Edwards Aquifer Contributing Zone Exception Request

Shane Lane Roadway Improvements

City of Dripping Springs

October 9, 2023

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Section 1:

Edwards Aquifer Application Cover Page

Shane Lane Roadway Improvements

City of Dripping Springs

Texas Commission on Environmental Quality

Edwards Aquifer Application Cover Page

Our Review of Your Application

The Edwards Aquifer Program staff conducts an administrative and technical review of all applications. The turnaround time for administrative review can be up to 30 days as outlined in 30 TAC 213.4(e). Generally administrative completeness is determined during the intake meeting or within a few days of receipt. The turnaround time for technical review of an administratively complete Edwards Aquifer application is 90 days as outlined in 30 TAC 213.4(e). Please know that the review and approval time is directly impacted by the quality and completeness of the initial application that is received. In order to conduct a timely review, it is imperative that the information provided in an Edwards Aquifer application include final plans, be accurate, complete, and in compliance with 30 TAC 213.

Administrative Review

1. Edwards Aquifer applications must be deemed administratively complete before a technical review can begin. To be considered administratively complete, the application must contain completed forms and attachments, provide the requested information, and meet all the site plan requirements. The submitted application and plan sheets should be final plans. Please submit one full-size set of plan sheets with the original application, and half-size sets with the additional copies.

   To ensure that all applicable documents are included in the application, the program has developed tools to guide you and web pages to provide all forms, checklists, and guidance. Please visit the below website for assistance: http://www.tceq.texas.gov/field/eapp.

2. This Edwards Aquifer Application Cover Page form (certified by the applicant or agent) must be included in the application and brought to the administrative review meeting.

3. Administrative reviews are scheduled with program staff who will conduct the review. Applicants or their authorized agent should call the appropriate regional office, according to the county in which the project is located, to schedule a review. The average meeting time is one hour.

4. In the meeting, the application is examined for administrative completeness. Deficiencies will be noted by staff and emailed or faxed to the applicant and authorized agent at the end of the meeting, or shortly after. Administrative deficiencies will cause the application to be deemed incomplete and returned.

   An appointment should be made to resubmit the application. The application is re-examined to ensure all deficiencies are resolved. The application will only be deemed administratively complete when all administrative deficiencies are addressed.

5. If an application is received by mail, courier service, or otherwise submitted without a review meeting, the administrative review will be conducted within 30 days. The applicant and agent will be contacted with the results of the administrative review. If the application is found to be administratively incomplete, it can be retrieved from the regional office or returned by regular mail. If returned by mail, the regional office may require arrangements for return shipping.

6. If the geologic assessment was completed before October 1, 2004 and the site contains "possibly sensitive" features, the assessment must be updated in accordance with the *Instructions to Geologists* (TCEQ-0585 Instructions).

Technical Review

1. When an application is deemed administratively complete, the technical review period begins. The regional office will distribute copies of the application to the identified affected city, county, and groundwater conservation district whose jurisdiction includes the subject site. These entities and the public have 30 days to provide comments on the application to the regional office. All comments received are reviewed by TCEQ.

2. A site assessment is usually conducted as part of the technical review, to evaluate the geologic assessment and observe existing site conditions. The site must be accessible to our staff. The site boundaries should be

clearly marked, features identified in the geologic assessment should be flagged, roadways marked and the alignment of the Sewage Collection System and manholes should be staked at the time the application is submitted. If the site is not marked the application may be returned.

3. We evaluate the application for technical completeness and contact the applicant and agent via Notice of Deficiency (NOD) to request additional information and identify technical deficiencies. There are two deficiency response periods available to the applicant. There are 14 days to resolve deficiencies noted in the first NOD. If a second NOD is issued, there is an additional 14 days to resolve deficiencies. If the response to the second notice is not received, is incomplete or inadequate, or provides new information that is incomplete or inadequate, the application must be withdrawn or will be denied. Please note that because the technical review is underway, whether the application is withdrawn or denied **the application fee will be forfeited**.
4. The program has 90 calendar days to complete the technical review of the application. If the application is technically adequate, such that it complies with the Edwards Aquifer rules, and is protective of the Edwards Aquifer during and after construction, an approval letter will be issued. Construction or other regulated activity may not begin until an approval is issued.

Mid-Review Modifications

It is important to have final site plans prior to beginning the permitting process with TCEQ to avoid delays.

Occasionally, circumstances arise where you may have significant design and/or site plan changes after your Edwards Aquifer application has been deemed administratively complete by TCEQ. This is considered a "Mid-Review Modification". Mid-Review Modifications may require redistribution of an application that includes the proposed modifications for public comment.

If you are proposing a Mid-Review Modification, two options are available:

- If the technical review has begun your application can be denied/withdrawn, your fees will be forfeited, and the plan will have to be resubmitted.
- TCEQ can continue the technical review of the application as it was submitted, and a modification application can be submitted at a later time.

If the application is denied/withdrawn, the resubmitted application will be subject to the administrative and technical review processes and will be treated as a new application. The application will be redistributed to the affected jurisdictions.

Please contact the regional office if you have questions. If your project is located in Williamson, Travis, or Hays County, contact TCEQ's Austin Regional Office at 512-339-2929. If your project is in Comal, Bexar, Medina, Uvalde, or Kinney County, contact TCEQ's San Antonio Regional Office at 210-490-3096

Please fill out all required fields below and submit with your application.

1. Regulated Entity Name: Shane Lane Roadway Improvements					**2. Regulated Entity No.:**			
3. Customer Name: City of Dripping Springs					**4. Customer No.:** CN602491284			
5. Project Type: **(Please circle/check one)**	New:		Modification		Extension		Exception	
6. Plan Type: **(Please circle/check one)**	WPAP	CZP	SCS	UST / AST	EXP	EXT	Technical Clarification	Optional Enhanced Measures
7. Land Use: **(Please circle/check one)**	Residential		Non-residential		**8. Site (acres):**		0.92	
9. Application Fee:	$500		**10. Permanent BMP(s):**		N/A			
11. SCS (Linear Ft.):	N/A		**12. AST/UST (No. Tanks):**		N/A			
13. County:	Hays		**14. Watershed:**		HUC 10: Onion Creek-Colorado River			

Application Distribution

Instructions: Use the table below to determine the number of applications required. One original and one copy of the application, plus additional copies (as needed) for each affected incorporated city, county, and groundwater conservation district are required. Linear projects or large projects, which cross into multiple jurisdictions, can require additional copies. Refer to the "Texas Groundwater Conservation Districts within the EAPP Boundaries" map found at:

http://www.tceq.texas.gov/assets/public/compliance/field_ops/eapp/EAPP%20GWCD%20map.pdf

For more detailed boundaries, please contact the conservation district directly.

Austin Region			
County:	**Hays**	**Travis**	**Williamson**
Original (1 req.)	___	___	___
Region (1 req.)	___	___	___
County(ies)	___	___	___
Groundwater Conservation District(s)	___Edwards Aquifer Authority ___Barton Springs/ Edwards Aquifer _X_Hays Trinity ___Plum Creek	___Barton Springs/ Edwards Aquifer	NA
City(ies) Jurisdiction	___Austin ___Buda X Dripping Springs ___Kyle ___Mountain City ___San Marcos ___Wimberley ___Woodcreek	___Austin ___Bee Cave ___Pflugerville ___Rollingwood ___Round Rock ___Sunset Valley ___West Lake Hills	___Austin ___Cedar Park ___Florence ___Georgetown ___Jerrell ___Leander ___Liberty Hill ___Pflugerville ___Round Rock

San Antonio Region					
County:	**Bexar**	**Comal**	**Kinney**	**Medina**	**Uvalde**
Original (1 req.)	___	___	___	___	___
Region (1 req.)	___	___	___	___	___
County(ies)	___	___	___	___	___
Groundwater Conservation District(s)	___ Edwards Aquifer Authority ___Trinity-Glen Rose	___Edwards Aquifer Authority	___Kinney	___EAA ___Medina	___EAA ___Uvalde
City(ies) Jurisdiction	___Castle Hills ___Fair Oaks Ranch ___Helotes ___Hill Country Village ___Hollywood Park ___San Antonio (SAWS) ___Shavano Park	___Bulverde ___Fair Oaks Ranch ___Garden Ridge ___New Braunfels ___Schertz	NA	___San Antonio ETJ (SAWS)	NA

I certify that to the best of my knowledge, that the application is complete and accurate. This application is hereby submitted to TCEQ for administrative review and technical review. Felipe S. Tudtud, P.E.
Print Name of Customer/Authorized Agent  4/13/2023 Signature of Customer/Authorized Agent Date

FOR TCEQ INTERNAL USE ONLY				
Date(s)Reviewed:		Date Administratively Complete:		
Received From:		Correct Number of Copies:		
Received By:		Distribution Date:		
EAPP File Number:		Complex:		
Admin. Review(s) (No.):		No. AR Rounds:		
Delinquent Fees (Y/N):		Review Time Spent:		
Lat./Long. Verified:		SOS Customer Verification:		
Agent Authorization Complete/Notarized (Y/N):		Fee Check:	Payable to TCEQ (Y/N):	
Core Data Form Complete (Y/N):			Signed (Y/N):	
Core Data Form Incomplete Nos.:			Less than 90 days old (Y/N):	

Section 2:

Contributing Zone Exception Request Form

Shane Lane Roadway Improvements

City of Dripping Springs

Contributing Zone Exception Request Form

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.

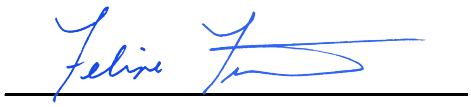
Signature

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 Exception Request Form** is hereby submitted for TCEQ review and executive director approval. The request was prepared by:

Print Name of Customer/Agent: Felipe S. Tudtud, P.E.

Date: 03-06-2023

Signature of Customer/Agent:



Regulated Entity Name: Shane Lane Roadway Improvements

Project Information

1. County: Hays
2. Stream Basin: Middle Colorado-Llano
3. Groundwater Conservation District (if applicable): Hays Trinity GCD
4. Customer (Applicant):

   Contact Person: Chad Gilpin
   Entity: City of Dripping Springs
   Mailing Address: 511 W. Mercer St.
   City, State: Dripping Springs, TX Zip: 78620
   Telephone: 512.858.4725 Fax: -----
   Email Address: chad.gilpin@gilpinengineering.com

5. Agent/Representative (If any):

   Contact Person: Felipe S. Tudtud, P.E.
   Entity: HDR Engineering, Inc.
   Mailing Address: 710 Hesters Crossing, Suite 150
   City, State: Round Rock, TX Zip: 78681
   Telephone: 512.685.2959 Fax: -----
   Email Address: Felipe.Tudtud@hdrinc.com

6. Project Location

   ☒ This project is inside the city limits of Dripping Springs.
   ☐ This project is outside the city limits but inside the ETJ (extra-territorial jurisdiction) of _____.
   ☐ This project is not located within any city 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.

   Intersection of Shane Lane and Golden Eagle Drive. Northwest of Dripping Springs High School.
   Lat: 30°12'10.7"
   Long: -98°06'09.6"

8. ☒ **Attachment A - Road Map**. A road map showing directions to and 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 USGS Quadrangle Map (Scale: 1" = 2000') is attached. The map(s) should clearly show:

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

10. ☒ **Attachment C - Project Narrative**. A detailed narrative description of the proposed project is provided at the end of this form. 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. ☒ **Attachment D - Nature Of Exception**. A narrative description of the nature of each exception requested is attached. All provisions of 30 TAC §213 Subchapter B for which an exception is being requested have been identified in the description.

13. ☒ **Attachment E - Equivalent Water Quality Protection**. Documentation demonstrating equivalent water quality protection for surface streams which enter the Edwards Aquifer is attached.

Administrative Information

14. ☒ 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.

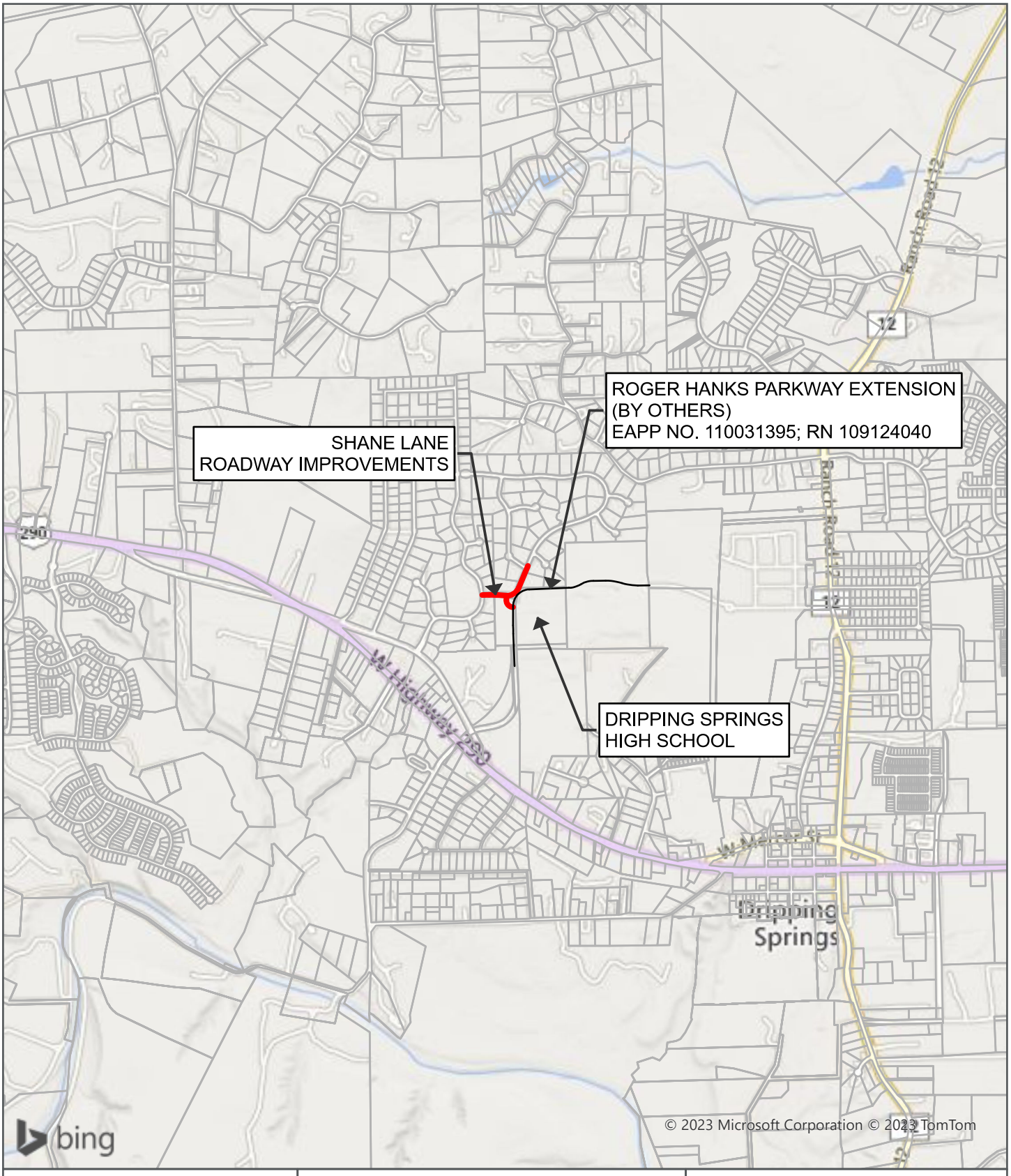
15. ☒ The applicant understands that prior approval under this section must be obtained from the executive director for the exception to be authorized.

Section 2 Attachment A:

Road Map

Shane Lane Roadway Improvements

City of Dripping Springs



N

0 2,000 4,000
FEET

LEGEND

KHA PROJECT

SITE LOCATION

HAYS CO. PARCELS

HDR

SHANE LANE ROADWAY IMPROVEMENTS

DRIPPING SPRINGS, TX
ROAD MAP

ATTACHMENT A

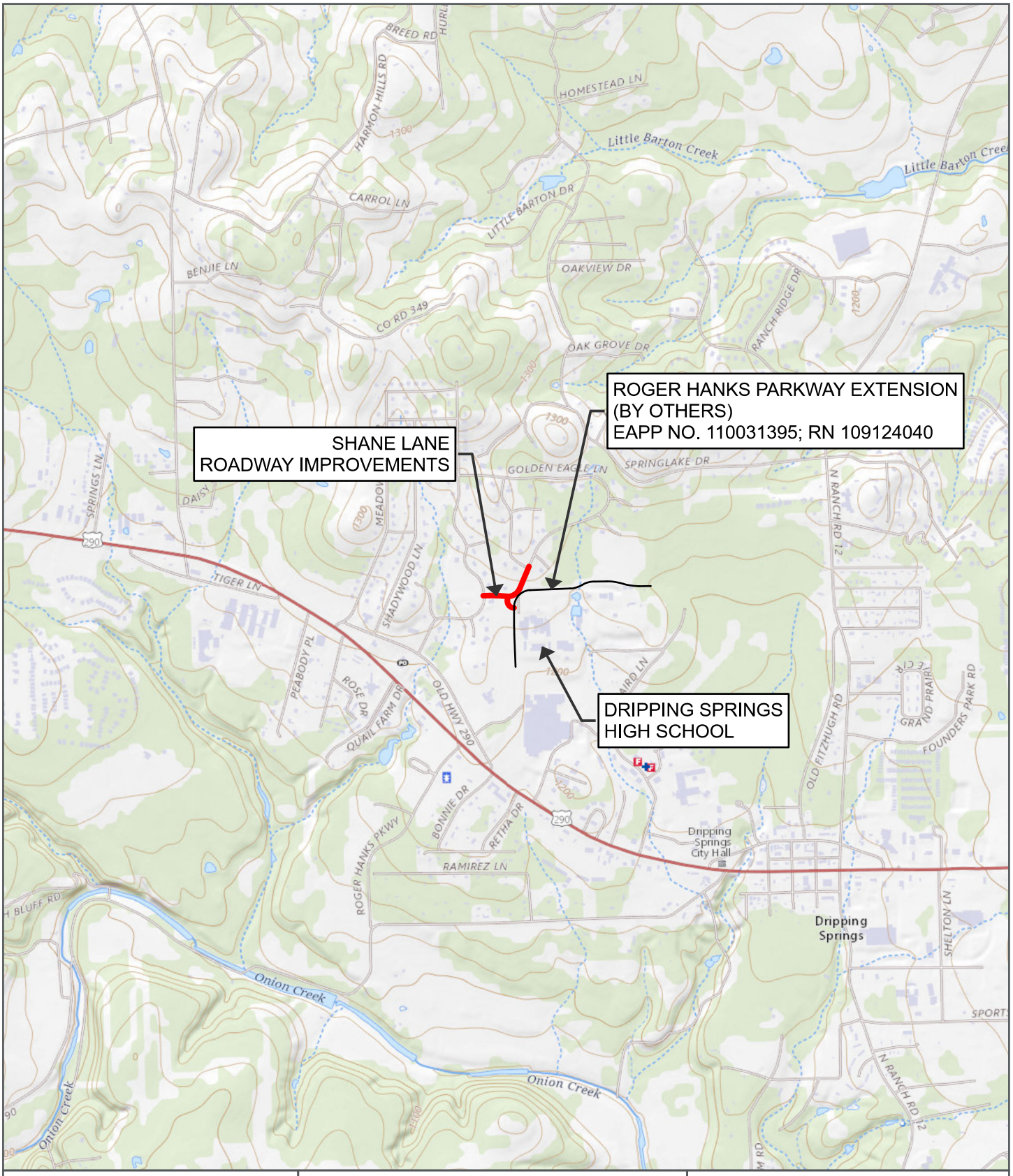
PATH: P:\4896_CITY_OF_DRIPPING_SPRINGS\10338078_2022_DSTS_TO5_ROGER_HANKS_PS&E\7.2_WIP\MAP_DOCS\HDR_PROJECT.APRX - USER: CAMARAL - DATE: 4/10/2023

Section 2 Attachment B:

USGS Quadrangle Map

Shane Lane Roadway Improvements

City of Dripping Springs



N

0 2,000 4,000
FEET

LEGEND

KHA PROJECT

SITE LOCATION

SHANE LANE ROADWAY IMPROVEMENTS

DRIPPING SPRINGS, TX
USGS QUADRANGLE

ATTACHMENT B

PATH: P:\4896_CITY_OF_DRIPPING_SPRINGS\10338078_2022_DSTS_TO5_ROGER_HANKS_PS&E\7.2_WIP\MAP_DOCS\HDR_PROJECT.APRX - USER: CAMARAL - DATE: 4/10/2023

Section 2 Attachment C:

Project Description/ Narrative

Shane Lane Roadway Improvements

City of Dripping Springs

Project Narrative

Area of the Site:

The Shane Lane Roadway Improvements project area is approximately 0.92 acres. The area adject to the project is owned by private homeowners, the City of Dripping Springs (CoDS), and Dripping Springs ISD (ROW is dedicated to the CoDS). The project site is between a residential area, Dripping Springs High School, and an undeveloped lot owned by the CoDS. Existing site area includes existing asphalt roads and an undeveloped grassy area. The project area is directly adject to the Roger Hanks Parkway Extension II project. This is another CoDS roadway project designed by Kimley-Horn and Associates (KHA). The Shane Lane Roadway Improvements and Roger Hanks Parkway Extension II projects are in the same common plan of development.

Offsite Areas:

There is about 10 acres of offsite area draining to the proposed roadway. Approximately 6 acres will be collected via proposed storm drain and outfall into the storm drain system proposed by KHA. The remaining 4 acres crosses Shane Lane via an existing culvert and outfalls to the undeveloped lot located southwest of the project site.

Impervious Cover:

The existing impervious cover is 0.47 acres, and the proposed impervious cover is 0.60 acres.

Permanent BMPs:

There are no permanent BMPs proposed in this project.

Proposed Site Use:

This roadway improvements project includes the realignment of the connection between Shane Lane and Golden Eagle Drive. Proposed site use is residential street.

Site History:

Shane Lane and Golden Eagle Lane were both built in the early 2000's. The surrounding residential area was developed in the late 2000's. The private property closest to the project area (956 Golden Eagle Lane) was bult in 2014. The current Dripping Springs High School campus, which is immediately Southeast of the project, was built in 2010. Roger Hanks Parkway Extension, which is the adjacent roadway project, is under construction as of Spring 2023.

Previous Development:

The existing Shane Lane and Golden Eagle Lane connection was built in the early 2000's. Roger Hanks Parkway is under construction as of Spring 2023.

Areas to be Demolished:

A section of the existing Shane Lane/Golden Eagle Drive connection will be demolished to make way for the proposed realignment.

TCEQ Coordination:

Note that a CZP exception request with the included equivalent water quality treatment was agreed to be acceptable for satisfying the TCEQ requirements verbally via a phone conversation with Kevin Smith on 01-12-2023.

Section 2 Attachment D:

Nature of Exception

Shane Lane Roadway Improvements

City of Dripping Springs

Nature of Exception

The Shane Lane Roadway Improvements project is subject to removal of total suspended solids (TSS) due to increased impervious cover according to Edwards Aquifer Rules (30 TAC Chapter 213). The proposed roadway improvements increase the amount impervious cover by 0.13 acres, which results in 115 lbs of required TSS removal.

The Shane Lane Roadway Improvements project and the adjacent project (Roger Hanks Parkway Extension II, EAPP ID No. 11003195; RN109124040) are part of the same common plan of improvement. This adjacent project includes proposed permanent best management practices (BMPs) which overtreat the required amount of TSS by 187 lbs according to the summary table shown on the project narrative (attachment C) of their approved CZP. The design team of this adjacent project (KHA) and HDR have an agreement that the use of this extra TSS removal as equivalent water quality protection is the best path forward. Refer to Attachment E, equivalent water quality protection, for more details. See Summary table below for TSS values.

Due to the limited ROW and large offsite flows, the construction of permanent BMPs to satisfy the TCEQ requirements is impractical. Various proposed permanent BMPs were considered during the design phase and ruled out due to the following reasons: Large offsite flows prevent the use of low-flow permanent BMPs such vegetative filter strips and grassy swales. In the areas without offsite flows, there is not enough ROW to fit sufficient permanent BMPs. Also, these areas do not drain enough impervious cover. Permanent BMP(s) in these areas would not remove enough TSS to fully satisfy the TCEQ requirements.

All the onsite and offsite runoff associated with the Shane Lane project outfalls to the Roger Hanks project. Drainage area A1 drains into an existing culvert, which drains to the undeveloped grassy area south of Shane Lane. This outfalls to “Detention Pond B”, proposed by KHA. Drainage areas A2 and A3 drain to area inlets and proposed storm drain. This runoff which outfall to line “SD-B”, proposed by KHA. See drainage area maps on plan sets for more details.

TSS Removal Summary Table			
Project	TSS Removal (lbs)		
	Required	Proposed	Difference
Shane Lane Roadway Improvements (HDR)	115	0	115
Roger Hanks Parkway Extension (KHA)	2156	2343	187

Table: TSS Removal Summary

Section 2 Attachment E:

Equivalent Water Quality Protection

Shane Lane Roadway Improvements

City of Dripping Springs

Equivalent Water Quality Protection

Roger Hanks Parkway Extension II (EAPP ID No. 11003195; RN109124040) is the adjacent roadway project in the same common plan of development providing equivalent water quality protection. Note that these two projects are in the same common plan of development. The permanent BMPs proposed in their design remove enough TSS to satisfy the TCEQ requirements for both projects. See table below for the "Overall Water Quality Drainage Basins" for summary of the KHA proposed water quality. See the "TSS Removal Summary Table" in the "Nature of Exception" attachment for a comparison of water quality treatment for both projects.

Note that all the onsite and offsite runoff associated with the Shane Lane project outfalls to the Roger Hanks project. Drainage area A1 drains into an existing culvert, which drains to the undeveloped grassy area south of Shane Lane. This outfalls to "Detention Pond B", proposed by KHA. Drainage areas A2 and A3 drain to proposed area inlets and storm drain. This runoff outfalls to line "SD-B", proposed by KHA. See plan sets for more details.

Note: This screen shot was taken from KHA's approved CZP. See Attachment C for more details.

Overall Water Quality Drainage Basins					
	Proposed Area (AC)	Proposed Impervious Cover (AC)	% Impervious Cover	Required TSS Removal	Proposed TSS Removal
WV-1	0.48	0.41	85.42%	332	387
VFS-1	1.53	1.02	66.67%	637	637
VFS-2	0.20	0.12	60.00%	99	99
VFS-3	1.45	1.05	72.41%	942	942
VFS-4	0.19	0.08	42.11%	72	72
VFS-5	0.64	0.47	73.44%	206	206
UNTREATED	6.37	0.22	3.45%	-162	0
ONSITE TOTAL	**10.86**	**3.37**	31.03%	**2127**	**2343**
OFFSITE (OS-1)	0.03	0.03	100.00%	29	0
Totals	10.89	3.40	31.22%	2156	2343

Table: Roger Hanks Parkway Extension (By Others) Overall Water Quality Drainage Basins

The following four documents are included as part of Attachment E of this CZP exception request:

1. A letter of agreement between City of Dripping Springs, Kimley-Horn and Associates, Inc. and HDR Engineering, Inc. regarding the equivalent water quality treatment.
2. The CZP letter of approval for the Roger Hanks Parkway Extension from TCEQ.
3. The entire CZP prepared for the City of Dripping Springs by KHA. (Separate pdf)
    a. Note that the entre design plan set, which includes detailed water quality calculations and the proposed BMPs, are included in the CZP.
4. The Shane Lane Roadway Improvements plans. (Separate pdf)

Letter of Agreement

Shane Lane Roadway Improvements

City of Dripping Springs

Letter of Agreement

The following is a letter of agreement between City of Dripping Springs, HDR Engineering, Inc. (HDR) and Kimley-Horn and Associates, Inc. (KHA) regarding the water quality and proposed best management practices to satisfy the TCEQ requirements for TSS removal. The Shane Lane Roadway Improvements project (HDR) and the adjacent Roger Hanks Parkway Extension project (KHA) are part are of the same common plan of development. Permanent BMPs to treat the TSS required for the Shane Lane project are unfeasible. See attachment D, “Nature of Exception” for more details. The approved CZP for the Roger Hanks Parkway Extension project (EAPP ID No. 11003195; RN109124040) shows that their proposed BMPs overtreat their project area. The overtreatment in their design is greater than the required treatment associated with the Shane Lane Roadway Improvements project. See attachment E “Equivalent Water Quality Protection” for more details.

This letter of agreement states:

1. The City of Dripping Springs approves the use of Roger Hanks Parkway Extension BMPs for treatment associated with the Shane Lane Roadway Improvements.
2. The two design teams have coordinated and agreed upon the previously mentioned details.

TSS Removal Summary Table			
Project	TSS Removal (lbs)		
	Required	Proposed	Difference
Shane Lane Roadway Improvements (HDR)	115	0	115
Roger Hanks Parkway Extension (KHA)	2156	2343	187

3. The over-treatment of rainfall runoff in the Roger Hanks Parkway Extension project is reserved for the required TSS associated with Shane Lane Roadway Improvements project.
4. This approach is the best engineered solution to satisfy the TCEQ water quality requirements.

I certify that the above statements are correct and acknowledge this document will be submitted to the TCEQ for administrative and Technical Review

City of Dripping Springs.

Print: Chad Gilpin

Signature: 

Date: 9-25-2023

HDR Engineering, Inc.

Print: Felipe S. Tudtud

Signature: 

Date: 09/17/2023

Kimley-Horn and Associates, Inc.

Print: Alejandro E. Granados Rico

Signature: 

Roger Hanks Parkway Extension II CZP Approval Letter

(KHA)

Shane Lane Roadway Improvements

City of Dripping Springs

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

October 7, 2022

Mr. Chad Gilpin
City of Dripping Springs
511 West Mercer Street
Dripping Springs, Texas 78620

Re: Edwards Aquifer, Hays County
Roger Hanks Parkway Extension; NW of US Hwy. 290 and RM 12; Dripping Springs, Texas
Request for Approval of a Contributing Zone Plan (CZP)
30 Texas Administrative Code (TAC) Chapter 213 Edwards Aquifer, Subchapter B
Edwards Aquifer Protection Program ID No. 11003195; RN109124040

Dear Mr. Gilpin:

The Texas Commission on Environmental Quality (TCEQ) has completed its review of the CZP application for the above-referenced project submitted to the Austin Regional Office by Kimley-Horn and Associates, Inc. on behalf of City of Dripping Springs on August 5, 2022. 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 roadway project extends Roger Hanks Parkway from its existing terminus and onto Heritage Subdivision (EAPP ID 11002494). The roadway will be a 2-lane public road with a sidewalk to be added. Some demolition of existing structures is also to occur. The project ROW is approximately 6.3 acres within the Onion Creek watershed.

The project is within the Contributing Zone and approves:

- Adding travel lanes and sidewalk,
- Demolishing existing pavement and improving drainage culverts,
- Installing Permanent BMPs consisting of vegetated filter strips (VFS) for selected pavement and adding a storm treatment unit (STU),
- Re-stabilizing the Right of Way 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

To prevent the pollution of stormwater runoff originating on-site or upgradient of the site and potentially flowing across and off the site after construction, one storm treatment unit (STU) –a Stormtrooper wet vault, designed in accordance with the TCEQ technical guidance document, *Complying with the Edwards Aquifer Rules: Technical Guidance on Best Management Practices (2005)*, will be installed to treat stormwater runoff, supplemented by a set of vegetated filter strips. The STU has been sized and positioned to treat a specific drainage area. Existing culverts will cross under or around Roger Hanks Parkway 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 parameters were sealed by Alexander Rico, P.E., on July 27, 2022, 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. The STU treatment measures shall be operational prior to public traffic of the new roadway.

III. All sediment removed from the STU basin during maintenance activities shall be properly disposed of according to 30 TAC 330 or 30 TAC 335, as applicable.

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.

2. The holder of the approved Edwards Aquifer protection plan must comply with all provisions of 30 TAC Chapter 213 and all best management practices and measures contained in the approved plan.

Prior to Commencement of Construction:

3. 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 location until all regulated activities are completed.

4. 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.

5. The applicant must provide written notification of intent to commence construction, replacement, or rehabilitation of the referenced project. Notification must be submitted to the Austin Regional Office no later than 48 hours prior to commencement of the regulated activity. Written notification must include the name of the approved plan and file number for the regulated activity, the date on which the regulated activity will commence, and the name of the prime contractor with the name and telephone number of the contact person.

6. Temporary erosion and sedimentation (E&S) controls, i.e., silt fences, rock berms, stabilized construction entrances, or other controls described in the approved Storm Water Pollution Prevention Plan (SWPPP) must be installed prior to construction and maintained during construction. Temporary E&S controls may be removed when vegetation is established, and the construction area is stabilized. The TCEQ may monitor stormwater discharges from the site to evaluate the adequacy of temporary E&S control measures. Additional controls may be necessary if excessive solids are being discharged from the site.

<u>During Construction</u>:

7. During the course of regulated activities related to this project, the applicant or his agent shall comply with all applicable provisions of 30 TAC Chapter 213, Edwards Aquifer. The applicant shall remain responsible for the provisions and conditions of this approval until such responsibility is legally transferred to another person or entity.

8. If sediment escapes the construction site, the 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 by the next rain). Sediment must be removed from sediment traps or sedimentation ponds not later than when design capacity has been significantly reduced. 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).

9. Intentional discharges of sediment laden water are not allowed. If dewatering becomes necessary, the discharge will be filtered through appropriately selected best management practices. These may include vegetated filter strips, sediment traps, rock berms, silt fence rings, etc.

10. The following records shall be maintained and made available to the executive director 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.

11. 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.

12. This approval does not authorize the installation of temporary aboveground storage tanks on this project. If the contractor desires to install a temporary aboveground storage tank for use during construction, an application to modify this approval must be submitted and approved prior to installation. The application must include information related to tank location and spill containment.

After Completion of Construction:

13. Owners of permanent BMPs and measures must ensure that the 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 Austin Regional Office within 30 days of site completion.

14. Upon legal transfer of this property, the new owner(s) is required to comply with all terms of the approved CZP. If the new owner intends to commence any new regulated activity on the site, a new CZP that specifically addresses the new activity must be submitted to the executive director. Approval of the plan for the new regulated activity by the executive director is required prior to commencement of the new regulated activity.

15. A CZP approval or extension will expire, and no extension will be granted if more than 50% of the total construction has not been completed within ten years from the initial approval of a plan. A new Contributing Zone Plan must be submitted to the Austin Regional Office with the appropriate fees for review and approval by the executive director prior to commencing any additional regulated activities.

16. At project locations where construction is initiated and abandoned, or not completed, the site shall be returned to a condition such that the aquifer is protected from potential contamination.

This action is taken under authority delegated by the executive director of the Texas Commission on Environmental Quality. If you have any questions or require additional information, please contact Mr. Kevin Lee Smith, P.E. of the Edwards Aquifer Protection Program of the Austin Regional Office at 512-339-2929.

Sincerely,

Lillian Butler

Lillian Butler, Section Manager
Edwards Aquifer Protection Program
Texas Commission on Environmental Quality

LIB/kls

Cc: Alex Rico, Kimley-Horn and Associates

Roger Hanks Parkway Extension II CZP

(KHA)

Shane Lane Roadway Improvements

City of Dripping Springs

CONTRIBUTING ZONE PLAN

ROGER HANKS PARKWAY EXTENSION II
ROGER HANKS PARKWAY
DRIPPING SPRINGS, HAYS COUNTY, TEXAS

Prepared For:

MI HOMES OF AUSTIN LLC.

7600 N. Capital of Texas Hwy., Bldg C, Suite 250
Austin, Texas 78731
(512) 770-8503

Prepared For:

CITY OF DRIPPING SPRINGS

511 W. Mercer Street.
Dripping Springs, Texas 78620
(512) 858-4725

Prepared By:

KIMLEY-HORN AND ASSOCIATES, INC.

10814 Jollyville Road, Building IV, Suite 200
Austin, Texas 78759
(512) 418-1771

07/28/2022

Firm No. 928
KHA Project No. 067783117

July 28, 2022

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SECTION 1:
EDWARDS AQUIFER APPLICATION COVER PAGE

Texas Commission on Environmental Quality

Edwards Aquifer Application Cover Page

Our Review of Your Application

The Edwards Aquifer Program staff conducts an administrative and technical review of all applications. The turnaround time for administrative review can be up to 30 days as outlined in 30 TAC 213.4(e). Generally administrative completeness is determined during the intake meeting or within a few days of receipt. The turnaround time for technical review of an administratively complete Edwards Aquifer application is 90 days as outlined in 30 TAC 213.4(e). Please know that the review and approval time is directly impacted by the quality and completeness of the initial application that is received. In order to conduct a timely review, it is imperative that the information provided in an Edwards Aquifer application include final plans, be accurate, complete, and in compliance with 30 TAC 213.

Administrative Review

1. Edwards Aquifer applications must be deemed administratively complete before a technical review can begin. To be considered administratively complete, the application must contain completed forms and attachments, provide the requested information, and meet all the site plan requirements. The submitted application and plan sheets should be final plans. Please submit one full-size set of plan sheets with the original application, and half-size sets with the additional copies.

   To ensure that all applicable documents are included in the application, the program has developed tools to guide you and web pages to provide all forms, checklists, and guidance. Please visit the below website for assistance: http://www.tceq.texas.gov/field/eapp.

2. This Edwards Aquifer Application Cover Page form (certified by the applicant or agent) must be included in the application and brought to the administrative review meeting.

3. Administrative reviews are scheduled with program staff who will conduct the review. Applicants or their authorized agent should call the appropriate regional office, according to the county in which the project is located, to schedule a review. The average meeting time is one hour.

4. In the meeting, the application is examined for administrative completeness. Deficiencies will be noted by staff and emailed or faxed to the applicant and authorized agent at the end of the meeting, or shortly after. Administrative deficiencies will cause the application to be deemed incomplete and returned.

   An appointment should be made to resubmit the application. The application is re-examined to ensure all deficiencies are resolved. The application will only be deemed administratively complete when all administrative deficiencies are addressed.

5. If an application is received by mail, courier service, or otherwise submitted without a review meeting, the administrative review will be conducted within 30 days. The applicant and agent will be contacted with the results of the administrative review. If the application is found to be administratively incomplete, it can be retrieved from the regional office or returned by regular mail. If returned by mail, the regional office may require arrangements for return shipping.
6. If the geologic assessment was completed before October 1, 2004 and the site contains "possibly sensitive" features, the assessment must be updated in accordance with the *Instructions to Geologists* (TCEQ-0585 Instructions).

Technical Review

1. When an application is deemed administratively complete, the technical review period begins. The regional office will distribute copies of the application to the identified affected city, county, and groundwater conservation district whose jurisdiction includes the subject site. These entities and the public have 30 days to provide comments on the application to the regional office. All comments received are reviewed by TCEQ.

2. A site assessment is usually conducted as part of the technical review, to evaluate the geologic assessment and observe existing site conditions. The site must be accessible to our staff. The site boundaries should be clearly marked, features identified in the geologic assessment should be flagged, roadways marked and the

alignment of the Sewage Collection System and manholes should be staked at the time the application is submitted. If the site is not marked the application may be returned.

3. We evaluate the application for technical completeness and contact the applicant and agent via Notice of Deficiency (NOD) to request additional information and identify technical deficiencies. There are two deficiency response periods available to the applicant. There are 14 days to resolve deficiencies noted in the first NOD. If a second NOD is issued, there is an additional 14 days to resolve deficiencies. If the response to the second notice is not received, is incomplete or inadequate, or provides new information that is incomplete or inadequate, the application must be withdrawn or will be denied. Please note that because the technical review is underway, whether the application is withdrawn or denied **the application fee will be forfeited**.
4. The program has 90 calendar days to complete the technical review of the application. If the application is technically adequate, such that it complies with the Edwards Aquifer rules, and is protective of the Edwards Aquifer during and after construction, an approval letter will be issued. Construction or other regulated activity may not begin until an approval is issued.

Mid-Review Modifications

It is important to have final site plans prior to beginning the permitting process with TCEQ to avoid delays.

Occasionally, circumstances arise where you may have significant design and/or site plan changes after your Edwards Aquifer application has been deemed administratively complete by TCEQ. This is considered a "Mid-Review Modification". Mid-Review Modifications may require redistribution of an application that includes the proposed modifications for public comment.

If you are proposing a Mid-Review Modification, two options are available:

- If the technical review has begun your application can be denied/withdrawn, your fees will be forfeited, and the plan will have to be resubmitted.
- TCEQ can continue the technical review of the application as it was submitted, and a modification application can be submitted at a later time.

If the application is denied/withdrawn, the resubmitted application will be subject to the administrative and technical review processes and will be treated as a new application. The application will be redistributed to the affected jurisdictions.

Please contact the regional office if you have questions. If your project is located in Williamson, Travis, or Hays County, contact TCEQ's Austin Regional Office at 512-339-2929. If your project is in Comal, Bexar, Medina, Uvalde, or Kinney County, contact TCEQ's San Antonio Regional Office at 210-490-3096

Please fill out all required fields below and submit with your application.

1. Regulated Entity Name: Roger Hanks Parkway Extension II						**2. Regulated Entity No.:**			
3. Customer Name: City of Dripping Springs						**4. Customer No.: CN602491284**			
5. Project Type: **(Please circle/check one)**	New **X**		Modification			Extension		Exception	
6. Plan Type: **(Please circle/check one)**	WPAP	CZP **x**	SCS	UST	AST	EXP	EXT	Technical Clarification	Optional Enhanced Measures
7. Land Use: **(Please circle/check one)**	Residential		Non-residential x			**8. Site (acres):**		10.89	
9. Application Fee:	$6,500		**10. Permanent BMP(s):**			Stormtrooper Wet Vault and Vegetative Filter Strips			
11. SCS (Linear Ft.):	N/A		**12. AST/UST (No. Tanks):**			N/A			
13. County:	Hays		**14. Watershed:**			Onion Creek			

Application Distribution

Instructions: Use the table below to determine the number of applications required. One original and one copy of the application, plus additional copies (as needed) for each affected incorporated city, county, and groundwater conservation district are required. Linear projects or large projects, which cross into multiple jurisdictions, can require additional copies. Refer to the "Texas Groundwater Conservation Districts within the EAPP Boundaries" map found at:

http://www.tceq.texas.gov/assets/public/compliance/field_ops/eapp/EAPP%20GWCD%20map.pdf

For more detailed boundaries, please contact the conservation district directly.

Austin Region			
County:	**Hays**	**Travis**	**Williamson**
Original (1 req.)	___	___	___
Region (1 req.)	___	___	___
County(ies)	___	___	___
Groundwater Conservation District(s)	___Edwards Aquifer Authority ___Barton Springs/ Edwards Aquifer ___Hays Trinity ___Plum Creek	___Barton Springs/ Edwards Aquifer	NA
City(ies) Jurisdiction	___Austin ___Buda X Dripping Springs ___Kyle ___Mountain City ___San Marcos ___Wimberley ___Woodcreek	___Austin ___Bee Cave ___Pflugerville ___Rollingwood ___Round Rock ___Sunset Valley ___West Lake Hills	___Austin ___Cedar Park ___Florence ___Georgetown ___Jerrell ___Leander ___Liberty Hill ___Pflugerville ___Round Rock

San Antonio Region					
County:	**Bexar**	**Comal**	**Kinney**	**Medina**	**Uvalde**
Original (1 req.)	___	___	___	___	___
Region (1 req.)	___	___	___	___	___
County(ies)	___	___	___	___	___
Groundwater Conservation District(s)	___ Edwards Aquifer Authority ___Trinity-Glen Rose	___Edwards Aquifer Authority	___Kinney	___EAA ___Medina	___EAA ___Uvalde
City(ies) Jurisdiction	___Castle Hills ___Fair Oaks Ranch ___Helotes ___Hill Country Village ___Hollywood Park ___San Antonio (SAWS) ___Shavano Park	___Bulverde ___Fair Oaks Ranch ___Garden Ridge ___New Braunfels ___Schertz	NA	___San Antonio ETJ (SAWS)	NA

I certify that to the best of my knowledge, that the application is complete and accurate. This application is hereby submitted to TCEQ for administrative review and technical review.

Alejandro E. Granados Rico, P.E.

Print Name of Customer/Authorized Agent

July 26, 2022

Alejandro E. Granados Rico /Authorized Agent Date

FOR TCEQ INTERNAL USE ONLY				
Date(s)Reviewed:		Date Administratively Complete:		
Received From:		Correct Number of Copies:		
Received By:		Distribution Date:		
EAPP File Number:		Complex:		
Admin. Review(s) (No.):		No. AR Rounds:		
Delinquent Fees (Y/N):		Review Time Spent:		
Lat./Long. Verified:		SOS Customer Verification:		
Agent Authorization Complete/Notarized (Y/N):		Fee Check:	Payable to TCEQ (Y/N):	
Core Data Form Complete (Y/N):			Signed (Y/N):	
Core Data Form Incomplete Nos.:			Less than 90 days old (Y/N):	

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: Alejandro E. Granados Rico, P.E.

Date: __July 27, 2022_____

Signature of Customer/Agent:

Regulated Entity Name: Roger Hanks Parkway Extension II

Project Information

1. County: Hays
2. Stream Basin: Colorado River Basin
3. Groundwater Conservation District (if applicable): N/A
4. Customer (Applicant):

   Contact Person: Chad Giplin
   Entity: City of Dripping Springs
   Mailing Address: 511 W. Mercer St.
   City, State: Dripping Springs, TX Zip: 78620
   Telephone: 512-858-4725 Fax: --------
   Email Address: cgilpin@cityofdrippingsprings.com

5. Agent/Representative (If any):

Contact Person: Alejandro E Granados Rico, P.E.
Entity: Kimley-Horn and Associates, Inc.
Mailing Address: 10814 Jollyville Road, Building 4, Suite 200
City, State: Austin, Texas Zip: 78759
Telephone: 512-418-1771 Fax: N/A
Email Address: alex.granados@kimley-horn.com

6. Project Location:

☒ The project site is located inside the city limits of Dripping Springs, TX.
☐ 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.
The Subject property is located northwest of the intersection of Highway 290 and Highway 12. This can be seen in the Road Map and the USGS Quadrangle Map, which are Attachments A and B, respectively.

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: _____

13. Total project area (size of site): 10.89 acres

Total disturbed area: 7.218 acres

14. Estimated projected population: N/A

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

1. Table 1 - Impervious Cover

Impervious Cover of Proposed Project	*Sq. Ft.*	*Sq. Ft./Acre*	*Acres*
Structures/Rooftops (HOMES AND DRIVEWAYS)	0	÷ 43,560 =	0.0
Parking	4,609	÷ 43,560 =	0.11
Other paved surfaces (ROADS AND SIDEWALK)	143,312	÷ 43,560 =	3.29
Total Impervious Cover	147,921	÷ 43,560 =	3.40

Total Impervious Cover 3.40 ÷ Total Acreage 10.89* X 100 = 31.22% Impervious Cover

*Using the area disturbed for total acreage

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
☒ Asphalt concrete pavement
☐ Other: _____

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

Length of R.O.W.: 3106 feet.

Width of R.O.W.: Varies feet.
L x W = 275400 Ft² ÷ 43,560 Ft²/Acre = 6.32 acres.

21. Pavement Area:

Length o f R.O.W.: 3106 feet.

Width of R.O.W.: 39 feet.
L x W = 1121134 Ft² ÷ 43,560 Ft²/Acre = 2.78 acres.
Pavement area 2.78 acres ÷ R .O.W. area 6.32 acres x 100 = 43.99 % 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 City of Dripping Springs Wastewater Treatment Plan. 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:

2. Table 2 - Tanks and Substance Storage

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

3. 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.

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 Map No. 48209C 0105F dated September 2, 2005

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.

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.

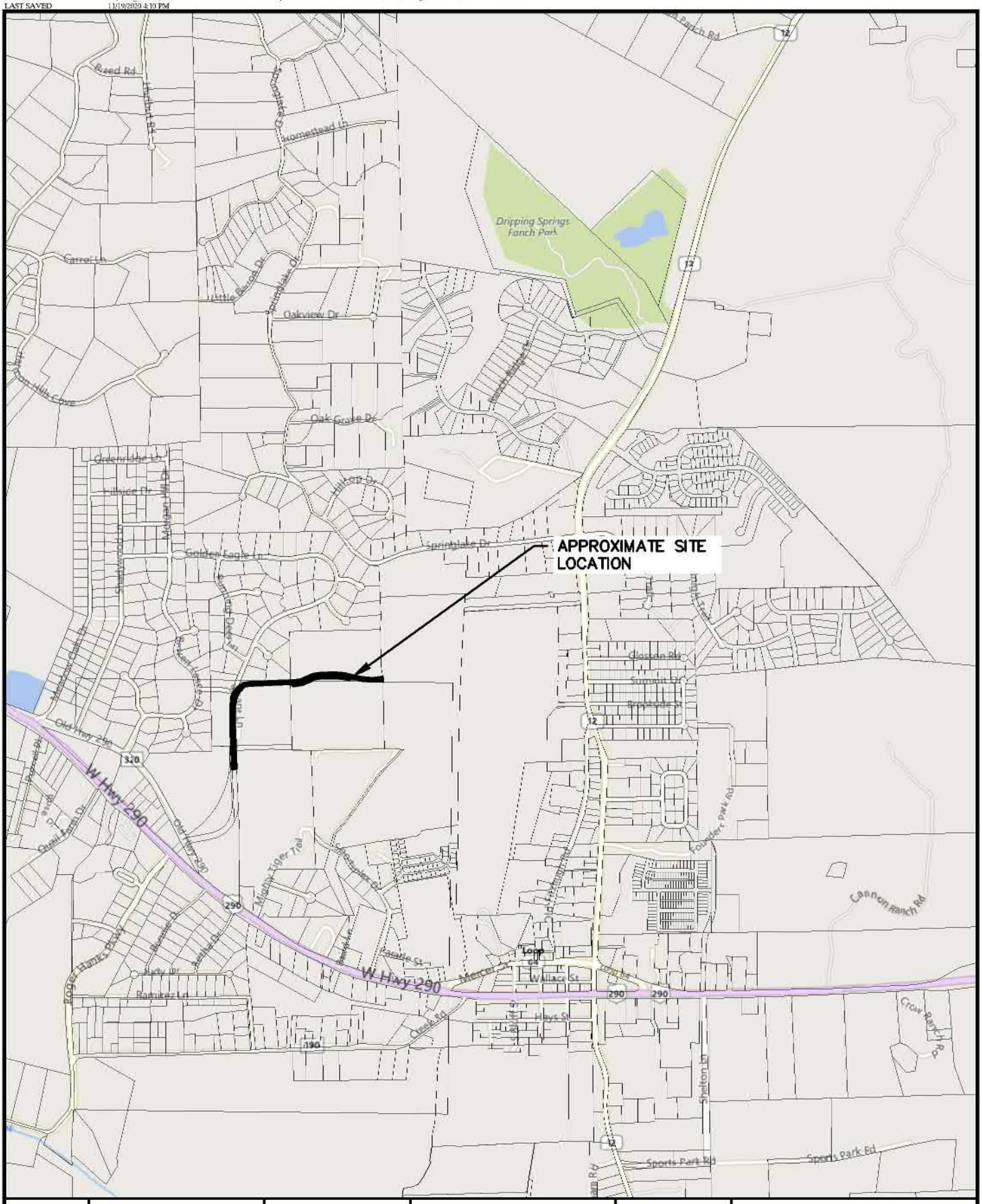
63. ☒ The site description, controls, maintenance, and inspection requirements for the storm water pollution prevention plan (SWPPP) developed under the EPA NPDES general permits for stormwater discharges have been submitted to fulfill paragraphs 30 TAC §213.24(1-5) of the technical report. All requirements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

SECTION 2:
CONTRIBUTING ZONE PLAN APPLICATION

ROAD MAP

IMAGES Overall Vicinity -
XREFS XREF Road Map sBorder - XREF aVmap
PLOTTED BY DUFFY, DANIEL 11/20/2020 10:12 AM
DWG NAME K:\AUS_CIVIL\067783117-HERITAGE-MI HOMES\ROGER HANKS PARKWAY\DOC\TCEQ CZP\CAD\ROAD MAP.DWG
LAST SAVED 11/19/2020 4:10 PM

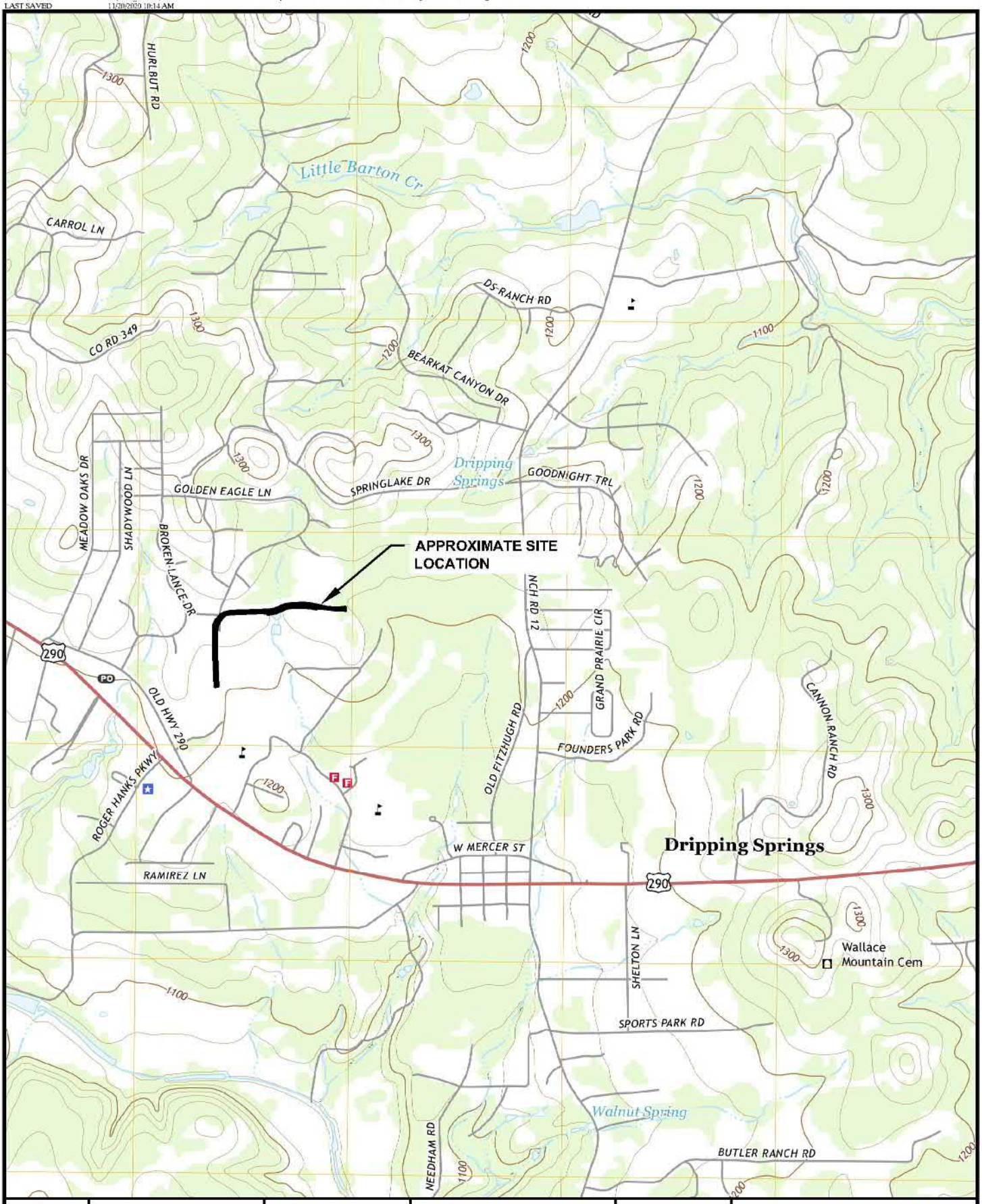


SHEET 1 OF 1 SHEETS	Scale:	N.T.S.	ROAD MAP	Roger Hanks Parkway Extension II Dripping Springs, Hays County, Texas	N W E S
	Designed by:	DPD			
	Drawn by:	DPD			
	Checked by:	AEG			
	Date:	NOV, 2020			
	Project No.	067783117			

Kimley»Horn

USGS QUADRANGLE MAP

IMAGES
XREFS XREF:xVmap - XREF:xSite-Extd - XREF:QuadBorder
PLOTTED BY DUFFY, DANIEL 11/20/2020 10:15 AM
DWG NAME K:\AUS_CIVIL\067783117-HERITAGE-MI HOMES\ROGER HANKS PARKWAY\DOC\TCEQ CZP\CAD\USGS QUADRANGLE MAP.DWG
LAST SAVED 11/20/2020 10:14 AM



SHEET 1 OF 1 SHEETS	Scale: 1:2000 Designed by: DPD Drawn by: DPD Checked by: AEG Date: NOV, 2020 Project No. 067783117	USGS Quadrangle	ROGER HANKS PARKWAY EXTENSION II Dripping Springs, Hays County, Texas	N W E S	Kimley»Horn

This product is for informational purposes and may not have been prepared for or be suitable for legal, engineering, or surveying purposes. It does not represent an on-th-ground survey and represents only the approximate relative location of property boundaries.

PROJECT NARRATIVE

Roger Hanks Parkway Extension II is the second extension of Roger Hanks Parkway that will encompass approximately 10.89 acres. This area is composed of portions of property owned by the Dripping Springs Independent School District (right of way dedicated to the City of Dripping Springs), City of Dripping Springs, existing and proposed right of way, and temporary construction easements. The area comprises of 0.11 acres of the 1.76-acres property described in DOC. No. 16043361, 0.42 acres of the 4.03-acres of property described in DOC. No. 09921953, 0.04 acres of the 40.0154-acre property described in Vol. 1084, PG. 148, 0.01 acres of the 1.12-acre property described in DOC. No. 90029784, 0.17 acres of existing ROW and 3.71 acres of Lot 1 Block D described in Vol 14, Pg. 69, 0.936 acres of ROW easement described in DOC No. 90029785, 0.367 acres described in the road easement in document No. 90029787,1.506 acres of right of way to be dedicated by the City of Dripping Springs, 3.091 acres of proposed ROW, 0.262 acres of temporary construction easements, 0.239 acres of drainage and access easement (see easements and other documentation for the area as Exhibit A) and 0.03 acres of offsite area. The public road will be extended to connect to the existing Roger Hanks Parkway and then tie into the proposed Heritage Phase 1 Roger Hanks Parkway. Phase 1 encompasses approximately 37.07 acres of single-family residential. The area of soil disturbance for Roger Hanks Parkway is 7.22 acres. The subject property is located northeast of Highway 290 and Roger Hanks Parkway, in the City of Dripping Springs, Texas. The existing site is partially paved road and undeveloped range land. Existing structures that are included within the limits of construction are buildings, parking lot, wire fence, and rock berms. The scope of the project consists of the following civil improvements: roadway, drainage improvements and storm sewer. The site lies over the Edwards Aquifer Contributing Zone and does not contain areas within the 100-year floodplain as defined by Federal Emergency Management Agency Federal Insurance Rate Map # 48209C0105F, dated September 2, 2005.

The Site, Roger Hanks Parkway Extension II, has an overall onsite impervious cover of 3.37 acres and 0.03 acres of offsite impervious cover for a total of 3.40 acres or 31.22% as shown in the first table below. The permanent BMP's designed to handle the impervious cover will be a stormtrooper wet vault and vegetative filter strips. The required TSS removal is 2156 lbs. We have provided 2343 lbs. of TSS removal.

All the proposed impervious cover is compliant with the limitations of the impervious allotted by the regulating entity (City of Dripping Springs). The proposed impervious cover and TSS removal are shown below.

Overall Water Quality Drainage Basins					
	Proposed Area (AC)	Proposed Impervious Cover (AC)	% Impervious Cover	Required TSS Removal	Proposed TSS Removal
WV-1	0.48	0.41	85.42%	332	387
VFS-1	1.53	1.02	66.67%	637	637
VFS-2	0.20	0.12	60.00%	99	99
VFS-3	1.45	1.05	72.41%	942	942
VFS-4	0.19	0.08	42.11%	72	72
VFS-5	0.64	0.47	73.44%	206	206
UNTREATED	6.37	0.22	3.45%	-162	0
ONSITE TOTAL	**10.86**	**3.37**	31.03%	**2127**	**2343**
OFFSITE (OS-1)	0.03	0.03	100.00%	29	0
Totals	10.89	3.40	31.22%	2156	2343

FACTORS AFFECTING SURFACE WATER QUALITY

Examples of items and activities to be expected with the proposed development include petroleum based fuels used in vehicles from vehicle parking, and grass and leaves from landscaping.

During construction, water quality could be affected by the runoff carrying sediments from the open construction area. Silt fence will be installed along the downstream portion of the property and inlet protections will be installed around all proposed inlet structures (once constructed).

After construction, all disturbed areas on the site will be re-vegetated and runoff from the proposed improvements will be captured by the proposed storm sewer system and into one of the proposed BMP's.

VOLUME AND CHARACTER OF STORMWATER

The proposed BMP's were designed and sized to treat the proposed onsite and offsite flows. The proposed improvements create a total of 3.40 acres of impervious covers, making up 31.22% of the overall site that drains into the proposed BMPs. TCEQ TSS Removal calculations are referenced on sheets 24 & 25 in attached construction plans.

SUITABILITY LETTER FROM AUTHORIZED AGENT

(NOT APPLICABLE)

BMPs FOR UPGRADIENT STORMWATER

(NOT APPLICABLE)

BMPs FOR ON-SITE STORMWATER

During construction, BMP's include silt fence and inlet protection to capture sediment from the construction area contained within the storm water runoff. Silt fence will be installed along the downstream portion of the property. Inlet protection will be installed on all storm sewer curb inlets existing and proposed (once constructed).

Current Plan Proposed Conditions:

The overall required removal for this in the current proposed phase of development is Lm = 2,156 LBS. The proposed BMPs have been designed to provide 2,343 LBS of TSS removal. The basins have been broken out and are shown on the construction drawings (Water Quality Area Map, Sheets 22 and 23). Water quality drainage area WV-1 will street flow to drainage inlets then pipe flow to a Size SWAQ-25 Strom Trooper that will then discharge to an offsite culvert. WV-1 will provide a total of 387 LBS of TSS removal. Water quality drainage areas VFS 1, VFS 2, VFS 3, VFS 4, VFS 5, and VFS 6 will be treated by vegetative filter strips. The VFS combined will provide a total of 1,956 LBS of TSS removal. All TSS calculations are shown on the construction drawings sheets 24 & 25. The impervious breakdown is shown under the project narrative.

BMPs FOR SURFACE STREAMS

There are no existing surface streams or sensitive features being affected on site. All permanent BMPs have been designed to remove the increase in Total Suspended Solids as per current TCEQ requirements.

CONSTRUCTION PLANS

Please reference attached construction plans.

CIVIL CONSTRUCTION PLANS
PAVING, GRADING & UTILITIES
FOR
ROGER HANKS PARKWAY EXTENSION II
CITY OF DRIPPING SPRINGS, HAYS COUNTY, TEXAS

ENGINEER

Kimley»Horn

10814 JOLLYVILLE ROAD
AVALLON IV, SUITE 200
AUSTIN, TEXAS 78759
PH. (512) 418-1771
CONTACT: ALEJANDRO E. GRANADOS RICO, P.E.

STATE OF TEXAS
REGISTRATION NO. F-928

OWNER/DEVELOPER

M/I HOMES OF AUSTIN, LLC
7600 N. CAPITAL OF TEXAS HWY
BLDG. C, STE 250
AUSTIN, TX 78731
TEL: (512) 770-8503
CONTACT: AUSTIN EVETTS

DRIPPING SPRINGS INDEPENDENT
SCHOOL DISTRICT
510 W. MERCER
DRIPPING SPRINGS, TX 78620
TEL:
CONTACT: CLINT PRUETT

CITY OF DRIPPING SPRINGS
511 MERCER ST.
PO BOX 384
DRIPPING SPRINGS, TX 78620
TEL: 512-858-4725
CONTACT: GINGER FAUGHT

WASTEWATER PROVIDER

CITY OF DRIPPING SPRINGS

WATERSHED STATUS

THIS SITE IS LOCATED IN THE ONION CREEK WATERSHED

FLOODPLAIN INFORMATION

NO PORTION OF THE SITE IS ENCROACHED BY A SPECIAL FLOOD HAZARD AREA INUNDATED BY THE 100 YEAR FLOOD AS IDENTIFIED BY THE U.S. FEDERAL EMERGENCY MANAGEMENT AGENCY BOUNDARY MAP NUMBER 48209C0105F DATED SEPTEMBER 2,2005

EDWARDS AQUIFER STATEMENT

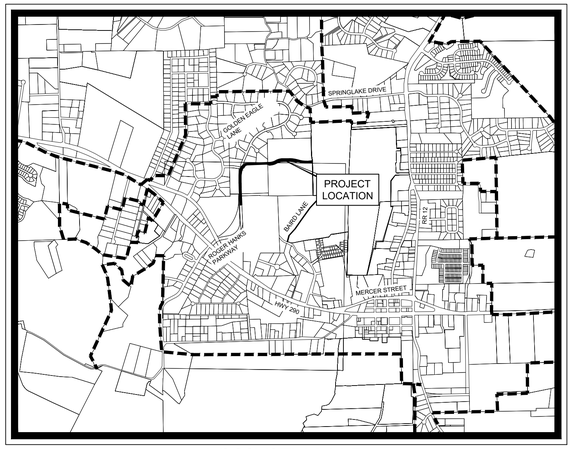
ALL PORTIONS OF THE SITE ARE LOCATED WITHIN THE EDWARDS AQUIFER CONTRIBUTING ZONE

ZONING/PDD/OVERLAY/DISTRICT: GUI

THE CITY WILL BE RESPONSIBLE FOR THE OPERATION AND MAINTENANCE OF STORMWATER UTILITIES AND PONDS LOCATED IN ROW AND PUBLIC EASEMENTS.

A WATER QUALITY BMP MAINTENANCE PLAN HAS BEEN PREPARED FOR THIS DEVELOPMENT AND IS RECORDED IN DOCUMENT #_____PUBLIC RECORDS OF HAYS COUNTY, TEXAS.

ALL RESPONSIBILITY FOR THE ADEQUACY OF THESE PLANS REMAINS WITH THE ENGINEER WHO PREPARED THEM. IN APPROVING THESE PLANS, THE CITY MUST RELY UPON THE ADEQUACY OF WORK OF THE DESIGN ENGINEER.



VICINITY MAP
SCALE: 1" = 2,000'

RELEASE OF THIS APPLICATION DOES NOT CONSTITUTE A VERIFICATION OF ALL DATA, INFORMATION AND CALCULATIONS SUPPLIED BY THE APPLICANT. THE ENGINEER OF RECORD IS SOLELY RESPONSIBLE FOR THE COMPLETENESS, ACCURACY AND ADEQUACY OF HIS/HER SUBMITTAL, WHETHER OR NOT THE APPLICATION IS REVIEWED FOR CODE COMPLIANCE BY CITY ENGINEERS.

ROADWAY LENGTH: 3106'

ROW ACREAGE: 5.55 ACRES

ROADWAY CLASSIFICATION: 2 LANE MINOR ARTERIAL WITH CENTER TURN LANE

DESIGN SPEED: VARIES - 35 MPH (STANDARD)
- 25 MPH (CURVE)

SHEET INDEX

JULY 2022

DRIPPING SPRINGS CITY ENGINEER _____ DATE _____

DRIPPING SPRINGS CITY ADMINISTRATOR _____ DATE _____

DRIPPING SPRINGS WASTEWATER REVIEW ENGINEER _____ DATE _____

FIRE DEPARTMENT/ ESD #6 _____ DATE _____

CITY OF DRIPPINGS SPRINGS DEVELOPMENT PERMIT # _____

REVISIONS/CORRECTIONS									
NO.	DESCRIPTION	REVISE (R) VOID (V) ADD (A) SHEET NO.'S	TOTAL NO. SHEETS IN PLAN SET	NET CHANGE IMP. COVER (SQ. FT.)	TOTAL SITE IMP. COVER (SQ. FT.)/%	CITY OF DRIPPING SPRINGS APPROVAL DATE	CITY ADMINISTRATOR APPORVAL	CITY ENGINEER APPROVAL	DATE IMAGED

WARNING: CONTRACTOR IS TO VERIFY PRESENCE AND EXACT LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION.

811 Know what's below. Call before you dig.

BENCHMARKS

BM #150	SQUARE CUT SET AT THE BACK OF CURB
•	ELEV.= 1229.74' (NAVD '88)
BM #151	SQUARE CUT SET AT THE BACK OF CURB
•	ELEV.= 1230.35' (NAVD '88)

Kimley»Horn
© 2021 KIMLEY-HORN AND ASSOCIATES, INC.
10814 JOLLYVILLE ROAD, AVALLON IV, SUITE 300, AUSTIN, TX 78759
PHONE: 512-418-1771 FAX: 512-418-1791
WWW.KIMLEY-HORN.COM
TEXAS REGISTERED ENGINEERING FIRM F-928

No.	REVISIONS	DATE	BY

07/27/2022

STATE OF TEXAS
ALEJANDRO E. GRANADOS RICO
103984
LICENSED
PROFESSIONAL ENGINEER

KHA PROJECT 067783117
DATE JULY 2022
SCALE: AS SHOWN
DESIGNED BY: AEG
DRAWN BY: DPD
CHECKED BY: AEG

COVER SHEET

ROGER HANKS PARKWAY EXTENSION II
CITY OF DRIPPING SPRINGS
HAYS COUNTY, TEXAS

SHEET NUMBER 1

ROGER HANKS PARKWAY EXTENSION II
KHA PROJECT NO. 067783117
CIVIL CONSTRUCTION PLANS

GENERAL NOTES:

1. THIS DEVELOPMENT IS SUBJECT TO THE HERITAGE OFFSITE ROAD AND TRAIL AGREEMENT, APPROVED BY CITY COUNCIL OCTOBER 17, 2017.
2. THIS DEVELOPMENT IS LOCATED WITHIN THE CITY LIMITS OF THE CITY OF DRIPPING SPRINGS, HAYS COUNTY, TEXAS.
3. THE ZONING OF THIS DEVELOPMENT IS GOVERNED BY CITY OF DRIPPING SPRINGS GUI.
4. THIS DEVELOPMENT IS LOCATED WITHIN THE CONTRIBUTING ZONE OF THE EDWARDS AQUIFER AND IS SUBJECT TO THE RULES AND REGULATIONS OF THE EDWARDS AQUIFER PROTECTION PROGRAM OF THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ).
5. DEVELOPMENT DESIGN STANDARDS PER THE HERITAGE OFFSITE ROAD AND TRAIL AGREEMENT OR THE CITY OF DRIPPING SPRINGS AS APPLICABLE.
6. UTILITIES WILL BE PROVIDED BY THE FOLLOWING:
   ELECTRIC - PEDERNALES ELECTRIC COMPANY
7. ALL (NEW) TELEPHONE AND CABLE TELEVISION LINES AND ALL ELECTRIC UTILITY LATERAL AND SERVICE LINES AND ALL WIRES SHALL BE PLACED UNDERGROUND, EXCEPT AS OTHERWISE HEREIN PROVIDED.
8. ALL ELECTRIC, CABLE TELEVISION, AND TELEPHONE SUPPORT EQUIPMENT (TRANSFORMERS, AMPLIFIERS, SWITCHING DEVICES, ETC.) NECESSARY FOR UNDERGROUND INSTALLATIONS IN SUBDIVISIONS SHALL BE PAD MOUNTED OR PLACED UNDERGROUND IN A PUBLIC UTILITY EASEMENT RATHER THAN A RIGHT-OF-WAY.
9. NO LOT WITHIN THIS SUBDIVISION IS WITHIN A FLOOD HAZARD AREA AS SHOWN ON THE FLOOD INSURANCE RESIDENTIAL MAP NO. 48209C0105F DATED SEPTEMBER 2, 2005.
10. THE PROPOSED DEVELOPMENT SHALL DEMONSTRATE COMPLIANCE WITH ALL REQUIREMENTS ESTABLISHED IN THE 2012 INTERNATIONAL FIRE CODE AND LOCAL AMENDMENTS.

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY CONTRIBUTING ZONE PLAN GENERAL CONSTRUCTION NOTES:

1. WRITTEN CONSTRUCTION NOTIFICATION MUST BE GIVEN TO THE APPROPRIATE TCEQ REGIONAL OFFICE NO LATER THAN 48 HOURS PRIOR TO COMMENCEMENT OF THE REGULATED ACTIVITY. INFORMATION MUST 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 AND THE NAME AND TELEPHONE NUMBER OF THE CONTACT PERSON.
2. ALL CONTRACTORS CONDUCTING REGULATED ACTIVITIES ASSOCIATED WITH THIS PROJECT MUST 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 CONTRACTORS ARE REQUIRED TO KEEP ON-SITE COPIES OF THE APPROVED PLAN AND APPROVAL LETTER.
3. IF ANY SENSITIVE FEATURE IS DISCOVERED DURING CONSTRUCTION, ALL REGULATED ACTIVITIES NEAR THE SENSITIVE FEATURE MUST BE SUSPENDED IMMEDIATELY. THE APPROPRIATE TCEQ REGIONAL OFFICE MUST BE IMMEDIATELY NOTIFIED OF ANY SENSITIVE FEATURES ENCOUNTERED DURING CONSTRUCTION. THE REGULATED ACTIVITIES NEAR THE SENSITIVE FEATURE MAY NOT PROCEED UNTIL THE TCEQ HAS REVIEWED AND APPROVED THE METHODS PROPOSED TO PROTECT THE SENSITIVE FEATURE AND THE EDWARDS AQUIFER FROM ANY POTENTIALLY ADVERSE IMPACTS TO WATER QUALITY.
4. NO TEMPORARY ABOVEGROUND HYDROCARBON AND HAZARDOUS SUBSTANCE STORAGE TANK SYSTEM IS INSTALLED WITHIN 150 FEET OF A DOMESTIC, INDUSTRIAL, IRRIGATION, OR PUBLIC WATER SUPPLY WELL.
5. PRIOR TO COMMENCEMENT OF CONSTRUCTION, ALL TEMPORARY EROSION AND SEDIMENTATION (E&S) CONTROL MEASURES MUST BE PROPERLY SELECTED, INSTALLED, AND MAINTAINED IN ACCORDANCE WITH THE MANUFACTURERS SPECIFICATIONS AND GOOD ENGINEERING PRACTICES. CONTROLS SPECIFIED IN THE TEMPORARY STORM WATER 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.
6. 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).
7. 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.
8. 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).
9. ALL SPOILS (EXCAVATED MATERIAL) GENERATED FROM THE PROJECT SITE MUST BE STORED ON-SITE WITH PROPER E&S CONTROLS.
10. 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.
11. THE FOLLOWING RECORDS SHALL 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.
12. THE HOLDER OF ANY APPROVED EDWARD AQUIFER 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 PONDS, DAMS, BERMS, SEWAGE TREATMENT PLANTS, AND DIVERSIONARY STRUCTURES;
   B. ANY CHANGE IN THE NATURE OR CHARACTER OF THE REGULATED ACTIVITY FROM THAT WHICH WAS ORIGINALLY APPROVED OR A CHANGE WHICH WOULD SIGNIFICANTLY IMPACT THE ABILITY OF THE PLAN TO PREVENT POLLUTION OF THE EDWARDS AQUIFER, AND PHYSIOLOGICALLY CONNECTED SURFACE WATER
   C. ANY DEVELOPMENT OF LAND PREVIOUSLY IDENTIFIED AS UNDEVELOPED IN THE ORIGINAL CONTRIBUTING ZONE PLAN.

TCEQ REGION 11 OFFICE
12100 PARK 35 CIRCLE,
BUILDING A, RM 179
AUSTIN, TEXAS 78753-3795
PHONE: (512) 339-2929
(512) 339-3795

WARNING: CONTRACTOR IS TO VERIFY PRESENCE AND EXACT LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION.

811
Know what's **below.**
Call before you dig.

No.	REVISIONS	DATE	BY

Kimley»Horn
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10814 JOLLYVILLE ROAD, AVALLON IV, SUITE 300, AUSTIN, TX 78759
PHONE: 512-418-1771 FAX: 512-418-1791
WWW.KIMLEY-HORN.COM
TEXAS REGISTERED ENGINEERING FIRM F-928

07/27/2022
STATE OF TEXAS
ALEJANDRO E. GRANADOS RICO
130084
LICENSED
PROFESSIONAL ENGINEER

KHA PROJECT 067783117
DATE JULY 2022
SCALE: AS SHOWN
DESIGNED BY: AEG
DRAWN BY: DPD
CHECKED BY: AEG

GENERAL NOTES

ROGER HANKS PARKWAY
EXTENSION II
CITY OF DRIPPING SPRINGS
HAYS COUNTY, TEXAS

SHEET NUMBER
2

KH GENERAL NOTES

OVERALL:

1. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THESE PLANS, CITY (OR TOWN) STANDARD DETAILS AND SPECIFICATIONS, THE FINAL GEOTECHNICAL REPORT AND ALL ISSUED ADDENDA, AND COMMONLY ACCEPTED CONSTRUCTION STANDARDS. THE CITY SPECIFICATIONS SHALL GOVERN WHERE OTHER SPECIFICATIONS DO NOT EXIST. IN CASE OF CONFLICTING SPECIFICATIONS OR DETAILS, THE MORE RESTRICTIVE SPECIFICATION AND DETAIL SHALL BE FOLLOWED.
2. THE CONTRACTOR SHALL COMPLY WITH CITY (OR TOWN) "GENERAL NOTES" FOR CONSTRUCTION, IF EXISTING AND REQUIRED BY THE CITY. FOR INSTANCES WHERE THEY CONFLICT WITH THESE KH GENERAL NOTES, THEN THE MORE RESTRICTIVE SHALL APPLY.
3. THE CONTRACTOR SHALL FURNISH ALL MATERIAL AND LABOR TO CONSTRUCT THE FACILITY AS SHOWN AND DESCRIBED IN THE CONSTRUCTION DOCUMENTS IN ACCORDANCE WITH THE APPROPRIATE AUTHORITIES' SPECIFICATIONS AND REQUIREMENTS.
4. THE CONTRACTOR SHALL VISIT THE SITE PRIOR TO BIDDING TO DETERMINE EXISTING CONDITIONS.
5. THE EXISTING CONDITIONS SHOWN ON THESE PLANS WERE PROVIDED BY THE TOPOGRAPHIC SURVEY PREPARED BY THE PROJECT SURVEYOR, AND ARE BASED ON THE BENCHMARKS SHOWN. THE CONTRACTOR SHALL REFERENCE THE SAME BENCHMARKS.
6. THE CONTRACTOR SHALL REVIEW AND VERIFY THE EXISTING TOPOGRAPHIC SURVEY SHOWN ON THE PLANS REPRESENTS EXISTING FIELD CONDITIONS PRIOR TO CONSTRUCTION, AND SHALL REPORT ANY DISCREPANCIES FOUND TO THE OWNER AND ENGINEER IMMEDIATELY.
7. IF THE CONTRACTOR DOES NOT ACCEPT THE EXISTING TOPOGRAPHIC SURVEY AS SHOWN ON THE PLANS, WITHOUT EXCEPTION, THEN THE CONTRACTOR SHALL SUPPLY AT THEIR OWN EXPENSE, A TOPOGRAPHIC SURVEY BY A REGISTERED PROFESSIONAL LAND SURVEYOR TO THE OWNER AND ENGINEER FOR REVIEW.
8. CONTRACTOR SHALL PROVIDE ALL CONSTRUCTION SURVEYING AND STAKING.
9. CONTRACTOR SHALL VERIFY HORIZONTAL AND VERTICAL CONTROL, INCLUDING BENCHMARKS PRIOR TO COMMENCING CONSTRUCTION OR STAKING OF IMPROVEMENTS. PROPERTY LINES AND CORNERS SHALL BE HELD AS THE HORIZONTAL CONTROL.
10. THE CONTRACTOR SHALL REVIEW AND VERIFY ALL DIMENSIONS, ELEVATIONS, AND FIELD CONDITIONS THAT MAY AFFECT CONSTRUCTION. ANY DISCREPANCIES ON THE DRAWINGS SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE ARCHITECT AND ENGINEER BEFORE COMMENCING WORK. NO FIELD CHANGES OR DEVIATIONS FROM DESIGN ARE TO BE MADE WITHOUT PRIOR APPROVAL OF THE ARCHITECT, ENGINEER, AND IF APPLICABLE THE CITY AND OWNER. NO CONSIDERATION WILL BE GIVEN TO CHANGE ORDERS FOR WHICH THE CITY, ENGINEER, AND OWNER WERE NOT CONTACTED PRIOR TO CONSTRUCTION OF THE AFFECTED ITEM.
11. CONTRACTOR SHALL THOROUGHLY CHECK COORDINATION OF CIVIL, LANDSCAPE, MEP, ARCHITECTURAL, AND OTHER PLANS PRIOR TO COMMENCING CONSTRUCTION. OWNER/ENGINEER SHALL BE NOTIFIED OF ANY DISCREPANCY PRIOR TO COMMENCING WITH CONSTRUCTION.
12. IT IS THE CONTRACTOR'S RESPONSIBILITY TO CONTACT THE VARIOUS UTILITY COMPANIES WHICH MAY HAVE BURIED OR AERIAL UTILITIES WITHIN OR NEAR THE CONSTRUCTION AREA BEFORE COMMENCING WORK TO HAVE THEM LOCATE THEIR EXISTING UTILITIES PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE AN ADEQUATE MINIMUM NOTICE TO ALL UTILITY COMPANIES PRIOR TO BEGINNING CONSTRUCTION.
13. CONTRACTOR SHALL CALL TEXAS 811 AN ADEQUATE AMOUNT OF TIME PRIOR TO COMMENCING CONSTRUCTION OR ANY EXCAVATION.
14. CONTRACTOR SHALL USE EXTREME CAUTION AS THE SITE CONTAINS VARIOUS KNOWN AND UNKNOWN PUBLIC AND PRIVATE UTILITIES.
15. THE LOCATIONS, ELEVATIONS, DEPTH, AND DIMENSIONS OF EXISTING UTILITIES SHOWN ON THE PLANS WERE OBTAINED FROM AVAILABLE UTILITY COMPANY MAPS AND PLANS, AND ARE CONSIDERED APPROXIMATE AND INCOMPLETE. IT SHALL BE THE CONTRACTORS' RESPONSIBILITY TO VERIFY THE PRESENCE, LOCATION, ELEVATION, DEPTH, AND DIMENSION OF EXISTING UTILITIES SUFFICIENTLY IN ADVANCE OF CONSTRUCTION SO THAT ADJUSTMENTS CAN BE MADE TO PROVIDE ADEQUATE CLEARANCES. THE ENGINEER SHALL BE NOTIFIED WHEN A PROPOSED IMPROVEMENT CONFLICTS WITH AN EXISTING UTILITY.
16. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING ANY ADJUSTMENTS AND RELOCATIONS OF EXISTING UTILITIES THAT CONFLICT WITH THE PROPOSED IMPROVEMENTS, INCLUDING BUT NOT LIMITED TO, ADJUSTING EXISTING MANHOLES TO MATCH PROPOSED GRADE, RELOCATING EXISTING POLES AND GUY WIRES THAT ARE LOCATED IN PROPOSED DRIVEWAYS, ADJUSTING THE HORIZONTAL OR VERTICAL ALIGNMENT OF EXISTING UNDERGROUND UTILITIES TO ACCOMMODATE PROPOSED GRADE OR CROSSING WITH A PROPOSED UTILITY, AND ANY OTHERS THAT MAY BE ENCOUNTERED THAT ARE UNKNOWN AT THIS TIME AND NOT SHOWN ON THESE PLANS.
17. CONTRACTOR SHALL ARRANGE FOR OR PROVIDE, AT ITS EXPENSE, ALL GAS, TELECOMMUNICATIONS, CABLE, OVERHEAD AND UNDERGROUND POWER LINE, AND UTILITY POLE ADJUSTMENTS NEEDED.
18. CONTRACTOR IS RESPONSIBLE FOR COORDINATING INSTALLATION OF FRANCHISE UTILITIES THAT ARE NECESSARY FOR ON-SITE AND OFF-SITE CONSTRUCTION, AND SERVICE TO THE PROPOSED DEVELOPMENT.
19. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ALL DAMAGES DUE TO THE CONTRACTORS' FAILURE TO EXACTLY LOCATE AND PRESERVE ALL UTILITIES. THE OWNER OR ENGINEER WILL ASSUME NO LIABILITY FOR ANY DAMAGES SUSTAINED OR COST INCURRED BECAUSE OF THE OPERATIONS IN THE VICINITY OF EXISTING UTILITIES OR STRUCTURES. IF IT IS NECESSARY TO SHORE, BRACE, SWING OR RELOCATE A UTILITY, THE UTILITY COMPANY OR DEPARTMENT AFFECTED SHALL BE CONTACTED BY THE CONTRACTOR AND THEIR PERMISSION OBTAINED REGARDING THE METHOD TO USE FOR SUCH WORK.
20. BRACING OF UTILITY POLES MAY BE REQUIRED BY THE UTILITY COMPANIES WHEN TRENCHING OR EXCAVATING IN CLOSE PROXIMITY TO THE POLES. THE COST OF BRACING POLES WILL BE BORNE BY THE CONTRACTOR, WITH NO SEPARATE PAY ITEM FOR THIS WORK. THE COST IS INCIDENTAL TO THE PAY ITEM.
21. CONTRACTOR SHALL USE ALL NECESSARY SAFETY PRECAUTIONS TO AVOID CONTACT WITH OVERHEAD AND UNDERGROUND POWER LINES. CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE LOCAL, STATE, FEDERAL AND UTILITY OWNER REGULATIONS PERTAINING TO WORK SETBACKS FROM POWER LINES.
22. THE CONTRACTOR SHALL BE RESPONSIBLE TO OBTAIN ALL REQUIRED CONSTRUCTION PERMITS, APPROVALS, AND BONDS PRIOR TO CONSTRUCTION.
23. THE CONTRACTOR SHALL HAVE AVAILABLE AT THE JOB SITE AT ALL TIMES A COPY OF THE CONTRACT DOCUMENTS INCLUDING PLANS, GEOTECHNICAL REPORT AND ADDENDA, PROJECT AND CITY SPECIFICATIONS, AND SPECIAL CONDITIONS, COPIES OF ANY REQUIRED CONSTRUCTION PERMITS, EROSION CONTROL PLANS, SWPPP AND INSPECTION REPORTS.
24. ALL SHOP DRAWINGS AND OTHER DOCUMENTS THAT REQUIRE ENGINEER REVIEW SHALL BE SUBMITTED BY THE CONTRACTOR SUFFICIENTLY IN ADVANCE OF CONSTRUCTION OF THAT ITEM, SO THAT NO LESS THAN 10 BUSINESS DAYS FOR REVIEW AND RESPONSE IS AVAILABLE.
25. ALL NECESSARY INSPECTIONS AND/OR CERTIFICATIONS REQUIRED BY CODES, JURISDICTIONAL AGENCIES, AND/OR UTILITY SERVICE COMPANIES SHALL BE PERFORMED PRIOR TO USE OF THE FACILITY AND THE FINAL CONNECTION OF SERVICES.
26. CONTRACTOR SHALL ARRANGE FOR REQUIRED CITY INSPECTIONS.
27. CONTRACTOR'S BID PRICE SHALL INCLUDE ALL INSPECTION FEES.
28. ALL SYMBOLS SHOWN ON THESE PLANS (E.G. FIRE HYDRANT, METERS, VALVES, INLETS, ETC.…) ARE FOR PRESENTATION PURPOSES ONLY AND ARE NOT TO SCALE. CONTRACTOR SHALL COORDINATE FINAL SIZES AND LOCATIONS WITH APPROPRIATE CITY INSPECTOR.
29. THE SCOPE OF WORK FOR THE CIVIL IMPROVEMENTS SHOWN ON THESE PLANS TERMINATES 5-FEET FROM THE BUILDING. REFERENCE THE BUILDING PLANS (E.G. ARCHITECTURAL, STRUCTURAL, MEP) FOR AREAS WITHIN 5-FEET OF THE BUILDING AND WITHIN THE BUILDING FOOTPRINT.
30. REFER TO ARCHITECTURAL AND STRUCTURAL PLANS FOR ALL FINAL BUILDING DIMENSIONS.
31. THE PROPOSED BUILDING FOOTPRINT(S) SHOWN IN THESE PLANS WAS PROVIDED TO KIMLEY-HORN AND ASSOCIATES, INC. (KH) BY THE PROJECT ARCHITECT AT THE TIME THESE PLANS WERE PREPARED. IT MAY NOT BE THE FINAL CORRECT VERSION BECAUSE THE BUILDING DESIGN WAS ONGOING. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR CONFIRMING THE FINAL CORRECT VERSION OF THE BUILDING FOOTPRINT WITH THE ARCHITECT AND STRUCTURAL ENGINEER PRIOR TO LAYOUT. DIMENSIONS AND/OR COORDINATES SHOWN ON THESE PLANS WERE BASED ON THE ABOVE STATED ARCHITECTURAL FOOTPRINT, AND ARE THEREFORE A PRELIMINARY LOCATION OF THE BUILDING. THE CONTRACTOR IS SOLELY RESPONSIBLE TO VERIFY WHAT PART OF THE BUILDING THE ARCHITECT'S FOOTPRINT REPRESENTS (E.G. SLAB, OUTSIDE WALL, MASONRY LEDGE, ETC.….) AND TO CONFIRM ITS FINAL POSITION ON THE SITE BASED ON THE FINAL ARCHITECTURAL FOOTPRINT, CIVIL DIMENSION CONTROL PLAN, SURVEY BOUNDARY AND/OR PLAT. ANY DIFFERENCES FOUND SHALL BE REPORTED TO KH IMMEDIATELY.
32. ALL CONSTRUCTION SHALL COMPLY WITH THE PROJECT'S FINAL GEOTECHNICAL REPORT (OR LATEST EDITION), INCLUDING SUBSEQUENT ADDENDA.
33. CONTRACTOR IS RESPONSIBLE FOR ALL MATERIALS TESTING AND CERTIFICATION, UNLESS SPECIFIED OTHERWISE BY OWNER. ALL MATERIALS TESTING SHALL BE COORDINATED WITH THE APPROPRIATE CITY INSPECTOR AND COMPLY WITH CITY STANDARD SPECIFICATIONS AND GEOTECHNICAL REPORT. TESTING SHALL BE PERFORMED BY AN APPROVED INDEPENDENT AGENCY FOR TESTING MATERIALS. OWNER SHALL APPROVE THE AGENCY NOMINATED BY THE CONTRACTOR FOR MATERIALS TESTING.
34. ALL COPIES OF MATERIALS TEST RESULTS SHALL BE SENT TO THE OWNER, ENGINEER AND ARCHITECT DIRECTLY FROM THE TESTING AGENCY.
35. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO SHOW, BY THE STANDARD TESTING PROCEDURES OF THE MATERIALS, THAT THE WORK CONSTRUCTED MEETS THE PROJECT REQUIREMENTS AND CITY SPECIFICATIONS.
36. DUE TO THE POTENTIAL FOR DIFFERENTIAL SOIL MOVEMENT ADJACENT TO THE BUILDING, THE CONTRACTOR SHALL ADHERE TO GEOTECHNICAL REPORT'S RECOMMENDATION FOR SUBGRADE PREPARATION SPECIFIC TO FLATWORK ADJACENT TO THE PROPOSED BUILDING. THE OWNER AND CONTRACTOR ARE ADVISED TO OBTAIN A GEOTECHNICAL ENGINEER RECOMMENDATION SPECIFIC TO FLATWORK ADJACENT TO THE BUILDING, IF NONE IS CURRENTLY EXISTING.
37. ALL CONTRACTORS MUST CONFINE THEIR ACTIVITIES TO THE WORK AREA. NO ENCROACHMENTS OUTSIDE OF THE WORK AREA WILL BE ALLOWED. ANY DAMAGE RESULTING THEREFROM SHALL BE CONTRACTOR'S SOLE RESPONSIBILITY TO REPAIR.
38. THE CONTRACTOR SHALL PROTECT ALL EXISTING STRUCTURES, UTILITIES, MANHOLES, POLES, GUY WIRES, VALVE COVERS, VAULT LIDS, FIRE HYDRANTS, COMMUNICATION BOXES/PEDESTALS, AND OTHER FACILITIES TO REMAIN AND SHALL REPAIR ANY DAMAGES AT NO COST TO THE OWNER.
39. THE CONTRACTOR SHALL IMMEDIATELY REPAIR OR REPLACE ANY PHYSICAL DAMAGE TO PRIVATE PROPERTY OR PUBLIC IMPROVEMENTS, INCLUDING BUT NOT LIMITED TO: FENCES, WALLS, SIGNS, PAVEMENT, CURBS, UTILITIES, SIDEWALKS, GRASS, TREES, LANDSCAPING, AND IRRIGATION SYSTEMS, ETC.… TO ORIGINAL CONDITION OR BETTER AT NO COST TO THE OWNER.
40. ALL AREAS IN EXISTING RIGHT-OF-WAY DISTURBED BY SITE CONSTRUCTION SHALL BE REPAIRED TO ORIGINAL CONDITION OR BETTER, INCLUDING AS NECESSARY GRADING, LANDSCAPING, CULVERTS, AND PAVEMENT.
41. THE CONTRACTOR SHALL SALVAGE ALL EXISTING POWER POLES, SIGNS, WATER VALVES, FIRE HYDRANTS, METERS, ETC... THAT ARE TO BE RELOCATED DURING CONSTRUCTION.
42. CONTRACTOR SHALL MAINTAIN ADEQUATE SITE DRAINAGE DURING ALL PHASES OF CONSTRUCTION, INCLUDING MAINTAINING EXISTING DITCHES OR CULVERTS FREE OF OBSTRUCTIONS AT ALL TIMES.
43. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING AND SUBMITTING A TRENCH SAFETY PLAN, PREPARED BY A PROFESSIONAL ENGINEER IN THE STATE OF TEXAS, TO THE CITY PRIOR TO CONSTRUCTION. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING TRENCH SAFETY REQUIREMENTS IN ACCORDANCE WITH CITY, STATE, AND FEDERAL REQUIREMENTS, INCLUDING OSHA FOR ALL TRENCHES. NO OPEN TRENCHES SHALL BE ALLOWED OVERNIGHT WITHOUT PRIOR WRITTEN APPROVAL OF THE CITY.
44. THE CONTRACTOR SHALL KEEP TRENCHES FREE FROM WATER.
45. SITE SAFETY IS SOLELY THE RESPONSIBILITY OF THE CONTRACTOR.
46. THESE PLANS DO NOT EXTEND TO OR INCLUDE DESIGNS OR SYSTEMS PERTAINING TO THE SAFETY OF THE CONTRACTOR OR ITS EMPLOYEES, AGENTS OR REPRESENTATIVES IN THE PERFORMANCE OF THE WORK. THE ENGINEER'S SEAL HEREON DOES NOT EXTEND TO ANY SUCH SAFETY SYSTEM. THE CONTRACTOR SHALL BE RESPONSIBLE FOR IMPLEMENTATION OF ALL REQUIRED SAFETY PROCEDURES AND PROGRAMS.
47. SIGNS RELATED TO SITE OPERATION OR SAFETY ARE NOT INCLUDED IN THESE PLANS.
48. CONTRACTOR OFFICE AND STAGING AREA SHALL BE AGREED ON BY THE OWNER AND CONTRACTOR PRIOR TO BEGINNING OF CONSTRUCTION. CONTRACTOR IS RESPONSIBLE FOR ALL PERMITTING REQUIREMENTS FOR THE CONSTRUCTION OFFICE, TRAILER, STORAGE, AND STAGING OPERATIONS AND LOCATIONS.
49. LIGHT POLES, SIGNS, AND OTHER OBSTRUCTIONS SHALL NOT BE PLACED IN ACCESSIBLE ROUTES.
50. ALL SIGNS, PAVEMENT MARKINGS, AND OTHER TRAFFIC CONTROL DEVICES SHALL CONFORM TO THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES".
51. TOP RIM ELEVATIONS OF ALL EXISTING AND PROPOSED MANHOLES SHALL BE COORDINATED WITH TOP OF PAVEMENT OR FINISHED GRADE AND SHALL BE ADJUSTED TO BE FLUSH WITH THE ACTUAL FINISHED GRADE AT THE TIME OF PAVING.
52. CONTRACTOR SHALL ADJUST ALL EXISTING AND PROPOSED VALVES, FIRE HYDRANTS, AND OTHER UTILITY APPURTENANCES TO MATCH ACTUAL FINISHED GRADES AT THE TIME OF PAVING.
53. THE CONTRACTOR IS RESPONSIBLE FOR CONSTRUCTION SEQUENCING AND PHASING, AND SHALL CONTACT THE APPROPRIATE CITY OFFICIALS, INCLUDING BUILDING OFFICIAL, ENGINEERING INSPECTOR, AND FIRE MARSHALL TO LEARN OF ANY REQUIREMENTS.
54. CONTRACTOR IS RESPONSIBLE FOR PREPARATION, SUBMITTAL, AND APPROVAL BY THE CITY OF A TRAFFIC CONTROL PLAN PRIOR TO THE START OF CONSTRUCTION, AND THEN THE IMPLEMENTATION OF THE PLAN.
55. CONTRACTOR SHALL KEEP A NEAT AND ACCURATE RECORD OF CONSTRUCTION, INCLUDING ANY DEVIATIONS OR VARIANCES FROM THE PLANS.
56. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING AS-BUILT PLANS TO THE ENGINEER AND CITY IDENTIFYING ALL DEVIATIONS AND VARIATIONS FROM THESE PLANS MADE DURING CONSTRUCTION.

EROSION CONTROL:

1. THE CONTRACTOR SHALL COMPLY WITH ALL LOCAL, STATE, AND FEDERAL EROSION CONTROL AND WATER QUALITY REQUIREMENTS, LAWS, AND ORDINANCES THAT APPLY TO THE CONSTRUCTION SITE LAND DISTURBANCE.
2. CONTRACTOR SHALL COMPLY WITH THE REQUIREMENTS OF THE "TCEQ GENERAL PERMIT TO DISCHARGE UNDER THE TEXAS POLLUTANT DISCHARGE ELIMINATION SYSTEM TXR 150000".
3. EROSION CONTROL DEVICES SHOWN ON THE EROSION CONTROL PLAN FOR THE PROJECT SHALL BE INSTALLED PRIOR TO THE START OF LAND DISTURBANCE.
4. ALL EROSION CONTROL DEVICES ARE TO BE INSTALLED IN ACCORDANCE WITH THE APPROVED PLANS AND SPECIFICATIONS FOR THE PROJECT.
5. CONTRACTOR IS SOLELY RESPONSIBLE FOR INSTALLATION, IMPLEMENTATION, MAINTENANCE, AND EFFECTIVENESS OF ALL EROSION CONTROL DEVICES, BEST MANAGEMENT PRACTICES (BMPS), AND FOR UPDATING THE EROSION CONTROL PLAN DURING CONSTRUCTION AS FIELD CONDITIONS CHANGE.
6. CONTRACTOR SHALL DOCUMENT THE DATES OF INSTALLATION, MAINTENANCE OR MODIFICATION, AND REMOVAL FOR EACH BMP EMPLOYED IN THE STORM WATER POLLUTION PREVENTION PLAN (SWPPP) IF APPLICABLE.
7. AS STORM SEWER INLETS ARE INSTALLED ON-SITE, TEMPORARY EROSION CONTROL DEVICES SHALL BE INSTALLED AT EACH INLET PER APPROVED DETAILS.
8. THE EROSION CONTROL DEVICES SHALL REMAIN IN PLACE UNTIL THE AREA IT PROTECTS HAS BEEN PERMANENTLY STABILIZED.
9. CONTRACTOR SHALL PROVIDE ADEQUATE EROSION CONTROL DEVICES NEEDED DUE TO PROJECT PHASING.
10. CONTRACTOR SHALL OBSERVE THE EFFECTIVENESS OF THE EROSION CONTROL DEVICES AND MAKE FIELD ADJUSTMENTS AND MODIFICATIONS AS NEEDED TO PREVENT SEDIMENT FROM LEAVING THE SITE. IF THE EROSION CONTROL DEVICES DO NOT EFFECTIVELY CONTROL EROSION AND PREVENT SEDIMENTATION FROM WASHING OFF THE SITE, THEN THE CONTRACTOR SHALL NOTIFY THE ENGINEER.
11. OFF-SITE SOIL BORROW, SPOIL, AND STORAGE AREAS (IF APPLICABLE) ARE CONSIDERED AS PART OF THE PROJECT SITE AND MUST ALSO COMPLY WITH THE EROSION CONTROL REQUIREMENTS FOR THIS PROJECT. THIS INCLUDES THE INSTALLATION OF BMP'S TO CONTROL EROSION AND SEDIMENTATION AND THE ESTABLISHMENT OF PERMANENT GROUND COVER ON DISTURBED AREAS PRIOR TO FINAL APPROVAL OF THE PROJECT. CONTRACTOR IS RESPONSIBLE FOR MODIFYING THE SWPPP AND EROSION CONTROL PLAN TO INCLUDE BMPS FOR ANY OFF-SITE THAT ARE NOT ANTICIPATED OR SHOWN ON THE EROSION CONTROL PLAN.
12. ALL STAGING, STOCKPILES, SPOIL, AND STORAGE SHALL BE LOCATED SUCH THAT THEY WILL NOT ADVERSELY AFFECT STORM WATER QUALITY. PROTECTIVE MEASURES SHALL BE PROVIDED IF NEEDED TO ACCOMPLISH THIS REQUIREMENT, SUCH AS COVERING OR ENCIRCLING THE AREA WITH AN APPROPRIATE BARRIER.
13. CONTRACTORS SHALL INSPECT ALL EROSION CONTROL DEVICES, BMPS, DISTURBED AREAS, AND VEHICLE ENTRY AND EXIT AREAS WEEKLY AND WITHIN 24 HOURS OF ALL RAINFALL EVENTS OF 0.5 INCHES OR GREATER, AND KEEP A RECORD OF THIS INSPECTION IN THE SWPPP BOOKLET IF APPLICABLE, TO VERIFY THAT THE DEVICES AND EROSION CONTROL PLAN ARE FUNCTIONING PROPERLY.
14. CONTRACTOR SHALL CONSTRUCT A STABILIZED CONSTRUCTION ENTRANCE AT ALL PRIMARY POINTS OF ACCESS IN ACCORDANCE WITH CITY SPECIFICATIONS. CONTRACTOR SHALL ENSURE THAT ALL CONSTRUCTION TRAFFIC USES THE STABILIZED ENTRANCE AT ALL TIMES FOR ALL INGRESS/EGRESS.
15. SITE ENTRY AND EXITS SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT THE TRACKING AND FLOWING OF SEDIMENT AND DIRT ONTO OFF-SITE ROADWAYS. ALL SEDIMENT AND DIRT FROM THE SITE THAT IS DEPOSITED ONTO AN OFF-SITE ROADWAY SHALL BE REMOVED IMMEDIATELY.
16. THE CONTRACTOR IS RESPONSIBLE FOR REMOVING ALL SILT AND DEBRIS FROM THE AFFECTED OFF-SITE ROADWAYS THAT ARE A RESULT OF THE CONSTRUCTION, AS REQUESTED BY OWNER AND CITY. AT A MINIMUM, THIS SHOULD OCCUR ONCE PER DAY FOR THE OFF-SITE ROADWAYS.
17. WHEN WASHING OF VEHICLES IS REQUIRED TO REMOVE SEDIMENT PRIOR TO EXITING THE SITE, IT SHALL BE DONE IN AN AREA STABILIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP BMP.
18. CONTRACTOR SHALL INSTALL A TEMPORARY SEDIMENT BASIN FOR ANY ON-SITE DRAINAGE AREAS THAT ARE GREATER THAN 10 ACRES, PER TCEQ AND CITY STANDARDS. IF NO ENGINEERING DESIGN HAS BEEN PROVIDED FOR A SEDIMENTATION BASIN ON THESE PLANS, THEN THE CONTRACTOR SHALL ARRANGE FOR AN APPROPRIATE DESIGN TO BE PROVIDED.
19. ALL FINES IMPOSED FOR SEDIMENT OR DIRT DISCHARGED FROM THE SITE SHALL BE PAID BY THE RESPONSIBLE CONTRACTOR.
20. WHEN SEDIMENT OR DIRT HAS CLOGGED THE CONSTRUCTION ENTRANCE VOID SPACES BETWEEN STONES OR DIRT IS BEING TRACKED ONTO A ROADWAY, THE AGGREGATE PAD MUST BE WASHED DOWN OR REPLACED. RUNOFF FROM THE WASH-DOWN OPERATION SHALL NOT BE ALLOWED TO DRAIN DIRECTLY OFF SITE WITHOUT FIRST FLOWING THROUGH ANOTHER BMP TO CONTROL SEDIMENTATION. PERIODIC RE-GRADING OR NEW STONE MAY BE REQUIRED TO MAINTAIN THE EFFECTIVENESS OF THE CONSTRUCTION ENTRANCE.
21. TEMPORARY SEEDING OR OTHER APPROVED STABILIZATION SHALL BE INITIATED WITHIN 14 DAYS OF THE LAST DISTURBANCE OF ANY AREA, UNLESS ADDITIONAL CONSTRUCTION IN THE AREA IS EXPECTED WITHIN 21 DAYS OF THE LAST DISTURBANCE.
22. CONTRACTOR SHALL FOLLOW GOOD HOUSEKEEPING PRACTICES DURING CONSTRUCTION, ALWAYS CLEANING UP DIRT, LOOSE MATERIAL, AND TRASH AS CONSTRUCTION PROGRESSES.
23. UPON COMPLETION OF FINE GRADING, ALL SURFACES OF DISTURBED AREAS SHALL BE PERMANENTLY STABILIZED. STABILIZATION IS ACHIEVED WHEN THE AREA IS EITHER COVERED BY PERMANENT IMPERVIOUS STRUCTURES, SUCH AS BUILDINGS, SIDEWALK, PAVEMENT, OR A UNIFORM PERENNIAL VEGETATIVE COVER.
24. AT THE CONCLUSION OF THE PROJECT, ALL INLETS, DRAIN PIPE, CHANNELS, DRAINAGEWAYS AND BORROW DITCHES AFFECTED BY THE CONSTRUCTION SHALL BE DREDGED, AND THE SEDIMENT GENERATED BY THE PROJECT SHALL BE REMOVED AND DISPOSED IN ACCORDANCE WITH APPLICABLE REGULATIONS.

STORM WATER DISCHARGE AUTHORIZATION:

1. CONTRACTOR SHALL COMPLY WITH ALL TCEQ AND EPA STORM WATER POLLUTION PREVENTION REQUIREMENTS.
2. CONTRACTOR SHALL COMPLY WITH THE REQUIREMENTS OF THE TCEQ GENERAL PERMIT TO DISCHARGE UNDER THE TEXAS POLLUTANT DISCHARGE ELIMINATION SYSTEM TXR 150000.
3. THE CONTRACTOR SHALL ENSURE THAT ALL PRIMARY OPERATORS SUBMIT A NOI TO TCEQ AT LEAST SEVEN DAYS PRIOR TO COMMENCING CONSTRUCTION (IF APPLICABLE), OR IF UTILIZING ELECTRONIC SUBMITTAL, PRIOR TO COMMENCING CONSTRUCTION. ALL PRIMARY OPERATORS SHALL PROVIDE A COPY OF THE SIGNED NOI TO THE OPERATOR OF ANY MS4 (TYPICALLY THE CITY) RECEIVING DISCHARGE FROM THE SITE.
4. CONTRACTOR SHALL BE RESPONSIBLE FOR THE IMPLEMENTATION OF THE STORM WATER POLLUTION PREVENTION PLAN (SWPPP) IF APPLICABLE, INCLUDING POSTING SITE NOTICE, INSPECTIONS, DOCUMENTATION, AND SUBMISSION OF ANY INFORMATION REQUIRED BY THE TCEQ AND EPA (E.G. NOI).
5. ALL CONTRACTORS AND SUBCONTRACTORS PROVIDING SERVICES RELATED TO THE SWPPP SHALL SIGN THE REQUIRED CONTRACTOR CERTIFICATION STATEMENT ACKNOWLEDGING THEIR RESPONSIBILITIES AS SPECIFIED IN THE SWPPP.
6. A COPY OF THE SWPPP, INCLUDING NOI, SITE NOTICE, CONTRACTOR CERTIFICATIONS, AND ANY REVISIONS, SHALL BE SUBMITTED TO THE CITY BY THE CONTRACTOR AND SHALL BE RETAINED ON-SITE DURING CONSTRUCTION.
7. A NOTICE OF TERMINATION (NOT) SHALL BE SUBMITTED TO TCEQ BY ANY PRIMARY OPERATOR WITHIN 30 DAYS AFTER ALL SOIL DISTURBING ACTIVITIES AT THE SITE HAVE BEEN COMPLETED AND A UNIFORM VEGETATIVE COVER HAS BEEN ESTABLISHED ON ALL UNPAVED AREAS AND AREAS NOT COVERED BY STRUCTURES, A TRANSFER OF OPERATIONAL CONTROL HAS OCCURRED, OR THE OPERATOR HAS OBTAINED ALTERNATIVE AUTHORIZATION UNDER A DIFFERENT PERMIT. A COPY OF THE NOT SHALL BE PROVIDED TO THE OPERATOR OF ANY MS4 RECEIVING DISCHARGE FROM THE SITE.

DEMOLITION:

1. KH IS NOT RESPONSIBLE FOR THE MEANS AND METHODS EMPLOYED BY THE CONTRACTOR TO IMPLEMENT THIS DEMOLITION PLAN. THIS PRELIMINARY DEMOLITION PLAN SIMPLY INDICATES THE KNOWN OBJECTS ON THE SUBJECT TRACT THAT ARE TO BE DEMOLISHED AND REMOVED FROM THE SITE.
2. KH DOES NOT WARRANT OR REPRESENT THAT THE PLAN, WHICH WAS PREPARED BASED ON SURVEY AND UTILITY INFORMATION PROVIDED BY OTHERS, SHOWS ALL IMPROVEMENTS AND UTILITIES, THAT THE IMPROVEMENTS AND UTILITIES ARE SHOWN ACCURATELY, OR THAT THE UTILITIES SHOWN CAN BE REMOVED. THE CONTRACTOR IS RESPONSIBLE FOR PERFORMING ITS OWN SITE RECONNAISSANCE TO SCOPE ITS WORK AND TO CONFIRM WITH THE OWNERS OF IMPROVEMENTS AND UTILITIES THE ABILITY AND PROCESS FOR THE REMOVAL OF THEIR FACILITIES.
3. THIS PLAN IS INTENDED TO GIVE A GENERAL GUIDE TO THE CONTRACTOR, NOTHING MORE. THE GOAL OF THE DEMOLITION IS TO LEAVE THE SITE IN A STATE SUITABLE FOR THE CONSTRUCTION OF THE PROPOSED DEVELOPMENT. REMOVAL OR PRESERVATION OF IMPROVEMENTS, UTILITIES, ETC. TO ACCOMPLISH THIS GOAL ARE THE RESPONSIBILITY OF THE CONTRACTOR.
4. CONTRACTOR IS STRONGLY CAUTIONED TO REVIEW THE FOLLOWING REPORTS DESCRIBING SITE CONDITIONS PRIOR TO BIDDING AND IMPLEMENTING THE DEMOLITION PLAN:
   a. ENVIRONMENTAL SITE ASSESSMENT PROVIDED BY THE OWNER,
   b. ASBESTOS BUILDING INSPECTION REPORT(S) PROVIDED BY THE OWNER,
   c. GEOTECHNICAL REPORT PROVIDED BY THE OWNER.
   d. OTHER REPORTS THAT ARE APPLICABLE AND AVAILABLE.
5. CONTRACTOR SHALL CONTACT THE OWNER TO VERIFY WHETHER ADDITIONAL REPORTS OR AMENDMENTS TO THE ABOVE CITED REPORTS HAVE BEEN PREPARED AND TO OBTAIN/REVIEW/AND COMPLY WITH THE RECOMMENDATION OF SUCH STUDIES PRIOR TO STARTING ANY WORK ON THE SITE.
6. CONTRACTOR SHALL COMPLY WITH ALL LOCAL, STATE, AND FEDERAL REGULATIONS REGARDING THE DEMOLITION OF OBJECTS ON THE SITE AND THE DISPOSAL OF THE DEMOLISHED MATERIALS OFF-SITE. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO REVIEW THE SITE, DETERMINE THE APPLICABLE REGULATIONS, RECEIVE THE REQUIRED PERMITS AND AUTHORIZATIONS, AND COMPLY.
7. KH DOES NOT REPRESENT THAT THE REPORTS AND SURVEYS REFERENCED ABOVE ARE ACCURATE, COMPLETE, OR COMPREHENSIVE SHOWING ALL ITEMS THAT WILL NEED TO BE DEMOLISHED AND REMOVED.
8. SURFACE PAVEMENT INDICATED MAY OVERLAY OTHER HIDDEN STRUCTURES, SUCH AS ADDITIONAL LAYERS OF PAVEMENT, FOUNDATIONS OR WALLS, THAT ARE ALSO TO BE REMOVED.

GRADING:

1. THE CONTRACTOR AND GRADING SUBCONTRACTOR SHALL VERIFY THE SUITABILITY OF EXISTING AND PROPOSED SITE CONDITIONS INCLUDING GRADES AND DIMENSIONS BEFORE START OF CONSTRUCTION. THE CIVIL ENGINEER SHALL BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCIES.
2. CONTRACTOR SHALL OBTAIN ANY REQUIRED GRADING PERMITS FROM THE CITY.
3. UNLESS OTHERWISE NOTED, PROPOSED CONTOURS AND SPOT ELEVATIONS SHOWN IN PAVED AREA REFLECT TOP OF PAVEMENT SURFACE. IN LOCATIONS ALONG A CURB LINE, ADD 6-INCHES (OR THE HEIGHT OF THE CURB) TO THE PAVING GRADE FOR TOP OF CURB ELEVATION.
4. PROPOSED SPOT ELEVATIONS AND CONTOURS OUTSIDE THE PAVEMENT ARE TO TOP OF FINISHED GRADE.
5. PROPOSED CONTOURS ARE APPROXIMATE. PROPOSED SPOT ELEVATIONS AND DESIGNATED GRADIENT ARE TO BE USED IN CASE OF DISCREPANCY.
6. ALL FINISHED GRADES SHALL TRANSITION UNIFORMLY BETWEEN THE FINISHED ELEVATIONS SHOWN.
7. CONTOURS AND SPOT GRADES SHOWN ARE ELEVATIONS OF TOP OF THE FINISHED SURFACE. WHEN PERFORMING THE GRADING OPERATIONS, THE CONTRACTOR SHALL PROVIDE AN APPROPRIATE ELEVATION HOLD-DOWN ALLOWANCE FOR THE THICKNESS OF PAVEMENT, SIDEWALK, TOPSOIL, MULCH, STONE, LANDSCAPING, RIP-RAP AND ALL OTHER SURFACE MATERIALS THAT WILL CONTRIBUTE TO THE TOP OF FINISHED GRADE. FOR EXAMPLE, THE LIMITS OF EARTHWORK IN PAVED AREAS IS THE BOTTOM OF THE PAVEMENT SECTION.
8. NO REPRESENTATIONS OF EARTHWORK QUANTITIES OR SITE BALANCE ARE MADE BY THESE PLANS. THE CONTRACTOR SHALL PROVIDE THEIR OWN EARTHWORK CALCULATION TO DETERMINE THEIR CONTRACT QUANTITIES AND COST. ANY SIGNIFICANT VARIANCE FROM A BALANCED SITE SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE CIVIL ENGINEER.
9. ALL GRADING AND EARTHWORK SHALL COMPLY WITH THE PROJECT'S FINAL GEOTECHNICAL REPORT (OR LATEST EDITION), INCLUDING SUBSEQUENT ADDENDA.
10. ALL EXCAVATION IS UNCLASSIFIED AND SHALL INCLUDE ALL MATERIALS ENCOUNTERED. UNUSABLE EXCAVATED MATERIAL AND ALL WASTE RESULTING FROM SITE CLEARING AND GRUBBING SHALL BE REMOVED FROM THE SITE AND APPROPRIATELY DISPOSED BY THE CONTRACTOR AT NO ADDITIONAL EXPENSE.
11. EROSION CONTROL DEVICES SHOWN ON THE EROSION CONTROL PLAN FOR THE PROJECT SHALL BE INSTALLED PRIOR TO THE START OF GRADING. REFERENCE EROSION CONTROL PLAN, DETAILS, GENERAL NOTES, AND SWPPP FOR ADDITIONAL INFORMATION AND REQUIREMENTS.
12. BEFORE ANY EARTHWORK IS PERFORMED, THE CONTRACTOR SHALL STAKE OUT AND MARK THE LIMITS OF THE PROJECT'S PROPERTY LINE AND SITE IMPROVEMENTS. THE CONTRACTOR SHALL PROVIDE ALL NECESSARY ENGINEERING AND SURVEYING FOR LINE AND GRADE CONTROL POINTS RELATED TO EARTHWORK.
13. CONTRACTOR TO DISPOSE OF ALL EXCESS EXCAVATION MATERIALS IN A MANNER THAT ADHERES TO LOCAL, STATE AND FEDERAL LAWS AND REGULATIONS. THE CONTRACTOR SHALL KEEP A RECORD OF WHERE EXCESS EXCAVATION WAS DISPOSED, ALONG WITH THE RECEIVING LANDOWNER'S APPROVAL TO DO SO.
14. CONTRACTOR IS RESPONSIBLE FOR REMOVAL AND REPLACEMENT OF TOPSOIL AT THE COMPLETION OF FINE GRADING. CONTRACTOR SHALL REFER TO LANDSCAPE ARCHITECTURE PLANS FOR SPECIFICATIONS AND REQUIREMENTS FOR TOPSOIL.
15. CONTRACTOR SHALL MAINTAIN ADEQUATE SITE DRAINAGE DURING ALL PHASES OF CONSTRUCTION, INCLUDING MAINTAINING EXISTING DITCHES OR CULVERTS FREE OF OBSTRUCTIONS AT ALL TIMES.
16. NO EARTHWORK FILL SHALL BE PLACED IN ANY EXISTING DRAINAGE WAY, SWALE, CHANNEL, DITCH, CREEK, OR FLOODPLAIN FOR ANY REASON OR ANY LENGTH OF TIME, UNLESS THESE PLANS SPECIFICALLY INDICATE THIS IS REQUIRED.
17. TEMPORARY CULVERTS MAY BE REQUIRED IN SOME LOCATIONS TO CONVEY RUN-OFF.
18. REFER TO DIMENSION CONTROL PLAN, AND PLAT FOR HORIZONTAL DIMENSIONS.
19. THE CONTRACTOR SHALL CLEAR AND GRUB THE SITE AND PLACE, COMPACT, AND CONDITION FILL PER THE PROJECT GEOTECHNICAL ENGINEER'S SPECIFICATIONS. THE FILL MATERIAL TO BE USED SHALL BE APPROVED BY THE GEOTECHNICAL ENGINEER PRIOR TO PLACEMENT.
20. CONTRACTOR IS RESPONSIBLE FOR ALL SOILS TESTING AND CERTIFICATION, UNLESS SPECIFIED OTHERWISE BY OWNER. ALL SOILS TESTING SHALL BE COORDINATED WITH THE APPROPRIATE CITY INSPECTOR AND SHALL COMPLY WITH CITY STANDARD SPECIFICATIONS AND THE GEOTECHNICAL REPORT. SOILS TESTING SHALL BE PERFORMED BY AN APPROVED INDEPENDENT AGENCY FOR TESTING SOILS. THE OWNER SHALL APPROVE THE AGENCY NOMINATED BY THE CONTRACTOR FOR SOILS TESTING.
21. ALL COPIES OF SOILS TEST RESULTS SHALL BE SENT TO THE OWNER, ENGINEER AND ARCHITECT DIRECTLY FROM THE TESTING AGENCY.
22. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO SHOW, BY THE STANDARD TESTING PROCEDURES OF THE SOILS, THAT THE WORK CONSTRUCTED MEETS THE PROJECT REQUIREMENTS AND CITY SPECIFICATIONS.
23. THE SCOPE OF WORK FOR CIVIL IMPROVEMENT SHOWN ON THESE PLANS TERMINATES 5-FEET FROM THE BUILDING. CONTRACTOR SHALL REFER TO THE GEOTECHNICAL REPORT AND STRUCTURAL PLANS AND SPECIFICATIONS FILL, CONDITIONING, AND PREPARATION IN THE BUILDING PAD.
24. DUE TO THE POTENTIAL FOR DIFFERENTIAL SOIL MOVEMENT ADJACENT TO THE BUILDING, THE CONTRACTOR SHALL ADHERE TO GEOTECHNICAL REPORT'S RECOMMENDATION FOR SUBGRADE PREPARATION SPECIFIC TO FLATWORK ADJACENT TO THE PROPOSED BUILDING. THE OWNER AND CONTRACTOR ARE ADVISED TO OBTAIN A GEOTECHNICAL ENGINEER RECOMMENDATION SPECIFIC TO FLATWORK ADJACENT TO THE BUILDING, IF NONE IS CURRENTLY EXISTING.
25. CONTRACTOR SHALL ENSURE THAT SUFFICIENT POSITIVE SLOPE AWAY FROM THE BUILDING PAD IS ACHIEVED FOR ENTIRE PERIMETER OF THE PROPOSED BUILDING(S) DURING GRADING OPERATIONS AND IN THE FINAL CONDITION. IF THE CONTRACTOR OBSERVES THAT THIS WILL NOT BE ACHIEVED, THE CONTRACTOR SHALL CONTACT THE ENGINEER TO REVIEW THE LOCATION.
26. THE CONTRACTOR SHALL TAKE ALL AVAILABLE PRECAUTIONS TO CONTROL DUST. CONTRACTOR SHALL CONTROL DUST BY SPRINKLING WATER, OR BY OTHER MEANS APPROVED BY THE CITY, AT NO ADDITIONAL COST TO THE OWNER.
27. CONTRACTOR SHALL COORDINATE WITH THE UTILITY COMPANIES FOR ANY REQUIRED UTILITY ADJUSTMENTS AND/OR RELOCATIONS NEEDED FOR GRADING OPERATIONS AND TO ACCOMMODATE PROPOSED GRADE, INCLUDING THE UNKNOWN UTILITIES NOT SHOWN ON THESE PLANS. CONTRACTOR SHALL REFER TO THE GENERAL NOTES "OVERALL" SECTION THESE PLANS FOR ADDITIONAL INFORMATION.
28. EXISTING TREE LOCATIONS SHOWN ON THESE PLANS ARE APPROXIMATE. CONTRACTOR SHALL REPORT ANY DISCREPANCIES FOUND IN THE FIELD THAT AFFECT THE GRADING PLAN TO THE CIVIL ENGINEER.
29. CONTRACTOR SHALL FIELD VERIFY ALL PROTECTED TREE LOCATIONS, INDIVIDUAL PROTECTED TREE CRITICAL ROOT ZONES, AND PROPOSED SITE GRADING, AND NOTIFY THE CIVIL ENGINEER AND LANDSCAPE ARCHITECT OF ANY CONFLICTS WITH THE TREE PRESERVATION PLAN BY THE LANDSCAPE ARCHITECT PRIOR TO COMMENCING THE WORK.
30. TREE PROTECTION MEASURES SHALL BE INSTALLED IN ACCORDANCE WITH THE CITY STANDARD TREE PROTECTION DETAILS AND THE APPROVED TREE PRESERVATION PLANS BY THE LANDSCAPE ARCHITECT.
31. CONTRACTOR SHALL REFER TO THE LANDSCAPING AND TREE PRESERVATIONS PLANS FOR ALL INFORMATION AND DETAILS REGARDING EXISTING TREES TO BE REMOVED AND PRESERVED.
32. NO TREE SHALL BE REMOVED UNLESS A TREE REMOVAL PERMIT HAS BEEN ISSUED BY THE CITY, OR CITY HAS OTHERWISE CONFIRMED IN WRITING THAT ONE IS NOT NEEDED FOR THE TREE(S).
33. NO TREE SHALL BE REMOVED OR DAMAGED WITHOUT PRIOR AUTHORIZATION OF THE OWNER OR OWNER'S REPRESENTATIVE. EXISTING TREES SHALL BE PRESERVED WHENEVER POSSIBLE AND GRADING IMPACT TO THEM HELD TO A MINIMUM.
34. AFTER PLACEMENT OF SUBGRADE AND PRIOR TO PLACEMENT OF PAVEMENT, CONTRACTOR SHALL TEST AND OBSERVE PAVEMENT AREAS FOR EVIDENCE OF PONDING AND INADEQUATE SLOPE FOR DRAINAGE. ALL AREAS SHALL ADEQUATELY DRAIN TOWARDS THE INTENDED STRUCTURE TO CONVEY STORMWATER RUNOFF. CONTRACTOR SHALL IMMEDIATELY NOTIFY OWNER AND ENGINEER IF ANY AREAS OF POOR DRAINAGE ARE DISCOVERED.
35. CONTRACTOR FIELD ADJUSTMENT OF PROPOSED SPOT GRADES IS ALLOWED, IF THE APPROVAL OF THE CIVIL ENGINEER IS OBTAINED.

RETAINING WALLS:

1. RETAINING WALLS SHOWN ARE FOR SITE GRADING PURPOSES ONLY, AND INCLUDE ONLY LOCATION AND SURFACE SPOT ELEVATIONS AT THE TOP AND BOTTOM OF THE WALL.
2. RETAINING WALL TYPE OR SYSTEM SHALL BE SELECTED BY THE OWNER.
3. RETAINING WALL DESIGN SHALL BE PROVIDED BY OTHERS AND SHALL FIT IN THE WALL ZONE OR LOCATION SHOWN ON THESE PLANS. STRUCTURAL DESIGN AND PERMITTING OF RETAINING WALLS, RAILINGS, AND OTHER WALL SAFETY DEVICES SHALL BE PERFORMED BY A LICENSED ENGINEER AND ARE NOT PART OF THIS PLAN SET.
4. RETAINING WALL DESIGN SHALL MEET THE INTENT OF THE GRADING PLAN AND SHALL ACCOUNT FOR ANY INFLUENCE ON ADJACENT BUILDING FOUNDATIONS, UTILITIES, PROPERTY LINES AND OTHER CONSTRUCTABILITY NOTES.
5. RETAINING WALL ENGINEER SHALL CONSULT THESE PLANS AND THE GEOTECHNICAL REPORT FOR POTENTIAL CONFLICTS.

PAVING:

1. ALL PAVING MATERIALS AND CONSTRUCTION SHALL BE IN ACCORDANCE WITH THESE PLANS, THE CITY STANDARD DETAILS AND SPECIFICATIONS, THE FINAL GEOTECHNICAL REPORT AND ALL ISSUED ADDENDA, AND COMMONLY ACCEPTED CONSTRUCTION STANDARDS. THE CITY SPECIFICATIONS SHALL GOVERN WHERE OTHER SPECIFICATIONS DO NOT EXIST. IN CASE OF CONFLICTING SPECIFICATIONS OR DETAILS, THE MORE RESTRICTIVE SPECIFICATION/DETAIL SHALL BE FOLLOWED.
2. ALL PRIVATE ON-SITE PAVING AND PAVING SUBGRADE SHALL COMPLY WITH THE PROJECT'S FINAL GEOTECHNICAL REPORT (OR LATEST EDITION), INCLUDING ALL ADDENDA.
3. ALL FIRELANE PAVING AND PAVING SUBGRADE SHALL COMPLY WITH CITY STANDARDS AND DETAILS. IF THESE ARE DIFFERENT THAN THOSE IN THE GEOTECHNICAL REPORT, THEN THE MORE RESTRICTIVE SHALL BE FOLLOWED.
4. ALL PUBLIC PAVING AND PAVING SUBGRADE SHALL COMPLY WITH CITY STANDARD CONSTRUCTION DETAILS AND SPECIFICATIONS.
5. CONTRACTOR IS RESPONSIBLE FOR ALL PAVING AND PAVING SUBGRADE TESTING AND CERTIFICATION, UNLESS SPECIFIED OTHERWISE BY OWNER. ALL PAVING AND PAVING SUBGRADE TESTING SHALL BE COORDINATED WITH THE APPROPRIATE CITY INSPECTOR. TESTING SHALL BE PERFORMED BY AN APPROVED INDEPENDENT AGENCY FOR TESTING PAVING AND SUBGRADE. OWNER SHALL APPROVE THE AGENCY NOMINATED BY THE CONTRACTOR FOR PAVING AND PAVING SUBGRADE TESTING.
6. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO SHOW, BY THE STANDARD TESTING PROCEDURES OF THE PAVING AND PAVING SUBGRADE, THAT THE WORK CONSTRUCTED MEETS THE PROJECT REQUIREMENTS AND CITY SPECIFICATIONS.
7. DUE TO THE POTENTIAL FOR DIFFERENTIAL SOIL MOVEMENT ADJACENT TO THE BUILDING, THE CONTRACTOR SHALL ADHERE TO GEOTECHNICAL REPORT'S RECOMMENDATION FOR SUBGRADE PREPARATION SPECIFIC TO FLATWORK ADJACENT TO THE PROPOSED BUILDING. THE OWNER AND CONTRACTOR ARE ADVISED TO OBTAIN A GEOTECHNICAL ENGINEER RECOMMENDATION SPECIFIC TO FLATWORK ADJACENT TO THE BUILDING, IF NONE IS CURRENTLY EXISTING.
8. CURB RAMPS ALONG PUBLIC STREETS AND IN THE PUBLIC RIGHT-OF-WAY SHALL BE CONSTRUCTED BASED ON THE CITY STANDARD CONSTRUCTION DETAIL AND SPECIFICATIONS.
9. PRIVATE CURB RAMPS ON THE SITE (I.E. OUTSIDE PUBLIC STREET RIGHT-OF-WAY) SHALL CONFORM TO ADA AND TAS STANDARDS AND SHALL HAVE A DETECTABLE WARNING SURFACE THAT IS FULL WIDTH AND FULL DEPTH OF THE CURB RAMP, NOT INCLUDING FLARES.
10. ALL ACCESSIBLE RAMPS, CURB RAMPS, STRIPING, AND PAVEMENT MARKINGS SHALL CONFORM TO ADA AND TAS STANDARDS, LATEST EDITION.
11. ANY COMPONENTS OF THE PROJECT SUBJECT TO RESIDENTIAL USE SHALL ALSO CONFORM TO THE FAIR HOUSING ACT, AND COMPLY WITH THE FAIR HOUSING ACT DESIGN MANUAL BY THE US DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT.
12. CONTRACTOR SHALL CONSTRUCT PROPOSED PAVEMENT TO MATCH EXISTING PAVEMENT WITH A SMOOTH, FLUSH, CONNECTION.
13. CONTRACTOR SHALL FURNISH AND INSTALL ALL PAVEMENT MARKINGS FOR FIRE LANES, PARKING STALLS, HANDICAPPED PARKING SYMBOLS, AND MISCELLANEOUS STRIPING WITHIN PARKING LOT AND AROUND BUILDING AS SHOWN ON THE PLANS. ALL PAINT AND PAVEMENT MARKINGS SHALL ADHERE TO CITY AND OWNER STANDARDS.
14. REFER TO GEOTECHNICAL REPORT FOR PAVING JOINT LAYOUT PLAN REQUIREMENTS FOR PRIVATE PAVEMENT.
15. REFER TO CITY STANDARD DETAILS AND SPECIFICATIONS FOR JOINT LAYOUT PLAN REQUIREMENTS FOR PUBLIC PAVEMENT.
16. ALL REINFORCING STEEL SHALL CONFORM TO THE GEOTECHNICAL REPORT, CITY STANDARDS, AND ASTM A-615, GRADE 60, AND SHALL BE SUPPORTED BY BAR CHAIRS. CONTRACTOR SHALL USE THE MORE STRINGENT OF THE CITY AND GEOTECHNICAL STANDARDS.
17. ALL JOINTS SHALL EXTEND THROUGH THE CURB.
18. THE MINIMUM LENGTH OF OFFSET JOINTS AT RADIUS POINTS SHALL BE 2 FEET.
19. CONTRACTOR SHALL SUBMIT A JOINTING PLAN TO THE ENGINEER AND OWNER PRIOR TO BEGINNING ANY OF THE PAVING WORK.
20. ALL SAWCUTS SHALL BE FULL DEPTH FOR PAVEMENT REMOVAL AND CONNECTION TO EXISTING PAVEMENT.
21. FIRE LANES SHALL BE MARKED AND LABELED AS A FIRELANE PER CITY STANDARDS.
22. UNLESS THE PLANS SPECIFICALLY DICTATE TO THE CONTRARY, ON-SITE AND OTHER DIRECTIONAL SIGNS SHALL BE ORIENTED SO THEY ARE READILY VISIBLE TO THE ONCOMING TRAFFIC FOR WHICH THEY ARE INTENDED.
23. CONTRACTOR IS RESPONSIBLE FOR INSTALLING NECESSARY CONDUIT FOR LIGHTING, IRRIGATION, ETC. PRIOR TO PLACEMENT OF PAVEMENT. ALL CONSTRUCTION DOCUMENTS (CIVIL, MEP, LANDSCAPE, IRRIGATION, AND ARCHITECT) SHALL BE CONSULTED.
24. BEFORE PLACING PAVEMENT, CONTRACTOR SHALL VERIFY THAT SUITABLE ACCESSIBLE PEDESTRIAN ROUTES (PER ADA, TAS, AND FHA) EXIST TO AND FROM EVERY DOOR AND ALONG SIDEWALKS, ACCESSIBLE PARKING SPACES, ACCESS AISLES, AND ACCESSIBLE ROUTES. IN NO CASE SHALL AN ACCESSIBLE RAMP SLOPE EXCEED 1 VERTICAL TO 12 HORIZONTAL. IN NO CASE SHALL SIDEWALK CROSS SLOPE EXCEED 2.0 PERCENT. IN NO CASE SHALL LONGITUDINAL SIDEWALK SLOPE EXCEED 5.0 PERCENT. ACCESSIBLE PARKING SPACES AND ACCESS AISLES SHALL NOT EXCEED 2.0 PERCENT SLOPE IN ANY DIRECTION.
25. CONTRACTOR SHALL TAKE FIELD SLOPE MEASUREMENTS ON FINISHED SUBGRADE AND FORM BOARDS PRIOR TO PLACING PAVEMENT TO VERIFY THAT ADA/TAS SLOPE REQUIREMENTS ARE PROVIDED. CONTRACTOR SHALL CONTACT ENGINEER PRIOR TO PAVING IF ANY EXCESSIVE SLOPES ARE ENCOUNTERED. NO CONTRACTOR CHANGE ORDERS WILL BE ACCEPTED FOR ADA AND TAS SLOPE COMPLIANCE ISSUES.

STORM DRAINAGE:

1. ALL STORM SEWER MATERIALS AND CONSTRUCTION SHALL COMPLY WITH CITY STANDARD CONSTRUCTION DETAILS AND SPECIFICATIONS.
2. THE SITE UTILITY CONTRACTOR SHALL PROVIDE ALL MATERIALS AND APPURTENANCES NECESSARY FOR COMPLETE INSTALLATION OF THE STORM SEWER.
3. THE CONTRACTOR SHALL FIELD VERIFY THE SIZE, CONDITION, HORIZONTAL, AND VERTICAL LOCATIONS OF ALL EXISTING STORM SEWER FACILITIES THAT ARE TO BE CONNECTED TO, PRIOR TO START OF CONSTRUCTION OF ANY STORM SEWER, AND SHALL NOTIFY THE ENGINEER OF ANY CONFLICTS DISCOVERED.
4. THE CONTRACTOR SHALL VERIFY AND COORDINATE ALL DIMENSIONS SHOWN, INCLUDING THE HORIZONTAL AND VERTICAL LOCATION OF CURB INLETS AND GRATE INLETS AND ALL UTILITIES CROSSING THE STORM SEWER.
5. FLOW LINE, TOP-OF-CURB, RIM, THROAT, AND GRATE ELEVATIONS OF PROPOSED INLETS SHALL BE VERIFIED WITH THE GRADING PLAN AND FIELD CONDITIONS PRIOR TO THEIR INSTALLATION.
6. ALL PUBLIC STORM SEWER CONSTRUCTION, PIPE, STRUCTURES, AND FITTINGS SHALL ADHERE TO CITY PUBLIC WORKS STANDARD DETAILS AND SPECIFICATIONS. CONTRACTOR SHALL ARRANGE FOR REQUIRED CITY INSPECTIONS.
7. ALL PRIVATE STORM SEWER CONSTRUCTION, PIPE, STRUCTURES, AND FITTINGS SHALL ADHERE TO THE APPLICABLE PLUMBING CODE. CONTRACTOR SHALL ARRANGE FOR REQUIRED CITY INSPECTIONS.
8. ALL PVC TO RCP CONNECTIONS AND ALL STORM PIPE CONNECTIONS ENTERING STRUCTURES OR OTHER STORM PIPES SHALL HAVE A CONCRETE COLLAR AND BE GROUTED TO ASSURE THE CONNECTION IS WATERTIGHT.
9. ALL PUBLIC STORM SEWER LINES SHALL BE MINIMUM CLASS III RCP. PRIVATE STORM SEWER LINES 18-INCHES AND GREATER SHALL BE CLASS III RCP OR OTHER APPROVED MATERIAL.
10. WHERE COVER EXCEEDS 20-FEET OR IS LESS THAN 2-FEET, CLASS IV RCP SHALL BE USED.
11. IF CONTRACTOR PROPOSES TO USE HDPE OR PVC IN LIEU OF RCP FOR PRIVATE STORM SEWER, CONTRACTOR SHALL SUBMIT TECHNICAL DATA TO THE OWNER, ENGINEER AND CITY ENGINEER/INSPECTOR FOR APPROVAL PRIOR TO ORDERING THE MATERIAL. ANY PROPOSED HDPE AND PVC SHALL BE WATERTIGHT.
12. THE CONTRACTOR SHALL PROVIDE CONSTRUCTION SURVEYING FOR ALL STORM SEWER LINES.
13. EMBEDMENT FOR ALL STORM SEWER LINES, PUBLIC OR PRIVATE, SHALL BE PER CITY STANDARD DETAILS.
14. ALL WYE CONNECTIONS AND PIPE BENDS ARE TO BE PREFABRICATED AND INSTALLED PER MANUFACTURERS SPECIFICATIONS.
15. USE 4 FOOT JOINTS WITH BEVELED ENDS IF RADIUS OF STORM SEWER IS LESS THAN 100 FEET.
16. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING AND SUBMITTING A TRENCH SAFETY PLAN, PREPARED BY A PROFESSIONAL ENGINEER IN THE STATE OF TEXAS, TO THE CITY PRIOR TO CONSTRUCTION. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING TRENCH SAFETY REQUIREMENTS IN ACCORDANCE WITH CITY, STATE, AND FEDERAL REQUIREMENTS, INCLUDING OSHA FOR ALL TRENCHES. NO OPEN TRENCHES SHALL BE ALLOWED OVERNIGHT WITHOUT PRIOR WRITTEN APPROVAL OF THE CITY.
17. THE CONTRACTOR SHALL KEEP TRENCHES FREE FROM WATER.

POND NOTES:

1. ANY PONDS THAT ARE INTENDED TO HOLD WATER INDEFINITELY SHALL BE CONSTRUCTED WATERTIGHT.
2. FOR ANY PONDS INTENDED TO HOLD WATER INDEFINITELY: THE CONTRACTOR SHALL REFER TO THE GEOTECHNICAL REPORT FOR POND LINER SPECIFICATIONS.
3. A GEOTECHNICAL ENGINEER SHALL REVIEW AND APPROVE ALL POND LINER MATERIAL, PLACEMENT PROCEDURES, AND PROVIDE TESTING TO ENSURE THE POND LINER MATERIAL PLACED IS WATERTIGHT.
4. STORM SEWER PIPES AND HEADWALLS THAT CONNECT TO A POND INTENDED TO HOLD WATER INDEFINITELY SHALL BE INSTALLED WITH WATERTIGHT JOINTS TO AT LEAST 1-FOOT ABOVE THE NORMAL POOL WATER SURFACE ELEVATION.
5. ANY GRAVEL OR OTHER PERVIOUS EMBEDMENT AROUND PIPES OR OUTFALL STRUCTURES NEAR THE POND SHALL BE ELIMINATED FOR AT LEAST 20-FEET FROM THE POND SO NO ROUTE FOR WATER TO LEAK THROUGH THE EMBEDMENT MATERIAL IS PROVIDED. BACKFILL IN THESE AREAS SHALL BE OF IMPERVIOUS MATERIAL.
6. FOR ANY PONDS INTENDED TO HOLD WATER INDEFINITELY: THE WATER LEVEL FOLLOWING COMPLETION AND FILLING OF THE POND SHALL BE MONITORED BY THE CONTRACTOR FOR AT LEAST 60 DAYS TO OBSERVE WATER INFLOW, OUTFLOW, AND CALCULATE EVAPORATION TO VERIFY THAT THE POND IS WATERTIGHT.
7. FOR ANY PONDS INTENDED TO HOLD WATER INDEFINITELY: THE POND WATER LEVEL SHALL ALSO BE MAINTAINED BY THE CONTRACTOR FOR THE DURATION OF CONSTRUCTION SO THAT IT REMAINS FULL TO ITS DESIGN WATER LEVEL, AND IS NOT LOWERED, AS THIS MAY DRY-OUT THE POND LINER AND RISK ITS WATERTIGHT PROPERTIES.

WATER AND WASTEWATER:

1. ALL WATER AND WASTEWATER MATERIALS AND CONSTRUCTION SHALL COMPLY WITH CITY STANDARD CONSTRUCTION DETAILS AND SPECIFICATIONS.
2. CONTRACTOR SHALL FIELD VERIFY THE SIZE, CONDITION, HORIZONTAL, AND VERTICAL LOCATIONS OF ALL EXISTING WATER AND WASTEWATER FACILITIES THAT ARE TO BE CONNECTED TO, PRIOR TO START OF CONSTRUCTION OF ANY WATER OR WASTEWATER CONSTRUCTION, AND SHALL NOTIFY THE ENGINEER OF ANY CONFLICTS DISCOVERED.
3. CONTRACTOR SHALL VERIFY AND COORDINATE ALL DIMENSIONS SHOWN, INCLUDING THE HORIZONTAL AND VERTICAL LOCATION OF ALL UTILITY SERVICES ENTERING THE BUILDING.
4. THE CONTRACTOR SHALL FIELD VERIFY THE ELEVATION OF ALL UTILITY CROSSINGS PRIOR TO THE INSTALLATION OF ANY PIPE.
5. THE SITE UTILITY CONTRACTOR SHALL PROVIDE ALL MATERIALS AND APPURTENANCES NECESSARY FOR COMPLETE INSTALLATION OF THE WATER AND WASTEWATER IMPROVEMENTS.
6. ALL PUBLIC WATER AND WASTEWATER CONSTRUCTION, PIPE, STRUCTURES, AND FITTINGS SHALL ADHERE TO CITY PUBLIC WORKS STANDARD DETAILS AND SPECIFICATIONS. CONTRACTOR SHALL ARRANGE FOR REQUIRED CITY INSPECTIONS.
7. ALL PRIVATE WATER AND WASTEWATER CONSTRUCTION, PIPE, STRUCTURES, AND FITTINGS SHALL ADHERE TO THE APPLICABLE PLUMBING CODE. CONTRACTOR SHALL ARRANGE FOR REQUIRED CITY INSPECTIONS.
8. FIRE SPRINKLER LINES SHALL BE DESIGNED AND INSTALLED BY A LICENSED FIRE SPRINKLER CONTRACTOR, AND COMPLY TO THE APPLICABLE CODES AND INSPECTIONS REQUIRED. THESE PLANS WERE PREPARED WITHOUT THE BENEFIT OF THE FIRE SPRINKLER DESIGN. CONTRACTOR SHALL NOTIFY THE ENGINEER IF ANY DISCREPANCIES.
9. EMBEDMENT FOR ALL WATER AND WASTEWATER LINES, PUBLIC OR PRIVATE, SHALL BE PER CITY STANDARD DETAILS.
10. CONTRACTOR SHALL TAKE REQUIRED SANITARY PRECAUTIONS, FOLLOWING ANY CITY, TCEQ, AND AWWA STANDARDS, TO KEEP WATER PIPE AND FITTINGS CLEAN AND CAPPED AT TIMES WHEN INSTALLATION IS NOT IN PROGRESS.
11. CONTRACTOR SHALL PROVIDE CONSTRUCTION SURVEYING FOR ALL WATER AND WASTEWATER LINES.
12. ALL WATER AND WASTEWATER SERVICES SHALL TERMINATE 5-FEET OUTSIDE THE BUILDING, UNLESS NOTED OTHERWISE.
13. CONTRACTOR SHALL COMPLY WITH CITY REQUIREMENTS FOR WATER AND WASTEWATER SERVICE DISRUPTIONS AND THE AMOUNT OF PRIOR NOTICE THAT IS REQUIRED, AND SHALL COORDINATE DIRECTLY WITH THE APPROPRIATE CITY DEPARTMENT.
14. CONTRACTOR SHALL SEQUENCE WATER AND WASTEWATER CONSTRUCTION TO AVOID INTERRUPTION OF SERVICE TO SURROUNDING PROPERTIES.
15. CONTRACTOR SHALL MAINTAIN WATER SERVICE AND WASTEWATER SERVICE TO ALL CUSTOMERS THROUGHOUT CONSTRUCTION (IF NECESSARY, BY USE OF TEMPORARY METHODS APPROVED BY THE CITY AND OWNER). THIS WORK SHALL BE CONSIDERED SUBSIDIARY TO THE PROJECT AND NO ADDITIONAL COMPENSATION SHALL BE ALLOWED.
16. THE CONTRACTOR IS RESPONSIBLE TO PROTECT ALL WATER AND WASTEWATER LINES CROSSING THE PROJECT. THE CONTRACTOR SHALL REPAIR ALL DAMAGED LINES IMMEDIATELY. ALL REPAIRS OF EXISTING WATER MAINS, WATER SERVICES, SEWER MAINS, AND SANITARY SEWER SERVICES ARE SUBSIDIARY TO THE WORK, AND NO ADDITIONAL COMPENSATION SHALL BE ALLOWED.
17. VALVE ADJUSTMENTS SHALL BE CONSTRUCTED SUCH THAT THE COVERS ARE AT FINISHED SURFACE GRADE OF THE PROPOSED PAVEMENT.
18. THE ENDS OF ALL EXISTING WATER MAINS THAT ARE CUT, BUT NOT REMOVED, SHALL BE PLUGGED AND ABANDONED IN PLACE. THIS WORK SHALL BE CONSIDERED AS A SUBSIDIARY COST TO THE PROJECT AND NO ADDITIONAL COMPENSATION SHALL BE ALLOWED.
19. ALL FIRE HYDRANTS, VALVES, TEES, BENDS, WYES, REDUCERS, FITTINGS, AND ENDS SHALL BE MECHANICALLY RESTRAINED AND/OR THRUST BLOCKED TO CITY STANDARDS.
20. CONTRACTOR SHALL INSTALL A FULL SEGMENT OF WATER OR WASTEWATER PIPE CENTERED AT ALL UTILITY CROSSINGS SO THAT THE JOINTS ARE GREATER THAN 9-FEET FROM THE CROSSING.
21. ALL CROSSINGS AND LOCATIONS WHERE WASTEWATER IS LESS THAN 9-FEET FROM WATER, WASTEWATER CONSTRUCTION AND MATERIALS SHALL COMPLY WITH TCEQ CHAPTER 217.53.
22. ALL CROSSING AND LOCATIONS WHERE WATER IS LESS THAN 9-FEET FROM WASTEWATER, WATER CONSTRUCTION AND MATERIALS SHALL COMPLY WITH TCEQ CHAPTER 290.44.
23. ALL WATER AND WASTEWATER SHALL BE TESTED IN ACCORDANCE WITH THE CITY, AWWA, AND TCEQ STANDARDS AND SPECIFICATIONS. AT A MINIMUM, THIS SHALL CONSIST OF THE FOLLOWING:
   a. ALL WATERLINES SHALL BE HYDROSTATICALLY TESTED AND CHLORINATED BEFORE BEING PLACED INTO SERVICE. CONTRACTOR SHALL COORDINATE WITH THE CITY FOR THEIR REQUIRED PROCEDURES AND SHALL ALSO COMPLY WITH TCEQ REGULATIONS.
   b. WASTEWATER LINES AND MANHOLES SHALL BE PRESSURE TESTED. CONTRACTOR SHALL COORDINATE WITH THE CITY FOR THEIR REQUIRED PROCEDURES AND SHALL ALSO COMPLY WITH TCEQ REGULATIONS. AFTER COMPLETION OF THESE TESTS, A TELEVISION INSPECTION SHALL BE PERFORMED AND PROVIDED TO THE CITY AND OWNER ON A DVD.
24. CONTRACTOR SHALL INSTALL DETECTABLE WIRING OR MARKING TAPE A MINIMUM OF 12" ABOVE WATER AND WASTEWATER LINES. MARKER DECALS SHALL BE LABELED "CAUTION - WATER LINE", OR "CAUTION - SEWER LINE". DETECTABLE WIRING AND MARKING TAPE SHALL COMPLY WITH CITY STANDARDS, AND SHALL BE INCLUDED IN THE COST OF THE WATER AND WASTEWATER PIPE.
25. DUCTILE IRON PIPE SHALL BE PROTECTED FROM CORROSION BY A LOW-DENSITY POLYETHYLENE LINER WRAP THAT IS AT LEAST A SINGLE LAYER OF 8-MIL. ALL DUCTILE IRON JOINTS SHALL BE BONDED.
26. WATERLINES SHALL BE INSTALLED AT NO LESS THAN THE MINIMUM COVER REQUIRED BY THE CITY.
27. CONTRACTOR SHALL PROVIDE CLEAN-OUTS FOR PRIVATE SANITARY SEWER LINES AT ALL CHANGES IN DIRECTION AND 100-FOOT INTERVALS, OR AS REQUIRED BY THE APPLICABLE PLUMBING CODE. CLEAN-OUTS REQUIRED IN PAVEMENT OR SIDEWALKS SHALL HAVE CAST IRON COVERS FLUSH WITH FINISHED GRADE.
28. CONTRACTOR SHALL PROVIDE BACKWATER VALVES FOR PLUMBING FIXTURES AS REQUIRED BY THE APPLICABLE PLUMBING CODE (E.G. FLOOR ELEVATION OF FIXTURE UNIT IS BELOW THE ELEVATION OF THE MANHOLE COVER OF THE NEXT UPSTREAM MANHOLE IN THE PUBLIC SEWER). CONTRACTOR SHALL REVIEW BOTH MEP AND CIVIL PLANS TO CONFIRM WHERE THESE ARE REQUIRED.
29. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING AND SUBMITTING A TRENCH SAFETY PLAN, PREPARED BY A PROFESSIONAL ENGINEER IN THE STATE OF TEXAS, TO THE CITY PRIOR TO CONSTRUCTION. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING TRENCH SAFETY REQUIREMENTS IN ACCORDANCE WITH CITY, STATE, AND FEDERAL REQUIREMENTS, INCLUDING OSHA FOR ALL TRENCHES. NO OPEN TRENCHES SHALL BE ALLOWED OVERNIGHT WITHOUT PRIOR WRITTEN APPROVAL OF THE CITY.
30. THE CONTRACTOR SHALL KEEP TRENCHES FREE FROM WATER.

ABBREVIATIONS AND DEFINITIONS:

A	AREA
ADA	AMERICANS WITH DISABILITIES ACT
AWWA	AMERICAN WATER WORKS ASSOCIATION
B-B	BACK TO BACK
BC	BEGIN CURVE
BC	BACK OF CURB
BCR	BEGIN CURB RETURN
BMP	BEST MANAGEMENT PRACTICE
BOC	BACK OF CURB
BVCE	BEGIN VERTICAL CURVE ELEVATION
BVCS	BEGIN VERTICAL CURVE STATION
BW	BOTTOM OF WALL
CFS	CUBIC FEET PER SECOND
CITY	CITY, TOWN, OR OTHER APPLICABLE LOCAL GOVERNMENT JURISDICTION
C/L	CENTERLINE
CL	CENTERLINE
CONC	CONCRETE
CY	CUBIC YARD
DEMO	DEMOLITION
DG	DECOMPOSED GRANITE
DTL	DETAIL
EA	EACH
EC	END CURVE
ECR	END CURB RETURN
EG	EXISTING GROUND
EL	ELEVATION
ELEC	ELECTRICAL / ELECTRICITY
ELEV	ELEVATION
EPA	UNITES STATES ENVIRONMENTAL PROTECTION AGENCY
ESMT	EASEMENT
EVCE	END VERTICAL CURVE ELEVATION
EVCS	END VERTICAL CURVE STATION
EX.	EXISTING
F-F	FACE TO FACE
FG	FINISHED GROUND
FH	FIRE HYDRANT
FL	FLOW LINE
FOC	FACE OF CURB
FT	FEET
HGL	HYDRAULIC GRADE LINE
KH	KIMLEY-HORN AND ASSOCIATES, INC.
KHA	KIMLEY-HORN AND ASSOCIATES, INC.
LAT	LATERAL
LF	LINEAR FEET
LT	LEFT
MAX	MAXIMUM
ME	MATCH EXISTING ELEVATION
MH	MANHOLE
MIN	MINUTE / MINIMUM
NO	NUMBER
NOI	NOTICE OF INTENT, REF. TCEQ GENERAL PERMIT
NOT	NOTICE OF TERMINATION, REF. TCEQ GENERAL PERMIT
NTS	NOT TO SCALE
OC	ON CENTER
OFF	OFFSET
OSHA	OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
PC	POINT OF CURVATURE
PCC	PORTLAND CEMENT CONCRETE / POINT OF COMPOUND CURVATURE
PGL	PROPOSED GRADE LINE
PI	POINT OF INFLECTION
PROP	PROPOSED
PRC	POINT OF REVERSE CURVATURE
PSI	POUNDS PER SQUARE INCH
PT	POINT OF TANGENCY
PVC	POLYVINYL CHLORIDE
PVI	POINT OF VERTICAL INFLECTION
PVMT	PAVEMENT
RCP	REINFORCED CONCRETE PIPE
ROW	RIGHT OF WAY
RT	RIGHT
SF	SQUARE FEET
SS	SANITARY SEWER
SSMH	SANITARY SEWER MANHOLE
STA	STATION
STD	STANDARD
SY	SQUARE YARD
TAS	ARCHITECTURAL BARRIERS TEXAS ACCESSIBILITY STANDARDS
TC	TOP OF CURB
TCEQ	TEXAS COMMISSION OF ENVIRONMENTAL QUALITY
TEMP	TEMPORARY
TXDOT	TEXAS DEPARTMENT OF TRANSPORTATION
TXMUTCD	TEXAS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES
TW	TOP OF WALL
TYP	TYPICAL
VC	VERTICAL CURVE
WTR	WATER
WW	WASTEWATER

UTILITY CONTACTS:

1. DRIPPING SPRINGS WSC

WARNING: CONTRACTOR IS TO VERIFY PRESENCE AND EXACT LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION.

811 Know what's below. Call before you dig.

THESE PLAN AND GENERAL NOTES REFER TO:
GEOTECHNICAL ENGINEERING REPORT
MLA GEOTECHNICAL
NO. 20101100.081
INCLUDING ALL REVISIONS AND ADDENDA TO THIS REPORT THAT MAY HAVE BEEN RELEASED AFTER THE NOTED DATE.

No.	REVISIONS	DATE	BY

Kimley»Horn
© 2021 KIMLEY-HORN AND ASSOCIATES, INC.
10814 JOLLYVILLE ROAD, AVALLON IV, SUITE 300, AUSTIN, TX 78759
PHONE: 512-418-1771 FAX: 512-418-1791
WWW.KIMLEY-HORN.COM
TEXAS REGISTERED ENGINEERING FIRM F-928

07/27/2022
STATE OF TEXAS
ALEJANDRO E. GRANADOS RICO
130084
LICENSED
PROFESSIONAL ENGINEER
FOR PERMIT PURPOSES ONLY NOT FOR CONSTRUCTION
Alejandro E. Granados Rico

KHA PROJECT	067783117
DATE	JULY 2022
SCALE:	AS SHOWN
DESIGNED BY:	AEG
DRAWN BY:	DPD
CHECKED BY:	AEG

KIMLEY-HORN GENERAL NOTES

ROGER HANKS PARKWAY EXTENSION II
CITY OF DRIPPING SPRINGS
HAYS COUNTY, TEXAS

SHEET NUMBER
3

GOLDEN EAGLE LANE
SPRING LAKE DRIVE
BROKEN LANCE DR
BLACK HAWK CT
DRIFTWOOD CT
PRAIRIE WOLF CT
BLACK BEAR CT
RUNNING DEER LANE
GRAY FOX CT
SHANE LANE
LONE WOLF CT
SILVER HAWK CT
ROGER HANKS PARKWAY
GOLDEN EAGLE LN DETOUR M4-9R
RUNNING DEER LN DETOUR M4-9R
BROKEN LANCE DR DETOUR M4-9L
BROKEN LANCE DR DETOUR M4-9L
GOLDEN EAGLE LN DETOUR M4-9S
ROAD CLOSED 400 FT W20-3
BROKEN LANCE DR DETOUR M4-9R
GOLDEN EAGLE LN DETOUR M4-9S
SHANE LANE ROAD CLOSED TO THRU TRAFFIC R11-4
ROAD CLOSED 400 FT W20-3
DETOUR AHEAD W20-2a
INSTALL TYPE 3 BARRICADE WITH "ROAD CLOSED" SIGN (R11-2)
CALLED 4.03 ACRES
DRIPPING SPRINGS INDEPENDENT SCHOOL D
DOC. NO. 09921953
WIDE RIGHT-OF-WAY "BAIRD" EASEMENT 35, PG.334 OPRHC
TIGERS

N W E S

0 150' 300'
GRAPHIC SCALE 150'

NOTES

1. ALL TRAFFIC CONTROL SIGNS AND DEVICES SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE TEXAS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD).
2. ANY VARIATIONS TO THE TRAFFIC CONTROL PLAN MUST BE APPROVED BY THE ENGINEER AND THE CITY
3. THIS DETOUR WILL LAST APPROXIMATELY 6 MONTHS FROM BEGINNING OF CONSTRUCTION.
4. CONTRACTOR TO COORDINATE WITH ESD #6 FOR SCHEDULING OF DETOUR AND DURATION.
5. TRAFFIC CONTROL SIGNS AND DEVICES TO REMAIN AFTER THE PROJECT IS COMPLETE UNLESS SHANE LANE EXTENSION IS CONSTRUCTED SIMULTANEOUSLY.

LEGEND

— > — > — > — PROPOSED DETOUR PATH FOR AFFECTED PROPERTY OWNERS TO ACCESS GOLDEN EAGLE LANE

WARNING: CONTRACTOR IS TO VERIFY PRESENCE AND EXACT LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION.

811 Know what's below. Call before you dig.

BENCHMARKS

BM #150 SQUARE CUT SET AT THE BACK OF CURB
- ELEV.= 1229.74' (NAVD '88)

BM #151 SQUARE CUT SET AT THE BACK OF CURB
- ELEV.= 1230.35' (NAVD '88)

No.	REVISIONS	DATE	BY

Kimley»Horn
© 2021 KIMLEY-HORN AND ASSOCIATES, INC.
10814 JOLLYVILLE ROAD, AVALLON IV, SUITE 300, AUSTIN, TX 78759
PHONE: 512-418-1771 FAX: 512-418-1791
WWW.KIMLEY-HORN.COM
TEXAS REGISTERED ENGINEERING FIRM F-928

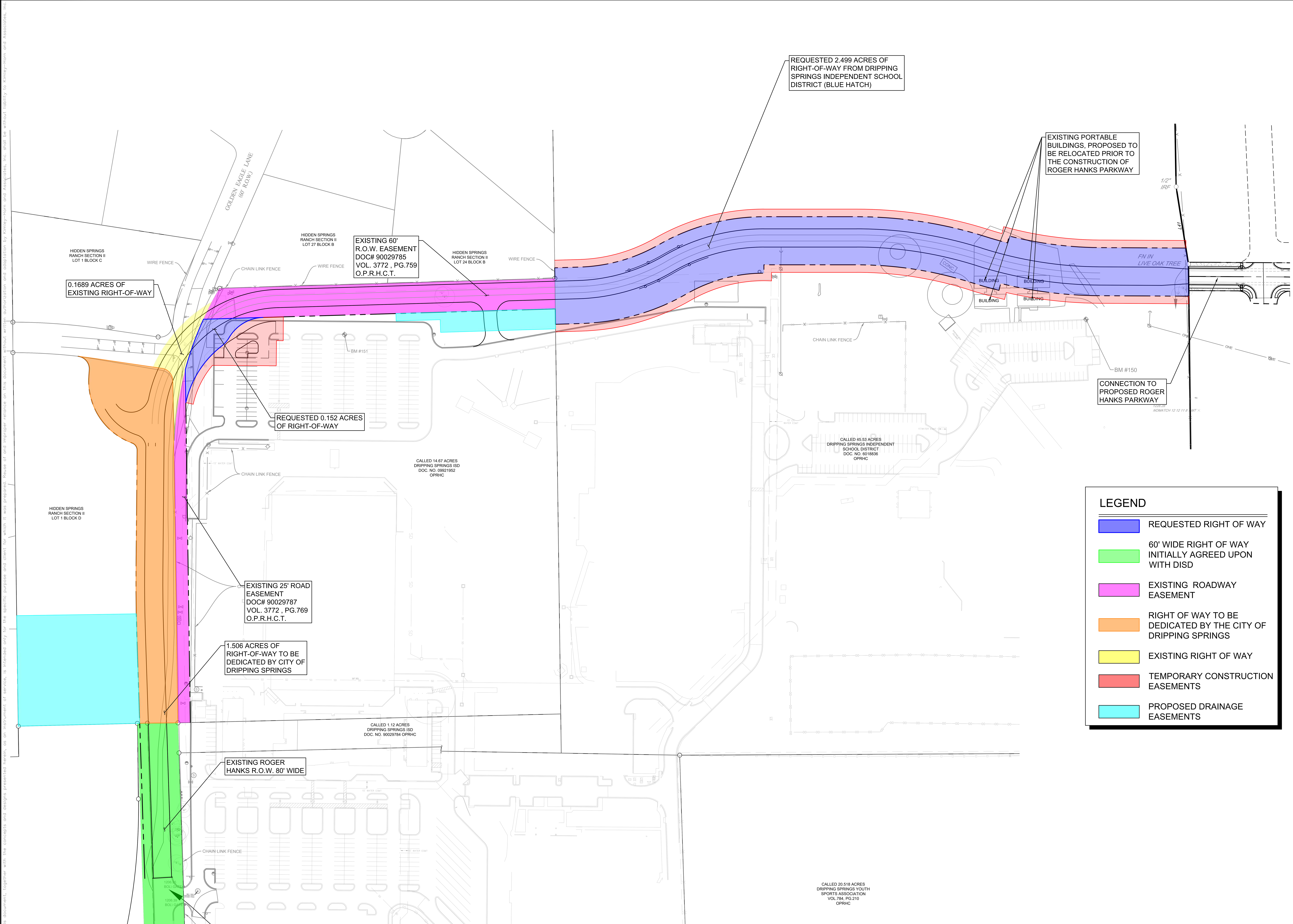
07/27/2022
STATE OF TEXAS ALEJANDRO E. GRANADOS RICO 130084 LICENSED PROFESSIONAL ENGINEER
FOR PERMIT PURPOSES ONLY NOT FOR CONSTRUCTION

KHA PROJECT 067783117
DATE JULY 2022
SCALE: AS SHOWN
DESIGNED BY: AEG
DRAWN BY: DPD
CHECKED BY: AEG

ROGER HANKS DETOUR

ROGER HANKS PARKWAY EXTENSION II
CITY OF DRIPPING SPRINGS
HAYS COUNTY, TEXAS

SHEET NUMBER
4


REQUESTED 2.499 ACRES OF RIGHT-OF-WAY FROM DRIPPING SPRINGS INDEPENDENT SCHOOL DISTRICT (BLUE HATCH)
EXISTING PORTABLE BUILDINGS, PROPOSED TO BE RELOCATED PRIOR TO THE CONSTRUCTION OF ROGER HANKS PARKWAY
GOLDEN EAGLE LANE (60' R.O.W.)
HIDDEN SPRINGS RANCH SECTION II LOT 27 BLOCK B
EXISTING 60' R.O.W. EASEMENT DOC# 90029785 VOL. 3772 , PG.759 O.P.R.H.C.T.
HIDDEN SPRINGS RANCH SECTION II LOT 24 BLOCK B
HIDDEN SPRINGS RANCH SECTION II LOT 1 BLOCK C
WIRE FENCE
CHAIN LINK FENCE
0.1689 ACRES OF EXISTING RIGHT-OF-WAY
BM #151
REQUESTED 0.152 ACRES OF RIGHT-OF-WAY
CONC.
BUILDING
FN IN LIVE OAK TREE
1/2" IRF
L41
BM #150
CONNECTION TO PROPOSED ROGER HANKS PARKWAY
OHE
CALLED 14.67 ACRES DRIPPING SPRINGS ISD DOC. NO. 09921952 OPRHC
CALLED 45.53 ACRES DRIPPING SPRINGS INDEPENDENT SCHOOL DISTRICT DOC. NO. 6018836 OPRHC
HIDDEN SPRINGS RANCH SECTION II LOT 1 BLOCK D
EXISTING 25' ROAD EASEMENT DOC# 90029787 VOL. 3772 , PG.769 O.P.R.H.C.T.
1.506 ACRES OF RIGHT-OF-WAY TO BE DEDICATED BY CITY OF DRIPPING SPRINGS
CALLED 1.12 ACRES DRIPPING SPRINGS ISD DOC. NO. 90029784 OPRHC
EXISTING ROGER HANKS R.O.W. 80' WIDE
CALLED 20.518 ACRES DRIPPING SPRINGS YOUTH SPORTS ASSOCIATION VOL.784, PG.210 OPRHC
LEGEND
REQUESTED RIGHT OF WAY
60' WIDE RIGHT OF WAY INITIALLY AGREED UPON WITH DISD
EXISTING ROADWAY EASEMENT
RIGHT OF WAY TO BE DEDICATED BY THE CITY OF DRIPPING SPRINGS
EXISTING RIGHT OF WAY
TEMPORARY CONSTRUCTION EASEMENTS
PROPOSED DRAINAGE EASEMENTS

No.	REVISIONS	DATE	BY

Kimley»Horn

© 2021 KIMLEY-HORN AND ASSOCIATES, INC.
10814 JOLLYVILLE ROAD, AVALLON IV, SUITE 300, AUSTIN, TX 78759
PHONE: 512-418-1771 FAX: 512-418-1791
WWW.KIMLEY-HORN.COM
TEXAS REGISTERED ENGINEERING FIRM F-928

07/27/2022

STATE OF TEXAS — ALEJANDRO E. GRANADOS RICO — 130084 — LICENSED PROFESSIONAL ENGINEER — FOR PERMIT PURPOSES, NOT FOR CONSTRUCTION

KHA PROJECT 067783117
DATE JULY 2022
SCALE: AS SHOWN
DESIGNED BY: AEG
DRAWN BY: DPD
CHECKED BY: AEG

OVERALL ROW BOUNDARY

ROGER HANKS PARKWAY EXTENSION II

CITY OF DRIPPING SPRINGS
HAYS COUNTY, TEXAS

SHEET NUMBER
5

METES AND BOUNDS DESCRIPTION OF:
RIGHT-OF-WAY DEDICATION - 0.152 ACRES

BEING A 0.152 ACRE (6,617 SQ. FT.) RIGHT-OF-WAY DEDICATION SITUATED IN THE PHILIP SMITH SURVEY, ABSTRACT 415, CITY OF DRIPPING SPRINGS, HAYS COUNTY, TEXAS; AND BEING A PORTION OF A CALLED 14.67 ACRE TRACT OF LAND DESCRIBED TO DRIPPING SPRINGS INDEPENDENT SCHOOL DISTRICT AS SHOWN ON INSTRUMENT RECORDED IN DOCUMENT NO. 2009-90029783 OF THE OFFICIAL PUBLIC RECORDS OF HAYS COUNTY, TEXAS; AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING, AT A 1/2" IRON ROD FOUND AT AN ANGLE CORNER IN THE EASTERLY RIGHT-OF-WAY LINE OF GOLDEN EAGLE LANE (VARIABLE RIGHT-OF-WAY WIDTH), IN THE SOUTH BOUNDARY LINE OF LOT 27, BLOCK B OF THE HIDDEN SPRINGS RANCH SECTION II SUBDIVISION AS SHOWN ON PLAT RECORDED IN VOLUME 14, PAGE 69 OF THE PLAT RECORDS OF HAYS COUNTY, TEXAS; AND AT THE NORTHWEST CORNER OF SAID 14.67 ACRE TRACT;

THENCE, SOUTH 27°06'35" WEST, A DISTANCE OF 68.82 FEET TO THE **POINT OF BEGINNING,** FOR THE NORTHWEST CORNER OF THIS DEDICATION;

THENCE, DEPARTING THE EASTERLY RIGHT-OFWAY LINE OF SAID GOLDEN EAGLE LANE AND OVER SAID 14.67 ACRE TRACT THE FOLLOWING FIVE (5) COURSES AND DISTANCES:

1. NORTH 87°47'41" WEST, A DISTANCE OF 117.146 FEET TO A POINT FOR THE NORTHEAST CORNER OF THIS DEDICATION;
2. ALONG A CURVE TO THE LEFT, HAVING AN INTERIOR ANGLE OF 57°39'46", A RADIUS OF 80.00 FEET, A CHORD BEARING AND DISTANCE OF NORTH 58°57'46" EAST 77.16 FEET, A TOTAL ARC LENGTH OF 80.51 FEET TO A POINT OF REVERSE CURVATURE, FOR AN ANGLE CORNER OF THIS DEDICATION;
3. ALONG A CURVE TO THE RIGHT, HAVING AN INTERIOR ANGLE OF 21°30'45", A RADIUS OF 63.00 FEET, A CHORD BEARING AND DISTANCE OF NORTH 40°53'23" EAST, 23.52 FEET, A TOTAL ARC LENGTH OF 23.66 FEET TO A POINT OF REVERSE CURVATURE, FOR AN ANGLE CORNER OF THIS DEDICATION;
4. ALONG A CURVE TO THE LEFT, HAVING AN INTERIOR ANGLE OF 39°3959 A RADIUS OF 194.00 FEET A CHORD BEARING AND DISTANCE OF NORTH 31°48'49" EAST, 131.64 FEET, A TOTAL ARC LENGTH OF 134.31 FEET TO A POINT FOR THE SOUTHWEST CORNER OF THIS DEDICATION;
5. NORTH 01°25'57" WEST, A DISTANCE OF 64.72 FEET TO A POINT OF CURVATURE IN THE EASTERLY RIGHT-OF-WAY LINE OF SAID GOLDEN EAGLE LANE AND THE WEST BOUNDARY LINE OF SAID 14.67 ACRE TRACT, FOR AN ANGLE CORNER OF THIS DEDICATION; WHENCE A 1/2" IRON ROD FOUND MARKING THE SOUTHEAST END OF A CUTBACK CURVE THE THE RIGHT AT THE INTERSECTION OF THE SOUTHERLY RIGHT-OF-WAY LINE OF SHANE LANE (CALLED 60' WIDTH RIGHT-OF-WAY) AND THE WESTERLY RIGHT-OF-WAY LINE OF SAID GOLDEN EAGLE LANE AND AT THE NORTHEAST CORNER OF LOT 1, BLOCK D OF THE HIDDEN SPRINGS RANCH SECTION II SUBDIVISION AS SHOWN ON PLAT RECORDED IN VOLUME 14, PAGE 69 OF THE PLAT RECORDS OF HAYS COUNTY, TEXAS; BEARS SOUTH 49°01'41" WEST, A DISTANCE OF 32.46 FEET;

THENCE, ALONG A CURVE TO THE RIGHT FOLLOWING THE COMMON BOUNDARY LINE OF SAID 14.67 ACRE TRACT AND SAID GOLDEN EAGLE LANE, HAVING AN INTERIOR ANGLE OF 09°26'41", A CHORD BEARING AND DISTANCE OF NORTH 19°19'47" EAST, 106.19 FEET, A TOTAL ARC LENGTH OF 106.31 TO THE **POINT OF BEGINNING** CONTAINING 0.152 ACRES, MORE OR LESS , IN HAYS COUNTY, TEXAS. THIS DOCUMENT WAS PREPARED IN THE OFFICE OF KIMLEY-HORN AND ASSOCIATES, INC. IN AUSTIN, TEXAS.

SURVEYOR'S NOTES:
THE BEARINGS, DISTANCES, AREAS AND COORDINATES SHOWN HEREON ARE TEXAS STATE COORDINATE SYSTEM GRID, CENTRAL ZONE (FIPS 4203) (NAD'83), AS DETERMINED BY THE GLOBAL POSITIONING SYSTEM (GPS). THE UNIT OF LINEAR MEASUREMENT IS U.S. SURVEY FEET. A RIGHT-OF-WAY DEDICATION BOUNDARY EXHIBIT AND A LINE & CURVE TABLE WERE CREATED IN CONJUNCTION WITH THIS METES & BOUNDS DESCRIPTION.
THE UNDERSIGNED, REGISTERED PROFESSIONAL LAND SURVEYOR, HEREBY CERTIFIES THAT THE FOREGOING DESCRIPTION ACCURATELY SETS OUT THE METES AND BOUNDS OF THIS DEDICATION.

ZACHARY KEITH PETRUS
REGISTERED PROFESSIONAL
LAND SURVEYOR NO. 6769
10814 JOLLYVILLE ROAD
CAMPUS IV, SUITE 200
AUSTIN, TEXAS 78759
PH. (512) 572-6674
ZACH.PETRUS@KIMLEY-HORN.COM

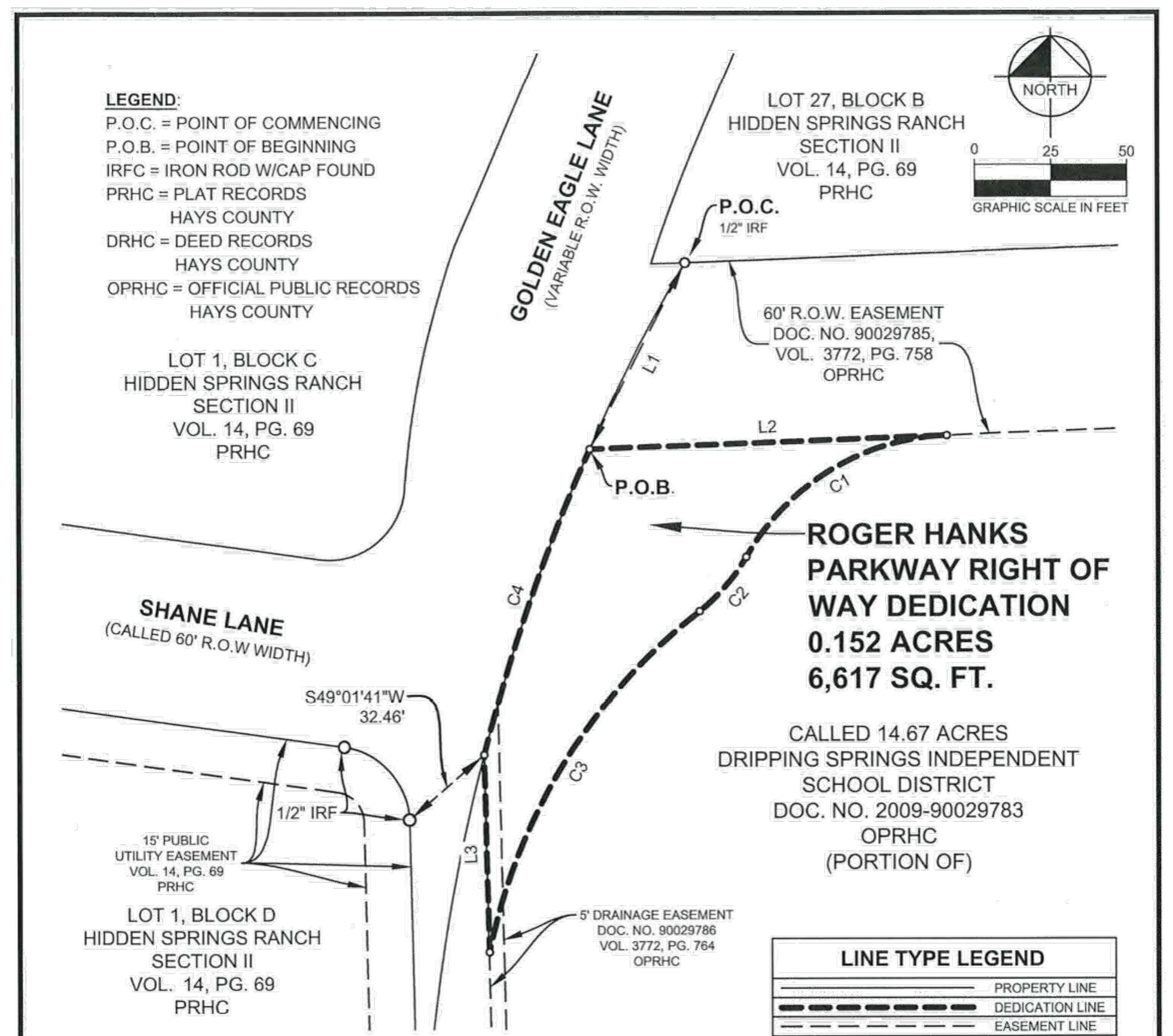
STATE OF TEXAS REGISTERED ZACHARY K. PETRUS 6769 PROFESSIONAL LAND SURVEYOR

EXHIBIT "A"
RIGHT-OF-WAY DEDICATION
0.152 ACRES
PHILIP SMITH SURVEY, ABSTRACT 415,
CITY OF DRIPPING SPRINGS, HAYS COUNTY, TEXAS

Kimley»Horn
10814 Jollyville Road Campus IV, Suite 200, Austin, Texas 78759 FIRM # 10194624 Tel. No. (512) 418-1771 www.kimley-horn.com

Scale	Drawn by	Checked by	Date	Project No.	Sheet No.
N/A	PTF	ZKP	4/26/2021	067783118	1 OF 3

PETRUS, ZACH 4/26/2021 11:52 PM \\SNAFP01\TX_SNA1\SNA_SURVEY\HERITAGE DRIPPING SPRINGS\067783118-HERITAGE DRIPPING SPRINGS\DWG\ROW DEDICATIONS\.1519 ACRE DEDICATION.DWG


LEGEND:
P.O.C. = POINT OF COMMENCING
P.O.B. = POINT OF BEGINNING
IRFC = IRON ROD W/CAP FOUND
PRHC = PLAT RECORDS HAYS COUNTY
DRHC = DEED RECORDS HAYS COUNTY
OPRHC = OFFICIAL PUBLIC RECORDS HAYS COUNTY
LOT 27, BLOCK B HIDDEN SPRINGS RANCH SECTION II VOL. 14, PG. 69 PRHC
NORTH
0 25 50
GRAPHIC SCALE IN FEET
GOLDEN EAGLE LANE (VARIABLE R.O.W. WIDTH)
P.O.C. 1/2" IRF
60' R.O.W. EASEMENT DOC. NO. 90029785, VOL. 3772, PG. 758 OPRHC
LOT 1, BLOCK C HIDDEN SPRINGS RANCH SECTION II VOL. 14, PG. 69 PRHC
L1
L2
P.O.B.
C1
ROGER HANKS PARKWAY RIGHT OF WAY DEDICATION 0.152 ACRES 6,617 SQ. FT.
SHANE LANE (CALLED 60' R.O.W WIDTH)
C4
C2
S49°01'41"W 32.46'
CALLED 14.67 ACRES DRIPPING SPRINGS INDEPENDENT SCHOOL DISTRICT DOC. NO. 2009-90029783 OPRHC (PORTION OF)
1/2" IRF
C3
15' PUBLIC UTILITY EASEMENT VOL. 14, PG. 69 PRHC
L3
LOT 1, BLOCK D HIDDEN SPRINGS RANCH SECTION II VOL. 14, PG. 69 PRHC
5' DRAINAGE EASEMENT DOC. NO. 90029786 VOL. 3772, PG. 764 OPRHC
LINE TYPE LEGEND
PROPERTY LINE
DEDICATION LINE
EASEMENT LINE

SURVEYOR'S NOTES:
THE BEARINGS, DISTANCES, AREAS AND COORDINATES SHOWN HEREON ARE TEXAS STATE COORDINATE SYSTEM GRID, CENTRAL ZONE (FIPS 4203) (NAD'83), AS DETERMINED BY THE GLOBAL POSITIONING SYSTEM (GPS). THE UNIT OF LINEAR MEASUREMENT IS U.S. SURVEY FEET. A METES & BOUNDS DESCRIPTION AND A LINE & CURVE TABLE WERE CREATED IN CONJUNCTION WITH THIS RIGHT-OF-WAY DEDICATION BOUNDARY EXHIBIT.
THE UNDERSIGNED, REGISTERED PROFESSIONAL LAND SURVEYOR, HEREBY CERTIFIES THAT THIS R.O.W. DEDICATION BOUNDARY EXHIBIT OF SURVEY ACCURATELY REFLECTS THE METES AND BOUNDS OF THIS DEDICATION.

ZACHARY KEITH PETRUS
REGISTERED PROFESSIONAL
LAND SURVEYOR NO. 6769
10814 JOLLYVILLE ROAD
CAMPUS IV, SUITE 200
AUSTIN, TEXAS 78759
PH. (512) 572-6674
ZACH.PETRUS@KIMLEY-HORN.COM

EXHIBIT "A"
RIGHT-OF-WAY DEDICATION
0.152 ACRES
PHILIP SMITH SURVEY, ABSTRACT 415,
CITY OF DRIPPING SPRINGS, HAYS COUNTY, TEXAS

Kimley»Horn
10814 Jollyville Road Campus IV, Suite 200, Austin, Texas 78759 FIRM # 10194624 Tel. No. (512) 418-1771 www.kimley-horn.com

Scale	Drawn by	Checked by	Date	Project No.	Sheet No.
1" = 50'	PTF	ZKP	4/26/2021	067783118	2 OF 3

PETRUS, ZACH 4/26/2021 11:52 PM \\SNAFP01\TX_SNA1\SNA_SURVEY\HERITAGE DRIPPING SPRINGS\067783118-HERITAGE DRIPPING SPRINGS\DWG\ROW DEDICATIONS\.1519 ACRE DEDICATION.DWG

LINE TABLE

NO.	BEARING	LENGTH
L1	S27°06'35"W	68.82'
L2	S87°47'41"W	117.46'
L3	S01°25'57"E	64.72'

CURVE TABLE

NO.	DELTA	RADIUS	LENGTH	CHORD BEARING	CHORD
C1	57°39'46"	80.00'	80.51'	N58°57'46"E	77.16'
C2	21°30'56"	63.00'	23.66'	N40°53'23"E	23.52'
C3	39°39'59"	194.00'	134.31'	N31°48'49"E	131.64'
C4	9°26'41"	644.92'	106.31'	S19°19'47"W	106.19'

SURVEYOR'S NOTES:
THE BEARINGS, DISTANCES, AREAS AND COORDINATES SHOWN HEREON ARE TEXAS STATE COORDINATE SYSTEM GRID, CENTRAL ZONE (FIPS 4203) (NAD'83), AS DETERMINED BY THE GLOBAL POSITIONING SYSTEM (GPS). THE UNIT OF LINEAR MEASUREMENT IS U.S. SURVEY FEET. A METES & BOUNDS DESCRIPTION AND A RIGHT-OF-WAY DEDICATION BOUNDARY EXHIBIT OF EVEN SURVEY DATE WAS CREATED IN CONJUNCTION WITH THIS LINE AND CURVE TABLE.
THE UNDERSIGNED, REGISTERED PROFESSIONAL LAND SURVEYOR, HEREBY CERTIFIES THAT THIS LINE & CURVE TABLE OF SURVEY ACCURATELY REFLECTS THE METES AND BOUNDS OF THIS DEDICATION.

ZACHARY KEITH PETRUS
REGISTERED PROFESSIONAL
LAND SURVEYOR NO. 6769
10814 JOLLYVILLE ROAD
CAMPUS IV, SUITE 200
AUSTIN, TEXAS 78759
PH. (512) 572-6674
ZACH.PETRUS@KIMLEY-HORN.COM

EXHIBIT "A"
RIGHT-OF-WAY DEDICATION
0.152 ACRES
PHILIP SMITH SURVEY, ABSTRACT 415,
CITY OF DRIPPING SPRINGS, HAYS COUNTY, TEXAS

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Scale	Drawn by	Checked by	Date	Project No.	Sheet No.
N/A	PTF	ZKP	4/26/2021	067783118	3 OF 3

PETRUS, ZACH 4/26/2021 11:52 PM \\SNAFP01\TX_SNA1\SNA_SURVEY\HERITAGE DRIPPING SPRINGS\067783118-HERITAGE DRIPPING SPRINGS\DWG\ROW DEDICATIONS\.1519 ACRE DEDICATION.DWG

METES & BOUNDS DESCRIPTION OF:
RIGHT-OF-WAY DEDICATION - 1.506 ACRES

BEING A 1.506 ACRE (65,600 SQ. FEET) RIGHT-OF-WAY DEDICATION SITUATED IN THE PHILIP SMITH SURVEY, ABSTRACT 415, CITY OF DRIPPING SPRINGS, HAYS COUNTY, TEXAS; BEING A PORTION OF LOT 1, BLOCK D OF THE HIDDEN SPRINGS RANCH SECTION II SUBDIVISION, AS SHOWN ON PLAT RECORDED IN VOLUME 14, PAGE 69 OF THE PLAT RECORDS OF HAYS COUNTY, TEXAS; AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT A 1/2" IRON ROD FOUND AT THE SOUTHWEST CORNER OF A CALLED 14.67 ACRE TRACT OF LAND DESCRIBED TO DRIPPING SPRINGS ISD AS SHOWN ON INSTRUMENT RECORDED IN DOCUMENT NO. 9921952 OF THE OFFICIAL PUBLIC RECORDS OF HAYS COUNTY, TEXAS; THE NORTHWEST CORNER OF A CALLED 1.12 ACRE TRACT OF LAND DESCRIBED TO DRIPPING SPRINGS ISD AS SHOWN ON INSTRUMENT RECORDED IN DOCUMENT NO. 90029784 OF THE OFFICIAL PUBLIC RECORDS OF HAYS COUNTY, TEXAS; AND THE NORTHEAST CORNER OF A CALLED 4.03 ACRE TRACT OF LAND DESCRIBED TO DRIPPING SPRINGS ISD AS SHOWN ON INSTRUMENT RECORDED IN DOCUMENT NO. 9921953 OF THE OFFICIAL PUBLIC RECORDS OF HAYS COUNTY, TEXAS; FOR THE SOUTHEAST CORNER OF SAID LOT 1, BLOCK D AND THE SOUTHEAST CORNER OF THIS DEDICATION;

THENCE, SOUTH 89°00'26" WEST, ALONG THE NORTH BOUNDARY LINE OF SAID 4.03 ACRE TRACT AND THE SOUTH BOUNDARY LINE OF SAID LOT 1, BLOCK D, A DISTANCE OF 60.23 FEET TO A 1/2" IRON ROD FOUND AT THE NORTHEAST CORNER OF A 19.21 ACRE TRACT OF LAND DESCRIBED TO HILLTOP CAMPUS, LTD, AS SHOWN ON INSTRUMENT RECORDED IN VOLUME 1780, PAGE 747 OF THE OFFICIAL PUBLIC RECORDS OF HAYS COUNTY, TEXAS; AND THE NORTHWEST CORNER OF SAID 4.03 ACRE TRACT, FOR AN ANGLE CORNER OF THIS DEDICATION;

THENCE, SOUTH 88°09'44" WEST, ALONG THE NORTH BOUNDARY LINE OF SAID 19.21 ACRE TRACT AND THE SOUTH BOUNDARY LINE OF SAID LOT 1, BLOCK D, A DISTANCE OF 15.14 FEET TO A POINT FOR THE SOUTHWEST CORNER OF THIS DEDICATION;

THENCE, ACROSS SAID LOT 1, BLOCK D, THE FOLLOWING SEVEN (7) COURSES AND DISTANCES:

1. NORTH 02°20'44" WEST, A DISTANCE OF 178.06 FEET TO A POINT FOR AN ANGLE CORNER OF THIS DEDICATION;
2. IN A NORTHERLY DIRECTION, ALONG A TANGENT CURVE TO THE RIGHT, A CENTRAL ANGLE OF 02°23'41", A RADIUS OF 3035.00 FEET, A CHORD BEARING AND DISTANCE OF NORTH 01°08'54" WEST, 126.84 FEET, AND A TOTAL ARC LENGTH OF 126.85 FEET TO A POINT FOR AN ANGLE CORNER OF THIS DEDICATION;
3. NORTH 00°02'57" EAST, A DISTANCE OF 234.66 FEET TO A POINT FOR AN ANGLE CORNER OF THIS DEDICATION;
4. IN A NORTHWESTERLY DIRECTION, ALONG A TANGENT CURVE TO THE LEFT, A CENTRAL ANGLE OF 70°41'24", A RADIUS OF 15.00 FEET, A CHORD BEARING AND DISTANCE OF NORTH 35°17'45" WEST, 17.35 FEET, AND A TOTAL ARC LENGTH OF 18.51 FEET TO A POINT FOR AN ANGLE CORNER OF THIS DEDICATION;
5. . IN A NORTHERLY DIRECTION, ALONG A TANGENT REVERSE CURVE TO THE RIGHT, A CENTRAL ANGLE OF 74°31'30", A RADIUS OF 130.00 FEET, A CHORD BEARING AND DISTANCE OF NORTH 33°22'42" WEST, 157.42 FEET, AND A TOTAL ARC LENGTH OF 169.09 FEET TO A POINT FOR AN ANGLE CORNER OF THIS DEDICATION;
6. NORTH 03°53'03" EAST, A DISTANCE OF 12.39 FEET TO A POINT FOR AN ANGLE CORNER OF THIS DEDICATION;
7. IN A NORTHWESTERLY DIRECTION, ALONG THE NORTH LINE OF SAID LOT 1, BLOCK D AND A TANGENT CURVE TO THE LEFT, A CENTRAL ANGLE OF 87°58'09", A RADIUS OF 25.00 FEET, A CHORD BEARING AND DISTANCE OF NORTH 40°06'02" WEST, 34.72 FEET, AND A TOTAL ARC LENGTH OF 38.38 FEET TO A POINT IN THE SOUTHERLY RIGHT-OF-WAY LINE OF SHANE LANE (CALLED 60' R.O.W. WIDTH) AND THE NORTH BOUNDARY LINE OF SAID LOT 1, BLOCK D, FOR THE NORTHWEST CORNER OF THIS DEDICATION;

THENCE, IN A SOUTHEASTERLY DIRECTION, ALONG A CURVE TO THE RIGHT AND THE COMMON BOUNDARY LINE OF SAID SHANE LANE AND SAID LOT 1, BLOCK D, A CENTRAL ANGLE OF 01°47'48" A RADIUS OF 1162.31 FEET, A CHORD BEARING AND DISTANCE OF SOUTH 83°11'12" EAST, 36.45 FEET, AND A TOTAL ARC LENGTH OF 36.45 FEET TO A POINT FOR AN ANGLE CORNER OF SAID LOT 1, BLOCK D AND AN ANGLE CORNER OF THIS DEDICATION;

THENCE, SOUTH 82°05'15" EAST, CONTINUING ALONG THE COMMON BOUNDARY LINE OF SAID SHANE LANE AND SAID LOT 1, BLOCK D, A DISTANCE OF 130.82 FEET TO A 1/2" IRON ROD FOUND AT THE NORTHWEST END OF A CUTBACK CURVE TO THE RIGHT AT THE INTERSECTION OF THE WESTERLY RIGHT-OF-WAY LINE OF GOLDEN EAGLE LANE (VARIABLE R.O.W. WIDTH) AND THE NORTHERLY RIGHT-OF-WAY LINE OF SAID SHANE LANE, FOR A NORTHEAST CORNER OF SAID LOT 1, BLOCK D AND A NORTHEAST CORNER OF THIS DEDICATION;

THENCE, IN A SOUTHEASTERLY DIRECTION, CONTINUING ALONG SAID CUTBACK CURVE TO THE RIGHT, A CENTRAL ANGLE OF 80°09'05", A RADIUS OF 25.00 FEET, A CHORD BEARING AND DISTANCE OF SOUTH 42°01'08" EAST, 32.19 FEET, AND A TOTAL ARC LENGTH OF 34.97 FEET TO A 1/2" IRON ROD FOUND AT THE SOUTHEAST END OF SAID CUTBACK CURVE TO THE RIGHT, FOR A NORTHEAST CORNER OF SAID LOT 1, BLOCK D AND A NORTHEAST CORNER OF THIS DEDICATION;

THENCE, SOUTH 1°20'31" EAST, ALONG THE EAST BOUNDARY LINE OF SAID LOT 1, BLOCK D, AT 156.07 FEET PASSING A 1/2" IRON ROD FOUND FOR A LINE MARKER, THEN CONTINUING ALONG THE EAST BOUNDARY LINE OF SAID LOT 1, BLOCK D, IN ALL A DISTANCE OF 676.34 FEET TO THE **POINT OF BEGINNING** AND CONTAINING 1.506 ACRES OF LAND, MORE OR LESS, IN HAYS COUNTY, TEXAS. THIS DOCUMENT WAS PREPARED IN THE OFFICE OF KIMLEY-HORN AND ASSOCIATES, INC. IN AUSTIN, TEXAS.

SURVEYOR'S NOTES:
THE BEARINGS, DISTANCES, AREAS AND COORDINATES SHOWN HEREON ARE TEXAS STATE COORDINATE SYSTEM GRID, CENTRAL ZONE (FIPS 4203) (NAD'83), AS DETERMINED BY THE GLOBAL POSITIONING SYSTEM (GPS). THE UNIT OF LINEAR MEASUREMENT IS U.S. SURVEY FEET. A RIGHT-OF-WAY DEDICATION BOUNDARY EXHIBIT AND A LINE & CURVE TABLE WERE CREATED IN CONJUNCTION WITH THIS METES & BOUNDS DESCRIPTION.
THE UNDERSIGNED, REGISTERED PROFESSIONAL LAND SURVEYOR, HEREBY CERTIFIES THAT THE FOREGOING DESCRIPTION ACCURATELY SETS OUT THE METES AND BOUNDS OF THIS DEDICATION.

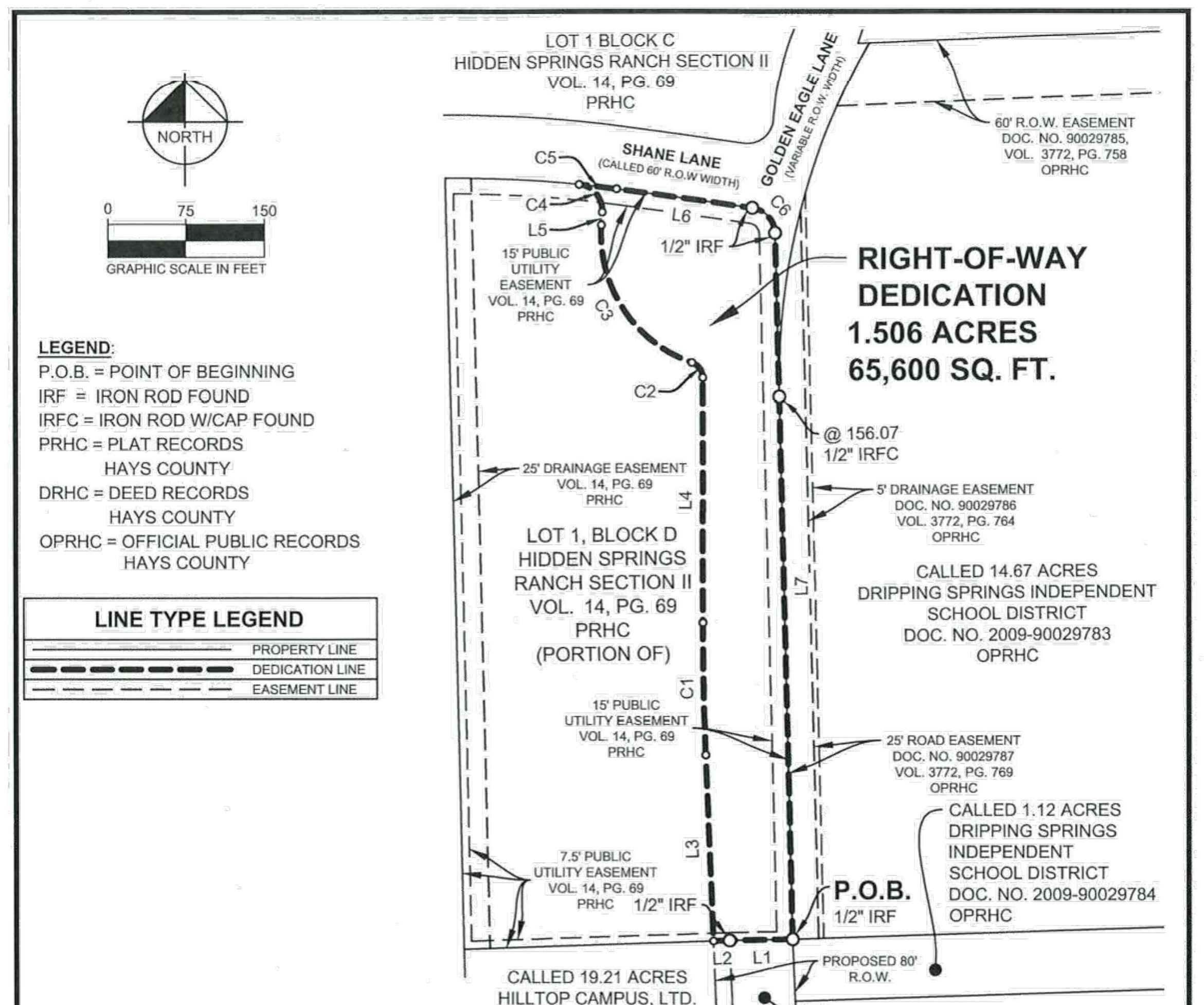
ZACHARY KEITH PETRUS
REGISTERED PROFESSIONAL
LAND SURVEYOR NO. 6769
10814 JOLLYVILLE ROAD
CAMPUS IV, SUITE 200
AUSTIN, TEXAS 78759
PH. (512) 572-6674
ZACH.PETRUS@KIMLEY-HORN.COM

EXHIBIT "A"
RIGHT-OF-WAY DEDICATION
1.506 ACRES
PHILIP SMITH SURVEY, ABSTRACT 415,
CITY OF DRIPPING SPRINGS, HAYS COUNTY, TEXAS

Kimley»Horn
10814 Jollyville Road Campus IV, Suite 200, Austin, Texas 78759 FIRM # 10194624 Tel. No. (512) 418-1771 www.kimley-horn.com

Scale	Drawn by	Checked by	Date	Project No.	Sheet No.
N/A	PTF	ZKP	4/26/2021	067783118	1 OF 3

PETRUS, ZACH 4/26/2021 11:51 PM \\SNAFP01\TX_SNA1\SNA_SURVEY\HERITAGE DRIPPING SPRINGS\067783118-HERITAGE DRIPPING SPRINGS\DWG\ROW DEDICATIONS\1.506 ROGER HANKS ROW.DWG


LOT 1 BLOCK C HIDDEN SPRINGS RANCH SECTION II VOL. 14, PG. 69 PRHC
NORTH
0 75 150
GRAPHIC SCALE IN FEET
GOLDEN EAGLE LANE (VARIABLE R.O.W. WIDTH)
60' R.O.W. EASEMENT DOC. NO. 90029785, VOL. 3772, PG. 758 OPRHC
SHANE LANE (CALLED 60' R.O.W WIDTH)
C5
C4
L5
L6
C6
1/2" IRF
15' PUBLIC UTILITY EASEMENT VOL. 14, PG. 69 PRHC
C3
RIGHT-OF-WAY DEDICATION 1.506 ACRES 65,600 SQ. FT.
C2
@ 156.07 1/2" IRFC
LEGEND:
P.O.B. = POINT OF BEGINNING
IRF = IRON ROD FOUND
IRFC = IRON ROD W/CAP FOUND
PRHC = PLAT RECORDS HAYS COUNTY
DRHC = DEED RECORDS HAYS COUNTY
OPRHC = OFFICIAL PUBLIC RECORDS HAYS COUNTY
25' DRAINAGE EASEMENT VOL. 14, PG. 69 PRHC
L4
5' DRAINAGE EASEMENT DOC. NO. 90029786 VOL. 3772, PG. 764 OPRHC
LOT 1, BLOCK D HIDDEN SPRINGS RANCH SECTION II VOL. 14, PG. 69 PRHC (PORTION OF)
L7
CALLED 14.67 ACRES DRIPPING SPRINGS INDEPENDENT SCHOOL DISTRICT DOC. NO. 2009-90029783 OPRHC
LINE TYPE LEGEND
PROPERTY LINE
DEDICATION LINE
EASEMENT LINE
C1
15' PUBLIC UTILITY EASEMENT VOL. 14, PG. 69 PRHC
25' ROAD EASEMENT DOC. NO. 90029787 VOL. 3772, PG. 769 OPRHC
CALLED 1.12 ACRES DRIPPING SPRINGS INDEPENDENT SCHOOL DISTRICT DOC. NO. 2009-90029784 OPRHC
L3
7.5' PUBLIC UTILITY EASEMENT VOL. 14, PG. 69 PRHC 1/2" IRF
P.O.B. 1/2" IRF
L2 L1
PROPOSED 80' R.O.W.
CALLED 19.21 ACRES HILLTOP CAMPUS, LTD. VOL. 1780 PG. 747 OPRHC
CALLED 4.03 ACRES DRIPPING SPRINGS INDEPENDENT SCHOOL DISTRICT DOC. NO. 9921953 OPRHC
CALLED 2.18 ACRES DRAPER RANCH PARTNERSHIP DOC. NO. 16043360 OPRHC

SURVEYOR'S NOTES:
THE BEARINGS, DISTANCES, AREAS AND COORDINATES SHOWN HEREON ARE TEXAS STATE COORDINATE SYSTEM GRID, CENTRAL ZONE (FIPS 4203) (NAD'83), AS DETERMINED BY THE GLOBAL POSITIONING SYSTEM (GPS). THE UNIT OF LINEAR MEASUREMENT IS U.S. SURVEY FEET. A METES & BOUNDS DESCRIPTION AND A LINE & CURVE TABLE WERE CREATED IN CONJUNCTION WITH THIS RIGHT-OF-WAY DEDICATION BOUNDARY EXHIBIT.
THE UNDERSIGNED, REGISTERED PROFESSIONAL LAND SURVEYOR, HEREBY CERTIFIES THAT THIS R.O.W. DEDICATION BOUNDARY EXHIBIT OF SURVEY ACCURATELY REFLECTS THE METES AND BOUNDS OF THIS DEDICATION.

ZACHARY KEITH PETRUS
REGISTERED PROFESSIONAL
LAND SURVEYOR NO. 6769
10814 JOLLYVILLE ROAD
CAMPUS IV, SUITE 200
AUSTIN, TEXAS 78759
PH. (512) 572-6674
ZACH.PETRUS@KIMLEY-HORN.COM

EXHIBIT "A"
RIGHT-OF-WAY DEDICATION
1.506 ACRES
PHILIP SMITH SURVEY, ABSTRACT 415,
CITY OF DRIPPING SPRINGS, HAYS COUNTY, TEXAS

Kimley»Horn
10814 Jollyville Road Campus IV, Suite 200, Austin, Texas 78759 FIRM # 10194624 Tel. No. (512) 418-1771 www.kimley-horn.com

Scale	Drawn by	Checked by	Date	Project No.	Sheet No.
1" = 150'	PTF	ZKP	4/26/2021	067783118	2 OF 3

PETRUS, ZACH 4/26/2021 11:52 PM \\SNAFP01\TX_SNA1\SNA_SURVEY\HERITAGE DRIPPING SPRINGS\067783118-HERITAGE DRIPPING SPRINGS\DWG\ROW DEDICATIONS\1.506 ROGER HANKS ROW.DWG

CURVE TABLE

NO.	DELTA	RADIUS	LENGTH	CHORD BEARING	CHORD
C1	2°23'41"	3035.00'	126.85'	N01°08'54"W	126.84'
C2	70°41'24"	15.00'	18.51'	N35°17'45"W	17.35'
C3	74°31'30"	130.00'	169.09'	N33°22'42"W	157.42'
C4	87°58'09"	25.00'	38.38'	N40°06'02"W	34.72'
C5	1°47'48"	1162.31'	36.45'	S83°11'12"E	36.45'
C6	80°09'05"	25.00'	34.97'	S42°01'08"E	32.19'

LINE TABLE

NO.	BEARING	LENGTH
L1	S89°00'26"W	60.23'
L2	S88°09'44"W	15.14'
L3	N02°20'44"W	178.06'
L4	N00°02'57"E	234.66'
L5	N03°53'03"E	12.39'
L6	S82°05'15"E	130.82'
L7	S01°20'31"E	676.34'

SURVEYOR'S NOTES:
THE BEARINGS, DISTANCES, AREAS AND COORDINATES SHOWN HEREON ARE TEXAS STATE COORDINATE SYSTEM GRID, CENTRAL ZONE (FIPS 4203) (NAD'83), AS DETERMINED BY THE GLOBAL POSITIONING SYSTEM (GPS). THE UNIT OF LINEAR MEASUREMENT IS U.S. SURVEY FEET. A METES & BOUNDS DESCRIPTION AND A RIGHT-OF-WAY DEDICATION BOUNDARY EXHIBIT OF EVEN SURVEY DATE WAS CREATED IN CONJUNCTION WITH THIS LINE AND CURVE TABLE.
THE UNDERSIGNED, REGISTERED PROFESSIONAL LAND SURVEYOR, HEREBY CERTIFIES THAT THIS LINE & CURVE TABLE OF SURVEY ACCURATELY REFLECTS THE METES AND BOUNDS OF THIS DEDICATION.

ZACHARY KEITH PETRUS
REGISTERED PROFESSIONAL
LAND SURVEYOR NO. 6769
10814 JOLLYVILLE ROAD
CAMPUS IV, SUITE 200
AUSTIN, TEXAS 78759
PH. (512) 572-6674
ZACH.PETRUS@KIMLEY-HORN.COM

EXHIBIT "A"
RIGHT-OF-WAY DEDICATION
1.506 ACRES
PHILIP SMITH SURVEY, ABSTRACT 415,
CITY OF DRIPPING SPRINGS, HAYS COUNTY, TEXAS

Kimley»Horn
10814 Jollyville Road Campus IV, Suite 200, Austin, Texas 78759 FIRM # 10194624 Tel. No. (512) 418-1771 www.kimley-horn.com

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N/A	PTF	ZKP	4/26/2021	067783118	3 OF 3

PETRUS, ZACH 4/26/2021 11:52 PM \\SNAFP01\TX_SNA1\SNA_SURVEY\HERITAGE DRIPPING SPRINGS\067783118-HERITAGE DRIPPING SPRINGS\DWG\ROW DEDICATIONS\1.506 ROGER HANKS ROW.DWG

No.	REVISIONS	DATE	BY

Kimley»Horn

10814 JOLLYVILLE ROAD, AVALLON IV, SUITE 300, AUSTIN, TX 78759
PHONE: 512-418-1771 FAX: 512-418-1791
WWW.KIMLEY-HORN.COM
TEXAS REGISTERED ENGINEERING FIRM F-928

07/27/2022
STATE OF TEXAS ALEJANDRO E. GRANADOS RICO 130084 LICENSED PROFESSIONAL ENGINEER

KHA PROJECT 067783117
DATE JULY 2022
SCALE: AS SHOWN
DESIGNED BY: AEG
DRAWN BY: DPD
CHECKED BY: AEG

EASEMENTS (1 OF 3)

ROGER HANKS PARKWAY EXTENSION II
CITY OF DRIPPING SPRINGS
HAYS COUNTY, TEXAS

SHEET NUMBER
6

METES AND BOUNDS DESCRIPTION OF:
RIGHT-OF-WAY DEDICATION - 2.939 ACRES

BEING A 2.939 ACRE (128,039 SQ. FT.) RIGHT-OF-WAY DEDICATION SITUATED IN THE PHILIP SMITH SURVEY, ABSTRACT 415, CITY OF DRIPPING SPRINGS, HAYS COUNTY, TEXAS, AND BEING A PORTION OF A CALLED 45.53 ACRE TRACT OF LAND DESCRIBED TO DRIPPING SPRINGS INDEPENDENT SCHOOL DISTRICT AS SHOWN ON INSTRUMENT RECORDED IN DOCUMENT NO. 6018836 OF THE OFFICIAL PUBLIC RECORDS OF HAYS COUNTY, TEXAS; AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING, AT A POINT IN THE WEST BOUNDARY LINE OF A TRACT 2, CALLED 50.206 ACRES, DESCRIBED TO SLF IV-DRIPPING SPRINGS JV, L.P., AS SHOWN ON INSTRUMENT RECORDED IN DOCUMENT NO. 2014-14037229 OF THE OFFICIAL PUBLIC RECORDS OF HAYS COUNTY, TEXAS; AND IN THE EAST BOUNDARY LINE OF SAID 45.53 ACRE TRACT; FOR THE NORTHEAST CORNER OF THIS DEDICATION; WHENCE A 1/2" IRON ROD FOUND FOR REFERENCE BEARS NORTH 09°31'11" WEST, A DISTANCE OF 122.84 FEET;

THENCE, SOUTH 09°31'11" EAST, ALONG THE COMMON BOUNDARY LINE OF SAID 45.53 ACRE TRACT AND SAID TRACT 2, A DISTANCE OF 32.03 FEET TO 1/2" IRON ROD FOUND AT AN ANGLE CORNER OF SAID TRACT 2, FOR AN ANGLE CORNER OF SAID 45.53 ACRE TRACT AND AN ANGLE CORNER OF THIS DEDICATION;

THENCE, SOUTH 01°10'11" EAST CONTINUING ALONG THE COMMON BOUNDARY LINE OF SAID 45.53 ACRE TRACT AND SAID TRACT 2, A DISTANCE OF 63.40 FEET TO A POINT FOR THE SOUTHEAST CORNER OF THIS DEDICATION;

THENCE, ACROSS SAID 45.53 ACRE TRACT THE FOLLOWING TEN (10) COURSES AND DISTANCES:

1. SOUTH 89°48'55" WEST, A DISTANCE OF 175.81 FEET TO A POINT OF CURVATURE FOR AN ANGLE CORNER OF THIS DEDICATION;
2. ALONG A CURVE TO THE RIGHT, WITH AN INTERIOR ANGLE OF 13°30'21", A RADIUS OF 839.00 FEET, A CHORD BEARING AND DISTANCE OF NORTH 83°25'54" WEST, 197.31 FEET, A TOTAL ARC LENGTH OF 197.77 FEET TO A POINT FOR AN ANGLE CORNER OF THIS DEDICATION;
3. SOUTH 13°19'16" WEST, A DISTANCE OF 14.00 FEET TO A POINT OF CURVATURE FOR AN ANGLE CORNER OF THIS DEDICATION;
4. ALONG A CURVE TO THE RIGHT, HAVING AN INTERIOR ANGLE OF 3°48'52", A RADIUS OF 853.00 FEET, A CHORD BEARING AND DISTANCE OF NORTH 74°46'18" WEST 56.78 FEET, A TOTAL ARC LENGTH OF 56.79 FEET TO A POINT OF REVERSE CURVATURE FOR AN ANGLE CORNER OF THIS DEDICATION;
5. ALONG A CURVE TO THE LEFT, HAVING AN INTERIOR ANGLE OF 17°37'07", A RADIUS OF 747.00 FEET, A CHORD BEARING AND DISTANCE OF NORTH 81°40'25" WEST, 228.80 FEET, A TOTAL ARC LENGTH OF 229.70 FEET TO A POINT FOR AN ANGLE CORNER OF THIS DEDICATION;
6. SOUTH 89°31'02" WEST, A DISTANCE OF 183.61 FEET TO A POINT FOR AN ANGLE CORNER OF THIS DEDICATION;
7. SOUTH 00°28'58" EAST, A DISTANCE OF 16.50 FEET TO A POINT OF CURVATURE FOR AN ANGLE CORNER OF THIS DEDICATION;
8. ALONG A CURVE TO THE LEFT, HAVING AN INTERIOR ANGLE OF 29°51'59", A RADIUS OF 305.50 FEET, A CHORD BEARING AND DISTANCE OF SOUTH 74°35'02" WEST, 157.45 FEET, A TOTAL ARC LENGTH OF 159.25 FEET TO A POINT OF REVERSE CURVATURE FOR AN ANGLE CORNER OF THIS DEDICATION;
9. ALONG A CURVE TO THE RIGHT, HAVING AN INTERIOR ANGLE OF 28°10'18", A RADIUS OF 444.50 FEET, A CHORD BEARING AND DISTANCE OF SOUTH 73°44'11" WEST 216.36 FEET, A TOTAL ARC LENGTH OF 218.56 FEET TO A POINT FOR AN ANGLE CORNER OF THIS DEDICATION;
10. SOUTH 87°49'20" WEST, A DISTANCE OF 51.32 FEET TO A POINT IN THE EAST BOUNDARY LINE OF A CALLED 14.67 ACRE TRACT DESCRIBED TO DRIPPING SPRINGS INDEPENDENT SCHOOL DISTRICT AS SHOWN ON INSTRUMENT RECORDED IN DOCUMENT NO. 09921952 OF THE OFFICIAL PUBLIC RECORDS OF HAYS COUNTY, TEXAS; AND IN THE WEST BOUNDARY LINE OF SAID 45.53 ACRE TRACT; FOR THE SOUTHWEST CORNER OF THIS DEDICATION;

(M&B DESCRIPTION CONTINUES ON SHEET 2)

SURVEYOR'S NOTES:

THE BEARINGS, DISTANCES, AREAS AND COORDINATES SHOWN HEREON ARE TEXAS STATE COORDINATE SYSTEM GRID, CENTRAL ZONE (FIPS 4203) (NAD'83), AS DETERMINED BY THE GLOBAL POSITIONING SYSTEM (GPS). THE UNIT OF LINEAR MEASUREMENT IS U.S. SURVEY FEET. A RIGHT-OF-WAY DEDICATION BOUNDARY EXHIBIT AND A LINE & CURVE TABLE WERE CREATED IN CONJUNCTION WITH THIS METES & BOUNDS DESCRIPTION.

THE UNDERSIGNED, REGISTERED PROFESSIONAL LAND SURVEYOR, HEREBY CERTIFIES THAT THE FOREGOING DESCRIPTION ACCURATELY SETS OUT THE METES AND BOUNDS OF THIS DEDICATION.

ZACHARY KEITH PETRUS
REGISTERED PROFESSIONAL
LAND SURVEYOR NO. 6769
10814 JOLLYVILLE ROAD
CAMPUS IV, SUITE 200
AUSTIN, TEXAS 78759
PH. (512) 572-6674
ZACH.PETRUS@KIMLEY-HORN.COM

STATE OF TEXAS REGISTERED ZACHARY K. PETRUS 6769 PROFESSIONAL LAND SURVEYOR

EXHIBIT "A"
RIGHT-OF-WAY DEDICATION
2.939 ACRES
PHILIP SMITH SURVEY, ABSTRACT 415,
CITY OF DRIPPING SPRINGS, HAYS COUNTY, TEXAS

Kimley»Horn
10814 Jollyville Road Campus IV, Suite 200, Austin, Texas 78759 FIRM # 10194624 Tel. No. (512) 418-1771 www.kimley-horn.com

Scale	Drawn by	Checked by	Date	Project No.	Sheet No.
N/A	PTF	ZKP	4/26/2021	067783118	1 OF 5

PETRUS, ZACH 4/26/2021 11:47 PM I:\SNAFP01\TX_SNA\TSNA_SURVEY\HERITAGE DRIPPING SPRINGS\067783118-HERITAGE DRIPPING SPRINGS\DWG\ROW DEDICATION\S2.939A ACRE DEDICATION.DWG

METES AND BOUNDS DESCRIPTION OF:
RIGHT-OF-WAY DEDICATION - 2.939 ACRES (CONTINUED)

THENCE, NORTH 01°15'27" WEST, ALONG THE COMMON BOUNDARY LINE OF SAID 14.67 ACRE TRACT AND SAID 45.53 ACRE TRACT, AT 90.81 FEET PASSING A 1/2" IRON ROD FOUND AT THE NORTHEAST CORNER OF SAID 14.67 ACRE TRACT AND THE SOUTHEAST CORNER OF LOT 24, BLOCK B OF THE HIDDEN SPRINGS RANCH SECTION II SUBDIVISION, AS SHOWN ON PLAT RECORDED IN VOLUME 14, PAGE 69 OF THE PLAT RECORDS OF HAYS COUNTY, TEXAS; THEN CONTINUING ALONG THE COMMON BOUNDARY LINE OF SAID 45.53 ACRE TRACT AND SAID LOT 24, IN ALL A DISTANCE OF 111.51 FEET TO A POINT FOR THE NORTHWEST CORNER OF THIS DEDICATION;

THENCE, ACROSS SAID 45.53 ACRE TRACT THE FOLLOWING NINE (9) COURSES AND DISTANCES:

1. NORTH 87°49'20" EAST, A DISTANCE OF 49.53 FEET TO A POINT OF CURVATURE FOR AN ANGLE CORNER OF THIS DEDICATION;
2. ALONG A CURVE TO THE LEFT, WITH A INTERIOR ANGLE OF 28°10'18", A RADIUS OF 333.00 FEET, A CHORD BEARING AND DISTANCE OF NORTH 74°44'11" EAST, 162.09 FEET, A TOTAL ARC LENGTH OF 163.73 FEET TO A POINT OF REVERSE CURVATURE FOR AN ANGLE CORNER OF THIS DEDICATION;
3. ALONG A CURVE TO THE RIGHT, HAVING AN INTERIOR ANGLE OF 29°51'59", A RADIUS OF 417.00 FEET, A CHORD BEARING AND DISTANCE OF NORTH 74°35'02" EAST, 214.92 FEET, A TOTAL ARC LENGTH OF 217.37 FEET TO A POINT FOR AN ANGLE CORNER OF THIS DEDICATION;
4. NORTH 89°31'02" EAST, A DISTANCE OF 183.61 FEET TO A POINT OF CURVATURE FOR AN ANGLE CORNER OF THIS DEDICATION;
5. ALONG A CURVE TO THE RIGHT, HAVING AN INTERIOR ANGLE OF 17°37'07", A RADIUS OF 842.00 FEET, A CHORD BEARING AND DISTANCE OF SOUTH 81°40'25" EAST, 257.90 FEET, A TOTAL ARC LENGTH OF 258.92 FEET TO A POINT OF REVERSE CURVATURE FOR AN ANGLE CORNER OF THIS DEDICATION;
6. ALONG A CURVE TO THE LEFT, HAVING AN INTERIOR ANGLE OF 03°20'52", A RADIUS OF 758.00 FEET, A CHORD BEARING AND DISTANCE OF SOUTH 74°32'18" EAST, 44.28 FEET, A TOTAL ARC LENGTH OF 44.29 FEET TO A POINT FOR AN ANGLE CORNER OF THIS DEDICATION;
7. NORTH 13°47'16" EAST, A DISTANCE OF 14.00 FEET TO A POINT OF CURVATURE FOR AN ANGLE CORNER OF THIS DEDICATION;
8. ALONG A CURVE TO THE LEFT, HAVING AN INTERIOR ANGLE OF 13°58'21", A RADIUS OF 744.00 FEET, A CHORD BEARING AND DISTANCE OF SOUTH 83°11'54" EAST, 180.99 FEET, A TOTAL ARC LENGTH OF 181.44 FEET TO A POINT FOR AN ANGLE CORNER OF THIS DEDICATION;
9. NORTH 89°48'55" EAST, A DISTANCE OF 169.52 FEET TO THE **POINT OF BEGINNING** CONTAINING 2.939 ACRES, MORE OR LESS, IN HAYS COUNTY, TEXAS. THIS DOCUMENT WAS PREPARED IN THE OFFICE OF KIMLEY-HORN AND ASSOCIATES, INC. IN AUSTIN, TEXAS.

SURVEYOR'S NOTES:

THE BEARINGS, DISTANCES, AREAS AND COORDINATES SHOWN HEREON ARE TEXAS STATE COORDINATE SYSTEM GRID, CENTRAL ZONE (FIPS 4203) (NAD'83), AS DETERMINED BY THE GLOBAL POSITIONING SYSTEM (GPS). THE UNIT OF LINEAR MEASUREMENT IS U.S. SURVEY FEET. A RIGHT-OF-WAY DEDICATION BOUNDARY EXHIBIT AND A LINE & CURVE TABLE WERE CREATED IN CONJUNCTION WITH THIS METES & BOUNDS DESCRIPTION.

THE UNDERSIGNED, REGISTERED PROFESSIONAL LAND SURVEYOR, HEREBY CERTIFIES THAT THE FOREGOING DESCRIPTION ACCURATELY SETS OUT THE METES AND BOUNDS OF THIS DEDICATION.

ZACHARY KEITH PETRUS
REGISTERED PROFESSIONAL
LAND SURVEYOR NO. 6769
10814 JOLLYVILLE ROAD
CAMPUS IV, SUITE 200
AUSTIN, TEXAS 78759
PH. (512) 572-6674
ZACH.PETRUS@KIMLEY-HORN.COM

STATE OF TEXAS REGISTERED ZACHARY K. PETRUS 6769 PROFESSIONAL LAND SURVEYOR

EXHIBIT "A"
RIGHT-OF-WAY DEDICATION
2.939 ACRES
PHILIP SMITH SURVEY, ABSTRACT 415,
CITY OF DRIPPING SPRINGS, HAYS COUNTY, TEXAS

Kimley»Horn
10814 Jollyville Road Campus IV, Suite 200, Austin, Texas 78759 FIRM # 10194624 Tel. No. (512) 418-1771 www.kimley-horn.com

Scale	Drawn by	Checked by	Date	Project No.	Sheet No.
N/A	PTF	ZKP	4/26/2021	067783118	2 OF 5

PETRUS, ZACH 4/26/2021 11:47 PM I:\SNAFP01\TX_SNA\TSNA_SURVEY\HERITAGE DRIPPING SPRINGS\067783118-HERITAGE DRIPPING SPRINGS\DWG\ROW DEDICATION\S2.939A ACRE DEDICATION.DWG

LEGEND:
P.O.C. = POINT OF COMMENCING
P.O.B. = POINT OF BEGINNING
IRFC = IRON ROD W/CAP FOUND
PRHC = PLAT RECORDS HAYS COUNTY
DRHC = DEED RECORDS HAYS COUNTY
OPRHC = OFFICIAL PUBLIC RECORDS HAYS COUNTY

NORTH
0 50 100
GRAPHIC SCALE IN FEET

CALLED 45.53 ACRES
DRIPPING SPRINGS INDEPENDENT
SCHOOL DISTRICT
DOC. NO. 6018836
OPRHC
(PORTION OF)

ROGER HANKS PARKWAY
RIGHT-OF-WAY
DEDICATION
2.939 ACRES
128,039 SQ. FT.

1/2" IRF
P.O.B.
1/2" IRF

CALLED 45.53 ACRES
DRIPPING SPRINGS INDEPENDENT
SCHOOL DISTRICT
DOC. NO. 6018836
OPRHC
(PORTION OF)

TRACT 2
CALLED 50.206 ACRES
SLF IV - DRIPPING SPRINGS JV, L.P.
DOC. NO. 2014-14037229
OPRHC

MATCH SHEET 3

LINE TYPE LEGEND
PROPERTY LINE
DEDICATION LINE
EASEMENT LINE
MATCH SHEET LINE

SURVEYOR'S NOTES:

THE BEARINGS, DISTANCES, AREAS AND COORDINATES SHOWN HEREON ARE TEXAS STATE COORDINATE SYSTEM GRID, CENTRAL ZONE (FIPS 4203) (NAD'83), AS DETERMINED BY THE GLOBAL POSITIONING SYSTEM (GPS). THE UNIT OF LINEAR MEASUREMENT IS U.S. SURVEY FEET. A METES & BOUNDS DESCRIPTION AND A LINE & CURVE TABLE WERE CREATED IN CONJUNCTION WITH THIS RIGHT-OF-WAY DEDICATION BOUNDARY EXHIBIT.

THE UNDERSIGNED, REGISTERED PROFESSIONAL LAND SURVEYOR, HEREBY CERTIFIES THAT THIS R.O.W. DEDICATION BOUNDARY EXHIBIT OF SURVEY ACCURATELY REFLECTS THE METES AND BOUNDS OF THIS DEDICATION.

ZACHARY KEITH PETRUS
REGISTERED PROFESSIONAL
LAND SURVEYOR NO. 6769
10814 JOLLYVILLE ROAD
CAMPUS IV, SUITE 200
AUSTIN, TEXAS 78759
PH. (512) 572-6674
ZACH.PETRUS@KIMLEY-HORN.COM

STATE OF TEXAS REGISTERED ZACHARY K. PETRUS 6769 PROFESSIONAL LAND SURVEYOR

EXHIBIT "A"
RIGHT-OF-WAY DEDICATION
2.939 ACRES
PHILIP SMITH SURVEY, ABSTRACT 415,
CITY OF DRIPPING SPRINGS, HAYS COUNTY, TEXAS

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10814 Jollyville Road Campus IV, Suite 200, Austin, Texas 78759 FIRM # 10194624 Tel. No. (512) 418-1771 www.kimley-horn.com

Scale	Drawn by	Checked by	Date	Project No.	Sheet No.
1" = 100'	PTF	ZKP	4/26/2021	067783118	3 OF 5

PETRUS, ZACH 4/26/2021 11:47 PM I:\SNAFP01\TX_SNA\TSNA_SURVEY\HERITAGE DRIPPING SPRINGS\067783118-HERITAGE DRIPPING SPRINGS\DWG\ROW DEDICATION\S2.939A ACRE DEDICATION.DWG

LEGEND:
P.O.C. = POINT OF COMMENCING
P.O.B. = POINT OF BEGINNING
IRFC = IRON ROD W/CAP FOUND
PRHC = PLAT RECORDS HAYS COUNTY
DRHC = DEED RECORDS HAYS COUNTY
OPRHC = OFFICIAL PUBLIC RECORDS HAYS COUNTY

NORTH
0 50 100
GRAPHIC SCALE IN FEET

CALLED 45.53 ACRES
DRIPPING SPRINGS INDEPENDENT
SCHOOL DISTRICT
DOC. NO. 6018836
OPRHC
(PORTION OF)

ROGER HANKS PARKWAY
RIGHT-OF-WAY
DEDICATION
2.939 ACRES
128,039 SQ. FT.

LOT 23, BLOCK B
HIDDEN SPRINGS RANCH
SECTION II
VOL. 14 PG. 69
PRHC

LOT 24, BLOCK B
HIDDEN SPRINGS RANCH
SECTION II
VOL. 14 PG. 69
PRHC

@90.81'
1/2" IRF

CALLED 45.53 ACRES
DRIPPING SPRINGS INDEPENDENT
SCHOOL DISTRICT
DOC. NO. 6018836
OPRHC
(PORTION OF)

CALLED 14.67 ACRES
DRIPPING SPRINGS INDEPENDENT
SCHOOL DISTRICT
DOC. NO. 2009-90029783
OPRHC

MATCH SHEET 3

LINE TYPE LEGEND
PROPERTY LINE
DEDICATION LINE
EASEMENT LINE
MATCH SHEET LINE

SURVEYOR'S NOTES:

THE BEARINGS, DISTANCES, AREAS AND COORDINATES SHOWN HEREON ARE TEXAS STATE COORDINATE SYSTEM GRID, CENTRAL ZONE (FIPS 4203) (NAD'83), AS DETERMINED BY THE GLOBAL POSITIONING SYSTEM (GPS). THE UNIT OF LINEAR MEASUREMENT IS U.S. SURVEY FEET. A METES & BOUNDS DESCRIPTION AND A RIGHT-OF-WAY DEDICATION BOUNDARY EXHIBIT OF EVEN SURVEY DATE WAS CREATED IN CONJUNCTION WITH THIS LINE AND CURVE TABLE.

THE UNDERSIGNED, REGISTERED PROFESSIONAL LAND SURVEYOR, HEREBY CERTIFIES THAT THIS LINE & CURVE TABLE OF SURVEY ACCURATELY REFLECTS THE METES AND BOUNDS OF THIS DEDICATION.

ZACHARY KEITH PETRUS
REGISTERED PROFESSIONAL
LAND SURVEYOR NO. 6769
10814 JOLLYVILLE ROAD
CAMPUS IV, SUITE 200
AUSTIN, TEXAS 78759
PH. (512) 572-6674
ZACH.PETRUS@KIMLEY-HORN.COM

STATE OF TEXAS REGISTERED ZACHARY K. PETRUS 6769 PROFESSIONAL LAND SURVEYOR

EXHIBIT "A"
RIGHT-OF-WAY DEDICATION
2.939 ACRES
PHILIP SMITH SURVEY, ABSTRACT 415,
CITY OF DRIPPING SPRINGS, HAYS COUNTY, TEXAS

Kimley»Horn
10814 Jollyville Road Campus IV, Suite 200, Austin, Texas 78759 FIRM # 10194624 Tel. No. (512) 418-1771 www.kimley-horn.com

Scale	Drawn by	Checked by	Date	Project No.	Sheet No.
N/A	PTF	ZKP	4/26/2021	067783118	5 OF 5

PETRUS, ZACH 4/26/2021 11:47 PM I:\SNAFP01\TX_SNA\TSNA_SURVEY\HERITAGE DRIPPING SPRINGS\067783118-HERITAGE DRIPPING SPRINGS\DWG\ROW DEDICATION\S2.939A ACRE DEDICATION.DWG

LINE TABLE		
NO.	BEARING	LENGTH
L1	S09°31'11"E	32.03'
L2	S01°10'11"E	63.40'
L3	S89°48'55"W	175.81'
L4	S13°19'16"W	14.00'
L5	S89°31'02"W	183.61'
L6	S00°28'58"E	16.50'
L7	S87°49'20"W	51.32'
L8	N01°15'27"W	111.51'
L9	N87°49'20"E	49.53'
L10	N89°31'02"E	183.61'
L11	N13°47'16"E	14.00'
L12	N89°48'55"E	169.52'
L13	N09°31'11"W	122.84'

CURVE TABLE					
NO.	DELTA	RADIUS	LENGTH	CHORD BEARING	CHORD
C1	13°30'21"	839.00'	197.77'	N83°25'54"W	197.31'
C2	3°48'52"	853.00'	56.79'	N74°46'18"W	56.78'
C3	17°37'07"	747.00'	229.70'	N81°40'25"W	228.80'
C4	29°51'59"	305.50'	159.25'	S74°35'02"W	157.45'
C5	28°10'18"	444.50'	218.56'	S73°44'11"W	216.36'
C6	28°10'18"	333.00'	163.73'	N73°44'11"E	162.09'
C7	29°51'59"	417.00'	217.37'	N74°35'02"E	214.92'
C8	17°37'07"	842.00'	258.92'	S81°40'25"E	257.90'
C9	3°20'52"	758.00'	44.29'	S74°32'18"E	44.28'
C10	13°58'21"	744.00'	181.44'	S83°11'54"E	180.99'

No.	REVISIONS	DATE	BY

Kimley»Horn
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10814 JOLLYVILLE ROAD, AVALLON IV, SUITE 300, AUSTIN, TX 78759
PHONE: 512-418-1771 FAX: 512-418-1791
WWW.KIMLEY-HORN.COM
TEXAS REGISTERED ENGINEERING FIRM F-928

07/27/2022

STATE OF TEXAS ZACHARY K. PETRUS 6769 LICENSED PROFESSIONAL LAND SURVEYOR

KHA PROJECT	067783117
DATE	JULY 2022
SCALE:	AS SHOWN
DESIGNED BY:	AEG
DRAWN BY:	DPD
CHECKED BY:	AEG

ROGER HANKS PARKWAY
EXTENSION II
CITY OF DRIPPING SPRINGS
HAYS COUNTY, TEXAS

EASEMENTS (2 OF 3)

SHEET NUMBER
7

Bk Vol Pg
90029785 OPR 3772 760

Exhibit "__"
Page 1 of 2
October 29, 2009

Easement
0.936 Acres
Phillip A. Smith, Survey No. 26
Abstract Number 415
Hays County, Texas

DESCRIPTION

DESCRIPTION OF 0.936 ACRES OF LAND SITUATED IN THE PHILLIP A. SMITH SURVEY NO. 26, ABSTRACT NUMBER 415, IN HAYS COUNTY, TEXAS, BEING A PORTION OF THAT CERTAIN 14.68 ACRE TRACT OF LAND DESCRIBED IN DEED TO THE CITY OF DRIPPING SPRINGS, TEXAS, OF RECORD IN VOLUME 1878, PAGE 628 OF THE OFFICIAL PUBLIC RECORDS OF HAYS COUNTY, TEXAS; SAID 0.936 ACRES OF LAND BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:

BEGINNING at a ½ inch iron rod, found for the northeast corner of said 14.68 acre tract, same point being in the west line of that certain called 45.53 acre tract of land described in Volume 2953, Page 181 said Official Public Records and same point being the southeast corner of Lot 24, Block B, Hidden Springs Ranch Section II, recorded in Volume 14, Page 69, of the Plat Records of Hays County, Texas, for the northeast corner of the herein described tract;

THENCE, South 01°15'19" East, with the common line of said 14.68 acre tract and said 45.53 acre tract, a distance of 60.00 feet, to a point for the southeast corner of the herein described tract, from which point a ½ inch iron rod found for the southeast corner of said 14.68 acre tract bears South 01°15'19" East a distance of 799.85 feet;

THENCE, South 87°49'20" West, parallel with and 60.00 feet south of the north line of said 14.68 acre tract of land, a distance of 695.46 feet to a point on the east right-of way line of that certain roadway known as Golden Eagle Lane dedicated by Volume 14, Page 69, said Plat Records, said east right-of-way line of Golden Eagle Lane being a curve to the right, having a radius of 645.00 feet;

THENCE, in a northeasterly direction, with said east right-of-way line of Golden Eagle Lane, an arc distance of 68.79 feet and whose chord bears North 27°04'02" East, a distance of 68.75 feet to a calculated point for the northwest corner of said 14.68 acre tract of land in the south line of Lot 27, Block B of said Hidden Springs Ranch, Section II;

MAE 29Oct09

S:\4520101_Supporting Documents\4520101_ESMT-60' ROADWAY_DSISD NEW HS.doc

Exhibit A
Page 1 of 3

Bk Vol Pg
90029785 OPR 3772 761

Exhibit "__"
Page 2 of 2
October 29, 2009

Easement
0.936 Acres
Phillip A. Smith, Survey No. 26
Abstract Number 415
Hays County, Texas

THENCE, North 87°49'20" East, with the north boundary line of said 14.68 acre tract of land, same line being a south boundary line of said Hidden Springs Ranch Section II, a distance of 662.83 feet to the POINT OF BEGINNING, containing 0.936 acres of land, more or less, within these metes and bounds.

Subject tract described herein is an easement. No monumentation set for corners.

Reference is herein made to the sketch accompanying this metes and bounds description.

Bearing Basis: Grid North, Texas Coordinate System of 1983, Central Zone, as derived from OPUS solution dated February 15, 2008. Distances hereon are surface values based on a surface adjustment factor of 1.00007683. (Ground = Grid x Surface Adjustment Factor)

I hereby certify that this description was prepared from a survey made on the ground under my supervision.

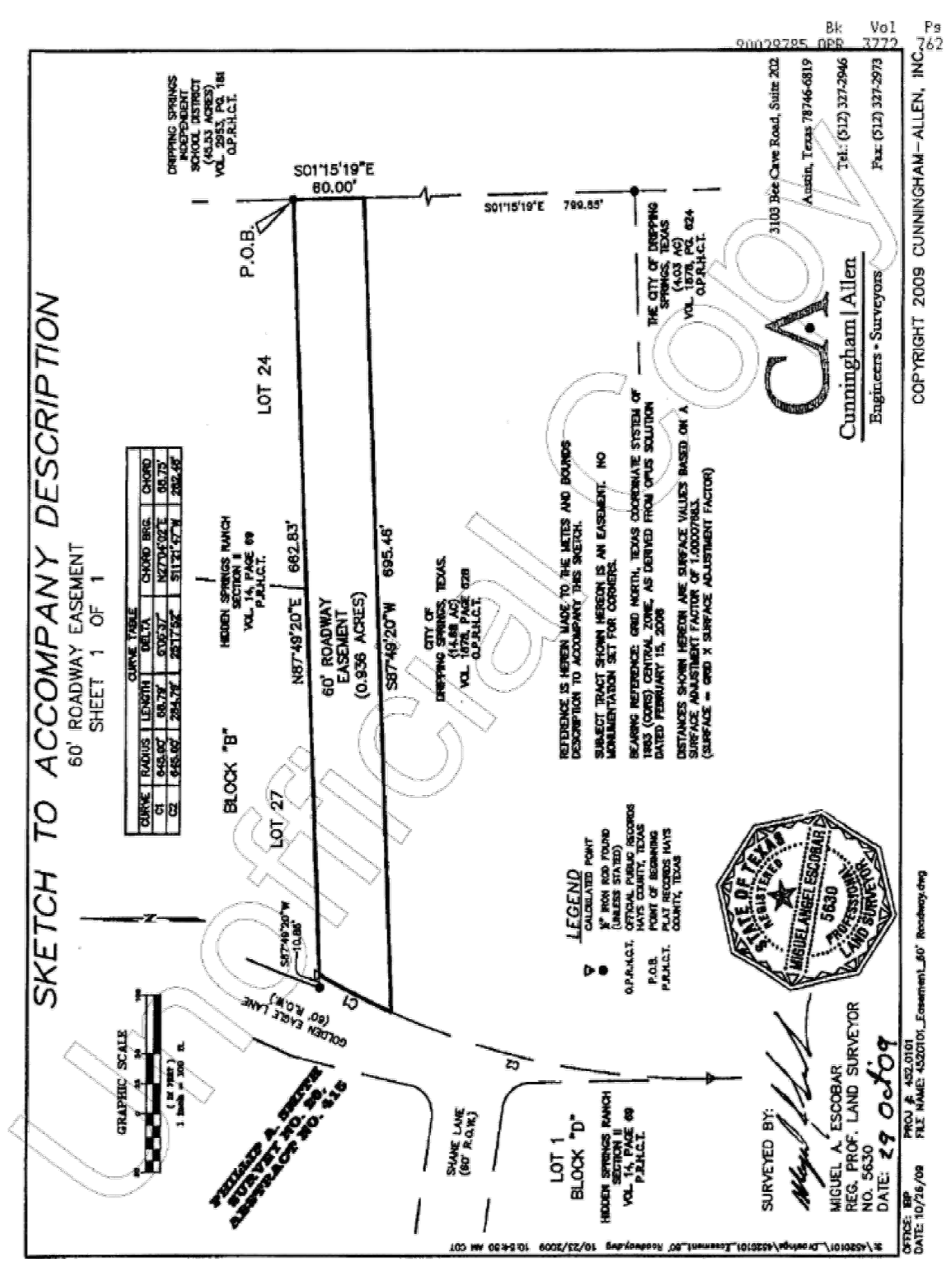
CUNNINGHAM-ALLEN, INC.

Miguel A. Escobar
Registered Professional Land Surveyor No. 5630
State of Texas
Date: 29Oct09

STATE OF TEXAS REGISTERED MIGUEL ANGEL ESCOBAR 5630 PROFESSIONAL LAND SURVEYOR

S:\4520101_Supporting Documents\4520101_ESMT-60' ROADWAY_DSISD NEW HS.doc

Exhibit A
Page 2 of 3



Bk Vol Pg
90029785 OPR 3772 762
SKETCH TO ACCOMPANY DESCRIPTION
60' ROADWAY EASEMENT
SHEET 1 OF 1
S01°15'19"E
60.00'
S01°15'19"E 799.85'
P.O.B.
LOT 24
LOT 27
BLOCK "B"
N87°49'20"E 662.83'
60' ROADWAY EASEMENT (0.936 ACRES)
S87°49'20"W 695.46'
GOLDEN EAGLE LANE (60' R.O.W.)
SHANE LANE (60' R.O.W.)
LOT 1
BLOCK "D"
GRAPHIC SCALE
LEGEND
SURVEYED BY:
MIGUEL A. ESCOBAR
REG. PROF. LAND SURVEYOR
NO. 5630
DATE: 29 Oct 09
3103 Bee Cave Road, Suite 202
Austin, Texas 78746-6819
Tel.: (512) 327-2946
Fax: (512) 327-2973
Cunningham | Allen
Engineers • Surveyors
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Exhibit A
Page 3 of 3

Bk Vol Pg
90029787 OPR 3772 772

Exhibit "__"
Page 1 of 2
October 29, 2009

25' Roadway Easement
0.367 acres of Land
Phillip A. Smith, Survey No. 26
Abstract Number 415
Hays County, Texas

DESCRIPTION

DESCRIPTION OF 0.367 ACRES OF LAND SITUATED IN THE PHILLIP A. SMITH SURVEY NO. 26, ABSTRACT NUMBER 415, IN HAYS COUNTY, TEXAS, BEING A PORTION OF THAT CERTAIN 14.68 ACRE TRACT OF LAND DESCRIBED IN DEED TO THE CITY OF DRIPPING SPRINGS, TEXAS, OF RECORD IN VOLUME 1878, PAGE 628 OF THE OFFICIAL PUBLIC RECORDS OF HAYS COUNTY, TEXAS; SAID 0.367 ACRES OF LAND BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:

BEGINNING at a 1/2 inch iron rod found for the southwest corner of said 14.68 acre tract, for the southeast corner of Lot 1, Block D, Hidden Springs Ranch, Section II according to the plat recorded in Volume 14, Page 69, Plat Records of Hays County, Texas and in the north line of that certain 4.03 acre tract of land described in deed to the City of Dripping Springs, Texas, of record in Volume 1878, Page 624 of the Official Public Records of Hays County, Texas, from which a 1/2 inch iron rod found with cap stamped "RPLS 4404" for the northwest corner of said 4.03 acre tract bears S88°12'53"W a distance of 60.03 feet;

THENCE N01°17'08"W with the common line of said 14.68 acre tract and said Lot 1, Block D a distance of 520.00 feet to a calculated point at the beginning of a curve to the right in the east right-of-way line of Golden Eagle Lane (60' R.O.W), from which point a 3/8 inch iron rod with cap stamped "RPLS 4542" found in the east line of said Lot 1, Block D and the west right-of-way line of said Golden Eagle Lane bears N01°26'23"W a distance of 155.30 feet;

THENCE with said curve to the right, having a radius distance of 645.00 feet, an arc length of 180.17 feet, a delta angle of 16°00'17" and a chord which bears N06°43'00"E, a distance of 179.59 feet to a point;

THENCE S01°17'08"E over and across said 14.68 acre tract a distance of 697.62 feet to a point in the south line of said 14.68 acre tract and the north line of said 4.03 acre tract, from which point a 1/2 inch iron rod found for the southeast corner of said 14.68 acre tract and the northeast corner of said 4.03 acre tract bears N88°12'53"E a distance of 731.83 feet;

MAE 29Oct09

S:\4520101_Supporting Documents\4520101_EASEMENT_25' roadway.doc

Exhibit A
Page 1 of 3

Bk Vol Pg
90029787 OPR 3772 773

Exhibit "__"
Page 2 of 2
October 29, 2009

25' Roadway Easement
0.367 acres of Land
Phillip A. Smith, Survey No. 26
Abstract Number 415
Hays County, Texas

THENCE S88°12'53"W with the south line of said 14.68 acre tract and the north line of said 4.03 acre tract a distance of 25.00 feet to the POINT OF BEGINNING, containing 0.367 acres of land, more or less, within these metes and bounds.

Subject tract described herein is an easement. No monumentation set for corners.

Reference is herein made to the sketch accompanying this metes and bounds description.

Bearing Basis: Grid North, Texas Coordinate System of 1983, Central Zone, as derived from OPUS solution dated February 15, 2008. Distances hereon are surface values based on a surface adjustment factor of 1.00007683. (Ground = Grid x Surface Adjustment Factor)

I hereby certify that this description was prepared from a survey made on the ground under my supervision.

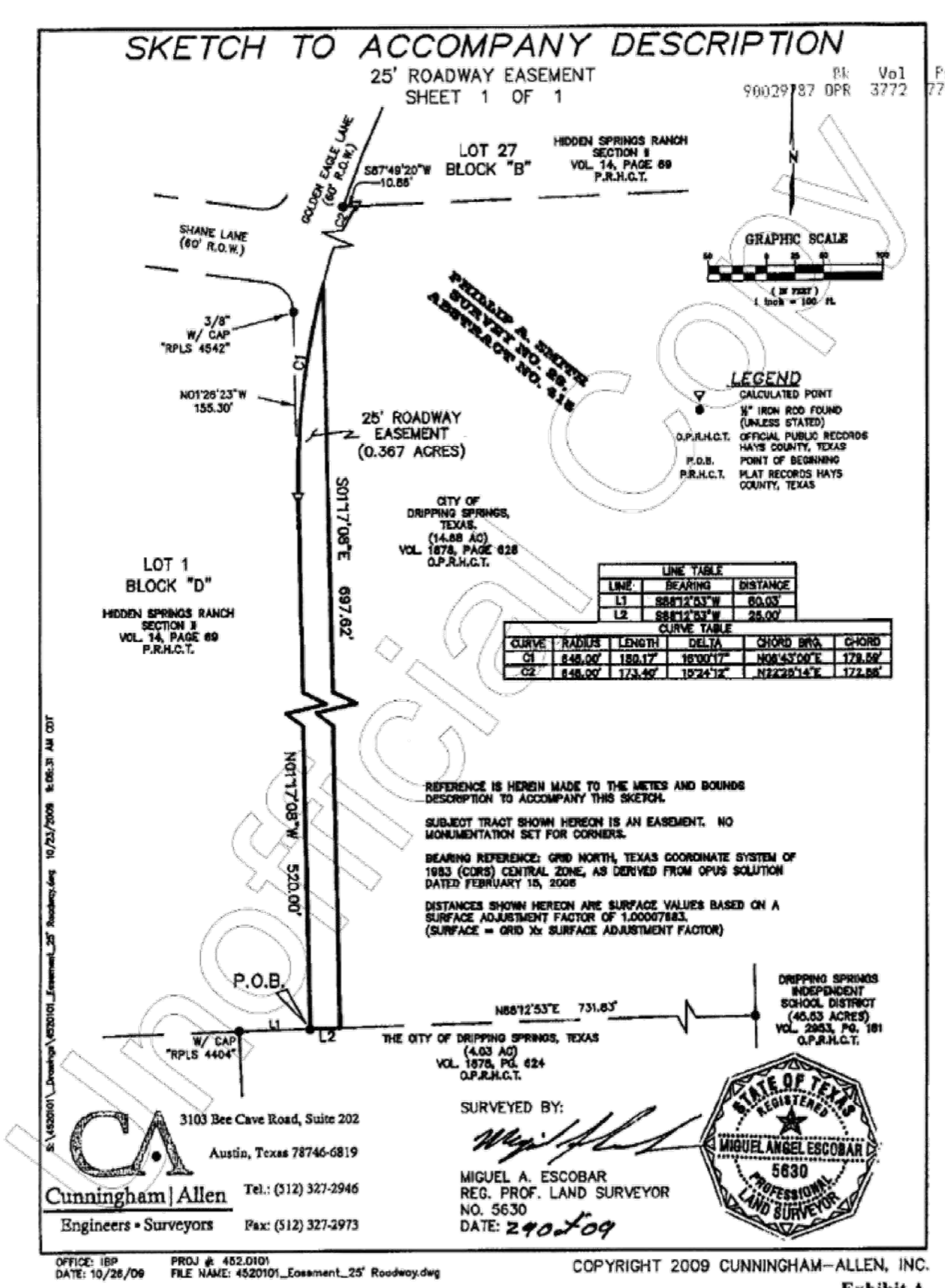
CUNNINGHAM-ALLEN, INC.

Miguel A. Escobar
Registered Professional Land Surveyor No. 5630
State of Texas
Date: 29Oct09

STATE OF TEXAS REGISTERED MIGUEL ANGEL ESCOBAR 5630 PROFESSIONAL LAND SURVEYOR

S:\4520101_Supporting Documents\4520101_EASEMENT_25' roadway.doc

Exhibit A
Page 2 of 3



SKETCH TO ACCOMPANY DESCRIPTION
25' ROADWAY EASEMENT
SHEET 1 OF 1
Bk Vol Pg
90029787 OPR 3772 774
LOT 27
BLOCK "B"
HIDDEN SPRINGS RANCH SECTION II VOL. 14, PAGE 69 P.R.H.C.T.
S87°49'20"W 10.86'
SHANE LANE (60' R.O.W.)
3/8" W/ CAP "RPLS 4542"
N01°26'23"W 155.30'
25' ROADWAY EASEMENT (0.367 ACRES)
S01°17'08"E 697.62'
CITY OF DRIPPING SPRINGS, TEXAS. (14.68 AC) VOL. 1878, PAGE 628 O.P.R.H.C.T.
LOT 1
BLOCK "D"
N01°17'08"W 520.00'
GRAPHIC SCALE
LEGEND
CALCULATED POINT
½" IRON ROD FOUND (UNLESS STATED)
O.P.R.H.C.T. OFFICIAL PUBLIC RECORDS HAYS COUNTY, TEXAS
P.O.B. POINT OF BEGINNING
P.R.H.C.T. PLAT RECORDS HAYS COUNTY, TEXAS
LINE TABLE
L1 S88°12'53"W 60.03'
L2 S88°12'53"W 25.00'
CURVE TABLE
C1 645.00' 180.17' 16°00'17" N06°43'00"E 179.59'
C2 645.00' 173.40' 15°24'12" N22°25'14"E 172.88'
REFERENCE IS HEREIN MADE TO THE METES AND BOUNDS DESCRIPTION TO ACCOMPANY THIS SKETCH.
SUBJECT TRACT SHOWN HEREON IS AN EASEMENT. NO MONUMENTATION SET FOR CORNERS.
BEARING REFERENCE: GRID NORTH, TEXAS COORDINATE SYSTEM OF 1983 (CORS) CENTRAL ZONE, AS DERIVED FROM OPUS SOLUTION DATED FEBRUARY 15, 2008
DISTANCES SHOWN HEREON ARE SURFACE VALUES BASED ON A SURFACE ADJUSTMENT FACTOR OF 1.00007683. (SURFACE = GRID X SURFACE ADJUSTMENT FACTOR)
P.O.B.
W/ CAP "RPLS 4404"
N88°12'53"E 731.83'
THE CITY OF DRIPPING SPRINGS, TEXAS (4.03 AC) VOL. 1878, PG. 624 O.P.R.H.C.T.
DRIPPING SPRINGS INDEPENDENT SCHOOL DISTRICT (45.53 ACRES) VOL. 2953, PG. 181 O.P.R.H.C.T.
SURVEYED BY:
MIGUEL A. ESCOBAR
REG. PROF. LAND SURVEYOR
NO. 5630
DATE: 29Oct09
3103 Bee Cave Road, Suite 202
Austin, Texas 78746-6819
Tel.: (512) 327-2946
Fax: (512) 327-2973
Cunningham | Allen
Engineers • Surveyors
OFFICE: IBP
DATE: 10/26/09
PROJ #: 452.0101
FILE NAME: 4520101_Easement_25' Roadway.dwg
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Exhibit A
Page 3 of 3

No.	REVISIONS	DATE	BY

Kimley»Horn
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10814 JOLLYVILLE ROAD, AVALLON IV, SUITE 300, AUSTIN, TX 78759
PHONE: 512-418-1771 FAX: 512-418-1791
WWW.KIMLEY-HORN.COM
TEXAS REGISTERED ENGINEERING FIRM F-928

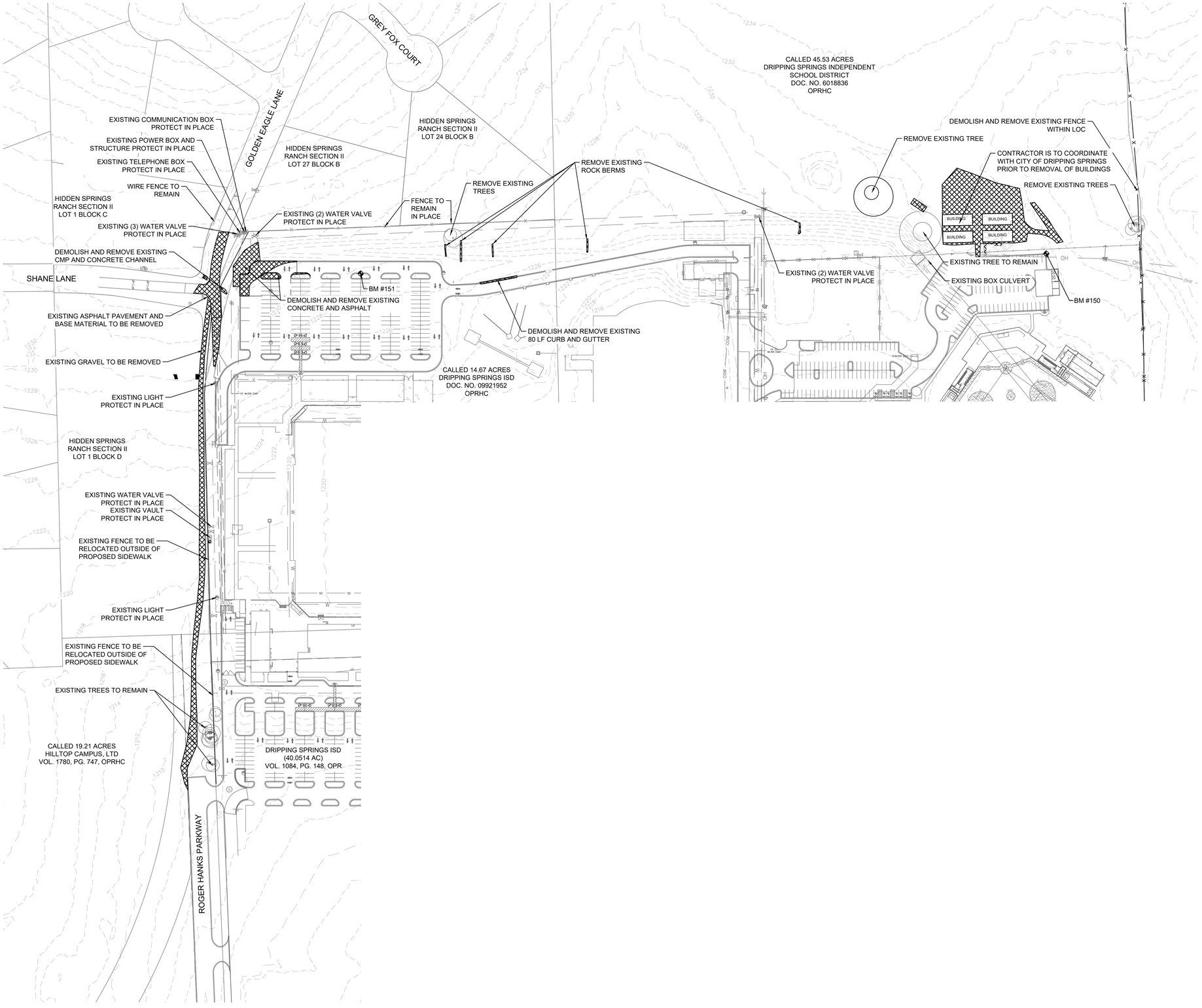
07/27/2022
STATE OF TEXAS ALEJANDRO E. GRANADOS RICO 130084 LICENSED PROFESSIONAL ENGINEER

KHA PROJECT 067783117
DATE JULY 2022
SCALE: AS SHOWN
DESIGNED BY: AEG
DRAWN BY: DPD
CHECKED BY: AEG

EASEMENTS (3 OF 3)

ROGER HANKS PARKWAY
EXTENSION II
CITY OF DRIPPING SPRINGS
HAYS COUNTY, TEXAS

SHEET NUMBER
8



LEGEND

- PROPERTY LINE
- 632 — EXISTING CONTOUR
- OHP — EXISTING OVERHEAD POWER LINE
- W — EXISTING WATER LINE
- WW — EXISTING WASTEWATER LINE
- EXISTING POWER POLE
- EXISTING FIRE HYDRANT
- EXISTING WATER METER
- EXISTING WASTEWATER MANHOLE
- BENCHMARK (BM)
- TO BE DEMOED

WARNING: CONTRACTOR IS TO VERIFY PRESENCE AND EXACT LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION.

811 Know what's below. Call before you dig.

BENCHMARKS

BM #150 SQUARE CUT SET AT THE BACK OF CURB
- ELEV.= 1229.74' (NAVD '88)

BM #151 SQUARE CUT SET AT THE BACK OF CURB
- ELEV.= 1230.35' (NAVD '88)

No.	REVISIONS	DATE	BY

Kimley»Horn
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PHONE: 512-418-1771 FAX: 512-418-1791
WWW.KIMLEY-HORN.COM
TEXAS REGISTERED ENGINEERING FIRM F-928

07/27/2022

STATE OF TEXAS
ALEJANDRO E. GRANADOS RICO
103084
LICENSED
PROFESSIONAL ENGINEER
Alejandro E. Granados Rico

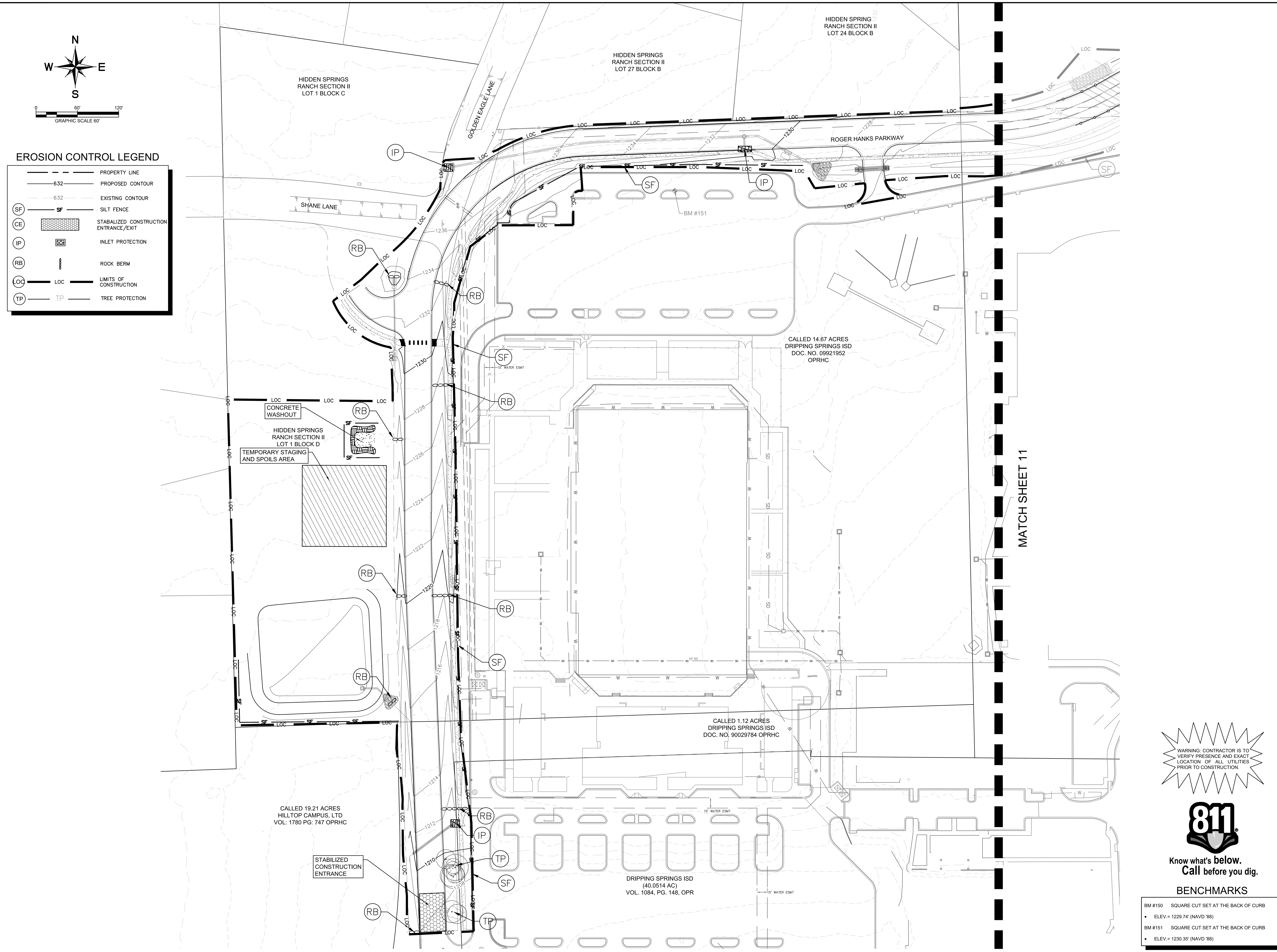
KHA PROJECT	067783117
DATE	JULY 2022
SCALE: AS SHOWN	
DESIGNED BY:	AEG
DRAWN BY:	DPD
CHECKED BY:	AEG

EXISTING CONDITIONS & DEMOLITION PLAN

ROGER HANKS PARKWAY EXTENSION II

CITY OF DRIPPING SPRINGS
HAYS COUNTY, TEXAS

SHEET NUMBER
9


N
W
E
S
0
60'
120'
GRAPHIC SCALE 60'
EROSION CONTROL LEGEND
PROPERTY LINE
632
PROPOSED CONTOUR
632
EXISTING CONTOUR
SF
SF
SILT FENCE
CE
STABALIZED CONSTRUCTION ENTRANCE/EXIT
IP
INLET PROTECTION
RB
ROCK BERM
LOC
LOC
LIMITS OF CONSTRUCTION
TP
TP
TREE PROTECTION
HIDDEN SPRINGS RANCH SECTION II LOT 1 BLOCK C
HIDDEN SPRINGS RANCH SECTION II LOT 27 BLOCK B
HIDDEN SPRING RANCH SECTION II LOT 24 BLOCK B
GOLDEN EAGLE LANE
SHANE LANE
ROGER HANKS PARKWAY
BM #151
CALLED 14.67 ACRES DRIPPING SPRINGS ISD DOC. NO. 09921952 OPRHC
15' WATER ESMT
CONCRETE WASHOUT
HIDDEN SPRINGS RANCH SECTION II LOT 1 BLOCK D
TEMPORARY STAGING AND SPOILS AREA
MATCH SHEET 11
30" SD
CALLED 1.12 ACRES DRIPPING SPRINGS ISD DOC. NO. 90029784 OPRHC
CALLED 19.21 ACRES HILLTOP CAMPUS, LTD VOL: 1780 PG: 747 OPRHC
STABILIZED CONSTRUCTION ENTRANCE
DRIPPING SPRINGS ISD (40.0514 AC) VOL. 1084, PG. 148, OPR
WARNING: CONTRACTOR IS TO VERIFY PRESENCE AND EXACT LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION.
811
Know what's below. Call before you dig.

BENCHMARKS

BM #150 SQUARE CUT SET AT THE BACK OF CURB
- ELEV.= 1229.74' (NAVD '88)

BM #151 SQUARE CUT SET AT THE BACK OF CURB
- ELEV.= 1230.35' (NAVD '88)

No.	REVISIONS	DATE	BY

Kimley»Horn

10814 JOLLYVILLE ROAD, AVALLON IV, SUITE 300, AUSTIN, TX 78759
PHONE: 512-418-1771 FAX: 512-418-1791
WWW.KIMLEY-HORN.COM
TEXAS REGISTERED ENGINEERING FIRM F-928

07/27/2022

STATE OF TEXAS
ALEJANDRO E. GRANADOS RICO
130084
LICENSED PROFESSIONAL ENGINEER

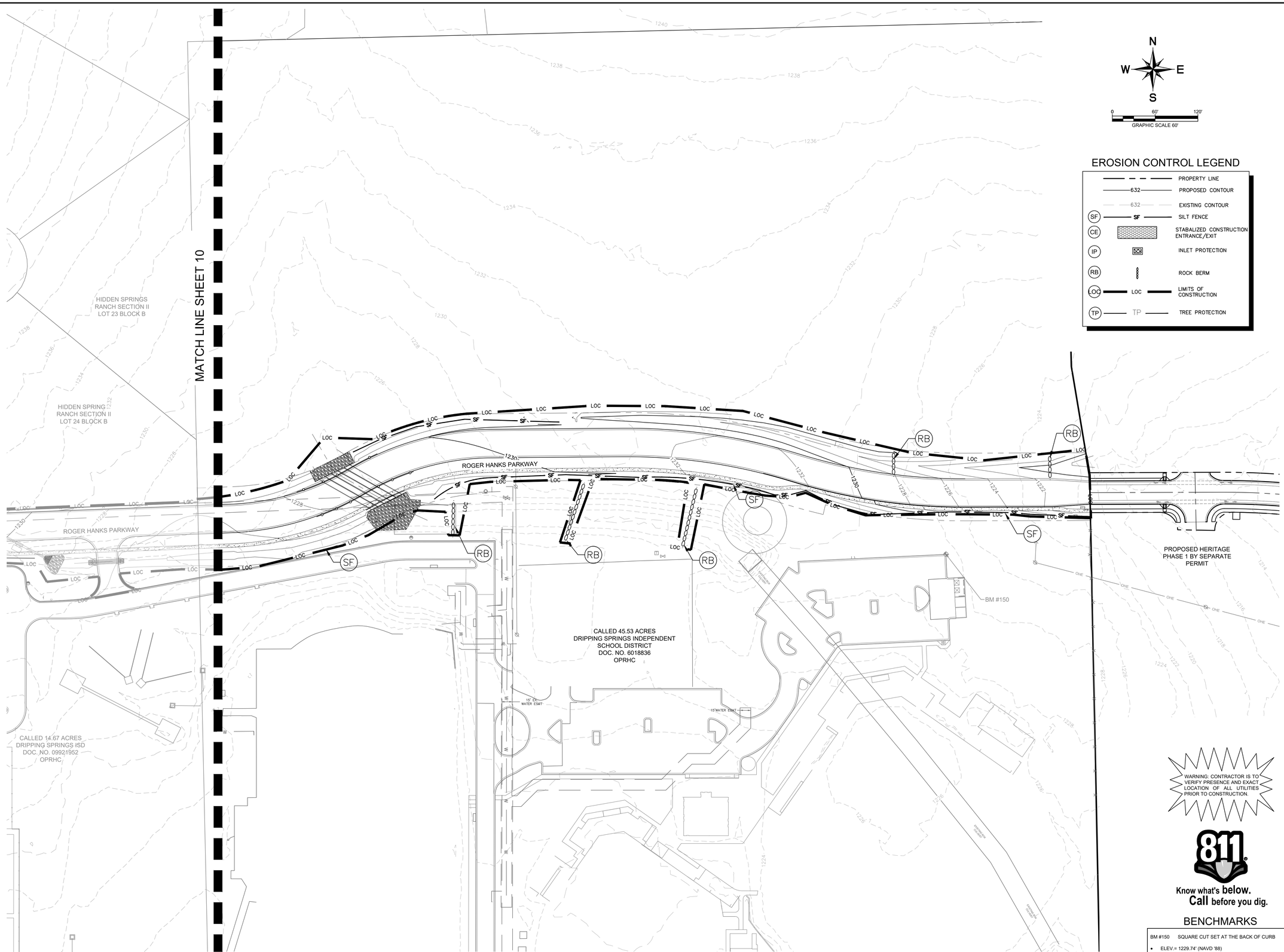
KHA PROJECT 067783117
DATE JULY 2022
SCALE: AS SHOWN
DESIGNED BY: AEG
DRAWN BY: DPD
CHECKED BY: AEG

EROSION CONTROL PLAN (SHEET 1 OF 2)

ROGER HANKS PARKWAY EXTENSION II

CITY OF DRIPPING SPRINGS
HAYS COUNTY, TEXAS

SHEET NUMBER
10



EROSION CONTROL LEGEND

- PROPERTY LINE
- 632 — PROPOSED CONTOUR
- 632 — EXISTING CONTOUR
- (SF) — SF — SILT FENCE
- (CE) — STABALIZED CONSTRUCTION ENTRANCE/EXIT
- (IP) — INLET PROTECTION
- (RB) — ROCK BERM
- (LOC) — LOC — LIMITS OF CONSTRUCTION
- (TP) — TP — TREE PROTECTION

WARNING: CONTRACTOR IS TO VERIFY PRESENCE AND EXACT LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION.

811 Know what's **below.** **Call** before you dig.

BENCHMARKS

BM #150 SQUARE CUT SET AT THE BACK OF CURB
- ELEV.= 1229.74' (NAVD '88)

BM #151 SQUARE CUT SET AT THE BACK OF CURB
- ELEV.= 1230.35' (NAVD '88)

No.	REVISIONS	DATE	BY

Kimley»Horn
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10814 JOLLYVILLE ROAD, AVALLON IV, SUITE 300, AUSTIN, TX 78759
PHONE: 512-418-1771 FAX: 512-418-1791
WWW.KIMLEY-HORN.COM
TEXAS REGISTERED ENGINEERING FIRM F-928

07/27/2022

STATE OF TEXAS — ALEJANDRO E. GRANADOS RICO — 129209 — LICENSED PROFESSIONAL ENGINEER

KHA PROJECT 067783117

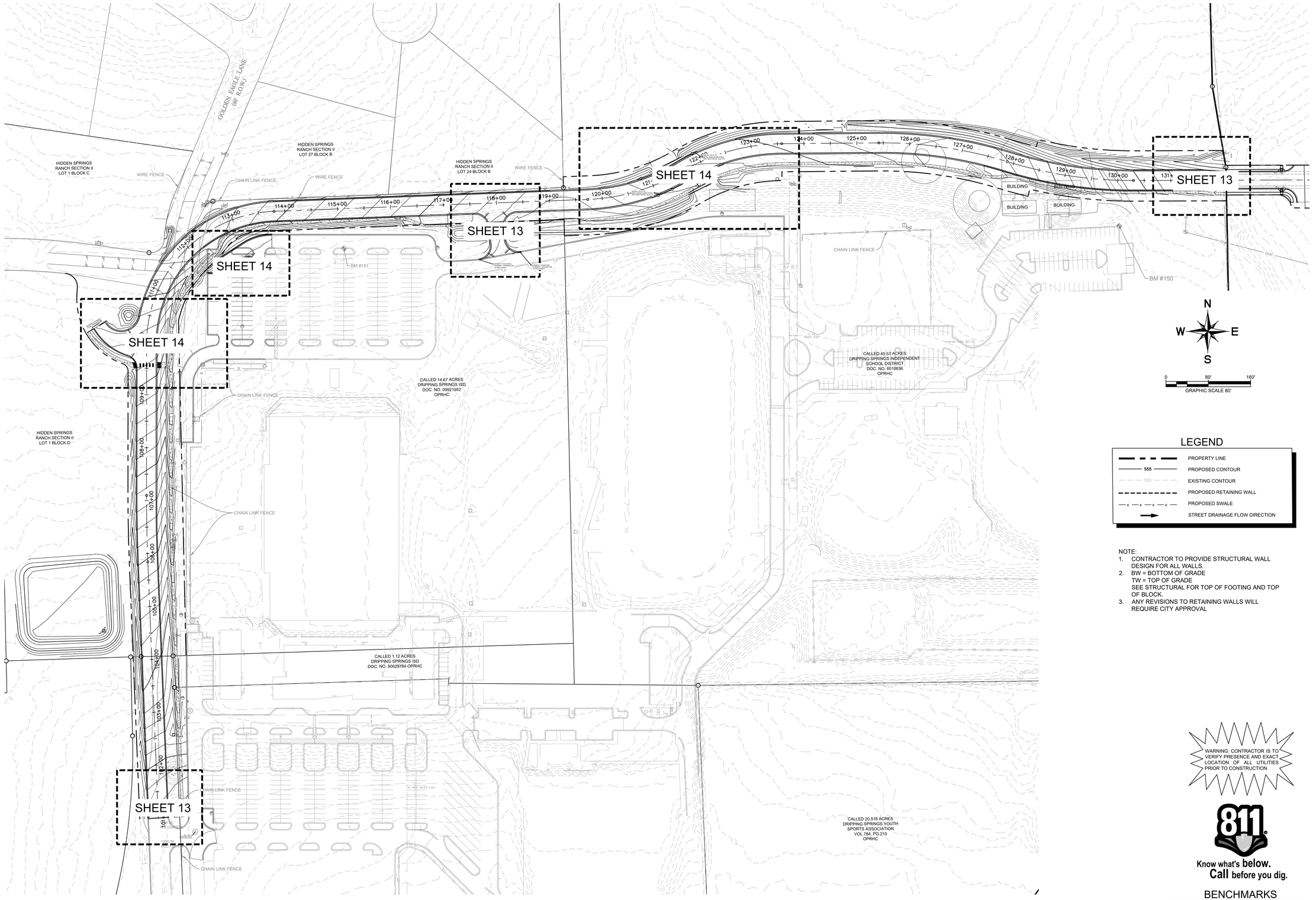
DATE	SCALE	DESIGNED BY:	DRAWN BY:	CHECKED BY:
JULY 2022	AS SHOWN	AEG	DPD	AEG

EROSION CONTROL PLAN (SHEET 2 OF 2)

ROGER HANKS PARKWAY EXTENSION II

CITY OF DRIPPING SPRINGS
HAYS COUNTY, TEXAS

SHEET NUMBER
11



LEGEND

- PROPERTY LINE
- 555 PROPOSED CONTOUR
- 555 EXISTING CONTOUR
- PROPOSED RETAINING WALL
- PROPOSED SWALE
- STREET DRAINAGE FLOW DIRECTION

NOTE:
1. CONTRACTOR TO PROVIDE STRUCTURAL WALL DESIGN FOR ALL WALLS.
2. BW = BOTTOM OF GRADE
   TW = TOP OF GRADE
   SEE STRUCTURAL FOR TOP OF FOOTING AND TOP OF BLOCK.
3. ANY REVISIONS TO RETAINING WALLS WILL REQUIRE CITY APPROVAL

WARNING: CONTRACTOR IS TO VERIFY PRESENCE AND EXACT LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION.

811 Know what's **below.** **Call** before you dig.

BENCHMARKS

BM #150	SQUARE CUT SET AT THE BACK OF CURB
•	ELEV.= 1229.74' (NAVD '88)
BM #151	SQUARE CUT SET AT THE BACK OF CURB
•	ELEV.= 1230.35' (NAVD '88)

No.	REVISIONS	DATE	BY

Kimley»Horn
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10814 JOLLYVILLE ROAD, AVALLON IV, SUITE 300, AUSTIN, TX 78759
PHONE: 512-418-1771 FAX: 512-418-1791
WWW.KIMLEY-HORN.COM
TEXAS REGISTERED ENGINEERING FIRM F-928

07/27/2022

STATE OF TEXAS — ALEJANDRO E. GRANADOS RICO — 130004 — LICENSED PROFESSIONAL ENGINEER

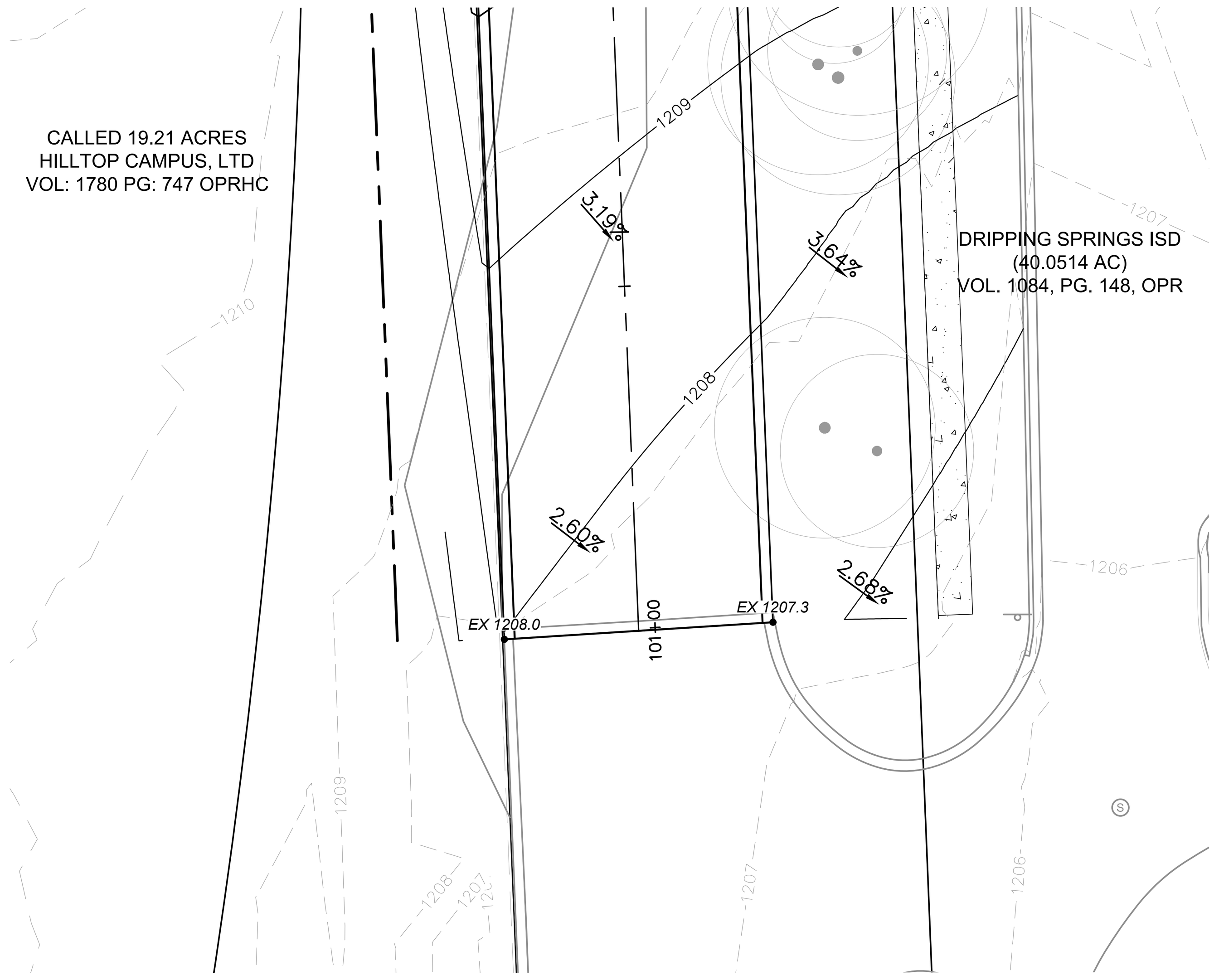
KHA PROJECT	067783117
DATE	JULY 2022
SCALE:	AS SHOWN
DESIGNED BY:	AEG
DRAWN BY:	DPD
CHECKED BY:	AEG

OVERALL GRADING PLAN

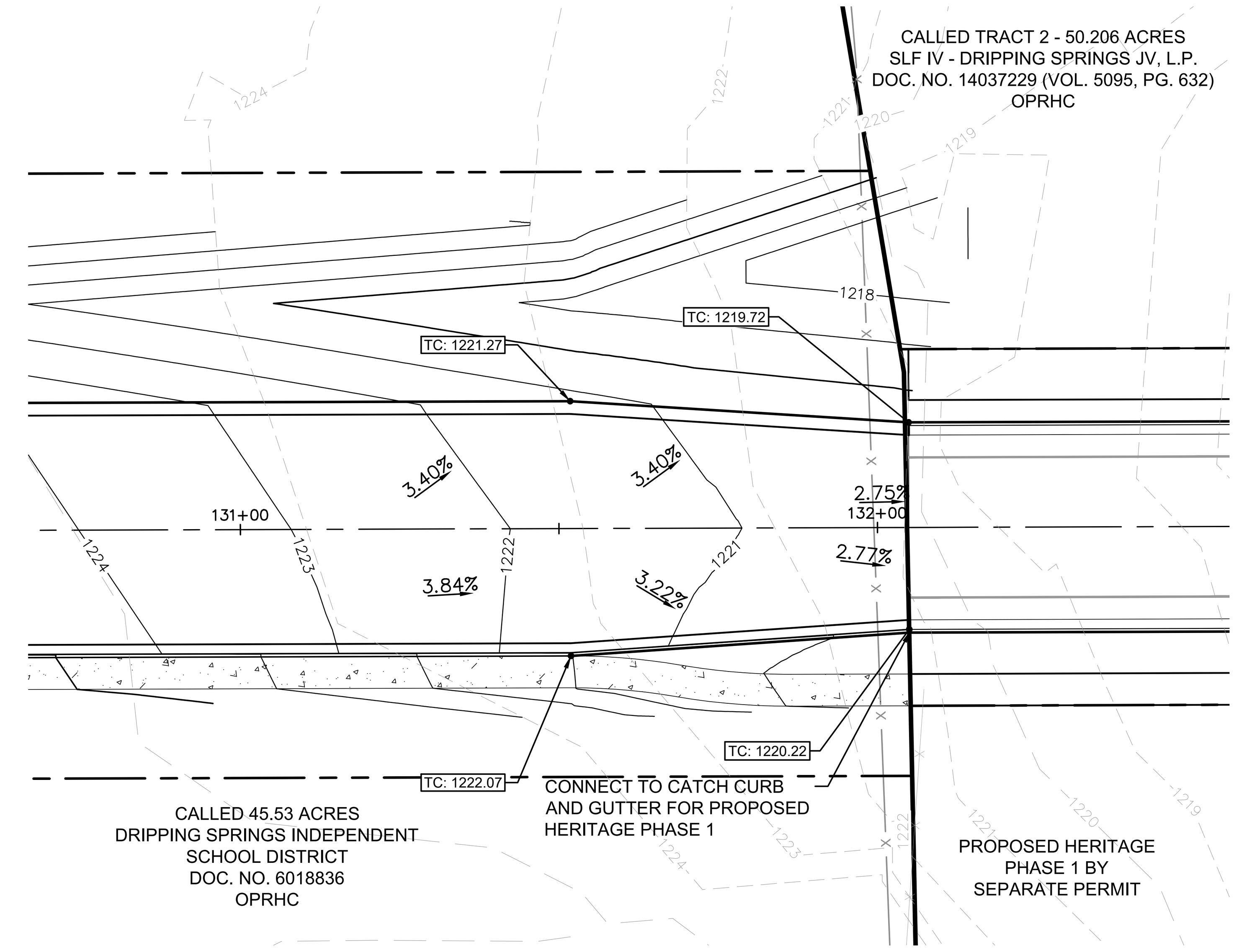
ROGER HANKS PARKWAY EXTENSION II

CITY OF DRIPPING SPRINGS
HAYS COUNTY, TEXAS

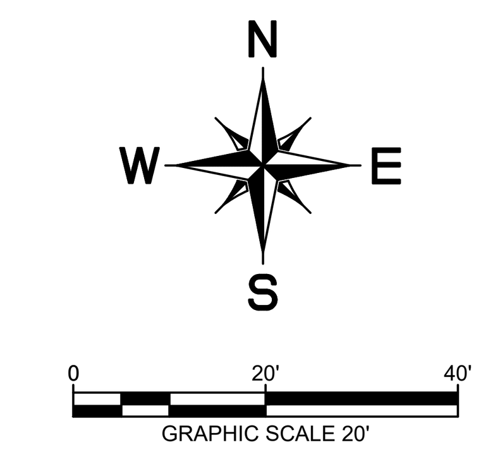
SHEET NUMBER
12



CONNECTION TO EXISTING ROGER HANKS PARKWAY
GRADING DETAIL VIEW "A"


CALLED TRACT 2 - 50.206 ACRES
SLF IV - DRIPPING SPRINGS JV, L.P.
DOC. NO. 14037229 (VOL. 5095, PG. 632)
OPRHC
TC: 1219.72
TC: 1221.27
1218
3.40%
3.40%
2.75%
132+00
131+00
2.77%
3.84%
3.22%
1224
1223
1222
1221
TC: 1220.22
TC: 1222.07
CONNECT TO CATCH CURB
AND GUTTER FOR PROPOSED
HERITAGE PHASE 1
CALLED 45.53 ACRES
DRIPPING SPRINGS INDEPENDENT
SCHOOL DISTRICT
DOC. NO. 6018836
OPRHC
PROPOSED HERITAGE
PHASE 1 BY
SEPARATE PERMIT

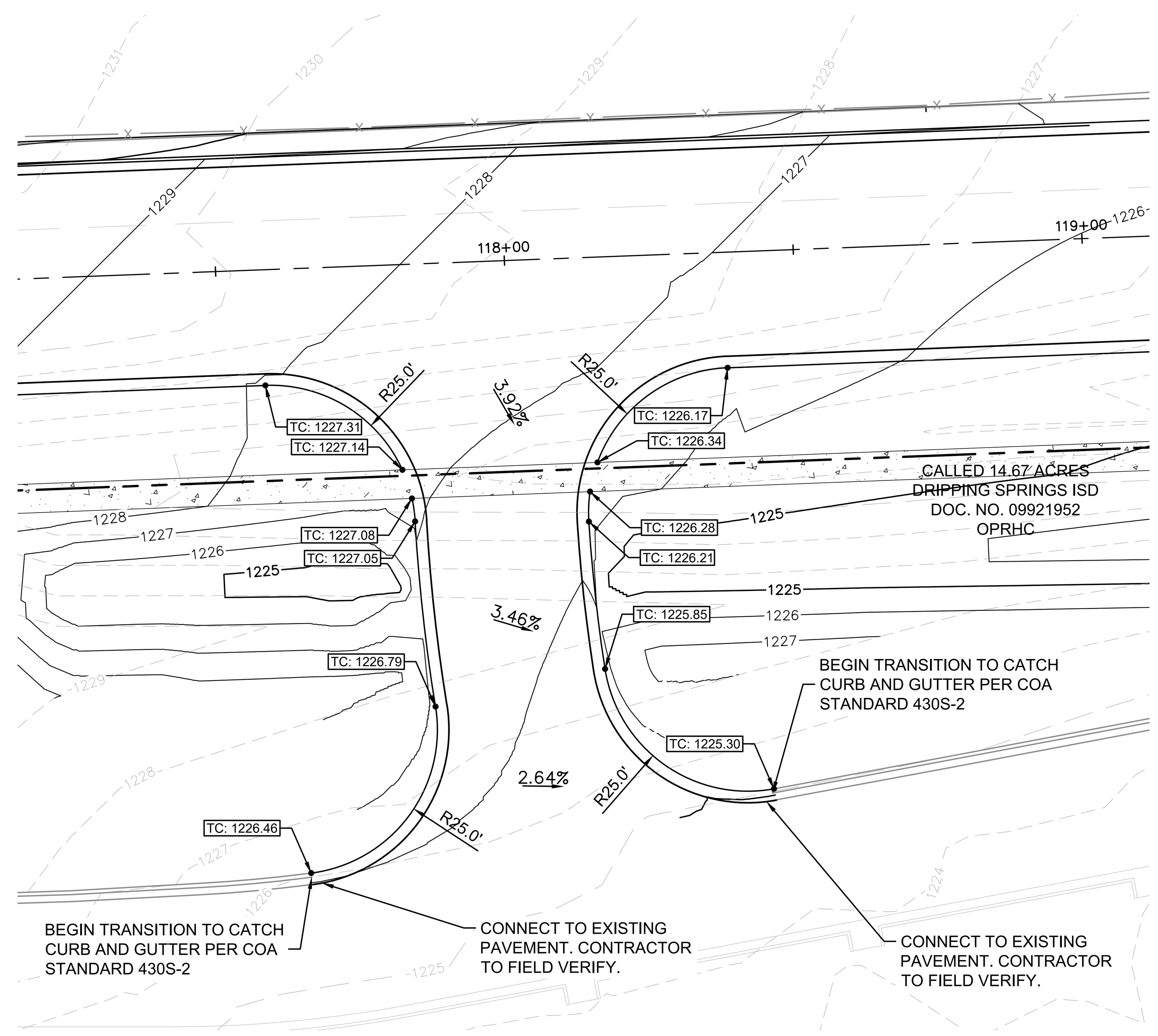
CONNECTION TO ROGER HANKS PARKWAY
GRADING DETAIL VIEW "B"



LEGEND

(line)	PROPERTY LINE
555	PROPOSED CONTOUR
555	EXISTING CONTOUR
(line)	PROPOSED RETAINING WALL
(line)	PROPOSED SWALE
(arrow)	STREET DRAINAGE FLOW DIRECTION

NOTE:
1. CONTRACTOR TO PROVIDE STRUCTURAL WALL DESIGN FOR ALL WALLS.
2. BW = BOTTOM OF GRADE
   TW = TOP OF GRADE
   SEE STRUCTURAL FOR TOP OF FOOTING AND TOP OF BLOCK.
3. ANY REVISIONS TO RETAINING WALLS WILL REQUIRE CITY APPROVAL


118+00
119+00
1229
1228
1227
1226
1225
R25.0'
3.92%
TC: 1227.31
TC: 1227.14
TC: 1227.08
TC: 1227.05
TC: 1226.79
TC: 1226.46
TC: 1226.17
TC: 1226.34
TC: 1226.28
TC: 1226.21
TC: 1225.85
TC: 1225.30
3.46%
2.64%
CALLED 14.67 ACRES
DRIPPING SPRINGS ISD
DOC. NO. 09921952
OPRHC
BEGIN TRANSITION TO CATCH
CURB AND GUTTER PER COA
STANDARD 430S-2
CONNECT TO EXISTING
PAVEMENT. CONTRACTOR
TO FIELD VERIFY.

PARKING LOT DRIVEWAY
GRADING DETAIL VIEW "C"

WARNING: CONTRACTOR IS TO VERIFY PRESENCE AND EXACT LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION.

Know what's **below.**
Call before you dig.

BENCHMARKS

BM #150	SQUARE CUT SET AT THE BACK OF CURB
•	ELEV.= 1229.74' (NAVD '88)
BM #151	SQUARE CUT SET AT THE BACK OF CURB
•	ELEV.= 1230.35' (NAVD '88)

No.	REVISIONS	DATE	BY

Kimley»Horn

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10814 JOLLYVILLE ROAD, AVALLON IV, SUITE 300, AUSTIN, TX 78759
PHONE: 512-418-1771 FAX: 512-418-1791
WWW.KIMLEY-HORN.COM
TEXAS REGISTERED ENGINEERING FIRM F-928

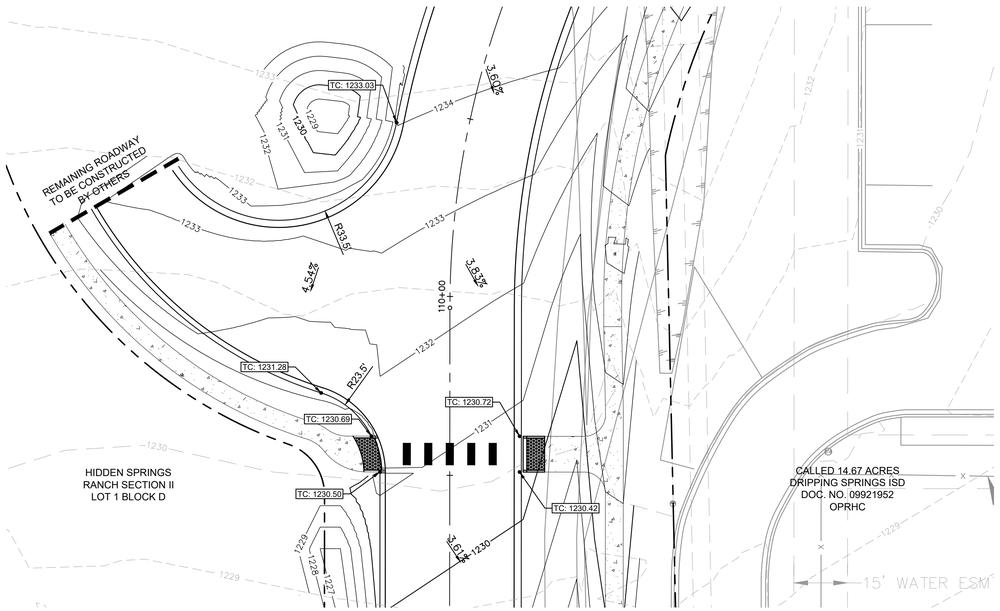
07/27/2022
STATE OF TEXAS
ALEJANDRO E. GRANADOS RICO
130084
LICENSED
PROFESSIONAL ENGINEER
FOR PERMIT PURPOSES NOT FOR CONSTRUCTION

KHA PROJECT 067783117	DATE JULY 2022	SCALE: AS SHOWN	DESIGNED BY: AEG	DRAWN BY: DPD	CHECKED BY: AEG

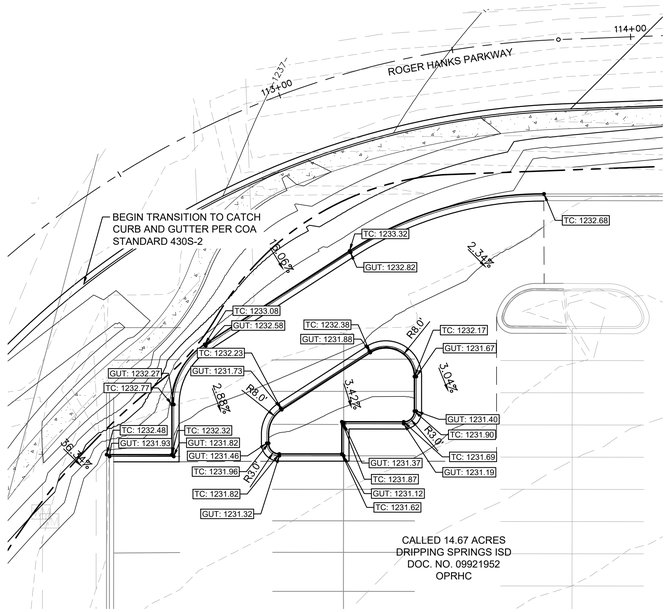
DETAILED GRADING PLAN (SHEET 1 OF 2)

ROGER HANKS PARKWAY EXTENSION II
CITY OF DRIPPING SPRINGS
HAYS COUNTY, TEXAS

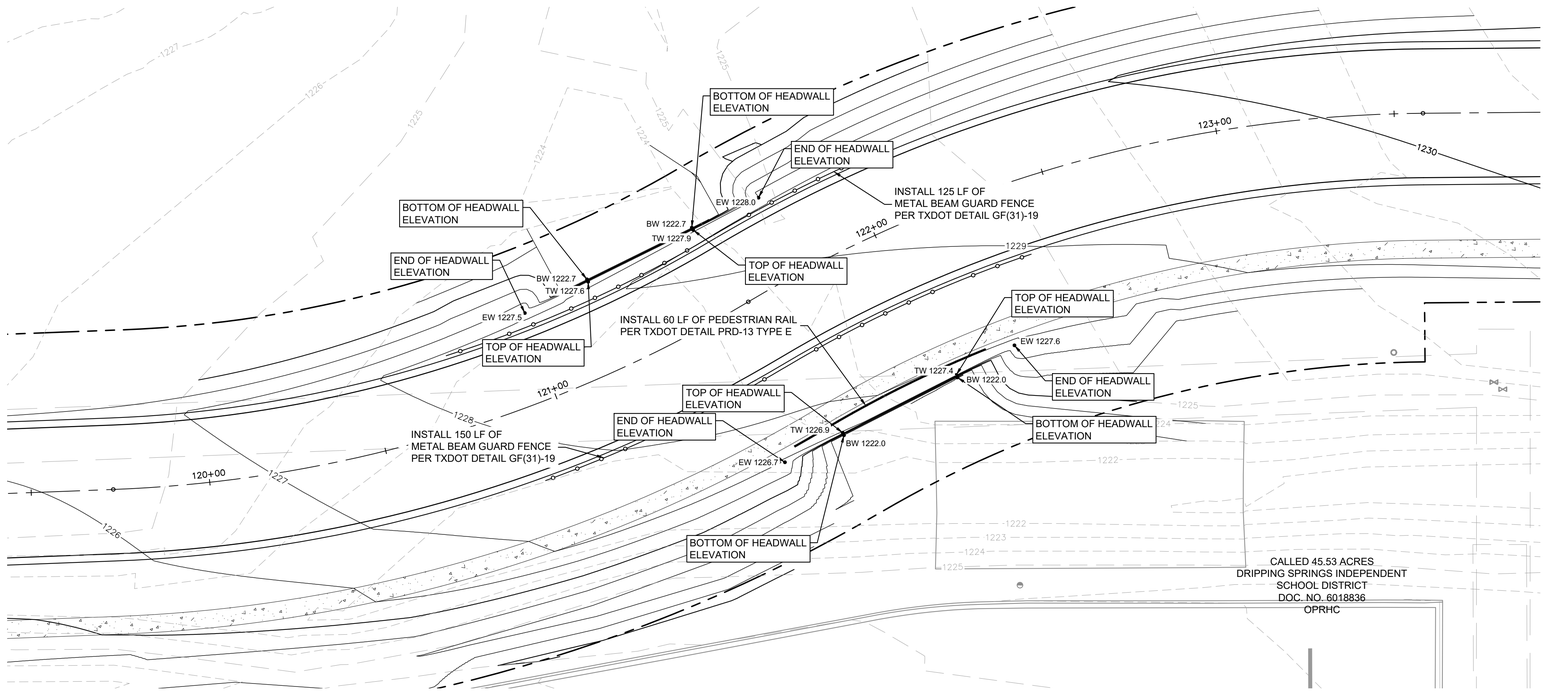
SHEET NUMBER
13



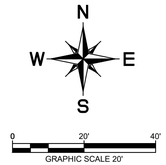
INTERSECTION OF ROGER HANKS PARKWAY AND GOLDEN EAGLE LANE
GRADING DETAIL VIEW "D"



PROPOSED PARKING LOT RECONFIGURATION
GRADING DETAIL VIEW "E"



HEADWALL
GRADING DETAIL VIEW "F"



LEGEND

- PROPERTY LINE
- 555 PROPOSED CONTOUR
- 555 EXISTING CONTOUR
- PROPOSED RETAINING WALL
- PROPOSED SWALE
- STREET DRAINAGE FLOW DIRECTION

NOTE:
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2. BW = BOTTOM OF GRADE
   TW = TOP OF GRADE
   SEE STRUCTURAL FOR TOP OF FOOTING AND TOP OF BLOCK.
3. ANY REVISIONS TO RETAINING WALLS WILL REQUIRE CITY APPROVAL
4. ALL CURB RADII FROM BACK OF CURB UNLESS OTHERWISE NOTED

WARNING: CONTRACTOR IS TO VERIFY PRESENCE AND EXACT LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION.

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BENCHMARKS

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No.	REVISIONS	DATE	BY

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TEXAS REGISTERED ENGINEERING FIRM F-928

07/27/2022

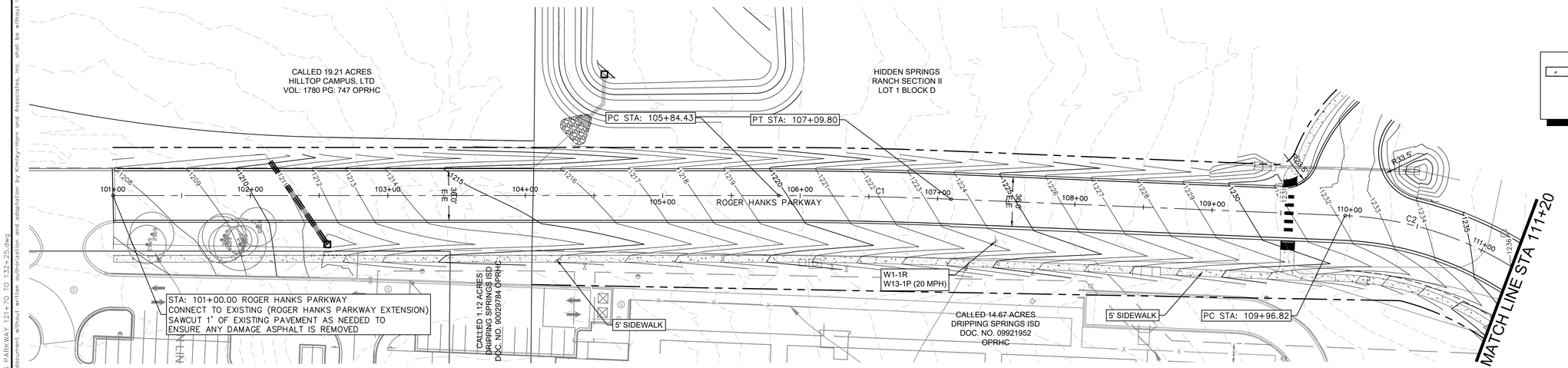
STATE OF TEXAS
ALEJANDRO E. GRANADOS RICO
103084
LICENSED PROFESSIONAL ENGINEER
Alejandro E. Granados Rico

KHA PROJECT 067783117			
DATE JULY 2022	SCALE: AS SHOWN	DESIGNED BY: AEG	
		DRAWN BY: DPD	
		CHECKED BY: AEG	

DETAILED GRADING PLAN
(SHEET 2 OF 2)

ROGER HANKS PARKWAY
EXTENSION II
CITY OF DRIPPING SPRINGS
HAYS COUNTY, TEXAS

SHEET NUMBER
14



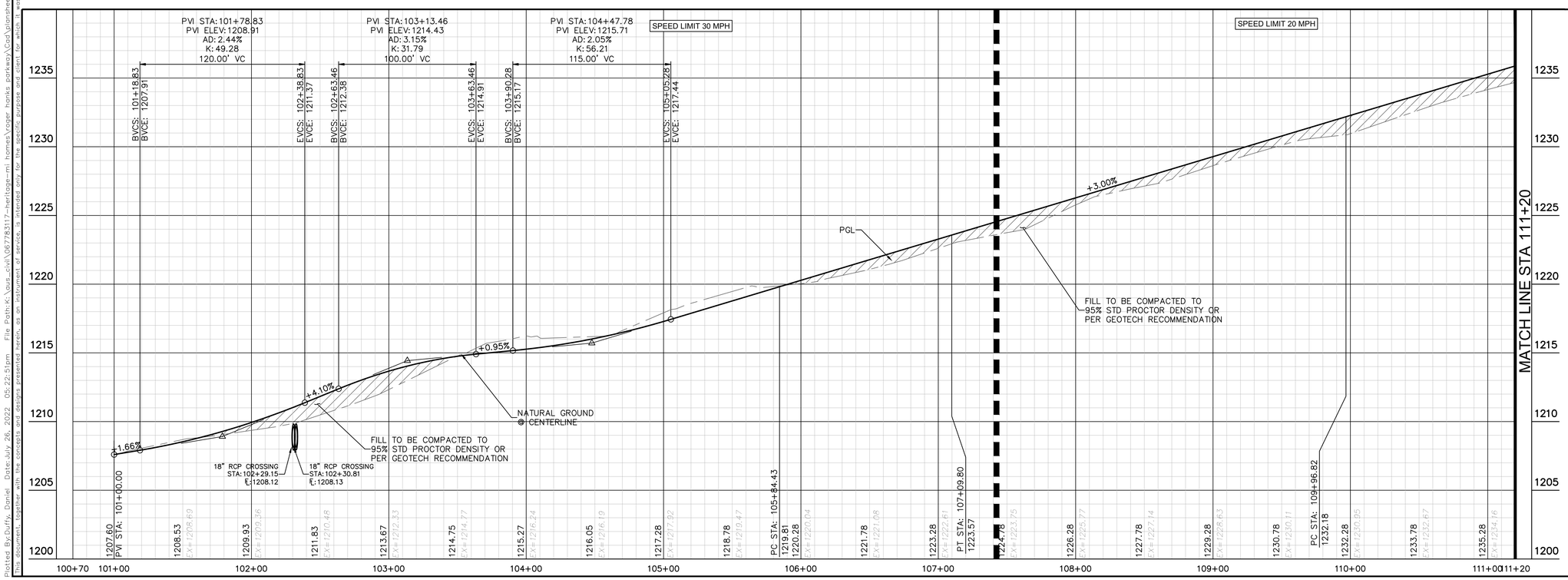
CURVE TABLE						
CURVE	RADIUS	LENGTH	CHORD BEARING	CHORD	DELTA	TANGENT
C1	3000.00'	125.37'	N1°08'54"W	125.36'	2°23'39"	62.69'
C2	250.00'	382.98'	N43°56'08"E	346.62'	87°46'25"	240.47'

PAVING NOTES

SEE PAVING DETAILS SHEETS 39 & 40
FOR TYPICAL PAVING SECTION

STREET INFORMATION			
STREET NAME	K VALUE - SAG	K VALUE - CREST	DESIGN SPEED LIMIT
ROGER HANKS PARKWAY	49	29	35 MPH
ROGER HANKS PARKWAY	26	12	25 MPH

ROGER HANKS PARKWAY



PROFILE SCALE
1" = 40' HORIZONTAL
1" = 4' VERTICAL

WARNING: CONTRACTOR IS TO VERIFY PRESENCE AND EXACT LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION.

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BENCHMARKS

BM #150 SQUARE CUT SET AT THE BACK OF CURB
- ELEV.= 1229.74' (NAVD '88)

BM #151 SQUARE CUT SET AT THE BACK OF CURB
- ELEV.= 1230.35' (NAVD '88)

No.	REVISIONS	DATE	BY

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WWW.KIMLEY-HORN.COM
TEXAS REGISTERED ENGINEERING FIRM F-928

07/27/2022

STATE OF TEXAS
ALEJANDRO E. GRANADOS RICO
103729
LICENSED
PROFESSIONAL ENGINEER
ALEJANDRO E. GRANADOS RICO

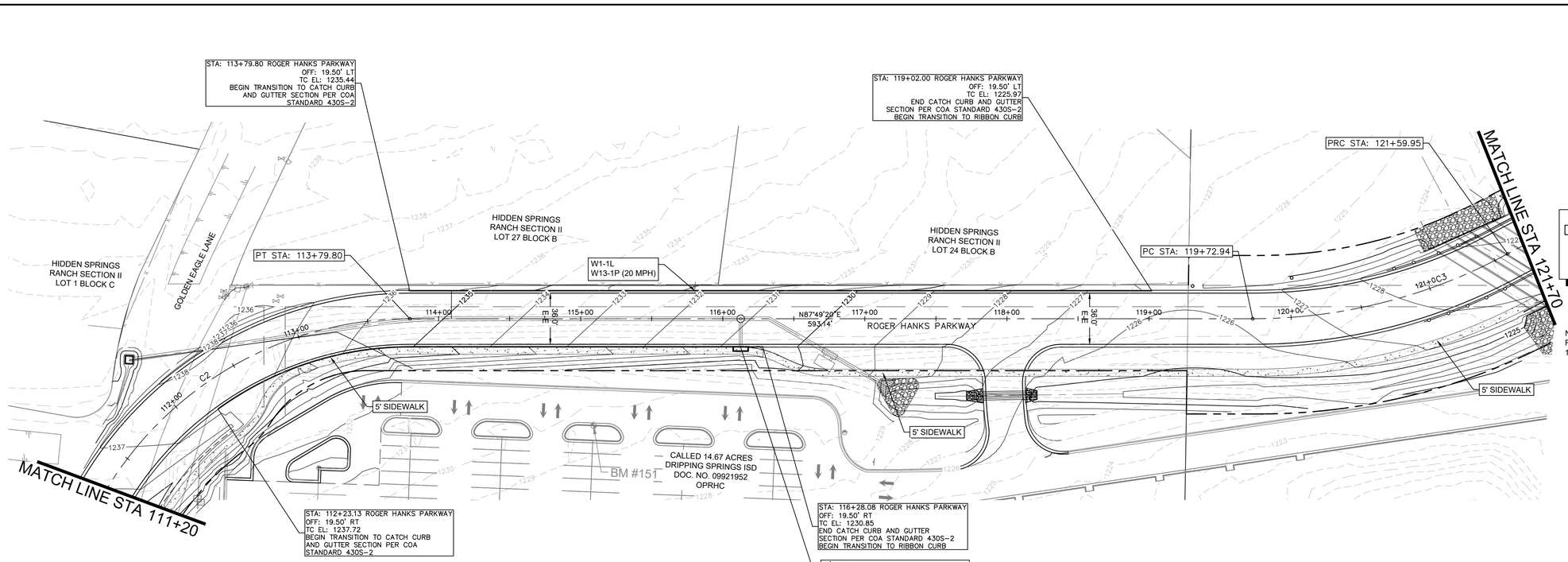
KHA PROJECT 067783117
DATE JULY 2022
SCALE: AS SHOWN
DESIGNED BY: AEG
DRAWN BY: DPD
CHECKED BY: AEG

PAVING PLAN & PROFILE - ROGER HANKS PARKWAY 100+70 TO 111+20

ROGER HANKS PARKWAY EXTENSION II

CITY OF DRIPPING SPRINGS
HAYS COUNTY, TEXAS

SHEET NUMBER
15



NOTE: SEE SHEET 18 FOR CROSS SECTION VIEWS FOR ROGER HANKS PARKWAY FOR STATIONS 112+00 TO 119+00.

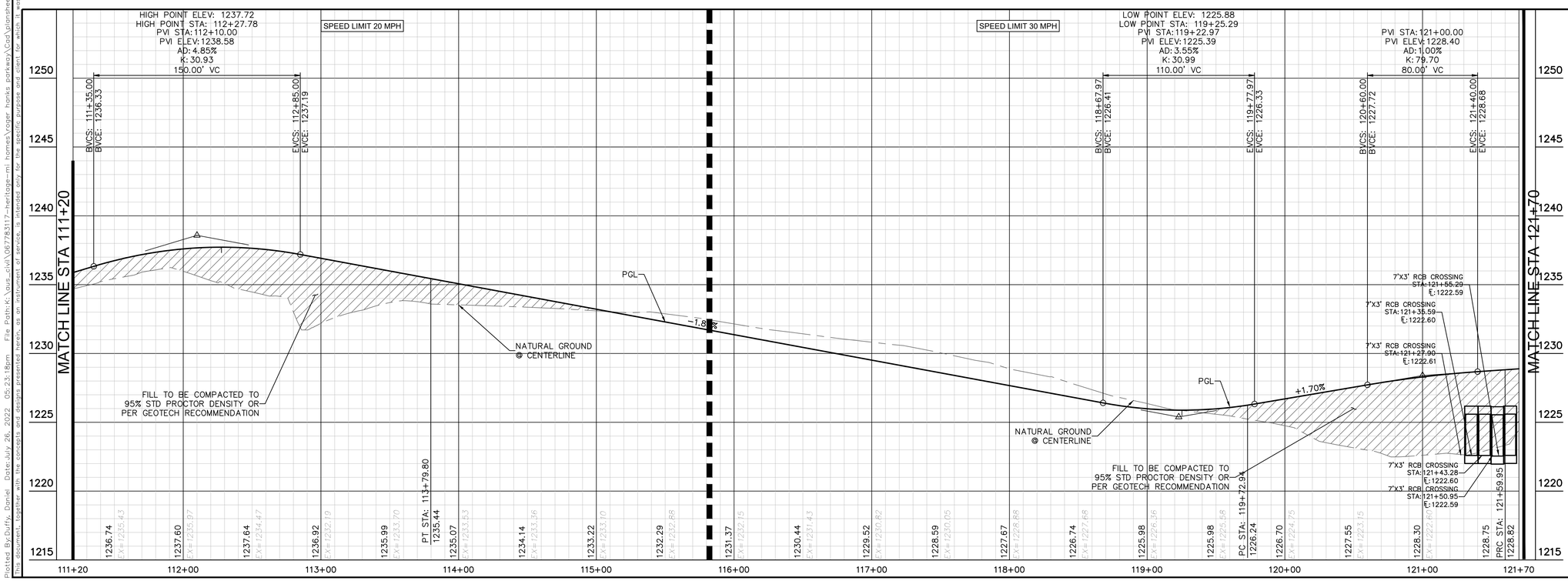
CURVE TABLE						
CURVE	RADIUS	LENGTH	CHORD BEARING	CHORD	DELTA	TANGENT
C2	250.00'	382.98'	N43°56'08"E	346.62'	87°46'25"	240.47'
C3	375.00'	187.01'	N73°32'08"E	185.08'	28°34'25"	95.49'

PAVING NOTES

SEE PAVING DETAILS SHEETS 39 & 40 FOR TYPICAL PAVING SECTION

STREET INFORMATION			
STREET NAME	K VALUE - SAG	K VALUE - CREST	DESIGN SPEED LIMIT
ROGER HANKS PARKWAY	49	29	35 MPH
ROGER HANKS PARKWAY	26	12	25 MPH

ROGER HANKS PARKWAY



PROFILE SCALE
1" = 40' HORIZONTAL
1" = 4' VERTICAL

WARNING: CONTRACTOR IS TO VERIFY PRESENCE AND EXACT LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION.

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BENCHMARKS

BM #150 SQUARE CUT SET AT THE BACK OF CURB
- ELEV.= 1229.74' (NAVD '88)

BM #151 SQUARE CUT SET AT THE BACK OF CURB
- ELEV.= 1230.35' (NAVD '88)

No.	REVISIONS	DATE	BY

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WWW.KIMLEY-HORN.COM
TEXAS REGISTERED ENGINEERING FIRM F-928

07/27/2022

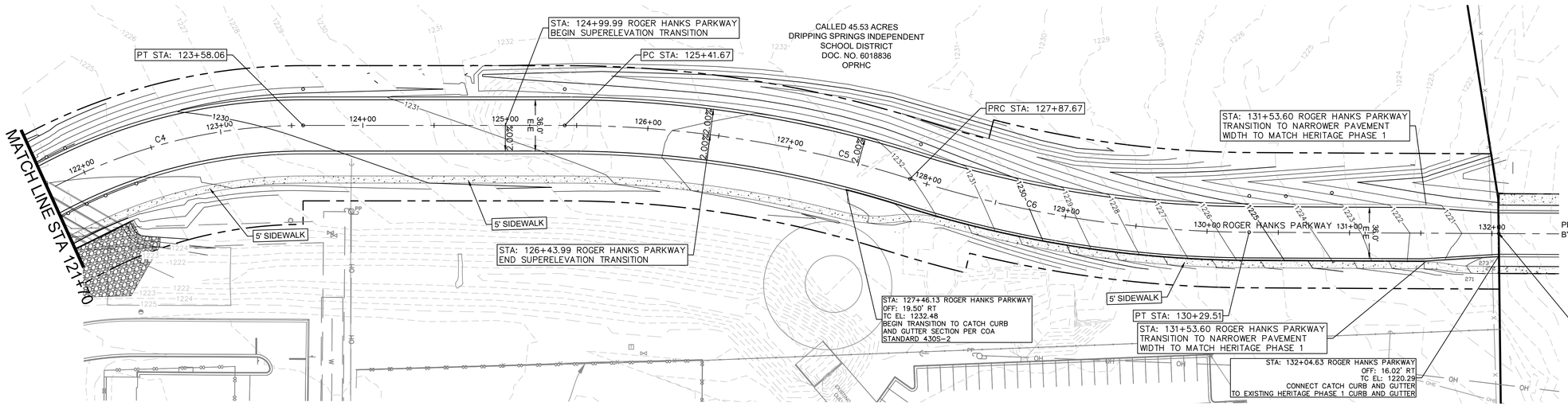
STATE OF TEXAS ALEJANDRO E. GRANADOS RICO 125064 LICENSED PROFESSIONAL ENGINEER

KHA PROJECT 067783117
DATE JULY 2022
SCALE: AS SHOWN
DESIGNED BY: AEG
DRAWN BY: DPD
CHECKED BY: AEG

PAVING PLAN & PROFILE - ROGER HANKS PARKWAY 110+20 TO 121+70

ROGER HANKS PARKWAY EXTENSION II
CITY OF DRIPPING SPRINGS
HAYS COUNTY, TEXAS

SHEET NUMBER
16



CURVE TABLE						
CURVE	RADIUS	LENGTH	CHORD BEARING	CHORD	DELTA	TANGENT
C4	375.00'	198.11'	N74°22'59"E	195.81'	30°16'06"	101.42'
C5	800.00'	246.00'	S81°40'25"E	245.03'	17°37'07"	123.98'
C6	800.00'	241.84'	S81°31'28"E	240.92'	17°19'13"	121.85'

N
W E
S

0 40' 80'
GRAPHIC SCALE 40'

LEGEND

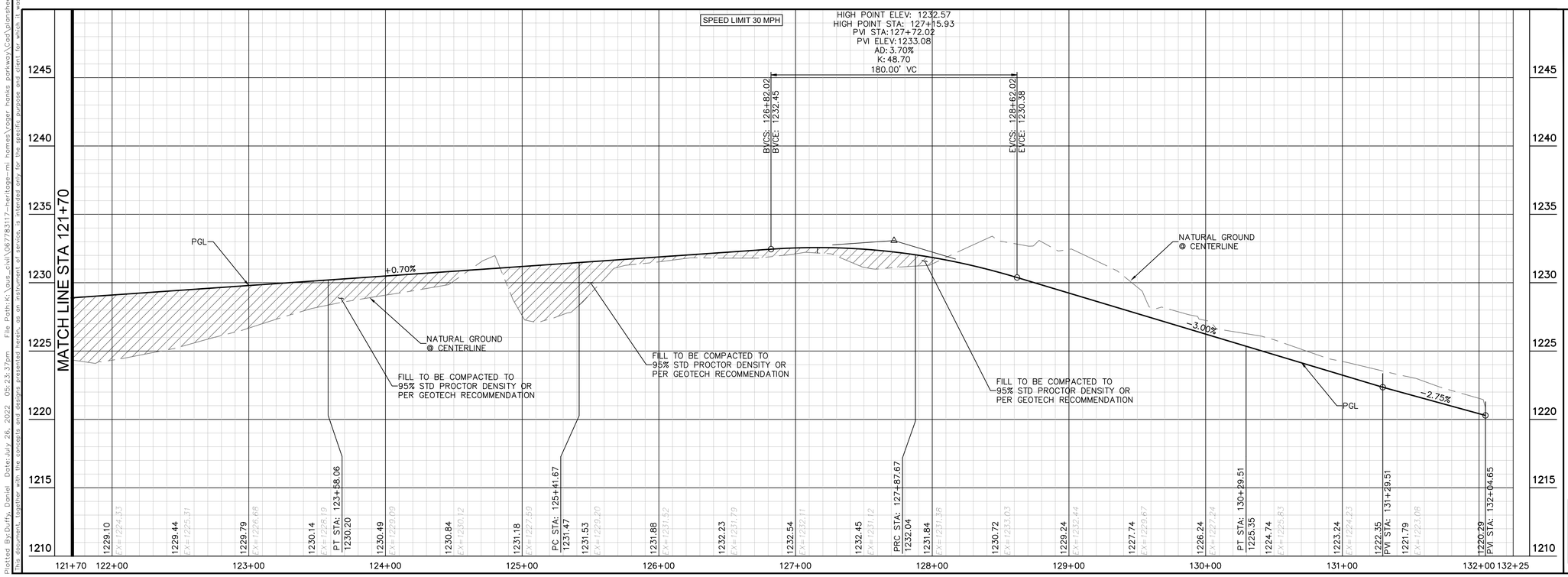
	5' SIDEWALK (IN THIS CONTRACT)
E-E	EDGE OF PAVEMENT TO EDGE OF PAVEMENT
PGL	PROPOSED GRADE LINE

PAVING NOTES

SEE PAVING DETAILS SHEETS 39 & 40
FOR TYPICAL PAVING SECTION

STREET INFORMATION			
STREET NAME	K VALUE - SAG	K VALUE - CREST	DESIGN SPEED LIMIT
ROGER HANKS PARKWAY	49	29	35 MPH
ROGER HANKS PARKWAY	26	12	25 MPH

ROGER HANKS PARKWAY



PROFILE SCALE
1" = 40' HORIZONTAL
1" = 4' VERTICAL

WARNING: CONTRACTOR IS TO VERIFY PRESENCE AND EXACT LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION.

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BENCHMARKS

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No.	REVISIONS	DATE	BY

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TEXAS REGISTERED ENGINEERING FIRM F-928

07/27/2022

STATE OF TEXAS
ALEJANDRO E. CERVANTES RICO
103729
LICENSED
PROFESSIONAL ENGINEER

KHA PROJECT 067783117
DATE JULY 2022
SCALE: AS SHOWN
DESIGNED BY: AEG
DRAWN BY: DPD
CHECKED BY: AEG

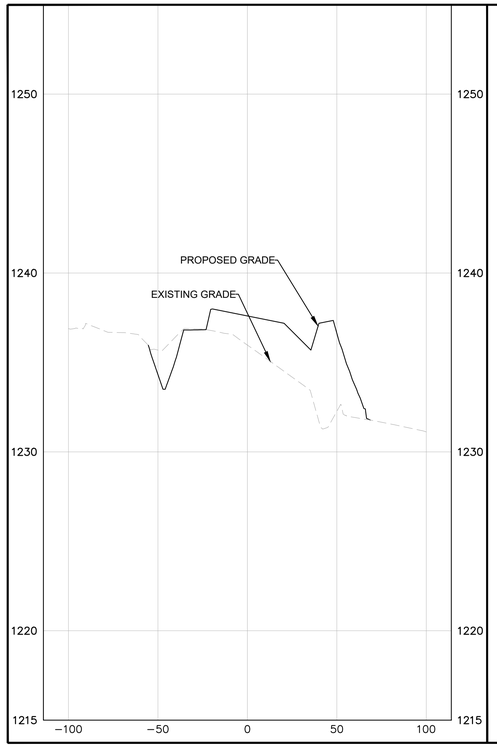
PAVING PLAN & PROFILE - ROGER HANKS PARKWAY 121+70 TO 132+25

ROGER HANKS PARKWAY EXTENSION II

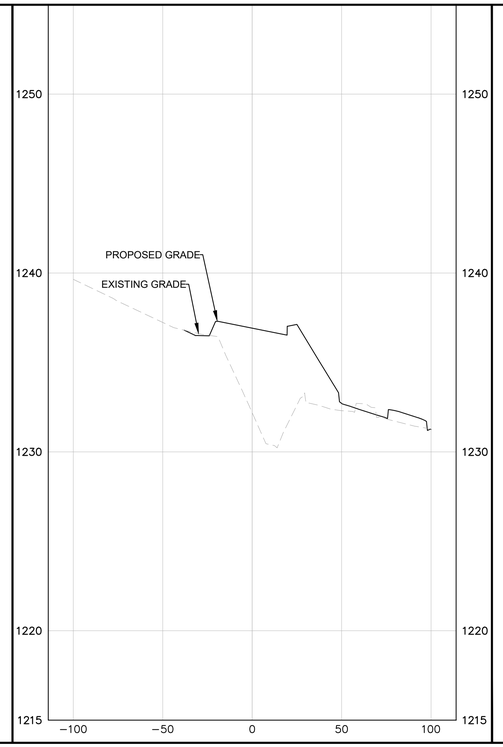
CITY OF DRIPPING SPRINGS
HAYS COUNTY, TEXAS

SHEET NUMBER
17

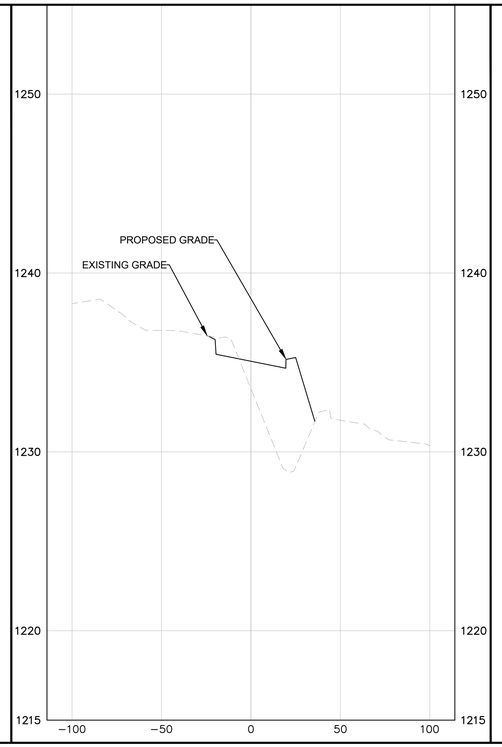
112+00



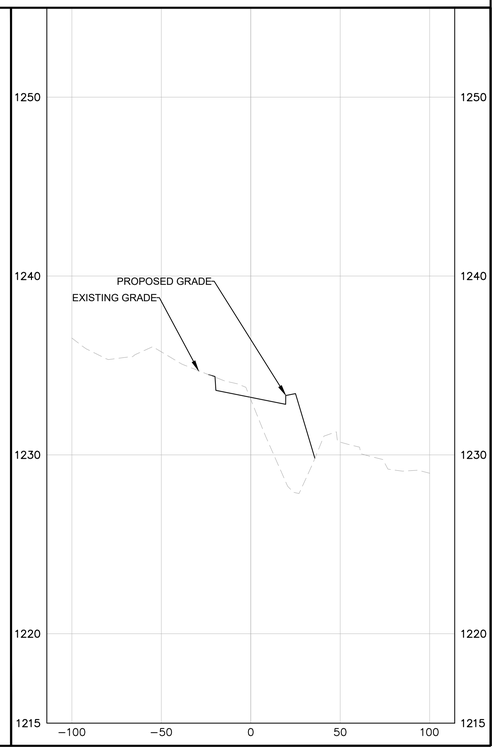
113+00



114+00



115+00



PROFILE SCALE
1" = 40' HORIZONTAL
1" = 4' VERTICAL

No.	REVISIONS	DATE	BY

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07/27/2022

KHA PROJECT 067783117	DATE JULY 2022	SCALE: AS SHOWN	DESIGNED BY: AEG	DRAWN BY: DPD	CHECKED BY: AEG

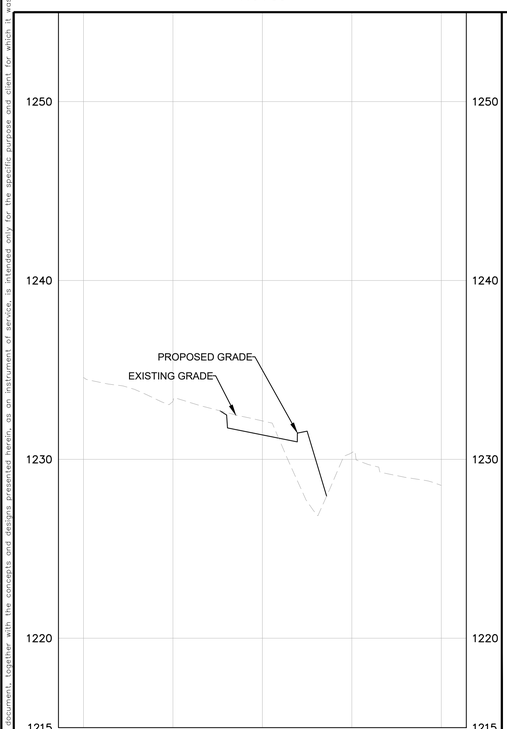
ROGER HANKS PARKWAY SECTION VIEWS - 112+00 TO 119+00

ROGER HANKS PARKWAY EXTENSION II

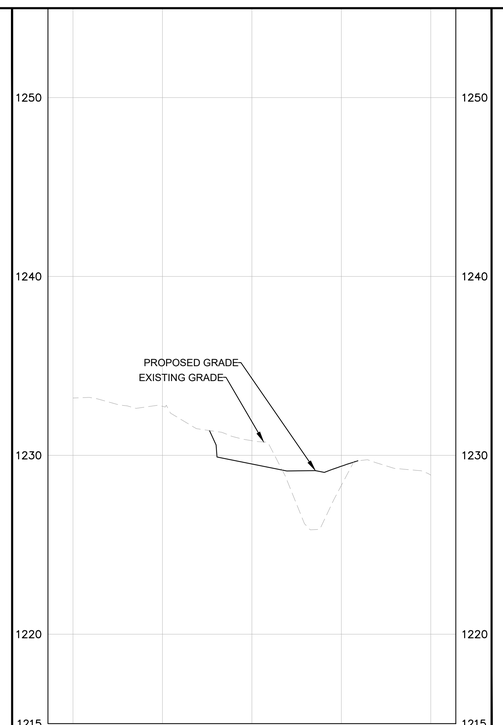
CITY OF DRIPPING SPRINGS
HAYS COUNTY, TEXAS

SHEET NUMBER
18

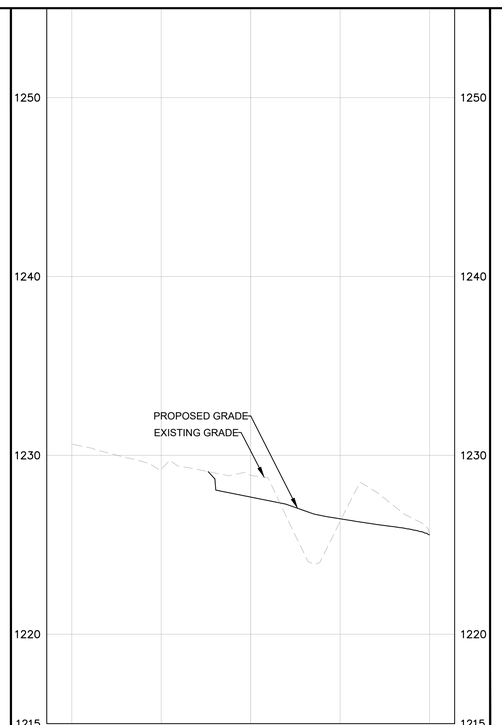
116+00



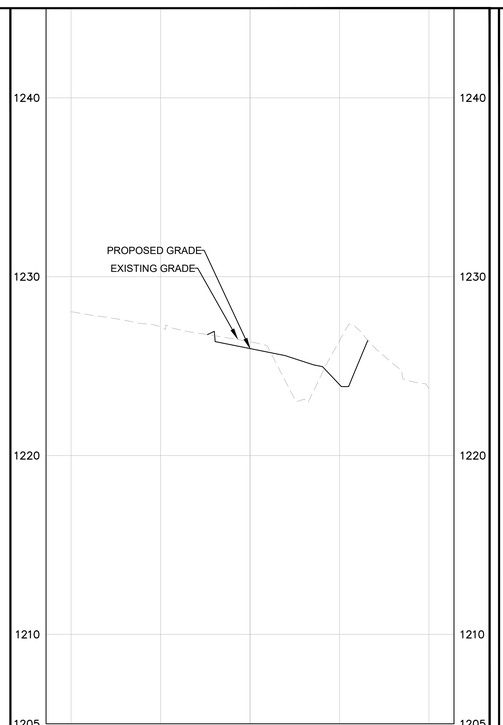
117+00



118+00



119+00



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1" = 4' VERTICAL

WARNING: CONTRACTOR IS TO VERIFY PRESENCE AND EXACT LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION.

811
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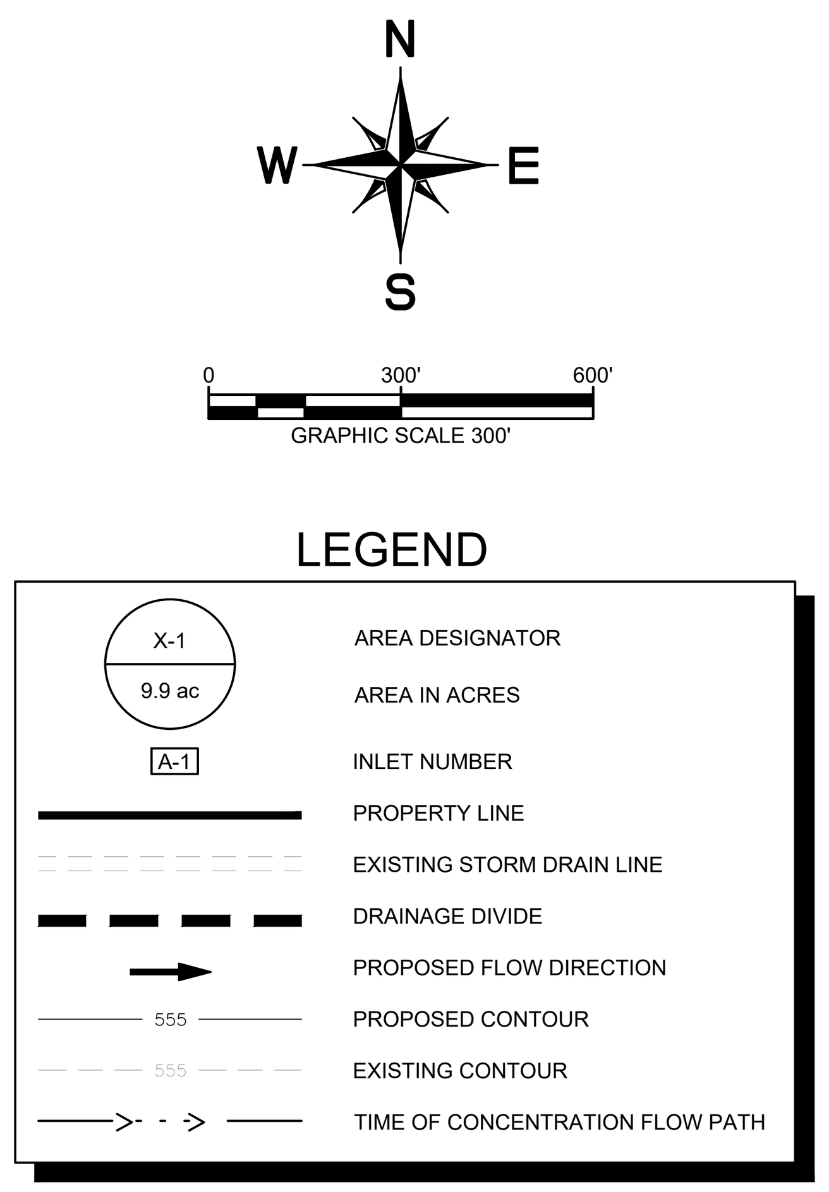
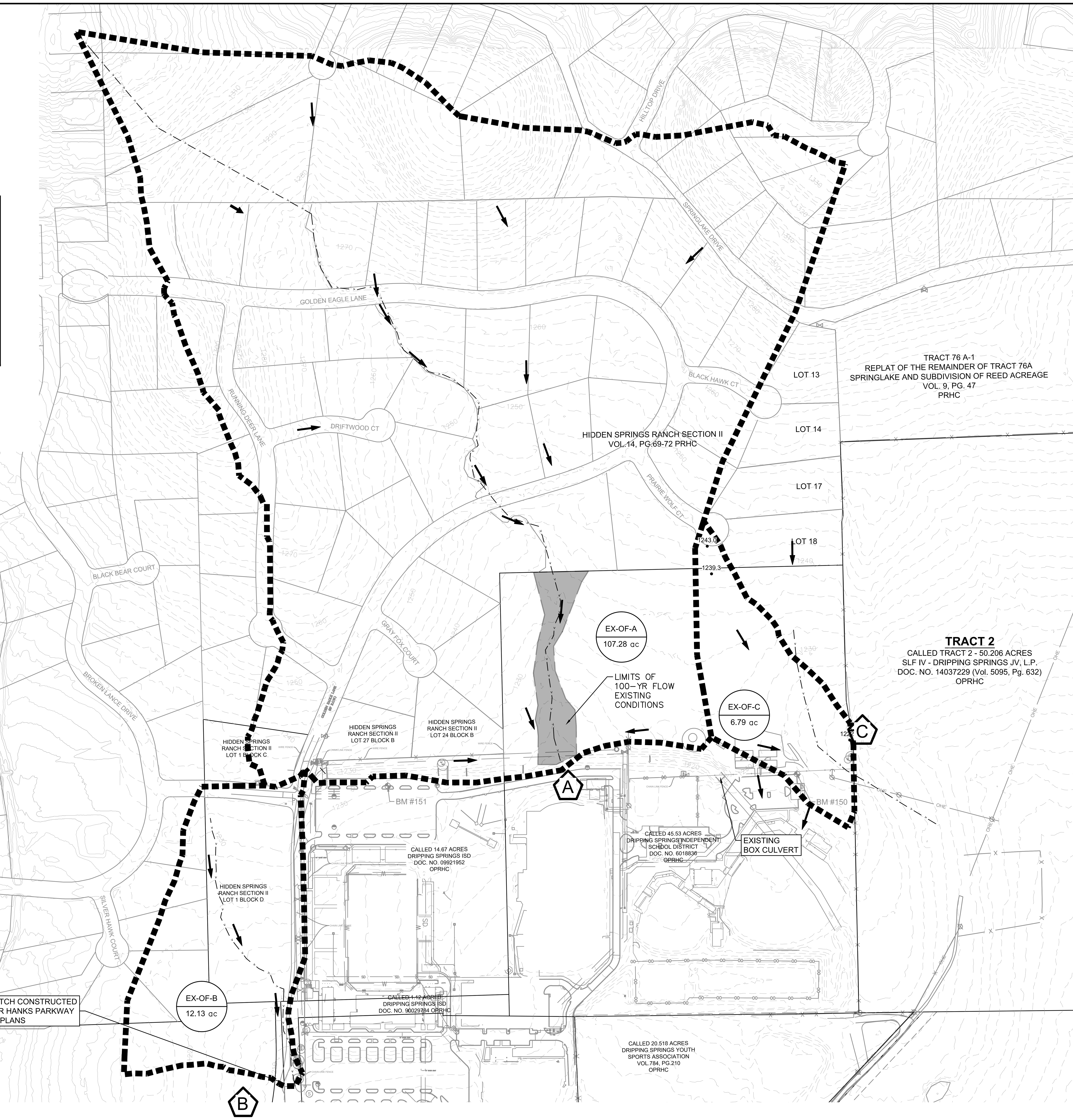
Call before you dig.

BENCHMARKS

BM #150 SQUARE CUT SET AT THE BACK OF CURB
- ELEV.= 1229.74' (NAVD '88)

BM #151 SQUARE CUT SET AT THE BACK OF CURB
- ELEV.= 1230.35' (NAVD '88)


N
W
E
S
0
300'
600'
GRAPHIC SCALE 300'
LEGEND
X-1
9.9 ac
AREA DESIGNATOR
AREA IN ACRES
A-1
INLET NUMBER
PROPERTY LINE
EXISTING STORM DRAIN LINE
DRAINAGE DIVIDE
PROPOSED FLOW DIRECTION
555
PROPOSED CONTOUR
555
EXISTING CONTOUR
TIME OF CONCENTRATION FLOW PATH


GOLDEN EAGLE LANE
HILLTOP DRIVE
SPRINGLAKE DRIVE
BLACK HAWK CT
RUNNING DEER LANE
DRIFTWOOD CT
PRAIRIE WOLF CT
BLACK BEAR COURT
GRAY FOX COURT
BROKEN LANCE DRIVE
LOVE WOLF COURT
SILVER HAWK COURT
HIDDEN SPRINGS RANCH SECTION II
VOL.14, PG.69-72 PRHC
LOT 13
LOT 14
LOT 17
LOT 18
TRACT 76 A-1
REPLAT OF THE REMAINDER OF TRACT 76A
SPRINGLAKE AND SUBDIVISION OF REED ACREAGE
VOL. 9, PG. 47
PRHC
TRACT 2
CALLED TRACT 2 - 50.206 ACRES
SLF IV - DRIPPING SPRINGS JV, L.P.
DOC. NO. 14037229 (Vol. 5095, Pg. 632)
OPRHC
1243.0
1239.3
EX-OF-A
107.28 ac
LIMITS OF
100–YR FLOW
EXISTING
CONDITIONS
EX-OF-C
6.79 ac
C
1222
A
HIDDEN SPRINGS
RANCH SECTION II
LOT 1 BLOCK C
HIDDEN SPRINGS
RANCH SECTION II
LOT 27 BLOCK B
HIDDEN SPRINGS
RANCH SECTION II
LOT 24 BLOCK B
BM #151
BM #150
CALLED 45.53 ACRES
DRIPPING SPRINGS INDEPENDENT
SCHOOL DISTRICT
DOC. NO. 6018836
OPRHC
EXISTING
BOX CULVERT
CALLED 14.67 ACRES
DRIPPING SPRINGS ISD
DOC. NO. 09921952
OPRHC
HIDDEN SPRINGS
RANCH SECTION II
LOT 1 BLOCK D
CALLED 1.12 ACRES
DRIPPING SPRINGS ISD
DOC. NO. 90029784 OPRHC
CALLED 20.518 ACRES
DRIPPING SPRINGS YOUTH
SPORTS ASSOCIATION
VOL.784, PG.210
OPRHC
EXISTING DITCH CONSTRUCTED
WITH ROGER HANKS PARKWAY
EXTENSION PLANS
EX-OF-B
12.13 ac
B

Composite CN Calculations					
Drainage Area			EX-OF-A		
Land Cover Description	Hydrologic Condition	Soil Group	SCS CN	Area	CN*AREA
Impervious			98	565031	55373038
Woods-Grass Combination	Fair	C	76	1124065	85428940
Woods-Grass Combination	Fair	D	82	2348044	192539608
Woods	Fair	C	73	692888	50580824
			Totals	4729772	383922410
		Composite SCS CN			81.1670481

Composite CN Calculations					
Drainage Area			EX-OF-B		
Land Cover Description	Hydrologic Condition	Soil Group	SCS CN	Area	CN*AREA
Impervious			98	25111	2460878
Meadow	Fair	C	71	38246	2715466
Meadow	Fair	D	78	464868	36259704
			Totals	528225	41436048
		Composite SCS CN			78.4439358

Composite CN Calculations					
Drainage Area			EX-OF-C		
Land Cover Description	Hydrologic Condition	Soil Group	SCS CN	Area	CN*AREA
Impervious			98	3437	336826
Woods-Grass Combination	Fair	D	82	292507	23985574
			Totals	295944	24322400
		Composite SCS CN			82.1858189

Roger Hanks Preliminary

DETENTION RESULTS - SCS METHOD

EXISTING CONDITIONS

Point of Analysis	Total Drainage Area (Acres)	Total Impervious Cover Area (acres)	Impervious Area (%)	Storm Event	Existing Runoff (cfs)
A	107.28	12.97	12.09%	2 10 25 100	142.68 336.59 455.12 651.45
B	12.13	0.58	4.75%	2 10 25 100	15.96 40.14 55.01 79.99
C	6.79	0.08	1.16%	2 10 25 100	10.54 24.29 32.55 46.28

ROGER HANKS PARKWAY

Drainage Calculations - SCS Method

DRAINAGE AREA	AREA	AREA	IMPERVIOUS COVER	WEIGHTED CURVE NO.	SHEET FLOW				SHALLOW CONCENTRATED FLOW				CHANNEL FLOW					TOTAL Tc**
					P-2yr24hr 4.07 IN				Grass Surface				Channel Flow 1					(min)
	(sf)	(Ac.)	(Ac.)	Cn*	N	L (ft)	S (ft/ft)	Tt(min)	L (ft)	V (fps)	S (ft/ft)	Tt(min)	L (ft)	V (fps)	n	S (ft/ft)	Tt(min)	
EX-OF-A	4,672,964	107.28	12.971	81.16	0.15	100	0.015	9.75	981	4.29	0.071	3.81	2480	8.5	0.030	0.019	4.86	18.42
EX-OF-B	528,225	12.13	0.576	78.44	0.15	100	0.035	6.95	720	2.37	0.022	5.07	354	8.0	0.035	0.025	0.74	12.75
EX-OF-C	295,944	6.79	0.079	82.19	0.15	100	0.037	6.79	833	2.34	0.021	5.94	-	-	0.030	-	0.00	12.73

WARNING: CONTRACTOR IS TO VERIFY PRESENCE AND EXACT LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION.

811 Know what's below. Call before you dig.

BENCHMARKS

BM #150 SQUARE CUT SET AT THE BACK OF CURB

- ELEV.= 1229.74' (NAVD '88)

BM #151 SQUARE CUT SET AT THE BACK OF CURB

- ELEV.= 1230.35' (NAVD '88)

No.	REVISIONS	DATE	BY

Kimley»Horn

© 2021 KIMLEY–HORN AND ASSOCIATES, INC.
10814 JOLLYVILLE ROAD, AVALLON IV, SUITE 300, AUSTIN, TX 78759
PHONE: 512–418–1771 FAX: 512–418–1791
WWW.KIMLEY–HORN.COM
TEXAS REGISTERED ENGINEERING FIRM F–928

07/27/2022

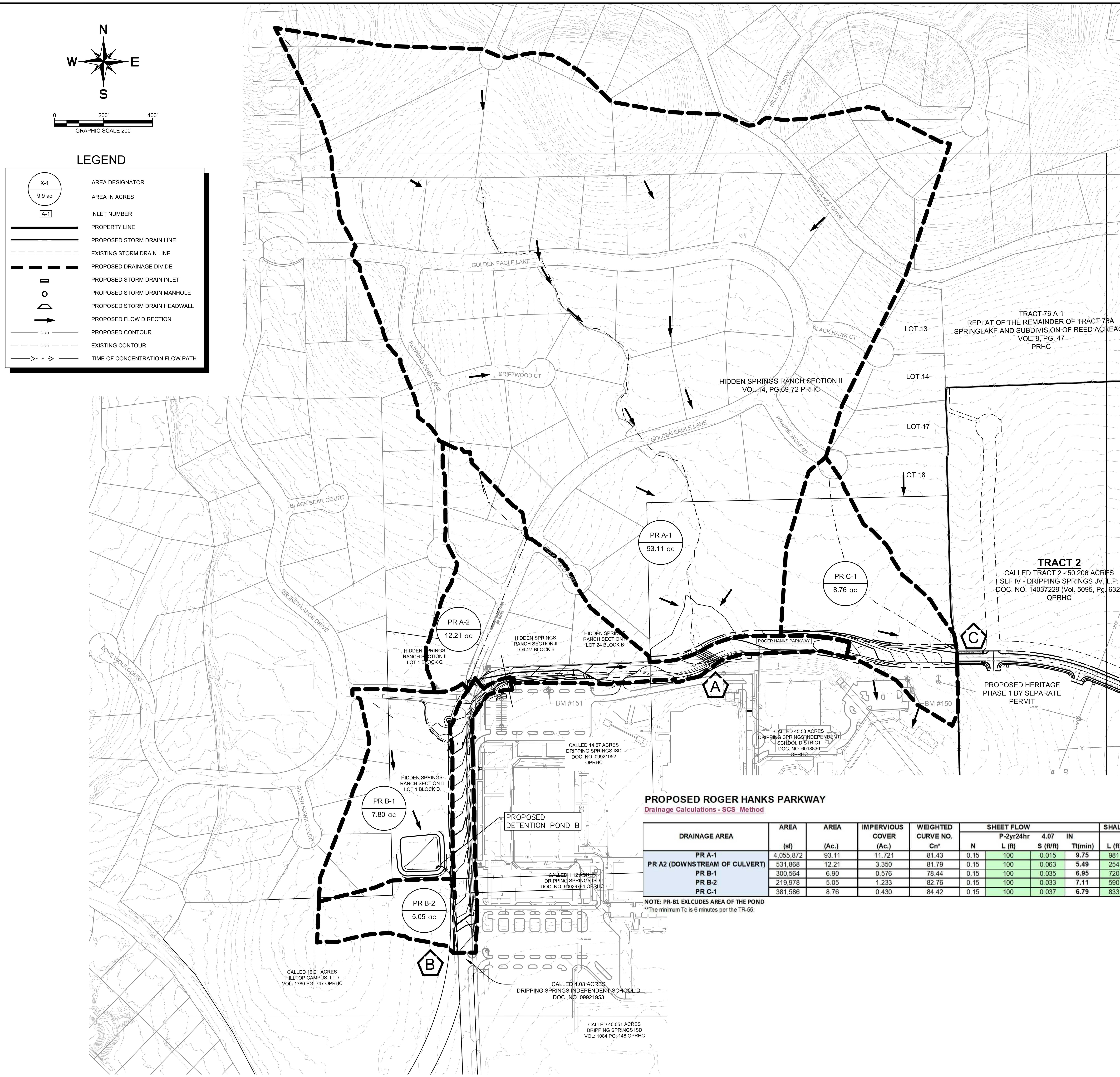
STATE OF TEXAS — ALEJANDRO E. GRANADOS RICO — 130084 — LICENSED PROFESSIONAL ENGINEER — FOR PERMIT PURPOSES ONLY NOT FOR CONSTRUCTION

KHA PROJECT 067783117 | DATE JULY 2022 | SCALE: AS SHOWN | DESIGNED BY: AEG | DRAWN BY: DPD | CHECKED BY: AEG

EXISTING DRAINAGE AREA MAP

ROGER HANKS PARKWAY EXTENSION II
CITY OF DRIPPING SPRINGS
HAYS COUNTY, TEXAS

SHEET NUMBER 19


N
W
E
S
0
200'
400'
GRAPHIC SCALE 200'
LEGEND
X-1
9.9 ac
AREA DESIGNATOR
AREA IN ACRES
A-1
INLET NUMBER
PROPERTY LINE
PROPOSED STORM DRAIN LINE
EXISTING STORM DRAIN LINE
PROPOSED DRAINAGE DIVIDE
PROPOSED STORM DRAIN INLET
PROPOSED STORM DRAIN MANHOLE
PROPOSED STORM DRAIN HEADWALL
PROPOSED FLOW DIRECTION
555
PROPOSED CONTOUR
EXISTING CONTOUR
TIME OF CONCENTRATION FLOW PATH
HILLTOP DRIVE
SPRINGLAKE DRIVE
GOLDEN EAGLE LANE
BLACK HAWK CT
RUNNING DEER LANE
DRIFTWOOD CT
PRAIRIE WOLF CT
BLACK BEAR COURT
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VOL. 9, PG. 47
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TRACT 2
CALLED TRACT 2 - 50.206 ACRES
SLF IV - DRIPPING SPRINGS JV, L.P.
DOC. NO. 14037229 (Vol. 5095, Pg. 632)
OPRHC
PR A-1
93.11 ac
PR C-1
8.76 ac
PR A-2
12.21 ac
PR B-1
7.80 ac
PR B-2
5.05 ac
A
B
C
HIDDEN SPRINGS
RANCH SECTION II
LOT 1 BLOCK C
HIDDEN SPRINGS
RANCH SECTION II
LOT 27 BLOCK B
HIDDEN SPRINGS
RANCH SECTION II
LOT 24 BLOCK B
HIDDEN SPRINGS
RANCH SECTION II
LOT 1 BLOCK D
ROGER HANKS PARKWAY
BM #151
BM #150
PROPOSED HERITAGE
PHASE 1 BY SEPARATE
PERMIT
CALLED 45.53 ACRES
DRIPPING SPRINGS INDEPENDENT
SCHOOL DISTRICT
DOC. NO. 6018836
OPRHC
CALLED 14.67 ACRES
DRIPPING SPRINGS ISD
DOC. NO. 09921952
OPRHC
PROPOSED
DETENTION POND B
CALLED 1.12 ACRES
DRIPPING SPRINGS ISD
DOC. NO. 90029784 OPRHC
CALLED 19.21 ACRES
HILLTOP CAMPUS, LTD
VOL: 1780 PG: 747 OPRHC
CALLED 4.03 ACRES
DRIPPING SPRINGS INDEPENDENT SCHOOL D
DOC. NO. 09921953
CALLED 40.051 ACRES
DRIPPING SPRINGS ISD
VOL: 1084 PG: 148 OPRHC

Roger Hanks Parkway Ext. II

DETENTION RESULTS - SCS METHOD

EXISTING CONDITIONS

Point of Analysis	Total Drainage Area (Acres)	Total Impervious Cover Area (acres)	Impervious Area (%)	Storm Event	Existing Runoff (cfs)
A	107.28	12.97	12.09%	2 10 25 100	142.68 336.59 455.12 651.45
B	12.13	0.58	4.75%	2 10 25 100	15.96 40.14 55.01 79.99
C	6.79	0.08	1.16%	2 10 25 100	10.66 24.52 32.84 46.67

PROPOSED CONDITIONS

Point of Analysis	Total Drainage Area (Acres)	Total Impervious Cover Area (acres)	Impervious Area (%)	Storm Event	Developed Runoff (With Detention) (cfs)
A	107.27	15.07	14.05%	2 10 25 100	141.77 331.18 443.73 624.51
B	12.86	1.86	14.46%	2 10 25 100	12.40 28.31 37.89 53.31
C	6.81	0.54	7.93%	2 10 25 100	15.11 33.18 43.91 61.67

PROPOSED VS. EXISTING COMPARISON

Point of Analysis	Storm Event	Existing Runoff (cfs)	Developed Runoff (cfs)	Runoff Difference at Point of Analysis (cfs)	Is Developed ≤ Existing?
A	2	142.68	141.77	0.91	YES
	10	336.59	331.18	5.41	YES
	25	455.12	443.73	11.39	YES
	100	651.45	624.51	26.94	YES
B	2	15.96	12.40	3.56	YES
	10	40.14	28.31	11.83	YES
	25	55.01	37.89	17.12	YES
	100	79.99	53.31	26.68	YES
C*	2	10.66	15.11	-4.45	NO
	10	24.52	33.18	-8.66	NO
	25	32.84	43.91	-11.07	NO
	100	46.67	61.67	-15.00	NO

Note: All detention runoff calculations were analyzed using the Soil Conservation Services Method as documented in the Technical Release 55. Pond Pack V8i was used to calculate the runoff and design the pond volume and outlet structure.

*Increase in flow to Point of Analysis "C" to be captured by the oversized Pond in Heritage Phase 1.

PROPOSED ROGER HANKS PARKWAY

Drainage Calculations - SCS Method

DRAINAGE AREA	AREA	AREA	IMPERVIOUS COVER	WEIGHTED CURVE NO.	SHEET FLOW				SHALLOW CONCENTRATED FLOW				CHANNEL FLOW					TOTAL Tc**
					P-2yr24hr 4.07 IN				Grass Surface				GRASS CHANNEL/PIPE FLOW					(min)
	(sf)	(Ac.)	(Ac.)	Cn*	N	L (ft)	S (ft/ft)	Tt(min)	L (ft)	V (fps)	S (ft/ft)	Tt(min)	L (ft)	V (fps)	n	S (ft/ft)	Tt(min)	
PR A-1	4,055,872	93.11	11.721	81.43	0.15	100	0.015	9.75	981	4.29	0.071	3.81	2480	8.5	0.030	0.019	4.86	18.42
PR A2 (DOWNSTREAM OF CULVERT)	531,868	12.21	3.350	81.79	0.15	100	0.063	5.49	254	3.54	0.048	1.20	1000	6.5	0.013	VARIES	2.56	9.25
PR B-1	300,564	6.90	0.576	78.44	0.15	100	0.035	6.95	720	2.37	0.022	5.07	0	0.1	0.035	0.000	0.00	12.01
PR B-2	219,978	5.05	1.233	82.76	0.15	100	0.033	7.11	590	2.60	0.026	3.78	0	0.1	0.030	0.000	0.00	10.89
PR C-1	381,586	8.76	0.430	84.42	0.15	100	0.037	6.79	833	2.34	0.021	5.94	769	6.0	0.030	VARIES	2.14	14.87

NOTE: PR-B1 EXLCUDES AREA OF THE POND

**The minimum Tc is 6 minutes per the TR-55.

WARNING: CONTRACTOR IS TO VERIFY PRESENCE AND EXACT LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION.

811
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Call before you dig.

BENCHMARKS

BM #150 SQUARE CUT SET AT THE BACK OF CURB
- ELEV.= 1229.74' (NAVD '88)

BM #151 SQUARE CUT SET AT THE BACK OF CURB
- ELEV.= 1230.35' (NAVD '88)

No.	REVISIONS	DATE	BY

Kimley»Horn

10814 JOLLYVILLE ROAD, AVALLON IV, SUITE 300, AUSTIN, TX 78759
PHONE: 512-418-1771 FAX: 512-418-1791
WWW.KIMLEY-HORN.COM
TEXAS REGISTERED ENGINEERING FIRM F-928

07/27/2022
STATE OF TEXAS
ALEJANDRO E. GRANADOS RICO
130084
LICENSED
PROFESSIONAL ENGINEER
FOR PERMIT PURPOSES ONLY NOT FOR CONSTRUCTION

KHA PROJECT 067783117
DATE JULY 2022
SCALE: AS SHOWN
DESIGNED BY: AEG
DRAWN BY: DPD
CHECKED BY: AEG

PROPOSED DRAINAGE AREA MAP

ROGER HANKS PARKWAY EXTENSION II
CITY OF DRIPPING SPRINGS
HAYS COUNTY, TEXAS

SHEET NUMBER
20

ROGER HANKS PARKWAY
Area Inlet Calculation Table

Equations:	**Weir (Unsubmerged)**	**$Q = 3.0h^{1.5}L$**		Clogging Factor = 10% (Grate inlets in Sump)			
Inlet # or	Q100	Required Q to Pass		Available Weir	Required Min. 'h'	Provided 'h'	Provided Capacity
Area #	(cfs)	(w/ 10 % clogging factor)		Length (ft.)	(ft.)	(ft.)	(cfs)
A0	16.0 cfs	17.7 cfs	4'x4'	16'	0.51'	0.42'	11.8 cfs
B0	38.2 cfs	42.5 cfs	4'x4'	16'	0.92'	0.42'	11.8 cfs
'h' measured from weir elevation:		if required min. 'h' greater than 0.42 ft (5 in.) check using orifice equation to right					

ORIFICE CALCULATIONS							
Equations:	**Orifice (Submerged)**	**$Q = 4.82Ah^{0.5}$**		Clogging Factor = 10% (Grate inlets in Sump)			
Inlet # or	**Q100**	**Required Q to Pass**	**INLET**	**Available Area**	**Required Min. 'h'**	**Provided 'h'**	**Provided Capacity**
Area #	(cfs)	(w/ 10 % clogging factor)	(FT)	(sq. ft.)	(ft.)	(ft.)	(cfs)
A0	16.0 cfs	17.7 cfs	4'x4'	6.7	0.41'	1.00'	29.2 cfs
B0	38.2 cfs	42.5 cfs	4'x4'	6.7	1.50'	2.50'	46.1 cfs

25-Year Street Capacity & Inlet Design Calculations

Project: ROGER HANKS PARKWAY
Location: DRIPPING SPRINGS, TX
Date: 11/5/2020

Inlet			Drainage Areas									Sag Inlet Percentage of flow from:		Sag Inlet Split 25-year Runoff (cfs) from:		"S_L" Street Longitudinal Slope (%)						25-year Depth of Flow (ft)		25-year Spread of Flow "T" (ft)												
Inlet No.	Inlet Type	Inlet Condition (Sag or On-Grade)	Area No.	Areas (acres)	25 YR Runoff "c"	Conc. Time (min.)	25-year Intensity (in/hr)	25-year Runoff (cfs)	25-year Crown Overflow (cfs)	25-year Carryover Flow (cfs)	25-year Total Gutter Q (cfs)	Lower Station	Higher Station	Lower Station	Higher Station	On-Grade/Lower Station for Sag	Higher Station for Sag	Street Section (Type)	Roadway Cross Slope "S_x" (%)	Manning's Coefficient for Pavement "n"	Street Capacity (cfs)	On-Grade/Lower Station for Sag	Higher Station for Sag	On-Grade/Lower Station for Sag	Higher Station for Sag	Gutter Cross Slope "S_w" (%)	Width of Depressed Gutter "W"	25-year Ratio of Flow "E_0"	Gutter Depression Depth "a" (ft)	Equivalent Cross Slope "S_e" (%)	25-year Required Length "L_T"	Length Provided "L" (ft)	Inlet Efficiency "E"	25-year Inlet Capacity (cfs)	25-year Carryover Flow "q" (cfs)	Target Inlet No.
B1	Curb	On-Grade	B1	1.82	0.51	7.4	10.47	9.74		0.00	9.74	N/A	N/A	N/A	N/A	1.85%	N/A	Type A	2.00%	0.016	30.92	0.33	N/A	16.75	N/A	27.78%	1.50	0.39	0.42	12.90%	19.26	10	0.73	7.13	2.61	B2

0.01

100-Year Street Capacity & Inlet Design Calculations

Project: ROGER HANKS PARKWAY
Location: DRIPPING SPRINGS, TX
Date: 11/5/2020

Inlet			Drainage Areas								Sag Inlet Percentage of flow from:		Sag Inlet Split 100-year Runoff (cfs) from:		"S_L" Street Longitudinal Slope (%)						Right-of-Way Capacity (cfs)		100-year Depth of Flow (ft)												
Inlet No.	Inlet Type	Inlet Condition (Sag or On-Grade)	Area No.	Areas (acres)	100 YR Runoff "c"	Conc. Time (min.)	100-year Intensity (in/hr)	100-year Runoff (cfs)	100-year Carryover Flow (cfs)	100-year Total Gutter Q (cfs)	Lower Station	Higher Station	Lower Station	Higher Station	On-Grade/Lower Station for Sag	Higher Station for Sag	Street Section (Type)	Roadway Cross Slope "S_x" (%)	Manning's Coefficient for Pavement "n"	Street Capacity (cfs)	On-Grade/Lower Station for Sag	Higher Station for Sag	On-Grade/Lower Station for Sag	Higher Station for Sag	Gutter Cross Slope "S_w" (%)	Width of Depressed Gutter "W"	100-year Ratio of Flow "E0"	Gutter Depression Depth "a" (ft)	Equivalent Cross Slope "S_e" (%)	100-year Required Length "LT"	Length Provided "L" (ft)	Inlet Efficiency "E"	100-year Inlet Capacity (cfs)	100-year Carryover Flow "q" (cfs)	Target Inlet No.
1	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**	**41**
B1	Curb	On-Grade	B1	1.82	0.58	7.4	13.67	14.55	0.00	14.55	N/A	N/A	N/A	N/A	1.85%	N/A	Type A	2.00%	0.016	30.92	53.98	N/A	0.39	N/A	27.78%	1.50	0.33	0.42	11.14%	24.90	10	0.60	8.78	5.77	N/A

ROGER HANKS PARKWAY CLEAR WIDTH CLEARANCE (Q25)					
Inlet 1	Ponded Width (ft)	Inlet 2	Ponded Width (ft)	ROW FOC-FOC(ft)	Clear Width (ft)
B1	16.22	N/A	0	38	21.78

No.	REVISIONS	DATE	BY

Kimley»Horn

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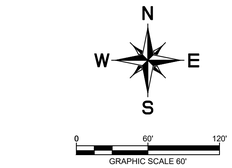
PROFESSIONAL ENGINEER

KHA PROJECT 067783117
DATE JULY 2022
SCALE: AS SHOWN
DESIGNED BY: AEG
DRAWN BY: DPD
CHECKED BY: AEG

DRAINAGE CALCULATIONS

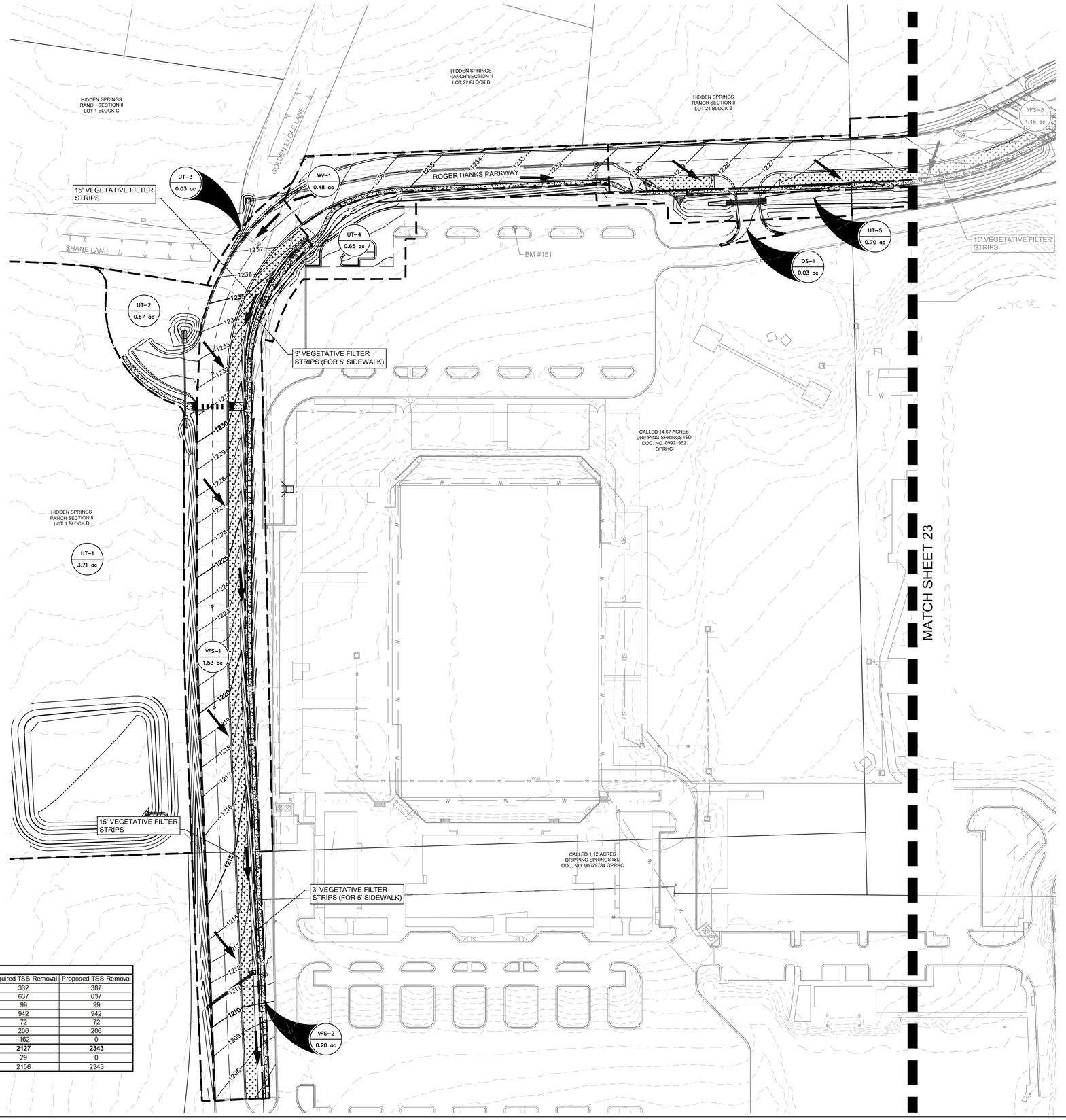
ROGER HANKS PARKWAY EXTENSION II
CITY OF DRIPPING SPRINGS
HAYS COUNTY, TEXAS

SHEET NUMBER
21



LEGEND

- X-1 / 9.9 ac — AREA DESIGNATOR / AREA IN ACRES
- PROPERTY LINE
- EXISTING STORM DRAIN LINE
- PROPOSED DRAINAGE DIVIDE
- PROPOSED FLOW DIRECTION
- VEGETATIVE FILTER STRIP



Overall Water Quality Drainage Basins					
	Proposed Area (AC)	Proposed Impervious Cover (AC)	% Impervious Cover	Required TSS Removal	Proposed TSS Removal
WV-1	0.48	0.41	85.42%	332	387
VFS-1	1.53	1.02	66.67%	637	637
VFS-2	0.20	0.12	60.00%	99	99
VFS-3	1.45	1.05	72.41%	942	942
VFS-4	0.19	0.08	42.11%	72	72
VFS-5	0.64	0.47	73.44%	206	206
UNTREATED	6.37	0.22	3.45%	-162	0
ONSITE TOTAL	**10.86**	**3.37**	31.03%	**2127**	**2343**
OFFSITE (OS-1)	0.03	0.03	100.00%	29	0
Totals	10.89	3.40	31.22%	2156	2343

WARNING: CONTRACTOR IS TO VERIFY PRESENCE AND EXACT LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION.

811 Know what's **below.** **Call** before you dig.

BENCHMARKS

BM #150 SQUARE CUT SET AT THE BACK OF CURB
- ELEV.= 1229.74' (NAVD '88)

BM #151 SQUARE CUT SET AT THE BACK OF CURB
- ELEV.= 1230.35' (NAVD '88)

No.	REVISIONS	DATE	BY

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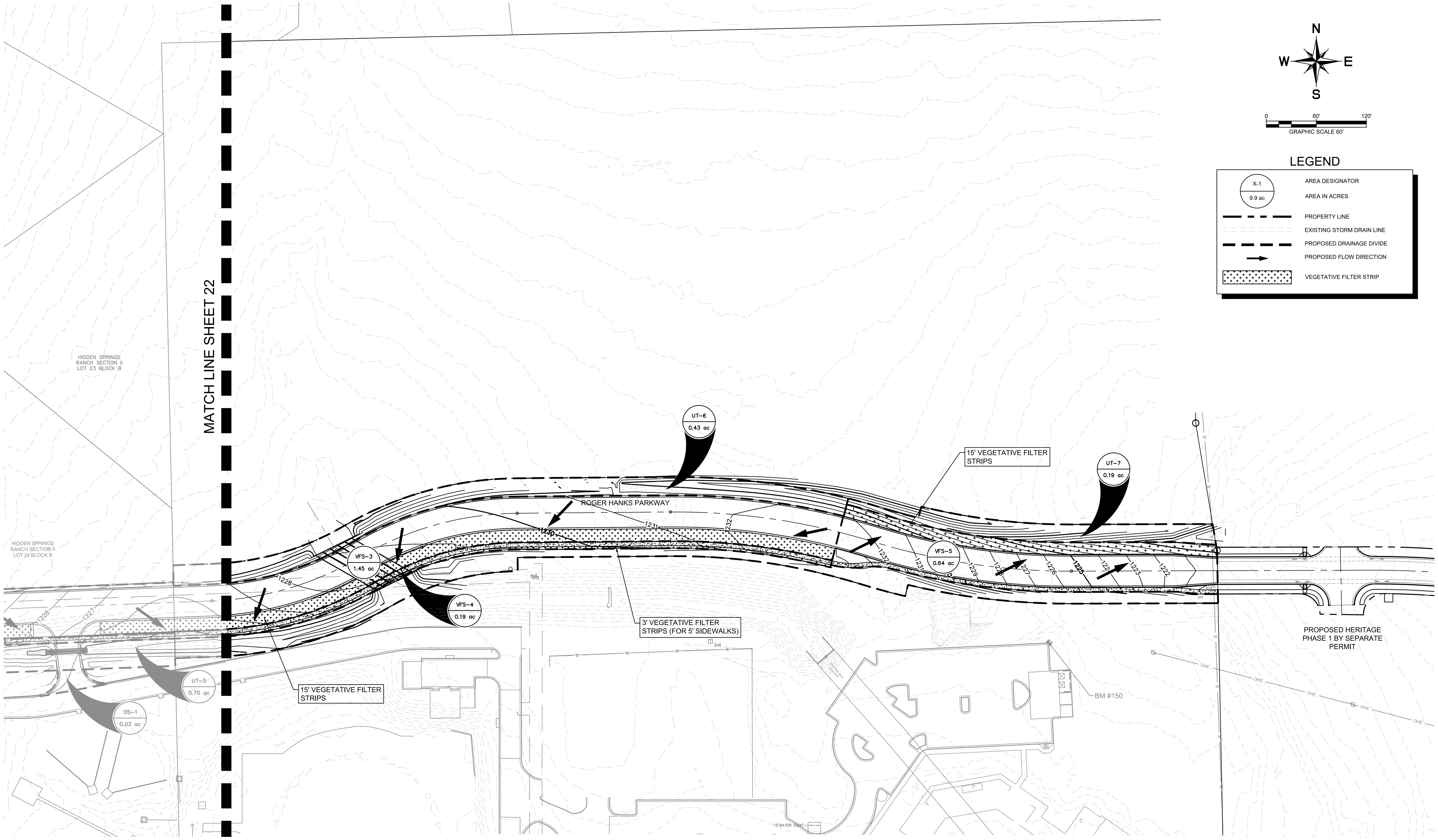
KHA PROJECT	067783117
DATE	JULY 2022
SCALE:	AS SHOWN
DESIGNED BY:	AEG
DRAWN BY:	DPD
CHECKED BY:	AEG

WATER QUALITY AREA MAP (SHEET 1 OF 2)

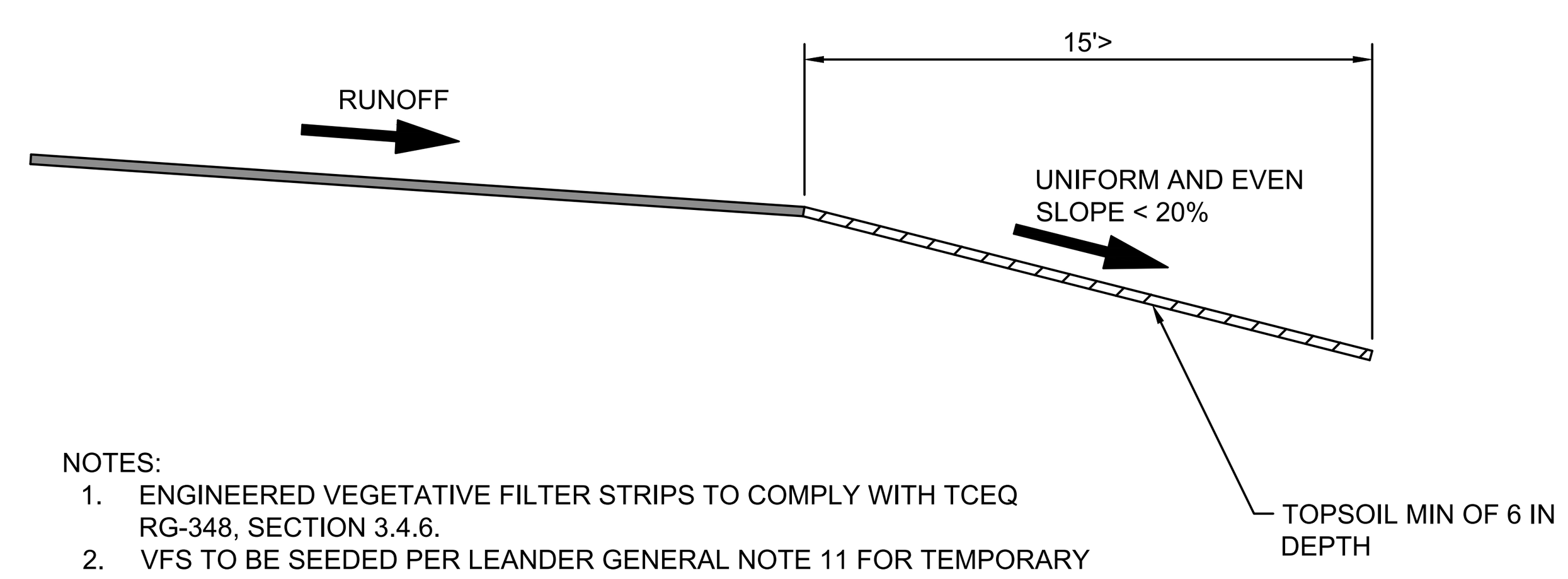
ROGER HANKS PARKWAY EXTENSION II

CITY OF DRIPPING SPRINGS
HAYS COUNTY, TEXAS

SHEET NUMBER
22



MATCH LINE SHEET 22
HIDDEN SPRINGS RANCH SECTION II LOT 23 BLOCK B
HIDDEN SPRINGS RANCH SECTION II LOT 24 BLOCK B
ROGER HANKS PARKWAY
UT-6
0.43 ac
UT-7
0.19 ac
UT-5
0.70 ac
OS-1
0.03 ac
VFS-3
1.45 ac
VFS-4
0.19 ac
VFS-5
0.64 ac
15' VEGETATIVE FILTER STRIPS
15' VEGETATIVE FILTER STRIPS
3' VEGETATIVE FILTER STRIPS (FOR 5' SIDEWALKS)
PROPOSED HERITAGE PHASE 1 BY SEPARATE PERMIT
BM #150
15'WATER ESMT
N
W
E
S
0
60'
120'
GRAPHIC SCALE 60'
LEGEND
X-1
9.9 ac
AREA DESIGNATOR
AREA IN ACRES
PROPERTY LINE
EXISTING STORM DRAIN LINE
PROPOSED DRAINAGE DIVIDE
PROPOSED FLOW DIRECTION
VEGETATIVE FILTER STRIP



NOTES:
1. ENGINEERED VEGETATIVE FILTER STRIPS TO COMPLY WITH TCEQ RG-348, SECTION 3.4.6.
2. VFS TO BE SEEDED PER LEANDER GENERAL NOTE 11 FOR TEMPORARY EROSION AND SEDIMENTATION CONTROLS.

ENGINEERED VEGETATIVE FILTER STIPS

NTS

WARNING: CONTRACTOR IS TO VERIFY PRESENCE AND EXACT LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION.

Know what's **below.**
Call before you dig.

BENCHMARKS

BM #150	SQUARE CUT SET AT THE BACK OF CURB
•	ELEV.= 1229.74' (NAVD '88)
BM #151	SQUARE CUT SET AT THE BACK OF CURB
•	ELEV.= 1230.35' (NAVD '88)

No.	REVISIONS	DATE	BY

Kimley»Horn

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10814 JOLLYVILLE ROAD, AVALLON IV, SUITE 300, AUSTIN, TX 78759
PHONE: 512-418-1771 FAX: 512-418-1791
WWW.KIMLEY-HORN.COM
TEXAS REGISTERED ENGINEERING FIRM F-928

07/27/2022
STATE OF TEXAS
ALEJANDRO E. GRANADOS RICO
130084
LICENSED PROFESSIONAL ENGINEER

KHA PROJECT 067783117
DATE JULY 2022
SCALE: AS SHOWN
DESIGNED BY: AEG
DRAWN BY: DPD
CHECKED BY: AEG

WATER QUALITY AREA MAP (SHEET 2 OF 2)

ROGER HANKS PARKWAY EXTENSION II
CITY OF DRIPPING SPRINGS
HAYS COUNTY, TEXAS

SHEET NUMBER
23

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: Roger Hanks Parkway
Date Prepared: 7/26/2022

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 spreadsheet.

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 load
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 = Hays
Total project area included in plan * = 10.86 acres 0
Predevelopment impervious area within the limits of the plan * = 1.00 acres
Total post-development impervious area within the limits of the plan* = 3.37 acres
Total post-development impervious cover fraction * = 0.31
P = 33 inches

$L_{M\ TOTAL\ PROJECT}$ = 2127 lbs.
* The values entered in these fields should be for the total project area.

Number of drainage basins / outfalls areas leaving the plan area = 7

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

Drainage Basin/Outfall Area No. = VFS-1

Total drainage basin/outfall area = 1.53 acres
Predevelopment impervious area within drainage basin/outfall area = 0.31 acres
Post-development impervious area within drainage basin/outfall area = 1.02 acres
Post-development impervious fraction within drainage basin/outfall area = 0.67
$L_{M\ THIS\ BASIN}$ = 637 lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Vegetated Filter Strips
Removal efficiency = 85 percent

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 = 1.53 acres
A_I = 1.02 acres
A_P = 0.51 acres
L_R = 998 lbs

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

Desired $L_{M\ THIS\ BASIN}$ = 637 lbs.

F = 0.64

16. Vegetated Filter Strips Designed as Required in RG-348 Pages 3-55 to 3-57

There are no calculations required for determining the load or size of vegetative filter strips.
The 80% removal is provided when the contributing drainage area does not exceed 72 feet (direction of flow) and the sheet flow leaving the impervious cover is directed across 15 feet of engineered filter strips with maximum slope of 20% or across 50 feet of natural vegetation with a maximum slope of 10%. There can be a break in grade as long as no slope exceeds 20%.

If vegetative filter strips are proposed for an interim permanent BMP, they may be sized as described on Page 3-56 of RG-348.

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: Roger Hanks Parkway
Date Prepared: 7/26/2022

Additional information is provided for cells with a red triangle in the upper right corner. Place the cursor over the cell.
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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 load
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 = Hays
Total project area included in plan * = 10.86 acres 0
Predevelopment impervious area within the limits of the plan * = 1.00 acres
Total post-development impervious area within the limits of the plan* = 3.37 acres
Total post-development impervious cover fraction * = 0.31
P = 33 inches

$L_{M\ TOTAL\ PROJECT}$ = 2127 lbs.
* The values entered in these fields should be for the total project area.

Number of drainage basins / outfalls areas leaving the plan area = 7

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

Drainage Basin/Outfall Area No. = VFS-2

Total drainage basin/outfall area = 0.20 acres
Predevelopment impervious area within drainage basin/outfall area = 0.01 acres
Post-development impervious area within drainage basin/outfall area = 0.12 acres
Post-development impervious fraction within drainage basin/outfall area = 0.60
$L_{M\ THIS\ BASIN}$ = 99 lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Vegetated Filter Strips
Removal efficiency = 85 percent

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 = 0.20 acres
A_I = 0.12 acres
A_P = 0.08 acres
L_R = 118 lbs

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

Desired $L_{M\ THIS\ BASIN}$ = 99 lbs.

F = 0.84

16. Vegetated Filter Strips Designed as Required in RG-348 Pages 3-55 to 3-57

There are no calculations required for determining the load or size of vegetative filter strips.
The 80% removal is provided when the contributing drainage area does not exceed 72 feet (direction of flow) and the sheet flow leaving the impervious cover is directed across 15 feet of engineered filter strips with maximum slope of 20% or across 50 feet of natural vegetation with a maximum slope of 10%. There can be a break in grade as long as no slope exceeds 20%.

If vegetative filter strips are proposed for an interim permanent BMP, they may be sized as described on Page 3-56 of RG-348.

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: Roger Hanks Parkway
Date Prepared: 7/26/2022

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where:
$L_{M\ TOTAL\ PROJECT}$ = Required TSS removal resulting from the proposed development = 80% of increased load
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 = Hays
Total project area included in plan * = 10.86 acres 0
Predevelopment impervious area within the limits of the plan * = 1.00 acres
Total post-development impervious area within the limits of the plan* = 3.37 acres
Total post-development impervious cover fraction * = 0.31
P = 33 inches

$L_{M\ TOTAL\ PROJECT}$ = 2127 lbs.
* The values entered in these fields should be for the total project area.

Number of drainage basins / outfalls areas leaving the plan area = 7

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

Drainage Basin/Outfall Area No. = VFS-3

Total drainage basin/outfall area = 1.45 acres
Predevelopment impervious area within drainage basin/outfall area = 0.00 acres
Post-development impervious area within drainage basin/outfall area = 1.05 acres
Post-development impervious fraction within drainage basin/outfall area = 0.72
$L_{M\ THIS\ BASIN}$ = 942 lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Vegetated Filter Strips
Removal efficiency = 85 percent

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 = 1.45 acres
A_I = 1.05 acres
A_P = 0.40 acres
L_R = 1025 lbs

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

Desired $L_{M\ THIS\ BASIN}$ = 942 lbs.

F = 0.92

16. Vegetated Filter Strips Designed as Required in RG-348 Pages 3-55 to 3-57

There are no calculations required for determining the load or size of vegetative filter strips.
The 80% removal is provided when the contributing drainage area does not exceed 72 feet (direction of flow) and the sheet flow leaving the impervious cover is directed across 15 feet of engineered filter strips with maximum slope of 20% or across 50 feet of natural vegetation with a maximum slope of 10%. There can be a break in grade as long as no slope exceeds 20%.

If vegetative filter strips are proposed for an interim permanent BMP, they may be sized as described on Page 3-56 of RG-348.

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: Roger Hanks Parkway
Date Prepared: 7/26/2022

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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 load
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 = Hays
Total project area included in plan * = 10.86 acres 0
Predevelopment impervious area within the limits of the plan * = 1.00 acres
Total post-development impervious area within the limits of the plan* = 3.37 acres
Total post-development impervious cover fraction * = 0.31
P = 33 inches

$L_{M\ TOTAL\ PROJECT}$ = 2127 lbs.
* The values entered in these fields should be for the total project area.

Number of drainage basins / outfalls areas leaving the plan area = 7

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

Drainage Basin/Outfall Area No. = VFS-4

Total drainage basin/outfall area = 0.19 acres
Predevelopment impervious area within drainage basin/outfall area = 0.00 acres
Post-development impervious area within drainage basin/outfall area = 0.08 acres
Post-development impervious fraction within drainage basin/outfall area = 0.42
$L_{M\ THIS\ BASIN}$ = 72 lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Vegetated Filter Strips
Removal efficiency = 85 percent

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 = 0.19 acres
A_I = 0.08 acres
A_P = 0.11 acres
L_R = 79 lbs

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

Desired $L_{M\ THIS\ BASIN}$ = 72 lbs.

F = 0.91

16. Vegetated Filter Strips Designed as Required in RG-348 Pages 3-55 to 3-57

There are no calculations required for determining the load or size of vegetative filter strips.
The 80% removal is provided when the contributing drainage area does not exceed 72 feet (direction of flow) and the sheet flow leaving the impervious cover is directed across 15 feet of engineered filter strips with maximum slope of 20% or across 50 feet of natural vegetation with a maximum slope of 10%. There can be a break in grade as long as no slope exceeds 20%.

If vegetative filter strips are proposed for an interim permanent BMP, they may be sized as described on Page 3-56 of RG-348.

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: Roger Hanks Parkway
Date Prepared: 7/26/2022

Additional information is provided for cells with a red triangle in the upper right corner. Place the cursor over the cell.
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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 load
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 = Hays
Total project area included in plan * = 10.86 acres 0
Predevelopment impervious area within the limits of the plan * = 1.00 acres
Total post-development impervious area within the limits of the plan* = 3.37 acres
Total post-development impervious cover fraction * = 0.31
P = 33 inches

$L_{M\ TOTAL\ PROJECT}$ = 2127 lbs.
* The values entered in these fields should be for the total project area.

Number of drainage basins / outfalls areas leaving the plan area = 7

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

Drainage Basin/Outfall Area No. = VFS-5

Total drainage basin/outfall area = 0.64 acres
Predevelopment impervious area within drainage basin/outfall area = 0.24 acres
Post-development impervious area within drainage basin/outfall area = 0.47 acres
Post-development impervious fraction within drainage basin/outfall area = 0.73
$L_{M\ THIS\ BASIN}$ = 206 lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Vegetated Filter Strips
Removal efficiency = 85 percent

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 = 0.64 acres
A_I = 0.47 acres
A_P = 0.17 acres
L_R = 459 lbs

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

Desired $L_{M\ THIS\ BASIN}$ = 206 lbs.

F = 0.45

16. Vegetated Filter Strips Designed as Required in RG-348 Pages 3-55 to 3-57

There are no calculations required for determining the load or size of vegetative filter strips.
The 80% removal is provided when the contributing drainage area does not exceed 72 feet (direction of flow) and the sheet flow leaving the impervious cover is directed across 15 feet of engineered filter strips with maximum slope of 20% or across 50 feet of natural vegetation with a maximum slope of 10%. There can be a break in grade as long as no slope exceeds 20%.

If vegetative filter strips are proposed for an interim permanent BMP, they may be sized as described on Page 3-56 of RG-348.

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: Roger Hanks Parkway
Date Prepared: 7/26/2022

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where:
$L_{M\ TOTAL\ PROJECT}$ = Required TSS removal resulting from the proposed development = 80% of increased load
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 = Hays
Total project area included in plan * = 10.86 acres 0
Predevelopment impervious area within the limits of the plan * = 1.00 acres
Total post-development impervious area within the limits of the plan* = 3.37 acres
Total post-development impervious cover fraction * = 0.31
P = 33 inches

$L_{M\ TOTAL\ PROJECT}$ = 2127 lbs.
* The values entered in these fields should be for the total project area.

Number of drainage basins / outfalls areas leaving the plan area = 7

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

Drainage Basin/Outfall Area No. = UNTREATED

Total drainage basin/outfall area = 6.37 acres
Predevelopment impervious area within drainage basin/outfall area = 0.40 acres
Post-development impervious area within drainage basin/outfall area = 0.22 acres
Post-development impervious fraction within drainage basin/outfall area = 0.03
$L_{M\ THIS\ BASIN}$ = -162 lbs.

No.	REVISIONS	DATE	BY

Kimley»Horn
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10814 JOLLYVILLE ROAD, AVALLON IV, SUITE 300, AUSTIN, TX 78759
PHONE: 512-418-1771 FAX: 512-418-1791
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TEXAS REGISTERED ENGINEERING FIRM F-928

07/27/2022
STATE OF TEXAS
ALEJANDRO E. GRANADOS RICO
130084
LICENSED PROFESSIONAL ENGINEER
FOR PERMIT PURPOSES ONLY. NOT FOR CONSTRUCTION
Alejandro E. Granados Rico

KHA PROJECT 067783117
DATE JULY 2022
SCALE: AS SHOWN
DESIGNED BY: AEG
DRAWN BY: DPD
CHECKED BY: AEG

WATER QUALITY CALCULATIONS

ROGER HANKS PARKWAY EXTENSION II
CITY OF DRIPPING SPRINGS
HAYS COUNTY, TEXAS

WARNING: CONTRACTOR IS TO VERIFY PRESENCE AND EXACT LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION.

811 Know what's below. Call before you dig.

BENCHMARKS
BM #150 SQUARE CUT SET AT THE BACK OF CURB
• ELEV.= 1229.74' (NAVD '88)
BM #151 SQUARE CUT SET AT THE BACK OF CURB
• ELEV.= 1230.35' (NAVD '88)

SHEET NUMBER
24

Texas Commission on Environmental Quality
TSS Required Load Reduction Calculations

Project Name: City of Dripping Springs
Project Location: Dripping Springs, TX
Date Prepared: 7/7/2022
Prepared For: Alex Granados

$$Lm = 27.2(AN \times P)$$

where: Lm = Required TSS removal
An = Net increase in impervious area for site
P = Average annual precipitation, inches

Site Data:
County = **HAYS**
Stormwater Quality Structure = **Wet Vault**
Total site area = **0.48** acres
Pre-development impervious area = **0.04** acres
Post-development impervious area = **0.410** acres
Post-development impervious fraction = **0.85**
P = **33** inches

Lm = **332** lbs. Total Project Required Removal

Drainage Basin	Outfall	Total Area	Impervious Cover	Impervious Area	Pre-Dev. Impervious Cover	An for Drainage Area	Runoff Coef. (C)	Pervious Area	Runoff Coef. (C)	Composite Runoff Coef. (C)	**Effective Area**	Intensity (I)	Calculated Flow (Q)	Required Pollutant Removal	StormTrooper Model	Unit Surface Area	By-Pass Flowrate	Intensity Treated	Fraction of Flow Treated (F)	F/0.9	Overflow Rate (ft/s)	Removal Effeciency	Actual Effeciency	Load Reduction (LR)
	[ID]	[ac]	[%]	[ac]	[ac]	[ac]		[ac]			[ac]	[in/hr]	[cfs]		#	(sf)	(cfs)	[in/hr]	[Figure 3-11]			[Figure 3-10]			(lbs)
1	WV-1	**0.48**	**85.4%**	0.41	**0.01**	0.40	0.9	0.07	0.03	0.77	0.36	1.1	0.41	359	**25**	369	3.21	1.10	**0.90**	1.00	1.11E-03	**83%**	83%	**387**

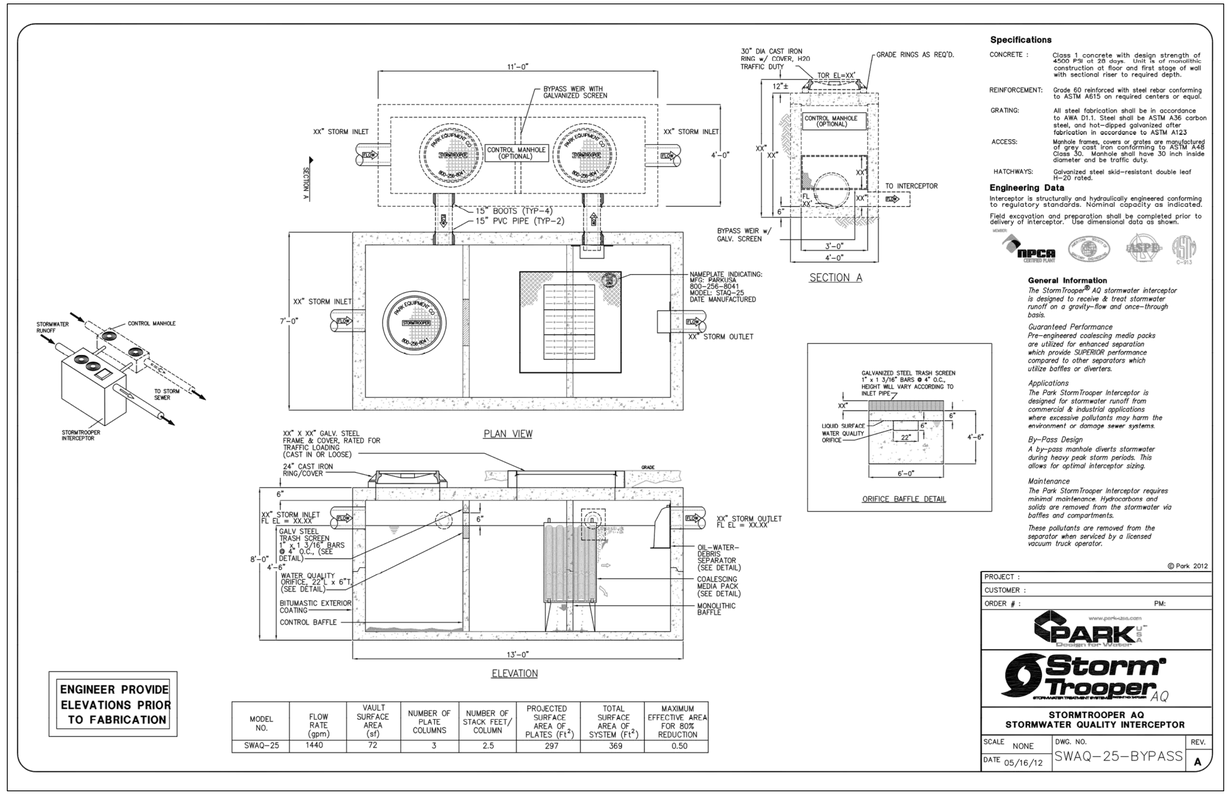
Total TSS Removed by BMP's Annually = 387
Total Required Reduction (Lm) = 332
Solids Removed By Other Means = 0
Sufficient Removal = Yes

STORMTROOPER

Model	S.A	By-Pass	E.A. @ 80%
5	100	420	< 0.13
10	149	600	0.14 - 0.20
20	248	1000	0.21 - 0.33
25	369	1440	0.34 - 0.50
40	588	2250	0.51 - 0.79
70	730	2720	0.80 - 0.98
110	913	4000	0.99 - 1.23

E.A. = (Imp. x 0.9 + Perv. x 0.03)
100% Impervious Acres Treated/Single Unit

0.14	**Acres**
0.22	**Acres**
0.37	**Acres**
0.56	**Acres**
0.88	**Acres**
1.09	**Acres**
1.37	**Acres**



ENGINEER PROVIDE ELEVATIONS PRIOR TO FABRICATION

MODEL NO.	FLOW RATE (gpm)	VAULT SURFACE AREA (sf)	NUMBER OF PLATE COLUMNS	NUMBER OF STACK FEET/ COLUMN	PROJECTED SURFACE AREA OF PLATES (Ft^2)	TOTAL SURFACE AREA OF SYSTEM (Ft^2)	MAXIMUM EFFECTIVE AREA FOR 80% REDUCTION
SWAQ-25	1440	72	3	2.5	297	369	0.50

Specifications

CONCRETE : Class 1 concrete with design strength of 4500 PSI at 28 days. Unit is of monolithic construction at floor and first stage of wall with sectional riser to required depth.

REINFORCEMENT: Grade 60 reinforced with steel rebar conforming to ASTM A615 on required centers or equal.

GRATING: All steel fabrication shall be in accordance to AWA D1.1. Steel shall be ASTM A36 carbon steel, and hot-dipped galvanized after fabrication in accordance to ASTM A123

ACCESS: Manhole frames, covers or grates are manufactured of grey cast iron conforming to ASTM A48 Class 30. Manhole shall have 30 inch inside diameter and be traffic duty.

HATCHWAYS: Galvanized steel skid-resistant double leaf H-20 rated.

Engineering Data

Interceptor is structurally and hydraulically engineered conforming to regulatory standards. Nominal capacity as indicated.

Field excavation and preparation shall be completed prior to delivery of interceptor. Use dimensional data as shown.

General Information

The StormTrooper® AQ stormwater interceptor is designed to receive & treat stormwater runoff on a gravity-flow and once-through basis.

Guaranteed Performance
Pre-engineered coalescing media packs are utilized for enhanced separation which provide SUPERIOR performance compared to other separators which utilize baffles or diverters.

Applications
The Park StormTrooper Interceptor is designed for stormwater runoff from commercial & industrial applications where excessive pollutants may harm the environment or damage sewer systems.

By-Pass Design
A by-pass manhole diverts stormwater during heavy peak storm periods. This allows for optimal interceptor sizing.

Maintenance
The Park StormTrooper Interceptor requires minimal maintenance. Hydrocarbons and solids are removed from the stormwater via baffles and compartments.

These pollutants are removed from the separator when serviced by a licensed vacuum truck operator.

PROJECT :
CUSTOMER :
ORDER # : PM:

www.parkenvironmental.com

STORMTROOPER AQ
STORMWATER QUALITY INTERCEPTOR

SCALE	NONE	DWG. NO.	REV.
DATE	05/16/12	SWAQ-25-BYPASS	A

Texas Commission on Environmental Quality
TSS Removal Calculations

AREA WV-1	DRAINAGE BASIN WV-1	TOTAL SITE DETAILS
		Project Name: City of Dripping Springs
		Project Location: Dripping Springs, TX
		Date Prepared: 7/7/2022
		Prepared By: Alex Granados
		Total Project Area to be Treated = 0.48
		Pre-Development Impervious Area = 0.04
		Post-Development Impervious Area = 0.41
		Composite Run-Off Coefficient = 0.85
		332
		County = HAYS

STEP ONE: Required TSS Removal

EQUATION 3.3

P = Average Annual Precipitation (inches)

Drainage Basin = 0.48 Acres
Pre-Dev. Imp. Area = 0.01 Acres
Post-Dev. Imp. Area = 0.40
Pervious Area = 0.07 Acres
P = 33 Inches
359 Lbs

STEP TWO: Select an Appropriate BMP

Effective Area = 0.36 EA = (Ai x 0.9) + (Ap x 0.03
StormTrooper SWAQ_ 25
Unit Surface Area = 369 Sq. Ft.

STORMTROOPER	
Model	**E.A. @ 80%**
5	< 0.13
10	0.14 - 0.20
20	0.21 - 0.33
25	0.34 - 0.50
40	0.51 - 0.79
70	0.80 - 0.98
110	0.99 - 1.23

EQUATION 3.4
Q = CiA, where:

C = 0.77 Composite Run-Off Coefficient
i = 1.10 Stormwater Quality Intensity
A = 0.48 Drainage Basin Acreage
Q = 0.41 Required Treatment Flow

EQUATION 3.5

Q = 0.41 Required Treatment Flow
A = 369 Unit Surface Area
1.11E-03 Overflow Rate
BMP Effeciency = 83%

STEP THREE: Calculate Fraction of Annual Runoff to be Treated

Unit By-Pass Flowrate = 3.21 cfs
Treated Intensity = 1.10 in/hr
Annual Volume Treated = 90% Volume of Run-Off Entering Unit
Treatment Reduction = 1.00 BMP Effeciency Reduction Factor
Actual BMP Effeciency = 83%

STEP FOUR: Calculate TSS Load Removed by BMPs

EQUATION 3.8

BMP Efficiency = TSS Removal Efficiency

0.41
0.07
387 lbs

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PHONE: 512-418-1771 FAX: 512-418-1791
WWW.KIMLEY-HORN.COM
TEXAS REGISTERED ENGINEERING FIRM F-928

07/27/2022

STATE OF TEXAS — ALEJANDRO E. GRANADOS RICO — 125053 — LICENSED PROFESSIONAL ENGINEER

WARNING: CONTRACTOR IS TO VERIFY PRESENCE AND EXACT LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION.

811 Know what's **below.** **Call** before you dig.

BENCHMARKS

BM #150 SQUARE CUT SET AT THE BACK OF CURB
- ELEV.= 1229.74' (NAVD '88)

BM #151 SQUARE CUT SET AT THE BACK OF CURB
- ELEV.= 1230.35' (NAVD '88)

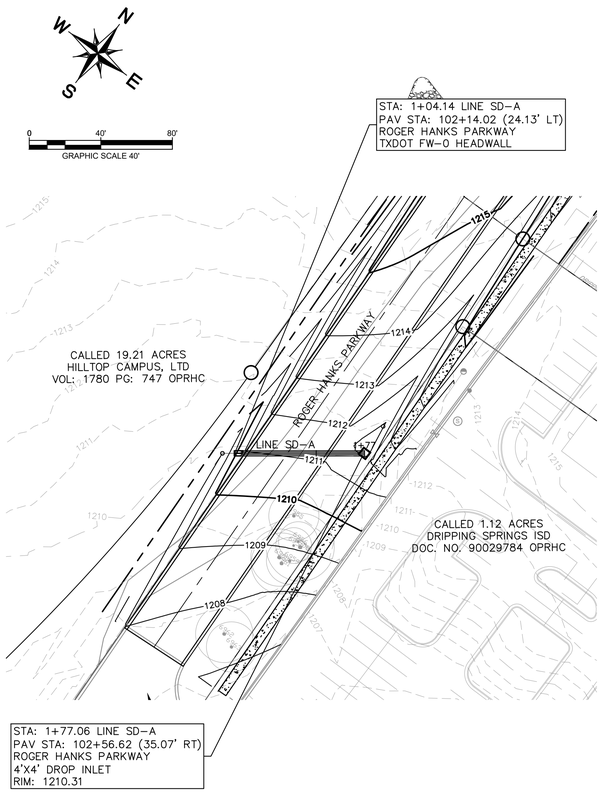
KHA PROJECT 067783117			
DATE JULY 2022	SCALE: AS SHOWN		
	DESIGNED BY: AEG	DPD	
	DRAWN BY:	DPD	
	CHECKED BY: AEG		

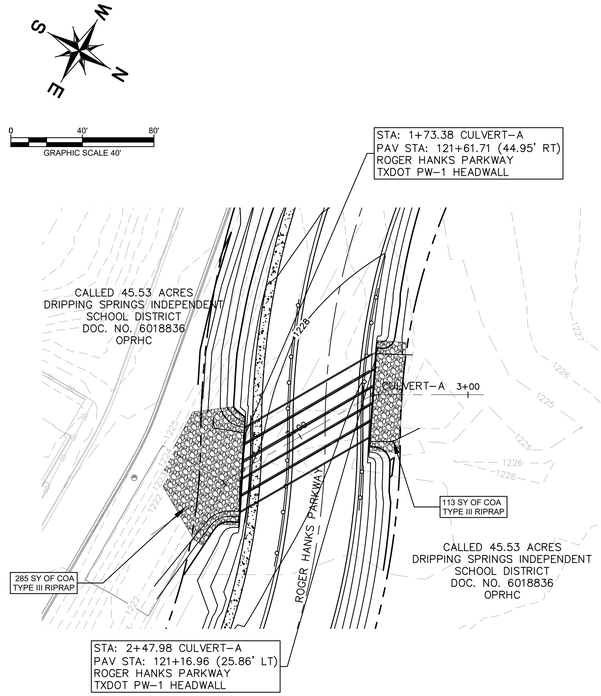
STORMTROOPER DETAILS

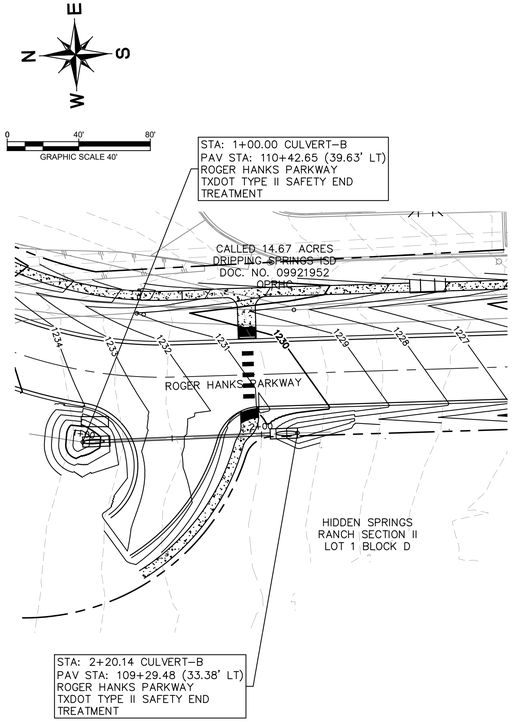
ROGER HANKS PARKWAY EXTENSION II
CITY OF DRIPPING SPRINGS
HAYS COUNTY, TEXAS

SHEET NUMBER 25

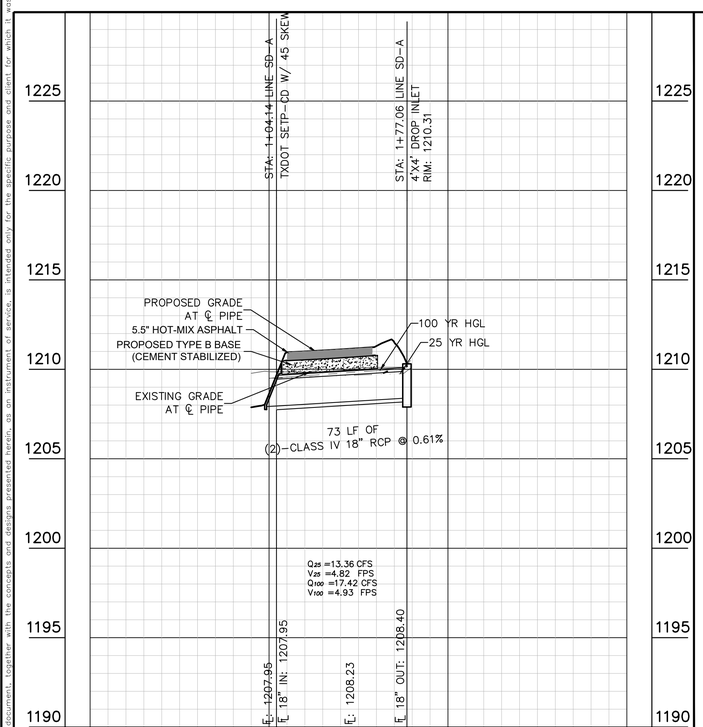
No.	REVISIONS	DATE	BY



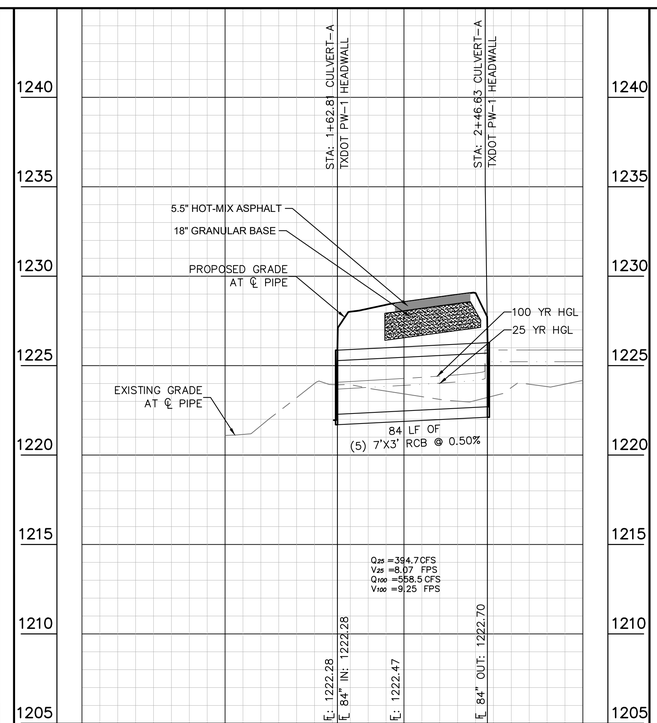




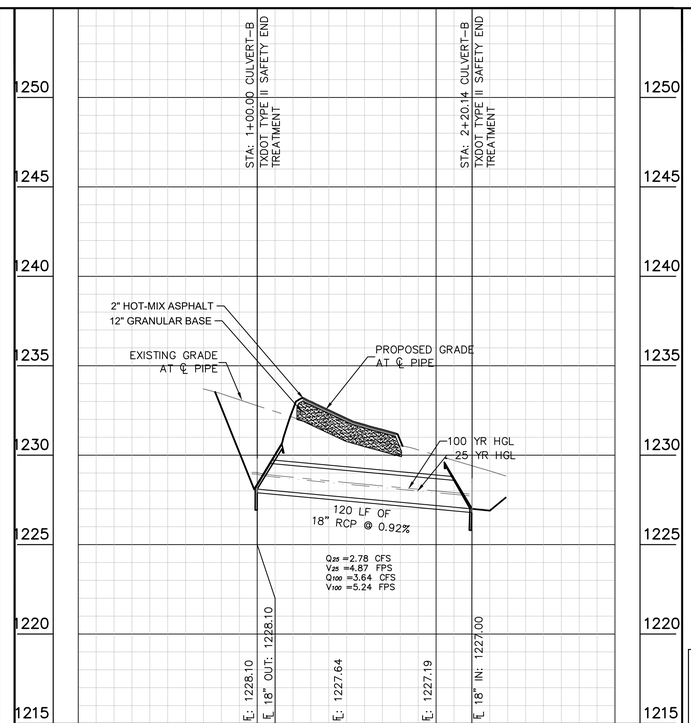
LINE SD-A



CULVERT-A



CULVERT-B



PROFILE SCALE
1" = 40' HORIZONTAL
1" = 4' VERTICAL

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No.	REVISIONS	DATE	BY

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WWW.KIMLEY-HORN.COM
TEXAS REGISTERED ENGINEERING FIRM F-928

07/27/2022

ALEJANDRO E. GRANADOS RICO 125064 LICENSED PROFESSIONAL ENGINEER STATE OF TEXAS

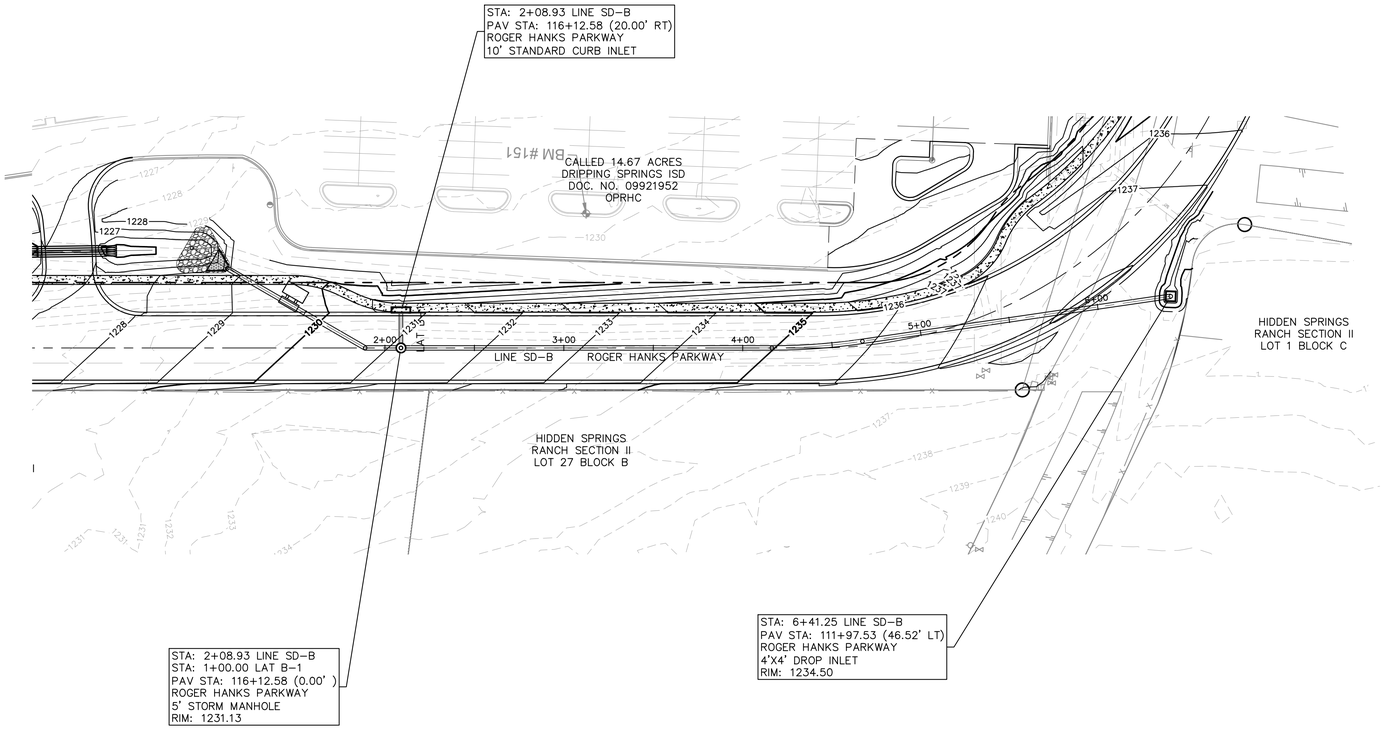
KHA PROJECT	067783117
DATE	JULY 2022
SCALE:	AS SHOWN
DESIGNED BY:	AEG
DRAWN BY:	DPD
CHECKED BY:	AEG

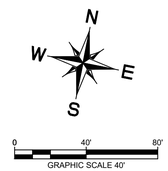
STORM PLAN & PROFILE - LINE SD-A, CULVERT A AND CULVERT B

ROGER HANKS PARKWAY EXTENSION II

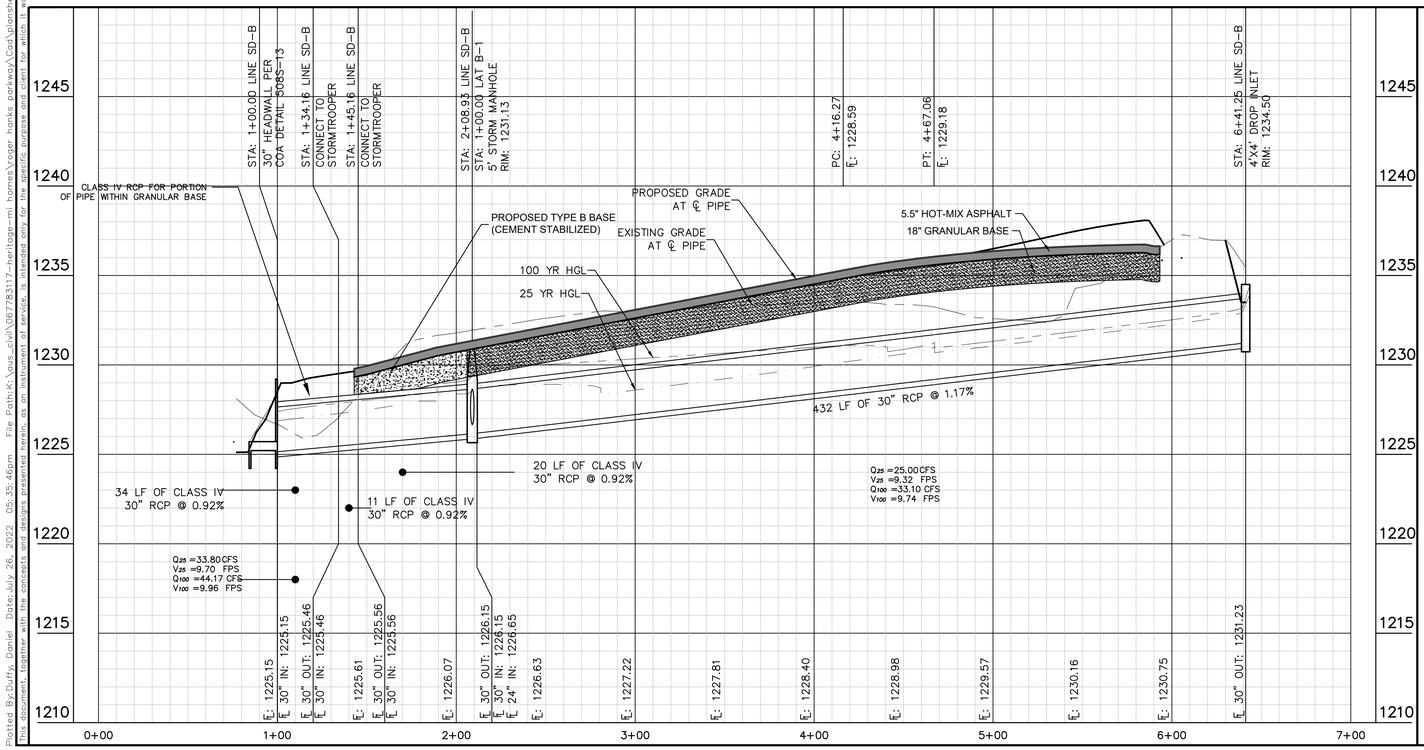
CITY OF DRIPPING SPRINGS
HAYS COUNTY, TEXAS

SHEET NUMBER
26

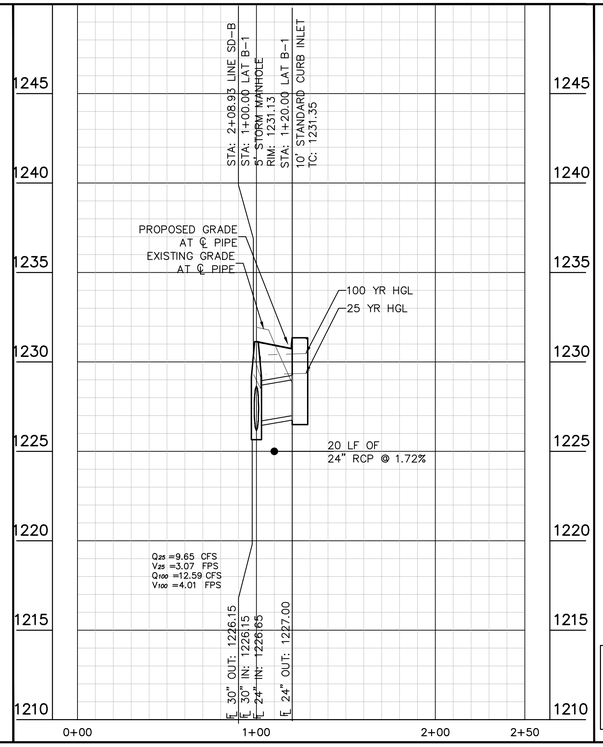




LINE SD-B



LAT B-1



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TEXAS REGISTERED ENGINEERING FIRM F-928

07/27/2022

STATE OF TEXAS
ALEJANDRO E. CARRANCO RICO
92208
LICENSED
PROFESSIONAL ENGINEER

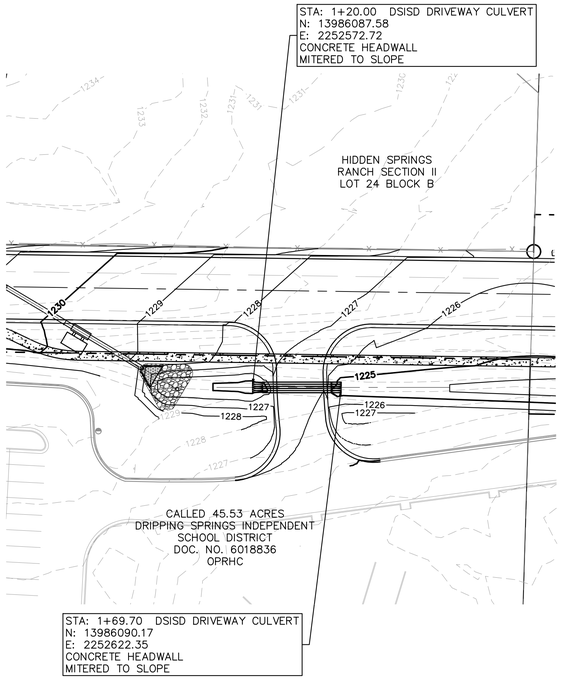
KHA PROJECT	067783117
DATE	JULY 2022
SCALE:	AS SHOWN
DESIGNED BY:	AEG
DRAWN BY:	DPD
CHECKED BY:	AEG

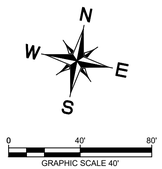
STORM PLAN & PROFILE - LINE SD-B

ROGER HANKS PARKWAY EXTENSION II

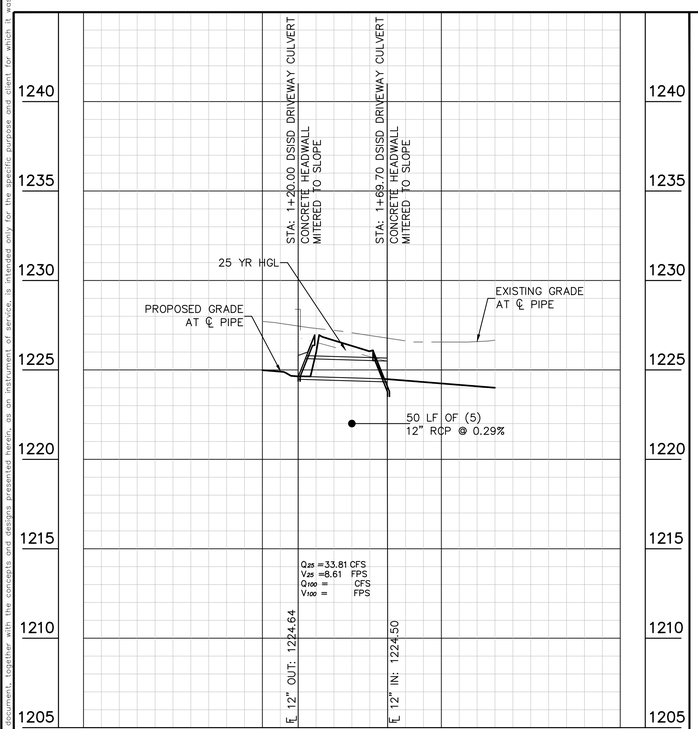
CITY OF DRIPPING SPRINGS
HAYS COUNTY, TEXAS

SHEET NUMBER
27





DSISD DRIVEWAY CULVERT



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TEXAS REGISTERED ENGINEERING FIRM F-928

07/27/2022

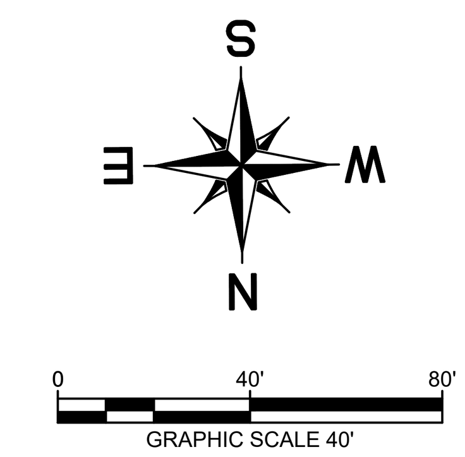
STATE OF TEXAS
ALEJANDRO E. GARANCEDO RODRIGUEZ
103684
LICENSED
PROFESSIONAL ENGINEER

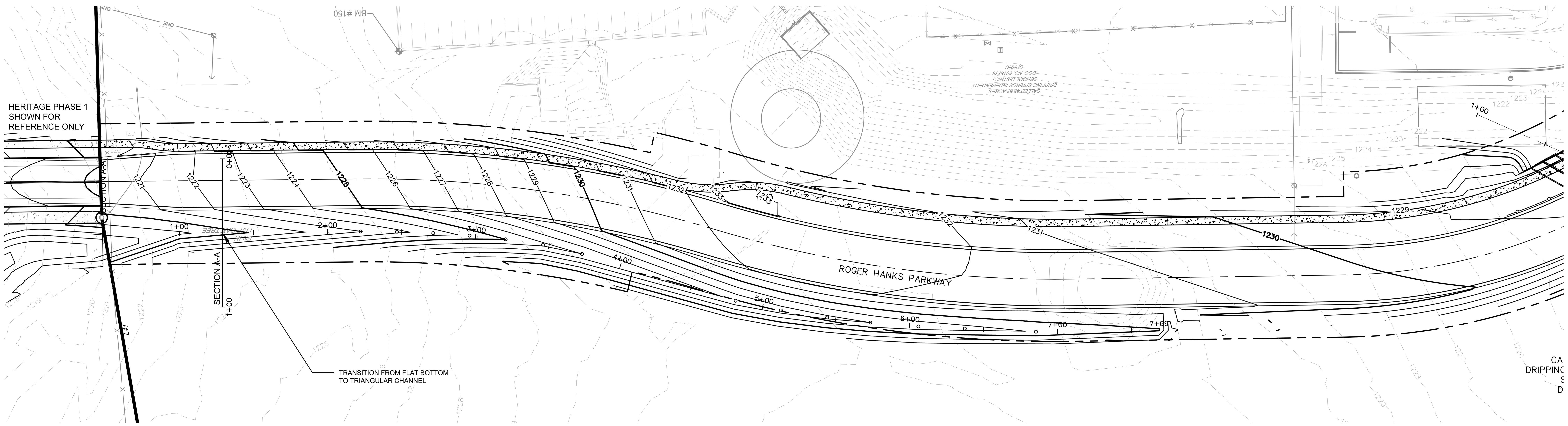
KHA PROJECT 067783117
DATE JULY 2022
SCALE: AS SHOWN
DESIGNED BY: AEG
DRAWN BY: DPD
CHECKED BY: AEG

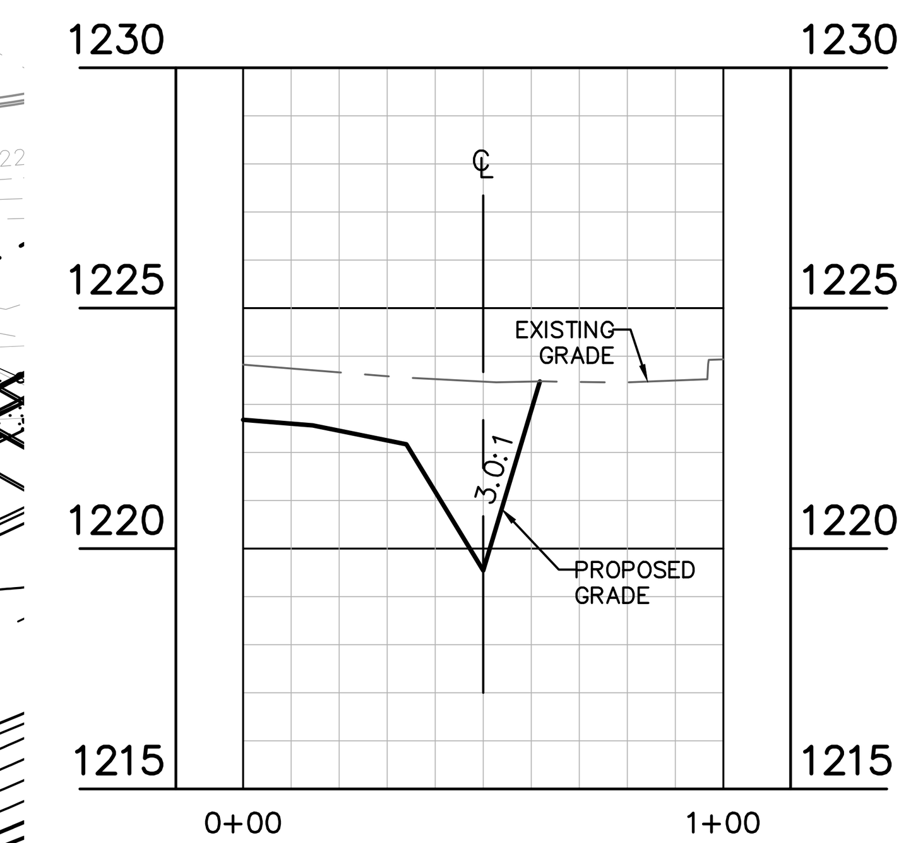
STORM PLAN & PROFILE - DSISD DRIVEWAY CULVERT

ROGER HANKS PARKWAY
EXTENSION II
CITY OF DRIPPING SPRINGS
HAYS COUNTY, TEXAS

SHEET NUMBER
28

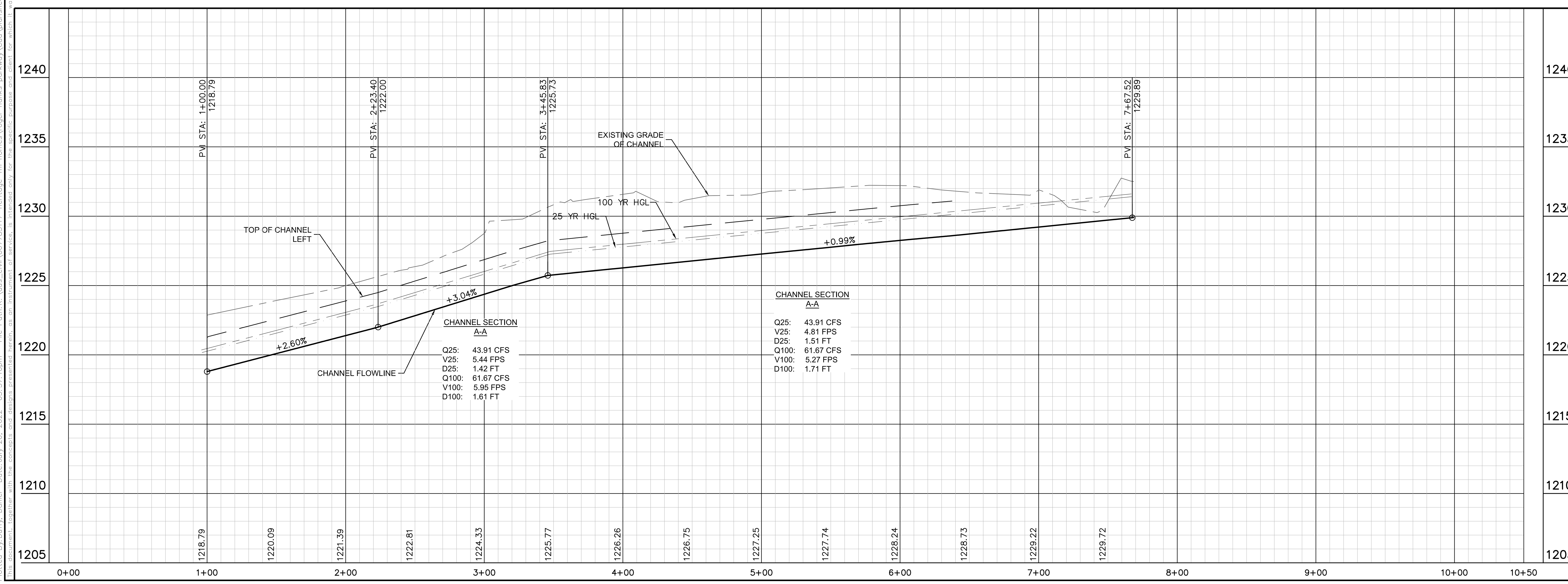






SECTION A-A
STA. 1+28.93
(TYPICAL STATION 1+00.00 - 6+00.00)

CHANNEL A


1240
1235
1230
1225
1220
1215
1210
1205
PVI STA: 1+00.00
1218.79
PVI STA: 2+23.40
1222.00
PVI STA: 3+45.83
1225.73
PVI STA: 7+67.52
1229.89
EXISTING GRADE
OF CHANNEL
100 YR HGL
25 YR HGL
TOP OF CHANNEL
LEFT
+2.60%
+3.04%
+0.99%
CHANNEL FLOWLINE
CHANNEL SECTION
A-A
Q25: 43.91 CFS
V25: 5.44 FPS
D25: 1.42 FT
Q100: 61.67 CFS
V100: 5.95 FPS
D100: 1.61 FT
CHANNEL SECTION
A-A
Q25: 43.91 CFS
V25: 4.81 FPS
D25: 1.51 FT
Q100: 61.67 CFS
V100: 5.27 FPS
D100: 1.71 FT
1218.79
1220.09
1221.39
1222.81
1224.33
1225.77
1226.26
1226.75
1227.25
1227.74
1228.24
1228.73
1229.22
1229.72
0+00
1+00
2+00
3+00
4+00
5+00
6+00
7+00
8+00
9+00
10+00
10+50

PROFILE SCALE
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1" = 4' VERTICAL

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TEXAS REGISTERED ENGINEERING FIRM F-928

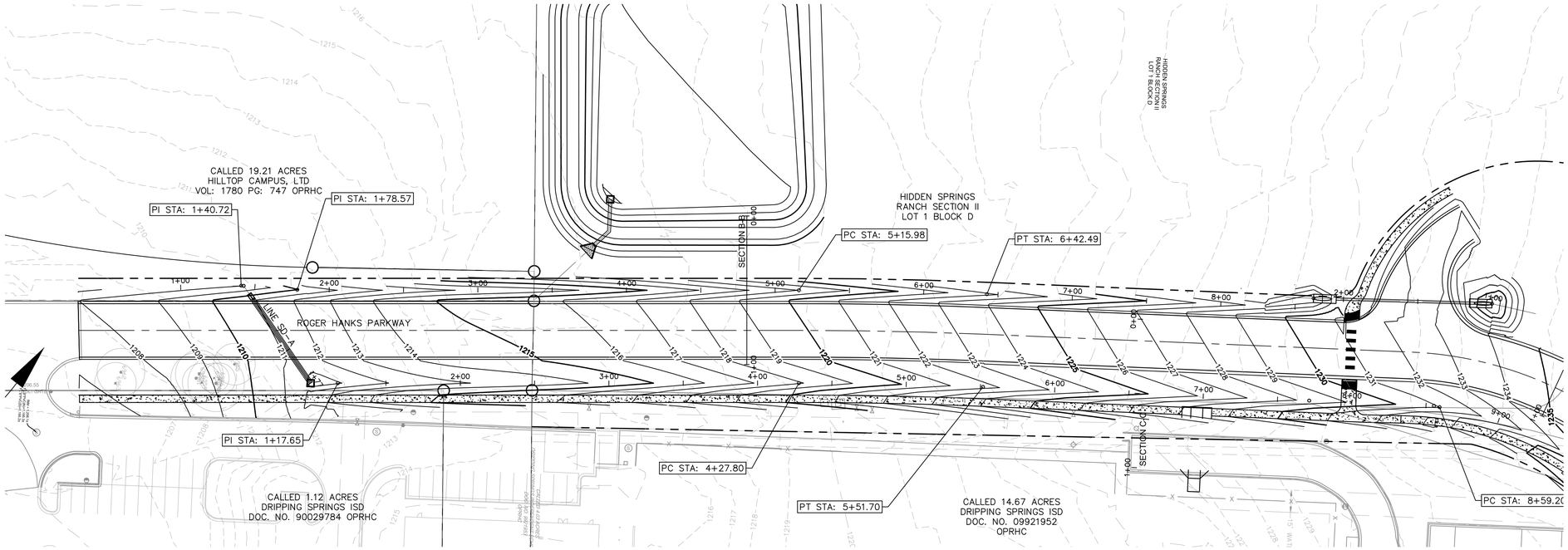
07/27/2022
STATE OF TEXAS
ALEJANDRO E. GRANADOS RICO
130084
LICENSED
PROFESSIONAL ENGINEER

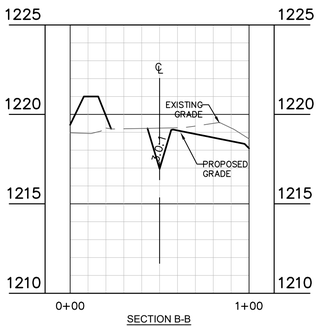
KHA PROJECT 067783117
DATE JULY 2022
SCALE: AS SHOWN
DESIGNED BY: AEG
DRAWN BY: DPD
CHECKED BY: AEG

CHANNEL A PLAN & PROFILE

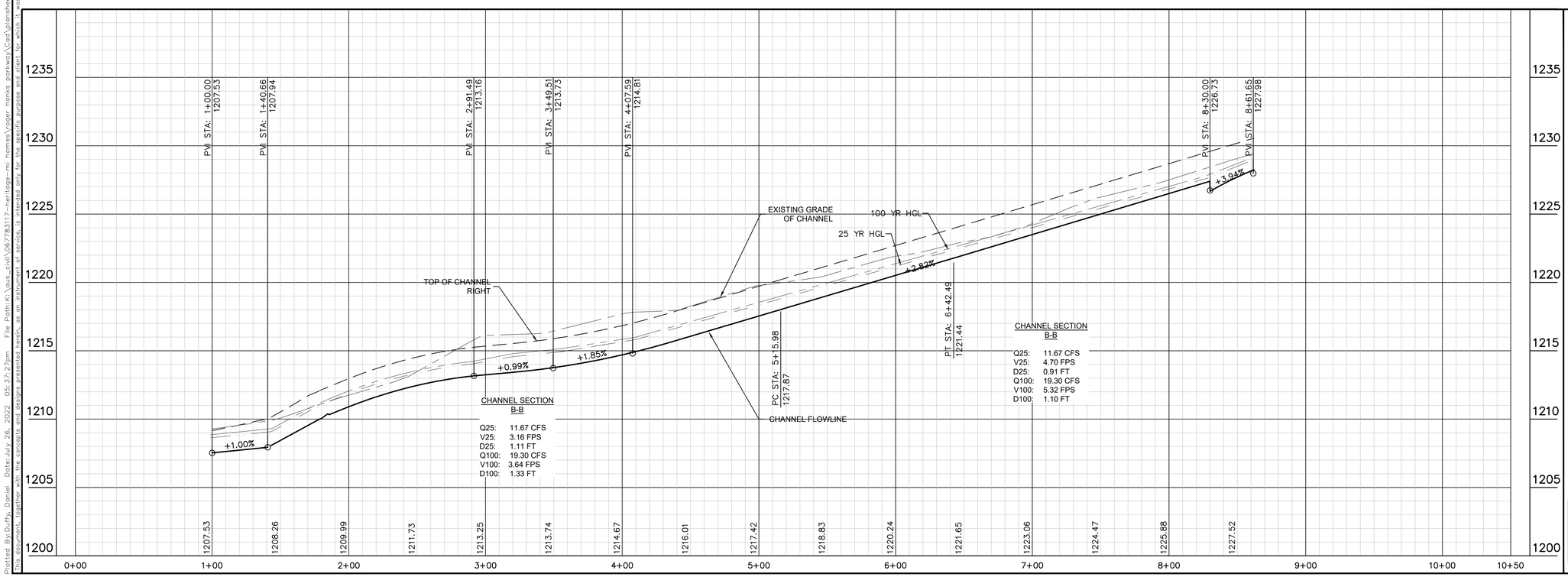
ROGER HANKS PARKWAY EXTENSION II
CITY OF DRIPPING SPRINGS
HAYS COUNTY, TEXAS

SHEET NUMBER
29





CHANNEL B



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07/27/2022

STATE OF TEXAS
ALEJANDRO E. GUTIERREZ
103084
LICENSED
PROFESSIONAL ENGINEER
07/27/22

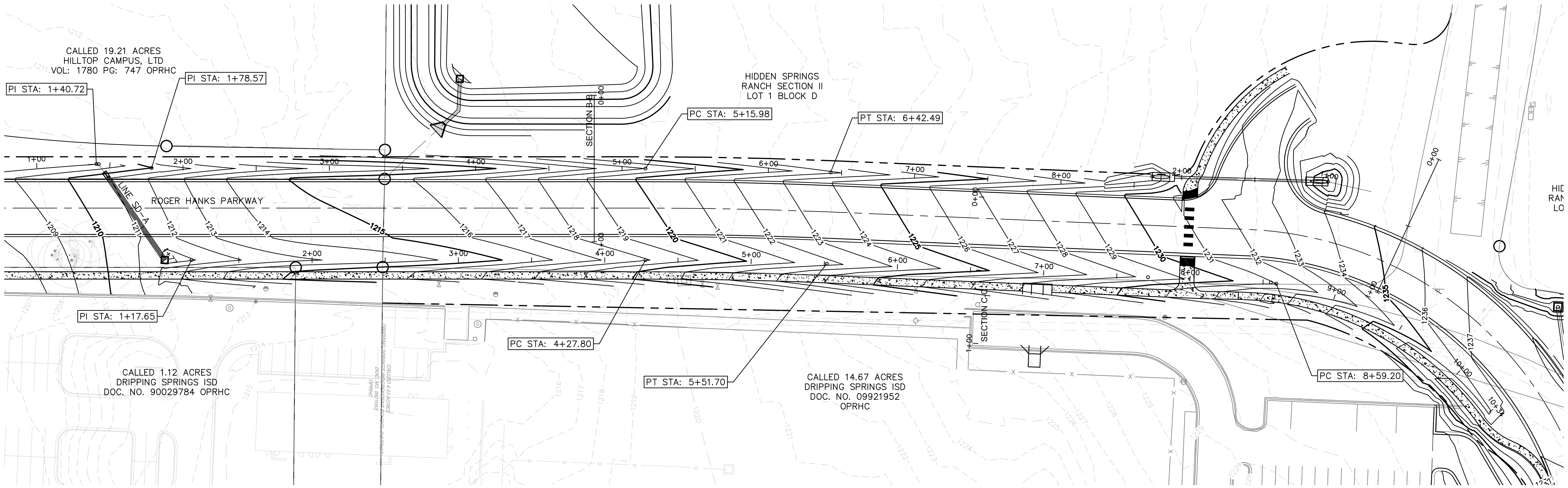
KHA PROJECT	067783117
DATE	JULY 2022
SCALE:	AS SHOWN
DESIGNED BY:	AEG
DRAWN BY:	DPD
CHECKED BY:	AEG

CHANNEL B PLAN & PROFILE

ROGER HANKS PARKWAY EXTENSION II

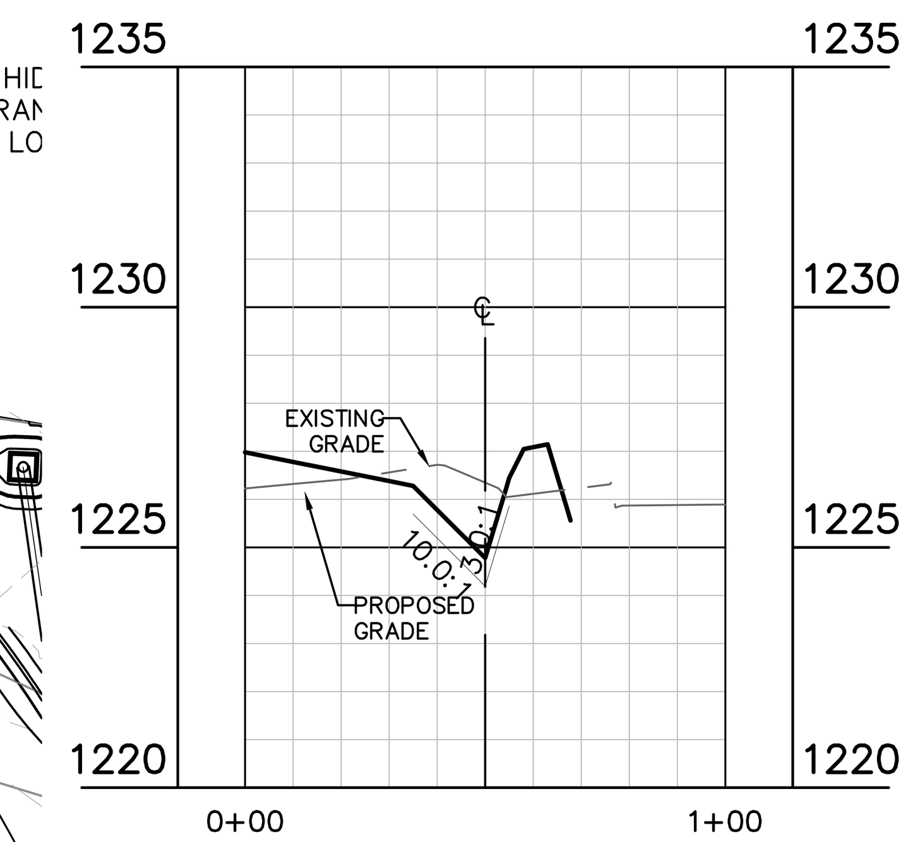
CITY OF DRIPPING SPRINGS
HAYS COUNTY, TEXAS

SHEET NUMBER
30



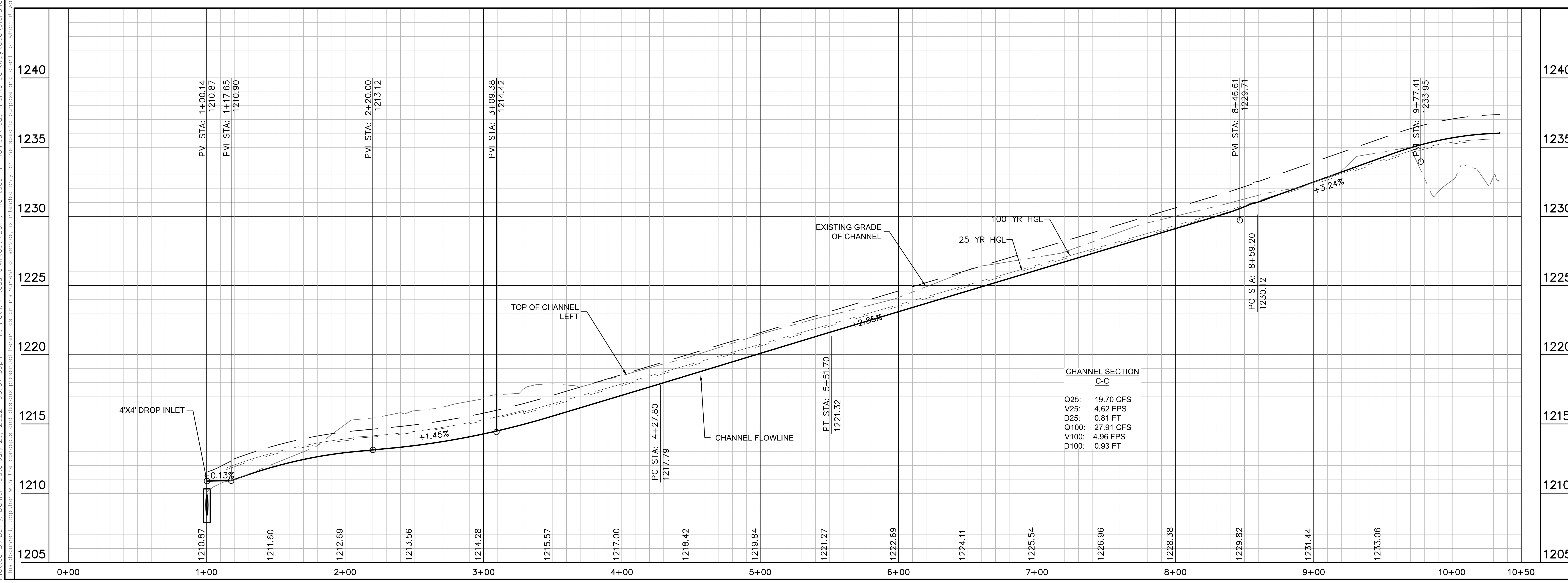
CALLED 19.21 ACRES
HILLTOP CAMPUS, LTD
VOL: 1780 PG: 747 OPRHC
PI STA: 1+40.72
PI STA: 1+78.57
PI STA: 1+17.65
LINE SD-A
ROGER HANKS PARKWAY
SECTION B-B
HIDDEN SPRINGS
RANCH SECTION II
LOT 1 BLOCK D
PC STA: 5+15.98
PT STA: 6+42.49
PC STA: 4+27.80
PT STA: 5+51.70
SECTION C-C
CALLED 1.12 ACRES
DRIPPING SPRINGS ISD
DOC. NO. 90029784 OPRHC
CALLED 14.67 ACRES
DRIPPING SPRINGS ISD
DOC. NO. 09921952
OPRHC
PC STA: 8+59.20

GRAPHIC SCALE 40'



SECTION C-C
STA. 6+55.56
(TYPICAL STATION 1+00.00 - 7+71.32)

CHANNEL C



PVI STA: 1+00.14 1210.87
PVI STA: 1+17.65 1210.90
PVI STA: 2+20.00 1213.12
PVI STA: 3+09.38 1214.42
PVI STA: 8+46.61 1229.71
PVI STA: 9+77.41 1233.95
PC STA: 4+27.80 1217.79
PT STA: 5+51.70 1221.32
PC STA: 8+59.20 1230.12
4'X4' DROP INLET
TOP OF CHANNEL LEFT
CHANNEL FLOWLINE
EXISTING GRADE OF CHANNEL
25 YR HGL
100 YR HGL
-0.13%
+1.45%
+2.85%
+3.24%

CHANNEL SECTION
C-C

Q25:	19.70 CFS
V25:	4.62 FPS
D25:	0.81 FT
Q100:	27.91 CFS
V100:	4.96 FPS
D100:	0.93 FT

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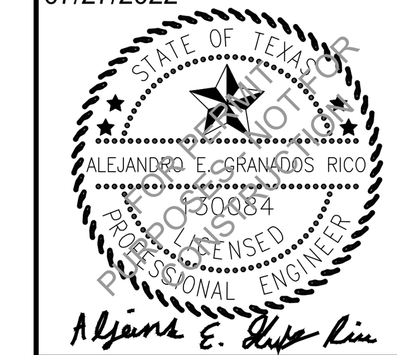
07/27/2022

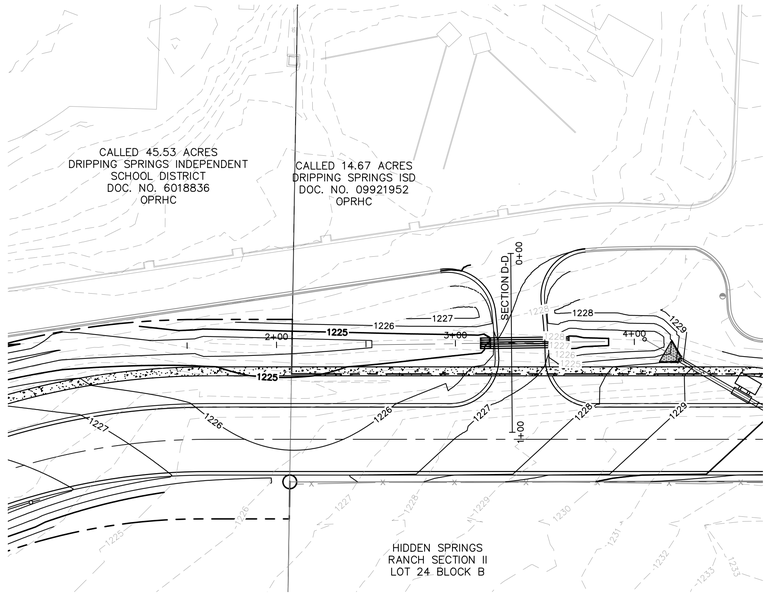


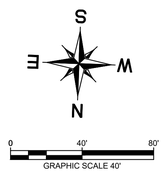
KHA PROJECT 067783117
DATE JULY 2022
SCALE: AS SHOWN
DESIGNED BY: AEG
DRAWN BY: DPD
CHECKED BY: AEG

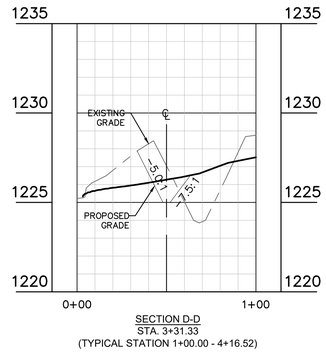
CHANNEL C PLAN & PROFILE

ROGER HANKS PARKWAY EXTENSION II
CITY OF DRIPPING SPRINGS
HAYS COUNTY, TEXAS

SHEET NUMBER
31

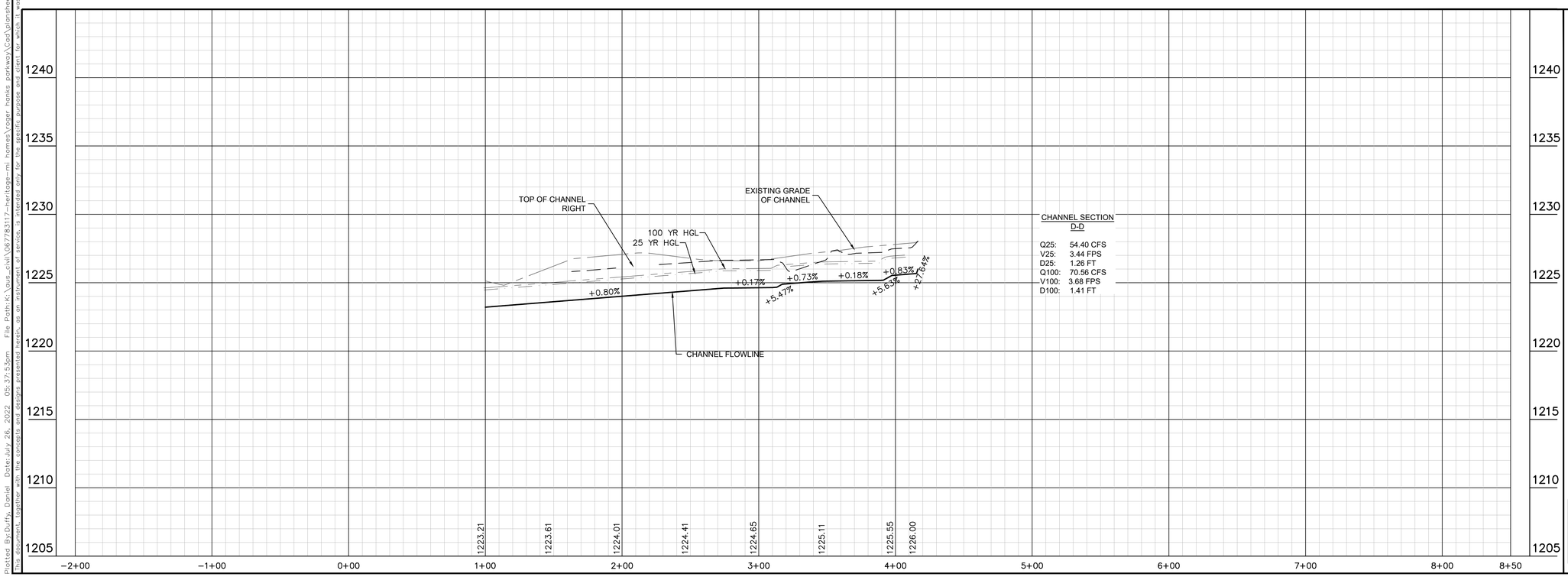






SECTION D-D
STA. 3+31.33
(TYPICAL STATION 1+00.00 - 4+16.52)

CHANNEL D



CHANNEL SECTION
D-D

Q25: 54.40 CFS
V25: 3.44 FPS
D25: 1.26 FT
Q100: 70.56 CFS
V100: 3.68 FPS
D100: 1.41 FT

PROFILE SCALE
1" = 40' HORIZONTAL
1" = 4' VERTICAL

WARNING: CONTRACTOR IS TO VERIFY PRESENCE AND EXACT LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION.

811
Know what's **below.**
Call before you dig.

BENCHMARKS

BM #150 SQUARE CUT SET AT THE BACK OF CURB
- ELEV.= 1229.74' (NAVD '88)

BM #151 SQUARE CUT SET AT THE BACK OF CURB
- ELEV.= 1230.35' (NAVD '88)

No.	REVISIONS	DATE	BY

Kimley»Horn
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10814 JOLLYVILLE ROAD, AVALLON IV, SUITE 300, AUSTIN, TX 78759
PHONE: 512-418-1771 FAX: 512-418-1791
WWW.KIMLEY-HORN.COM
TEXAS REGISTERED ENGINEERING FIRM F-928

07/27/2022

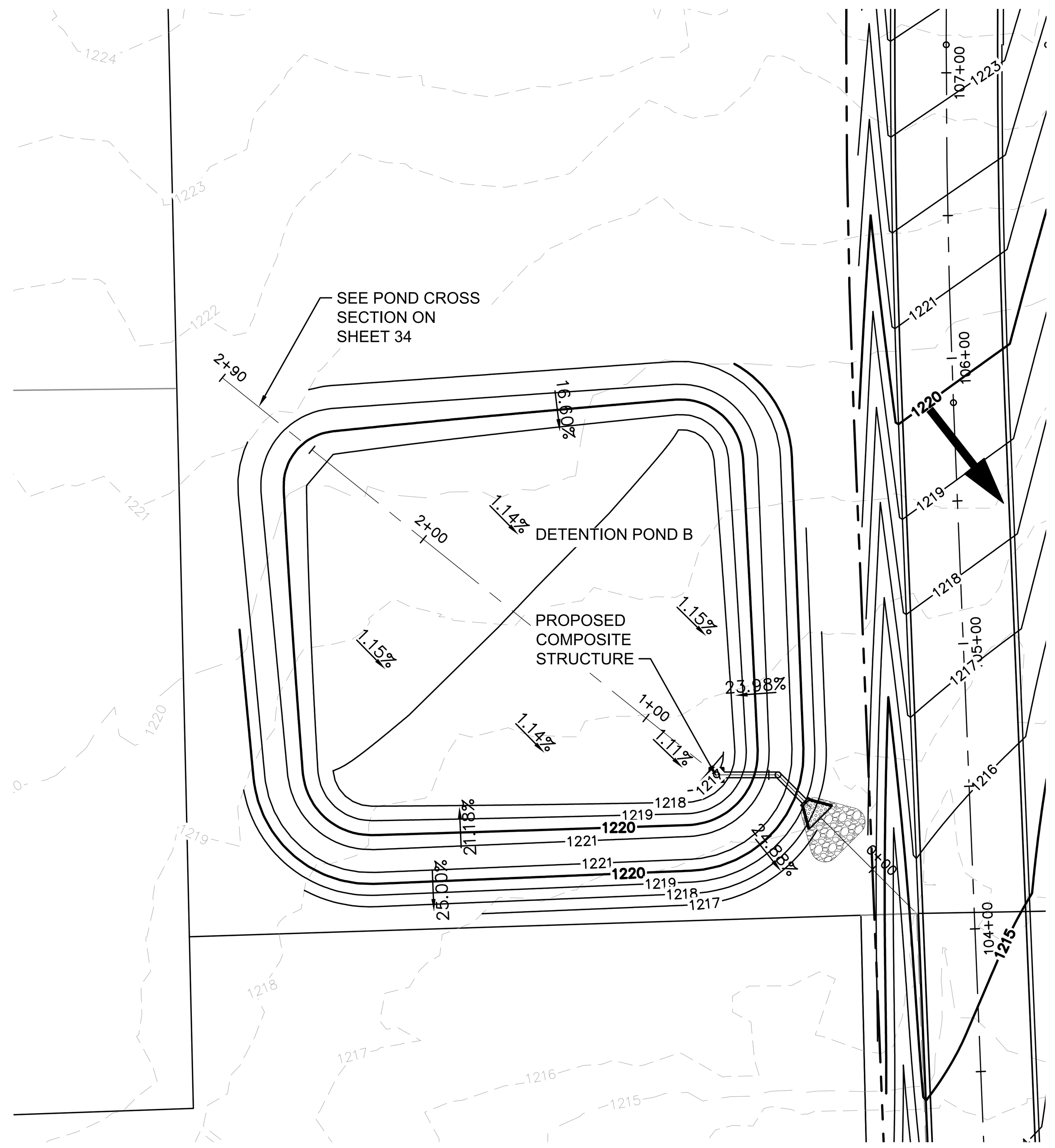
STATE OF TEXAS
ALEJANDRO E. GONZALEZ
103084
LICENSED
PROFESSIONAL ENGINEER

KHA PROJECT	067783117
DATE	JULY 2022
SCALE:	AS SHOWN
DESIGNED BY:	AEG
DRAWN BY:	DPD
CHECKED BY:	AEG

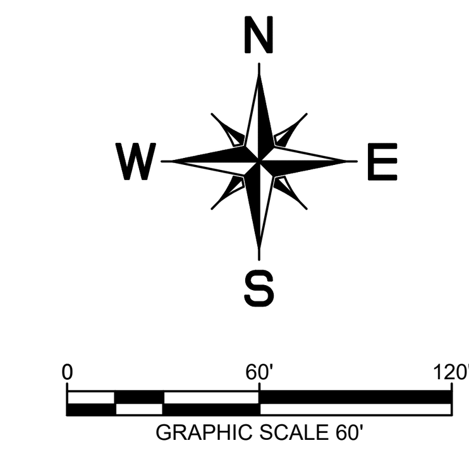
CHANNEL D PLAN & PROFILE

ROGER HANKS PARKWAY
EXTENSION II
CITY OF DRIPPING SPRINGS
HAYS COUNTY, TEXAS

SHEET NUMBER
32



Detention Pond B :						Rating Table
Stage	Area	Storage	Cumm. Storage	Cumm. Storage	Flow	
(FT MSL)	(SF)	(CF)	(CF)	(AC-FT)	(CFS)	
1217.00	0		-		0.00	
1218.00	10,034	5,017	5,017	0.12	3.14	CULVERT
1219.00	19,874	14,954	19,971	0.46	10.86	CULVERT
1220.00	22,944	21,409	41,380	0.95	17.85	CULVERT
1221.00	26,197	24,571	65,951	1.51	23.06	CULVERT



LEGEND

- PROPERTY LINE
- PROPOSED STORM SEWER LINE
- EXISTING STORM SEWER LINE
- PROPOSED STORM SEWER INLET
- PROPOSED STORM SEWER MANHOLE
- PROPOSED STORM SEWER HEADWALL
- PROPOSED FLOW DIRECTION
- 555 PROPOSED CONTOUR
- 555 EXISTING CONTOUR
- MAINTENANCE ACCESS PATH

NOTES:

1. BOTTOM OF SEDIMENTATION AND DETENTION BASINS SHALL BE GRASS LINED.
2. BARRIER FENCE SHALL BE INSTALLED ON ANY WALLS IN EXCESS OF 30" TALL.
3. ALL POND BOTTOMS, SIDE SLOPES, AND EARTHEN EMBANKMENTS SHALL BE COMPACTED TO 95% MAXIMUM DENSITY PER GEOTECH REPORT.
4. EXPANSION JOINTS ON FREE STANDING WALLS SHALL HAVE WATER TIGHT SEALS AS NEEDED.
5. EXPOSED CONCRETE POND WALLS TO HAVE STONE VENEER FINISH. SAMPLE OF PROPOSED STONE VENEER FINISH TO BE APPROVED BY DEVELOPER.
6. ALL EXPOSED CONCRETE THAT IS VISIBLE IS REQUIRED TO BE CLAD IN STONE INCLUDING BUT NOT LIMITED TO LEDGESTONE, FIELDSTONE, CAST STONE, OR OTHER DECORATIVE MATERIALS AS APPROVED BY THE DIRECTOR OF PLANNING. ALL OTHER EXPOSED CONCRETE IS REQUIRED TO BE CLAD IN STONE AS LISTED ABOVE.

WARNING: CONTRACTOR IS TO VERIFY PRESENCE AND EXACT LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION.

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BENCHMARKS

BM #150 SQUARE CUT SET AT THE BACK OF CURB
- ELEV.= 1229.74' (NAVD '88)

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STATE OF TEXAS
ALEJANDRO E. GRANADOS RICO
130084
LICENSED
PROFESSIONAL ENGINEER

KHA PROJECT 067783117
DATE JULY 2022
SCALE: AS SHOWN
DESIGNED BY: AEG
DRAWN BY: DPD
CHECKED BY: AEG

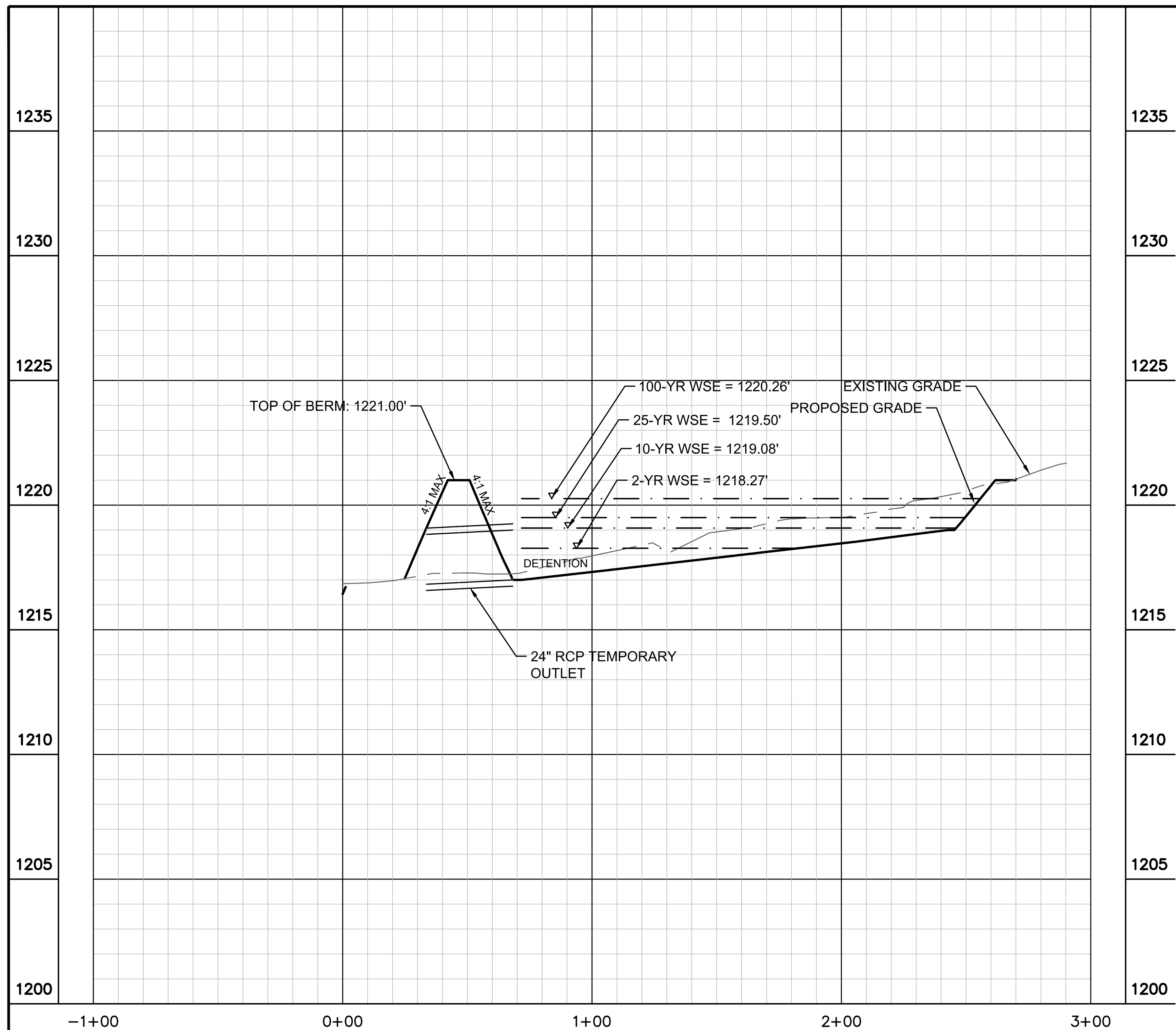
DETENTION POND B

ROGER HANKS PARKWAY EXTENSION II

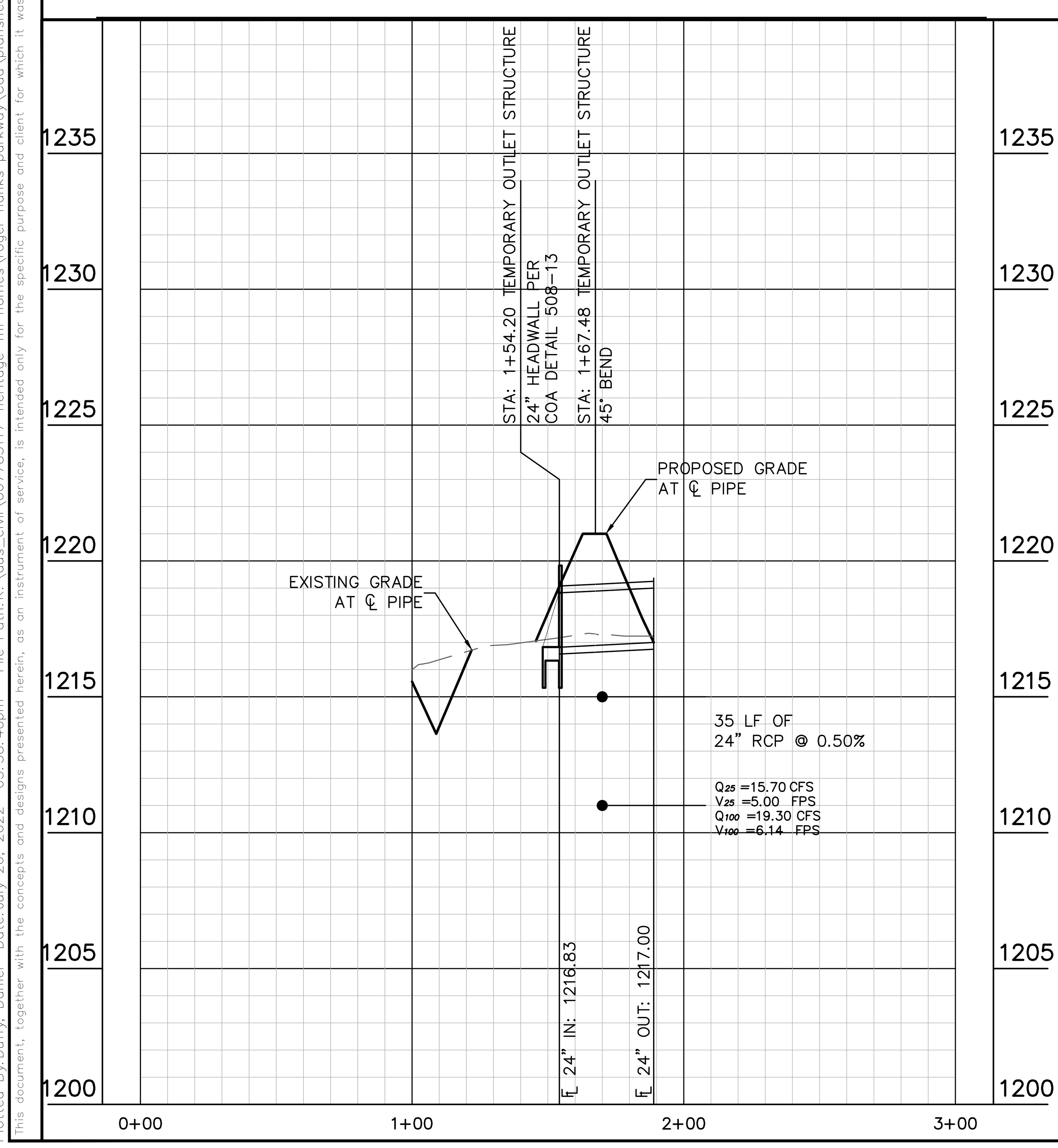
CITY OF DRIPPING SPRINGS
HAYS COUNTY, TEXAS

SHEET NUMBER
33

POND SECTION B–B



TEMPORARY OUTLET STRUCTURE



1235
1230
1225
1220
1215
1210
1205
1200
0+00
1+00
2+00
3+00
STA: 1+54.20 TEMPORARY OUTLET STRUCTURE
24" HEADWALL PER
COA DETAIL 508-13
STA: 1+67.48 TEMPORARY OUTLET STRUCTURE
45° BEND
PROPOSED GRADE
AT ℄ PIPE
EXISTING GRADE
AT ℄ PIPE
35 LF OF
24" RCP @ 0.50%
Q25 =15.70 CFS
V25 =5.00 FPS
Q100 =19.30 CFS
V100 =6.14 FPS
FL 24" IN: 1216.83
FL 24" OUT: 1217.00

PROFILE SCALE
1" = 40' HORIZONTAL
1" = 4' VERTICAL

PROFILE SCALE
1" = 40' HORIZONTAL
1" = 4' VERTICAL

WARNING: CONTRACTOR IS TO VERIFY PRESENCE AND EXACT LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION.

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BENCHMARKS

BM #150 SQUARE CUT SET AT THE BACK OF CURB
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KHA PROJECT 067783117
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DRAWN BY: DPD
CHECKED BY: AEG

POND CROSS SECTIONS

ROGER HANKS PARKWAY
EXTENSION II
CITY OF DRIPPING SPRINGS
HAYS COUNTY, TEXAS

SHEET NUMBER
34

CALLED 19.21 ACRES
HILLTOP CAMPUS, LTD
VOL: 1780 PG: 747 OPRHC

SPEED LIMIT 30
R2-1

ROGER HANKS PARKWAY
STA: 101+00
OFF: 6.00' RT/LF
BEGIN DUAL LEFT-TURN PAVEMENT MARKING

4" YELLOW SOLID LINE PER TX-DOT DETAIL PM (1-3)-20 (TYP.)

4" YELLOW BROKEN LINE AND TYPE II-A-A SPACED AT 40' PER TX-DOT DETAIL PM (1-3)-20 (TYP.)

STREET LIGHT (TYP.)

HIDDEN SPRINGS RANCH SECTION II LOT 1 BLOCK D

ROGER HANKS PARKWAY
STA: 109+50.80
OFF: 6.00' RT/LF
END DUAL LEFT-TURN PAVEMENT MARKING

TYPE 3 BARRICADE WITH ROAD CLOSED SIGN (R11-2)

STOP SIGN WITH "STREET" NAME

ROGER HANKS PARKWAY
STA: 110+45.33
OFF: 6.00' RT/LF
BEGIN DUAL LEFT-TURN PAVEMENT MARKING

ARROW PAVEMENT MARKING PER TX-DOT DETAIL PM (1-3) - 20

ROGER HANKS PARKWAY

101+00 102+00 103+00 104+00 105+00 106+00 107+00 108+00 109+00 110+00 111+00

12.0' 12.0' 12.0'

S1-1
W16-9P

W1-1R
W13-1P (20 MPH)

S1-1
SW16-7P

CROSSWALK PAVEMENT MARKING PER TX-DOT DETAIL PM (4) - 20

MATCH LINE STA 111+50

R2-1 (30 MPH)

CALLED 1.12 ACRES
DRIPPING SPRINGS ISD
DOC. NO. 90029784 OPRHC

CALLED 14.67 ACRES
DRIPPING SPRINGS ISD
DOC. NO. 09921952
OPRHC

W1-1R

S1-1

15'

20 M.P.H. W13-1

SW16-7P

S1-1
AHEAD W16-9P

HIDDEN SPRINGS RANCH SECTION II LOT 27 BLOCK B

W1-1L

20 M.P.H. W13-1

4" YELLOW SOLID LINE PER TX-DOT DETAIL PM (1-3)-20 (TYP.)

4" YELLOW BROKEN LINE AND TYPE II-A-A SPACED AT 40' PER TX-DOT DETAIL PM (1-3)-20 (TYP.)

HIDDEN SPRINGS RANCH SECTION II LOT 24 BLOCK B

S1-1
W16-9P

W1-1L
W13-1 (20 MPH)

HIDDEN SPRINGS RANCH SECTION II LOT 1 BLOCK C

ROGER HANKS PARKWAY

113+00 114+00 115+00 116+00 117+00 118+00 119+00 120+00 121+00 122+00

12.0' 12.0' 12.0'

98.0'

5.0'

MATCH LINE STA 111+50

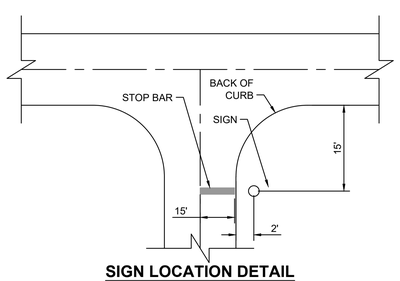
MATCH LINE STA 122+00

STREET LIGHT (TYP.)

CALLED 14.67 ACRES
DRIPPING SPRINGS ISD
DOC. NO. 09921952
OPRHC

BM #151

5' SIDEWALK



SIGN LOCATION DETAIL
SCALE: N.T.S.

LEGEND

- PROPERTY BOUNDARY
- SIDEWALK (IN THIS CONTRACT) (ALL SIDEWALKS TO BE 5' WIDE UNLESS OTHERWISE NOTED)
- FIRE HYDRANT PAVEMENT MARKER
- FIRE HYDRANT
- PROPOSED SPEED LIMIT SIGN
- STOP AND STREET SIGN NAME (R1-1) AND STOP BAR (TYP.)
- PROPOSED STREET LIGHT

GRAPHIC SCALE 40'

NOTES:

1. ALL STREET SIGNS AND PAVEMENT MARKINGS SHALL CONFORM TO THE STANDARDS SET FORTH IN THE LATEST EDITION OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD).
2. ALL PAVEMENT MARKINGS SHALL BE TYPE I THERMOPLASTIC IN ACCORDANCE WITH ITEM 666 OF THE TXDOT STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MAINTENANCE OF HIGHWAYS, STREETS, AND BRIDGES.
3. THE BOTTOM OF ALL STREET SIGNS SHALL BE A MINIMUM OF 7 FEET ABOVE FINISHED GRADE.
4. ALL "STOP" SIGNS TO BE R1-1.
5. ALL SIGN POLES TO BE 2 3/8" O.D. TUBULAR POSTS.
6. ELECTRIC SERVICE TO BE PROVIDED BY BLUEBONNET ELECTRIC. CONTRACTOR TO MATCH STREET LIGHT DETAIL SUBMITTED WITH HERITAGE PHASE 1.

No.	REVISIONS	DATE	BY

Kimley»Horn

10814 JOLLYVILLE ROAD, AVALLON IV, SUITE 300, AUSTIN, TX 78759
PHONE: 512-418-1771 FAX: 512-418-1791
WWW.KIMLEY-HORN.COM
TEXAS REGISTERED ENGINEERING FIRM F-928

07/27/2022

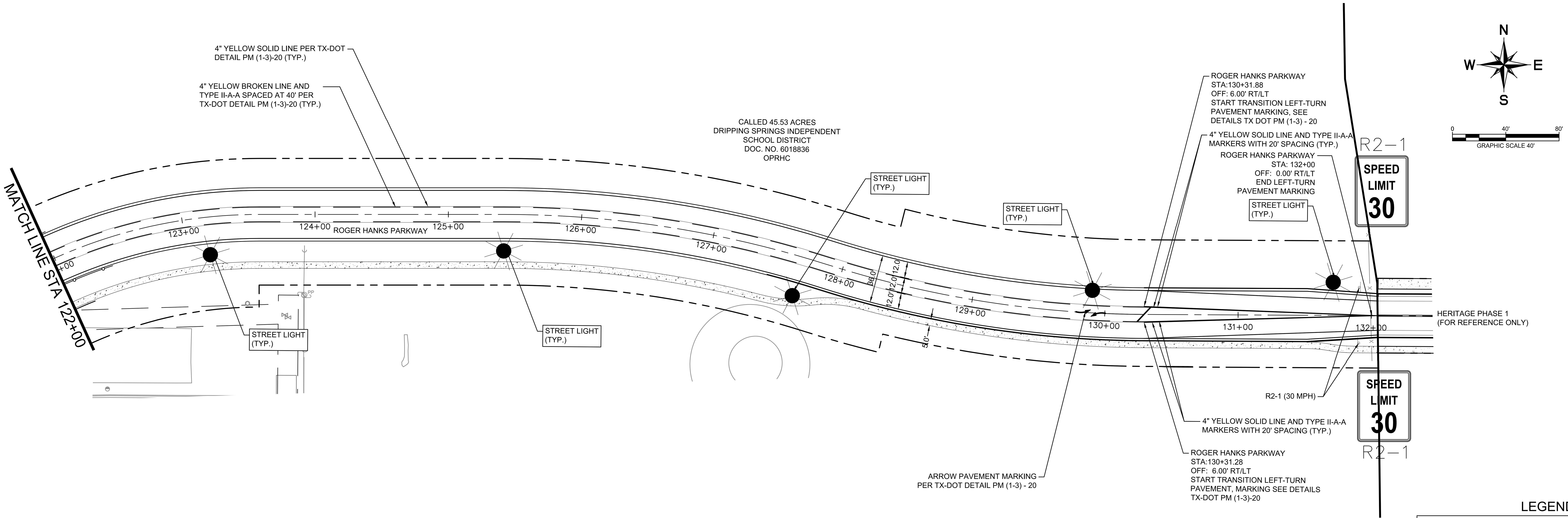
KHA PROJECT 067783117	DATE JULY 2022	SCALE: AS SHOWN	DESIGNED BY: AEG	DRAWN BY: DPD	CHECKED BY: AEG

STRIPING, SIGNAGE, AND STREET LIGHT PLAN (SHEET 1 OF 2)

ROGER HANKS PARKWAY EXTENSION II

CITY OF DRIPPING SPRINGS
HAYS COUNTY, TEXAS

SHEET NUMBER
35


4" YELLOW SOLID LINE PER TX-DOT DETAIL PM (1-3)-20 (TYP.)
4" YELLOW BROKEN LINE AND TYPE II-A-A SPACED AT 40' PER TX-DOT DETAIL PM (1-3)-20 (TYP.)
MATCH LINE STA 122+00
123+00
124+00
ROGER HANKS PARKWAY
125+00
126+00
127+00
128+00
129+00
130+00
131+00
132+00
STREET LIGHT (TYP.)
CALLED 45.53 ACRES
DRIPPING SPRINGS INDEPENDENT SCHOOL DISTRICT
DOC. NO. 6018836
OPRHC
36.0'
12.0'
5.0'
ARROW PAVEMENT MARKING PER TX-DOT DETAIL PM (1-3) - 20
ROGER HANKS PARKWAY STA:130+31.88 OFF: 6.00' RT/LT START TRANSITION LEFT-TURN PAVEMENT MARKING, SEE DETAILS TX DOT PM (1-3) - 20
4" YELLOW SOLID LINE AND TYPE II-A-A MARKERS WITH 20' SPACING (TYP.)
ROGER HANKS PARKWAY STA: 132+00 OFF: 0.00' RT/LT END LEFT-TURN PAVEMENT MARKING
R2-1
SPEED LIMIT 30
R2-1 (30 MPH)
ROGER HANKS PARKWAY STA:130+31.28 OFF: 6.00' RT/LT START TRANSITION LEFT-TURN PAVEMENT, MARKING SEE DETAILS TX-DOT PM (1-3)-20
HERITAGE PHASE 1 (FOR REFERENCE ONLY)
N
W
E
S
0
40'
80'
GRAPHIC SCALE 40'

LEGEND

——— — — ———	PROPERTY BOUNDARY
(sidewalk hatch)	SIDEWALK (IN THIS CONTRACT) (ALL SIDEWALKS TO BE 5' WIDE UNLESS OTHERWISE NOTED)
⊠	FIRE HYDRANT PAVEMENT MARKER
	FIRE HYDRANT
	PROPOSED SPEED LIMIT SIGN
	STOP AND STREET SIGN NAME (R1-1) AND STOP BAR (TYP.)
	PROPOSED STREET LIGHT

NOTES:

1. ALL STREET SIGNS AND PAVEMENT MARKINGS SHALL CONFORM TO THE STANDARDS SET FORTH IN THE LATEST EDITION OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD).
2. ALL PAVEMENT MARKINGS SHALL BE TYPE I THERMOPLASTIC IN ACCORDANCE WITH ITEM 666 OF THE TXDOT STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MAINTENANCE OF HIGHWAYS, STREETS, AND BRIDGES.
3. THE BOTTOM OF ALL STREET SIGNS SHALL BE A MINIMUM OF 7 FEET ABOVE FINISHED GRADE.
4. ALL "STOP" SIGNS TO BE R1-1.
5. ALL SIGN POLES TO BE $2\frac{3}{8}$" O.D. TUBULAR POSTS.
6. ELECTRIC SERVICE TO BE PROVIDED BY BLUEBONNET ELECTRIC. CONTRACTOR TO MATCH STREET LIGHT DETAIL SUBMITTED WITH HERITAGE PHASE 1.

No.	REVISIONS	DATE	BY

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07/27/2022
STATE OF TEXAS
ALEJANDRO E. GRANADOS RICO
130084
LICENSED PROFESSIONAL ENGINEER
FOR PERMIT PURPOSES ONLY NOT FOR CONSTRUCTION
Alejandro E. Granados Rico

KHA PROJECT	067783117
DATE	JULY 2022
SCALE:	AS SHOWN
DESIGNED BY:	AEG
DRAWN BY:	DPD
CHECKED BY:	AEG

STRIPING, SIGNAGE, AND STREET LIGHT PLAN (SHEET 2 OF 2)

ROGER HANKS PARKWAY EXTENSION II

CITY OF DRIPPING SPRINGS
HAYS COUNTY, TEXAS

SHEET NUMBER
36

APPENDIX P-1 - EROSION CONTROL NOTES

1. THE CONTRACTOR SHALL INSTALL EROSION/SEDIMENTATION CONTROLS, TREE/NATURAL AREA PROTECTIVE FENCING, AND CONDUCT "PRE-CONSTRUCTION" TREE FERTILIZATION (IF APPLICABLE) PRIOR TO ANY SITE PREPARATION WORK (CLEARING, GRUBBING OR EXCAVATION).
2. THE PLACEMENT OF EROSION/SEDIMENTATION CONTROLS SHALL BE IN ACCORDANCE WITH THE ENVIRONMENTAL CRITERIA MANUAL AND THE APPROVED EROSION AND SEDIMENTATION CONTROL PLAN. THE COA ESC PLAN SHALL BE CONSULTED AND USED AS THE BASIS FOR A TPDES REQUIRED SWPPP. IF A SWPPP IS REQUIRED, IT SHALL BE AVAILABLE FOR REVIEW BY THE CITY OF AUSTIN ENVIRONMENTAL INSPECTOR AT ALL TIMES DURING CONSTRUCTION, INCLUDING AT THE PRE-CONSTRUCTION MEETING. THE CHECKLIST BELOW CONTAINS THE BASIC ELEMENTS THAT SHALL BE REVIEWED FOR PERMIT APPROVAL BY COA EV PLAN REVIEWERS AS WELL AS COA EV INSPECTORS.
   - PLAN SHEETS SUBMITTED TO THE CITY OF AUSTIN MUST SHOW THE FOLLOWING:
     - ✓ DIRECTION OF FLOW DURING GRADING OPERATIONS.
     - ✓ LOCATION, DESCRIPTION, AND CALCULATIONS FOR OFF-SITE FLOW DIVERSION STRUCTURES.
     - ✓ AREAS THAT WILL NOT BE DISTURBED; NATURAL FEATURES TO BE PRESERVED.
     - ✓ DELINEATION OF CONTRIBUTING DRAINAGE AREA TO EACH PROPOSED BMP (E.G., SILT FENCE, SEDIMENT BASIN, ETC.).
     - ✓ LOCATION AND TYPE OF E&S BMPS FOR EACH PHASE OF DISTURBANCE.
     - ✓ CALCULATIONS FOR BMPS AS REQUIRED.
     - ✓ LOCATION AND DESCRIPTION OF TEMPORARY STABILIZATION MEASURES.
     - ✓ LOCATION OF ON-SITE SPOILS, DESCRIPTION OF HANDLING AND DISPOSAL OF BORROW MATERIALS, AND DESCRIPTION OF ON-SITE PERMANENT SPOILS DISPOSAL AREAS, INCLUDING SIZE, DEPTH OF FILL AND REVEGETATION PROCEDURES.
     - ✓ DESCRIBE SEQUENCE OF CONSTRUCTION AS IT PERTAINS TO ESC INCLUDING THE FOLLOWING ELEMENTS:
       - INSTALLATION SEQUENCE OF CONTROLS (E.G. PERIMETER CONTROLS, THEN SEDIMENT BASINS, THEN TEMPORARY STABILIZATION, THEN PERMANENT, ETC.)
       - PROJECT PHASING IF REQUIRED (LOC GREATER THAN 25 ACRES)
       - SEQUENCE OF GRADING OPERATIONS AND NOTATION OF TEMPORARY STABILIZATION MEASURES TO BE USED
       - SCHEDULE FOR CONVERTING TEMPORARY BASINS TO PERMANENT WQ CONTROLS
       - SCHEDULE FOR REMOVAL OF TEMPORARY CONTROLS
       - ANTICIPATED MAINTENANCE SCHEDULE FOR TEMPORARY CONTROLS
   - CATEGORIZE EACH BMP UNDER ONE OF THE FOLLOWING AREAS OF BMP ACTIVITY AS DESCRIBED BELOW:
     - 3.1 MINIMIZE DISTURBED AREA AND PROTECT NATURAL FEATURES AND SOIL
     - 3.2 CONTROL STORMWATER FLOWING ONTO AND THROUGH THE PROJECT
     - 3.3 STABILIZE SOILS
     - 3.4 PROTECT SLOPES
     - 3.5 PROTECT STORM DRAIN INLETS
     - 3.6 ESTABLISH PERIMETER CONTROLS AND SEDIMENT BARRIERS
     - 3.7 RETAIN SEDIMENT ON-SITE AND CONTROL DEWATERING PRACTICES
     - 3.8 ESTABLISH STABILIZED CONSTRUCTION EXITS
     - 3.9 ANY ADDITIONAL BMPS
   - NOTE THE LOCATION OF EACH BMP ON YOUR SITE MAP(S).
   - FOR ANY STRUCTURAL BMPS, YOU SHOULD PROVIDE DESIGN SPECIFICATIONS AND DETAILS AND REFER TO THEM.
   - FOR MORE INFORMATION, SEE CITY OF AUSTIN ENVIRONMENTAL CRITERIA MANUAL 1.4.
3. THE PLACEMENT OF TREE/NATURAL AREA PROTECTIVE FENCING SHALL BE IN ACCORDANCE WITH THE CITY OF AUSTIN STANDARD NOTES FOR TREE AND NATURAL AREA PROTECTION AND THE APPROVED GRADING/TREE AND NATURAL AREA PLAN.
4. A PRE-CONSTRUCTION CONFERENCE SHALL BE HELD ON-SITE WITH THE CONTRACTOR, DESIGN ENGINEER/PERMIT APPLICANT AND ENVIRONMENTAL INSPECTOR AFTER INSTALLATION OF THE EROSION/SEDIMENTATION CONTROLS, TREE/NATURAL AREA PROTECTION MEASURES AND "PRE-CONSTRUCTION" TREE FERTILIZATION (IF APPLICABLE) PRIOR TO BEGINNING ANY SITE PREPARATION WORK. THE OWNER OR OWNER'S REPRESENTATIVE SHALL NOTIFY THE DEVELOPMENT SERVICES DEPARTMENT, 512-974-2278 OR BY EMAIL AT ENVIRONMENTAL.INSPECTIONS@AUSTINTEXAS.GOV, AT LEAST THREE DAYS PRIOR TO THE MEETING DATE. COA APPROVED ESC PLAN AND TPDES SWPPP (IF REQUIRED) SHOULD BE REVIEWED BY COA EV INSPECTOR AT THIS TIME.
5. ANY MAJOR VARIATION IN MATERIALS OR LOCATIONS OF CONTROLS OR FENCES FROM THOSE SHOWN ON THE APPROVED PLANS WILL REQUIRE A REVISION AND MUST BE APPROVED BY THE REVIEWING ENGINEER, ENVIRONMENTAL SPECIALIST OR CITY ARBORIST AS APPROPRIATE. MAJOR REVISIONS MUST BE APPROVED BY AUTHORIZED COA STAFF. MINOR CHANGES TO BE MADE AS FIELD REVISIONS TO THE EROSION AND SEDIMENTATION CONTROL PLAN MAY BE REQUIRED BY THE ENVIRONMENTAL INSPECTOR DURING THE COURSE OF CONSTRUCTION TO CORRECT CONTROL INADEQUACIES.
6. THE CONTRACTOR IS REQUIRED TO PROVIDE A CERTIFIED INSPECTOR THAT IS EITHER A LICENSED ENGINEER (OR PERSON DIRECTLY SUPERVISED BY THE LICENSED ENGINEER) OR CERTIFIED PROFESSIONAL IN EROSION AND SEDIMENT CONTROL (CPESC OR CPESC - IT), CERTIFIED EROSION, SEDIMENT AND STORMWATER - INSPECTOR (CESSWI OR CESSWI - IT) OR CERTIFIED INSPECTOR OF SEDIMENTATION AND EROSION CONTROLS (CISEC OR CISEC - IT) CERTIFICATION TO INSPECT THE CONTROLS AND FENCES AT WEEKLY OR BI-WEEKLY INTERVALS AND AFTER ONE-HALF (½) INCH OR GREATER RAINFALL EVENTS TO INSURE THAT THEY ARE FUNCTIONING PROPERLY. THE PERSON(S) RESPONSIBLE FOR MAINTENANCE OF CONTROLS AND FENCES SHALL IMMEDIATELY MAKE ANY NECESSARY REPAIRS TO DAMAGED AREAS. SILT ACCUMULATION AT CONTROLS MUST BE REMOVED WHEN THE DEPTH REACHES SIX (6) INCHES OR ONE-THIRD (⅓) OF THE INSTALLED HEIGHT OF THE CONTROL WHICHEVER IS LESS.
7. PRIOR TO FINAL ACCEPTANCE BY THE CITY, HAUL ROADS AND WATERWAY CROSSINGS CONSTRUCTED FOR TEMPORARY CONTRACTOR ACCESS MUST BE REMOVED, ACCUMULATED SEDIMENT REMOVED FROM THE WATERWAY AND THE AREA RESTORED TO THE ORIGINAL GRADE AND REVEGETATED. ALL LAND CLEARING DEBRIS SHALL BE DISPOSED OF IN APPROVED SPOIL DISPOSAL SITES.
8. ALL WORK MUST STOP IF A VOID IN THE ROCK SUBSTRATE IS DISCOVERED WHICH IS; ONE SQUARE FOOT IN TOTAL AREA; BLOWS AIR FROM WITHIN THE SUBSTRATE AND/OR CONSISTENTLY RECEIVES WATER DURING ANY RAIN EVENT. AT THIS TIME IT IS THE RESPONSIBILITY OF THE PROJECT MANAGER TO IMMEDIATELY CONTACT A CITY OF AUSTIN ENVIRONMENTAL INSPECTOR FOR FURTHER INVESTIGATION.
9. TEMPORARY AND PERMANENT EROSION CONTROL: ALL DISTURBED AREAS SHALL BE RESTORED AS NOTED BELOW:
   A. ALL DISTURBED AREAS TO BE REVEGETATED ARE REQUIRED TO PLACE A MINIMUM OF SIX (6) INCHES OF TOPSOIL [SEE STANDARD SPECIFICATION ITEM NO. 601S.3(A)]. DO NOT ADD TOPSOIL WITHIN THE CRITICAL ROOT ZONE OF EXISTING TREES.
   - TOPSOIL SALVAGED FROM THE EXISTING SITE IS ENCOURAGED FOR USE, BUT IT SHOULD MEET THE STANDARDS SET FORTH IN 601S.

     AN OWNER/ENGINEER MAY PROPOSE USE OF ONSITE SALVAGED TOPSOIL WHICH DOES NOT MEET THE CRITERIA OF STANDARD SPECIFICATION 601S BY PROVIDING A SOIL ANALYSIS AND A WRITTEN STATEMENT FROM A QUALIFIED PROFESSIONAL IN SOILS, LANDSCAPE ARCHITECTURE, OR AGRONOMY INDICATING THE ONSITE TOPSOIL WILL PROVIDE AN EQUIVALENT GROWTH MEDIA AND SPECIFYING WHAT, IF ANY, SOIL AMENDMENTS ARE REQUIRED.
   - SOIL AMENDMENTS SHALL BE WORKED INTO THE EXISTING ONSITE TOPSOIL WITH A DISC OR TILLER TO CREATE A WELL-BLENDED MATERIAL.

THE VEGETATIVE STABILIZATION OF AREAS DISTURBED BY CONSTRUCTION SHALL BE AS FOLLOWS:

TEMPORARY VEGETATIVE STABILIZATION:

1. FROM SEPTEMBER 15 TO MARCH 1, SEEDING SHALL BE WITH OR INCLUDE A COOL SEASON COVER CROP: (WESTERN WHEATGRASS (*PASCOPYRUM SMITHII*) AT 5.6 POUNDS PER ACRE, OATS (*AVENA SATIVA*) AT 4.0 POUNDS PER ACRE, CEREAL RYE GRAIN (*SECALE CEREALE*) AT 45 POUNDS PER ACRE. CONTRACTOR MUST ENSURE THAT ANY SEED APPLICATION REQUIRING A COOL SEASON COVER CROP DOES NOT UTILIZE ANNUAL RYEGRASS (*LOLIUM MULTIFLORUM*) OR PERENNIAL RYEGRASS (*LOLIUM PERENNE*). COOL SEASON COVER CROPS ARE NOT PERMANENT EROSION CONTROL.
2. FROM MARCH 2 TO SEPTEMBER 14, SEEDING SHALL BE WITH HULLED BERMUDA AT A RATE OF 45 POUNDS PER ACRE OR A NATIVE PLANT SEED MIX CONFORMING TO ITEM 604S OR 609S.
   A. FERTILIZER SHALL BE APPLIED ONLY IF WARRANTED BY A SOIL TEST AND SHALL CONFORM TO ITEM NO. 606S, FERTILIZER. FERTILIZATION SHOULD NOT OCCUR WHEN RAINFALL IS EXPECTED OR DURING SLOW PLANT GROWTH OR DORMANCY. CHEMICAL FERTILIZER MAY NOT BE APPLIED IN THE CRITICAL WATER QUALITY ZONE.
   B. HYDROMULCH SHALL COMPLY WITH TABLE 1, BELOW.
   C. TEMPORARY EROSION CONTROL SHALL BE ACCEPTABLE WHEN THE GRASS HAS GROWN AT LEAST 1½ INCHES HIGH WITH A MINIMUM OF 95% TOTAL COVERAGE SO THAT ALL AREAS OF A SITE THAT RELY ON VEGETATION FOR TEMPORARY STABILIZATION ARE UNIFORMLY VEGETATED, AND PROVIDED THERE ARE NO BARE SPOTS LARGER THAN 10 SQUARE FEET.
   D. WHEN REQUIRED, NATIVE PLANT SEEDING SHALL COMPLY WITH REQUIREMENTS OF THE CITY OF AUSTIN ENVIRONMENTAL CRITERIA MANUAL, AND STANDARD SPECIFICATION 604S OR 609S.

TABLE 1 HYDROMULCHING FOR TEMPORARY VEGETATIVE STABILIZATION

MATERIAL	DESCRIPTION	LONGEVITY	TYPICAL APPLICATIONS	APPLICATION RATES
100%, OR ANY BLEND OF WOOD, CELLULOSE, STRAW, AND/OR COTTON PLANT MATERIAL (EXCEPT NO MULCH SHALL EXCEED 30% PAPER)	70% OR GREATER WOOD/STRAW 30% OR LESS PAPER OR NATURAL FIBERS	0-3 MONTHS	MODERATE SLOPES; FROM FLAT TO 3:1	1500 TO 2000 LBS PER ACRE

PERMANENT VEGETATIVE STABILIZATION:

1. FROM SEPTEMBER 15 TO MARCH 1, SEEDING IS CONSIDERED TO BE TEMPORARY STABILIZATION ONLY. IF COOL SEASON COVER CROPS EXIST WHERE PERMANENT VEGETATIVE STABILIZATION IS DESIRED, THE GRASSES SHALL BE MOWED TO A HEIGHT OF LESS THAN ONE-HALF (½) INCH AND THE AREA SHALL BE RE-SEEDED IN ACCORDANCE WITH TABLE 2 BELOW. ALTERNATIVELY, THE COOL SEASON COVER CROP CAN BE MIXED WITH BERMUDAGRASS OR NATIVE SEED AND INSTALLED TOGETHER, UNDERSTANDING THAT GERMINATION OF WARM-SEASON SEED TYPICALLY REQUIRES SOIL TEMPERATURES OF 60 TO 70 DEGREES.
2. FROM MARCH 2 TO SEPTEMBER 14, SEEDING SHALL BE WITH HULLED BERMUDA AT A RATE OF 45 POUNDS PER ACRE WITH A PURITY OF 95% AND A MINIMUM PURE LIVE SEED (PLS) OF 0.83. BERMUDA GRASS IS A WARM SEASON GRASS AND IS CONSIDERED PERMANENT EROSION CONTROL. PERMANENT VEGETATIVE STABILIZATION CAN ALSO BE ACCOMPLISHED WITH A NATIVE PLANT SEED MIX CONFORMING TO ITEM 604S OR 609S.
   A. FERTILIZER USE SHALL FOLLOW THE RECOMMENDATION OF A SOIL TEST. SEE ITEM 606S, FERTILIZER. APPLICATIONS OF FERTILIZER (AND PESTICIDE) ON CITY-OWNED AND MANAGED PROPERTY REQUIRES THE YEARLY SUBMITTAL OF A PESTICIDE AND FERTILIZER APPLICATION RECORD, ALONG WITH A CURRENT COPY OF THE APPLICATOR'S LICENSE. FOR CURRENT COPY OF THE RECORD TEMPLATE CONTACT THE CITY OF AUSTIN'S IPM COORDINATOR.
   B. HYDROMULCH SHALL COMPLY WITH TABLE 2, BELOW.
   C. WATER THE SEEDED AREAS IMMEDIATELY AFTER INSTALLATION TO ACHIEVE GERMINATION AND A HEALTHY STAND OF PLANTS THAT CAN ULTIMATELY SURVIVE WITHOUT SUPPLEMENTAL WATER. APPLY THE WATER UNIFORMLY TO THE PLANTED AREAS WITHOUT CAUSING DISPLACEMENT OR EROSION OF THE MATERIALS OR SOIL. MAINTAIN THE SEEDBED IN A MOIST CONDITION FAVORABLE FOR PLANT GROWTH. ALL WATERING SHALL COMPLY WITH CITY CODE CHAPTER 6-4 (WATER CONSERVATION), AT RATES AND FREQUENCIES DETERMINED BY A LICENSED IRRIGATOR OR OTHER QUALIFIED PROFESSIONAL, AND AS ALLOWED BY THE AUSTIN WATER UTILITY AND CURRENT WATER RESTRICTIONS AND WATER CONSERVATION INITIATIVES.
   D. PERMANENT EROSION CONTROL SHALL BE ACCEPTABLE WHEN THE GRASS HAS GROWN AT LEAST 1½ INCHES HIGH WITH A MINIMUM OF 95 PERCENT FOR THE NON-NATIVE MIX, AND 95 PERCENT COVERAGE FOR THE NATIVE MIX SO THAT ALL AREAS OF A SITE THAT RELY ON VEGETATION FOR STABILITY MUST BE UNIFORMLY VEGETATED, AND PROVIDED THERE ARE NO BARE SPOTS LARGER THAN 10 SQUARE FEET.
   E. WHEN REQUIRED, NATIVE PLANT SEEDING SHALL COMPLY WITH REQUIREMENTS OF THE CITY OF AUSTIN ENVIRONMENTAL CRITERIA MANUAL, ITEMS 604S AND 609S.

TABLE 2 HYDROMULCHING FOR PERMANENT VEGETATIVE STABILIZATION

MATERIAL	DESCRIPTION	LONGEVITY	TYPICAL APPLICATIONS	APPLICATION RATES
BONDED FIBER MATRIX (BFM)	80% ORGANIC DEFIBRATED FIBERS 10% TACKIFIER	6 MONTHS	ON SLOPES UP TO 2:1 AND EROSIVE SOIL CONDITIONS	2500 TO 4000 LBS PER ACRE (SEE MANUFACTURERS RECOMMENDATIONS)
FIBER REINFORCED MATRIX (FRM)	65% ORGANIC DEFIBRATED FIBERS 25% REINFORCING FIBERS OR LESS 10% TACKIFIER	UP TO 12 MONTHS	ON SLOPES UP TO 1:1 AND EROSIVE SOIL CONDITIONS	3000 TO 4500 LBS PER ACRE (SEE MANUFACTURERS RECOMMENDATIONS)

10. DEVELOPER INFORMATION:
    OWNER: M/I HOMES OF AUSTIN, LLC
    ADDRESS: 7600 N. CAPITAL OF TEXAS HWY. BLDG. C, STE 250
    AUSTIN, TEXAS 78731

    A. OWNER'S REPRESENTATIVE RESPONSIBLE FOR PLAN ALTERATIONS:
    KIMLEY-HORN AND ASSOCIATES, INC.
    CONTACT: ALEX GRANADOS
    PHONE NO: (512) 782-0602

    B. PERSON OR FIRM RESPONSIBLE FOR EROSION / SEDIMENTATION CONTROL MAINTENANCE:
    OWNER: M/I HOMES OF AUSTIN, LLC
    CONTACT: AUSTIN EVETTS
    ADDRESS: 7600 N. CAPITAL OF TEXAS HWY. BLDG. C, STE 250
    AUSTIN, TEXAS 78731
    PHONE NO: (512) 770-8503

    D. PERSON OR FIRM RESPONSIBLE FOR TREE / NATURAL AREA CONTROL MAINTENANCE:
    OWNER: M/I HOMES OF AUSTIN, LLC
    CONTACT: AUSTIN EVETTS
    ADDRESS: 7600 N. CAPITAL OF TEXAS HWY. BLDG. C, STE 250
    AUSTIN, TEXAS 78731
    PHONE NO: (512) 770-8503

THE CONTRACTOR SHALL NOT DISPOSE OF SURPLUS EXCAVATED MATERIAL FROM THE SITE WITHOUT NOTIFYING THE DEVELOPMENT SERVICES DEPARTMENT AT 512-974-2278 AT LEAST 48 HOURS PRIOR WITH THE LOCATION AND A COPY OF THE PERMIT ISSUED TO RECEIVE THE MATERIAL.

APPENDIX P-2: - CITY OF AUSTIN STANDARD NOTES FOR TREE AND NATURAL AREA PROTECTION

1. ALL TREES AND NATURAL AREAS SHOWN ON PLAN TO BE PRESERVED SHALL BE PROTECTED DURING CONSTRUCTION WITH TEMPORARY FENCING.
2. PROTECTIVE FENCES SHALL BE ERECTED ACCORDING TO CITY OF AUSTIN STANDARDS FOR TREE PROTECTION.
3. PROTECTIVE FENCES SHALL BE INSTALLED PRIOR TO THE START OF ANY SITE PREPARATION WORK (CLEARING, GRUBBING OR GRADING), AND SHALL BE MAINTAINED THROUGHOUT ALL PHASES OF THE CONSTRUCTION PROJECT.
4. EROSION AND SEDIMENTATION CONTROL BARRIERS SHALL BE INSTALLED OR MAINTAINED IN A MANNER WHICH DOES NOT RESULT IN SOIL BUILD-UP WITHIN TREE DRIP LINES.
5. PROTECTIVE FENCES SHALL SURROUND THE TREES OR GROUP OF TREES, AND WILL BE LOCATED AT THE OUTERMOST LIMIT OF BRANCHES (DRIP LINE) , FOR NATURAL AREAS, PROTECTIVE FENCES SHALL FOLLOW THE LIMIT OF CONSTRUCTION LINE, IN ORDER TO PREVENT THE FOLLOWING:
   A. SOIL COMPACTION IN THE ROOT ZONE AREA RESULTING FROM VEHICULAR TRAFFIC OR STORAGE OF EQUIPMENT OR MATERIALS;
   B. ROOT ZONE DISTURBANCES DUE TO GRADE CHANGES (GREATER THAN 6 INCHES CUT OR FILL), OR TRENCHING NOT REVIEWED AND AUTHORIZED BY THE CITY ABORIST;
   C. WOUNDS TO EXPOSED ROOTS, TRUNK OR LIMBS BY MECHANICAL EQUIPMENT;
   D. OTHER ACTIVITIES DETRIMENTAL TO TREES SUCH AS CHEMICAL STORAGE, CEMENT TRUCK CLEANING, AND FIRES.
6. EXCEPTIONS TO INSTALLING FENCES AT TREE DRIP LINES MAY BE PERMITTED IN THE FOLLOWING CASES:
   A. WHERE THERE IS TO BE AN APPROVED GRADE CHANGE, IMPERMEABLE PAVING SURFACE, TREE WELL, OR OTHER SUCH SITE DEVELOPMENT, ERECT THE FENCE APPROXIMATELY 2 TO 4 FEET BEYOND THE AREA DISTURBED;
   B. WHERE PERMEABLE PAVING IS TO BE INSTALLED WITHIN A TREE'S DRIP LINE, ERECT THE FENCE AT THE OUTER LIMITS OF THE PERMEABLE PAVING AREA (PRIOR TO SITE GRADING SO THAT THIS AREA IS GRADED SEPARATELY PRIOR TO PAVING INSTALLATION TO MINIMIZED ROOT DAMAGE);
   C. WHERE TREES ARE CLOSE TO PROPOSED BUILDINGS, ERECT THE FENCE TO ALLOW 6 TO 10 FEET OF WORK SPACE BETWEEN THE FENCE AND THE BUILDING;
   D. WHERE THERE ARE SEVERE SPACE CONSTRAINTS DUE TO TRACT SIZE, OR OTHER SPECIAL REQUIREMENTS, CONTACT THE CITY ARBORIST AT 974-1876 TO DISCUSS ALTERNATIVES.

SPECIAL NOTE: FOR THE PROTECTION OF NATURAL AREAS, NO EXCEPTIONS TO INSTALLING FENCES AT THE LIMIT OF CONSTRUCTION LINE WILL BE PERMITTED.

7. WHERE ANY OF THE ABOVE EXCEPTIONS RESULT IN A FENCE BEING CLOSER THAN 4 FEET TO A TREE TRUNK, PROTECT THE TRUNK WITH STRAPPED-ON PLANKING TO A HEIGHT OF 8 FT (OR TO THE LIMITS OF LOWER BRANCHING) IN ADDITION TO THE REDUCED FENCING PROVIDED.
8. TREES APPROVED FOR REMOVAL SHALL BE REMOVED IN A MANNER WHICH DOES NOT IMPACT TREES TO BE PRESERVED.
9. ANY ROOTS EXPOSED BY CONSTRUCTION ACTIVITY SHALL BE PRUNED FLUSH WITH THE SOIL. BACKFILL ROOT AREAS WITH GOOD QUALITY TOP SOIL AS SOON AS POSSIBLE. IF EXPOSED ROOT AREAS ARE NOT BACKFILLED WITHIN 2 DAYS, COVER THEM WITH ORGANIC MATERIAL IN A MANNER WHICH REDUCES SOIL TEMPERATURE AND MINIMIZES WATER LOSS DUE TO EVAPORATION.
10. ANY TRENCHING REQUIRED FOR THE INSTALLATION OF LANDSCAPE IRRIGATION SHALL BE PLACED AS FAR FROM EXISTING TREE TRUNKS AS POSSIBLE.
11. NO LANDSCAPE TOPSOIL DRESSING GREATER THAN 4 INCHES SHALL BE PERMITTED WITHIN THE DRIP LINE OF TREES. NO SOIL IS PERMITTED ON THE ROOT FLARE OF ANY TREE.
12. PRUNING TO PROVIDE CLEARANCE FOR STRUCTURES, VEHICULAR TRAFFIC AND EQUIPMENT SHALL TAKE PLACE BEFORE DAMAGE OCCURS (RIPPING OF BRANCHES, ETC.).
13. ALL FINISHED PRUNING SHALL BE DONE ACCORDING TO RECOGNIZED, APPROVED STANDARDS OF THE INDUSTRY (REFERENCE THE NATIONAL ARBORIST ASSOCIATION PRUNING STANDARDS FOR SHADE TREES AVAILABLE ON REQUEST FROM THE CITY ARBORIST).

DEVIATIONS FROM THE ABOVE NOTES MAY BE CONSIDERED ORDINANCE VIOLATIONS IF THERE IS SUBSTANTIAL NON-COMPLIANCE OR IF A TREE SUSTAINS DAMAGE AS A RESULT.

APPENDIX P-4: - STANDARD SEQUENCE OF CONSTRUCTION

THE FOLLOWING SEQUENCE OF CONSTRUCTION SHALL BE USED FOR ALL DEVELOPMENT. THE APPLICANT IS ENCOURAGED TO PROVIDE ANY ADDITIONAL DETAILS APPROPRIATE FOR THE PARTICULAR DEVELOPMENT.

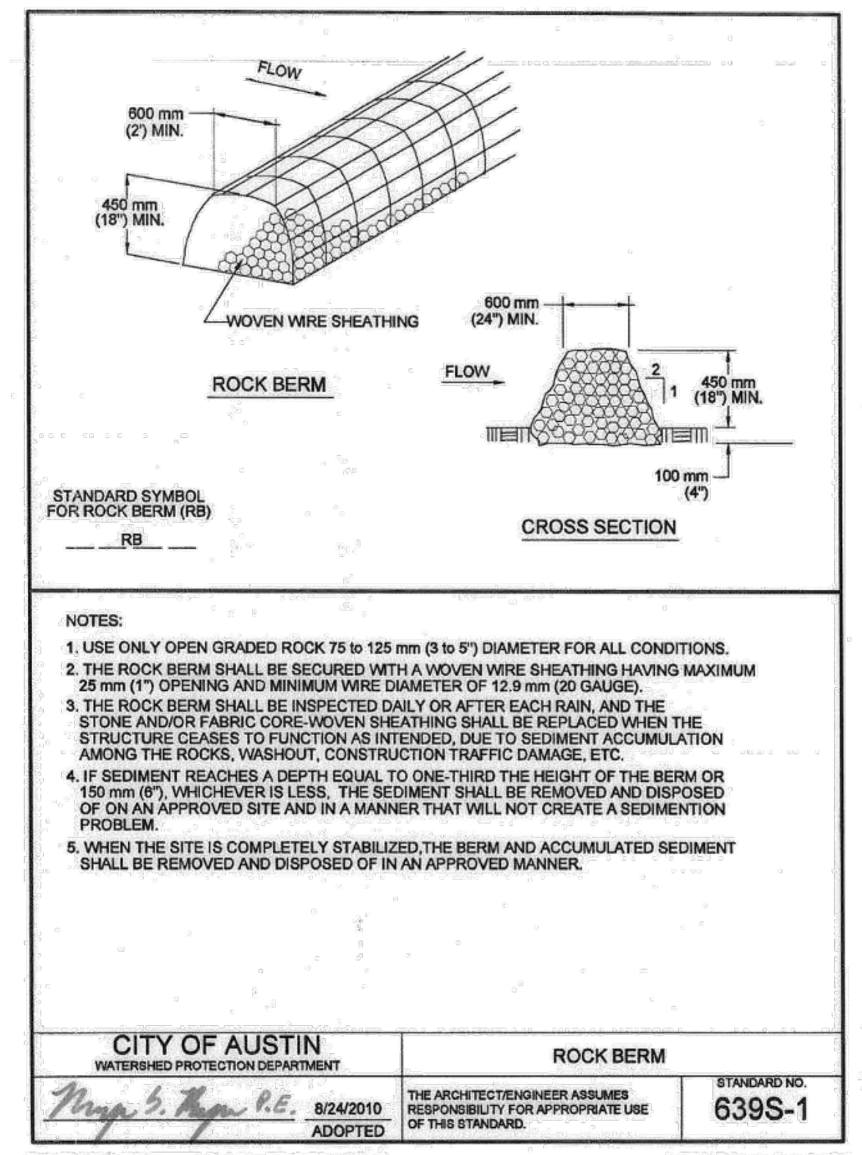
1. TEMPORARY EROSION AND SEDIMENTATION CONTROLS ARE TO BE INSTALLED AS INDICATED ON THE APPROVED SITE PLAN OR SUBDIVISION CONSTRUCTION PLAN AND IN ACCORDANCE WITH THE EROSION SEDIMENTATION CONTROL PLAN (ESC) AND STORMWATER POLLUTION PREVENTION PLAN (SWPPP) THAT IS REQUIRED TO BE POSTED ON THE SITE. INSTALL TREE PROTECTION, INITIATE TREE MITIGATION MEASURES AND CONDUCT "PRE - CONSTRUCTION" TREE FERTILIZATION (IF APPLICABLE).
2. THE ENVIRONMENTAL PROJECT MANAGER OR SITE SUPERVISOR MUST CONTACT THE DEVELOPMENT SERVICES DEPARTMENT, ENVIRONMENTAL INSPECTION, AT 512-974-2278, 72 HOURS PRIOR TO THE SCHEDULED DATE OF THE REQUIRED ON-SITE PRECONSTRUCTION MEETING.
3. THE ENVIRONMENTAL PROJECT MANAGER, AND/OR SITE SUPERVISOR, AND/OR DESIGNATED RESPONSIBLE PARTY, AND THE GENERAL CONTRACTOR WILL FOLLOW THE EROSION SEDIMENTATION CONTROL PLAN (ESC) AND STORM WATER POLLUTION PREVENTION PLAN (SWPPP) POSTED ON THE SITE. TEMPORARY EROSION AND SEDIMENTATION CONTROLS WILL BE REVISED, IF NEEDED, TO COMPLY WITH CITY INSPECTORS' DIRECTIVES, AND REVISED CONSTRUCTION SCHEDULE RELATIVE TO THE WATER QUALITY PLAN REQUIREMENTS AND THE EROSION PLAN.
4. ROUGH GRADE THE POND(S) AT 100% PROPOSED CAPACITY. EITHER THE PERMANENT OUTLET STRUCTURE OR A TEMPORARY OUTLET MUST BE CONSTRUCTED PRIOR TO DEVELOPMENT OF EMBANKMENT OR EXCAVATION THAT LEADS TO PONDING CONDITIONS. THE OUTLET SYSTEM MUST CONSIST OF A SUMP PIT OUTLET AND AN EMERGENCY SPILLWAY MEETING THE REQUIREMENTS OF THE DRAINAGE CRITERIA MANUAL AND/OR THE ENVIRONMENTAL CRITERIA MANUAL, AS REQUIRED. THE OUTLET SYSTEM SHALL BE PROTECTED FROM EROSION AND SHALL BE MAINTAINED THROUGHOUT THE COURSE OF CONSTRUCTION UNTIL INSTALLATION OF THE PERMANENT WATER QUALITY POND(S).
5. TEMPORARY EROSION AND SEDIMENTATION CONTROLS WILL BE INSPECTED AND MAINTAINED IN ACCORDANCE WITH THE EROSION SEDIMENTATION CONTROL PLAN (ESC) AND STORM WATER POLLUTION PREVENTION PLAN (SWPPP) POSTED ON THE SITE.
6. BEGIN SITE CLEARING/CONSTRUCTION (OR DEMOLITION) ACTIVITIES.
7. IN THE BARTON SPRINGS ZONE, THE ENVIRONMENTAL PROJECT MANAGER OR SITE SUPERVISOR WILL SCHEDULE A MID-CONSTRUCTION CONFERENCE TO COORDINATE CHANGES IN THE CONSTRUCTION SCHEDULE AND EVALUATE EFFECTIVENESS OF THE EROSION CONTROL PLAN AFTER POSSIBLE CONSTRUCTION ALTERATIONS TO THE SITE. PARTICIPANTS SHALL INCLUDE THE CITY INSPECTOR, PROJECT ENGINEER, GENERAL CONTRACTOR AND ENVIRONMENTAL PROJECT MANAGER OR SITE SUPERVISOR. THE ANTICIPATED COMPLETION DATE AND FINAL CONSTRUCTION SEQUENCE AND INSPECTION SCHEDULE WILL BE COORDINATED WITH THE APPROPRIATE CITY INSPECTOR.
8. PERMANENT WATER QUALITY PONDS OR CONTROLS WILL BE CLEANED OUT AND FILTER MEDIA WILL BE INSTALLED PRIOR TO/CONCURRENTLY WITH REVEGETATION OF SITE.
9. COMPLETE CONSTRUCTION AND START REVEGETATION OF THE SITE AND INSTALLATION OF LANDSCAPING.
10. UPON COMPLETION OF THE SITE CONSTRUCTION AND REVEGETATION OF A PROJECT SITE, THE DESIGN ENGINEER SHALL SUBMIT AN ENGINEER'S LETTER OF CONCURRENCE BEARING THE ENGINEER'S SEAL, SIGNATURE, AND DATE TO THE DEVELOPMENT SERVICES DEPARTMENT INDICATING THAT CONSTRUCTION, INCLUDING REVEGETATION, IS COMPLETE AND IN SUBSTANTIAL COMPLIANCE WITH THE APPROVED PLANS. AFTER RECEIVING THIS LETTER, A FINAL INSPECTION WILL BE SCHEDULED BY THE APPROPRIATE CITY INSPECTOR.
11. UPON COMPLETION OF LANDSCAPE INSTALLATION OF A PROJECT SITE, THE LANDSCAPE ARCHITECT SHALL SUBMIT A LETTER OF CONCURRENCE TO THE DEVELOPMENT SERVICES DEPARTMENT INDICATING THAT THE REQUIRED LANDSCAPING IS COMPLETE AND IN SUBSTANTIAL CONFORMITY WITH THE APPROVED PLANS. AFTER RECEIVING THIS LETTER, A FINAL INSPECTION WILL BE SCHEDULED BY THE APPROPRIATE CITY INSPECTOR.
12. AFTER A FINAL INSPECTION HAS BEEN CONDUCTED BY THE CITY INSPECTOR AND WITH APPROVAL FROM THE CITY INSPECTOR, REMOVE THE TEMPORARY EROSION AND SEDIMENTATION CONTROLS AND COMPLETE ANY NECESSARY FINAL REVEGETATION RESULTING FROM REMOVAL OF THE CONTROLS. CONDUCT ANY MAINTENANCE AND REHABILITATION OF THE WATER QUALITY PONDS OR CONTROLS.

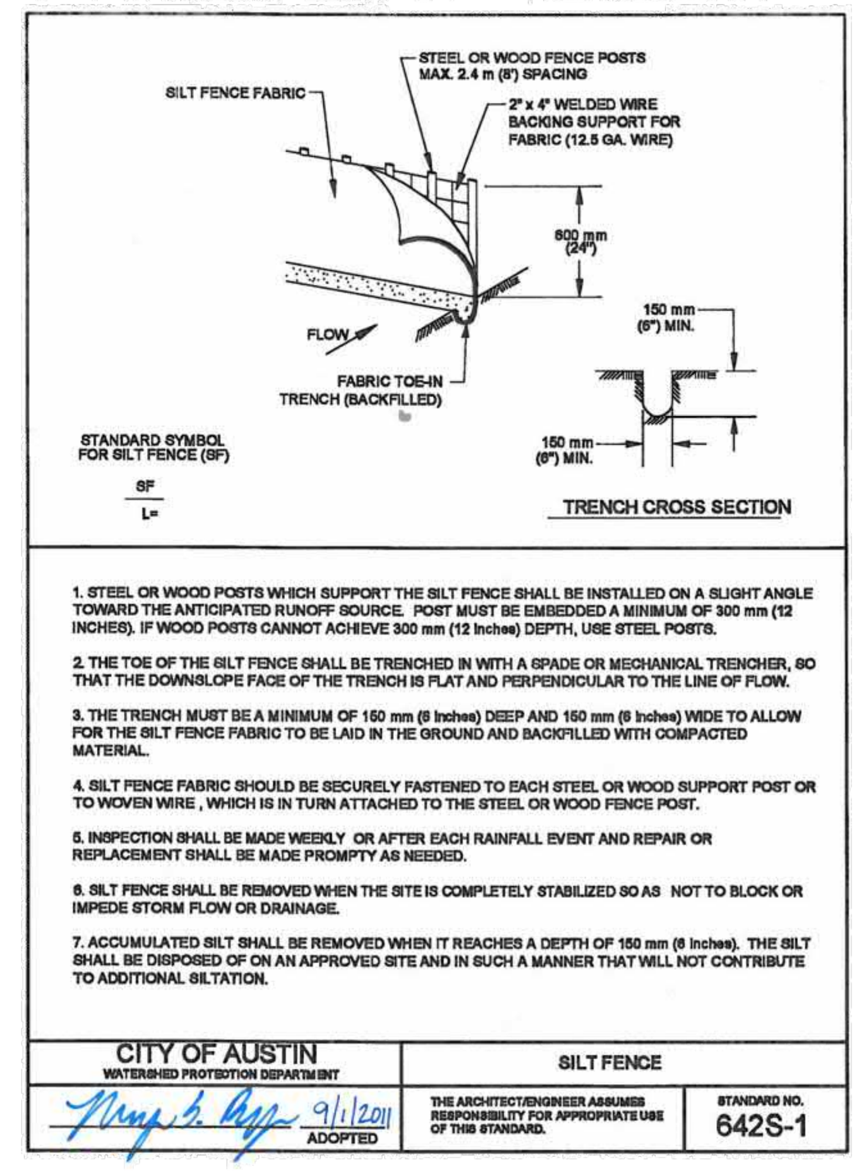
APPENDIX P-6 - REMEDIAL TREE CARE NOTES AERATION AND SUPPLEMENTAL NUTRIENT REQUIREMENTS FOR TREES WITHIN CONSTRUCTION AREAS

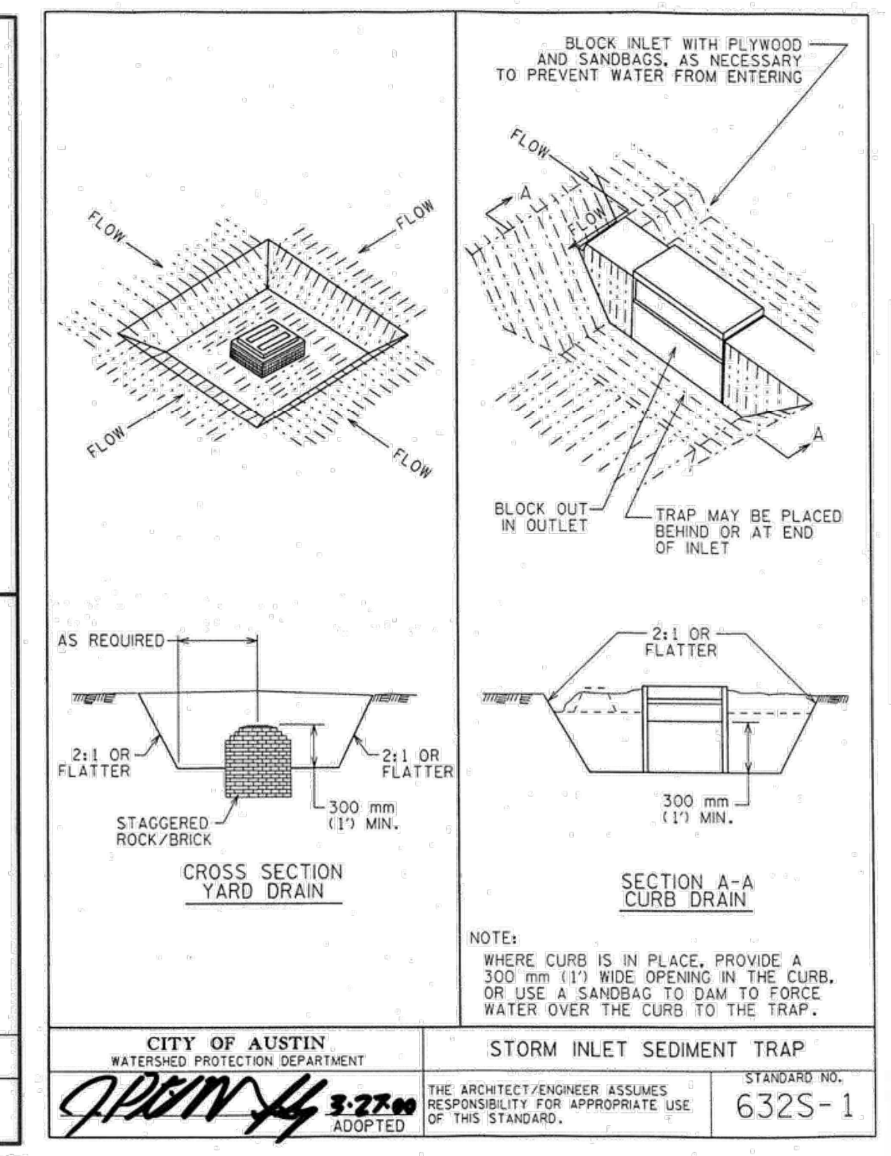
AS A COMPONENT OF AN EFFECTIVE REMEDIAL TREE CARE PROGRAM PER ENVIRONMENTAL CRITERIA MANUAL SECTION 3.5.4, PRESERVED TREES WITHIN THE LIMITS OF CONSTRUCTION MAY REQUIRE SOIL AERATION AND SUPPLEMENTAL NUTRIENTS. SOIL AND/OR FOLIAR ANALYSIS SHOULD BE USED TO DETERMINE THE NEED FOR SUPPLEMENTAL NUTRIENTS. THE CITY ARBORIST MAY REQUIRE THESE ANALYSES AS PART OF A COMPREHENSIVE TREE CARE PLAN. SOIL PH SHALL BE CONSIDERED WHEN DETERMINING THE FERTILIZATION COMPOSITION AS SOIL PH INFLUENCES THE TREE'S ABILITY TO UPTAKE NUTRIENTS FROM THE SOIL. IF ANALYSES INDICATE THE NEED FOR SUPPLEMENTAL NUTRIENTS, THEN HUMATE/NUTRIENT SOLUTIONS WITH MYCORRHIZAE COMPONENTS ARE HIGHLY RECOMMENDED. IN ADDITION, SOIL ANALYSIS MAY BE NEEDED TO DETERMINE IF ORGANIC MATERIAL OR BENEFICIAL MICROORGANISMS ARE NEEDED TO IMPROVE SOIL HEALTH. MATERIALS AND METHODS ARE TO BE APPROVED BY THE CITY ARBORIST (512-974-1876) PRIOR TO APPLICATION. THE OWNER OR GENERAL CONTRACTOR SHALL SELECT A FERTILIZATION CONTRACTOR AND IENSURE COORDINATION WITH THE CITY ARBORIST.

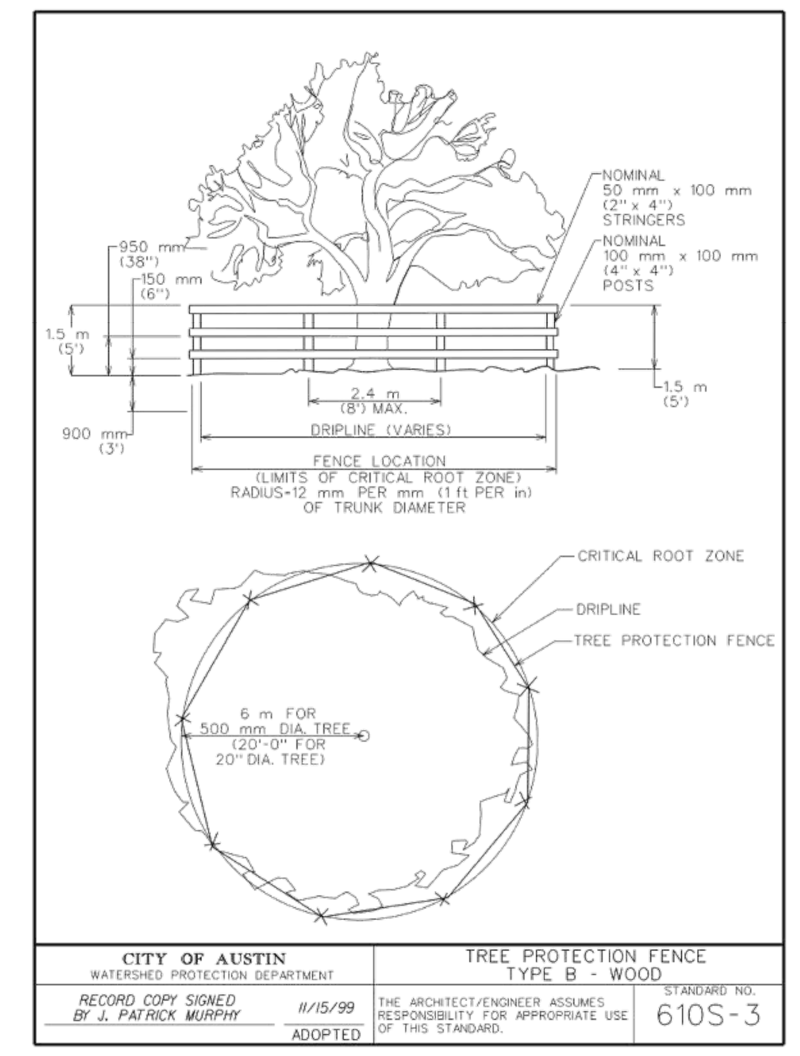
PRE-CONSTRUCTION TREATMENT SHOULD BE APPLIED IN THE APPROPRIATE SEASON, IDEALLY THE SEASON PRECEDING THE PROPOSED CONSTRUCTION. MINIMALLY, AREAS TO BE TREATED INCLUDE THE ENTIRE CRITICAL ROOT ZONE OF TREES AS DEPICTED ON THE CITY APPROVED PLANS. TREATMENT SHOULD INCLUDE, BUT NOT LIMITED TO, FERTILIZATION, SOIL TREATMENT, MULCHING, AND PROPER PRUNING.

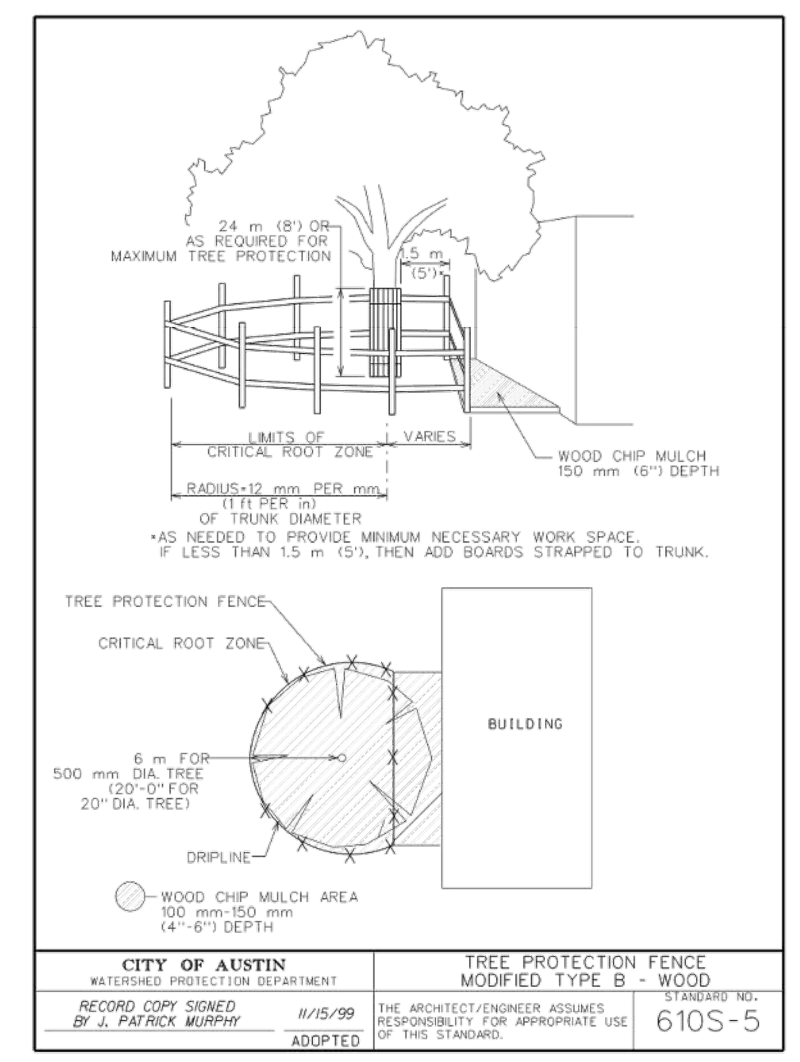
POST-CONSTRUCTION TREATMENT SHOULD OCCUR DURING FINAL REVEGETATION OR AS DETERMINED BY A QUALIFIED ARBORIST AFTER CONSTRUCTION. CONSTRUCTION ACTIVITIES OFTEN RESULT IN A REDUCTION IN SOIL MACRO AND MICRO PORES AND AN INCREASE IN SOIL BULK DENSITY. TO AMELIORATE THE DEGRADED SOIL CONDITIONS, AERATION VIA WATER AND/OR AIR INJECTED INTO THE SOIL IS NEEDED OR BY OTHER METHODS AS APPROVED BY THE CITY ARBORIST. THE PROPOSED NUTRIENT MIX SPECIFICATIONS AND SOIL AND/OR FOLIAR ANALYSIS RESULTS NEED TO BE PROVIDED TO AND APPROVED BY THE CITY ARBORIST PRIOR TO APPLICATION (FAX # 512-974-3010). CONSTRUCTION WHICH WILL BE COMPLETED IN LESS THAN 90 DAYS MAY USE MATERIALS AT ½ RECOMMENDED RATES. ALTERNATIVE ORGANIC FERTILIZER MATERIALS ARE ACCEPTABLE WHEN APPROVED BY THE CITY ARBORIST. WITHIN 7 DAYS AFTER FERTILIZATION IS PERFORMED, THE CONTRACTOR SHALL PROVIDE DOCUMENTATION OF THE WORK PERFORMED TO THE CITY ARBORIST, PLANNING AND DEVELOPMENT REVIEW DEPARTMENT. P.O. BOX 1088, AUSTIN, TX 78767. THIS NOTE SHOULD BE REFERENCED AS ITEM #1 IN THE SEQUENCE OF CONSTRUCTION.

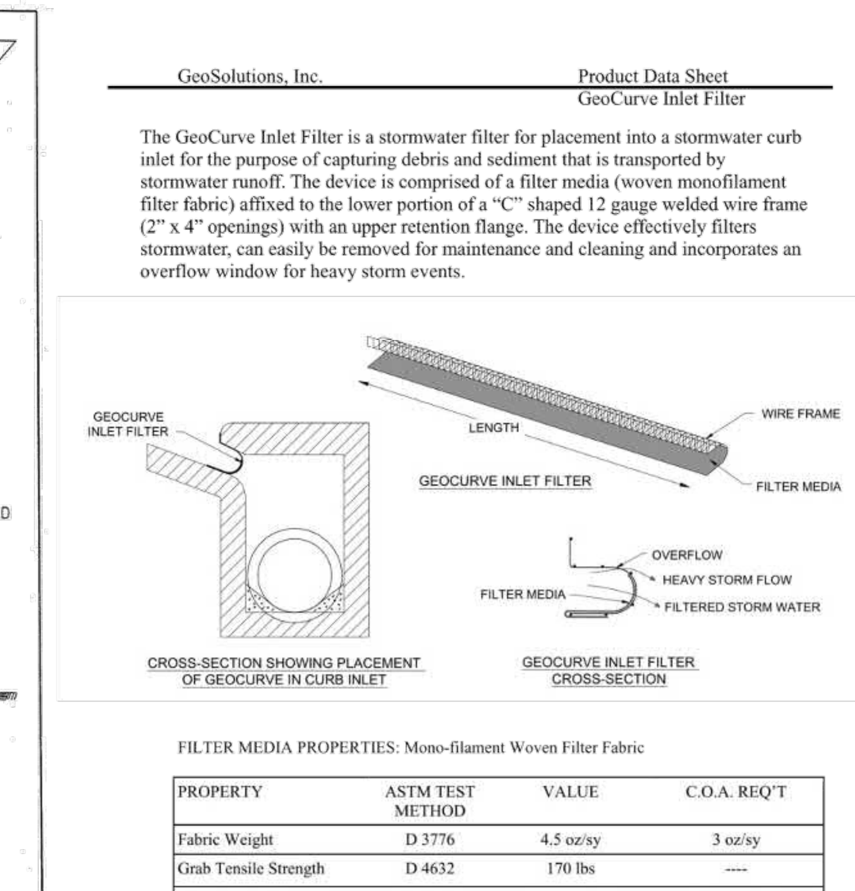






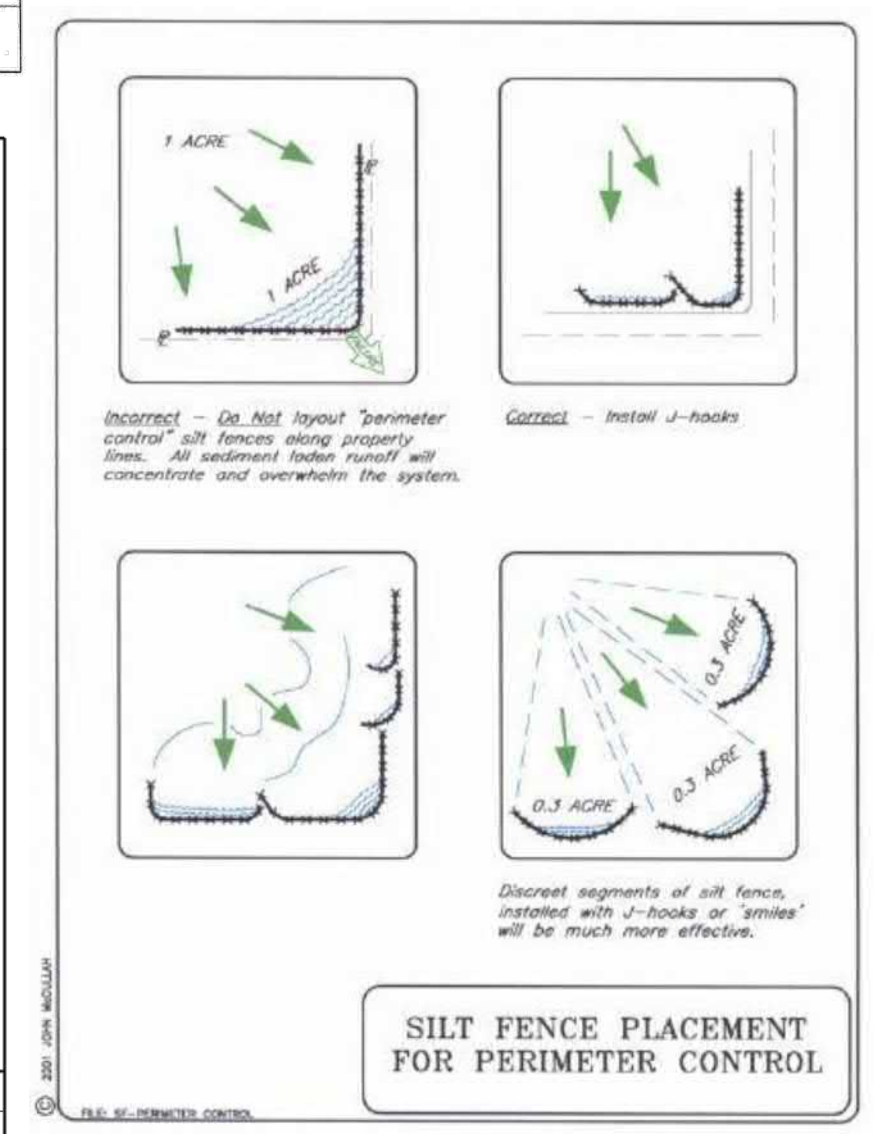


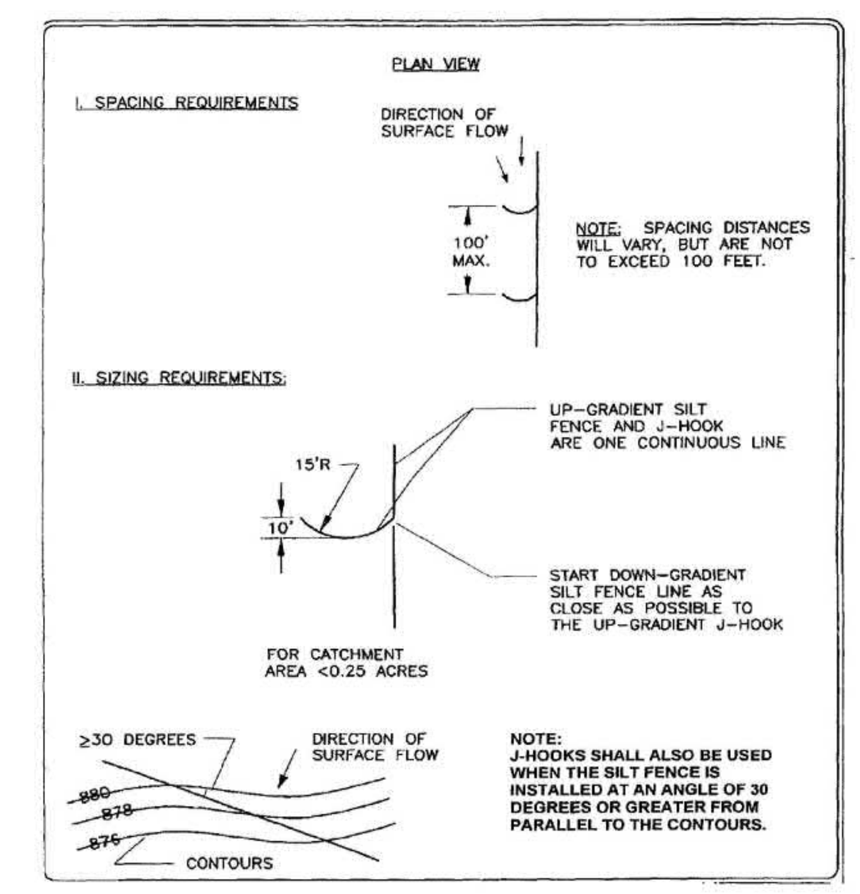


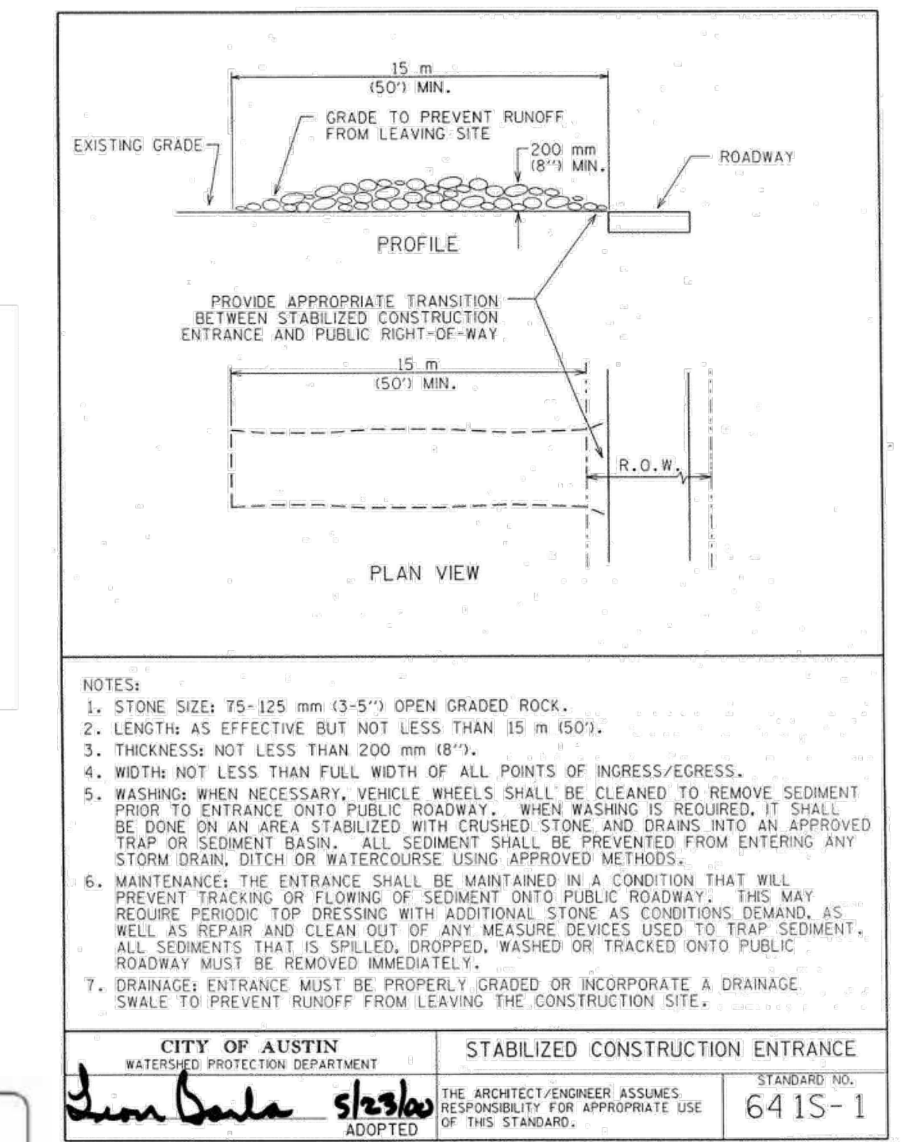


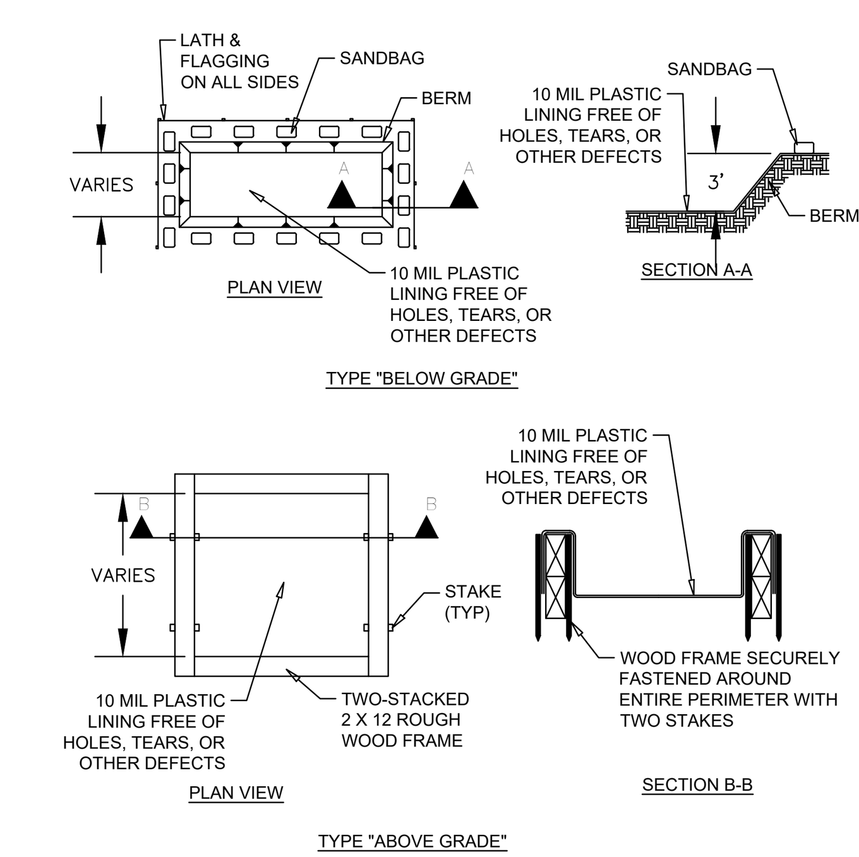
PROPERTY	ASTM TEST METHOD	VALUE	C.O.A. REQ'T
Fabric Weight	D 3776	4.5 oz/sy	3 oz/sy
Grab Tensile Strength	D 4632	170 lbs	----
Mullen Burst Strength	D 3786	410 lbs/sq in	120 lbs/sq in
UV Stability	D 4355	80 %	70 %
Water Flow Rate	D 4491	325 gal/min/sf	275 gal/min/sf

GeoSolutions, Inc. 4417 Burleson Road Austin, Texas 78744 512-330-0796









GENERAL NOTES:

- DETAIL ABOVE ILLUSTRATES MINIMUM DIMENSIONS. PIT CAN BE INCREASED IN SIZE DEPENDING ON EXPECTED FREQUENCY OF USE.
- WASHOUT PIT SHALL BE LOCATED IN AN AREA EASILY ACCESSIBLE TO CONSTRUCTION TRAFFIC.
- WASHOUT PIT SHALL NOT BE LOCATED IN AREAS SUBJECT TO INUNDATION FROM STORM WATER RUNOFF AND AT LEAST 50 FEET FROM SENSITIVE FEATURES, STORM DRAINS, OPEN DITCHES, STREETS, OR STREAMS.

CONCRETE TRUCK WASHOUT PIT

WARNING: CONTRACTOR IS TO VERIFY PRESENCE AND EXACT LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION.

811 Know what's **below.** **Call** before you dig.

BENCHMARKS

BM #150 SQUARE CUT SET AT THE BACK OF CURB
- ELEV.= 1229.74' (NAVD '88)

BM #151 SQUARE CUT SET AT THE BACK OF CURB
- ELEV.= 1230.35' (NAVD '88)

No.	REVISIONS	DATE	BY

Kimley»Horn

© 2021 KIMLEY-HORN AND ASSOCIATES, INC.
10814 JOLLYVILLE ROAD, AVALLON IV, SUITE 300, AUSTIN, TX 78759
PHONE: 512-418-1771 FAX: 512-418-1791
WWW.KIMLEY-HORN.COM
TEXAS REGISTERED ENGINEERING FIRM F-928

07/27/2022
STATE OF TEXAS
ALEJANDRO E. GRANADOS RICO
130084
LICENSED PROFESSIONAL ENGINEER
FOR PERMIT PURPOSES ONLY NOT FOR CONSTRUCTION

KHA PROJECT 067783117
DATE JULY 2022
SCALE: AS SHOWN
DESIGNED BY: AEG
DRAWN BY: DPD
CHECKED BY: AEG

EROSION CONTROL DETAILS

ROGER HANKS PARKWAY EXTENSION II
CITY OF DRIPPING SPRINGS
HAYS COUNTY, TEXAS

SHEET NUMBER
37

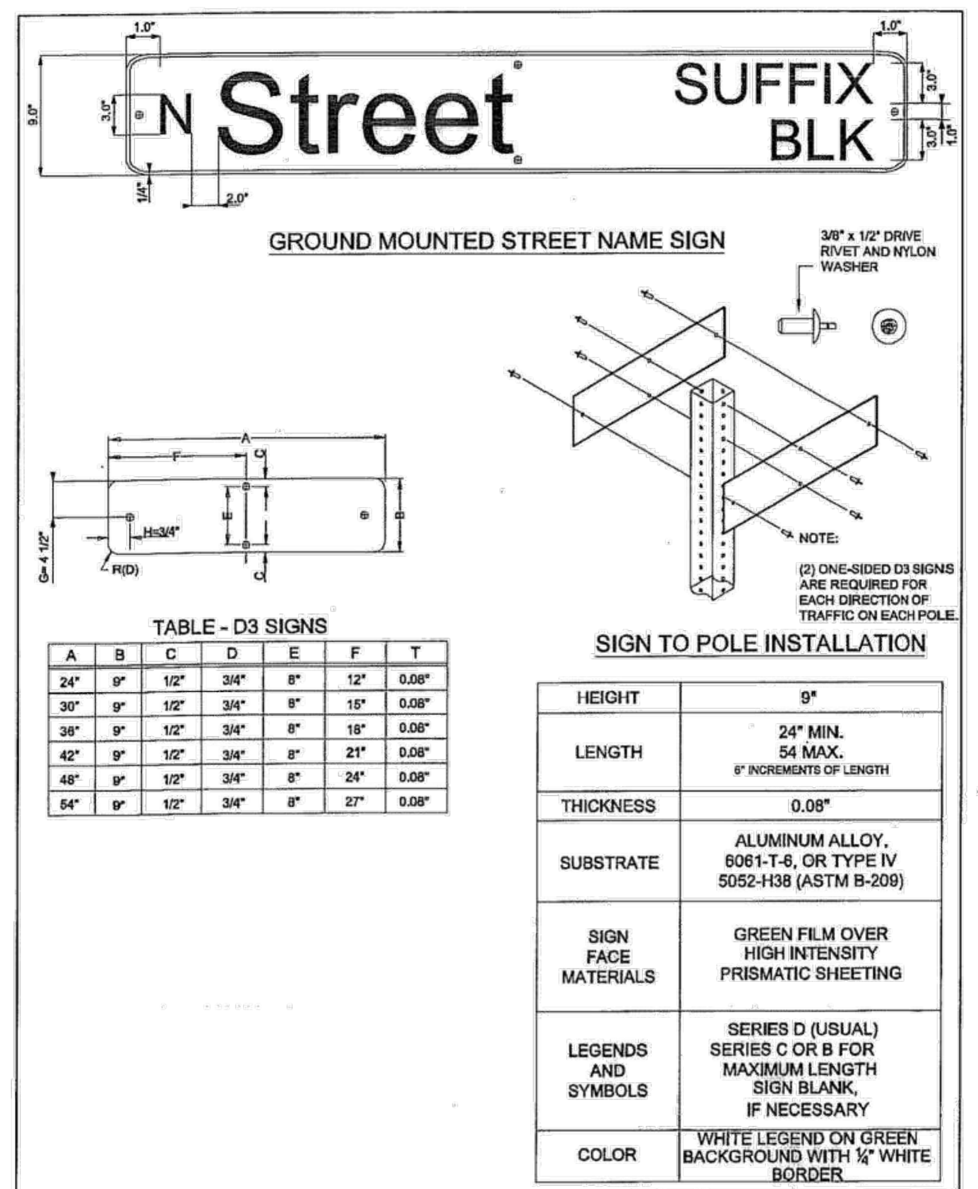
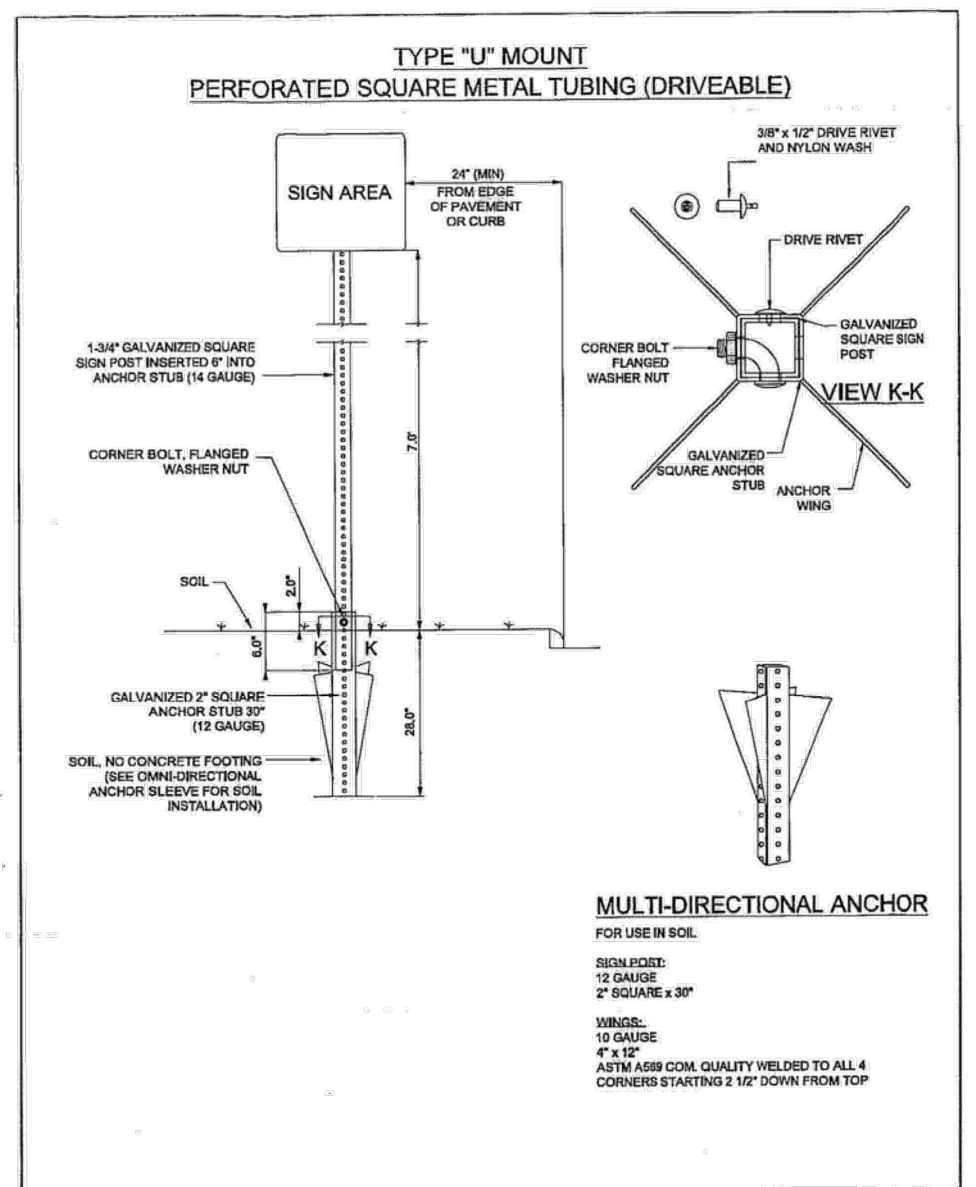


TABLE - D3 SIGNS

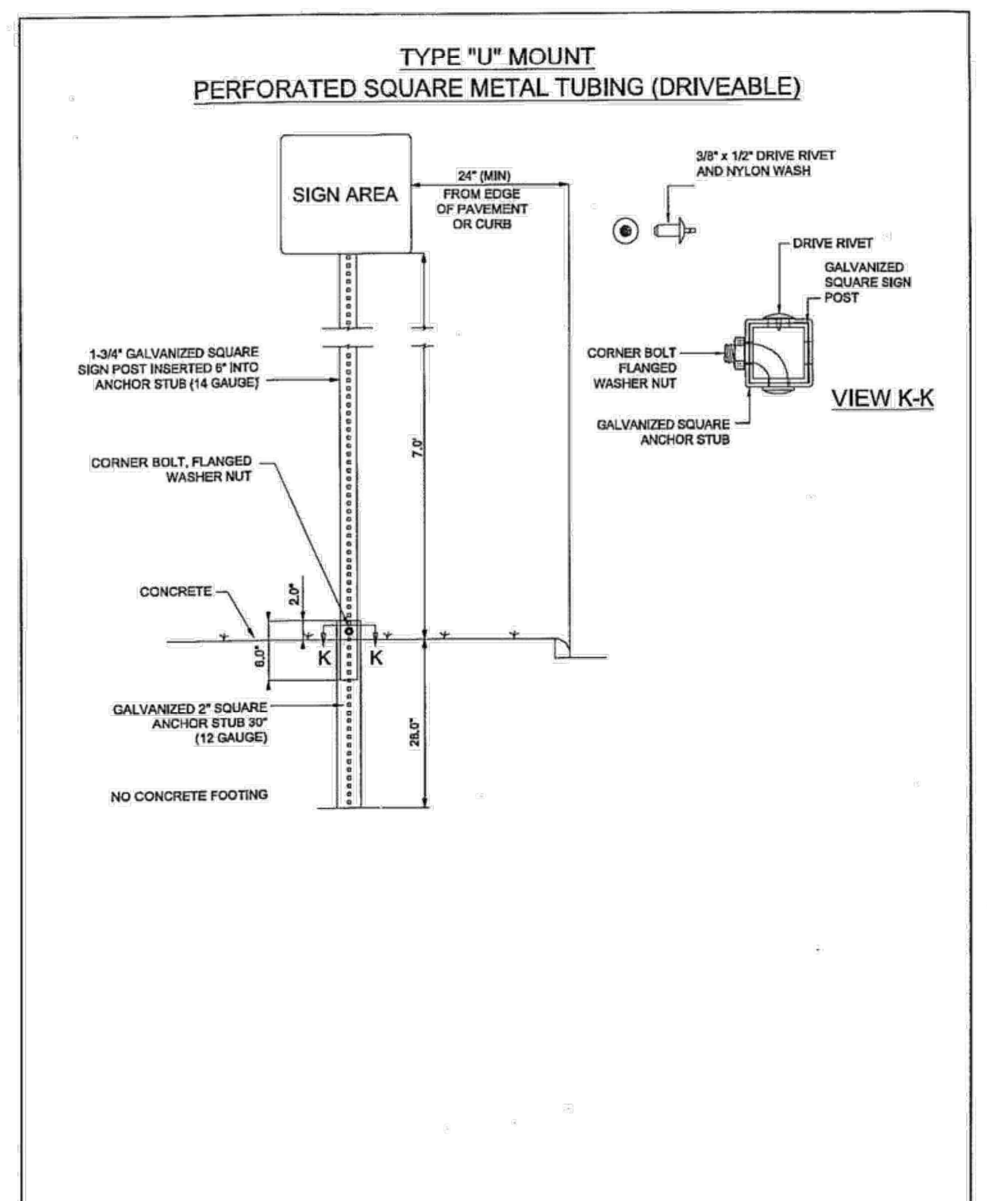
A	B	C	D	E	F	T
24"	9"	1/2"	3/4"	8"	12"	0.08"
30"	9"	1/2"	3/4"	8"	15"	0.08"
36"	9"	1/2"	3/4"	8"	18"	0.08"
42"	9"	1/2"	3/4"	8"	21"	0.08"
48"	9"	1/2"	3/4"	8"	24"	0.08"
54"	9"	1/2"	3/4"	8"	27"	0.08"

HEIGHT	9"
LENGTH	24" MIN. 54 MAX. 6" INCREMENTS OF LENGTH
THICKNESS	0.08"
SUBSTRATE	ALUMINUM ALLOY, 6061-T-6, OR TYPE IV 5052-H38 (ASTM B-209)
SIGN FACE MATERIALS	GREEN FILM OVER HIGH INTENSITY PRISMATIC SHEETING
LEGENDS AND SYMBOLS	SERIES D (USUAL) SERIES C OR B FOR MAXIMUM LENGTH SIGN BLANK, IF NECESSARY
COLOR	WHITE LEGEND ON GREEN BACKGROUND WITH ¼" WHITE BORDER

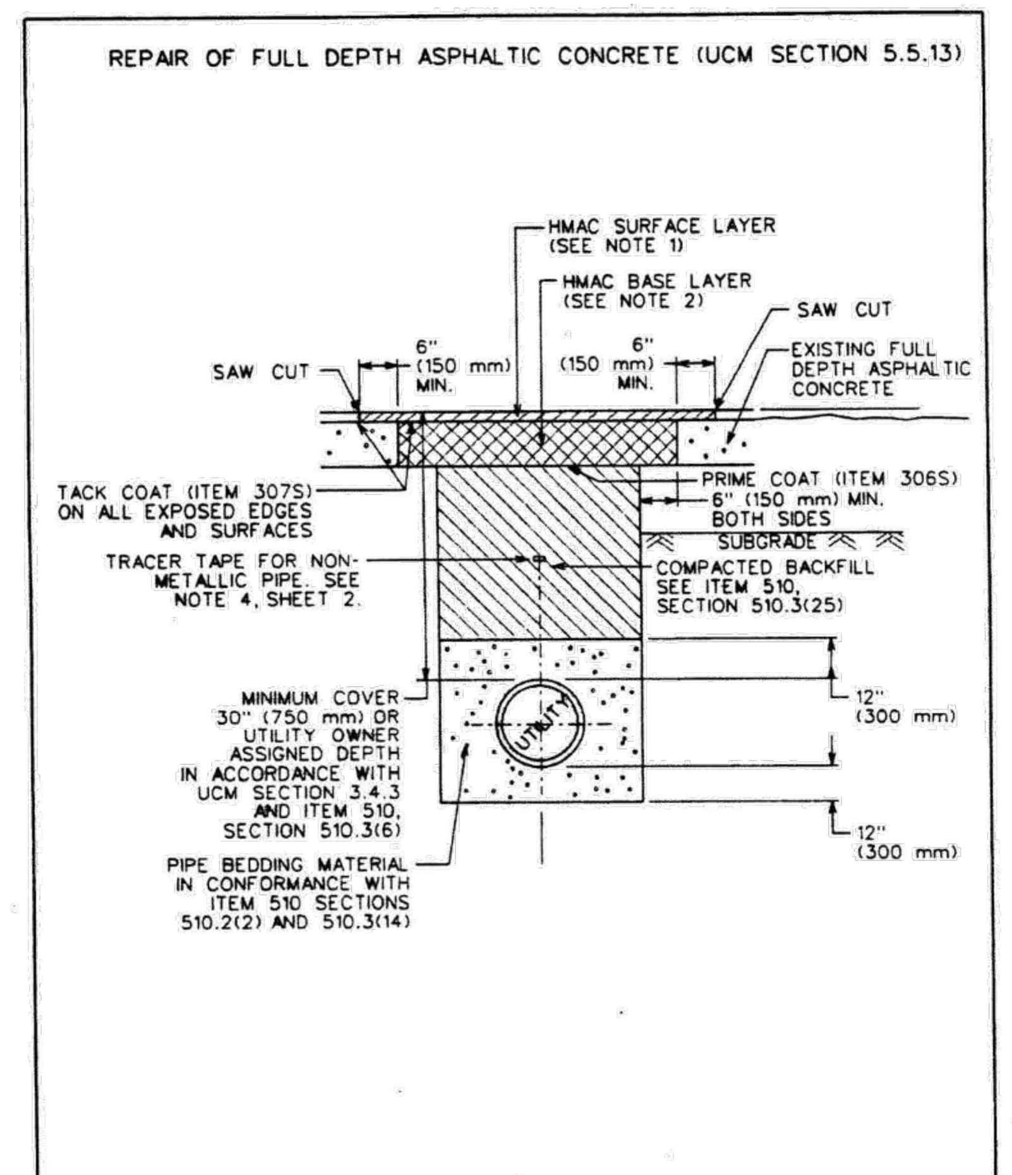
CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS — GROUND MOUNTED TRAFFIC AND STREET NAME SIGNS — ADOPTED 1/4/11 — THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD. — STANDARD NO. 824-2 1 OF 3


TYPE "U" MOUNT
PERFORATED SQUARE METAL TUBING (DRIVEABLE)
SIGN AREA
24" (MIN) FROM EDGE OF PAVEMENT OR CURB
1-3/4" GALVANIZED SQUARE SIGN POST INSERTED 6" INTO ANCHOR STUB (14 GAUGE)
CORNER BOLT, FLANGED WASHER NUT
SOIL
GALVANIZED 2" SQUARE ANCHOR STUB 30" (12 GAUGE)
SOIL, NO CONCRETE FOOTING (SEE OMNI-DIRECTIONAL ANCHOR SLEEVE FOR SOIL INSTALLATION)
3/8" x 1/2" DRIVE RIVET AND NYLON WASH
DRIVE RIVET
GALVANIZED SQUARE SIGN POST
CORNER BOLT FLANGED WASHER NUT
VIEW K-K
GALVANIZED SQUARE ANCHOR STUB
ANCHOR WING
MULTI-DIRECTIONAL ANCHOR
FOR USE IN SOIL
SIGN POST: 12 GAUGE 2" SQUARE x 30"
WINGS: 10 GAUGE 4" x 12" ASTM A569 COM. QUALITY WELDED TO ALL 4 CORNERS STARTING 2 1/2" DOWN FROM TOP

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS — GROUND MOUNTED TRAFFIC AND STREET NAME SIGNS - SOIL — ADOPTED 1/4/11 — THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD. — STANDARD NO. 824-2 2 OF 3


TYPE "U" MOUNT
PERFORATED SQUARE METAL TUBING (DRIVEABLE)
SIGN AREA
24" (MIN) FROM EDGE OF PAVEMENT OR CURB
1-3/4" GALVANIZED SQUARE SIGN POST INSERTED 6" INTO ANCHOR STUB (14 GAUGE)
CORNER BOLT, FLANGED WASHER NUT
CONCRETE
GALVANIZED 2" SQUARE ANCHOR STUB 30" (12 GAUGE)
NO CONCRETE FOOTING
3/8" x 1/2" DRIVE RIVET AND NYLON WASH
DRIVE RIVET
GALVANIZED SQUARE SIGN POST
CORNER BOLT FLANGED WASHER NUT
GALVANIZED SQUARE ANCHOR STUB
VIEW K-K

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS — GROUND MOUNTED TRAFFIC AND STREET NAME SIGNS - CONCRETE — ADOPTED 1/4/11 — THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD. — STANDARD NO. 824-2 3 OF 3

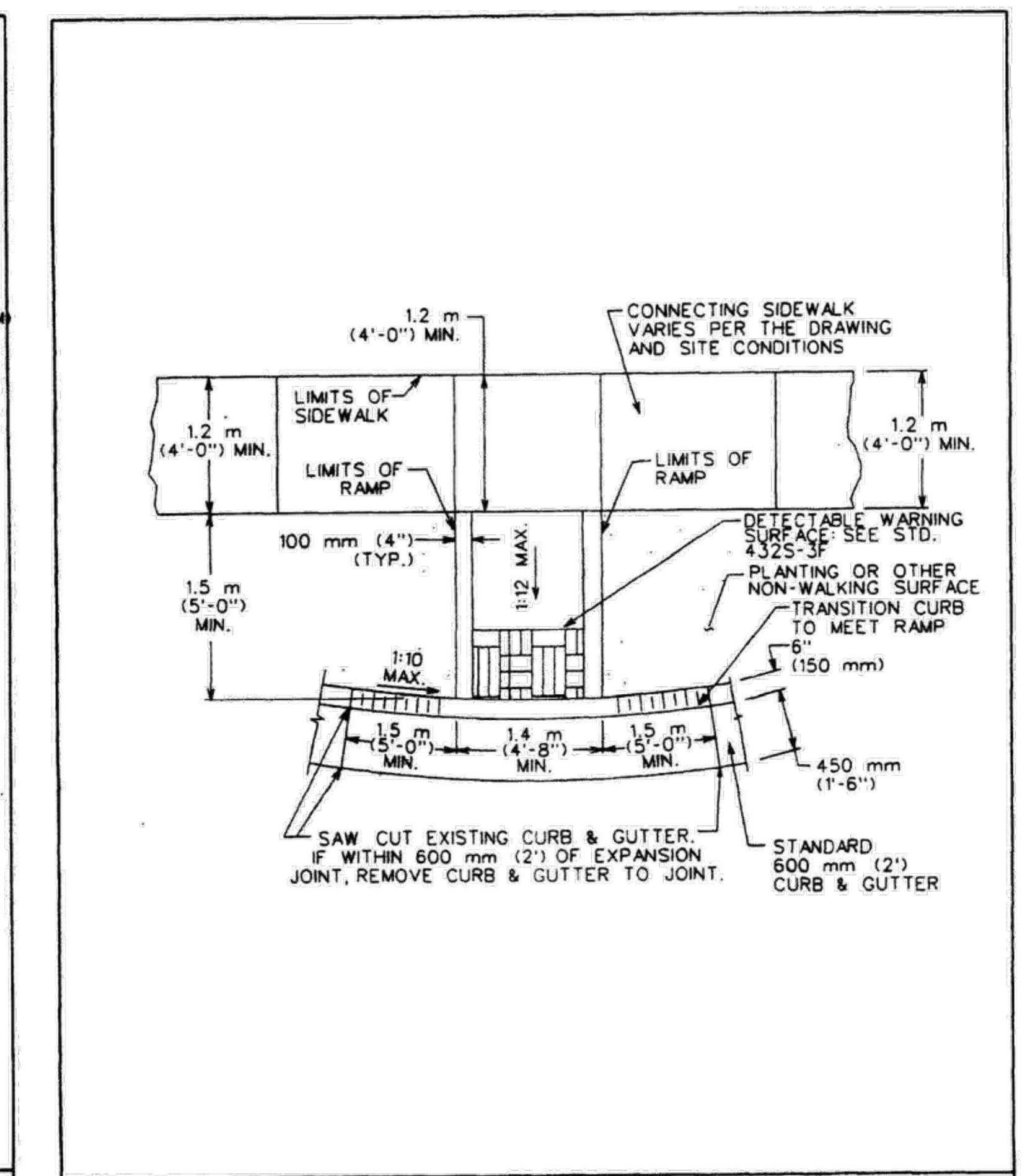

REPAIR OF FULL DEPTH ASPHALTIC CONCRETE (UCM SECTION 5.5.13)
HMAC SURFACE LAYER (SEE NOTE 1)
HMAC BASE LAYER (SEE NOTE 2)
SAW CUT
6" (150 mm) MIN.
EXISTING FULL DEPTH ASPHALTIC CONCRETE
TACK COAT (ITEM 307S) ON ALL EXPOSED EDGES AND SURFACES
PRIME COAT (ITEM 306S)
6" (150 mm) MIN. BOTH SIDES
SUBGRADE
TRACER TAPE FOR NON-METALLIC PIPE. SEE NOTE 4, SHEET 2.
COMPACTED BACKFILL SEE ITEM 510, SECTION 510.3(25)
MINIMUM COVER 30" (750 mm) OR UTILITY OWNER ASSIGNED DEPTH IN ACCORDANCE WITH UCM SECTION 3.4.3 AND ITEM 510, SECTION 510.3(6)
UTILITY
12" (300 mm)
PIPE BEDDING MATERIAL IN CONFORMANCE WITH ITEM 510 SECTIONS 510.2(2) AND 510.3(14)

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS — FULL DEPTH ASPHALTIC CONCRETE PAVEMENT TRENCH REPAIR — ADOPTED 9/14/05 — THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD. — STANDARD NO. 1100S-5 1 OF 2

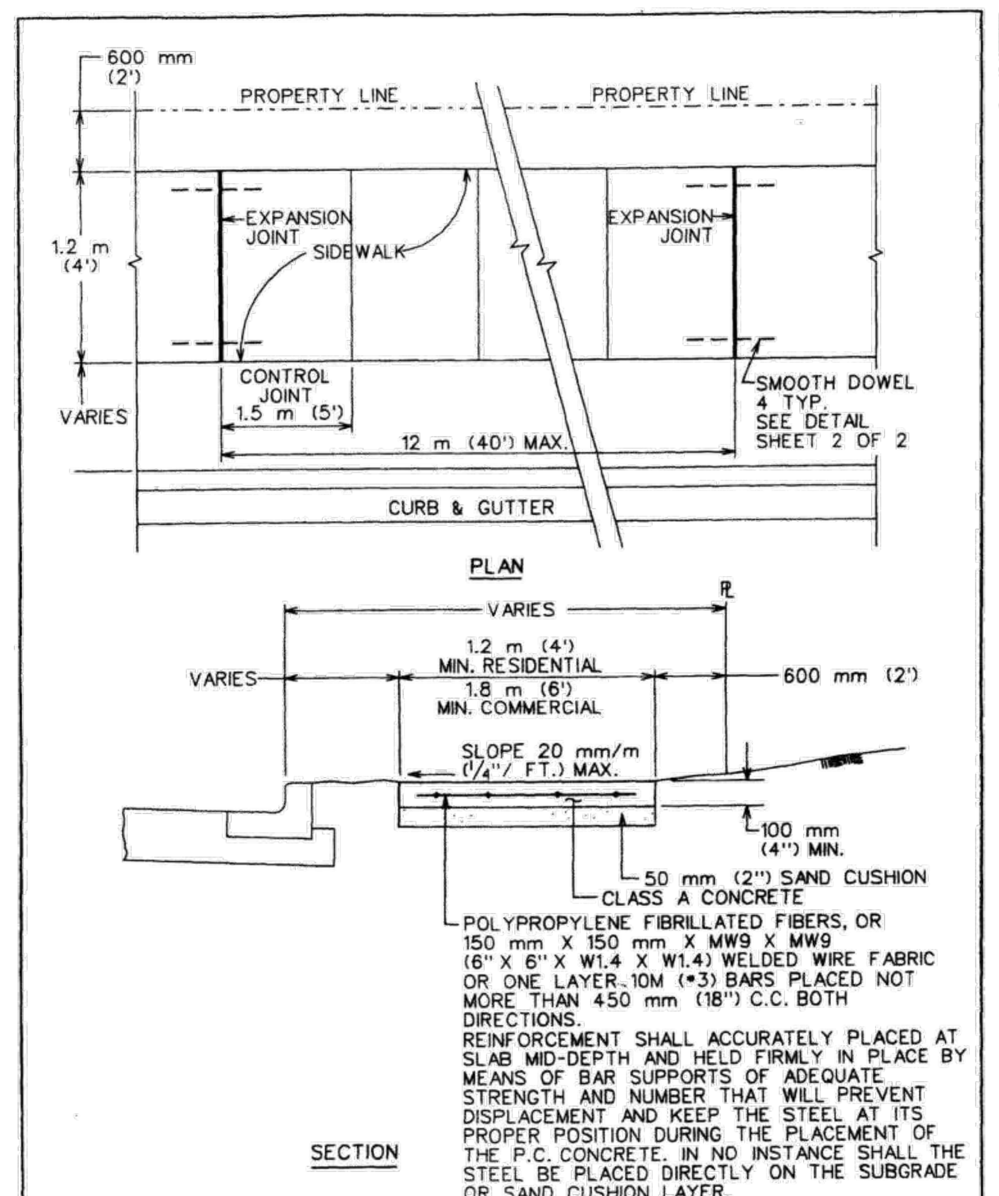
NOTES:

1. REPLACEMENT AC SURFACE LAYER SHALL BE OF THE TYPE AND THICKNESS BASED ON FUNCTIONAL CLASSIFICATION.
   a) MIN. 2" (50 mm) HMAC TYPE "D" FOR TRENCH REPAIR IN LOCAL/RESIDENTIAL STREETS.
   b) MIN. 3" (75 mm) HMAC TYPE "C" FOR TRENCH REPAIR IN COLLECTOR/ARTERIAL STREETS.
   SEE ITEM 340S, SECTION 340S.4.
2. THE COMBINED THICKNESS OF THE REPLACEMENT AC SURFACE AND BASE LAYERS SHALL MATCH THE THICKNESS OF EXISTING FULL DEPTH AC LAYER. HOWEVER, THE REPLACEMENT AC BASE LAYER SHALL BE A MINIMUM THICKNESS OF 6" (150 mm) OF TYPE A OR B HMA. A BASE LAYER TYPE THAT MATCHES THE NEW HMA SURFACE LAYER (SEE NOTE 1) MAY BE USED, IF THE TOTAL REPAIR AREA IS LESS THAN 300 SQUARE YARDS (250 SQUARE METERS).
3. CLASS "J" PC CONCRETE (ITEM 403S) OR CONTROLLED LOW STRENGTH MATERIAL (CLSM) MAY BE SUBSTITUTED IN THESE REPAIRS FOR THE FLEXIBLE BASE AND COMPACTED BACKFILL. PC CONCRETE GREATER THAN A 2 SACK MIX WILL NOT BE ALLOWED.
4. AS PER CITY OF AUSTIN STANDARD SPECIFICATION 510, SECTION 510.2(8)(K)5, FOR ALL NON-METALLIC PIPE, DIRECTLY ABOVE THE CENTERLINE OF THE PIPE AND A MINIMUM OF 12" (300 mm) BELOW THE SUBGRADE, OR A MINIMUM OF 18" (450 mm) BELOW FINISHED GRADE ON AREAS OUTSIDE THE LIMITS OF PAVEMENT, SHALL BE PLACED INDUCTIVE TRACER TAPE IN ACCORDANCE WITH THE MANUFACTURER'S REQUIREMENTS. THE TAPE SHALL BE ENCASED IN A PROTECTIVE, INERT, PLASTIC JACKET AND COLOR CODED IN ACCORDANCE WITH APWA UNIFORM COLOR CODE.

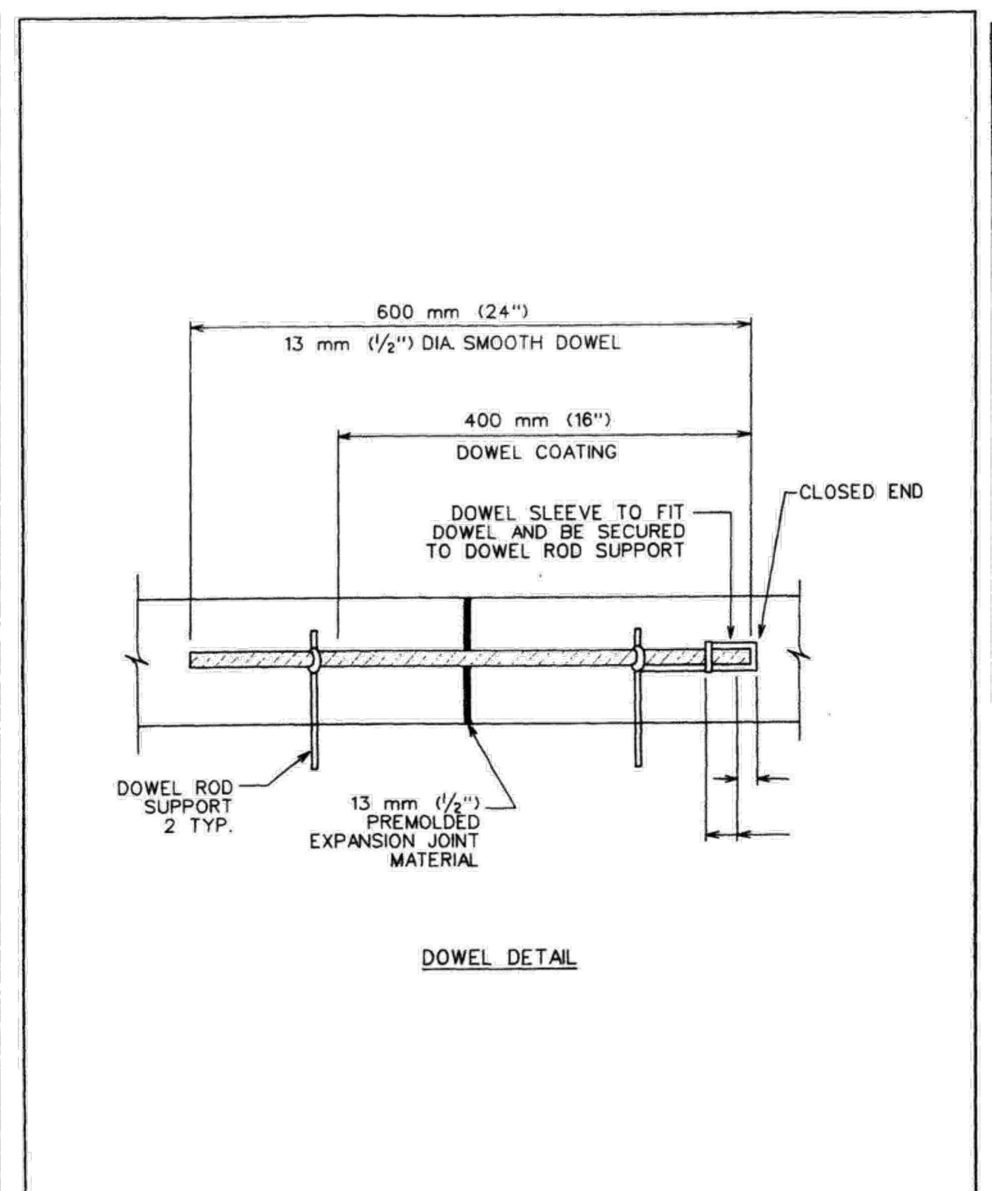
CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS — FULL DEPTH ASPHALTIC CONCRETE PAVEMENT TRENCH REPAIR — ADOPTED 9/14/05 — THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD. — STANDARD NO. 1100S-5 2 OF 2


1.2 m (4'-0") MIN.
CONNECTING SIDEWALK VARIES PER THE DRAWING AND SITE CONDITIONS
LIMITS OF SIDEWALK
LIMITS OF RAMP
100 mm (4") (TYP.)
1:12 MAX.
DETECTABLE WARNING SURFACE: SEE STD. 432S-3F
PLANTING OR OTHER NON-WALKING SURFACE
TRANSITION CURB TO MEET RAMP
6" (150 mm)
1.5 m (5'-0") MIN.
1:10 MAX.
1.4 m (4'-8") MIN.
450 mm (1'-6")
SAW CUT EXISTING CURB & GUTTER. IF WITHIN 600 mm (2') OF EXPANSION JOINT, REMOVE CURB & GUTTER TO JOINT.
STANDARD 600 mm (2') CURB & GUTTER

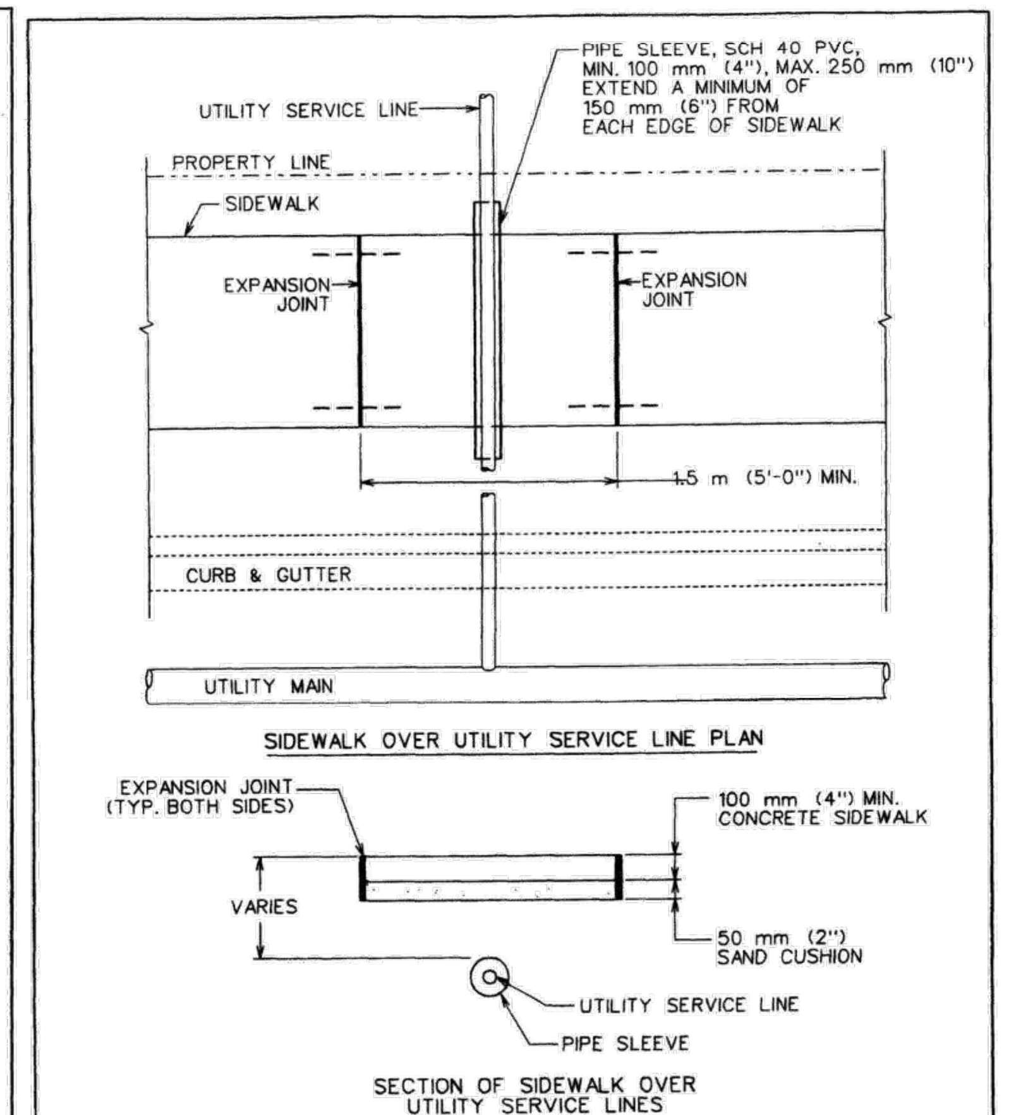
CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS — TYPE 1B SIDEWALK CURB RAMP — ADOPTED 9/14/05 — THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD. — STANDARD NO. 432S-5B


600 mm (2')
PROPERTY LINE
EXPANSION JOINT
SIDEWALK
1.2 m (4')
CONTROL JOINT 1.5 m (5')
VARIES
12 m (40') MAX.
SMOOTH DOWEL 4 TYP. SEE DETAIL SHEET 2 OF 2
CURB & GUTTER
PLAN
VARIES
1.2 m (4') MIN. RESIDENTIAL
1.8 m (6') MIN. COMMERCIAL
SLOPE 20 mm/m (¼"/ FT.) MAX.
100 mm (4") MIN.
50 mm (2") SAND CUSHION
CLASS A CONCRETE
POLYPROPYLENE FIBRILLATED FIBERS, OR 150 mm X 150 mm X MW9 X MW9 (6" X 6" X W1.4 X W1.4) WELDED WIRE FABRIC OR ONE LAYER 10M (#3) BARS PLACED NOT MORE THAN 450 mm (18") C.C. BOTH DIRECTIONS.
REINFORCEMENT SHALL ACCURATELY PLACED AT SLAB MID-DEPTH AND HELD FIRMLY IN PLACE BY MEANS OF BAR SUPPORTS OF ADEQUATE STRENGTH AND NUMBER THAT WILL PREVENT DISPLACEMENT AND KEEP THE STEEL AT ITS PROPER POSITION DURING THE PLACEMENT OF THE P.C. CONCRETE. IN NO INSTANCE SHALL THE STEEL BE PLACED DIRECTLY ON THE SUBGRADE OR SAND CUSHION LAYER.
SECTION

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS — SIDEWALK — ADOPTED 3/26/08 — THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD. — STANDARD NO. 432S-1 1 OF 3

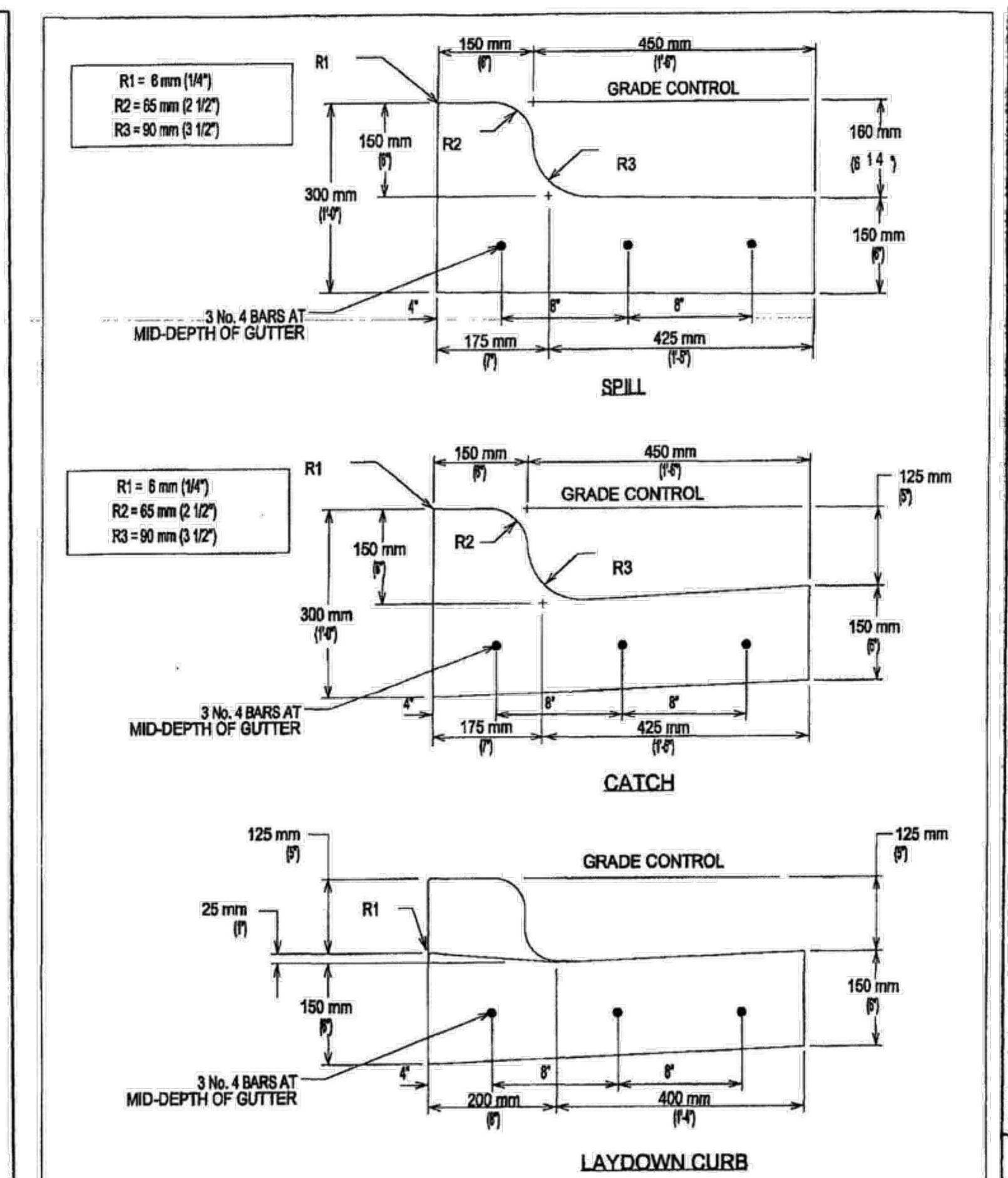


CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS — SIDEWALK — ADOPTED 3/26/08 — THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD. — STANDARD NO. 432S-1 2 OF 3

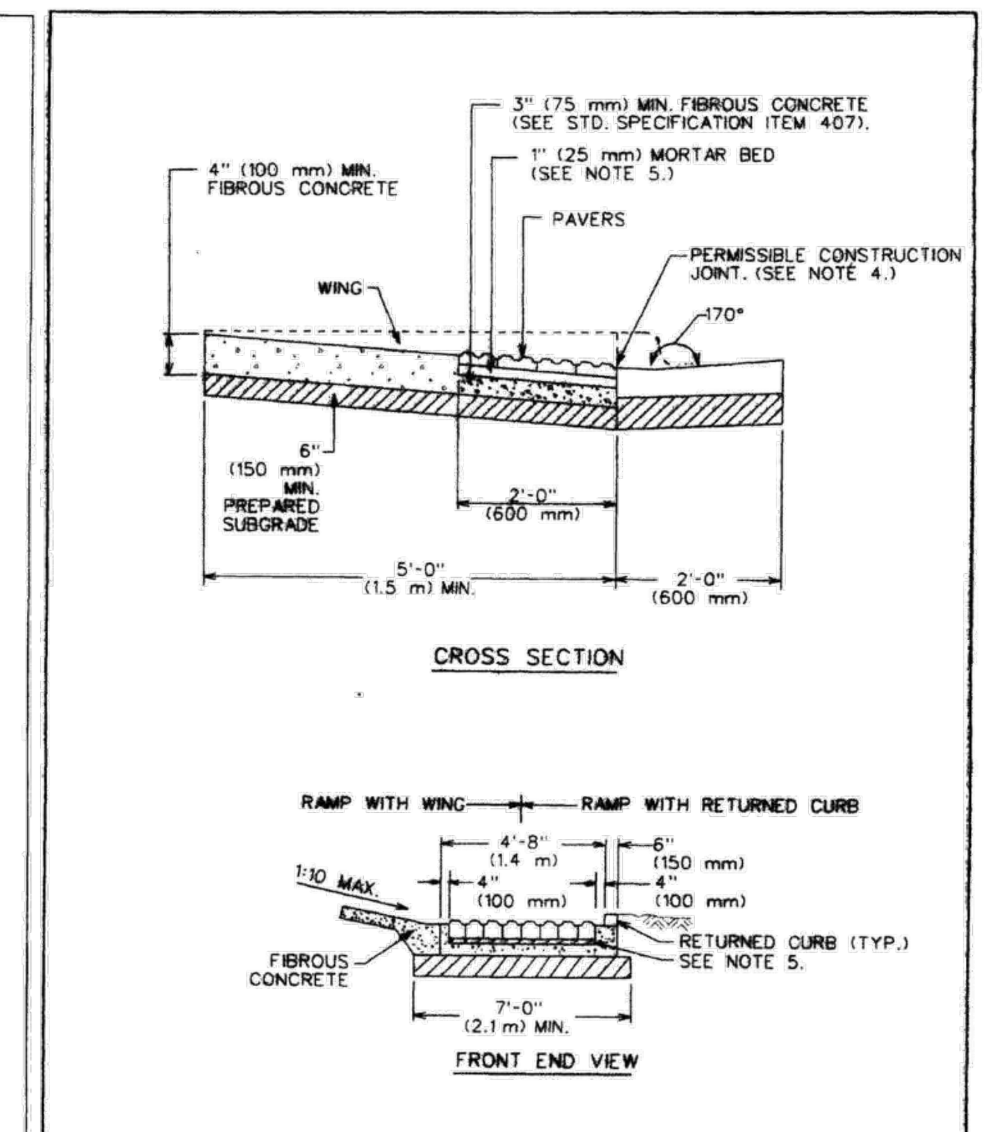

PIPE SLEEVE, SCH 40 PVC, MIN. 100 mm (4"), MAX. 250 mm (10") EXTEND A MINIMUM OF 150 mm (6") FROM EACH EDGE OF SIDEWALK
UTILITY SERVICE LINE
PROPERTY LINE
SIDEWALK
EXPANSION JOINT
1.5 m (5'-0") MIN.
CURB & GUTTER
UTILITY MAIN
SIDEWALK OVER UTILITY SERVICE LINE PLAN
EXPANSION JOINT (TYP. BOTH SIDES)
100 mm (4") MIN. CONCRETE SIDEWALK
VARIES
50 mm (2") SAND CUSHION
UTILITY SERVICE LINE
PIPE SLEEVE
SECTION OF SIDEWALK OVER UTILITY SERVICE LINES

NOTES:
1. THIS STANDARD APPLIES TO THE INSTALLATION OF NEW UTILITIES OR UTILITIES BEING REPLACED BY A NEW LINE.
2. NO JOINTS IN UTILITY SERVICE PIPE TO BE LOCATED INSIDE PVC PIPE SLEEVE.

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS — SIDEWALK — ADOPTED 3/26/08 — THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD. — STANDARD NO. 432S-1 3 OF 3



CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS — REINFORCED CURB AND GUTTER SECTION — ADOPTED 1/4/10 — THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD. — STANDARD NO. 430S-2

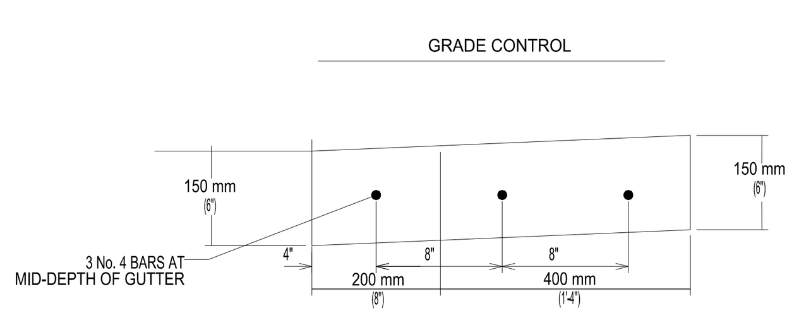

3" (75 mm) MIN. FIBROUS CONCRETE (SEE STD. SPECIFICATION ITEM 407).
1" (25 mm) MORTAR BED (SEE NOTE 5.)
4" (100 mm) MIN. FIBROUS CONCRETE
PAVERS
PERMISSIBLE CONSTRUCTION JOINT. (SEE NOTE 4.)
WING
6" (150 mm) MIN. PREPARED SUBGRADE
2'-0" (600 mm)
5'-0" (1.5 m) MIN.
CROSS SECTION
RAMP WITH WING
RAMP WITH RETURNED CURB
1:10 MAX.
FIBROUS CONCRETE
RETURNED CURB (TYP.) SEE NOTE 5.
7'-0" (2.1 m) MIN.
FRONT END VIEW

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS — DETECTABLE WARNING-PAVER (CITY PROPERTY/EASEMENTS) — ADOPTED 6/21/07 — THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD. — STANDARD NO. 432S-2A 1 OF 2

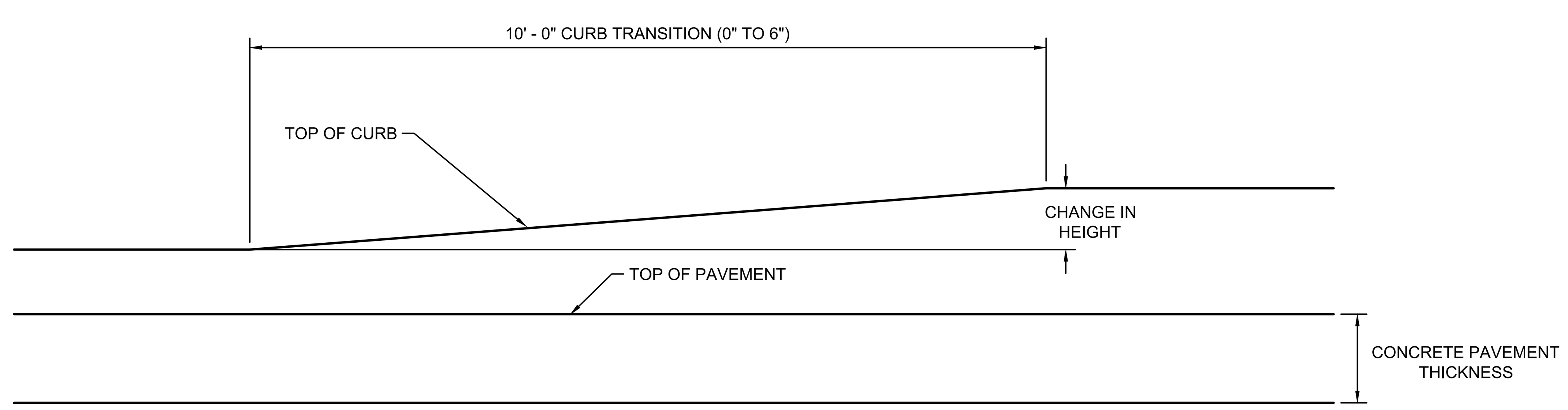
GENERAL NOTES:

1. THIS STANDARD IS APPLICABLE FOR RAMP CONSTRUCTION ON CITY PROPERTY AND EASEMENT AREAS ONLY.
2. PAVERS ARE REQUIRED FOR ALL CURB RAMP INSTALLATIONS.
3. PAVERS WILL HAVE DETECTABLE WARNING THAT CONSISTS OF RAISED TRUNCATED DOMES WITH A DIAMETER OF 0.9" (23 mm), A NOMINAL HEIGHT OF 0.2" (5 mm) AND A NOMINAL CENTER TO CENTER SPACING OF 2.35" (60 mm) AND SHALL CONSTRAST VISUALLY WITH ADJOINING SURFACES, EITHER LIGHT-ON-DARK OR DARK-ON-LIGHT (Re: ADAAG SECTION 4.29.2). MATERIAL USED TO PROVIDE CONTRAST SHALL BE AN INTEGRAL PART OF THE WALKING SURFACE. PAVER PATTERN SHALL BE BASKET WEAVE UNLESS DIRECTED OTHERWISE BY THE ENGINEER OR DESIGNATED REPRESENTATIVE.
4. TYPICAL SIDEWALK WIDTHS AND CURB RADII ARE SHOWN FOR ILLUSTRATION ONLY. REFER TO THE TRANSPORTATION CRITERIA MANUAL FOR SIDEWALK WIDTHS, CURB RADII AND CURB BASIS.
5. THE PERMISSIBLE CONSTRUCTION JOINT BETWEEN THE PAVERS AND THE ADJOINING SURFACE SHALL BE LIMITED TO ¼" (6 mm) JOINT SIZE. GAPS LARGER THAN ¼" (6 mm) MUST BE APPROVED BY THE ENGINEER OR DESIGNATED REPRESENTATIVE. ALL JOINTS BETWEEN BRICKS AND ADJOINING SURFACE SHALL BE MORTAR FILLED UNLESS DIRECTED OTHERWISE BY THE ENGINEER OR DESIGNATED REPRESENTATIVE.
6. MORTAR SHALL CONFORM TO STD. SPECIFICATION ITEM SECTION 403S.3.5, MORTAR AND GROUT. ALL OTHER CONCRETE SHALL CONFORM TO STD. SPECIFICATION ITEM 403S, CONCRETE FOR STRUCTURES, UNLESS OTHERWISE NOTED.
7. CURB RAMPS WITH RETURNED CURB MAY ONLY BE USED WHERE PEDESTRIANS WOULD NOT NORMALLY WALK DIAGONALLY ACROSS THE RAMP.

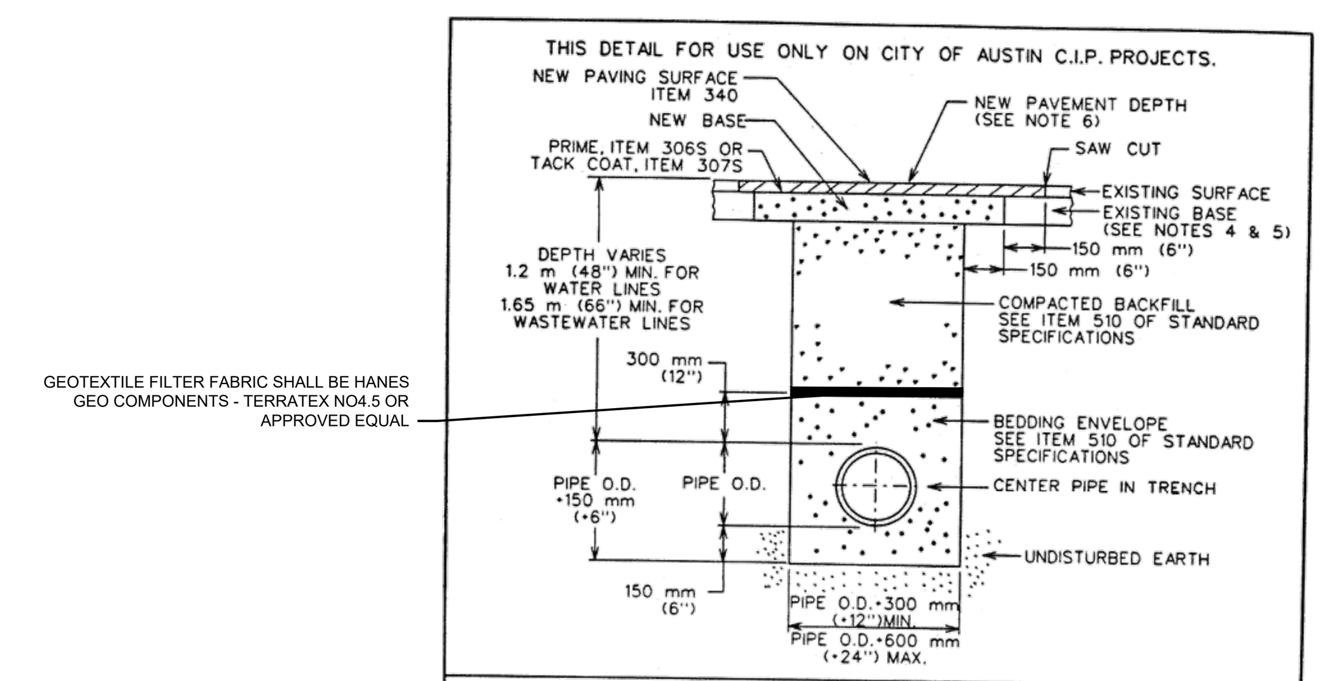
CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS — DETECTABLE WARNING-PAVER (CITY PROPERTY/EASMENTS) — ADOPTED 6/21/07 — THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD. — STANDARD NO. 432S-2A 2 OF 2



RIBBON CURB



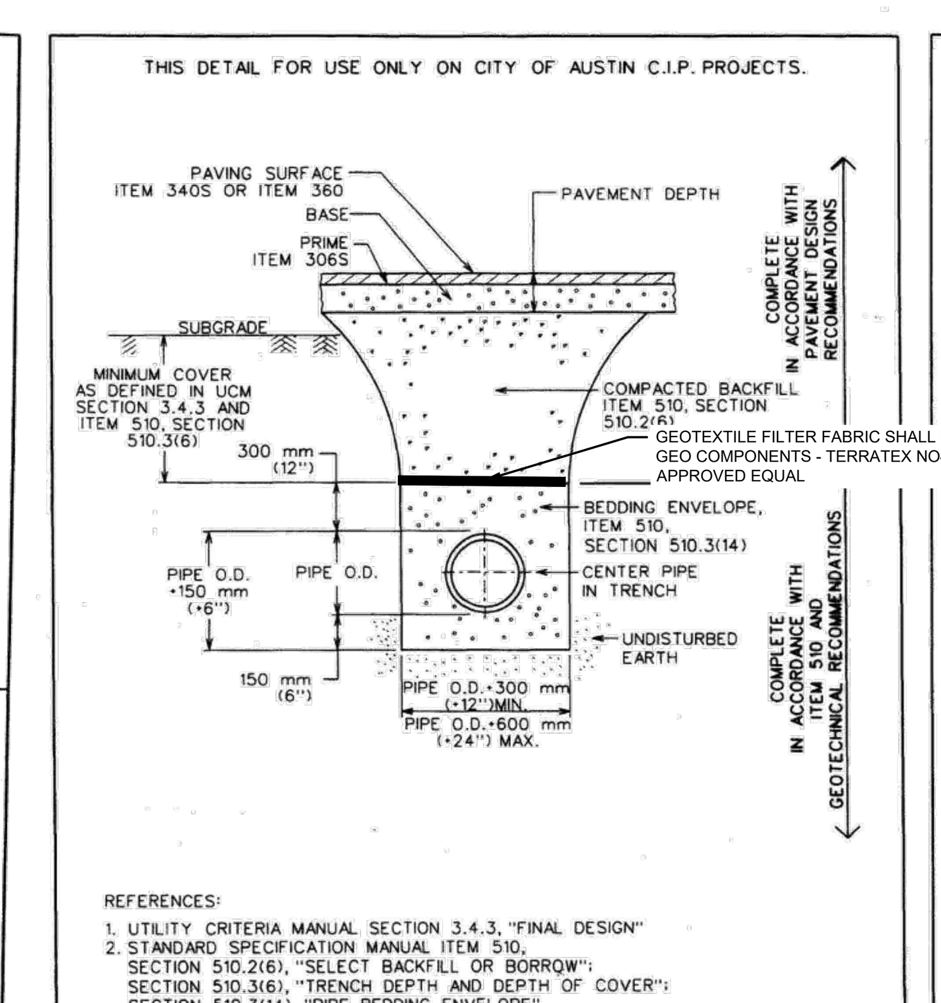
CURB TRANSITION


THIS DETAIL FOR USE ONLY ON CITY OF AUSTIN C.I.P. PROJECTS.
NEW PAVING SURFACE ITEM 340
NEW BASE
PRIME, ITEM 306S OR TACK COAT, ITEM 307S
NEW PAVEMENT DEPTH (SEE NOTE 6)
SAW CUT
EXISTING SURFACE
EXISTING BASE (SEE NOTES 4 & 5)
150 mm (6")
DEPTH VARIES 1.2 m (48") MIN. FOR WATER LINES 1.65 m (66") MIN. FOR WASTEWATER LINES
COMPACTED BACKFILL SEE ITEM 510 OF STANDARD SPECIFICATIONS
300 mm (12")
GEOTEXTILE FILTER FABRIC SHALL BE HANES GEO COMPONENTS - TERRATEX NO4.5 OR APPROVED EQUAL
BEDDING ENVELOPE SEE ITEM 510 OF STANDARD SPECIFICATIONS
PIPE O.D. +150 mm (+6")
PIPE O.D.
CENTER PIPE IN TRENCH
UNDISTURBED EARTH
150 mm (6")
PIPE O.D.+300 mm (+12")MIN.
PIPE O.D.+600 mm (+24") MAX.

NOTES:

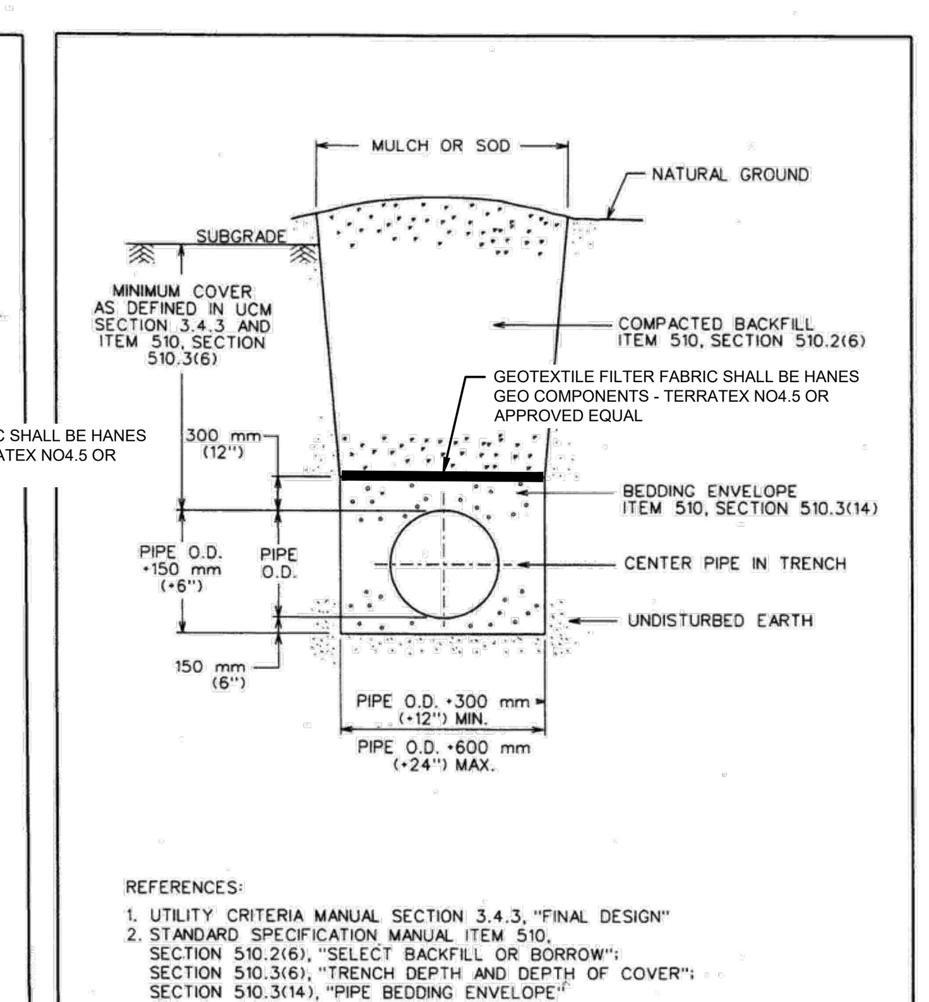
1. THE EXISTING PAVING SURFACE SHALL BE SAW CUT IN A STRAIGHT LINE A MINIMUM OF 300 mm (12") WIDER THAN THE UNDISTURBED SIDES OF THE TRENCH, SYMETRICAL ABOUT THE CENTER LINE OF THE EXCAVATION.
2. ANY CONCRETE PAVING SHALL BE SAW CUT 150 mm (6") WIDER THAN UNDISTURBED SIDES OF EXCAVATION.
3. IF EXCAVATION AREA IS OPEN FOR TEMPORARY PUBLIC USE, THE SURFACE SHALL BE MAINTAINED LEVEL WITH ADJACENT RIDING SURFACE WITH COLD MIX OR TEMPORARY HOT MIX ASPHALTIC CONCRETE.
4. ROAD BASE AND SURFACE MATERIALS IN THE TRENCH CUT SHALL BE REPLACED IN KIND OF EQUAL THICKNESS, OR MINIMUM BASE THICKNESS OF 250 mm (10"), WHICHEVER IS GREATER.
5. ALL DAMAGED AREAS OF PAVEMENT OUTSIDE THE TRENCH CUT SHALL BE REMOVED AND REPLACED WITH MINIMUM OF 200 mm (8") OF BASE OR MATCH EXISTING THICKNESS, WHICHEVER IS GREATER.
6. SURFACE PAVEMENT SHALL BE OF THE KIND AND THICKNESS AS EXISTING, OR MINIMUM 50 mm (2"), WHICHEVER IS GREATER.

CITY OF AUSTIN WATER AND WASTEWATER UTILITY — TYPICAL TRENCH WITH PAVED SURFACE — ADOPTED 8/19/02 — THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD. — STANDARD NO. 510S-3


THIS DETAIL FOR USE ONLY ON CITY OF AUSTIN C.I.P. PROJECTS.
PAVING SURFACE ITEM 340S OR ITEM 360
BASE
PRIME ITEM 306S
PAVEMENT DEPTH
SUBGRADE
COMPLETE IN ACCORDANCE WITH PAVEMENT DESIGN RECOMMENDATIONS
MINIMUM COVER AS DEFINED IN UCM SECTION 3.4.3 AND ITEM 510, SECTION 510.3(6)
COMPACTED BACKFILL ITEM 510, SECTION 510.2(6)
300 mm (12")
GEOTEXTILE FILTER FABRIC SHALL BE HANES GEO COMPONENTS - TERRATEX NO4.5 OR APPROVED EQUAL
BEDDING ENVELOPE, ITEM 510, SECTION 510.3(14)
PIPE O.D. +150 mm (+6")
PIPE O.D.
CENTER PIPE IN TRENCH
UNDISTURBED EARTH
COMPLETE IN ACCORDANCE WITH ITEM 510 AND GEOTECHNICAL RECOMMENDATIONS
150 mm (6")
PIPE O.D.+300 mm (+12")MIN.
PIPE O.D.+600 mm (+24") MAX.

REFERENCES:
1. UTILITY CRITERIA MANUAL SECTION 3.4.3, "FINAL DESIGN"
2. STANDARD SPECIFICATION MANUAL ITEM 510,
   SECTION 510.2(6), "SELECT BACKFILL OR BORROW";
   SECTION 510.3(6), "TRENCH DEPTH AND DEPTH OF COVER";
   SECTION 510.3(14), "PIPE BEDDING ENVELOPE"

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS — TYPICAL DETAIL FOR PROPOSED STREET — ADOPTED 3/13/06 — THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD. — STANDARD NO. 510S-4


MULCH OR SOD
NATURAL GROUND
SUBGRADE
MINIMUM COVER AS DEFINED IN UCM SECTION 3.4.3 AND ITEM 510, SECTION 510.3(6)
COMPACTED BACKFILL ITEM 510, SECTION 510.2(6)
GEOTEXTILE FILTER FABRIC SHALL BE HANES GEO COMPONENTS - TERRATEX NO4.5 OR APPROVED EQUAL
300 mm (12")
BEDDING ENVELOPE ITEM 510, SECTION 510.3(14)
PIPE O.D. +150 mm (+6")
PIPE O.D.
CENTER PIPE IN TRENCH
UNDISTURBED EARTH
150 mm (6")
PIPE O.D. +300 mm (+12") MIN.
PIPE O.D. +600 mm (+24") MAX.

REFERENCES:
1. UTILITY CRITERIA MANUAL SECTION 3.4.3, "FINAL DESIGN"
2. STANDARD SPECIFICATION MANUAL ITEM 510,
   SECTION 510.2(6), "SELECT BACKFILL OR BORROW";
   SECTION 510.3(6), "TRENCH DEPTH AND DEPTH OF COVER";
   SECTION 510.3(14), "PIPE BEDDING ENVELOPE"

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS — TYPICAL TRENCH DETAIL WITH UNFINISHED SURFACE — ADOPTED 3/13/06 — THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD. — STANDARD NO. 510S-5

No.	REVISIONS	DATE	BY

Kimley»Horn

© 2021 KIMLEY-HORN AND ASSOCIATES, INC.
10814 JOLLYVILLE ROAD, AVALLON IV, SUITE 300, AUSTIN, TX 78759
PHONE: 512-418-1771 FAX: 512-418-1791
WWW.KIMLEY-HORN.COM
TEXAS REGISTERED ENGINEERING FIRM F-928

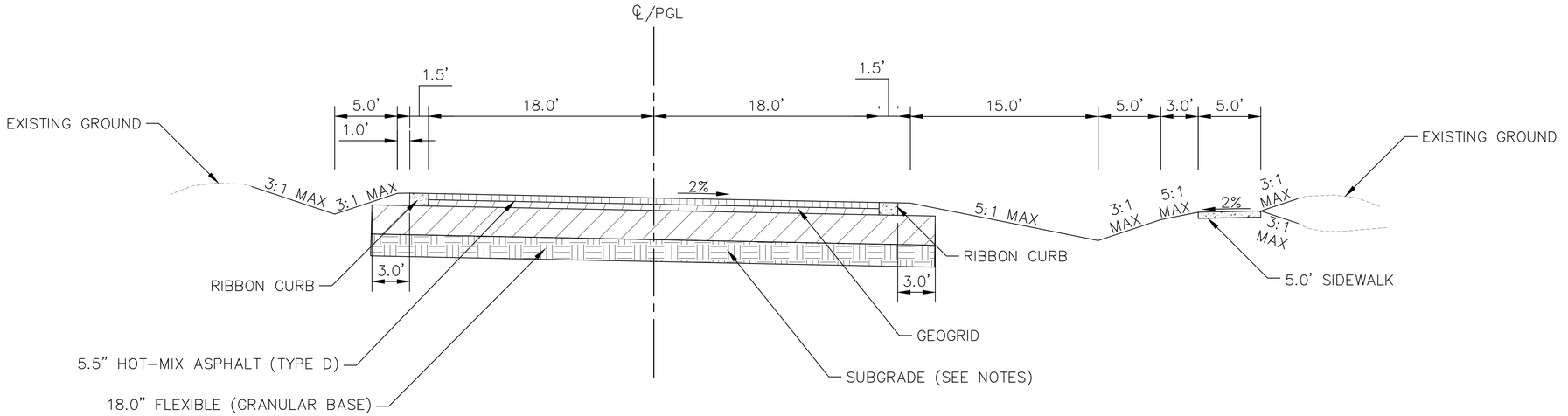
07/27/2022
STATE OF TEXAS — ALEJANDRO E. GRANADOS RICO — 130084 — LICENSED PROFESSIONAL ENGINEER — FOR PERMIT PURPOSES ONLY, NOT FOR CONSTRUCTION

KHA PROJECT 067783117
DATE JULY 2022
SCALE: AS SHOWN
DESIGNED BY: AEG
DRAWN BY: DPD
CHECKED BY: AEG

PAVING DETAILS (SHEET 1 OF 4)

ROGER HANKS PARKWAY EXTENSION II
CITY OF DRIPPING SPRINGS
HAYS COUNTY, TEXAS

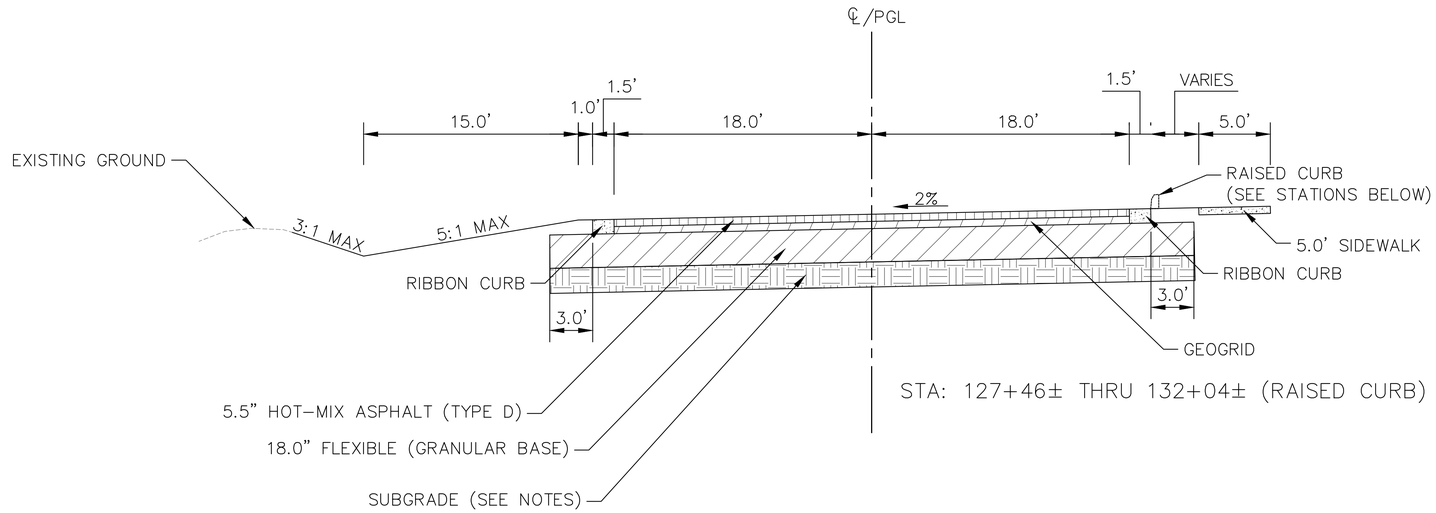
SHEET NUMBER
38



ROGER HANKS PARKWAY - SECTION 1 (PUBLIC)

STA: 101+00± THRU 109+29±

NTS



ROGER HANKS PARKWAY - SECTION 3 (PUBLIC)

STA: 124+84± THRU 132+04±

NTS

NOTES:
1. PER HAYS COUNTY SPECIFICATIONS, WHENEVER A SOIL INVESTIGATION INDICATES THAT MORE THAN TWO FEET OF EXPANSIVE SUBGRADE SOIL WITH A P.I. OF 35 OR GREATER EXISTS BENEATH THE EXPECTED BASE LAYER, THE DESIGN PROFESSIONAL SHALL INCORPORATE A COMBINATION OF THE TWO MEASURES DESCRIBED IN [COA TCM 3.1.3].
2. SECTIONS TO BE VERIFIED AFTER ROUGH CUT OF ROAD PER GEOTECHNICAL ASSESSMENT SUBGRADE CONDITIONS.

No.	REVISIONS	DATE	BY

Kimley»Horn
© 2021 KIMLEY-HORN AND ASSOCIATES, INC.
10814 JOLLYVILLE ROAD, AVALLON IV, SUITE 300, AUSTIN, TX 78759
PHONE: 512-418-1771 FAX: 512-418-1791
WWW.KIMLEY-HORN.COM
TEXAS REGISTERED ENGINEERING FIRM F-928

07/27/2022

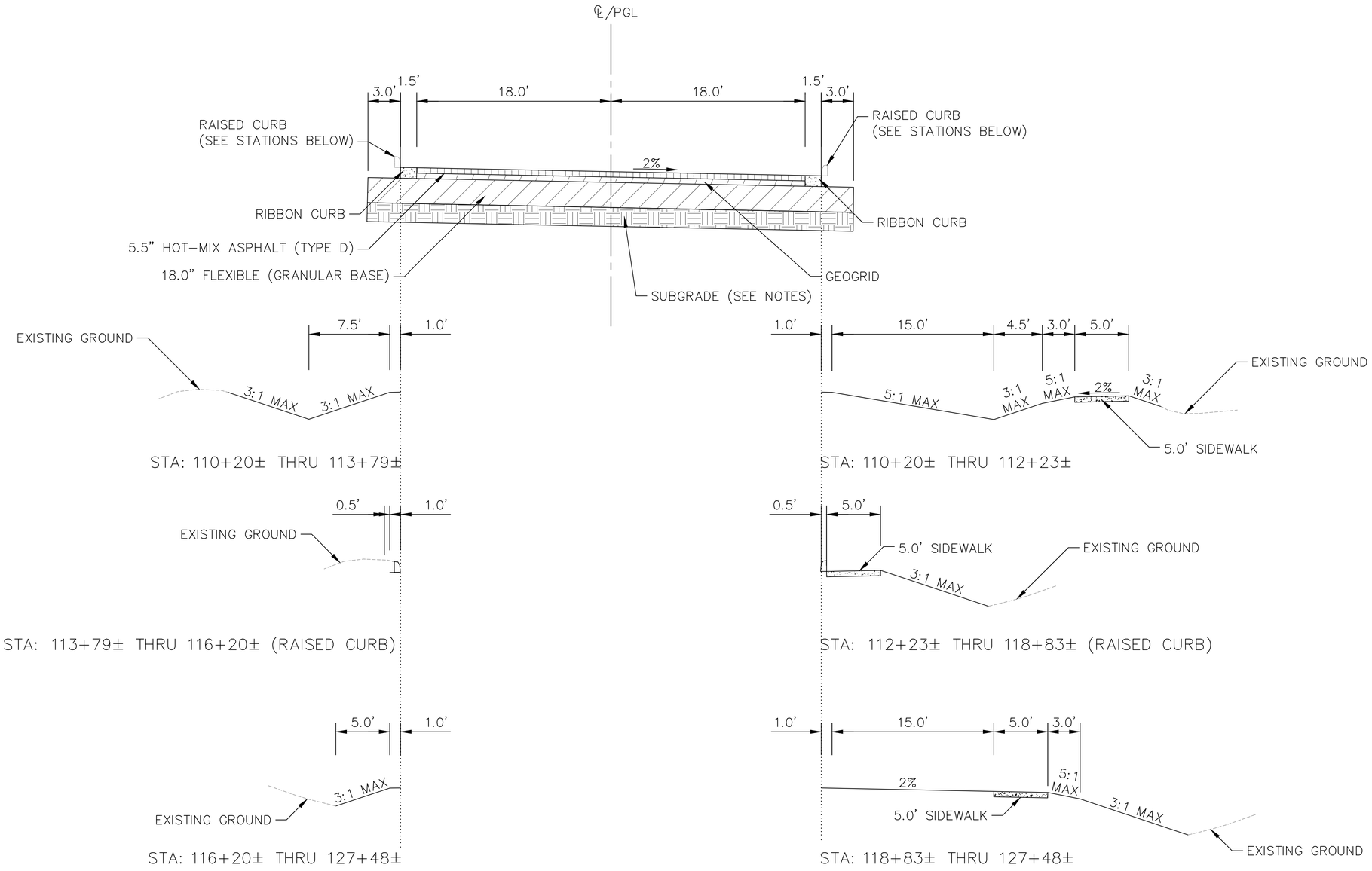
STATE OF TEXAS
ALEJANDRO E. CORNEJO RICO
103084
LICENSED
PROFESSIONAL ENGINEER

KHA PROJECT	067783117
DATE	JULY 2022
SCALE:	AS SHOWN
DESIGNED BY:	AEG
DRAWN BY:	DPD
CHECKED BY:	AEG

PAVING DETAILS
(SHEET 2 OF 4)

ROGER HANKS PARKWAY
EXTENSION II
CITY OF DRIPPING SPRINGS
HAYS COUNTY, TEXAS

SHEET NUMBER
39



ROGER HANKS PARKWAY - SECTION 2 (PUBLIC)

STA: 110+20± THRU 127+48± NTS

NOTES:
1. PER HAYS COUNTY SPECIFICATIONS, WHENEVER A SOIL INVESTIGATION INDICATES THAT MORE THAN TWO FEET OF EXPANSIVE SUBGRADE SOIL WITH A P.I. OF 35 OR GREATER EXISTS BENEATH THE EXPECTED BASE LAYER, THE DESIGN PROFESSIONAL SHALL INCORPORATE A COMBINATION OF THE TWO MEASURES DESCRIBED IN [COA TCM 3.1.3].
2. SECTIONS TO BE VERIFIED AFTER ROUGH CUT OF ROAD PER GEOTECHNICAL ASSESSMENT SUBGRADE CONDITIONS.

No.	REVISIONS	DATE	BY

Kimley»Horn
© 2021 KIMLEY-HORN AND ASSOCIATES, INC.
10814 JOLLYVILLE ROAD, AVALLON IV, SUITE 300, AUSTIN, TX 78759
PHONE: 512-418-1771 FAX: 512-418-1791
WWW.KIMLEY-HORN.COM
TEXAS REGISTERED ENGINEERING FIRM F-928

07/27/2022

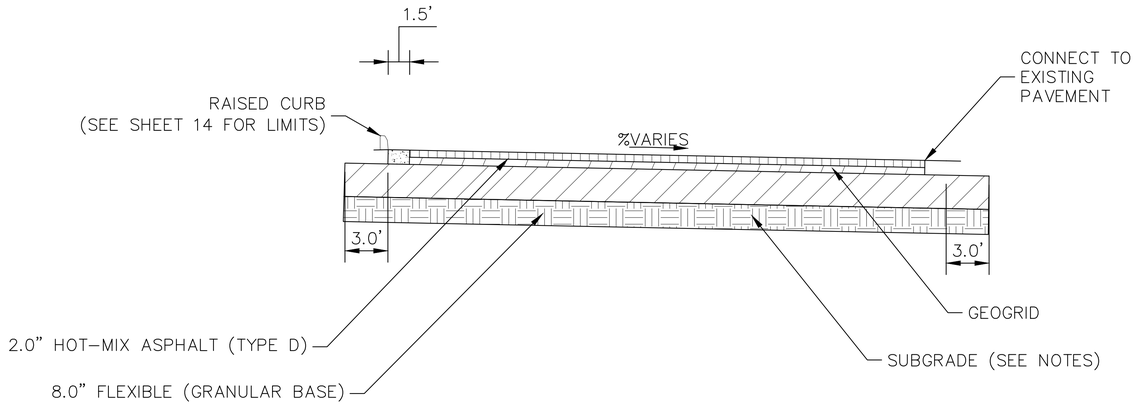
STATE OF TEXAS
ALEJANDRO E. GARRIDO RICO
103084
LICENSED
PROFESSIONAL ENGINEER

KHA PROJECT 067783117
DATE JULY 2022
SCALE: AS SHOWN
DESIGNED BY: AEG
DRAWN BY: DPD
CHECKED BY: AEG

PAVING DETAILS (SHEET 3 OF 4)

ROGER HANKS PARKWAY EXTENSION II
CITY OF DRIPPING SPRINGS
HAYS COUNTY, TEXAS

SHEET NUMBER
40



PARKING LOT TYPICAL SECTION

NTS

Heritage Phase 2 and Roger Hanks Parkway
Engineer's Job No. 21101100.175

RECOMMENDATIONS - PAVEMENT THICKNESS SECTIONS

Street Classification	Subgrade Material	Hot Mix Asphaltic Concrete, in	Crushed Limestone Base, in	Subgrade Improvements Required
Local Streets	More than 2 feet of expansive subgrade PI > 35	2.0	8	X*
	Less than 2 feet of expansive subgrade PI > 35	2.0	8	-
Minor Collector	More than 2 feet of expansive subgrade PI > 35	2.0	12	X*
	Less than 2 feet of expansive subgrade PI > 35	2.0	12	-
Major Collector	More than 2 feet of expansive subgrade PI > 35	2.5	16	X*
	Less than 2 feet of expansive subgrade PI > 35	2.5	16	-
Major Arterial	More than 2 feet of expansive subgrade PI > 35	5.5	18	X*
	Less than 2 feet of expansive subgrade PI > 35	5.5	18	-

Notes:

1. *Where more than 2 feet of expansive subgrade exists after rough cut of the streets, two of the four following options must be employed. This is a requirement of the Hays County Standard Specifications.
   - **Option 1:** Place a minimum of 18 inches of low PI (PI < 20) material below the crushed limestone base.
   - **Option 2:** A single layer of Tensar TX-130S or equivalent should be placed below the crushed limestone base layer.
   - **Option 3:** A moisture barrier should extend horizontally from the back of the curb a minimum of 10 feet.
   - **Option 4:** Lime stabilize a minimum of 8 inches of the subgrade below the crushed limestone base. The surface clay must first be tested for sulfate reaction and a mix design should be completed to determine the proper lime content, lime type, mixing procedure and curing conditions required.
2. Any expansive fill (PI > 35) placed in the subgrade shall be considered expansive subgrade.
3. **Delineation between these different pavement thickness sections should be completed in the field by observation of open utility trenches and the pavement subgrade by the Geotechnical Engineer or his designate.** Given the known variability of surface soils at this site, the geotechnical engineer must verify the subgrade before installation of the pavement system can proceed. Multiple site visits may be required depending upon the construction schedule. Finalized distinction between pavement thickness section options shall be provided as addendums to this report as these observations are completed. Please contact the geotechnical engineer when the utility trenches are open.
4. The subgrade improvements should be extended 3 feet beyond the back of the curb line.
5. These pavement thickness designs are intended to transfer the load from the anticipated traffic conditions.
6. The responsibility of assigning street classification to the streets in this project is left to the civil engineer.
7. If pavement designs other than those listed above are desired, please contact MLA Geotechnical.

NOTES:

1. PER HAYS COUNTY SPECIFICATIONS, WHENEVER A SOIL INVESTIGATION INDICATES THAT MORE THAN TWO FEET OF EXPANSIVE SUBGRADE SOIL WITH A P.I. OF 35 OR GREATER EXISTS BENEATH THE EXPECTED BASE LAYER, THE DESIGN PROFESSIONAL SHALL INCORPORATE A COMBINATION OF THE TWO MEASURES DESCRIBED IN [COA TCM 3.1.3].
2. SECTIONS TO BE VERIFIED AFTER ROUGH CUT OF ROAD PER GEOTECHNICAL ASSESSMENT SUBGRADE CONDITIONS.

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PHONE: 512-418-1771 FAX: 512-418-1791
WWW.KIMLEY-HORN.COM
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07/27/2022

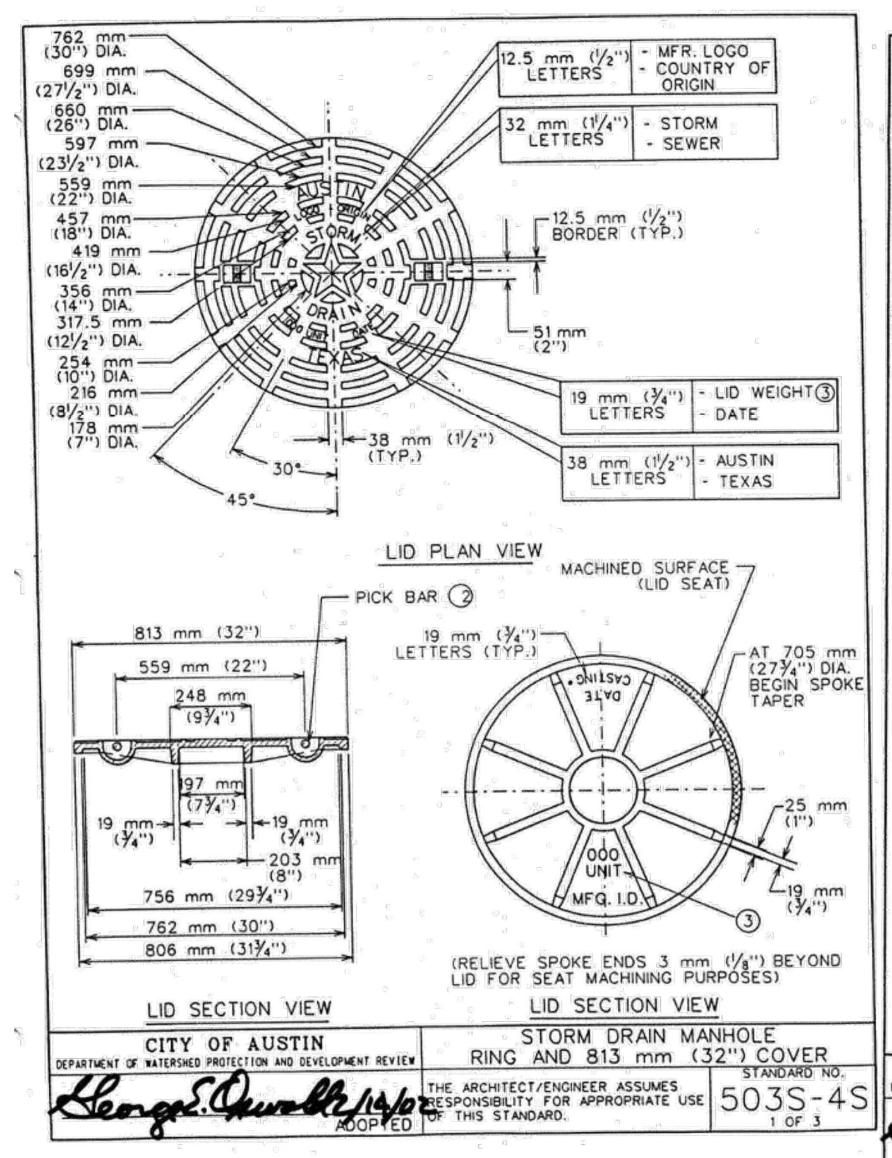
STATE OF TEXAS
ALEJANDRO E. GARANDOS RICO
92084
LICENSED
PROFESSIONAL ENGINEER

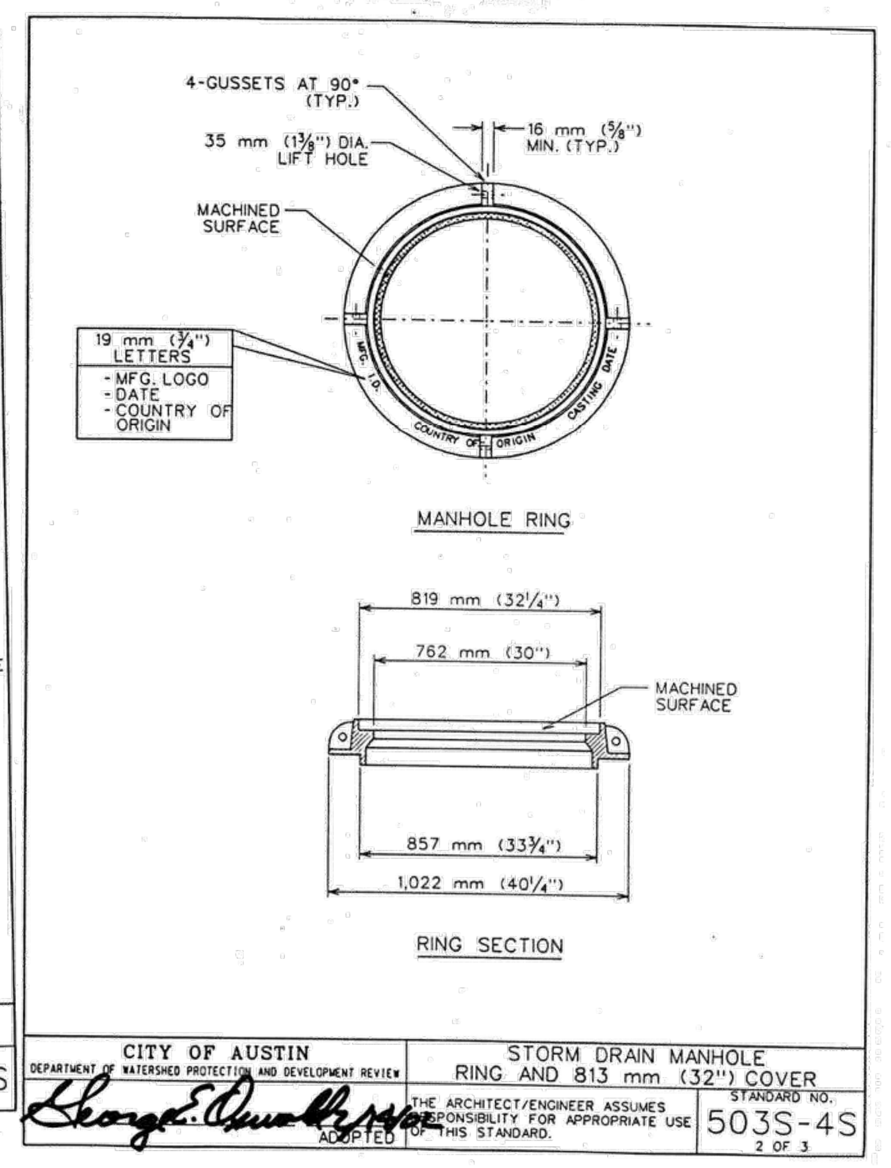
KHA PROJECT 067783117
DATE JULY 2022
SCALE: AS SHOWN
DESIGNED BY: AEG
DRAWN BY: DPD
CHECKED BY: AEG

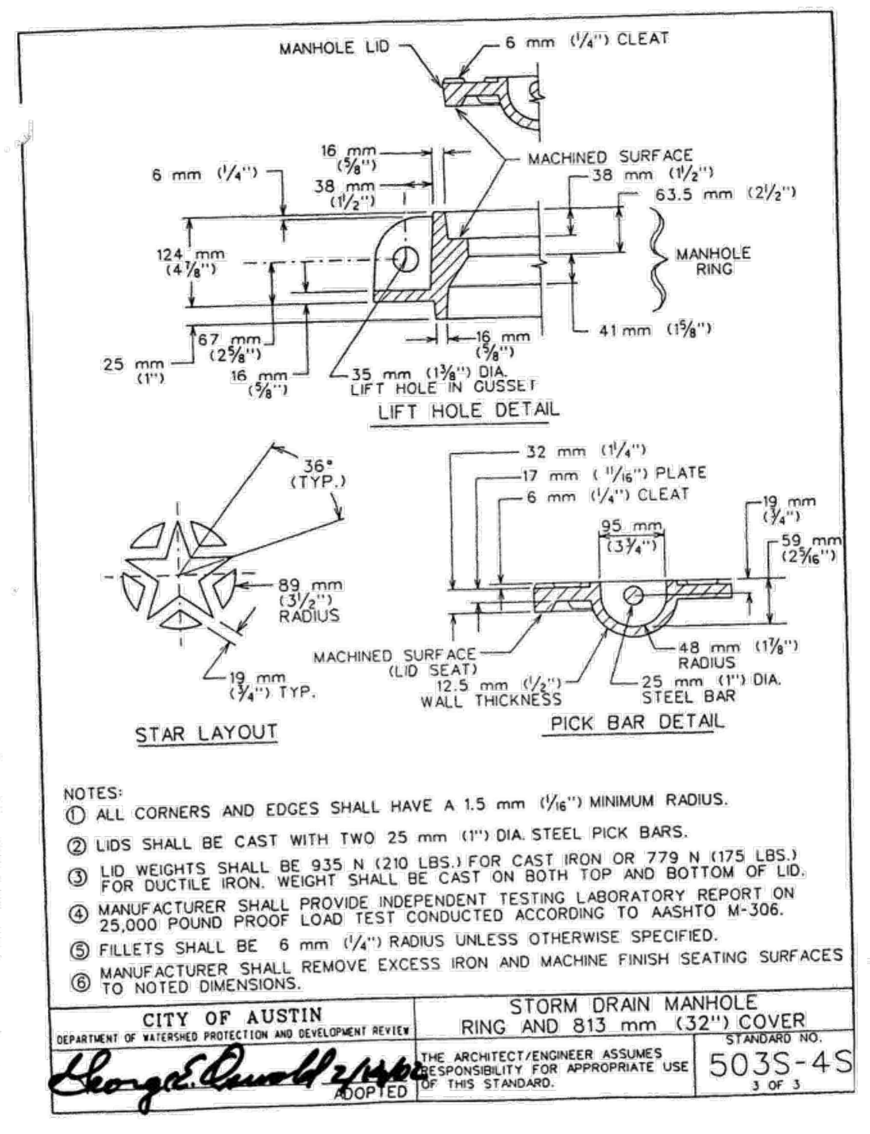
PAVING DETAILS (SHEET 4 OF 4)

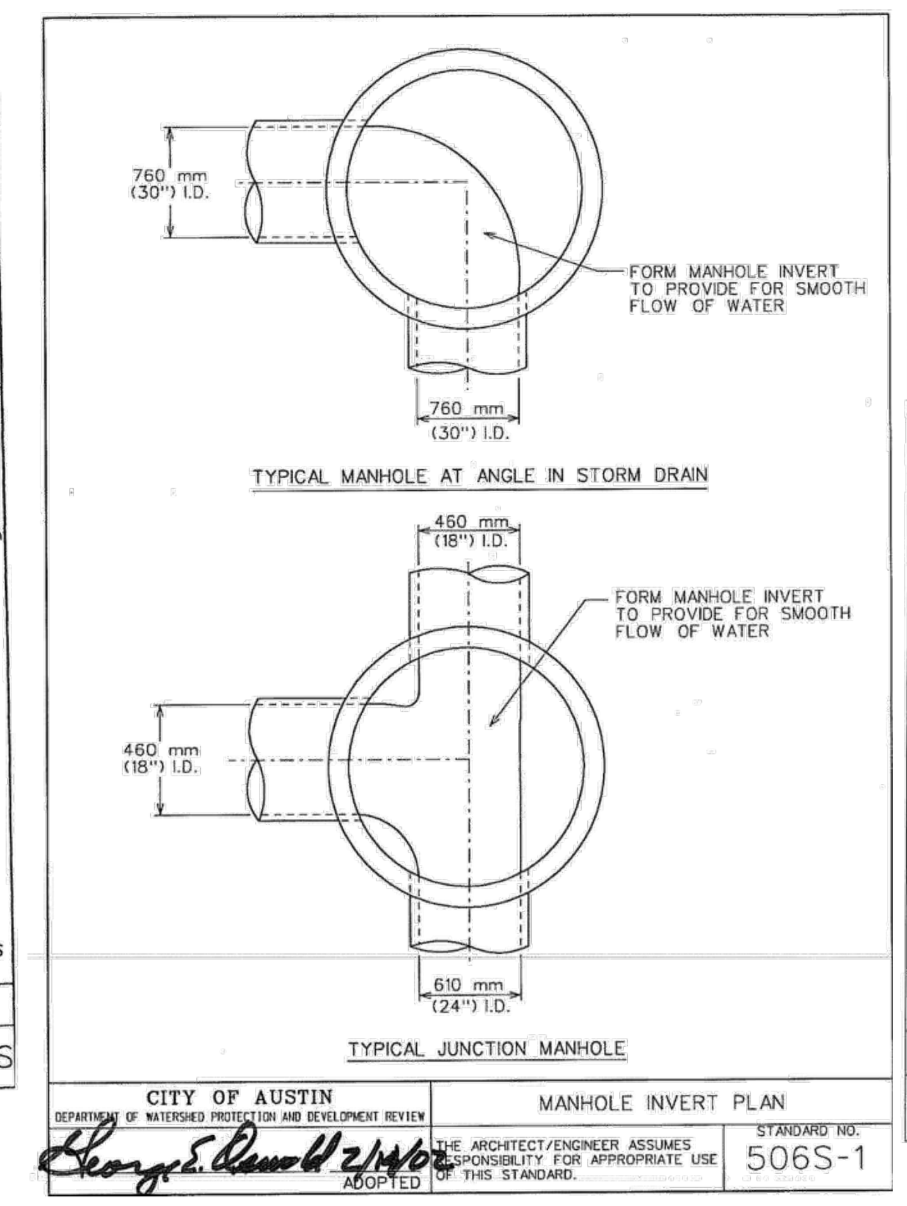
ROGER HANKS PARKWAY EXTENSION II
CITY OF DRIPPING SPRINGS
HAYS COUNTY, TEXAS

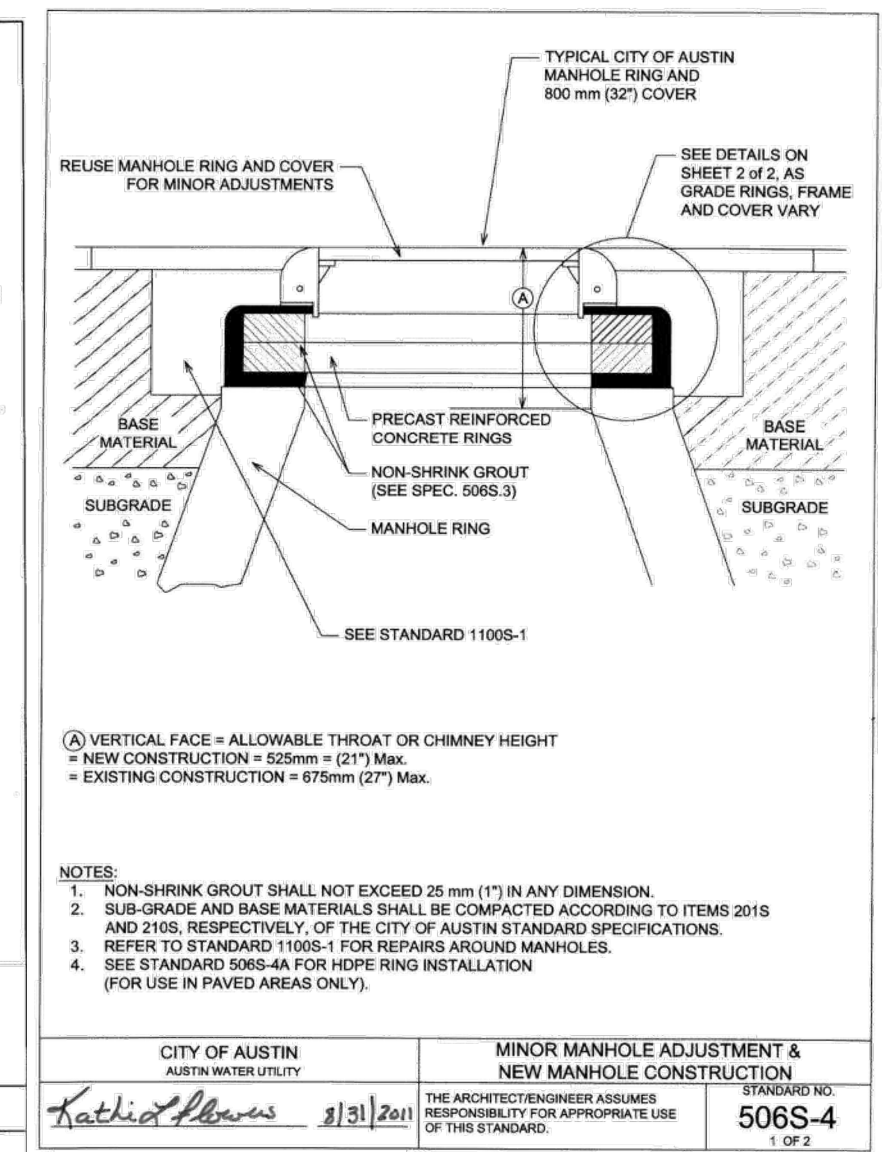
SHEET NUMBER
41

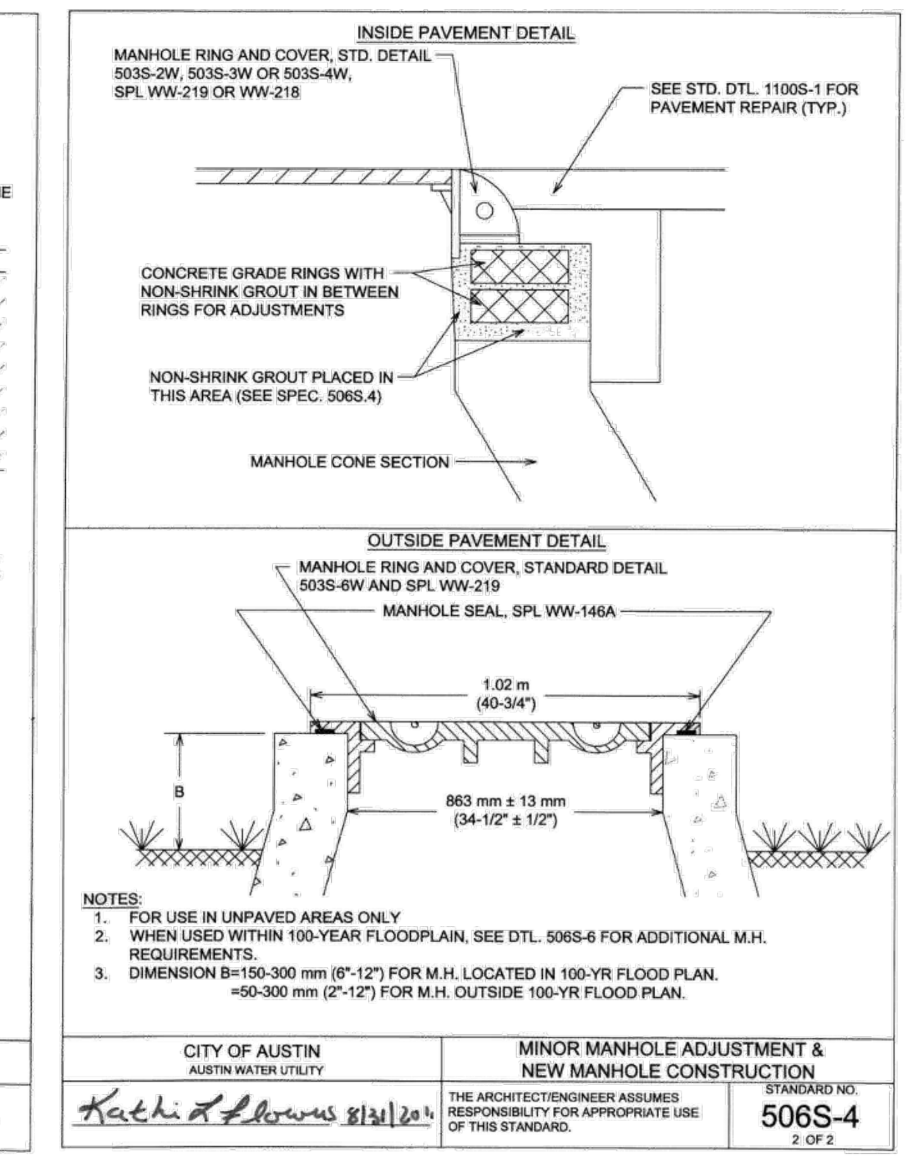

LID PLAN VIEW
LID SECTION VIEW
LID SECTION VIEW
12.5 mm (1/2") LETTERS - MFR. LOGO - COUNTRY OF ORIGIN
32 mm (1 1/4") LETTERS - STORM - SEWER
19 mm (3/4") LETTERS - LID WEIGHT (3) - DATE
38 mm (1 1/2") LETTERS - AUSTIN - TEXAS
(RELIEVE SPOKE ENDS 3 mm (1/8") BEYOND LID FOR SEAT MACHINING PURPOSES)
CITY OF AUSTIN
DEPARTMENT OF WATERSHED PROTECTION AND DEVELOPMENT REVIEW
STORM DRAIN MANHOLE RING AND 813 mm (32") COVER
THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.
ADOPTED
STANDARD NO. 503S-4S 1 OF 3

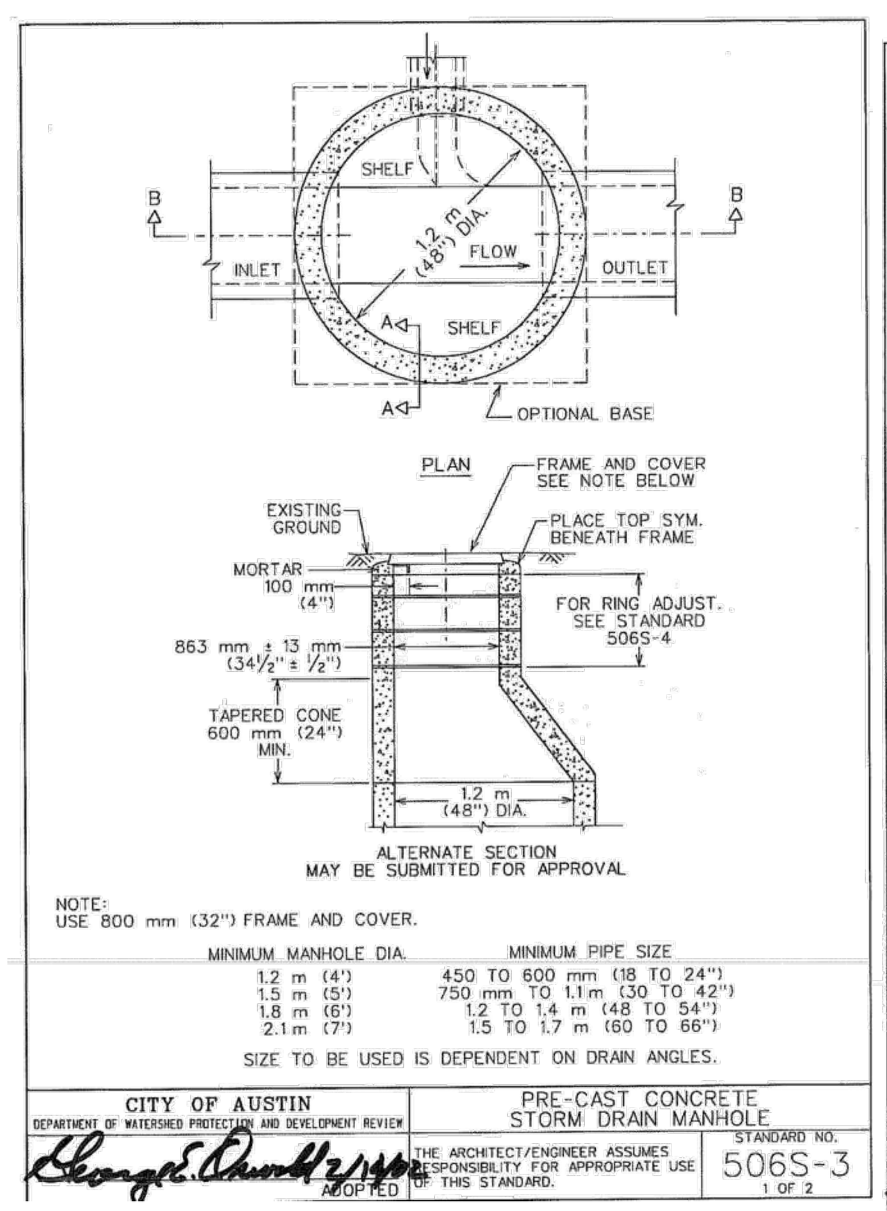

MANHOLE RING
RING SECTION
4-GUSSETS AT 90° (TYP.)
35 mm (1 3/8") DIA. LIFT HOLE
MACHINED SURFACE
19 mm (3/4") LETTERS - MFG. LOGO - DATE - COUNTRY OF ORIGIN
CITY OF AUSTIN
DEPARTMENT OF WATERSHED PROTECTION AND DEVELOPMENT REVIEW
STORM DRAIN MANHOLE RING AND 813 mm (32") COVER
THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.
ADOPTED
STANDARD NO. 503S-4S 2 OF 3

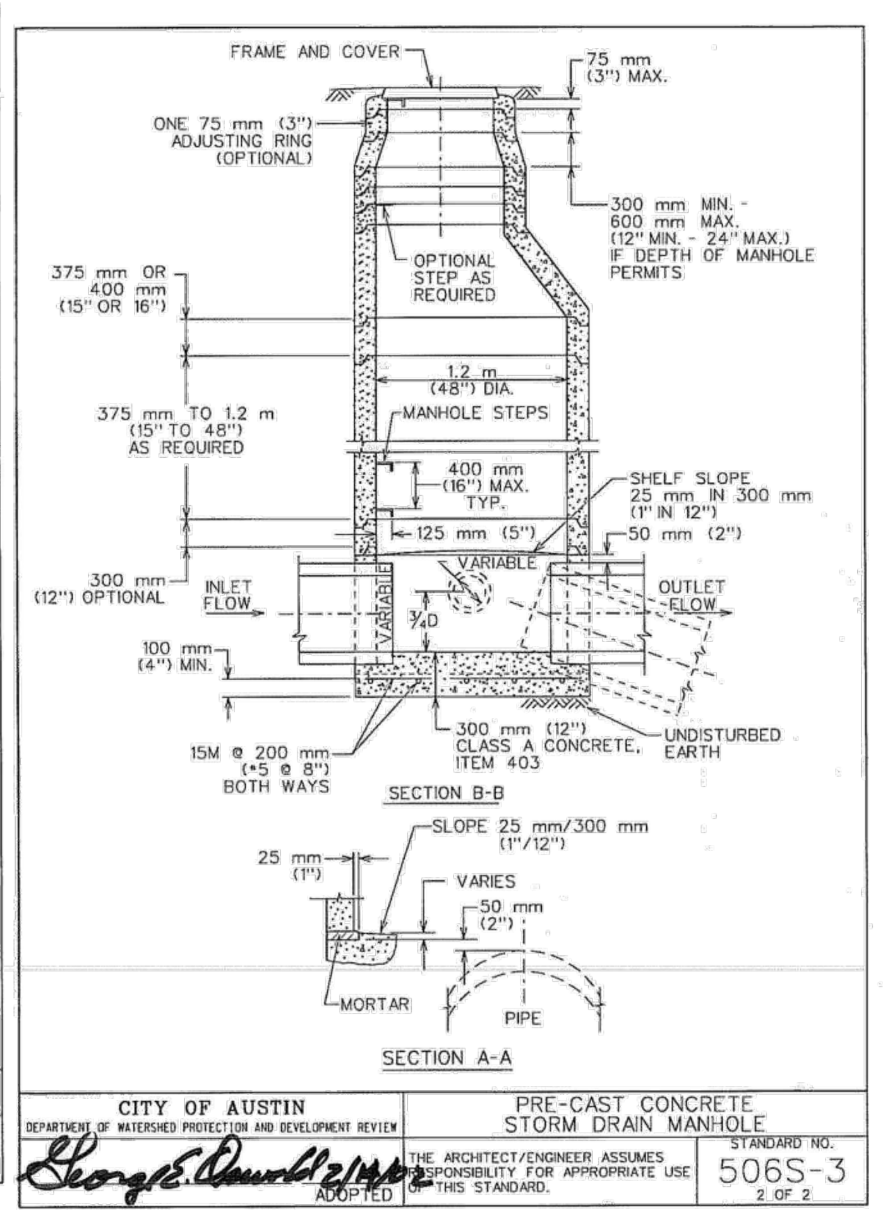

LIFT HOLE DETAIL
STAR LAYOUT
PICK BAR DETAIL
NOTES:
(1) ALL CORNERS AND EDGES SHALL HAVE A 1.5 mm (1/16") MINIMUM RADIUS.
(2) LIDS SHALL BE CAST WITH TWO 25 mm (1") DIA. STEEL PICK BARS.
(3) LID WEIGHTS SHALL BE 935 N (210 LBS.) FOR CAST IRON OR 779 N (175 LBS.) FOR DUCTILE IRON. WEIGHT SHALL BE CAST ON BOTH TOP AND BOTTOM OF LID.
(4) MANUFACTURER SHALL PROVIDE INDEPENDENT TESTING LABORATORY REPORT ON 25,000 POUND PROOF LOAD TEST CONDUCTED ACCORDING TO AASHTO M-306.
(5) FILLETS SHALL BE 6 mm (1/4") RADIUS UNLESS OTHERWISE SPECIFIED.
(6) MANUFACTURER SHALL REMOVE EXCESS IRON AND MACHINE FINISH SEATING SURFACES TO NOTED DIMENSIONS.
CITY OF AUSTIN
STORM DRAIN MANHOLE RING AND 813 mm (32") COVER
STANDARD NO. 503S-4S 3 OF 3

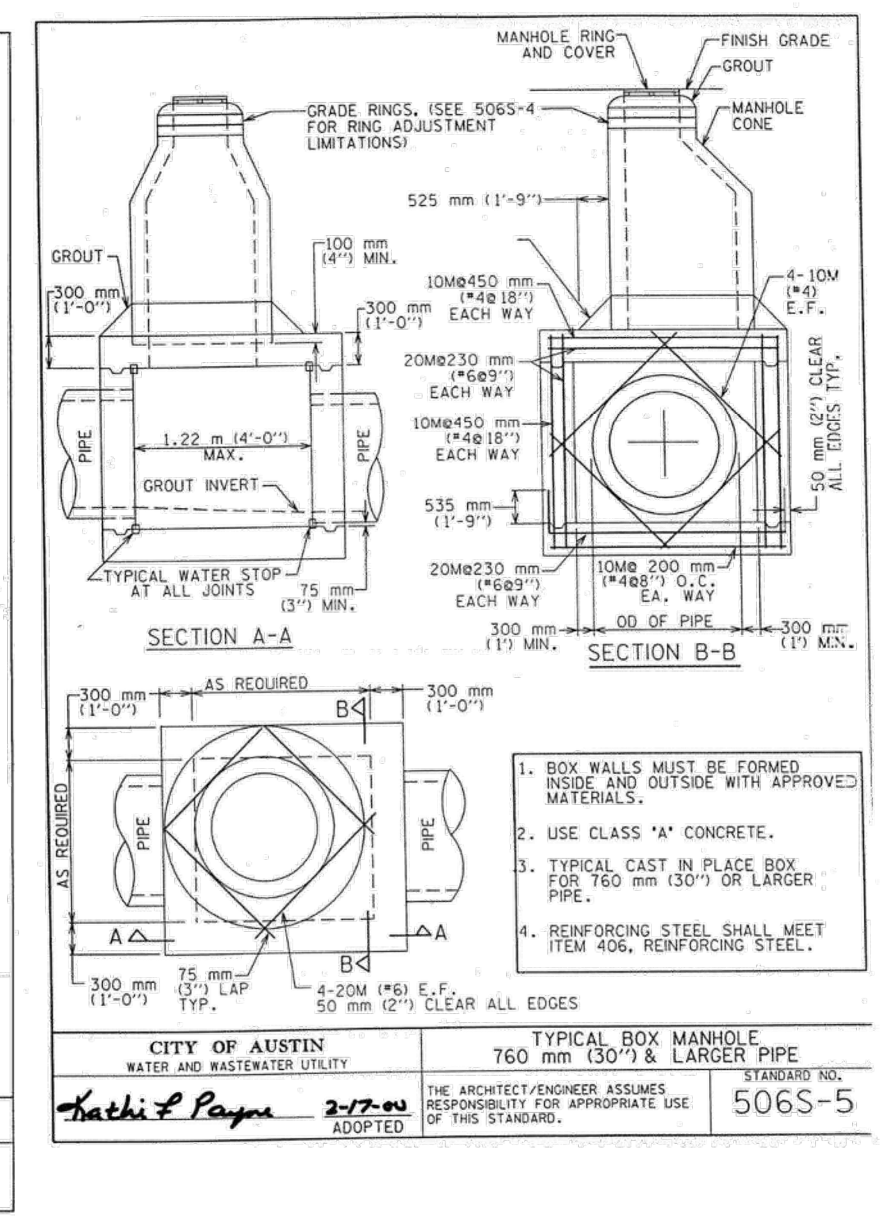


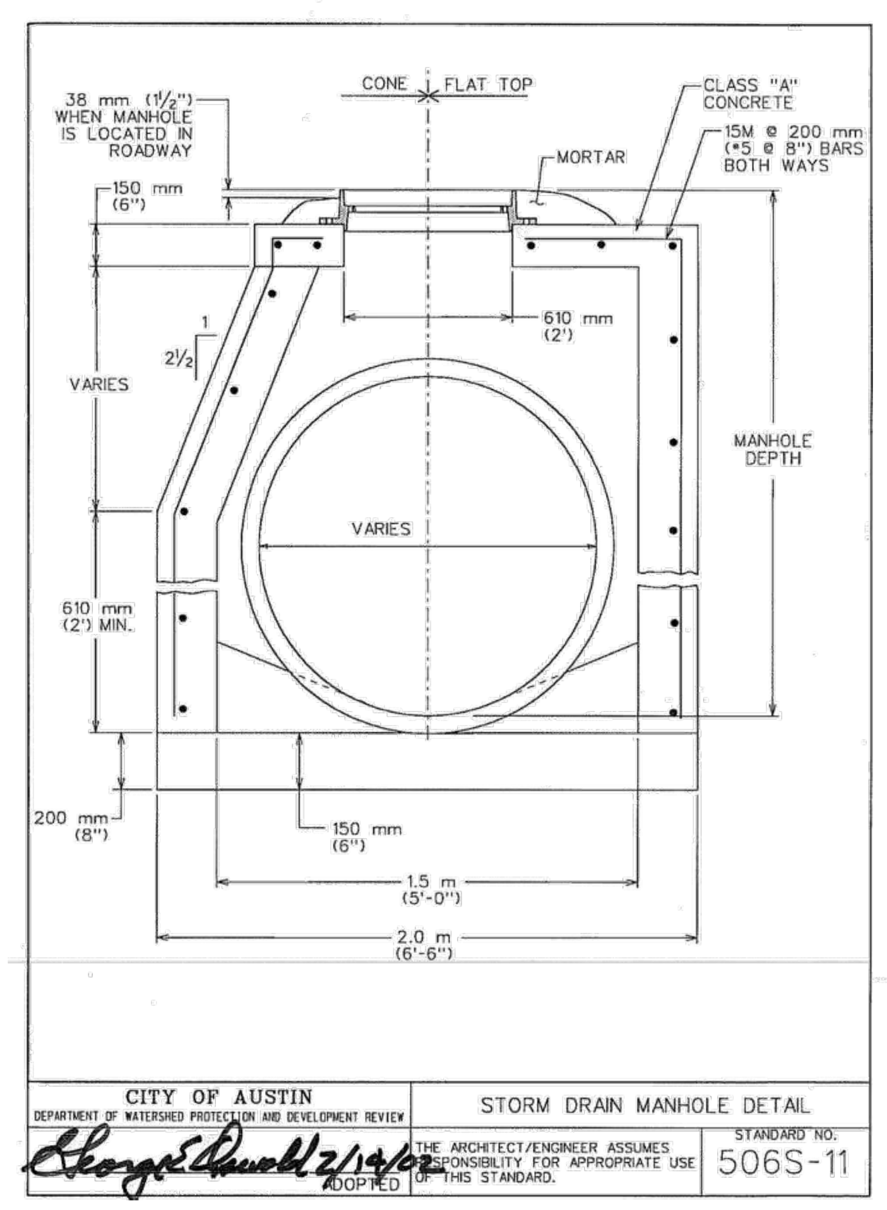

TYPICAL CITY OF AUSTIN MANHOLE RING AND 800 mm (32") COVER
REUSE MANHOLE RING AND COVER FOR MINOR ADJUSTMENTS
SEE DETAILS ON SHEET 2 of 2, AS GRADE RINGS, FRAME AND COVER VARY
PRECAST REINFORCED CONCRETE RINGS
NON-SHRINK GROUT (SEE SPEC. 506S.3)
MANHOLE RING
SEE STANDARD 1100S-1
(A) VERTICAL FACE = ALLOWABLE THROAT OR CHIMNEY HEIGHT
= NEW CONSTRUCTION = 525mm = (21") Max.
= EXISTING CONSTRUCTION = 675mm (27") Max.
NOTES:
1. NON-SHRINK GROUT SHALL NOT EXCEED 25 mm (1") IN ANY DIMENSION.
2. SUB-GRADE AND BASE MATERIALS SHALL BE COMPACTED ACCORDING TO ITEMS 201S AND 210S, RESPECTIVELY, OF THE CITY OF AUSTIN STANDARD SPECIFICATIONS.
3. REFER TO STANDARD 1100S-1 FOR REPAIRS AROUND MANHOLES.
4. SEE STANDARD 506S-4A FOR HDPE RING INSTALLATION (FOR USE IN PAVED AREAS ONLY).
CITY OF AUSTIN
AUSTIN WATER UTILITY
MINOR MANHOLE ADJUSTMENT & NEW MANHOLE CONSTRUCTION
STANDARD NO. 506S-4 1 OF 2

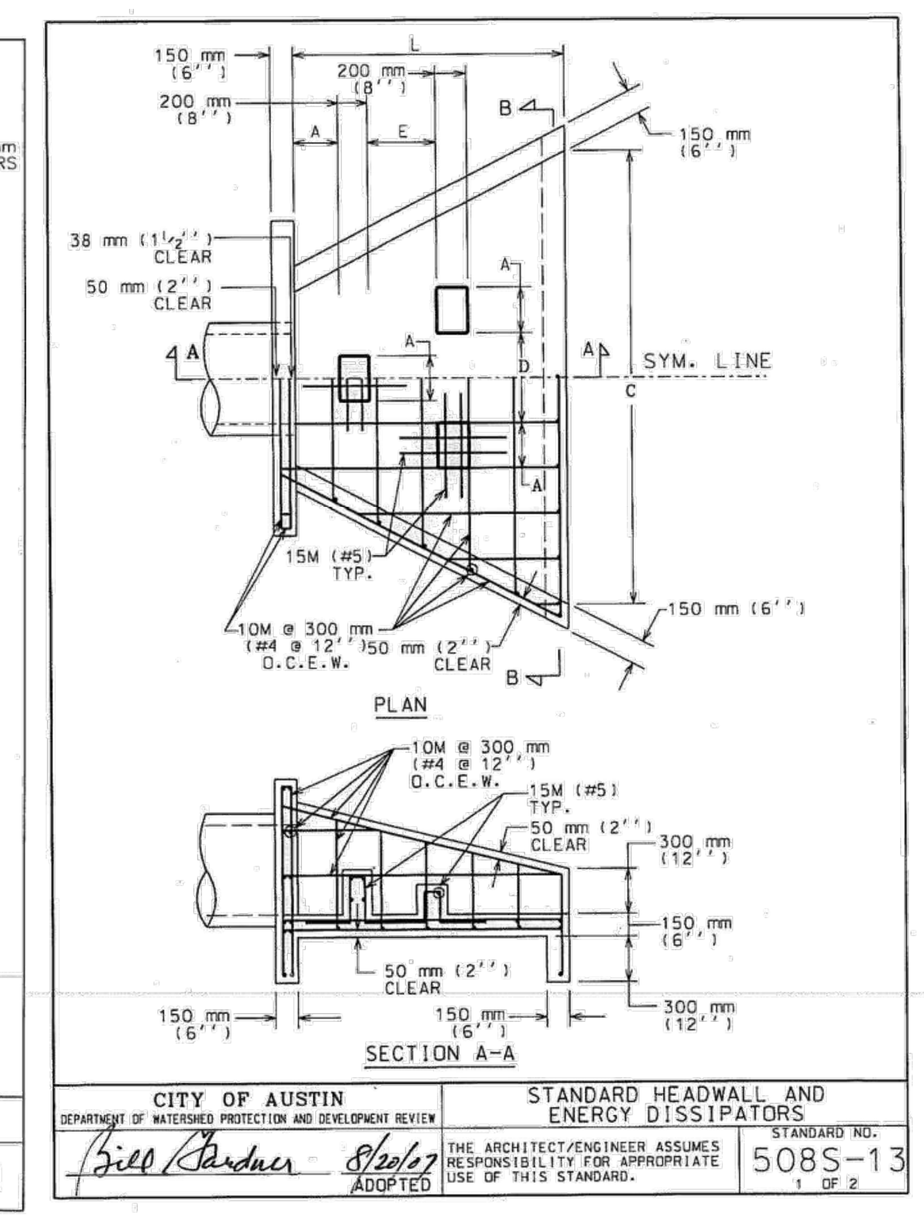

INSIDE PAVEMENT DETAIL
OUTSIDE PAVEMENT DETAIL
NOTES:
1. FOR USE IN UNPAVED AREAS ONLY
2. WHEN USED WITHIN 100-YEAR FLOODPLAIN, SEE DTL. 506S-6 FOR ADDITIONAL M.H. REQUIREMENTS.
3. DIMENSION B=150-300 mm (6"-12") FOR M.H. LOCATED IN 100-YR FLOOD PLAN. =50-300 mm (2"-12") FOR M.H. OUTSIDE 100-YR FLOOD PLAN.
CITY OF AUSTIN
AUSTIN WATER UTILITY
MINOR MANHOLE ADJUSTMENT & NEW MANHOLE CONSTRUCTION
STANDARD NO. 506S-4 2 OF 2

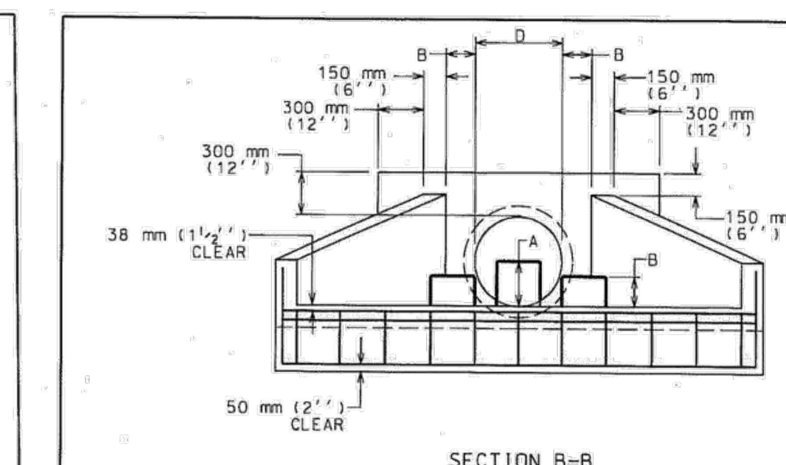

PLAN
ALTERNATE SECTION MAY BE SUBMITTED FOR APPROVAL
NOTE:
USE 800 mm (32") FRAME AND COVER.
MINIMUM MANHOLE DIA. / MINIMUM PIPE SIZE
1.2 m (4') 450 TO 600 mm (18 TO 24")
1.5 m (5') 750 mm TO 1.1 m (30 TO 42")
1.8 m (6') 1.2 TO 1.4 m (48 TO 54")
2.1 m (7') 1.5 TO 1.7 m (60 TO 66")
SIZE TO BE USED IS DEPENDENT ON DRAIN ANGLES.
CITY OF AUSTIN
PRE-CAST CONCRETE STORM DRAIN MANHOLE
STANDARD NO. 506S-3 1 OF 2




SECTION A-A
SECTION B-B
1. BOX WALLS MUST BE FORMED INSIDE AND OUTSIDE WITH APPROVED MATERIALS.
2. USE CLASS 'A' CONCRETE.
3. TYPICAL CAST IN PLACE BOX FOR 760 mm (30") OR LARGER PIPE.
4. REINFORCING STEEL SHALL MEET ITEM 406, REINFORCING STEEL.
CITY OF AUSTIN
WATER AND WASTEWATER UTILITY
TYPICAL BOX MANHOLE 760 mm (30") & LARGER PIPE
STANDARD NO. 506S-5







NOTES:

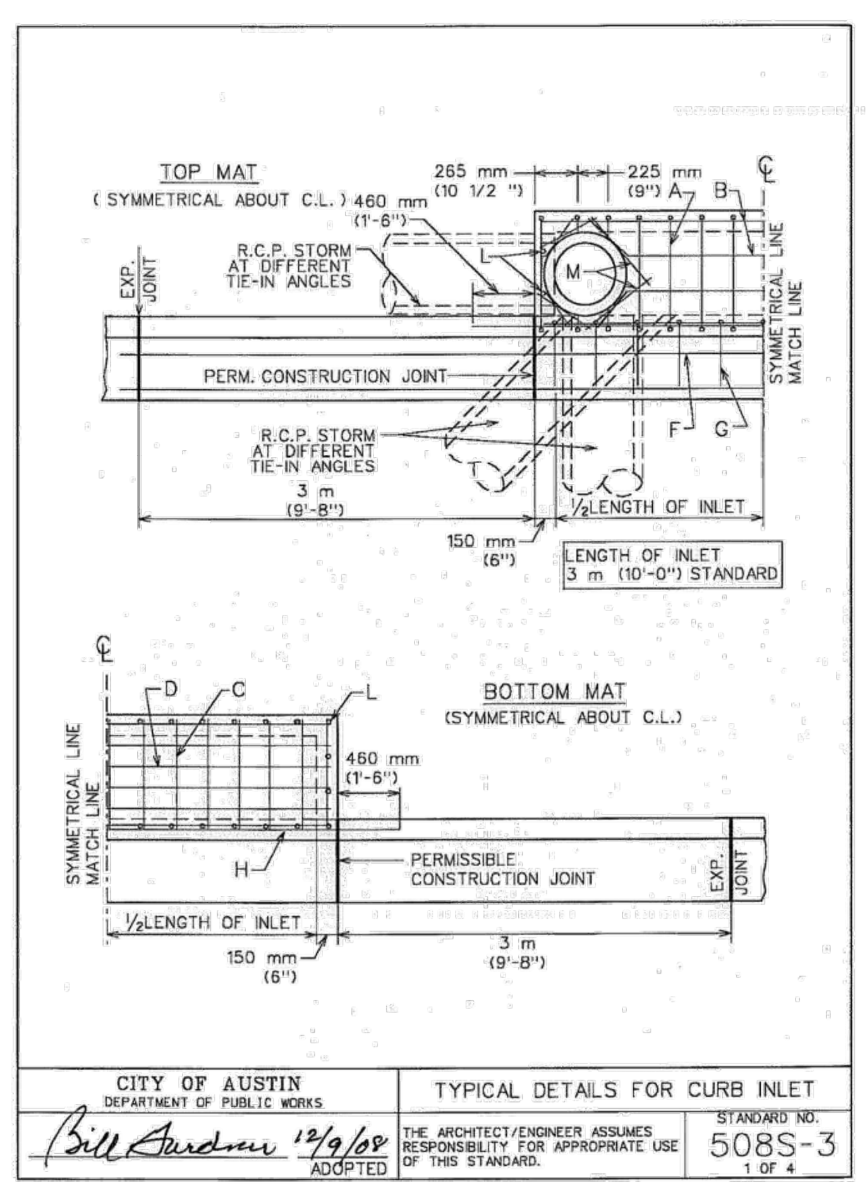
1. ALL CONCRETE SHALL BE TYPE "C" AS PER SPEC. 403S. CONCRETE FOR STURCTURES.
2. CHAMFER ALL EXTERNAL VISIBLE CORNERS.
3. DISSIPATOR BLOCKS REQUIRED ON DISCHARGE HEADWALLS ONLY.

D	457 mm (18'')	533 mm (21'')	610 mm (24'')	685 mm (27'')	765 mm (30'')	838 mm (33'')	914 mm (36'')	1.067 m (42'')	1.219 m (48'')	1.372 m (54'')	1.524 m (60'')
A	225 mm (9'')	250 mm (10'')	300 mm (12'')	350 mm (14'')	375 mm (15'')	400 mm (16'')	450 mm (18'')	525 mm (21'')	600 mm (24'')	675 mm (27'')	750 mm (30'')
B	150 mm (6'')	175 mm (7'')	200 mm (8'')	225 mm (9'')	250 mm (10'')	275 mm (11'')	300 mm (12'')	350 mm (14'')	400 mm (16'')	450 mm (18'')	500 mm (20'')
C	2.29 m (90'')	2.67 m (105'')	3.05 m (120'')	343 m (135'')	3.81 m (150'')	4.19 m (165'')	4.57 m (180'')	5.33 m (210'')	6.10 m (240'')	6.86 m (270'')	7.62 m (300'')
L	1.37 m (54'')	1.60 m (63'')	1.83 m (72'')	2.06 m (81'')	2.29 m (90'')	2.51 m (99'')	2.74 m (108'')	3.20 m (126'')	3.66 m (144'')	4.11 m (162'')	4.57 m (180'')
E	300 mm (12'')	350 mm (14'')	400 mm (16'')	450 mm (18'')	500 mm (20'')	550 mm (22'')	600 mm (24'')	700 mm (28'')	800m (32'')	900 mm (36'')	1000 mm (40'')

DIMENSIONS IN MILLIMETERS, METERS AND (INCHES).

DISCHARGE VELOCITIES GREATER THAN 3 METERS/SECOND (10 fps) REQUIRE ROCK OUTLET PROTECTION.

CITY OF AUSTIN
DEPARTMENT OF WATERSHED PROTECTION AND DEVELOPMENT REVIEW
STANDARD HEADWALL AND ENERGY DISSIPATORS
THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.
ADOPTED 8/20/07
STANDARD NO. 508S-13 2 OF 2


TOP MAT (SYMMETRICAL ABOUT C.L.)
BOTTOM MAT (SYMMETRICAL ABOUT C.L.)
PERM. CONSTRUCTION JOINT
R.C.P. STORM AT DIFFERENT TIE-IN ANGLES
LENGTH OF INLET 3 m (10'-0") STANDARD
PERMISSIBLE CONSTRUCTION JOINT
CITY OF AUSTIN
DEPARTMENT OF PUBLIC WORKS
TYPICAL DETAILS FOR CURB INLET
STANDARD NO. 508S-3 1 OF 4

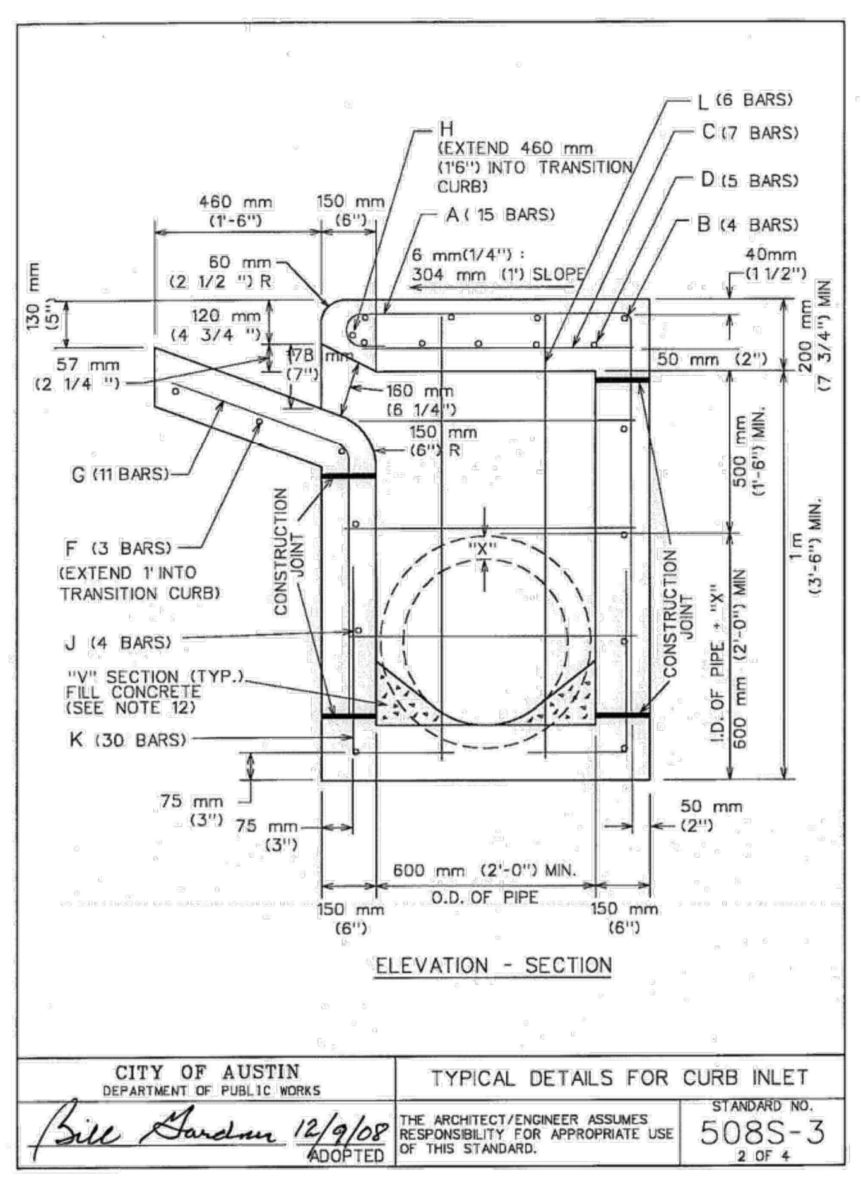
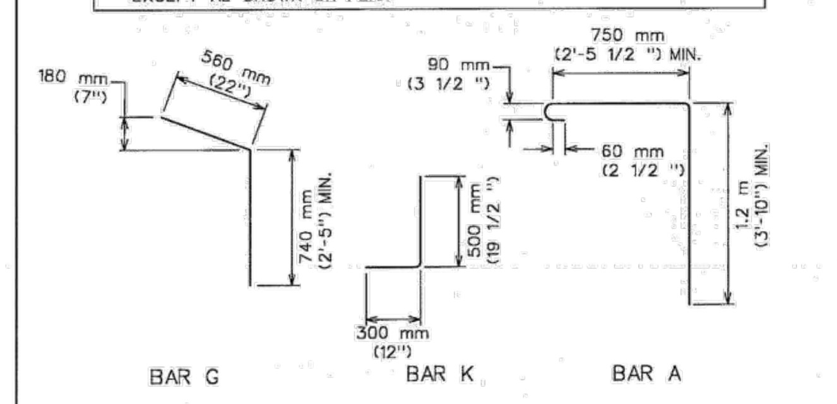


TABLE OF QUANTITIES
FOR 18" OUTLET PIPE
REINFORCING STEEL QUANTITIES

BARS	SIZE	SPACING	NUMBER	LENGTH	WEIGHT
A	4	230mm (9")*	15	2 m (7'-0")	73
B	4	250 mm (10")	4	3.25 m (10'-8")	29
C	4	460 mm (18")	7	760 mm (2'-6")	12
D	6	150 mm (6")	5	3.25 m (10'-8")	80
E	4	300 mm (12")	6	760 mm (2'-6")	10
F	4	250 mm (10")	3	4 m (13'-0")	35
G	4	300 mm (12")	11	1.25 m (4'-3")	31
H	6	-	1	4.25 m (14'-0")	20
J	4	300 mm (12")	7	3.25 m (10'-8")	50
K	4	230 mm (9")*	30	800 mm (2'-7 1/2")	52
L	4	300 mm (12")*	6	1.3 m (4'-4")	17
M	4	-	4	500 mm (1'-8") AVG	4
TOTAL STEEL, LB.					413
TOTAL CONCRETE, C.Y.					4.06

* EXCEPT AS SHOWN ON PLAN



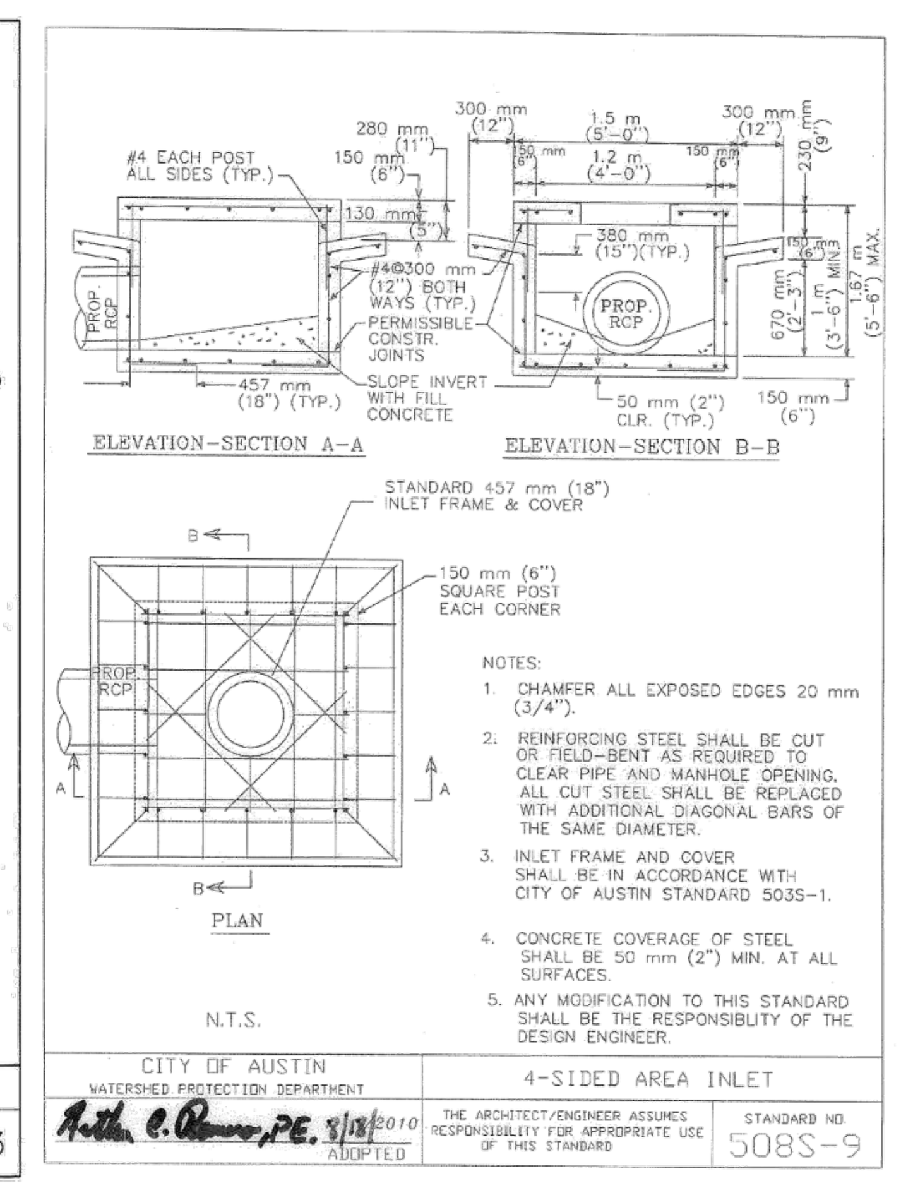
CITY OF AUSTIN
DEPARTMENT OF PUBLIC WORKS
TYPICAL DETAILS FOR CURB INLET
ADOPTED 12/9/08
STANDARD NO. 508S-3 3 OF 4

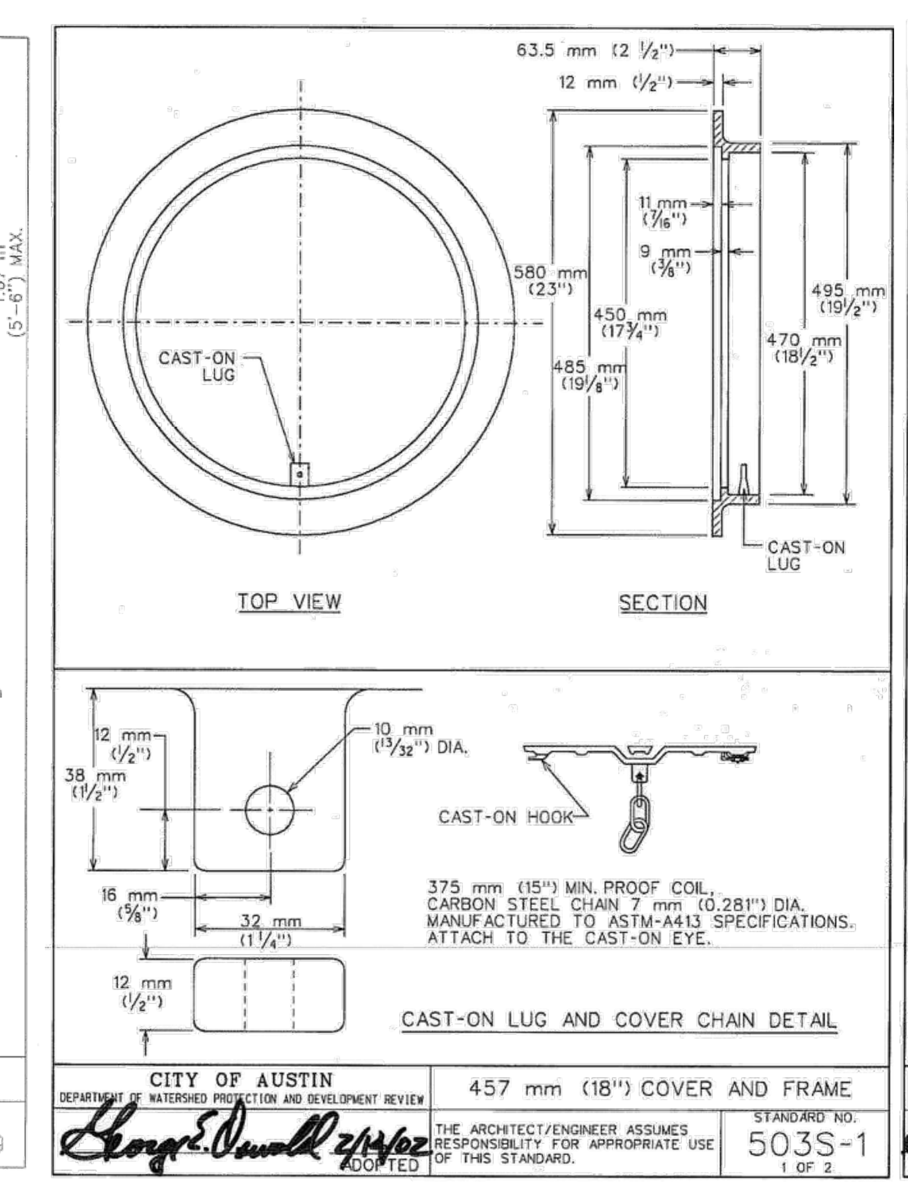
NOTES:

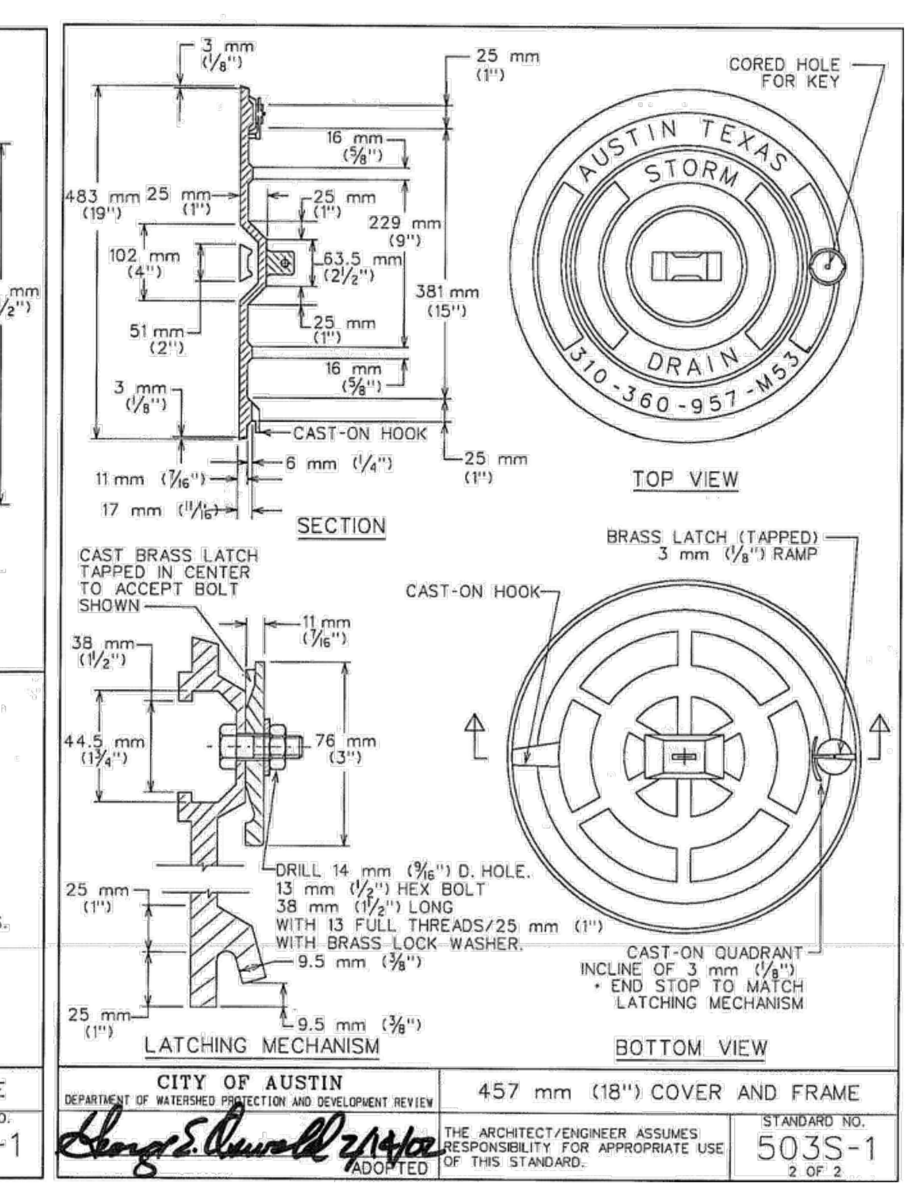
1. ALL CONCRETE SHALL BE CLASS "A"
2. ALL REINFORCING STEEL SHALL BE GRADE 60
3. DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTERS OF BARS.
4. VERTICAL STEEL MAY BE SPLICED (380 mm or 15" MIN. LAP) IN THE LOWER ONE-HALF OF ALL INLET WALLS.5. IN AREAS OF CONFLICT BETWEEN REINFORCING STEEL, PIPES AND MANHOLE FRAME, THE REINFORCEMENT SHALL BE BENT OR ADJUSTED TO CLEAR AS DIRECTED BY THE ENGINEER.
6. QUANTITIES SHOWN HEREON ARE FOR THE CONTRACTOR'S INFORMATION ONLY. PAYMENT WILL BE MADE FOR EACH INLET OF THE TYPE SPECIFIED, COMPLETE IN PLACE INCLUDING MANHOLE FRAME AND OVER.
7. CHAMFER ALL EXPOSED EDGES 20 mm (3/4 ").
8. MANHOLE FRAME AND COVER SHALL BE IN ACCORDANCE WITH CITY OF AUSTIN STANDARD 503S-1.
9. THE CONTRACTOR MAY PROPOSE ALTERNATE PROCEDURES FOR THE CONSTRUCTION OF INLETS, INCLUDING PRECAST UNITS. PLANS FOR SUCH PROPOSED ALTERNATES SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL BEFORE CONSTRUCTION.
10. ALL INLET WALLS SHALL BE FORMED EXCEPT WHERE THE NATURE OF THE SURROUNDING MATERIAL IS SUCH THAT IT CAN BE TRIMMED TO A SMOOTH VERTICAL FACE. WHEN INLET WALLS ARE PLACED TO NEAT EXCAVATION LINES THE WALL THICKNESS SHALL NOT EXCEED 10 INCHES.
11. PAYMENT FOR INLET AT THE CONTRACT PRICE SHALL INCLUDE THE TRANSITION CURB.
12. INVERT OF INLET SHALL BE SLOPED 1:20 WITH FILL CONCRETE, SHAPED AS "V" SECTION
13. NO SPLICING OF REINFORCING STEEL SHALL BE PERMITTED UNLESS OTHERWISE NOTED ON THE PLANS OR PERMITTED IN WRITING BY THE ENGINEER.

REFERENCES:
FOR EXPANSION JOINT DOWEL AND DOWEL LOCATION DETAILS SEE STD. 430S-3, "CURB EXPANSION JOINT DOWEL DETAIL".
FOR 18" MANHOLE FRAME AND COVER DETAILS SEE STD. 503S-1, "18" COVER AND FRAME".

CITY OF AUSTIN
DEPARTMENT OF PUBLIC WORKS
TYPICAL DETAILS FOR CURB INLET
ADOPTED 12/9/08
STANDARD NO. 508S-3 4 OF 4


ELEVATION-SECTION A-A
ELEVATION-SECTION B-B
PLAN
N.T.S.
NOTES:
1. CHAMFER ALL EXPOSED EDGES 20 mm (3/4").
2. REINFORCING STEEL SHALL BE CUT OR FIELD-BENT AS REQUIRED TO CLEAR PIPE AND MANHOLE OPENING. ALL CUT STEEL SHALL BE REPLACED WITH ADDITIONAL DIAGONAL BARS OF THE SAME DIAMETER.
3. INLET FRAME AND COVER SHALL BE IN ACCORDANCE WITH CITY OF AUSTIN STANDARD 503S-1.
4. CONCRETE COVERAGE OF STEEL SHALL BE 50 mm (2") MIN. AT ALL SURFACES.
5. ANY MODIFICATION TO THIS STANDARD SHALL BE THE RESPONSIBILITY OF THE DESIGN ENGINEER.
CITY OF AUSTIN
WATERSHED PROTECTION DEPARTMENT
4-SIDED AREA INLET
STANDARD NO. 508S-9





No.	REVISIONS	DATE	BY

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PHONE: 512-418-1771 FAX: 512-418-1791
WWW.KIMLEY-HORN.COM
TEXAS REGISTERED ENGINEERING FIRM F-928

07/27/2022
STATE OF TEXAS
ALEJANDRO E. GRANADOS RICO
130084
LICENSED PROFESSIONAL ENGINEER
FOR PERMIT PURPOSES ONLY NOT FOR CONSTRUCTION

KHA PROJECT 067783117
DATE JULY 2022
SCALE: AS SHOWN
DESIGNED BY: AEG
DRAWN BY: DPD
CHECKED BY: AEG

STORM DRAIN DETAILS (SHEET 1 OF 2)

ROGER HANKS PARKWAY EXTENSION II
CITY OF DRIPPING SPRINGS
HAYS COUNTY, TEXAS

SHEET NUMBER
42

TABLE OF DIMENSIONS & REINFORCING STEEL
(Wings for One Structure End)

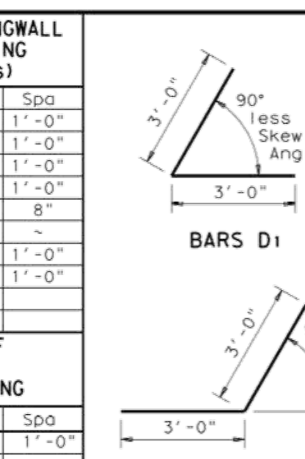
Maximum Wingwall Height Hw	W	X	Y	Z	Bars J1 Size	Bars J1 Spa	Bars J2 Size	Bars J2 Spa	Estimated Quantities (4) per ft of wing (2~Wings) Reinf (Lb/Ft)	Conc (CY/Ft)	Estimated Quantities per ft of Toewall (1~Toewall) Reinf (Lb/Ft)	Conc (CY/Ft)
2'-6"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	48.64	0.406	6.85	0.071
2'-9"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	49.31	0.424	6.85	0.071
3'-0"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	49.98	0.444	6.85	0.071
3'-3"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	53.32	0.462	6.85	0.071
3'-6"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	53.98	0.480	6.85	0.071
4'-0"	3'-2"	1'-2"	1'-0"	7"	#4	1'-0"	#4	1'-0"	55.77	0.532	6.85	0.071
4'-6"	3'-2"	1'-2"	1'-0"	7"	#4	1'-0"	#4	1'-0"	59.77	0.568	6.85	0.071
5'-0"	3'-9"	1'-7"	1'-2"	7"	#4	1'-0"	#4	1'-0"	63.45	0.632	6.96	0.075
5'-6"	3'-9"	1'-7"	1'-2"	7"	#4	1'-0"	#4	1'-0"	67.46	0.668	6.96	0.075
6'-0"	4'-4"	2'-0"	1'-4"	7"	#5	1'-0"	#5	1'-0"	80.67	0.730	7.07	0.078
6'-6"	4'-4"	2'-0"	1'-4"	7"	#5	1'-0"	#5	1'-0"	85.05	0.768	7.07	0.078
7'-0"	5'-0"	2'-3"	1'-9"	8"	#5	1'-0"	#5	1'-0"	92.15	0.864	8.07	0.093
7'-6"	5'-0"	2'-3"	1'-9"	8"	#5	1'-0"	#5	1'-0"	96.54	0.902	8.07	0.093
8'-0"	5'-6"	2'-8"	1'-10"	8"	#5	6"	#5	6"	139.04	0.962	8.13	0.095
8'-6"	5'-6"	2'-8"	1'-10"	8"	#5	6"	#5	6"	144.47	1.000	8.13	0.095
9'-6"	6'-0"	2'-10"	2'-2"	9"	#5	6"	#5	6"	156.93	1.136	8.41	0.110
10'-6"	6'-5"	3'-0"	2'-5"	9"	#6	6"	#5	6"	196.27	1.234	8.57	0.117
11'-6"	7'-2"	3'-6"	2'-8"	11"	#6	6"	#6	6"	230.13	1.438	9.52	0.140
12'-6"	7'-8"	3'-9"	2'-11"	1'-0"	#7	6"	#6	6"	283.41	1.592	9.74	0.157
13'-6"	8'-2"	4'-0"	3'-2"	1'-2"	#8	6"	#6	6"	348.72	1.804	10.02	0.186
14'-6"	8'-10"	4'-5"	3'-5"	1'-4"	#9	6"	#6	6"	432.94	2.046	10.30	0.218
15'-6"	9'-6"	4'-10"	3'-8"	1'-6"	#9	6"	#7	6"	489.52	2.302	11.24	0.253
16'-0"	9'-11"	5'-0"	3'-11"	1'-7"	#9	6"	#7	6"	505.72	2.448	11.47	0.279

TABLE OF WINGWALL REINFORCING (2~Wings)

Bar	Size	No.	Spa
D1	#6	~	1'-0"
D2	#6	~	1'-0"
E1	#4	~	1'-0"
F	#4	~	1'-0"
G	#6	~	8"
M1	#4	4	~
P	#4	~	1'-0"
V	#4	~	1'-0"

TABLE OF TOEWALL REINFORCING

Bar	Size	No	Spa
J3	#4	~	1'-0"
M2	#4	2	~
E2	#4	~	1'-0"



WING DIMENSION CALCULATIONS:

Formulas: (All values are in Feet)

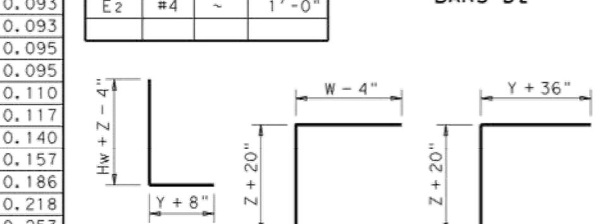
Hw = H + T + C
Lw = (Hw) (SL) ÷ Cosine θ for Ty PW-1
= (Hw - 1') (SL) ÷ Cosine θ for Ty PW-2 and Hw ≥ 4'
= (Hw - 0.5') (SL) ÷ Cosine θ for Ty PW-2 and Hw < 4'

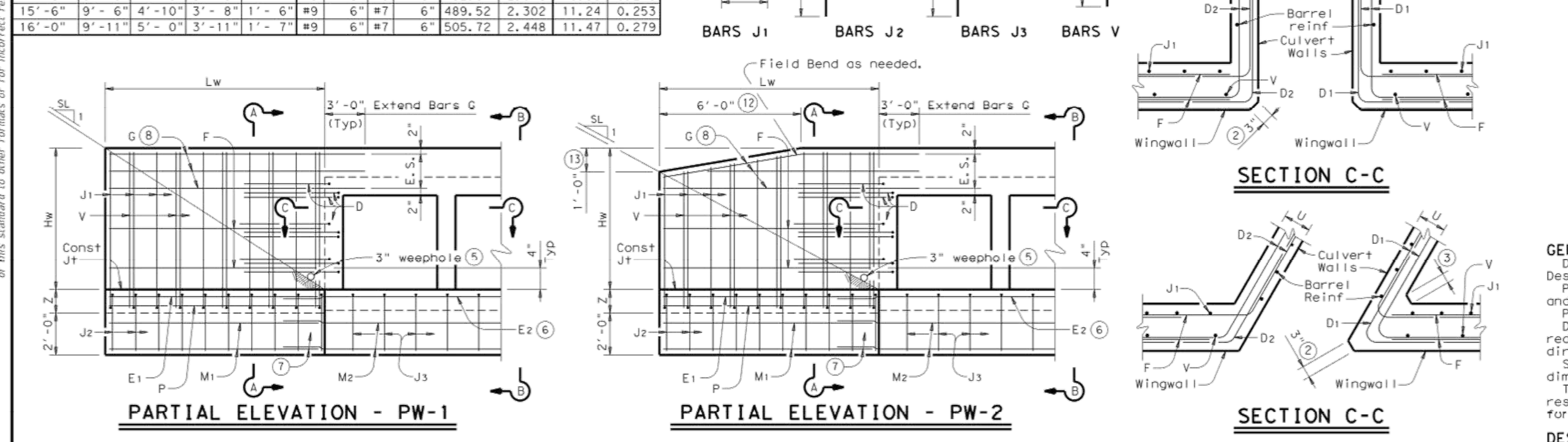
For Cast-in-place culverts:
Ltw = [(N) (S) + (N + 1) (U)] ÷ Cosine θ

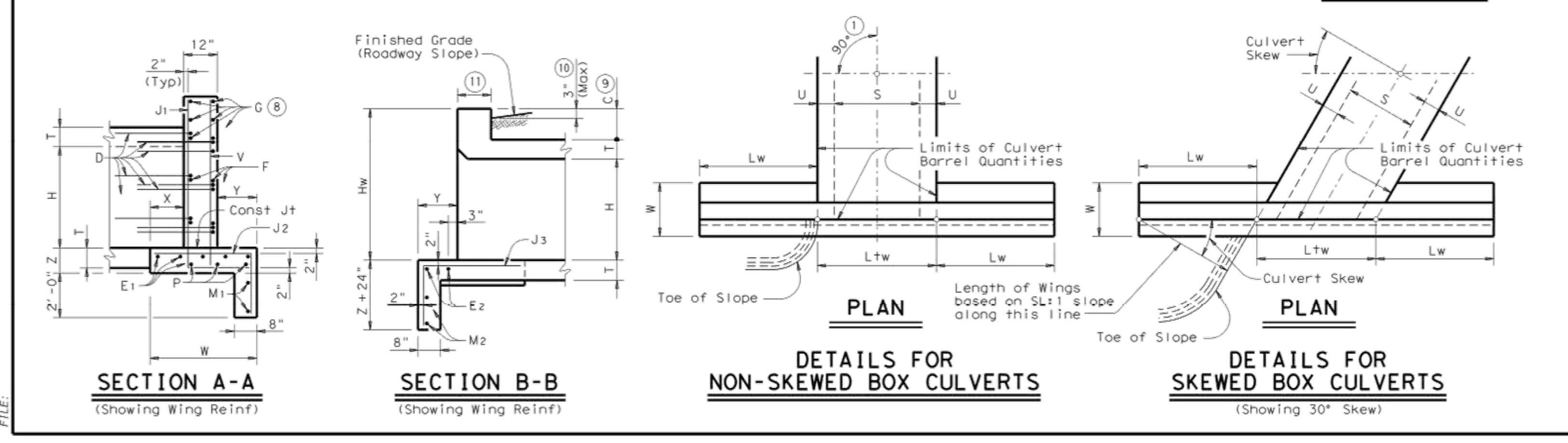
For Precast culverts:
Ltw = [(N) (2 U + S) + (N - 1) (0.5')] ÷ Cosine θ
Total Wingwall Area (Two Wings ~ SF)
= (2) (Hw) (Lw) for Ty PW-1
= (2) (Hw) (Lw) - 6 SF for Ty PW-2 and Hw ≥ 4'
= (2) (Hw) (Lw) - 1.5 SF for Ty PW-2 and Hw < 4'

Hw = Height of Wingwall
Lw = Length of Wingwall
Ltw = Culvert Toewall Length
N = Number of Culvert Spans
SL:1 = Channel Slope ratio. (Horizontal: 1 Vertical, Usual value is 2:1)
θ = Culvert Skew

See applicable box culvert standard for S, H, T and U values.







(1) Skew Angle = 0°
(2) At discharge end, chamfer may be 3/4".
(3) For 15° Skew ~ 1"
For 30° Skew ~ 2"
For 45° Skew ~ 3"
(4) Quantities shown are for two Type PW-1 wings. Adjust concrete volume for Type PW-2 wings. To determine estimated quantities for two wings, multiply the tabulated values by Lw. Quantities shown do not include weight of Bars D.
(5) Provide weepholes for Hw = 5'-0" and greater. Fill around weepholes with coarse gravel.
(6) Extend Bars E2 1'-6" minimum into the wingwall footing.
(7) Lap Bars M1 1'-6" minimum with Bars M2.
(8) Bars G equally spaced at 8" maximum, place as shown. Provide at least two pair Bars G per wing.
(9) 0" min to 5'-0" max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail, bicycle rail or curbs taller than 1'-0", refer to ECD standard. For structures with T6 bridge rail, refer to T6-CM standard. For structures with traffic rail, other than T6, refer to RAC standard.
(10) For vehicle safety, the following requirements must be met:
- For structures without bridge rail, curbs cannot project more than 3" above finished grade.
- For structures with bridge rail, build curbs flush with finished grade.
Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
(11) 1'-0" typical. 2'-0" typical when RAC standard is referenced elsewhere in the plans.
(12) 3'-0" for Hw < 4'.
(13) 6" for Hw < 4'.

GENERAL NOTES:
Designed in accordance with AASHTO LRFD Bridge Design Specifications.
Provide Class "C" Concrete (f'c = 3,600 psi Min) and Grade 60 reinforcing steel.
Provide 1 1/4" Min clear cover to reinforcing steel.
Depth of toewalls for wingwalls and culverts may be reduced or eliminated when founded on solid rock, when directed by the Engineer.
See BCS sheet for wingwall type and additional dimensions and information.
The quantities for concrete and reinforcing steel resulting from the formulas given on this sheet are for the Contractor's information only.

DESIGNER NOTES:
Type PW-1 can be used for all applications and must be used if railing is to be mounted to the wingwall.
Type PW-2 can only be used for applications without a railing mounted to the wingwall.

Texas Department of Transportation — Bridge Division Standard

CONCRETE WINGWALLS WITH PARALLEL WINGS FOR BOX CULVERTS TYPES PW-1 AND PW-2

PW

FILE: pwstde01.dgn	DN: GAF	CK: CAT	DW: TxDOT	CK: GAF
©TxDOT February 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS 11-10: Reinforcing Quantities. 01-12: PW-1 & PW-2.	DIST		COUNTY	SHEET NO.

DATE:
FILE:

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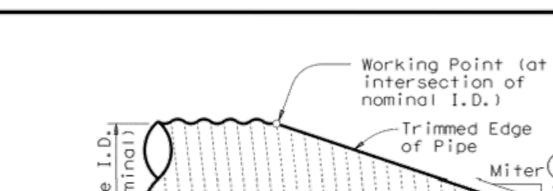
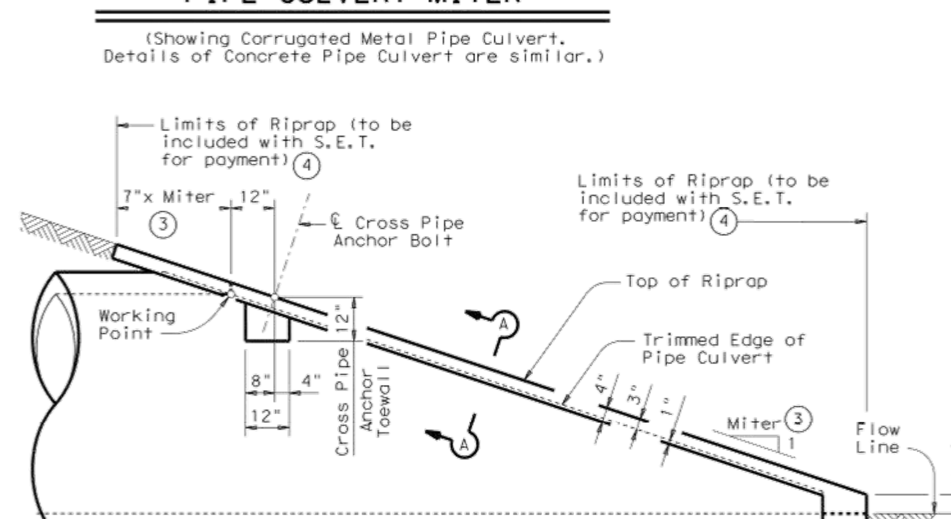
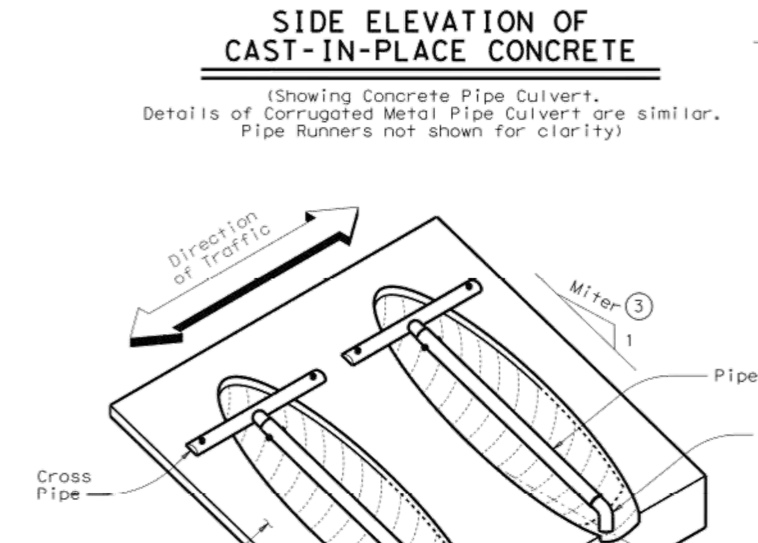


NOTE: All Pipe Runners, calculations, and dimensions are based on the pipe culverts mitered as shown in this detail. Alternate styles of mitered ends will require that appropriate adjustments be made to the values presented on this standard.

SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER
(Showing Corrugated Metal Pipe Culvert. Details of Concrete Pipe Culvert are similar.)



SIDE ELEVATION OF CAST-IN-PLACE CONCRETE
(Showing Concrete Pipe Culvert. Details of Corrugated Metal Pipe Culvert are similar. Pipe Runners not shown for clarity)



ISOMETRIC VIEW OF TYPICAL INSTALLATION
(Showing installation with no skew.)

CROSS PIPE LENGTHS & PIPE RUNNER LENGTHS (1)(2)

Nominal Culvert I.D.	Pipe Culvert Spa ~ G	Cross Pipe Length	3:1 0° Skew	3:1 15° Skew	3:1 30° Skew	3:1 45° Skew	4:1 0° Skew	4:1 15° Skew	4:1 30° Skew	4:1 45° Skew	6:1 0° Skew	6:1 15° Skew	6:1 30° Skew	6:1 45° Skew
24"	1'-7"	3'-5"	N/A	N/A	N/A	5'-10"	N/A	N/A	N/A	8'-1"	N/A	N/A	N/A	12'-9"
27"	1'-8"	3'-8"	N/A	N/A	5'-5"	6'-11"	N/A	N/A	7'-7"	9'-7"	N/A	N/A	11'-11"	14'-11"
30"	1'-10"	3'-11"	N/A	N/A	6'-4"	8'-0"	N/A	N/A	8'-9"	11'-0"	N/A	N/A	13'-8"	17'-0"
33"	1'-11"	4'-2"	6'-2"	6'-5"	7'-3"	9'-1"	8'-6"	8'-10"	10'-0"	12'-5"	13'-3"	13'-9"	15'-5"	19'-2"
36"	2'-1"	4'-5"	6'-11"	7'-3"	8'-2"	10'-2"	9'-6"	9'-11"	11'-2"	13'-10"	14'-9"	15'-3"	17'-2"	21'-3"
42"	2'-4"	4'-11"	8'-6"	8'-10"	9'-11"	12'-4"	11'-7"	12'-0"	13'-6"	16'-8"	17'-9"	18'-5"	20'-8"	25'-7"
48"	2'-7"	5'-5"	10'-1"	10'-5"	11'-9"	N/A	13'-7"	14'-2"	15'-10"	N/A	20'-9"	21'-6"	24'-2"	N/A
54"	3'-0"	5'-11"	11'-8"	12'-1"	N/A	N/A	15'-8"	16'-3"	N/A	N/A	23'-10"	24'-8"	N/A	N/A
60"	3'-3"	6'-5"	13'-3"	N/A	N/A	N/A	17'-9"	N/A	N/A	N/A	26'-10"	N/A	N/A	N/A

(Columns under 3:1, 4:1 and 6:1 Side Slope are Pipe Runner Length.)

TYPICAL PIPE CULVERT MITERS (3)

Side Slope	0° Skew	15° Skew	30° Skew	45° Skew
3:1	3:1	3.106:1	3.464:1	4.243:1
4:1	4:1	4.141:1	4.619:1	5.657:1
6:1	6:1	6.212:1	6.928:1	8.485:1

CONDITIONS WHERE PIPE RUNNERS ARE NOT REQUIRED (2)

Nominal Culvert I.D.	Single Pipe Culvert	Multiple Pipe Culverts
12" thru 21"	Skews thru 45°	Skews thru 45°
24"	Skews thru 45°	Skews thru 30°
27"	Skews thru 30°	Skews thru 15°
30"	Skews thru 15°	Skews thru 15°
33"	Skews thru 15°	Always required
36"	Normal (No Skew)	Always required
42" to 60"	Always required	Always required

STANDARD PIPE SIZES & MAX PIPE RUNNER LENGTHS (1)

Pipe Size	Pipe O.D.	Pipe I.D.	Max Pipe Runner Length
2" STD	2.375"	2.067"	N/A
3" STD	3.500"	3.068"	10'-0"
4" STD	4.500"	4.026"	19'-8"
5" STD	5.563"	5.047"	34'-2"

ESTIMATED CONCRETE RIPRAP QUANTITIES (CY) (5)

Nominal Culvert I.D.	3:1 0° Skew	3:1 15° Skew	3:1 30° Skew	3:1 45° Skew	4:1 0° Skew	4:1 15° Skew	4:1 30° Skew	4:1 45° Skew	6:1 0° Skew	6:1 15° Skew	6:1 30° Skew	6:1 45° Skew
12"	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.6	0.7	0.7	0.7	0.8
15"	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.9
18"	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.8	0.8	0.8	0.9	1.0
21"	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.9	0.9	0.9	1.0	1.2
24"	0.6	0.7	0.7	0.8	0.8	0.8	0.8	1.0	1.0	1.0	1.1	1.3
27"	0.7	0.7	0.8	0.9	0.8	0.9	0.9	1.1	1.1	1.1	1.2	1.4
30"	0.8	0.8	0.8	0.9	0.9	0.9	1.0	1.2	1.2	1.2	1.3	1.6
33"	0.8	0.8	0.9	1.0	1.0	1.0	1.1	1.3	1.3	1.4	1.5	1.7
36"	0.9	0.9	0.9	1.1	1.1	1.1	1.2	1.4	1.4	1.5	1.6	1.8
42"	1.0	1.0	1.1	1.3	1.2	1.3	1.3	1.6	1.6	1.7	1.8	2.1
48"	1.1	1.1	1.2	N/A	1.4	1.4	1.5	N/A	1.9	1.9	2.1	N/A
54"	1.3	1.3	N/A	N/A	1.6	1.6	N/A	N/A	2.1	2.1	N/A	N/A
60"	1.4	N/A	N/A	N/A	1.7	N/A	N/A	N/A	2.3	N/A	N/A	N/A

(1) Size of Pipe Runner shall be as shown in the tables. Cross Pipe shall be the same size as the Pipe Runner. Cross Pipe Stub Out and Bottom Anchor Pipe shall be the next smaller size pipe as shown in the STANDARD PIPE SIZES table.
(2) This standard allows for the placement of only one pipe runner across each culvert pipe opening. In order to limit the clear opening to be traversed by an errant vehicle, the following conditions must be met:
For 60" culvert pipes, the skew must not exceed 0°.
For 54" culvert pipes, the skew must not exceed 15°.
For 48" culvert pipes, the skew must not exceed 30°.
For all culvert pipe sizes 42" and less, the skew must not exceed 45°.
If the above conditions cannot be met, the designer should consider using a safety end treatment with flared wings. For further information, refer to the TxDOT "Roadway Design Manual".
(3) Miter = Slope of Mitered Pipe Culvert End
(4) Riprap placed beyond the limits shown will be paid as Concrete Riprap in accordance with Item 432, "Riprap".
(5) Quantities shown are for one end of one reinforced Concrete Pipe Culvert. For multiple Pipe Culverts or for Corrugated Metal Pipe Culverts, quantities will need to be adjusted. Riprap quantities are for Contractor's information only.

SHEET 1 OF 2

Texas Department of Transportation — Bridge Division Standard

SAFETY END TREATMENT FOR 12" DIA TO 60" DIA PIPE CULVERTS TYPE II ~ CROSS DRAINAGE

SETP-CD

FILE: setpcdse.dgn	DN: GAF	CK: CAT	DW: JRP	CK: GAF
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REVISIONS 11-10: Add note for synthetic fibers.	DIST		COUNTY	SHEET NO.

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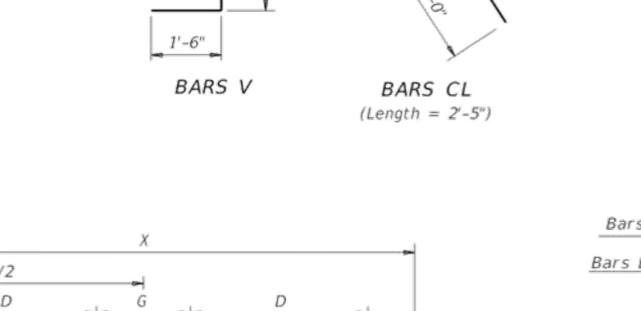
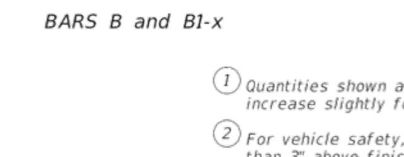
TABLE OF VARIABLE DIMENSIONS AND QUANTITIES FOR ONE HEADWALL (5)

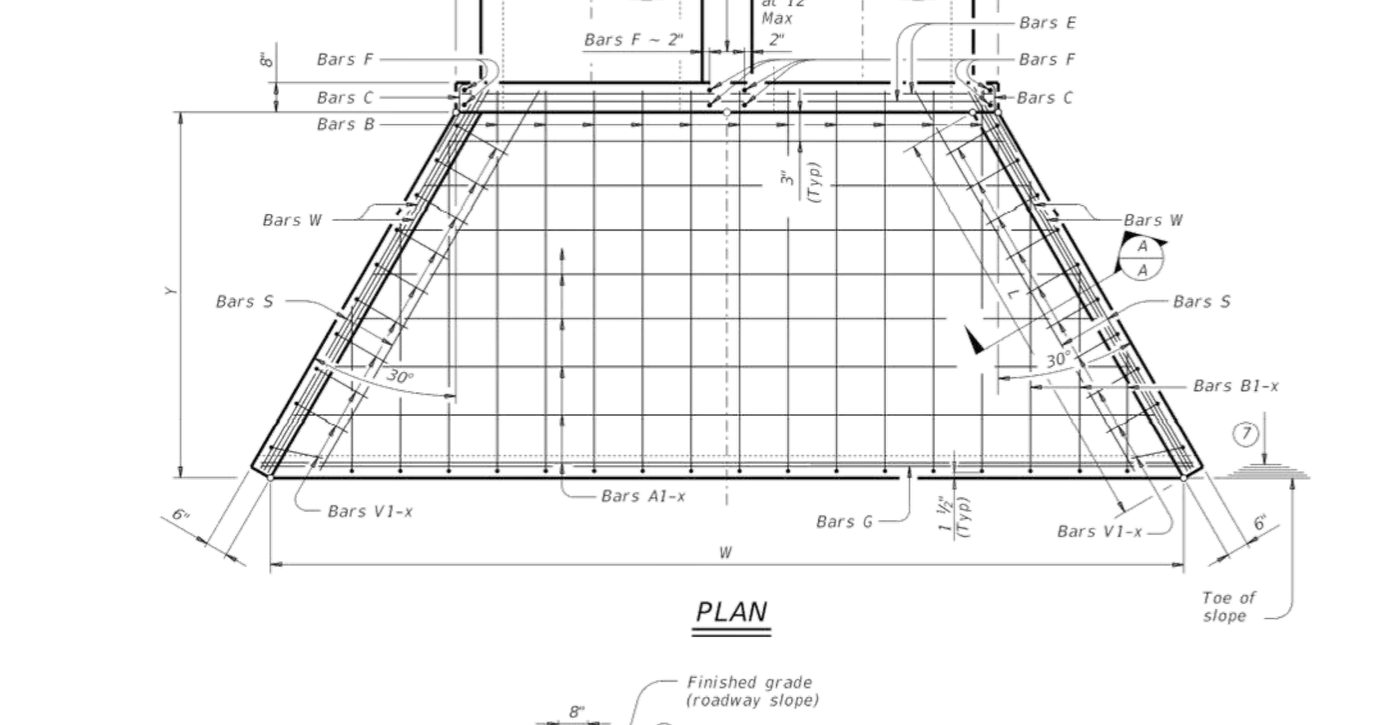
Slope	Dia of Pipe (D)	W	X	Y	L	Reinf (Lbs)	Conc (CY) (1)	Addt'l Pipe X and W	Addt'l Pipe Reinf (Lbs)	Addt'l Pipe Conc (CY) (1)
2:1	12"	4'-7 1/2"	2'-6"	2'-10"	3'-3 1/4"	88	0.6	1'-9"	20	0.2
2:1	15"	5'-5 3/4"	2'-9 1/2"	3'-4"	3'-10 1/4"	103	0.7	2'-2"	24	0.3
2:1	18"	6'-4 1/4"	3'-1"	3'-10"	4'-5"	124	0.9	2'-8"	32	0.3
2:1	21"	7'-2 3/4"	3'-4 1/2"	4'-4"	5'-0"	143	1.1	3'-1"	43	0.4
2:1	24"	8'-2 1/2"	3'-9 1/2"	4'-10"	5'-7"	164	1.3	3'-7"	50	0.5
2:1	27"	9'-1"	4'-1"	5'-4"	6'-2"	179	1.5	3'-11"	56	0.6
2:1	30"	9'-11 1/2"	4'-4 1/2"	5'-10"	6'-8 3/4"	203	1.7	4'-4"	65	0.8
2:1	33"	10'-10"	4'-8"	6'-4"	7'-3 3/4"	224	2.0	4'-8"	71	0.9
2:1	36"	11'-8 1/4"	4'-11 1/2"	6'-10"	7'-10 3/4"	249	2.2	5'-1"	81	1.0
2:1	42"	13'-5 1/4"	5'-6 1/2"	7'-10"	9'-0 1/2"	298	2.8	5'-10"	97	1.3
2:1	48"	15'-9"	6'-1 1/2"	9'-4"	10'-9 1/4"	360	3.8	6'-7"	117	1.7
2:1	54"	17'-5 3/4"	6'-8 1/2"	10'-4"	11'-11 1/4"	427	4.5	7'-6"	151	2.1
2:1	60"	19'-2 3/4"	7'-3 1/2"	11'-4"	13'-1"	481	5.3	8'-3"	174	2.5
2:1	66"	20'-11 1/2"	7'-10 1/2"	12'-4"	14'-3"	544	6.2	8'-9"	194	2.9
2:1	72"	22'-8 1/2"	8'-5 1/2"	13'-4"	15'-4 3/4"	601	7.1	9'-4"	213	3.3
3:1	12"	6'-3"	2'-6"	4'-3"	4'-11"	118	0.8	1'-9"	22	0.2
3:1	15"	7'-5"	2'-9 1/2"	5'-0"	5'-9 1/4"	137	1.1	2'-2"	28	0.3
3:1	18"	8'-6 3/4"	3'-1"	5'-9"	6'-7 3/4"	170	1.3	2'-8"	37	0.5
3:1	21"	9'-8 3/4"	3'-4 1/2"	6'-6"	7'-6"	195	1.6	3'-1"	48	0.6
3:1	24"	11'-0"	3'-9 1/2"	7'-3"	8'-4 1/2"	227	2.0	3'-7"	58	0.7
3:1	27"	12'-2"	4'-1"	8'-0"	9'-2 3/4"	251	2.3	3'-11"	67	0.8
3:1	30"	13'-4"	4'-4 1/2"	8'-9"	10'-1 1/4"	293	2.7	4'-4"	77	1.0
3:1	33"	14'-5 3/4"	4'-8"	9'-6"	10'-11 3/4"	318	3.1	4'-8"	84	1.2
3:1	36"	15'-7 3/4"	4'-11 1/2"	10'-3"	11'-10"	351	3.5	5'-1"	96	1.4
3:1	42"	17'-11 1/2"	5'-6 1/2"	11'-9"	13'-6 3/4"	432	4.5	5'-10"	119	1.7
3:1	48"	21'-1 3/4"	6'-1 1/2"	14'-0"	16'-2"	537	6.1	6'-7"	146	2.3
3:1	54"	23'-5 1/2"	6'-8 1/2"	15'-6"	17'-10 3/4"	630	7.3	7'-6"	186	2.9
3:1	60"	25'-9 1/4"	7'-3 1/2"	17'-0"	19'-7 1/2"	719	8.7	8'-3"	219	3.4
3:1	66"	28'-1"	7'-10 1/2"	18'-6"	21'-4 1/4"	811	10.1	8'-9"	242	3.9
3:1	72"	30'-4 3/4"	8'-5 1/2"	20'-0"	23'-1 1/4"	924	11.7	9'-4"	272	4.4
4:1	12"	7'-10 3/4"	2'-6"	5'-8"	6'-6 1/2"	148	1.1	1'-9"	24	0.3
4:1	15"	9'-4"	2'-9 1/2"	6'-8"	7'-8 1/2"	181	1.5	2'-2"	32	0.4
4:1	18"	10'-9 1/2"	3'-1"	7'-8"	8'-10 1/4"	221	1.9	2'-8"	42	0.5
4:1	21"	12'-2 3/4"	3'-4 1/2"	8'-8"	10'-0"	260	2.3	3'-1"	57	0.7
4:1	24"	13'-9 1/2"	3'-9 1/2"	9'-8"	11'-2"	301	2.8	3'-7"	67	0.9
4:1	27"	15'-3"	4'-1"	10'-8"	12'-3 3/4"	334	3.3	3'-11"	77	1.0
4:1	30"	16'-8 1/4"	4'-4 1/2"	11'-8"	13'-5 3/4"	385	3.8	4'-4"	89	1.3
4:1	33"	18'-1 3/4"	4'-8"	12'-8"	14'-7 1/2"	425	4.5	4'-8"	101	1.4
4:1	36"	19'-7"	4'-11 1/2"	13'-8"	15'-9 1/4"	472	5.1	5'-1"	115	1.7
4:1	42"	22'-5 3/4"	5'-6 1/2"	15'-8"	18'-1"	583	6.5	5'-10"	141	2.1
4:1	48"	26'-6 1/4"	6'-1 1/2"	18'-8"	21'-6 3/4"	730	8.9	6'-7"	175	2.8
4:1	54"	29'-5"	6'-8 1/2"	20'-8"	23'-10 1/4"	875	10.7	7'-6"	226	3.6
4:1	60"	32'-3 3/4"	7'-3 1/2"	22'-8"	26'-2"	996	12.7	8'-3"	264	4.3
4:1	66"	35'-2 1/2"	7'-10 1/2"	24'-8"	28'-5 3/4"	1,140	14.9	8'-9"	300	4.9
4:1	72"	38'-1 1/4"	8'-5 1/2"	26'-8"	30'-9 1/2"	1,297	17.3	9'-4"	334	5.6
6:1	12"	11'-2"	2'-6"	8'-6"	9'-9 3/4"	224	1.9	1'-9"	28	0.4
6:1	15"	13'-2 1/4"	2'-9 1/2"	10'-0"	11'-6 1/2"	268	2.5	2'-2"	37	0.5
6:1	18"	15'-2 1/2"	3'-1"	11'-6"	13'-3 1/4"	330	3.2	2'-8"	50	0.7
6:1	21"	17'-2 3/4"	3'-4 1/2"	13'-0"	15'-0 1/4"	387	3.9	3'-1"	69	0.9
6:1	24"	19'-4 1/2"	3'-9 1/2"	14'-6"	16'-9"	453	4.8	3'-7"	80	1.2
6:1	27"	21'-4 3/4"	4'-1"	16'-0"	18'-5 3/4"	512	5.7	3'-11"	96	1.4
6:1	30"	23'-5 1/4"	4'-4 1/2"	17'-6"	20'-2 1/2"	593	6.7	4'-4"	110	1.7
6:1	33"	25'-5 1/2"	4'-8"	19'-0"	21'-11 1/4"	675	7.8	4'-8"	127	2.0
6:1	36"	27'-5 3/4"	4'-11 1/2"	20'-6"	23'-8"	735	9.0	5'-1"	144	2.3
6:1	42"	31'-6 1/4"	5'-6 1/2"	23'-6"	27'-1 1/2"	922	11.5	5'-10"	179	3.0
6:1	48"	37'-3 1/2"	6'-1 1/2"	28'-0"	32'-4"	1,191	15.9	6'-7"	231	4.0
6:1	54"	41'-4 1/4"	6'-8 1/2"	31'-0"	35'-9 1/2"	1,424	19.2	7'-6"	300	5.0
6:1	60"	45'-4 3/4"	7'-3 1/2"	34'-0"	39'-3"	1,631	22.9	8'-3"	353	6.0

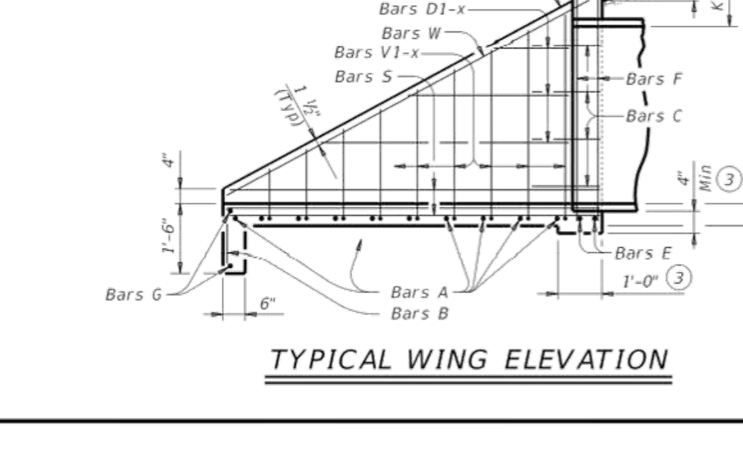
(Columns W through Conc are Values for One Pipe; the last three are Values to be Added for Each Addt'l Pipe.)

DATE:
FILE:









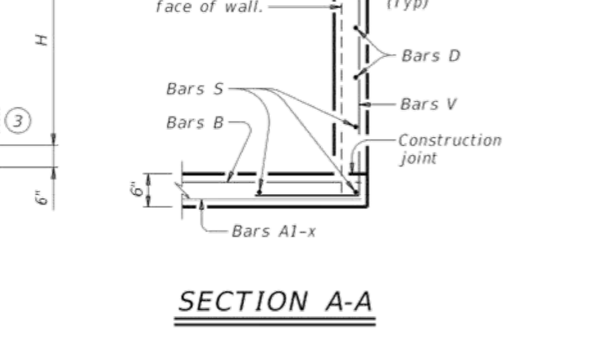


TABLE OF REINFORCING STEEL (5)

Bar	Size	Spa	No.
A	#4	1'-0"	~
B	#3	1'-6"	~
C	#4	1'-0"	~
D	#3	1'-0"	~
E	#5	~	4
F	#5	~	~
G	#3	~	2
S	#4	~	6
V	#4	1'-0"	~
W	#5	~	4

TABLE OF CONSTANT DIMENSIONS

Dia of Pipe (D)	G	K (4)	H
12"	0'-9"	1'-0"	2'-0"
15"	0'-11"	1'-0"	2'-3"
18"	1'-2"	1'-0"	2'-6"
21"	1'-4"	1'-0"	2'-9"
24"	1'-7"	1'-0"	3'-0"
27"	1'-8"	1'-0"	3'-3"
30"	1'-10"	1'-0"	3'-6"
33"	1'-11"	1'-0"	3'-9"
36"	2'-1"	1'-0"	4'-0"
42"	2'-4"	1'-0"	4'-6"
48"	2'-7"	1'-3"	5'-3"
54"	3'-0"	1'-3"	5'-9"
60"	3'-3"	1'-3"	6'-3"
66"	3'-3"	1'-3"	6'-9"
72"	3'-4"	1'-3"	7'-3"

(1) Quantities shown are for concrete pipe and will increase slightly for metal pipe installations.
(2) For vehicle safety, construct curbs no more than 3" above finished grade. Reduce curb heights, if necessary, to meet these requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
(3) Provide a 1'-0" footing as shown where required to maintain 4" minimum cover for pipes.
(4) Dimensions shown are usual and maximum.
(5) Quantities shown are for one structure end only (one headwall).
(6) Min Length = $6" + 3" \times \left(\frac{12 \times H - 7}{12 \times L}\right)$
Max Length = $12 \times H - 3" \times \left(\frac{12 \times H - 7}{12 \times L}\right) - 1"$
(7) Lengths of wings based on SL:1 slope along this line.

MATERIAL NOTES:
Provide Grade 60 reinforcing steel.
Provide Class C concrete (f'c = 3,600 psi).

GENERAL NOTES:
Designed according to AASHTO LRFD Bridge Design Specifications.
Do not mount bridge rails of any type directly to these culvert headwalls.
This standard may not be used for wall heights, H, exceeding the values shown.

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

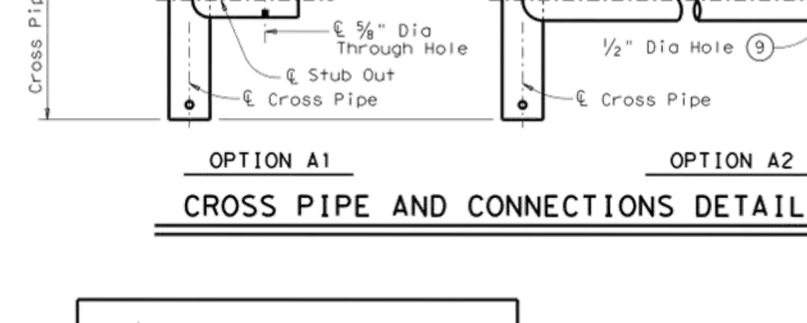
Texas Department of Transportation — Bridge Division Standard

CONCRETE HEADWALLS WITH FLARED WINGS FOR 0° SKEW PIPE CULVERTS

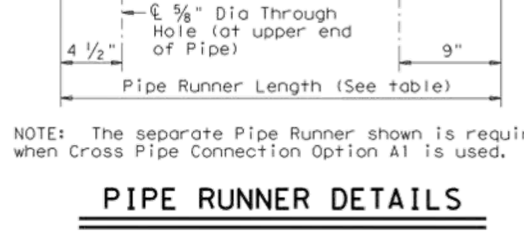
CH-FW-0

FILE: chfw00se-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	DIST		COUNTY	SHEET NO.

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

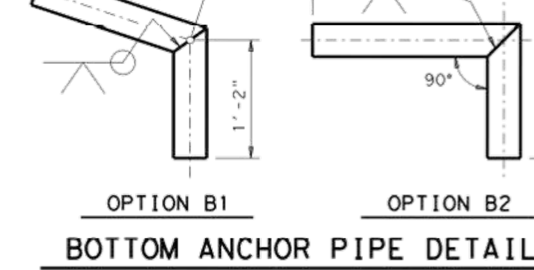


CROSS PIPE AND CONNECTIONS DETAILS

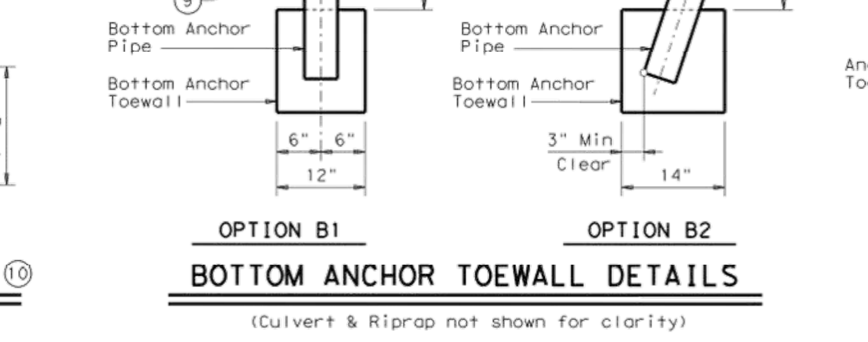


NOTE: The separate Pipe Runner shown is required when Cross Pipe Connection Option A1 is used.

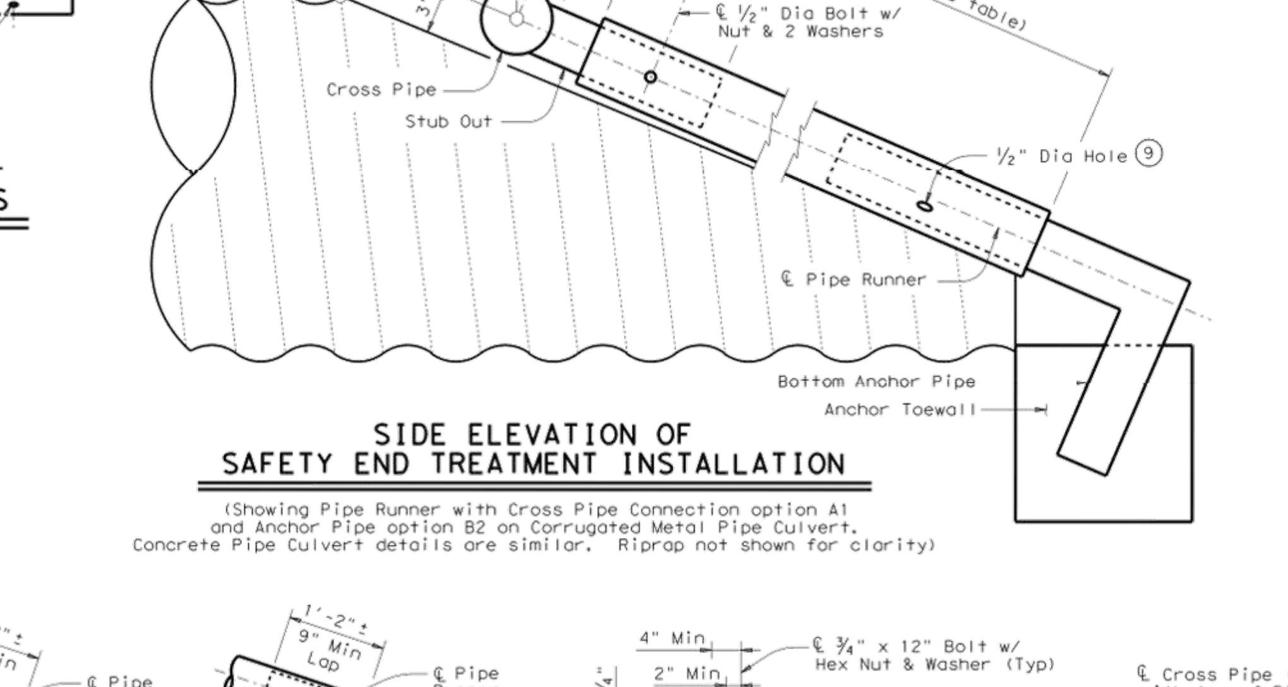
PIPE RUNNER DETAILS



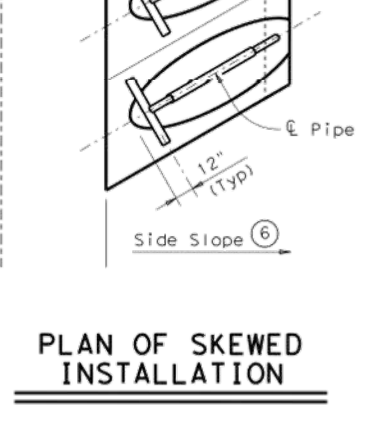
BOTTOM ANCHOR PIPE DETAILS (10)



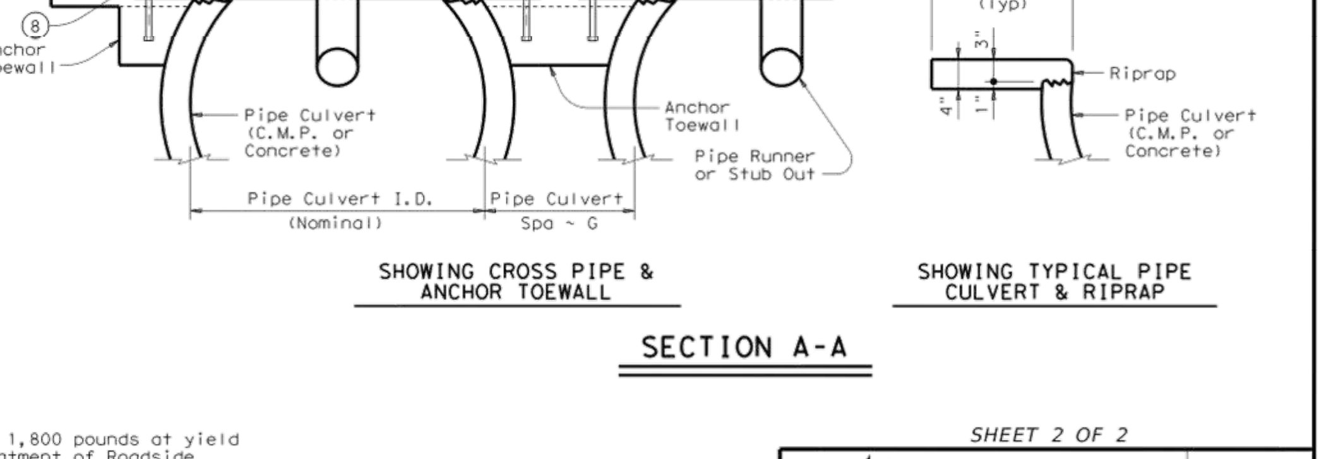
BOTTOM ANCHOR TOEWALL DETAILS
(Culvert & Riprap not shown for clarity)



SIDE ELEVATION OF SAFETY END TREATMENT INSTALLATION
(Showing Pipe Runner with Cross Pipe Connection option A1 and Anchor Pipe option B2 on Corrugated Metal Pipe Culvert. Concrete Pipe Culvert details are similar. Riprap not shown for clarity)



PLAN OF SKEWED INSTALLATION



SECTION A-A

(4) Riprap placed beyond the limits shown will be paid as Concrete Riprap in accordance with Item 432, "Riprap".
(6) Recommended values of side slope are 3:1, 4:1, & 6:1. All quantities, calculations, and dimensions shown herein are based on these recommended values. Slope of 3:1 or flatter is required for vehicle safety.
(7) Note that actual slope of Pipe Runner may vary slightly from Side Slope of Riprap and trimmed Culvert Pipe edge.
(8) Care shall be taken to ensure that Riprap concrete does not flow into the Cross Pipe so as to permit disassembly of the bolted connection to allow cleanout access.
(9) After installation, the 1/2" hole shall be inspected to ensure that the lap of the Pipe Runner with the Bottom Anchor Pipe is adequate.
(10) At fabricator's option, a heat bend to a smooth 5" radius or a manufactured elbow (of the same material as the Runner) may be substituted for the mitered and welded joint in the Bottom Anchor Pipe.

GENERAL NOTES:
Pipe Runners are designed for a traversing load of 1,800 pounds at yield as recommended by Research Report 280-1, "Safety Treatment of Roadside Cross-Drainage Structures", Texas Transportation Institute, March 1981.
The Safety End Treatments shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the Pipe Runners.
Riprap and all necessary inverts shall be Concrete Riprap conforming to the requirements of Item 432, "Riprap".
Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.
Payment for riprap and toewall is included in the Price Bid for each Safety End Treatment.
Pipe Runners, Cross Pipes, and Anchor Pipes shall conform to the requirements of ASTM A53 (Type E or S, Grade B), ASTM A500 (Grade B), or API 5LX52.
Bolts and nuts shall conform to ASTM A307.
All steel components, except concrete reinforcing, shall be galvanized after fabrication. Galvanizing damaged during transport or construction shall be repaired in accordance with the specifications.

SHEET 2 OF 2

Texas Department of Transportation — Bridge Division Standard

SAFETY END TREATMENT FOR 12" DIA TO 60" DIA PIPE CULVERTS TYPE II ~ CROSS DRAINAGE

SETP-CD

FILE: setpcdse.dgn	DN: GAF	CK: CAT	DW: JRP	CK: GAF
©TxDOT February 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS 11-10: Add note for synthetic fibers.	DIST		COUNTY	SHEET NO.

DATE:
FILE:

No.	REVISIONS	DATE	BY

Kimley»Horn

10814 JOLLYVILLE ROAD, AVALLON IV, SUITE 300, AUSTIN, TX 78759
PHONE: 512-418-1771 FAX: 512-418-1791
WWW.KIMLEY-HORN.COM
TEXAS REGISTERED ENGINEERING FIRM F-928

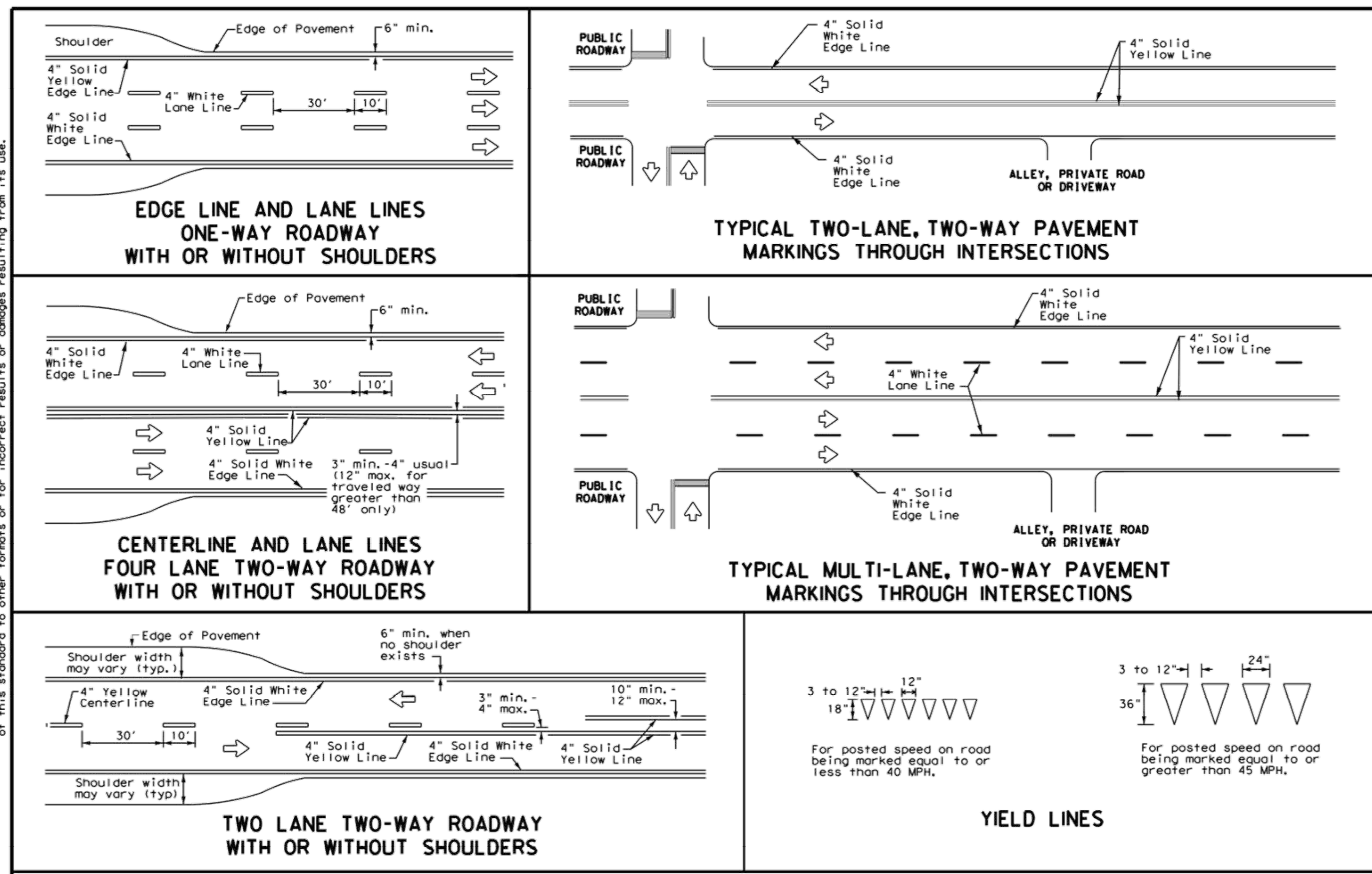
07/27/2022
STATE OF TEXAS — ALEJANDRO E. GRANADOS RICO — 130084 — LICENSED PROFESSIONAL ENGINEER
Alejandro E. Granados Rico

KHA PROJECT 067783117	DATE JULY 2022	SCALE: AS SHOWN	DESIGNED BY: AEG	DRAWN BY: DPD	CHECKED BY: AEG

STORM DRAIN DETAILS (SHEET 2 OF 2)

ROGER HANKS PARKWAY EXTENSION II
CITY OF DRIPPING SPRINGS
HAYS COUNTY, TEXAS

SHEET NUMBER
43



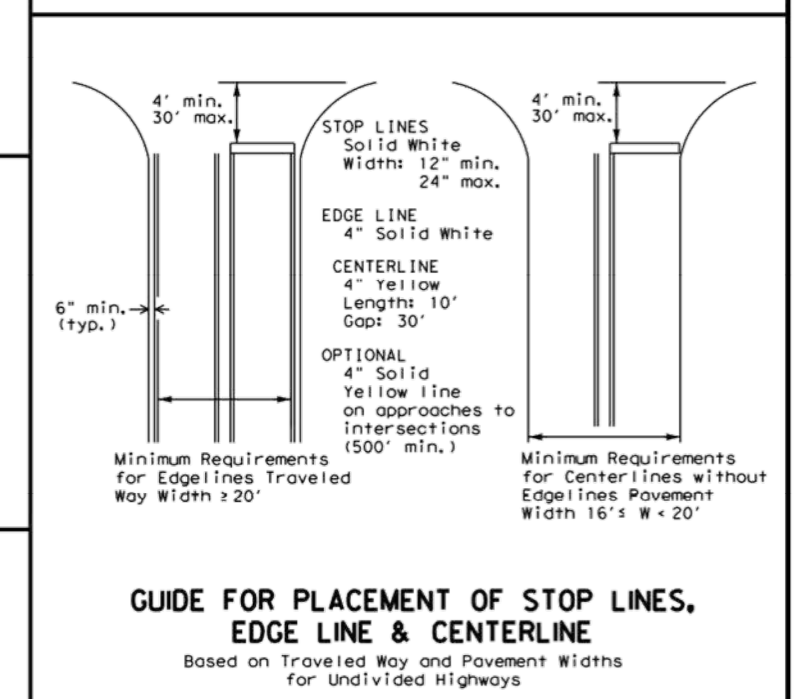
EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS
TYPICAL TWO-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS
CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS
TYPICAL MULTI-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS
TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS
YIELD LINES
For posted speed on road being marked equal to or less than 40 MPH.
For posted speed on road being marked equal to or greater than 45 MPH.

GENERAL NOTES

1. Edgeline striping shall be as shown in the plans or as directed by the Engineer. The edgeline should not be placed less less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edgelines are not required in curb and gutter sections of roadways.
2. The traveled way includes only that portion of the roadway used for vehicular travel. It does not include the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the inside of edgeline to the inside of edgeline of a two lane roadway.

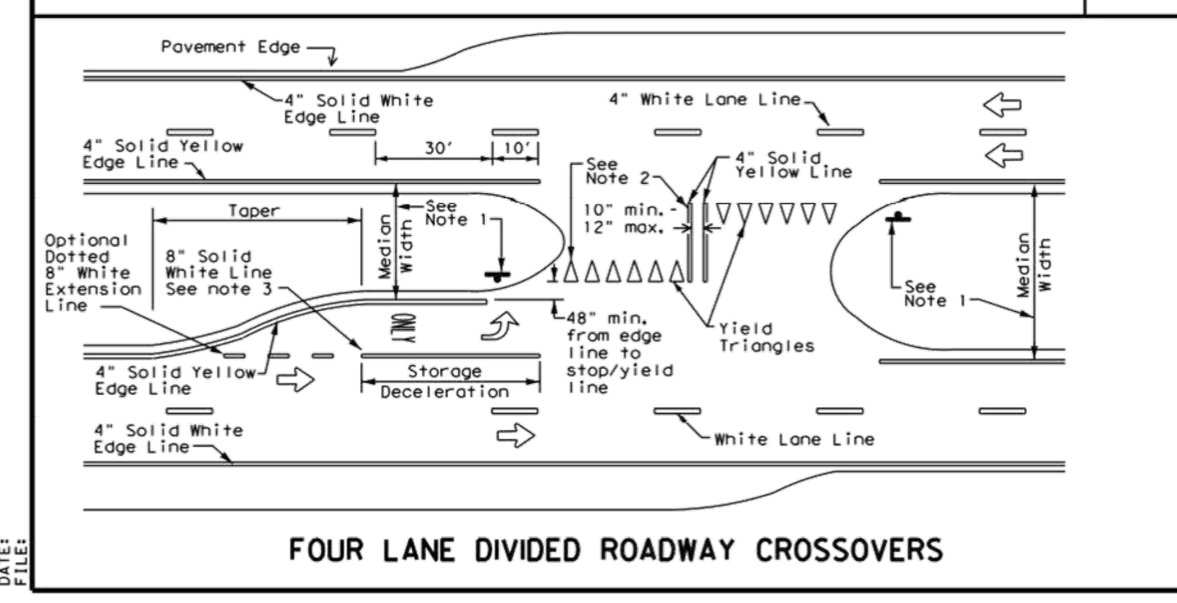
MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



STOP LINES Solid White Width: 12" min. 24" max.
EDGE LINE 4" Solid White
CENTERLINE 4" Yellow Length: 10' Gap: 30'
OPTIONAL 4" Solid Yellow line on approaches to intersections (500' min.)
Minimum Requirements for Edgelines Traveled Way Width ≥ 20'
Minimum Requirements for Centerlines without Edgelines Pavement Width 16' ≤ W < 20'

GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE
Based on Traveled Way and Pavement Widths for Undivided Highways



NOTES

1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling width to determine if signs are required. Yield signs are the typical intersection control. Stop signs are optional as determined by the Engineer.
2. Install median striping (double yellow centerlines and stop bars/yield triangles) when a 50' or greater median centerline can be placed. Stop bars shall only be used with stop signs. Yield traingles shall only be used with yield signs.
3. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

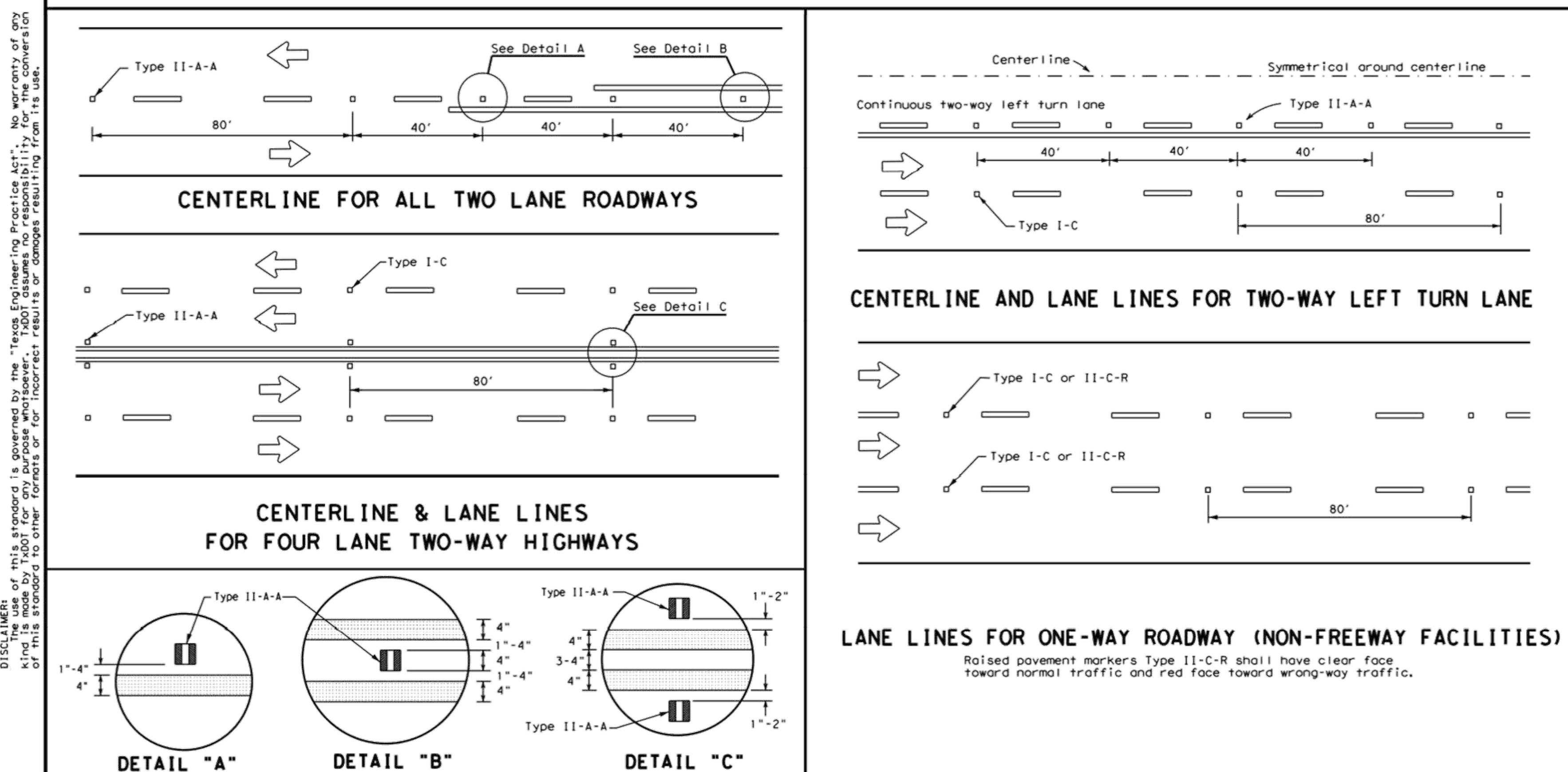
Texas Department of Transportation — Traffic Safety Division Standard

TYPICAL STANDARD PAVEMENT MARKINGS

PM(1)-20

FILE: pm1-20.dgn | © TxDOT November 1978 | REVISIONS 8-95 3-03 5-00 2-12 8-00 6-20

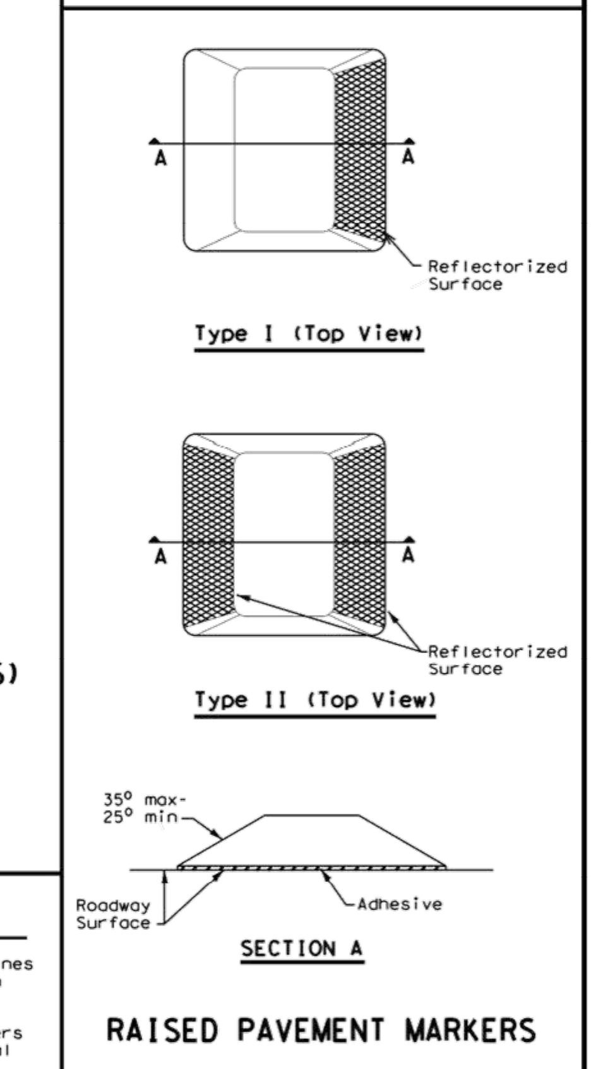
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE



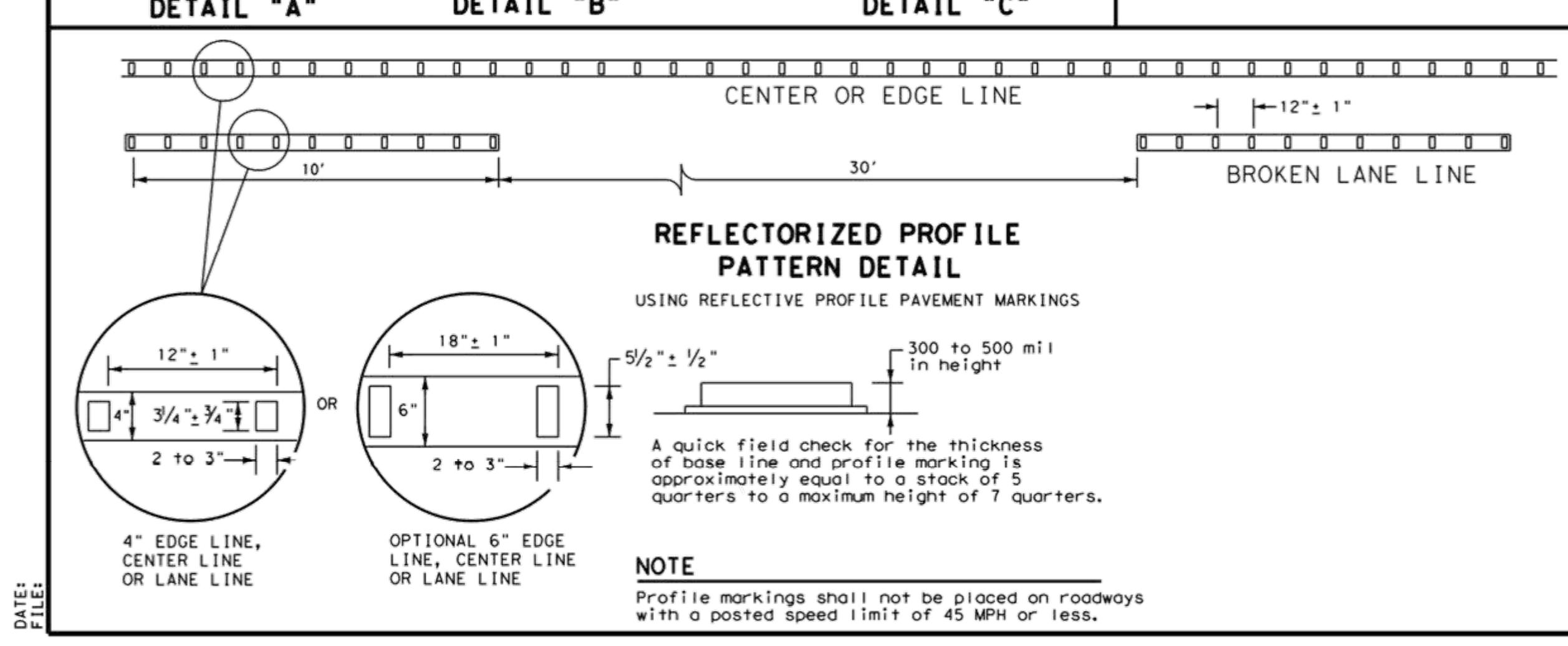
CENTERLINE FOR ALL TWO LANE ROADWAYS
CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY HIGHWAYS
CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE
LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)
Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.
DETAIL "A"
DETAIL "B"
DETAIL "C"

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



RAISED PAVEMENT MARKERS



NOTE
Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

GENERAL NOTES

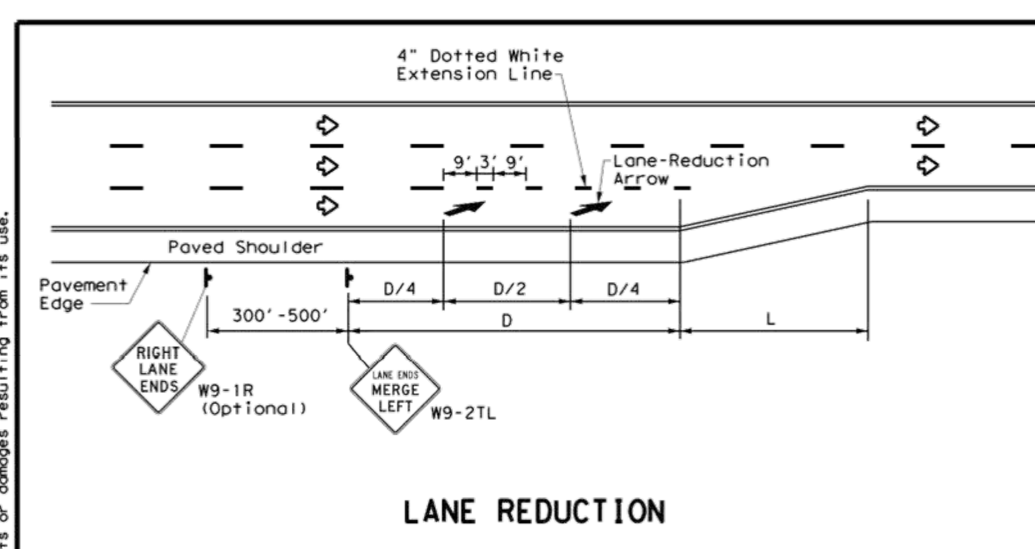
1. All raised pavement markers placed in broken lines shall be placed in line with and midway between the stripes.
2. On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.

Texas Department of Transportation — Traffic Safety Division Standard

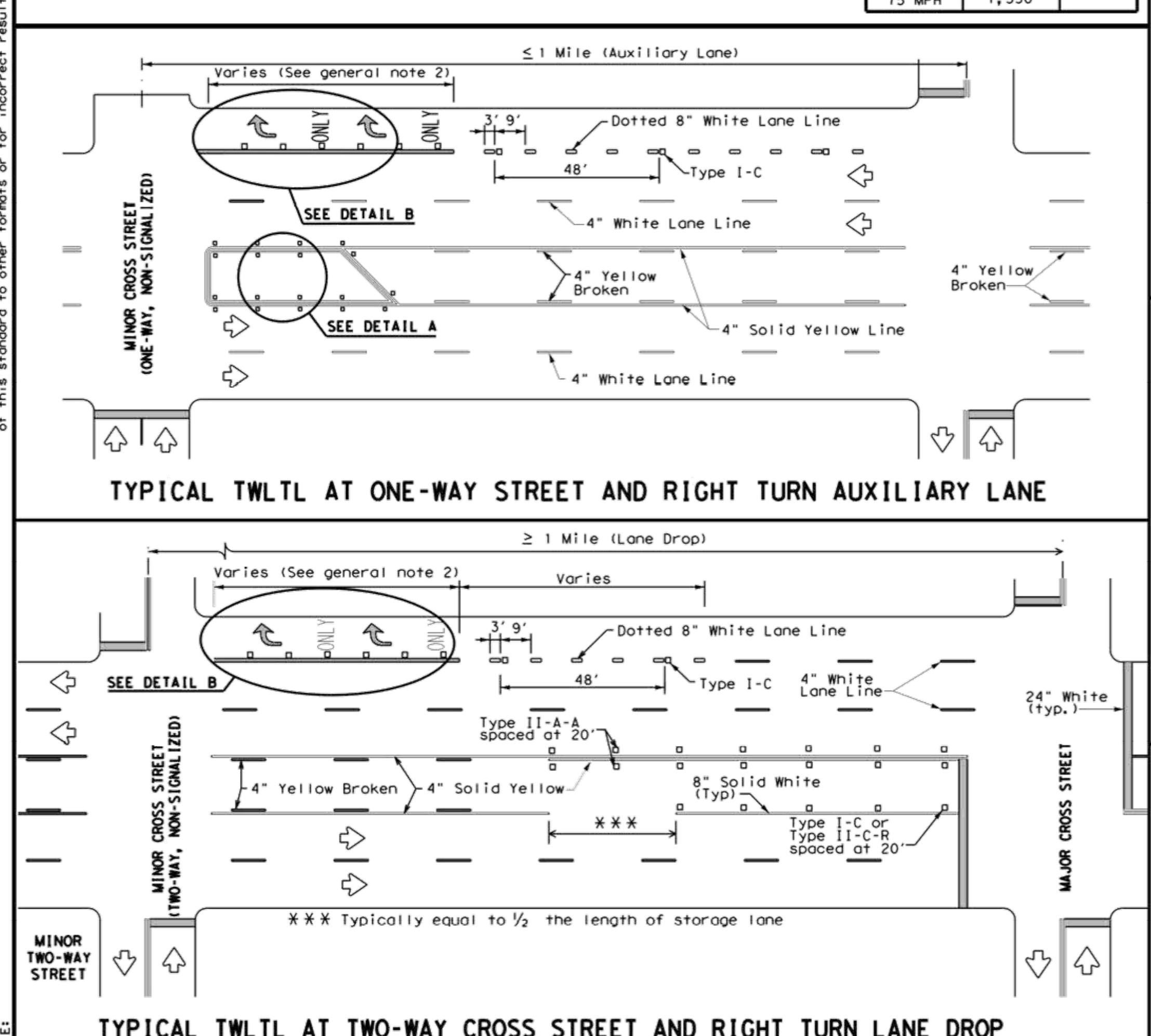
POSITION GUIDANCE USING RAISED MARKERS RELECTORIZED PROFILE MARKINGS

PM(2)-20

FILE: pm2-20.dgn | © TxDOT April 1977 | REVISIONS 4-92 2-10 5-00 2-12 8-00 6-20

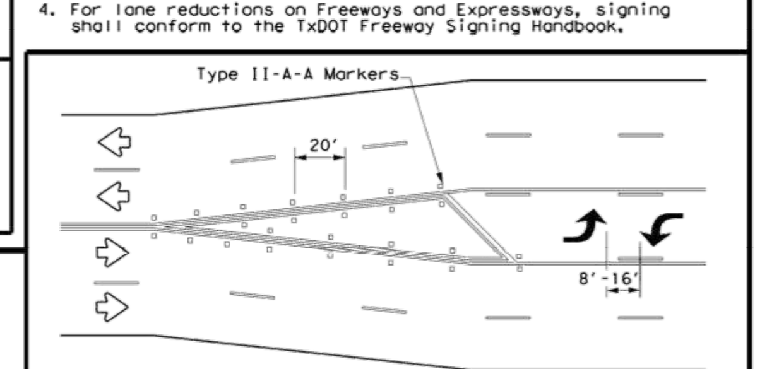


Posted Speed	D (ft)	L (ft)
30 MPH	460	$L = \frac{WS^2}{60}$
35 MPH	565	
40 MPH	670	
45 MPH	775	L=WS
50 MPH	885	
55 MPH	990	
60 MPH	1,100	
65 MPH	1,200	
70 MPH	1,250	
75 MPH	1,350	



NOTES

1. Lane reduction pavement markings are used where the number of through lanes is reduced because of narrowing of the roadway or because of a section of on-street parking in what would otherwise be a through lane. For Texas Super 2 Passing Lanes, see TS2(PL) standard sheets.
2. On divided highways, an additional W9-1R "RIGHT LANE ENDS" sign may be installed in the median aligned with the W9-1R sign on the right side of the highway.
3. Lane reduction arrows are required for speeds of 45 mph or greater. An optional third lane reduction arrow may be added based on engineering judgement. If used, the optional third lane reduction arrow should be centered between the first and last lane reduction arrows.
4. For lane reductions on Freeways and Expressways, signing shall conform to the TxDOT Freeway Signing Handbook.



A two-way left-turn (TWLT) lane-use arrow pavement marking should be used at or just downstream from the beginning of a two-way left-turn lane within a corridor. Repeating the marking after each intersection or dedicated turn bay is not required unless stated elsewhere in the plans.

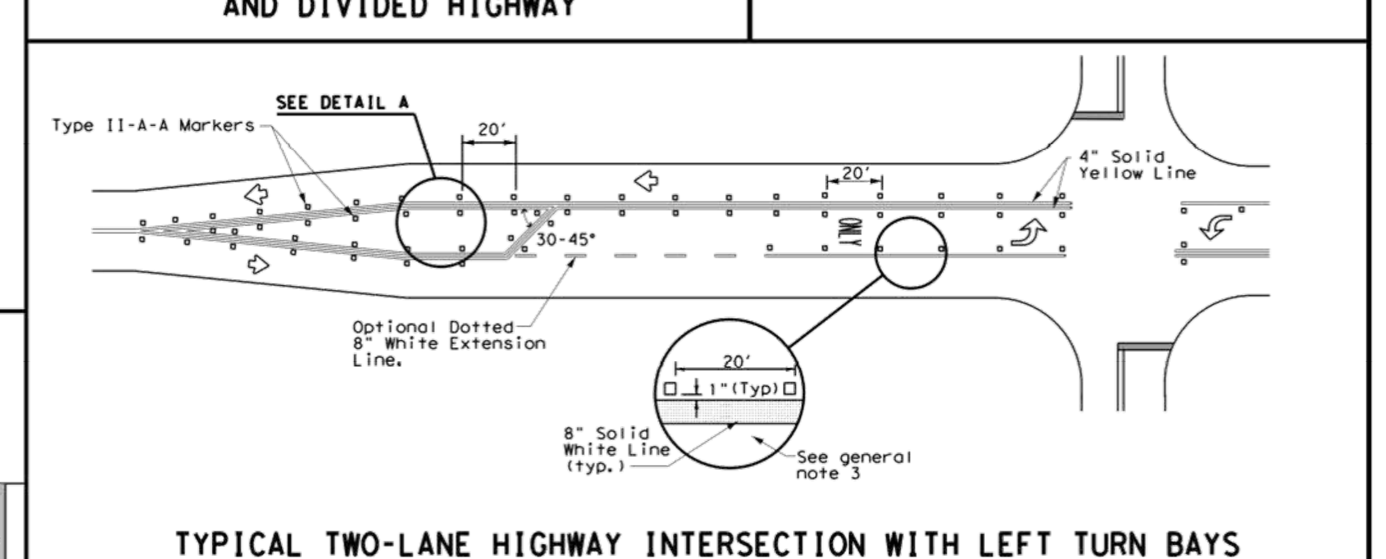
TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY

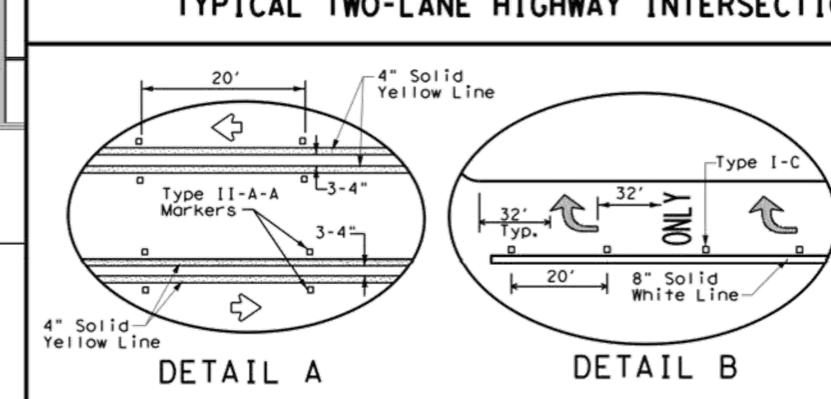
GENERAL NOTES

1. Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings or word and arrow markings may be used in other lanes and turn bays for emphasis. Details for words and arrows are as shown in the Standard Highway Sign Designs for Texas.
2. When lane-use words and arrow markings are used, two sets of arrows should be used if the length of the bay is greater than 180 feet. When a single lane use arrow or word and arrow marking is used for a short turn lane, it should be located at or near the upstream end of the full-width turn lane.
3. Use raised pavement marker Type I-C with undivided highways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.
4. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.





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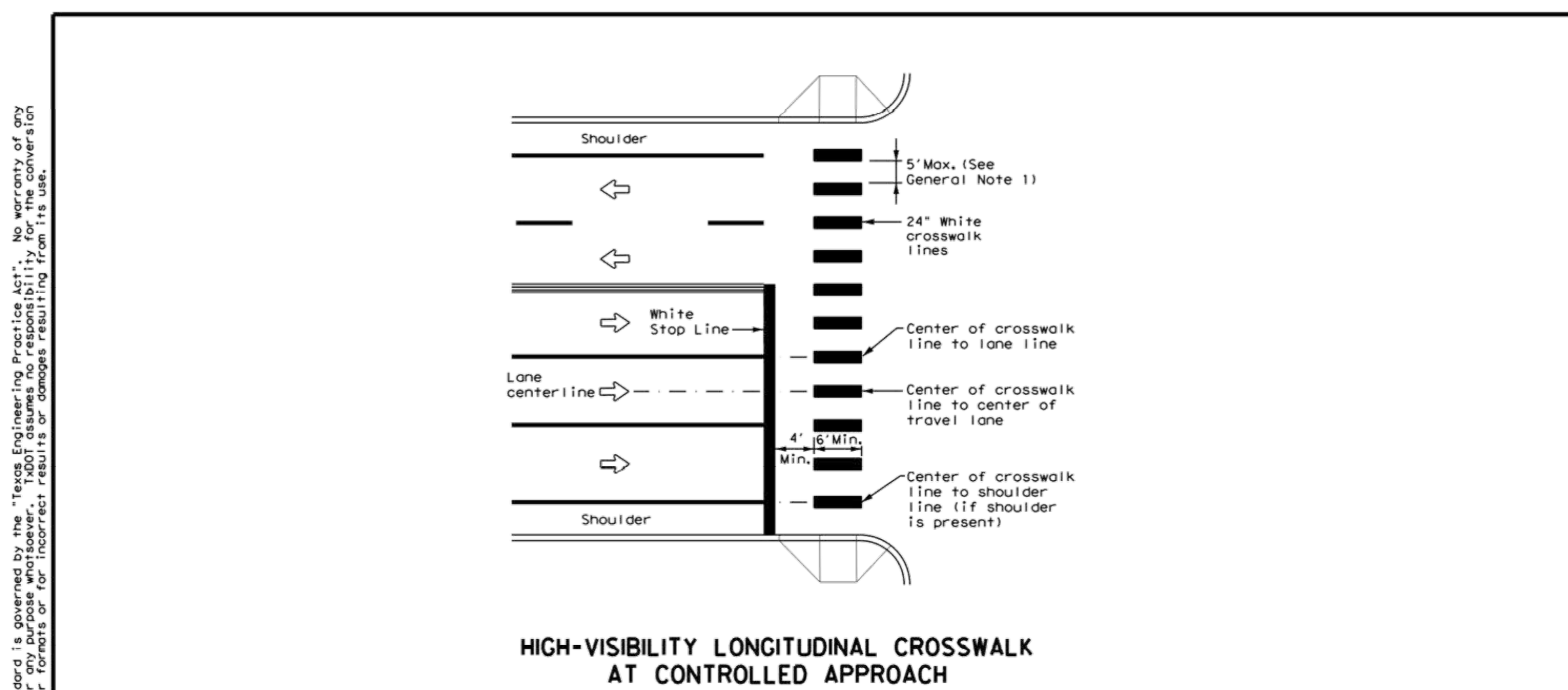
TWO-WAY LEFT TURN LANES, RURAL LEFT TURN BAYS, AND LANE REDUCTION PAVEMENT MARKINGS

PM(3)-20

FILE: pm3-20.dgn | © TxDOT April 1998 | REVISIONS 5-00 2-10 8-00 2-12 3-03 6-20

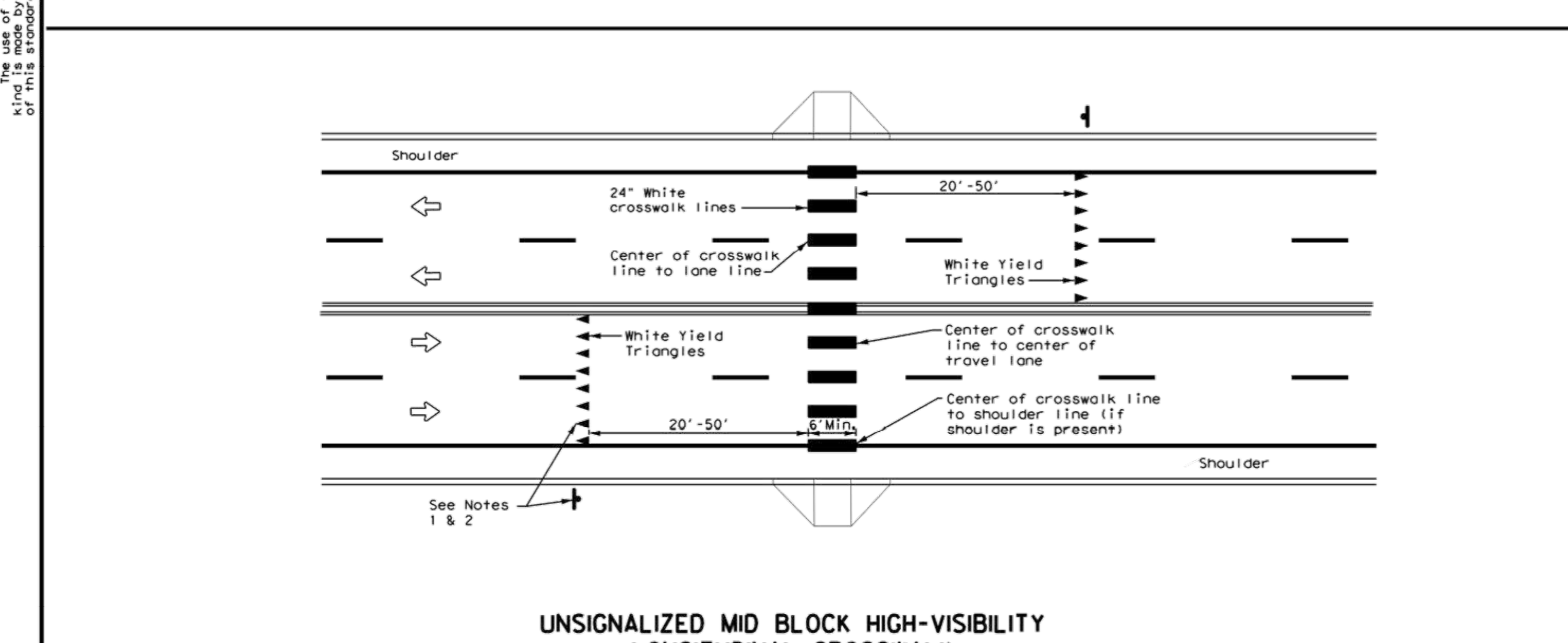


GENERAL NOTES

1. Longitudinal crosswalk lines should not be placed in the wheel path of vehicles. Center the crosswalk lines on travel lanes, lane lines, and shoulder lines (if present).
2. A minimum 6" clear distance shall be provided to the curb face. If the last crosswalk line falls into this distance it must be omitted.
3. For divided roadways, adjustments in spacing of the crosswalk lines should be made in the median so that the crosswalk lines are maintained in their proper location across the travel portion of the roadway.
4. At skewed crosswalks, the crosswalk lines are to remain parallel to the lane lines.
5. Each crosswalk shall be a minimum of 6' wide.
6. The High-Visibility Longitudinal Crosswalk is the preferred crosswalk pattern on State Highways. Other crosswalk patterns as shown in the "Texas Manual on Uniform Traffic Control Devices" may be used. All crosswalk designs and dimension shall comply with the "Texas Manual on Uniform Traffic Control Devices."
7. Final placement of Stop Bar/Yield Triangles and Crosswalk shall be approved by the Engineer in the field.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



NOTES

1. Use yield triangles with "Yield Here to Pedestrians" signs at unsignalized mid block crosswalks.
2. Use stop bars with "Stop Here on Red" signs at mid block crosswalks controlled by traffic signals or pedestrian hybrid beacons.

Texas Department of Transportation — Traffic Safety Division Standard

CROSSWALK PAVEMENT MARKINGS

PM(4)-20

FILE: pm4-20.dgn | © TxDOT June 2020

No.	REVISIONS	DATE	BY

Kimley»Horn
© 2021 KIMLEY-HORN AND ASSOCIATES, INC.
10814 JOLLYVILLE ROAD, AVALLON IV, SUITE 300, AUSTIN, TX 78759
PHONE: 512-418-1771 FAX: 512-418-1791
WWW.KIMLEY-HORN.COM
TEXAS REGISTERED ENGINEERING FIRM F-928

07/27/2022
STATE OF TEXAS — ALEJANDRO E. GRANADOS RICO — 130084 — LICENSED PROFESSIONAL ENGINEER

KHA PROJECT 067783117 | DATE JULY 2022 | SCALE: AS SHOWN | DESIGNED BY: AEG | DRAWN BY: DPD | CHECKED BY: AEG

TXDOT DETAILS (SHEET 1 OF 2)

ROGER HANKS PARKWAY EXTENSION II
CITY OF DRIPPING SPRINGS
HAYS COUNTY, TEXAS

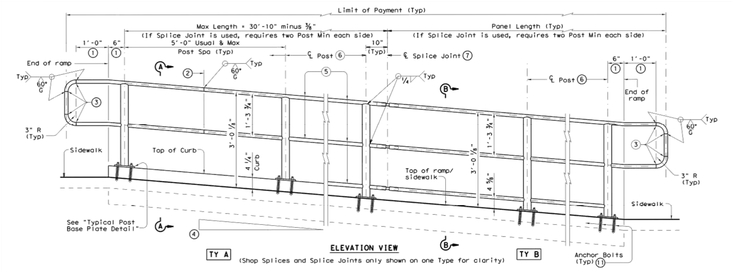
SHEET NUMBER
44

DATE:
FILE:

Limit of Payment (Typ)

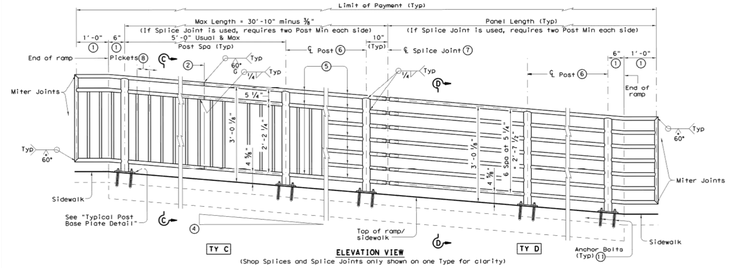
Max Length = 30'-10" minus ⅜" (If Splice Joint is used, requires two Post Min each side) 5'-0" Usual & Max Post Spa (Typ)

Panel Length (Typ) (If Splice Joint is used, requires two Post Min each side)



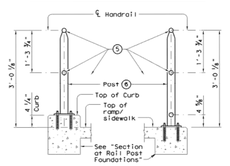
ELEVATION VIEW
(Shop Splices and Splice Joints only shown on one Type for clarity)

TY A | TY B



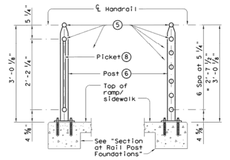
TY C | TY D

RECOMMENDED USAGE ⑨ ⑩
Dropoff Height/ Condition	Recommended Rail Options
< 30" dropoff	TY A, TY B, TY C, or TY D
≥ 30" dropoff, or along Bike Path	TY E or TY F



SECTION A-A
(Showing Handrail TY A)

SECTION B-B
(Showing Handrail TY B)



SECTION C-C
(Showing Handrail TY C)

SECTION D-D
(Showing Handrail TY D)

SHEET 1 OF 3

Texas Department of Transportation — Design Division Standard

PEDESTRIAN HANDRAIL DETAILS

PRD-13

FILE: prd13.dgn	DN: TxDOT	CK: BM	DW: JTB	CK: CGL
©TxDOT December 2006	CONT	SECT	JOB	HIGHWAY
REVISIONS				
REVISED MAY, 2013 (VP)	DIST	COUNTY		SHEET NO.

① Parallel to ground.

② One shop splice per panel is permitted with minimum 85 percent penetration. The weld may be square groove or single vee groove. Grind smooth.

③ Shop splice is permitted with minimum 85 percent penetration. The weld may be square groove or single vee groove. Grind smooth.

④ See Ramp Details located elsewhere in plans for ramp slope and dimensions. Maximum ramp slope will not exceed 8.3 percent. Level landing required for each 30" rise if grade exceeds 5 percent.

⑤ 1 ½" Dia. Standard Pipe (1.900" O.D., 0.145" wall thickness). Parallel to ramp / sidewalk. Provide holes as needed in 1 ½" Dia. pipe for galvanizing drainage and venting.

⑥ 2 ½" Dia. Standard Pipe (2.875" O.D., 0.203" wall thickness). See "Post Mount Detail" for crimping and trimming post to fit Dia. of top rail. Provide holes as needed in post for galvanizing drainage and venting.

⑦ See "Handrail Fabrication Details" for Splice Joints.

⑧ ⅝" Dia. Round Bar equal spacing at 4 ½" Max. Plumb all pickets.

⑨ When needed for accessibility (grade > 5 percent) or as needed for pedestrian safety.

⑩ Not to be used on bridges.

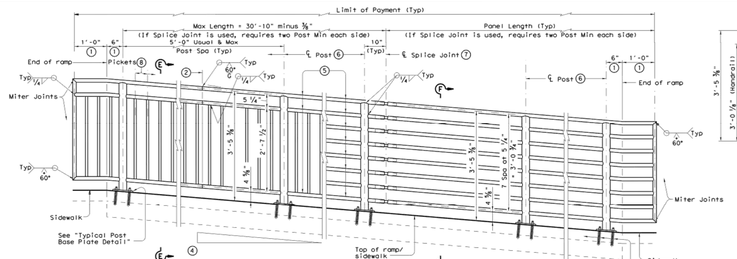
⑪ See "General Notes" for anchor bolt information.

DATE:
FILE:

Limit of Payment (Typ)

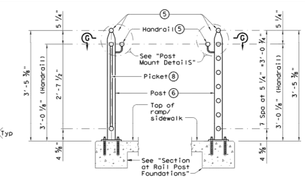
Max Length = 30'-10" minus ⅜" (If Splice Joint is used, requires two Post Min each side) 5'-0" Usual & Max Post Spa (Typ)

Panel Length (Typ) (If Splice Joint is used, requires two Post Min each side)



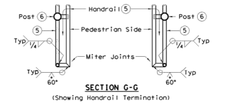
TY E | TY F

ELEVATION VIEW
(Shop Splices and Splice Joints only shown on one Type for clarity)

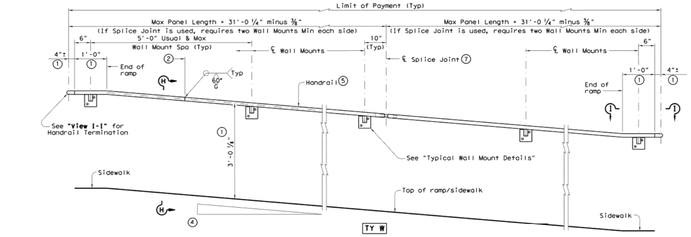


SECTION E-E
(Showing Handrail TY E)

SECTION F-F
(Showing Handrail TY F)

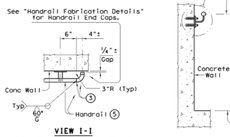


SECTION G-G
(Showing Handrail Termination)

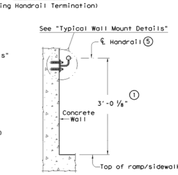


TY W

ELEVATION VIEW



VIEW I-I
(Showing Handrail Termination)



SECTION H-H
(Showing Handrail TY W)

① Parallel to ground.

② One shop splice per panel is permitted with minimum 85 percent penetration. The weld may be square groove or single vee groove. Grind smooth.

③ Shop splice is permitted with minimum 85 percent penetration. The weld may be square groove or single vee groove. Grind smooth.

④ See Ramp Details located elsewhere in plans for ramp slope and dimensions. Maximum ramp slope will not exceed 8.3 percent. Level landing required for each 30" rise if grade exceeds 5 percent.

⑤ 1 ½" Dia. Standard Pipe (1.900" O.D., 0.145" wall thickness). Parallel to ramp / sidewalk. Provide holes as needed in 1 ½" Dia. pipe for galvanizing drainage and venting.

⑥ 2 ½" Dia. Standard Pipe (2.875" O.D., 0.203" wall thickness). See "Post Mount Detail" for crimping and trimming post to fit Dia. of top rail. Provide holes as needed in post for galvanizing drainage and venting. Plumb all posts.

⑦ See "Handrail Fabrication Details" for Splice Joints.

⑧ ⅝" Dia. Round Bar equal spacing at 4 ½" Max. Plumb all pickets.

⑪ See "General Notes" for anchor bolt information.

SHEET 2 OF 3

Texas Department of Transportation — Design Division Standard

PEDESTRIAN HANDRAIL DETAILS

PRD-13

FILE: prd13.dgn	DN: TxDOT	CK: BM	DW: JTB	CK: CGL
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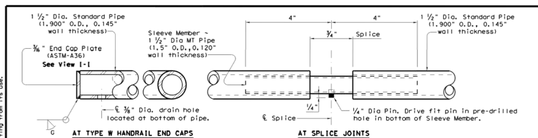
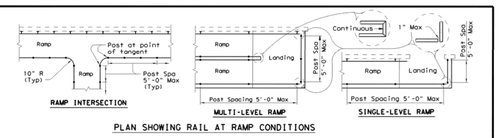
REVISIONS				
REVISED MAY, 2013 (VP)	DIST	COUNTY		SHEET NO.



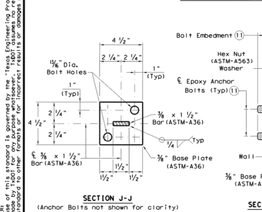
AT TYPE W HANDRAIL END CAPS | AT SPLICE JOINTS



RAMP INTERSECTION | MULTI-LEVEL RAMP | SINGLE-LEVEL RAMP

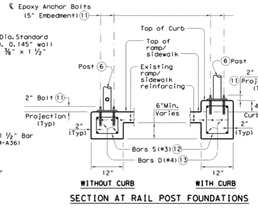
PLAN SHOWING RAIL AT RAMP CONDITIONS

HANDRAIL FABRICATION DETAILS



SECTION J-J
(Anchor Bolts not shown for clarity)

SECTION AT WALL MOUNT



SECTION AT RAIL POST FOUNDATIONS

TYPICAL WALL MOUNT DETAILS

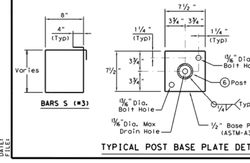
⑤ 1 ½" Dia. Standard Pipe (1.900" O.D., 0.145" wall thickness). Parallel to ramp/sidewalk. Provide holes as needed in 1 ½" Dia. pipe for galvanizing drainage and venting.

⑥ 2 ½" Dia. Standard Pipe (2.875" O.D., 0.203" wall thickness). Plumb all posts. See "Post Mount Detail" for crimping and trimming post to fit the diameter of top rail. Provide holes as needed in post for galvanizing drainage and venting.

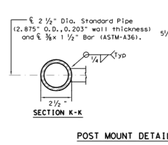
⑪ See "General Notes" for anchor bolt information.

⑫ Bars S(#3) spaced at 12" Max (Spaced 3" from outside edge of overall length of Ramp/Sidewalk).

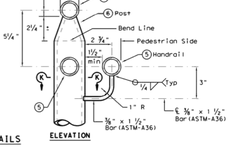
⑬ Provide 1 ½" end cover to Bars D(#4) from outside edge of overall length of Ramp/Sidewalk.



TYPICAL POST BASE PLATE DETAIL



POST MOUNT DETAILS



ELEVATION

GENERAL NOTES

Designed according to ADAAG, Texas Accessibility Standards, Uniform Building Code, and AASHTO LRFD Specifications.

Handrail anchorage details shown on this standard may require modification for skewed anchorage slopes. See appropriate details elsewhere in plans for these modifications.

Pipe will conform to ASTM-A53 Grade B or 4500 Grade B. Steel plates and steel bars will conform to ASTM-A36. Mechanical tubing (MT) will conform to ASTM-513 Grade 1015 or higher. Galvanize all steel components except reinforcing steel unless noted otherwise.

Concrete for foundations will be in accordance with Item 531 "Sidewalks". All reinforcing steel must be Grade 60. Bar laps, where required, will be as follows: Uncoated - #4 x 1'-5" Epoxy coated - #4 x 2'-1"

When the plans require painted steel, follow the requirements for painting galvanized steel in Item 445, "Galvanizing and Painting Steel". Sleeve Members will be painted galvanized and only get field painted after installation unless directed otherwise by Engineer.

Epoxy anchor bolts for wall mount and post base plate will be ⅝" Dia. ASTM A36 threaded rods with one hex nut and one hardened steel washer at each bolt. ⅝" Dia. threaded rod embedment for wall mounts is 3 ⅞" and embedment depth for post base plate is 5".

Embed threaded rods into concrete with a Type III (Class C) epoxy meeting the requirements of DMS-6100, "Epoxies and Adhesives". Mix and dispense adhesive with the manufacturer's static mixing nozzle/dual cartridge system. Core drill holes (percussion drilling not permitted).

At the contractor's option the post base plate anchor bolts may be cast with the Ramp/Sidewalk (See Cast-In-Place Anchor Bolt Options).

Optional cast-in-place anchor bolts will be ⅝" Dia ASTM A307 Grade A bolts for A36 threaded rods with one hex nut and one hardened steel washer at each bolt. Embedment depth of cast-in-place bolt will be 8" for post base plate.

Handrails and any wall or other surface adjacent to them will be free of any sharp or abrasive elements.

Submit shop drawings to the Engineer unless otherwise noted. For curved handrail applications, fabricate the handrail to the curve if radius is less than 600 ft. Shop drawings are required when rail is fabricated to the curve.

For all handrails, erection drawings will be submitted to the Engineer for approval to ensure proper installation.

Drawings will show handrail mount locations with bolts setting, spacing, ramp slope, and/or splice joint locations, and handrail lengths with identification showing where each handrail goes on the layout.

Payment for concrete sidewalks or curb ramps will be paid for in accordance with Item 531 "Sidewalks".

Payment for all items shown is to be included in unit price bid in accordance with Item 450 "Railing" of the type specified.

All exposed edges will be rounded or chamfered to approximately ⅛" by grinding.

SHEET 3 OF 3

Texas Department of Transportation — Design Division Standard

PEDESTRIAN HANDRAIL DETAILS

PRD-13

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REVISIONS				
REVISED MAY, 2013 (VP)	DIST	COUNTY		SHEET NO.

DATE:
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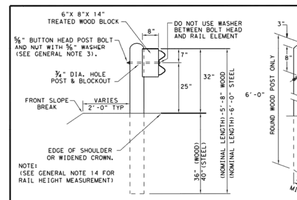
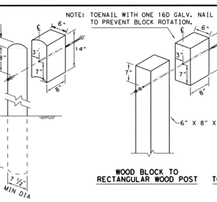
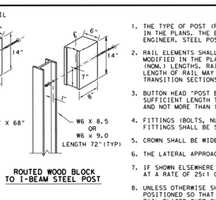
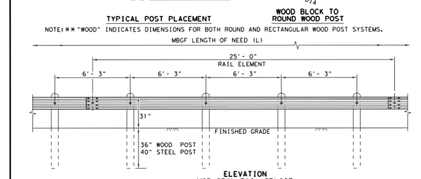


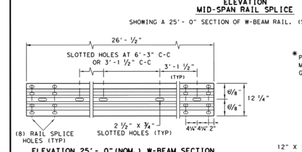
TYPICAL POST PLACEMENT







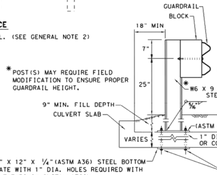
ELEVATION MID-SPAN RAIL SPLICE
SHOWING A 25'- 0" SECTION OF W-BEAM RAIL. (SEE GENERAL NOTE 2)



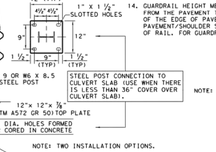
ELEVATION 25'- 0" (NOM.) W-BEAM SECTION

NOTES: SEE GENERAL NOTE 2 FOR ALLOWABLE RAIL TYPES. SEE RAIL SPLICE DETAIL FOR REQUIRED HARDWARE.

*POST(S) MAY REQUIRE FIELD MODIFICATION TO ENSURE PROPER GUARDRAIL HEIGHT.



LOW FILL CULVERT POST



NOTE: TWO INSTALLATION OPTIONS.

1. BOLT-THROUGH OPTION: REQUIRES A 6" MIN. SLAB THICKNESS. ⅝" DIA (ASTM A449) HEAVY HEX BOLTS WITH TWO HARDENED WASHER EACH AND HEAVY HEX NUTS.
NOTE: BOLT LENGTH = SLAB PLUS 2 ½" MIN.

2. EPOXY ANCHOR OPTION: THIS OPTION MAY ONLY BE USED IF THE CULVERT SLAB IS 9" MIN. THICK. THREADED ANCHOR RODS MUST BE ⅝" DIA. ASTM A449 OR A193 GRADE B7 WITH HEAVY HEX NUT, AND ONE HARDENED WASHER EACH. EMBED ANCHOR RODS 6" WITH HILTI HIT RE 500 EPOXY ADHESIVE. OTHER TYPE III CLASS C EPOXY ADHESIVES MEETING THE REQUIREMENTS OF DMS-6100, "EPOXIES AND ADHESIVES", MAY BE USED IF IT CAN BE DEMONSTRATED THAT THEY MEET OR EXCEED THE STRENGTH OF HILTI HIT RE 500 WITH THE SAME EMBEDMENT DEPTH AND THREADED ROD DIA. FOLLOW THE MANUFACTURER'S REQUIREMENTS FOR INSTALLING EPOXIED THREADED RODS. EXTEND RODS ¼" MIN. BEYOND NUT.

NOTE: CULVERTS OF 25 FT. OR LESS, SEE GF(31)LS STANDARD FOR "LONG SPAN" OPTION.

NOTE: TRANSITIONS TO BRIDGE RAILS OR TRAFFIC BARRIERS.
SEE GF(31)TL1 TR STANDARD FOR HIGH-SPEED TL-3 TRANSITIONS.
SEE GF(31)TL2 TR STANDARD FOR LOW-SPEED TL-2 TRANSITIONS.

GENERAL NOTES

1. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST, OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. THE EXACT POSITION OF WOOD RAIL, IF SHOWN IN THE PLANS, OR AS DIRECTED BY THE ENGINEER. STEEL POSTS TO BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING."

2. RAIL ELEMENTS SHALL MEET THE REQUIREMENTS OF ITEM 540,"METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED IN THE PLANS. THE CONTRACTOR MAY FURNISH RAIL ELEMENTS OF 25'- 0", OR 12'- 6" (NOM.) LENGTHS. RAIL ELEMENTS MAY HAVE SLOTTED HOLES AT 3'-1 ½" C-C OR 6'-3" C-C. A SPECIAL LENGTH OF RAIL MAY BE MANUFACTURED TO ACCOMMODATE THE DOWNSTREAM ANCHOR TERMINAL (DAT) AND THE TRANSITION SECTIONS OF GUARDRAIL.

3. BUTTON HEAD "POST BOLTS & NUTS" SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND ⅜" WASHER (HVY16A) AND NOT MORE THAN ½" BEYOND IT. TRIM REMAINING BOLT LENGTH AS REQUIRED.

4. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445,"GALVANIZING." FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.

5. CROWN SHALL BE WIDENED TO ACCOMMODATE THE METAL BEAM GUARD FENCE.

6. THE LATERAL APPROACH TO THE GUARD FENCE, SHALL HAVE A MAXIMUM SLOPE OF 1V:10H.

7. IF SHOWN ELSEWHERE IN THE PLANS OR AS DIRECTED BY THE ENGINEER, THE GUARD FENCE MAY BE FLARED AT A RATE OF 2511 OR FLATTER.

8. UNLESS OTHERWISE SHOWN IN THE PLANS, GUARD FENCE PLACED IN THE VICINITY OF CURBS SHALL BE POSITIONED SO THAT THE FACE OF CURB IS LOCATED DIRECTLY BELOW OR BEHIND THE FACE OF THE RAIL. RAIL PLACED OVER CURBS SHALL BE INSTALLED SO THAT THE POST BOLT IS LOCATED APPROXIMATELY 25 INCHES ABOVE THE GUTTER PAN OR EDGE OF SHOULDER.

9. APPLICATIONS IN SOLID ROCK ARE ONLY ALLOWED WITH STEEL POSTS. IF SOLID ROCK IS ENCOUNTERED WITHIN 0 TO 18" OF THE FINISHED GRADE, DRILL A 24" DIA. HOLE, 24" INTO THE ROCK. IF SOLID ROCK IS ENCOUNTERED BELOW 18", DRILL A 12" DIA. HOLE, 12" INTO THE ROCK OR TO THE STANDARD EMBEDMENT DEPTH, WHICHEVER MAYBE LESS. ANY EXCESS POST LENGTH, AFTER MEETING THESE DEPTHS, MAY BE FIELD CUT TO ENSURE PROPER GUARDRAIL MOUNTING HEIGHT. BACKFILL WITH COARSE AGGREGATE MATERIAL.

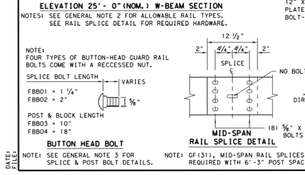
10. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.

11. SPECIAL FABRICATION WILL BE REQUIRED AT INSTALLATION LOCATIONS HAVING A CURVATURE OF LESS THAN 150 FT. RADIUS.

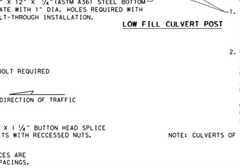
12. UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210, "COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE" MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. THE CONSTRUCTION DIVISION, TXDOT MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210 ONLY. PRODUCERS ON THE MPL MAY FURNISH COMPOSITE MATERIAL BLOCKS.

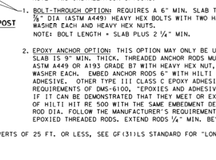
13. FOR THE LOW FILL CULVERT OPTION, POSTS LOCATED PARTIALLY OR WHOLLY BETWEEN PRECAST BOX CULVERT UNITS, THE USE OF A CAST-IN-PLACE CONCRETE CLOSURE BETWEEN BOXES IS REQUIRED. THE LENGTH OF THE CAST-IN-PLACE CONCRETE CLOSURE SHALL ACCOMMODATE THE PLACEMENT OF THE LOW FILL CULVERT OPTION. SEE CONCRETE CLOSURE DETAILS ON BRIDGE STANDARD SCP-MD.

14. GUARDRAIL HEIGHT MEASUREMENTS WHEN THE GUARDRAIL IS LOCATED ABOVE PAVEMENT, MEASURE THE HEIGHT FROM THAT PAVEMENT TO THE TOP OF THE W-BEAM RAIL. WHEN THE GUARDRAIL IS LOCATED UP TO 2 FT. OFF OF THE EDGE OF PAVEMENT OR FOR A PAVEMENT OVERLAY, USE A 10-FOOT STRAIGHTEDGE TO EXTEND THE PAVEMENT/SHOULDER SLOPE TO THE BACK OF RAIL; MEASURE FROM THE BOTTOM OF STRAIGHTEDGE TO THE TOP OF RAIL. FOR GUARDRAIL LOCATED DOWN A 10:1 SLOPE, MEASURE FROM THE NOMINAL TERRAIN.



TYPICAL POST PLACEMENT





ELEVATION MID-SPAN RAIL SPLICE
SHOWING A 25'- 0" SECTION OF W-BEAM RAIL. (SEE GENERAL NOTE 2)

ELEVATION 25'- 0" (NOM.) W-BEAM SECTION

NOTES: SEE GENERAL NOTE 2 FOR ALLOWABLE RAIL TYPES. SEE RAIL SPLICE DETAIL FOR REQUIRED HARDWARE.

NOTE: FOUR TYPES OF BUTTON-HEAD GUARD RAIL BOLTS COME WITH A RECESSED NUT.

SPLICE BOLT LENGTH

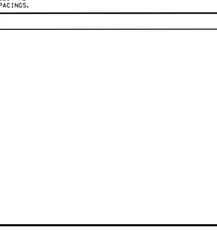
FBB01 = 1 ¼"
FBB02 = 2"

POST & BLOCK LENGTH

FBB03 = 10"
FBB04 = 18"

BUTTON HEAD BOLT

NOTE: SEE GENERAL NOTE 3 FOR SPLICE & POST BOLT DETAILS.



MID-SPAN RAIL SPLICE DETAIL

NOTE: GF(31)_ MID-SPAN RAIL SPLICES ARE REQUIRED WITH 6'-3" POST SPACINGS.

SHEET 3 OF 3

Texas Department of Transportation — Design Division Standard

METAL BEAM GUARD FENCE TL-3 MASH COMPLIANT

GF(31)-19

FILE: gf3119.dgn	DN:TxDOT	CK: KM	DW: VP	CK:CGL/AC
©TxDOT NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.

Kimley»Horn

© 2021 KIMLEY-HORN AND ASSOCIATES, INC.
10814 JOLLYVILLE ROAD, AVALLON IV, SUITE 300, AUSTIN, TX 78759
PHONE: 512-418-1771 FAX: 512-418-1791
WWW.KIMLEY-HORN.COM
TEXAS REGISTERED ENGINEERING FIRM F-928

No.	REVISIONS	DATE	BY

07/27/2022

KHA PROJECT 069783117

DATE:	JULY 2022
SCALE:	AS SHOWN
DESIGNED BY:	AEG
DRAWN BY:	DPD
CHECKED BY:	AEG

TXDOT DETAILS (SHEET 2 OF 2)

ROGER HANKS PARKWAY EXTENSION II

CITY OF DRIPPING SPRINGS
HAYS COUNTY, TEXAS

SHEET NUMBER
45

Inspection, Maintenance, Repair and Retrofit Plan

The following sections address inspection and maintenance taken from the TNRCC Manual, "Complying with Edward Aquifer Rules: Technical Guidance on Best Management Practices."

Silt Fence:

1. Inspection shall be made weekly and after each rainfall event, in accordance with Section 1.4.3 of RG-348.

2. Tom fabric shall be replaced or a second line of fencing parallel to the tom section shall be implemented as needed.

3. Accumulated silt shall be removed when it reaches a depth of six (6) inches. The silt shall be disposed of on an approved site and in such a manner that will not contribute to additional siltation.

4. Silt fence shall be removed when the site is completely stabilized so as not to block or impede storm flow or drainage.

Inlet Protection:

1. Daily inspection shall be made by the Contractor and silt accumulation must be removed when depth reaches 50 mm (two (2) inches).

2. Contractor shall monitor the performance of inlet protection during each rainfall event and immediately remove the inlet protections if the stormwater begins to overtop the curb.

3. Inlet protections shall be removed as soon as the source of sediment is stabilized.

Stabilized Construction Entrance:

1. The entrance shall be maintained in a condition that will prevent tracking or flowing of sediment onto public roadway. This may require periodic top dressing with additional stone as conditions demand. As well as repair and clean out of any measure device used to trap sediment. All sediments that are spilled, dropped, washed or tracked onto public roadway must be removed immediately.

2. Entrance shall be properly graded to prevent run-off from leaving the construction site.

Concrete Washout Area:

1. Routine inspection in accordance with Section 1.4.18 of RG-348 of the area to ensure that sufficient quantity and volume remain to contain all liquid and concrete waste generated by washout operations.

2. Plastic lining material should be a minimum of 10 mil in polyethylene sheeting and should be free of holes, tears, or other defects that compromise the impermeability of the material.

3. When temporary concrete washout facilities are no longer required for the work, the hardened concrete should be removed and disposed of. Materials used to construct temporary concrete washout facilities should be removed from the site of the work and disposed of. Holes, depressions or other ground disturbance caused by the removal of the temporary concrete washout facilities should be backfilled and repaired.

Rock Berm

1. Inspection should be made weekly and after each rainfall in accordance to Section 1.4.5 of RG-348. If placed in streambeds, inspection should occur on a daily basis.

2. Accumulated silt shall be removed when it reaches a depth of six (6) inches. The silt shall be disposed of on an approved site and in such a manner that will not contribute to additional siltation.

3. Loose wire sheathing shall be repaired immediately when necessary and the berm shall be reshaped as needed during inspection.

4. Berm shall be replaced if the structure ceases to function as initially intended due to factors such as silt accumulation, washout, construction traffic damage, etc.

5. When all upstream areas are stabilized and the accumulated silt has been removed, the rock berm should be removed and disposed of.

VEGETATIVE FILTER STRIPS

VEGETATIVE FILTER STRIPS

First Two Months: The first two months are the most important for vegetative filter strips, or until they are well established. The following guidelines should be followed most closely during this time period. After the vegetative filter strips have been well established, little additional maintenance is necessary.

Pest Management: An Integrated Pest Management (IPM) Plan should be developed for vegetated areas. This plan should specify how problem insects and weeds will be controlled with minimal or no use of insecticides and herbicides.

Seasonal Mowing and Lawn Care: If the filter strip is made up of turf grass, it should be mowed as needed to limit vegetation height to 18 inches, using a mulching mower (or removal of clippings). If native grasses are used, the filter may require less frequent mowing, but a minimum of twice annually. Grass clippings and brush debris should not be deposited on vegetated filter strip area Regular mowing should also include weed control practices, however herbicide use should be kept to a minimum (Urbonas et al., 1992). Healthy grass can be maintained without using fertilizers because runoff usually contains sufficient nutrients. Irrigation of the site can help assure a dense and healthy vegetative cover.

Inspection: Inspect filter strips at least twice annually for erosion or damage to vegetation; however, additional inspection after periods of heavy runoff is most desirable. The strip should be checked for uniformity of grass cover, debris and litter, and areas of sediment accumulation. More frequent

inspections of the grass cover during the first few years after establishment will help to determine if any problems are developing, and to plan for long-term restorative maintenance needs. Bare spots and areas of erosion identified during semi-annual inspections must be replanted and restored to meet specifications. Construction of a level spreader device may be necessary to reestablish shallow overland flow.

Debris and Litter Removal: Trash tends to accumulate in vegetated areas, particularly along highways. Any filter strip structures (i.e. level spreaders) should be kept free of obstructions to reduce floatables being flushed downstream, and for aesthetic reasons. The need for this practice is determined through periodic inspection, but should be performed no less than 4 times per year.

Sediment Removal: Sediment removal is not normally required in filter strips, since the vegetation normally grows through it and binds it to the soil. However, sediment may accumulate along the upstream boundary of the strip preventing uniform overland flow. Excess sediment should be removed by hand or with flat-bottomed shovels.

Grass Reseeding and Mulching: A healthy dense grass should be maintained on the filter strip. If areas are eroded, they should be filled, compacted, and reseeded so that the final grade is level. Grass damaged during the sediment removal process should be promptly replaced using the same seed mix used during filter strip establishment. If possible, flow should be diverted from the damaged areas until the grass is firmly established. Bare spots and areas of erosion identified during semi-annual inspections must be replanted and restored to meet specifications. Corrective maintenance such as weeding or replanting should be done more frequently in the first two to three years after installation to ensure stabilization. Dense vegetation may require irrigation immediately after planting, and during particularly dry periods, particularly as the vegetation is initially established.

STORMTROOPER™ SWAQ-25

MAINTENANCE GUIDELINES

A preventative maintenance cleanout schedule is the most valuable tool for maintaining the proper operation of StormTrooper™. Separator maintenance costs will be greatly reduced if a good housekeeping plan for the property is developed i.e. trash pickup, lawn maintenance, dumpster control, etc.

StormTrooper™ separators have no moving parts and no filter cartridges. The manufacturer recommends quarterly ongoing inspections for accumulated pollutants. Pollutant deposition may vary from year to year. Quarterly inspections ensure that the system is serviced at the appropriate times. Table 4 lists recommended maximum capacities of oil and sediment. Professional vacuum services should be considered when capacities exceed these recommended levels.

StormTrooper™ Maintenance Levels		
Model Number	Oil Depth	Sediment Depth
SWAQ-25	12”	12”

Inspection Procedures

1. Easiest observation and maintenance is best accomplished during non-flow (dry weather) conditions 3-4 days after the most recent rain.
2. Remove interceptor covers or open hatchway to observe conditions. Remove hatchway safety net (“EnterNet”). Observe for trash and debris and remove if necessary. This is the most important maintenance requirement. If absorbent pillows are utilized, observe their condition. Uniform browning or gray color of the pillow means they should be replaced. Observe baffle debris screen and clean if necessary.
3. Coalescing plates are self-cleaning and seldom require maintenance unless damaged. Do not walk on or stand on plate packs. Call ParkUSA (888-611-PARK) for replacement parts.
4. Check of the depth (level) of oil and sediment with a tank sampler devise designed for this purpose. The tank sampler requires a dipstick tube equipped with a ball valve (typically a Sludge Judge® or Core Pro®).
5. Make sure the dipstick tube goes completely to the bottom. Lift the dipstick tube out of the unit and keep it in a vertical position and read the level of sediment and oils from the gauge on the dipstick. Record pollutant levels on your StormTrooper™ Monitoring/Maintenance Report. If either pollutant(s) in the dipstick tube (sediments or oils) exceed the levels indicated on Table 1, maintenance of the StormTrooper™ is required. Upon completing the recording of pollutant levels, the dipstick tube is then drained back into the inlet side of the StormTrooper™. This ensures that the pollutants in the dipstick tube do not leave the unit.

Maintenance Procedures

•Park Environmental Equipment, manufacturers of StormTrooper™, recommends that a professional pumping contractor licensed to remove and dispose waste from underground utilities be used to pump out the interceptor.
• Pull all manhole covers. Be sure all sections of the interceptor are cleaned. **If a control/bypass manhole is part of the system, it should be inspected and serviced with the interceptor.**

• If the coalescing media option is utilized, visually inspected the plates for any heavy build-up of oil, grease or sludge. Typically, the plates are self-cleaning and require little maintenance. If buildup of material is evident, either remove the media from the frame or clean the plate pack in place. Removing media is accomplished by attaching a lifting device in the lifting lug provided (top center of the frame), and then pull straight up. Media plates may be cleaned in place with special steam cleaning nozzle attachment that provides a flat spray.
• **Facet's MPak® plates are designed to be cleaned in place using a special cleaning wand and city water pressure.** The wand has a connection just like an ordinary garden hose and is equipped with a small conical strainer in the connection so that solids in the inlet water will not clog the cleaning holes.

For cleaning in place, connect a pressure water hose (at least 60 psig) to the special cleaning wand. Provide a vacuum truck (or other means of disposing of the sludge and dirt) in the vessel. Turn on the water to produce a spray from the wand and insert the tip of the wand slowly into each hole of the plate pack, starting at the upstream end. As the water flushes the dirt out of the plate packs, it should be removed by the vacuum hose or directed to an oil water sewer if one is available. For cleaning outside of the vessel, remove the plate packs and other internals (except bolted-in internals). Flush with hose and cleaning wand to oil water drain.
(**NOTE:** The cleaning wand produces a vigorous spray. Operators should wear waterproof clothing and goggles or face mask.)

Typically, the vacuum truck will skim off the oil and other floatables. In most geographic areas the sediment can be disposed of in a sanitary landfill once dewatered. Pollutants are not allowed to be discharged back into the sanitary or storm sewer systems.

• After cleaning via vacuum truck, pumping contractor can refill the StormTrooper™ with water previously drawn out of unit, or haul water to disposal facility and let natural rainfall recharge the unit during future rain events. Replace manhole covers.
• After cleanout is accomplished, obtain a copy of the service truck manifest. Update the StormTrooper™ Monitoring/Maintenance Report and attach a copy of the manifest to the report.

Responsible Party for Maintenance: City of Dripping Springs

Address: 511 W. Mercer Street

City, State, Zip: Dripping Springs, TX 78620

Telephone Number: 512 858 4725

Signature of Responsible Party: CHAD GILPIN

PROJECT NAME: Roger Hanks Parkway Extension II
ADDRESS: Roger Hanks Parkway
CITY, STATE ZIP: Dripping Springs, Texas 78620

MEASURES FOR MINIMIZING SURFACE STREAM CONTAMINATION

During construction, Best Management Practices include the use of silt fence and inlet protection to capture sediment from the construction area contained within the storm water runoff. Silt fence will be installed along the downstream portion of the property and inlet protection will be installed around all existing and proposed inlet structures (once constructed).

After construction, all disturbed areas on the site will be re-vegetated and runoff from the proposed improvements will be captured by the proposed inlets and conveyed to BMP's or flow offsite. Roger Hanks Parkway Extension II has a total of 7 onsite basins and 1 offsite basin. Water quality drainage area WV-1 will street flow to drainage inlets then pipe flow to a Size SWAQ-25 Strom Trooper that will then discharge to an offsite culvert. Water quality drainage areas VFS 1, VFS 2, VFS 3, VFS 4, VFS 5, and VFS 6 will be treated by vegetative filter strips. All proposed water quality BMP’s are shown in the construction drawings under sheets 22 & 23. The TSS Removal calculations are shown on the sheets 24 & 25. Please refer to the Erosion and Sedimentation Control for proposed temporary BMPs proposed on sheets 10 & 11.

SECTION 3:
STORM WATER POLLUTION PREVENTION PLAN

STORM WATER POLLUTION PREVENTION PLAN (SWP3)

Roger Hanks Parkway Extension II

Dripping Springs, Texas

JULY 2022

07/28/2022

Project Owner:

CITY OF DRIPPING SPRINGS
511 W. Mercer St.
Dripping Springs, Texas 78620
(512) 858-4725

Project Contractor:

TBD

Prepared By:

KIMLEY-HORN AND ASSOCIATES, INC.
10814 Jollyville Road, Avallon IV, Suite 200
Austin, Texas 78759
(512) 418-1771

TBPE
Firm No. 928
KHA Project No. 067783117

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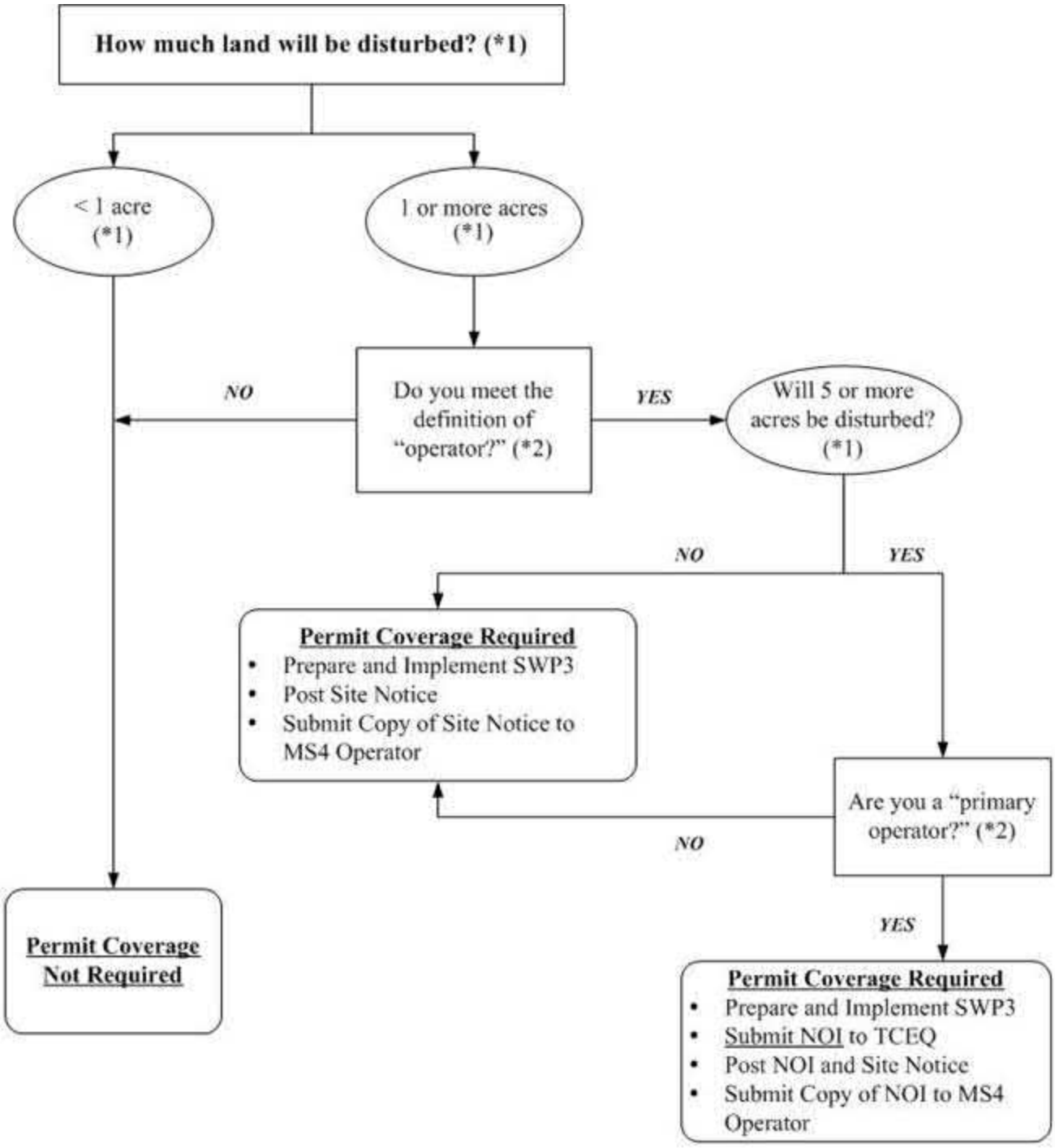
APPENDICES



(*1) To determine the size of the construction project, use the size of the entire area to be disturbed, and include the size of the larger common plan of development or sale, if the project is part of a larger project (refer to Part I.B., "Definitions," for an explanation of "larger common plan of development or sale").

(*2) Refer to the definitions for "operator," "primary operator," and "secondary operator" in Part I., Section B. of this permit.

STORM WATER POLLUTION PREVENTION PLAN REVISIONS

Provide a general description and document the date of any revisions to the storm water pollution prevention plan during the course of this construction project. Revisions may be necessary as a result of site inspections or because of a change in the circumstances of the construction project (such as schedule change or a modification in design).

The Storm Water Pollution Prevention Plan (SWP3) must be modified based on the results of inspections, as necessary, to better control pollutants in runoff. Revisions to the SWP3 must be completed within seven (7) calendar days following the inspection. If existing best management practices (BMPs) are modified or if additional BMPs are necessary, an implementation schedule must be described in the SWP3 and wherever possible those changes implemented before the next storm event. If implementation before the next anticipated storm event is impracticable, these changes must be implemented as soon as practicable.

REVISION (Refer to attachments if necessary)	DATE	SIGNATURE
	la	

1.0 INTRODUCTION

On April 10, 2003, responsibility for the administration of storm water protection associated with construction activities in Texas was delegated by the U.S. Environmental Protection Agency (EPA) to the Texas Commission on Environmental Quality (TCEQ). The Texas Pollutant Discharge Elimination System (TPDES) program in Texas meets or exceeds the National Pollutant Discharge Elimination System (NPDES) standards established on a federal level. This SWP3 has been developed in accordance with the TPDES requirements. Additional local requirements may apply and this SWP3 should be updated accordingly (Appendix O).

The purpose of the SWP3 is to provide guidelines for preventing or minimizing sediment and other pollutants that may originate on the site from flowing into municipal storm systems or jurisdictional waters during the construction period. This plan also addresses the principal activities known to disturb significant amounts of ground surface during construction. Stabilization measures must begin within fourteen (14) days of stoppage of construction activities (Appendix I). The permit coverage requirements terminate when areas disturbed for this project reach full stabilization (i.e., when disturbed areas are paved or achieve 70 percent native background vegetative coverage). Revisions to this plan will be made as necessary to accurately reflect project activities and storm water pollution prevention measures.

The storm water management controls included in this SWP3 focus on providing control of pollutant discharges with practical approaches that use readily available techniques, expertise, materials, and equipment. The necessary forms for implementing the SWP3 are found in the appendices of this document, including the Inspector's Qualifications, Inspection Form, Notice of Intent (NOI), Notice of Termination (NOT), and construction site notice. The SWP3 must be implemented prior to the start of construction activities.

The Project Owner's and the Contractor's roles and responsibilities for implementation and maintenance of the elements of the SWP3 are shown in a checklist in Appendix F of this document. Appendix F also includes a description of primary and secondary operators, along with associated responsibilities. The Project Owner and each Contractor must complete the checklist in Appendix F and sign the included certification statement. The certification statement indicates that each operator understands and accepts their roles and responsibilities with respect to storm water pollution prevention for this project.

A. Project Name and Location

Roger Hanks Parkway Extension II – Dripping Springs, Hays County, Texas (See Appendix A for a project location map).

B. Owner Information

Name: City of Dripping Springs
Address: 511 W. Mercer St.
Dripping Springs, TX 78620
Representative:
Title:
Telephone: (512) 858-4725
Fax: _____

C. Contractor Information

Name:
Address:
Representative:
Title: _____
Telephone:
Fax: _____

D. Subcontractor Information

Name: _____
Address: _____
_____
Representative: _____
Title: _____
Telephone: _____
Fax: _____

Name: _____
Address: _____
_____
Representative: _____
Title: _____
Telephone: _____
Fax: _____

E. Discharges Eligible for Authorization

The general permit for construction activities allows for storm water discharges from construction activities, construction support activities, and authorized non-storm water discharges. Under the general permit, construction support activities include, but are not limited to:

- concrete and asphalt batch plants,
- rock crushers,
- equipment staging areas,
- material storage yards,
- material borrow areas, and
- excavated material disposal areas.

Storm water discharges from these construction support activities are authorized under the general permit for construction activities provided:

- the activity is located within one mile of the permitted construction site and is directly supporting the construction activities,
- the SWP3 for the permitted construction activities is developed to include the controls and measures to reduce erosion and discharge of pollutants in storm water runoff from the construction support activities, and
- the construction support activities either do not operate beyond the completion date of the construction activity or, at the time that they do, are authorized under separate Texas Pollutant Discharge Elimination System (TPDES) authorization.

The following non-storm water discharges are also authorized under the general permit for construction activities:

- Discharges from firefighting activities,
- Uncontaminated fire hydrant flushings,
- Water from routine external washing of vehicles, the external portion of buildings or structures, and pavement (where detergents and soaps are not used),
- Uncontaminated water used to control dust,
- Potable water sources, including waterline flushings,
- Uncontaminated air conditioning condensate,
- Uncontaminated groundwater or spring water, and
- Lawn watering and similar Irrigation drainage.

Part II.A.3 of the general permit contains additional information and requirements for non-storm water discharges. Discharges of storm water runoff from concrete batch plants may be authorized provided that the benchmark sampling and associated requirements located in Part V of the general permit are met. The wash out of concrete trucks associated with off-site facilities may be conducted in accordance with the requirements of Part V of the general permit. The Operator will be responsible for updating the SWP3 to meet Part V requirements, if applicable. A non-storm water discharge inventory is located in Appendix L.

F. Obtaining Coverage under the General Permit

Construction activities, including the activities associated with this project, disturbing five (5) acres or more (definition of a large construction activity) are required to comply with the following requirements of the general permit to obtain permit coverage:

a) Develop a SWP3 according to the provisions of the general permit that covers either the entire site or all portions of the site for which the applicant is the operator and implement that plan prior to commencing construction activities.

b) Primary operators must submit a NOI:

   1) at least seven days prior to commencing construction activities if mailing a paper NOI, or

   2) prior to commencing construction activities if utilizing electronic submittal.

   A copy of the NOI form is located in Appendix H. Instructions for NOI submittal relating to primary operator additions or changes are also located in Appendix H.

c) Post a site notice where it is safely and readily available for viewing by the general public, local, state, and federal authorities prior to commencing construction. The site notice must be maintained until completion of the construction activity.

   1) For linear construction activities, the site notice must be placed in a publicly accessible location near where construction is actively underway. A copy of the construction site notice is located in Appendix H.

d) All primary operators must also post a copy of the signed NOI at the construction site in a location where it is readily available for viewing by the general public, local, state, and federal authorities prior to starting construction activities until completion of the construction activity.

If multiple crews will be conducting construction activities under the general permit simultaneously, copies of the signed NOI should be posted at each separate construction site.

e) All primary operators must provide a copy of the signed NOI at least seven days prior to commencement of construction activities to any secondary operator and to the operator of any municipal separate storm sewer system (MS4) receiving construction site discharge. The names and addresses of all MS4 operators receiving a copy of the NOI are to be recorded in this SWP3 (Appendix H).

f) Secondary operators are regulated under the general construction permit but are not required to submit a NOI provided that:

   1) a primary operator(s) at the site has submitted a NOI, or

   2) another operator(s) is required to submit a NOI and the secondary operator has provided notification to the operator(s) of the need to obtain coverage.

   Additional information for secondary operators seeking alternative coverage is located in the general permit.

Questions about the TPDES construction permit program can be directed to the TCEQ Storm Water and General Permits Team at (512) 239-4515. A copy of the TPDES General Permit (TXR150000) for Storm Water Discharges from Construction Activities has been included in Appendix G for reference.

G. Notice of Change Letter

If the Operator becomes aware that he/she failed to submit any relevant facts, or submitted incorrect information in a NOI, the correct information must be provided to the TCEQ in a Notice of Change (NOC) letter within fourteen (14) days after discovery. In addition, if relevant information provided in the NOI changes, a NOC letter must be submitted to the TCEQ within fourteen (14) days of the change. A copy of the NOC must be provided to the operator of any MS4 receiving discharge from the construction activity. The names and addresses of all MS4 operators receiving a copy of the NOC must be included in this SWP3 (Appendix H).

H. Notice of Termination

Authorization under the general permit must be terminated by submitting a completed and signed NOT form provided in Appendix H. The NOT must be submitted to the TCEQ, and a copy of the NOT must be provided to the operator of any municipal separate storm sewer system (MS4) receiving the discharge within thirty (30) days after final stabilization has been achieved on all portions of the site that are the responsibility of the permittee, or another permitted contractor has assumed control over all areas of the site that have not been finally stabilized. The names and addresses of all MS4 operators receiving a copy of the NOT must be recorded in this SWP3 (Appendix H).

I. Termination of Coverage for Secondary Operators

Each operator that obtained authorization of the general permit without submitting a NOI must remove the site notice and complete the applicable portion of the notice related to removal of the notice. A copy of the completed notice must be submitted to the operator of any MS4 receiving site discharge within 30 days of any the following conditions:

a) final stabilization has been achieved on all portions of the site that are the responsibility of the permittee,

b) a transfer of operational control has occurred, or

c) the operator has obtained alternative authorization under an individual TPDES permit or alternative TPDES general permit.

J. SWP3 Availability

This SWP3 must be retained on-site at the construction site, or if the site is inactive or does not have an on-site location to store the plan, a notice must be posted describing the location of the SWP3. This SWP3 must be made readily available at the time of an on-site inspection.

K. Hazardous Materials

The following potential pollutant sources may be present at the site due to the nature of the construction activities. An inventory of materials is located in Appendix L. Controls for potential pollutants are listed and described in Appendices C and D.

- Solvents
- Stains/paints
- Fuels
- Oils
- Grease
- Pesticides
- Fertilizer
- Sediment/total suspended solids
- Trash
- Paving
- Concrete curing compound
- Glue adhesives
- Joint compound
- Concrete, painting, and brick wash
- Excavation pump-out water
- Concrete

2.0 SITE DESCRIPTION

A. General Site Description

The construction site is in Dripping Springs, which is located in Hays County, Texas (Appendix A). The site covers an area of approximately 10.89-acres. The construction site is generally located northeast of the intersection of Highway 290 and Roger Hanks Parkway. Coordinates for the site are approximately 30.202 latitude and -98.092 longitude (1983 North American Datum (NAD83) Coordinates).

This site is located over the Edwards Aquifer Contributing Zone and is not located on Indian Country Lands. If information about the Edwards Aquifer Zone or Indian Country Lands changes, the Operator should update this SWP3 accordingly.

B. Nature of Construction Activity

The purpose of the construction project is to construct roadways, water quality improvements, and civil improvements (storm sewer). The table in Appendix B should be updated to depict the anticipated schedule for the project.

C. Estimate of Total Site Area and Disturbed Area

The amount of area involved in the project is estimated to be 14.656-acres. No additional acreage will be utilized offsite. Disturbed areas are projected to total approximately 6.053-acres.

D. Storm Water Discharge Locations and Quality Data

No data is available describing quality of storm water discharges from the site. Information will be added to this plan as it is received.

E. Information on Soil Types

A soils map showing the project site and surrounding area is included in Appendix A. The predominant soil types found on the project site are Doss silty clay, 1 to 5 percent slopes; Krum clay, 1 to 3 percent slopes; Bolar clay loam, 1 to 3 percent slopes. A description of these soils is located in Appendix A (USDA, 2016).

F. Receiving Waters and Wetlands

The site lies to the north of Onion Creek, the sites receiving body of water. This portion of the river is not listed on the 2008 Texas 303(d) list of impaired waters.

New sources or new discharges of the constituents of concern to impaired waters are not authorized by the general construction permit (unless otherwise allowable under 30 TAC Chapter 305 and applicable state law). Impaired waters are those that do not meet applicable water quality standards and are listed on the EPA approved CWA 303(d) list. Pollutants of concern are those for which the water body is listed as impaired.

If discharges are expected to enter into a receiving water body located on the 303(d) list, constituents of concern are those for which the water body is listed as impaired. Discharges of the constituents of concern to impaired water bodies for which there is a total maximum daily load (TMDL) are not eligible for

the general permit unless they are consistent with the approved TMDL. The receiving water does not have a known published TMDL. Permittees must incorporate the conditions and requirements applicable to their discharges, including monitoring frequency and reporting required by TCEQ rules, into this SWP3 in order to be eligible for coverage under the general permit.

There are no known wetlands on the site. If any wetlands are identified on the site, the Operator should update this SWP3 accordingly.

G. Threatened and Endangered Species

Are endangered or threatened species and critical habitats on or near the project area?

☐ Yes ☒ No

Describe how this determination was made:

No portion of the Heritage development was identified, in an environmental study performed by Horizon Environmental Services, Inc., as potential habitat for any threatened or endangered species.

If yes, describe the species and/or critical habitat: N/A

If yes, describe or refer to documentation that determines the likelihood of an impact on identified species and/or habitat and the steps taken to address that impact. (Note, if species are on or near your project site, EPA strongly recommends that the site operator work closely with the appropriate field office of the U.S. Fish and Wildlife Service or National Marine Fisheries Service. For concerns related to state or tribal listing of species, please contact a state or tribal official.): N/A

H. Discharges to the Edwards Aquifer Recharge Zone

Discharges cannot be authorized by the general permit where prohibited by 30 Texas Administrative Code (TAC) Chapter 213.

1. New Discharges

   For new discharges located within the Edwards Aquifer Recharge Zone, or within that area upstream from the recharge zone and defined as the Contributing Zone, operators must meet all applicable requirements of, and operate according to, 30 TAC Chapter 213 (Edwards Aquifer Rule) in addition to the provisions and requirements of the general construction permit. A copy of 30 TAC Chapter 213 is located in Appendix Q.

2. Existing Discharges

   For existing discharges, the requirements of the agency-approved Water Pollution Abatement Plan under the Edwards Aquifer Rules are in addition to the requirements of the general construction permit. Best management practices and maintenance schedules for structural storm water controls, for example, may be required as a provision of the rule. All applicable requirements of the Edwards Aquifer Rule for reductions of suspended solids in storm water runoff are in addition to the

requirements in the general construction permit. A copy of the 30 TAC Chapter 213 is located in Appendix Q.

For discharges from large construction activities located on the Edwards Aquifer recharge zone or the Edwards Aquifer contributing zone, applicants must also submit a copy of the NOI to the appropriate TCEQ regional office. For discharges from large construction activities by operators not required to submit a NOI, a copy of the construction site notice must be submitted to the appropriate TCEQ regional office.

Counties:	**Contact:**
Comal, Bexar, Medina, Uvalde, and Kinney	TCEQ Water Program Manager San Antonio Regional Office 14250 Judson Road San Antonio, Texas (210) 490-3096
Williamson, Travis, and Hays	TCEQ Water Program Manager Austin Regional Office 2800 South IH 35, Suite 100 Austin, Texas 78704-5712 (512) 339-2929

3.0 BEST MANAGEMENT PRACTICE MEASURES AND CONTROLS

A. MINIMIZE DISTURBED AREA AND PROTECT NATURAL FEATURES AND SOIL

The entire limits of construction, detailed in the Erosion and Sedimentation Control Plan, are subject to disturbance during construction activities. The construction will have one (1) staging and spoils area located within the limits of construction that will be used to store and save topsoil and trenching materials. The contractor will try to minimize disturbance of the natural ground as much as possible during the construction process and will not leave the designated limits of construction for the project.

B. PHASE CONSTRUCTION ACTIVITY

This project is proposed to be constructed in one single phase. The contractor will install all silt fencing prior to beginning any construction or demolition as identified on the Erosion and Sedimentation Control Plan found in site's construction plan set.

The sequence of major activities for Phase 1 of the roadway extension will be as follows:

Phase 1 (total disturbed area approximately 7 acres):

1) Install tree protection and initiate tree mitigation measures.
2) Install erosion controls as indicated on approved plan.
3) Contact City of Dripping Springs and Hays County to schedule the preconstruction coordination meeting.
4) Evaluate temporary erosion control installation. Review construction schedule with the erosion control plan.
5) Rough grade site.
6) Construct site utilities and paving.

Final Phase (all temporary E&S to be removed, and no disturbed area)

7) Upon re-vegetation per City of Dripping Springs requirements, remove temporary erosion/sedimentation controls.

C. CONTROL STORMWATER FLOWING ONTO AND THROUGH THE PROJECT

BMP Description: **Silt Fence – Perimeter**	
Installation Schedule:	Prior to commencing construction activities.
Maintenance and Inspection:	If a standard-strength fabric is used, it can be reinforced with wire mesh behind the filter fabric. This increases the effective life of the fence. The maximum life expectancy for synthetic fabric silt fences is about six (6) months, depending on the amount of rainfall and runoff. Burlap fences have a much shorter useful life span, usually up to two (2) months. Inspect silt fences regularly and frequently, as well as after each rainfall event, to make sure that they are intact and that there are no gaps where the fence meets the ground or tears along the length of the fence. If you find gaps or tears, repair or replace the fabric immediately. Remove accumulated sediments from the fence base when the sediment reaches one-third (1/3) to one-half (1/2) the fence height. Remove sediment more frequently if accumulated sediment is creating noticeable strain on the fabric and the fence might fail from a sudden storm event. When you remove the silt fence, remove the accumulated sediment as well.
Responsible Staff:	TBD

***BMP Description*: Rock Berms – Check Dam**	
***Installation Schedule*:**	Prior to commencing construction activities.
***Maintenance and Inspection*:**	Inspect the berm after every rainfall to make sure sediment has not built up and that vehicles have not damaged it. It is important to make repairs at the first sign of deterioration to keep the berm functioning properly.
***Responsible Staff*:**	TBD

D. STABILIZE SOILS

***BMP Description:* Seeding**	
☒ ***Permanent***	☒ ***Temporary***
Installation Schedule:	After final grading in areas not to be landscaped. Bare soils should be stabilized within 14 calendar days after final grading or where construction activity has temporarily ceased for more than 21 days.
Maintenance and Inspection:	Low-maintenance areas are mowed infrequently or not at all and do not receive lime or fertilizer regularly. Plants must be able to persist with minimal maintenance over long periods of time. Use grass and legume mixtures for these sites because legumes fix nitrogen from the atmosphere. Sites suitable for low-maintenance vegetation include steep slopes, stream or channel banks, some commercial properties, and "utility" turf areas such as road banks.

	Grasses should emerge within 4-28 days and legumes 5-28 days after seeding, with legumes following grasses. A successful stand has the following characteristics: • Vigorous dark green or bluish green (not yellow) seedlings • Uniform density, with nurse plants, legumes, and grasses well intermixed • Green leaves that remain green throughout the summer--at least at the plant bases Inspect seeded areas for failure and, if needed, reseed and repair them as soon as possible. If a stand has inadequate cover, reevaluate the choice of plant materials and quantities of lime and fertilizer. Depending on the condition of the stand, repair by overseeding or reseeding after complete seedbed preparation. If timing is bad, overseed with rye grain or German millet to thicken the stand until a suitable time for seeding perennials. Consider seeding temporary, annual species if the season is not appropriate for permanent seeding. If vegetation fails to grow, test the soil to determine if low pH or nutrient imbalances are responsible. On a typical disturbed site, full plant establishment usually requires refertilization in the second growing season. Use soil tests to determine if more fertilizer needs to be added. Do not fertilize cool season grasses in late May through July. Grass that looks yellow might be nitrogen deficient. Do not use nitrogen fertilizer if the stand contains more than 20% legumes.
Responsible Staff:	TBD

BMP Description: **Soil Roughening**	
☐ ***Permanent***	☒ ***Temporary***
Installation Schedule:	After interim and rough grading activities, prior to final site work or utility construction
Maintenance and Inspection:	Inspect roughened areas after storms to see if re-roughening is needed. Regular inspection should indicate where additional erosion and sediment control measures are needed. If rills (small watercourses that have steep sides and are usually only a few inches deep) appear, fill, regrade, and reseed them immediately.
Responsible Staff:	TBD

BMP Description: **Hydro-mulching**	
☐ ***Permanent***	☒ ***Temporary***

Installation Schedule:	Bare soils should be stabilized within 14 calendar days after final grading or where construction activity has temporarily ceased for more than 21 days.
Maintenance and Inspection:	Anchor mulches to resist wind displacement. When protection is no longer needed, remove netting and compost it or dispose of it in a landfill. Inspect mulched areas frequently to identify areas where it has loosened or been removed, especially after rainstorms. Reseed these areas, if necessary, and replace the mulch cover immediately. Apply mulch binders at rates recommended by the manufacturer. If washout, breakage, or erosion occurs, repair, reseed and remulch surfaces, and install new netting. Continue inspections until vegetation is firmly established.
Responsible Staff:	TBD

E. PROTECT SLOPES

There are no excessive slopes located within the construction area; therefore, no additional controls are proposed to protect slopes

F. PROTECT STORM DRAIN INLETS

BMP Description: **Bagged Gravel Inlet Filter**	
Installation Schedule:	Prior to stabilization of associated drainage areas
Maintenance and Inspection:	Inspection should be made weekly and after each rainfall. Repair or replacement should be made promptly as needed by the contractor. Remove sediment when buildup reaches a depth of three (3) inches. Removed sediment should be deposited in a suitable area and in such a manner that it will not erode. Check placement of device to prevent gaps between device and curb. Inspect filter fabric and patch or replace if torn or missing. Structures should be removed and the area stabilized only after the remaining drainage area has been properly stabilized.
Responsible Staff:	TBD

There are no storm drain inlets located within the construction area for the public wastewater line; therefore, no controls are proposed to protect storm drain inlets at the time of its construction.

G. ESTABLISH PERIMETER CONTROLS AND SEDIMENT BARRIERS

BMP Description: **Silt Fence – Perimeter**	
Installation Schedule:	Prior to commencing construction activities.
Maintenance and Inspection:	If a standard-strength fabric is used, it can be reinforced with wire mesh behind the filter fabric. This increases the effective life of the fence. The maximum life expectancy for synthetic fabric silt fences is about six (6)

	months, depending on the amount of rainfall and runoff. Burlap fences have a much shorter useful life span, usually up to two (2) months. Inspect silt fences regularly and frequently, as well as after each rainfall event, to make sure that they are intact and that there are no gaps where the fence meets the ground or tears along the length of the fence. If you find gaps or tears, repair or replace the fabric immediately. Remove accumulated sediments from the fence base when the sediment reaches one-third (1/3) to one-half (1/2) the fence height. Remove sediment more frequently if accumulated sediment is creating noticeable strain on the fabric and the fence might fail from a sudden storm event. When you remove the silt fence, remove the accumulated sediment as well.
Responsible Staff:	TBD

***BMP Description*: <u>Rock Berms – Check Dam</u>**	
***Installation Schedule*:**	Prior to commencing construction activities.
***Maintenance and Inspection*:**	Inspect the berm after every rainfall to make sure sediment has not built up and that vehicles have not damaged it. It is important to make repairs at the first sign of deterioration to keep the berm functioning properly.
***Responsible Staff*:**	TBD

H. RETAIN SEDIMENT ON-SITE .

***BMP Description:* <u>Sediment Basin</u>**	
Installation Schedule:	Prior to commencing construction activities.
Maintenance and Inspection:	Sediment basins should be inspected regularly (at least as often as required by the TPDES Construction General Permit) to check for damage and to ensure that obstructions are not diminishing the effectiveness of the structure. Sediment shall be removed and the basin shall be re-graded to its original dimensions when the sediment storage capacity of the impoundment has been reduced by 20 percent. The removed sediment may be stockpiled or redistributed onsite in areas that are protected by erosion and sediment controls. Inspect temporary stabilization of the embankment and graded basin and the velocity dissipaters at the outlet and spillway for signs of erosion. Repair any eroded areas that are found. Install additional erosion controls if erosion is frequently evident.
Responsible Staff:	TBD

I. ESTABLISH STABILIZED CONSTRUCTION EXITS

***BMP Description:* <u>Stabilized Construction Entrance/Exit</u>**	
Installation Schedule:	Prior to commencing construction activities.

Maintenance and Inspection:	Maintain stabilization of the site entrances until the rest of the construction site has been fully stabilized. You might need to add stone and gravel periodically to each stabilized construction site entrance to keep the entrance effective. Sweep up soil tracked offsite immediately for proper disposal. For sites with wash racks at each site entrance, construct sediment traps and maintain them for the life of the project. Periodically remove sediment from the traps to make sure they keep working
Responsible Staff:	TBD

J. ADDITIONAL BMPS

No additional BMPs are proposed onsite.

4.0 EXAMPLE PRACTICES

A. Example Stabilization Practices

1. Temporary Stabilization

   Top soil stock piles and disturbed portions of the site where construction activity temporarily ceases for at least 21 days will be stabilized with temporary seed and mulch no later than 14 days from the last construction activity in that area. Areas of the site which are to be paved will be temporarily stabilized until pavement can be applied.

2. Permanent Stabilization

   Disturbed portions of the site where construction activities permanently cease shall be stabilized with permanent seed no later than 14 days after the last construction activity.

B. Example Structural Practices

1. Interceptor Swale

   An interceptor swale is a small v-shaped or parabolic channel which collects runoff and directs it to a desired location. It can either have a natural grass lining or, depending upon slope and design velocity, a protective lining of erosion matting, stone or concrete. The interceptor swale can either be used to direct sediment-laden flow from disturbed areas into a controlled outlet or to direct “clean” runoff around disturbed areas. Since the swale is easy to install during early grading operations, it can serve as the first line of defense in reducing runoff across disturbed areas. As a method of reducing runoff across the disturbed construction area, it reduces the requirements of structural measures to capture sediment from runoff since the flow is reduced. By intercepting sediment-laden flow downstream of the disturbed area, runoff can be directed into a sediment basin or other BMP for sedimentation as opposed to long runs of silt fence, straw bales or other filtration method.

2. Silt Fence

   A silt fence consists of geotextile fabric supported by poultry netting or other backing stretched between either wooden or metal posts with the lower edge of the fabric securely embedded in the soil. The fence is typically located downstream of disturbed areas to intercept runoff in the form of sheet flow. Silt fence provides both filtration and time for sedimentation to reduce sediment and the velocity of the runoff. Properly designed silt fence is economical since it can be relocated during construction and reused on other projects. Silt fence is normally used as perimeter control located downstream of disturbed areas. It is only feasible for non-concentrated, sheet flow conditions.

3. Fiber Roll/Sediment Log

   Fiber rolls/sediment logs are tightly compacted tubular cylinders composed of straw, flax, coconut fiber, or other similar types of material wrapped with a fiber mesh. They must be secured with stakes. When installed at the base of an embankment or on a slope, fiber rolls are effective at controlling sediment and reducing erosion rates. They achieve this by intercepting storm water runoff, thereby reducing the velocity of the flow and dispersing concentrated runoff as sheet flows. Fiber rolls are also water-permeable and are effective at trapping eroded sediment. It is important not to crush fiber rolls when they are installed. If more than one sock is placed in a row, the socks should be overlapped; not abutted.

4. Inlet Control

   Inlet protection consists of a variety of methods of intercepting sediment at low point inlets through the use of stone, filter fabric and other materials. This is normally located at the inlet, providing either detention or filtration to reduce sediment and floatable materials in storm water. Inlet protection is normally used as a secondary defense in site erosion control due to the limited effectiveness and applicability of the technique. It is normally used in new developments that include new inlets or roads with new curb inlets or during major repairs to existing roadways. Inlet protection has limited use in developed areas due to the potential for loading, traffic safety and pedestrian safety and maintenance problems. Inlet protection can reduce sediment in a storm sewer system by serving as a back system to onsite controls or by reducing sediment loads from controls with limited effectiveness such as straw bale dikes.

5. Check Dams

   Check dams are small barriers consisting of straw bales, rock, or earth berms placed across a drainage swale or ditch. They reduce the velocity of small concentrated flows, provide a limited barrier for sediment and help disperse concentrated flows, reducing potential erosion. Check dams are used for long drainage swales or ditches in which permanent vegetation may not be established and erosive velocities are present. They are typically used in conjunction with other techniques such as inlet protection, rip rap or other sediment reduction techniques. Check dams provide limited treatment. They are more useful in reducing flow to acceptable levels.

6. Erosion Control Mats

   An erosion control mat (ECM) is a geomembrane or biodegradable fabric placed over disturbed areas to limit the effects of erosion due to rainfall and runoff across barren soil. Erosion control mats are manufactured by a wide variety of vendors addressing a wide variety of conditions such as vegetation

establishment and high velocity flow. Types of matting include organic (jute, straw) and synthetic (plastic and glass fiber) materials. Mats can provide both temporary and/or permanent stabilization for disturbed soil or barren areas. It is used for difficult areas to stabilize such as steep slopes, temporary or permanent drainage swales, embankments or high traffic (pedestrian) areas. Some mats are reusable, reducing the initial cost of the installation.

7. Stabilized Construction Entrance

   A stabilized construction entrance consists of a pad consisting of gravel, crushed stone, recycled concrete or other rock like material on top of geotextile filter cloth to facilitate the wash down and removal of sediment and other debris from construction equipment prior to exiting the construction site. For added effectiveness, a wash rack area can be incorporated into the design to further reduce sediment tracking. For long term projects, cattle guards or other type of permanent rack system can be used in conjunction with a wash rack. This directly addresses the problem of silt and mud deposition in roadways used for construction site access. Stabilized construction entrances are used primarily for sites in which significant truck traffic occurs on a daily basis. It reduces the need to remove sediment from streets. If used properly, it also directs the majority of traffic to a single location, reducing the number and quantity of disturbed areas on the site and providing protection for other structural controls through traffic control.

8. Earth Dike

   An earth dike is constructed along the uphill perimeter of a site. A portion of the dike will divert run-on around the construction site. The remaining portion of the dike will collect runoff from the disturbed area and direct the runoff to the sediment basin.

9. Triangular Sediment Filter Dike

   A triangular sediment filter dike is a self-contained silt fence consisting of filter fabric wrapped around welded wire fabric shaped into a triangular cross section. While similar in use to a silt fence, the dike is reusable, sturdier, transportable, and can be used on paved areas in situations where it is impractical to install embedded posts for support. Triangular filter dikes are used in place of silt fence, treating sediment flow at the perimeter of construction areas and at the perimeter of the site. Also, the dikes can serve as stream protection devices by preventing sediment from entering the streams or as check dams in small swales. Triangular sediment filter dikes are especially useful for construction areas surrounded by pavement, where silt fence or hay bale installation is impracticable. Since they can be anchored without penetration (through the use of rock), pavement damage can be minimized. Triangular dikes are used to provide perimeter control by detaining sediment on a disturbed site with drainage that would otherwise flow onto adjacent properties. Triangular dikes also serve as sediment trapping devices when used in areas of sheet flow across disturbed areas or are placed along stream banks to prevent sediment-laden sheet flow from entering the stream. The dikes can be subjected to more concentrated flows and a higher flow rate than silt fence.

10. Sediment Basin

    Sediment basins are required, where feasible, for sites with drainage areas of ten (10) or more acres. Additional information for sedimentation basins is located in Appendix N.

11. Tree Protection

Tree protection prevents the disturbance of existing trees and their roots on a construction site. Trees are not the same shape below ground as they are above, so it is difficult to predict the length or location of their roots. One common method used to identify the critical root zone is to define the tree's "drip line" – the area directly below the branches of the tree. Many roots extend beyond the longest branches a distance equal to two or more times the height of the tree. For this reason, it is recommended to protect as much of the area beyond the drip line as feasible. An example of tree protection is to tie continuous nylon string with two-foot tundra weight orange streamers to eight-foot minimum metal t-posts driven two feet into the ground. Four-foot minimum orange plastic fencing per manufacturer's recommendations will surround the critical root zone to keep equipment off the rooting area. If a fence cannot be erected, cushion the rooting area with six inches of wood chips, wood, or brick paths. Where root areas must be graded, cut large roots instead of tearing them with equipment.

C. Waste Control and Disposal

1. Waste Materials

   All waste materials will be collected and stored in a securely lidded metal dumpster rented from a local waste management company, which is a licensed solid waste management company. The dumpster will meet all local and any State solid waste management regulations. All trash and construction debris from the site will be deposited in the dumpster. The dumpster will be emptied periodically or more often if necessary, and the trash will be hauled to an appropriate waste management facility. No construction waste materials will be buried onsite. Staging areas for construction materials should have secondary containment. All personnel will be instructed regarding the correct procedure for waste disposal. Notices stating these practices will be posted in the office trailer. The individual who manages the day-to-day site operations will be responsible for seeing that these procedures are followed.

2. Hazardous Waste

   All hazardous waste materials will be disposed of in the manner specified by local or State regulations or by the manufacturer. Site personnel will be instructed in these practices and the individual who manages day-to-day site operations will be responsible for seeing that these practices are followed.

3. Sanitary Waste

   All sanitary waste will be collected from the portable units periodically by a licensed sanitary waste management contractor, as required by local regulation.

4. Offsite Vehicle Tracking and Dust Control

   A stabilized construction entrance has been provided to help reduce vehicle tracking of sediments. The paved street adjacent to the site entrance will be swept to remove any excess mud, dirt or rock tracked from the site. Dump trucks hauling material from the construction site will be covered with a tarpaulin. If dust is visible when dump trucks are leaving the site due to construction activities, dust suppression techniques such as wetting the soil will be employed.

D. Timing of Controls/Measures

The contractor and the operator shall review the SWP3 requirements prior to beginning construction activities. The following is a sample erosion control sequence:

- Site Mobilization: Prior to any construction on the site a stabilized construction entrance shall be installed.
- Clearing and Rough Grading: Prior to any grading of the site, erosion control measures shall be installed. These controls may include but are not limited to silt fences, sedimentation ponds and vegetated swales. The installation is required to prevent sediment from leaving disturbed areas.
- Storm Drain Installation: In addition to maintaining the devices installed during initial grading, supplemental control measures will need to be installed. These devices will include devices shown on the plan such as storm drain inlet protection and sediment traps. Inlet protection devices prevent sedimentation from entering the inlet and subsequently, the storm sewer system

as well as the receiving water body. Other devices may be required as shown on the erosion control plan or requested by the inspector or operator.

- Installation of Public Utilities: Additional control measures are likewise not required during installation of public utilities. However, maintenance of existing control measures installed during previous phases must continue.
- Pavement Installation: In addition to maintaining the control measures installed during initial grading and storm drain installation phases, supplemental measures should be installed. Upon completion of paving and curb backfill operations, control measures should be installed behind curbs at handicap ramps and along parkways where sediment could enter streets and/or paved areas.
- Final Grading: Additional control measures are not required during final grading. However, maintenance of existing control measures installed during previous phases will continue.
- Building Construction: In addition to maintaining previously installed control measures, a strict policy will be enacted which minimizes vehicle traffic from entering non-paved areas. Construction materials will be unloaded from existing paved surfaces where possible, thereby preventing disturbing control measures already in place and reducing sediment tracking into paved areas. Areas where construction activity temporarily ceases for more than 21 days will be stabilized with a temporary seed and mulch within 14 days of the last disturbance. Once construction activity ceases permanently in an area, that area will be stabilized with permanent seed and mulch. After the entire site is stabilized, the accumulated sediment will be removed and the erosion control measures will be removed.

5.0 RELEASES OF REPORTABLE QUANTITIES

Because construction activities may handle certain hazardous substances over the course of the project, spills of these substances in amounts that equal or exceed Reportable Quantity (RQ) levels are a possibility. Material management practice guidelines are located in Appendix K.

EPA has issued regulations that define what reportable quantity levels are for oil and hazardous substances. These regulations are found at 40 CFR Part 110 Part 117, or 40 CFR Part 302. A list of RQs are included in Appendix M. If there is a RQ release during the construction period, then you must take the following steps:

- Notify TCEQ immediately at (800) 832-8224.
- Notify the National Response Center immediately at (800) 424-8802.
- Within fourteen (14) days, submit a written description of the release to TCEQ providing the date and circumstances of the release and the steps to be taken to prevent another release.
- Modify the pollution prevention plan to include the date of release, the circumstances leading to the release, and steps taken to prevent reoccurrence of the release.

6.0 STATE AND LOCAL PROGRAMS

The TPDES program meets or exceeds the NPDES standards established on a federal level. This SWP3 has been developed in accordance with the requirements of the TPDES requirements. Information for the City of Dripping Springs has been included in Appendix N. Additional local requirements may apply and this SWP3 should be updated accordingly.

Storm water from the project construction area discharges into the storm sewer system of the City of Dripping Springs (MS4).

Construction projects that discharge storm water to an MS4 are required to:

- submit a copy of the signed NOI to the operator of the MS4 at least seven days prior to the commencement of construction activities,
- post a copy of the signed NOI and construction site notice at the project site at all times,
- submit a copy of any NOCs to the operator of the MS4,
- submit a copy of the NOT to the operator of the MS4, and
- keep and maintain a list of the names and address of MS4s that receive NOI, NOT, and/or NOC forms (Appendix H).

7.0 INSPECTION AND MAINTENANCE

A. Inspection Schedule

1. All disturbed areas, as well as all erosion and sediment control devices, will be inspected according to one of the following schedules:

   a) at least every seven (7) calendar days and within 24 hours after a rainfall of 0.5 inch or greater, or

   b) every seven (7) days on the same day of the week each week, regardless of whether or not there has been a rainfall event since the previous inspection.

2. Inspections may occur on either schedule provided that this SWP3 reflects the current schedule and that any changes are in accordance with the following:

   a) the schedule is changed a maximum of one time each month,

   b) the schedule change must be implemented at the beginning of a calendar month, and

   c) the reason for the schedule change must be documented in this SWP3 (an inspection schedule form is located in Appendix E).

B. Inspection Reports

1. Completed inspection reports (Appendix E) will include the following information:

   a) scope of the inspection,

   b) date of the inspection,

   c) name(s) of personnel making the inspection,

   d) reference to qualifications of inspection personnel,

   e) observed major construction activities, and

   f) actions taken as a result of the inspection.

2. All disturbed areas (on and off-site), areas for material storage locations where vehicles enter or exit the site, and all of the erosion and sediment controls that were identified as part of the SWP3 must be inspected. The inspection report must state whether the site was in compliance or identify any incidents of non-compliance. The report will be signed by the qualified inspector in accordance with the TPDES general permit and filed in the SWP3. A sample Inspection Report is included in Appendix E, along with an Inspector Qualification Form. All reports and inspections required by the general construction permit will be completed by a duly authorized representative. A copy of a Delegation of Signatories to Reports letter is included in Appendix J.

3. The operator should correct any damage or deficiencies as soon as practicable after the inspection, but in no case later than seven (7) calendar days after the inspection. If existing BMPs are modified or if additional BMPs are necessary, an implementation schedule must be described in the SWP3, and wherever possible, those changes implemented before the next storm event or as soon as practicable. A list of maintenance guidelines is included in Appendix E.

4. Inspection reports will be kept in the Operator's file, along with the SWP3, for at least three years from the date that the NOT is submitted to the TCEQ for the construction site.

C. Final Stabilization

Final stabilization of the construction site has been achieved when all soil disturbing activities at the site have been completed, and a uniform (e.g., evenly distributed, without large bare areas) perennial vegetative cover with a density of 70 percent of the native background vegetative cover for the area has been established on all unpaved areas and areas not covered by permanent structures. If a vegetative cover cannot be established, equivalent permanent stabilization measures (such as riprap, gabions, or geotextiles) can be employed. When these conditions have been met, BMPs can be removed from the construction area.

8.0 RECORD RETENTION

The permittee must retain the following records for a minimum period of three (3) years from the date that a NOT is submitted. Records include:

- A copy of the SWP3,
- All data used to complete the NOI, if an NOI is required for coverage under this general permit,
- All reports and actions required by this permit, including a copy of the construction site notice, and
- All records of submittal of forms submitted to the operator of any MS4 receiving the discharge and to the secondary operator of a large construction site, if applicable.

9.0 CONCRETE BATCH PLANTS (IF APPLICABLE)

A. Storm Water Runoff from Concrete Batch Plants

Discharges of storm water runoff from concrete batch plants may be authorized under the general permit provided that the requirements in Part IV of the permit are met (Appendix G). If discharges are not covered under the general permit, then discharges must be authorized under an alternative permit. Authorization for discharge or land disposal of concrete batch plant wastewater must be obtained under an alternative permit.

B. Benchmark Sampling Requirements

Operators of concrete batch plants must sample the storm water runoff from the concrete batch plant according to the requirements of the general permit. A table of benchmark monitoring values is located in Part IV.A. of the general permit. Analytical results that exceed a benchmark value are not a violation of the general construction permit. Results of analyses are indicators that modifications of the SWP3 should be assessed and may be necessary to protect water quality. Benchmark sampling records should be included in Appendix P.

C. Additional BMP and SWP3 Requirements

The following items are additional requirements for concrete batch plants. The Operator is responsible for updating the SWP3 as appropriate. Additional information for concrete batch plant requirements is located in Part IV of the general construction permit. Records and information for the concrete batch plant should be included in Appendix P.

1. A description of potential pollutant sources associated with the concrete batch plant must be kept in the SWP3.

2. The site map in Appendix A must include the following information:

    a) the location of all outfalls for storm water discharges associated with concrete batch plants;

    b) a depiction of the drainage area and the direction of flow to the outfall(s);

    c) structural controls used within the drainage area(s);

    d) the locations of the following areas associated with concrete batch plants that are exposed to precipitation: vehicle and equipment maintenance activity areas; areas used for the treatment, storage, or disposal of wastes; liquid storage tanks; material process and storage areas; and loading and unloading areas; and

    e) the locations of the following: any bag house or other dust control device(s); recycle/sedimentation pond, clarifier or other device used for the treatment of facility wastewater; areas with significant materials; and areas where major spills or leaks have occurred.

3. A list of materials handled at the concrete batch plant that may be exposed to storm water and that have a potential to affect the quality of storm water discharges associated with concrete batch plants must be kept in this SWP3.

4. A list of significant spills and leaks of toxic or hazardous pollutants that occurred in areas exposed to storm water and that drain to storm water outfalls associated with concrete batch plants must be developed, maintained, and updated.

5. A summary of existing storm water discharge sampling data must be maintained if available.

6. Good housekeeping measures must be developed and implemented in the area(s) associated with concrete batch plants.

7. Areas where potential spills that can contribute pollutants to storm water runoff, and the drainage areas from these locations must be identified. Include material handling procedures, storage requirements, and use of equipment information. Procedures for cleaning up spills must be identified and made available to the appropriate personnel.

8. Qualified facility personnel must be identified to inspect designated equipment and areas of the facility specified in this SWP3. Inspection frequency must be specified based upon a consideration of the level of concrete production, but must be a minimum of once per month while the facility is in operation. The inspection must take place while the facility is in operation and include all areas that are exposed to storm water at the site. Records of inspections must be maintained in Appendix P.

9. An employee training program must be developed to educate personnel. At a minimum, training must occur prior to the initiation of operation of the concrete batch plant.

10. A description of spills and similar incidents, plus additional information that is obtained regarding the quality and quantity of storm water discharges must be included with this SWP3.

11. Include a narrative consideration for reducing the volume of runoff from concrete batch plants by diverting runoff or otherwise managing runoff, including use of infiltration, detention ponds, retention ponds, or reusing of runoff.

12. At least once per year, one or more qualified personnel shall conduct a compliance evaluation of the plant. Evaluation requirements are listed in Part IV.B.3 of the general permit.

10.0 CONCRETE TRUCK WASH OUT (IF APPLICABLE)

The wash out of concrete trucks at the construction site is authorized, provided that the requirements in Part V of the general permit are met. Authorization is limited to the land disposal of wash out water from concrete trucks. Any other direct discharge of concrete production waste eater must be authorized under a separate general permit or individual permit.

A. Wash Out Requirements

1. Direct discharge of concrete truck wash out water to surface water in the state, including discharge to storm sewers, is prohibited by the general permit.

2. Concrete truck wash out water should be discharged to areas at the construction site where structural controls have been established to prevent direct discharge to surface waters, or to areas that have minimal slope that allow infiltration and filtering of wash out water to prevent direct discharge to surface waters. Structural controls may consist of temporary berms, temporary shallow pits, temporary storage tanks with slow rate release, or other reasonable measures to prevent runoff from the site.

3. Wash out of concrete trucks during rainfall events shall be minimized. The direct discharge of concrete wash out water is prohibited at all times, and the operator should have BMPs sufficient to prevent the discharge of concrete truck wash out as the result of rain.

4. The discharge of wash out water should not cause or contribute to groundwater contamination.

5. The Operator is responsible for showing concrete wash out areas on a map (Appendix A).

11.0 REFERENCES

North Central Texas Council of Governments (NCTCOG). 2010. Integrated Storm Water Management Technical Manual. http://iswm.nctcog.org/technical_manual.asp.

Texas Commission on Environmental Quality (TCEQ). 2014. "2014 Texas Water Quality Inventory and 303(d) List." [Online] (accessed on June 27, 2016). Available URL: http://www.tceq.texas.gov/assets/public/waterquality/swqm/assess/14txir/2014_basin12.pdf.

United States Department of Agriculture (USDA). 2016. Soil Survey of Williamson County, Texas. "Web Soil Survey." [Online] (accessed on June 27, 2016). Available URL: http://websoilsurvey.nrcs.usda.gov/app/

APPENDIX A

PROJECT MAPS

Map/Figure Notes:

- The Operator is solely responsible for selection, implementation, maintenance, and effectiveness of all BMPs.
- Best management practices shown on the attached figures are suggested controls only. The Operator will record BMPs (whether called out on the original SWP3 or not) directly on the site map.
- If information is not shown or if site conditions change from the attached figures, the Operator is responsible for updating the maps. The following information should be included on maps.
  - drainage patterns and approximate slopes anticipated after major grading activities,
  - areas where soil disturbance will occur,
  - locations of all major structural controls either planned or in place,
  - locations where stabilization practices are expected to be used,
  - locations of off-site material, waste, borrow, fill, or equipment storage areas,
  - surface waters (including wetlands) either adjacent or in close proximity,
  - locations where storm water discharges from the site directly to a surface water body or a MS4, and
  - vehicle wash areas
  - designated points on the site where vehicles will exit onto paved roads
- Where the amount of information required to be included on the map would result in a single map being difficult to interpret, the operator shall develop a series of maps that collectively include the required information.

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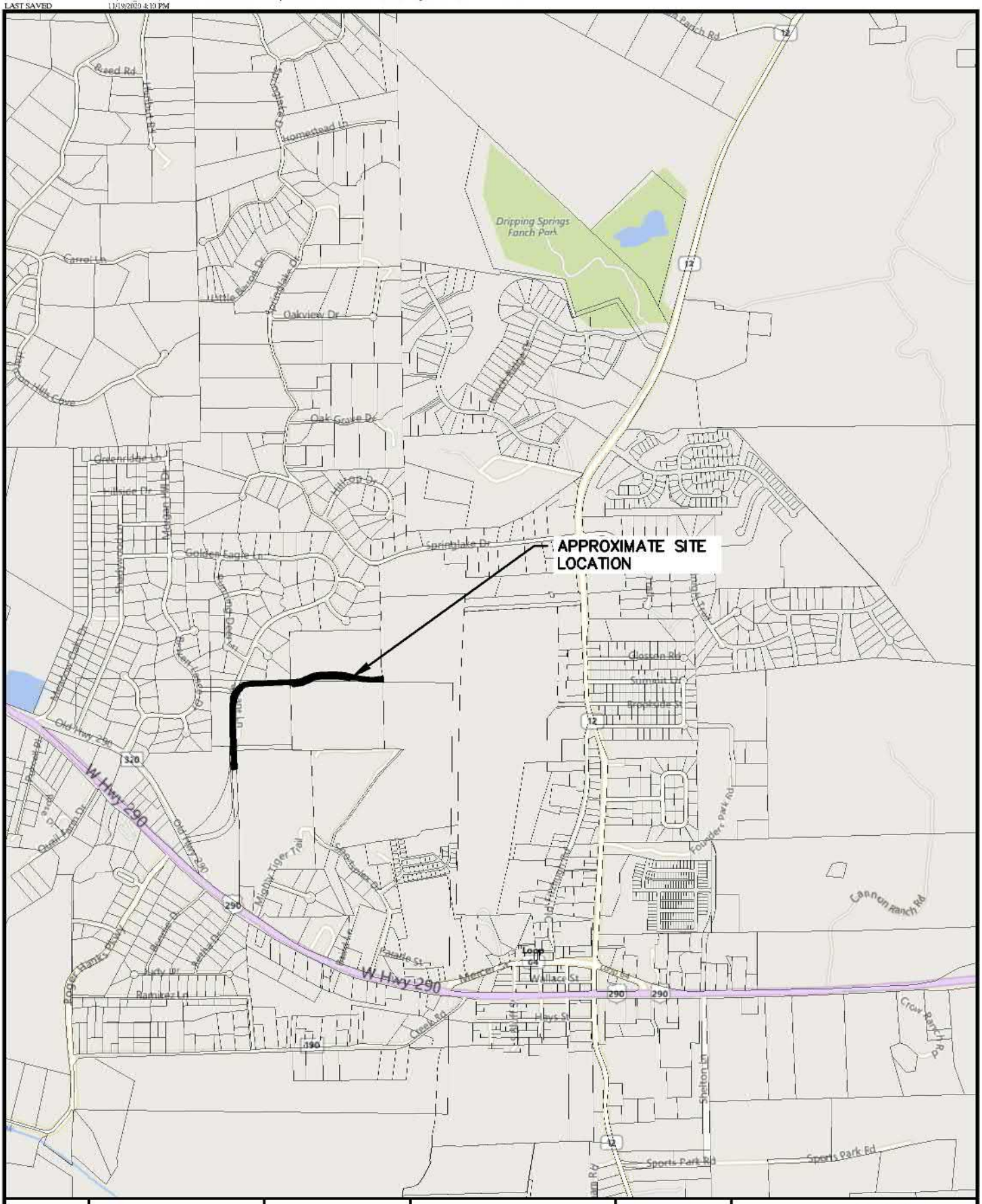

SHEET 1 OF 1 SHEETS	Scale:	N.T.S.	ROAD MAP	Roger Hanks Parkway Extension II Dripping Springs, Hays County, Texas	N W E S
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	Drawn by:	DPD			
	Checked by:	AEG			
	Date:	NOV, 2020			
	Project No.	067783117			

Kimley»Horn

IMAGES
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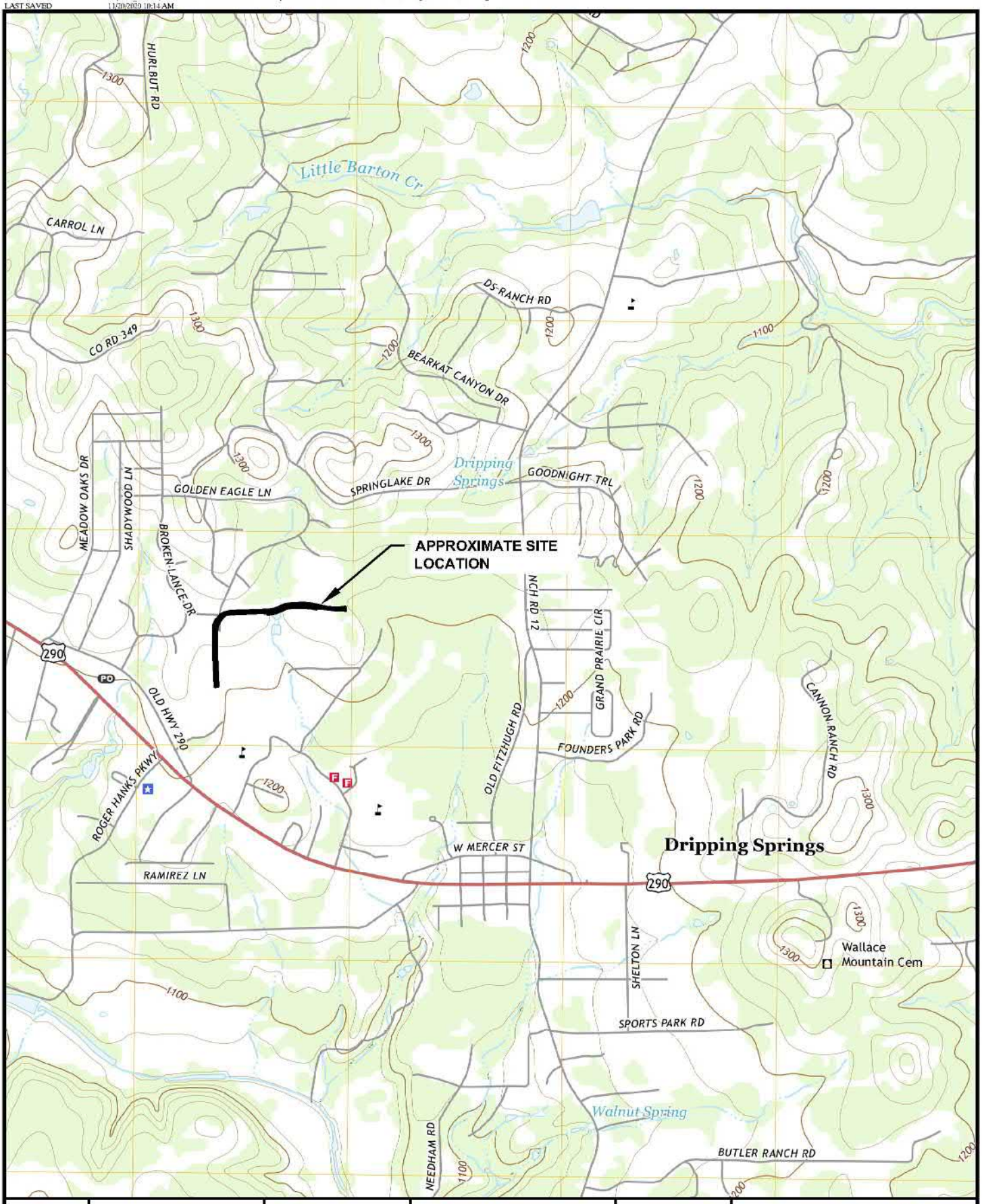


SHEET 1 OF 1 SHEETS	Scale: 1:2000 Designed by: DPD Drawn by: DPD Checked by: AEG Date: NOV, 2020 Project No. 067783117	USGS Quadrangle	ROGER HANKS PARKWAY EXTENSION II Dripping Springs, Hays County, Texas	N W E S	Kimley»Horn

This product is for informational purposes and may not have been prepared for or be suitable for legal, engineering, or surveying purposes. It does not represent an on-th-ground survey and represents only the approximate relative location of property boundaries.

United States Department of Agriculture

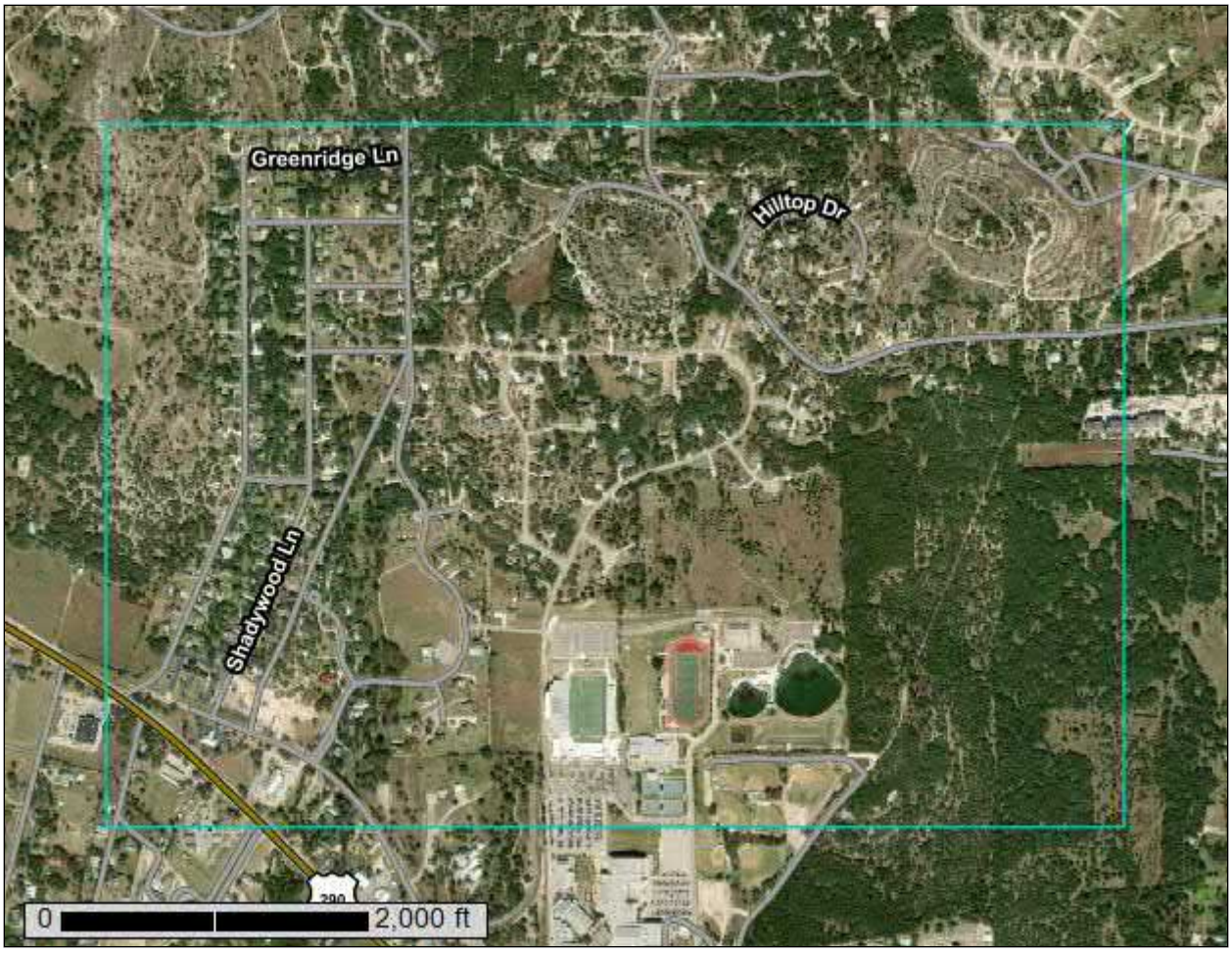
NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Comal and Hays Counties, Texas

Roger Hanks Parkway Extension II



November 23, 2020

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

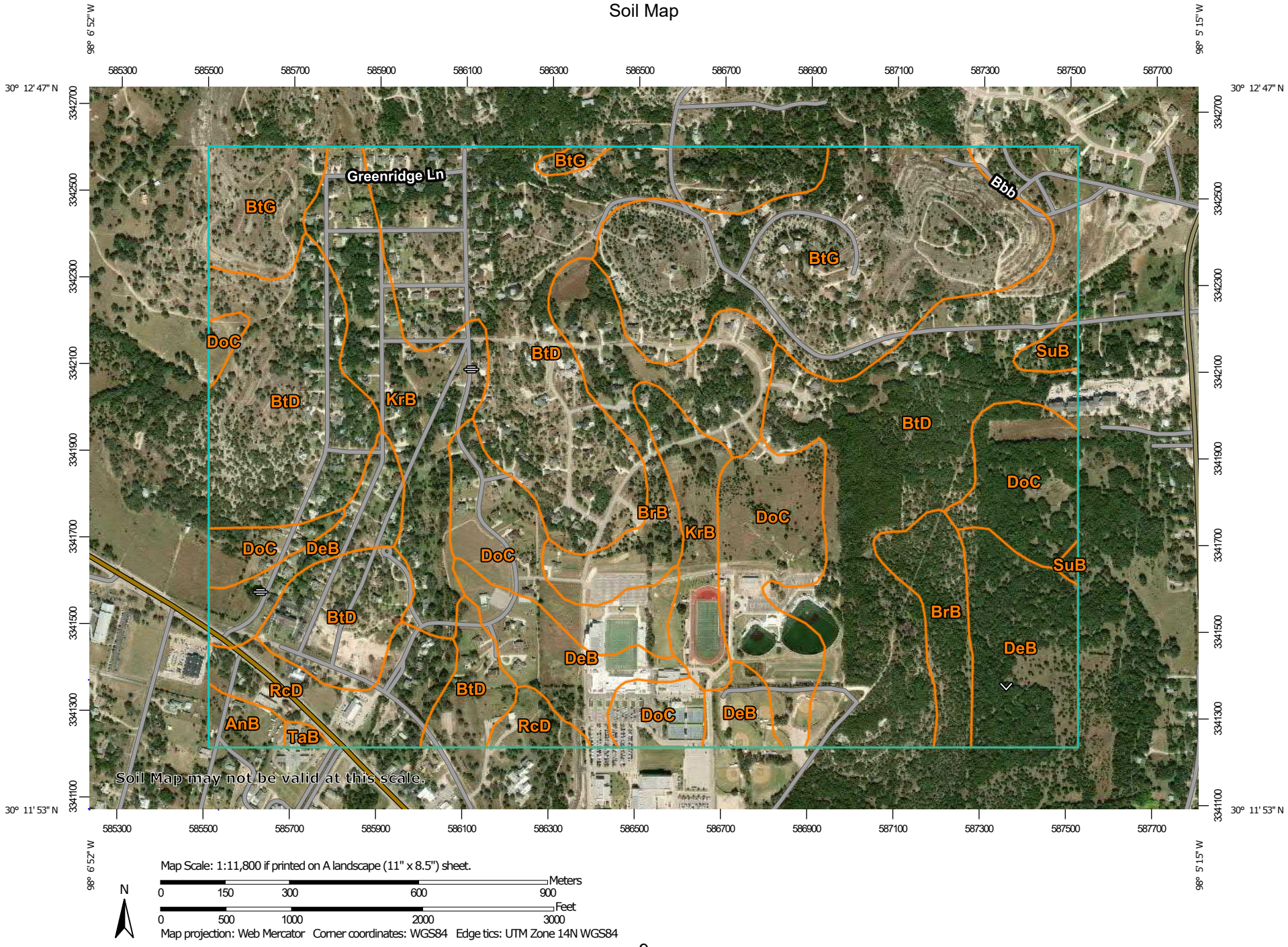
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Comal and Hays Counties, Texas
Survey Area Data: Version 17, Jun 11, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 2, 2016—Nov 30, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
AnB	Anhalt clay, 1 to 3 percent slopes	4.6	0.7%
BrB	Bolar clay loam, 1 to 3 percent slopes	55.4	8.0%
BtD	Brackett-Rock outcrop-Comfort complex, 1 to 8 percent slopes	273.4	39.4%
BtG	Brackett-Rock outcrop-Real complex, 8 to 30 percent slopes	106.5	15.4%
DeB	Denton silty clay, 1 to 3 percent slopes	66.9	9.7%
DoC	Doss silty clay, moist, 1 to 5 percent slopes	93.0	13.4%
KrB	Krum clay, 1 to 3 percent slopes	61.8	8.9%
RcD	Real-Comfort-Doss complex, 1 to 8 percent slopes	26.8	3.9%
SuB	Sunev clay loam, 1 to 3 percent slopes	3.7	0.5%
TaB	Tarpley clay, 1 to 3 percent slopes	1.2	0.2%
Totals for Area of Interest		**693.3**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a

particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Comal and Hays Counties, Texas

AnB—Anhalt clay, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2t2mf
Elevation: 570 to 2,200 feet
Mean annual precipitation: 31 to 36 inches
Mean annual air temperature: 65 to 68 degrees F
Frost-free period: 220 to 260 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Anhalt and similar soils: 92 percent
Minor components: 8 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Anhalt

Setting

Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Clayey residuum weathered from limestone

Typical profile

Ap - 0 to 6 inches: clay
Bss1 - 6 to 15 inches: clay
Bss2 - 15 to 29 inches: clay
Cr - 29 to 60 inches: bedrock

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water capacity: Low (about 3.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: D
Ecological site: R081CY358TX - Deep Redland 29-35 PZ
Hydric soil rating: No

Minor Components

Tarpley

Percent of map unit: 6 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R081CY361TX - Redland 29-35 PZ
Hydric soil rating: No

Krum

Percent of map unit: 2 percent
Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R081CY357TX - Clay Loam 29-35 PZ
Hydric soil rating: No

BrB—Bolar clay loam, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2t272
Elevation: 650 to 1,720 feet
Mean annual precipitation: 30 to 36 inches
Mean annual air temperature: 64 to 68 degrees F
Frost-free period: 230 to 260 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Bolar and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bolar

Setting

Landform: Hillslopes
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Loamy residuum weathered from limestone

Typical profile

A - 0 to 14 inches: clay loam
Bk - 14 to 28 inches: clay loam
R - 28 to 80 inches: bedrock

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 80 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water capacity: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: C
Ecological site: R081CY357TX - Clay Loam 29-35 PZ
Hydric soil rating: No

Minor Components

Denton

Percent of map unit: 3 percent
Landform: Hillslopes
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R081CY357TX - Clay Loam 29-35 PZ
Hydric soil rating: No

Krum

Percent of map unit: 3 percent
Landform: Drainageways
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Linear
Across-slope shape: Concave, linear
Ecological site: R081CY357TX - Clay Loam 29-35 PZ
Hydric soil rating: No

Doss

Percent of map unit: 2 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R081CY574TX - Shallow 29-35 PZ
Hydric soil rating: No

Sunev

Percent of map unit: 2 percent
Landform: Stream terraces

Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: R081CY357TX - Clay Loam 29-35 PZ
Hydric soil rating: No

BtD—Brackett-Rock outcrop-Comfort complex, 1 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2ylv1
Elevation: 800 to 2,000 feet
Mean annual precipitation: 33 to 37 inches
Mean annual air temperature: 65 to 69 degrees F
Frost-free period: 220 to 260 days
Farmland classification: Not prime farmland

Map Unit Composition

Brackett and similar soils: 50 percent
Rock outcrop: 20 percent
Comfort and similar soils: 15 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Brackett

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from limestone

Typical profile

A - 0 to 6 inches: paragravelly clay loam
Bk - 6 to 14 inches: gravelly clay loam
Cr - 14 to 60 inches: bedrock

Properties and qualities

Slope: 1 to 8 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 90 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water capacity: Very low (about 1.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: R081CY355TX - Adobe 29-35 PZ
Hydric soil rating: No

Description of Rock Outcrop

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, backslope, shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Limestone

Typical profile

R - 0 to 48 inches: bedrock

Properties and qualities

Slope: 1 to 8 percent
Depth to restrictive feature: 0 to 2 inches to lithic bedrock
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 1.98 in/hr)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Hydric soil rating: No

Description of Comfort

Setting

Landform: Ridges
Landform position (two-dimensional): Shoulder, summit, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from limestone

Typical profile

A - 0 to 6 inches: very stony clay
Bt - 6 to 13 inches: extremely stony clay
R - 13 to 40 inches: bedrock

Properties and qualities

Slope: 1 to 8 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches

Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water capacity: Very low (about 0.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Ecological site: R081CY360TX - Low Stony Hill 29-35 PZ
Hydric soil rating: No

Minor Components

Bolar

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R081CY357TX - Clay Loam 29-35 PZ
Hydric soil rating: No

Doss

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R081CY574TX - Shallow 29-35 PZ
Hydric soil rating: No

Purves

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R081CY574TX - Shallow 29-35 PZ
Hydric soil rating: No

BtG—Brackett-Rock outcrop-Real complex, 8 to 30 percent slopes

Map Unit Setting

National map unit symbol: 2t2m3
Elevation: 470 to 1,900 feet
Mean annual precipitation: 32 to 37 inches
Mean annual air temperature: 66 to 68 degrees F
Frost-free period: 230 to 265 days
Farmland classification: Not prime farmland

Map Unit Composition

Brackett and similar soils: 38 percent
Rock outcrop: 25 percent
Real and similar soils: 22 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Brackett

Setting

Landform: Ridges
Landform position (two-dimensional): Shoulder, backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Residuum weathered from limestone

Typical profile

A - 0 to 6 inches: gravelly clay loam
Bk - 6 to 14 inches: gravelly clay loam
Cr - 14 to 60 inches: bedrock

Properties and qualities

Slope: 8 to 30 percent
Surface area covered with cobbles, stones or boulders: 0.0 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 90 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water capacity: Very low (about 1.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: R081CY362TX - Steep Adobe 29-35 PZ
Hydric soil rating: No

Description of Rock Outcrop

Setting

Landform: Ridges
Landform position (two-dimensional): Footslope, backslope
Landform position (three-dimensional): Side slope, base slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Limestone

Typical profile

R - 0 to 80 inches: bedrock

Properties and qualities

Slope: 8 to 30 percent
Depth to restrictive feature: 0 to 2 inches to lithic bedrock
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 1.98 in/hr)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydrologic Soil Group: D
Hydric soil rating: No

Description of Real

Setting

Landform: Ridges
Landform position (two-dimensional): Footslope, backslope
Landform position (three-dimensional): Base slope, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from limestone

Typical profile

A - 0 to 4 inches: gravelly loam
Ak - 4 to 14 inches: extremely gravelly loam
Cr - 14 to 40 inches: bedrock

Properties and qualities

Slope: 8 to 30 percent
Surface area covered with cobbles, stones or boulders: 0.0 percent
Depth to restrictive feature: 8 to 19 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 1.98 in/hr)
Depth to water table: More than 80 inches

Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 70 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water capacity: Very low (about 1.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: R081CY362TX - Steep Adobe 29-35 PZ
Hydric soil rating: No

Minor Components

Eckrant

Percent of map unit: 10 percent
Landform: Ridges
Landform position (two-dimensional): Shoulder, summit, backslope, footslope
Landform position (three-dimensional): Crest
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R081BY350TX - Steep Rocky 23-31 PZ
Hydric soil rating: No

Volente

Percent of map unit: 5 percent
Landform: Drainageways
Landform position (two-dimensional): Toeslope, footslope, backslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R081CY357TX - Clay Loam 29-35 PZ
Hydric soil rating: No

DeB—Denton silty clay, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2t26l
Elevation: 570 to 1,870 feet
Mean annual precipitation: 31 to 36 inches
Mean annual air temperature: 65 to 68 degrees F
Frost-free period: 220 to 260 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Denton and similar soils: 88 percent
Minor components: 12 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Denton

Setting

Landform: Hillslopes
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Silty and clayey slope alluvium over residuum weathered from limestone

Typical profile

A - 0 to 14 inches: silty clay
Bw - 14 to 25 inches: silty clay
Bk - 25 to 33 inches: silty clay
Ck - 33 to 36 inches: gravelly silty clay
R - 36 to 80 inches: bedrock

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: 22 to 60 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 80 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water capacity: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: D
Ecological site: R081CY357TX - Clay Loam 29-35 PZ
Hydric soil rating: No

Minor Components

Krum

Percent of map unit: 6 percent
Landform: Drainageways
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R081CY357TX - Clay Loam 29-35 PZ
Hydric soil rating: No

Doss

Percent of map unit: 4 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R081BY343TX - Shallow 23-31 PZ
Hydric soil rating: No

Anhalt

Percent of map unit: 2 percent
Landform: Hillslopes
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R081CY358TX - Deep Redland 29-35 PZ
Hydric soil rating: No

DoC—Doss silty clay, moist, 1 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2s0st
Elevation: 630 to 1,840 feet
Mean annual precipitation: 30 to 36 inches
Mean annual air temperature: 66 to 68 degrees F
Frost-free period: 210 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Doss and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Doss

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Residuum weathered from limestone

Typical profile

A - 0 to 9 inches: silty clay
Bk - 9 to 17 inches: silty clay
Cr - 17 to 80 inches: bedrock

Properties and qualities

Slope: 1 to 5 percent
Depth to restrictive feature: 11 to 20 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 70 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water capacity: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Ecological site: R081CY574TX - Shallow 29-35 PZ
Hydric soil rating: No

Minor Components

Brackett

Percent of map unit: 7 percent
Landform: Ridges
Landform position (two-dimensional): Shoulder, backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R081CY362TX - Steep Adobe 29-35 PZ
Hydric soil rating: No

Bolar

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R081CY357TX - Clay Loam 29-35 PZ
Hydric soil rating: No

Purves

Percent of map unit: 1 percent
Landform: Plains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R081CY574TX - Shallow 29-35 PZ
Hydric soil rating: No

Denton

Percent of map unit: 1 percent
Landform: Plains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R081CY357TX - Clay Loam 29-35 PZ
Hydric soil rating: No

Eckrant

Percent of map unit: 1 percent
Landform: Ridges
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R081CY360TX - Low Stony Hill 29-35 PZ
Hydric soil rating: No

KrB—Krum clay, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2t2j5
Elevation: 550 to 1,750 feet
Mean annual precipitation: 31 to 37 inches
Mean annual air temperature: 65 to 69 degrees F
Frost-free period: 230 to 250 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Krum and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Krum

Setting

Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Calcareous silty and clayey alluvium derived from limestone

Typical profile

A - 0 to 16 inches: clay
Bk1 - 16 to 58 inches: clay
Bk2 - 58 to 66 inches: clay
Ck - 66 to 80 inches: clay

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Calcium carbonate, maximum content: 50 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 3.0
Available water capacity: High (about 9.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: R081CY357TX - Clay Loam 29-35 PZ
Hydric soil rating: No

Minor Components

Bolar

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R081CY357TX - Clay Loam 29-35 PZ
Hydric soil rating: No

Doss

Percent of map unit: 3 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R081CY574TX - Shallow 29-35 PZ
Hydric soil rating: No

Lewisville

Percent of map unit: 2 percent
Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: R081CY357TX - Clay Loam 29-35 PZ
Hydric soil rating: No

RcD—Real-Comfort-Doss complex, 1 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2ylv4
Elevation: 1,000 to 1,400 feet
Mean annual precipitation: 33 to 37 inches
Mean annual air temperature: 65 to 69 degrees F
Frost-free period: 220 to 260 days

Farmland classification: Not prime farmland

Map Unit Composition

Real and similar soils: 40 percent
Comfort and similar soils: 30 percent
Doss and similar soils: 20 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Real

Setting

Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from limestone

Typical profile

A - 0 to 4 inches: gravelly loam
Ak - 4 to 14 inches: very gravelly loam
Crk - 14 to 40 inches: bedrock

Properties and qualities

Slope: 1 to 8 percent
Depth to restrictive feature: 8 to 16 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 70 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water capacity: Very low (about 1.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: R081CY355TX - Adobe 29-35 PZ
Hydric soil rating: No

Description of Comfort

Setting

Landform: Ridges
Landform position (two-dimensional): Shoulder, backslope, summit
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from limestone

Typical profile

A - 0 to 6 inches: very stony clay

Bt - 6 to 13 inches: extremely stony clay
R - 13 to 40 inches: bedrock

Properties and qualities

Slope: 1 to 8 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water capacity: Very low (about 0.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Ecological site: R081CY360TX - Low Stony Hill 29-35 PZ
Hydric soil rating: No

Description of Doss

Setting

Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Clayey residuum weathered from limestone

Typical profile

A - 0 to 9 inches: clay loam
Bk - 9 to 18 inches: clay loam
Crk - 18 to 41 inches: bedrock

Properties and qualities

Slope: 1 to 8 percent
Depth to restrictive feature: 11 to 20 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 70 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water capacity: Very low (about 1.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: D
Ecological site: R081CY574TX - Shallow 29-35 PZ
Hydric soil rating: No

Minor Components

Rock outcrop
Percent of map unit: 4 percent
Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Brackett
Percent of map unit: 3 percent
Landform: Ridges
Landform position (two-dimensional): Summit, backslope, shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R081CY355TX - Adobe 29-35 PZ
Hydric soil rating: No

Eckrant
Percent of map unit: 3 percent
Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R081CY360TX - Low Stony Hill 29-35 PZ
Hydric soil rating: No

SuB—Sunev clay loam, 1 to 3 percent slopes

Map Unit Setting
National map unit symbol: f6mf
Elevation: 430 to 1,500 feet
Mean annual precipitation: 28 to 34 inches
Mean annual air temperature: 63 to 70 degrees F
Frost-free period: 230 to 245 days
Farmland classification: Farmland of statewide importance

Map Unit Composition
Sunev and similar soils: 85 percent
Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sunev

Setting

Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Alluvium derived from limestone

Typical profile

H1 - 0 to 11 inches: clay loam
H2 - 11 to 35 inches: clay loam
H3 - 35 to 45 inches: clay loam

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 70 percent
Available water capacity: Moderate (about 6.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Ecological site: R081CY357TX - Clay Loam 29-35 PZ
Hydric soil rating: No

Minor Components

Unnamed

Percent of map unit: 15 percent
Hydric soil rating: No

TaB—Tarpley clay, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2t2m9
Elevation: 570 to 2,300 feet
Mean annual precipitation: 30 to 37 inches
Mean annual air temperature: 64 to 68 degrees F
Frost-free period: 220 to 260 days
Farmland classification: Not prime farmland

Map Unit Composition

Tarpley and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tarpley

Setting

Landform: Hillslopes
Landform position (two-dimensional): Shoulder, summit, backslope
Landform position (three-dimensional): Side slope, interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Clayey residuum weathered from limestone

Typical profile

A - 0 to 6 inches: clay
Bt - 6 to 17 inches: clay
R - 17 to 60 inches: bedrock

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: 13 to 20 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water capacity: Very low (about 2.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: D
Ecological site: R081CY361TX - Redland 29-35 PZ
Hydric soil rating: No

Minor Components

Anhalt

Percent of map unit: 4 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R081CY358TX - Deep Redland 29-35 PZ
Hydric soil rating: No

Doss

Percent of map unit: 2 percent

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R081CY574TX - Shallow 29-35 PZ
Hydric soil rating: No

Rumple

Percent of map unit: 2 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R081CY359TX - Gravelly Redland 29-35 PZ
Hydric soil rating: No

Rock outcrop

Percent of map unit: 2 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

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APPENDIX B

CONSTRUCTION ACTIVITY SCHEDULE

Construction Activity Schedule

Activities	Start Date	Finish Date
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
11.		

*Construction activity sequences for linear projects may be conducted on a rolling basis. As a result, construction activities may be at different stages at different locations in the project area. The Contractor is required to complete and update the schedule and adjust as necessary.

APPENDIX C

BEST MANAGEMENT PRACTICE CHECKLIST AND FACT SHEETS

Best Management Practice Measures and Controls

Best Management Practice (BMP)	In Use	Maintained Post Construction?
Interceptor Swale		
Diversion Dike		
Pipe Slope Drain		
Vegetation		
Mulching		
Erosion Control Blankets		
Channel Protection		
Dust Control		
Silt Fence		
Organic Filter Berm		
Triangular Sediment Filter Dike		
Inlet Protection		
Stone Outlet Sediment Trap		
Sediment Basin		
Check Dam		
Temporary Sediment Tank		
Stabilized Construction Entrance		
Wheel Wash		
Debris and Trash Management		
Chemical Management		
Concrete Waste Management		
Concrete Sawcutting Waste Management		
Sandblasting Waste Management		
Lime Stabilization Management		
Sanitary Facilities		
Other*		
Other*		

*If another BMP is being used, include the BMP information in Appendix D.

EROSION AND SEDIMENT CONTROL CHECKLIST

Instructions: Check each item and fill in the blanks below to evaluate compliance for each drainage area and location.

Stabilization Practices:

☐ Stabilization will be initiated on all disturbed areas where construction activity will not occur for a period of more than 21 calendar days by the 14th day after construction activity has permanently or temporarily ceased. Stabilization measures to be used include:

- ☐ Temporary Seeding
- ☐ Permanent Seeding
- ☐ Mulching
- ☐ Sod Stabilization
- ☐ Geotextiles
- ☐ Other _____

Structural Practices

☐ Flows from upstream areas will be diverted from exposed soils to the degree attainable. Measures to be used include:

- ☐ Earth Dike
- ☐ Drainage Swale
- ☐ Interceptor Dike and Swale
- ☐ Pipe Slope Drain
- ☐ Other _____

For Drainage locations serving less than 10 disturbed acres, Sediment *Basin will be installed and will include:*

- ☐ Sediment Trap
- ☐ Silt Fence or equivalent along all sideslopes & downstream boundaries

For Drainage locations serving 10 or more disturbed acres, a Sediment Basin will be installed (See Appendix N), if a Sediment Basin is not attainable on-site, Sediment Controls will be installed & will include:

- ☐ Sediment Trap
- ☐ Silt Fence or equivalent along all sideslopes & downstream boundaries
- ☐ Sediment Basin

FINAL STABILIZATION / TERMINATION CHECKLIST

1. All soil disturbing activities are complete.

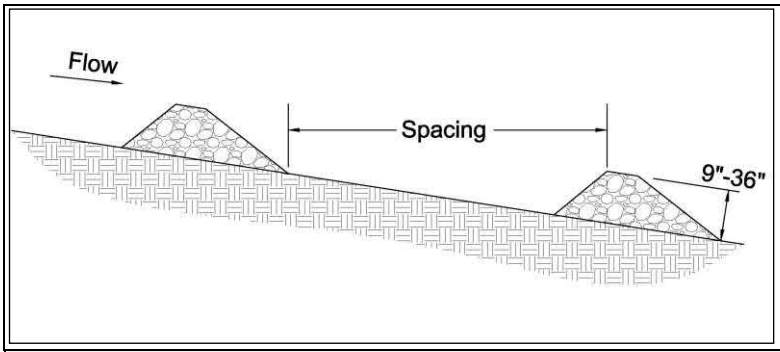
2. Temporary erosion and sediment control measures have been, or will be, removed at an appropriate time.

3. All areas of the construction site not otherwise covered by a permanent pavement or structure have been stabilized with a uniform perennial vegetative cover with a density of 70% or equivalent measures have been employed.

2.0 Erosion Controls

2.1 Check Dam

Erosion Control



Description: Check dams are small barriers consisting of loose rock, rock bags, or organic filter tubes placed across a drainage swale or ditch. They reduce the velocity of small concentrated flows, provide a limited barrier for sediment and reduce the potential for erosion of the swale or ditch.

KEY CONSIDERATIONS

DESIGN CRITERIA:

- Heights between 9 inches and 36 inches
- Top of the downstream dam should be at the same elevation as the toe of the upstream dam

ADVANTAGES / BENEFITS:

- Reduced velocities in long drainage swales or ditches
- May be used with other channel protection measures
- Provides some sediment removal

DISADVANTAGES / LIMITATIONS:

- Cannot be used in live stream channels
- Minor ponding upstream of the check dams
- Extensive maintenance or replacement of the dams required after heavy flows or high velocity flows
- Mowing hazard from loose rocks if all rock is not removed at end of construction

MAINTENANCE REQUIREMENTS:

- Inspect regularly
- Remove silt when it reaches approximately ⅓ the height of the dam or 12 inches, whichever is less

TARGETED POLLUTANTS

- ◒ Sediment
- ○ Nutrients & Toxic Materials
- ○ Oil & Grease
- ◒ Floatable Materials
- ○ Other Construction Wastes

APPLICATIONS

Perimeter Control

Slope Protection

Sediment Barrier

Channel Protection

Temporary Stabilization

Final Stabilization

Waste Management

Housekeeping Practices

Fe=0.30-0.50
(*Depends on soil type*)

IMPLEMENTATION CONSIDERATIONS

- ◒ Capital Costs
- ● Maintenance
- ○ Training
- ◒ Suitability for Slopes > 5%

Other Considerations:

- *None*

2.1.1 Primary Use

Check dams are used in long drainage swales or ditches to reduce erosive velocities. They are typically used in conjunction with other channel protection techniques such as vegetation lining and turf reinforcement mats. Check dams provide limited treatment to sediment-laden flows. They are more useful in reducing flow velocities to acceptable levels for stabilization methods. Check dams may be used in combination with stone outlet sediment traps, where the check dams prevent erosion of the swale while the sediment trap captures sediment at the downstream end of the swale.

2.1.2 Applications

Check dams are typically used in swales and drainage ditches along linear projects such as roadways. They can also be used in short swales down a steep slope, such as swales down a highway embankment, to reduce velocities. Check dams shall not be used in live stream channels.

Check dams should be installed before the contributing drainage area is disturbed, so as to mitigate the effects on the swale from the increase in runoff. If the swale itself is graded as part of the construction activities, check dams are installed immediately upon completion of grading to control velocities in the swale until stabilization is completed.

2.1.3 Design Criteria

General Criteria

- Typically, the dam height should be between 9 inches and 36 inches, depending on the material of which they are made. The height of the check dam shall always be less than one-third the depth of the channel.
- Dams should be spaced such that the top of the downstream dam is at the same elevation as the toe of the upstream dam. On channel grades flatter than 0.4 percent, check dams should be placed at a distance that allows small pools to form between each check dam.
- The top of the side of the check dam shall be a minimum of 12 inches higher than the middle of the dam. In addition, the side of the dams shall be embedded a minimum of 18 inches into the side of the drainage ditch, swale or channel to minimize the potential for flows to erode around the side of the dam.
- Larger flows (greater than 2-year, 24-hour design storm) must pass the check dam without causing excessive upstream flooding.
- Check dams should be used in conjunction with other sediment reduction techniques prior to releasing flow offsite.
- Use geotextile filter fabric under check dams of 12 inches in height or greater. The fabric shall meet the following minimum criteria:
    - Tensile Strength, ASTM D4632 Test Method for Grab Breaking Load and Elongation of Geotextiles, 250-lbs.
    - Puncture Rating, ASTM D4833 Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products, 135-lbs.
    - Mullen Burst Rating, ASTM D3786 Standard Test Method for Hydraulic Bursting Strength of Textile Fabrics-Diaphragm Bursting Strength Tester Method, 420-psi.
    - Apparent Opening Size, ASTM D4751 Test Method for Determining Apparent Opening Size of a Geotextile, U.S. Sieve No. 20 (max).
- Loose, unconfined soil, wood chips, compost, and other material that can float or be transported by runoff shall not be used to construct check dams.

Rock Check Dams

- Stone shall be well graded with stone size ranging from 3 to 6 inches in diameter for a check dam height of 24 inches or less. The stone size range for check dams greater than 24 inches is 4 to 8 inches in diameter.
- Rock check dams shall have a minimum top width of 2 feet with side slopes of 2:1 or flatter.

Rock Bag Check Dams

- Rock bag check dams should have a minimum top width of 16 inches.
- Bag length shall be 24 inches to 30 inches, width shall be 16 inches to 18 inches and thickness shall be 6 inches to 8 inches and having a minimum weight of 40 pounds.
- Minimum rock bag dam height of 12 inches would consist of one row of bags stacked on top of two rows of bag. The dam shall always be one more row wide than it is high, stacked pyramid fashion.
- Bags should be filled with pea gravel, filter stone, or aggregate that is clean and free of deleterious material.
- Sand bags shall not be used for check dams, due to their propensity to break and release sand that is transported by the concentrated flow in the drainage swale or ditch.
- Bag material shall be polypropylene, polyethylene, polyamide or cotton burlap woven fabric, minimum unit weight 4-ounces-per-square-yard, Mullen burst strength exceeding 300-psi as determined by ASTM D3786, Standard Test Method for Hydraulic Bursting Strength of Textile Fabrics-Diaphragm Bursting Strength Tester Method, and ultraviolet stability exceeding 70 percent.
- PVC pipes may be installed through the dam to allow for controlled flow through the dam. Pipe should be schedule 40 or heavier polyvinyl chloride (PVC) having a nominal internal diameter of 2 inches.

Sack Gabion Check Dams

- Sack gabion check dams may be used in channels with a contributing drainage area of 5 acres or less.
- Sack gabions shall be wrapped in galvanized steel, woven wire mesh. The wire shall be 20 gauge with 1 inch diameter, hexagonal openings.
- Wire mesh shall be one piece, wrapped around the rock, and secured to itself on the downstream side using wire ties or hog rings.
- Sack gabions shall be staked with ¾ inch rebar at a maximum spacing of three feet. Each wire sack shall have a minimum of two stakes.
- Stone shall be well graded with a minimum size range from 3 to 6 inches in diameter.

Organic Filter Tube Check Dams

- Organic filter tubes may be used as check dams in channels with a contributing drainage area of 5 acres or less.
- Organic filter tubes shall be a minimum of 12 inches in diameter.
- Filter material used within tubes to construct check dams shall be limited to coir, straw, aspen fiber and other organic material with high cellulose content. The material should be slow to decay or leach nutrients in standing water.
- Staking of filter tubes shall be at a maximum of 4 foot spacing and shall alternate through the tube and on the downstream face of the tube.
- Unless superseded by requirements in this section, filter tubes and filter material shall comply with the

criteria in *Section 3.6 Organic Filter Tubes*.

2.1.4 Design Guidance and Specifications

Specifications for construction of this item may be found in the Standard Specifications for Public Works Construction – North Central Texas Council of Governments, Section 201.9 Check Dam (Rock). Specifications are also available in the Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges (TxDOT 2004), Item 506.2.A and Item 506.4.C.1.

2.1.5 Inspection and Maintenance Requirements

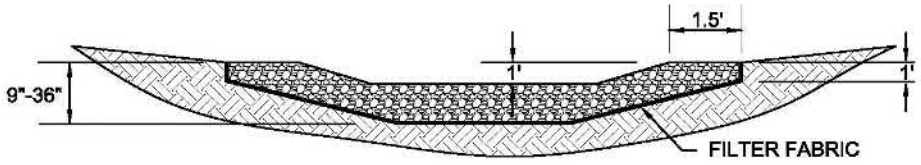
Check dams should be inspected regularly (at least as often as required by the TPDES Construction General Permit). Silt must be removed when it reaches approximately 1/3 the height of the dam or 12 inches, whichever is less. Inspectors should monitor the edges of the dam where it meets the sides of the drainage ditch, swale or channel for evidence of erosion due to bypass or high flows. Eroded areas shall be repaired. If erosion continues to be a problem, modifications to the check dam or additional controls are needed.

Care must be used when taking out rock check dams in order to remove as much rock as possible. Loose rock can create an extreme hazard during mowing operations once the area has been stabilized.

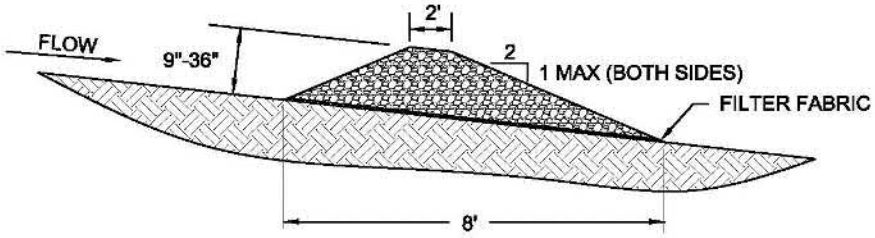
2.1.6 Example Schematics

The following schematics are example applications of the construction control. They are intended to assist in understanding the control's design and function.

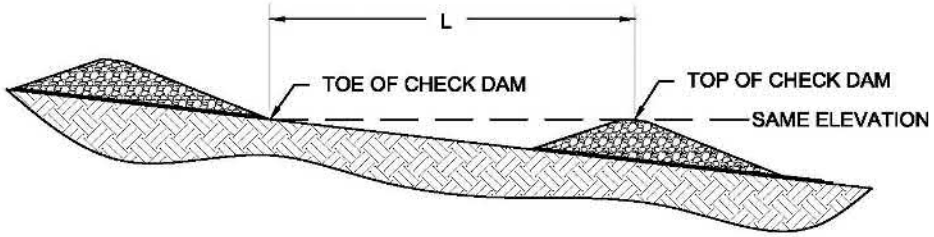
The schematics are **not for construction**. They may serve as a starting point for creating a construction detail, but they must be adapted for the site by the designer. Dimensions and notes appropriate for the application must also be added by the designer.



ROCK CHECK DAM VIEW LOOKING UPSTREAM
N.T.S.



CROSS SECTION OF ROCK CHECK DAM
N.T.S.

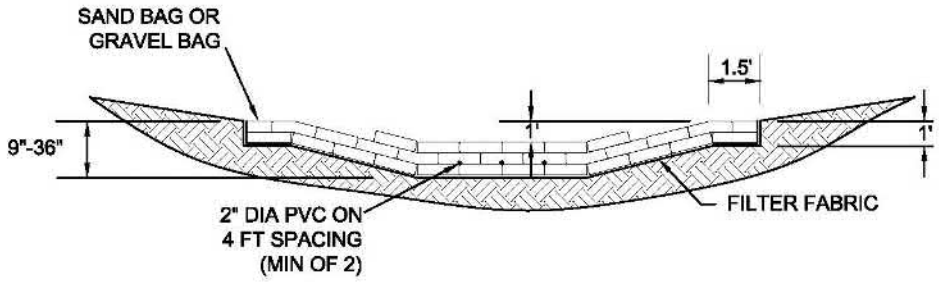


SPACING BETWEEN ROCK CHECK DAMS
N.T.S.

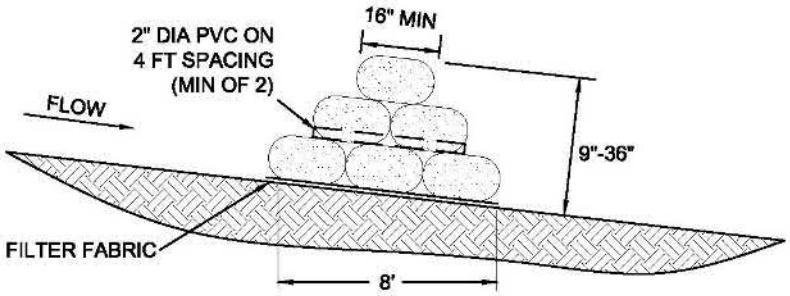
NOTES: ACTUAL DIMENSIONS OF THE CHECK DAMS SHALL BE DESIGNED BASED ON FLOW CONDITIONS IN THE DRAINAGE SWALE OR DITCH. PROVIDE CALCULATIONS THAT DOCUMENT THE FOLLOWING PARAMETERS USED TO DESIGN THE CHECK DAMS.

- HEIGHT OF CHECK DAMS BASED ON SWALE OR DITCH DIMENSIONS AND FLOW CONDITIONS.
- SPACING OF CHECK DAMS BASED ON GRADE OF THE SWALE OR DITCH. TOP OF DOWNSTREAM DAM SHALL BE AT SAME ELEVATION AS TOE OF UPSTREAM DAM

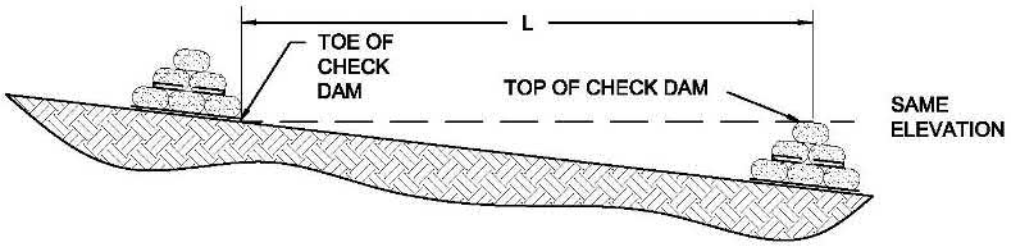
Figure 2.1 Schematics of Rock Check Dams
(Source: Modified from Stormwater Management Manual for Western Washington)



ROCK BAG CHECK DAM VIEW LOOKING UPSTREAM
N.T.S.



CROSS SECTION OF ROCK BAG CHECK DAM
N.T.S.

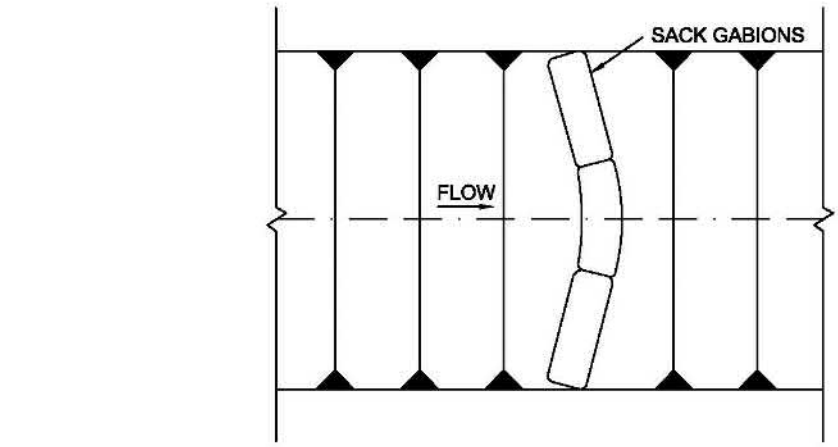


SPACING BETWEEN ROCK BAG CHECK DAMS
N.T.S.

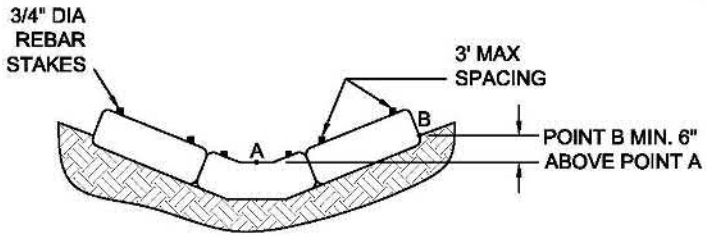
NOTES: ACTUAL DIMENSIONS OF THE CHECK DAMS SHALL BE DESIGNED BASED ON FLOW CONDITIONS IN THE DRAINAGE SWALE OR DITCH. PROVIDE CALCULATIONS THAT DOCUMENT THE FOLLOWING PARAMETERS USED TO DESIGN THE CHECK DAMS.

- HEIGHT OF CHECK DAMS BASED ON SWALE OR DITCH DIMENSIONS AND FLOW CONDITIONS.
- SPACING OF CHECK DAMS BASED ON GRADE OF THE SWALE OR DITCH. TOP OF DOWNSTREAM DAM SHALL BE AT SAME ELEVATION AS TOE OF UPSTREAM DAM.

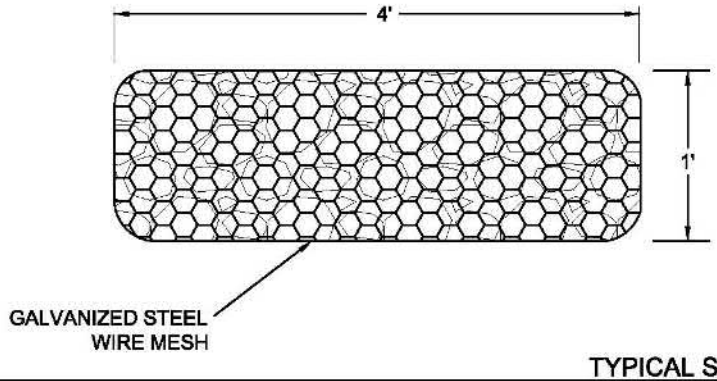
Figure 2.2 Schematics of Rock Bag Check Dams



SACK GABION CHECK DAM PLAN VIEW
N.T.S.



SACK GABION CHECK DAM VIEW LOOKING UPSTREAM
N.T.S.

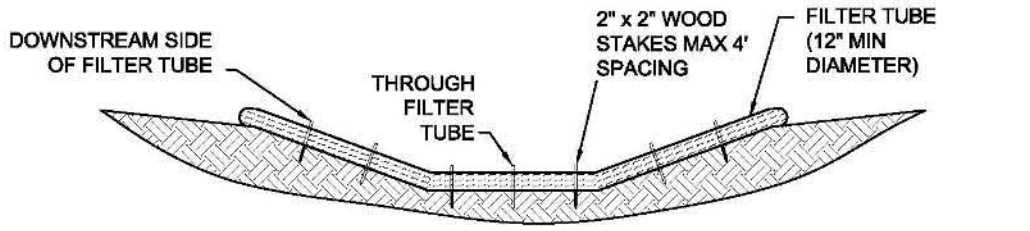


TYPICAL SACK GABION
N.T.S.

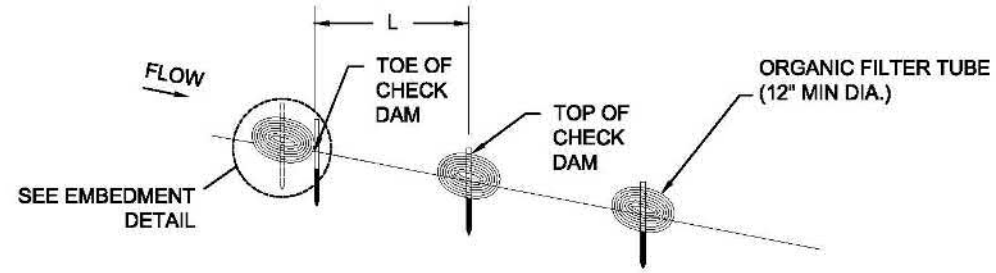
NOTES: ACTUAL DIMENSIONS OF THE CHECK DAMS SHALL BE DESIGNED BASED ON FLOW CONDITIONS IN THE DRAINAGE SWALE OR DITCH. PROVIDE CALCULATIONS THAT DOCUMENT THE FOLLOWING PARAMETERS USED TO DESIGN THE CHECK DAMS.

- HEIGHT OF CHECK DAMS BASED ON SWALE OR DITCH DIMENSIONS AND FLOW CONDITIONS.
- SPACING OF CHECK DAMS BASED ON GRADE OF THE SWALE OR DITCH. TOP OF DOWNSTREAM DAM SHALL BE AT SAME ELEVATION AS TOE OF UPSTREAM DAM.

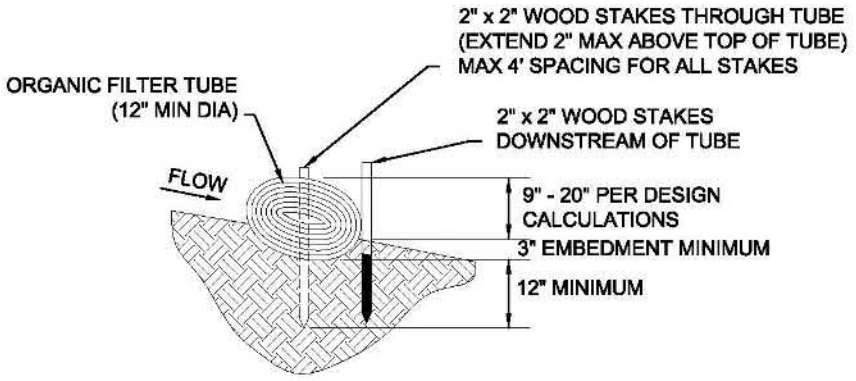
Figure 2.3 Schematics of Sack Gabion Check Dams
(Source: Modified from Texas Department of Transportation Detail Sheet EC (2)-93)



ORGANIC FILTER TUBE CHECK DAM VIEW LOOKING UPSTREAM
N.T.S.



ORGANIC FILTER TUBE CHECK DAM PROFILE
N.T.S.



EMBEDMENT DETAIL FOR ORGANIC FILTER TUBE CHECK DAM
N.T.S.

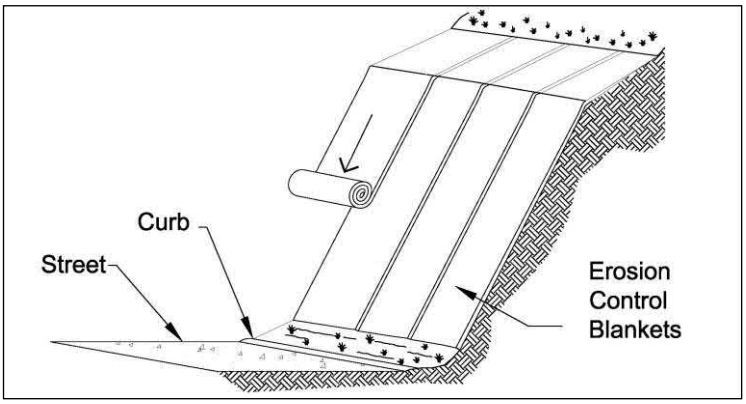
NOTES: ACTUAL DIMENSIONS OF THE CHECK DAMS SHALL BE DESIGNED BASED ON FLOW CONDITIONS IN THE DRAINAGE SWALE OR DITCH. PROVIDE CALCULATIONS THAT DOCUMENT THE FOLLOWING PARAMETERS USED TO DESIGN THE CHECK DAMS.

- HEIGHT OF CHECK DAMS BASED ON SWALE OR DITCH DIMENSIONS AND FLOW CONDITIONS.
- SPACING OF CHECK DAMS BASED ON GRADE OF THE SWALE OR DITCH. TOP OF DOWNSTREAM DAM SHALL BE AT SAME ELEVATION AS TOE OF UPSTREAM DAM.

Figure 2.4 Schematics of Organic Filter Tube Check Dams
(Source: Modified from City of Plano BMP S-7)

2.3 Erosion Control Blankets

Erosion Control



Description: An erosion control blanket (ECB) is a temporary, degradable, rolled erosion control product that reduces soil erosion and assists in the establishment and growth of vegetation. ECBs, also known as soil retention blankets, are manufactured by many companies and are composed primarily of processed, natural, organic materials that are woven, glued, or structurally bound together with natural fiber netting or mesh on one or both sides.

KEY CONSIDERATIONS

DESIGN CRITERIA:

- ECB selected based on slope, flow rate and length of service
- Specify preparation of soil surface to ensure uniform contact with blanket
- Installation and anchoring according to manufacturer's recommendations

ADVANTAGES / BENEFITS:

- Holds seed and soil in place until vegetation is established
- Effective for slopes, embankments and small channels

DISADVANTAGES / LIMITATIONS:

- Not for use on slopes greater than 2:1 or in channels with shear stresses greater than 2.0 pounds per square foot

MAINTENANCE REQUIREMENTS:

- Replace or re-anchor loosened blankets
- Remove sediment deposited on blankets

TARGETED POLLUTANTS

- ● Sediment
- ○ Nutrients & Toxic Materials
- ○ Oil & Grease
- ○ Floatable Materials
- ○ Other Construction Waste

APPLICATIONS

Perimeter Control
Slope Protection
Sediment Barrier
Channel Protection
Temporary Stabilization
Final Stabilization

Waste Management

Housekeeping Practices

Fe=0.90 (*Ground cover*)
Fe=0.65
(*Perimeter w/o vegetation*)

IMPLEMENTATION CONSIDERATIONS

- ● Capital Costs
- ◒ Maintenance
- ◒ Training
- ● Suitability for Slopes > 5%

Other Considerations:

- *Life expectancy, partial degradation, and mowing/ maintenance issues for ECBs left in place as part of final stabilization*

2.3.1 Primary Use

Erosion control blankets (ECBs) are used to hold seed and soil in place until vegetation is established on disturbed areas. They can be used on many types of disturbed areas, but are particularly effective for slopes and embankments and in small drainage swales.

ECBs seeded for vegetation may be used as a perimeter control. When used in combination with other sediment barriers, such as silt fence or organic filter tubes, blankets may be used as a perimeter control with or without vegetation.

2.3.2 Applications

ECBs may be used on many types of disturbed areas but are most applicable on gradual to steep (2:1) cut/fill slopes and in swales and channels with low to moderate flow velocities. In these applications they may provide temporary stabilization by themselves or may be used with seeding to provide final stabilization. ECBs are also used to establish vegetation in channels where velocities are less than 6.0 feet per second.

When seeded for establishment of vegetation, ECBs can be an effective perimeter along the down slope side of linear construction projects (roads and utilities). ECBs with vegetation are also used as perimeter controls for new development, particularly at the front on residential lots in new subdivisions. ECBs are an effective aid in establishing vegetated filter strips.

2.3.3 Design Criteria

- The designer shall specify the manufacturer, type of erosion control blanket to be used, and dimensioned limits of installation based on the site topography and drainage.
- The type and class of erosion control blanket must be specified in accordance with the manufacturer's guidance for the slope of the area to be protected, the flow rate (sheet flow on cut/fill slopes) or velocity (concentrated flow in swales) of stormwater runoff in contact in with the ECB, and the anticipated length of service.
- ECBs should meet the applicable "Minimum Performance Standards for TxDOT" as published by TxDOT in its "Erosion Control Report" and/or be listed on the most current annual "Approved Products List for TxDOT" applicable to TxDOT Item 169 Soil Retention Blanket and its Special Provisions.
- ECBs shall be installed vertically down slope (across contours) on cut/fill slopes and embankments and along the contours (parallel to flow) in swales and drainage ditches.
- ECBs designed to remain onsite as part of final stabilization shall have netting or mesh only on one side (the exposed side) of the ECB. The ECB shall be installed with the side that does not have netting or mesh in contact with the soil surface. All materials in the ECB, including anchors, should be 100 percent biodegradable within three years.
- On cut/fill slopes and drainage ditches or swales designed to receive erosion control blankets for temporary or final stabilization, installation of the ECBs shall be initiated immediately after completing grading of the slope or drainage way, and in no case later than 14 days after completion of grading these features. Do not delay installation of ECBs on these highly-erodible areas until completion of construction activities and stabilization of the remainder of the site.
- Unless the ECB is seeded to establish vegetation, perimeter control applications shall be limited to thirty foot wide drainage areas (i.e. linear construction projects) for an 8 foot width of ECB. When seeded for vegetation, use of ECBs for perimeter control shall follow the criteria in the *Section 3.15 Vegetated Filter Strips and Buffers*.
- Prior to the installation of the ECB, all rocks, dirt clods, stumps, roots, trash and any other obstructions that would prevent the ECB from lying in direct contact with the soil shall be removed.

- Anchor trenching shall be located along the top of slope of the installation area, except for small areas with less than 2 percent slope.
- Installation and anchoring shall conform to the recommendations shown within the manufacturer's published literature for the erosion control blanket. Anchors (staples) shall be a minimum of 6 inches in length and 1 inch wide. They shall be made of 11-gauge wire, or equivalent, unless the ECB is intended to remain in place with final stabilization and biodegrade.
- Particular attention must be paid to joints and overlapping material. Overlap along the sides and at the ends of ECBs should be per the manufacturer's recommendations for site conditions and the type of ECB being installed. At a minimum, the end of each roll of ECB shall overlap the next roll by 3 feet and the sides of rolls shall overlap 4 inches.
- After installation, the blankets should be checked for uniform contact with the soil, security of the lap joints, and flushness of the staples with the ground.
- When ECBs are installed to assist with establishing vegetation, seeding shall be completed before installation of the ECB. Criteria for seeding are provided in *Section 2.9 Vegetation*.
- Turf Reinforcement Mats should be used instead of ECBs for permanent erosion control and for stabilizing slopes greater than 2:1.
- ECBs are limited to use in swales and channels that have shear stresses of less than 2.0 pounds per square foot. Turf reinforcement mats shall be used in open channels with higher shear stresses.

2.3.4 Design Guidance and Specifications

Specifications for construction of this item may be found in the Standard Specifications for Public Works Construction – North Central Texas Council of Governments, Section 201.15 Erosion Control Blankets and in Item 169 of the Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges (TxDOT, 2004).

2.3.5 Inspection and Maintenance Requirements

Erosion control blankets should be inspected regularly (at least as often as required by the TPDES Construction General Permit) for bare spots caused by weather or other events. Missing or loosened blankets must be replaced or re-anchored.

Check for excess sediment deposited from runoff. Remove sediment and/or replace blanket as necessary. In addition, determine the source of excess sediment and implement appropriate measures to control the erosion. Also check for rill erosion developing under the blankets. If found, repair the eroded area. Determine the source of water causing the erosion and add controls to prevent its reoccurrence.

2.3.6 Example Schematics

The following schematics are example applications of the construction control. They are intended to assist in understanding the control's design and function.

The schematics are **not for construction**. The designer is responsible for working with ECB manufacturers to ensure the proper ECB is specified based on the site topography and drainage. Installation measures should be dictated by the ECB manufacturer and are dependent on the type of ECB installed. Manufacturer's recommendations for overlap, anchoring, and stapling shall always be followed. Criteria shown here are applicable only when they are more stringent than those provided by the manufacturer.

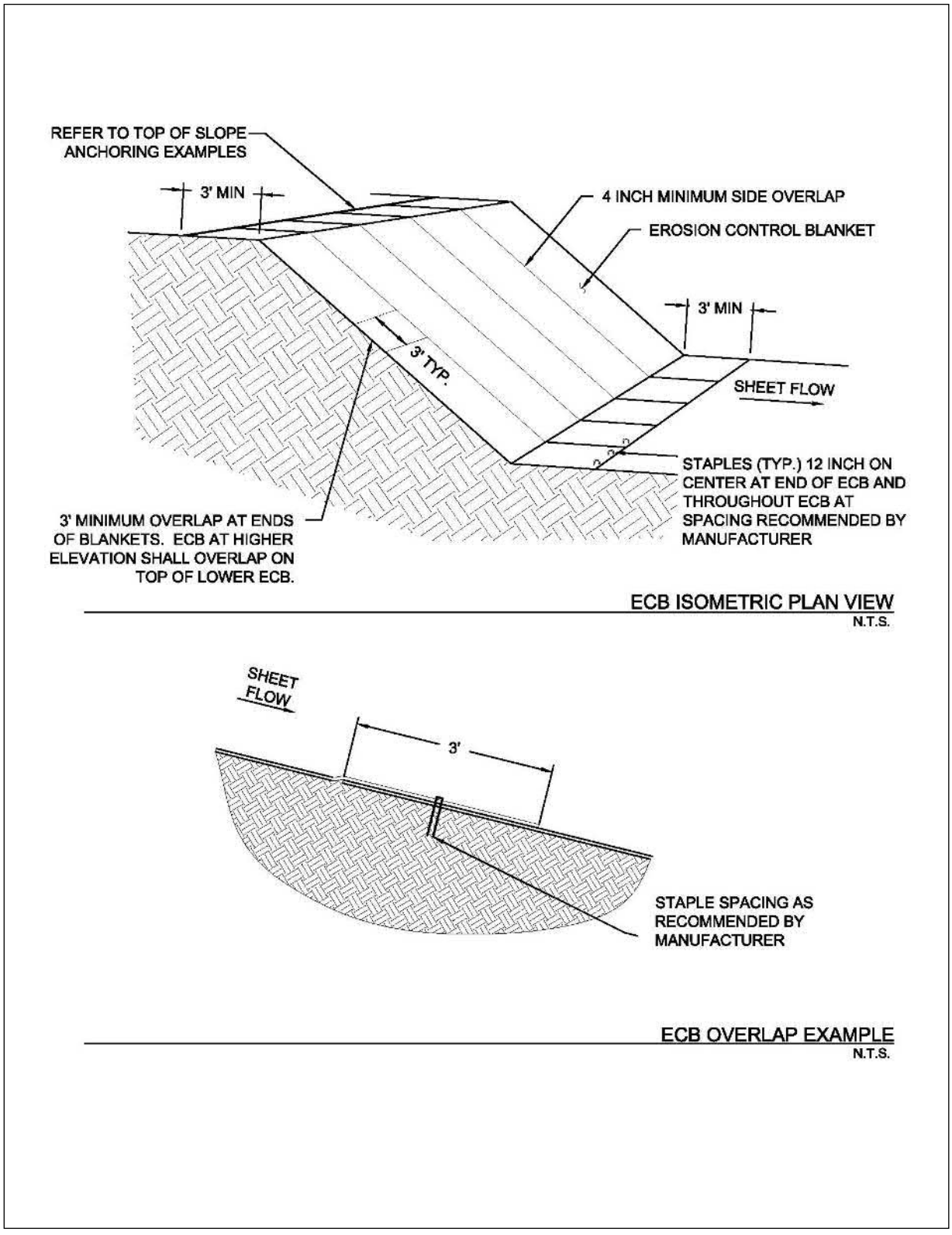
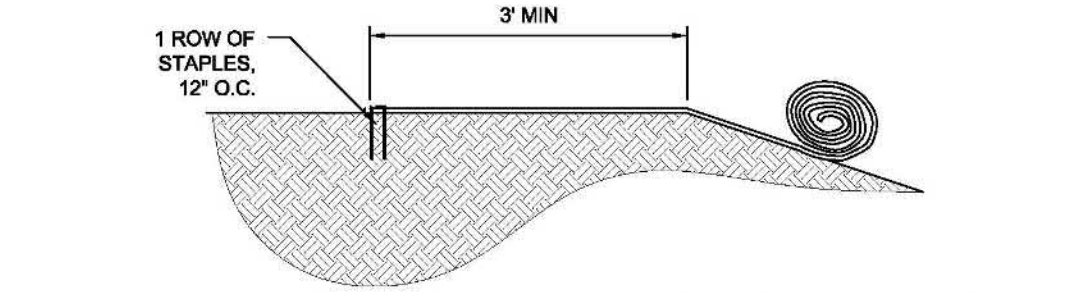
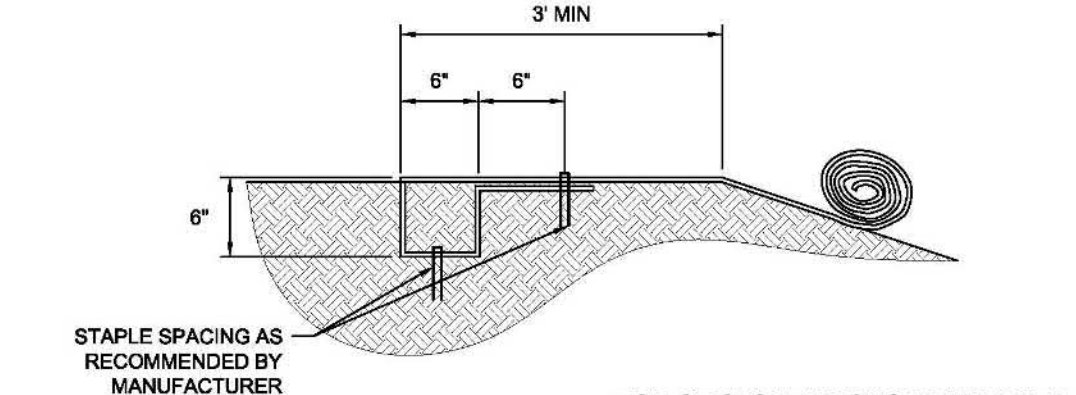


Figure 2.7 Schematics of Erosion Control Blankets



TOP OF SLOPE ANCHOR EXAMPLE 1
N.T.S.



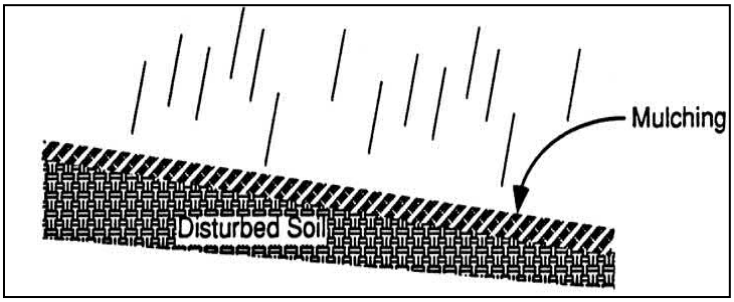
TOP OF SLOPE ANCHOR EXAMPLE 2
N.T.S.

NOTE: ANCHORING METHODS PROVIDED ARE EXAMPLES OF THE TYPE OF ANCHORING THE ECB MANUFACTURER MAY RECOMMEND. THERE ARE MORE THAN A DOZEN DIFFERENT TOP OF SLOPE ANCHORING METHODS BASED ON TYPE OF ECB, TYPE OF SOIL, SPECIFIED PERFORMANCE PERIOD, SLOPE STEEPNESS, ETC. ALWAYS FOLLOW THE MANUFACTURER'S RECOMMENDATIONS FOR ANCHORING BASED ON THE SITE-SPECIFIC APPLICATION.

Figure 2.8 Anchor Examples for Erosion Control Blankets
(Sources: American Excelsior Company and Western Excelsior Corporation)

2.5 Mulching

Erosion Control



Description: Mulching is the application of a uniform layer of organic material over barren areas to reduce the effects of erosion from rainfall. Types of mulch include compost mixtures, straw, wood chips, bark, or other fibers. Commercialized surface treatments that combine straw or other mulch material with organic or inorganic soil binding systems are also available and are particularly useful on steep slopes.

KEY CONSIDERATIONS

DESIGN CRITERIA:

- Specify even, uniform application
- Thickness of 1 to 2 inches, depending on application
- Application criteria specific to type of mulch
- Anchor mulch on slopes of 3:1 to 1.5:1
- Do not use mulch on slopes steeper than 1.5:1

ADVANTAGES / BENEFITS:

- Provides immediate stabilization of bare areas
- May be used with seeding for final stabilization
- Decreases soil moisture loss
- Decreases velocity of sheet flow
- Reduces volume of sediment-laden flow

DISADVANTAGES / LIMITATIONS:

- Subject to removal by wind or water
- Results in lower soil temperature, which may yield longer seed germination periods
- Should not be applied within the ordinary high-water mark of natural surface waters or within the design flow depth of constructed ditches and channels

MAINTENANCE REQUIREMENTS:

- Inspect regularly
- Replace regularly in high traffic areas to maintain uniform thickness
- Maintain a stockpile of excess mulch at the site to repair problem spots

TARGETED POLLUTANTS

- ◒ Sediment
- ○ Nutrients & Toxic Materials
- ○ Oil & Grease
- ○ Floatable Materials
- ○ Other Construction Wastes

APPLICATIONS

Perimeter Control

Slope Protection

Sediment Barrier

Channel Protection

Temporary Stabilization

Final Stabilization

Waste Management

Housekeeping Practices

Fe=0.75-0.90

(Depends on coverage)

IMPLEMENTATION CONSIDERATIONS

- ◒ Capital Costs
- ◒ Maintenance
- ○ Training
- ◒ Suitability for Slopes > 5%

Other Considerations:

- *Availability of materials for mulch*
- *Application depends on slope*

2.5.1 Primary Use

Mulch may be used by itself to temporarily stabilize bare areas or with seed to establish final stabilization of bare areas. Mulch protects the soil from erosion and moisture loss by lessening the effects of wind, water, and sunlight. It also decreases the velocity of sheet flow, thereby reducing the volume of sediment-laden water flow leaving the mulched area.

2.5.2 Applications

Mulch may be applied on most areas disturbed by construction that require surface protection including:

- Freshly seeded or planted areas;
- Disturbed areas at risk of erosion due to the time period being unsuitable for growing vegetation;
- Disturbed areas that are not conducive to vegetation for temporary stabilization; or
- Steep slopes of 3:1 to 1.5:1, provided the mulch is anchored to the soil by use of soil stabilizers, netting, or crimping.

Mulch is frequently applied with seeding for vegetation. In these cases, refer to *Section 2.9 Vegetation* for related criteria that may affect mulching.

Mulch may also be applied with commercially available polymers for soil surface treatment to bind the mulch with the soil. This method is particularly useful on steep slopes. Related criteria are available in *Section 2.7 Soil Surface Treatments*.

2.5.3 Design Criteria

General

- Specific design information is required for the use of this control. The designer shall specify the type of mulch to be used, the application rate and/or thickness, and the type of anchoring (if applicable) based on site conditions.
- Choice of mulch depends largely on slope and soil type, in addition to availability of materials.
- Netting, adhesive polymers, or other methods of anchoring the mulch are required on slopes of 3:1 to 1.5:1. Do not use mulch on slopes steeper than 1.5:1.
- Mulch should be applied in an even and uniform manner where concentrated water flow is negligible. Do not apply mulch within the ordinary high-water mark of natural surface waters or within the design flow depth of constructed ditches and channels.
- Hay should not be used as mulch.
- Organic mulches may be distributed by hand or by mechanical means, provided a uniform thickness is achieved.
- When mulch is used with vegetation for final stabilization, fertilization and soil treatment for vegetation establishment should be done prior to placement of mulch, with the exception of hydroseeding or when seed is distributed following straw mulch spread during winter months.
- Table 2.1 on the following page contains a summary of mulch types and general guidelines.

Table 2.1 Mulch Standards and Guidelines			
Mulch Material	*Quality Standards*	*Application Rates*	*Remarks*
Straw	Air-dried, free of mold and not rotten. Certified Weed Free.	1.5 to 2 tons per acre	Cost-effective when applied with adequate thickness. Straw must be held in place by crimping, netting, or soil stabilizer.
Chipped Site Vegetation	Should include gradation from fine to coarse to promote interlocking properties. Must be free of waste materials such as plastic bags, metal debris, etc.	10 to 12 tons per acre	Cost-effective method to dispose of vegetative debris from site. Best application is for temporary stabilization where construction will resume. Use cautiously on areas where vegetation will be established, as wood chips will deplete soil nitrogen.
Erosion Control Compost (Wood Chip and Compost Mixture)	Shall meet the Physical Requirements in Table 1 of TxDOT Special Specification 1001.	Approx. 10 tons per acre	Special caution is advised regarding the source and composition of wood mulches. Ensure compost is free of herbicides. Ensure wood chips are from unpainted and untreated wood.
Hydraulic Mulch	Must not contain sawdust, cardboard, paper, paper byproducts, plastics, or synthetics. No petroleum-based tackifiers.	Follow the manufacturer's recommendations. Application rate increases with slope steepness.	May be particularly effective on slopes steeper than 3:1. Ensure wood fibers are from unpainted and untreated wood.

Straw Mulch

- Straw mulch shall be free of weed and grass seed.
- Straw mulch shall be air-dried, free of mold, and not rotten.
- Straw fibers shall be a minimum of 4 inches and a maximum of 8 inches in length.
- Straw mulch must be anchored by using a tractor-drawn crimper to punch into the soil, by placing degradable netting above the mulch, or by application of a soil stabilizer (*Section 2.7 Soil Surface Treatments*).

Chipped Site Vegetation

- Chipped site vegetation is suitable mulch for temporary stabilization before construction will resume in an area of the construction site.
- Ensure the cleared vegetation is free of trash, litter, and debris prior to chipping.

- Chipped pieces shall be a minimum of 2 inches and a maximum of 6 inches in length.
- Chipped woody vegetation that is greater than 50% wood chips by volume may result in mulch that depletes nitrogen in the soil. It is useful as mulch for temporary stabilization where construction activity will resume and result in removal of the mulch. However, it should be used with care on areas where vegetation will be established for final stabilization.
- Chipped vegetation that is greater than 50 percent wood chips by volume may require treatment with a nitrogen fertilizer when used for mulch with seeding.
- Chipped vegetation that includes green matter will include seeds. It should not be used on areas that have specific landscaping requirements.

Erosion Control Compost (Wood Chip and Compost Mixture)

- Wood chip and compost mixture used for mulch shall meet the criteria for Erosion Control Compost in TxDOT Special Specification 1001.
- Wood chips for the mixture shall be less than or equal to 5 inches in length with 95 percent passing a 2 inch screen and less than 30 percent passing a 1 inch screen. Mulch should not contain chipped manufactured boards or chemically treated wood such as particleboard, railroad ties, or similar treated wood.
- Compost for the mixture shall meet the Physical Requirements specified in Table 1 of 2004 TxDOT Special Specification 1001, Compost. It must be free of herbicides and other chemicals.
- Mixing of the Erosion Control Compost into the soil surface is allowed when vegetation is established for final stabilization, except for drill seeding, in which case it is best to leave the mulch as an undisturbed top layer.

Hydraulic Mulch (Including Bonded Fiber Matrix)

- Hydraulic mulch shall consist of a mixture of shredded wood fiber and a stabilizing binder. The mulch must not contain sawdust, cardboard, paper or paper byproducts.
- Shredded wood fiber shall be long strand, whole wood fibers that are:
    - Minimum of 25 percent of fibers 3/8 inch long;
    - Minimum of 50 percent held on a No. 25 sieve;
    - Free from paint, printing ink, varnish, petroleum products, seed germination inhibitors; and
    - Free from synthetic or plastic materials.
- Mulch binders may be organic or inorganic polymers. Asphaltic emulsions and other petroleum-based tackifiers shall not be used.
- The stabilizing emulsion must be nonflammable, non-toxic to aquatic organisms, and free from growth or germination inhibiting factors.
- Areas hydraulically mulched shall be protected from all traffic, including foot traffic, a minimum of 24 hours to allow the mulch to dry and cure. Depending on the mulch, up to 48 hours of protection may be required. Always follow manufacturer's recommendations.
- Hydraulic mulch provides limited to no protection until cured. Do not apply when rain is forecast within the next 24 hours.
- Hydraulic mulch may be particularly effective on slopes steeper than 3:1.

2.5.4 Design Guidance and Specifications

Specifications for construction of this item may be found in the Standard Specifications for Public Works Construction – North Central Texas Council of Governments, Section 201.16 Mulching. Specifications for

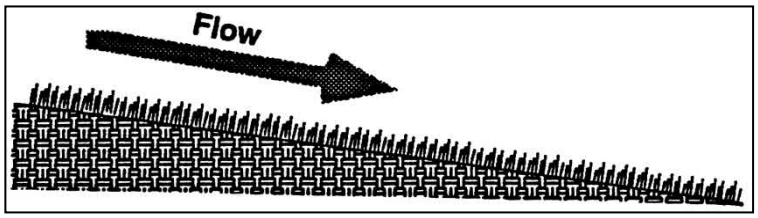
compost may be found in Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges (TxDOT 2004) Item 161.

2.5.5 Inspection and Maintenance Requirements

Mulched areas should be inspected regularly (at least as often as required by the TPDES Construction General Permit) for thin or bare spots caused by natural decomposition or weather related events. Mulch in high traffic areas should be replaced on a regular basis to maintain uniform protection. Excess mulch should be brought to the site and stockpiled for use during the maintenance period to dress problem spots.

2.9 Vegetation

Erosion Control



Description: Vegetation, used as an erosion control, is the sowing or sodding of grasses, small grains, or legumes to provide temporary and final vegetative stabilization for disturbed areas.

KEY CONSIDERATIONS

DESIGN CRITERIA:

- Specify preparation of the soil surface before seeding or sodding
- Minimum of 4 to 6 inches of top soil required, depending on subsurface conditions
- Specify soil amendments depending on soil conditions
- Select seed or sod species appropriate for the climate, season, and soil

ADVANTAGES / BENEFITS:

- More effective and easier to maintain than sediment controls during a long construction period
- May be used for temporary or final stabilization

DISADVANTAGES / LIMITATIONS:

- Not appropriate for areas with heavy pedestrian, vehicular traffic, or concentrated, high velocity flow
- May require days to weeks for adequate establishment
- Alternate erosion control is needed until vegetation is established

MAINTENANCE REQUIREMENTS:

- Inspect regularly
- Protect newly seeded areas from excessive runoff, high velocity flow, and traffic until vegetation is established
- Water and fertilize until vegetation is established
- Reseed and/or provide mulch or another control for bare spots
- Rake accumulations of sediment from the vegetation

TARGETED POLLUTANTS

- ● Sediment
- ◒ Nutrients & Toxic Materials
- ○ Oil & Grease
- ○ Floatable Materials
- ○ Other Construction Wastes

APPLICATIONS

Perimeter Control

Slope Protection

Sediment Barrier

Channel Protection

Temporary Stabilization

Final Stabilization

Waste Management

Housekeeping Practices

Fe=0.90
(*When fully established; lower while vegetation is first growing*)

IMPLEMENTATION CONSIDERATIONS

- ◒ Capital Costs
- ◒ Maintenance
- ○ Training
- ◒ Suitability for Slopes > 5%

Other Considerations:

- *Design is unique to soil and other conditions at each site*
- *Watering and other maintenance required until vegetation is established*

2.9.1 Primary Use

Vegetation is used as a temporary or final stabilization measure for areas disturbed by construction. As a temporary control, vegetation is used to stabilize stockpiles, earthen dikes, and barren areas that are inactive for longer than two weeks. As a final control at the end of construction, grasses and other vegetation provide good protection from erosion along with some filtering for overland runoff. Subjected to acceptable runoff velocities, vegetation can provide a positive method of long-term stormwater management as well as a visual amenity to the site.

Other control measures may be required to assist during the establishment of vegetation. These other controls include erosion control blankets, mulching, swales, and dikes to direct flow around newly seeded areas and proper grading to limit runoff velocities during construction.

2.9.2 Applications

Vegetation effectively reduces erosion in channels and swales and on stockpiles, dikes, and mild to medium slopes. Vegetative strips can provide some protection and sediment trapping when used as a perimeter control for utility and site development construction. Refer to *Section 3.15 Vegetated Filter Strips and Buffers* for more information.

In many cases, the initial cost of temporary seeding may be high compared to tarps or covers for stockpiles or other barren areas subject to erosion. This initial cost should be weighed with the amount of time the area is to remain inactive, since vegetation is more effective and the maintenance cost for vegetated areas is much less than most structural controls.

2.9.3 Design Criteria

General

- Vegetation is a highly effective erosion control when the vegetation is fully established. Until then, additional controls are needed. Sediment controls should not be removed from vegetated areas until the vegetation is established.
- On grades steeper than 20:1 (5 percent), anchored mulch or erosion control blankets are required to protect seeded areas until vegetation is established. Refer to *Section 2.5 Mulching* and *Section 2.3 Erosion Control Blankets* for design criteria.
- Vegetation may be used by itself for channel protection when the channel grade is less than 2 percent and the temporary control design storm (2-year, 24-hour) and the conveyance storm (25-year, 24-hour) flow velocities are less than 6 feet per second.
- If the velocity of the temporary control design storm is greater than 2 feet per second, erosion control blankets shall be used in the channel while vegetation is being established. Turf reinforcement mats are required when the velocity exceeds 6 feet per second. Refer to *Section 2.3 Erosion Control Blankets* and *Section 2.8 Turf Reinforcement Mats* for design criteria.
- Stabilization of channels with vegetation is limited to channels that have side slopes of 3:1 or flatter.
- On cut/fill slopes and channels designed to receive temporary or final vegetation, establishment of vegetation shall be initiated immediately after completing grading of the cut/fill slope or channel, and in no case later than 14 days after completion of grading on these features. It is not acceptable to delay establishing vegetation on these highly-erodible areas until completion of construction activities and stabilization of the remainder of the site.

Surface Preparation

- Unless infeasible, remove and stockpile existing topsoil at the start of grading activities. Store topsoil in a series of small stockpiles instead of one large stockpile to decrease the loss of aerobic soil micro-organisms during stockpiling.

- Interim or final grading must be completed prior to seeding or sodding.
- To minimize soil compaction of areas to be vegetated, limit vehicle and equipment traffic in these areas to the minimum necessary to accomplish grading.
- Install all necessary erosion structures such as dikes, swales, diversions, etc. prior to seeding or sodding.
- Spread stockpiled topsoil evenly over the disturbed area to be vegetated.
- Depth of topsoil shall be a minimum of 4 inches, with 6 inches required where the topsoil is over rock, gravel or otherwise unsuitable material for root growth. After spreading stockpiled topsoil, provide additional top soil as needed to achieve these depths.
- Compost Manufactured Topsoil as specified in TxDOT Special Specification 1001 may be used to achieve the specified depths or when it's infeasible to stockpile topsoil. Topsoil may also be acquired from another construction site if there is no space to stockpile the topsoil at that site.
- Topsoil shall have an organic content of 10 to 20 percent using ASTM D2974 Standard Test Methods for Moisture, Ash, and Organic Matter of Peat and Other Organic Soils.
- Topsoil that does not meet the organic content requirement shall be amended with General Use Compost as specified in TxDOT Special Specification 1001. Amendment should be three parts of topsoil to one part compost by volume thoroughly blended.
- Seed bed should be well pulverized and loosened to a minimum depth of 3 inches and then raked to have a uniform surface.
- When establishing vegetation from seed, groove or furrow slopes steeper than 3:1 on the contour line before seeding.

Plant Selection, Fertilization and Seeding

- Use only high quality, USDA certified seed.
- Use an appropriate species or species mixture adapted to the local climate, onsite soil conditions and the season as shown below, or consult with the local office of the Natural Resource Conservation Service (NRCS) or Texas AgriLife Extension Service for selection of proper species and application technique in this area.
- Seeding rate should be in accordance with the Tables 2.4, 2.5 and 2.6 as follow in this section or as recommended by the Natural Resources Conservation Service (NRCS) or Texas AgriLife Extension Service.
- Chemical fertilization is not recommended at the time of seeding, because it typically stimulates and is consumed by fast growing weeds that out-compete the slower growing grasses and legumes. If the topsoil has not been amended by compost as discussed above, an 0.5 inch layer of General Use Compost (TxDOT Special Specification 1001) is recommended as a surface treatment to protect the seed and provide slow release nutrients
- Evenly apply seed using a seed drill, cultipacker, terraseeding, or hydroseeder.
- Hydro-seeding should not be used on slopes of 5:1 or steeper unless Bonded Fiber Matrix is used.
- Seeded areas shall be thoroughly watered immediately after planting. Water shall be applied at a rate that moistens the top 6 inches of soil without causing runoff. Provide water daily for the first 14 days after seeding and thereafter as needed to aid in establishment of vegetation.
- Use appropriate mulching techniques (*Section 2.5 Mulching*) where necessary, especially during cold periods of the year. Mulch consisting of chipped site vegetation is discouraged, since the wood content may result in depleting nitrogen from the soil.

Sodding

- Use of sod should be limited to planned landscapes due to the relatively high water use of most types of sod grass.
- When sod is necessary to achieve immediate stabilization, buffalograss (*Buchloe dactyloides*) is recommended. Other types of sod may be used in landscaping when specified by a landscape architect for a commercial property or a homebuyer for a residential lot.
- The sod should be mowed prior to sod cutting so that the height of the grass shall not exceed 3 inches and should not be harvested or planted when its moisture condition is so excessively wet or dry that its survival shall be affected.
- Sod shall have a healthy, virile, system of dense, thickly matted roots throughout a minimum soil thickness of 0.75 inch.
- Sod shall be planted within 3 days after it is excavated.
- In areas subject to direct sunlight, pre-moisten prepared sod bed by watering immediately prior to placing sod.
- Sodded areas shall be thoroughly watered immediately after they are planted.

Temporary Vegetation

The following table lists recommended plant species for the North Central Texas region depending on the season for planting.

Table 2.4 Recommended Grass Mixture for Temporary Erosion Control

Season	*Common Name*	*Pure Live Seed Rate (Lbs/Acre)*
Sep 1 - Nov 30	Tall Fescue Western Wheat Grass Wheat (Red, Winter)	4.5 5.6 34.0
May 1 - Aug 31	Foxtail Millet	34.0
Feb 15 – May 31 Sep 1 – Dec 31	Annual Rye	20.0

Areas receiving temporary seeding and vegetation shall be landscaped, re-seeded or sodded with perennial species to establish final vegetation at the end of construction.

Vegetation for Final Stabilization

Sodding or seeding may be used to establish vegetation for final stabilization of areas disturbed by construction activity. The vegetation must achieve a cover that is 70 percent of the native background vegetative cover to be considered final stabilization. Sod will achieve this coverage quicker than seeding; however, sod is usually more expensive than seeding. Sod is most cost-effective for small areas or areas of concentrated flow or heavy pedestrian traffic where it will be difficult to establish vegetation by seeding.

Grass seed for establishing final stabilization can be sown at the same time as seeding for temporary (annual) vegetation. Drought tolerant native vegetation is recommended rather than exotics as a long-term water conservation measure. Native grasses can be planted as seed or placed as sod. Buffalo 609, for example, is a hybrid grass that is placed as sod. Fertilizers are not normally used to establish native grasses, but mulching is effective in retaining soil moisture for the native plants.

Table 2.5 Recommended Grass Mixture for Final Stabilization of Upland in Rural Areas

County	Planting Date	Clay Soils Species and Pure Live Seed Rate (Lbs/Acre)		Sandy Soils Species and Pure Live Seed Rate (Lbs/Acre)	
Erath Hood Johnson Palo Pinto Parker Somervell Tarrant Wise	February 1 – May 15	Green Sprangletop Sideoats Grama (El Reno) Bermudagrass Little Bluestem (Native) Blue Grama (Hachita) Illinois Bundleflower	0.3 2.7 0.9 1.0 0.9 1.0	Green Sprangletop Sand Lovegrass Bermudagrass Weeping Lovegrass (Ermelo) Sand Dropseed Partridge Peal	0.3 0.5 1.8 0.8 0.4 1.0
Collin Dallas Denton Ellis Kaufman Navarro Rockwell	February 1 – May 15	Green Sprangletop Bermudagrass Sideoats Grama (El Reno) Little Bluestem (Native) Buffalograss (Texoka) Illinois Bundleflower	0.3 1.2 2.7 2.0 1.6 1.0	Green Sprangletop Bermudagrass Weeping Lovegrass (Ermelo) Sand Lovegrass Sand Dropseed Partridge Pea	0.3 1.8 0.6 0.6 0.4 1.0
Hunt	February 1 – May 15	Green Sprangletop Sideoats Grama (El Reno) Bermudagrass Little Bluestem (Native) Illinois Bundleflower	0.3 3.2 1.8 1.7 1.0	Green Sprangletop Bermudagrass Bahiagrass (Pensacola) Sand Lovegrass Weeping Lovegrass (Ermelo) Partridge Pea	0.3 1.5 6.0 0.6 0.8 1.0

(Source: TxDOT Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges, Item 164)

Table 2.6 Recommended Grass Mixture for Final Stabilization of Upland in Urban Areas

County	Planting Date	Clay Soils Species and Pure Live Seed Rate (Lbs/Acre)		Sandy Soils Species and Pure Live Seed Rate (Lbs/Acre)	
Erath Hood Johnson Palo Pinto Parker Somervell Tarrant Wise	February 1 – May 15	Green Sprangletop Sideoats Grama (El Reno) Bermudagrass Buffalograss (Texoka)	0.3 3.6 2.4 1.6	Green Sprangletop Sideoats Grama (El Reno) Bermudagrass Sand Dropseed	0.3 3.6 2.1 0.3
Collin Dallas Denton Ellis Kaufman Navarro Rockwell	February 1 – May 15	Green Sprangletop Sideoats Grama (El Reno) Buffalograss (Texoka) Bermudagrass	0.3 3.6 1.6 2.4	Green Sprangletop Buffalograss (Texoka) Bermudagrass Sand Dropseed	0.3 1.6 3.6 0.4
Hunt	February 1 – May 15	Green Sprangletop Bermudagrass Sideoats Grama (Haskell)	0.3 2.4 4.5	Green Sprangletop Bermudagrass	0.3 5.4

(Source: TxDOT Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges, Item 164)

Vegetation for final stabilization of channels requires grasses that are tolerant of periodic inundation, such as Bermuda grass, Kentucky bluegrass or a grass-legume mixture.

Additional Considerations

- Conditions for establishing vegetation vary significantly from site to site. Therefore, specifics of the vegetation design should be prepared based on the soil, slopes, drainage patterns, and the purpose of the vegetation at a each site.
- For construction activities that include landscaping in the development plans, the landscape architect should be consulted when specifying vegetation for temporary or final stabilization of disturbed areas.
- Vegetation is easier to establish if equipment and vehicle traffic is managed onsite to minimize soil compaction by traffic in the disturbed area that will be vegetated.
- Establishing a good vegetative cover is dependent on the season of the year. Projects that commence in the fall of the year may not be candidates for using vegetation as an erosion control.
- Where vegetation is used in swales and channels it may be necessary to use sod, rather than seeding, to establish an erosion resistant surface that accommodates rainfall runoff flows.
- Mulch should be used to enhance vegetative growth, in that mulch protects seeds from heat, prevents soil moisture loss, and provides erosion protection until the vegetation is established. Compost mulch has the additional benefit of providing some slow-release nutrients.
- Fertilizers have both beneficial and adverse effects. Fertilizers provide nutrients to the vegetation, but fertilizers are also a source of unwanted nutrients in streams and lakes. In this latter regard, they are a pollutant. The use of native vegetation rather than exotics reduces the need for fertilizers. Organic fertilizers, such as compost mulch, are generally preferred over chemical fertilizers. They provide a slow release of nutrients over a longer period of time and are less likely to cause environmental problems.
- Steep slopes represent a problem for establishing vegetation. Hydraulic mulches are useful for establishing vegetation on slopes. Refer to *Section 2.5 Mulching*.

2.9.4 Design Guidance and Specifications

Additional criteria for the application of vegetation in channels are in *Section 3.6.3 of the iSWM Criteria Manual* and design guidance is in *Section 3.2 of the Hydraulics Technical Manual*.

Specifications for construction of this item may be found in the Standard Specifications for Public Works Construction – North Central Texas Council of Governments, Item 202 Landscaping. Additional specifications for the following components of this item are in the Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges (TxDOT 2004):

- Topsoil, Item 160.
- Compost, Item 161.
- Sodding for Erosion Control, Item 162.
- Seeding for Erosion Control, Item 163.
- Fertilization, Item 164.
- Vegetative Watering 165.

2.9.5 Inspection and Maintenance Requirements

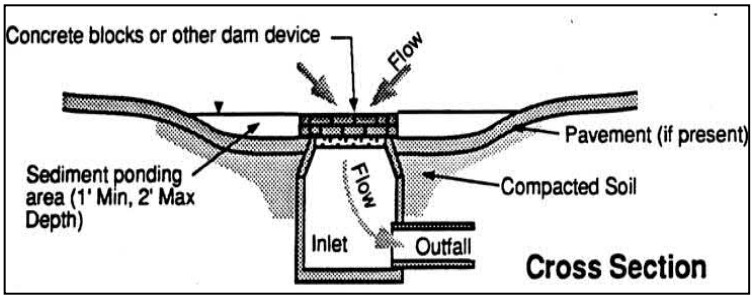
Protect newly seeded areas from excessive runoff and traffic until vegetation is established. Include a watering and fertilizing schedule in the iSWM Construction Plan facilitate the establishment of the vegetation. Vegetation for final stabilization must be maintained until the vegetative cover is 70 percent of the native background vegetative cover.

Vegetation should be inspected regularly (at least as often as required by the TPDES Construction General Permit) to ensure that the plant material is established properly and remains healthy. Bare spots shall be reseeded and/or protected from erosion by mulch or other measures. Accumulated sediment

deposited by runoff should be removed to prevent smothering of the vegetation. In addition, determine the source of excess sediment and implement appropriate measures to control the erosion.

3.4 Inlet Protection

Sediment Control



Description: Inlet protection consists of a variety of methods to intercept sediment at low point inlets through the use of depressed grading, filter stone, filter fabric, inlet inserts, organic filter tubes and other materials. The protection devices are placed around or across the inlet openings to provide localized detention or filtration of sediment and floatable materials in stormwater. Protection devices may be assembled onsite or purchased as manufactured assemblies.

KEY CONSIDERATIONS

DESIGN CRITERIA:

- Evaluate drainage patterns to ensure inlet protection will not cause flooding of roadway, property or structures
- Never block entire inlet opening
- Size according to drainage area and flow rates
- Include flow bypass for clogged controls and large storm events

ADVANTAGES / BENEFITS:

- May be the only feasible sediment control when all construction is located within rights-of-way

DISADVANTAGES / LIMITATIONS:

- Limited effectiveness and reliability
- High maintenance requirements
- Has potential to flood roadways or adjacent properties

MAINTENANCE REQUIREMENTS:

- Inspect regularly
- Check for and remove blockage of inlet after every storm event
- Remove sediment before it reaches half the design height or volume of the inlet protection, more frequently for curb inlets
- Repair or replace damaged materials
- Clean or replace filter stone and organic filter tubes is when clogged with sediment

TARGETED POLLUTANTS

- ◒ Sediment
- ○ Nutrients & Toxic Materials
- ○ Oil & Grease
- ◒ Floatable Materials
- ○ Other Construction Wastes

APPLICATIONS

Perimeter Control
Slope Protection
Sediment Barrier
Channel Protection
Temporary Stabilization
Final Stabilization
Waste Management
Housekeeping Practices

Fe=0.35-0.65
(*Depends on soil type*)

IMPLEMENTATION CONSIDERATIONS

- ◒ Capital Costs
- ● Maintenance
- ○ Training
- ○ Suitability for Slopes > 5%

Other Considerations:

- *Traffic hazards*
- *Passage of larger storm events without causing flooding*
- *Flow diversion to other inlets or drainage points*

3.4.1 Primary Use

Inlet protection is typically used as a secondary sediment barrier, due to its limited effectiveness and numerous disadvantages. It is used to reduce sediment in storm sewer systems by serving as a back-up system for areas that have newly applied erosion controls or for other sediment controls that cannot achieve adequate sediment removal by themselves.

Inlet protection may be used as a primary sediment control only when all other primary controls are infeasible because of site configuration or the type of construction activity.

3.4.2 Applications

Inlet protection is best applied at low point (sump) inlets where stormwater runoff will pond behind the protection measure, and then either filter through the protection measure or flow over a weir created by it. Most inlet protection measures depend on ponding to be effective. These types of inlet protection are not applicable to on-grade curb inlets, where the inlet protection will cause stormwater runoff to bypass the inlet and overload downstream inlets. Only inlet protection measures that allow for use of the inlet opening (e.g. inlet inserts) are applicable as inlet protection for on-grade inlets.

Inlet protection is normally used in new developments with new inlets and roads that are not in public use. It has limited applications in developed areas due to the potential for flooding, traffic safety, pedestrian safety, and maintenance problems. Potential applications in developed areas are on parking lot inlets where water can pond without causing damage and during major repairs to existing roadways where no other controls are viable.

The application of inlet protection is highly variable due to the wide variety of inlet configurations (existing and new) and site conditions. The schematics in Section 6 show example applications; however, applications in most cases must be site adapted. Different methods and materials may be used. It is the responsibility of the designer to ensure that the methods and materials applied for inlet protection are appropriate to the site and flow conditions following the design criteria in Section 3.

3.4.3 Design Criteria

General

- Drainage patterns shall be evaluated to ensure inlet protection will not divert flow or flood the roadway or adjacent properties and structures.
- Inlet protection measures or devices that completed block the inlet are prohibited. They must also include a bypass capability in case the protection measures are clogged.
- Inlet protection must be designed to pass the conveyance storm (25-year, 24-hour) without creating a road hazard or damaging adjacent property. This may be accomplished by any of the following measures:
    - An overflow weir on the protection measure.
    - An existing positive overflow swale on the inlet.
    - Sufficient storage volume around the inlet to hold the ponded water until it can all filter into the inlet.
    - Other engineered method.
- Positive overflow drainage is critical in the design of inlet protection. If overflow is not provided for at the inlet, temporary means shall be provided to route excess flows through established swales, streets, or other watercourses to minimize damage due to flooding.
- Filter fabric and wire mesh used for inlet protection shall meet the material requirements specified in *Section 3.10 Silt Fence*.

- Block and gravel (crushed stone or recycled concrete) protection is used when flows exceed 0.5 cubic feet per second and it is necessary to allow for overtopping to prevent flooding.
- The tube and filler for organic filter tubes shall be in accordance with the criteria in *Section 3.6 Organic Filter Tube*.
- Bags used to secure inlet protection devices on pavement shall be filled with aggregate, filter stone, or crushed rock that is less likely than sand to be washed into an inlet if the bag is broken. Filled bags shall be 24 to 30 inches long, 16 to 18 inches wide, and 6 to 8 inches thick. Bags shall be polypropylene, polyethylene, or polyamide woven fabric with a minimum unit weight of 4 ounces per square yard and meet the following criteria:
    - Greater than 300 psi Mullen Burst Strength using ASTM D3786 Standard Test Method for Hydraulic Bursting Strength of Textile Fabrics-Diaphragm Bursting Strength Tester Method.
    - Greater than 70 percent UV Stability using ASTM D4355 Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture, and Heat in a Xenon Arc Type Apparatus.

Curb Inlet Protection

- Municipality approval is required before installing inlet protection on public streets.
- Special caution must be exercised when installing curb inlet protection on publicly traveled streets or in developed areas. Ensure that inlet protection is properly designed, installed and maintained to avoid flooding of the roadway or adjacent properties and structures.
- A two inch overflow gap or weir is required on all curb inlet protection devices.
- Traffic cones, warning signs, or other measures shall be installed to warn motorists when the inlet protection measures extend beyond the gutter line.
- 2 inch X 4 inch Weir Protection:
    - Bend wire mesh around the 2 inch x 4 inch board and staple to the board. Bend wire mesh around the bottom of the board, the curb opening, and along the pavement to form a cage for the rock.
    - Rock bags shall be placed perpendicular to the curb, at both ends of the wooden frame, to disrupt the flow and direct water into the rock filter. Stack the bags two high if needed.
- Organic Filter Tube Protection:
    - The diameter of the tube shall be at least 2 inches less than the height of the inlet opening. The tube should not be allowed to block the entire opening, since it will clog.
    - The tube shall be placed on 4 inch x 4 inch or 2 inch x 4 inch wire mesh to prevent the tube from sagging into the inlet.
    - The tube should be long enough to extend a minimum of 12 inches past the curb opening on each side of the inlet.
- Hog Wire Weir Protection:
    - The filter fabric and wire mesh shall extend a minimum of 12 inches past the curb opening on each side of the inlet.
    - Filter fabric shall be placed on 2 inch x 4 inch wire mesh to prevent the tube from sagging into the inlet.
    - Rock bags are used to hold the wire mesh and filter fabric in contact with the pavement. At least one bag shall be placed on either side of the opening, parallel to and up against the concrete curb. The bags are in intended to disrupt and slow the flow and ensure it does not go under the fabric. Add bags if needed.

- If a board is used to anchor the wire mesh and fabric instead of rock bags, the board shall be secured with concrete nails at 3 inches on center. Upon removal clean any dirt or debris from the nailing locations, apply chemical sanding agent, and apply non-shrink grout flush with surface of concrete.

- Block and Gravel Protection:
  - Concrete blocks shall be standard 8 inch x 8 inch x 16 inch concrete masonry units and shall be in accordance with ASTM C139, Concrete Masonry Units for Construction. Filter gravel shall be ¾ inch washed stone containing no fines. Angular shaped stone is preferable to rounded shapes.
  - Concrete blocks are to be placed on their sides in a single row around the perimeter of the inlet, with ends abutting. Openings in the blocks should face outward, not upward. ½ inch x ½ inch wire mesh shall then be placed over the outside face of the blocks covering the holes. Filter gravel shall then be piled against the wire mesh to the top of the blocks with the base of the stone being a minimum of 18 inches from the blocks.
  - Alternatively, where loose stone is a concern (streets, etc.), the filter gravel may be placed in appropriately sized filter fabric bags.
  - Periodically, when the gravel filter becomes clogged, the gravel must be removed and cleaned in a proper manner or replaced with new gravel and piled back against the wire mesh.

- Organic Filter Tube On-Grade Protection:
  - Organic filter tubes may be used to provide sediment control at on-grade curb inlets where the tube will not be a traffic hazard, such as on residential streets where the pavement adjacent to the curb is allocated to parked cars. Tubes should not be used in this manner where they will extend into an active travel lane.
  - The filter tube shall be secured in a U-shape by rock bags. Runoff flowing in the gutter will pond within the U until it filters through the tube or overflows around the end.

- Inlet protection shall be phased on curb inlets being constructed. Controls shall be installed on the pipe inlet at the bottom of the catch basin as soon as it is installed and while the inlet box and top are being formed or placed.

Area Inlet Protection

- Installation methods for protection on area inlets vary depending on the type of inlet (drop, "Y," or other) and the type and use of the surface surrounding the inlet (parking lot, playground, etc.). It is the responsibility of the designer to appropriately adapt inlet protection measures and their installation methods for each site condition. Several types may be needed on one project.

- Filter Fabric Protection:
  - Filter fabric protection is appropriate where the drainage area is less than one acre and the basin slope is less than five (5) percent. Filter fabric, posts, and wire mesh shall meet the material requirements specified in *Section 3.10 Silt Fence*.
  - A 6 inch wide trench is to be cut 6 inches deep at the toe of the fence to allow the fabric to be laid below the surface and backfilled with compacted earth or gravel. This entrenchment prevents any bypass of runoff under the fence.
  - Stone overflow structures, according to the criteria in *Section 3.10 Silt Fence* shall be installed where flow to the inlet is concentrated and more than 1 cubic feet per second.

- Excavated Impoundment Protection:
  - Excavated inlet protection is usually the most effective type of area inlet protection; however, it is only applicable to drop inlets. It should not be applied to Y inlets because it will undermine the concrete pad surrounding the inlet opening. Nor can it be used for inlets on pavement.

- With this protection method, it is necessary to install weep holes to allow the impoundment to drain completely.
- The impoundment shall be sized such that the volume of excavation is equal to or exceeds the runoff volume from the temporary control design storm (2-year, 24-hour) for the inlet's drainage area.
- The trap shall have a minimum depth of one foot and a maximum depth of 2 feet as measured from the top of the inlet and shall have side slopes of 2:1 or flatter.

- Block and Gravel Protection:
  - Block and gravel inlet protection is the most stable area inlet protection and can handle more concentrated flows. It may be installed on paved or vegetated surfaces. Loose stone shall be carefully removed from vegetated surfaces at the end of construction to prevent the stone from becoming a mowing hazard.
  - The inlet protection may be one or two blocks high. Single block heights are applicable for drainage areas up to 3 acres in size. The double block height shall be used for larger drainage areas.
  - Concrete blocks shall be standard 8 inch x 8 inch x 16 inch concrete masonry units and shall be in accordance with ASTM C139, Concrete Masonry Units for Construction. Filter gravel shall be ¾ inch washed stone containing no fines. Angular shaped stone is preferable to rounded shapes.
- Organic Filter Tube Protection:
  - Organic filter tubes may be used on paved or unpaved surfaces.
  - On paved surfaces, tubes shall be secured in place by rock bags. On unpaved surfaces, the tubes shall be embedded in the ground a minimum of 3 inches and staked at 4 foot spacing.
  - Designer shall provide calculations and specify the diameter of tube to be used based on the inlet's drainage area and the flow rate of runoff to the inlet. The minimum allowable diameter is 12 inches.

Proprietary Inlet Protection

- Numerous proprietary protection devices are available from commercial vendors. The devices often have the advantage of being reusable on several projects if they are maintained in good condition.
- It is the policy of this manual not to recommend any specific commercial vendors for proprietary controls. However, this subsection is included in order to provide municipalities with a rationale for approving the use of a proprietary inlet protection device within their jurisdiction.
- The designer shall work with the supplier to provide the municipality with flow calculations or independent third-party tests that document the device's performance for conditions similar to the ones in which it is proposed to be installed. The conditions that should be considered include: type and size of inlet, inlet configuration, size of contributing drainage area, design flow rate, soil particle sizes to be removed, and other pollutants to be removed.
- The designer or vendor of the proprietary device shall provide a minimum of three references for projects where the device has been installed and maintained in operation at a construction site for at least six months. Local references are preferred; but references from other regions can be accepted if a similarity between the reference project and the proposed application can be demonstrated.
- Proprietary devices must not completely block the inlet. The device shall have a minimum of a 2 inch wide opening for the length of the inlet when it will be used in areas that water can safely pond to depths deeper than the design depths for the inlet. If ponding is not an option, then the device must have overflow capacity equal to the inlet design flow rate.
- Some proprietary devices are available with replaceable pads or filters. These pads or filters have the added benefit or removing pollutants such as metals and oils in addition to removing sediment.

These types of inserts are recommended in applications where prior or current land use in or adjacent to the construction areas may result in the discharge of pollutants.

- Proprietary protection devices shall be in accordance with the General criteria at the beginning of this section and any criteria listed under Curb Inlet Protection and Area Inlet Protection that are not specific to an inlet protection method.

3.4.4 Design Guidance and Specifications

Specifications for construction of this item may be found in the Standard Specifications for Public Works Construction – North Central Texas Council of Governments, Section 201.15 Inlet Protection.

3.4.5 Inspection and Maintenance Requirements

Inlet protection should be inspected regularly (at least as often as required by the TPDES Construction General Permit). Inlet controls should also be inspected after every storm event to check for collapse into the inlet or other damages that may block flow in the inlet. In addition to routine inspection, inlet protection devices should be observed and monitored during larger storm events to verify that they are not ponding or diverting water in a manner that floods a roadway or damages property.

Floatable debris and other trash caught by the inlet protection should be removed after each storm event. Sediment should also be removed from curb inlet protection after each storm event because of the limited storage area associated with curb inlets.

Sediment collected at area inlet protection should be removed before it reaches half the height of the protection device. Sediment should be removed from inlets with excavated impoundment protection before the volume of the excavation is reduced by 50 percent. In addition, the weep holes should be checked and kept clear of blockage.

Concrete blocks, 2 inch x 4 inch boards, stakes, and other materials used to construct inlet protection should be checked for damaged and repaired or replaced if damaged.

When filter fabric or organic filter tubes are used, they should be cleaned or replaced when the material becomes clogged. For systems using filter stone, when the filter stone becomes clogged with sediment, the stones must be pulled away from the inlet and cleaned or replaced.

Because of the potential for inlet protection to divert runoff or cause localized flooding, remove inlet protection as soon as the drainage area contributing runoff to the inlet is stabilized. Ensure that all inlet protection devices are removed at the end of the construction.

3.4.6 Example Schematics

The following schematics are example applications of the construction control. They are intended to assist in understanding the control's design and function.

The schematics are **not for construction**. They may serve as a starting point for creating a construction detail, but they must be site adapted by the designer. In addition, dimensions and notes appropriate for the application must be added by the designer.

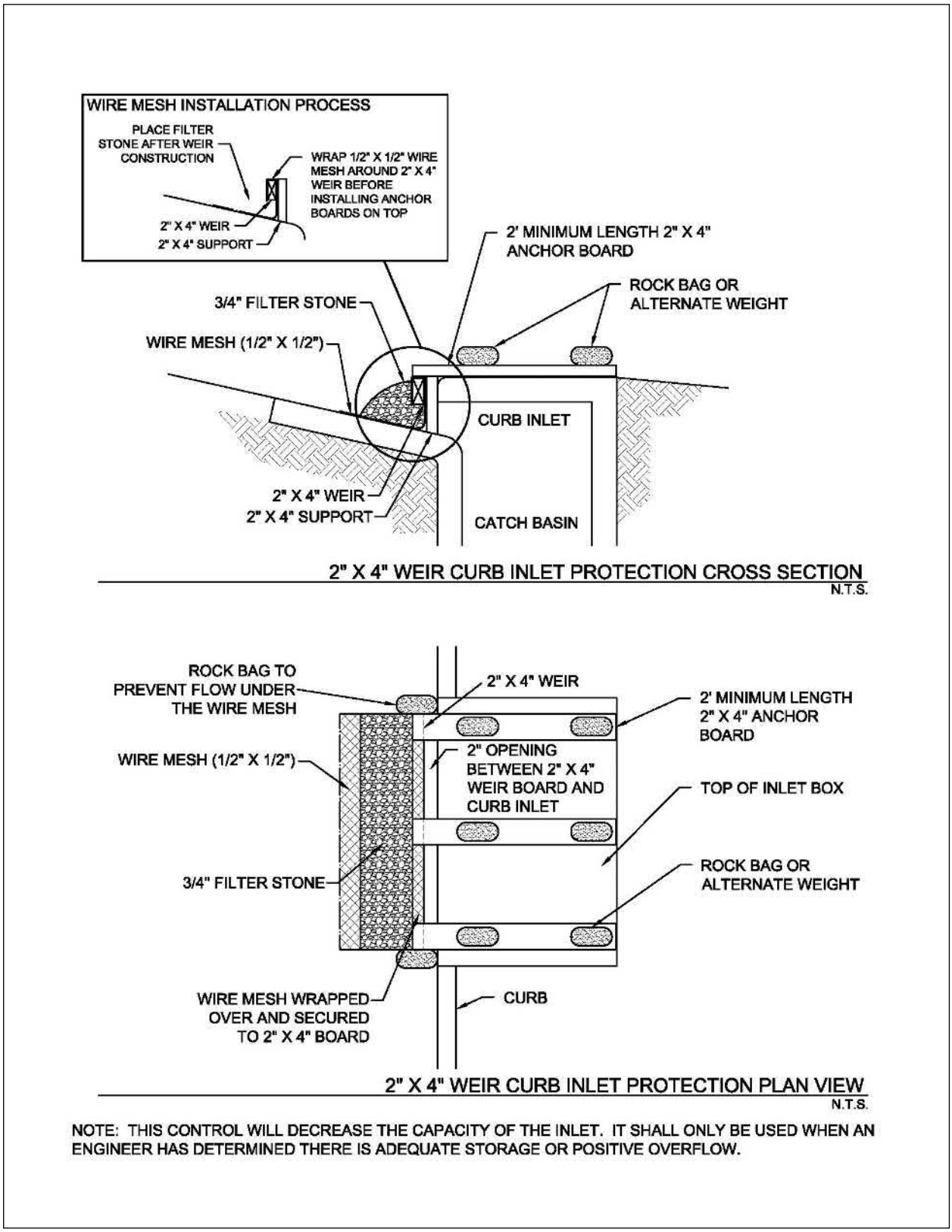
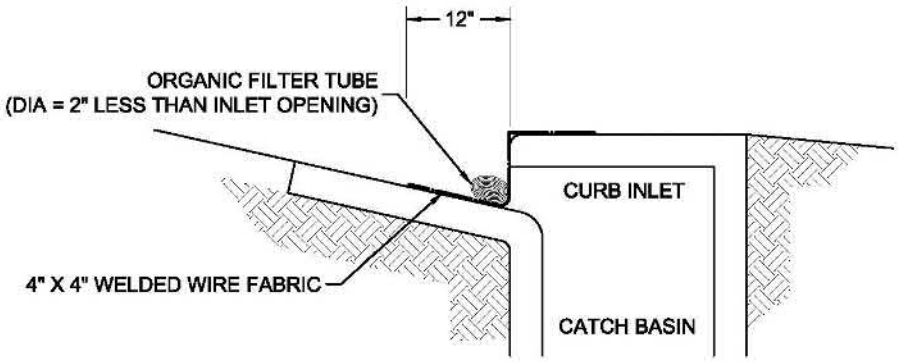
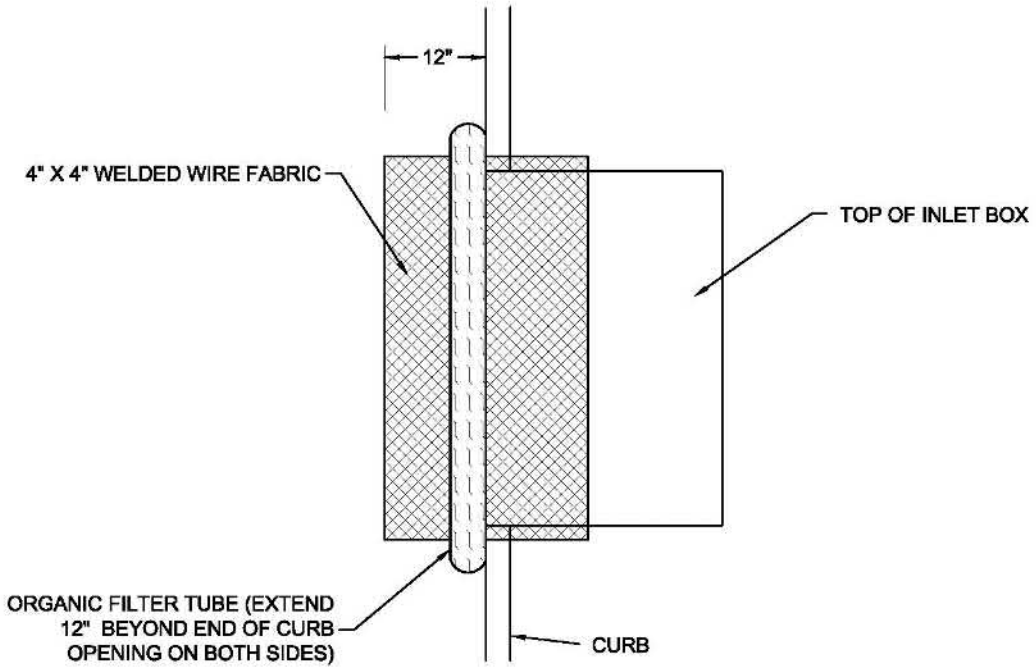


Figure 3.5 Schematics of 2"x4" Weir Curb Inlet Protection
(Source: Modified from Washington Suburban Sanitary Commission Detail SC-16.0)



ORGANIC FILTER TUBE CURB INLET PROTECTION CROSS SECTION
N.T.S.



ORGANIC FILTER TUBE CURB INLET PROTECTION PLAN VIEW
N.T.S.

NOTE: THIS CONTROL WILL DECREASE THE CAPACITY OF THE INLET. IT SHALL ONLY BE USED WHEN AN ENGINEER HAS DETERMINED THERE IS ADEQUATE STORAGE OR POSITIVE OVERFLOW.

Figure 3.6 Schematics of Organic Filter Tube Curb Inlet Protection
(Source: Modified from City of Plano BMP SP-4)

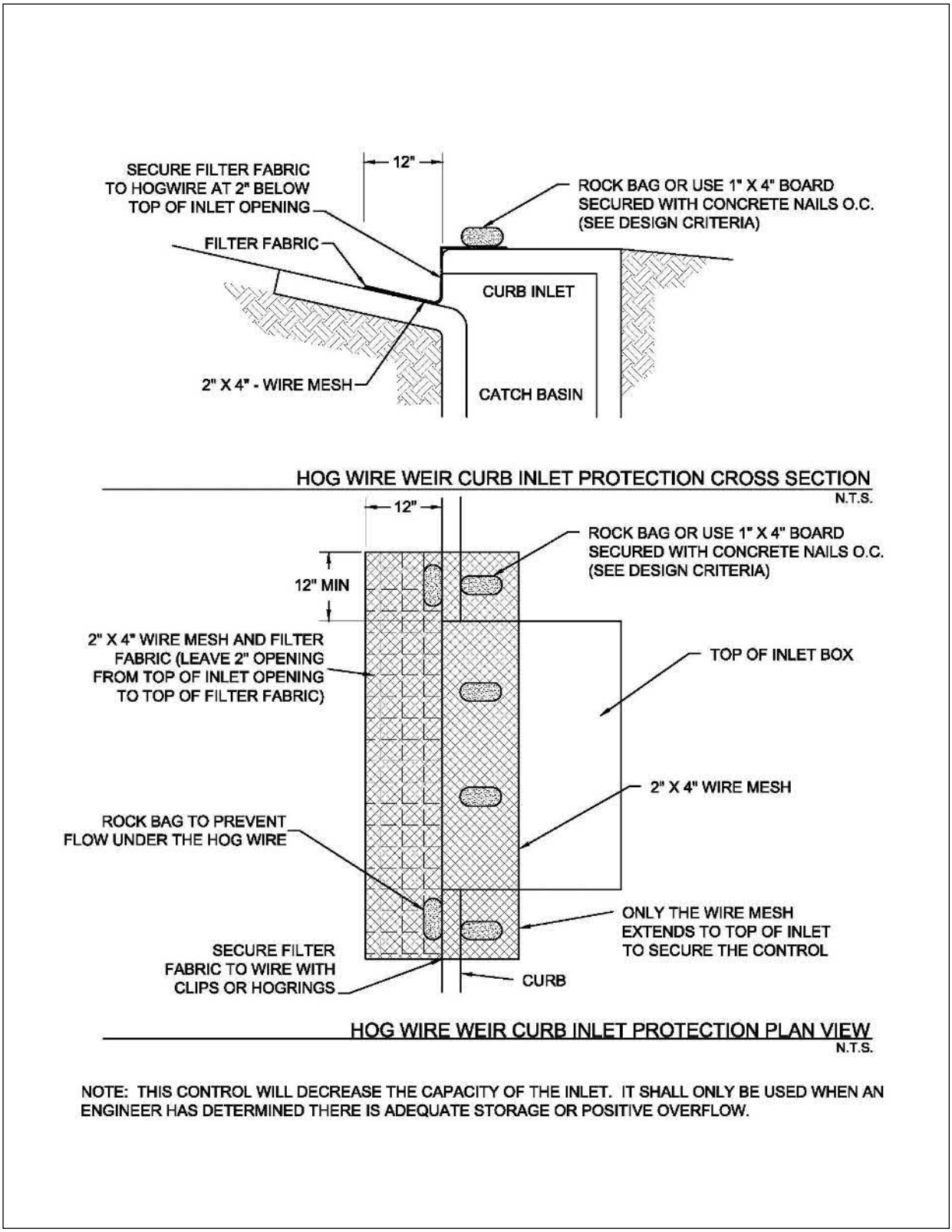
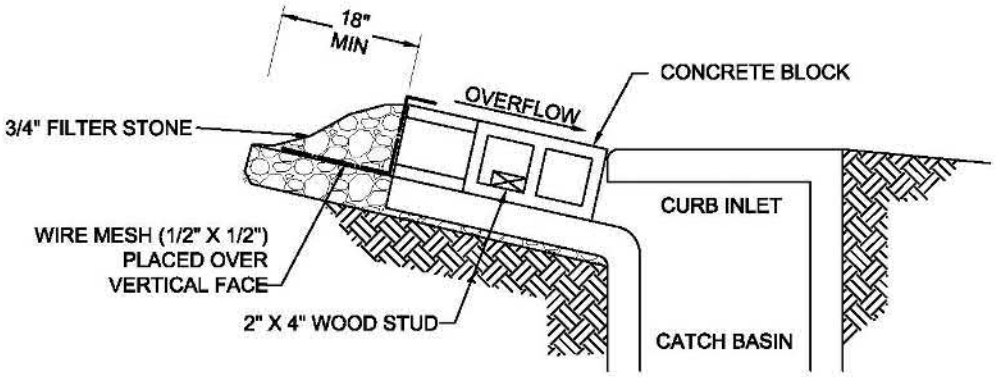
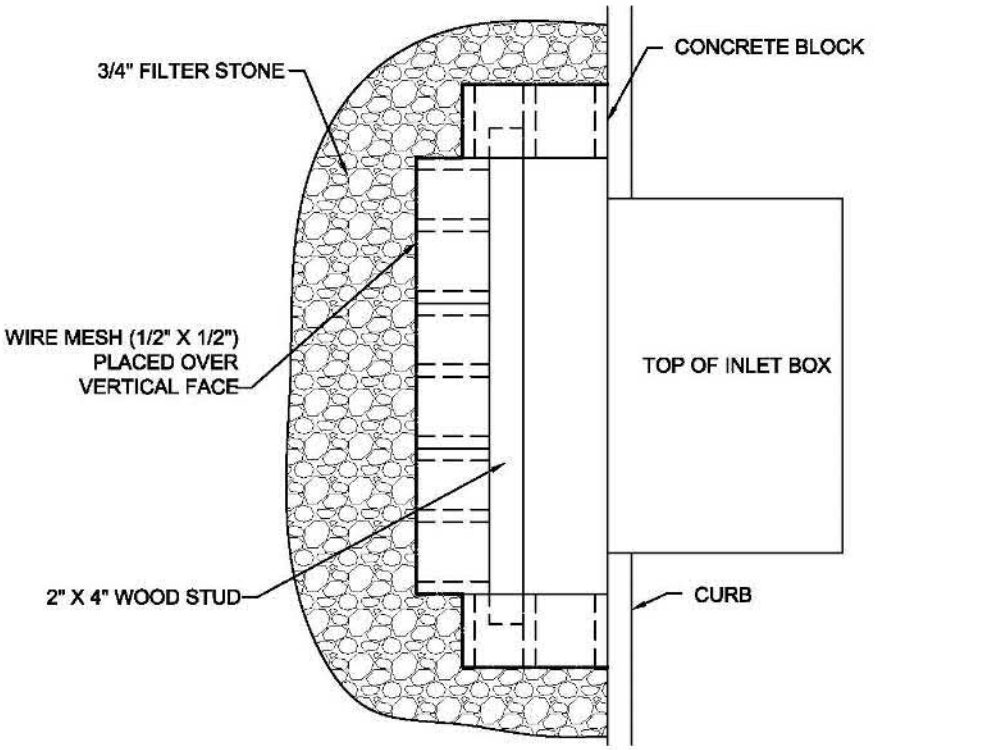


Figure 3.7 Schematics of Hog Wire Weir Curb Inlet Protection
(Source: Modified from City of Round Rock Detail E-03)



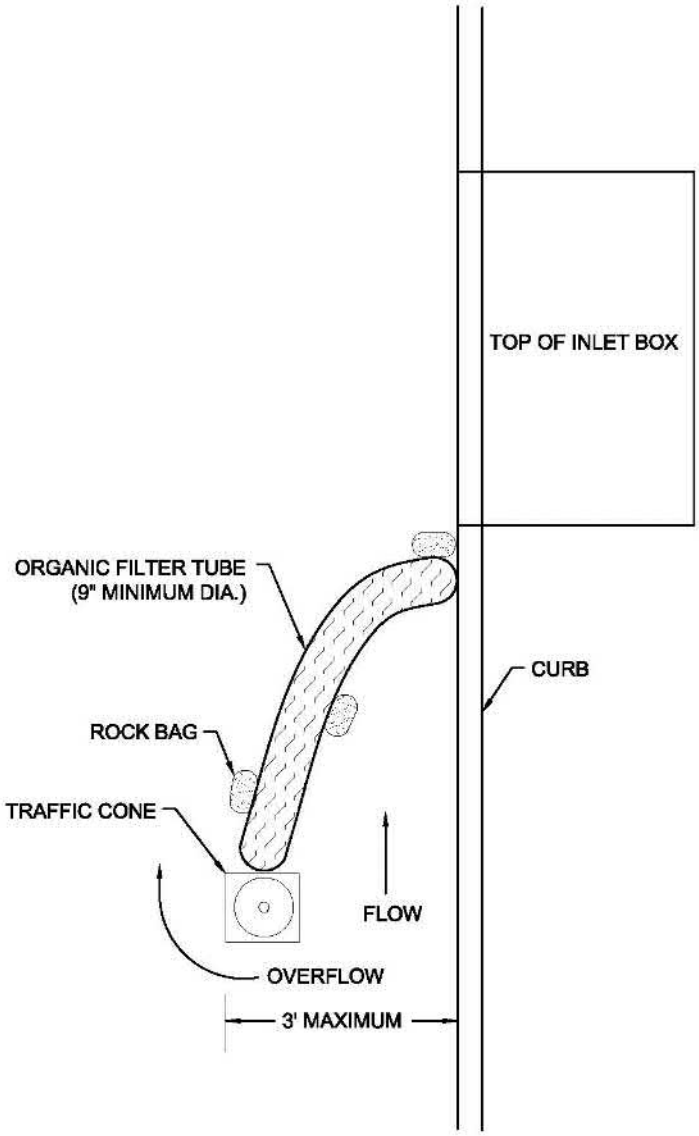
BLOCK AND GRAVEL FILTER CURB INLET PROTECTION CROSS SECTION
N.T.S.



BLOCK AND GRAVEL FILTER CURB INLET PROTECTION PLAN VIEW
N.T.S.

NOTES:
1. DO NOT INSTALL ON INLETS IN A PUBLIC STREET OR OTHER ACTIVE TRAVEL LANE. BLOCK AND GRAVEL FILTER IS INTENDED FOR USE ON LOW POINT (SUMP) INLETS IN PARKING LOTS AND OTHER PAVEMENT THAT IS NOT AN ACTIVE TRAVEL LANE. THIS INLET PROTECTION METHOD ALLOWS FOR FULL USE OF THE INLET DESIGN CAPACITY.
2. INSTALL TRAFFIC CONES AS NEEDED TO MINIMIZE THE POTENTIAL FOR CARS HITTING THE BLOCK AND GRAVEL.

Figure 3.8 Schematics of Block and Gravel Filter Curb Inlet Protection

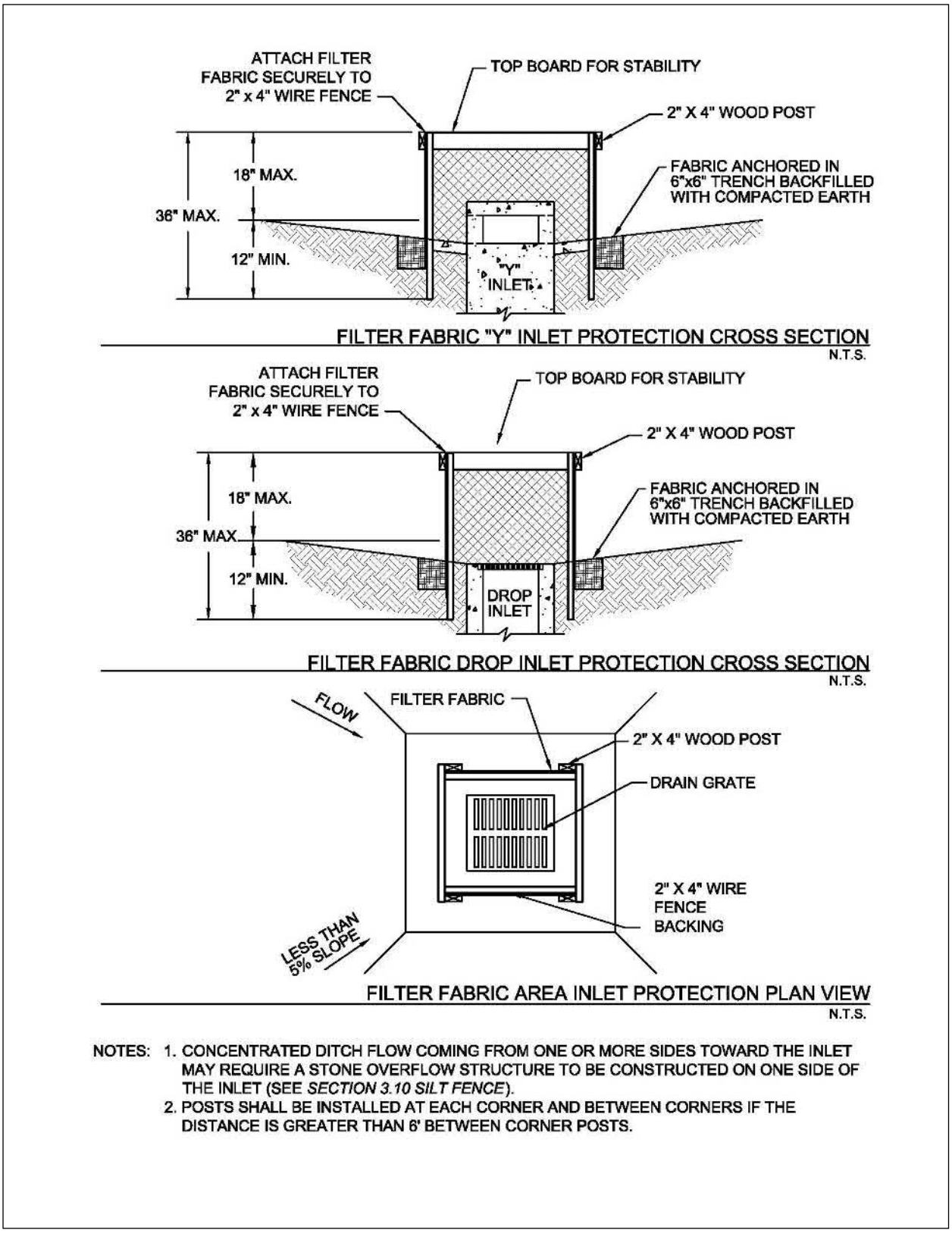


ORGANIC FILTER TUBE ON-GRADE CURB INLET PROTECTION DETAIL

N.T.S.

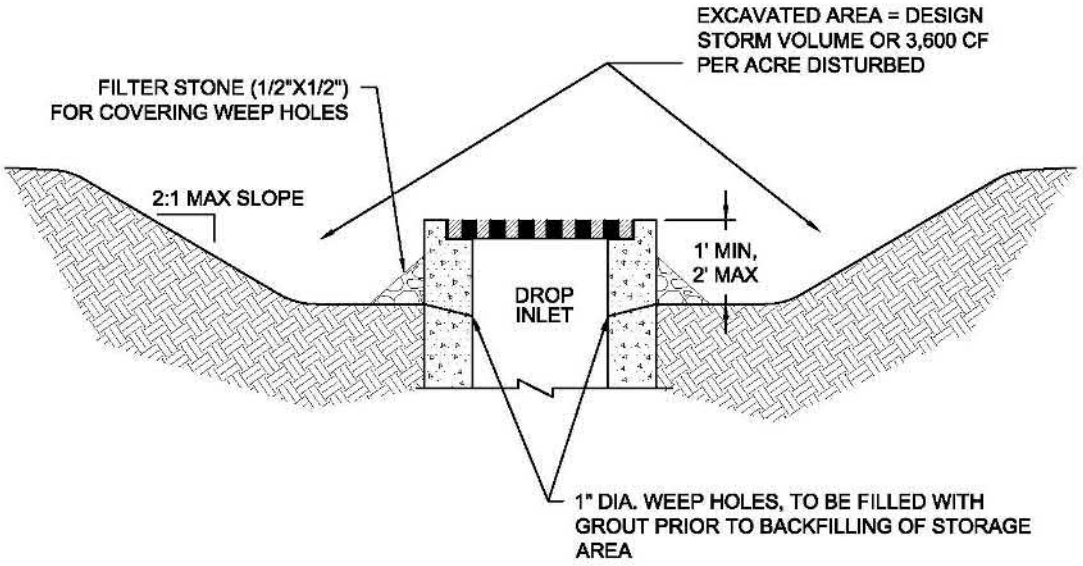
NOTES: 1. THIS DETAIL IS INTENDED FOR USE WITH ON-GRADE INLETS (NOT A LOW POINT) WHERE WATER WOULD BE DIVERTED INSTEAD OF PONDING BEHIND THE OTHER TYPES OF INLET PROTECTION.
2. DO NOT INSTALL ON INLETS WHERE THE ORGANIC FILTER TUBE WOULD EXTEND INTO AN ACTIVE TRAVEL LANE.

Figure 3.9 Schematic of Organic Filter Tube On-Grade Curb Inlet Protection

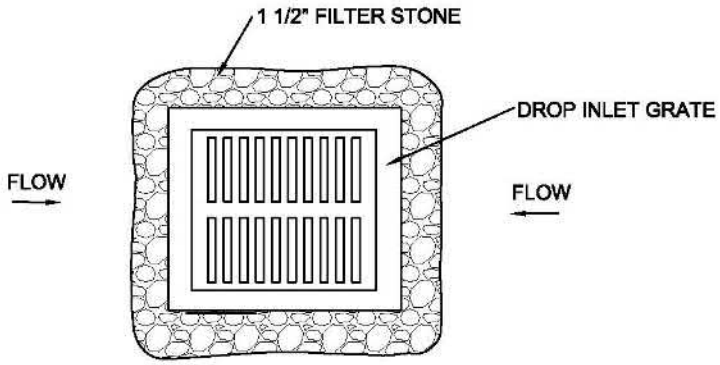


NOTES:
1. CONCENTRATED DITCH FLOW COMING FROM ONE OR MORE SIDES TOWARD THE INLET MAY REQUIRE A STONE OVERFLOW STRUCTURE TO BE CONSTRUCTED ON ONE SIDE OF THE INLET (SEE *SECTION 3.10 SILT FENCE*).
2. POSTS SHALL BE INSTALLED AT EACH CORNER AND BETWEEN CORNERS IF THE DISTANCE IS GREATER THAN 6' BETWEEN CORNER POSTS.

Figure 3.10 Schematics of Filter Fabric Area Inlet Protection
(Source: City of Plano BMP SP-4)

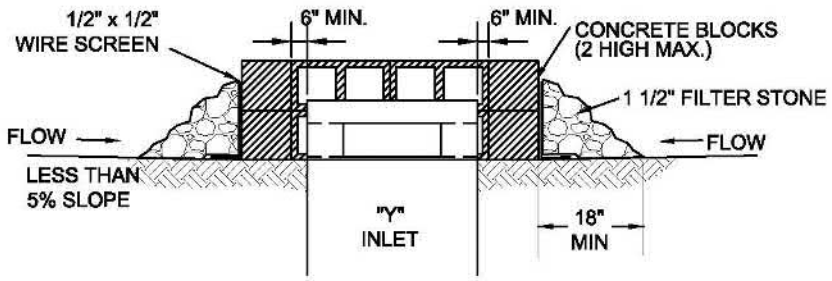


EXCAVATED IMPOUNDMENT DROP INLET PROTECTION CROSS SECTION
N.T.S.

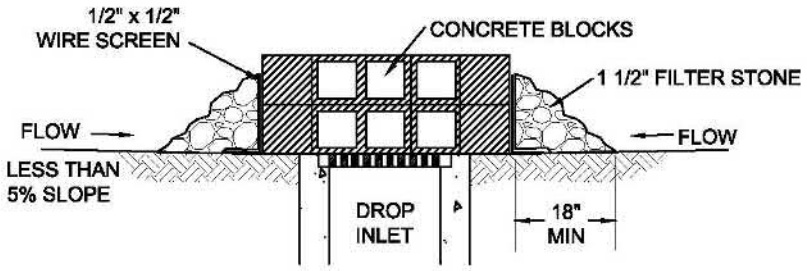


EXCAVATED IMPOUNDMENT AREA INLET PROTECTION PLAN VIEW
N.T.S.

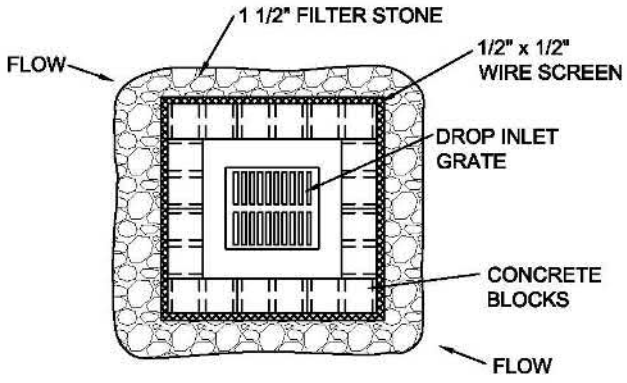
Figure 3.11 Schematics of Excavated Impoundment Area Inlet Protection



BLOCK AND GRAVEL "Y" INLET PROTECTION CROSS SECTION
N.T.S.



BLOCK AND GRAVEL DROP INLET PROTECTION CROSS SECTION
N.T.S.



BLOCK AND GRAVEL AREA INLET PROTECTION PLAN VIEW
N.T.S.

Figure 3.12 Schematics of Block and Gravel Area Inlet Protection
(Source: Modified from City of Plano BMP SP-4)

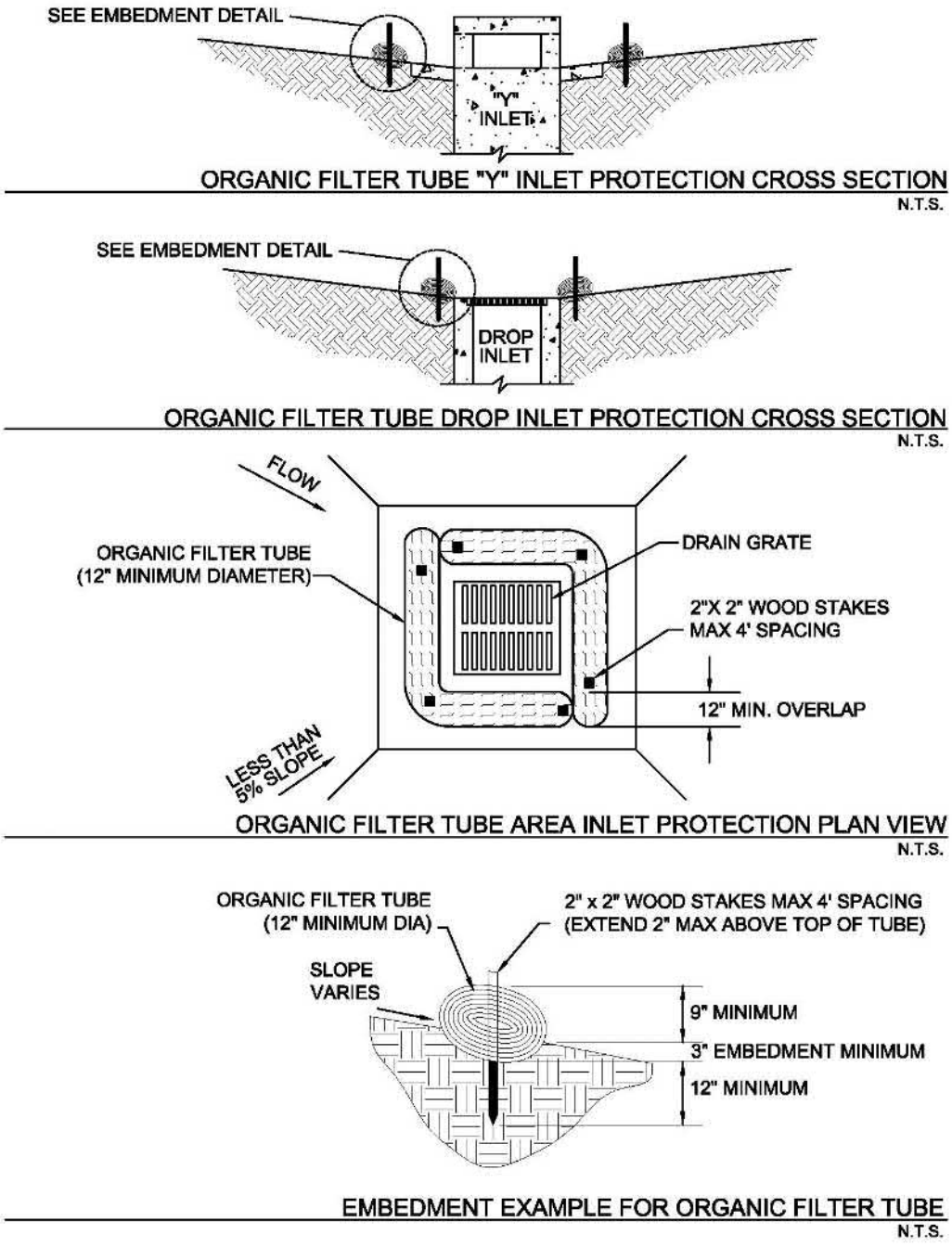
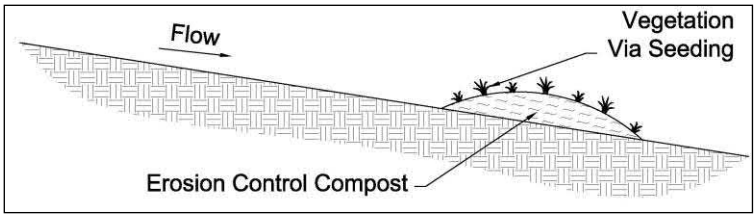


Figure 3.13 Schematics of Organic Filter Tube Area Inlet Protection

3.5 Organic Filter Berm

Sediment Control



Description: Organic filter berms, also called compost filter berms, are linear berms constructed of a mix of compost and wood chips. They are placed on a contour to control runoff. The organic filter berm provides both filtration and time for sediment settling by reducing the velocity of the runoff.

KEY CONSIDERATIONS

DESIGN CRITERIA:

- Maximum drainage area of 0.25 acre per 100 linear feet of berm
- Maximum 200 feet distance of flow to silt fence; 50 feet if slope exceeds 10 percent
- 1½ to 3 feet high, top width of 2 to 3 feet, and base of 3 to 5 feet for trapezoidal shaped berms
- 1 to 2 feet high and 2 to 4 feet wide for windrow (triangular) berms

ADVANTAGES / BENEFITS:

- Economical means to trap sediment
- Most effective with coarse to silty soil types
- May be tilled into the soil at end of project, thus adding organic content to the soil

DISADVANTAGES / LIMITATIONS:

- Localized flooding due to minor ponding upslope of the filter berm
- Not for use in swales or low areas where berms will be subject to concentrated flow
- Can interfere with construction operations
- Repeated clogging may require replacement of berm with another control

MAINTENANCE REQUIREMENTS:

- Inspect regularly
- Repair undercutting and other failures
- Remove sediment when before it reaches one-half the height of the berm
- Maintain dimensions of the berm by replacing organic filter material when necessary

TARGETED POLLUTANTS

- ● Sediment
- ○ Nutrients & Toxic Materials
- ○ Oil & Grease
- ◒ Floatable Materials
- ○ Other Construction Wastes

APPLICATIONS

Perimeter Control
Slope Protection
Sediment Barrier

Channel Protection

Temporary Stabilization

Final Stabilization

Waste Management

Housekeeping Practices

Fe=0.50-0.75
(*Depends on soil type*)

IMPLEMENTATION CONSIDERATIONS

- ◒ Capital Costs
- ● Maintenance
- ○ Training
- ◒ Suitability for Slopes > 5%

Other Considerations

- *Effects of ponding on adjacent areas and property*

3.5.1 Primary Use

Organic filter berms are used as perimeter controls down slope of disturbed areas and on side slopes where stormwater may runoff the area. They are very well suited to sites with small disturbed drainage areas that are not subjected to concentrated flows and that will ultimately be seeded, sodded, or landscaped.

3.5.2 Applications

Properly designed, the organic filter berm is economical due to the ease of installation and because it can be tilled into the soil at the end of project, limiting the cost of removal and adding to the organic content of the soil. The berms are used as perimeter control devices for both development sites and linear (roadway) type projects. They are most effective with coarse to silty soil types. Additional controls, such as a passive treatment system, may be needed to remove fine silts and clay soils suspended in stormwater.

3.5.3 Design Criteria

- Filter berms are to be constructed along a line of constant elevation (along a contour line) where possible.
- Berms can interfere with construction operations; therefore planning of access routes onto the site is critical.
- Maximum drainage area shall be 0.25 acre per 100 linear feet of filter berm.
- Maximum flow to any 20 foot section of filter berm shall be 1cubic feet per second.
- Maximum distance of flow to berm shall be 200 feet or less. If the slope exceeds 10 percent the flow distance shall be less than 50 feet.
- Maximum slope adjacent to the filter berm shall be 4:1.
- Trapezoidal shaped berms should be 1½ to 3 feet high with a top width of 2 to 3 feet and a base of 3 to 6 feet wide.
- Windrow (triangular) shaped berms should be 1 to 2 feet high and 2 to 4 feet wide.
- Berm side slopes shall be 2:1 or flatter.
- Roughen the soil surface before placing the berm to increase adherence of the compost.
- Compost shall conform to the requirements for Erosion Control Compost in Item 161 of the Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges (TxDOT 2004).
- Organic filter berms should be stabilized by seeding if there are no other sediment controls down slope of the filter berm. Seeding shall be as specified in *Section 2.9 Vegetation* at a seed loading of 1 lb. per 10 linear feet for small berms (1ft. by 2 ft.) or 2.25 lbs per 10 linear ft. for larger berms (1.5 ft. by 3 ft.)

3.5.4 Design Guidance and Specifications

Specifications for Erosion Control Compost to be used as filter material may be found in Item 161 of the Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges (TxDOT 2004).

3.5.5 Inspection and Maintenance Requirements

Filter berms should be inspected regularly (at least as often as required by the TPDES Construction General Permit) for buildup of excess sediment, undercutting, and other failures. Silt must be removed

when before it reaches half the height of the berm. Silt may be raked from the disturbed side of the device to clean side the berm for the first few times that it becomes clogged to prevent ponding. Repeated clogging of the berm at one location will require replacement of the organic filter material or may require installation of another control to prevent failure of the berm.

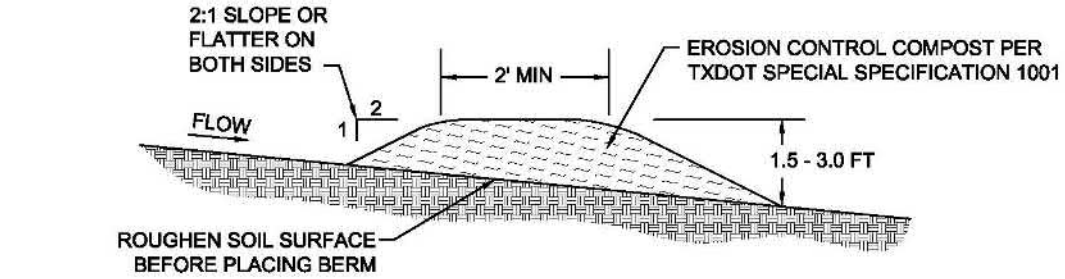
Dimensions of the berm must be maintained by replacing organic filter material when necessary. Typically excess material is stockpiled onsite for repairs to berms disturbed by construction activity.

There shall be no signs of erosion, breeching or runoff around or under the berm.

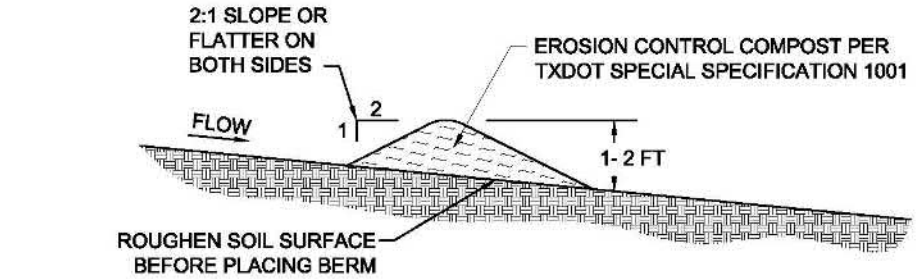
3.5.6 Example Schematics

The following schematics are example applications of the construction control. They are intended to assist in understanding the control's design and function.

The schematics are **not for construction**. They may serve as a starting point for creating a construction detail, but they must be site adapted by the designer. In addition, dimensions and notes appropriate for the application must be added by the designer.



TRAPEZOIDAL SHAPED ORGANIC FILTER BERM
N.T.S.



TRIANGULAR SHAPED ORGANIC FILTER BERM
N.T.S.

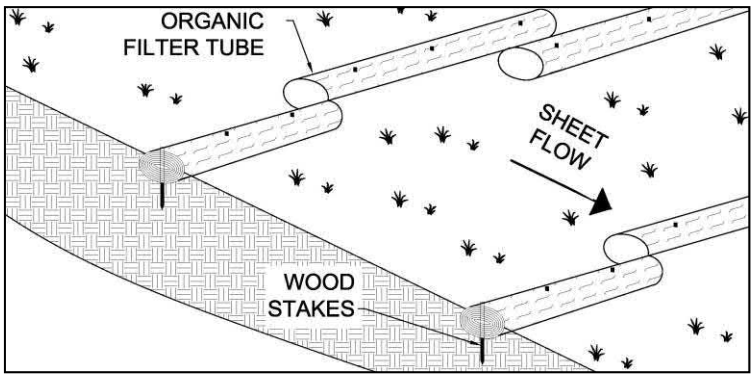
NOTE: DIMENSIONS OF THE BERM SHALL BE DESIGNED BASED ON FLOW CONDITIONS. PROVIDE CALCULATIONS THAT DOCUMENT THE FOLLOWING PARAMETERS TO DESIGN THE SWALE:

- SIZE OF CONTRIBUTING DRAINAGE AREA
- DESIGN STORM
- FLOW RATE
- BERM HEIGHT AND WIDTH

Figure 3.14 Schematics of Organic Filter Berm

3.6 Organic Filter Tubes

Sediment Control



Description: Organic filter tubes are comprised of an open weave, mesh tube that is filled with a filter material (compost, wood chips, straw, coir, aspen fiber, or a mixture of materials). The tube may be constructed of geosynthetic material, plastic, or natural materials. Organic filter tubes are also called fiber rolls, fiber logs, wattles, mulch socks, and/or coir rolls. Filter tubes detain flow and capture sediment as linear controls along the contours of a slope or as a perimeter control down-slope of a disturbed area.

KEY CONSIDERATIONS

DESIGN CRITERIA:

- Tube diameter when filled shall be specified on the plans
- 3 inch minimum embedment in soil
- 18 inch minimum overlap at ends of tubes
- Spacing based on drainage area and slope
- Must be staked on soil and secured with rockbags on pavement
- Turn ends of tube lines upslope a minimum of 10 feet

ADVANTAGES / BENEFITS:

- Effective means to treat sheet flow over a short distance
- Relatively easy to install
- May be used on steep slopes
- Can provide perimeter control on paved surfaces or where soil type prevents embedment of other controls
- Work well as perimeter controls around stockpiles

DISADVANTAGES / LIMITATIONS:

- Difficult to remove when wet and/or filled with sediment
- Relatively small effective areas for sediment capture

MAINTENANCE REQUIREMENTS:

- Inspect regularly
- Repair eroded areas underneath the organic filter tubes
- Re-align and stake tubes that are dislodged by flow
- Remove sediment before it reaches half the height of the exposed tube

TARGETED POLLUTANTS

- ● Sediment
- ○ Nutrients & Toxic Materials
- ◒ Oil & Grease
- ○ Floatable Materials
- ○ Other Construction Wastes

APPLICATIONS

Perimeter Control
Slope Protection
Sediment Barrier

Channel Protection

Temporary Stabilization

Final Stabilization

Waste Management

Housekeeping Practices

Fe=0.50-0.75
(*Depends on soil type*)

IMPLEMENTATION CONSIDERATIONS

- ◒ Capital Costs
- ◒ Maintenance
- ○ Training
- ◒ Suitability for Slopes > 5%

Other Considerations:

- *None*

3.6.1 Primary Use

Organic filter tubes are long, flexible controls that are used along a line of constant elevation (along a contour) on slopes. They are used as perimeter controls down slope of disturbed areas, around temporary stockpiles and on side slopes where stormwater may runoff the area. The tubes maintain sheet flow, slow velocities, and capture sediment. When used in series on slopes, they also shorten the slope length and protect the slope from erosion.

3.6.2 Applications

Organic filter tubes include a wide variety of tube and filter materials. Organic filter tubes are used as a perimeter sediment barrier, similar to silt fence, for development projects and linear projects, such as roadways and utilities. They work well on individual residential lots and on lots being re-developed, where space may be limited. Organic filter tubes are most effective with coarse to silty soil types. Additional controls may be needed to remove fine silts and clay soils suspended in stormwater.

Organic filter tubes can be used on paved surfaces where it's not possible to stake a silt fence. Applications on paved surfaces include perimeter controls for soil stockpiles, pavement repair areas, utility trenching, and building demolition. When compost filter material is used in tubes on pavement, the material has the added benefit of removing some oil and grease from stormwater runoff.

Applications on slopes include temporary sediment control during construction and erosion control of the disturbed soil on the slope. Organic filter tubes may be used to control sheet flow on slopes when final stabilization measures are being applied and established.

Organic filter tubes may also be used for inlet protection and, in limited cases, as check dams in small drainage swales. Refer to *Section 3.4 Inlet Protection* and *Section 2.1 Check Dam* for the design criteria to use organic filter tubes in these applications.

3.6.3 Design Criteria

General Criteria

- Filter tubes should be installed along the contour.
- Tubes shall be staked with 2 inch by 2 inch wooden stakes at a maximum spacing of 4 feet. Rebar or similar metal stakes may be used instead of wooden stakes.
- When placed on pavement, sand or rock bags shall be placed abutting the down-slope side of the tubes to prevent runoff from dislodging the tubes. At a minimum, bags shall be placed one foot from each end of the tube and at the middle of the tube.
- Filter tubes shall be embedded a minimum of three inches when placed on soil. Placement on rock shall be designed as placement on pavement.
- The end of tubes shall overlap a minimum of 18 inches when multiple tubes are connected to form a linear control along a contour or a perimeter.
- Loose mulch material shall be placed against the log on the upstream side to facilitate contact with the ground.
- The last 10 feet (or more) at the ends of a line of tubes shall be turned upslope to prevent bypass by stormwater. Additional upslope lengths of tubes may be needed every 200 to 400 linear feet, depending on the traverse slope along the line of tubes.
- The most common sizes of tubes are 6 to 24 inches in diameter; however, tubes are available in sizes as small as 4 inches and up to 36 inches in diameter. The designer shall specify a diameter based on the site application. Tubes less than 8 inches in diameter when filled will require more frequent maintenance if used.

- Manufactured organic filter tube products shall have documentation of a minimum 75 percent soil retention using ASTM D7351 Standard Test Method for Determination of Sediment Retention Device Effectiveness in Sheet Flow Applications.
- When using manufactured tubes, the manufacturer's recommendations for diameter and spacing based on slope, flow velocities, and other site conditions shall be followed when they are more stringent than the design criteria in this section.
- When used as a perimeter control on grades of 10:1 or less, criteria in the following table shall be used as a guide for the size and installation rate of the organic filter tube.

Table 3.1 Perimeter Control Applications*

Drainage Area (Max)	*Max Flow Length to the Tube*	*Tube Diameter (Min)*
1/3 Acre per 100 feet	145 feet	18 inches
1/4 Acre per 100 feet	110 feet	15 inches
1/5 Acre per 100 feet	85 feet	12 inches
1/8 Acre per 100 feet	55 feet	9 inches

(Source: Modified and expanded from City of Plano Fact Sheet SP-13)
*Applicable on grades of 10:1 or flatter.

- When installing organic filter tubes along contours on slopes, criteria in the following table shall be used as a general guide for size and spacing of the tubes. Actual tube diameter and spacing shall be specified by the designer. The designer shall consider the tube manufacturers recommendations, the soil type, flow volume on the slope, required performance life, and erosion control measures that may be used in conjunction with the tubes.

Table 3.2 Maximum Spacing for Slope Protection

	Tube Diameter (Min)			
Slope (H:V)	*9 Inches*	*12 Inches*	*18 Inches*	*24 Inches*
5:1 to 10:1	35 feet	40 feet	55 feet	60 feet
4:1	30 feet	40 feet	50 feet	50 feet
3:1	25 feet	35 feet	40 feet	40 feet
2:1	20 feet	25 feet	30 feet	30 feet
1:1	10 feet	15 feet	20 feet	20 feet

(Source: Modified and expanded from Iowa Statewide Urban Design and Specifications Standards for Filter Socks)

Tube Material

- The designer shall specify the type of mesh based on the required life of the tube. At a minimum, the mesh shall have a rated life of one year under field conditions.
- If the tubes will be left onsite as part of the final stabilization, they must be constructed of 100 percent biodegradable jute, coir, sisal or similar natural fiber or 100 percent UV photodegradable plastic, polyester or geosynthetic material.
- Mesh tubes may be oval or round in cross-section.
- Mesh for the tubes shall be open and evenly woven. Size of weave openings shall be specified based on filter material. Openings may range from ½ inch for Erosion Control Compost to 2 inches for straw and coir.
- Mesh openings should not exceed ½ inch in diameter.

Filter Material

- Different filter materials have different properties and will affect sheet flow differently. The designer shall specify the type of material to be used (or excluded) on a particular site.
- Straw filter material shall be Certified Weed Free Forage. The straw must be in good condition, air-dried, and not rotten or moldy.
- Compost shall conform to the requirements for Erosion Control Compost in Item 161 of the Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges (TxDOT 2004).
- Compost may provide some oil and grease removal; however, the large percentage of fines in compost will result in less filtering and more ponding of stormwater.
- Wood chips shall be 100 percent untreated chips and free of inorganic debris, such as plastic, glass, metal, etc. Wood chip size shall not be smaller than 1 inch and shall not exceed 3 inches in diameter. Shavings shall not be more than 5% of the total mass.

3.6.4 Design Guidance and Specifications

Specifications for Erosion Control Compost to be used as filter material may be found in Item 161 of the Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges (TxDOT 2004).

3.6.5 Inspection and Maintenance Requirements

Organic filter tubes should be inspected regularly (at least as often as required by the TPDES Construction General Permit). The filter tube should be checked to ensure that it is in continuous contact with the soil at the bottom of the embedment trench. Closely check for rill erosion that may develop under the filter tubes. Eroded spots must be repaired and monitored to prevent reoccurrence. If erosion under the tube continues, additional controls are needed.

Staking shall be checked to ensure that the filter tubes are not moving due to stormwater runoff. Repair and re-stake slumping filter tubes. Tubes that are split, torn or unraveling shall be repaired or replaced.

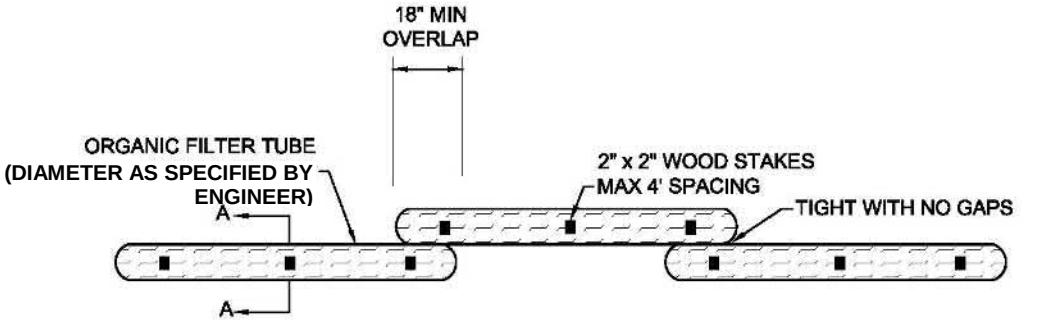
Check the filter tube material to make sure that it has not become clogged with sediment or debris. Clogged filter tubes usually lead to standing water behind the filter tube after the rain event. Sediment shall be removed from behind the filter tube before it reaches half the height of the exposed portion of the tube.

When sediment control is no longer needed on the site, the tubes may be split open and the filter material may be used for mulching during establishment of vegetation for final stabilization if it meets the criteria in *Section 2.5 Mulching*.

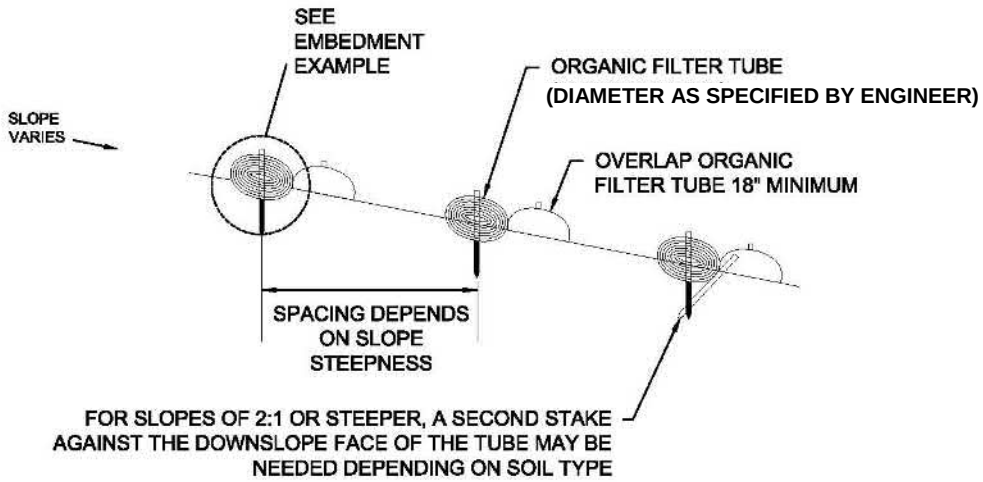
3.6.6 Example Schematics

The following schematics are example applications of the construction control. They are intended to assist in understanding the control's design and function.

The schematics are **not for construction**. They may serve as a starting point for creating a construction detail, but they must be site adapted by the designer. In addition, dimensions and notes appropriate for the application must be added by the designer.



ORGANIC FILTER TUBE PERIMETER CONTROL PLAN VIEW
N.T.S.



ORGANIC FILTER TUBE SLOPE PROTECTION PROFILE
N.T.S.

NOTES:

1. TYPE OF NETTING, FILTER MATERIAL, DIAMETER OF TUBE, AND SPACING OF TUBES SHALL BE SPECIFIED BY THE DESIGNER BASED ON THE FOLLOWING SITE PARAMETERS.
   - SIZE OF CONTRIBUTING DRAINAGE AREA
   - STEEPNESS OF SLOPE
   - GROUND CONDITIONS (SOIL OR PAVEMENT)
2. DESIGNER SHALL SHOW ON THE DRAWINGS THE LOCATIONS WHERE TUBES ARE TO BE TURNED UPSLOPE. UPSLOPE LENGTHS SHALL BE MINIMUM OF 10 FEET.

Figure 3.15 Schematics of Organic Filter Tubes

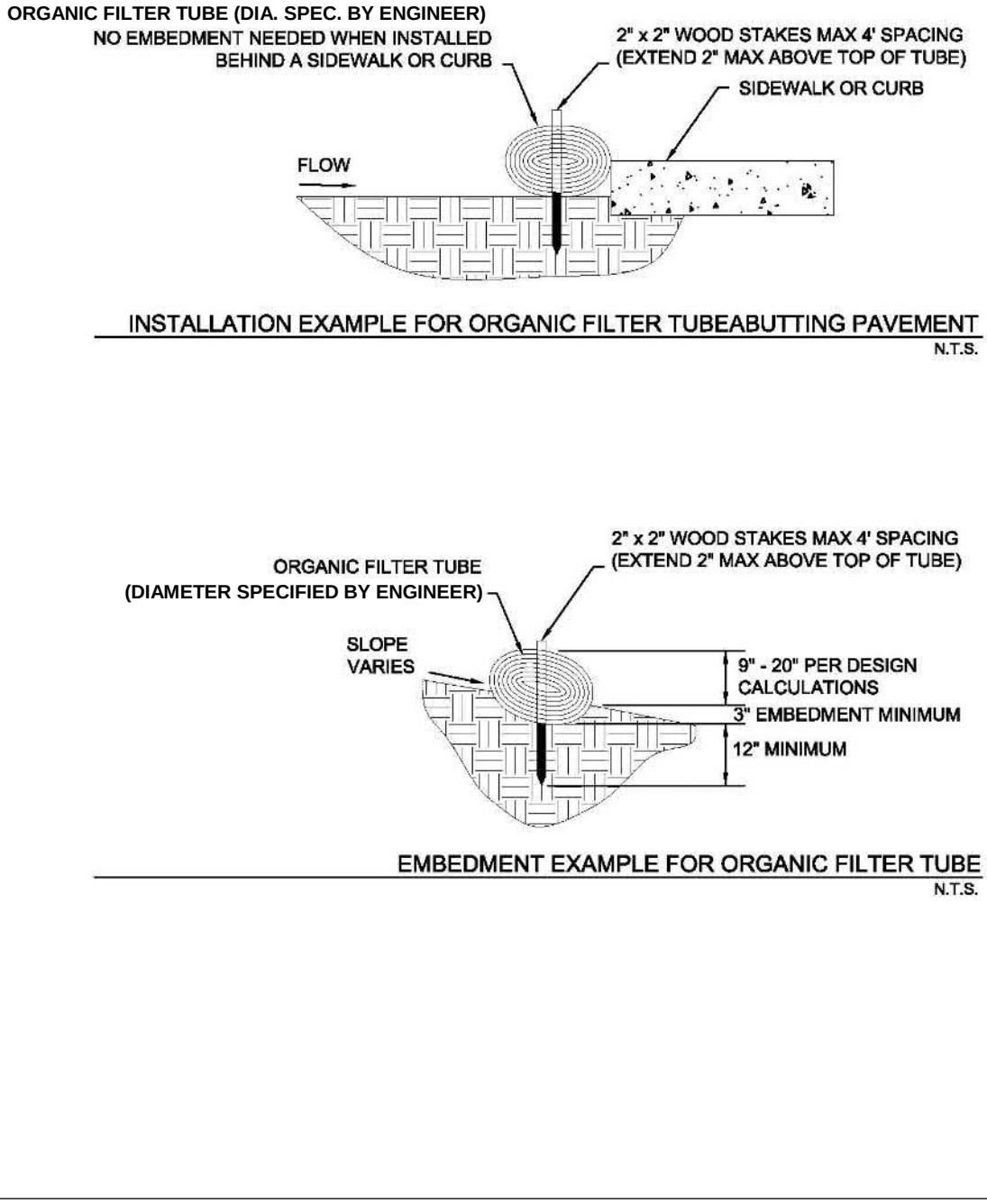
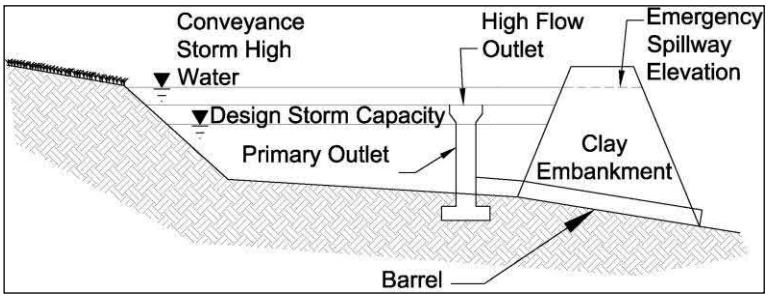


Figure 3.16 Examples of Organic Filter Tube Installation Methods

3.9 Sediment Basin

Sediment Control



Description: A sediment basin is an embankment with a controlled outlet that detains stormwater runoff, resulting in the settling of suspended sediment. The basin provides treatment for the runoff as well as detention and controlled release of runoff, decreasing erosion and flood impacts downstream.

KEY CONSIDERATIONS

DESIGN CRITERIA:

- Minimum 4:1 length to width ratio
- Maximum embankment height and storage capacity limited by TCEQ requirements
- Minimum dewatering time of 36 hours
- Safely pass 25-year, 24-hour storm event without structure damage

ADVANTAGES / BENEFITS:

- Effective at removing suspended sand and loam
- May be both a temporary and permanent control
- Can be used in combination with passive treatment

DISADVANTAGES / LIMITATIONS:

- Effectiveness depends on type of outlet
- Limited effectiveness in removing fine silt and clay
- May require a relatively large portion of the site
- Storm events that exceed the design storm event may damage the structure and cause downstream impacts

MAINTENANCE REQUIREMENTS:

- Inspect regularly
- Remove obstructions from discharge structures
- Remove sediment and re-grade basin when storage capacity reduced by 20 percent

TARGETED POLLUTANTS

- ● Sediment
- ◒ Nutrients & Toxic Materials
- ○ Oil & Grease
- ◒ Floatable Materials
- ○ Other Construction Wastes

APPLICATIONS

Perimeter Control

Slope Protection

Sediment Barrier

Channel Protection

Temporary Stabilization

Final Stabilization

Waste Management

Housekeeping Practices

Fe=0.50-0.90
(*Depends on soil type*)

IMPLEMENTATION CONSIDERATIONS

- ● Capital Costs
- ◒ Maintenance
- ○ Training
- ● Suitability for Slopes > 5%

Other Considerations:

- *Public safety*
- *Mosquito breeding habitat*
- *Requires comprehensive planning and design*

3.9.1 Primary Use

Sediment basins should be used for all sites with adequate open space for a basin and where the site topography directs a majority of the site drainage to one point. Sediment basins are necessary as either temporary or permanent controls for sites with disturbed areas of 10 acres and larger that are part of a common drainage area unless specific site conditions limit their use.

3.9.2 Applications

Sediment basins serve as treatment devices that can be used on a variety of project types. They are normally used in site development projects in which large areas of land are available for the basin, a minor stream or off-line drainage way crosses the site, or a specific water feature is planned for the site. Sediment basins are highly effective at reducing sediment and other pollutants for design storm conditions. Sediment basins are typically easier to maintain than other structural controls (e.g. silt fences, etc).

A sediment basin by itself does not typically remove a sufficient percentage of fine silts and clays to be an effective sediment barrier. Table 3.3 provides a summary of sediment basin effectiveness based on soil type.

Table 3.3 Sediment Basin Effectiveness for Different Soil Types

Soil Type	*Runoff Potential*	*Settling Rate*	*Sediment Basin Effectiveness*	*Efficiency Rating (Fe)*
Sand	Low	High	High	0.90
Sandy Loam	Low	High	High	0.90
Sandy Silt Loam	Moderate	Moderate	Moderate	0.75
Silt Loam	Moderate	Moderate	Moderate	0.75
Silty Clay Loam	Moderate	Low	Low	0.75
Clay Loam	Great	Low	Low	0.50
Clay	Great	Low	Low	0.50

(Source: Michigan Department of Environmental Quality Soil Erosion and Sedimentation Control Training Manual)

When the disturbed area contains a high percentage of fine silt or clay soil types, the sediment basin may be used with a passive or active treatment system to remove these finer suspended solids. Design criteria may be found in *Section 3.1 Active Treatment System* and *Section 3.7 Passive Treatment System*.

3.9.3 Design Criteria

Texas Administrative Code Title 30, Chapter 299 (30 TAC 299), Dams and Reservoirs, contains specific requirements for dams that:

- Have a height greater than or equal to 25 feet and a maximum storage capacity greater than or equal to 15 acre-feet; or
- Have a height greater than six feet and a maximum storage capacity greater than or equal to 50 acre feet.

If the size of the detention basin meets or exceeds the above applicability, the design must be in accordance with state criteria, and the final construction plans and specifications must be submitted to the TCEQ for review and approval.

The following design criteria are for temporary sediment basins that are smaller than the TCEQ thresholds. The sediment basin shall be designed by a licensed engineer in the State of Texas. The criteria and schematics are the minimum and, in some cases, only concept level. It is the responsibility of the engineer to design and size the embankment, outfall structures, overflow spillway, and downstream

energy dissipaters and stabilization measures. Alternative designs may be acceptable if submitted to the reviewing municipality with supporting design calculations.

Sediment Basin Location and Planning

- Design of the sediment basin should be coordinated with design of the permanent drainage infrastructure for the development.
- The basin shall not be located within a mapped 100-year floodplain unless its effects on the floodplain are modeled, and the model results are approved by the reviewing municipality.
- Basins shall not be located on a live stream that conveys stormwater from upslope property through the construction site.
- Basins may be located at the discharge point of a drainage swale that collects runoff from construction activities, or the basin may be located off-channel with a swale or dike constructed to divert runoff from disturbed areas to the basin. Design criteria for these controls are in *Section 2.2 Diversion Dike* and *Section 2.4 Interceptor Swale*.
- Sediment basins must be designed, constructed, and maintained to minimize mosquito breeding habitats by minimizing the creation of standing water.
- Temporary stabilization measures should be specified for all areas disturbed to create the basin.

Basin Size

- Minimum capacity of the basin shall be the calculated volume of runoff from a 2-year, 24-hour duration storm event plus sediment storage capacity of at least 1,000 cubic feet.
- The basin must be laid out such that the effective flow length to width ratio of the basin is a minimum of 4:1. Settling efficiencies are dependent on flow velocity, basin length, and soil type. Smaller particle sizes require slower velocities and longer basins. Basin dimensions should be designed based on flow velocities and anticipated particle sizes.
- Stoke's equation for settling velocities, as modified to Newton's equation for turbulent flow, may be used to estimate length required based on depth of the basin.

  Settling Velocity (ft/s) = 1.74 $[(\rho_p - \rho)gd/\rho]^{1/2}$ **(3.1)**

  Where:

  ρ_p = density of particles (lb/ ft^3)

  ρ = density of water (lb/ft^3)

  g = gravitational acceleration (ft/s^2)

  d = diameter of particles (ft)
- The effective length of sediment basins may be increased with baffles. Baffles shall be spaced at a minimum distance of 100 feet. Spacing should be proportional to the flow rate, with greater spacing for higher flow rates. Check the flow velocity in the cross section created by the baffles to ensure settling will occur.
- Baffles may be constructed by using excavated soil to create a series of berms within the basin; however, porous baffles are recommended. Porous baffles may consist of coir fiber, porous geotextiles, porous turbidity barriers, and similar materials. Porous materials disrupt the flow patterns, decrease velocities, and increase sedimentation.
- Basins have limited effectiveness on suspended clay soil particles. The basin's length to width ratio typically should be 10:1 to effectively remove suspended clay particles. The use of passive treatment systems can significantly reduce this ratio and improve removal rates. Criteria are in *Section 3.7 Passive Treatment System*.

Embankment

- Top width shall be determined by the engineer based on the total height of the embankment as measured from the toe of the slope on the downstream side.
- Embankment side slopes shall be 3:1 or flatter.
- The embankment shall be constructed with clay soil, minimum Plasticity Index of 30 using ASTM D4318 Standard Test for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- Clay soil for the embankment shall be placed in 8 inch lifts and compacted to 95 percent Standard Proctor Density at optimum moisture content using ASTM D698 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort.
- The embankment should be stabilized with rock riprap or temporary vegetation.

Outlet and Spillway

- The primary outlet shall have a minimum design dewatering time of 36 hours for the temporary control design storm (2-year, 24-hour).
- Whenever possible, the outlet shall be designed to drain the basin in less than 72 hours to minimize the potential for breeding mosquitoes.
- The basin's primary outlet and spillway shall be sized to pass the difference between the conveyance storm (25-year, 24-hour) and the temporary control design storm without causing damage to the embankment and structures.
- Unless infeasible, the primary outlet structure should withdraw water from the surface of the impounded water. Outlet structures that do this include surface skimmers, solid risers (non-perforated), flashboard risers, and weirs.
- Surface skimmers use a floating orifice to discharge water from the basin. Skimmers have the advantage of being able to completely drain the detention basin. Skimmers typically result in the greatest sediment removal efficiency for a basin, because they allow for a slower discharge rate than other types of surface outlets. Due to this slower discharge rate, a high flow riser may still be needed to discharge the conveyance storm if a large enough spillway is not feasible due to site constraints.
- Discharge rates for surface skimmers are dependent on the orifice configuration in the skimmer. Use manufacturer's flow rate charts to select the skimmer based on the flow rate needed to discharge the design storm from the basin within a selected time period (i.e. Q=Volume/time).
- Risers shall be designed using the procedures in *Section 3.9.7 Design Procedures*.
- Weir outlets should be designed using the guidance in *Section 2.2.2 of the Hydraulics Technical Manual*.
- Use of overflow risers and weirs result in a pool of water that should be accounted for in the design capacity of the basin. These outlet structures are good options when the temporary sediment basin will be retained as a permanent site feature upon completion of construction. If the basin is temporary and standing water is not acceptable during construction, the construction plans shall include procedures for dewatering the basin following criteria in *Section 3.3 Dewatering Controls*.
- Flashboard risers function like an overflow riser pipe, but they contain a series of boards that allow for adjustment of the pool level. The boards may be removed for draining the basin to a lower level. However, this operation can be difficult and a safety hazard when done manually.
- A perforated riser may be used as an outlet when surface discharge is not feasible. A perforated rise has the advantage of dewatering the basin; however, it also results in the lowest sediment removal efficiency. Perforated risers provide a relatively rapid drawdown of the pool, and they discharge water from the entire water column, resulting in more suspended sediment being discharged than with a surface outlet.

- Size and spacing of the orifices on a perforated riser shall be designed to provide the minimum detention time while allowing for the drawdown of detained water.
- Gravel (1½ to 3 inches) may be placed around the perforated riser to aid sediment removal, particularly the removal of fine soil particles, and to keep trash from plugging the perforations. The gravel is most effective when the basin will be used for less than a year. When installed for longer periods of time, the gravel may become clogged with fine sediments and require cleaning while submerged.
- The outlet of the outfall pipe (barrel) shall be stabilized with riprap or other materials designed using the conveyance storm flow rate and velocity. Velocity dissipation measures shall be used to reduce outfall velocities in excess of 5 feet per second.
- The outfall pipe through the embankment shall be provided with anti-seep collars connected to the exterior of the pipe section or at a normal joint of the pipe material. The anti-seep collar material shall be compatible with the pipe material used and shall have a watertight bond to the exterior of the pipe section. The size and number of collars shall be selected by the designer in accordance with the following formula and table:

  Collar Outside Dimension = X + Diameter of pipe in feet

  Example: Pipe Length = 45 feet
  Barrel Pipe Diameter = 12 inches = 1 foot
  2 anti-seep collars

  Anti-seep Collar Dimensions:
  3.4 feet (from table) + 1.0 foot (Pipe dia.) = 4.4 feet
  Use 2 anti-seep collars each being 4.4 feet square or 4.4 feet diameter if round.

Table 3.4 Number and Spacing of Anti-Seep Collars

	X Values - Feet			
Pipe Length	*Number of Anti-Seep Collars*			
	1	**2**	**3**	**4**
40	6.0	3.0		
45	6.8	3.4		
50	7.5	3.8	2.5	
55		4.2	2.8	
60		4.5	3.0	
65		4.9	3.3	
70		5.3	3.5	2.6
75		5.6	3.8	2.8
80		6.0	4.0	3.0

- Risers used to discharge high flows shall be equipped with an anti-vortex device and trash rack.
- Spillways shall be constructed in undisturbed soil material (not fill) and shall not be placed on the embankment that forms the basin.

3.9.4 Design Guidance and Specifications

Design guidance for temporary sediment basins is in *Section 3.9.7 Design Procedures*. Criteria for sediment basins that will become permanent detention basins are in *Section 3.6.3 of the iSWM Criteria Manual*. Additional design guidance for different types of outlet structures is in *Section 2.2 of the Hydraulics Technical Manual*.

No specification for construction of this item is currently available in the Standard Specifications for Public Works Construction – North Central Texas Council of Governments.

3.9.5 Inspection and Maintenance Requirements

Sediment basins should be inspected regularly (at least as often as required by the TPDES Construction General Permit) to check for damage and to insure that obstructions are not diminishing the effectiveness of the structure. Sediment shall be removed and the basin shall be re-graded to its original dimensions when the sediment storage capacity of the impoundment has been reduced by 20 percent. The removed sediment may be stockpiled or redistributed onsite in areas that are protected by erosion and sediment controls.

Inspect temporary stabilization of the embankment and graded basin and the velocity dissipaters at the outlet and spillway for signs of erosion. Repair any eroded areas that are found. Install additional erosion controls if erosion is frequently evident.

3.9.6 Example Schematics

The following schematics are example applications of the construction control. They are intended to assist in understanding the control's design and function.

The schematics are **not for construction**. Dimensions of the sediment basin, embankment, and appurtenances shall be designed by an engineer licensed in the State of Texas. Construction drawings submitted to the municipality for review shall include, but are not limited to, the following information and supporting calculations.

- Embankment height, side slopes and top width.
- Dimensions of the skimmer, riser, weir or other primary outlet.
- Diameter of outfall pipe (barrel).
- Pool elevation for the temporary control design storm and conveyance storm.
- Outfall pipe flow rate and velocity for the temporary control design storm and conveyance storm.
- Spillway cross section, slope, flow rate, and velocity for the conveyance storm.
- Depth, width, length, and mean stone diameter for riprap apron or other velocity dissipation device at the outfall pipe and spillway discharge points.

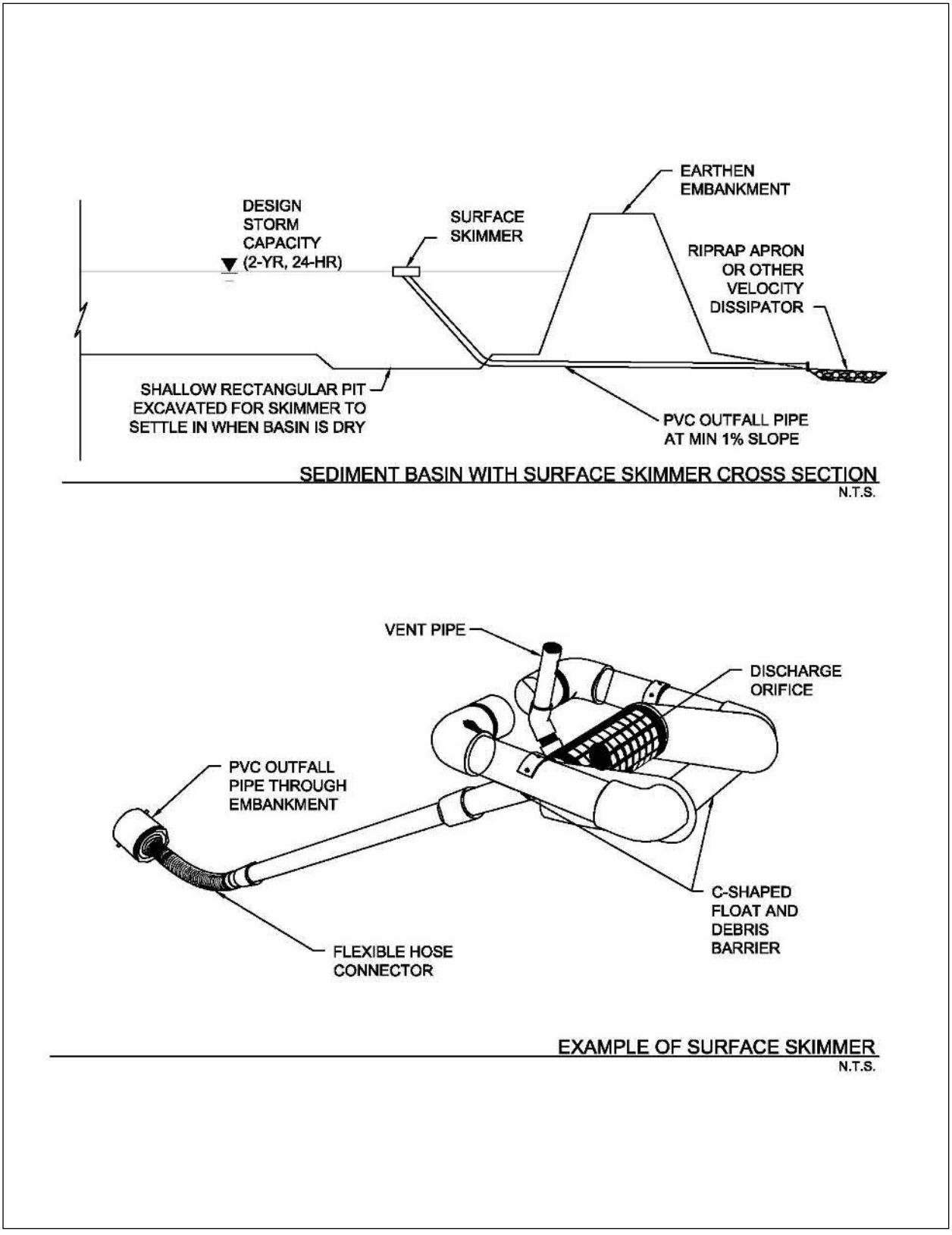


Figure 3.19 Schematics of Sediment Basin with Surface Skimmer
(Source: J.W. Faircloth & Son, Inc.)

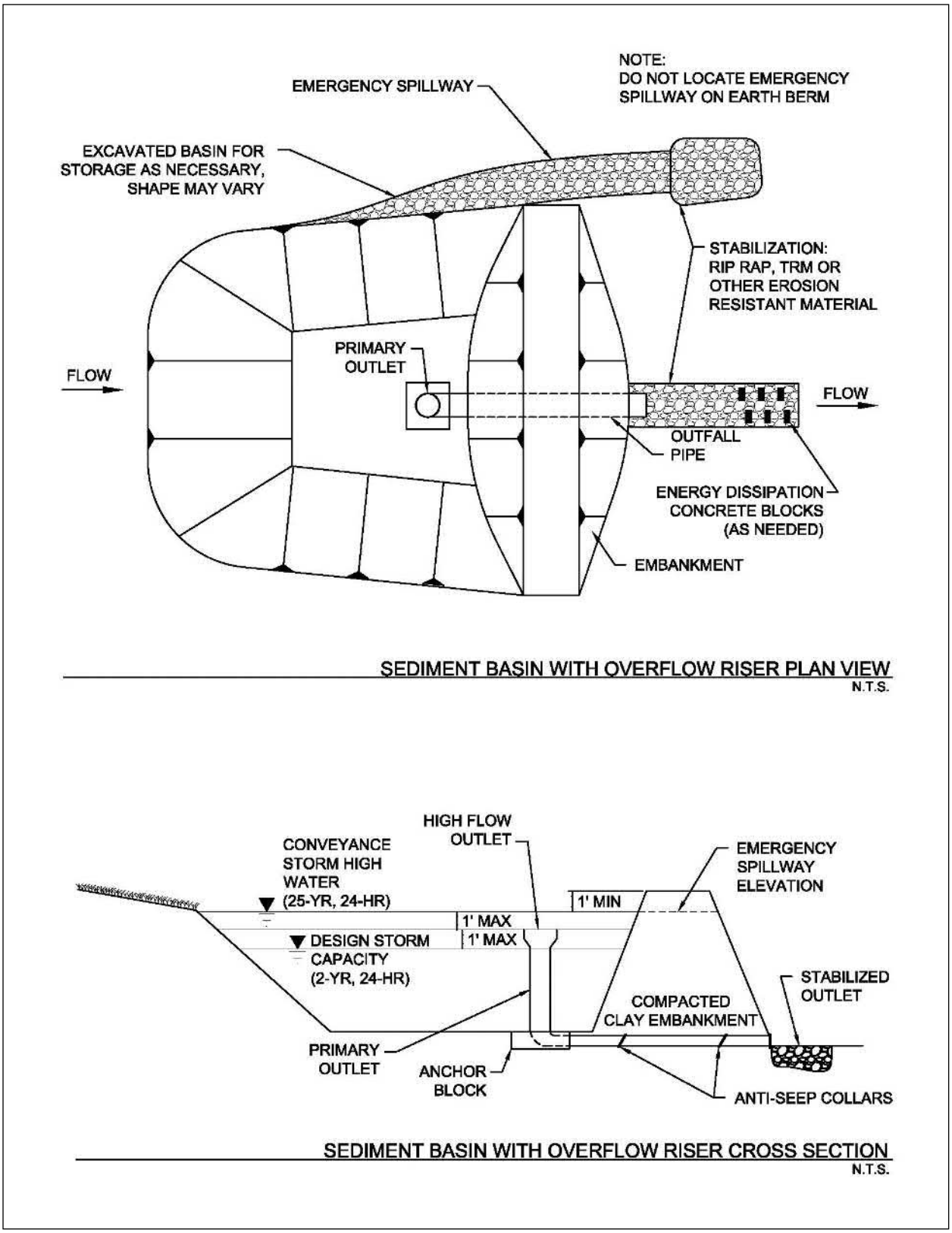


Figure 3.20 Schematics of Sediment Basin with Overflow Riser

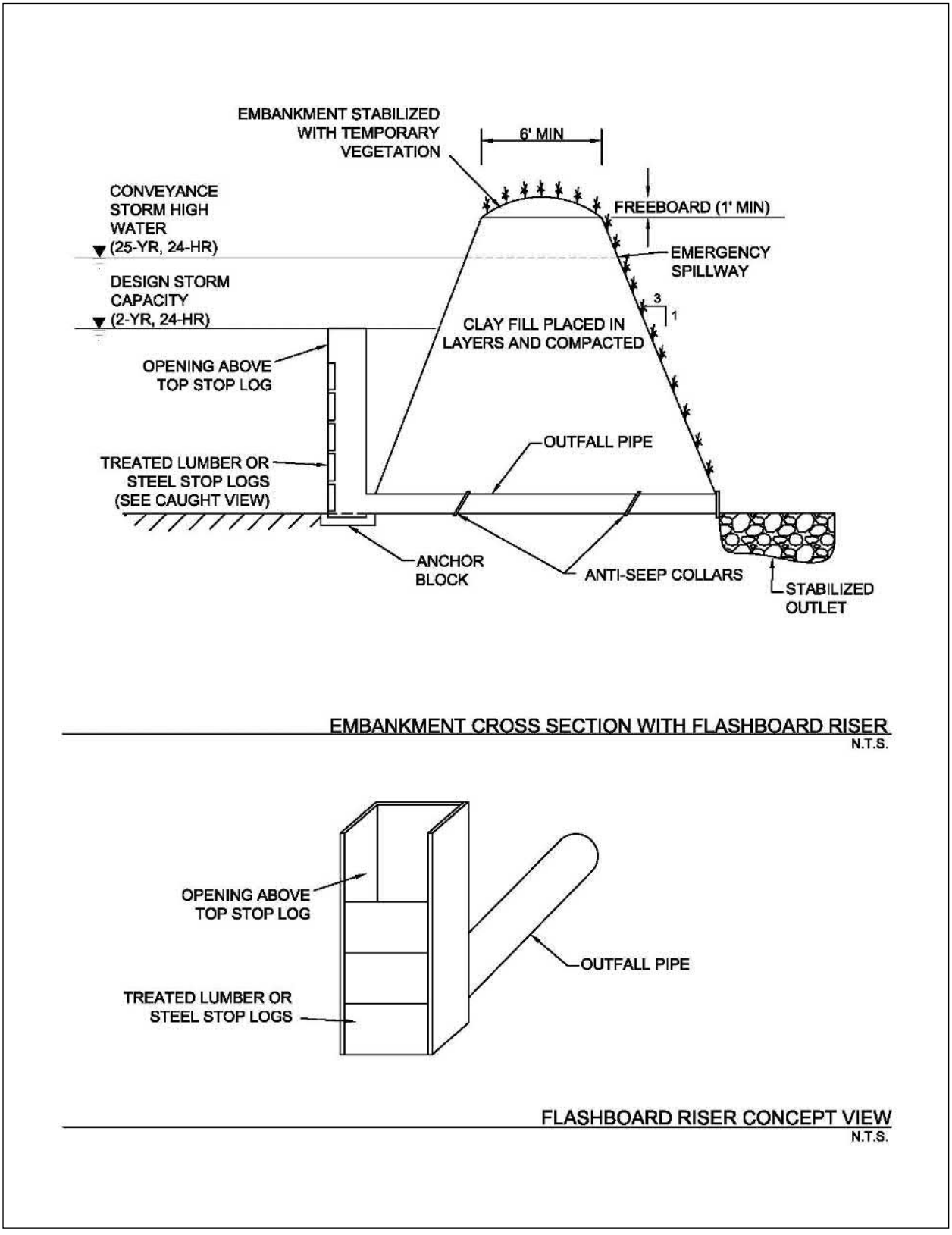


Figure 3.21 Schematics of Basin Embankment with Flashboard Riser

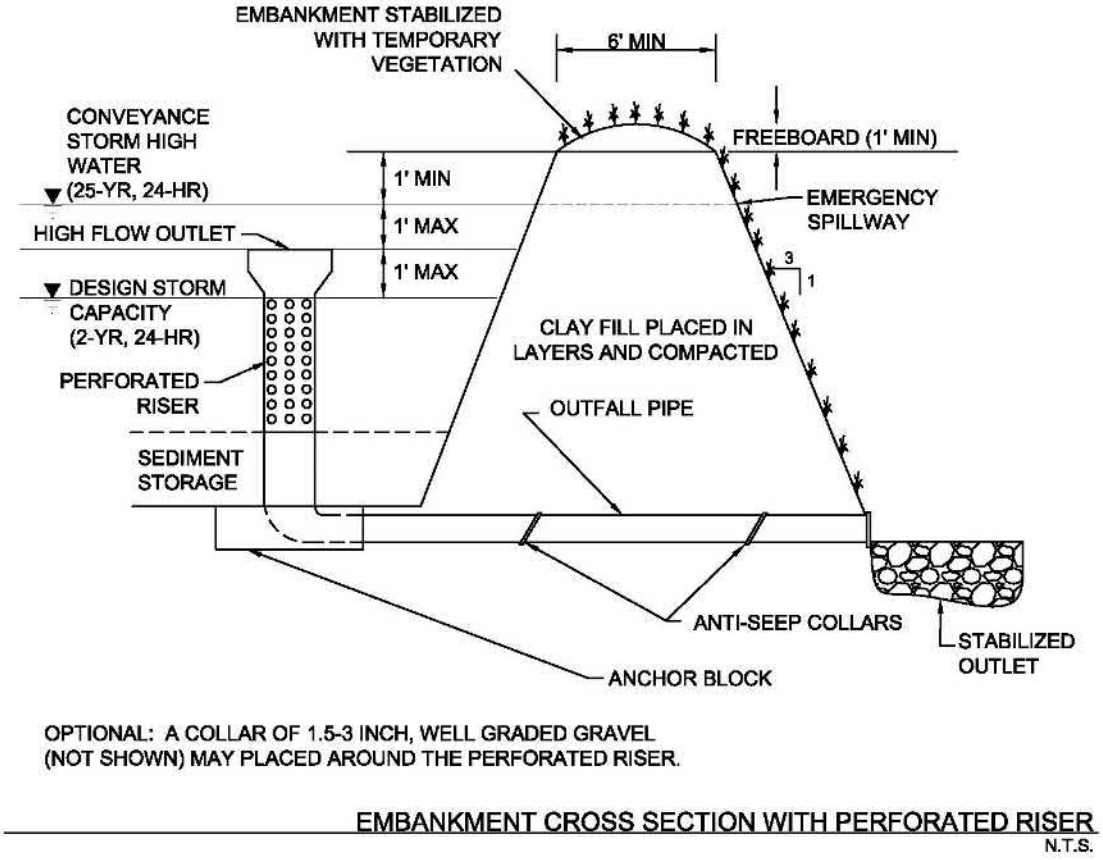


Figure 3.22 Schematic of Basin Embankment with Perforated Riser

3.9.7 Design Procedures

The following procedures provide a step-by-step method for the design of a temporary sediment basin that is smaller than the TCEQ thresholds for state requirements to apply. Criteria in *Section 3.8 of the iSWM Criteria Manual* should be used for the design of permanent basins (dry detention/extended dry detention) and stormwater ponds. *Section 3.9.8 Design Form* should be used to document the design values calculated for the temporary sediment basin.

These design procedures are provided as an example of the steps required to design a temporary sediment basin and are based on a specific type of primary outlet. When designing a sediment basin for a construction site, it's the engineer's responsibility to select the type of outlet that is appropriate based on criteria in the preceding sections and to modify the following procedures as needed to use appropriate calculations for the selected outlet, particularly in Steps 12, 13, and 14.

Step 1 Determine the required basin volume.

The basin volume shall be the calculated volume of runoff from the temporary control design storm (2-year, 24-hour) from each disturbed acre draining to the basin. When rainfall data is not available, a design volume of 3600 cubic feet of storage per acre drained may be used.

For a natural basin, the storage volume may be approximated as follows:

$$\mathbf{V_1 = 0.4 \times A_1 \times D_1} \qquad \mathbf{(3.2)}$$

where:

V_1 = the storage volume in cubic feet

A_1 = the surface area of the flooded area at the crest of the basin outlet, in square feet

D_1 = the maximum depth in feet, measured from the low point in the basin to the crest of the basin riser

Note 1: The volumes may be computed from more precise contour information or other suitable methods.

Note 2: Conversion between cubic feet and cubic yards is as follows:

Number of cubic feet x 0.037 = number of cubic yards

If the volume of the basin is inadequate or embankment height becomes excessive, pursue the use of excavation to obtain the required volume.

Step 2 Determine the basin shape.

The shape of the basin must be such that the length-to-width ratio is at least 4 to 1 according to the following equation:

$$\mathbf{\text{Length-to-width Ratio} = \frac{L}{We}} \qquad \mathbf{(3.3)}$$

where:

We = A/L = the effective width

A = the surface area of the normal pool

L = the length of the flow path from the inflow to the outflow. If there is more than one inflow point, any inflow that carries more than 30 percent of the peak rate of inflow must meet these criteria.

The correct basin length can be obtained by proper site selection, excavation, or the use of baffles. Baffles increase the flow length by interrupting flow and directing it through the basin in a circuitous path to prevent short-circuiting. Porous baffles are recommended. Spacing of baffles should be wide enough to not cause a channeling effect within the basin. Analyze the

flow cross section and velocity between baffles to ensure that velocities are not too fast for settling to occur.

Step 3 Design the embankment.

The side slopes of the embankment should be 3:1 or flatter.

Top width shall be determined by the engineer based on the total height of the embankment.

The area under the embankment should be cleared, grubbed, and stripped of topsoil to remove trees, vegetation, roots, or other objectionable materials. The pool area should also be cleared of all brush and trees.

The embankment fill material should be clay soil from an approved borrow area. It should be clean soil, free from roots, woody vegetation, oversized stones, and rocks.

Step 4 Select the type(s) of outlet(s).

The outlets for the basin may consist of a combination of a primary outlet and emergency spillway or a primary outlet alone. In either case, the outlet(s) must pass the peak runoff expected from the drainage area for the conveyance storm (25-year, 24-hour) without damage to the embankment, structures, or basin.

Step 5 Determine whether the basin will have a separate emergency spillway.

A side channel emergency spillway is required for sediment basins receiving stormwater from more than 10 acres.

Step 6 Determine the elevation of the crest of the basin outlet riser for the required volume.

Step 7 Estimate the elevation of the conveyance storm and the required height of the dam.

(a) If an emergency spillway is included, the crest of the basin outlet riser must be at least 1.0 foot below the crest of the emergency spillway.

(b) If an emergency spillway is included, the elevation of the peak flow through the emergency spillway (which will be the design high water for the conveyance storm) must be at least 1.0 foot below the top of embankment.

(c) If an emergency spillway is not included, the crest of the basin outlet riser must be at least 3 feet below the top of the embankment.

(d) If an emergency spillway is not included, the elevation of the design high water for the conveyance storm must be 2.0 feet below the top of the embankment.

Step 8 Determine the peak rate of runoff for a 25-year storm.

Using SCS TR 55 Urban Hydrology for Small Watersheds or other methods, determine the peak rate of runoff expected from the drainage area of the basin for the conveyance storm. The "C" factor or "CN" value used in the runoff calculation should be derived from analysis of the contributing drainage area at the peak of land disturbance (condition which will create greatest peak runoff).

Step 9 Design the basin outlet.

(a) If an emergency spillway is included, the basin outfall must at least pass the peak rate of runoff from the basin drainage area for the temporary control design storm (2-year, 24-hour).

Q_p = the 2-year peak rate of runoff.

(b) If an emergency spillway is not included, the basin outfall must pass the peak rate of runoff from the basin drainage area for the conveyance storm (25-year, 24-hour).

Q_{25} = the 25-year peak rate of runoff.

(c) Refer to Figure 3.23, where h is the difference between the elevation of the crest of the basin outlet riser and the elevation of the crest of the emergency spillway.

(d) Enter Figure 3.24 with Q_p. Choose the smallest riser which will pass the required flow with the available head, h.

(e) Refer to Figure 3.23, where H is the difference in elevation of the centerline of the outlet of the outfall and the crest of the emergency spillway. L is the length of the barrel through the embankment.

(f) Enter Table 3.5 or Table 3.6 with H. Choose the smallest size outlet that will pass the flow provided by the riser. If L is other than 70 feet, make the necessary correction.

(g) The basin riser shall consist of a solid (non-perforated), vertical pipe or box of corrugated metal joined by a watertight connection to a horizontal pipe (outfall) extending through the embankment and discharging beyond the downstream toe of the fill. Another approach is to utilize a perforated vertical riser section surrounded by filter stone.

(h) The basin outfall, which extends through the embankment, shall be designed to carry the flow provided by the riser with the water level at the crest of the emergency spillway. The connection between the riser and the outfall must be watertight. The outlet of the outfall must be protected to prevent erosion or scour of downstream areas.

(i) Weirs, skimmers and other types of outlets may be used if accompanied with appropriate calculations.

Step 10 Design the emergency spillway.

(a) The emergency spillway must pass the remainder of the 25-year peak rate of runoff not carried by the basin outlet.

(b) Compute: $Q_e = Q_{25} - Q_p$

(c) Refer to Figure 3.25 and Table 3.7.

(d) Determine approximate permissible values for b, the bottom width; s, the slope of the exit channel; and X, minimum length of the exit channel.

(e) Enter Table 3.7 and choose the exit channel cross-section which passes the required flow and meets the other constraints of the site.

(f) Notes:

1. The maximum permissible velocity for vegetated waterways must be considered when designing an exit channel.
2. For a given Hp, a decrease in the exit slope from S as given in the table decreases spillway discharge, but increasing the exit slope from S does not increase discharge. If an exit slope (Se) steeper than S is used, then the exit should be considered an open channel and analyzed using the Manning's Equation.
3. Data to the right of heavy vertical lines should be used with caution, as the resulting sections will be either poorly proportioned or have excessive velocities.

(g) The emergency spillway should not be constructed over fill material.

(h) The emergency spillway should be stabilized with rock riprap or temporary vegetation upon completion of the basin.

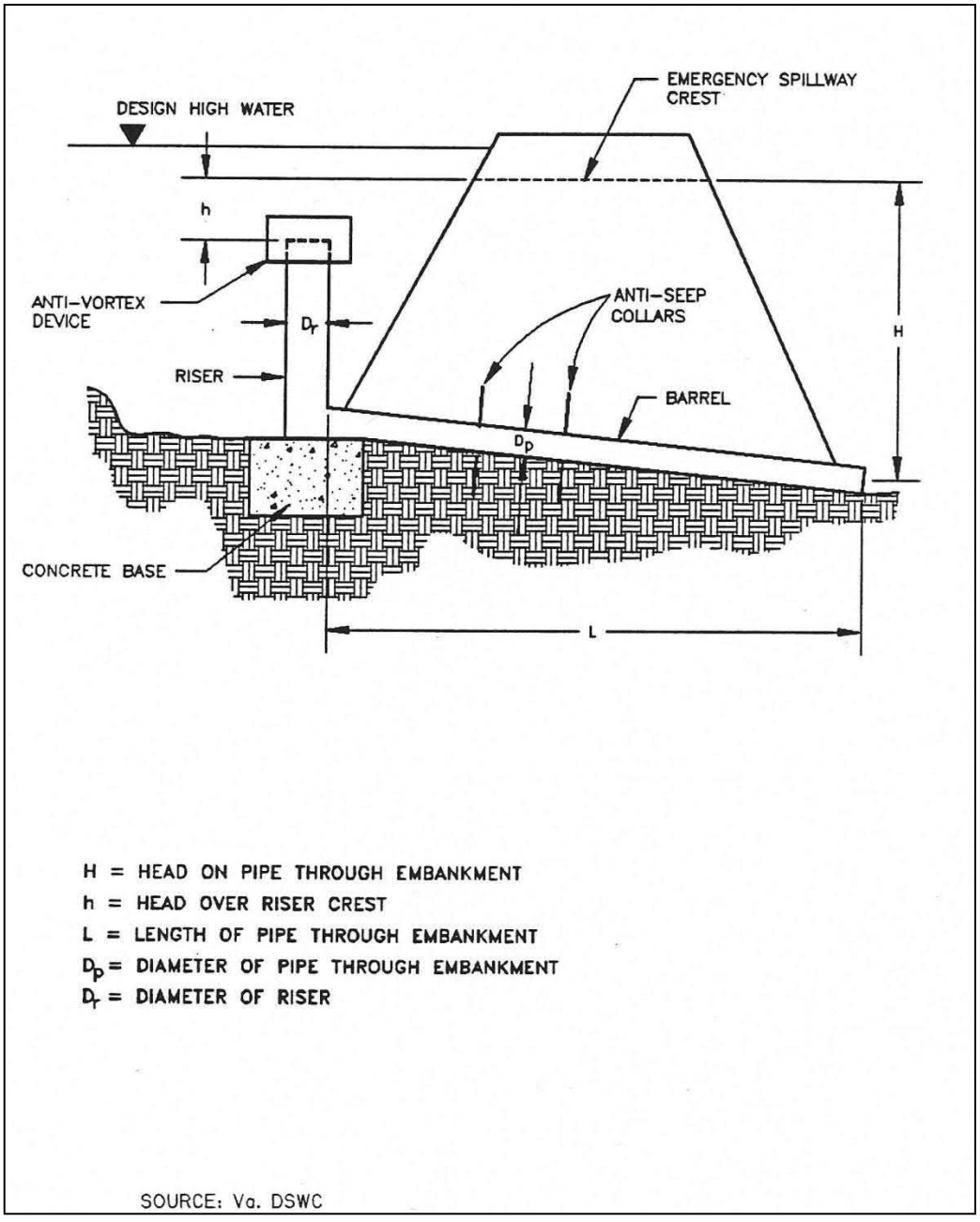


Figure 3.23 Example of Basin Outlet Design

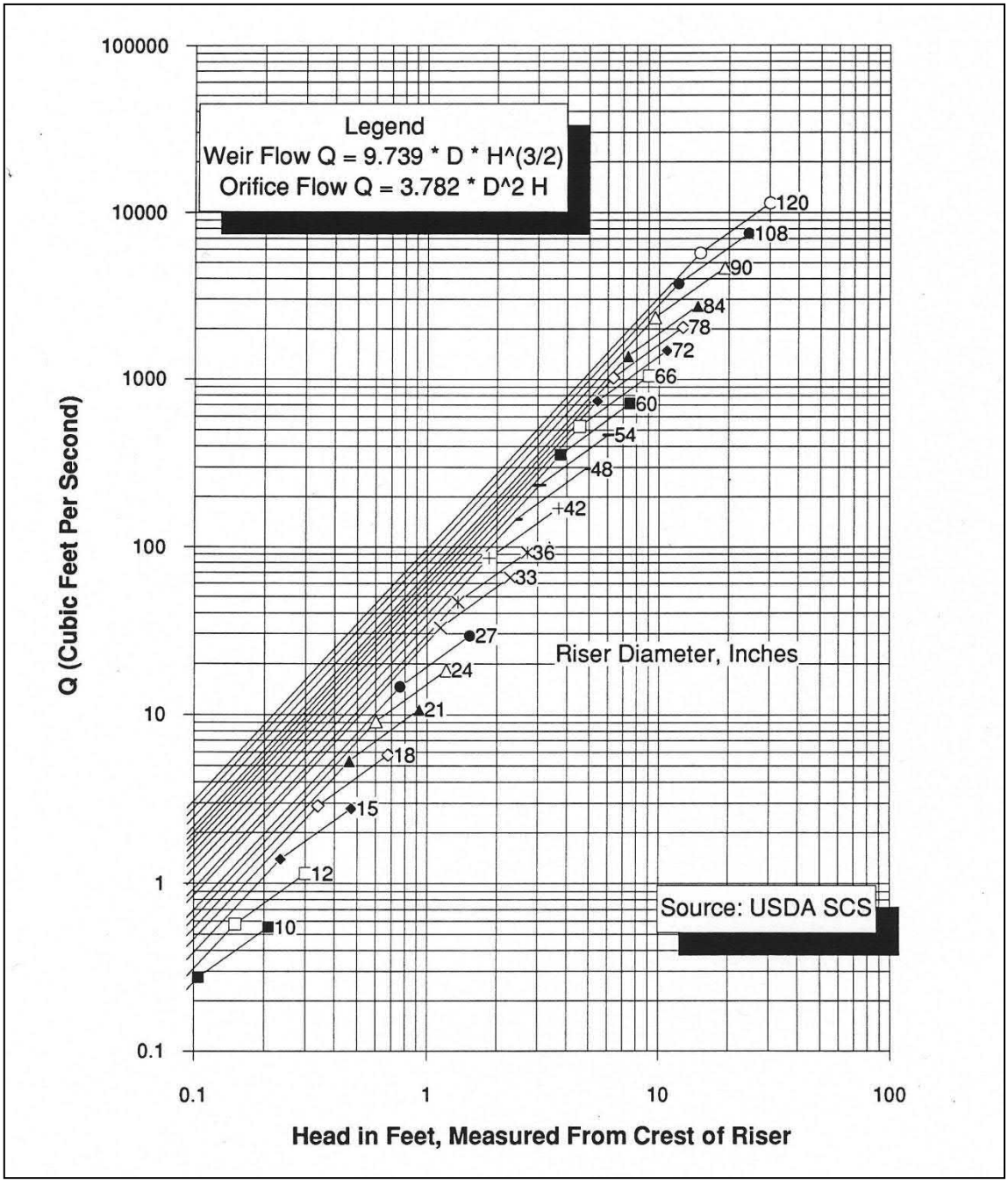
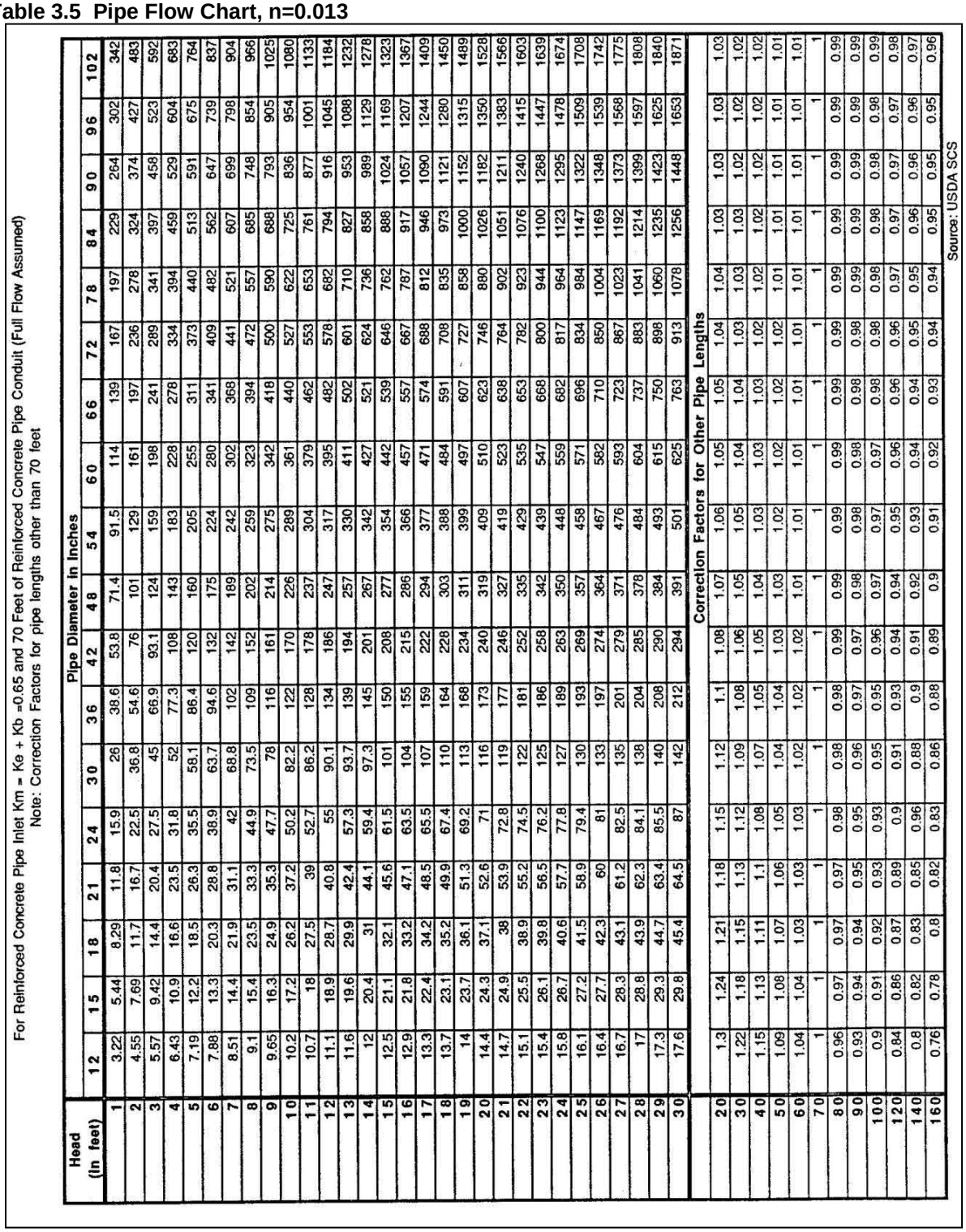


Figure 3.24 Riser Inflow Curves for Basin Outlet Design

Table 3.5 Pipe Flow Chart, n=0.013



For Reinforced Concrete Pipe Inlet Km = Ke + Kb =0.65 and 70 Feet of Reinforced Concrete Pipe Conduit (Full Flow Assumed)
Note: Correction Factors for pipe lengths other than 70 feet

Head (in feet)	Pipe Diameter in Inches																	
	12	15	18	21	24	30	36	42	48	54	60	66	72	78	84	90	96	102
1	3.22	5.44	8.29	11.8	15.9	26	38.6	53.8	71.4	91.5	114	139	167	197	229	264	302	342
2	4.55	7.69	11.7	16.7	22.5	36.8	54.6	76	101	129	161	197	236	278	324	374	427	483
3	5.57	9.42	14.4	20.4	27.5	45	66.9	93.1	124	159	198	241	289	341	397	458	523	592
4	6.43	10.9	16.6	23.5	31.8	52	77.3	108	143	183	228	278	334	394	459	529	604	683
5	7.19	12.2	18.5	26.3	35.5	58.1	86.4	120	160	205	255	311	373	440	513	591	675	764
6	7.88	13.3	20.3	28.8	38.9	63.7	94.6	132	175	224	280	341	409	482	562	647	739	837
7	8.51	14.4	21.9	31.1	42	68.8	102	142	189	242	302	368	441	521	607	699	798	904
8	9.1	15.4	23.5	33.3	44.9	73.5	109	152	202	259	323	394	472	557	685	748	854	966
9	9.65	16.3	24.9	35.3	47.7	78	116	161	214	275	342	418	500	590	688	793	905	1025
10	10.2	17.2	26.2	37.2	50.2	82.2	122	170	226	289	361	440	527	622	725	836	954	1080
11	10.7	18	27.5	39	52.7	86.2	128	178	237	304	379	462	553	653	761	877	1001	1133
12	11.1	18.9	28.7	40.8	55	90.1	134	186	247	317	395	482	578	682	794	916	1045	1184
13	11.6	19.6	29.9	42.4	57.3	93.7	139	194	257	330	411	502	601	710	827	953	1088	1232
14	12	20.4	31	44.1	59.4	97.3	145	201	267	342	427	521	624	736	858	989	1129	1278
15	12.5	21.1	32.1	45.6	61.5	101	150	208	277	354	442	539	646	762	888	1024	1169	1323
16	12.9	21.8	33.2	47.1	63.5	104	155	215	286	366	457	557	667	787	917	1057	1207	1367
17	13.3	22.4	34.2	48.5	65.5	107	159	222	294	377	471	574	688	812	946	1090	1244	1409
18	13.7	23.1	35.2	49.9	67.4	110	164	228	303	388	484	591	708	835	973	1121	1280	1450
19	14	23.7	36.1	51.3	69.2	113	168	234	311	399	497	607	727	858	1000	1152	1315	1489
20	14.4	24.3	37.1	52.6	71	116	173	240	319	409	510	623	746	880	1026	1182	1350	1528
21	14.7	24.9	38	53.9	72.8	119	177	246	327	419	523	638	764	902	1051	1211	1383	1566
22	15.1	25.5	38.9	55.2	74.5	122	181	252	335	429	535	653	782	923	1076	1240	1415	1603
23	15.4	26.1	39.8	56.5	76.2	125	186	258	342	439	547	668	800	944	1100	1268	1447	1639
24	15.8	26.7	40.6	57.7	77.8	127	189	263	350	448	559	682	817	964	1123	1295	1478	1674
25	16.1	27.2	41.5	58.9	79.4	130	193	269	357	458	571	696	834	984	1147	1322	1509	1708
26	16.4	27.7	42.3	60	81	133	197	274	364	467	582	710	850	1004	1169	1348	1539	1742
27	16.7	28.3	43.1	61.2	82.5	135	201	279	371	476	593	723	867	1023	1192	1373	1568	1775
28	17	28.8	43.9	62.3	84.1	138	204	285	378	484	604	737	883	1041	1214	1399	1597	1808
29	17.3	29.3	44.7	63.4	85.5	140	208	290	384	493	615	750	898	1060	1235	1423	1625	1840
30	17.6	29.8	45.4	64.5	87	142	212	294	391	501	625	763	913	1078	1256	1448	1653	1871
Correction Factors for Other Pipe Lengths																		
20	1.3	1.24	1.21	1.18	1.15	1.12	1.1	1.08	1.07	1.06	1.05	1.05	1.04	1.04	1.03	1.03	1.03	1.03
30	1.22	1.18	1.15	1.13	1.12	1.09	1.08	1.06	1.05	1.05	1.04	1.04	1.03	1.03	1.03	1.02	1.02	1.02
40	1.15	1.13	1.11	1.1	1.08	1.07	1.05	1.05	1.04	1.03	1.03	1.03	1.02	1.02	1.02	1.02	1.02	1.02
50	1.09	1.08	1.07	1.06	1.05	1.04	1.04	1.03	1.03	1.02	1.02	1.02	1.02	1.01	1.01	1.01	1.01	1.01
60	1.04	1.04	1.03	1.03	1.03	1.02	1.02	1.02	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
70	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
80	0.96	0.97	0.97	0.97	0.98	0.98	0.98	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
90	0.93	0.94	0.94	0.95	0.95	0.96	0.97	0.97	0.98	0.98	0.98	0.98	0.98	0.99	0.99	0.99	0.99	0.99
100	0.9	0.91	0.92	0.93	0.93	0.95	0.95	0.96	0.97	0.97	0.97	0.98	0.98	0.98	0.98	0.98	0.98	0.99
120	0.84	0.86	0.87	0.89	0.9	0.91	0.93	0.94	0.94	0.95	0.96	0.96	0.96	0.97	0.97	0.97	0.97	0.98
140	0.8	0.82	0.83	0.85	0.96	0.88	0.9	0.91	0.92	0.93	0.94	0.94	0.95	0.95	0.96	0.96	0.96	0.97
160	0.76	0.78	0.8	0.82	0.83	0.86	0.88	0.89	0.9	0.91	0.92	0.93	0.94	0.94	0.95	0.95	0.95	0.96

Source: USDA SCS

Table 3.6 Pipe Flow Chart, n=0.025

For Corrugated Metal Pipe Inlet Km = Ke + Kb =0.65 and 70 Feet of Corrugated Metal Pipe Conduit (Full Flow Assumed)
Note: Correction Factors for pipe lengths other than 70 feet

Head (In feet)	Pipe Diameter In Inches																							
	6	8	10	12	15	18	21	24	30	36	42	48	54	60	66	72	78	84	90	96	102
1	0.33	0.7	1.25	1.98	3.48	5.47	7.99	11	18.8	28.8	41.1	55.7	72.6	91.8	113	137	163	191	222	255	290
2	0.47	0.99	1.76	2.8	4.92	7.74	11.3	15.6	26.6	40.8	58.2	78.8	103	130	160	194	231	271	314	360	410
3	0.58	1.22	2.16	3.43	6.02	9.48	13.8	19.1	32.6	49.9	71.2	96.5	126	159	196	237	282	331	384	441	502
4	0.67	1.4	2.49	3.97	6.96	10.9	16	22.1	37.6	57.7	82.3	111	145	184	226	274	326	383	444	510	580
5	0.74	1.57	2.79	4.43	7.78	12.2	17.9	24.7	42.1	64.5	92	125	162	205	253	306	365	428	496	570	648
6	0.82	1.72	3.05	4.86	8.52	13.4	19.6	27	46.1	70.6	101	136	178	225	277	336	399	469	544	624	710
7	0.88	1.86	3.3	5.25	9.2	14.5	21.1	29.2	49.8	76.3	109	147	192	243	300	362	431	506	587	674	767
8	0.94	1.99	3.53	5.61	9.84	15.5	22.6	31.2	53.2	81.5	116	158	205	260	320	388	461	541	628	721	820
9	1	2.11	3.74	5.95	10.4	16.4	24	33.1	56.4	86.5	123	167	218	275	340	411	489	574	666	764	870
10	1.05	2.22	3.94	6.27	11	17.3	25.3	34.9	59.5	91.2	130	176	230	290	358	433	516	605	702	806	917
11	1.1	2.33	4.13	6.58	11.5	18.2	26.5	36.6	62.4	95.6	136	185	241	304	376	454	541	635	736	845	962
12	1.15	2.43	4.32	6.87	12.1	19	27.7	38.2	65.2	99.9	142	193	252	318	392	475	565	663	769	883	1004
13	1.2	2.53	4.49	7.15	12.6	19.7	28.8	39.8	67.8	104	148	201	262	331	408	494	588	690	800	919	1045
14	1.25	2.63	4.66	7.42	13	20.5	29.9	41.3	70.4	108	154	208	272	343	424	513	610	716	830	953	1085
15	1.29	2.72	4.83	7.68	13.5	21.2	30.9	42.8	72.8	112	159	216	281	355	439	531	631	741	860	987	1123
16	1.33	2.81	4.99	7.93	13.9	21.9	32	44.2	75.2	115	165	223	290	367	453	548	652	765	888	1019	1160
17	1.37	2.9	5.14	8.18	14.3	22.6	32.9	45.5	77.5	119	170	230	300	378	467	565	672	789	915	1051	1195
18	1.41	2.98	5.29	8.41	14.8	23.2	33.9	46.8	79.8	120	174	236	308	389	480	581	692	812	942	1081	1230
19	1.45	3.06	5.43	8.64	15.2	23.9	34.8	48.1	82	126	179	243	316	400	494	597	711	834	967	1111	1264
20	1.49	3.14	5.57	8.87	15.6	24.5	35.7	49.4	84.1	129	184	249	325	410	506	613	729	856	993	1139	1297
21	1.53	3.22	5.71	9.09	15.9	25.1	36.6	50.6	86.2	132	188	255	333	421	519	628	747	877	1017	1168	1329
22	1.56	3.29	5.85	9.3	16.3	25.7	37.5	51.8	88.2	135	193	261	341	430	531	643	765	898	1041	1195	1360
23	1.6	3.37	5.98	9.51	16.7	26.2	38.3	53	90.2	138	197	267	348	440	543	657	782	918	1064	1222	1390
24	1.63	3.44	6.11	9.72	17	26.8	39.1	54.1	92.1	141	201	273	356	450	555	671	799	937	1087	1248	1420
25	1.66	3.51	6.23	9.92	17.4	27.4	39.9	55.2	94	144	206	279	363	459	566	685	815	957	1110	1274	1450
26	1.7	3.58	6.36	10.1	17.7	27.9	40.7	56.3	95.9	147	210	284	370	468	577	699	831	976	1132	1299	1478
27	1.73	3.65	6.48	10.3	18.1	28.4	41.5	57.4	97.7	150	214	290	377	477	588	712	847	994	1153	1324	1507
28	1.76	3.72	6.6	10.5	18.4	29	42.3	58.4	99.5	153	218	295	384	486	599	725	863	1013	1174	1348	1534
29	1.79	3.78	6.71	10.7	18.7	29.5	43	59.5	101	155	221	300	391	494	610	738	878	1030	1195	1372	1561
30	1.82	3.85	6.83	10.9	19.1	30	43.7	60.5	103	158	225	305	398	503	620	750	893	1048	1216	1396	1588
Correction Factors for Other Pipe Lengths																					
20	1.69	1.63	1.58	1.53	1.47	1.42	1.37	1.34	1.28	1.24	1.2	1.18	1.16	1.14	1.13	1.11	1.1	1.1	1.09	1.08	1.08
30	1.44	1.41	1.39	1.36	1.32	1.29	1.27	1.24	1.21	1.18	1.15	1.13	1.12	1.11	1.1	1.09	1.08	1.07	1.07	1.06	1.06
40	1.28	1.27	1.25	1.23	1.21	1.2	1.18	1.17	1.14	1.12	1.11	1.1	1.09	1.08	1.07	1.06	1.06	1.05	1.05	1.05	1.04
50	1.16	1.16	1.15	1.14	1.13	1.12	1.11	1.1	1.09	1.08	1.07	1.06	1.06	1.05	1.05	1.04	1.04	1.04	1.03	1.03	1.03
60	1.07	1.07	1.07	1.06	1.06	1.05	1.05	1.05	1.04	1.04	1.03	1.03	1.03	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.01
70	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
80	0.94	0.94	0.95	0.95	0.95	0.95	0.96	0.96	0.96	0.97	0.97	0.97	0.98	0.98	0.98	0.98	0.98	0.98	0.99	0.99	0.99
90	0.89	0.89	0.9	0.9	0.91	0.91	0.92	0.92	0.93	0.94	0.94	0.95	0.95	0.96	0.96	0.96	0.97	0.97	0.97	0.97	0.94
100	0.85	0.85	0.86	0.86	0.86	0.87	0.88	0.89	0.89	0.9	0.91	0.92	0.93	0.93	0.94	0.94	0.95	0.95	0.95	0.96	0.94
120	0.78	0.79	0.79	0.8	0.81	0.82	0.83	0.83	0.85	0.86	0.87	0.89	0.89	0.9	0.91	0.91	0.92	0.93	0.93	0.94	0.94
140	0.72	0.73	0.74	0.75	0.76	0.77	0.78	0.79	0.81	0.82	0.84	0.85	0.86	0.87	0.88	0.86	0.89	0.9	0.91	0.91	0.92
160	0.68	0.69	0.69	0.7	0.71	0.73	0.74	0.75	0.77	0.79	0.8	0.82	0.83	0.84	0.85	0.92	0.87	0.88	0.89	0.89	0.9

Source: USDA SCS

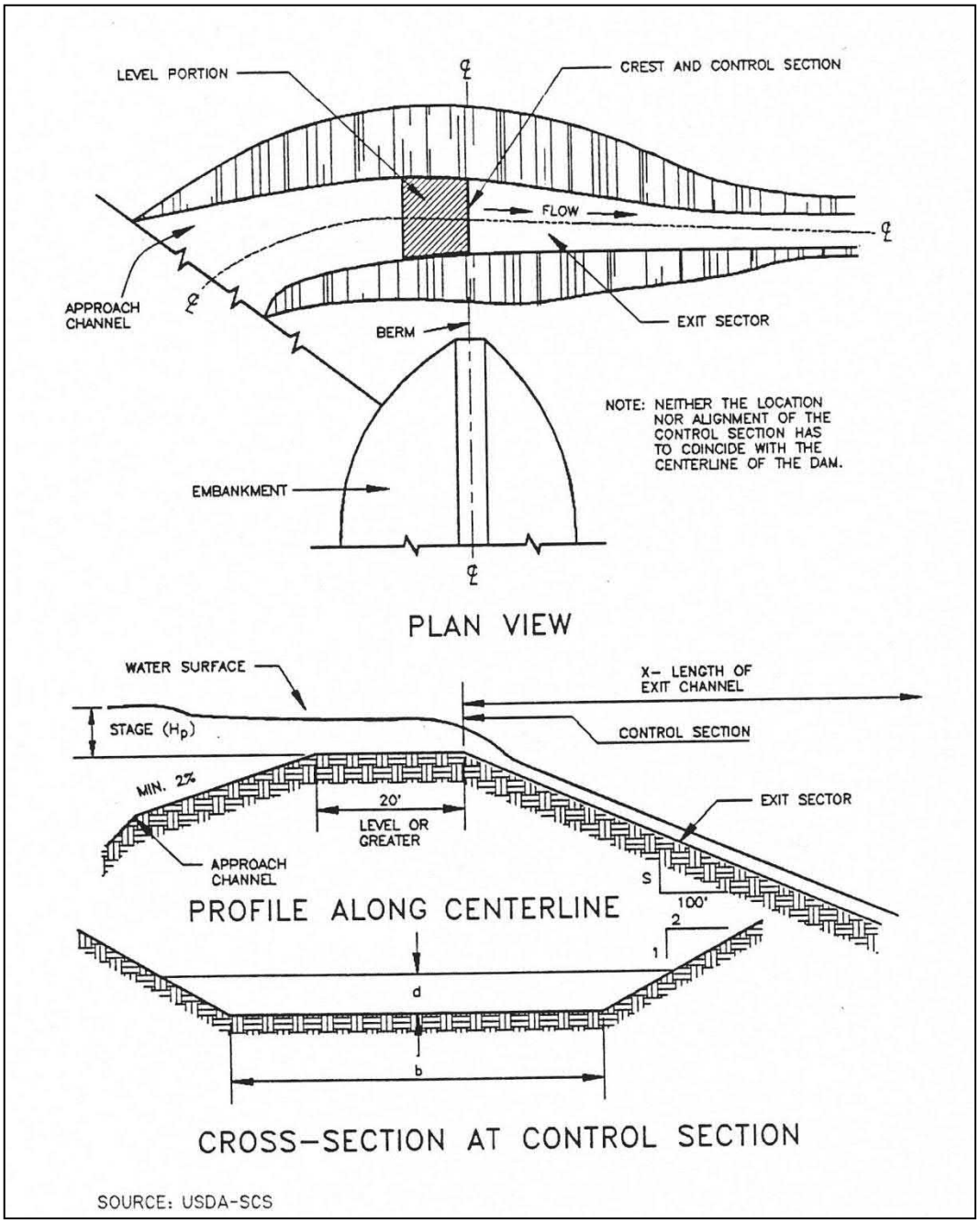


Figure 3.25 Example of Excavated Earth Spillway Design

Table 3.7 Design Data for Earth Spillways

Stage (Hp) In Feet	Spillway Variables	Bottom Width (b) In Feet																
		8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40
0.5	Q	6	7	8	10	11	13	14	15	17	18	20	21	22	24	25	27	28
	V	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
	S	3.9	3.9	3.9	3.9	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8
	X	32	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33
0.6	Q	8	10	12	14	16	18	20	22	24	26	28	30	32	34	35	37	39
	V	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
	S	3.7	3.7	3.7	3.7	3.6	3.7	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
	X	36	36	36	36	36	36	37	37	37	37	37	37	37	37	37	37	37
0.7	Q	11	13	16	18	20	23	25	28	30	33	35	38	41	43	44	46	48
	V	3.2	3.2	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
	S	3.5	3.5	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
	X	39	40	40	40	41	41	41	41	41	41	41	41	41	41	41	41	41
0.8	Q	13	16	19	22	26	29	32	35	38	42	45	46	48	51	54	57	60
	V	3.5	3.5	3.5	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
	S	3.3	3.3	3.3	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
	X	44	44	44	44	44	45	45	45	45	45	45	45	45	45	45	45	45
0.9	Q	17	20	24	28	32	35	39	43	47	51	53	57	60	64	68	71	75
	V	3.7	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8
	S	3.2	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
	X	47	47	48	48	48	48	48	48	48	48	49	49	49	49	49	49	49
1	Q	20	24	29	33	38	42	47	51	56	61	63	68	72	77	81	86	90
	V	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
	S	3.1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
	X	51	51	51	51	52	52	52	52	52	52	52	52	52	52	52	52	52
1.1	Q	23	28	34	39	44	49	54	60	65	70	74	79	84	89	95	100	105
	V	4.2	4.2	4.2	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
	S	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
	X	55	55	55	55	55	55	55	56	56	56	56	56	56	56	56	56	56
1.2	Q	28	33	40	45	51	58	64	69	76	80	86	92	98	104	110	116	122
	V	4.4	4.4	4.4	4.4	4.4	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
	S	2.9	2.9	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
	X	58	58	59	59	59	59	59	59	60	60	60	60	60	60	60	60	60
1.3	Q	32	38	46	53	58	65	73	80	86	91	99	106	112	119	125	133	140
	V	4.5	4.6	4.6	4.6	4.6	4.6	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7
	S	2.8	2.8	2.8	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
	X	62	62	62	63	63	63	63	63	63	63	63	64	64	64	64	64	64
1.4	Q	37	44	51	59	66	74	82	90	96	103	111	119	127	134	143	150	158
	V	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9
	S	2.8	2.7	2.7	2.7	2.7	2.7	2.7	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6
	X	65	66	66	66	66	67	67	67	67	67	67	68	68	68	68	68	69

Table 3.7 Design Data for Earth Spillways (continued)

Stage (Hp) In Feet	Spillway Variables	Bottom Width (b) In Feet																
		8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40
1.5	Q	41	50	58	66	75	85	92	101	108	116	125	133	142	150	160	169	178
	V	4.8	4.9	5	5	5	5	5	5	5	5	5	5	5	5	5.1	5.1	5.1
	S	2.7	2.7	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.5	2.5	2.5
	X	69	69	70	70	71	71	71	71	71	71	71	72	72	72	72	72	72
1.6	Q	46	56	65	75	84	94	104	112	122	132	142	149	158	168	178	187	197
	V	5	5.1	5.1	5.1	5.1	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2
	S	2.6	2.6	2.6	2.6	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
	X	72	74	74	75	75	76	76	76	76	76	76	76	76	76	76	76	76
1.7	Q	52	62	72	83	94	105	115	126	135	145	156	167	175	187	196	206	217
	V	5.2	5.2	5.2	5.3	5.3	5.3	5.3	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4
	S	2.6	2.6	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
	X	76	78	79	80	80	80	80	80	80	80	80	80	80	80	80	80	80
1.8	Q	58	69	81	93	104	116	127	138	150	160	171	182	194	204	214	226	233
	V	5.3	5.4	5.4	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.6	5.6	5.6	5.6	5.6	5.6
	S	2.5	2.5	2.5	2.5	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4
	X	80	82	83	84	84	84	84	84	84	84	84	84	84	84	84	84	84
1.9	Q	64	76	88	102	114	127	140	152	164	175	188	201	213	225	235	248	260
	V	5.5	5.5	5.5	5.6	5.6	5.6	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7
	S	2.5	2.5	2.5	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4
	X	84	85	86	87	88	88	88	88	88	88	88	88	88	88	88	88	88
2	Q	71	83	97	111	125	138	153	164	178	193	204	218	232	245	256	269	283
	V	5.6	5.7	5.7	5.7	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.9	5.9	5.9	5.9	5.9	5.9
	S	2.5	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
	X	88	90	91	91	91	91	92	92	92	92	92	92	92	92	92	92	92
2.1	Q	77	91	107	122	135	149	162	177	192	207	220	234	250	267	276	291	305
	V	5.7	5.8	5.9	5.9	5.9	5.9	5.9	6	6	6	6	6	6	6	6	6	6
	S	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
	X	92	93	95	95	95	95	95	95	95	96	96	96	96	96	96	96	96
2.2	Q	84	100	116	131	146	163	177	194	210	224	238	253	269	288	301	314	330
	V	5.9	5.9	6	6	6	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.2	6.2	6.2	6.2
	S	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
	X	96	98	99	99	99	99	99	100	100	100	100	100	100	100	100	100	100
2.3	Q	90	108	124	140	158	175	193	208	226	243	258	275	292	306	323	341	354
	V	6	6.1	6.1	6.1	6.2	6.2	6.2	6.2	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
	S	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
	X	100	102	102	103	103	103	104	104	104	105	105	105	105	105	105	105	105
2.4	Q	99	116	136	152	170	189	206	224	241	260	275	294	312	327	346	364	378
	V	6.1	6.2	6.2	6.3	6.3	6.3	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4
	S	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
	X	105	105	106	107	107	108	108	108	108	109	109	109	109	109	109	109	109

Source: USDA - SCS

Step 11 Re-estimate the elevation of the design high water and the top of the dam based upon the design of the basin outlet and the emergency spillway.

Step 12 Design the anti-vortex device and trash rack.

If an outfall riser is used, an anti-vortex device and trash rack shall be attached to the top of the basin riser to improve the flow of water into the outfall and prevent floating debris from being carried out of the basin.

This design procedure for the anti-vortex device and trash rack refers only to round riser pipes of corrugated metal. There are numerous ways to provide protection for concrete pipe; these include various hoods and grates and rebar configurations which should be a part of project-specific design and will frequently be a part of a permanent structure.

Refer to Figure 3.26 and Table 3.8. Choose cylinder size, support bars, and top requirements from Table 3.8 based on the diameter of the riser pipe.

Step 13 Design the anchoring for the basin outlet.

The basin outlet must be firmly anchored to prevent its floating.

If the riser is over 10 feet high, the forces acting on the spillway must be calculated. A method of anchoring the spillway which provides a safety factor of 1.25 must be used (downward forces = 1.25 x upward forces).

If the riser is 10 feet or less in height, choose one of the two methods in Figure 3.27 to anchor the basin outlet.

Determine the number and spacing of anti-seep collars for the outfall pipe through the embankment.

Step 14 Provide for dewatering.

(a) Use a modified version of the discharge equation for a vertical orifice and a basic equation for the area of a circular orifice.

Naming the variables:

- A = flow area of orifice, in square feet
- D = diameter of circular orifice, in inches
- h = average driving head (maximum possible head measured from radius of orifice to crest of basin outlet divided by 2), in feet
- Q = volumetric flow rate through orifice needed to achieve approximate 6-hour drawdown, cubic feet per second
- S = total storage available in dry storage area, cubic feet
- Q = S/21,600 seconds

(b) An alternative approach for dewatering is the use of a perforated riser (0.75" to 1" diameter holes spaced every 12 inch horizontally and 8 inch vertically) with 1½ inch to 2 inch filter stone stacked around the exterior.

Use S for basin and find Q. Then substitute in calculated Q and find A:

$$A = \frac{Q}{(0.6) \times (64.32 \times \frac{h}{2})} \qquad (3.4)$$

Then, substitute in calculated A and find d:

$$d^* = 2 \times \frac{(A)}{(3.14)} \qquad (3.5)$$

Diameter of the dewatering orifice should never be less than 3 inches in order to help prevent clogging by soil or debris.

Flexible tubing should be at least 2 inches larger in diameter than the calculated orifice to promote improved flow characteristics.

Additional design guidance for orifices and perforated risers are in *Section 2.2.2 of the Hydraulics Technical Manual*.

(c) If a surface skimmer is used as the basin's primary outlet, it may also be used to dewater the basin. Orifice flowrates for the skimmer will be provided by the manufacturer.

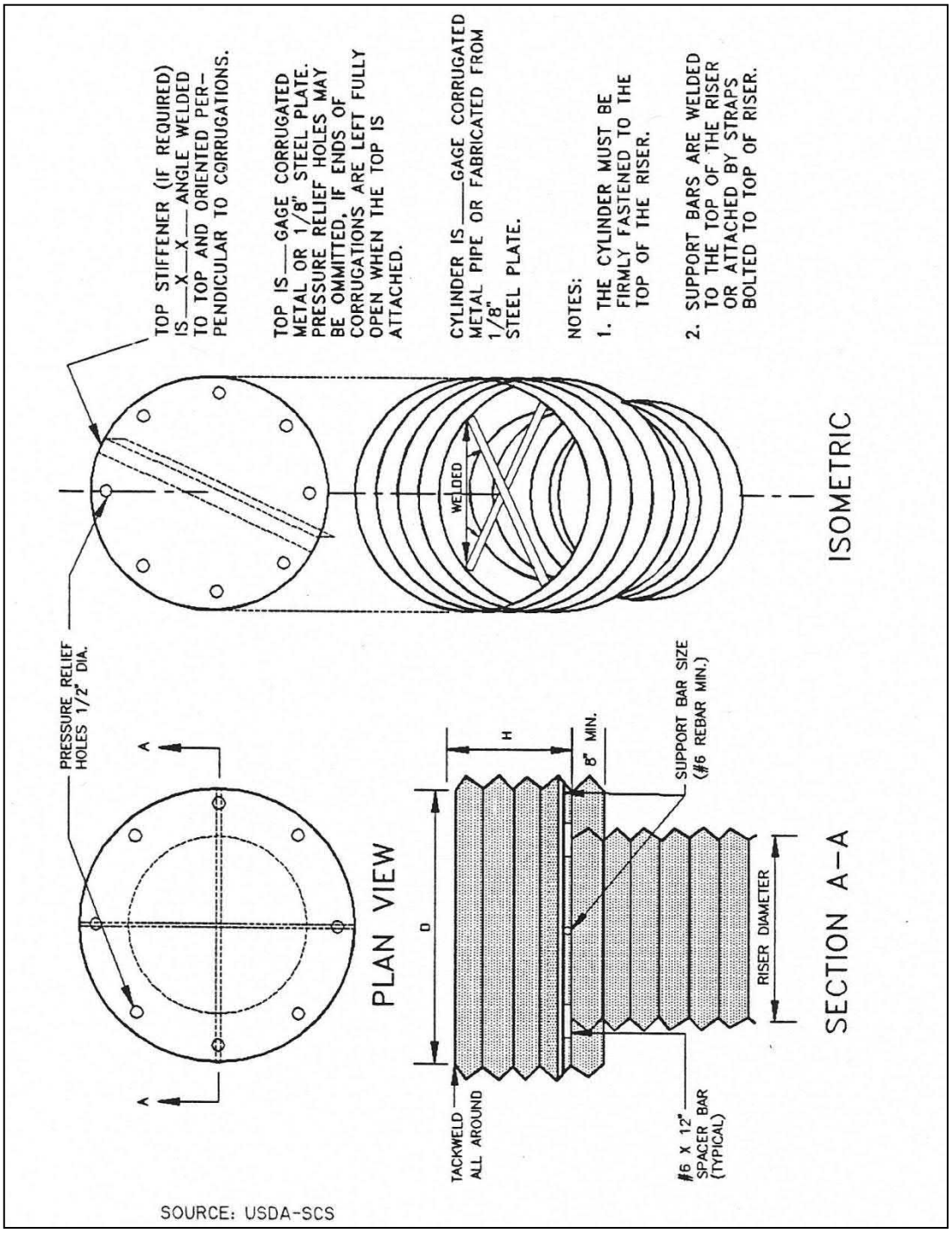


Figure 3.26 Example of Anti-Vortex Design for Corrugated Metal Pipe Riser

Table 3.8 Trash Rack and Anti-Vortex Device Design Table

Riser Diam., in.	Cylinder		Height inches	Minimum Size Support Bar	Minimum Top	
	Diameter inches	Thickness gage			Thickness	Stiffener
12	18	16	6	#6 Rebar or 1 ½ x 1 ½ x 3/16 angle	16 ga. (F&C)	-
15	21	16	7	" "	" "	-
18	27	16	8	" "	" "	-
21	30	16	11	" "	16 ga.(C), 14 ga.(F)	-
24	36	16	13	" "	" "	-
27	42	16	13	" "	" "	-
36	54	14	17	#8 Rebar	14 ga.(C), 12 ga.(F)	-
42	60	16	19	" "	" "	-
48	72	16	21	1 ¼" pipe or 1 ½ x 1 ½ x ¼ angle	14 ga.(C), 10 ga.(F)	-
54	78	16	25	" "	" "	-
60	90	14	29	1 ½" pipe or 1 ½ x 1 ½ x ¼ angle	12 ga.(C), 8 ga.(F)	-
66	96	14	33	2" pipe or 2 x 2 x 3/16 angle	12 ga.(C), 8	2 x 2 x ¼ angle
72	102	14	36	" "	" "	2 ½ x 2 ½ x ¼ angle
78	114	14	39	2 ½" pipe or 2 ½ x ¼ angle	" "	" "
84	120	12	42	2 ½" pipe or 2 ½ x 2 ½ x ¼ angle	" "	2 ½ x 2 ½ x 5/16 angle

Note$_1$: The criterion for sizing the cylinder is that the area between the inside of the cylinder and the outside of the riser is equal to or greater than the area inside the riser. Therefore, the above table is invalid for use with concrete pipe risers.
Note$_2$: Corrugation for 12"-36" pipe measures 2 ⅔ x ½"; for 42"-84" the corrugation measures 5" x 1" or 8" x 1".
Note$_3$: C = corrugated; F = flat.

Source: Adapted from USDA-SCS and Carl M. Henshaw Drainage Products Information.

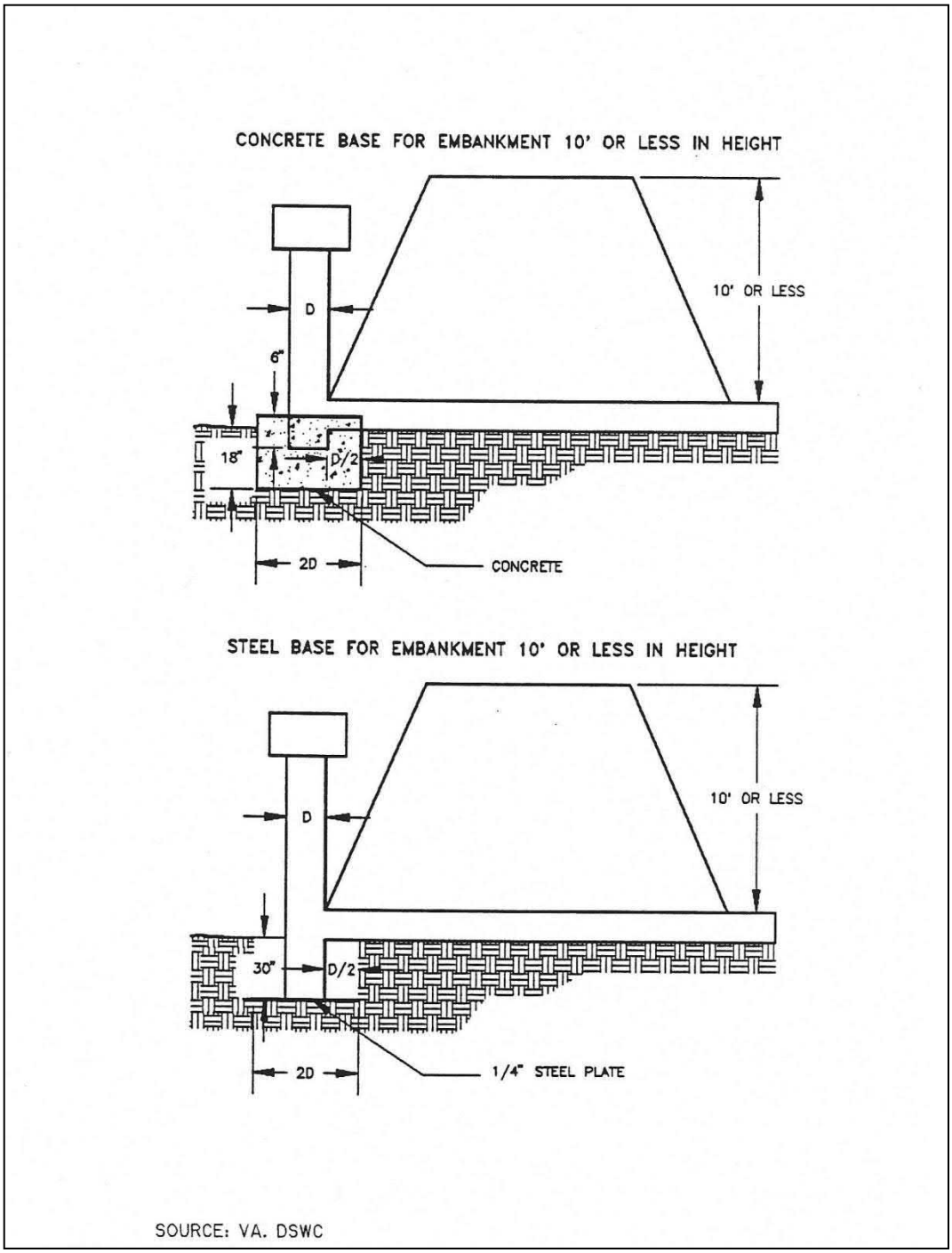


Figure 3.27 Riser Pipe Base Design for Embankment Less Than 10 Feet High

3.9.8 Design Form

Note: This design form is for basins designed with a riser as its primary outlet. It is provided as an example of the type of documentation required for a sediment basin. Different calculations will be needed for other types of outlets.

Project _____

Basin # _____ Location _____

Total area draining to basin: _____ acres.

Total disturbed area draining to basin: _____ acres.

Basin Volume Design

1. Minimum required volume is the lesser of

   a.) (3600 cu. ft. x _____ total drainage acres) / 27 = _____ cu. yds.

   b.) 2 yr, 24 hr storm volume in cubic yards = _____ cu. yds.

2. Total available basin volume at crest of riser* = _____ cu. yds. at elevation _____.
   (From Storage - Elevation Curve)

   * Minimum = Lesser of 3600 cubic feet/acre of Total Drainage Area or
   2yr. 24 hr. storm volume from Disturbed Area drained

3. Excavate _____ cu. yds. to obtain required volume*.

   *Elevation corresponding to required volume = invert of the dewatering orifice.

4. Diameter of dewatering orifice = _____ in.

5. Diameter of flexible tubing = _____ in. (diameter of dewatering orifice plus 2 inches).

Preliminary Design Elevations

6. Crest of Riser = _____

   Top of Dam = _____

   Design High Water = _____

   Upstream Toe of Dam = _____

Basin Shape

7. Length of Flow / Effective Width = L / We = _____

   If > 2, baffles are not required _____

   If < 2, baffles are required _____

Runoff

8. Q_2 = _____ cfs (From TR-55)

9. Q_{25} = _____ cfs (From TR-55)

Basin Outlet Design

10. With emergency spillway, required basin outlet capacity $Q_p = Q_2$ = _____ cfs. (riser and outfall)

    Without emergency spillway, required basin outlet capacity $Q_p = Q_{25}$ = _____ cfs. (riser and outfall)

11. With emergency spillway:

    Assumed available head (h) = _____ ft. (Using Q_2)

    h = Crest of Emergency Spillway Elevation - Crest of Riser Elevation

    Without emergency spillway:

    h = Design High Water Elevation - Crest of Riser Elevation

12. Riser diameter (D_r) = _____ in. Actual head (h) = _____ft.

    (Figure 3.23)

    Note: Avoid orifice flow conditions.

13. Barrel length (l) = _____ ft.

    Head (H) on outfall through embankment = _____ ft.

    (Figure 3.24)

14. Barrel Diameter = _____ in.

    (From Table 3.5 [concrete pipe] or Table 3.6 [corrugated pipe]).

15. Trash rack and anti-vortex device

    Diameter = _____ inches.

    Height = _____ inches.

    (From Table 3.8).

Emergency Spillway Design

16. Required spillway capacity $Q_e = Q_{25} - Q_p$ = _____ cfs.

17. Bottom width (b) = _____ ft.; the slope of the exit channel(s) = _____ ft./foot; and the minimum length of the exit channel (x) = _____ ft.
    (From Figure 3.25 and Table 3.7).

Final Design Elevations

18. Top of Dam = _____

    Design High Water = _____

    Emergency Spillway Crest = _____

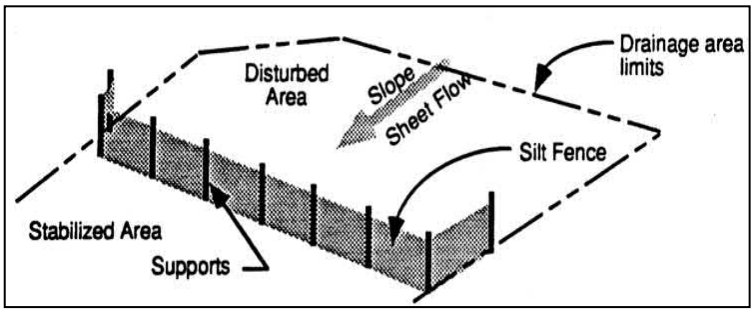
    Basin Riser Crest = _____

    Dewatering Orifice Invert = _____

    Elevation of Upstream Toe of Dam
    (if excavation was performed) = _____

3.10 Silt Fence

Sediment Control



Description: A silt fence consists of geotextile fabric supported by wire mesh netting or other backing stretched between metal posts with the lower edge of the fabric securely embedded six-inches in the soil. The fence is typically located downstream of disturbed areas to intercept runoff in the form of sheet flow. A silt fence provides both filtration and time for sediment settling by reducing the velocity of the runoff.

KEY CONSIDERATIONS

DESIGN CRITERIA:

- Maximum drainage area of 0.25 acre per 100 linear feet of silt fence
- Maximum 200 feet distance of flow to silt fence; 50 feet if slope exceeds 10 percent
- Minimum fabric overlap of 3 feet at abutting ends; join fabric to prevent leakage
- Turn end of silt fence line upslope a minimum of 10 feet
- Install stone overflow structure at low points or spaced at approximately 300 feet if no apparent low point

ADVANTAGES / BENEFITS:

- Economical means to treat sheet flow
- Most effective with coarse to silty soil types

DISADVANTAGES / LIMITATIONS:

- Limited effectiveness with clay soils due to clogging
- Localized flooding due to minor ponding at the upslope side of the silt fence
- Not for use as check dams in swales or low areas subject to concentrated flow
- Not for use where soil conditions prevent a minimum toe-in depth of 6 inches or installation of support posts to a depth of 12 inches
- Can fail structurally under heavy storm flows, creating maintenance problems and reducing effectiveness

MAINTENANCE REQUIREMENTS:

- Inspect regularly
- Repair undercutting, sags and other fence failures
- Remove sediment before it reaches half the height of the fence
- Repair or replace damaged or clogged filter fabric

TARGETED POLLUTANTS

- ● Sediment
- ○ Nutrients & Toxic Materials
- ○ Oil & Grease
- ◒ Floatable Materials
- ○ Other Construction Wastes

APPLICATIONS

- **Perimeter Control**
- **Slope Protection**
- **Sediment Barrier**
- **Channel Protection**
- **Temporary Stabilization**
- **Final Stabilization**
- **Waste Management**
- **Housekeeping Practices**

Fe=0.50-0.75
(*Depends on soil type*)

IMPLEMENTATION CONSIDERATIONS

- ◒ Capital Costs
- ● Maintenance
- ○ Training
- ◒ Suitability for Slopes > 5%

Other Considerations:

- *Effects of ponding or the redirection of flow onto adjacent areas and property*

3.10.1 Primary Use

Silt fence is normally used as a perimeter control on the down slope side of disturbed areas and on side slopes where stormwater may runoff the area. It is only feasible for non-concentrated, sheet flow conditions. If it becomes necessary to place a silt fence where concentrated flows may be occur (e.g. where two silt fences join at an angle, or across minor channels or gullies), it will be necessary to reinforce the silt fence at that area by a rock berm or sand bag berm, or other structural measures that will support the silt fence.

3.10.2 Applications

Silt fence is an economical means to treat overland, non-concentrated flows for all types of projects. Silt fences are used as perimeter control devices for both site developers and linear (roadway) type projects. They are most effective with coarse to silty soil types. Due to the potential of clogging and limited effectiveness, silt fences should be used with caution in areas that have predominantly clay soil types. In this latter instance, a soils engineer or soil scientist should confirm the suitability of silt fence for that application. Additional controls may be needed to remove fine silts and clay soils suspended in stormwater.

3.10.3 Design Criteria

- Fences are to be constructed along a line of constant elevation (along a contour line) where possible.
- Silt fence can interfere with construction operations; therefore, planning of access routes onto the site is critical.
- Maximum drainage area shall be 0.25 acre per 100 linear feet of silt fence.
- Maximum flow to any 20 foot section of silt fence shall be 1 CFS.
- Maximum distance of flow to silt fence shall be 200 feet or less. If the slope exceeds 10 percent the flow distance shall be less than 50 feet.
- Maximum slope adjacent to the fence shall be 2:1.
- Silt fences shall not be used where there is a concentration of water in a channel, drainage ditch or swale, nor should it be used as a control on a pipe outfall.
- If 50 percent or less soil, by weight, passes the U.S. Standard Sieve No. 200; select the apparent opening size (A.O.S.) to retain 85percent of the soil.
- If 85 percent or more of soil by weight, passes the U.S. Standard Sieve No. 200, silt fences shall not be used unless the soil mass is evaluated and deemed suitable by a soil scientist or geotechnical engineer concerning the erodiblity of the soil mass, dispersive characteristics, and the potential grain-size characteristics of the material that is likely to be eroded.
- Stone overflow structures or other outlet control devices shall be installed at all low points along the fence or spaced at approximately 300 feet if there is no apparent low point.
- Filter stone for overflow structure shall be 1 ½ inches washed stone containing no fines. Angular shaped stone is preferable to rounded shapes.
- Silt fence fabric must meet the following minimum criteria:
    - Tensile Strength, ASTM D4632 Test Method for Grab Breaking Load and Elongation of Geotextiles, 90-lbs.
    - Puncture Rating, ASTM D4833 Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products, 60-lbs.
    - Mullen Burst Rating, ASTM D3786 Standard Test Method for Hydraulic Bursting Strength of Textile Fabrics-Diaphragm Bursting Strength Tester Method, 280-psi.

  - Apparent Opening Size, ASTM D4751 Test Method for Determining Apparent Opening Size of a Geotextile, U.S. Sieve No. 30(max) to No. 100 (min).
  - Ultraviolet Resistance, ASTM D4355 Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture, and Heat in a Xenon Arc Type Apparatus, Minimum 70 percent.
- Fence posts shall be steel and may be T-section or L-section, 1.3 pounds per linear foot minimum, and 4 feet in length minimum. Wood posts may be used depending on anticipated length of service and provided they are 4 feet in length minimum and have a nominal cross section of 2 inches by 4 inches for pine or 2 inches by 2 inches for hardwoods.
- Silt fence shall be supported by steel wire fence fabric as follows:
  - 4 inch x 4 inch mesh size, W1.4 /1.4, minimum 14 gauge wire fence fabric;
  - Hog wire, 12 gauge wire, small openings installed at bottom of silt fence;
  - Standard 2 inch x 2 inch chain link fence fabric; or
  - Other welded or woven steel fabrics consisting of equal or smaller spacing as that listed herein and appropriate gauge wire to provide support.
- Silt Fence shall consist of synthetic fabric supported by wire mesh and steel posts set a minimum of 1-foot depth and spaced not more than 6-feet on center.
- A 6 inch wide trench is to be cut 6 inches deep at the toe of the fence to allow the fabric to be laid below the surface and backfilled with compacted earth or gravel to prevent bypass of runoff under the fence. Fabric shall overlap at abutting ends a minimum of 3 feet and shall be joined such that no leakage or bypass occurs. If soil conditions prevent a minimum toe-in depth of 6 inches or installation of support post to depth of 12 inches, silt fences shall not be used.
- Sufficient room for the operation of sediment removal equipment shall be provided between the silt fence and other obstructions in order to properly maintain the fence.
- The last 10 feet (or more) at the ends of a line of silt fence shall be turned upslope to prevent bypass of stormwater. Additional upslope runs of silt fence may be needed every 200 to 400 linear feet, depending on the traverse slope along the line of silt fence.

3.10.4 Design Guidance and Specifications

Specifications for construction of this item may be found in the Standard Specifications for Public Works Construction – North Central Texas Council of Governments, Section 201.5 Silt Fence and in the Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges (TxDot 2004) Item 506.2.J and Item 506.4.C.9.

The American Society for Testing and Materials has established standard specifications for silt fence materials (ASTM D6461) and silt fence installation (ASTM D6462).

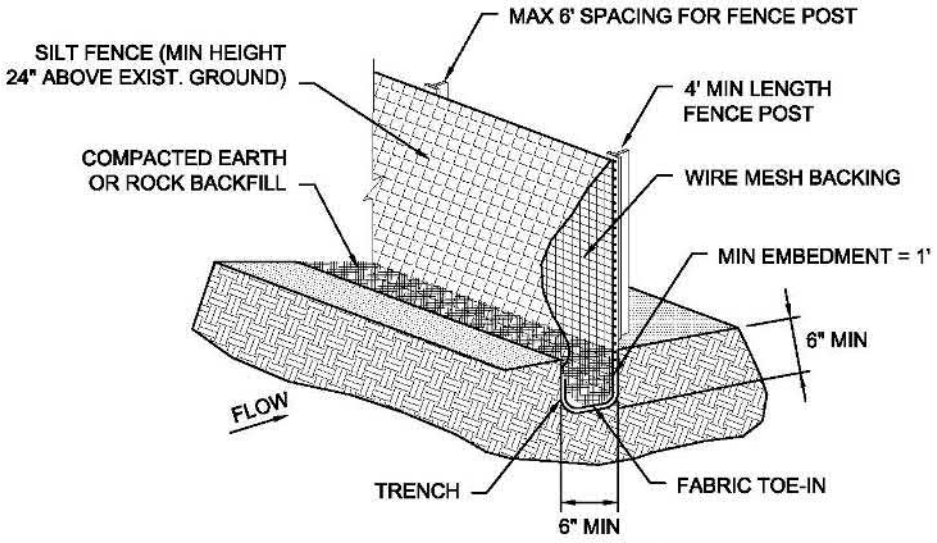
3.10.5 Inspection and Maintenance Requirements

Silt fence should be inspected regularly (at least as often as required by the TPDES Construction General Permit) for buildup of excess sediment, undercutting, sags, and other failures. Sediment should be removed before it reaches half the height of the fence. In addition, determine the source of excess sediment and implement appropriate measures to control the erosion. Damaged or clogged fabric must be repaired or replaced as necessary.

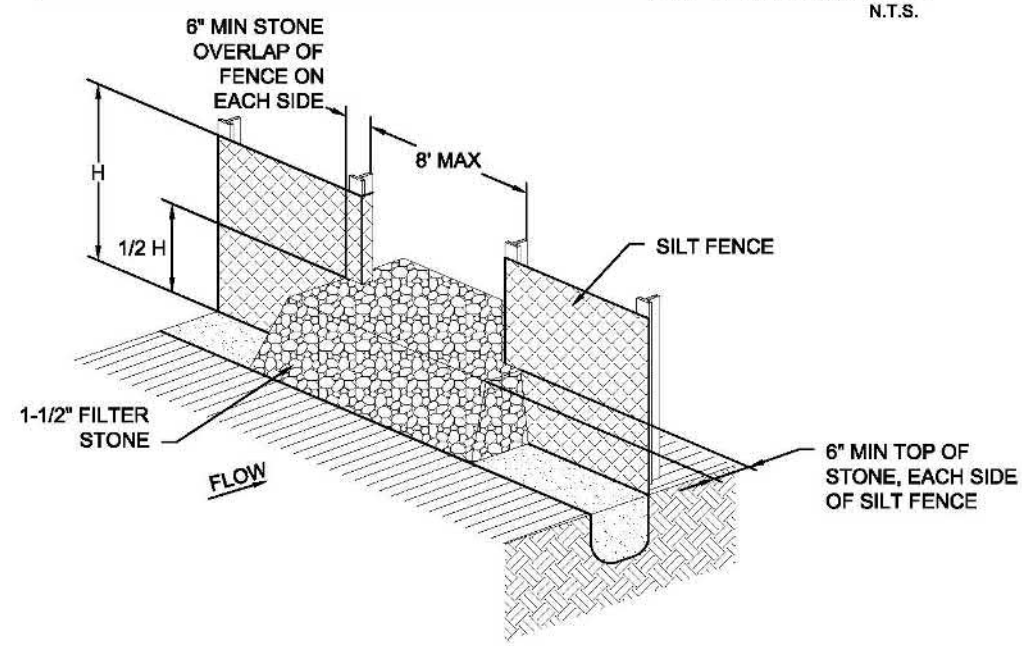
3.10.6 Example Schematics

The following schematics are example applications of the construction control. They are intended to assist in understanding the control's design and function.

The schematics are **not for construction**. They may serve as a starting point for creating a construction detail, but they must be site adapted by the designer. In addition, dimensions and notes appropriate for the application must be added by the designer.



SILT FENCE EXAMPLE
N.T.S.



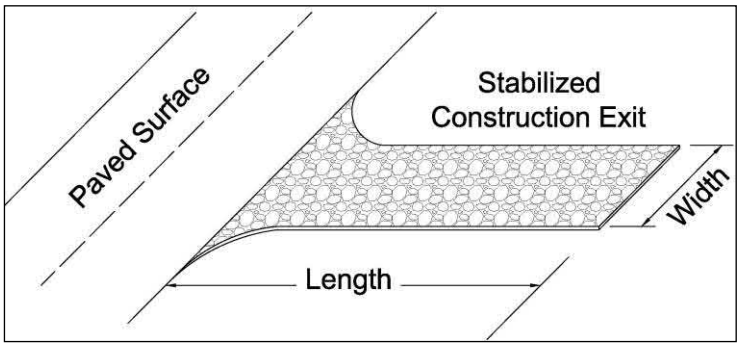
STONE OVERFLOW STRUCTURE EXAMPLE
N.T.S.

NOTES: 1. DESIGN SHALL SHOW ON THE DRAWINGS THE LOCATIONS WHERE OVERFLOW STRUCTURES SHALL BE INSTALLED. OVERFLOW STRUCTURES ARE REQUIRED AT ALL LOW POINTS AND AT A SPACING OF APPROXIMATELY 300 FT WHERE NO LOW POINT IS APPARENT.
2. DESIGNER SHALL ON THE DRAWINGS THE LOCATIONS WHERE SILT FENCE IS TO BE TURNED UPSLOPE. UPSLOPE LENGTHS SHALL BE A MINIMUM OF 10 FEET.

Figure 3.28 Schematics of Silt Fence

3.11 Stabilized Construction Exit

Sediment Control



Description: A stabilized construction exit is a pad of crushed stone, recycled concrete or other rock material placed on geotextile filter cloth to dislodge soil and other debris from construction equipment and vehicle tires prior to exiting the construction site. The object is to minimize the tracking of soil onto public roadways where it will be suspended by stormwater runoff.

KEY CONSIDERATIONS

DESIGN CRITERIA:

- Slope exit away from offsite paved surface
- Minimum width and length dependent on size of disturbed area, which correlates to traffic volume
- 6 inches minimum thickness of stone layer
- Stone of 3 to 5 inches in size
- Add a wheel cleaning system when inspections reveal the stabilized exit does not prevent tracking

ADVANTAGES / BENEFITS:

- Reduces tracking of soil onto public streets
- Directs traffic to a controlled access point
- Protects other sediment controls by limiting the area disturbed

DISADVANTAGES / LIMITATIONS:

- Effectiveness dependent on limiting ingress and egress to the stabilized exit
- A wheel washing system may also be required to remove clay soil from tires, particularly in wet conditions

MAINTENANCE REQUIREMENTS:

- Inspect regularly
- Replace rock when sediment in the void area between the rocks is visible on the surface
- Periodically re-grade and top dress with additional stone to maintain efficiency

TARGETED POLLUTANTS

- ◒ Sediment
- ○ Nutrients & Toxic Materials
- ○ Oil & Grease
- ○ Floatable Materials
- ○ Other Construction Wastes

APPLICATIONS

Perimeter Control
Slope Protection
Sediment Barrier
Channel Protection
Temporary Stabilization
Final Stabilization
Waste Management
Housekeeping Practices

Fe=N/A

IMPLEMENTATION CONSIDERATIONS

- ◒ Capital Costs
- ◒ Maintenance
- ○ Training
- ○ Suitability for Slopes > 5%

Other Considerations:

- *None*

3.11.1 Primary Use

Stabilized construction exits are used to remove soil, mud and other matter from vehicles that drive off of a construction site onto public streets. Stabilized exits reduce the need to remove sediment from streets. When used properly, they also control traffic by directing vehicles a single (or two for larger sites) location. Controlling traffic onto and off of the site reduces the number and quantity of disturbed areas and provides protection for other sediment controls by decreasing the potential for vehicles to drive over the control.

3.11.2 Applications

Stabilized construction exits are used on all construction sites with a disturbed area of one acre or larger and are a recommended practice for smaller construction sites. A stabilized exit is used on individual residential lots until the driveway is placed. Stabilized construction exits may be used in conjunction with wheel cleaning systems as described in *Section 3.16 Wheel Cleaning Systems*.

3.11.3 Design Criteria

- Limit site access to one route during construction, if possible; two routes for linear and larger projects.
- Prevent traffic from avoiding or shortcutting the full length of the construction exit by installing barriers. Barriers may consist of silt fence, construction safety fencing, or similar barriers.
- Design the access point(s) to be at the upslope side of the construction site. Do not place construction access at the lowest point on the construction site.
- Stabilized construction exits are to be constructed such that drainage across the exit is directed to a controlled, stabilized outlet onsite with provisions for storage, proper filtration, and removal of wash water.
- The exit must be sloped away from the paved surface so that stormwater from the site does not discharge through the exit onto roadways.
- Minimum width of exit shall be 15 feet.
- The construction exit material shall be a minimum thickness of 6 inches. The stone or recycled concrete used shall be 3 to 5 inches in size with little or no fines.
- The geotextile fabric must meet the following minimum criteria:
    - Tensile Strength, ASTM D4632 Test Method for Grab Breaking Load and Elongation of Geotextiles, 300 lbs.
    - Puncture Strength, ASTM D4833 Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products, 120 lbs.
    - Mullen Burst Rating, ASTM D3786 Standard Test Method for Hydraulic Bursting Strength of Textile Fabrics-Diaphragm Bursting Strength Tester Method, 600 psi.
    - Apparent Opening Size, ASTM D4751 Test Method for Determining Apparent Opening Size of a Geotextile, U.S. Sieve No. 40 (max).
- Rock by itself may not be sufficient to remove clay soils from wheels, particularly in wet conditions. When necessary, vehicles must be cleaned to remove sediment prior to entering paved roads, streets, or parking lots. Refer to *Section 3.16 Wheel Cleaning Systems* for additional controls.
- Using water to wash sediment from streets is prohibited
- Minimum dimensions for the stabilized exit shall be as follows:

Table 3.9 Minimum Exit Dimensions		
Disturbed Area	*Min. Width of Exit*	*Min. Length of Exit*
< 1 Acre	15 feet	20 feet
≥ 1 Acre but < 5 Acres	25 feet	50 feet
≥ 5 Acres	30 feet	50 feet

- If a wheel cleaning system is used, the width of the stabilized exit may be reduced to funnel traffic into the system. Refer to *Section 3.16 Wheel Cleaning*.

3.11.4 Design Guidance and Specifications

Specifications for construction of this item may be found in the Standard Specifications for Public Works Construction – North Central Texas Council of Governments, Section 201.10 Stabilized Construction Entrance and in the Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges (TxDOT 2004) Item 506.2.E and Item 506.4.C.5.

3.11.5 Inspection and Maintenance Requirements

Construction exits should be inspected regularly (at least as often as required by the TPDES Construction General Permit). The stabilized construction exit shall be maintained in a condition that prevents tracking or flow of sediment onto paved surfaces. Periodic re-grading and top dressing with additional stone must be done to keep the efficiency of the exit from diminishing. The rock shall be re-graded when ruts appear. Additional rock shall be added when soil is showing through the rock surface.

Additional controls are needed if inspections reveal a properly installed and maintained exit, but tracking of soil outside the construction area is still evident. Additional controls may be daily sweeping of all soil spilled, dropped, or tracked onto public rights-of-way or the installation of a wheel cleaning system.

3.11.6 Example Schematics

The following schematics are example applications of the construction control. They are intended to assist in understanding the control's design and function.

The schematics are **not for construction**. They may serve as a starting point for creating a construction detail, but they must be site adapted by the designer. In addition, dimensions and notes appropriate for the application must be added by the designer.

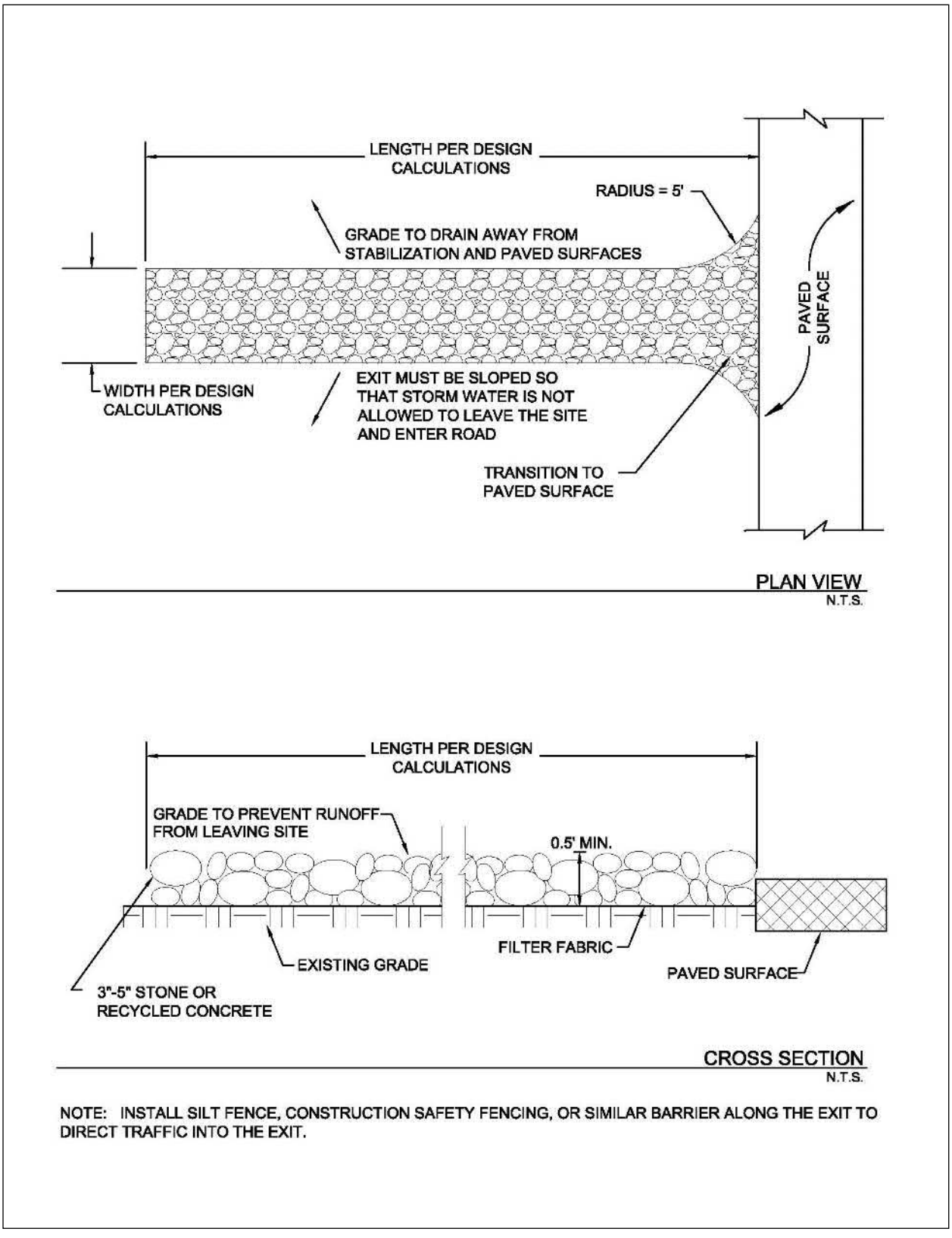
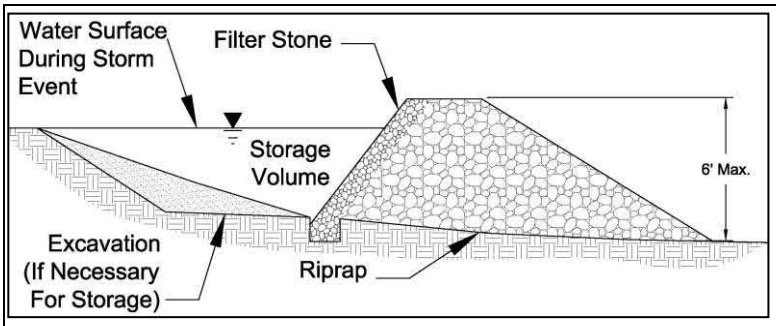


Figure 3.29 Schematics of Stabilized Construction Exit

3.12 Stone Outlet Sediment Trap

Sediment Control



Description: A stone outlet sediment trap is a small detention area formed by placing a stone embankment with an integral stone filter outlet across a drainage swale for the purpose of detaining sediment-laden runoff from construction activities. The sediment trap detains runoff long enough to allow most of the suspended sediment to settle while still allowing for diffused flow of runoff.

KEY CONSIDERATIONS

DESIGN CRITERIA:

- Maximum contributing drainage area of 10 acres for excavated trap and 5 acres for bermed trap
- Provide storage volume for the 2-year, 24-hour design storm
- Maximum embankment height of 6 feet
- Embankment slope of 1.5:1 or flatter
- 2 foot minimum top width

ADVANTAGES / BENEFITS:

- Effectively traps sediment in a drainage swale
- Reduces flow velocities
- Relatively long effective life

DISADVANTAGES / LIMITATIONS:

- Amount of land required
- Can cause minor upstream flooding, possibly impacting construction operations
- Not for use in “live” (normally flowing) channels

MAINTENANCE REQUIREMENTS:

- Inspect regularly
- Replace filter stone when it appears to be silted in such that efficiency is diminished
- Remove trash and debris after each storm event
- Remove deposited sediment when before the storage capacity is reduced by one third or has reached a depth of one foot, whichever is less

TARGETED POLLUTANTS

- ● Sediment
- ○ Nutrients & Toxic Materials
- ○ Oil & Grease
- ◒ Floatable Materials
- ○ Other Construction Wastes

APPLICATIONS

Perimeter Control
Slope Protection
Sediment Barrier
Channel Protection
Temporary Stabilization
Final Stabilization
Waste Management
Housekeeping Practices

Fe=0.50-0.85
(*Depends on soil type*)

IMPLEMENTATION CONSIDERATIONS

- ◒ Capital Costs
- ◒ Maintenance
- ○ Training
- ● Suitability for Slopes > 5%

Other Considerations:

- *Re-grading and stabilization of the control area after construction*

3.12.1 Primary Use

A sediment trap is used where flows are concentrated in a drainage swale or channel. The sediment trap detains and temporarily impounds stormwater, which allows for settling of sediment as the water is slowly discharged from the trap. Sediment traps may be used in combination with check dams when erosive velocities exist in the swale upstream of the sediment trap.

3.12.2 Applications

Temporary stone outlet sediment traps are installed at locations where concentrated flows require a protected outlet to contain sediment or spread flow prior to discharge. They are an effective, long term (12 – 18 months) application for sediment control on large construction sites where a sediment basin is not feasible due to site or construction method restrictions. Several traps may be used to control sediment on drainage sub-basins within the construction site, instead of one large sediment basin at the discharge point from the entire construction site. Sediment traps may also be used with a passive treatment system to provide better removal of fine silt and clay soil particles.

3.12.3 Design Criteria

- Design calculations are required for the use of this control. The designer shall provide drainage computations and dimensions for the stone outlet, berms, and excavated areas associated with this control.
- The maximum drainage area contributing to the trap shall be less than 10 acres for the excavated stone outlet sediment trap and 5 acres or less for the bermed trap.
- The minimum storage volume shall be the volume of runoff from the temporary control design storm (2-year, 24 hour) for the sediment trap's drainage area.
- The surface area of the design storage area shall not be less than 1 percent of the area draining to the device.
- The maximum height of the rock shall be 6 feet, as measured from the toe of the slope on the downstream side to the low point in the rock dam.
- Minimum width of the rock dam at the top shall be 2 feet.
- Rock dam slope shall be 1.5:1 or flatter.
- The rock dam shall have a depressed area, over the center of swale, to serve as the outlet with a minimum width of 4 feet.
- A six inch minimum thickness layer of 1½ inch filter stone shall be placed on the upstream face of the stone embankment when the stormwater runoff contains fine silt and clay soil particles.
- The embankment shall be comprised of well graded stone with a size range of 6 to 12 inches in diameter. The stone may be enclosed in wire mesh or gabion basket and anchored to the channel bottom to prevent washing away.
- The dam shall consist of stone riprap or a combination of compacted fill with a stone riprap outlet.
- Fill placed to constrict the swale for construction of the excavated stone outlet sediment trap and fill placed for the berm in the bermed stone outlet sediment trap shall consist of clay material, minimum Plasticity Index of 30, using ASTM D4318 Standard Test for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- Fill shall be placed in 8 inch loose lifts (maximum) and compacted to 95% Standard Proctor Density at optimum moisture content using ASTM D698 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort.
- The outlet shall be designed to have a minimum freeboard of 6" at design flow.

- Rock shall be placed on geotextilefilter fabric meeting the following minimum criteria:
  - Tensile Strength, ASTM D4632 Test Method for Grab Breaking Load and Elongation of Geotextiles, 250-lbs.
  - Puncture Rating, ASTM D4833 Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products, 135-lbs.
  - Mullen Burst Rating, ASTM D3786 Standard Test Method for Hydraulic Bursting Strength of Textile Fabrics-Diaphragm Bursting Strength Tester Method, 420-psi.
  - Apparent Opening Size, ASTM D4751 Test Method for Determining Apparent Opening Size of a Geotextile, U.S. Sieve No. 20 (max).
- The geotextile fabric, covered with a layer of stone, shall extend past the base of the embankment on the downstream side a minimum of 2 feet.

3.12.4 Design Guidance and Specifications

Specifications for construction of this item may be found in the Standard Specifications for Public Works Construction – North Central Texas Council of Governments, Section 201.12 Stone Outlet Sediment Trap.

3.12.5 Inspection and Maintenance Requirements

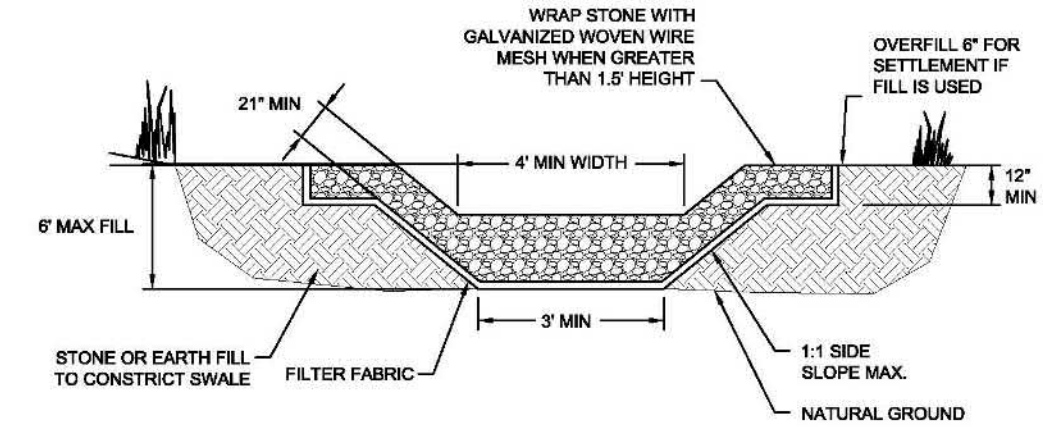
The stone outlet sediment trap should be inspected regularly (at least as often as required by the TPDES Construction General Permit) to check for clogging of the void spaces between stones. If the filter stone appears to be clogged, such that the basin will not completely drain, then the filter stone will require maintenance. If the filter stone is not completely clogged it may be raked with a garden rake to allow the water to release from the basin. If filter stone is completely clogged with mud and sediment, then the filter stone will have to be removed and replaced. Failure to keep the filter stone material properly maintained will lead to clogging of the stone riprap embankment. When this occurs, the entire stone rip-rap structure will need to be replaced. If the aggregate appears to be silted in such that efficiency is diminished, the stone should be replaced.

Trash and debris should be removed from the trap after each storm event to prevent it from plugging the rock. Deposited sediment shall be removed before the storage capacity is decreased by one-third, or sediment has reached a depth of one foot, whichever is less. The removed sediment shall be stockpiled or redistributed in areas that are protected with erosion and sediment controls.

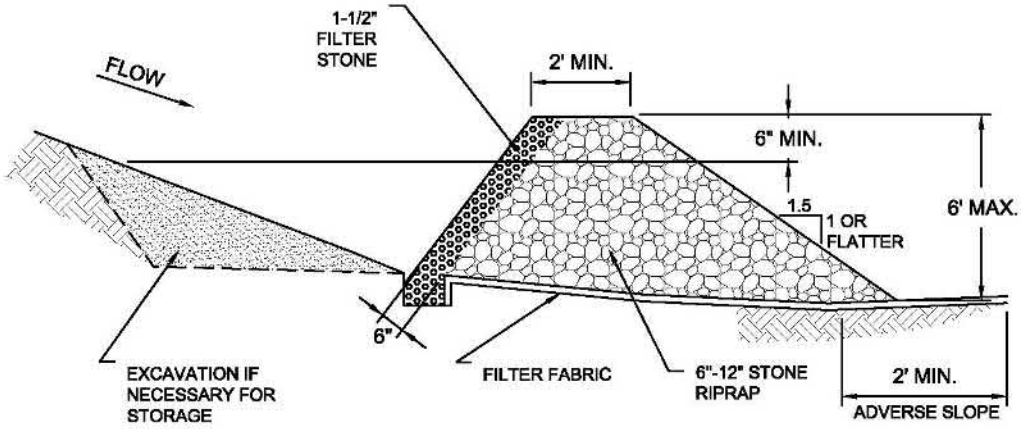
3.12.6 Example Schematics

The following schematics are example applications of the construction control. They are intended to assist in understanding the control's design and function.

The schematics are **not for construction**. They may serve as a starting point for creating a construction detail, but they must be site adapted by the designer. In addition, dimensions and notes appropriate for the application must be added by the designer.



EXCAVATED STONE OUTLET SEDIMENT TRAP VIEW LOOKING UPSTREAM
N.T.S.

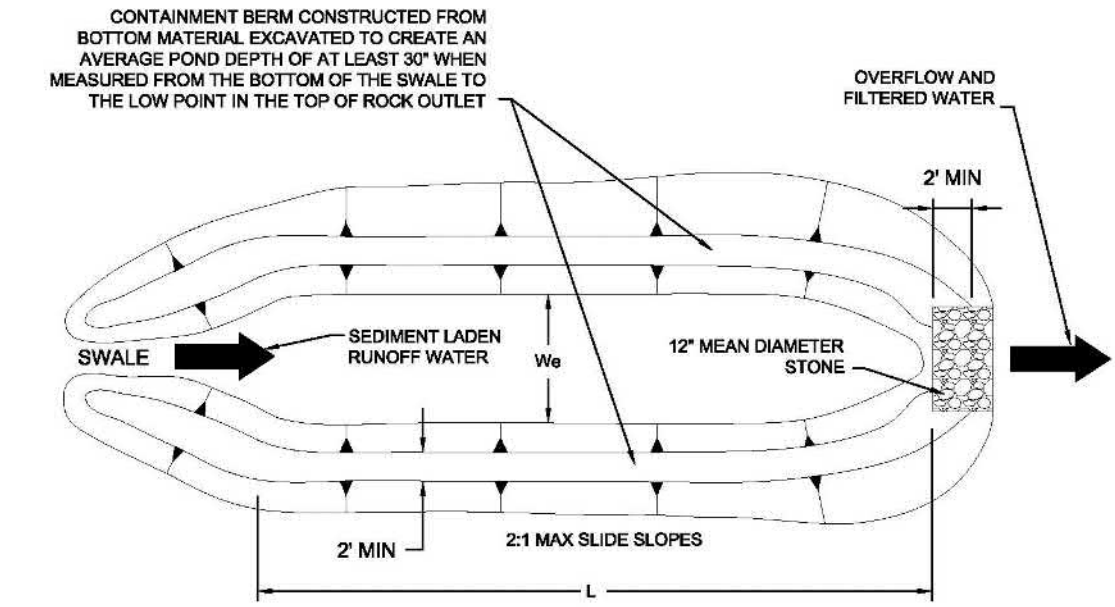


EXCAVATED STONE OUTLET SEDIMENT TRAP SECTION VIEW
N.T.S.

NOTE: ACTUAL DIMENSIONS OF THE SEDIMENT TRAP SHALL BE DESIGNED BASED ON FLOW CONDITIONS AND SITE TOPOGRAPHY. PROVIDE CALCULATIONS THAT DOCUMENT THE FOLLOWING PARAMETER USED TO DESIGN THE TRAP.

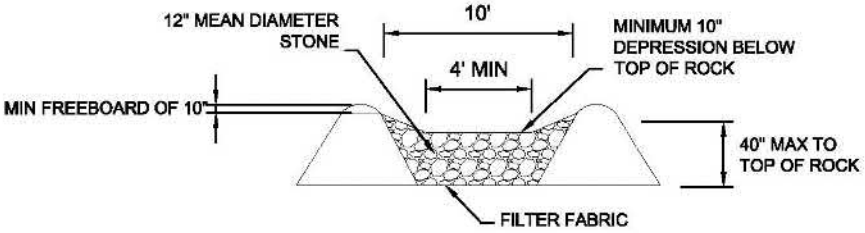
- SIZE OF CONTRIBUTING DRAINAGE AREA
- DESIGN STORM VOLUME AND FLOW RATE AT THE TRAP
- HEIGHT, SLOPE, AND LENGTH OF STONE OUTLET
- STORAGE VOLUME
- EXTENT OF GRADING TO PROVIDE THE CONTROLLED OUTLET

Figure 3.30 Schematics of Excavated Stone Outlet Sediment Trap



BERMED STONE OUTLET SEDIMENT TRAP PLAN VIEW

N.T.S.



BERMED STONE OUTLET SEDIMENT TRAP SECTION VIEW

N.T.S.

NOTE: ACTUAL DIMENSIONS OF THE SEDIMENT TRAP SHALL BE DESIGNED BASED ON FLOW CONDITIONS AND SITE TOPOGRAPHY. PROVIDE CALCULATIONS THAT DOCUMENT THE FOLLOWING PARAMETER USED TO DESIGN THE TRAP.

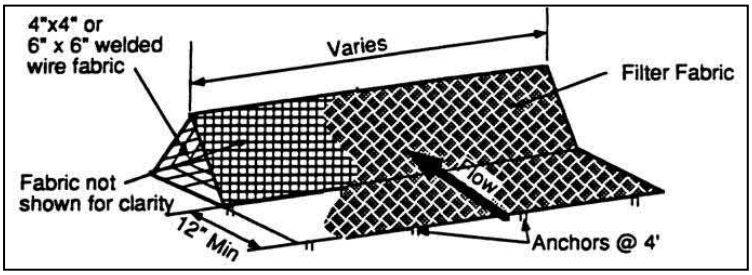
- SIZE OF CONTRIBUTING DRAINAGE AREA
- DESIGN STORM VOLUME AND FLOW RATE AT THE TRAP
- HEIGHT, SLOPE, AND LENGTH OF STONE OUTLET
- STORAGE VOLUME
- EXTENT OF GRADING TO PROVIDE THE CONTROLLED OUTLET

TRIBUTARY AREA (ACRES)	L (FT)	We (FT)
< 0.5	59	13
0.51-1.0	82	16
1.01-1.5	102	20
1.51-2.0	118	23
2.01-2.5	131	26
2.51-3.0	144	30
3.01-3.5	154	30
3.51-4.0	167	33
4.01-4.5	177	36
4.51-5.0	187	36

Figure 3.31 Schematics of Bermed Stone Outlet Sediment Trap
(Source: City of Chesterfield Department of Public Works Detail SC 7.2)

3.13 Triangular Sediment Filter Dike

Sediment Control



Description: A triangular sediment filter dike is a self-contained silt fence consisting of filter fabric wrapped around welded wire fabric and shaped into a triangular cross section. While similar in use to a silt fence, the dike is reusable, sturdier, transportable, and can be used on paved areas or in situations where it is impractical to install embedded posts for support.

KEY CONSIDERATIONS

DESIGN CRITERIA:

- Maximum drainage area of 0.25 acre per 100 linear feet of dike
- Maximum 200 feet distance of flow to filter dike; 50 feet if slope exceeds 10 percent
- Overlap ends of filter material 6 inches to cover dike-to-dike junction; secure with shoat rings

ADVANTAGES / BENEFITS:

- Can be installed on paved surfaces or where the soil type prevents embedment of other controls
- Withstands more concentrated flow and higher flow rates than silt fence

DISADVANTAGES / LIMITATIONS:

- Localized flooding due to minor ponding at the upslope side of the filter dike
- Not effective where there are substantial concentrated flows
- Not effective along contours due to the potential for flow concentration and overtopping

MAINTENANCE REQUIREMENTS:

- Inspect regularly
- Remove sediment before it reaches 6 inches in depth
- Clean or replace fabric if clogged
- Repair or replace dike when structural deficiencies are found

TARGETED POLLUTANTS

- ● Sediment
- ○ Nutrients & Toxic Materials
- ○ Oil & Grease
- ◒ Floatable Materials
- ○ Other Construction Wastes

APPLICATIONS

- **Perimeter Control**
- **Slope Protection**
- **Sediment Barrier**
- **Channel Protection**
- **Temporary Stabilization**
- **Final Stabilization**
- **Waste Management**
- **Housekeeping Practices**

Fe=0.50-0.75
(*Depends on soil type*)

IMPLEMENTATION CONSIDERATIONS

- ◒ Capital Costs
- ◒ Maintenance
- ○ Training
- ◒ Suitability for Slopes > 5%

Other Considerations:

- *Effects of ponding on adjacent areas and property*

3.13.1 Primary Use

Triangular filter dikes are used in place of silt fence, treating sediment flow at the perimeter of construction areas and at the perimeter of the site. Also, the dikes can serve as stream protection devices by preventing sediment from entering the streams or as check dams in small swales.

Triangular sediment filter dikes are especially useful for construction areas surrounded by pavement, where silt fence, filter berm, or other sediment control installations are impractical.

3.13.2 Applications

Triangular dikes are used to provide perimeter control by detaining sediment on a disturbed site with drainage that would otherwise flow onto adjacent properties. Triangular dikes function as sediment trapping devices when used in areas of sheet flow across disturbed areas or are placed along stream banks to prevent sediment-laden sheet flow from entering the stream. The dikes can be subjected to more concentrated flows and a higher flow rate than silt fence.

Dikes can be used on a variety of surfaces where other controls are not effective. They may be installed on paved surfaces and where the soil type prevents embedment of other sediment controls.

3.13.3 Design Criteria

- Dikes are to be installed along a line of constant elevation (along a contour line).
- Maximum drainage area shall be 0.25 acre per 100 linear feet of dike.
- Maximum flow to any 20 foot section of dike shall be 1 CFS.
- Maximum distance of flow to dike shall be 200 feet or less. If the slope exceeds 10 percent, the flow distance shall be less than 50 feet.
- Maximum slope adjacent to the dike shall be 2:1.
- If 50 percent or less of soil, by weight, passes the U.S. Standard Sieve No. 200, select the apparent opening size (A.O.S.) to retain 85 percent of the soil.
- If 85 percent or more of soil, by weight, passes the U.S. Standard Sieve No. 200, triangular sediment dike shall not be used due to clogging.
- The filter fabric shall meet the following minimum criteria:
    - Tensile Strength, ASTM D4632 Test Method for Grab Breaking Load and Elongation of Geotextiles 90-lbs.
    - Puncture Rating, ASTM D4833 Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products, 60-lbs.
    - Mullen Burst Rating, ASTM D3786 Standard Test Method for Hydraulic Bursting Strength of Textile Fabrics-Diaphragm Bursting Strength Tester Method, 280-psi.
    - Apparent Opening Size, ASTM D4751 Test Method for Determining Apparent Opening Size of a Geotextile, U.S. Siev No. 30 (max) to 100 (min).
    - Ultraviolet Resistance, ASTM D4355 Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture, and Heat in a Xenon Arc Type Apparatus, Minimum 70 percent.
- The internal support for the dike structure shall be 6-gauge 6 inch x 6 inch wire mesh or 6-guage 4 inch x 4 inch welded wire fabric folded into triangular form eighteen (18) inches on each side.
- Tie-in to the existing grade should be accomplished by:

  (i) embedding the fabric six-inches below the top of ground on the upslope side;

(ii) extending the fabric to form a 12 inch skirt on the upstream slope and covering it with 3 to 5 inches of 1½ inch washed filter stone; or

(iii) entrenching the base of the triangular dike four inches below ground.

For (ii) above, the skirt and the upslope portion of the triangular dike skeleton should be anchored by metal staples on two-foot centers, driven a minimum of six inches into the ground (except where crossing pavement or exposed limestone). When installed on pavement, the washed rock in option (ii) may be replaced by bags filled with 1½ inch washed filter stone placed at 4 foot spacing to anchor the end of the filter fabric to the pavement.

- Filter material shall lap over ends six (6) inches to cover dike-to-dike junction; each junction shall be secured by shoat rings. Where the dike is placed on pavement, two rock bags shall be used to anchor the overlap to the pavement. Additional bags shall be used as needed to ensure continuous contact with the pavement (no gaps).
- Sand bags or large rock should be used as ballast inside the triangular dike section to stabilize the dike against the effects of high flows.
- Sufficient room for the operation of sediment removal equipment shall be provided between the dike and other obstructions in order to properly remove sediment.
- The ends of the dike shall be turned upgrade to prevent bypass of stormwater.
- When used as a perimeter control on drainage areas larger than 0.5 acres, a stone overflow structure, similar to the one shown in *Section 3.10 Silt Fence*, may be necessary at low points to act as a controlled overflow point in order to prevent localized flooding and failure of the dike.
- If used as check dams in small swales (drainage areas less than 3 acres), the dikes shall be installed according to the spacing and other criteria in *Section 2.1 Check Dam*.

3.13.4 Design Guidance and Specifications

Specifications for construction of this item may be found in the Standard Specifications for Public Works Construction – North Central Texas Council of Governments, Section 201.8 Triangular Sediment Filter Dike.

3.13.5 Inspection and Maintenance Requirements

Triangular sediment filter dikes should be inspected regularly (at least as often as required by the TPDES Construction General Permit). Sediment should be removed before it reaches 6 inches in depth. If the fabric becomes clogged, it should be cleaned or, if necessary, replaced. If structural deficiencies are found, the dike should be immediately repaired or replaced.

The integrity of the filter fabric is important to the effectiveness of the dike. Overlap between dike sections must be checked on a regular basis and repaired if deficient.

3.13.6 Example Schematics

The following schematics are example applications of the construction control. They are intended to assist in understanding the control's design and function.

The schematics are **not for construction**. They may serve as a starting point for creating a construction detail, but they must be site adapted by the designer. In addition, dimensions and notes appropriate for the application must be added by the designer.

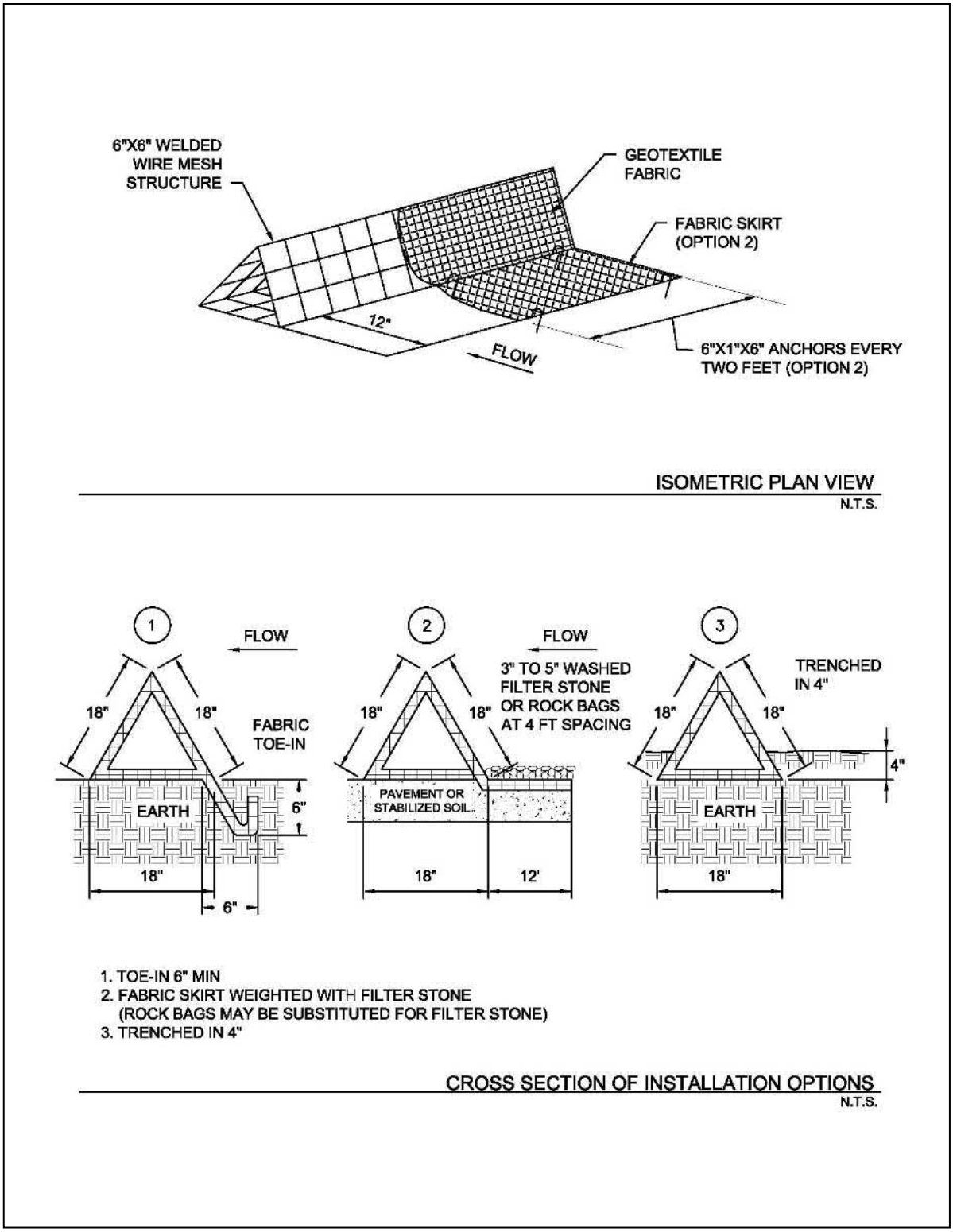
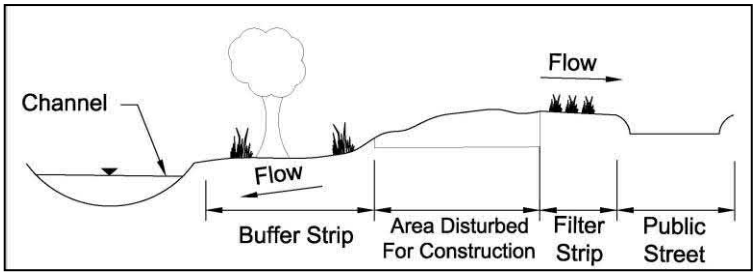


Figure 3.32 Schematics of Triangular Sediment Filter Dike

3.15 Vegetated Filter Strips and Buffers

Sediment Control



Description: Buffer strips (existing vegetation) and filter strips (planted vegetation) are sections of vegetated land adjacent to disturbed areas. They are designed with low slopes to convey sheet flow runoff from disturbed areas, resulting in the removal of sediment and other pollutants as the runoff passes through vegetation and infiltration occurs.

KEY CONSIDERATIONS

DESIGN CRITERIA:

- Minimum width (direction of flow across the vegetation) dependent on slope of disturbed area
- Maximum ratio of disturbed area to vegetated area dependent on slope
- Existing vegetation must meet criteria for type and coverage
- Dense grass required for planted vegetation
- Demarcate limits of vegetation and protect from traffic

ADVANTAGES / BENEFITS:

- Effective secondary control for removing clay particles
- Disperses flow and slows velocities to decrease erosion potential in receiving water
- Preserves the character of existing riparian corridor
- May become part of the permanent stormwater controls

DISADVANTAGES / LIMITATIONS:

- Appropriate as a primary control only for drainage areas of 2 acres or less and under certain site conditions
- Maximum 150 feet of flow to vegetated strip or buffer is used as a primary control
- Cannot treat large volumes or concentrated flows
- Not effective as a perimeter control when the perimeter cuts across contours instead of following contours
- Must limit access to vegetated portion of the site

MAINTENANCE REQUIREMENTS:

- Inspect regularly
- Rake accumulations of sediment from the vegetation
- Repair bare areas

TARGETED POLLUTANTS

- ● Sediment
- ◒ Nutrients & Toxic Materials
- ○ Oil & Grease
- ○ Floatable Materials
- ○ Other Construction Wastes

APPLICATIONS

Perimeter Control
Slope Protection
Sediment Barrier

Channel Protection

Temporary Stabilization

Final Stabilization

Waste Management

Housekeeping Practices

Fe=0.35-0.85
(*Depends on many conditions in addition to soil type*)

IMPLEMENTATION CONSIDERATIONS

- ◒ Capital Costs
- ○ Maintenance
- ○ Training
- ◒ Suitability for Slopes > 5%

Other Considerations:

- *Coordination with final landscaping*

3.15.1 Primary Use

Vegetated filter strips and buffers are used to reduce the velocity of sheet flow and reduce the volume of runoff through infiltration. In the process, sediment is removed as the runoff is filtered through the vegetation and infiltration occurs.

Vegetated filter strips and buffers are frequently used a secondary sediment control, since their performance is highly variable. They may be used as a primary sediment control only for small areas and under select site conditions.

3.15.2 Applications

Vegetated buffers are most applicable on development projects that are adjacent or near to floodplains, wetlands, streams and other natural waterways. Vegetated strips may be established along roads and property lines as a perimeter control for development. They are also applicable along the down slope side of utility line projects.

Vegetated buffers may be a primary sediment control for small areas where the conditions meet design criteria. They are also commonly used as a secondary control with other perimeter controls to provide higher levels of sediment removal. Vegetated areas have more capability to remove fine particle sizes than many conventional sediment controls. Combinations such as an organic filter tube or silt fence at the upslope edge of a vegetated strip are very effective.

In addition to perimeter control, vegetated strips are applicable for slope protection. Strips may be established at regular intervals to interrupt long or steep slopes. The strips maintain sheet flow, decrease velocities, and decrease erosion on the slopes.

3.15.3 Design Criteria

Vegetated buffers should be preserved along existing floodplains, wetlands, channels, and other natural waters whenever possible, even when the buffer is not a primary sediment control. Check for local requirements, as many municipalities mandate a vegetated buffer to maintain the character of the riparian corridor along a natural waterway. Vegetated buffers are encouraged to protect existing waterways by decreasing velocities, dispersing flow, and attenuating volume before the runoff reaches the waterway. If the development plans necessitate disturbing the riparian corridor, phase the development (when possible) to retain a vegetated buffer until final grading and landscaping at the end construction.

The evaluation and use of vegetated strips and buffers for use as a sediment control are unique to each site. The designer should carefully consider slope, vegetation, soils, depth to impermeable layer, depth to ground water, and runoff sediment characteristics before specifying a vegetated strip or buffer as a primary sediment control. This consideration is especially true for buffer strips of existing vegetation. If the buffer is not correctly planned, the first storm event can damage the natural vegetation beyond repair.

Design criteria in this section are only applicable when a vegetated strip or buffer is intended to be a primary or secondary sediment control for the construction site. As discussed above, a vegetated buffer may be preserved for other reasons that do not necessitate the use of these criteria if other sediment controls are provided for the construction site.

General

- Maximum slope of the vegetated strip or buffer shall be 5% across the width of the vegetation in the direction of flow.
- To maintain sheet flow, maximum distance of flow to the vegetated filter shall be 150 feet.
- Vegetated buffers and strips may only serve as a primary sediment control when the contributing drainage area has a slope of 15% or less. On steeper slopes, another perimeter control (e.g. organic filter tube, silt fence) may be installed at the upslope edge of the vegetated buffer or strip as a primary control, with the vegetation serving as a secondary control.

- Maximum disturbed area contributing runoff to the vegetated strip or buffer shall be 2 acres.
- Vegetated filter strips and buffers shall be a minimum of 15 feet wide. Width shall be increased based on the slope of the disturbed area as shown in the following table. Although the slope of the disturbed area may be up 15%, the slope of the vegetated strip or buffer is still limited to 5% maximum if used as a primary control for sediment.

Table 3.10 Sizing of Vegetated Buffers and Strips

Maximum Slope of Contributing Drainage Area	*Maximum Ratio of Disturbed Area to Vegetated Area*	*Minimum Width of Vegetated Area (Direction of Flow)*
5%	8:1	15 feet
10%	5:1	30 feet
15%	3:1	50 feet

- Access to vegetated buffers and strips shall be prohibited. These areas shall be protected from all traffic. No activities should occur in these areas, including no parking of the workers' vehicles, no eating of lunch, etc.
- Install controlled and stabilized ingress/egress points to manage traffic and direct it away from vegetation. Fence the vegetation or provide other means of protection to prevent vehicles and equipment from driving on the vegetated areas.
- Vegetated buffers and filter strips should not be used when high ground water, shallow depth to bedrock, or low soil permeability will inhibit infiltration of runoff.

Buffers of Existing Vegetation

- Fencing, flagged stakes spaced at a maximum of 6 feet, or other measures shall be used to clearly mark existing vegetation that is being preserved as a buffer before the start of any clearing, grubbing, or grading.
- Existing vegetation must be well established to be used as a vegetated buffer. It may be a mix of trees, sapling/shrubs, vines and herbaceous plants. However, the herbaceous plants shall cover at least 80 percent of the ground area.
- Bare soil shall not be visible within the buffer. Area between herbaceous plants shall be covered with a natural litter of organic matter (e.g. leaves, dead grass).
- Lots with a thick stand of existing grasses may preserve strips of the grasses as perimeter control in addition to using vegetation as a buffer along a natural waterway.

Strips of Planted Vegetation

- Vegetated strips should only be used when the site perimeter is along (parallel to) contours. Erosion of the vegetated strip will be a problem when the strip is placed along roads or site perimeters that cut across contours, resulting in runoff flowing along, instead of across, the filter strip.
- Minimize vehicle and equipment traffic and other activities that could compact soils on areas that will be planted for vegetated strips.
- Sod is required when the strip is intended to immediately function as a sediment control.
- Erosion control blankets (ECBs) should be used to prevent erosion and provide sediment control while establishing vegetation for a filter strip. If ECBs are not used, than another perimeter control is required until the vegetation is mature. Refer to *Section 2.3 Erosion Control Blankets*.
- Refer to the *Section 2.9 Vegetation* for criteria on establishing vegetation.
- When using vegetated strips for slope protection, spacing of the strips should be designed based on

slope steepness and type of soil. The strips may be planted directly on the slope grade when the slope is flatter than 2:1. For slopes of 2:1 and steeper, vegetation should be established on terraces. Terraces shall have a transverse slope of 1 percent in the opposite direction of the slope (i.e. back into the ground).

3.15.4 Design Guidance and Specifications

Guidance for analysis of the hydraulic loading on filter strips is in *Section 13.3 of the Stormwater Controls Technical Manual*.

No specification for vegetated filter strips and buffers is currently available in the Standard Specifications for Public Works Construction – North Central Texas Council of Governments.

3.15.5 Inspection and Maintenance Requirements

Vegetated filter strips and buffers should be inspected regularly (at least as often as required by the TPDES Construction General Permit). If rill erosion is developing, additional controls are needed to spread the flow before it enters the vegetated area. Rake light accumulations of sediment from the vegetation. Remove trash that accumulates in the vegetation. Additional sediment controls (e.g. a line of organic filter tubes or silt fence), are needed if sediment accumulations are large enough to bury the vegetation.

Inspect established planted vegetation for bare areas and place sod or install seeded erosion control blankets, as appropriate. Mow as needed after planted vegetation is mature.

3.15.6 Example Schematics

The following schematics are example applications of the construction control. They are intended to assist in understanding the control's design and function.

The schematics are **not for construction**. They may serve as a starting point for creating a construction detail, but they must be site adapted by the designer. In addition, dimensions and notes appropriate for the application must be added by the designer.

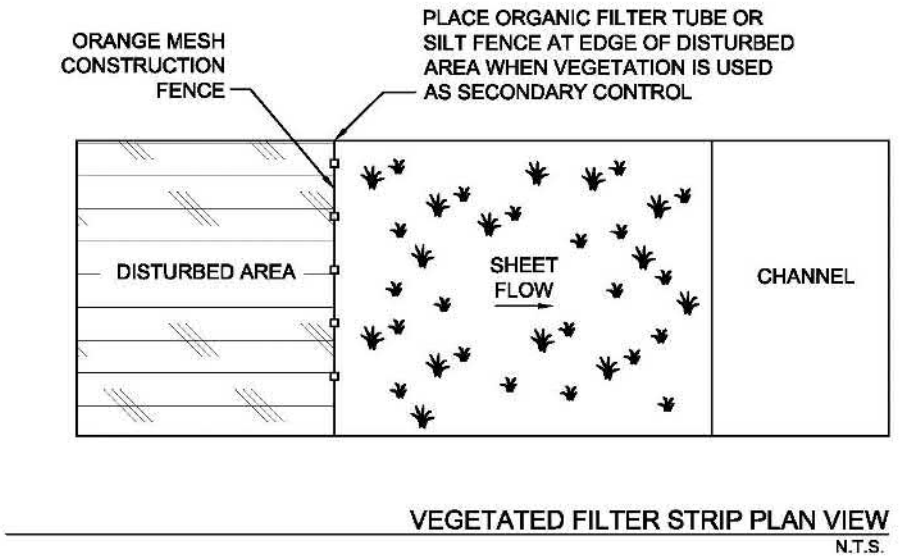


Figure 3.35 Schematics of Vegetated Filter Strip

4.3 Concrete Waste Management

Waste Control

Description: Concrete waste at construction sites comes in two forms: 1) excess fresh concrete mix, including residual mix washed from trucks and equipment, and 2) concrete dust and concrete debris resulting from demolition. Both forms have the potential to impact water quality through stormwater runoff contact with the waste. The objective of concrete waste management is to dispose of these wastes in a manner that protects surface and ground water.

KEY CONSIDERATIONS

DESIGN CRITERIA:

- Prohibit the discharge of untreated concrete washout water
- Prohibit dumping waste concrete anywhere except at pre-determined, regulated, recycling or disposal sites
- Provide a washout containment with a minimum of 6 cubic feet of containment volume for every 10 cubic yards of concrete placed
- Minimum 1 foot freeboard on containment
- Minimum 10 mil plastic lining of containment
- Washout water evaporation and concrete recycling are the recommended disposal methods
- Educate drivers and operators on proper disposal and equipment cleaning procedures

LIMITATIONS:

- Does not address concrete sawcutting waste

MAINTENANCE REQUIREMENTS:

- Inspect regularly
- Check for and repair any damage to washout containment areas
- Clean up any overflow of washout pits
- Regularly remove and properly dispose of concrete waste

TARGETED POLLUTANTS

- ○ Sediment
- ● Nutrients & Toxic Materials
- ○ Oil & Grease
- ○ Floatable Materials
- ● Other Construction Wastes

APPLICATIONS

Perimeter Control
Slope Protection
Sediment Barrier
Channel Protection
Temporary Stabilization
Final Stabilization
Waste Management
Housekeeping Practices

IMPLEMENTATION CONSIDERATIONS

- ◒ Capital Costs
- ◒ Maintenance
- ● Training
- ○ Suitability for Slopes > 5%

Other Considerations:

- *None*

4.3.1 Primary Use

Concrete waste management is used to prevent the discharge of concrete wash water and waste into stormwater runoff. A number of water quality parameters can be affected by the introduction of concrete, especially fresh concrete. Concrete affects the pH of runoff, causing significant chemical changes in water bodies and harming aquatic life. Suspended solids in the form of both cement and aggregated dust are also generated from both fresh and demolished concrete waste.

4.3.2 Applications

Concrete waste management is applicable to all construction sites where existing concrete is being demolished or new concrete is being placed, regardless of the size of the total area disturbed. It is also applicable on repair and maintenance projects that may not be required to implement erosion and sediment controls.

4.3.3 Design Criteria

- The discharge of washout water to an inlet, swale, or any portion of the storm drainage system or a natural drainage system (e.g. channel) shall be prohibited.
- Construction plan notes shall state that the discharge of concrete washout to anything except a designated containment area is prohibited.
- Show the location of the concrete washout containment on the drawings, or require the contractor to provide this information.
- The contractor should be required to designate the site superintendent, foreman, or other person who is responsible for concrete placement to also be responsible for concrete waste management.

Unacceptable Waste Concrete Disposal Practices

- Dumping in vacant areas on the job-site.
- Illicit dumping onto off-site lots or any other placed not permitted to receive construction demoliotion debris.
- Dumping into ditches, drainage facilities, or natural water ways.
- Using concrete waste as fill material or bank stabilization.

Recommended Disposal Procedures

- Identify pre-determined, regulated, facilities for disposal of solid concrete waste. Whenever possible, haul the concrete waste to a recycling facility. Disposal facilities must have a Class IV (or more stringent) municipal solid waste permit from the TCEQ.
- A concrete washout pit or other containment shall be installed a minimum of 50 feet away from inlets, swales, drainage ways, channels, and other waters, if the site configuration provides sufficient space to do so. In no case shall concrete washout occur closer than 20 feet from inlets, swales, drainage ways, channels and other waters.
- Provide a washout area with a minimum of 6 cubic feet of containment volume for every 10 cubic yards of concrete poured. Alternatively, the designer may provide calculations sizing the containment based on the number of concrete trucks and pumps to be washed out.
- The containment shall be lined with plastic (minimum 10 millimeters thick) or an equivalent measure to prevent seepage to groundwater.
- Mosquitoes do not typically breed in the high pH of concrete washout water. However, the concrete washout containment should be managed in a manner that prevents the collection of other water that could be a potential breeding habitat.

  - Do not excavate the washout area until the day before the start of concrete placement to minimize the potential for collecting stormwater.
  - Do not discharge any water or wastewater into the containment except for concrete washout to prevent dilution of the high pH environment that is hostile to mosquitoes.
  - Remove the waste concrete and grade the containment closed within a week of completing concrete placement. Do not leave it open to collect stormwater.
  - If water must be pumped from the containment, it shall be collected in a tank, neutralized to lower the pH, and then hauled to a treatment facility for disposal. Alternatively, it may be hauled to a batch plant that has an onsite collection facility for concrete washout water.
  - Do **not** pump water directly from the containment to the Municipal Separate Storm Sewer System or a natural drainage way without treating for removal of fine particles and neutralization of the pH.

- Multiple concrete washout areas may be needed for larger projects to allow for drying time and proper disposal of the washout water and waste concrete.
- Portable, pre-fabricated, concrete washout containers are commercially available and are an acceptable alternative to excavating a washout area.
- Evaporation of the washout water and recycling of the concrete waste is the preferred disposal method. After the water has evaporated from the washout containment, the remaining cuttings and fine sediment shall be hauled from the site to a concrete recycling facility or a solid waste disposal facility.
- Remove waste concrete when the washout containment is half full. Always maintain a minimum of one foot freeboard.
- Use waste and recycling haulers and facilities approved by the local municipality.
- When evaporation of the washout water is not feasible, discharge from the collection area shall only be allowed if a passive treatment system is used to remove the fines. Criteria are in *Section 3.7 Passive Treatment System*. Mechanical mixing is required within the containment for passive treatment to be effective. The pH must be tested, and discharge is allowed only if the pH does not exceed 8.0. The pH may be lowered by adding sulfuric acid to the water. Dewatering of the collection area after treatment shall follow the criteria in *Section 3.3 Dewatering Controls*.
- Care shall be exercised when treating the concrete washout water for discharge. Monitoring must be implemented to verify that discharges do not violate groundwater or surface water quality standards.
- On large projects that are using a nearby batch plant, a washout facility associated with the plant and under the plant's TPDES Multi-Sector General Permit may be used instead of installing an onsite containment area for truck washout.

Education

- Drivers and equipment operators should be instructed on proper disposal and equipment washing practices (see above).
- Supervisors must be made aware of the potential environmental consequences of improperly handled concrete waste.

Enforcement

- The construction site manager or foreman must ensure that employees and pre-mix companies follow proper procedures for concrete disposal and equipment washing.
- Employees violating disposal or equipment cleaning directives must be re-educated or disciplined if necessary.

Demolition Practices

- Monitor weather and wind direction to ensure concrete dust is not entering drainage structures and surface waters.
- Spray water on structures being demolished to wet them before start of demolition operations. Reapply water whenever dust is observed.
- Construct sediment traps or other types of sediment detention devices downstream of demolition activities to capture and treat runoff from demolition wetting operations.

4.3.4 Design Guidance and Specifications

No specification for concrete waste management is currently available in the Standard Specifications for Public Works – North Central Texas Council of Governemtns.

4.3.5 Inspection and Maintenance Requirements

Concrete waste management controls should be inspected regularly (at least as often as required by the TPDES Construction General Permit) for proper handling of concrete waste. Check concrete washout pits and make repairs as needed. Washout pits should not be allowed to overflow. Maintain a schedule to regularly remove concrete waste and prevent over-filling.

If illicit dumping of concrete is found, remove the waste and reinforce proper disposal methods through education of employees.

4.3.6 Example Schematics

The following schematics are example applications of the construction control. They are intended to assist in understanding the control's design and function.

The schematics are **not for construction**. They may serve as a starting point for creating a construction detail, but they must be site adapted by the designer. In addition, dimensions and notes appropriate for the application must be added by the designer.

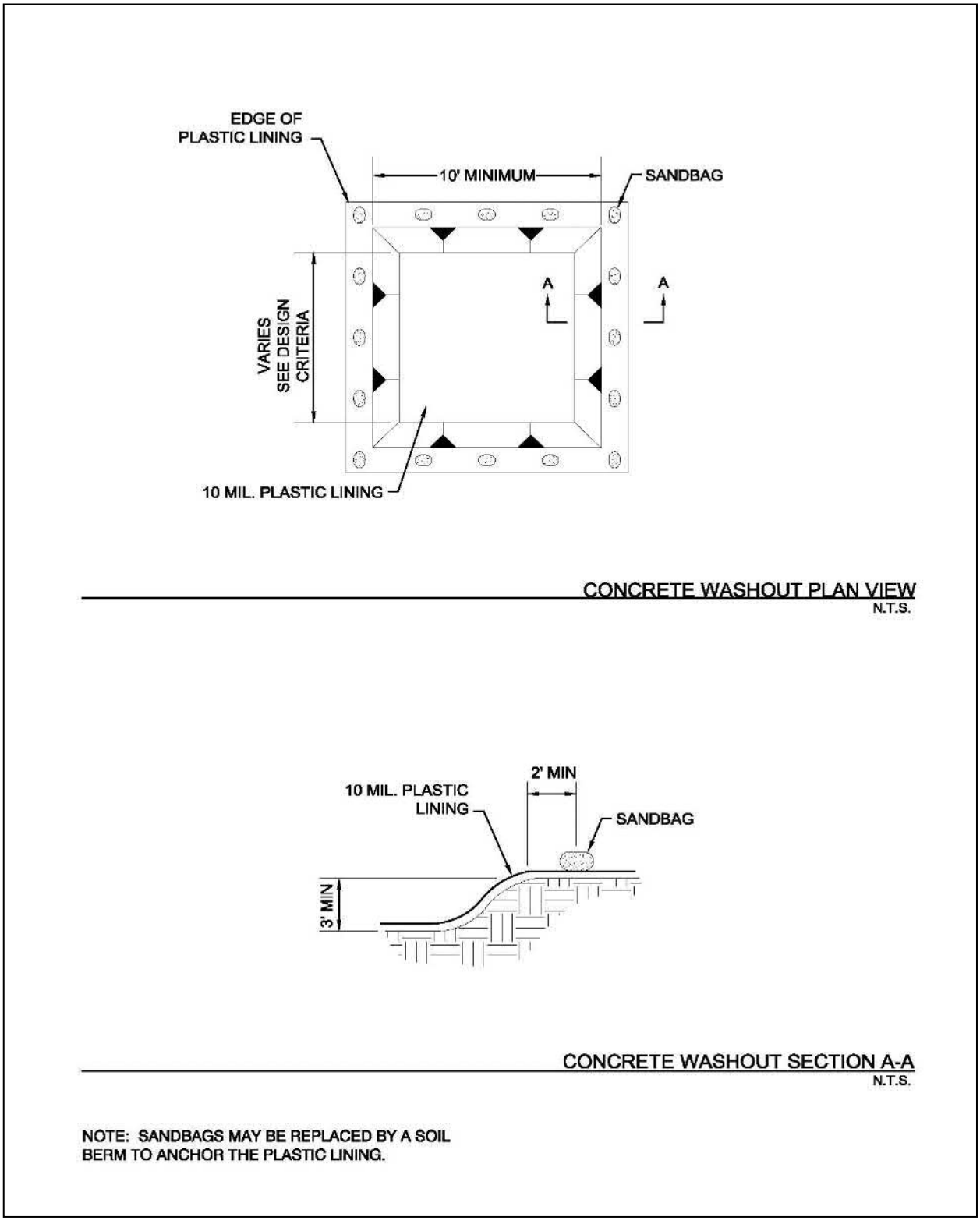


Figure 4.1 Schematics of Concrete Washout Containment

Storm Trooper® AQ

PARK USA℠

Edwards Aquifer Design

Stormwater Quality Wet Vault

APPROVED
For use on The Edwards Aquifer

▸General Information

The Edwards Aquifer, located in South Central Texas, is one of the greatest natural resources of artesian aquifers in the world. It serves as the primary source of water for over 2 million people. Because the aquifer is highly permeable and has rapid recharge and discharge, the aquifer produces large quantities of water. However, this phenomenon makes the aquifer highly vulnerable to contamination where it is exposed at the surface in the recharge zone.

Sustainable management of water quality is imperative if future generations hope to enjoy this natural resource. Stormwater runoff collects pollutants like trash, debris and oil dumping them directly into the stormwater drainage system. Until recently, stormwater runoff was left untreated with no protection from pollutants entering the aquifer, public waterways, streams, rivers and lakes.

The StormTrooper AQ is a patented stormwater wet vault specifically designed to intercept free oils, grease, TSS, debris, and other pollutants found in stormwater runoff. StormTrooper AQ features "Enhanced" Gravity Separation which is technology utilizing coalescing media plates engineered to a performance analysis based on Stoke's Law. This cutting edge technology is now available for use to protect the Edwards Aquifer for future generations!

▸Operation

Untreated storm water enters the "Grit Chamber" on the inlet side of the StormTrooper AQ. Larger particles, as well as semi-buoyant material, are captured in this chamber to prevent excessive clogging and obstruction of the frontal area of the coalescing media plates. This process also reduces the potential for short circuiting and higher velocities through the plates. The "diffusion baffle," which separates the two chambers, works to perform two vital functions.

First, it distributes flow evenly through the entire cross-section of the unit allowing for a more uniform delivery of pollutants through the plate.

Next, a water quality orifice regulates flow through the plates and lower section of unit to prevent re-suspension of pollutants. Each StormTrooper has a specific maximum flow rate that has been pre-calibrated. Higher flow rates by-pass the system once the pre-calibrated flow rates are exceeded.

▸Features

- Best Value BMP
- Larger Effective Area (EA) Treatment
- Low Profile Design
- LEED Compliant
- Enhanced Gravity Separation...
  ...utilizing CMP Technology
- Texas Manufactured
- 3rd Party Tested by SwRI
- See us in the TCEQ RG-348 Addendum pg.57 thru 64

DESIGN FOR WATER™

PARK USA℠

Engineering Worksheet

Project: _____ **By:** _____

Subject: _____ **Date:** _____

ElevYader Elevator Oil-Water Separator

Storm Trooper Stormwater Treatment System

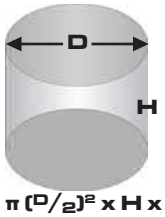
DeconTank DECONTAMINATION TANK SYSTEM

Pump Trooper Lift Stations

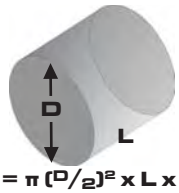
BreakTank™

Formulas

$V_{Gal} = L \times W \times H \times 7.48$



$V_{Gal} = \pi (D/2)^2 \times H \times 7.48$



$V_{Gal} = \pi (D/2)^2 \times L \times 7.48$

Temperature

°C = (°F - 32) x .556

°F = °C (1.8) + 32

Flow

1 gpm = 0.134 $^{cuft}/_{min}$

1 cfs = 448.8 gpm

1 cfm = 448.8 gph

Mass & Volume

1 $ft^3_{Concrete}$ = 150lbs as

1 ft^3 = 7.48 Gal (US)

231 in^3 = 1 Gal (US)

1 $yd^3_{Concrete}$ = 4050 lbs

Pressure

1 psi = 2.31 ft $H_2O_{60°F}$

1ft $H_2O_{60°F}$ = 0.4333 psi

1 in $Hg_{60°F}$ = .49 psi

Decimal Equivalents

1 in	=	.08 ft
2 in	=	.17 ft
3 in	=	.25 ft
4 in	=	.33 ft
5 in	=	.42 ft
6 in	=	.50 ft
7 in	=	.58 ft
8 in	=	.67 ft
9 in	=	.75 ft
10 in	=	.83 ft
11 in	=	.82 ft
12 in	=	1.0 ft

Specific Gravities

$Water_{60°F}$ sg = 1.0

$Gasoline_{60°F}$ sq = .74

$SAE30\ Oil_{115°F}$ = .94

Engineering Fact Sheet

For StormTrooper Stormwater Interceptor

StormTrooper® AQ

Stormwater Quality Wet Vault for Edwards Aquifer

General Information

The Edwards Aquifer, located in South Central Texas, is one of the greatest natural resources of artesian aquifers in the world. It serves as the primary source of water for over 2 million people. Because the aquifer is highly permeable and has rapid recharge and discharge, the aquifer produces large quantities of water. However, this phenomenon makes the aquifer highly vulnerable to contamination where it is exposed at the surface in the recharge zone.

Sustainable management of water quality is imperative if future generations hope to enjoy this natural resource. Stormwater runoff collects pollutants like trash, debris and oil dumping them directly into the stormwater drainage system. Until recently, stormwater runoff was left untreated with no protection from pollutants entering the aquifer, public waterways, streams, rivers and lakes.

The StormTrooper® AQ is a patented stormwater wet vault specifically designed to intercept free oils, grease, TSS, debris and other pollutants found in stormwater runoff. StormTrooper AQ features “Enhanced” Gravity Separation which is technology utilizing coalescing media plates engineered to a performance prediction based on Stoke’s Law. This cutting edge technology is now available for use to protect the Edwards Aquifer for future generations.

Did you know...

The Edwards Aquifer began forming approximately 100 million years ago in the Mesozoic Era. At that time, Texas was covered by a shallow sea that was habitat for prehistoric marine animals. When the sea creatures died, their remains-skeletons and shells made of calcium carbonate-were deposited on the sea floor. The calcium carbonate and other minerals from seawater formed layers, or strata, on the sea floor. After a while, these layered deposits compacted into limestone, known today as the Edwards and Associated Limestones. About 17 million years ago, a shift in the earths crust caused central Texas to be lifted above sea level. As the ground rose, the limstone broke, producing fractures and faults. The result was a stair-step lanscape that is now reffered to as the Balcones Fault Zone. The Edwards Aquifer has been a source of water for people in south central Texas for more than 12,000 years. Today, it is the primary source of water for approximately 2 million people.

Storm Trooper® AQ

Edwards Aquifer Design

Stormwater Quality Wet Vault

Features

- **Best Value BMP**
- **Larger Effective Area (EA) treatment**
- **Low Profile Design**
- **LEED Compliant**
- **Enhanced Gravity Separation utilizing CMP Technology**
- **Texas Manufactured**
- **3rd Party Tested by SwRI**
- **See us in RG-348 Addendum pg.57 thru 64**

StormTrooper AQ Sizes

Model	Flow Rate *gpm*	Total Sruface Area *sq ft*	Dimensions *outside dimensions*			Max Effective Area *acres*
			Length	Width	Height	
SWAQ-05	420	100	7’-10”	4’-4”	7’-0”	0.13
SWAQ-10	600	149	8’-8”	5’-0”	7’-0”	0.20
SWAQ-20	1,000	248	11’-0”	6’-0”	7’-6”	0.33
SWAQ-25	1,440	369	13’-0”	7’-0”	8’-0”	0.50
SWAQ-40	2,250	588	16’-0”	8’-6”	8’-0”	0.79
SWAQ-70	2,720	730	18’-0”	9’-0”	6’-10”	0.98
SWAQ-110	4,000	913	21’-2”	11’-2”	6’-10”	1.23

Engineering Fact Sheet

For StormTrooper Stormwater Interceptor

Certification

All BMPs, including StormTrooper® AQ, require special approval by the TCEQ Edwards Aquifer Protection Program before they may be submitted for use on an Edward's Aquirer project. StormTrooper AQ TCEQ approval is found in Addendum Sheet, RG-348, "Complying with the Edwards Aquifer Rules Technical Guidance on Best Management Practice."

www.tceq.texas.gov/field/eapp/addendum.html/at_download/file

StoormTrooper AQ Concept

The StormTrooper Storm Water Treatment System utilizes "Enhanced" Gravity Separation. Enhanced Gravity Separation has been predominantly used in industrial applications of the separation of free oil and suspended solids from effluent water.

Enhanced Gravity Separation is an improvement over "gravity separation." Gravity separation is the phenomenon where a phase with higher density will settle and the phase with lower density will float to the surface of fluid. Enhanced Gravity Separation is achieved by utilizing CMP technology (coalescing media plates).

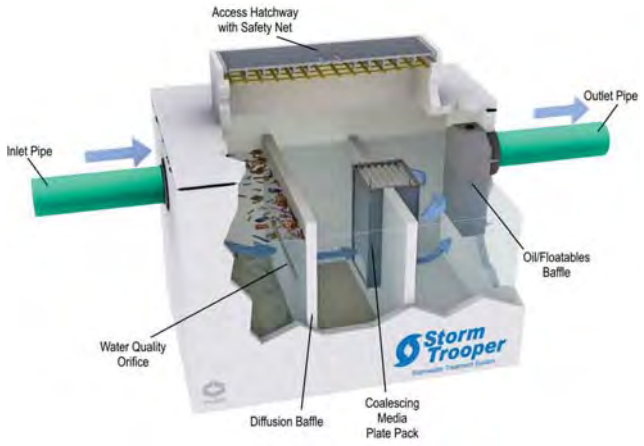
CMP technology introduces multi layer separation which provides an extensive reduction in surface area and ultimately smaller separators. Surface area requirements are reduced according to the number of CMP plates utilized. The StormTrooper System makes it feasible to achieve high levels of separation not typically achieved by a larger surface area separator.

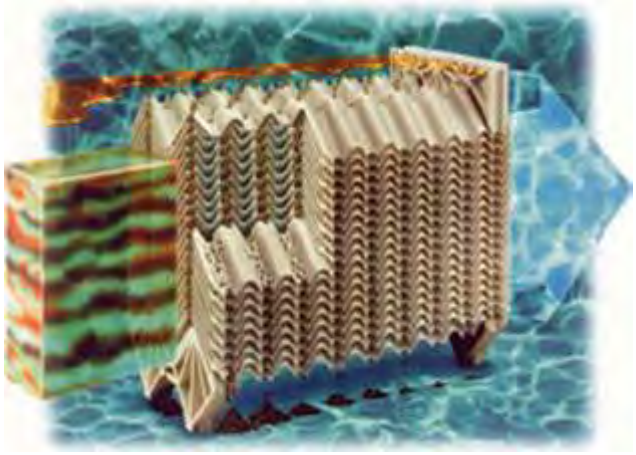
Selection Criteria

- Achieves greater than 80% TSS removal
- Provides smallest footprint possible and safest entry
- Appropriate for retrofits as well as new development

Operation of StormTrooper AQ

Untreated storm water enters the "Grit Chamber" on the inlet side of the StormTrooper AQ. Larger particles, as well as semi-buoyant material, are captured in this chamber to prevent excessive clogging and obstruction of the frontal area of the coalescing media plates. This process also reduces the potential for short circuiting and higher velocities through the plates. The "diffusion baffle," which separates the two chambers, works to perform two vital functions. First, it distributes flow evenly through the entire cross-section of the unit allowing for a more uniform delivery of pollutants through the plate. Next, a water quality orifice regulates flow through the plates and lower section of unit to prevent re-suspension of pollutants. Each StormTrooper has a specific maximum flow rate that has been pre-calibrated. Higher flow rates by-pass the system once the pre-calibrated flow rates are exceeded.





Coalecing Media Plates

A submerged oil/floatable baffle is located around the effluent pipe to allow for the capture and containment of these pollutants. Collected pollutants will remain in the interceptor until removal. Because no filter cartridges are required operating costs are minimal. Furthermore, the StormTrooper AQ System has no moving parts substantially reducing maintenance costs.

As stormwater pollutants travel through the CMP (coalescing media plate pack) oil rises to the top and solids drop to the bottom through dedicated surfaces and weep holes. Plate supports at the bottom allow for easy removal of the solids that collect beneath the plates. Because of the steep angles and short travel distances, oils and solids are quickly released eventually floating to the surface of the StormTrooper unit or settling to the bottom of the unit.

StormTrooper AQ Design Criteria

As a flow-based BMP, the StormTrooper is designed using the treatment flow rate for the site, as calculated using the Rational Method. The runoff rate from the tributary area is calculated using Equation 3.4:

$$Q = CIA$$

Where:

Q	=	flow rate (ft3/s)
C	=	runoff coefficient for the tributary area
I	=	design rainfall intensity (1.1 in/hr)
A	=	drainage area (ac)

The runoff coefficient is calculated as the weighted average of the impervious and pervious areas. Runoff coefficient for impervious areas is assumed to be 0.90 and the runoff coefficient for pervious areas is assumed to be 0.03.

The overflow rate (hydraulic loading rate) is calculated using Equation 3.5:

$$V_{OR} = Q/A$$

Where:

V_{OR}	=	overflow rate (ft/s)
Q	=	runoff rate calculated with Equation 3.4 (ft3/s)
A	=	surface Area of Unit (ft2)

The overflow rate can then be used with Table 3 to determine the StormTrooper unit that provides the desired TSS removal.

The StormTrooper system is available in several models. The table below summarizes the various unit models and their corresponding dimensions.

Engineering Fact Sheet

For StormTrooper Stormwater Interceptor

Table 1. StormTrooper® SWAQ Models								
StormTrooper Model	System Length (in)	System Width (in)	Minimum Settling Depth (in)	Vault Surface Area (sf)	Number of Plate Collumns	Number of Stack Feet / Column	Projected Surface Area of Plates (sf)	Total Surface Area of System (sf)
SWAQ-05	84	36	48	21	1	2	79	100
SWAQ-10	90	48	48	30	1	3	119	149
SWAQ-20	120	60	48	50	2	2.5	198	248
SWAQ-25	144	72	48	72	3	2.5	297	369
SWAQ-40	180	90	48	113	4	3	475	588
SWAQ-70	204	96	48	136	5	3	594	730
SWAQ-110	240	120	48	200	6	3	713	913

The characteristics of the catchment area are defined as Effective Area (EA). The Effective Area is the number of acres draining to a single treatment unit and is calculated using the following equation:

$$EA = (A_i * 0.9) + (A_p * 0.03)$$

Where:

EA = Effective Area (ac)
A^i = Impervious Area (ac)
A_p = Pervious Area (ac)

StormTrooper models can be selected from Table 2 below that will achieve an 80% TSS reduction at the corresponding Effective Areas shown.

The StormTrooper® SWAQ system for the Edwards Aquifer is designed using the overflow rates provided in Table 3. These were calculated based on the surface area of the vault alone and a rainfall intensity of 1.1 in/hr.

Table 2. StormTrooper Sizing Chart (for 80% Reduction)	
Effective Area - EA Acres	StormTrooper AQ Model
Less than 0.13	SWAQ-05
0.14 - 0.20	SWAQ-10
0.21 - 0.33	SWAQ-20
0.34 - 0.50	SWAQ-25
0.51 - 0.79	SWAQ-40
0.80 - 0.98	SWAQ-70
0.99 - 1.23	SWAQ-110

Table 3. StormTrooper BMP Efficiency vs. Overflow Rate (V_{or})							
Eff (%)	V_{or} (fps)	Eff (%)	V_{or} (fps)	Eff (%)	V_{or} (fps)	Eff (%)	V_{or} (fps)
40%	1.74E-02	55%	6.28E-03	70%	2.51E-03	85%	8.38E-04
41%	7.66E-02	56%	6.00E-03	71%	2.42E-03	86%	7.78E-04
42%	1.58E-02	57%	5.72E-03	72%	2.30E-03	87%	7.18E-04
43%	1.51E-02	58%	5.44E-03	73%	2.18E-03	88%	6.58E-04
44%	1.43E-02	59%	5.16E-03	74%	2.06E-03	89%	5.98E-04
45%	1.35E-02	60%	4.87E-03	75%	1.93E-03	90%	5.36E-04
46%	1.27E-02	61%	4.59E-03	76%	1.81E-03	91%	4.95E-04
47%	1.20E-02	62%	4.35E-03	77%	1.69E-03	92%	4.54E-04
48%	1.12E-02	63%	4.11E-03	78%	1.57E-03	93%	4.13E-04
48%	1.04E-02	64%	3.87E-03	79%	1.45E-03	94%	3.72E-04
50%	9.65E-03	65%	3.63E-03	80%	1.33E-03	95%	3.31E-04
51%	8.88E-03	66%	3.39E-03	81%	1.23E-03	96%	2.90E-04
52%	8.11E-03	67%	3.14E-03	82%	1.13E-03	97%	2.49E-04
53%	7.34E-03	68%	2.90E-03	83%	1.04E-03	98%	2.08E-04

Example:

A civil engineer is designing a 1.0 acre office park located over the Edward's Aquifer. 0.90 acres, which is 90% impervious, is draining to a single StormTrooper unit. 0.10 Acres, which is 10% impervious, cannot be treated and therefore TSS removal must be compensated within the single unit. Below is a detailed example of how to calculate annual load reduction of the StormTrooper model chosen.

PROJECT: StormTrooper® SWAQ - 40 Example **AREA #: 1** **DATE: 6/10/2011**

Table 2. Sizing Chart for 80% Reduction

Effective Area (Ac.)	StormTrooper® Model	Total Surface Area (ft^2)
E.A. < 0.13	SWAQ - 05	100
0.14 < E.A. < 0.20	SWAQ - 10	149
0.21 < E.A. < 0.33	SWAQ - 20	248
0.34 < E.A. < 0.50	SWAQ - 25	369
0.51 < E.A. < 0.79	SWAQ - 40	588
0.80 < E.A. ≤ 0.98	SWAQ - 70	730
0.99 < E.A. ≤ 1.23	SWAQ - 110	913

Use additional sheets for additional units.
A_I = Impervious Cover (Acres)
A_P = Pervious Cover (Acres)
A = Total Area (Acres)
P = Avg. Annual Rainfall (33" for Example)
A_N = Net Impervious Cover (Acres)

List only the uncaptured area being compensated for in the unit. TSS compensation for uncaptured areas can be divided up between multiple units or BMP's.

BMP Catchment Area "A"		Untreated Catchment Area "A" - Compensation Req'd
A_{I1} = 0.81		A_{I2} = 0.01
A_{P1} = 0.09		A_{P2} = 0.09
A_1 = 0.90		A_2 = 0.1
A_{N1} = 0.81		A_{N2} = 0.01
L_{M1} = 1534.90		L_{M2} = 8.98

1 StormTrooper® Model Sizing based on Individual Catchement Areas to the BMP.

Effective Area (EA) = (0.9 x A_I) + (0.03 x A_P)

EA = (0.9 x 0.81) + (0.03 x 0.09) = 0.7317 Acres

Page 3-27 "RG-348" (C=0.90 Imp. Area, C=0.03 for Perv. Area)

From Table 2 choose an initial Model: SWAQ - 40
Surface Area of Model: 588 Sq. Ft.
Required TSS removal for catchment area:

L_{M1} = 27.2 x A_N x P

Equation 3.3 "RG-348"

L_{M1} = 27.2 x 0.81 x 33 = 727.06

2 Overflow Rate

V_{OR} = Q/S.A. where: Q = i(EA)

Equation 3.4 & 3.5 "RG-348"
Page 3-30 "RG-348" (i = 1.1 in./hr., 90% Volume Treated)

Q = (i x EA)/Model Surface Area
Q = (1.1 x 0.7317) / 588 = 0.00137 fps

3 BMP efficiency (Table 3). If the overflow rate is between two percent efficiencies, use the smaller.

V_{OR} =	0.00133 fps
BMP Eff. (%) =	80 %

4 Maximum TSS Removal of BMP: L_{R1}

L_r = (BMP Efficiency) x P x (A_i x 34.6 + A_p x 0.54)

Equation 3.8 "RG-348"

L_r = Load Removed by BMP
BMP Efficiency = TSS Removal Efficiency (expressed as a decimal fraction from Table 3)

L_{R1} = 0.80 x 33 x (0.81 x 34.6 + 0.09 x 0.54) = 741.17 #TSS

EFS-SWST-AQ12

TSS removal exceeding required L_M to be counted towards untreated area = L_C

$L_C = L_{R1} - L_{M1}$

LC = 741.17 - 727.06 = 14.11 #TSS

Required TSS removal for untreated area:

L_{M2} = 27.2 x 0.01 x 33 = 8.98 #TSS < 14.11 #TSS => O.K.

UNIT IS SUFFICIENTLY SIZED TO REMOVE REQUIRED TSS FROM BOTH CAPTURED AND UNCAPTURED AREAS!!

StormTrooper® AQ Maintenance

A preventative maintenance cleanout schedule is the most valuable tool for maintaining the proper operation of StormTrooper. Separator maintenance costs will be greatly reduced if a good housekeeping plan for the property is developed i.e., trash pickup, lawn maintenance, dumpster control, etc.

StormTrooper separators have no moving parts and no filter cartridges. The manufacturer recommends quarterly ongoing inspections for accumulated pollutants. Pollutant deposition may vary from year to year. Quarterly inspections ensure that the system is serviced at the appropriate times. Table 4 lists recommended maximum capacities of oil and sediment. Professional vacuum services should be considered when capacities exceed these recommended levels.

It is very useful to keep a record of each inspection; therefore, an inspection and maintenance form has been attached for your use.

Table 4. StormTrooper AQ Maintenance Levels

Model Number	Oil Depth	Sediment Depth
SWAQ-05	12”	12”
SWAQ-10	12”	12”
SWAQ-20	12”	12”
SWAQ-25	12”	12”
SWAQ-40	12”	12”
SWAQ-70	12”	12”
SWAQ-110	12”	12”

Inspection Procedures

1. Easiest observation and maintenance is best accomplished during non-flow (dry weather) conditions 3-4 days after the most recent rain.
2. Remove interceptor covers or open hatchway to observe conditions. Remove hatchway safety net (“EnterNet”). Observe for trash and debris and remove if necessary. This is the most important maintenance requirement. If absorbent pillows are utilized, observe their condition. Uniform browning or gray color of the pillow means they should be replaced. Observe baffle debris screen and clean if necessary.
3. Coalescing plates are self-cleaning and seldom require maintenance unless damaged. Do not walk on or stand on plate packs. Call ParkUSA (888-611-PARK) for replacement parts.
4. Check of the depth (level) of oil and sediment with a tank sampler device designed for this purpose.

(Optional) StormTrooper® Interceptor Monitoring / Maintenance Report

Year:	
Company Name:	
Address:	
City/State/Zip:	
Contact Phone:	
Contact Name:	
StormTrooper® Model	
GPM	

Quarterly Record Keeping

Maintenance Activity	Mar	June	Sept	Dec
Non-Structural Controls				
Manhole Debris Cleaned				
Interceptor Debris Cleaned				
Hose Off Inside Walls				
Debris Screens Cleaned				
Mowing of Stormtrooper				
Structural Controls				
Oil Depth				
Solids Depth				
Pumped Out				
Inspections				
Quarterly				
Annually				
"X" identifies the months in which the activity will be performed (at a minimum).				
*Provided to residents at move-in and available at community locations.				
**Sediment removed from basin per chart on Table 4 or at least one year from move-in of location				

I certify that I supervised or performed StormTrooper® monitoring per local codes and manufacturer's recommended monitoring and maintenance procedures on the dates listed above.

Signed: _____
Owner Or Owner Representative

Print Name: _____

Date Submitted: _____

Recommended Maintenance Plan

Edwards Aquifer Region

1.0 Inspection Schedule

- A preventative maintenance cleanout schedule is the most valuable tool for maintaining the proper operation of Park StormTrooper™. Interceptor maintenance costs will be greatly reduced if a good housekeeping plan for the property is developed i.e., trash pickup, lawn maintenance, dumpster control, etc.

- Park StormTrooper™ interceptors have no moving parts. The manufacturer recommends ongoing quarterly inspections for accumulated pollutants. Pollutant accumulation may vary from year to year. Quarterly inspections ensure that the system is serviced at appropriate times. **Owner must observe site conditions and determine whether or not pollutant loads require a more frequent inspection schedule.** Table 1 lists recommended maximum capacities of oil and sediment. Professional vacuum services should be considered when capacities meet or exceed these recommended levels.

Table 1. StormTrooper™ Maintenance Levels

Model Number	Oil Depth	Sediment Depth
SWAQ-05	12”	12”
SWAQ-10	12”	12”
SWAQ-20	12”	12”
SWAQ-25	12”	12”
SWAQ-40	12”	12”
SWAQ-70	12”	12”
SWAQ-110	12”	12”

It is very important to keep a record of each inspection; therefore, an inspection and maintenance form has been attached for your use.

2.0 Inspection Procedures

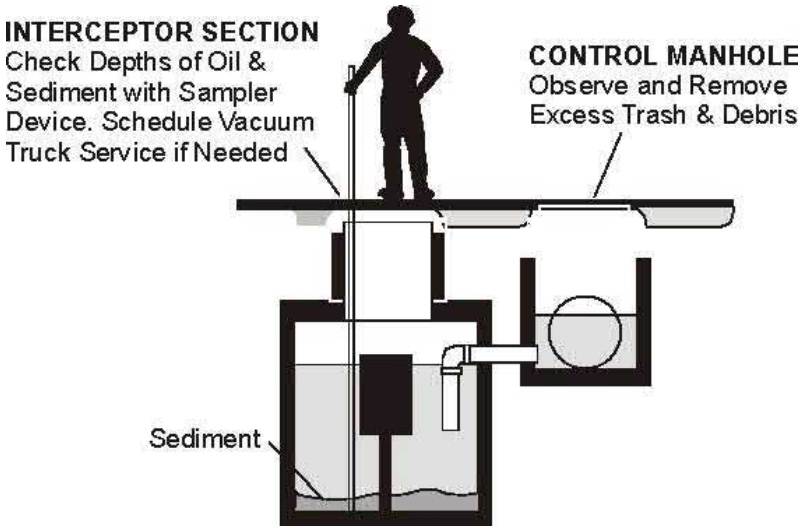
- Easiest observation and maintenance is best accomplished during non-flow (dry weather) conditions, 5-7 days after the most recent rain.

- Remove interceptor covers or open hatchway to observe conditions. Remove hatchway safety net ("EnterNet"), if installed. Observe for trash and debris and remove if necessary. This is the most important maintenance requirement.

- Coalescing plates are self-cleaning and seldom require maintenance unless damaged. Do not walk on or stand on plate packs. Call ParkUSA (888-611-PARK) for replacement parts.

- Check of the depth (level) of oil and sediment with a tank sampler device designed for this purpose. The tank sampler requires a dipstick tube equipped with a ball valve (typically a Sludge Judge® or Core Pro®).

- Make sure the dipstick tube goes completely to the bottom. Lift the dipstick tube out of the unit and keep it in a vertical position and read the level of sediment and oils from the gauge on the dipstick. Record pollutant levels on your StormTrooper™ Monitoring / Maintenance Report. If either pollutant(s) in the dipstick tube (sediments or oils) exceed the levels indicated on Table 1, maintenance of the StormTrooper™ is required. Upon completing the recording of pollutant levels, the dipstick tube is then drained back into the inlet side of the StormTrooper™. This ensures that the pollutants in the dipstick tube do not leave the unit.



3.0 Maintenance Procedures

- Park Environmental Equipment, manufacturers of StormTrooper™, recommends that a professional pumping contractor licensed to remove and dispose waste from underground utilities be used to pump out the interceptor.

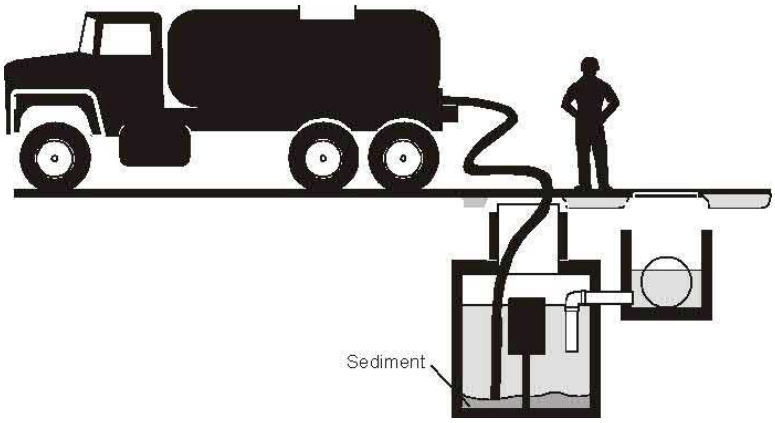
- Pull all manhole covers. Be sure all sections of the interceptor are cleaned. **If a control/bypass manhole is part of the system, it should be inspected and serviced with the interceptor.**

- If the coalescing media option is utilized, visually inspected the plates for any heavy build-up of oil, grease or sludge. Typically, the plates are self-cleaning and require little maintenance. If buildup of material is evident, either remove the media from the frame or clean the plate pack in place. Removing media is accomplished by attaching a lifting device in the lifting lug provided (top center of the frame), and then pull straight up. Media plates may be cleaned in place with special steam cleaning nozzle attachment that provides a flat spray.

- **Facet's MPak® plates are designed to be cleaned in place using a special cleaning wand and city water pressure.** The wand has a connection just like an ordinary garden hose and is equipped with a small conical strainer in the connection so that solids in the inlet water will not clog the cleaning holes.

  For cleaning in place, connect a pressure water hose (at least 60 psig) to the special cleaning wand. Provide a vacuum truck (or other means of disposing of the sludge and dirt) in the vessel. Turn on the water to produce a spray from the wand and insert the tip of the wand slowly into each hole of the plate pack, starting at the upstream end. As the water flushes the dirt out of the plate packs, it should be removed by the vacuum hose or directed to an oil water sewer if one is available. For cleaning outside of the vessel, remove the plate packs and other internals (except bolted-in internals). Flush with hose and cleaning wand to oil water drain.

  (**NOTE:** The cleaning wand produces a vigorous spray. Operators should wear waterproof clothing and goggles or face mask.)



- Typically, the vacuum truck will skim off the oil and other floatables. In most geographic areas the sediment can be disposed of in a sanitary landfill once dewatered. Pollutants are not allowed to be discharged back into the sanitary or storm sewer systems.

- After cleaning via vacuum truck, pumping contractor can refill the StormTrooper™ with water previously drawn out of unit, or haul water to disposal facility and let natural rainfall recharge the unit during future rain events. Replace manhole covers.

- After cleanout is accomplished, obtain a copy of the service truck manifest. Update the StormTrooper™ Monitoring/Maintenance Report and attach a copy of the manifest to the report.

4.0 Safety and Environmental Considerations

- All normal safety precautions should be taken with this equipment to prevent accidents and fires. Normal fire prevention measures must be taken to prevent fire danger from the separated oil.

- Care should be taken to keep the area around the interceptor clean to prevent accidents.

- Dispose of the separated oil properly, preferably by recycling.

- The atmosphere inside the Park Environmental Equipment StormTrooper™ is a confined space and may be hazardous. Entry is not recommended without proper equipment. Follow OSHA confined space entry requirements.

- SAFETY AND ENVIRONMENTAL PROTECTION ARE THE RESPONSIBILITY OF THE USER. PARK EQUIPMENT CO. ASSUMES NO LIABILITY FOR MISUSE OF THIS SEPARATOR OR FOR USE OUTSIDE THE PARAMETERS FOR WHICH IT IS DESIGNED.

(Optional) StormTrooper® Interceptor Monitoring / Maintenance Report

Year:	
Company Name:	
Address:	
City/State/Zip:	
Contact Phone:	
Contact Name:	
StormTrooper® Model	
GPM	

Quarterly Record Keeping

Maintenance Activity	Mar	June	Sept	Dec
Non-Structural Controls				
Manhole Debris Cleaned				
Interceptor Debris Cleaned				
Hose Off Inside Walls				
Debris Screens Cleaned				
Mowing of Stormtrooper				
Structural Controls				
Oil Depth				
Solids Depth				
Pumped Out				
Inspections				
Quarterly				
Annually				
"X" identifies the months in which the activity will be performed (at a minimum).				
*Provided to residents at move-in and available at community locations.				
**Sediment removed from basin per chart on Table 4 or at least one year from move-in of location				

I certify that I supervised or performed StormTrooper® monitoring per local codes and manufacturer's recommended monitoring and maintenance procedures on the dates listed above.

Signed: _____
Owner Or Owner Representative

Print Name: _____

Date Submitted: _____

Per the *"Permanent Stormwater Section" for Regulated Activities on the Edwards Aquifer Recharge Zone and Relating to 30 TAC §213.5(b)(4)(C), (D)(Ii), (E), and (5), Effective June 1, 1999 a plan for the inspection, maintenance, repair, and, if necessary, retrofit of the permanent BMPs and measures is provided herein.*

This plan has been prepared and certified by the engineer designing the permanent BMPs and measures. This plan has been signed by the owner or responsible party. The plan includes procedures for documenting inspections, maintenance, repairs, and, if necessary, retrofits as well as a discussion of record keeping procedures.

I, _____, a Professional Engineer duly licensed to practice in the State of Texas do hereby certify that the information presented in this document was prepared under my direction and supervision and complies with the proper inspection and maintenance requirements determined by the manufacturer.

Signature:_____ Date:_____

License Number:
Address:

Phone Number:

_____
Engineers Seal and Signature

I, _____ (Name), acting as _____ (Officer Position) for _____ (Permittee's Name), have read the Recommended StormTrooper Maintenance Plan, as well as the associated drawings, and agree to implement the requirements described herein.

Signature:_____ Date:_____

Address:

Phone Number:

PARK® ENVIRONMENTAL EQUIPMENT

Storm Trooper®
Stormwater Interceptors

StormTrooper® Specifications

A: General:

1. A Stormwater Interceptor shall be provided and installed as indicated on plans. System shall be Park Environmental Equipment Company Model SWAQ-xxx. The system shall be installed in strict accordance with the manufacturer's recommendations. Manufacturer shall have been in business for 10 years in the design and manufacturing of wastewater products. Manufacturer shall provide a one-year limited warranty. Manufacturer shall provide proof of third party testing by an independent applied engineering and physical sciences testing organization.

2. The Stormwater Interceptor shall be provided with installation, operation & maintenance manuals that contain clear and concise descriptions.

3. Contractor shall submit required copies of manufacturer's equipment specification for engineer's review. Shop drawings shall include the following:

   a) Detailed manufacturer's data including installation plan/elevation drawings, rebar layout drawings, buoyancy calculations, and site specific coalescing plate performance analysis for TSS & TPH, all certified by a registered professional engineer.
   b) Manhole frame/cover specifications.
   c) Joint Sealant specifications.
   d) Coatings and/or concrete additives specifications.

4. Stormwater Interceptor design shall conform to criteria set forth by the International Association of Plumbing and Mechanical Officials (IAPMO), the American Petroleum Institute, and all other governing state and local code requirements.

5. Contractor shall field verify all dimensions for piping inverts and interceptor excavation depth.

B: Materials:

1. Concrete: The Stormwater Interceptor tank shall be constructed of precast concrete having a 28 day minimum compressive strength of 4500 PSI using a Type I Portland Cement.

2. Steel Reinforcement: The Stormwater Interceptor shall be designed for H-20-44 traffic loading as defined by AASHTO 14th ED. 1989 using a 30% impact factor. Structural reinforcement placement shall be in accordance to ACI. All reinforcement steel shall comply with ASTM A615 grade 60 or ASTM A706 Grade 60. Bar bending shall comply with latest ACI standards. Lifting inserts to be installed for handling and be installed per manufacturer's requirements.

3. Manhole Access: Interceptor shall have adequate manhole access covers and frames to permit access for cleaning all areas of the interceptor. Each manhole access shall be minimum 24" diameter clear opening. Cast iron frame and covers shall conform to ASTM A48-83 Class 30.

4. Fabricated steel access covers shall be ASTM A36 steel construction and hot-dipped galvanized after fabrication. All access covers shall be traffic duty. Access covers shall be placed at grade elevation by using concrete extensions.

5. Pipe Material: All pipe and fittings shall be of materials approved by engineer.

6. Coalescing Media: The oil coalescing media pak shall be fabricated of an oleophillic polypropylene plastic material and assembled into modules with 304 stainless steel materials. Media assembly shall be self-cleaning and removable.

7. The Stormwater Interceptor shall be equipped with a system to control by-pass manhole to control unusually high rainfall. The control manhole system shall prevent resuspension and scouring of the storm water interceptor. The control by-pass system shall be equipped with an adjustable weir and stainless steel debris screen.

C: Interceptor Performance:

1. The interceptor shall be sized in accordance with the latest revision of "Addendum Sheet – Complying with the Edwards Aquifer Rules Technical Guidance on Best Management Practices RG-348 (Revised July 2005)."

2. The Interceptor shall be capable containing and treating a wide variety of concentration and loads of floatable and non floatable constituents such sand, sediments, oil, grease, grit and trash debris to the acceptable loadings of EPA and local authorities.

3. Influent Characteristics - The interceptor shall be designed for intermittent and variable flows of water, oil, or any combination of nonemusified sediment/oil/water mixtures ranging from zero to 2,400 gpm (adjust number accordingly). Operating temperatures of the influent storm water shall range from 40F to 60F. The specific gravities of the hydrocarbons shall range from .68 to .95 at operation temperature and have a concentration of 400 PPM or less.

4. Effluent Characteristics – The total petroleum hydrocarbon (TPH) concentration of the interceptor effluent shall not exceed 10 mg/l. The system shall be capable of removing a minimum of 80% of the total suspended solids (TSS).

5. The Interceptor manufacturer shall provide recommended maintenance and operations instructions that comply with EPA, county and local monitoring requirements.

D: Installation:

1. The Interceptor shall be installed in strict accordance with the manufacturer's recommendations and according to plans and specifications. The manufacturer shall have representation during the setting procedure to insure proper installation.

2. The Stormwater Interceptor shall be installed on level, undisturbed soil or an approved compact fill with a load bearing capacity of minimum 2000 PSF.

3. The interceptor shall be backfilled after placement with an approved backfill material. Backfill of all sides of structure shall be performed simultaneously to prevent unbalanced lateral pressures during construction.

4. All joints shall be made watertight. Manufacturer shall seal joints with a plastic flexible gasket conforming to AASHTO M-198-75 for bitumen gasket.

5. All interceptor inlet/outlet/vent piping shall be installed in accordance to manufacturer's recommendations and project specifications.

6. Interceptor shall be filled with clean water prior to start-up of system. Follow manufacturer's recommendations for testing and start-up.

APPENDIX D

INSPECTION AND MAINTENANCE REPORTS

Inspector Qualifications*

Inspector Name: _____
Qualifications (Check as appropriate and provide description):
□ Training Course _____
□ Supervised Experience _____
□ Other _____

Inspector Name: _____
Qualifications (Check as appropriate and provide description):
□ Training Course _____
□ Supervised Experience _____
□ Other _____

Inspector Name: _____
Qualifications (Check as appropriate and provide description):
□ Training Course _____
□ Supervised Experience _____
□ Other _____

**Personnel conducting inspections must be knowledgeable of the general permit, familiar with the construction site, and knowledgeable of the SWP3 for the site.*

INSPECTION SCHEDULE

Inspections must be conducted:

- **Option 1** – at least once every 14 calendar days and within 24 hours of the end of a storm event of 0.5 inch or greater
- **Option 2** – at least once every 7 calendar days, regardless of whether or not there has been a rainfall event since the previous inspection.

Any changes to the schedule are conducted in accordance with the following:

- the schedule is changed a maximum of one time each month,
- the schedule change must be implemented at the beginning of a calendar month, and
- the reason for the schedule change must be documented below.

Date	Schedule Option	Reason for Schedule Change

Construction Site SWP3 Inspection Report

Status		
	☐ Complies	
	☐ Warning	No.
	☐ Project Shutdown	

SWP3	On-Site		Up-to-date	
	Yes	No[1]	Yes	No[2]

General Information		
	Project:	Date:
	Address:	Inspector:
		Qualifications: see Appendix E of SWP3
		Weather Conditions:
	Owner:	Contractor:

BMP	BMP In Use		Maint. Req'd		Comments
	Yes	No	Yes[2]	No	

[1]The SWP3 must be retained on-site at the construction site or, if the site is inactive or does not have an on-site location to store the plan, a notice must be posted describing the location of the SWP3.

[2]Items marked in this column need to be addressed in the Actions to be Taken table.

ACTIONS TO BE TAKEN	RESPONSIBLE PERSON(S)	DUE DATE	DATE COMPLETED	INITIALS

NOTE: These reports will be kept on file as part of the Storm Water Pollution Prevention Plan for at least three years. A copy of the SWP3 will be kept at the site at all times during construction.

CERTIFICATION STATEMENT: *"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."*

Name:	
Address:	
Telephone:	
Site Location:	
Inspector Signature:	Date:

MAINTENANCE GUIDELINES

1. Below are some maintenance practices to be used to maintain erosion and sediment controls:
   - All control measures will be inspected according to the schedule identified in Appendix E.
   - All measures will be maintained in good working order. The operator should correct any damage or deficiencies as soon as practicable after the inspection, but in no case later than seven (7) calendar days after the inspection.
   - BMP Maintenance (as applicable)
     - Sediment must be removed from sediment traps and sedimentation ponds no later than the time that design capacity has been reduced by 50%. For perimeter controls such as silt fences, berms, etc., the trapped sediment must be removed before it reaches 50% of the above-ground height.
     - Silt fence will be inspected for depth of sediment, tears, to see of the fabric is securely attached to the fence posts, and to see that the fence posts are firmly in the ground.
     - Drainage swale will be inspected and repaired as necessary.
     - Inlet control will be inspected and repaired as necessary.
     - Check dam will be inspected and repaired as necessary.
     - Straw bale dike will be inspected and repaired as necessary.
     - Diversion dike will be inspected and any breaches promptly repaired.
     - Temporary and permanent seeding and planting will be inspected for bare spots, washouts, and healthy growth.
     - If sediment escapes the site, accumulations must be removed at a frequency that minimizes off-site impacts, and prior to the next rain event, if feasible. If the permittee does not own or operate the off-site conveyance, then the permittee must to work with the owner or operator of the property to remove the sediment.
     - Locations where vehicles enter or exit the site must be inspected for evidence of off-site sediment tracking.

2. To maintain the above practices, the following will be performed:
   - Maintenance and repairs will be conducted before the next anticipated storm event or as necessary to maintain the continued effectiveness of storm water controls. Following an inspection, deficiencies should be corrected no later than seven (7) calendar days after the inspection.
   - Any necessary revisions to the SWP3 as a result of the inspection must be completed within seven (7) calendar days following the inspection. If existing BMPs are modified or if additional BMPs are necessary, an implementation schedule must be described in the SWP3 and wherever possible those changes implemented before the next storm event.
   - Personnel selected for inspection and maintenance responsibilities must be knowledgeable of the general permit, familiar with the construction site, and knowledgeable of the SWP3 for the site.

APPENDIX E

ROLES AND RESPONSIBILITIES CHECKLIST AND CERTIFICATION STATEMENT

PRIMARY AND SECONDARY OPERATOR GENERAL RESPONSIBILITIES

DEFINITIONS:

Operator - The person or persons associated with a large or small construction activity that is either a primary or secondary operator as defined below:

Primary Operator – the person or persons associated with a large or small construction activity that meets either of the following two criteria:

(a.) the person or persons have operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications, or

(b.) the person or persons have day-to-day operational control of those activities at a construction site that are necessary to ensure compliance with a storm water pollution prevention plan (SWP3) for the site or other permit conditions (e.g., they are authorized to direct workers at a site to carry out activities required by the SWP3 or comply with other permit conditions).

Secondary Operator – The person whose operational control is limited to the employment of other operators or to the ability to approve or disapprove changes to plans and specifications. A secondary operator is also defined as a primary operator and must comply with the permit requirements for primary operators if there are no other operators at the construction site.

Please note that both Owners and Contractors can meet the definition of being an Operator and will need to fulfill the associated requirements. The Roles and Responsibilities Checklist and Certification Statement located in Appendix F are to be completed and signed by the Owner and Contractor(s).

Secondary Operators and Primary Operators with Control Over Construction Plans and Specifications

All secondary operators and primary operators with control over construction plans and specifications must:

(a.) ensure the project specifications allow or provide that adequate BMPs are developed to meet the requirements of the general permit,

(b.) ensure that the SWP3 indicates the areas of the project where they have control over project specifications, including the ability to make modifications in specifications,

(c.) ensure all other operators affected by modifications in project specifications are notified in a timely manner so that those operators may modify their best management practices as necessary to remain compliant with the conditions of this general permit, and

(d.) ensure that the SWP3 for portions of the project where they are operators indicates the name and site-specific TPDES authorization numbers for permittees with the day-to-day operational control over those activities necessary to ensure compliance with the SWP3 and other permit conditions. If the party with day-to-day operational control has not been authorized or has abandoned the site, the

person with control over project specifications is considered to be the responsible party until the authority is transferred to another party and the SWP3 is updated.

Primary Operators with Day-to-Day Operational Control

Primary Operators with day-to-day operational control of those activities at a project that are necessary to ensure compliance with the SWP3 and other permit conditions must ensure that the SWP3 accomplishes the following requirements:

(a.) meets the requirements of the general permit for those portions of the project where they are operators,
(b.) the parties responsible for implementation of BMPs described in the SWP3,
(c.) indicates areas of the project where they have operational control over day-to-day activities, and
(d.) includes, for areas where they have operational control over day-to-day activities, the name and site-specific TPDES authorization number of the parties with control over project specifications, including the ability to make modifications in specifications.

Roles and Responsibilities Checklist

Role/Responsibility	Project Owner*	Primary Operator	Secondary Operator
Development of initial design specifications			
Payment for proposed construction activity			
Maintain SWP3 records for three years from the date that a NOT is submitted			
Complete, sign, and postmark NOI at least seven days prior to beginning of construction activity, or Complete, sign, and electronically submit NOI prior to the beginning of construction activity			
Post a copy of the signed NOI at project site and maintain through duration of project			
Post copy of completed construction site notice(s) at project site through duration of project			
Provide a copy of the signed NOI to any secondary operator and to the operator of any MS4 receiving construction site discharge, at least seven days prior to commencing construction activities			
Maintain schedule of major construction activities, keep a copy with SWP3, and retain a copy of the SWP3 at the construction site at all times			
Update SWP3 to reflect daily operations (e.g., revisions, installation dates, grading operation dates, BMP maintenance, and inspection information)			
Update SWP3 to reflect changes in the Contractor's contact information			
Identify, maintain and modify BMPs (as necessary) to control erosion and sedimentation due to construction activities throughout life of project			
Provide stabilized construction entrances and sediment barriers, and clean existing rock and/or add rock to prevent mud and dirt from entering streets or alleys			
Maintain and/or replace sediment barriers and silt traps (if installed), etc. throughout life of project			
Maintain erosion control on stockpiles without blocking drainage paths			
Perform SWP3 inspections in accordance with TPDES General Permit, and keep inspection reports with SWP3			
Based on inspection results, modify SWP3 and pollution prevention controls to maintain that storm water (or identified non-storm water discharges) are the only discharges leaving the site			

Role/Responsibility	Project Owner*	Primary Operator	Secondary Operator
Provide proper management of project-generated trash and debris, including debris collected from storm water protection devices			
Stabilize all disturbed areas related to construction for temporary or permanent ceasing of activities			
Comply with all State and local sanitary sewer or septic system regulations			
Provide copies of all SWP3 records to the Project Owner			
Complete, sign, and submit NOT form to the TCEQ and MS4 Operators when the project has been completed and stabilized			
Complete applicable portion of the site notice related to removal of the notice and submit to the operator of any MS4 receiving site discharge			

**Please note that the Project Owner can meet the definition of an operator. Please refer to the definitions of "primary operator" and "secondary operator" for more information.*

Each operator engaged in activities that disturb surface soils must be identified and must sign the following certification statement. Signatory requirement guidance and an additional certification statement form are attached (Appendix F).

Certification Statement:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

I further certify that I am authorized under 30 Texas Administrative Code §305.44 to sign this document and can provide documentation in proof of such authorization upon request."

Project Owner

Name:_____
Title:_____
Company: _____
Signature:_____
Date:_____
Operator Type:_____

General Contractor

Name: _____
Title: _____
Company: _____
Signature:_____
Date:_____
Operator Type:_____

Subcontractor (as appropriate)

Name:_____
Title:_____
Company:_____
Signature:_____
Date:_____
Operator Type:_____

Subcontractor (as appropriate)

Name:_____
Title:_____
Company:_____
Signature:_____
Date:_____
Operator Type:_____

NOTICE OF INTENT (NOI) LOG			
Name	**Company**	**Date Submitted NOI**	**TPDES Permit No.**

APPENDIX F

TPDES GENERAL PERMIT (TXR150000) FOR STORM WATER DISCHARGES FROM CONSTRUCTION ACTIVITIES

General Permit to Discharge Under the Texas Pollutant Discharge Elimination System

Stormwater Discharges Associated with Construction Activities

TXR150000

Effective March 5, 2018

printed on recycled paper

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

APPENDIX G

SITE NOTICE, NOTICE OF INTENT, NOTICE OF CHANGE AND NOTICE OF TERMINATION FORMS

Operator Notes

Construction Site Notice

The construction site notice located in Appendix H should be posted along with a signed copy of the Notice of Intent. The site notice must be located where it is safely and readily available for viewing by the general public, local, state, and federal authorities prior to commencing construction.

Notice of Intent (NOI)

The TPDES General Permit TXR 150000 requires that a NOI be submitted before construction activities begin. The NOI is essentially an application and contains items such as important information about your site, including site location, owner information, operator (general contractor) information, receiving water(s), and a brief description of the project.

TCEQ has developed a form to be used by industrial facilities and construction activities when they submit NOIs. This form indicates all the information that you are required to provide and must be used in order for the NOI to be processed correctly.

Primary Operators

Please note that both Owners and Contractors can meet the definition of being a "primary operator."

Primary operators must submit a NOI at least seven days prior to commencing construction activities, or if utilizing electronic submittal, prior to commencing construction activities.

If an additional primary operator is added after the initial NOI is submitted, the new primary operator must:

- submit a paper NOI at least seven days before assuming operational control, or
- submit an electronic NOI prior to assuming operational control.

If the primary operator changes after the initial NOI is submitted, the new primary operator must:

- submit a paper NOI at least ten days before assuming operational control, or
- submit an electronic NOI at least ten days before assuming operational control

All primary operators must post a copy of the signed NOI at the construction site in allocation where it is readily available for viewing by the general public, local, state, and federal authorities prior to commencing construction activities. A copy of the signed NOI must be submitted to the operator of any MS4 receiving the discharge and to any secondary operator, at least seven days prior to commencing construction activities. A list of the MS4 operators receiving a copy of the NOI is located in Appendix H.

Secondary Operators

Secondary operators are not required to submit a NOI, provided that another operator(s) at the site has submitted a NOI, or is required to submit a NOI and the secondary operator has provided notification to the operator(s) of the need to obtain coverage under the permit. Please refer to the general permit for more information.

NOI Fees

Please note the fees associated with NOI submission:

- $325 if submitting a paper NOI, or
- $225 if submitting an electronic NOI.

No separate annual fees will be assessed. The Water Quality Annual fee has been incorporated into the NOI fees.

It is anticipated that there will be projects where more than one entity (e.g., the owner, developer, or general contractor) will need to submit an NOI so that the requirements for an operator are met. In this case, those persons will share the Storm Water Pollution Plan, and the submittal of the NOI and the TPDES Permit Number will need to be recorded in the NOI log located in Appendix F.

Please refer to the general permit and NOI form instructions for more information.

Notice of Change (NOC)

The operators are responsible for updating the SWP3 to implement and maintain sediment controls and submit a Notice of Change (NOC) if off-site material, waste, borrow, fill or equipment storage areas are being utilized and are not under a separate permit. An operator must submit a NOC letter in conformance with TPDES General Permit TXR150000 if they become aware of any incorrect information in an NOI or failed to submit any relevant facts.

Information that may be included on an NOC includes, but is not limited to, the following: the description of the construction project, an increase in the number of acres disturbed (for increases of one or more acres), or the operator name. A transfer of operational control from one operator to another, including a transfer of the ownership of a company, may not be included in an NOC. A transfer of ownership of a company includes changes to the structure of a company, such as changing from a partnership to a corporation or changing corporation types, so that the filing number (or charter number) that is on record with the Texas Secretary of State must be changed.

An NOC is not required for notifying TCEQ of a decrease in the number of acres disturbed. This information must be included in the storm water pollution prevention plan (SWP3) and retained on site.

A list of the MS4 operators receiving a copy of the NOC is located in Appendix H.

Notice of Termination (NOT)

Any operator that has submitted a NOI must apply to terminate authorization of the general permit. The NOT is a form which should be completed and submitted to the TCEQ within 30 days of the following:

- final stabilization has been achieved on all portions of the site that are the responsibility of the permittee,
- a transfer of operational control has occurred, or

- the operator has obtained alternative authorization under an individual TPDES permit or alternative TPDES general permit.

Information to be included on the NOT includes the location of the construction site; the name, address, and telephone number of the operator terminating coverage; the TPDES General Permit Number; an indication of why coverage under the permit should be terminated for the operator; and a signed certification statement.

Authorization under the general permit terminates at midnight on the day the NOT is postmarked for delivery to the TCEQ. If the NOT is submitted electronically, the permit terminates immediately following confirmation of receipt of the NOT by TCEQ.

Note that when there is a change in operators of a construction activity, then the new operator must submit an NOI.

NOT's should be submitted to MS4 Operator(s). A list of the MS4 operator(s) receiving a copy of the NOT is located in Appendix H.

LARGE CONSTRUCTION SITE NOTICE

FOR THE
Texas Commission on Environmental Quality (TCEQ)
Storm Water Program

TPDES GENERAL PERMIT TXR150000

"PRIMARY OPERATOR" NOTICE

This notice applies to construction sites operating under Part II.E.3. of the TPDES General Permit Number TXR150000 for discharges of storm water runoff from construction sites equal to or greater than five acres, including the larger common plan of development. The information on this notice is required in Part III.D.2. of the general permit. This notice shall be posted along with a copy of the signed Notice of Intent (NOI), as applicable. Additional information regarding the TCEQ storm water permit program may be found on the internet at:

http://www.tceq.state.tx.us/nav/permits/sw_permits.html

Site-Specific TPDES Authorization Number:	
Operator Name:	
Contact Name and Phone Number:	
Project Description: *Physical address or description of the site's location, and estimated start date and projected end date, or date that disturbed soils will be stabilized.*	
Location of Storm Water Pollution Prevention Plan:	

LARGE CONSTRUCTION SITE NOTICE

FOR THE
Texas Commission on Environmental Quality (TCEQ)
Storm Water Program

TPDES GENERAL PERMIT TXR150000

"SECONDARY OPERATOR" NOTICE

This notice applies to secondary operators of construction sites operating under Part II.E.3. of the TPDES General Permit Number TXR150000 for discharges of storm water runoff from construction sites equal to or greater than five acres, including the larger common plan of development. The information on this notice is required in Part III.D.2. of the general permit. Additional information regarding the TCEQ storm water permit program may be found on the internet at:

http://www.tceq.state.tx.us/nav/permits/sw_permits.html

Site-Specific TPDES Authorization Number:	TXR150000
Operator Name:	
Contact Name and Phone Number:	
Project Description: *Physical address or description of the site's location, and estimated start date and projected end date, or date that disturbed soils will be stabilized.*	
Location of Storm Water Pollution Prevention Plan (SWP3):	

For Large Construction Activities Authorized Under Part II.E.3. (Obtaining Authorization to Discharge) the following certification must be completed:

I _____ (Typed or Printed Name Person Completing This Certification) certify under penalty of law that I have read and understand the eligibility requirements for claiming an authorization under Part II.E.3. of TPDES General Permit TXR150000 and agree to comply with the terms of this permit. A storm water pollution prevention plan has been developed and will be implemented prior to construction, according to permit requirements. A copy of this signed notice is supplied to the operator of the MS4 if discharges enter an MS4. I am aware there are significant penalties for providing false information or for conducting unauthorized discharges, including the possibility of fine and imprisonment for knowing violations.

Signature and Title_____ Date _____

_____*Date Notice Removed*
____*MS4 operator notified per Part II.F.3.*

Record of Submittals to MS4s

Form Type	MS4 Name	Address	Date Submitted

APPENDIX H

RECORD OF TEMPORARY/PERMANENT CEASING OF CONSTRUCTION ACTIVITIES

Record of Temporary/Permanent Ceasing of Construction Activities

Project Activity Area	Date Activities Ceased	Temporary* or Permanent	Date Soil Stabilization Implemented	Date Activities Resumed	Initials

*** "Temporarily Ceased" means inactive for less than 21 consecutive days.**

APPENDIX I

DELEGATION OF SIGNATORIES

Executive Director
Texas Commission on Environmental Quality
Storm Water and Pretreatment Team
P.O. Box 13087, MC-148
Austin, TX 78711-3087

Subject: Delegation of Signatories to Reports

Facility/Company/Site Name: _____
TPDES Permit Number: _____

Dear Executive Director:

This letter serves to designate the following people or positions as authorized personnel for signing reports, storm water pollution prevention plans, certifications or other information requested by the Executive Director or required by the general permit, as set forth by 30 TAC §305.128 (see page 2).

Name or Position	
Name or Position	
Name or Position	
Name or Position	

I understand that this authorization does not extend to the signing of a Notice of Intent for obtaining coverage under a storm water general permit.

By signing this authorization, I confirm that I meet the requirements to make such a designation as set forth in 30 TAC §305.44 (see page 2).

Sincerely,

_____ _____ _____
Name Title Date

RELEVANT PROVISIONS

305.128(a) All reports requested by permits and other information requested by the executive director shall be signed by a person described in §305.44(a) of this title (relating to Signatories to Applications) or by a duly authorized representative of that person. A person is a duly authorized representative only if:

(1) the authorization is made in writing by a person described in §305.44(a) of this title (relating to Signatories to Applications);

(2) the authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity or for environmental matters for the applicant, such as the position of plant manager, operator of a well or well field, environmental manager, or a position of equivalent responsibility. (A duly authorized representative may thus be either a named individual or any individual occupying a named position); and

(3) the written authorization is submitted to the executive director.

(b) If an authorization under this section is no longer accurate because of a change in individuals or position, a new authorization satisfying the requirements of this section must be submitted to the executive director prior to or together with any reports, information, or applications to be signed by an authorized representative.

(c) Any person signing a report required by a permit shall make the certification set forth in §305.44(b) of this title (relating to Signatories to Applications).

305.44(a) All applications shall be signed as follows.

(1) For a corporation, the application shall be signed by a responsible corporate officer. For purposes of this paragraph, a responsible corporate officer means a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding $25 million (in second-quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures. Corporate procedures governing authority to sign permit or post-closure order applications may provide for assignment or delegation to applicable corporate positions rather than to specific individuals.

(2) For a partnership or sole proprietorship, the application shall be signed by a general partner or the proprietor, respectively.

(3) For a municipality, state, federal, or other public agency, the application shall be signed by either a principal executive officer or a ranking elected official. For purposes of this paragraph, a principal executive officer of a federal agency includes the chief executive officer of the agency, or a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., regional administrator of the EPA).

(b) A person signing an application shall make the following certification: "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

APPENDIX J

MATERIAL MANAGEMENT PRACTICES

MATERIAL MANAGEMENT PRACTICES

The following are the material management practices that will be used to reduce risk of spills or other accidental exposure of materials and substances to storm water runoff:

1. Good Housekeeping: The following good housekeeping practices will be followed onsite during the construction project:
   - An effort will be made to store only enough product required to do the job.
   - All materials stored on-site will be stored in a neat, orderly manner in their appropriate containers and, if possible, under a roof or other enclosure.
   - Products will be kept in their original containers with the original manufacturer's label.
   - Substances will not be mixed with one another unless recommended by the manufacturer.
   - Whenever possible, all of a product will be used up before disposing of the container.
   - Manufacturers' recommendations for proper use and disposal will be followed.
   - Designated areas for equipment maintenance and repair (control of oil, grease and fuel spills).
   - Waste receptacles with regular collection for litter and construction debris.
   - Equipment washdown area on-site with appropriate control of wash waters (including concrete truck wash down).
   - Protected storage areas for chemicals, paints, solvents, fertilizers and other potentially toxic materials.
   - Adequately maintained sanitary facilities.
   - Proper control of raw materials stored on-site (for example, sand, aggregate and cement used in the manufacture of concrete or stockpiles of topsoil).
   - Street sweeping or cleaning.
   - Removal of inlet protection barriers during major rainfall events if flooding occurs and verification that reinforced filter fabric fences are in proper condition prior to all rainfall events.
   - The site superintendent will ensure proper use and disposal of materials onsite.
2. Hazardous Products: The following practices are used to reduce the risks associated with hazardous materials.
   - Products will be kept in original containers unless they are not re-sealable.
   - Paints, solvents, fertilizer, fuel (small containers), and other stored chemical substances will be kept within an enclosure to protect the containers and the floor of the enclosure, from wind, precipitation, and storm water runoff.
   - Fuel storage and filling areas will be bermed off to provide collection of any spills and prevent exposure to storm water runoff.
   - Original labels and Material Safety Data Sheets (MSDS) will be retained on-site and available for review by workers.
   - If surplus product must be disposed of, manufacturers' or local and State recommended methods for proper disposal will be followed.

PRODUCT SPECIFIC PRACTICES

The following product specific practices will be followed onsite:

1. Petroleum Products: All onsite vehicles will be monitored for leaks and receive regular preventive maintenance to reduce the chance of leakage. Petroleum products will be stored in tightly sealed containers, which are clearly labeled. Any asphalt substances used onsite will be applied according to the manufacturer's recommendations.
2. Fertilizers: Fertilizers used will be applied only in the minimum amounts recommended by the manufacturer. Storage will be in a covered shed.
3. Paints: All containers will be tightly sealed and stored when not required for use. Excess paint will not be discharged to the storm sewer system but will be properly disposed of according to manufacturers' instructions or State and local regulations.
4. Concrete Trucks: Discharges of concrete truck wash out at construction sites may be authorized if conducted in accordance with the requirements of Part V of the general permit.

SPILL CONTROL PRACTICES

In addition to the good housekeeping and material management practices discussed in the previous sections of this plan, the following practices will be followed for spill prevention and cleanup:

- Manufacturers' recommended methods for spill cleanup will be maintained on-site in the material data sheets (MSDS) and site personnel will be made aware of the procedures and the location of the information and cleanup supplies.
- Materials and equipment necessary for spill cleanup will be kept in the material storage area onsite. Equipment and materials will include but not be limited to brooms, dust pans, mops, rags, gloves, goggles, kitty litter, sand, sawdust and plastic and metal trash containers specifically for this purpose.
- All spills will be cleaned up immediately after discovery.
- The spill area will be kept well ventilated and personnel will wear appropriate protective clothing to prevent injury from contact with a hazardous substance.
- Contact the MS4 Operator, TCEQ (800-832-8224), and the National Response Center (800-424-8802) to inform of any spill of toxic or hazardous material regardless of the size.

The spill prevention plan will be adjusted to include measures to prevent this type of spill from recurring and how to clean up the spill if there is another one. A description of the spill, what caused it, and the cleanup measures will also be included.

APPENDIX K

NON-STORM WATER DISCHARGE INVENTORY

NON-STORM WATER DISCHARGE INVENTORY

Mark the materials or substances listed below expected to be present onsite during construction:

☐ Concrete	☐ Detergents	☐ Paints (enamel/latex)
☐ Metal Studs	☐ Fuels	☐ Lubricants
☐ Fertilizers	☐ Petroleum Based Products	☐ Cleaning Solvents
☐ Masonry Block	☐ Electrical Equipment and Materials	☐ Asphalt and Asphalt Related Products
☐ Tar	☐ Roof Shingles	☐ Wood
☐ Steel Products	☐ _____	☐ _____
☐ _____	☐ _____	☐ _____

AUTHORIZED NON STORMWATER DISCHARGES ANTICIPATED DURING THE PROJECT

Mark the following non-storm water discharges expected to occur from the site during the construction period (refer to general permit in Appendix G for additional information):

- ☐ discharges from firefighting activities,
- ☐ uncontaminated fire hydrant flushings, which include flushings from systems that utilize potable water, surface water, or groundwater that does not contain additional pollutants,
- ☐ water from the routine external washing of vehicles, the external portion of buildings or structures, and pavement, where detergents and soaps are not used and where spills or leaks of toxic or hazardous materials have not occurred and where the purpose is to remove mud, dirt, or dust,
- ☐ uncontaminated water used to control dust,
- ☐ potable water sources including waterline flushings,
- ☐ uncontaminated air conditioning condensate,
- ☐ uncontaminated ground water or spring water, including foundation or footing drains where flows are not contaminated with industrial materials such as solvents,
- ☐ lawn watering and similar irrigation drainage,
- ☐ runoff from concrete batch plants (refer to Part IV of general permit),
- ☐ concrete truck wash out (refer to Part V of general permit).

APPENDIX L

REPORTABLE QUANTITIES OF HAZARDOUS SUBSTANCES

Each substance in Table 117.3 that is listed in Table 302.4, 40 CFR part 302, is assigned the reportable quantity listed in Table 302.4 for that substance.

TABLE 117.3 -- REPORTABLE QUANTITIES OF HAZARDOUS SUBSTANCES DESIGNATED PURSUANT TO SECTION 311 OF THE CLEAN WATER ACT

Note: The first number under the column headed "RQ" is the reportable quantity in pounds. The number in parentheses is the metric equivalent in kilograms. For convenience, the table contains a column headed "Category" which lists the code letters "X", "A", "B", "C", and "D" associated with reportable quantities of 1, 10, 100, 1000, and 5000 pounds, respectively.

Table 117.3_Reportable Quantities of Hazardous Substances Designated Pursuant to Section 311 of the Clean Water Act

Material	Category	RQ in pounds (kilograms)
Acetaldehyde	C	1,000 (454)
Acetic acid	D	5,000 (2,270)
Acetic anhydride	D	5,000 (2,270)
Acetone cyanohydrin	A	10 (4.54)
Acetyl bromide	D	5,000 (2,270)
Acetyl chloride	D	5,000 (2,270)
Acrolein	X	1 (0.454)
Acrylonitrile	B	100 (45.4)
Adipic acid	D	5,000 (2,270)
Aldrin	X	1 (0.454)
Allyl alcohol	B	100 (45.4)
Allyl chloride	C	1,000 (454)
Aluminum sulfate	D	5,000 (2,270)
Ammonia	B	100 (45.4)
Ammonium acetate	D	5,000 (2,270)
Ammonium benzoate	D	5,000 (2,270)
Ammonium bicarbonate	D	5,000 (2,270)
Ammonium bichromate	A	10 (4.54)
Ammonium bifluoride	B	100 (45.4)
Ammonium bisulfite	D	5,000 (2,270)
Ammonium carbamate	D	5,000 (2,270)
Ammonium carbonate	D	5,000 (2,270)
Ammonium chloride	D	5,000 (2,270)
Ammonium chromate	A	10 (4.54)
Ammonium citrate dibasic	D	5,000 (2,270)
Ammonium fluoborate	D	5,000 (2,270)
Ammonium fluoride	B	100 (45.4)
Ammonium hydroxide	C	1,000 (454)
Ammonium oxalate	D	5,000 (2,270)
Ammonium silicofluoride	C	1,000 (454)
Ammonium sulfamate	D	5,000 (2,270)
Ammonium sulfide	B	100 (45.4)
Ammonium sulfite	D	5,000 (2,270)
Ammonium tartrate	D	5,000 (2,270)
Ammonium thiocyanate	D	5,000 (2,270)
Amyl acetate	D	5,000 (2,270)
Aniline	D	5,000 (2,270)

Antimony pentachloride	C	1,000 (454)
Antimony potassium tartrate	B	100 (45.4)
Antimony tribromide	C	1,000 (454)
Antimony trichloride	C	1,000 (454)
Antimony trifluoride	C	1,000 (454)
Antimony trioxide	C	1,000 (454)
Arsenic disulfide	X	1 (0.454)
Arsenic pentoxide	X	1 (0.454)
Arsenic trichloride	X	1 (0.454)
Arsenic trioxide	X	1 (0.454)
Arsenic trisulfide	X	1 (0.454)
Barium cyanide	A	10 (4.54)
Benzene	A	10 (4.54)
Benzoic acid	D	5,000 (2,270)
Benzonitrile	D	5,000 (2,270)
Benzoyl chloride	C	1,000 (454)
Benzyl chloride	B	100 (45.4)
Beryllium chloride	X	1 (0.454)
Beryllium fluoride	X	1 (0.454)
Beryllium nitrate	X	1 (0.454)
Butyl acetate	D	5,000 (2,270)
Butylamine	C	1,000 (454)
n-Butyl phthalate	A	10 (4.54)
Butyric acid	D	5,000 (2,270)
Cadmium acetate	A	10 (4.54)
Cadmium bromide	A	10 (4.54)
Cadmium chloride	A	10 (4.54)
Calcium arsenate	X	1 (0.454)
Calcium arsenite	X	1 (0.454)
Calcium carbide	A	10 (4.54)
Calcium chromate	A	10 (4.54)
Calcium cyanide	A	10 (4.54)
Calcium dodecylbenzenesulfonate	C	1,000 (454)
Calcium hypochlorite	A	10 (4.54)
Captan	A	10 (4.54)
Carbaryl	B	100 (45.4)
Carbofuran	A	10 (4.54)
Carbon disulfide	B	100 (45.4)
Carbon tetrachloride	A	10 (4.54)
Chlordane	X	1 (0.454)
Chlorine	A	10 (4.54)
Chlorobenzene	B	100 (45.4)
Chloroform	A	10 (4.54)
Chlorosulfonic acid	C	1,000 (454)
Chlorpyrifos	X	1 (0.454)
Chromic acetate	C	1,000 (454)
Chromic acid	A	10 (4.54)
Chromic sulfate	C	1,000 (454)
Chromous chloride	C	1,000 (454)
Cobaltous bromide	C	1,000 (454)
Cobaltous formate	C	1,000 (454)
Cobaltous sulfamate	C	1,000 (454)
Coumaphos	A	10 (4.54)
Cresol	B	100 (45.4)
Crotonaldehyde	B	100 (45.4)

Cupric acetate	B	100 (45.4)
Cupric acetoarsenite	X	1 (0.454)
Cupric chloride	A	10 (4.54)
Cupric nitrate	B	100 (45.4)
Cupric oxalate	B	100 (45.4)
Cupric sulfate	A	10 (4.54)
Cupric sulfate, ammoniated	B	100 (45.4)
Cupric tartrate	B	100 (45.4)
Cyanogen chloride	A	10 (4.54)
Cyclohexane	C	1,000 (454)
2,4-D Acid	B	100 (45.4)
2,4-D Esters	B	100 (45.4)
DDT	X	1 (0.454)
Diazinon	X	1 (0.454)
Dicamba	C	1,000 (454)
Dichlobenil	B	100 (45.4)
Dichlone	X	1 (0.454)
Dichlorobenzene	B	100 (45.4)
Dichloropropane	C	1,000 (454)
Dichloropropene	B	100 (45.4)
Dichloropropene-Dichloropropane (mixture).	B	100 (45.4)
2,2-Dichloropropionic acid	D	5,000 (2,270)
Dichlorvos	A	10 (4.54)
Dicofol	A	10 (4.54)
Dieldrin	X	1 (0.454)
Diethylamine	B	100 (45.4)
Dimethylamine	C	1,000 (454)
Dinitrobenzene (mixed)	B	100 (45.4)
Dinitrophenol	A	10 (45.4)
Dinitrotoluene	A	10 (4.54)
Diquat	C	1,000 (454)
Disulfoton	X	1 (0.454)
Diuron	B	100 (45.4)
Dodecylbenzenesulfonic acid	C	1,000 (454)
Endosulfan	X	1 (0.454)
Endrin	X	1 (0.454)
Epichlorohydrin	B	100 (45.4)
Ethion	A	10 (4.54)
Ethylbenzene	C	1,000 (454)
Ethylenediamine	D	5,000 (2,270)
Ethylenediamine-tetraacetic acid (EDTA).	D	5,000 (2,270)
Ethylene dibromide	X	1 (0.454)
Ethylene dichloride	B	100 (45.4)
Ferric ammonium citrate	C	1,000 (454)
Ferric ammonium oxalate	C	1,000 (454)
Ferric chloride	C	1,000 (454)
Ferric fluoride	B	100 (45.4)
Ferric nitrate	C	1,000 (454)
Ferric sulfate	C	1,000 (454)
Ferrous ammonium sulfate	C	1,000 (454)
Ferrous chloride	B	100 (45.4)
Ferrous sulfate	C	1,000 (454)
Formaldehyde	B	100 (45.4)
Formic acid	D	5,000 (2,270)

Fumaric acid	D	5,000 (2,270)
Furfural	D	5,000 (2,270)
Guthion	X	1 (0.454)
Heptachlor	X	1 (0.454)
Hexachlorocyclopentadiene	A	10 (4.54)
Hydrochloric acid	D	5,000 (2,270)
Hydrofluoric acid	B	100 (45.4)
Hydrogen cyanide	A	10 (4.54)
Hydrogen sulfide	B	100 (45.4)
Isoprene	B	100 (45.4)
Isopropanolamine dodecylbenzenesulfonate.	C	1,000 (454)
Kepone	X	1 (0.454)
Lead acetate	A	10 (4.54)
Lead arsenate	X	1 (0.454)
Lead chloride	A	10 (4.54)
Lead fluoborate	A	10 (4.54)
Lead fluoride	A	10 (4.54)
Lead iodide	A	10 (4.54)
Lead nitrate	A	10 (4.54)
Lead stearate	A	10 (4.54)
Lead sulfate	A	10 (4.54)
Lead sulfide	A	10 (4.54)
Lead thiocyanate	A	10 (4.54)
Lindane	X	1 (0.454)
Lithium chromate	A	10 (4.54)
Malathion	B	100 (45.4)
Maleic acid	D	5,000 (2,270)
Maleic anhydride	D	5,000 (2,270)
Mercaptodimethur	A	10 (4.54)
Mercuric cyanide	X	1 (0.454)
Mercuric nitrate	A	10 (4.54)
Mercuric sulfate	A	10 (4.54)
Mercuric thiocyanate	A	10 (4.54)
Mercurous nitrate	A	10 (4.54)
Methoxychlor	X	1 (0.454)
Methyl mercaptan	B	100 (45.4)
Methyl methacrylate	C	1,000 (454)
Methyl parathion	B	100 (45.4)
Mevinphos	A	10 (4.54)
Mexacarbate	C	1,000 (454)
Monoethylamine	B	100 (45.4)
Monomethylamine	B	100 (45.4)
Naled	A	10 (4.54)
Naphthalene	B	100 (45.4)
Naphthenic acid	B	100 (45.4)
Nickel ammonium sulfate	B	100 (45.4)
Nickel chloride	B	100 (45.4)
Nickel hydroxide	A	10 (4.54)
Nickel nitrate	B	100 (45.4)
Nickel sulfate	B	100 (45.4)
Nitric acid	C	1,000 (454)
Nitrobenzene	C	1,000 (454)
Nitrogen dioxide	A	10 (4.54)
Nitrophenol (mixed)	B	100 (45.4)

Nitrotoluene	C	1,000 (454)
Paraformaldehyde	C	1,000 (454)
Parathion	A	10 (4.54)
Pentachlorophenol	A	10 (4.54)
Phenol	C	1,000 (454)
Phosgene	A	10 (4.54)
Phosphoric acid	D	5,000 (2,270)
Phosphorus	X	1 (0.454)
Phosphorus oxychloride	C	1,000 (454)
Phosphorus pentasulfide	B	100 (45.4)
Phosphorus trichloride	C	1,000 (454)
Polychlorinated biphenyls	X	1 (0.454)
Potassium arsenate	X	1 (0.454)
Potassium arsenite	X	1 (0.454)
Potassium bichromate	A	10 (4.54)
Potassium chromate	A	10 (4.54)
Potassium cyanide	A	10 (4.54)
Potassium hydroxide	C	1,000 (454)
Potassium permanganate	B	100 (45.4)
Propargite	A	10 (4.54)
Propionic acid	D	5,000 (2,270)
Propionic anhydride	D	5,000 (2,270)
Propylene oxide	B	100 (45.4)
Pyrethrins	X	1 (0.454)
Quinoline	D	5,000 (2,270)
Resorcinol	D	5,000 (2,270)
Selenium oxide	A	10 (4.54)
Silver nitrate	X	1 (0.454)
Sodium	A	10 (4.54)
Sodium arsenate	X	1 (0.454)
Sodium arsenite	X	1 (0.454)
Sodium bichromate	A	10 (4.54)
Sodium bifluoride	B	100 (45.4)
Sodium bisulfite	D	5,000 (2,270)
Sodium chromate	A	10 (4.54)
Sodium cyanide	A	10 (4.54)
Sodium dodecylbenzenesulfonate	C	1,000 (454)
Sodium fluoride	C	1,000 (454)
Sodium hydrosulfide	D	5,000 (2,270)
Sodium hydroxide	C	1,000 (454)
Sodium hypochlorite	B	100 (45.4)
Sodium methylate	C	1,000 (454)
Sodium nitrite	B	100 (45.4)
Sodium phosphate, dibasic	D	5,000 (2,270)
Sodium phosphate, tribasic	D	5,000 (2,270)
Sodium selenite	B	100 (45.4)
Strontium chromate	A	10 (4.54)
Strychnine	A	10 (4.54)
Styrene	C	1,000 (454)
Sulfuric acid	C	1,000 (454)
Sulfur monochloride	C	1,000 (454)
2,4,5-T acid	C	1,000 (454)
2,4,5-T amines	D	5,000 (2,270)
2,4,5-T esters	C	1,000 (454)
2,4,5-T salts	C	1,000 (454)
TDE	X	1 (0.454)

2,4,5-TP acid	B	100 (45.4)
2,4,5-TP acid esters	B	100 (45.4)
Tetraethyl lead	A	10 (4.54)
Tetraethyl pyrophosphate	A	10 (4.54)
Thallium sulfate	B	100 (45.4)
Toluene	C	1,000 (454)
Toxaphene	X	1 (0.454)
Trichlorfon	B	100 (45.4)
Trichloroethylene	B	100 (45.4)
Trichlorophenol	A	10 (4.54)
Triethanolamine dodecylbenzenesulfonate.	C	1,000 (454)
Triethylamine	D	5,000 (2,270)
Trimethylamine	B	100 (45.4)
Uranyl acetate	B	100 (45.4)
Uranyl nitrate	B	100 (45.4)
Vanadium pentoxide	C	1,000 (454)
Vanadyl sulfate	C	1,000 (454)
Vinyl acetate	D	5,000 (2,270)
Vinylidene chloride	B	100 (45.4)
Xylene (mixed)	B	100 (45.4)
Xylenol	C	1,000 (454)
Zinc acetate	C	1,000 (454)
Zinc ammonium chloride	C	1,000 (454)
Zinc borate	C	1,000 (454)
Zinc bromide	C	1,000 (454)
Zinc carbonate	C	1,000 (454)
Zinc chloride	C	1,000 (454)
Zinc cyanide	A	10 (4.54)
Zinc fluoride	C	1,000 (454)
Zinc formate	C	1,000 (454)
Zinc hydrosulfite	C	1,000 (454)
Zinc nitrate	C	1,000 (454)
Zinc phenolsulfonate	D	5,000 (2,270)
Zinc phosphide	B	100 (45.4)
Zinc silicofluoride	D	5,000 (2,270)
Zinc sulfate	C	1,000 (454)
Zirconium nitrate	D	5,000 (2,270)
Zirconium potassium fluoride	C	1,000 (454)
Zirconium sulfate	D	5,000 (2,270)
Zirconium tetrachloride	D	5,000 (2,270)

– [50 FR 13513, Apr. 4, 1985, as amended at 51 FR 34547, Sept. 29, 1986; 54 FR 33482, Aug. 14, 1989; 58 FR 35327, June 30, 1993; 60 FR 30937, June 12, 1995]

APPENDIX M

SEDIMENTATION BASIN INFORMATION

Sites With Drainage Areas of Ten or More Acres

A sedimentation basin is required, where feasible, for a common drainage location that serves an area with ten (10) or more acres disturbed at one time.

A sedimentation basin may be temporary or permanent, and must provide sufficient storage to contain a calculated volume of runoff from a 2-year, 24-hour storm from each disturbed acre drained. When calculating the volume of runoff from a 2-year, 24-hour storm event, it is not required to include the flows from offsite areas and flow from onsite areas that are either undisturbed or have already undergone permanent stabilization, if these flows are diverted around both the disturbed areas of the site and the sediment basin. Capacity calculations shall be included in Appendix M of this SWP3.

Where rainfall data is not available or a calculation cannot be performed, the sedimentation basin must provide at least 3,600 cubic feet of storage per acre drained until final stabilization of the site.

If a sedimentation basin is not feasible, then the permittee shall provide equivalent control measures until final stabilization of the site. In determining whether installing a sediment basin is feasible, the permittee may consider factors such as site soils, slope, available area, public safety, precipitation patterns, site geometry, site vegetation, infiltration capacity, geotechnical factors, depth to groundwater, and other similar considerations. The permittee shall document the reason that the sediment basins are not feasible, and shall utilize equivalent control measures, which may include a series of smaller sediment basins.

Sites With Drainage Areas Less than Ten Acres

Sediment traps and sediment basins may be used to control solids in storm water runoff for drainage locations serving less than ten (10) acres.

Alternatively, a sediment basin that provides storage for a calculated volume of runoff from a 2-year, 24-hour storm from each disturbed acre drained may be utilized. Where rainfall data is not available or a calculation cannot be performed, a temporary or permanent sediment basin providing 3,600 cubic feet of storage per acre drained may be provided. If a calculation is performed, then the calculation shall be included in Appendix N of this SWP3.

Proposed Sedimentation Basin Calculations

For Roger Hanks Parkway Extension II, there will be no proposed sedimentation basins provided.

APPENDIX N

LOCAL REQUIREMENTS

SECTION 10. NON-POINT SOURCE POLLUTION CONTROL MANAGEMENT PERFORMANCE STANDARDS

Except as otherwise provided in this section, all development subject to this Manual shall achieve the following performance standards.

10.1. Removal of Annual Pollutant Load

10.1.1. For development not using on-site irrigation with treated wastewater effluent:

Total Suspended Solids (TSS)	95% removal
Total Phosphorus (TP)	95% removal
Oil and Grease (O&G)	95% removal

10.1.2. For development using on-site irrigation with treated wastewater effluent or with septic system effluent:

Total Suspended Solids (TSS)	95% removal
Total Phosphorus (TP)	95% removal
Total Nitrogen (TN)	95% removal
Chemical Oxygen Demand (COD)	95% removal

Biochemical Oxygen Demand (BOD)	95% removal
(vi) Fecal Coliform (FC)	95% removal
(vii) Fecal Strepticocci (FS)	95% removal
(viii)Total Organic Carbon (TOC)	95% removal

10.1.3. Background and Developed Sites Pollutant Concentrations and Pollutant Loads:

(a) Background pollutant concentrations shall be as defined below:

Background pollutant load is the amount of pollution in stormwater runoff that is discharged from a site before development. The background pollutant load is calculated by multiplying the drainage area of the site by the annual runoff coefficient by the background stormwater pollution concentrations. The annual runoff coefficient for background conditions is 0.049. The background stormwater pollution concentrations are as follows:

[Frame1]

(b) Standard pollutant concentrations for developed sites shall be as defined in the TCSS Manual.

(c) Calculation of annual pollutant loading shall comply with the criteria given in the TCSS Manual.

10.1.4. Water Quality Volume

The minimum volume of stormwater runoff for water quality control shall be the first one-half (0.5") inch of runoff plus an

additional one-tenth (0.1") inch for each ten percentage point increase of the gross impervious cover over twenty percent (20%) of the contributing drainage area to the water quality control. Water quality volume shall be calculated in accordance with the TCSS Manual.

10.1.5. Impervious Cover

Impervious cover limits in this section are expressed as percentage of the total site area. Impervious cover shall not exceed the following:

(A) Single-family residential use	20%
(B) Multi-family residential use and non-residential use	40%

10.1.6. Impervious Cover Allowances:

(a) General - The impervious cover limits above may be increased by the following amounts under the following conditions, if approved by the City:

(1) Isolation of Roof Runoff and Irrigation (for all development uses). The maximum impervious cover limits may be increased up to five (5) percentage points if roof runoff is isolated, treated and used for irrigation.
(2) Water Quality Controls (for single-family residential use only). The maximum impervious cover limit may be increased up to twenty (20) percentage points if appropriate water quality controls are provided in accordance with this section.
(3) Transfer of Development Intensity: multi-family residential use and nonresidential use.

i) An applicant who complies with a provision of this subsection qualifies for the development intensity transfer:

For each three (3) acres of land that an applicant leaves undeveloped and undisturbed in an area zoned by the City for nonresidential use, and does not include impervious calculations elsewhere, the applicant may transfer up to one (1) acre of impervious cover, but in no case shall the maximum impervious cover limit be increased by more than ten (10) percentage points; or

For each six (6) acres of land that an applicant leaves undeveloped and undisturbed in an area zoned by the City for residential use and does not include impervious calculations elsewhere, the applicant may transfer up to one (1) acre of impervious cover, but in no case shall the maximum impervious cover limit be increased by more than ten (10) percentage points; or

For each six (6) acres of land that an applicant leaves undeveloped and undisturbed in the ETJ of the City and does not include its impervious calculations elsewhere, the applicant may transfer up to one (1) acre of impervious cover, but in no case shall the maximum impervious cover limit be increased by more than ten (10) percentage points.

ii) An applicant who qualifies for a development density transfer must comply with the following requirements to effect the transfer:

- the transferring tract and the receiving tract must be located within the corporate limits or the ETJ of the City, and
- the transferring tract does not include a water quality buffer zone or critical environmental feature, and

- the receiving tract must comply with the water quality control standards of this article, and
- the transferring and the receiving tracts must be concurrently platted and must transfer development intensity at that time, and
- the development intensity transfer must be noted on the plats of the transferring and receiving tracts, and
- a restrictive covenant must be filed in the deed records, approved by the City, that runs with the transferring tract and describes the development intensity transfer.

10.1.7. Critical Water Quality Zones (CWQZ)

A critical water quality zone is established along each waterway as follows:

(a) Upland Waterways: The CWQZ shall extend a minimum of eighty-five feet (85') from the outer limit of the peak two-year flood level paralleling each side of the waterway. The CWQZ shall parallel all reaches of each waterway with at least thirty (30) acres of contributing drainage area.
(b) Onion Creek, Little Barton Creek, Barton Creek: The CWQZ shall extend a minimum of three hundred feet (300') from the outer limit of the peak two-year flood level, paralleling each side of the waterway.
(c) The two-year peak flood level shall be calculated in accordance with the TCSS Manual.

10.1.8. Critical Environmental Features (CEF):

The CWQZ shall extend a minimum of eighty-five feet (85') around the outside periphery of natural springs, natural recharge features, and wetlands.

10.1.9. Overlapping Critical Water Quality Zones:

If two (2) or more CWQZ's overlap, then the widest zone shall be established.

10.2. Impervious Cover

Although a certain percentage of impervious cover is discussed and designated within this article, nothing in this article shall release a person from meeting the requirements of the zoning and landscape provisions of the City of Dripping Springs, Texas Code of Ordinances. Impervious cover shall include all man-made improvements which prevent the infiltration of water into the natural soil, or prevent the migration of the infiltration as base flow.

10.2.1. The following shall be considered as impervious cover:

(a) Roads, pavements, and driveways, except as provided in subsection (c) of this section;

(b) Parking areas;

(c) Buildings;

(d) Pedestrian walkways and sidewalks;

(e) Concrete, asphalt, masonry, surfaces areas, and paving stone surfaced areas;

(f) Swimming pool water surface area;

(g) Densely compacted natural soils or fills which result in a coefficient of permeability less than 1x10-6 cm/sec;

(h) All existing man-made impervious surfaces prior to development;

(i) Water quality and stormwater detention basins lined with impermeable materials;

(j) Stormwater drainage conveyance structures lined with impermeable materials;

(k) Interlocking or "permeable pavers";

(l) Fifty percent (50%) of the horizontal surface area of an uncovered deck that has drainage spaces between the deck boards that is located over a pervious surface;

10.2.2. The following will not be considered as impervious cover:

(a) Existing roads adjacent to the development and not constructed as part of the development at an earlier phase;

(b) Naturally occurring impervious features, such as rock out crops;

(c) Landscaped areas and areas remaining in their natural state;

(d) Water quality controls and stormwater detention basins not lined with impermeable materials.

(e) Stormwater drainage conveyance structures not lined with impermeable materials.

10.2.3. The following shall not be included in the total site area against which the allowable impervious cover percentage limit is applied:

(a) Critical Water Quality Zones;

(b) Critical Environmental Features.

10.2.4. Restrictions:

(a) Impervious cover shall not be constructed downstream of water quality controls;

(b) Impervious cover shall not be constructed within Critical Water Quality Zones;

(c) Impervious cover shall not be constructed within the areas designated for on-site irrigation for treated wastewater effluent disposal.

10.3. Critical Water Quality Zones (CWQZ)

10.3.1. All development activities, including temporary construction activities and landscaping activities, shall be restricted from the CWQZ, except the following development activities may be allowed if approved by the City:

(a) Roadway and driveway crossings;

(b) Hike and bike trails in accordance with the Comprehensive Plan;

(c) Maintenance and restoration of natural vegetation;

(d) Water quality control monitoring devices;

(e) Removal of trash, debris, pollutants;

(f) Utilities, as subject to the restrictions of subsection (b) of this section;

(g) Fences that do not obstruct flood flows;

(h) Public and private parks and open space, with development in the parks and open space limited to hiking, jogging, or walking trails, and excludes stables and corrals for animals

(i) Private drives to allow access to property not otherwise accessible.

10.3.2. All utilities, other than wastewater shall be located outside the CWQZ except for crossings.

Wastewater lift stations shall be located outside the CWQZ. On-site wastewater disposal system shall be located outside the CWQZ. Wastewater trunk lines and lateral lines shall be located outside the CWQZ to the maximum extent practical except for crossings. In no case shall any wastewater line be located less than one hundred feet (100') from the center line of Little Barton Creek or Barton Creek or fifty feet (50') from the center line of an upland waterway except for crossing, unless approved by the City, and unless the applicant has shown that installation outside of this zone is physically prohibitive or environmentally unsound. All wastewater trunk lines located in the CWQZ shall meet design standards and construction specifications of testing to a zero (0) leakage allowable.

10.3.3. All water quality control discharges and stormwater discharges onto a CWQZ shall:

7. have diffused, sheet flow;

8. have peak velocities of less than five (5) fps at the 2-year design storm.

10.4. Overland Flow

10.4.1. No untreated stormwater runoff from developed land shall be allowed to flow over critical environmental features that are recharge structures.

10.4.2. To the maximum extent practical, all roof runoff from non-residential buildings shall have down spouts disconnected from the site stormwater drainage system.

10.4.3. To the maximum extent practical, all stormwater drainage shall be treated using overland flow methods to a vegetated buffer. The vegetated buffer shall be designed in accordance with the TCSS Manual.

10.4.4. Drainage patterns shall be designed to the maximum extent practical to prevent erosion, maintain and recharge of local seeps and springs, and attenuate the harm of contaminants collected and transported by stormwater. Overland sheet flow and natural drainage features and patterns shall be maintained to the maximum extent practical, depending on volumes and velocities of runoff for the development, as opposed to concentrating flows in storm sewers and drainage ditches.

10.4.5. Construction of enclosed storm sewers and impervious channel linings are permitted only when the City, on the basis of competent engineering evidence from the applicant, concludes that such storm sewers or impervious linings are protective of water quality.

10.4.6. If storm sewers are deemed necessary as specified above, the applicant shall design the stormwater drainage system to mitigate its impact on water quality by using structural devices or other methods to prevent erosion and dissipate discharges from outlets wherever practicable, and by directing discharges to maximize overland flow through buffer zones or grass line swales.

10.4.7. Overland flow facilities for the stormwater drainage system shall be designed in accordance with the criteria of the TCSS Manual.

10.5. Infiltration

10.5.1. To the maximum extent practical, water quality controls shall be designed to restore the infiltration capacity of pre-development conditions. Infiltration BMP's shall be designed in accordance with the TCSS Manual.

10.5.2. Infiltration systems shall be designed and located to avoid impacts to existing springs and recharge structures.

10.6. Steep Slopes

10.6.1. To the maximum extent practical, non-residential construction shall be limited to those areas with pre-development natural grades of less than twenty-five percent (25%).

10.6.2. Erosion control, terracing and water quality control BMP's shall be designed in accordance with the TCSS Manual.

10.6.3. A cut or fill with a finished gradient steeper than thirty-three percent (33%) shall be stabilized with a permanent structure.

10.7. Vegetation

10.7.1. To the maximum extent practical, landscape shall be preserved in its natural state and shall comply with the requirements of the zoning ordinance of the City.

10.7.2. To the maximum extent practical, xeriscape and low maintenance vegetation shall be included in all non-residential development and shall be provided in accordance with the TCSS Manual.

10.7.3. To the maximum extent practical, the use of herbicides, pesticides and fertilizers shall be minimized.

10.7.4. A pesticide and fertilizer management plan shall be submitted providing information regarding proper use, storage, and disposal of pesticides and fertilizers. The plan shall indicate likely pesticides and fertilizers to be used. The plan shall include two lists of pesticides and fertilizers: (1) those which, due to their chemical characteristics, potentially contribute significantly to water quality degradation; (2) those which, due to the chemical characteristics, potentially would result in minimal water quality degradation.

10.7.5. An Integrated Pest Management (IPM) Plan shall be submitted in accordance with the TCSS Manual.

10.7.6. Vegetative BMP's, such as vegetative filter strips, shall be designed in accordance with the TCSS Manual.

10.8. Water Quality Controls (WQC)

10.8.1. Water quality controls (WQC) are required for all new impervious cover development as follows:

(a) Multi-family residential development, non-residential development, and all subdivision development: Water quality controls shall be sized for the entire contributing drainage area that contains development if:

i) the new development contains impervious cover; or

ii) the re-development increases the total impervious cover to exceed 40 percent.

(b) Single-family residential development (not part of a subdivision development): Water quality controls shall be sized for the entire contributing drainage area that contains development if:

i) the new development contains total impervious cover in excess of twenty percent (20%); or
ii) the re-development increases the total impervious cover to exceed twenty percent (20%).

10.8.2. The volume of runoff (water quality volume) to be captured, isolated, and treated by each WQC shall be as required in 10.1.0 (b). Each WQC shall be sized for the contributing drainage area only to that WQC.

10.8.3. Vegetated filter strips shall be used to the maximum extent practical for the treatment of stormwater runoff. Additional structural WQC's shall be provided where a vegetated filter strip alone is not sufficient to reduce developed condition pollutant loads to the levels required in this section.

10.8.4. Pollutant loads from all developed areas shall be considered when determining the level of treatment needed to comply with these regulations. Developed areas requiring treatment shall include the total contributing drainage area with:

(a) areas of impervious cover;

(b) lawns using pesticides, herbicides or fertilizers;

(c) landscaping using pesticides, herbicides or fertilizers;

(d) gardens using pesticides, herbicides or fertilizers;

(e) golf courses and play fields using pesticides, herbicides or fertilizers;

(f) areas of on-site spray irrigation with wastewater effluent;

10.8.5. The following areas shall not require water quality treatment:

(a) The full area of existing natural areas or restored natural areas which are restricted from development and pesticides, herbicide, or fertilizer application through a plat note or

restrictive covenant and the runoff from which is routed around the WQC. The drainage areas of unrouted runoff from natural areas which blend with the runoff from the developed areas shall be included in the water quality volume calculations.

(b) One half (1/2) of the area using landscaping with vegetation that requires no irrigation, pesticide, herbicide, or fertilizer applications.

(c) The full area of the WQC structure.

(d) Swimming pools which do not discharge its filter backwash into the stormwater drainage system.

(e) Impervious surface areas used for stormwater collection and on-site irrigation.

(f) The full area of off-site drainage areas and the runoff from which is routed around the WQC. Unrouted runoff from off-site areas shall be included in the sizing of the WQC. The drainage areas of unrouted runoff from off-site areas which blend with the runoff from the developed areas shall be included in the water quality volume calculations.

10.8.6. Removal efficiencies for WQC's shall be as established in the TCSS Manual or must be approved by the City based on reports or studies contained in engineering or scientific literature. The efficiency of a second or later WQC in a series shall be reduced by five percentage points for each subsequent WQC in series, except the design of the first WQC in series after a vegetative filter strip shall be based upon the full rated efficiency.

10.8.7. WQC for oil and grease treatment shall be sized only for the surface area of paving.

10.8.8. The maximum drainage area for a single WQC shall be fifty (50) acres.

10.8.9. The design of WQC's shall be in accordance with the TCSS Manual.

10.9. Erosion Control Requirements

10.9.1. This article shall apply regardless of whether an applicant is required to obtain a permit from the City in order to conduct such land disturbing or construction activity.

10.9.2. Off-Site Borrow, Spoil and Staging Areas: Where applicable, off-site borrow areas, spoil areas and construction staging areas shall be considered as part of the project site and shall be governed by this article.

10.9.3. Related Land Areas: The erosion control requirements of this article shall apply to all related land areas. Additionally, when land disturbing activity occurs on a project, all disturbed land areas related to the project shall have permanent erosion control established before final occupancy of structures located thereon or final acceptance of the subdivision may be obtained. This section applies whether or not a building permit is required.

10.9.4. BMP's: For erosion and sediment control during construction, BMP's shall comply with the TCSS Manual.

10.9.5. Design of Permanent BMP's: For erosion and sediment control, design of permanent BMP's shall be in accordance with the TCSS Manual.

10.9.6. Peak Runoff Rate: The peak runoff rate for developed conditions shall not exceed the peak runoff rate for pre-development conditions for the two-year storm event. Peak runoff rate calculations shall comply with the criteria given in the TCSS Manual.

10.10. Isolation of Roof Runoff and Irrigation

10.10.1. If roof runoff is isolated from the site stormwater collection system and is used for irrigation, the system shall comply with the following requirements:

(a) The system shall comply with the pollutant removal requirements of this section;
(b) No reduction in the water quality volume will be allowed as a result of choosing this method of pollution reduction;
(c) Roof runoff shall be collected and routed to a separate storage area distinct from that which collects and treats other stormwater runoff;
(d) The roof runoff system shall provide for the collection of no less than the required water quality volume. Harvesting and storage of additional runoff in excess of the minimum required water quality volume for on-site irrigation is allowable;
(e) Roof runoff in excess of the minimum required water quality volume may be routed to detention facilities or discharged to a water quality control;
(f) The system shall be designed to accept the water quality volume within seventy-two (72) hours after the end of the

rainfall event and to detain and treat the water quality volume in accordance with the water quality control requirements of this article. For the purpose of this requirement, individual storm events shall be separated by seventy-two (72) hours with no more than a trace of rainfall;

(g) The collected water may be used to irrigate landscaped or natural areas on the site. Irrigation systems shall be designed in accordance with standard irrigation practices considering such factors as soil type slope, and vegetation and must be approved by the City.

10.10.2. The impervious area of the roof that is used for isolation and water quality control treatment of the roof runoff may be used for the impervious cover allowance, allowed by 10.1.0, subject to the following restrictions:

10.2.5. TSS pollutant removal from the roof's stormwater runoff that is isolated shall exceed the pollutant removal requirements of 10.1.0, but in no case shall the total TSS pollutant removal by the system exceed the total TSS load of pollutants from the impervious roof surface, including background TSS pollutant loads and development-caused TSS pollutant loads; and

10.2.6. The excess TSS pollutant removal shall be equated to a surface area of impervious cover that would contribute an amount of TSS pollutants equivalent to the excess TSS pollutant removed; and

10.2.7. The maximum allowable impervious cover allowance shall be the lesser of the following:

i) The impervious surface area that does not increase the total impervious surface for the contributing drainage area by more than five (5) percentage points; or

ii) The impervious surface area that is equal to fifty percent (50%) of the equivalent impervious surface area determined in subsection (b)(2) of this section.

10.11. Erosion Hazard Setbacks

Erosion hazard setback determinations shall be made for every stream in which natural channels and waterways are to be preserved. Natural channel banks will be protected by use of the determined setbacks unless a plan to stabilize and protect stream banks is approved by the City. Where setbacks are used for erosion protection, no building, fence, wall, deck, swimming pool or other structure shall be located, constructed or maintained within the area encompassing the setback.

Erosion hazard setbacks shall be utilized to provide stream bank protection for the major waterways within the City which are to be maintained as

natural floodplains. These major waterways are Onion Creek, Little Barton Creek and Barton Creek. Erosion setbacks may also be required for other waterways within the City where a future determination is made that the waterway shall be maintained as a natural floodplain. The setback requirement for each waterway shall be determined as described in the TCSS Manual.

10.12. Non-Residential and Multi-Family Permanent Construction

When construction or land disturbing activities are conducted as part of a Non-Residential or Multi-Family construction project in the incorporated limits or in the ETJ of the City, as part of the application for a building permit or a site development permit, the developer shall submit an erosion control plan to the City for approval. Permanent erosion control shall be established prior to the occupancy of any non-residential or multi-family structure. Phased occupancy will be allowed only when there are no outstanding erosion control violations for the project for which the request is made.

10.13. Residential Lots with a Building Permit

When land disturbing activities are conducted on a residential lot for which a building permit must be issued, the builder shall comply with the following:

10.13.1. Erosion Control Plan: Prior to approval of a building permit for a residential lot by the City, the builder obtaining the building permit shall submit an erosion control plan for approval by the City. No inspection may be performed on a project until a City-approved erosion control plan is implemented.

10.13.2. City Inspection: The City shall inspect the erosion control devices located at a site for compliance with the approved erosion control plan submitted for such site. If a builder fails to implement or maintain erosion control devices as specified in the approved erosion control plan, the City shall provide such party with written notice of noncompliance identifying the nature of such noncompliance.

10.13.3. Correction Period: The builder shall have twenty-four (24) hours to bring the erosion control devices into compliance with the intent of the approved erosion control plan for the site where the violation occurred. Modifications to the approved erosion control plan may be required to maintain all sediment on-site. Correction shall include sediment clean-up, erosion control device repair, erosion control device maintenance, and installation of additional erosion control devices to prevent re-

occurrence of the violation. The 24-hour cure period may be extended for inclement weather or other factors at the discretion of the building official.

10.13.4. Extension/Stop Work Order: If the intent of the approved control plan, which is maintaining sediment on-site, is not met, then the builder shall take action within twenty-four (24) hours to control soil eroding from the site and clean up any sediment and shall have one week to submit a new erosion control plan. Work may continue during the review period. Implementation of this plan will be required within twenty-four (24) hours of plan approval by the City. If no plan is submitted within one week, then construction activities shall be halted until a new plan is submitted and approved.

10.13.5. City Re-inspection: At the end of the 24-hour correction period, the City shall re-inspect the site and may assess a re-inspection fee. If at the time of such re-inspection, the erosion control devices at the site have not been brought into compliance with the approved erosion control plan, the City may issue a stop work order and issue a citation for each violation of the City's erosion control requirements. When a stop work order has been issued, a re-inspection fee shall be assessed. To obtain a re-inspection for removal of the stop work order, a request must be submitted and a re-inspection fee, as set by the City, shall be paid.

10.13.6. Removal of Erosion Control Devices: Upon issuance of a certificate of occupancy or upon establishing permanent ground cover on a lot, all temporary erosion control devices shall be removed.

SECTION 4: ADDITIONAL FROMS

Copy of Notice of Intent

TCEQ Office Use Only
Permit No.:
RN:
CN:
Region:

RESET FORM

Notice of Intent (NOI) for Stormwater Discharges Associated with Construction Activity under TPDES General Permit (TXR150000)

IMPORTANT:

- Use the INSTRUCTIONS to fill out each question in this form.
- Use the CHECKLIST to make certain all you filled out all required information. Incomplete applications WILL delay approval or result in automatic denial.
- Once processed your permit can be viewed at: http://www2.tceq.texas.gov/wq_dpa/index.cfm

ePERMITS: Sign up now for online NOI: https://www3.tceq.texas.gov/steers/index.cfm
Pay a $225 reduced application fee by using ePermits.

APPLICATION FEE:

- You must pay the $325 Application Fee to TCEQ for the paper application to be complete.
- Payment and NOI must be mailed to separate addresses.
- Did you know you can pay on line?
  - Go to https://www3.tceq.texas.gov/epay/index.cfm
  - Select Fee Type: GENERAL PERMIT CONSTRUCTION STORM WATER DISCHARGE NOI APPLICATION
- Provide your payment information below, for verification of payment:

☐ Mailed — Check/Money Order No.: _____
Name Printed on Check: _____

☐ EPAY — Voucher No.: _____
Is the Payment Voucher copy attached? ☐ Yes

RENEWAL: Is this NOI a Renewal of an existing General Permit Authorization? (Note: A permit cannot be renewed after June 3, 2013.)

☐ Yes The Permit number is: TXR15_____
(If a permit number is not provided, a new number will be assigned.)
☐ No

1) OPERATOR (Applicant)

a) If the applicant is currently a customer with TCEQ, what is the Customer Number (CN) issued to this entity? You may search for your CN at: http://www12.tceq.texas.gov/crpub/index.cfm?fuseaction=cust.CustSearch

CN_____

b) What is the Legal Name of the entity (applicant) applying for this permit?

_____

(The legal name must be spelled exactly as filed with the Texas Secretary of State, County, or in the legal document forming the entity.)

c) What is the name and title of the person signing the application? The person must be an executive official meeting signatory requirements in TAC 305.44(a).
Prefix (Mr. Ms. Miss): _____
First/Last Name: _____ Suffix: _____
Title: _____ Credential: _____

d) What is the Operator Contact's (Responsible Authority) contact information and mailing address as recognized by the US Postal Service (USPS)? You may verify the address at: http://zip4.usps.com/zip4/welcome.jsp
Phone #: _____ ext: _____ Fax #: _____
E-mail: _____
Mailing Address: _____
Internal Routing (Mail Code, Etc.): _____
City: _____ State: _____ ZIP Code: _____
If outside USA: Territory: _____ Country Code: _____ Postal Code: _____

e) Indicate the type of Customer (The instructions will help determine your customer type):

☐ Individual	☐ Limited Partnership	☐ Sole Proprietorship-DBA
☐ Joint Venture	☐ General Partnership	☐ Corporation
☐ Trust	☐ Estate	☐ Federal Government
☐ State Government	☐ County Government	☐ City Government
☐ Other Government		

f) Independent Operator? ☐ Yes ☐ No
(If governmental entity, subsidiary, or part of a larger corporation, check "No".)

g) Number of Employees:
☐ 0-20; ☐ 21-100; ☐ 101-250; ☐ 251-500; or ☐ 501 or higher

h) Customer Business Tax and Filing Numbers:
(REQUIRED for Corporations and Limited Partnerships. Not Required for Individuals, Government, or Sole Proprietors)
State Franchise Tax ID Number: _____
Federal Tax ID: _____
Texas Secretary of State Charter (filing) Number: _____
DUNS Number (if known): _____

2) APPLICATION CONTACT

If TCEQ needs additional information regarding this application, who should be contacted?

Is the application contact the same as the applicant identified above?

☐ Yes, go to Section 3). ☐ No, complete section below.

Prefix (Mr. Ms. Miss): _____
First/Last Name: _____ Suffix: _____
Title: _____ Credential: _____

Organization Name:_____
Phone No.:_____ ext:_____ Fax Number:_____
E-mail:_____
Mailing Address:_____
Internal Routing (Mail Code, Etc.):_____
City:_____State:_____ZIP Code:_____
Mailing Information if outside USA:
Territory:_____Country Code:_____Postal Code:_____

3) REGULATED ENTITY (RE) INFORMATION ON PROJECT OR SITE

If the site of your business is part of a larger business site or if other businesses were located at this site before yours, a Regulated Entity Number (RN) may already be assigned for the larger site. Use the RN assigned for the larger site. Search TCEQ's Central Registry to see if the larger site may already be registered as a regulated site at: http://www12.tceq.texas.gov/crpub/index.cfm?fuseaction=regent.RNSearch.

If the site is found, provide the assigned Regulated Entity Reference Number and provide the information for the site to be authorized through this application below. The site information for this authorization may vary from the larger site information.

a) TCEQ issued RE Reference Number (RN): RN_____

b) Name of project or site (the name known by the community where located):
_____

c) In your own words, briefly describe the primary business of the Regulated Entity: (Do not repeat the SIC and NAICS code):
_____

d) County (or counties if > 1) _____

e) Latitude:_____ Longitude: _____

f) Does the site have a physical address?
☐ Yes, complete Section A for a physical address.
☐ No, complete Section B for site location information.

Section A: Enter the physical address for the site.
Verify the address with USPS. If the address is not recognized as a delivery address, provide the address as identified for overnight mail delivery, 911 emergency or other online map tools to confirm an address.

Physical Address of Project or Site:
Street Number: _____ Street Name: _____
City: _____State: Texas ZIP Code: _____

Section B: Enter the site location information.

If no physical address (Street Number & Street Name), provide a written location access description to the site. (Ex.: located 2 miles west from intersection of Hwy 290 & IH35 accessible on Hwy 290 South)

City where the site is located or, if not in a city, what is the nearest city:

State: Texas ZIP Code where the site is located: _____

4) GENERAL CHARACTERISTICS

a) Is the project/site located on Indian Country Lands?

☐ Yes - If the answer is Yes, you must obtain authorization through EPA, Region 6.

☐ No

b) Is your construction activity associated with a facility that, when completed, would be associated with the exploration, development, or production of oil or gas or geothermal resources?

☐ Yes - If the answer is Yes, you may be under jurisdiction of the Railroad Commission of Texas and may need to obtain authorization through EPA, Region 6.

☐ No

c) What is the Primary Standard Industrial Classification (SIC) Code that best describes the construction activity being conducted at the site?
Primary SIC Code: _____

d) If applicable, what is the Secondary SIC Code(s): _____

e) What is the total number of acres disturbed? _____

f) Is the project site part of a larger common plan of development or sale?

☐ Yes - If the answer is Yes, the total number of acres disturbed can be less than 5 acres.

☐ No - If the answer is No, the total number of acres disturbed must be 5 or more. If the total number of acres disturbed is less than 5 then the project site does not qualify for coverage through this Notice of Intent. Coverage will be denied. See the requirements in the general permit for small construction sites.

g) What is the name of the first water body(s) to receive the stormwater runoff or potential runoff from the site?

_____

h) What is the segment number(s) of the classified water body(s) that the discharge will eventually reach?

_____

i) Is the discharge into an MS4?

☐ Yes - If the answer is Yes, provide the name of the MS4 operator below.

☐ No

If Yes, provide the name of the MS4 operator:

_____

Note: The general permit requires you to send a copy of the NOI to the MS4 operator.

j) Are any of the surface water bodies receiving discharges from the construction site on the latest EPA-approved CWA 303(d) List of impaired waters?

☐ Yes - If the answer is Yes, provide the name(s) of the impaired water body(s) below.

☐ No

If Yes, provide the name(s) of the impaired water body(s):

_____

k) Is the discharge or potential discharge within the Recharge Zone, Contributing Zone, or Contributing Zone within the Transition Zone of the Edwards Aquifer as defined in 30 TAC Chapter 213?

☐ Yes - If the answer is Yes, complete certification below by checking "Yes."

☐ No

I certify that a copy of the TCEQ approved Plan required by the Edwards Aquifer Rule (30 TAC Chapter 213) is either included or referenced in the Stormwater Pollution Prevention Plan.

☐ Yes

5) CERTIFICATION

Check Yes to the certifications below. Failure to indicate Yes to *ALL* items may result in denial of coverage under the general permit.

a) I certify that I have obtained a copy and understand the terms and conditions of the Construction General Permit (TXR150000). ☐ Yes

b) I certify that the full legal name of the entity applying for this permit has been provided and is legally authorized to do business in Texas. ☐ Yes

c) I understand that a Notice of Termination (NOT) must be submitted when this authorization is no longer needed. ☐ Yes

d) I certify that a Stormwater Pollution Prevention Plan has been developed, will be implemented prior to construction and to the best of my knowledge and belief is compliant with any applicable local sediment and erosion control plans, as required in the general permit TXR150000. Note: For multiple operators who prepare a shared SWP3, the confirmation of an operator may be limited to its obligations under the SWP3 provided all obligations are confirmed by at least one operator. ☐ Yes

Operator Certification:

I,_____ _____
Typed or printed name Title

certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

I further certify that I am authorized under 30 Texas Administrative Code 305.44 to sign and submit this document, and can provide documentation in proof of such authorization upon request.

Signature: _____ Date:_____
(Use blue ink)

NOTICE OF INTENT CHECKLIST (TXR150000)

- Did you complete everything? Use this checklist to be sure!
- Are you ready to mail your form to TCEQ? Go to the General Information Section of the Instructions for mailing addresses.

This checklist is for use by the operator to ensure a complete application. Missing information may result in denial of coverage under the general permit. (See NOI process description in the Instructions)

Application Fee:

If paying by Check:

- ☐ Check was mailed separately to the TCEQs Cashier's Office. (See Instructions for Cashier's address and Application address.)
- ☐ Check number and name on check is provided in this application.

If using ePay:

- ☐ The voucher number is provided in this application or a copy of the voucher is attached.

PERMIT NUMBER:

- ☐ Permit number provided – if this application is for renewal of an existing authorization.

OPERATOR INFORMATION - Confirm each item is complete:

- ☐ Customer Number (CN) issued by TCEQ Central Registry
- ☐ Legal name as filed to do business in Texas (Call TX SOS 512/463-5555)
- ☐ Name and title of responsible authority signing the application
- ☐ Mailing address is complete & verifiable with USPS. www.usps.com
- ☐ Phone numbers/e-mail address
- ☐ Type of operator (entity type)
- ☐ Independent operator
- ☐ Number of employees
- ☐ For corporations or limited partnerships – Tax ID and SOS filing numbers
- ☐ Application contact and address is complete & verifiable with USPS. http://www.usps.com

REGULATED ENTITY (RE) INFORMATION ON PROJECT OR SITE - Confirm each item is complete:

- ☐ Regulated Entity Reference Number (RN) (if site is already regulated by TCEQ)
- ☐ Site/project name/regulated entity
- ☐ Latitude and longitude http://www.tceq.texas.gov/gis/sqmaview.html
- ☐ County
- ☐ Site/project physical address. Do not use a rural route or post office box.
- ☐ Business description

GENERAL CHARACTERISTICS - Confirm each item is complete:

- ☐ Indian Country Lands –the facility is not on Indian Country Lands
- ☐ Construction activity related to facility associated to oil, gas, or geothermal resources
- ☐ Standard Industrial Classification (SIC) Code www.osha.gov/oshstats/sicser.html
- ☐ Acres disturbed is provided and qualifies for coverage through a NOI
- ☐ Common plan of development or sale
- ☐ Receiving water body(s)
- ☐ Segment number(s)
- ☐ Impaired water body(s)
- ☐ MS4 operator
- ☐ Edwards Aquifer rule

CERTIFICATION

- ☐ Certification statements have been checked indicating "Yes"
- ☐ Signature meets 30 Texas Administrative Code (TAC) 305.44 and is original.

Notice of Intent (NOI) for Stormwater Discharges Associated with Construction Activity under TPDES General Permit (TXR150000)

General Information and Instructions

GENERAL INFORMATION

Where to Send the Notice of Intent (NOI):

BY REGULAR U.S. MAIL
Texas Commission on
Environmental Quality
Stormwater Processing Center
(MC228)
P.O. Box 13087
Austin, Texas 78711-3087

BY OVERNIGHT/EXPRESS MAIL
Texas Commission on
Environmental Quality
Stormwater Processing Center
(MC228)
12100 Park 35 Circle
Austin, TX 78753

TCEQ Contact List:

Application – status and form questions:	*512/245-0130, swpermit@tceq.texas.gov*
Technical questions:	*512/239-4671, swgp@tceq.texas.gov*
Environmental Law Division:	*512/239-0600*
Records Management - obtain copies of forms:	*512/239-0900*
Reports from databases (as available):	*512/239-DATA (3282)*
Cashier's office:	*512/239-0357 or 512/239-0187*

Notice of Intent Process:

When your NOI is received by the program, the form will be processed as follows:

1) Administrative Review: Each item on the form will be reviewed for a complete response. In addition, the operator's legal name must be verified with Texas Secretary of State as valid and active (if applicable). The address(s) on the form must be verified with the US Postal service as receiving regular mail delivery. Never give an overnight/express mailing address.

2) Notice of Deficiency: If an item is incomplete or not verifiable as indicated above, a notice of deficiency (NOD) will be mailed to the operator. The operator will have 30 days to respond to the NOD. The response will be reviewed for completeness.

3) Acknowledgment of Coverage: An Acknowledgment Certificate will be mailed to the operator. This certificate acknowledges coverage under the general permit.

   -or-

   Denial of Coverage: If the operator fails to respond to the NOD or the response is inadequate, coverage under the general permit may be denied. If coverage is denied, the operator will be notified.

General Permit (Your Permit)

For NOIs submitted electronically through ePermits, provisional coverage under the general permit begins immediately following confirmation of receipt of the NOI form by the TCEQ.

For paper NOIs, provisional coverage under the general permit begins 7 days after a completed NOI is postmarked for delivery to the TCEQ.

You should have a copy of your general permit when submitting your application. You may view and print your permit for which you are seeking coverage, on the TCEQ web site http://www.tceq.texas.gov. Search using key word TXR150000.

General Permit Forms

The Notice of Intent (NOI), Notice of Termination (NOT), and Notice of Change (NOC) (including instructions) are available in Adobe Acrobat PDF format on the TCEQ web site http://www.tceq.texas.gov.

Change in Operator

An authorization under the general permit is not transferable. If the operator of the regulated entity changes, the present permittee must submit a Notice of Termination and the new operator must submit a Notice of Intent. The NOT and NOI must be submitted no later than 10 days prior to the change in Operator status.

TCEQ Central Registry Core Data Form

The Core Data Form has been incorporated into this form. Do not send a Core Data Form to TCEQ. After final acknowledgment of coverage under the general permit, the program will assign a Customer Number and Regulated Entity Number.

You can find the information on the Central Registry web site at http://www12.tceq.texas.gov/crpub/index.cfm. You can search by the Regulated Entity (RN), Customer Number (CN) or Name (Permittee), or by your permit number under the search field labeled AAdditional ID@. Capitalize all letters in the permit number.

The Customer (Permittee) is responsible for providing consistent information to the TCEQ, and for updating all CN and RN data for all authorizations as changes occur. For General Permits, a Notice of Change form must be submitted to the program area.

Fees associated with a General Permit

Payment of the fee may be made by check or money order, payable to TCEQ, or through EPAY (electronic payment through the web).

Application Fee: This fee is required to be paid at the time the NOI is submitted. Failure to submit payment at the time the application is filed will cause delays in acknowledgment or denial of coverage under the general permit.

Mailed Payments:

Payment must be mailed under separate cover at one of the addresses below using the attached Application Fee submittal form. (DO NOT SEND A COPY OF THE NOI WITH THE APPLICATION FEE SUBMITTAL FORM)

BY REGULAR U.S. MAIL
Texas Commission on Environmental Quality
Financial Administration Division
Cashier's Office, MC-214
P.O. Box 13088
Austin, TX 78711-3088

BY OVERNIGHT/EXPRESS MAIL
Texas Commission on Environmental Quality
Financial Administration Division
Cashier's Office, MC-214
12100 Park 35 Circle
Austin, TX 78753

ePAY Electronic Payment: http://www.tceq.texas.gov/epay

When making the payment you must select Water Quality, and then select the fee category "General Permit Construction Storm Water Discharge NOI Application". You must include a copy of the payment voucher with your NOI. Your NOI will not be considered complete without the payment voucher.

INSTRUCTIONS FOR FILLING OUT THE NOI FORM

Renewal of General Permit. Dischargers holding active authorizations under the expired General Permit are required to submit a NOI to continue coverage. The existing permit number is required. If the permit number is not provided or has been terminated, expired, or denied a new permit number will be issued.

1. Operator (Applicant)

a) Enter assigned Customer Number (CN)
TCEQ's Central Registry will assign each customer a number that begins with CN, followed by nine digits. This is not a permit number, registration number, or license number.
If this customer has not been assigned a CN, leave the space for the CN blank.
If this customer has already been assigned this number, enter the permittee's CN.

b) Legal Name
Provide the current legal name of the permittee, as authorized to do business in Texas. The name must be provided exactly as filed with the Texas Secretary of State (SOS), or on other legal documents forming the entity, that is filed in the county where doing business. You may contact the SOS at 512/463-5555, for more information related to filing in Texas. If filed in the county where doing business, provide a copy of the legal documents showing the legal name.

c) Person Signing Application
Provide information about person signing section 5) Certification.

d) Operator Contact's (Responsible Authority) Contact Information and Mailing Address
Provide a complete mailing address for receiving mail from the TCEQ. The address must be verifiable with the US Postal Service at http://www.usps.com for regular mail delivery (not overnight express mail). If you find that the address is not verifiable using the USPS web search, please indicate the address is used by the USPS for regular mail delivery.

The area code and phone number should provide contact to the operator. Leave Extension blank if not applicable.

The fax number and e-mail address are optional and should correspond to the operator.

e) Type of Customer (Entity Type)
Check only one box that identifies the type of entity. Use the descriptions below to identify the appropriate entity type. Note that the selected entity type also indicates the name that must be provided as an applicant for a permit, registration or authorization.

Sole Proprietorship – DBA

A sole proprietorship is a customer that is owned by only one person and has not been incorporated. This business may:

- be under the person's name
- have its own name (doing business as or d.b.a.)
- have any number of employees

If the customer is a Sole Proprietorship or DBA, the 'legal name' of the individual business 'owner' must be provided. The DBA name is not recognized as the 'legal name' of the entity. The DBA name may be used for the site name (regulated entity).

Individual

An individual is a customer who has not established a business, but conducts an activity that needs to be regulated by the TCEQ.

Partnership

- A customer that is established as a partnership as defined by the Texas Secretary of State Office (TX SOS). A Limited Partnership or Limited Liability Partnership (Partnership) is required to file with the Texas Secretary of State. A General Partnership or Joint Venture is not required to register with the state.
- Partnership (Limited Partnership or Limited Liability Partnership): A limited partnership is defined in the Act as a partnership formed by two or more persons under the provisions of Section 3 of the Uniform Limited Partnership Act (Art. 6132a, Revised Civil Statutes of Texas) and having as members one or more general partners and one or more limited partners. The limited partners as such are not bound by the obligations of the partnership. Limited partners may not take part in the day-to-day operations of the business. A Limited Partnership must file with the Texas Secretary of State. A registered limited liability partnership is a general or limited partnership that is registered with the Texas Secretary of State. The partnership's name must contain the words "Registered Limited Liability Partnership" or the abbreviation "L.L.P." as the last words or letters of its name.
- General Partnership: A general partner may or may not invest, participates in running the partnership and is liable for all acts and debts of the partnership and any member of it. A General Partnership does not have limited partners. For a General Partnership, there is no registration with the state or even written agreement necessary for a general partnership to be formed. The legal definition of a partnership is generally stated as "an association of two or more persons to carry on as co-owners a business for profit" (Revised Uniform Partnership Act § 101 [1994]).
- Joint Venture: A joint venture is but another name for a special partnership. It might be distinguished from a general partnership in that the latter is formed for the transaction of a general business, while a joint venture is usually limited to a single transaction. That is, a joint venture is a special combination of persons in the nature of a partnership engaged in the joint prosecution of a particular transaction for mutual benefit or profit.

Corporation

A customer meets all of these conditions:

- is a legally incorporated entity under the laws of any state or country
- is recognized as a corporation by the Texas Secretary of State

- has proper operating authority to operate in Texas.
- The corporation's 'legal name' as filed with the Texas Secretary of State must be provided as applicant. An 'assumed' name of a corporation is not recognized as the 'legal name' of the entity.

Government

Federal, state, county, or city government (as appropriate)
The customer is either an agency of one of these levels of government or the governmental body itself. The government agency's 'legal name' must be provided as the applicant. A department name or other description of the organization should not be included as a part of the 'legal name' as applicant.

Trust or Estate

A trust and an estate are fiduciary relationships governing the trustee/executor with respect to the trust/estate property.

Other Government

A utility district, water district, tribal government, college district, council of governments, or river authority. Write in the specific type of government.

Other

The customer does not fit any of the above descriptions. Enter a short description of the type of customer in the blank provided.

f) Independent Entity

Check No if this customer is a subsidiary, part of a larger company, or is a governmental entity. Otherwise, check Yes.

g) Number of Employees

Check one box to show the number of employees for this customer's entire company, at all locations. This is not necessarily the number of employees at the site named in the application.

h) Customer Business Tax and Filing Numbers

These are required for Corporations and Limited Partnerships. These are not required for Individuals, Government, and Sole Proprietors.

State Franchise Tax ID Number

Corporations and limited liability companies that operate in Texas are issued a franchise tax identification number. If this customer is a corporation or limited liability company, enter this number here.

Federal Tax ID

All businesses, except for some small sole proprietors, individuals, or general partnerships should have a federal taxpayer identification number (TIN). Enter this number here. Use no prefixes, dashes, or hyphens. Sole proprietors, individuals, or general partnerships do not need to provide a federal tax ID.

TX SOS Charter (filing) Number

Corporations and Limited Partnerships required to register with the Texas Secretary of State are issued a charter or filing number. You may obtain further information by calling SOS at 512/463-5555.

DUNS Number
Most businesses have a DUNS (Data Universal Numbering System) number issued by Dun and Bradstreet Corp. If this customer has one, enter it here.

2. APPLICATION CONTACT
Provide the name, title and communication information of the person that TCEQ can contact for additional information regarding this application.

3. REGULATED ENTITY (RE) INFORMATION ON PROJECT OR SITE
a) Regulated Entity Reference Number (RN)
A number issued by TCEQ's Central Registry to sites (a location where a regulated activity occurs) regulated by TCEQ. This is not a permit number, registration number, or license number. If this regulated entity has not been assigned an RN, leave this space blank.

If the site of your business is part of a larger business site, a Regulated Entity Number (RN) may already be assigned for the larger site. Use the RN assigned for the larger site. Search TCEQ's Central Registry to see if the larger site may already be registered as a regulated site at: http://www12.tceq.texas.gov/crpub/index.cfm?fuseaction=regent.RNSearch

If the site is found, provide the assigned Regulated Entity Reference Number (RN) and provide the information for the site to be authorized through this application. The site information for this authorization may vary from the larger site information.

An example is a chemical plant where a unit is owned or operated by a separate corporation that is accessible by the same physical address of your unit or facility. Other examples include industrial parks identified by one common address but different corporations have control of defined areas within the site. In both cases, an RN would be assigned for the physical address location and the permitted sites would be identified separately under the same RN.

b) Site/Project Name/Regulated Entity
Provide the name of the site as known by the public in the area where the site is located. The name you provide on this application will be used in the TCEQ Central Registry as the Regulated Entity name.

c) Description of Activity Regulated
In your own words, briefly describe the primary business that you are doing that requires this authorization. Do not repeat the SIC Code description.

d) County
Identify the county or counties in which the regulated entity is located.

e) Latitude and Longitude
Enter the latitude and longitude of the site in degrees, minutes, and seconds or decimal form. For help obtaining the latitude and longitude, go to: http://www.tceq.texas.gov/gis/sqmaview.html or http://nationalmap.gov/ustopo

f) Site/Project (RE) Physical Address/Location Information
Enter the complete address for the site in Section A if the address can be validated through the US Postal Service. If the physical address is not recognized as a USPS delivery address, you may need to validate the address with your local police (911 service) or through an online map site

used to locate a site. Please confirm this to be a complete and valid address. Do not use a rural route or post office box for a site location.

If a site does not have an address that includes a street (or house) number and street name, enter NO ADDRESS for the street name in Section A. In Section B provide a complete written location description. For example: "The site is located 2 miles west from intersection of Hwy 290 & IH35, located on the southwest corner of the Hwy 290 South bound lane."
Provide the city (or nearest city) and zip code of the facility location.

4. GENERAL CHARACTERISTICS

a) Indian Country Lands

If your site is located on Indian Country Lands, the TCEQ does not have authority to process your application. You must obtain authorization through EPA, Region 6, Dallas. Do not submit this form to TCEQ.

b) Construction activity associated with facility associated with exploration, development, or production of oil, gas, or geothermal resources

If your activity is associated with oil and gas exploration, development, or production, you may be under jurisdiction of the Railroad Commission of Texas and may need to obtain authorization from EPA Region 6. For more information, see:
http://info.sos.state.tx.us/pls/pub/readtac$ext.TacPage?sl=R&app=9&p_dir=&p_rloc=&p_tloc=&p_ploc=&pg=1&p_tac=&ti=16&pt=1&ch=3&rl=30

Construction activities associated with a facility related to oil, gas or geothermal resources may include the construction of a well site; treatment or storage facility; underground hydrocarbon or natural gas storage facility; reclamation plant; gas processing facility; compressor station; terminal facility where crude oil is stored prior to refining and at which refined products are stored solely for use at the facility; a carbon dioxide geologic storage facility; and a gathering, transmission, or distribution pipeline that will transport crude oil or natural gas, including natural gas liquids, prior to refining of such oil or the use of the natural gas in any manufacturing process or as a residential or industrial fuel.

Where required by federal law, discharges of stormwater associated with construction activities under the Railroad Commission's jurisdiction must be authorized by the EPA and the Railroad Commission of Texas, as applicable. Activities under Railroad Commission of Texas jurisdiction include construction of a facility that, when completed, would be associated with the exploration, development, or production of oil or gas or geothermal resources, such as a well site; treatment or storage facility; underground hydrocarbon or natural gas storage facility; reclamation plant; gas processing facility; compressor station; terminal facility where crude oil is stored prior to refining and at which refined products are stored solely for use at the facility; a carbon dioxide geologic storage facility under the jurisdiction of the Railroad Commission of Texas; and a gathering, transmission, or distribution pipeline that will transport crude oil or natural gas, including natural gas liquids, prior to refining of such oil or the use of the natural gas in any manufacturing process or as a residential or industrial fuel. The Railroad Commission of Texas also has jurisdiction over stormwater from land disturbance associated with a site survey that is conducted prior to construction of a facility that would be regulated by the Railroad Commission of Texas. Under 33 U.S.C. §1342(l)(2) and §1362(24), EPA cannot require a permit for discharges of stormwater from "field activities or operations associated with {oil and gas} exploration, production, processing, or treatment operations, or transmission facilities, including activities necessary to prepare a site for drilling and for the movement and placement

of drilling equipment, whether or not such field activities or operations may be considered to be construction activities" unless the discharge is contaminated by contact with any overburden, raw material, intermediate product, finished product, byproduct, or waste product located on the site of the facility. Under §3.8 of this title (relating to Water Protection), the Railroad Commission of Texas prohibits operators from causing or allowing pollution of surface or subsurface water. Operators are encouraged to implement and maintain best management practices (BMPs) to minimize discharges of pollutants, including sediment, in stormwater during construction activities to help ensure protection of surface water quality during storm events.

c) Primary Standard Industrial Classification (SIC) Code

Provide the SIC Code that best describes the construction activity being conducted at this site.

Common SIC Codes related to construction activities include:

- 1521 - Construction of Single Family Homes
- 1522 - Construction of Residential Bldgs. Other than Single Family Homes
- 1541 - Construction of Industrial Bldgs. and Warehouses
- 1542 - Construction of Non-residential Bldgs, other than Industrial Bldgs. and Warehouses
- 1611 - Highway and Street Construction, except Highway Construction
- 1622 - Bridge, Tunnel, and Elevated Highway Construction
- 1623 - Water, Sewer, Pipeline and Communications, and Power Line Construction

For help with SIC Codes, go to:
http://www.osha.gov/pls/imis/sicsearch.html

d) Secondary SIC Code

Secondary SIC Code(s) may be provided. Leave blank if not applicable. For help with SIC Codes, go to:
http://www.osha.gov/pls/imis/sicsearch.html

e) Total Number of Acres Disturbed

Provide the approximate number of acres that the construction site will disturb. Construction activities that disturb less than one acre, unless they are part of a larger common plan that disturbs more than one acre, do not require permit coverage. Construction activities that disturb between one and five acres, unless they are part of a common plan that disturbs more than five acres, do not require submission of an NOI. Therefore, the estimated area of land disturbed should not be less than five, unless the project is part of a larger common plan that disturbs five or more acres. Disturbed means any clearing, grading, excavating, or other similar activities.

If you have any questions about this item, please contact the stormwater technical staff by phone at (512)239-4671 or by email at swgp@tceq.texas.gov.

f) Common Plan of Development

Construction activities that disturb less than five acres do not require submission of an NOI unless they are part of a common plan of development or for sale where the area disturbed is five or more acres. Therefore, the estimated area of land disturbed should not be less than five, unless the project is part of a larger common plan that disturbs five or more acres. Disturbed means any clearing, grading, excavating, or other similar activities.

For more information on "What is a common plan of development?" go to: www.tceq.texas.gov/permitting/stormwater/common_plan_of_development_steps.html

For further information, go to the TCEQ stormwater construction webpage at: www.tceq.texas.gov/goto/construction and search for "Additional Guidance and Quick Links". If you have any further questions about this item, please call the stormwater technical staff at (512)239-4671.

g) Identify the water body(s) receiving stormwater runoff

The stormwater may be discharged directly to a receiving stream or through a MS4 from your site. It eventually reaches a receiving water body such as a local stream or lake, possibly via a drainage ditch. You must provide the name of the water body that receives the discharge from the site (a local stream or lake).

If your site has more than one outfall you need to include the name of the first water body for each outfall, if they are different.

h) Identify the segment number(s) of the classified water body(s)

Identify the classified segment number(s) receiving a discharge directly or indirectly. Go to the following link to find the segment number of the classified water body where stormwater will flow from the site: www.tceq.texas.gov/waterquality/monitoring/viewer.html

You may also find the segment number in TCEQ publication GI-316: www.tceq.texas.gov/publications/gi/gi-316

If the discharge is into an unclassified receiving water and then crosses state lines prior to entering a classified segment, select the appropriate watershed:

- 0100 (Canadian River Basin)
- 0200 (Red River Basin)
- 0300 (Sulfur River Basin)
- 0400 (Cypress Creek Basin)
- 0500 (Sabine River Basin)

Call the Water Quality Assessments section at (512)239-4671 for further assistance.

i) Discharge into MS4

The discharge may initially be into a municipal separate storm sewer system (MS4). The Construction General Permit requires the Operator to provide a copy of the NOI to the MS4 Operator.

j) Identify the MS4 Operator

If the stormwater discharge is into an MS4, provide the name of the entity that operates the MS4 where the stormwater discharges. An MS4 operator is often a city, town, county, or utility district, but possibly can be another form of government. Please note that the Construction General Permit requires the Operator to supply the MS4 with a copy of the NOI submitted to TCEQ. For assistance, you may call the technical staff at (512)239-4671.

k) Surface Water bodies on list of impaired waters

Indicate Yes or No if any surface water bodies receiving discharges from the construction site are on the latest EPA-approved CWA 303(d) List of impaired waters. The EPA-approved CWA

303(d) List of impaired waters in Texas can be found at:
www.tceq.texas.gov/waterquality/assessment/305_303.html

NOTE: Do not use any "draft" documents.

l) Identify the impaired water body(s)
Provide the name(s) of surface water bodies receiving discharges or potential discharges from the construction site that are on the latest EPA-approved CWA 303(d) List of impaired waters. The EPA-approved CWA 303(d) List of impaired waters in Texas can be found at:
www.tceq.texas.gov/waterquality/assessment/305_303.html

NOTE: Do not use any "draft" documents.

m) Discharges to the Edwards Aquifer Recharge Zone
See maps on the TCEQ website to determine if the site is located within the Recharge Zone, Contributing Zone, or Contributing Zone within the Transition Zone of the Edwards Aquifer at:
www.tceq.texas.gov/field/eapp/viewer.html

If the discharge or potential discharge is within the Recharge Zone, Contributing Zone, or Contributing Zone within the Transition Zone of the Edwards Aquifer, a site specific authorization approved by the Executive Director under the Edwards Aquifer Protection Program (30 TAC Chapter 213) is required before construction can begin.

The general permit requires the approved Contributing Zone Plan or Water Pollution Abatement Plan to be included or referenced as a part of the Stormwater Pollution Prevention Plan.

n) Certification regarding Edwards Aquifer Rule (30 TAC Chapter 213)
If the discharge or potential discharge is within the Recharge Zone, Contributing Zone, or Contributing Zone within the Transition Zone of the Edwards Aquifer as defined in 30 TAC Chapter 213, the certification must be answered "Yes" for coverage under the Construction General Permit. The TCEQ approved plan must be readily available for TCEQ staff to review at the time that the NOI is submitted.

For questions regarding the Edwards Aquifer Protection Program, contact the appropriate TCEQ Regional Office. For projects in Hays, Travis and Williamson Counties: Austin Regional Office, 12100 Park 35 Circle, Austin, TX 78753, 512-339-2929. For Projects in Bexar, Comal, Kinney, Medina and Uvalde Counties: TCEQ San Antonio Regional Office, 14250 Judson Rd., San Antonio, TX 78233-4480, 210-490-3096.

5. CERTIFICATIONS

Failure to indicate Yes to ALL of the certification items may result in denial of coverage under the general permit.

a) Certification of Understanding the Terms and Conditions of Construction General Permit (TXR150000)
Provisional coverage under the Construction General Permit (TXR150000) begins 7 days after the completed paper NOI is postmarked for delivery to the TCEQ. (Electronic applications submitted through ePermits have immediate provisional coverage). You must obtain a copy and read the Construction General Permit before submitting your application. You may view and print the Construction General Permit for which you are seeking coverage at the TCEQ web site: www.tceq.texas.gov/goto/construction

b) Certification of Legal Name

The full legal name of the applicant as authorized to do business in Texas is required. The name must be provided exactly as filed with the Texas Secretary of State (SOS), or on other legal documents forming the entity, that is filed in the county where doing business. You may contact the SOS at (512)463 5555, for more information related to filing in Texas.

c) Understanding of Notice of Termination

A permittee shall terminate coverage under this Construction General Permit through the submittal of a NOT when the operator of the facility changes, final stabilization has been reached, the discharge becomes authorized under an individual permit, or the construction activity never began at this site.

d) Certification of Stormwater Pollution Prevention Plan

The SWP3 identifies the areas and activities that could produce contaminated runoff at your site and then tells how you will ensure that this contamination is mitigated. For example, in describing your mitigation measures, your site's plan might identify the devices that collect and filter stormwater, tell how those devices are to be maintained, and tell how frequently that maintenance is to be carried out. You must develop this plan in accordance with the TCEQ general permit requirements. This plan must be developed and implemented before you complete this NOI. The SWP3 must be available for a TCEQ investigator to review on request.

Operator Certification:

The certification must bear an original signature of a person meeting the signatory requirements specified under 30 Texas Administrative Code (TAC) §305.44.

IF YOU ARE A CORPORATION:

The regulation that controls who may sign an NOI or similar form is 30 Texas Administrative Code §305.44(a)(1) (see below). According to this code provision, any corporate representative may sign an NOI or similar form so long as the authority to sign such a document has been delegated to that person in accordance with corporate procedures. By signing the NOI or similar form, you are certifying that such authority has been delegated to you. The TCEQ may request documentation evidencing such authority.

IF YOU ARE A MUNICIPALITY OR OTHER GOVERNMENT ENTITY:

The regulation that controls who may sign an NOI or similar form is 30 Texas Administrative Code §305.44(a)(3) (see below). According to this code provision, only a ranking elected official or principal executive officer may sign an NOI or similar form. Persons such as the City Mayor or County Commissioner will be considered ranking elected officials. In order to identify the principal executive officer of your government entity, it may be beneficial to consult your city charter, county or city ordinances, or the Texas statute(s) under which your government entity was formed. An NOI or similar document that is signed by a government official who is not a ranking elected official or principal executive officer does not conform to §305.44(a)(3). The signatory requirement may not be delegated to a government representative other than those identified in the regulation. By signing the NOI or similar form, you are certifying that you are either a ranking elected official or principal executive officer as required by the administrative code. Documentation demonstrating your position as a ranking elected official or principal executive officer may be requested by the TCEQ.

If you have any questions or need additional information concerning the signatory requirements discussed above, please contact the Texas Commission on Environmental Quality's Environmental Law Division at (512)239-0600.

30 Texas Administrative Code

§305.44. Signatories to Applications

(a) All applications shall be signed as follows.

(1) For a corporation, the application shall be signed by a responsible corporate officer. For purposes of this paragraph, a responsible corporate officer means a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding $25 million (in second-quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures. Corporate procedures governing authority to sign permit or post-closure order applications may provide for assignment or delegation to applicable corporate positions rather than to specific individuals.

(2) For a partnership or sole proprietorship, the application shall be signed by a general partner or the proprietor, respectively.

(3) For a municipality, state, federal, or other public agency, the application shall be signed by either a principal executive officer or a ranking elected official. For purposes of this paragraph, a principal executive officer of a federal agency includes the chief executive officer of the agency, or a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., regional administrator of the EPA).

Texas Commission on Environmental Quality
General Permit Payment Submittal Form

Use this form to submit your Application Fee only if you are mailing your payment.

- Complete items 1 through 5 below:
- Staple your check in the space provided at the bottom of this document.
- Do not mail this form with your NOI form.
- Do not mail this form to the same address as your NOI.

Mail this form and your check to:

BY REGULAR U.S. MAIL

Texas Commission on Environmental Quality
Financial Administration Division
Cashier's Office, MC-214
P.O. Box 13088
Austin, TX 78711-3088

BY OVERNIGHT/EXPRESS MAIL

Texas Commission on Environmental Quality
Financial Administration Division
Cashier's Office, MC-214
12100 Park 35 Circle
Austin, TX 78753

Fee Code: GPA General Permit: TXR150000

1. Check / Money Order No: _____
2. Amount of Check/Money Order: _____
3. Date of Check or Money Order: _____
4. Name on Check or Money Order: _____
5. NOI INFORMATION

   If the check is for more than one NOI, list each Project/Site (RE) Name and Physical Address exactly as provided on the NOI. DO NOT SUBMIT A COPY OF THE NOI WITH THIS FORM AS IT COULD CAUSE DUPLICATE PERMIT ENTRIES.

   See Attached List of Sites (If more space is needed, you may attach a list.)

   Project/Site (RE) Name: _____

   Project/Site (RE) Physical Address:

Staple Check in This Space

Agent Authorization Form

For Required Signature
Edwards Aquifer Protection Program
Relating to 30 TAC Chapter 213
Effective June 1, 1999

I Chad Gilpin,
Print Name

City Engineer,
Title - Owner/President/Other

of City of Dripping Springs,
Corporation/Partnership/Entity Name

have authorized Alex Granados, P.E.
Print Name of Agent/Engineer

of Kimley-Horn and Associates, Inc.
Print Name of Firm

to represent and act on the behalf of the above named Corporation, Partnership, or Entity for the purpose of preparing and submitting this plan application to the Texas Commission on Environmental Quality (TCEQ) for the review and approval consideration of regulated activities.

I also understand that:

1. The applicant is responsible for compliance with 30 Texas Administrative Code Chapter 213 and any condition of the TCEQ's approval letter. The TCEQ is authorized to assess administrative penalties of up to $10,000 per day per violation.

2. For those submitting an application who are not the property owner, but who have the right to control and possess the property, additional authorization is required from the owner.

3. Application fees are due and payable at the time the application is submitted. The application fee must be sent to the TCEQ cashier or to the appropriate regional office. The application will not be considered until the correct fee is received by the commission.

4. A notarized copy of the Agent Authorization Form must be provided for the person preparing the application, and this form must accompany the completed application.

5. No person shall commence any regulated activity on the Edwards Aquifer Recharge Zone, Contributing Zone or Transition Zone until the appropriate application for the activity has been filed with and approved by the Executive Director.

SIGNATURE PAGE:

CHAD GIPLIN
Applicant's Signature

7-26-22
Date

THE STATE OF TX §

County of Hays §

BEFORE ME, the undersigned authority, on this day personally appeared CHAD GIPLIN known to me to be the person whose name is subscribed to the foregoing instrument, and acknowledged to me that (s)he executed same for the purpose and consideration therein expressed.

GIVEN under my hand and seal of office on this 26th day of July, 2022.

NOTARY PUBLIC

JESSICA SELINA ROMERO
Notary Public, State of Texas
Comm. Expires 01-18-2026
Notary ID 133537537

Jessica Selina Romero
Typed or Printed Name of Notary

MY COMMISSION EXPIRES: 01.18.26

Application Fee Form

Texas Commission on Environmental Quality

Name of Proposed Regulated Entity: Roger Hanks Parkway Extension II
Regulated Entity Location: Northeast of the intersection of Highway 290 and Roger Hanks PKwy, Dripping Springs, TX
Name of Customer: City of Dripping Springs
Contact Person: _____
Phone: (512) 770-8503 Customer Reference Number (if issued):CN _602491284_____
Regulated Entity Reference Number (if issued):RN _____

Austin Regional Office (3373)

☒ Hays ☐ Travis ☐ Williamson

San Antonio Regional Office (3362)

☐ Bexar ☐ Medina ☐ Uvalde
☐ Comal ☐ Kinney

Application fees must be paid by check, certified check, or money order, payable to the **Texas Commission on Environmental Quality**. Your canceled check will serve as your receipt. **This form must be submitted with your fee payment**. This payment is being submitted to:

☒ Austin Regional Office
☐ Mailed to: TCEQ - Cashier
Revenues Section
Mail Code 214
P.O. Box 13088
Austin, TX 78711-3088

☐ San Antonio Regional Office
☐ Overnight Delivery to: TCEQ - Cashier
12100 Park 35 Circle
Building A, 3rd Floor
Austin, TX 78753
(512)239-0357

Site Location (Check All That Apply):

☐ Recharge Zone ☒ Contributing Zone ☐ Transition Zone

Type of Plan	***Size***	***Fee Due***
Water Pollution Abatement Plan, Contributing Zone Plan: One Single Family Residential Dwelling	N/A Acres	$ 0
Water Pollution Abatement Plan, Contributing Zone Plan: Multiple Single Family Residential and Parks	N/A Acres	$0
Water Pollution Abatement Plan, Contributing Zone Plan: Non-residential	10.89 Acres	$6,500
Sewage Collection System	N/A L.F.	$ 0
Lift Stations without sewer lines	N/A Acres	$ 0
Underground or Aboveground Storage Tank Facility	N/A Tanks	$ 0
Piping System(s)(only)	N/A Each	$ 0
Exception	N/A Each	$ 0
Extension of Time	N/A Each	$ 0

Signature: Alejandro E. Granados Rios Date: 7/26/2022 Application Fee Schedule

Application Fee Schedule

Texas Commission on Environmental Quality
Edwards Aquifer Protection Program 30 TAC Chapter 213 (effective 05/01/2008)

Water Pollution Abatement Plants and Modifications

Contributing Zone Plans and Modifications

Project	*Project Area in Acres*	*Fee*
One Single Family Residential Dwelling	< 5	$650
Multiple Single Family Residential and Parks	< 5 5 < 10 10 < 40 40 < 100 100 < 500 ≥ 500	$1,500 $3,000 $4,000 $6,500 $8,000 $10,000
Non-residential (Commercial, industrial, institutional, multi-family residential, schools, and other sites where regulated activities will occur)	< 1 1 < 5 5 < 10 10 < 40 40 < 100 ≥ 100	$3,000 $4,000 $5,000 $6,500 $8,000 $10,000

Organized Sewage Collection Systems and Modifications

Project	*Cost per Linear Foot*	*Minimum Fee-Maximum Fee*
Sewage Collection Systems	$0.50	$650 - $6,500

Underground and Aboveground Storage Tank System Facility Plans and Modifications

Project	*Cost per Tank or Piping System*	*Minimum Fee-Maximum Fee*
Underground and Aboveground Storage Tank Facility	$650	$650 - $6,500

Exception Requests

Project	*Fee*
Exception Request	$500

Extension of Time Requests

Project	*Fee*
Extension of Time Request	$150

Check Payable to the "Texas Commission on Environmental Quality"

Core Data Form

TCEQ Core Data Form

TCEQ Use Only

For detailed instructions regarding completion of this form, please read the Core Data Form Instructions or call 512-239-5175.

SECTION I: General Information

1. Reason for Submission (*If other is checked please describe in space provided.*)

☒ New Permit, Registration or Authorization (*Core Data Form should be submitted with the program application.*)

☐ Renewal (*Core Data Form should be submitted with the renewal form*) ☐ Other

2. Customer Reference Number *(if issued)*	Follow this link to search for CN or RN numbers in Central Registry**	3. Regulated Entity Reference Number *(if issued)*
CN 602491284		RN

SECTION II: Customer Information

4. General Customer Information	5. Effective Date for Customer Information Updates (mm/dd/yyyy)	7/7/2022

☐ New Customer ☒ Update to Customer Information ☐ Change in Regulated Entity Ownership

☐ Change in Legal Name (Verifiable with the Texas Secretary of State or Texas Comptroller of Public Accounts)

The Customer Name submitted here may be updated automatically based on what is current and active with the Texas Secretary of State (SOS) or Texas Comptroller of Public Accounts (CPA).

6. Customer Legal Name (*If an individual, print last name first: eg: Doe, John*) *If new Customer, enter previous Customer below:*

CITY OF DRIPPING SPRINGS

7. TX SOS/CPA Filing Number	8. TX State Tax ID (11 digits)	9. Federal Tax ID (9 digits)	10. DUNS Number (*if applicable*)

11. Type of Customer: ☐ Corporation ☐ Individual Partnership: ☐ General ☐ Limited

Government: ☒ City ☐ County ☐ Federal ☐ State ☐ Other ☐ Sole Proprietorship ☐ Other:

12. Number of Employees
☐ 0-20 ☐ 21-100 ☐ 101-250 ☐ 251-500 ☐ 501 and higher

13. Independently Owned and Operated?
☐ Yes ☒ No

14. Customer Role (Proposed or Actual) – *as it relates to the Regulated Entity listed on this form. Please check one of the following*

☒ Owner ☐ Operator ☐ Owner & Operator
☐ Occupational Licensee ☐ Responsible Party ☐ Voluntary Cleanup Applicant ☐ Other:

15. Mailing Address:	511 W Mercer St.						
	City	Dripping Springs	State	TX	ZIP	78620	ZIP + 4

16. Country Mailing Information (*if outside USA*)	17. E-Mail Address (*if applicable*)

18. Telephone Number	19. Extension or Code	20. Fax Number (*if applicable*)
(512) 858-4725		( ) -

SECTION III: Regulated Entity Information

21. General Regulated Entity Information (*If 'New Regulated Entity" is selected below this form should be accompanied by a permit application*)

☒ New Regulated Entity ☐ Update to Regulated Entity Name ☐ Update to Regulated Entity Information

The Regulated Entity Name submitted may be updated in order to meet TCEQ Agency Data Standards (removal of organizational endings such as Inc, LP, or LLC).

22. Regulated Entity Name (*Enter name of the site where the regulated action is taking place.*)

Roger Hanks Parkway Extension II

23. Street Address of the Regulated Entity: *(No PO Boxes)*							
	City		**State**		**ZIP**		**ZIP + 4**
24. County	Hays						

Enter Physical Location Description if no street address is provided.

25. Description to Physical Location:	Approximately 0.3 miles northwest of the intersection of Highway 290 and RR 12

26. Nearest City	**State**	**Nearest ZIP Code**
Dripping Springs	TX	78620

27. Latitude (N) In Decimal:	30.203209		**28. Longitude (W) In Decimal:**	98.102233	
Degrees	Minutes	Seconds	Degrees	Minutes	Seconds
30	12	11.55	98	6	8.04

29. Primary SIC Code (4 digits)	**30. Secondary SIC Code** (4 digits)	**31. Primary NAICS Code** (5 or 6 digits)	**32. Secondary NAICS Code** (5 or 6 digits)
6552	N/A	237210	N/A

33. What is the Primary Business of this entity? *(Do not repeat the SIC or NAICS description.)*

Single-Family Homes

34. Mailing Address:	**511 W Mercer Street**							
	City	**Drippin Spring**	**State**	**TX**	**ZIP**	**78620**	**ZIP + 4**	

35. E-Mail Address:	

36. Telephone Number	**37. Extension or Code**	**38. Fax Number** *(if applicable)*
(512) 858-4725		**( ) -**

39. TCEQ Programs and ID Numbers Check all Programs and write in the permits/registration numbers that will be affected by the updates submitted on this form. See the Core Data Form instructions for additional guidance.

☐ Dam Safety	☐ Districts	☒ Edwards Aquifer	☐ Emissions Inventory Air	☐ Industrial Hazardous Waste
☐ Municipal Solid Waste	☐ New Source Review Air	☐ OSSF	☐ Petroleum Storage Tank	☐ PWS
☐ Sludge	☐ Storm Water	☐ Title V Air	☐ Tires	☐ Used Oil
☐ Voluntary Cleanup	☐ Waste Water	☐ Wastewater Agriculture	☐ Water Rights	☐ Other:

SECTION IV: Preparer Information

40. Name:	Alejandro Granados	**41. Title:**	Project Manager

42. Telephone Number	**43. Ext./Code**	**44. Fax Number**	**45. E-Mail Address**
(512) 782-0602		( ) -	alex.granados@kimley-horn.com

SECTION V: Authorized Signature

46. By my signature below, I certify, to the best of my knowledge, that the information provided in this form is true and complete, and that I have signature authority to submit this form on behalf of the entity specified in Section II, Field 6 and/or as required for the updates to the ID numbers identified in field 39.

Company:	City of Dripping Springs	**Job Title:**	
Name *(In Print):*		**Phone:**	( ) -
Signature:		**Date:**	

HC 9921033 2 pgs

SWT

HC 9921953 4 pgs

GIFT DEED

STATE OF TEXAS §
§ KNOW ALL MEN BY THESE PRESENTS:
COUNTY OF HAYS §

THAT TEDDY B. DRAPER AND PAMELA S. DRAPER (jointly herein referred to as "Grantor"), for Ten DOLLARS with full intention of conveying the property hereinafter described as a gift, with no reversionary interests whatsoever in favor of Grantor, has GIVEN, GRANTED, and CONVEYED, and by these presents does GIVE, GRANT and CONVEY to DRIPPING SPRINGS INDEPENDENT SCHOOL DISTRICT ("Grantee"), all that certain the real property ("Property") containing approximately 4.03 acres of land in Hays County, Texas and being for fully described on Exhibit "A" attached hereto and incorporated herein for all purposes.

This conveyance is made subject to any and all restrictions, reservations, conditions, covenants, easements and exceptions, if any, validly existing against the Property and recorded in the Records of Hays County, Texas.

TO HAVE AND TO HOLD the Property, together with all and singular the rights and appurtenances thereto in anywise belonging to the Property, subject to the provisions stated above, to Grantee, Grantee's heirs, executors, administrators, successors and/or assigns forever; and Grantor does hereby bind Grantor's heirs, executors, administrators, successors and/or assigns, to WARRANT AND FOREVER DEFEND all and singular the Property unto Grantee, Grantee's heirs, executors, administrators, successors and/or assigns, against every person whomsoever claiming or to claim the same or any part thereof.

EXECUTED this 18 day of April, 1999.

Teddy B. Draper
Teddy B. Draper

Pamela S. Draper
Pamela S. Draper

Grantee's Address:

P.O. Box 479
Dripping Springs, Texas 78620

Document being re-recorded to attach field notes.

1

STATE OF TEXAS §
§
COUNTY OF HAYS §

This instrument was acknowledged before me on this the 18 day of Aug, 1999 by Teddy B. Draper and Pamela S. Draper.

REX G. BAKER, III
MY COMMISSION EXPIRES
February 1, 2001

NOTARY PUBLIC, STATE OF TEXAS

MY COMMISSION EXPIRES: _____

AFTER RECORDING RETURN TO:
Baker, Boldt & Gallerano
P.O. Box 718
Dripping Springs, Texas 78620

giftdeed.doc

FILED AND RECORDED
OFFICIAL PUBLIC RECORDS

Lee Carlisle

9-2-99 08:07 AM 9921033
LYNN $11.00
LEE CARLISLE, County Clerk
HAYS COUNTY

Exhibit "__"
Page 1 of 2
October 29, 2009

25' Roadway Easement
0.367 acres of Land
Phillip A. Smith, Survey No. 26
Abstract Number 415
Hays County, Texas

DESCRIPTION

DESCRIPTION OF 0.367 ACRES OF LAND SITUATED IN THE PHILLIP A. SMITH SURVEY NO. 26, ABSTRACT NUMBER 415, IN HAYS COUNTY, TEXAS, BEING A PORTION OF THAT CERTAIN 14.68 ACRE TRACT OF LAND DESCRIBED IN DEED TO THE CITY OF DRIPPING SPRINGS, TEXAS, OF RECORD IN VOLUME 1878, PAGE 628 OF THE OFFICIAL PUBLIC RECORDS OF HAYS COUNTY, TEXAS; SAID 0.367 ACRES OF LAND BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:

BEGINNING at a 1/2 inch iron rod found for the southwest corner of said 14.68 acre tract, for the southeast corner of Lot 1, Block D, Hidden Springs Ranch, Section II according to the plat recorded in Volume 14, Page 69, Plat Records of Hays County, Texas and in the north line of that certain 4.03 acre tract of land described in deed to the City of Dripping Springs, Texas, of record in Volume 1878, Page 624 of the Official Public Records of Hays County, Texas, from which a 1/2 inch iron rod found with cap stamped "RPLS 4404" for the northwest corner of said 4.03 acre tract bears S88°12'53"W a distance of 60.03 feet;

THENCE N01°17'08"W with the common line of said 14.68 acre tract and said Lot 1, Block D a distance of 520.00 feet to a calculated point at the beginning of a curve to the right in the east right-of-way line of Golden Eagle Lane (60' R.O.W), from which point a 3/8 inch iron rod with cap stamped "RPLS 4542" found in the east line of said Lot 1, Block D and the west right-of-way line of said Golden Eagle Lane bears N01°26'23"W a distance of 155.30 feet;

THENCE with said curve to the right, having a radius distance of 645.00 feet, an arc length of 180.17 feet, a delta angle of 16°00'17" and a chord which bears N06°43'00"E, a distance of 179.59 feet to a point;

THENCE S01°17'08"E over and across said 14.68 acre tract a distance of 697.62 feet to a point in the south line of said 14.68 acre tract and the north line of said 4.03 acre tract, from which point a 1/2 inch iron rod found for the southeast corner of said 14.68 acre tract and the northeast corner of said 4.03 acre tract bears N88°12'53"E a distance of 731.83 feet;

M45
29 Oct 09

S:\4520101_Supporting Documents\4520101_EASEMENT_25' roadway.doc

Exhibit A
Page 1 of 3

Exhibit "__"
Page 2 of 2
October 29, 2009

25' Roadway Easement
0.367 acres of Land
Phillip A. Smith, Survey No. 26
Abstract Number 415
Hays County, Texas

THENCE S88°12'53"W with the south line of said 14.68 acre tract and the north line of said 4.03 acre tract a distance of 25.00 feet to the POINT OF BEGINNING, containing 0.367 acres of land, more or less, within these metes and bounds.

Subject tract described herein is an easement. No monumentation set for corners.

Reference is herein made to the sketch accompanying this metes and bounds description.

Bearing Basis: Grid North, Texas Coordinate System of 1983, Central Zone, as derived from OPUS solution dated February 15, 2008. Distances hereon are surface values based on a surface adjustment factor of 1.00007683. (Ground = Grid x Surface Adjustment Factor)

I hereby certify that this description was prepared from a survey made on the ground under my supervision.

CUNNINGHAM-ALLEN, INC.

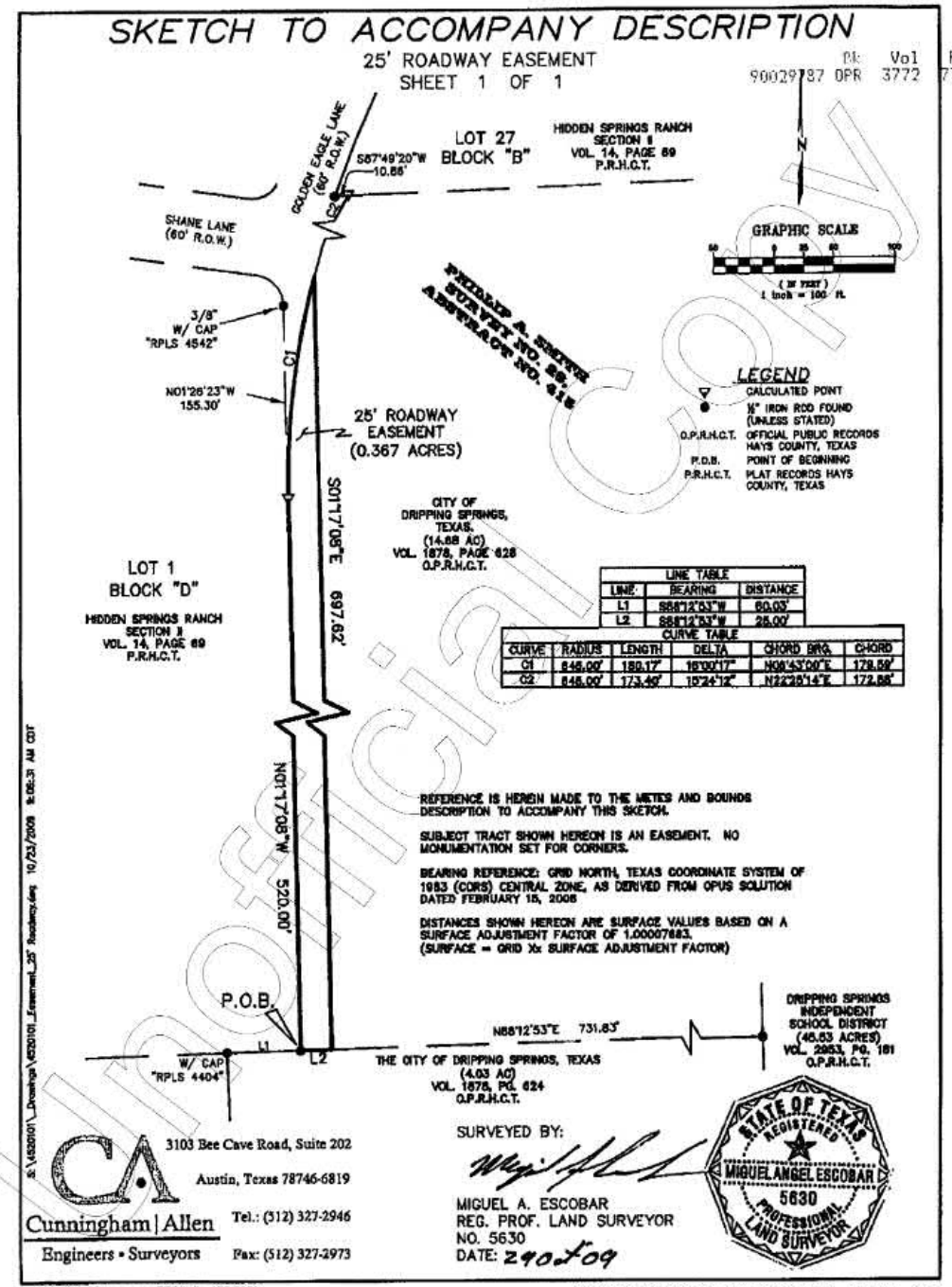
Miguel A. Escobar
Registered Professional Land Surveyor No. 5630
State of Texas
Date: 29oct09

S:\4520101_Supporting Documents\4520101_EASEMENT_25' roadway.doc

SKETCH TO ACCOMPANY DESCRIPTION

25' ROADWAY EASEMENT
SHEET 1 OF 1

Pk: Vol Pg
90029787 OPR 3772 774



LEGEND

	CALCULATED POINT
	½" IRON ROD FOUND (UNLESS STATED)
O.P.R.H.C.T.	OFFICIAL PUBLIC RECORDS HAYS COUNTY, TEXAS
P.O.B.	POINT OF BEGINNING
P.R.H.C.T.	PLAT RECORDS HAYS COUNTY, TEXAS

LINE TABLE		
LINE	BEARING	DISTANCE
L1	S88°12'53"W	60.03'
L2	S88°12'53"W	25.00'

CURVE TABLE					
CURVE	RADIUS	LENGTH	DELTA	CHORD BRG.	CHORD
C1	646.00'	189.17'	16°00'17"	N09°43'00"E	178.59'
C2	646.00'	173.49'	15°24'12"	N23°25'14"E	172.98'

REFERENCE IS HEREIN MADE TO THE METES AND BOUNDS DESCRIPTION TO ACCOMPANY THIS SKETCH.

SUBJECT TRACT SHOWN HEREON IS AN EASEMENT. NO MONUMENTATION SET FOR CORNERS.

BEARING REFERENCE: GRID NORTH, TEXAS COORDINATE SYSTEM OF 1983 (CORS) CENTRAL ZONE, AS DERIVED FROM OPUS SOLUTION DATED FEBRUARY 15, 2008

DISTANCES SHOWN HEREON ARE SURFACE VALUES BASED ON A SURFACE ADJUSTMENT FACTOR OF 1.00007683. (SURFACE = GRID X SURFACE ADJUSTMENT FACTOR)

3103 Bee Cave Road, Suite 202
Austin, Texas 78746-6819
Cunningham | Allen
Engineers • Surveyors
Tel.: (512) 327-2946
Fax: (512) 327-2973

SURVEYED BY:

MIGUEL A. ESCOBAR
REG. PROF. LAND SURVEYOR
NO. 5630
DATE: 2/05/09

STATE OF TEXAS REGISTERED MIGUEL ANGEL ESCOBAR 5630 PROFESSIONAL LAND SURVEYOR

OFFICE: IBP
DATE: 10/26/09

PROJ #: 452.0101
FILE NAME: 4520101_Easement_25' Roadway.dwg

Exhibit A
Page 3 of 3

Instrument # 16043361 Number: 1 of 5 Filed and Recorded: 12/22/2016 8:42 AM
Liz Q. Gonzalez, Hays County Clerk, Texas Rec $42.00 Deputy Clerk: MCASTRO

SPECIAL WARRANTY DEED
(EXCHANGE DEED)

STATE OF TEXAS §
§ KNOW ALL MEN BY THESE PRESENTS:
COUNTY OF HAYS §

THAT DRAPER RANCH PARTNERSHIP ("Grantor"), for and in consideration of the exchange of the Property (hereinafter defined) of even date herewith for that certain real property owned by THE CITY OF DRIPPING SPRINGS, HAYS COUNTY, TEXAS, a general laws municipality ("Grantee") and located in Hays County, Texas, the receipt of which is hereby acknowledged, has GRANTED, SOLD AND CONVEYED, and by these presents does GRANT, SELL AND CONVEY unto Grantee, the real property containing 1.76 acres, more or less, and being more fully described on Exhibit "A" attached hereto and incorporated herein for all purposes (the "Property").

This conveyance, however, is made and accepted expressly subject to any and all easements, rights-of-way and prescriptive rights, whether of record or not; all recorded restrictions, reservations, encumbrances, covenants, conditions, oil and gas leases and mineral reservations if any, relating to or affecting the Property; rights of adjoining owners in any walls and fences situated along a common boundary; any discrepancies, conflicts, or shortages in area or boundary lines; any encroachments or overlapping of improvements.

TO HAVE AND TO HOLD the above described premises, together with all and singular the rights and appurtenances thereto in anywise belonging, unto Grantee, Grantee's successors and assigns forever; and Grantor does hereby bind itself and its successors and assigns to WARRANT AND FOREVER DEFEND all and singular the said premises unto Grantee, Grantee's successors and assigns, against every person whomsoever claiming or to claim the same or any part thereof, by through or under Grantor, but not otherwise.

EXECUTED this 22 day of December 2016.

GRANTOR:

Draper Ranch Partnership

By: _____
Name: James R. Karhan
Title: Partner

Grantee's Address:
P O Box 384
Dripping Springs, Texas 78620

STATE OF TEXAS §
§
COUNTY OF HAYS §

The foregoing instrument was acknowledged before me on the 20 day of December, 2016 by James R. Karhan, partner of Draper Ranch Partnership, a Texas general partnership, on behalf of said partnership.

Lisa R. Blaha
NOTARY PUBLIC, STATE OF TEXAS

MY COMMISSION EXPIRES:

LISA R. BLAHA
My Notary ID # 7234664
Expires April 24, 2019

Instrument # 16043361 Number: 3 of 5 Filed and Recorded: 12/22/2016 8:42 AM
Liz Q. Gonzalez, Hays County Clerk, Texas Rec $42.00 Deputy Clerk: MCASTRO

EXHIBIT "A"

3 of 4

STATE OF TEXAS **1.76 ACRES**
COUNTY OF HAYS **P.A. SMITH SURVEY**

A DESCRIPTION OF A 1.76 ACRE TRACT OF LAND OUT OF THE P.A. SMITH SURVEY NO. 26, HAYS COUNTY, TEXAS , BEING OUT OF A CALLED 142.00 ACRE TRACT OF LAND CONVEYED TO DRAPER RANCH PARTNERSHIP IN VOLUME 936, PAGE 868, OFFICIAL PUBLIC RECORDS OF HAYS COUNTY, TEXAS, SAID 1.76 ACRES BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS;

BEGINNING at a ½ inch iron rod with cap set for the northwest corner of the herein described tract, said iron rod being in the northeast corner of a called 19.21 acre tract of land conveyed to Hilltop Campus, LTD. In Volume 1780, Page 747, Official Public Records of Hays County, Texas, said iron rod being in the south line of a called 98.47 acre tract of land (remainder tract) recorded in Document No. 9926903, Official Public Records of Hays County, Texas;

THENCE N 89°11'12"E, with the south line of said 98.47 acre remainder tract and the north line of the herein described tract, a distance of 19.96 feet to a ½ inch iron rod with cap set for the northeast corner of the herein described tract, said iron rod being a northwest corner of a called 4.03 acre tract of land conveyed to The City of Dripping Springs, Texas in Volume 1878, Page 624, Official Public Records of Hays County, Texas;

THENCE S 01°18'22"E, with the west line of said 4.03 acre tract and the east line of said Draper Ranch Partnership remainder tract, a distance of 1010.94 feet to a ½ inch iron rod with cap set for the beginning of a non-tangent curve to the right;

THENCE crossing said Draper Ranch Partnership remainder tract, the following three (3) courses and distances;

1) with the arc of a non-tangent curve to the right, a distance of 396.92 feet, said curve having a radius of 440.00 feet and a chord bearing of S 54°49'12"W, a chord distance of 383.60 feet to a ½ inch iron rod with cap set for the end of said curve;

2) S 80°39'46"W, a distance of 223.53 feet to a ½ inch iron rod with cap set for the beginning of a curve to the left, and

3) with the arc of a curve to the left, a distance of 68.19 feet, said curve having a radius of 360.00 feet and a chord bearing of S 75°14'11"W, a chord distance of 68.09 feet to a ½ inch iron rod with cap set in the east right of way of Hays County Road No. 320 (R.O.W. varies), said iron rod being in the westerly line of said Draper Ranch Partnership remainder tract for the most southerly corner of the herein described tract, from which a concrete highway monument found bears S 26°42'54"E, a distance of 247.70 feet;

THENCE N 26°42'54"W, with the east right of way of Hays County Road No. 320, a distance of 80.43 feet to a ½ inch iron rod with cap set for the most westerly corner of the herein described tract and the beginning of a non-tangent curve to the right;

THENCE crossing said Draper Ranch partnership remainder tract, the following four courses and distances;

1) with the arc of a non-tangent curve to the right, a distance of 92.48 feet, said curve having a radius of 440.00 feet and a chord bearing of N 74°38'29"E, a chord distance of 92.31 feet to a ½ inch iron rod with cap set for the end of said curve;

2) N 80°39'46"E, a distance of 223.53 feet to a ½ inch iron rod with cap set for the beginning of a curve to the left;

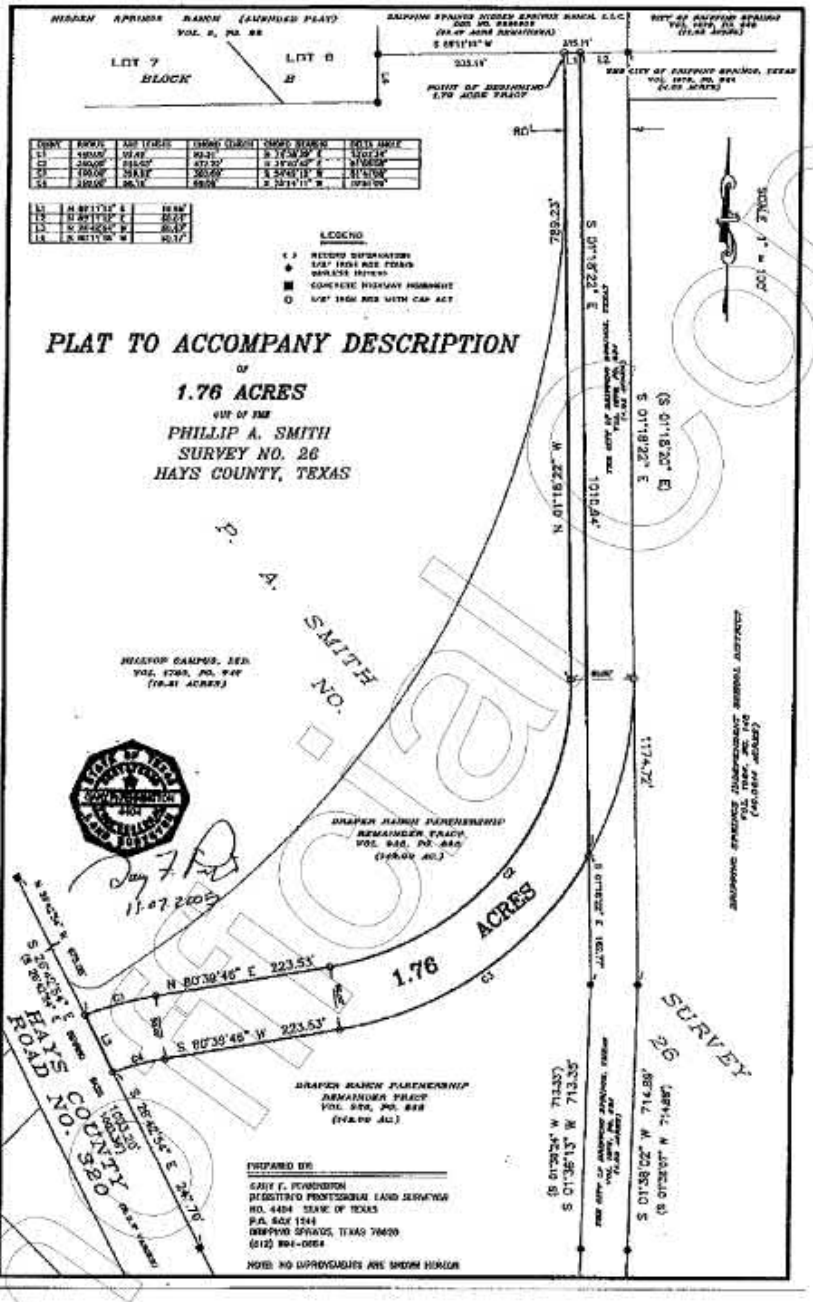
3) with the arc of a curve to the left, a distance of 515.03 feet, said curve having a radius of 360.00 feet and a chord bearing of N 39°40'42"E, a distance of 472.22 feet to a ½ inch iron rod with cap set for the end of said curve, and

4) N 01°18'22"W, a distance of 789.23 feet to the **POINT OF BEGINNING**, containing 1.76 acres of land.

I, Gary F. Pennington, do hereby certify that this description with associated plat to accompany description was prepared from a survey performed under my direction and supervision during November of 2005, and is true and correct to the best of my knowledge and belief.

11-07-2005

Gary F. Pennington
Registered Professional Land Surveyor
No. 4404- State of Texas
P.O. Box 1244
Dripping Springs, Texas 78620
(512) 894-0664



Instrument # 16043361 Number: 5 of 5Filed and Recorded: 12/22/2016 8:42 AM
Liz Q. Gonzalez, Hays County Clerk, Texas Rec $42.00 Deputy Clerk: MCASTRO

Hays County
Linda C. Fritsche
County Clerk
San Marcos, Texas 78666

70 2009 90029784

Instrument Number: 2009-90029784
As
OPR RECORDINGS

Recorded On: November 16, 2009

Parties: DRIPPING SPRINGS CITY OF
To DRIPPING SPRINGS INDEPENDENT SCHOOL

Billable Pages: 5
Number of Pages: 6

Comment:

(Parties listed above are for Clerks reference only)

**** Examined and Charged as Follows: ****

OPR RECORDINGS	32.00
Total Recording:	**32.00**

************** DO NOT REMOVE. THIS PAGE IS PART OF THE INSTRUMENT **************

Any provision herein which restricts the Sale, Rental or use of the described REAL PROPERTY because of color or race is invalid and unenforceable under federal law.

File Information:

Document Number: 2009-90029784
Receipt Number: 233201
Recorded Date/Time: November 16, 2009 12:03:10P
Book-Vol/Pg: BK-OPR VL-3772 PG-751
User / Station: O Martinez - Cashiering #3

Record and Return To:

CITY OF DRIPPINGS SPRINGS
TO CUSTOMER
SAN MARCOS TX 78666

COUNTY COURT OF HAYS COUNTY, TEXAS

State of Texas |
County of Hays

I hereby certify that this instrument was filed for record in my office on the date and time stamped hereon and was recorded on the volume and page of the named records of Hays County, Texas

Linda C. Fritsche

Linda C. Fritsche, County Clerk

GENERAL WARRANTY DEED
(EXCHANGE DEED)

STATE OF TEXAS §
§ KNOW ALL MEN BY THESE PRESENTS:
COUNTY OF HAYS §

THAT THE CITY OF DRIPPING SPRINGS, HAYS COUNTY, TEXAS, a general laws municipality ("Grantor"), for and in consideration of the exchange of the Property (hereinafter defined) of even date herewith for that certain real property owned by DRIPPING SPRINGS INDEPENDENT SCHOOL DISTRICT ("Grantee") and located in Hays County, Texas, the receipt of which is hereby acknowledged, has GRANTED, SOLD AND CONVEYED, and by these presents does GRANT, SELL AND CONVEY unto Grantee, the real property containing 1.12 acres, more or less, and being more fully described on Exhibit "A" attached hereto and incorporated herein for all purposes (the "Property").

This conveyance, however, is made and accepted expressly subject to any and all easements, rights-of-way and prescriptive rights, whether of record or not; all recorded restrictions, reservations, encumbrances, covenants, conditions, oil and gas leases and mineral reservations if any, relating to or affecting the Property; rights of adjoining owners in any walls and fences situated along a common boundary; any discrepancies, conflicts, or shortages in area or boundary lines; any encroachments or overlapping of improvements.

TO HAVE AND TO HOLD the above described premises, together with all and singular the rights and appurtenances thereto in anywise belonging, unto Grantee, Grantee's successors and assigns forever; and Grantor does hereby bind itself and its successors and assigns to WARRANT AND FOREVER DEFEND all and singular the said premises unto Grantee, Grantee's successors and assigns, against every person whomsoever claiming or to claim the same or any part thereof.

EXECUTED this 11th day of November, 2009.

"GRANTOR"

The City of Dripping Springs, Hays County, Texas
A general laws municipality

By: _____
Name: Bill Foulds
Title: Mayor Pro Tem

Grantee's Address:
510 W. Mercer
P O Box 479
Dripping Springs, Texas 78620

STATE OF TEXAS §
§
COUNTY OF HAYS §

The foregoing instrument was acknowledged before me on the 11th day of November, 2009 by Bill Fields, Mayor Pro Tem of the City of Dripping Springs, Hays County, Texas, a general law municipality, on behalf of said municipality.

Jo Ann Touchstone
NOTARY PUBLIC, STATE OF TEXAS

MY COMMISSION EXPIRES: 10/09/2011

NOTARY PUBLIC • STATE OF TEXAS
Jo Ann Touchstone
My Commission Expires
10/08/2011

EXHIBIT "A"

STATE OF TEXAS
COUNTY OF HAYS

1.12 ACRES
PHILLIP A. SMITH SURVEY

A DESCRIPTION OF A 1.12 ACRE TRACT OF LAND OUT OF THE PHILLIP A. SMITH SURVEY NO. 26, ABSTRACT NO. 415, HAYS COUNTY, TEXAS, SAID 1.12 ACRES BEING A PORTION OF A CALLED 4.03 ACRE TRACT OF LAND DESCRIBED IN A SPECIAL WARRANTY DEED CONVEYED TO THE CITY OF DRIPPING SPRINGS, TEXAS, IN VOLUME 1878, PAGE 624, OFFICIAL PUBLIC RECORDS OF HAYS COUNTY, TEXAS, SAID 1.12 ACRES BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUND AS FOLLOWS;

BEGINNING at a ½ inch iron rod found for the northeast corner of the herein described 1.12 acre tract of land, said iron rod being the southeast corner of a called 14.68 acre tract of land described in a Special Warranty Deed to The City Of Dripping Springs, Texas, recorded in Volume 1878, Page 628, Official Public Records of Hays County, Texas, said iron rod also being in the west line of a called 45.53 acre tract of land described in a Warranty Deed to Dripping Springs Independent School District, recorded in Volume 2953, Page 181, Official Public Records of Hays County, Texas;

THENCE S 00°13'37"E, with the east line of the herein described 1.12 acre tract of land, and the west line of said 45.53 acre tract, a distance of 78.07 feet to a ½ inch iron rod found for the southeast corner of the herein described 1.12 acre tract of land, from which a ½ inch iron rod found (origin unknown) bears, S 85°20'22"W, a distance of 6.06 feet for reference, said ½ inch iron rod found (southeast corner of herein described 1.12 acre tract of land) also being in the north line of a called 40.0514 acre tract of land described in a deed to Dripping Springs Independent School District, recorded in Volume 1084, Page 148, Official Public Records of Hays County, Texas;

THENCE N 88°29'53"W, with the south line of the herein described 1.12 acre tract of land and the north line of said 40.0514 acre tract, a distance of 238.29 feet to a 60d nail found in wood fence post for an angle point in the south line of the herein described 1.12 acre tract of land;

THENCE with the south line of the herein described 1.12 acre tract of land and a south line of said 4.03 acre parent tract, the following two (2) courses and distances:

1) N 07°26'59"E, a distance of 8.69 feet to a 60d nail found in wood fence post, and

2) S 89°11'45"W, a distance of 518.56 feet to a ½ inch iron rod found for the southwest corner of the herein described 1.12 acre tract of land;

THENCE N 01°25'55"W, crossing said 4.03 acre parent tract, leaving the north line of said 40.0514 acre tract, and with the west line of the herein described 1.12 acre tract of land, a distance of 60.35 feet to a ½ inch iron rod found for the northwest corner of the herein described 1.12 acre tract of land, said iron rod being

the southwest corner of said 14.68 acre tract, said iron rod also being the southeast corner of Lot 1, Blk. "D", Hidden Springs Ranch Section II, a subdivision recorded in Book 14, Page 69, Plat Records of Hays County, Texas;

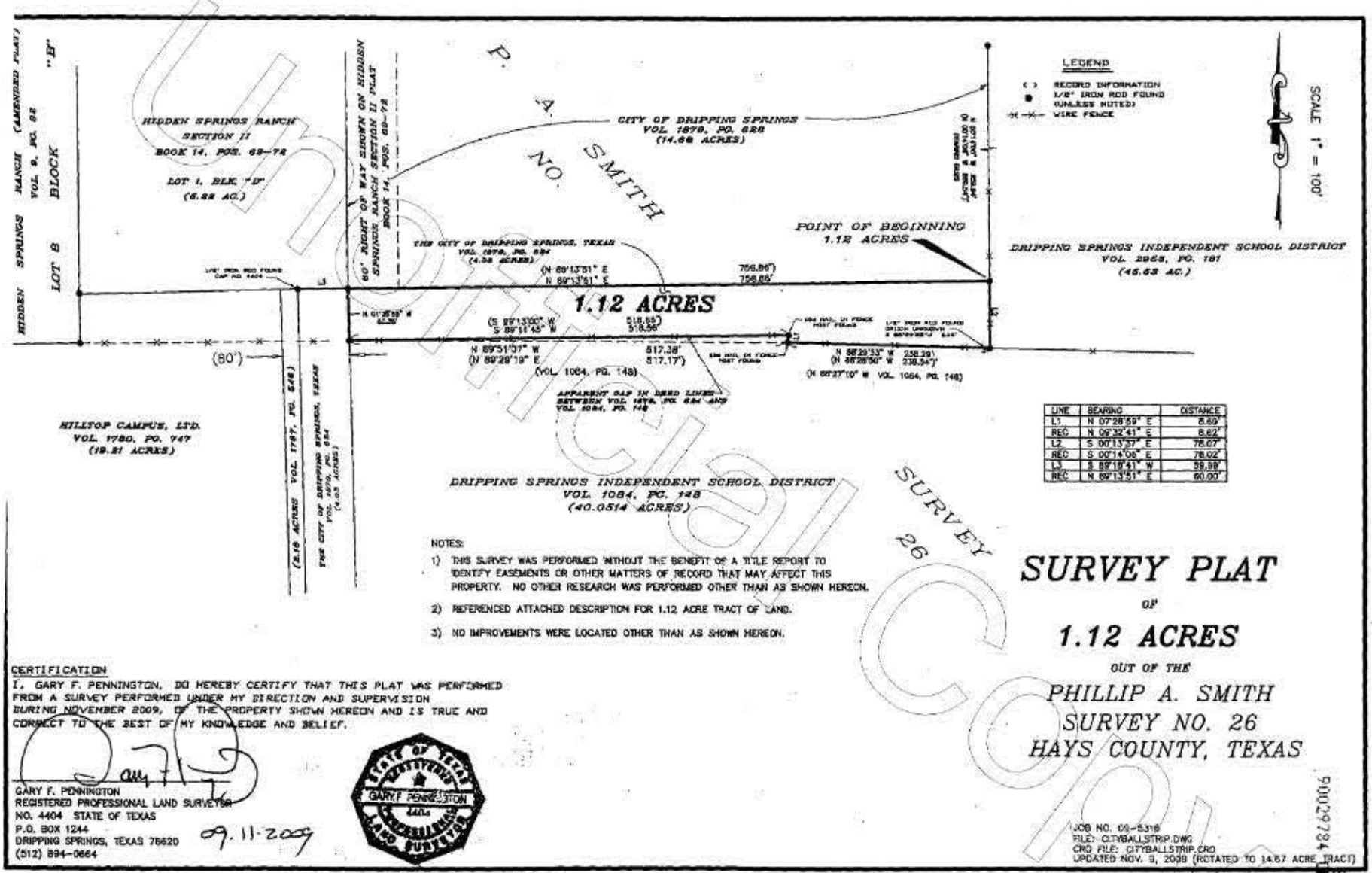
THENCE N 89°13'51"E, with the north line of the herein described 1.12 acre tract of land and the south line of said 14.68 acre tract, a distance of 756.86 feet to the **POINT OF BEGINNING** containing 1.12 acres of land.

Bearing Basis for the herein described 1.12 acre tract of land is the east line of said 14.68 acre tract, having a bearing of N 00°14'06"W, and a distance of 859.94 feet.

I, Gary F. Pennington, do hereby certify that this description and associated survey plat was prepared from a survey performed under my direction and supervision during November of 2009, and is true and correct to the best of my knowledge and belief.

11-09-2009
Date

Gary F. Pennington
Registered Professional Land Surveyor
No. 4404- State of Texas
P.O. Box 1244, Dripping Springs, Texas 78620, (512) 894-0664



LINE	BEARING	DISTANCE
L1	N 07°28'59" E	8.69'
REC	N 09°32'41" E	8.62'
L2	S 00°13'37" E	78.07'
REC	S 00°14'06" E	78.02'
L3	S 89°19'41" W	59.99'
REC	N 89°13'51" E	60.00'

NOTES:

1) THIS SURVEY WAS PERFORMED WITHOUT THE BENEFIT OF A TITLE REPORT TO IDENTIFY EASEMENTS OR OTHER MATTERS OF RECORD THAT MAY AFFECT THIS PROPERTY. NO OTHER RESEARCH WAS PERFORMED OTHER THAN AS SHOWN HEREON.
2) REFERENCED ATTACHED DESCRIPTION FOR 1.12 ACRE TRACT OF LAND.
3) NO IMPROVEMENTS WERE LOCATED OTHER THAN AS SHOWN HEREON.

SURVEY PLAT

OF

1.12 ACRES

OUT OF THE

PHILLIP A. SMITH SURVEY NO. 26 HAYS COUNTY, TEXAS

CERTIFICATION

I, GARY F. PENNINGTON, DO HEREBY CERTIFY THAT THIS PLAT WAS PERFORMED FROM A SURVEY PERFORMED UNDER MY DIRECTION AND SUPERVISION DURING NOVEMBER 2009, OF THE PROPERTY SHOWN HEREON AND IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

09.11.2009

GARY F. PENNINGTON
REGISTERED PROFESSIONAL LAND SURVEYOR
NO. 4404 STATE OF TEXAS
P.O. BOX 1244
DRIPPING SPRINGS, TEXAS 78620
(512) 894-0664

STATE OF TEXAS REGISTERED GARY F. PENNINGTON 4404 LAND SURVEYOR

JOB NO. 09-5316
FILE: CITYBALLSTRIP.DWG
CRD FILE: CITYBALLSTRIP.CRD
UPDATED NOV. 9, 2009 (ROTATED TO 14.67 ACRE TRACT)

P1 373

Bk Vol 3772 Pg 756

Exhibit "__"
Page 1 of 2
October 29, 2009

Easement
0.936 Acres
Phillip A. Smith, Survey No. 26
Abstract Number 415
Hays County, Texas

DESCRIPTION

DESCRIPTION OF 0.936 ACRES OF LAND SITUATED IN THE PHILLIP A. SMITH SURVEY NO. 26, ABSTRACT NUMBER 415, IN HAYS COUNTY, TEXAS, BEING A PORTION OF THAT CERTAIN 14.68 ACRE TRACT OF LAND DESCRIBED IN DEED TO THE CITY OF DRIPPING SPRINGS, TEXAS, OF RECORD IN VOLUME 1878, PAGE 628 OF THE OFFICIAL PUBLIC RECORDS OF HAYS COUNTY, TEXAS; SAID 0.936 ACRES OF LAND BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:

BEGINNING at a ½ inch iron rod, found for the northeast corner of said 14.68 acre tract, same point being in the west line of that certain called 45.53 acre tract of land described in Volume 2953, Page 181 said Official Public Records and same point being the southeast corner of Lot 24, Block B, Hidden Springs Ranch Section II, recorded in Volume 14, Page 69, of the Plat Records of Hays County, Texas, for the northeast corner of the herein described tract;

THENCE, South 01°15'19" East, with the common line of said 14.68 acre tract and said 45.53 acre tract, a distance of 60.00 feet, to a point for the southeast corner of the herein described tract, from which point a ½ inch iron rod found for the southeast corner of said 14.68 acre tract bears South 01°15'19" East a distance of 799.85 feet;

THENCE, South 87°49'20" West, parallel with and 60.00 feet south of the north line of said 14.68 acre tract of land, a distance of 695.46 feet to a point on the east right-of way line of that certain roadway known as Golden Eagle Lane dedicated by Volume 14, Page 69, said Plat Records, said east right-of-way line of Golden Eagle Lane being a curve to the right, having a radius of 645.00 feet;

THENCE, in a northeasterly direction, with said east right-of-way line of Golden Eagle Lane, an arc distance of 68.79 feet and whose chord bears North 27°04'02" East, a distance of 68.75 feet to a calculated point for the northwest corner of said 14.68 acre tract of land in the south line of Lot 27, Block B of said Hidden Springs Ranch, Section II;

Exhibit "__"
Page 2 of 2
October 29, 2009

Easement
0.936 Acres
Phillip A. Smith, Survey No. 26
Abstract Number 415
Hays County, Texas

THENCE, North 87°49'20" East, with the north boundary line of said 14.68 acre tract of land, same line being a south boundary line of said Hidden Springs Ranch Section II, a distance of 662.83 feet to the POINT OF BEGINNING, containing 0.936 acres of land, more or less, within these metes and bounds.

Subject tract described herein is an easement. No monumentation set for corners.

Reference is herein made to the sketch accompanying this metes and bounds description.

Bearing Basis: Grid North, Texas Coordinate System of 1983, Central Zone, as derived from OPUS solution dated February 15, 2008. Distances hereon are surface values based on a surface adjustment factor of 1.00007683. (Ground = Grid x Surface Adjustment Factor)

I hereby certify that this description was prepared from a survey made on the ground under my supervision.

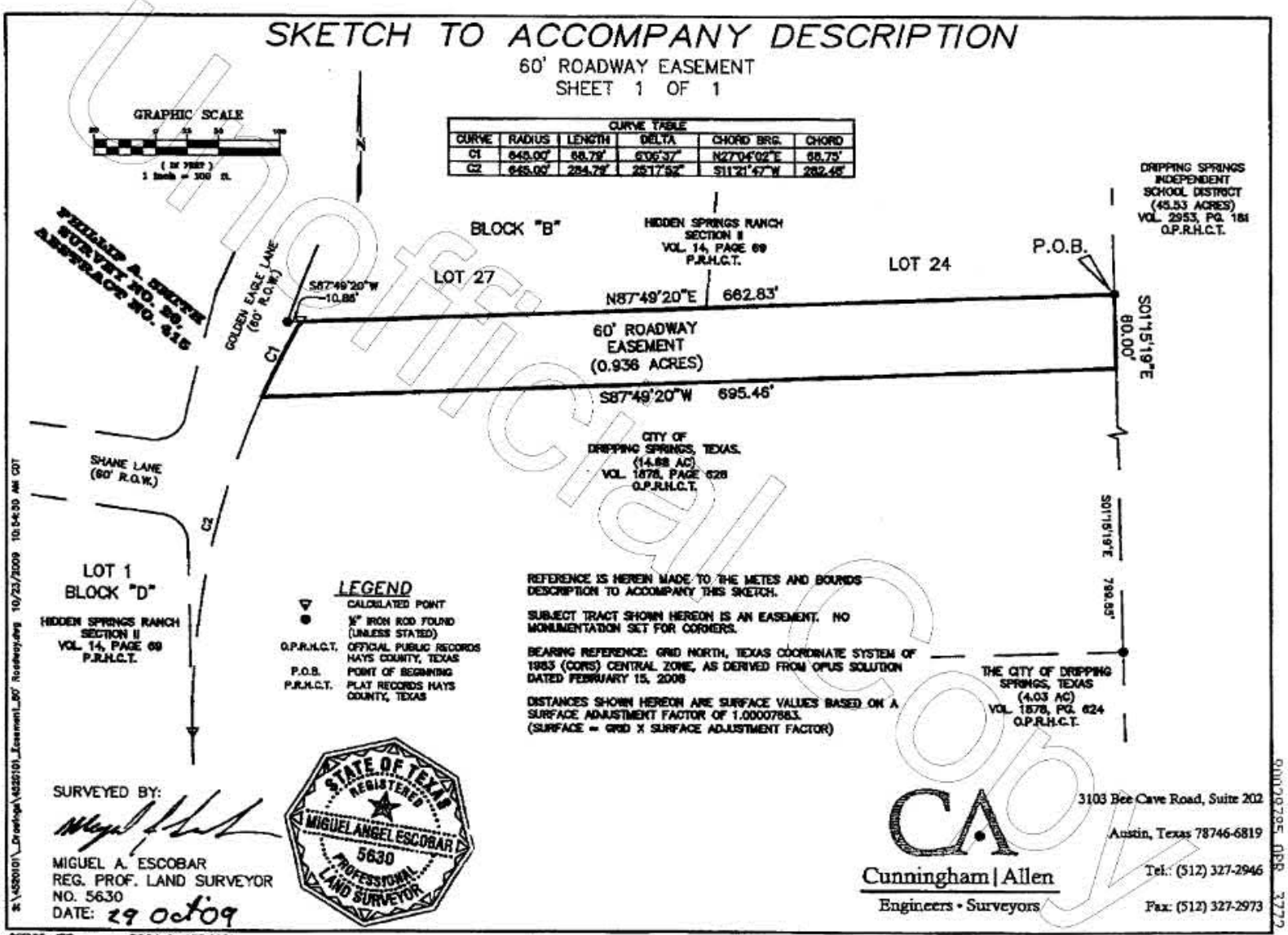
CUNNINGHAM-ALLEN, INC.

Miguel A. Escobar
Registered Professional Land Surveyor No. 5630
State of Texas
Date: 29 Oct 09

STATE OF TEXAS
REGISTERED
MIGUEL ANGEL ESCOBAR
5630
PROFESSIONAL
LAND SURVEYOR

SKETCH TO ACCOMPANY DESCRIPTION

60' ROADWAY EASEMENT
SHEET 1 OF 1



LEGEND

▽	CALCULATED POINT
●	½" IRON ROD FOUND (UNLESS STATED)
O.P.R.H.C.T.	OFFICIAL PUBLIC RECORDS HAYS COUNTY, TEXAS
P.O.B.	POINT OF BEGINNING
P.R.H.C.T.	PLAT RECORDS HAYS COUNTY, TEXAS

REFERENCE IS HEREIN MADE TO THE METES AND BOUNDS DESCRIPTION TO ACCOMPANY THIS SKETCH.

SUBJECT TRACT SHOWN HEREON IS AN EASEMENT. NO MONUMENTATION SET FOR CORNERS.

BEARING REFERENCE: GRID NORTH, TEXAS COORDINATE SYSTEM OF 1983 (CORS) CENTRAL ZONE, AS DERIVED FROM OPUS SOLUTION DATED FEBRUARY 15, 2008

DISTANCES SHOWN HEREON ARE SURFACE VALUES BASED ON A SURFACE ADJUSTMENT FACTOR OF 1.00007583. (SURFACE = GRID X SURFACE ADJUSTMENT FACTOR)

STATE OF TEXAS REGISTERED MIGUEL ANGEL ESCOBAR 5630 PROFESSIONAL LAND SURVEYOR

SURVEYED BY:

MIGUEL A. ESCOBAR
REG. PROF. LAND SURVEYOR
NO. 5630
DATE: 29 Oct 09

3103 Bee Cave Road, Suite 202
Austin, Texas 78746-6819
Tel.: (512) 327-2946
Fax: (512) 327-2973
Cunningham | Allen
Engineers • Surveyors

OFFICE: IBP
DATE: 10/26/09
PROJ # 452.0101
FILE NAME: 4520101_Easement_60' Roadway.dwg

Exhibit "__"
Page 1 of 2
October 29, 2009

25' Roadway Easement
0.367 acres of Land
Phillip A. Smith, Survey No. 26
Abstract Number 415
Hays County, Texas

DESCRIPTION

DESCRIPTION OF 0.367 ACRES OF LAND SITUATED IN THE PHILLIP A. SMITH SURVEY NO. 26, ABSTRACT NUMBER 415, IN HAYS COUNTY, TEXAS, BEING A PORTION OF THAT CERTAIN 14.68 ACRE TRACT OF LAND DESCRIBED IN DEED TO THE CITY OF DRIPPING SPRINGS, TEXAS, OF RECORD IN VOLUME 1878, PAGE 628 OF THE OFFICIAL PUBLIC RECORDS OF HAYS COUNTY, TEXAS; SAID 0.367 ACRES OF LAND BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:

BEGINNING at a 1/2 inch iron rod found for the southwest corner of said 14.68 acre tract, for the southeast corner of Lot 1, Block D, Hidden Springs Ranch, Section II according to the plat recorded in Volume 14, Page 69, Plat Records of Hays County, Texas and in the north line of that certain 4.03 acre tract of land described in deed to the City of Dripping Springs, Texas, of record in Volume 1878, Page 624 of the Official Public Records of Hays County, Texas, from which a 1/2 inch iron rod found with cap stamped "RPLS 4404" for the northwest corner of said 4.03 acre tract bears S88°12'53"W a distance of 60.03 feet;

THENCE N01°17'08"W with the common line of said 14.68 acre tract and said Lot 1, Block D a distance of 520.00 feet to a calculated point at the beginning of a curve to the right in the east right-of-way line of Golden Eagle Lane (60' R.O.W), from which point a 3/8 inch iron rod with cap stamped "RPLS 4542" found in the east line of said Lot 1, Block D and the west right-of-way line of said Golden Eagle Lane bears N01°26'23"W a distance of 155.30 feet;

THENCE with said curve to the right, having a radius distance of 645.00 feet, an arc length of 180.17 feet, a delta angle of 16°00'17" and a chord which bears N06°43'00"E, a distance of 179.59 feet to a point;

THENCE S01°17'08"E over and across said 14.68 acre tract a distance of 697.62 feet to a point in the south line of said 14.68 acre tract and the north line of said 4.03 acre tract, from which point a 1/2 inch iron rod found for the southeast corner of said 14.68 acre tract and the northeast corner of said 4.03 acre tract bears N88°12'53"E a distance of 731.83 feet;

M45
29 Oct 09

S:\4520101_Supporting Documents\4520101_EASEMENT_25' roadway.doc

Exhibit A
Page 1 of 3

Exhibit "__"
Page 2 of 2
October 29, 2009

25' Roadway Easement
0.367 acres of Land
Phillip A. Smith, Survey No. 26
Abstract Number 415
Hays County, Texas

THENCE S88°12'53"W with the south line of said 14.68 acre tract and the north line of said 4.03 acre tract a distance of 25.00 feet to the POINT OF BEGINNING, containing 0.367 acres of land, more or less, within these metes and bounds.

Subject tract described herein is an easement. No monumentation set for corners.

Reference is herein made to the sketch accompanying this metes and bounds description.

Bearing Basis: Grid North, Texas Coordinate System of 1983, Central Zone, as derived from OPUS solution dated February 15, 2008. Distances hereon are surface values based on a surface adjustment factor of 1.00007683. (Ground = Grid x Surface Adjustment Factor)

I hereby certify that this description was prepared from a survey made on the ground under my supervision.

CUNNINGHAM-ALLEN, INC.

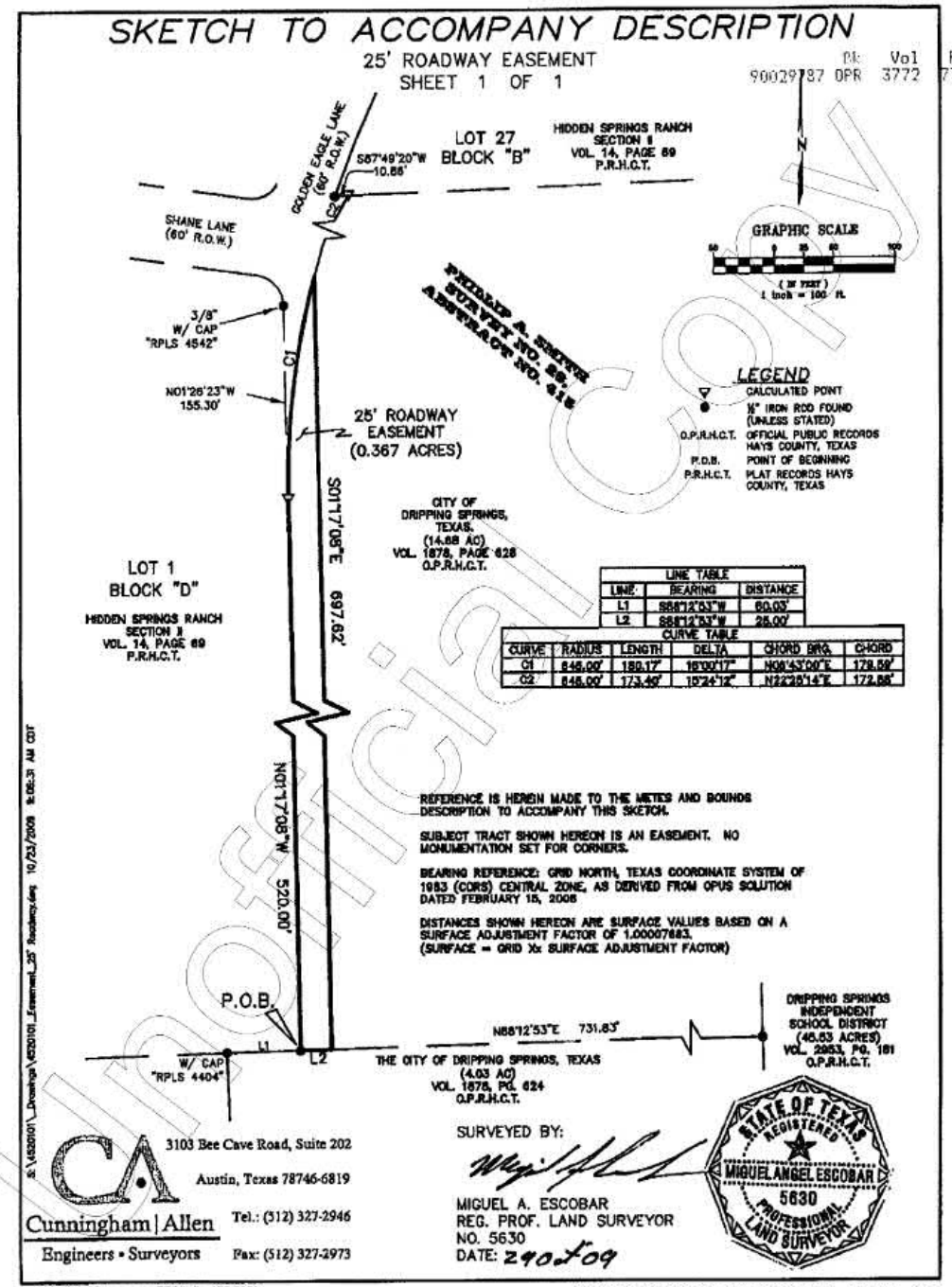
Miguel A. Escobar
Registered Professional Land Surveyor No. 5630
State of Texas
Date: 29oct09

S:\4520101_Supporting Documents\4520101_EASEMENT_25' roadway.doc

SKETCH TO ACCOMPANY DESCRIPTION

25' ROADWAY EASEMENT
SHEET 1 OF 1

Pk: Vol Pg
90029787 OPR 3772 774



LEGEND

	CALCULATED POINT
	½" IRON ROD FOUND (UNLESS STATED)
O.P.R.H.C.T.	OFFICIAL PUBLIC RECORDS HAYS COUNTY, TEXAS
P.O.B.	POINT OF BEGINNING
P.R.H.C.T.	PLAT RECORDS HAYS COUNTY, TEXAS

LINE TABLE		
LINE	BEARING	DISTANCE
L1	S88°12'53"W	60.03'
L2	S88°12'53"W	25.00'

CURVE TABLE					
CURVE	RADIUS	LENGTH	DELTA	CHORD BRG.	CHORD
C1	646.00'	189.17'	16°00'17"	N09°43'00"E	178.59'
C2	646.00'	173.49'	15°24'12"	N23°25'14"E	172.98'

REFERENCE IS HEREIN MADE TO THE METES AND BOUNDS DESCRIPTION TO ACCOMPANY THIS SKETCH.

SUBJECT TRACT SHOWN HEREON IS AN EASEMENT. NO MONUMENTATION SET FOR CORNERS.

BEARING REFERENCE: GRID NORTH, TEXAS COORDINATE SYSTEM OF 1983 (CORS) CENTRAL ZONE, AS DERIVED FROM OPUS SOLUTION DATED FEBRUARY 15, 2008

DISTANCES SHOWN HEREON ARE SURFACE VALUES BASED ON A SURFACE ADJUSTMENT FACTOR OF 1.00007683. (SURFACE = GRID X SURFACE ADJUSTMENT FACTOR)

3103 Bee Cave Road, Suite 202
Austin, Texas 78746-6819
Cunningham | Allen
Engineers • Surveyors
Tel.: (512) 327-2946
Fax: (512) 327-2973

SURVEYED BY:

MIGUEL A. ESCOBAR
REG. PROF. LAND SURVEYOR
NO. 5630
DATE: 2/05/09

STATE OF TEXAS REGISTERED MIGUEL ANGEL ESCOBAR 5630 PROFESSIONAL LAND SURVEYOR

OFFICE: IBP
DATE: 10/26/09

PROJ #: 452.0101
FILE NAME: 4520101_Easement_25' Roadway.dwg

Exhibit A
Page 3 of 3

AR30703
D576 $13.00

WARRANTY DEED

DOC# 362149

STATE OF TEXAS)
)
)
COUNTY OF HAYS)

KNOW ALL MEN BY THESE PRESENTS:

1084 148

ROGER S. HANKS and LUCY W. HANKS, of the County of Hays and the State of Texas, for and in consideration of TEN AND NO/100 DOLLARS ($10.00), and other valuable cash consideration, the receipt of which is hereby acknowledged, have GRANTED, SOLD AND CONVEYED, and by these presents do GRANT, SELL AND CONVEY unto DRIPPING SPRINGS INDEPENDENT SCHOOL DISTRICT whose address is: P.O. Box 479, Dripping Springs, 78620, of the County of Hays and the State of Texas, all of the following described real property and improvements thereon, situated in Hays County, Texas, to-wit:

40.0514 acres of land, more or less, out of the P. A. SMITH LEAGUE, being more particularly described by metes and bounds as Exhibit "A".

TO HAVE AND TO HOLD the above described premises, together with all and singular the rights and appurtenances thereto in any way belonging, unto the said Grantee, their, heirs, administrators, successors and assigns forever and Grantors do hereby bind themselves, their heirs, administrators and assigns to WARRANT AND FOREVER DEFEND all and singular the said premises unto the said Grantee, their heirs, administrators, successors and assigns, against every person whomsoever lawfully claiming or to claim the same or any part thereof.

This conveyance is made and accepted subject to any and all of the reservations, restrictions, easements and conditions, if any, relating to the herein described real property, to the extent, and only to the extent, that the same may still remain in force and effect, as shown of record in the office of the County Clerk of Hays County, Texas.

Executed this 27th day of June 1994.

Roger S. Hanks
ROGER S. HANKS

Lucy W. Hanks
LUCY W. HANKS

(acknowledgment)

STATE OF TEXAS)
COUNTY OF HAYS)

This instrument was acknowledged before me on the 27th day of June, 1994 by ROGER S. HANKS.

Pamela J Cummins
NOTARY PUBLIC, STATE OF TEXAS

PAMELA J CUMMINS
Notary Public, State of Texas
My Commission Expires
JAN 14, 1995

(acknowledgment)

STATE OF TEXAS)
COUNTY OF HAYS)

This instrument was acknowledged before me on the 27th day of June, 1994 by LUCY W. HANKS.

Pamela J. Cummins
NOTARY PUBLIC, STATE OF TEXAS

PAMELA J CUMMINS
Notary Public, State of Texas
My Commission Expires
JAN 14, 1995

AFTER RECORDING RETURN TO:
Dripping Springs Title Guaranty Company
P. O. Box 100
Dripping Springs, Texas 78620

OFFICIAL PUBLIC RECORDS
Hays County, Texas

K.C. ENGINEERING, INC.
CONSULTING ENGINEERS AND SURVEYORS
9410 HIGHWAY 290 WEST AUSTIN, TEXAS 78736
PHONE: (512) 288-7572 FAX: (512) 288-6020

1084 149

Hanks/DSISD Tract
Hays County, Texas
Attachments: Survey Drawing 393-100

A DESCRIPTION OF 40.0514 ACRES OF LAND OUT A 60.56 ACRE TRACT OUT OF THE P.A. SMITH LEAGUE, HAYS COUNTY, TEXAS, AS DESCRIBED IN VOLUME 447, PAGE 67 AND VOLUME 639, PAGE 179 OF THE DEED RECORDS OF HAYS COUNTY, TEXAS; SAID 40.0514 ACRES OF LAND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING at a 1/2" rebar found in the north right-of-way line of U.S. Highway 290 West (100' right-of-way), being also a southern corner of the 60.56 acre tract;

THENCE North 04°09'04" East, with a west line of the 60.56 acre tract, a distance of 361.07 feet (record North 04°08' East, 361.03 feet) to a 1/2" rebar found;

THENCE North 86°39'32" West, with a south line of the 60.56 acre tract, a distance of 195.05 feet (record North 86°39' West, 194.98 feet) to a 1/2" rebar found in an east line of a 49.6075 acre tract described in Volume 732, Page 190 of the Deed Records of Hays County, Texas;

THENCE with the common line of the 60.56 acre tract and the 49.6075 acre tract, the following two courses:

1. North 00°57'02" East, a distance of 714.88 feet (record North 00°54' East, 714.37 feet) to a 1/2" rebar found;

2. North 01°59'37" West, a distance of 1114.41 feet (record North 01°59" West, 1115.08 feet) to a 1/2" rebar found at the northwest corner of the 60.56 acre tract;

THENCE North 89°29'19" East, with the north line of the 60.56 acre tract, a distance of 517.17 feet (record North 89°31' East, 516.80 feet) to a 60d nail found at an angle point in the 49.6075 acre tract (see note on referenced survey drawing);

THENCE South 89°09'41" East, with the common line of the 60.56 acre tract and the 49.6075 acre tract, a distance of 472.55 feet (record South 89°08" East, 472.55 feet) to a 1/2" rebar set at the northwest corner of a 20.518 acre tract described in Volume 784, Page 210 of the Deed Records of Hays County, Texas;

THENCE South 01°57'23" East, with the west line of the said 20.518 acre tract, a distance of 1597.82 feet (record South 01°58'10" East, 1597.72 feet) to a 1/2" rebar found in the north line of Lot 1 of the A. Benny Subdivision, a subdivision of record in Volume 4,

EXHIBIT "A"

Page 219 of the Plat Record of Hays County, Texas;

THENCE North 89°40'51" West, with the common boundary line of the A. Benny Subdivision and the 60.56 acre tract, a distance of 543.03 feet (record North 89°42' West, 653.45 feet total) to a 5/8" rebar found;

THENCE South 19°24'42" West, continuing with the common boundary of the A. Benny Subdivision and the 60.56 acre tract, a distance of 691.74 feet (record South 19°24' West, 692.00 feet) to a 5/8" rebar found in the north right-of-way line of U.S. 290 West, from which a concrete monument found at Engineers Centerline Station 465+52.6 bears South 57°20'42" East, a distance of 564.84 feet;

THENCE North 57°20'42" West, with the north right-of-way line of U.S. 290 West, a distance of 90.00 feet (record North 57°07' West, 90 feet) to the POINT OF BEGINNING, containing 40.0514 acres of land, more or less.

Surveyed on the ground under my direction and supervision May 9, 1994. Bearing basis is from record plat information for the west line of the A. Benny Subdivision.

Robert Watts 6-27-94

Robert C. Watts, Jr.
Registered Professional Land Surveyor
State of Texas No. 4995

STATE OF TEXAS
COUNTY OF HAYS
I hereby certify that this instrument was FILED on the date and at the time stamped hereon by me and was duly RECORDED, in the Volume and Page of the named RECORDS of Hays County, Texas, as stamped hereon by me.

JUN 29 1994

COUNTY CLERK
HAYS COUNTY, TEXAS

FILED FOR RECORD
DOC# 362149
#13
06-29-1994 04:05:28
RONNIE DANNELLEY
HAYS COUNTY

METES AND BOUNDS DESCRIPTION OF:
RIGHT-OF-WAY DEDICATION - 0.152 ACRES

BEING A 0.152 ACRE (6,617 SQ. FT.) RIGHT-OF-WAY DEDICATION SITUATED IN THE PHILIP SMITH SURVEY, ABSTRACT 415, CITY OF DRIPPING SPRINGS, HAYS COUNTY, TEXAS; AND BEING A PORTION OF A CALLED 14.67 ACRE TRACT OF LAND DESCRIBED TO DRIPPING SPRINGS INDEPENDENT SCHOOL DISTRICT AS SHOWN ON INSTRUMENT RECORDED IN DOCUMENT NO. 2009-90029783 OF THE OFFICIAL PUBLIC RECORDS OF HAYS COUNTY, TEXAS; AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING, AT A 1/2" IRON ROD FOUND AT AN ANGLE CORNER IN THE EASTERLY RIGHT-OF-WAY LINE OF GOLDEN EAGLE LANE (VARIABLE RIGHT-OF-WAY WIDTH), IN THE SOUTH BOUNDARY LINE OF LOT 27, BLOCK B OF THE HIDDEN SPRINGS RANCH SECTION II SUBDIVISION AS SHOWN ON PLAT RECORDED IN VOLUME 14, PAGE 69 OF THE PLAT RECORDS OF HAYS COUNTY, TEXAS; AND AT THE NORTHWEST CORNER OF SAID 14.67 ACRE TRACT;

THENCE, SOUTH 27°06'35" WEST, A DISTANCE OF 68.82 FEET TO THE **POINT OF BEGINNING,** FOR THE NORTHWEST CORNER OF THIS DEDICATION;

THENCE, DEPARTING THE EASTERLY RIGHT-OFWAY LINE OF SAID GOLDEN EAGLE LANE AND OVER SAID 14.67 ACRE TRACT THE FOLLOWING FIVE (5) COURSES AND DISTANCES:

1. NORTH 87°47'41" WEST, A DISTANCE OF 117.146 FEET TO A POINT FOR THE NORTHEAST CORNER OF THIS DEDICATION;
2. ALONG A CURVE TO THE LEFT, HAVING AN INTERIOR ANGLE OF 57°39'46", A RADIUS OF 80.00 FEET, A CHORD BEARING AND DISTANCE OF NORTH 58°57'46" EAST 77.16 FEET, A TOTAL ARC LENGTH OF 80.51 FEET TO A POINT OF REVERSE CURVATURE, FOR AN ANGLE CORNER OF THIS DEDICATION;
3. ALONG A CURVE TO THE RIGHT, HAVING AN INTERIOR ANGLE OF 21°30'45", A RADIUS OF 63.00 FEET, A CHORD BEARING AND DISTANCE OF NORTH 40°53'23" EAST, 23.52 FEET, A TOTAL ARC LENGTH OF 23.66 FEET TO A POINT OF REVERSE CURVATURE, FOR AN ANGLE CORNER OF THIS DEDICATION;
4. ALONG A CURVE TO THE LEFT, HAVING AN INTERIOR ANGLE OF 39°3959 A RADIUS OF 194.00 FEET A CHORD BEARING AND DISTANCE OF NORTH 31°48'49" EAST, 131.64 FEET, A TOTAL ARC LENGTH OF 134.31 FEET TO A POINT FOR THE SOUTHWEST CORNER OF THIS DEDICATION;
5. NORTH 01°25'57" WEST, A DISTANCE OF 64.72 FEET TO A POINT OF CURVATURE IN THE EASTERLY RIGHT-OF-WAY LINE OF SAID GOLDEN EAGLE LANE AND THE WEST BOUNDARY LINE OF SAID 14.67 ACRE TRACT, FOR AN ANGLE CORNER OF THIS DEDICATION; WHENCE A 1/2" IRON ROD FOUND MARKING THE SOUTHEAST END OF A CUTBACK CURVE THE THE RIGHT AT THE INTERSECTION OF THE SOUTHERLY RIGHT-OF-WAY LINE OF SHANE LANE (CALLED 60' WIDTH RIGHT-OF-WAY) AND THE WESTERLY RIGHT-OF-WAY LINE OF SAID GOLDEN EAGLE LANE AND AT THE NORTHEAST CORNER OF LOT 1, BLOCK D OF THE HIDDEN SPRINGS RANCH SECTION II SUBDIVISION AS SHOWN ON PLAT RECORDED IN VOLUME 14, PAGE 69 OF THE PLAT RECORDS OF HAYS COUNTY, TEXAS; BEARS SOUTH 49°01'41" WEST, A DISTANCE OF 32.46 FEET;

THENCE, ALONG A CURVE TO THE RIGHT FOLLOWING THE COMMON BOUNDARY LINE OF SAID 14.67 ACRE TRACT AND SAID GOLDEN EAGLE LANE, HAVING AN INTERIOR ANGLE OF 09°26'41", A CHORD BEARING AND DISTANCE OF NORTH 19°19'47" EAST, 106.19 FEET, A TOTAL ARC LENGTH OF 106.31 TO THE **POINT OF BEGINNING** CONTAINING 0.152 ACRES, MORE OR LESS , IN HAYS COUNTY, TEXAS. THIS DOCUMENT WAS PREPARED IN THE OFFICE OF KIMLEY-HORN AND ASSOCIATES, INC. IN AUSTIN, TEXAS.

SURVEYOR'S NOTES:

THE BEARINGS, DISTANCES, AREAS AND COORDINATES SHOWN HEREON ARE TEXAS STATE COORDINATE SYSTEM GRID, CENTRAL ZONE (FIPS 4203) (NAD'83), AS DETERMINED BY THE GLOBAL POSITIONING SYSTEM (GPS). THE UNIT OF LINEAR MEASUREMENT IS U.S. SURVEY FEET. A RIGHT-OF-WAY DEDICATION BOUNDARY EXHIBIT AND A LINE & CURVE TABLE WERE CREATED IN CONJUNCTION WITH THIS METES & BOUNDS DESCRIPTION.

THE UNDERSIGNED, REGISTERED PROFESSIONAL LAND SURVEYOR, HEREBY CERTIFIES THAT THE FOREGOING DESCRIPTION ACCURATELY SETS OUT THE METES AND BOUNDS OF THIS DEDICATION.

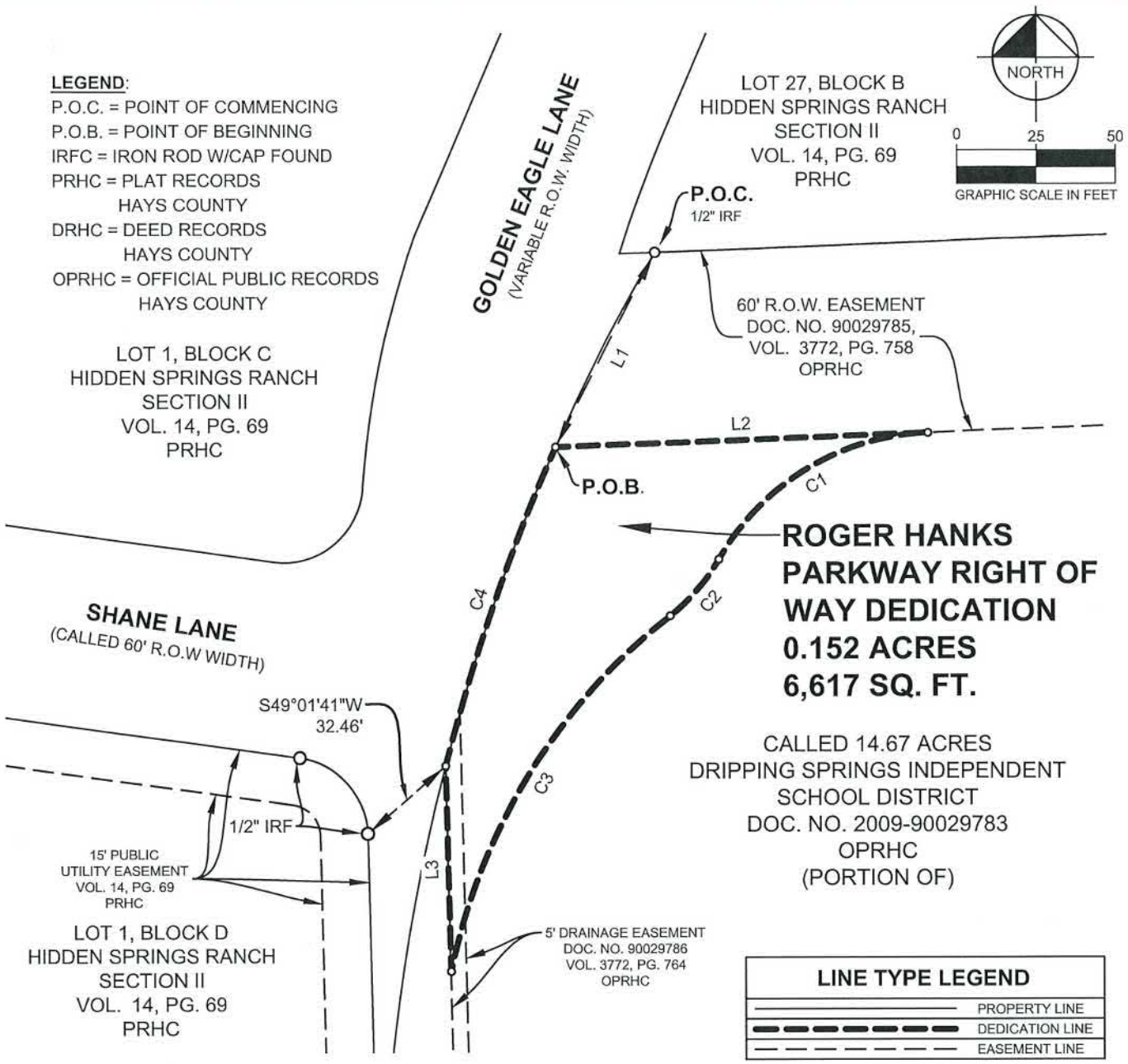
ZACHARY KEITH PETRUS
REGISTERED PROFESSIONAL
LAND SURVEYOR NO. 6769
10814 JOLLYVILLE ROAD
CAMPUS IV, SUITE 200
AUSTIN, TEXAS 78759
PH. (512) 572-6674
ZACH.PETRUS@KIMLEY-HORN.COM

STATE OF TEXAS
REGISTERED
ZACHARY K. PETRUS
6769
PROFESSIONAL
LAND SURVEYOR

EXHIBIT "A"
RIGHT-OF-WAY DEDICATION
0.152 ACRES
PHILIP SMITH SURVEY, ABSTRACT 415,
CITY OF DRIPPING SPRINGS, HAYS COUNTY, TEXAS

Kimley»Horn
10814 Jollyville Road Campus IV, Suite 200, Austin, Texas 78759 FIRM # 10194624
Tel. No. (512) 418-1771
www.kimley-horn.com

Scale	Drawn by	Checked by	Date	Project No.	Sheet No.
N/A	PTF	ZKP	4/26/2021	067783118	1 OF 3



SURVEYOR'S NOTES:

THE BEARINGS, DISTANCES, AREAS AND COORDINATES SHOWN HEREON ARE TEXAS STATE COORDINATE SYSTEM GRID, CENTRAL ZONE (FIPS 4203) (NAD'83), AS DETERMINED BY THE GLOBAL POSITIONING SYSTEM (GPS). THE UNIT OF LINEAR MEASUREMENT IS U.S. SURVEY FEET. A METES & BOUNDS DESCRIPTION AND A LINE & CURVE TABLE WERE CREATED IN CONJUNCTION WITH THIS RIGHT-OF-WAY DEDICATION BOUNDARY EXHIBIT.

THE UNDERSIGNED, REGISTERED PROFESSIONAL LAND SURVEYOR, HEREBY CERTIFIES THAT THIS R.O.W. DEDICATION BOUNDARY EXHIBIT OF SURVEY ACCURATELY REFLECTS THE METES AND BOUNDS OF THIS DEDICATION.

ZACHARY KEITH PETRUS
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STATE OF TEXAS
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EXHIBIT "A"
RIGHT-OF-WAY DEDICATION
0.152 ACRES

PHILIP SMITH SURVEY, ABSTRACT 415,
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Scale	Drawn by	Checked by	Date	Project No.	Sheet No.
1" = 50'	PTF	ZKP	4/26/2021	067783118	2 OF 3

LINE TABLE		
NO.	BEARING	LENGTH
L1	S27°06'35"W	68.82'
L2	S87°47'41"W	117.46'
L3	S01°25'57"E	64.72'

CURVE TABLE					
NO.	DELTA	RADIUS	LENGTH	CHORD BEARING	CHORD
C1	57°39'46"	80.00'	80.51'	N58°57'46"E	77.16'
C2	21°30'56"	63.00'	23.66'	N40°53'23"E	23.52'
C3	39°39'59"	194.00'	134.31'	N31°48'49"E	131.64'
C4	9°26'41"	644.92'	106.31'	S19°19'47"W	106.19'

SURVEYOR'S NOTES:

THE BEARINGS, DISTANCES, AREAS AND COORDINATES SHOWN HEREON ARE TEXAS STATE COORDINATE SYSTEM GRID, CENTRAL ZONE (FIPS 4203) (NAD'83), AS DETERMINED BY THE GLOBAL POSITIONING SYSTEM (GPS). THE UNIT OF LINEAR MEASUREMENT IS U.S. SURVEY FEET. A METES & BOUNDS DESCRIPTION AND A RIGHT-OF-WAY DEDICATION BOUNDARY EXHIBIT OF EVEN SURVEY DATE WAS CREATED IN CONJUNCTION WITH THIS LINE AND CURVE TABLE.

THE UNDERSIGNED, REGISTERED PROFESSIONAL LAND SURVEYOR, HEREBY CERTIFIES THAT THIS LINE & CURVE TABLE OF SURVEY ACCURATELY REFLECTS THE METES AND BOUNDS OF THIS DEDICATION.

ZACHARY KEITH PETRUS
REGISTERED PROFESSIONAL
LAND SURVEYOR NO. 6769
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STATE OF TEXAS
REGISTERED
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EXHIBIT "A"
RIGHT-OF-WAY DEDICATION
0.152 ACRES

PHILIP SMITH SURVEY, ABSTRACT 415,
CITY OF DRIPPING SPRINGS, HAYS COUNTY, TEXAS

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N/A	PTF	ZKP	4/26/2021	067783118	3 OF 3

METES & BOUNDS DESCRIPTION OF:
RIGHT-OF-WAY DEDICATION - 1.506 ACRES

BEING A 1.506 ACRE (65,600 SQ. FEET) RIGHT-OF-WAY DEDICATION SITUATED IN THE PHILIP SMITH SURVEY, ABSTRACT 415, CITY OF DRIPPING SPRINGS, HAYS COUNTY, TEXAS; BEING A PORTION OF LOT 1, BLOCK D OF THE HIDDEN SPRINGS RANCH SECTION II SUBDIVISION, AS SHOWN ON PLAT RECORDED IN VOLUME 14, PAGE 69 OF THE PLAT RECORDS OF HAYS COUNTY, TEXAS; AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT A 1/2" IRON ROD FOUND AT THE SOUTHWEST CORNER OF A CALLED 14.67 ACRE TRACT OF LAND DESCRIBED TO DRIPPING SPRINGS ISD AS SHOWN ON INSTRUMENT RECORDED IN DOCUMENT NO. 9921952 OF THE OFFICIAL PUBLIC RECORDS OF HAYS COUNTY, TEXAS; THE NORTHWEST CORNER OF A CALLED 1.12 ACRE TRACT OF LAND DESCRIBED TO DRIPPING SPRINGS ISD AS SHOWN ON INSTRUMENT RECORDED IN DOCUMENT NO. 90029784 OF THE OFFICIAL PUBLIC RECORDS OF HAYS COUNTY, TEXAS; AND THE NORTHEAST CORNER OF A CALLED 4.03 ACRE TRACT OF LAND DESCRIBED TO DRIPPING SPRINGS ISD AS SHOWN ON INSTRUMENT RECORDED IN DOCUMENT NO. 9921953 OF THE OFFICIAL PUBLIC RECORDS OF HAYS COUNTY, TEXAS; FOR THE SOUTHEAST CORNER OF SAID LOT 1, BLOCK D AND THE SOUTHEAST CORNER OF THIS DEDICATION;

THENCE, SOUTH 89°00'26" WEST, ALONG THE NORTH BOUNDARY LINE OF SAID 4.03 ACRE TRACT AND THE SOUTH BOUNDARY LINE OF SAID LOT 1, BLOCK D, A DISTANCE OF 60.23 FEET TO A 1/2" IRON ROD FOUND AT THE NORTHEAST CORNER OF A 19.21 ACRE TRACT OF LAND DESCRIBED TO HILLTOP CAMPUS, LTD, AS SHOWN ON INSTRUMENT RECORDED IN VOLUME 1780, PAGE 747 OF THE OFFICIAL PUBLIC RECORDS OF HAYS COUNTY, TEXAS; AND THE NORTHWEST CORNER OF SAID 4.03 ACRE TRACT, FOR AN ANGLE CORNER OF THIS DEDICATION;

THENCE, SOUTH 88°09'44" WEST, ALONG THE NORTH BOUNDARY LINE OF SAID 19.21 ACRE TRACT AND THE SOUTH BOUNDARY LINE OF SAID LOT 1, BLOCK D, A DISTANCE OF 15.14 FEET TO A POINT FOR THE SOUTHWEST CORNER OF THIS DEDICATION;

THENCE, ACROSS SAID LOT 1, BLOCK D, THE FOLLOWING SEVEN (7) COURSES AND DISTANCES:

1. NORTH 02°20'44" WEST, A DISTANCE OF 178.06 FEET TO A POINT FOR AN ANGLE CORNER OF THIS DEDICATION;
2. IN A NORTHERLY DIRECTION, ALONG A TANGENT CURVE TO THE RIGHT, A CENTRAL ANGLE OF 02°23'41", A RADIUS OF 3035.00 FEET, A CHORD BEARING AND DISTANCE OF NORTH 01°08'54" WEST, 126.84 FEET, AND A TOTAL ARC LENGTH OF 126.85 FEET TO A POINT FOR AN ANGLE CORNER OF THIS DEDICATION;
3. NORTH 00°02'57" EAST, A DISTANCE OF 234.66 FEET TO A POINT FOR AN ANGLE CORNER OF THIS DEDICATION;
4. IN A NORTHWESTERLY DIRECTION, ALONG A TANGENT CURVE TO THE LEFT, A CENTRAL ANGLE OF 70°41'24", A RADIUS OF 15.00 FEET, A CHORD BEARING AND DISTANCE OF NORTH 35°17'45" WEST, 17.35 FEET, AND A TOTAL ARC LENGTH OF 18.51 FEET TO A POINT FOR AN ANGLE CORNER OF THIS DEDICATION;
5. . IN A NORTHERLY DIRECTION, ALONG A TANGENT REVERSE CURVE TO THE RIGHT, A CENTRAL ANGLE OF 74°31'30", A RADIUS OF 130.00 FEET, A CHORD BEARING AND DISTANCE OF NORTH 33°22'42" WEST, 157.42 FEET, AND A TOTAL ARC LENGTH OF 169.09 FEET TO A POINT FOR AN ANGLE CORNER OF THIS DEDICATION;
6. NORTH 03°53'03" EAST, A DISTANCE OF 12.39 FEET TO A POINT FOR AN ANGLE CORNER OF THIS DEDICATION;
7. IN A NORTHWESTERLY DIRECTION, ALONG THE NORTH LINE OF SAID LOT 1, BLOCK D AND A TANGENT CURVE TO THE LEFT, A CENTRAL ANGLE OF 87°58'09", A RADIUS OF 25.00 FEET, A CHORD BEARING AND DISTANCE OF NORTH 40°06'02" WEST, 34.72 FEET, AND A TOTAL ARC LENGTH OF 38.38 FEET TO A POINT IN THE SOUTHERLY RIGHT-OF-WAY LINE OF SHANE LANE (CALLED 60' R.O.W. WIDTH) AND THE NORTH BOUNDARY LINE OF SAID LOT 1, BLOCK D, FOR THE NORTHWEST CORNER OF THIS DEDICATION;

THENCE, IN A SOUTHEASTERLY DIRECTION, ALONG A CURVE TO THE RIGHT AND THE COMMON BOUNDARY LINE OF SAID SHANE LANE AND SAID LOT 1, BLOCK D, A CENTRAL ANGLE OF 01°47'48" A RADIUS OF 1162.31 FEET, A CHORD BEARING AND DISTANCE OF SOUTH 83°11'12" EAST, 36.45 FEET, AND A TOTAL ARC LENGTH OF 36.45 FEET TO A POINT FOR AN ANGLE CORNER OF SAID LOT 1, BLOCK D AND AN ANGLE CORNER OF THIS DEDICATION;

THENCE, SOUTH 82°05'15" EAST, CONTINUING ALONG THE COMMON BOUNDARY LINE OF SAID SHANE LANE AND SAID LOT 1, BLOCK D, A DISTANCE OF 130.82 FEET TO A 1/2" IRON ROD FOUND AT THE NORTHWEST END OF A CUTBACK CURVE TO THE RIGHT AT THE INTERSECTION OF THE WESTERLY RIGHT-OF-WAY LINE OF GOLDEN EAGLE LANE (VARIABLE R.O.W. WIDTH) AND THE NORTHERLY RIGHT-OF-WAY LINE OF SAID SHANE LANE, FOR A NORTHEAST CORNER OF SAID LOT 1, BLOCK D AND A NORTHEAST CORNER OF THIS DEDICATION;

THENCE, IN A SOUTHEASTERLY DIRECTION, CONTINUING ALONG SAID CUTBACK CURVE TO THE RIGHT, A CENTRAL ANGLE OF 80°09'05", A RADIUS OF 25.00 FEET, A CHORD BEARING AND DISTANCE OF SOUTH 42°01'08" EAST, 32.19 FEET, AND A TOTAL ARC LENGTH OF 34.97 FEET TO A 1/2" IRON ROD FOUND AT THE SOUTHEAST END OF SAID CUTBACK CURVE TO THE RIGHT, FOR A NORTHEAST CORNER OF SAID LOT 1, BLOCK D AND A NORTHEAST CORNER OF THIS DEDICATION;

THENCE, SOUTH 1°20'31" EAST, ALONG THE EAST BOUNDARY LINE OF SAID LOT 1, BLOCK D, AT 156.07 FEET PASSING A 1/2" IRON ROD FOUND FOR A LINE MARKER, THEN CONTINUING ALONG THE EAST BOUNDARY LINE OF SAID LOT 1, BLOCK D, IN ALL A DISTANCE OF 676.34 FEET TO THE **POINT OF BEGINNING** AND CONTAINING 1.506 ACRES OF LAND, MORE OR LESS, IN HAYS COUNTY, TEXAS. THIS DOCUMENT WAS PREPARED IN THE OFFICE OF KIMLEY-HORN AND ASSOCIATES, INC. IN AUSTIN, TEXAS.

SURVEYOR'S NOTES:

THE BEARINGS, DISTANCES, AREAS AND COORDINATES SHOWN HEREON ARE TEXAS STATE COORDINATE SYSTEM GRID, CENTRAL ZONE (FIPS 4203) (NAD'83), AS DETERMINED BY THE GLOBAL POSITIONING SYSTEM (GPS). THE UNIT OF LINEAR MEASUREMENT IS U.S. SURVEY FEET. A RIGHT-OF-WAY DEDICATION BOUNDARY EXHIBIT AND A LINE & CURVE TABLE WERE CREATED IN CONJUNCTION WITH THIS METES & BOUNDS DESCRIPTION.

THE UNDERSIGNED, REGISTERED PROFESSIONAL LAND SURVEYOR, HEREBY CERTIFIES THAT THE FOREGOING DESCRIPTION ACCURATELY SETS OUT THE METES AND BOUNDS OF THIS DEDICATION.

ZACHARY KEITH PETRUS
REGISTERED PROFESSIONAL
LAND SURVEYOR NO. 6769
10814 JOLLYVILLE ROAD
CAMPUS IV, SUITE 200
AUSTIN, TEXAS 78759
PH. (512) 572-6674
ZACH.PETRUS@KIMLEY-HORN.COM

EXHIBIT "A"
RIGHT-OF-WAY DEDICATION
1.506 ACRES
PHILIP SMITH SURVEY, ABSTRACT 415,
CITY OF DRIPPING SPRINGS, HAYS COUNTY, TEXAS

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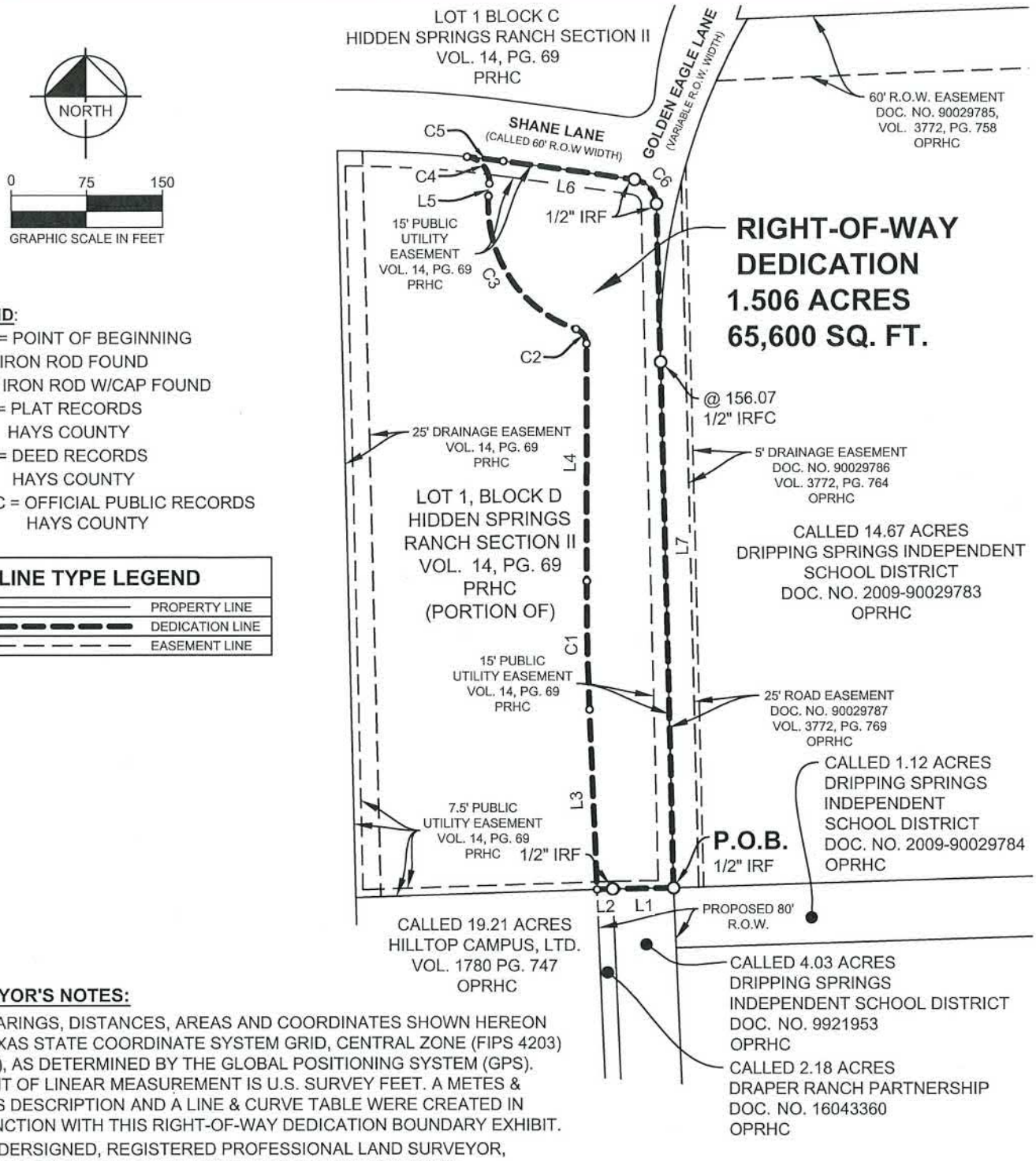
N/A	PTF	ZKP	4/26/2021	067783118	1 OF 3



NORTH

0 75 150

GRAPHIC SCALE IN FEET

LEGEND:

P.O.B. = POINT OF BEGINNING
IRF = IRON ROD FOUND
IRFC = IRON ROD W/CAP FOUND
PRHC = PLAT RECORDS
HAYS COUNTY
DRHC = DEED RECORDS
HAYS COUNTY
OPRHC = OFFICIAL PUBLIC RECORDS
HAYS COUNTY

LINE TYPE LEGEND

PROPERTY LINE	
DEDICATION LINE	
EASEMENT LINE	

SURVEYOR'S NOTES:

THE BEARINGS, DISTANCES, AREAS AND COORDINATES SHOWN HEREON ARE TEXAS STATE COORDINATE SYSTEM GRID, CENTRAL ZONE (FIPS 4203) (NAD'83), AS DETERMINED BY THE GLOBAL POSITIONING SYSTEM (GPS). THE UNIT OF LINEAR MEASUREMENT IS U.S. SURVEY FEET. A METES & BOUNDS DESCRIPTION AND A LINE & CURVE TABLE WERE CREATED IN CONJUNCTION WITH THIS RIGHT-OF-WAY DEDICATION BOUNDARY EXHIBIT.

THE UNDERSIGNED, REGISTERED PROFESSIONAL LAND SURVEYOR, HEREBY CERTIFIES THAT THIS R.O.W. DEDICATION BOUNDARY EXHIBIT OF SURVEY ACCURATELY REFLECTS THE METES AND BOUNDS OF THIS DEDICATION.

ZACHARY KEITH PETRUS
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STATE OF TEXAS
REGISTERED
ZACHARY K. PETRUS
6769
PROFESSIONAL
LAND SURVEYOR

EXHIBIT "A"
RIGHT-OF-WAY DEDICATION
1.506 ACRES

PHILIP SMITH SURVEY, ABSTRACT 415,
CITY OF DRIPPING SPRINGS, HAYS COUNTY, TEXAS

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Scale	Drawn by	Checked by	Date	Project No.	Sheet No.
1" = 150'	PTF	ZKP	4/26/2021	067783118	2 OF 3

CURVE TABLE					
NO.	DELTA	RADIUS	LENGTH	CHORD BEARING	CHORD
C1	2°23'41"	3035.00'	126.85'	N01°08'54"W	126.84'
C2	70°41'24"	15.00'	18.51'	N35°17'45"W	17.35'
C3	74°31'30"	130.00'	169.09'	N33°22'42"W	157.42'
C4	87°58'09"	25.00'	38.38'	N40°06'02"W	34.72'
C5	1°47'48"	1162.31'	36.45'	S83°11'12"E	36.45'
C6	80°09'05"	25.00'	34.97'	S42°01'08"E	32.19'

LINE TABLE		
NO.	BEARING	LENGTH
L1	S89°00'26"W	60.23'
L2	S88°09'44"W	15.14'
L3	N02°20'44"W	178.06'
L4	N00°02'57"E	234.66'
L5	N03°53'03"E	12.39'
L6	S82°05'15"E	130.82'
L7	S01°20'31"E	676.34'

SURVEYOR'S NOTES:

THE BEARINGS, DISTANCES, AREAS AND COORDINATES SHOWN HEREON ARE TEXAS STATE COORDINATE SYSTEM GRID, CENTRAL ZONE (FIPS 4203) (NAD'83), AS DETERMINED BY THE GLOBAL POSITIONING SYSTEM (GPS). THE UNIT OF LINEAR MEASUREMENT IS U.S. SURVEY FEET. A METES & BOUNDS DESCRIPTION AND A RIGHT-OF-WAY DEDICATION BOUNDARY EXHIBIT OF EVEN SURVEY DATE WAS CREATED IN CONJUNCTION WITH THIS LINE AND CURVE TABLE.

THE UNDERSIGNED, REGISTERED PROFESSIONAL LAND SURVEYOR, HEREBY CERTIFIES THAT THIS LINE & CURVE TABLE OF SURVEY ACCURATELY REFLECTS THE METES AND BOUNDS OF THIS DEDICATION.

ZACHARY KEITH PETRUS
REGISTERED PROFESSIONAL
LAND SURVEYOR NO. 6769
10814 JOLLYVILLE ROAD
CAMPUS IV, SUITE 200
AUSTIN, TEXAS 78759
PH. (512) 572-6674
ZACH.PETRUS@KIMLEY-HORN.COM

STATE OF TEXAS
REGISTERED
ZACHARY K. PETRUS
6769
PROFESSIONAL
LAND SURVEYOR

EXHIBIT "A"
RIGHT-OF-WAY DEDICATION
1.506 ACRES

PHILIP SMITH SURVEY, ABSTRACT 415,
CITY OF DRIPPING SPRINGS, HAYS COUNTY, TEXAS

Kimley»Horn
10814 Jollyville Road Campus IV, Suite 200, Austin, Texas 78759 FIRM # 10194624
Tel. No. (512) 418-1771 www.kimley-horn.com

Scale	Drawn by	Checked by	Date	Project No.	Sheet No.
N/A	PTF	ZKP	4/26/2021	067783118	3 OF 3

METES AND BOUNDS DESCRIPTION OF:
RIGHT-OF-WAY DEDICATION - 2.939 ACRES

BEING A 2.939 ACRE (128,039 SQ. FT.) RIGHT-OF-WAY DEDICATION SITUATED IN THE PHILIP SMITH SURVEY, ABSTRACT 415, CITY OF DRIPPING SPRINGS, HAYS COUNTY, TEXAS, AND BEING A PORTION OF A CALLED 45.53 ACRE TRACT OF LAND DESCRIBED TO DRIPPING SPRINGS INDEPENDENT SCHOOL DISTRICT AS SHOWN ON INSTRUMENT RECORDED IN DOCUMENT NO. 6018836 OF THE OFFICIAL PUBLIC RECORDS OF HAYS COUNTY, TEXAS; AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING, AT A POINT IN THE WEST BOUNDARY LINE OF A TRACT 2, CALLED 50.206 ACRES, DESCRIBED TO SLF IV-DRIPPING SPRINGS JV, L.P., AS SHOWN ON INSTRUMENT RECORDED IN DOCUMENT NO. 2014-14037229 OF THE OFFICIAL PUBLIC RECORDS OF HAYS COUNTY, TEXAS; AND IN THE EAST BOUNDARY LINE OF SAID 45.53 ACRE TRACT; FOR THE NORTHEAST CORNER OF THIS DEDICATION; WHENCE A 1/2" IRON ROD FOUND FOR REFERENCE BEARS NORTH 09°31'11" WEST, A DISTANCE OF 122.84 FEET;

THENCE, SOUTH 09°31'11" EAST, ALONG THE COMMON BOUNDARY LINE OF SAID 45.53 ACRE TRACT AND SAID TRACT 2, A DISTANCE OF 32.03 FEET TO 1/2" IRON ROD FOUND AT AN ANGLE CORNER OF SAID TRACT 2, FOR AN ANGLE CORNER OF SAID 45.53 ACRE TRACT AND AN ANGLE CORNER OF THIS DEDICATION;

THENCE, SOUTH 01°10'11" EAST CONTINUING ALONG THE COMMON BOUNDARY LINE OF SAID 45.53 ACRE TRACT AND SAID TRACT 2, A DISTANCE OF 63.40 FEET TO A POINT FOR THE SOUTHEAST CORNER OF THIS DEDICATION;

THENCE, ACROSS SAID 45.53 ACRE TRACT THE FOLLOWING TEN (10) COURSES AND DISTANCES:

1. SOUTH 89°48'55" WEST, A DISTANCE OF 175.81 FEET TO A POINT OF CURVATURE FOR AN ANGLE CORNER OF THIS DEDICATION;
2. ALONG A CURVE TO THE RIGHT, WITH AN INTERIOR ANGLE OF 13°30'21", A RADIUS OF 839.00 FEET, A CHORD BEARING AND DISTANCE OF NORTH 83°25'54" WEST, 197.31 FEET, A TOTAL ARC LENGTH OF 197.77 FEET TO A POINT FOR AN ANGLE CORNER OF THIS DEDICATION;
3. SOUTH 13°19'16" WEST, A DISTANCE OF 14.00 FEET TO A POINT OF CURVATURE FOR AN ANGLE CORNER OF THIS DEDICATION;
4. ALONG A CURVE TO THE RIGHT, HAVING AN INTERIOR ANGLE OF 3°48'52", A RADIUS OF 853.00 FEET, A CHORD BEARING AND DISTANCE OF NORTH 74°46'18" WEST 56.78 FEET, A TOTAL ARC LENGTH OF 56.79 FEET TO A POINT OF REVERSE CURVATURE FOR AN ANGLE CORNER OF THIS DEDICATION;
5. ALONG A CURVE TO THE LEFT, HAVING AN INTERIOR ANGLE OF 17°37'07", A RADIUS OF 747.00 FEET, A CHORD BEARING AND DISTANCE OF NORTH 81°40'25" WEST, 228.80 FEET, A TOTAL ARC LENGTH OF 229.70 FEET TO A POINT FOR AN ANGLE CORNER OF THIS DEDICATION;
6. SOUTH 89°31'02" WEST, A DISTANCE OF 183.61 FEET TO A POINT FOR AN ANGLE CORNER OF THIS DEDICATION;
7. SOUTH 00°28'58" EAST, A DISTANCE OF 16.50 FEET TO A POINT OF CURVATURE FOR AN ANGLE CORNER OF THIS DEDICATION;
8. ALONG A CURVE TO THE LEFT, HAVING AN INTERIOR ANGLE OF 29°51'59", A RADIUS OF 305.50 FEET, A CHORD BEARING AND DISTANCE OF SOUTH 74°35'02" WEST, 157.45 FEET, A TOTAL ARC LENGTH OF 159.25 FEET TO A POINT OF REVERSE CURVATURE FOR AN ANGLE CORNER OF THIS DEDICATION;
9. ALONG A CURVE TO THE RIGHT, HAVING AN INTERIOR ANGLE OF 28°10'18", A RADIUS OF 444.50 FEET, A CHORD BEARING AND DISTANCE OF SOUTH 73°44'11" WEST 216.36 FEET, A TOTAL ARC LENGTH OF 218.56 FEET TO A POINT FOR AN ANGLE CORNER OF THIS DEDICATION;
10. SOUTH 87°49'20" WEST, A DISTANCE OF 51.32 FEET TO A POINT IN THE EAST BOUNDARY LINE OF A CALLED 14.67 ACRE TRACT DESCRIBED TO DRIPPING SPRINGS INDEPENDENT SCHOOL DISTRICT AS SHOWN ON INSTRUMENT RECORDED IN DOCUMENT NO. 09921952 OF THE OFFICIAL PUBLIC RECORDS OF HAYS COUNTY, TEXAS; AND IN THE WEST BOUNDARY LINE OF SAID 45.53 ACRE TRACT; FOR THE SOUTHWEST CORNER OF THIS DEDICATION;

(M&B DESCRIPTION CONTINUES ON SHEET 2)

SURVEYOR'S NOTES:

THE BEARINGS, DISTANCES, AREAS AND COORDINATES SHOWN HEREON ARE TEXAS STATE COORDINATE SYSTEM GRID, CENTRAL ZONE (FIPS 4203) (NAD'83), AS DETERMINED BY THE GLOBAL POSITIONING SYSTEM (GPS). THE UNIT OF LINEAR MEASUREMENT IS U.S. SURVEY FEET. A RIGHT-OF-WAY DEDICATION BOUNDARY EXHIBIT AND A LINE & CURVE TABLE WERE CREATED IN CONJUNCTION WITH THIS METES & BOUNDS DESCRIPTION.

THE UNDERSIGNED, REGISTERED PROFESSIONAL LAND SURVEYOR, HEREBY CERTIFIES THAT THE FOREGOING DESCRIPTION ACCURATELY SETS OUT THE METES AND BOUNDS OF THIS DEDICATION.

ZACHARY KEITH PETRUS
REGISTERED PROFESSIONAL
LAND SURVEYOR NO. 6769
10814 JOLLYVILLE ROAD
CAMPUS IV, SUITE 200
AUSTIN, TEXAS 78759
PH. (512) 572-6674
ZACH.PETRUS@KIMLEY-HORN.COM

STATE OF TEXAS REGISTERED ZACHARY K. PETRUS 6769 PROFESSIONAL LAND SURVEYOR

EXHIBIT "A"
RIGHT-OF-WAY DEDICATION
2.939 ACRES
PHILIP SMITH SURVEY, ABSTRACT 415,
CITY OF DRIPPING SPRINGS, HAYS COUNTY, TEXAS

Kimley»Horn
10814 Jollyville Road Campus IV, Suite 200, Austin, Texas 78759 FIRM # 10194624
Tel. No. (512) 418-1771
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METES AND BOUNDS DESCRIPTION OF:
RIGHT-OF-WAY DEDICATION - 2.939 ACRES (CONTINUED)

THENCE, NORTH 01°15'27" WEST, ALONG THE COMMON BOUNDARY LINE OF SAID 14.67 ACRE TRACT AND SAID 45.53 ACRE TRACT, AT 90.81 FEET PASSING A 1/2" IRON ROD FOUND AT THE NORTHEAST CORNER OF SAID 14.67 ACRE TRACT AND THE SOUTHEAST CORNER OF LOT 24, BLOCK B OF THE HIDDEN SPRINGS RANCH SECTION II SUBDIVISION, AS SHOWN ON PLAT RECORDED IN VOLUME 14, PAGE 69 OF THE PLAT RECORDS OF HAYS COUNTY, TEXAS; THEN CONTINUING ALONG THE COMMON BOUNDARY LINE OF SAID 45.53 ACRE TRACT AND SAID LOT 24, IN ALL A DISTANCE OF 111.51 FEET TO A POINT FOR THE NORTHWEST CORNER OF THIS DEDICATION;

THENCE, ACROSS SAID 45.53 ACRE TRACT THE FOLLOWING NINE (9) COURSES AND DISTANCES:

1. NORTH 87°49'20" EAST, A DISTANCE OF 49.53 FEET TO A POINT OF CURVATURE FOR AN ANGLE CORNER OF THIS DEDICATION;
2. ALONG A CURVE TO THE LEFT, WITH A INTERIOR ANGLE OF 28°10'18", A RADIUS OF 333.00 FEET, A CHORD BEARING AND DISTANCE OF NORTH 744'11" EAST, 162.09 FEET, A TOTAL ARC LENGTH OF 163.73 FEET TO A POINT OF REVERSE CURVATURE FOR AN ANGLE CORNER OF THIS DEDICATION;
3. ALONG A CURVE TO THE RIGHT, HAVING AN INTERIOR ANGLE OF 29°51'59", A RADIUS OF 417.00 FEET, A CHORD BEARING AND DISTANCE OF NORTH 74°35'02" EAST, 214.92 FEET, A TOTAL ARC LENGTH OF 217.37 FEET TO A POINT FOR AN ANGLE CORNER OF THIS DEDICATION;
4. NORTH 89°31'02" EAST, A DISTANCE OF 183.61 FEET TO A POINT OF CURVATURE FOR AN ANGLE CORNER OF THIS DEDICATION;
5. ALONG A CURVE TO THE RIGHT, HAVING AN INTERIOR ANGLE OF 17°37'07", A RADIUS OF 842.00 FEET, A CHORD BEARING AND DISTANCE OF SOUTH 81°40'25" EAST, 257.90 FEET, A TOTAL ARC LENGTH OF 258.92 FEET TO A POINT OF REVERSE CURVATURE FOR AN ANGLE CORNER OF THIS DEDICATION;
6. ALONG A CURVE TO THE LEFT, HAVING AN INTERIOR ANGLE OF 03°20'52", A RADIUS OF 758.00 FEET, A CHORD BEARING AND DISTANCE OF SOUTH 74°32'18" EAST, 44.28 FEET, A TOTAL ARC LENGTH OF 44.29 FEET TO A POINT FOR AN ANGLE CORNER OF THIS DEDICATION;
7. NORTH 13°47'16" EAST, A DISTANCE OF 14.00 FEET TO A POINT OF CURVATURE FOR AN ANGLE CORNER OF THIS DEDICATION;
8. ALONG A CURVE TO THE LEFT, HAVING AN INTERIOR ANGLE OF 13°58'21", A RADIUS OF 744.00 FEET, A CHORD BEARING AND DISTANCE OF SOUTH 83°11'54" EAST, 180.99 FEET, A TOTAL ARC LENGTH OF 181.44 FEET TO A POINT FOR AN ANGLE CORNER OF THIS DEDICATION;
9. NORTH 89°48'55" EAST, A DISTANCE OF 169.52 FEET TO THE **POINT OF BEGINNING** CONTAINING 2.939 ACRES, MORE OR LESS, IN HAYS COUNTY, TEXAS. THIS DOCUMENT WAS PREPARED IN THE OFFICE OF KIMLEY-HORN AND ASSOCIATES, INC. IN AUSTIN, TEXAS.

SURVEYOR'S NOTES:

THE BEARINGS, DISTANCES, AREAS AND COORDINATES SHOWN HEREON ARE TEXAS STATE COORDINATE SYSTEM GRID, CENTRAL ZONE (FIPS 4203) (NAD'83), AS DETERMINED BY THE GLOBAL POSITIONING SYSTEM (GPS). THE UNIT OF LINEAR MEASUREMENT IS U.S. SURVEY FEET. A RIGHT-OF-WAY DEDICATION BOUNDARY EXHIBIT AND A LINE & CURVE TABLE WERE CREATED IN CONJUNCTION WITH THIS METES & BOUNDS DESCRIPTION.

THE UNDERSIGNED, REGISTERED PROFESSIONAL LAND SURVEYOR, HEREBY CERTIFIES THAT THE FOREGOING DESCRIPTION ACCURATELY SETS OUT THE METES AND BOUNDS OF THIS DEDICATION.

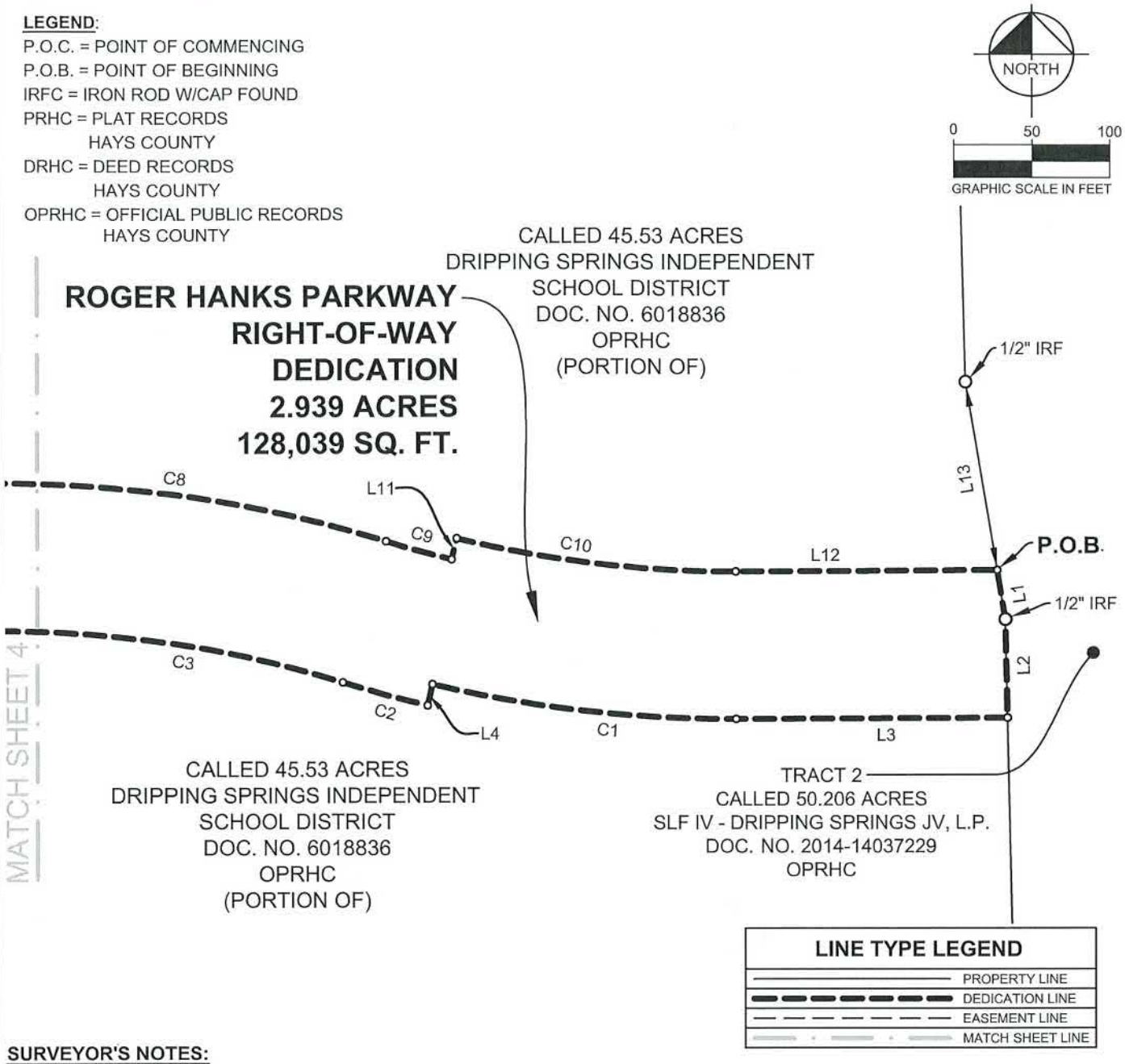
ZACHARY KEITH PETRUS
REGISTERED PROFESSIONAL
LAND SURVEYOR NO. 6769
10814 JOLLYVILLE ROAD
CAMPUS IV, SUITE 200
AUSTIN, TEXAS 78759
PH. (512) 572-6674
ZACH.PETRUS@KIMLEY-HORN.COM

EXHIBIT "A"
RIGHT-OF-WAY DEDICATION
2.939 ACRES
PHILIP SMITH SURVEY, ABSTRACT 415,
CITY OF DRIPPING SPRINGS, HAYS COUNTY, TEXAS

Kimley»Horn
10814 Jollyville Road Campus IV, Suite 200, Austin, Texas 78759 FIRM # 10194624
Tel. No. (512) 418-1771 www.kimley-horn.com

Scale	Drawn by	Checked by	Date	Project No.	Sheet No.
N/A	PTF	ZKP	4/26/2021	067783118	2 OF 5

LEGEND:
P.O.C. = POINT OF COMMENCING
P.O.B. = POINT OF BEGINNING
IRFC = IRON ROD W/CAP FOUND
PRHC = PLAT RECORDS
HAYS COUNTY
DRHC = DEED RECORDS
HAYS COUNTY
OPRHC = OFFICIAL PUBLIC RECORDS
HAYS COUNTY



LINE TYPE LEGEND	
	PROPERTY LINE
	DEDICATION LINE
	EASEMENT LINE
	MATCH SHEET LINE

SURVEYOR'S NOTES:

THE BEARINGS, DISTANCES, AREAS AND COORDINATES SHOWN HEREON ARE TEXAS STATE COORDINATE SYSTEM GRID, CENTRAL ZONE (FIPS 4203) (NAD'83), AS DETERMINED BY THE GLOBAL POSITIONING SYSTEM (GPS). THE UNIT OF LINEAR MEASUREMENT IS U.S. SURVEY FEET. A METES & BOUNDS DESCRIPTION AND A LINE & CURVE TABLE WERE CREATED IN CONJUNCTION WITH THIS RIGHT-OF-WAY DEDICATION BOUNDARY EXHIBIT.

THE UNDERSIGNED, REGISTERED PROFESSIONAL LAND SURVEYOR, HEREBY CERTIFIES THAT THIS R.O.W. DEDICATION BOUNDARY EXHIBIT OF SURVEY ACCURATELY REFLECTS THE METES AND BOUNDS OF THIS DEDICATION.

ZACHARY KEITH PETRUS
REGISTERED PROFESSIONAL
LAND SURVEYOR NO. 6769
10814 JOLLYVILLE ROAD
CAMPUS IV, SUITE 200
AUSTIN, TEXAS 78759
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EXHIBIT "A"
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2.939 ACRES
PHILIP SMITH SURVEY, ABSTRACT 415,
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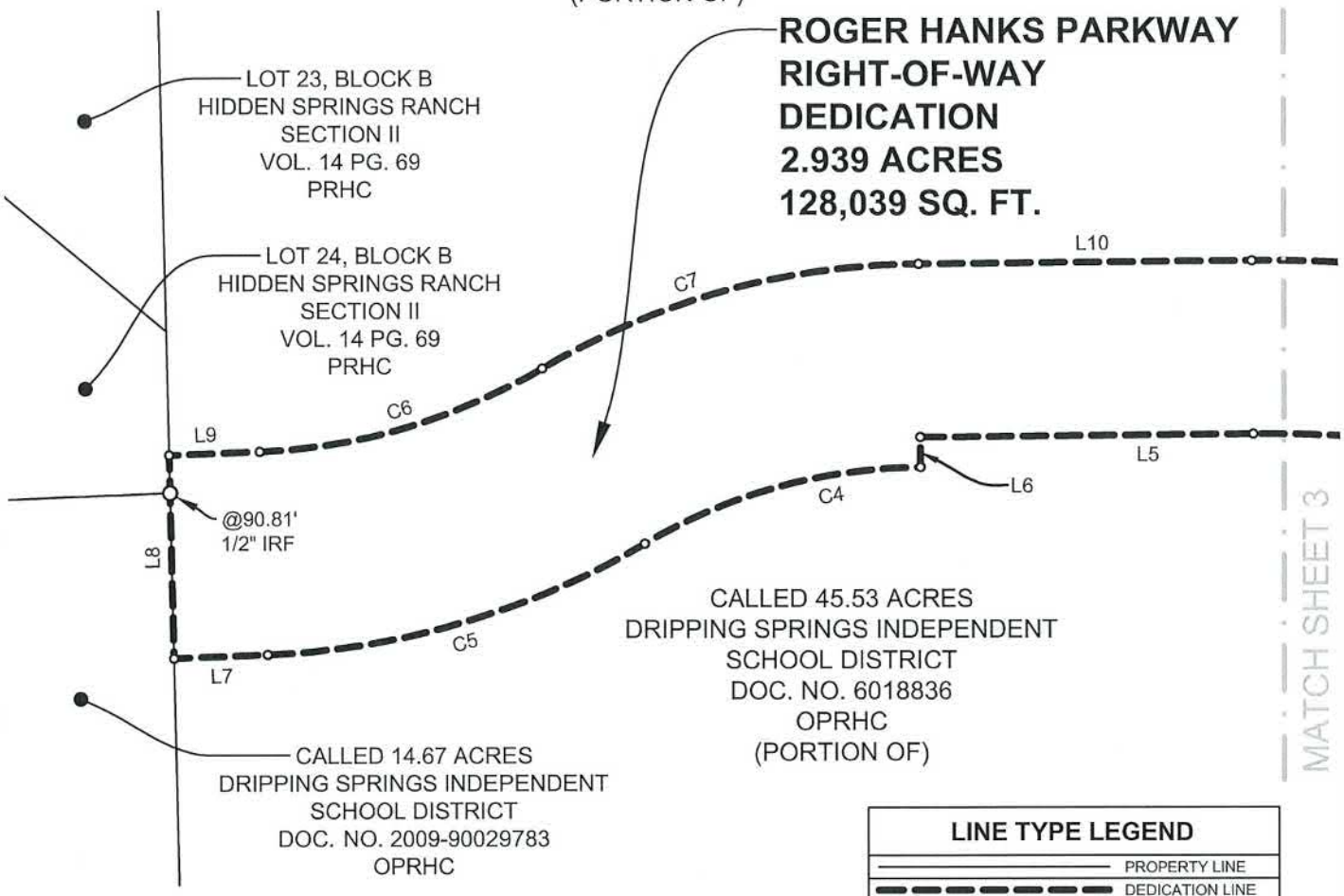
Scale	Drawn by	Checked by	Date	Project No.	Sheet No.
1" = 100'	PTF	ZKP	4/26/2021	067783118	3 OF 5

LEGEND:
P.O.C. = POINT OF COMMENCING
P.O.B. = POINT OF BEGINNING
IRFC = IRON ROD W/CAP FOUND
PRHC = PLAT RECORDS HAYS COUNTY
DRHC = DEED RECORDS HAYS COUNTY
OPRHC = OFFICIAL PUBLIC RECORDS HAYS COUNTY

NORTH

0 50 100
GRAPHIC SCALE IN FEET



LINE TYPE LEGEND	
	PROPERTY LINE
	DEDICATION LINE
	EASEMENT LINE
	MATCH SHEET LINE

SURVEYOR'S NOTES:

THE BEARINGS, DISTANCES, AREAS AND COORDINATES SHOWN HEREON ARE TEXAS STATE COORDINATE SYSTEM GRID, CENTRAL ZONE (FIPS 4203) (NAD'83), AS DETERMINED BY THE GLOBAL POSITIONING SYSTEM (GPS). THE UNIT OF LINEAR MEASUREMENT IS U.S. SURVEY FEET. A METES & BOUNDS DESCRIPTION AND A LINE & CURVE TABLE WERE CREATED IN CONJUNCTION WITH THIS RIGHT-OF-WAY DEDICATION BOUNDARY EXHIBIT.

THE UNDERSIGNED, REGISTERED PROFESSIONAL LAND SURVEYOR, HEREBY CERTIFIES THAT THIS R.O.W. DEDICATION BOUNDARY EXHIBIT OF SURVEY ACCURATELY REFLECTS THE METES AND BOUNDS OF THIS DEDICATION.

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LINE TABLE		
NO.	BEARING	LENGTH
L1	S09°31'11"E	32.03'
L2	S01°10'11"E	63.40'
L3	S89°48'55"W	175.81'
L4	S13°19'16"W	14.00'
L5	S89°31'02"W	183.61'
L6	S00°28'58"E	16.50'
L7	S87°49'20"W	51.32'
L8	N01°15'27"W	111.51'
L9	N87°49'20"E	49.53'
L10	N89°31'02"E	183.61'
L11	N13°47'16"E	14.00'
L12	N89°48'55"E	169.52'
L13	N09°31'11"W	122.84'

CURVE TABLE					
NO.	DELTA	RADIUS	LENGTH	CHORD BEARING	CHORD
C1	13°30'21"	839.00'	197.77'	N83°25'54"W	197.31'
C2	3°48'52"	853.00'	56.79'	N74°46'18"W	56.78'
C3	17°37'07"	747.00'	229.70'	N81°40'25"W	228.80'
C4	29°51'59"	305.50'	159.25'	S74°35'02"W	157.45'
C5	28°10'18"	444.50'	218.56'	S73°44'11"W	216.36'
C6	28°10'18"	333.00'	163.73'	N73°44'11"E	162.09'
C7	29°51'59"	417.00'	217.37'	N74°35'02"E	214.92'
C8	17°37'07"	842.00'	258.92'	S81°40'25"E	257.90'
C9	3°20'52"	758.00'	44.29'	S74°32'18"E	44.28'
C10	13°58'21"	744.00'	181.44'	S83°11'54"E	180.99'

SURVEYOR'S NOTES:

THE BEARINGS, DISTANCES, AREAS AND COORDINATES SHOWN HEREON ARE TEXAS STATE COORDINATE SYSTEM GRID, CENTRAL ZONE (FIPS 4203) (NAD'83), AS DETERMINED BY THE GLOBAL POSITIONING SYSTEM (GPS). THE UNIT OF LINEAR MEASUREMENT IS U.S. SURVEY FEET. A METES & BOUNDS DESCRIPTION AND A RIGHT-OF-WAY DEDICATION BOUNDARY EXHIBIT OF EVEN SURVEY DATE WAS CREATED IN CONJUNCTION WITH THIS LINE AND CURVE TABLE.

THE UNDERSIGNED, REGISTERED PROFESSIONAL LAND SURVEYOR, HEREBY CERTIFIES THAT THIS LINE & CURVE TABLE OF SURVEY ACCURATELY REFLECTS THE METES AND BOUNDS OF THIS DEDICATION.

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10814 JOLLYVILLE ROAD
CAMPUS IV, SUITE 200
AUSTIN, TEXAS 78759
PH. (512) 572-6674
ZACH.PETRUS@KIMLEY-HORN.COM

STATE OF TEXAS REGISTERED ZACHARY K. PETRUS 6769 PROFESSIONAL LAND SURVEYOR

EXHIBIT "A"
RIGHT-OF-WAY DEDICATION
2.939 ACRES

PHILIP SMITH SURVEY, ABSTRACT 415,
CITY OF DRIPPING SPRINGS, HAYS COUNTY, TEXAS

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N/A	PTF	ZKP	4/26/2021	067783118	5 OF 5

METES AND BOUNDS DESCRIPTION OF:
TEMPORARY CONSTRUCTION EASEMENT - 0.262 ACRES

BEING A 0.262 ACRE (11,430 SQ. FT.) TEMPORARY CONSTRUCTION EASEMENT SITUATED IN THE PHILIP SMITH SURVEY, ABSTRACT 415, CITY OF DRIPPING SPRINGS, HAYS COUNTY, TEXAS; AND BEING A PORTION OF A CALLED 14.67 ACRE TRACT OF LAND DESCRIBED TO DRIPPING SPRINGS INDEPENDENT SCHOOL DISTRICT AS SHOWN ON INSTRUMENT RECORDED IN DOCUMENT NO. 2009-90029783 OF THE OFFICIAL PUBLIC RECORDS OF HAYS COUNTY, TEXAS; AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING, AT A 1/2" IRON ROD FOUND AT AN ANGLE CORNER IN THE EASTERLY RIGHT-OF-WAY LINE OF GOLDEN EAGLE LANE (VARIABLE RIGHT-OF-WAY WIDTH), IN THE SOUTH BOUNDARY LINE OF LOT 27, BLOCK B OF THE HIDDEN SPRINGS RANCH SECTION II SUBDIVISION AS SHOWN ON PLAT RECORDED IN VOLUME 14, PAGE 69 OF THE PLAT RECORDS OF HAYS COUNTY, TEXAS; AND AT THE NORTHWEST CORNER OF SAID 14.67 ACRE TRACT;

THENCE, SOUTH 56°33'39" EAST, A DISTANCE OF 103.08 FEET TO THE **POINT OF BEGINNING,** FOR THE NORTHWEST CORNER OF THIS EASEMENT;

THENCE, DEPARTING THE EASTERLY RIGHT-OF-WAY LINE OF SAID GOLDEN EAGLE LANE AND OVER SAID 14.67 ACRE TRACT THE FOLLOWING NINE (9) COURSES AND DISTANCES**:**

1. NORTH 87°49'20" EAST, A DISTANCE OF 103.08 FEET TO A POINT FOR THE NORTHEAST CORNER OF THIS EASEMENT;
2. SOUTH 00°13'20" EAST, A DISTANCE OF 47.03 FEET TO A POINT OF CORNER OF THIS EASEMENT;
3. NORTH 89°58'13" WEST, A DISTANCE OF 13.34 FEET TO A POINT OF CORNER OF THIS EASEMENT;
4. SOUTH 00°04'47" WEST, A DISTANCE OF 49.67 FEET TO A POINT FOR THE SOUTHEAST CORNER OF THIS EASEMENT;
5. SOUTH 89°53'30" WEST, A DISTANCE OF 126.01 FEET TO A POINT OF CURVATURE MARKING A CORNER OF THIS EASEMENT;
6. ALONG A CURVE TO THE LEFT, HAVING AN INTERIOR ANGLE OF 27°40'29", A RADIUS OF 179.00 FEET, A CHORD BEARING AND DISTANCE OF SOUTH 25°49'04" WEST 85.62 FEET, A TOTAL ARC LENGTH OF 86.46 FEET TO A POINT, FOR AN ANGLE CORNER OF THIS EASEMENT;
7. NORTH 78°01'10" WEST, A DISTANCE OF 15.00 FEET TO A POINT FOR THE SOUTHWEST CORNER OF THIS EASEMENT,
8. ALONG A CURVE TO THE RIGHT, HAVING AN INTERIOR ANGLE OF 39°39'59", A RADIUS OF 194.00 FEET, A CHORD BEARING AND DISTANCE OF NORTH 31°48'49" EAST, 131.64 FEET, A TOTAL ARC LENGTH OF 134.31 FEET TO A POINT OF REVERSE CURVATURE, FOR AN ANGLE CORNER OF THIS EASEMENT;
9. ALONG A CURVE TO THE LEFT, HAVING AN INTERIOR ANGLE OF 21°30'56" A RADIUS OF 63.00 FEET A CHORD BEARING AND DISTANCE OF NORTH 40°53'23" EAST, 23.52 FEET, A TOTAL ARC LENGTH OF 23.66 FEET TO A POINT OF CURVATURE FOR A CORNER OF THIS EASEMENT;

THENCE, ALONG A CURVE TO THE RIGHT, HAVING AN INTERIOR ANGLE OF 57°38'32", A RADIUS OF 80.00 FEET, A CHORD BEARING AND DISTANCE OF SOUTH 59°00'07" WEST, 77.13 FEET, A TOTAL ARC LENGTH OF 80.48 FEET TO A POINT OF **POINT OF BEGINNING** CONTAINING 0.262 ACRES, MORE OR LESS , IN HAYS COUNTY, TEXAS. THIS DOCUMENT WAS PREPARED IN THE OFFICE OF KIMLEY-HORN AND ASSOCIATES, INC. IN AUSTIN, TEXAS.

SURVEYOR'S NOTES:

THE BEARINGS, DISTANCES, AREAS AND COORDINATES SHOWN HEREON ARE TEXAS STATE COORDINATE SYSTEM GRID, CENTRAL ZONE (FIPS 4203) (NAD'83), AS DETERMINED BY THE GLOBAL POSITIONING SYSTEM (GPS). THE UNIT OF LINEAR MEASUREMENT IS U.S. SURVEY FEET. A RIGHT-OF-WAY EASEMENT BOUNDARY EXHIBIT AND A LINE & CURVE TABLE WERE CREATED IN CONJUNCTION WITH THIS METES & BOUNDS DESCRIPTION.

THE UNDERSIGNED, REGISTERED PROFESSIONAL LAND SURVEYOR, HEREBY CERTIFIES THAT THE FOREGOING DESCRIPTION ACCURATELY SETS OUT THE METES AND BOUNDS OF THIS EASEMENT.

PRELIMINARY

THIS DOCUMENT SHALL NOT BE RECORDED FOR ANY PURPOSE AND SHALL NOT BE USED OR VIEWED OR RELIED UPON AS A FINAL SURVEY DOCUMENT

ZACHARY KEITH PETRUS
REGISTERED PROFESSIONAL
LAND SURVEYOR NO. 6769
10814 JOLLYVILLE ROAD
CAMPUS IV, SUITE 200
AUSTIN, TEXAS 78759
PH. (512) 572-6674
ZACH.PETRUS@KIMLEY-HORN.COM

EXHIBIT "A"
TEMPORARY CONSTRUCTION EASEMENT
0.262 ACRES

PHILIP SMITH SURVEY, ABSTRACT 415,
CITY OF DRIPPING SPRINGS, HAYS COUNTY, TEXAS

Kimley»Horn
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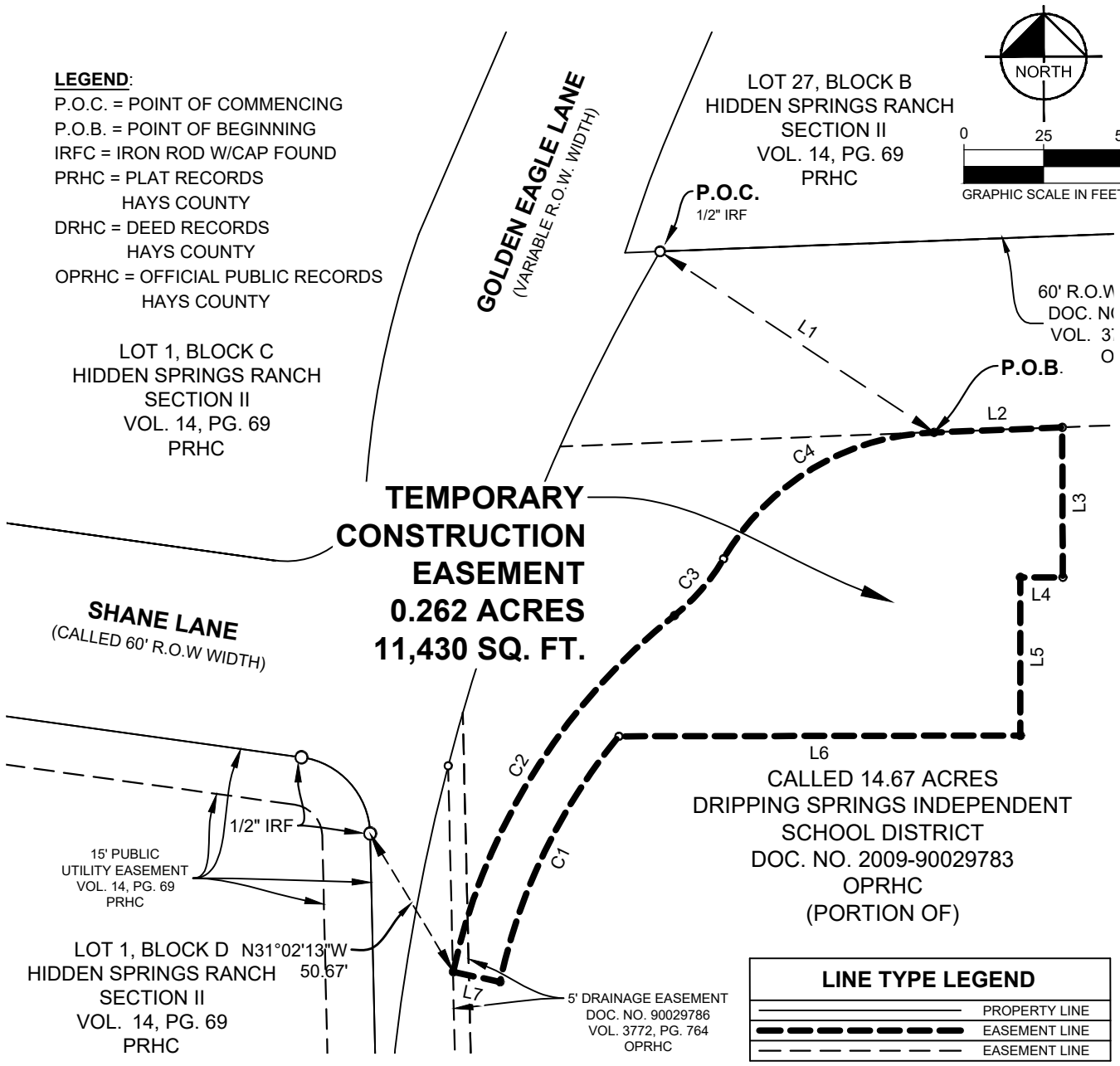
N/A	PTF	ZKP	7/26/2022	067783118	1 OF 3



SURVEYOR'S NOTES:

THE BEARINGS, DISTANCES, AREAS AND COORDINATES SHOWN HEREON ARE TEXAS STATE COORDINATE SYSTEM GRID, CENTRAL ZONE (FIPS 4203) (NAD'83), AS DETERMINED BY THE GLOBAL POSITIONING SYSTEM (GPS). THE UNIT OF LINEAR MEASUREMENT IS U.S. SURVEY FEET. A METES & BOUNDS DESCRIPTION AND A LINE & CURVE TABLE WERE CREATED IN CONJUNCTION WITH THIS RIGHT-OF-WAY EASEMENT BOUNDARY EXHIBIT.

THE UNDERSIGNED, REGISTERED PROFESSIONAL LAND SURVEYOR, HEREBY CERTIFIES THAT THIS R.O.W. EASEMENT BOUNDARY EXHIBIT OF SURVEY ACCURATELY REFLECTS THE METES AND BOUNDS OF THIS EASEMENT.

PRELIMINARY

THIS DOCUMENT SHALL NOT BE RECORDED FOR ANY PURPOSE AND SHALL NOT BE USED OR VIEWED OR RELIED UPON AS A FINAL SURVEY DOCUMENT

ZACHARY KEITH PETRUS
REGISTERED PROFESSIONAL
LAND SURVEYOR NO. 6769
10814 JOLLYVILLE ROAD
CAMPUS IV, SUITE 200
AUSTIN, TEXAS 78759
PH. (512) 572-6674
ZACH.PETRUS@KIMLEY-HORN.COM

EXHIBIT "A"
TEMPORARY CONSTRUCTION EASEMENT
0.262 ACRES

PHILIP SMITH SURVEY, ABSTRACT 415,
CITY OF DRIPPING SPRINGS, HAYS COUNTY, TEXAS

Kimley»Horn
10814 Jollyville Road Campus IV, Suite 200, Austin, Texas 78759 FIRM # 10194624
Tel. No. (512) 418-1771
www.kimley-horn.com

Scale	Drawn by	Checked by	Date	Project No.	Sheet No.
1" = 50'	PTF	ZKP	7/26/2022	067783118	2 OF 3

LINE TABLE		
NO.	BEARING	LENGTH
L1	S56°33'39"E	103.08'

CURVE TABLE					
NO.	DELTA	RADIUS	LENGTH	CHORD BEARING	CHORD

SURVEYOR'S NOTES:

THE BEARINGS, DISTANCES, AREAS AND COORDINATES SHOWN HEREON ARE TEXAS STATE COORDINATE SYSTEM GRID, CENTRAL ZONE (FIPS 4203) (NAD'83), AS DETERMINED BY THE GLOBAL POSITIONING SYSTEM (GPS). THE UNIT OF LINEAR MEASUREMENT IS U.S. SURVEY FEET. A METES & BOUNDS DESCRIPTION AND A RIGHT-OF-WAY EASEMENT BOUNDARY EXHIBIT OF EVEN SURVEY DATE WAS CREATED IN CONJUNCTION WITH THIS LINE AND CURVE TABLE.

THE UNDERSIGNED, REGISTERED PROFESSIONAL LAND SURVEYOR, HEREBY CERTIFIES THAT THIS LINE & CURVE TABLE OF SURVEY ACCURATELY REFLECTS THE METES AND BOUNDS OF THIS EASEMENT.

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Scale	Drawn by	Checked by	Date	Project No.	Sheet No.
N/A	PTF	ZKP	7/26/2022	067783118	3 OF 3

PHOTOGRAPHIC MYLAR

VOL 14 PG 169

HIDDEN SPRINGS RANCH
Section II

I, Kurt Barton, acting on behalf of Hidden Springs, LP, a Limited Partnership, owner of a 95.86 acre tract of land out of the Phillip A. Smith Survey No. 26, Hays County, Texas; as conveyed to me by deed recorded in Book 3060, Page 558 et seq. of the Official Public Records of said County, do hereby subdivide said 95.86 acres to be known as HIDDEN SPRINGS RANCH, Section II as shown hereon, subject to any and all easements and restrictions heretofore granted and not released, and do dedicate to the public the use of the streets and utility easements shown hereon.

Kurt Barton
Managing Member
Triton Land Development, LLC
General Partner

This instrument was acknowledged before me on June 19, A.D., 2007.

Notary — Kelly Nienhaus, print or stamp name

My commission expires: 10/05/08

I, Linda C. Fritsche, Clerk of Hays County, do hereby certify that the foregoing instrument of writing, with its certificate of authentication was filed for record in my office on the 10 day of July A.D., 2007 at 2:35 o'clock P.M., and duly recorded on the 10 day of July A.D., 2007 at 2:35 o'clock P.M. in the Plat Records of said County in Plat Book No. 14, Page 169-172.

Witness my hand and seal of the County Clerk, this the 10 day of July A.D., 2007.

Linda C. Fritsche
By: Cheemaclez, Deputy
County Clerk

COUNTY COURT OF HAYS COUNTY, TEXAS

No structure in this subdivision shall be occupied until connected to a public sewer system or to an on-site wastewater system which has been approved and permitted by the City of Dripping Springs Environmental Health Department.

No structure in this subdivision shall be occupied until connected to an individual water supply or an approved community water system.

Dora Fogle RS. 3493
Dora Fogle, RS
City Sanitarian
City of Dripping Springs

REGISTERED SANITARIAN — PUBLIC HEALTH — STATE OF TEXAS — 3493

GENERAL NOTES:

The water system for this subdivion was designed from criteria from the Dripping Springs Water Supply Corporation. The Corporation does not imply that fire flow is available in their distribution system.

In approving this plat by the City of Dripping Springs, Texas, it is understood that the building of all streets, roads and other public thoroughfares delineated and shown on ths plat, and all bridges or culverts necessary to be constructed or placed in such streets, roads or other public thoroughfares, or in accordance therewith, shall be the responsibility of the owner/developer of the tract of land covered by this plat in accordance with the plans and specifications prescribed by the City of Dripping Springs, Texas and the City of Dripping Springs, Texas assumes no obligation to build the streets, roads or other public thoroughfares shown on this plat, or of constructing any bridges or culverts in connection therewith.

This tract is not shown in a Special Flood Hazard Area on FIRM for Hays County, Texas, Map No. 48209C0105 F, 9/2/2005.

There shall be a 15 foot utility easement along either side of all streets and a 7-1/2 foot utility easement along side lines, unless otherwise noted.

Lots will have a 30 foot front/rear & 20 foot side building setback lines unless otherwise noted. Building lines will not extend into drainage easements.

ACCEPTED AND AUTHORIZED FOR RECORD by the City Council of the City of Dripping Springs, Texas on the 20th day of June, A.D., 2007.
This plat was originally accepted and authorized for record by the City Council February 13, 2001.

City Secretary — Mayor

This plat was prepared from an on the ground survey performed under my direction and supervision. It substantially complies with the City of Dripping Springs' Ordinance No. 30E, as amended.

Dale Allen Sultemeier
Registered Professional Land Surveyor
No. 4542 — State of Texas

6-07

This plat substantially complies with the City of Dripping Springs' Ordinance No. 30E, as amended. Stormwater resulting from a 100-year storm is contained within the drainage easements.

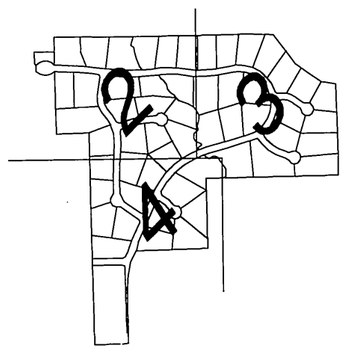
STATE OF TEXAS — DALE ALLEN SULTEMEIER — 4542 — REGISTERED PROFESSIONAL ENGINEER

OWNER/DEVELOPER:
Triton Land Development
3755 Capital of TX Hwy. S. #293
Austin, TX 78704

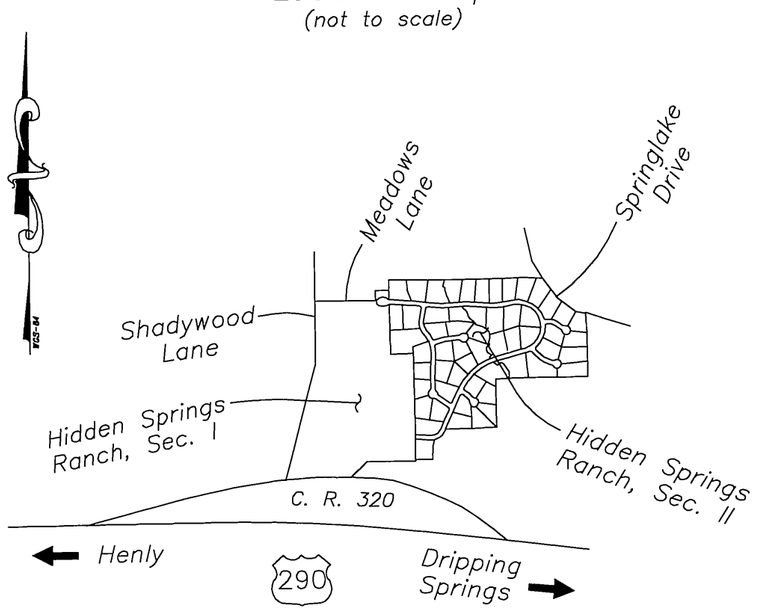
SURVEYOR/ENGINEER:
Dale Allen Sultemeier, P.E., R.P.L.S.
805 North Llano
Fredericksburg, TX 78624

Sheet Index

Sheet Layout Diagram



Location Map
(not to scale)



SULTEMEIER SURVEYING
805 North Llano
(830) 990-1221
Fredericksburg, Texas
78624

Vol 14 Pg 70

HIDDEN SPRINGS RANCH
Section II

SPRINGLAKE SUBDIVISION
(unrecorded subdivision)

542/691 518/346 378/451 610/464

Lot 1 1.57 ac. | Lot 2 1.55 ac. | Lot 3 1.84 ac. | Lot 4 1.39 ac. | Lot 5 1.31 ac. | Lot 6 1.34 ac.

Common Area 0.43 ac.

"B"

Morgan Hill Drive | Meadows Lane | Golden Eagle Lane (60') | Lot 7 See Sht. 3

Lot 9 1.36 ac. | Lot 8 1.64 ac.

"A"

Lot 7 2.39 ac. | Lot 6 1.31 ac.

Lot 1 1.51 ac. | Lot 4 1.09 ac. | Lot 5 1.36 ac.

Lot 2 1.23 ac. | Lot 3 1.31 ac. | Lot 12 1.28 ac.

"C"

Lot 16 1.35 ac. | Lot 15 1.01 ac. | Lot 13 1.54 ac.

Lot 14 1.07 ac.

Driftwood Court (60') | Running Deer Lane (60') | Golden Eagle Lane (60')

50' Drainage Easement | 25' drainage easement | 50' drainage easement | 25' drainage easement

Hidden Springs Ranch, Sec. I
Bk. 9 Pg. 87

Broken Lance Drive | Lot 21 | Lot 20 | Lot 19 | Lot 18 | Lot 17 | Lot 22-R 10/7

Lot 17 See Sht. 4 | Lot 18 See Sht. 4 | Lot 5 See Sht. 4 | Lot 6 See Sht. 3 | Lot 11 See Sht. 3 | See Sht. 4

CURVE TABLE				
CURVE	LENGTH	RADIUS	CHORD BEARING	CHORD
C1	38.67'	205.00'	N 29°14'44" E	38.61'
C2	293.55'	645.00'	S 11°39'09" W	291.02'
C8	40.22'	25.00'	N 36°37'49" W	36.02'
C9	38.03'	25.00'	S 53°01'37" W	34.46'
C10	314.55'	1752.77'	S 87°51'18" E	314.13'
C11	69.94'	341.22'	S 80°34'36" W	69.82'
C12	31.31'	145.00'	S 03°16'04" W	31.25'
C13	104.25'	205.00'	S 05°06'57" E	103.13'
C14	86.56'	145.00'	S 20°01'09" E	85.28'
C15	62.38'	205.00'	S 28°24'10" E	62.14'
C16	66.59'	341.15'	N 31°31'43" W	66.49'
C17	72.03'	401.15'	N 31°58'35" W	71.94'
C18	174.10'	341.15'	N 11°18'58" W	172.22'
C21	106.89'	401.15'	N 04°19'46" W	106.58'
C22	272.33'	1812.77'	S 87°42'12" E	272.08'
C23	108.90'	1812.77'	N 86°16'19" E	108.88'
C24	105.13'	341.22'	N 84°43'30" W	104.72'
C25	31.81'	25.00'	N 67°39'14" E	29.70'
C26	83.27'	60.00'	S 70°57'55" W	76.75'
C27	60.00'	60.00'	N 40°37'41" W	57.53'
C28	62.83'	60.00'	N 18°01'12" E	60.00'
C29	58.73'	60.00'	N 76°03'39" E	56.41'
C30	39.27'	281.22'	N 79°53'57" W	39.24'
C31	105.01'	281.22'	S 85°24'08" W	104.41'
C34	175.06'	786.76'	S 62°27'31" W	174.70'
C35	191.48'	786.76'	S 49°06'42" W	191.01'
C36	75.04'	1752.77'	N 85°46'38" E	75.03'
C37	140.37'	699.18'	N 89°41'52" W	140.13'
C38	17.78'	699.18'	N 83°13'06" W	17.78'
C39	58.00'	717.13'	S 84°48'25" E	57.99'
C40	144.57'	639.18'	N 88°58'10" W	144.26'
C41	26.59'	777.13'	S 83°28'12" E	26.59'
C42	32.04'	25.00'	S 63°32'48" E	29.89'
C43	37.91'	25.00'	S 31°15'21" W	34.38'

LINE TABLE		
LINE	LENGTH	BEARING
L1	21.06'	N 23°49'53" E
L2	105.73'	N 00°58'18" W
L3	21.32'	N 44°03'39" E
L4	59.99'	N 01°07'12" W
L5	21.13'	N 45°48'58" W
L6	105.44'	S 01°03'51" E
L7	138.32'	S 00°50'33" E
L8	44.72'	S 89°14'55" E
L9	43.22'	S 89°14'55" E
L10	34.15'	S 54°27'10" E
L11	15.34'	N 75°53'54" W
L14	69.95'	N 84°33'03" E
L15	31.38'	S 29°52'05" E
L16	40.64'	S 48°29'24" E
L17	46.55'	S 36°41'42" E
L18	44.42'	S 10°10'29" E
L19	41.98'	S 38°03'17" E
L20	38.08'	S 56°53'25" E
L21	36.10'	S 40°13'13" E
L22	34.67'	S 40°13'13" E
L23	94.72'	S 70°57'14" E
L24	48.55'	S 58°29'08" E
L25	53.52'	S 39°34'46" E
L26	41.01'	S 22°13'53" E
L27	42.60'	S 01°26'22" E
L28	38.95'	S 10°11'28" W
L29	28.98'	S 24°02'59" W
L30	18.31'	S 30°53'01" E
L31	15.38'	S 07°18'23" E
L32	29.43'	S 54°40'44" W
L33	19.92'	S 38°05'13" W
L34	40.53'	S 07°19'43" W
L35	34.86'	S 28°30'15" E
L36	57.36'	S 66°33'45" E
L37	11.59'	S 27°28'57" E
L38	38.81'	S 51°53'22" W
L39	13.11'	S 10°39'06" W
L40	11.44'	S 30°25'35" E
L41	124.09'	S 04°55'55" W
L42	200.54'	S 19°03'50" E
L43	124.14'	S 03°10'52" W
L44	123.38'	S 21°48'30" E
L45	175.07'	S 70°12'27" E
L46	194.03'	S 55°30'03" E
L47	87.06'	S 09°27'56" E
L48	91.08'	S 34°25'18" E
L49	70.77'	N 71°34'57" E
L50	109.70'	S 65°33'49" E
L51	52.63'	S 07°26'03" W
L52	141.43'	S 11°36'56" E
L53	104.01'	S 17°07'17" W
L54	135.69'	S 17°54'37" E
L55	120.74'	S 43°36'42" E
L56	166.46'	S 27°37'17" E
L57	128.60'	S 71°46'51" E
L58	177.29'	S 45°59'51" E
L59	65.81'	S 46°24'26" W
L60	73.49'	S 08°53'01" W
L61	176.21'	S 29°25'29" E
L62	39.92'	N 84°33'03" E
L63	60.08'	N 84°33'03" E
L64	47.20'	N 88°55'15" E
L65	30.05'	N 84°33'03" E

LEGEND
- 3/8" dia. iron rod set
- 1/2" dia. iron rod found
- building setback line

1" = 100'

NOTE: Drainage easements are centered on lot lines.

SULTEMEIER SURVEYING
805 North Llano Fredericksburg, Texas
(830) 990-1221 78624

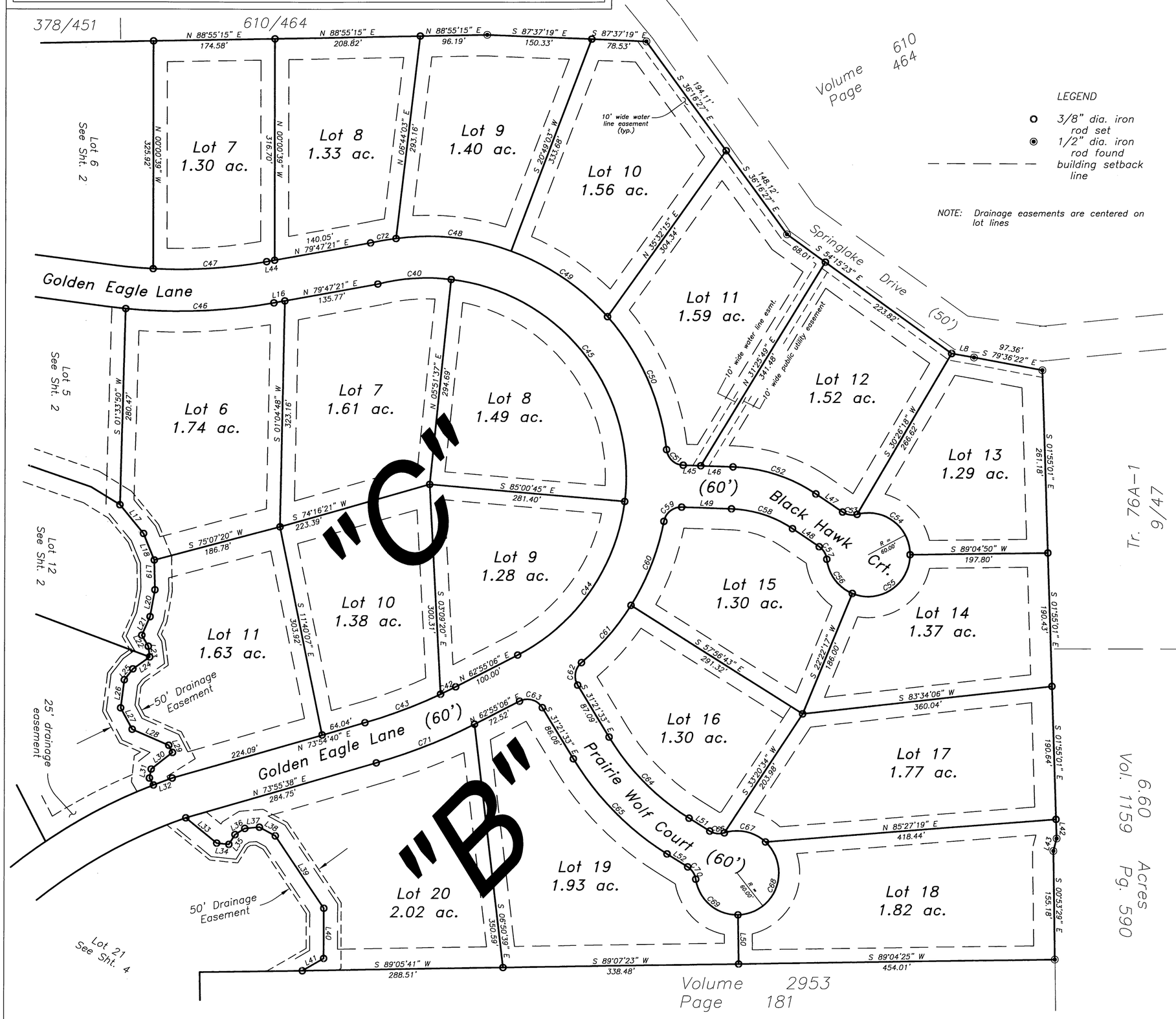
PHOTOGRAPHIC MYLAR

SULTEMEIER SURVEYING

805 North Llano — Fredericksburg, Texas
(830) 990-1221 — 78624

HIDDEN SPRINGS RANCH
Section II

Vol 14 Pg 01



LINE TABLE		
LINE	LENGTH	BEARING
L1	21.06'	N 23°50'32" E
L1	21.06'	N 23°49'53" E
L2	105.73'	N 00°58'18" W
L3	21.32'	N 44°03'39" E
L4	59.99'	N 01°07'12" W
L5	21.13'	N 45°48'58" W
L6	105.44'	S 01°03'51" E
L7	138.32'	S 00°50'33" E
L8	35.01'	S 80°24'22" E
L16	15.90'	N 79°47'21" E
L17	53.52'	S 39°34'46" E
L18	41.01'	S 22°13'53" E
L19	42.60'	S 01°26'22" E
L20	38.95'	S 10°11'28" W
L21	28.98'	S 24°02'59" W
L22	18.31'	S 30°53'01" E
L23	15.38'	S 07°18'23" E
L24	29.43'	S 54°40'44" W
L25	19.92'	S 38°05'13" W
L26	40.53'	S 07°19'43" W
L27	34.86'	S 28°30'15" E
L28	57.36'	S 66°33'45" E
L29	11.59'	S 27°28'57" E
L30	38.81'	S 51°53'22" W
L31	13.11'	S 10°39'06" W
L32	11.44'	S 30°25'35" E
L33	57.24'	S 51°05'35" E
L34	17.61'	S 84°18'07" E
L35	16.52'	N 32°00'13" E
L36	16.53'	N 57°59'33" E
L37	21.10'	N 85°13'38" E
L38	25.87'	S 61°43'06" E
L39	124.86'	S 34°09'21" E
L40	71.81'	S 00°00'39" E
L41	35.49'	S 59°57'36" W
L42	27.37'	S 01°55'01" E
L43	18.42'	S 14°26'58" W
L44	11.63'	N 79°47'21" E
L45	25.27'	S 88°03'43" E
L46	46.33'	S 88°03'43" E
L47	46.39'	S 56°06'25" E
L48	46.39'	S 56°06'25" E
L49	71.60'	S 88°03'43" E
L50	70.44'	S 00°54'19" E
L51	34.98'	N 58°15'52" W
L52	34.98'	N 58°15'52" W

CURVE TABLE				
CURVE	LENGTH	RADIUS	CHORD BEARING	CHORD
C1	38.67'	205.00'	N 29°14'05" E	38.61'
C2	293.55'	645.00'	S 11°39'09" W	291.02'
C40	106.22'	285.00'	S 86°27'30" W	105.61'
C42	24.07'	714.59'	N 63°53'00" E	24.07'
C43	116.03'	714.59'	N 69°30'00" E	115.90'
C44	278.40'	285.00'	N 34°56'04" E	267.46'
C45	449.52'	285.00'	N 38°14'06" W	404.35'
C46	213.77'	777.13'	N 87°40'10" E	213.10'
C47	163.80'	717.13'	N 86°19'57" E	163.44'
C48	167.96'	345.00'	N 83°49'53" W	166.31'
C49	169.51'	345.00'	N 55°48'33" W	167.81'
C50	211.49'	345.00'	N 24°10'20" W	208.19'
C51	35.54'	25.00'	S 47°20'11" E	32.62'
C52	126.82'	227.38'	N 72°05'04" W	125.18'
C53	21.68'	25.00'	S 80°56'48" E	21.00'
C54	110.78'	60.00'	N 52°53'36" W	95.70'
C55	117.68'	60.00'	N 56°11'09" E	99.70'
C56	64.09'	60.00'	S 37°01'40" E	61.09'
C57	21.68'	25.00'	N 31°16'01" W	21.00'
C58	93.35'	167.38'	N 72°05'04" W	92.15'
C59	35.54'	25.00'	S 51°12'44" W	32.62'
C60	129.87'	345.00'	N 21°16'14" E	129.11'
C61	108.61'	345.00'	N 41°04'25" E	108.16'
C62	35.54'	25.00'	S 09°21'59" W	32.62'
C63	37.40'	25.00'	N 74°13'13" W	34.01'
C64	165.01'	351.40'	S 44°48'43" E	163.50'
C65	193.19'	411.40'	S 44°48'43" E	191.42'
C66	21.68'	25.00'	S 83°06'16" E	21.00'
C67	63.47'	60.00'	N 77°38'29" W	60.55'
C68	142.36'	60.00'	N 20°38'01" E	111.24'
C69	86.72'	60.00'	S 49°59'22" E	79.36'
C70	21.68'	25.00'	N 33°25'29" W	21.00'
C71	151.86'	774.59'	N 68°32'06" E	151.62'
C72	37.23'	345.00'	S 80°26'40" W	37.21'

PHOTOGRAPHIC MYLAR

PHOTOGRAPHIC MYLAR

Vol 14 Pg 72

HIDDEN SPRINGS RANCH
Section II

Lot 18 | Lot 17 | Lot 16 | Lot 12 | Lot 11 | Lot 10 | Lot 9 | Lot 8

Hidden Springs Ranch, Sec. 1
Book 9
Page 87

Lot 6 See Sht. 2 | Lot 16 See Sht. 2 | Lot 13 See Sht. 2 | Lot 14 See Sht. 2 | Lot 20 See Sht. 3

Running Deer Lane

Golden Eagle Lane (60')

Gray Fox Crt. (60')

Shane Lane (60')

Lot 5 1.11 ac.
Lot 4 1.12 ac.
Lot 3 1.41 ac.
Lot 2 1.28 ac.
Lot 1 1.60 ac.
Lot 17 1.39 ac.
Lot 18 1.13 ac.
Lot 19 1.31 ac.
Lot 21 1.91 ac.
Lot 22 1.72 ac.
Lot 23 1.45 ac.
Lot 24 1.57 ac.
Lot 26 1.16 ac.
Lot 27 1.32 ac.
Lot 1 5.22 ac.

"C"

"B"

"D"

50' Drainage Easement

50' drainage easement

25' drainage easement

25' drainage easement

184 sq. ft. tr. dedicated by this plat

right-of-way dedicated by City of Dripping Springs

4.03 Ac. 1878/624

19.21 Ac. 1780/747

2.18 Ac. 1767/546

City of Driipping Springs
14.68 Acres
Vol. 1878 Pg. 628

Volume 970
Page 623

WGS-84

1" = 100'

LEGEND

- 3/8" dia. iron rod set
- 1/2" dia. iron rod found
- building setback line

NOTE: Drainage easements are centered on lot lines.

LINE TABLE		
LINE	LENGTH	BEARING
L1	21.06'	N 23°50'32" E
L1	21.06'	N 23°49'53" E
L2	105.73'	N 00°58'18" W
L3	21.32'	N 44°03'39" E
L4	59.99'	N 01°07'12" W
L5	21.13'	N 45°48'58" W
L6	105.44'	S 01°03'51" E
L7	138.32'	S 00°50'33" E
L8	78.60'	S 03°18'16" W
L9	116.98'	S 03°18'16" W
L10	30.09'	S 88°36'45" W
L11	20.00'	S 88°27'52" W
L12	235.23'	S 88°37'57" W
L13	30.00'	S 88°36'45" W
L16	57.24'	S 51°05'35" E
L17	17.61'	S 84°18'07" E
L18	16.52'	N 32°00'13" E
L19	16.53'	N 57°59'33" E
L20	21.10'	N 85°13'38" E
L21	25.87'	S 61°43'06" E
L22	124.86'	S 34°09'21" E
L23	71.81'	S 00°00'39" E
L24	35.49'	S 59°57'36" W
L25	45.14'	N 81°28'20" E
L26	70.83'	S 51°51'09" E
L27	75.16'	N 89°05'41" E
L28	65.89'	S 28°18'33" E
L29	63.00'	S 71°02'09" E
L31	4.56'	S 38°02'37" E
L32	4.56'	S 38°02'37" E

CURVE TABLE				
CURVE	LENGTH	RADIUS	CHORD BEARING	CHORD
C1	38.67'	205.00'	N 29°14'44" E	38.61'
C1	38.67'	205.00'	N 29°14'05" E	38.61'
C2	293.55'	645.00'	S 11°39'09" W	291.02'
C3	155.55'	2684.56'	S 01°38'40" W	155.52'
C4	153.93'	2624.56'	S 01°37'27" W	153.91'
C5	21.68'	25.00'	N 24°37'59" E	21.00'
C6	70.36'	60.00'	S 15°52'42" W	66.40'
C7	75.91'	60.00'	S 53°57'45" E	70.95'
C8	14.74'	60.00'	N 82°45'12" E	14.70'
C9	21.68'	25.00'	N 79°26'42" W	21.00'
C10	21.68'	25.00'	S 25°02'48" E	21.00'
C11	47.08'	60.00'	N 27°24'21" W	45.88'
C12	21.68'	25.00'	S 29°45'55" E	21.00'
C13	34.22'	25.00'	N 15°23'13" W	31.61'
C14	44.32'	25.00'	N 74°36'47" E	38.74'
C22	41.64'	786.76'	S 25°20'50" W	41.63'
C23	209.76'	786.76'	S 34°30'05" W	209.14'
C24	220.24'	726.76'	S 37°31'52" W	219.40'
C25	38.95'	25.00'	S 15°47'04" E	35.13'
C26	39.86'	25.00'	S 69°30'14" W	35.77'
C27	107.20'	288.34'	N 48°41'41" W	106.59'
C28	137.09'	348.34'	N 49°19'04" W	136.20'
C29	21.68'	25.00'	S 62°53'00" E	21.00'
C30	21.68'	25.00'	N 13°12'13" W	21.00'
C31	100.60'	60.00'	S 36°23'46" E	89.22'
C32	58.34'	60.00'	N 67°43'05" E	56.07'
C33	78.09'	60.00'	N 02°34'52" E	72.69'
C34	55.52'	60.00'	N 61°12'46" W	53.56'
C35	313.46'	726.76'	S 58°34'08" W	311.03'
C50	165.55'	1162.31'	N 85°55'19" W	165.41'
C51	34.97'	25.00'	N 41°34'19" W	32.19'
C52	178.26'	1222.31'	N 85°49'58" W	178.10'
C53	41.04'	25.00'	N 51°19'58" E	36.58'
C54	47.52'	456.22'	S 20°50'51" W	47.50'
C55	81.47'	296.96'	S 12°09'54" W	81.21'

SULTEMEIER SURVEYING
805 North Llano Fredericksburg, Texas
(830) 990-1221 78624

Shane Lane Roadway Improvements Plans

Shane Lane Roadway Improvements

City of Dripping Springs

CONT	SECT	JOB	HIGHWAY
			SHANE LN
DIST	COUNTY		SHEET NO.
AUS	HAYS		1

INDEX OF SHEETS

CITY OF DRIPPING SPRINGS

CONSTRUCTION PLANS FOR ROADWAY IMPROVEMENTS ON SHANE LANE

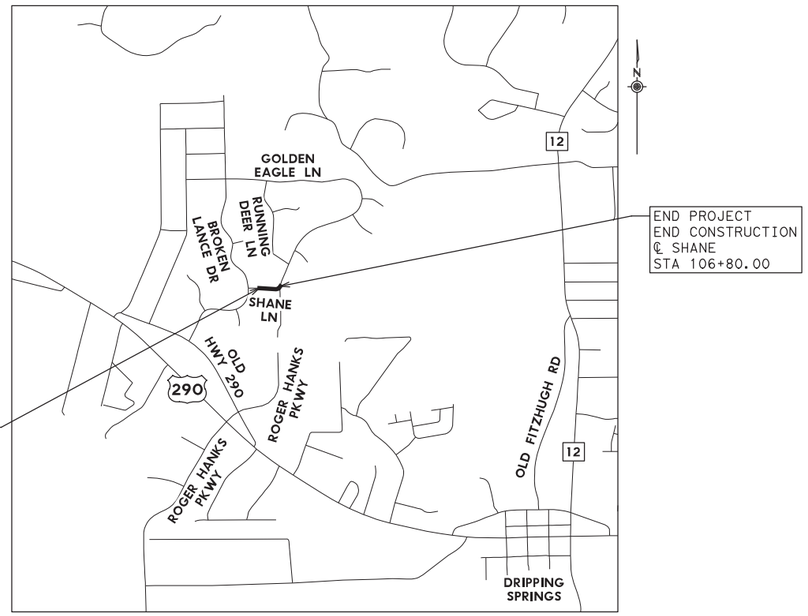
NET LENGTH OF PROJECT = 509.00 FEET = 0.096 MILES

HAYS COUNTY
SHANE LANE ROADWAY IMPROVEMENTS

FROM: SHANE LANE/GOLDEN EAGLE LN
TO: SOUTH OF RUNNING DEER LN

FOR THE RECONSTRUCTION OF ROADWAY INTERSECTION

CONSISTING OF GRADING, BASE, ASPHALT, DRAINAGE, PEDESTRIAN FACILITIES, EROSION CONTROL, SIGNING, AND PAVEMENT MARKINGS.



LOCATION MAP NOT TO SCALE

EXCEPTIONS: NONE
EQUATIONS: NONE
RAILROAD CROSSINGS: NONE

TDLR INSPECTION IS NOT REQUIRED

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION ON NOVEMBER 1, 2014 SHALL GOVERN ON THIS PROJECT.

DESIGN SPEED

SHANE LANE/GOLDEN EAGLE LN: 30 MPH

10.04.23

STATE OF TEXAS
LESLIE D. POLLACK
101285
LICENSED
PROFESSIONAL ENGINEER

Leslie D Pollack

HDR
Firm Registration No. F-754
710 Hesters Crossing, Suite 150
Round Rock, Texas 78681
512.685.2900

CONSULTANT:

HDR ENGINEERING, INC (TBPE FIRM REG. F-754)

SUBMITTED FOR LETTING:

CITY OF DRIPPING SPRINGS

FILE: $FILE$
DATE: 10/4/2023 8:30:15 AM

SHEET NUMBERS	DESCRIPTION
	I. GENERAL
1	TITLE SHEET
2	INDEX OF SHEETS
3	PROJECT LAYOUT
4 - 5	TYPICAL SECTIONS
6 - 10	GENERAL NOTES
11	SUMMARY OF QUANTITIES
	II. TRAFFIC CONTROL PLAN
12	TRAFFIC CONTROL AND SEQUENCE OF CONSTRUCTION
13	DETOUR PLAN
	TRAFFIC CONTROL STANDARDS
14 - 18	BC(1)-21 THRU BC(5)-21 *
19 - 22	BC(7)-21 THRU BC(10)-21 *
23	WZ(RCD)-13 *
	III. ROADWAY PLANS
24	HORIZONTAL ALIGNMENT DATA
25	REMOVAL LAYOUT
26 - 27	ROADWAY PLAN AND PROFILE
28	DRIVEWAY AND SIDEWALK PLAN AND PROFILE
	ROADWAY STANDARDS
29	GF(31)-19 *
30	GF (31)MS-19 *
31	SGT(11S)31-18 *
32	SGT(12S)31-18 *
33	SGT(15)31-20 *
	IV. DRAINAGE PLANS
34	EXISTING DRAINAGE AREA MAP
35	PROPOSED DRAINAGE AREA MAP
36	CULVERT 01 LAYOUT
37	DRAINAGE DETAILS
	DRAINAGE STANDARDS
38	PDD *
39	PB *
40	PBGC *
41	PAZD-CZ *
42 - 43	SETP-CD *
44	PSET-SC *
45	PSET-RC *
46	PSET-RR *
	V. SIGNING AND PAVEMENT MARKING PLANS
47	SIGNING AND PAVEMENT MARKING PLAN
	SIGNING AND PAVEMENT MARKING STANDARDS
48	D & OM(1)-20 *
49	D & OM(2)-20 *
50	D & OM(3)-20 *
51	D & OM(5)-20 *
52	D & OM(VIA)-20 *
	VI. ENVIRONMENTAL PLANS
53	ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS (EPIC)
54	SW3P NARRATIVE
55 - 56	SW3P LAYOUT
	ENVIRONMENTAL STANDARDS
57	EC(1)-16 *
58	EC(2)-16 *
59	EC(3)-16 *

STATE OF TEXAS
FELIPE S. TUDTUD
104836
LICENSED
PROFESSIONAL ENGINEER
10/04/2023

* THE STANDARD SHEETS SPECIFICALLY IDENTIFIED ABOVE HAVE BEEN SELECTED BY ME OR UNDER MY RESPONSIBLE SUPERVISION AS BEING APPLICABLE TO THIS PROJECT.

NO.	DATE	REVISION	APPROVED

HDR
Firm Registration No. F-754
710 Hesters Crossing, Suite 150
Round Rock, Texas 78681
512.685.2900

THE CITY OF DRIPPING SPRINGS TEXAS

ROGER HANKS

INDEX OF SHEETS

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC				RH
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	HAYS	2
CHECK	CONTROL	SECTION	JOB	
CHECK				

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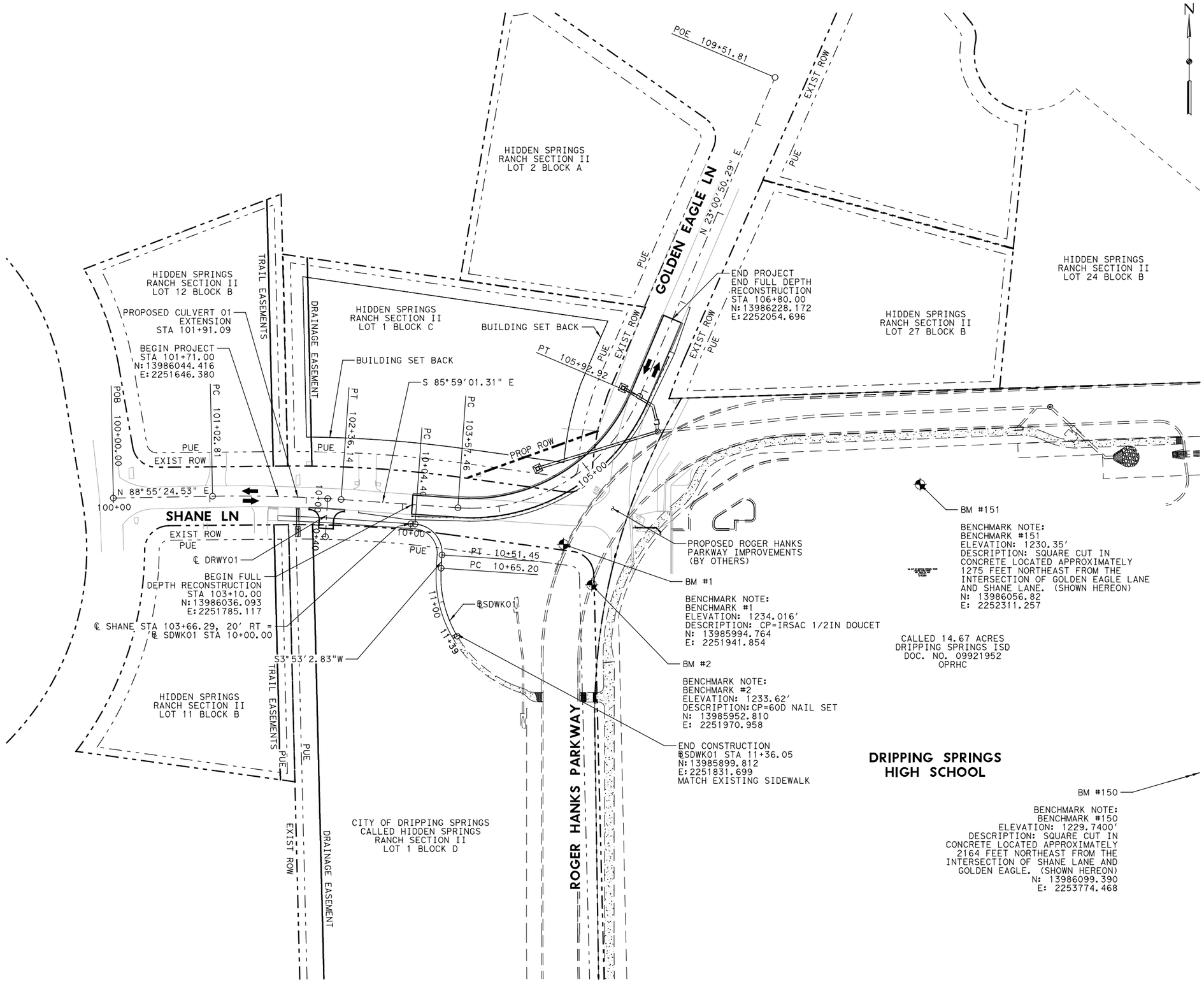

LEGEND

- PROPERTY LINE (HAYS CENTRAL APPRAISAL DISTRICT)
- EXISTING RIGHT OF WAY
- PROPOSED RIGHT OF WAY
- PROPOSED CONSTRUCTION BY OTHERS
- TRAVEL LANE
- BENCHMARK POINT

NOTES:

1. SEE "HORIZONTAL ALIGNMENT DATA" SHEET FOR ALIGNMENT INFORMATION.
2. EXISTING ROW IS BASED ON BEST AVAILABLE INFORMATION FROM HAYS COUNTY APPRAISAL DISTRICT AND AVAILABLE SITE PLANS.

CONTROL NOTE:

BASIS OF BEARING IS THE TEXAS COORDINATE SYSTEM, SOUTH CENTRAL ZONE (4204), NORTH AMERICA DATUM 1983 (NAD83). 2011 ADJUSTMENT (EPOCH 2010) AND A VERTICAL DATUM OF NAVD88. GEOID 12B. ALL COORDINATE VALUES AND DISTANCES SHOWN ARE GRID VALUES UNITS: US SURVEY FEET.

THE SURVEY WAS PERFORMED WITHOUT THE BENEFIT OF A TITLE COMMITMENT. EASEMENTS OR OTHER MATTERS OF RECORD MAY EXIST WHERE NON ARE SHOWN.

STATE OF TEXAS
FELIPE S. TUDTUD
104836
LICENSED PROFESSIONAL ENGINEER
10/04/2023

NO.	DATE	REVISION	APPROVED

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Firm Registration No. F-754
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Round Rock, Texas 78681
512.685.2900

THE CITY OF DRIPPING SPRINGS TEXAS

ROGER HANKS

PROJECT LAYOUT

SHEET 1 OF 1

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC				RH
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	HAYS	
CHECK	CONTROL	SECTION	JOB	3
CHECK				

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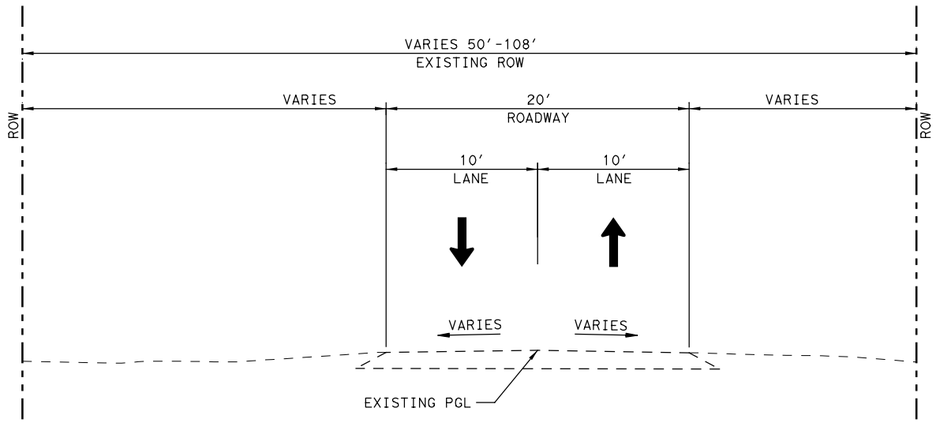
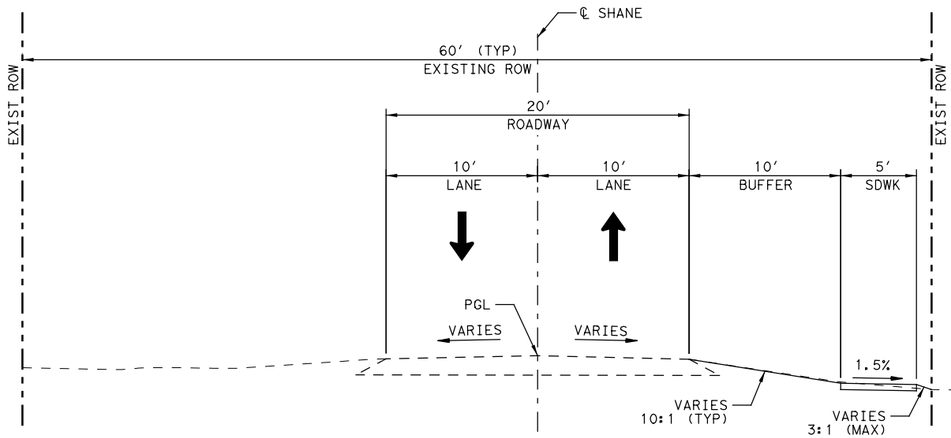


SHANE LANE
EXISTING TYPICAL SECTION



SHANE LANE
PROPOSED TYPICAL SECTION
BEGIN PROJECT TO STA 103+10

STATE OF TEXAS
FELIPE S. TUDTUD
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PROFESSIONAL ENGINEER
10/04/2023

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710 Hesters Crossing, Suite 150
Round Rock, Texas 78681
512.685.2900

THE CITY OF
DRIPPING SPRINGS
TEXAS

ROGER HANKS

TYPICAL SECTIONS

SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC				RH
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	HAYS	
CHECK	CONTROL	SECTION	JOB	4
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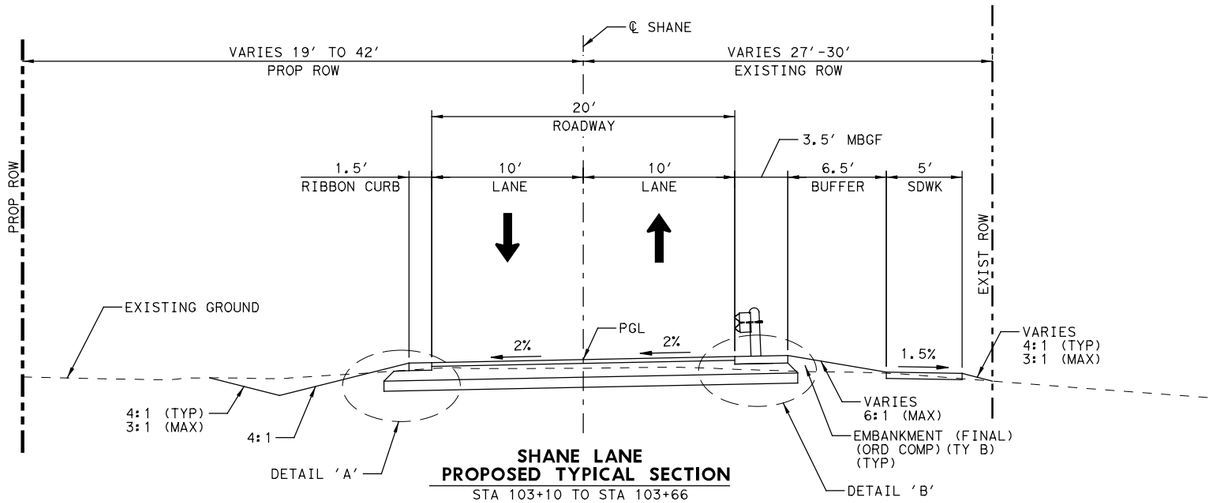
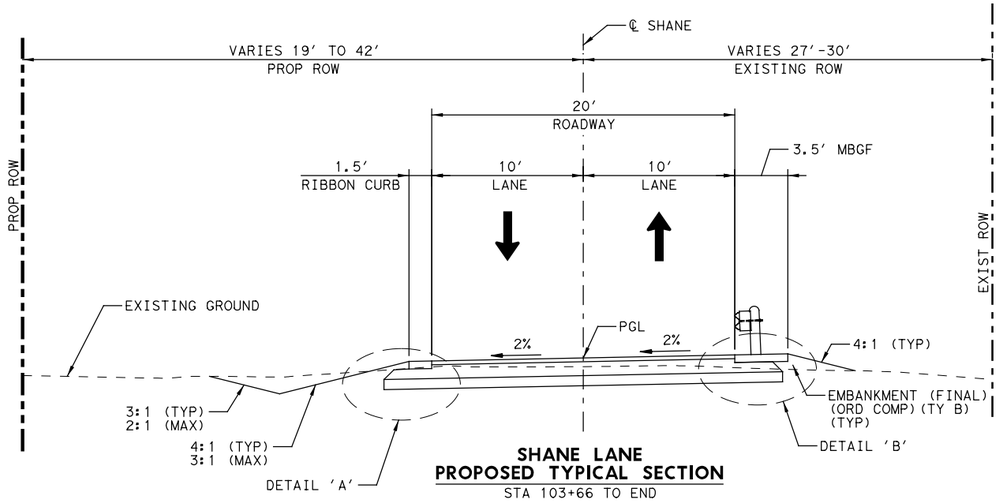
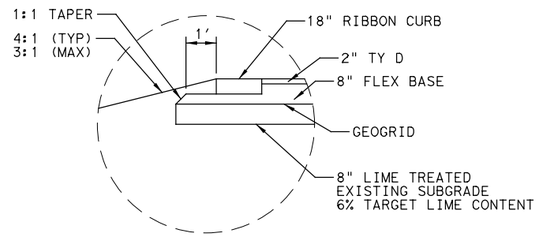


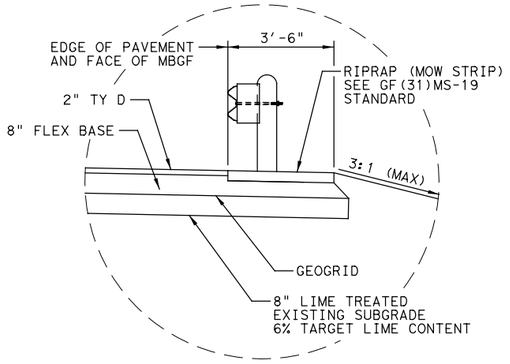
SHANE LANE
PROPOSED TYPICAL SECTION
STA 103+10 TO STA 103+66



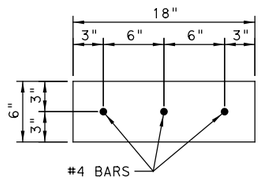
SHANE LANE
PROPOSED TYPICAL SECTION
STA 103+66 TO END



DETAIL 'A'



DETAIL 'B'



RIBBON CURB DETAIL

NOTES:

1. PER HAYS COUNTY SPECIFICATIONS, WHENEVER A SOIL INVESTIGATION INDICATES THAT MORE THAN TWO FEET OF EXPANSIVE SUBGRADE SOIL WITH A P.I. OF 35 OR GREATER EXISTS BENEATH THE EXPECTED BASE LAYER, THE DESIGN PROFESSIONAL SHALL INCORPORATE A COMBINATION OF THE TWO MEASURES DESCRIED IN (COA TCM 3.1.3).
2. SECTIONS TO BE VERIFIED AFTER ROUGH CUT OF ROAD PER GEOTECHNICAL ASSESSMENT SUBGRADE CONDITIONS.
3. ASPHALTIC BINDER SHALL BE PG-76 PER COLLECTORS AND ARTERIALS.

STATE OF TEXAS
FELIPE S. TUDTUD
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LICENSED
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10/04/2023

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710 Hesters Crossing, Suite 150
Round Rock, Texas 78681
512.685.2900

THE CITY OF
DRIPPING SPRINGS
TEXAS

ROGER HANKS

TYPICAL SECTIONS

SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC				RH
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	HAYS	
CHECK	CONTROL	SECTION	JOB	5
CHECK				

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SCALE: 1:10

GENERAL NOTES:

Item	Description	**Rate
**204	**Sprinkling** (Dust) (Item 132) (Item 247)	 30 GAL/CY 30 GAL/CY 30 GAL/CY
**210	**Rolling (Flat Wheel)** (Item 247) (Item 316)	 1 HR/200 TON 1 HR/6000 SY
**210	**Rolling (Tamping and Heavy Tamping)**	1 HR/200 CY
**210	**Rolling (Lt Pneumatic Tire)** (Item 132) (Item 247) (Item 316 - Seal Coat) (Item 316 - Two Course)	 1 HR/500 CY 1 HR/200 TON 1 HR/6000 SY 1 HR/3000 SY
247	**Flexible Base (CMP IN PLC)**	132 LB/CF
310	**Prime Coat**	0.20 GAL/SY
3076	**Dense-Graded Hot-Mix Asphalt**	110 LB/SY/IN
	Tack Coat	0.08 GAL/SY

** For Informational Purposes Only

GENERAL
Contractor questions on this project are to be addressed to the following individual(s):

Company:	Email:	Phone:
HDR Engineering, Inc.	Leslie.Pollack@hdrinc.com	(512) 904-3728

Contractor questions and request for documents will be accepted through email, phone, and in person by the above individuals.

All Contractor questions will be reviewed by the Engineer.

References to manufacturer's trade name or catalog numbers are for the purpose of identification only. Similar materials from other manufacturers are permitted if they are of equal quality, comply with the specifications for this project, and are approved.

If work is performed at Contractor's option, when inclement weather is impending, and the work is damaged by subsequent precipitation, the Contractor is responsible for all costs associated with replacing the work, if required.

The roadbed will be free of organic material prior to placing any section of the pavement structure.

Equip all construction equipment used in roadway work with highly visible omnidirectional flashing warning lights.

Provide a smooth, clean sawcut along the existing asphalt or concrete pavement structure, as directed. Consider subsidiary to the pertinent Items.

Project: Roger Hanks Parkway
County: Hays
Sheets: 6-10

Construct all manholes/valves to final pavement elevations prior to the placement of final surface. If the manholes/valves are going to be exposed to traffic, place temporary asphalt around the manhole/valve to provide a 50:1 taper. The asphalt taper is subsidiary to the ACP work.

Use a self-contained vacuum broom to sweep the roadway and keep it free of sediment as directed. The contractor will be responsible for any sweeping above and beyond the normal maintenance required to keep fugitive sediment off the roadway as directed by the Engineer.

Damage to existing pipes and SET's due to Contractor operations will be repaired at Contractor's expense.

All locations used for storing construction equipment, materials, and stockpiles of any type, within the right of way, will be as directed. Use of right of way for these purposes will be restricted to those locations where driver sight distance to businesses and side street intersections is not obstructed and at other locations where an unsightly appearance will not exist. The Contractor will not have exclusive use of right of way but will cooperate in the use of the right of way with the city/county and various public utility companies as required.

CONTROL OF THE WORK
Place construction stakes at intervals of no more than 100 ft. This work is subsidiary.

Electronic Shop Drawing Submittals.
Submit electronic shop drawing submittals according to the current Guide to Electronic Shop Drawing Submittal https://www.txdot.gov/business/resources/highway/bridge/shop-drawing-submittal-cycle.html. Pre-approved producers can be found online at https://www.txdot.gov/business/resources/materials/material-producer-list.html.

CONTROL OF MATERIALS
Give a minimum of 1 business day notice for materials, which require inspection.

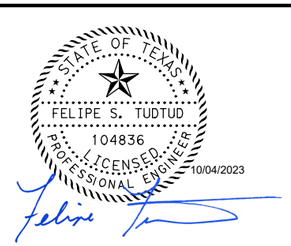
For structures with paint containing hazardous materials, provide locations of material removal 60 days prior to begin removal. For metal elements to be removed, mechanical shear or unbolting for removal and disposal does not require paint abatement but requires 60 day advance notice.

LEGAL RELATIONS AND RESPONSIBILITIES
TxDOT will coordinate with TDLR regarding pedestrian elements and sidewalks. The contractor will procure and provide all permits, licenses, and inspections; pay all charges, fees, and taxes regarding TDLR rules governing industrialized housing and buildings.

No significant traffic generator events identified.

Refer to the Environmental Permits, Issues and Commitments (EPIC) plan sheets for additional requirements and permits.

Perform maintenance of vehicles or equipment at designated maintenance sites. Keep a spill kit on-site during fueling and maintenance. This work is subsidiary.



NO.	DATE	REVISION	APPROVED

HDR
Firm Registration No. F-754
710 Hesters Crossing, Suite 150
Round Rock, Texas 78681
512.685.2900

THE CITY OF DRIPPING SPRINGS TEXAS

ROGER HANKS

GENERAL NOTES

SHEET 1 OF 5

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
				RH
GRAPHICS AT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	AUS	HAYS	
CHECK	CONTROL	SECTION	JOB	6

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Maintain positive drainage for permanent and temporary work for the duration of the project. Be responsible for any items associated with the temporary or interim drainage and all related maintenance. This work is subsidiary.

Suspend all activities near any significant recharge features, such as sinkholes, caves, or any other subterranean openings that are discovered during construction or core sampling. Do not proceed until the designated Geologist or TCEQ representative is present to evaluate and approve remedial action.

Locate aboveground storage tanks kept on-site for construction purposes in a contained area as to not allow any exposure to soils. The containment will be sized to capture 150% of the total capacity of the storage tanks.

Migratory Birds and Bats.
Migratory birds and bats may be nesting within the project limits and concentrated on roadway structures such as bridges and culverts. Remove all old and unoccupied migratory bird nests from any structures, trees, etc. between September 16 and February 28. Prevent migratory birds from re-nesting between March 1 and September 15. Prevention shall include all areas within 25 ft. of proposed work. All methods used for the removal of old nesting areas and the prevention of re-nesting must be submitted to the Engineer 30 business days prior to begin work. This work is subsidiary.

If active nests are encountered on-site during construction, all construction activity within 25 ft. of the nest must stop. Contact the Engineer to determine how to proceed.

Tree and Brush Trimming and Removal.
Work will be conducted September 16 thru February 28. Work conducted outside this timeframe will require a bird survey. Submit a survey request to the Engineer 30 business days prior to begin work.

No extension of time or compensation will be granted for a delay or suspension due to the above bird and tree/brush requirements.

Back Up Alarm.
For hours 9 P to 5 A, utilize a non-intrusive, self-adjusting noise level reverse signal alarm. This is not applicable to hotmix operations. This is subsidiary.

ITEM 100 - PREPARING RIGHT OF WAY
Prep ROW must not begin until accessible trees designated for preservation have been protected, items listed in the EPIC have been addressed, and SW3P controls installed in accessible areas.

Backfill material will be Type B Embankment using ordinary compaction.

Follow Item 752.4 Work Methods and Item 752 general notes when removing or working on or near trees and brush.

Project: Roger Hanks Parkway
County: Hays
Sheets: 6-10

Unless shown otherwise in the plans or a designated non-mow area, perform trimming or removal for areas within 30 ft. of edge of pavement under construction. Trim or remove to provide minimum of 5 ft. of horizontal clearance and 7 ft. of vertical clearance for the following: sidewalks, paths, guard fence, rails, signs, object markers, and structures. Trim to provide a minimum of 14 ft. vertical clearance under all trees. This work is subsidiary.

ITEM 105 – REMOVING TREATED AND UNTREATED BASE AND ASPHALT PAVEMENT
Existing typical is based on information available. This typical may not account for all maintenance work such as overlays or pavement repairs. A change in material type or thickness does not warrant additional payment. Payment is full compensation for removing all material to the depth specified.

ITEM 110 – EXCAVATION
The Engineer will define unsuitable material.

ITEM 132 – ALL EMBANKMENT
The Engineer will define unsuitable material. Material which the Contractor might deem to be unsuitable due to moisture content will not be considered unsuitable material.

Prior to begin embankment of existing area, correct or replace unstable material to a depth of 6 in. below existing grade. Embankment areas will be inspected prior to beginning work.

Rock or broken concrete produced by the project is allowed in earth embankments. The size of the rock or broken concrete will not exceed the layer thickness requirements in Section 132.3.4., “Compaction Methods.” The material will not be placed vertically within 5 ft. of the finished subgrade elevation.

ITEM 160 - TOPSOIL
Off-site topsoil will have a minimum PI of 25.

No Sandy Loam allowed.

Obtain approval of the actual depth of the topsoil sources for both on-site and off-site sources. Construct topsoil stockpiles of no more than five (5) feet in height.

It is permissible to use topsoil dikes for erosion control berms within the right of way, as directed.

Seed or track slopes within 14 days of placement.

Salvage topsoil from sites of excavation and embankment. Maximum salvage depth is 6 inches.

Windrowing of topsoil obtained from the Right of Way (ROW) is not allowed.

ITEM 168 – VEGETATIVE WATERING
Water all areas of project to be seeded or sodded. Watering is subsidiary to pay item 164 seeding for revegetation.

STATE OF TEXAS
FELIPE S. TUDTUD
104836
LICENSED
PROFESSIONAL ENGINEER
10/04/2023

NO.	DATE	REVISION	APPROVED

HDR
Firm Registration No. F-754
710 Hesters Crossing, Suite 150
Round Rock, Texas 78681
512.685.2900

THE CITY OF DRIPPING SPRINGS TEXAS

ROGER HANKS

GENERAL NOTES

SHEET 2 OF 5

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
				RH
GRAPHICS AT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	AUS	HAYS	
CHECK	CONTROL	SECTION	JOB	7

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USER: LGOMEZGONZ
FILE: RHGNO2.dgn (General notes 02)
PENTABLE: 0338078.tbl
DATE: 10/4/2023 TIME: 8:11:22 AM
SCALE: 1:1

Maintain the seedbed in a condition favorable for the growth of grass. Watering can be postponed immediately after a rainfall on the site of ½ inch or greater, but will be resumed before the soil dries out. Continue watering until grass is 1.5 inches high with 70% coverage.

Vegetative watering rates and quantities are based on ¼ inch of watering per week over a 3-month watering cycle. The actual rates used will be as directed and will be based on prevailing weather conditions to maintain the seedbed.

Obtain water at a source that is metered (furnish a current certification of the meter being used) or furnish the manufacturer's specifications showing the tank capacity for each truck used. Notify the Engineer, each day that watering takes place, before watering, so that meter readings or truck counts can be verified.

ITEM 204 – SPRINKLING
Apply water for dust control as directed. When dust control is not being maintained, cease operations until dust control is maintained. Consider subsidiary to the pertinent Items.

ITEM 216 - PROOF ROLLING
Correct and perform "Proof Rolling" retest at the Contractor's expense, to the satisfaction of the Engineer, when initial "Proof Rolling" yields a failing result.

ITEM 247 - FLEXIBLE BASE
The layer thickness will be 6 in. max unless shown on the plans. Placing in a single layer is allowed when total thickness of base is 8 in. or less. When placed in multiple layers, compact the bottom and middle layers to at least 95% and 98% of the maximum dry density, respectively. When placed in a single layer or the final layer, compact to at least 100%.

Correction of subgrade soft spots is subsidiary.

Complete per plans the subgrade, ditches, slopes, and drainage structures prior to the placement of base.

Do not use a vibratory roller to compact base placed directly on top of a drainage structure.

ITEMS 260 THRU 276 – SUBGRADE TREATMENTS AND BASE
Use ordinary compaction for subgrade treatment.

Three weeks prior to treatment, provide a sample of soil or flexible base to be treated.

ITEM 260 - LIME TREATMENT (ROAD-MIXED)
For sulfate content greater than 3000 ppm, mix in an additional 4.0% points above optimum moisture after initial mixing and prior to mellow.
If the sulfate content is greater than 7000 ppm, do not treat. Undercut the unsuitable material to the depth per bid item for lime treatment and replace unsuitable material in accordance with Item 110. Payment will be made in accordance with Item 110.

Project: Roger Hanks Parkway
County: Hays
Sheets: 6-10

ITEM 300s – SURFACE COURSES AND PAVEMENTS
Asphalt season is May 1 thru September 15. The latest work start date for asphalt season is August 1.

ITEM 310 – PRIME COAT
Apply blotter material to all driveways and intersections. This work is subsidiary.

When Multi Option is allowed, provide MC 30, EC 30 or AE-P.

Rolling to ensure penetration is required.

ITEM 320 - EQUIPMENT FOR ASPHALT CONCRETE PAVEMENT
Use of motor grader is allowed for placement of mixtures greater than 10 inches from the riding surface, when hot-mix is used in lieu of flexible base, or as allowed.

ITEM 3076 THRU 3082 - HOT-MIX ASPHALT PAVEMENT
Core holes may be filled with an Asphaltic patching material meeting the requirements of DMS-9203 or with SCM meeting requirements of DMS-9202.

Install transverse butt joints with 50 ft. H: 1 in. V transition from the new ACP to the existing surface. Saw cut the existing pavement at the butt joints. This work is subsidiary.

Use a device to create a maximum 3H:1V notched wedge joint on all longitudinal joints of 2 in. or greater. This work is subsidiary.

Ensure placement sequence to avoid excess distance of longitudinal joint lap back not to exceed one day's production rates.

Submit any proposed adjustments or changes to a JMF before production of the new JMF.

Tack every layer. Do not dilute tack coat. Apply it evenly through a distributor spray bar.

Irregularities will require the replacement of a full lane width using an asphalt paver. Replace the entire sublot if the irregularities are greater than 40% of the sublot area.

Lime or an approved anti-stripping agent must be used when crushed gravel is utilized to meet a SAC "A" requirement.

When using RAP or RAS, include the management methods of processing, stockpiling, and testing the material in the QCP submitted for the project. If RAP and RAS are used in the same mix, the QCP must document that both of these materials have dedicated feeder bins for each recycled material. Blending of RAP and RAS in one feeder bin or in a stockpile is not permitted.

STATE OF TEXAS
FELIPE S. TUDTUD
104836
LICENSED
PROFESSIONAL ENGINEER
10/04/2023

NO.	DATE	REVISION	APPROVED

HDR
Firm Registration No. F-754
710 Hesters Crossing, Suite 150
Round Rock, Texas 78681
512.685.2900

THE CITY OF DRIPPING SPRINGS TEXAS

ROGER HANKS

GENERAL NOTES

SHEET 3 OF 5

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
				RH
GRAPHICS AT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	AUS	HAYS	
CHECK	CONTROL	SECTION	JOB	8

PLOT DRIVER: TXDOT_PDF_BW.pltcfg SCALE: 1:1
USER: LGOMEZGONZ TIME: 8:11:28 AM
FILE: RHGNO3.dgn (General notes 03) DATE: 10/4/2023
PENTABLE: 1033807B.tbl

Asphalt content and binder properties of RAP and RAS stockpiles must be documented when recycled asphalt content greater than 20% is utilized.
No RAS is allowed in surface courses.

Department approved warm-mix additives is required for all surface mix application when RAP is used. Dosage rates will be approved during JMF approval.

The Hamburg Wheel Test will have a minimum rut depth of 3mm except for SMA with HPG or PG 76.

ITEM 3076 - DENSE-GRADED HOT-MIX ASPHALT
Use the SGC for design and production testing of all mixtures. Design all Type D mixtures as a surface mix, maximum 15% RAP and no RAS. Contractor may not use a substitute PG binder for 76-22. When using substitute binders, mold specimens for mix design and production at the temperature required for the substitute binder used to produce the HMA.

The Hamburg Wheel minimum number of passes for PG 64 or lower is reduced to 7,000. The Engineer may accept Hamburg Wheel test results for production and placement if no more than 1 of the 5 most recent tests is below the specified number of passes and the failing test is no more than 2,000 passes below the specified number of passes.

ITEM 432 - RIPRAP
Mow strip riprap will be 4 in. and all other riprap will be 5 in. unless otherwise shown on the plans. Fiber reinforcement is not allowed. GFRP is allowed reinforcement for all applications.

SGT approach taper will be seeded and graded at 10:1 or flatter per MBGF (MOW STRIP) standard and considered subsidiary to pertinent items. Placement will be ordinary compaction and does not require placement using an asphalt paver.

ITEM 465 – JUNCTION BOXES, MANHOLES, AND INLETS
Construct cast-in-place reinforced concrete apron as shown in the standards. This work is subsidiary.

Backfill shall use cohesionless material per Item 400 or flowable fill if width between structure and extent of excavation is 2 ft. or less. This is subsidiary.

ITEM 467 - SAFETY END TREATMENT
Field adjust pipe end to maintain the necessary slope. Field cutting of pipe end is allowed. Coat all metal field cuts or exposed reinforcement with asphalt paint.

ITEM 502 - BARRICADES, SIGNS, AND TRAFFIC HANDLING
Cover, relocate, or remove existing signs that conflict with traffic control. This work is subsidiary.

Install all permanent signs, delineation, and object markers required for the operation of the roadway before opening to traffic. Use of temporary mounts is allowed or may be required until

Project: Roger Hanks Parkway
County: Hays
Sheets: 6-10

the permanent mounts are installed or not impacted by construction. Maintain the temporary mounts. This work is subsidiary.

Place a 28-inch cone, meeting requirements of BC (10), on top of foundations that have protruding studs. This work is subsidiary.

Edge condition treatment types must be in accordance with the TxDOT standard. Installation and removal of a safety slope is subsidiary.

The Contractor Force Account "Safety Contingency" that has been established for this project is intended to be utilized for work zone enhancements, to improve the effectiveness of the Traffic Control Plan, that could not be foreseen in the project planning and design stage. These enhancements will be mutually agreed upon by the Engineer and the Contractor's Responsible Person based on weekly or more frequent traffic management reviews on the project. The Engineer may choose to use existing bid items if it does not slow the implementation of enhancement.

ITEM 506 - TEMPORARY EROSION, SEDIMENTATION, AND ENV CONTROLS
Install, maintain, remove control measures in areas of the right of way utilized by the Contractor that are outside the limits of disturbance required for construction. Permanently stabilize the area. This work is subsidiary.

Erosion control measures must be initiated immediately in areas where construction activities have ceased and will not resume for a period exceeding 14 calendar days. Vertical track all exposed soil, stockpiles, and slopes. Re-track after each rain event or every 14 days, whichever occurs first. Sheep foot roller is allowed for vertical tracking. This work is subsidiary.

Unless a specific pay item is provided in the plans, the installation of the 6:1 or flatter for RFD side slopes in the safety zone will be subsidiary to pertinent bid items.

ITEMS 528, 529, 530, 531, & 536 – MISCELLANEOUS CONSTRUCTION
Reinforcement will be in accordance with Section 432.3.1 unless shown on the plans. Fiber reinforcement is not allowed. GFRP is allowed reinforcement for all applications. Class A and B Concrete are allowed to use Coarse Aggregate Grades 1-8.

Unless shown on the plans, all concrete will be 5 in. thick and have 2 in. sand, base, or RAP bedding. Furnish base meeting the requirement for any type or grade in accordance with Item 247. Compressive strengths for flexible base are waived. RAP must be 100% passing a 1 in. sieve. Bedding and flexible base must be placed using ordinary compaction.

Expansion joints will be placed every 40 ft. Expansion joints must be 1 in. wide asphalt board and flush with the surface. The bottom of the asphalt board will be at half the depth of the concrete. The reinforcement will be continuous thru the expansion joint.

Sidewalk cross slope must not exceed 1.5%.

STATE OF TEXAS
FELIPE S. TUDTUD
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HDR
Firm Registration No. F-754
710 Hesters Crossing, Suite 150
Round Rock, Texas 78681
512.685.2900

THE CITY OF DRIPPING SPRINGS TEXAS

ROGER HANKS

GENERAL NOTES

SHEET 4 OF 5

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
				RH
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
AT	TEXAS	AUS	HAYS	
CHECK	CONTROL	SECTION	JOB	9
CHECK				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: LGOMEZGONZ
FILE: RHGNO4.dgn (General notes 04)
PENTABLE: 0338078.tbl
DATE: 10/4/2023
TIME: 8:11:34 AM
SCALE: NI

If roots are encountered verify with the Engineer before accommodating or removing 2 in. diameter or larger roots. Root removal must be in accordance with Section 752.4.2. Roots may remain in the bedding or base. For improvements within 6 in. of a root, the concrete thickness may be reduced by 1 in. and the bedding increased by 1 in. to minimize impacts to the roots. Adjust bedding and surface profile to provide a 1 in. bedding cushion around the roots. The surface profile may be adjusted to the extent allowed by ADA. This work is subsidiary.

ITEM 530 – INTERSECTIONS, DRIVEWAYS, AND TURNOUTS
Notify property owners at least 48 hr. before beginning work on their driveway. Provide a list of each notification and contact before each closure. Only close driveways for reconstruction if duration and alternate access are approved. Install and maintain material across a work zone as temporary access. This work is subsidiary.
For CONC, the pavement structure will be 6 in. thick and have 3 in. flexible base bedding unless detailed on the plans.

ITEMS 540, 542, & 544 - METAL BEAM GUARD FENCE AND GUARDRAIL END TREATMENTS
Furnish round timber posts for guard fence. Stake the locations for approval before installation. Adjust the limits of the fence to meet field conditions. Install delineators before opening the road to traffic.

Remove, replace, and install mow strip block out material. Construct new block outs and backfill unused block outs with class B concrete. This work is subsidiary.

Repair of mow strip damage, not caused by contractor negligence, and installation of new mow strip will be paid with appropriate bid items. Backfill and shoulder up of area around fence and mow strip will be paid using embankment item.

ITEMS 600s & 6000s – SIGNING AND MARKINGS
Meet the requirements of the Texas MUTCD, TxDOT standards, and TxDOT Standard Specifications. Notify the Engineer if existing elements to remain do not meet code or specification.

ITEM 658 – DELINEATOR AND OBJECT MARKER ASSEMBLIES
Installation and maintenance of portable CTB reflectors will be subsidiary to the barrier.

Flexible posts YFLX and WFLX must be tubular in shape. The “flat” flexible posts are not allowed.

ITEM 752 – TREE AND BRUSH REMOVAL
Follow Item 752.4 Work Methods and Item 752 general notes when removing or working on or near trees and brush even if Item 752 is not included as a pay item.

Project: Roger Hanks Parkway
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Sheets: 6-10

Flailing equipment is not allowed. Burning brush is not allowed in urban areas or on ROW. Use hand methods or other means of removal if doing work by mechanical methods is impractical.

Prior to begin tree pruning, send email confirmation to the Engineer that training and demonstration of work methods has been provided to the employees. This work is subsidiary.

Shredded vegetation may be blended, at a rate not to exceed 15 percent by volume, with Item 160 if the maximum dimension is not greater than 2 in.

ITEM 6001 – PORTABLE CHANGEABLE MESSAGE SIGN
Provide **2** PCMS. Provide a replacement within 12 hours. PCMS will be available for traffic control, event notices, roadway conditions, service announcements, etc.

Place PCMS 10 calendar days prior to begin work stating “Road Work Begin Soon, Contact 832-7000 For Info”.

Place PCMS at time of LCN request. Place the PCMS at the expected end of queue caused by the closure. When the closure is active, revise the message to reflect the actual condition during the closure, such as “RIGHT LN CLOSED XXX FT”.

ITEM 6185 – TRUCK MOUNTED ATTENUATOR AND TRAILER ATTENUATOR
The TMA/TA used for installation/removal of traffic control for a work area will be subsidiary to the TMA/TA used to perform the work.

The contractor will be responsible for determining if one or more operations will be ongoing at the same time to determine the total number of TMA/TA required for the work. TMA/TAs paid by the day is full compensation for all worksite locations during an entire day.

TMA/TAs used to protect damaged attenuators will be paid by the day using the force account item for the repair.

STATE OF TEXAS
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HDR
Firm Registration No. F-754
710 Hesters Crossing, Suite 150
Round Rock, Texas 78681
512.685.2900

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ROGER HANKS

GENERAL NOTES

SHEET 5 OF 5

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
				RH
GRAPHICS AT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	AUS	HAYS	
CHECK	CONTROL	SECTION	JOB	10

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PENTABLE: 0338078.tbl
DATE: 10/4/2023 TIME: 8:11:39 AM
SCALE: 1:1

SUMMARY OF TRAFFIC CONTROL QUANTITIES

LOCATION	0500 6001 MOBILIZATION	0502 6001 BARRICADES, SIGNS AND TRAFFIC HANDLING	6001 6002 PORTABLE CHANGEABLE MESSAGE SIGN	6185 6002 TMA (STATIONARY)*
	LS	MO	EA	DAY
DETOUR PLAN	1	4	2	5
PROJECT TOTALS	1	4	2	5

* TMA WILL ONLY BE PAID FOR ON AN AS-NEEDED BASIS. THE USE OF TMA SHALL BE APPROVED BY THE ENGINEER.

SUMMARY OF REMOVAL QUANTITIES

LOCATION	0100 6002 PREPARING ROW	0105 6015 REMOVING STAB BASE & ASPH PAV (8"-10")	0496 6004 REMOV STR (SET)
	STA	SY	EA
REMOVAL LAYOUT	4	815	1
PROJECT TOTALS	4	815	1

SUMMARY OF SHANE LANE EARTHWORK QUANTITIES

STATION	0110 6001 EXCAVATION (ROADWAY)	0132 6003 EMBANKMENT (FINAL) (ORD COMP) (TY B)
	(CY)	(CY)
101+61	0	0
101+75	0	2
102+00	7	8
102+25	8	5
102+50	2	0
102+75	2	0
103+00	1	0
103+10	15	0
103+25	43	1
103+50	72	12
103+75	75	10
104+00	74	0
104+25	75	1
104+50	90	2
104+54	17	0
104+75	77	5

SUMMARY OF SHANE LANE EARTHWORK QUANTITIES CON'T

STATION	0110 6001 EXCAVATION (ROADWAY)	0132 6003 EMBANKMENT (FINAL) (ORD COMP) (TY B)
	(CY)	(CY)
105+00	82	6
105+25	89	2
105+37	46	0
105+50	52	0
105+56	25	0
105+75	80	0
105+94	85	0
106+00	29	0
106+25	115	0
106+50	101	0
106+75	86	0
106+80	15	0
TOTAL	1,363	54

SUMMARY OF SIDEWALK EARTHWORK QUANTITIES

STATION	0110 6001 EXCAVATION (ROADWAY)	0132 6003 EMBANKMENT (FINAL) (ORD COMP) (TY B)
	(CY)	(CY)
10+00	0	0
10+25	75	3
10+50	34	3
10+75	1	1
11+00	1	0
11+25	1	0
11+39	1	0
TOTAL	113	7

SUMMARY OF CULVERT 01 DITCH GRADING EARTHWORK QUANTITIES

STATION	0110 6001 EXCAVATION (ROADWAY)	0132 6003 EMBANKMENT (FINAL) (ORD COMP) (TY B)
	(CY)	(CY)
10+81	0	0
11+00	11	0
11+25	7	0
11+50	4	0
11+75	1	0
11+92	0	0
TOTAL	23	0

SUMMARY OF ROADWAY QUANTITIES

LOCATION	0110 ## 6001 EXCAVATION (ROADWAY)	0132 ## 6003 EMBANKMENT (FINAL) (ORD COMP) (TY B)	0247 6053 FL BS (CMP IN PLC) (TYD GR1-2) (FNAL POS)	0260 6002 LIME (HYDRATED LIME (SLURRY))	0260 6073 LIME TRT (SUBGRADE) (8")	0432 6045 RIPRAP (MOW STRIP) (4 IN)	0464 6005 RC PIPE (CL III) (24 IN)	0465 6560 INL (CMP) (PAZ D-CZ) (FG) (4FTX4FT-4FTX4FT)	0467 6390 SET (TY II) (24 IN) (RCP) (4:1) (C)	0529 6038 CONC CURB (RIBBON)	0530 6004 DRIVEWAYS (CONC)	0531 6002 CONC SIDEWALKS (5")	0540 6001 MTL W-BEAM GD FEN (TIM POST)	0544 6001 GUARDRAIL END TREATMENT (INSTALL)	3076 6072 D-GR HMA TY-D PG 76-22 (EXEMPT)	5001 6002 GEOGRID BASE REINFORCEMENT (TY II)
	CY	CY	CY	TON	SY	CY	LF	EA	EA	LF	SY	SY	LF	EA	TON	SY
ROADWAY PLAN AND PROFILE																
SHEET 1 OF 2	640	52	106	11	519	10	41	1	-	183	-	79	150	1	46	519
SHEET 2 OF 2	723	2	110	12	546	9	135	1	-	207	-	-	100	1	44	546
DRIVEWAY AND SIDEWALK PLAN AND PROFILE	113	7	-	-	-	-	-	-	-	-	45	72	-	-	-	-
CULVERT 01 LAYOUT	23	-	-	-	-	-	29	-	1	-	-	-	-	-	-	-
PROJECT TOTALS	1,499	61	216	23	1,065	19	205	2	1	390	45	151	250	2	90	1,065

REFER TO ABOVE TABLE FOR STATION BREAK OUT.

SUMMARY OF SW3P QUANTITIES

LOCATION	0160 6003 FURNISHING AND PLACING TOPSOIL (4")	0164 6007 BROADCAST SEED (PERM) (URBAN) (CLAY)	0164 6071 BROADCAST SEED (TEMP) (WARM OR COOL)	0166 6002 FERTILIZER	0168 ** 6001 VEGETATIVE WATERING	0432 6002 RIPRAP (CONC) (5 IN)	0506 6002 ROCK FILTER DAMS (INSTALL) (TY 2)	0506 6011 ROCK FILTER DAMS (REMOVE)	0506 6020 CONSTRUCTION EXITS (INSTALL) (TY 1)	0506 6024 CONSTRUCTION EXITS (REMOVE)	0506 6038 TEMP SEDMT CONT FENCE (INSTALL)	0506 6039 TEMP SEDMT CONT FENCE (REMOVE)
	SY	SY	SY	TON	MG	CY	LF	LF	SY	SY	LF	LF
SW3P LAYOUT												
SHEET 1 OF 2	1,760	1,760	1,760	0.1	18	8	70	70	78	78	1,164	1,164
SHEET 2 OF 2	73	73	73	0.1	1	-	-	-	-	-	130	130
PROJECT TOTALS	1,833	1,833	1,833	0.2	19	8	70	70	78	78	1,294	1,294

**FOR CONTRACTOR INFORMATION ONLY, SUBSIDIARY TO PAY ITEM 164.

SUMMARY OF SIGNING AND PAVEMENT MARKING QUANTITIES

LOCATION	0658 6016 INSTL DEL ASSM (D-SW) SZ (BRF) GF1 (BI)
	EA
SIGNING AND PAVEMENT MARKING PLAN	6
PROJECT TOTALS	6

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HDR
Firm Registration No. F-754
710 Hesters Crossing, Suite 150
Round Rock, Texas 78681
512.685.2900

THE CITY OF DRIPPING SPRINGS TEXAS

ROGER HANKS

SUMMARY OF QUANTITIES

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SJ				RH
GRAPHICS KB	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JC	TEXAS	AUS	HAYS	11
CHECK JC	CONTROL	SECTION	JOB	

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: LGOMEZGONZ
FILE: Roger Hanks Parkway - Summary of Quantities
PENTABLE: I0338078.tbl
DATE: 10/4/2023 TIME: 8:35:51 AM
SCALE: 1:1

TRAFFIC CONTROL PLAN GENERAL NOTES:

1. INSTALL ALL SIGNS, BARRICADES, AND TRAFFIC CONTROL DEVICES AS SHOWN AND IN ACCORDANCE WITH THE STANDARD BC SHEETS AND AS DIRECTED. SIGNS MAY BE ADJUSTED DUE TO FIELD CONDITIONS AND SAFETY TO THE TRAVELING PUBLIC.

2. ALL TRAFFIC CONTROL DEVICES SHALL CONFORM WITH THE LATEST EDITION OF THE TEXAS "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS" (TMUTCD), AND SHALL BE MAINTAINED AS DIRECTED BY THE ENGINEER. ADDITIONAL GUIDELINES FOR TRAFFIC CONTROL DEVICES MAY BE FOUND IN THE TMUTCD.

3. ADDITIONAL SIGNS, BARRICADES, OR TRAFFIC CONTROL DEVICES OTHER THAN THOSE SPECIFIED MAY BE REQUIRED FOR THE SAFE MOVEMENT OF TRAFFIC THROUGH THE PROJECT. PAYMENT FOR ALL SUCH SIGNS, BARRICADES, OR TRAFFIC CONTROL DEVICES WILL BE CONSIDERED SUBSIDIARY TO THE ITEM 502, "BARRICADES, SIGNS AND TRAFFIC HANDLING".

4. WORK SITES WILL BE CAREFULLY MONITORED TO ENSURE THAT TRAFFIC CONTROL MEASURES ARE OPERATING EFFECTIVELY AND THAT ALL DEVICES USED ARE CLEARLY VISIBLE, CLEAN, AND IN GOOD REPAIR.

5. ACCESS TO ALL PRIVATE PROPERTY SHOULD TO THE GREATEST EXTENT POSSIBLE BE MAINTAINED AT ALL TIMES AND ALL WEATHER CONDITIONS AT THE SOLE EXPENSE OF THE CONTRACTOR. CONTACT THE PROPERTY OWNER AT LEAST 5 DAYS IN ADVANCE OF DRIVEWAY CONSTRUCTION. IF THE PROPERTY OWNER HAS MORE THAN ONE DRIVEWAY, CONSTRUCTION WILL ONLY BE PERMITTED ON ONE DRIVEWAY AT A TIME. DRIVEWAY GRADES DURING CONSTRUCTION SHOULD NOT EXCEED 15%. ADJUST CONSTRUCTION ACTIVITIES ACCORDINGLY TO NOT EXCEED MAXIMUM GRADE LIMITS. PROVIDE ADEQUATE TEMPORARY SURFACING FOR TRANSITIONS BETWEEN PAVEMENT ELEVATIONS FOR ALL DRIVEWAYS.

6. THE CONTRACTOR WILL BE REQUIRED TO SUBMIT A DETAILED SCHEDULE OF WORK TO THE PROJECT ENGINEER PRIOR TO THE BEGINNING OF CONSTRUCTION WHICH GENERALLY CONFORMS TO THE SEQUENCE SHOWN ON THE TCP SEQUENCE OF OPERATION.

7. COMPLETE ALL WORK ON THE PROJECT AS SHOWN ON THE VARIOUS PLAN SHEETS AND IN COMPLIANCE WITH THE GENERAL NOTES OF THIS CONTRACT.

8. ANY REQUEST TO ALTER THE SEQUENCE OF OPERATION OR TRAFFIC CONTROL PLAN WILL BE SUBMITTED TO THE ENGINEER FOR HIS WRITTEN APPROVAL.

9. NO EQUIPMENT OR MATERIALS SHALL BE STORED WITHIN THE CLEAR ZONE UNLESS OTHERWISE APPROVED.

SEQUENCE OF OPERATION

1. SET PROJECT BARRICADES AND DETOUR SIGNAGE.

2. INSTALL REQUIRED TEMPORARY EROSION CONTROL DEVICES, AS DIRECTED.

3. CONSTRUCT NEW DRAINAGE AND ROADWAY.

4. PLACE PERMANENT DELINEATORS.

5. COMPLETE ALL OTHER WORK AS SHOWN ON THE PLANS.

6. CLEAN UP PROJECT AND REMOVE TEMPORARY EROSION CONTROL DEVICES, PROJECT BARRICADES, AND DETOUR SIGNAGE.

STATE OF TEXAS
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HDR
Firm Registration No. F-754
710 Hesters Crossing, Suite 150
Round Rock, Texas 78681
512.685.2900

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ROGER HANKS

TRAFFIC CONTROL AND SEQUENCE OF CONSTRUCTION

SHEET 1 OF 1

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SJ				RH
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
KB	TEXAS	AUS	HAYS	
CHECK	CONTROL	SECTION	JOB	12
JC				
CHECK				
JC				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
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PENTABLE: I0338078.tbl
DATE: 10/4/2023
TIME: 8:3:53 AM
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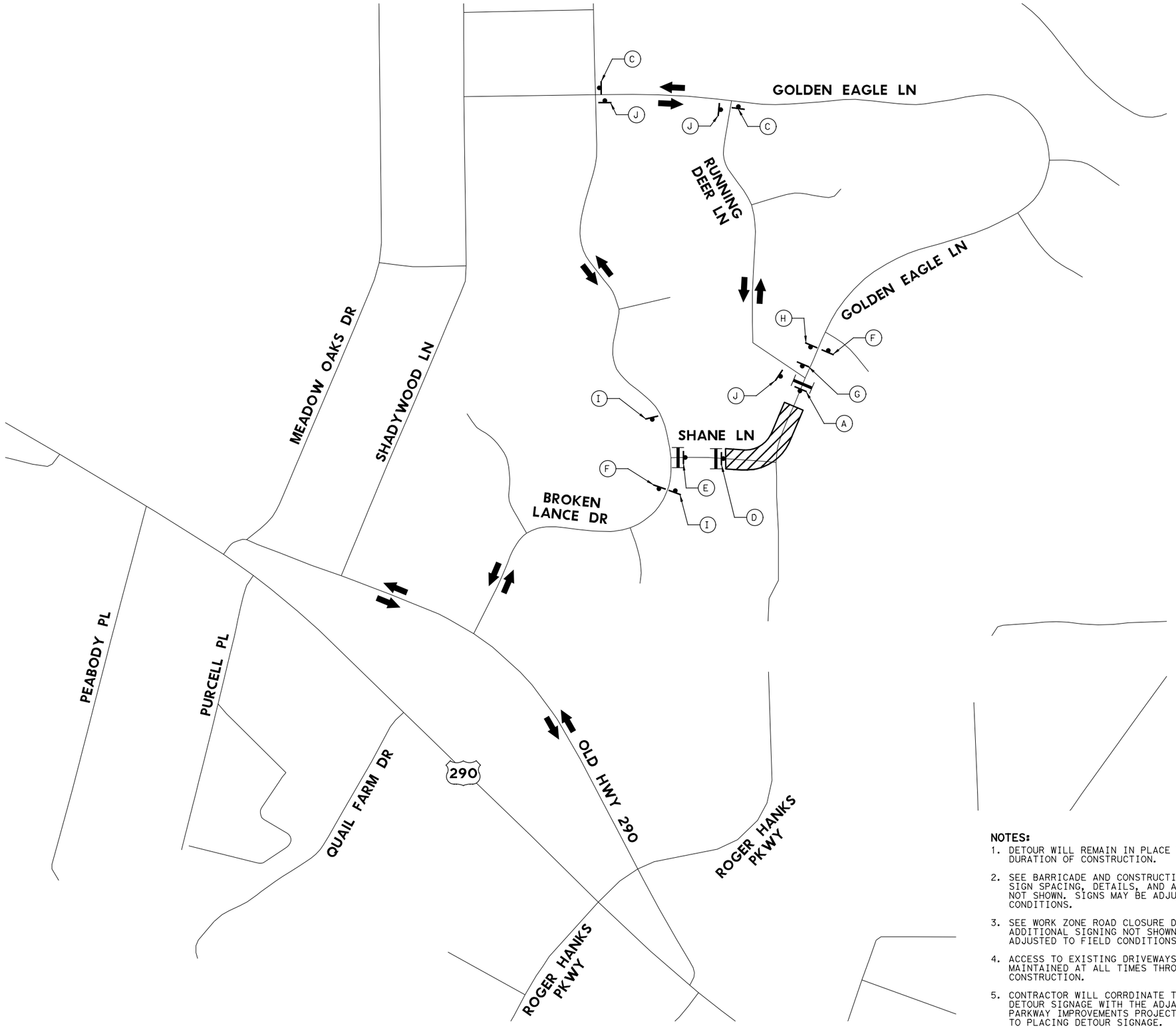
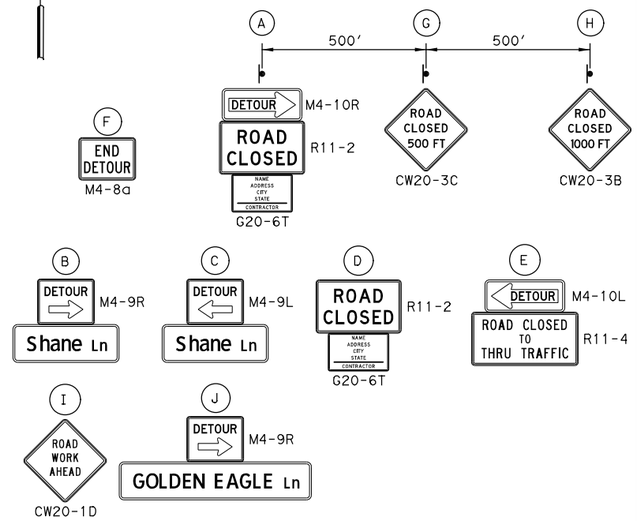


N

LEGEND

- CONSTRUCTION AREA
- TYPE III BARRICADE
- PROPOSED TEMPORARY SIGN
- PROPOSED TRAFFIC FLOW



NOTES:

1. DETOUR WILL REMAIN IN PLACE THROUGHOUT THE DURATION OF CONSTRUCTION.
2. SEE BARRICADE AND CONSTRUCTION STANDARDS FOR SIGN SPACING, DETAILS, AND ADDITIONAL SIGNING NOT SHOWN. SIGNS MAY BE ADJUSTED TO FIELD CONDITIONS.
3. SEE WORK ZONE ROAD CLOSURE DETAILS FOR ADDITIONAL SIGNING NOT SHOWN. SIGNS MAY BE ADJUSTED TO FIELD CONDITIONS.
4. ACCESS TO EXISTING DRIVEWAYS WILL BE MAINTAINED AT ALL TIMES THROUGHOUT CONSTRUCTION.
5. CONTRACTOR WILL CORRDINATE TRAFFIC CONTROL DETOUR SIGNAGE WITH THE ADJACENT ROGER HANKS PARKWAY IMPROVEMENTS PROJECT CONTRACTOR PRIOR TO PLACING DETOUR SIGNAGE.

STATE OF TEXAS
FELIPE S. TUDTUD
104836
LICENSED PROFESSIONAL ENGINEER
10/04/2023

NO.	DATE	REVISION	APPROVED

HDR
Firm Registration No. F-754
710 Hesters Crossing, Suite 150
Round Rock, Texas 78681
512.685.2900

THE CITY OF DRIPPING SPRINGS TEXAS

ROGER HANKS

DETOUR PLAN

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SJ				RH
GRAPHICS KB	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JC	TEXAS	AUS	HAYS	
CHECK JC	CONTROL	SECTION	JOB	13

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: LGOMEZGON2
FILE: Roger Hanks Parkway - Detour Plan
PENTABLE: I0338078.tbl
DATE: 10/4/2023
TIME: 8:13:55 AM
SCALE: 1:500

BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

1. The Barricade and Construction Standard Sheets (BC sheets) are intended to show typical examples for placement of temporary traffic control devices, construction pavement markings, and typical work zone signs. The information contained in these sheets meet or exceed the requirements shown in the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).

2. The development and design of the Traffic Control Plan (TCP)is the responsibility of the Engineer.

3. The Contractor may propose changes to the TCP that are signed and sealed by a licensed professional engineer for approval. The Engineer may develop, sign and seal Contractor proposed changes.

4. The Contractor is responsible for installing and maintaining the traffic control devices as shown in the plans. The Contractor may not move or change the approximate location of any device without the approval of the Engineer.

5. Geometric design of lane shifts and detours should, when possible, meet the applicable design criteria contained in manuals such as the American Association of State Highway and Transportation Officials (AASHTO), "A Policy on Geometric Design of Highways and Streets," the TxDOT "Roadway Design Manual" or engineering judgment.

6. When projects abut, the Engineer(s) may omit the END ROAD WORK, TRAFFIC FINES DOUBLE, and other advance warning signs if the signing would be redundant and the work areas appear continuous to the motorists. If the adjacent project is completed first, the Contractor shall erect the necessary warning signs as shown on these sheets, the TCP sheets or as directed by the Engineer. The BEGIN ROAD WORK NEXT X MILES sign shall be revised to show appropriate work zone distance.

7. The Engineer may require duplicate warning signs on the median side of divided highways where median width will permit and traffic volumes justify the signing.

8. All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition. Sign details not shown in this manual shall be shown in the plans or the Engineer shall provide a detail to the Contractor before the sign is manufactured.

9. The temporary traffic control devices shown in the illustrations of the BC sheets are examples. As necessary, the Engineer will determine the most appropriate traffic control devices to be used.

10. Where highway construction or maintenance work is being undertaken, other than mobile operations as defined by the Texas Manual on Uniform Traffic Control Devices, CSJ limit signs are required. CSJ limit signs are shown on BC(2). The OBEY WARNING SIGNS STATE LAW sign, STAY ALERT TALK OR TEXT LATER and the WORK ZONE TRAFFIC FINES DOUBLE sign with plaque shall be erected in advance of the CSJ limits. The BEGIN ROAD WORK NEXT X MILES, CONTRACTOR and END ROAD WORK signs shall be erected at or near the CSJ limits. For mobile operations, CSJ limit signs are not required.

11. Traffic control devices should be in place only while work is actually in progress or a definite need exists.

12. The Engineer has the final decision on the location of all traffic control devices.

13. Inactive equipment and work vehicles, including workers' private vehicles must be parked away from travel lanes. They should be as close to the right-of-way line as possible, or located behind a barrier or guardrail, or as approved by the Engineer.

WORKER SAFETY NOTES:

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

2. Except in emergency situations, flagger stations shall be illuminated when flagging is used at night.

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

1. Only pre-qualified products shall be used. The "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources.

2. Work zone traffic control devices shall be compliant with the Manual for Assessing safety Hardware (MASH).

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-03 7-13				RH
9-07 8-14	DIST	COUNTY		SHEET NO.
5-10 5-21	AUS	HAYS		14

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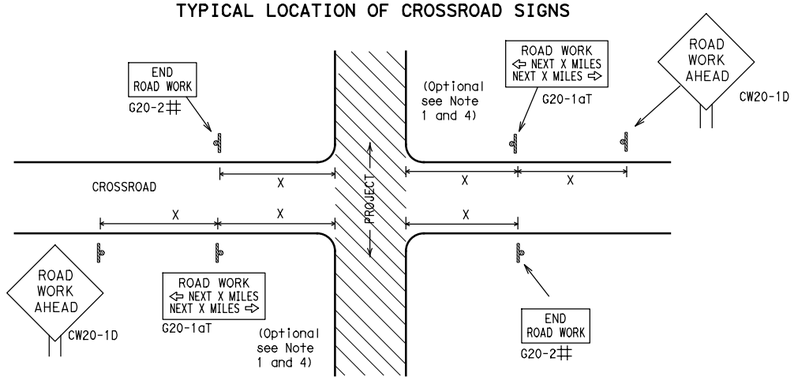
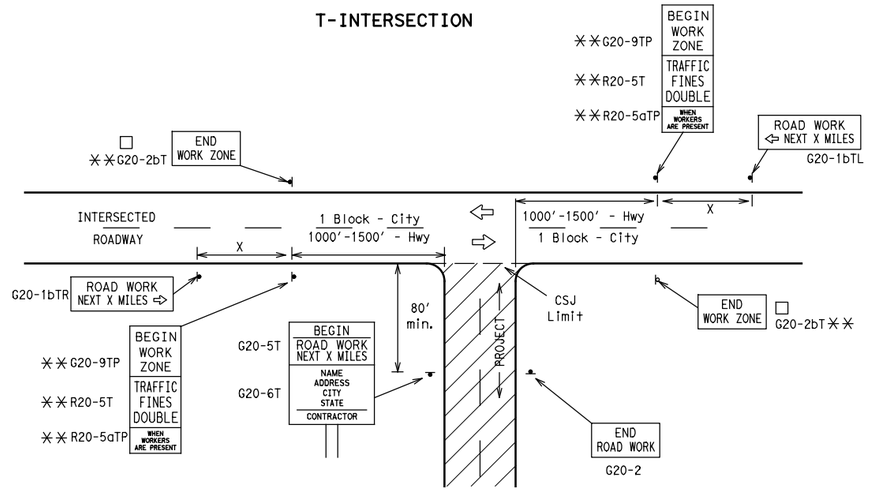
TYPICAL LOCATION OF CROSSROAD SIGNS



May be mounted on back of "ROAD WORK AHEAD"(CW20-1D) sign with approval of Engineer. (See note 2 below)

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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

TYPICAL CONSTRUCTION WARNING SIGN SIZE AND SPACING[1,5,6]

SIZE

Sign Number or Series	Conventional Road	Expressway/ Freeway
CW20[4] CW21 CW22 CW23 CW25	48" x 48"	48" x 48"
CW1, CW2, CW7, CW8, CW9, CW11, CW14	36" x 36"	48" x 48"
CW3, CW4, CW5, CW6, CW8-3, CW10, CW12	48" x 48"	48" x 48"

SPACING

Posted Speed	Sign △ Spacing "X"
MPH	Feet (Apprx.)
30	120
35	160
40	240
45	320
50	400
55	500[2]
60	600[2]
65	700[2]
70	800[2]
75	900[2]
80	1000[2]
✳	✳[3]

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

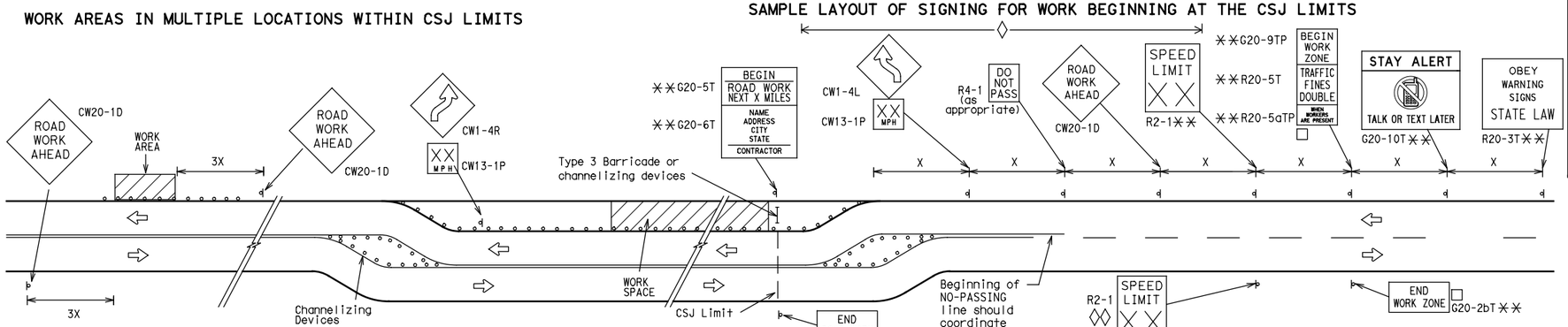
△ Minimum distance from work area to first Advance Warning sign nearest the work area and/or distance between each additional sign.

GENERAL NOTES

1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D)signs may be used on low volume crossroads at the discretion of the Engineer as per TMUTCD Part 5. See Note 2 under "Typical Location of Crossroad Signs".
5. Only diamond shaped warning sign sizes are indicated.
6. See sign size listing in "TMUTCD", Sign Appendix or the "Standard Highway Sign Designs for Texas" manual for complete list of available sign design sizes.

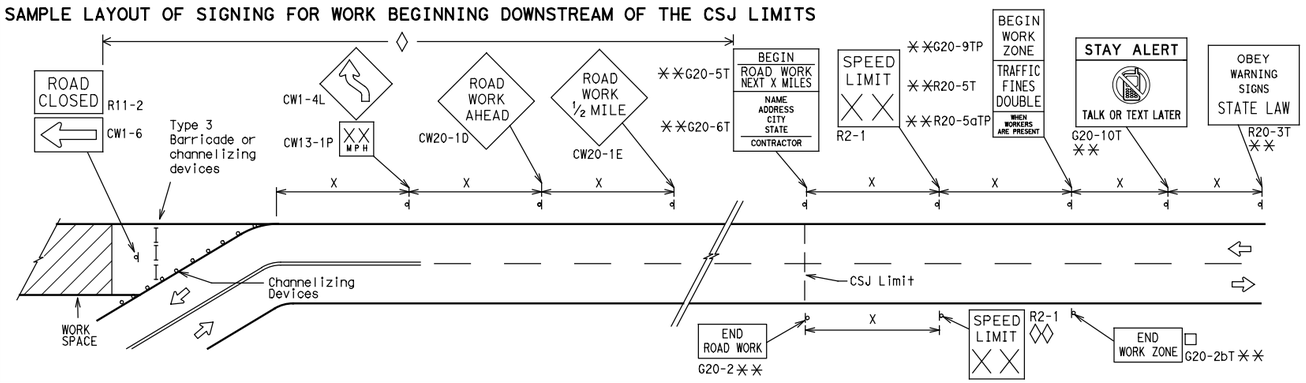
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS



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

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



NOTES

The Contractor shall determine the appropriate distance to be placed on the G20-1 series signs and "BEGIN ROAD WORK NEXT X MILES"(G20-5T)sign for each specific project. This distance shall replace the "X" and shall be rounded to the nearest whole mile with the approval of the Engineer. No decimals shall be used.

□ The "BEGIN WORK ZONE"(G20-9TP) and "END WORK ZONE" (G20-2bT) shall be used as shown on the sample layout when advance signs are required outside the CSJ Limits. They inform the motorist of entering or leaving a part of the work zone lying outside the CSJ Limits where traffic fines may double if workers are present.

✳✳ CSJ limit signing is required for highway construction and maintenance work, with the exception of mobile operations.

◇ Area for placement of "ROAD WORK AHEAD" (CW20-1D)sign and other signs or devices as called for on the Traffic Control Plan.

◇◇ Contractor will install a regulatory speed limit sign at the end of the work zone.

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	AUS	HAYS		15

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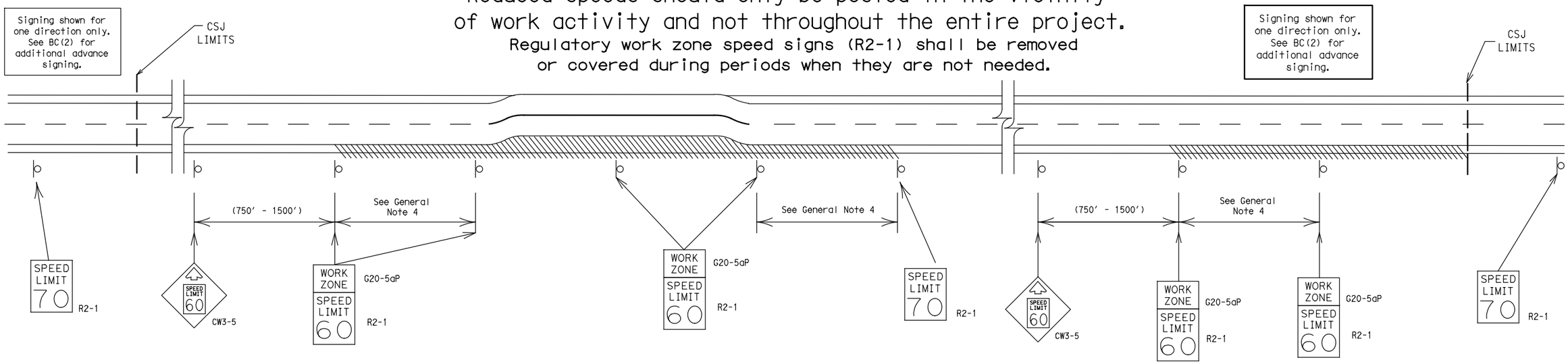
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

Reduced speeds should only be posted in the vicinity of work activity and not throughout the entire project.

Regulatory work zone speed signs (R2-1) shall be removed or covered during periods when they are not needed.



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

a) rough road or damaged pavement surface
b) substantial alteration of roadway geometrics (diversions)
c) construction detours
d) grade
e) width
f) other conditions readily apparent to the driver

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

1. Regulatory work zone speed limits should be used only for sections of construction projects where speed control is of major importance.
2. Regulatory work zone speed limit signs shall be placed on supports at a 7 foot minimum mounting height.
3. Speed zone signs are illustrated for one direction of travel and are normally posted for each direction of travel.
4. Frequency of work zone speed limit signs should be:
   40 mph and greater 0.2 to 2 miles
   35 mph and less 0.2 to 1 mile
5. Regulatory speed limit signs shall have black legend and border on a white reflective background (See "Reflective Sheeting" on BC(4)).
6. Fabrication, erection and maintenance of the"ADVANCE SPEED LIMIT"(CW3-5)sign, "WORK ZONE"(G20-5aP) plaque and the "SPEED LIMIT"(R2-1)signs shall not be paid for directly, but shall be considered subsidiary to Item 502.
7. Turning signs from view, laying signs over or down will not be allowed, unless as otherwise noted under "REMOVING OR COVERING" on BC(4).
8. Techniques that may help reduce traffic speeds include but are not limited to:
   A. Law enforcement.
   B. Flagger stationed next to sign.
   C. Portable changeable message sign (PCMS).
   D. Low-power (drone) radar transmitter.
   E. Speed monitor trailers or signs.
9. Speeds shown on details above are for illustration only. Work Zone Speed Limits should only be posted as approved for each project.
10. For more specific guidance concerning the type of work, work zone conditions and factors impacting allowable regulatory construction speed zone reduction see TxDOT form #1204 in the TxDOT e-form system.

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

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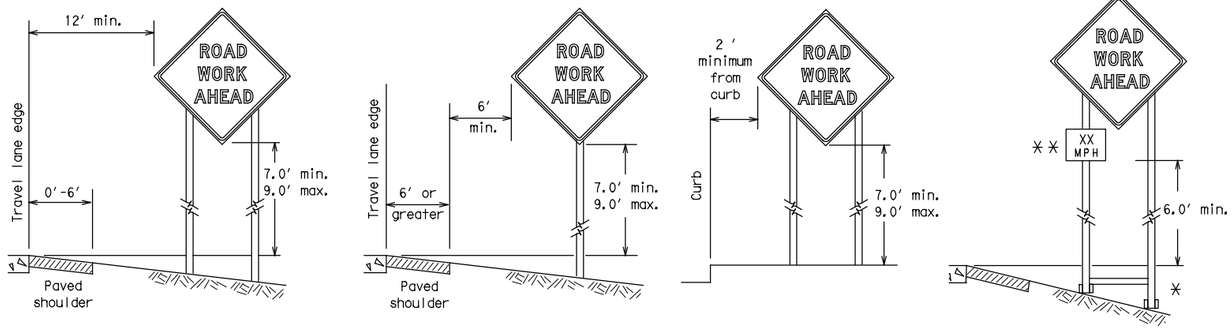
7-13 5-21	AUS	HAYS		16

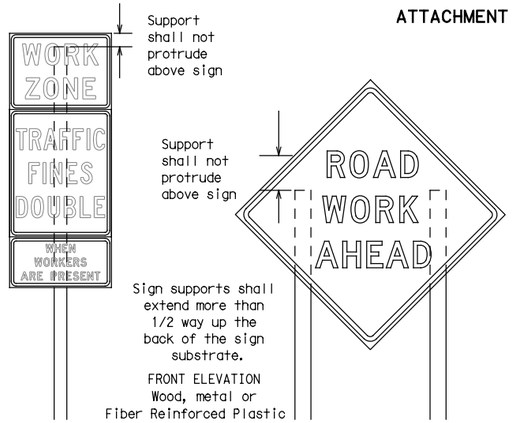
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

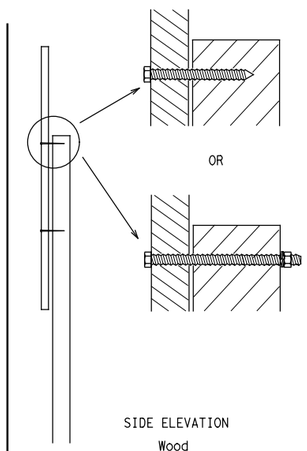


⚹ When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

ATTACHMENT FOR SIGN SUPPORTS





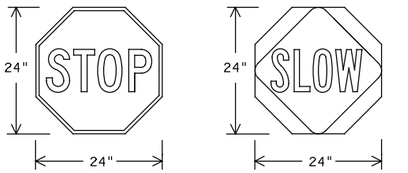
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

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

STOP/SLOW PADDLES

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



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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS				RH
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	AUS	HAYS		17

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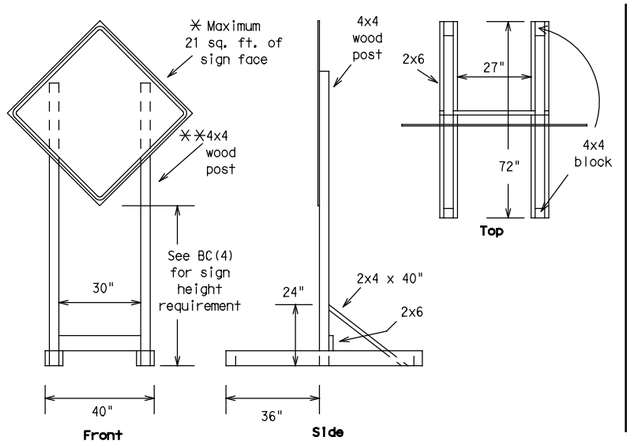
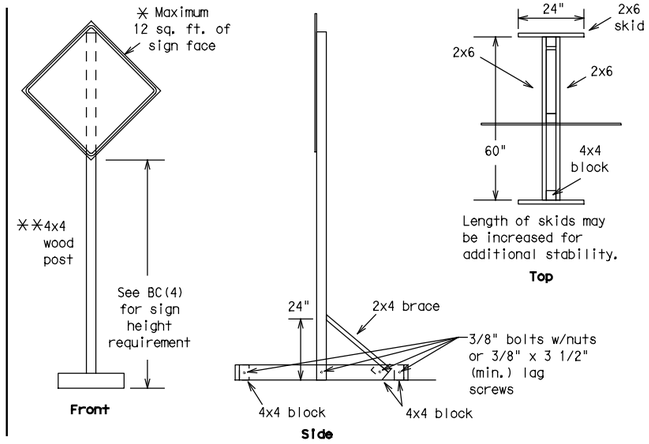
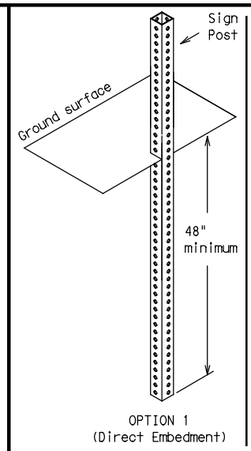
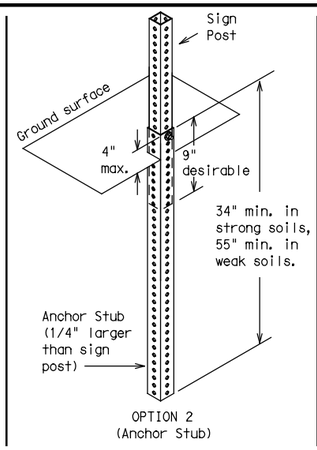


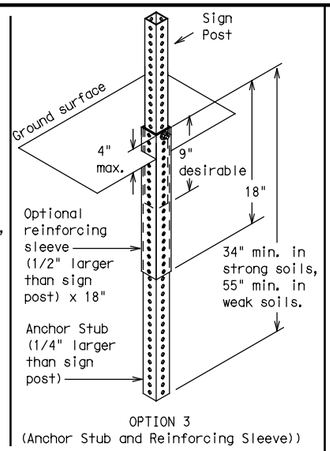


SKID MOUNTED WOOD SIGN SUPPORTS

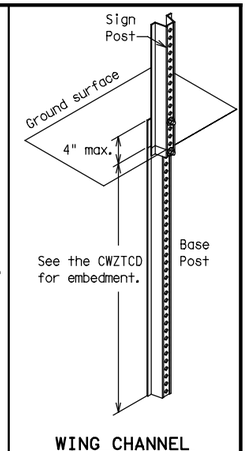
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS







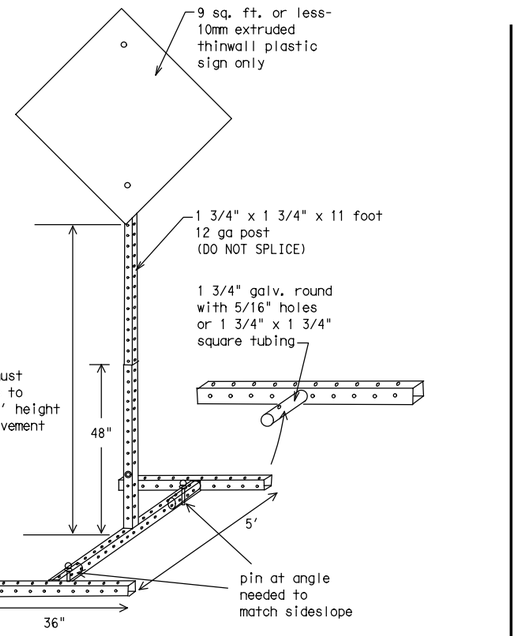
PERFORATED SQUARE METAL TUBING

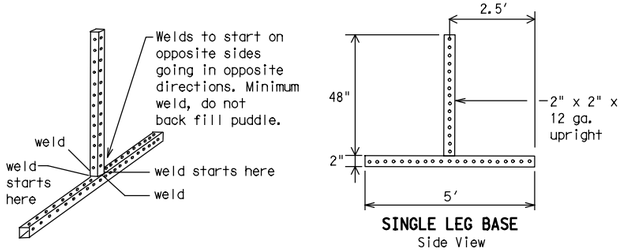


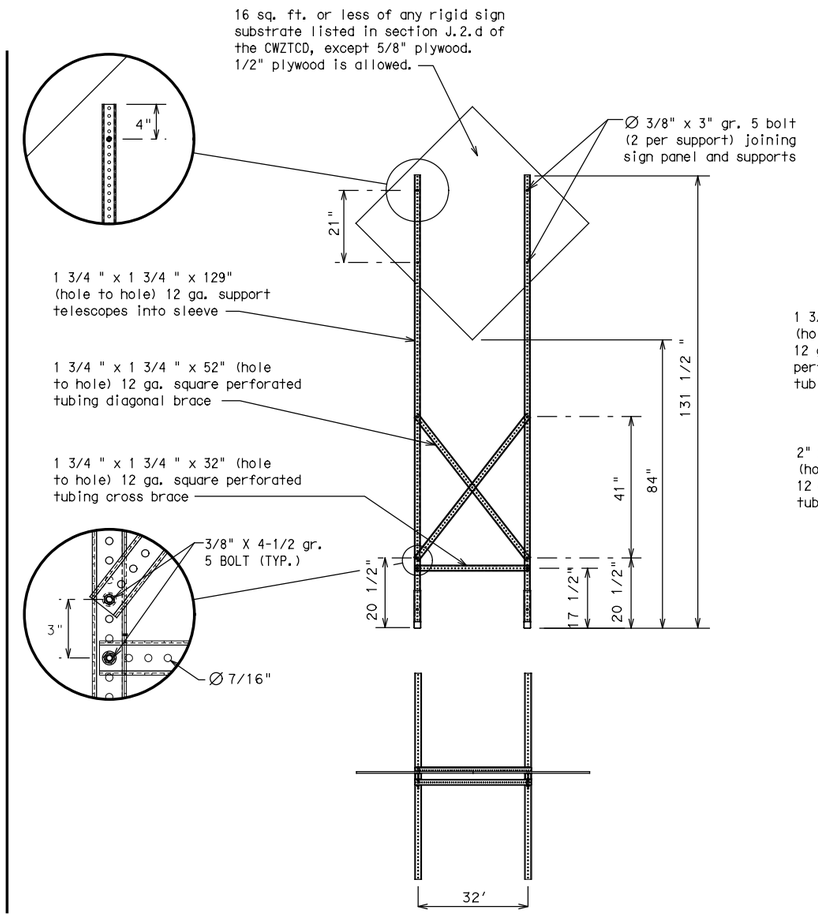
WING CHANNEL
Lap-splice/base bolted anchor

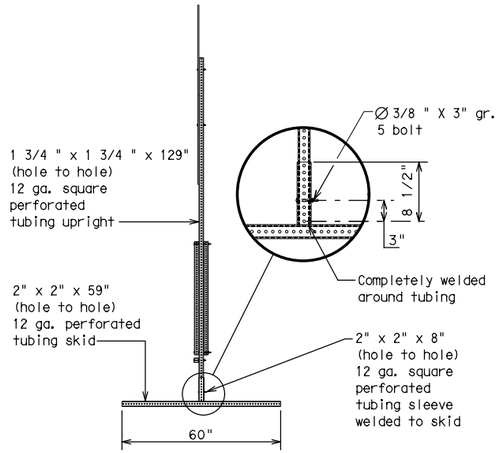
GROUND MOUNTED SIGN SUPPORTS

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









SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

1. Nails may be used in the assembly of wooden sign supports, but 3/8" bolts with nuts or 3/8" x 3 1/2" lag screws must be used on every joint for final connection.
2. No more than 2 sign posts shall be placed within a 7 ft. circle, except for specific materials noted on the CWZTCD List.
3. When project is completed, all sign supports and foundations shall be removed from the project site. This will be considered subsidiary to Item 502.

* See BC(4) for definition of "Work Duration."

** Wood sign posts MUST be one piece. Splicing will NOT be allowed. Posts shall be painted white.

□ See the CWZTCD for the type of sign substrate that can be used for each approved sign support.

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

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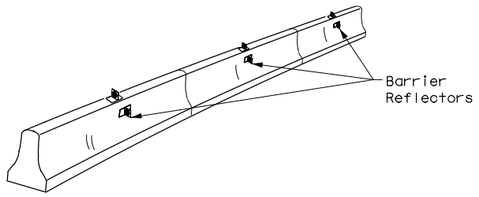
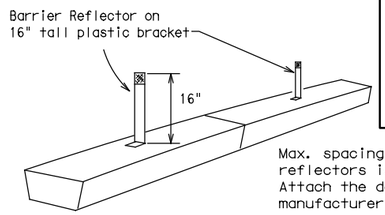
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost of the reflectors shall be considered subsidiary to Item 512.



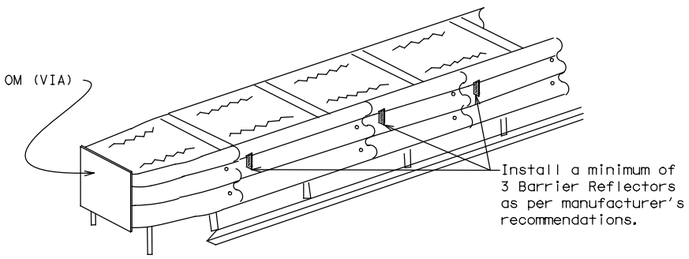
CONCRETE TRAFFIC BARRIER (CTB)

3. Where traffic is on one side of the CTB, two (2) Barrier Reflectors shall be mounted in approximately the midsection of each section of CTB. An alternate mounting location is uniformly spaced at one end of each CTB. This will allow for attachment of a barrier grapple without damaging the reflector. The Barrier Reflector mounted on the side of the CTB shall be located directly below the reflector mounted on top of the barrier, as shown in the detail above.
4. Where CTB separates two-way traffic, three barrier reflectors shall be mounted on each section of CTB. The reflector unit on top shall have two yellow reflective faces (Bi-Directional)while the reflectors on each side of the barrier shall have one yellow reflective face, as shown in the detail above.
5. When CTB separates traffic traveling in the same direction, no barrier reflectors will be required on top of the CTB.
6. Barrier Reflector units shall be yellow or white in color to match the edgeline being supplemented.
7. Maximum spacing of Barrier Reflectors is forty (40) feet.
8. Pavement markers or temporary flexible-reflective roadway marker tabs shall NOT be used as CTB delineation.
9. Attachment of Barrier Reflectors to CTB shall be per manufacturer's recommendations.
10. Missing or damaged Barrier Reflectors shall be replaced as directed by the Engineer.
11. Single slope barriers shall be delineated as shown on the above detail.



Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB)



DELINEATION OF END TREATMENTS

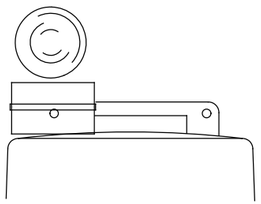
LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

LPCB is approved for use in work zone locations, where the posted speed is 45mph, or less. See Roadway Standard Sheet LPCB.

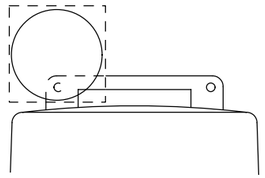
END TREATMENTS FOR CTB'S USED IN WORK ZONES

End treatments used on CTB's in work zones shall meet the apppropriate crashworthy standards as defined in the Manual for Assessing Safety Hardware (MASH). Refer to the CWZTCD List for approved end treatments and manufacturers.

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



Type C Warning Light or approved substitute mounted on a drum adjacent to the travel way.



Warning reflector may be round or square.Must have a yellow reflective surface area of at least 30 square inches

WARNING LIGHTS

1. Warning lights shall meet the requirements of the TMUTCD.
2. Warning lights shall NOT be installed on barricades.
3. Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of or mark a potentially hazardous area. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "FL". The Type A Warning Lights shall not be used with signs manufactured with Type B_{FL} or C_{FL} Sheeting meeting the requirements of Departmental Material Specification DMS-8300.
4. Type-C and Type D 360 degree Steady Burn Lights are intended to be used in a series for delineation to supplement other traffic control devices. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "SB".
5. The Engineer/Inspector or the plans shall specify the location and type of warning lights to be installed on the traffic control devices.
6. When required by the Engineer, the Contractor shall furnish a copy of the warning lights certification. The warning light manufacturer will certify the warning lights meet the requirements of the latest ITE Purchase Specifications for Flashing and Steady-Burn Warning Lights.
7. When used to delineate curves, Type-C and Type D Steady Burn Lights should only be placed on the outside of the curve, not the inside.
8. The location of warning lights and warning reflectors on drums shall be as shown elsewhere in the plans.

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

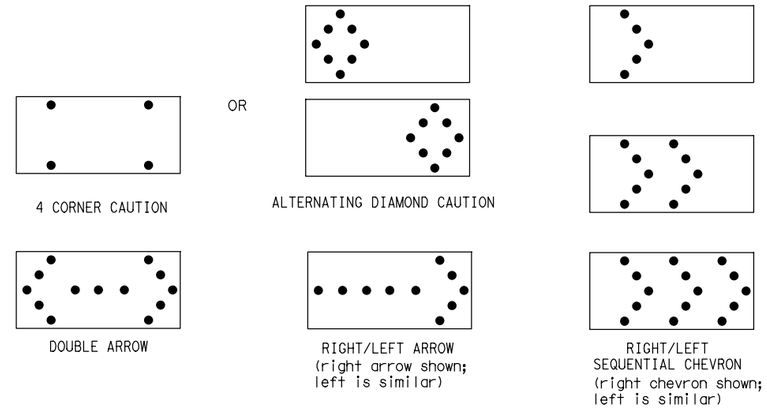
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing devices to form a merging taper may be used for delineation. If used, the successive flashing of the sequential warning lights should occur from the beginning of the taper to the end of the merging taper in order to identify the desired vehicle path. The rate of flashing for each light shall be 65 flashes per minute, plus or minus 10 flashes.
4. Type C and D steady-burn warning lights are intended to be used in a series to delineate the edge of the travel lane on detours, on lane changes, on lane closures, and on other similar conditions.
5. Type A, Type C and Type D warning lights shall be installed at locations as detailed on other sheets in the plans.
6. Warning lights shall not be installed on a drum that has a sign, chevron or vertical panel.
7. The maximum spacing for warning lights on drums should be identical to the channelizing device spacing.

WARNING REFLECTORS MOUNTED ON PLASTIC DRUMS AS A SUBSTITUTE FOR TYPE C (STEADY BURN) WARNING LIGHTS

1. A warning reflector or approved substitute may be mounted on a plastic drum as a substitute for a Type C, steady burn warning light at the discretion of the Contractor unless otherwise noted in the plans.
2. The warning reflector shall be yellow in color and shall be manufactured using a sign substrate approved for use with plastic drums listed on the CWZTCD.
3. The warning reflector shall have a minimum retroreflective surface area (one-side) of 30 square inches.
4. Round reflectors shall be fully reflectorized, including the area where attached to the drum.
5. Square substrates must have a minimum of 30 square inches of reflectorized sheeting. They do not have to be reflectorized where it attaches to the drum.
6. The side of the warning reflector facing approaching traffic shall have sheeting meeting the color and retroreflectivity requirements for DMS 8300-Type B or Type C.
7. When used near two-way traffic, both sides of the warning reflector shall be reflectorized.
8. The warning reflector should be mounted on the side of the handle nearest approaching traffic.
9. The maximum spacing for warning reflectors should be identical to the channelizing device spacing requirements.

Arrow Boards may be located behind channelizing devices in place for a shoulder taper or merging taper, otherwise they shall be delineated with four (4) channelizing devices placed perpendicular to traffic on the upstream side of traffic.

1. The Flashing Arrow Board should be used for all lane closures on multi-lane roadways, or slow moving maintenance or construction activities on the travel lanes.
2. Flashing Arrow Boards should not be used on two-lane, two-way roadways, detours, diversions or work on shoulders unless the "CAUTION" display (see detail below) is used.
3. The Engineer/Inspector shall choose all appropriate signs, barricades and/or other traffic control devices that should be used in conjunction with the Flashing Arrow Board.
4. The Flashing Arrow Board should be able to display the following symbols:



5. The "CAUTION" display consists of four corner lamps flashing simultaneously, or the Alternating Diamond Caution mode as shown.
6. The straight line caution display is NOT ALLOWED.
7. The Flashing Arrow Board shall be capable of minimum 50 percent dimming from rated lamp voltage. The flashing rate of the lamps shall not be less than 25 nor more than 40 flashes per minute.
8. Minimum lamp "on time" shall be approximately 50 percent for the flashing arrow and equal intervals of 25 percent for each sequential phase of the flashing chevron.
9. The sequential arrow display is NOT ALLOWED.
10. The flashing arrow display is the TxDOT standard; however, the sequential chevron display may be used during daylight operations.
11. The Flashing Arrow Board shall be mounted on a vehicle, trailer or other suitable support.
12. A Flashing Arrow Board SHALL NOT BE USED to laterally shift traffic.
13. A full matrix PCMS may be used to simulate a Flashing Arrow Board provided it meets visibility, flash rate and dimming requirements on this sheet for the same size arrow.
14. Minimum mounting height of trailer mounted Arrow Boards should be 7 feet from roadway to bottom of panel.

REQUIREMENTS			
TYPE	MINIMUM SIZE	MINIMUM NUMBER OF PANEL LAMPS	MINIMUM VISIBILITY DISTANCE
B	30 x 60	13	3/4 mile
C	48 x 96	15	1 mile

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

WHEN NOT IN USE, REMOVE THE ARROW BOARD FROM THE RIGHT-OF-WAY OR PLACE THE ARROW BOARD BEHIND CONCRETE TRAFFIC BARRIER OR GUARDRAIL.

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

1. Truck-mounted attenuators (TMA) used on TxDOT facilities must meet the requirements outlined in the Manual for Assessing Safety Hardware (MASH).
2. Refer to the CWZTCD for the requirements of Level 2 or Level 3 TMAs.
3. Refer to the CWZTCD for a list of approved TMAs.
4. TMAs are required on freeways unless otherwise noted in the plans.
5. A TMA should be used anytime that it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the work performance.
6. The only reason a TMA should not be required is when a work area is spread down the roadway and the work crew is an extended distance from the TMA.

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION ARROW PANEL, REFLECTORS, WARNING LIGHTS & ATTENUATOR

BC(7)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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GENERAL NOTES

1. For long term stationary work zones on freeways, drums shall be used as the primary channelizing device.
2. For intermediate term stationary work zones on freeways, drums should be used as the primary channelizing device but may be replaced in tangent sections by vertical panels, or 42" two-piece cones. In tangent sections, one-piece cones may be used with the approval of the Engineer but only if personnel are present on the project at all times to maintain the cones in proper position and location.
3. For short term stationary work zones on freeways, drums are the preferred channelizing device but may be replaced in tapers, transitions and tangent sections by vertical panels, two-piece cones or one-piece cones as approved by the Engineer.
4. Drums and all related items shall comply with the requirements of the current version of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
5. Drums, bases, and related materials shall exhibit good workmanship and shall be free from objectionable marks or defects that would adversely affect their appearance or serviceability.
6. The Contractor shall have a maximum of 24 hours to replace any plastic drums identified for replacement by the Engineer/Inspector. The replacement device must be an approved device.

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

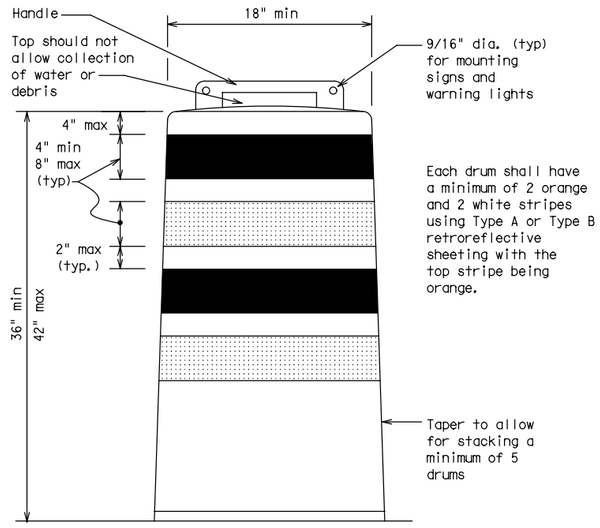
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents accidental separation due to normal handling and/or air turbulence created by passing vehicles.
3. Plastic drums shall be constructed of lightweight flexible, and deformable materials. The Contractor shall NOT use metal drums or single piece plastic drums as channelization devices or sign supports.
4. Drums shall present a profile that is a minimum of 18 inches in width at the 36 inch height when viewed from any direction. The height of drum unit (body installed on base) shall be a minimum of 36 inches and a maximum of 42 inches.
5. The top of the drum shall have a built-in handle for easy pickup and shall be designed to drain water and not collect debris. The handle shall have a minimum of two widely spaced 9/16 inch diameter holes to allow attachment of a warning light, warning reflector unit or approved compliant sign.
6. The exterior of the drum body shall have a minimum of four alternating orange and white retroreflective circumferential stripes not less than 4 inches nor greater than 8 inches in width. Any non-reflectorized space between any two adjacent stripes shall not exceed 2 inches in width.
7. Bases shall have a maximum width of 36 inches, a maximum height of 4 inches, and a minimum of two footholds of sufficient size to allow base to be held down while separating the drum body from the base.
8. Plastic drums shall be constructed of ultra-violet stabilized, orange, high-density polyethylene (HDPE) or other approved material.
9. Drum body shall have a maximum unballasted weight of 11 lbs.
10. Drum and base shall be marked with manufacturer's name and model number.

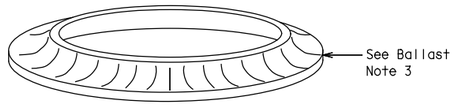
RETROREFLECTIVE SHEETING

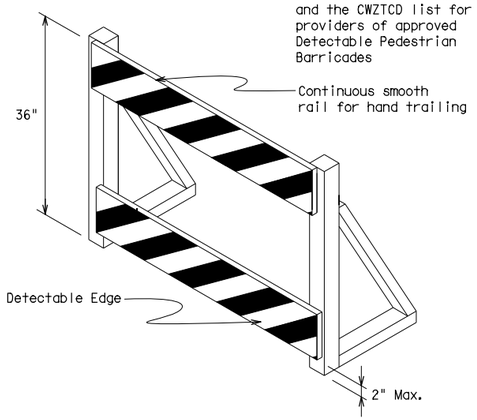
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials," Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall be suitable for use on and shall adhere to the drum surface such that, upon vehicular impact, the sheeting shall remain adhered in-place and exhibit no delaminating, cracking, or loss of retroreflectivity other than that loss due to abrasion of the sheeting surface.

BALLAST

1. Unballasted bases shall be large enough to hold up to 50 lbs. of sand. This base, when filled with the ballast material, should weigh between 35 lbs (minimum) and 50 lbs (maximum). The ballast may be sand in one to three sandbags separate from the base, sand in a sand-filled plastic base, or other ballasting devices as approved by the Engineer. Stacking of sandbags will be allowed, however height of sandbags above pavement surface may not exceed 12 inches.
2. Bases with built-in ballast shall weigh between 40 lbs. and 50 lbs. Built-in ballast can be constructed of an integral crumb rubber base or a solid rubber base.
3. Recycled truck tire sidewalls may be used for ballast on drums approved for this type of ballast on the CWZTCD list.
4. The ballast shall not be heavy objects, water, or any material that would become hazardous to motorists, pedestrians, or workers when the drum is struck by a vehicle.
5. When used in regions susceptible to freezing, drums shall have drainage holes in the bottoms so that water will not collect and freeze becoming a hazard when struck by a vehicle.
6. Ballast shall not be placed on top of drums.
7. Adhesives may be used to secure base of drums to pavement.

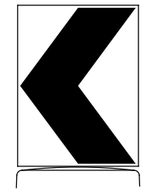




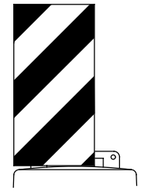


DETECTABLE PEDESTRIAN BARRICADES

1. When existing pedestrian facilities are disrupted, closed, or relocated in a TTC zone, the temporary facilities shall be detectable and include accessibility features consistent with the features present in the existing pedestrian facility. Refer to WZ(BTS-2) for Pedestrian Control requirements for Sidewalk Diversions, Sidewalk Detours and Crosswalk Closures.
2. Where pedestrians with visual disabilities normally use the closed sidewalk, a Detectable Pedestrian Barricade shall be placed across the full width of the closed sidewalk instead of a Type 3 Barricade.
3. Detectable pedestrian barricades similar to the one pictured above, longitudinal channelizing devices, some concrete barriers, and wood or chain link fencing with a continuous detectable edging can satisfactorily delineate a pedestrian path.
4. Tape, rope, or plastic chain strung between devices are not detectable, do not comply with the design standards in the "Americans with Disabilities Act Accessibility Guidelines (ADAAG)" and should not be used as a control for pedestrian movements.
5. Warning lights shall not be attached to detectable pedestrian barricades.
6. Detectable pedestrian barricades should use 8" nominal barricade rails as shown on BC(10) provided that the top rail provides a smooth continuous rail suitable for hand trailing with no splinters, burrs, or sharp edges.



18" x 24" Sign
(Maximum Sign Dimension)
Chevron CW1-8, Opposing Traffic Lane Divider, Driveway sign D70a, Keep Right R4 series or other signs as approved by Engineer



12" x 24"
Vertical Panel
mount with diagonals sloping down towards travel way

Plywood, Aluminum or Metal sign substrates shall NOT be used on plastic drums

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

1. Signs used on plastic drums shall be manufactured using substrates listed on the CWZTCD.
2. Chevrons and other work zone signs with an orange background shall be manufactured with Type B_{FL} or Type C_{FL} Orange sheeting meeting the color and retroreflectivity requirements of DMS-8300, "Sign Face Material," unless otherwise specified in the plans.
3. Vertical Panels shall be manufactured with orange and white sheeting meeting the requirements of DMS-8300 Type A or Type B. Diagonal stripes on Vertical Panels shall slope down toward the intended traveled lane.
4. Other sign messages (text or symbolic) may be used as approved by the Engineer. Sign dimensions shall not exceed 18 inches in width or 24 inches in height, except for the R9 series signs discussed in note 8 below.
5. Signs shall be installed using a 1/2 inch bolt (nominal) and nut, two washers, and one locking washer for each connection.
6. Mounting bolts and nuts shall be fully engaged and adequately torqued. Bolts should not extend more than 1/2 inch beyond nuts.
7. Chevrons may be placed on drums on the outside of curves, on merging tapers or on shifting tapers. When used in these locations, they may be placed on every drum or spaced not more than on every third drum. A minimum of three (3) should be used at each location called for in the plans.
8. R9-9, R9-10, R9-11 and R9-11a Sidewalk Closed signs which are 24 inches wide may be mounted on plastic drums, with approval of the Engineer.

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS				RH
4-03 8-14	DIST	COUNTY		SHEET NO.
9-07 5-21	AUS	HAYS		20
7-13				

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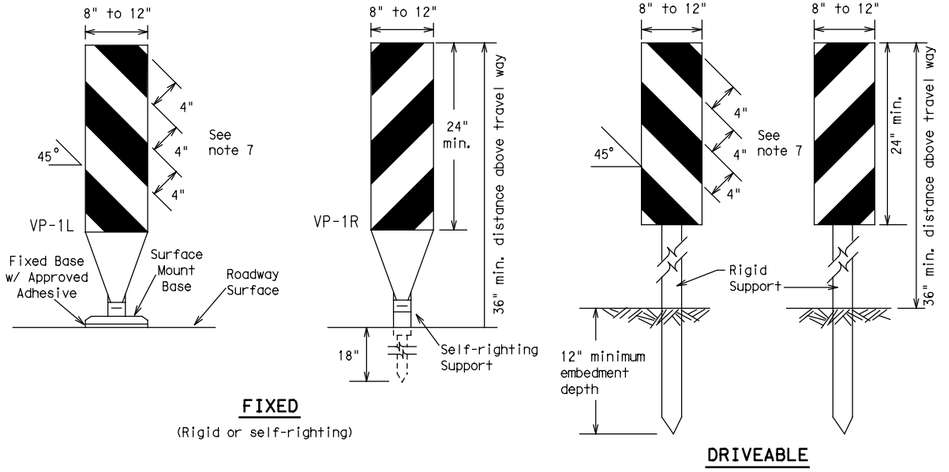
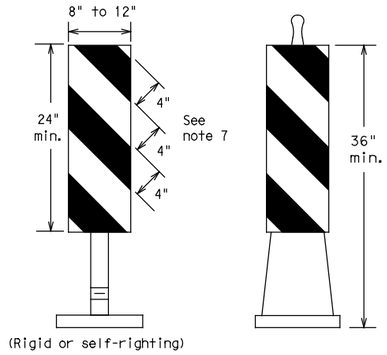


FIXED

(Rigid or self-righting)

DRIVEABLE

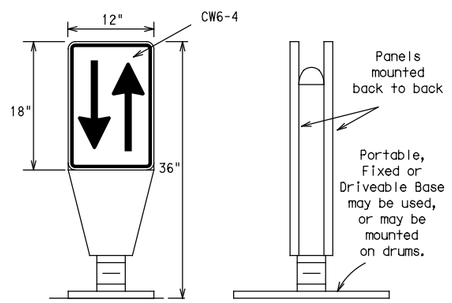


(Rigid or self-righting)

PORTABLE

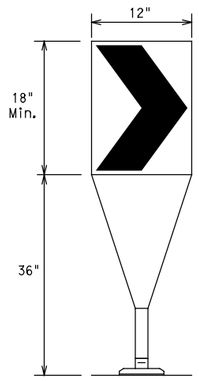
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is required. The Engineer/Inspector shall refer to the Roadway Design Manual for additional requirements on the use VP's for drop-offs.
3. VP's should be mounted back to back if used at the edge of cuts adjacent to two-way two lane roadways. Stripes are to be reflective orange and reflective white and should always slope downward toward the travel lane.
4. VP's used on expressways and freeways or other high speed roadways, may have more than 270 square inches of retroreflective area facing traffic.
5. Self-righting supports are available with portable base. See "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
6. Sheeting for the VP's shall be retroreflective Type A or Type B conforming to Departmental Material Specification DMS-8300, unless noted otherwise.
7. Where the height of reflective material on the vertical panel is 36 inches or greater, a panel stripe of 6 inches shall be used.

VERTICAL PANELS (VPs)



1. Opposing Traffic Lane Dividers (OTLD) are delineation devices designed to convert a normal one-way roadway section to two-way operation. OTLD's are used on temporary centerlines. The upward and downward arrows on the sign's face indicate the direction of traffic on either side of the divider. The base is secured to the pavement with an adhesive or rubber weight to minimize movement caused by a vehicle impact or wind gust.
2. The OTLD may be used in combination with 42" cones or VPs.
3. Spacing between the OTLD shall not exceed 500 feet. 42" cones or VPs placed between the OTLD's should not exceed 100 foot spacing.
4. The OTLD shall be orange with a black non-reflective legend. Sheeting for the OTLD shall be retroreflective Type B_{FL} or Type C_{FL} conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



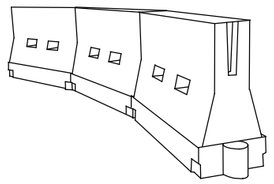
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

1. The chevron shall be a vertical rectangle with a minimum size of 12 by 18 inches.
2. Chevrons are intended to give notice of a sharp change of alignment with the direction of travel and provide additional emphasis and guidance for vehicle operators with regard to changes in horizontal alignment of the roadway.
3. Chevrons, when used, shall be erected on the outside of a sharp curve or turn, or on the far side of an intersection. They shall be in line with and at right angles to approaching traffic. Spacing should be such that the motorist always has three in view, until the change in alignment eliminates its need.
4. To be effective, the chevron should be visible for at least 500 feet.
5. Chevrons shall be orange with a black nonreflective legend. Sheeting for the chevron shall be retroreflective Type B_{FL} or Type C_{FL} conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.
6. For Long Term Stationary use on tapers or transitions on freeways and divided highways, self-righting chevrons may be used to supplement plastic drums but not to replace plastic drums.

CHEVRONS

GENERAL NOTES

1. Work Zone channelizing devices illustrated on this sheet may be installed in close proximity to traffic and are suitable for use on high or low speed roadways. The Engineer/Inspector shall ensure that spacing and placement is uniform and in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
2. Channelizing devices shown on this sheet may have a driveable, fixed or portable base. The requirement for self-righting channelizing devices must be specified in the General Notes or other plan sheets.
3. Channelizing devices on self-righting supports should be used in work zone areas where channelizing devices are frequently impacted by errant vehicles or vehicle related wind gusts making alignment of the channelizing devices difficult to maintain. Locations of these devices shall be detailed elsewhere in the plans. These devices shall conform to the TMUTCD and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
4. The Contractor shall maintain devices in a clean condition and replace damaged, nonreflective, faded, or broken devices and bases as required by the Engineer/Inspector. The Contractor shall be required to maintain proper device spacing and alignment.
5. Portable bases shall be fabricated from virgin and/or recycled rubber. The portable bases shall weigh a minimum of 30 lbs.
6. Pavement surfaces shall be prepared in a manner that ensures proper bonding between the adhesives, the fixed mount bases and the pavement surface. Adhesives shall be prepared and applied according to the manufacturer's recommendations.
7. The installation and removal of channelizing devices shall not cause detrimental effects to the final pavement surfaces, including pavement surface discoloration or surface integrity. Driveable bases shall not be permitted on final pavement surfaces. The Engineer/Inspector shall approve all application and removal procedures of fixed bases.



LONGITUDINAL CHANNELIZING DEVICES (LCD)

1. LCDs are crashworthy, lightweight, deformable devices that are highly visible, have good target value and can be connected together. They are not designed to contain or redirect a vehicle on impact.
2. LCDs may be used instead of a line of cones or drums.
3. LCDs shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. LCDs should not be used to provide positive protection for obstacles, pedestrians or workers.
5. LCDs shall be supplemented with retroreflective delineation as required for temporary barriers on BC(7) when placed roughly parallel to the travel lanes.
6. LCDs used as barricades placed perpendicular to traffic should have at least one row of reflective sheeting meeting the requirements for barricade rails as shown on BC(10). Place reflective sheeting near the top of the LCD along the full length of the device.

WATER BALLASTED SYSTEMS USED AS BARRIERS

1. Water ballasted systems used as barriers shall not be used solely to channelize road users, but also to protect the work space per the appropriate Manual for Assessing Safety Hardware (MASH) crashworthiness requirements based on roadway speed and barrier application.
2. Water ballasted systems used to channelize vehicular traffic shall be supplemented with retroreflective delineation or channelizing devices to improve daytime/nighttime visibility. They may also be supplemented with pavement markings.
3. Water ballasted systems used as barriers shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. Water ballasted systems used as barriers should not be used for a merging taper except in low speed (less than 45 MPH) urban areas. When used on a taper in a low speed urban area, the taper shall be delineated and the taper length should be designed to optimize road user operations considering the available geometric conditions.
5. When water ballasted systems used as barriers have blunt ends exposed to traffic, they should be attenuated as per manufacturer recommendations or flared to a point outside the clear zone.

If used to channelize pedestrians, longitudinal channelizing devices or water ballasted systems must have a continuous detectable bottom for users of long canes and the top of the unit shall not be less than 32 inches in height.

HOLLOW OR WATER BALLASTED SYSTEMS USED AS LONGITUDINAL CHANNELIZING DEVICES OR BARRIERS

Posted Speed	Formula	Minimum Desirable Taper Lengths ✻✻ 10′ Offset	11′ Offset	12′ Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent
30	$L=\frac{WS^2}{60}$	150′	165′	180′	30′	60′
35		205′	225′	245′	35′	70′
40		265′	295′	320′	40′	80′
45	L=WS	450′	495′	540′	45′	90′
50		500′	550′	600′	50′	100′
55		550′	605′	660′	55′	110′
60		600′	660′	720′	60′	120′
65		650′	715′	780′	65′	130′
70		700′	770′	840′	70′	140′
75		750′	825′	900′	75′	150′
80		800′	880′	960′	80′	160′

✻✻Taper lengths have been rounded off.
L=Length of Taper (FT.) W=Width of Offset (FT.)
S=Posted Speed (MPH)

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

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Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

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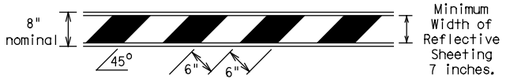
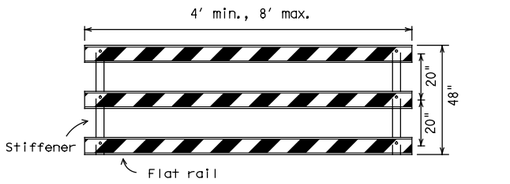
TYPE 3 BARRICADES

1. Refer to the Compliant Work Zone Traffic Control Devices List (CWZTCD) for details of the Type 3 Barricades and a list of all materials used in the construction of Type 3 Barricades.
2. Type 3 Barricades shall be used at each end of construction projects closed to all traffic.
3. Barricades extending across a roadway should have stripes that slope downward in the direction toward which traffic must turn in detouring. When both right and left turns are provided, the chevron striping may slope downward in both directions from the center of the barricade. Where no turns are provided at a closed road, striping should slope downward in both directions toward the center of roadway.
4. Striping of rails, for the right side of the roadway, should slope downward to the left. For the left side of the roadway, striping should slope downward to the right.
5. Identification markings may be shown only on the back of the barricade rails. The maximum height of letters and/or company logos used for identification shall be 1".
6. Barricades shall not be placed parallel to traffic unless an adequate clear zone is provided.
7. Warning lights shall NOT be installed on barricades.
8. Where barricades require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand is recommended. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight. Sand bags shall not be stacked in a manner that covers any portion of a barricade rails reflective sheeting. Rock, concrete, iron, steel or other solid objects will NOT be permitted. Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs. Sandbags shall be made of a durable material that tears upon vehicular impact. Rubber (such as tire inner tubes) shall not be used for sandbags. Sandbags shall only be placed along or upon the base supports of the device and shall not be suspended above ground level or hung with rope, wire, chains or other fasteners.
9. Sheeting for barricades shall be retroreflective Type A or Type B conforming to Departmental Material Specification DMS-8300 unless otherwise noted.

Barricades shall NOT be used as a sign support.



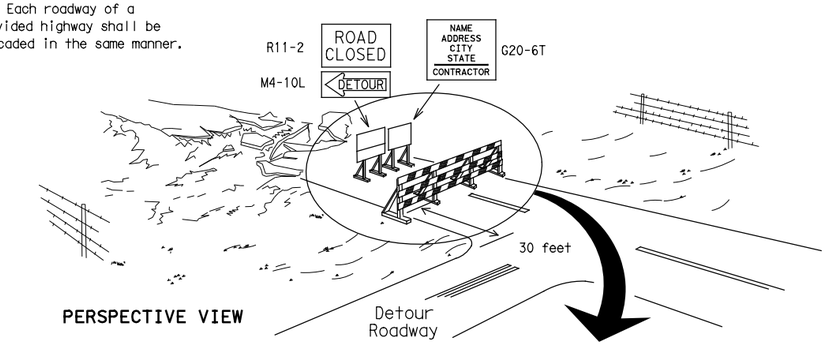
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



Stiffener may be inside or outside of support, but no more than 2 stiffeners shall be allowed on one barricade.

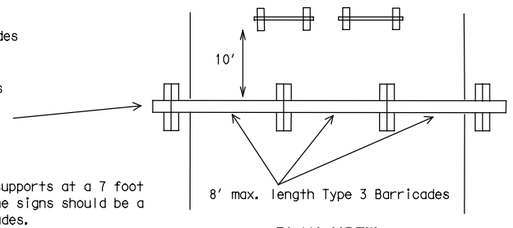
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

Each roadway of a divided highway shall be barricaded in the same manner.



PERSPECTIVE VIEW

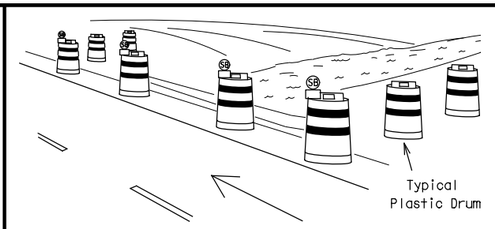
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

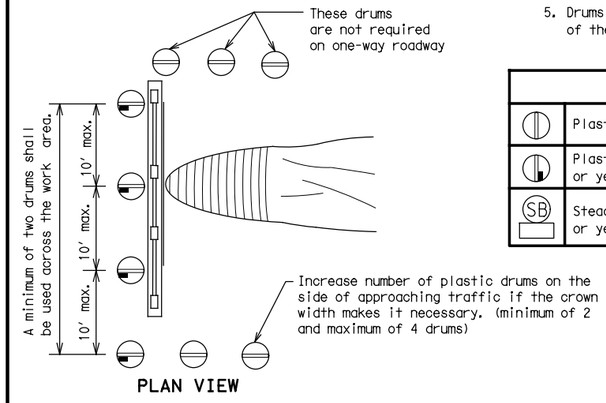
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

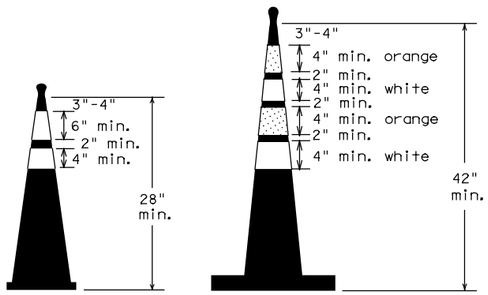
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder width is greater than 12 feet, steady-burn lights may be omitted if drums are used.
5. Drums must extend the length of the culvert widening.



PLAN VIEW

LEGEND	
	Plastic drum
	Plastic drum with steady burn light or yellow warning reflector
SB	Steady burn warning light or yellow warning reflector

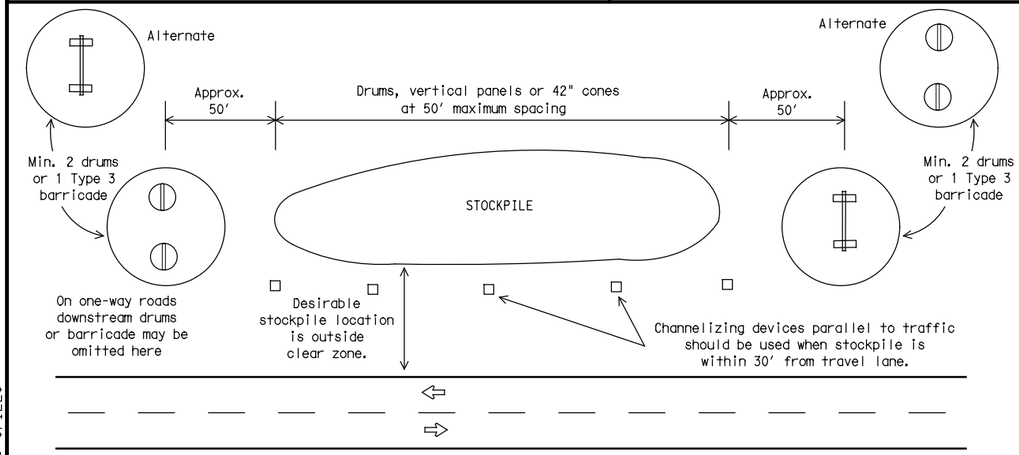
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



28" Cones shall have a minimum weight of 9 1/2 lbs.

42" 2-piece cones shall have a minimum weight of 30 lbs. including base.

1. Traffic cones and tubular markers shall be predominantly orange, and meet the height and weight requirements shown above.
2. One-piece cones have the body and base of the cone molded in one consolidated unit. Two-piece cones have a cone shaped body and a separate rubber base, or ballast, that is added to keep the device upright and in place.
3. Two-piece cones may have a handle or loop extending up to 8" above the minimum height shown, in order to aid in retrieving the device.
4. Cones or tubular markers shall have white or white and orange reflective bands as shown above. The reflective bands shall have a smooth, sealed outer surface and meet the requirements of Departmental Material Specification DMS-8300 Type A or Type B.
5. 28" cones and tubular markers are generally suitable for short duration and short-term stationary work as defined on BC(4). These should not be used for intermediate-term or long-term stationary work unless personnel is on-site to maintain them in their proper upright position.
6. 42" two-piece cones, vertical panels or drums are suitable for all work zone durations.
7. Cones or tubular markers used on each project should be of the same size and shape.



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

SHEET 10 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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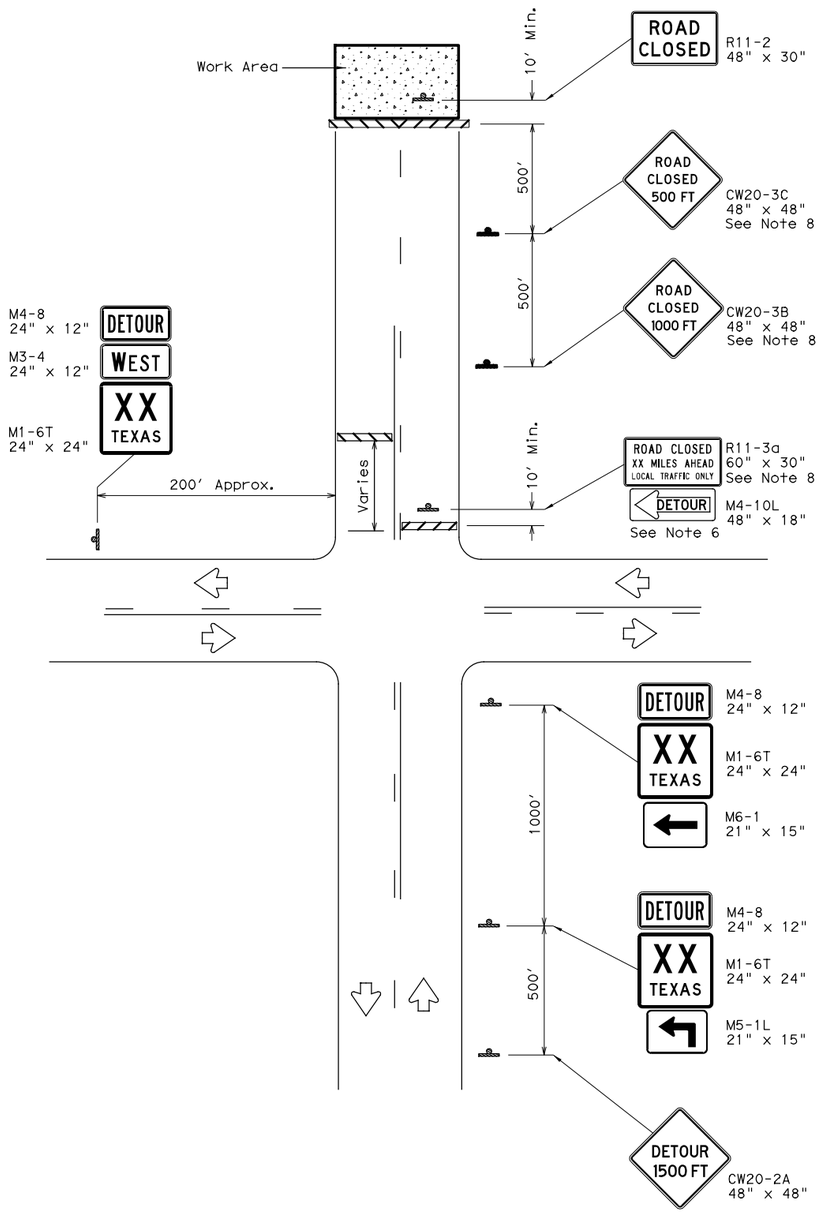
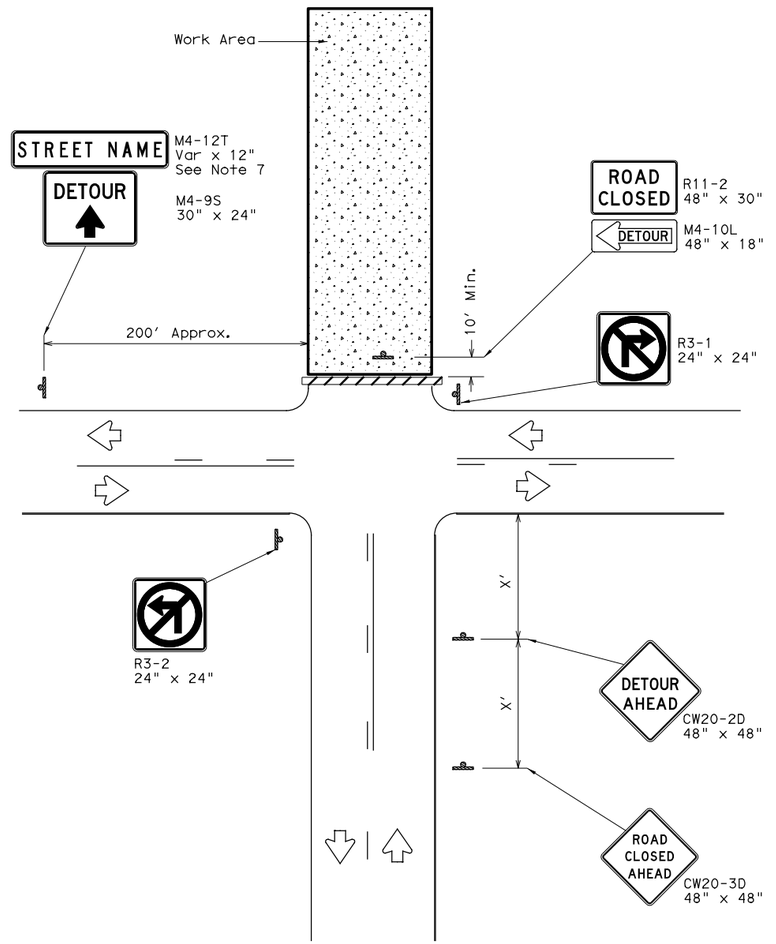


ROAD CLOSURE BEYOND THE INTERSECTION

Signing for a Numbered Route with an Off-Site Detour



ROAD CLOSURE AT THE INTERSECTION

Signing for an Un-numbered Route with an Off-Site Detour

LEGEND	
	Type 3 Barricade
	Sign

Posted Speed *	Minimum Sign Spacing "X" Distance
30	120'
35	160'
40	240'
45	320'
50	400'
55	500'
60	600'
65	700'
70	800'
75	900'

* Conventional Roads Only

GENERAL NOTES

1. This sheet is intended to provide details for temporary work zone road closures. For permanent road closure details see the D&OM standards.
2. Barricades used shall meet the requirements shown on Barricade and Construction Standard BC(10) and listed on the Compliant Work Zone Traffic Control Devices list (CWZTCD).
3. Stockpiled materials shall not be placed on the traffic side of barricades.
4. Barricades at the road closure should extend from pavement edge to pavement edge.
5. Detour signing shown is intended to illustrate the type of signing that is appropriate for numbered routes or un-numbered routes as labeled. It does not indicate the full extent of detour signing required. Detour routes should be signed as shown elsewhere in the plans.
6. If the road is open for a significant distance beyond the intersection or there are significant origin/destination points beyond the intersection, the signs and barricades at this location should be located at the edge of the traveled way.
7. The Street Name (M4-12T) sign is to be placed above the DETOUR (M4-9S) sign.
8. For urban areas where there is a shorter distance between the intersection and the actual closure location, the ROAD CLOSED XX MILES AHEAD (R11-3a) sign may be replaced with a ROAD CLOSED TO THRU TRAFFIC (R11-4) sign. If adequate space does not exist between the intersection and the closure a single ROAD CLOSED AHEAD (CW20-3D) sign spaced as per the table above may replace the ROAD CLOSED 1000 FT (CW20-3B) and ROAD CLOSED 500 FT (CW20-3C) signs.
9. Signs and barricades shown shall be subsidiary to Item 502. Locations where these details will be required shall be as shown elsewhere in the plans.

Texas Department of Transportation

Traffic Operations Division Standard

WORK ZONE ROAD CLOSURE DETAILS

WZ(RCD)-13

FILE: wzrcd-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS				RH
1-97 4-98 7-13	DIST	COUNTY		SHEET NO.
2-98 3-03	AUS	HAYS		23

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PROPOSED SHANE LANE ALIGNMENT DATA (℄ SHANE)

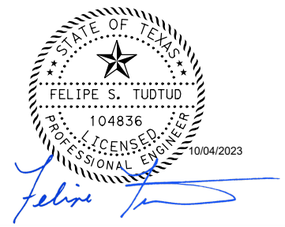
		STATION	NORTHING	EASTING
Element: Linear				
POB	( )	100+00.00	13986042.754	2251475.405
PC	( )	101+02.81	13986044.685	2251578.195
Tangent Direction:		N 88°55'24.53" E		
Tangent Length:		102.8089		
Element: Circular				
PC	( )	101+02.81	13986044.685	2251578.195
PI	( )	101+69.52	13986045.938	2251644.892
CC	( )		13984544.950	2251606.377
PT	( )	102+36.14	13986041.266	2251711.437
Radius:		1500.0000		
Delta:		5°05'34.15" Right		
Degree of Curvature(Arc):		3°49'10.99"		
Length:		133.3297		
Tangent:		66.7088		
Chord:		133.2858		
Middle Ordinate:		1.4812		
External:		1.4826		
Tangent Direction:		N 88°55'24.53" E		
Radial Direction:		S 1°04'35.47" E		
Chord Direction:		S 88°31'48.39" E		
Radial Direction:		S 4°00'58.69" W		
Tangent Direction:		S 85°59'01.31" E		
Element: Linear				
PT	( )	102+36.14	13986041.266	2251711.437
PC	( )	103+57.46	13986032.768	2251832.465
Tangent Direction:		S 85°59'01.31" E		
Tangent Length:		121.3258		
Element: Circular				
PC	( )	103+57.46	13986032.768	2251832.465
PI	( )	104+93.00	13986023.276	2251967.664
CC	( )		13986222.302	2251845.773
PT	( )	105+92.92	13986148.020	2252020.651
Radius:		190.0000		
Delta:		71°00'08.40" Left		
Degree of Curvature(Arc):		30°09'20.42"		
Length:		235.4527		
Tangent:		135.5315		
Chord:		220.6734		
Middle Ordinate:		35.3203		
External:		43.3855		
Tangent Direction:		S 85°59'01.31" E		
Radial Direction:		S 4°00'58.69" W		
Chord Direction:		N 58°30'54.49" E		
Radial Direction:		S 66°59'09.71" E		
Tangent Direction:		N 23°00'50.29" E		
Element: Linear				
PT	( )	105+92.92	13986148.020	2252020.651
POE	( )	109+51.81	13986478.352	2252160.963
Tangent Direction:		N 23°00'50.29" E		
Tangent Length:		358.8963		

PROPOSED DRIVEWAY01 ALIGNMENT DATA (℄ DRWY01)

		STATION	NORTHING	EASTING
Element: Linear				
POB	( )	10+00.00	13986042.178	2251697.525
POE	( )	10+39.54	13986002.710	2251695.123
Tangent Direction:		S 3°29'01.54" W		
Tangent Length:		39.5409		

PROPOSED SIDEWALK ALIGNMENT DATA (℄ SDWK01)

		STATION	NORTHING	EASTING
Element: Linear				
POB	( )	10+00.00	13986016.142	2251783.716
PC	( )	10+04.40	13986015.834	2251788.104
Tangent Direction:		S 85°59'01.31" E		
Tangent Length:		4.3987		
Element: Circular				
PC	( )	10+04.40	13986015.834	2251788.104
PI	( )	10+34.33	13986013.737	2251817.962
CC	( )		13985985.907	2251786.003
PT	( )	10+51.45	13985983.875	2251815.934
Radius:		30.0000		
Delta:		89°52'04.14" Right		
Degree of Curvature(Arc):		190°59'09.35"		
Length:		47.0547		
Tangent:		29.9309		
Chord:		42.3774		
Middle Ordinate:		8.7623		
External:		12.3776		
Tangent Direction:		S 85°59'01.31" E		
Radial Direction:		S 4°00'58.69" W		
Chord Direction:		S 41°02'59.24" E		
Radial Direction:		N 86°06'57.17" W		
Tangent Direction:		S 3°53'02.83" W		
Element: Linear				
PT	( )	10+51.45	13985983.875	2251815.934
PC	( )	10+65.20	13985970.157	2251815.003
Tangent Direction:		S 3°53'02.83" W		
Tangent Length:		13.7502		
Element: Circular				
PC	( )	10+65.20	13985970.157	2251815.003
PI	( )	11+03.05	13985932.394	2251812.439
CC	( )		13985961.893	2251936.723
PT	( )	11+38.60	13985899.812	2251831.699
Radius:		122.0000		
Delta:		34°28'18.88" Left		
Degree of Curvature(Arc):		46°57'49.51"		
Length:		73.4011		
Tangent:		37.8492		
Chord:		72.2990		
Middle Ordinate:		5.4787		
External:		5.7363		
Tangent Direction:		S 3°53'02.83" W		
Radial Direction:		N 86°06'57.17" W		
Chord Direction:		S 13°21'06.61" E		
Radial Direction:		S 59°24'43.95" W		
Tangent Direction:		S 30°35'16.05" E		



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710 Hesters Crossing, Suite 150
Round Rock, Texas 78681
512.685.2900

THE CITY OF DRIPPING SPRINGS TEXAS

ROGER HANKS

HORIZONTAL ALIGNMENT DATA

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SJ				RH
GRAPHICS KB	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JC	TEXAS	AUS	HAYS	
CHECK JC	CONTROL	SECTION	JOB	24

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TIME: 8:4:09 AM
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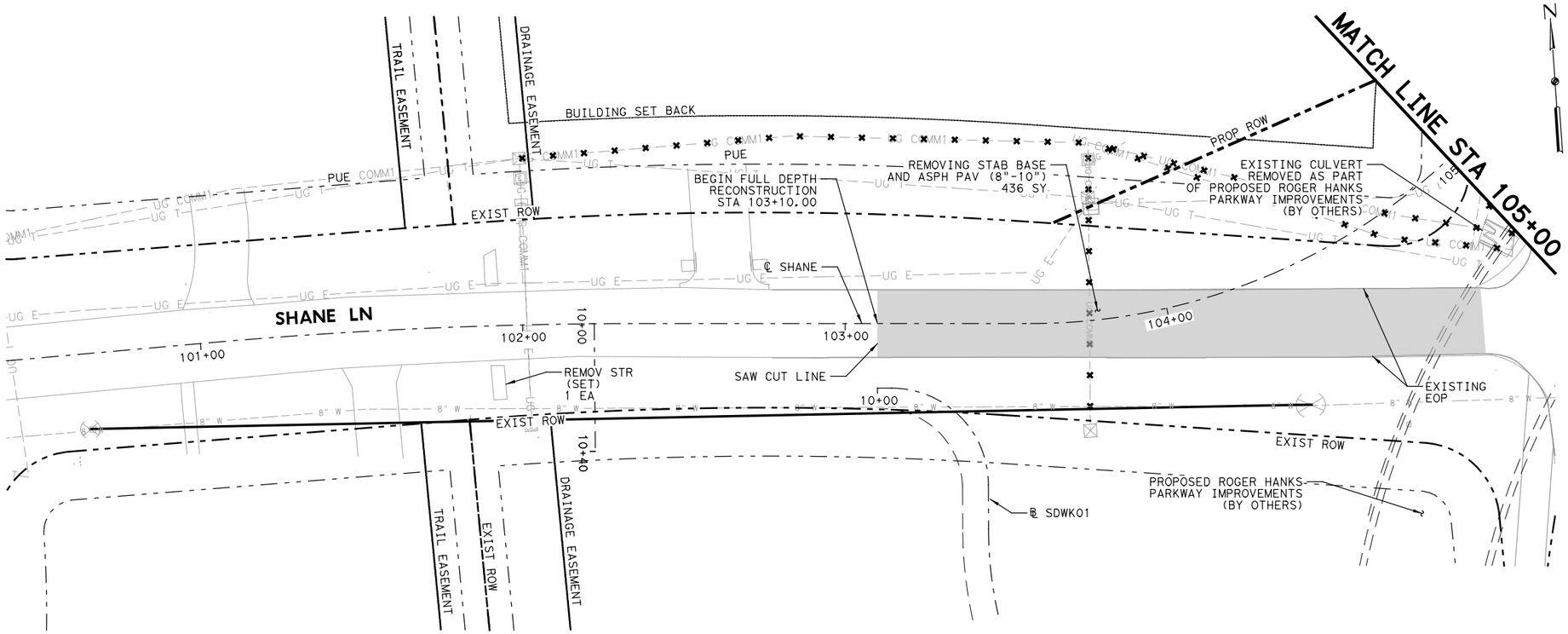


LEGEND

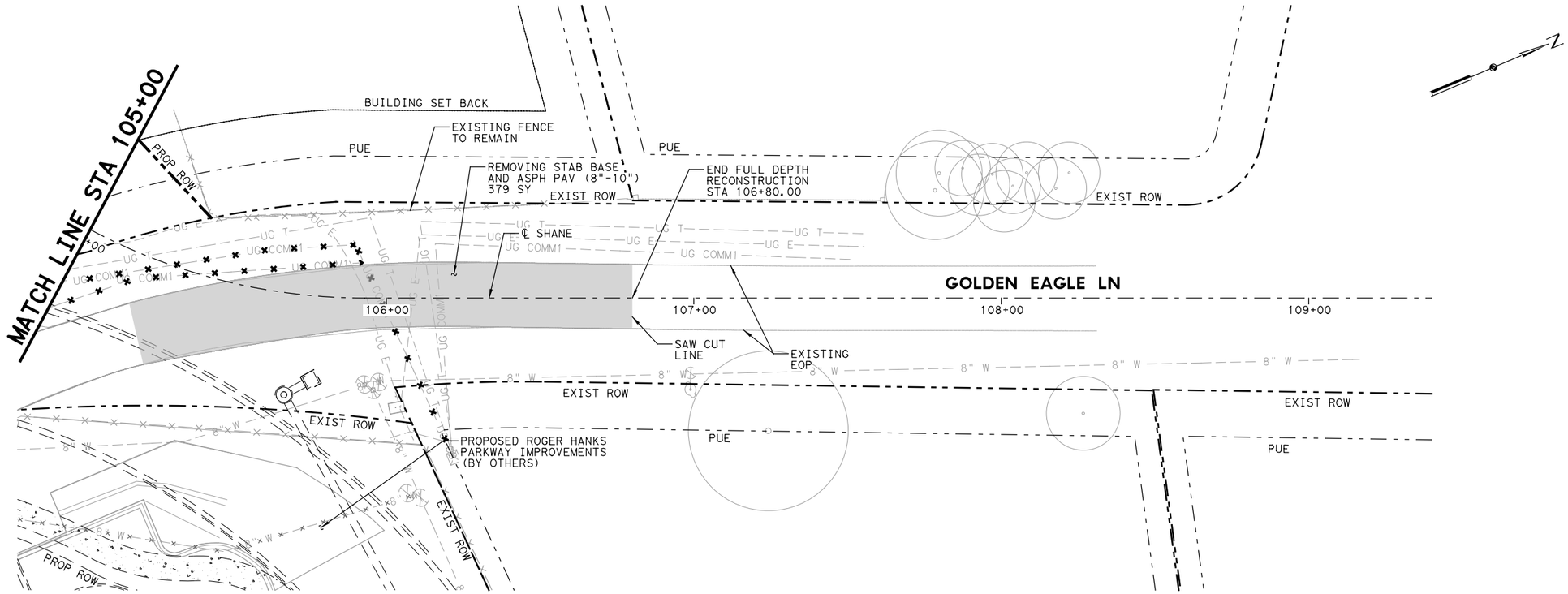
- PROPERTY LINE (HAYS CENTRAL APPRAISAL DISTRICT)
- EXISTING RIGHT OF WAY
- PROPOSED RIGHT OF WAY
- PROPOSED CONSTRUCTION BY OTHERS
- REMOVE STAB BASE AND ASPH PAV
- REMOVE CONCRETE

NOTES:

1. ANY ITEMS REQUIRING REMOVAL THAT ARE NOT DIRECTLY CALLED OUT SHALL BE CONSIDERED SUBSIDIARY TO PREP ROW.
2. SAW CUTTING WILL NOT BE PAID FOR SEPARATELY BUT WILL BE CONSIDERED SUBSIDIARY TO PERTINENT BID ITEMS.
3. THE UTILITY INFORMATION SHOWN IS PROVIDED BY OTHERS. THIS INFORMATION WAS OBTAINED SOLELY FOR THE USE OF THE ENGINEERING DESIGN OF THE PROJECT. THE ACCURACY AND SUFFICIENCY OF THE INFORMATION SHOWN IS NOT GUARANTEED. THE CONTRACTOR SHALL FIELD VERIFY UTILITY LIMITS AND LOCATIONS PRIOR TO CONSTRUCTION.
4. CONTRACTOR WILL COORDINATE REMOVAL ITEMS WITH THE ADJACENT CONTRACTOR FOR THE "ROGER HANKS IMPROVEMENTS PROJECT".

0 20 40 60 80

SCALE IN FEET



STATE OF TEXAS
FELIPE S. TUDTUD
104836
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ROGER HANKS

REMOVAL LAYOUT

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SJ				RH
GRAPHICS KB	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JC	TEXAS	AUS	HAYS	25
CHECK JC	CONTROL	SECTION	JOB	

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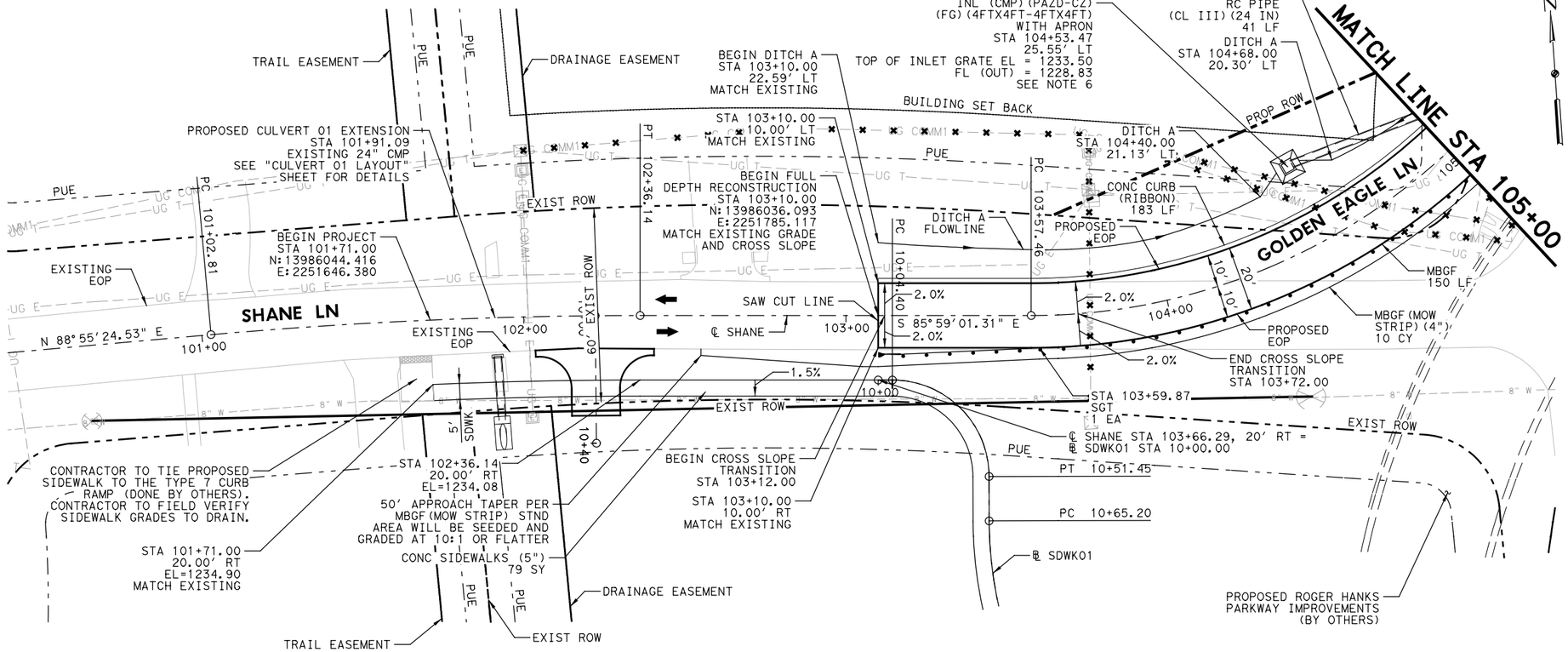

NOTES:

1. SEE "HORIZONTAL ALIGNMENT DATA" SHEET FOR ALIGNMENT INFORMATION.
2. SAW CUTTING WILL NOT BE PAID FOR SEPARATELY BUT WILL BE CONSIDERED SUBSIDIARY TO PERTINENT BID ITEMS.
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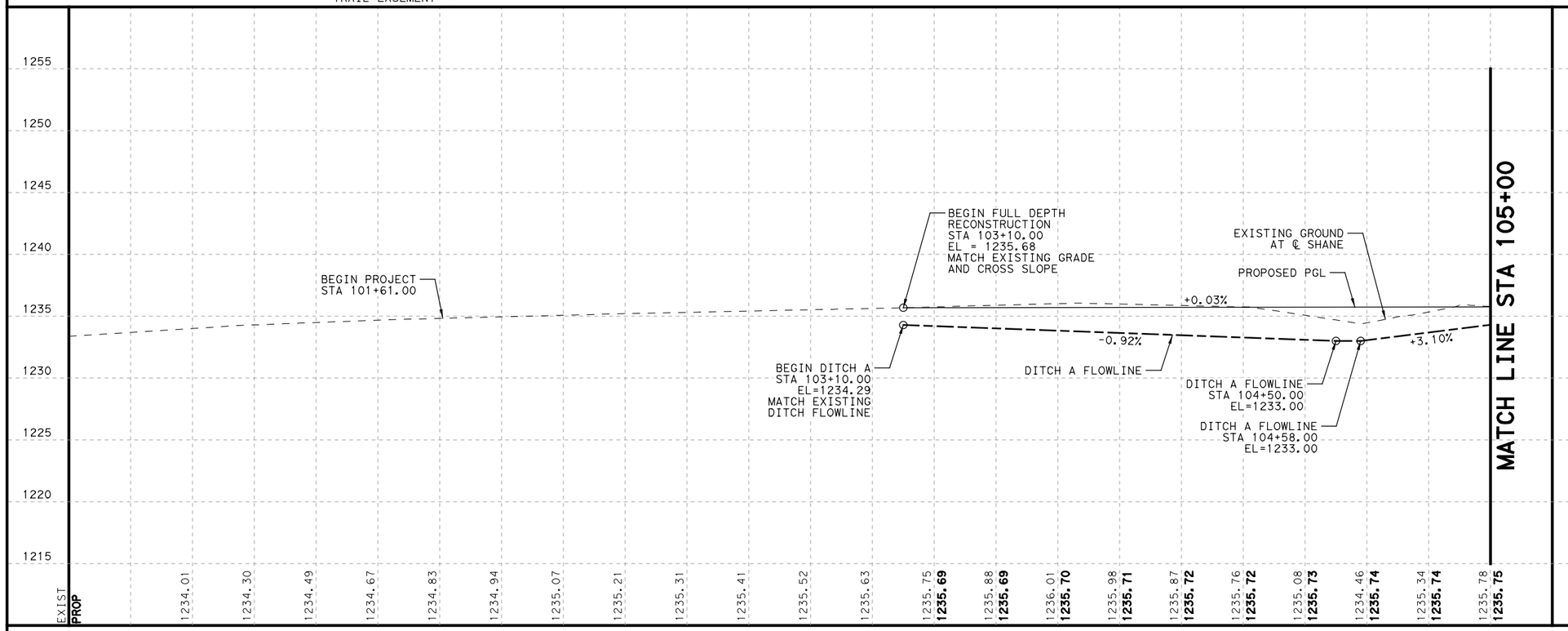
4. ROADWAY DIMENSIONS ARE TO THE EDGE OF PAVEMENT (EOP) UNLESS NOTED OTHERWISE.
5. STATION AND OFFSET FOR INLET ARE TO CENTER OF VAULT. INLET ELEVATIONS ARE INFALL ELEVATIONS UNLESS NOTED OTHERWISE.
6. PAZD INLET ELEVATIONS ARE TOP OF GRATE ELEVATION. DITCH ELEVATIONS TIE TO TOP OF APRON.



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PENTABLE: 0338078.tbl
DATE: 10/4/2023
TIME: 8:43:31 AM
SCALE: 1:40

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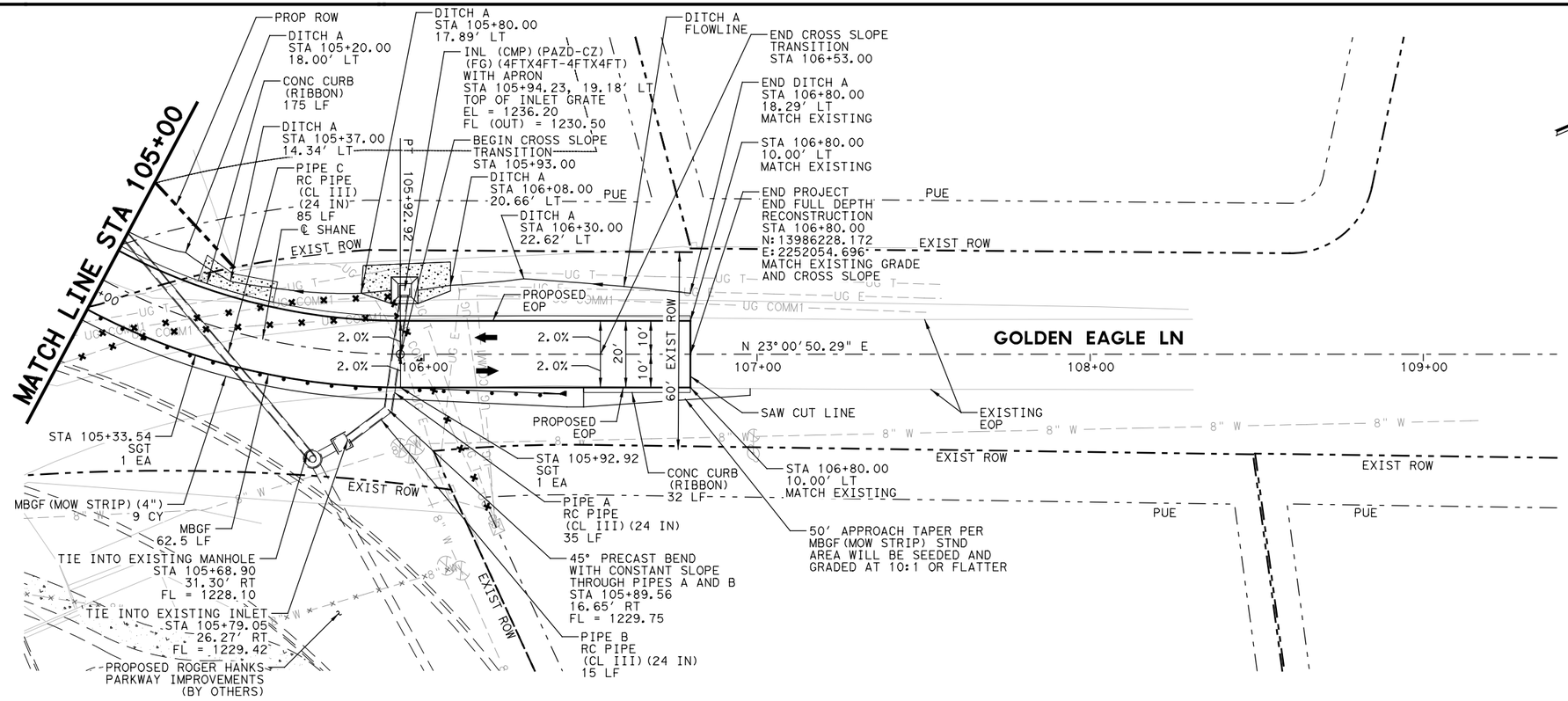
THE CITY OF DRIPPING SPRINGS TEXAS

ROGER HANKS

ROADWAY PLAN AND PROFILE

SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SJ				RH
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
KB	TEXAS	AUS	HAYS	
CHECK	CONTROL	SECTION	JOB	26
JC				
CHECK				
JC				



LEGEND

- PROPERTY LINE (HAYS CENTRAL APPRAISAL DISTRICT)
- EXISTING RIGHT OF WAY
- PROPOSED RIGHT OF WAY
- TRAVEL LANE
- PROPOSED CONSTRUCTION BY OTHERS
- DITCH A FLOWLINE

NOTES:

1. SEE "HORIZONTAL ALIGNMENT DATA" SHEET FOR ALIGNMENT INFORMATION.
2. SAW CUTTING WILL NOT BE PAID FOR SEPARATELY BUT WILL BE CONSIDERED SUBSIDIARY TO PERTINENT BID ITEMS.
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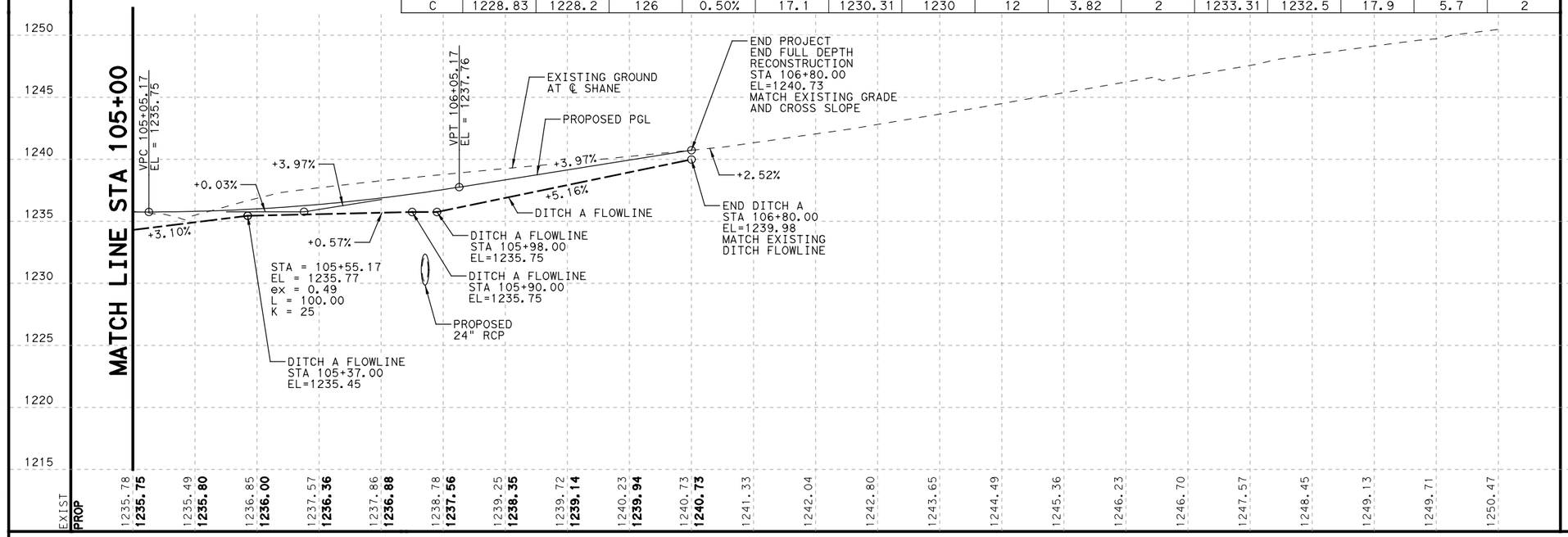
5. STATION AND OFFSET FOR INLET ARE TO CENTER OF VAULT. INLET ELEVATIONS ARE INFALL ELEVATIONS UNLESS NOTED OTHERWISE.
6. PAZD INLET ELEVATIONS ARE TOP OF GRATE ELEVATION. DITCH ELEVATIONS TIE TO TOP OF APRON.

H: 0 20 40 60 80
V: 0 5 10 15 20
SCALE IN FEET

DRAINAGE HYDRAULIC NOTES:
1. THE 25-YEAR HGL IS UNDER THE PROPOSED GROUND SURFACE FOR ALL PIPES AS PER THE COA DCM.
2. THE MINIMUM AND MAXIMUM PIPE VELOCITIES ARE 2.5 AND 20 FPS FOR THE 25-YEAR DESIGN STORM PER THE COA DCM.

Storm Drain Hydraulic Data

Pipe ID	Data					25 YR					100 YR				
	FL Elelvation (ft)		Length	Slope	Capacity	HGL (ft)		Q (cfs)	V (fps)	Depth (ft)	HGL (ft)		Q (cfs)	V (fps)	Depth (ft)
	In	Out	ft	(%)	(cfs)	In	Out				In	Out			
A	1230.5	1229.75	35	2.17%	33.5	1231.57	1230.82	18.9	10.96	1.07	1233.94	1233.39	27.9	8.88	2
B	1229.75	1229.42	15	2.17%	33.5	1230.82	1230.5	18.9	10.96	1.07	1232.2	1232.66	27.9	8.88	2
C	1228.83	1228.2	126	0.50%	17.1	1230.31	1230	12	3.82	2	1233.31	1232.5	17.9	5.7	2



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10/04/2023

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ROGER HANKS

ROADWAY PLAN AND PROFILE

SHEET 2 OF 3

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SJ				RH
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
KB	TEXAS	AUS	HAYS	
CHECK	CONTROL	SECTION	JOB	27
JC				
CHECK				
JC				

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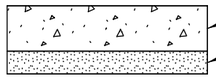


CONCRETE DRIVEWAY

GENERAL NOTES:

PROVIDE EXPANSION 20 FT C-C FOR WIDTH OR LENGTH OVER 25FT. EXPANSION JOINT PER AUS STANDARD FOR SIDEWALK (MCPSWMD).

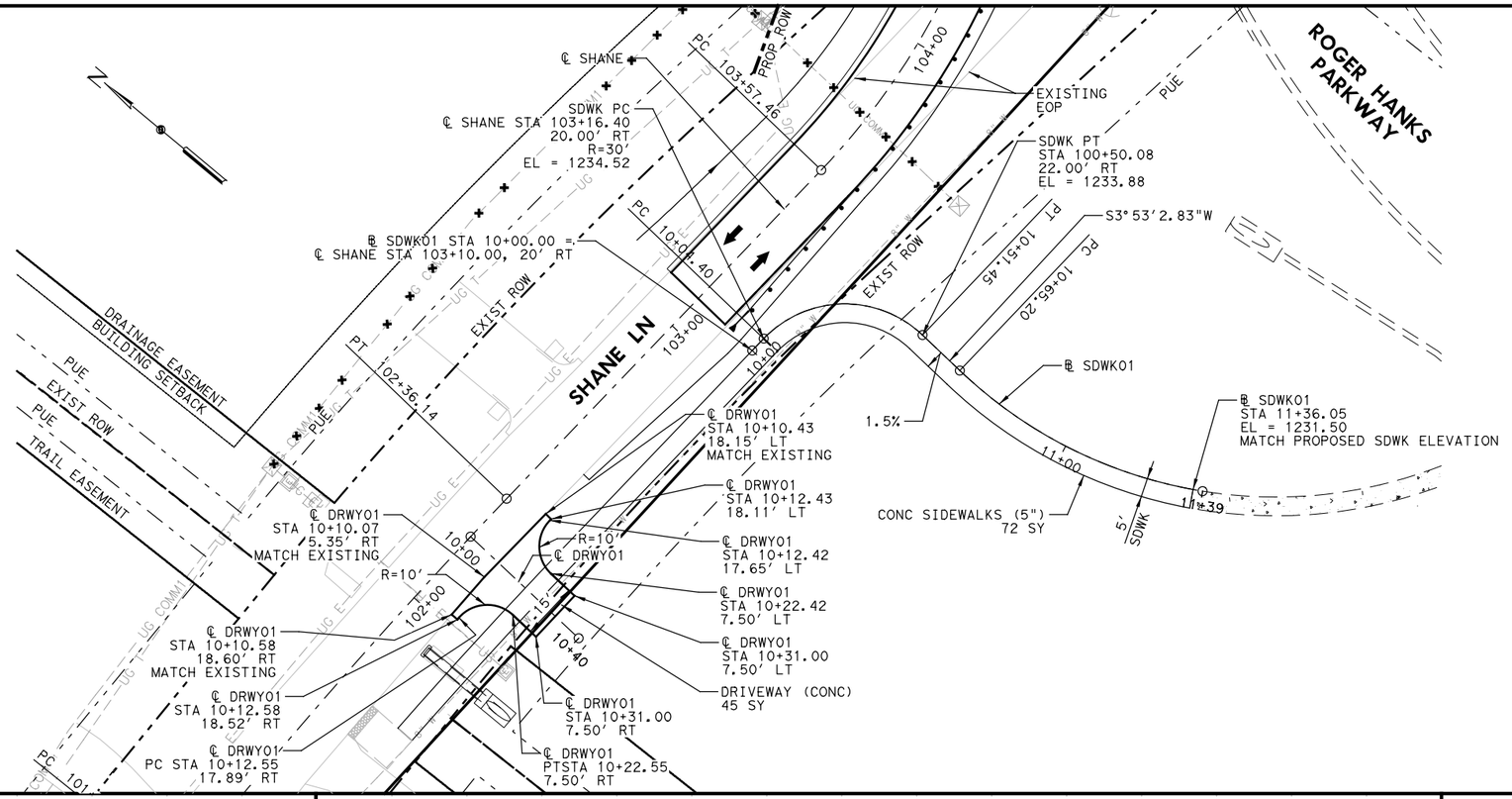
REINFORCEMENT WILL BE IN ACCORDANCE WITH ITEM 432.3.1 USING NO. 3 OR NO. 4 BARS.

FIBER REINFORCEMENT IS NOT ALLOWED. CLASS A CONCRETE IS ALLOWED TO USE COARSE AGGREGATE GRADES 1-8.

FURNISH BASE MEETING THE REQUIREMENTS FOR ANY TYPE OR GRADE IN ACCORDANCE WITH ITEM 247. BASE COMPRESSIVE STRENGTHS ARE WAIVED.

THE BASE UNDER THE CONCRETE MAY BE REPLACED WITH CONCRETE AT A RATIO OF 3 INCHES OF BASE EQUALS 2 INCHES OF CONCRETE.

IF ROOTS ARE ENCOUNTERED VERIFY WITH THE ENGINEER PRIOR TO ACCOMMODATING OR REMOVING 2 IN. DIAMETER OR LARGER ROOTS. ROOT REMOVAL MUST BE IN ACCORDANCE WITH ITEM 752.4.2 ROOTS MAY REMAIN IN THE BASE. FOR IMPROVEMENTS WITH 6 IN. OF A ROOT, THE CONCRETE THICKNESS MAY BE REDUCED BY 1 IN. AND THE BASE INCREASED BY 1 IN. TO MINIMIZE IMPACTS TO THE ROOTS. ADJUST BASE AND SURFACE PROFILE TO PROVIDE A 1 IN. BASE CUSHION AROUND THE ROOTS. THE SURFACE PROFILE MAY BE ADJUSTED TO THE EXTENT ALLOWED BY ADA. THIS WORK IS SUBSIDIARY TO ITEM 530.



LEGEND

- PROPERTY LINE (HAYS CENTRAL APPRAISAL DISTRICT)
- EXISTING RIGHT OF WAY
- PROPOSED RIGHT OF WAY
- TRAVEL LANE
- PROPOSED CONSTRUCTION BY OTHERS

NOTES:

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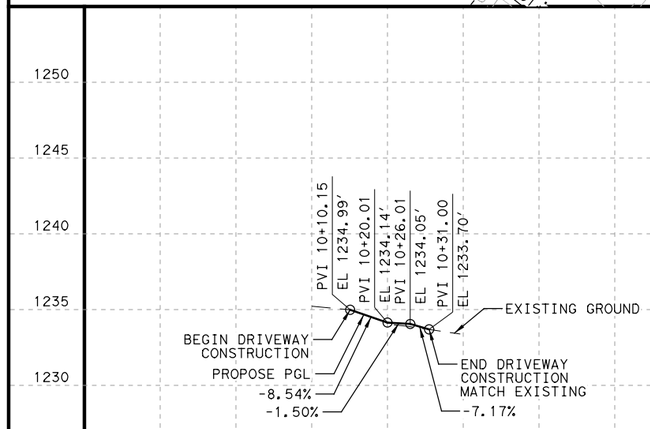
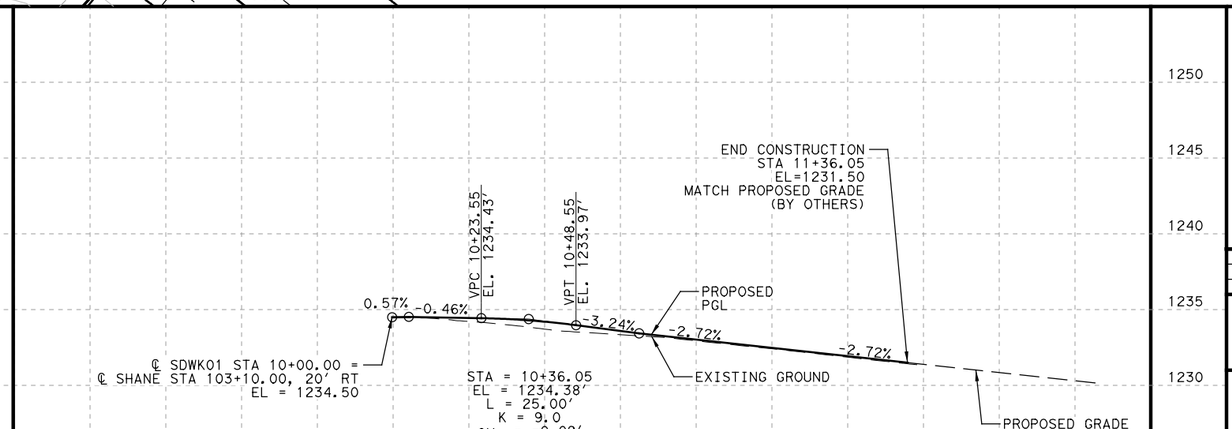
6. PAZD INLET ELEVATIONS ARE TOP OF GRATE ELEVATION. DITCH ELEVATIONS TIE TO TOP OF APRON.
7. SLOPE SIDEWALK TO DRAIN.

H: 0 20 40 60 80
V: 0 5 10 15 20
SCALE IN FEET





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THE CITY OF DRIPPING SPRINGS TEXAS

ROGER HANKS

DRIVEWAY AND SIDEWALK PLAN AND PROFILE

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SJ				RH
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
KB	TEXAS	AUS	HAYS	
CHECK	CONTROL	SECTION	JOB	28
JC				
CHECK				
JC				

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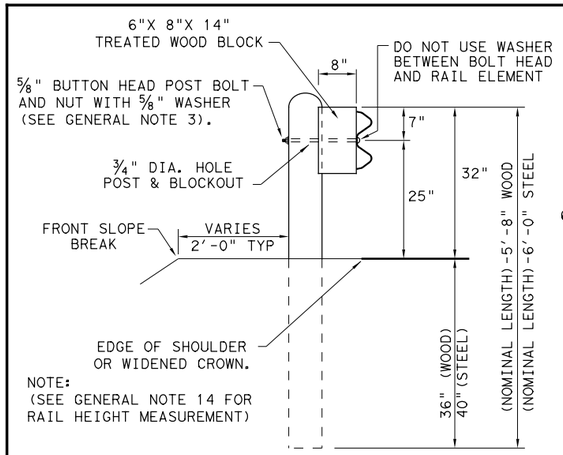
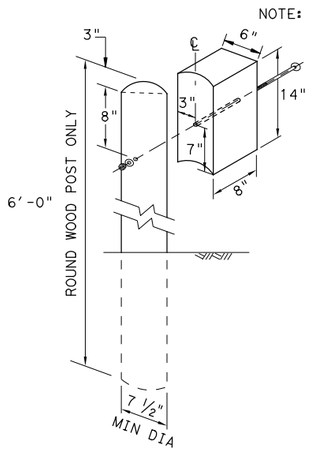
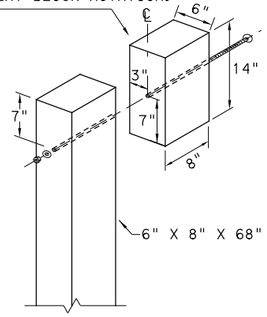


TYPICAL POST PLACEMENT

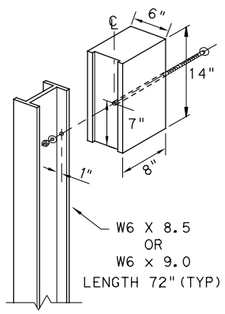


WOOD BLOCK TO ROUND WOOD POST

NOTE: TOENAIL WITH ONE 16D GALV. NAIL TO PREVENT BLOCK ROTATION.

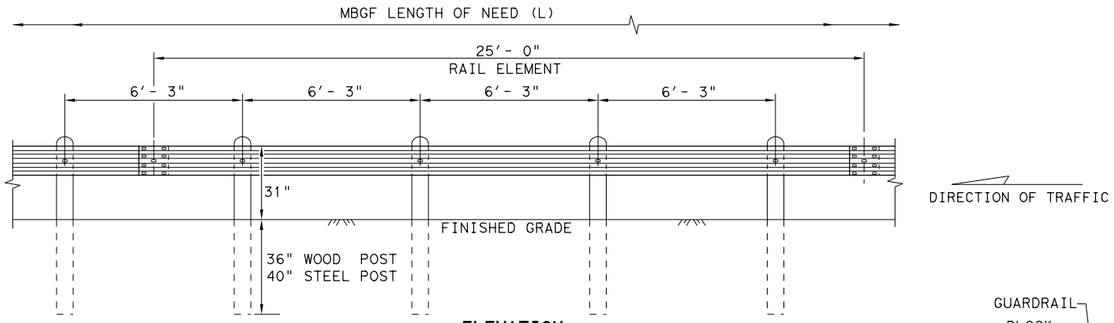


WOOD BLOCK TO RECTANGULAR WOOD POST



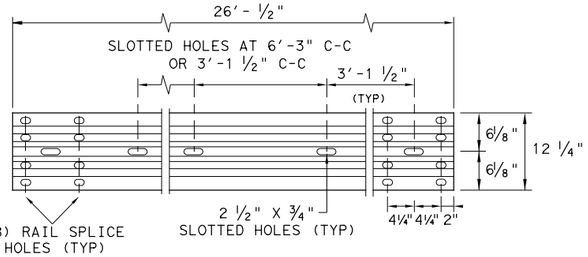
ROUTED WOOD BLOCK TO I-BEAM STEEL POST

NOTE: ✳✳ "WOOD" INDICATES DIMENSIONS FOR BOTH ROUND AND RECTANGULAR WOOD POST SYSTEMS.



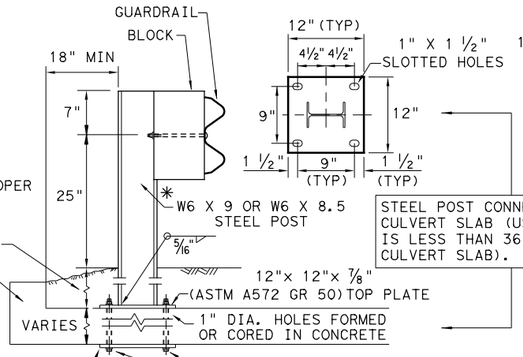
ELEVATION MID-SPAN RAIL SPLICE

SHOWING A 25'- 0" SECTION OF W-BEAM RAIL. (SEE GENERAL NOTE 2)



ELEVATION 25'- 0"(NOM.) W-BEAM SECTION

NOTES: SEE GENERAL NOTE 2 FOR ALLOWABLE RAIL TYPES.
SEE RAIL SPLICE DETAIL FOR REQUIRED HARDWARE.



LOW FILL CULVERT POST

STEEL POST CONNECTION TO CULVERT SLAB (USE WHEN THERE IS LESS THAN 36" COVER OVER CULVERT SLAB).

NOTE: TWO INSTALLATION OPTIONS.

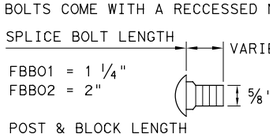
1. BOLT-THROUGH OPTION: REQUIRES A 6" MIN. SLAB THICKNESS. ⅞" DIA (ASTM A449) HEAVY HEX BOLTS WITH TWO HARDENED WASHER EACH AND HEAVY HEX NUTS.
   NOTE: BOLT LENGTH = SLAB PLUS 2 ¼" MIN.

2. EPOXY ANCHOR OPTION: THIS OPTION MAY ONLY BE USED IF THE CULVERT SLAB IS 9" MIN. THICK. THREADED ANCHOR RODS MUST BE ⅞" DIA. ASTM A449 OR A193 GRADE B7 WITH HEAVY HEX NUT, AND ONE HARDENED WASHER EACH. EMBED ANCHOR RODS 6" WITH HILTI HIT RE 500 EPOXY ADHESIVE. OTHER TYPE III CLASS C EPOXY ADHESIVES MEETING THE REQUIREMENTS OF DMS-6100, "EPOXIES AND ADHESIVES", MAY BE USED IF IT CAN BE DEMONSTRATED THAT THEY MEET OR EXCEED THE STRENGTH OF HILTI HIT RE 500 WITH THE SAME EMBEDMENT DEPTH AND THREADED ROD DIA. FOLLOW THE MANUFACTURER'S REQUIREMENTS FOR INSTALLING EPOXIED THREADED RODS. EXTEND RODS ¼" MIN. BEYOND NUT.

NOTE: CULVERTS OF 25 FT. OR LESS, SEE GF(31)LS STANDARD FOR "LONG SPAN" OPTION.

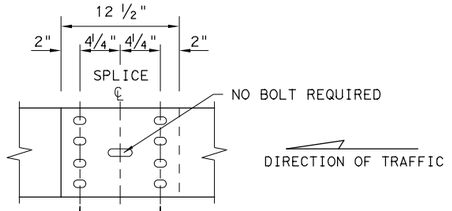
NOTE: TRANSISTIONS TO BRIDGE RAILS OR TRAFFIC BARRIERS.
SEE GF(31)TL3 TR STANDARD FOR HIGH-SPEED TL-3 TRANSITIONS.
SEE GF(31)TL2 TR STANDARD FOR LOW-SPEED TL-2 TRANSITIONS.

NOTE:
FOUR TYPES OF BUTTON-HEAD GUARD RAIL BOLTS COME WITH A RECCESSED NUT.



BUTTON HEAD BOLT

NOTE: SEE GENERAL NOTE 3 FOR SPLICE & POST BOLT DETAILS.



MID-SPAN RAIL SPLICE DETAIL

NOTE: GF(31), MID-SPAN RAIL SPLICES ARE REQUIRED WITH 6'-3" POST SPACINGS.

GENERAL NOTES

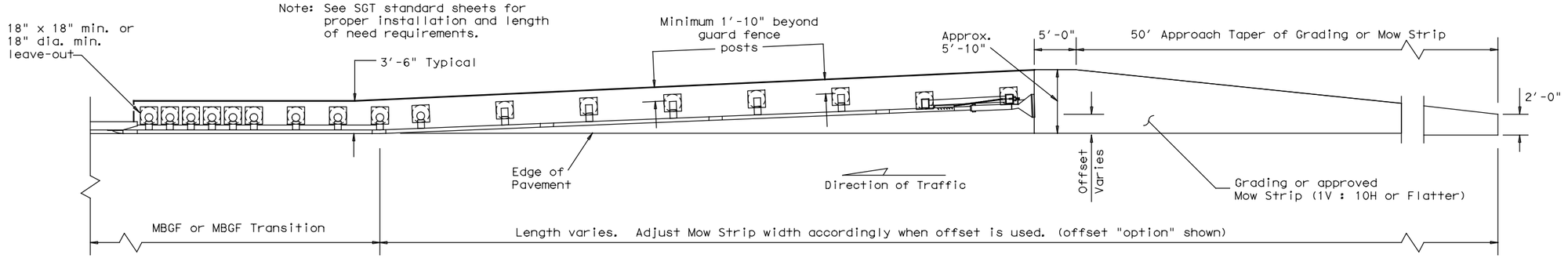
1. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST, OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. THE EXACT POSITION OF MBGF SHALL BE SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. STEEL POSTS TO BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING."
2. RAIL ELEMENTS SHALL MEET THE REQUIREMENTS OF ITEM 540,"METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED IN THE PLANS. THE CONTRACTOR MAY FURNISH RAIL ELEMENTS OF 25'- 0", OR 12'- 6" (NOM.) LENGTHS. RAIL ELEMENTS MAY HAVE SLOTTED HOLES AT 3'-1 ½" C-C OR 6'-3" C-C. A SPECIAL LENGTH OF RAIL MAY BE MANUFACTURED TO ACCOMMODATE THE DOWNSTREAM ANCHOR TERMINAL (DAT) AND THE TRANSITION SECTIONS OF GUARDRAIL.
3. BUTTON HEAD "POST BOLTS & NUTS" SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND ⅝" WASHER (FWC16a) AND NOT MORE THAN 1" BEYOND IT. TRIM REMAINING BOLT LENGTH TO MEET REQUIRED LENGTH.
4. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445,"GALVANIZING." FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
5. CROWN SHALL BE WIDENED TO ACCOMMODATE THE METAL BEAM GUARD FENCE.
6. THE LATERAL APPROACH TO THE GUARD FENCE, SHALL HAVE A MAXIMUM SLOPE OF 1V:10H.
7. IF SHOWN ELSEWHERE IN THE PLANS OR AS DIRECTED BY THE ENGINEER, THE GUARD FENCE MAY BE FLARED AT A RATE OF 25:1 OR FLATTER.
8. UNLESS OTHERWISE SHOWN IN THE PLANS, GUARD FENCE PLACED IN THE VICINITY OF CURBS SHALL BE POSITIONED SO THAT THE FACE OF CURB IS LOCATED DIRECTLY BELOW OR BEHIND THE FACE OF THE RAIL. RAIL PLACED OVER CURBS SHALL BE INSTALLED SO THAT THE POST BOLT IS LOCATED APPROXIMATELY 25 INCHES ABOVE THE GUTTER PAN OR EDGE OF SHOULDER.
9. APPLICATIONS IN SOLID ROCK ARE ONLY ALLOWED WITH STEEL POSTS. IF SOLID ROCK IS ENCOUNTERED WITHIN 0 TO 18" OF THE FINISHED GRADE, DRILL A 24" DIA. HOLE, 24" INTO THE ROCK. IF SOLID ROCK IS ENCOUNTERED BELOW 18", DRILL A 12" DIA. HOLE, 12" INTO THE ROCK OR TO THE STANDARD EMBEDMENT DEPTH, WHICHEVER MAYBE LESS. ANY EXCESS POST LENGTH, AFTER MEETING THESE DEPTHS, MAY BE FIELD CUT TO ENSURE PROPER GUARDRAIL MOUNTING HEIGHT. BACKFILL WITH COARSE AGGREGATE MATERIAL.
10. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
11. SPECIAL FABRICATION WILL BE REQUIRED AT INSTALLATION LOCATIONS HAVING A CURVATURE OF LESS THAN 150 FT. RADIUS.
12. UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210,"COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE" MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. THE CONSTRUCTION DIVISION, TXDOT MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210 ONLY PRODUCERS ON THE MPL MAY FURNISH COMPOSITE MATERIAL BLOCKS.
13. FOR THE LOW FILL CULVERT OPTION, POSTS LOCATED PARTIALLY OR WHOLLY BETWEEN PRECAST BOX CULVERT UNITS, THE USE OF A CAST-IN-PLACE CONCRETE CLOSURE BETWEEN BOXES IS REQUIRED. THE LENGTH OF THE CAST-IN-PLACE CONCRETE CLOSURE SHALL ACCOMMODATE THE PLACEMENT OF THE LOW FILL CULVERT OPTION. SEE CONCRETE CLOSURE DETAILS ON BRIDGE STANDARD SCP-MD.
14. GUARDRAIL HEIGHT MEASUREMENT: WHEN THE GUARDRAIL IS LOCATED ABOVE PAVEMENT, MEASURE THE HEIGHT FROM THE PAVEMENT TO THE TOP OF THE W-BEAM RAIL. WHEN THE GUARDRAIL IS LOCATED UP TO 2 FT. OFF OF THE EDGE OF PAVEMENT OR FOR A PAVEMENT OVERLAY, USE A 10-FOOT STRAIGHTEDGE TO EXTEND THE PAVEMENT/SHOULDER SLOPE TO THE BACK OF RAIL, MEASURE FROM THE BOTTOM OF STRAIGHTEDGE TO THE TOP OF RAIL. FOR GUARDRAIL LOCATED DOWN A 10:1 SLOPE, MEASURE FROM THE NOMINAL TERRAIN.

Texas Department of Transportation

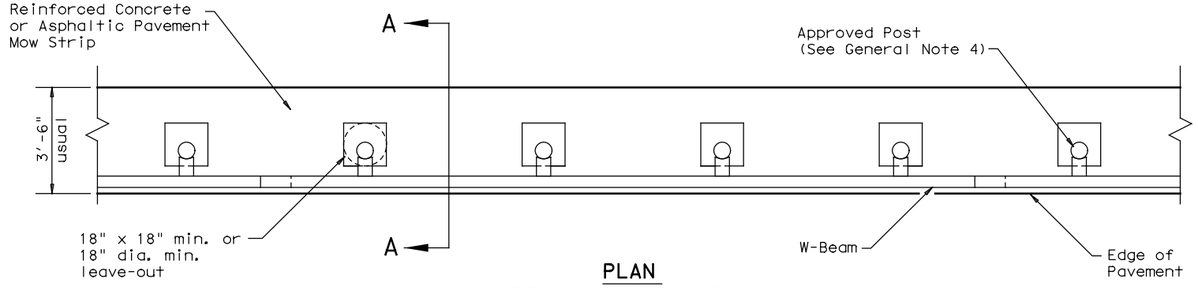
Design Division Standard

METAL BEAM GUARD FENCE
TL-3 MASH COMPLIANT
GF(31)-19

FILE: gf3119.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS				RH
	DIST	COUNTY		SHEET NO.
	AUS	HAYS		29

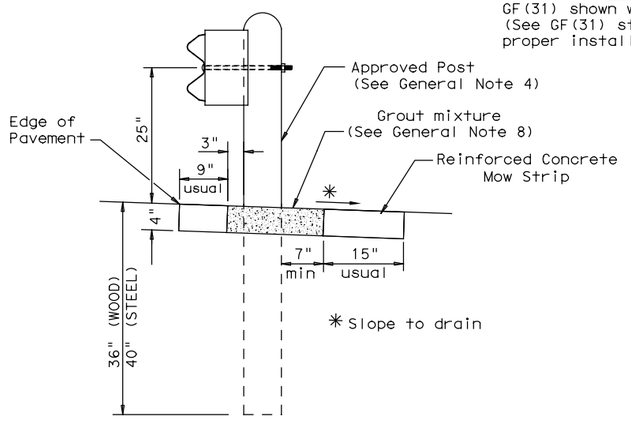


GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS



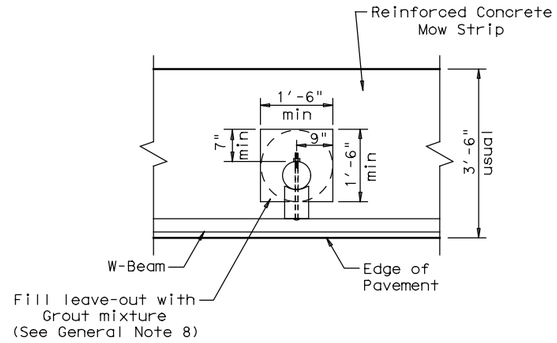
PLAN

GF(31) shown with Mow Strip
(See GF(31) standard sheet for proper installation)



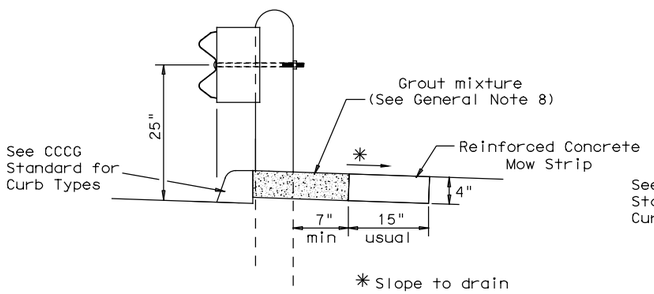
SECTION A-A

Typical



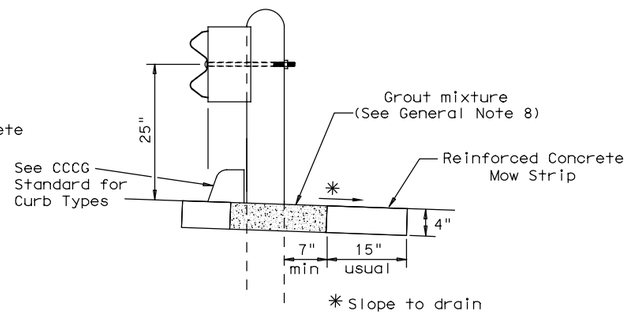
MOW STRIP DETAIL

Reinforced Concrete Mow Strip
with 18" x 18" Square or
18" Dia. minimum leave-out.



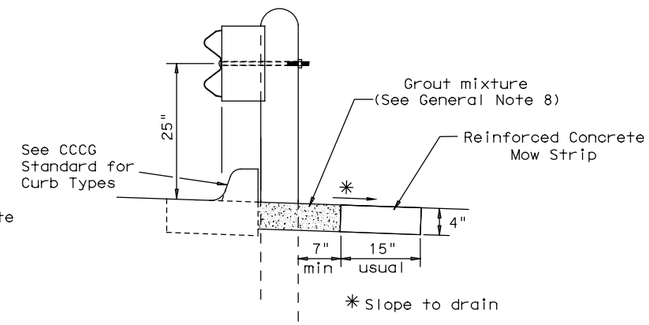
CURB OPTION (1)

This option will increase the post embedment throughout the system.



CURB OPTION (2)

Curb shown on top of mow strip



CURB OPTION (3)

Note: Site Condition(s)

Site conditions may exist where grading is required for the proper installation of metal guard fence and end treatments.

Approach grading or mow strip may be decreased or eliminated, as directed by the Engineer.

GENERAL NOTES

1. This mow strip design is for use with metal beam guard fence, guard fence transitions, and guard fence end treatments. See applicable GF(31) MBGF or GF(31) Transition Standard sheet for additional information.
2. Mow strips shall be reinforced concrete with (wire mesh or synthetic fiber), as shown on the plans and will be paid for under the pertinent bid item. Reinforced concrete shall be placed in accordance with Item 432, "Riprap." The use of the synthetic fiber in lieu of steel reinforcing is acceptable, provided the fiber producer is on the Department Material Producer List (MPL), maintained by TxDOT, Construction Division.
3. The leave-out behind the post shall be a minimum of 7".
4. Only steel (W6 x 8.5 or W6 x 9.0), or 7 ½" Dia. round wood posts are acceptable for use in the mow strip. See GF(31) Standard for additional details.
5. Other curb placement options may be used. Curbs are not considered part of the mow strip and will be paid for under other pertinent bid item.
6. Thickness of the mow strip will be 4".
7. The limits of payment for reinforced concrete will include leave-outs for the posts.
8. The leave-outs shall be filled with a Grout mixture consisting of: 2719 pounds sand, 188 pounds Type 1 or II cement, and 550 pounds of water per cubic yard, with a 28-day compressive strength of approximately 230 psi or less. Provide grout with a consistency that will flow into and completely fill all voids. Due to auger size, larger leave-out dimensions are acceptable from both an impact performance and maintenance repair standpoint (Suggested Maximum leave-out of 20"). Payment for furnishing and placing the grout mixture will be subsidiary to the pay item of riprap mow strip.

Texas Department of Transportation

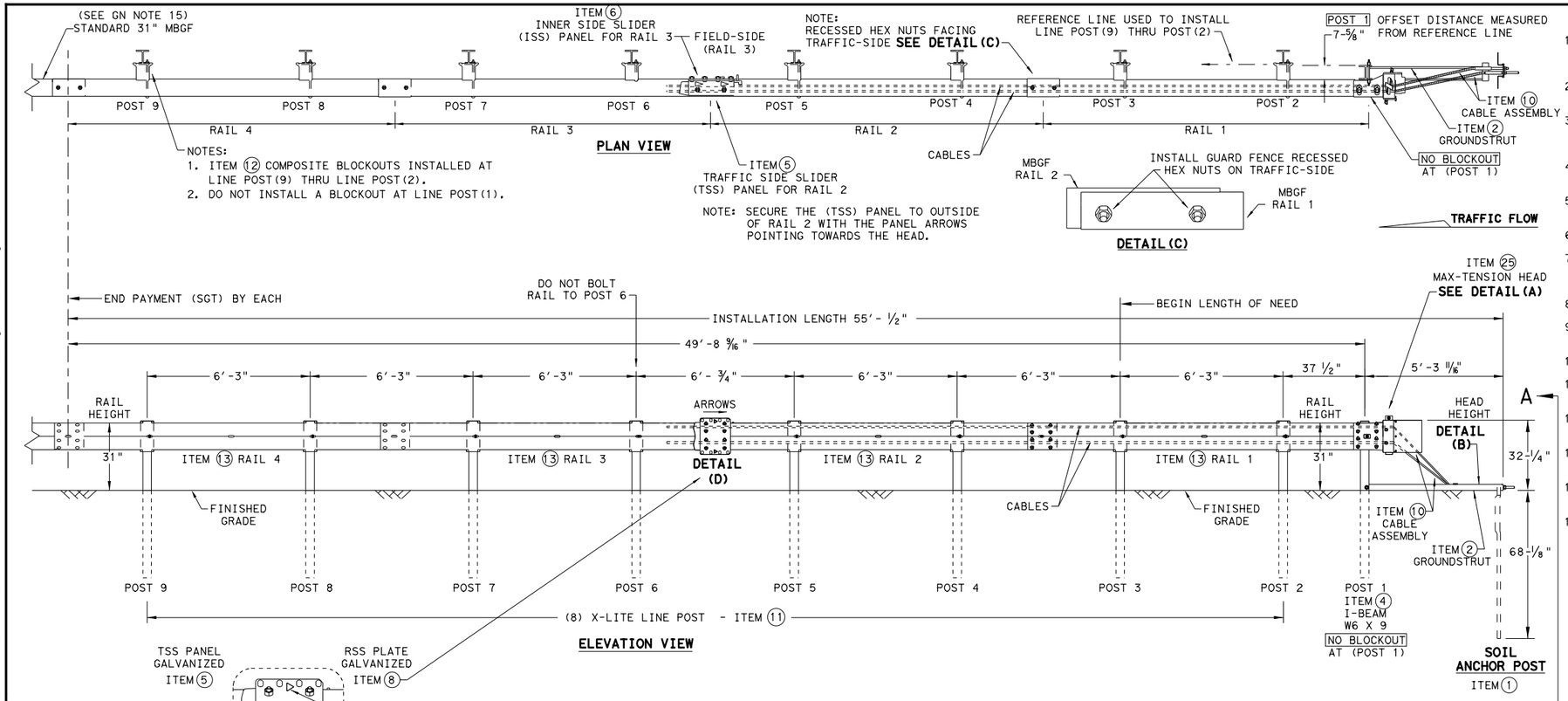
Design Division Standard

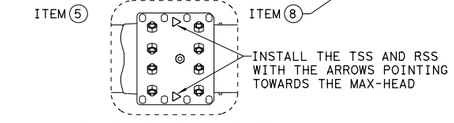
METAL BEAM GUARD FENCE (MOW STRIP) TL-3 MASH COMPLIANT

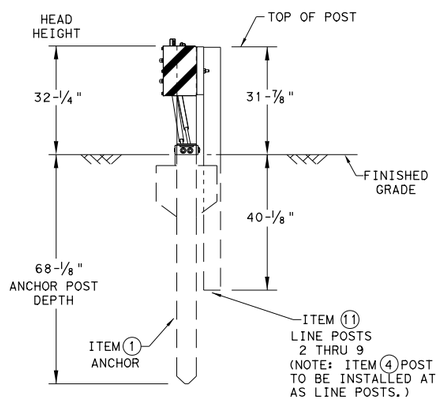
GF(31)MS-19

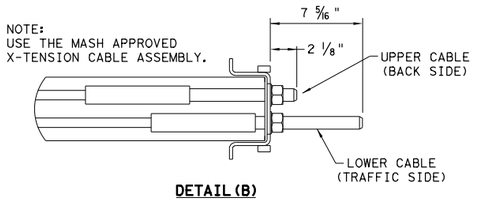
FILE: gf31ms19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG	
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY	
REVISIONS				RH	
	DIST	COUNTY		SHEET NO.	
	AUS	HAYS		30	

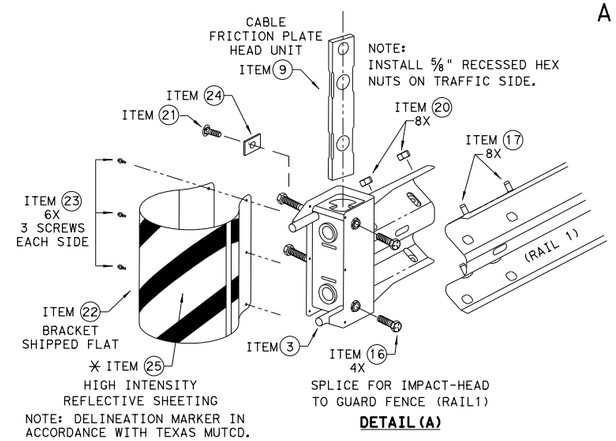
DATE: 10/4/2023
FILE: $FILE$











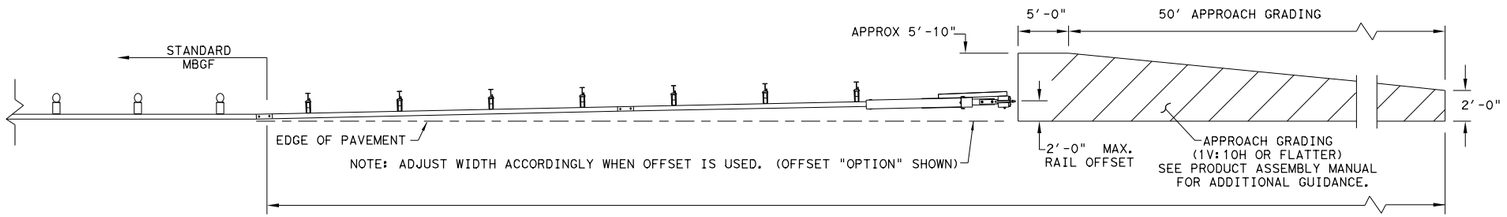
GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: LINDSAY TRANSPORTATION SOLUTIONS (LTS) - BARRIER SYSTEMS, INC. AT (707) 374-6800
2. FOR INSTALLATION, REPAIR, & MAINTENANCE REFER TO THE; MAX-TENSION INSTALLATION INSTRUCTION MANUAL. P/N MANMAX REV D (ECN 3516).
3. APPLY HIGH INTENSITY REFLECTIVE SHEETING, "OBJECT MARKER" ON THE FRONT FACE OF THE DEVICE PER MANUFACTURE'S RECOMMENDATIONS. OBJECT MARKER SHALL CONFORM TO THE STANDARDS REQUIRED IN TEXAS MUTCD.
4. FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.
5. ALL STEEL COMPONENTS ARE GALVANIZED PER ASTM A123 OR EQUIVALENT UNLESS OTHERWISE STATED.
6. SYSTEM SHOWN USING STEEL WIDE FLANGE POST WITH COMPOSITE BLOCKOUTS.
7. COMPOSITE MATERIAL BLOCKOUT THAT MEETS THE REQUIREMENTS OF DMS-7210, MAY BE SUBSTITUTED FOR BLOCKOUTS SIMILAR DIMENSIONS. SEE CONSTRUCTION DIVISION MATERIAL PRODUCER LIST(MPL)FOR CERTIFIED PRODUCERS.
8. REFER TO INSTALLATION MANUAL FOR SPECIFIC PANEL LAPPING GUIDANCE.
9. IF SOLID ROCK IS ENCOUNTERED SEE THE MANUFACTURER'S INSTALLATION MANUAL FOR INSTALLATION GUIDANCE.
10. POSTS SHALL NOT BE SET IN CONCRETE.
11. A DRIVING CAP WITH A TIMBER OR PLASTIC INSERT SHALL BE USED WHEN DRIVING POST TO PREVENT DAMAGE TO THE GALVANIZING ON TOP OF THE POST.
12. MAX-TENSION SYSTEM SHALL NEVER BE INSTALLED WITHIN A CURVED SECTION OF GUARDRAIL.
13. IF A DELINEATION MARKER IS REQUIRED, MARKER SHALL BE IN ACCORDANCE WITH TEXAS MUTCD.
14. THE SYSTEM IS SHOWN WITH 12'-6" MBGF PANELS, 25'-0" MBGF PANELS ARE ALSO ALLOWED.
15. A MINIMUM OF 12'-6" OF 12GA. MBGF IS REQUIRED IMMEDIATELY DOWNSTREAM OF THE MAX-TENSION SYSTEM.

ITEM #	PART NUMBER	DESCRIPTION	QTY
1	BSI-1610060-00	SOIL ANCHOR - GALVANIZED	1
2	BSI-1610061-00	GROUND STRUT - GALVANIZED	1
3	BSI-1610062-00	MAX-TENSION IMPACT HEAD	1
4	BSI-1610063-00	W6x9 I-BEAM POST 6FT.-GALVANIZED	1
5	BSI-1610064-00	TSS PANEL - TRAFFIC SIDE SLIDER	1
6	BSI-1610065-00	ISS PANEL - INNER SIDE SLIDER	1
7	BSI-1610066-00	TOOTH - GEOMET	1
8	BSI-1610067-00	RSS PLATE - REAR SIDE SLIDER	1
9	B061058	CABLE FRICTION PLATE - HEAD UNIT	1
10	BSI-1610069-00	CABLE ASSEMBLY - MASH X-TENSION	2
11	BSI-1012078-00	X-LITE LINE POST-GALVANIZED	8
12	B090534	8" W-BEAM COMPOSITE-BLOCKOUT XT110	8
13	BSI-4004386	12'-6" W-BEAM GUARD FENCE PANELS 12GA.	4
14	BSI-1102027-00	X-LITE SQUARE WASHER	1
15	BSI-2001886	5/8" X 7" THREAD BOLT HH (GR.5)GEOMET	1
16	BSI-2001885	3/4" X 3" ALL-THREAD BOLT HH (GR.5)GEOMET	4
17	4001115	5/8" X 1 1/4" GUARD FENCE BOLTS (GR.2)MGAL	48
18	2001840	5/8" X 10" GUARD FENCE BOLTS MGAL	8
19	2001636	5/8" WASHER F436 STRUCTURAL MGAL	2
20	4001116	5/8" RECESSED GUARD FENCE NUT (GR.2)MGAL	59
21	BSI-2001888	5/8" X 2" ALL THREAD BOLT (GR.5)GEOMET	1
22	BSI-1701063-00	DELINEATION MOUNTING (BRACKET)	1
23	BSI-2001887	1/4" X 3/4" SCREW SD HH 410SS	7
24	4002051	GUARDRAIL WASHER RECT AASHTO FWR03	1
* 25	SEE NOTE BELOW	HIGH INTENSITY REFLECTIVE SHEETING	1
** 26	4002337	8" W-BEAM TIMBER-BLOCKOUT, PDB01B	8
** 27	BSI-4004431	25' W-BEAM GUARDRAIL PANEL,8-SPACE,12GA.	2
28	MANMAX Rev-(D)	MAX-TENSION INSTALLATION INSTRUCTIONS	1

* TO BE PROVIDED BY DISTRIBUTOR OR CONTRACTOR.

** ALTERNATIVE ITEMS NOT SHOWN.
ITEM(26) 8" WOOD-BLOCKOUTS
ITEM(27) 25'GUARD FENCE PANELS



TRAFFIC FLOW

NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE MAX-TENSION END TERMINAL, IT IS NOT INTENDED TO REPLACE THE PRODUCT DESCRIPTION ASSEMBLY MANUAL.

Texas Department of Transportation

Design Division Standard

MAX-TENSION END TERMINAL
MASH - TL-3
SGT(11S)31-18

FILE: sgt11s3118.dgn	DN: TxDOT	CK: KM	DW: TxDOT	CK: CL
© TxDOT: FEBRUARY 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS				RH
	DIST	COUNTY		SHEET NO.
	AUS	HAYS		31

DATE: 10/4/2023
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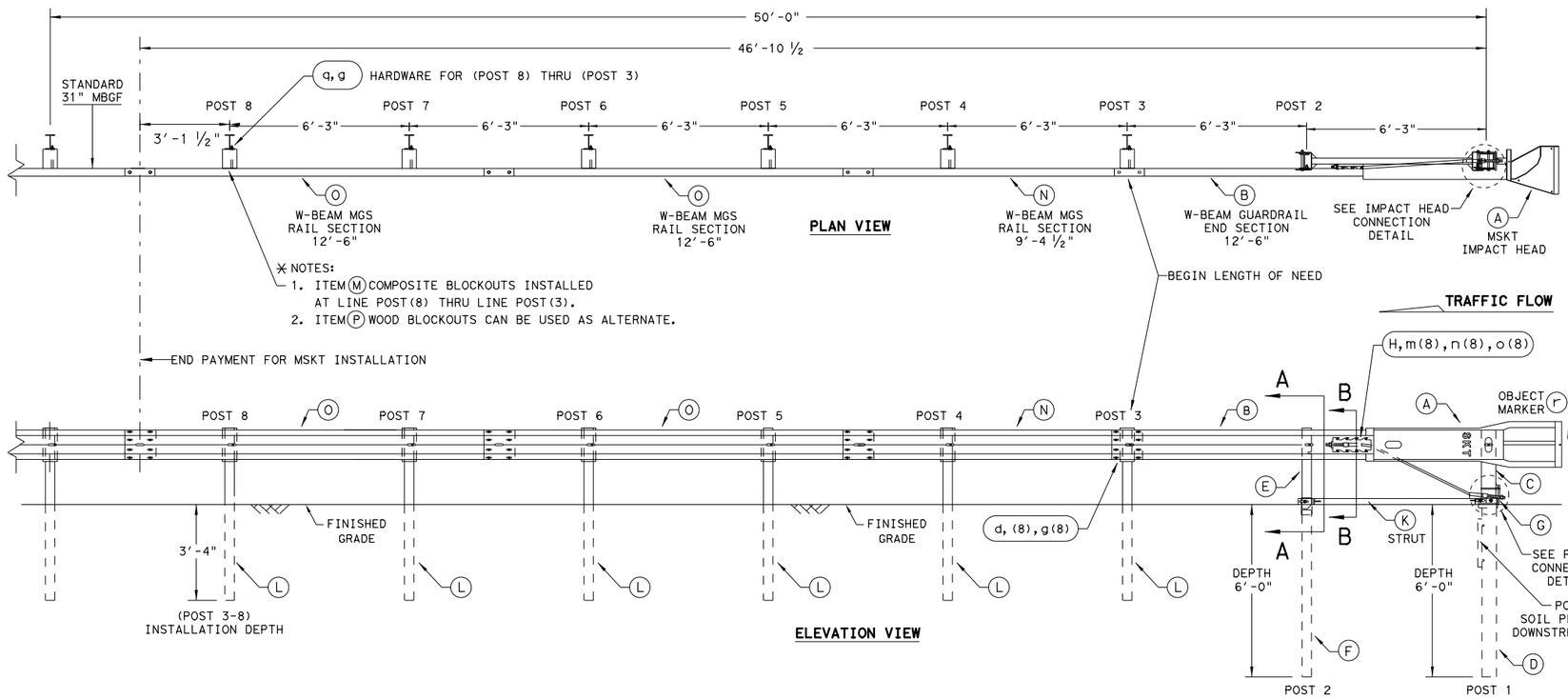


NOTE: SEE (GENERAL NOTE 14) FOR DRIVING CAP INFORMATION.

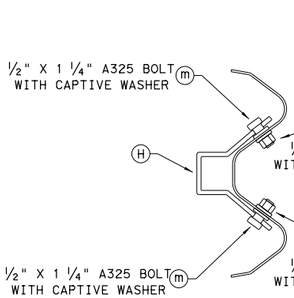
GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: ROAD SYSTEMS, INC. (432)263-2435. 3616 OLD HOWARD COUNTY AIRPORT, BIG SPRING, TX 79720
2. FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE; MSKT END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY MANUAL (PUBLICATION~062717).
3. APPLY HIGH INTENSITY REFLECTIVE SHEETING, "OBJECT MARKER" ON THE FRONT FACE OF THE DEVICE PER MANUFACTURER'S RECOMMENDATIONS. OBJECT MARKER SHALL CONFORM TO THE STANDARDS REQUIRED IN TEXAS MUTCD.
4. FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.
5. HARDWARE (BOLTS, NUTS, & WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
6. SYSTEM SHOWN USING STEEL WIDE FLANGE POSTS WITH COMPOSITE BLOCKOUTS.
7. A COMPOSITE MATERIAL BLOCKOUTS THAT MEETS THE REQUIREMENTS OF DMS-7210, MAY BE SUBSTITUTED FOR BLOCKOUTS OF SIMILAR DIMENSIONS. SEE CONSTRUCTION DIVISION MATERIAL PRODUCER LIST (MPL) FOR CERTIFIED PRODUCERS.
8. IF SOLID ROCK IS ENCOUNTERED IN THE AREA OF (POST 1) AND / OR (POST 2) CONTACT THE MANUFACTURER, & REFER TO THE LATEST ROADWAY MBGF STANDARD FOR INSTALLATION GUIDANCE.
9. POSTS SHALL NOT BE SET IN CONCRETE.
10. SYSTEM MUST BE ATTACHED TO STANDARD 31" MBGF.
11. UNDER NO CIRCUMSTANCES SHALL THE GUARDRAIL WITHIN THE MSKT SYSTEM BE CURVED.
12. A FLARE RATE OF UP TO 25:1 MAY BE USED TO PREVENT THE TERMINAL HEAD FROM ENCROACHING ON THE SHOULDER. THE FLARE MAY BE DECREASED OR ELIMINATED FOR SPECIFIC INSTALLATIONS, IF DIRECTED BY THE ENGINEER.
13. THE SYSTEM IS SHOWN WITH TWO 12′-6" MBGF PANELS, ONE 25′-0" MBGF PANEL IS ALSO ALLOWED IN THEIR PLACE.
14. A DRIVING CAP WITH A TIMBER OR PLASTIC INSERT SHALL BE USED WHEN DRIVING POSTS 3-8 TO PREVENT DAMAGE TO THE GALVANIZING ON TOP OF THE POST. SPECIAL DRIVING CAP TO BE USED ON LOWER POSTS 1 & 2 TO PREVENT DAMAGE TO THE WELDED PLATES.

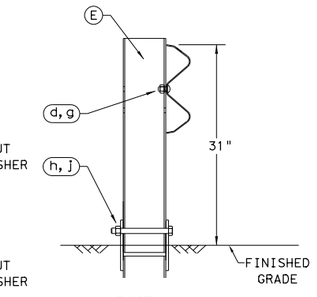
ITEM	QTY	MAIN SYSTEM COMPONENTS	ITEM NUMBERS
A	1	MSKT IMPACT HEAD	MS3000
B	1	W-BEAM GUARDRAIL END SECTION, 12 Ga.	SF1303
C	1	POST 1 - TOP (6" X 6" X ⅛" TUBE)	MTPHP1A
D	1	POST 1 - BOTTOM (6′ W6X15)	MTPHP1B
E	1	POST 2 - ASSEMBLY TOP	UHP2A
F	1	POST 2 - ASSEMBLY BOTTOM (6′ W6X9)	HP2B
G	1	BEARING PLATE	E750
H	1	CABLE ANCHOR BOX	S760
J	1	BCT CABLE ANCHOR ASSEMBLY	E770
K	1	GROUND STRUT	MS785
L	6	W6x9 OR W6x8.5 STEEL POST	P621
M	6	COMPOSITE BLOCKOUTS	CBSP-14
N	1	W-BEAM MGS RAIL SECTION (9′-4 ½")	G12025
O	2	W-BEAM MGS RAIL SECTION (12′-6")	G1203A
P	6	WOOD BLOCKOUT 6" X 8" X 14"	P675
Q	1	W-BEAM MGS RAIL SECTION (25′-0")	G1209
		SMALL HARDWARE	
a	2	⅝" x 1" HEX BOLT (GRD 5)	B5160104A
b	4	⅝" WASHER	W0516
c	2	⅝" HEX NUT	N0516
d	25	⅝" Dia. x 1 ¼" SPLICE BOLT (POST 2)	B580122
e	2	⅝" Dia. x 9" HEX BOLT (GRD A449)	B580904A
f	3	⅝" WASHER	W050
g	33	⅝" Dia. H.G.R NUT	N050
h	1	¾" Dia. x 8 ½" HEX BOLT (GRD A449)	B340854A
j	1	¾" Dia. HEX NUT	N030
k	2	1 ANCHOR CABLE HEX NUT	N100
l	2	1 ANCHOR CABLE WASHER	W100
m	8	½" x 1 ¼" A325 BOLT WITH CAPTIVE WASHER	SB12A
n	8	½" STRUCTURAL NUTS	N012A
o	8	1 1/16" O.D. x 9/16" I.D. STRUCTURAL WASHERS	W012A
p	1	BEARING PLATE RETAINER TIE	CT-100ST
q	6	⅝" x 10" H.G.R. BOLT	B581002
r	1	OBJECT MARKER 18" X 18"	E3151

SEE NOTES: ✳

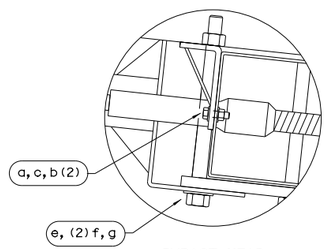
ALTERNATIVE ITEMS NOT SHOWN. ✳✳
✳ ITEM(P) 8" WOOD-BLOCKOUT
✳✳ ITEM(Q) 25′GUARD FENCE PANEL



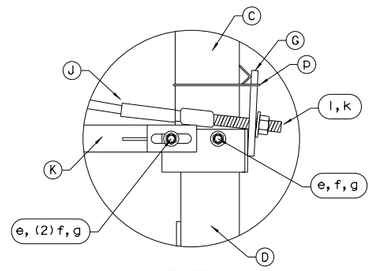
SECTION B-B
ANCHOR BRACKET



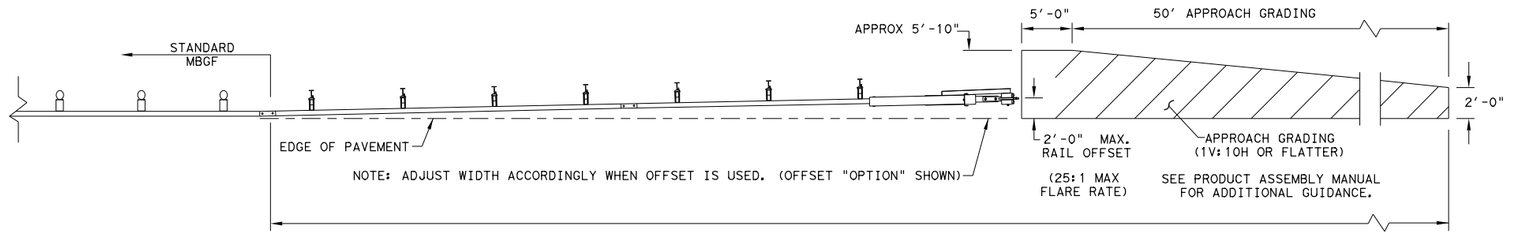
POST 2
SECTION A-A



IMPACT HEAD
CONNECTION DETAIL



POST 1
CONNECTION DETAIL



APPROACH GRADING AT GUARDRAIL END TREATMENTS

TRAFFIC FLOW

NOTE: TXDOT GENERIC APPROACH GRADING LAYOUT USED FOR ALL TANGENT TYPE END TREATMENTS.

NOTE: THIS STANDARD IS A BASIC REPRESENTATION OF THE MSKT END TERMINAL, IT IS NOT INTENDED TO REPLACE THE PRODUCT DESCRIPTION ASSEMBLY MANUAL.

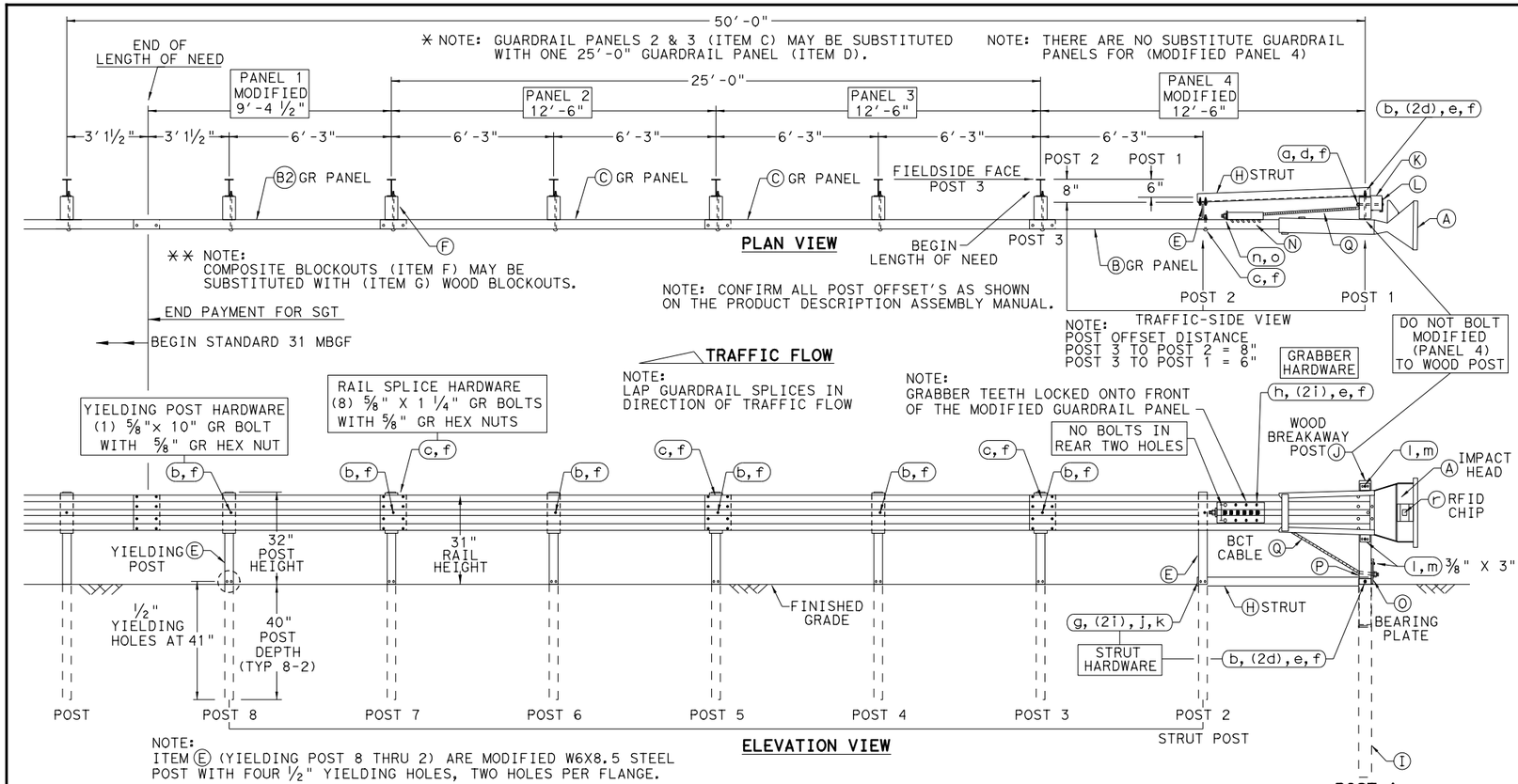
Texas Department of Transportation

Design Division Standard

SINGLE GUARDRAIL TERMINAL
MSKT-MASH-TL-3
SGT(12S)31-18

FILE: sgt12s3118.dgn	DN:TxDOT	CK:KM	DW:VP	CK:CL	
© TxDOT: APRIL 2018	CONT	SECT	JOB	HIGHWAY	
REVISIONS				RH	
	DIST	COUNTY		SHEET NO.	
	AUS	HAYS		32	

DATE: 10/4/2023
FILE: $FILE$

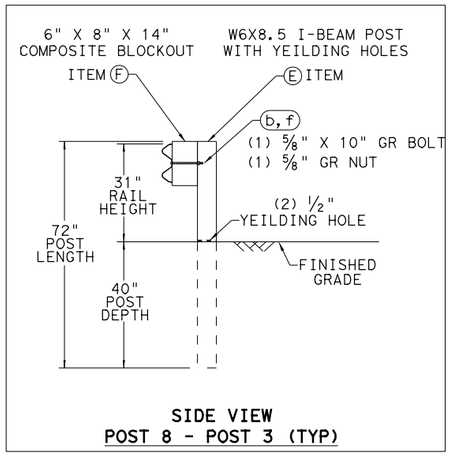


GENERAL NOTES

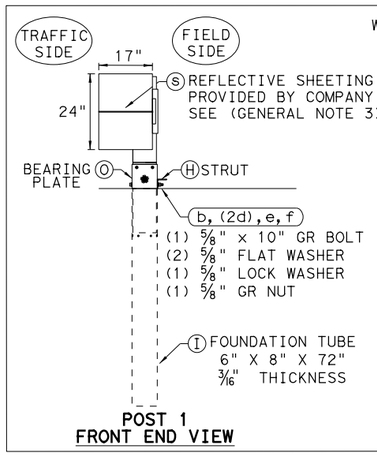
1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: SPIG INDUSTRY, INC. AT 1(267) 644-9510. 14675 INDUSTRIAL PARK RD; BRISTOL, VA 24202
2. FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE MANUFACTURER'S; SGET END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY MANUAL.
3. MANUFACTURER WILL APPLY HIGH INTENSITY REFLECTIVE SHEETING, "OBJECT MARKER" TO THE FACE PLATE OF THE DEVICE PER MANUFACTURER'S RECOMMENDATIONS. THE OBJECT MARKER SHALL CONFORM TO THE STANDARDS REQUIRED IN TEXAS MUTCD.
4. THE NOMINAL HEIGHT OF THE GUARDRAIL BEAM IS 31 INCHES WITH A TOLERANCE OF +/- ONE INCH.
5. FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.
6. (POST 2 THROUGH POST 8) ARE MODIFIED STEEL-YIELDING POSTS WITH YIELDING HOLES AT GROUND LEVEL. THERE ARE NO SUBSTITUTE POSTS.
7. POSTS SHALL NOT BE SET IN CONCRETE.
8. IF SOLID ROCK IS ENCOUNTERED FOR ANY OF THE POSTS IN THE SYSTEM, CONTACT THE MANUFACTURER FOR SPECIFIC INSTALLATION GUIDANCE.
9. HARDWARE (BOLTS, NUTS, & WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445,"GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
10. A COMPOSITE MATERIAL BLOCKOUT THAT MEETS DMS-7210 REQUIREMENTS MAY BE SUBSTITUTED FOR AN APPROVED WOOD BLOCKOUT. SEE CONSTRUCTION DIVISION MATERIAL PRODUCER LIST (MPL) FOR CERTIFIED PRODUCERS.
11. THE ENTIRE SYSTEM MUST BE INSTALLED IN A STRAIGHT LINE WITHOUT ANY CURVE. HOWEVER, THE SYSTEM CAN BE OFFSET BY TWO FEET AS SHOWN ON THE APPROACH GRADING DETAIL TO HELP OFF-SET THE IMPACT HEAD FROM SHOULDER OF THE ROAD.

ITEM	QTY	MAIN SYSTEM COMPONENTS	ITEM #
A	1	SGET IMPACT HEAD	SIH1A
B	1	MODIFIED GUARDRAIL PANEL 12'-6" 12GA	126SPZGP
B2	1	MODIFIED GUARDRAIL PANEL 9'-4 1/2" 12GA	GP94
C	2	STANDARD GUARDRAIL PANEL 12'-6" 12GA	GP126
D	1	STANDARD GUARDRAIL PANEL 25'-0" 12GA	GP25
E	7	MODIFIED YIELDING I-BEAM POST W6x8.5	YP6MOD
F	6	COMPOSITE BLOCKOUT 6" X 8" X 14"	CBO8
G	6	WOOD BLOCKOUT 6" X 8" X 14"	WBO8
H	1	STRUT 3" X 3" X 80" x 1/4" A36 ANGLE	STR80
I	1	FOUNDATION TUBE 6" X 8" X 72" x 3/16"	FNDT6
J	1	WOOD BREAKAWAY POST 5 1/2" x 7 1/2" x 50"	WBRK50
K	1	WOOD STRIKE BLOCK	WSBLK14
L	1	STRIKE PLATE 1/4" A36 BENT PLATE	SPLT8
M	1	REINFORCEMENT PLATE 12 GA. GR55	REPLT17
N	1	GUARDRAIL GRABBER 2 1/2" X 2 1/2" X 16 1/2"	GGR17
O	1	BEARING PLATE 8" X 8 5/8" X 5/8" A36	BPLT8
P	1	PIPE SLEEVE 4 1/4" X 2 3/8" O.D. (2 1/8" I.D.)	PSLV4
Q	1	BCT CABLE 3/4" X 81" LENGTH	CBL81
		SMALL HARDWARE	
a	1	5/8" X 12" GUARDRAIL BOLT 307A HDG	12GRBLT
b	7	5/8" X 10" GUARDRAIL BOLT 307A HDG	10GRBLT
c	33	5/8" X 1 1/4" GR SPLICE BOLTS 307A HDG	1GRBLT
d	3	5/8" FLAT WASHER F436 A325 HDG	58FW436
e	1	5/8" LOCK WASHER HDG	58LW
f	39	5/8" GUARDRAIL HEX NUT HDG	58HN563
g	2	1/2" X 2" STRUT BOLT A325 HDG	2BLT
h	6	1/2" X 1 1/4" PLATE BOLT A325 HDG	125BLT
i	16	1/2" FLAT WASHER F436 A325 HDG	12FWF436
j	8	1/2" LOCK WASHER HDG	12LW
k	8	1/2" HEX NUT A563 HDG	12HN563
l	4	3/8" X 3" HEX LAG SCREW GR5 HDG	38LS
m	4	3/8" FLAT WASHER F436 A325 HDG	38FW844
n	2	1" FLAT WASHER F436 A325 HDG	1FWF436
o	2	1" HEX NUT A563DH HDG	1HN563
p	1	18" TO 24" LONG ZIP TIE RATED 175-200LB	ZPT18
q	1	1 1/2" X 4" SCH-40 PVC PIPE	PSPCR4
r	1	RFID CHIP RATED MIL-STD-810F	RFID810F
s	1	IMPACT HEAD REFLECTIVE SHEETING	RS30M

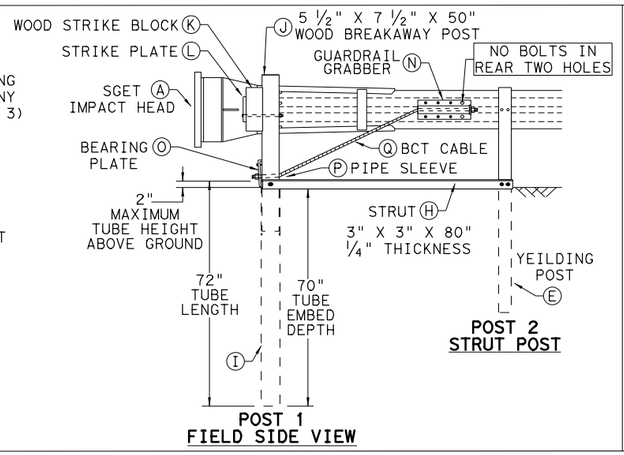
ALTERNATIVE ITEMS
NOTE: SEE PLAN VIEW
* D E
** G



SIDE VIEW
POST 8 - POST 3 (TYP)

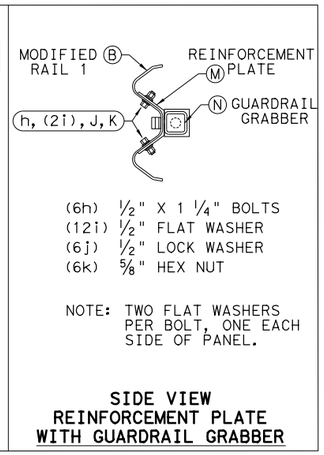


POST 1
FRONT END VIEW

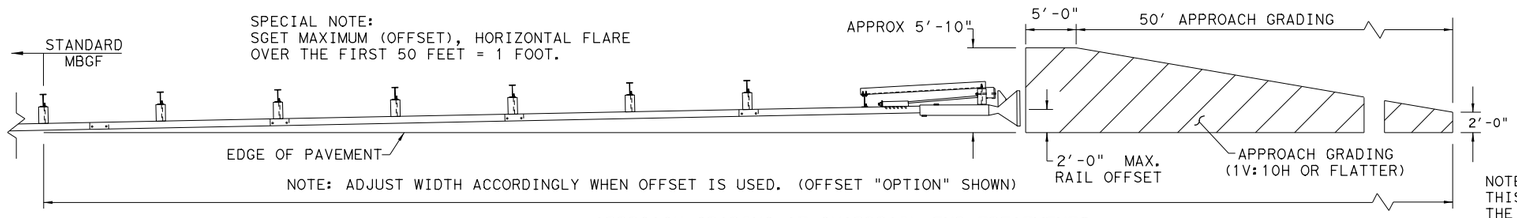


POST 1
FIELD SIDE VIEW

POST 2
STRUT POST



SIDE VIEW
REINFORCEMENT PLATE
WITH GUARDRAIL GRABBER



APPROACH GRADING AT GUARDRAIL END TREATMENTS

NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE SGET TERMINAL SYSTEM AND IS NOT INTENDED TO REPLACE THE MANUFACTURER'S ASSEMBLY MANUAL.

Texas Department of Transportation

Design Division Standard

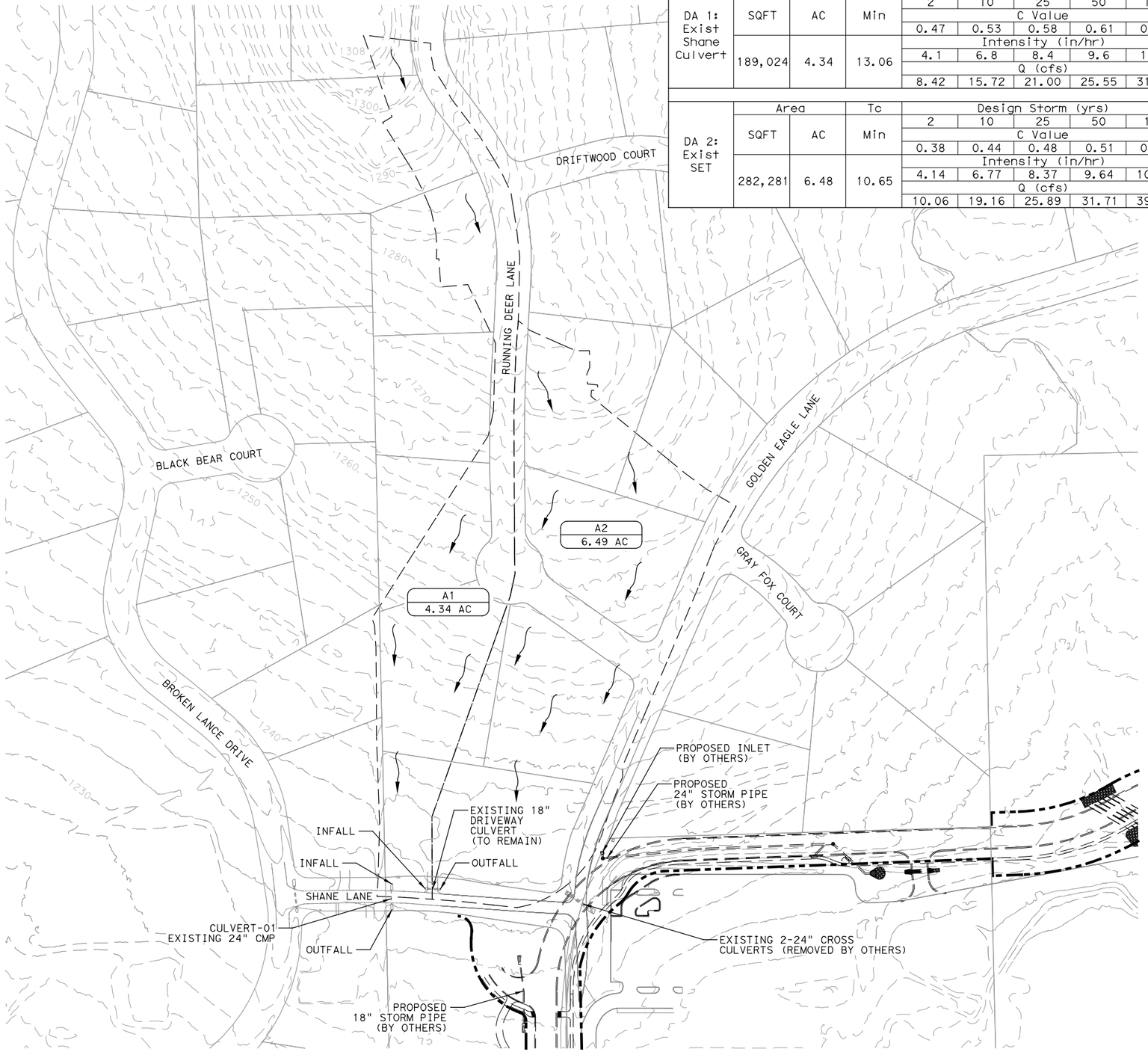
SPIG INDUSTRY, LLC
SINGLE GUARDRAIL TERMINAL
SGET - TL-3 - MASH
SGT(15)31-20

FILE: sgt15320.dgn	DN: TxDOT		CK: KM	DW: VP		CK: VP
©TxDOT: APRIL 2020	CONT	SECT	JOB		HIGHWAY	
REVISIONS					RH	
	DIST	COUNTY			SHEET NO.	
	AUS	HAYS			33	

DATE: 10/4/2023
FILE: $FILE$

H&H Summary Table (Exisitng Conditions)								
	Area		Tc	Design Storm (yrs)				
DA 1: Exist Shane Culvert	SQFT	AC	Min	2	10	25	50	100
				C Value				
				0.47	0.53	0.58	0.61	0.65
	189,024	4.34	13.06	Intensity (in/hr)				
				4.1	6.8	8.4	9.6	11.0
				Q (cfs)				
				8.42	15.72	21.00	25.55	31.14

	Area		Tc	Design Storm (yrs)				
DA 2: Exist SET	SQFT	AC	Min	2	10	25	50	100
				C Value				
				0.38	0.44	0.48	0.51	0.55
	282,281	6.48	10.65	Intensity (in/hr)				
				4.14	6.77	8.37	9.64	10.97
				Q (cfs)				
				10.06	19.16	25.89	31.71	39.00



N

LEGEND

XX
X.XX AC
DRAINAGE AREA ID
TOTAL AREA

DRAINAGE AREA BOUNDARY
FLOW ARROW
-820- EXIST CONTOURS
820 PROP CONTOURS
PROPOSED CONSTRUCTION BY OTHERS

NOTES:

1. HAYS COUNTY TECHNICAL CRITERIA AND CITY OF AUSTIN CRITERIA DRAINAGE MANUAL (DCM) WERE USED FOR ALL HYDRAULIC COMPUTATIONS
2. HY-8 WAS USED TO MODEL THE EXTENSION OF THE EXISTING SHANE LANE CROSS CULVERT. CHANGES RESULT IN A MINOR DECREASE TO THE HEADWATER ELEVATION.
3. THE DESIGN STORM FOR THIS PROJECT IS THE 25-YR STORM EVENT.

0 100 200 300 400
SCALE IN FEET

STATE OF TEXAS
FELIPE S. TUDTUD
104836
LICENSED
PROFESSIONAL ENGINEER
10/04/2023

NO.	DATE	REVISION	APPROVED

HDR
Firm Registration No. F-754
710 Hesters Crossing, Suite 150
Round Rock, Texas 78681
512.685.2900

THE CITY OF DRIPPING SPRINGS TEXAS

ROGER HANKS

EXISTING DRAINAGE AREA MAP

SCALE: 1"=200' SHEET 1 OF 2

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
				RH
GRAPHICS AT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	AUS	HAYS	
CHECK	CONTROL	SECTION	JOB	34

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: LGOMEZGONZ
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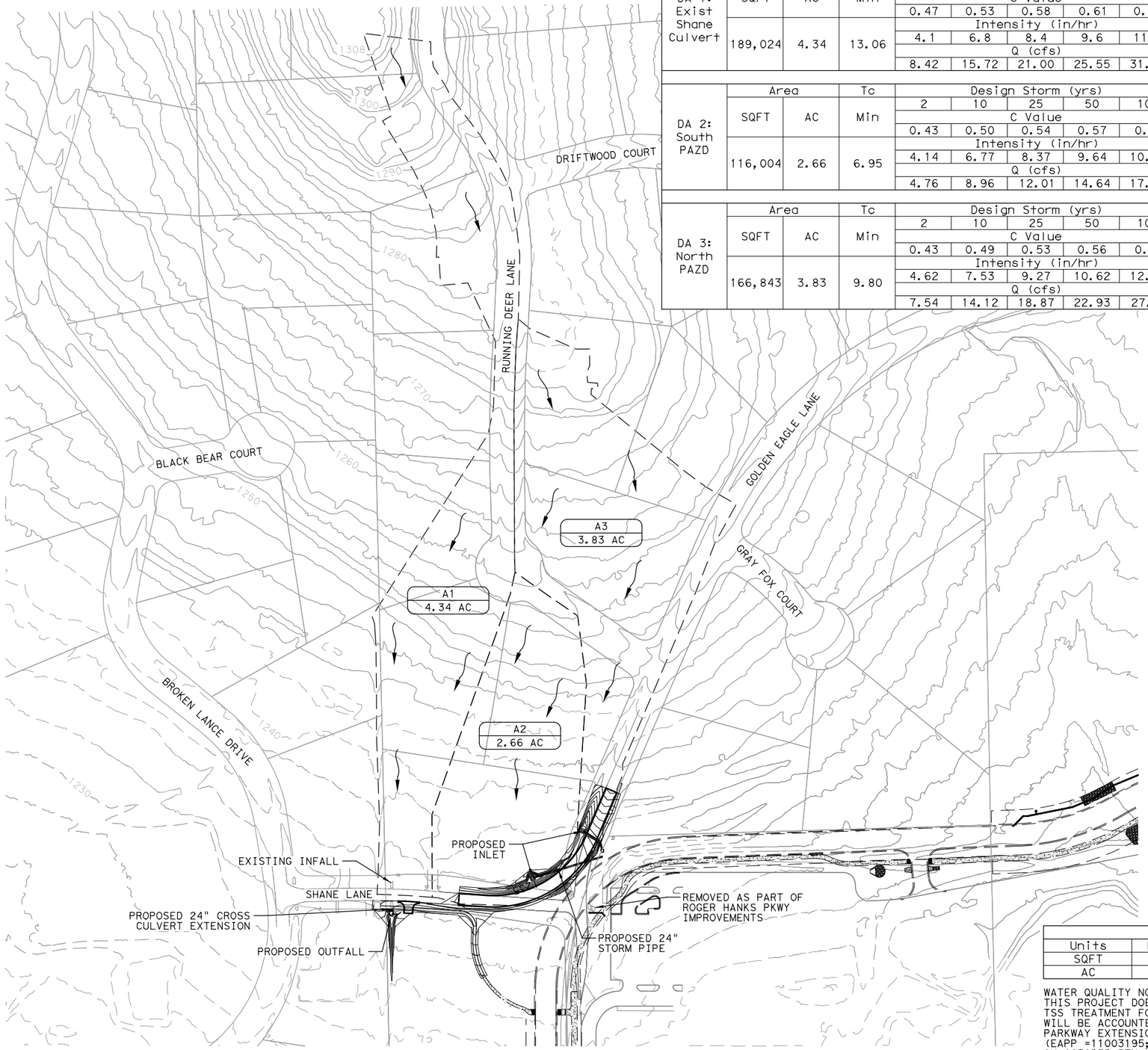
PENTABLE: 10338078.tbl
DATE: 10/4/2023 TIME: 8:15:00 AM SCALE: 1:200



H&H Summary Table (Proposed Conditions)								
DA 1: Exist Shane Culvert	Area		Tc	Design Storm (yrs)				
	SQFT	AC	Min	2	10	25	50	100
				C Value				
	189,024	4.34	13.06	0.47	0.53	0.58	0.61	0.65
				Intensity (in/hr)				
				4.1	6.8	8.4	9.6	11.0
				Q (cfs)				
				8.42	15.72	21.00	25.55	31.14
DA 2: South PAZD	Area		Tc	Design Storm (yrs)				
	SQFT	AC	Min	2	10	25	50	100
				C Value				
	116,004	2.66	6.95	0.43	0.50	0.54	0.57	0.61
				Intensity (in/hr)				
				4.14	6.77	8.37	9.64	10.97
				Q (cfs)				
				4.76	8.96	12.01	14.64	17.90
DA 3: North PAZD	Area		Tc	Design Storm (yrs)				
	SQFT	AC	Min	2	10	25	50	100
				C Value				
	166,843	3.83	9.80	0.43	0.49	0.53	0.56	0.61
				Intensity (in/hr)				
				4.62	7.53	9.27	10.62	12.04
				Q (cfs)				
				7.54	14.12	18.87	22.93	27.91

TSS Treatment Data	
HDR Required TSS (lbs)	115
KHA Extra TSS (lbs)	187

Impervious Cover			
Units	Existing	Proposed	Increase
SQFT	20,300	26,136	5,663
AC	0.47	0.60	0.13

WATER QUALITY NOTE:
THIS PROJECT DOES NOT PROPOSE ANY BMPS. THE REQUIRED TSS TREATMENT FOR THE INCREASE IN IMPERIOUS COVER WILL BE ACCOUNTED FOR IN THE ADJACENT ROGER HANKS PARKWAY EXTENSION PROJECT. THE ADJACENT PROJECT (EAPP =11003195; RN109124040) RECEIVED CZP APPROVAL ON OCTOBER 7TH, 2022, AND INCLUDES BMPS WITH MORE TREATMENT CAPACITY THAN REQUIRED ACCORDING TO THE CZP AND PLAN SET. THE EXTRA TREATMENT OF TSS FOR THE KHA PROJECT IS MORE THAN THE REQUIRED TSS FOR THIS PROJECT. A CZP EXCEPTION REQUEST STATING THIS IS TO BE SUBMITTED AT A FUTURE DATE.

N

LEGEND

XX
X.XX AC
DRAINAGE AREA ID
TOTAL AREA

DRAINAGE AREA BOUNDARY
FLOW ARROW
-820- EXIST CONTOURS
820 PROP CONTOURS
PROPOSED CONSTRUCTION BY OTHERS

NOTES:

1. HAYS COUNTY TECHNICAL CRITERIA AND CITY OF AUSTIN CRITERIA DRAINAGE MANUAL (DCM) WERE USED FOR ALL HYDRAULIC COMPUTATIONS
2. HY-8 WAS USED TO MODEL THE EXTENSION OF THE EXISTING SHANE LANE CROSS CULVERT. CHANGES RESULT IN A MINOR DECREASE TO THE HEADWATER ELEVATION.
3. THE DESIGN STORM FOR THIS PROJECT IS THE 25-YR STORM EVENT.

0 100 200 300 400
SCALE IN FEET

STATE OF TEXAS
FELIPE S. TUDTUD
104836
LICENSED PROFESSIONAL ENGINEER
10/04/2023

NO.	DATE	REVISION	APPROVED

HDR
Firm Registration No. F-754
710 Hesters Crossing, Suite 150
Round Rock, Texas 78681
512.685.2900

THE CITY OF DRIPPING SPRINGS TEXAS

ROGER HANKS

PROPOSED DRAINAGE AREA MAP

SCALE: 1"=200' SHEET 2 OF 2

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
				RH
GRAPHICS AT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	AUS	HAYS	
CHECK	CONTROL	SECTION	JOB	35

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
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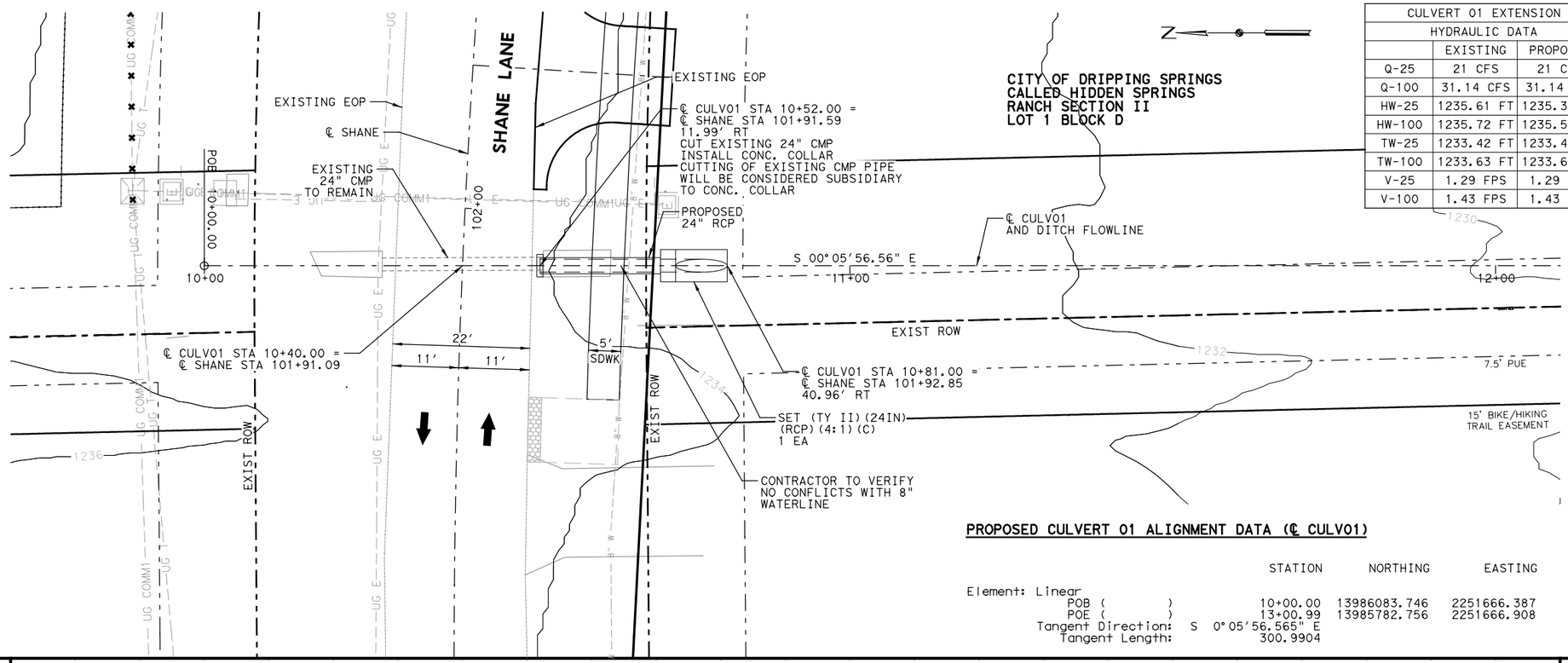


CULVERT 01 EXTENSION		
HYDRAULIC DATA		
	EXISTING	PROPOSED
Q-25	21 CFS	21 CFS
Q-100	31.14 CFS	31.14 CFS
HW-25	1235.61 FT	1235.38 FT
HW-100	1235.72 FT	1235.59 FT
TW-25	1233.42 FT	1233.42 FT
TW-100	1233.63 FT	1233.63 FT
V-25	1.29 FPS	1.29 FPS
V-100	1.43 FPS	1.43 FPS

LEGEND

- -820- EXIST CONTOURS
- —820— PROP CONTOURS
- EXIST ROW
- PROPOSED CONSTRUCTION BY OTHERS

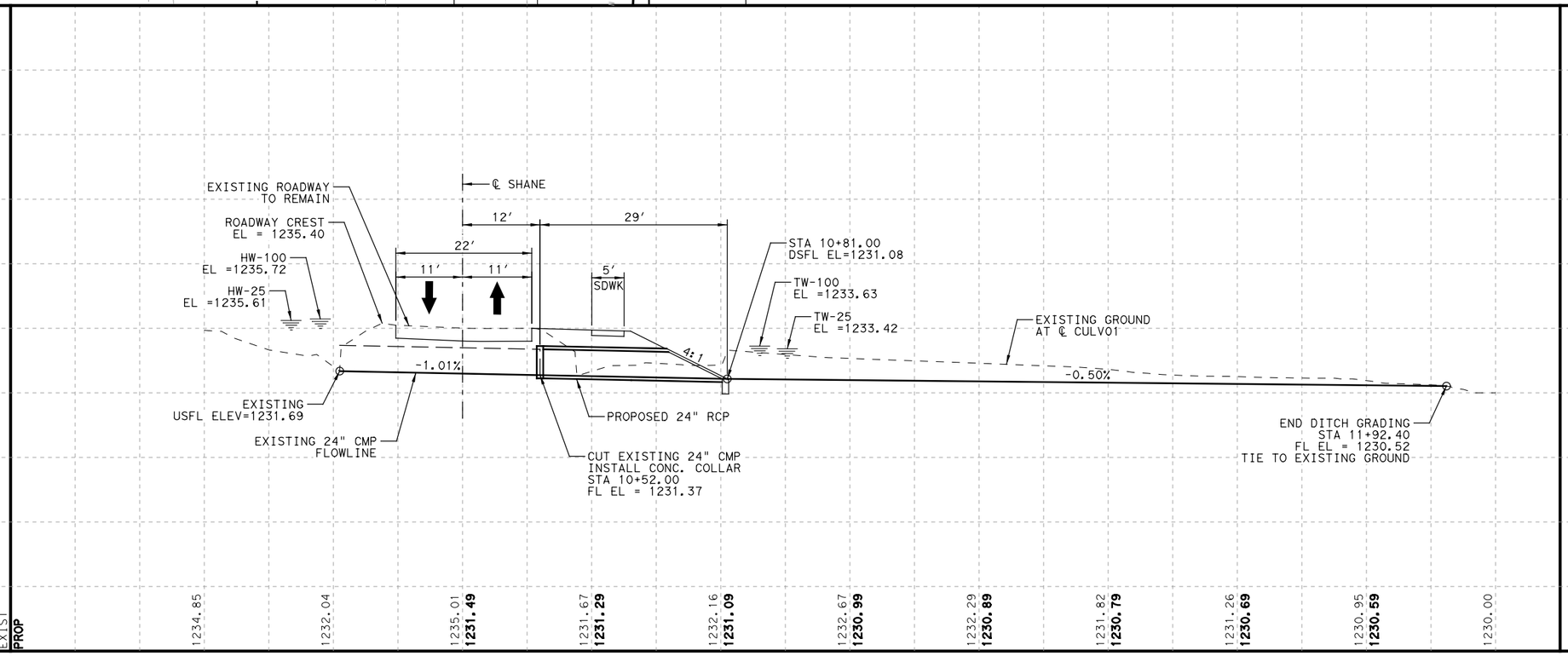
NOTES:

1. HAYS COUNTY TECHNICAL CRITERIA AND CITY OF AUSTIN CRITERIA DRAINAGE MANUAL (DCM) WERE USED FOR ALL HYDRAULIC COMPUTATIONS.
2. HY-8 WAS USED TO MODEL THE EXTENSION OF THE EXISTING SHANE LANE CROSS CULVERT. CHANGES RESULT IN A MINOR DECREASE TO THE HEADWATER ELEVATION.
3. THE UTILITY INFORMATION SHOWN IS PROVIDED BY OTHERS. THIS INFORMATION WAS OBTAINED SOLELY FOR THE USE OF THE ENGINEERING DESIGN OF THE PROJECT. THE ACCURACY AND SUFFICIENCY OF THE INFORMATION SHOWN IS NOT GUARANTEED. THE CONTRACTOR SHALL FIELD VERIFY UTILITY LIMITS AND LOCATIONS PRIOR TO CONSTRUCTION.

PROPOSED CULVERT 01 ALIGNMENT DATA (℄ CULV01)

		STATION	NORTHING	EASTING
Element: Linear				
POB	( )	10+00.00	13986083.746	2251666.387
POE	( )	13+00.99	13985782.756	2251666.908
Tangent Direction:		S 0°05′56.565" E		
Tangent Length:		300.9904		

H: 0 10 20 30 40
V: 0 5 10 15 20
SCALE IN FEET



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DATE: 10/4/2023
TIME: 8:15:10 AM
SCALE: 1:20

STATE OF TEXAS
FELIPE S. TUDTUD
104836
LICENSED PROFESSIONAL ENGINEER
10/04/2023

NO.	DATE	REVISION	APPROVED

HDR
Firm Registration No. F-754
710 Hesters Crossing, Suite 150
Round Rock, Texas 78681
512.685.2900

THE CITY OF DRIPPING SPRINGS TEXAS

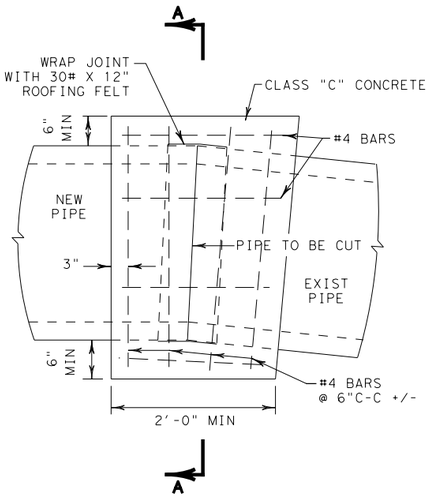
ROGER HANKS

CULVERT 01 LAYOUT

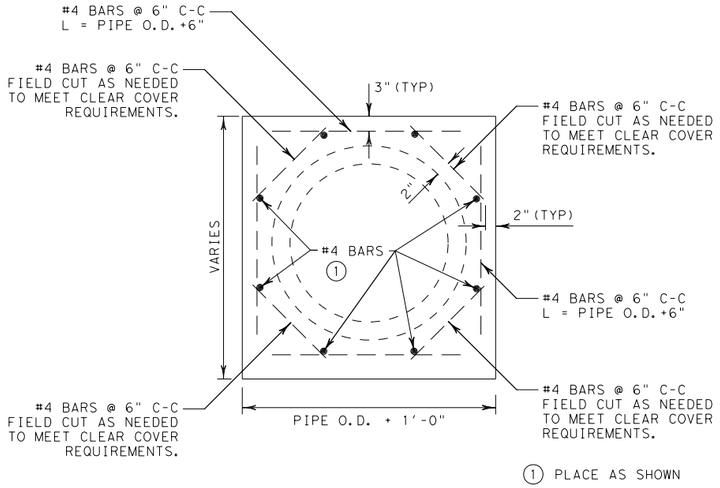
SCALE: 1"=10′-H
1"=5′-V

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
				RH
GRAPHICS AT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	AUS	HAYS	36
CHECK	CONTROL	SECTION	JOB	



PLAN/ELEVATION



SECTION A-A

PIPE COLLAR DETAIL

FOR HORIZONTAL OR VERTICAL PLACEMENT
N.T.S.

PIPE COLLAR GENERAL NOTES

1. THE CONTRACTOR SHALL TAKE STEPS TO ENSURE A SMOOTH JOINT ALONG THE INSIDE WALL OF PIPE.
2. ANY SPILLAGE OF CONCRETE THROUGH THE JOINT SHALL BE REMOVED AND THE INSIDE PIPE SURFACES SMOOTHED AS DIRECTED BY THE ENGINEER.
3. PIPE COLLARS WILL NOT BE PAID FOR DIRECTLY, BUT SHALL BE CONSIDERED SUBSIDIARY TO ITEM 464.

STATE OF TEXAS
FELIPE S. TUDTUD
104836
LICENSED PROFESSIONAL ENGINEER
10/04/2023

NO.	DATE	REVISION	APPROVED

HDR
Firm Registration No. F-754
710 Hesters Crossing, Suite 150
Round Rock, Texas 78681
512.685.2900

THE CITY OF DRIPPING SPRINGS TEXAS

ROGER HANKS DRAINAGE DETAILS

NTS

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
FT				RH
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	HAYS	
CHECK	CONTROL	SECTION	JOB	37
CHECK				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: LGOMEZGONZ
FILE: RH-DRN-DETAILS1.dgn
PENTABLE: 10338078.tbl
DATE: 10/4/2023 TIME: 8:22:14 AM SCALE: 1:1

	Size	MAX DEPTH = 15 ft. to top of BASE SLAB										MAX DEPTH = 25 ft. to top of BASE SLAB										Min Height (See Gen Note 3)	Max HOLE DIA (See Fab Note 2)	Max KO DIA (See Fab Note 2)
		Base Slab			Base Unit or Riser Walls			Below Grade Slab (w/PJB) Reducing Slab (w/PB)				Base Slab			Base Unit or Riser Walls			Below Grade Slab (w/PJB) Reducing Slab (w/PB)						
		Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Reduced Riser Size	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Reduced Riser Size	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness			
	X x Y	Ashort	Along	BS	Bshort	Blong	W	RWSxRWL or ID	Dshort	Dlong	TS	Ashort	Along	BS	Bshort	Blong	W	RWSxRWL or ID	Dshort	Dlong	TS	BH MIN	HOLE DIA	KO DIA
	ft.	in^2/ft	in^2/ft	in.	in^2/ft	in^2/ft	in.	ft. **	in^2/ft	in^2/ft	in.	in^2/ft	in^2/ft	in.	in^2/ft	in^2/ft	in.	ft. **	in^2/ft	in^2/ft	in.	ft.	in.	in.
Precast Junction Box (PJB)	3x3	0.23	0.23	6	0.19	0.19	6	N/A	0.37	0.37	9	0.29	0.29	6	0.24	0.24	6	N/A	0.37	0.37	9	3.5	36	36
	4x4	0.29	0.29	6	0.24	0.24	6	N/A	0.41	0.41	9	0.47	0.47	6	0.38	0.38	6	N/A	0.41	0.41	9	4.5	48	48
	3x5	0.29	0.18	6	0.19	0.35	6	N/A	0.48	0.48	9	0.39	0.18	6	0.23	0.59	6	N/A	0.48	0.48	9	3.5	36/60	36/60
	4x5	0.36	0.18	6	0.22	0.34	6	N/A	0.42	0.42	9	0.53	0.26	6	0.39	0.59	6	N/A	0.42	0.42	9	4.5	48/60	48/60
	5x5	0.36	0.36	6	0.34	0.34	6	N/A	0.43	0.43	9	0.62	0.62	6	0.59	0.59	6	N/A	0.43	0.43	9	5.5	60	60
	5x6	0.27	0.27	9	0.34	0.45	6	N/A	0.48	0.48	9	0.47	0.45	9	0.38	0.54	8	N/A	0.48	0.48	9	5.5	60/72	60/72
	6x6	0.27	0.27	9	0.45	0.45	6	N/A	0.56	0.56	9	0.52	0.52	9	0.54	0.54	8	N/A	0.56	0.56	9	6.5	72	72
	8x8	0.46	0.46	9	0.51	0.51	8	N/A	0.45	0.45	12	0.87	0.87	9	0.59	0.59	10	N/A	0.45	0.45	12	8.5	96	72
Precast Base (PB)	3x3	0.23	0.23	6	0.19	0.19	6	N/A	N/A	N/A	N/A	0.29	0.29	6	0.24	0.24	6	N/A	N/A	N/A	N/A	3.5	36	36
	4x4	0.29	0.29	6	0.24	0.24	6	N/A	N/A	N/A	N/A	0.47	0.47	6	0.38	0.38	6	N/A	N/A	N/A	N/A	4.5	48	48
	3x5	0.29	0.18	6	0.19	0.35	6	3x3	0.30	0.34	9	0.39	0.18	6	0.23	0.59	6	3x3	0.40	0.40	9	3.5	36/60	36/60
	4x5	0.36	0.18	6	0.22	0.34	6	3x3	0.30	0.30	9	0.53	0.26	6	0.39	0.59	6	3x3	0.46	0.37	9	4.5	48/60	48/60
	4x5	0.36	0.18	6	0.22	0.34	6	4x4	0.30	0.30	9	0.53	0.26	6	0.39	0.59	6	4x4	0.39	0.39	9	4.5	48/60	48/60
	4x5	0.36	0.18	6	0.22	0.34	6	48"	0.39	0.39	9	0.53	0.26	6	0.39	0.59	6	48"	0.47	0.47	9	4.5	48/60	48/60
	4x5	0.36	0.18	6	0.22	0.34	6	3x5	0.33	0.40	9	0.53	0.26	6	0.39	0.59	6	3x5	0.48	0.48	9	4.5	48/60	48/60
	5x5	0.36	0.36	6	0.34	0.34	6	3x3	0.34	0.34	9	0.62	0.62	6	0.59	0.59	6	3x3	0.53	0.53	9	5.5	60	60
	5x5	0.36	0.36	6	0.34	0.34	6	4x4	0.36	0.36	9	0.62	0.62	6	0.59	0.59	6	4x4	0.64	0.64	9	5.5	60	60
	5x5	0.38	0.38	6	0.34	0.34	6	48"	0.36	0.36	9	0.62	0.62	6	0.59	0.59	6	48"	0.64	0.64	9	5.5	60	60
	5x5	0.36	0.36	6	0.34	0.34	6	3x5	0.34	0.40	9	0.62	0.62	6	0.59	0.59	6	3x5	0.53	0.53	9	5.5	60	60
	5x6	0.31	0.31	9	0.34	0.45	6	3x3	0.34	0.34	9	0.47	0.45	9	0.38	0.54	8	3x3	0.61	0.50	9	5.5	60/72	60/72
	5x6	0.27	0.27	9	0.34	0.45	6	4x4	0.36	0.45	9	0.47	0.45	9	0.38	0.54	8	4x4	0.74	0.57	9	5.5	60/72	60/72
	5x6	0.29	0.29	9	0.34	0.45	6	48"	0.36	0.45	9	0.47	0.45	9	0.38	0.54	8	48"	0.74	0.57	9	5.5	60/72	60/72
	5x6	0.29	0.29	9	0.34	0.45	6	3x5	0.45	0.45	9	0.47	0.45	9	0.38	0.54	8	3x5	0.61	0.61	9	5.5	60/72	60/72
	6x6	0.29	0.29	9	0.45	0.45	6	3x3	0.41	0.41	9	0.52	0.52	9	0.54	0.54	8	3x3	0.74	0.74	9	6.5	72	72
	6x6	0.27	0.27	9	0.45	0.45	6	4x4	0.45	0.45	9	0.52	0.52	9	0.54	0.54	8	4x4	0.87	0.87	9	6.5	72	72
	6x6	0.29	0.29	9	0.45	0.45	6	48"	0.45	0.45	9	0.52	0.52	9	0.54	0.54	8	48"	0.87	0.87	9	6.5	72	72
	6x6	0.29	0.29	9	0.45	0.45	6	3x5	0.45	0.45	9	0.52	0.52	9	0.54	0.54	8	3x5	0.87	0.87	9	6.5	72	72
	8x8	0.52	0.52	9	0.51	0.51	8	3x3	0.61	0.61	12	0.91	0.91	9	0.70	0.70	10	3x3	0.85	0.85	12	8.5	96	72
	8x8	0.52	0.52	9	0.51	0.51	8	4x4	0.70	0.70	12	0.87	0.87	9	0.70	0.70	10	4x4	1.01	1.01	12	8.5	96	72
	8x8	0.52	0.52	9	0.51	0.51	8	48"	0.70	0.70	12	0.87	0.87	9	0.70	0.70	10	48"	1.01	1.01	12	8.5	96	72
	8x8	0.52	0.52	9	0.51	0.51	8	3x5	0.70	0.85	12	0.87	0.87	9	0.70	0.70	10	3x5	1.01	1.01	12	8.5	96	72

** Unless otherwise indicated.

FABRICATION NOTES:
1. Maximum spacing of reinforcement is 8".
2. At manufacturer's option, provide cast or cored holes or thin wall panels (KO) to the maximum diameter shown for each. When no penetration is required, it is acceptable to provide a wall with no sectional reduction.

GENERAL NOTES:
1. Precast Junction Box consists of base slab, base unit, risers (as required), and below grade slab. See sheet PJB for details.
2. Precast Base consists of base slab, base unit, risers (as required), reducing slab (as required), and reduced risers (as required). See sheet PB for details.
3. Min Height shown is for stock base units. Use stock base units whenever practical. Smaller height base units can be used in special installation circumstances, when noted elsewhere in the plans. Absolute minimum height of base units is 2'-6".

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DESIGN DATA FOR PRECAST BASE AND JUNCTION BOX

PDD

FILE: prestd10-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS				RH
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	AUS	HAYS		38

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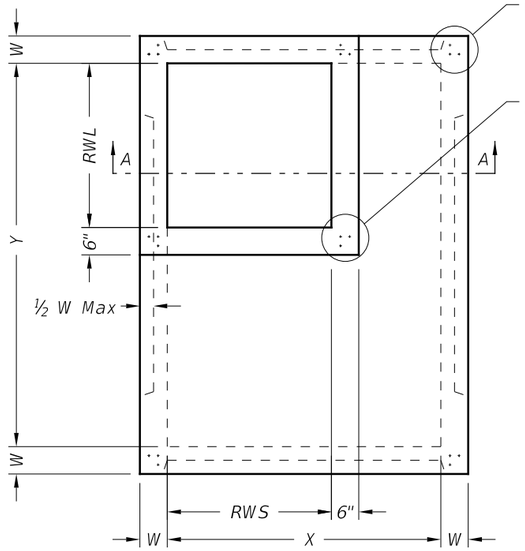
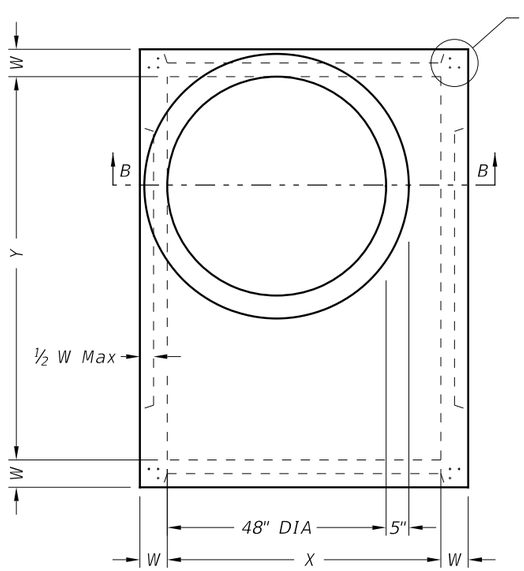


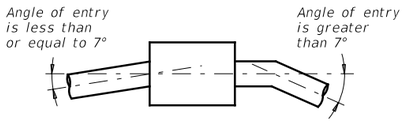
PLAN VIEW "A"

SQUARE REDUCED RISER OPTION



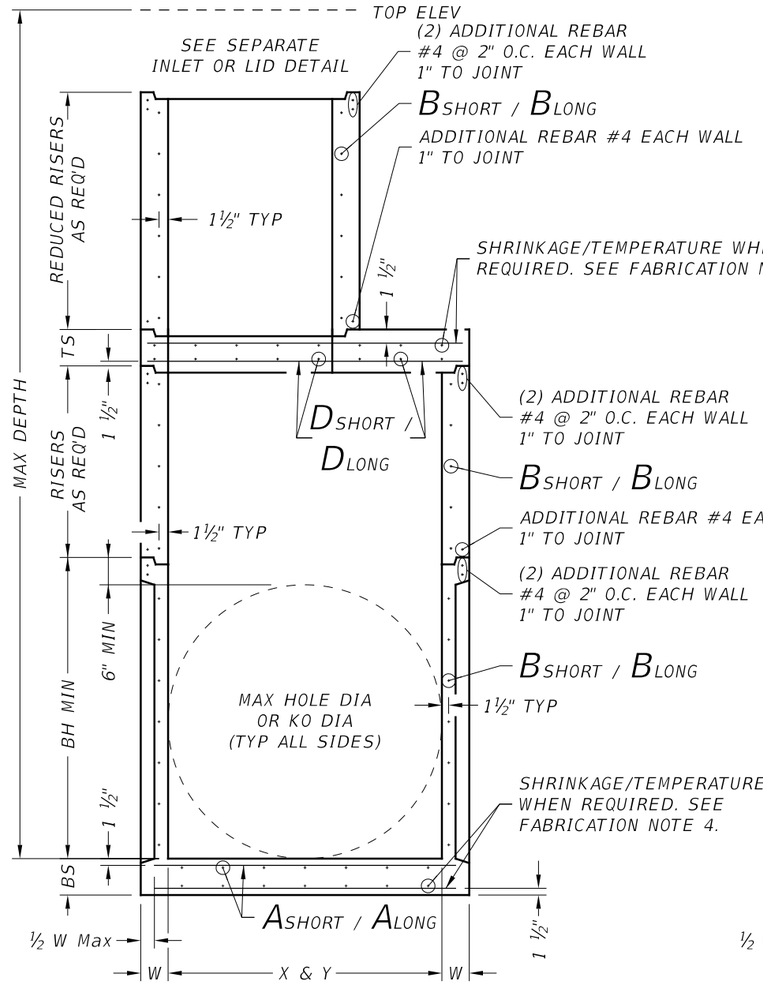
PLAN VIEW "B"

ROUND REDUCED RISER OPTION



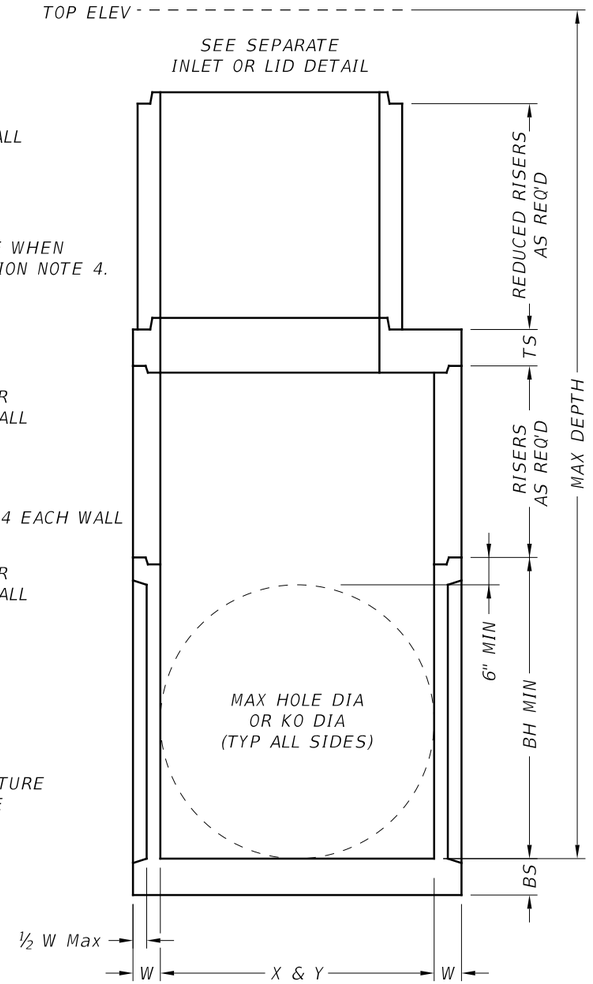
PIPE CONNECTION DETAIL

Connect pipes within 7° of normal to PB wall.
If necessary, use pipe elbow or curved approach alignment to stay within this limit.



SECTION A-A

SQUARE REDUCED RISER OPTION



SECTION B-B

ROUND REDUCED RISER OPTION

FABRICATION NOTES:

1. Provide Class "H" concrete in accordance with Item 421 and having a minimum compressive strength of 5,000 psi.
2. Provide Grade 60 reinforcing steel or equivalent area of WWR.
3. Provide typical clear cover of 1 ½" to reinforcing steel at interior or exterior walls.
4. Walls or slabs with a thickness of 8" or greater require shrinkage and temperature reinforcing steel. Provide steel area = 0.11 in^2/ft each way.
5. No substitution is allowed for vertical and horizontal #4 bars in corners.
6. Manufacture base and risers to nearest 3" increment.
7. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is ¾".
8. Provide lifting devices in conformance with Manufacturer's recommendations.
9. See sheet PDD for sizes, dimensions, and reinforcing steel not shown.

INSTALLATION NOTES:

1. If required elsewhere. Inverts (benching) to be provided by Contractor. Concrete or mortar used for invert is subsidiary to specified inlet or manhole.
2. Seal tongue and groove joints with preformed or bulk mastic in conformance with Manufacturer's recommendations. Tongue and groove joints may be grouted no more than 1" between each section, or ½ the joint depth, whichever is greater.
3. Do not grout rubber gasket joints without Manufacturer's recommendation.
4. For rigid pipe, cut hole in thin wall panel (KO) 4" Max, 2" Min larger than pipe OD.
5. For flexible pipe, consult boot/seal Manufacturer's specification for placement tolerance and hole size. Center pipe in hole and install boot/seal per Manufacturer's specification.

GENERAL NOTES:

1. Precast Base consists of base slab, base unit, risers (as required), reducing slab (as required), and reduced risers (as required). See sheet PDD for sizes.
2. Designed according to ASTM C913.
3. Payment for precast base is subsidiary to the specified inlet, per Item 465, "Junction Boxes, Manholes, and Inlets."

Cover dimensions are clear dimensions, unless noted otherwise.

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Texas Department of Transportation

Bridge Division Standard

PRECAST BASE

PB

FILE: prestd01-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS				RH
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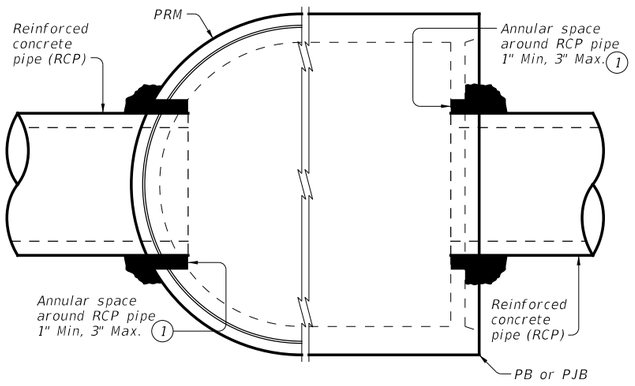
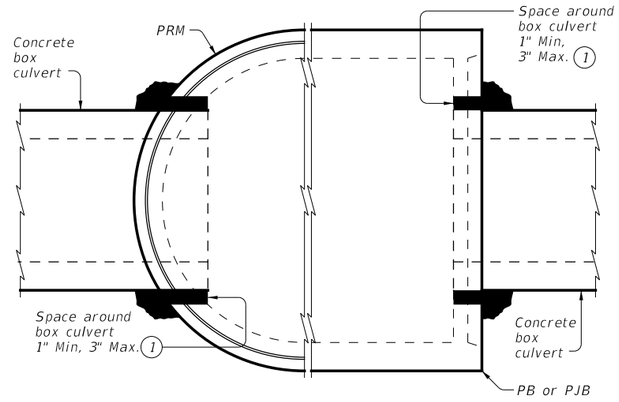


PRECAST ROUND MANHOLE (PRM) WITH THROUGH-HOLE

PRECAST BASE (PB) OR PRECAST JUNCTION BOX (PJB) WITH THIN-WALL KNOCK-OUT

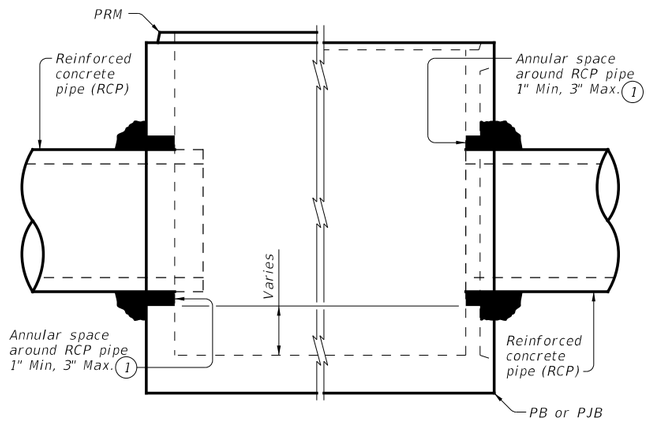
TYPICAL HALF PLAN



PRECAST ROUND MANHOLE (PRM) WITH THROUGH-HOLE

PRECAST BASE (PB) OR PRECAST JUNCTION BOX (PJB) WITH THIN-WALL KNOCK-OUT

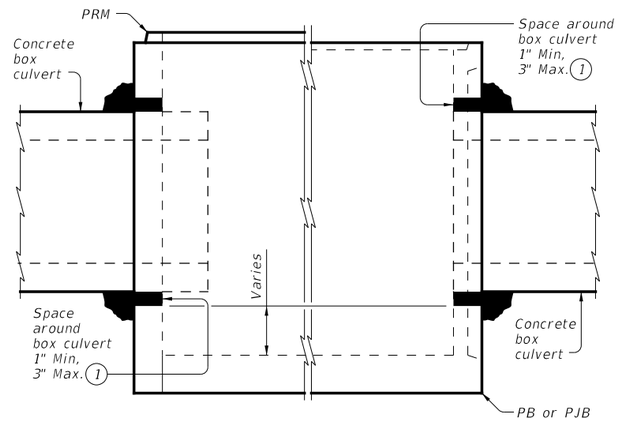
TYPICAL HALF PLAN



PRECAST ROUND MANHOLE (PRM) WITH THROUGH-HOLE

PRECAST BASE (PB) OR PRECAST JUNCTION BOX (PJB) WITH THIN-WALL KNOCK-OUT

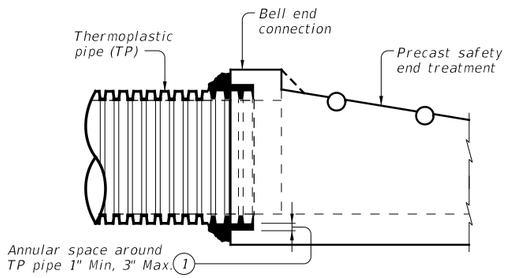
TYPICAL HALF ELEVATION



PRECAST ROUND MANHOLE (PRM) WITH THROUGH-HOLE

PRECAST BASE (PB) OR PRECAST JUNCTION BOX (PJB) WITH THIN-WALL KNOCK-OUT

TYPICAL HALF ELEVATION



TYPICAL PARTIAL ELEVATION OF PRECAST SAFETY END TREATMENTS

Showing square PSET for parallel drainage, cross drainage shown similar.

(1) Completely fill the void between the precast structure and the connecting pipe or box with cementitious grouts and mortars in accordance with DMS-4675 "Cementitious Grouts and Mortars for Miscellaneous Application".

CONSTRUCTION NOTES:

Do not grout rubber gasket joints without Manufacturer's recommendations.

Do not use bricks, masonry blocks, native stone, or similar materials in conjunction with grouted connections when filling void spaces around pipes or box culverts.

MATERIAL NOTES:

Provide grouted connections in accordance with DMS-4675 "Cementitious Grouts and Mortars for Miscellaneous Application".

GENERAL NOTES:

See applicable standards for notes and details not shown:
- Precast Base (PB)
- Precast Junction Box (PJB)
- Precast Round Manhole (PRM)
- Precast Safety End Treatments C/D Square (PSET-SC)
- Precast Safety End Treatments P/D Square (PSET-SP)

Provide Concrete Box Culverts in accordance with Item 462 "Concrete Box Culverts and Drains".

Provide Reinforced Concrete Pipe (RCP) in accordance with Item 464 "Reinforced Concrete Pipe".

Provide Thermoplastic Pipe (TP) in accordance with Special Specification Thermoplastic Pipe.

Payment for grouted connections is considered subsidiary to other bid Items.

Texas Department of Transportation

Bridge Division Standard

PIPE AND BOX GROUTED CONNECTIONS FOR PRECAST STRUCTURES

PBGC

FILE: pbgcstd1-20.dgn	DN: TxDOT	CK: TAR	DW: JTR	CK: TAR
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
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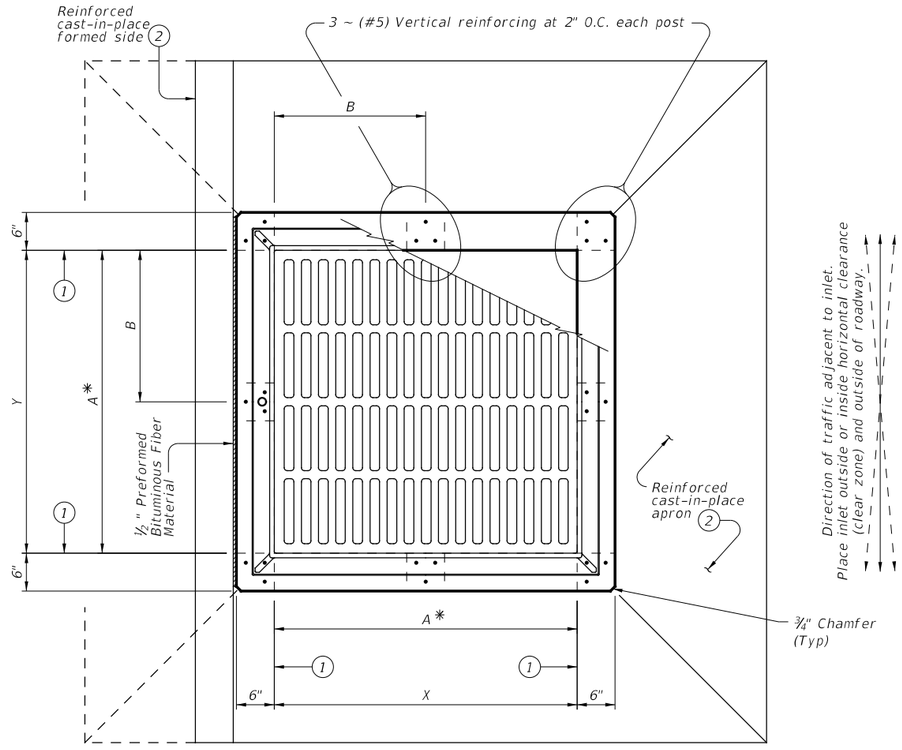
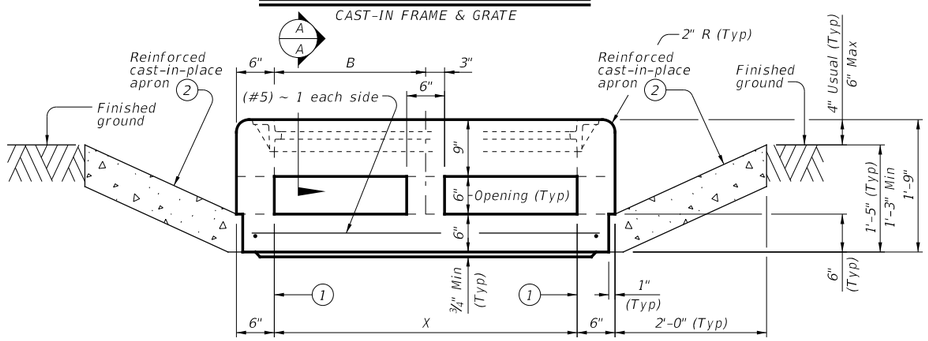
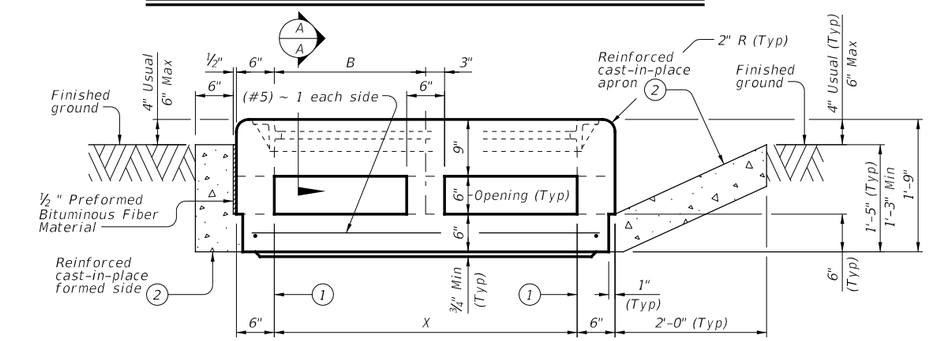


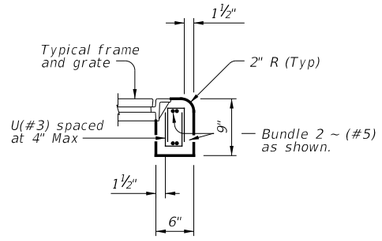
PLAN VIEW ~ STYLE 'FG' (3)



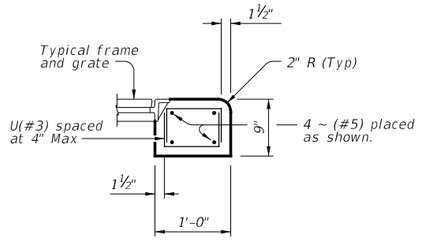
ELEVATION VIEW WITHOUT FORMED SIDE (4)



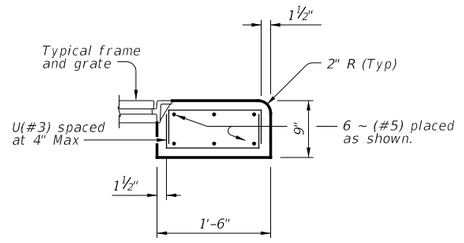
ELEVATION VIEW WITH FORMED SIDE (4)



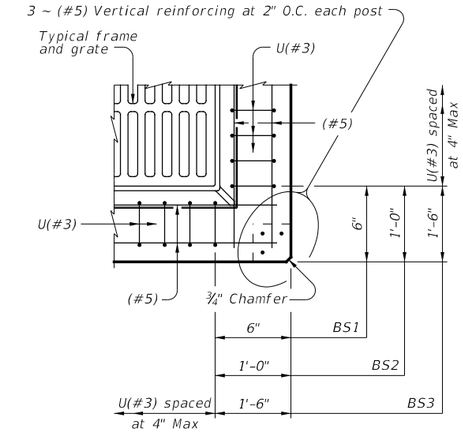
SECTION A-A ~ BS1



SECTION A-A ~ BS2

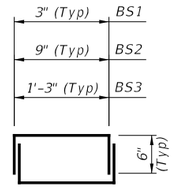


SECTION A-A ~ BS3



TYPICAL CORNER REINFORCING PLAN DETAIL

Showing BS2 other beam sections similar.



BARS U (#3)

Showing one complete bar.

Style	Size (X x Y)	A x A *	B x B	Beam Section
FG	3'x3'	3'x3'	1.5'x1.5'	BS1
FG	4'x4'	3'x3'	2'x2'	BS2
FG	4'x4'	4'x4'	2'x2'	BS1
FG	5'x5'	3'x3'	2.5'x2.5'	BS3
FG	5'x5'	4'x4'	2.5'x2.5'	BS2

* Nominal frame/grate size.

(1) Matches inside face of wall of precast base or riser below inlet.

(2) Construct cast-in-place reinforced concrete with or without formed side. Place formed side/sides as directed elsewhere in the plans. Formed sides may only be used on sides parallel to traffic. Use Class "C" concrete. Apron and formed side reinforcing not shown for clarity. Apron and formed side are subsidiary to PAZD-CZ. Apron is 2'-0" width around precast zone drain, unless an optional formed side is used. For apron and formed side, provide (#4) reinforcing at 12" O.C.

(3) Top slab reinforcing not shown for clarity.

(4) Top slab reinforcing and post reinforcing not shown for clarity.

FABRICATION NOTES:

1. Provide Class "H" concrete in accordance with Item 421 and having a minimum compressive strength of 5,000 psi.
2. Provide Grade 60 reinforcing steel or equivalent area of WWR.
3. Provide clear cover of ¾" to reinforcing from bottom of slab and 2" to reinforcing from top of slab for structural reinforcement.
4. Provide 1 ½" end cover on (#5) reinforcing.
5. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is ¾".
6. Provide lifting devices in conformance with Manufacturer's recommendations.

INSTALLATION NOTES:

1. Precast Area Zone Drain within Clear Zone (PAZD-CZ) is for use in ditches and medians outside and inside of the horizontal clearance (clear zone). PAZD-CZ is never placed in the roadway.
2. Seal tongue and groove joints with preformed or bulk mastic in conformance with Manufacturer's recommendations. Tongue and groove joints may be grouted no more than 1" between each section, or ½ the joint depth, whichever is greater.
3. Do not grout rubber gasket joints without Manufacturer's recommendation.

GENERAL NOTES:

1. Designed according to ASTM C913.
2. Payment for inlet is per Item 465, "Junction Boxes, Manholes, and Inlets" by type, style, size, and opening size (when applicable).

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

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

PRECAST AREA ZONE DRAIN WITHIN CLEAR ZONE

PAZD-CZ

FILE: prestd15-20.dgn	DN: SDC	CK: TAR	DW: JTR	CK: SDC
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
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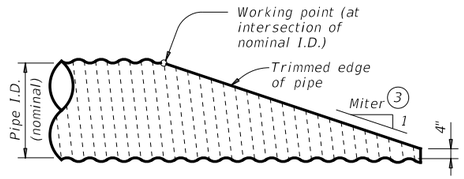
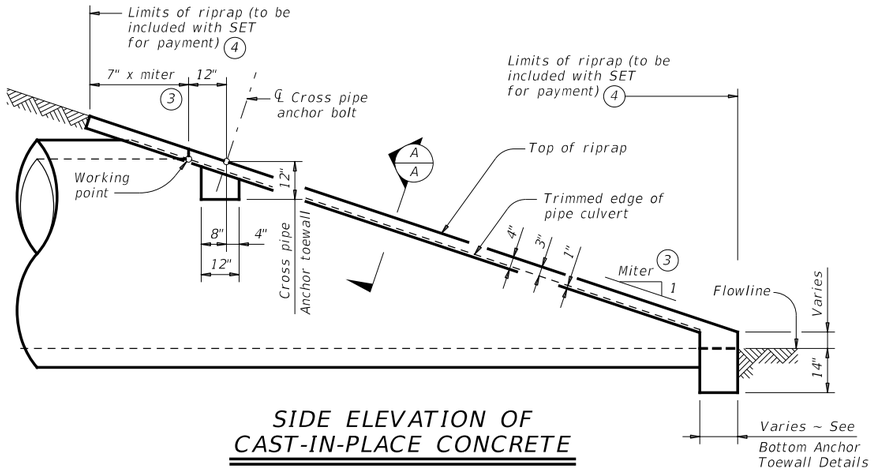


NOTE: All pipe runners, calculations, and dimensions are based on the pipe culverts mitered as shown in this detail. Alternate styles of mitered ends will require that appropriate adjustments be made to the values presented on this standard.

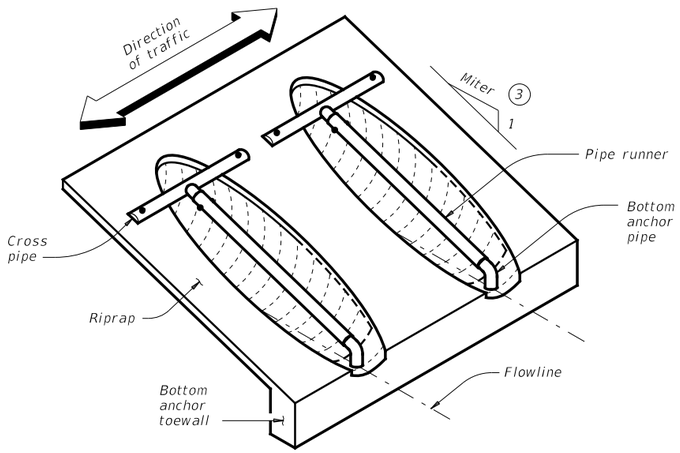
SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

(Showing corrugated metal pipe (CMP) culvert. Details of reinforced concrete pipe (RCP) culvert are similar.)



SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

(Showing reinforced concrete pipe (RCP) culvert. Details of corrugated metal pipe (CMP) culvert are similar. Pipe runners not shown for clarity)



ISOMETRIC VIEW OF TYPICAL INSTALLATION

(Showing installation with no skew.)

CROSS PIPE LENGTHS AND PIPE RUNNER LENGTHS (1) (2)

Nominal Culvert I.D.	Pipe Culvert Spa ~ G	Cross Pipe Length	Pipe Runner Length											
			3:1 Side Slope				4:1 Side Slope				6:1 Side Slope			
			0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew
24"	1' – 7"	3' – 5"	N/A	N/A	N/A	5' – 10"	N/A	N/A	N/A	8' – 1"	N/A	N/A	N/A	12' – 9"
27"	1' – 8"	3' – 8"	N/A	N/A	5' – 5"	6' – 11"	N/A	N/A	7' – 7"	9' – 7"	N/A	N/A	11' – 11"	14' – 11"
30"	1' – 10"	3' – 11"	N/A	N/A	6' – 4"	8' – 0"	N/A	N/A	8' – 9"	11' – 0"	N/A	N/A	13' – 8"	17' – 0"
33"	1' – 11"	4' – 2"	6' – 2"	6' – 5"	7' – 3"	9' – 1"	8' – 6"	8' – 10"	10' – 0"	12' – 5"	13' – 3"	13' – 9"	15' – 5"	19' – 2"
36"	2' – 1"	4' – 5"	6' – 11"	7' – 3"	8' – 2"	10' – 2"	9' – 6"	9' – 11"	11' – 2"	13' – 10"	14' – 9"	15' – 3"	17' – 2"	21' – 3"
42"	2' – 4"	4' – 11"	8' – 6"	8' – 10"	9' – 11"	12' – 4"	11' – 7"	12' – 0"	13' – 6"	16' – 8"	17' – 9"	18' – 5"	20' – 8"	25' – 7"
48"	2' – 7"	5' – 5"	10' – 1"	10' – 5"	11' – 9"	N/A	13' – 7"	14' – 2"	15' – 10"	N/A	20' – 9"	21' – 6"	24' – 2"	N/A
54"	3' – 0"	5' – 11"	11' – 8"	12' – 1"	N/A	N/A	15' – 8"	16' – 3"	N/A	N/A	23' – 10"	24' – 8"	N/A	N/A
60"	3' – 3"	6' – 5"	13' – 3"	N/A	N/A	N/A	17' – 9"	N/A	N/A	N/A	26' – 10"	N/A	N/A	N/A

TYPICAL PIPE CULVERT MITERS (3)

Side Slope	0° Skew	15° Skew	30° Skew	45° Skew
3:1	3:1	3.106:1	3.464:1	4.243:1
4:1	4:1	4.141:1	4.619:1	5.657:1
6:1	6:1	6.212:1	6.928:1	8.485:1

CONDITIONS WHERE PIPE RUNNERS ARE NOT REQUIRED (2)

Nominal Culvert I.D.	Single Pipe Culvert	Multiple Pipe Culverts
12" thru 21"	Skews thru 45°	Skews thru 45°
24"	Skews thru 45°	Skews thru 30°
27"	Skews thru 30°	Skews thru 15°
30"	Skews thru 15°	Skews thru 15°
33"	Skews thru 15°	Always required
36"	Normal (no skew)	Always required
42" thru 60"	Always required	Always required

STANDARD PIPE SIZES AND MAX PIPE RUNNER LENGTHS (1)

Pipe Size	Pipe O.D.	Pipe I.D.	Max Pipe Runner Length
2" STD	2.375"	2.067"	N/A
3" STD	3.500"	3.068"	10' – 0"
4" STD	4.500"	4.026"	19' – 8"
5" STD	5.563"	5.047"	34' – 2"

ESTIMATED CONCRETE RIPRAP QUANTITIES (CY) (5)

Nominal Culvert I.D.	3:1 Side Slope				4:1 Side Slope				6:1 Side Slope			
	0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew
12"	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.6	0.7	0.7	0.7	0.8
15"	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.9
18"	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.8	0.8	0.8	0.9	1.0
21"	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.9	0.9	0.9	1.0	1.2
24"	0.6	0.7	0.7	0.8	0.8	0.8	0.8	1.0	1.0	1.0	1.1	1.3
27"	0.7	0.7	0.8	0.9	0.8	0.9	0.9	1.1	1.1	1.1	1.2	1.4
30"	0.8	0.8	0.8	0.9	0.9	0.9	1.0	1.2	1.2	1.2	1.3	1.6
33"	0.8	0.8	0.9	1.0	1.0	1.0	1.1	1.3	1.3	1.4	1.5	1.7
36"	0.9	0.9	0.9	1.1	1.1	1.1	1.2	1.4	1.4	1.5	1.6	1.8
42"	1.0	1.0	1.1	1.3	1.2	1.3	1.3	1.6	1.6	1.7	1.8	2.1
48"	1.1	1.1	1.2	N/A	1.4	1.4	1.5	N/A	1.9	1.9	2.1	N/A
54"	1.3	1.3	N/A	N/A	1.6	1.6	N/A	N/A	2.1	2.1	N/A	N/A
60"	1.4	N/A	N/A	N/A	1.7	N/A	N/A	N/A	2.3	N/A	N/A	N/A

(1) *Provide pipe runner of the size shown in the tables. Provide cross pipe of the same size as the pipe runner. Provide cross pipe stub out and bottom anchor pipe of the next smaller size pipe as shown in the Standard Pipe Sizes and Max Pipe Runner Lengths table.*

(2) *This standard allows for the placement of only one pipe runner across each culvert pipe opening. In order to limit the clear opening to be traversed by an errant vehicle, the following conditions must be met:*

For 60" culvert pipes, the skew must not exceed 0°.
For 54" culvert pipes, the skew must not exceed 15°.
For 48" culvert pipes, the skew must not exceed 30°.
For all culvert pipe sizes 42" and less, the skew must not exceed 45°.

If the above conditions cannot be met, the designer should consider using a safety end treatment with flared wings. For further information, refer to the TxDOT Roadway Design Manual.

(3) *Miter = slope of mitered end of pipe culvert.*

(4) *Riprap placed beyond the limits shown will be paid for as concrete riprap in accordance with Item 432, "Riprap".*

(5) *Quantities shown are for one end of one reinforced concrete pipe (RCP) culvert. For multiple pipe culverts or for corrugated metal pipe (CMP) culverts, quantities will need to be adjusted. Riprap quantities are for Contractor's information only.*

Texas Department of Transportation

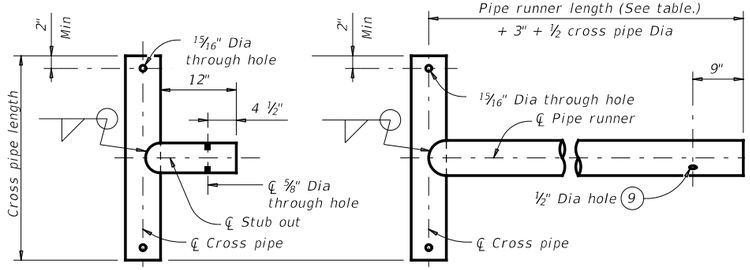
Bridge Division Standard

SAFETY END TREATMENT

FOR 12" DIA TO 60" DIA
PIPE CULVERTS
TYPE II ~ CROSS DRAINAGE

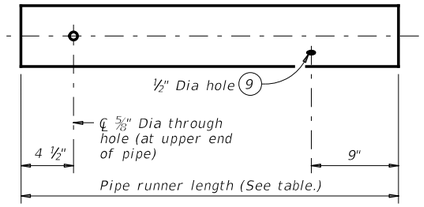
SETP-CD

FILE: setpcdse-20.dgn	DN: GAF	CK: CAT	DW: JRP	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				RH
	DIST	COUNTY		SHEET NO.
	AUS	HAYS		42



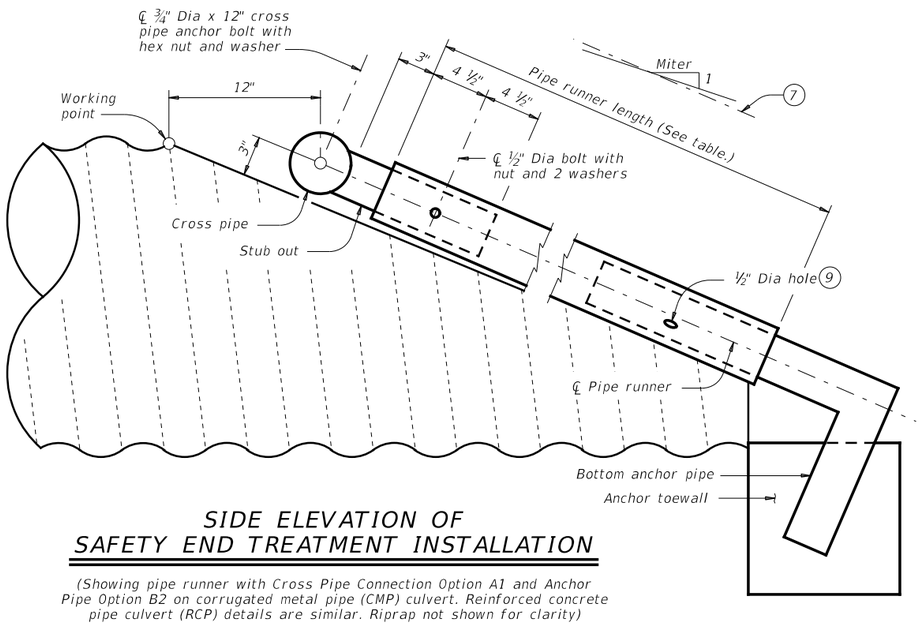
OPTION A1 OPTION A2

CROSS PIPE AND CONNECTIONS DETAILS



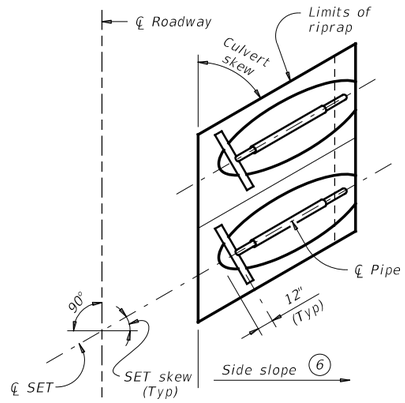
NOTE: The separate pipe runner shown is required when Cross Pipe Connection Option A1 is used.

PIPE RUNNER DETAILS

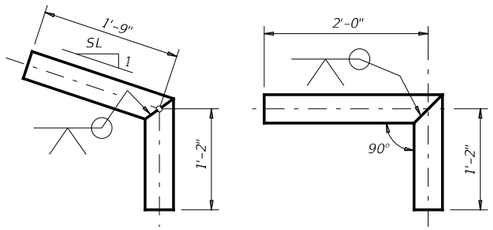


SIDE ELEVATION OF SAFETY END TREATMENT INSTALLATION

(Showing pipe runner with Cross Pipe Connection Option A1 and Anchor Pipe Option B2 on corrugated metal pipe (CMP) culvert. Reinforced concrete pipe culvert (RCP) details are similar. Riprap not shown for clarity)

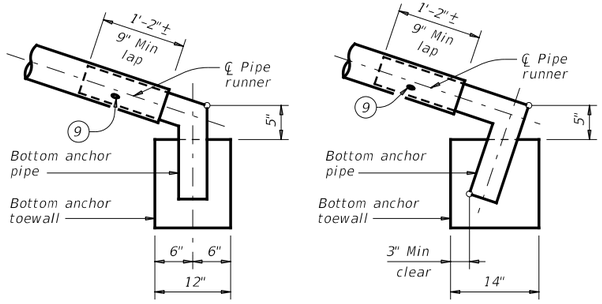


PLAN OF SKEWED INSTALLATION



OPTION B1 OPTION B2

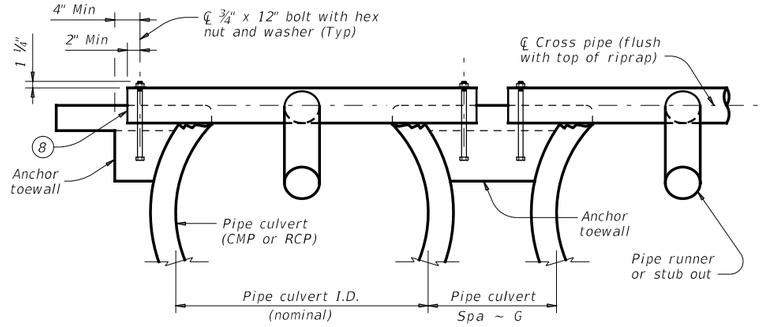
BOTTOM ANCHOR PIPE DETAILS (10)



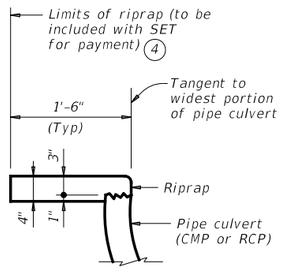
OPTION B1 OPTION B2

BOTTOM ANCHOR TOEWALL DETAILS

(Culvert and riprap not shown for clarity.)



SHOWING CROSS PIPE AND ANCHOR TOEWALL



SHOWING TYPICAL PIPE CULVERT AND RIPRAP

SECTION A-A

(4) Riprap placed beyond the limits shown will be paid for as concrete riprap in accordance with Item 432, "Riprap".

(6) Recommended values of side slope are 3:1, 4:1, and 6:1. All quantities, calculations, and dimensions shown herein are based on these recommended values. Slope of 3:1 or flatter is required for vehicle safety.

(7) Note that actual slope of pipe runner may vary slightly from side slope of riprap and trimmed culvert pipe edge.

(8) Ensure that riprap concrete does not flow into the cross pipe so as to permit disassembly of the bolted connection to allow cleanout access.

(9) After installation, inspect the 1/2" hole to ensure that the lap of the pipe runner with the bottom anchor pipe is adequate.

(10) At fabricator's option, a heat bend to a smooth 5" radius or a manufactured elbow (of the same material as the runner) may be substituted for the mitered and welded joint in the bottom anchor pipe.

MATERIAL NOTES:

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

Provide pipe runners, cross pipes, and anchor pipes conforming to the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 Gr B, or API 5LX52.

Provide ASTM A307 bolts and nuts.

Galvanize all steel components, except concrete reinforcing, after fabrication.

Repair galvanizing damaged during transport or construction in accordance with the specifications.

GENERAL NOTES:

Pipe runners are designed for a traversing load of 1,800 pounds at yield as recommended by Research Report 280-1, "Safety Treatment of Roadside Cross-Drainage Structures", Texas Transportation Institute, March 1981.

Safety end treatments (SET) shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the pipe runners.

Payment for riprap and toewall is included in the price bid for each safety end treatment.

Construct concrete riprap and all necessary inverts in accordance with the requirements of Item 432, "Riprap".

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Texas Department of Transportation

Bridge Division Standard

SAFETY END TREATMENT

FOR 12" DIA TO 60" DIA
PIPE CULVERTS
TYPE II ~ CROSS DRAINAGE

SETP-CD

FILE: setpcdse-20.dgn	DN: GAF	CK: CAT	DW: JRP	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				RH
	DIST	COUNTY		SHEET NO.
	AUS	HAYS		43

DISCLAIMER:
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DATE: 10/4/2023 8:15:29 AM
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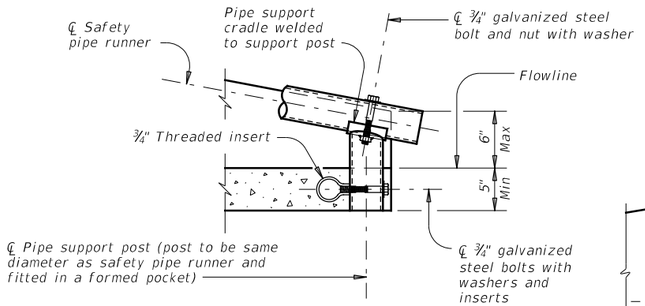
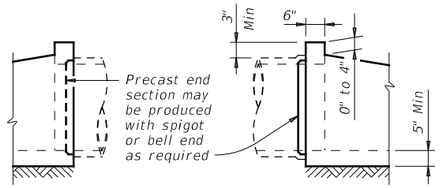
REQUIREMENTS FOR CULVERT PIPES AND SAFETY PIPE RUNNERS

Pipe I.D.	RCP Wall "B" Thickness	TP Wall Thickness (8)	"D" (1)	Slope	Min Length of Unit	Single Pipe Skew	Single Pipe Pipe Runners Required	Multiple Pipes Skew	Multiple Pipes Pipe Runners Required
12"	2"	1.15"	17.00"	3:1	2' – 11"	≤ 45°	No	≤ 45°	No
				4:1	3' – 6"				
				6:1	4' – 9"				
15"	2 ¼"	1.30"	20.50"	3:1	3' – 8"	≤ 45°	No	≤ 45°	No
				4:1	4' – 7"				
				6:1	6' – 5"				
18"	2 ½"	1.60"	24.00"	3:1	4' – 6"	≤ 45°	No	≤ 45°	No
				4:1	5' – 8"				
				6:1	8' – 0"				
24"	3"	1.95"	31.00"	3:1	6' – 2"	≤ 45°	No	= 30°	No
				4:1	7' – 10"			> 30°	Yes
				6:1	11' – 3"				
30"	3 ½"	2.65"	38.50"	3:1	7' – 10"	= 15°	No	= 15°	No
				4:1	10' – 1"	> 15°	Yes	> 15°	Yes
				6:1	14' – 8"				
36"	4"	2.75"	45.50"	3:1	9' – 5"	= 0°	No	≥ 0°	Yes
				4:1	12' – 3"	> 0°	Yes		
				6:1	17' – 11"				
42"	4 ½"	2.7"	52.50"	3:1	11' – 1"	≥ 0°	Yes	≥ 0°	Yes
				4:1	14' – 5"				
				6:1	21' – 2"				



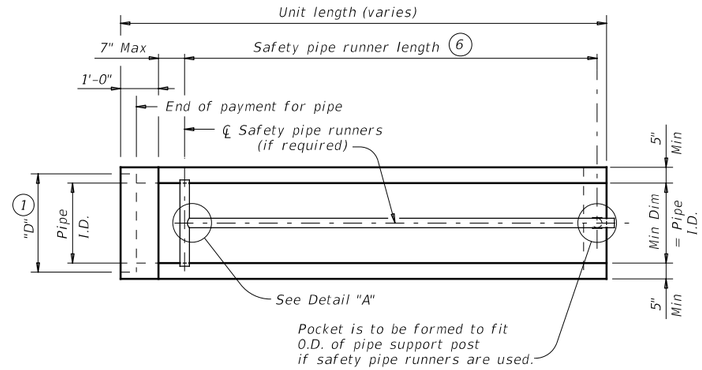
END DETAIL FOR INSTALLATION OF SAFETY PIPE RUNNERS

(If required)



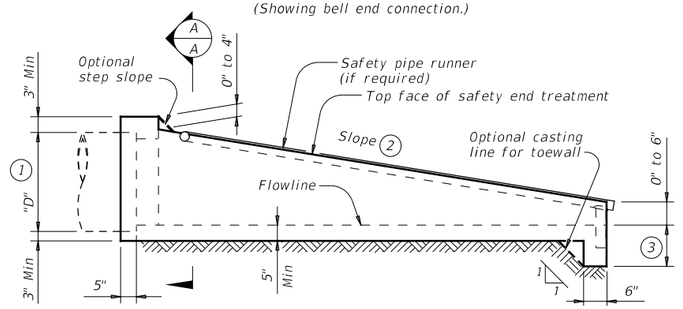
OPTIONAL JOINT FOR RCP

(Showing joint between RCP and precast safety end treatment)



PLAN

(Showing bell end connection.)



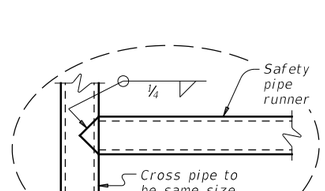
LONGITUDINAL ELEVATION

(Showing bell end connection.)

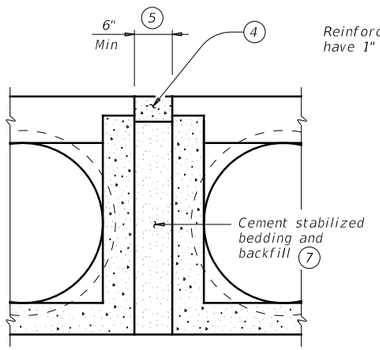
OPTION A

DETAIL A

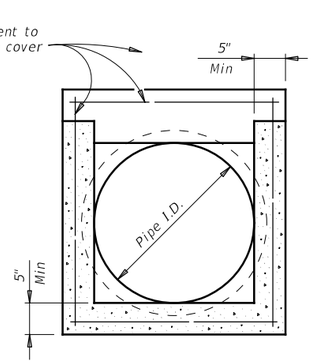
(If required)



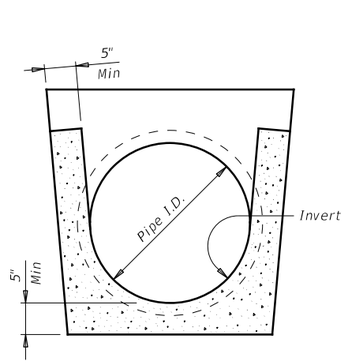
OPTION B



MULTIPLE PIPE INSTALLATION

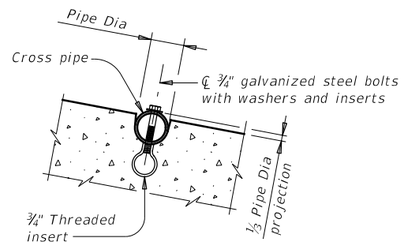


OPTION WITH SQUARE BOTTOM



OPTION WITH INVERT BOTTOM

SECTION A-A



INSTALLATION DETAIL FOR SAFETY PIPE RUNNERS

(If required)

SAFETY PIPE RUNNER DIMENSIONS

Max Safety Pipe Runner Length	Required Pipe Runner Size: Pipe Size	Pipe O.D.	Pipe I.D.
11' – 2"	3" STD	3.500"	3.068"
15' – 6"	3 ½" STD	4.000"	3.548"
20' – 10"	4" STD	4.500"	4.026"
35' – 4"	5" STD	5.563"	5.047"

(1) Dimension "D" is based on reinforced concrete pipe (RCP) meeting the requirements of ASTM C-76, Class III, (RCP Wall "B" thickness). Adjust "D" for any other wall thickness used. For thermoplastic pipe (TP) take into account the annular space requirements for grouted connections.

(2) Slope as shown elsewhere in plans. Slope of 3:1 or flatter is required for vehicle safety.

(3) Toewall to be used only when dimension is shown elsewhere in the plans.

(4) Fill the top 4" of void between precast end treatments with concrete riprap. Concrete riprap is considered subsidiary to the Item 467, "Safety End Treatment".

(5) Adjust clear distance between pipes to provide for the minimum distance between safety end treatments.

(6) Measured along slope.

(7) Provide cement stabilized bedding and backfill in accordance with the Item 400, "Excavation and Backfill for Structures". Bedding and backfill is considered subsidiary to the Item 467, "Safety End Treatment". When concrete riprap is specified around the safety end treatment, backfill as directed by Engineer.

(8) Thermoplastic pipe wall thickness may vary. Adjust accordingly. Thermoplastic pipe requires the safety end treatments to have a bell end for grouted connections.

GENERAL NOTES:

Precast safety end treatment for reinforced concrete pipe (RCP), and thermoplastic pipe (TP) may be used for TYPE II end treatment as specified in Item "Safety End Treatment".

When precast safety end treatment is used as a Contractor's alternate to mitered RCP, riprap will not be required unless noted otherwise on the plans.

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

Manufacture this product in accordance with Item 467, "Safety End Treatment" except as noted below :

A. Provide minimum reinforcing of #4 at 6" (Grade 40) or #4 at 9" (Grade 60) each way or 6"x6" – D12 x D12 or 5"x5" – D10 x D10 welded wire reinforcement (WWR).

B. For precast (steel formed) sections, provide Class "C" concrete (f'c = 3,600 psi).

At the option and expense of the Contractor, the next larger size of safety end treatment may be furnished as long as the "D" dimension cast is that of the required size of pipe.

Pipe runners are designed for a traversing load of 1,800 Lbs at yield as recommended by Research Report 280-1, "Safety Treatment of Roadside Cross-Drainage Structures", Texas Transportation Institute, March 1981.

Provide safety pipe runners, cross pipes, pipe support posts, and pipe stubs meeting the requirements of ASTM A53 (Type E or S, Grade B), ASTM A500 (Grade B), or API 5LX52.

Galvanize all steel components except reinforcing steel after fabrication. Repair galvanizing damaged during transport or construction in accordance with the specifications.

Connect RCP using the Optional Joint for RCP detail shown or in accordance with Item 464 "Reinforced Concrete Pipe". Connect TP by grouting. See Pipe and Box Grouted Connections (PBGC) standard for grouted connections with TP and precast safety end treatment.

Texas Department of Transportation

Bridge Division Standard

PRECAST SAFETY END TREATMENT

TYPE II ~ CROSS DRAINAGE

PSET-SC

FILE: psetscss-21.dgn	DN: RLW	CK: KLR	DW: JTR	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-21: Added 42" TP				RH
	DIST	COUNTY		SHEET NO.
	AUS	HAYS		44

DATE: 10/4/2023 8:15:32 AM
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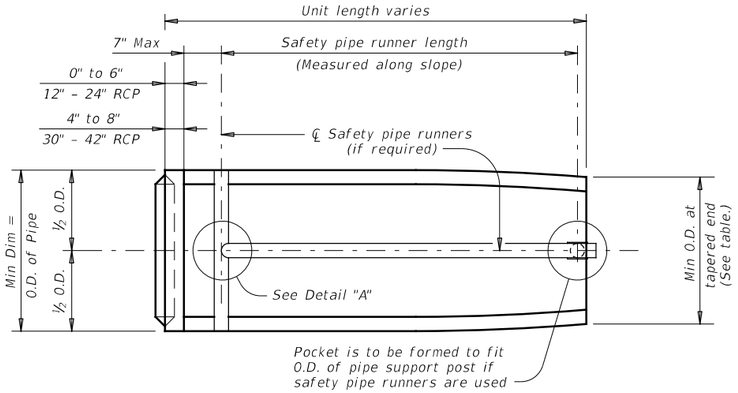
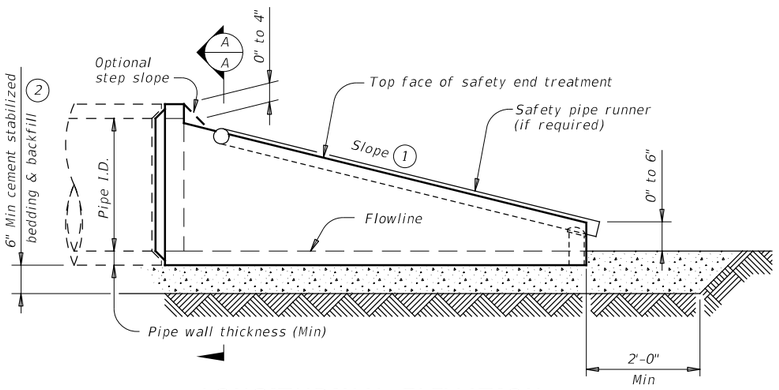


PLAN VIEW

(Showing spigot end connection.)



LONGITUDINAL ELEVATION

(Showing spigot end connection.)

MAX SAFETY PIPE RUNNER LENGTHS AND REQUIRED SAFETY PIPE RUNNER SIZES

Max Safety Pipe Runner Length	Required Pipe Runner Size		
	Pipe Size	Pipe O.D.	Pipe I.D.
11' – 2"	3" STD	3.500"	3.068"
15' – 6"	3 ½" STD	4.000"	3.548"
20' – 10"	4" STD	4.500"	4.026"
35' – 4"	5" STD	5.563"	5.047"

(1) Slope as shown elsewhere in the plans. Slope of 3:1 or flatter is required for vehicle safety.

(2) Provide cement stabilized bedding and backfill in accordance with the Item, "Excavation and Backfill for Structures". Bedding and backfill is considered subsidiary to the Item "Safety End Treatment". When concrete riprap is specified around the safety end treatment, backfill as directed by Engineer.

(3) Fill the top 4" of void between precast end treatments with concrete riprap. Concrete riprap be considered subsidiary to the Item "Safety End Treatment".

(4) Adjust clear distance between pipes to provide for the minimum distance between safety end treatments.

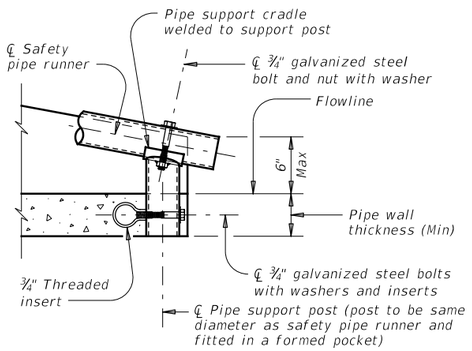
REQUIREMENTS FOR CULVERT PIPES AND SAFETY PIPE RUNNERS

Pipe I.D.	Min Wall Thickness	Min O.D.	Min O.D. at Tapered End	Min Reinf Requirements (sq. in. / ft. of pipe)	Slope	Minimum Length of Unit	Single Pipe		Multiple Pipe	
							Skew	Pipe Runners Required	Skew	Pipe Runners Required
12"	2"	16"	16"	0.07 Circ.	3:1	2' – 0"	≤ 45°	No	≤ 45°	No
					4:1	2' – 8"				
					6:1	4' – 0"				
15"	2 ¼"	19 ½"	19"	0.07 Circ.	3:1	2' – 10"	≤ 45°	No	≤ 45°	No
					4:1	3' – 9"				
					6:1	5' – 8"				
18"	2 ½"	23"	21 ½"	0.07 Circ.	3:1	3' – 8"	≤ 45°	No	≤ 45°	No
					4:1	4' – 10"				
					6:1	7' – 3"				
24"	3"	30"	27"	0.07 Circ.	3:1	5' – 3"	≤ 45°	No	≤ 30°	No
					4:1	7' – 0"			> 30°	Yes
					6:1	10' – 6"				
30"	3 ½"	37"	31"	0.18 Circ.	3:1	6' – 3"	≤ 15°	No	≤ 15°	No
					4:1	8' – 2"	> 15°	Yes	> 15°	Yes
					6:1	12' – 1"				
36"	4"	44"	36"	0.19 Ellip.	3:1	7' – 10"	= 0°	No	≥ 0°	Yes
					4:1	10' – 4"	> 0°	Yes		
					6:1	15' – 4"				
42"	4 ½"	51"	41 ½"	0.23 Ellip.	3:1	9' – 6"	≥ 0°	Yes	≥ 0°	Yes
					4:1	12' – 6"				
					6:1	18' – 7"				

OPTION A

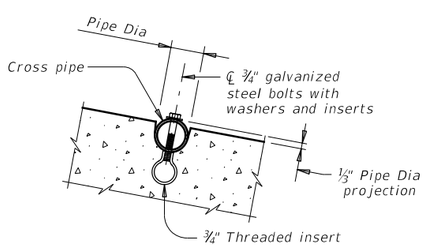
OPTION B

DETAIL A



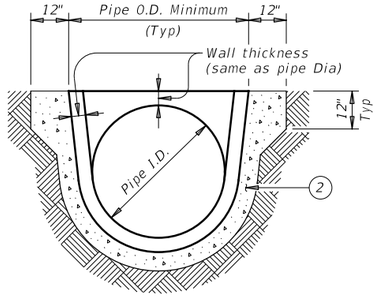
END DETAIL FOR INSTALLATION OF SAFETY PIPE RUNNERS

(If required)

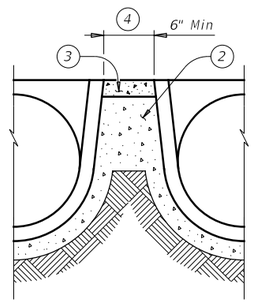


INSTALLATION DETAIL FOR SAFETY PIPE RUNNERS

(If required)



SECTION A-A



MULTIPLE PIPE INSTALLATION

MATERIAL NOTES:

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

Provide safety pipe runners, cross pipes, pipe support posts, and pipe stubs meeting the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 Gr B, or API 5LX52.

Galvanize all steel components except reinforcing steel after fabrication. Repair galvanizing damaged during transport or construction in accordance with the specifications.

GENERAL NOTES:

Precast safety end treatment for reinforced concrete pipe (CRP) may be used for TYPE II end treatment as specified in Item 467, "Safety End Treatment".

When precast safety end treatment is used as a Contractor's alternate to mitered RCP, riprap will not be required unless noted otherwise on the plans.

Manufacture precast concrete end sections in accordance with Item 464, "Reinforced Concrete Pipe" and in accordance with ASTM Specification C-76, Class III, Wall B for circular pipe.

Provide precast concrete end sections with a spigot or bell end for compatibility to upstream or downstream end conditions with sufficient annular space to allow for grout, mortar, cold applied asphalt joint compound or pre-formed plastic gasket material.

Methods of lifting shall be provided by the manufacturer for ease of loading, unloading, and installation.

Pipe runners are designed for a traversing load of 1,800 Lbs at yield as recommended by Research Report 280-1, "Safety Treatment of Roadside Cross-Drainage Structures", Texas Transportation Institute, March 1981.

Texas Department of Transportation

Bridge Division Standard

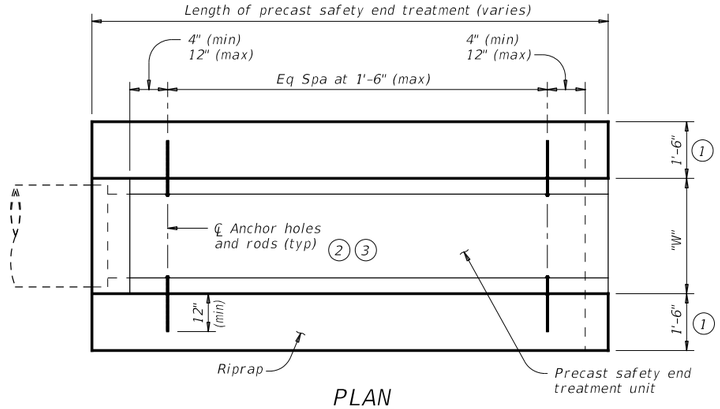
PRECAST SAFETY END TREATMENT

TYPE II ~ CROSS DRAINAGE

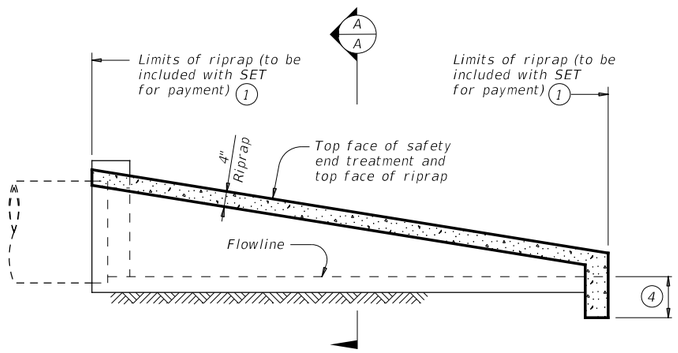
PSET-RC

FILE: psetrcss-20.dgn	DN: RLW	CK: KLR	DW: JTR	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				RH
	DIST	COUNTY		SHEET NO.
	AUS	HAYS		45

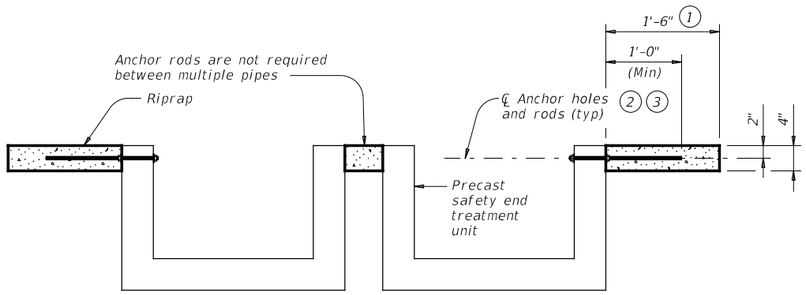
DATE: 10/4/2023 8:15:34 AM
FILE: $FILE$



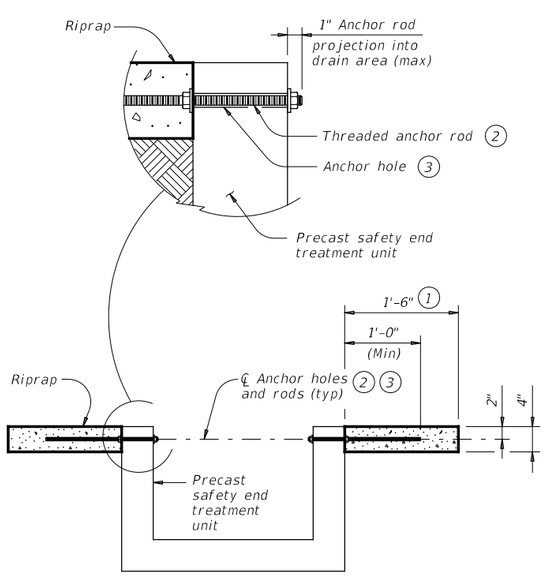
PLAN



LONGITUDINAL ELEVATION



MULTIPLE PIPE INSTALLATION



SINGLE PIPE INSTALLATION

SECTION A-A

ESTIMATED CONCRETE RIPRAP QUANTITIES (CY) 5

Nominal Culvert (Pipe) I.D.	PSET-SC and PSET-SP Standards				PSET-RC and PSET-RP Standards			
	Unit Width "W"	Side Slope			Unit Width "W"	Side Slope		
		3:1	4:1	6:1		3:1	4:1	6:1
12"	23.0"	0.1	0.2	0.2	16.0"	0.1	0.1	0.2
15"	26.5"	0.2	0.2	0.3	19.5"	0.1	0.2	0.2
18"	30.0"	0.2	0.2	0.3	23.0"	0.2	0.2	0.3
24"	37.0"	0.3	0.3	0.5	30.0"	0.2	0.3	0.4
30"	44.5"	0.3	0.4	0.6	37.0"	0.3	0.3	0.5
36"	51.5"	0.4	0.5	0.7	44.0"	0.3	0.4	0.6
42"	58.5"	0.5	0.6	0.8	51.0"	0.4	0.5	0.7

(1) Riprap placed beyond the limits shown will be paid as concrete riprap in accordance with Item 432, "Riprap". When riprap is cast integrally with the precast safety end treatment, this dimension is 1'-0" minimum.

(2) 1#2" Dia ASTM A307 Gr A threaded anchor rod with 2 nuts and 2 washers. Galvanize all components in accordance with Item 445, "Galvanizing". Repair galvanizing that is damaged during transport or construction in accordance with the specifications.

(3) 3#4" through holes in walls of safety end treatment for riprap anchor rods may be drilled with rotary (coring or masonry) type drilling equipment or may be formed. Do not use percussive (star) type drilling equipment. If holes are drilled, patch spalls in the inside face of the wall exceeding 1#2" from the holes.

(4) Provide riprap toe wall when dimension is shown elsewhere in the plans or when field conditions require a toe wall.

(5) Quantities shown are for one end of one reinforced concrete pipe culvert. For multiple pipe culverts, quantities will need to be adjusted. Riprap quantities are for Contractor's information only. Quantities are based on the minimum unit lengths shown on the Precast Saftey End Treatment (SET) standard sheets.

MATERIAL NOTES:

Provide Class "B" riprap in accordance with Item 432, "Riprap".

Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise. The anchor rods shown are always required.

GENERAL NOTES:

Precast safety end treatment for reinforced concrete pipe may be used for TYPE II end treatment as specified in Item 467, "Safety End Treatment".

Refer to PSET-SC or PSET-SP standard sheets for details of square safety end treatments not shown. Refer to PSET-RC or PSET-RP standard sheets for details of round safety end treatments not shown.

For precast units with integrally cast riprap, substitute reinforcing steel in the amount on 0.26 in./ft. minimum for the threaded anchor rods shown. When requested, submit sealed engineering drawings for approval prior to construction. Shop drawings will not be required. Note that a proprietary precast unit with integral riprap is available from L&R Precast Concrete Works, Inc. (956) 583-6293 or www.lrprecast.com.

Payment for riprap and toewalls is included in the price bid for each safety end treatment.

These riprap details are only applicable when notes that require placement of riprap with precast safety end treatments are shown elsewhere in the plans.

Precast units with integrally cast riprap are permitted unless noted otherwise on the plans.

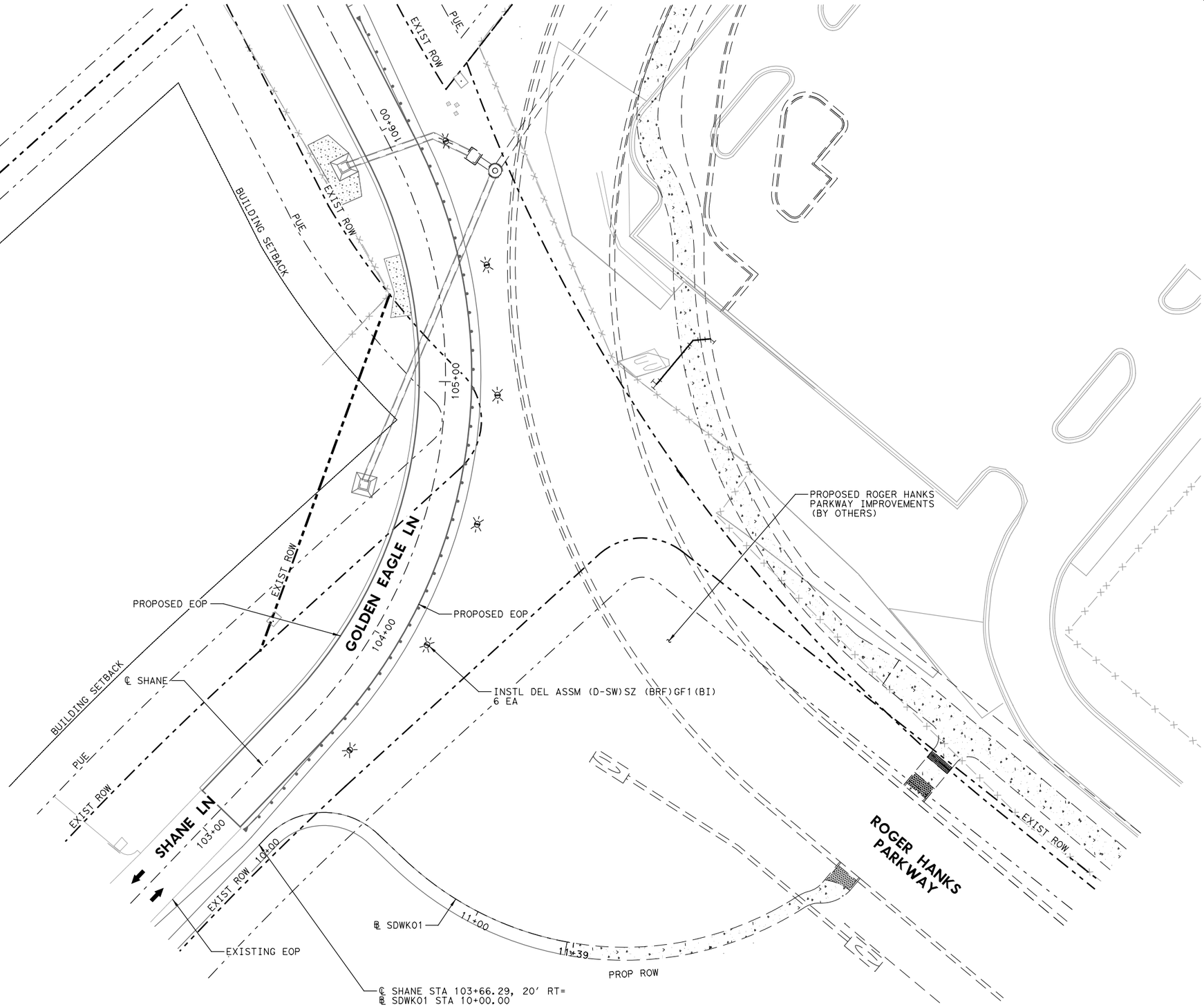
Texas Department of Transportation

Bridge Division Standard

PRECAST SAFETY END TREATMENT
TYPE II
RIPRAP DETAILS

PSET-RR

FILE: psetrrse-20.dgn	DN: GAF	CK: TxDOT	DW: JRP	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				RH
	DIST	COUNTY		SHEET NO.
	AUS	HAYS		46



LEGEND

- PROPERTY LINE (HAYS CENTRAL APPRAISAL DISTRICT)
- EXISTING RIGHT OF WAY
- PROPOSED RIGHT OF WAY
- PROPOSED CONSTRUCTION BY OTHERS
- INSTL DEL ASSM (D-SW)SZ(BRF)GF1(BI)

NOTES:

1. ALL DELINEATORS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD).

0 20 40 60 80

SCALE IN FEET

STATE OF TEXAS
FELIPE S. TUDTUD
104836
LICENSED
PROFESSIONAL ENGINEER
10/04/2023

NO.	DATE	REVISION	APPROVED

HDR
Firm Registration No. F-754
710 Hesters Crossing, Suite 150
Round Rock, Texas 78681
512.685.2900

THE CITY OF DRIPPING SPRINGS TEXAS

ROGER HANKS

SIGNING AND PAVEMENT MARKING PLAN

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SJ				RH
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
KB	TEXAS	AUS	HAYS	
CHECK	CONTROL	SECTION	JOB	47
JC				
CHECK				
JC				

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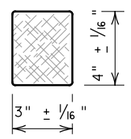
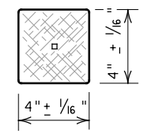
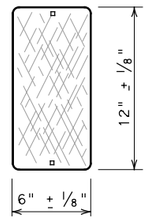
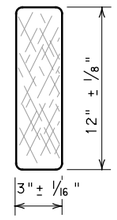
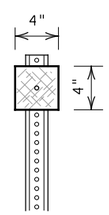
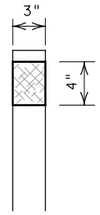
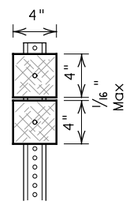
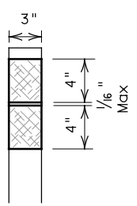
USER: LGOMEZGONZ
FILE: Roger Hanks Parkway - Connector Signing and Pavement Marking Plan
PENTABLE: 10338078.tbl
DATE: 10/4/2023
TIME: 8:15:45 AM
SCALE: 1:40

REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS

	SIZE 1	SIZE 2	SIZE 3	SIZE 4
DEVICE				
SHEETING	Yellow, White or Red Type B or C reflective sheeting			
NOTE	1. Size 1 and 4 - Direct applied reflective sheeting for use on flexible post (flx). 2. Size 2 and 3 - For use on wing channel (wc) post only. Use approved metal, plastic or fiberglass backplate with 17/64" mounting holes.			

DELINEATORS

	SINGLE		DOUBLE	
DEVICE				
	1-Size 2 reflector unit	1-Size 1 reflector unit	2-Size 2 reflector units	2-Size 1 reflector units
SHEETING	Yellow, White or Red Type B or C Reflective Sheeting			
POST TYPE	WC	YFLX, WFLX	WC	YFLX, WFLX
MOUNT TYPE	GND	GND, SRF	GND	GND, SRF

D & OM DESCRIPTIVE CODES

INSTL DEL ASSM (D-XX)SZ X (XXXX)XXX(XX)

NUMBER OF REFLECTORS
S = Single
D = Double

COLOR OF REFLECTORS
W = White
Y = Yellow
R = Red

REFLECTOR UNIT SIZE
1 or 2

TYPE OF POST OR DELINEATOR
WC = Wing Channel Post
YFLX = Yellow Flexible Post
WFLX = White Flexible Post
BRF = Barrier Reflector

TYPE OF MOUNT
GND = Embedded (drivable or set in concrete)
CTB = Concrete Barrier Mount
GF1 or GF2 = Guard Fence Attachment
SRF = Surface Mount

DIRECTION
If Required
BI = Bi-Directional
BR = Bi-Directional with red on back

INSTL OM ASSM (OM-XX) (XXXX)XXX(XX)

TYPE OF OBJECT MARKER
1, 2, 3, or 4

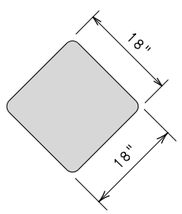
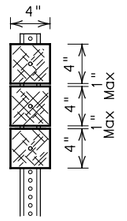
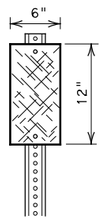
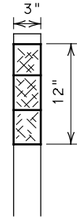
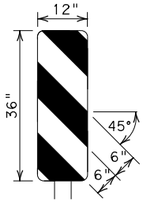
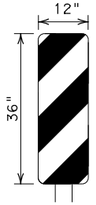
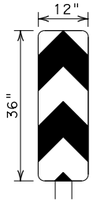
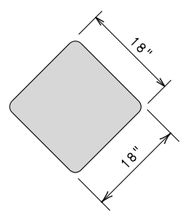
NUMBER OF REFLECTORS OR DIRECTION
X = 3-Size 2 reflector units (Type 2 only)
Y = 1-Size 3 reflector unit (Type 2 only)
Z = 3-Size 1 or 1-Size 4 reflector unit(s)(Type 2 only)
L = Left Side (Type 3 Object Marker only)
R = Right Side (Type 3 Object Marker only)
C = Center (Type 3 Object Marker only)

TYPE OF POST
WC = Wing Channel Post
WFLX = White Flexible Post
TWT = Thin Walled Tubing

TYPE OF MOUNT
GND = Embedded (drivable)
SRF = Surface Mount
WAS = Wedge Anchor Steel
WAP = Wedge Anchor Plastic

DIRECTION
If Required
BI = Bi-Directional

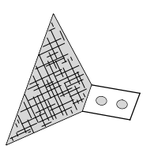
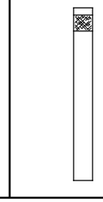
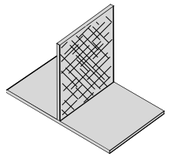
OBJECT MARKERS

	Type 1 (OM-1)	Type 2 (OM-2)			Type 3 (OM-3)			Type 4 (OM-4)
	OM-1	OM-2X	OM-2Y	OM-2Z	OM-3L	OM-3R	OM-3C	OM-4
DEVICE								
		3-Size 2 reflector units	1-Size 3 reflector unit	3-Size 1 reflector units or 1-Size 4 reflector unit				
SHEETING	Yellow-Type B_{FL} or C_{FL} Sheeting	Yellow - Type B or C Sheeting			Alternating acrylic black and retroflective yellow - Type B_{FL} or C_{FL} Sheeting			Red -Type B_{FL} or C_{FL} Sheeting
POST TYPE	TWT	WC	WC	WFLX	TWT			TWT
MOUNT TYPE	WAS, WAP	GND	GND	GND, SRF	WAS, WAP			WAS, WAP

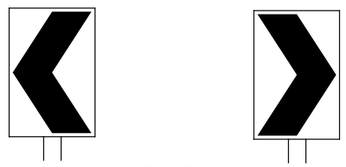
DEPARTMENTAL MATERIAL SPECIFICATIONS

FLEXIBLE DELINEATOR & OBJECT MARKER POSTS (EMBEDDED & SURFACE MOUNT TYPES)	DMS-4400
SIGN FACE MATERIALS	DMS-8300
DELINEATORS, OBJECT MARKERS AND BARRIER REFLECTORS	DMS-8600

BARRIER REFLECTORS (BRF)

	GF1	GF2	CTB
DEVICE			
	1. Barrier reflectors shall meet the requirements of DMS 8600. 2. Approved Barrier Reflectors are listed on the "Barrier Reflectors" Material Producer List at: www.txdot.gov.		
SHEETING	Yellow, White, Red		
NOTE	1. Reflective sheeting shall have a minimum dimension of 3 inches and minimum surface area of 9 square inches.		

CHEVRONS

DEVICE	 W1-8			
SIZE (W x L)	18"x 24" (Conventional)	24"x 30" (Conventional Oversize)	30"x 36" (Expressway)	36" x 48" (Freeway)
MOUNTING HEIGHT	4'-0" or 7'-0"		7'-0" Only	
NOTE	1. CHEVRON (W1-8) signs and ONE DIRECTION LARGE ARROW (W1-6) Signs shall be installed per Sign Mounting Details (SMD) Standard Sheets and paid under Item 644 (Small Roadside Sign Assemblies). 2. When there is a need to increase conspicuity, the Texas version of the ONE DIRECTION LARGE ARROW sign (W1-9T) may be used instead of the ONE DIRECTION LARGE ARROW (W1-6).			

ONE DIRECTION LARGE ARROW

DEVICE	 W1-6	
SIZE (W x L)	48" x 24" (Conventional)	60" x 30" (Expressway & Freeway)
MOUNTING HEIGHT	7'-0"	

NOTE:

Delineator and object marker substrates and sign substrates shall be 0.080" Aluminum sign blank to conform to ASTM B-209 Alloy 6061-T6 or approved alternative.

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION

D & OM(1)-20

FILE: dom1-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
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REVISIONS				RH
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	AUS	HAYS		48

20A

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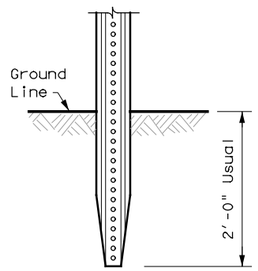
POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

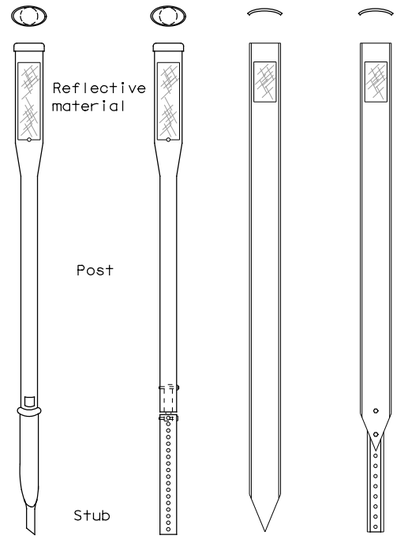


NOTES

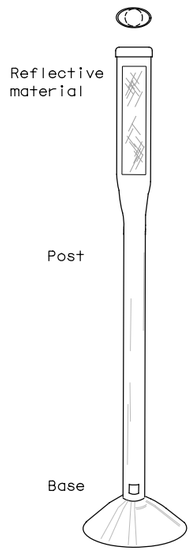
1. Embedded Wing Channel (WC) post option may be used for Type 2 Object Markers and Delineators only.
2. 1.12 lbs/ft steel per ASTM A 1011 SS Gr. 50, or ASTM A499.

FLEXIBLE POSTS (YFLX, WFLX)

GND



SRF



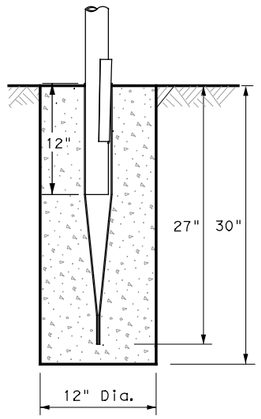
EMBEDDED | SURFACE MOUNT

NOTES

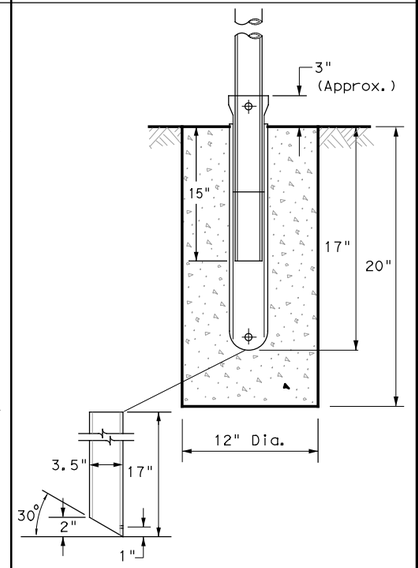
1. See "Flexible Delineator and Object Marker Posts" Material Producer List for approved devices.
2. Install per manufacturer's recommendations.
3. Post length may vary to meet field conditions.
4. When using yellow delineators with flexible posts to separate opposing direction of travel, such as centerline or median use, the flexible posts shall be yellow.

WEDGE ANCHOR SYSTEMS

WAS



WAP



STEEL | PLASTIC

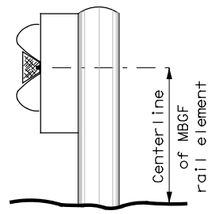
NOTE

1. Install per manufacturer's recommendations.

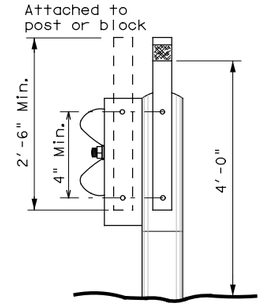
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

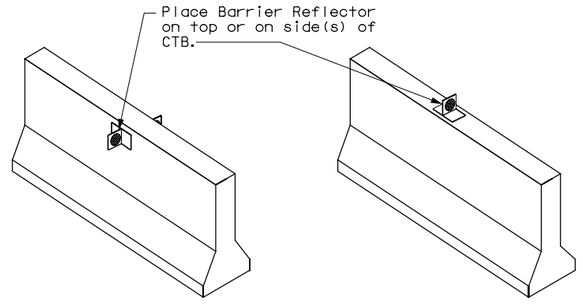
GF1



GF2



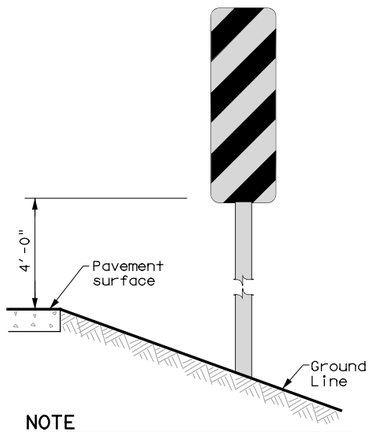
CONCRETE TRAFFIC BARRIER (CTB)



GENERAL NOTES

1. Place delineators on a section of roadway at a consistent distance from the edge of pavement.
2. Where a restriction prevents consistent placement from the pavement edge, place the affected object markers in line with the innermost edge of the obstruction.
3. When Type 2 object markers and delineators are more than 8'-0" from the edge of the pavement, it may not be possible to maintain a height of approximately 4'-0". If this is the case, place the object marker or delineator as close to the desired height as possible.
4. Install all delineators, object markers and barrier reflectors in accordance with the manufacturer's recommendation.
5. Barrier reflectors should be installed a minimum of 18 inches above the edge of the pavement surface.
6. Diagonal stripes on Type 3 object markers shall slope down toward the intended travel lane.

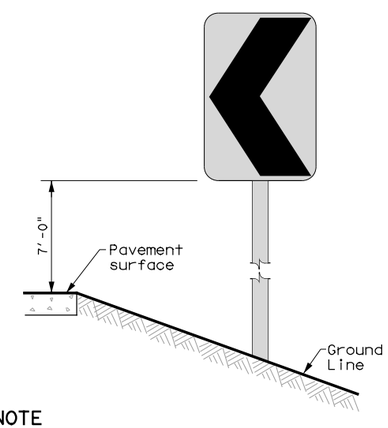
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



NOTE

Mounting at 4 feet to the bottom of the chevron is permitted for chevrons that will not exceed a height of 6'-6" to the top of the chevron (sizes 24" x 30" and smaller)

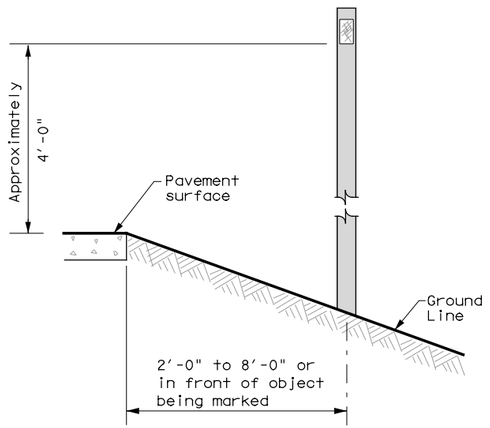
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



NOTE

Chevrons 30" x 36" and larger shall be mounted at a height of 7' to the bottom of the chevron. Chevron sign and ONE DIRECTION LARGE ARROW sign (W1-9T) shall be installed per SMD standard sheets and paid under item 644.

DELINEATORS AND TYPE 2 OBJECT MARKERS



See general notes 1, 2 and 3.

Texas Department of Transportation — Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER INSTALLATION

D & OM(2)-20

FILE: dom2-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
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REVISIONS				RH
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	AUS	HAYS		49

20B

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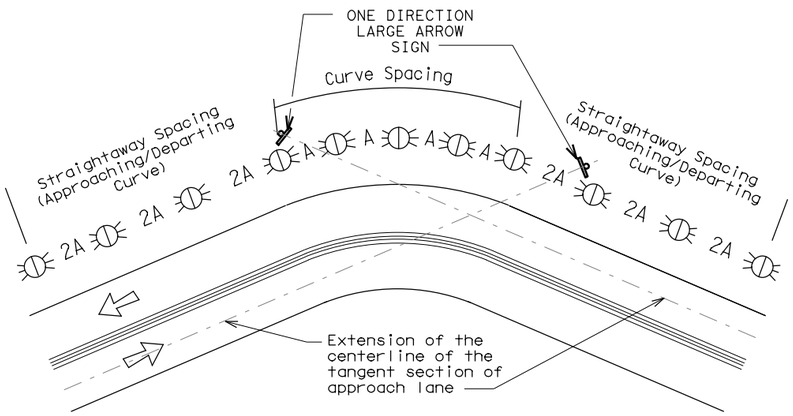
MINIMUM WARNING DEVICES AT CURVES WITH ADVISORY SPEEDS

Amount by which Advisory Speed is less than Posted Speed	Curve Advisory Speed	
	Turn (30 MPH or less)	Curve (35 MPH or more)
5 MPH & 10 MPH	• RPMs	• RPMs
15 MPH & 20 MPH	• RPMs and One Direction Large Arrow sign	• RPMs and Chevrons; or • RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons.
25 MPH & more	• RPMs and Chevrons; or • RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons	• RPMs and Chevrons

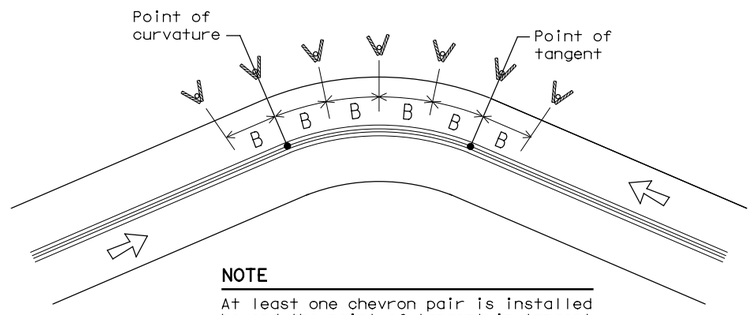
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



NOTE

ONE DIRECTION LARGE ARROW (W1-6) sign should be located at approximately and perpendicular to the extension of the centerline of the tangent section of approach lane.

SUGGESTED SPACING FOR CHEVRONS ON HORIZONTAL CURVES



NOTE

At least one chevron pair is installed beyond the point of tangent in tangent section.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS KNOWN

Degree of Curve	FEET			
	Radius of Curve	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
		A	2A	B
1	5730	225	450	——
2	2865	160	320	——
3	1910	130	260	200
4	1433	110	220	160
5	1146	100	200	160
6	955	90	180	160
7	819	85	170	160
8	716	75	150	160
9	637	75	150	120
10	573	70	140	120
11	521	65	130	120
12	478	60	120	120
13	441	60	120	120
14	409	55	110	80
15	382	55	110	80
16	358	55	110	80
19	302	50	100	80
23	249	40	80	80
29	198	35	70	40
38	151	30	60	40
57	101	20	40	40

Curve delineator approach and departure spacing should include 3 delineators spaced at 2A. This spacing should be used during design preparation or when the degree of curve is known.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS NOT KNOWN

Advisory Speed (MPH)	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
	A	2xA	B
65	130	260	200
60	110	220	160
55	100	200	160
50	85	170	160
45	75	150	120
40	70	140	120
35	60	120	120
30	55	110	80
25	50	100	80
20	40	80	80
15	35	70	40

If the degree of curve is not known, delineator spacing may be determined based on the Advisory Speed of the curve. Use the delineator curve spacing for each Advisory Speed (MPH).

DELINEATOR AND OBJECT MARKER APPLICATION AND SPACING

CONDITION	REQUIRED TREATMENT	MINIMUM SPACING
Frwy./Exp. Tangent	RPMs	See PM-series and FPM-series standard sheets
Frwy./Exp. Curve	Single delineators on right side	See delineator spacing table
Frwy/Exp.Ramp	Single delineators on at least one side of ramp (should be on outside of curves) (see Detail 3 on D&OM(4))	100 feet on ramp tangents Use delineator spacing table for ramp curves ("straightway spacing" does not apply to ramp curves)
Acceleration/Deceleration Lane	Double delineators (see Detail 3 on D&OM(4))	100 feet (See Detail 3 on D & OM (4))
Truck Escape Ramp	Single red delineators on both sides	50 feet
Bridge Rail (steel or concrete)and Metal Beam Guard Fence	Bi-Directional Delineators when undivided with one lane each direction Single Delineators when multiple lanes each direction	Equal spacing (100'max) but not less than 3 delineators
Concrete Traffic Barrier (CTB) or Steel Traffic Barrier	Barrier reflectors matching the color of the edge line	Equal spacing 100' max
Cable Barrier	Reflectors matching the color of the edge line	Every 5th cable barrier post (up to 100'max)
Guard Rail Terminus/Impact Head	Divided highway - Object marker on approach end Undivided 2-lane highways - Object marker on approach and departure end	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5) and D & OM (6)
Bridges with no Approach Rail	Type 3 Object Marker (OM-3) at end of rail and 3 single delineators approaching rail	See D & OM(5)
Reduced Width Approaches to Bridge Rail	Type 2 and Type 3 Object Markers (OM-3) and 3 single delineators approaching bridge	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5)
Culverts without MBGF	Type 2 Object Markers	See Detail 2 on D & OM(4)
Crossovers	Double yellow delineators and RPMs	See Detail 1 on D & OM (4)
Pavement Narrowing (lane merge) on Freeways/Expressway	Single delineators adjacent to affected lane for full length of transition	100 feet

NOTES

1. Unless indicated otherwise, the delineator or barrier reflector color shall conform to the color of the pavement edge line on the side of the road where the delineators or barrier reflectors are placed.
2. Barrier reflectors may be used to replace required delineators.
3. Single red delineators may be mounted on the back side of delineator posts for wrong way driver applications

LEGEND	
	Bi-directional Delineator
	Delineator
	Sign

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(3)-20

FILE: dom3-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
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REVISIONS				RH
3-15 8-15	DIST	COUNTY		SHEET NO.
8-15 7-20	AUS	HAYS		50

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DATE: 10/4/2023 8:15:55 AM
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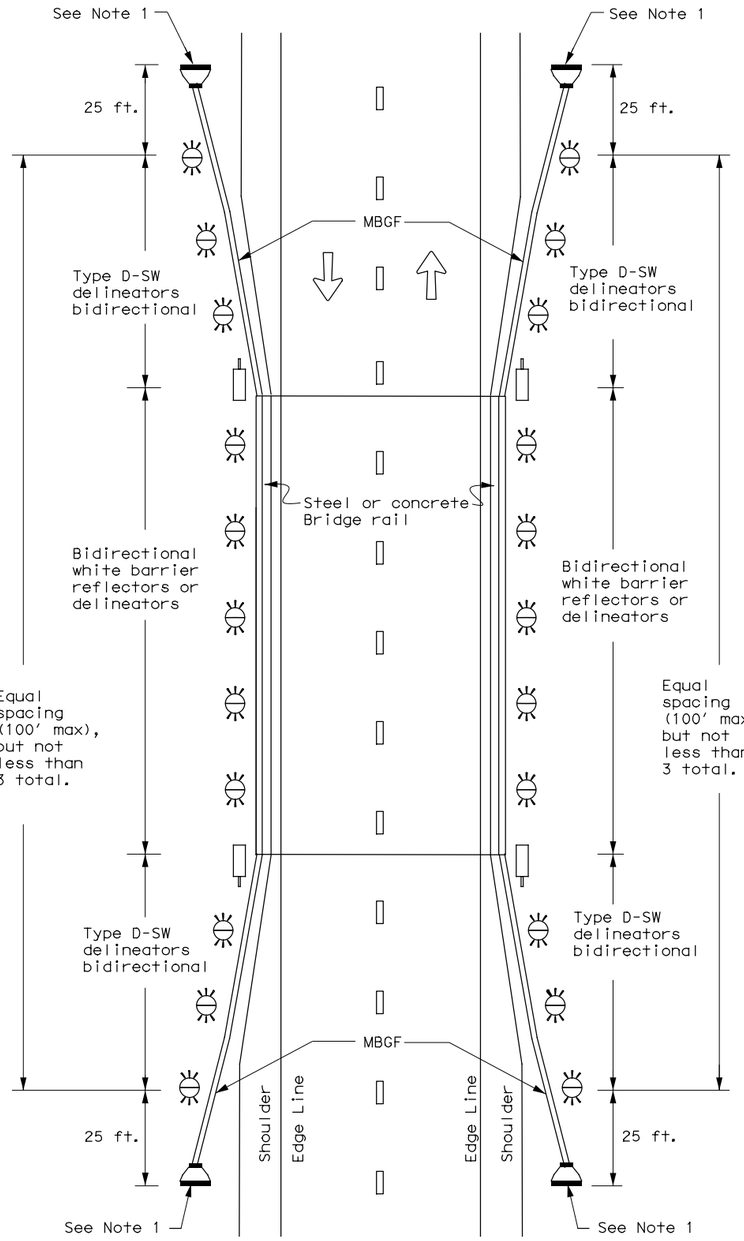
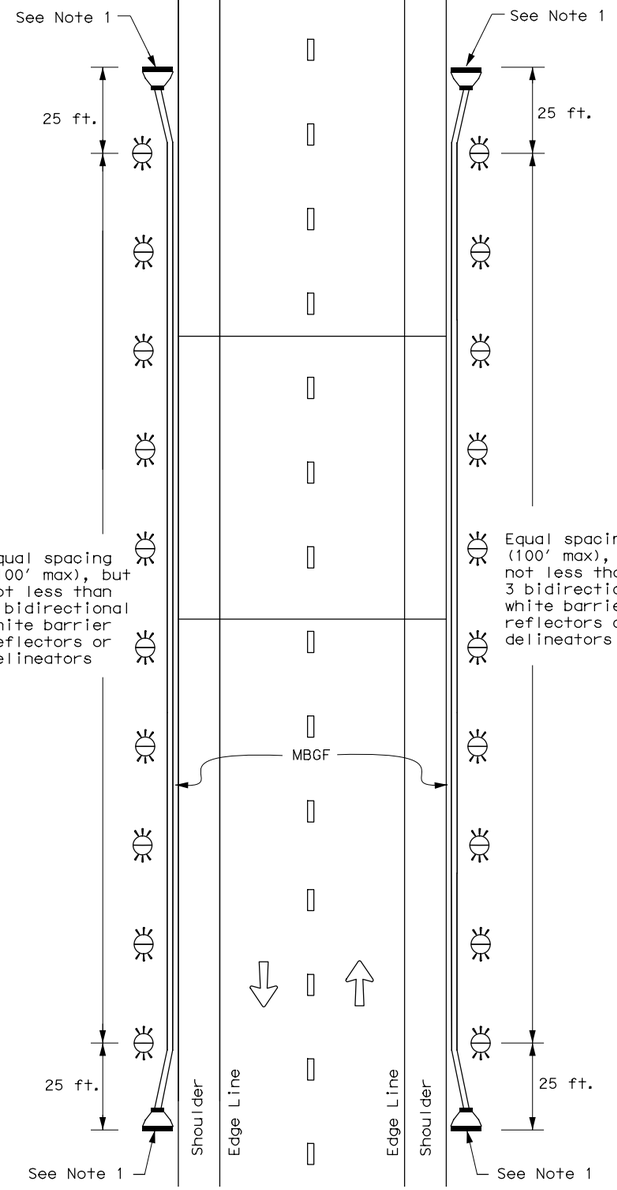
TWO-WAY, TWO LANE ROADWAY WITH REDUCED WIDTH APPROACH RAIL



NOTE:

1. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end.

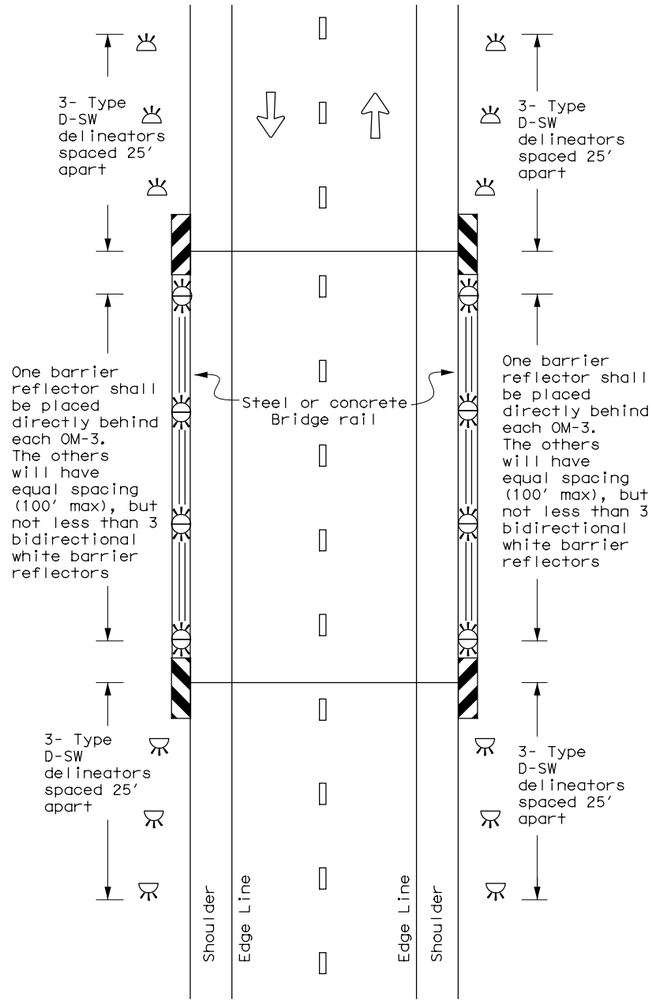
TWO-WAY, TWO LANE ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



NOTE:

1. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end.

TWO-WAY, TWO LANE ROADWAY BRIDGE WITH NO APPROACH RAIL



LEGEND

	Bidirectional Delineator
	Delineator
	OM-3
	OM-2
	Terminal End
	Traffic Flow

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(5)-20

FILE: dom5-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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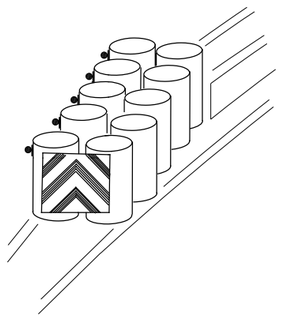
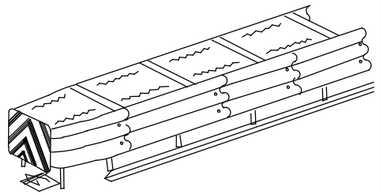
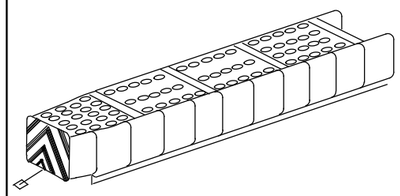
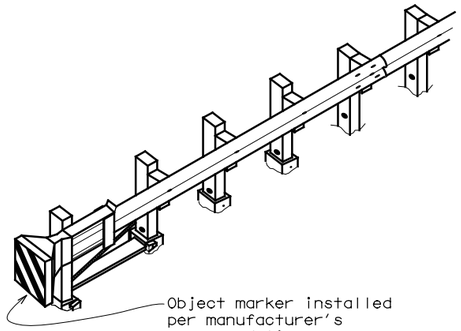
REVISIONS				RH
7-20	DIST	COUNTY		SHEET NO.
	AUS	HAYS		51

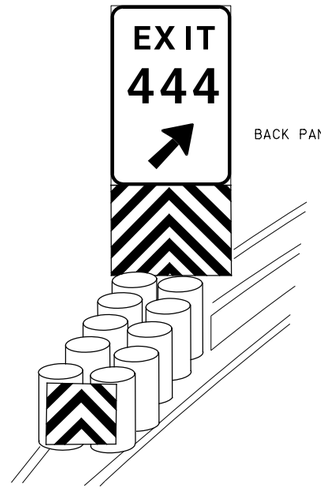
20E

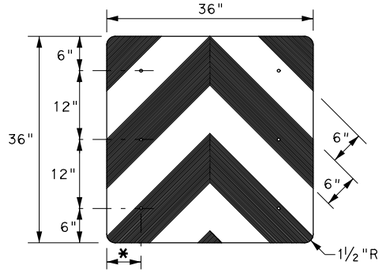


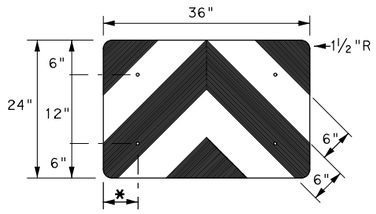




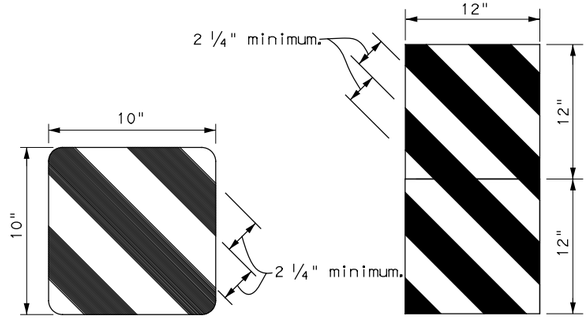




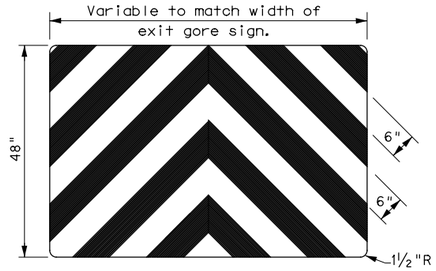


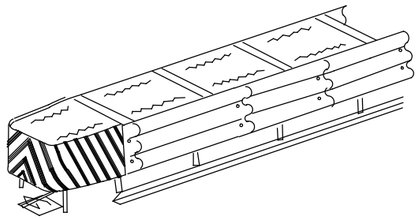


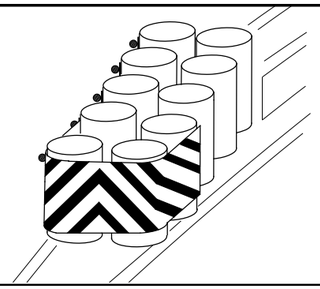
* Adjust to fit attenuator per manufacturer's recommendation, or as directed by the Engineer

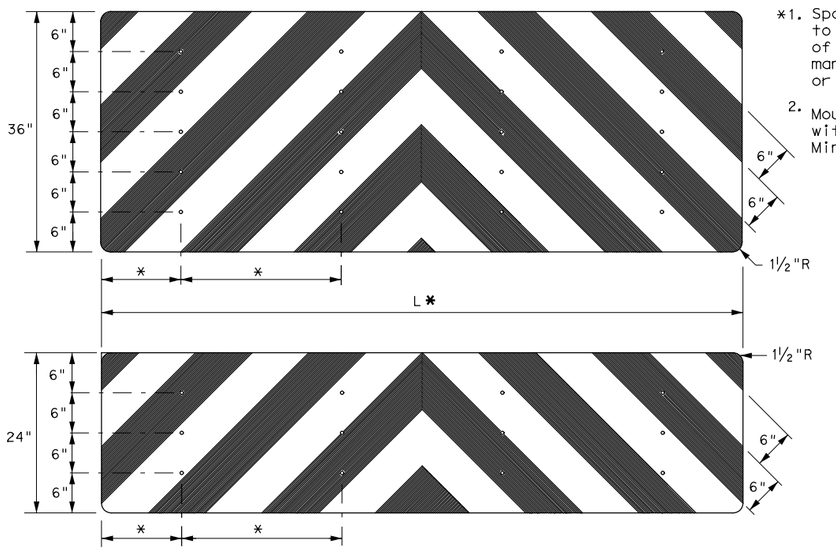


OBJECT MARKERS SMALLER THAN 3 FT^2









NOTES

*1. Spacing should be adjusted to attach through centerline of drum, per attenuator manufacturers recommendation, or as directed by the Engineer.

2. Mounting should be flush with top of attenuator. Minimum size 96" x 24".

NOTES

1. Object Markers shall conform to the Texas MUTCD and meet the color and reflectivity requirement of Department Material Specification DMS 8300. Background shall be yellow reflective sheeting (Type B or C) and Chevron shall be black.

2. Object Markers may be fabricated from adhesive backed reflective sheeting applied directly to guardrail end treatment, or applied directly to an "end cap" as per the manufacturer's recommendation. Direct applied sheeting shall provide a smooth surface and have no wrinkles, air bubbles, cuts or tears. A radius at the corners is not required for direct applied sheeting.

3. Object Marker size may be reduced to fit smaller devices. Width of alternating black and yellow stripes are typically 6". Object Markers smaller than 3ft may have reduced width stripes of a minimum of 2 ¼".

4. Pop rivets, screws, or nuts and bolts may be used to attach object markers and reflectors. Holes, slots or other openings may be cut or drilled through object markers to allow cable or other attachments.

5. Object Marker at nose of attenuator is subsidiary to the attenuator.

6. See D & OM (1-4) for required barrier reflectors.

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER FOR VEHICLE IMPACT ATTENUATORS

D & OM(VIA)-20

FILE: domvia20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT December 1989	CONT	SECT	JOB	HIGHWAY
REVISIONS				RH
4-92 8-04	DIST	COUNTY		SHEET NO.
8-95 3-15	AUS	HAYS		52
4-98 7-20				
20G				

DATE: 10/4/2023 8:15:59 AM
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DATE: 10/4/2023
FILE: $FILE$

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

TPDES TXR 150000: Stormwater Discharge Permit or Construction General Permit required for projects with 1 or more acres disturbed soil. Projects with any disturbed soil must protect for erosion and sedimentation in accordance with Item 506.

List MS4 Operator(s) that may receive discharges from this project. They may need to be notified prior to construction activities.

1.

2.

☐ 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 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 TCEQ, EPA or other inspectors.
4. When Contractor project specific locations (PSL's) increase disturbed soil area to 5 acres or more, submit NOI to TCEQ and the Engineer.

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

USACE Permit required for filling, dredging, excavating or other work in any water bodies, rivers, creeks, streams, wetlands or wet areas.

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

☒ No Permit Required

☐ Nationwide Permit 14 - PCN not Required (less than 1/10th acre waters or wetlands affected)

☐ Nationwide Permit 14 - PCN Required (1/10 to <1/2 acre, 1/3 in tidal waters)

☐ 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 planned to control erosion, sedimentation and post-project TSS.

1.

2.

3.

4.

The elevation of the ordinary high water marks of any areas requiring work to be performed in the waters of the US requiring the use of a nationwide permit can be found on the Bridge Layouts.

Best Management Practices:

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	☐ 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.

2.

3.

4.

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 immediate area, and contact the Engineer immediately.

LIST OF ABBREVIATIONS

BMP:	Best Management Practice	SPCC:	Spill Prevention Control and Countermeasure
CGP:	Construction General Permit	SW3P:	Storm Water Pollution Prevention Plan
DSHS:	Texas Department of State Health Services	PCN:	Pre-Construction Notification
FHWA:	Federal Highway Administration	PSL:	Project Specific Location
MOA:	Memorandum of Agreement	TCEQ:	Texas Commission on Environmental Quality
MOU:	Memorandum of Understanding	TPDES:	Texas Pollutant Discharge Elimination System
MS4:	Municipal Separate Stormwater Sewer System	TPWD:	Texas Parks and Wildlife Department
MBTA:	Migratory Bird Treaty Act	TxDOT:	Texas Department of Transportation
NOT:	Notice of Termination	T&E:	Threatened and Endangered Species
NWP:	Nationwide Permit	USACE:	U.S. Army Corps of Engineers
NOI:	Notice of Intent	USFWS:	U.S. Fish and Wildlife Service

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 appropriate 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 following 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

Does the project involve any bridge class structure rehabilitation or replacements (bridge class structures not including box culverts)?

☐ Yes ☒ No

If "No", then no further action is required.
If "Yes", then TxDOT is responsible for completing asbestos assessment/inspection.

Are the results of the asbestos inspection positive (is asbestos present)?

☐ Yes ☒ No

If "Yes", then TxDOT must retain a DSHS licensed asbestos consultant to assist with the notification, develop abatement/mitigation procedures, and perform management activities as necessary. The notification form to DSHS must be postmarked at least 15 working days prior to scheduled demolition.

If "No", then TxDOT is still required to notify DSHS 15 working days prior to any scheduled demolition.

In either case, the Contractor is responsible for providing the date(s) for abatement activities and/or demolition with careful coordination between the Engineer and asbestos consultant in order to minimize construction delays and subsequent claims.

Any other evidence indicating possible hazardous materials or contamination discovered on site. Hazardous Materials or Contamination Issues Specific to this Project:

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

VII. OTHER ENVIRONMENTAL ISSUES

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

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

STATE OF TEXAS
FELIPE S. TUDTUD
104836
LICENSED
PROFESSIONAL ENGINEER
10/04/2023

HDR
Firm Registration No. F-754
710 Hesters Crossing, Suite 150
Round Rock, Texas 78681
512.685.2900

Texas Department of Transportation

Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

EPIC

FILE: epic.dgn	DN: TxDOT	CK: RG	DW: VP	CK: AR
©TxDOT: February 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-12-2011 (DS)				RH
05-07-14 ADDED NOTE SECTION IV.	DIST	COUNTY		SHEET NO.
01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.	AUS	HAYS		53

A. GENERAL SITE DATA

1. PROJECT LIMITS:
SHANE LN/GOLDEN EAGLE DR AT ROGER HANKS PARKWAY
PROJECT LENGTH = 519.00 FT. = 0.098 MILES

PROJECT LOCATION:
BEG LATITUDE: +30°12′10.57" N BEG LONGITUDE: -98°06′14.03" W
END LATITUDE: +30°12′13.06" N END LONGITUDE: -98°06′08.23" W

2. PROJECT SITE MAPS:
* PROJECT LOCATION MAP: SEE TITLE SHEET
* DRAINAGE PATTERNS: SEE DRAINAGE AREA MAP
* SLOPES ANTICIPATED AFTER MAJOR GRADINGS OR AREAS OF SOIL DISTURBANCE: SEE TYPICAL SECTIONS
* LOCATION OF EROSION AND SEDIMENT CONTROLS: SEE SW3P LAYOUT
* SURFACE WATERS AND DISCHARGE LOCATIONS: SEE DRAINAGE AREA MAP
* PROJECT SPECIFIC LOCATIONS: TO BE SPECIFIED BY THE PROJECT FIELD OFFICE DURING CONSTRUCTION AND LOCATED IN THE PROJECT SW3P FILE. REFERENCE ITEM #10 BELOW

3. PROJECT DESCRIPTION: RECONSTRUCTING OF THE ROADWAY AND OPERATIONAL IMPROVEMENTS

4. MAJOR SOIL DISTURBING ACTIVITIES:
SOIL DISTURBING ACTIVITIES WILL INCLUDE PREPARING THE RIGHT OF WAY, GRADING, EROSION CONTROLS, AND TOPSOIL WORK FOR FINAL SEEDING.

5. EXISTING CONDITION OF SOIL & VEGETATIVE COVER AND % OF EXISTING VEGETATIVE COVER:
EXISTING SOILS CONSIST OF CLAY LOAM
EXISTING VEGETATIVE COVER PATCHY GRASS APPROX 60%

6. TOTAL PROJECT AREA: 0.92 ACRES

7. TOTAL AREA TO BE DISTURBED: 0.99 ACRES

8. WEIGHTED RUNOFF COEFFICIENT
BEFORE CONSTRUCTION: 0.52
AFTER CONSTRUCTION: 0.55

9. NAME OF RECEIVING WATERS: (SEGMENT NUMBER OF RECEIVING WATERS)
ONION CREEK (SEGMENT NUMBER 1427)

10. PROJECT SW3P FILE: FOR PROJECTS DISTURBING ONE ACRE OR MORE, TXDOT WILL MAINTAIN AN SW3P FILE WITH ALL PERTINENT ENVIRONMENTAL DOCUMENTS, CORRESPONDENCE, ETC. AT THE PROJECT FIELD OFFICE. IF NO FIELD OFFICE IS AVAILABLE THEN THE SW3P FILE SHALL BE KEPT IN THE INSPECTOR'S TRUCK.

B. EROSION AND SEDIMENT CONTROLS

1. SOIL STABILIZATION PRACTICES:

__X__ TEMPORARY SEEDING
__X__ PERMANENT PLANTING, SODDING, OR SEEDING
____ MULCHING
____ SOIL RETENTION BLANKET
____ BUFFER ZONES
____ PRESERVATION OF NATURAL RESOURCES

OTHER:

2. STRUCTURAL PRACTICES:

__X__ SILT FENCES
__X__ ROCK FILTER DAMS
____ DIVERSION, INTERCEPTOR, OR PERIMETER DIKES
____ DIVERSION, INTERCEPTOR, OR PERIMETER SWALES
____ DIVERSION DIKE AND SWALE COMBINATIONS
____ PIPE SLOPE DRAINS
____ PAVED FLUMES
__X__ 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
__X__ STORM SEWERS
____ VELOCITY CONTROL DEVICES

OTHER:

3. STORM WATER MANAGEMENT:
STORM WATER DRAINAGE WILL BE PROVIDED BY EXISTING AND PROPOSED OPEN DITCHES THIS SYSTEM WILL CARRY THE DRAINAGE WITHIN THE RIGHT-OF-WAY TO EXISTING CHANNELS AND STORM SEWER SYSTEM

4. STORM WATER MANAGEMENT ACTIVITIES: (SEQUENCE OF CONSTRUCTION)
1. EXTEND EXISTING PIPE AND INSTALL AREA INLET.
2. RECONSTRUCT SHANE LN/GOLDEN EAGLE FROM BEGIN TO END.
3. CONSTRUCT CONNECTOR FROM SHANE LN TO ROGER HANKS PARKWAY.

5. NON-STORM WATER DISCHARGES:
FILTER NON-STORM WATER DISCHARGES, OR HOLD RETENTION BASINS, BEFORE BEING ALLOWED TO MIX WITH STORM WATER. THESE DISCHARGES CONSIST OF NON-POLLUTED GROUND WATER, SPRING WATER, FOUNDATION AND/OR FOOTING DRAIN WATER; AND WATER USED FOR DUST CONTROL, PAVEMENT WASHING AND VEHICLE WASHWATER CONTAINING NO DETERGENTS.

C. OTHER REQUIREMENTS & PRACTICES

1. MAINTENANCE:
MAINTENANCE WILL BE PERFORMED AS INDICATED ON FIELD INSPECTION AND MAINTENANCE REPORT FORM 2118.

2. INSPECTION:
INSPECTION WILL BE PERFORMED AS INDICATED ON FIELD INSPECTION AND MAINTENANCE REPORT FORM 2118.

3. WASTE MATERIALS:
ALL WASTE MATERIALS WILL BE COLLECTED, STORED AND DISPOSED OF IN A LEGAL AND PROPER MANNER. NO CONSTRUCTION WASTE MATERIAL WILL BE BURIED ON SITE.

4. HAZARDOUS WASTE (INCLUDING SPILL REPORTING):
AT A MINIMUM, ANY PRODUCTS IN THE FOLLOWING CATEGORIES ARE CONSIDERED TO BE HAZARDOUS. PAINTS, ACIDS FOR CLEANING MASONRY SURFACES, CLEANING SOLVENTS, ASPHALT PRODUCTS, CHEMICAL ADDITIVES FOR SOIL STABILIZATION, OR CONCRETE CURING COMPOUNDS AND ADDITIVES. IN THE EVENT A SPILL WHICH MAY BE HAZARDOUS, THE SPILL COORDINATOR MUST BE CONTACTED IMMEDIATELY.

5. SANITARY WASTE:
ALL SANITARY WASTE WILL BE COLLECTED FROM THE PORTABLE UNITS AS NECESSARY OR AS REQUIRED BY LOCAL REGULATION BY A LICENSED SANITARY WASTE MANAGEMENT CONTRACTOR.

OFFSITE VEHICLE TRACKING:

__X__ HAUL ROADS DAMPENED FOR DUST CONTROL
__X__ LOADED HAUL TRUCKS TO BE COVERED WITH TARPAULIN
__X__ EXCESS DIRT ON ROAD REMOVED DAILY
__X__ STABILIZED CONSTRUCTION ENTRANCE

OTHER:

REMARKS: DISPOSAL AREAS, STOCKPILES AND HAUL ROADS SHALL BE CONSTRUCTED IN A MANNER THAT WILL MINIMIZE AND CONTROL SEDIMENT FROM ENTERING RECEIVING WATERS. DISPOSAL AREAS SHALL NOT BE LOCATED IN ANY WATERBODY OR STREAMBED.

CONSTRUCTION STAGING AREAS AND VEHICLE MAINTENANCE AREAS SHALL BE CONSTRUCTED TO MINIMIZE THE RUNOFF OF POLLUTANTS.

STATE OF TEXAS
FELIPE S. TUDTUD
104836
LICENSED PROFESSIONAL ENGINEER
10/04/2023

NO.	DATE	REVISION	APPROVED

HDR
Firm Registration No. F-754
710 Hesters Crossing, Suite 150
Round Rock, Texas 78681
512.685.2900

THE CITY OF DRIPPING SPRINGS TEXAS

ROGER HANKS

SW3P NARRATIVE

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SJ				RH
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
KB	TEXAS	AUS	HAYS	
CHECK	CONTROL	SECTION	JOB	54
JC				
CHECK				
JC				

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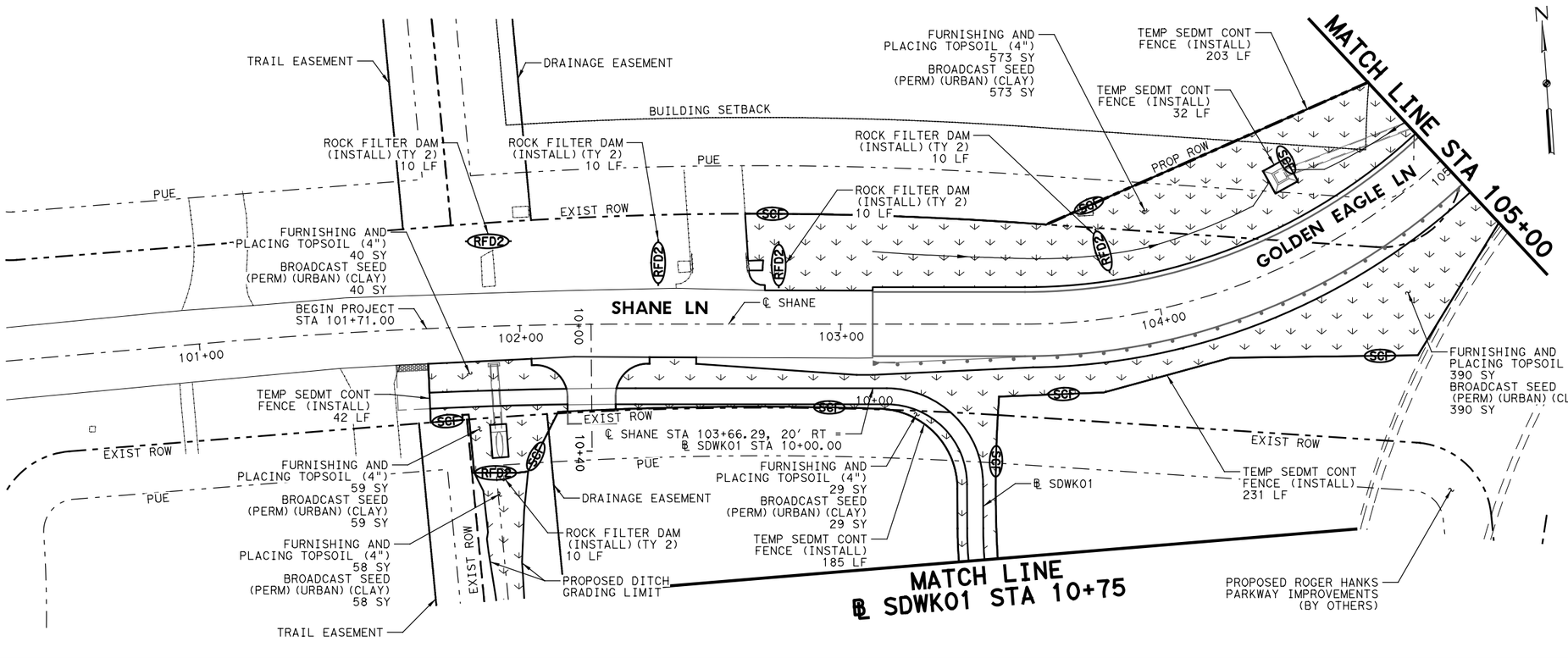
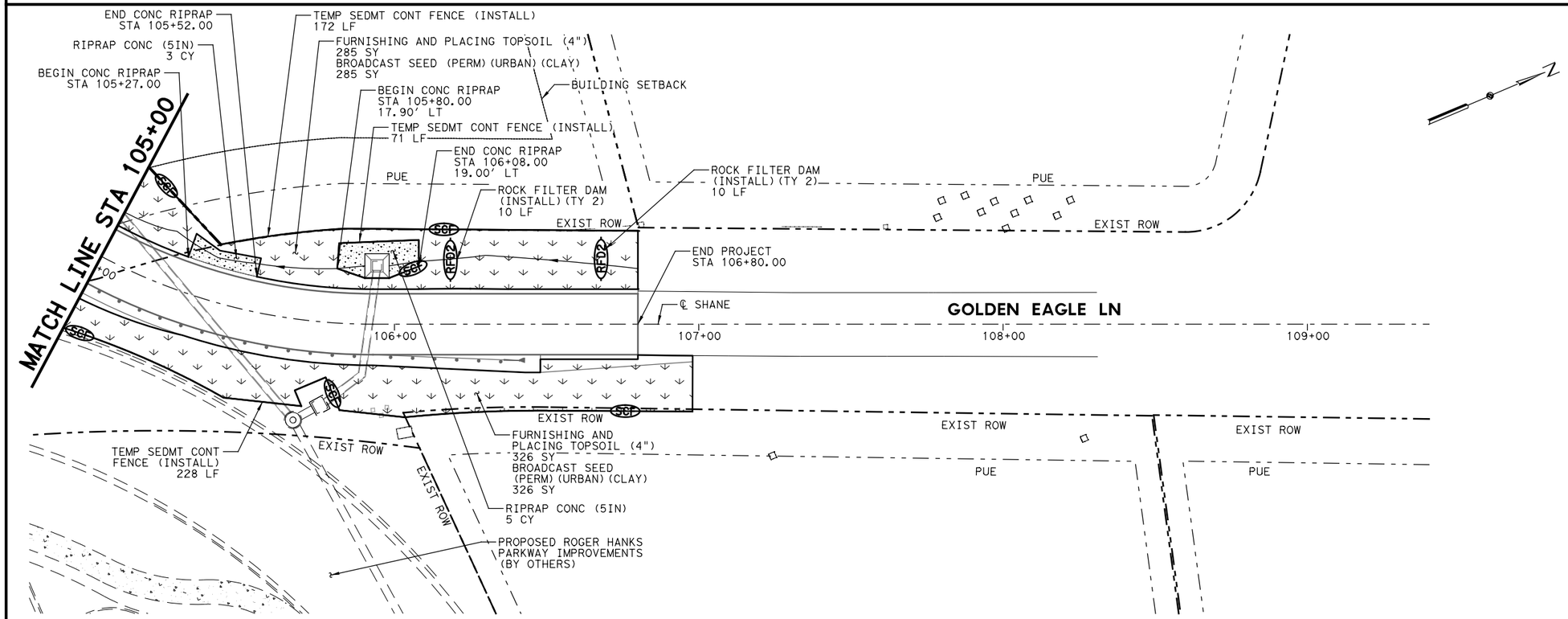


LEGEND

- PROPERTY LINE (HAYS CENTRAL APPRAISAL DISTRICT)
- EXISTING RIGHT OF WAY
- PROPOSED RIGHT OF WAY
- PROPOSED CONSTRUCTION BY OTHERS
- RFD2 — ROCK FILTER DAM (TY 2)
- SCF — SEDIMENT CONTROL FENCE
- SEEDING AND TOPSOIL

NOTES:

1. CONTRACTOR SHALL FIELD VERIFY LOCATIONS OF BMPs SHOWN AND ALTER LOCATIONS AS NEEDED TO ACHIEVE INTENDED PURPOSE AS APPROVED BY THE ENGINEER.
2. PERIMETER CONTROLS SHALL BE IN PLACE PRIOR TO COMMENCING ANY SOIL DISTURBING ACTIVITIES. PERIMETER DEVICES TO BE PLACED AT ROW OR EASEMENT UNLESS OTHERWISE NOTED.
3. CONSTRUCTION EXIT LOCATIONS ARE TO BE DETERMINED IN THE FIELD BY THE CONTRACTOR AND APPROVED BY THE ENGINEER.
4. CONTRACTOR IS RESPONSIBLE TO VEGETATE ANY ADDITIONAL DISTURBED AREAS NOT CALLED OUT IN PLANS. PROVIDE SEEDING AND TOPSOIL FOR THESE AREAS. SUBSIDIARY TO PERTINENT ITEMS.



STATE OF TEXAS
FELIPE S. TUDTUD
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10/04/2023

NO.	DATE	REVISION	APPROVED

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Firm Registration No. F-754
710 Hesters Crossing, Suite 150
Round Rock, Texas 78681
512.685.2900

THE CITY OF DRIPPING SPRINGS TEXAS

ROGER HANKS

SW3P LAYOUT

SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SJ				RH
GRAPHICS KB	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JC	TEXAS	AUS	HAYS	55
CHECK JC	CONTROL	SECTION	JOB	

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LEGEND

- PROPERTY LINE (HAYS CENTRAL APPRAISAL DISTRICT)
- EXISTING RIGHT OF WAY
- PROPOSED RIGHT OF WAY
- PROPOSED CONSTRUCTION BY OTHERS
- RFD2 — ROCK FILTER DAM (TY 2)
- SCF — SEDIMENT CONTROL FENCE
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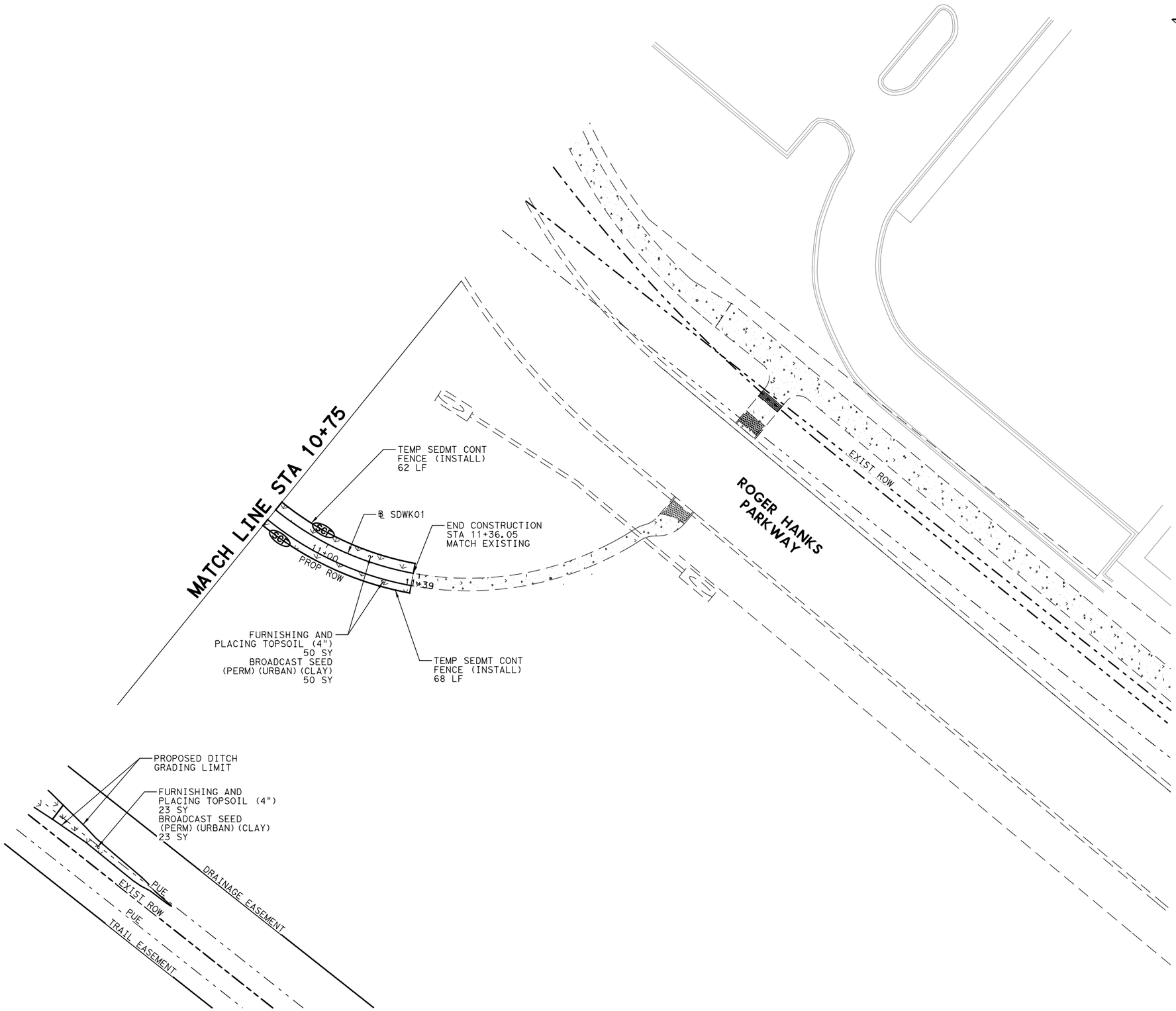

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SCALE IN FEET

STATE OF TEXAS
FELIPE S. TUDTUD
104836
LICENSED PROFESSIONAL ENGINEER
10/04/2023

NO.	DATE	REVISION	APPROVED

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Firm Registration No. F-754
710 Hesters Crossing, Suite 150
Round Rock, Texas 78681
512.685.2900

THE CITY OF DRIPPING SPRINGS TEXAS

ROGER HANKS

SW3P LAYOUT

SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SJ				RH
GRAPHICS KB	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JC	TEXAS	AUS	HAYS	
CHECK JC	CONTROL	SECTION	JOB	56

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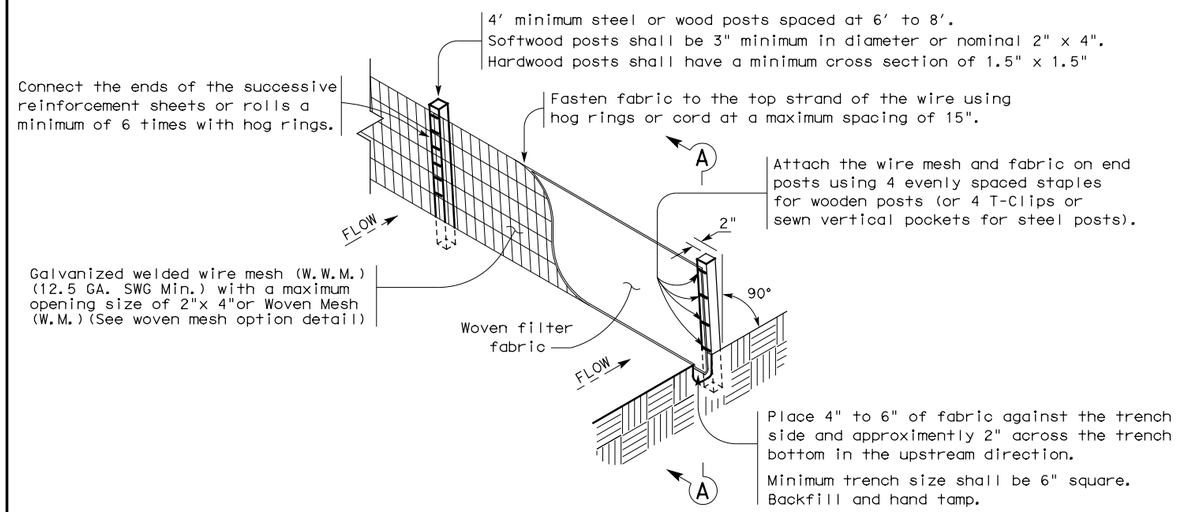
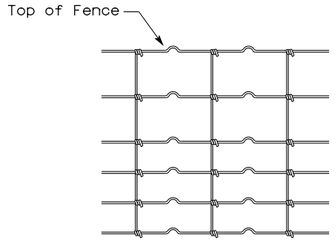
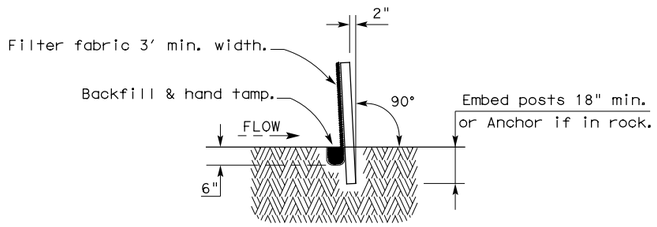


TEMPORARY SEDIMENT CONTROL FENCE

SCF





SECTION A-A

HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL

Galvanized hinge joint knot woven mesh (12.5 GA.SWG Min.) requires a minimum of five horizontal wires spaced at a maximum of 12 inches apart and all vertical wires spaced at a maximum of 12 inches apart.

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 maximum 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.

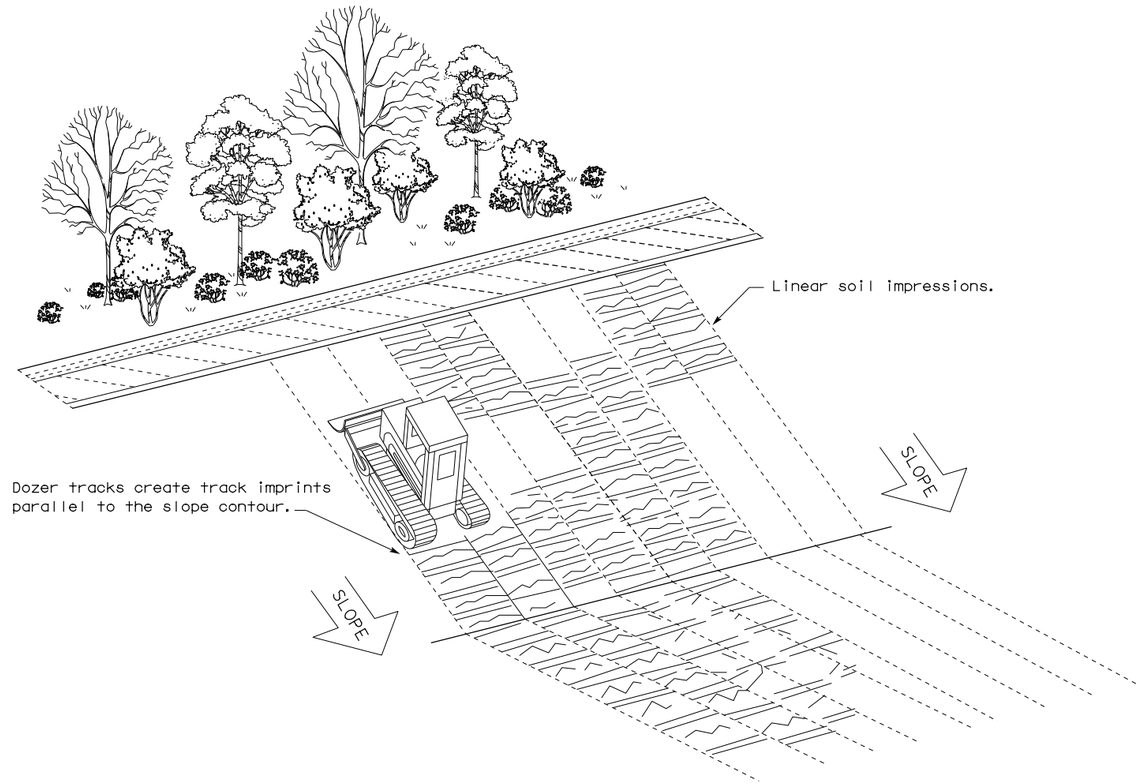
LEGEND

Sediment Control Fence

SCF

GENERAL NOTES

1. Vertical tracking is required on projects where soil distributing activities have occurred unless otherwise approved.
2. Perform vertical tracking on slopes to temporarily stabilize soil.
3. Provide equipment with a track undercarriage capable of producing linear soil impressions measuring a minimum of 12" in length by 2" to 4" in width by 1/2" to 2" in depth.
4. Do not exceed 12" between track impressions.
5. Install continous linear track impressions where the minimum 12" length impressions are perpendicular to the slope or direction of water flow.



VERTICAL TRACKING

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

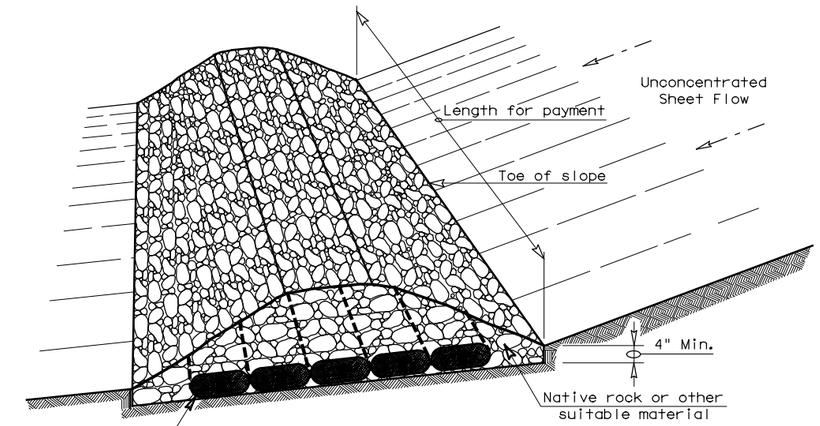
FENCE & VERTICAL TRACKING

EC(1)-16

FILE: ec116	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS	
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY	
REVISIONS				RH	
	DIST	COUNTY		SHEET NO.	
	AUS	HAYS		57	

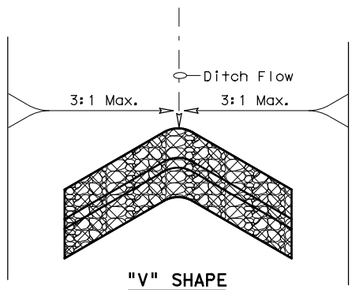
10/4/2023
$FILE$

DATE: 10/4/2023
FILE: $FILE$

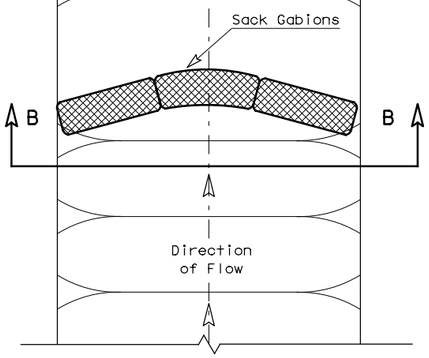


FILTER DAM AT TOE OF SLOPE

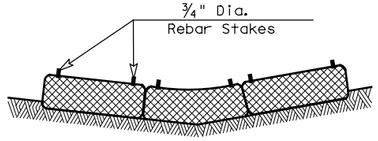
RFD1



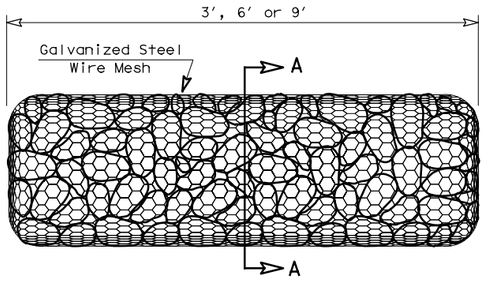
"V" SHAPE
PLAN VIEW



PLAN VIEW

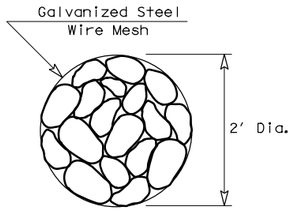


SECTION B-B

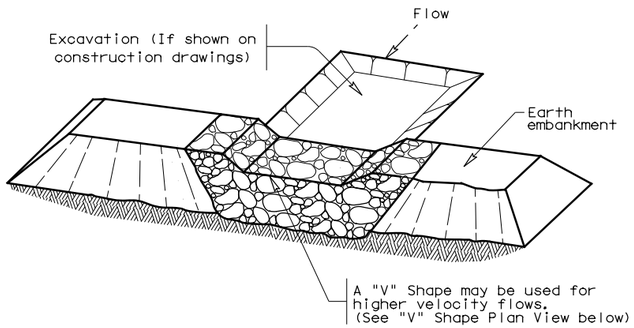


TYPE 4 (SACK GABIONS)

RFD4

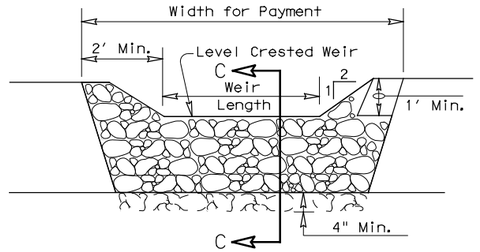


SECTION A-A

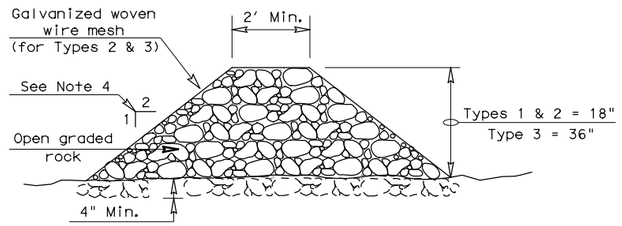


FILTER DAM AT SEDIMENT TRAP

RFD1 — OR — RFD2



PROFILE



SECTION C-C

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.

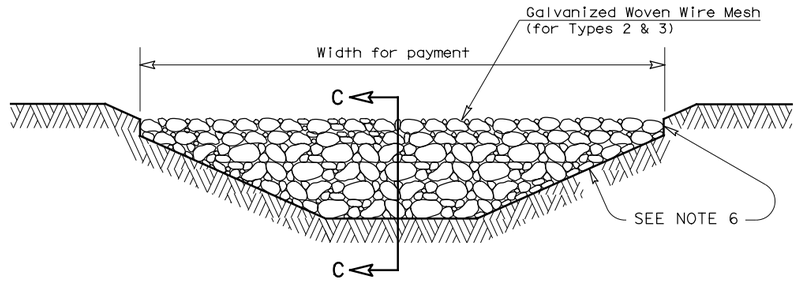
Type 1 (18" high with no wire mesh) (3" to 6" aggregate): Type 1 may be used at the toe of slopes, around inlets, in small ditches, and at dike or swale outlets. This type of dam is recommended to control erosion from a drainage area of 5 acres or less. Type 1 may not be used in concentrated high velocity flows (approximently 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) (3" to 6" aggregate): Type 2 may be used in ditches and at dike or swale outlets.

Type 3 (36" high with wire mesh) (4" to 8" aggregate): Type 3 may be used in stream flow and should be secured to the stream bed.

Type 4 (Sack gabions) (3" to 6" aggregate): Type 4 May be used in ditches and smaller channels to form an erosion control dam.

Type 5: Provide rock filter dams as shown on plans.



FILTER DAM AT CHANNEL SECTIONS

RFD1 — OR — RFD2 — OR — RFD3

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. For 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, and have a double-twisted hexagonal weave with a nominal mesh opening of 2 ½" x 3 ¼"
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.

PLAN SHEET LEGEND

Type 1 Rock Filter Dam	RFD1
Type 2 Rock Filter Dam	RFD2
Type 3 Rock Filter Dam	RFD3
Type 4 Rock Filter Dam	RFD4

Texas Department of Transportation

Design Division Standard

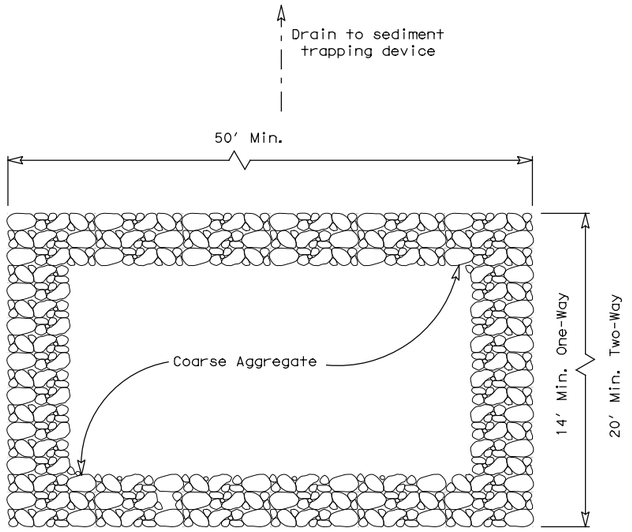
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

ROCK FILTER DAMS

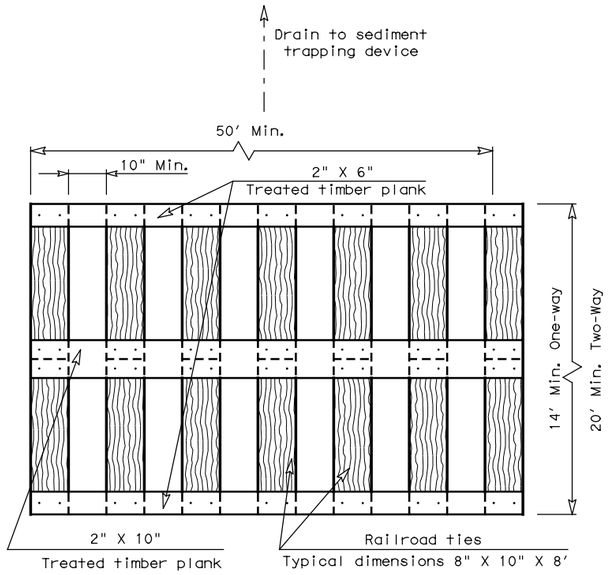
EC(2)-16

FILE: ec216	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS		
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY	
REVISIONS					RH	
	DIST	COUNTY			SHEET NO.	
	AUS	HAYS			58	

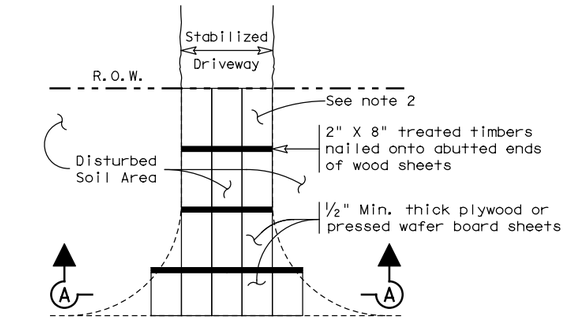
DATE: 10/4/2023
FILE: $FILE$



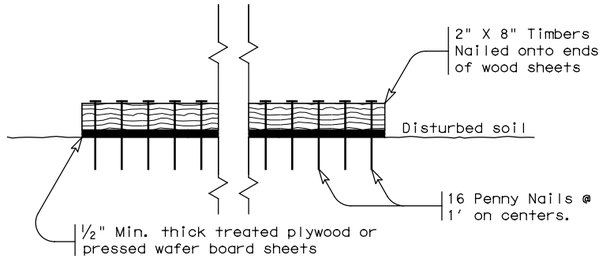
PLAN VIEW



PLAN VIEW



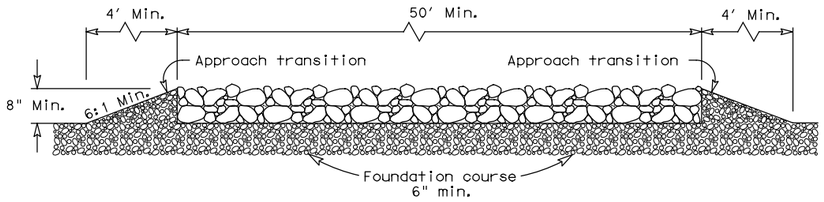
PLAN VIEW



SECTION A-A

CONSTRUCTION EXIT (TYPE 3)

SHORT TERM



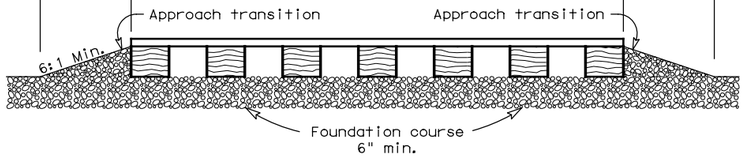
ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 1)

ROCK CONSTRUCTION (LONG TERM)

GENERAL NOTES (TYPE 1)

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".
3. The approach transitions should be no steeper than 6:1 and constructed as directed by the Engineer.
4. The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other materialas approved by the Engineer.
5. 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.
7. Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.



ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 2)

TIMBER CONSTRUCTION (LONG TERM)

GENERAL NOTES (TYPE 2)

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.
4. The approach transitions shall be no steeper than 6:1 and constructed as directed by the Engineer.
5. The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other material as approved by the Engineer.
6. 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.
8. Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.

GENERAL NOTES (TYPE 3)

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.

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

CONSTRUCTION EXITS

EC(3)-16

FILE: ec316	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
©TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS				RH
	DIST	COUNTY		SHEET NO.
	AUS	HAYS		59

Section 3:

Storm Water Pollution Prevention Plan Exception Request

Shane Lane Roadway Improvements

City of Dripping Springs

SWPPP Exception Request

The Shane Lane Roadway Improvements project is a part of a larger plan of development. The adjacent project is Roger Hanks Parkway (EAPP NO. 11003195; RN 109124040). This project is designed by KHA, which has an approved CZP that includes a SWPPP. The Shane Lane Roadway Improvements project is small. It has a project area of ~1 acre and adds 0.13 acres of impervious cover. The entire Shane Lane project drains to the Roger Hanks project, and the construction timelines and contractor will overlap.

We are requesting an exception to the requirement to have either a SWPPP or a Temporary included in our CZP Exception Request because the SWPPP included in the Roger Hanks CZP adequately represents the temporary stormwater protection measures to be taken in the Shane Lane Roadway Construction. Please refer to the attachments for the Roger Hanks approved CZP & SWPPP.

Kevin Smith agreed to these details via phone conversation on Sept 7, 2023.

Section 4: Additional Forms and Documents

Shane Lane Roadway Improvements

City of Dripping Springs

Agent Authorization Form
For Required Signature
Edwards Aquifer Protection Program
Relating to 30 TAC Chapter 213
Effective June 1, 1999

I Chad Gilpin,
Print Name

City Engineer,
Title - Owner/President/Other

of City of Dripping Springs,
Corporation/Partnership/Entity Name

have authorized Felipe S. Tudtud, P.E.
Print Name of Agent/Engineer

of HDR Engineering, Inc.
Print Name of Firm

to represent and act on the behalf of the above named Corporation, Partnership, or Entity for the purpose of preparing and submitting this plan application to the Texas Commission on Environmental Quality (TCEQ) for the review and approval consideration of regulated activities.

I also understand that:

1. The applicant is responsible for compliance with 30 Texas Administrative Code Chapter 213 and any condition of the TCEQ's approval letter. The TCEQ is authorized to assess administrative penalties of up to $10,000 per day per violation.

2. For those submitting an application who are not the property owner, but who have the right to control and possess the property, additional authorization is required from the owner.

3. Application fees are due and payable at the time the application is submitted. The application fee must be sent to the TCEQ cashier or to the appropriate regional office. The application will not be considered until the correct fee is received by the commission.

4. A notarized copy of the Agent Authorization Form must be provided for the person preparing the application, and this form must accompany the completed application.

5. No person shall commence any regulated activity on the Edwards Aquifer Recharge Zone, Contributing Zone or Transition Zone until the appropriate application for the activity has been filed with and approved by the Executive Director.

SIGNATURE PAGE:

Chad Gilpin
Applicant's Signature

9-26-2023
Date

THE STATE OF TX §

County of Hays §

BEFORE ME, the undersigned authority, on this day personally appeared Chad Gilpin known to me to be the person whose name is subscribed to the foregoing instrument, and acknowledged to me that (s)he executed same for the purpose and consideration therein expressed.

GIVEN under my hand and seal of office on this 26th day of September.

JESSICA SELINA ROMERO
Notary Public, State of Texas
Comm. Expires 01-18-2026
Notary ID 133537537

NOTARY PUBLIC

J. Selina Romero
Typed or Printed Name of Notary

MY COMMISSION EXPIRES: 01-18-26

Application Fee Form

Texas Commission on Environmental Quality
Name of Proposed Regulated Entity: Shane Lane Roadway Improvements
Regulated Entity Location: Intersection of Shane Lane and Golden Eagle Lane.
Name of Customer: City of Dripping Springs
Contact Person: Felipe S Tudtud Phone: 512-685-2959
Customer Reference Number (if issued):CN 602491284
Regulated Entity Reference Number (if issued):RN _____

Austin Regional Office (3373)

☒ Hays ☐ Travis ☐ Williamson

San Antonio Regional Office (3362)

☐ Bexar ☐ Medina ☐ Uvalde
☐ Comal ☐ Kinney

Application fees must be paid by check, certified check, or money order, payable to the **Texas Commission on Environmental Quality**. Your canceled check will serve as your receipt. **This form must be submitted with your fee payment**. This payment is being submitted to:

☒ Austin Regional Office
☐ Mailed to: TCEQ - Cashier
Revenues Section
Mail Code 214
P.O. Box 13088
Austin, TX 78711-3088

☐ San Antonio Regional Office
☐ Overnight Delivery to: TCEQ - Cashier
12100 Park 35 Circle
Building A, 3rd Floor
Austin, TX 78753
(512)239-0357

Site Location (Check All That Apply):

☐ Recharge Zone ☒ Contributing Zone ☐ Transition Zone

Type of Plan	***Size***	***Fee Due***
Water Pollution Abatement Plan, Contributing Zone Plan: One Single Family Residential Dwelling	N/A Acres	$ 0
Water Pollution Abatement Plan, Contributing Zone Plan: Multiple Single Family Residential and Parks	N/A Acres	$ 0
Water Pollution Abatement Plan, Contributing Zone Plan: Non-residential	N/A Acres	$ 0
Sewage Collection System	N/A L.F.	$ 0
Lift Stations without sewer lines	N/A Acres	$ 0
Underground or Aboveground Storage Tank Facility	N/A Tanks	$ 0
Piping System(s)(only)	N/A Each	$ 0
Exception	1 Each	$ 500
Extension of Time	N/A Each	$ 0

Signature:  Date: 4/13/2023

Application Fee Schedule

Texas Commission on Environmental Quality
Edwards Aquifer Protection Program 30 TAC Chapter 213 (effective 05/01/2008)

Water Pollution Abatement Plans and Modifications

Contributing Zone Plans and Modifications

Project	*Project Area in Acres*	*Fee*
One Single Family Residential Dwelling	< 5	$650
Multiple Single Family Residential and Parks	< 5 5 < 10 10 < 40 40 < 100 100 < 500 ≥ 500	$1,500 $3,000 $4,000 $6,500 $8,000 $10,000
Non-residential (Commercial, industrial, institutional, multi-family residential, schools, and other sites where regulated activities will occur)	< 1 1 < 5 5 < 10 10 < 40 40 < 100 ≥ 100	$3,000 $4,000 $5,000 $6,500 $8,000 $10,000

Organized Sewage Collection Systems and Modifications

Project	*Cost per Linear Foot*	*Minimum Fee-Maximum Fee*
Sewage Collection Systems	$0.50	$650 - $6,500

Underground and Aboveground Storage Tank System Facility Plans and Modifications

Project	*Cost per Tank or Piping System*	*Minimum Fee-Maximum Fee*
Underground and Aboveground Storage Tank Facility	$650	$650 - $6,500

Exception Requests

Project	*Fee*
Exception Request	$500

Extension of Time Requests

Project	*Fee*
Extension of Time Request	$150

TCEQ Use Only

TCEQ Core Data Form

For detailed instructions on completing this form, please read the Core Data Form Instructions or call 512-239-5175.

SECTION I: General Information

1. Reason for Submission (*If other is checked please describe in space provided.*)

☒ New Permit, Registration or Authorization (*Core Data Form should be submitted with the program application.*)

☐ Renewal *(Core Data Form should be submitted with the renewal form)* ☐ Other

2. Customer Reference Number *(if issued)*	Follow this link to search for CN or RN numbers in Central Registry**	**3. Regulated Entity Reference Number** *(if issued)*
CN 602491284		**RN**

SECTION II: Customer Information

4. General Customer Information | **5. Effective Date for Customer Information Updates** (mm/dd/yyyy)

☐ New Customer ☒ Update to Customer Information ☐ Change in Regulated Entity Ownership
☐ Change in Legal Name (Verifiable with the Texas Secretary of State or Texas Comptroller of Public Accounts)

The Customer Name submitted here may be updated automatically based on what is current and active with the Texas Secretary of State (SOS) or Texas Comptroller of Public Accounts (CPA).

6. Customer Legal Name *(If an individual, print last name first: eg: Doe, John)* | *If new Customer, enter previous Customer below:*

City of Dripping Springs

7. TX SOS/CPA Filing Number	**8. TX State Tax ID** (11 digits)	**9. Federal Tax ID** (9 digits)	**10. DUNS Number** *(if applicable)*

11. Type of Customer: ☐ Corporation ☐ Individual Partnership: ☐ General ☐ Limited
Government: ☒ City ☐ County ☐ Federal ☐ Local ☐ State ☐ Other ☐ Sole Proprietorship ☐ Other:

12. Number of Employees
☐ 0-20 ☐ 21-100 ☐ 101-250 ☐ 251-500 ☐ 501 and higher

13. Independently Owned and Operated?
☐ **Yes** ☒ **No**

14. Customer Role (Proposed or Actual) – *as it relates to the Regulated Entity listed on this form. Please check one of the following*

☒ Owner ☐ Operator ☐ Owner & Operator
☐ Occupational Licensee ☐ Responsible Party ☐ VCP/BSA Applicant ☐ Other:

15. Mailing Address: 511 W Mercer St.

City	Dripping Springs	**State**	TX	**ZIP**	78620	**ZIP + 4**	

16. Country Mailing Information *(if outside USA)*	**17. E-Mail Address** *(if applicable)*

18. Telephone Number	**19. Extension or Code**	**20. Fax Number** *(if applicable)*

(512) 858-4725		( ) -

SECTION III: Regulated Entity Information

21. General Regulated Entity Information *(If 'New Regulated Entity" is selected, a new permit application is also required.)*

☒ New Regulated Entity ☐ Update to Regulated Entity Name ☐ Update to Regulated Entity Information

The Regulated Entity Name submitted may be updated, in order to meet TCEQ Core Data Standards (removal of organizational endings such as Inc, LP, or LLC).

22. Regulated Entity Name *(Enter name of the site where the regulated action is taking place.)*

Shane Lane

23. Street Address of the Regulated Entity: ***(No PO Boxes)***							
	City		**State**		**ZIP**		**ZIP + 4**	
24. County	Hays						

If no Street Address is provided, fields 25-28 are required.

25. Description to Physical Location:	Intersection of Shane Lane and Golden Eagle Lane				
26. Nearest City			**State**		**Nearest ZIP Code**
Dripping Springs			TX		78620

Latitude/Longitude are required and may be added/updated to meet TCEQ Core Data Standards. (Geocoding of the Physical Address may be used to supply coordinates where none have been provided or to gain accuracy).

27. Latitude (N) In Decimal:	30.203056		**28. Longitude (W) In Decimal:**	98.102766	
Degrees	Minutes	Seconds	Degrees	Minutes	Seconds
30	20	11.7	98	06	09.6

29. Primary SIC Code (4 digits)	**30. Secondary SIC Code** (4 digits)	**31. Primary NAICS Code** (5 or 6 digits)	**32. Secondary NAICS Code** (5 or 6 digits)

33. What is the Primary Business of this entity? *(Do not repeat the SIC or NAICS description.)*

N/A (Residential Street)

34. Mailing Address:	**511 W Mercer St.**						
	City	**Dripping Springs**	**State**	**TX**	**ZIP**	**78620**	**ZIP + 4**	
35. E-Mail Address:							

36. Telephone Number	**37. Extension or Code**	**38. Fax Number** *(if applicable)*
(512) 585-4725		( ) -

39. TCEQ Programs and ID Numbers Check all Programs and write in the permits/registration numbers that will be affected by the updates submitted on this form. See the Core Data Form instructions for additional guidance.

☐ Dam Safety	☐ Districts	☒ Edwards Aquifer	☐ Emissions Inventory Air	☐ Industrial Hazardous Waste
☐ Municipal Solid Waste	☐ New Source Review Air	☐ OSSF	☐ Petroleum Storage Tank	☐ PWS
☐ Sludge	☐ Storm Water	☐ Title V Air	☐ Tires	☐ Used Oil
☐ Voluntary Cleanup	☐ Wastewater	☐ Wastewater Agriculture	☐ Water Rights	☐ Other:

SECTION IV: Preparer Information

40. Name:	Felipe Tudtud	**41. Title:**	Roadway Engineer

42. Telephone Number	**43. Ext./Code**	**44. Fax Number**	**45. E-Mail Address**
(512 **)** 685-2959		**( )** -	Felipe.Tudtud@hdrinc.com

SECTION V: Authorized Signature

46. By my signature below, I certify, to the best of my knowledge, that the information provided in this form is true and complete, and that I have signature authority to submit this form on behalf of the entity specified in Section II, Field 6 and/or as required for the updates to the ID numbers identified in field 39.

Company:	City of Dripping Springs	**Job Title:**	City of Dripping Springs Engineer
Name *(In Print):*	Chad Gilpin	**Phone:**	**(** 512 **)** 858- **4725**
Signature:	CHAD GILPIN	**Date:**	9-25-2023