Bryan W. Shaw, Ph.D., P.E., *Chairman*
Toby Baker, *Commissioner*
Zak Covar, *Commissioner*
Richard A. Hyde, P.E., *Executive Director*

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

February 27, 2015

RECEIVED

MAR 02 2015

COUNTY ENGINEER

Mr. Roy Eklund
Bulverde Hills Properties, LLC
P.O. Box 89
Bulverde, Texas 78163

Re: Edwards Aquifer, Comal County

NAME OF PROJECT: Bulverde Hills Properties, LLC; Located on the northwest corner of Bulverde Road and Saddle Ridge Drive; Bulverde, Texas

TYPE OF PLAN: Request for Approval of a Contributing Zone Plan (CZP); 30 Texas Administrative Code (TAC) Chapter 213 Subchapter B Edwards Aquifer

Investigation No. 1217078; Regulated Entity No. RN107915134; Additional ID No. 13-1412902

Dear Mr. Eklund:

The Texas Commission on Environmental Quality (TCEQ) has completed its review of the CZP Application for the above-referenced project submitted to the San Antonio Regional Office by Torres Engineering on behalf of Bulverde Hills Properties, LLC on December 19, 2014. Final review of the CZP was completed after additional material was received on February 3 and February 23, 2015. As presented to the TCEQ, the Temporary and Permanent Best Management Practices (BMPs) were selected 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 Edwards Aquifer Protection 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 percent of the construction has commenced on the project or an extension of time has been requested.*

PROJECT DESCRIPTION

The proposed commercial project will have an area of approximately 1.9788 acres. It will include one commercial structure, driveways, parking and utility infrastructure. The impervious cover will be 1.131 acres (57.2 percent). Project wastewater will be disposed of by on-site sewage

facilities. According to a letter dated November 13, 2014, signed by Mr. Robert Boyd, P.E., with Comal County, the development is acceptable for the use of on-site sewage facilities.

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 (1) rooftop rainwater harvesting system and permeable concrete for the paved surfaces, designed using the TCEQ technical guidance document, Complying with the Edwards Aquifer Rules: Technical Guidance on Best Management Practices (2005), will be constructed to treat stormwater runoff. The required total suspended solids (TSS) treatment for this project is 1,015 pounds of TSS generated from the 1.131 acres of impervious cover. The approved measures meet the required 80 percent removal of the increased load in TSS caused by the project.

The individual treatment measures are described below.

Rainwater Harvesting System							
Tank	Contributing Area (acre)	Req. Capture Volume (ft^3)	Design Capture Volume (ft^3)	Req. Irrigation Area (ft^2)	Design Irrigation Area (ft^2)	Req. TSS Removal (lb/yr)	Design TSS Removal (lb/yr)
1 & 2	0.351	1,913	2,238	6,648	6,648	315.3	394.09

The permeable concrete surfaces used for sidewalks and parking consists of 0.78 acres. The permeable concrete will not have an underdrain as allowed over the contributing zone. The mix formula has been proposed to meet the specifications of the Technical Guidance Manual. The TSS required to be removed is 699.7 pounds of TSS.

SPECIAL CONDITIONS

I. All permanent pollution abatement measures shall be operational prior to occupancy of the facility.

II. Sediment and/or media removed from the permanent pollution abatement measures 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. Additional and separate approvals, permits, registrations

and/or authorizations from other TCEQ Programs (i.e., Stormwater, Water Rights, UIC) can be required depending on the specifics of the plan.

3. In addition to the rules of the Commission, the applicant may also be required to comply with state and local ordinances and regulations providing for the protection of water quality.

Prior to Commencement of Construction:

4. 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 Contributing Zone Plan and this notice of approval shall be maintained at the project location until all regulated activities are completed.
5. 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.
6. The applicant must provide written notification of intent to commence construction, replacement, or rehabilitation of the referenced project. Notification must be submitted to the San Antonio 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.
7. 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. If a water quality pond is proposed, it shall be used as a sedimentation basin during construction. 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.

During Construction:

8. 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.
9. 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 or sensitive features 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).
10. 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.

11. 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.
12. 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.
13. 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 tauk 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. Refer to Standard Condition No. 5, above.

<u>After Completion of Construction:</u>

14. Owners of permanent BMPs and measures must insure 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 San Antonio Regional Office within 30 days of site completion.
15. The applicant shall be 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. A copy of the transfer of responsibility must be filed with the executive director through the San Antonio Regional Office within 30 days of the transfer. A copy of the transfer form (TCEQ-10263) is enclosed.
16. Upon legal transfer of this property, the new owner(s) is required to comply with all terms of the approved Contributing Zone Plan. If the new owner intends to commence any new regulated activity on the site, a new Contributing Zone Plan 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.
17. A Contributing Zone Plan approval or extension will expire and no extension will be granted if more than 50 percent 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 San Antonio Regional Office with the appropriate fees for review and approval by the executive director prior to commencing any additional regulated activities.
18. 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 Michael Isley, P.E. of the Edwards Aquifer Protection Program of the San Antonio Regional Office at 210-403-4057.

Sincerely,

Lynn Bumguardner, Water Section Manager
San Antonio Region Office
Texas Commission on Environmental Quality

LMB/MI/eg

Enclosures: Deed Recordation Affidavit, Form TCEQ-0625A
Change in Responsibility for Maintenance of Permanent BMPs, Form TCEQ-10263

cc: Mr. Xavier Torres, P.E., Torres Engineering
Mr. Thomas Hornseth, P.E., Comal County
Mr. Roland Ruiz, Edwards Aquifer Authority
The Honorable Bill Krawietz, City of Bulverde
TCEQ Central Records, Building F, MC212

Torres Engineering, P.C.

TBPE Firm # F-13692

Xavier A. Torres, P.E
xtorres@torresengineering.net

February 23, 2015

RECEIVED
MAR 02 2015
COUNTY ENGINEER

RECEIVED TCEQ
2015 FEB 23 PM 2:19
SAN ANTONIO REGION

Mr. Michael Isley, P.E.
Edwards Aquifer Protection Program
TCEQ – San Antonio Region
14250 Judson Rd
San Antonio, TX 78233

Mr. Isley,

Thank you for you response to our Water Pollution Plan Submittal. The comments have been reviewed and are addressed as follows:

1. The Inspection, Maintenance, Repair, and Retrofit (IMRR) Plan has been signed and revised accordingly.
2. The IRMM has been revised to include requested statement. See attached IMRR and TCEQ Nod 2.
3. The IRMM has been revised to include requested statement. See attached IMRR and TCEQ Nod 2.
4. See Landscape/Irrigation responses and attachments.
5. See Landscape/Irrigation responses and attachments.
6. Calculations Have been attached.
7. See Landscape/Irrigation responses and attachments.
8. See Landscape/Irrigation responses and attachments.
9. See Landscape/Irrigation responses and attachments.
10. See Landscape/Irrigation responses and attachments.
11. See Landscape/Irrigation responses and attachments.
12. Detail sheet has been revised to insure compliance with RG-0348. See attached Detail Sheet and TCEQ NOD 2.

5503 Grissom Rd, Ste. 101 ● San Antonio ● Texas 78238
Phone: 210-680-0808

13. See Landscape/Irrigation responses and attachments.

Once again thank you for all your time and effort in this matter and please feel free to contact me should you have any additional concerns.

Sincerely
Torres Engineering,

Xavier Torres

Xavier Torres, P.E.



2-23-15

5503 Grissom Rd, Ste. 101 ● San Antonio ● Texas 78238
Phone: 210-680-0808

Sprinkler head produces $1.1 \frac{gal}{min}$

$1.1 \frac{gallon}{min} * 4 \text{ heads} = 4.4 \frac{gal.}{min}$

$4.4 \frac{gal}{min} * 60 \text{ min/hr} * 231 \text{ in}^3/gal = 60,984 \text{ in}^3/hr$

Sprinkler Radius $= 23' \rightarrow$ Area $= 1662 \text{ ft}^2$

$1662 \text{ ft}^2 * 4 \times \frac{144 \text{ in}^2}{\text{ft}^2} = 957,312 \text{ in}^2$

$$\frac{60,984 \frac{\text{in}^2}{hr}}{957,312 \text{ in}^2} = 0.064 \text{ in/hr}$$

$0.064 \text{ in/hr} < 0.1 \text{ in/hr}$

No runoff occurs

Use Hunter Industries PGP Ultra/1-20 Black Short Radius 1.5 SR Spray Head

STATE OF TEXAS
XAVIER A. TORRES
93953
LICENSED
PROFESSIONAL ENGINEER

2-23-15

Xavier Torres

Protecting Texas by Reducing and Preventing Pollution

FAX TRANSMITTAL

DATE:	**02/09/2015**	NUMBER OF PAGES (including this cover sheet) 2
TO:	NAME	**Xavier Torres, P.E.**
	ORGANIZATION	**Torres Engineering**
	FAX Number	**xtorres@torresengineering.net**
TO:	NAME	**Roy Eckland**
	ORGANIZATION	**Bulverde Hills Properties, LLC**
	FAX NUMBER	**830-980-8650**
FROM:	TEXAS COMMISSION ON ENVIRONMENTAL QUALITY	
	NAME	**Michael Isley, P.E.**
	Division/Region	**San Antonio Regional Office – Edwards Program**
	Telephone Number	**210-403-4057**
	FAX Number	**210-545-4329**

Re: Edwards Aquifer, Comal County
NAME OF PROJECT: Bulverde Retail Center; Located on the northwest corner of Bulverde Road and Saddle Ridge Drive; Bulverde, Texas
TYPE OF PLAN: Request for the Approval of a Contributing Zone Plan (CZP); 30 Texas Administrative Code (TAC) Chapter 213 Edwards Aquifer;
Additional ID No. 13-14121902

Dear Mr. Torres:

We are in the process of technically reviewing the CZP application that was submitted on the above-referenced project. Before we can proceed with our review, the following comments relating to the application must be addressed.

CZP Application

1. The Inspection, Maintenance, Repair, and Retrofit (IMRR) Plan was submitted in response to the previous TCEQ comments in an unsigned state. The IMRR Plan will need to incorporate comments given herein and submitted signed by the owner (Regulated Entity).
2. Indicate in the IMRR that vacuuming of pressure wash water (or hydrocarbons if a spill) and shall be disposed in accordance with applicable regulations.
3. Indicate in the IMRR that with the vacuuming of the parking lot, the sweepings (and steam assisted vacuuming sweepings) shall be disposed in accordance with applicable

regulations.

4. Identify more clearly in the IMRR that any entry into the irrigation tanks to remove sediment, perform maintenance, etc. shall be handled as a confined space entry applicable to OSHA regulations. If and when entry is necessary, provide tanks capable of being entered (hatch sizing, structural strength, access to tank hatch, etc.).
5. Per RG-348, all irrigation system distribution and lateral piping shall be Schedule 80.
6. Prepare calculations for percolation of irrigation water into landscape, without causing runoff, using the permeability of the soils as determined by permeability testing (see RG-348). If permeability testing has not been performed, utilize 0.1 in/hr. A Professional Engineer shall seal the calculations.
7. Address whether there will be a connection of the irrigated water distribution system with a municipal potable water system for makeup water when the rainwater harvesting tanks are near or at empty. If so, address how the potable water supply will be protected.
8. Address in drawings that irrigation system piping will be marked with non-potable markings.
9. Address and incorporate into design drawings how the pump will deactivate upon a low tank water level and how that condition will be relayed to building occupants (e.g., visible beacon light).
10. Detail 1 of the Irrigation Plan indicates one tank rather than the two tanks that will be used. Indicate the second tank on the drawing, manifold piping network, etc.
11. Indicate in a drawing note or diagram that irrigation piping under pavement (e.g., parking) shall be sleeved with Class 200 piping, provided with solvent welded joints, and sized at least twice the diameter of the primary irrigation piping or electrical bundle.
12. Provide specifications on drawings for permeable concrete to ensure compliance with RG-348.
13. Please verify and address that there will be no cross-connection between the land applied treated sewage effluent and the rainwater irrigation system.

We ask that you submit one original and four copies of the amended materials to supplement the CZP application to this office by no later than **14 days from the date of this letter. We only need the individual pages/drawings that were changed, not complete, new application packages.** If the response to this notice is not received, is incomplete or inadequate, or provides new information that is incomplete or inadequate, additional comments may be generated.

If you have any questions or require additional information, please contact Michael Isley, P.E. of the Edwards Aquifer Protection Program of the San Antonio Regional Office at 210-403-4057. **END**

Project Name: Bulverde Retail Center
Address: 2925 Bulverde Rd.
City, State, Zip: Bulverde TX, 78163

It is the responsibility of the owner to comply with the Inspection, Maintenance and Retrofit Plan.

Safety Criteria for Rainwater Harvesting Tank Entry:

Per OSHA Standards, the CGS 1203 Westeel Water Storage Tanks specified which includes a 24" TECQ approved as well as AWWA/NFPA 22 approved side access door eliminates the Confined Space Requirements for personnel providing maintenance to the tank after installation completion. When personnel arrive for maintenance on one of these tanks, they will climb up an OSHA approved ladder and lower an air testing monitor into the 24" side roof inspection hatch for air quality testing. Immediately following completion of air quality testing the maintenance crew is approved to release the side wall access door and enter the tank. By utilizing an open sidewall access door tank while performing maintenance eliminates confined space requirements due to adequate access/egress and fresh air is flowing through the open upper and side doors.

Inspection:

1. Inspect gutter for debris and or leaks.
2. Inspect Tank for debris, leaks and standing water.
3. After every rain event inspect tank to insure that rainwater stand for twelve hour before discharging.
4. Inspect irrigation system for leaks.
5. Inspect Irrigation Heads, Buster Pumps, Pump Start Relay and electrical controller to insure they are in proper working order.
6. Inspect pumps upon operation to insure that they do not operate dry.
7. Inspect Permeable Concrete (Parking Lot and Sidewalk) for Oil spills and or clogging.

Inspections are to be performed every three months and after ever rain event.

Maintenance:

1. Every three months and after every rain event, remove all debris from gutters.
2. Every three months and after every rain event, remove any debris and or sediment from rainwater storage tank. Manually discharge rainwater from rainwater storage tanks to insure that water does not stand for more than seven days.

3. Once a year, pressure-wash permeable concrete followed by immediately vacuuming pressure washing water. The water shall be disposed of in accordance with applicable regulations.
4. The parking lot will be swept twice per year with vacuum sweeper. The sweepings shall be disposed in accordance with applicable regulations.
5. Every two years steam vacuum permeable concrete. The sweepings and steam assisted vacuuming sweepings shall be disposed in accordance with applicable regulations.
6. Steam Vacuum permeable concrete should it become clogged or shows evidence of standing water. The sweepings and steam assisted vacuuming sweepings shall be disposed in accordance with applicable regulations.
7. Steam Vacuum permeable concrete should any hydrocarbon spill occur. The hydrocarbons shall be disposed in accordance with applicable regulations.

Repair:

1. Repair leaking gutters, irrigation pipe, irrigation heads and tank.
2. Repair Buster Pumps, Pump Start Relay and or Electrical Controller.

Retrofit:

1. Replace permeable concrete and or durable aggregate should hydrocarbon spill occur or if permeable concrete should become clogged if Steam Vacuuming does not remove hydrocarbon or unclog permeable concrete.

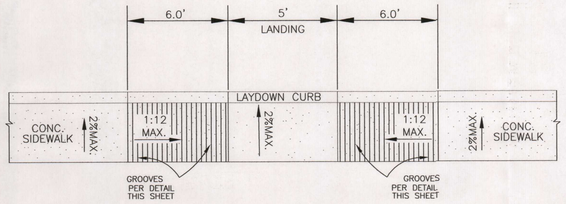
Responsible Party: Bulverde Retail Center
Address: 2923 Bulverde Rd., Bulverde TX., 78163
Signature:

"RECEIVED TCEQ"
SAN ANTONIO
REGION
2015 FEB 23 PM 2:19

RECEIVED
MAR 02 2015
COUNTY ENGINEER

PAVEMENT MARKING NOTES:

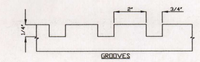
1. FURNISH AND INSTALL PAVEMENT MARKINGS OF THE TYPE AND SIZE SHOWN ON THE PLANS AND AS REQUIRED FOR COMPLIANCE WITH GOVERNING CODES. IF NO GOVERNING CODES APPLY, THEN USE TXDOT STANDARDS.
2. EXECUTION
   - A. CONTRACTOR SHALL CLEAN PAVEMENT OF GREASE, DIRT, OIL, SAND, GRAVEL OR OTHER FOREIGN MATERIALS PRIOR TO APPLYING MARKINGS AS RECOMMENDED BY PAINT MANUFACTURER.
   - B. PAVEMENT MARKINGS SHALL BE APPLIED BY MACHINE AT A RATE OF ONE (1) GALLON/100 SQUARE FEET.
   - C. PAVEMENT MARKINGS SHALL NOT BE APPLIED DURING PERIODS OF EXCESS HUMIDITY OR PAVEMENT TERMERATURES BELOW 50 DEGREES F.
   - D. MINIMUM LINE WIDTH IS 4 INCHES. PAVEMENT MARKINGS MUST COMPLY WITH LOCAL FIRE STARNDARDS AND CURRENT ACCESSIBILITY CODE.
   - E. A MINIMUM OF TWO COATS SHALL BE REQUIRED UNLESS REJECTED BY OWNER IN WRITING. WAIT 30 DAYS AFTER PAVEMENT INSTALLATION BEFORE APPLYING THE SECOND COAT OF PAVEMENT MARKINGS.
   - F. CLOSE AREAS TO TRAFFIC FOR DURATION OF DRYING TIME, WHICH SHALL BE NO LESS THAN THE MINIMUM RECOMMEDED BY THE PAINT MANUFACTURER.
3. TRAFFIC PAINT SHALL BE SHERWIN WILLIAMS PRO-MAR TRAFFIC PAINT OR APPROVED EQUAL - COLOR AS SPECIFIED ON PLANS.



PARALLEL CURB RAMP DETAIL

NOT TO SCALE

1. FULL WIDTH AND DEPTH OF CONCRETE CURB RAMP SURFACES (EXCLUDES FLARES) SHALL BEBROOM FINISHED WITH GROVES PLACED PERPENDICULAR TO THE PATH OF TRAVEL AS PER THE FOLLOWING DETAIL:



CONCRETE CURB RAMP GROOVE

NOT TO SCALE

NOTES:
THE USE OF GROOVES, IF ARRANGED SO THAT WATER WILL NOT ACCUMULATE, IS ACCEPTABLE IN TEXAS PROVIDED THE GROOVED SURFACE IS DETECTABLE UNDERFOOT PER TDLR TECHNICAL MEMORANDUM No. TM 08-01. IF THE AUTHORITY HAVING JURISDICTION (I.E. CITY, COUNTY, TxDOT) REQUIRES THE USE OF TRUNCATED DOMES INSTEAD OF GROOVES, CAST IN PLACE DETECTABLE WARNING TILES FROM ARMOR-TILE (OR EQUIVALENT) SHALL BE USED ON THE FULL WIDTH AND DEPTH OF THE RAMP SURFACE. PRODUCT INFORMATION/SPECS MAY BE OBTAINED FROM:

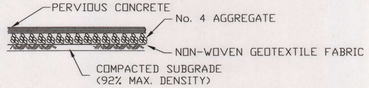
ARMOR-TILE ENGINEERED PLASTICS, INC.
300 INTERNATIONAL DRIVE, STE 100
WILLIAMSVILLE, NY 14221
(800) 682-2525 / FAX: (800) 769-4463
WWW.ARMOR-TILE.COM

2. FULL WIDTH AND DEPTH OF CURB RAMP SURFACES SHALL HAVE A LIGHT REFLECTIVE VALUE THAT SIGNFICANTLY CONTRASTS WITH THAT OF THE ADJACENT PEDESTRIAN ROUTES BY USING OF THE FOLLOWING METHODS (GROOVED RAMP SURFACES ONLY):
   - A) INTERGRAL COLORED CONCRETE MIX
   - B) DRY SHAKER COLOR PLACED AND TROVELED INTO FRESHLY POURED CONCRETE PER MANUFACTURER'S SPECIFICATIONS
   - C)CONCRETE STAIN APPLIED PER MANUFACTURE'S SPECIFICATIONS

   NOTE 1: COLOR TO BE SELECTED BY OWNER OR DESIGN PROFESSIONAL.
   NOTE 2: COLOR ON FLARED SURFACES ARE OPTIONAL (NOT REQUIRED)
   NOTE 3: ARMOR-TILE DETECTABLE WARNING SURFACES ALREADY COME IN A VARIETY OF CONTRASTING COLORS TO BE SELECTED BY OWNER OR DESIGN PROFESSIONAL.
3. RAMP SURFACE DIMENSIONS SHOWN CORRESPOND ONLY TO STANDARD 6 INCH CURB HEIGHTS WITH SAID RAMP LOCATED ENTIRELY WITHIN AN AREA THAT IS FLAT IN ALL DIRECTIONS -- 1:12 MAX SLOPE SHALL GOVERN FOR ALL CURB RAMP SURFACES.
4. CURB RAMP CONSTRUCTION TO BE CONSTRUCTED AS PER TYPICAL CONCRETE SIDEWALK SECTION SHOWN ON THIS SHEET.

RIGID PAVEMENT DESIGN

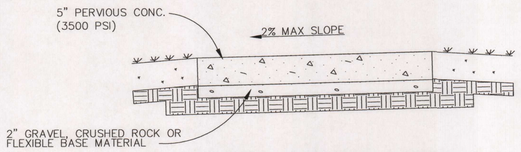
6.0" PERVIOUS CONCRETE (LIGHT DUTY)
7.0" PERVIOUS CONCRETE (HEAVY DUTY)
8.0" CLEAN, DURABLE, ASTM C-33 No. 4 AGGREGATE
6" COMPACTED SUBGRADE



PURVIOUS CONCRETE PAVEMENT DETAIL

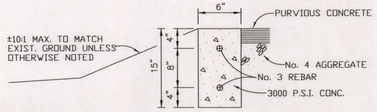
NOT TO SCALE

NOTE:
1. LIGHT DUTY PAVEMENT TO BE USED FOR PARKING STAHLS.
2. HEAVY DUTY PAVEMENT TO BE USED FOR DRIVE ILSES.
3. GEOTEXTILE FABRIC TO COMPLY WITH THE MINIMUM SPECIFICATIONS IN TABLE 3-7 OF THE TCEQ RG-348.
4. CONCRETE SHOULD HAVE A MINIMUM COMPRESIVE STRENGHT OF 3,500 PSI.



CONCRETE SIDEWALK SECTION

NOT TO SCALE



LAYDOWN CURB DETAIL

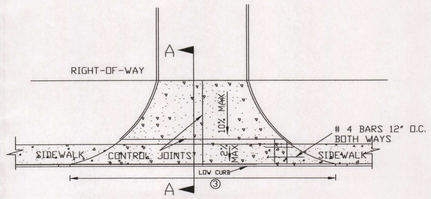
NOT TO SCALE

MATERIALS:

CEMENT:
PORTLAND CEMENT TYPE I OR II CONFORMING TO ASTM C 150 OR PORTLAND CEMENT TYPE IP OR IS CONFORMING TO ASTM C 595.
AGGREGATE: USE TEXAS DEPARTMENT OF TRANSPORTATION (TXDOT) GRADE NO. 8 COARSE AGGREGATE (3/8 TO NO. 16) PER ASTM C 33; OR NO. 89 COARSE AGGREGATE (3/8 TO NO. 50) PER ASTM D 448.
ADMIXTURES: OPTIONAL WATER: POTABLE OR SHOULD COMPLY WITH TXDOT STANDARD SPECIFICATIONS BASE MATERIAL: THE DESIGN OF THE WATER QUALITY FUNCTIONS OF THE PAVEMENT SYSTEM DEPENDS ON ADEQUATE STORAGE VOLUME WITHIN THE BASE MATERIAL. THE GRAVEL LAYERS SHOULD CONSIST OF CLEAN, DURABLE, UNIFORMLY GRADED ROCK MEETING THE ASTM C-33 SPECIFICATIONS FOR NO. 4 AGGREGATE. THE SAND LAYER IN SYSTEMS WITH AN UNDERDRAIN SHOULD MEET ASTM C-33 SPECIFICATIONS FOR FINE AGGREGATE.

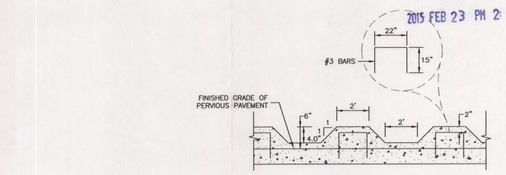
PROPORTIONS:
CEMENT CONTENT: FOR PAVEMENTS SUBJECT TO VEHICULAR TRAFFIC LOADING, THE TOTAL CEMENTITIOUS MATERIAL SHALL NOT BE LESS THAN 564 LBS. PER CUBIC YARD AGGREGATE CONTENT: THE VOLUME OF AGGREGATE PER CUBIC YARD SHALL BE EQUAL TO 27 CUBIC FEET WHEN CALCULATED AS A FUNCTION OF THE UNIT WEIGHT DETERMINED IN ACCORDANCE WITH ASTM C 29 JIGGING PROCEDURE. ADMIXTURE: OPTIONAL FOR STRENGTH.

MIX WATER:
MIX WATER QUANTITY SHALL BE SUCH THAT THE CEMENT PASTE DISPLAYS A WET METALLIC SHEEN WITHOUT CAUSING THE PASTE TO FLOW FROM THE AGGREGATE. (MIX WATER QUANTITY YIELDING A CEMENT PASTE WITH A DULL-DRY APPEARANCE HAS INSUFFICIENT WATER FOR HYDRATION.) INSUFFICIENT WATER RESULTS IN INCONSISTENCY IN THE MIX AND POOR AGGREGATE BOND STRENGTH. HIGH WATER CONTENT RESULTS IN THE PASTE SEALING THE VOID SYSTEM PRIMARILY AT THE BOTTOM AND POOR AGGREGATE SURFACE BOND.



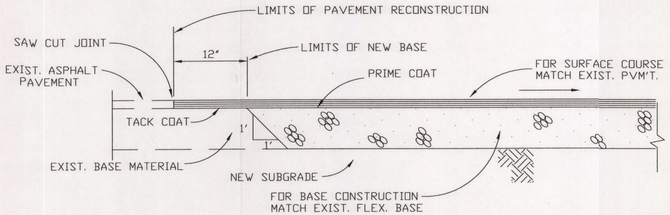
CONCRETE DRIVEWAY DETAIL

NOT TO SCALE

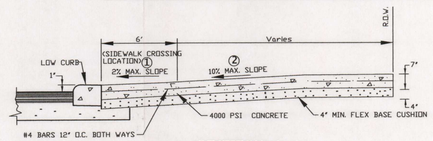


SAWTOOTH SECTION

NOT TO SCALE

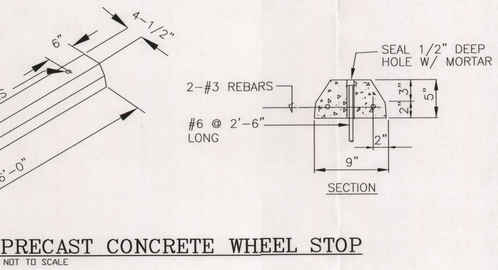


PAVEMENT JUNCTION DETAIL



SECTION A-A

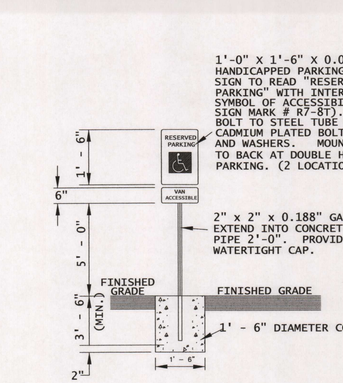
NOTES:
1. 2% MAXIMUM SLOPE LOCATION ON DRIVEWAY INLINE WITH ADJOINING SIDEWALKS. SEE DIMENSIONAL CONTROL PLAN FOR SIDEWALK LOCATION.
2. DRIVEWAY % SLOPE AND SLOPE DIRECTION MAY VARY. SEE GRADING PLAN FOR % SLOPE AND DIRECTION.
3. SAWCUT STRAIGHT LINE AT EDGE OF EXISTING PAVEMENT FOR DRIVEWAY CONNECTION



PRECAST CONCRETE WHEEL STOP

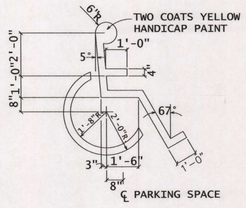
NOT TO SCALE

SECTION



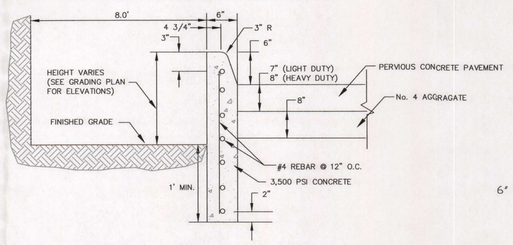
HANDICAP SIGN DETAIL

NOT TO SCALE

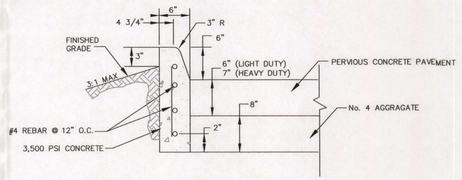


ACCESSIBILITY HANDICAP SYMBOL

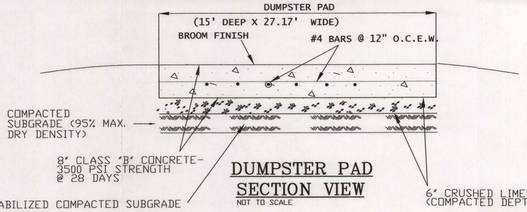
NOT TO SCALE



CONCRETE RETAINING WALL — CONCRETE PAVEMENT COMBINATION TYPE

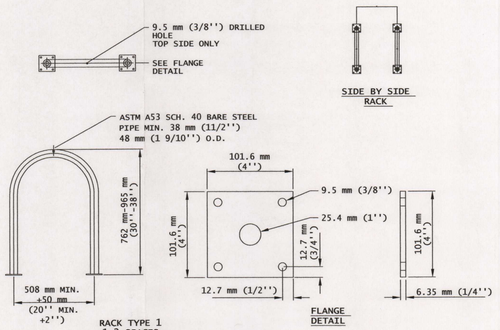


CONCRETE CURB ON PERVIOUS PAVEMENT



DUMPSTER PAD SECTION VIEW

NOT TO SCALE



NOTE:
1. ALL BICYCLE PARKING PROVIDED SHOULD BE SET IN CONCRETE OR FLANGE MOUNTED ON CONCRETE, AND LOCATED A MIN. OF 24" FROM PARALLEL WALL, AND 30" FROM A PERPENDICULAR WALL AS MEASURED TO THE CLOSEST BICYCLE RACK.

BICYCLE RACK DETAIL

NOT TO SCALE

TORRES ENGINEERING P.C.
TBPE FIRM # F-13892
5503 GRISSOM RD, STE. 101 (210) 680-0808
SAN ANTONIO, TEXAS 78238

DATE: OCT. 14, 2014
DESIGNED BY:
DRAWN BY:
CHECKED BY:
SCALE: 1" 20'
FILE NAME:

STATE OF TEXAS
XAVIER A. TORRES
68953
LICENSED PROFESSIONAL ENGINEER
10/14/14

NO.	DATE	REVISIONS DESCRIPTION	BY
1	02/09/15	ADDED CONCRETE SPECIFICATIONS	XAT

DETAIL SHEET
FOR BULVERDE RETAIL CENTER
2925 BULVERDE RD
BULVERDE, TEXAS

DETAIL SHEET
SHEET 8 OF 9

RECEIVED TCEQ
SAN ANTONIO
REGION
2015 FEB 23 PM 2:19

Two CGS 1203 Westeel Water Storage Tanks—each tank is 9,208 gallons with usable volume of 8,371 for a total of 16,742 usable gallons in two tanks placed side by side on a poured in place concrete slab. The tanks are galvanized steel with side access. An EBARA 3 HP Pump, Two-stage Centrifugal pump is recommended Start Relay for the Booster Pump. This pump is available from Steve Mechler and Associates, *sales@mechler.com.* A Hunter Pro XC 400 Controller is required to operate this system, (mounted with the Hunter 15 station Pro-C controller used for the main irrigation system as shown) as well. The Schedule 40 2" PVC Main line for this system will be routed to a Hunter Series PGV Electric Valve in a box. Schedule 80 1 ½" Lateral lines to the four Hunter PGP Rotors set to provide water for the unimproved 'wildscape' area as well as the large remaining tree cluster as shown on the plan

Sprinkler Heads & Valves Data:

Pop-up Spray Heads: Hunter Pro-S Series Pop-up Spray
(4" for turf, 12" for beds and shrubs)(acceptable alternates: Toro 570, Rainbird 1800, Weathermatic LX)
(all MPR)

ARC	target PSI	15' nozzle	12' nozzle	10' nozzle	8' nozzle	5' nozzle	17' nozzle
360°	40 psi	4.0 gpm ( )	2.35 gpm (12)	1.6 gpm (10)	1.1 gpm (8)	0.5 gpm (5)	5.5 gpm (17)
270°	40 psi	3.0 gpm ( )	1.7 gpm (12)	1.2 gpm (10)	0.9 gpm (8)	0.35 gpm (5)	4.1 gpm (17)
240°	40 psi	2.7 gpm ( )	1.69 gpm (12)	1.1 gpm (10)	0.8 gpm (8)	0.3 gpm (5)	3.7 gpm (17)
180°	40 psi	2.0 gpm ( )	1.3 gpm (12)	1.0 gpm (10)	0.6 gpm (8)	0.25 gpm (5)	2.8 gpm (17)
120°	40 psi	1.3 gpm ( )	0.9 gpm (12)	0.7 gpm (10)	0.4 gpm (8)	0.2 gpm (5)	1.8 gpm (17)
90°	40 psi	1.0 gpm ( )	0.6 gpm (12)	0.3 gpm (10)	0.2 gpm (8)	0.1 gpm (5)	1.4 gpm (17)
end strip	40 psi	0.5 gpm (es)					
center strip	40 psi	1.0 gpm (cs)					
wide strip	40 psi	1.4 gpm (ws)					

( ) – designates marking on plan

Bubblers: Hunter PCN nozzle in PRO-S body
(acceptable alternates: Toro FB nozzles in 570 body, Rainbird 1400 nozzle in 1800 body, Weathermatic 102 nozzle in LX body)
360° 40 psi 1.0 gpm
Rotors: 1/20 – 3.0 nozzle - 3.0 gpm at 40 PSI
3000 MP Rotators: 90° @ 40 PSI – 0.9 gpm; 180° @ 40 PSI – 1.8 gpm

Electric Valves: Hunter PGV Series

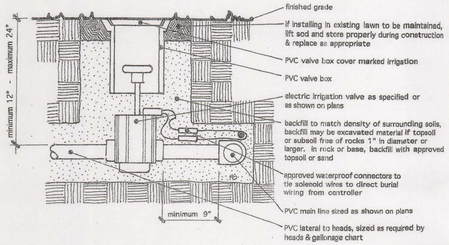
0.1 gpm to 17.5 gpm	1" valve
17.6 gpm to 40.0 gpm	1 1/2" valve
40.1 gpm to 60.0 gpm	2" valve
60.1 gpm +	3" valve

Piping Size Requirements: (based on Class 200)

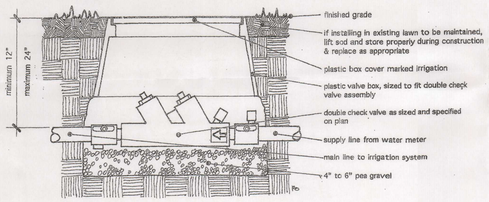
no 1/2" laterals allowed

0.1 gpm to 6.0 gpm	3/4" PVC
6.1 gpm to 10.0 gpm	1" PVC
10.1 gpm to 20.0 gpm	1 1/4" PVC
20.1 gpm to 30.0 gpm	1 1/2" PVC
30.1 gpm to 50.0 gpm	2" PVC
50.1 gpm to 75.0 gpm	2 1/2" PVC
75.1 gpm +	3" PVC

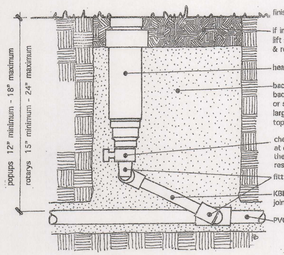
Special Spray Head Performance Note: In areas where normal spray from a pop-up will pass more than 6" beyond the leading edge of a curb, walk, etc., the adjustment screw on the nozzle top shall be adjusted to cut back the spray as required.



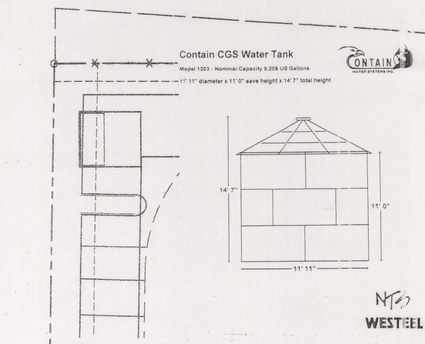
Typical Electric Valve Installation
Not to Scale

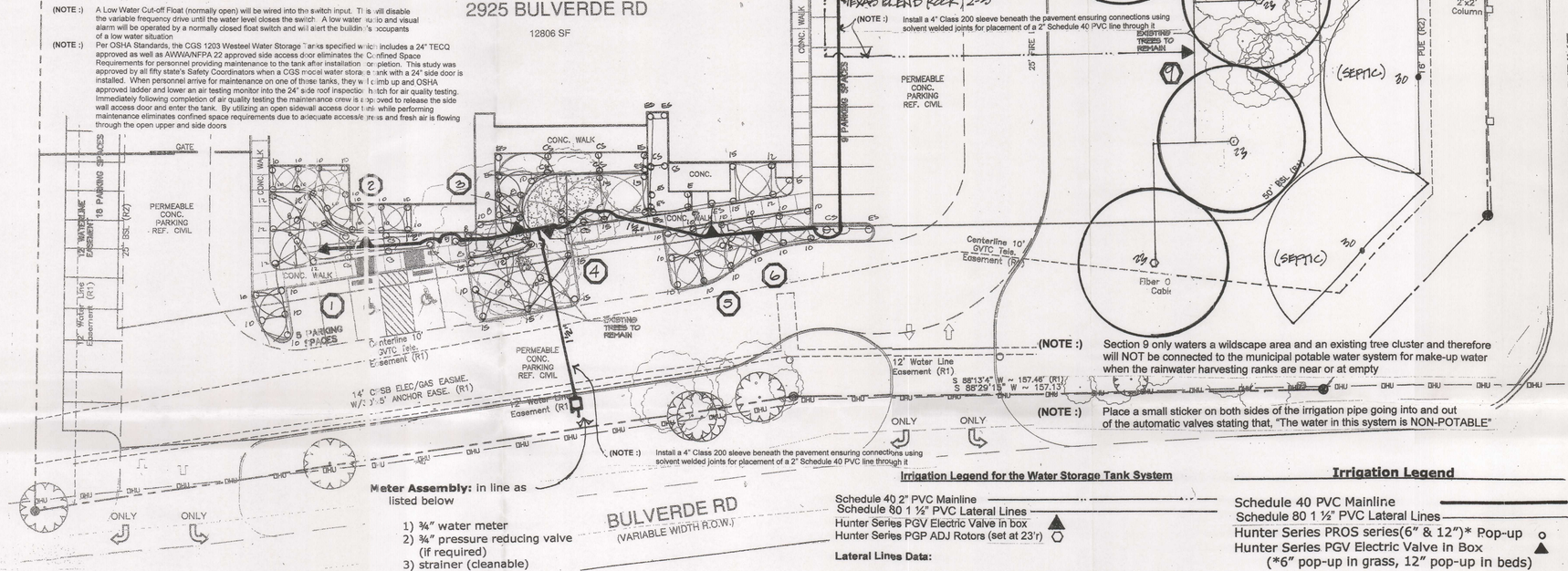


Double Check Valve In Box
Not to Scale



Typical Head Installation
(with check valve where required)
Not to Scale





Hunter 15 station PRO-C controller in weatherproof metal box with key lock. Connect to Hunter 'Rain-Clik' and electrical supply as required.

(NOTE :) There will be NO CROSS CONNECTION between land applied treated sewage effluent and the rainwater irrigation system

(NOTE :) Install a 4" Class 200 sleeve beneath the pavement ensuring connections using solvent welded joints for placement of a 2" Schedule 40 PVC line through it

(NOTE :) A Low Water Cut-off Float (normally open) will be wired into the switch input. This will disable the variable frequency drive until the water level closes the switch. A low water audio and visual alarm will be operated by a normally closed float switch and will alert the building's occupants of a low water situation

(NOTE :) Per OSHA Standards, the CGS 1203 Westeel Water Storage Tanks specified which includes a 24" TECQ approved as well as AWWA/NFPA 22 approved side access door eliminates the Confined Space Requirements for personnel providing maintenance to the tank after installation completion. This study was approved by all fifty state's Safety Coordinators when a CGS model water storage tank with a 24" side door is installed. When personnel arrive for maintenance on one of those tanks, they will climb up and OSHA approved ladder and lower an air testing monitor into the 24" side roof inspection hatch for air quality testing. Immediately following completion of air quality testing the maintenance crew is approved to release the side wall access door and enter the tank. By utilizing an open sidewall access door tank while performing maintenance eliminates confined space requirements due to adequate accessible areas and fresh air is flowing through the open upper and side doors

(NOTE :) Section 9 only waters a wildscape area and an existing tree cluster and therefore will NOT be connected to the municipal potable water system for make-up water when the rainwater harvesting ranks are near or at empty

(NOTE :) Place a small sticker on both sides of the irrigation pipe going into and out of the automatic valves stating that, "The water in this system is NON-POTABLE"

Meter Assembly: in line as listed below

1) ¾" water meter
2) ¾" pressure reducing valve (if required)
3) strainer (cleanable)
4) ¾" double check valve
5) 1" master valve

(NOTE:) Ensure landscaped areas receiving treatment and irrigation coverage have a minimum of 12 inches of soil in place after landscape and irrigation installation. The area receiving Water Storage Tank System irrigation per Section 9 is native wildscape and receives no special soil treatment and is left undisturbed

Irrigation Installation Notes:

1. The contractor shall install an **electric controller** as identified on the plan. The controller shall be mounted between 42" and 54" above finished grade, in a waterproof box with keylock (if exterior mounted), and shall be direct wired to all valves, master valve, and electrical supply as required. Unless otherwise indicated on the plan, the controller shall be solid state, controllable between 1 minute and 60 minutes per station, and shall have an adequate number of stations to operate all lateral lines and the master valve. The controller shall be compatible to the rainstat and any other supplemental controls.
2. The controller shall be connected to a **rainstat** overhead system which will skip the watering cycle whenever adequate rain has occurred. The rainstat shall be exterior mounted as near as possible to the controller, and in a location where overhead obstructions such as trees, building overhangs, signs, etc. will not affect performance. Typical mounting will be at the eave edge.
3. All **water pipe** shall be rigid PVC class 200 or better as noted on the plans. All **sleeves** shall be Schedule 40 rigid PVC and a minimum of 4".
4. Except where required as a component in the installation of a **riser, no ½" pipe** will be allowed.
5. All pipe shall have a **minimum cover** of ten inches (10").
6. All irrigation parts/components will be **new equipment** at the time of installation and will conform to the latest specifications and catalog of the respective manufacturer.
7. Each lateral shall have its lowest head in elevation equipped with a **low head drainage check valve,** either externally mounted on the sprinkler or internal (SAM type).
8. **Backfill** material will be free of rocks greater than 1" in diameter, trash, and other debris. Backfilling will be completed in a manner to compensate for soil settling, and the top 4" of backfill in landscape areas shall be approved topsoil or soil mix to match final landscape plan requirements. Where lines are installed in existing lawns, sod cover shall be neatly removed prior to ditching, stockpiled in an appropriate manner, and replaced after backfilling and compaction is complete.
9. The contractor shall be responsible for **removing** all debris, spoil, etc. and for properly **disposing of** off site.
10. The irrigation contractor shall be responsible for **securing any and all construction permits** (if not secured by a general contractor) and shall be responsible for securing all inspections and approvals by appropriate governing agencies.
11. All connections to domestic water systems **(water meters)** shall be made by appropriately licensed and certified individuals. A licensed Irrigator shall oversee all installation. At the completion of installation, the same licensed Irrigator who oversaw installation shall be responsible for any certifications to governmental agencies or other appropriate groups.
12. After completion, the system shall be subjected to a **72 hour pressure test.** All leaks and other problems shall be corrected immediately.
13. All sprinkler heads shall be installed **a minimum of 4" away** from all curbs, walks, and other appurtenances.
14. All trenching/digging within the **Root Protection Zone (RPZ)** of existing trees as identified by governmental agencies and counted as trees to be saved shall be completed by hand digging. No tree roots larger than 1" in diameter shall be cut, and any marred or damaged roots shall be treated with an approved pruning paint.
15. The contractor shall be responsible for verifying the location of all other **underground utilities** and shall protect such utilities from damage, etc.

Sprinkler Irrigation Component Parts List

Sprinkler Heads:
Pop-up Spray Heads select from following – Matched Precipitation Rates (MPR):
Hunter I-NST Series — Toro 570 Series, MPR nozzles
Weathermatic LX Series, MPR

Bubblers (select from following)
Hunter PCN nozzle in PRO-S body — Toro FB nozzles in 570 body
Weathermatic 102 nozzle in LX body

Small Radius Rotary Heads:
Hunter Series I-20/I-20 rotary

Check Valve or Valve in Head (must install a minimum of one per each lateral): select from the following:
Irritrol SLCV Check Valve — Rainbird 1800-ISAM-PRS
Toro 570 Series, Check-o-matic — Hunter I Spray – CV

Electric Valves, except Master Valve: select from following:
Hunter PGV valves with ICD decoders with surge arrestors

Master Valves: select from following:
Irritrol 700 Series — Hunter ICV Series

Double Check Valve Assemblies: select from following:
Conbraco Series 40-100 for ¾" to 4"
Febco Master Series 850 for ¾" to 6"

Piping (White for normal applications, purple for reclaimed water):
Mains: Schedule 40 PVC for ¾" to 2 ½", Class 200 for 3" and greater.
Laterals: Solvent weld for ¾" to 2 ½", solvent weld or ring-tite for 3" and greater Class 200, solvent weld for ¾" to 2 ½", solvent weld or ring-tite for 3" and greater
Fittings: a working pressure equal to or greater than the required pipe
Solvent: compatible to the pipe used

Swing Joints: select from following:
KBI swing joint — Hunter SJ Series

Wiring: to be Hunter ID wire, model 2 MM (2)(14 AWG) standard decoder cable up to 10,000 ft.
model 3.3 MM (2) long range heavy-duty decoder cable over 10,000 ft.
install grounding poles to wires not to exceed every 300' on center

Wire Nuts and Waterproof Connectors:
Wire nuts to be Type UF and approved for ground mount in "Non-Ion systems
Waterproof connectors to be by 3M, King,

Valve Boxes: select from following:
For electric valves, in-line valves, etc.
Ametek Economy Turf Box — DFW Model D-109
For double check valve assemblies and other large valves/meters
Ametek Meter Box — DFW Model D-1200 or D-1800

Controllers: as specified on plans

(NOTE :) The 2nd CGS 1203 Westeel Water Storage Tank (tank 2) will be placed beside the 1st CGS 1203 Westeel Water Storage Tank (tank 1) on the concrete slab, per plan. The connection between the two tanks will be Schedule 80 2" pipe and fittings providing gravity and pump discharge equally between the two tanks. The fittings and connection between the two tanks will be provided by the Water Storage Tank provider/installer. Tank 2 will also be fitted with a Ball Valve Drain Assembly shown on the plan

Irrigation Legend for the Water Storage Tank System

Schedule 40 2" PVC Mainline
Schedule 80 1 ½" PVC Lateral Lines
Hunter Series PGV Electric Valve in box
Hunter Series PGP ADJ Rotors (set at 23'r)

Lateral Lines Data:

section	valve size	gpm	heads	½ coverage
9	1"	4.4 gpm	rotors	22 minutes

Irrigation Legend

Schedule 40 PVC Mainline
Schedule 80 1 ½" PVC Lateral Lines
Hunter Series PROS series(6" & 12")* Pop-up
Hunter Series PGV Electric Valve in Box
(*6" pop-up in grass, 12" pop-up in beds)

Lateral Lines Data:

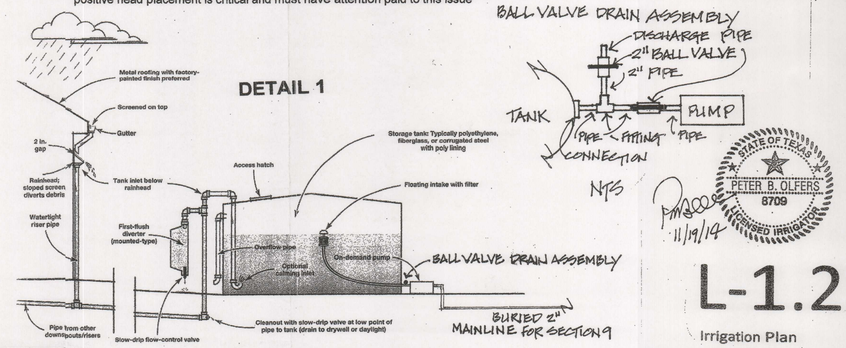
section	valve size	gpm	heads	1/2" coverage
1	1"	15.0 gpm	sprays	22 minutes
2	1"	11.6 gpm	sprays	22 minutes
3	1"	12.2 gpm	sprays	22 minutes
4	1"	15.6 gpm	sprays	22 minutes
5	1"	9.3 gpm	sprays	22 minutes
6	1"	14.4 gpm	sprays	22 minutes
7	1"	11.4 gpm	sprays	22 minutes
8	1"	10.0 gpm	sprays	22 minutes

(NOTE :) Section 9 only waters a wildscape area and an existing tree cluster. Only water from the storage tank system is used in Section 9, not potable water from the main irrigation system. Rain water must be held in the storage tanks a minimum of twelve hours prior to being used as irrigation water for Section 9

(NOTE :) Gutter connections, screening, filtration, clean-outs/drainage are shown on Detail 1. Non-potable water markings will be placed four times on each tank at the cardinal points 3' above the ground as well as smaller stickers stating the same on exposed pipes and at the discharge point from the tank into the pump as well as on the pipe leading to the buried Section 9

(NOTE:) Ensure final placement of the septic heads as well as the final placement of the four Section 9 rotors are placed approximately per plan. There must be NO OVER-SPRAY between the two zones. Placement shown of the plan will accomplish this, however, positive head placement is critical and must have attention paid to this issue

DETAIL 1



TYPICAL TANK 1 DRAWING WITH THE PUMP. TANK 2 IDENTICAL WITHOUT PUMP ASSEMBLY

STATE OF TEXAS
XAVIER A. TORRES
93953
LICENSED
PROFESSIONAL ENGINEER
10/14/14

Xavier Torres

I XAVIER TORRES, P.E. ATTACHING MY SEAL TO ACACIA ALDC'S IRRIGATION PLAN TO CERTIFY THAT THE RAINWATER HARVESTING SYSTEM WAS DESIGNED IN ACCORDANCE WITH TCEQ TECHNICAL GUIDANCE ON BEST MANAGEMENT PRACTICES PUBLICATION RG 348.

811
Call before you dig!
Call 811

STATE OF TEXAS
PETER B. OLFERS
8709
LICENSED IRRIGATOR
11/19/14

ACACIA ALDC
FAX:210-494-7744
210-863-7744
DOUGLAS E. SMITH
-BS LANDSCAPE ARCHITECTURE
-BS AGRONOMY/PLANT GENETICS
-MS HORTICULTURE
-TEXAS LICENSED IRRIGATOR #6018

Irrigation Plan
SCALE : 1" = 20'-0"

TRUE NORTH PLAN NORTH

L-1.2
Irrigation Plan

Bulverde Retail Center

Torres Engineering, P.C.

TBPE Firm # F-13692

Xavier A. Torres, P.E
xtorres@torresengineering.net

RECEIVED
FEB 17 2015
COUNTY ENGINEER

RECEIVED
FEB 03 2015
By TCEQ #13

February 3, 2015

Mr. Michael Isley, P.E.
Edwards Aquifer Protection Program
TCEQ – San Antonio Region
14250 Judson Rd
San Antonio, TX 78233

Mr. Isley,

Thank you for you response to our Water Pollution Plan Submittal. The comments have been reviewed and are addressed as follows:

1. Inspection after every rain event has been incorporated. Attached is the IMRR and section from SW3P
2. Detail of concrete washout has been revised to indicate 10-mill Liner. Attached is the SWPP detail sheet and SW3P Exhibit.
3. The F factor has been removed. TSS removal has been revised. Rainwater harvesting has been considered for over treatment to treat un-captured runoff from driveway entrances. It has been determined that the over treatment does allow for driveway entrances. Attached is "Attachment E, Attachment M" and hand calculation sheet.
4. See Landscape/Irrigation responses and attachments. Additionally, water storage tank foundation design has been incorporated. See attached TCEQ Site Plan sheet 1A of 1 and Site Plan sheet.
5. See Landscape/Irrigation responses and attachments.
6. See Landscape/Irrigation responses and attachments. Additionally in response, the grading will be as to remove soil from the site. There is not a need for bringing soil on site. Further, the grading is as such that there is not a need for filling any areas of the site. However there irrigation plan does call for 12" of top soil to be required at all irrigated areas.
7. See Landscape/Irrigation responses and attachments.

5503 Grissom Rd, Ste. 101 ● San Antonio ● Texas 78238
Phone: 210-680-0808

8. The required design elements for 1.64" surface treatment depth has been analyzed and it has been determined that the curbs are configured in such a manner as to provide the required volume. The parking lot surface area is 32938 ft^2. The volume of rainwater to be treated at 1.64" is 4501.53 ft^3. The provided volume is 4796.76 ft^3. See attached hand calculations for analysis.
9. See Landscape/Irrigation responses and attachments.
10. IMRR has been revised accordingly. See attached IMRR.
11. IMRR has been revised accordingly. See attached IMRR.
12. FEMA Panel Number has been added. See Attached TCEQ-10257 page 5 of 9.
13. Runoff coefficients have been revised accordingly. See SW3P runoff coefficient sheet and WPAP Attachment E.

Once again thank you for all your time and effort in this matter and please feel free to contact me should you have any additional concerns.

Sincerely
Torres Engineering,

Xavier Torres

Xavier Torres, P.E.

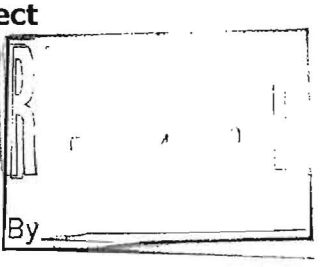


5503 Grissom Rd, Ste. 101 ● San Antonio ● Texas 78238
Phone: 210-680-0808

ACACIA ALDC

(Architectural Landscape Design Consulting)

Douglas E. Smith, Owner and Retired USAF Landscape Architect
2503 Cedar Glen
San Antonio, Texas 78232
210-863-7744
acaciadesign96@yahoo.com



Mr. Michael Isley, P.E.
San Antonio Regional Office—Edwards Program

Dear Mr. Isley, January 29, 2015

My name is Doug Smith and I coordinated the Landscape and Irrigation plans for the Bulverde Hills Project. I received your comments from Xavier Torres, P.E. of Torres Engineering. He asked me to address and assist with items 4, 5, 6, 7, and 9 for clarification and remediation.

Page 4: L 1.2 now correctly shows the placement of two 7,750 gallon storage tanks on a slab. Tank details included part number, debris diverter and first-flush diverter, overflow, gravity drain assembly with detail, foundation specifications, and pump specifications are noted. The foundation is 27' long and 14' wide. Gutter components, screening, and routing are noted. There is a ball assembly placed on the tank side of the pump to accomplish gravity draining of the tank. The tanks will be installed with an Overflow pipe to remove excess water when it reaches an established height in the tanks. The need to physically monitor and observe this excess discharge is addressed in the IMRR. Also noted in the IMRR is the requirement to ensure the pump is never operated 'dry' as it will cause pump burn-out/failure. Non-potable water signage is addressed in a note on L 1.2 and will be noted in the IMRR.

Page 5: The spray pattern of all main irrigation, septic, and Section 9—the Water Storage Tank System heads is now shown on L 1.2. The Water Storage Tank water is only used for Section 9 which is four rotors placed in the large native/wildscape area, per plan. The water in the storage tanks will used every time Section 9 operates, of course, but the requirement to empty the storage tanks of unused water every seven days is noted in the IMRR and will be accomplished either through the gravity drain assembly or via irrigation through Section 9. Additionally, the requirement to hold collected rain water for twelve hours prior to use as irrigation through Section 9 is addressed and noted in the IMRR.

Page 6: There is a note on L 1.1 as well as L 1.2 to ensure landscape and main irrigation system areas receive at least 12" of soil after landscape and irrigation installation. This will also be noted in the IMRR. The area receiving Water Storage Tank System irrigation per Section 9 is native wildscape and receives no special soil treatment and is left undisturbed except for raking and leveling of trenching run disturbed areas.

Page 7: The area between the septic system heads and the Section 9 Water Storage Tank System irrigation heads is addressed in a note on L 1.2. The final actual placement of the heads for the septic and Section 9 heads must ensure there is no overlap of spray. The placement of all these heads per plan accomplishes this buffer; however, positive and correct head placement is critical and must have attention paid to this issue by a supervisor of the irrigation installation company.

Page 9: Re: storage tank emptying procedures is addressed in Page 5 above and also noted in the IMRR. Tank settled debris and sediment removal will be accomplished by certified/trained personnel through each tank's access hatch allowing for physical entry to manually clean the bottom of the tanks. This cleaning can be accomplished with shovels and a bucket/rope/pulley arrangement to the outside of the tanks or by physically vacuuming the sediment.

Hopefully, this report and incorporation as noted in the IMRR and stated/shown on L-1.2 will satisfy the application requirements sent to Xavier Torres of Torres Engineering. Please feel free to contact me to discuss or clarify. I am,

Most Sincerely Yours,

Doug Smith

Owner
Acacia ALDC
Texas Licensed Irrigator #6018

RECEIVED
FEB 0 4 2015
By

ATTACHMENT E

(Volume and Character of Stormwater)

The stormwater runoff generated from this site will consist of runoff from paved areas, roof tops, curbs, sidewalks and undisturbed land. The runoff will contain hydrocarbons, fertilizers/pesticides, suspended solids, and fluids from vehicles. The site is currently undeveloped. Therefore the predevelopment coefficient of runoff is C=52. Since the sidewalks and parking lots will be constructed of permeable concrete and the runoff from the roof tops will be harvested, the post development coefficient will be C=48.

RECEIVED
FEB 17 2015
COUNTY ENGINEER

The Total Suspended Solids (TSS) will be mediated by Permeable Concrete and Rainwater harvesting from roof tops. The required volume of rainwater due to harvesting is calculated by multiplying the surface area of the rooftops times 1.5 inches. This gives a volume of 1,912.5 ft^3 or 14,305.5 gals.

ATTACHMENT M

(Construction Plans and Design Calculations)

Permeable Concrete	=	0.7798 Acres (Parking Lot and Sidewalk)
Curb	=	0.0184 Acres
Roof Top	=	15,300 S.F.

Average Annual Precipitation = 33 Inches

Rainwater Harvesting Volume:

V = 15300*1.5/12 = 1,912.5 Ft^3 = ± 14,306.0 Gal.

Use a 15,000 gal Tank with pumps discharging at 16 gpm

Time to discharge Tank = (15000/16)/(60*24) = 0.65 days

substance(s) being stored. The proposed containment structure will be constructed of _____.

28. **ATTACHMENT H - AST Containment Structure Drawings.** A scaled drawing of the containment structure is found at the end of this form 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

29. 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

Items 30 through 41 must be included on the Site Plan.

30. The Site Plan must have a minimum scale of 1" = 400'.
Site Plan Scale: 1" = 20 '.

31. 100-year floodplain boundaries

__ Some part(s) of the project site is located within the 100-year floodplain. The floodplain is shown and labeled.
X 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):
Firm # 4854630380F Dated Sept. 2, 2009

32. X 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.

33. n/a A drainage plan showing all paths of drainage from the site to surface streams.

34. X The drainage patterns and approximate slopes anticipated after major grading

Project Name: Bulverde Retail Center
Address: 2925 Bulverde Rd.
City, State, Zip: Bulverde TX,

It is the responsibility of the owner to comply with the Inspection, Maintenance and Retrofit Plan.

Inspection:

1. Inspect gutter for debris and or leaks.
2. Inspect Tank for debris, leaks and standing water.
3. After every rain event inspect tank to insure that rainwater stand for twelve hour before discharging.
4. Inspect irrigation system for leaks.
5. Inspect Irrigation Heads, Buster Pumps, Pump Start Relay and electrical controller to insure they are in proper working order.
6. Inspect pumps upon operation to insure that they do not operate dry.
7. Inspect Permeable Concrete (Parking Lot and Sidewalk) for Oil spills and or clogging.

Inspections are to be performed every three months and after ever rain event.

Maintenance:

1. Every three months and after every rain event, remove all debris from gutters.
2. Every three months and after every rain event, remove any debris and or sediment from rainwater storage tank. Manually discharge rainwater from rainwater storage tanks to insure that water does not stand for more than seven days.
3. Once a year, pressure-wash permeable concrete followed by immediately vacuuming pressure washing water.
4. The parking lot will be swept twice per year with vacuum sweeper.
5. Every two years steam vacuum permeable concrete.
6. Steam Vacuum permeable concrete should it become clogged or shows evidence of standing water.
7. Steam Vacuum permeable concrete should any hydrocarbon spill occur.

Repair:

1. Repair leaking gutters, irrigation pipe, irrigation heads and tank.
2. Repair Buster Pumps, Pump Start Relay and or Electrical Controller.

Retrofit:

1. Replace permeable concrete and or durable aggregate should hydrocarbon spill occur or if permeable concrete should become clogged if Steam Vacuuming does not remove hydrocarbon or unclog permeable concrete.

Responsible Party: Bulverde Retail Center
Address: 2925 Bulverde Rd., Bulverde TX., 78163
Signature: _____

Required TSS Removal for Rooftops

$$L_M = 27.2 \left(\frac{15300}{43560} \right) 33 = 315.27$$

Total TSS Produced By Rooftops

$$L_{oad} = \frac{315.27}{0.8} = 394.09$$

Rooftops will be treated by Rainwater Harvesting which is 100% efficient Therefore Rainwater Harvesting is Over treating

$$L_{over} = 394.09 - 315.27 = 78.82 \text{ Lbs}$$

Area of Driveway Entrance

Area = 1617.49 ft^2

$$L_M = 27.2 \left(\frac{1617.49}{43560} \right) 33 = 33.3 \text{ Lbs}$$

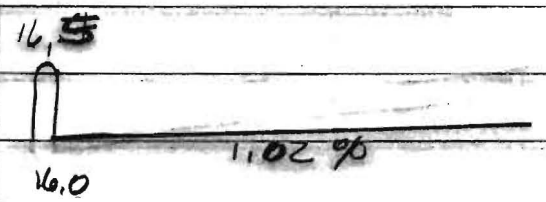
Since 78.82 < 33.3 The uncaptured Runoff Due to Driveway Entrance is be treated by The over treatment of the rooftops,

1) Add Foundation Detail

2) SAW cut North curb only

3) curbs to remain 6"

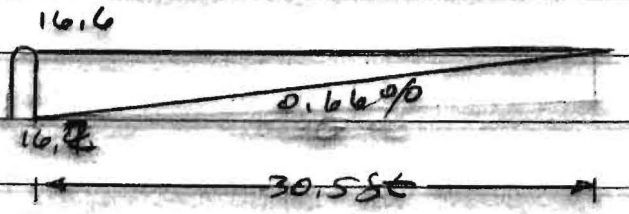
4) reprint Grading Detail Site plan TCEQ site plan



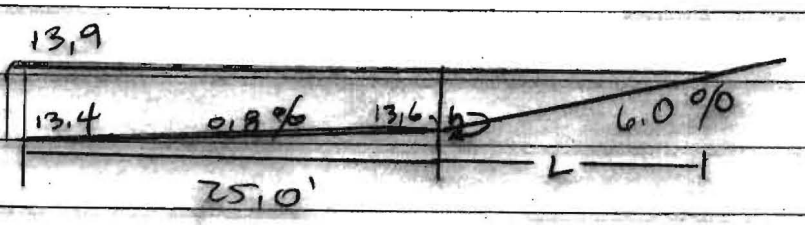
$0.0102(L) = 0.5$

$L = 49.04$

$Volume = \frac{1}{2}(49.04)0.5(145) = 1777.7$



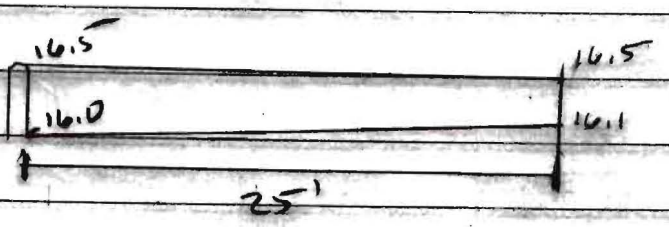
$Volume = \frac{1}{2}(30.5)0.2(238.1) = 726.21$

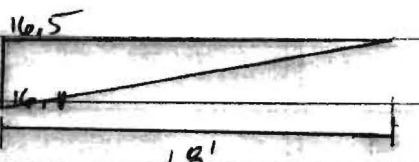


$s = \frac{\Delta E}{L}$

$125(0.008) = h \cdot 13$ $\quad 0.06(L) = 0.3 \approx L = 5$

$V = 0.3(25)70 + \frac{1}{2}(25)0.2(70) + \frac{1}{2}(5)0.3(70) = 752.5$





$V = \frac{1}{2}(18)0.4(81) = 291.6$

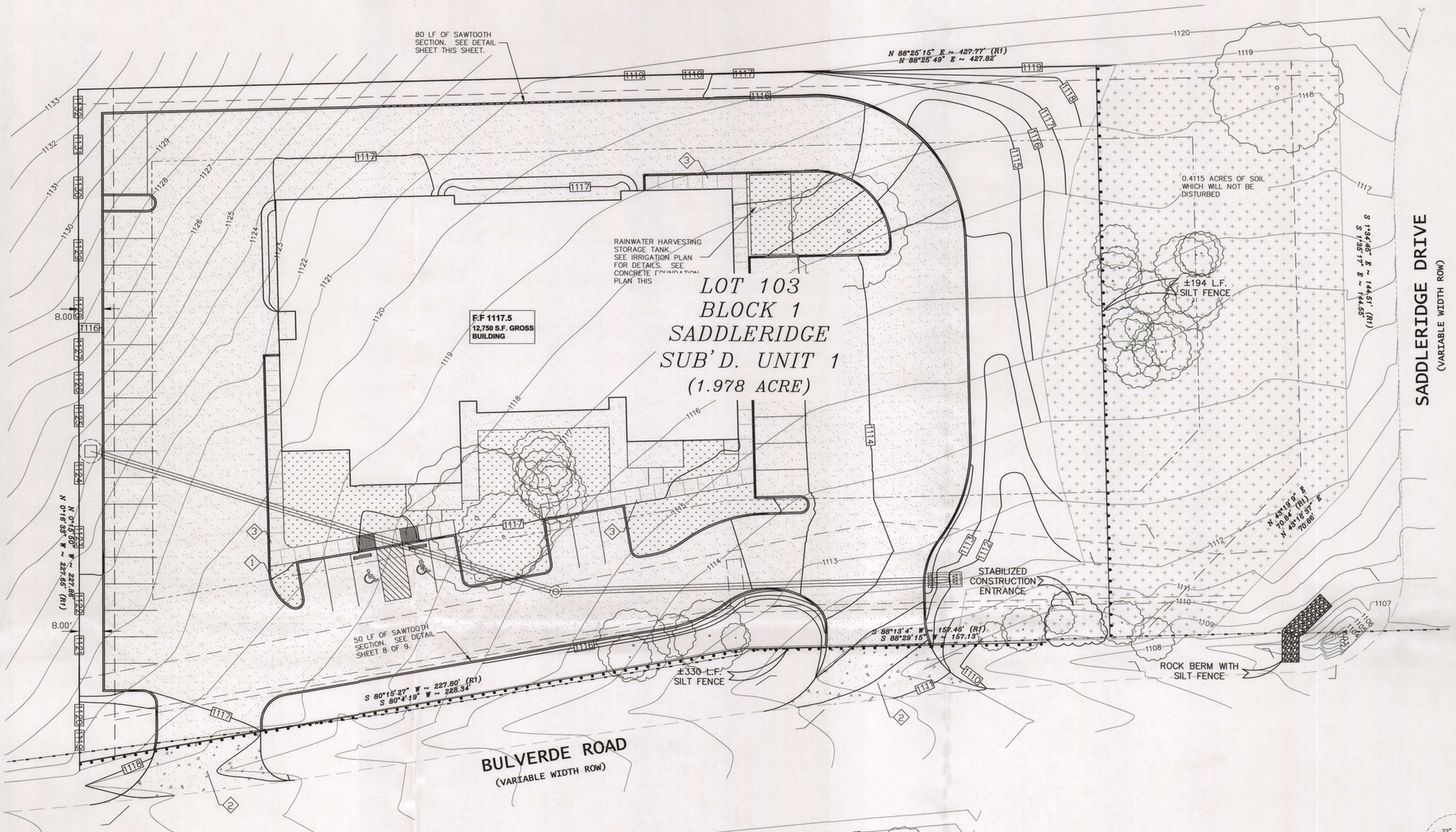
$V = \frac{1}{2}(25)0.1(111) + 25(0.4)111 = 1248.75$

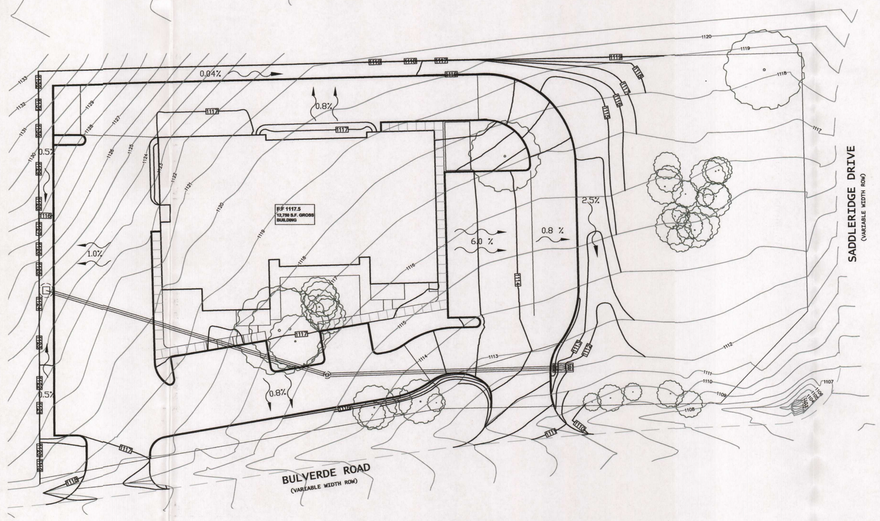
$V_T = 4796.76$ CY

Permeable Concrete Parking lot:

Surface Area = 32938.03 ft^2

Volume @ 1.64" = $32938.03 * \frac{1.64}{12} = 4501.535 ft^3$





DRAINAGE PATTERNS AND APPROX. SLOPES AFTER GRADING

SCALE:
1 INCH = 40 FT.

LEGEND:

DRAINAGE PATTERNS

1.0 % APPROX. SLOPE

GRAPHIC SCALE

40 0 10 20 40

(IN FEET)
1 inch = 20 ft.

LEGEND:

832 EXISTING CONTOUR

832 FINISHED CONTOUR

CONCRETE

PERMEABLE CONCRETE PARKING LOT

GRASS - AREA OF SOIL STABILIZATION

AREA OF UNDISTURBED SOIL

EXISITNG TREES

NOTES:

1. THE AREA OF DISTURBED SOIL WILL BE LOCATED OUTSIDE OF THE UNDISTURBED AREA WHICH IS APPROXIMATELY 1.55 ACRES.
2. USE LANDLOK 300 PERMANENT TURF REINFORCEMENT MAT FOR SOIL STABILIZATION. SEE CONTECH ENGINEERED SOLUTIONS INSTALLATION GUIDE.

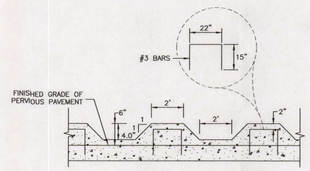
KEY NOTE LIST:

1. CONCRETE CURB. (TYP.).
2. CONCRETE DRIVEWAY.
3. PERMEABLE SIDEWALK.

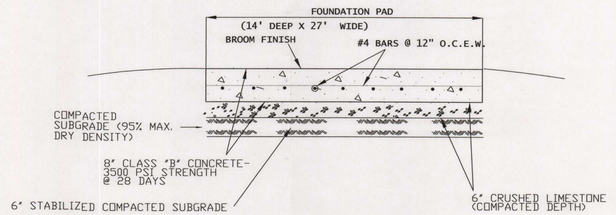
TEMPORARY BEST MANAGEMENT PRACTICES

ESTIMATED STORM WATER POLLUTION PREVENTION PLAN & TEMPORARY SEDIMENTATION AND EROSION CONTROL PLAN QUANTITIES

ITEM	UNIT	QUANTITY
STABILIZED CONSTRUCTION ENTRANCE	EACH	1
SILT FENCE	L.F.	± 524
ROCK BERM W/ SILT FENCE	L.F.	± 29



SAWTOOTH SECTION
NOT TO SCALE



RAINWATER STORAGE TANK FOUNDATION SECTION VIEW
NOT TO SCALE

TORRES ENGINEERING P.C.
TBPE FIRM # P-13692
5503 GRISSOM RD. STE. 101 (210) 680-0808
SAN ANTONIO, TEXAS 78238

DATE: DEC. 13, 2014
DESIGNED BY: X.A.T.
DRAWN BY: J.D.C.
CHECKED BY: X.A.T.
SCALE: 1" 20'
FILE NAME:

STATE OF TEXAS
XAVIER A. TORRES
93953
LICENSED PROFESSIONAL ENGINEER
12/3/14

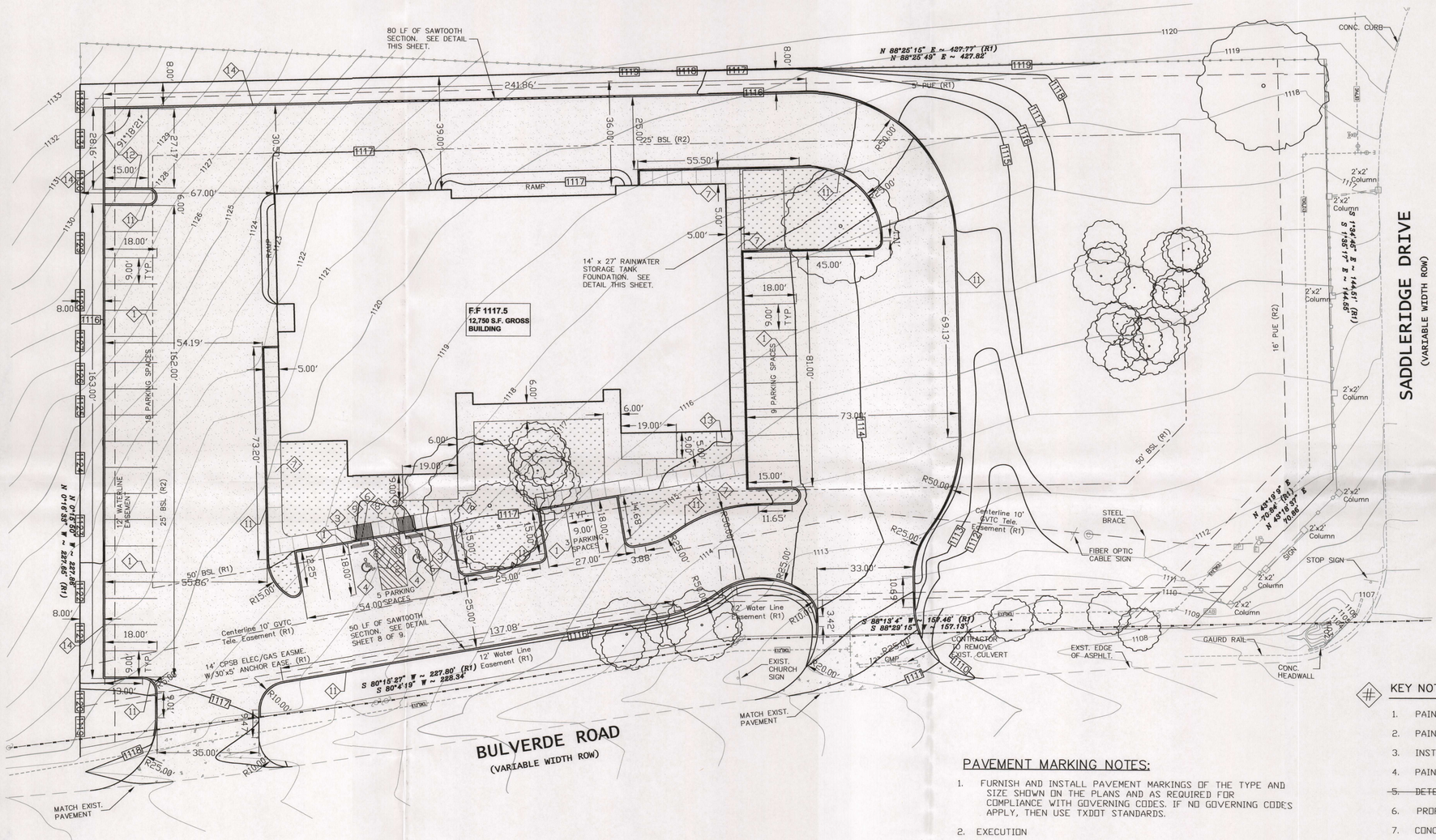
NO.	DATE	REVISIONS	BY
1	2/3/15	ADDED FOUNDATION DETAIL ADDED SAW TOOTH CUT DETAIL	XAT

TCEQ SITE PLAN
FOR BULVERDE RETAIL CENTER
2925 BULVERDE RD
BULVERDE, TEXAS

RECEIVED
FEB 04 2015
By

TCEQ SITE

SHEET 1A OF 1



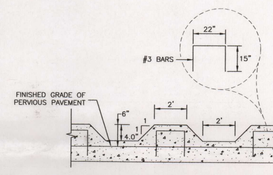
GRAPHIC SCALE

40 0 10 20 40

(IN FEET)
1 inch = 20 ft.

LEGEND:

- E8" PVC — EXISTING WATER LINE
- E12" DICL — EXISTING WATER LINE
- EXISTING FIRE HYDRANT
- EXISTING POWER POLE
- CONCRETE
- POROUS (PERMEABLE) CONCRETE
- GRASS



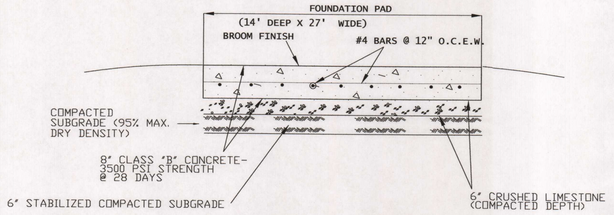
SAWTOOTH SECTION
NOT TO SCALE

!!! CALL BEFORE YOU DIG !!!

CONTRACTOR TO LOCATE EXISTING UTILITIES PRIOR TO WORK. ANY CONFLICT WITH EXISTING UTILITIES SHALL BE REMEDIED BETWEEN SAID CONLICTING UTILITY AND CONTRACTOR. ENGINEER SHALL BE NOTIFIED IN WRITING OF ANY CONLICTS IMMEDIATELY UPON DISCOVERY OF CONFLICT (LETTER, FAX, EMAIL).

TEXAS ON CALL PARTICIPANTS REQUESTS 48 HOURS NOTICE BEFORE YOU DIG, DRILL, OR BLAST - STOP AND CALL

TEXAS ON CALL SYSTEM
(800)245-4545



RAINWATER STORAGE TANK FOUNDATION
SECTION VIEW
NOT TO SCALE

PAVEMENT MARKING NOTES:

1. FURNISH AND INSTALL PAVEMENT MARKINGS OF THE TYPE AND SIZE SHOWN ON THE PLANS AND AS REQUIRED FOR COMPLIANCE WITH GOVERNING CODES. IF NO GOVERNING CODES APPLY, THEN USE TXDOT STANDARDS.
2. EXECUTION
   - A. CONTRACTOR SHALL CLEAN PAVEMENT OF GREASE, DIRT, OIL, SAND, GRAVEL OR OTHER FOREIGN MATERISLS PRIOR TO APPLYING MARKINGS AS RECOMMENDED BY PAINT MANUFACTURER.
   - B. PAVEMENT MARKINGS SHALL BE APPLIED BY MACHINE AT A RATE OF ONE (1) GALLON/100 SQUARE FEET.
   - C. PAVEMENT MARKINGS SHALL NOT BE APPLIED DURING PERIODS OF EXCESS HUMIDITY OR PAVEMENT TERMERATURES BELOW 50 DEGREES F.
   - D. MINIMUM LINE WIDTH IS 4 INCHES. PAVEMENT MARKINGS MUST COMPLY WITH LOCAL FIRE STARNDARDS AND CURRENT ACCESSIBILITY CODE.
   - E. A MINIMUM OF TWO COATS SHALL BE REQUIRED UNLESS REJECTED BY OWNER IN WRITING. WAIT 30 DAYS AFTER PAVEMENT INSTALLATION BEFORE APPLYING THE SECOND COAT OF PAVEMENT MARKINGS.
   - F. CLOSE AREAS TO TRAFFIC FOR DURATION OF DRYING TIME, WHICH SHALL BE NO LESS THAN THE MINIMUM RECOMMENDED BY THE PAINT MANUFACTURER.
3. TRAFFIC PAINT SHALL BE SHERWIN WILLIAMS PRO-MAR TRAFFIC PAINT OR APPROVED EQUAL - COLOR AS SPECIFIED ON PLANS.

KEY NOTE LIST:

1. PAINT 4" WIDE PARKING SPACE STRIPE. (TYP.).
2. PAINT 4" WIDE DIAGONAL STRIPING @ 2' ON CENTERS WITH BORDER STRIPE.
3. INSTALL HANDICAP SIGN. SEE DETAIL SHEET 8 OF 9
4. PAINTED PARKING SPACE HANDICAP SYMBOL. SEE DETAIL SHEET 8 OF 9.
5. ~~DETECTABLE WARNING AREA. SEE DETAIL SHEET 4 OF 5~~
6. PROPOSED WHEELSTOPES. SEE DETAIL SHEET 8 OF 9.
7. CONCRETE SIDEWALK. SEE DETAIL SHEET 8 OF 9
8. TRANSITION TO LAYDOWN CURB.
9. PROPOSED T.A.S. COMPLIANT CURB RAMPS SEE DETAIL SHEET 8 OF 9
10. LAYDOWN CURB SEE DETAIL SHEET 8 OF 9
11. 6" CONCRETE CURB SEE DETAIL SHEET 8 OF 9
12. DUMPSTER PAD SEE DETAIL SHEET 8 OF 9
13. 5' X 5' CONCRETE PAD WITH ONE (1) BIKE HOOP RACK. CONTRACTOR TO USE HOOP RACK MANIFACTURED BY DERO BIKE RACKS SEE DETAIL SHEET 8 OF 9 OR APPROVED EQUAL.
14. CONCRETE RETAININGWALL - PURVIOUS CONCRETE PAVEMENT COMBINATION TYPE. SEE DETAIL SHEET 8 OF 9

NOTES:

1. ALL RADIUS 3' UNLESS OTHERWISE NOTED.

RECEIVED
FEB 0 4 2015
By

SITE PLAN AND DIMENSIONAL CONTROL FOR BULVERDE RETAIL CENTER 2925 BULVERDE RD BULVERDE, TEXAS

SITE

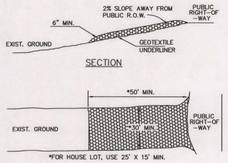
SHEET 1 OF 9

TORRES ENGINEERING P.C.
TBPE FIRM # F-13692
5503 GRISSOM RD. STE. 101 (210) 680-0808
SAN ANTONIO, TEXAS 78238

DATE: OCT. 14, 2014
DESIGNED BY: X.A.T.
DRAWN BY: J.D.C.
CHECKED BY: X.A.T.
SCALE: 1" 20'
FILE NAME:

STATE OF TEXAS — XAVIER A. TORRES — 93953 — LICENSED PROFESSIONAL ENGINEER — 10/14/14

NO.	DATE	DESCRIPTION	BY
1	2/3/15	ADDED FOUNDATION DETAIL	XAT
		ADDED SAW TOOTH CUT DETAIL	



PLAN VIEW

STABILIZED CONSTRUCTION ENTRANCE/EXIT

WITHOUT WHEEL WASHING

N.T.S.

GENERAL NOTES:

Clear all vegetation, roots and all other obstructions in preparation for grading.

Prior to placing geotextile (filter fabric) make sure that the entrance is properly graded and compacted.

To reduce maintenance and loss of aggregate place geotextile fabric (filter cloth) over the existing ground before placing the stone for the entrance.

Stone should be placed to a depth of 6-inches or greater for the entire width and length.

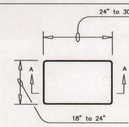
Width should be not less than full width of all points of ingress or egress. Flare the entrance where it meets existing road to provide a turning radius.

Periodic maintenance will be required to prevent tracking onto public right-of-way or any roadway. All sediment spilled, dropped, or tracked onto any public right-of-way must be removed immediately.

MATERIALS:

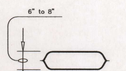
- Crushed stone 4-inches – 8-inches in diameter.
- Geotextile (filter fabric) with the properties listed below.

Physical Property	Requirements
Grab Tensile Strength	220 lbs. (ASTM D4632)
Elongation Failure	60% (ASTM D4632)
Mullen Burst Strength	430 lbs. (ASTM D3786)
Puncture Strength	125 lbs. (ASTM D4833)
Equivalent Opening	Size 40–80 (US Std Sieve)(ASTM D4751)



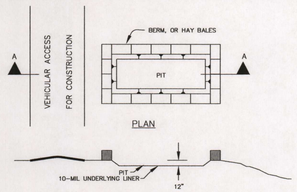
GRAVEL FILTER BAG DETAIL

N.T.S.



SECTION A–A

1. The filter bag material shall be made of polypropylene, polyethylene or polyamide woven fabric, min. unit weight of 4 ounces/SY, Mullen burst strength exceeding 300 psi and ultraviolet stability exceeding 70%.
2. The filter bag shall be filled with clean, medium to coarse gravel (0.31 to 0.75 inch diameter).



SECTION A–A

CONCRETE TRUCK WASHOUT PIT

N.T.S.

GENERAL NOTES:

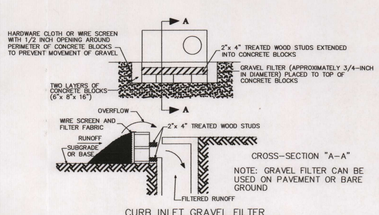
Detail above illustrates minimum dimensions. Pit can be increased in size depending on expected frequency of use.

If hay bales are used, they shall be anchored in place with two rebars per bale, driven into the ground far enough to provide reasonable stability

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.

Washout pit shall be constructed with a 10–mil underlying liner.



CURB INLET GRAVEL FILTER

N.T.S.

GENERAL NOTES:

All storm drainage systems inlets should filter runoff before the water is discharged into streams or onto adjacent properties, unless treatment is provided elsewhere.

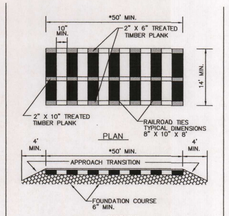
If no additional downstream treatment exists, the maximum drainage area tributary to and area drain installed with a gravel filter should be one acre.

Curb inlet gravel filters should be constructed with a combination of concrete blocks, 1/2-inch wire screen, coarse (approximately 3/4–inch diameter) gravel and a 2"x 4" wood stud for support. Concrete blocks (6"x 8" x 16") may be placed either on their sides or stood on their ends depending on the area being served.

Gravel filters can be used if the immediate and adjacent area to the drain consists of soil or pavement. However, only gravel filters should be installed on top of pavement.

All curb inlet gravel filters should be inspected and repaired after each runoff event. Sediment should be removed when material is within three inches if the top of the concrete blocks. Periodically, the gravel should be raked to increase infiltration and filtering of runoff waters.

Gravel can be placed in porous sacks which will allow water to flow through gravel and help prevent downstream migration of gravel.



CONSTRUCTION EXIT (TYPE 2)

N.T.S.

GENERAL NOTES:

The length of the type 2 construction exit shall be as indicated on the plans, but not less than 50 ft.

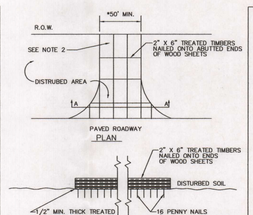
The treated timber planks shall be attached to the railroad ties with 1/2" x 6" min. lag bolts. Other fasteners may be used as approved by the Engineer.

The treated timber planks shall be #2 grade min. and should be free of large loose knots.

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

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

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

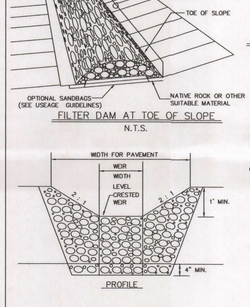


CONSTRUCTION EXIT (TYPE 3)

N.T.S.

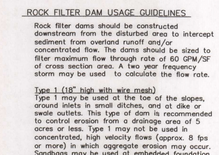
GENERAL NOTES:

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



FILTER DAM AT TOE OF SLOPE

N.T.S.



ROCK FILTER DAM USAGE GUIDELINES

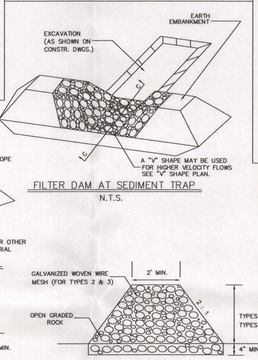
Rock filter dams should be constructed downstream from the disturbed area to intercept sediment from overland runoff and/or concentrated flow. The dams should be sized to filter maximum flow through rate of 60 GPM/SF of cross section area. A two year frequency storm may be used to calculate the flow rate.

Type 1 (18" high with wire mesh)
Type 1 may be used at the toe of the slopes, around inlets in small ditches, and at dike or swale outlets. This type of dam is recommended to control erosion from a drainage area of 5 acres or less. Type 1 may not be used in concentrated, high velocity flows (approx. 8 fps or more) in which aggregate erosion may occur. Sandbags may be used at embedded foundation (4" deep min.) for better filtering efficiency of low flows id called for on the plans or directed by the Engineer.

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

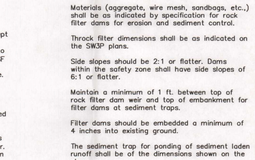
Type 3 (36" high with wire mesh)
Type 3 may be used in stream flow and should be secured in the stream bed.

Type 4 (Sack Gabions)
Type 4 may be used in ditches and in smaller channels to form and erosion control dam.



FILTER DAM AT SEDIMENT TRAP

N.T.S.



SECTION C–C

GENERAL NOTES:

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.

Materials (aggregate, wire mesh, sandbags, etc.) shall be as indicated by specification for rock filter dams for erosion and sediment control.

Throck filter dimensions shall be as indicated on the SWQP plans.

Side slopes should be 2:1 or flatter. Dams within the safety zone shall have side slopes of 6:1 or flatter.

Maintain a minimum of 1 ft. between top of rock filter dam weir and top of embankment for filter dams at sediment traps.

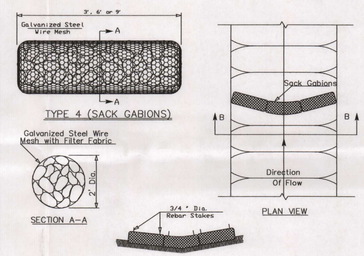
Filter dams should be embedded a minimum of 4 inches into existing ground.

The sediment trap for ponding of sediment laden runoff shall be of the dimensions shown on the plans.

Rock filter dams types 2 & 3 shall be secure with 20 gauge galvanized woven wire mesh with 1" diameter hexagonal openings. The aggregate shall be placed on the mesh to the heights and slopes and specified. The aggregate and tightly secured to itself on the downstream side using wire ties or hog rings. The mesh should be secured or staked to the stream bed prior to aggregate placement.

Sack gabions should be staked down with 3/4" dia. rebar stakes.

Flow outlet should be onto a stabilized area (vegetation, rock, etc.)



GENERAL NOTES:

- The top of the sack gabions should be level and oriented perpendicular to the direction of flow.
- Filter fabric material shall be fastened to woven wire support.
- Filter fabric material should meet the following specifications:
  Resistant to ultraviolet light, Fabric should be non–woven geotextile with minimum weight of 3.5 ounces per square yard, minimum mullen burst strength of 200 pounds per square inch and a flow through rate of 120 gallons per minute per square foot of frontal area.
- Stone size: ±4"–8" open graded crushed limestone.
- Inspect weekly or after each rainfall event and repair or replace as needed
- When silt reaches a depth of 6 inches or more above natural ground, silt shall be removed and disposed in an approved manner that will not contribute to resitlation. Contaminated sediment must be removed and disposed of off–site in accordance with applicable regulations.
- Remove sack gabions after construction site is completely stabilized.

INSTALLATION:

- Layout the perpendicular to flow direction.
- Clear the area of debris, rocks or plants that will interfere with installation.
- Place wire mesh and filter fabric on the ground along the proposed installation with enough overlap to completely encircle the finished size of the berm.
- Place the rock along the center of the woven wire mesh taking care not to damage the filter fabric.
- Wrap the structure with the previously placed woven wire mesh secure enough so that when walked across the structure retains it's shape.
- Secure with tie wire.

MATERIALS:

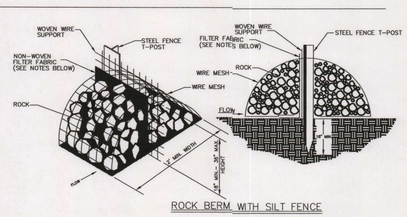
- Synthetic filter fabric should contain ultraviolet ray inhibitors and stabilizers to provide a minimum of 70% strength retained after 500 hours.
- Burlap of 10 ounces per square yard of fabric may also be used.
- The filter fabric should be purchased in continuous rolls to minimize joints.
- Woven wire support sheathing shall be a minimum 20 gauge with 1 inch openings.

MAINTENANCE:

- Inspect regularly and after every storm. Make any repairs necessary to ensure the sack gabions are in good working order.
- Sediment should be removed and the structure restored to its original dimensions when sediment has accumulated to a depth of 6".
- Clean or remove and replace the stone filter or filter fabric if they become clogged.
- Sack Gabions should remain in place and operational until the drainage area is stabilized.

GENERAL NOTES

1. Do not disturb vegetated areas (trees, grass, weeds, brush, etc.) any more than necessary for construction.
2. Construction entrance/exit location and concrete washout pit to be determined in the field.
3. Storm Water Pollution Prevention Controls may need to be modified in the field to accomplish the desired effect.
4. Restrict entry/exit to the project site to designated locations by use of adequate fencing, if necessary.
5. All Storm Water Pollution Prevention Controls are to be maintained and in working conditions at all times.
6. Storm water pollution prevention structures should be constructed within the site boundaries.
7. As soon as practical, all disturbed soil that will not be covered by impervious cover such as house slab, sidewalks, and driveway will be stabilized.
8. This is a performance based plan. Actual field conditions may require different placement of erosion control measures. Contractor will be responsible for proper placement of erosion control devices to prevent contamination from leaving the construction site.



ROCK BERM WITH SILT FENCE

GENERAL NOTES:

- The top of the rock berm should be level and oriented perpendicular to the direction of flow.
- Steel fence T–posts should be embedded a minimum of 18 inches.
- Woven wire support shall be fastened to steel fence posts.
- Filter fabric material shall be fastened to woven wire support.
- Filter fabric material should meet the following specifications:
  Resistant to ultraviolet light, Fabric should be non–woven geotextile with minimum weight of 3.5 ounces per square yard, minimum mullen burst strength of 200 pounds per square inch and a flow through rate of 120 gallons per minute per square foot of frontal area.
- Stone size: ±3"–5" open graded crushed limestone.
- Inspect weekly or after each rainfall event and repair or replace as needed
- When silt reaches a depth of 6 inches or more above natural ground, silt shall be removed and disposed in an approved manner that will not contribute to resitlation. Uncontaminated sediment deposits remaining in place after the filter fence has been removed should be dressed to conform with the existing grade and stabilized. Contaminated sediment must be removed and disposed of off–site in accordance with applicable regulations.
- Remove silt fence/rock berm after construction site is completely stabilized.

INSTALLATION:

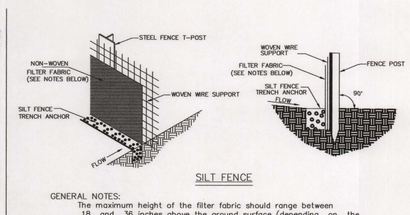
- Layout the rock berm following the contour as closely as possible.
- Clear the area of debris, rocks or plants that will interfere with installation.
- Place wire mesh on the ground along the proposed installation with enough overlap to completely encircle the finished size of the berm.
- Install the silt fence (stem–t posts, woven wire support, and filter fabric) along the center of the proposed berm placement.
- Place the rock along the center of the woven wire mesh on both sides of the silt fence to the designated height.
- Wrap the structure with the previously placed woven wire mesh secure enough so that when walked across the structure retains it's shape.
- Secure with tie wire.

MATERIALS:

- Synthetic filter fabric should contain ultraviolet ray inhibitors and stabilizers to provide a minimum of 70% strength retained after 500 hours.
- Burlap of 10 ounces per square yard of fabric may also be used.
- The filter fabric should be purchased in continuous rolls to minimize joints.
- Woven wire support sheathing shall be a minimum 20 gauge with 1 inch openings.

MAINTENANCE:

- Inspect regularly and after every storm. Make any repairs necessary to ensure the rock berm is in good working order.
- Sediment should be removed and the structure restored to its original dimensions when sediment has accumulated to a depth of 6".
- Clean or remove and replace the stone filter or filter fabric if they become clogged.
- Rock berm should remain in place and operational until the drainage area is stabilized.



SILT FENCE

GENERAL NOTES:

The maximum height of the filter fabric should range between 18 and 36 inches above the ground surface (depending on the amount of upslope ponding expected).

Posts should be spaced 8 to 10 feet apart when a woven wire support fence is used and not more than 6 feet apart when extra strength filter fabric (without a woven wire support fence) is used. The posts should be embedded a minimum of 18 inches.

A trench should be excavated 4 to 8 inches wide and 4 to 12 inches deep along the upslope side of the line of posts.

If standard strength filter fabric is to be used, the optional woven wire support fence should be fastened to the upslope side of the posts. Extend the woven wire support to the bottom of the trench. The filter fabric should be fastened using 4 evenly spaced staples or T–clips to the woven wire support fence, and 8 to 20 inches of the fabric should extend into the trench.

Extra strength filter fabric does not require a woven wire support fence. Fastened the filter fabric directly to the posts and extend 8 to 20 inches of the fabric into the trench.

Where joints in the filter fabric are required, the filter fabric should be spliced together only at a support post, with a minimum 6–inch overlap and securely sealed.

Do not attach filter fabric to trees.

Backfill the anchor trench with compacted soil or 0.75 inch minimum diameter gravel placed over the filter fabric.

Remove silt fence when the construction site is completely stabilized.

Inspect silt fences daily during periods of prolonged rainfall, immediately after each rainfall event, and weekly during periods of no rainfall. Make any required repairs immediately.

- Sediment must be removed when it reaches a depth of 6". Take care to avoid damaging the fence during cleanout.
- Silt fences should not be removed until the upslope area has been permanently stabilized. Contaminated sediment deposits must be removed and disposed of off–site in accordance with applicable regulations. Uncontaminated sediment deposits remaining in place after the silt fence has been removed should be dressed to conform with the existing grade, and stabilized.
- Place silt fence along a line of uniform elevation, perpendicular to the direction of flow.

MATERIALS:

- Fence posts ma be either 4' min. steel or wood posts spaced at 6' to 8'. Softwood shall be 3" min. dia. or nominal 2" x 4". Hard wood posts shall have a min. cross section 1.5" x 1.5".
- Synthetic filter fabric should be a pervious sheet of polypropylene, nylon, polyester, or polyethylene yarn conforming to the requirements below:

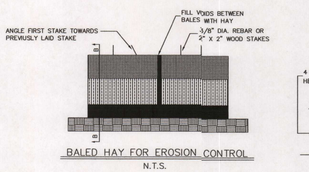
SYNTHETIC FILTER FABRIC REQUIREMENTS

Physical Property	Requirements
Minimum Weight	3.5 ounces per square yard (ASTM 3776–84)
Min. Mullen Burst Strength	200 lbs per square inch (ASTM 3786–87)
Maximum flow through rate	100 GPM/SF of frontal area (ASTM 4491–85)

- Burlap of 10 ounces per square yard of fabric can also be used.
- The filter fabric should be purchased in continuous rolls to minimize joints.

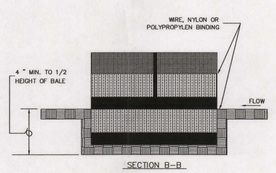
MAINTENANCE:

- Inspect regularly and after every storm. Make any repairs necessary to ensure the measure is in good working order.
- Sediment should be removed and the structure restored to its original dimensions when sediment has accumulated to a depth of 6".
- Clean or remove and replace the stone filter or filter fabric if they become clogged.
- Inlet protection should remain in place and operational until the drainage area is stabilized.

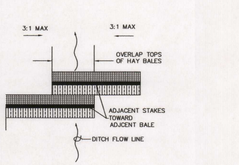


BALED HAY FOR EROSION CONTROL

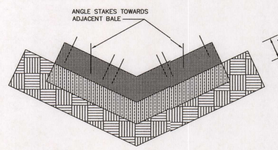
N.T.S.



SECTION B–B



PLAN VIEW



PROFILE VIEW

BALED HAY USAGE GUIDELINES

GENERAL NOTES:

Hay bales shall be a minimum of 30" in length and weigh a minimum of 50 pounds.

Hay bales shall be bound by either wire or nylon or polypropylene string. The bales shall be composed entirely of vegetable matter.

Hay bales shall be embedded in soil a minimum of 4" and where possible 1/2 the height of the bale.

Hay bales shall be placed in a row with ends tightly abutting adjacent bales. The bales shall be placed with bindings parallel to the ground.

Hay bales shall be securely anchored in placed with 3/8" dia. rebar or 2" x 2" wood stakes driven throught the bales. The first stake shall be angled towards the previously laid bale to fence the bales together.

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

Where the runoff approaching the baled hay the slope of the disturbed soil shall not exceed 10% and the length of the slope upstream of the hay bale should be less than 50'.

Where the installation will be required for less than three months.

Where the contributing drainage area is less than 1/2 acre.

For baled hay installations in small ditches, the additional following considerations apply.

The ditch side slopes shall be graded as flow as possible to maximize the drainage flow rate thru the hay.

The ditch shall be graded large enough to contain overlapping drainage when sediment has filled to the top of the bailed hay.

Bales should be replaced usually every 2 monthes or more often durning wet weather when loss of sturctural integrity is accerated.

TORRES ENGINEERING P.C.
TBPE FIRM # F-13692
5503 GRISSOM RD. STE. 101 (210) 680-0808
SAN ANTONIO, TEXAS 78238

DATE: OCT. 14, 2014
DESIGNED BY:
DRAWN BY:
CHECKED BY:
SCALE: 1" 20'
FILE NAME:

REVISIONS

NO.	DATE	DESCRIPTION	BY

SEDIMENTAION DETAIL PLANS FOR BULVERDE RETAIL CENTER 2925 BULVERDE RD BULVERDE, TEXAS

RECEIVED
FEB 04 2015
By

SEDIMENTATION

SHEET 7 OF 9

AREA (ACRES ±)	DISRUPTION (% OF TOTAL AREA ±)	CONSTRUCTION	
		ESTIMATED START	ESTIMATED COMPLETE
1.978	1.566	3/2/15	7/2/15

D. RUNOFF COEFFICIENT

Estimated runoff coefficients for the site, illustrating the change in the anticipated storm water runoff as a result of the construction on the subject property, are as follows:

AREA (ACRES ±)	RUNOFF COEFFICIENT	
	BEFORE	AFTER
1.978	52	48

E. SITE PLANS

Site plans reflecting the topography of the project are included in the project construction plans

F. RECEIVING WATERS

This project will discharge storm water into Bulverde Rd located the northwest corner of the intersection between Bulverde Rd and Saddle Ridge Rd.

G. ENDANGERED SPECIES

There are no known listed endangered or threatened species, or critical habitat known to be on or in proximity to the development site.

MAINTENANCE

Structural controls shall be inspected as stipulated in this plan. Structural units shall be maintained to perform the function as intended. When a structure deteriorates to a condition so that its performance is less than intended, the structure shall be repaired or replaced to full function as specified.

- Particular attention should be paid to the sedimentation areas behind silt fences. When the sediment has accumulated to six inches or more behind a berm or silt fence (from silting, construction debris, tree trimming, trash, municipal type garbage, etc.) it will be removed and the berms and silt fences will be restored to their original specifications. Contaminated sediment removed from containment areas (vehicle maintenance, concrete wash out pits, etc.) shall be disposed of off-site in accordance with appropriate regulations.

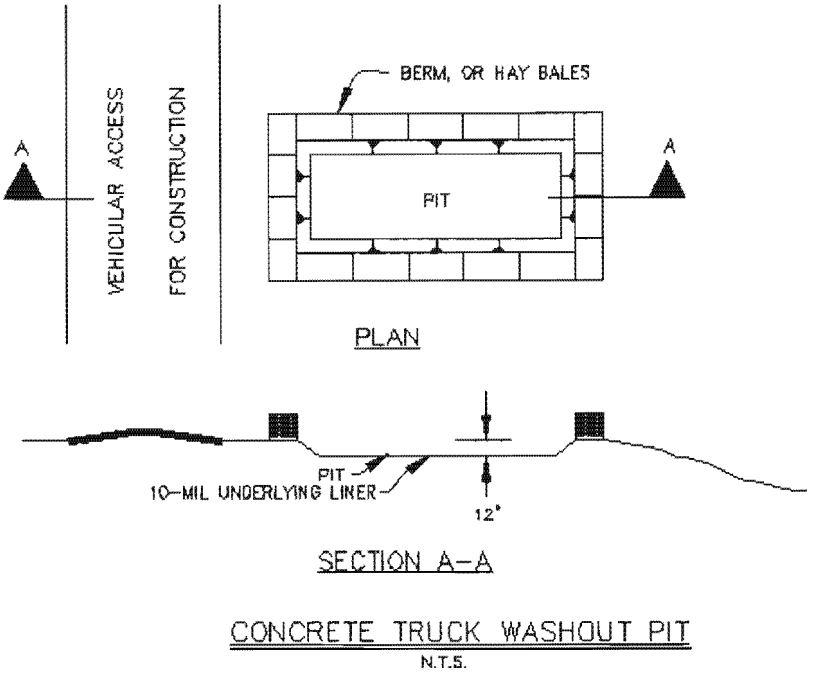
- Exhibit 10 lists the various major components of this pollution prevention plan and identifies the party responsible for its function, maintenance and inspections. A plan Implementation Checklist is included as Exhibit 11.

INSPECTIONS

Designated and qualified person(s) shall inspect Pollution Control Measures once a week and all rain events. An inspection report that summarized the scope of the inspection, names and qualifications of personnel conducting the inspection, date of inspection, major observations and actions taken as a result of the inspection shall be recorded and maintained as part of Storm Water NPDES data for a period of three (3) years after the date of the inspection. A copy of the Inspection Report Form is provided in this Storm Water Pollution Plan.

As a minimum, the inspector shall observe: (1) significant disturbed areas for evidence of erosion, (2) storage areas for evidence of leakage from the exposed

E. CONCRETE WASHOUT (Exhibit 5)



CONCRETE TRUCK WASHOUT PIT
N.T.S.

Notes:

(1) The detail above illustrates minimum dimensions. The pit can be increased in size depending on expected frequency of use.

(2) If hay bales are used for berm, they shall be anchored in place with two rebars per bale, driven into the ground for enough to provide reasonable stability.

(3) Washout Pit shall be located in an area easily accessible to construction traffic

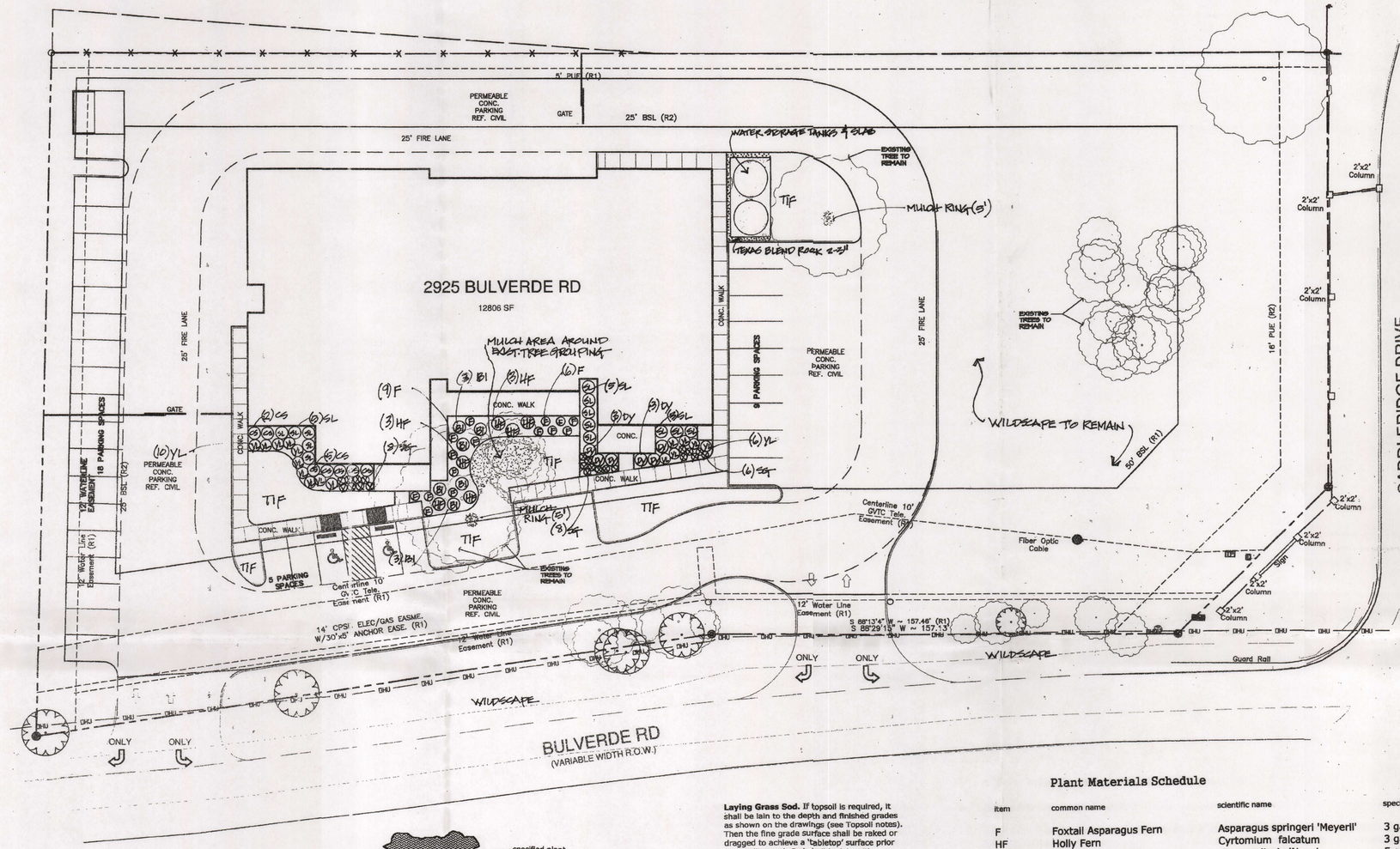
(4) Washout Pit shall not be located in an are subject to inundation from storm water runoff.

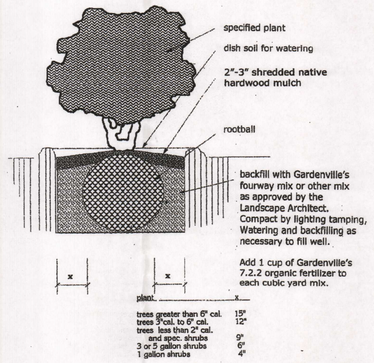
(5) Pit shall not be located over or in the immediate vicinity of a feature of groundwater recharge.

(6) Washout pit shall be constructed with a 10-mill underlying liner.

RECEIVED
FEB 04 2015
BY

ACACIA ALDC





Typical Plant Installation
Not to Scale

Laying Grass Sod. If topsoil is required, it shall be lain to the depth and finished grades as shown on the drawings (see Topsoil notes). Then the fine grade surface shall be raked or dragged to achieve a 'tabletop' surface prior to installing sod. Sod shall be lain with off-setting joints and shall completely cover all grass areas. All sod shall be watered immediately after installation and maintained in a healthy, vigorous growth state until accepted. All sod shall be placed the day of delivery. No sod remaining on pallets or otherwise left un-installed or un-watered over 24 hours will be accepted. Sod shall be rolled with an acceptable roller a minimum of one time and as often as needed to achieve a smooth acceptable lawn. Any dry or dead patches shall be removed and replaced immediately. Where breaks, un-level areas, or open joints occur, fine grain washed sand shall be used to top-dress the lawn surface.

Maintenance of Installed Plantings:

All installed plant materials (trees, shrubs, groundcovers, perennials, florals, grass, etc.) shall be maintained by the landscape contractor until accepted by the Owner. Maintenance shall include watering, weeding, fertilizing, pruning, etc. At the time of final acceptance, all plant materials shall be alive, in a healthy state of growth and meeting size requirements as specified on the drawings as well as normal horticultural practice standards. Any diseased, dead or partially dead plants shall be immediately replaced. All plantings shall be guaranteed for one year from the date of final acceptance.

Plant Materials Schedule

item	common name	scientific name	specifications
F	Foxtail Asparagus Fern	Asparagus springeri 'Meyerii'	3 gal
HF	Holly Fern	Cyrtomium falcatum	3 gal
DY	Dwarf Yaupon Holly	Ilex vomitoria 'Nana'	5 gal
YL	New Gold Yellow Lantana	Lantana species 'New Gold'	3 gal
CS	Compact Senisa	Leucophyllum frutescens 'Compact'	5 gal
BI	Butterfly Iris	Moraea tridoides	5 gal
CS	Mexican Bush Sage	Salvia Leucantha	3 gal
☒ SG	Society Garlic	Tulbaghia violacea	1 gal
TIF	TIF 419 Bermuda Sod	Cynadon dadylon TIF 419	Solid Sod

Install 4" Bendable Steel Edging between all turf and beds; Install 1/2" above finished grade

(NOTE:) Ensure landscaped areas receiving treatment and irrigation coverage have a minimum of 12 inches of soil in place after landscape and irrigation installation. The area receiving Water Storage Tank System irrigation per Section 9 is native wildscape and receives no special soil treatment and is left undisturbed

ACACIA ALDC
FAX:210-494-7744
210-863-7744
DOUGLAS E. SMITH
-BS LANDSCAPE ARCHITECTURE
-BS AGRONOMY/PLANT GENETICS
-MS HORTICULTURE
-TEXAS LICENSED IRRIGATOR #6018

Landscape Plan
SCALE : 1" = 20'-0"

TRUE NORTH PLAN NORTH

811
Call before you dig!
Call 811

STATE OF TEXAS
PETER B. OLPERS
487
REGISTERED LANDSCAPE ARCHITECT
11/19/14

L-1.1
Landscape Plan

RECEIVED
FEB 0 4 2015
By

15,500 Total Capacity Plastic Water Storage Tanks—total capacity accomplished by placing two Plastic-Mart 7,750 gallon plastic tanks side by side on a poured in place concrete slab. The model number for these tanks is N 44121 and they are available at *plastic-mart.com*. A Lancaster 2 HP Centrifugal Two Stage End Suction Pump, Part # 3-2L97 (or similar) is required as well as a Pump Start Relay for the Booster Pump. The Lancaster pump is available from *raintankdepot.com*. A Hunter Pro XC 400 Controller is required to operate this system, (mounted with the Hunter 15 station Pro-C controller used for the main irrigation system as shown) as well. The Schedule 40 2" PVC Mainline for this system will be routed to a Hunter Series PGV Electric Valve in a box. Rigid Class 200 1 ½" Lateral lines to the four Hunter PGP Rotors set to provide water for the unimproved 'wildscape' area as well as the large remaining tree cluster as shown on the plan

Sprinkler Heads & Valves Data:

Pop-up Spray Heads: Hunter Pro-S Series Pop-up Spray
(4" for turf, 12" for beds and shrubs)(acceptable alternates: Toro 570, Rainbird 1800, Weathermatic LX) (all MPR)

ARC	target PSI	15' nozzle	12' nozzle	10' nozzle	8' nozzle	5' nozzle	17' nozzle
360°	40 psi	4.0 gpm ( )	2.35 gpm (12)	1.6 gpm (10)	1.1 gpm (8)	0.5 gpm (5)	5.5 gpm (17)
270°	40 psi	3.0 gpm ( )	1.7 gpm (12)	1.2 gpm (10)	0.9 gpm (8)	0.35 gpm (5)	4.1 gpm (17)
240°	40 psi	2.7 gpm ( )	1.65 gpm (12)	1.1 gpm (10)	0.8 gpm (8)	0.3 gpm (5)	3.7 gpm (17)
180°	40 psi	2.0 gpm ( )	1.3 gpm (12)	1.0 gpm (10)	0.6 gpm (8)	0.25 gpm (5)	2.8 gpm (17)
120°	40 psi	1.3 gpm ( )	0.9 gpm (12)	0.7 gpm (10)	0.4 gpm (8)	0.2 gpm (5)	1.8 gpm (17)
90°	40 psi	1.0 gpm ( )	0.6 gpm (12)	0.5 gpm (10)	0.2 gpm (8)	0.1 gpm (5)	1.4 gpm (17)
end strip	40 psi	0.5 gpm (es)					
center strip	40 psi	1.0 gpm (cs)					
wide strip	40 psi	1.4 gpm (ws)					

( ) - designates marking on plan

Bubblers: Hunter PCN nozzle in PRO-S body
(acceptable alternates: Toro PB nozzles in 570 body, Rainbird 1400 nozzle in 1800 body, Weathermatic 102 nozzle in LX body)
360° 40 psi 1.0 gpm

Rotors: 1/20 – 3.0 nozzle – 3.0 gpm at 40 PSI
3000 MP Rotators: 90° @ 40 PSI – 0.9 gpm; 180° @ 40 PSI – 1.8 gpm

Electric Valves: Hunter PGV Series

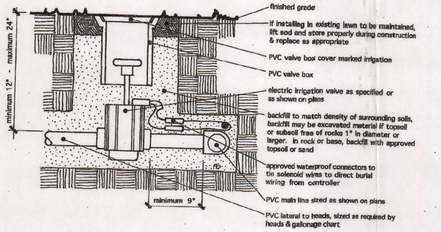
0.1 gpm to 17.5 gpm 1" valve
17.6 gpm to 40.0 gpm 1 1/2" valve
40.1 gpm to 60.0 gpm 2" valve
60.1 gpm + 3" valve

Piping Size Requirements: (based on Class 200)

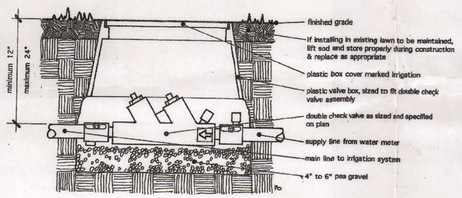
no 1/2" laterals allowed

0.1 gpm to 6.0 gpm	3/4" PVC
6.1 gpm to 10.0 gpm	1" PVC
10.1 gpm to 20.0 gpm	1 1/4" PVC
20.1 gpm to 30.0 gpm	1 1/2" PVC
30.1 gpm to 50.0 gpm	2" PVC
50.1 gpm to 75.0 gpm	2 1/2" PVC
75.1 gpm +	3" PVC

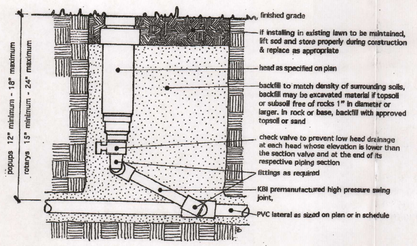
Special Spray Head Performance Note: In areas where normal spray from a pop-up will pass more than 6" beyond the leading edge of a curb, walk, etc., the adjustment screw on the nozzle top shall be adjusted to cut back the spray as required.



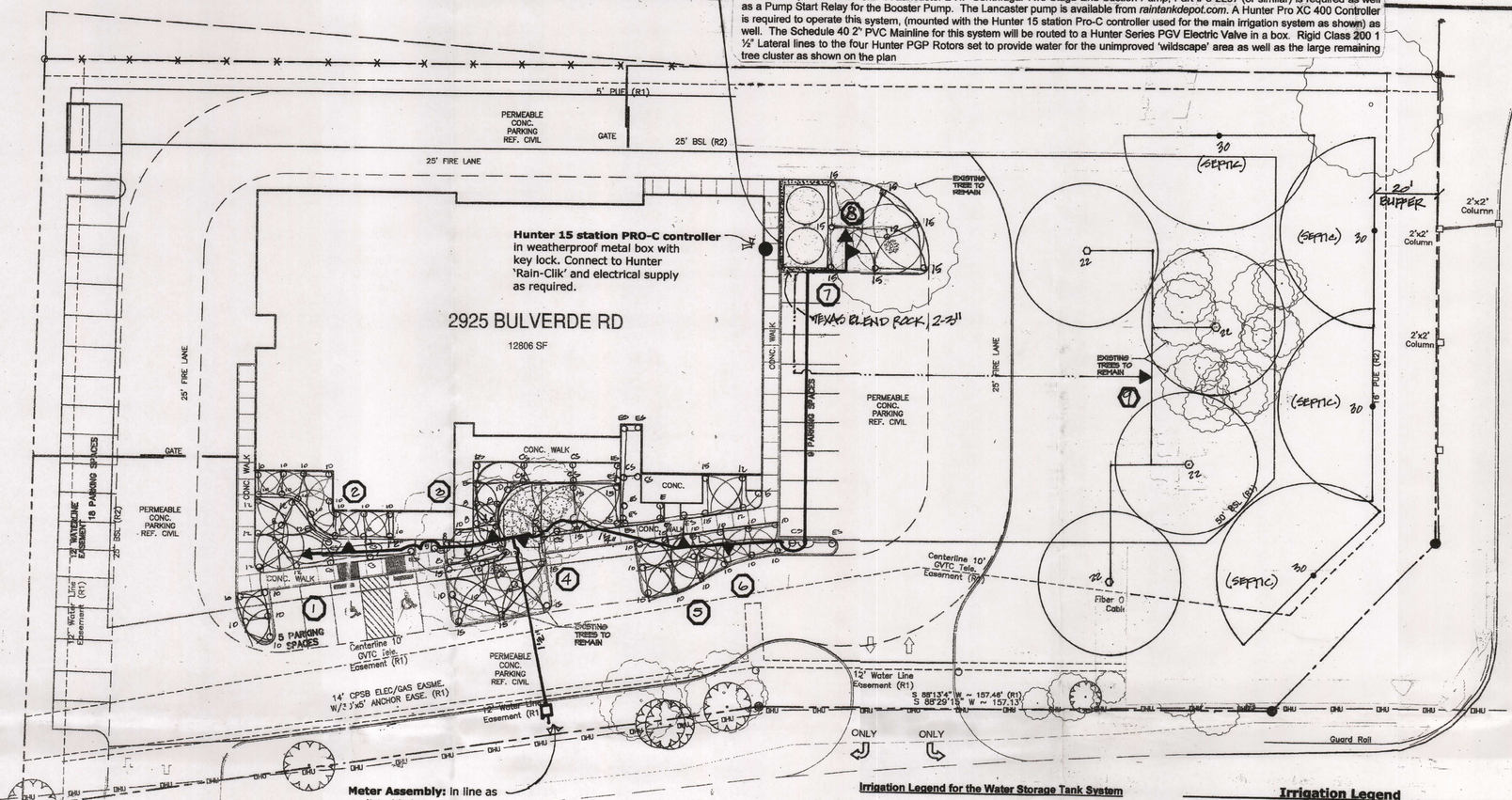
Typical Electric Valve Installation
Not to Scale



Double Check Valve In Box
Not to Scale



Typical Head Installation
(with check valve where required)
Not to Scale



Meter Assembly: In line as listed below

1) ¾" water meter
2) ¾" pressure reducing valve (if required)
3) strainer (cleanable)
4) ¾" double check valve
5) 1" master valve

(NOTE:) Ensure landscaped areas receiving treatment and irrigation coverage have a minimum of 12 inches of soil in place after landscape and irrigation installation. The area receiving Water Storage Tank System irrigation per Section 9 is native wildscape and receives no special soil treatment and is left undisturbed

Irrigation Installation Notes:

1. The contractor shall install an **electric controller** as identified on the plan. The controller shall be mounted between 42" and 54" above finished grade, in a waterproof box with keylock (if exterior mounted), and shall be direct wired to all valves, master valve, and electrical supply as required. Unless otherwise indicated on the plan, the controller shall be solid state, controllable between 1 minute and 60 minutes per station, and shall have an adequate number of stations to operate all lateral lines and the master valve. The controller shall be compatible to the rainstat and any other supplemental controls.
2. The controller shall be connected to a **rainstat** override system which will skip the watering cycle whenever adequate rain has occurred. The rainstat shall be exterior mounted as near as possible to the controller, and in a location where overhead obstructions such as trees, building overhangs, signs, etc. will not affect performance. Typical mounting will be at the eave edge.
3. All **water pipe** shall be rigid PVC class 200 or better as noted on the plans. All **sleeves** shall be Schedule 40 rigid PVC and a minimum of 4".
4. Except where required as a component in the installation of a riser, **no ¼" pipe** will be allowed.
5. All pipe shall have a **minimum cover** of ten inches (10").
6. All irrigation parts/components will be **new equipment** at the time of installation and will conform to the latest specifications and catalog of the respective manufacturer.
7. Each lateral shall have its lowest head in elevation equipped with a **low head drainage check valve,** either externally mounted on the sprinkler or internal (SAM type).
8. **Backfill** material will be free of rocks greater than 1" in diameter, trash, and other debris. Backfilling will be completed in a manner to compensate for soil settling, and the top 4" of backfill in landscape areas shall be approved topsoil or soil mix to match final landscape plan requirements. Where lined are installed in existing lawns, sod cover shall be neatly removed prior to ditching, stockpiled in an appropriate manner, and replaced after backfilling and compaction is completed.
9. The contractor shall be responsible for **removing** all debris, spoil, etc. and for properly **disposing of** off site.
10. The irrigation contractor shall be responsible for **securing any and all construction permits** (if not secured by a general contractor) and shall be responsible for securing all inspections and approvals by appropriate governing bodies.
11. All connections to domestic water systems **(water meters)** shall be made by appropriately licensed and certified individuals. A Licensed Irrigator shall oversee all installation. At the completion of installation, the same Licensed Irrigator who oversaw installation shall be responsible for any certifications to governmental agencies or other appropriate groups.
12. After completion, the system shall be subjected to a **72 hour pressure test.** All leaks and other problems shall be corrected immediately.
13. All sprinkler heads shall be installed a **minimum of 4" away** from all curbs, walks, and other appurtenances.
14. All trenching/digging within the **Root Protection Zone (RPZ)** of existing trees as identified by governmental agencies and counted as trees to be saved shall be completed by hand digging. No tree roots larger than 1" in diameter shall be cut, and any marred or damaged roots shall be treated with an approved pruning paint.
15. The contractor shall be responsible for verifying the location of all other **underground utilities** and shall protect such utilities from damage, etc.

Sprinkler Irrigation Component Parts List

Sprinkler Heads:
Pop-up Spray Heads select from following – Matched Precipitation Rates (MPR):
Hunter I-NST Series — Toro 570 Series, MPR nozzles
Weathermatic LX Series, MPR

Bubblers (select from following):
Hunter PCN nozzle in PRO-S body — Toro PB nozzles in 570 body
Weathermatic 102 nozzle in LX body

Small Radius Rotary Heads:
Hunter Series I-10/I-20 rotary

Check Valve or Valve In Head (must install a minimum of one per each lateral):
select from the following:
Irritrol SLCV Check Valve — Rainbird 1800-SAM-PRS
Toro 570 Series, Check-o-matic — Hunter I Spray – CV

Electric Valves, except Master Valve: select from following:
Hunter PGV valves with ICD decoders with surge arrestors

Master Valves: select from following:
Irritrol 700 Series — Hunter ICV Series

Double Check Valve Assemblies: select from following:
Conbraco Series 40-100 for ¾" to 4"
Febco Master Series 850 for ¾" to 6"

Piping (White for normal applications, purple for reclaimed water):
Mains: Schedule 40 PVC for ¾" to 2 ½", Class 200 for 3" and greater.
Laterals: Solvent weld for ¾" to 2 ½", solvent weld or ring-tite for 3" and greater
Class 200, solvent weld for ¾" to 2 ½", solvent weld or ring-tite for 3" and greater
Fittings: a working pressure equal to or greater than the required pipe
Solvent: compatible to the pipe used

Swing Joints: select from following:
KBI swing joint — Hunter SJ Series

Wiring: to be Hunter 10 wire, model 2 MM (2)(14 AWG) standard decoder cable up to 10,000 ft.
model 3.3 MM (2) long range heavy-duty decoder cable over 10,000 ft.
install grounding poles to wires not to exceed every 300' on center

Wire Nuts and Waterproof Connectors:
Wire nuts to be Type UF and approved for ground mount in " Jon systems
Waterproof connectors to be by 3M, Kings

Valve Boxes: select from following:
For electric valves, in-line valves, etc. -
Amistek Economy Turf Box — DFW Model D-109
For double check valve assemblies and other large valves/meters
Amistek Meter Box — DFW Model D-1300 or D-1800

Controllers: as specified on plans

Irrigation Legend for the Water Storage Tank System

Schedule 40 2" PVC Mainline
Rigid Class 200 1 ½" PVC Lateral Lines
Hunter Series PGV Electric Valve in box
Hunter Series PGP ADJ Rotors (set at 22'r)

Lateral Lines Data:

section	valve size	gpm	heads	½ coverage
9	1"	16 gpm	rotors	22 minutes

(NOTE :) Section 9 only waters a wildscape area and an existing tree cluster. Only water from the storage tank system is used in Section 9, not potable water from the main irrigation system. Rain water must be held in the storage tanks a minimum of twelve hours prior to being used as irrigation water for Section 9

(NOTE :) Gutter connections, screening, filtration, clean-outs/drainage are shown on Detail 1. Non-potable water markings will be placed four times on each tank at the cardinal points 3' above the ground as well as smaller stickers stating the same on exposed pipes and at the discharge point from the tank into the pump as well as on the pipe leading to the buried Section 9

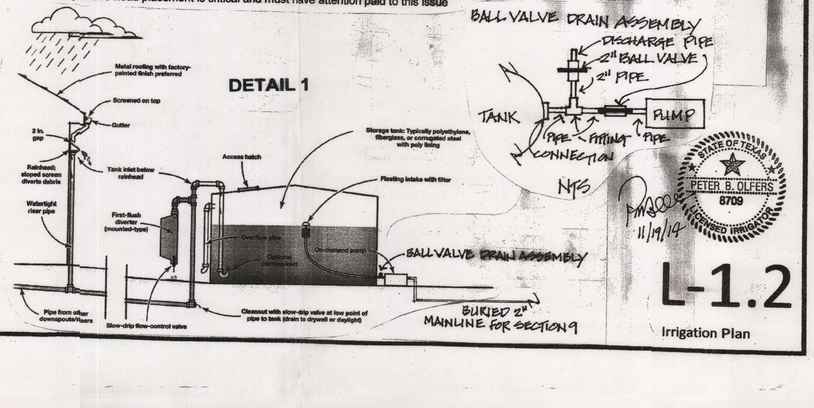
(NOTE:) Ensure final placement of the septic heads as well as the final placement of the four Section 9 rotors are placed approximately per plan. There must be NO OVER-SPRAY between the two zones. Placement shown of the plan will accomplish this, however, positive head placement is critical and must have attention paid to this issue

Irrigation Legend

Schedule 40 PVC Mainline
Rigid Class 200 PVC Lateral
Hunter Series PROS series(6" & 12")* Pop-up
Hunter Series PGV Electric Valve in Box
(*6" pop-up in grass, 12" pop-up in beds)

Lateral Lines Data:

section	valve size	gpm	heads	1/2" coverage
1	1"	15.0 gpm	sprays	22 minutes
2	1"	11.6 gpm	sprays	22 minutes
3	1"	12.2 gpm	sprays	22 minutes
4	1"	15.6 gpm	sprays	22 minutes
5	1"	9.3 gpm	sprays	22 minutes
6	1"	14.4 gpm	sprays	22 minutes
7	1"	11.4 gpm	sprays	22 minutes
8	1"	10.0 gpm	sprays	22 minutes



ACACIA ALDC
FAX:210-494-7744
210-863-7744
DOUGLAS E. SMITH
-BS LANDSCAPE ARCHITECTURE
-BS AGRONOMY/PLANT GENETICS
-MS HORTICULTURE
-TEXAS LICENSED IRRIGATOR #6018

811 Call before you dig! Call 811

Irrigation Plan
SCALE : 1" = 20'-0"

TRUE NORTH PLAN NORTH

STATE OF TEXAS
PETER B. OLFERS
8709
LICENSED IRRIGATOR
11/19/14

L-1.2
Irrigation Plan

VICKREY & ASSOCIATES, Inc.
CONSULTING ENGINEERS

RECEIVED TCEQ
SAN ANTONIO
REGION
2015 FEB 27 PM 4:07

February 26, 2015

RECEIVED
MAR 04 2015
COUNTY ENGINEER

Texas Commission on Environmental Quality
Edwards Aquifer Protection Program
Attn.: Mr. Neal Denton
14250 Judson Road
San Antonio, Texas 78233

V&A No. 2540-001

RE: Brookshire Brothers at Canyon Lake, NW Corner of Canyon Park Road and FM 306, Canyon Lake, Texas
Investigation No. 1217087, Regulated Entity No. RN107915225, Additional ID No. 13-14122302
Response to Comments dated February 13, 2014

Dear Mr. Denton:

This letter is to provide an item-by-item response to Texas Commission on Environmental Quality (TCEQ) comments for the above referenced project.

1. The Contributing Zone Plan (CZP) and the plan sheets indicate the site is 6.04 acres. A deed confirming this is attached to this letter.
2. Attachment K of the CZP has been updated to indicate that the sand filter basin will convey water to Canyon Lake and ultimately to the Guadalupe River.
3. The Inspection, Maintenance, Repair, and Retrofit Plan has been signed by the owner.
4. Per item #51 of the CZP Application Form, a discussion of record keeping procedures has been added to the Inspection, Maintenance, Repair, and Retrofit Plan.
5. Per TCEQ Regulatory Guidance 348 (RG-348) the Inspection, Maintenance, Repair, and Retrofit Plan has been updated to include instructions for the underdrain piping network in sand filter systems.
6. The Inspection, Maintenance, Repair, and Retrofit Plan has been updated to state that procedures may not be altered without approval by the TCEQ.
7. The notes indicating that encountered geologic features must be reported to the TCEQ have been removed from the construction notes on sheet C0.02.
8. The Site Plan on sheet C1.03 of the plan set has been updated to satisfy the requirements of 30 TAC §213.24(1)(B) regarding the 100-year floodplain boundary, the approximate slopes anticipated after major grading activities, the areas of soil disturbance and areas that will not be disturbed, and the locations where stabilization practices are expected to occur.
9. The storm water pollution prevention plan (SWPPP) has been revised to include only controls identified in the site plan.
10. The Proposed Drainage Plan shown on sheet C1.07 has been updated to include the pre-construction runoff coefficients.
11. The SWPPP has been updated to include a discussion of the actual measures that will be used when a hydrocarbon or hazardous substance spill occurs.

Texas Board of Professional Engineers Registration #F-159
© 2015 Vickrey & Associates, Inc.

1717 West 6th Street, Suite 260 • Austin, Texas 78703 • Phone 512-494-8014 • Fax 512-494-8054
12940 Country Parkway • San Antonio, Texas 78216 • Phone • 210-349-3271 • Fax 210-349-2561

12. The Erosion and Sedimentation (E&S) Control Plan on sheet C1.08 has been updated to include the location of the concrete washout container with a detail showing its design.
13. The reference in the sequence of construction activities in the CZP to the use of a sand filter basin as a sediment control measuring during construction activities has been removed.
14. Maintenance and review guidelines for the rock berms and flow spreaders have been added to the CZP.
15. The Drainage Plan on sheet C1.07 and the Site Plan on sheet C1.03 have been revised to show the correct configuration of Drainage areas A and L.
16. Item # 6 of the TSS Removal Calculations in the CZP has been updated to include the off-site contributing area.
17. Item # 12 of the CZP Application Form has been revised to show the actual proposed impervious cover
18. The calculations in item # 2 and item # 4 of the TSS Removal Calculations in the CZP have been revised to indicate the actual proposed impervious cover within the drainage basin for the BMP.
19. The TSS Removal Calculations in the CZP have been updated to include the uncaptured impervious area.
20. The uncaptured impervious cover calculations have been updated.
21. The inflow structure to the sedimentation chamber shown on sheet C1.09 has been revised to show a flow-splitting device capable of isolating the capture volume and bypassing the 25-year peak flow around the sand filter system.
22. The sedimentation basin inlet has been revised on sheet C1.09 to include energy dissipation.
23. Sheets C1.09 and C1.10 of the plans have been updated to include a note instructing all pond bottoms, side slopes, and earthen embankments to be compacted to 95% maximum density.
24. Sheet C1.09 has been updated to include permanent maintenance equipment access ramps.
25. The note on sheet C1.10 has been revised to indicate that the gablon rock should be 5 to 8 inches in diameter.
26. Sheet C1.09 has been updated to show the installation of a valve so that the discharge from the BMP can be stopped in case runoff from a spill of hazardous material enters the sand filter.
27. The pond plan on sheet C1.09 has been updated to include the designed water quality volume and to show the depth of the water quality volume in the basin.
28. The wet well has been moved to outside of the basin as shown on sheet C1.09.
29. The alarm system has been added to the pump notes and details on sheet C1.10.
30. The sediment depth marker detail on sheet C1.09 has been upgraded to show the depth at gabion to equal 3.75'. 3.75' x 20% = 0.75' or 9".
31. The sand bed profile information on sheet C1.10 has been revised to show a sand media thickness of 18-inches.
32. The wet well detail on sheet C1.10 has been revised to show a discharge pipe and an inlet invert elevation lower than the pipe draining to it.
33. Sheets C1.09 and C1.10 of the plans have been revised to show the location and detail of a valve to restrict the flow from the sand filter system.

34. The detail for the sand filter system on sheet C1.09 has been revised to show the outlet of the wet well to the east.

If there are any questions concerning this site plan update, please contact me.

Sincerely,

VICKREY & ASSOCIATES, INC.
Texas Board of Professional Engineers Registration #F-159

James C. Massaro, PE
Senior Project Manager

JM/agt

Attachment
Warranty Deed, Official Public Records, Comal County document # 201306048908 dated 11/27/2013

4/TC ✓ (4)

ATC-BULVERDE
ATC CF 4013001868 VJB



201306048908 11/27/2013 09:18:23 AM 1/4

WARRANTY DEED

NOTICE OF CONFIDENTIALITY RIGHTS: IF YOU ARE A NATURAL PERSON, YOU MAY REMOVE OR STRIKE ANY OR ALL OF THE FOLLOWING INFORMATION FROM ANY INSTRUMENT THAT TRANSFERS AN INTEREST IN REAL PROPERTY BEFORE IT IS FILED FOR RECORD IN THE PUBLIC RECORDS: YOUR SOCIAL SECURITY NUMBER OR YOUR DRIVER'S LICENSE NUMBER.

Date: November 21, 2013

Grantors: KENNETH E. HALM and wife, PATRICIA KAY HALM

Grantors' Mailing Address: 2800 Mail Route Rd., Fischer, Texas 78623

Grantee: BROOKSHIRE BROTHERS, INC., a Texas corporation

Grantee's Mailing Address: 1201 Ellen Trout Drive, Lufkin, Texas 75904

Consideration: Ten and no/100 ($10.00) dollars and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged.

Property (including any improvements):

Certain real property located in the John Cocke Survey No. 34, Abstract No. 104, Comal County, Texas, said property being more particularly described on Exhibit A attached hereto and incorporated herein by reference for all purposes.

Reservations from Conveyance: None.

Grantors hereby grant, sell, and convey to Grantee the Property, together with all and singular the rights and appurtenances thereto in any way belonging, to have and to hold it to Grantee and Grantee's successors, and assigns forever. Grantors bind Grantors and Grantors' heirs and successors to warrant and forever defend all and singular the Property to Grantee and Grantee's successors and assigns against every person whomsoever lawfully claiming or to claim the same or any part thereof.

When the context requires, singular nouns and pronouns include the plural.

Kenneth E. Halm
KENNETH E. HALM

Patricia Kay Halm
PATRICIA KAY HALM

STATE OF TEXAS

COUNTY OF COMAL

The foregoing instrument was acknowledged before me on November 21, 2013, by the said KENNETH E. HALM.

Print Name:
Notary Public in and for State of Texas

STATE OF TEXAS

COUNTY OF COMAL

VELDA J. BROWN
NOTARY PUBLIC
STATE OF TEXAS
My Comm. Exp. 04-14-2016

The foregoing instrument was acknowledged before me on November 21, 2013, by the said PATRICIA KAY HALM.

Print Name:
Notary Public in and for State of Texas

VELDA J. BROWN
NOTARY PUBLIC
STATE OF TEXAS
My Comm. Exp. 04-14-2016

AFTER RECORDING RETURN TO:
Jule Fenley
Brookshire Brothers, Inc.
1201 Ellen Trout Drive
Lufkin, Texas 75904

EXHIBIT "A"

PROPERTY DESCRIPTION

DESCRIPTION OF A 6.04 ACRE TRACT OR PARCEL OF LAND IN THE JOHN COCKE SURVEY NUMBER 34 ABSTRACT NUMBER 104 AND THE JOHN O DANIEL SURVEY NO. 32 ABSTRACT NO. 447 IN COMAL COUNTY, TEXAS, BEING COMPRISED OF A CALL 2.9258 ACRE TRACT, OF A CALL 2.340 ACRE TRACT AS DESCRIBED IN A DEED TO KENNETH E, HALM (78.625%) AND PATRICIA KAY HALM (21.375%) AND RECORDED UNDER DOCUMENT NUMBER 9906034462 OF THE OFFICIAL RECORDS OF COMAL COUNTY, TEXAS, A REMAINDER PORTION OF A CALL 617.66 ACRE TRACT RECORDED IN VOLUME 82 PAGE 518 OF THE DEED RECORDS OF COMAL COUNTY, TEXAS, AND OF A 0.20 ACRE TRACT OF LAND DESCRIBED IN A DEED TO KENNETH E. HALM AND WIFE, PATRICIA KAY HALM AS RECORDED IN VOLUME 201306048174 OF THE OFFICIAL PUBLIC RECORDS OF COMAL COUNTY, TEXAS, SAID 6.04 ACRE TRACT BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS WITH ALL BEARINGS BEING GRID AND DERIVED FROM GPS OBSERVATIONS NAD 83/ NATIONAL ADJUSTMENT OF 2011 TEXAS SOUTH CENTRAL ZONE.

BEGINNING at a 3/4" inch iron pipe found monumenting the southwest corner of Lot 2 of the Young Center a subdivision recorded under Document Number 201006037161 of the Map and Plat Records of Comal County, Texas, being an "ell" corner of a call 74.423 acre tract as described in a deed to Jolene I. Wesch and Larry Wesch as recorded under Document Number 9906034461 of the Official Records of Comal County, Texas, being the northeast corner of the said 2.340 acre tract and the northwest corner of the said 2.9258 acre tract;

THENCE with the south line of said Lot 2 of the Young Center common with the north line of the said 2.9258 acre tract **N62°27'13"E** passing at a distance of 252.81 feet to an iron rod with cap stamped Baker Surveying found monumenting the southeast corner of said Lot 2 and the southwest corner of a 22' foot wide right-of-way dedication as shown on the said plat of the Young Center Subdivision in all a distance of **274.82** feet to a 1/2" inch iron pipe found monumenting the northeast corner of the said 2.9258 acre tract, of the herein described tract, and being in the west right-of-way line of Farm to Market Road 306 having a call 100 foot wide right-of-way, from which a an iron rod with cap stamped Baker Surveying found monumenting the southeast corner of the said 22' foot wide right-of-way dedication bears N47°03'08"E for a distance of 0.12 feet;

THENCE with the said west right-of-way line of Farm to Market Road 306 being common with the east line of the said 2.9258 acre tract the following two (2) courses and distances;

1. **S22°34'29"E** for a distance of **353.83** feet to a TXDOT Type II concrete monument found monumenting the Point of Curvature of a curve to the left,

2. With the arc of said curve passing at an arc distance of 199.34 feet a 1" inch iron rod found monumenting the southeast corner of the said 2.9258 acre tract and an exterior ell corner of said remainder of 617.66 acre tract, continuing with the arc of said curve for a central angle of **14°01'50"** to a PK Nail set in asphalt for the southeast corner of the herein described tract, said curve having a radius of **1196.26** feet, an arc length of **292.94** feet, and a long chord bearing **S 29°39'19" E** for a distance of **292.21** feet,

THENCE departing the said west right-of-way line of Farm to Market Road 306 with the south line of the herein described tract and the southeast line of said 0.20 acre tract being common with the north edge of paving of Canyon Park Road **S51°07'28"W** for a distance of **269.75** feet

to an iron rod with cap stamped "JACOBS" set monumenting the southerly corner of said 0.20 acre tract and of the herein described tract;

THENCE departing the said common line **N 38°52'32" W** with the southwest line of said 0.20 acre tract, for a distance of **121.37** feet to a ½" inch iron rod found monumenting most southerly corner of the said 2.340 acre tract, the northwest corner of said 0.20 acre tract and the northeast corner of a call 28.684 acre tract as described in a deed to Kenneth E. Halm and Patricia Kay Halm as recorded under Document No. 9906034462 of the Official Records of Comal County, Texas

THENCE with the north line of the said 28.684 acre tract being common with the south line of the 2.340 acre tract **N89°29'27"W** for a distance of **231.52** feet to an iron rod with cap stamped "JACOBS" set monumenting the southwest corner of the said 2.340 acre tract, of the herein described tract, and the southeast corner of the said 74.423 acre tract;

THENCE with the west line of the said 2.340 acre tract, of the herein described tract, being common with an east line of the said 74.423 acre tract **N10°00'03"W** for a distance of **491.17** feet to a 1/2" iron rod found monumenting an "ell" corner of the said 74.423 acre tract, the northwest corner of the said 2.340 acre tract and of the herein described tract;

THENCE with a south line of the said 74.423 acre tract being common with the north line of the said 2.340 acre tract and of the herein described tract **N61°37'44"E** for a distance of **89.68** feet to the **POINT OF BEGINNING** of the herein described tract and containing 6.04 acres of land more or less.

I David Paul Carr do hereby certify that the foregoing metes and bounds description was prepared from an on the ground survey performed by Jacobs Engineering Group in September and November of 2013 under my direction and supervision and it is true and correct to the best of my belief.

David Paul Carr
Registered Professional Land Surveyor
Texas Registration No. 3997

Nov 22, 2013
Date

STATE OF TEXAS
REGISTERED
DAVID PAUL CARR
3997
PROFESSIONAL
LAND SURVEYOR

Filed and Recorded
Official Public Records
Joy Streater, County Clerk
Comal County, Texas
11/27/2013 09:18:23 AM
TERRI 4 Page(s)
201306048908

Joy Streater

TCEQ
Protecting Texas by Reducing and Preventing Pollution

Fax Cover Sheet

Number of Pages: *(including this sheet)* 6

Date: February 13, 2015
To: Mr. Richard Parker
Organization: Brookshire Brothers, Inc.
Fax: 936-633-4670

To: Mr. Andrew W. Dobson, P.E.
Organization: Vickrey & Associates, Inc.
Fax: 512-494-8054

From: Neal Denton
Division: Edwards Aquifer Protection Program
Texas Commission on Environmental Quality
Phone: 210-403-4026
Fax: 210-545-4329

Re: Edwards Aquifer, Comal County

Name of Project: Brookshire Brothers at Canyon Lake; Located northwest corner of the intersection of Canyon Park Road and F.M. 306; Canyon Lake, Texas

Plan Type: Request for the Approval of a Contributing Zone Plan (CZP); 30 Texas Administrative Code (TAC) Chapter 213

Investigation No. 1217087; Regulated Entity No. RN107915225; Additional ID No. 13-14122302

Dear Mr. Dobson:

We are in the process of technically reviewing the CZP Application you submitted on the above-referenced project. Before we can proceed with our review, the following comments relating to the application must be addressed.

1. The site is indicated to be 6.04 acres. According to Comal County Central Appraisal District (CAD), the four properties on which regulated activities are proposed amount to 6.0757 acres. The CAD Property ID Numbers are 74294, 74298, 385078, and 385079. Site is defined in 30 TAC §213 as the entire area within the legal boundaries of the property described in the application. Please provide legal documentation showing the site is 6.04 acres or revise to indicate the site is 6.08 acres.

2. It is indicated in Attachment K that the sand filter basin will convey water to the San Gabriel River. However, treated water will be conveyed to Canyon Lake and ultimately to the Guadalupe River. Please revise this information.

3. The Inspection, Maintenance, Repair, and Retrofit Plan is required by 30 TAC §213.24(6)(C)(ii) to be signed by the owner. It is important that the owner understands the inspection and maintenance practices must be carried out to maintain compliance with 30 TAC §213, so it is ideal that a statement indicating something to that effect is included with the signature. Please have the Inspection, Maintenance, Repair, and Retrofit Plan signed by the owner.

4. It is indicated under #51 of the CZP Application Form that the Inspection, Maintenance, Repair, and Retrofit Plan includes a discussion of record keeping procedures. The plan does not include a discussion of record keeping procedures such as the record retention time and location. Please add these procedures to the plan.

5. As indicated in TCEQ Regulatory Guidance 348 (RG-348), the underdrain piping network in sand filter systems should be cleaned as needed to maintain the designed drawdown time and that grass areas in and around the sand filter must be mowed at least twice annually to limit vegetation height to 18 inches. Please update the Inspection, Maintenance, Repair, and Retrofit Plan accordingly.

6. It is indicated in the Inspection, Maintenance, Repair, and Retrofit Plan that the plan is meant to be a dynamic working guide that is to be amended whenever necessary. Since the TCEQ would have to review and approve any changes to the inspection and maintenance plan to verify compliance with 30 TAC §213, please revise to indicate the procedures may not be altered without approval by the TCEQ.

7. The construction notes for water pollution abatement plans are included. These notes include an indication that encountered geologic features must be reported to the TCEQ. To avoid confusion, please remove these notes.

8. It is required by 30 TAC §213.24(1)(B) that the site plan shows the 100-year floodplain boundary, the approximate slopes anticipated after major grading activities, the areas of soil disturbance and areas that will not be disturbed, and the locations where stabilization practices are expected to occur. Please revise the site plan to satisfy these requirements.

9. It is indicated in the SWPPP that a flow spreader, filter dikes, and mulch socks will be used, and it is required by 30 TAC §213.24(1)(B)(vi) that the site plan shows the locations of major structural and nonstructural controls identified in the application. Please revise accordingly.

10. It is required by 30 TAC §213.24(3) that the application includes an estimate of the runoff coefficient of the site for both the pre-construction and post-construction conditions. The proposed drainage plan shows the post-construction runoff coefficients but not the pre-construction runoff coefficients. Please provide the pre-construction runoff coefficients.

11. It is required by 30 TAC §213.24(9) that the application includes a description of the measures that will be used to contain any spill of static hydrocarbons or hazardous substances. The SWPPP does not include a discussion of the actual measures that will be used when a spill occurs. Please revise the SWPPP to meet this requirement.

12. It is indicated in the SWPPP that a prefabricated washout container will be used. Please show the location of the concrete washout container and provide a detail showing its design.

13. It is indicated in the sequence of construction activities that the sand filter basin will be used as a sediment control measuring during construction activities. It is required by 30 TAC §213.24(5)(E) that temporary sediment pond construction plans and design calculations be prepared by or under the direct supervision of a Texas licensed professional engineer and that the construction plans and design information be signed, sealed, and dated by the Texas licensed professional engineer. Please provide the temporary sediment pond construction plans and design calculations that are signed, sealed, and dated by the P.E.

14. Please provide maintenance guidelines for the rock berms, flow spreaders, filter dikes, and mulch socks as required by 30 TAC §213.24(5)(C).

15. Drainage Areas A and L are shown to drain to the basin, but an inlet is not shown at the basin. Please revise to show all impervious cover indicated to be captured by the basin will be.

16. The Proposed Drainage Plan shows F.M. 306 will drain onto the site via the northern driveway. Please update #6 of the TSS Removal Calculations to include the off-site contributing area.

17. It is indicated under #12 of the CZP Application Form that 4.85 acres of impervious cover are proposed, and it is indicated under #1 of the TSS Removal Calculations that 4.79 acres of impervious cover are proposed. Please review and revise to indicate the actual proposed impervious cover.

18. It is indicated under #2 of the TSS Removal Calculations that 4.71 acres of impervious cover are proposed in the drainage basin for the BMP, and it is indicated under #4 of the TSS Removal Calculations that 4.79 acres of impervious cover are proposed in the drainage basin for the BMP. Please review and revise to indicate the actual proposed impervious cover within the drainage basin for the BMP.

19. Drainage Area M is shown to drain offsite without treatment. Please provide TSS removal calculations for the uncaptured impervious area, and ensure that the uncaptured quantities are not included in the drainage basin parameters for the BMP in the TSS Removal Calculations (#2 and #4).

20. Please explain if any impervious cover resulting in an increased annual TSS load will be installed for the proposed lift station, and if so, include it in the uncaptured impervious cover calculations.

21. As indicated in RG-348, the inflow structure to the sedimentation chamber should incorporate a flow-splitting device capable of isolating the capture volume and bypassing the 25-year peak flow around the sand filter system once the entire water quality volume has been captured. Please revise accordingly.

22. As indicated in RG-348, energy dissipation is required at the sedimentation basin inlet so that flows entering the basin will be distributed uniformly and at low velocity in order to prevent resuspension and encourage conditions necessary for deposition of solids. Please revise accordingly.

23. As indicated in RG-348, all pond bottoms, side slopes, and earthen embankments should be compacted to 95% maximum density. Please revise accordingly.

24. As indicated in RG-348, water quality facilities should have a permanent maintenance equipment access ramp whose slope should not exceed four to one. The minimum width is 12 feet for a ramp into each basin of the facilities if the basin area is greater than 5000 ft^2. For smaller facilities, the ramp should be at least 6 feet wide. Please revise accordingly. Please ensure gates are included to allow for maintenance access.

25. It is indicated the gabion that rock will be 4 to 8 inches in diameter in the notes and 6 to 8 inches in the detail. As indicated in RG-348, the gabion rock should be 5 to 8 inches in diameter. Please revise accordingly.

26. As indicated in RG-348, a valve must be installed so that discharge from the BMP can be stopped in case runoff from a spill of hazardous material enters the sand filter. Please revise accordingly.

27. Please provide the designed water quality volume, and show the depth of the water quality volume in the basin.

28. Wet wells are typically installed outside of the basin. Its location within the sand filter system may lead to erosion problems requiring more frequent maintenance and may necessitate significant water/sediment removal to access the manhole for maintenance purposes. "Short-circuiting" of the system may occur where the clay liner meets the wet well as well. Please explain the reasoning behind placing the wet well within the sand filter system, evaluate any potential long-term problems, and make any necessary revisions.

29. As presented, it appears the wet well does not have an alarm system to alert the responsible party of its failure. The following guidance is presented in RG-348 for wet well alarms for retention/irrigation systems: an alarm system should be provided consisting of a red light located at a height of at least 5 feet above the ground level at the wet well. The alarm should activate when: (1) the high water level has been maintained in excess of 72 hours, (2) the water level is below the shutoff point and the pump has not turned off, or (3) the high/low-pressure pump shut off switch has been activated. The alarm should be vandal and weather resistant. A sign should be placed at the wet well clearly displaying the name and phone number of a responsible party that may be contacted if the alarm is activated. Please provide an alarm system meeting these specifications.

30. The sediment depth marker detail shows 20% of the basin capacity to be at 1.10'. The depth of the sedimentation chamber is shown at 2.75'. 20% of that would be 0.55'. Please revise the sediment depth marker to show that it will indicate when sediment accumulation equals 20% of the water quality volume.

31. It is indicated in the sand bed profile information that 12" to 18" of sand media will be installed. As indicated in RG-348, the sand media should be 18" thick. Please revise accordingly.

32. The wet well detail shows the inlet invert at a higher elevation than most of the underdrain piping elevations shown on the site plan. It also does not show a discharge pipe. Please revise to show a discharge pipe and an inlet invert elevation lower than the piping draining to it.

33. Please explain if the 24-48 hour drawdown time for sand filter systems will be achieved by the sand media and pipe or if a valve will be required to restrict the flow. If a valve will be required, please update the plans to show its location and detail.

34. The plan view of the sand filter basin shows the outlet from the wet well existing to the east of the well, but the detail shows underdrain piping in that location. Please review and revise for consistency.

We ask that you submit one original and three copies of the amended materials to supplement the CZP Application to this office by no later than **14 days from the date of this fax** to avoid denial of the plan. If the response to this notice is not received, is incomplete or inadequate, or provides new information that is incomplete or inadequate, a second notice will be sent to you requiring a response within 14 days from the notice date. 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 will be denied unless you provide written notification that the application is being withdrawn. Please note that the application fee will be forfeited if the plan is not withdrawn. If you have any questions or require additional information, please contact Neal Denton of the Edwards Aquifer Protection Program of the San Antonio Regional Office at (210) 403-4026.

CONTRIBUTING ZONE PLAN FOR

BROOKSHIRE BROTHERS AT CANYON LAKE

18267 FM 306

CANYON LAKE, TEXAS 78133

RECEIVED
MAR 04 2015
COUNTY ENGINEER

1

PREPARED FOR:

Brookshire Brothers, Inc.

AND

The Texas Commission on Environmental Quality

RECEIVED
FEB 27 2015
By

PREPARED BY:

Vickrey & Associates, Inc.

Texas Board of Professional Engineers Firm No. F-159
1717 West 6th Street, Suite 260
Austin, Texas 78703
(512) 494-8014

STATE OF TEXAS
JAMES C. MASSARO
92530
LICENSED
PROFESSIONAL ENGINEER
02/26/2015

V&A Job # 2540-001

December 2014

Updated February 26, 2015

TABLE OF CONTENTS

1.0 CONTRIBUTING ZONE PLAN APPLICATION (TCEQ-10257) 3
1.1 Attachment A – Road Map 12
1.2 Attachment B – USGS Quadrangle Map 13
1.3 Attachment C – Project Narrative 15
1.4 Attachment D – Factors Affecting Surface Water Quality 16
1.5 Attachment E – Volume and Character of Stormwater 17
1.6 Attachment F – Suitability Letter from Authorized Agent (*if OSSF is proposed*) 17
1.7 Attachment G – Alternative Secondary Containment Methods (*if AST with an alternative method of secondary containment is proposed*) 17
1.8 Attachment H – Aboveground Storage Tank (AST) Containment Structure Drawings (*if AST is proposed*) 17
1.9 Attachment I – 20% or Less Impervious Cover Waiver (*if project is multi-family residential, a school, or a small business and 20% or less impervious cover is proposed for the site*) 18
1.10 Attachment J – BMPs for Upgradient Stormwater 18
1.11 Attachment K – BMPs for On-site Stormwater 18
1.12 Attachment L – BMPs for Surface Streams 24
1.13 Attachment M – Construction Plans 24
1.14 Attachment N – Inspection, Maintenance, Repair and Retrofit Plan 24
1.15 Attachment O – Pilot-Scale Field Testing Plan, if BMPs not based on *Complying with the Edwards Aquifer Rules: Technical Guidance for BMPs* 27
1.16 Attachment P – Measures for Minimizing Surface Stream Contamination 27
2.0 STORM WATER POLLUTION PREVENTION PLAN (SWPPP) 28
3.0 COPY OF THE NOTICE OF INTENT (NOI) 29
4.0 AGENT AUTHORIZATION FORM (TCEQ-0599) 30
5.0 APPLICATION FEE FORM (TCEQ-0574) 32
6.0 CHECK PAYABLE TO THE "Texas Commission on Environmental Quality" 34
7.0 CORE DATA FORM (TCEQ-10400) 35

1.0 CONTRIBUTING ZONE PLAN APPLICATION (TCEQ-10257)

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

Regulated Entity Name: Brookshire Brothers at Canyon Lake
County: Comal Stream Basin: Guadalupe River Basin

1. ✓ Regulated activities on this site will disturb at least 5 acres.
   ___ Regulated activities on this site will disturb less than 5 acres and are part of a larger common plan of development or sale with the potential to disturb cumulatively five or more acres.

2. Customer (Applicant):

Contact Person:	Richard Parker
Entity:	Brookshire Brothers, Inc.
Mailing Address:	1201 Ellen Trout Drive
City, State:	Lufkin, Texas Zip: 75904
Telephone:	(936) 633-4619 FAX: (936) 633-4670

Agent/Representative (If any):

Contact Person:	Andrew W. Dodson, P.E.
Entity:	Vickrey & Associates, Inc.
Mailing Address:	1717 West 6th Street, Suite 260
City, State:	Austin, Texas Zip: 78703
Telephone:	(512) 494-8014 FAX: (512) 494-8054

3. ___ This project is inside the city limits of _____.
   ___ This project is outside the city limits but inside the ETJ (extra-territorial jurisdiction) of _____.
   ✓ This project is not located within any city's limits or ETJ.

4. 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.
   This project is located on the northwest corner of Canyon Park Road at its intersection with F.M. 306. The site is 6 miles north / northwest of the town of Sattler, Texas.

5. ✓ **ATTACHMENT A - Road Map.** A road map showing directions to and the location of the project site is found as at the end of this form.

6. ✓ **ATTACHMENT B - USGS Quadrangle Map.** A copy of the USGS Quadrangle Map (Scale: 1" = 2000') is found at the end of this form. The map(s) clearly shows:
   ✓ Project site boundaries.
   ✓ USGS Quadrangle Name(s).

7. ✓ **ATTACHMENT C - Project Narrative.** A detailed narrative description of the proposed project is found at the end of this form.

8. 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/Uncleared)
   - ___ Other: _____

PROJECT INFORMATION

9. The type of project is:
   - ___ Residential: # of Lots: _____
   - ___ Residential: # of Living Unit Equivalents: _____
   - ✓ Commercial
   - ___ Industrial
   - ___ Other: _____

10. Total project area (size of site): 6.04 Acres
    Total disturbed area: 5.85 Acres

11. Projected population: 20

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

Impervious Cover of Proposed Project	Sq. Ft.	Sq. Ft./Acre	Acres
Structures/Rooftops	45,275	÷ 43,560 =	1.04
Parking	42,758	÷ 43,560 =	0.98
Other paved surfaces	123,233	÷ 43,560 =	2.83
Total Impervious Cover	211,266	÷ 43,560 =	4.85
Total Impervious Cover ÷ Total Acreage x 100 =			82.95 %

13. ✓ **ATTACHMENT D - Factors Affecting Surface Water Quality.** A description of factors that could affect surface water quality is found as at the end of this form. If applicable, this should include the location and description of any discharge associated with industrial activity other than construction.

14. ✓ Only inert materials as defined by 30 TAC 330.2 will be used as fill material.

FOR ROAD PROJECTS ONLY
Complete questions 15-20 if this application is exclusively for a road project.

15. 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.

16. Type of pavement or road surface to be used:
__ Concrete
__ Asphaltic concrete pavement
__ Other: _____

17. Length of Right of Way (R.O.W.): _____ feet.
Width of R.O.W.: _____ feet.
L x W = _____ Ft^2 ÷ 43,560 Ft^2/Acre = _____ acres.

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

19. __ A rest stop will be included in this project.
__ A rest stop will **not** be included in this project.

20. __ 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

21. ✓ **ATTACHMENT E - Volume and Character of Stormwater.** A description of the volume and character (quality) of the stormwater runoff which is expected to occur from the proposed project is found at the end of this form. The estimates of stormwater runoff quality and quantity are based on area and type of impervious cover. The runoff coefficient of the site for both pre-construction and post-construction conditions is included.

WASTEWATER TO BE GENERATED BY THE PROPOSED PROJECT

22. **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 written approval is provided at the end of this form. 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, or it identifies those areas that are not suitable for the use of private sewage facilities. The system will be designed by a licensed professional engineer or a registered sanitarian and installed by a licensed installer in

compliance with 30 TAC §285.

✓ Sewage Collection System (Sewer Lines):
Wastewater is to be disposed of by conveyance to the (name) treatment plant for treatment and disposal. The treatment facility is: Canyon Park Estates Wastewater Treatment Plant .
✓ existing.
__ proposed.

__ 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.

FOR PERMANENT ABOVEGROUND STORAGE TANKS (ASTs) ≥ 500 GALLONS
Complete questions 23-29 if this project includes the installation of AST(s) with volume(s) greater than or equal to 500 gallons.

23. Tanks and substance stored:

AST Number	Size (Gallons)	Substance to be Stored	Tank Material
1			
2			
3			
4			
5			
Total		x 1.5 =	gallons

24. __ 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 found at the end of this form.

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

Length (L) (Ft.)	Width (W) (Ft.)	Height (H) (Ft.)	L x W x H = (Ft^3)	Gallons
Total				

26. ___ 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

27. ___ 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 _____.

28. **ATTACHMENT H - AST Containment Structure Drawings.** A scaled drawing of the containment structure is found at the end of this form 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

29. 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

Items 30 through 41 must be included on the Site Plan.

30. The Site Plan must have a minimum scale of 1" = 400'.
Site Plan Scale: 1" = 40 '.

31. 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):
Federal Emergency Management Agency (FEMA) FIRM Map No. 48091C0115F effective 9/2/2009

32. ✓ 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.

33. ✓ A drainage plan showing all paths of drainage from the site to surface streams.

34. ✓ The drainage patterns and approximate slopes anticipated after major grading activities.

35. ✓ Areas of soil disturbance and areas which will not be disturbed.

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

37. ✓ Locations where soil stabilization practices are expected to occur.

38. ✓ Surface waters (including wetlands).

39. ✓ Locations where stormwater discharges to surface water.
— There will be no discharges to surface water.

40. — Temporary aboveground storage tank facilities.
✓ Temporary aboveground storage tank facilities will not be located on this site.

41. — Permanent aboveground storage tank facilities.
✓ Permanent aboveground storage tank facilities will not be located on this site.

Permanent best management practices (BMPs) and measures that will be used during and after construction is completed.

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

43. ✓ 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 provided below.

_____

_____

44. ✓ 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.

45. ✓ 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.

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

46. ✓ 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.** This 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 found at the end of this form.
✓ This site will be used for multi-family residential developments, schools, or small business sites but has more than 20% impervious cover.
__ This site will not be used for multi-family residential developments, schools, or small business sites.

47. **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 provided as **ATTACHMENT J** at the end of this form.
__ If no surface water, groundwater or stormwater originates upgradient from the site and flows across the site, an explanation is provided as **ATTACHMENT J** at the end of this form.
__ If 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, an explanation is provided as **ATTACHMENT J** at the end of this form.

48. **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 provided as **ATTACHMENT K** at the end of this form.
__ If 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, an explanation is provided as **ATTACHMENT K** at the end of this form.

49. ✓ **ATTACHMENT L - BMPs for Surface Streams.** A description of the BMPs and

measures that prevent pollutants from entering surface streams is provided at the end of this form.

50. ✓ **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. All construction plans and design information have been signed, sealed, and dated by the Texas Licensed Professional Engineer. Construction plans for the proposed permanent BMPs and measures are provided at the end of this form. Design Calculations, TCEQ Construction Notes, all proposed structural measures, and appropriate details must be shown on the construction plans.

51. ✓ **ATTACHMENT N - Inspection, Maintenance, Repair and Retrofit Plan.** A plan for the inspection, maintenance, repair, and, if necessary, retrofit of the permanent BMPs and measures is provided at the end of this form. The plan has been prepared and certified by the engineer designing the permanent BMPs and measures. The 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.

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

— Pilot-scale field testing (including water quality monitoring) may be required for BMPs that are not contained in technical guidance recognized by or prepared by the executive director.

N/A **ATTACHMENT O - Pilot-Scale Field Testing Plan.** A plan for pilot-scale field testing is provided at the end of this form.

53. ✓ **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 provided at the end of this form. 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 increases erosion that result in water quality degradation.

Responsibility for maintenance of permanent BMPs and measures after construction is complete.

54. ✓ 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.

55. ✓ 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

56. ✓ 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. The copies must be submitted to the appropriate regional office.

57. ✓ 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.

58. ✓ 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.

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:

Andrew W. Dodson, P.E.
Print Name of Customer/Agent

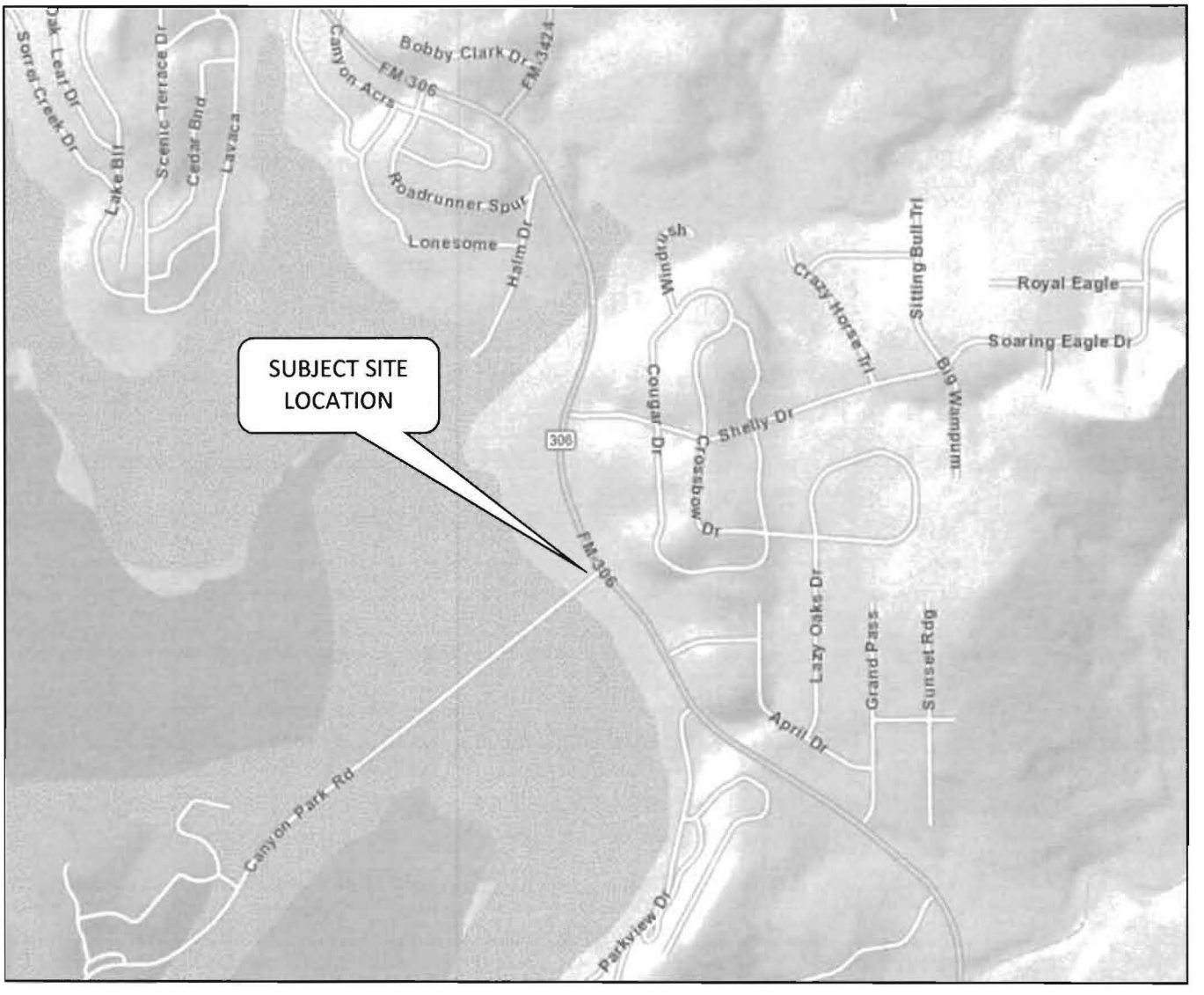
Signature of Customer/Agent

2/25/15
Date

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

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

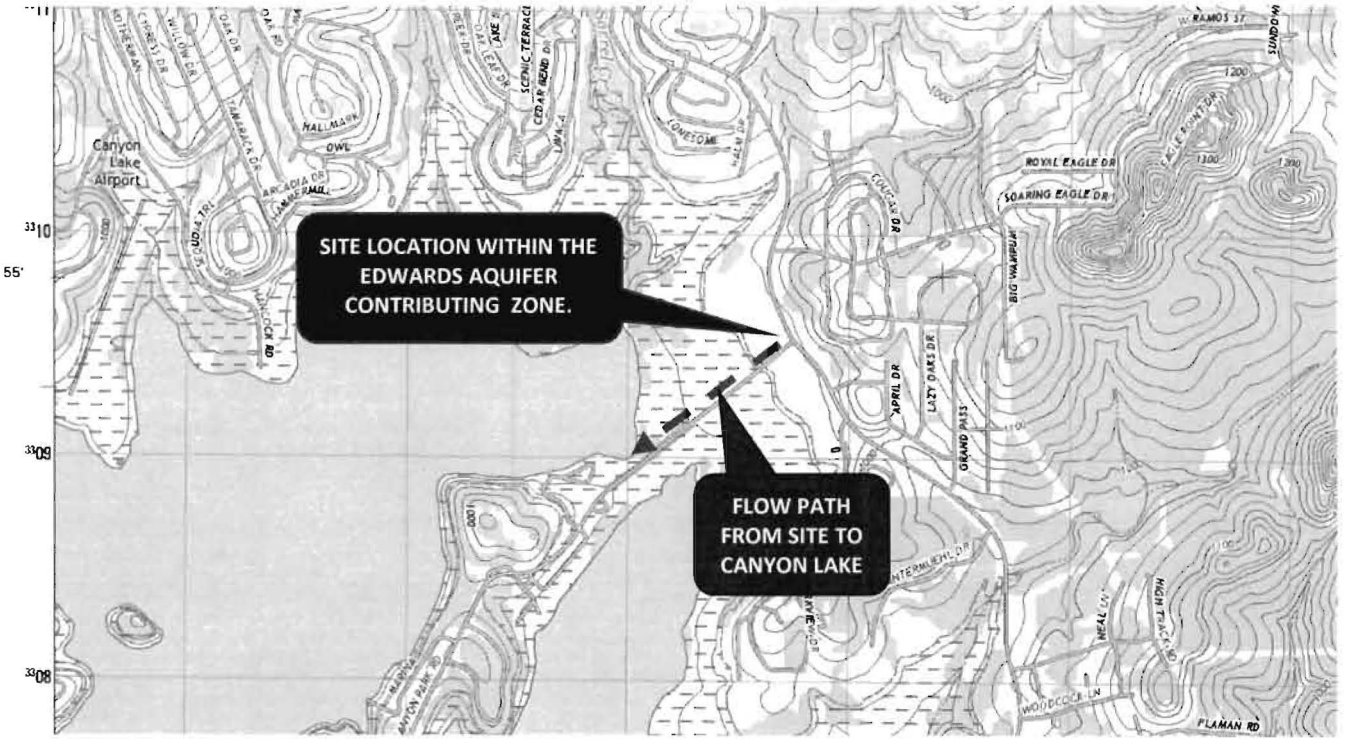
ATTACHMENT A-1.1 Road Map and Site Location Map:



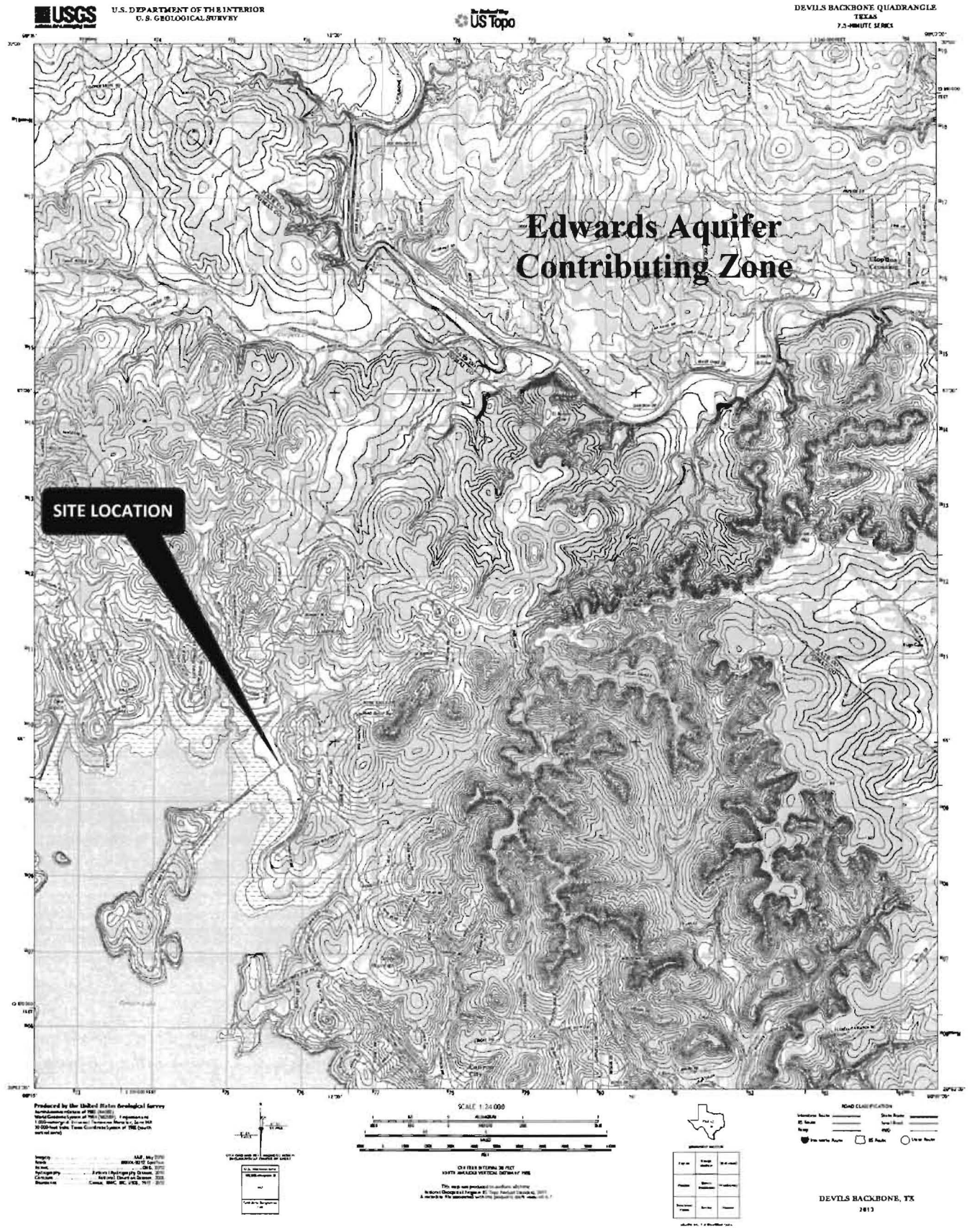


N

ATTACHMENT B-1.2 USGS Quadrangle Map:



MAP PRODUCED FROM THE U.S. GEOLOGICAL SURVEY (USGS)
USGS QUADRANGLE: DEVILS BACKBONE


USGS
U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY
US Topo
DEVILS BACKBONE QUADRANGLE
TEXAS
7.5-MINUTE SERIES
Edwards Aquifer
Contributing Zone
SITE LOCATION
SCALE 1:24 000
DEVILS BACKBONE, TX
2013

ATTACHMENT C-1.3 Project Narrative:

This project is located within an unincorporated part of Comal County on the northwest corner of F.M. 306 at its intersection with Canyon Park Road. The 6.04 acre (263,102 square foot) site is composed of four lots. The project is planned for use as a grocery store and fueling station. The site is within the Canyon Lake watershed, and the Contributing Zone of the Edwards Aquifer. A small portion on the southwest corner of the site is located within the 100-year floodplain as identified by FIRM panel 48091C0115F, dated September 2, 2009 (Comal County). The property contains an existing well and various structures which have been removed.

Based on field visits, no critical environmental features (CEFs) such as springs, canyon rim rocks, caves, sinkholes were found on or within 150 feet from the subject property.

ATTACHMENT D-1.4 Factors Affecting Surface Water Quality:

Potential sources of sediment to stormwater runoff include:

- Clearing, grading, and excavating activities, primarily un-stabilized areas; paving operations, demolition and debris disposal; dewatering operations, drilling, material delivery, storage and use and landscaping operations.

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

Potential pollutants other than sediment include the following materials and substances that could be expected to be present on-site during construction:

- Heavy Metals – from concrete additives, concrete washout, material delivery, storage and use, and hazardous substance/waste spills
- pH (Acids and Bases) – from concrete washout, painting and cleaning, drilling, material delivery, storage and use, hazardous waste spills, and sanitary/septic waste.
- Paints and Solvents – from concrete washout and waste, painting, concrete polishing, cleaning products, material delivery and use, hazardous waste spills, and sanitary/septic waste
- Trash, Debris and Solids – from clearing and grading, paving, concrete wash waste, construction painting and cleaning, demolition, drilling and blasting, material delivery storage and use, landscaping, and general construction
- Petroleum Based Products – from material delivery storage and use, hazardous waste spills, vehicle and equipment use on site, and vehicle and equipment fueling and maintenance and storage
- Pesticides/Herbicides – from material delivery, storage and use, hazardous waste spills, vehicle use, storage, service and maintenance
- Fertilizers/Nutrients – from painting, cleaning products, dewatering, material delivery and storage, spills during landscaping operation, sanitary/septic waste

Potential sources of post construction stormwater runoff include:

- Sediment – coarse and fine from vehicle and equipment use on site.
- Heavy Metals – dissolved and particulate from vehicle washing activities
- pH (Acids and Bases) – from detergents used in the washing equipment.
- Trash, Debris and Solids – from washing and cleaning vehicles.
- Petroleum Based Products – from hazardous material spills, vehicle and equipment use on site.

ATTACHMENT E-1.5 Volume and Character of Stormwater:

The existing site is 6.04 acres (263,102 square feet) with an existing well and various existing structures which have been removed. This project consists of a grocery store and fueling station, or 82.95% impervious cover for the site. This project will discharge 64.8 CFS in the 100-year storm event.

Per a web soil survey of Comal County from the USDA Natural Resources Conservation Service National Cooperative Soil Survey, the site consists mainly of the following:

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
BtD	Brackett-Rock outcrop-Comfort complex 1 to 8 percent slopes	1.24	20.7%
DeB	Denton silty clay, 1 to 3 percent slopes	0.83	13.7%
DoC	Doss silty clay, moist, 1 to 5 percent slopes	2.62	43.4%
SuB	Sunev clay loam, 1 to 3 percent slopes	1.35	22.2%
Totals for Area of Interest (AOI)		**6.04**	**100.0%**

ATTACHMENT F-1.6 Suitability Letter from Authorized Agent:

An OSSF is not proposed, and a letter of suitability is NOT a part of this CZP.

ATTACHMENT G-1.7 Alternative Secondary Containment Methods:

An AST with an alternative method of secondary containment is not proposed.

ATTACHMENT H-1.8 AST Containment Structure Drawings:

An AST Containment Structure is not proposed.

ATTACHMENT I-1.9 Waiver for 20% or Less Impervious Cover:

The impervious cover on this site is greater than 20%. A waiver for 20% or less impervious cover will not be requested as part of this plan.

ATTACHMENT J-1.10 Best Management Practices (BMPs) for Upgradient Stormwater:

The proposed site is at the top of the watershed. As such, no significant upgradient stormwater will flow to or across the proposed site. No upgradient stormwater BMPs are included as part of this plan

ATTACHMENT K-1.11 BMPs for On-Site Stormwater:

1. **Stabilization Practices**
    A. Installation of a partial sedimentation/sand filter and detention basins will collect on-site storm water runoff to be conveyed back to natural drainage patterns to Canyon Lake and ultimately to the Guadalupe River.
    B. Permanent seeding and planting of all unpaved areas using a manual broadcasting or hydromulching grass seeding technique. Permanent vegetation controls erosion by physically protecting a bare soil surface from raindrop impact, flowing water and wind. Vegetation binds soil particles together with a dense root system and reduces the velocity of runoff.
    C. Mulching exposed areas. Surface mulch is the most effective, practical means of controlling erosion on disturbed areas before establishing vegetation. Mulch protects the soil surface, reduces runoff velocity, increases infiltration, slows soil moisture loss, helps prevent soil crusting and sealing, moderates soil temperatures, and improves the microclimate for seed germination.
    D. Sodding/Landscape Planting Trees, Shrubs, vines, and ground covers can provide superior, low-maintenance, long-term erosion protection. Woody plants and ground covers are particularly adapted for use on steep or rocky slopes where maintenance is difficult, in shaded areas, for wildlife habitat improvements, as windbreaks or screens.

2. **Structural Practices**
    A. Diversion berms and a storm sewer network are used to direct the flow of stormwater to the designed on-site water quality and stormwater detention facility.
    B. Sand Filter pond provides water quality control of on-site stormwater and the lift station and Canyon Park driveway areas not contributing to the sand filter BMP. See attached calculations on the following sheets. As shown in the calculations on the following sheets:
        - The Canyon Park Driveway requires 90 lbs. to be treated.
        - The lift station area requires 9 lbs. to be treated.
        - The contributing area requires 2,118 lbs. to be treated.
        - For a TOTAL of 2,217 lbs. to be treated.
        - The Sand Filter is sized to treat 2,220 lbs.

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: Brookshire Brothe
Date Prepared: 2/25/2015

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 sp

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

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

County =	Comal	
Total project area included in plan * =	6.04	acres
Predevelopment impervious area within the limits of the plan * =	2.59	acres
Total post-development impervious area within the limits of the plan* =	4.79	acres
Total post-development impervious cover fraction * =	0.79	
P =	33	inches
$L_{M\ TOTAL\ PROJECT}$ =	1975	lbs.

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

Number of drainage basins / outfalls areas leaving the plan area = 2

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

Drainage Basin/Outfall Area No. = 1

Total drainage basin/outfall area =	5.82	acres
Predevelopment impervious area within drainage basin/outfall area =	2.59	acres
Post-development impervious area within drainage basin/outfall area =	4.95	acres
Post-development impervious fraction within drainage basin/outfall area =	0.85	
$L_{M\ THIS\ BASIN}$ =	2118	lbs.

REQUIRED TREATMENT
THIS BASIN: 2,118 lbs.
LIFT STATION: 9 lbs.
CANYON PARK DRIVEWAY: 90 lbs.
TOTAL: 2,217 lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Sand Filter
Removal efficiency = 89 percent

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

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

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

where:

A_C = Total On-Site drainage area in the BMP catchment area
A_I = Impervious area proposed in the BMP catchment area

A_P = Pervious area remaining in the BMP catchment area
L_R = TSS Load removed from this catchment area by the proposed BMP

A_C =	5.80	acres
A_I =	4.95	acres
A_P =	**0.85**	acres
L_R =	**5044**	lbs

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

REQUIRED.

Desired $L_{M\ THIS\ BASIN}$ = **2220** lbs. 2,217 lbs.

F = **0.44**

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

Rainfall Depth =	**0.34**	inches
Post Development Runoff Coefficient =	**0.70**	
On-site Water Quality Volume =	**5048**	cubic feet

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

Off-site area draining to BMP =	**0.00**	acres
Off-site Impervious cover draining to BMP =	**0.00**	acres
Impervious fraction of off-site area =	**0**	
Off-site Runoff Coefficient =	**0.00**	
Off-site Water Quality Volume =	**0**	cubic feet
Storage for Sediment =	**1010**	
Total Capture Volume (required water quality volume(s) x 1.20) =	**6057**	cubic feet

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

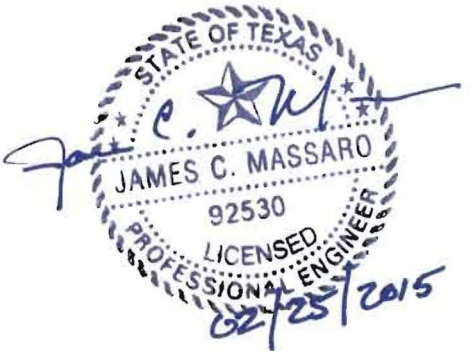
9A. Full Sedimentation and Filtration System

Water Quality Volume for sedimentation basin =	**6057**	cubic feet	
Minimum filter basin area =	**280**	square feet	
Maximum sedimentation basin area =	**2524**	square feet	For minimum water depth of 2 feet
Minimum sedimentation basin area =	**631**	square feet	For maximum water depth of 8 feet

9B. Partial Sedimentation and Filtration System

PROVIDED

Water Quality Volume for combined basins =	**6057**	cubic feet	6,078.75 cu.ft.
Minimum filter basin area =	**505**	square feet	900.00 sf.
Maximum sedimentation basin area =	**2019**	square feet	For minimum water depth of 2 feet 765.00 sf.
Minimum sedimentation basin area =	**126**	square feet	For maximum water depth of 8 feet



"CANYON PARK DRIVEWAY"

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Additional information is provided for cells with a red triangle in the upper right corn
Text shown in blue indicate location of instructions in the Technical Guidance Manual - RG
Characters shown in red are data entry fields.
Characters shown in black (Bold) are calculated fields. Changes to these fields will

1. The Required Load Reduction for the total project: Calculations from RG-348

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

where:

$L_{M\ TOTAL\ PROJECT}$ = Required TSS removal resul
A_N = Net increase in impervious a
P = Average annual precipitation

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

County =	**Comal**	
Total project area included in plan * =	**6.04**	acres
Predevelopment impervious area within the limits of the plan * =	**2.59**	acres
Total post-development impervious area within the limits of the plan* =	**4.79**	acres
Total post-development impervious cover fraction * =	**0.79**	
P =	**33**	inches
$L_{M\ TOTAL\ PROJECT}$ =	**1975**	lbs.

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

Number of drainage basins / outfalls areas leaving the plan area = 3

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

Drainage Basin/Outfall Area No. = 2

Total drainage basin/outfall area =	**0.10**	acres
Predevelopment impervious area within drainage basin/outfall area =	**0.00**	acres
Post-development impervious area within drainage basin/outfall area =	**0.10**	acres
Post-development impervious fraction within drainage basin/outfall area =	**1.00**	
$L_{M\ THIS\ BASIN}$ =	**90**	lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = **Sand Filter**
Removal efficiency = **89** percent

"LIFT STATION AREA"

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Additional information is provided for cells with a red triangle in the upper right corn
Text shown in blue indicate location of instructions in the Technical Guidance Manual - RG
Characters shown in red are data entry fields.
Characters shown in black (Bold) are calculated fields. Changes to these fields will

1. The Required Load Reduction for the total project: Calculations from RG-348

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

where:

$L_{M\ TOTAL\ PROJECT}$ = Required TSS removal resul
A_N = Net increase in impervious a
P = Average annual precipitation

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

County =	**Comal**	
Total project area included in plan * =	**6.04**	acres
Predevelopment impervious area within the limits of the plan * =	**2.59**	acres
Total post-development impervious area within the limits of the plan* =	**4.79**	acres
Total post-development impervious cover fraction * =	**0.79**	
P =	**33**	inches
$L_{M\ TOTAL\ PROJECT}$ =	**1975**	lbs.

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

Number of drainage basins / outfalls areas leaving the plan area = **3**

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

Drainage Basin/Outfall Area No. = 3

Total drainage basin/outfall area =	**0.01**	acres
Predevelopment impervious area within drainage basin/outfall area =	**0.00**	acres
Post-development impervious area within drainage basin/outfall area =	**0.01**	acres
Post-development impervious fraction within drainage basin/outfall area =	**1.00**	
$L_{M\ THIS\ BASIN}$ =	**9**	lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = **Sand Filter**
Removal efficiency = **89** percent

ATTACHMENT L-1.12 BMPs for Surface Streams:

There were no "sensitive" features found on the proposed site.

ATTACHMENT M-1.13 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. All construction plans and design information have been signed, sealed, and dated by the Texas Licensed Professional Engineer.

ATTACHMENT N-1.14 Inspection, Maintenance, Repair, and Retrofit Plan:

The following inspection and maintenance practices will be used to maintain permanent erosion and sediment controls.

1. Inspection of all permanent BMPs shall be performed using a copy of the form provided at the end of this section, and inspections shall be performed:
   (a) On a quarterly basis and after large storm events for the first year of operation. An inspection report will be completed after each inspection.
   (b) After the first year, inspections should take place at least twice a year (once during or immediately following wet weather) to evaluate facility operations. An inspection report will be completed after each inspection.
2. With each inspection, any damage to the structural elements of the system (pipes, concrete drainage structures, retaining walls, etc.) must be identified and repaired immediately. Cracks, voids and undermining should be patched/filled to prevent additional structural damage. Tree and root systems should be removed to prevent growth in cracks and joints that can cause structural damage. The following items will require more specific attention:
   (a) Sediment Removal – Remove sediment from the inlet structure and sedimentation chamber when sediment buildup reaches a depth of 6 inches or when the proper functioning of the inlet and outlet structures is impaired. Sediment should be cleared from the inlet structure at least every year and from the sedimentation basin at least every 5 years.
   (b) Media Replacement – Maintenance of the filter media is necessary when the drawdown time exceeds 48 hours. When this occurs, the upper layer of sand should be removed and replaced with new material meeting the original specifications. Any discolored sand should also be removed and replaced. In filters that have been regularly maintained, this should be limited to the top 2 or 3 inches.
   (c) Debris and Litter Removal – Debris and litter will accumulate near the sedimentation basin outlet device and should be removed at regular intervals. Particular attention should be paid to floating debris that can eventually clog the inlet control device.
3. Modifications/Repairs - The required inspections should also identify if any revisions to the permanent BMPs that are warranted due to unexpected conditions. Any changes to these procedures may not be altered without approval by the Texas Commission on Environmental Quality (TCEQ):
   (a) There is a change in design, construction, operation, or maintenance at the site that has or could have a significant effect on the discharge of pollutants to the Waters of the United States that has not been previously addressed.
   (b) Inspections or investigations by site staff, or by local, state or federal officials, determine that the discharges from the permanent BMPs are ineffective in eliminating or significantly minimizing pollutants in storm water discharges from the construction site.
   (c) Based on the results of an inspection, it must be modified as necessary to include additional or modified BMPs designed to correct problems identified.

4. All logs shall be kept on site throughout construction. The owner shall retain logs for one (1) year after completion.

SIGNATURE(S)

Brookshire Brothers, Inc by Jerry A. Johnson
Print name of Customer / Owner

2-26-15
Signature of Customer / Owner Date

INSPECTION REPORT

General Information	
Date of inspection:	

Type of Inspection: ❑ Routine ❑ Pre Storm Event ❑ During a Storm Event ❑ Post Storm

Weather at time of this inspection?
❑ Clear ❑Cloudy ❑ Rain ❑ Sleet ❑ Fog ❑ Snowing ❑ High Winds
❑ Other: Temperature:

Has there been a rain event since last inspection? ❑Yes ❑No

Has there been a rain event in the last 24 hours? ❑Yes ❑No Amount of Precipitation (in):_____

(Amount represents all within the last 24 hours)

Have any stormwater discharges occurred since the last inspection? ❑Yes ❑No
If yes, describe:

Are there any discharges at the time of inspection? ❑Yes ❑No
If yes, describe:

BMP	BMP Installed?	BMP Maintenance Required?	Corrective Action Needed and Notes	Corrective Action Completion Date
	❑Yes ❑No	❑Yes ❑No		
	❑Yes ❑No	❑Yes ❑No		
	❑Yes ❑No	❑Yes ❑No		
	❑Yes ❑No	❑Yes ❑No		
	❑Yes ❑No	❑Yes ❑No		
	❑Yes ❑No	❑Yes ❑No		

Additional Notes/Comments:

ATTACHMENT O-1.15 Pilot-Scale Field Testing Plan:

The TCEQ Technical Guidance Manual (TGM) was used to design permanent BMPs and measures for this site; NO pilot-scale field testing is requested as part of this plan.

ATTACHMENT P-1.16 Measures for Minimizing Surface Stream Contamination:

Approximately 6.08 acres of land will be disturbed under this plan. The water quality pond will accept flows from the entire improved areas as part of the development in built-out/developed conditions.

The project will not involve rerouting, filling or crossing a waterway of any kind. This site will surface drain and through an engineered onsite water quality facility located on the southern edge of the site. Stormwater will be discharged from the facility to an existing drainage ditch on the north side of Canyon Park Road, and eventually into Canyon Lake.

The pre and post runoff rate calculations were done for the 2-yr, 10-yr, 25-yr, and 100-yr storm events. HEC-HMS program, set to the SCS method, the HEC-1 unit hydrograph was utilized to model the stormwater design for the project. The design storm is based on the USGS Type III 24-hour storm.

The proposed site plan and improvements will have minimal impact on the existing site condition and surrounding property. The design, analysis, and their applicability as presented herein is based on and limited by the weather data available for this area. This development, with recommended improvements if constructed per the site development plans prepared by Vickrey & Associates, Inc., is deemed not to increase existing endangerment to life or property in the surrounding area and no adverse impacts to existing drainage patterns.

Andrew W. Dodson, P.E.
Vickrey & Associates, Inc.

Date: 2/25/15

2.0 STORM WATER POLLUTION PREVENTION PLAN (SWPPP):

STORM WATER POLLUTION PREVENTION PLAN

FOR

CONSTRUCTION ACTIVITIES

at

BROOKSHIRE BROTHERS CANYON LAKE

18267 F.M. 306

Canyon Lake, Texas 78133

PREPARED FOR:

Brookshire Brothers, Inc.

PREPARED BY:

Vickrey & Associates, Inc.

Texas Board of Professional Engineers Firm No. F-159
1717 West 6th Street, Suite 260
Austin, Texas 78703
(512) 494-8014

V&A Job # 2540-001

December 2014
Revised February 26, 2015

Stormwater Pollution Prevention Plan

for:

Brookshire Brothers Canyon Lake
18267 F.M. 306
Canyon Lake, Texas 78133
TPDES Permit Number
TXR150000

Owner(s):

Brookshire Brothers, Inc.
Jerry A. Johnson
c/o Brookshire Brothers, Inc.
PO Box 1688
Lufkin, Texas 75904
(936) 633-4619
rparker2@brookshirebros.com

Operator(s):

CONTRACTOR
CONTACT NAME
ADDRESS
City, TX zip code
PHONE NO.
E-MAIL

SWPPP Contact(s):

Vickrey & Associates, Inc
Texas Board of Professional Engineers Firm No. F-159
Andew Dodson, P.E.
1717 West 6th St, Ste 260
Austin, TX 78703
(512) 494-8014
austin@vickreyinc.com
Fax (512) 494-8054

SWPPP Preparation Date:

12/18/2014

Estimated Project Dates:

Project Start Date: 03/01/2015

Project Completion Date: 09/01/2015

Contents

SECTION 1: SITE EVALUATION, ASSESSMENT, AND PLANNING 4
1.1 Project/Site Information 4
1.2 Contact Information/Responsible Parties 5
1.3 Soils, Slopes, Vegetation, and Current Drainage Patterns 7
1.4 Receiving Waters 8
1.5 Site Features and Sensitive Areas to be Protected 9
1.6 Endangered Species Certification 10
1.7 Maps and Photographs 11
SECTION 2: CONSTRUCTION ACTIVITIES AND SITE MANAGEMENT PRACTICES 16
2.1 Nature and Sequence of Construction Activity 16
2.2 Construction Site Estimates 17
2.3 Phasing and Construction Sequence Plan 18
2.4 Potential Sources of Pollution 20
SECTION 3: GRADING AND EROSION/SEDIMENT CONTROL BMPs 21
3.1 Minimize Disturbed Area and Protect Natural Features and Soil 22
3.2 Control Stormwater Flowing onto and through the Project 23
3.3 Stabilize Soils 26
3.4 Protect Slopes 27
3.5 Protect Storm Drain Inlets 28
3.6 Establish Perimeter Controls and Sediment Barriers 29
3.7 Retain Sediment On-Site 30
3.8 Establish Stabilized Construction Exits 32
3.9 Additional BMPs 33
SECTION 4: GOOD HOUSEKEEPING BMPs 34
4.1 Material Handling and Waste Management 35
4.2 Establish Proper Building Material Staging Areas 36
4.3 Designate Washout Areas 37
4.4 Establish Proper Equipment/Vehicle Fueling and Maintenance Practices 38
4.5 Control Equipment/Vehicle Washing 39
4.6 Spill Prevention and Control Plan 40
4.7 Any Additional BMPs 43
4.8 Allowable Non-Stormwater Discharge Management 44
SECTION 5: SELECTING POST-CONSTRUCTION BMPs 45
SECTION 6: INSPECTIONS 46
6.1 Inspections 46
6.2 Delegation of Authority 52
6.3 Corrective Action Log 54
SECTION 7: RECORDKEEPING AND TRAINING 56
7.1 Recordkeeping 56
7.2 Log of Changes to the SWPPP 58
7.3 Training 60
SECTION 8: PERMANENT STABILIZATION 61
SECTION 9: CERTIFICATION AND NOTIFICATION 63
COMAL COUNTY PERMIT 64
TEXAS COMMISSION ON ENVIRONMENTAL QUALITY LETTER 65
CONSTRUCTION SITE NOTICE 66

SECTION 1: SITE EVALUATION, ASSESSMENT, AND PLANNING

1.1 Project/Site Information

Instructions:

- In this section, you can gather some basic site information that will be helpful to you later when you file for permit coverage.
- For more information, see *Developing Your Stormwater Pollution Prevention Plan: A SWPPP Guide for Construction Sites* (also known as the *SWPPP Guide*), Chapter 2
- Detailed information on determining your site's latitude and longitude can be found at www.epa.gov/npdes/stormwater/latlong

Project/Site Name: Brookshire Brothers Canyon Lake

Project Street/Location: 18267 F.M. 306

City: Canyon Lake State: TX ZIP Code: 78736

County: Comal County

Comal County Permit Number (complete when assigned):

Comal County Case Manager (complete when assigned):

TPDES project or permit tracking number*:TXR150000

Latitude/Longitude (Use **one** of three possible formats, and specify method)

Latitude:	Longitude:
1. 29 ° 54 ' 52" N (degrees, minutes, seconds)	1. 98 ° 12 ' 59" W (degrees, minutes, seconds)
2. __ ° __ . __ ' N (degrees, minutes, decimal)	2. __ ° __ . __ ' W (degrees, minutes, decimal)
3. __ . ____ ° N (decimal)	3. -__ . ____ ° W (decimal)

Method for determining latitude/longitude:

☐ USGS topographic map (specify scale:_____) ☒ EPA Web site ☐ GPS

☒ Other (please specify): Google Earth

Is the project located in Indian country? ☐ Yes ☒ No

If yes, name of Reservation, or if not part of a Reservation, indicate "not applicable."_____

Not Applicable.

Is this project considered a federal facility? ☐ Yes ☒ No

TPDES project or permit tracking number*: TXR150000

**(This is the unique identifying number assigned to your project by your permitting authority after you have applied for coverage under the appropriate Texas Pollutant Discharge Elimination System (TPDES) construction general permit.)*

1.2 Contact Information/Responsible Parties

Instructions:

- List the operator(s), project managers, stormwater contact(s), and person or organization that prepared the SWPPP. Indicate respective responsibilities, where appropriate.
- Also, list subcontractors expected to work on-site. Notify subcontractors of stormwater requirements applicable to their work.
- See *SWPPP Guide*, Chapter 2.B.

Owner(s):

Brookshire Brothers, Inc.
Jerry A. Jonnson, Brookshire Brothers, Inc.
PO Box 1688
Lufkin, Texas 75904
(936) 633-4619
Fax: (936) 633-4670 E-mail: rparker2@brookshirebros.com
Owner

Operator(s):

CONTRACTOR
CONTACT NAME
ADDRESS
City, TX zip code
PHONE NO.
Fax: (###) ###-#### E-mail: E-MAIL
Construction Manager

Project Manager(s) or Site Supervisor(s):

Vickrey & Associates, Inc.
James Massaro, P.E.
1717 W. 6th Street, Suite 260
City, TX 78703
PHONE NO. (512) 494-8014
Fax: (512) 494-8054 E-mail: jmassaro@vickreyinc.com
Project Civil Engineer

SWPPP Contact(s):

Vickrey & Associates, Inc.
James Massaro, P.E.
1717 W. 6th Street, Suite 260
City, TX 78703
PHONE NO. (512) 494-8014
Fax: (512) 494-8054 E-mail: jmassaro@vickreyinc.com
Project Civil Engineer

This SWPPP was Prepared by:

Vickrey & Associates, Inc.
Andrew W. Dodson, P.E.
1717 West 6th Street, Suite 260
Austin, Texas 78703
Telephone: (512) 494-8014
Fax: (512) 494-8054 E-Mail: austin@vickreyinc.com
Texas Board of Professional Engineers Firm No. F-159

Subcontractor(s):

Not applicable.

Emergency 24-Hour Contact:

Brookshire Brothers, Inc.
Jerry A. Jonnson
(936) 633-4619

1.3 Soils, Slopes, Vegetation, and Current Drainage Patterns

Instructions:

- Describe the existing soil conditions at the construction site including soil types, slopes and slope lengths, and other topographic features that might affect erosion and sediment control. Use NRCS Soil Survey, USGS, or Bureau of Economic Geology Geologic Maps.
- Delineate and describe the existing topography and drainage patterns, including overland and concentrated flow.
- Delineate and describe the contributing drainage area for flow paths that drain at least 1 acre.
- Note the presence or absence of baseflow and USGS stream type (ephemeral, intermittent, or perennial).
- Describe predominant vegetation.
- Note any historic site contamination evident from existing site features and known past usage of the site.
- This information should also be included on your site maps.

Soil type(s):

The USDA Natural Resources Conservation Service (NRCS) Comal and Hays Counties National Cooperative soil survey indicates the following soil types on the site:

- BtD – Brackett-Rock outcrop-Comfort complex, 1 to 8 percent slopes
- DeB – Denton silty clay, 1 to 3 percent slopes
- DoC – Doss silty clay, moist, 1 to 5 percent slopes
- SuB – Sunev clay loam, 1 to 3 percent slopes

Slopes (describe current slopes and note any changes due to grading or fill activities):

There are no slopes on this site greater than 12%. Approximately 20% of the site contains 1 to 8 percent slopes. Approximately 43% of the site contains 1 to 5 percent slopes. Approximately 37% of the site contains 1 to 3 percent slopes.

Drainage Patterns (describe current drainage patterns and note any changes dues to grading or fill activities):

All of the storm water from the site eventually flows into Canyon Lake and the Guadalupe River Basin.

Vegetation:

The site is currently undeveloped with **43%** impervious cover. The site plan for this project proposes **4.8** acres of impervious cover, or **83%** impervious cover. The survey did not identify any heritage trees on this site.

Other: None.

1.4 Receiving Waters

Instructions:

- List the water body(s) that would receive stormwater from your site, including streams, rivers, lakes, coastal waters, and wetlands. Describe each as clearly as possible, such as *Boggy Creek, a tributary to the Colorado River*, and so on.
- Indicate the location of all waters, including wetlands, on the site map.
- Note any stream crossings, if applicable.
- List the storm sewer system or drainage system that stormwater from your site could discharge to and the water body(s) that it ultimately discharges to.
- If any of the water bodies above are impaired and/or subject to Total Maximum Daily Loads (TMDLs), please list the pollutants causing the impairment and any specific requirements in the TMDL(s) that are applicable to construction sites. Your SWPPP should specifically include measures to prevent the discharge of these pollutants.
- Also, for more information and a list of TMDL contacts and links by state, visit www.epa.gov/npdes/stormwater/tmdl.

Description of receiving waters:

The project site is 6.04 acres. The site lies within the Canyon Lake watershed and flows to the south and west. The receiving water for Canyon Lake is the Guadalupe River Basin.

Description of storm sewer systems:

There are no existing storm water systems on F.M. 306.

Description of impaired waters or waters subject to TMDLs:

None.

Other:

None.

1.5 Site Features and Sensitive Areas to be Protected

Instructions:

- Describe unique site features including streams, stream buffers, heritage or protected trees, natural vegetation, steep slopes, or highly erodible soils that are to be preserved.
- Describe critical environmental features including bluffs, canyon rimrocks, caves, sinkholes, springs, and wetlands.
- Describe measures to protect these features.
- Include these features and areas on your site plans.

Describe unique features that are to be preserved:
There are no unique features that need to be preserved.

Describe critical environmental features that are to be preserved:
Based on a field visit, no critical environmental features (CEFs) such as springs, canyon rim rocks, caves, sinkholes, or wetlands, were found on or within 150 feet of the subject property. There are no known critical environmental features that need to be preserved.

Describe measures to protect these features:
Not necessary as there are no critical environmental features that need to be preserved.

1.6 Endangered Species Certification

Instructions:

- Before beginning construction, determine whether endangered or threatened species or their critical habitats are on or near your site.
- Adapt this section as needed for state or tribal endangered species requirements and, if applicable, document any measures deemed necessary to protect endangered or threatened species or their critical habitats.
- For more information on this topic, see *SWPPP Guide*, Chapter 3.B.
- Additional information on Endangered Species Act (ESA) provisions is at www.epa.gov/npdes/stormwater/esa

Are endangered or threatened species and critical habitats on or near the project area?

☐ Yes ☒ No

Describe how this determination was made:

There are no endangered or threatened species and critical habitats on this site or near the project area.

If yes, describe the species and/or critical habitat:

Not applicable. There are no known threatened species and/or critical habitat on this site.

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.)

Not applicable. There are no known threatened species and/or critical habitat on this site.

1.7 Maps and Photographs

Instructions:

- Site plan sheets should include the graphics necessary to illustrate, review, and construct the systems outlined in the SWPPP. Specific submittal requirements are explained in later sections of this document.
- Attach additional maps and photographs. Include representative photograph of site that shows designer ON-SITE and photographs of predominant vegetation.

Include the site maps and photographs with the SWPPP.

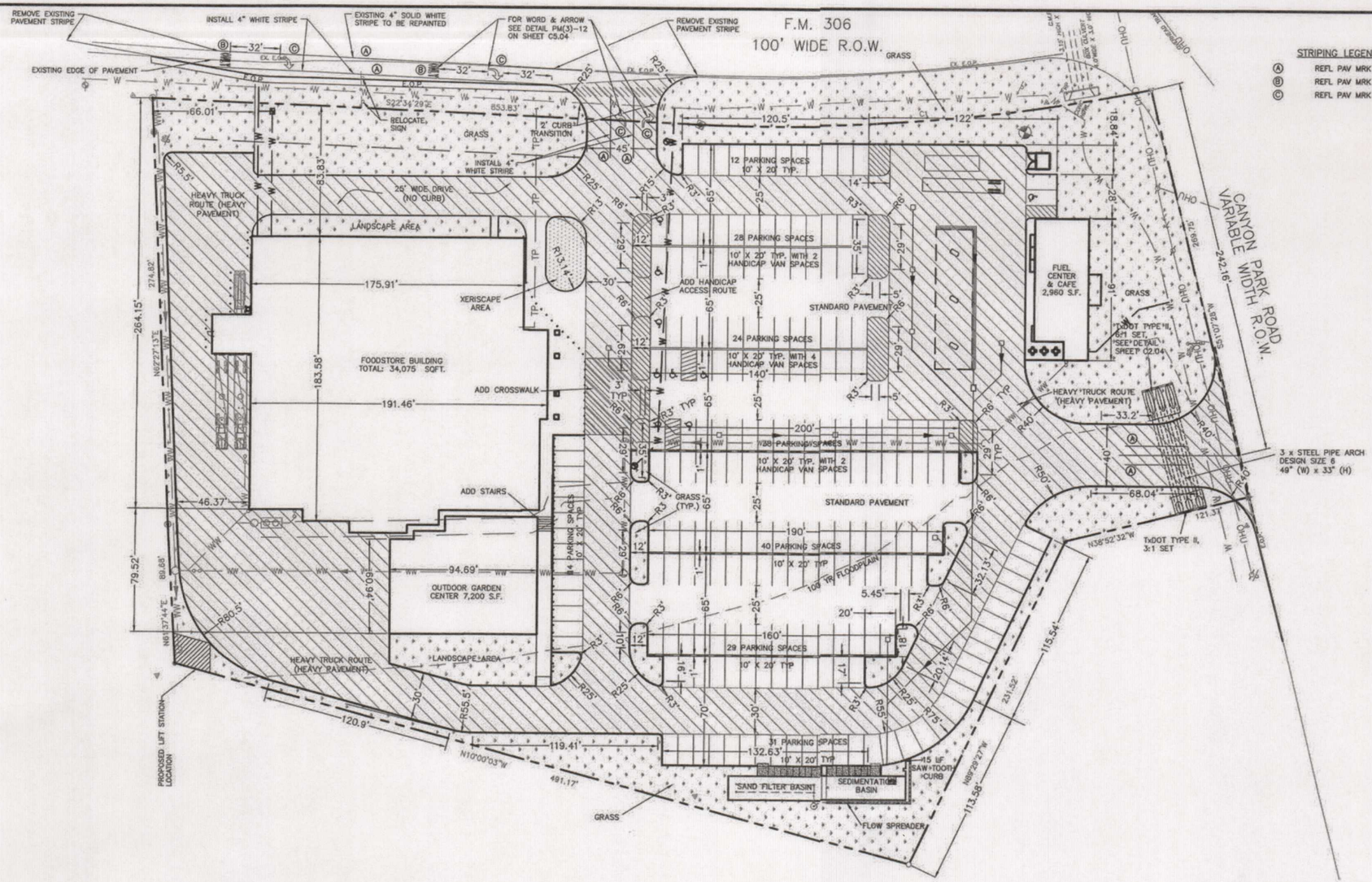
The following three (3) pages contain 11" x 17" copies of:

Sheet C1.03: Site Plan

Sheet C1.05: Grading Plan North

Sheet C1.06: Grading Plan South

INSERT SHEET C1.03: SITE PLAN



STRIPING LEGEND

- Ⓐ REFL PAV MRK (W) 4" (SLD)
- Ⓑ REFL PAV MRK (WORD)
- Ⓒ REFL PAV MRK (ARROW)

0 40 80
20 60
SCALE: 1"=40'

LEGEND

- PROPERTY LINE
- FIRE LANE STRIPING
- FENCE
- ACCESSIBLE ROUTE
- RETAINING WALL
- SET IRON ROD
- ELECTRIC POLE
- HANDICAP PARKING
- ACCESSIBLE RAMP
- SIGN
- EXISTING FIRE HYDRANT
- PROPOSED FIRE HYDRANT
- STANDARD CURB & GUTTER
- LAYDOWN CURB & GUTTER
- STANDARD CONC. PAVEMENT
- SHADED SIDEWALK
- TREES TO REMAIN
- TREES TO BE REMOVED
- (14) PARKING COUNT

PAVEMENT SECTIONS

HEAVY PAVEMENT	• 7" CONCRETE PAVING 3500 PSI MIN. @ 28 DAYS • 8" MOISTURE CONDITIONED SUBGRADE
STANDARD PAVEMENT	• 5" CONCRETE PAVING 3500 PSI MIN. @ 28 DAYS • 8" MOISTURE CONDITIONED SUBGRADE

VERIFY SUBGRADE CONDITION FOR CONCRETE PAVING

SITE PLAN NOTES

1. ALL AREAS ONSITE ARE CONSIDERED TO BE DISTURBED DURING CONSTRUCTION. AREA SHOWN ON THE EROSION/SEDIMENTATION CONTROL SHEET AS LOC/LIMITS OF CONSTRUCTION ARE TO BE DISTURBED.

2. SLOPES ARE ANTICIPATED AFTER GRADING, TO BE 0.5% TO 3% PRIMARILY WITH A PORTION OF DRIVEWAYS AND DRIVE ACCESS AT 10% IN PERVIOUS AREAS, SOME SLOPES MAY BE AS HIGH AS 3:1 (33%)

3. STABILIZATION PRACTICES SUCH AS COMPACTION FOR PAVING AND REVEGETATION ARE EXPECTED TO OCCUR IN ALL DISTURBED AREAS.

DESCRIPTION | DATE | NO.

STATE OF TEXAS
JAMES C. MASSARO
92530
LICENSED
PROFESSIONAL ENGINEER
2/27/15

VICKREY & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION # F-109 TBPLS REGISTRATION # 10004100
1717 West 6th Street, Suite 260
Austin, Texas 78703
Phone: (512) 494-8014 Fax: (512) 494-8054

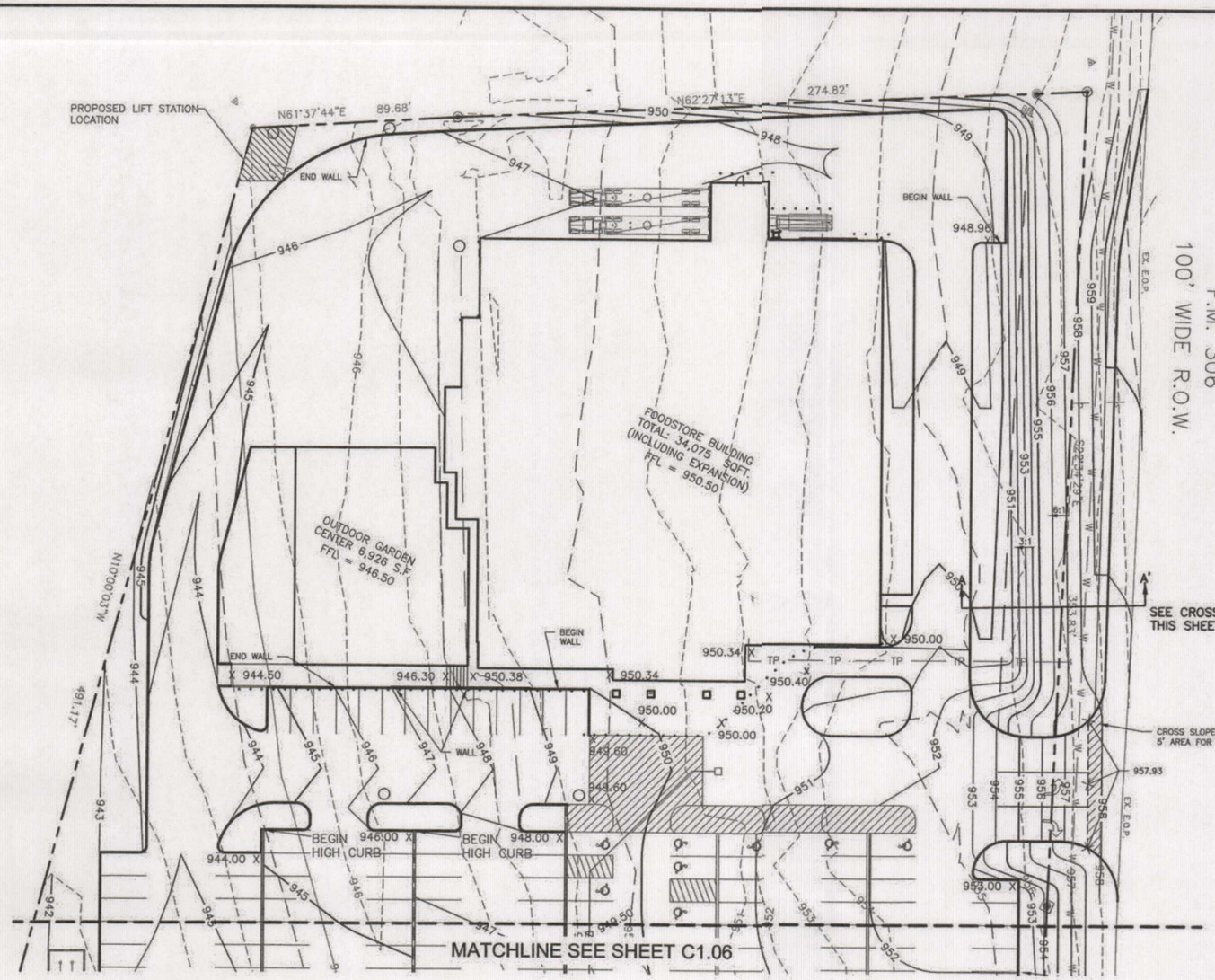
SITE PLAN AND DIMINSIONAL CONTROL

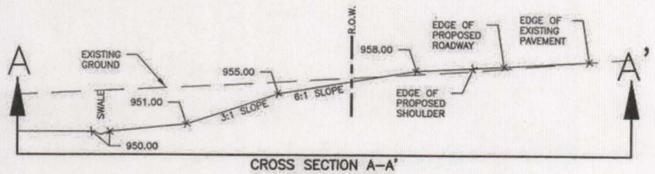
BROOKSHIRE BROTHERS, CANYON LAKE
18267 FM 306
CANYON LAKE, TX

DRAWN BY:	JTM
CHECKED BY:	JCM
APPROVED BY:	JCM
DATE:	09/15/2014

SHEET
C1.03

PROJ NO. 2540-001





CROSS SECTION A–A'
SCALE: 1"=10'

0 30 60
15 45
SCALE: 1"=30'

LEGEND

- PROPERTY LINE
- RETAINING WALL
- 890 EXISTING CONTOURS
- 890 PROPOSED CONTOURS
- FLOW DIRECTION
- 890.00 SPOT ELEVATION
- 890.50 / 890.00 SPOT ELEVATION TOP & BASE OF CURB (TOP / BASE)
- 1000 TREES TO REMAIN
- PROPOSED STREET LIGHT

DATE	NO.	DESCRIPTION

STATE OF TEXAS
JAMES C. MASSARO
92530
LICENSED
PROFESSIONAL ENGINEER
8/27/15

VICKREY & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION # F-159 TBPLS REGISTRATION # 10004100
1717 West 6th Street, Suite 260
Austin, Texas 78703
Phone: (512) 494-8014 Fax: (512) 494-8054

GRADING PLAN

BROOKSHIRE BROTHERS, CANYON LAKE
18267 FM 306
CANYON LAKE, TX

DRAWN BY:	JTM
CHECKED BY:	JCM
APPROVED BY:	JCM
DATE:	09/15/2014

SHEET
C1.05

PROJ NO. 2540-001

Drawing: W:\2540-001\Engineering\DWG\wh_grading.dwg ;C1.04 Grading Plan
User: JMOCK
Last Modified: Feb. 27, 15 - 09:06
Plot Date/Time: Feb. 27, 15 - 09:07:04

Photographs:

SECTION 2: CONSTRUCTION ACTIVITIES AND SITE MANAGEMENT PRACTICES

2.1 Nature and Sequence of Construction Activity

Instructions:

- Briefly describe the nature of the construction activity and approximate time frames (one or more paragraphs, depending on the nature and complexity of the project).

Describe the general scope of the work for the project, major phases of construction, etc:

This project is located within the unincorporated part of Comal County on the northwest corner of F.M. 306 at its intersection with Canyon Park Road, near the northeast shore of Canyon Lake. The planned project for this 6.04 acre site consists of a grocery store and a fueling station. The site is within the Canyon Lake watershed, within the Contributing Zone of the Edwards Aquifer. A small portion on the southwest corner of the site is located within the 100-year floodplain as identified by FIRM panel 48091C0115F, dated September 2, 2009 (Comal County). The property contains an existing well and various structures which have been removed.

The site plan proposes to increase the existing impervious cover from approximately **43%** to **83%** and includes a water quality pond designed in accordance with TCEQ standards. Calculations for the pond are included in the plans. The construction will take approximately **6** months to complete.

Based on field visits, no critical environmental features (CEFs) such as springs, canyon rim rocks, caves, sinkholes, or wetlands, were found on or within 150 feet from the subject property.

What is the function of the construction activity?

☐ Residential ☒ Commercial ☐ Industrial ☐ Road Construction ☐ Linear Utility

☒ Other (please specify): Private Recreation Area.

Estimated Project Start Date: 03/01/2015.

Estimated Project Completion Date: 09/01/2015.

2.2 Construction Site Estimates

Instructions:

- Estimate the area to be disturbed by excavation, grading, or other construction activities, including dedicated off-site borrow and fill areas.
- Calculate the percentage of impervious surface area before and after construction
- Calculate the runoff coefficients before and after construction.
- Provide calculation of cut/fill volumes per phase, including a demonstration of how spoils will be handled during construction.

The following are estimates of the construction site.

Total project area:	6.04 acres
Construction site area to be disturbed:	6.04 acres
Limits of construction:	6.04 acres
Percentage impervious area before construction:	43 %
Runoff coefficient before construction:	0.68
Percentage impervious area after construction:	83 %
Runoff coefficient after construction:	0.88
Cut/Fill Volumes per Area:	Net Fill 200 cubic yards

Demonstration of how spoils will be handled during construction:
All vegetation removed from this site as a result from clearing and grubbing shall be mulched and stored on-site in the designated storage area for re-use in landscaped areas. Materials from trench excavation will be stored on a temporary spoils disposal site shown on the Site Plan. Materials not used for backfill of the trenches will be transported to an approved off-site spoils disposal site. Inspections will evaluate areas for storing materials. If necessary, the materials must be covered. Also, protective berms or filter dikes must be installed, if needed, to contain runoff from material storage areas. As the majority of the construction areas are to be filled, only minimal spoils are expected.

2.3 Phasing and Construction Sequence Plan

Instructions:

- Provide maps and schedules of disturbances, phasing, and temporary and permanent stabilization.
- For site plan review purposes, construction sequence must show the duration of each activity, as opposed to specific start and end dates. Prior to the start of construction though, the SWPPP must be updated with actual dates of start/finish for each activity outlined in this sequence.
- Provide length of time to install construction phase E&S controls.
- Provide length of time for each identified phase of construction from initial groundbreaking to final grade and any intermediate steps that would require modification of E&S controls (temporary and permanent stormwater ponds, clearing and grubbing, rough grade, final grade, utilities, etc.).
- Identify areas within the limits of construction (LOC) that will require temporary stabilization and the times of installation, modification, and removal. Sequencing of grading, cut and fill activities will be required to show how disturbed and stockpiled sediment is accounted for each time it is transported from initial disturbance to permanent stabilization.
- Identify schedule for permanent stabilization.
- Identify schedule for converting temporary controls to permanent functions (e.g. basins).
- Identify schedule for removal of E&S controls.
- Identify maintenance schedule for Construction Phase BMPs.

- Phase I

SEQUENCE OF CONSTRUCTION:

1. Coordinate all start-up work with owner.
2. 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 Stormwater Pollution Prevention Plan (SWPPP) and Contributing Zone Plan (CZP) that is required to be posted on the site. Install tree protection and initiate tree mitigation measures.
3. Hold pre-construction conference.
4. The Site Supervisor, and/or Designated Responsible Party, and the General Contractor will follow the Storm Water Pollution Prevention Plan (SWPPP) and CZP posted on the site. Temporary erosion and sedimentation controls will be revised, if needed, to comply with local inspectors' directives, and revised construction schedule relative to the water quality plan requirements and the erosion plan.
5. Temporary erosion and sedimentation controls will be inspected and maintained in accordance with the Storm Water Pollution Prevention Plan (SWPPP) and CZP posted on the site.
6. Begin site clearing/construction (or demolition) activities.
7. Construction areas should be stripped of all vegetation, loose topsoil, cobbles, and boulders.
8. Temporary controls to be inspected and maintained weekly and prior to anticipated rainfall events, and after rainfall events, as needed.
9. Rough grade site in accordance with plans and specifications.
10. Complete construction and start re-vegetation of the site and installation of landscaping.
11. Construct "all weather driving surface".
12. Complete grading, drainage, and paving. Installation of base material and/or paving should occur as soon as it is feasible to do so.
13. Hydromulch or sod all disturbed areas and clean-up site.

14. Finalize all site improvements.
15. Permanent water quality ponds or controls will be cleaned out and filter media will be installed prior to/concurrently with re-vegetation of site.
16. Upon completion of the site construction and re-vegetation of a project site, the design engineer shall submit an engineer's letter of concurrence to the local permitting authority indicating that construction, including re-vegetation, is complete and in substantial conformity with the approved plans. After receiving this letter, a final inspection will be scheduled by the appropriate inspector.
17. Upon completion of landscape installation of a project site, the Landscape Architect shall submit a letter of concurrence to the local permitting authority 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 Inspector.
18. After a final inspection has been conducted by the Inspector and with approval from the Inspector, remove the temporary erosion and sedimentation controls and complete any necessary final re-vegetation resulting from removal of the controls. Conduct any maintenance and rehabilitation of the water quality ponds or controls.
19. Permanent controls will be cleaned out and filter media will be installed prior to/concurrently with re-vegetation of site.
20. If disturbed area is not to be worked on for more than 14 days, disturbed area need to be stabilized by re-vegetation, mulch, tarp or re-vegetation matting.
21. Final cleaning of erosion and sedimentation controls and storm drain structures. This shall occur prior to final payment.
22. Dispose of all construction debris and trash. Re-vegetate disturbed areas, and complete permanent erosion control and site restoration, or execute a developer's contract for the re-vegetation. Remove temporary erosion/sedimentation controls and tree protection. Restore any areas disturbed during removal of erosion/sedimentation controls.
23. Receive city clearance for occupancy.

2.4 Potential Sources of Pollution

Instructions:

- Identify and list all potential sources of sediment, which may reasonably be expected to affect the quality of stormwater discharges from the construction site.
- Identify and list all potential sources of pollution, other than sediment, which may reasonably be expected to affect the quality of stormwater discharges from the construction site.
- Describe pollution controls procedures and devices.

Potential sources of sediment to stormwater runoff:

Site vehicular traffic, clearing and grubbing operations, grading and site excavation operations, construction activity, site demolition, utility installation, and landscaping operations.

Potential pollutants and sources, other than sediment, to stormwater runoff:

Temporary sanitary facilities, paints, oil from site equipment, general building materials, solvents, adhesives, pavement demolition, concrete removal, debris, trash.

Pollution control procedures and devices:

Filter dikes, silt fence, inlet protection, compliance with local and state sanitary regulations, designated area for equipment cleaning and repair, runoff with contaminants must be collected, removed, treated and disposed at a chemical disposal facility.

Trade Name Material	Stormwater Pollutants	Location

SECTION 3: GRADING AND EROSION/SEDIMENT CONTROL BMPs

Instructions:

- Describe the BMPs that will be implemented to control pollutants in stormwater discharges. For each major activity identified, do the following
  - ✓ Clearly describe appropriate control measures.
  - ✓ Describe the general sequence during the construction process in which the measures will be implemented.
  - ✓ Describe the maintenance and inspection procedures that will be used for that specific BMP.
  - ✓ Include protocols, thresholds, and schedules for cleaning, repairing, or replacing damaged or failing BMPs.
  - ✓ Identify staff responsible for maintaining BMPs.
  - ✓ (If your SWPPP is shared by multiple operators, indicate the operator responsible for each BMP.)
- Plan sheets should 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.
- Categorize each BMP under one of the following 10 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.

3.1 Minimize Disturbed Area and Protect Natural Features and Soil

Instructions:

- Describe the areas that will be disturbed with each phase of construction and the methods (e.g., signs, fences) that you will use to protect those areas that should not be disturbed. Describe natural features identified earlier and how each will be protected during construction activity. Also describe how topsoil will be preserved. Include these areas and associated BMPs on your site map(s) also.
- Provide any necessary calculations. Computations shall be required for BMPs that rely on detention, sedimentation, filtration, diversion and velocity control.

There are no natural features on the site. There are no existing areas of preserved vegetation.

BMP Description:	
Installation Schedule:	
Maintenance and Inspection:	
Responsible Staff:	

3.2 Control Stormwater Flowing onto and through the Project

Instructions:

- Describe structural practices (e.g., diversions, berms, ditches, storage basins) including design specifications and details used to divert flows from exposed soils, retain or detain flows, or otherwise limit runoff and the discharge of pollutants from exposed areas of the site.
- Provide any necessary calculations. Computations shall be required for BMPs that rely on detention, sedimentation, filtration, diversion and velocity control.

BMP Description:	Perimeter protection using reinforced silt fencing
Installation Schedule:	Prior to any site work in the area.
Maintenance and Inspection:	Inspect weekly and after rain events of >0.5 inches.
Responsible Staff:	Construction Manager

BMP Description: Rock Berm - Temporary sedimentation will be sent by the Pond Pumps through a 30-foot Rock Berm on the south edge of the detention pond.	
Installation Schedule:	Prior to any clearing.
Maintenance and Inspection:	Inspect weekly and after rain events of >0.5 inches.
Responsible Staff:	Construction Manager

See the plans for the location of Rock Berms.

Inspection and Maintenance Guidelines for Rock Berms per TCEQ RG-348 (July 2005):

(1) Inspection should be made weekly and after each rainfall by the responsible party. For installations in streambeds, additional daily inspections should be made.

(2) Remove sediment and other debris when buildup reaches 6 inches and dispose of the accumulated silt in an approved manner that will not cause any additional siltation.

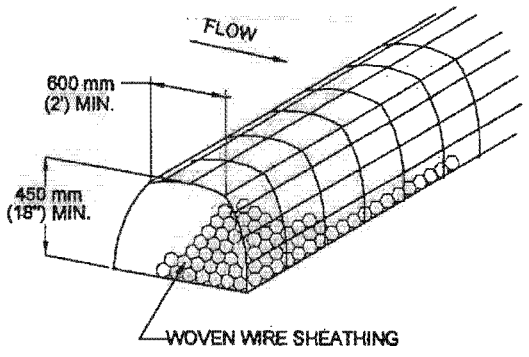
(3) Repair any loose wire sheathing.

(4) The berm should be reshaped as needed during inspection.

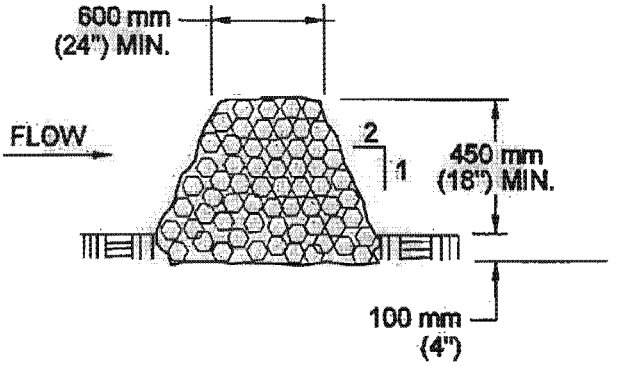
(5) The berm should be replaced when the structure ceases to function as intended due to silt accumulation among the rocks, washout, construction traffic damage, etc.

(6) The rock berm should be left in place until all upstream areas are stabilized and accumulated silt removed.

City of Austin Rock Berm Detail 639_S-1:



ROCK BERM



CROSS SECTION

BMP Description:	Flow Spreader
Installation Schedule:	Prior to any site work in the area.
Maintenance and Inspection:	Inspect weekly and after rain events of >0.5 inches.
Responsible Staff:	Construction Manager

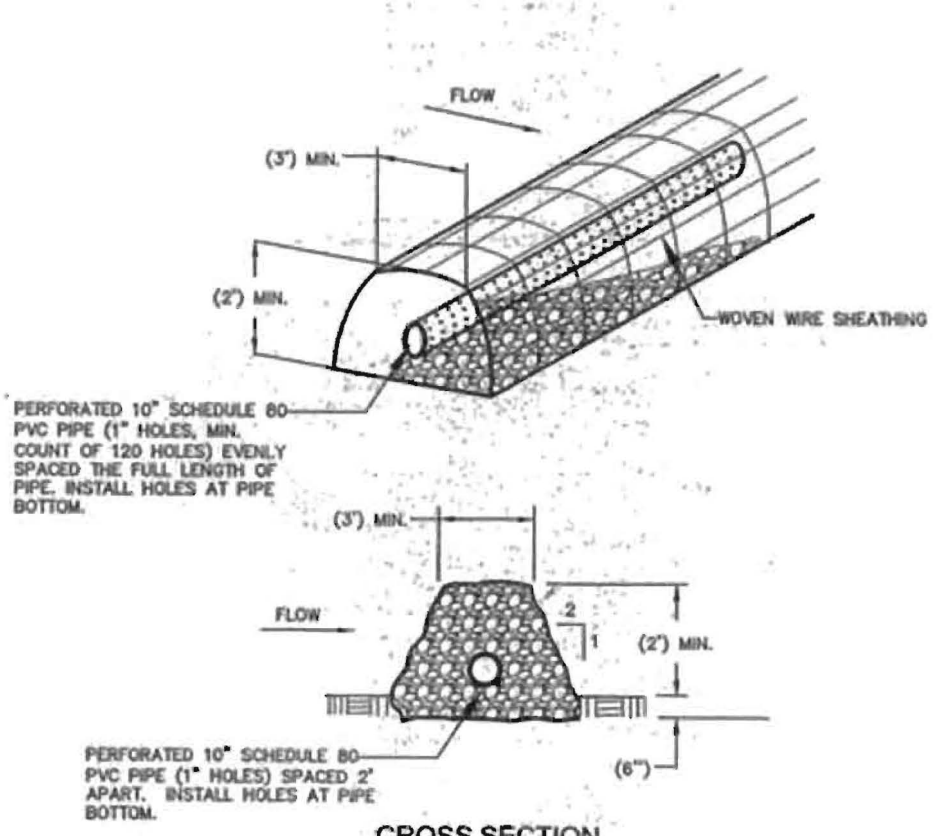
Inspection and Maintenance Guidelines for Flow Spreaders - TCEQ RG-348 (July 2005):

(1) The measure should be inspected after every rainfall and repairs made, if required.

(2) Flow spreader lip should remain at 0% slope to allow proper function of measure.

(3) The contractor should avoid the placement of any material on and prevent construction traffic across the structure. If the measure is damaged by construction traffic, it should be repaired immediately.

Flow Spreader detail:



CROSS SECTION

Stormwater Perforated Discharge Line				
Q=4.82Ah^.5				
Q=		cf/48hr - OR -	5.320	cfs
Q	h	A	r (ft)	d (inches)
5.320	0.001	34.903	3.334	80.016

MIN. NUMBER OF 1" PERFORATED HOLES REQUIRED TO DISCHARGE THE CALCULATED FLOW OF 5.32 CFS IS 120 WITH A 50% CLOGGING FACTOR.

FLOW SPREADER

NTS

Planning &

3.3 Stabilize Soils

Instructions:

- Describe controls (e.g., interim seeding with native vegetation, hydroseeding) to stabilize exposed soils where construction activities have temporarily or permanently ceased. Also describe measures to control dust generation. Avoid using impervious surfaces for stabilization whenever possible.
- Provide any necessary calculations. Computations shall be required for BMPs that rely on detention, sedimentation, filtration, diversion and velocity control.

BMP Description:	Temporary Hydromulch Seeding to provide protection to exposed soils during short periods of construction, and to provide soil stabilization.
☐ ***Permanent***	☒ ***Temporary***
Installation Schedule:	Within 24 days after construction cease and no construction for 14 days.
Maintenance and Inspection:	Inspect weekly. Temporary erosion control shall be acceptable when the grass has grown at least 1 1/2 inches high with 95% coverage, provided no bare spots larger than 16 square feet exist.
Responsible Staff:	Construction Manager

BMP Description:	Dust control/Water Trucks
☐ ***Permanent***	☒ ***Temporary***
Installation Schedule:	As needed once site grading has commenced and during windy conditions while site grading is occurring.
Maintenance and Inspection:	Inspect daily and after rain events of >0.5 inches.
Responsible Staff:	Construction Manager

BMP Description:	
☐ ***Permanent***	☐ ***Temporary***
Installation Schedule:	
Maintenance and Inspection:	
Responsible Staff:	

3.4 Protect Slopes

Instructions:

- Describe controls (e.g., erosion control blankets, tackifiers, rip rap, biotechnical slope stabilization) including design specifications and details that will be implemented to protect all slopes.
- Provide any necessary calculations. Computations shall be required for BMPs that rely on detention, sedimentation, filtration, diversion and velocity control.

BMP Description:	Re-vegetation
Installation Schedule:	Seeding as soon as possible after completion of final grades
Maintenance and Inspection:	N/A
Responsible Staff:	Construction Manager

BMP Description:	
Installation Schedule:	
Maintenance and Inspection:	
Responsible Staff:	

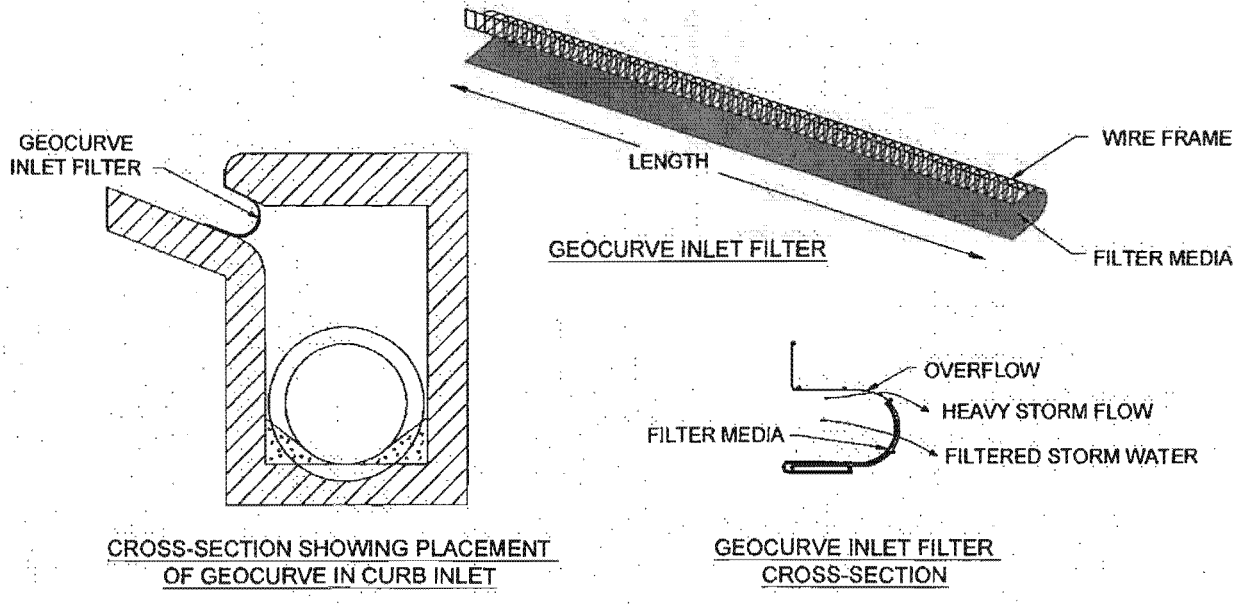
3.5 Protect Storm Drain Inlets

Instructions:

- Describe controls including design specifications and details that will be implemented to protect all inlets receiving stormwater from the project during the entire project.
- Provide any necessary calculations. Computations shall be required for BMPs that rely on detention, sedimentation, filtration, diversion and velocity control.

BMP Description:	Inlet Protection
Installation Schedule:	Immediately after installation.
Maintenance and Inspection:	Inspect weekly and after rain events of >0.5 inches.
Responsible Staff:	Construction Manager

Inlet Protection detail:



FILTER MEDIA PROPERTIES: Mono-filament Woven Filter Fabric

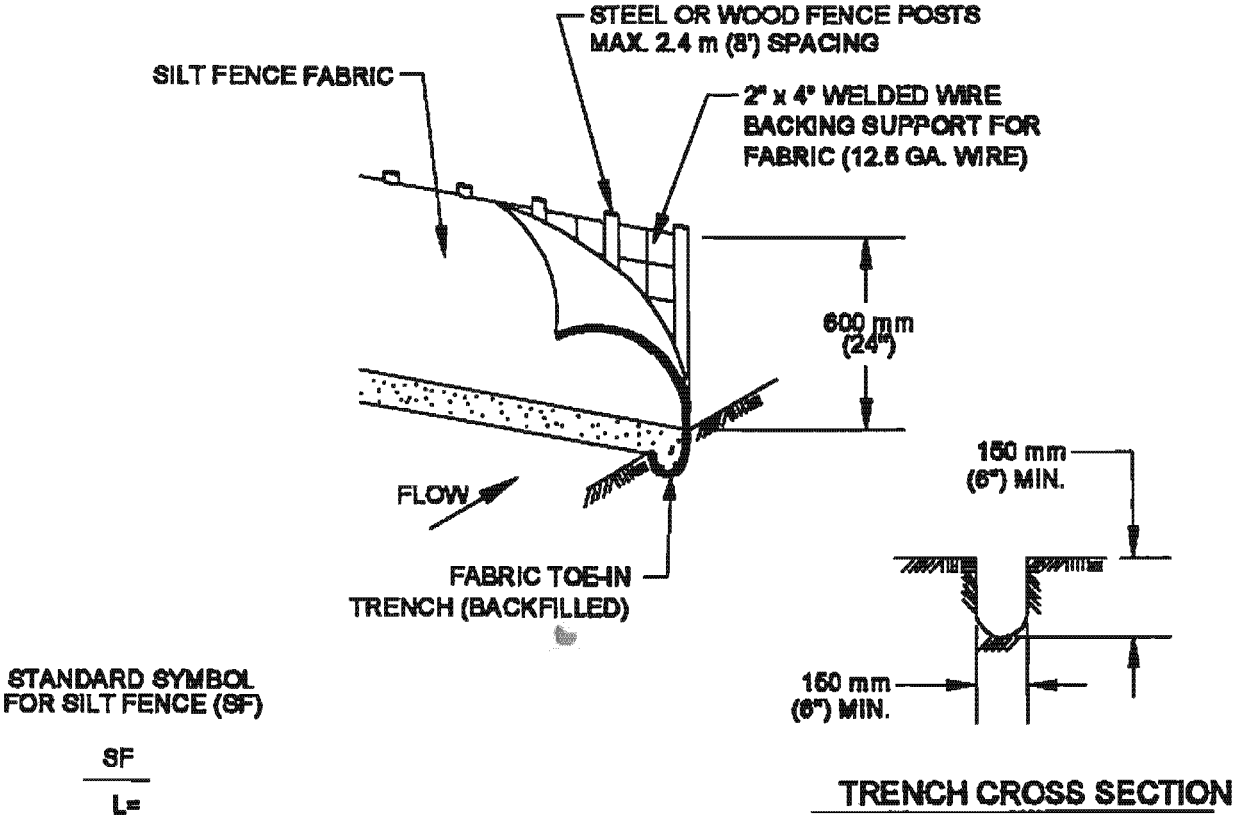
3.6 Establish Perimeter Controls and Sediment Barriers

Instructions:

- Describe structural practices (e.g., silt fences or mulch berms) including design specifications and details to filter and trap sediment before it leaves the construction site.
- Provide any necessary calculations. Computations shall be required for BMPs that rely on detention, sedimentation, filtration, diversion and velocity control.

BMP Description:	Silt Fence
Installation Schedule:	Prior to any site work in the area.
Maintenance and Inspection:	Inspect weekly and after rain events of >0.5 inches.
Responsible Staff:	Construction Manager

Silt Fence detail:



3.7 Retain Sediment On-Site

Instructions:

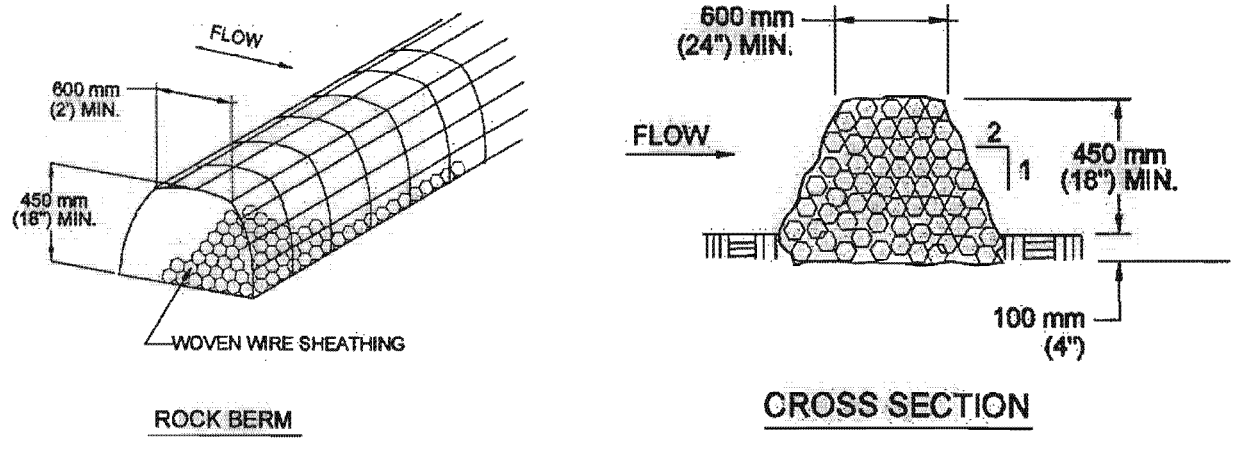
- Describe sediment control practices (e.g., sediment trap or sediment basin), including design specifications and details (volume, dimensions, outlet structure) that will be implemented at the construction site to retain sediments on-site.
- Provide any necessary calculations. Computations shall be required for BMPs that rely on detention, sedimentation, filtration, diversion and velocity control.

BMP Description: Temporary sedimentation will be sent by the Pond Pumps through a 30-foot Rock Berm on the south edge of the detention pond.

Installation Schedule:	Prior to grading activity.
Maintenance and Inspection:	Inspect monthly and after rain events of >0.5 inches.
Responsible Staff:	Construction Manager

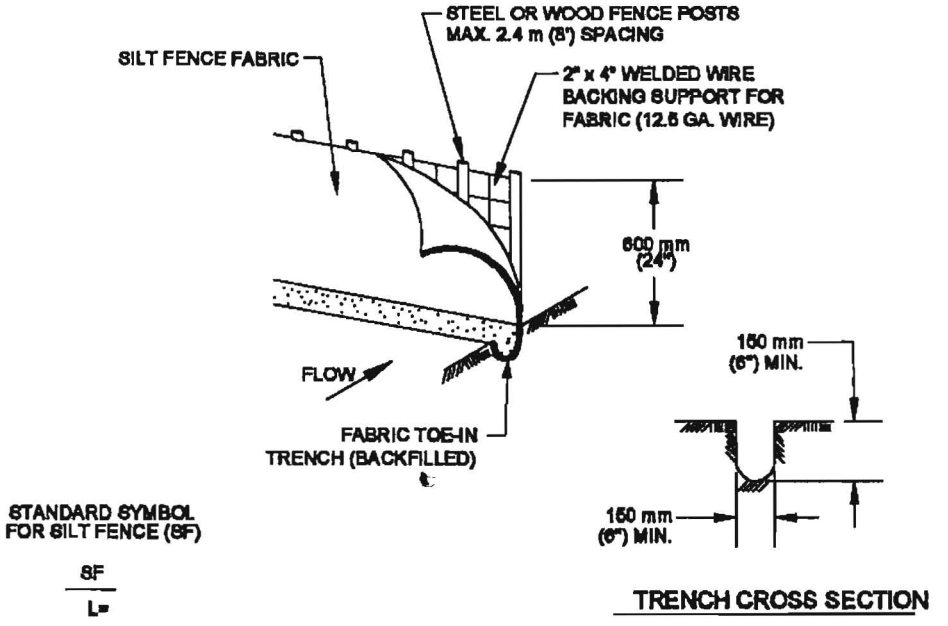
See the plans for the location of Rock Berms.

City of Austin Rock Berm Detail 639_S-1:



BMP Description:	Silt Fence
Installation Schedule:	Prior to any site work in the area.
Maintenance and Inspection:	Inspect weekly and after rain events of >0.5 inches.
Responsible Staff:	Construction Manager

Silt Fence detail:



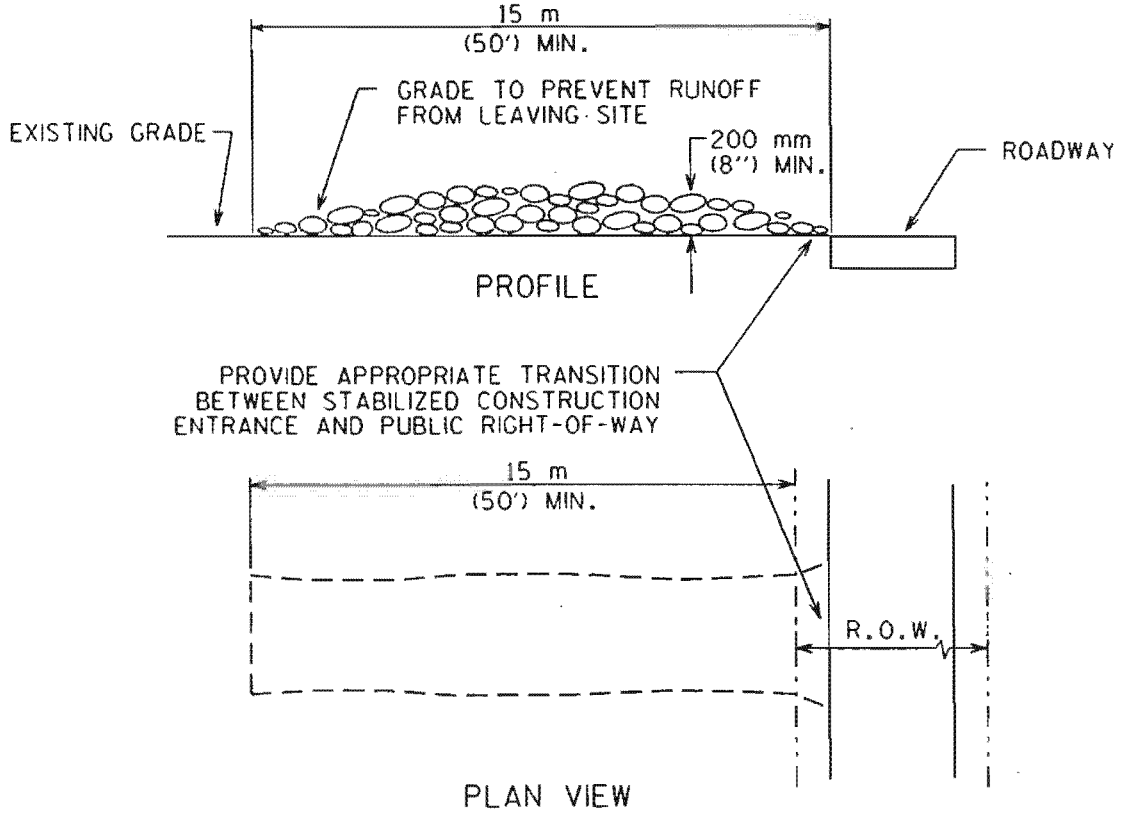
3.8 Establish Stabilized Construction Exits

Instructions:

- Describe location(s) of vehicle entrance(s) and exit(s), procedures to remove accumulated sediment off-site (e.g., vehicle tracking), and stabilization practices (e.g., stone pads or wash racks or both) to minimize off-site vehicle tracking of sediments and discharges to stormwater.
- Provide any necessary calculations. Computations shall be required for BMPs that rely on detention, sedimentation, filtration, diversion and velocity control.

BMP Description:	Stabilized Construction Entrance
Installation Schedule:	Stabilized construction entrances will be constructed where vehicles enter and exit prior to construction activity on the site. The stone anti-tracking pads will remain in place until the subgrade of the pavement is installed at the site.
Maintenance and Inspection:	Inspect daily and after rain events of >0.5 inches.
Responsible Staff:	Construction Manager

Stabilized Construction Entrance detail:



3.9 Additional BMPs

Instructions:

- Describe additional BMPs that do not fit into the above categories.
- Provide any necessary calculations. Computations shall be required for BMPs that rely on detention, sedimentation, filtration, diversion and velocity control.

BMP Description:	No Additional BMPs were identified.
Installation Schedule:	N/A
Maintenance and Inspection:	N/A
Responsible Staff:	Construction Manager

BMP Description:	
Installation Schedule:	
Maintenance and Inspection:	
Responsible Staff:	

SECTION 4: GOOD HOUSEKEEPING BMPs

Instructions:

- Describe the key good housekeeping and pollution prevention (P2) BMPs that will be implemented to control pollutants in stormwater.
- Categorize each good housekeeping and pollution prevention (P2) BMP under one of the following seven categories:
  - ***4.1 Material Handling and Waste Management***
  - ***4.2 Establish Proper Building Material Staging Areas***
  - ***4.3 Designate Washout Areas***
  - ***4.4 Establish Proper Equipment/Vehicle Fueling and Maintenance Practices***
  - ***4.5 Allowable Non-Stormwater Discharges and Control Equipment/Vehicle Washing***
  - ***4.6 Spill Prevention and Control Plan***
  - ***4.7 Any Additional BMPs***
- For more information, see *SWPPP Guide*, Chapter 5.
- Consult your state's design manual or resources in Appendix D of the *SWPPP Guide*.
- For more information or ideas on BMPs, see EPA's National Menu of BMPs http://www.epa.gov/npdes/stormwater/menuofbmps

4.1 Material Handling and Waste Management

Instructions:

- Describe measures (e.g., trash disposal, sanitary wastes, recycling, and proper material handling) to prevent the discharge of solid materials to receiving waters, except as authorized by a permit issued under section 404 of the CWA. (For more information, see *SWPPP Guide*, Chapter 5, P2 Principle 1.)
- Also, see EPA's *General Construction Site Waste Management BMP Fact Sheet* at www.epa.gov/npdes/stormwater/menuofbmps/construction/cons_wasteman

BMP Description:	Sanitary Facilities
Installation Schedule:	Prior to construction
Maintenance and Inspection:	Weekly.
Responsible Staff:	Construction Manager

BMP Description:	Solid Waste Disposal
Installation Schedule:	Prior to demolition
Maintenance and Inspection:	After demolition and prior to haul off.
Responsible Staff:	Construction Manager

BMP Description:	
Installation Schedule:	
Maintenance and Inspection:	
Responsible Staff:	

4.2 Establish Proper Building Material Staging Areas

Instructions:

- Describe construction materials expected to be stored on-site and procedures for storage of materials to minimize exposure of the materials to stormwater. (For more information, see *SWPPP Guide*, Chapter 5, P2 Principle 2.)

BMP Description:	Cover Spoils Material
Installation Schedule:	As necessary
Maintenance and Inspection:	Weekly and after a rainfall of 0.5 inches or greater
Responsible Staff:	Construction Manager

BMP Description:	Designated Construction Staging Area
Installation Schedule:	Prior to construction
Maintenance and Inspection:	Weekly and after a rainfall of 0.5 inches or greater
Responsible Staff:	Construction Manager

BMP Description:	
Installation Schedule:	
Maintenance and Inspection:	
Responsible Staff:	

4.3 Designate Washout Areas

Instructions:

- Describe location(s) and controls to eliminate the potential for discharges from washout areas for concrete mixers, paint, stucco, and so on. (For more information, see *SWPPP Guide*, Chapter 5, P2 Principle 3.)
- Also, see EPA's *Concrete Washout BMP Fact Sheet* at www.epa.gov/npdes/stormwater/menuofbmps/construction/concrete_wash

BMP Description:	Prefabricated washout container
Installation Schedule:	Prior to use of concrete on site.
Maintenance and Inspection:	Weekly and after a rainfall of 0.5 inches or greater.
Responsible Staff:	Construction Manager

BMP Description:	
Installation Schedule:	
Maintenance and Inspection:	
Responsible Staff:	

4.4 Establish Proper Equipment/Vehicle Fueling and Maintenance Practices

Instructions:

- Describe equipment/vehicle fueling and maintenance practices that will be implemented to control pollutants to stormwater (e.g., secondary containment, drip pans, and spill kits). (For more information, see *SWPPP Guide*, Chapter 5, P2 Principle 4.)
- Also, see EPA's *Vehicle Maintenance and Washing Areas BMP Fact Sheet* at www.epa.gov/npdes/stormwater/menuofbmps/construction/vehicile_maintain

BMP Description:	Vehicles and equipment requiring fuel, and fuel storage tanks.
Installation Schedule:	Prior to construction on site.
Maintenance and Inspection:	Inspect the storage area of the vehicles, equipment, and fuel tanks weekly and after a rainfall of 0.5 inches or greater. Vehicles and equipment will be inspected at the end of each day of use. Leaks are to be repaired immediately, or the equipment or vehicle involved will be removed from the site. Materials for cleaning up any spills will be stored on site, and any spills will be immediately cleaned up and the materials properly disposed.
Responsible Staff:	Construction Manager

BMP Description:	
Installation Schedule:	
Maintenance and Inspection:	
Responsible Staff:	

4.5 Control Equipment/Vehicle Washing

Instructions:

- Describe equipment/vehicle washing practices that will be implemented to control pollutants to stormwater. (For more information, see *SWPPP Guide*, Chapter 5, P2 Principle 5.)
- Also, see EPA's *Vehicle Maintenance and Washing Areas BMP Fact Sheet* at www.epa.gov/npdes/stormwater/menuofbmps/construction/vehicile_maintain

BMP Description:	All Vehicle and Equipment Washing will be conducted off-site.
Installation Schedule:	N/A
Maintenance and Inspection:	N/A
Responsible Staff:	Construction Manager

BMP Description:	
Installation Schedule:	
Maintenance and Inspection:	
Responsible Staff:	

4.6 Spill Prevention and Control Plan

Instructions:

- Describe the spill prevention and control plan to include ways to reduce the chance of spills, stop the source of spills, contain and clean up spills, dispose of materials contaminated by spills, and train personnel responsible for spill prevention and control. (For more information, see *SWPPP Guide*, Chapter 5, P2 Principle 6.)
- Also, see EPA's *Spill Prevention and Control Plan BMP Fact sheet* at www.epa.gov/npdes/stormwater/menuofbmps/construction/spill_control

The most likely instances of a spill of hydrocarbons or hazardous substances are:

1. Refueling construction equipment.
2. Performing operator-level maintenance, including adding petroleum, oils, or lubricants.
3. Unscheduled or emergency repairs, such as hydraulic fluid leaks.

Every effort will be taken to be cautious and prevent spills. In the event of a fuel or hazardous substance spill as defined by the Reportable Quantities Table 1 (page 3) of the TCEQ's Small-Business Handbook for Spill Response (RG-285, June 1997), the contractor is required to clean up the spill and notify the TCEQ as required in RG-285.

General Measures (TCEQ RG-285):

(1) To the extent that the work can be accomplished safely, spills of oil, petroleum products, substances listed under 40 CFR parts 110,117, and 302, and sanitary and septic wastes should be contained and cleaned up immediately.
(2) Store hazardous materials and wastes in covered containers and protect from vandalism.
(3) Place a stockpile of spill cleanup materials where it will be readily accessible.
(4) Train employees in spill prevention and cleanup.
(5) Designate responsible individuals to oversee and enforce control measures.
(6) Spills should be covered and protected from stormwater runon during rainfall to the extent that it doesn't compromise clean up activities.
(7) Do not bury or wash spills with water.
(8) Store and dispose of used clean up materials, contaminated materials, and recovered spill material that is no longer suitable for the intended purpose in conformance with the provisions in applicable BMPs.
(9) Do not allow water used for cleaning and decontamination to enter storm drains or watercourses. Collect and dispose of contaminated water in accordance with applicable regulations.
(10) Contain water overflow or minor water spillage and do not allow it to discharge into drainage facilities or watercourses.
(11) Place Material Safety Data Sheets (MSDS), as well as proper storage, cleanup, and

spill reporting instructions for hazardous materials stored or used on the project site in an open, conspicuous, and accessible location.

(12) Keep waste storage areas clean, well-organized, and equipped with ample cleanup supplies as appropriate for the materials being stored. Perimeter controls, containment structures, covers, and liners should be repaired or replaced as needed to maintain proper function.

Cleanup (TCEQ RG-285):

(1) Clean up leaks and spills immediately.

(2) Use a rag for small spills on paved surfaces, a damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be disposed of as hazardous waste.

(3) Never hose down or bury dry material spills. Clean up as much of the material as possible and dispose of properly. See the waste management BMPs in this section for specific information.

Minor Spills (TCEQ RG-285):

(1) Minor spills typically involve small quantities of oil, gasoline, paint, etc. which can be controlled by the first responder at the discovery of the spill.

(2) Use absorbent materials on small spills rather than hosing down or burying the spill.

(3) Absorbent materials should be promptly removed and disposed of properly.

(4) Follow the practice below for a minor spill:

(5) Contain the spread of the spill.

(6) Recover spilled materials.

(7) Clean the contaminated area and properly dispose of contaminated materials..

Semi-Significant Spills (TCEQ RG-285):

Semi-significant spills still can be controlled by the first responder along with the aid of other personnel such as laborers and the foreman, etc. This response may require the cessation of all other activities.

Spills should be cleaned up immediately:

(1) Contain spread of the spill.

(2) Notify the project foreman immediately.

(3) If the spill occurs on paved or impermeable surfaces, clean up using "dry" methods (absorbent materials, cat litter and/or rags). Contain the spill by encircling with absorbent materials and do not let the spill spread widely.

(4) If the spill occurs in dirt areas, immediately contain the spill by constructing an earthen dike. Dig up and properly dispose of contaminated soil.

(5) If the spill occurs during rain, cover spill with tarps or other material to prevent contaminating runoff..

Significant / Hazardous Spills (TCEQ RG-285):

For significant or hazardous spills that are in reportable quantities:

(1) Notify the TCEQ by telephone as soon as possible and within 24 hours at 512-339-2929 (Austin) or 210-490-3096 (San Antonio) between 8 AM and 5 PM. After hours, contact the Environmental Release Hotline at 1-800-832-8224. It is the contractor's responsibility to have all emergency phone numbers at the construction site.

(2) For spills of federal reportable quantities, in conformance with the requirements in 40 CFR parts 110,119, and 302, the contractor should notify the National Response Center at (800) 424-8802.

(3) Notification should first be made by telephone and followed up with a written report.

(4) The services of a spills contractor or a Haz-Mat team should be obtained immediately. Construction personnel should not attempt to clean up until the appropriate and qualified staffs have arrived at the job site.

(5) Other agencies which may need to be consulted includ e, but are not limited to, the City Police Department, County Sheriff Office, Fire Departments, etc.

More information on spill rules and appropriate responses is available on the TCEQ website at: http://www.tnrcc.state.tx.us/enforcement/emergency_response.html.

During business hours report spills to the TCEQ's San Antonio Regional Office at (210) 490-3096, after business hours call 1-800-832-8224, the Environmental Response Hotline or (512) 463-7727, the TCEQ Spill Reporting Hotline, which is also answered 24 hours a day.

BMP Description:	Spill Prevention and Control Procedures and Employee Training
Installation Schedule:	The spill prevention and control procedures will be implemented at start of construction activities on site.
Maintenance and Inspection:	All personnel will be instructed during regular training sessions on the correct procedures for prevention and control of spills. Notices stating the spill prevention and control practices will be posted in the on-site project office trailer, and the Construction Manager will be responsible for implementation of these practices.
Responsible Staff:	Construction Manager

4.7 Any Additional BMPs

Instructions:

- Describe any additional BMPs that do not fit into the above categories. Indicate the problem they are intended to address.

BMP Description:	No Additional BMPs were identified.
Installation Schedule:	N/A
Maintenance and Inspection:	N/A
Responsible Staff:	Construction Manager

BMP Description:	
Installation Schedule:	
Maintenance and Inspection:	
Responsible Staff:	

4.8 Allowable Non-Stormwater Discharge Management

Instructions:

- Identify all allowable sources of non-stormwater discharges that are not identified. The allowable non-stormwater discharges identified might include the following (see your permit for an exact list):
  - ✓ Waters used to wash vehicles where detergents are not used
  - ✓ Water used to control dust
  - ✓ Potable water including uncontaminated water line flushings
  - ✓ Routine external building wash down that does not use detergents
  - ✓ Pavement wash waters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used
  - ✓ Uncontaminated air conditioning or compressor condensate
  - ✓ Uncontaminated ground water or spring water
  - ✓ Foundation or footing drains where flows are not contaminated with process materials such as solvents
  - ✓ Uncontaminated excavation dewatering
  - ✓ Landscape irrigation
- Identify measures used to eliminate or reduce these discharges and the BMPs used to prevent them from becoming contaminated.
- For more information, see *SWPPP Guide*, Chapter 3.A.

List allowable non-stormwater discharges and the measures used to eliminate or reduce them and to prevent them from becoming contaminated:

BMP Description:	Landscape Irrigation. Irrigation waters will not be sprayed onto impermeable surfaces such as paved driveways and roads. Waters will be directed onto soil and lawns by using appropriately sized sprinklers with adjustable spray patterns with low-flow rates.
Installation Schedule:	After installation of planned landscaping enhancements.
Maintenance and Inspection:	Inspect for excess watering after each scheduled irrigation discharge and adjust watering times and schedules as needed.
Responsible Staff:	Construction Manager

BMP Description:	Any changes in construction activities that produce other allowable non-storm water discharges will be identified, and the SWPPP will be amended to reflect implementation of appropriate erosion and sedimentation controls.
Installation Schedule:	N/A
Maintenance and Inspection:	N/A
Responsible Staff:	Construction Manager

SECTION 5: SELECTING POST-CONSTRUCTION BMPs

Instructions:

- Describe all post-construction stormwater management measures that will be installed during the construction process to control pollutants in stormwater discharges after construction operations have been completed. Examples of post-construction BMPs include the following:
  - ✓ Sedimentation/Filtration Systems
  - ✓ Wet Ponds
  - ✓ Retention/Irrigation Systems
  - ✓ Vegetative Filter Strips
  - ✓ Biofiltration
  - ✓ Rainwater Harvesting
  - ✓ Rain Garden
- Identify any applicable federal, state, local, or tribal requirements for design or installation.
- Describe how low-impact designs or smart growth considerations have been incorporated into the design.
- For any structural BMPs, you should have design specifications and details and refer to them.

BMP Description:	Water Quality Controls
Installation Schedule:	Permanent water quality ponds or controls will be cleaned out and filter media will be installed prior to/concurrently with re-vegetation of site. Re-vegetate site within 7 days of bringing site to final grade.
Maintenance and Inspection:	After re-vegetation of site.
Responsible Staff:	Construction Manager

BMP Description:	Re-vegetation
Installation Schedule:	Seeding within 7 days of bringing site to final grade.
Maintenance and Inspection:	After re-vegetation of site.
Responsible Staff:	Construction Manager

SECTION 6: INSPECTIONS

6.1 Inspections

Instructions:

- Identify the individual(s) responsible for conducting inspections and describe their qualifications (CPESC/CESSWI). Reference or attach the inspection form (see ECM Appendix P-8 for template) that will be used.
- Describe the frequency that inspections will occur at your site including any correlations to storm frequency and intensity.
- Note that inspection details for particular BMPs should be included in Sections 3 and 4.
- You should also document the repairs and maintenance that you undertake as a result of your inspections. These actions can be documented in the corrective action log described in Part 6.3 below.
- For more on this topic, see *SWPPP Guide*, Chapters 6 and 8.

1. ***Inspection Personnel:*** Identify the person(s) who will be responsible for conducting inspections and describe their qualifications:
   Construction Manager

2. ***Inspection Schedule and Procedures:***

   Describe the inspection schedules and procedures you have developed for your site (include frequency of inspections for each BMP or group of BMPs, indicate when you will inspect, e.g., before/during/and after rain events, spot inspections):
   Weekly inspections and after a rainfall event of 0.5 inches or greater

   Describe the general procedures for correcting problems when they are identified. Include responsible staff and time frames for making corrections:

   Corrections to be made within 24 hours
   Construction Manager

   Attach a copy of the inspection report you will use for your site.
   See Attached Inspection Forms on the Following Pages

Appendix P-8 – Inspection Report

Project Name: Brookshire Brothers Canyon Lake

SWPPP Contact: CONTRACTOR

BEST MANAGEMENT PRACTICE
INSPECTION AND MAINTENANCE REPORT FORM

SILT FENCE

Name of Inspector: _____ Inspection Date: _____

Days Since Last Rainfall: _____ Amount of Last Rainfall: _____ inches

Where is the Silt Fence Located?	Is the Bottom of the Fabric Still Buried?	Is the Fabric Torn or Sagging?	Are the Posts Tipping Over?	How Deep is the Sediment?

MAINTENANCE REQUIRED FOR SILT FENCE: _____

_____

_____

_____

_____

_____

_____

TO BE PERFORMED BY: _____ **ON OR BEFORE:** _____

Project Name: Brookshire Brothers Canyon Lake

SWPPP Contact: CONTRACTOR

BEST MANAGEMENT PRACTICE
INSPECTION AND MAINTENANCE REPORT FORM

INLET PROTECTION BARRIERS

Name of Inspector: _____ Inspection Date: _____

Days Since Last Rainfall: _____ Amount of Last Rainfall: _____ inches

Location	In Place?	Depth of Sediment	Condition of Inlet

MAINTENANCE REQUIRED FOR INLET PROTECTION BARRIERS: _____

_____

_____

_____

_____

_____

_____

TO BE PERFORMED BY: _____ **ON OR BEFORE:** _____

Project Name: Brookshire Brothers Canyon Lake

SWPPP Contact: CONTRACTOR

BEST MANAGEMENT PRACTICE
INSPECTION AND MAINTENANCE REPORT FORM

STABILIZED CONSTRUCTION ENTRANCE

Name of Inspector: _____ Inspection Date: _____

Days Since Last Rainfall: _____ Amount of Last Rainfall: _____ inches

Location	Is Sediment Being Tracked onto Road?	Is the Entry Surface Clean or Sediment Filled?	Does All Traffic Use the Entrance?

MAINTENANCE REQUIRED FOR STABILIZED CONSTRUCTION ENTRANCES: ___

_____

_____

_____

_____

_____

_____

_____

TO BE PERFORMED BY: _____ **ON OR BEFORE:** _____

Project Name: Brookshire Brothers Canyon Lake

SWPPP Contact: CONTRACTOR

BEST MANAGEMENT PRACTICE
INSPECTION AND MAINTENANCE REPORT FORM
(Completed weekly or as soon as possible after a significant storm event)

Name of Inspector: _____ Inspection Date: _____
Days Since Last Rainfall: _____
Amount of Last Rainfall: _____ inches

STABILIZATION MEASURES					
Area or Drainage Areas*	**Date Since Last Disturbance**	**Date of Next Disturbance**	**Stabilized (Yes or No)**	**Control Measures Implemented**	**Current Conditions of Control Measures**

* See site map for drainage areas. Site may include borrow sources, haul roads, contractor's yard, stockpiles, etc.
** Areas that will be exposed more than 21 days must be stabilized within 14 days.

STABILIZATION REQUIRED: _____

_____

_____

_____

TO BE PERFORMED BY: _____ **ON OR BEFORE:** _____

Control Measure Codes		**Condition Codes**
1. Temporary Seeding	14. Rock Bed at Construction Exit	U – Upgrade Needed
2. Permanent Plant, Sod, or Seed	15. Timber Mat at Construction Entrance	R – Replacement Needed
3. Mulch	16. Channel Liner	M – Maintenance Needed
4. Soil Retention Blanket	17. Sediment Trap	C – Cleaning Needed
5. Buffer Zone	18. Sediment Basin	I – Increase Measures
6. Preserve Natural Resources	19. Storm Inlet Sediment Trap	S – Stable (no action required)
7. Silt Fence	20. Stone Outlet Structure	
8. Hay Bales	21. Curb and Gutter	
9. Rock Berm	22. Storm Sewers	
10. Diversion Dike	23. Velocity Control Devices	
11. Diversion Swale	24. Excess Dirt Removed From Road	
12. Pipe Slope Drain	25. Haul Roads Dampened for Dust	
13. Paved Flume	26. Cleanup of Possible Contaminants	

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 or the person 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.

Signature: _____ Date: _____

Project Name: Brookshire Brothers Canyon Lake

SWPPP Contact: CONTRACTOR

BEST MANAGEMENT PRACTICE
INSPECTION AND MAINTENANCE REPORT FORM

CONSTRUCTION ACTIVITIES LOG

Name of Inspector	Date	Major Grading Activities	Temporary Suspension of Construction Activities	Permanent Suspension of Construction Activities	Initiation of Stabilization Measures	Comments

Date	Additional Changes

6.2 Delegation of Authority

Instructions:

- Identify the individual(s) or specifically describe the position where the construction site operator has delegated authority for the purposes of signing inspection reports, certifications, or other information.
- Attach the delegation of authority form that will be used.

CONTRACTOR
CONTACT NAME
ADDRESS
City, TX zip code
PHONE NO.
Fax: (###) ###-#### E-mail: E-MAIL
Construction Manager

Duly Authorized Representative(s) or Position(s):

CONTRACTOR
CONTACT NAME
ADDRESS
City, TX zip code
PHONE NO.
Fax: (###) ###-#### E-mail: E-MAIL
Construction Manager

Attach a copy of the signed delegation of authority form.

Delegation of Authority

I, _____, hereby designate the person or specifically described position below to be a duly authorized representative for the purpose of overseeing compliance with the requirements of the Texas Pollution Discharge Elimination System (TPDES) General Permit, as transferred to the Texas Commission on Environmental Quality (TCEQ), and any local governing agency having jurisdiction concerning erosion and sedimentation control at the **Brookshire Brothers Canyon Lake** construction site.

By signing this authorization, I confirm that I meet the requirements to make such a designation and that the designee above meets the definition of a "duly authorized representative."

Duly Authorized Representative(s) or Position(s):

Construction Contractor:	Brookshire Brothers, Inc.
Contact Name:	Jerry A. Johnson
Contact Position/Title:	President / CEO
Address:	1201 Ellen Trout Drive
City, State, Zip Code:	Lufkin, TX 75904
Telephone Number:	(936) 633-4619
Fax / Email:	ejohnson@brookshirebros.com

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 penalties for submitting false information, including the possibility of fine for knowing violations.

Owner Name: **Jerry A. Jonson**

Company: **Brookshire Brothers, Inc.**

Title: **President / CEO**

Signature: _____

Date: _____

6.3 Corrective Action Log

Instructions:

- Create here, or as an attachment, a corrective action log. This log should describe repair, replacement, and maintenance of BMPs undertaken as a result of the inspections and maintenance procedures described above. Actions related to the findings of inspections should reference the specific inspection report.
- This log should describe actions taken, date completed, and note the person that completed the work.

Corrective Action Log:
See following page. Page 55.

Corrective Action Log

Project Name: Brookshire Brothers Canyon Lake

SWPPP Contact: CONTRACTOR

Inspection Date	Inspector Name	Description of BMP Deficiency	Corrective Action Needed (including planned date / responsible person)	Date Action Taken / Responsible Person

SECTION 7: RECORDKEEPING AND TRAINING

7.1 Recordkeeping

Instructions:

- The following is a list of records you should keep at your project site available for inspectors to review:
- Dates of grading, construction activity, and stabilization (which is covered in Sections 3 and 4)
- A copy of the construction general permit (attach)
- The signed and certified NOI form or permit application form (attach)
- A copy of the letter from EPA or/the state notifying you of their receipt of your complete NOI/application (attach)
- Inspection reports (attach)
- Records relating to endangered species and historic preservation (attach)
- Check your permit for additional details
- For more on this subject, see *SWPPP Guide*, Chapter 6.C.

Records will be retained for a minimum period of at least 3 years after the permit is terminated.

A log of dates will be maintained using the attached forms for date(s) when:

- Major grading activities occur
- Construction activities temporarily or permanently cease on a portion of the site
- An area is either temporarily or permanently stabilized

SITE STABILIZATION and CONSTRUCTION ACTIVITY DATES

A record of dates will be maintaining using the log form below for the following activities:
- **major grading activities occur**
- **construction activities temporarily or permanently cease on a portion of the site**
- **an area is either temporarily or permanently stabilized**

Description of Activity:	
Location:	
Begin DATE:	
End DATE:	
Site Contractor:	

Description of Activity:	
Location:	
Begin DATE:	
End DATE:	
Site Contractor:	

Description of Activity:	
Location:	
Begin DATE:	
End DATE:	
Site Contractor:	

Description of Activity:	
Location:	
Begin DATE:	
End DATE:	
Site Contractor:	

7.2 Log of Changes to the SWPPP

Instructions:

- Create a log here, or as an attachment, of changes and updates to the SWPPP. You should include additions of new BMPs, replacement of failed BMPs, significant changes in the activities or their timing on the project, changes in personnel, changes in inspection and maintenance procedures, updates to site maps, and so on.

Log of changes and updates to the SWPPP
See following page. Page 59.

Appendix P-9 - SWPPP Amendment Log

Project Name: Brookshire Brothers Canyon Lake

SWPPP Contact: CONTRACTOR

Amendment No.	Description of the Amendment	Date of Amendment	Amendment Prepared by [Name(s) and Title]

7.3 Training

Instructions:

- Training your staff and subcontractors is an effective BMP. As with the other steps you take to prevent stormwater problems at your site, you should document the training that you conduct for your staff, for those with specific stormwater responsibilities (e.g. installing, inspecting, and maintaining BMPs), and for subcontractors.
- Include dates, number of attendees, subjects covered, and length of training.
- For more on this subject, see *SWPPP Guide*, Chapter 8.

Individual(s) Responsible for Training:
Construction Manager

Describe Training Conducted:

- General stormwater and BMP awareness training for staff and subcontractors:
- Detailed training for staff and subcontractors with specific stormwater responsibilities:

SECTION 8: PERMANENT STABILIZATION

Instructions:

- Describe procedures for permanent stabilization. If you complete major construction activities on part of your site, you can document your permanent stabilization efforts for that portion of the site. Many permits will allow you to then discontinue inspection activities in these areas (be sure to check your permit for exact requirements). You can amend or add to this section as areas of your project are finally stabilized.
- Additional requirements for permanent stabilization submittals include:
  - ✓ Location and type of permanent stabilization (e.g., vegetation, slope stabilization, sodding, seed/soil retention blanket, Flexible Growth Medium, Bonded Fiber Matrix, or rock rip rap).
  - ✓ Establishment, irrigation, and maintenance plan for permanent vegetation. Re-vegetation plans for all disturbed areas on the site and information provided by the engineer should include any of the following which are applicable:
    - Topsoil requirements
    - Seed, sod, and mulch type and rate of application
    - If seed is used to revegetate, include the soil retention blanket, FGM or BFM to be used until establishment.
    - Irrigation schedule for permanent vegetative establishment
    - Application technique
    - Maintenance requirements for each specific area
    - Whether vegetation is to be temporary or permanent
    - A clear definition of criteria to be utilized in determining when acceptable revegetation has taken place (minimum requirements are 95 percent coverage with no bare areas exceeding 16 square feet with a 1½ inch stand of grass)
  - ✓ Landscaping installation and natural area restoration requirements may be applicable to certain developments.
  - ✓ Specific locations shall be noted where special slope stabilization techniques are to be utilized, and the extent of stabilization to be achieved shall be described.
  - ✓ Location and type of permanent Stormwater management facilities (e.g., detention ponds, water quality ponds, outlet protection/velocity dissipaters) shall be described.
  - ✓ A schematic representation of each control measure for each phase of construction, with adequate specifications for the measure, such as dimensions and length (or size), so that the feature can be built and maintained as intended.
  - ✓ For detention/sedimentation control devices, a summary of calculations for runoff from the ten (10) year storm. Calculations shall include velocity for each of the drainage sub basins to a control in the pre-disturbance, under construction, and permanently stabilized conditions.
- Update your site plans to indicate areas that have achieved permanent stabilization.

BMP Description:	Re-Vegetation
Installation Schedule:	After Construction
Maintenance and Inspection:	Construction Manager, Site Engineer of Record
Responsible Staff:	Construction Manager

BMP Description:	Water Quality Pond
Installation Schedule:	After Construction
Maintenance and Inspection:	Construction Manager, Site Engineer of Record
Responsible Staff:	Construction Manager

BMP Description:	
Installation Schedule:	
Maintenance and Inspection:	
Responsible Staff:	

SECTION 9: CERTIFICATION AND NOTIFICATION

SECTION 9: CERTIFICATION AND NOTIFICATION

Instructions:

- The SWPPP should be signed and certified by the construction operator(s). Attach a copy of the NOI and permit authorization letter received from EPA or the state.

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.

Owner:

Name: JERRY A. JOHNSON Title: President/CEO

Signature: Jerry A. Johnson Date: 11-11-14

Construction Contractor:

Name: _____ Title: _____

Signature: _____ Date: _____

Repeat as needed for multiple construction operators at the site

COMAL COUNTY PERMIT

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY LETTER

CONSTRUCTION SITE NOTICE

LARGE CONSTRUCTION SITE NOTICE

FOR THE
Texas Commission on Environmental Quality (TCEQ)
Stormwater 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 stormwater 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 stormwater permit program may be found on the internet at:

http://www.tceq.state.tx.us/nav/permits/wq_construction.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 Stormwater Pollution Prevention Plan:	

3.0 NOTICE OF INTENT (NOI):

Insert copy here.

TCEQ Office Use Only
Permit No.:
RN:
CN:
Region:

TCEQ 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 604093674

b) What is the Legal Name of the entity (applicant) applying for this permit?
Brookshire Brothers, Inc.
(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): Mr.
First/Last Name: Jerry A. Johnson Suffix:
Title: President / CEO 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 #: (936) 633-4619 ext: Fax #: (936) 633-4670
E-mail: ejohnson@brookshirebros.com
Mailing Address: 1201 Ellen Trout Drive
Internal Routing (Mail Code, Etc.):
City: Lufkin State: TX ZIP Code: 75904
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: 752692839
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): Mr.
First/Last Name: Andrew W. Dodson Suffix: P.E.
Title: Austin Division Manager Credential: P.E.

Organization Name: Vickrey & Associates, Inc.
Phone No.: (512) 494-8014 ext: Fax Number: (512) 494-8054
E-mail: adodson@vickreyinc.com
Mailing Address: 1717 West 6th Street, Suite 260
Internal Routing (Mail Code, Etc.):
City: Austin State: TX ZIP Code: 78703
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):
Brookshire Brothers Canyon Lake

c) In your own words, briefly describe the primary business of the Regulated Entity: (Do not repeat the SIC and NAICS code):
Grocery store and fueling station

d) County (or counties if > 1) Comal County

e) Latitude: 29° 54' 51.9" N Longitude: 98° 12' 58.5" W

f) Does the site have a physical address?
- [x] 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: 18267 Street Name: F.M. 306
City: Canyon Lake State: Texas ZIP Code: 78133

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: 5411

d) If applicable, what is the Secondary SIC Code(s):

e) What is the total number of acres disturbed? 6.04 acres

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?
Canyon Lake

h) What is the segment number(s) of the classified water body(s) that the discharge will eventually reach?
1805

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):
Canyon Lake

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)

4.0 AGENT AUTHORIZATION FORM (TCEQ-0599)

Agent Authorization Form
For Required Signature
Edwards Aquifer Protection Program
Relating to 30 TAC Chapter 213
Effective June 1, 1999

I JERRY A JOHNSON,
Print Name

President / CEO,
Title - Owner/President/Other

of Brookshire Brothers, Inc.,
Corporation/Partnership/Entity Name

have authorized Andrew W. Dodson, P.E.
Print Name of Agent/Engineer

of Vickrey & 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:

Jerry A Johnson
Applicant's Signature

11-11-14
Date

THE STATE OF Texas §
County of Angelina §

BEFORE ME, the undersigned authority, on this day personally appeared Jerry A. Johnson 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 11TH day of November, 2014

SUSIE FREEMAN
MY COMMISSION EXPIRES
February 28, 2015

Susie Freeman
NOTARY PUBLIC

Susie Freeman
Typed or Printed Name of Notary

MY COMMISSION EXPIRES: 2/28/15

5.0 APPLICATION FEE FORM (TCEQ-0574):

Texas Commission on Environmental Quality
Edwards Aquifer Protection Program
Application Fee Form

NAME OF PROPOSED REGULATED ENTITY: Brookshire Brothers at Canyon Lake
REGULATED ENTITY LOCATION: 18267 F.M. 306, Canyon Lake, Texas 78736
NAME OF CUSTOMER: Brookshire Brothers, Inc.
CONTACT PERSON: Andrew W. Dodson, P.E. PHONE: (512) 494-8014
(Please Print)

Customer Reference Number (if issued): CN 604093674 (nine digits)

Regulated Entity Reference Number (if issued): RN _____ (nine digits)

Austin Regional Office (3373) ☐ Hays ☐ Travis ☐ Williamson

San Antonio Regional Office (3362) ☐ Bexar ☒ Comal ☐ Medina ☐ Kinney ☐ Uvalde

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 (Check One):

☐ **Austin Regional Office**

☐ **Mailed to TCEQ**:
TCEQ – Cashier
Revenues Section
Mail Code 214
P.O. Box 13088
Austin, TX 78711-3088

☒ **San Antonio Regional Office**

☐ **Overnight Delivery to TCEQ**:
TCEQ - Cashier
12100 Park 35 Circle
Building A, 3rd Floor
Austin, TX 78753
512/239-0347

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		Acres	$
Water Pollution Abatement Plan, Contributing Zone Plan: Multiple Single Family Residential and Parks		Acres	$
Water Pollution Abatement Plan, Contributing Zone Plan: Non-residential	6.04	Acres	$ 5,000.00
Sewage Collection System		L.F.	$
Lift Stations without sewer lines		Acres	$
Underground or Aboveground Storage Tank Facility		Tanks	$
Piping System(s)(only)		Each	$
Exception		Each	$
Extension of Time		Each	$

Signature _____ Date _____

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

Individuals are entitled to request and review their personal information that the agency gathers on its forms. They may also have any errors in

5.0 APPLICATION FEE FORM (TCEQ-0574):

Texas Commission on Environmental Quality
Edwards Aquifer Protection Program
Application Fee Form

NAME OF PROPOSED REGULATED ENTITY: Brookshire Brothers at Canyon Lake
REGULATED ENTITY LOCATION: 18267 F.M. 306, Canyon Lake, Texas 78736
NAME OF CUSTOMER: Brookshire Brothers, Inc.
CONTACT PERSON: Andrew W. Dodson, P.E. PHONE: (512) 494-8014
(Please Print)

Customer Reference Number (if issued): CN 604093674 (nine digits)

Regulated Entity Reference Number (if issued): RN 107915225 (nine digits)

Austin Regional Office (3373) ☐ Hays ☐ Travis ☐ Williamson

San Antonio Regional Office (3362) ☐ Bexar ☒ Comal ☐ Medina ☐ Kinney ☐ Uvalde

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 (Check One):

☐ **Austin Regional Office**

☐ **Mailed to TCEQ**:
TCEQ – Cashier
Revenues Section
Mail Code 214
P.O. Box 13088
Austin, TX 78711-3088

☒ **San Antonio Regional Office**

☐ **Overnight Delivery to TCEQ**:
TCEQ - Cashier
12100 Park 35 Circle
Building A, 3rd Floor
Austin, TX 78753
512/239-0347

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		Acres	$
Water Pollution Abatement Plan, Contributing Zone Plan: Multiple Single Family Residential and Parks		Acres	$
Water Pollution Abatement Plan, Contributing Zone Plan: Non-residential	6.04	Acres	$ 5,000.00
Sewage Collection System		L.F.	$
Lift Stations without sewer lines		Acres	$
Underground or Aboveground Storage Tank Facility		Tanks	$
Piping System(s)(only)		Each	$
Exception		Each	$
Extension of Time		Each	$

Signature

12/18/14
Date

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

Individuals are entitled to request and review their personal information that the agency gathers on its forms. They may also have any errors in

their information corrected. To review such information, contact us at 512/239-3282.

Texas Commission on Environmental Quality
Edwards Aquifer Protection Program
Application Fee Schedule
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

6.0 CHECK PAYABLE TO THE "Texas Commission on Environmental Quality"

BROOKSHIRE BROTHERS, INC. P.O. BOX 1688 LUFKIN, TEXAS 75902-1688 DETACH AND RETAIN

VENDOR#: 240318 11/28/2014 CHK# 2481905

INVOICE#	INV DATE	AMOUNT	DISCOUNT	NET
LOC-> 112514	11/25/2014	5,000.00	.00	5,000.00
		5,000.00	.00	5,000.00

TO VERIFY AUTHENTICITY, SEE REVERSE SIDE FOR DESCRIPTION OF THE 13 SECURITY FEATURES

Brookshire Brothers
Food & Pharmacy
"Proud To Be Employee Owned"
P.O. BOX 1688
LUFKIN, TEXAS 75902-1688

POLK PICK UP

No. 2481905
DATE 11/28/2014

$*****5,000.00

PAY Five Thousand and 00/100 Dollars

TO THE ORDER OF TEXAS COMMISSION ON ENVIRON-
MENTAL QUALITY
P O BOX 13089
AUSTIN TX 78711-3089

Jerry A. Johnson

7.0 CORE DATA FORM (TCEQ-10400):

See following pages.

TCEQ

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. Attachments **Describe Any Attachments:** *(ex. Title V Application, Waste Transporter Application, etc.)*

☐ Yes ☒ No

3. Customer Reference Number *(if issued)*	Follow this link to search for CN or RN numbers in Central Registry**	4. Regulated Entity Reference Number *(if issued)*
CN 604093674		RN 107915225

SECTION II: Customer Information

5. Effective Date for Customer Information Updates (mm/dd/yyyy)

6. Customer Role (Proposed or Actual) – *as it relates to the Regulated Entity listed on this form. Please check only one of the following:*

☑ Owner ☐ Operator ☒ Owner & Operator
☐ Occupational Licensee ☐ Responsible Party ☐ Voluntary Cleanup Applicant ☐ Other:

7. General Customer Information

☑ New Customer ☒ Update to Customer Information ☐ Change in Regulated Entity Ownership
☐ Change in Legal Name (Verifiable with the Texas Secretary of State) ☐ No Change**

If "No Change" and Section I is complete, skip to Section III – Regulated Entity Information.

8. Type of Customer:			
☐ City Government	☐ County Government	☐ Federal Government	☐ State Government
☐ Other Government	☐ General Partnership	☐ Limited Partnership	☐ Other:

9. Customer Legal Name *(If an individual, print last name first: ex: Doe, John)*	*If new Customer, enter previous Customer below*	*End Date:*
Brookshire Brothers, Inc.		

10. Mailing Address: 1201 Ellen Trout Drive

City	Lufkin	State	TX	ZIP	75904	ZIP + 4	

11. Country Mailing Information *(if outside USA)*	12. E-Mail Address *(if applicable)*

13. Telephone Number	14. Extension or Code	15. Fax Number *(if applicable)*
(936) 634-8115	4286	(936) 208-9249

16. Federal Tax ID *(9 digits)*	17. TX State Franchise Tax ID *(11 digits)*	18. DUNS Number *(if applicable)*	19. TX SOS Filing Number *(if applicable)*
75-2692839			

20. Number of Employees

☐ 0-20 ☐ 21-100 ☐ 101-250 ☑ 251-500 ☐ 501 and higher

21. Independently Owned and Operated?

☑ Yes ☐ No

SECTION III: Regulated Entity Information

22. 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 ☐ No Change** *(See below)*

If "NO CHANGE" is checked and Section I is complete, skip to Section IV, Preparer Information.

23. Regulated Entity Name *(name of the site where the regulated action is taking place)*

Brookshire Brothers at Canyon Lake

24. Street Address of the Regulated Entity: *(No P.O. Boxes)*	18267 F.M. 306						
	City	Canyon Lake	State	TX	ZIP	78133	ZIP + 4
25. Mailing Address:							
	City		State		ZIP		ZIP + 4

26. E-Mail Address:	rparker2@brookshirebros.com		
27. Telephone Number	28. Extension or Code	29. Fax Number *(if applicable)*	
(936) 633-4619		(936) 633-4670	
30. Primary SIC Code (4 digits)	31. Secondary SIC Code (4 digits)	32. Primary NAICS Code (5 or 6 digits)	33. Secondary NAICS Code (5 or 6 digits)
5411	5541	445110	447110

34. What is the Primary Business of this entity? *(Please do not repeat the SIC or NAICS description.)*

grocery store and fueling station

Questions 34 – 37 address geographic location. Please refer to the instructions for applicability.

35. Description to Physical Location:	Northwest corner of F.M. 306 at its intersection with Canyon Park Road.

36. Nearest City	County	State	Nearest ZIP Code
Canyon Lake	Comal	TX	78133

37. Latitude (N) In Decimal:	29.9144167		38. Longitude (W) In Decimal:	-98.21625	
Degrees	Minutes	Seconds	Degrees	Minutes	Seconds
29	54	51.9	98	12	58.5

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 or the updates may not be made. If your Program is not listed, check other and write it in. See the Core Data Form instructions for additional guidance.

☐ Dam Safety	☐ Districts	☑ Edwards Aquifer	☐ Industrial Hazardous Waste	☐ Municipal Solid Waste
		CZP		
☐ New Source Review – Air	☐ OSSF	☐ Petroleum Storage Tank	☐ PWS	☐ Sludge
☐ Stormwater	☐ Title V – Air	☐ Tires	☐ Used Oil	☐ Utilities
☐ Voluntary Cleanup	☐ Waste Water	☐ Wastewater Agriculture	☐ Water Rights	☐ Other:

SECTION IV: Preparer Information

40. Name:	Andrew W. Dodson, P.E.	41. Title:	Austin Division Manager

42. Telephone Number	43. Ext./Code	44. Fax Number	45. E-Mail Address
(512) 494-8014	110	(512) 494-8054	adodson@vickreyinc.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 9 and/or as required for the updates to the ID numbers identified in field 39.

(See the Core Data Form instructions for more information on who should sign this form.)

Company:	Vickrey & Associates, Inc.	Job Title:	Austin Division Manager
Name *(In Print)*:	Andrew W. Dodson, P.E.	Phone:	(512) 494-8014
Signature:	Andrew Dodson	Date:	12/10/14

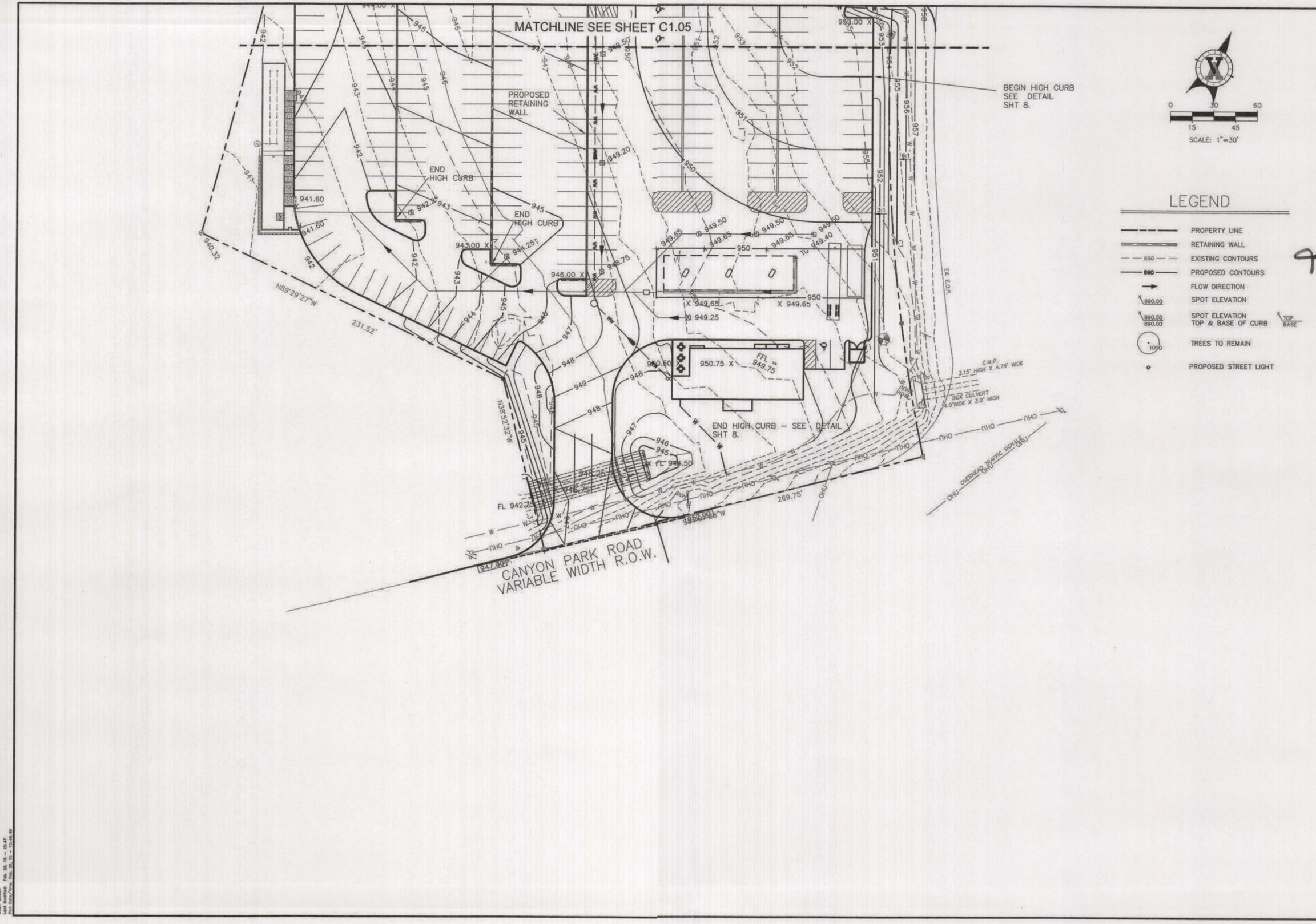
Vickrey & Associates, Inc.

Austin Division:
1717 West 6th Street, Suite 260
Austin, Texas 78703
(512) 494-8014

San Antonio Headquarters:
12940 Country Parkway
San Antonio, Texas 78216
(210) 349-3271

www.vickreyinc.com

TBPE Registration #159 | TBPLS Registration #10004100



DESCRIPTION

DATE NO.

STATE OF TEXAS
JAMES C. MASSARO
92530
LICENSED
PROFESSIONAL ENGINEER

VICKREY & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION # F-159 TBPLS REGISTRATION # 10004100
1717 West 6th Street, Suite 260
Austin, Texas 78703
Phone: (512) 494-8014 Fax: (512) 494-8054

GRADING PLAN

BROOKSHIRE BROTHERS, CANYON LAKE
18267 FM 306
CANYON LAKE, TX

DRAWN BY: JTM
CHECKED BY: JCM
APPROVED BY: JCM
DATE: 09/15/2014

SHEET
C1.06

PROJ NO. 2540-001

BENCHMARK– DISC FOUND IN MONUMENT BOX STAMPED "TEXAS DEPARTMENT OF TRANSPORTATION BENCHMARK 306–66"

OWNER: BROOKSHIRE BROTHERS, INC.
1201 ELLEN TROUT DRIVE (PO BOX 1688)
LUFKIN, TEXAS 75904
RICHARD PARKER
JERRY A. JOHNSON, PRESIDENT/CEO

ENGINEER: VICKREY & ASSOCIATES, INC.
1717 W 6TH STREET, SUITE 260
AUSTIN, TX 78703
(512) 494–8014

SURVEYOR: JACOBS ENGINEERING
AUSTIN TEXAS. 78746

PROJECT LOCATION: NW CORNER OF FM 306 AT CANYON PARK ROAD & 18267 FM 306 (AND 18259, 18255, AND 18241 ACCORDING TO COMAL COUNTY RECORDS) CANYON LAKE, TEXAS 78133

LEGAL DESCRIPTION:

TRACT 1: A–104 SUR–34 J H COCKE, ACRES 2.926 (PROPERTY ID 74294)

TRACT 2: A–104 SUR–34 J H COCKE, ACRES 2.34 (PROPERTY ID 74298)

TRACT 3: A–104 SUR–34 J H COCKE, ACRES 0.574 (PROPERTY ID 385079)

TRACT 4: A–447 SUR–32 JO DANIEL, ACRES 0.20 (PROPERTY ID 385078)

FLOODPLAIN: COMAL COUNTY RECORDS PER FIRM MAP INDICATES A FLOODPLAIN ON THE SOUTHWEST CORNER OF THE LOT–SEE MAP FOR FURTHER DETAIL.

CURRENT ZONING: AG

TXDOT DRIVEWAY PERMIT NUMBER: _____

SUBMITTED BY: _____ 2-27-2015
DATE

VICKREY & ASSOCIATES, INC.
1717 W 6TH STREET, SUITE 260
AUSTIN, TX 78703
(512) 494–8014

FIRM REGISTRATION #F–159

STATE OF TEXAS
JAMES C. MASSARO
92530
LICENSED
PROFESSIONAL ENGINEER

RECEIVED
MAR 04 2015
COUNTY ENGINEER

RECEIVED
FEB 27 2015
By TCEQ APD

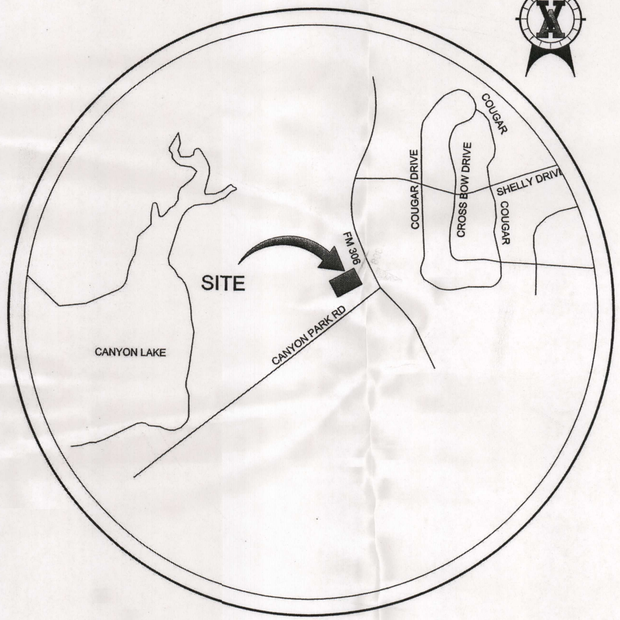
Drawing: W:\2540-001\Engineering\DWG\sh_Cover.dwg | C0.00 Cover
User: JPEDERSON
Last Modified: Mon, Feb 24, 15 – 16:03
Plot Date/Time: Fri, Feb 27, 15 – 10:47:31

SITE DEVELOPMENT PLANS FOR

BROOKSHIRE BROTHERS CANYON LAKE

18267 FM 306
CANYON LAKE, TX 78133

SUBMITTAL DATE:



LOCATION MAP
1" = 1000'

VICKREY & ASSOCIATES, INC.
CONSULTING ENGINEERS
1717 West 6th Street, Suite 260 Austin, Texas 78703
Telephone: (512) 494–8014
www.vickreyinc.com

REVISIONS / CORRECTIONS:

NO.	DESCRIPTION	REVISE (R)/ADD (A) SHEET NO'S	TOTAL # SHEET IN PLAN SET	NET CHANGE IMP. COVER	SITE IMP. COVER	% SITE IMP. COVER	APPROVED DATE

INDEX OF SHEETS

C0.00 – COVER
C0.01 – GENERAL NOTES & TCEQ NOTES
C0.02 – TCEQ NOTES
C1.02 – DEMOLITION PLAN
C1.03 – SITE PLAN AND DIMINSIONAL CONTROL
C1.04 – UTILITY PLAN
C1.05 – GRADING PLAN
C1.06 – GRADING PLAN
C1.07 – PROPOSED DRAINAGE PLAN
C1.08 – EROSION CONTROL PLAN
C1.09 – POND PLAN SHEET
C1.10 – POND SECTION SHEET
C1.11 – STORM PLAN
C2.00 – WATER DETAILS
C2.01 – WASTEWATER DETAILS
C2.02 – TRAFFIC CONTROL DETAILS
C2.03 – TRAFFIC CONTROL DETAILS
C2.04 – EROSION CONTROL & MISC. DETAILS

C5.01 – TXDOT DETAIL SHEET 1
C5.02 – TXDOT DETAIL SHEET 2
C5.03 – TXDOT DETAIL SHEET 3
C5.04 – TXDOT DETAIL SHEET 4
C5.05 – TXDOT DETAIL SHEET 5
C5.06 – TXDOT DETAIL SHEET 6
C5.07 – TXDOT DETAIL SHEET 7
C5.08 – TXDOT DETAIL SHEET 8
C5.09 – TXDOT DETAIL SHEET 9

GENERAL NOTES:

1. I CERTIFY THAT THESE ENGINEERING DOCUMENTS ARE COMPLETE, ACCURATE, AND IN COMPLIANCE WITH COMAL COUNTY AND ADEQUATE FOR THE INTENDED PURPOSES, INCLUDING CONSTRUCTION, BUT ARE NOT AUTHORIZED FOR CONSTRUCTION PRIOR TO FORMAL CITY APPROVAL.

2. 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 MUNICIPAL ENGINEERS.

3. THESE PLANS ARE NOT TO BE CONSIDERED FINAL FOR CONSTRUCTION UNTIL APPROVED BY THE CITY AND/OR COUNTY. CHANGES MAY BE REQUIRED PRIOR TO APPROVAL.

4. THE LOCATION AND DEPTH OF EXISTING UTILITIES SHOWN ON THESE PLANS ARE APPROXIMATE ONLY. ACTUAL LOCATIONS AND DEPTHS OF UTILITIES MUST BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO LOCATE UTILITY SERVICE LINES AS REQUIRED FOR CONSTRUCTION AND NOTIFY THE ENGINEER OF ANY CONFLICTS IMMEDIATELY. ANY DAMAGE BY THE CONTRACTOR TO THE EXISTING UTILITIES, WHETHER SHOWN ON THE PLANS OR NOT, SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO REPAIR TO EQUAL OR BETTER CONDITION, AT HIS/HER EXPENSE.

5. BY THE ACT OF SUBMITTING A BID FOR THE PROPOSED CONTRACT, THE BIDDER WARRANTS THAT THE BIDDER, ALL SUBCONTRACTORS, AND MATERIAL SUPPLIERS HE/SHE INTENDS TO USE HAVE CAREFULLY AND THOROUGHLY REVIEWED THE DRAWINGS AND SPECIFICATIONS AND OTHER CONTRACT DOCUMENTS AND HAVE FOUND THEM COMPLETE AND FREE FROM ANY AMBIGUITIES AND ARE SUFFICIENT FOR THE PURPOSE INTENDED. THE BIDDER FURTHER WARRANTS THAT TO THE BEST OF THEIR KNOWLEDGE AND HIS/HER SUBCONTRACTORS AND MATERIAL SUPPLIERS KNOWLEDGE THAT ALL MATERIALS AND PRODUCTS SPECIFIED OR INDICATED HEREIN ARE ACCEPTABLE FOR ALL APPLICABLE CODES AND AUTHORITIES.

RECEIVED
MAR 04 2015
COUNTY ENGINEER

PERMIT / BID SET

NO.	DATE	DESCRIPTION

VICKREY & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION # F-159 TBPLS REGISTRATION # 100041-00
1717 West 6th Street, Suite 260
Austin, Texas 78703
Phone: (512) 494–8014 Fax: (512) 494–8054

©2014

COVER

BROOKSHIRE BROTHERS, CANYON LAKE
18267 FM 306
CANYON LAKE, TX

DRAWN BY: JTM
CHECKED BY: JCM
APPROVED BY: JCM
DATE: 09/15/2014
SHEET
C0.00
PROJ NO. 2540–001

STANDARD WATER NOTES

1. IT IS THE INTENT OF THESE PLANS TO SHOW THE LOCATION OF EXISTING UNDERGROUND FACILITIES IN ACCORDANCE WITH EXISTING RECORDS. HOWEVER, IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO LOCATE AND VERIFY THE EXACT LOCATION OF ALL EXISTING UNDERGROUND FACILITIES PRIOR TO EXCAVATION. THE CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY FOR ANY AND ALL DAMAGES TO EXISTING FACILITIES.
2. BOUNDARY FENCES OR OTHER IMPROVEMENTS REMOVED TO PERMIT CONSTRUCTION SHALL BE REPLACED IN THE SAME LOCATION AND IN SAME CONDITION AS GOOD OR BETTER THAN IN WHICH THEY WERE FOUND. NO COMPENSATION SHALL BE GIVEN TO THE CONTRACTOR FOR REMOVAL AND REPLACEMENT OF FENCES.
3. CONTRACTOR SHALL NOTIFY THE CLWSC OPERATOR (830)964-3854) AT LEAST 72 HOURS PRIOR TO COMMENCING CONSTRUCTION.
4. ALL PAVEMENT UTILITY CUTS (ASPHALT OR CONCRETE) SHALL BE SAW CUT OR REMOVED TO THE NEAREST JOINT.
5. BRACE ALL UTILITY POLES AS REQUIRED TO MAINTAIN STABILITY OF THE POLES DURING CONSTRUCTION.
6. ALL BARRICADES, WARNING SIGNS, LIGHTS, DEVICES, ETC., FOR THE GUIDANCE AND PROTECTION OF TRAFFIC AND PEDESTRIANS MUST CONFORM TO THE INSTALLATION SHOWN IN THE 1980 TEXAS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES AS CURRENTLY AMENDED, TEXAS DEPARTMENT OF TRANSPORTATION.
7. THE CONTRACTOR IS RESPONSIBLE FOR KEEPING STREETS AND SIDEWALKS ADJACENT TO PROJECT FREE OF MUD AND DEBRIS FROM THE CONSTRUCTION.
8. CONTRACTOR SHALL NOT PLACE FILL OR WASTE MATERIAL ON ANY PRIVATE PROPERTY WITHOUT PRIOR WRITTEN AGREEMENT WITH THE PROPERTY OWNER.
9. NO EXCESS EXCAVATION MATERIAL SHALL BE DEPOSITED IN LOW AREAS OR ALONG NATURAL DRAINAGE WAY WITHOUT WRITTEN PERMISSION FROM THE ENGINEER.
10. BEFORE FINAL COMPLETION OF THE PROPOSED WORK, ALL ROADWAY, SLOPES, DITCHES AND BERMS SHALL BE RESTORED TO THEIR ORIGINAL CONDITION.
11. OPEN CUTTING OF ROADWAYS CAN BE PERFORMED BETWEEN THE HOURS OF 8:00 AM TO 4:00 PM.
12. REMOVE AND DISPOSE OF TREES, STUMPS, BRUSH, ROOTS, VEGETATION, LOGS, RUBBISH AND OTHER OBJECTIONABLE MATTER WITHIN THE LIMITS OF AREA AFFECTED BY THE WORK, INCLUDING ALL AREAS TO BE RE-GRADED. PROTECT TREES, SHRUBS, AND OTHER LANDSCAPE FEATURES SPECIFICALLY DESIGNATED FROM DAMAGE DURING CONSTRUCTION OPERATIONS.
13. ALL TRENCHES UNDER OR WITHIN 5 FEET OF PAVEMENT OR STRUCTURES TO BE BACK FILLED IN MAXIMUM 8-INCH LIFTS COMPACTED TO 95% STANDARD PROCTOR DENSITY. TRENCHES IN OTHER AREAS TO BE COMPACTED TO THE DENSITY OF THE ADJACENT UNDISTURBED SOIL.
14. CONTRACTOR TO CONFIRM ACTUAL HORIZONTAL AND VERTICAL LOCATION OF EXISTING STRUCTURES, PIPING, PAVING, FENCING AND ALL OTHER EXISTING FACILITIES PRIOR TO CONSTRUCTION. ANY DISCREPANCIES DISCOVERED WILL BE PROVIDED IN WRITING TO THE ENGINEER PRIOR TO CONSTRUCTION.
15. FOR ALL STREETS AND DRIVEWAYS NOT WITHIN TXDOT ROW, UNLESS SPECIFICALLY SHOWN OR NOTED OTHERWISE, PROPOSED PIPE CROSSING OF EXISTING STREETS AND DRIVEWAYS MAY BE BY BORING AND JACKING OR SAW CUTS, REMOVAL, AND REPLACEMENT OF PAVEMENT AT THE CONTRACTOR'S OPTION.
16. CONTRACTOR SHALL CONTACT DIG TESS AT LEAST 48 HOURS PRIOR TO CONSTRUCTION.
17. CONTRACTOR SHALL NOTIFY TEXAS DEPARTMENT OF TRANSPORTATION AT LEAST 48 HOURS PRIOR TO ANY CONSTRUCTION ACTIVITY WITHIN THE STATE RIGHT-OF-WAY.
18. CONTRACTOR SHALL NOT OPEN CUT ANY IMPROVED DRIVEWAY IN STATE RIGHT-OF-WAY WITHOUT PRIOR WRITTEN APPROVAL OF PROPERTY OWNER.
19. CONTRACTOR TO INSTALL PROPOSED WATER LINE UNDER TREES 6" DIAMETER OR GREATER WITHIN TXDOT ROW BY DIRECTIONAL DRILL USING HDPE PIPE AS DIRECTED BY OWNER AND DETERMINED BY TXDOT.
20. CONTRACTOR SHALL FINE GRADE AREAS TO ACHIEVE FINAL CONTOURS INDICATED OR RESTORE EXISTING GRADES. REMOVE RUBBISH VEGETATION AND ROCKS OVER 1-½" IN DIAMETER. CONTRACTOR SHALL ADJUST CONTOURS TO ACHIEVE POSITIVE DRAINAGE AWAY FROM STRUCTURES. CONTRACTOR SHALL PROVIDE UNIFORM ROUNDING AT TOP AND BOTTOM OF SLOPES AND OTHER BREAKS IN GRADE. CONTRACTOR SHALL CORRECT IRREGULARITIES AND AREAS WHERE WATER WILL STAND.
21. NO UTILITY TRENCHES OR PITS ARE TO BE LEFT OPEN OVERNIGHT. BACKFILLING WILL OCCUR DAILY AND AS SOON AS PRACTICAL, FOLLOWING CONSTRUCTION OPERATIONS.

CONTRACTOR SHALL:

22. FOLLOW METHODS AND PROCEDURES OF SHUTDOWN AS DIRECTED BY THE CLWSC MAINTENANCE DEPARTMENT.
23. NOTIFY CONSUMERS OF, AND COORDINATE ALL SHUTDOWNS WITH CLWSC, PER CLWSC GUIDELINES.
24. ESTABLISH PIPE GRADES USING TOP OF GRADE.
25. GRADE MAIN TO AVOID USE OF AIR VALVES.
26. MAINTAIN MINIMUM 10 FEET CLEARANCE BETWEEN MAINS AND SANITARY SEWERS.
27. CENTER A FULL LENGTH OF PIPE WHEN UNDERCROSSING SANITARY SEWERS OR LATERALS. VERTICAL CLEARANCE SHALL BE A MINIMUM OF 12".
28. MAINTAIN MINIMUM 10 FEET CLEARANCE BETWEEN HYDRANTS AND DRIVEWAY THROAT.
29. INSTALL SERVICES SUCH THAT CONSUMER'S LINES DO NOT CROSS DRIVEWAYS.
30. CONTRACTOR TO PROVIDE A CLEAN, NEAT AS-BUILT DRAWING WITHIN 10 DAYS OF JOB COMPLETION.
31. USE DUCTILE IRON FITTINGS WITH MECHANICAL JOINT AND MEGALUG PER CLWSC STANDARD SPECIFICATIONS.
32. INSTALL HYDRANT & CONNECTION PER CLWSC STANDARD DETAIL.

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY CONTRIBUTING ZONE PLAN

1. WRITTEN CONSTRUCTION NOTIFICATION SHOULD BE PROVIDED TO THE APPROPRIATE TCEQ REGIONAL OFFICE NO LATER THAN 48 HOURS PRIOR TO COMMENCEMENT OF THE REGULATED ACTIVITY. INFORMATION SHOULD INCLUDE THE DATE ON WHICH THE REGULATED ACTIVITY WILL COMMENCE, THE NAME OF THE APPROVED PLAN FOR THE REGULATED ACTIVITY, AND THE NAME OF THE PRIME CONTRACTOR WITH THE NAME AND TELEPHONE NUMBER OF THE CONTACT PERSON.
2. ALL CONTRACTORS CONDUCTING REGULATED ACTIVITIES ASSOCIATED WITH THIS PROJECT SHOULD BE PROVIDED WITH COMPLETE COPIES OF THE APPROVED CONTRIBUTING ZONE PLAN AND THE TCEQ LETTER INDICATING THE SPECIFIC CONDITIONS OF ITS APPROVAL. DURING THE COURSE OF THESE REGULATED ACTIVITIES, THE CONTRACTOR(S) SHOULD KEEP COPIES OF THE APPROVED PLAN AND APPROVAL LETTER ON-SITE.
3. NO TEMPORARY ABOVEGROUND HYDROCARBON AND HAZARDOUS SUBSTANCE STORAGE TANK SYSTEM MAY BE INSTALLED WITHIN 150 FEET IF A DOMESTIC, INDUSTRIAL, IRRIGATION, OR PUBLIC WATER SUPPLY WELL.
4. PRIOR TO COMMENCING CONSTRUCTION, ALL TEMPORARY EROSION AND SEDIMENTATION (E&S) CONTROL MEASURES MUST BE PROPERLY SELECTED, INSTALLED, AND MAINTAINED IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS AND GOOD ENGINEERING PRACTICES. CONTROLS SPECIFIED IN THE SWPPP SECTION OF THE APPROVED EDWARDS AQUIFER CONTRIBUTING ZONE PLAN ARE REQUIRED DURING CONSTRUCTION. IF INSPECTIONS INDICATE A CONTROL HAS BEEN USED INAPPROPRIATELY, OR INCORRECTLY, THE APPLICANT MUST REPLACE OR MODIFY THE CONTROL FOR SITE SITUATIONS. THE CONTROLS MUST REMAIN IN PLACE UNTIL DISTURBED AREAS ARE REVEGETATED AND THE AREAS HAVE BECOME PERMANENTLY STABILIZED.
5. IF SEDIMENT ESCAPES THE CONSTRUCTION SITE, OFF-SITE ACCUMULATIONS OF SEDIMENT MUST BE REMOVED AT A FREQUENCY SUFFICIENT TO MINIMIZE OFFSITE IMPACTS TO WATER QUALITY (E.G., FUGITIVE SEDIMENT IN STREET BEING WASHED INTO SURFACE STREAMS OR SENSITIVE FEATURES BY THE NEXT RAIN).
6. SEDIMENT MUST BE REMOVED FROM SEDIMENT TRAPS OR SEDIMENTATION PONDS NOT LATER THAN WHEN DESIGN CAPACITY HAS BEEN REDUCED BY 50%. A PERMANENT STAKE MUST BE PROVIDED THAT CAN INDICATE WHEN THE SEDIMENT OCCUPIES 50% OF THE BASIN VOLUME.
7. LITTER, CONSTRUCTION DEBRIS, AND CONSTRUCTION CHEMICALS EXPOSED TO STORMWATER SHALL BE PREVENTED FROM BECOMING A POLLUTANT SOURCE FOR STORMWATER DISCHARGES (E.G., SCREENING OUTFALLS, PICKED UP DAILY).
8. ALL SPOILS (EXCAVATED MATERIAL) GENERATED FROM THE PROJECT SITE AND STORED ON-SITE MUST HAVE PROPER E&S CONTROLS INSTALLED.
9. STABILIZATION MEASURES SHALL BE INITIATED AS SOON AS PRACTICABLE IN PORTIONS OF THE SITE WHERE CONSTRUCTION ACTIVITIES HAVE TEMPORARILY OR PERMANENTLY CEASED, AND CONSTRUCTION ACTIVITIES WILL NOT RESUME WITHIN 21 DAYS. WHEN THE INITIATION OF STABILIZATION MEASURES BY THE 14TH DAY IS PRECLUDED BY WEATHER CONDITIONS, STABILIZATION MEASURES SHALL BE INITIATED AS SOON AS PRACTICABLE.
10. THE FOLLOWING RECORDS SHOULD BE MAINTAINED AND MADE AVAILABLE TO THE TCEQ UPON REQUEST: THE DATES WHEN MAJOR GRADING ACTIVITIES OCCUR; THE DATES WHEN CONSTRUCTION ACTIVITIES TEMPORARILY OR PERMANENTLY CEASE ON A PORTION OF THE SITE; AND THE DATES WHEN STABILIZATION MEASURES ARE INITIATED.
11. THE HOLDER OF ANY APPROVED CONTRIBUTING ZONE PLAN MUST NOTIFY THE APPROPRIATE REGIONAL OFFICE IN WRITING AND OBTAIN APPROVAL FROM THE EXECUTIVE DIRECTOR PRIOR TO INITIATING ANY OF THE FOLLOWING:

A. ANY PHYSICAL OR OPERATIONAL MODIFICATION OF ANY BEST MANAGEMENT PRACTICES OR STRUCTURE(S), INCLUDING BUT NOT LIMITED TO TEMPORARY OR PERMANENT PONDS, DAMS, BERMS, SILT FENCES, AND DIVERSIONARY STRUCTURES;

B. ANY CHANGE IN THE NATURE OR CHARACTER OF THE REGULATED ACTIVITY FROM THAT WHICH WAS ORIGINALLY APPROVED;

C. ANY CHANGE THAT WOULD SIGNIFICANTLY IMPACT THE ABILITY TO PREVENT POLLUTION OF THE EDWARDS AQUIFER AND HYDROLOGICALLY CONNECTED SURFACE WATER; OR

D. ANY DEVELOPMENT OF LAND PREVIOUSLY IDENTIFIED IN A CONTRIBUTING ZONE PLAN AS UNDEVELOPED.

AUSTIN REGIONAL OFFICE 2800 S. IH 35, SUITE 100 AUSTIN, TEXAS 78704-5712 PHONE (512) 339-2929 FAX (512) 339-3795	SAN ANTONIO REGIONAL OFFICE 14250 JUDSON ROAD SAN ANTONIO, TEXAS 78233-4480 PHONE (210) 490-3096 FAX (210) 545-4329

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

"TXDOT CONSTRUCTION GENERAL NOTES"

1. "THE DESIGN AND CONSTRUCTION WILL PROVIDE FOR PRESERVING ALL EXISTING FEATURES IN OR NEAR THE STATE RIGHT OF WAY BEING AFFECTED BY THE WIDENING. THIS INCLUDES BUT IS NOT LIMITED TO, EXISTING DRIVEWAY GATE SET-BACKS, RELOCATION OF ELECTRONIC PRIVATE PROPERTY GATES, MAILBOX TURNOUTS, MAIL BOXES AND SUPPORTS, CATTLE GUARDS, ROADWAY SIGNING, EXISTING RIP-RAP OR OTHER PERMANENT EROSION CONTROL FEATURES, DIVERSIONARY BERMS, SWALES, DITCHES, AMOUNT AND CONFIGURATION OF DRIVEWAY FLARES AND DRIVEWAY CENTERLINE PROFILE, METAL BEAM GUARD FENCE AND END TREATMENTS, ETC. EXISTING DRIVEWAY CULVERTS AND SAFETY END TREATMENTS IF EFFECTED BY ROADWAY WIDENING WILL BE RECONSTRUCTED TO PRESERVE EXISTING FRONT SLOPE RATES. THE COORDINATION OF ITEMS THAT EFFECT EXISTING PRIVATE PROPERTY ACCESS, MAIL DELIVERY, ETC. IS THE RESPONSIBILITY OF THE DEVELOPER. THE WRITTEN CONCURRENCE OF ANY EFFECTED PROPERTY OWNERS FOR CONSTRUCTION EFFECTING THEIR DRIVEWAYS OR MAILBOX TURNOUTS MUST BE OBTAINED AND PROVIDED TXDOT PRIOR TO TXDOT DRIVEWAY PERMITS BEING ISSUED."
2. "FOR WORK IN STATE RIGHT OF WAY, THE DEVELOPER IS RESPONSIBLE FOR COORDINATION OF, OBTAINING PERMITS FOR, AND COMPLYING WITH ANY AND ALL STATE AND FEDERAL REGULATORY AGENCIES AND ALL APPLICABLE LAWS, RULES AND REGULATIONS PERTAINING TO THE REGULATION OF DRAINAGE, PRESERVATION OF CULTURAL RESOURCES, NATURAL RESOURCES AND THE ENVIRONMENT. THE DEVELOPER IS RESPONSIBLE FOR DETERMINING IF THE PROJECT IS IN AN ENVIRONMENTALLY SENSITIVE AREA SUCH AS WITHIN THE RECHARGE OR CONTRIBUTING ZONE OF PROTECTED AQUIFERS, AND ACT IN ACCORDANCE WITH ALL RESOURCE AGENCY REGULATIONS."

IF TXDOT HAS A CZP OR WPAP ON FILE WITH TCEQ, THE DEVELOPER IS RESPONSIBLE FOR AMENDING TXDOT'S PERMIT, OBTAINING TCEQ APPROVAL AND PROVIDING TXDOT WITH THE APPROVED AMENDED PERMIT. THE AMENDED PERMIT WILL ADDRESS THE RELOCATION OF ANY TXDOT PERMANENT BMP'S INCLUDING VEGETATIVE FILTER STRIPS THAT MAY BE IMPACTED BY WORK DONE WITHIN TXDOT ROW. "

IF TXDOT DOES NOT HAVE A CZP OR WPAP ON FILE WITH TCEQ, ANY PERMANENT BMP'S INCLUDING VEGETATIVE FILTER STRIPS, THAT MAY BE REQUIRED IN ORDER TO TREAT ADDITIONAL IMPERVIOUS COVER PLACED IN TXDOT ROW WILL BE LOCATED IN PRIVATE PROPERTY AND THE DEVELOPER WILL PROVIDE TXDOT WITH EVIDENCE OF TCEQ APPROVAL OF THE ADDITIONAL IMPERVIOUS COVER."

THE DEVELOPER MAY NOT OPERATE UNDER RESOURCE AGENCY ENVIRONMENTAL CLEARANCE OF A PREVIOUS OR ONGOING TXDOT PROJECT, BUT WILL BE REQUIRED TO OBTAIN SEPARATE RESOURCE/ENVIRONMENTAL AGENCY CLEARANCE."

3. "IF WASTE AREAS OR MATERIAL SOURCE AREAS RESULT FROM THIS PROJECT, THE CONTRACTOR IS REMINDED TO FOLLOW THE REQUIREMENTS OF THE TEXAS AGGREGATE QUARRY AND PIT SAFETY ACT. IN ADDITION, IT IS REQUESTED THAT THESE AREAS NOT BE VISIBLE FROM ANY HIGHWAY ON THE STATE SYSTEM."
4. "ANY TREES EXISTING WITHIN STATE RIGHT OF WAY ARE THE NATURAL RESOURCES OF THE STATE AND WILL BE PROTECTED. IN THE EVENT THAT TREES MUST BE REMOVED, TXDOT WRITTEN PERMISSION WILL BE RECEIVED IN ADVANCE AND WILL IDENTIFY THE SPECIFIC TREES BY SPECIES, DIAMETER AND LOCATION TO BE REMOVED. THE DEVELOPER WILL BE FINED FOR ANY UNPERMITTED REMOVAL OF TREES."
5. "THE DEVELOPER WILL MAINTAIN AT THE PROJECT SITE, AND MAKE AVAILABLE UPON REQUEST, COPIES OF ALL APPROVED ENVIRONMENTAL PLANS AND PERMITS RELATING TO WORK IN STATE RIGHT OF WAY."
6. "PRIOR TO BEGINNING GRADING ACTIVITY THE CONTRACTOR WILL SET AND MAINTAIN ROADWAY STATIONING, CONTROL POINTS, MARKS, STAKES TO ESTABLISH LINES, SLOPES, GRADES AND CENTERLINES."
7. "ANY SLOPES IN STATE RIGHT OF WAY WHICH BECOME STEEPER THAN 3:1 AS A RESULT OF THE WORK WILL BE TREATED WITH 4" THICK REINFORCED CONCRETE RIPRAP AND BE TREATED WITH METAL BEAM GUARD FENCE. THIS MAY ENTAIL ADDITIONAL RIP-RAP BEYOND THAT SHOWN IN THE PLANS."
8. "JAMES BROWNE (830) 609-0707 NEW BRAUNFELS, BRENT RAINOSEK (830) 303-0130 SEGUIN, CHAD LUX (830) 816-2430 BOERNE, TIMOTHY LOWAK (830) 393-3144 FLORESVILLE, TXDOT MAINTENANCE OFFICE WILL BE CONTACTED BY THE CONTRACTOR 48 HOURS PRIOR TO WORK OCCURRING IN STATE RIGHT OF WAY."
9. "STATE RIGHT OF WAY WILL NOT BE USED AS AN AREA FOR CONTRACTOR PARKING OR FOR STAGING THE RECEIPT OF MATERIALS OR EQUIPMENT."
10. "TRAFFIC CONTROL AND CONSTRUCTION BARRICADES WILL MEET THE REQUIREMENTS OF THE TEXAS MUTCD."
11. "AT NO TIME WILL THE ROADWAY TRAVEL WAY BE BLOCKED"
12. "LANE CLOSURES WILL ONLY BE PERMITTED WITH 48 HOUR PRIOR APPROVAL OF THE TXDOT MAINTENANCE SUPERVISOR. LANE CLOSURES WILL BE PERMITTED ONLY BETWEEN 9:00 A.M. AND 4:00 P.M. MONDAY THROUGH FRIDAY."
13. "A MINIMUM 3:1 (H:V) TEMPORARY SAFETY SLOPE OF STABLE COMPACTED MATERIAL WILL BE REQUIRED ADJACENT TO THE STATE HIGHWAY EDGE OF PAVEMENT AT ALL TIMES DURING NON WORKING HOURS."
14. "ONLY ONE SIDE OF THE ROADWAY WILL BE OPEN TO CONSTRUCTION AT A TIME. WORK WILL BE COMPLETED AND PAVEMENT EDGES BACKFILLED ON ONE SIDE OF THE ROAD BEFORE WORK WILL BEGIN ON THE OPPOSITE SIDE OF THE ROADWAY.
15. "ANY PAVEMENT EDGE DROP-OFFS BETWEEN 1 AND 2 INCHES IN HEIGHT WILL HAVE CW 8-11 WARNING SIGNS. ANY PAVEMENT EDGE DROP-OFF 2 INCHES OR GREATER WILL HAVE A 3:1 COMPACTED SAFETY SLOPE AND CW 8-9A OR CW 8-11 SIGNS PLUS CHANNELIZING DEVICES. PAVEMENT EDGES WILL BE SHOULDERED UP WITH COMPACTED EMBANKMENT MATERIAL AND 4 INCHES OF TOPSOIL AS SOON AS POSSIBLE AFTER PAVING IS COMPLETED ON THE SIDE OF THE ROAD BEING WIDENED."
16. "PROOF ROLLING OF SUBGRADE IS REQUIRED AND SHALL BE WITNESSED BY TXDOT PRIOR TO PLACEMENT OF PAVEMENT STRUCTURE UNLESS OTHERWISE APPROVED BY THE TXDOT MAINTENANCE SUPERVISOR."
17. "ALL FLEXIBLE BASE WILL HAVE A MINIMUM PLASTICITY INDEX OF 4."
18. "ALL COURSES OF ASPHALTIC CONCRETE PAVEMENT (REGARDLESS OF TYPE) WILL BE PLACED WITH A ASPHALT PAVING EQUIPMENT MEETING THE REQUIREMENTS OF TXDOT ITEM 320, "EQUIPMENT FOR ASPHALT CONCRETE PAVEMENT", UNLESS OTHERWISE APPROVED BY THE MAINTENANCE SUPERVISOR."
19. "ALL SURFACE AGGREGATES WILL MEET THE REQUIREMENTS OF TXDOT FRICTION CLASSIFICATION "B" AND WILL MEET PG BINDER GRADE 70-22."
20. "ALL SURFACE ASPHALT CONCRETE PAVEMENT WILL BE UNDER-SEALED WITH A ONE COURSE SURFACE TREATMENT."
21. "ALL ASPHALTIC CONCRETE PAVEMENT USED IN BASE COURSES WILL BE TYPE "A" OR "B" AND WILL MEET PG BINDER GRADE 64-22."
22. "ALL PAVEMENT WIDENING INCLUDING SHOULDERS WILL MATCH THE EXISTING PAVEMENT CROSS SLOPE."
23. "ALL PAVEMENT MARKINGS WILL BE TYPE I THERMOPLASTIC (100 MIL) WITH UNDER-SEAL MEETING THE REQUIREMENTS OF TXDOT ITEM 666, REFLECTORIZED PAVEMENT MARKINGS. THE CONTRACTOR WILL PLACE GUIDE MARKS IN ACCORDANCE WITH ITEM 666 AND WILL MAKE ARRANGEMENTS FOR TXDOT INSPECTION OF THE PAVEMENT MARKING LAYOUT PRIOR TO PLACEMENT OF STRIPING. EQUIPMENT USED FOR THE PLACEMENT OF STRIPING WILL MEET THE PRODUCTION REQUIREMENTS OF ITEM 666 UNLESS OTHERWISE APPROVED IN ADVANCE BY THE TXDOT MAINTENANCE SUPERVISOR."
24. "ALL MATERIALS AND CONSTRUCTION METHODS USED IN STATE RIGHT OF WAY WILL MEET TXDOT SPECIFICATIONS. THIS SUPERSEDES ALL OTHER SPECIFICATIONS IN THE PLANS."
25. "ALL TURN LANE CONCRETE PAVEMENT IN STATE ROW WILL MEET THE REQUIREMENTS OF TXDOT ITEM 360 CLASS P CONCRETE AND WILL BE BATCHED AT CONCRETE PLANTS HAVING A CURRENT APPROVED MIX DESIGN. CLASS P CONCRETE SHALL HAVE 7 AND 28 DAY COMPRESSIVE STRENGTH OF 3200 PSI AND 4400 PSI RESPECTIVELY."
26. "WHEN WIDENING EXISTING CONCRETE PAVEMENTS, JOINTS IN THE NEW PAVEMENT WILL MATCH JOINTS IN EXISTING PAVEMENT AND CURB."
27. "THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT TXDOT APPROVED MATERIALS, MIX DESIGNS, APPROVED SOURCES AND PRODUCTS ARE USED FOR ALL WORK IN STATE ROW. THE CONTRACTOR WILL ARRANGE FOR THE SERVICES OF A QUALIFIED TESTING LABORATORY FOR ALL ITEMS REQUIRING TESTING. WILL NOTIFY TXDOT OF ANY DISCREPANCIES BETWEEN TEST RESULTS AND TXDOT SPECS IN A TIMELY MANNER. THE CONTRACTOR WILL PROVIDE TO TXDOT INVOICES AND TESTING RESULTS AS SOON THEY ARE AVAILABLE. FAILURE TO DO THIS WILL RESULT IN REJECTION OF THE WORK."
28. "SAWING OF CONTRACTION/CONSTRUCTION JOINTS IN CONCRETE PAVEMENT WILL BE ACCOMPLISHED AS SOON AS PERSONNEL CAN WALK ON THE CONCRETE WITHOUT DAMAGING THE SURFACE REGARDLESS OF TIME OF DAY OR WEATHER CONDITIONS. STAND-BY POWER DRIVEN CONCRETE SAWS WILL BE PROVIDED DURING THE SAWING OPERATION. CURING COMPOUND WILL BE RE-APPLIED TO THE SAWED JOINT IMMEDIATELY UPON SAWING THE JOINT."
29. "ANY CONCRETE CURB TO BE REMOVED WILL BE SAW-CUT AT THE LIMITS OF REMOVAL AND BE REMOVED ENTIRELY. SLICING THE TOP PORTION OF THE CURB OFF AND LEAVING REMAINING PORTION OF CURB IN PLACE IS UNACCEPTABLE. "
30. "ANY DAMAGE TO TXDOT FACILITIES WILL BE REPAIRED AT NO EXPENSE TO THE STATE, TO TXDOT'S SATISFACTION."
31. "SIDEWALKS PLACED IN THE HIGHWAY RIGHT-OF-WAY WILL BE A MINIMUM WIDTH OF FIVE FEET OR COMPLY WITH THE MORE STRINGENT WIDTH AS REQUIRED BY CITY ORDINANCE AND WILL MEET ALL OTHER REQUIREMENTS OF THE AMERICANS WITH DISABILITIES ACT. PEDESTRIAN RAMPS WILL BE PROVIDED AT STREET AND DRIVEWAY INTERSECTIONS AS SHOWN ON THE CURRENT STATE STANDARD FOR PEDESTRIAN FACILITIES. COLOR CONTRAST AND TEXTURING OF PEDESTRIAN RAMPS WILL BE PLACE AT STREET INTERSECTION RAMPS ONLY AS SHOWN ON THE CURRENT STATE STANDARD FOR PEDESTRIAN FACILITIES. PEDESTRIAN RAMPS AT DRIVEWAY INTERSECTIONS WILL NOT RECEIVE ANY COLOR CONTRAST OR TEXTURING."
32. "THE CONTRACTOR WILL USE BEST MANAGEMENT PRACTICES (BMP'S) TO MINIMIZE EROSION AND SEDIMENTATION IN THE STATE RIGHT OF WAY RESULTING FROM THE PROPOSED CONSTRUCTION. RE-VEGETATION OF DISTURBED AREAS WILL BE COMPLETED IN ACCORDANCE WITH TXDOT STANDARD SPECIFICATIONS. PERMANENT VEGETATIVE COVER MUST ACHIEVE 70% COVERAGE PRIOR TO PROJECT ACCEPTANCE. SOIL RETENTION BLANKETS MAY BE REQUIRED TO PREVENT EROSION OF TOPSOIL PRIOR TO VEGETATION RE-ESTABLISHMENT"
33. "PRIOR TO SEEDING OR RE-VEGETATION THE FRONT SLOPES WILL BE SHOULDERED UP WITH TOPSOIL TO ELIMINATE ANY PAVEMENT EDGE DROP-OFF."
34. "MUD TRACKED ONTO THE ROADWAY FROM THE SITE WILL BE IMMEDIATELY REMOVED TO THE SATISFACTION OF TXDOT."
35. "IT WILL BE THE DEVELOPER/OWNER'S RESPONSIBILITY TO CLEAN OUT, TO THE STATE'S SATISFACTION, ANY DRAINAGE STRUCTURE OR STORM SEWER SYSTEM THAT BECOMES SILTED AS A RESULT OF THEIR OPERATIONS."
36. "THE ADJUSTMENT OF ANY UTILITIES IN STATE RIGHT OF WAY OR ADJACENT PRIVATE EASEMENT WILL BE THE RESPONSIBILITY OF THE DEVELOPER/OWNER'S."
37. "THE CONTRACTOR IS RESPONSIBLE FOR PLACING AND MAINTAINING EXISTING SIGNS ON TXDOT APPROVED TEMPORARY MOUNTS UNTIL PERMANENT SIGNS ARE PLACED."
38. "THE FINAL PLACEMENT OF PERMANENT SIGNS WILL BE COORDINATED PRIOR TO PLACEMENT WITH THE LOCAL TXDOT MAINTENANCE SUPERVISOR."
39 "FOR WORK WITHIN THE STATE RIGHT OF WAY WHERE REMOVAL OF MATERIALS OR DEBRIS WITHIN THE CONSTRUCTION LIMITS AND NOT INCORPORATED IN THE FINISHED ROADWAY SECTION OF RIGHT OF WAY, WILL BE DISPOSED OF IN A MANNER ACCEPTABLE TO THE MAINTENANCE SUPERVISOR AT NO EXPENSE TO THE STATE. MATERIALS THAT ARE NOT DETERMINED TO BE SALVAGEABLE BY THE MAINTENANCE SUPERVISOR BECOME THE PROPERTY OF THE CONTRACTOR FOR PROPER DISPOSAL AT THEIR EXPENSE. MATERIALS DETERMINED TO BE SALVAGEABLE WILL BE RETURNED TO THE STATE AND DELIVERED TO THE LOCATION AS DETERMINED BY THE MAINTENANCE SUPERVISOR."
40. "REGARDLESS OF ERRORS AND OMISSIONS IN INFORMATION PROVIDED IN THE PLANS OR CROSS-SECTIONS THE PERMITEE IS RESPONSIBLE FOR PROVIDING FOR POSITIVE DRAINAGE OUTFALLS WITHIN AND OFF THE LIMITS OF THE PROJECT."
41. "ALL TRAFFIC SIGNALS ON THE STATE HIGHWAY SYSTEM WITHIN THE NEW BRAUNFELS CITY LIMITS, WITH THE EXCEPTION OF SIGNALS ON IH 35, ARE THE RESPONSIBILITY OF THE CITY OF NEW BRAUNFELS AND THE CITY OF NEW BRAUNFELS WILL PERFORM CONSTRUCTION INSPECTION. CONTACT GARRY FORD, P.E. AT (830) 221-4645, 48 HOURS PRIOR TO THE NEED FOR ANY INSPECTIONS. ALSO WHEN NON-TRAFFIC SIGNAL WORK IS BEING PERFORMED WITHIN 400 FEET OF AN EXISTING SIGNALIZED INTERSECTION, FLASHING BEACON OR SCHOOL ZONE FLASHER OR OTHER TYPE OF SIGNAL; IF WITHIN THE CITY OF NEW BRAUNFELS AREA OF RESPONSIBILITY CONTACT GARRY FORD, P.E. TO DETERMINE/VERIFY THE LOCATION OF LOOP DETECTORS, CONDUIT, GROUND-BOXES, ETC. FOR ALL OTHER LOCATIONS, CONTACT TXDOT REPRESENTATIVE, CRAIG WILLIAMS, AT (210) 615-6213, E-MAIL IS CRAIG.WILLIAMS@TXDOT.GOV. THE CONTRACTOR IS RESPONSIBLE FOR REPAIR OR REPLACEMENT OF ANY SIGNAL EQUIPMENT DAMAGED BY CONSTRUCTION OPERATIONS. THE METHOD OF REPAIR OR REPLACEMENT SHALL BE PRE-APPROVED AND INSPECTED. DEPENDING ON THE TYPE AND EXTENT OF THE DAMAGE, THE ENGINEER RESERVES THE RIGHT TO PERFORM THE REPAIR OR REPLACEMENT WORK AND THE CONTRACTOR WILL BE BILLED FOR THIS WORK. WHEN WORKING NEAR AERIAL ELECTRICAL LINES OR UTILITY POLES, COMPLY WITH FEDERAL, STATE AND LOCAL REGULATIONS."

Required by TxDOT to be included or shown in Site Development Plans

1. A Traffic Control Plan is required in the site plan. Traffic Control measures must be in accordance with the Texas Manual of Uniform Traffic Control Devices (TMUTCD). Standards can be located on TxDOT web site www.txdot.gov under Business, then Cad Standards.
2. Construction work within the State's right of way must be scheduled for Monday through Friday during daylight hours only.
3. Label plans to saw cut edge of pavement when making the proposed access driveway connection to State maintained roadways.
4. Driveway construction shall comply with ADAAG/TAS requirements and standards, match the grade of the highway edge of pavement, and sloped to provide positive drainage away from the highway pavement.
5. Driveway must provide 6:1 or flatter side slopes. Highway side slopes should provide 6:1 slopes or as approved by the TxDOT Area Engineers Office.
6. Locate all existing underground utilities before excavating in state right of way.
7. The contractor shall place topsoil and restore all disturbed areas within TxDOT right of way in accordance with TxDOT standard and specifications or as directed by the TxDOT Inspector.
8. A copy of the approved permit shall be available at the construction site at all times when working within the right of way.
9. The TxDOT Inspector or a representative from their office can make and require changes as necessary to ensure the State's roadway infrastructure is maintained according to TxDOT requirements.
10. **Add a note:** In the event this project is under construction at the same time as a highway construction project all proposed work within the right of way must be coordinated with the State Highway contractor. In the event there is a scheduling conflict between the two contractors, work planned by the highway contractor will take precedence.
11. **Add a note:** Lane/shoulder closures are only allowed during the hours of 9:00 AM to 4:00 PM Monday through Friday. If night time lane closures are required by the TxDOT Area Engineers office, they must be from 8:00 PM to 5:00 AM, Sunday evening through Friday morning.
12. **Add a note:** Contact TxDOT at 830-625-6278 at least 48-hours prior to working in the right of way to schedule an inspection.
13. **Add a note:** The primary contractor is responsible for keeping the state roadway free of mud, rocks, and other debris. If the highway becomes unsafe for traffic because of debris from the construction site. The contractor must clean the roadway immediately and suspend work if necessary.
14. **Add a note:** General Contractor must provide on site parking during all phases of construction. Parking will not be allowed within the right of way of state maintained roadways.
15. **Add a note:** Drop-offs of 2 inches or more at edge of the roadway left open overnight must provide a 3:1 safety wedge.

NO.	DATE	DESCRIPTION

STATE OF TEXAS
JAMES C. MASSARO
92530
LICENSED PROFESSIONAL ENGINEER
2/24/15

VICKREY & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION # F-159 TBPLS REGISTRATION # 10004000
1717 West 6th Street, Suite 260
Austin, Texas 78703
Phone: (512) 494-8014 Fax: (512) 494-8054

©2014

GENERAL NOTES & TCEQ NO

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY LIFT STATIONS AND FORCE MAINS GENERAL CONSTRUCTION NOTES

1. THIS LIFT STATION AND/OR FORCE MAIN MUST BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY'S (TCEQ) EDWARDS AQUIFER RULES 30 TEXAS ADMINISTRATIVE CODE (TAC) §213.5(C), THE DESIGN CRITERIA FOR DOMESTIC WASTEWATER SYSTEMS 30 TAC CHAPTER 217, AND THE CITY OF LOCAL MUNICIPAL STANDARD SPECIFICATIONS.

2. ANY MODIFICATION TO THE ACTIVITIES DESCRIBED IN THE REFERENCED LIFT STATION/FORCE MAIN SYSTEM APPLICATION FOLLOWING THE DATE OF APPROVAL MAY REQUIRE THE SUBMITTAL OF A LIFT STATION/FORCE MAIN SYSTEM APPLICATION TO MODIFY THIS APPROVAL, INCLUDING THE PAYMENT OF APPROPRIATE FEES AND ALL INFORMATION NECESSARY FOR ITS REVIEW AND APPROVAL.

3. PRIOR TO COMMENCING ANY REGULATED ACTIVITY, THE APPLICANT OR HIS AGENT MUST NOTIFY THE SAN ANTONIO REGIONAL OFFICE, IN WRITING, OF THE DATE ON WHICH THE REGULATED ACTIVITY WILL BEGIN.

4. UPON COMPLETION OF THE WET WELL EXCAVATION, A GEOLOGIST MUST CERTIFY THAT THE EXCAVATION HAS BEEN INSPECTED FOR THE PRESENCE OF SENSITIVE FEATURES AND THE CERTIFICATION MUST BE SUBMITTED TO THE APPROPRIATE REGIONAL OFFICE. FURTHER ACTIVITIES MAY NOT PROCEED UNTIL THE EXECUTIVE DIRECTOR HAS REVIEWED AND APPROVED THE METHODS PROPOSED TO PROTECT ANY SENSITIVE FEATURE AND THE EDWARDS AQUIFER FROM POTENTIALLY ADVERSE IMPACTS TO WATER QUALITY FROM THE LIFT STATION. CONSTRUCTION MAY CONTINUE IF THE GEOLOGIST CERTIFIES THAT NO SENSITIVE FEATURE OR FEATURES ARE PRESENT.

5. IF ANY SENSITIVE FEATURES ARE DISCOVERED DURING THE WASTEWATER LINE TRENCHING ACTIVITIES, ALL REGULATED ACTIVITIES NEAR THE SENSITIVE FEATURE MUST BE SUSPENDED IMMEDIATELY. THE APPLICANT MUST IMMEDIATELY NOTIFY THE APPROPRIATE REGIONAL OFFICE OF THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY OF THE FEATURE DISCOVERY. A GEOLOGIST'S ASSESSMENT OF THE LOCATION AND EXTENT OF THE FEATURE DISCOVERED MUST BE REPORTED TO THAT REGIONAL OFFICE IN WRITING WITHIN TWO WORKING DAYS. THE APPLICANT MUST SUBMIT A PLAN FOR ENSURING THE STRUCTURAL INTEGRITY OF THE SEWER LINE OR FOR MODIFYING THE PROPOSED COLLECTION SYSTEM ALIGNMENT AROUND THE FEATURE. THE REGULATED ACTIVITIES NEAR THE SENSITIVE FEATURE MAY NOT PROCEED UNTIL THE EXECUTIVE DIRECTOR HAS REVIEWED AND APPROVED THE METHODS PROPOSED TO PROTECT THE SENSITIVE FEATURE AND THE EDWARDS AQUIFER FROM ANY POTENTIALLY ADVERSE IMPACTS TO WATER QUALITY WHILE MAINTAINING THE STRUCTURAL INTEGRITY OF THE LINE.

6. LIFT STATIONS SHALL BE DESIGNED TO WITHSTAND AND OPERATE DURING A 100-YEAR FLOOD EVENT AND SHALL BE ACCESSIBLE DURING A 25-YEAR FLOOD. ALL LIFT STATIONS SHALL BE INTRUDER-RESISTANT WITH A CONTROLLED ACCESS.

7. DRY WELL SUMP PUMPS:
   (A) A DRY WELL MUST USE DUAL SUMP PUMPS, EACH WITH A MINIMUM CAPACITY OF 1,000 GALLONS PER HOUR AND CAPABLE OF HANDLING THE VOLUME OF LIQUID GENERATED DURING PEAK OPERATIONS.
   (B) A PUMP MUST HAVE A SUBMERSIBLE MOTOR AND WATERTIGHT WIRING.
   (C) A DRY WELL FLOOR MUST SLOPE TOWARD A SUMP SIZED FOR PROPER DRAINAGE.
   (D) THE MINIMUM SUMP DEPTH IS 6.0 INCHES AND MUST PREVENT STANDING WATER ON A DRY WELL FLOOR UNDER NORMAL OPERATION.
   (E) A SUMP PUMP MUST OPERATE AUTOMATICALLY BY USE OF A FLOAT SWITCH OR OTHER LEVEL-DETECTING DEVICE.
   (F) A SUMP PUMP MUST USE SEPARATE PIPES CAPABLE OF DISCHARGING MORE THAN THE MAXIMUM LIQUID LEVEL OF AN ASSOCIATED WET WELL.
   (G) A SUMP PUMP OUTLET PIPE MUST BE AT LEAST 1.5 INCHES IN DIAMETER AND HAVE AT LEAST TWO CHECK VALVES IN SERIES.

8. PUMP CONTROLS.
   (A) A LIFT STATION PUMP MUST OPERATE AUTOMATICALLY, BASED ON THE WATER LEVEL IN A WET WELL.
   (B) THE LOCATION OF A WET WELL LEVEL MECHANISM MUST ENSURE THAT THE MECHANISM IS UNAFFECTED BY CURRENTS, RAGS, GREASE, OR OTHER FLOATING MATERIALS.
   (C) A LEVEL MECHANISM MUST BE ACCESSIBLE WITHOUT ENTERING THE WET WELL.
   (D) WET WELL CONTROLS WITH A BUBBLER SYSTEM REQUIRE DUAL AIR SUPPLY AND DUAL CONTROLS.
   (E) MOTOR CONTROL CENTERS MUST BE MOUNTED AT LEAST 4.0 INCHES ABOVE GRADE TO PREVENT WATER INTRUSION AND CORROSION FROM STANDING WATER IN THE ENCLOSURE.
   (F) ELECTRICAL EQUIPMENT AND ELECTRICAL CONNECTIONS IN A WET WELL OR A DRY WELL MUST MEET NATIONAL FIRE PREVENTION ASSOCIATION 70 NATIONAL ELECTRIC CODE EXPLOSION PREVENTION REQUIREMENTS, UNLESS CONTINUOUS VENTILATION IS PROVIDED.

9. WET WELLS.
   (A) A WET WELL MUST BE ENCLOSED BY WATERTIGHT AND GAS TIGHT WALLS.
   (B) A PENETRATION THROUGH A WALL OF A WET WELL MUST BE GAS TIGHT.
   (C) A WET WELL MUST NOT CONTAIN EQUIPMENT REQUIRING REGULAR OR ROUTINE INSPECTION OR MAINTENANCE, UNLESS INSPECTION AND MAINTENANCE CAN BE DONE WITHOUT STAFF ENTERING THE WET WELL.
   (D) A GRAVITY PIPE DISCHARGING TO A WET WELL MUST BE LOCATED SO THAT THE INVERT ELEVATION IS ABOVE THE LIQUID LEVEL OF A PUMP'S "ON" SETTING.
   (E) GATE VALVES AND CHECK VALVES ARE PROHIBITED IN A WET WELL.
   (F) GATE VALVES AND CHECK VALVES MAY BE LOCATED IN A VALVE VAULT NEXT TO A WET WELL OR IN A DRY WELL.
   (G) PUMP CYCLE TIME, BASED ON PEAK FLOW, MUST EQUAL OR EXCEED THOSE IN THE FOLLOWING TABLE:

PUMP HORSEPOWER	MINIMUM CYCLE TIMES (minutes)
<50	6
50–100	10
> 100	15

   H) AN EVALUATION OF MINIMUM WET WELL VOLUMES REQUIRES THE FOLLOWING REQUIRES THE FOLLOWING FORMULA

$$V=\frac{T \times Q}{4 \times 7.48}$$

   WHERE:
   V = ACTIVE VOLUME (CUBIC FEET)
   Q = PUMP CAPACITY (GALLONS PER MINUTE)
   T = CYCLE TIME (MINUTES)
   7.48 = CONVERSION FACTOR (GALLONS/CUBIC FOOT)

10. WET WELL SLOPES.
   (A) A WET WELL FLOOR MUST HAVE A SMOOTH FINISH AND MINIMUM SLOPE OF 10% TO A PUMP INTAKE.
   (B) A WET WELL DESIGN MUST PREVENT DEPOSITION OF SOLIDS UNDER NORMAL OPERATING CONDITIONS.
   (C) A LIFT STATION WITH GREATER THAN 5.0 MILLION GALLONS PER DAY FIRM PUMPING CAPACITY MUST HAVE ANTI-VORTEX BAFFLING.

11. DRY WELL ACCESS.
   (A) AN UNDERGROUND DRY WELL MUST BE ACCESSIBLE.
   (B) A STAIRWAY IN A DRY WELL MUST USE NON-SLIP STEPS AND CONFORM TO OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION REGULATIONS WITH RESPECT TO RISE AND RUN.
   (C) A LADDER IN A DRY WELL MUST MADE OF NON-CONDUCTIVE MATERIAL AND RATED FOR THE LOAD NECESSARY FOR STAFF AND EQUIPMENT TO DESCEND AND ASCEND.

12. VENTILATION SHALL BE PROVIDED FOR LIFT STATIONS, INCLUDING BOTH WET AND DRY WELLS.

13. HOISTING EQUIPMENT. A LIFT STATION MUST HAVE PERMANENT HOISTING EQUIPMENT OR BE ACCESSIBLE TO PORTABLE HOISTING EQUIPMENT FOR REMOVAL OF PUMPS, MOTORS, VALVES, PIPES, AND OTHER SIMILAR EQUIPMENT.

14. A FLOOR DRAIN FROM A VALVE VAULT TO A WET WELL MUST PREVENT GAS FROM ENTERING A VALVE VAULT BY INCLUDING FLAP VALVES, "P" TRAPS, SUBMERGED OUTLETS, OR A COMBINATION OF THESE DEVICES.

15. PUMPS.
   (A) GENERAL REQUIREMENTS. A RAW WASTEWATER PUMP, WITH THE EXCEPTION OF A GRINDER PUMP, MUST:
   (1) BE DESIGNED TO PREVENT CLOGGING;
   (2) BE CAPABLE OF PASSING A SPHERE OF 2.5 INCHES IN DIAMETER OR GREATER; AND
   (3) HAVE GREATER THAN 3.0 INCH DIAMETER SUCTION AND DISCHARGE OPENINGS.
   (B) SUBMERSIBLE AND NON-SUBMERSIBLE PUMPS.
   (1) A NON-SUBMERSIBLE PUMP MUST HAVE INSPECTION AND CLEANOUT PLATES ON BOTH THE SUCTION AND DISCHARGE SIDES OF EACH PUMPING UNIT THAT FACILITATE LOCATING AND REMOVING BLOCKAGE-CAUSING MATERIALS, UNLESS THE PUMP DESIGN ACCOMMODATES EASY REMOVAL OF THE ROTATION ELEMENTS.
   (2) A PUMP SUPPORT MUST PREVENT MOVEMENT AND VIBRATION DURING OPERATION.
   (3) A SUBMERSIBLE PUMP MUST USE A RAIL-TYPE PUMP SUPPORT SYSTEM WITH MANUFACTURER-APPROVED MECHANISMS DESIGNED TO ALLOW PERSONNEL TO REMOVE AND REPLACE ANY SINGLE PUMP WITHOUT ENTERING OR DEWATERING THE WET WELL.
   (4) SUBMERSIBLE PUMP RAILS AND LIFTING CHAINS MUST BE CONSTRUCTED OF A MATERIAL THAT PERFORMS TO AT LEAST THE STANDARD OF SERIES 300 STAINLESS STEEL.
   (C) LIFT STATION PUMPING CAPACITY. THE FIRM PUMPING CAPACITY OF A LIFT STATION MUST HANDLE THE EXPECTED PEAK FLOW.
   (D) PUMP HEAD CALCULATIONS.
   (1) AN OWNER SHALL SELECT A PUMP BASED UPON ANALYSIS OF THE SYSTEM HEAD AND PUMP CAPACITY CURVES THAT DETERMINE THE PUMPING CAPACITIES ALONE AND WITH OTHER PUMPS AS THE TOTAL DYNAMIC-HEAD INCREASES DUE TO ADDITIONAL FLOWS PUMPED THROUGH A FORCE MAIN.
   (2) THE PIPE HEAD LOSS CALCULATIONS, USING THE HYDRAULIC INSTITUTE STANDARDS, PERTAINING TO HEAD LOSSES THROUGH PIPES, VALVES, AND FITTINGS, MUST BE INCLUDED IN THE REPORT.
   (3) THE SELECTED FRICTION COEFFICIENT (HAZEN-WILLIAMS "C" VALUE) USED IN FRICTION HEAD LOSS CALCULATIONS MUST BE BASED ON THE PIPE MATERIAL SELECTED.
   (4) FOR A LIFT STATION WITH MORE THAN TWO PUMPS, A FORCE MAIN IN EXCESS OF ONE-HALF MILE, OR FIRM PUMPING CAPACITY OF 100 GALLONS PER MINUTE OR GREATER, SYSTEM CURVES MUST BE PROVIDED FOR BOTH THE NORMAL AND PEAK OPERATING CONDITIONS AT C VALUES FOR PROPOSED AND EXISTING PIPE.
   (E) FLOW CONTROL.
   (1) A LIFT STATION OR A TRANSFER PUMPING STATION LOCATED AT OR DISCHARGING DIRECTLY TO A WASTEWATER TREATMENT SYSTEM MUST HAVE A PEAK PUMP CAPACITY EQUAL TO OR LESS THAN THE PEAK DESIGN FLOW, UNLESS EQUALIZATION IS PROVIDED.

   (2) A WASTEWATER TREATMENT SYSTEM WITH A PEAK FLOW THAT IS GREATER THAN 300,000 GALLON PER DAY MUST USE THREE OR MORE PUMPS, UNLESS DUPLEX, AUTOMATICALLY CONTROLLED, VARIABLE CAPACITY PUMPS ARE PROVIDED.
   (F) SELF-PRIMING PUMPS.
   (1) A SELF-PRIMING PUMP MUST BE CAPABLE OF PRIMING WITHOUT RELIANCE UPON A SEPARATE PRIMING SYSTEM, AN INTERNAL FLAP VALVE, OR ANY EXTERNAL MEANS FOR PRIMING.
   (2) A SELF-PRIMING PUMP MUST USE A SUCTION PIPE VELOCITY AT LEAST 3.0 FEET PER SECOND BUT NOT MORE THAN 7.0 FEET PER SECOND, AND MUST INCORPORATE ITS OWN SUCTION PIPE.
   (3) A SELF-PRIMING PUMP MUST VENT AIR BACK INTO THE WET WELL DURING PRIMING.
   (G) VACUUM-PRIMING PUMPS.
   (1) A VACUUM-PRIMED PUMP MUST BE CAPABLE OF PRIMING BY USING A SEPARATE POSITIVE PRIMING SYSTEM WITH A DEDICATED VACUUM PUMP FOR EACH MAIN WASTEWATER PUMP.
   (2) A VACUUM-PRIMING PUMP MUST USE A SUCTION PIPE VELOCITY AT LEAST 3.0 FEET PER SECOND BUT LESS THAN 7.0 FEET PER SECOND AND MUST HAVE ITS OWN SUCTION PIPE.
   (H) VERTICAL POSITIONING OF PUMPS. A RAW WASTEWATER PUMP MUST HAVE POSITIVE STATIC SUCTION HEAD DURING NORMAL ON-OFF CYCLING, EXCEPT A SUBMERSIBLE PUMP WITH "NO SUCTION" PIPES, A VACUUM-PRIMED PUMP, OR A SELF-PRIMING UNIT CAPABLE OF SATISFACTORY OPERATION UNDER ANY NEGATIVE SUCTION HEAD ANTICIPATED FOR THE LIFT STATION.
   (I) INDIVIDUAL GRINDER PUMPS. A GRINDER PUMP SERVING ONLY ONE RESIDENTIAL OR COMMERCIAL STRUCTURE THAT IS PRIVATELY OWNED, MAINTAINED, AND OPERATED IS NOT SUBJECT TO THE RULES OF THIS CHAPTER.
   (J) PUMP FOR LOW-FLOW LIFT STATION. A PUMP USED FOR A LIFT STATION WITH A PEAK FLOW OF LESS THAN 120 GALLONS PER MINUTE MUST BE SUBMERSIBLE AND INCLUDE A GRINDER.

16. PIPING.
   (A) HORIZONTAL PUMP SUCTIONS.
   (1) EACH PUMP MUST HAVE A SEPARATE SUCTION PIPE THAT USES AN ECCENTRIC REDUCER.
   (2) PIPES IN A WET WELL MUST HAVE A TURNDOWN TYPE FLARED INTAKE.
   (B) VALVES.
   (1) THE DISCHARGE SIDE OF EACH PUMP FOLLOWED BY A FULL-CLOSING ISOLATION VALVE MUST ALSO HAVE A CHECK VALVE.
   (A) A CHECK VALVE MUST BE A SWING TYPE VALVE WITH AN EXTERNAL LEVER.
   (B) A VALVE MUST INCLUDE A POSITION INDICATOR TO SHOW ITS OPEN AND CLOSED POSITIONS, UNLESS A FULL-CLOSING VALVE IS A RISING-STEM GATE VALVE.
   (2) A GRINDER PUMP INSTALLATION MAY USE A RUBBER-BALL CHECK VALVE OR A SWING-TYPE CHECK VALVE.
   (3) A BUTTERFLY VALVE, TILTING-DISC CHECK VALVE, OR ANY OTHER VALVE USING A TILTING-DISC IN A FLOW PIPE IS PROHIBITED.
   (C) PIPES.
   (1) A LIFT STATION PIPE MUST HAVE FLANGED OR FLEXIBLE CONNECTIONS TO ALLOW FOR REMOVAL OF PUMPS AND VALVES WITHOUT INTERRUPTION OF THE LIFT STATION OPERATIONS.
   (2) WALL PENETRATIONS MUST ALLOW FOR PIPE FLEXURE WHILE EXCLUDING EXFILTRATION OR INFILTRATION.
   (3) PIPE SUCTION VELOCITIES MUST BE AT LEAST 3.0 FEET PER SECOND BUT NOT MORE THAN 7.0 FEET PER SECOND.

17. EMERGENCY PROVISIONS FOR LIFT STATIONS.
   (A) A COLLECTION SYSTEM LIFT STATION MUST BE EQUIPPED WITH A TESTED QUICK-CONNECT MECHANISM OR A TRANSFER SWITCH PROPERLY SIZED TO CONNECT TO A PORTABLE GENERATOR, IF NOT EQUIPPED WITH AN ONSITE GENERATOR.
   (B) LIFT STATIONS MUST INCLUDE AN AUDIOVISUAL ALARM SYSTEM AND THE SYSTEM MUST TRANSMIT ALL ALARM CONDITIONS THROUGH USE OF AN AUTO-DIALER SYSTEM, SUPERVISORY CONTROL AND DATA ACQUISITION SYSTEM, OR TELEMETERING SYSTEM CONNECTED TO A CONTINUOUSLY MONITORED LOCATION.
   (C) AN ALARM SYSTEM MUST SELF-ACTIVATE FOR A POWER OUTAGE, PUMP FAILURE, OR A HIGH WET WELL WATER LEVEL.
   (D) A LIFT STATION CONSTRUCTED TO PUMP RAW WASTEWATER MUST HAVE SERVICE RELIABILITY BASED ON:
   (1) RETENTION CAPACITY.
   (A) THE RETENTION CAPACITY IN A LIFT STATION'S WET WELL AND INCOMING GRAVITY PIPES MUST PREVENT DISCHARGES OF UNTREATED WASTEWATER AT THE LIFT STATION OR ANY POINT UPSTREAM FOR A PERIOD OF TIME EQUAL TO THE LONGEST ELECTRICAL OUTAGE RECORDED DURING THE PAST 24 MONTHS, BUT NOT LESS THAN 20 MINUTES.
   (B) FOR CALCULATION PURPOSES, THE OUTAGE PERIOD BEGINS WHEN A LIFT STATION PUMP FINISHED ITS LAST NORMAL CYCLE, EXCLUDING A STANDBY PUMP.
   (2) ON-SITE GENERATORS. A LIFT STATION MAY BE PROVIDED EMERGENCY POWER BY ON-SITE, AUTOMATIC ELECTRICAL GENERATORS SIZED TO OPERATE THE LIFT STATION AT ITS FIRM PUMPING CAPACITY OR AT THE AVERAGE DAILY FLOW, IF THE PEAK FLOW CAN BE STORED IN THE COLLECTION SYSTEM.
   (3) PORTABLE GENERATORS AND PUMPS.
   (A) A LIFT STATION MAY USE PORTABLE GENERATORS AND PUMPS TO GUARANTEE SERVICE IF THE REPORT INCLUDES:
   (I) THE STORAGE LOCATION OF EACH GENERATOR AND PUMP;
   (II) THE AMOUNT OF TIME THAT WILL BE NEEDED TO TRANSPORT EACH GENERATOR OR PUMP TO A LIFT STATION;
   (III) THE NUMBER OF LIFT STATIONS FOR WHICH EACH GENERATOR OR PUMP IS DEDICATED AS A BACKUP; AND
   (IV) THE TYPE OF ROUTINE MAINTENANCE AND UPKEEP PLANNED FOR EACH PORTABLE GENERATOR AND PUMP TO ENSURE THAT THEY WILL BE OPERATIONAL WHEN NEEDED.
   (B) AN OPERATOR THAT IS KNOWLEDGEABLE IN OPERATION OF THE PORTABLE GENERATORS AND PUMPS SHALL BE ON CALL 24 HOURS PER DAY EVERY DAY.
   (C) THE SIZE OF A PORTABLE GENERATOR MUST HANDLE THE FIRM PUMPING CAPACITY OF THE LIFT STATION.
   (E) SPILL CONTAINMENT STRUCTURES.
   (1) THE USE OF A SPILL CONTAINMENT STRUCTURE AS A SOLE MEANS OF PROVIDING SERVICE RELIABILITY IS PROHIBITED.
   (2) A LIFT STATION MAY USE A SPILL CONTAINMENT STRUCTURE IN ADDITION TO ONE OF THE SERVICE RELIABILITY OPTIONS DETAILED IN THIS IN SUBSECTION (A) OF THIS SECTION.
   (3) THE REPORT MUST INCLUDE A DETAILED MANAGEMENT PLAN FOR CLEANING AND MAINTAINING EACH SPILL CONTAINMENT STRUCTURE.
   (4) A SPILL CONTAINMENT STRUCTURE MUST HAVE A LOCKED GATE AND BE SURROUNDED AN INTRUDER RESISTANT FENCE THAT IS 6.0 FEET HIGH CHAIN LINK, MASONRY, OR BOARD FENCE WITH AT LEAST THREE STRANDS OF BARBED WIRE OR 8.0 FEET HIGH CHAIN LINK, MASONRY, OR BOARD FENCE WITH AT LEAST ONE STRAND OF BARBED WIRE.
   (F) A LIFT STATION MUST BE FULLY ACCESSIBLE DURING A 25-YEAR 24-HOUR RAINFALL EVENT.
   (G) LIFT STATION SYSTEM CONTROLS MUST PREVENT OVER-PUMPING UPON RESUMPTION OF NORMAL POWER AFTER A POWER FAILURE. BACKUP OR STANDBY UNITS MUST BE ELECTRICALLY INTERLOCKED TO PREVENT OPERATION AT THE SAME TIME THAT OTHER LIFT STATIONS PUMPS ARE OPERATING ONLY ON THE RESUMPTION OF NORMAL POWER AFTER A POWER FAILURE.

THESE LIFT STATION AND FORCE MAINS CONSTRUCTION NOTES MUST BE INCLUDED ON THE CONSTRUCTION PLANS PROVIDED TO THE CONTRACTOR AND ALL SUBCONTRACTORS.

DATE	NO.	DESCRIPTION

STATE OF TEXAS — JAMES C. MASSARO — 92530 — LICENSED PROFESSIONAL ENGINEER — 9/15/14

©2014

VICKREY & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION # F-159 TBPLS REGISTRATION # 100041-00
1717 West 6th Street, Suite 260
Austin, Texas 78703
Phone: (512) 494-8014 Fax: (512) 494-8054

TCEQ NOTES

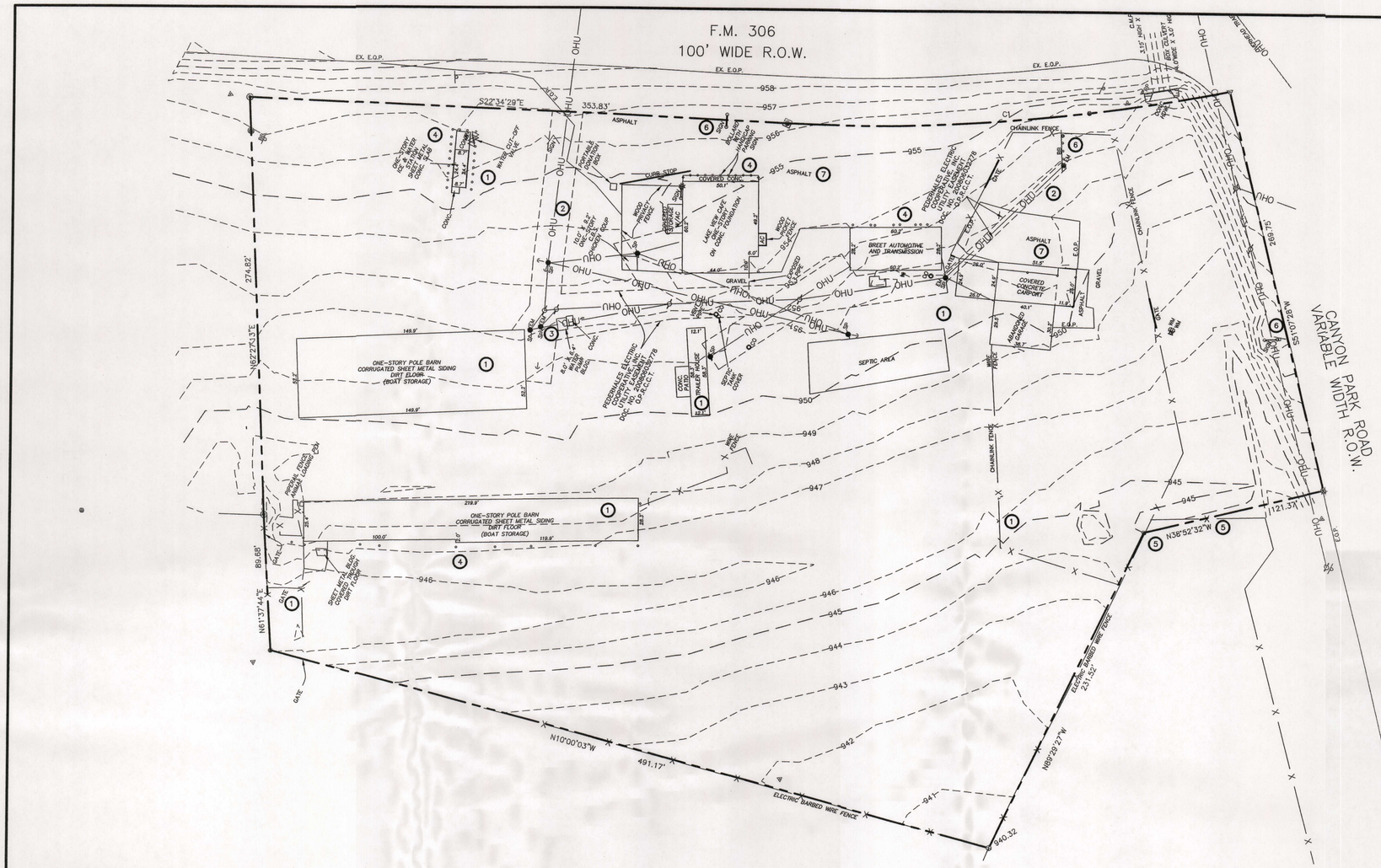
BROOKSHIRE BROTHERS, CANYON LAKE
18267 FM 306
CANYON LAKE, TX

DRAWN BY: JTM
CHECKED BY: JCM
APPROVED BY: JCM
DATE: 09/15/2014

SHEET
C0.02

PROJ NO. 2540-001

Drawing: N:\2540-001\Engineering\DWF\Gen notes.dwg, C0.02 TCEQ
User: JCM
Last Modified: Feb. 19, 15 - 15:56
Plot Date/Time: Feb. 20, 15 - 08:51:27



0 40 80
20 60
SCALE: 1"=40'

LEGEND

- WW — WASTEWATER LINE
- WW — WASTEWATER MANHOLE
- W — WATER LINE
- FIRE HYDRANT
- STORM SEWER LINE
- OVERHEAD ELECTRIC
- PPS — POWER POLE
- PROPERTY LINE
- GAS — GAS LINE
- 955 — EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- EXISTING CURB & GUTTER

NOTE:

1. CONTRACTOR TO VERIFY ALL BUILDINGS, SEPTIC AREAS, OVERHEAD UTILITIES AND FENCES HAVE BEEN REMOVED FROM SITE PRIOR TO CONSTRUCTION.
2. CONTRACTOR TO VERIFY ALL UTILITY EASEMENTS ARE RELEASED BY PEC PRIOR TO CONSTRUCTION.
3. CONTRACTOR TO VERIFY ONSITE WATER WELL HAS BEEN PLUGGED AND ABANDONED PER TCEQ REGULATIONS PRIOR TO CONSTRUCTION.
4. CONTRACTOR TO REMOVE ALL BOLLARDS.
5. CONTRACTOR TO RELOCATE FENCES BY OTHERS ALONG PROPERTY LINES AS SHOWN PRIOR TO CONSTRUCTION.
6. CONTRACTOR TO REMOVE ALL SIGNS PRIOR TO CONSTRUCTION.
7. CONTRACTOR TO REMOVE ALL ASPHALT PRIOR TO CONSTRUCTION.

DESCRIPTION | NO. | DATE

STATE OF TEXAS
JAMES C. MASSARO
92530
LICENSED PROFESSIONAL ENGINEER
2/27/15

VICKREY & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION # F-159 TBPLS REGISTRATION # 10004100
1717 West 6th Street, Suite 260
Austin,Texas 78703
Phone: (512) 494-8014 Fax: (512) 494-8054

©2014

DEMOLITION PLAN

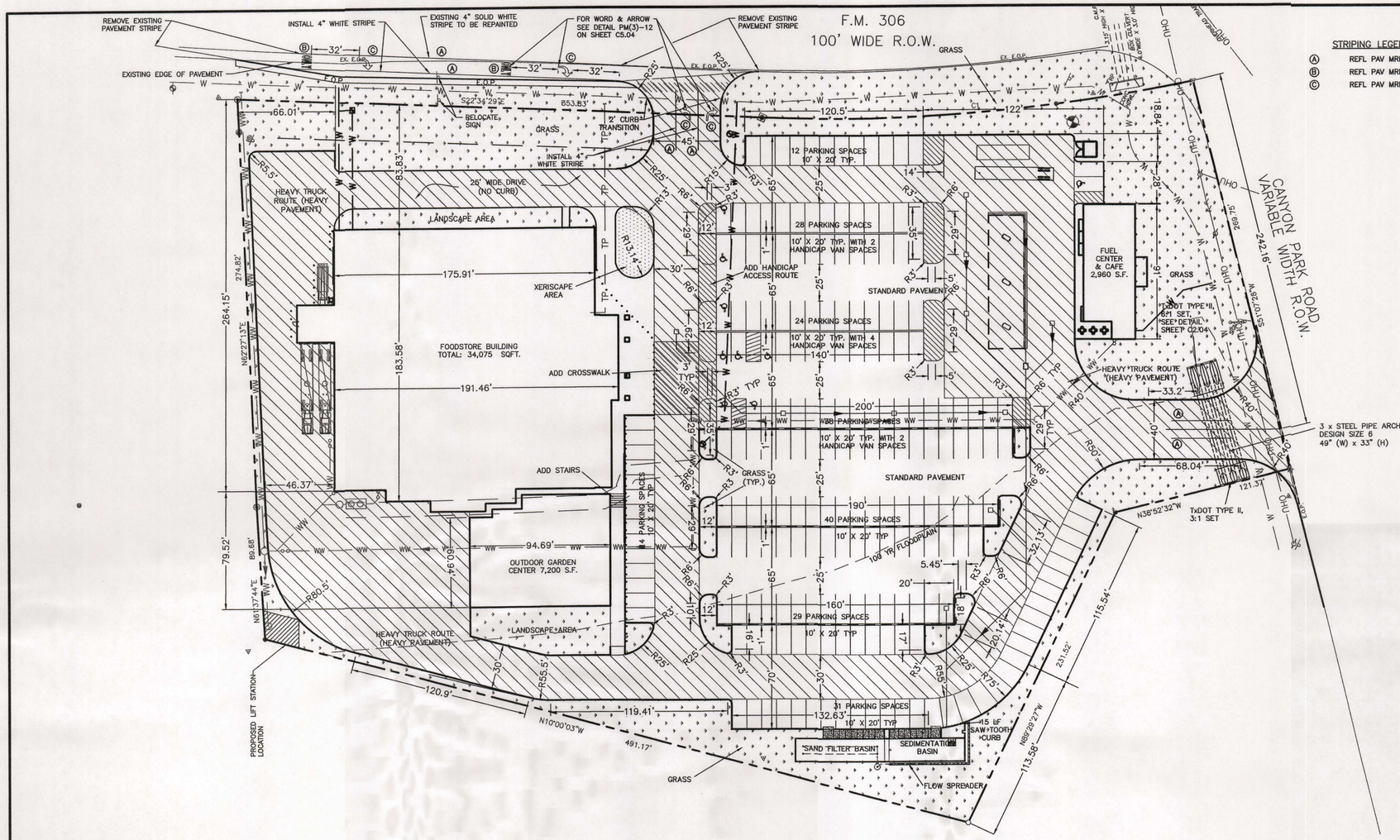
BROOKSHIRE BROTHERS, CANYON LAKE
18267 FM 306
CANYON LAKE, TX

DRAWN BY:	JTM
CHECKED BY:	JCM
APPROVED BY:	JCM
DATE:	09/15/2014

SHEET
C1.02

PROJ NO. 2540-001

Drawing: W:\2540-001\Engineering\DWG\sh_demo plan.dwg ; c1.01 Demolition Plan
User: CHEDERSON
Last Modified: Feb. 15 - 15:31
Plot Date/Time: Feb. 20 - 08:52:25



STRIPING LEGEND

- (A) REFL PAV MRK (W) 4" (SLD)
- (B) REFL PAV MRK (WORD)
- (C) REFL PAV MRK (ARROW)

0 40 80
20 60
SCALE: 1"=40'

LEGEND

- PROPERTY LINE
- FIRE LANE STRIPING
- FENCE
- ACCESSIBLE ROUTE
- RETAINING WALL
- SET IRON ROD
- ELECTRIC POLE
- HANDICAP PARKING
- ACCESSIBLE RAMP
- SIGN
- EXISTING FIRE HYDRANT
- PROPOSED FIRE HYDRANT
- STANDARD CURB & GUTTER
- LAYDOWN CURB & GUTTER
- STANDARD CONC. PAVEMENT
- SHADED SIDEWALK
- TREES TO REMAIN
- TREES TO BE REMOVED
- (14) PARKING COUNT

PAVEMENT SECTIONS

HEAVY PAVEMENT	• 7" CONCRETE PAVING 3500 PSI MIN. @ 28 DAYS • 8" MOISTURE CONDITIONED SUBGRADE
STANDARD PAVEMENT	• 5" CONCRETE PAVING 3500 PSI MIN. @ 28 DAYS • 8" MOISTURE CONDITIONED SUBGRADE

VERIFY SUBGRADE CONDITION FOR CONCRETE PAVING

SITE PLAN NOTES

1. ALL AREAS ONSITE ARE CONSIDERED TO BE DISTURBED DURING CONSTRUCTION. AREA SHOWN ON THE EROSION/SEDIMENTATION CONTROL SHEET AS LOC/LIMITS OF CONSTRUCTION ARE TO BE DISTURBED.

2. SLOPES ARE ANTICIPATED AFTER GRADING, TO BE 0.5% TO 3% PRIMARILY WITH A PORTION OF DRIVEWAYS AND DRIVE ACCESS AT 10% IN PERVIOUS AREAS, SOME SLOPES MAY BE AS HIGH AS 3:1 (33%)

3. STABILIZATION PRACTICES SUCH AS COMPACTION FOR PAVING AND REVEGETATION ARE EXPECTED TO OCCUR IN ALL DISTURBED AREAS.

NO.	DESCRIPTION	DATE

STATE OF TEXAS
JAMES C. MASSARO
92530
LICENSED
PROFESSIONAL ENGINEER
9-24-15

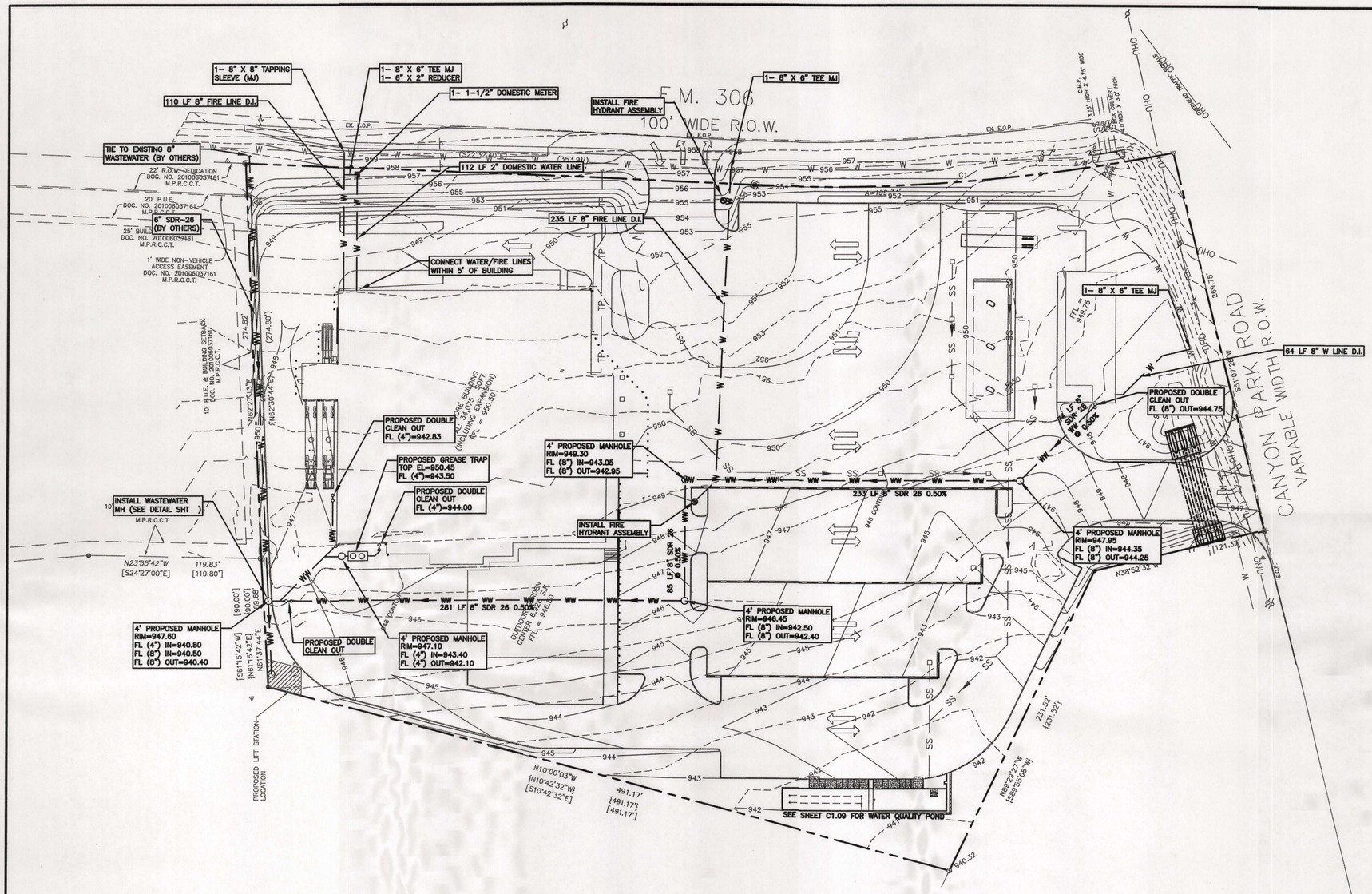
VICKREY & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION # F-159 TBPLS REGISTRATION # 10004100
1717 West 6th Street, Suite 260
Austin, Texas 78703
Phone: (512) 494-8014 Fax: (512) 494-8054

SITE PLAN AND DIMINSIONAL CONTROL

BROOKSHIRE BROTHERS, CANYON LAKE
18267 FM 306
CANYON LAKE, TX

DRAWN BY:	JTM
CHECKED BY:	JCM
APPROVED BY:	JCM
DATE:	09/15/2014
SHEET	C1.03
PROJ NO.	2540-001

Drawing: W:\2540-001\Engineering\DWG\sh_site plan.dwg : ct:02 Site Plan
User: JMOCK
Last Modified: Feb. 27, 15 - 09:16
Plot Date/Time: Feb. 27, 15 - 09:17:24



0 40 80
20 60
SCALE: 1"=40'

LEGEND

- PROPERTY LINE
- W — WATERLINE
- WW — WASTEWATER LINE
- SS — STORM SEWER LINE
- W — EXISTING WATERLINE
- WW — EXISTING WASTEWATER LINE
- UE — UNDERGROUND ELECTRIC
- OE — EXISTING OVERHEAD ELECTRIC
- GAS — EXISTING GAS LINE
- GAS — PROPOSED GAS LINE
- SS — EXISTING STORM SEWER LINE
- X — FENCE
- WATER VALVE
- MH — EXISTING MANHOLE
- PROPOSED MANHOLE
- EXISTING FIRE HYDRANT
- EXISTING WATER METER
- CO — EXISTING CLEAN OUT
- T — TRANSFORMER

NOTE:
ALL UTILITY CUTS IN ROW WITHIN 10' OF EXISTING OR PROPOSED PAVEMENT WILL BE BACKFILLED WITH FLOWABLE FILL.

NO.	DESCRIPTION	DATE

STATE OF TEXAS
JAMES C. MASSARO
92530
LICENSED PROFESSIONAL ENGINEER
9/23/15

©2014

VICKREY & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION # F-159 TBPLS REGISTRATION # 100041-00
1717 West 6th Street, Suite 260
Austin, Texas 78703
Phone: (512) 494-8014 Fax: (512) 494-8054

UTILITY PLAN

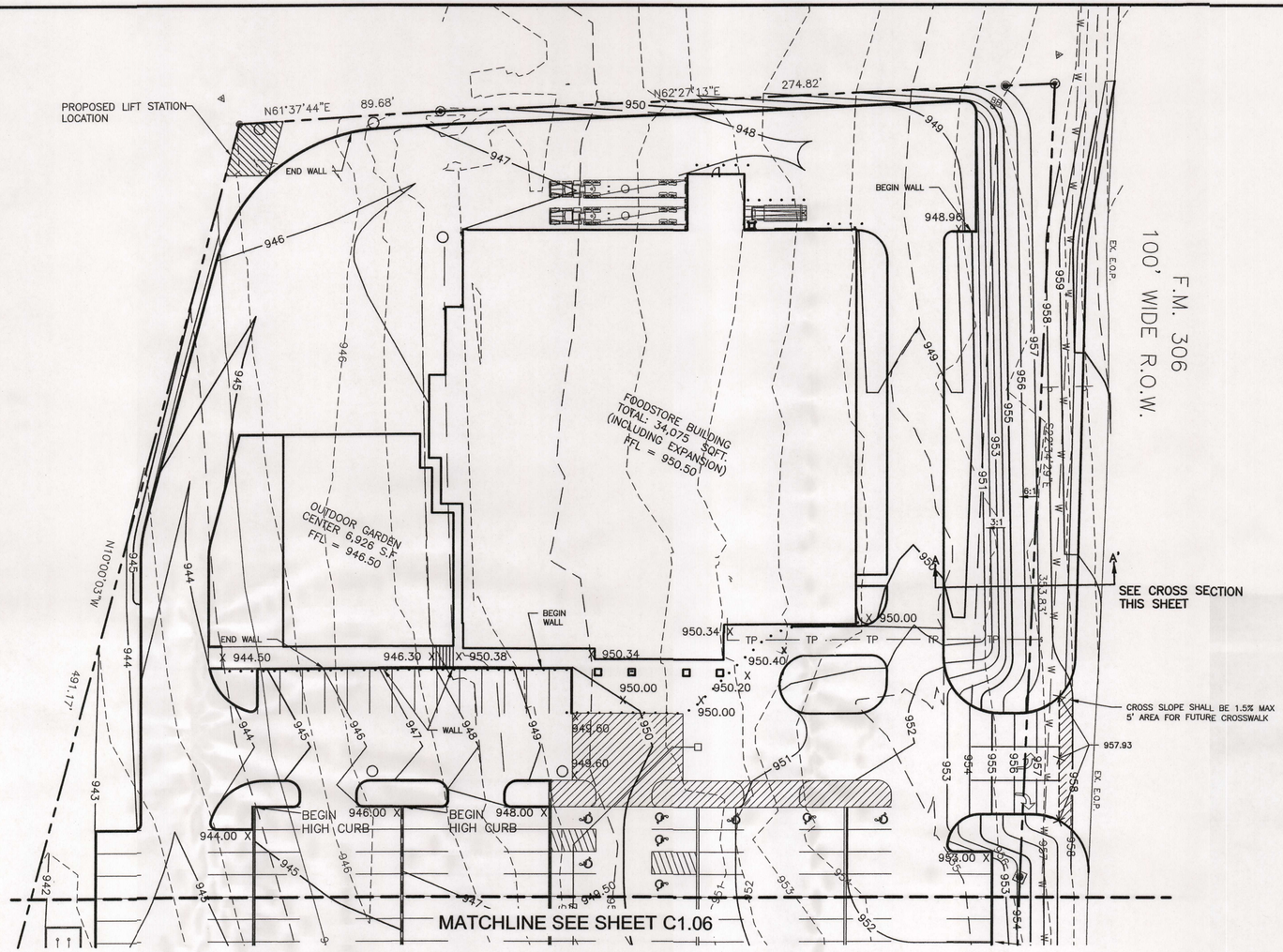
BROOKSHIRE BROTHERS, CANYON LAKE
18267 FM 306
CANYON LAKE, TX

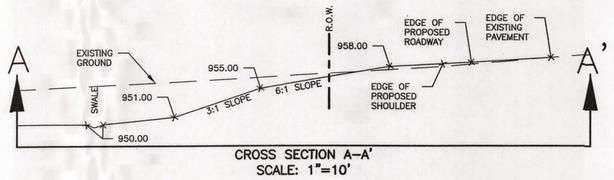
DRAWN BY:	JTM
CHECKED BY:	JCM
APPROVED BY:	JCM
DATE:	09/15/2014

SHEET
C1.04

PROJ NO. 2540-001

Drawing: W:\2540-001\Engineering\DWG\sh_utility plan.dwg : C1.03 Utility Plan
User: JMOCK
Last Modified: Feb. 25, 15 - 09:05
Plot Date/Time: Feb. 26, 15 - 16:47:13





CROSS SECTION A–A'
SCALE: 1"=10'

0 30 60
15 45
SCALE: 1"=30'

LEGEND

- PROPERTY LINE
- RETAINING WALL
- 890 EXISTING CONTOURS
- 890 PROPOSED CONTOURS
- FLOW DIRECTION
- 890.00 SPOT ELEVATION
- 890.50 / 890.00 SPOT ELEVATION TOP & BASE OF CURB (TOP / BASE)
- 1000 TREES TO REMAIN
- PROPOSED STREET LIGHT

NO.	DESCRIPTION	DATE

STATE OF TEXAS
JAMES C. MASSARO
92530
LICENSED PROFESSIONAL ENGINEER
09/15/15

©2014

VICKREY & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION # F-159 TBPLS REGISTRATION # 10004100
1717 West 6th Street, Suite 260
Austin,Texas 78703
Phone: (512) 494-8014 Fax: (512) 494-8054

GRADING PLAN

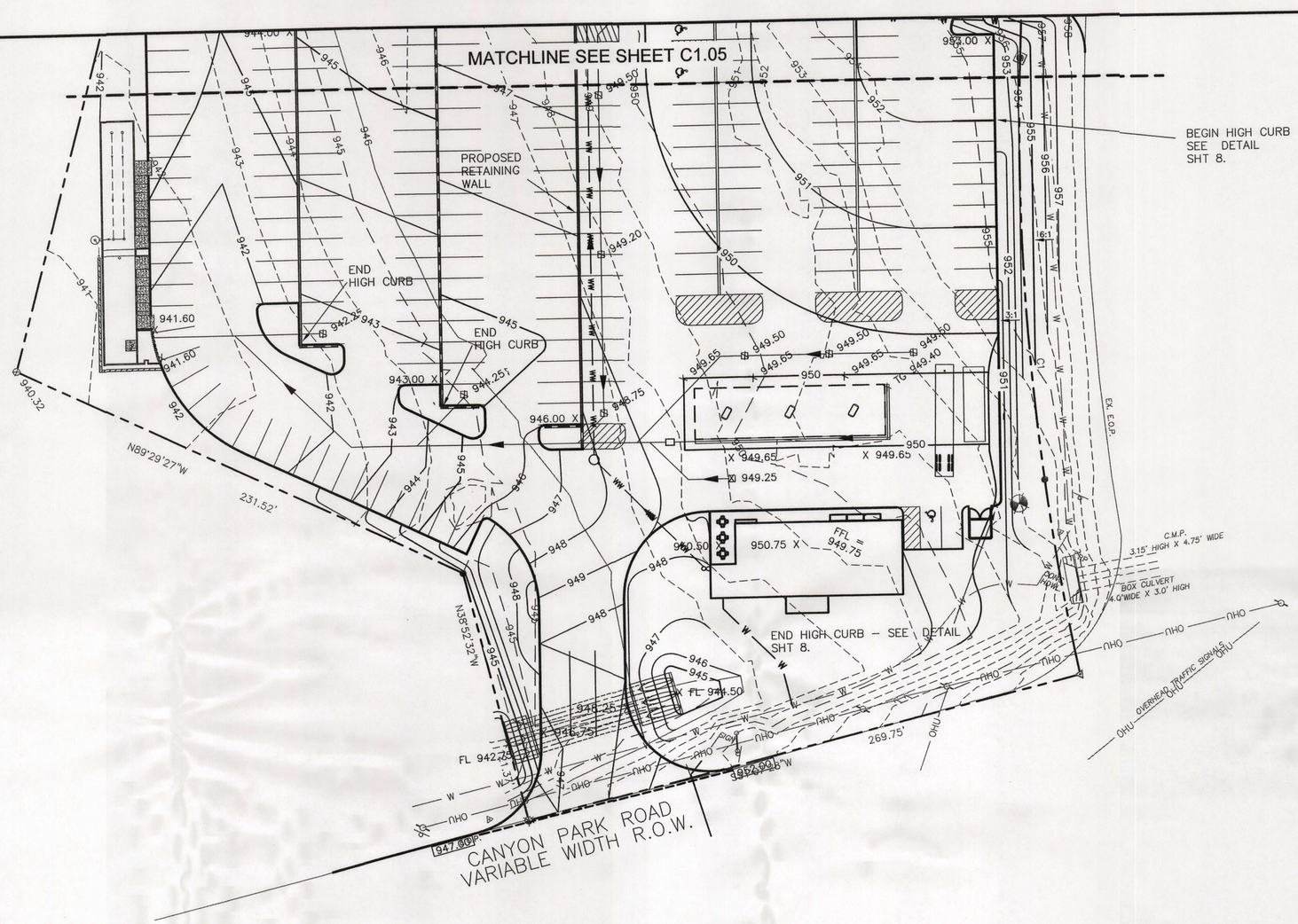
BROOKSHIRE BROTHERS, CANYON LAKE
18267 FM 306
CANYON LAKE, TX

DRAWN BY:	JTM
CHECKED BY:	JCM
APPROVED BY:	JCM
DATE:	09/15/2014

SHEET
C1.05

PROJ NO. 2540–001

Drawing: W:\2540-001\Engineering\Civil\Sh...grading.dwg C1.04 Grading Plan
User: JMOOK
Last Modified: Feb. 27, 15 – 09:06
Plot Date/Time: Feb. 27, 15 – 09:07:04



0 30 60
15 45
SCALE: 1"=30'

LEGEND

- PROPERTY LINE
- RETAINING WALL
- 890 EXISTING CONTOURS
- 890 PROPOSED CONTOURS
- FLOW DIRECTION
- 890.00 SPOT ELEVATION
- 890.50 / 890.00 SPOT ELEVATION TOP & BASE OF CURB (TOP / BASE)
- 1000 TREES TO REMAIN
- PROPOSED STREET LIGHT

NO.	DATE	DESCRIPTION

STATE OF TEXAS
JAMES C. MASSARO
92530
LICENSED PROFESSIONAL ENGINEER
9/15/14

VICKREY & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION # F-159 TBPLS REGISTRATION # 10004100
1717 West 6th Street, Suite 260
Austin, Texas 78703
Phone: (512) 494-8014 Fax: (512) 494-8054

GRADING PLAN

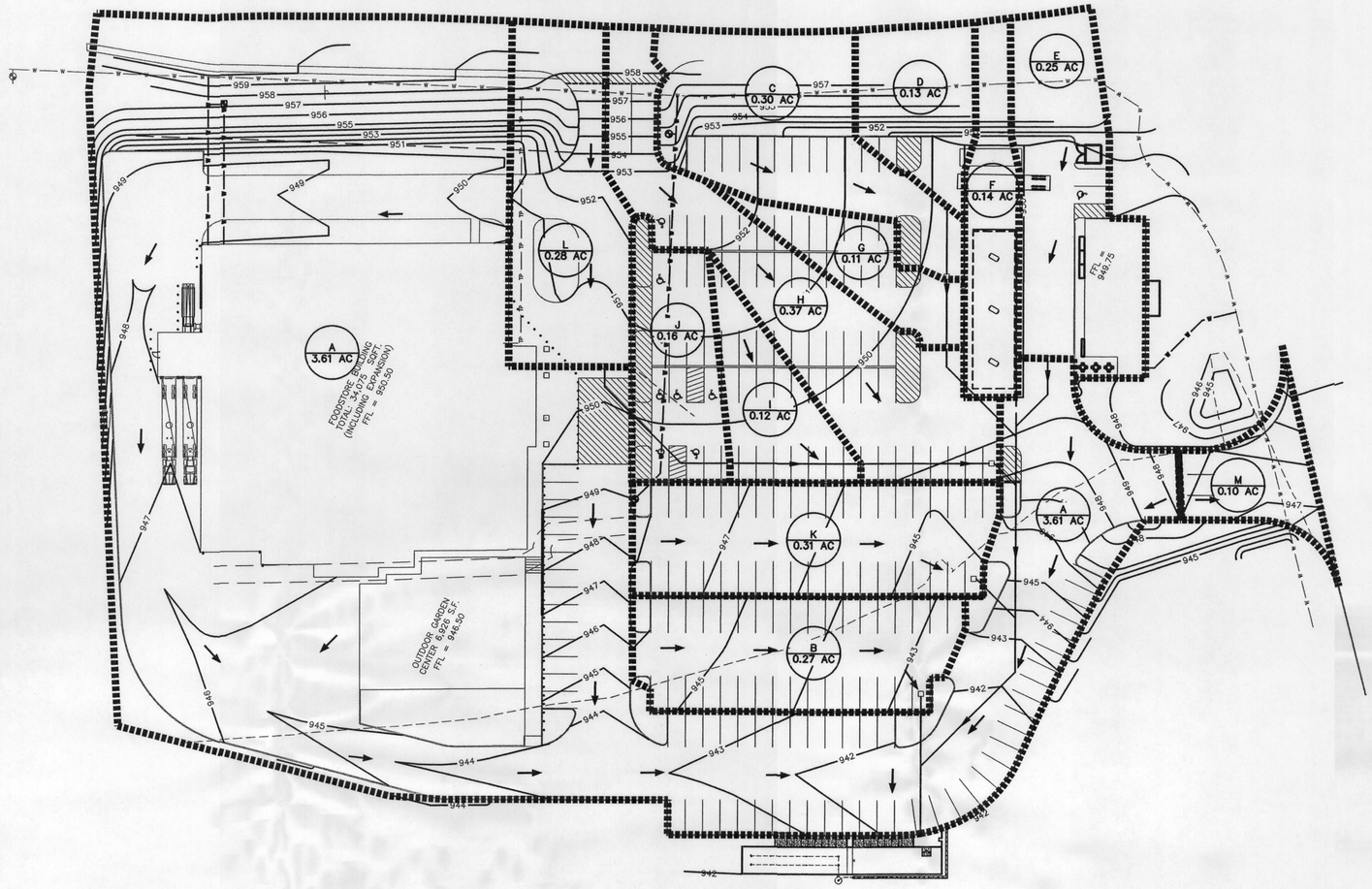
BROOKSHIRE BROTHERS, CANYON LAKE
18267 FM 306
CANYON LAKE, TX

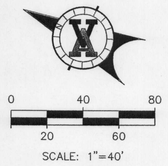
DRAWN BY:	JTM
CHECKED BY:	JCM
APPROVED BY:	JCM
DATE:	09/15/2014

SHEET
C1.06

PROJ NO. 2540-001

Drawing: W:\2540-001\Engineering\DWG\sh_grading.dwg ; c1.05 Grading Plan
User: JMOCK
Last Modified: Feb. 26, 15 - 15:47
Plot Date/Time: Feb. 26, 15 - 15:48:49





LEGEND

- PROPERTY LINE
- DRAINAGE AREA
- 890 EXISTING CONTOURS
- 890 PROPOSED CONTOURS
- EXISTING TC FLOW PATH
- PROPOSED TC FLOW PATH
- FLOW DIRECTION
- A DRAINAGE ID
- 1.59 AC ACREAGE
- 890.00 SPOT ELEVATION
- 890.50 / 890.00 SPOT ELEVATION TOP & BASE OF CURB (TOP / BASE)
- 1000 TREES TO REMAIN
- 1000 TREES TO BE REMOVED

Time of Concentration (TR-55 method)

Subbasin		PROPOSED	EXISTING
Area	ac.	5.85	5.85
Impervious	%	82%	44%
Pervious	Cn	80	80
Composite	Cn	95	88
Sheet Flow			
Slope	in/in	0.0800	0.0400
Length	ft.	80	150
Roughness	n	0.011	0.011
Time	hr.	0.01	0.02
Shallow Concentrated			
Slope	in/in	0.0200	0.0400
Length	ft.	500	350
Paved?	p/u	p	u
Time	hr.	0.05	0.03
Channel Flow			
Slope	in/in	0	0
Length	ft.	0	0
Velocity	fps	0	0
Time	hr.	0.00	0.00
Summary			
Travel Time	hr.	0.06	0.05
Tc	min.	3.41	2.93
Lag Time	min.	3.00	3.00

Proposed Runoff- Austin Modified Rational Method

BASIN	CARRY-OVER	FREQ.	AREA	RUNOFF COEFF	Tc	AVERAGE INTENSITY	DIS-CHARGE
			A	C		I	Q
	<cfs>	<yrs.>	<Acres>		<min.>	<in/hr>	<cfs>
1 (PR)	--	2	5.85	0.67	5.0	5.8	22.6
	--	10	5.85	0.75	5.0	8.6	37.8
	--	25	5.85	0.80	5.0	10.1	47.1
	--	100	5.85	0.88	5.0	12.5	64.8
1 (EX)	--	2	5.85	0.49	5.0	5.8	16.5
	--	10	5.85	0.58	5.0	8.6	29.0
	--	25	5.85	0.61	5.0	10.1	35.8
	--	100	5.85	0.68	5.0	12.5	50.2

DATE	NO.	DESCRIPTION

STATE OF TEXAS
JAMES C. MASSARO
92530
LICENSED
PROFESSIONAL ENGINEER
2/27/15

VICKREY & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION # F-159 TBPLS REGISTRATION # 10004100
1717 West 6th Street, Suite 260
Austin, Texas 78703
Phone: (512) 494-8014 Fax: (512) 494-8054

©2014

PROPOSED DRAINAGE PLAN

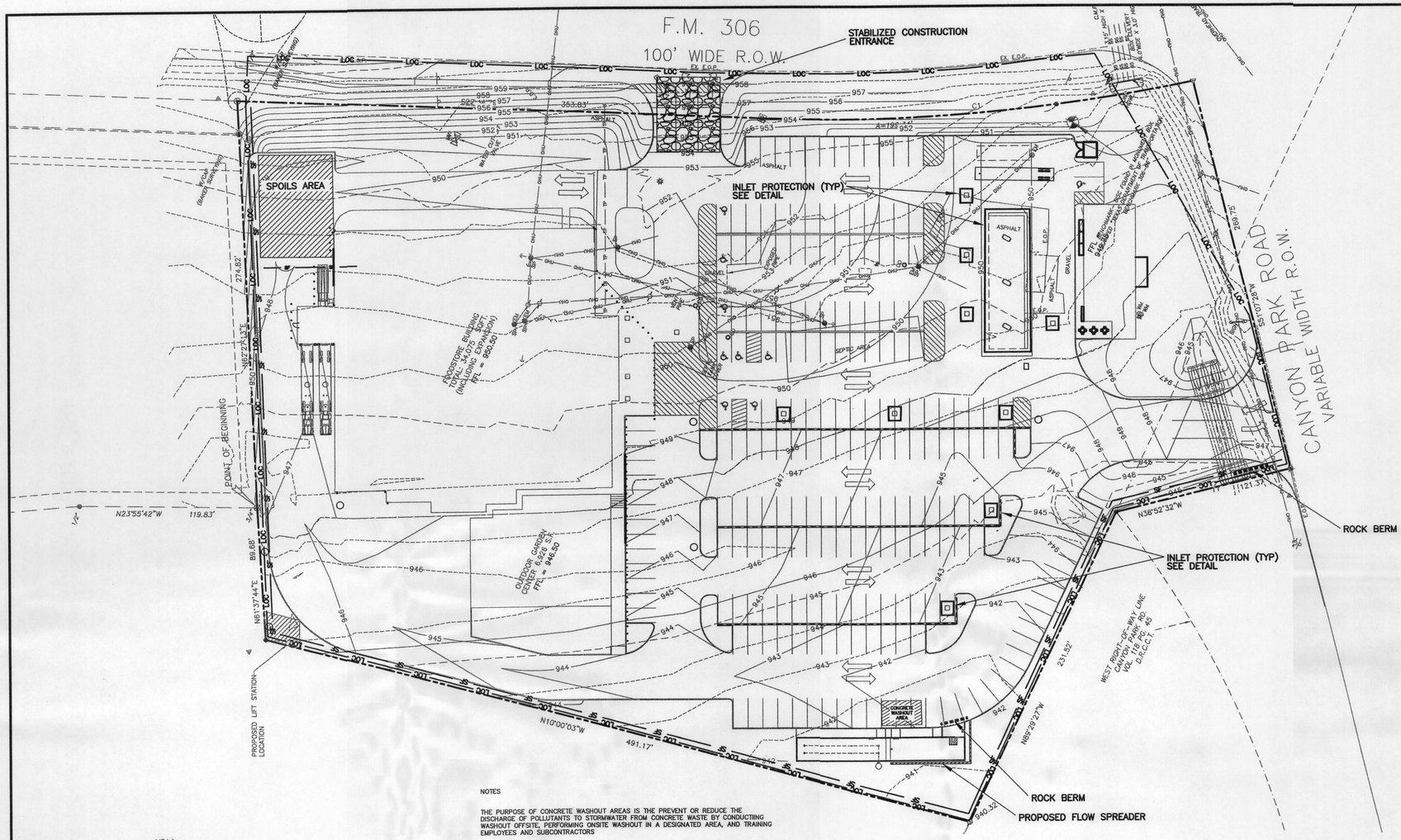
BROOKSHIRE BROTHERS, CANYON LAKE
18267 FM 306
CANYON LAKE, TX

DRAWN BY:	JTM
CHECKED BY:	JCM
APPROVED BY:	JCM
DATE:	09/15/2014

SHEET
C1.07

PROJ NO. 2540-001

Drawing: W:\2540-001\Engineering\DWG\sh_drainage_ plan.dwg :Proposed Drainage Plan
User: CPEDERSON
Last Modified: Feb. 26, 15 - 10:06
Plot Date/Time: Feb. 26, 15 - 10:53:35



0 40 80
20 60
SCALE: 1"=40'

LEGEND

- PROPERTY LINE
- RETAINING WALL
- SILT FENCE
- LOC — LIMITS OF CONSTRUCTION
- INLET PROTECTION
- STABILIZED CONSTRUCTION ENTRANCE
- ROCK BERM
- 1000 — TREES TO REMAIN
- 1000 — TREES TO REMAIN W/ TREE PROTECTION

NOTES

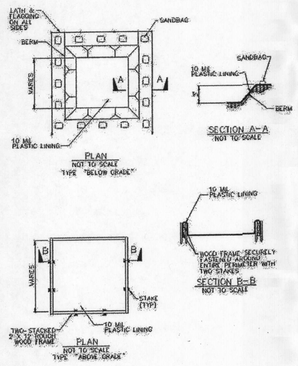
THE PURPOSE OF CONCRETE WASHOUT AREAS IS THE PREVENT OR REDUCE THE DISCHARGE OF POLLUTANTS TO STORMWATER FROM CONCRETE WASTE BY CONDUCTING WASHOUT OFFSITE, PERFORMING ONSITE WASHOUT IN A DESIGNATED AREA, AND TRAINING EMPLOYEES AND SUBCONTRACTORS

1. CONTRACTOR SHALL AVOID MIXING EXCESS AMOUNTS OF FRESH CONCRETE
2. CONTRACTOR SHALL PERFORM WASH OUT OF CONCRETE TRUCKS IN DESIGNATED AREA ONLY.
3. CONTRACTOR SHALL NOT WASH OUT CONCRETE TRUCKS INTO STORM DRAINS, OPEN DITCHES, STREETS, OR STREAMS.
4. CONTRACTOR SHALL NOT ALLOW EXCESS CONCRETE TO BE DUMPED ONSITE, EXCEPT IN DESIGNATED AREAS.

FOR ONSITE WASHOUT:

- LOCATE WASHOUT AREA AT LEAST 50 FEET FROM SENSITIVE FEATURES, STORM DRAINS, OPEN DITCHES, OR WATER BODIES. DO NOT ALLOW RUNOFF FROM THIS AREA BY CONSTRUCTING A TEMPORARY PIT OR BERMED AREA LARGE ENOUGH FOR LIQUID AND SOLID WASTE.
- WASH OUT WASTES INTO THE TEMPORARY PIT WHERE THE CONCRETE CAN SET, BE BROKEN UP, AND THEN DISPOSED PROPERLY.

5. TEMPORARY CONCRETE WASHOUT FACILITY SHALL BE CONSTRUCTED AS SHOWN ON THE DETAILS SUFFICIENT VOLUME TO CONTAIN ALL LIQUID AND CONCRETE WASTE GENERATED BY WASHOUT OPERATIONS. 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.
6. WHEN TEMPORARY CONCRETE WASHOUT FACILITIES SHALL NO LONGER BE 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 SHALL BE BACKFILLED AND REPAIRED.



Concrete Washout Area

VICKREY & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION # F-159 TBPLS REGISTRATION # 10004100
1717 West 6th Street, Suite 260
Austin, Texas 78703
Phone: (512) 494-8014 Fax: (512) 494-8054

STATE OF TEXAS
JAMES C. MASSARO
92530
LICENSED PROFESSIONAL ENGINEER
2/9/15

NO.	DESCRIPTION	DATE

EROSION CONTROL PLAN

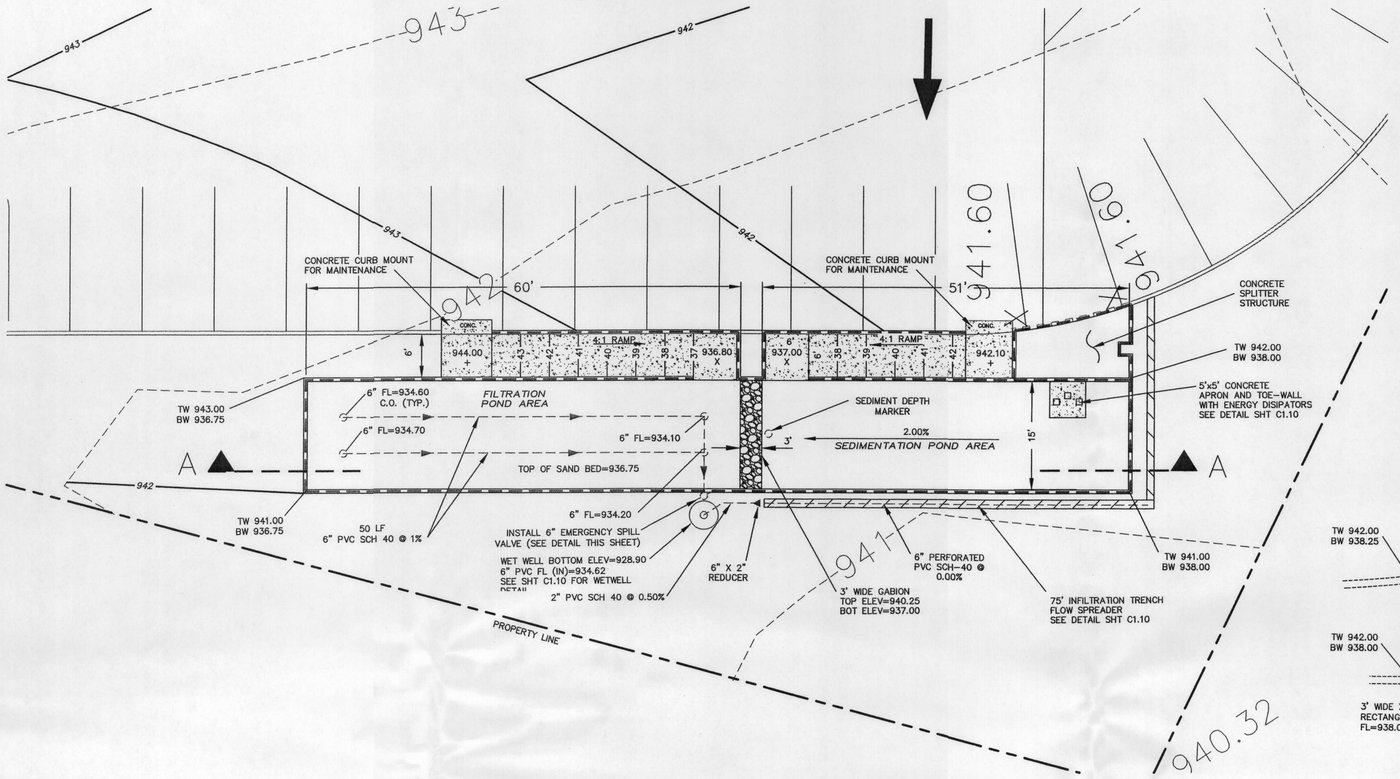
BROOKSHIRE BROTHERS, CANYON LAKE
18267 FM 306
CANYON LAKE, TX

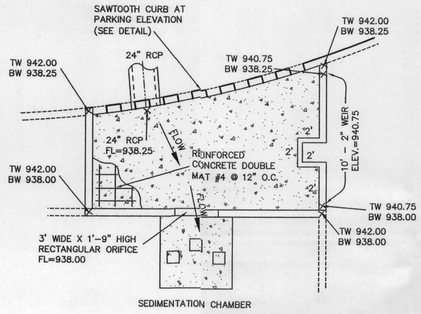
DRAWN BY:	JTM
CHECKED BY:	JCM
APPROVED BY:	JCM
DATE:	09/15/2014

SHEET
C1.08

PROJ NO. 2540-001

Drawing: W:\2540-001\Engineering\DWG\sh...ake plan.dwg , c1.08 Erosion Control Plan
User: CPEDERSON
Last Modified: Feb. 19, 15 - 17:31
Plot Date/Time: Feb. 20, 15 - 09:58:00



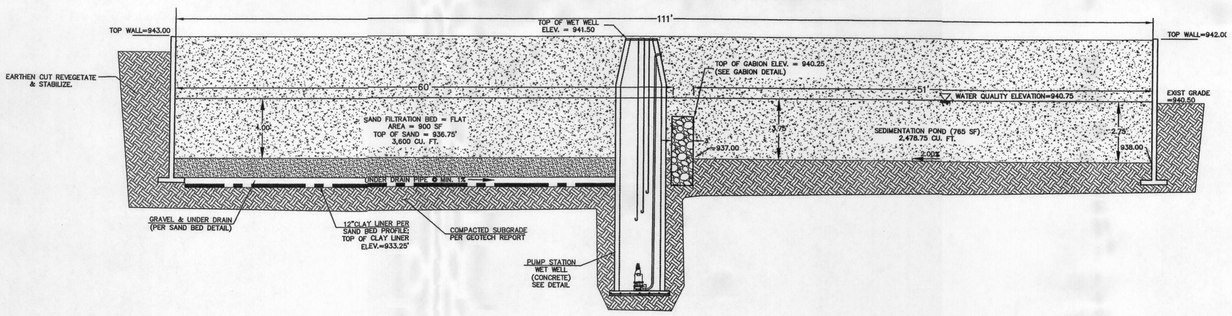


SPLITTER STRUCTURE DETAIL
(NTS)

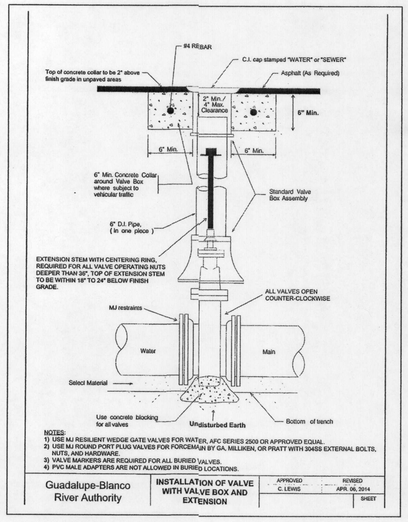
POND NOTES:

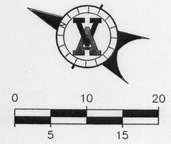
1. ALL POND BOTTOMS, SIDE SLOPES, AND EARTHEN EMBANKMENTS SHALL BE COMPACTED TO 95% MAXIMUM DENSITY.

SECTION A–A: SAND FILTRATION / SEDIMENTATION BASINS (NTS)



NOTE:
CHAIN LINK FENCES ARE NOT SHOWN ON SECTIONS FOR CLARITY.





SCALE: 1"=10'

LEGEND

- PROPERTY LINE
- DRAINAGE AREA
- 890 EXISTING CONTOURS
- 890 PROPOSED CONTOURS
- EXISTING TC FLOW PATH
- PROPOSED TC FLOW PATH
- FLOW DIRECTION
- A / 1.59 AC — DRAINAGE ID / ACREAGE
- 890.00 — SPOT ELEVATION
- 890.50 / 890.00 — SPOT ELEVATION TOP & BASE OF CURB (TOP / BASE)
- 1000 — TREES TO REMAIN
- 1000 — TREES TO BE REMOVED

NO.	DESCRIPTION	DATE

VICKREY & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION # F-159 TBPLS REGISTRATION # 10004400
1717 West 6th Street, Suite 260
Austin,Texas 78703
Phone: (512) 494-8014 Fax: (512) 494-8054

STATE OF TEXAS
JAMES C. MASSARO
92530
LICENSED PROFESSIONAL ENGINEER
8/29/15

©2014

POND PLAN SHEET

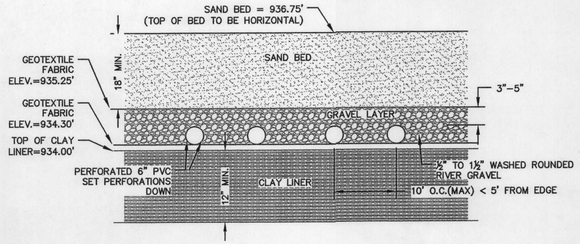
BROOKSHIRE BROTHERS, CANYON LAKE
18267 FM 306
CANYON LAKE, TX

DRAWN BY:	JTM
CHECKED BY:	JCM
APPROVED BY:	JCM
DATE:	09/15/2014

SHEET
C1.09

PROJ NO. 2540–001

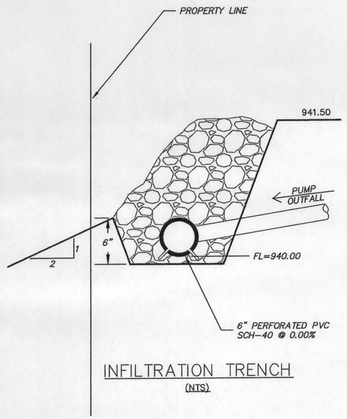
Drawing: W:\2540-001\Engineering\DWG\ai_pond_ plan.dwg | Pond Plan Sheet
User: CHRISBROWN
Last Modified: Fri, Feb. 20, 15 - 12:14
Plot Date/Time: Fri, Feb. 20, 15 - 14:07:15



SAND BED PROFILE (FLAT DESIGN)

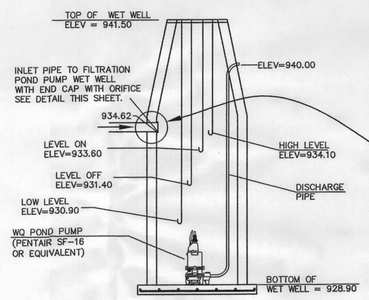
The top layer shall be (18) inches of 0.02–0.04 inch diameter sand which corresponds with ASTM C–33 concrete sand (smaller sand size is not acceptable). Laterals shall be placed in trenches with a covering of one–half (0.5) to one and one–half (1.5) inch diameter washed, rounded river gravel which provides three (3) inches to five (5) inches of cover over the top of the underdrain lateral pipes and geotextile fabric. The geotextile fabric is needed to prevent the filter media from infiltrating into the lateral piping. The geotextile fabric specifications are listed in the chart below.

Table 1.4.5.P.1 Geotextile Fabric Material Requirements		
Property	Test method	ASTM Requirements
Fabric Weight	D 3776	≥ 3.0 ounces/square yard
Ultraviolet (UV) Radiation Stability	D 4355	70% strength retained min., After 500 hours in xenon arc device
Mullen Burst Strength	D 3786	≥ 120 pound per square inch
Water Flow Rate	D 4491	≥ 275 gallons/minute/square feet



INFILTRATION TRENCH

(NTS)



4' DIA. WET WELL

(NTS)

(FACE FROM FILTRATION POND INTO WET WELL)

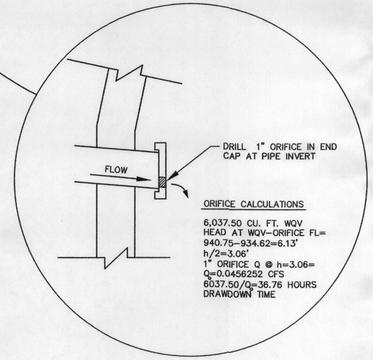
- PUMP RATING:
  20 GPM @ 12.10' STATIC HEAD
- TIME:
  10 MIN. DRAW DOWN TIME= 61 HRS, 45 MIN.

NOTES:
1. USE THROTTLING VALVE TO RAISE HEAD TO A TOTAL OF 50' TDH

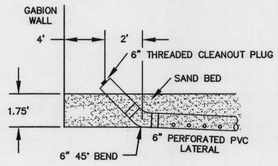
2. AN ALARM SYSTEM SHOULD BE PROVIDED CONSISTING OF A RED LIGHT LOCATED OF AT HEIGHT OF AT LEAST 5 FEET ABOVE GROUND LEVEL AT THE WET WELL. THE ALARM SHOULD ACTIVATE WHEN: (1) THE HIGH WATER LEVEL HAS BEEN MAINTAINED IN EXCESS OF 72 HOURS, (2) THE WATER LEVEL IS BELOW THE SHUTOFF POINT AND THE PUMP HAS NOT TURNED OFF, OR (3) THE HIGH/LOW–PRESSURE PUMP SHUT OFF SWITCH HAS BEEN ACTIVATED.

3. THE ALARM SHALL BE VANDAL AND WEATHER RESISTANT.

4. A SIGN SHALL BE PLACED AT THE WET WELL CLEARLY DISPLAYING THE NAME AND PHONE NUMBER OF A RESPONSIBLE PARTY THAT MAY BE CONTACTED IF THE ALARM IS ACTIVATED.



ALL CLEANOUTS OTHER THAN ACCESSIBLE CLEAN OUT TO BE FLUSH WITH THE TOP OF THE SAND BED





FILTRATION POND CLEANOUT DETAILS

NTS

594.1 DESCRIPTION

THIS ITEM SHALL CONSIST OF THE EXCAVATION, FURNISHING AND PLACING OF FILTER FABRIC, GABIONS OR WIRE CONTAINERS OF THE TYPE INDICATED TO THE LINES AND GRADES SPECIFIED AND PLACING STONES IN THE WIRE CONTAINERS.

594.2 MATERIALS

(1) STONE

STONE FILL MATERIAL SHALL CONSIST OF HARD, DURABLE, CLEAN STONE OF THE SIZE INDICATED. 6 TO 8 INCHES IN SIZE OR AS APPROVED BY THE ENGINEER AND RESISTANT TO THE ACTION OF AIR AND WATER AND SUITABLE IN ALL RESPECTS FOR THE PURPOSE INTENDED.

(2) WIRE CONTAINERS

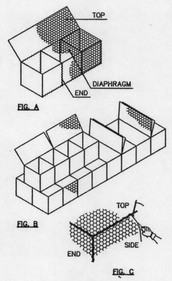
WIRE MESH SHALL CONSIST OF PLASTIC COATED (PVC) GALVANIZED WIRE 0.120 INCH IN DIAMETER MINIMUM AND SHALL EQUAL OR EXCEED FEDERAL SPECIFICATION QQ–W–461g, CLASS 3 UNLESS OTHERWISE INDICATED. OPENINGS OF THE MESH SHALL NOT EXCEED APPROXIMATELY 4 INCHES IN THE LONGEST DIMENSION. THE WIRE MESH IS TO BE FABRICATED IN SUCH A MANNER AS TO BE NONRAVELING. TIE AND CONNECTING WIRE SHALL BE OF THE SAME TYPE AND SIZE AS THE BASKETS AND SHALL BE SUPPLIED IN SUFFICIENT QUANTITY FOR SECURELY FASTENING ALL EDGES OF THE GABION AND DIAFRAMS.

(3) FILTER FABRIC

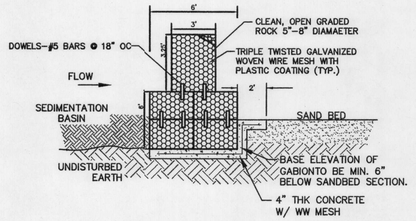
FILTER FABRIC SHALL BE NONBIODEGRADABLE, ULTRAVIOLET STABILIZED, INERT TO MOST SOIL CHEMICALS, UNAFFECTED BY MOISTURE, WHICH ALLOWS WATER TO PASS THROUGH WHILE RETAINING SOIL PARTICLES AND SHALL CONFORM TO ITEM NO. 620, "FILTER FABRIC".

(4) REINFORCEMENT

DOWELS SHALL BE #5 BARS AND CONFORM TO ITEM NO. 406, "REINFORCING STEEL"



GABION DETAIL

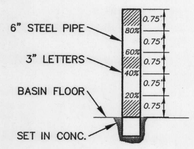


GABION SECTION

NOTE:
CONSTRUCT GABIONS PER C.O.A. SPECIFICATION 594–5

NTS

TYPICAL GABION UNITS

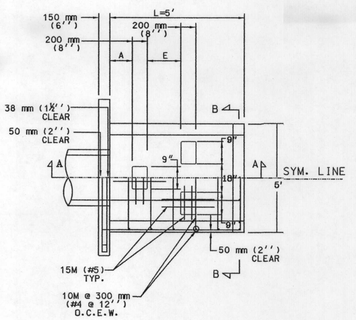


SEDIMENTATION DEPTH MARKER

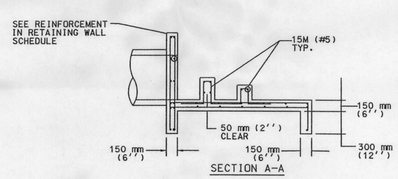
GABION NOTES

Installation
1) Level the base where the gabions will be placed to a smooth finish and the right elevation.
2) Each unit should be securely wired to the adjacent units along the top and the vertical edges prior to placing the 5" to 8" stone. To achieve better alignment and finish, the gabions can be stretched before filling.
3) Where permitted by the thickness of the structure, the gabions can be placed back to back and front to front to facilitate the filling and closing of the lids. Fig. B.
4) During the filling operation connecting wires shall be inserted in the following manner:
a) Each cell of the 36" high gabion shall be filled to a depth of one third after which connecting wires are placed one in each direction with the ends looped around two meshes at each end. This operation shall be repeated when the gabion is two thirds full.
b) For thinner gabions, connecting wires are not necessary unless the 18" are used to build vertical structures and in this case two wires, one in each direction at 9" from the base, must be placed as above.
5) After filling has been completed, the top is folded shut and wired to the ends, sides and diaphragms. (Fig. C)
6) Empty gabions placed on top of a completed row must be wired to the filled gabions at front and back.

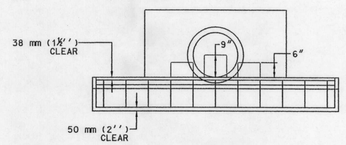
Assembly
1) Open the bundle and unfold each unit.
2) Lift the sides, the ends and diaphragms into vertical position, Fig. A.
3) Wire the four corners together and the edges of the diaphragms to the gabion sides, Fig. A.



PLAN



SECTION A–A



SECTION B–B

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.

OUTLET HEADWALL AND ENERGY DISIPATORS

(NTS)

DESCRIPTION | DATE | NO.

STATE OF TEXAS
JAMES C. MASSARO
92530
LICENSED PROFESSIONAL ENGINEER
2/9/15

VICKREY & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION # F–159 TBPLS REGISTRATION # 100041–00
1717 West 6th Street, Suite 260
Austin, Texas 78703
Phone: (512) 494–8014 Fax: (512) 494–8054

POND SECTION SHEET

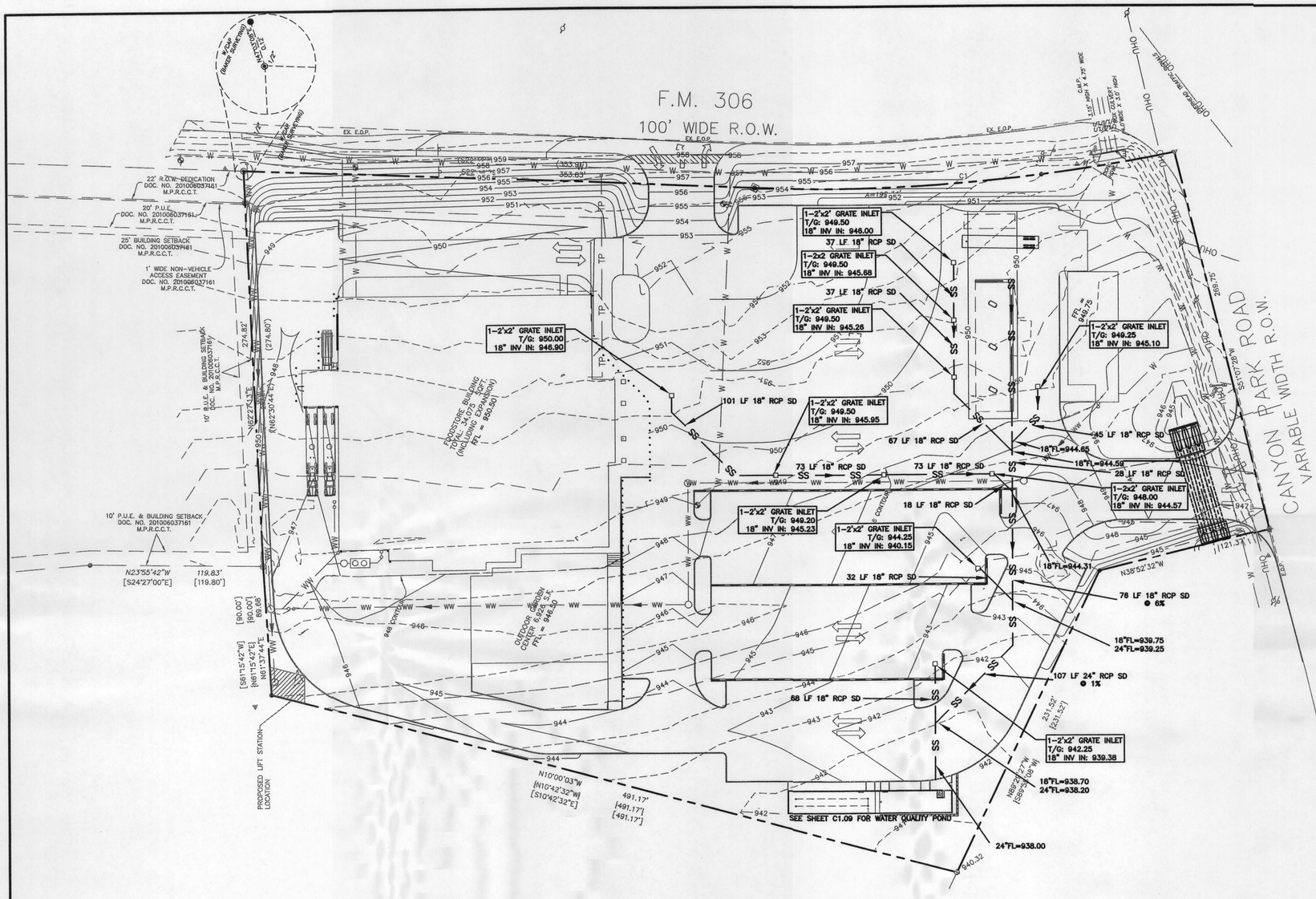
BROOKSHIRE BROTHERS, CANYON LAKE
18267 FM 306
CANYON LAKE, TX

DRAWN BY:	JTM
CHECKED BY:	JCM
APPROVED BY:	JCM
DATE:	09/15/2014

SHEET
C1.10

PROJ NO. 2540–001

Drawing: W:\2540-001\Engineering\DWG\sh_pond_plan.dwg ;Pond Section Sheet
Plotted By: Jason Mathis
Last Modified: Feb. 20, 15 – 09:42
Plot Date/Time: Feb. 20, 15 – 09:45:59



0 40 80
20 60
SCALE: 1"=40'

LEGEND

- PROPERTY LINE
- W — WATERLINE
- WW — WASTEWATER LINE
- SS — STORM SEWER LINE
- W — EXISTING WATERLINE
- WW — EXISTING WASTEWATER LINE
- UE — UNDERGROUND ELECTRIC
- OE — EXISTING OVERHEAD ELECTRIC
- GAS — EXISTING GAS LINE
- GAS — PROPOSED GAS LINE
- SS — EXISTING STORM SEWER LINE
- X — FENCE
- WATER VALVE
- MH — EXISTING MANHOLE
- PROPOSED MANHOLE
- EXISTING FIRE HYDRANT
- EXISTING WATER METER
- CO — EXISTING CLEAN OUT
- T — TRANSFORMER

DESCRIPTION | NO. | DATE

STATE OF TEXAS
JAMES C. MASSARO
92530
LICENSED PROFESSIONAL ENGINEER
9/24/15

VICKREY & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION # F-159 TBPLS REGISTRATION # 10004100
1717 West 6th Street, Suite 260
Austin,Texas 78703
Phone: (512) 494-8014 Fax: (512) 494-8054

STORM PLAN

BROOKSHIRE BROTHERS, CANYON LAKE
18267 FM 306
CANYON LAKE, TX

DRAWN BY:	JTM
CHECKED BY:	JCM
APPROVED BY:	JCM
DATE:	09/15/2014

SHEET
C1.11

PROJ NO. 2540-001

Drawing: W:\2540-001\Engineering\DWG\sh_storm plan.dwg [C1.03 Utility Plan
User: CPEDERSON
Last Modified: Feb. 18, 15 - 15:40
Plot Date/Time: Feb. 20, 15 - 09:55:35

1) APPROVED ASSEMBLIES ARE REQUIRED TO HAVE RESILIENT SEATED SHUT-OFF VALVES AND TEST COCKS AS INTEGRAL PARTS OF THE ASSEMBLIES OTHERWISE THE APPROVAL IS VOIDED.
2) ASSEMBLY MUST BE ACCESSIBLE FOR TESTING AND MAINTENANCE.
3) PROTECTION FROM FREEZE DAMAGE MAY BE REQUIRED IN EXPOSED AREAS.
4) NO CONNECTIONS OR TEES WILL BE ALLOWED BETWEEN SERVICE CONNECTION AND ASSEMBLY.
5) INSTALLATION AND OPERATION MUST COMPLY WITH STANDARDS SET FORTH BY A.W.W.A. AND ALL FEDERAL, STATE, AND LOCAL LAWS, RULES, REGULATIONS, CODES AND ORDINANCES.
6) THE DCDA SHALL BE INSTALLED AS CLOSE TO THE PROPERTY LINE AS PRACTICAL. ANY DEVIATION FROM THIS METHOD MUST BE APPROVED BY CLWSC PRIOR TO INSTALLATION.
7) ASSEMBLY MAY BE INSTALLED BELOW GRADE WITH APPROVAL BY CLWSC.

GENERAL NOTES:
(1) FOR ADDITIONAL INFORMATION, SEE CANYON LAKE WATER SERVICE COMPANY'S STANDARD SPECIFICATIONS.
(2) A LIST OF APPROVED DCDA'S ARE AVAILABLE UPON REQUEST.

BY	REVISION	DATE	CK	AP	OPS

CLWSC — CANYON LAKE WATER SERVICE COMPANY, 1399 Sattler Road, Canyon Lake, Texas 78133, (830) 964-3854

APPROVED DOUBLE CHECK DETECTOR ASSEMBLY (DCDA) INSTALLATION

BY	JM / MJ HOMER
DATE	04-29-10
SCALE	NONE
	OPERATIONS / DATE
	ENGINEERING / DATE
	DIRECTOR OF ENGINEERING / DATE

REF. NOS.
DWG. NO. BK-DCDA
SHEET 1 OF 1

GENERAL NOTES:
(1) FOR ADDITIONAL INFORMATION, SEE CANYON LAKE WATER SERVICE COMPANY'S STANDARD SPECIFICATIONS.

BY	REVISION	DATE	CK	AP	OPS

CLWSC — CANYON LAKE WATER SERVICE COMPANY, 1399 Sattler Road, Canyon Lake, Texas 78133, (830) 964-3854

CASING DETAIL

BY	JM / MJ HOMER
DATE	02-11-09
SCALE	NONE
	OPERATIONS / DATE
	ENGINEERING / DATE
	DIRECTOR OF ENGINEERING / DATE

REF. NOS.
DWG. NO. MAIN-CSG
SHEET 1 OF 1

DETAIL: HYDRANT NUMBER LOCATION
TOP VIEW

GENERAL NOTES:
(1) FOR ADDITIONAL INFORMATION, SEE CANYON LAKE WATER SERVICE COMPANY'S STANDARD SPECIFICATIONS.

BY	REVISION	DATE	CK	AP	OPS

CLWSC — CANYON LAKE WATER SERVICE COMPANY, 1399 Sattler Road, Canyon Lake, Texas 78133, (830) 964-3854

STANDARD HYDRANT INSTALLATION

BY	JM / MJ HOMER
DATE	08-11-08
SCALE	NONE
	OPERATIONS / DATE
	ENGINEERING / DATE
	DIRECTOR OF ENGINEERING / DATE

REF. NOS.
DWG. NO. MAIN-HYD
SHEET 1 OF 1

NOTE:
SEE DETAIL "MAIN-CSG" FOR CASING SPACER REQUIREMENTS.

GENERAL NOTES:
(1) FOR ADDITIONAL INFORMATION, SEE CANYON LAKE WATER SERVICE COMPANY'S STANDARD SPECIFICATIONS.

BY	REVISION	DATE	CK	AP	OPS
MH	UPDATE DRAWING	08-24-10			
MH	UPDATE DRAWING	04-20-10			

CLWSC — CANYON LAKE WATER SERVICE COMPANY, 1399 Sattler Road, Canyon Lake, Texas 78133, (830) 964-3854

TYPICAL ROAD BORING AT HIGHWAY CROSSING (HDPE CASING)

BY	JM / MJ HOMER
DATE	02-11-09
SCALE	NONE
	OPERATIONS / DATE
	ENGINEERING / DATE
	DIRECTOR OF ENGINEERING / DATE

REF. NOS.
DWG. NO. MAIN-BRG
SHEET 1 OF 1

GENERAL NOTES:
(1) FOR ADDITIONAL INFORMATION, SEE CANYON LAKE WATER SERVICE COMPANY'S STANDARD SPECIFICATIONS.

BY	REVISION	DATE	CK	AP	OPS

CLWSC — CANYON LAKE WATER SERVICE COMPANY, 1399 Sattler Road, Canyon Lake, Texas 78133, (830) 964-3854

VALVE BOX INSTALLATION

BY	JM / M.HOMER
DATE	02-11-09
SCALE	NONE
	OPERATIONS / DATE
	ENGINEERING / DATE
	DIRECTOR OF ENGINEERING / DATE

REF. NOS.
DWG. NO. MAIN-VB
SHEET 1 OF 1

NOTES:
1. SERVICE SADDLES SHALL BE WRAPPED COMPLETELY WITH 8 MIL. POLYETHYLENE FILM.
2. PIPING AND TUBING SHALL BE BEDDED IN GRANULAR MATERIALS AS REQUIRED IN THE SPECIFICATIONS.
3. METERS SUPPLIED BY CLWSC (PAID FOR BY CUSTOMER).

GENERAL NOTES:
(1) FOR ADDITIONAL INFORMATION, SEE CANYON LAKE WATER SERVICE COMPANY'S STANDARD SPECIFICATIONS.

BY	REVISION	DATE	CK	AP	OPS
MH	UPDATE DRAWING	08-24-10			
MH	UPDATE DRAWING	04-20-10			

CLWSC — CANYON LAKE WATER SERVICE COMPANY, 1399 Sattler Road, Canyon Lake, Texas 78133, (830) 964-3854

1 1/2" OR 2" SERVICES

BY	JM / M.HOMER
DATE	02-11-09
SCALE	NONE
	OPERATIONS / DATE
	ENGINEERING / DATE
	DIRECTOR OF ENGINEERING / DATE

REF. NOS.
DWG. NO. SER-2
SHEET 1 OF 1

NOTE:
1) USE TRAFFIC RATED BOXES FOR METER BOXES INSTALLED IN DRIVEWAYS OR SIDEWALKS.
2) METER SUPPLIED BY CLWSC (PAID FOR BY CUSTOMER).

GENERAL NOTES:
(1) FOR ADDITIONAL INFORMATION, SEE CANYON LAKE WATER SERVICE COMPANY'S STANDARD SPECIFICATIONS.

BY	REVISION	DATE	CK	AP	OPS
MH	UPDATE DRAWING	08-24-10			
MH	UPDATE DRAWING	04-20-10			

CLWSC — CANYON LAKE WATER SERVICE COMPANY, 1399 Sattler Road, Canyon Lake, Texas 78133, (830) 964-3854

4" SERVICE

BY	JM / M.HOMER
DATE	02-11-09
SCALE	NONE
	OPERATIONS / DATE
	ENGINEERING / DATE
	DIRECTOR OF ENGINEERING / DATE

REF. NOS.
DWG. NO. SER-4
SHEET 1 OF 1

PIPE DIA.	WIDTH "A"	DEPTH "B"
4"	16"	39"
6"	18"	40"
8"	20"	44"
12"	30"	52"
18"	38"	58"
>18"	DIA.+ 24"	DIA.+ 40"

NOTES:
1. SEE CLWSC STANDARD SPECIFICATIONS FOR NOTES CONCERNING BEDDING AND COMPACTION.
2. ALL TRENCHES UNDER OR WITHIN 5 FEET OF PAVEMENT OR STRUCTURES TO BE FILLED IN MAXIMUM 8-INCH LIFTS COMPACTED TO 95% STANDARD PROCTOR DENSITY. TRENCHES IN OTHER AREAS ARE TO BE COMPACTED TO THE DENSITY OF THE ADJACENT UNDISTURBED SOIL.
3. SEE STANDARD DETAIL "MAIN-CC" FOR CONCRETE CAP OVER SHALLOW PIPE.

GENERAL NOTES:

BY	REVISION	DATE	CK	AP	OPS

CLWSC — CANYON LAKE WATER SERVICE COMPANY, 1399 Sattler Road, Canyon Lake, Texas 78133, (830) 964-3854

TYPICAL TRENCH DETAIL

BY	M.HOMER
DATE	02-11-09
SCALE	NONE
	OPERATIONS / DATE
	ENGINEERING / DATE
	DIRECTOR OF ENGINEERING / DATE

REF. NOS.
DWG. NO. MAIN-TRN
SHEET 1 OF 1

NOTE:
1) USE TRAFFIC RATED BOXES FOR METER BOXES INSTALLED IN DRIVEWAYS OR SIDEWALKS.
2) METER SUPPLIED BY CLWSC (PAID FOR BY CUSTOMER).

GENERAL NOTES:
(1) FOR ADDITIONAL INFORMATION, SEE CANYON LAKE WATER SERVICE COMPANY'S STANDARD SPECIFICATIONS.

BY	REVISION	DATE	CK	AP	OPS
MH	UPDATE DRAWING	08-24-10			
MH	UPDATE DRAWING	04-20-10			

CLWSC — CANYON LAKE WATER SERVICE COMPANY, 1399 Sattler Road, Canyon Lake, Texas 78133, (830) 964-3854

4" SERVICE

BY	JM / M.HOMER
DATE	02-11-09
SCALE	NONE
	OPERATIONS / DATE
	ENGINEERING / DATE
	DIRECTOR OF ENGINEERING / DATE

REF. NOS.
DWG. NO. SER-4
SHEET 1 OF 1

DATE	NO.	DESCRIPTION

STATE OF TEXAS — JAMES C. MASSARO — 92530 — LICENSED PROFESSIONAL ENGINEER — 09/15/14

©2014

VICKREY & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION # F-199 TBPLS REGISTRATION # 100040-00
1717 West 6th Street, Suite 260
Austin, Texas 78703
Phone: (512) 494-8014 Fax: (512) 494-8054

WATER DETAILS

BROOKSHIRE BROTHERS, CANYON LAKE
18267 FM 306
CANYON LAKE, TX

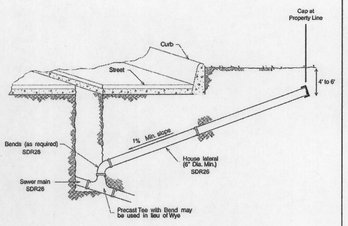
DRAWN BY:	JTM
CHECKED BY:	JCM
APPROVED BY:	JCM
DATE:	09/15/2014

SHEET
C2.00

PROJ NO. 2540-001

Drawing: R:\2540-001\Engineering\DWG\WL_W&W details.dwg , Water Details
User: JTMorton
Last Modified: Jan. 20, 15 - 15:04
Plot Date/Time: Feb. 20, 15 - 10:05:09

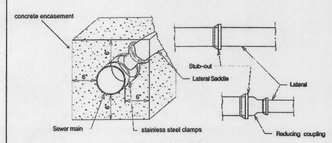
Depth and grade of service laterals as shown, are typical only. Actual depth, alignment and grade of service laterals shall be determined by the Engineer based on the elevations of the sewer main, street, natural ground and building to be serviced.



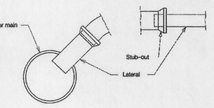
Notes:
1) Cleanout to be installed by house plumber.
2) Pipe and fittings shall be gasketed.
3) Pressure rated pipe and fittings shall be installed for sewer mains and laterals that cross water mains (use ASTM D2241 SDR26). Center both water and sewer joints at all crossings. Comply with TCEQ Rules.

Guadalupe-Blanco River Authority	HOUSE LATERAL DETAIL	APPROVED C. LEWIS	REVISED APR. 30, 2014	SHEET

LATERAL CONNECTION TO EXISTING SEWER MAIN/STUB-OUT

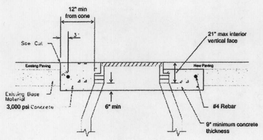


ACCEPTABLE



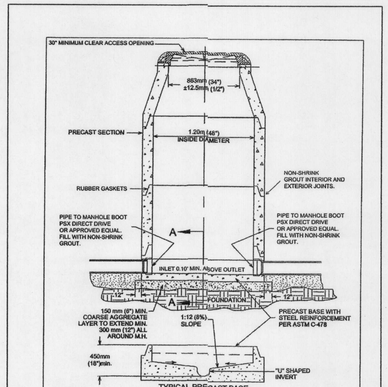
UNACCEPTABLE

Guadalupe-Blanco River Authority	LATERAL CONNECTION	APPROVED C. LEWIS	REVISED APRIL 06, 2014	SHEET



NOTES:
1) Manhole ring concrete encasement is required for all manholes.
2) Manholes located outside of roadways shall be installed with covers 2" above finish grade.
3) Use non-shrink grout for grade ring installation.
4) All manholes shall have traffic rated bolted and gasketed watertight rings and covers. Bolts and flat washers shall be 316SS with lead applied anti-seize compound. Bolts shall include gasket washers.
5) All manhole rings shall have 30" minimum clear access opening.
6) All manhole covers shall have pick bars.
7) All manhole covers shall be stamped "SANITARY SEWER" only without any city references.
8) Install vented covers where required by TCEQ.

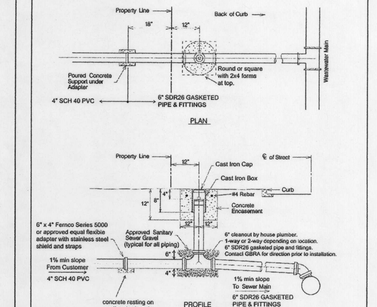
Guadalupe-Blanco River Authority	MANHOLE RING ENCASEMENT DETAIL	APPROVED C. LEWIS	REVISED MAY 07, 2014	SHEET



TYPICAL PRECAST BASE

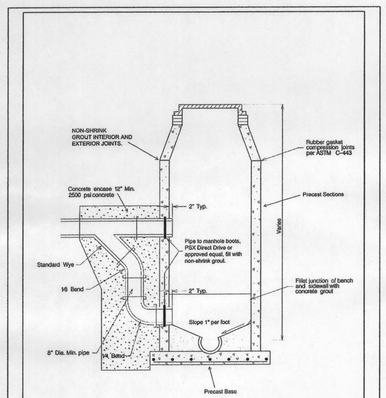
NOTE:
1. THE MANHOLE BASE SHALL BE BEDDED ON 150 mm (6") COARSE AGGREGATE. THE CONTRACTOR SHALL LEVEL AND PLUMB THE BASE PRIOR TO SETTING THE PRECAST MANHOLE RISER SECTIONS ON THE PRECAST CONCRETE BASE.
2. INTERIOR SURFACES OF ALL MANHOLES SHALL BE LINED WITH 1/2" SEWPERCOAT CALCIUM ALUMINATE.

Guadalupe-Blanco River Authority	WASTEWATER MANHOLE ON PRECAST BASE THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD	C. LEWIS APR. 30, 2014



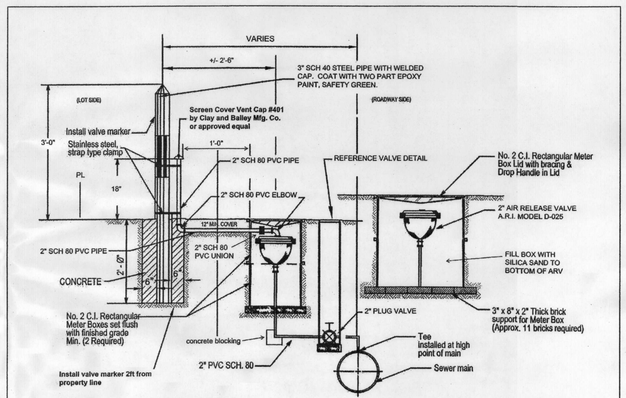
NOTES:
1) Plumber to install a separate 4" cleanout at house (2-way).
2) Use SAWS sewer gravel or approved equal bedding for all piping.
3) Obtain GBRA inspection prior to backfill (830-379-5822).

Guadalupe-Blanco River Authority	TYPICAL CLEANOUT DETAIL	APPROVED C. LEWIS	REVISED APRIL 17, 2014	SHEET



Notes:
1) A wastewater collection system pipe entering a manhole more than 24" above the manhole out invert must have a drop pipe (reference TCEQ, Chapter 217, Subchapter C).
2) Reference standard precast manhole detail for additional requirements.

Guadalupe-Blanco River Authority	PRECAST DROP MANHOLE	APPROVED C. LEWIS	REVISED APR. 06, 2014	SHEET



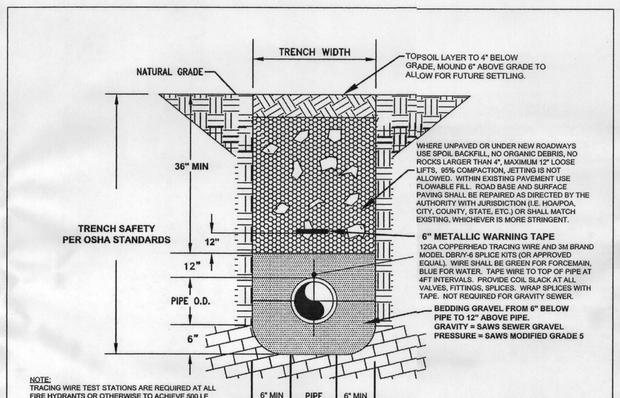
SEWER COMBINATION AIR VALVE DETAIL

NOT TO SCALE

(COLLECTION)

NOTE:
PVC MALE ADAPTERS ARE NOT ALLOWED IN BURIED LOCATIONS.

GUADALUPE-BLANCO RIVER AUTHORITY
04/30/2014



NOTE:
TRACING WIRE TEST STATIONS ARE REQUIRED AT ALL FIRE HYDRANTS OR OTHERWISE TO ACHIEVE 500 LF MAX SPACING. TEST STATIONS SHALL BE COPPERHEAD OR APPROVED EQUAL AND SHALL BE COLOR CODED AND STAMPED FOR WATER OR SEWER SERVICE. INSTALL WITHIN VALVE BOX CONCRETE COLLARS WITH 6" MINIMUM CONCRETE COVER ON ALL SIDES. LEAVE 12" WIRE SLACK INSIDE TEST STATIONS. NOT REQUIRED FOR GRAVITY SEWER.

TYPICAL PIPE TRENCH

GUADALUPE-BLANCO RIVER AUTHORITY
04/30/2014

NO.	DESCRIPTION	DATE

VICKREY & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION # F-159 TBPLS REGISTRATION # 100041100
1717 West 6th Street, Suite 260
Austin, Texas 78703
Phone: (512) 494-8014 Fax: (512) 494-8054

STATE OF TEXAS
JAMES C. MASSARO
92530
LICENSED PROFESSIONAL ENGINEER
4/30/15

©2014

WASTEWATER DETAILS

BROOKSHIRE BROTHERS, CANYON LAKE
18267 FM 306
CANYON LAKE, TX

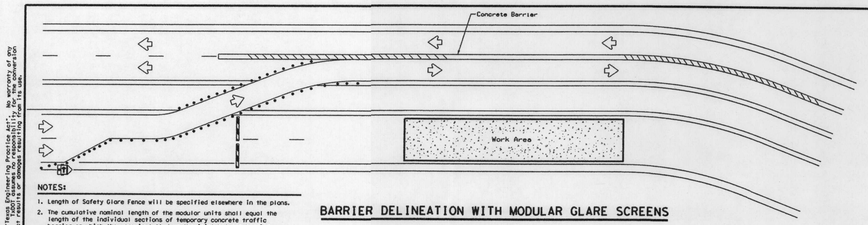
DRAWN BY:	JTM
CHECKED BY:	JCM
APPROVED BY:	JCM
DATE:	09/15/2014

SHEET

C2.01

PROJ NO. 2540–001

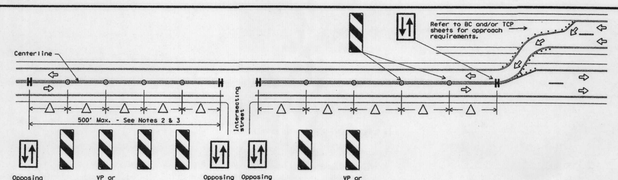
Drawing: N:\2540-001\Engineering\DWG\wtr_WBW details.dwg ; Wastewater Details
User: JTM
Last Modified: Jan. 20, 15 - 15:04
Plot Date/Time: Feb. 20, 15 - 10:00:32



LEGEND
- Type 3 Barricade
- Channelizing Devices
- Trailer Mounted Flashing Arrow Board
- Sign
- Safety glare fence

NOTES:
1. Length of Safety Glare Fence will be specified elsewhere in the plans.
2. The cumulative nominal length of the modular units shall equal the length of the individual sections of temporary concrete traffic barrier on which they are installed so the joint between barrier sections will not be spanned by any one unit.
3. Panels/blades will be designed such that reflective sheeting conforming with Departmental Material Specification DMS-8300, Sign Face Materials, Type B or C Yellow, minimum size of 2 inches by 12 inches can be attached to the outside of the panels/blade. The sheeting shall be attached to one panel/blade section of concrete barrier not to exceed a spacing of 30 feet. Barrier reflectors are not necessary when panels/blades are installed with reflective sheeting as described.
4. Payment for these devices will be under statewide Special Specification "Modular Glare Screens for Headlight Barrier."
5. This detail is only intended to show types of locations where Glare Screens would be appropriate. Required signing and other devices shall be as shown elsewhere in the plans.

BARRIER DELINEATION WITH MODULAR GLARE SCREENS



VERTICAL PANELS & OPPOSING TRAFFIC LANE DIVIDERS (OTLD) SEPARATING TWO-WAY TRAFFIC ON NORMALLY DIVIDED HIGHWAYS

NOTES:
1. When two-lane, two way traffic control must be maintained on one roadway of a normally divided highway, opposing traffic shall be separated with either temporary traffic barriers, channelizing devices, or a temporary raised island throughout the limits of the work operations. The above Typical Application is intended to show the general types and locations of channelizing devices when they are used for this purpose. This is not a traffic control plan. If this detail is to be used for other types of roads or applications, those locations should be stated elsewhere in the plans.
2. Space devices according to the Tangent Spacing shown on the Device Spacing table on BC(9) but not exceeding 100'.
3. Every fifth device should be an OTLD except when spaced closer to accommodate an intersection. An OTLD should be the first device on each side of intersecting streets or roads.
4. Locations where surface mount bases with adhesives or self-righting devices will be required in order to maintain them in their proper position should be noted elsewhere in the plans.

DEPARTMENTAL MATERIAL SPECIFICATIONS

SIGN FACE MATERIALS	DMS-8300
DELINEATORS AND OBJECT MARKERS	DMS-8600
MODULAR GLARE SCREENS FOR HEADLIGHT BARRIER	DMS-8610

Only pre-qualified products shall be used. A copy of the "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources and may be found at the following web address:
http://www.txdot.gov/txdot_library/publications/construction.htm

Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC CONTROL PLAN TYPICAL DETAILS

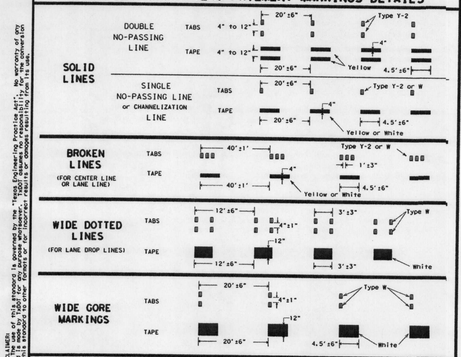
WZ(TD)-13

FILE:	wzTD-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	February 1998	CONT	SECT	JOB	HIGHWAY
4-98 5-00 7-13 11-14	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 disclaims responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE:
FILE:

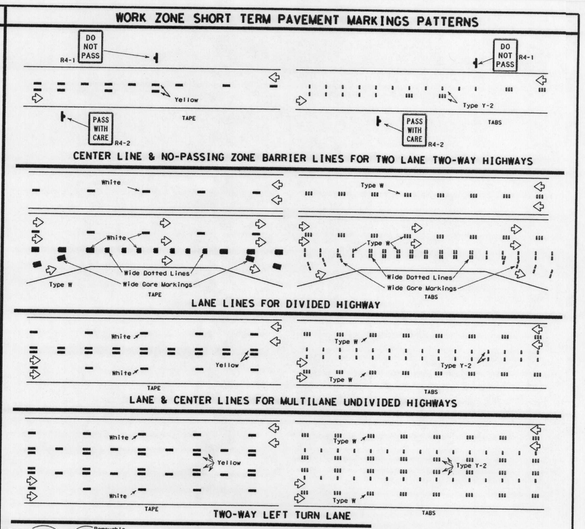
WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS



NOTES:
1. Short term pavement markings may be prefabricated markings (stick down tape) or temporary flexible-reflective roadway marker tabs unless otherwise specified elsewhere in plans.
2. Short term pavement markings shall NOT be used to simulate edge lines.
3. Dimensions indicated on this sheet are typical and approximate. Variations in size and height may occur between markers or devices made by manufacturers, by as much as 1/4 inch, unless otherwise noted.
4. Temporary flexible-reflective roadway marker tabs will require normal maintenance replacement when used on roadways with an ADT per lane of up to 7500 vehicles with no more than 10% truck mix. When roadways exceed these values, additional maintenance replacement of devices should be planned.
5. No segment of roadway open to traffic shall remain without permanent pavement markings for a period greater than 14 calendar days. The Contractor will be responsible for maintaining short term pavement markings until permanent pavement markings are in place. When the Contractor is responsible for placement of permanent pavement markings, no segment of roadway shall remain without permanent pavement markings for a period greater than 14 calendar days unless weather conditions prohibit placement. Permanent pavement markings shall be placed as soon as weather permits.
6. For two lane, two-way roadways, DO NOT PASS signs shall be erected to mark the beginning of sections where passing is prohibited and PASS WITH CARE signs shall be erected to mark the beginning of sections where passing is permitted. Signs shall be in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) and may be used to indicate the limits of no-passing zones for up to 14 calendar days. Permanent pavement markings should then be placed.
7. For low volume two lane, two-way roadways of 4000 ADT or less, no-passing lines may be omitted when approved by the Engineer. DO NOT PASS and PASS WITH CARE signs shall be erected (see note 6).
8. For exit gores where a lane is being dropped place wide gore markings or retroreflective channelizing devices to guide motorist through the exit. If channelizing devices are to be used it should be noted elsewhere in the plans. One piece cones are not allowed for this purpose.

TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)
1. Temporary flexible-reflective roadway marker tabs detailed on this sheet will be designated Type Y-2 (two amber reflective surfaces with yellow body); Type Y (one amber reflective surface with yellow body); and Type W (one white or silver reflective surface with white body). Additional details may be found on BC(11).
2. Tabs shall meet requirements of Departmental Material Specification DMS-8242.
3. When dry, tabs shall be visible for a minimum distance of 200 feet during normal daylight hours and when illuminated by automobile low-beam head light at night, unless slight distance is restricted by roadway geometrics.
4. No two consecutive tabs nor four tabs per 1000 feet of line shall be missing or fail to meet the visual performance requirements of Note 3.

WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS

LANE LINES FOR DIVIDED HIGHWAY

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS

TWO-WAY LEFT TURN LANE

Raised Pavement Marker — Removable Short Term Pavement Marking (Tape)

If raised pavement markers are used to supplement REMOVABLE short term markings, the markers shall be applied to the top of the tape at the approximate mid length of the tape. This allows an easier removal of raised markers and tape.

PREFABRICATED PAVEMENT MARKINGS
1. Temporary Removable Prefabricated Pavement Markings shall meet the requirements of DMS-8241.
2. Non-removable Prefabricated Pavement Markings shall meet the requirements of either DMS-8240 "Permanent Prefabricated Pavement Markings" or DMS-8243 "Temporary Construction-Grade Prefabricated Pavement Markings."

RAISED PAVEMENT MARKERS
1. All raised pavement markers used for work zone markings shall meet the requirements of Item 672, "RAISED PAVEMENT MARKERS" and DMS-4200.

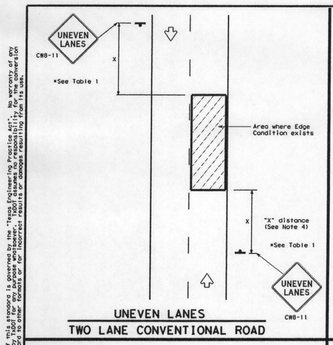
DEPARTMENTAL MATERIAL SPECIFICATIONS (DMS) & MATERIAL PRODUCER LISTS (MPL)
1. DMSs referenced above can be found along with embedded links to their respective MPLs at the following website:
http://www.txdot.gov/business/contractors_consultants/material_specifications/default.htm

Texas Department of Transportation — Traffic Operations Division Standard

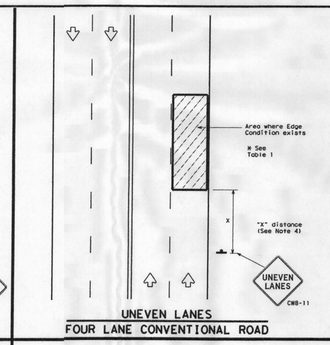
WORK ZONE SHORT TERM PAVEMENT MARKINGS

WZ(STPM)-13

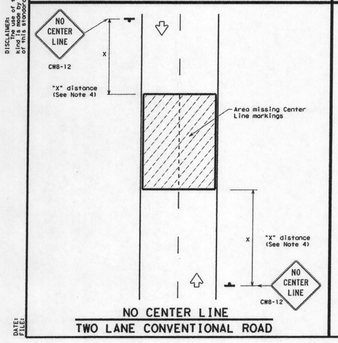
FILE:	wzstpm-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	April 1992	CONT	SECT	JOB	HIGHWAY
1-97 5-00 7-13	REVISIONS	DIST	COUNTY		SHEET NO.



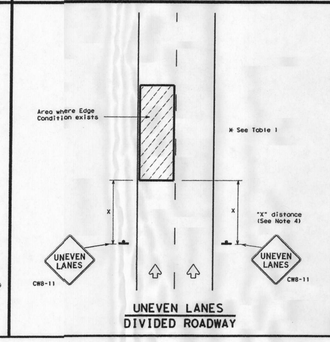
UNEVEN LANES
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
FOUR LANE CONVENTIONAL ROAD



NO CENTER LINE
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
DIVIDED ROADWAY

DEPARTMENTAL MATERIAL SPECIFICATIONS

PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY (REMOVABLE) PREFABRICATED PAVEMENT MARKINGS	DMS-8241
SIGN FACE MATERIALS	DMS-8300

COLOR	USAGE	SHEETING MATERIAL
ORANGE	BACKGROUND	TYPE B_N OR TYPE C_N SHEETING
BLACK	LEGEND & BORDERS	ACRYLIC NON-REFLECTIVE SHEETING

GENERAL NOTES

1. If spalling or holes occur, ROUGH ROAD (C8B-8) signs should be placed in advance of the condition and be repeated every two miles where the condition persists.
2. UNEVEN LANES (C8B-11) signs shall be installed in advance of the condition and repeated every mile. Signs installed along the uneven lane condition may be supplemented with the NEXT XX MILES (C8T-3xP) plaque or Advisory Speed (C8E13-1P) plaque.
3. NO CENTER LINE (C8B-12) signs and temporary pavement markings as per the WZ(STPM) standard shall be installed if yellow centerlines separating two way traffic are obscured or obliterated. Repeat NO CENTER LINE signs every two miles where the center line markings are not in place. The signs and markings shall remain in place until permanent pavement markings are installed.
4. Signs shall be spaced at the distances recommended as per BC standards.
5. Additional signs may be required as directed by the Engineer. Signs shall remain in place only as long as the hazard is applied. Signs shall be considered subsidiary to Item 502 "BARRICADES, SIGNS AND TRAFFIC HANDLING."
6. Signs shall be fabricated and mounted on supports as shown on the BC standards and/or listed on the "Compliant Work Zone Traffic Control Devices" list.
7. Short term markings shall not be used to simulate edge lines.
8. All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition.

TABLE 1

Edge Condition	Edge Height (D)	≥ Warning Devices
①	Less than or equal to 1½" (maximum planing) 1½" (typical overlay)	Signs C8B-11
②	Distance "D" may be a maximum of 1 1/4 " for planing operations and 2" for overlay operations if uneven lanes with edge condition 1 are open to traffic after work operations cease.	Signs C8B-11
③	Less than or equal to 3"	Signs C8B-11
③	"D" to 3/4" — Distance "D" may be a maximum of 3" if uneven lanes with edge condition 2 or 3 are open to traffic after work operations cease. Uneven lanes should not be open to traffic when "D" is greater than 3".	Signs C8B-11

Notched Wedge Joint

TRAFFIC CONTROL DURING PLANING, OVERLAY AND LEVELING OPERATIONS ARE SHOWN ELSEWHERE IN THE PLANS.

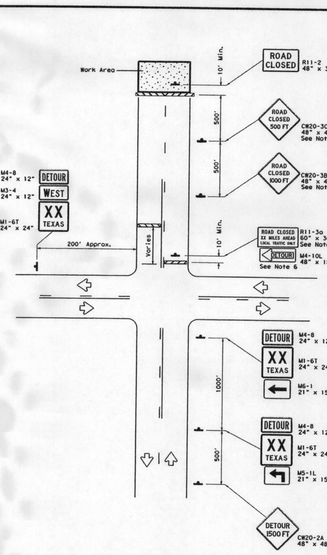
MINIMUM WARNING SIGN SIZE	
Conventional roads	36" x 36"
Freeways/expressways, divided roadways	48" x 48"

Texas Department of Transportation — Traffic Operations Division Standard

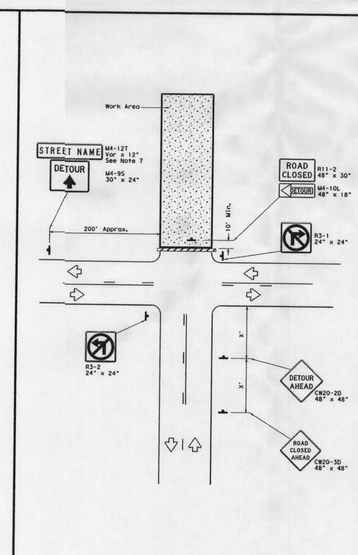
SIGNING FOR UNEVEN LANES

WZ(UL)-13

FILE:	wzul-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	April 1992	CONT	SECT	JOB	HIGHWAY
8-95 2-98 7-13 11-14	REVISIONS	DIST	COUNTY		SHEET NO.



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 M	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 SMM standards.
2. Barricades used shall meet the requirements shown on Barricade and Construction Standard BC(1) 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
©TxDOT	August 1995	CONT	SECT	JOB	HIGHWAY
1-97 4-98 7-13 2-98 3-00	REVISIONS	DIST	COUNTY		SHEET NO.

VICKREY & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION # F-1599 TBPLS REGISTRATION # 10004100
1717 West 6th Street, Suite 260
Austin,Texas 78703
Phone: (512) 494-8014 Fax: (512) 494-8054

NO.	DESCRIPTION	DATE

TRAFFIC CONTROL DETAILS

BROOKSHIRE BROTHERS, CANYON LAKE
18267 FM 306
CANYON LAKE, TX

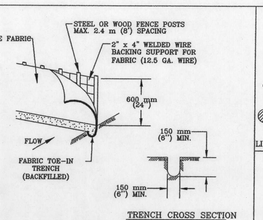
DRAWN BY: JTM
CHECKED BY: JCM
APPROVED BY: JCM
DATE: 09/15/2014

SHEET
C2.02

PROJ NO. 2540-001

©2014

Drawing: W:\2540-001\Engineering\DWG's\sh_traffice control details.dwg :TRAFFIC CONTROL
User: MORRISON
Last Modified: Jan. 15, 15 - 16:53
Plot Date/Time: Feb. 20, 15 - 10:01:55



TRENCH CROSS SECTION

1. STEEL OR WOOD POSTS WHICH SUPPORT THE SILT FENCE SHALL BE INSTALLED ON A SLIGHT ANGLE TOWARD THE ANTICIPATED RUNOFF SOURCE. POST MUST BE EMBEDDED A MINIMUM OF 300 mm (12 INCHES). IF WOOD POSTS CANNOT ACHIEVE 300 mm (12 inches) DEPTH, USE STEEL POSTS.

2. THE TOE OF THE SILT FENCE SHALL BE TRENCHED IN WITH A SPADE OR MECHANICAL TRENCHER, SO THAT THE DOWNSLOPE FACE OF THE TRENCH IS FLAT AND PERPENDICULAR TO THE LINE OF FLOW.

3. THE TRENCH MUST BE A MINIMUM OF 150 mm (6 inches) DEEP AND 150 mm (6 inches) WIDE TO ALLOW FOR THE SILT FENCE FABRIC TO BE LAID IN THE GROUND AND BACKFILLED WITH COMPACTED MATERIAL.

4. SILT FENCE FABRIC SHOULD BE SECURELY FASTENED TO EACH STEEL OR WOOD SUPPORT POST OR TO WOVEN WIRE , WHICH IS IN TURN ATTACHED TO THE STEEL OR WOOD FENCE POST.

5. INSPECTION SHALL BE MADE WEEKLY OR AFTER EACH RAINFALL EVENT AND REPAIR OR REPLACEMENT SHALL BE MADE PROMPTLY AS NEEDED.

6. SILT FENCE SHALL BE REMOVED WHEN THE SITE IS COMPLETELY STABILIZED SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.

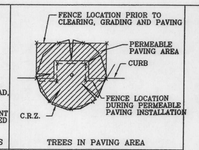
7. ACCUMULATED SILT SHALL BE REMOVED WHEN IT REACHES A DEPTH OF 150 mm (6 inches). THE SILT SHALL BE DISPOSED OF ON AN APPROVED SITE AND IN SUCH A MANNER THAT WILL NOT CONTRIBUTE TO ADDITIONAL SILTATION.

CITY OF AUSTIN — WATERSHED PROTECTION DEPARTMENT

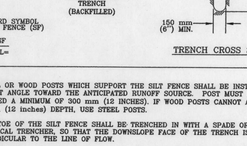
SILT FENCE

RECORD COPY SIGNED BY MORGAN BYARS	09/01/2011	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 642S-1
ADOPTED			

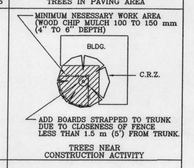
LINEAR CONSTRUCTION THROUGH TREES



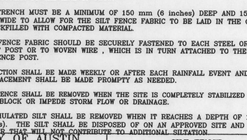
TREES IN PAVING AREA



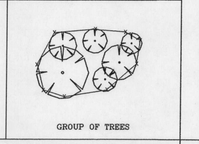
NATURAL AREAS



TREES NEAR CONSTRUCTION ACTIVITY



INDIVIDUAL TREE

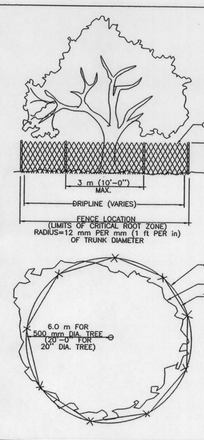


GROUP OF TREES

CITY OF AUSTIN — WATERSHED PROTECTION DEPARTMENT

TREE PROTECTION FENCE LOCATIONS

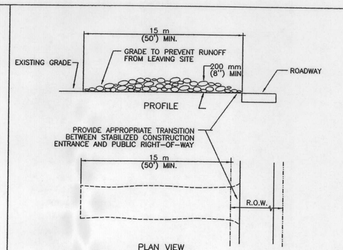
RECORD COPY SIGNED BY J. PATRICK MURPHY	11/16/99	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 610S-1
ADOPTED			



CITY OF AUSTIN — WATERSHED PROTECTION DEPARTMENT

TREE PROPTECTION FENCE TYPE A – CHAIN LINK

RECORD COPY SIGNED BY J. PATRICK MURPHY	11/15/99	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 610S-2
ADOPTED			

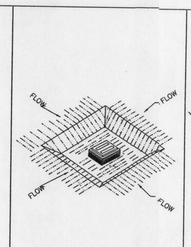


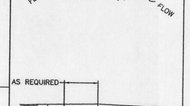
NOTES:
1. STONE SIZE: 75–125 mm (3–5") OPEN GRADED ROCK.
2. LENGTH: AS EFFECTIVE BUT NOT LESS THAN 15 m (50').
3. THICKNESS: NOT LESS THAN 200 mm (8").
4. WIDTH: NOT LESS THAN FULL WIDTH OF ALL POINTS OF INGRESS/EGRESS.
5. WASHING: WHEN NECESSARY, VEHICLE WHEELS SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC ROADWAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE AND DRAINS INTO AN APPROVED TRAP OR SEDIMENT BASIN. ALL SEDIMENT SHALL BE PREVENTED FROM ENTERING ANY STORM DRAIN, DITCH OR WATERCOURSE USING APPROVED METHODS.
6. MAINTENANCE: 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 DEVICES USED TO TRAP SEDIMENT. ALL SEDIMENTS THAT IS SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC ROADWAY MUST BE REMOVED IMMEDIATELY.
7. DRAINAGE: ENTRANCE MUST BE PROPERLY GRADED OR INCORPORATE A DRAINAGE SWALE TO PREVENT RUNOFF FROM LEAVING THE CONSTRUCTION SITE.

CITY OF AUSTIN — WATERSHED PROTECTION DEPARTMENT

STABILIZED CONSTRUCTION ENTRANCE

RECORD COPY SIGNED BY J. PATRICK MURPHY	5/23/00	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 641S-1
ADOPTED			



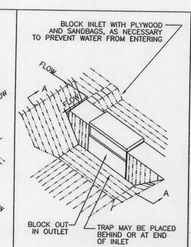


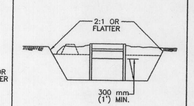
CROSS SECTION YARD DRAIN

CITY OF AUSTIN — WATERSHED PROTECTION DEPARTMENT

RECORD COPY SIGNED BY J. PATRICK MURPHY	3/27/00	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 632S-1
ADOPTED			

STORM INLET SEDIMENT TRAP



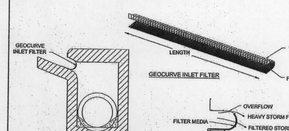


SECTION A–A CURB DRAIN

NOTE:
WHERE CURB IS IN PLACE, PROVIDE A 300 mm (1') WIDE OPENING IN THE CURB, OR USE A SANDBAG TO DAM TO FORCE WATER OVER THE CURB TO THE TRAP.

GeoSolutions, Inc. — Product Data Sheet
GeoCurve Inlet Filter

The GeoCurve Inlet Filter is a stormwater filter for placement into a stormwater curb inlet for the purpose of capturing debris and sediment that is transported by stormwater runoff. The device is comprised of a filter media (woven monofilament filter fabric) affixed to the lower portion of a "L" shaped 12 gauge welded wire frame (2" x 4" openings) with an upper retention flange. The device effectively filters stormwater, can easily be removed for maintenance and cleaning and incorporates an overflow window for heavy storm events.



CROSS-SECTION SHOWING PLACEMENT OF GEOCURVE IN CURB INLET

GEOCURVE INLET FILTER CROSS-SECTION

FILTER MEDIA PROPERTIES: Mono-filament Woven Filter Fabric

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 512-330-9796

NOTES:

1. THIS MATERIAL SHOULD HAVE A MAXIMUM EXPECTED USEFUL LIFE OF APPROXIMATELY EIGHTEEN (18) MONTHS. THE INLET PROTECTION DEVICES SHOULD BE CONSTRUCTED IN A MANNER THAT WILL FACILITATE CLEAN OUT AND DISPOSAL OF TRAPPED SEDIMENT WILE MINIMIZING INTERFERENCE WITH CONSTRUCTION ACT IVITIES. THEY SHOULD ALSO BE CONSTRUCTED SUCH THAT ANY PONDING OF STORM WATER WILL NOT CAUSE EXCESSIVE R.O.W. FLOODING (I.E. ≤ 4 INCHES OF STANDING WATER) OR DAMAGE TO THESTRUCTURE OR ADJACENT AREAS.

2. COVERAGE - THE FABRIC/WIRE SHOULD COMPLETELY COVER THE OPENING OF THE INLET AND DEVICES SHOULD BE INSTALLED WITHOUT PROTRUDING PARTS THAT COULD BE A TRAFFIC, WORKER, OR PEDESTRIAN HAZARD. WHERE SECTIONS OF THE FABRIC OVERLAP, THEY SHALL OVERLAP AT LEASTTHREE (3) INCHES.

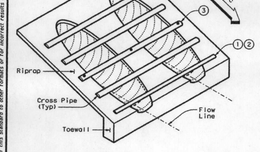
3. THE INLET FILTER SHALL BE ATTACHED IN A WAY THAT THEY CAN EASILY BE REMOVED AND ARE NOT SECURED OR ATTACHED BY THE USE OF SAND BAGS. THE INLET FILTER MUST BE REMOVED UPON COMPLETION OF WORK. IF REMOVAL DAM AGES THE CONCRETE CURB, THE CURB MUSTBE REPAIRED IMMEDIATELY.

4. DAILY INSPECTION SHALL BE MADE BY THE CONTRACTOR AND SILT ACCUMULATION MUST BE REMOVED WHEN THE DEPTH REACHES 50 MM (2 INCHES) INCHES OR ONE- THIRD THE HEIGHT OF THE INLET THROAT, AND DISPOSED OF IN A MANNER WHICH WILL NOT CAUSE ADDITIONAL SILTATION.

5. CONTRACTOR SHALL MONITOR THE PERFORMANCE OF INLET PROTECTION DURING EACH RAINFALL E VENT AND IMMEDIATELY REMOVE THE INLET PROTECTIONS IF THE STORMWATER BEGINS TO OVERTOP THE CURB.

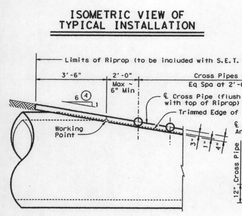
6. INLET PROTECTIONS SHALL BE REMOVED AS SOON AS THE SOURCE OF SEDIMENT HAS ACHIEVED FINAL STABILIZATION CONDITIONS.

CURB INLET PROTECTION
USE GEOSOLUTIONS GEOCURVE OR APPROVED EQUAL.

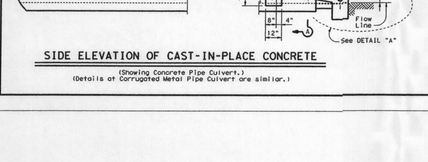


SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

(Showing Corrugated Metal Pipe Culvert.)
(Details of Concrete Pipe Culvert are similar.)

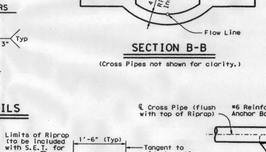


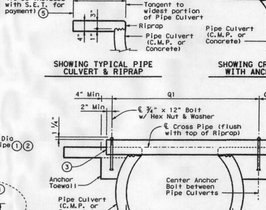
ISOMETRIC VIEW OF TYPICAL INSTALLATION



SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

(Showing Concrete Pipe Culvert.)
(Details of Corrugated Metal Pipe Culvert are similar.)





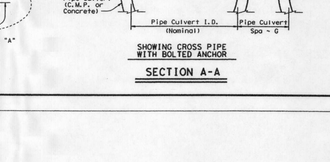
CROSS PIPE DETAILS

DETAIL "A"

(Showing Invert with Corrugated Metal Pipe Culvert. Concrete Pipe Culvert details are similar. Cross Pipes not shown for clarity.)

SECTION B-B

(Cross Pipes not shown for clarity.)



SECTION A-A

CROSS PIPE LENGTHS, REQUIRED PIPE SIZES, & RIPRAP QUANTITIES 2

Nominal Culvert I.D.	Conc Cross (CY) 4	Pipe Culverts Spa = G	Single Barrel ~ Q1	Multi-Barrel ~ Q1	Q2	Conditions for use of Cross Pipes	Cross Pipe Size
12"	0.6	8"	N/A	2'-1"	1'-9"	3 or more Pipe Culverts	3" Std (3.500" O.D.)
15"	0.7	11"	N/A	2'-5"	2'-2"		
18"	0.8	1'-2"	N/A	2'-10"	2'-8"		
21"	0.9	1'-4"	N/A	3'-2"	3'-1"		
24"	0.9	1'-7"	N/A	3'-6"	3'-7"		
27"	1.0	1'-8"	N/A	3'-10"	3'-11"	3 or more Pipe Culverts	3 ½" Std (4.000" O.D.)
30"	1.1	1'-10"	N/A	4'-2"	4'-4"	2 or more Pipe Culverts	
33"	1.2	1'-11"	4'-2"	4'-5"	4'-8"	All Pipe Culverts	4" Std (4.500" O.D.)
36"	1.3	2'-1"	4'-5"	4'-9"	5'-1"		
42"	1.5	2'-4"	4'-11"	5'-5"	5'-10"		
48"	1.7	2'-7"	5'-5"	6'-0"	6'-7"		
54"	2.0	3'-0"	5'-11"	6'-9"	7'-6"	All Pipe Culverts	5" Std (5.563" O.D.)
60"	2.2	3'-3"	6'-5"	7'-4"	8'-3"		
66"	2.4	3'-5"	6'-11"	7'-10"	8'-9"		
72"	2.7	3'-4"	7'-5"	8'-5"	9'-4"		

(1) The proper installation of the first Cross Pipe is critical for vehicle safety. The top of the first Cross Pipe must be placed at no more than 6" above the flow line.

(2) Size of Cross Pipes, except the first bottom pipe, shall be as shown in the PIPE SIZE table. The first bottom pipe shall be 3 ½" Standard Pipe (4" O.D.).

(3) The third Cross Pipe from the bottom of the Culvert shall always be installed using a bolted connection. Care shall be taken to ensure that Riprap concrete does not flow into the Culvert so as to permit disassembly of the bolted connection for subsequent access. At the Contractor's option, all other Cross Pipes may also be installed using the bolted connection details.

(4) Match Cross Slope as shown elsewhere in the plans. Cross Slope of 6:1 or flatter is required for vehicle safety.

(5) Riprap placed beyond the limits shown will be paid as concrete Riprap in accordance with Item 432, "Riprap".

(6) 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.

GENERAL NOTES:

Cross Pipes are designed for a traversing load of 10,000 pounds at yield as recommended by Research Report 280-2F, "Safety Treatment of Roadside Parallel-Drainage Structures", Texas Transportation Institute, March 1981.

Safety End Treatments shown herein are intended for use in traversable locations where out of control vehicles are likely to impact the openings approximately perpendicular to the Cross Pipes.

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.

Cross Pipes shall conform to the requirements of ASTM A53 (Type E or S, Grade B), ASTM A139 (Grade B), or API 5L.X52.

Bolts and nuts shall conform to ASTM A307.

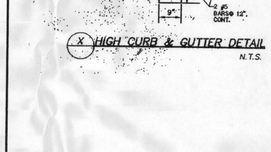
All steel components, except concrete reinforcing, shall be galvanized after fabrication. Galvanizing damaged during transport or construction shall be repaired in accordance with the specifications.

Texas Department of Transportation — Bridge Division Standard

SAFETY END TREATMENT
FOR 12" DIA TO 72" DIA PIPE CULVERTS
TYPE II – PARALLEL DRAINAGE

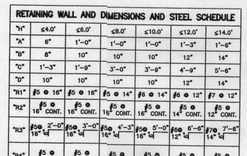
SETP-PD

File: setypdtx.dgn		dw: GAF	ck: CAT	dw: JRP	ck: GAF
© TxDOT February 2010		CONT	SECT	JOB	HIGHWAY
REVISIONS					
12-10 Rft. min for skewed flares.		DIST	COUNTY		SHEET NO.



X HIGH CURB & GUTTER DETAIL

N.T.S.



RETAINING WALL DETAIL

N.T.S.

RETAINING WALL AND DIMENSIONS AND STEEL SCHEDULE

	≤4.0'	≤6.0'	≤8.0'	≤10.0'	≤12.0'	≤14.0'
"A"	8"	1'-0"	1'-0"	1'-0"	1'-3"	1'-6"
"B"	8"	10"	10"	10"	12"	14"
"C"	1'-3"	1'-9"	2'-0"	3'-6"	4'-9"	5'-6"
"D"	10"	10"	10"	10"	12"	14"
"R1"	#5 @ 18"	#5 @ 18"	#5 @ 14"	#5 @ 14"	#6 @ 12"	#7 @ 12"
"R2"	#5 @ 18" CONT.	#5 @ 18" CONT.	#5 @ 18" CONT.	#5 @ 18" CONT.	#5 @ 14" CONT.	#5 @ 12" CONT.
"R3"	#50 2'-0" 16" 14"	#50 3'-0" 16" 14"	#50 4'-0" 16" 14"	#50 5'-0" 16" 14"	#50 5'-0" 12" 14"	#70 7'-6" 12" 14"
"R4"	#5 @ 18" CONT.	#5 @ 18" CONT.	#5 @ 18" CONT.	#5 @ 18" CONT.	#5 @ 14" CONT.	#5 @ 12" CONT.
"R5"	#50 18" 14"	#50 18" 14"	#50 14" 14"	#50 14" 14"	#70 12" 14"	#70 12" 14"

VICKREY & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION # F-159 TBPLS REGISTRATION # 100400
1717 West 6th Street, Suite 260
Austin, Texas 78703
Phone: (512) 494-8014 Fax: (512) 494-8054

DESCRIPTION | DATE | NO.

STATE OF TEXAS — JAMES C. MASSARO — 92530 — LICENSED PROFESSIONAL ENGINEER — 2/27/14

©2014

EROSION CONTROL & MISC. DETAILS

BROOKSHIRE BROTHERS, CANYON LAKE
18267 FM 306
CANYON LAKE, TX

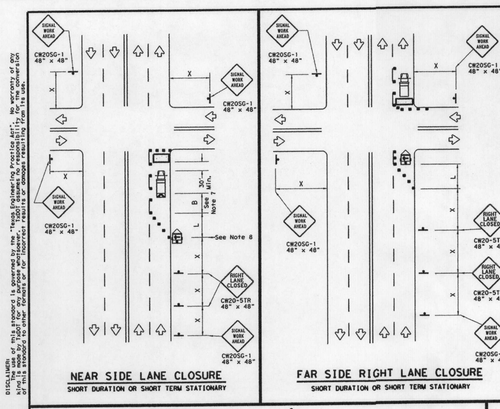
DRAWN BY: JTM
CHECKED BY: JCM
APPROVED BY: JCM
DATE: 09/15/2014

SHEET
C2.04

PROJ NO. 2540–001

Drawing: W:\2540-001\Engineering\DWG\M_E&S details.dwg | C2.04 Erosion Control & Misc. Details
User: JTM/JCM
Last Modified: Feb. 19, 15 – 17:39
Plot Date/Time: Feb. 20, 15 – 10:11:25

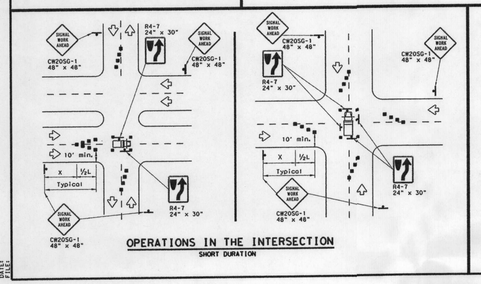
DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.



NEAR SIDE LANE CLOSURE
SHORT DURATION OR SHORT TERM STATIONARY

FAR SIDE RIGHT LANE CLOSURE
SHORT DURATION OR SHORT TERM STATIONARY

FAR SIDE LEFT LANE CLOSURE
SHORT DURATION OR SHORT TERM STATIONARY



OPERATIONS IN THE INTERSECTION
SHORT DURATION

DATE FILED:

GENERAL NOTES

1. The minimum size channelizing device is the 28" cone. 42" Two-piece cones, drums, vertical panels or barricades will be required when the device must be left unattended at night.
2. Obstructions or hazards at the work area shall be clearly marked and delineated at all times.
3. Flaggers and Flagger Symbol (CW20-7) signs may be required according to field conditions.
4. Vehicles parked in roadway shall be equipped with at least two high intensity rotating, flashing, oscillating or strobe type lights.
5. High level warning devices (flag trees) may be used at corners of the vehicle.
6. When work operations are performed on existing signals, the signals may be placed in flashing red mode when approved by the engineer. If existing signals do not have power, All-Way Stop (R1-1 and R1-3P) signs may be implemented when approved by the engineer.
7. For Short-Term Stationary work the buffer space "B" from the above table should be used if field conditions permit. For Short Duration (less than 1 hour) any buffer space provided will enhance the safety of the setup.
8. The arrow board at this location may be omitted for Short Duration work if the work vehicle has an arrow board in operation. As an option, the arrow board may be placed at the end of the taper in the closed lane if space is not available at the beginning of the taper.
9. Signs and devices for the NEAR SIDE LANE CLOSURE may be altered for a left lane closure by using a LEFT LANE CLOSED (CW20-5TL) and adding channelizing devices on the centerline to protect the work space from opposing traffic.

SHEET 1 OF 2

Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC SIGNAL WORK TYPICAL DETAILS

WZ(BTS-1)-13

FILE:	wzbts-13.dgn	Dev: TxDOT	Con: TxDOT	Dev: TxDOT	Con: TxDOT
©TxDOT	April 1992	DIST	COUNTY	JOB	HIGHWAY
REVISIONS					
2-98 10-98 7-13					
4-98 3-03		DIST	COUNTY		SHEET NO.

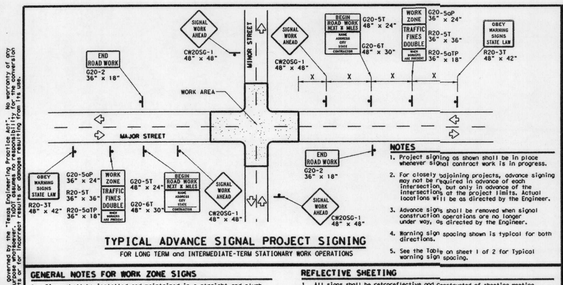
LEGEND

	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

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	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
30		150'	165'	180'	30'	60'	120'	90'
35	L = WS²/60	205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45		450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55	L=WS	550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only
** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

WORKERS IN BUCKET TRUCKS SHALL NOT WORK ABOVE OPEN LANES OF TRAFFIC.



TYPICAL ADVANCE SIGNAL PROJECT SIGNING
FOR LONG TERM and INTERMEDIATE-TERM STATIONARY WORK OPERATIONS

NOTES

1. Project signing as shown shall be in place whenever it shall contract work is in progress.
2. For closely adjoining projects, advance signing may not be required in advance of each intersection, but only in advance of the intersections at the project limits. Actual locations will be as directed by the Engineer.
3. Advance signs shall be removed when signal construction operations are no longer under way, as directed by the Engineer.
4. Warning sign spacing shown is typical for both directions.
5. See the Table on sheet 1 of 2 for typical warning sign spacing.

GENERAL NOTES FOR WORK ZONE SIGNS

1. Signs shall be installed and maintained in a straight and plumb condition.
2. Wooden sign posts shall be painted white.
3. Barricades shall NOT be used as sign supports.
4. Rails shall NOT be used to attach signs to any support.
5. All signs shall be installed in accordance with the plans or as directed by the Engineer.
6. The Contractor shall furnish the sign design shown in the plans or in the "Standard Highway Sign Designs for Texas" (SHSD).
7. The Contractor shall furnish sign supports and substrates listed in the "Compliant Work Zone Traffic Control Device List" (CWZTCD), installed as per the manufacturer's recommendations.
8. Damaged signs that have damaged or cracked substrates and/or damaged or cracked reflective sheeting shall be replaced as directed by the Engineer.
9. 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".
10. Damaged wood posts shall be replaced. Splicing wood posts will not be allowed.

DURATION OF WORK

1. Work zone durations are defined in Part 6, Section 6G.02 of the Texas Manual on Uniform Traffic Control Devices (TMUTCD).

SIGN MOUNTING HEIGHT

1. Sign height of Long-term/Intermediate-term warning signs shall be as shown on Figure 6F-1 of the TMUTCD.
2. Sign height of Short-term/Short duration warning signs shall be as shown on Figure 6F-2 of the TMUTCD.
3. Regulatory signs shall be mounted at least 7 feet, but not more than 9 feet, above the paved surface regardless of work duration.

REMOVING OR COVERING

1. When sign messages may be confusing or do not apply, the signs shall be removed or completely covered, unless otherwise approved by the Engineer.
2. When signs are covered, the material used shall be opaque, such that the sign face and all of the legend, border and background of the entire sign face and maintain their opaque properties under automobile headlights at night without damaging the sign sheeting. Burlap, or heavy materials such as plywood or aluminum shall not be used to cover signs.
3. Duct tape or other adhesive material shall NOT be affixed to a sign face.
4. Signs and washer plates shall be removed and holes back filled upon completion of the work.

REFLECTIVE SHEETING

1. All signs shall be retroreflective and constructed of sheeting meeting the requirements of the DMS and color/image table shown on this sheet.

SIGN SUPPORT WEIGHTS

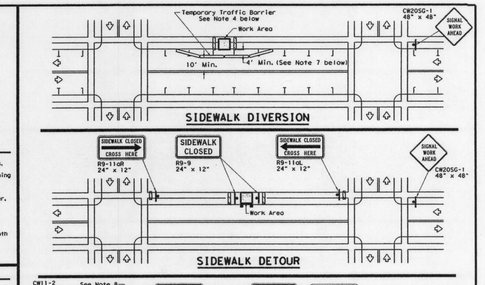
1. Weights used to keep signs from turning over should be sandbags filled with dry, cohesionless material.
2. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
3. Rock, concrete, iron, steel or other solid objects will not be permitted for use as sign support 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 vandalism 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.

LEGEND	
	Sign
	Channelizing Devices
	Type 3 Barricade

DEPARTMENTAL MATERIAL SPECIFICATIONS	
SIGN FACE MATERIALS	DMS-8300
FLEXIBLE ROLL-UP REFLECTIVE SIGNS	DMS-8310

COLOR	USAGE	SHEETING MATERIAL
ORANGE	BACKGROUND	TYPE B_{FL} OR TYPE C_{FL} SHEETING
WHITE	BACKGROUND	TYPE A SHEETING
BLACK	LEGEND & BORDERS	ACRYLIC NON-REFLECTIVE SHEETING

Only pre-qualified products shall be used. A copy of the "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources and may be found at the following web address:
http://www.txdot.gov/txdot_library/publications/construction.htm



PEDESTRIAN CONTROL

1. Holes, trenches or other hazards shall be adequately protected by covering, delineating or surrounding the hazard with orange plastic pedestrian fencing or longitudinal channelizing devices, or as directed by the Engineer.
2. "CROSSWALK CLOSURES" as detailed above will require the Engineer's approval prior to installation.
3. R9 series signs shown may be placed on supports detailed on the BC standards or CWZTCD list, or when fabricated from approved lightweight plastic substrates, they may be mounted on top of a plastic drum at or near the location shown.
4. For speeds less than 45 mph longitudinal channelizing devices may be used instead of traffic barricades if approved by the Engineer. Attenuation of any end or transition of water filled devices shall be as per BCH1 and manufacturer's recommendations.
5. Location of devices are for general guidance. Actual device spacing and location must be field adjusted to meet actual conditions.
6. Where pedestrians with visual disabilities normally use the closed sidewalk Detectable Pedestrian Barricades should be used instead of the Type 3 Barricades shown.
7. The width of existing sidewalk should be maintained if practical.
8. Pavement markings for sidewalk crosswalks shall be paid for under the appropriate bid items.
9. Temporary facilities to ensure pedestrian facilities are closed or relocated. Temporary facilities shall be detectable and shall include accessibility features consistent with the features present in the existing pedestrian facility.

SHEET 2 OF 2

Texas Department of Transportation — Traffic Operations Division Standard

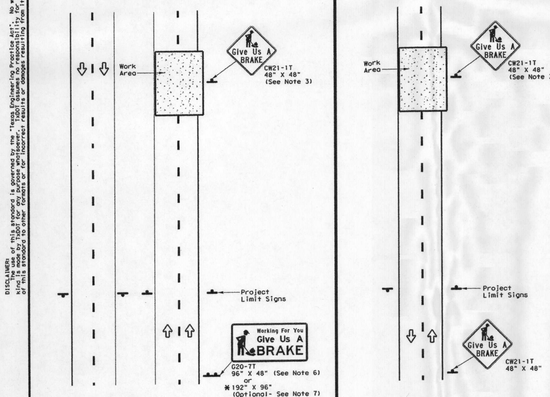
TRAFFIC SIGNAL WORK BARRICADES AND SIGNS

WZ(BTS-2)-13

FILE:	wzbts-13.dgn	Dev: TxDOT	Con: TxDOT	Dev: TxDOT	Con: TxDOT
©TxDOT	April 1992	DIST	COUNTY	JOB	HIGHWAY
REVISIONS					
2-98 10-98 7-13					
4-98 3-03		DIST	COUNTY		SHEET NO.

©2014

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.



DIVIDED HIGHWAY

UNDIVIDED HIGHWAY

SIGNS ARE SHOWN FOR ONE DIRECTION OF TRAVEL

* When the optional larger WORKING FOR YOU GIVE US A BRAKE (G20-7T) 192" x 96" sign is required, the locations shall be noted elsewhere in the plans.

DATE FILED:

SUMMARY OF LARGE SIGNS

BACKGROUND COLOR	SIGN DESIGNATION	SIGN	SIGN DIMENSIONS	REFLECTIVE SHEETING	SQ FT	GALVANIZED STRUCTURAL STEEL Size	(LF) ①	(LF) ②	DRILLED SHAFT 24" DIA. (LF)
Orange	G20-7T	Working For You Give Us A BRAKE	96" X 48"	Type B_{FL} or C_{FL}	32	▲	▲	▲	▲
Orange	G20-7T	Working For You Give Us A BRAKE	192" X 96"	Type B_{FL} or C_{FL}	128	#8x18	16	17	12

▲ See Note 6 Below

LEGEND	
	Sign
	Large Sign
	Traffic Flow

DEPARTMENTAL MATERIAL SPECIFICATIONS	
PLYWOOD SIGN BLANKS	DMS-7100
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

COLOR	USAGE	SHEETING MATERIAL
ORANGE	BACKGROUND	TYPE B_{FL} OR TYPE C_{FL}
BLACK	LEGEND & BORDERS	NON-REFLECTIVE ACRYLIC FILM

GENERAL NOTES

1. See BC and SMD sheets for additional sign support details.
2. Sign locations shall be approved by the Engineer.
3. For projects more than two miles in length, Give Us a BRAKE signs should be repeated halfway through the project. The Give Us a Brake (CW21-1T) may be used for this purpose.
4. Work zone speed limits are sometimes used in conjunction with GIVE US A BRAKE signing. See BC(3) for location and spacing of construction speed zone signing when required.
5. Give Us a Brake (CW21-1T) signs and supports shall be considered subsidiary to Item 502, "Barricades, Signs and Traffic Handling."
6. The 96" X 48" Working For You Give Us A BRAKE (G20-7T) may use a 1/2" or 5/8" plywood substrate or 0.125" aluminum sheeting substrate and may be supported by two 4" x 6" wood posts with drilled holes for breakaway as per BC(5) and will be subsidiary to Item 502.
7. The Working For You Give Us A BRAKE (G20-7T) 192" X 96" sign shall be paid for under the following specification items:
   Item 636 - Aluminum Signs
   Item 647 - Large Roadside Sign Supports and Assemblies.
   Item 416 - Drilled Shaft Foundations
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.

Texas Department of Transportation — Traffic Operations Division Standard

WORK ZONE "GIVE US A BRAKE" SIGNS

WZ(BRK)-13

FILE:	wzbrk-13.dgn	Dev: TxDOT	Con: TxDOT	Dev: TxDOT	Con: TxDOT
©TxDOT	August 1995	DIST	COUNTY	JOB	HIGHWAY
REVISIONS					
8-96 5-98 7-13					
8-96 3-03		DIST	COUNTY		SHEET NO.

VICKREY & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION # F-1159 TBPLS REGISTRATION # 100041100
1717 West 6th Street, Suite 260
Austin, Texas 78703
Phone: (512) 494-8014 Fax: (512) 494-8054

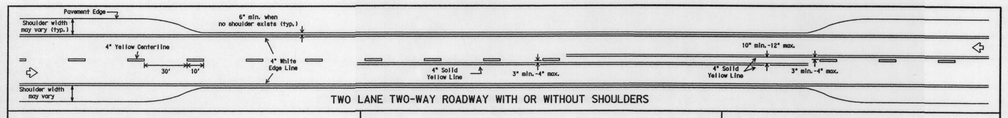
TRAFFIC CONTROL DETAILS
BROOKSHIRE BROTHERS, CANYON LAKE
18267 FM 306
CANYON LAKE, TX

DRAWN BY:	JTM
CHECKED BY:	JCM
APPROVED BY:	JCM
DATE:	09/15/2014
SHEET	C2.03
PROJ NO.	2540-001

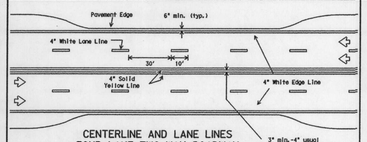
DATE NO. DESCRIPTION

Drawing: W:\2540-001\Engineering\DWG\sh_traffice control details.dwg, TRAFFIC CONTROL (2)
User: CHERESKIN
Last Modified: Feb. 15, 15 — 15:53
Plot Date/Time: Feb. 20, 15 — 10:10:23

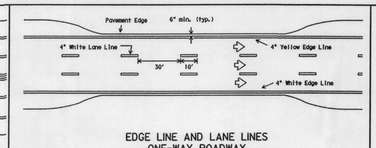
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the incorrect results or damages resulting from its use.



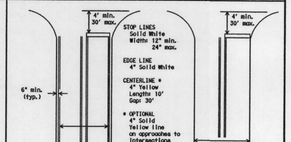
TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



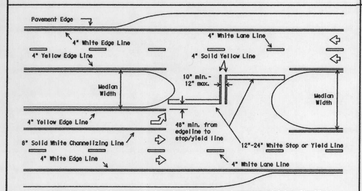
CENTERLINE AND LANE LINES
FOUR LANE TWO-WAY ROADWAY
WITH OR WITHOUT SHOULDERS



EDGE LINE AND LANE LINES
ONE-WAY ROADWAY
WITH OR WITHOUT SHOULDERS

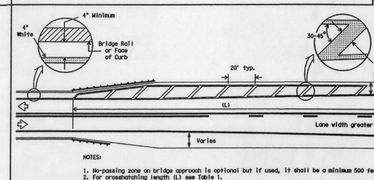


GUIDE FOR PLACEMENT OF STOP LINES,
EDGE LINE & CENTERLINE
Based on Traveled Way and Pavement Widths for Individual Highways



All medians shall be field measured to determine the location of necessary striping. Stop/Yield bars and centerlines shall be placed when the median width is greater than 30 ft. The median width is defined as the area between two roadways of a divided highway measured from edge of traveled way to edge of traveled way. The median excludes turn lanes. The median width might be different between intersections, interchanges and at opposite approaches of the same intersection. The narrow median width will be the controlling width to determine if markings are required.

FOUR LANE DIVIDED ROADWAY INTERSECTIONS



NOTES:
1. No-passing zone on bridge approach is optional but if used, it shall be a minimum 500 feet long.
2. For crosshatching length (L) see Table 1.
3. The width of the offset (W) and the required crosshatching width is the full shoulder width in advance of the bridge.
4. The crosshatching is not required if delineators or barrier reflectors are used along the structure.
5. For guard fence details, refer elsewhere in the plans.

ROADWAYS WITH REDUCED SHOULDER
WIDTHS ACROSS BRIDGE OR CULVERT

TABLE 1 - TYPICAL LENGTH (L)

Posted Speed S	Formula
≤ 40	$L = \frac{WS^2}{60}$
≥ 45	L=WS

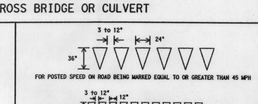
S=85th Percentile Speed may be used on roads where Traffic Speed Survey(s) exceed the posted speed limit. Crosshatching length should be rounded up to nearest 5 foot increment.
W=Width of Crosshatching (Ft.) L=Length of Crosshatching (Ft.)

EXAMPLES:
An 8 foot shoulder in advance of a bridge reduces to 4 feet on a 70 MPH roadway. The length of the crosshatching should be:
L = 8 x 70 = 560 Ft.
A 4 foot shoulder in advance of a bridge reduces to 2 feet on a 40 MPH roadway. The length of the crosshatching should be:
L = 4(40)² / 60 = 106.67 ft. rounded to 110 ft.

GENERAL NOTES
1. Edgeline striping shall be as shown in the plans or as directed by the Engineer. The edgeline should typically be placed a minimum of 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 and not the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the inside of edgeline to 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.



YIELD LINES

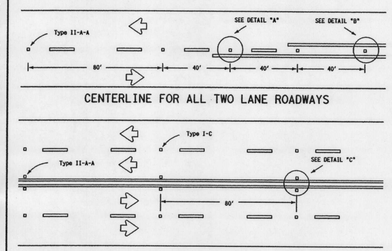
Texas Department of Transportation
Traffic Operations Division

TYPICAL STANDARD
PAVEMENT MARKINGS
PM(1)-12

©TxDOT November 1979 — REVISIONS: 8-85 2-12; 5-90; 8-00; 5-03; 2-10; 22A

DATE/FILE:

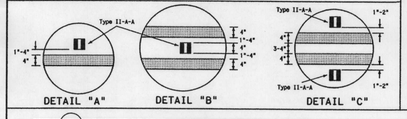
REFLECTIVE RAISED PAVEMENT MARKERS
FOR VEHICLE POSITIONING GUIDANCE

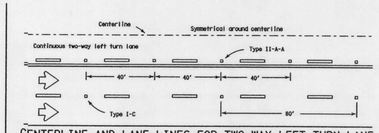


CENTERLINE FOR ALL TWO LANE ROADWAYS

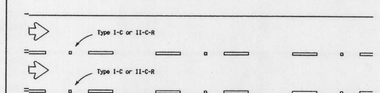
CENTERLINE & LANE LINES
FOR FOUR LANE TWO-WAY HIGHWAYS

Raised pavement marker Type I-C, clear face toward normal traffic, shall be placed on 80-foot centers.

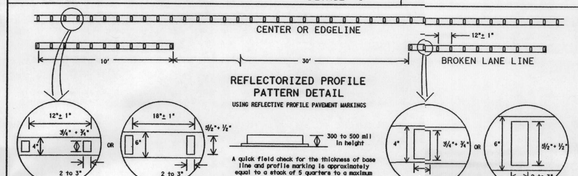




CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



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.

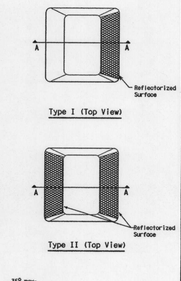


NOTE:
Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

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.

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 in the plans.

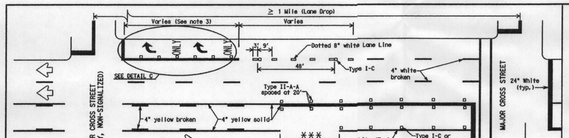


RAISED PAVEMENT MARKERS

Texas Department of Transportation
Traffic Operations Division

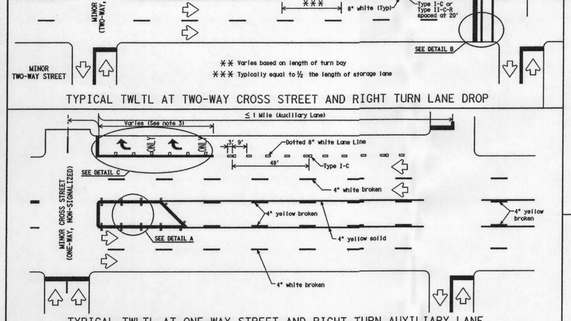
POSITION GUIDANCE USING
RAISED MARKERS
REFLECTORIZED PROFILE
MARKINGS
PM(2)-12

©TxDOT April 1977 — REVISIONS: 4-92 2-10; 8-90 2-12; 2-98; 2-10; 22B

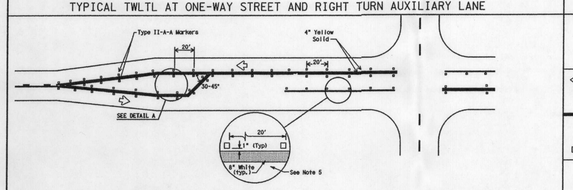


** Varies based on length of turn bay
*** Typically equal to ½ the length of storage lane

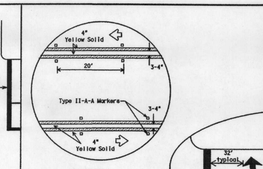
TYPICAL TWLTL AT TWO-WAY CROSS STREET AND RIGHT TURN LANE DROP



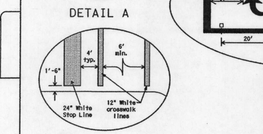
TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE



TYPICAL TWO-LANE HIGHWAY INTERSECTION WITH LEFT TURN BAYS

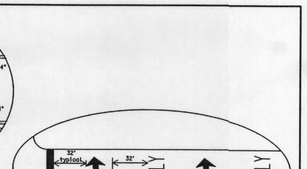


DETAIL A



Final placement of Stop Bar and Crosswalk shall be approved by the Engineer in the field.

DETAIL B

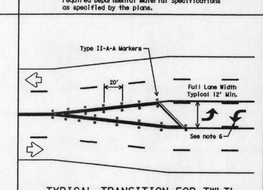


DETAIL C

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.

GENERAL NOTES
1. Refer elsewhere in plans for additional RPM placement and details.
2. 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 may be used in advance of the bay taper for turn lanes and turn bays for emphasis. Details for words and arrows as shown in the Standard Highway Sign Designs for Texas.
3. When lane used word and arrow markings are used, two sets of arrows should be used if the length of the bay is greater than 150 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.
4. Other crosswalk patterns as shown in the "Texas Manual on Uniform Traffic Control Devices" may be used.
5. Raised pavement marker Type I-C with undivided highways, flush medians and two way left-turn lanes. Raised pavement marker Type II-C-R with divided highways and raised medians.
6. 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.

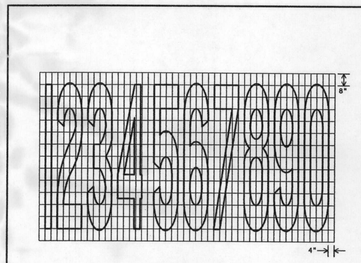


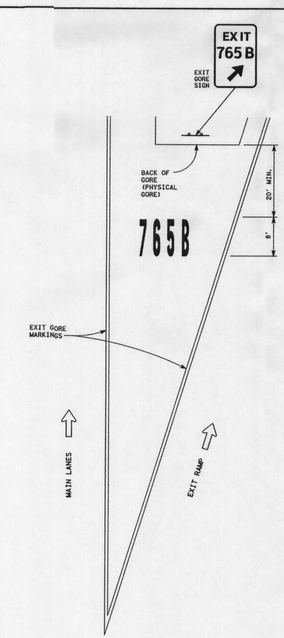
TYPICAL TRANSITION FOR TWLTL
AND DIVIDED HIGHWAY

Texas Department of Transportation
Traffic Operations Division

PAVEMENT MARKINGS FOR
TWO-WAY LEFT TURN LANES
DIVIDED HIGHWAYS AND
RURAL LEFT TURN BAYS
PM(3)-12

©TxDOT April 1998 — REVISIONS: 8-00 2-12; 5-03; 2-10; 22C





GENERAL NOTES
1. Minimum 8 foot white markings should be used, unless otherwise noted.
2. Spacing between letters and numbers should be approximately 4 inches.
3. Pavement markings are to be located as specified elsewhere in the plans.
4. All pavement marking materials shall meet the required Departmental Material Specifications or as specified in these plans.

Texas Department of Transportation
Traffic Operations Division

EXIT NUMBER
GORE MARKINGS FOR
AERIAL VIEW DETAIL
PM(4)-12

©TxDOT April 2006 — REVISIONS: 2-10; 2-12; 22D

VICKREY & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION # F-159 TBPLS REGISTRATION # 100048100
1717 West 6th Street, Suite 260
Austin, Texas 78703
Phone: (512) 494-8014 Fax: (512) 494-8054

©2014

NO.	DESCRIPTION	DATE

TXDOT DETAIL SHEET 4

BROOKSHIRE BROTHERS, CANYON LAKE
18267 FM 306
CANYON LAKE, TX

DRAWN BY: JTM
CHECKED BY: JCM
APPROVED BY: JCM
DATE: 09/15/2014

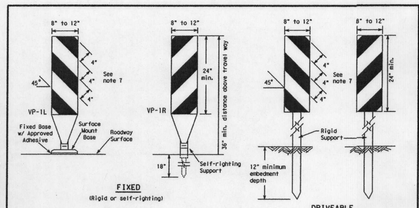
SHEET
C5.04

PROJ NO. 2540-001

Drawing: W:\2540-001\Engineering\DWG\sh_TxDOT details 2.dwg ;C5.04 TxDOT DETAIL SHEET 4
User: jmoore
Last Modified: Feb. 24, 15 - 15:40
Plot Date/Time: Feb. 25, 15 - 13:26:14

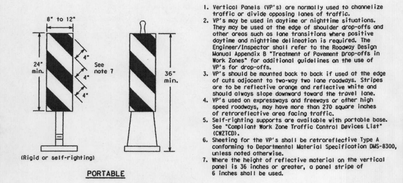
DISCLAIMER:
The use of this proposed & governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the accuracy or any alterations of this standard by other parties or for incorrect results or damages resulting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

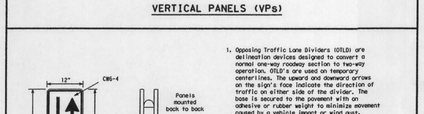
DATE/FILE:



VERTICAL PANELS (VPs)

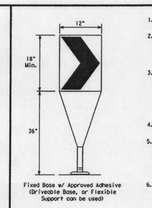
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is required. The Engineer/Inspector shall refer to the Roadway Design Manual Appendix B "Treatment of Pavement Drop-offs in Work Zones" for additional guidelines on the use of 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. Strikes and shall be perpendicular to traffic flow in both lanes and should not project downward into 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 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.





OPPOSING TRAFFIC LANE DIVIDERS (OTLD)

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 not 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 A_{FL} or Type C_{FL} conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.

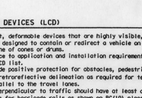


CHEVRONS

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 A_{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.

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) placed 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 NCHRP 350 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 shall have a taper ramp taper except in low speed (less than 45 MPH) applications. Water ballasted systems used as channelizing devices, 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 M	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent
30		150'	165'	180'	30'	60'
35	$L=\frac{WS^2}{60}$	205'	225'	245'	35'	70'
40		265'	295'	320'	40'	80'
45		450'	495'	540'	45'	90'
50		500'	550'	600'	50'	100'
55	L=WS	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'

**Lower lengths have been rounded off.
L=Length of Taper (Ft.) W=Width of Offset (Ft.)
S=Posted Speed (MPH)

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

SHEET 9 OF 12

Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

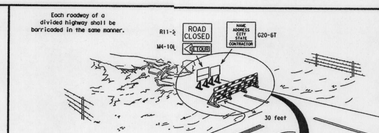
BC(9)-14

File: bc-14.dgn		DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002		CONT	SECT	JOB	HIGHWAY
REVISIONS					
9-07 8-14		DIST	COUNTY		SHEET NO.
7-13					

105

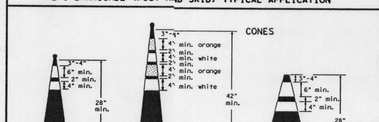
TYPE 3 BARRICADES

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 to the right, from the left side of the roadway.
4. Striping of rails, for two-lane, two-way 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 to secure barricades. Barricades shall be placed along or upon the base supports of the device and shall not be placed above ground level or hung with rope, wire, chains or other fasteners.
9. Sheeting for barricades shall be retroreflective Type A conforming to Departmental Material Specification DMS-8300 unless otherwise noted.



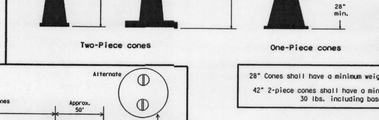
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION

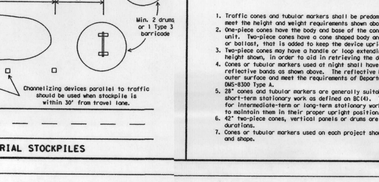


TYPICAL STRIPING DETAIL FOR BARRICADE RAIL

TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

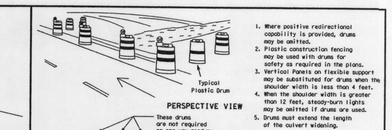


28" Cones shall have a minimum weight of 9 1/2 lbs.
42" 2-piece cones shall have a minimum weight of 30 lbs. including base.



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

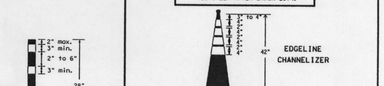
1. Traffic cones and tubular markers shall be predominantly orange, and meet the height and weight requirements shown above.
2. One-piece cones have the body and base of the cone molded in one consolidated unit. Two-piece cones have a cone shaped body and a separate rubber base, or ballast, that is added 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 used at night 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.
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.



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.

LEGEND	
	Plastic drum
	Plastic drum with steady burn light or yellow warning reflector
SB	Steady burn warning light or yellow warning reflector

THIS DEVICE SHALL NOT BE USED ON PROJECTS LET AFTER MARCH 2014.



1. This device is intended only for use in place of a vertical panel to channelize traffic by indicating the edge of the travel lane. It is not intended to be used in transitions or tapers.
2. This device shall not be used to separate lanes of traffic (opposing or otherwise) or warn of objects.
3. This device is based on a 42 inch, two-piece cone with an alternate striping patterns: four 4 inch retroreflective bands, with an approximate 2 inch gap between bands. The color of the band should correspond to the color of the edgeline (yellow for left edgeline, white for right edgeline) for which the device is substituted or for which it supplements. The reflectorized bands shall be retroreflective Type A conforming to Departmental Material Specification DMS-8300, unless otherwise noted.
4. The base must weigh a minimum of 30 lbs.

SHEET 10 OF 12

Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-14

File: bc-14.dgn		DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002		CONT	SECT	JOB	HIGHWAY
REVISIONS					
9-07 8-14		DIST	COUNTY		SHEET NO.
7-13					

106

WORK ZONE PAVEMENT MARKINGS

GENERAL

1. The Contractor shall be responsible for maintaining work zone and existing pavement markings, in accordance with the standard specifications and special provisions, on all roadways open to traffic within the CSJ limits unless otherwise stated in the plans.
2. Color, patterns and dimensions shall be in conformance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
3. Additional supplemental pavement marking details may be found in the plans or specifications.
4. Pavement markings shall be installed in accordance with the TMUTCD and as shown on the plans.
5. When short term markings are required on the plans, short term markings shall conform with the TMUTCD, the plans and details as shown on the Standard Plan Sheet RS(STP4).
6. When standard pavement markings are not in place and the roadway is opened to traffic, DO NOT PASS signs shall be erected to mark the beginning of the sections where passing is prohibited and PASS WITH CARE signs at the beginning of sections where passing is permitted.
7. All work zone pavement markings shall be installed in accordance with Item 662, "Work Zone Pavement Markings."

RAISED PAVEMENT MARKERS

1. Raised pavement markers are to be placed according to the patterns on BC(12).
2. All raised pavement markers used for work zone markings shall meet the requirements of Item 672, "RAISED PAVEMENT MARKERS" and Departmental Material Specification DMS-4200 or DMS-4300.

PREFABRICATED PAVEMENT MARKINGS

1. Removable prefabricated pavement markings shall meet the requirements of DMS-8241.
2. Non-removable prefabricated pavement markings (roll back) shall meet the requirements of DMS-8240.

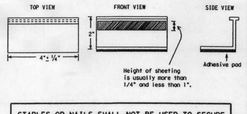
MAINTAINING WORK ZONE PAVEMENT MARKINGS

1. The Contractor will be responsible for maintaining work zone pavement markings within the work limits.
2. Work zone pavement markings shall be inspected in accordance with the frequency and reporting requirements of work zone traffic control device inspections as required by Form 1695.
3. The markings should provide a visible reference for a minimum distance of 300 feet during normal daylight hours and 150 feet when illuminated by automobile low-beam headlights at night, unless sight distance is restricted by roadway geometrics.
4. Markings failing to meet this criteria within the first 30 days after placement shall be replaced at the expense of the Contractor as per Specification Item 662.

REMOVAL OF PAVEMENT MARKINGS

1. Pavement markings that are no longer applicable, could create confusion or direct a motorist toward or into the closed portion of the roadway shall be removed or obliterated before the roadway is opened to traffic.
2. The above shall not apply to detours in place for less than three days, where flaggers and/or sufficient channelizing devices are used in lieu of markings to outline the detour route.
3. Pavement markings shall be removed to the fullest extent possible, so as not to leave a discernible marking. This shall be by any method approved by TxDOT Specification Item 677 for "Eliminating Existing Pavement Markings and Markers".
4. The removal of pavement markings may require resurfacing or seal coating portions of the roadway as described in Item 677.
5. Subject to the approval of the Engineer, any method that proves to be successful on a particular type pavement may be used.
6. Blast cleaning may be used but will not be required unless specifically shown in the plans.
7. Over-painting of the markings SHALL NOT BE permitted.
8. Removal of raised pavement markers shall be as directed by the Engineer.
9. Removal of existing pavement markings and markers will be paid for directly in accordance with Item 677, "ELIMINATING EXISTING PAVEMENT MARKINGS AND MARKERS," unless otherwise stated in the plans.
10. Black-out marking tape may be used to cover conflicting existing markings for periods less than two weeks when approved by the Engineer.

Temporary Flexible-Reflective Roadway Marker Tabs



STAPLES OR NAILS SHALL NOT BE USED TO SECURE TEMPORARY FLEXIBLE-REFLECTIVE ROADWAY MARKER TABS TO THE PAVEMENT SURFACE

1. Temporary flexible-reflective roadway marker tabs used as guidemarks shall meet the requirements of DMS-8242.
2. Tabs detailed on this sheet are to be inspected and accepted by the Engineer or designated representative. Sampling and testing is not normally required, however at the option of the Engineer, either "A" or "B" below may be imposed to assure quality before placement on the roadway.
   A. Select five (5) or more tabs at random from each lot or shipment and submit to the Construction Division, Materials and Pavement Section to determine specification compliance.
   B. Select five (5) tabs and perform the following test. Affix five (5) tabs at 24 inch intervals on an asphaltic pavement in a straight line. Using a median size passenger vehicle or pickup, run over the markers with the front and rear tires at a speed of 35 to 40 miles per hour, four (4) times in each direction. No more than one (1) out of the five (5) reflective surfaces shall be lost or displaced as a result of this test.
3. Small design variances may be noted between tab manufacturers.
4. See Standard Sheet RS(STP4) for tab placement on new pavements. See Standard Sheet TCP(T-1) for tab placement on seal coat work.

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

1. Raised pavement markers used as guidemarks shall be from the approved product list, and meet the requirements of DMS-4200.
2. All temporary construction raised pavement markers provided on a project shall be of the same manufacturer.
3. Adhesive for guidemarks shall be bituminous material hot applied or butyl rubber pad for all surfaces, or thermoplastic for concrete surfaces.

Guidemarks shall be designated as:
YELLOW - two amber reflective surfaces with yellow body.
WHITE - one silver reflective surface with white body.

DEPARTMENTAL MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
TRAFFIC BUTTONS	DMS-4300
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY REMOVABLE, PREFABRICATED PAVEMENT MARKINGS	DMS-8241
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS	DMS-8242

A list of prequalified reflective raised pavement markers, non-reflective traffic buttons, roadway marker tabs and other pavement markings can be found at the Material Producer List web address shown on BC(1).

SHEET 11 OF 12

Texas Department of Transportation | Traffic Operations Division Standard

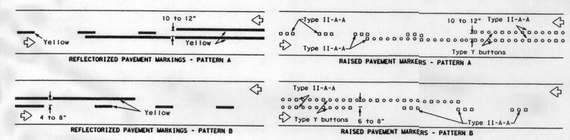
BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-14

File: bc-14.dgn		DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998		CONT	SECT	JOB	HIGHWAY
REVISIONS					
2-98 5-01		DIST	COUNTY		SHEET NO.
1-02 7-13					
11-02 8-14					

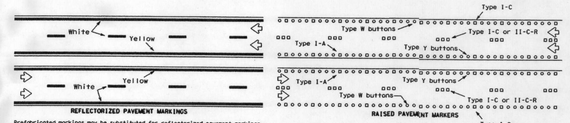
107

PAVEMENT MARKING PATTERNS



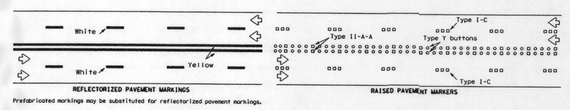
Pattern A is the TxDOT Standard, however Pattern B may be used if approved by the Engineer.
Prefabricated markings may be substituted for reflectorized pavement markings.

CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO-LANE, TWO-WAY HIGHWAYS



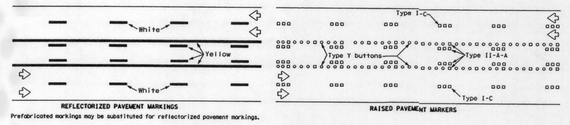
Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



Prefabricated markings may be substituted for reflectorized pavement markings.

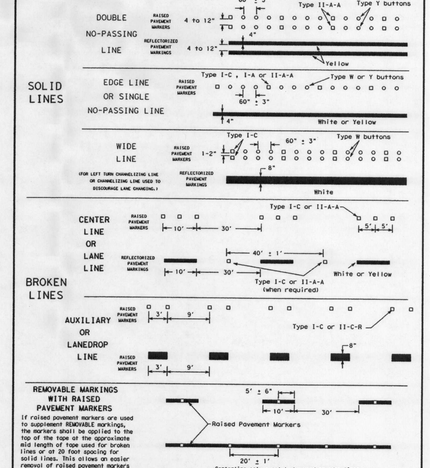
LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS



Raised pavement markers used as standard pavement markings shall be from the approved products list and meet the requirements of Item 672 "RAISED PAVEMENT MARKERS."

SHEET 12 OF 12

Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-14

File: bc-14.dgn		DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998		CONT	SECT	JOB	HIGHWAY
REVISIONS					
1-97 9-02		DIST	COUNTY		SHEET NO.
2-98 7-13					
11-02 8-14					

108

VICKREY & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION # F-159 TBPLS REGISTRATION # 10004500
1717 West 6th Street, Suite 260
Austin, TX 78703
Phone: (512) 494-8054 Fax: (512) 494-8054

TXDOT DETAIL SHEET 3

BROOKSHIRE BROTHERS, CANYON LAKE
18267 FM 306
CANYON LAKE, TX

DRAWN BY:	JTM
CHECKED BY:	JCM
APPROVED BY:	JCM
DATE:	09/15/2014
SHEET	C5.03
PROJ NO.	2540-001

©2014

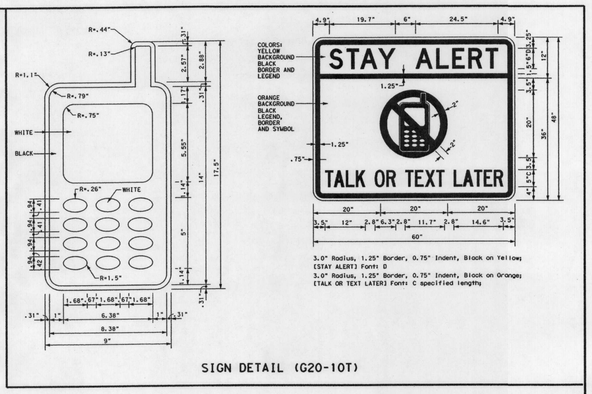
Drawing: W:\2540-001\Engineering\DWG\txdt_TxDOT details 1.dwg (C5.03 TxDOT DETAIL SHEET 3
User: jmcclung
Last Modified: Feb. 24, 15 - 14:48
Plot Date/Time: Feb. 25, 15 - 13:23:54

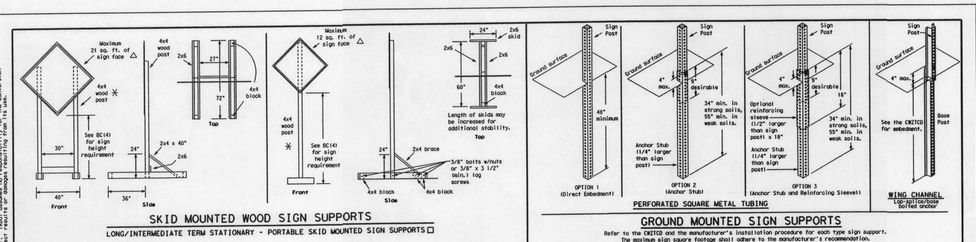
BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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 obut, 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. As shown on BC(2), the OBEY WARNING SIGNS STATE LAW sign, STAY ALERT TALK OR TEXT LATER (see Sign Detail (G20-10T) and the WORK ZONE TRAFFIC FINES DOUBLE sign with plaque shall be erected in advance of the CSJ limits. However, the TRAFFIC FINES DOUBLE sign will not be required on projects consisting solely of mobile operation work, such as striping or milling edgeline rumble strips. The BEGIN ROAD WORK NEXT X MILES, CONTRACTOR and END ROAD WORK signs shall be erected at or near the CSJ limits.
11. Except for devices required by Note 10, 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 APPAREL 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.


R=.44"
R=.13"
R=1.17"
R=.79"
R=.75"
WHITE
BLACK
R=.26"
WHITE
R=1.5"
2.67"
2.88"
.31"
.31"
.31"
5.85"
1.14"
1.14"
17.5"
9"
1.14"
.31"
.31"
1.68"
.67"
1.68"
.67"
1.68"
6.38"
.31"
1"
1"
.31"
8.38"
9"
4.9"
19.7"
6"
24.5"
4.9"
COLORS:
YELLOW BACKGROUND
BLACK BORDER AND LEGEND
ORANGE BACKGROUND
BLACK LEGEND, BORDER AND SYMBOL
STAY ALERT
1.25"
2"
1.4"
TALK OR TEXT LATER
1.25"
.75"
.5"
.5"
.5



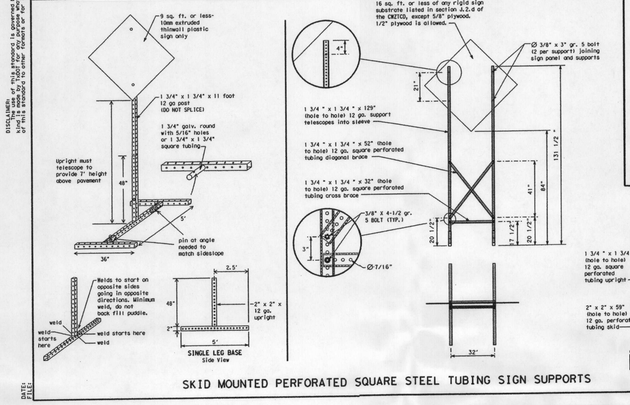
SKID MOUNTED WOOD SIGN SUPPORTS

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

PERFORATED SQUARE METAL TUBING

GROUND MOUNTED SIGN SUPPORTS

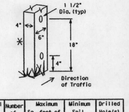
Refer to the CMTED and the manufacturer's installation procedure for each type sign support.
The maximum sign square footage shall adhere to the manufacturer's recommendation.
Two post installations can be used for larger signs.



SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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 used to mount signs on all paving soils if embedded 5" (min) then set in concrete. Refer to "Traffic Engineering Standard Sheets" on BC(11).



Nominal Post Size	Number of Posts	Maximum Sq. feet of Sign Face	Minimum Soil Embedment	Drilled Hole(s) Required
4 x 4	1	12	36"	NO
4 x 4	2	21	36"	NO
4 x 6	1	21	36"	YES
4 x 6	2	36	36"	YES

WOOD POST SYSTEM FOR GROUND MOUNTED SIGN SUPPORTS

OTHER DESIGNS

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

GENERAL NOTES

1. Bolts 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 CMTED 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 "Mark Duration."

✳ Wood sign posts MUST be one piece. Splicing will NOT be allowed. Posts shall be painted white.

△ See the CMTED for the type of sign substrate that can be used for each approved sign support.

SHEET 5 OF 12

Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-14

FILE:	bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002		CONT	SECT	JOB	HIGHWAY
REVISIONS					
9-07 8-14		DIST	COUNTY		SHEET NO.
7-13					

DISCLAIMER:
The use or copying 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 subsequent use of this standard or incompatibility of this standard with other standards.

DATE: FILE:

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

PORTABLE CHANGEABLE MESSAGE SIGNS

1. The Engineer/Inspector shall approve all messages used on portable changeable message signs (PCMS).
2. Messages on PCMS should contain no more than 8 words (about four to eight characters per word), not including simple words such as "TO," "FOR," "AT," etc.
3. Messages should consist of a single phase, or two phases that alternate. Three-phase messages are not allowed. Each phase of the message should convey a single thought, and must be understood by itself.
4. Use the word "EXIT" to refer to an exit ramp on a freeway; i.e., "EXIT CLOSED." Do not use the term "RAMP."
5. Always use the route or interstate designation (IH, US, SH, FM) along with the number when referring to a roadway.
6. When in use the bottom of a stationary PCMS message panel should be a minimum 7 feet above the roadway, where possible.
7. The message term "WEEKEND" should be used only if the work is to start on Saturday morning and end by Sunday evening at midnight. Actual days and hours of work should be displayed on the PCMS if work is to begin on Friday evening and/or continue into Monday morning.
8. The Engineer/Inspector may select one of two options which are available for displaying a two-phase message on a PCMS. Each phase may be displayed for either four seconds each or for three seconds each. Do not "flash" messages or words included in a message. The message should be steady burn or continuous while displayed.
9. Do not present redundant information on a two-phase message; i.e., keeping two lines of the message the same and changing the third line.
10. Do not use the word "TRAFFIC" in a message.
11. Do not display the two message "LANES SHIFT LEFT" or "LANES SHIFT RIGHT" on a PCMS. Drivers do not understand the message.
12. Do not display messages that scroll horizontally or vertically across the face of the sign.
13. The following table lists abbreviated words and two-word phrases that are acceptable for use on a PCMS. Both words in a phrase must be displayed together. Words or phrases not on this list should not be abbreviated, unless shown in the TMUTCD.
14. PCMS character height should be at least 18 inches for trailer mounted units. They should be visible from at least 1/2 (.5) mile and the text should be legible from at least 600 feet at night and 800 feet in daylight. Truck mounted units must have a character height of 10 inches and should be legible from at least 300 feet.
15. Each line of text should be centered on the message board either from left or right justified.
16. If disabled, the PCMS should default to an illegible display that will not alarm motorists and will only be used to alert workers that the PCMS has malfunctioned. A pattern such as a series of horizontal solid bars is appropriate.

WORD OR PHRASE	ABBREVIATION	WORD OR PHRASE	ABBREVIATION
Access Road	ACCS RD	Major	MAJ
Alternate	ALT	Miles	MI
Avenue	AVE	Miles Per Hour	MPH
Best Route	BEST RTE	Minor	MNR
Boulevard	BLVD	Monday	MON
Bridge	BRDG	Normal	NORM
Cannot	CANT	North	N
Center	CTR	Northbound	(route) N
Construction Ahead	CONST AHD	Parking	PRKING
Crash	CRASH	Road	RD
CROSSING	XING	Right Lane	RT LN
Detour Route	DETOUR RTE	Saturday	SAT
Do Not	DONT	Service Road	SERV RD
East	E	Shoulder	SHLDR
Eastbound	(route) E	Slippery	SLIP
Emergency	EMER	South	S
Emergency Vehicle	EMER VEH	Southbound	(route) S
Entrance, Enter	ENT	Speed	SPD
Express Lane	EXP LN	Street	ST
Expressway	EXPWY	Sunday	SUN
FOG Ahead	FOG AHD	Telephone	PHONE
Freeway	FWY, FRWY	Temporary	TEMP
Freeway Blocked	FWY BLKD	Thursday	THURS
Friday	FRI	To Downtown	TO DWNTN
Hazardous Driving	HAZ DRIVING	To Traffic	TRAF
Hazardous Material	HAZMAT	Travelers	TRVLRS
High-Occupancy	HOV	Tuesday	TUES
Highway	HWY	Time Minutes	TIME MIN
Hospital	HOSP	Upper Level	UPR LEVEL
Hour(s)	HR, HRS	Vehicles (s)	VEHL, VEHS
Information	INFO	Warning	WARN
It Is	ITS	Wednesday	WED
Junction	JCT	Weight Limit	WT LIMIT
Left	LFT	West	W
Left Lane	LFT LN	Westbound	(route) W
Lane Closed	LN CLOSED	Wet Pavement	WET PVMT
Local Traffic	LOCAL	Will Not	WON'T
Maintenance	MAINT		

Roadway designation = IH-number, US-number, SH-number, FM-number

DISCLAIMER:
The use or copying 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 subsequent use of this standard or incompatibility of this standard with other standards.

DATE: FILE:

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

FREEWAY CLOSED X MILE	FRONTAGE ROAD CLOSED	ROADWORK XXX FT	ROAD REPAIRS XXXX FT
ROAD CLOSED AT SH XXX	SHOULDER CLOSED XXX FT	FLAGGER XXXX FT	LANE NARROWS XXXX FT
ROAD CLSD AT FM XXXX	RIGHT LN CLOSED XXX FT	RIGHT LN NARROWS XXXX FT	TWO-WAY TRAFFIC XX MILE
RIGHT X LANES CLOSED	RIGHT X LANES OPEN	MERGING TRAFFIC XXXX FT	CONST TRAFFIC XXX FT
CENTER LANE CLOSED	DAYTIME LANE CLOSURES	LOOSE GRAVEL XXXX FT	UNEVEN LANES XXXX FT
NIGHT LANE CLOSURES	I-XX SOUTH EXIT CLOSED	DETOUR X MILE	ROUGH ROAD XXXX FT
VARIOUS LANES CLOSED	EXIT XXX CLOSED X MILE	ROADWORK PAST SH XXXX	ROADWORK NEXT FRI-SUN
EXIT CLOSED	RIGHT LN TO BE CLOSED	BUMP XXXX FT	US XXX EXIT X MILES
MALL DRIVEWAY CLOSED	X LANES CLOSED TUE - FRI	TRAFFIC SIGNAL XXXX FT	LANES SHIFT *
XXXXXXXX BLVD CLOSED			

* LANES SHIFT in Phase 1 must be used with STAY IN LANE in Phase 2.

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List		Location List	Warning List	** Advance Notice List
MERGE RIGHT	FORM X LINES RIGHT	AT FM XXXX	SPEED LIMIT XX MPH	TUE-FRI XX AM- X PM
DETOUR NEXT X EXITS	USE XXXXX RD EXIT	BEFORE RAILROAD CROSSING	MAXIMUM SPEED XX MPH	APR XX-XX X PM-X AM
USE EXIT XXX	USE EXIT I-XX NORTH	NEXT X MILES	MINIMUM SPEED XX MPH	BEGINS MONDAY
STAY ON US XXX SOUTH	USE I-XX E TO I-XX N	PAST US XXX EXIT	ADVISORY SPEED XX MPH	BEGINS MAY XX
TRUCKS USE US XXX N	WATCH FOR TRUCKS	XXXXXXX TO XXXXXXX	RIGHT LANE EXIT	MAY X-X XX PM - XX AM
WATCH FOR TRUCKS	EXPECT DELAYS	US XXX TO FM XXXX	USE CAUTION	NEXT FRI-SUN
EXPECT DELAYS	PREPARE TO STOP		DRIVE SAFELY	XX AM TO XX PM
REDUCE SPEED XXX FT	END SHOULDER USE		DRIVE WITH CARE	NEXT TUE AUG XX
USE OTHER ROUTES	WATCH FOR WORKERS			TONIGHT XX PM- XX AM
STAY IN LANE *				

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

1. Only 1 or 2 phases are to be used on a PCMS.
2. The 1st phase (or both) should be selected from the "Road/Lane/Ramp Closure List" and the "Other Condition List".
3. A 2nd phase can be selected from the "Action to Take/Effect on Travel List", "Location List", "Warning List", or "Advance Notice List".
4. A Location Phase is necessary only if a distance or location is not included in the first phase selected.
5. If two PCMS are used in sequence, they must be separated by a minimum of 1,000 ft. Each PCMS shall be limited to two phases, and should be understandable by themselves.
6. For advance notice, when the current date is within seven days of the actual work date, calendar days should be replaced with days of the week. Advance notification should typically be for no more than one week prior to the work.

WORDING ALTERNATIVES

1. The words RIGHT, LEFT and ALL can be interchanged as appropriate.
2. Roadway designations IH, US, SH, FM and LP can be interchanged as appropriate.
3. EAST, WEST, NORTH and SOUTH (or abbreviations E, W, N and S) can be interchanged as appropriate.
4. Highway names and numbers replaced as appropriate.
5. ROAD, HIGHWAY and FREEWAY can be interchanged as needed.
6. AHEAD may be used instead of distances if necessary.
7. FT and MI, MILE and MILES interchanged as appropriate.
8. AT, BEFORE and PAST interchanged as needed.
9. Distances or AHEAD can be eliminated from the message if a location phase is used.

PCMS SIGNS WITHIN THE R.O.W. SHALL BE BEHIND GUARDRAIL OR CONCRETE BARRIER OR SHALL HAVE A MINIMUM OF FOUR (4) PLASTIC DRUMS PLACED PERPENDICULAR TO TRAFFIC ON THE UPSTREAM SIDE OF THE PCMS, WHEN EXPOSED TO ONE DIRECTION OF TRAFFIC. WHEN EXPOSED TO TWO WAY TRAFFIC, THE FOUR DRUMS SHOULD BE PLACED WITH ONE DRUM AT EACH OF THE FOUR CORNERS OF THE UNIT.

FULL MATRIX PCMS SIGNS

1. When full Matrix PCMS signs are used, the character height and legibility/visibility requirements shall be maintained as listed in Note 15 under "PORTABLE CHANGEABLE MESSAGE SIGNS" above.
2. When full matrix PCMS signs are used, the "Flagger Symbol" (CW20-7) approved for application on the Full Matrix PCMS sign and, with the approval of the Engineer, it shall maintain the legibility/visibility requirement listed above.
3. When symbol signs are represented graphically on the Full Matrix PCMS, they shall only supplement the use of the static sign represented, and shall not substitute for, or replace that sign.
4. A full matrix PCMS may be used to simulate a flashing arrow board provided it meets the visibility, flash rate and dimming requirements on BC(7), for the same size arrow.

SHEET 6 OF 12

Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

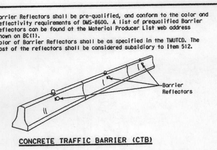
BC(6)-14

FILE:	bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002		CONT	SECT	JOB	HIGHWAY
REVISIONS					
9-07 8-14		DIST	COUNTY		SHEET NO.
7-13					

DISCLAIMER:
The use or copying 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 subsequent use of this standard or incompatibility of this standard with other standards.

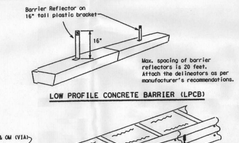
DATE: FILE:

1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of pre-qualified 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 cast of the reflectors shall be considered subsidiary to Item 512.

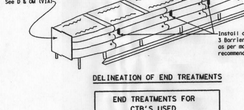


CONCRETE TRAFFIC BARRIER (CTB)

3. Where traffic is on one side of the CTB, two (2) Barrier Reflectors shall be mounted in approximately the middle section of CTB. An alternate mounting location shall be uniformly spaced at one end of each CTB. This will eliminate the placement of a barrier grapple without reflectorized protection. 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 lens (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 moving in the same direction, no barrier reflectors shall be placed on top of the CTB.
6. Barrier Reflector units shall be yellow or white in color to match lane 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.



LOW PROFILE CONCRETE BARRIER (LPCB)

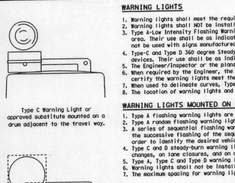


DELINEATION OF END TREATMENTS

END TREATMENTS FOR CTB'S USED IN WORK ZONES

End treatments used on CTB's in work zones shall meet crashworthy standards as defined in the National Cooperative Highway Research Report 350. Refer to the CMTED List for approved end treatments and manufacturers.

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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_G or C_G 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 latest ITE Purchase Specifications for Flashing and Steady-Burn Warning Lights, to certify the warning lights meet the requirements of the latest ITE Purchase Specifications.
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 a drum shall be as shown elsewhere in the plans.

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

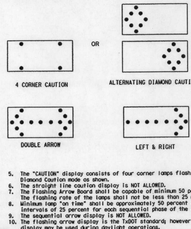
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing devices to form a merging taper may be used for delineation. If used, the successive flashing of the sequential warning lights in the merging taper shall 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, or 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. Type C 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, and is subsidiary to the channelizing devices.
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 CMTED.
3. The warning reflector shall have a minimum retroreflective surface area lone-sided of 30 square inches.
4. Round reflectors shall be fully reflective discs, 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 is attached to the drum.
6. The sides of the warning reflector facing approaching traffic shall have sheeting meeting the color and retroreflectivity requirements for Type A-500-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 hahdle 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.
8. The flashing rate of the lamps shall not be less than 25 nor more than 40 flashes per minute.
9. 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.
10. The Flashing Arrow Board shall be NEMA TS-1.
11. The Flashing Arrow Display is the TxDOT standard; however, the sequential Chevron display may be used during daylight operations.
12. The Flashing Arrow Board shall be mounted on a vehicle, trailer or other suitable support.
13. A Flashing Arrow Board SHALL NOT BE USED to laterally shift traffic.
14. 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.
15. Minimum mounting height of trailer mounted Arrow Boards should be 7 feet from roadway to bottom of panel.

REQUIREMENTS			
TYPE	MINIMUM SIZE	MINIMUM NUMBER OF PANEL LAMPS	MINIMUM VISIBILITY DISTANCE
B	30 x 60	13	3/4 mile
C	48 x 96	15	1 mile

ATTENTION
Flashing Arrow Boards shall be equipped with automatic dimming devices.

WHEN NOT IN USE, REMOVE THE ARROW BOARD FROM THE RIGHT-OF-WAY OR PLACE THE ARROW BOARD BEHIND CONCRETE TRAFFIC BARRIER OR GUARDRAIL.

FLASHING ARROW BOARDS

SHEET 7 OF 12

Texas Department of Transportation | Traffic Operations Division Standard

TRUCK-MOUNTED ATTENUATORS

1. Truck-mounted attenuators (TMA) used on TxDOT facilities must meet the requirements outlined in the National Cooperative Highway Research Report No. 350 (NCHRP 350) or the Manual for Assessing Safety Hardware (MASH).
2. Refer to the CMTED for the requirements of Level 2 or Level 3 TMA's.
3. Refer to the CMTED 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 area exposure without adversely affecting the work performance.
6. The only reason a TMA should not be required is when a work area is spread over the roadway and the work area is an extended distance from the TMA.

BARRICADE AND CONSTRUCTION ARROW PANEL, REFLECTORS, WARNING LIGHTS & ATTENUATOR

BC(7)-14

FILE:	bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002		CONT	SECT	JOB	HIGHWAY
REVISIONS					
9-07 8-14		DIST	COUNTY		SHEET NO.
7-13					

DISCLAIMER:
The use or copying 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 subsequent use of this standard or incompatibility of this standard with other standards.

DATE: FILE:

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. Drums may be replaced in tangent sections by vertical panels, cones, or 42" two-piece drums. In tangent sections where drums 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 devices 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" (CWTCD).
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:

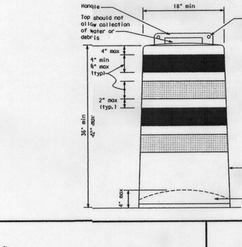
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted. The force required for a load of 20 lbf or greater that produces incidental separation due to normal highway wind 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 6 inches in width. Any non-reflective gap space between any two adjacent stripes shall not exceed 2 inches in width.
7. Drum bases shall have a maximum width of 36 inches, a minimum 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 minimum unballasted weight of 11 lbs.
10. Drum and base shall be marked with manufacturer's name and model number.

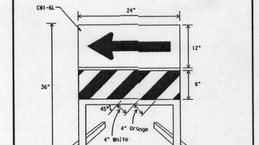
RETROREFLECTIVE SHEETING

1. The stripes used on drums shall be constructed of sheeting meeting the requirements of DMS-8300, Departmental Requirements or Departmental Materials Specification DMS-8300, "Sign Face Material." Only a reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall be applied to the drum so that when the drum surface touch 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

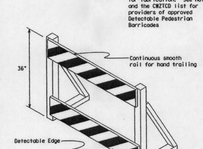
1. Unfastened bases shall be large enough to hold up to 50 lbs. of sand. This base, when filled with the ballast material, should weigh between 35 lbs. minimum and 50 lbs. maximum. The ballast may be sand in one to three sandbags separate from the base, sand in a sand-filled plastic base, or other ballasting 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 CMTED 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 ballast compartment that 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.





DIRECTION INDICATOR BARRICADE

1. The Direction Indicator Barricade may be used in tapers, transitions, and other areas where specific directional information is to be displayed.
2. If used, the Direction Indicator Barricade should be used in series to direct the driver through the transition and into the intended travel lane.
3. The Direction Indicator Barricade shall consist of One-Direction Large Arrow (CW1-6) sign in the sign shown with a black arrow on a background of Type B_G or Type C_G Orange retroreflective sheeting applied to a 24" x 48" panel. The arrow shall be oriented pointing 4" white and orange stripes slanting downward at an angle of 45 degrees in the direction road users are to pass. Sheeting types shall be as per DMS 8300.
4. Double arrows on the Direction Indicator Barricade will not be allowed.
5. Approved manufacturers are shown on the CMTED List. Ballast shall be as approved by the manufacturers instructions.



DETECTABLE PEDESTRIAN BARRICADES

1. When existing pedestrian facilities are disrupted, closed, or relocated by TTC zones, the temporary facilities shall be detectable and include accessibility features consistent with the features present in the existing pedestrian facility.
2. Where pedestrians with visual disabilities normally use the closed sidewalk, the temporary facility shall be provided with a detectable edging at the entrance of a long cane path that is placed across the full width of the closed sidewalk.
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 for Buildings and Facilities (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 may 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.

SHEET 8 OF 12

Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-14

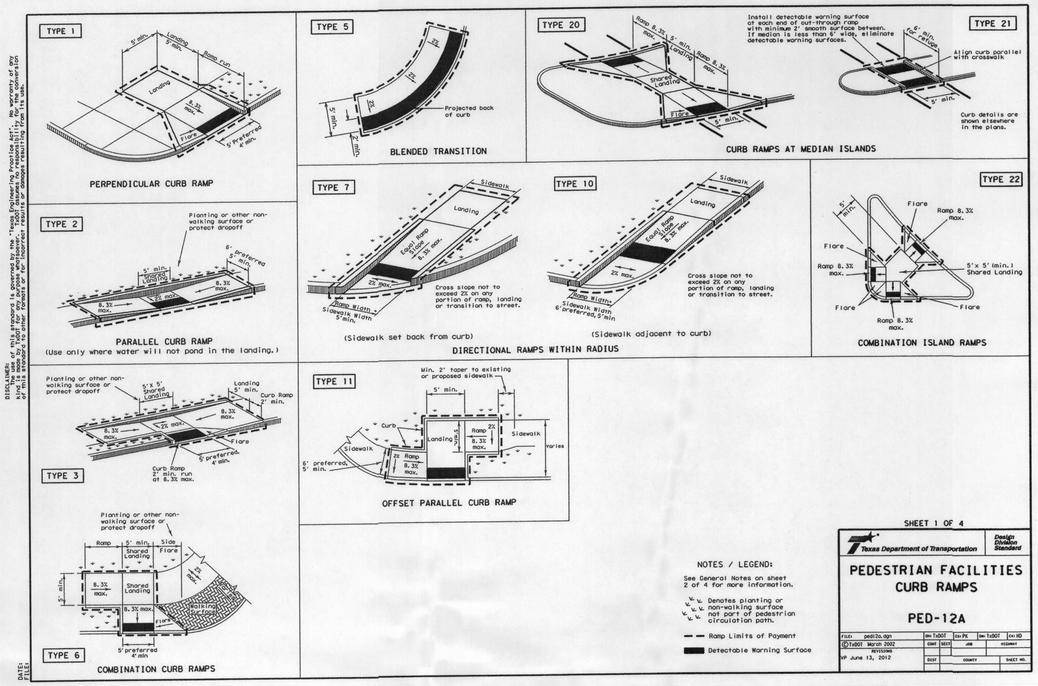
FILE:	bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002		CONT	SECT	JOB	HIGHWAY
REVISIONS					
4-03 7-13		DIST	COUNTY		SHEET NO.
9-07 8-14					

DISCLAIMER:
The use or copying 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 subsequent use of this standard or incompatibility of this standard with other standards.

DATE: FILE:

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

1. Signs used on plastic drums shall be manufactured using substrates listed on the CMTED.
2. Chevrons and other work zone signs with an orange background shall be manufactured with Type B_G or Type C_G 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 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 6 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



NOTES / LEGEND:

See General Notes on sheet 2 of 4 for more information.

Denotes planting or non-walking surface not part of pedestrian circulation path.

Ramp Limits of Payment

Detectable Warning Surface

SHEET 1 OF 4

Texas Department of Transportation — Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-12A

FILE:	ped12a.dgn		dw: TxDOT	ck: PE	dw: TxDOT	ck: HD
©TxDOT	March 2002		CONT	SECT	JOB	HIGHWAY
	REVISIONS					
VP	June 13, 2012		DIST	COUNTY		SHEET NO.

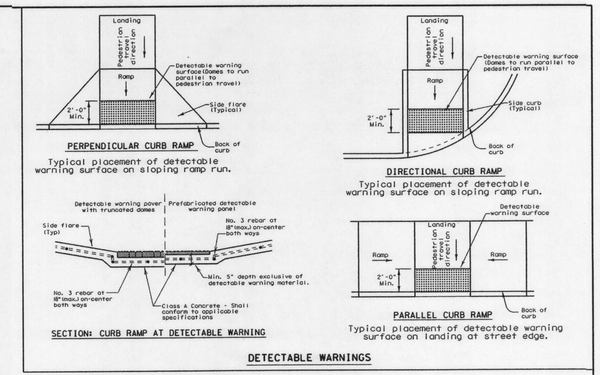
General Notes

Curb Ramps

1. Install a curb ramp or blended transition at each pedestrian street crossing.
2. All slopes shown are maximum allowable. Lesser slopes that will still drain properly should be used. Adjust curb ramp length or grade of approach sidewalks as directed.
3. The minimum sidewalk width is 5'. Where the sidewalk is adjacent to the back of curb, a 6' sidewalk width is desirable. Where a 5' sidewalk cannot be provided due to site constraints, sidewalk width may be reduced to 4' for short distances. 5'x 5' passing areas at intervals not to exceed 200' are required.
4. Landings shall be 5'x 5' minimum with a maximum 2% slope in any direction.
5. Maneuvering space at the bottom of curb ramps shall be a minimum of 4'x 4' wholly contained within the crosswalk and wholly outside the parallel vehicular travel path.
6. Maximum allowable cross slope on sidewalk and curb ramp surfaces is 2%.
7. Provide flared sides where the pedestrian circulation path crosses the curb ramp. Flared sides shall be sloped at 10% maximum, measured parallel to the curb. Returned curbs may be used only where pedestrians would not normally walk across the ramp, either because the adjacent surface is planted, substantially obstructed, or otherwise protected.
8. Additional information on curb ramp location, design, light reflective value and texture may be found in the current edition of the Texas Accessibility Standards (TAS) and 16 TAC 68.102.
9. To serve as a pedestrian refuge area, the median should be a minimum of 6' wide, measured from back of curbs. Medians should be designed to provide accessible passage over or through them.
10. Small channelization islands, which do not provide a minimum 5'x 5' landing at the top of curb ramps, shall be cut through level with the surface of the street.
11. Crosswalk dimensions, crosswalk markings and stop bar locations shall be as shown elsewhere in the plans. At intersections where crosswalk markings are not required, curb ramps shall align with theoretical crosswalks unless otherwise directed.
12. Handrails are not required on curb ramps. Provide curb ramps wherever an accessible route crosses (penetrates) a curb.
13. Curb ramps and landings shall be constructed and paid for in accordance with Item 531 "Sidewalks".
14. Place concrete at a minimum depth of 5" for ramps, flares and landings, unless otherwise directed.
15. Provide a smooth transition where the curb ramps connect to the street.
16. Curbs shown on sheet 1 within the limits of payment are considered part of the curb ramp for payment, whether it is concrete curb, gutter, or combined curb and gutter.
17. Existing features that comply with TAS may remain in place unless otherwise shown on the plans.

Detectable Warning Material

18. Curb ramps must contain a detectable warning surface that consists of raised truncated domes complying with Section 705 of the TAS. The surface must contrast visually with adjoining surfaces, including side flares. Furnish and install an approved cast-in-place dark brown or dark red detectable warning surface material adjacent to uncolored concrete, unless specified elsewhere in the plans.
19. Detectable Warning Materials must meet TxDOT Departmental Materials Specification DMS 4350 and be listed on the Material Producer List. Install products in accordance with manufacturer's specifications.
20. Detectable warning surfaces must be slip resistant and not allow water to accumulate.
21. Detectable warning surfaces shall be a minimum of 24" in depth in the direction of pedestrian travel, and extend the full width of the curb ramp or landing where the pedestrian access route enters the street.
22. Detectable warning surfaces shall be located so that the edge nearest the curb line is at the back of curb. Align the rows of domes to be perpendicular to the grade break between the ramp run and the street. Detectable warning surfaces may be curved along the corner radius.
23. Shaded areas on Sheet 1 of 4 indicate the approximate location for the detectable warning surface for each curb ramp type.



DETECTABLE WARNINGS

Detectable Warning Pavers

24. Furnish detectable warning paver units meeting all requirements of ASTM C-936, C-33. Lay in a two by two unit basket weave pattern or as directed.
25. Lay full-size units first followed by closure units consisting of at least 25 percent of a full unit. Cut detectable warning paver units using a power saw.

Sidewalks

26. Provide clear ground space at operable parts, including pedestrian push buttons. Operable parts shall be placed within one or more reach ranges specified in TAS 308.
27. Place traffic signal or illumination poles, ground boxes, controller boxes, signs, drainage facilities and other items so as not to obstruct the pedestrian access route or clear ground space.
28. Street grades and cross slopes shall be as shown elsewhere in the plans.
29. Changes in level greater than 1/4 inch are not permitted.
30. The least possible grade should be used to maximize accessibility. The running slope of sidewalks and crosswalks within the public right of way may follow the grade of the parallel roadway. Where a continuous grade greater than 5% must be provided, handrails may be desirable to improve accessibility. Handrails may also be needed to protect pedestrians from potentially hazardous conditions. If provided, handrails shall comply with TAS 505.
31. Handrail extensions shall not protrude into the usable landing area or into intersecting pedestrian routes.
32. Driveways and turnouts shall be constructed and paid for in accordance with Item "Intersections, Driveways and Turnouts". Sidewalks shall be constructed and paid for in accordance with Item, "Sidewalks".
33. Sidewalk details are shown elsewhere in the plans.

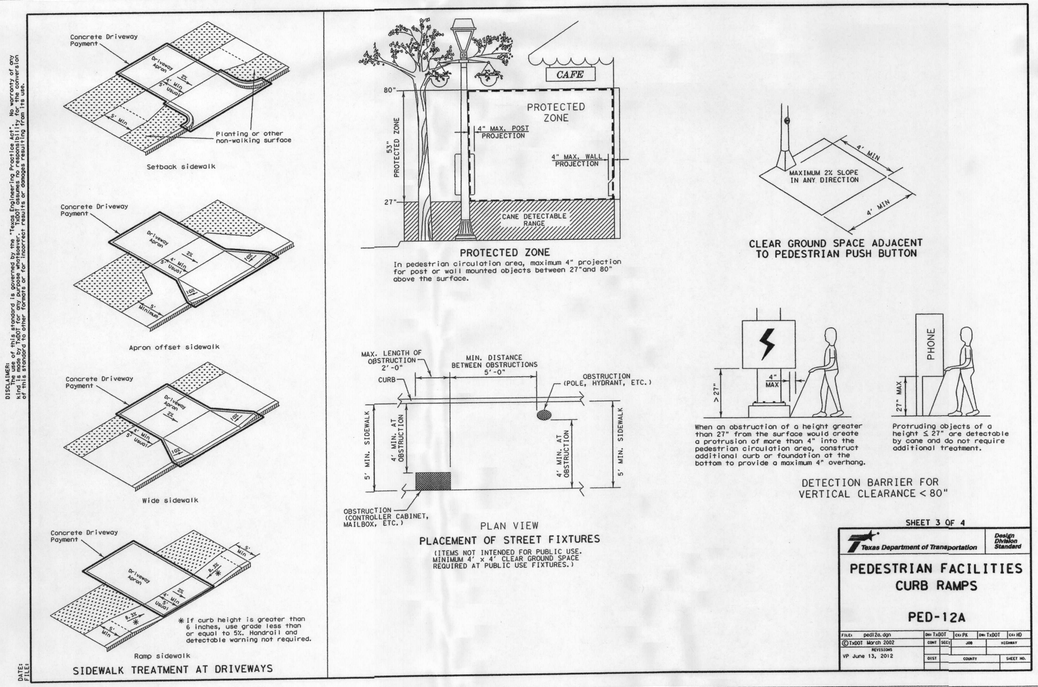
SHEET 2 OF 4

Texas Department of Transportation — Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-12A

FILE:	ped12a.dgn		dw: TxDOT	ck: PE	dw: TxDOT	ck: HD
©TxDOT	March 2002		CONT	SECT	JOB	HIGHWAY
	REVISIONS					
VP	June 13, 2012		DIST	COUNTY		SHEET NO.



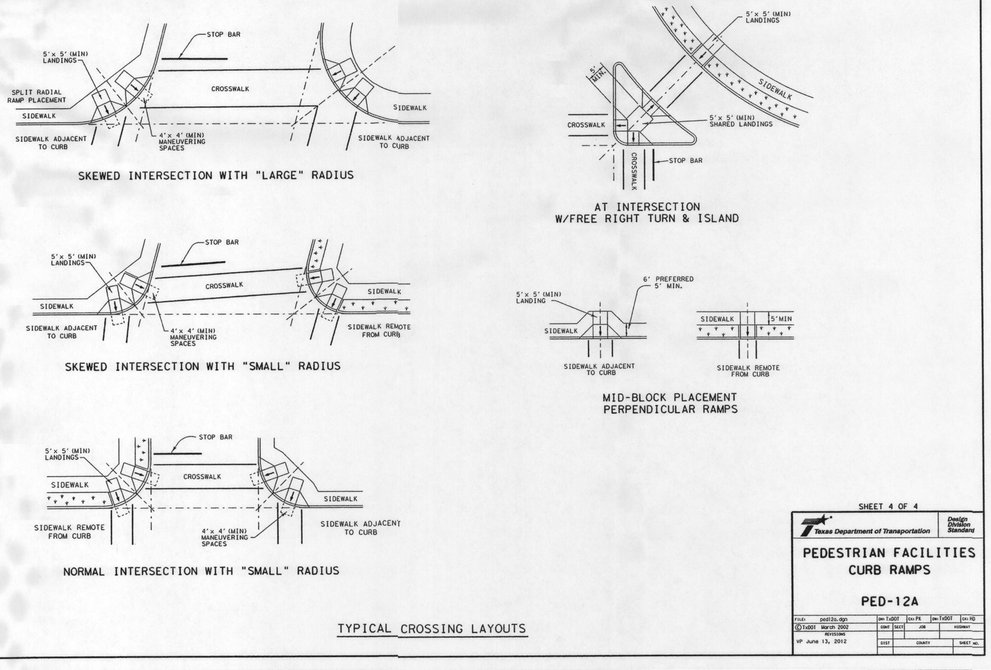
SHEET 3 OF 4

Texas Department of Transportation — Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-12A

FILE:	ped12a.dgn		dw: TxDOT	ck: PE	dw: TxDOT	ck: HD
©TxDOT	March 2002		CONT	SECT	JOB	HIGHWAY
	REVISIONS					
VP	June 13, 2012		DIST	COUNTY		SHEET NO.



SHEET 4 OF 4

Texas Department of Transportation — Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-12A

FILE:	ped12a.dgn		dw: TxDOT	ck: PE	dw: TxDOT	ck: HD
©TxDOT	March 2002		CONT	SECT	JOB	HIGHWAY
	REVISIONS					
VP	June 13, 2012		DIST	COUNTY		SHEET NO.

VICKREY & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION # F-159 TBPLS REGISTRATION # 10004100
1717 West 6th Street, Suite 260
Austin, Texas 78703
Phone: (512) 494-8014 Fax: (512) 494-8054

©2014

DATE	NO.	DESCRIPTION

TXDOT DETAIL SHEET 5

BROOKSHIRE BROTHERS, CANYON LAKE
18267 FM 306
CANYON LAKE, TX

DRAWN BY:	JTM
CHECKED BY:	JCM
APPROVED BY:	JCM
DATE:	09/15/2014

SHEET

C5.05

PROJ NO. 2540-001

Drawing: W:\2540-001\Engineering\DWG\sh...TxDOT details 2.dwg c5.05 TxDOT DETAIL SHEET 5
User: CHEDESON
Last Modified: Feb. 24, 15 - 15:40
Plot Date/Time: Feb. 26, 15 - 13:28:27

SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

SM RD SGN ASSM TY XXXXX(X)XX(X)-(XXXX)

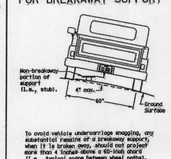
Post Type
- FRP = Fiberglass Reinforced Plastic Pipe (see SMD(FRP))
- TWT = Thin-Wall Tubing (see SMD(TWT))
- 10GA = 10 GA Tubing (see SMD(SLIP-1) to CSLIP-3))
- SCH = Schedule 80 Pipe (see SMD(SLIP-1) to CSLIP-3))

Number of Posts (1 or 2)

Anchor Type
- UA = Universal Anchor - Concreted (see SMD(FRP) and (TWT))
- DA = Direct Burial Anchor - Bolted Down (see SMD(FRP) and (TWT))
- YS = Wedge Anchor (Steel = Yoke SMD(TWT))
- WP = Wedge Anchor Plastic (see SMD(TWT))
- SA = Slipbase - Concreted (see SMD(SLIP-1) to CSLIP-3))
- SB = Slipbase - Bolted Down (see SMD(SLIP-1) to CSLIP-3))

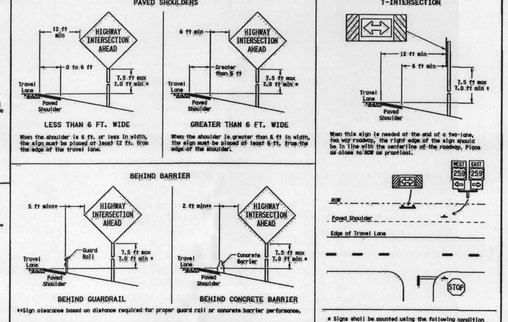
Sign Mounting Designation
- P = Prefab. "Patch" (see SMD(SLIP-1) to CSLIP-3), (TWT), (FRP))
- T = Prefab. "T" (see SMD(SLIP-1) to CSLIP-3), (TWT))
- U = Prefab. "U" (see SMD(SLIP-1) to CSLIP-3))
- (Blank) = Universal
- 1EXT, 2EXT = Number of Extensions (see SMD(SLIP-1) to CSLIP-3), (TWT))
- BW = Extruded Wind Beam (see SMD(SLIP-1) to CSLIP-3))
- WC = 1.12 W/FT Wing Channel (see SMD(SLIP-1) to CSLIP-3))
- EXAL = Extruded Aluminum Sign Panels (see SMD(SLIP-3))

REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



To avoid vehicle undercarriage snagging, any substantial remains of breakaway supports when cut off at ground level, should not project more than 4 inches above a 60-inch chord (i.e., typical space between wheel pathes).

SIGN LOCATION



- * Signs shall be mounted using the following condition that results in the greatest sign elevation:
  - (1) a minimum of 7 ft to a maximum of 7.5 feet above the edge of the travel lane or
  - (2) a minimum of 7 ft to a maximum of 7.5 feet above the grade of the base of the support when sign is installed on the backslope.

The maximum values may be increased when directed by the Engineer.

See the Traffic Operations Division website for detailed drawings of sign clamps, Triangular Slipbase System components and Wedge Anchor System components.

The website address is:
http://www.txdot.gov/publications/traffic.htm

Right-of-way restrictions may be created by rocks, water, vegetation, fences, buildings, a narrow island, or other reasons.

In situations where a lateral restriction prevents the minimum horizontal clearance from the edge of the travel lane, signs should be placed as far from the travel lane as practical.

*** Post may be shorter if protected by guardrail or if Engineer determines the post could not be hit due to entrance angles.

SIGN SUPPORT DESCRIPTIVE CODES (duplicate)

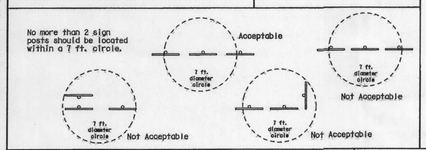
SM RD SGN ASSM TY XXXXX(X)XX(X)-(XXXX)

Post Type
- FRP = Fiberglass Reinforced Plastic Pipe (see SMD(FRP))
- TWT = Thin-Wall Tubing (see SMD(SLIP-1) to CSLIP-3))
- 10GA = 10 GA Tubing (see SMD(SLIP-1) to CSLIP-3))
- SCH = Schedule 80 Pipe (see SMD(SLIP-1) to CSLIP-3))

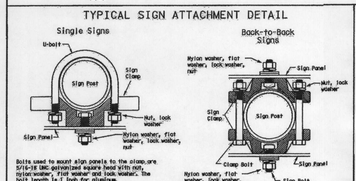
Number of Posts (1 or 2)

Anchor Type
- UA = Universal Anchor - Concreted (see SMD(FRP) and (TWT))
- DA = Direct Burial Anchor - Bolted Down (see SMD(FRP) and (TWT))
- YS = Wedge Anchor (Steel = Yoke SMD(TWT))
- WP = Wedge Anchor Plastic (see SMD(TWT))
- SA = Slipbase - Concreted (see SMD(SLIP-1) to CSLIP-3))
- SB = Slipbase - Bolted Down (see SMD(SLIP-1) to CSLIP-3))

Sign Mounting Designation
- P = Prefab. "Patch" (see SMD(SLIP-1) to CSLIP-3), (TWT), (FRP))
- T = Prefab. "T" (see SMD(SLIP-1) to CSLIP-3), (TWT))
- U = Prefab. "U" (see SMD(SLIP-1) to CSLIP-3))
- (Blank) = Universal
- 1EXT, 2EXT = Number of Extensions (see SMD(SLIP-1) to CSLIP-3), (TWT))
- BW = Extruded Wind Beam (see SMD(SLIP-1) to CSLIP-3))
- WC = 1.12 W/FT Wing Channel (see SMD(SLIP-1) to CSLIP-3))
- EXAL = Extruded Aluminum Sign Panels (see SMD(SLIP-3))



TYPICAL SIGN ATTACHMENT DETAIL



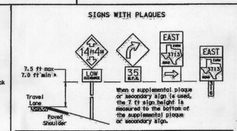
Bolts used to mount sign panels to the clamps are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

When two sign clamps are used to mount signs back-to-back, use a 5/16-18 self-galvanized hex head bolt, nut, flat washer and self-galvanizing lock washer. The approximate bolt lengths for various post sizes and sign clamp types are given in the table at right. The bolt length may need to be adjusted depending upon field conditions.

Sign clamps may be either the specific size clamp or the universal clamp.

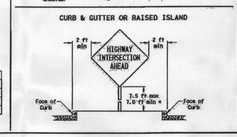
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



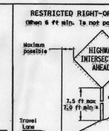
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



RESTRICTED RIGHT-OF-WAY

(When 6 ft min. is not possible.)



Right-of-way restrictions may be created by rocks, water, vegetation, fences, buildings, a narrow island, or other reasons.

In situations where a lateral restriction prevents the minimum horizontal clearance from the edge of the travel lane, signs should be placed as far from the travel lane as practical.

*** Post may be shorter if protected by guardrail or if Engineer determines the post could not be hit due to entrance angles.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
GENERAL NOTES & DETAILS

SMD (GEN)-08

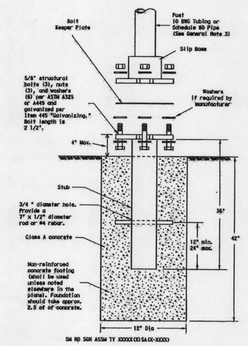
©TxDOT July 2002	Tex-784M	Tex-785M	Tex-786M	Tex-788M
9-08 REVISIONS	DIST. COUNTY			ROADWAY
				SHEET NO.

26A

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 accuracy or suitability of this standard for other than its intended purpose or for incorrect results or for its misuse in connection with any project. When conflicts arise between this standard and project plans, the project plans govern.

DATED: 2/1/13

TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS

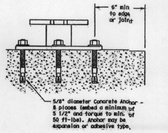


SM RD SGN ASSM TY XXXXX(1)SA(T)-XXXX

NOTE

There are various devices approved for the Triangular Slipbase System. Please reference the Material Producer List for approved slip base systems. http://www.txdot.gov/business/producer_list.htm The devices shall be installed per manufacturers' recommendations. Installation procedures shall be provided to the Engineer by Contractor.

CONCRETE ANCHOR



SM RD SGN ASSM TY XXXXX(1)SA(X)-XXXX

Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. Heavy hex nut per ASTM A563, and hardened washer per ASTM F436. The stud bolt shall be a minimum of 316 stainless steel, or high strength 316 stainless steel per ASTM A193, Grade B8M. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Adhesive type anchors shall have stud bolts installed with Type III epoxy per DMS-6100, "Epoxies and Adhesives." Adhesive anchors shall be installed per concrete epoxy manufacturer's recommendations. Top of bolt shall extend at least flush with top of the nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 5 1/2" minimum embedment, shall have a minimum allowable tension and shear of 3900 and 3100 pst, respectively.

GENERAL NOTES:

1. Slip base shall be permanently marked to indicate manufacturer, method, design, and location of marking are subject to approval of the TxDOT Traffic Standards Engineer.
2. Material used on post with this system shall conform to the following specifications:
   - 10 BWG Tubing (2.625" outside diameter)
     - Steel tubing per ASTM A500 Gr C
     - Stainless or electric-resistance welded steel tubing or pipe
     - Steel shall be ASLAS Gr 55 per ASTM A1011 or ASTM A1008
     - Other steels may be used if they meet the following:
       - 55,000 PSI minimum yield strength
       - 70,000 PSI minimum tensile strength
       - 20E minimum elongation in 2"
     - Wall thickness (uncoated) shall be within the range of 0.122" to 0.138"
     - Outside diameter (uncoated) shall be within the range of 2.863" to 2.883"
     - Galvanize per Item 445, ASTM A653 G210, for preached steel tubing (ASTM A653), reseed hole outside diameter and clean by swabbing with zinc rich per ASTM A633.
   - Schedule 80 Pipe (2.875" outside diameter)
     - 0.276" nominal wall thickness
     - Steel tubing per ASTM A500 Gr C
     - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
       - 46,000 PSI minimum yield strength
       - 60,000 PSI minimum tensile strength
       - 20E minimum elongation in 2"
     - Wall thickness (uncoated) shall be within the range of 0.249" to 0.304"
     - Outside diameter (uncoated) shall be within the range of 2.855" to 2.895"
     - Galvanized per ASTM A123
3. See the Traffic Operations Division website for detailed drawings of sign clamps and Texas Universal Triangular Slipbase System components. The website address is: http://www.txdot.gov/publications/traffic.htm
4. Sign supports shall not be spliced where shown. Sign support posts shall not be spliced.

ASSEMBLY PROCEDURE

Foundation
1. Prepare 12-inch diameter by 42-inch deep hole. If solid rock is encountered, the depth of the foundation may be reduced such that it is embedded a minimum of 18 inches into the solid rock.
2. The Engineer may permit batches of concrete less than 2 cubic yards to be mixed with a portable, motor-driven concrete mixer, for small placements less than 0.5 cubic yards, hand-mixing in a suitable container may be allowed by Engineer. Concrete shall be Class A.
3. Push the pipe end of the slip base stub into the center of the concrete. Rotate the stub back and forth to work the concrete into the corrugations. Fill the annular space between the concrete and stub. Continue to work the stub into the concrete until it is approximately 4 inches into the ground.
4. Plumb the stub. Allow a minimum of 4 days to set, unless otherwise directed by the Engineer.
5. The triangular slipbase system is multidirectional and is designed to release when struck from any direction.

Support
1. Cut support so that the bottom of the sign will be 7 to 7.5 feet above the edge of the roadway (i.e., edge of the closest lane) when slip plate is below the edge of pavement or 7 to 7.5 feet above the ground line when the slip plate is above the edge of the roadway. The cut shall be plumb and straight.
2. Attach sign to support using connections shown. When multiple signs are installed on the same support, ensure the minimum clearance between each sign is maintained. See SMD(SLIP-2) for clearances based on sign types.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM

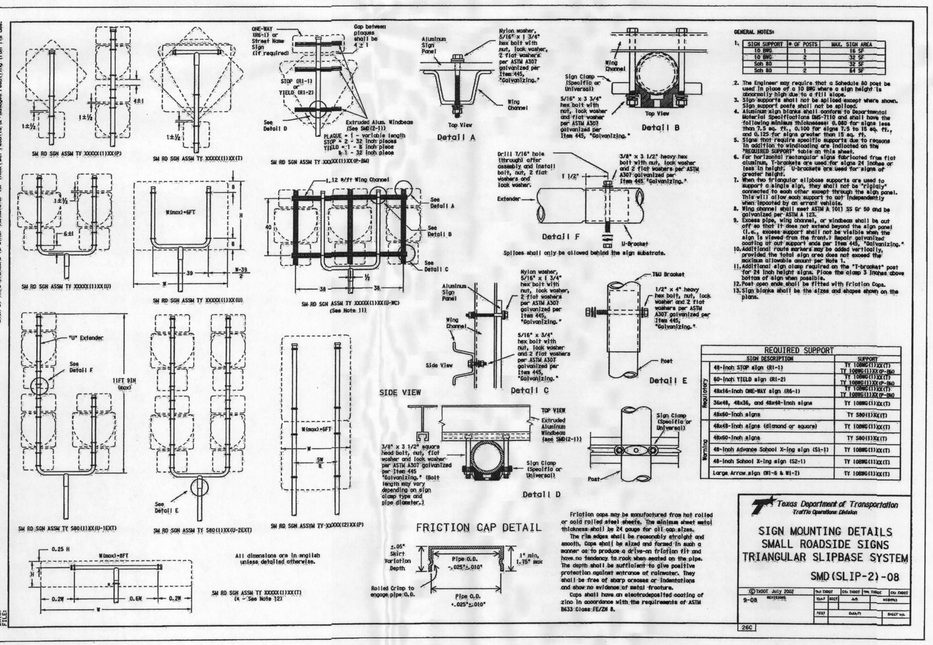
SMD(SLIP-1)-08

©TxDOT July 2002	Tex-784M	Tex-785M	Tex-786M	Tex-788M
9-08 REVISIONS	DIST. COUNTY			ROADWAY
				SHEET NO.

25B

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 accuracy or suitability of this standard for other than its intended purpose or for incorrect results or for its misuse in connection with any project. When conflicts arise between this standard and project plans, the project plans govern.

DATED: 2/1/13



GENERAL NOTES:

SIGN SUPPORT	NO. OF POSTS	MAX. SIGN AREA
10 BWG	1	15 SF
10 BWG	2	30 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is considered to be in excess of 15 ft.
3. Slip base/stub shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Department material specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 in. for signs less than 7.5 sq. ft. in area; 0.100 in. for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require acsorbtive supports due to requests in addition to windloading are indicated on the Plan Summary of Support table on this sheet.
6. For horizontal mounting of signs, the Contractor may flip flat sheeting, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "staggered" (i.e., one sign post shall not be ahead of the other). This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Sign panels, sheeting, and/or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Apply galvanized coating or cut support ends per Item 445, "Galvanizing."
10. Additional sign clamps may be added vertically or horizontally to the standard as long as the maximum allowable moment per clamp does not exceed the maximum allowable moment per Table 1.
11. Additional sign clamp required on the "T-bracket" post for 24 inch height signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.
13. Slip blades shall be the sizes and shapes shown on the plans.

REQUIRED SUPPORT	
SIGN DESCRIPTION	SUPPORT
48-inch STOP sign (R1-1)	TY 10BWG(1)SA(T) TY 10BWG(1)SB(P-BW)
60-inch YIELD sign (R1-2)	TY 10BWG(1)SA(T) TY 10BWG(1)SB(P-BW)
48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)SA(T) TY 10BWG(1)SB(P-BW)
36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)SA(T)
48x60-inch signs	TY SCH(1)SX(T)
48x48-inch signs (diamond or square)	TY 10BWG(1)SX(T)
48x60-inch signs	TY SCH(1)SX(T)
48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)SX(T)
48-inch School X-ing sign (S2-1)	TY 10BWG(1)SX(T)
Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)SX(T)

Reinforcing / Working

FRICTION CAP DETAIL

Friction caps may be manufactured from hot rolled or cold rolled steel sheets. The minimum sheet metal thickness shall be 24 gauge for all cap sizes.

The rim edges shall be reasonably straight and smooth. Caps shall be sized and formed in such a manner as to produce a drive-on friction fit and have no tendency to rock when seated on the pipe. The depth shall be sufficient to give positive protection against entrance of rainwater. They shall be free of sharp recesses or indentations and show no evidence of metal fracture.

Caps shall have an electrodeposited coating of zinc in accordance with the requirements of ASTM B633 Class Fe/Zn 8.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-2)-08

©TxDOT July 2002	Tex-784M	Tex-785M	Tex-786M	Tex-788M
9-08 REVISIONS	DIST. COUNTY			ROADWAY
				SHEET NO.

26C

DATE	NO.	DESCRIPTION

VICKREY & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION # F-159 TBPLS REGISTRATION # 10004500
1717 West 6th Street, Suite 260
Austin,Texas 78703
Phone: (512) 494-8014 Fax: (512) 494-8054

©2014

TXDOT DETAIL SHEET 6

BROOKSHIRE BROTHERS, CANYON LAKE
18267 FM 306
CANYON LAKE, TX

DRAWN BY:	JTM
CHECKED BY:	JCM
APPROVED BY:	JCM
DATE:	09/15/2014

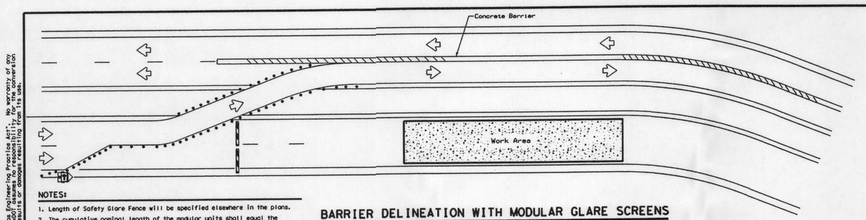
SHEET
C5.06

PROJ NO. 2540-001

Drawing: W:\2540-001\Engineering\DWG\sh_TxDOT details 2-way CS5.06 TxDOT DETAIL SHEET 6
User: CPEDERSON
Last Modified: Feb. 24, 15 - 15:40
Xref Drawings: Feb. 20, 15 - 13:26:16

DISCLAIMER:
The use and application 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 media by other parties from its original form. The user agrees to indemnify TxDOT from all claims arising from the use of this standard.

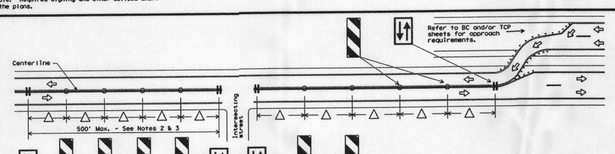
DATE:
FILE: wzsd-13.dgn



BARRIER DELINEATION WITH MODULAR GLARE SCREENS

LEGEND	
	Type 3 Barricade
	Channelizing Devices
	Trailer Mounted Flashing Arrow Board
	Sign
	Safety glare fence

NOTES:
1. Length of Safety Glare Fence will be specified elsewhere in the plans.
2. The cumulative nominal length of the modular units shall equal the length of the individual sections of temporary concrete traffic barrier on which they are installed so the joint between barrier sections will not be spanned by any one unit.
3. Panels/blades will be designed such that reflective sheeting conforming with Departmental Material Specification DMS-8300, Sign Face Materials, Type B or C Yellow, minimum size of 2 inches by 12 inches can be attached to the edge of the panel/blade. The sheeting shall be attached to one panel/blade per section of concrete barrier not to exceed a spacing of 30 feet. Barrier reflectors are not necessary when panels/blades are installed with reflective sheeting as described.
4. Payment for these devices will be under statewide Special Specification "Modular Glare Screens for Headlight Barrier."
5. This detail is only intended to show types of locations where Glare Screens would be appropriate. Required signing and other devices shall be as shown elsewhere in the plans.



VERTICAL PANELS & OPPOSING TRAFFIC LANE DIVIDERS (OTLD) SEPARATING TWO-WAY TRAFFIC ON NORMALLY DIVIDED HIGHWAYS

NOTES:
1. When two-lane, two way traffic control must be maintained on one roadway of a normally divided highway, opposing traffic shall be separated with either temporary traffic barriers, channelizing devices, or a temporary raised island throughout the length of the two way operation. The above Typical Application is intended to show the appropriate application of channelizing devices when they are used for this purpose. This is not a traffic control plan. If this detail is to be used for other types of roads or applications, those locations should be stated elsewhere in the plans.
2. △ Space devices according to the Tangent Spacing shown on the Device Spacing table on BC(9) but not exceeding 100'.
3. Every fifth device should be an OTLD except when spaced closer to accomodate an intersection. An OTLD should be the first device on each side of intersecting streets or roads.
4. Locations where surface mount bases with adhesives or self-righting devices will be required in order to maintain them in their proper position should be noted elsewhere in the plans.

DEPARTMENTAL MATERIAL SPECIFICATIONS	
SIGN FACE MATERIALS	DMS-8300
DELINEATORS AND OBJECT MARKERS	DMS-8600
MODULAR GLARE SCREENS FOR HEADLIGHT BARRIER	DMS-8610

Only pre-qualified products shall be used. A copy of the "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources and may be found at the following web address:
http://www.txdot.gov/txdot_library/publications/construction.htm

Texas Department of Transportation — Traffic Operations Division Standard

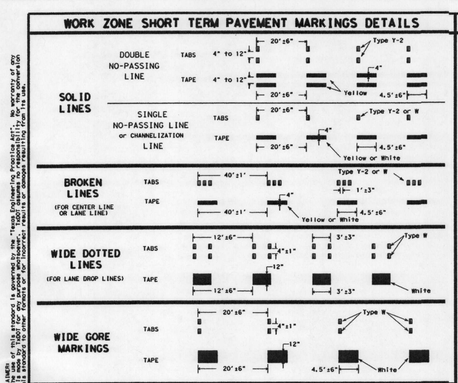
TRAFFIC CONTROL PLAN TYPICAL DETAILS

WZ(TD)-13

FILE:	wztd-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS					
4-98		DIST	COUNTY		SHEET NO.
3-03					
7-13					

113

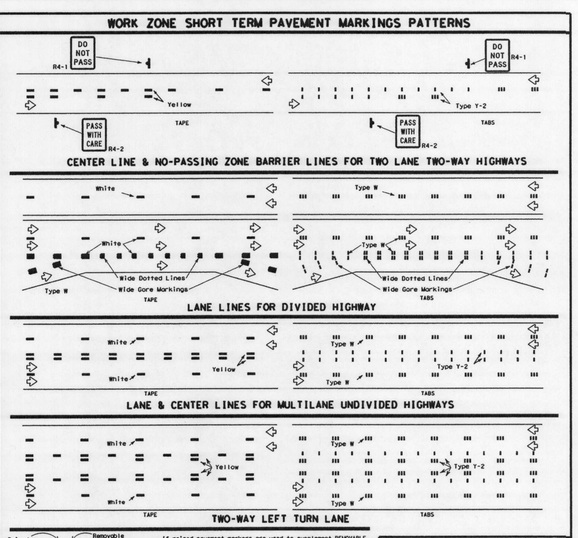
WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS



NOTES:
1. Short term pavement markings may be prefabricated markings (stick down tape) or temporary flexible-reflective roadway marker tabs unless otherwise specified elsewhere in plans.
2. Short term pavement markings shall NOT be used to simulate edge lines.
3. Dimensions indicated on this sheet are typical and approximate. Variations in size and height may occur between markers or devices made by manufacturers, by as much as 1/4 inch, unless otherwise noted.
4. Temporary flexible-reflective roadway marker tabs will require normal maintenance replacement when used on roadways with an ADT per lane of up to 7500 vehicles with no more than 10% truck mix. When roadways exceed these values, additional maintenance replacement of devices should be planned.
5. No segment of roadway open to traffic shall remain without permanent pavement markings for a period greater than 14 calendar days. The Contractor will be responsible for maintaining short term pavement markings until permanent pavement markings are in place, then the Contractor is responsible for placement of permanent pavement markings. no segment of roadway shall remain without permanent pavement markings for a period greater than 14 calendar days unless weather conditions prohibit placement. Permanent pavement markings shall be placed as soon as weather permits.
6. For two lane, two-way roadways, DO NOT PASS signs shall be erected to mark the beginning of sections where passing is prohibited and PASS WITH CARE signs shall be erected to mark the beginning of sections where passing is permitted. Signs shall be in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) and may be used to indicate the limits of no-passing zones for up to 14 calendar days. Permanent pavement markings should then be placed.
7. For low volume two lane, two-way roadways of 4000 ADT or less, no-passing lines may be omitted when approved by the Engineer. DO NOT PASS and PASS WITH CARE signs shall be erected (see note 6).
8. For exit gores where a lane is being dropped place wide gore markings or retroreflective channelizing devices to guide motorist through the exit. If channelizing devices are to be used it should be noted elsewhere in the plans. One piece cones are not allowed for this purpose.

TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)
1. Temporary flexible-reflective roadway marker tabs detailed on this sheet will be designated Type Y-2 (two amber reflective surfaces with yellow body), Type Y (one amber reflective surface with yellow body), and Type W (one white or silver reflective surface with white body). Additional details may be found on BC(11).
2. Tabs shall meet requirements of Departmental Material Specification DMS-8242.
3. When dry, tabs shall be visible for a minimum distance of 200 feet during normal daylight hours and when illuminated by automobile low-beam head light at night, unless sight distance is restricted by roadway geometrics.
4. No two consecutive tabs nor four tabs per 1000 feet of line shall be missing or fail to meet the visual performance requirements of Note 3.

WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



Raised Pavement Marker — Removable Short Term Pavement Marking (tape)

If raised pavement markers are used to supplement REMOVABLE short term markings, the markers shall be applied to the top of the tape at the approximate mid length of the tape. This allows an easier removal of raised markers and tape.

PREFABRICATED PAVEMENT MARKINGS
1. Temporary Removable Prefabricated Pavement Markings shall meet the requirements of DMS-8241.
2. Non-removable Prefabricated Pavement Markings shall meet the requirements of either DMS-8240 "Permanent Prefabricated Pavement Markings" or DMS-8243 "Temporary Contruction-Grade Prefabricated Pavement Markings."

RAISED PAVEMENT MARKERS
1. All raised pavement markers used for work zone markings shall meet the requirements of Item 672, "RAISED PAVEMENT MARKERS" and DMS-4200.

DEPARTMENTAL MATERIAL SPECIFICATIONS (DMS) & MATERIAL PRODUCER LISTS (MPL)
1. DMSs referenced above can be found along with embedded links to their respective MPLs at the following website:
http://www.txdot.gov/business/contractors_consultants/material_specifications/default.htm

Texas Department of Transportation — Traffic Operations Division Standard

WORK ZONE SHORT TERM PAVEMENT MARKINGS

WZ(STPM)-13

FILE:	wzstpm-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	April 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS					
1-97		DIST	COUNTY		SHEET NO.
3-03					
7-13					

111

©2014

NO.	DESCRIPTION	DATE

VICKREY & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION # F-159 TBPLS REGISTRATION # 10004100
1717 West 6th Street, Suite 260
Austin, Texas 78703
Phone: (512) 494-8014 Fax: (512) 494-8054

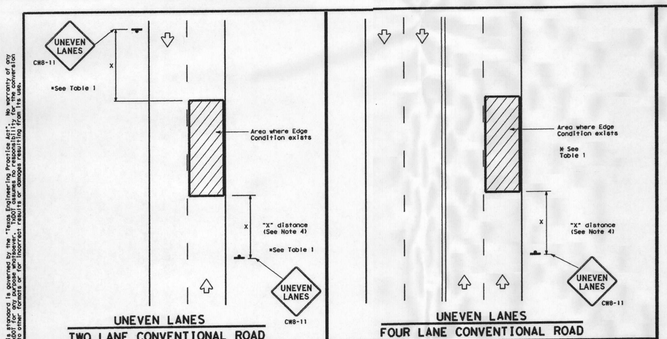
TXDOT DETAIL SHEET 7

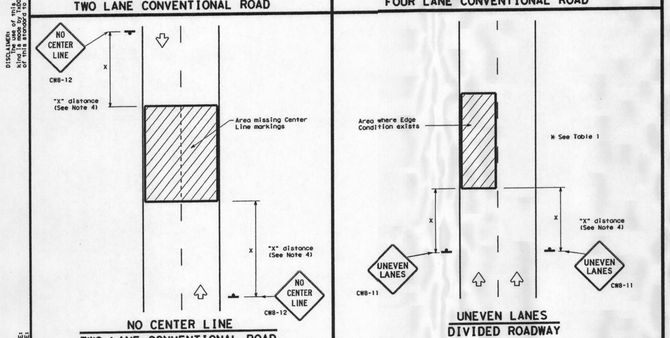
BROOKSHIRE BROTHERS, CANYON LAKE
18267 FM 306
CANYON LAKE, TX

DRAWN BY:	JTM
CHECKED BY:	JCM
APPROVED BY:	JCM
DATE:	09/15/2014
SHEET	C5.07
PROJ NO.	2540–001

DISCLAIMER:
The use and application 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 media by other parties from its original form. The user agrees to indemnify TxDOT from all claims arising from the use of this standard.

DATE:
FILE: wzsd-13.dgn





DEPARTMENTAL MATERIAL SPECIFICATIONS	
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY (REMOVABLE) PREFABRICATED PAVEMENT MARKINGS	DMS-8241
SIGN FACE MATERIALS	DMS-8300

COLOR	USAGE	SHEETING MATERIAL
ORANGE	BACKGROUND	TYPE B_{FL} OR TYPE C_{FL} SHEETING
BLACK	LEGEND & BORDERS	ACRYLIC NON-REFLECTIVE SHEETING

GENERAL NOTES

1. If spalling or holes occur, ROUGH ROAD (CWB-8) signs should be placed in advance of the condition and repeated every two miles where the condition persists.
2. UNEVEN LANES (CWB-11) signs shall be installed in advance of the condition and repeated every mile. Signs installed along the uneven lane condition may be supplemented with the NEXT XX MILES (CWT-3aP) plaque or Advisory Speed (CWB-13P1) plaque.
3. NO CENTER LINE (CWB-12) signs and temporary pavement markings as per the MUTCD(PM) standard shall be installed if yellow centerlines separating two way traffic are obscured or obliterated. Repeat NO CENTER LINE signs every two miles where the center line markings are not in place. The signs and markings shall remain in place until permanent pavement markings are installed.
4. Signs shall be spaced at the distances recommended as per BC standards.
5. Additional signs may be required as directed by the Engineer. Signs shall remain in place until final surface is applied. Signs shall be considered subsidiary to Item 502 "BARRICADES, SIGNS AND TRAFFIC HANDLING."
6. Signs shall be fabricated and mounted on supports as shown on the BC standards and/or listed on the "Compliant Work Zone Traffic Control Devices" list.
7. Short term markings shall not be used to simulate edge lines.
8. All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition.

TABLE 1

Edge Condition	Edge Height (D)	X Warning Devices
①	Less than or equal to 1½" (maximum-planing) 1½" (typical-overlay)	Signs CWB-11
②	Distance "D" may be a maximum of 1 1/4 " for planing operations and 2" for overlay operations if uneven lanes with edge condition 1 are open to traffic after work operations cease.	
③	Less than or equal to 3"	Signs CWB-11
③ Notched Wedge Joint	Distance "D" may be a maximum of 3" if uneven lanes with edge condition 2 or 3 are open to traffic after work operations cease. Uneven lanes should not be open to traffic when "D" is greater than 3".	

TRAFFIC CONTROL DURING PLANING, OVERLAY AND LEVELING OPERATIONS ARE SHOWN ELSEWHERE IN THE PLANS.

MINIMUM WARNING SIGN SIZE	
Conventional roads	36" x 36"
Freeways/expressways, divided roadways	48" x 48"

Texas Department of Transportation — Traffic Operations Division Standard

SIGNING FOR UNEVEN LANES

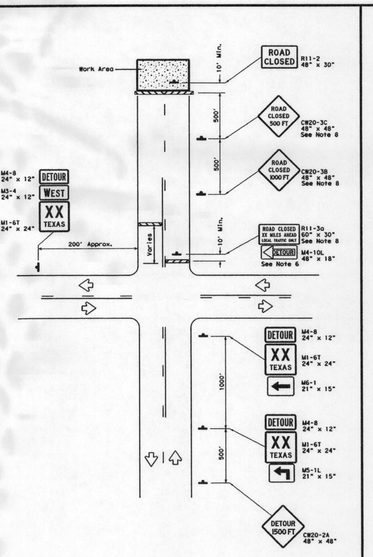
WZ(UL)-13

FILE:	wzul-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	April 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS					
8-95	2-98 7-13	DIST	COUNTY		SHEET NO.
1-97	3-03				

112

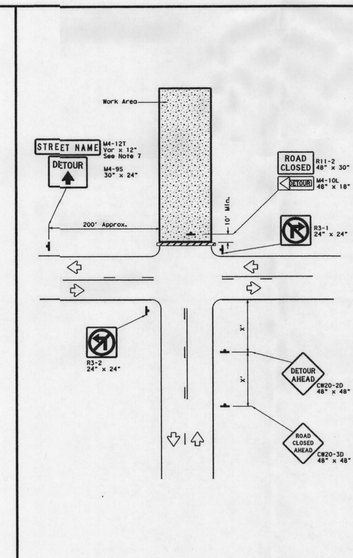
DISCLAIMER:
The use and application of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this media by other parties from its original form. The user agrees to indemnify TxDOT from all claims arising from the use of this standard.

DATE:
FILE: wzrcd-13.dgn



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 M	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'

M 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 EBDM 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

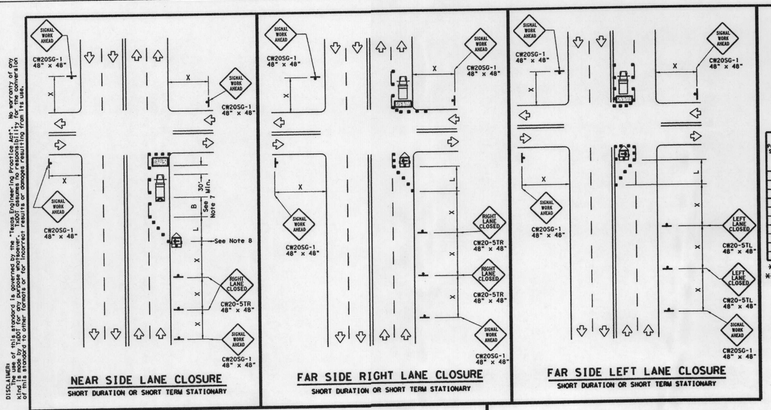
WORK ZONE ROAD CLOSURE DETAILS

WZ(RCD)-13

FILE:	wzrcd-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	August 1995	CONT	SECT	JOB	HIGHWAY
REVISIONS					
1-97	4-98 7-13	DIST	COUNTY		SHEET NO.
2-98	3-03				

113

Drawing: W:\2540-001\Engineering\DWG\sh_txdot details 3.dwg (25.07 TxDOT DETAIL SHEET 7
User Name: jmcmillan
Last Modified: Feb. 24, 15 – 15:50
Plot Date/Time: Feb. 26, 15 – 13:32:29



DISCLAIMER:
The use of this sequence 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 sequence to other formats or for incorrect results or damages resulting from its use.

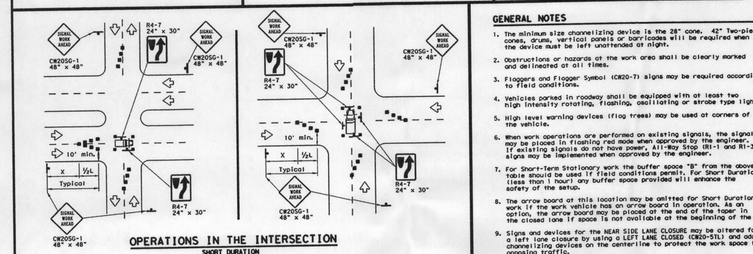
DATE/FILE:

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board		Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed	Formula	Minimum Desirable Taper Lengths M N			Suggested Maximum Spacing of Channelizing Devices		Minimum Sight Distance	Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent	"L"	
30		150'	165'	180'	30'	60'	120'	90'
35	L = WS / 60	205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45		450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55	L = WS	550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only
Min Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

WORKERS IN BUCKET TRUCKS SHALL NOT WORK ABOVE OPEN LANES OF TRAFFIC.



GENERAL NOTES

1. The minimum size channelizing device is the 28" cone. 42" Two-piece cones, drums, vertical panels or barricades will be required when the device must be left unattended at night.
2. Obstructions or hazards at the work area shall be clearly marked and delineated at all times.
3. Flaggers and Flagger Symbol (CW20-7) signs may be required according to field conditions.
4. Vehicles parked in roadway shall be equipped with at least two high intensity rotating, flashing, oscillating or strobe type lights.
5. High level warning devices (flog trees) may be used at corners of the vehicle.
6. When work operations are performed on existing signals, the signals may be placed in flashing red mode when approved by the engineer. If existing signals do not have power, All-Way Stop (R1-1 and R1-3P) signs may be implemented when approved by the engineer.
7. For Short-Term Stationary work the buffer space "B" from the above table should be used if field conditions permit. For Short Duration less than 1 hour any buffer space provided will enhance the safety of the setup.
8. The arrow board at this location may be omitted for Short Duration work if the work vehicle has an arrow board in operation. As an option, the arrow board may be placed at the end of the taper in the closed lane if space is not available at the beginning of the taper.
9. Signs and devices for the NEAR SIDE LANE CLOSURE may be altered for a left lane closure by using a LEFT LANE CLOSED (CW20-5TL) and adding channelizing devices on the centerline to protect the work space from opposing traffic.

SHEET 1 OF 2

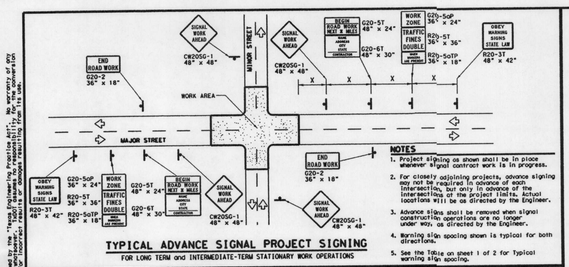
Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC SIGNAL WORK TYPICAL DETAILS

WZ(BTS-1)-13

FILE:	wzbts-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	April 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS					
2-98 10-99 7-13		DIST	COUNTY		SHEET NO.
4-98 3-03					

115

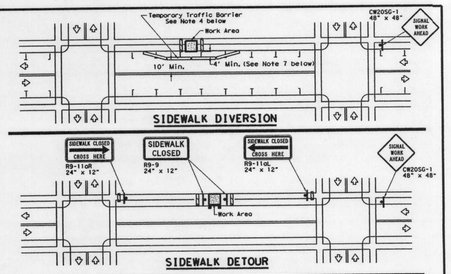


TYPICAL ADVANCE SIGNAL PROJECT SIGNING

FOR LONG TERM and INTERMEDIATE-TERM STATIONARY WORK OPERATIONS

NOTES

1. Project signing as shown shall be in place whenever signal control work is in progress.
2. For closely adjoining projects, advance signing may not be required in advance of the intersections or between the intersections on the project limits. Actual locations will be as directed by the Engineer.
3. Advance signs shall be removed when signal construction operations are no longer under way as directed by the Engineer.
4. Warning sign spacing shown is typical for both directions.
5. See the Table on sheet 1 of 2 for typical warning sign spacing.



GENERAL NOTES FOR WORK ZONE SIGNS

1. Signs shall be installed and maintained in a straight and plumb condition.
2. Wooden sign posts shall be painted white.
3. Barricades shall NOT be used as sign supports.
4. Nails shall NOT be used to attach signs to any support.
5. All signs shall be installed in accordance with the plans or as directed by the Engineer.
6. The Contractor shall furnish the sign design shown in the plans or in the "Standard Highway Sign Designs for Texas" (SHSD).
7. The Contractor shall furnish sign supports and substrates listed in the "Compliant Work Zone Traffic Control Devices List" (CWZTCD) installed as per the manufacturer's recommendations.
8. Temporary signs that have damaged or cracked substrates and/or damaged or marred reflective sheeting shall be replaced as directed by the Engineer.
9. 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".
10. Damaged wood posts shall be replaced. Splicing wood posts will not be allowed.

DURATION OF WORK

1. Work zone durations are defined in Part 6, Section 6G.02 of the Texas Manual on Uniform Traffic Control Devices (TMUTCD).

SIGN MOUNTING HEIGHT

1. Sign height of Long-term/Intermediate-term warning signs shall be as shown on Figure 6F-1 of the TMUTCD.
2. Sign height of Short-term/Short Duration warning signs shall be as shown on Figure 6F-2 of the TMUTCD.
3. Regulatory signs shall be mounted at least 7 feet, but not more than 9 feet, above the paved surface regardless of work duration.

REMOVING OR COVERING

1. When sign messages may be confusing or do not apply, the signs shall be removed or completely covered, unless otherwise approved by the Engineer.
2. When signs are covered, the material used shall be opaque, such as heavy kraft 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. Burlap, or heavy materials such as plywood or aluminum shall not be used to cover signs.
3. Duct tape or other adhesive material shall NOT be affixed to a sign face.
4. Signs and anchor studs shall be removed and holes back filled upon completion of the work.

REFLECTIVE SHEETING

1. All signs shall be retroreflective and constructed of sheeting meeting the requirements of the DMS and color usage table shown on this sheet.

SIGN SUPPORT WEIGHTS

1. Weights used to keep signs from turning over should be sandbags filled with dry, cohesionless material.
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 will 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 skids.

LEGEND	
	Sign
	Channelizing Devices
	Type 3 Barricade

DEPARTMENTAL MATERIAL SPECIFICATIONS	
SIGN FACE MATERIALS	DMS-8300
FLEXIBLE ROLL-UP REFLECTIVE SIGNS	DMS-8310

COLOR	USAGE	SHEETING MATERIAL
ORANGE	BACKGROUND	TYPE B_{FL} OR TYPE C_{FL} SHEETING
WHITE	BACKGROUND	TYPE A SHEETING
BLACK	LEGEND & BORDERS	ACRYLIC NON-REFLECTIVE SHEETING

Only pre-qualified products shall be used. A copy of the "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources and may be found on the following web address:
http://www.txdot.gov/txdot_library/publications/construction.htm

PEDESTRIAN CONTROL

1. Holes, trenches or other hazards shall be adequately protected by covering, delineating or surrounding the hazard with orange plastic pedestrian fencing or longitudinal channelizing devices, or as directed by the Engineer.
2. "CROSSWALK CLOSURES" as detailed above will require the Engineer's approval for use and location.
3. Barricades shown may be placed on supports detailed on the BC standards or CWZTCD list, or when fabricated from approved lightweight plastic substrates, they may be mounted on top of a plastic drum at or near the location shown.
4. For speeds less than 45 mph longitudinal channelizing devices may be used instead of traffic barriers when approved by the Engineer. Attenuation of blunt ends and installation of water filled devices shall be as per BC(9) and manufacturer's recommendations.
5. Locations shown are for general guidance. Actual device spacing and location must be field adjusted to meet actual conditions.
6. Where pedestrians with visual disabilities normally use the closed sidewalk Detectable Pedestrian Barricades should be used instead of the Type 3 Barricades shown.
7. The width of existing sidewalk should be maintained if practicel.
8. Pavement markings for mid-block crosswalks shall be paid for under the appropriate bid items.
9. When crosswalks or other pedestrian facilities are closed or relocated, temporary facilities shall be detectable and shall include accessibility features consistent with the features present in the existing pedestrian facility.

SHEET 2 OF 2

Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC SIGNAL WORK BARRICADES AND SIGNS

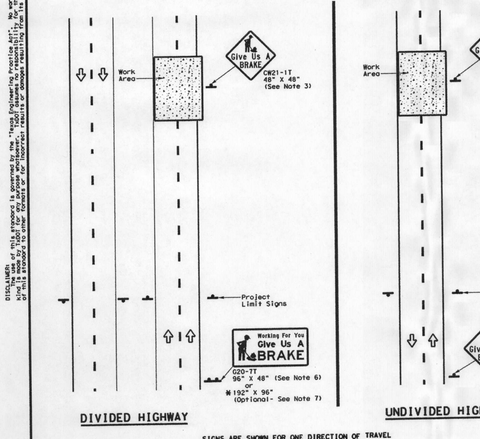
WZ(BTS-2)-13

FILE:	wzbts-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	April 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS					
2-98 10-99 7-13		DIST	COUNTY		SHEET NO.
4-98 3-03					

115

DISCLAIMER:
The use of this sequence 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 sequence to other formats or for incorrect results or damages resulting from its use.

DATE/FILE:



W When the optional larger WORKING FOR YOU GIVE US A BRAKE (G20-7T) 192" x 96" sign is required, the locations shall be noted elsewhere in the plans.

SUMMARY OF LARGE SIGNS

BACKGROUND COLOR	SIGN DESIGNATION	SIGN	SIGN DIMENSIONS	REFLECTIVE SHEETING	SQ FT	GALVANIZED STRUCTURAL STEEL Size	GALVANIZED STRUCTURAL STEEL (LF) ①	GALVANIZED STRUCTURAL STEEL (LF) ②	DRILLED SHAFT 24" DIA. (LF)
Orange	G20-7T	Working For You Give Us A BRAKE	96" X 48"	Type B_{FL} or C_{FL}	32	▲	▲	▲	▲
Orange	G20-7T	Working For You Give Us A BRAKE	192" X 96"	Type B_{FL} or C_{FL}	128	W8x18	16	17	12

▲ See Note 6 Below

LEGEND	
	Sign
	Large Sign
	Traffic Flow

DEPARTMENTAL MATERIAL SPECIFICATIONS	
PLYWOOD SIGN BLANKS	DMS-7100
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

COLOR	USAGE	SHEETING MATERIAL
ORANGE	BACKGROUND	TYPE B_{FL} OR TYPE C_{FL}
BLACK	LEGEND & BORDERS	NON-REFLECTIVE ACRYLIC FILM

GENERAL NOTES

1. See BC and SMD sheets for additional sign support details.
2. Sign locations shall be approved by the Engineer.
3. For projects more than two miles in length, Give Us a BRAKE signs should be repeated halfway through the project. The Give Us a Brake (CW21-1T) may be used for this purpose.
4. Work zone speed limits are sometimes used in conjunction with GIVE US A BRAKE signing. See BC(3) for location and spacing of construction speed zone signing when required.
5. Give Us a Brake (CW21-1T) signs and supports shall be considered subsidiary to Item 502, "Barricades, Signs and Traffic Handling."
6. The 96" X 48" Working For You Give Us A BRAKE (G20-7T) may use a 1/2" or 5/8" plywood substrate or 0.125" aluminum sheeting substrate and may be supported by two 4" x 6" wood posts with drilled holes for breakaway as per BC(5) and will be subsidiary to Item 502.
7. The Working For You Give Us A BRAKE (G20-7T) 192" X 96" sign shall be paid for under the following specification items:
   Item 636 - Aluminum Signs
   Item 647 - Large Roadside Sign Supports and Assemblies.
   Item 416 - Drilled Shaft Foundations
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.

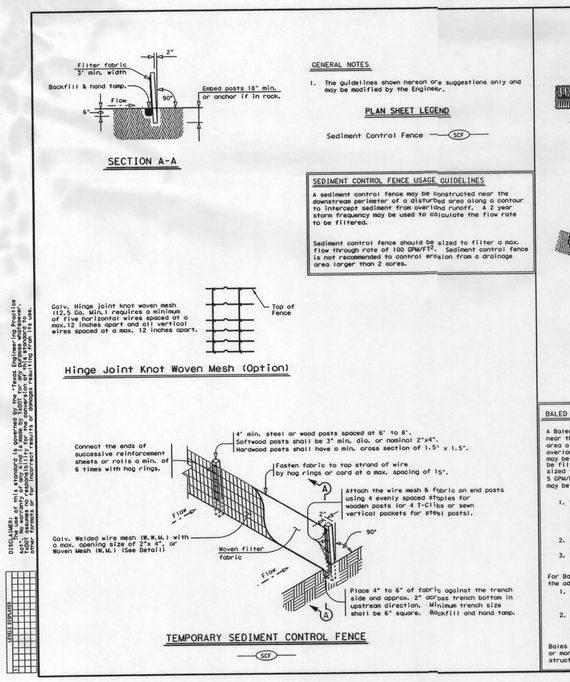
Texas Department of Transportation — Traffic Operations Division Standard

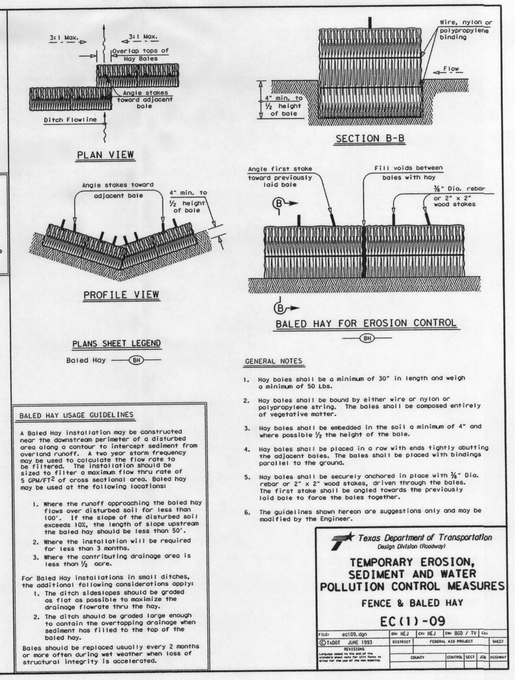
WORK ZONE "GIVE US A BRAKE" SIGNS

WZ(BRK)-13

FILE:	wzbrk-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	August 1995	CONT	SECT	JOB	HIGHWAY
REVISIONS					
4-96 5-98 7-13		DIST	COUNTY		SHEET NO.
8-96 3-03					

116





PLANS SHEET LEGEND
Baled Hay BH

BALED HAY USAGE GUIDELINES

A Baled Hay installation may be constructed near the downstream perimeter of a disturbed area along a contour to intercept sediment from overland runoff. A two year storm frequency may be used to calculate the flow rate to be filtered. The installation should be sized to filter a maximum flow thru rate of 5 GPM/FT² of cross sectional area. Baled hay may be used at the following locations:

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

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

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

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

GENERAL NOTES

1. Hay bales shall be a minimum of 30" in length and weigh a minimum of 50 lbs.
2. Hay bales shall be bound by either wire or nylon or polypropylene string. The bales shall be composed entirely of vegetative matter.
3. Hay bales shall be embedded in the soil a minimum of 4" and where possible ½ the height of the bale.
4. Hay bales shall be placed in a row with ends tightly abutting the adjacent bales. The bales shall be placed with bindings parallel to the ground.
5. Hay bales shall be securely anchored in place with ¾" Dia. rebar or 2" x 2" wood stakes, driven through the bales. The first stake shall be angled towards the previously laid bale to force the bales together.
6. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

Texas Department of Transportation — Design Division (Roadway)

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

FENCE & BALED HAY

EC(1)-09

FILE:	ec09.dgn	DN: HEJ	CK: HEJ	DW: BID 7 / TX	CK:
©TxDOT	JUNE 1993	DISTRICT		FEDERAL AID PROJECT	SHEET
REVISIONS					
Language added to the end of the 1st bullet under "Where the runoff..." and under "If the slope of the disturbed..."		COUNTY		CONTROL	SECT	JOB	HIGHWAY

VICKREY & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION # F-159 TBPLS REGISTRATION # 10004400
1717 West 6th Street, Suite 260
Austin, Texas 78703
Phone: (512) 494-8014 Fax: (512) 494-8054

TXDOT DETAIL SHEET 8

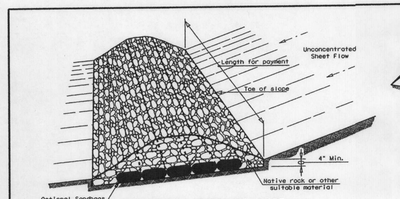
BROOKSHIRE BROTHERS, CANYON LAKE
18267 FM 306
CANYON LAKE, TX

DRAWN BY:	JTM
CHECKED BY:	JCM
APPROVED BY:	JCM
DATE:	09/15/2014
SHEET	C5.08
PROJ NO.	2540-001

DATE NO. DESCRIPTION

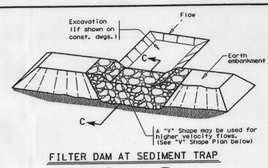
©2014

Drawings: R:\2540-001\Engineering\DWG\sh_txdot details 3.dwg 125.00 TXDOT DETAIL SHEET 8
User: JOSHUA CRONK
Last Modified: Feb. 24, 15 -- 15:50
Plot Date/Time: Feb. 26, 15 -- 13:33:07



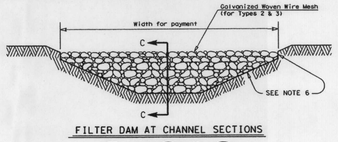
FILTER DAM AT TOE OF SLOPE

WDM TYPE 1



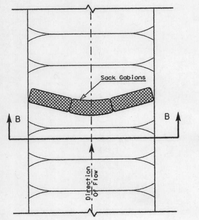
FILTER DAM AT SEDIMENT TRAP

WDM TYPE 1 OR WDM TYPE 2

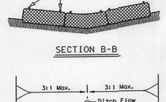


FILTER DAM AT CHANNEL SECTIONS

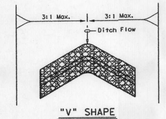
WDM TYPE 1 OR WDM TYPE 2 OR WDM TYPE 3



PLAN VIEW

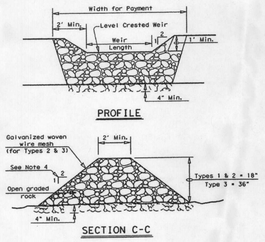


SECTION B-B



"V" SHAPE

(Plan View)



PROFILE

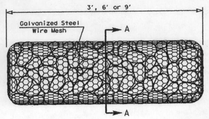
SECTION C-C

PLANS SHEET LEGEND

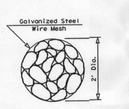
Type 1 Rock Filter Dam — WDM1

Type 2 Rock Filter Dam — WDM2

Type 3 Rock Filter Dam — WDM3



TYPE 4 (SACK GABIONS)



SECTION A-A

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/FT² of cross sectional area. A 2 year storm frequency may be used to calculate the flow rate.

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

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

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

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

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

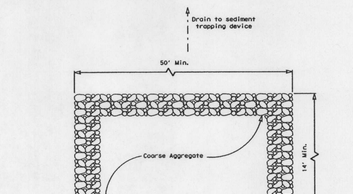
Texas Department of Transportation
Design Division (Roadway)

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

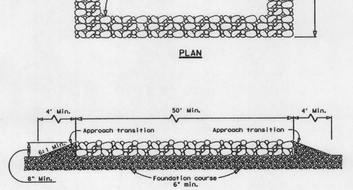
ROCK FILTER DAMS

EC(2)-93

FILE: EC293.DGN	DN: MEJ	CK: MEJ	DW: BGD	CK:
©TxDOT JUNE 1993	DISTRICT	FEDERAL AID PROJECT		SHEET
REVISIONS	COUNTY	CONTROL	SECT	JOB	HIGHWAY



PLAN

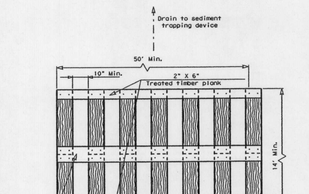


PROFILE

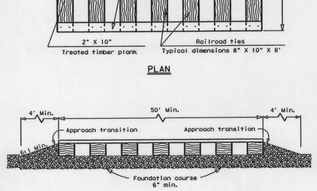
CONSTRUCTION EXIT (TYPE 1)

GENERAL NOTES

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



PLAN

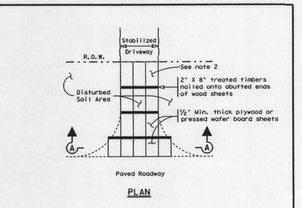


PROFILE

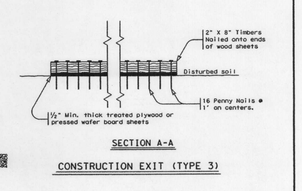
CONSTRUCTION EXIT (TYPE 2)

GENERAL NOTES

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



PLAN



SECTION A-A

CONSTRUCTION EXIT (TYPE 3)

GENERAL NOTES

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

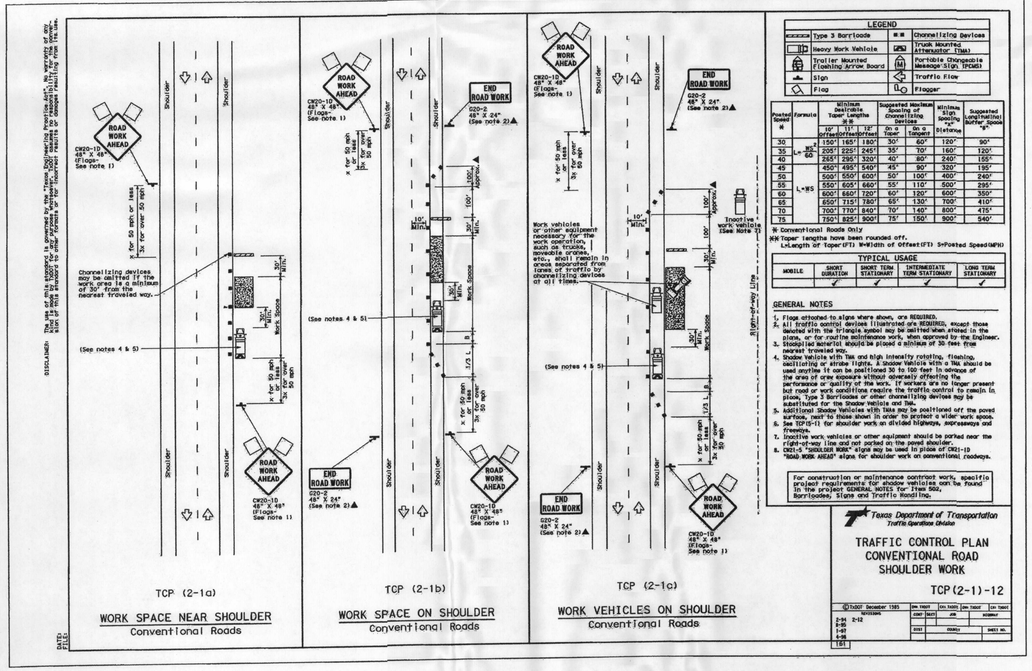
Texas Department of Transportation
Design Division (Roadway)

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

CONSTRUCTION EXITS

EC(3)-93

FILE: EC393.DGN	DN: MEJ	CK: MEJ	DW: BGD	CK:
©TxDOT JUNE 1993	DISTRICT	FEDERAL AID PROJECT		SHEET
REVISIONS	COUNTY	CONTROL	SECT	JOB	HIGHWAY



TCP (2-1a)

WORK SPACE NEAR SHOULDER

Conventional Roads

TCP (2-1b)

WORK SPACE ON SHOULDER

Conventional Roads

TCP (2-1c)

WORK VEHICLES ON SHOULDER

Conventional Roads

LEGEND			
	Type 3 Barricade	##	Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board		Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths **		Suggested Maximum Spacing of Channelizing Devices		Minimum Sight Distance	Suggested Longitudinal Buffer Space ***
		10'	11'	12'	On a Tangent	On a Taper	
30	L = WS² / 60	150'	165'	180'	30'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45		450'	495'	540'	45'	90'	320'	195'	360'
50	L = WS	500'	550'	600'	50'	100'	400'	240'	425'
55		550'	605'	660'	55'	110'	500'	295'	495'
60		600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70		700'	770'	840'	70'	140'	800'	475'	730'
75		750'	825'	900'	75'	150'	900'	540'	820'

* Conventional Roads Only

** Taper lengths have been rounded off.

L=Length of Taper (FT) W=Width of Offset (FT) S=Posted Speed (MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓	✓	✓

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4 "ONE LANE ROAD XXX FT" sign, but proper sign spacing shall be maintained.
4. Flagger's should use two-way radios or other methods of communication to control traffic.
5. Shadow Vehicles should be used on mobile or short term operations, as needed.
6. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
7. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.
8. See TCP(5-1) for shoulder work on divided highways, expressways and freeways.
9. Inactive work vehicles or other equipment should be parked near the right-of-way line and not parked on the paved shoulder.
10. CW21-5 "SHOULDER WORK" signs may be used in place of CW21-1D "ROAD WORK AHEAD" signs for shoulder work on conventional roadways.

For construction or maintenance contract work, specific project requirements can be found in the GENERAL NOTES for Lane Shifts, Barricades, Signs and Traffic Handling.

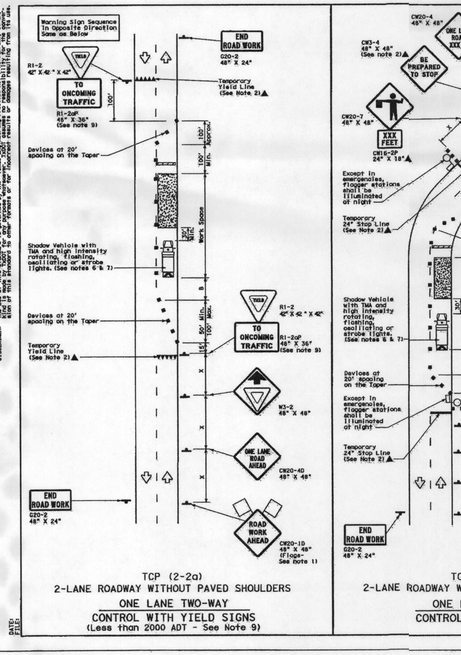
Texas Department of Transportation
Traffic Operations Division

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(2-1)-12

©TxDOT December 1985	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
REVISIONS	FHWA	STATE		SHEET NO.

2-94 2-12
8-95
1-97
2-98
181



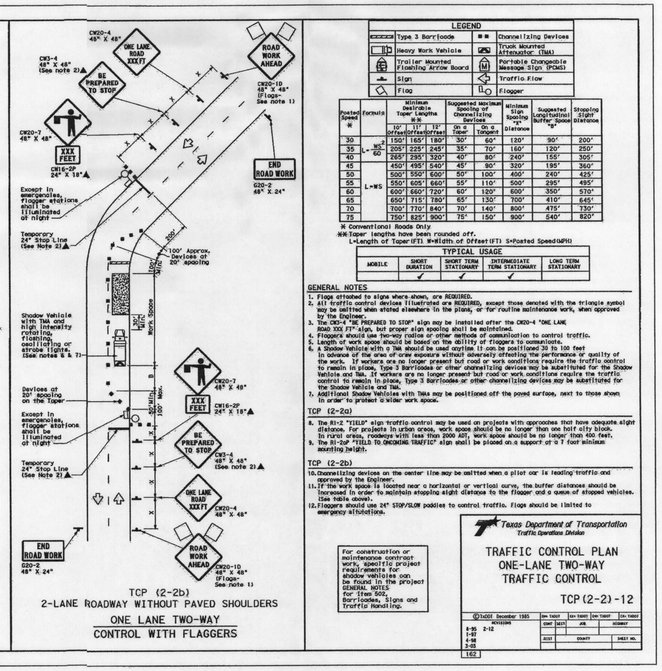
TCP (2-2a)

2-LANE ROADWAY WITHOUT PAVED SHOULDERS

ONE LANE TWO-WAY

CONTROL WITH YIELD SIGNS

(Less than 2000 ADT - See Note 9)



TCP (2-2b)

2-LANE ROADWAY WITHOUT PAVED SHOULDERS

ONE LANE TWO-WAY

CONTROL WITH FLAGGERS

LEGEND			
	Type 3 Barricade	##	Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board		Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths **		Suggested Maximum Spacing of Channelizing Devices		Minimum Sight Distance	Suggested Longitudinal Buffer Space ***	Stopping Sight Distance
		10'	11'	12'	On a Taper	On a Tangent		
30	L = WS² / 60	150'	165'	180'	30'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45		450'	495'	540'	45'	90'	320'	195'	360'
50	L = WS	500'	550'	600'	50'	100'	400'	240'	425'
55		550'	605'	660'	55'	110'	500'	295'	495'
60		600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70		700'	770'	840'	70'	140'	800'	475'	730'
75		750'	825'	900'	75'	150'	900'	540'	820'

* Conventional Roads Only

** Taper lengths have been rounded off.

L=Length of Taper (FT) W=Width of Offset (FT) S=Posted Speed (MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
		✓	✓	✓

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4 "ONE LANE ROAD XXX FT" sign, but proper sign spacing shall be maintained.
4. Flagger's should use two-way radios or other methods of communication to control traffic.
5. Shadow Vehicles should be used on mobile or short term operations, as needed.
6. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
7. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-2a)

8. The R1-2 "YIELD" sign traffic control may be used on projects with approaches that have adequate sight distance. For projects in urban areas, work space should be no longer than one half city block. In rural areas, roadways with less than 2000 ADT, work space should be no longer than 400 feet.
9. The R1-2aP "YIELD TO ONCOMING TRAFFIC" sign shall be placed on a support at 5' 7 foot minimum mounting height.

TCP (2-2b)

10. Channeling devices on the center line may be omitted when a pilot car is leading traffic and approved by the Engineer.
11. If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain stopping sight distance to the Flagger and a queue of stopped vehicles. Use table above.
12. Flaggers should use 24" STOP/SLOW paddles to control traffic. Flags should be limited to emergency situations.

For construction or maintenance contract work, specific project requirements for shadow vehicles can be found in the project GENERAL NOTES for Lane Shifts, Barricades, Signs and Traffic Handling.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC CONTROL PLAN ONE-LANE TWO-WAY TRAFFIC CONTROL

TCP(2-2)-12

©TxDOT December 1985	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
REVISIONS	FHWA	STATE		SHEET NO.

2-94 2-12
8-95
1-97
2-98
182

VICKREY & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION # F-159 TBPLS REGISTRATION # 10004100
1717 West 6th Street, Suite 260
Austin, Texas 78703
Phone: (512) 494-8014 Fax: (512) 494-8054

TXDOT DETAIL SHEET 9

BROOKSHIRE BROTHERS, CANYON LAKE
18267 FM 306
CANYON LAKE, TX

DRAWN BY:	JTM
CHECKED BY:	JCM
APPROVED BY:	JCM
DATE:	09/15/2014

SHEET

C5.09

PROJ NO. 2540-001

NO.	DATE	DESCRIPTION

©2014

DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the completion of this project by others, except those expressly employed by TxDOT.

Drawing: R:\2540-001\Engineering\DWG\sh_TXDOT details 3.dwg - C5.09 TXDOT DETAIL SHEET 9
CMDIVISION
User: Matthew Mc
Last Modified: Feb. 24, 15 - 15:50
Plot Date/Time: Feb. 26, 15 - 13:33:51