

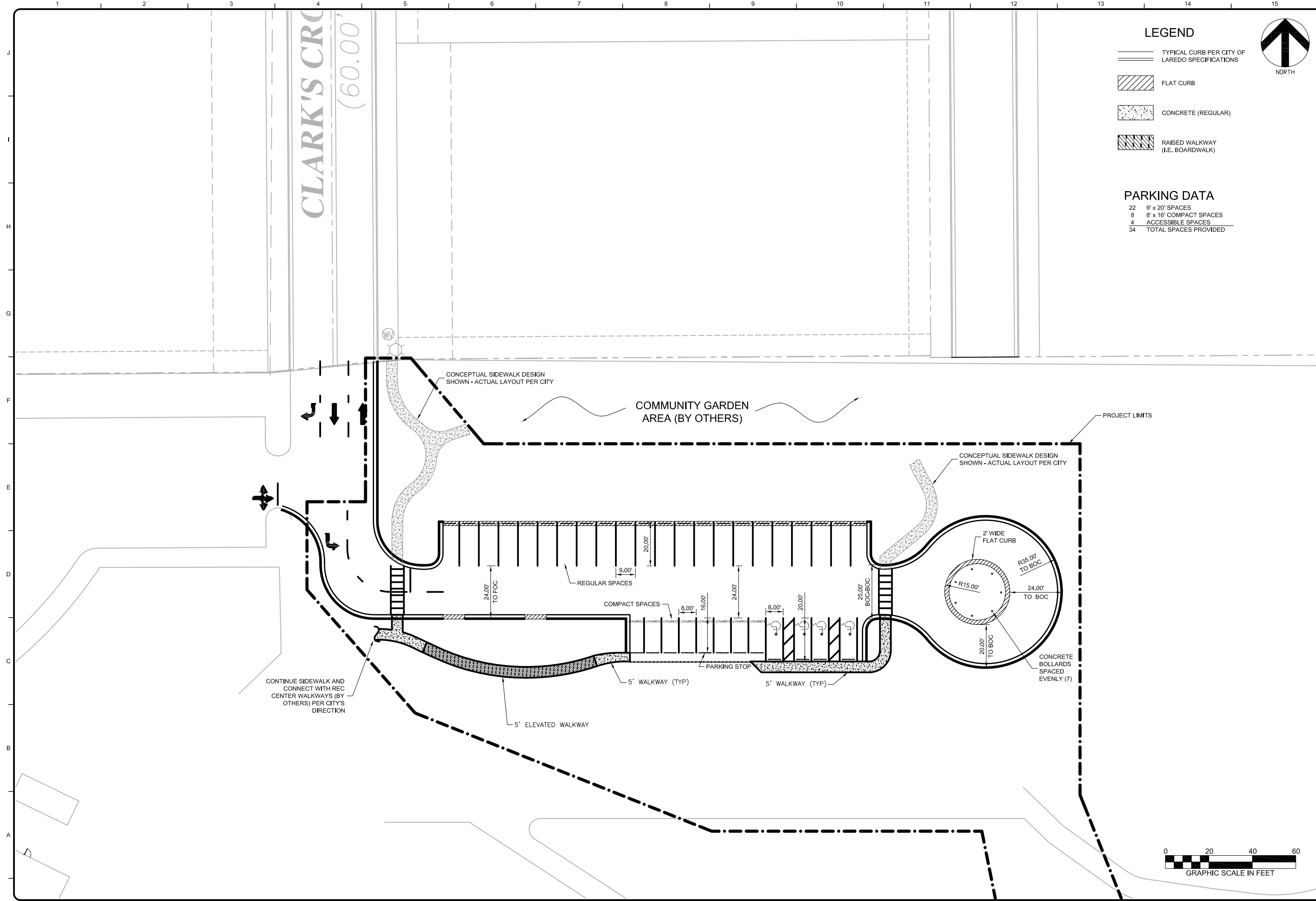
**TECHNICAL MEMORANDUM  
BROWNFIELDS SUSTAINABILITY PILOT  
CONCEPTUAL DESIGN DRAWINGS -  
HAYNES RECREATION CENTER  
LAREDO, TX**

Prepared for:  
U.S. Environmental Protection Agency  
Office of Solid Waste and Emergency Response  
Office of Brownfields and Land Revitalization  
Washington, DC 20460

Prepared by:  
Tetra Tech EM Inc.  
1881 Campus Commons Dr.  
Ste. 200  
Reston, VA 20191

SRA International, Inc. (Contract No. EP-W-07-023)  
3434 Washington Boulevard  
Arlington, VA 22201

Wednesday, May 06, 2009 2:44:54 PM DRAWING: W:\CADD-Maps\Laredo-P-5-nobypass-gardenmoved.DWG LAYOUT: SITEPLAN-1 USER NAME: SNOOK, DAVID



**LEGEND**

- TYPICAL CURB PER CITY OF LAREDO SPECIFICATIONS
- FLAT CURB
- CONCRETE (REGULAR)
- RAISED WALKWAY (I.E. BOARDWALK)

**PARKING DATA**

22	9' x 20' SPACES
8	8' x 16' COMPACT SPACES
4	ACCESSIBLE SPACES
34	TOTAL SPACES PROVIDED

**TETRA TECH**  
www.tetra.tech.com  
1881 CAMPUS COMMONS DRIVE, SUITE 200  
RESTON, VA 20191  
PHONE: 703.391.5875 FAX: 703.391.5876

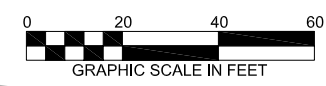
MARK	DATE	DESCRIPTION	BY
	4/15/09	DRAFT SUBMITTAL FOR CLIENT REVIEW	DGS
	5/4/09	DRAFT FINAL SUBMITTAL FOR TR	DGS
	5/4/09	MINOR REVISIONS	DGS

Client: SRA BROWNFIELDS WORK ASSIGNMENT 0018  
Proj. Loc.: LAREDO, TEXAS  
CITY OF LAREDO, TEXAS  
LID PARKING LOT DESIGN PILOT PROJECT

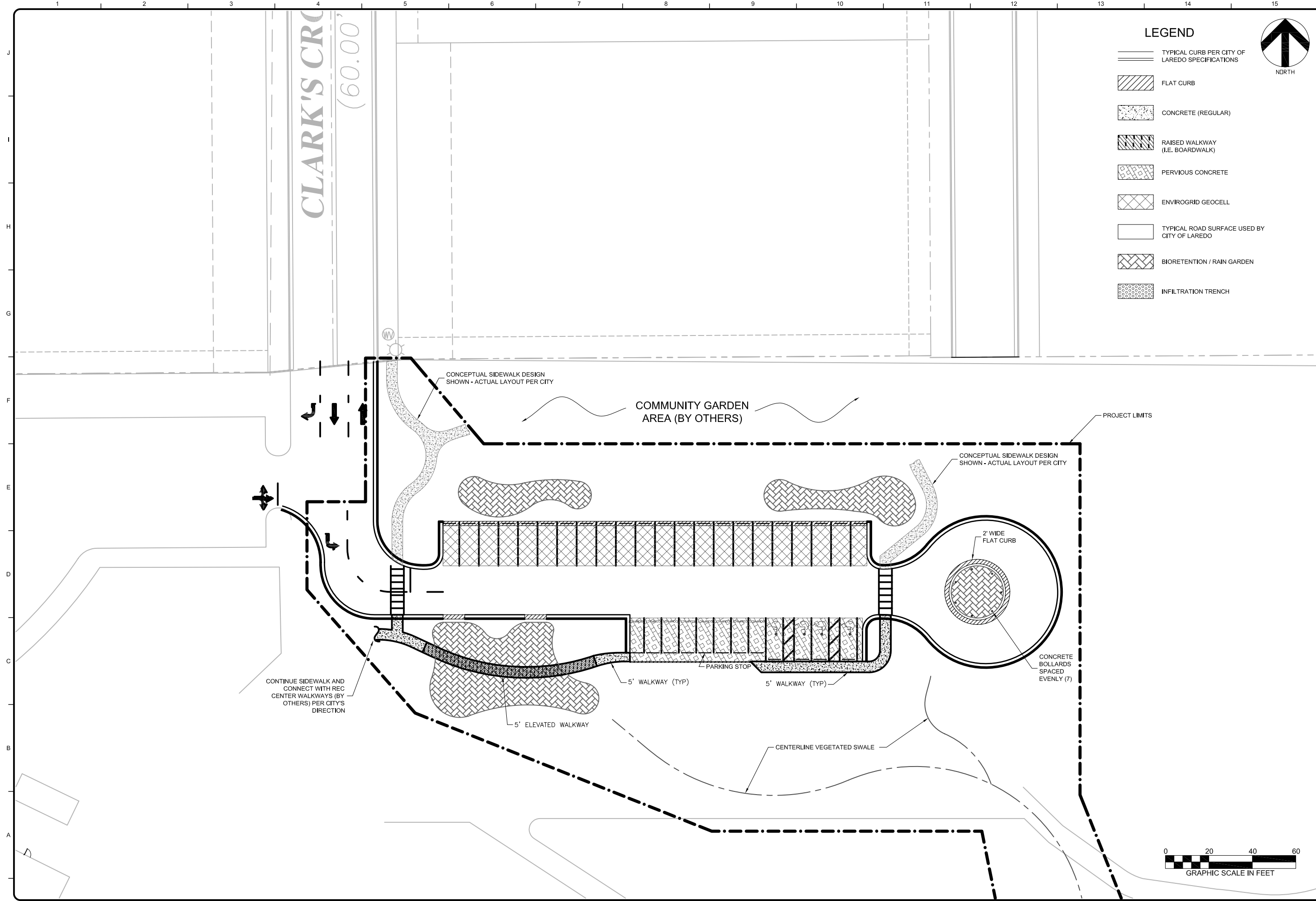
Project No.: 103DG1392-1806.02

Designed By:	DGS
Drawn By:	DGS
Checked By:	

**SIT-1**  
Sheet 1 of 9  
Copyright: Tetra Tech



Wednesday, May 06, 2009 2:45:00 PM DRAWING: W:\CADD-Maps\Laredo-P-5-nobypass-gardenmoved.DWG LAYOUT: SITEPLAN-2 USER NAME: SNOOK, DAVID



**LEGEND**

- TYPICAL CURB PER CITY OF LAREDO SPECIFICATIONS
- FLAT CURB
- CONCRETE (REGULAR)
- RAISED WALKWAY (I.E. BOARDWALK)
- PERVIOUS CONCRETE
- ENVIROGRID GEOCELL
- TYPICAL ROAD SURFACE USED BY CITY OF LAREDO
- BIORETENTION / RAIN GARDEN
- INFILTRATION TRENCH

**NORTH**

**TETRA TECH**

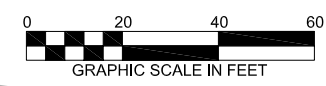
www.tetra.tech.com  
 1881 CAMPUS COMMONS DRIVE, SUITE 200  
 RESTON, VA 20191  
 PHONE: 703.391.5875 FAX: 703.391.5876

MARK	DATE	DESCRIPTION	BY
	4/15/09	DRAFT SUBMITTAL FOR CLIENT REVIEW	DGS
	5/4/09	DRAFT FINAL SUBMITTAL FOR TR	DGS
	5/4/09	MINOR REVISIONS	DGS

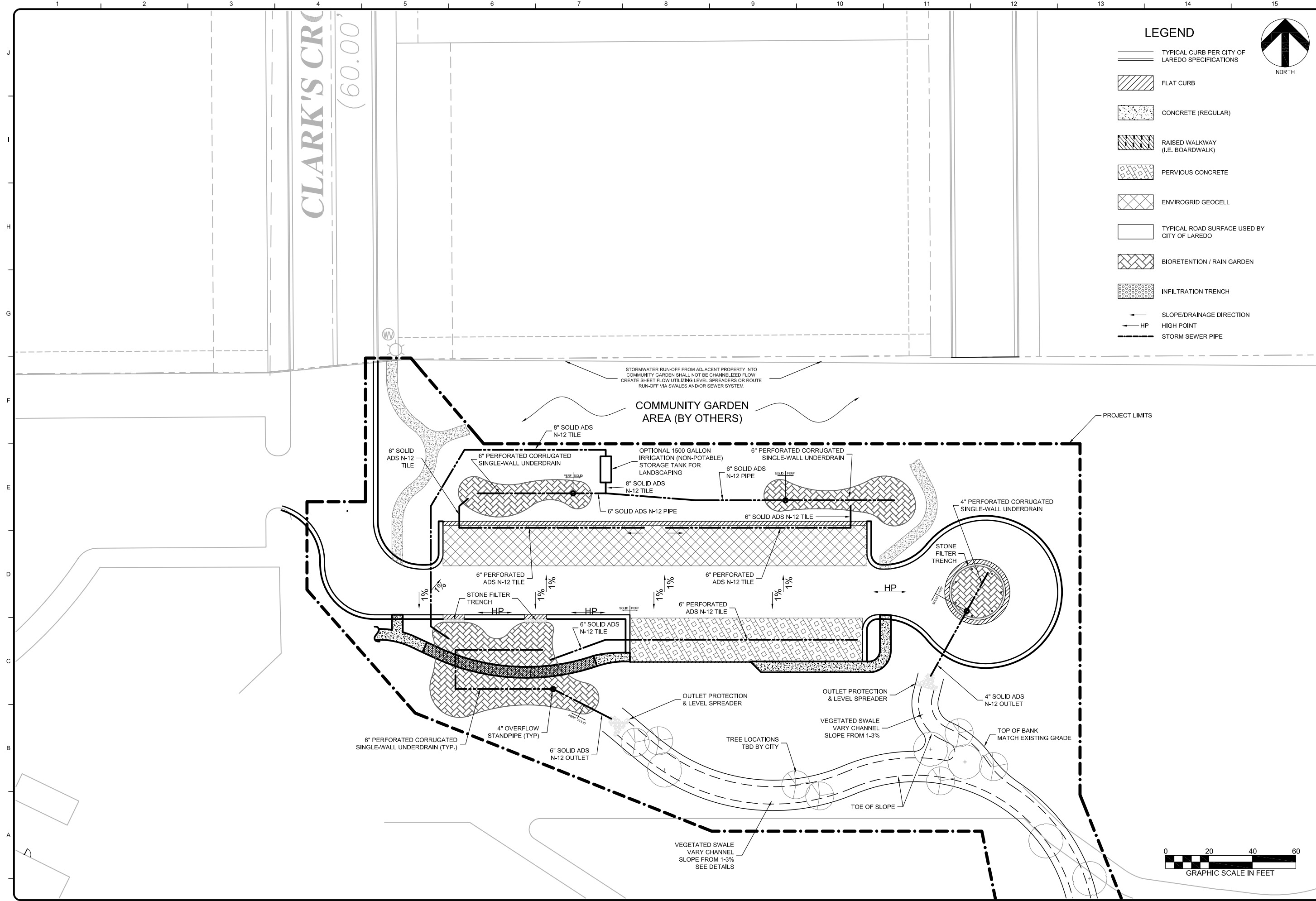
Client: SRA BROWNFIELDS WORK ASSIGNMENT 0018  
 Proj. Loc.: LAREDO, TEXAS  
 CITY OF LAREDO, TEXAS  
 LID PARKING LOT DESIGN PILOT PROJECT

Project No.: 103DG1392-1806.02  
 Designed By: DGS  
 Drawn By: DGS  
 Checked By:

**SIT-2**  
 Sheet 2 of 9  
 Copyright: Tetra Tech



Wednesday, May 06, 2009 2:45:13 PM DRAWING: W:\CADD-Maps\Laredo-P-5-mobypass-gardenmoved.DWG LAYOUT: SITEPLAN-3 USER NAME: SNOOK, DAVID



### LEGEND

- TYPICAL CURB PER CITY OF LAREDO SPECIFICATIONS
- FLAT CURB
- CONCRETE (REGULAR)
- RAISED WALKWAY (I.E. BOARDWALK)
- PERVIOUS CONCRETE
- ENVIROGRID GEOCELL
- TYPICAL ROAD SURFACE USED BY CITY OF LAREDO
- BIORETENTION / RAIN GARDEN
- INFILTRATION TRENCH
- SLOPE/DRAINAGE DIRECTION
- HP
- STORM SEWER PIPE

NORTH

STORMWATER RUN-OFF FROM ADJACENT PROPERTY INTO COMMUNITY GARDEN SHALL NOT BE CHANNELIZED FLOW. CREATE SHEET FLOW UTILIZING LEVEL SPREADERS OR ROUTE RUN-OFF VIA SWALES AND/OR SEWER SYSTEM.

**COMMUNITY GARDEN AREA (BY OTHERS)**

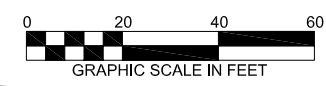
PROJECT LIMITS

**TETRA TECH**  
 www.tetra.tech.com  
 1881 CAMPUS COMMONS DRIVE, SUITE 200  
 RESTON, VA 20191  
 PHONE: 703.391.5875 FAX: 703.391.5876

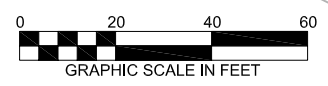
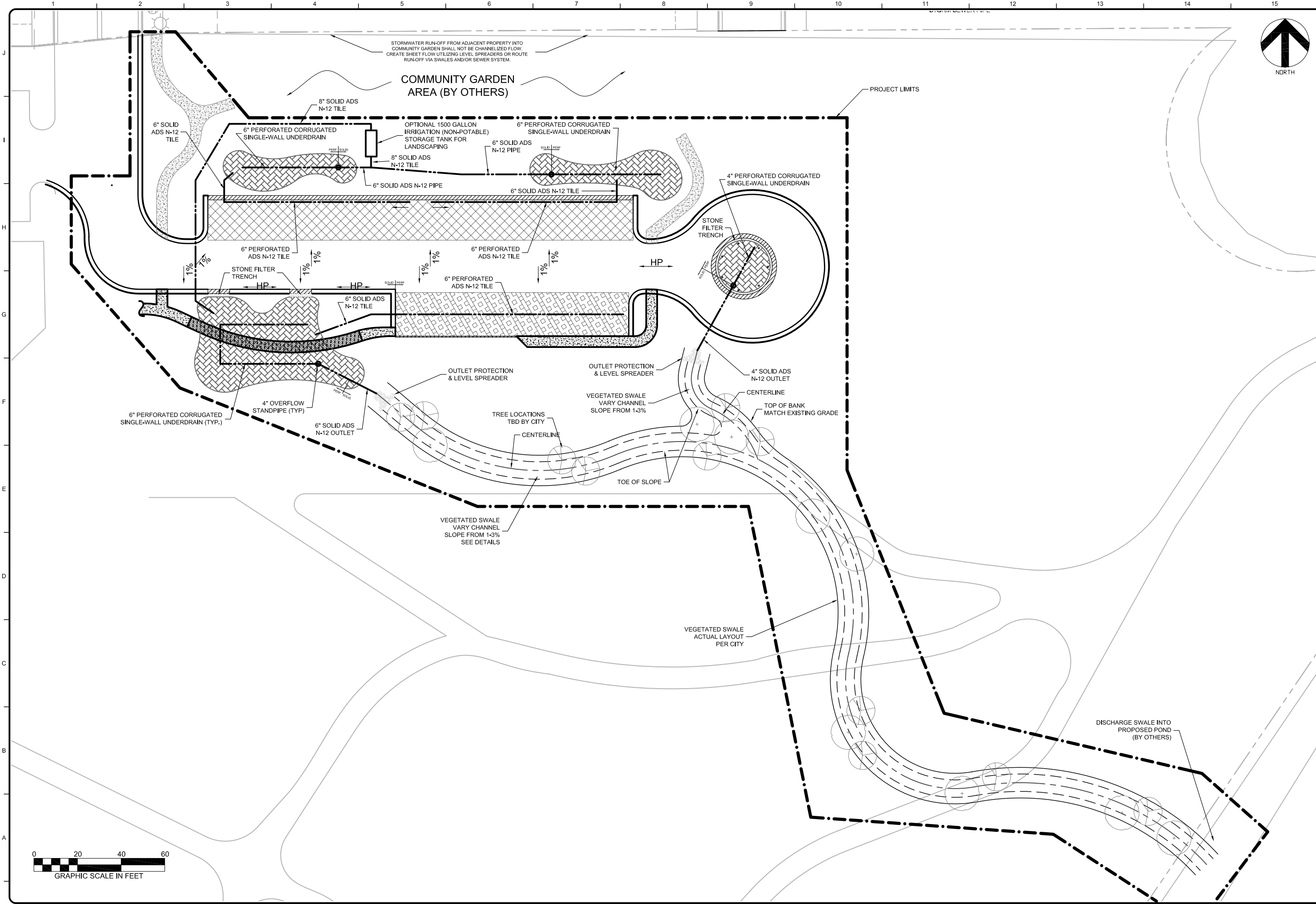
MARK	DATE	DESCRIPTION	BY
	4/15/09	DRAFT SUBMITTAL FOR CLIENT REVIEW	DGS
	5/4/09	DRAFT FINAL SUBMITTAL FOR TR	DGS
	5/4/09	MINOR REVISIONS	DGS

Client: SRA BROWNFIELDS WORK ASSIGNMENT 0018  
 Proj. Loc.: LAREDO, TEXAS  
 CITY OF LAREDO, TEXAS  
 LID PARKING LOT DESIGN PILOT PROJECT  
**LID/STORMWATER PLAN**

Project No.: 103DG1392-1806.02  
 Designed By: DGS  
 Drawn By: DGS  
 Checked By:



Wednesday, May 06, 2009 2:45:22 PM DRAWING: W:\CADD-Maps\Laredo-P-5-mobypass-gardenmoved.DWG LAYOUT: SITEPLAN-4 USER NAME: SNOOK, DAVID



**TETRA TECH**  
www.tetra.tech.com  
1881 CAMPUS COMMONS DRIVE, SUITE 200  
RESTON, VA 20191  
PHONE: 703.391.5875 FAX: 703.391.5876

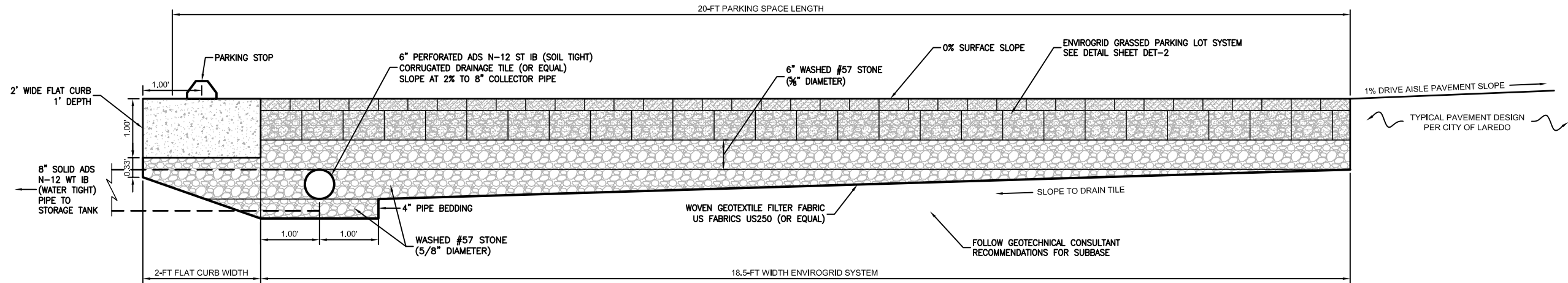
MARK	DATE	DESCRIPTION	BY
	4/15/09	DRAFT SUBMITTAL FOR CLIENT REVIEW	DGS
	5/4/09	DRAFT FINAL SUBMITTAL FOR TR	DGS
	5/4/09	MINOR REVISIONS	DGS

Client: SRA BROWNFIELD'S WORK ASSIGNMENT 0018  
Proj. Loc.: LAREDO, TEXAS  
CITY OF LAREDO, TEXAS  
LID PARKING LOT DESIGN PILOT PROJECT  
**LID/STORMWATER PLAN WITH SWALE TO FUTURE POND**

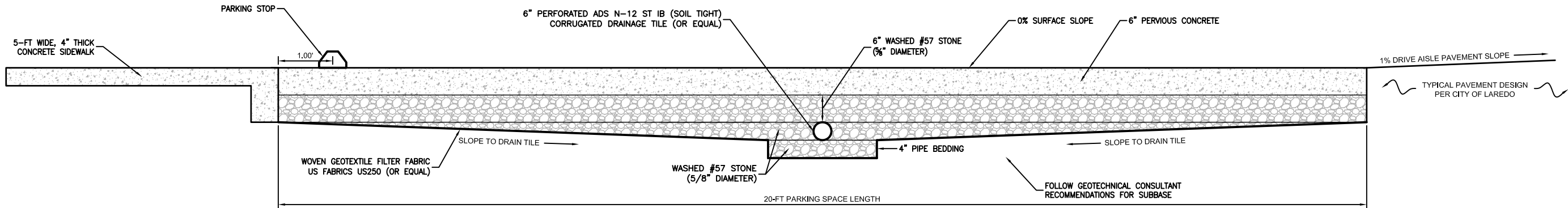
Project No.: 103DG1392-1806.02  
Designed By: DGS  
Drawn By: DGS  
Checked By:

**SIT-4**  
Sheet 3 of 9  
Copyright: Tetra Tech

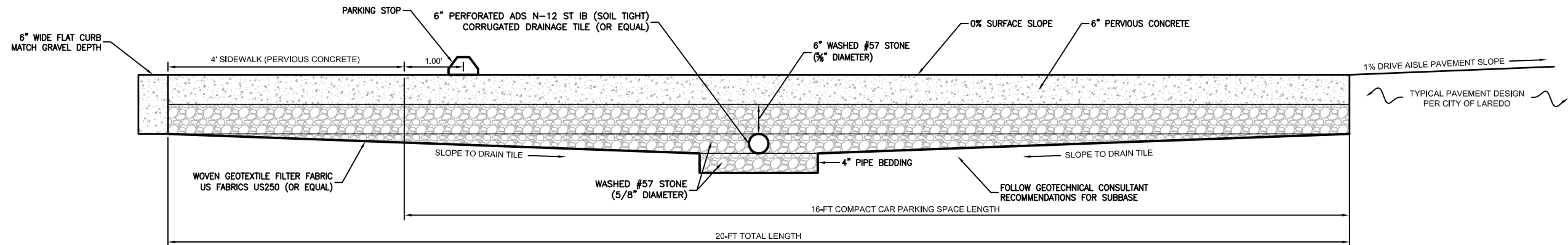
### GRASSED PARKING SPACE WITH PERFORATED DRAIN PIPE



### 20-FT PERVIOUS CONCRETE ACCESSIBLE PARKING SPACE WITH PERFORATED DRAIN PIPE



### 16-FT PERVIOUS CONCRETE COMPACT PARKING SPACE WITH PERFORATED DRAIN PIPE



www.tetratech.com  
1881 CAMPUS COMMONS DRIVE, SUITE 200  
RESTON, VA 20191  
PHONE: 703.391.5875 FAX: 703.391.5876

MARK	DATE	DESCRIPTION	BY
	4/15/09	DRAFT SUBMITTAL FOR CLIENT REVIEW	DGS
	5/4/09	DRAFT FINAL SUBMITTAL FOR TR	DGS
	5/4/09	MINOR REVISIONS	DGS

Client: SRA BROWNFIELD'S WORK ASSIGNMENT 0018  
Proj. Loc.: LAREDO, TEXAS  
CITY OF LAREDO, TEXAS  
LID PARKING LOT DESIGN PILOT PROJECT

Project No.: 103DG1392-1806.02  
Designed By: DGS  
Drawn By: DGS  
Checked By:

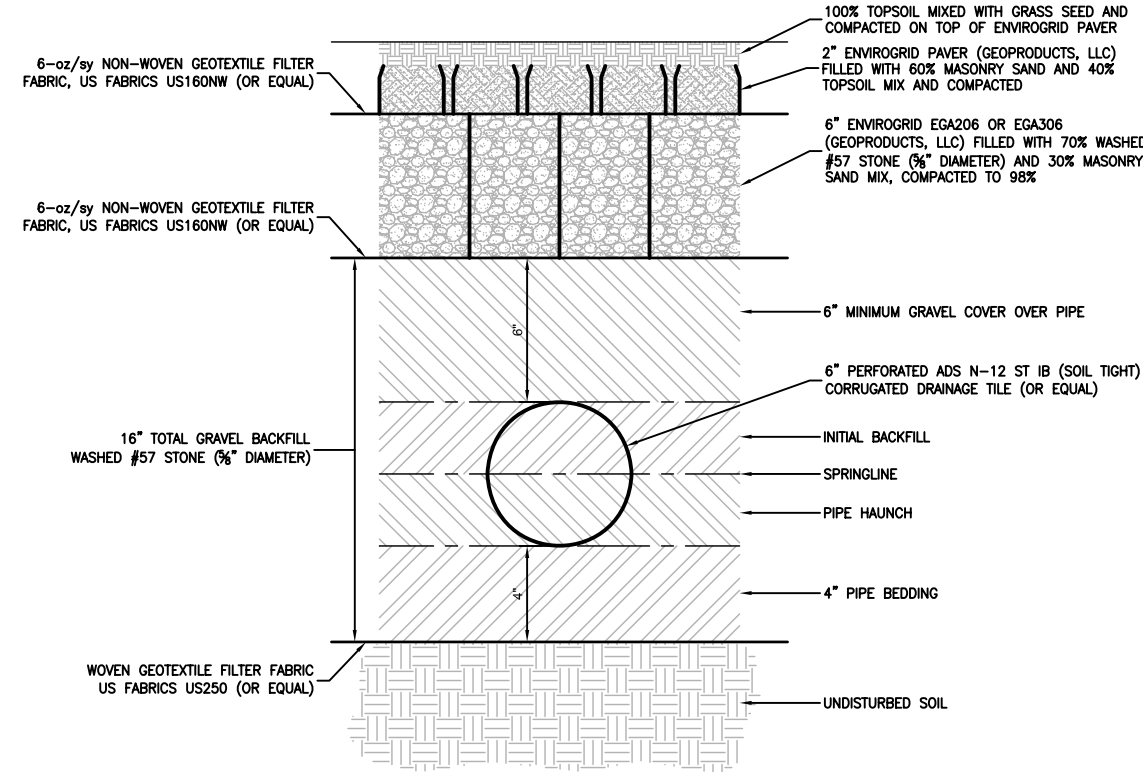
**DET-1**

Sheet 5 of 9  
Copyright: Tetra Tech

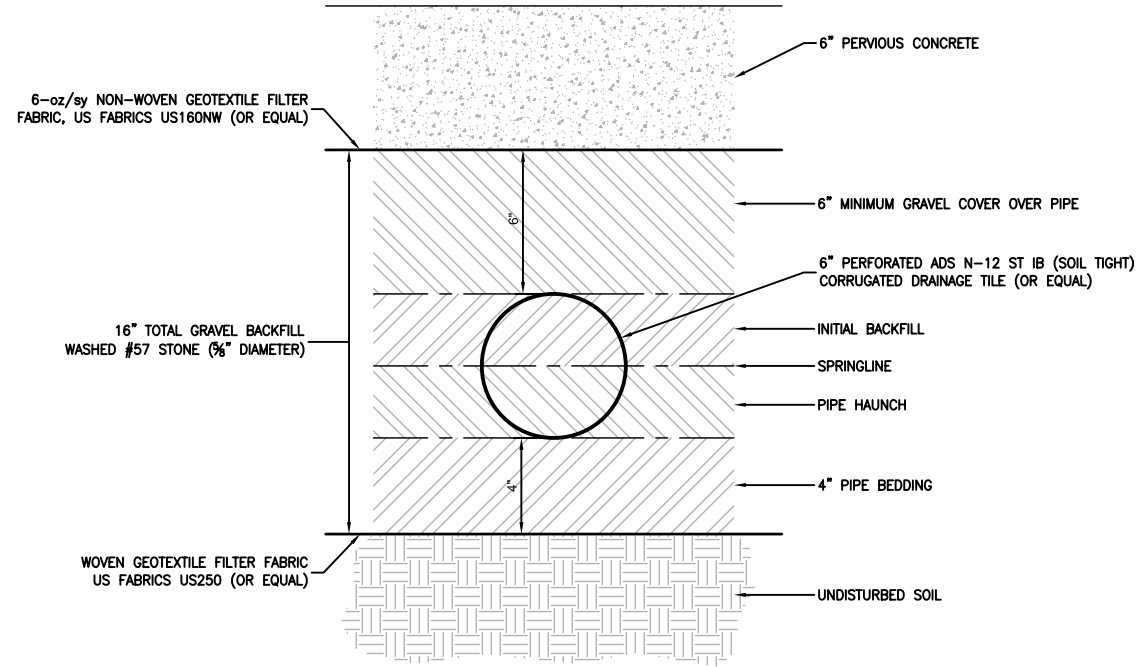
Wednesday, May 06, 2009 2:47:40 PM DRAWING: W:\CADD-Maps\Laredo-Details.DWG LAYOUT: DETAILS-1 USER NAME: SNOOK, DAVID

Wednesday, May 06, 2009 2:47:46 PM DRAWING: W:\CADD-Maps\Laredo-Details-DWG\_LAYOUT: DETAILS-2 USER NAME: SNOOK, DAVID

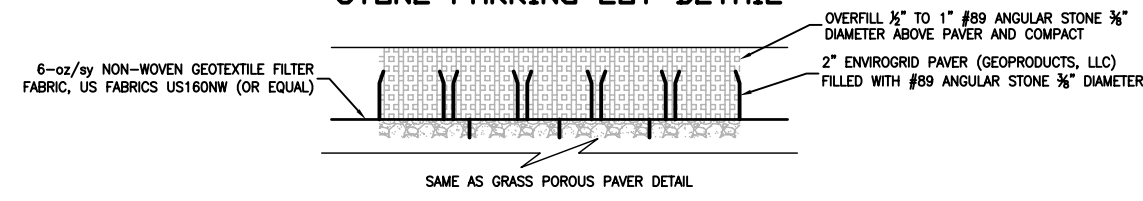
### POROUS PAVERS GRASSED PARKING LOT DETAIL



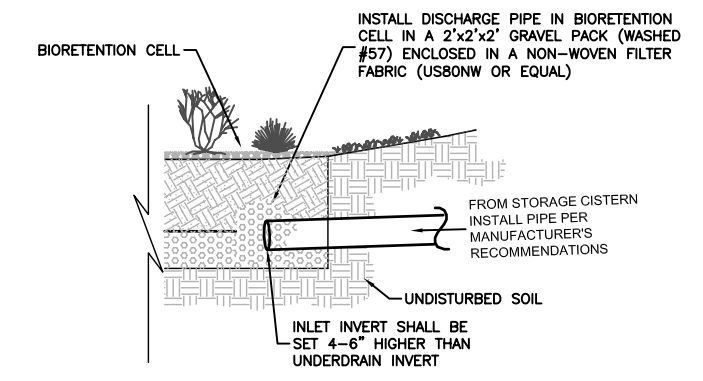
### PERVIOUS CONCRETE WITH DETAIL 6" PERFORATED DRAIN PIPE



### POROUS PAVERS STONE PARKING LOT DETAIL



### BIORETENTION PIPE INLET DETAIL



**TETRA TECH**  
www.tetra-tech.com  
1881 CAMPUS COMMONS DRIVE, SUITE 200  
RESTON, VA 20191  
PHONE: 703.391.5875 FAX: 703.391.5876

MARK	DATE	DESCRIPTION	BY
	4/15/09	DRAFT SUBMITTAL FOR CLIENT REVIEW	DGS
	5/4/09	DRAFT FINAL SUBMITTAL FOR TR	DGS
	5/14/09	MINOR REVISIONS	DGS

Client: SRA BROWNFIELDS WORK ASSIGNMENT 0018  
Proj. Loc.: LAREDO, TEXAS  
CITY OF LAREDO, TEXAS  
LID PARKING LOT DESIGN PILOT PROJECT

Project No.: 103DG1392-1806.02  
Designed By: DGS  
Drawn By: DGS  
Checked By:

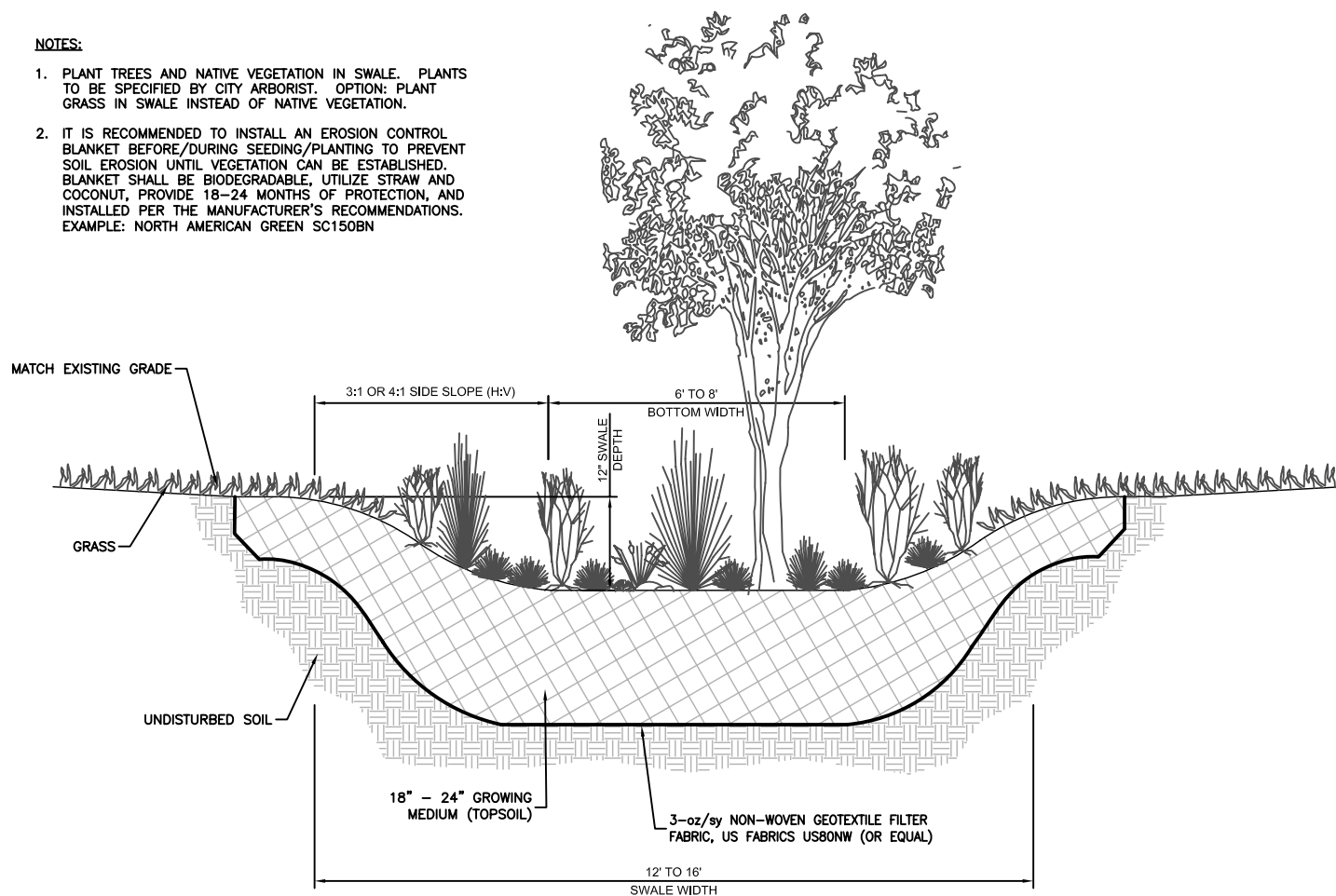
**DET-2**  
Sheet 6 of 9  
Copyright: Tetra Tech

**GENERAL DETAILS**

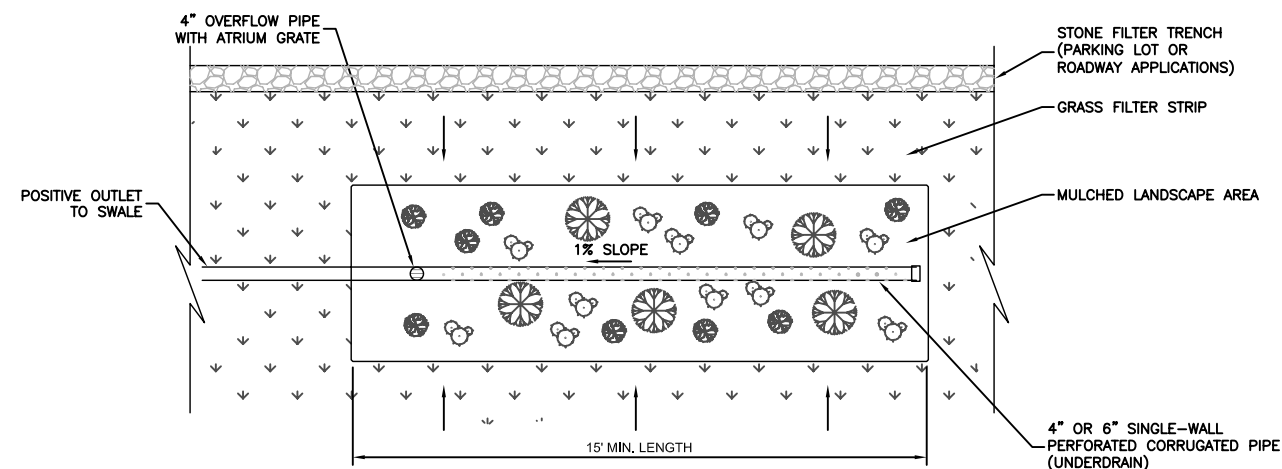
### TYPICAL SWALE DETAIL

**NOTES:**

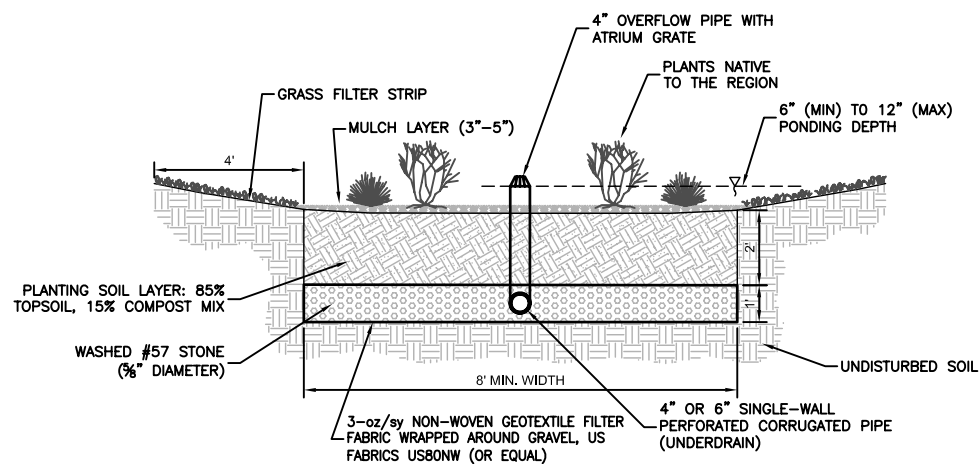
1. PLANT TREES AND NATIVE VEGETATION IN SWALE. PLANTS TO BE SPECIFIED BY CITY ARBORIST. OPTION: PLANT GRASS IN SWALE INSTEAD OF NATIVE VEGETATION.
2. IT IS RECOMMENDED TO INSTALL AN EROSION CONTROL BLANKET BEFORE/DURING SEEDING/PLANTING TO PREVENT SOIL EROSION UNTIL VEGETATION CAN BE ESTABLISHED. BLANKET SHALL BE BIODEGRADABLE, UTILIZE STRAW AND COCONUT, PROVIDE 18-24 MONTHS OF PROTECTION, AND INSTALLED PER THE MANUFACTURER'S RECOMMENDATIONS. EXAMPLE: NORTH AMERICAN GREEN SC150BN



### TYPICAL BIORETENTION CELL DETAIL



### PLAN VIEW

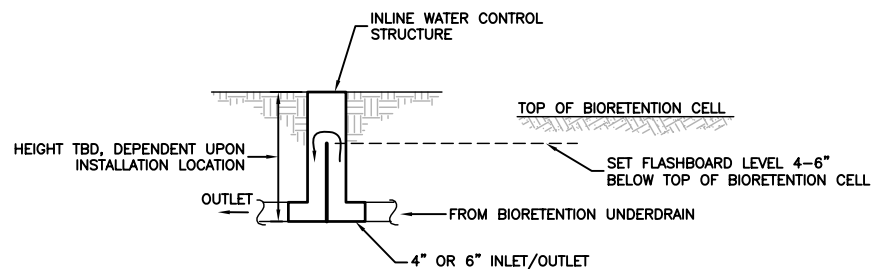


### CROSS SECTION

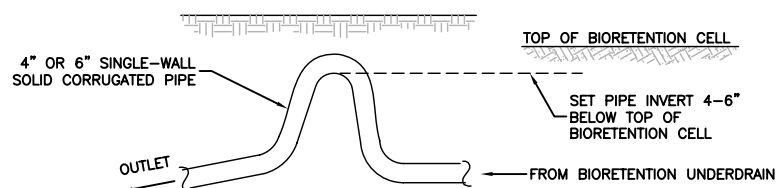
### WATER LEVEL CONTROL STRUCTURE FOR BIORETENTION CELL

- NOTES:**
1. TWO OPTIONS SHOWN BELOW
  2. PLACE WATER CONTROL STRUCTURE OUTSIDE OF BIORETENTION CELL

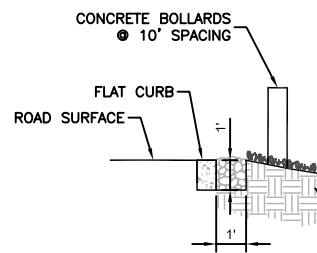
#### AGRI DRAIN (OR EQUAL) INLINE WATER CONTROL STRUCTURE (WCS)



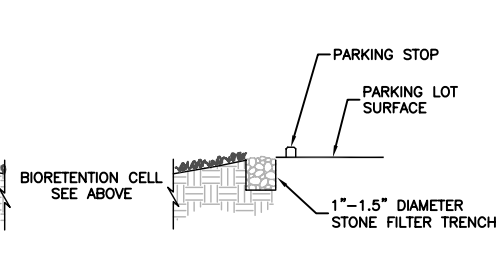
#### WATER CONTROL STRUCTURE CREATED BY CONFIGURING CORRUGATED PIPE



#### ROADWAY/DRIVE AISLE APPLICATION



#### PARKING LOT APPLICATION



### ROADWAY & PARKING LOT APPLICATIONS

**TETRA TECH**  
www.tetra.tech.com  
1881 CAMPUS COMMONS DRIVE, SUITE 200  
RESTON, VA 20191  
PHONE: 703.391.5875 FAX: 703.391.5876

MARK	DATE	DESCRIPTION	BY
	4/15/09	DRAFT SUBMITTAL FOR CLIENT REVIEW	DGS
	5/4/09	DRAFT FINAL SUBMITTAL FOR TR	DGS
	5/4/09	MINOR REVISIONS	DGS

Client: SRA BROWNFIELD'S WORK ASSIGNMENT 0018  
Proj. Loc.: LAREDO, TEXAS  
CITY OF LAREDO, TEXAS  
LID PARKING LOT DESIGN PILOT PROJECT

Project No.: 103DG1392-1806.02  
Designed By: DGS  
Drawn By: DGS  
Checked By:

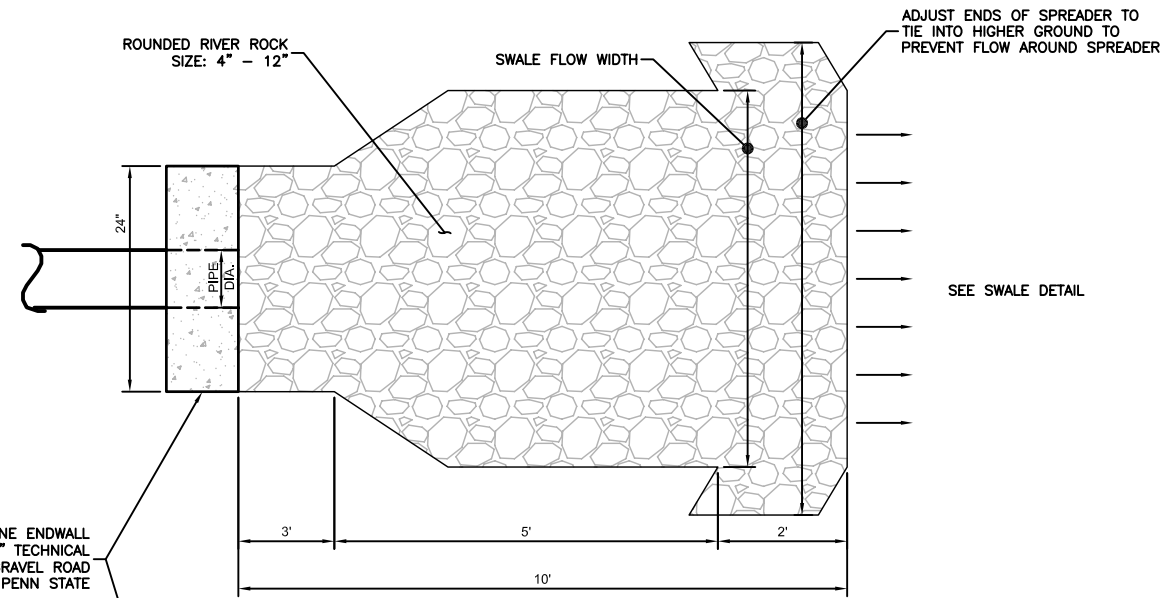
**DET-3**  
Sheet 7 of 9  
Copyright: Tetra Tech

Wednesday, May 06, 2009 2:47:53 PM DRAWING: W:\CADD-Maps\Laredo-Detals-DWG LAYOUT: DETAILS-3 USER NAME: SNOOK, DAVID

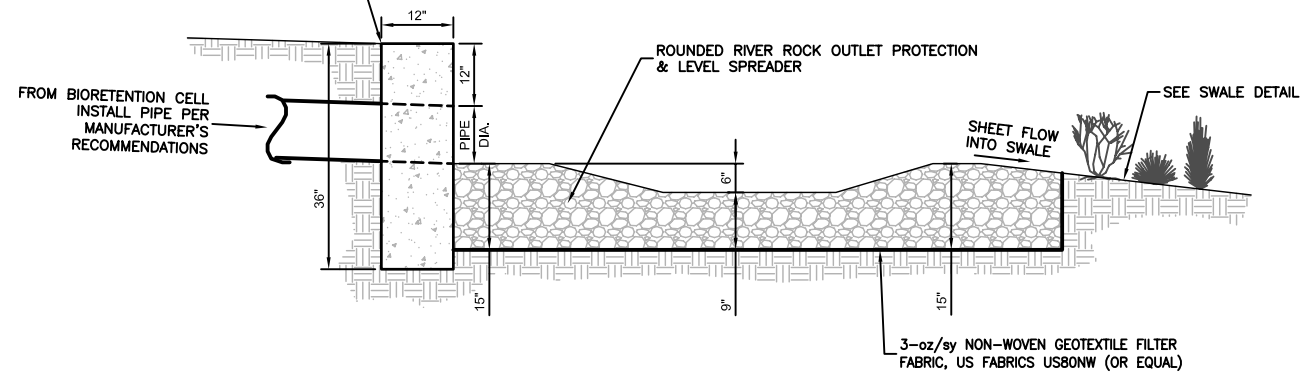


Wednesday, May 06, 2009 2:48:01 PM DRAWING: W:\CADD\Mapst\Laredo-Details.DWG LAYOUT: DETAILS-4 USER NAME: SNOOK, DAVID

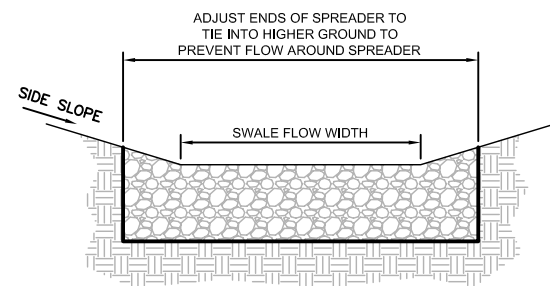
## PIPE OUTLET WITH LEVEL SPREADER DETAIL



**PLAN VIEW**



**SECTION VIEW**



**END VIEW**

**TETRA TECH**

www.tetratech.com  
1881 CAMPUS COMMONS DRIVE, SUITE 200  
RESTON, VA 20191  
PHONE: 703.391.5875 FAX: 703.391.5876

MARK	DATE	DESCRIPTION	BY
	4/15/09	DRAFT SUBMITTAL FOR CLIENT REVIEW	DGS
	5/4/09	DRAFT FINAL SUBMITTAL FOR TR	DGS
	5/4/09	MINOR REVISIONS	DGS

Client: SRA BROWNFIELDS WORK ASSIGNMENT 0018  
 Proj. Loc.: LAREDO, TEXAS  
 CITY OF LAREDO, TEXAS  
 LID PARKING LOT DESIGN PILOT PROJECT

**GENERAL DETAILS**

Project No.: 103DG1392-1806.02  
 Designed By: DGS  
 Drawn By: DGS  
 Checked By:

DET-4

Sheet 8 of 9  
 Copyright: Tetra Tech

Wednesday, May 06, 2009 2:46:05 PM DRAWING: W:\CADD-Maps\Laredo-Details-DWG LAYOUT: NOTES-1 USER NAME: SNOOK, DAVID

**NOTES**

**SURVEY:**

1. EXISTING SURVEY IS BASED ON CLIENT-SUPPLIED GIS FILES.
2. EXISTING SITE FEATURES AND UNDERGROUND UTILITIES SHALL BE VERIFIED BEFORE CONSTRUCTION COMMENCES.

**GEOTECHNICAL:**

1. REFER TO "GEOTECHNICAL ENGINEERING STUDY, EAST SIDE RECREATIONAL FACILITY, CLARK'S CROSSING DRIVE, LAREDO TEXAS, DECEMBER 8, 2008." STUDY WAS PREPARED BY:

CASTLE ENGINEERING & TESTING, LLC  
 PROJECT NO. 08G036  
 1216 SANTA MARIA AVENUE  
 LAREDO, TEXAS 78040  
 PHONE: 956.727.3530

2. THE GEOTECHNICAL ENGINEER SHALL BE CONTACTED BY THE CLIENT AND/OR CONTRACTOR TO VERIFY DETAILS PROVIDED IN THESE DRAWINGS ARE SUITABLE TO BE INSTALLED IN/ON EXISTING ON-SITE SOILS. ADDITIONAL SOIL PREPARATION MAY BE REQUIRED BY THE GEOTECHNICAL ENGINEER TO INSTALL THESE DETAILS.

**GENERAL:**

1. LANDSCAPING SHALL BE DESIGNED BY CITY OF LAREDO.
2. TYPICAL DEPTH OF A FLAT CURB IS 1-FT OR MATCH THE GRAVEL DEPTH.
3. LIGHTING SHALL BE DESIGNED BY CITY OF LAREDO.

**MATERIAL SUPPLIER LIST:**

ADVANCED DRAINAGE SYSTEMS, INC. (ADS)  
 4640 TRUEMAN BOULEVARD  
 HILLIARD, OHIO 43026  
 PHONE: 800.821.6710  
 WWW.ADS-PIPE.COM

ENVIROGRID  
 8615 GOLEN SPIKE LANE  
 HOUSTON, TEXAS  
 PHONE: 800.434.4743  
 WWW.ENVIROGRID.COM

US FABRICS, INC.  
 3904 VIRGINIA AVENUE  
 CINCINNATI, OHIO 45227  
 PHONE: 800.518.2290  
 WWW.USFABRICSINC.COM

NORTH AMERICAN GREEN  
 14649 HIGHWAY 41 NORTH  
 EVANSVILLE, IN 47725  
 PHONE: 800.772.2040  
 WWW.NAGREEN.COM

AGRI DRAIN CORPORATION  
 1462 340th STREET  
 ADAIR, IA 50002  
 PHONE: 800.232.4742  
 WWW.AGRIDRAIN.COM

**MISCELLANEOUS INFORMATION**

NATURAL STONE HEADWALLS, VERSION 1.0, 6/1/04  
 CENTER FOR DIRT & GRAVEL ROADS STUDIES  
 PENN STATE UNIVERSITY  
 207 RESEARCH UNIT D  
 UNIVERSITY PARK, PA 16802  
 PHONE: 866.863.6787  
 www.dirtandgravelroads.org

**POTENTIAL RECYCLED PLASTIC/RUBBER PARKING STOP SUPPLIERS:**

AMERICAN RECYCLED PLASTICS, INC.  
 1500 MAIN STREET  
 PALM BAY, FLORIDA 32905  
 PHONE: 866.674.1525  
 www.itsrecycled.com  
 Note: This company carries many recycled products such as benches, tables, fencing, etc.

GLOBAL INDUSTRIAL (GLOBAL EQUIPMENT COMPANY), INC.  
 11 HARBOR PARK DRIVE  
 PORT WASHINGTON, NY 11050  
 PHONE: 888.978.7759  
 www.globalindustrial.com

PAVEMENT COATINGS, INC.  
 2120 N. GRAND AVENUE  
 EVANSVILLE, IN 47711  
 PHONE: 800.422.9554  
 www.pavecoat.com

MARKSTAAR, a division of Franklin Marketing, Inc.  
 318 EAST 8TH STREET  
 LA CROSSE, KS 67548  
 PHONE: 888.846.2693  
 www.markstaar.com

MARK	DATE	DESCRIPTION	BY
	4/15/09	DRAFT SUBMITTAL FOR CLIENT REVIEW	DGS
	5/4/09	DRAFT FINAL SUBMITTAL FOR TR	DGS
	5/4/09	MINOR REVISIONS	DGS

Client: SRA BROWNFIELDS WORK ASSIGNMENT 0018  
 Proj. Loc.: LAREDO, TEXAS  
 CITY OF LAREDO, TEXAS  
 LID PARKING LOT DESIGN PILOT PROJECT

Project No.: 103DG1392-1806.02  
 Designed By: DGS  
 Drawn By: DGS  
 Checked By:

**NOTES**  
 Sheet 9 of 9



**TETRA TECH**  
 www.tetratech.com  
 1881 CAMPUS COMMONS DRIVE, SUITE 200  
 RESTON, VA 20191  
 PHONE: 703.391.5875 FAX: 703.391.5876