET 6 OF 8

FED. RD. DIV. NO.	PROJECT	SHEET NO.
		206

STATE	DIST.	COUNTY
TEXAS	SAT	KENDALL, ETC

CONT.	SECT.	JOB	HIGHWAY NO.
0215	06	037,ETC	SH 46



ESTIMATED QUANTITIES			215-7-22
ITEM	DESCRIPTION	UNIT	QTY
0100 6002	PREPARING ROW	STA	10
0110 6001	EXCAVATION (ROADWAY)	CY	268
0132 6001	EMBANKMENT (FINAL) (ORD COMP) (TY A)	CY	227
0247 6366	FL BS (CMP IN PLC) (TY A GR 5) FNL POS	CY	389
0310 6009	PRIME COAT (MC-30)	GAL	333
0316 6240	AGGR (TY-PD GR-4 SAC-B)	CY	71
0316 6410	ASPH (AC-15P, AC-20-5TR, AC-20XP, AC10-2TR)	GAL	3852
0316 XXX1	AGGR (TY-PD GR-3)	CY	58
0341 6064	D-GR HMA TY-D PG 70-22 (LEVEL-UP)	TON	179
0354 6051	PLANE ASPH CONC PAV (0" TO 1 1/2")	SY	667
0432 6001	RIPRAP (CONC) (4 IN)	CY	
0432 6045	RIPRAP (MOW STRIP) (4 IN)	CY	14
0530 6005	DRIVEWAYS (ACP)	SY	
0530 6006	DRIVEWAYS (SURF TREAT)	SY	75
0530 6008	TURNOUTS (ACP)	EA	
0530 6009	TURNOUTS (SURF TREAT)	EA	2
0530 XXX1	DRIVEWAYS (GRAVEL)	SY	
0540 6001	MTL W-BEAM GD FEN (TIM POST)	LF	225
0540 6014	MTL W-BEAM GD FEN (TIM POST) SHORT RADIUS	LF	
0540 6016	DOWNSTREAM ANCHOR TERMINAL SECTION	EA	
0544 6001	GUARDRAIL END TREATMENT (INSTALL)	EA	1
0560 6001	MAILBOX INSTALL-S (TWG-POST) TY 1	EA	2
0560 6002	MAILBOX INSTALL-D (TWG-POST) TY 1	EA	
0560 6003	MAILBOX INSTALL-M (TWG-POST) TY 1	EA	

LEGEND:

EXIST EDGE OF ROADWAY
EXIST FENCE
EXIST UTILITY
RIGHT OF WAY (ROW)
MAIL BOX
DRIVEWAY NUMBER (A1)
ROADWAY WIDENING
CONCRETE RIPRAP (4")
DIRECTION OF TRAFFIC

50 0 100
HORIZ SCALE: 1"=100'

NO.	DATE	REVISION	APPR

RECEIVED
JUN 28 2016
COUNTY ENGINEER

SH 46 WIDENING TABLE				
STATION	RT SAWCUT LINE		RT EOP	
	OFFSET	ELEV	OFFSET	ELEV
640+00	18' RT	1367.06	28' RT	1366.88
640+50	18' RT	1364.99	28' RT	1364.84
641+00	18' RT	1362.87	28' RT	1362.66
641+50	18' RT	1361.04	28' RT	1360.97
642+00	18' RT	1358.79	28' RT	1358.62
642+50	18' RT	1356.48	28' RT	1356.22
643+00	18' RT	1354.38	28' RT	1354.13
643+50	18' RT	1352.48	28' RT	1352.28
644+00	18' RT	1350.42	28' RT	1350.28
644+50	18' RT	1348.08	28' RT	1347.99
645+00	18' RT	1346.03	28' RT	1345.93
645+50	18' RT	1344.04	28' RT	1343.94
646+00	18' RT	1341.98	28' RT	1341.78
646+50	18' RT	1340.00	28' RT	1339.78
647+00	18' RT	1338.28	28' RT	1338.09
647+50	18' RT	1336.65	28' RT	1336.45
648+00	18' RT	1335.45	28' RT	1335.27
648+50	18' RT	1334.36	28' RT	1334.12
649+00	18' RT	1333.67	28' RT	1333.50
649+50	18' RT	1332.98	28' RT	1332.80
650+00	18' RT	1332.63	28' RT	1332.44

NOTES:

1. SAWCUT TO BE SUBSIDIARY TO THE PERTINENT BID ITEMS.
2. ALL STATIONS, OFFSETS, AND ELEVATIONS SHOWN IN THE WIDENING TABLES ARE REFERENCED FROM SH 46 BASELINE ALIGNMENT.

PRELIMINARY
FOR REVIEW ONLY
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100% SUBMITTAL
Engineer:
LORI DULLNIG-WARLEN, PE 2/16/2016
P.E. No: 63520 Date:

BAIN MEDINA BAIN, INC.
ENGINEERS & SURVEYORS
TBPE F-001712
7073 San Pedro, San Antonio, Texas, 78216
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Texas Department of Transportation

SH 46
SEGMENT C

ROADWAY LAYOUTS

STA 640+00 TO STA 650+00

SHEET 7 OF 8

FED. RD. DIV. NO.	PROJECT	SHEET NO.
		207

STATE	DIST.	COUNTY
TEXAS	SAT	KENDALL, ETC

CONT.	SECT.	JOB	HIGHWAY NO.
0215	06	037, ETC	SH 46

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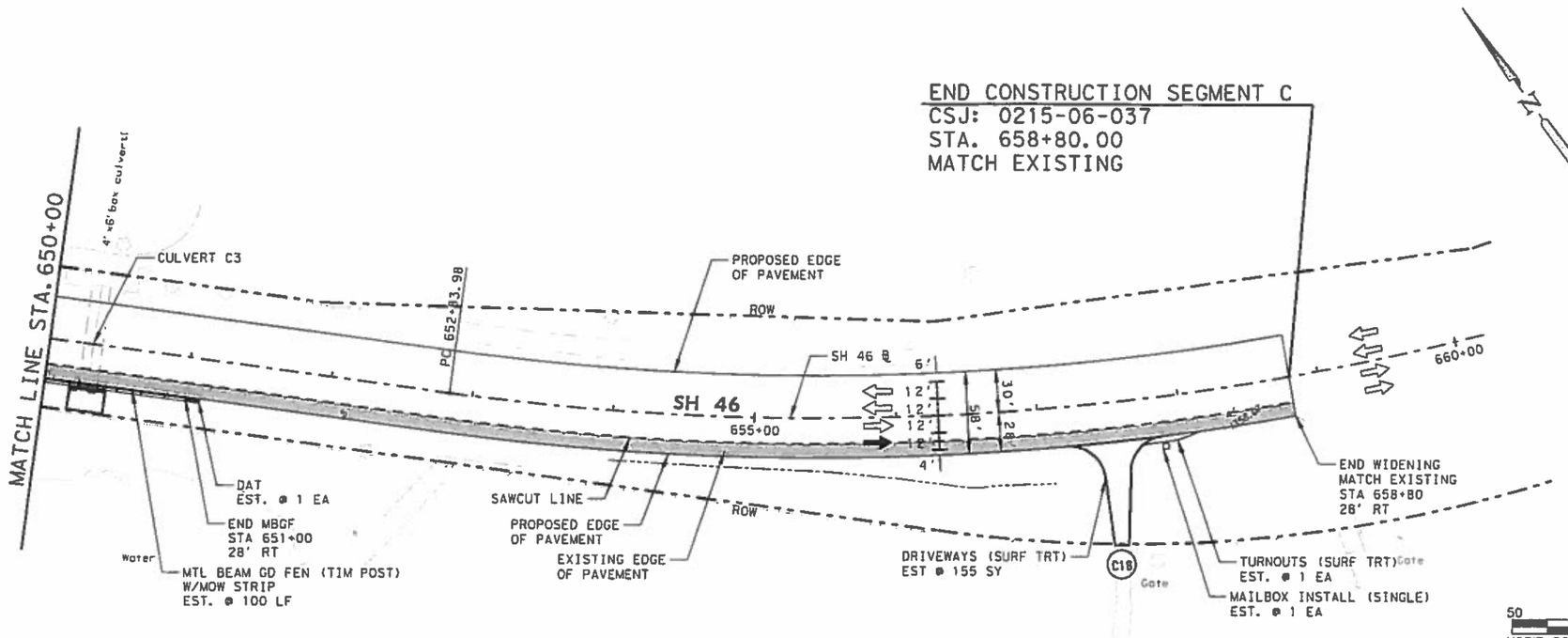


ESTIMATED QUANTITIES			215-7-22
ITEM	DESCRIPTION	UNIT	QTY
0100 6002	PREPARING ROW	STA	8.8
0110 6001	EXCAVATION (ROADWAY)	CY	286
0132 6001	EMBANKMENT (FINAL) (ORD COMP) (TY A)	CY	172
0247 6366	FL BS(CMP IN PLC)(TY A GR 5)FNL POS	CY	345
0310 6009	PRIME COAT (MC-30)	GAL	296
0316 6240	AGGR(TY-PD GR-4 SAC-B)	CY	63
0316 6410	ASPH(AC-15P,AC-20-5TR,AC-20XP,AC10-2TR)	GAL	3403
0316 XXX1	AGGR(TY-PD GR-3)	CY	52
0341 6064	D-GR HMA TY-D PG 70-22 (LEVEL-UP)	TON	146
0354 6051	PLANE ASPH CONC PAV (0" TO 1 1/2")	SY	587
0432 6001	RIPRAP (CONC)(4 IN)	CY	
0432 6045	RIPRAP (MOW STRIP)(4 IN)	CY	6
0530 6005	DRIVEWAYS (ACP)	SY	
0530 6006	DRIVEWAYS (SURF TREAT)	SY	155
0530 6008	TURNOUTS (ACP)	EA	
0530 6009	TURNOUTS (SURF TREAT)	EA	1
0530 XXX1	DRIVEWAYS (GRAVEL)	SY	
0540 6001	MTL W-BEAM GD FEN (TIM POST)	LF	100
0540 6014	MTL W-BEAM GD FEN(TIM POST)SHORT RADIUS	LF	
0540 6016	DOWNSTREAM ANCHOR TERMINAL SECTION	EA	1
0544 6001	GUARDRAIL END TREATMENT (INSTALL)	EA	
0560 6001	MAILBOX INSTALL-S (TWG-POST) TY 1	EA	1
0560 6002	MAILBOX INSTALL-D (TWG-POST) TY 1	EA	
0560 6003	MAILBOX INSTALL-M (TWG-POST) TY 1	EA	

LEGEND:

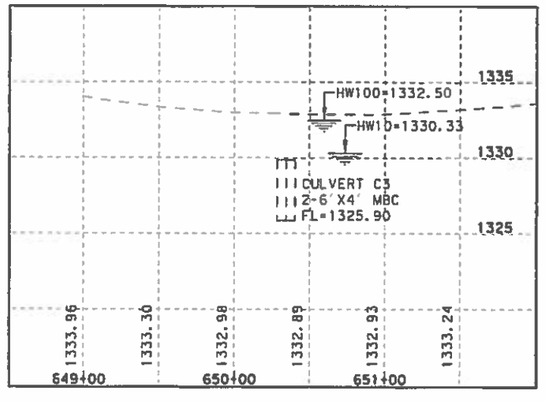
- EXIST EDGE OF ROADWAY
- EXIST FENCE
- EXIST UTILITY
- RIGHT OF WAY (ROW)
- MAIL BOX
- DRIVEWAY NUMBER (A1)
- ROADWAY WIDENING
- CONCRETE RIPRAP (4")
- DIRECTION OF TRAFFIC

50 0 100
HORIZ SCALE: 1"=100'

5 0 10
VERT SCALE: 1"=10'

SHEET 8

SH 46 WIDENING TABLE				
STATION	RT SAWCUT LINE		RT EOP	
	OFFSET	ELEV	OFFSET	ELEV
650+00	18' RT	1332.63	28' RT	1332.44
650+50	18' RT	1332.53	28' RT	1332.33
651+00	18' RT	1332.59	28' RT	1332.39
651+50	18' RT	1332.94	28' RT	1332.77
652+00	18' RT	1333.60	28' RT	1333.55
652+50	18' RT	1334.49	28' RT	1334.55
653+00	18' RT	1335.62	28' RT	1335.72
653+50	18' RT	1337.27	28' RT	1337.57
654+00	18' RT	1339.10	28' RT	1339.61
654+50	18' RT	1340.76	28' RT	1341.24
655+00	18' RT	1342.69	28' RT	1343.17
655+50	18' RT	1344.91	28' RT	1345.45
656+00	18' RT	1347.12	28' RT	1347.63
656+50	18' RT	1349.44	28' RT	1349.93
657+00	18' RT	1351.67	28' RT	1352.14
657+50	18' RT	1353.79	28' RT	1354.19
658+00	18' RT	1356.10	28' RT	1356.47
658+50	18' RT	1358.50	28' RT	1358.95



STA. 650+30

NOTES:

1. SAWCUT TO BE SUBSIDIARY TO THE PERTINENT BID ITEMS.
2. ALL STATIONS, OFFSETS, AND ELEVATIONS SHOWN IN THE WIDENING TABLES ARE REFERENCED FROM SH 46 BASELINE ALIGNMENT.

NO.	DATE	REVISION	APPR

PRELIMINARY
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100% SUBMITTAL
Engineer:
LORI DULLNIG-WARLEN, PE 2/16/2016
P.E. No: 83520 Date:

BAIN MEDINA BAIN, INC.
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Texas Department of Transportation

SH 46
SEGMENT C

ROADWAY LAYOUTS

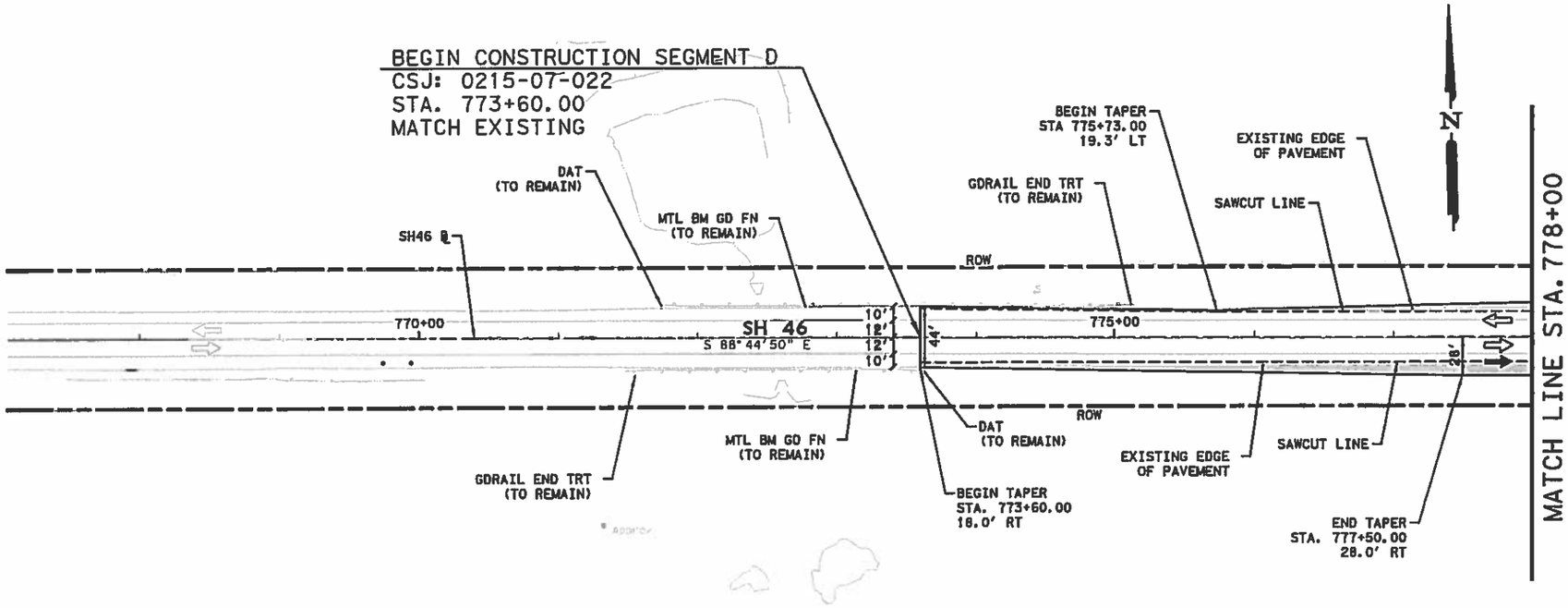
STA 650+00 TO STA 660+00

SHEET 8 OF 8

FED. RD. DIV. NO.	PROJECT	SHEET NO.
		208

STATE	DIST.	COUNTY
TEXAS	SAT	KENDALL, ETC

CONT.	SECT.	JOB	HIGHWAY NO.
0215	06	037,ETC	SH 46



ESTIMATED QUANTITIES			215-7-22
ITEM	DESCRIPTION	UNIT	QTY
0100 6002	PREPARING ROW	STA	4.4
0110 6001	EXCAVATION (ROADWAY)	CY	404
0132 6001	EMBANKMENT (FINAL) (ORD COMP) (TY A)	CY	316
0247 6366	FL BS (CMP IN PLC) (TY A GR 5) FNL POS	CY	193
0310 6009	PRIME COAT (MC-30)	GAL	144
0316 6240	AGGR (TY-PD GR-4 SAC-B)	CY	25
0316 6410	ASPH (AC-15P, AC-20-5TR, AC-20XP, AC10-2TR)	GAL	1364
0316 XXX1	AGGR (TY-PD GR-3)	CY	21
0341 6064	D-GR HMA TY-D PG 70-22 (LEVEL-UP)	TON	9
0432 6001	RIPRAP (CONC) (4 IN)	CY	
0432 6045	RIPRAP (MOW STRIP) (4 IN)	CY	
0530 6004	DRIVEWAYS (CONC)	SY	
0530 6005	DRIVEWAYS (ACP)	SY	
0530 6006	DRIVEWAYS (SURF TREAT)	SY	
0530 6008	TURNOUTS (ACP)	EA	
0530 6009	TURNOUTS (SURF TREAT)	EA	
0540 6001	MTL W-BEAM GD FEN (TIM POST)	LF	
0540 6014	MTL W-BEAM GD FEN (TIM POST) SHORT RADIUS	LF	
0540 6016	DOWNSTREAM ANCHOR TERMINAL SECTION	EA	
0544 6001	GUARDRAIL END TREATMENT (INSTALL)	EA	
0552 XXX1	REMOVE AND INSTALL PIPE FENCE AND GATE	LF	
0560 6001	MAILBOX INSTALL-S (TWG-POST) TY 1	EA	
0560 6003	MAILBOX INSTALL-M (TWG-POST) TY 1	EA	

LEGEND:

- EXIST EDGE OF ROADWAY
- EXIST FENCE
- EXIST UTILITY
- RIGHT OF WAY (ROW)
- MAIL BOX
- DRIVEWAY NUMBER (A1)
- ROADWAY WIDENING
- CONCRETE RIPRAP (4")
- DIRECTION OF TRAFFIC

50 25 0 100
HORIZ SCALE: 1"=100'

SH46 WIDENING TABLE - LEFT SIDE				
	PROPOSED EOP		SAWCUT LINE	
STATION	OFFSET	ELEV	OFFSET	ELEV
774+00	21.44 LT	1306.54	18' LT	1306.63
774+50	20.84' LT	1308.08	18' LT	1308.14
775+00	20.23' LT	1309.92	18' LT	1309.97
775+50	19.63' LT	1312.15	18' LT	1312.18
776+00	20.06' LT	1314.62	18' LT	1314.67
776+50	21.37' LT	1317.37	18' LT	1317.45
777+00	22.68' LT	1320.12	18' LT	1320.23
777+50	23.99' LT	1322.62	18' LT	1322.81
778+00	25.29' LT	1325.04	18' LT	1325.30

SH46 WIDENING TABLE - RIGHT SIDE				
	SAWCUT LINE		PROPOSED EOP	
STATION	OFFSET	ELEV	OFFSET	ELEV
774+00	18' RT	1306.61	22.44' RT	1306.50
774+50	18' RT	1308.21	23.23' RT	1308.11
775+00	18' RT	1310.00	24.03' RT	1309.88
775+50	18' RT	1312.27	24.82' RT	1312.15
776+00	18' RT	1314.74	25.62' RT	1314.58
776+50	18' RT	1317.46	26.41' RT	1317.25
777+00	18' RT	1320.22	27.21' RT	1319.99
777+50	18' RT	1322.88	28' RT	1322.62
778+00	18' RT	1325.43	28' RT	1325.14

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COUNTY ENGINEER

NOTES:

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NO.	DATE	REVISION	APPR

PRELIMINARY
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100% SUBMITTAL
Engineer:
LARRY ZAMORA, PE
P.E. No: 88698 Date: 2/16/2016

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY
TBPE REGISTRATION No. F-2614

BAIN MEDINA BAIN, INC.
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Texas Department of Transportation

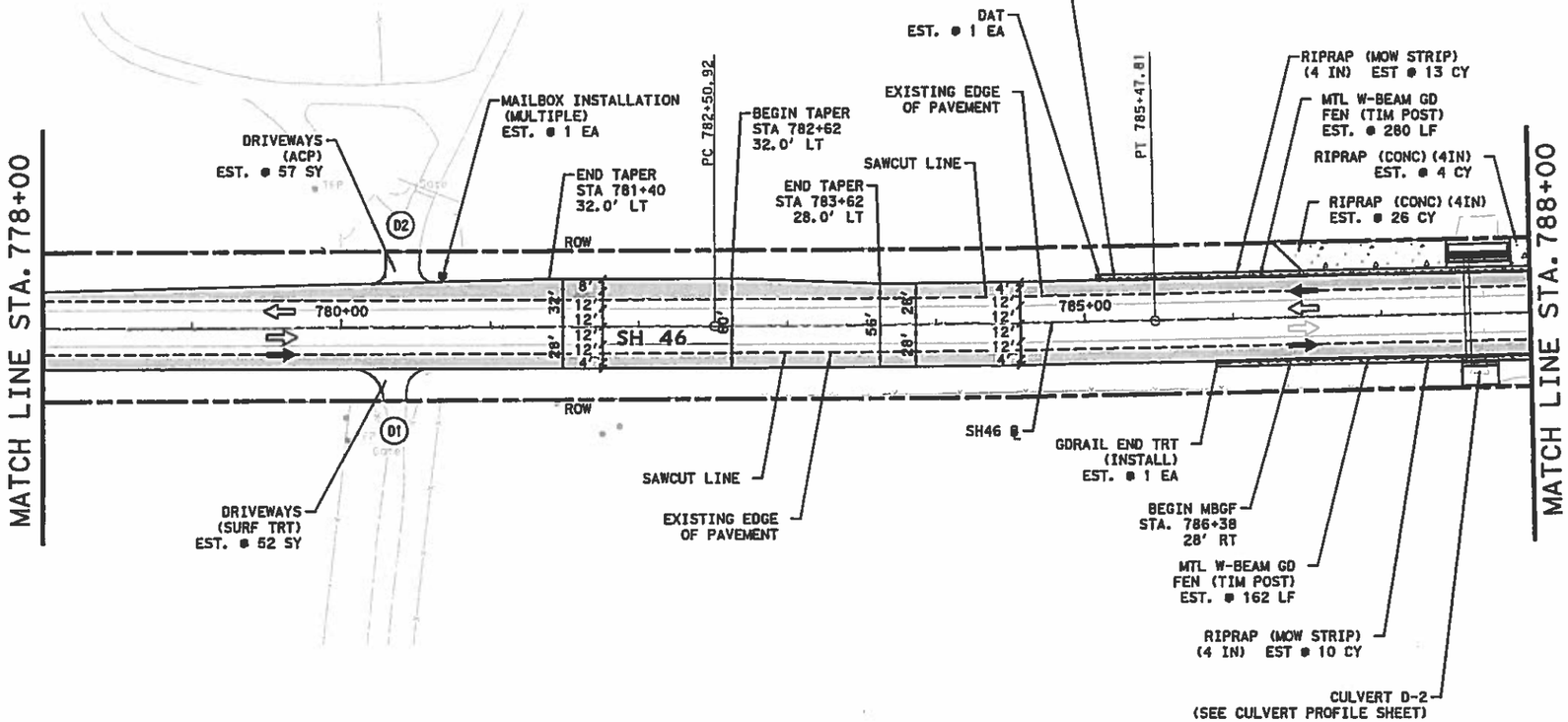
SH 46
SEGMENT D
ROADWAY LAYOUTS
STA 768+00 TO STA 778+00

SHEET 1 OF 9

FED. RD. DIV. NO.	PROJECT	SHEET NO.
		223

STATE	DIST.	COUNTY	
TEXAS	SAT	KENDALL, ETC	
CONT.	SECT.	JOB	HIGHWAY NO.
0215	06	037, ETC	SH 46

8TIME 2/16/2016 8FILE



ESTIMATED QUANTITIES			215-7-22
ITEM	DESCRIPTION	UNIT	QTY
0100 6002	PREPARING ROW	STA	10.0
0110 6001	EXCAVATION (ROADWAY)	CY	603
0132 6001	EMBANKMENT (FINAL) (ORD COMP) (TY A)	CY	673
0247 6366	FL BS (CMP IN PLC) (TY A GR 5) FNL POS	CY	899
0310 6009	PRIME COAT (MC-30)	GAL	144
0316 6240	AGGR (TY-PD GR-4 SAC-B)	CY	70
0316 6410	ASPH (AC-15P, AC-20-5TR, AC-20XP, AC10-2TR)	GAL	3784
0316 XXX1	AGGR (TY-PD GR-3)	CY	57
0341 6064	D-GR HMA TY-D PG 70-22 (LEVEL-UP)	TON	26
0432 6001	RIPRAP (CONC) (4 IN)	CY	30
0432 6045	RIPRAP (MOW STRIP) (4 IN)	CY	23
0530 6004	DRIVEWAYS (CONC)	SY	
0530 6005	DRIVEWAYS (ACP)	SY	57
0530 6006	DRIVEWAYS (SURF TREAT)	SY	52
0530 6008	TURNOUTS (ACP)	EA	
0530 6009	TURNOUTS (SURF TREAT)	EA	
0540 6001	MTL W-BEAM GD FEN (TIM POST)	LF	442
0540 6014	MTL W-BEAM GD FEN (TIM POST) SHORT RADIUS	LF	
0540 6016	DOWNSTREAM ANCHOR TERMINAL SECTION	EA	1
0544 6001	GUARDRAIL END TREATMENT (INSTALL)	EA	1
0552 XXX1	REMOVE AND INSTALL PIPE FENCE AND GATE	LF	
0560 6001	MAILBOX INSTALL-S (TWG-POST) TY 1	EA	
0560 6003	MAILBOX INSTALL-M (TWG-POST) TY 1	EA	1

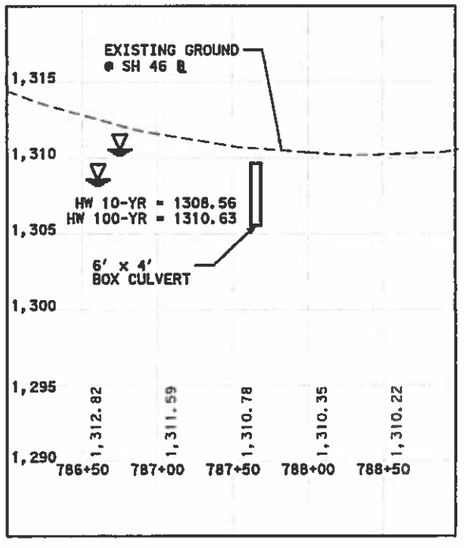
LEGEND:

- EXIST EDGE OF ROADWAY
- EXIST FENCE
- EXIST UTILITY
- RIGHT OF WAY (ROW)
- MAIL BOX
- DRIVEWAY NUMBER (A1)
- ROADWAY WIDENING
- CONCRETE RIPRAP (4")
- DIRECTION OF TRAFFIC

50 25 0 100
HORIZ SCALE: 1"=100'

SH46 WIDENING TABLE - LEFT SIDE				
	PROPOSED EOP		SAWCUT LINE	
STATION	OFFSET	ELEV	OFFSET	ELEV
778+00	25.29' LT	1325.04	18' LT	1325.3
778+50	26.6' LT	1327.33	18' LT	1327.62
779+00	27.91' LT	1329.44	18' LT	1329.68
779+50	29.21' LT	1331.07	18' LT	1331.27
780+00	30.52' LT	1332.06	18' LT	1332.29
780+50	31.35' LT	1332.41	18' LT	1332.73
781+00	31.85' LT	1332.52	18' LT	1332.81
781+50	32' LT	1332.3	18' LT	1332.5
782+00	32' LT	1331.4	18' LT	1331.66
782+50	32' LT	1330.04	18' LT	1330.33
783+00	30.58' LT	1327.99	18' LT	1328.29
783+50	28.54' LT	1325.62	18' LT	1325.87
784+00	28' LT	1323.19	18' LT	1323.38
784+50	28' LT	1320.54	18' LT	1320.77
785+00	28' LT	1318.28	18' LT	1318.41
785+50	28' LT	1315.97	18' LT	1316.11
786+00	28' LT	1313.83	18' LT	1314.04
786+50	28' LT	1312	18' LT	1312.29
787+00	28' LT	1311.1	18' LT	1311.28
787+50	28' LT	1310.4	18' LT	1310.54
788+00	28' LT	1309.68	18' LT	1309.92

SH46 WIDENING TABLE - RIGHT SIDE				
	SAWCUT LINE		PROPOSED EOP	
STATION	OFFSET	ELEV	OFFSET	ELEV
778+00	18' RT	1325.43	28' RT	1325.14
778+50	18' RT	1327.9	28' RT	1327.71
779+00	18' RT	1329.92	28' RT	1329.81
779+50	18' RT	1331.3	28' RT	1331.14
780+00	18' RT	1332.22	28' RT	1331.99
780+50	18' RT	1332.9	28' RT	1332.74
781+00	18' RT	1332.93	28' RT	1332.79
781+50	18' RT	1332.45	28' RT	1332.28
782+00	18' RT	1331.59	28' RT	1331.41
782+50	18' RT	1330.37	28' RT	1330.34
783+00	18' RT	1328.32	28' RT	1328.13
783+50	18' RT	1325.9	28' RT	1325.69
784+00	18' RT	1323.34	28' RT	1323.21
784+50	18' RT	1320.68	28' RT	1320.41
785+00	18' RT	1318.08	28' RT	1317.91
785+50	18' RT	1315.89	28' RT	1315.64
786+00	18' RT	1313.98	28' RT	1313.73
786+50	18' RT	1312.38	28' RT	1312.14
787+00	18' RT	1311.21	28' RT	1310.99
787+50	18' RT	1310.51	28' RT	1310.36
788+00	18' RT	1310.12	28' RT	1309.99



NOTES:

1. SAWCUT TO BE SUBSIDIARY TO THE PERTINENT BID ITEMS.
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RECEIVED
JUN 28 2016
COUNTY ENGINEER

NO.	DATE	REVISION	APPR

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100% SUBMITTAL
Engineer: LARRY ZAMORA, PE
P.E. No: 88696 Date: 2/16/2016

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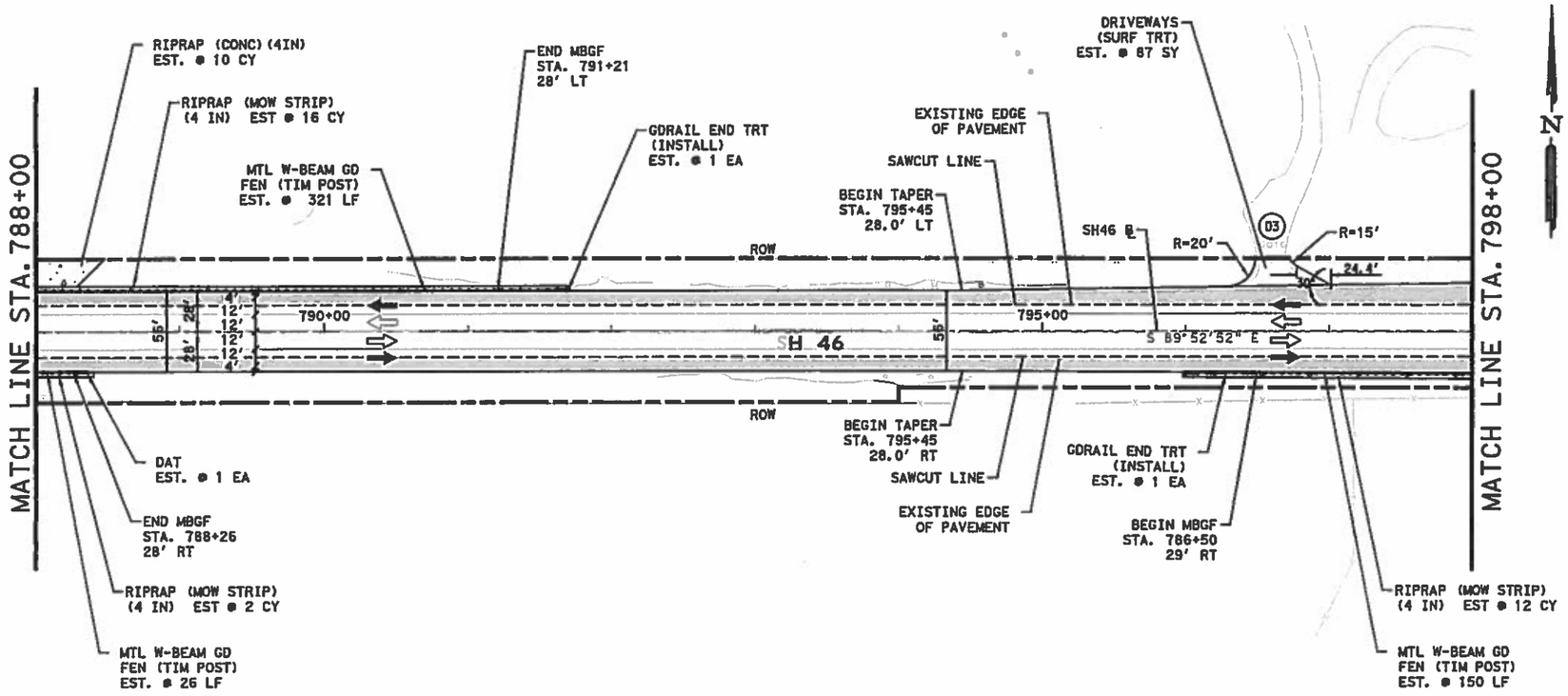
Phone: 210-494-7283 Fax: 210-490-8120 WWW.RMBI.COM

SH 46
SEGMENT 0
ROADWAY LAYOUTS
STA 778+00 TO STA 788+00

SHEET 2 OF 9

DIST.	PROJECT	SHEET NO.
		224
STATE	DIST.	COUNTY
TEXAS	SAT	KENDALL, ETC
CONT.	SECT.	JOB / HIGHWAY NO.
0215	06	037, ETC / SH 46

2/16/2016



SH46 WIDENING TABLE - LEFT SIDE				
	PROPOSED EOP		SAWCUT LINE	
STATION	OFFSET	ELEV	OFFSET	ELEV
788+00	28' LT	1309.68	18' LT	1309.92
788+50	28' LT	1309.63	18' LT	1309.84
789+00	28' LT	1310.02	18' LT	1310.2
789+50	28' LT	1310.64	18' LT	1310.89
790+00	28' LT	1311.82	18' LT	1312
790+50	28' LT	1313.2	18' LT	1313.48
791+00	28' LT	1315.19	18' LT	1315.45
791+50	28' LT	1317.39	18' LT	1317.62
792+00	28' LT	1319.67	18' LT	1319.94
792+50	28' LT	1322.15	18' LT	1322.4
793+00	28' LT	1324.54	18' LT	1324.76
793+50	28' LT	1326.76	18' LT	1326.95
794+00	28' LT	1328.87	18' LT	1329.04
794+50	28' LT	1330.87	18' LT	1331.04
795+00	28' LT	1332.79	18' LT	1332.95
795+50	28' LT	1334.47	18' LT	1334.65
796+00	28.29' LT	1336.12	18' LT	1336.28
796+50	29.27' LT	1337.62	18' LT	1337.82
797+00	30.25' LT	1339.06	18' LT	1339.34
797+50	31.23' LT	1340.75	18' LT	1341.04
798+00	32.21' LT	1342.55	18' LT	1342.82

SH46 WIDENING TABLE - RIGHT SIDE				
	SAWCUT LINE		PROPOSED EOP	
STATION	OFFSET	ELEV	OFFSET	ELEV
788+00	18' RT	1310.12	28' RT	1309.99
788+50	18' RT	1309.81	28' RT	1309.59
789+00	18' RT	1310.1	28' RT	1309.86
789+50	18' RT	1310.81	28' RT	1310.64
790+00	18' RT	1312.1	28' RT	1311.97
790+50	18' RT	1313.65	28' RT	1313.54
791+00	18' RT	1315.46	28' RT	1315.2
791+50	18' RT	1317.66	28' RT	1317.47
792+00	18' RT	1320.08	28' RT	1319.89
792+50	18' RT	1322.55	28' RT	1322.38
793+00	18' RT	1324.82	28' RT	1324.64
793+50	18' RT	1327	28' RT	1326.83
794+00	18' RT	1329.02	28' RT	1328.84
794+50	18' RT	1331.07	28' RT	1330.91
795+00	18' RT	1332.95	28' RT	1332.79
795+50	18' RT	1334.77	28' RT	1334.65
796+00	18' RT	1336.33	28.23' RT	1336.19
796+50	18' RT	1337.83	28.99' RT	1337.65
797+00	18' RT	1339.41	29.75' RT	1339.18
797+50	18' RT	1341.07	30.51' RT	1340.84
798+00	18' RT	1342.8	31.27' RT	1342.64

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COUNTY ENGINEER

NOTES:

1. SAWCUT TO BE SUBSIDIARY TO THE PERTINENT BID ITEMS.
2. ALL STATIONS, OFFSETS, AND ELEVATIONS SHOWN IN THE WIDENING TABLES ARE REFERENCED FROM SH 46 BASELINE ALIGNMENT.

ESTIMATED QUANTITIES			215-7-22
ITEM	DESCRIPTION	UNIT	QTY
0100 6002	PREPARING ROW	STA	10.0
0110 6001	EXCAVATION (ROADWAY)	CY	672
0132 6001	EMBANKMENT (FINAL) (ORD COMP) (TY A)	CY	864
0247 6366	FL BS (CMP IN PLC) (TY A GR 5) FNL POS	CY	822
0310 6009	PRIME COAT (MC-30)	GAL	697
0316 6240	AGGR (TY-PD GR-4 SAC-B)	CY	70
0316 6410	ASPH (AC-15P, AC-20-5TR, AC-20XP, AC10-2TR)	GAL	3794
0316 XXX1	AGGR (TY-PD GR-3)	CY	57
0341 6064	D-GR HMA TY-D PG 70-22 (LEVEL-UP)	TON	32
0432 6001	RIPRAP (CONC) (4 IN)	CY	10
0432 6045	RIPRAP (MOW STRIP) (4 IN)	CY	30
0530 6004	DRIVEWAYS (CONC)	SY	
0530 6005	DRIVEWAYS (ACP)	SY	
0530 6006	DRIVEWAYS (SURF TREAT)	SY	87
0530 6008	TURNOUTS (ACP)	EA	
0530 6009	TURNOUTS (SURF TREAT)	EA	
0540 6001	MTL W-BEAM GD FEN (TIM POST)	LF	497
0540 6014	MTL W-BEAM GD FEN (TIM POST) SHORT RADIUS	LF	
0540 6016	DOWNSTREAM ANCHOR TERMINAL SECTION	EA	1
0544 6001	GUARDRAIL END TREATMENT (INSTALL)	EA	2
0552 XXX1	REMOVE AND INSTALL PIPE FENCE AND GATE	LF	
0560 6001	MAILBOX INSTALL-S (TWG-POST) TY 1	EA	
0560 6003	MAILBOX INSTALL-M (TWG-POST) TY 1	EA	

LEGEND:

- EXIST EDGE OF ROADWAY
- EXIST FENCE
- EXIST UTILITY
- RIGHT OF WAY (ROW)
- MAIL BOX
- DRIVEWAY NUMBER (A1)
- ROADWAY WIDENING
- CONCRETE RIPRAP (4")
- DIRECTION OF TRAFFIC

50 25 0 100

HORIZ SCALE: 1"=100'

NO.	DATE	REVISION	APPR

PRELIMINARY

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bidding or permit purposes.

100% SUBMITTAL

Engineer:
LARRY ZAMORA, PE
P.E. No: 88698 Date: 2/16/2016

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY
TBPE REGISTRATION No. F-2614

BAIN MEDINA BAIN, INC.
ENGINEERS & SURVEYORS
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7073 San Pedro, San Antonio, Texas, 78216
Phone: 210-494-7223 Fax: 210-490-5120 WWW.BMBI.COM

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SH 46
SEGMENT 0

ROADWAY LAYOUTS
STA 778+00 TO STA 788+00

SHEET 3 OF 9

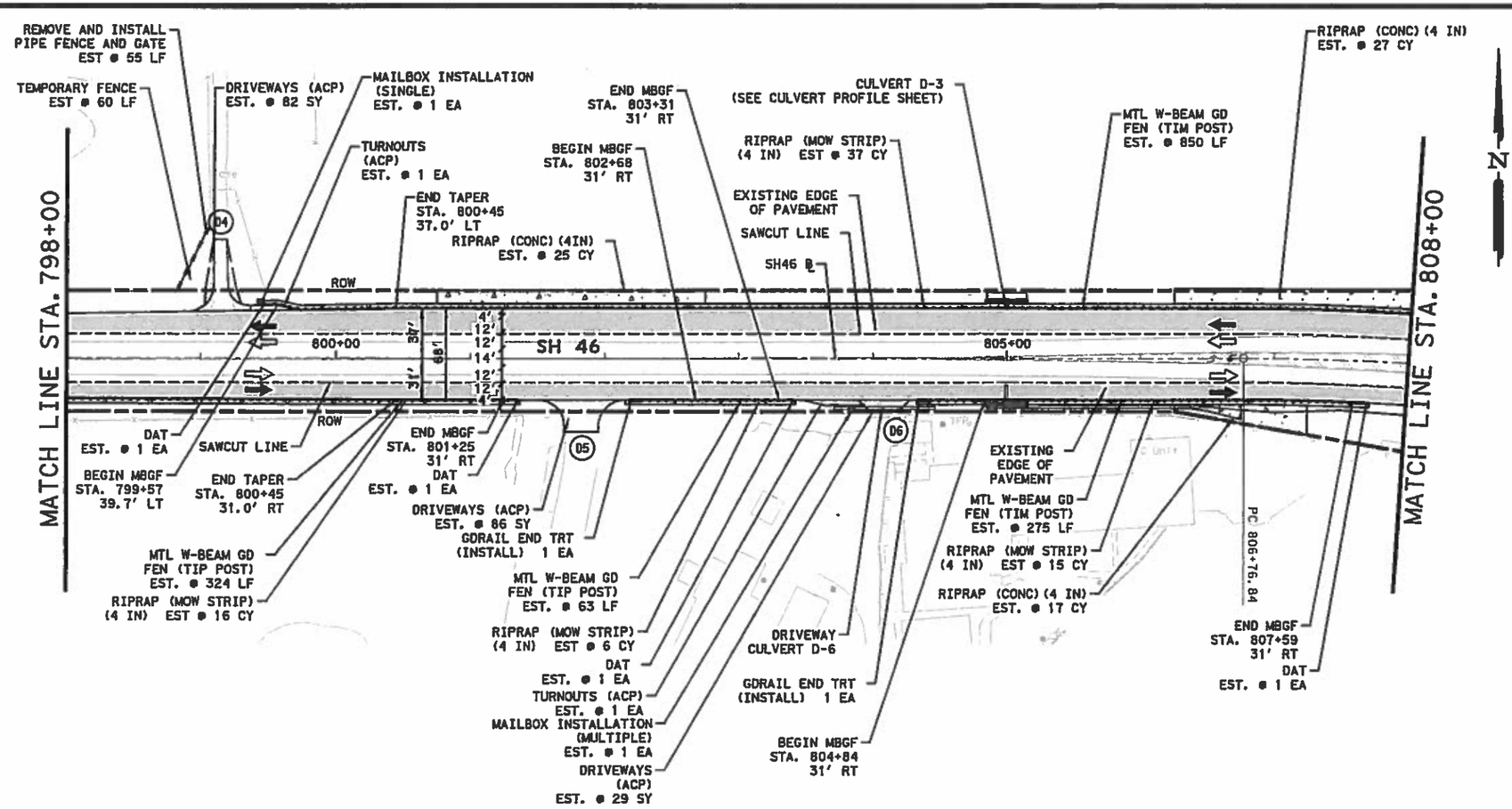
DIST.	PROJECT	SHEET NO.
		225

STATE	DIST.	COUNTY	
TEXAS	SAT	KENDALL, ETC	
CONT.	SECT.	JOB	HIGHWAY NO.
0215	06	037, ETC	SH 46

2/16/2016

TIME

FILE



ESTIMATED QUANTITIES			215-7-22
ITEM	DESCRIPTION	UNIT	QTY
0100 6002	PREPARING ROW	STA	10.0
0110 6001	EXCAVATION (ROADWAY)	CY	802
0132 6001	EMBANKMENT (FINAL) (ORD COMP) (TY A)	CY	1244
0247 6366	FL BS (CMP IN PLC) (TY A GR 5) FNL POS	CY	1311
0310 6009	PRIME COAT (MC-30)	GAL	1047
0316 6240	AGGR (TY-PD GR-4 SAC-B)	CY	83
0316 6410	ASPH (AC-15P, AC-20-5TR, AC-20XP, AC10-2TR)	GAL	4494
0316 XXX1	AGGR (TY-PD GR-3)	CY	68
0341 6064	D-GR HMA TY-D PG 70-22 (LEVEL-UP)	TON	27
0432 6001	RIPRAP (CONC) (4 IN)	CY	69
0432 6046	RIPRAP (MOW STRIP) (4 IN)	CY	74
0530 6004	DRIVEWAYS (CONC)	SY	
0530 6005	DRIVEWAYS (ACP)	SY	197
0530 6006	DRIVEWAYS (SURF TREAT)	SY	
0530 6008	TURNOUTS (ACP)	EA	2
0530 6009	TURNOUTS (SURF TREAT)	EA	
0540 6001	MTL W-BEAM GD FEN (TIM POST)	LF	1512
0540 6014	MTL W-BEAM GD FEN (TIM POST) SHORT RADIUS	LF	
0540 6016	DOWNSTREAM ANCHOR TERMINAL SECTION	EA	4
0544 6001	GUARDRAIL END TREATMENT (INSTALL)	EA	2
0552 XXX1	REMOVE AND INSTALL PIPE FENCE AND GATE	LF	55
0560 6001	MAILBOX INSTALL-S (TWG-POST) TY 1	EA	1
0560 6003	MAILBOX INSTALL-M (TWG-POST) TY 1	EA	1

LEGEND:

EXIST EDGE OF ROADWAY
EXIST FENCE
EXIST UTILITY
RIGHT OF WAY (ROW)
MAIL BOX
DRIVEWAY NUMBER (A1)
ROADWAY WIDENING
CONCRETE RIPRAP (4")
DIRECTION OF TRAFFIC

50 25 0 100
HORIZ SCALE: 1"=100'

NO.	DATE	REVISION	APPR

PRELIMINARY

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Engineer: LARRY ZAMORA, PE
P.E. No: 88696 Date: 2/16/2016

Lockwood, Andrews & Newnam, Inc.
A LCG A DAILY COMPANY
TBPE REGISTRATION No. F-2614

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SH 46
SEGMENT D

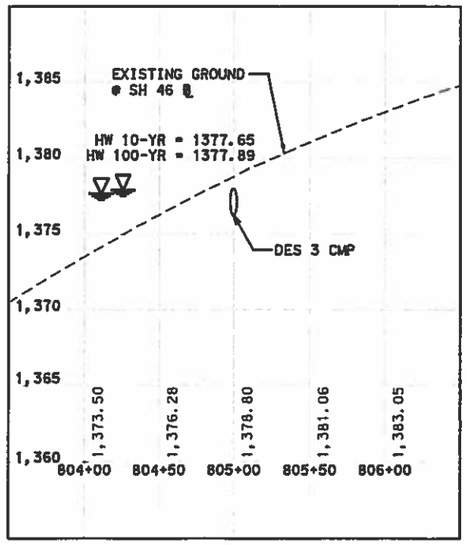
ROADWAY LAYOUTS
STA 798+00 TO STA 808+00

SHEET 4 OF 9

DIST.	COUNTY	PROJECT	SHEET NO.
			226
STATE	DIST.	COUNTY	
TEXAS	SAT	KENDALL, ETC	
CONT.	SECT.	JOB	HIGHWAY NO.
0215	06	037, ETC	SH 46

SH46 WIDENING TABLE - LEFT SIDE				
	PROPOSED EOP		SAWCUT LINE	
STATION	OFFSET	ELEV	OFFSET	ELEV
798+00	32.21' LT	1342.55	18' LT	1342.82
798+50	33.19' LT	1344.58	18' LT	1344.79
799+00	34.17' LT	1346.41	18' LT	1346.66
799+50	35.14' LT	1347.87	18' LT	1348.32
800+00	36.12' LT	1349.75	18' LT	1350.25
800+50	37' LT	1351.87	18' LT	1352.41
801+00	37' LT	1354.09	18' LT	1354.73
801+50	37' LT	1357.1	18' LT	1357.51
802+00	37' LT	1360.48	18' LT	1360.64
802+50	37' LT	1363.53	18' LT	1363.78
803+00	37' LT	1369.39	18' LT	1370.07
803+50	37' LT	1369.39	0' LT	0
804+00	37' LT	1372.45	18' LT	1372.99
804+50	37' LT	1375.54	18' LT	1375.92
805+00	37' LT	1378.65	18' LT	1378.72
805+50	37' LT	1381.03	18' LT	1381.05
806+00	37' LT	1383.5	18' LT	1383.27
806+50	37' LT	1385.65	18' LT	1385.21
807+00	37' LT	1387.5	18' LT	1386.87
807+50	37' LT	1389.16	18' LT	1388.37
808+00	37' LT	1390.29	18' LT	1389.47

SH46 WIDENING TABLE - RIGHT SIDE				
	SAWCUT LINE		PROPOSED EOP	
STATION	OFFSET	ELEV	OFFSET	ELEV
798+00	18' RT	1342.8	31.27' RT	1342.64
798+50	18' RT	1344.78	32.03' RT	1344.58
799+00	18' RT	1346.52	31.77' RT	1346.22
799+50	18' RT	1348.4	31.51' RT	1348.1
800+00	18' RT	1350.4	31.24' RT	1350.15
800+50	18' RT	1352.43	31' RT	1352.14
801+00	18' RT	1354.81	31' RT	1354.52
801+50	18' RT	1357.56	31' RT	1357.42
802+00	18' RT	1360.51	31' RT	1360.3
802+50	18' RT	1363.59	31' RT	1363.46
803+00	18' RT	1366.92	31' RT	1366.72
803+50	18' RT	1370.16	31' RT	1369.92
804+00	18' RT	1373.18	31' RT	1372.94
804+50	18' RT	1375.92	31' RT	1375.67
805+00	18' RT	1378.49	31' RT	1378.27
805+50	18' RT	1380.67	31' RT	1380.39
806+00	18' RT	1382.73	31' RT	1382.49
806+50	18' RT	1384.32	31' RT	1383.98
807+00	18' RT	1385.57	31' RT	1385.19
807+50	18' RT	1386.83	31' RT	1386.26
808+00	18' RT	1387.92	31' RT	1387.37



NOTES:

1. SAWCUT TO BE SUBSIDIARY TO THE PERTINENT BID ITEMS.
2. ALL STATIONS, OFFSETS, AND ELEVATIONS SHOWN IN THE WIDENING TABLES ARE REFERENCED FROM SH 46 BASELINE ALIGNMENT.

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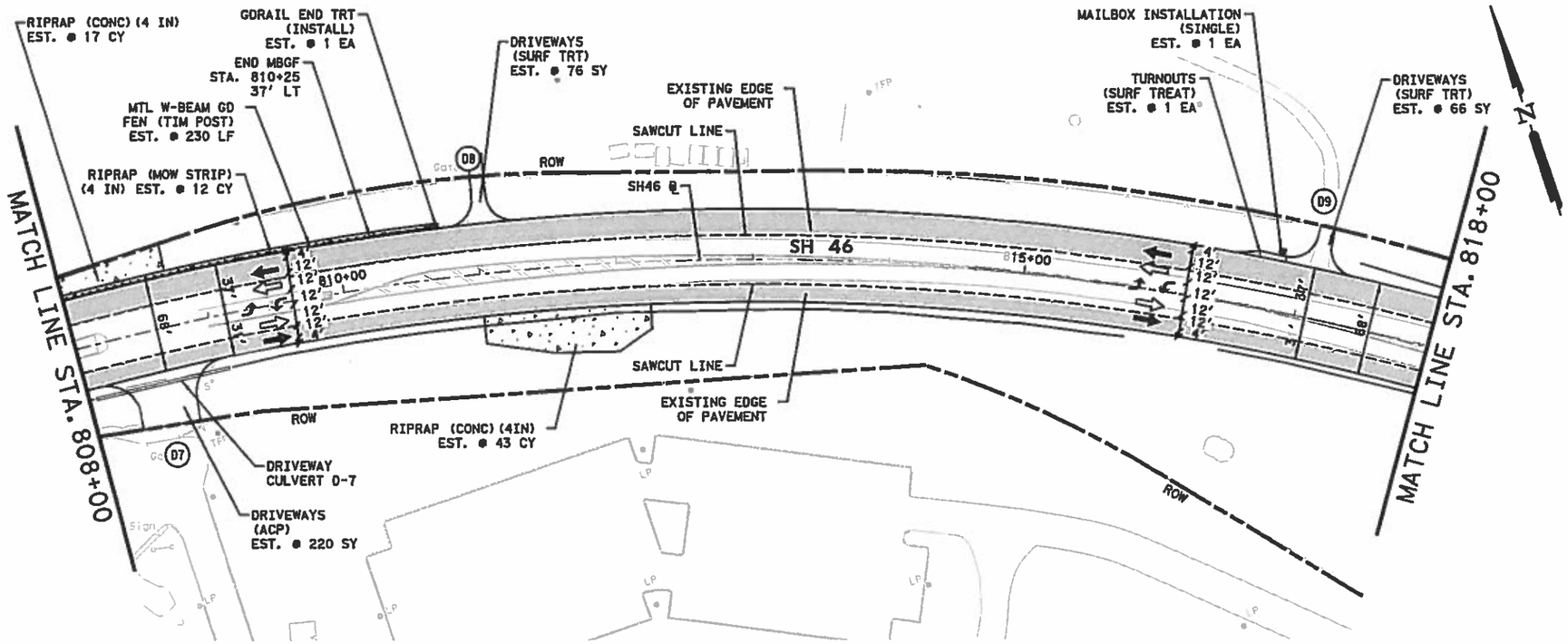

ESTIMATED QUANTITIES			215-7-22
ITEM	DESCRIPTION	UNIT	QTY
0100 6002	PREPARING ROW	STA	10.0
0110 6001	EXCAVATION (ROADWAY)	CY	1417
0132 6001	EMBANKMENT (FINAL) (ORD COMP) (TY A)	CY	1416
0247 6366	FL BS (CMP IN PLC) (TY A GR 5) FNL POS	CY	1259
0310 6009	PRIME COAT (MC-30)	GAL	1067
0316 6240	AGGR (TY-PD GR-4 SAC-B)	CY	84
0316 6410	ASPH (AC-15P, AC-20-5TR, AC-20XP, AC10-2TR)	GAL	4534
0316 XXX1	AGGR (TY-PD GR-3)	CY	69
0341 6064	D-GR HMA TY-D PG 70-22 (LEVEL-UP)	TON	28
0432 6001	RIPRAP (CONC) (4 IN)	CY	60
0432 6045	RIPRAP (MOW STRIP) (4 IN)	CY	12
0530 6004	DRIVEWAYS (CONC)	SY	
0530 6005	DRIVEWAYS (ACP)	SY	220
0530 6006	DRIVEWAYS (SURF TREAT)	SY	142
0530 6008	TURNOUTS (ACP)	EA	
0530 6009	TURNOUTS (SURF TREAT)	EA	1
0540 6001	MTL W-BEAM GD FEN (TIM POST)	LF	230
0540 6014	MTL W-BEAM GD FEN (TIM POST) SHORT RADIUS	LF	
0540 6016	DOWNSTREAM ANCHOR TERMINAL SECTION	EA	
0544 6001	GUARDRAIL END TREATMENT (INSTALL)	EA	1
0552 XXX1	REMOVE AND INSTALL PIPE FENCE AND GATE	LF	
0560 6001	MAILBOX INSTALL-S (TWG-POST) TY 1	EA	1
0560 6003	MAILBOX INSTALL-M (TWG-POST) TY 1	EA	

LEGEND:

- EXIST EDGE OF ROADWAY
- EXIST FENCE
- EXIST UTILITY
- RIGHT OF WAY (ROW)
- MAIL BOX
- DRIVEWAY NUMBER (A1)
- ROADWAY WIDENING
- CONCRETE RIPRAP (4")
- DIRECTION OF TRAFFIC

SH46 WIDENING TABLE - LEFT SIDE				
	PROPOSED EOP		SAWCUT LINE	
STATION	OFFSET	ELEV	OFFSET	ELEV
808+00	37' LT	1390.29	18' LT	1389.47
808+50	37' LT	1391.12	18' LT	1390.32
809+00	37' LT	1391.91	18' LT	1391.07
809+50	37' LT	1392.45	18' LT	1391.59
810+00	37' LT	1392.94	18' LT	1392.05
810+50	37' LT	1393.33	18' LT	1392.44
811+00	37' LT	1393.54	18' LT	1392.63
811+50	37' LT	1393.45	18' LT	1392.6
812+00	37' LT	1393.29	18' LT	1392.46
812+50	37' LT	1392.96	18' LT	1392.13
813+00	37' LT	1392.64	18' LT	1391.81
813+50	37' LT	1392.11	18' LT	1391.25
814+00	37' LT	1391.27	18' LT	1390.46
814+50	37' LT	1390.23	18' LT	1389.44
815+00	37' LT	1389.33	18' LT	1388.45
815+50	37' LT	1388.09	18' LT	1387.22
816+00	37' LT	1386.68	18' LT	1385.83
816+50	37' LT	1385.09	18' LT	1384.27
817+00	37' LT	1383.36	18' LT	1382.57
817+50	37' LT	1381.59	18' LT	1380.74
818+00	37' LT	1379.65	18' LT	1378.75

SH46 WIDENING TABLE - RIGHT SIDE				
	SAWCUT LINE		PROPOSED EOP	
STATION	OFFSET	ELEV	OFFSET	ELEV
808+00	18' RT	1387.92	31' RT	1387.37
808+50	18' RT	1388.72	31' RT	1388.12
809+00	18' RT	1389.4	31' RT	1388.78
809+50	18' RT	1389.9	31' RT	1389.31
810+00	18' RT	1390.31	31' RT	1389.67
810+50	18' RT	1390.68	31' RT	1390.02
811+00	18' RT	1390.92	31' RT	1390.3
811+50	18' RT	1390.9	31' RT	1390.26
812+00	18' RT	1390.76	31' RT	1390.16
812+50	18' RT	1390.58	31' RT	1390.05
813+00	18' RT	1390	31' RT	1389.54
813+50	18' RT	1389.54	31' RT	1388.99
814+00	18' RT	1388.85	31' RT	1388.24
814+50	18' RT	1387.98	31' RT	1387.67
815+00	18' RT	1386.85	31' RT	1386.39
815+50	18' RT	1385.79	31' RT	1385.35
816+00	18' RT	1384.37	31' RT	1383.9
816+50	18' RT	1382.75	31' RT	1382.21
817+00	18' RT	1381.06	31' RT	1380.52
817+50	18' RT	1379.2	31' RT	1378.67
818+00	18' RT	1377.17	31' RT	1376.64

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NOTES:

1. SAWCUT TO BE SUBSIDIARY TO THE PERTINENT BID ITEMS.
2. ALL STATIONS, OFFSETS, AND ELEVATIONS SHOWN IN THE WIDENING TABLES ARE REFERENCED FROM SH 46 BASELINE ALIGNMENT.

NO.	DATE	REVISION	APPR

PRELIMINARY

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100% SUBMITTAL

Engineer: LARRY ZAMORA, PE
P.E. No: 88698 Date: 2/16/2016

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY
TBPE REGISTRATION No. F-2614

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SH 46
SEGMENT D

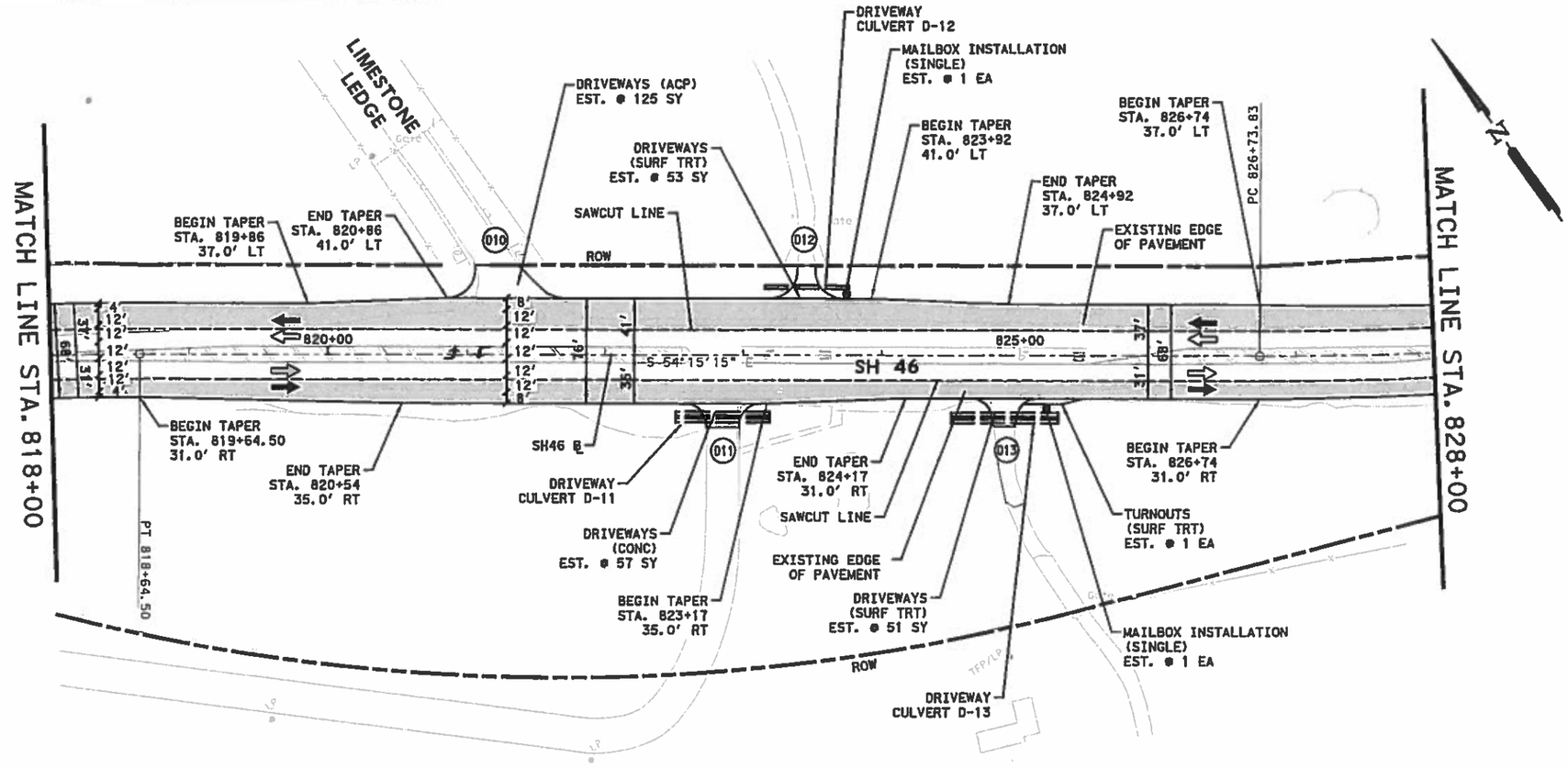
ROADWAY LAYOUTS
STA 808+00 TO STA 818+00

SHEET 5 OF 9

DIV. NO.	PROJECT	SHEET NO.
		227

STATE	DIST.	COUNTY
TEXAS	SAT	KENDALL, ETC

CONT.	SECT.	JOB	HIGHWAY NO.
0215	06	037, ETC	SH 46



ESTIMATED QUANTITIES			215-7-22
ITEM	DESCRIPTION	UNIT	QTY
0100 6002	PREPARING ROW	STA	10.0
0110 6001	EXCAVATION (ROADWAY)	CY	2032
0132 6001	EMBANKMENT (FINAL) (ORD COMP) (TY A)	CY	1003
0247 6366	FL BS (CMP IN PLC) (TY A GR 5) FNL POS	CY	1439
0310 6009	PRIME COAT (MC-30)	GAL	1161
0316 6240	AGGR (TY-PD GR-4 SAC-B)	CY	87
0316 6410	ASPH (AC-15P, AC-20-5TR, AC-20XP, AC10-2TR)	GAL	4722
0316 XXX1	AGGR (TY-PD GR-3)	CY	72
0341 6064	D-GR HMA TY-D PG 70-22 (LEVEL-UP)	TON	30
0432 6001	RIPRAP (CONC) (4 IN)	CY	
0432 6045	RIPRAP (MOW STRIP) (4 IN)	CY	
0530 6004	DRIVEWAYS (CONC)	SY	57
0530 6005	DRIVEWAYS (ACP)	SY	125
0530 6006	DRIVEWAYS (SURF TREAT)	SY	104
0530 6008	TURNOUTS (ACP)	EA	
0530 6009	TURNOUTS (SURF TREAT)	EA	1
0540 6001	MTL W-BEAM GD FEN (TIM POST)	LF	
0540 6014	MTL W-BEAM GD FEN (TIM POST) SHORT RADIUS	LF	
0540 6016	DOWNSTREAM ANCHOR TERMINAL SECTION	EA	
0544 6001	GUARDRAIL END TREATMENT (INSTALL)	EA	
0552 XXX1	REMOVE AND INSTALL PIPE FENCE AND GATE	LF	
0560 6001	MAILBOX INSTALL-S (TWG-POST) TY 1	EA	2
0560 6003	MAILBOX INSTALL-M (TWG-POST) TY 1	EA	

LEGEND:

- EXIST EDGE OF ROADWAY
- EXIST FENCE
- EXIST UTILITY
- RIGHT OF WAY (ROW)
- MAIL BOX
- DRIVEWAY NUMBER (A1)
- ROADWAY WIDENING
- CONCRETE RIPRAP (4")
- DIRECTION OF TRAFFIC

50 25 0 100

HORIZ SCALE: 1"=100'

NO.	DATE	REVISION	APPR

PRELIMINARY

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100% SUBMITTAL

Engineer: LARRY ZAMORA, PE
P.E. No: 88698 Date: 2/16/2016

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY
TBPE REGISTRATION No. F-2614

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SH 46
SEGMENT D

ROADWAY LAYOUTS
STA 818+00 TO STA 828+00

SHEET 6 OF 9

DIST.	COUNTY	PROJECT	SHEET NO.
			228
STATE	DIST.	COUNTY	
TEXAS	SAT	KENDALL, ETC	
CONT.	SECT.	JOB	HIGHWAY NO.
0215	06	037, ETC	SH 46

SH46 WIDENING TABLE - LEFT SIDE				
	PROPOSED EOP		SAWCUT LINE	
STATION	OFFSET	ELEV	OFFSET	ELEV
818+00	37' LT	1379.65	18' LT	1378.75
818+50	37' LT	1377.48	18' LT	1376.68
819+00	37' LT	1375.06	18' LT	1374.54
819+50	37' LT	1372.54	18' LT	1372.34
820+00	37.57' LT	1370.3	18' LT	1370.23
820+50	39.57' LT	1367.98	18' LT	1368.05
821+00	41' LT	1365.72	18' LT	1365.9
821+50	41' LT	1363.63	18' LT	1363.82
822+00	41' LT	1361.38	18' LT	1361.72
822+50	41' LT	1359.11	18' LT	1359.64
823+00	41' LT	1357.32	18' LT	1357.69
823+50	41' LT	1355.55	18' LT	1355.78
824+00	40.69' LT	1353.57	18' LT	1353.78
824+50	38.69' LT	1351.68	18' LT	1351.84
825+00	37' LT	1349.53	18' LT	1349.79
825+50	37' LT	1347.32	18' LT	1347.71
826+00	37' LT	1345.11	18' LT	1345.62
826+50	37' LT	1343.35	18' LT	1343.77
827+00	36.26' LT	1341.6	18' LT	1342.01
827+50	35.26' LT	1340.07	18' LT	1340.45
828+00	34.27' LT	1338.28	18' LT	1338.74

SH46 WIDENING TABLE - RIGHT SIDE				
	SAWCUT LINE		PROPOSED EOP	
STATION	OFFSET	ELEV	OFFSET	ELEV
818+00	18' RT	1377.17	31' RT	1376.64
818+50	18' RT	1375.36	31' RT	1374.95
819+00	18' RT	1373.56	31.75' RT	1373.19
819+50	18' RT	1371.59	32.81' RT	1371.13
820+00	18' RT	1369.58	33.87' RT	1369.06
820+50	18' RT	1367.52	34.92' RT	1366.99
821+00	18' RT	1365.56	35' RT	1365.1
821+50	18' RT	1363.59	35' RT	1363.24
822+00	18' RT	1361.65	35' RT	1361.34
822+50	18' RT	1359.65	35' RT	1359.26
823+00	18' RT	1357.62	35' RT	1357.28
823+50	18' RT	1355.59	33.7' RT	1355.27
824+00	18' RT	1353.57	31.7' RT	1353.37
824+50	18' RT	1351.68	31' RT	1351.49
825+00	18' RT	1349.75	31' RT	1349.56
825+50	18' RT	1347.8	31' RT	1347.59
826+00	18' RT	1345.94	31' RT	1345.89
826+50	18' RT	1344.3	31' RT	1344.4
827+00	18' RT	1342.52	30.84' RT	1342.7
827+50	18' RT	1341.03	30.53' RT	1341.2
828+00	18' RT	1339.6	30.23' RT	1340

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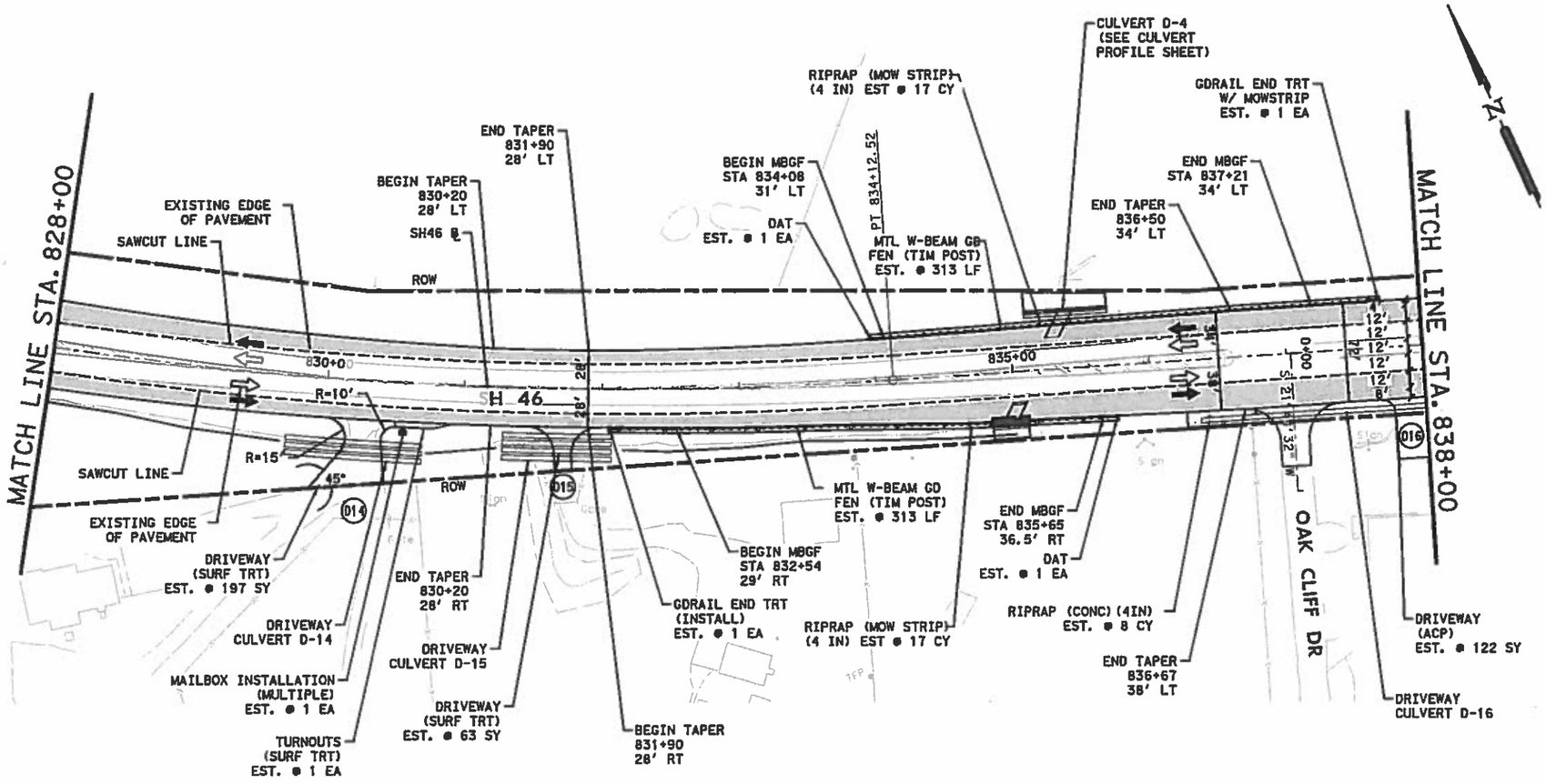
JUN 28 2016
COUNTY ENGINEER

NOTES:

1. SAWCUT TO BE SUBSIDIARY TO THE PERTINENT BID ITEMS.
2. ALL STATIONS, OFFSETS, AND ELEVATIONS SHOWN IN THE WIDENING TABLES ARE REFERENCED FROM SH 46 BASELINE ALIGNMENT.

&TIME&
2/16/2016
&FILE&



ESTIMATED QUANTITIES			216-7-22
ITEM	DESCRIPTION	UNIT	QTY
0100 6002	PREPARING ROW	STA	10.0
0110 6001	EXCAVATION (ROADWAY)	CY	1106
0132 6001	EMBANKMENT (FINAL) (ORD COMP) (TY A)	CY	1797
0247 6366	FL BS (CMP IN PLC) (TY A GR 5) FNL POS	CY	1070
0310 6009	PRIME COAT (MC-30)	GAL	897
0316 6240	AGGR (TY-PD GR-4 SAC-B)	CY	78
0316 6410	ASPH (AC-15P, AC-20-5TR, AC-20XP, AC10-2TR)	GAL	4194
0316 XXX1	AGGR (TY-PD GR-3)	CY	64
0341 6064	D-GR HMA TY-D PG 70-22 (LEVEL-UP)	TON	32
0432 6001	RIPRAP (CONC) (4 IN)	CY	8
0432 6045	RIPRAP (MOW STRIP) (4 IN)	CY	34
0530 6004	DRIVEWAYS (CONC)	SY	
0530 6005	DRIVEWAYS (ACP)	SY	122
0530 6006	DRIVEWAYS (SURF TREAT)	SY	260
0530 6008	TURNOUTS (ACP)	EA	
0530 6009	TURNOUTS (SURF TREAT)	EA	1
0540 6001	MTL W-BEAM GD FEN (TIM POST)	LF	626
0540 6014	MTL W-BEAM GD FEN (TIM POST) SHORT RADIUS	LF	
0540 6016	DOWNSTREAM ANCHOR TERMINAL SECTION	EA	2
0544 6001	GUARDRAIL END TREATMENT (INSTALL)	EA	2
0552 XXX1	REMOVE AND INSTALL PIPE FENCE AND GATE	LF	
0560 6001	MAILBOX INSTALL-S (TWG-POST) TY 1	EA	
0560 6003	MAILBOX INSTALL-W (TWG-POST) TY 1	EA	1

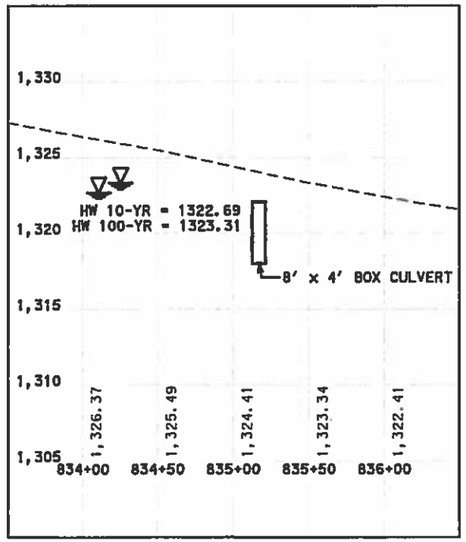
LEGEND:

EXIST EDGE OF ROADWAY
EXIST FENCE
EXIST UTILITY
RIGHT OF WAY (ROW)
MAIL BOX
DRIVEWAY NUMBER
ROADWAY WIDENING
CONCRETE RIPRAP (4")
DIRECTION OF TRAFFIC

50 25 0 100
HORIZ SCALE: 1"=100'

SH46 WIDENING TABLE - LEFT SIDE				
	PROPOSED EOP		SAWCUT LINE	
STATION	OFFSET	ELEV	OFFSET	ELEV
828+00	34.27' LT	1338.28	18' LT	1338.74
828+50	33.31' LT	1336.52	18' LT	1337.12
829+00	32.37' LT	1335.24	18' LT	1335.8
829+50	31.45' LT	1334.09	18' LT	1334.56
830+00	30.56' LT	1332.85	18' LT	1333.38
830+50	29.69' LT	1331.99	18' LT	1332.45
831+00	28.84' LT	1331.11	18' LT	1331.51
831+50	28.5' LT	1329.95	18' LT	1330.44
832+00	28.5' LT	1328.8	18' LT	1329.33
832+50	28.9' LT	1327.96	18' LT	1328.44
833+00	29.45' LT	1327.01	18' LT	1327.5
833+50	30.16' LT	1326.2	18' LT	1326.64
834+00	31.02' LT	1325.51	18' LT	1325.87
834+50	31.84' LT	1324.67	18' LT	1325.03
835+00	32.61' LT	1323.94	18' LT	1324.15
835+50	33.38' LT	1322.69	18' LT	1322.99
836+00	34.15' LT	1321.92	18' LT	1322.15
836+50	34.93' LT	1321.04	18' LT	1321.3
837+00	35' LT	1320	18' LT	1320.31
837+50	35' LT	1318.88	18' LT	1319.29
838+00	35' LT	1318.07	18' LT	1318.47

SH46 WIDENING TABLE - RIGHT SIDE				
	SAWCUT LINE		PROPOSED EOP	
STATION	OFFSET	ELEV	OFFSET	ELEV
828+00	18' RT	1339.6	30.23' RT	1340
828+50	18' RT	1338.38	29.93' RT	1338.74
829+00	18' RT	1337.16	29.65' RT	1337.59
829+50	18' RT	1336.03	29.37' RT	1336.56
830+00	18' RT	1334.82	29.11' RT	1335.23
830+50	18' RT	1333.85	28.85' RT	1334.27
831+00	18' RT	1332.57	28.6' RT	1332.85
831+50	18' RT	1331.65	28.5' RT	1331.89
832+00	18' RT	1330.61	28.5' RT	1330.96
832+50	18' RT	1329.84	28.79' RT	1330.21
833+00	18' RT	1328.78	29.3' RT	1329.11
833+50	18' RT	1327.59	30.03' RT	1327.84
834+00	18' RT	1326.51	32.02' RT	1326.77
834+50	18' RT	1325.52	35.06' RT	1325.55
835+00	18' RT	1324.45	36.61' RT	1324.5
835+50	18' RT	1323.28	37.38' RT	1323.21
836+00	18' RT	1322.29	38.16' RT	1322.16
836+50	18' RT	1321.37	38.93' RT	1321.13
837+00	18' RT	1320.41	39.11' RT	1320.14
837+50	18' RT	1319.42	39' RT	1319.06
838+00	18' RT	1318.49	39' RT	1318.03



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JUN 28 2016
COUNTY ENGINEER

NOTES:

1. SAWCUT TO BE SUBSIDIARY TO THE PERTINENT BID ITEMS.
2. ALL STATIONS, OFFSETS, AND ELEVATIONS SHOWN IN THE WIDENING TABLES ARE REFERENCED FROM SH 46 BASELINE ALIGNMENT.

NO.	DATE	REVISION	APPR

PRELIMINARY
FOR REVIEW ONLY
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100% SUBMITTAL
Engineer: LARRY ZAMORA, PE
P.E. No: 88698 Date: 2/16/2016

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY
TBPE REGISTRATION No. F-2614

BAIN MEDINA BAIN, INC.
ENGINEERS & SURVEYORS
TBPE F-001718
7073 San Pedro, San Antonio, Texas, 78216
Phone: 210-494-7223 Fax: 210-490-5180 WWW.BMBI.COM

Texas Department of Transportation
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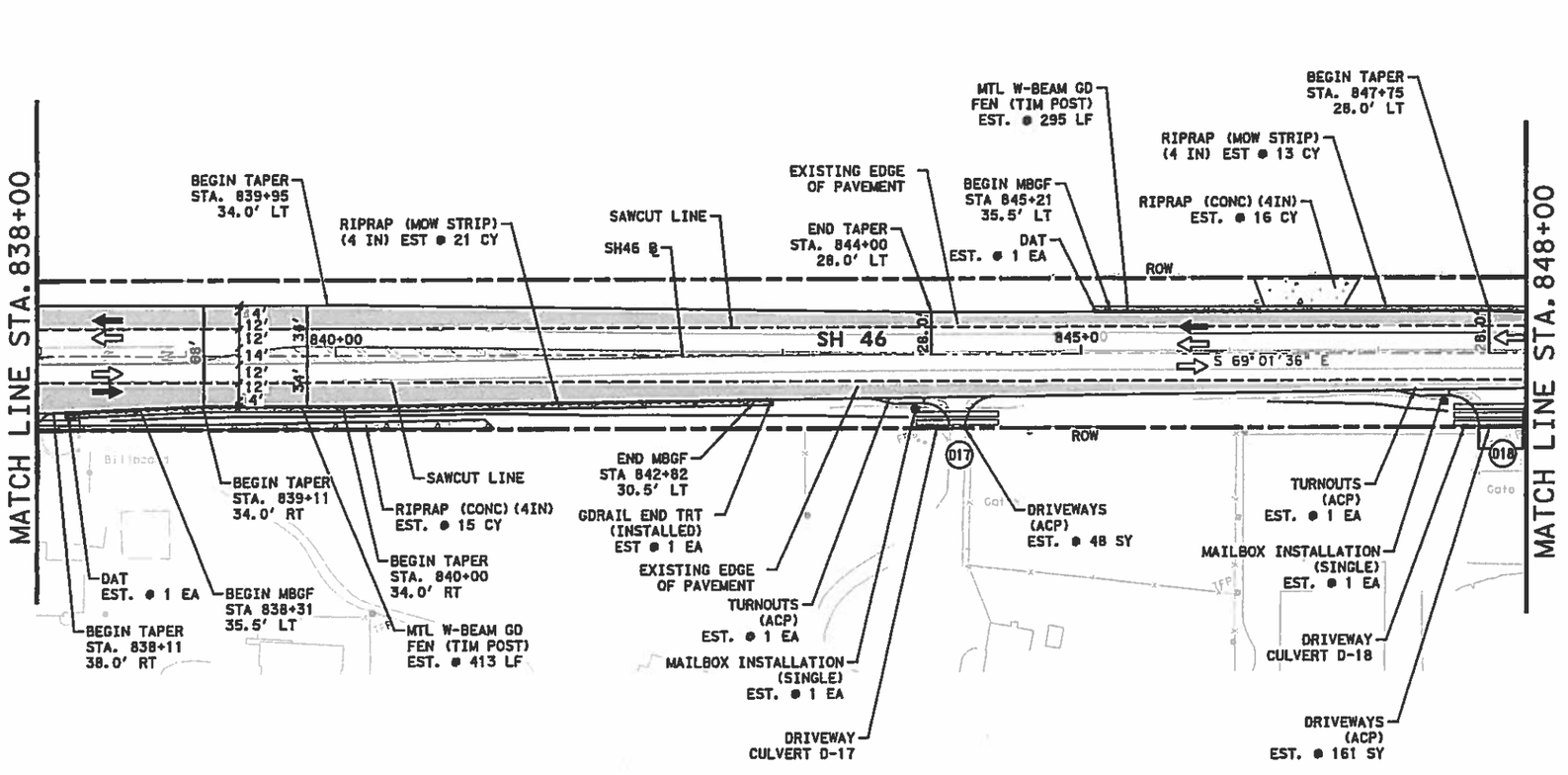
SH 46
SEGMENT 0
ROADWAY LAYOUTS
STA 828+00 TO STA 838+00

SHEET 7 OF 9

DIV. NO.	PROJECT		SHEET NO.
			229
STATE	DIST.	COUNTY	
TEXAS	SAT	KENDALL, ETC	
CONT.	SECT.	JOB	HIGHWAY NO.
0215	06	037, ETC	SH 46

2/16/2016



ESTIMATED QUANTITIES			215-7-22
ITEM	DESCRIPTION	UNIT	QTY
0100 6002	PREPARING ROW	STA	10.0
0110 6001	EXCAVATION (ROADWAY)	CY	1036
0132 6001	EMBANKMENT (FINAL) (ORD COMP) (TY A)	CY	692
0247 6366	FL BS (CMP IN PLC) (TY A GR 5) FNL POS	CY	896
0310 6009	PRIME COAT (MC-30)	GAL	739
0316 6240	AGGR (TY-PD GR-4 SAC-B)	CY	53
0316 6410	ASPH (AC-15P, AC-20-5TR, AC-20XP, AC10-2TR)	GAL	2838
0316 XXX1	AGGR (TY-PD GR-3)	CY	43
0341 6064	D-GR HMA TY-D PG 70-22 (LEVEL-UP)	TON	36
0432 6001	RIPRAP (CONC) (4 IN)	CY	31
0432 6045	RIPRAP (MOW STRIP) (4 IN)	CY	34
0530 6004	DRIVEWAYS (CONC)	SY	
0530 6005	DRIVEWAYS (ACP)	SY	209
0530 6006	DRIVEWAYS (SURF TREAT)	SY	
0530 6008	TURNOUTS (ACP)	EA	
0530 6009	TURNOUTS (SURF TREAT)	EA	
0540 6001	MTL W-BEAM GD FEN (TIM POST)	LF	708
0540 6014	MTL W-BEAM GD FEN (TIM POST) SHORT RADIUS	LF	
0540 6016	DOWNSTREAM ANCHOR TERMINAL SECTION	EA	2
0544 6001	GUARDRAIL END TREATMENT (INSTALL)	EA	1
0552 XXX1	REMOVE AND INSTALL PIPE FENCE AND GATE	LF	
0560 6001	MAILBOX INSTALL-S (TWG-POST) TY 1	EA	2
0560 6003	MAILBOX INSTALL-M (TWG-POST) TY 1	EA	

LEGEND:

- EXIST EDGE OF ROADWAY
- EXIST FENCE
- EXIST UTILITY
- RIGHT OF WAY (ROW)
- MAIL BOX
- DRIVEWAY NUMBER (A1)
- ROADWAY WIDENING
- CONCRETE RIPRAP (4")
- DIRECTION OF TRAFFIC

SH46 WIDENING TABLE - LEFT SIDE				
	PROPOSED EOP		SAWCUT LINE	
STATION	OFFSET	ELEV	OFFSET	ELEV
838+00	35' LT	1318.07	18' LT	1318.47
838+50	35' LT	1317.34	18' LT	1317.65
839+00	35' LT	1316.56	18' LT	1316.78
839+50	35' LT	1315.4	18' LT	1315.78
840+00	35' LT	1314.9	18' LT	1315.13
840+50	34.18' LT	1314.06	18' LT	1314.24
841+00	33.26' LT	1313.09	18' LT	1313.28
841+50	32.35' LT	1312.21	18' LT	1312.37
842+00	31.43' LT	1311.23	18' LT	1311.41
842+50	30.52' LT	1310.21	18' LT	1310.42
843+00	29.6' LT	1308.95	18' LT	1309.29
843+50	28.69' LT	1307.86	18' LT	1308.19
844+00	27.77' LT	1306.86	18' LT	1307.1
844+50	27.76' LT	1305.5	18' LT	1305.8
845+00	27.76' LT	1304.16	18' LT	1304.5
845+50	27.75' LT	1303.44	18' LT	1303.53
846+00	27.74' LT	1301.41	18' LT	1301.66
846+50	27.74' LT	1299.97	18' LT	1300.18
847+00	27.73' LT	1298.46	18' LT	1298.64
847+50	27.72' LT	1296.56	18' LT	1296.77
848+00	27.01' LT	1294.61	18' LT	1294.87

SH46 WIDENING TABLE - RIGHT SIDE				
	SAWCUT LINE		PROPOSED EOP	
STATION	OFFSET	ELEV	OFFSET	ELEV
838+00	18' RT	1318.49	39' RT	1318.03
838+50	18' RT	1317.6	37.45' RT	1317.2
839+00	18' RT	1316.67	35.45' RT	1316.33
839+50	18' RT	1315.74	35' RT	1315.45
840+00	18' RT	1314.91	35' RT	1314.48
840+50	18' RT	1314.01	34.25' RT	1313.65
841+00	18' RT	1313.09	33.41' RT	1312.74
841+50	18' RT	1312.2	32.58' RT	1311.89
842+00	18' RT	1311.33	31.74' RT	1311.08
842+50	18' RT	1310.34	30.91' RT	1310.07
843+00	18' RT	1309.3	30.07' RT	1308.96
843+50	18' RT	1308.1	29.24' RT	1307.75
844+00	18' RT	1307.02	28.41' RT	1306.81
844+50	18' RT	1305.8	27.57' RT	1305.55
845+00	18' RT	1304.53	26.74' RT	1304.24
845+50	18' RT	1303.14	25.9' RT	1302.9
846+00	18' RT	1301.58	25.07' RT	1301.37
846+50	18' RT	1300.04	24.23' RT	1299.86
847+00	18' RT	1298.51	23.40' RT	1298.41
847+50	18' RT	1296.66	22.56' RT	1296.56
848+00	18' RT	1294.93	21.73' RT	1294.86

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COUNTY ENGINEER

NOTES:

1. SAWCUT TO BE SUBSIDIARY TO THE PERTINENT BID ITEMS.
2. ALL STATIONS, OFFSETS, AND ELEVATIONS SHOWN IN THE WIDENING TABLES ARE REFERENCED FROM SH 46 BASELINE ALIGNMENT.

NO.	DATE	REVISION	APPR

PRELIMINARY

FOR REVIEW ONLY
Not for construction, bidding or permit purposes.

100% SUBMITTAL

Engineer:
LARRY ZAMORA, PE
P.E. No: 88696 Date: 2/16/2016

Lockwood, Andrews & Newnam, Inc.
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Phone: 210-494-7223 Fax: 210-490-3120 WWW.BMBI.COM

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SH 46
SEGMENT D

ROADWAY LAYOUTS
STA 838+00 TO STA 848+00

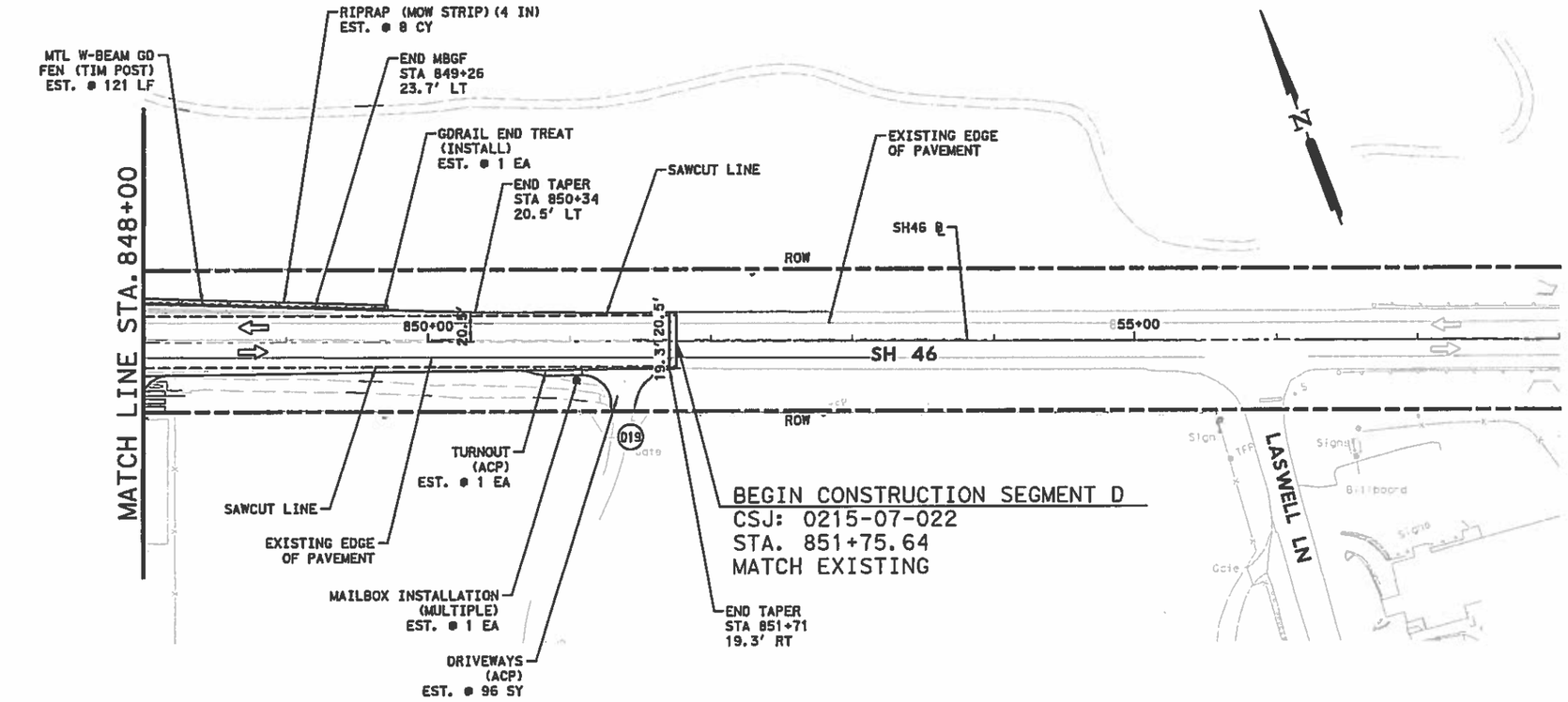
SHEET 8 OF 9

DIST. COUNTY	PROJECT	SHEET NO.
		230

STATE	DIST.	COUNTY
TEXAS	SAT	KENDALL, ETC

CONT.	SECT.	JOB	HIGHWAY NO.
0215	06	037, ETC	SH 46

2/16/2016



ESTIMATED QUANTITIES			215-7-22
ITEM	DESCRIPTION	UNIT	QTY
0100 6002	PREPARING ROW	STA	4.0
0110 6001	EXCAVATION (ROADWAY)	CY	200
0132 6001	EMBANKMENT (FINAL) (ORD COMP) (TY A)	CY	310
0247 6366	FL BS (CMP IN PLC) (TY A GR 5) FNL POS	CY	140
0310 6009	PRIME COAT (MC-30)	GAL	101
0316 6240	AGGR (TY-PD GR-4 SAC-B)	CY	21
0316 6410	ASPH (AC-15P, AC-20-5TR, AC-20XP, AC10-2TR)	GAL	1108
0316 XXX1	AGGR (TY-PD GR-3)	CY	17
0341 6064	D-GR HMA TY-D PG 70-22 (LEVEL-UP)	TON	15
0432 6001	RIPRAP (CONC) (4 IN)	CY	
0432 6045	RIPRAP (MOW STRIP) (4 IN)	CY	8
0530 6004	DRIVEWAYS (CONC)	SY	
0530 6005	DRIVEWAYS (ACP)	SY	96
0530 6006	DRIVEWAYS (SURF TREAT)	SY	
0530 6008	TURNOUTS (ACP)	EA	1
0530 6009	TURNOUTS (SURF TREAT)	EA	
0540 6001	MTL W-BEAM GD FEN (TIM POST)	LF	126
0540 6014	MTL W-BEAM GD FEN (TIM POST) SHORT RADIUS	LF	
0540 6016	DOWNSTREAM ANCHOR TERMINAL SECTION	EA	
0544 6001	GUARDRAIL END TREATMENT (INSTALL)	EA	1
0552 XXX1	REMOVE AND INSTALL PIPE FENCE AND GATE	LF	
0560 6001	MAILBOX INSTALL-S (TWG-POST) TY 1	EA	
0560 6003	MAILBOX INSTALL-M (TWG-POST) TY 1	EA	1

LEGEND:

- EXIST EDGE OF ROADWAY
- EXIST FENCE
- EXIST UTILITY
- RIGHT OF WAY (ROW)
- MAIL BOX
- DRIVEWAY NUMBER (A1)
- ROADWAY WIDENING
- CONCRETE RIPRAP (4")
- DIRECTION OF TRAFFIC

50 25 0 100

HORIZ SCALE: 1"=100'

SH46 WIDENING TABLE - LEFT SIDE				
	PROPOSED EOP		SAWCUT LINE	
STATION	OFFSET	ELEV	OFFSET	ELEV
848+00	27.01' LT	1294.61	18' LT	1294.87
848+50	25.59' LT	1292.77	18' LT	1293.02
849+00	24.17' LT	1291.01	18' LT	1291.17
849+50	22.74' LT	1289.12	18' LT	1289.28
850+00	21.32' LT	1287.58	18' LT	1287.67
850+50	20.44' LT	1286.21	18' LT	1286.25
851+00	20.36' LT	1284.57	18' LT	1284.63
851+50	20.29' LT	1283.33	18' LT	1283.39

SH46 WIDENING TABLE - RIGHT SIDE				
	SAWCUT LINE		PROPOSED EOP	
STATION	OFFSET	ELEV	OFFSET	ELEV
848+00	18' RT	1294.88	21.73' RT	1294.86
848+50	18' RT	1293.12	20.89' RT	1293.04
849+00	18' RT	1291.24	20.06' RT	1291.19
849+50	18' RT	1289.34	19.26' RT	1289.31
850+00	18' RT	1287.56	19.26' RT	1287.54
850+50	18' RT	1285.87	19.26' RT	1285.85
851+00	18' RT	1284.57	19.26' RT	1284.54
851+50	18' RT	1283.35	19.26' RT	1283.31

NOTES:

1. SAWCUT TO BE SUBSIDIARY TO THE PERTINENT BID ITEMS.
2. ALL STATIONS, OFFSETS, AND ELEVATIONS SHOWN IN THE WIDENING TABLES ARE REFERENCED FROM SH 46 BASELINE ALIGNMENT.

NO.	DATE	REVISION	APPR

PRELIMINARY

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100% SUBMITTAL

Engineer: LARRY ZAMORA, PE
P.E. No: 88696 Date: 2/16/2016

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY
TBPE REGISTRATION No. F-2614

RAIN MEDINA RAIN, INC.
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7073 San Pedro, San Antonio, Texas, 78216
Phone: 210-494-7233 Fax: 210-490-5120 WWW.RMRI.COM

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SH 46
SEGMENT D

ROADWAY LAYOUTS
STA 848+00 TO STA 851+75.64

SHEET 9 OF 9

DIST.	PROJECT	SHEET NO.
		231

STATE	DIST.	COUNTY	
TEXAS	SAT	KENDALL, ETC	
CONT.	SECT.	JOB	HIGHWAY NO.
0215	06	037, ETC	SH 46

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2/16/2016

SH 46 Grassy Swale Design Calculations

Design Method: TCEQ Technical Guidance Manual

Drainage Area ID	A_c Drainage Area (Ac)	A_I Impervious Cover (Ac)	Pervious Cover Area (Ac)	Swale Slope (%)	Side Slopes (h:v)	Design Depth (ft)	Swale Width (ft)	Calc. Flow (cfs)	Calc. Vel. (fps)	Reqired Swale Length (ft)	Meets Criteria (Y/N)	L_R TSS Load Removed
C3-1	0.55	0.32	0.23	1.4	3:1	0.33	2.0	0.34	0.42	126	Y	259 lbs

Total Load Removed from GS = 259 lbs

SH 46 VFS Design Calculations

Design Method: TCEQ Technical Guidance Manual

Drainage Area ID	A_c Drainage Area (Ac)	A_I Impervious Cover (Ac)	A_P Pervious Cover Area (Ac)	L_R TSS Load Removed
C3-2	0.24	0.17	0.07	166 lbs
C3-3	0.16	0.11	0.05	108 lbs
D1-1	0.34	0.20	0.14	196 lbs
D2-1	0.26	0.19	0.07	185 lbs
D2-2	0.26	0.19	0.07	185 lbs
D2-3	0.26	0.19	0.07	185 lbs
D3-1	0.09	0.08	0.01	78 lbs
D3-2	0.17	0.15	0.02	146 lbs
D4-1	1.17	0.99	0.18	964 lbs
D4-2	1.99	1.39	0.60	1358 lbs
D5-1	0.25	0.15	0.10	147 lbs

Total Load Removed from VFS = 3,718 lbs

Total Load Removed from GS = 259 lbs

Total Load Removed = 3,977 lbs

Required Load Removal = 3,510 lbs

+ 467 lbs

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JUN 28 2016

COUNTY ENGINEER

NO.	DATE	REVISION	APPR

STATE OF TEXAS
MARTIN PALACIOS
111619
LICENSED
PROFESSIONAL ENGINEER

Martin Palacios
NAME

11-4-14
DATE

BAIN MEDINA BAIN, INC.
ENGINEERS & SURVEYORS
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7073 San Pedro, San Antonio, Texas, 78216
Phone: 210-494-7223 Fax: 210-496-8120 WWW.BMBI.COM

Texas Department of Transportation

SH 46

CONTRIBUTING ZONE PLAN SUMMARY

SHEET 1 OF 1

DIST. COUNTY	PROJECT	SHEET NO.

STATE	DIST.	COUNTY
TEXAS	SAT	KENDALL, ETC
CONT.	SECT.	JOB / HIGHWAY NO.

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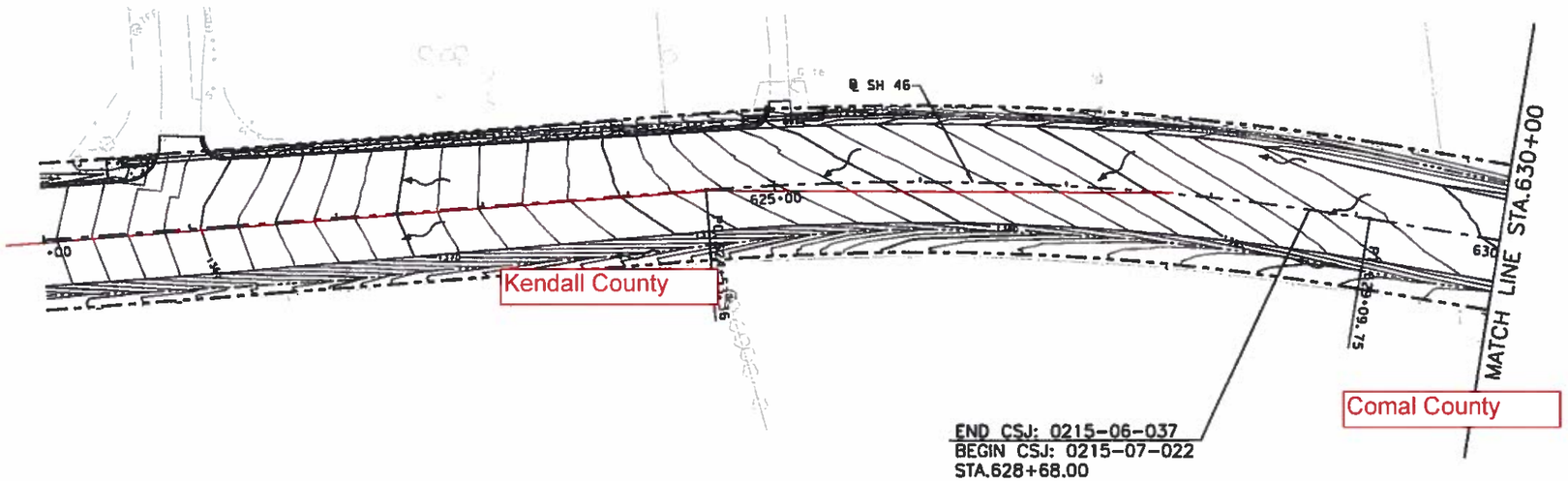

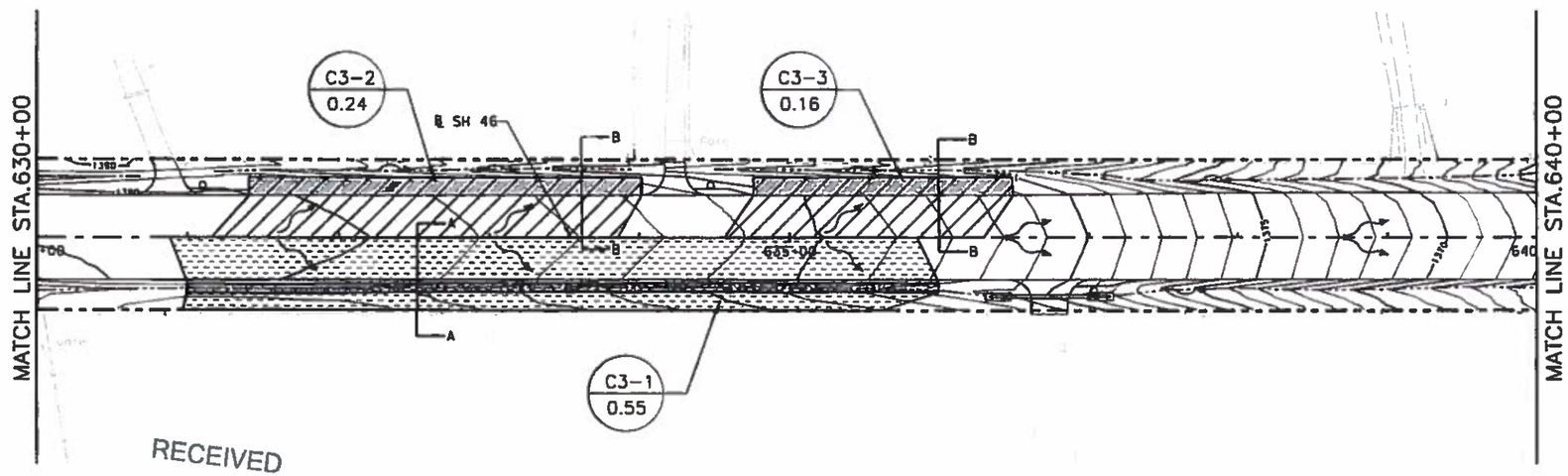

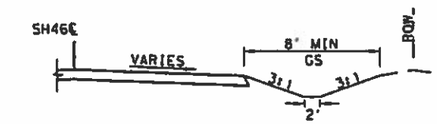

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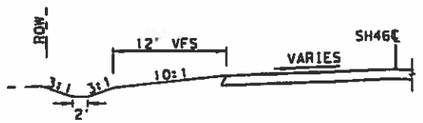
N.T.S.



SECTION B-B
N.T.S.

RECEIVED
JUN 28 2016
COUNTY ENGINEER

LEGEND:

- VEGETATIVE FILTER STRIP
- GRASSY SWALE
- TREATMENT AREA FOR VEGETATIVE FILTER STRIP
- TREATMENT AREA FOR GRASSY SWALE
- DIRECTION OF FLOW
- TREATMENT AREA ID / TREATMENT AREA (ACRES) — ID / X.XX

50 0 100
HORIZ SCALE: 1"=100'

NO.	DATE	REVISION	APPR

STATE OF TEXAS
MARTIN PALACIOS
111619
LICENSED PROFESSIONAL ENGINEER

Martin Palacios 11-4-14
NAME DATE

BAIN MEDINA BAIN, INC.
ENGINEERS & SURVEYORS
TBPE F-001712
7073 San Pedro, San Antonio, Texas, 78216
Phone: 210-494-7223 Fax: 210-490-5120 WWW.BMBI.COM

Texas Department of Transportation

SH 46
SEGMENT C

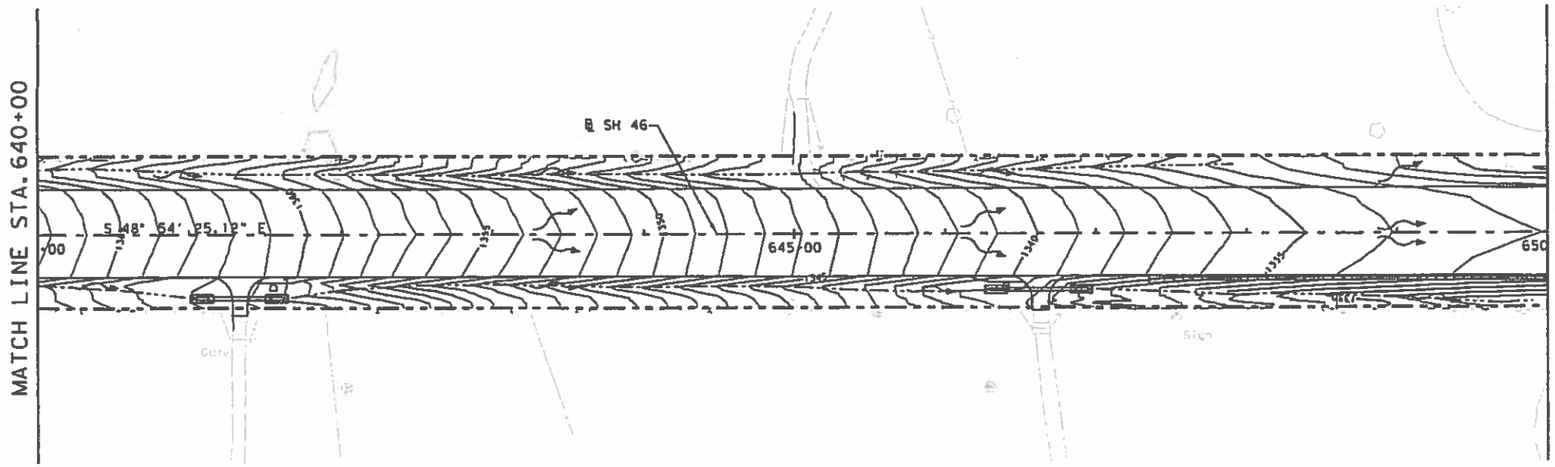
CONTRIBUTING ZONE PLAN
STA 628+68 TO STA 630+00

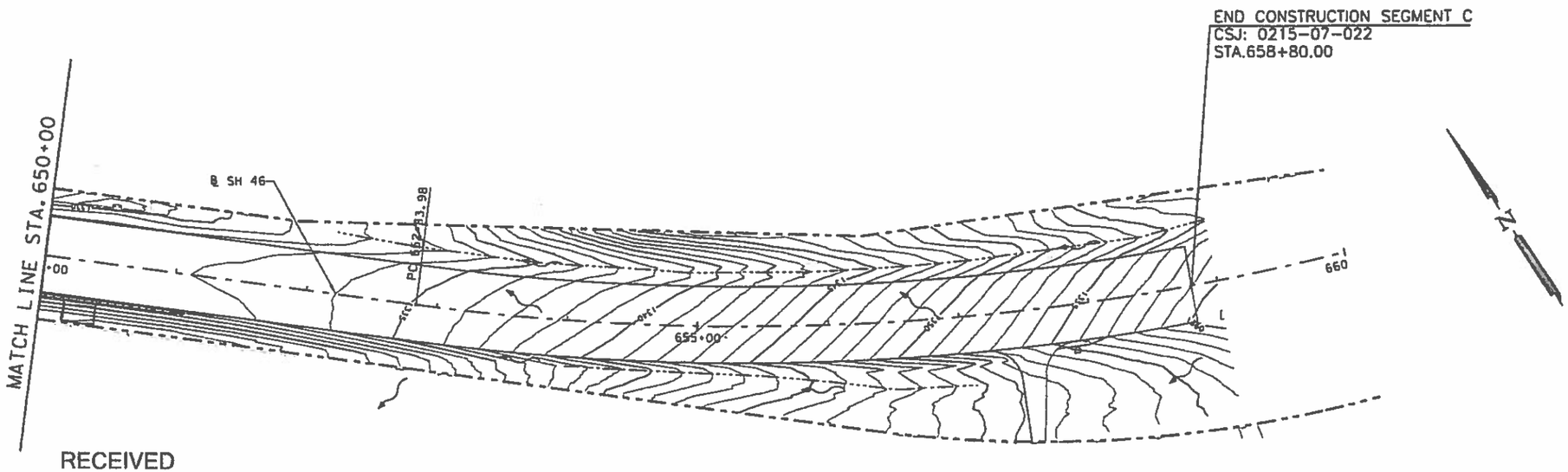
SHEET 1 OF 7

STATE DIST. COUNTY	PROJECT	SHEET NO.

STATE	DIST.	COUNTY
TEXAS	SAT	KENDALL, ETC

CONT.	SECT.	JOB	HIGHWAY NO.





LEGEND:

- VEGETATIVE FILTER STRIP
- GRASSY SWALE
- TREATMENT AREA FOR VEGETATIVE FILTER STRIP
- TREATMENT AREA FOR GRASSY SWALE
- DIRECTION OF FLOW
- TREATMENT AREA ID / TREATMENT AREA (ACRES) (ID / X.XX)

50 0 100
HORIZ SCALE: 1"=100'

NO.	DATE	REVISION	APPR

STATE OF TEXAS
MARTIN PALACIOS
111619
LICENSED
PROFESSIONAL ENGINEER

Martin Palacios 11-4-14
NAME DATE

BAIN MEDINA BAIN, INC.
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TBPE F-001712
7373 San Pedro, San Antonio, Texas, 78216
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Texas Department of Transportation

SH 46
SEGMENT C

CONTRIBUTING ZONE PLAN
STA 630+00 TO STA 658+80

SHEET 2 OF 7

FED. RD. DIV. NO.	PROJECT	SHEET NO.

STATE	DIST.	COUNTY
TEXAS	SAT	KENDALL, ETC

CONT.	SECT.	JOB	HIGHWAY NO.

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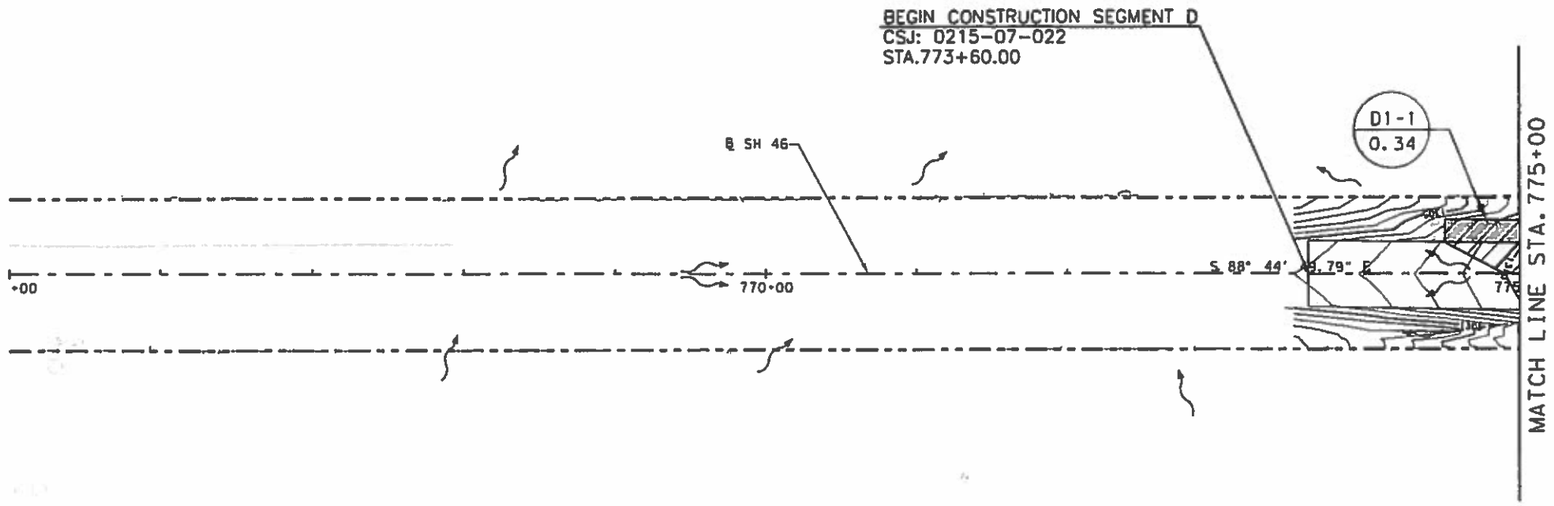
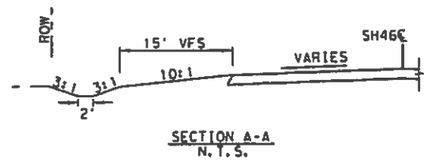
JUN 28 2016
COUNTY ENGINEER





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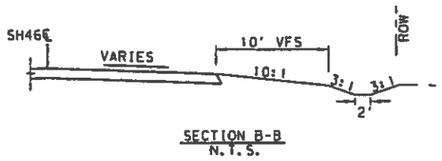

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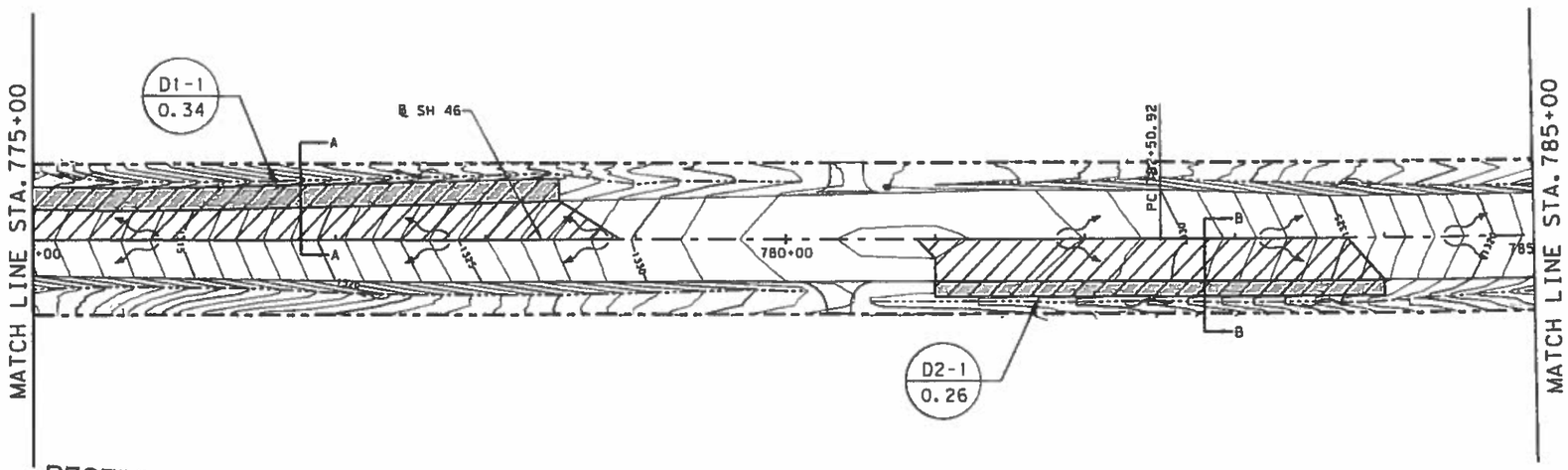

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COUNTY ENGINEER

LEGEND:

- VEGETATIVE FILTER STRIP
- GRASSY SWALE
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50 0 100
HORIZ SCALE: 1"=100'

NO.	DATE	REVISION	APPR

STATE OF TEXAS
MARTIN PALACIOS
111619
LICENSED
PROFESSIONAL ENGINEER

Martin Palacios 11-4-14
NAME DATE

BAIN MEDINA BAIN, INC.
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7073 San Pedro, San Antonio, Texas, 78216
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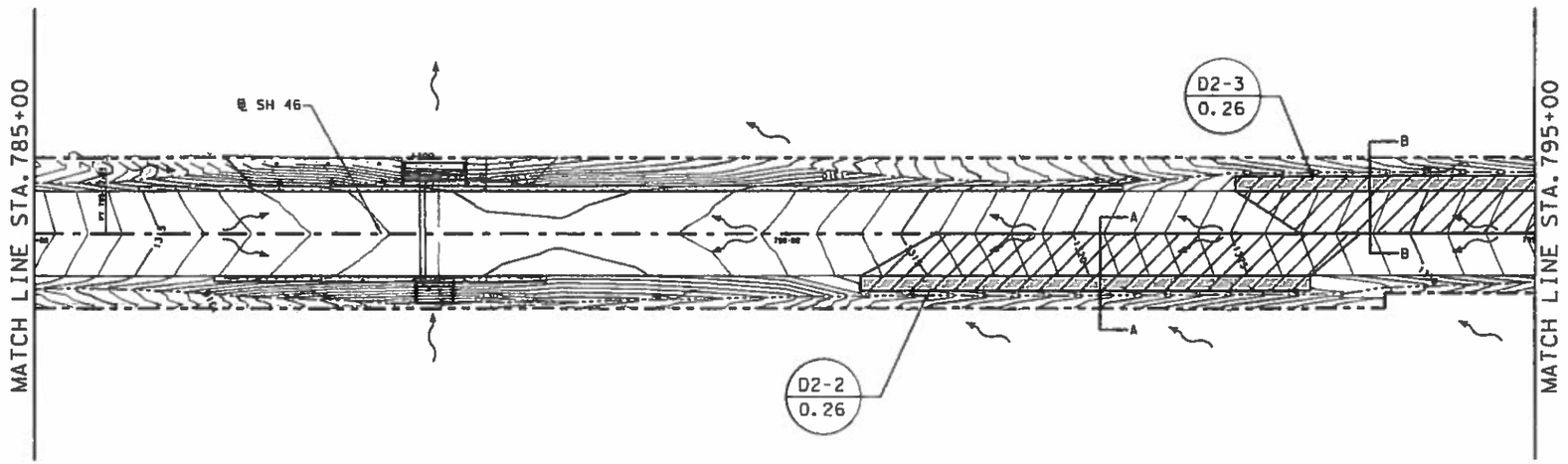
SH 46
SEGMENT D

CONTRIBUTING ZONE PLAN
STA 768+00 TO STA 785+00

SHEET 3 OF 7

DIST. COUNTY	PROJECT	SHEET NO.

STATE	DIST.	COUNTY	
TEXAS	SAT	KENDALL, ETC	
CONT.	SECT.	JOB	HIGHWAY NO.



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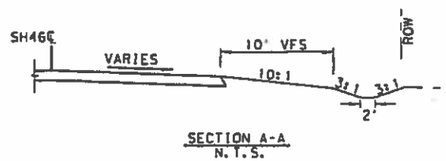

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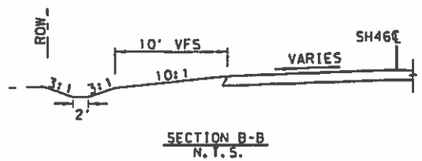

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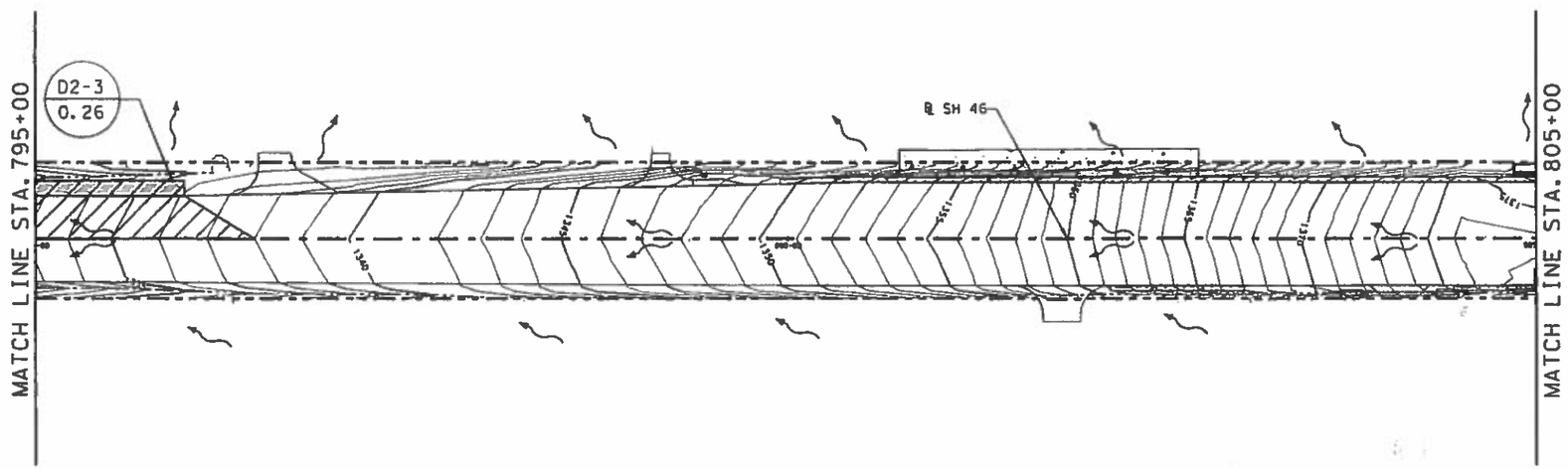

NO.	DATE	REVISION	APPR

STATE OF TEXAS
MARTIN PALACIOS
111619
LICENSED PROFESSIONAL ENGINEER

Martin Palacios — NAME
11-4-14 — DATE

BAIN MEDINA BAIN, INC.
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SH 46
SEGMENT D

CONTRIBUTING ZONE PLAN
STA 785+00 TO STA 805+00

SHEET 4 OF 7

ETD. NO. DIV. NO.	PROJECT	SHEET NO.

STATE	DIST.	COUNTY	
TEXAS	SAT	KENDALL, ETC	
CONT.	SECT.	JOB	HIGHWAY NO.

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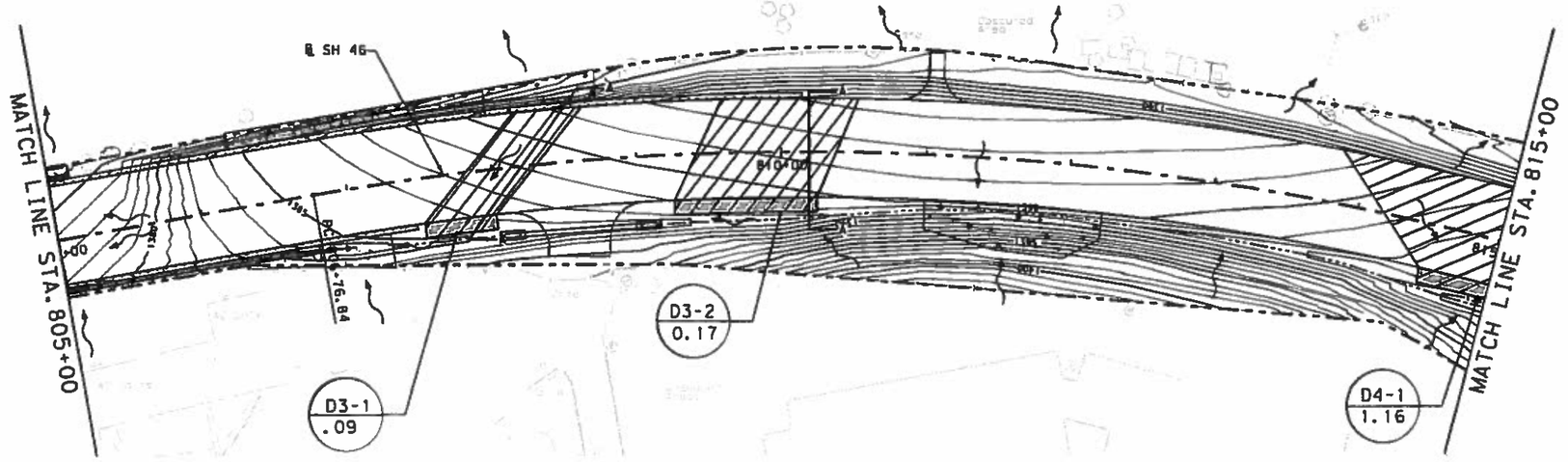

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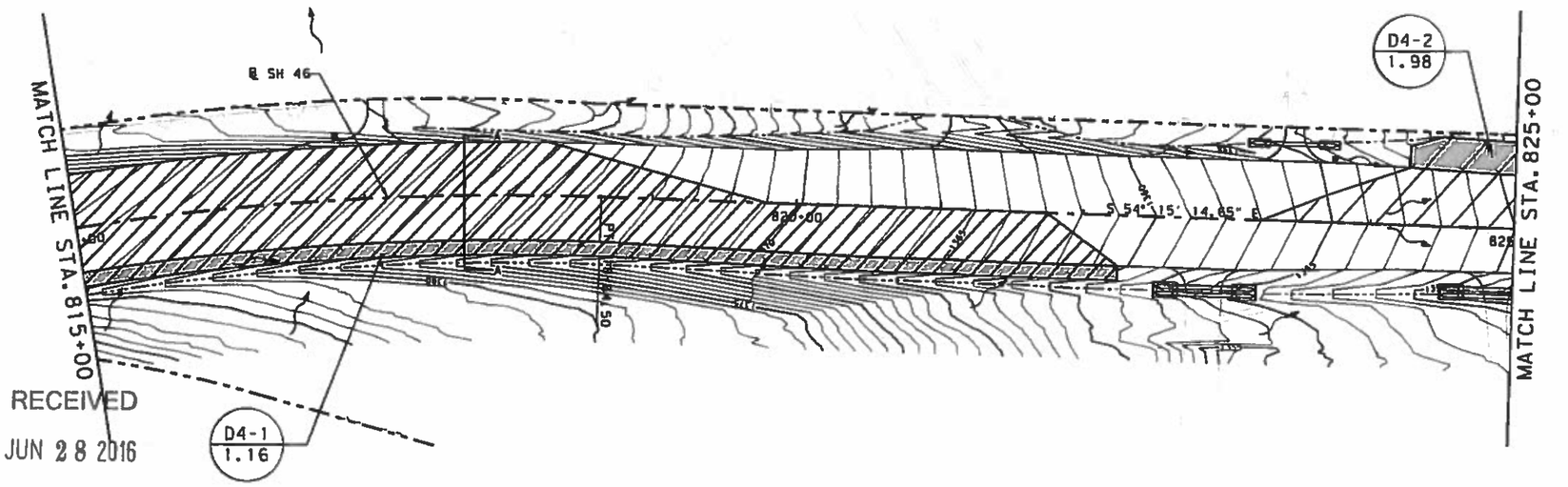

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HORIZ SCALE: 1"=100'

NO.	DATE	REVISION	APPR

STATE OF TEXAS
MARTIN PALACIOS
111619
LICENSED
PROFESSIONAL ENGINEER

Martin Palacios — NAME
11-4-14 — DATE

BAIN MEDINA BAIN, INC.
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7073 San Pedro, San Antonio, Texas, 78216
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Texas Department of Transportation

SH 46
SEGMENT D

CONTRIBUTING ZONE PLAN
STA 805+00 TO STA 825+00

SHEET 5 OF 7

DIST.	COUNTY		SHEET NO.
STATE	DIST.	COUNTY	
TEXAS	SAT	KENDALL, ETC	
CONT.	SECT.	JOB	HIGHWAY NO.

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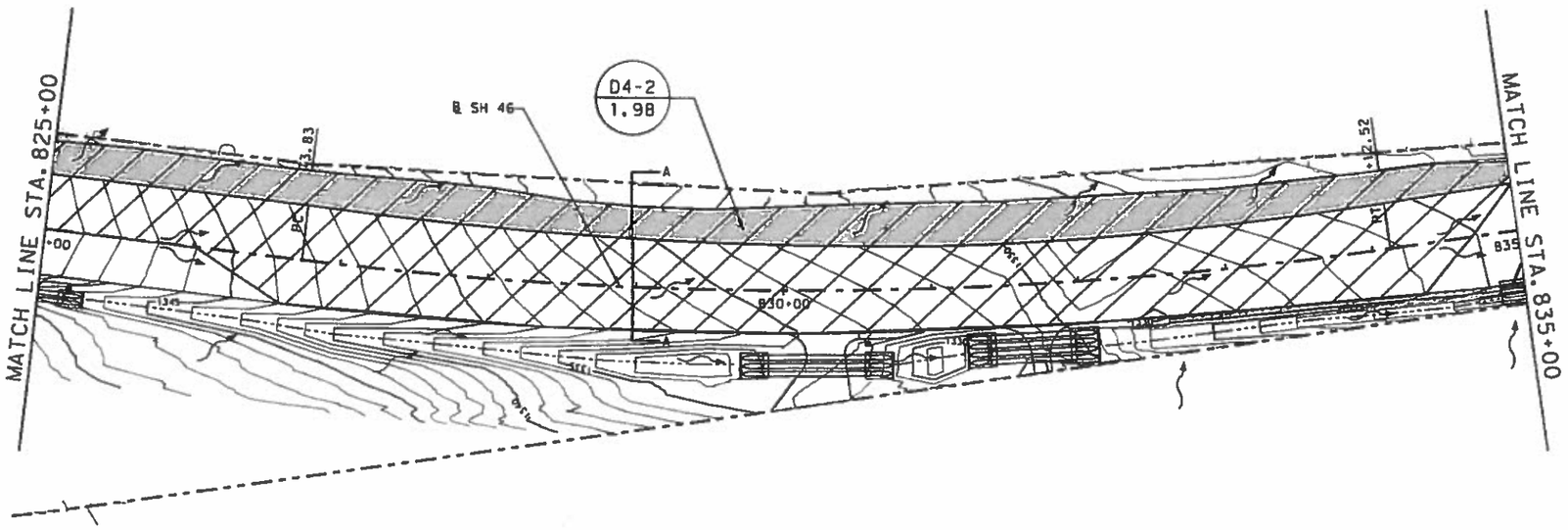

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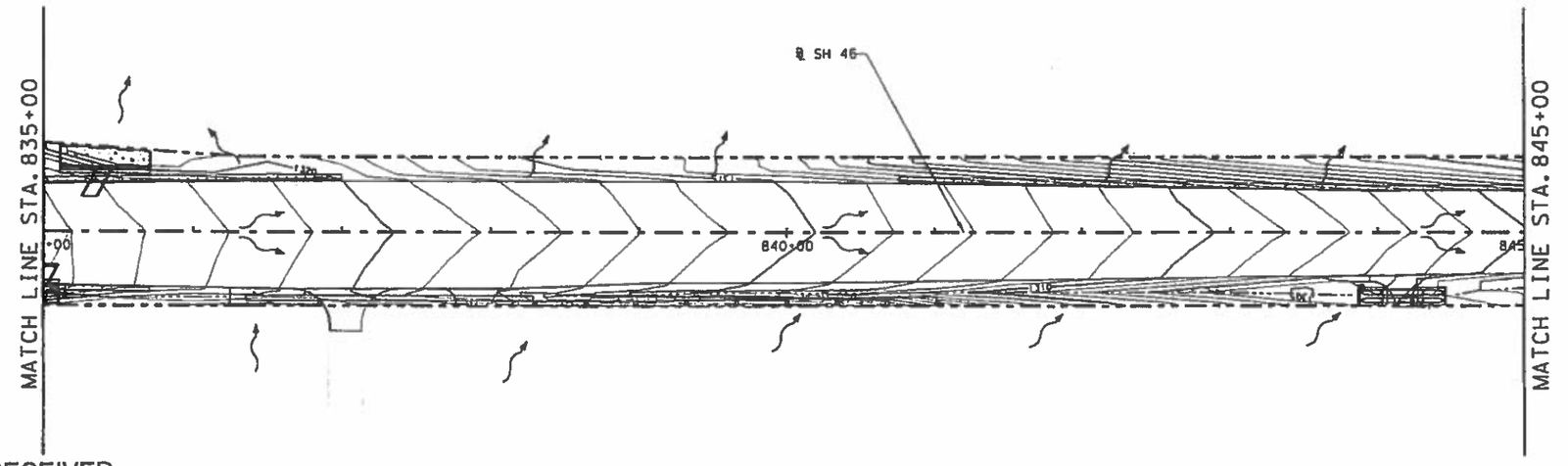

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JUN 28 2016

COUNTY ENGINEER

LEGEND:

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50 0 100
HORIZ SCALE: 1"=100'

NO.	DATE	REVISION	APPR

STATE OF TEXAS
MARTIN PALACIOS
111619
LICENSED
PROFESSIONAL ENGINEER

Martin Palacios — NAME
11-4-14 — DATE

BAIN MEDINA BAIN, INC.
ENGINEERS & SURVEYORS
TBPE F-001712
7073 San Pedro, San Antonio, Texas, 78216
Phone: 210-494-7223 Fax: 210-490-3120 WWW.BMBI.COM

Texas Department of Transportation

SH 46
SEGMENT D

CONTRIBUTING ZONE PLAN
STA 825+00 TO STA 845+00

SHEET 6 OF 7

FED. RD. DIV. NO.	PROJECT	SHEET NO.
STATE	DIST.	COUNTY
TEXAS	SAT	KENDALL, ETC
CONT.	SECT.	JOB / HIGHWAY NO.

Note To Designer:
1. Do not alter Sheet Design or Font style, size or weight - match text attributes.
2. If additional space is needed for a numbered section, fence and adjust sections up or down as nec. for proportioning and readability but do not relocate from it's relative position.

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A. GENERAL SITE DATA

1. PROJECT LIMITS: *Segment D - Station 773+60 to Station 851+76*

2. PROJECT SITE MAPS:
   - *Project Latitude 29.806236° Project Longitude -98.510267°*
   - *Project Location Map: Shown on Title Sheet*
   - *Drainage Patterns: Shown on Drainage Area Maps (Sheet 282)*
   - *Approx. Slopes Anticipated After Major Gradings and Areas of Soil Disturbance: Shown on Typical Sections (Sheets 17 & 18)*
   - *Major Controls and Locations of Stabilization Practices: Shown on SW3P Sheets (Sheets 368-372)*
   - *Project Specific Locations: Off-site waste, borrow, or storage areas are not part of this SW3P.*
   - *Surface Waters and Discharge Locations: Shown on Drainage and Culvert Layout Sheets (Sheets 289-291)*

3. PROJECT DESCRIPTION: *WIDEN ROADWAY TO PROVIDE PASSING LANES*

   - *Joint-bid utilities are not part of this SW3P*

4. FOR MAJOR SOIL DISTURBING ACTIVITIES SEQUENCE OF EVENTS:

   1. *Install controls down-slope of work area and initiate inspection and maintenance activities.*
   2. *Begin phased construction with interim stabilization practices. Adjust erosion and sedimentation controls during construction to meet requirements and changing conditions and as directed/approved by the Engineer.*
   3. *Major soil disturbing activities may include but are not limited to: right-of-way preparation, cut and/or fill to improve roadway profile, final grading and placement of topsoil and the following (if marked):*

      _X_ *Placement of road base*
      _X_ *Extensive ditch grading*
      _X_ *Upgrading or replacing culverts or bridges*
      ___ *Temporary detour road(s)*
      ___ *Other: _____*

5. EXISTING AND PROPOSED CONDITIONS:

   Description of existing vegetative cover: (Provide type and description of vegetative cover)
   Percentage of existing vegetative cover: (Provide percentage)
   Existing vegetative cover: (mark one)
   _X_ *Thick or uniformly established*
   ___ *Thin and Patchy*
   ___ *None or minimal cover*
   Description of soils: Clayey Gravel
   Site Acreage: 23.6 AC *Acreage disturbed: 6.6 AC*
   Site runoff coefficient (pre-construction): 0.79 *Site runoff coefficient (post-construction): 0.82*

6. RECEIVING WATERS:

   _X_ *A classified stream does not pass through project.*
   ___ *A classified stream passes through project. Name _____ Segment Number _____*
   Name of receiving waters that will receive discharges from disturbed areas of the project: _____

   Site is in a Municipal Separate Storm Sewer System (MS4).
   MS4 Operator (name): _____

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B. BEST MANAGEMENT PRACTICES

General timing or sequence for implementation of BMPs shall be as required and/or as directed/approved by the Engineer to provide adequate controls. BMPs shown on plan sheets are to be considered "proposed" unless/until install date is shown. BMPs are to reduce sediments from road construction activities.

1. SOIL STABILIZATION PRACTICES: (Select T = Temporary or P = Permanent, as applicable)

   ___ SEEDING
   ___ MULCHING (Hay or Straw)
   ___ BUFFER ZONES
   ___ PLANTING
   ___ COMPOST/MULCH FILTER BERM
   ___ SODDING
   ___ PRESERVATION OF NATURAL RESOURCES
   ___ FLEXIBLE CHANNEL LINER
   _P_ RIGID CHANNEL LINER
   _P_ SOIL RETENTION BLANKET
   _P_ COMPOST MANUFACTURED TOPSOIL
   ___ OTHER: (Specify Practice)

2. STRUCTURAL PRACTICES: (Select T = Temporary or P = Permanent, as applicable)

   _T_ SILT FENCES
   ___ HAY BALES
   _T_ ROCK FILTER DAMS
   ___ DIVERSION, INTERCEPTOR, OR PERIMETER DIKES
   ___ DIVERSION, INTERCEPTOR, OR PERIMETER SWALES
   ___ DIVERSION DIKE AND SWALE COMBINATIONS
   ___ PIPE SLOPE DRAINS
   ___ PAVED FLUMES
   _T_ ROCK BEDDING AT CONSTRUCTION EXIT
   ___ TIMBER MATTING AT CONSTRUCTION EXIT
   ___ CHANNEL LINERS
   ___ SEDIMENT TRAPS
   ___ SEDIMENT BASINS
   ___ STORM INLET SEDIMENT TRAP
   ___ STONE OUTLET STRUCTURES
   ___ CURBS AND GUTTERS
   ___ STORM SEWERS
   ___ VELOCITY CONTROL DEVICES
   ___ OTHER: (Specify Practice)

3. STORM WATER MANAGEMENT:

   The proposed facility was designed in consideration of hydraulic design standards to convey stormwater in a manner that is protective of public safety and property. The control of erosion from the facility is inherent to the design. Additional factors affecting post-construction stormwater at the project location include: (mark all that apply)

   _X_ *Existing or new vegetation provides natural filtration.*
   _X_ *The design includes provisions for permanent erosion controls provided by strategically placed pervious and impervious surfaces.*
   _X_ *Project includes permanent sedimentation controls (other than grass).*
   ___ *Velocities do not require dissipation devices.*
   ___ *Velocity-dissipation devices included in the design.*
   ___ *Other : _____*

4. NON-STORM WATER DISCHARGES:

   Off-site discharges are prohibited except as follows:

   1. *Discharges from fire fighting activities and/or fire hydrant flushings.*
   2. *Vehicle, external building, and pavement wash water where detergents and soaps are not used and where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed).*
   3. *Plain water used to control dust.*
   4. *Plain water originating from potable water sources.*
   5. *Uncontaminated groundwater, spring water or accumulated stormwater.*
   6. *Foundation or footing drains where flows are not contaminated with process materials such as solvents.*
   7. *Other: _____*

Concrete truck wash water discharges on the site should be prohibited or minimized. If allowed by the Engineer, they must be managed in a manner so as not to contaminate surface water. They must not be located in areas of concentrated flow. Concrete truck wash-out locations must be shown on the SW3P Layout and included in the inspections.

Hazardous material spill/leak shall be prevented or minimized. At a minimum, this includes asphalt products, fuels, oils, lubricants, solvents, paints, acids, concrete curing compounds and chemical additives for soil stabilization. BMPs shall be implemented to the storage areas of these products. All spills must be cleaned and disposed properly and reported to the Engineer. Report any release at or above the reportable quantity during a 24 hour period to the National Response Center at 1-800-424-8802.

C. OTHER REQUIREMENTS & PRACTICES

1. MAINTENANCE:

   All erosion and sediment controls shall be maintained in good working order. If a repair is necessary, it shall be performed before the next anticipated storm event but no later than 7 calendar days after the surrounding exposed ground has dried sufficiently to prevent further damage from equipment. If maintenance prior to the next anticipated storm event is impracticable, maintenance must be scheduled and accomplished as soon as practicable. Disturbed areas on which construction activities have ceased, temporarily or permanently, shall be stabilized within 14 calendar days unless they are scheduled to and do resume within 21 calendar days. The areas adjacent to creeks and drainageways shall have priority followed by protecting storm sewer inlets.

2. INSPECTION:

   For areas of the construction site that have not been finally stabilized, areas used for storage of materials, structural control measures, and locations where vehicles enter or exit the site, personnel provided by the permittee and familiar with the SW3P must inspect disturbed areas at least once every seven (7) calendar days. An inspection and Maintenance Report shall be prepared for each inspection and the controls shall be revised on the SW3P within seven (7) calendar days following the inspection.

3. WASTE MATERIALS:

   All non-hazardous municipal waste materials such as litter, rubbish, trash and garbage located on or originating from the project shall be collected and stored in a securely lidded metal dumpster, provided by the Contractor. The dumpster shall be emptied as necessary or as required by local regulation and the trash shall be hauled to a permitted disposal facility. The burying of non-hazardous municipal waste on the project shall not be permitted. Construction material waste sites, stockpiles and haul roads shall be constructed to minimize and control the amount of sediment that may enter receiving waters. Construction material waste sites shall not be located in any wetland, water body or stream bed. Construction staging areas and vehicle maintenance areas shall be constructed in a manner to minimize the runoff of pollutants.

4. OFFSITE VEHICLE TRACKING:

   Off-site vehicle tracking of sediments and the generation of dust must be minimized. Excess sediments on road shall be removed on a regular basis as directed/approved by the Engineer.

5. OTHER:

   See the EPIC sheet for additional environmental information.

PRELIMINARY
FOR REVIEW ONLY
Not for construction, bidding or permit purposes.
100% SUBMITTAL
Engineer:
LORI DULLNIG-WARLEN, PE 2/16/2016
P.E. No: 63520 Date:

_____, P.E.
Signature of Registrant & Date

REVISION DATE: 10/12

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ENGINEERS & SURVEYORS
TBPE F-001712
7073 San Pedro, San Antonio, Texas, 78216
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 Texas Department of Transportation

SH 46
SEGMENT D

STORM WATER POLLUTION PREVENTION PLAN (SW3P)

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
6			SH 46
STATE	DISTRICT	COUNTY	
TEXAS	SAT	KENDALL	
CONTROL	SECTION	JOB	SHEET NO.
0215	06	037,ETC	367

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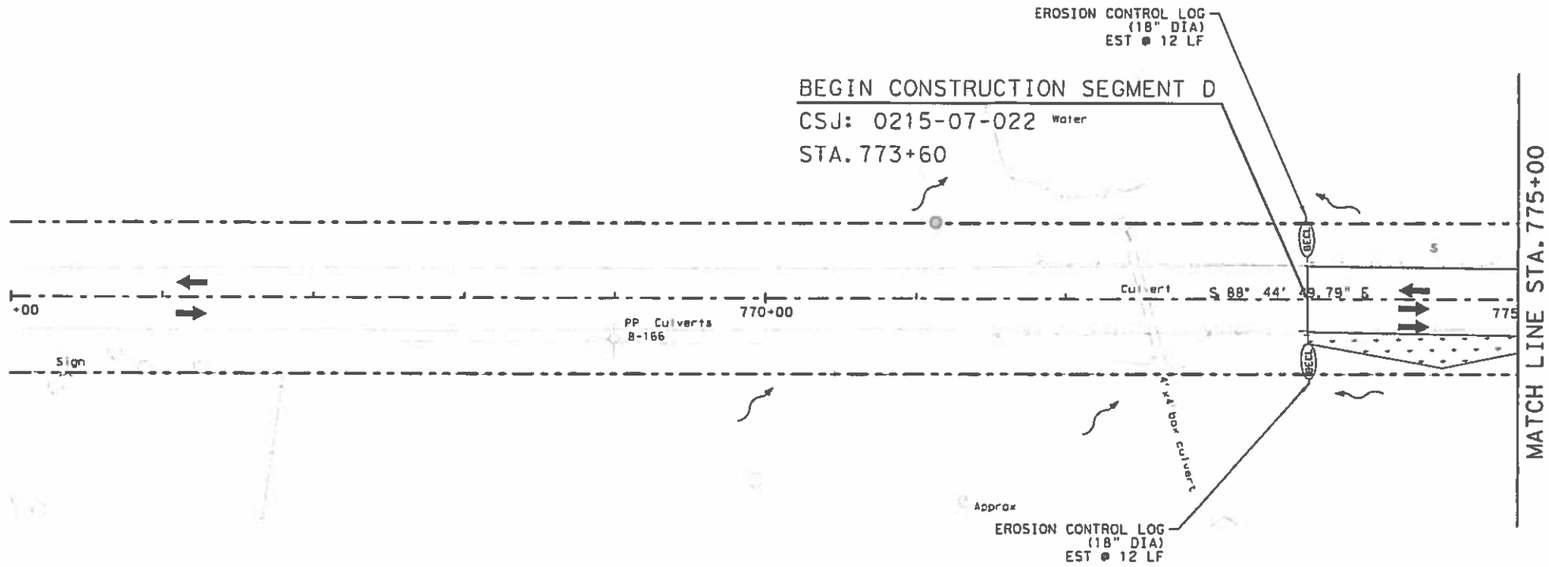
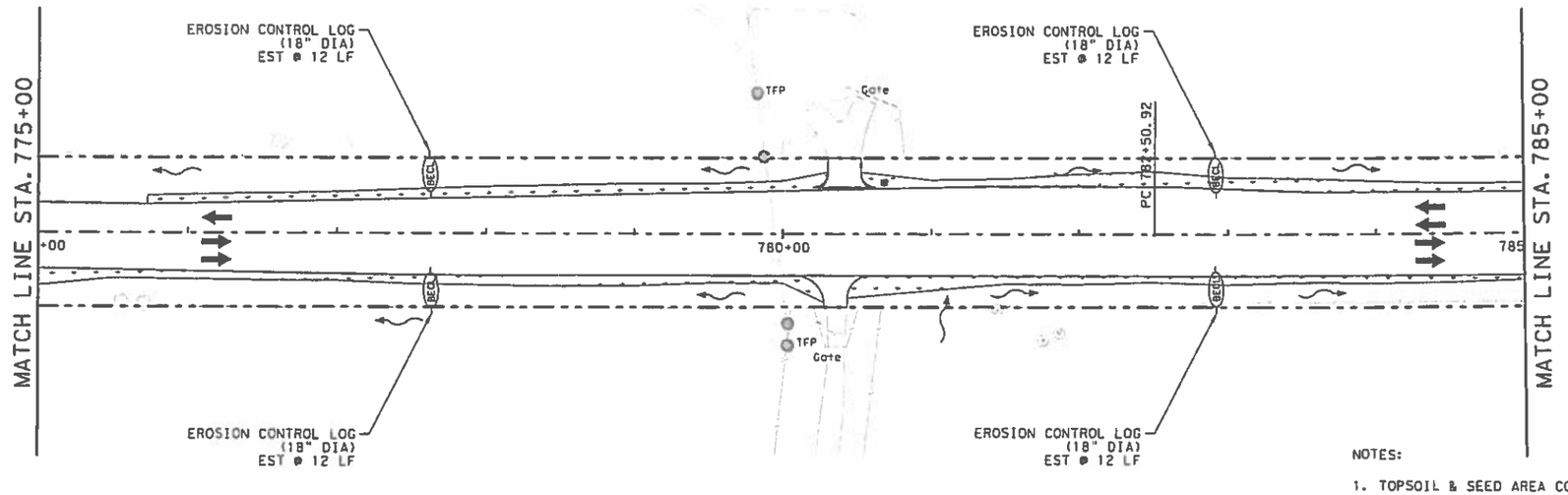
ESTIMATED QUANTITIES			215-7-22
ITEM	DESCRIPTION	UNIT	QTY
0160 6003	FURNISHING AND PLACING TOPSOIL (4")	SY	1725
0164 6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	1725
0164 6041	DRILL SEEDING (TEMP) (WARM)	SY	1725
0164 6043	DRILL SEEDING (TEMP) (COOL)	SY	1725
0166 6002	FERTILIZER	TON	0.1
0168 6001	VEGETATIVE WATERING	MG	26.9
0169 6007	SOIL RETENTION BLANKETS (CL 2) (TY G)	SY	1511
0506 6005	ROCK FILTER DAMS (INSTALL) (TY 5)	LF	
0506 6011	ROCK FILTER DAMS (REMOVE)	LF	
0506 6020	CONSTRUCTION EXITS (INSTALL) (TY 1)	SY	120
0506 6024	CONSTRUCTION EXITS (REMOVE)	SY	120
0506 6038	TEMPORARY SEDIMENT CONTROL FENCE INSTLL	LF	
0506 6039	TEMPORARY SEDIMENT CONTROL FENCE REMOVE	LF	
0506 6042	BIOGRD EROSN CONT LOGS (18" DIA) INSTALL	LF	72
0506 6043	BIODEGRADBLE EROSION CONTROL LOGS REMOV	LF	72





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LEGEND:

- SEDIMENT CONTROL FENCE — SCF
- ROCK FILTER DAM TY 5 — RFD5
- BIODEGRADABLE EROSION CONTROL LOG — BECL
- FLOW DIRECTION
- DIRECTION OF TRAFFIC
- TOPSOIL & DRILL SEED (PERM)/(TEMP)
- TOPSOIL / DRILL SEED & SOIL RETENTION BLANKET (PERM)/(TEMP)

50 0 100
HORIZ SCALE: 1"=100'

NOTES:

1. TOPSOIL & SEED AREA CONSISTS OF STRAW/HAY MULCH SEED (TEMP) (WARM) AND STRAW/HAY MULCH SEED (TEMP) (COOL) FOR TEMPORARY EROSION CONTROL AND TOPSOIL (4") AND DRILL SEEDING (PERM) (RURAL) (CLAY) FOR PERMANENT EROSION CONTROL.
2. PLANTING DATES AND RATES FOR SEED SHALL BE APPLIED PER SPECIFICATIONS FOR ITEM 164, SEEDING FOR EROSION CONTROL, OR AS DIRECTED BY THE ENGINEER.

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Engineer:
LORI DULLNIG-WARLEN, PE 2/16/2016
P.E. No: 63520 Date:

BAIN MEDINA BAIN, INC.
ENGINEERS & SURVEYORS
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7073 San Pedro, San Antonio, Texas, 78216
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Texas Department of Transportation

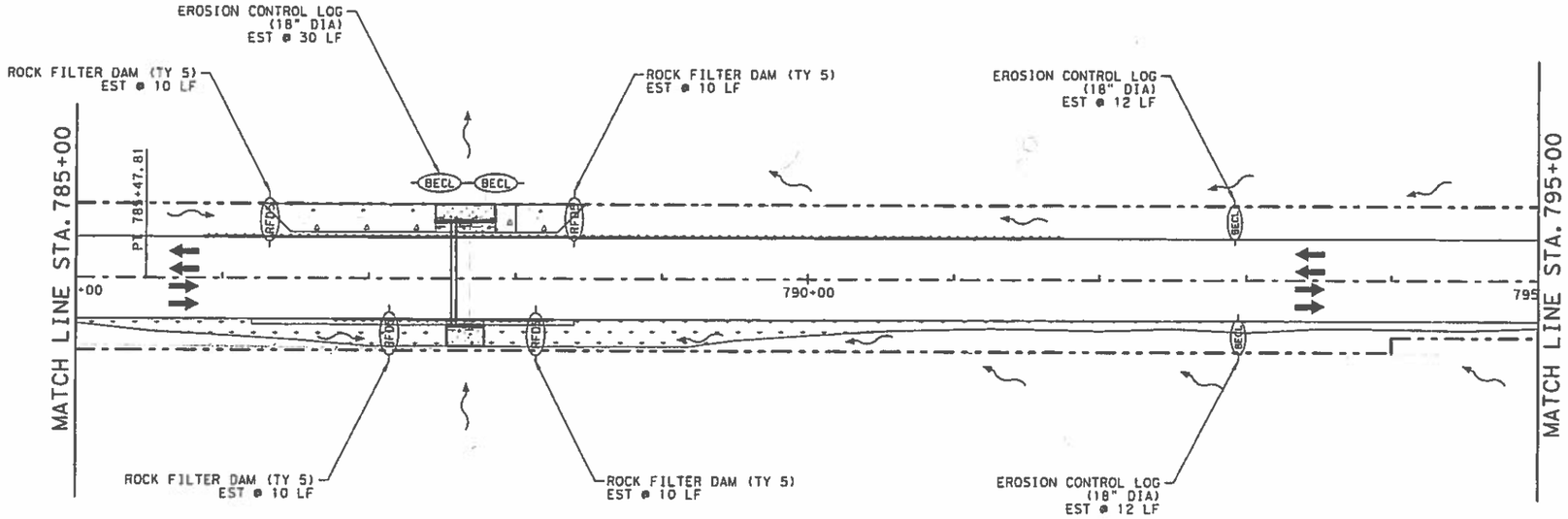
SH 46
SEGMENT D
SW3P LAYOUTS

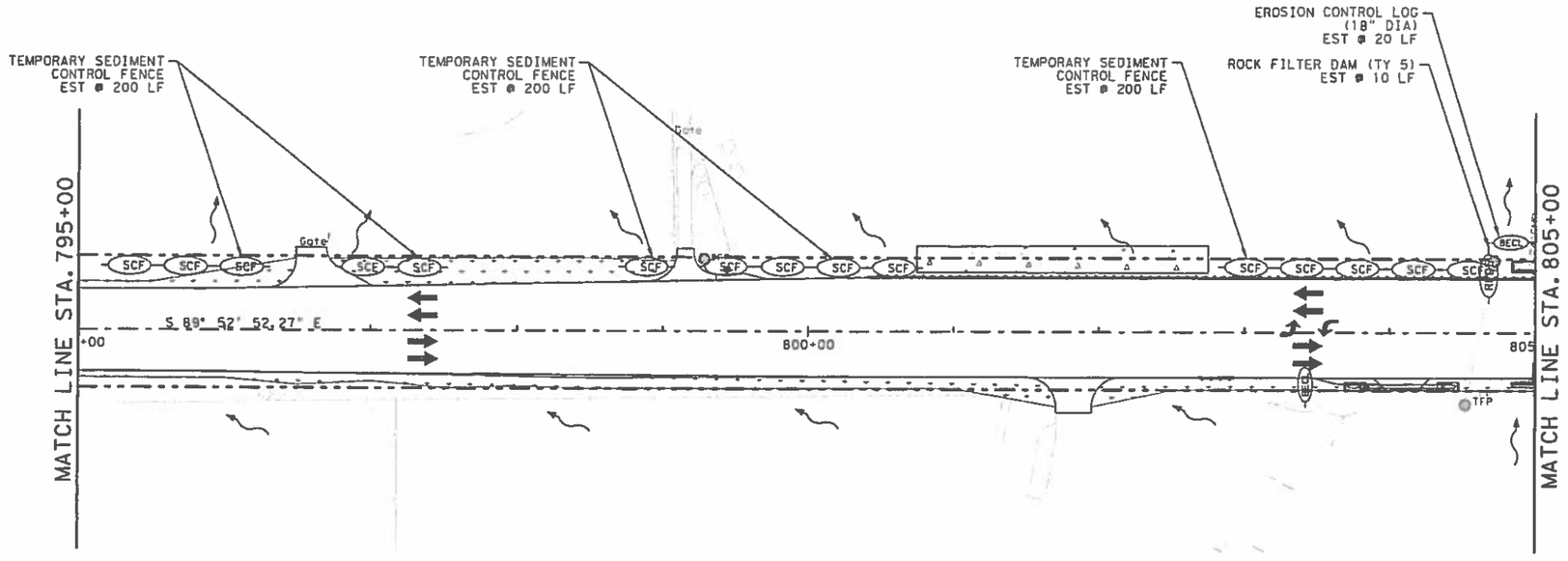
STA 765+00 TO STA 785+00

SHEET 1 OF 5

FED. RD. DIV. NO.	PROJECT	SHEET NO.
		368

STATE	DIST.	COUNTY	
TEXAS	SAT	KENDALL, ETC	
CONT.	SECT.	JOB	HIGHWAY NO.
0215	06	037, ETC	SH 46





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COUNTY ENGINEER

ESTIMATED QUANTITIES			215-7-22
ITEM	DESCRIPTION	UNIT	QTY
0160 6003	FURNISHING AND PLACING TOPSOIL (4")	SY	3603
0164 6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	3603
0164 6041	DRILL SEEDING (TEMP) (WARM)	SY	3603
0164 6043	DRILL SEEDING (TEMP) (COOL)	SY	3603
0166 6002	FERTILIZER	TON	0.2
0168 6001	VEGETATIVE WATERING	MG	56.2
0169 6007	SOIL RETENTION BLANKETS (CL 2) (TY G)	SY	1200
0506 6005	ROCK FILTER DAMS (INSTALL) (TY 5)	LF	50
0506 6011	ROCK FILTER DAMS (REMOVE)	LF	50
0506 6020	CONSTRUCTION EXITS (INSTALL) (TY 1)	SY	
0506 6024	CONSTRUCTION EXITS (REMOVE)	SY	
0506 6038	TEMPORARY SEDIMENT CONTROL FENCE INSTLL	LF	600
0506 6039	TEMPORARY SEDIMENT CONTROL FENCE REMOVE	LF	600
0506 6042	BIOGRD EROSN CONT LOGS (18" DIA) INSTALL	LF	74
0506 6043	BIODEGRADBLE EROSION CONTROL LOGS REMOV	LF	74

N

LEGEND:

- SEDIMENT CONTROL FENCE — SCF
- ROCK FILTER DAM TY 5 — RFD5
- BIODEGRADABLE EROSION CONTROL LOG — BECL
- FLOW DIRECTION
- DIRECTION OF TRAFFIC
- TOPSOIL & DRILL SEED (PERM) / (TEMP)
- TOPSOIL / DRILL SEED & SOIL RETENTION BLANKET (PERM) / (TEMP)

50 0 100

HORIZ SCALE: 1"=100'

NO.	DATE	REVISION	APPR

PRELIMINARY

FOR REVIEW ONLY
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100% SUBMITTAL

Engineer:
LORI DULLNIG-WARLEN, PE 2/16/2016
P.E. No: 63520 Date:

BAIN MEDINA BAIN, INC.
ENGINEERS & SURVEYORS
TBPE F-001112
7073 San Pedro, San Antonio, Texas, 78216
Phone: 210-494-7223 Fax: 210-490-5120 WWW.BMBI.COM

Texas Department of Transportation

SH 46
SEGMENT D
SW3P LAYOUTS

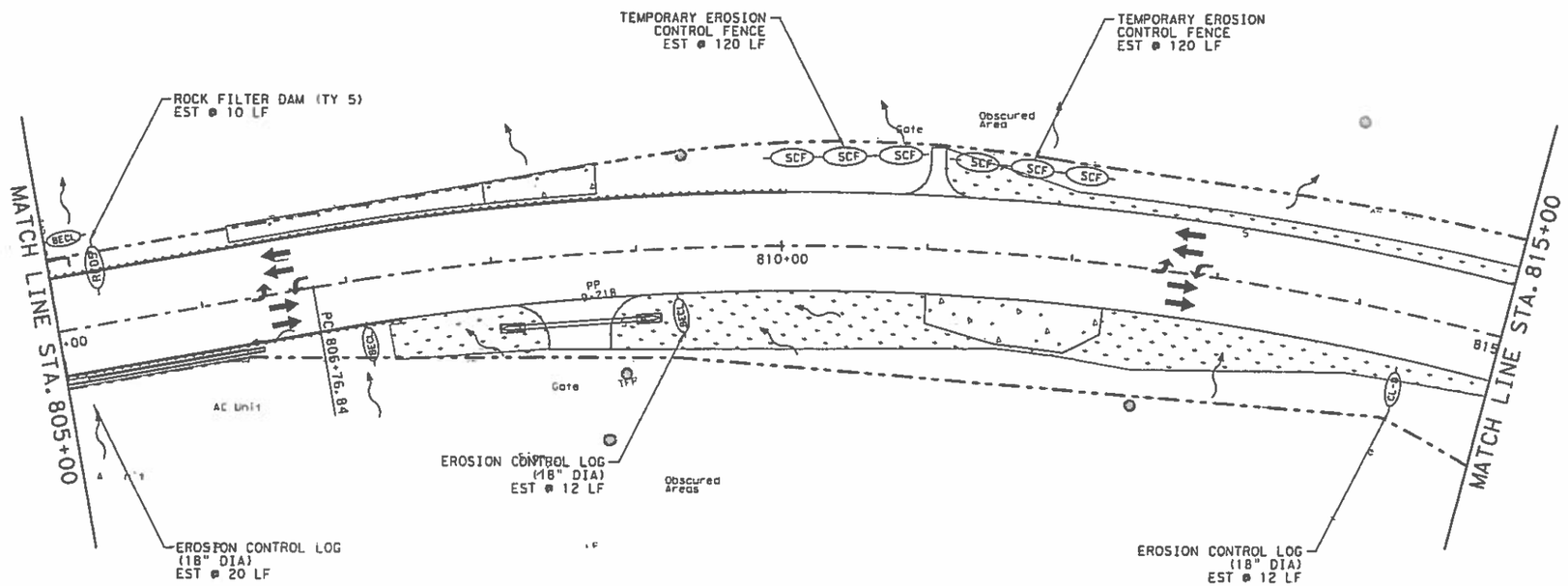
STA 785+00 TO STA 805+00

SHEET 2 OF 5

ESC. DIS.	RB. NO.	PROJECT	SHEET NO.
			369

STATE	DIST.	COUNTY
TEXAS	SAT	KENDALL, ETC

CONT.	SECT.	JOB	HIGHWAY NO.
0215	06	037, ETC	SH 46



ESTIMATED QUANTITIES			215-7-22
ITEM	DESCRIPTION	UNIT	QTY
0160 6003	FURNISHING AND PLACING TOPSOIL (4")	SY	5031
0164 6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	5031
0164 6041	DRILL SEEDING (TEMP) (WARM)	SY	5031
0164 6043	DRILL SEEDING (TEMP) (COOL)	SY	5031
0166 6002	FERTILIZER	TON	0.2
0168 6001	VEGETATIVE WATERING	MG	78.5
0169 6007	SOIL RETENTION BLANKETS (CL 2) (TY G)	SY	2267
0506 6005	ROCK FILTER DAMS (INSTALL) (TY 5)	LF	10
0506 6011	ROCK FILTER DAMS (REMOVE)	LF	10
0506 6020	CONSTRUCTION EXITS (INSTALL) (TY 1)	SY	120
0506 6024	CONSTRUCTION EXITS (REMOVE)	SY	120
0506 6038	TEMPORARY SEDIMENT CONTROL FENCE INSTLL	LF	440
0506 6039	TEMPORARY SEDIMENT CONTROL FENCE REMOVE	LF	440
0506 6042	BIOGRD EROSN CONT LOGS (18" DIA) INSTALL	LF	56
0506 6043	BIODEGRADBLE EROSION CONTROL LOGS REMOV	LF	56

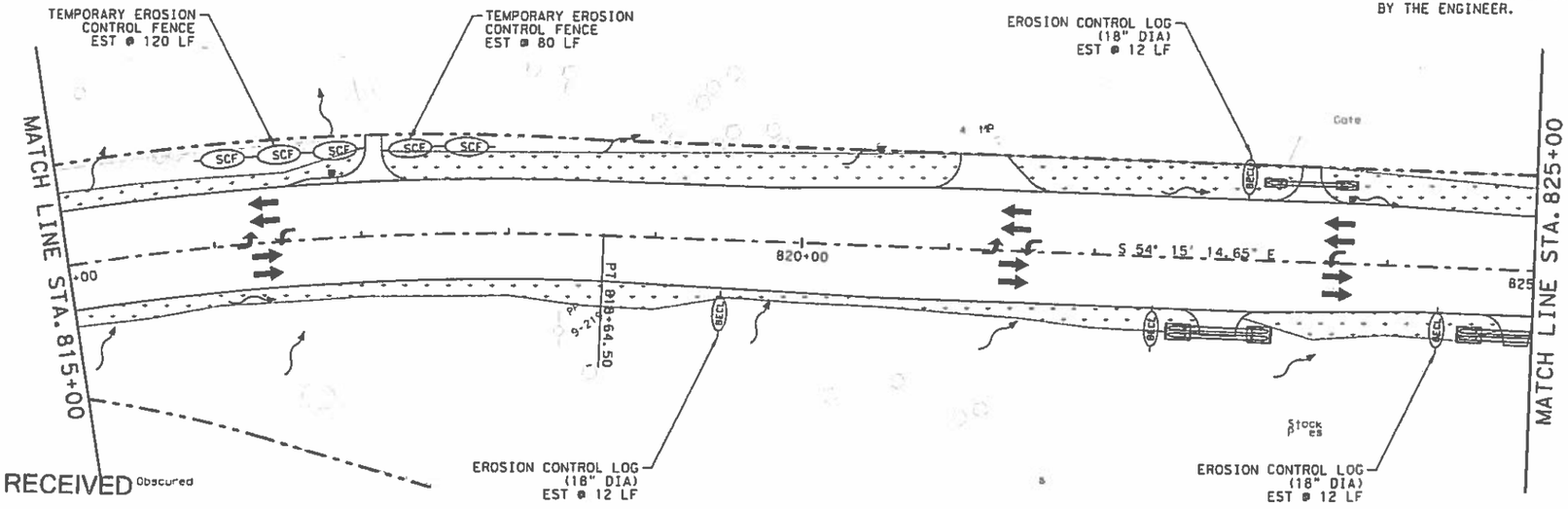
LEGEND:

- SEDIMENT CONTROL FENCE — SCF
- ROCK FILTER DAM TY 5 — RFD5
- BIODEGRADABLE EROSION CONTROL LOG — BECL
- FLOW DIRECTION
- DIRECTION OF TRAFFIC
- TOPSOIL & DRILL SEED (PERM)/(TEMP)
- TOPSOIL / DRILL SEED & SOIL RETENTION BLANKET (PERM)/(TEMP)

50 0 100
HORIZ SCALE: 1"=100'

NOTES:

1. TOPSOIL & SEED AREA CONSISTS OF STRAW/HAY MULCH SEED (TEMP) (WARM) AND STRAW/HAY MULCH SEED (TEMP) (COOL) FOR TEMPORARY EROSION CONTROL AND TOPSOIL (4") AND DRILL SEEDING (PERM) (RURAL) (CLAY) FOR PERMANENT EROSION CONTROL.
2. PLANTING DATES AND RATES FOR SEED SHALL BE APPLIED PER SPECIFICATIONS FOR ITEM 164, SEEDING FOR EROSION CONTROL, OR AS DIRECTED BY THE ENGINEER.



NO.	DATE	REVISION	APPR

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P.E. No: 63520 Date:

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Texas Department of Transportation

SH 46
SEGMENT D
SW3P LAYOUTS
STA 805+00 TO STA 825+00

SHEET 3 OF 5

ECO: RO: DIV. NO:	PROJECT	SHEET NO.
		370

STATE	DIST.	COUNTY
TEXAS	SAT	KENDALL, ETC

CONT.	SECT.	JOB	HIGHWAY NO.
0215	06	037, ETC	SH 46

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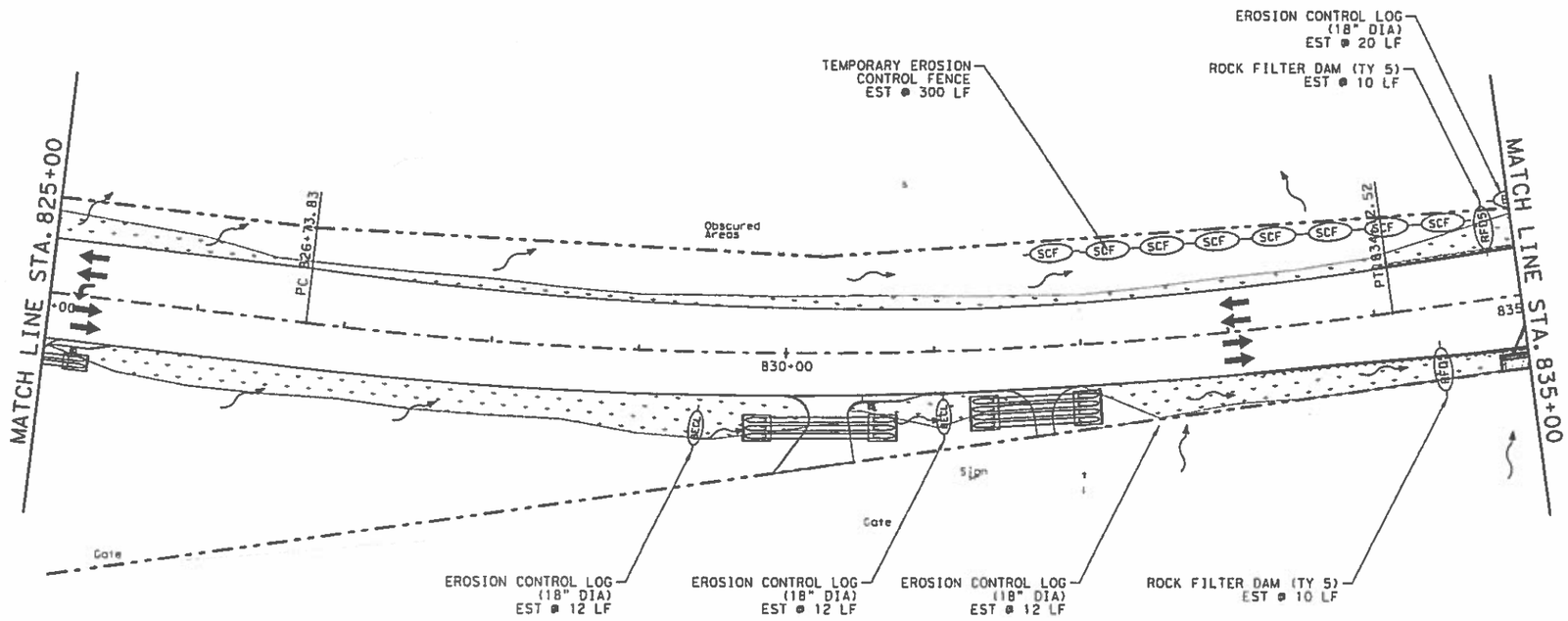
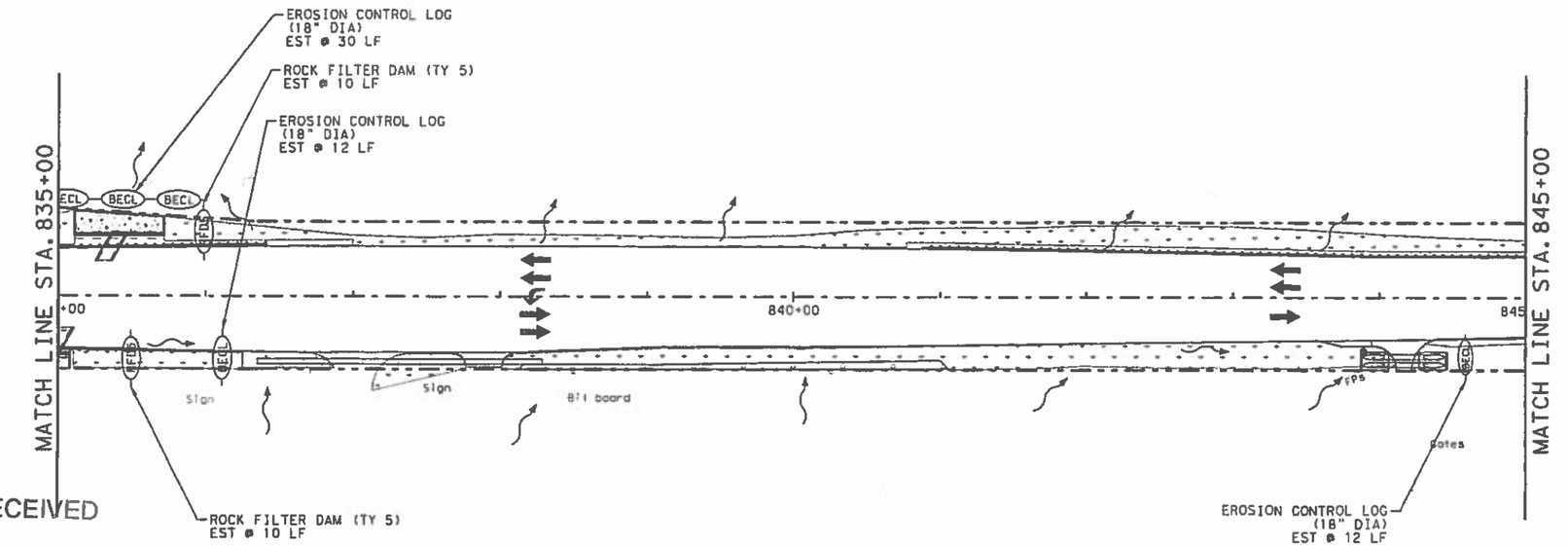
ESTIMATED QUANTITIES			215-7-22
ITEM	DESCRIPTION	UNIT	QTY
0160 6003	FURNISHING AND PLACING TOPSOIL (4")	SY	5100
0164 6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	5100
0164 6041	DRILL SEEDING (TEMP) (WARM)	SY	5100
0164 6043	DRILL SEEDING (TEMP) (COOL)	SY	5100
0166 6002	FERTILIZER	TON	0.2
0168 6001	VEGETATIVE WATERING	MG	79.6
0169 6007	SOIL RETENTION BLANKETS (CL 2) (TY G)	SY	1452
0506 6005	ROCK FILTER DAMS (INSTALL) (TY 5)	LF	40
0506 6011	ROCK FILTER DAMS (REMOVE)	LF	40
0506 6020	CONSTRUCTION EXITS (INSTALL) (TY 1)	SY	
0506 6024	CONSTRUCTION EXITS (REMOVE)	SY	
0506 6038	TEMPORARY SEDIMENT CONTROL FENCE INSTLL	LF	300
0506 6039	TEMPORARY SEDIMENT CONTROL FENCE REMOVE	LF	300
0506 6042	BIOGRD EROSN CONT LOGS (18" DIA) INSTALL	LF	90
0506 6043	BIODEGRADBLE EROSION CONTROL LOGS REMOV	LF	90





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COUNTY ENGINEER

OAK CLIFF DRIVE

LEGEND:

- SEDIMENT CONTROL FENCE — SCF
- ROCK FILTER DAM TY 5 — RFD5
- BIODEGRADABLE EROSION CONTROL LOG — BECL
- FLOW DIRECTION
- DIRECTION OF TRAFFIC
- TOPSOIL & DRILL SEED (PERM) / (TEMP)
- TOPSOIL / DRILL SEED & SOIL RETENTION BLANKET (PERM) / (TEMP)

50 0 100
HORIZ SCALE: 1"=100'

NO.	DATE	REVISION	APPR

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Engineer:
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P.E. No: 63520 Date:

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Texas Department of Transportation

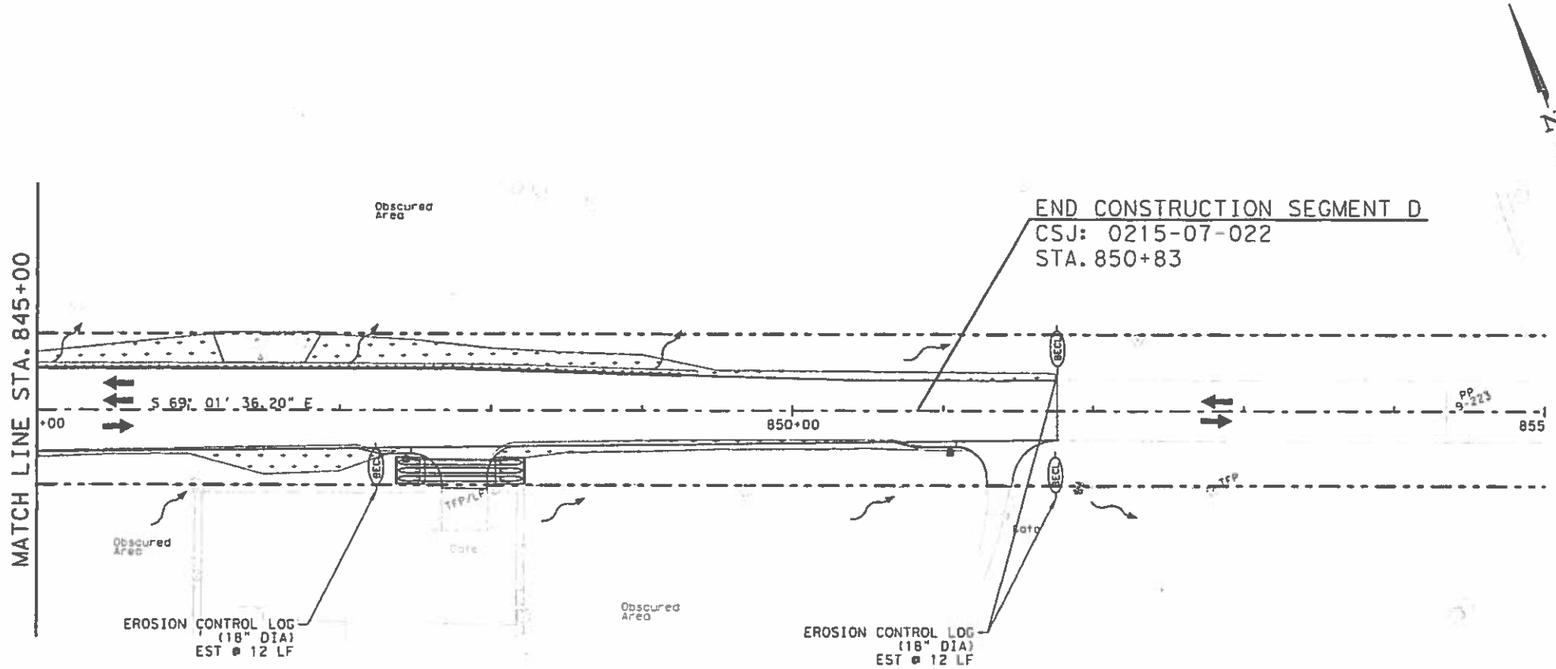
SH 46
SEGMENT D
SW3P LAYOUTS
STA 825+00 TO STA 845+00

SHEET 4 OF 5

FED. RD. DIV. NO.	PROJECT	SHEET NO.
		371

STATE	DIST.	COUNTY	
TEXAS	SAT	KENDALL, ETC	
CONT.	SECT.	JOB	HIGHWAY NO.
0215	06	037, ETC	SH 46

ESTIMATED QUANTITIES			215-7-22
ITEM	DESCRIPTION	UNIT	QTY
0160 6003	FURNISHING AND PLACING TOPSOIL (4")	SY	1190
0164 6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	1190
0164 6041	DRILL SEEDING (TEMP) (WARM)	SY	1190
0164 6043	DRILL SEEDING (TEMP) (COOL)	SY	1190
0166 6002	FERTILIZER	TON	0.1
0168 6001	VEGETATIVE WATERING	MG	18.6
0169 6007	SOIL RETENTION BLANKETS (CL 2) (TY G)	SY	45
0506 6005	ROCK FILTER DAMS (INSTALL) (TY 5)	LF	
0506 6011	ROCK FILTER DAMS (REMOVE)	LF	
0506 6020	CONSTRUCTION EXITS (INSTALL) (TY 1)	SY	120
0506 6024	CONSTRUCTION EXITS (REMOVE)	SY	120
0506 6038	TEMPORARY SEDIMENT CONTROL FENCE INSTLL	LF	
0506 6039	TEMPORARY SEDIMENT CONTROL FENCE REMOVE	LF	
0506 6042	BIODGRD EROSN CONT LOGS (18" DIA) INSTALL	LF	
0506 6043	BIODEGRADBLE EROSION CONTROL LOGS REMOV	LF	



LEGEND:

- SEDIMENT CONTROL FENCE — SCF
- ROCK FILTER DAM TY 5 — RFDS
- BIODEGRADABLE EROSION CONTROL LOG — BECL
- FLOW DIRECTION
- DIRECTION OF TRAFFIC
- TOPSOIL & DRILL SEED (PERM) / (TEMP)
- TOPSOIL / DRILL SEED & SOIL RETENTION BLANKET (PERM) / (TEMP)

50 0 100
HORIZ SCALE: 1"=100'

NO.	DATE	REVISION	APPR

PRELIMINARY

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100% SUBMITTAL

Engineer:
LORI DULLNIG-WARLEN, PE 2/16/2016
P.E. No: 63520 Date:

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SH 46
SEGMENT D
SW3P LAYOUTS

STA 845+00 TO STA 851+75

SHEET 5 OF 5

FED. RD. DIV. NO.	PROJECT	SHEET NO.
		372

STATE	DIST.	COUNTY	
TEXAS	SAT	KENDALL, ETC	
CONT.	SECT.	JOB	HIGHWAY NO.
0215	06	037, ETC	SH 46

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I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

Texas Pollutant Discharge Elimination System (TPDES) TXR 150000: Stormwater Discharge Permit or Construction General Permit (CGP) required for projects with 1 or more acres distrubed soil. Projects with any disturbed soil must protect for erosion and sedimentation in accordance with Item 506.

☐ No Action Required ☒ Required Action

Action No.

1. Prevent stormwater pollution by controlling erosion and sedimentation in accordance with TPDES Permit TXR 150000.
2. Comply with the Storm Water Pollution Prevention Plan (SW3P) and revise when necessary to control pollution or required by the Engineer.
3. Post Construction Site Notice (CSN) with SW3P information on or near the site, accessible to the public and Texas Commission on Environmental Quality (TCEQ), Environmental Protection Agency (EPA) or other inspectors.
4. When Contractor project specific locations (PSL's) increase disturbed soil area to 5 acres or more, Contractor shall submit Notice of Intent (NOI) to TCEQ and the Engineer.
5. NOI required: ☒Yes ☐No

Note: If amount of soil disturbance changes, permit requirements may change.

II. WORK IN OR NEAR STREAMS, WATERBODIES AND WETLANDS CLEAN WATER ACT SECTIONS 401 AND 404

US Army Corps of Engineers (USACE) Permit required for filling, dredging, excavating or other work in any potential USACE jurisdictional water, such as, rivers, creeks, streams, or wetlands.

The Contractor shall adhere to all of the terms and conditions associated with the following permit(s):

☐ No Permit Required
☒ Nationwide Permit (NWP) 14 - Pre-construction Notice (PCN) not Required
☐ Nationwide Permit 14 - PCN Required
☐ Individual 404 Permit Required
☐ Other Nationwide Permit Required: NWP# _____

Required Actions: List waters of the US permit applies to, location in project and check Best Management Practices (BMPs) planned to control erosion, sedimentation and post-project total suspended solids (TSS).

1. STA 238+44, NWP 14 No PCN
2. STA 467+30, NWP 14 No PCN
3.
4.

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401 Best Management Practices: (Not applicable if no USACE permit)

Erosion	Sedimentation	Post-Construction TSS
☒ Temporary Vegetation	☐ Silt Fence	☐ Vegetative Filter Strips
☒ Blankets/Matting	☒ Rock Berm	☐ Retention/Irrigation Systems
☐ Mulch	☐ Triangular Filter Dike	☐ Extended Detention Basin
☐ Sodding	☐ Sand Bag Berm	☐ Constructed Wetlands
☐ Interceptor Swale	☐ Straw Bale Dike	☐ Wet Basin
☐ Diversion Dike	☐ Brush Berms	☐ Erosion Control Compost
☐ Erosion Control Compost	☐ Erosion Control Compost	☐ Mulch Filter Berm and Socks
☐ Mulch Filter Berm and Socks	☐ Mulch Filter Berm and Socks	☐ Compost Filter Berm and Socks
☐ Compost Filter Berm and Socks	☐ Compost Filter Berm and Socks	☒ Vegetation Lined Ditches
	☐ Stone Outlet Sediment Traps	☐ Sand Filter Systems
	☐ Sediment Basins	☐ Sedimentation Chambers
		☐ Grassy Swales

III. CULTURAL RESOURCES

Refer to TxDOT Standard Specifications in the event historical issues or archeological artifacts are found during construction. Upon discovery of archeological artifacts (bones, burnt rock, flint, pottery, etc.) cease work in the immediate area and contact the Engineer immediately.

☒ No Action Required ☐ Required Action

Action No.

1.
2.
3.
4.

IV. VEGETATION RESOURCES

Preserve native vegetation to the extent practical. Contractor must adhere to Construction Specification Requirements Specs 162,164, 192, 193, 506, 730, 751, 752 in order to comply with requirements for invasive species, beneficial landscaping, and tree/brush removal commitments.

☒ No Action Required ☐ Required Action

Action No.

1.
2.
3.
4.

V. FEDERAL LISTED, PROPOSED THREATENED, ENDANGERED SPECIES, CRITICAL HABITAT, STATE LISTED SPECIES, CANDIDATE SPECIES AND MIGRATORY BIRDS.

☐ No Action Required ☒ Required Action

Action No.

1. MIGRATORY BIRD NESTS: Schedule construction activities as needed to meet the following requirements:

   A. Do not remove or destroy any active migratory bird nests (nests containing eggs and/or flightless birds) at any time of year. If there are any active nests, they shall not be removed until the nests become inactive.

   B. On/in structures, if there are any active nests, they shall not be removed until all nests become inactive. After inactive nests are removed and/or before nest activity begins, deterrent materials may be applied to the structures to prevent future nest building.

2. See Item 5 in General Notes.
3. There is potential Golden Cheeked Warbler (GCWA) habitat between Sta 756+00 -Sta 764+00. No construction is to occur between Sta 753+00 - Sta 767+00. Contractor to avoid placement of PSLs/equipment storage between Sta 753+00 - Sta 767+00.
4. The Texas garter snake may occur in the project area and the contractor is to avoid harming the species if encountered.

If any of the listed species are observed, cease work in the immediate area, do not disturb species or habitat and contact the Engineer immediately. The work may not remove active nests from bridges and other structures during nesting season of the birds associated with the nests. If caves or sinkholes are discovered, cease work in the immediated area, and contact the Engineer immediately.

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):

Comply with the Hazard Communication Act (the Act) for personnel who will be working with hazardous materials by conducting safety meetings prior to beginning construction and making workers aware of potential hazards in the workplace. Ensure that all workers are provided with personal protective equipment appropiate for any hazardous materials used.

Obtain and keep on-site Material Safety Data Sheets (MSDS) for all hazardous products used on the project, which may include, but are not limited to the following categories: Paints, acids, solvents, asphalt products, chemical additives, fuels and concrete curing compounds or additives. Provide protected storage, off bare ground and covered, for products which may be hazardous. Maintain product labelling as required by the Act.

Maintain an adequate supply of on-site spill response materials, as indicated in the MSDS. In the event of a spill, take actions to mitigate the spill as indicated in the MSDS, in accordance with safe work practices, and contact the District Spill Coordinator immediately. The Contractor shall be responsible for the proper containment and cleanup of all product spills.

Contact the Engineer if any of the follwing are detected:
- Dead or distressed vegetation (not identified as normal)
- Trash piles, drums, canister, barrels, etc.
- Undesirable smells or odors
- Evidence of leaching or seepage of substances

Hazardous Materials or Contamination Issues Specific to this Project:

☐ No Action Required ☒ Required Action

Action No.

1. Contractor is to avoid the area around the cattle dip vat (concrete tank) near Sta 257+00 - Sta 258+00(left).
2.
3.

Does the project involve the demolition of a span bridge?

☐ Yes ☒ No (No further action required)

If "Yes", a pre- demolition notification must be submitted to the Texas Department of State Health Services. The contractor shall contact TxDOT's Project Engineer 25 calendar days prior to the demolition of the bridges(s) on the project to assist with the notification.

VII. OTHER ENVIRONMENTAL ISSUES

(includes regional issues such as Edwards Aquifer District, etc.)

☐ No Action Required ☒ Required Action

Action No.

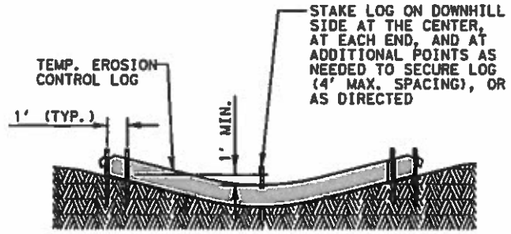
1. Comply with TCEQ-approved Edwards Aquifer Protection Plan conditions in the TCEQ-authorized letter for this project.
2. The contractor must immediately report spills (including sanitary sewer discharge) of reportable quantities to TxDOT and to the following:
   - State Emergency Response Center (800) 424-8802
   - TCEQ Regional Office (210) 490-3096
   - National Response Center at (800) 424-8802
   - Edwards Aquifer Authority at (210) 222-2204
3. Hazardous substances (e.g., fuel, oil, asphalt emulsion, concrete curing compounds) shall not be stored on the state ROW or easements.
4. Intentional discharges of sediment laden storm water during construction are not allowed.
5. If any sensitive feature (e.g., cave, sinkhole, well) is discovered during construction all regulated activities near the sensitive feature must be suspended immediately and notify the TxDOT Environmental Office. Construction near the sensitive feature may not proceed until the feature has been evaluated and approval to continue construction has been received.

Texas Department of Transportation
San Antonio District Standard

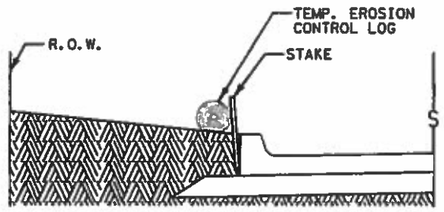
ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

EPIC

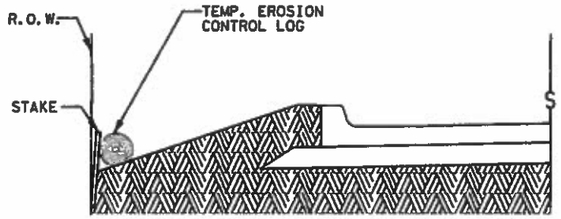
FILE: epic_2015-10-09_SAT.dgn	DW: TxDOT		CK: TxDOT	DW: BW		CK: DAC	
©TxDOT OCTOBER 2015	CONT	SECT	JOB		HIGHWAY		
REVISIONS	0215	08	DIST, ETC.		SH 46		
	DIST		COUNTY			SHEET NO.	
	SAT		KENDALL, ETC.			373	



SECTION A-A



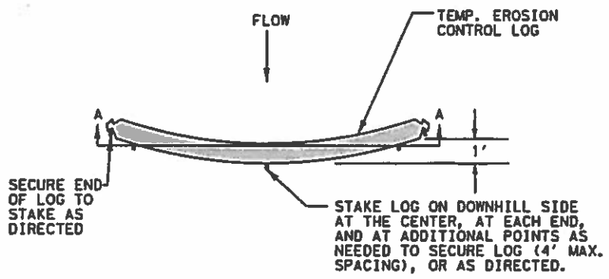
SECTION B-B



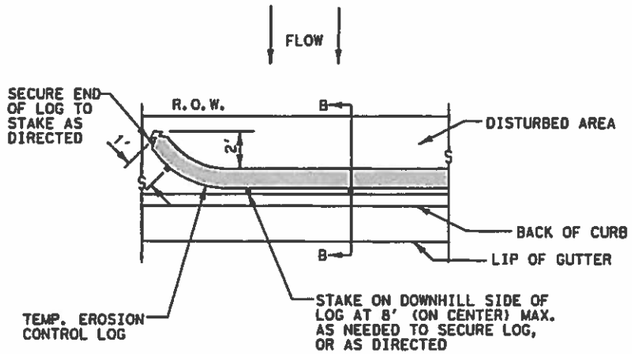
SECTION C-C

GENERAL NOTES:

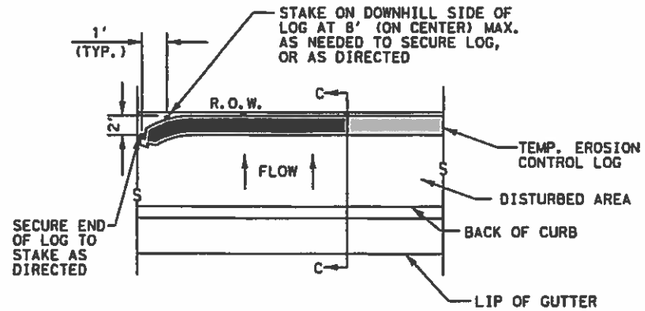
1. INSTALL EROSION CONTROL LOGS IN ACCORDANCE WITH MANFACTURER'S RECOMMENDATIONS.
2. LIMIT THE LENGTH OF INDIVIDUAL LOGS IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS. 60' MAXIMUM FOR 18" LOGS. 30' MAXIMUM FOR 12" LOGS.
3. USE BIODEGRADABLE OR PHOTODEGRADABLE CONTAINMENT MESH WHERE LOG WILL REMAIN IN PLACE AS PART OF A VEGETATIVE SYSTEM.
4. FILL LOGS WITH SUFFICIENT FILTER MATERIAL TO ACHIEVE THE MINIMUM COMPACTED DIAMETER SPECIFIED IN THE PLANS WITHOUT EXCESSIVE DEFORMATION.
5. USE STAKES MADE FROM 2" X 2" WOOD OR #3 REBAR. INSTALLED STAKES SHOULD BE FLUSH TOP OF LOG BUT NO MORE THAN 2" ABOVE LOG.
6. USE FIBER MULCH TO FILL EROSION CONTROL LOGS OR OTHER MATERIAL AS APPROVED BY THE ENGINEER. COMPOST MATERIALS WILL NOT BE ALLOWED FOR THIS ITEM.



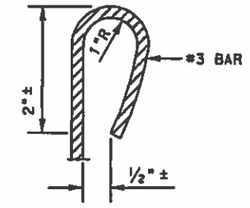
PLAN VIEW



PLAN VIEW



PLAN VIEW



REBAR STAKE DETAIL

LOG DAM

CL-D

LOG PLACED AT BACK OF CURB

CL-BOC

LOG PLACED AT EDGE OF RIGHT-OF-WAY

CL-ROW

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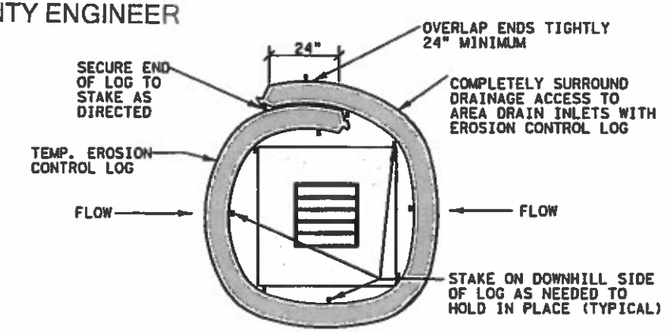
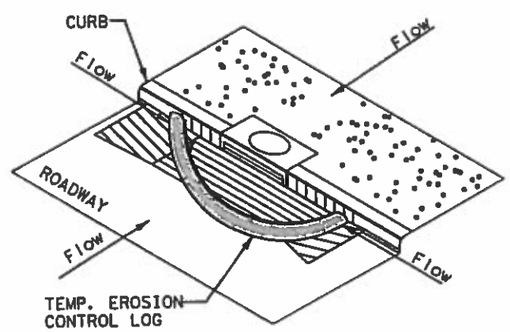
JUN 28 2016
COUNTY ENGINEER



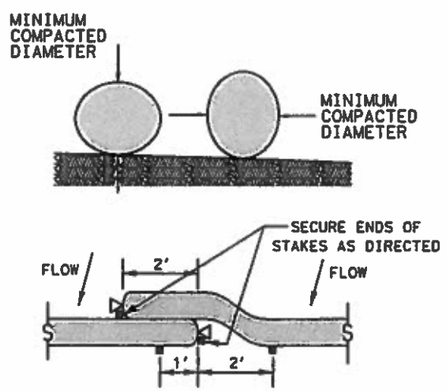
INLET SEDIMENT TRAP

CL-I



CURB INLET SEDIMENT TRAP

CL-CI



LAP DETAIL

NO.	DATE	REVISION	APPR

PRELIMINARY
FOR REVIEW ONLY
Not for construction, bidding or permit purposes.
100% SUBMITTAL
Engineer: LORI DULLNIG-WARLEN, PE 2/16/2016
P.E. No: 63520 Date:

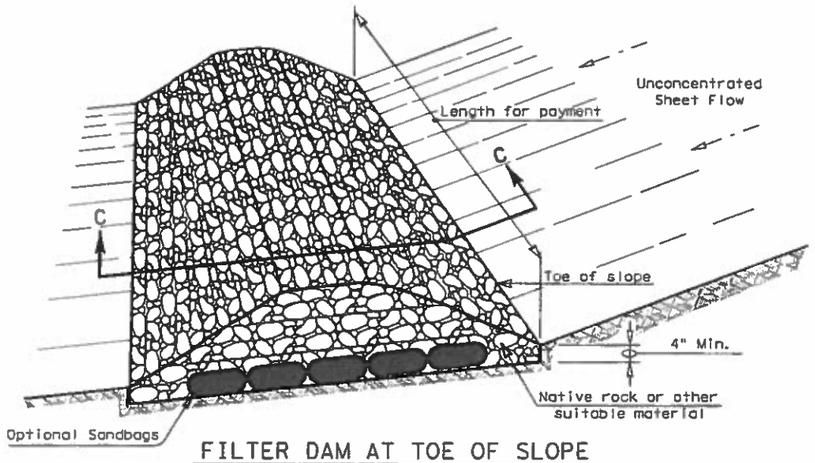
BAIN MEDINA BAIN, INC.
ENGINEERS & SURVEYORS
TBPE F-00178
7073 San Pedro, San Antonio, Texas, 78216
Phone: 210-494-7223 Fax: 210-490-5120 WWW.BMBI.COM

Texas Department of Transportation

SH 46

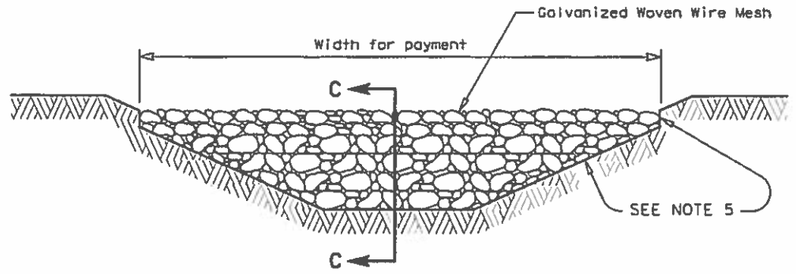
EROSION CONTROL LOG DETAILS

FED. RD. DIV. NO.	PROJECT		SHEET NO.
			383
STATE	DIST.	COUNTY	
TEXAS	SAT	KENDALL, ETC	
CONT.	SECT.	JOB	HIGHWAY NO.
0215	06	037,ETC	SH 46



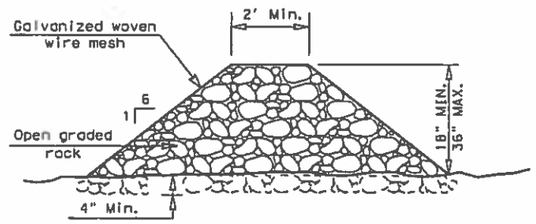
FILTER DAM AT TOE OF SLOPE

RFDS



FILTER DAM AT CHANNEL SECTIONS

RFDS



SECTION C-C

GENERAL NOTES

1. If shown on the plans or directed by the Engineer, filter dams should be placed near the toe of slopes where erosion is anticipated, upstream and/or downstream at drainage structures, and in roadway ditches and channels to collect sediment.
2. Materials (aggregate, wire mesh, sandbags, etc.) shall be as indicated by the specification for "Rock Filter Dams for Erosion and Sedimentation Control".
3. Side slopes should be 6:1 or flatter.
4. Maintain a minimum of 1' between top of rock filter dam weir and top of embankment for filter dams at sediment traps.
5. Filter dams should be embedded a minimum of 4" into existing ground.
6. Flow outlet should be onto a stabilized area (vegetation, rock, etc.).
7. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

ROCK FILTER DAM USAGE GUIDELINES

Rock Filter Dams should be constructed downstream from disturbed areas to intercept sediment from overland runoff and/or concentrated flow. The dams should be sized to filter a maximum flow through rate of 60 GPM/FT^2 of cross sectional area. A 2 year storm frequency may be used to calculate the flow rate.

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COUNTY ENGINEER

NO.	DATE	REVISION	APPR

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100% SUBMITTAL

Engineer:
MARTIN PALACIOS 2/16/2016
P.E. No: 111619 Date:

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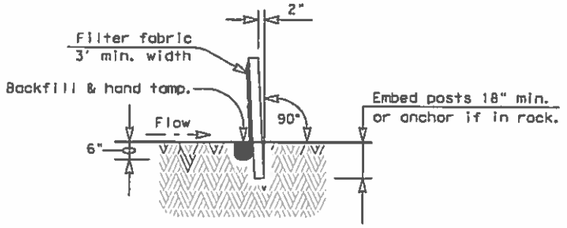
Texas Department of Transportation

SH 46

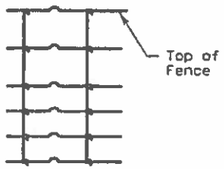
ROCK FILTER DAM
TYPE 5 DETAILS

FED. RD. DIV. NO.	PROJECT		SHEET NO.
			384
STATE	DIST.	COUNTY	
TEXAS	SAT	KENDALL, ETC	
CONT.	SECT.	JOB	HIGHWAY NO.
0215	06	037, ETC	SH 46

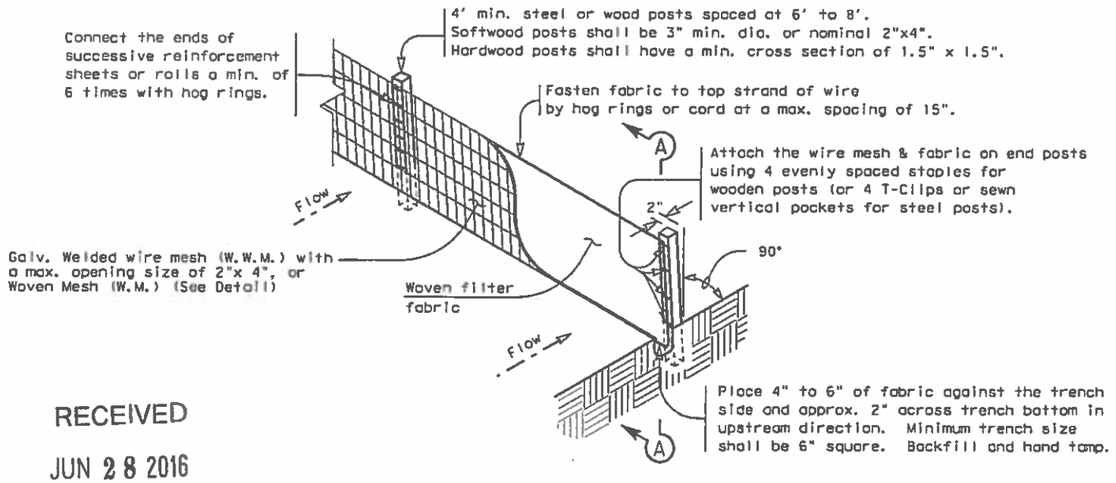


SECTION A-A

Galv. Hinge joint knot woven mesh (12.5 Ga. Min.) requires a minimum of five horizontal wires spaced at a max.12 inches apart and all vertical wires spaced at a max. 12 inches apart.



Hinge Joint Knot Woven Mesh (Option)



TEMPORARY SEDIMENT CONTROL FENCE

SCF

GENERAL NOTES

1. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

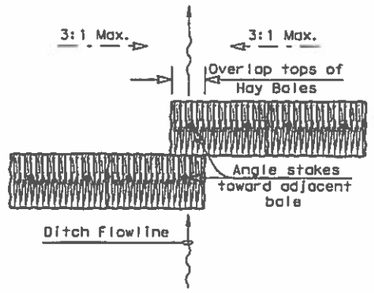
PLAN SHEET LEGEND

Sediment Control Fence — SCF

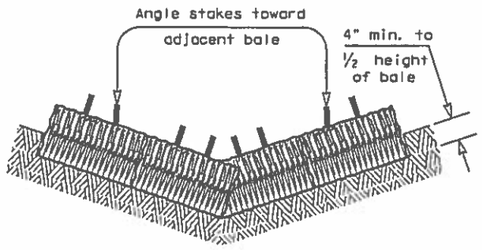
SEDIMENT CONTROL FENCE USAGE GUIDELINES

A sediment control fence may be constructed near the downstream perimeter of a disturbed area along a contour to intercept sediment from overland runoff. A 2 year storm frequency may be used to calculate the flow rate to be filtered.

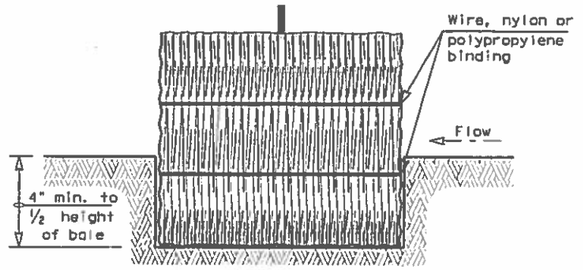
Sediment control fence should be sized to filter a max. flow through rate of 100 GPM/FT^2. Sediment control fence is not recommended to control erosion from a drainage area larger than 2 acres.



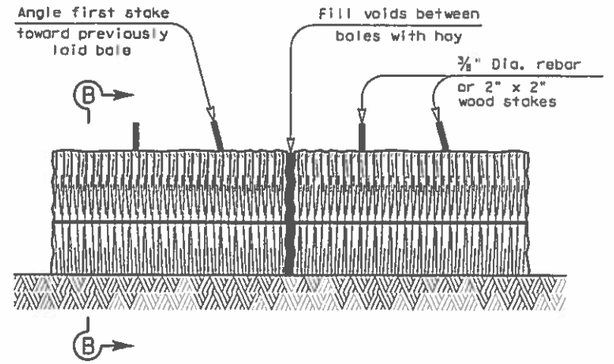
PLAN VIEW



PROFILE VIEW



SECTION B-B



BALED HAY FOR EROSION CONTROL

BH

PLANS SHEET LEGEND

Baled Hay — BH

BALED HAY USAGE GUIDELINES

A Baled Hay installation may be constructed near the downstream perimeter of a disturbed area along a contour to intercept sediment from overland runoff. A two year storm frequency may be used to calculate the flow rate to be filtered. The installation should be sized to filter a maximum flow thru rate of 5 GPM/FT^2 of cross sectional area. Baled hay may be used at the following locations:

1. Where the runoff approaching the baled hay flows over disturbed soil for less than 100'. If the slope of the disturbed soil exceeds 10%, the length of slope upstream the baled hay should be less than 50'.
2. Where the installation will be required for less than 3 months.
3. Where the contributing drainage area is less than ½ acre.

For Baled Hay installations in small ditches, the additional following considerations apply:

1. The ditch sideslopes should be graded as flat as possible to maximize the drainage flowrate thru the hay.
2. The ditch should be graded large enough to contain the overtopping drainage when sediment has filled to the top of the baled hay.

Bales should be replaced usually every 2 months or more often during wet weather when loss of structural integrity is accelerated.

GENERAL NOTES

1. Hay bales shall be a minimum of 30" in length and weigh a minimum of 50 Lbs.
2. Hay bales shall be bound by either wire or nylon or polypropylene string. The bales shall be composed entirely of vegetative matter.
3. Hay bales shall be embedded in the soil a minimum of 4" and where possible ½ the height of the bale.
4. Hay bales shall be placed in a row with ends tightly abutting the adjacent bales. The bales shall be placed with bindings parallel to the ground.
5. Hay bales shall be securely anchored in place with ⅜" Dia. rebar or 2" x 2" wood stakes, driven through the bales. The first stake shall be angled towards the previously laid bale to force the bales together.
6. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

FENCE & BALED HAY

EC(1)-09

FILE: ec109.dgn	DN: TxDOT	CK: AM	DW: TV	CK: BD	
© TxDOT June 1993	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0215	06	037, ETC.	SH 46	
	DIST	COUNTY		SHEET NO.	
	SAT	KENDALL, ETC.		385	

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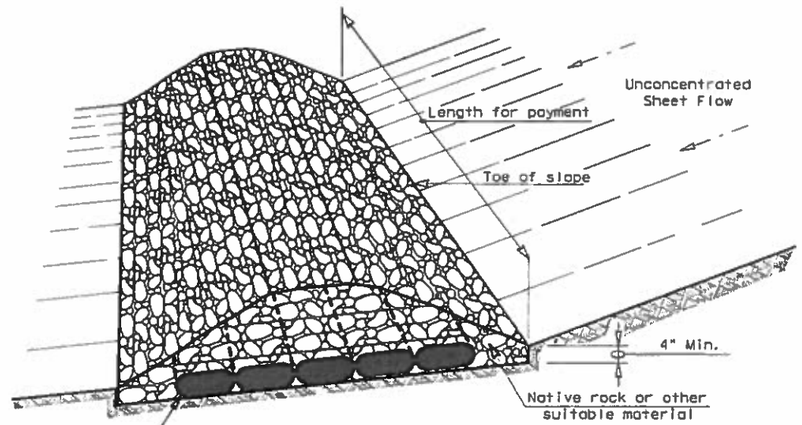
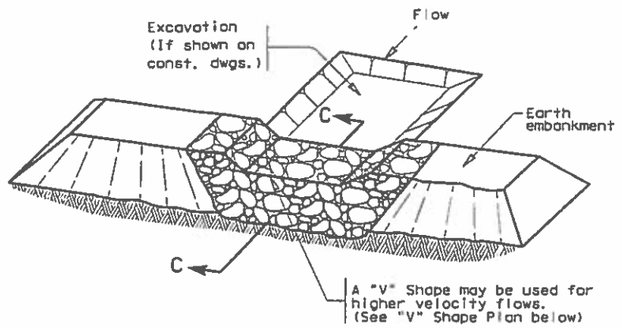


FILTER DAM AT TOE OF SLOPE

RFD1

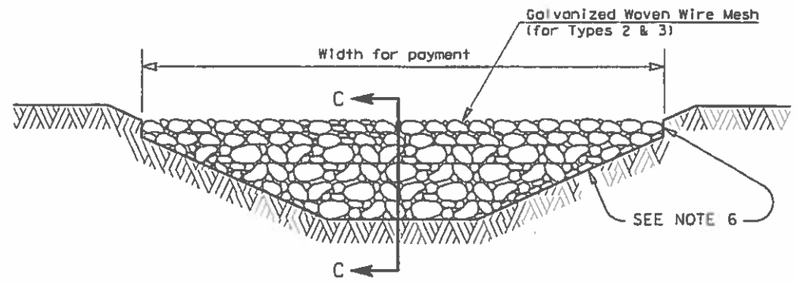
TYPE 1



FILTER DAM AT SEDIMENT TRAP

RFD1 — OR — RFD2

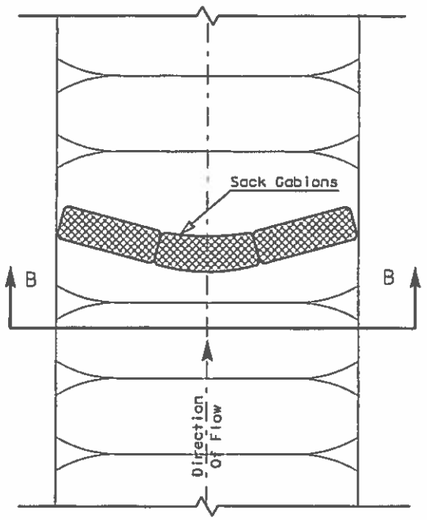
TYPE 1 OR TYPE 2



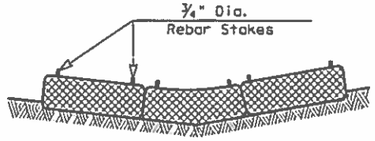
FILTER DAM AT CHANNEL SECTIONS

RFD1 — OR — RFD2 — OR — RFD3

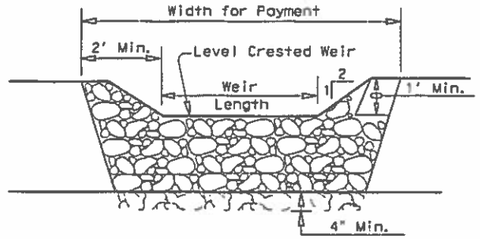
TYPE 1 OR TYPE 2 OR TYPE 3



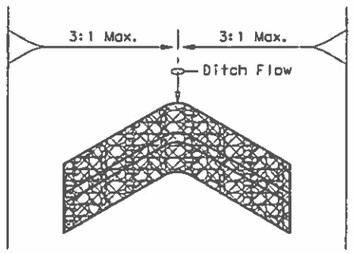
PLAN VIEW



SECTION B-B

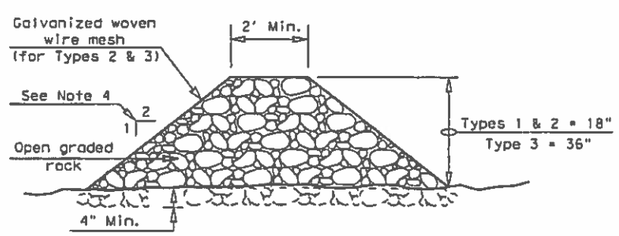


PROFILE



"V" SHAPE

(Plan View)



SECTION C-C

GENERAL NOTES

1. If shown on the plans or directed by the Engineer, filter dams should be placed near the toe of slopes where erosion is anticipated, upstream and/or downstream at drainage structures, and in roadway ditches and channels to collect sediment.
2. Materials (aggregate, wire mesh, sandbags, etc.) shall be as indicated by the specification for "Rock Filter Dams for Erosion and Sedimentation Control".
3. The rock filter dam dimensions shall be as indicated on the SW3P plans.
4. Side slopes should be 2:1 or flatter. Dams within the safety zone shall have sideslopes of 6:1 or flatter.
5. Maintain a minimum of 1' between top of rock filter dam weir and top of embankment for filter dams at sediment traps.
6. Filter dams should be embedded a minimum of 4" into existing ground.
7. The sediment trap for ponding of sediment laden runoff shall be of the dimensions shown on the plans.
8. Rock filter dam types 2 & 3 shall be secured with 20 gauge galvanized woven wire mesh with 1" diameter hexagonal openings. The aggregate shall be placed on the mesh to the height & slopes specified. The mesh shall be folded at the upstream side over the aggregate and tightly secured to itself on the downstream side using wire ties or hog rings. In stream use the mesh should be secured or staked to the stream bed prior to aggregate placement.
9. Sack Gabions should be staked down with ¾" dia. rebar stakes.
10. Flow outlet should be onto a stabilized area (vegetation, rock, etc.).
11. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

PLANS SHEET LEGEND

Type 1 Rock Filter Dam — RFD1

Type 2 Rock Filter Dam — RFD2

Type 3 Rock Filter Dam — RFD3

ROCK FILTER DAM USAGE GUIDELINES

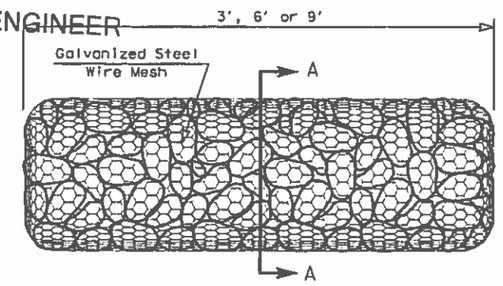
Rock Filter Dams should be constructed downstream from disturbed areas to intercept sediment from overland runoff and/or concentrated flow. The dams should be sized to filter a maximum flow through rate of 60 GPM/FT^2 of cross sectional area. A 2 year storm frequency may be used to calculate the flow rate.

Type 1 (18" high with no wire mesh): Type 1 may be used at the toe of slopes, around inlets, in small ditches, and at dike or swale outlets. This type of dam is recommended to control erosion from a drainage area of 5 acres or less. Type 1 may not be used in concentrated high velocity flows (approx. 8 Ft/Sec or more) in which aggregate wash out may occur. Sandbags may be used at the embedded foundation (4" deep min.) for better filtering efficiency of low flows if called for on the plans or directed by the Engineer.

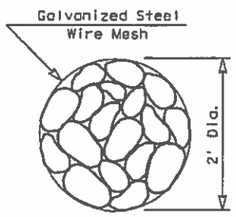
Type 2 (18" high with wire mesh): Type 2 may be used in ditches and at dike or swale outlets.

Type 3 (36" high with wire mesh): Type 3 may be used in stream flow and should be secured to the stream bed.

Type 4 (Sack gabions): Type 4 May be used in ditches and smaller channels to form an erosion control dam.



TYPE 4 (SACK GABIONS)



SECTION A-A

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Texas Department of Transportation

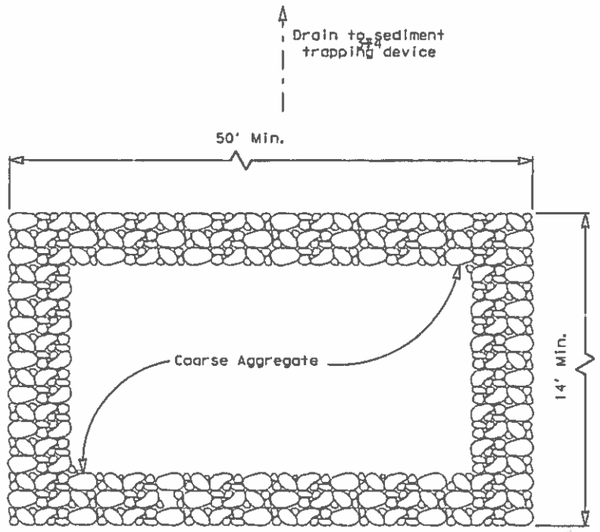
Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

ROCK FILTER DAMS

EC(2)-93

FILE: ec293.dgn	DN: TxDOT	CK: HEJ	DW: BD	CK:
©TxDOT June 1993	CONT	SECT	JOB	HIGHWAY
REVISIONS	0215	06	037, ETC.	SH 46
	DIST	COUNTY		SHEET NO.
	SAT	KENDALL, ETC.		386



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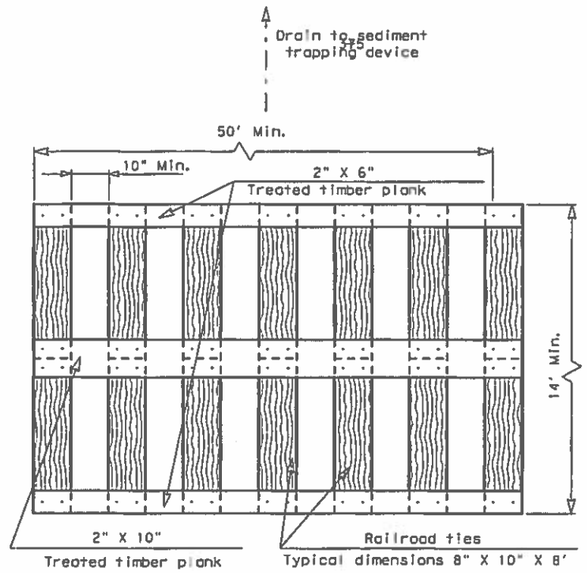

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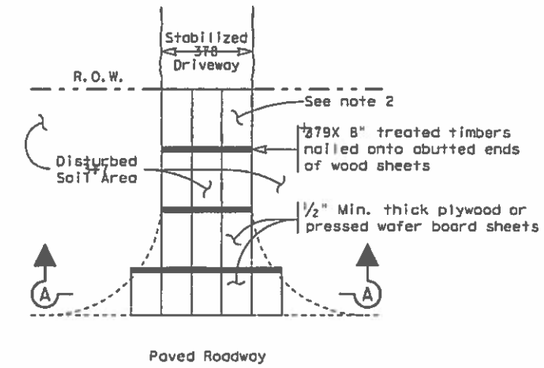

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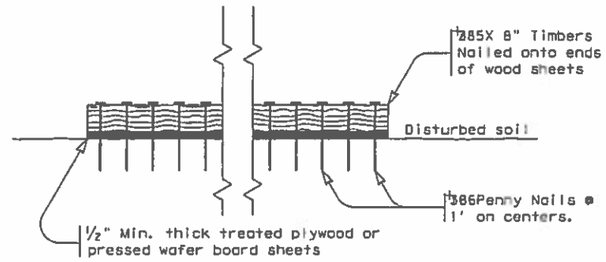
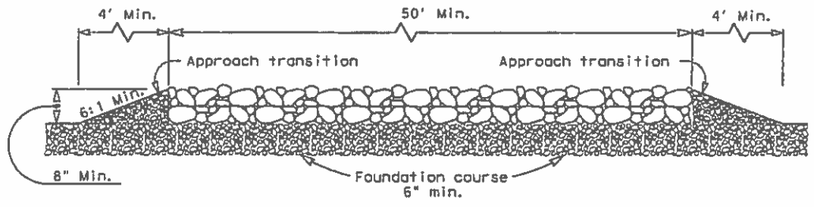


SECTION A-A

CONSTRUCTION EXIT (TYPE 3)

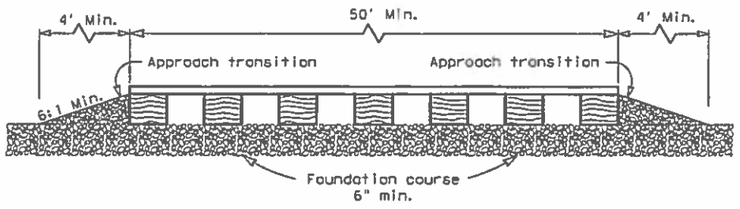
382



PROFILE

CONSTRUCTION EXIT (TYPE 1)

380



PROFILE

CONSTRUCTION EXIT (TYPE 2)

381

GENERAL NOTES

1. The length of the type 1 construction exit shall be as indicated on the plans, but not less than 50'.
2. The coarse aggregate should be open graded with a size of 4" to 8".

373 The approach transitions should be no steeper than 6:1 and constructed as directed by the Engineer.

384 The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other material as approved by the Engineer.

372 The construction exit shall be graded to allow drainage to a sediment trapping device.

6. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

GENERAL NOTES

1. The length of the type 2 construction exit shall be as indicated on the plans, but not less than 50'.
2. The treated timber planks shall be attached to the railroad ties with ½"x 6" min. lag bolts. Other fasteners may be used as approved by the Engineer.
3. The treated timber planks shall be #2 grade min., and should be free from large and loose knots.

376 The approach transitions shall be no steeper than 6:1 and constructed as directed by the Engineer.

383 The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other material as approved by the Engineer.

387 The construction exit should be graded to allow drainage to a sediment trapping device.

7. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

GENERAL NOTES

1. The length of the type 3 construction exit shall be as shown on the plans, or as directed by the Engineer.
2. The type 3 construction exit may be constructed from open graded crushed stone with a size of two to four inches spread a min. of 4" thick to the limits shown on the plans.
3. The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
4. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

DATE:
FILE:

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

CONSTRUCTION EXITS

EC(3)-93

FILE: ec393.dgn	DN: TxDOT	CK: HEJ	DW: BD	CK:
©TxDOT June 1993	CONT	SECT	JOB	HIGHWAY
REVISIONS	0215	06	037, ETC.	SH 46
	DIST	COUNTY		SHEET NO.
	SAT	KENDALL, ETC.		387

3/19/2015 4:01:32 PM

Texas Commission on Environmental Quality
Contributing Zone Plan
General Construction Notes

1. Written construction notification should be provided to the appropriate TCEQ regional office no later than 48 hours prior to commencement of the regulated activity. Information should include the date on which the regulated activity will commence, the name of the approved plan for the regulated activity, and the name of the prime contractor with the name and telephone number of the contact person.

2. All contractors conducting regulated activities associated with this project should be provided with complete copies of the approved Contributing Zone Plan and the TCEQ letter indicating the specific conditions of its approval. During the course of these regulated activities, the contractor(s) should keep copies of the approved plan and approval letter on-site.

3. No temporary aboveground hydrocarbon and hazardous substance storage tank system may be installed within 150 feet if a domestic, industrial, irrigation, or public water supply well.

4. Prior to commencing construction, all temporary erosion and sedimentation (E&S) control measures must be properly selected, installed, and maintained in accordance with the manufacturer's specifications and good engineering practices. Controls specified in the SWPPP section of the approved Edwards Aquifer Contributing Zone Plan are required during construction. If inspections indicate a control has been used inappropriately, or incorrectly, the applicant must replace or modify the control for site situations. The controls must remain in place until disturbed areas are revegetated and the areas have become permanently stabilized.

5. If sediment escapes the construction site, off-site accumulations of sediment must be removed at a frequency sufficient to minimize offsite impacts to water quality (e.g., fugitive sediment in street being washed into surface streams or sensitive features by the next rain).

6. Sediment must be removed from sediment traps or sedimentation ponds not later than when design capacity has been reduced by 50%. A permanent stake must be provided that can indicate when the sediment occupies 50% of the basin volume.

7. Litter, construction debris, and construction chemicals exposed to stormwater shall be prevented from becoming a pollutant source for stormwater discharges (e.g., screening outfalls, picked up daily).

8. All spoils (excavated material) generated from the project site and stored on-site must have proper E&S controls installed.

9. Stabilization measures shall be initiated as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, and construction activities will not resume within 21 days. When the initiation of stabilization measures by the 14th day is precluded by weather conditions, stabilization measures shall be initiated as soon as practicable.

10. The following records should be maintained and made available to the TCEQ upon request: the dates when major grading activities occur; the dates when construction activities temporarily or permanently cease on a portion of the site; and the dates when stabilization measures are initiated.

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11. The holder of any approved Contributing Zone plan must notify the appropriate regional office in writing and obtain approval from the executive director prior to initiating any of the following:

A. any physical or operational modification of any best management practices or structure(s), including but not limited to temporary or permanent ponds, dams, berms, silt fences, and diversionary structures;

B. any change in the nature or character of the regulated activity from that which was originally approved;

C. any change that would significantly impact the ability to prevent pollution of the Edwards Aquifer and hydrologically connected surface water; or

D. any development of land previously identified in a contributing zone plan as undeveloped.

Austin Regional Office 2800 S. IH 35, Suite 100 Austin, Texas 78704-5712 Phone (512) 339-2929 Fax (512) 339-3795	San Antonio Regional Office 14250 Judson Road San Antonio, Texas 78233-4480 Phone (210) 490-3096 Fax (210) 545-4329

THESE GENERAL CONSTRUCTION NOTES MUST BE INCLUDED ON THE CONSTRUCTION PLANS PROVIDED TO THE CONTRACTOR AND ALL SUBCONTRACTORS.

LEGEND:

SEDIMENT CONTROL FENCE	SCF
ROCK FILTER DAM TY 5	RFD5
BIODEGRADABLE EROSION CONTROL LOG	BECL
FLOW DIRECTION	
DIRECTION OF TRAFFIC	
TOPSOIL & DRILL SEED (PERM)/(TEMP)	
TOPSOIL / DRILL SEED & SOIL RETENTION BLANKET (PERM)/(TEMP)	

NO.	DATE	REVISION	APPR

PRELIMINARY
FOR REVIEW ONLY
Not for construction, bidding or permit purposes.
95% SUBMITTAL
Engineer: LORI DULLNIG-WARLEN, PE 3/19/2015
P.E. No: 63520 Date:

BAIN MEDINA BAIN, INC.
ENGINEERS & SURVEYORS
TBPE F-001718
7073 San Pedro, San Antonio, Texas, 78216
Phone: 210-494-7223 Fax: 210-496-8130 WWW.BAIN.COM

Texas Department of Transportation

SH 46

CONTRIBUTING ZONE PLAN NOTES

SHEET 1 OF 1

CSJ:	PROJECT	SHEET NO.
		375

STATE	DIST.	COUNTY	
TEXAS	SAT	KENDALL, ETC	
CONT.	SECT.	JOB	HIGHWAY NO.
0215	06	037, ETC	SH 46

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