HISTORIC AND DESIGN REVIEW COMMISSION

April 20, 2016

Agenda Item No: 16

HDRC CASE NO:	**2016-073**
ADDRESS:	203 MCDONALD
LEGAL DESCRIPTION:	NCB: 3957 BLK: 36 LOT: 1A, 2A,12,13 & N IRR PTS OF 3A AND 5 THRU 11
ZONING:	R6-CD H RIO-5
CITY COUNCIL DIST.:	3
DISTRICT:	Mission Historic District
APPLICANT:	Amy Middleton/San Antonio River Authority
OWNER:	San Antonio River Authority
TYPE OF WORK:	SARA trash collection system

REQUEST:

The applicant is requesting a Certificate of Appropriateness to install a trash and floatables collection system in Riverside Creek downstream of Roosevelt Avenue.

APPLICABLE CITATIONS:

UDC Section 35-673 – Site Design Standards
(c) Topography and Drainage. The natural contours of occasional hillsides and riverbanks contribute to the distinct character of the San Antonio River and shall be considered in site designs for new development. Site plans shall minimize the need for cut and fill. It should be considered as an opportunity for positive enhancements through the creative use of terraces and retaining walls.
(5) Design of Stormwater Management Facilities to be a Landscape Amenity. Where above ground stormwater management facilities are required, such facilities shall be multi-purpose amenities. For example, water quality features can be included as part of the site landscaping and detention facilities can be included as part of a hardscape patio. Using an open concrete basin as a detention pond is prohibited. (see Figure 673-3)
(6) Walls and Fences at Detention Areas.
A. When the topography of the site exceeds a four to one (4:1) slope and it becomes necessary to use a masonry wall as part of the detention area, use a textured surface and incorporate plant materials, from the plant list maintained by the parks department, that will drape over the edge to soften the appearance of the structure.
B. The use of solid board or chain link fence with or without slats is prohibited. A welded wire, tubular steel, wrought iron or garden loop is permitted.
(g) Paving Materials. An important San Antonio landscape tradition is the use of decorative surfaces for paving and other landscape structures. Paving materials and patterns should be carefully chosen to preserve and enhance the pedestrian experience.
(1) Vary Walkway, Patio and Courtyard Paving to Add Visual Interest on the Riverside of Properties Abutting the River. Pervious paving is encouraged where feasible and appropriate to the site.
A. A maximum of six hundred (600) square feet is allowed for a single paving material before the paving material must be divided or separated with a paving material that is different in texture, pattern, color or material. A separation using a different material must be a minimum of twenty-four (24) inches wide, the full width of the pathway.
B. A maximum of one hundred (100) lineal feet is allowed in a walkway before the pattern must change in districts "RIO-2," "RIO-3," and "RIO-4." A maximum of five hundred twenty-eight (528) lineal feet is allowed before the pattern must change in districts "RIO-1," "RIO-5" and "RIO-6." The change of material at five hundred twenty-eight (528) lineal feet will define and delineate one-tenth-mile markers.
UDC Section 35-678. – Signs and Billboards in the RIO.
(d)Proportion of Signs. For all signage, signage width and height must be in proportion to the facade, respecting the size, scale and mass of the facade, building height, and rhythms and sizes of window and door openings. The building facade shall be considered as part of an overall sign program but the sign shall be subordinate to the overall building composition. Additionally, signs shall respect and respond to the character and/or period of the area in which they are being placed.

(e)Number and Size of Signs.
(1)Number and Size. The historic and design review commission shall be guided in its decisions by the total number of businesses or services per building and the percentage of visible storefront occupied by each business or service. Applicants may apply for up to three (3) signs total. Total signage for all applicants shall not exceed fifty (50) square feet unless additional signs and/or additional total footage is approved. Additional square footage may be approved provided that the additional signage is in conformity with, and does not interfere with, the pedestrian experience on the Riverwalk. The additional square footage shall be based upon the size and scope of the site. Signs should reflect the type and speed of traffic they are meant to attract. Signs designed for pedestrians and drivers of slow moving cars should not be the same size as signs designed for highway traffic.
(2)Sign Area. The sign area shall be determined in the following manner:
A.Sign Areas. The area of a sign shall be computed on the actual area of the sign. Sign area shall be calculated as the area within a parallelogram, triangle, circle, semicircle or other regular geometric figure including all letters, figures, graphics or other elements of the sign, together with the framework or background of the sign. The supporting framework of the sign shall not be included in determining sign area unless such supporting framework forms an integral part of the sign display, as determined by the historic preservation officer. If the sign is located on a decorative fence or wall, when such fence or wall otherwise meets these or other ordinances or regulations and is clearly incidental to the display itself, the fence or wall shall not be included in the sign area. In the cases of signs with more than one (1) sign face, including but not restricted to double-faced signs, back-to-back signs, overhanging signs, and projecting signs, each side of the sign shall be included in total allowable signage area.

FINDINGS:

a. The applicant received conceptual approval on March 2, 2016; the HDRC approved with the stipulations that the applicant provide detailed information regarding the specific pervious paving product and any landscaping material infill that is to be installed, and that the applicant provide a signage mockup and site plan noting the location of the proposed sign. Signage is no longer part of this request.
b. The applicant has proposed to install a trash and floatables collection system in Riverside Creek downstream of Roosevelt Avenue. The collection system will consist of a headwall being built into the east and west banks with seven to eight collection nets running along the wall with a diameter of thirty inches each. The installation of the headwall as well as the collection nets will prevent the spread of trash impacting Riverside Creek and the surrounding landscape. Neither the proposed headwall nor the proposed nets will extrude above grade. Staff finds this proposal appropriate.
c. To facilitate the removal of collected trash and floatables, the applicant has proposed to install a staging area for maintenance equipment to be located consisting of a pervious paving system. The staging area will consist of a pervious surface in the form of grass pavers, TrueGrid, an asphalt alternative with an erosion –proof grid in the soil, and concealed with grass and gravel. According to the UDC Section 35-673(c)(5), stormwater management facilities should be designed in a way that presents them as multi-purpose facilities. Staff finds the applicant's proposal appropriate and consistent with the UDC.

RECOMMENDATION:

Staff recommends approval based on findings a through c.

CASE MANAGER:

Lauren Sage

N

Flex Viewer

Powered by ArcGIS Server

Printed:Feb 19, 2016

Litter Trap at Riverside Creek
Project Narrative for HDRC Application

The San Antonio River Authority, along with the City of San Antonio, are proposing to put in a trash and floatables collection system in Riverside Creek downstream of Roosevelt Avenue. The collection system will consist of a headwall being built into the east and west banks with 7 collection nets running along the wall. The nets will collect floatable trash and litter when rain events occur. As a part of the operations and maintenance of this device, the nets will be cleaned out no later than 14 days after a rain event. In order to accommodate maintenance equipment access for the device, a staging area consisting of porous pavement will be established between a portion of the parking lot and the creek channel.

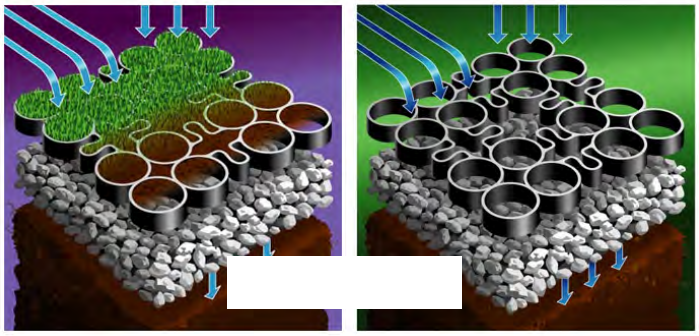
Material descriptions

StormX Device

The StormX device is constructed of stainless steel hubs anchored into concrete for a weir configuration with reusable, commercial-grade, HDPE nets that are UV stabilized with 2.3% carbon black. The device is available in standard sizes ranging from 18 to 72 inches in diameter.

Pavers

The staging area for maintenance equipment traffic will consist of a pervious surface in the form of grass pavers, TrueGrid®. Porous pavement is an environmentally-friendly asphalt alternative established with an erosion-proof grid in the soil. The grid is subsequently concealed after being covered by grass or can be filled with gravel.



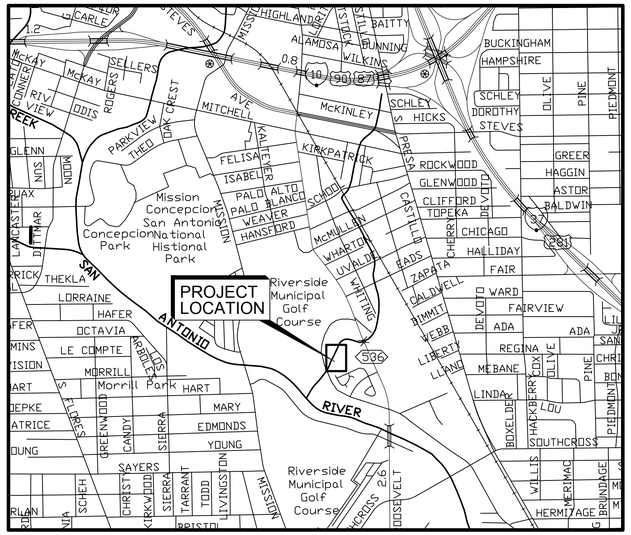
SAN ANTONIO RIVER AUTHORITY

LITTER TRAP INSTALLATION
ON RIVERSIDE CREEK
FISCAL YEAR 2016

SAN ANTONIO RIVER AUTHORITY

Leaders In Watershed Solutions

LOCATION MAP



SHEET INDEX	
SHEET NUMBER	DESCRIPTION
G1	COVER SHEET
G2	GENERAL NOTES
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C2	CIVIL DETAILS 1 OF 2
C3	CIVIL DETAILS 2 OF 2
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S2	STRUCTURAL PLANS- EXISTING & PROPOSED
S3	STRUCTURAL SECTIONS
T1	TREE PRESERVATION-SITE PLAN & NOTES
T2	TREE PRESERVATION-TREE INVENTORY
T3	TREE PRESERVATION-TREE PROTECTION DETAILS
T4	TREE PRESERVATION-TREE PROTECTION DETAILS (CONT.)

PREPARED BY:
HDR Engineering, Inc.

(MARCH 2016)

Cris Parker, P.E.
HDR Engineering, Inc

SET NO. 1

GENERAL NOTES

1. ALL CONSTRUCTION SHALL CONFORM TO THE CITY OF SAN ANTONIO STANDARD SPECIFICATIONS FOR CONSTRUCTION JUNE 2008, OR LATEST
2. NO EXTRA PAYMENT SHALL BE ALLOWED FOR WORK CALLED FOR ON THE PLANS, BUT NOT INCLUDED IN THE BID PROPOSAL. THIS INCIDENTAL WORK WILL BE REQUIRED AND SHALL BE INCLUDED IN THE PAY ITEM TO WHICH IT RELATES.
3. THE CONTRACTOR SHALL PROVIDE ACCESS FOR THE DELIVERY OF MAIL BY THE U.S. POSTAL SERVICE.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR RESTORING TO ITS ORIGINAL OR BETTER CONDITION ANY DAMAGE DONE TO EXISTING FENCES, CONCRETE ISLANDS, STREET PAVING, CURBS, SHRUBS, BUSHES OR DRIVEWAYS. (NO SEPARATE PAY ITEM).
5. IT IS THE CONTRACTOR'S RESPONSIBILITY TO SEE THAT ALL SIGNS AND BARRICADES ARE PROPERLY INSTALLED AND MAINTAINED. ALL LOCATIONS AND DISTANCES WILL BE DECIDED UPON IN THE FIELD BY THE CONTRACTOR, USING THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (2009 WITH REVISIONS). THE CITY'S CONSTRUCTION INSPECTOR AND TRAFFIC ENGINEERING REPRESENTATIVE WILL ONLY BE RESPONSIBLE TO INSPECT BARRICADES AND SIGNS. IF, IN THE OPINION OF THE TRAFFIC ENGINEERING REPRESENTATIVE AND THE CONSTRUCTION INSPECTOR, THE BARRICADES AND SIGNS DO NOT CONFORM TO ESTABLISHED STANDARDS OR ARE INCORRECTLY PLACED OR ARE INSUFFICIENT IN QUANTITY TO PROTECT THE GENERAL PUBLIC, THE CONSTRUCTION INSPECTOR SHALL HAVE THE OPTION TO STOP OPERATIONS UNTIL SUCH TIME AS THE CONDITIONS ARE CORRECTED.
6. IF THE NEED ARISES, ADDITIONAL BARRICADES AND DIRECTIONAL DEVICES MAY BE ORDERED BY THE TRAFFIC ENGINEERING REPRESENTATIVE AT THE CONTRACTOR'S EXPENSE.
7. DUE TO FEDERAL REGULATIONS TITLE 49, PART 192.171 C.P.S. MUST MAINTAIN ACCESS TO GAS VALVES AT ALL TIMES. THE CONTRACTOR MUST PROTECT AND WORK AROUND ANY GAS VALVES THAT ARE IN THE PROJECT AREA.
8. CONTRACTOR SHALL NOTIFY THE CITY INSPECTOR TWENTY FOUR (24) HOURS PRIOR TO BACKFILL OF ANY UTILITY TRENCHES TO SCHEDULE FOR DENSITY TEST AS REQUIRED.
9. CONTRACTOR SHALL PRESERVE ALL CONSTRUCTION STAKES, MARKS, ETC. IF ANY ARE DESTROYED OR REMOVED BY THE CONTRACTOR OR HIS EMPLOYEES, THEY SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.
10. CONTRACTOR SHALL NOTIFY ALL UTILITY COMPANIES PRIOR TO CONSTRUCTION TO DETERMINE THE LOCATION OF EXISTING UTILITIES. CONTRACTOR SHALL NOTIFY THE FOLLOWING AT LEAST FORTY-EIGHT (48) HOURS PRIOR TO EXCAVATION OPERATION:

SAN ANTONIO WATER SYSTEM (SAWS)	233-2010
COSA DRAINAGE	207-8052
COSA SIGNAL OPERATIONS	207-7720 / 207-7765
– TEXAS STATE WIDE ONE CALL LOCATOR	1-800-344-8377
– CITY PUBLIC SERVICE ENERGY	
– TIME WARNER	
– AT&T	
– MCI	

11. THE EXISTENCE AND LOCATION OF UNDERGROUND UTILITIES INDICATED ON THE PLANS ARE TAKEN FROM AVAILABLE RECORDS AND ARE NOT GUARANTEED, BUT SHALL BE INVESTIGATED AND VERIFIED BY THE CONTRACTOR BEFORE STARTING WORK. THE CONTRACTOR SHALL BE HELD RESPONSIBLE FOR ANY DAMAGE TO AND FOR THE MAINTENANCE AND PROTECTION OF THE EXISTING UTILITIES EVEN IF THEY ARE NOT SHOWN ON THE PLANS. LOCATION AND DEPTH OF EXISTING UTILITIES SHOWN HERE ARE APPROXIMATE ONLY. ACTUAL LOCATIONS AND DEPTHS MUST BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION AND HE SHALL BE RESPONSIBLE FOR PROTECTION OF SAME DURING CONSTRUCTION.
12. ALL WASTE MATERIAL SHALL BECOME PROPERTY OF THE CONTRACTOR AND SHALL BE HIS SOLE REPONSIBILITY TO DISPOSE OF THIS MATERIAL OFF THE LIMITS OF THE PROJECT. NO WASTE MATERIAL SHALL BE PLACED IN EXISTING LOWS THAT WILL BLOCK OR ALTER FLOW LIMITS OF EXISTING ARTIFICIAL OR NATURAL DRAINAGE.
13. THE CONTRACTOR SHALL NOT PLACE ANY WASTE MATERIAL IN THE 100-YEAR FLOOD PLAIN WITHOUT FIRST OBTAINING AN APPROVED FLOOD PLAIN DEVELOPMENT PERMIT.
14. THE CONTRACTOR SHALL MAINTAIN ALL ADJOINING STREETS AND TRAVELED ROUTES FREE FROM SPILLED AND / OR TRACKED CONSTRUCTION MATERIALS AND / OR DEBRIS.
15. IF THE CONTRACTOR ENCOUNTERS ANY ARCHAEOLOGICAL DEPOSITS DURING CONSTRUCTION OPERATIONS, THE CONTRACTOR MUST STOP EXCAVATION IMMEDIATELY, CONTACT THE CITY INSPECTOR, AND CALL THE CITY HISTORIC PRESERVATION OFFICE AT 207-7306 OR 207-3327 FOR AN ARCHAEOLOGICAL INVESTIGATION. THE CONTRACTOR CANNOT BEGIN EXCAVATION AGAIN WITHOUT WRITTEN PERMISSION FROM THE CITY.
    IF MORE THAN THREE (3) DAYS ARE REQUIRED FOR INVESTIGATION (NOT INCLUDING HOLIDAY AND WEEKENDS) AND IF THE CONTRACTOR IS UNABLE TO WORK IN OTHER AREAS, THEN THE CONTRACTOR WILL BE ALLOWED TO NEGOTIATE FOR ADDITIONAL CONSTRUCTION TIME UPON WRITTEN REQUEST WITHIN TEN (10) DAYS AFTER THE FIRST NOTICE TO THE CITY OF ARCHAEOLOGICAL INVESTIGATION FOR EACH EVENT.
    IF THE TIME REQUIRED FOR INVESTIGATION IS LESS THAN OR EQUAL TO THREE (3) DAYS FOR EACH EVENT, CONTRACT DURATION WILL NOT BE EXTENDED.
16. IF SUSPECTED CONTAMINATION IS ENCOUNTERED DURING CONSTRUCTION OPERATIONS, C.O.S.A. SHALL BE NOTIFIED IMMEDIATELY WHEN CONTAMINATED SOILS AND / OR GROUNDWATER ARE ENCOUNTERED AT LOCATIONS NOT IDENTIFIED IN THE PLANS. THE NOTIFICATION SHOULD INCLUDE THE STATION NUMBER, TYPE OF CONTAMINATED MEDIA, EVIDENCE OF CONTAMINATION AND MEASURES TAKEN TO CONTAIN THE CONTAMINATED MEDIA AND PREVENT PUBLIC ACCESS. THE CONTAMINATED SOIL AND / OR GROUNDWATER SHALL NOT BE REMOVED FROM THE LOCATION WITHOUT PRIOR C.O.S.A. APPROVAL.
    THE CONTRACTOR MUST STOP THE EXCAVATION IMMEDIATELY AND CONTACT THE C.O.S.A. INSPECTOR. THE CONTRACTOR CANNOT BEGIN EXCAVATION ACTIVITIES WITHOUT WRITTEN PERMISSION FROM THE CITY.
17. CONTRACTOR SHALL NOT REMOVE OR ADJUST ANY VIA FACILITIES. THE CONTRACTOR MUST CONTACT VIA FOURTEEN DAYS PRIOR, FOR THE REMOVAL OF BENCHES, STOP POLES OR ANY OTHER VIA FACILITIES THAT MAY BE PRESENT. PLEASE PROVIDE THIRTY DAYS PRIOR NOTICE FOR SHELTER REMOVAL (TELEPHONE NOS: (210) 362-2155 OR (210) 362-2096). THE CONTRACTOR WILL BE LIABLE FOR ANY DAMAGES TO VIA FACILITIES NOT REMOVED BY VIA. THE CONTRACTOR IS REQUIRED TO REPLACE ALL FLATWORK REMOVED OR DAMAGED IN THE COURSE OF EXECUTING THE CONTRACT UNLESS OTHERWISE NOTED BY VIA. THE CONTRACTOR WILL BE RESPONSIBLE FOR PROTECTING VIA FACILITIES IF ADJACENT TO WORK AREA.

ACCESSIBILITY REQUIREMENTS

1. THE CONTRACTOR SHALL PROVIDE AND MAINTAIN VEHICULAR AND PEDESTRIAN ACCESS AT ALL TIMES TO LOCAL RESIDENCES AND BUSINESSES.
2. WHEN THE WORK REQUIRES THE EXCAVATION OF THE STREET AND THE REMOVAL OF THE EXISTING DRIVEWAY APPROACHES AND SIDEWALKS, THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING TEMPORARY ALL-WEATHER ACCESS TO THE BUSINESSES AND RESIDENCES. THE TEMPORARY DRIVEWAY APPROACHES SHALL BE CONSTRUCTED WITH FLEXIBLE BASE OR GRAVEL MATERIAL AT NO SEPARATE COST TO THE CITY.
3. PRIOR TO INITIATING THE CONSTRUCTION OF NEW DRIVEWAY APPROACHES, THE CONTRACTOR SHALL GIVE ADVANCE WARNING IN PERSON, OR IN WRITING, OF AT LEAST 48 HOURS TO EACH RESIDENCE THAT WILL BE IMMEDIATELY AFFECTED, SO THAT ALTERNATE PLANS MAY BE MADE BY THE RESIDENTS.
4. FOR BUSINESSES WITH MORE THAN ONE DRIVEWAY, AT LEAST ONE DRIVEWAY SHALL REMAIN OPEN WHILE THE OTHER NEW DRIVEWAY APPROACHES ARE CONSTRUCTED. FOR BUSINESSES WITH ONLY ONE DRIVEWAY, THE NEW DRIVEWAY APPROACH SHALL BE CONSTRUCTED IN HALF WIDTHS, UNLESS A TEMPORARY ASPHALT DRIVEWAY IS FIRST INSTALLED AT NO SEPARATE COST TO THE CITY.

NO.	REVISION	DATE	BY

DESIGNED BY: L. STAHNKE
DRAWN BY: L. STAHNKE
CHECKED BY: C. PARKER
APPROVED BY: C. PARKER
DATE: 22 MAR 2016 FILE: G2.DWG

3/31/2016
STATE OF TEXAS
CRISTOPHER L. PARKER
88602
REGISTERED
PROFESSIONAL ENGINEER

HDR

SAN ANTONIO RIVER AUTHORITY
Leaders In Watershed Solutions

SAN ANTONIO RIVER AUTHORITY
100 E. GUENTHER STREET
P.O. BOX 839980
SAN ANTONIO, TEXAS 78283-9980

GENERAL NOTES

0 1" 2" 1"=40'

G2

SHEET 2 OF 12

McDONALD AVE.

EXISTING GOLF COURSE PARKING LOT

SAW CUT AND MATCH EXISTING PAVEMENT GRADE

3'-4" TALL REMOVABLE BOLLARDS CONNECTED BY 1/2" STEEL CABLE REFER TO DETAIL SHEET C2

PROPOSED 2,172 SF PERVIOUS PAVEMENT AREA PER (SS 250) REFER TO PERVIOUS PAVEMENT SECTION DETAIL SHEET C2

1% MINIMUM

1% MINIMUM

REPLACE CAR STOPS WITH TWO REMOVABLE BOLLARDS. RELOCATE 3 CAR STOPS AROUND ADJACENT OAK TREES AS DIRECTED BY OWNER

LOC

20'

38'

28.8'

30.2'

68'

45.3'

225' TO EXISTING HEADWALL

WEIR WALL ALIGNED WITH EDGE OF STAGING AREA

PROPOSED CONCRETE LITTER TRAP STRUCTURE WITH 7-30" STORM WATER SYSTEMS STORM-X DUAL HUB UNITS OR EQUAL (PER SS 450) REFER TO STRUCTURAL SECTIONS SHEET S3

HDPE REUSABLE NETS 7 NETS W/EXTRA SET. 5' MINIMUM LENGTH (PER SS 450) REFER TO STRUCTURAL SECTIONS SHEET S3

RIVERSIDE CREEK

EXISTING 4" CONCRETE LINED CHANNEL 30' BOTTOM WIDTH 1.5':1' SIDE SLOPES

FEMA ZONE A

100 YEAR

560

570

580

N

NOTES:
1. CONTRACTOR SHALL COORDINATE ACCESS TO THE SITE WITH THE SAN ANTONIO RIVER AUTHORITY (SARA).

2. ALL AREAS DISTURBED BY THE CONTRACTOR SHALL BE RESTORED TO EXISTING CONDITIONS OR BETTER AT THE CONTRACTOR'S EXPENSE, NO SEPARATE PAY.

3. DESIGN STORM FLOWS FEMA DFIRM (2010)
Q (10-YR) =1,490 CFS
Q (25-YR) =1,490 CFS
Q (100-YR) =1,490 CFS

4. DESIGN STORM VELOCITIES FEMA DFIRM (2010)
V (10-YR) =8.7 FT/S
V (25-YR) =7.3 FT/S
V (100-YR) =4.4 FT/S

5. CONTRACTOR TO PROVIDE STORMWATER POLLUTION PREVENTION PLAN FOR SARA APPROVAL PRIOR TO THE START OF WORK.

6. DESIGN STORM WSEL FEMA DFIRM (2010)
(10-YR) =573.7 FT (DEPTH=3.7 FT)
(25-YR) =574.7 FT (DEPTH=4.7 FT)
(100-YR) =577.2 FT (DEPTH=7.2 FT)

LITTER TRAP EFFECTIVE UP TO 3 FT OF FLOW DEPTH.

7. CONTRACTOR IS RESPONSIBLE FOR AN APPROVED MUTCD TRAFFIC CONTROL PLAN.

NO.	REVISION	DATE	BY

DESIGNED BY: L. STAHNKE
DRAWN BY: L. STAHNKE
CHECKED BY: C. PARKER
APPROVED BY: C. PARKER
DATE: 22 MAR 2016 FILE: C1.DWG

03/22/2016
STATE OF TEXAS
CRISTOPHER L. PARKER
88602
REGISTERED PROFESSIONAL ENGINEER

HDR

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Leaders In Watershed Solutions

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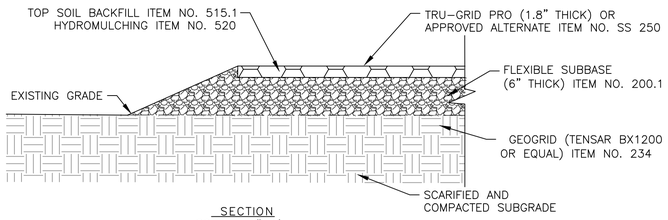
100 E. GUENTHER STREET
P.O. BOX 839980
SAN ANTONIO, TEXAS 78283-9980

SITE LAYOUT

0 1" 2" 1"=10'

C1

SHEET 3 OF 12

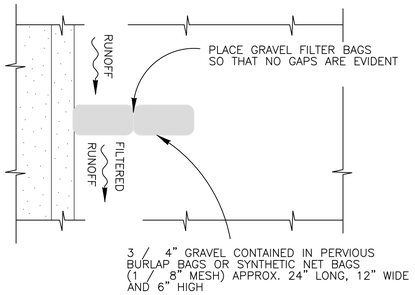


SECTION
SCALE : 1"=1'

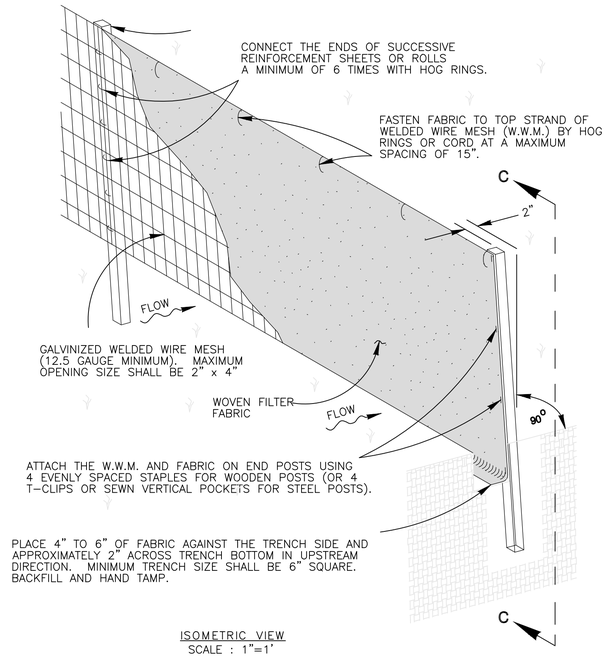
GENERAL NOTES

1. WHERE ABUTTING EXISTING PARKING LOT ASPHALT PAVING, MATCH EXISTING GRADE
2. ALLOW SUBBASE TO DRAIN FREELY ALONG DOWN-GRADIENT EDGE OF PERVIOUS PAVEMENT AREA

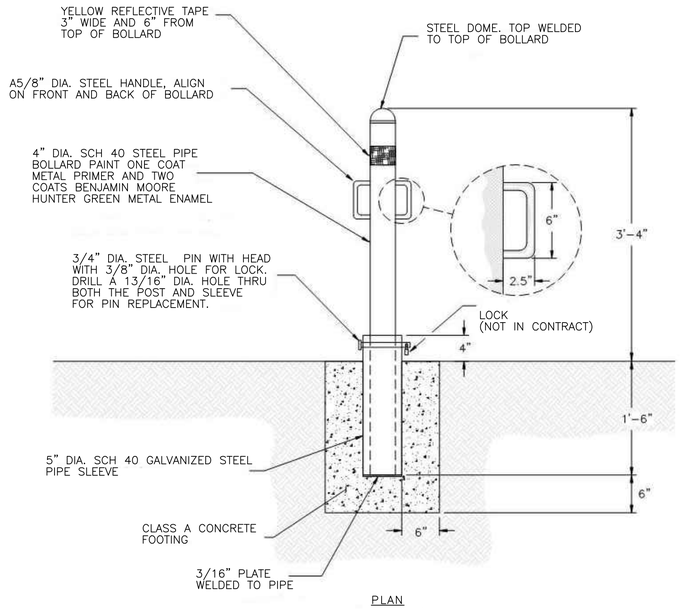
PERVIOUS PAVEMENT



PLAN
SCALE : 1"=2.5'

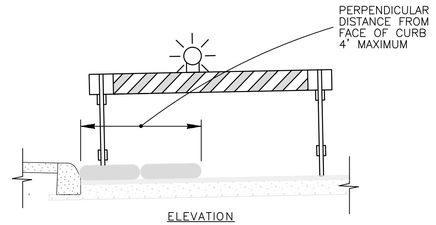


ISOMETRIC VIEW
SCALE : 1"=1'



PLAN
SCALE : 1"=1'

REMOVABLE BOLLARD



ELEVATION

NOTE:
STRADDLE GRAVEL FILTER BAGS WITH TYPE 1 BARRICADES MOUNTED WITH TYPE "A" FLASHING WARNING LIGHT. SEE BARRICADE CONSTRUCTION SIGN DETAILS. PLACE FLASHING LIGHTS AWAY FROM GUTTER, FLUSH WITH OUTSIDE EDGE OF BAG CONFIGURATION.

GRAVEL FILTER BAGS
SCALE : 1"=2.5'

SECTION C-C
SCALE : 1"=1'

SEDIMENT CONTROL FENCE USAGE GUIDELINES

A SEDIMENT CONTROL FENCE MAY BE CONSTRUCTED NEAR THE DOWNSTREAM PERIMETER OF A DISTURBED AREA ALONG A CONTOUR TO INTERCEPT SEDIMENT FROM OVERLAND RUN-OFF. A 2 YEAR STORM FREQUENCY MAY BE USED TO CALCULATE THE FLOW RATE TO BE FILTERED.

SEDIMENT CONTROL FENCE SHOULD BE SIZED TO FILTER A MAXIMUM FLOW THRU RATE OF 100 GPM / FT SQUARED. SEDIMENT CONTROL FENCE IS NOT RECOMMENDED TO CONTROL EROSION FROM A DRAINAGE AREA LARGER THAN 2 ACRES.

GENERAL NOTES

1. THE GUIDELINES SHOWN HEREON ARE SUGGESTIONS ONLY AND MAY BE MODIFIED BY THE ENGINEER.

TEMPORARY SEDIMENT CONTROL FENCE

NO.	REVISION	DATE	BY

DESIGNED BY: L. STAHNKE
DRAWN BY: L. STAHNKE
CHECKED BY: C. PARKER
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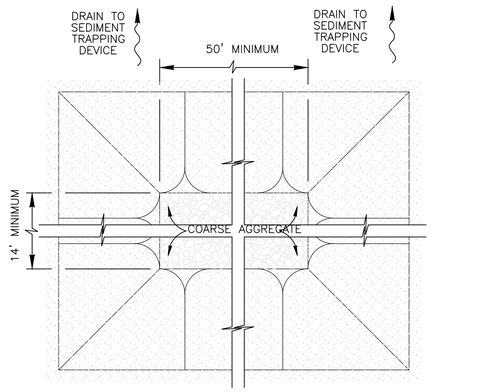
SAN ANTONIO, TEXAS 78283-9980

CIVIL DETAILS 1 of 2

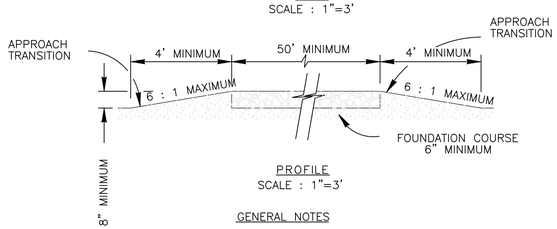
0 1" 2" N.T.S.

C2

SHEET
4 OF 12



PLAN
SCALE : 1"=3'

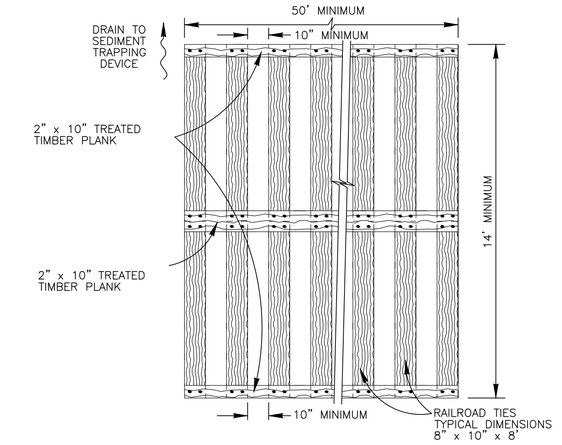


PROFILE
SCALE : 1"=3'

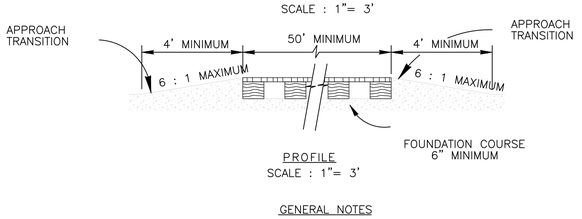
GENERAL NOTES

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.

CONSTRUCTION EXIT – TYPE 1



PLAN
SCALE : 1"= 3'

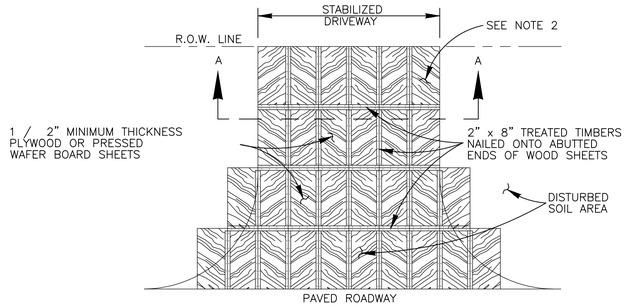


PROFILE
SCALE : 1"= 3'

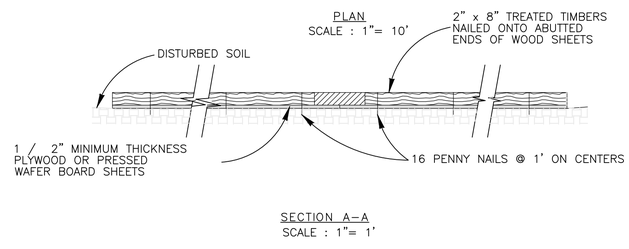
GENERAL NOTES

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 1 / 2" 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 SHOULD 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.

CONSTRUCTION EXIT – TYPE 2



PLAN
SCALE : 1"= 10'



SECTION A–A
SCALE : 1"= 1'

GENERAL NOTES

1. THE LENGTH OF THE TYPE 3 CONSTRUCTION EXIT SHALL BE AS INDICATED 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 2 TO 4 INCHES SPREAD A MINIMUM OF 4 INCHES 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.

CONSTRUCTION EXIT – TYPE 3

NO.	REVISION	DATE	BY

DESIGNED BY: L. STAHNKE
DRAWN BY: L. STAHNKE
CHECKED BY: C. PARKER
APPROVED BY: C. PARKER
DATE: 22 MAR 2016 FILE: C3.DWG

03/22/2016
STATE OF TEXAS
CRISTOPHER L. PARKER
88602
REGISTERED PROFESSIONAL ENGINEER

HDR

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CIVIL DETAILS 2 of 2

0 1" 2" N.T.S.

C3

SHEET 5 OF 12

GENERAL

G01. SCOPE
THE NOTES ON THIS SHEET AND THE STANDARD STRUCTURAL DETAILS ARE GENERAL AND APPLY TO THE ENTIRE PROJECT WHETHER SPECIFICALLY CALLED OUT OR NOT, EXCEPT WHERE THERE ARE SPECIFIC INDICATIONS TO THE CONTRARY ON STRUCTURAL SHEETS. IF THERE ARE QUESTIONS, THEY SHALL BE SUBMITTED TO THE STRUCTURAL ENGINEER AND ANSWERED IN WRITING PRIOR TO CONSTRUCTION.

G02. APPLICABLE SPECIFICATIONS AND CODES
A. INTERNATIONAL BUILDING CODE, IBC 2015 WITH APPLICABLE EDITIONS OF THE CODE REFERENCED STANDARDS.
B. LOCAL JURISDICTION AMENDMENTS

G03. DESIGN CRITERIA
1. APPLIES TO ALL STRUCTURES (UNO)

A. DEAD LOAD:
1. ACTUAL TRIBUTARY STRUCTURE WEIGHT

B. WIND:
1. RISK CATEGORY: 1
2. ULTIMATE WIND SPEED, VULT: 105 MPH
3. NOMINAL WIND SPEED, VASD: 82 MPH

C. SEISMIC:
1. ABOVE GRADE, NON WATER BEARING STRUCTURES:
a. RISK CATEGORY: I
b. IMPORTANCE FACTOR: 1.0
c. SPECTRAL RESPONSE ACCELERATION, SS: 0.081g
d. SPECTRAL RESPONSE ACCELERATION, S1: 0.030g
e. SITE CLASS: D
f. SEISMIC DESIGN CATEGORY: A
g. SPECTRAL RESPONSE COEFFICIENT, SDS: 0.086g
h. SPECTRAL RESPONSE COEFFICIENT, SD1: 0.048g
i. ANALYSIS PROCEDURE: EQUIVALENT LATERAL FORCE

D. SNOW LOAD:
1. GROUND SNOW LOAD, Pg: 5 psf

E. FLOOD CRITERIA:
1. 100 YEAR FLOOD ELEVATION: 577.18'

G04. ASSUMED ALLOWABLE SOIL BEARING PRESSURES ARE AS FOLLOWS:
STORMX SYSTEM SUPPORT WALL: 1500 PSF

G05. SAFETY
SAFETY AND STRUCTURE STABILITY DURING CONSTRUCTION ARE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. STRUCTURES HAVE BEEN DESIGNED TO RESIST THE DESIGN LIVE LOADS ONLY AS A COMPLETED STRUCTURE.

G06. OPENINGS
OPENINGS FOR PIPES, DUCTS, CONDUITS, ETC. ARE NOT ALL SHOWN ON THE STRUCTURAL DRAWINGS. COORDINATE AND PROVIDE OPENINGS AS REQUIRED TO ACCOMMODATE ALL WORK SHOWN OR SPECIFIED IN THE CONTRACT DOCUMENTS AND OTHERWISE REQUIRED FOR THE FURNISHING OF A FUNCTIONALLY COMPLETE PROJECT. REINFORCE AROUND OPENINGS PER STANDARD STRUCTURAL DETAILS UNLESS OTHERWISE SHOWN.

G07. STANDARD DETAILS
THE STANDARD DETAILS DEPICT TYPICAL DETAILING TO BE USED ON THIS PROJECT. IF CONDITIONS ARE NOT EXPLICITLY SHOWN ON THE DRAWINGS THEY SHALL BE MADE SIMILAR TO THE STANDARD DETAILS. OBTAIN APPROVAL OF ENGINEER IN WRITING FOR SIMILAR CONDITIONS PRIOR TO CONSTRUCTION.

G08. THE CONTACTOR SHALL FIELD VERIFY ALL DIMENSIONS AND ELEVATIONS OF EXISTING CONSTRUCTION AS REQUIRED TO COORDINATE NEW CONSTRUCTION. SUBMIT REQUIRED CHANGES FOR APPROVAL.

G09. CONTRACTOR TO SUBMIT FOR REVIEW ALL EQUIPMENT SIZES, OPERATING WEIGHTS, VIBRATION FORCES, SUPPORT LOCATIONS, ALONG WITH ANY OPENINGS, NOTCHES, AND RECESSES REQUIRED BY SUCH EQUIPMENT. CONCRETE SUPPORT PADS AND/OR FRAMING REQUIRED TO SUPPORT SAID EQUIPMENT SHALL NOT BE FABRICATED AND PLACED UNTIL THE CONCRETE SUPPORT PADS AND/OR FRAMING IS APPROVED TO SUPPORT THE EQUIPMENT.

G10. SEE CIVIL DRAWINGS FOR ALL EXTERIOR PAVING AND FLATWORK.

G11. FORMED CONSTRUCTION JOINTS SHALL BE KEYED, CONSTRUCTION JOINTS AT UNFORMED SURFACES SHALL BE ROUGHENED, SEE STANDARD DETAILS.

G12. A MINIMUM 48 HOURS SHALL ELAPSE BETWEEN PLACEMENTS OF ADJACENT CONCRETE CONSTRUCTION AT JOINTS WHERE PLACEMENT IS INTERRUPTED.

CONCRETE

C01. DESIGN STRENGTHS:
F'c: 4,000 PSI
Fy: 60,000 PSI

C02. CONCRETE COVER
UNLESS OTHERWISE NOTED, PROVIDE CONCRETE COVER FOR REINFORCING AS FOLLOWS:
CONCRETE DEPOSITED AGAINST EARTH: 3"
ALL OTHER: 2"
SEE DRAWINGS FOR EXCEPTIONS

C03. SEE SPECIFICATIONS FOR REINFORCING PLACEMENT REQUIREMENTS.

C04. REFER TO OTHER DISCIPLINE DRAWINGS PRIOR TO CONSTRUCTION FOR EMBEDDED ITEMS AND PENETRATIONS NOT SHOWN ON STRUCTURAL DRAWINGS. AS REQUIRED TO ACCOMMODATE ALL WORK SHOWN OR SPECIFIED IN THE CONTRACT DOCUMENTS AND OTHERWISE REQUIRED FOR THE FURNISHING OF A FUNCTIONALLY COMPLETE PROJECT. REINFORCE AROUND OPENINGS PER STANDARD STRUCTURAL DETAILS UNLESS OTHERWISE SHOWN.

C05. PROVIDE 3/4" CHAMFERS AT ALL EXPOSED EDGES AND 1/2" CHAMFERS AT JOINTS AS SHOWN. NOT ALL CHAMFERS MAY BE SHOWN ON DRAWINGS.

C06. FIELD ADJUST REINFORCING AT OPENINGS AND EMBEDDED ITEMS AS INDICATED.

C07. ANCHOR BOLTS NOT SPECIFIED BY ENGINEER SHALL BE DESIGNED AND CERTIFIED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF TEXAS, RETAINED BY THE CONTRACTOR, IN ACCORDANCE WITH APPLICABLE PROJECT AND CODE REQUIREMENTS. SUBMIT AS A SHOP DRAWING FOR REVIEW AND APPROVAL BY THE ENGINEER. COORDINATE LOCATION, SIZE AND EMBEDMENT PRIOR TO CASTING CONCRETE.

C08. ABSOLUTELY NO WELDING OF REINFORCING BARS OR TORCHING TO BEND REINFORCING BARS SHALL BE ALLOWED WITHOUT SPECIFIC APPROVAL FROM THE STRUCTURAL ENGINEER.

C09. CONTRACTOR SHALL SUBMIT A CONCRETE PLACEMENT PLAN IDENTIFYING JOINT TYPES, JOINT LOCATIONS AND CONCRETE PLACEMENT SEQUENCE.

C10. ALL CAST IN PLACE AND POST-INSTALLED ANCHORS INDICATED IN THE STRUCTURAL DOCUMENTS SHALL COMPLY WITH APPENDIX D OF ACI 318 AND CHAPTER 19 OF THE IBC. ALL EXPANSION AND ADHESIVE ANCHORS SHALL HAVE THE ICC REPORT SHOWING EQUIVALENT LOAD CAPACITY. SUBMIT AND INSTALL PER THE ICC EVALUATION REPORT.

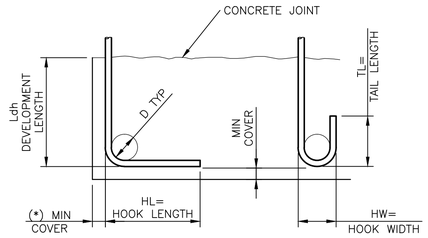
C11. PRIOR TO INSTALLING POST INSTALLED ANCHORS INTO CONCRETE, THE CONTRACTOR SHALL LOCATE REINFORCING. DO NOT DAMAGE CONCRETE REINFORCING.

C12. SEE CIVIL DRAWINGS FOR ALL EXTERIOR PAVING AND FLATWORK.

TESTING

T01: CONTRACTOR SHALL HIRE A QUALIFIED TESTING AGENCY TO PERFORM THE FOLLOWING TESTING AND PROVIDE TEST RESULTS TO THE ENGINEER:

1. TESTING OF MATERIALS AND MIXES PROPOSED BY THE CONTRACTOR FOR COMPLIANCE WITH THE CONTRACT DOCUMENTS AND RETESTING IN THE EVENT OF CHANGES.
2. ADDITIONAL TESTING AND INSPECTION REQUIRED BECAUSE OF CHANGES IN MATERIALS OR PROPORTIONS REQUESTED BY CONTRACTOR.
3. TESTING AND INSPECTION OF CONCRETE AND GROUT PRODUCED FOR INCORPORATION INTO THE WORK DURING THE CONSTRUCTION OF THE PROJECT FOR COMPLIANCE WITH THE CONTRACT DOCUMENTS.
4. ADDITIONAL TESTING OR RETESTING OF MATERIALS OCCASIONED BY THEIR FAILURE, BE TEST OR INSPECTION, TO MEET REQUIREMENTS OF THE CONTRACT DOCUMENTS.
5. IN-PLACE TESTING OF CONCRETE AS MAY BE REQUIRED BY ENGINEER WHEN STRENGTH OF STRUCTURE IS CONSIDERED POTENTIALLY DEFICIENT.
6. OTHER TESTING SERVICES NEEDED OR REQUIRED BY CONTRACTOR SUCH AS FIELD CURING OF TEST SPECIMENS AND TESTING OF ADDITIONAL SPECIMENS FOR DETERMINING WHEN FORMS, FORM SHORING OR RESHORING MAY RE REMOVED.
7. IN-PLACE SOIL DENSITY TESTS OF SUBGRADE AND FILL.
8. CONTRACTOR SHALL PAY FOR SERVICES DEFINED IN THIS PARAGRAPH.
9. SEE SPECIFICATIONS FOR FURTHER CONCRETE AND SOIL TESTING REQUIREMENTS.



90 DEG STD HOOK 180 DEG STD HOOK

BAR SIZE GRADE 60	HL	HW	TL	D	f'c=4.0 OR 4.5 KSI Ldh *
#3	6"	3"	3"	2 1/4"	6"
#4	8"	4"	4 1/2"	3"	7"
#5	10"	5"	5"	3 3/4"	9"
#6	1'-0"	6"	6"	4 1/2"	10"
#7	1'-2"	7"	7"	5 1/4"	12"
#8	1'-4"	8"	8"	6"	14"
#9	1'-7"	11 3/4"	10 1/2"	9 1/2"	15"
#10	1'-10"	1'-1 1/4"	11 1/2"	10 3/4"	17"
#11	2'-0"	1'-2 3/4"	1'-1"	12"	19"

* COMPLYING WITH MINIMUM COVER REQUIREMENTS OF ACI 318, 12.5.3. OTHERWISE Ldh MUST BE RE-CALCULATED.

REINFORCING HOOK SCHEDULE

NTS

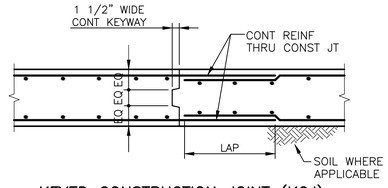
NOTES:

1. LAP LENGTHS SHOWN ARE FOR CLASS "B" TENSION SPLICES.
2. LAP LENGTHS AND EMBEDMENTS SHOWN ARE FOR BARS SPACED LATERALLY ≥ FIVE TIMES THE BAR DIAMETER (CENTER TO CENTER) AND FOR MINIMUM COVER IN ACCORDANCE WITH ACI 318-14.
3. IF SPACING IS < 5 TIMES BAR DIAMETER (CENTER TO CENTER), INCREASE LAP LENGTH AND EMBEDMENT PER ACI-318.
4. TOP REINFORCING IS HORIZONTAL STEEL SO PLACED THAT MORE THAN 12" OF CONCRETE IS CAST IN THE MEMBER BELOW THE REINFORCING.

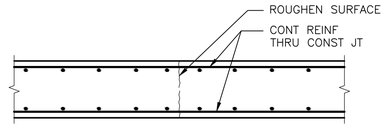
BAR SIZE	f'c = 4.0 - 5.0 ksi, fy = 60.0 ksi			
	LAP LENGTH Ld (IN.)		EMBEDMENT LENGTH (IN.)	
	TOP	OTHER	TOP	OTHER
#3	16	16	12	12
#4	19	16	15	12
#5	24	20	19	15
#6	29	23	22	18
#7	42	33	33	25
#8	48	38	37	29
#9	60	47	46	36
#10	74	57	57	44
#11	89	69	68	53

LAP LENGTHS

NTS



KEYED CONSTRUCTION JOINT (KCJ)



ROUGHEN CONSTRUCTION JOINT (CJ)

NOTES:

1. JOINT MAY BE FORMED WITH 1/2" CHAMFER STRIPS BACK-TO-BACK AT WALLS, CONTRACTOR'S OPTION.
2. TO BE USED ONLY WHERE CALLED FROM IN THE CONTRACT DOCUMENTS, OR AS PERMITTED BY THE ENGINEER.

CONSTRUCTION JOINT

NTS

NO.	REVISION	DATE	BY

DESIGNED BY: H. CLOUDT
DRAWN BY: D. GROSENBACHER
CHECKED BY: S. PEARCE
APPROVED BY: H. CLOUDT
DATE: 22 MAR 2016 FILE: S1.DWG

STATE OF TEXAS
HARDING C. CLOUDT
117100
LICENSED
PROFESSIONAL ENGINEER
3/24/16

HDR

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Leaders In Watershed Solutions

SAN ANTONIO RIVER AUTHORITY
100 E. GUENTHER STREET
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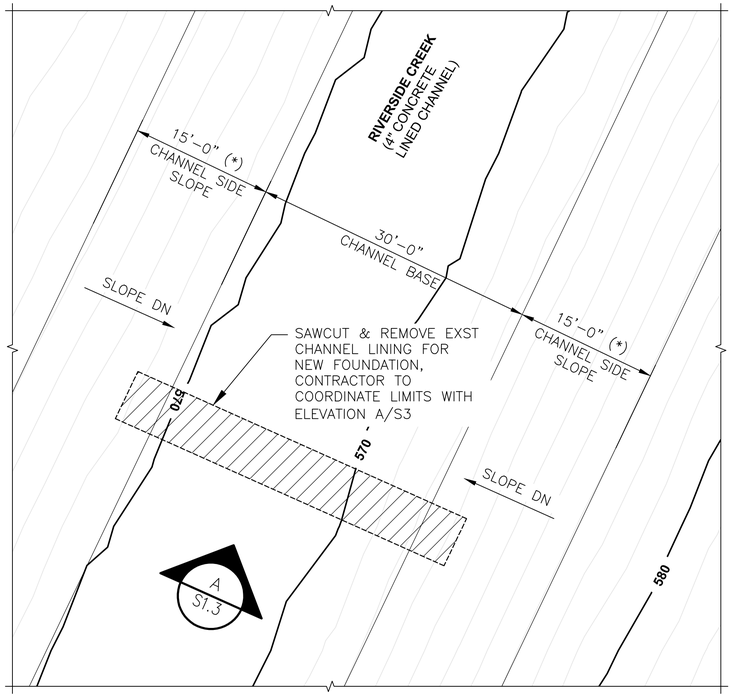
SAN ANTONIO, TEXAS 78283-9980

STRUCTURAL GENERAL NOTES

0 1" 2"
AS NOTED

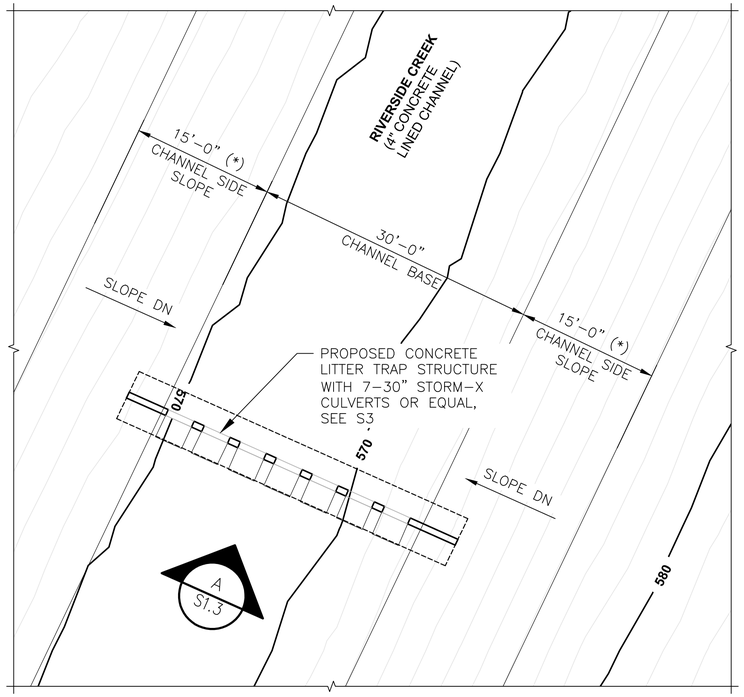
S1

SHEET 6 OF 12



EXISTING PLAN LAYOUT

1"=10'



PROPOSED PLAN LAYOUT

1"=10'

PLAN NOTES:

1. SEE S1 FOR GENERAL STRUCTURAL NOTES AND STANDARD DETAILS.
2. CONTRACTOR SHALL REVIEW EXISTING CHANNEL DRAWINGS BY GULLATT, LODAL AND ASSOCIATES, DATED AUGUST 1, 1959, FOR ALL DETAILS PERTAINING TO THE EXISTING STRUCTURE. CONTRACTOR TO VERIFY ALL DIMENSIONS SHOWN WITH EXISTING CONSTRUCTION AND REPORT ANY DISCREPANCIES TO THE ENGINEER.
3. DIMENSIONS INDICATED BY (*) SHALL BE VERIFIED BY THE CONTRACTOR BASED ON ACTUAL EQUIPMENT OR COMPONENTS SUPPLIED.
4. SEE CIVIL DRAWINGS FOR ALL EXTERIOR PAVING AND FLATWORK.
5. FORMED CONSTRUCTION JOINTS SHALL BE KEYED, CONSTRUCTION JOINTS AT UNFORMED SURFACES SHALL BE ROUGHENED, SEE STANDARD DETAILS.
6. A MINIMUM 48 HOURS SHALL ELAPSE BETWEEN PLACEMENTS OF ADJACENT CONCRETE CONSTRUCTION AT JOINTS WHERE PLACEMENT IS INTERRUPTED.
7. ALL CONCRETE SHALL BE WET-CURED FOR A MINIMUM 7 DAYS, SEE SPECIFICATIONS.
8. ALL STRUCTURAL CONCRETE FOOTINGS AND WALLS SHALL MEET REQUIREMENTS FOR CLASS "S" CONCRETE PER CITY OF SAN ANTONIO STANDARD SPECIFICATIONS ITEM 300.
9. ALL CONCRETE REINFORCING STEEL SHALL MEET THE REQUIREMENTS FOR ASTM A 615, GRADE 60, DEFORMED BAR, AND CITY OF SAN ANTONIO STANDARD SPECIFICATION ITEM 301.
10. FOOTING SUBGRADE MATERIAL SHALL BE FLEXIBLE BASE AND MEET REQUIREMENTS OF CITY OF SAN ANTONIO STANDARD SPECIFICATION ITEM 200.
11. EPOXY ADHESIVE MATERIAL SHALL MEET REQUIREMENTS FOR TYPE III ADHESIVE PER TXDOT DMS-6100. SET-XP BY SIMPSON STRONG-TIE OR APPROVED EQUAL.
12. STORM-X SYSTEM ANCHORS AND HARDWARE SHALL BE STAINLESS STEEL TYPE 316.
13. EXPANSION JOINT FILLER, SEALANT, BACKING ROD, AND MATERIAL SHALL BE MEET REQUIREMENTS OF TXDOT DMS-6310. SEALANT SHALL BE CLASS 5. FILLER SHALL BE REBONDED NEOPRENE.

NO.	REVISION	DATE	BY

DESIGNED BY: H. CLOUDT
DRAWN BY: D. GROSENBACHER
CHECKED BY: S. PEARCE
APPROVED BY: H. CLOUDT
DATE: 22 MAR 2016 FILE: S2.DWG

STATE OF TEXAS
HARDING C. CLOUDT
117100
LICENSED
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3/24/16

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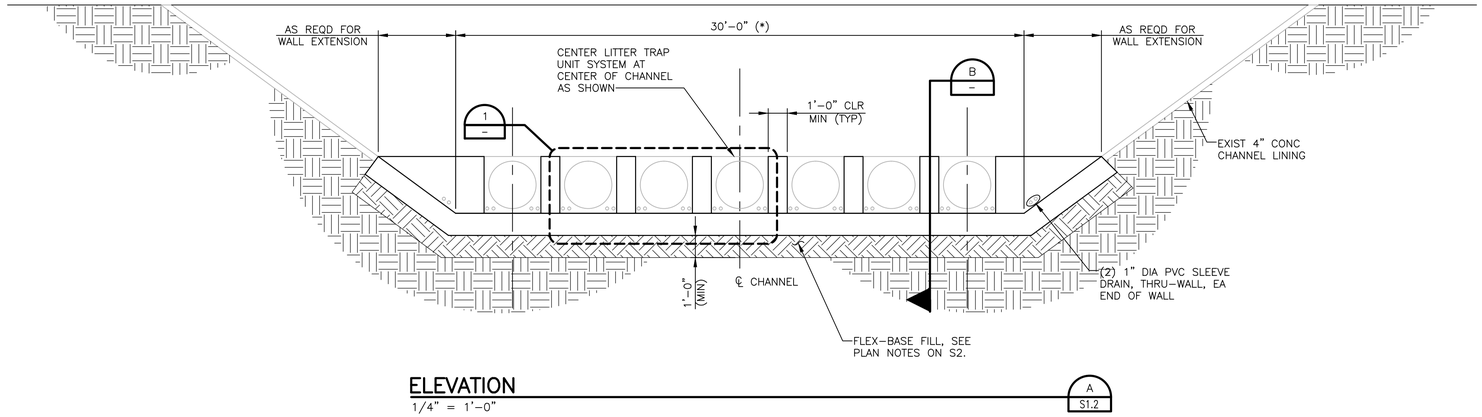
STRUCTURAL
PLANS - EXISTING AND PROPOSED

0 1" 2"

AS NOTED

S2

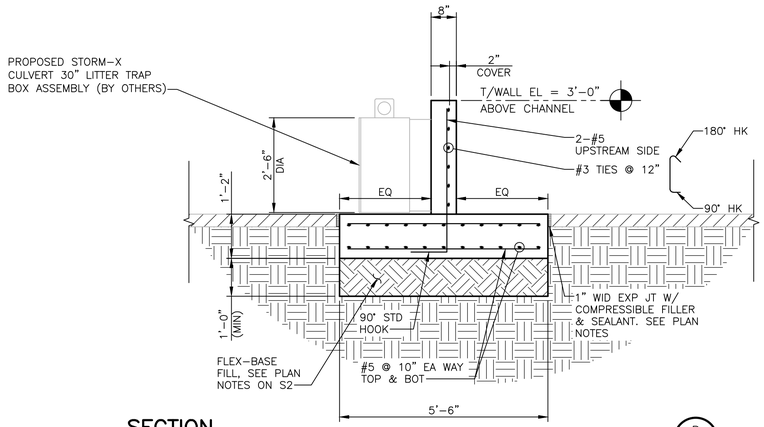
SHEET
7 OF 12



ELEVATION

1/4" = 1'-0"

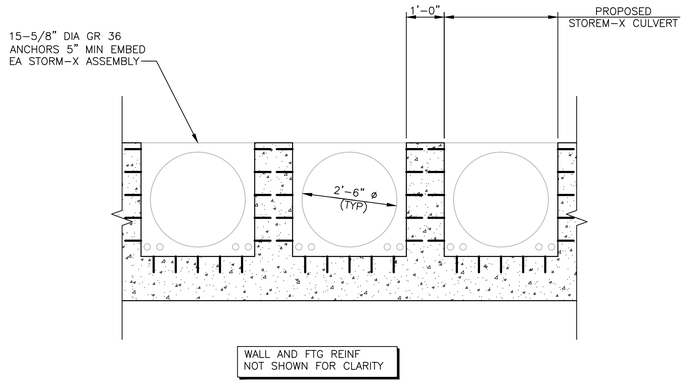
A
S1.2



SECTION

1/2" = 1'-0"

B
–



DETAIL

1/2" = 1'-0"

1
–

NO.	REVISION	DATE	BY

DESIGNED BY: H. CLOUDT
DRAWN BY: D. GROSENBACHER
CHECKED BY: S. PEARCE
APPROVED BY: H. CLOUDT
DATE: 22 MAR 2016 FILE: S3.DWG

STATE OF TEXAS
HARDING C. CLOUDT
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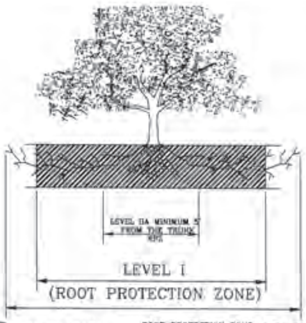
STRUCTURAL SECTIONS

0 1" 2"

AS NOTED

S3

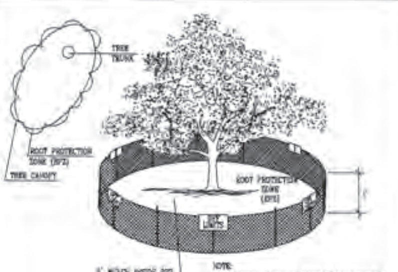
SHEET 8 OF 12



(1.1.1) ELEVATION

N. T. S.

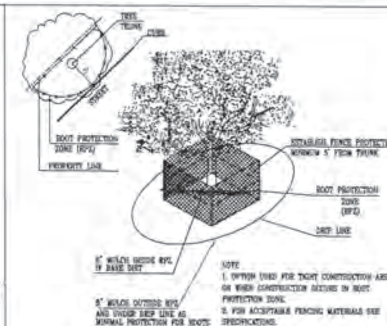
ROOT PROTECTION ZONE THE ROOT PROTECTION ZONE IS A CIRCULAR AREA AROUND A TREE THAT IS BASED ON THE DIAMETER OF THE TREE. EACH 1 INCH DIAMETER OF THE TREE EQUALS 1 FOOT RADIUS FOR ROOT PROTECTION ZONE.



NOTE:
1. THE FENCING SHOWN ABOVE IS DIAGRAMATIC ONLY AND WILL CONFORM TO THE DRIP LINE AND LIMITED TO PROJECT BOUNDARY.
2. FOR ACCEPTABLE FENCING MATERIALS SEE SPECIFICATIONS.

(1.1.2) LEVEL I & FENCE PROTECTION

N. T. S.



NOTE:
1. OPTION USED FOR TIGHT CONSTRUCTION AREAS OR WHEN CONSTRUCTION OCCURS IN ROOT PROTECTION ZONE.
2. FOR ACCEPTABLE FENCING MATERIALS SEE SPECIFICATIONS.

(1.1.3) LEVEL II A FENCE PROTECTION

N. T. S.

GENERAL NOTES

1. ALL THE TREES WITH A DIAMETER GREATER THAN 3 INCHES AFFECTED BY CONSTRUCTION SHALL HAVE THE LIMBS AND ROOTS TRIMMED AND PRUNED ACCORDING TO ITEM No. 802 TREE PRUNING, SOIL AMENDING AND FERTILIZATION. UNLESS SPECIFIED TREES SHALL RECEIVE LEVEL 2 PROTECTION AS PER ITEM No. 802. TREES TO RECEIVE LEVEL 1 PROTECTION AS PER ITEM No. 802 ARE SHOWN ON TREE PROTECTION TABLE ON THIS SHEET.

2. ALL TREES SHALL REMAIN UNLESS NOTED ON THE PLANS.

3. NO SITE PREPARATION WORK SHALL BEGIN IN AREAS WHERE TREE PRESERVATION AND TREATMENT MEASURES HAVE NOT BEEN COMPLETED AND APPROVED.

4. TREE PROTECTION FENCING SHALL BE REQUIRED. TREE PROTECTION FENCING SHALL BE INSTALLED, MAINTAINED AND REPAIRED BY THE CONTRACTOR DURING SITE CONSTRUCTION.

5. THE CONTRACTOR SHALL AVOID CUTTING ROOTS LARGER THAN THREE INCHES IN DIAMETER WHEN EXCAVATING NEAR EXISTING TREES. EXCAVATION IN THE VICINITY OF TREES SHALL PROCEED WITH CAUTION. THE CONTRACTOR SHALL CONTACT THE CITY INSPECTOR.

6. THE ROOT PROTECTION ZONE IS THAT AREA SURROUNDING A TREE, AS MEASURED BY A RADIUS FROM THE TREE TRUNK, IN WHICH NO EQUIPMENT, VEHICLES OR MATERIALS MAY OPERATE OR BE STORED. THE REQUIRED RADIUS LENGTH IS 1 FOOT PER DIAMETER INCH OF THE TREE. FOR EXAMPLE, A 10-INCH DIAMETER TREE WOULD HAVE A 5-FOOT RADIUS ROOT PROTECTION ZONE AROUND THE TREE. ROOTS OR BRANCHES THAT ARE IN CONFLICT WITH THE CONSTRUCTION SHALL BE CUT CLEANLY ACCORDING TO PROPER PRUNING METHODS. LIVE OAK WOUNDS SHALL BE PAINTED OVER, WITHIN 20 MINUTES TO PREVENT OAK WILT.

7. ACCESS TO FENCED AREAS WILL BE PERMITTED ONLY WITH THE APPROVAL OF THE ENGINEER OR CITY INSPECTOR.

8. GRADING, IF REQUIRED, SHALL BE LIMITED TO A 3 INCH CUT OR FILL WITHIN THE FENCED ROOT ZONE AREAS.

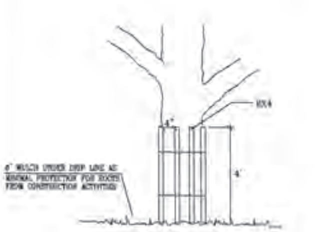
9. TREES, SHRUBS OR BUSHES TO BE CLEARED FROM PROTECTED ROOT ZONE AREAS SHALL BE REMOVED BY HAND AS DIRECTED BY THE PROJECT MANAGER OR CITY INSPECTOR.

10. TREES DAMAGED OR LOST DUE TO CONTRACTOR'S NEGLIGENCE DURING CONSTRUCTION SHALL BE MITIGATED TO THE ENGINEER'S SATISFACTION.

11. EXPOSED ROOTS SHALL BE COVERED AT THE END OF EACH DAY USING TECHNIQUES SUCH AS COVERING WITH SOIL, MULCH OR WET BURLAP.

12. ANY TREE REMOVAL SHALL BE APPROVED BY THE CITY ARBORIST PRIOR TO ITS REMOVAL.

(1.3) GENERAL NOTES



NOTE:
WRAP TREE TRUNK WITH 2"X4" STUDS AND ROPE OR BAND IN PLACE AS NEEDED TO PROTECT TREES IN WORK AREAS.

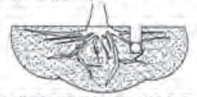
(1.1.4) LEVEL II B FENCE PROTECTION

N. T. S.

TREES THAT ARE MARKED TO BE PRESERVED ON A SITE PLAN AND FOR WHICH UTILITIES MUST PASS TROUGH THEIR ROOT PROTECTION ZONES MAY REQUIRE TUNNELING AS OPPOSED TO OPEN TRENCHES. THE DECISION TO TUNNEL WILL BE DETERMINED ON A CASE BY CASE BASIS BY THE ENGINEER.

TUNNELS SHALL BE DUG THROUGH THE ROOT PROTECTION ZONE IN ORDER TO MINIMIZE ROOT DAMAGE.

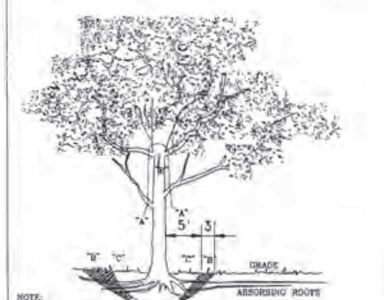
TUNNEL TO MINIMIZE ROOT DAMAGE (TOP) AS OPPOSED TO SURFACE-DUG TRENCHES IN ROOT PROTECTION ZONE WHEN THE 5' MINIMUM DISTANCE FROM TRUNK CAN NOT BE ACHIEVED.



OPEN TRENCHING MAY BE USED IF EXPOSED TREE ROOTS DO NOT EXCEED 3" OR ROOTS CAN BE BENT BACK.

(1.2) BORING THRU TREE ROOT ZONE

N. T. S.



NOTE:

A" REMOVE BULKY TREE PARTS "SHRED" AND/OR HAUL SEPARATELY

"B" BEGIN EXCAVATION APPROX. 8' FROM THE TRUNK – CUT THRU ANCHOR ROOTS AT AN ANGLE – 3' TO 4' DEEP

"C" USING TREE TRUNK AS A LEVER PUSH AT POINT "E" TO REMOVE TREE BOLE AND LARGE FEEDER ROOTS (4" TO 10" IN DIAM.)

"D" BACKFILL HOLE AND CLEAN UP

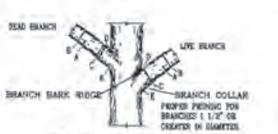
(1.3) TREE REMOVAL DIAGRAM

N. T. S.

TREE PROTECTION TABLE

				PROTECTION MEASURE		
TREE	TREE/CALIPER	STATION OR	LOCATION	ITEM 801	ITEM 802 MAINTENCE/	REMOVAL
SHEET #	SHEET #	NUMBER			TREATMENTS/ PROTECTION	SEE GENERAL NOTE No. 2
	SEE TREE PRESERVATION PLAN SHEETS					

(1.3) TREE PROTECTION TABLE



NOTE: DO NOT CUT FROM D to E.

A. FIRST CUT – TO PREVENT THE BARK FROM BEING PEELED WHEN THE BRANCH FALLS
B. SECOND CUT – TO REDUCE THE WEIGHT OF BRANCH
C. FINAL CUT – ALLOW FOR HEALING COLLAR BUT NO STUBS
D. BRANCH RIDGES – INDENT PROPERLY BRANCH RIDGES WHICH ARE SITE FOR DECAY.

FOR OAKS ONLY: PAINT ALL WOUNDS OR CUTS WITH PRUNING PAINT WITH 20 MIN TO PREVENT THE SPREAD OF OAK WILT.

(1.4) BRANCH PRUNING DETAIL

N. T. S.

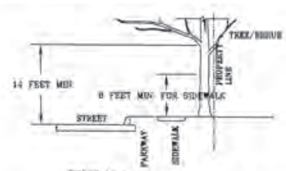
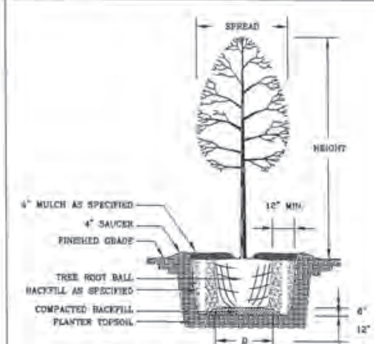


FIGURE No.2:

A MINIMUM BRANCH CLEARANCE OF 14 FEET ABOVE STREET ELEVATION MUST BE MAINTAINED FROM THE PROPERTY LINE TO THE CURB LINE AS PRESCRIBED BY PROJECT MANAGER.

(1.5) BRANCH CLEARANCE DETAIL

N. T. S.



(1.6) NEW TREE PLANTING DETAIL

N. T. S.

TREE INVENTORY SUMMARY
(8" DIAMETER AND LARGER)

TOTAL DIAMETER INCHES R.O.W	302
TOTAL DIAMETER INCHES REMOVED	162
TOTAL DIAMETER INCHES PRESERVED	135
TOTAL PERCENTAGE INCHES PRESERVED	50
TOTAL INCHES TO BE MITIGATED	15.5

(1.3) TREE INVENTORY SUMMARY

SHEET 23 OF 26

PREPARED BY: FERNANDEZ FRAZER WHITE & ASSOC. INC. & C. F. ZAVALA GROUP

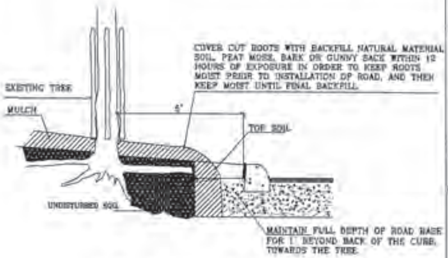
CITY OF SAN ANTONIO

DEPARTMENT OF PUBLIC WORKS

CITY OF SAN ANTONIO
TREE PROTECTION DETAILS

TREE PRESERVATION

DESIGNED:	FED. RD. DIV. NO.	STATE					SHT. NO.
CHECKED:		TEXAS					1 OF 4
DRAWN:	STATE DIST. NO.	COUNTY	CONTROL NO.	SECT. NO.	JOB NO.		HIGHWAY NO.
CHECKED:		BEXAR					

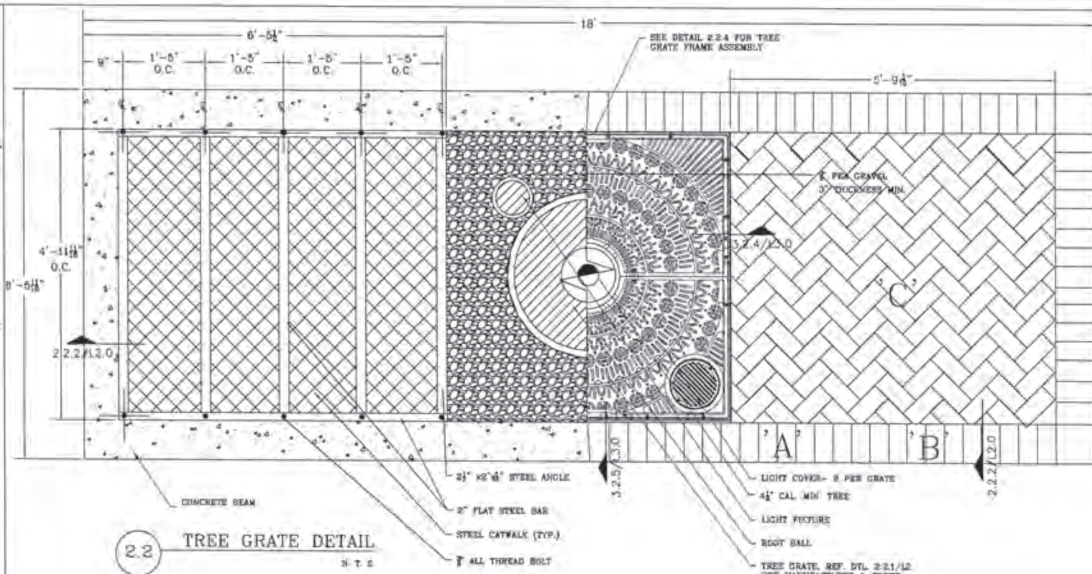


NOTE: ROOT ZONE OUTSIDE OF TREE PROTECTION BARRIER SHOULD BE COVERED AT ALL TIMES WITH 6" OF BARK MULCH THROUGHOUT THE CONSTRUCTION PHASE. EXISTING TREES SHOULD BE DEEP WATERED AS SPECIFIED IN ITEM 801 & 802

2.1 EXPOSED ROOT PROTECTION DETAIL

N. T. S.

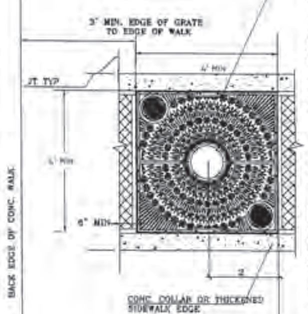
NOTE:
FOR THOSE TREES THAT DO NOT MEET THE TREE PRESERVATION ORDINANCE REQUIREMENTS PRESERVATION SHALL BE DETERMINED ON A CASE BY CASE BASIS



2.2 TREE GRATE DETAIL

N. T. S.

NOTES:
1. PAVER 'A' 8$\frac{5}{16}$" - 3⅛" THICKNESS
CONC. PAVER(CITY STONE II) CASTONE COLOR, BY PAVESTONE 1-800-580-PAVE.
2. PAVER 'B' 4$\frac{5}{16}$" X 8$\frac{5}{16}$" - 3⅛" THICKNESS, PATTERN AS SHOWN ON PLAN, CONC. PAVER(HOLLAND STONE) CAST STONE COLOR, MANUF. BY PAVESTONE.
3. PAVER 'C' 4$\frac{5}{16}$" X 8$\frac{5}{16}$" - 3⅛" THICKNESS, 45° HERRINGBONE PATTERN, CONC. PAVER(HOLLAND STONE), ANTIQUE COLOR, MANUF. BY PAVESTONE.



TREE GRATE, NEENAH FOUNDRY, MODEL R-8754, 1-800-558-5075

DIMENSIONAL REQUIREMENTS:
- 25 SQ. FT MIN. TREE GRATE SIZE (5'X5' & 4'X6' TYP).
- 2'-0" MIN. REQUIRED BETWEEN EXISTING TREE CENTER LINE AND FACE OF CURB.
- 3'-0" MIN. REQUIRED BETWEEN EXISTING TREE CENTER LINE & CONC. PAVEMENT (SIDE WALK OR CON. COLLAR).
-4'-0" MIN. CONC. WALKING SURFACE.
-1'-0" MIN. CENTER GRATE OPENING (1'-6" RECOMMENDED).

NOTE:
INSTALLATIONS REQUIRING LESS THAN STANDARD MIN. CLEARANCES SHALL BE ALLOWED ONLY WITH SPECIFIC APPROVAL BY THE ENGINEER.

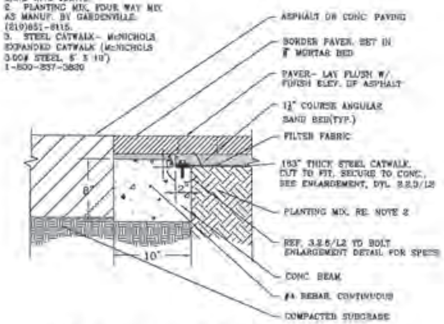
NOTE:
SEE SHEET 2 DETAIL 4 FOR SUBSURFACE TREATMENT OF WALK.

NOTE:
FOR THOSE TREES THAT DO NOT MEET THE TREE PRESERVATION ORDINANCE REQUIREMENTS PRESERVATION SHALL BE DETERMINED ON A CASE BY CASE BASIS.

2.2.1 TREE GRATE PLAN VIEW

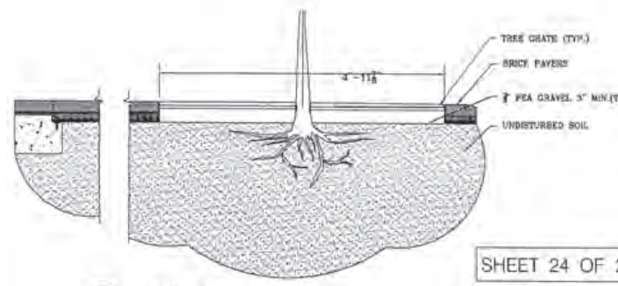
N. T. S.

NOTES:
1. COMPACT, VIBRATE & SWEEP SAND INTO JOINTS.
2. PLANTING MIX, FOUR WAY MIX AS MANUF. BY GARDENVILLE. (210)651-6115.
3. STEEL CATWALK- McNICHOLS EXPANDED CATWALK (McNICHOLS 3.00# STEEL, 6" X 10") 1-800-237-3820



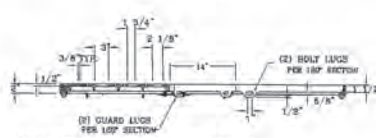
2.2.2 SECTION: PAVER @ ASPHALT

N. T. S.



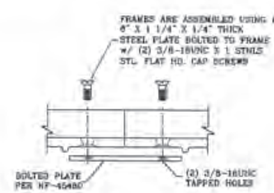
2.2.3 TREE WELL SECTION

N. T. S.



2.2.4 SECTION: TREE GRATE FRAME

N. T. S.



2.2.5 SECTION: GRATE FRAME ASSEMBLY

N. T. S.

SHEET 24 OF 26

PREPARED BY FERNANDEZ FRAZER WHITE & ASSOC. INC & C. F. ZAVALA GROUP

CITY OF SAN ANTONIO

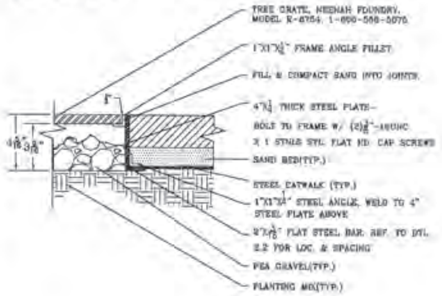
DEPARTMENT OF PUBLIC WORKS

CITY OF SAN ANTONIO
TREE PROTECTION DETAILS

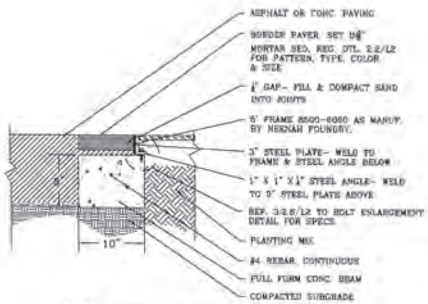
TREE PRESERVATION

DESIGNED:	FED. RD. DIV. NO.	STATE		SHT. NO.
CHECKED:		FEDERAL		2 OF 4
DRAWN:	STATE DIST. NO.	COUNTY	CONTROL NO. / SECT. NO. / JOB NO.	HIGHWAY NO.
CHECKED:		DESIGN		

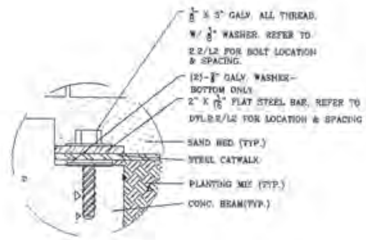
NOTES:
1. 5" FRAME 8500-6060 AS MANUFACTURED BY NEENAH FOUNDRY.
2. REMOVE CROSSBAR FROM FRAME BEFORE INSTALLATION.



3.2.4 TREE GRATE/FRAME @ PAVERS
N.T.S.



3.2.5 SECTION: PAVER @ TREE GRATE
N.T.S.



3.2.6 DETAIL: BOLT/CONC. CONNECTION
N.T.S.

ADDITIONAL GENERAL NOTES

1. NO UTILITY OR STREET EXCAVATION WORK SHALL BEGIN IN AREAS WHERE TREE PRESERVATION AND TREATMENT MEASURES HAVE NOT BEEN COMPLETED AND APPROVED. A PRE-CONSTRUCTION CONFERENCE WITH THE CITY ARBORIST TO REVIEW PROCEDURES FOR PROTECTION AND MANAGEMENT OF ALL SIGNIFICANT, HERITAGE OR MITIGATION TREES IS REQUIRED.

2. TREE PROTECTION FENCING SHALL BE REQUIRED. TREE PROTECTION FENCING SHALL BE INSTALLED, MAINTAINED AND REPAIRED BY THE CONTRACTOR DURING SITE CONSTRUCTION. DURING CONSTRUCTION ACTIVITY ON SITE, AT LEAST A 3-INCH LAYER OF COURSE MULCH SHALL BE PLACED AND MAINTAINED OVER THE ROOT PROTECTION ZONE.

3. THE CONTRACTOR SHALL AVOID CUTTING ROOTS LARGER THAN ONE-INCH IN DIAMETER WHEN EXCAVATING NEAR EXISTING TREES. EXCAVATIONS IN THE VICINITY OF TREES SHALL PROCEED WITH CAUTION. THE CONTRACTOR SHALL CONTACT THE CITY INSPECTOR FOR GUIDANCE.

4. EXPOSED ROOTS SHALL BE COVERED AT THE END OF THE WORK DAY USING TECHNIQUES SUCH AS COVERING WITH SOIL, MULCH OR WET BURLAP.

5. NO EQUIPMENT, VEHICLES OR MATERIALS SHALL BE OPERATED OR STORED WITHIN THE ROOT PROTECTION ZONE OF ANY TREE NEAR THE PROJECT. THE ROOT PROTECTION ZONE SHALL BE AN AREA DEFINED BY AN AVERAGE RADIUS EXTENDING OUTWARD FROM THE TRUNK OF THE TREE A DISTANCE OF ONE (1) LINEAR FOOT FOR EACH INCH DIAMETER INCH BREAST HEIGHT (4.5 ') OF THE TREE. A 10-INCH DIAMETER TREE WILL HAVE A 10 FOOT RADIUS ROOT PROTECTION ZONE.

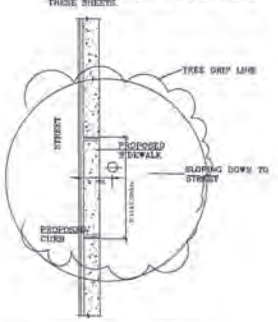
6. ALL BROKEN BRANCHES AND EXPOSED ROOTS TWO (2) INCHES IN DIAMETER OR GREATER OF SIGNIFICANT, HERITAGE OR MITIGATION TREES SHALL BE CUT CLEANLY AND IN ACCORDANCE WITH ANSI A300 STANDARDS. IN THE CASE OF OAK SPECIES, IN ORDER TO PREVENT INFECTION BY OAK WILT SPORES, WOUNDS MUST BE PAINTED WITH AN ACCEPTABLE WOUND DRESSING WITHIN THIRTY (30) MINUTES.

7. ANY TREE REMOVAL SHALL BE APPROVED BY THE CITY ARBORIST (207-8053)

8. TREES WHICH ARE DAMAGED OR LOST DUE TO THE CONTRACTOR'S NEGLIGENCE DURING CONSTRUCTION SHALL BE MITIGATED TO THE CITY'S SATISFACTION.

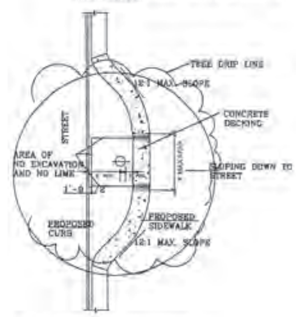
Trees shall be maintained in a healthy condition for the duration of the contract for this project. Maintenance shall include but be not limited to: irrigating, fertilizing, pruning and other maintenance as needed. Pruning shall be done by a Certified Arborist with a city issued Tree Maintenance License under direction of the City Arborist. Irrigation may be provided by temporary measures such as de-contaminated 55 gallon drums (5-6) placed within the drip line of each tree and filled twice a week.

AREA BENEATH PROPOSED SIDEWALKS IN THE DRIP LINE OF AN EXISTING TREE SHALL RECEIVE TREE VENTING AS PER OPTIONS ON THESE SHEETS.



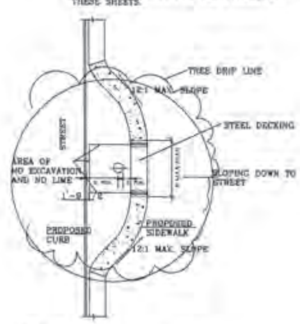
3.3 ELEVATED WALKWAY
N.T.S.

AREA BENEATH PROPOSED SIDEWALKS IN THE DRIP LINE OF AN EXISTING TREE SHALL RECEIVE TREE VENTING AS PER OPTIONS ON THESE SHEETS.



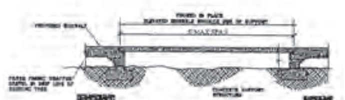
3.3.1 ELEVATED WALKWAY /CONCRETE DECKING N.T.S.

AREA BENEATH PROPOSED SIDEWALKS IN THE DRIP LINE OF AN EXISTING TREE SHALL RECEIVE TREE VENTING AS PER OPTIONS ON THESE SHEETS.



3.3.2 ELEVATED WALKWAY /STEEL DECKING N.T.S.

NOTE:
DESIGN STEEL PLATE SUPPORT ACCORDING TO SPECIFIED WIDTH AND LENGTH



3.3.4 ELEVATED WALKWAY SECTION
N.T.S.

NOTE:
FOR THOSE TREES THAT DO NOT MEET THE TREE PRESERVATION ORDINANCE REQUIREMENTS PRESERVATION SHALL BE DETERMINED ON A CASE BY CASE BASIS

NOTE: FOR TREE AERATION SYSTEMS LOCATED UNDER A PRIVATE OR PUBLIC ROADWAY - THE PROJECT ENGINEER SHALL SUBMIT FOR APPROVAL A PAVEMENT DESIGN SUPPORTED BY A GEOTECHNICAL REPORT THAT MEETS THE REQD. STRUCTURAL NUMBERS AND COMPACTION OF THE SUBGRADE, ABOVE THE PROPOSED SYSTEM OF TREE AERATION, IN ACCORDANCE WITH UDC 35-506(P) PAVEMENT STANDARDS, AND CITY OF SAN ANTONIO'S STANDARD SPECS. FOR PUBLIC WORKS CONSTRUCTION.

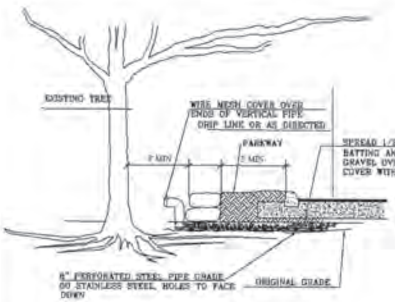
SHEET 25 OF 26

PREPARED BY: FERNANDEZ FOXER WHITE & ASSOC. INC. & C. F. ZAVALA GROUP

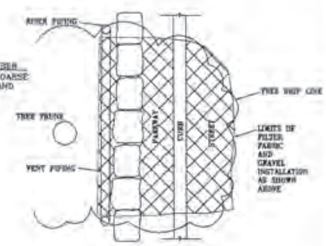
CITY OF SAN ANTONIO

DEPARTMENT OF PUBLIC WORKS

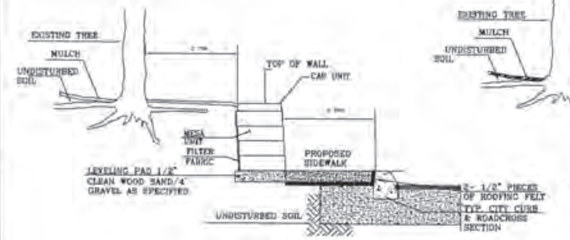
CITY OF SAN ANTONIO
TREE PROTECTION



4.2 TREE AERATION DETAIL B
N. T. S.

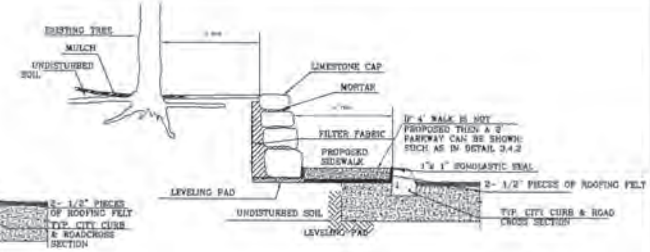


4.2.2 PLAN VIEW B
N. T. S.



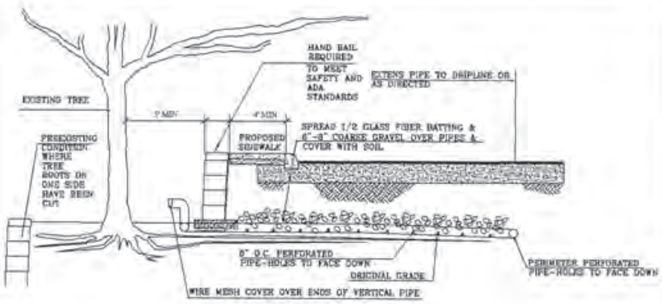
4.3 SEGMENTAL GRAVITY WALL
ADJACENT TO CURB
N. T. S.

NOTE–
THIS TYPE OF WALL CAN BE USED ON OTHER APPLICATIONS
TREES CANNOT BE PRESERVED IF THEY ARE CLOSER THAN 5 FEET TO THE WALL

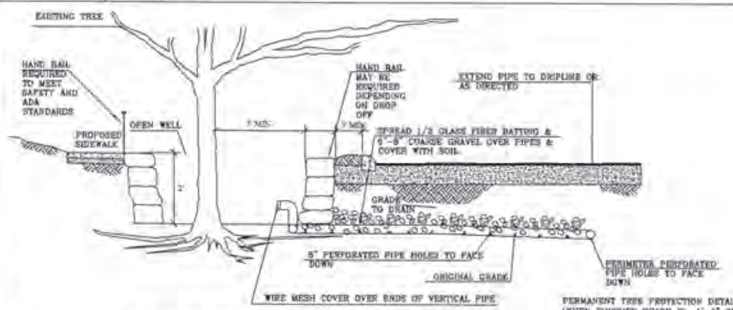


4.3.2 LIMESTONE BOULDER GRAVITY WALL
ADJACENT TO CURB
N. T. S.

NOTE–
THIS TYPE OF WALL CAN BE USED ON OTHER APPLICATIONS
TREES CANNOT BE PRESERVED IF THEY ARE CLOSER THAN 5 FEET TO THE WALL



4.4 TREE AERATION DETAIL C
N. T. S.



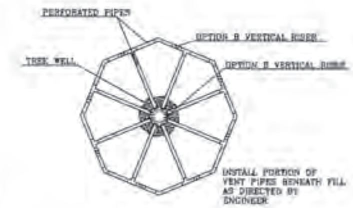
4.4.2 TREE AERATION DETAIL C
N. T. S.

NOTE: THIS AERATION SYSTEM CAN BE USED FOR NEW PROJECTS WHERE FILL IS OCCURRING SUCH AS PARKING LOTS OR CONSTRUCTION. DRAIN AWAY FROM EXISTING TREE.

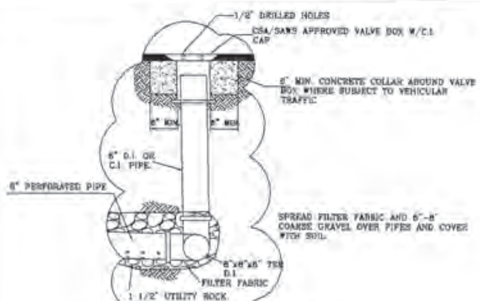
PERMANENT TREE PROTECTION DETAIL (WHEN FINISHED GRADE IS 1'-0" OR MORE ABOVE EXISTING GRADE)

NOTE:

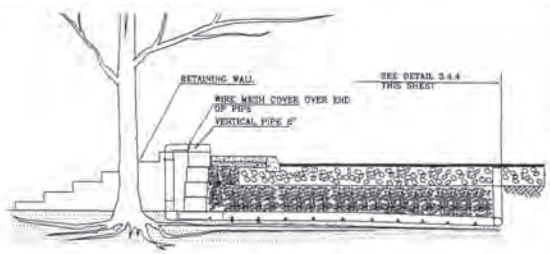
WELL TO BE CONSTRUCTED OF STONE, BLOCK OR BRICK. IF BRICK IS USED: VERTICAL JOINTS LEFT OPEN FOR DRAINAGE 1/2" MAXIMUM INSIDE FACE OF WALL



4.4.3 PLAN VIEW C
N. T. S.

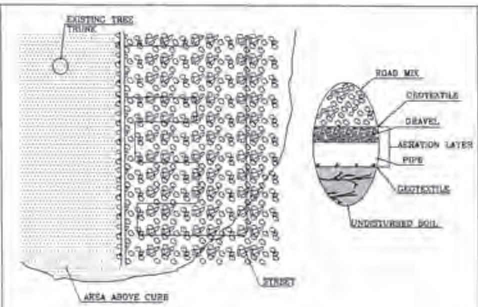


4.4.4 TREE AERATION SECTION C
N. T. S.



4.4.5 TREE AERATION DETAIL D
N. T. S.

NOTE: THIS AERATION SYSTEM CAN BE USED FOR NEW PROJECTS WHERE FILL IS OCCURRING SUCH AS PARKING LOTS OR ROADWAY CONSTRUCTION. DRAIN AWAY FROM EXISTING TREE.



4.4. TREE AERATION PLAN VIEW D
N. T. S.

SHEET 26 OF 26

PREPARED BY: FERNANDEZ FRAZER WHITE & ASSOC. INC. & C. F. ZAVALA GROUP

CITY OF SAN ANTONIO

DEPARTMENT OF PUBLIC WORKS

CITY OF SAN ANTONIO
TREE PROTECTION DETAILS

TREE PRESERVATION

DESIGNED	FED. RD. DIV. NO.	STATE					SHT. NO.
CHECKED		TEXAS					4 OF 4
DRAWN	STATE DIST. NO.	COUNTY	CONTROL NO.	SECT. NO.	JOB NO.	HIGHWAY NO.	
CHECKED		BEXAR					

LITTER TRAP INSTALLATION ON RIVERSIDE CREEK

SPECIAL SPECIFICATIONS
SS250 Pervious Flexible Paving
SS450 Netting Trash Trap

HDR ENGINEERING, INC.
Texas P.E. Firm Registration No. F-754

ITEM

SS250 PERVIOUS FLEXIBLE PAVING

SS250.1. DESCRIPTION: *Construct a pervious flexible grass fill pavement surface course as shown on the plan. The pavement shall be constructed on the newly constructed subgrade or base course as herein specified and in accordance with the details shown on the plans.*

SS250.2. GENERAL:

A. Description of work

1. Work Included
   - Provide and install base material as shown on drawings. SS250.3. Materials
   - Provide permeable pavement, TRUEGRID PRO or approved equal, and installation per the manufacturer's instructions and other available specification material.
   - Provide and install specified fill material for permeable pavement grass fill.

2. Related Work
   - Subgrade preparation under Division 1 Earthwork.
   - Item 200 Flexible Base.

B. Quality assurance

1. Follow Contract submittal procedure and requirements.

2. Installation performed to provided specification or accepted alternative specification

3. Certificates: Manufacturer signed certificate stating the product is MADE IN THE USA.

C. Delivery, storage and handling: Protect permeable pavement materials from damage during delivery and unloading.

D. Project conditions

1. Review installation and coordinate permeable paver work with other work affected.

2. All hard surface paving adjacent to permeable paver areas, including concrete walks and asphalt paving should be completed prior to installation of permeable pavers.

3. For permeable paving grass fill applications, install turf when ambient air temperatures is at least 55 degrees.

4. In wet weather, do not build on wet, saturated or muddy subgrade.

5. In cold weather, do not use on frozen materials or materials mixed or coated with ice or frost, and do not build on a frozen base or wet, saturated or muddy subgrade.

6. Protect partially completed paving against damage from other construction traffic when work is in progress.

E. Limited warranty

1. The permeable pavement material manufacturer shall warrant that all products furnished will be free from defects in material and/or workmanship.

2. This warranty shall extend for a period of (5) years following the date of shipment.

SS250.3. MATERIALS:

A. Permeable Pavers, TRUEGRID PRO (or approved equal) for grass applications.

1. Manufactured in the USA.
2. High density polyethylene (HDPE): 100% post consumer recycled materials
3. Recycled and recyclable content: 100%
4. Color: black- carbon black additive for long term UV stabilization
5. Paver size: 16" x 16" x 1.8";
6. Pre-assembled: 4'x 4' sections
7. Cylindrical cell design for column strength
8. Cell size: 3.25" inside diameter
9. Co-joined cells at sixteen (16) places for strength
10. Wall thickness: 0.150" nominal
11. A minimum of two (2) co-joined common walls per cell for structural integrity
12. Connections:
    a. No clips or stakes necessary
    b. No additional parts or tools needed
    c. Integral male-female three point locking system
    d. Wall thickness at tabs: 0.290"
13. Molded in X-anchors to stabilize pavers: no stakes necessary
14. S-Flexural joints molded in for soil seasonal expansion and contraction
15. Nominal Coverage per Paver : 4 square feet
16. Weight per paver: 2.22 lbs
17. Permeability of System: 100%
18. Compressive Strength (empty)- 990,720 psf; 6880 psi
19. Compressive Strength (filled)- 1,152,000 psf; 8000 psi
20. Material Safety: ground water neutral, 100% inert
21. Chemical Resistant: Excellent: highly resistant to hydrocarbons, oils

B. Base Course: Flexible Base (Grade 1) per Item 200.

1. Geogrid reinforcement per plans and Item 234.

C. Grass Fill: A sandy loam or loam soil should be used to fill the empty grass paver cells. The selection of sandy loam or loam soil should be made based upon the soil requirements of the turf variety selected for the project. Other soils if compatible with type of seed or sod are acceptable. Refer to Item 502 Topsoil.

SS250.4. CONSTRUCTION:

A. *Preparation:*

1. Examine sub-grade course installed conditions. Do not start permeable paver installation until unsatisfactory conditions are corrected. Check for improperly compacted trenches, debris, and improper gradients.

2. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance. If existing conditions are found unsatisfactory, contact Quality Control Manager for resolution.

3. Place base course material in accordance with specification 200. Leave minimum 1.8" for permeable paver unit for final elevation.

B. *Installation of Permeable Pavers*: Install permeable paver units and soil fill per manufacturer's recommendations for grass fill pavers.

C. Installation of Grass Fill: See Item 515 Topsoil and Item 520 Hydromulching.

1. Apply seed mixture onto the site at rates shown in specification Item 520 Hydromulching. Coverage should be uniform and complete. Seeded areas must be fertilized and kept moist during development of the turf.

D. Protection

1. Grass Fill / Seeded: Seeded areas must be protected from any traffic, other than emergency vehicles, for a period of 4 – 6 weeks, or until the grass is mature to handle traffic. Avoid sharp turns or "jack knifes" in trailered vehicles when cells are empty. Damage due to buckling can occur.

E. Field Quality Control

1. Any damaged sections of the permeable pavers during install shall be removed and replaced with no evidence of replacement apparent.

2. Remove all excess materials, debris, and equipment from site upon completion of install.

ITEM

SS450 NETTING TRASH TRAP

SS450.1. DESCRIPTION: *Furnish and install Storm X Netting Trash Trap, or approved equal, devices as shown in the plans. This system is composed of metal units and removable nets that collect trash and floatable debris and keep it from continuing downstream.*

SS450.2. METAL CONSTRUCTION:

A. All devices shall be constructed with type 316 stainless steel
B. Plate for cylindrical hubs shall be rolled from sheet, using minimum .187" thickness materials, with mounting frame to be constructed using .250" thickness plate
C. All stainless steel materials shall meet ASTM A-240 Standard Specification
D. All welders of stainless materials shall meet AWS A-5.1 Standard Specification
E. All welders of carbon steel materials shall meet AWS A-5.1 Standard Specification
F. Galvanized Zinc Hot Dip Coating shall meet ASTM 123-09/ASTM-09 Standard Specification

SS450.3. NETS:

A. All reusable nets shall be 1" HDPE (high density polyethylene) containing a minimum of 2.3% carbon black and shall be a minimum of 5' long and shall meet ASTM D-792 Standard Specification having an average density of 0.95 and shall have a tensile strength of 4,600 psi per ASTM D-638 Standard Specification
B. Contractor to provide extra set of additional nets (7 additional nets)

SS450.4. OTHER:

A. Provide trash trap device that includes a lifting lug on top to allow removal of litter trap with a lifting device for routine emptying of collected trash.

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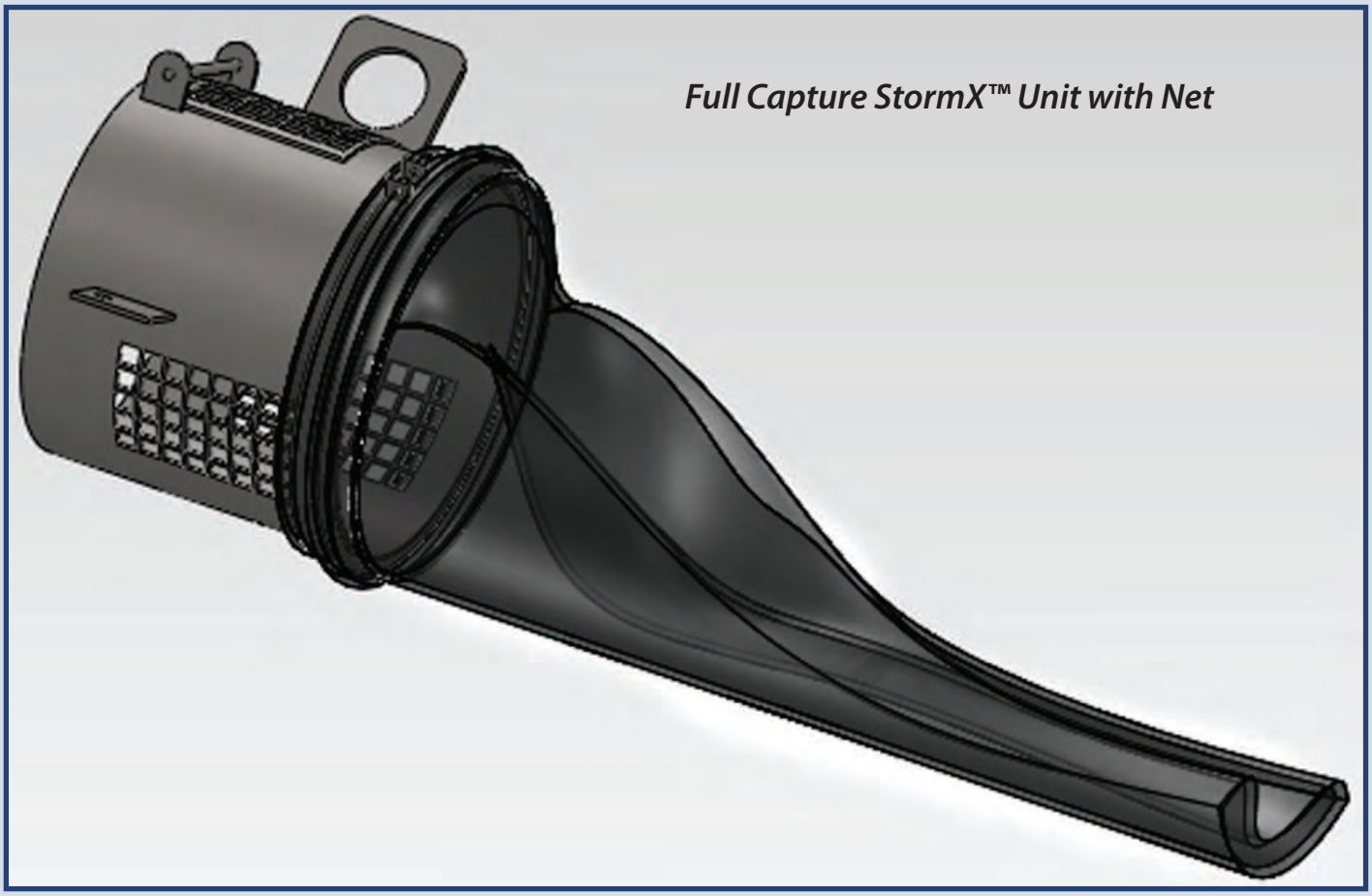

Full Capture StormX™ Unit with Net

StormX™ Installation, Operations & Maintenance Manual

www.stormwatersystems.com

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General Information

The StormX™ Full Capture Gross Pollutant Netting Trash Trap by Storm Water Systems, Inc. is a unique device that collects trash, litter and debris from stormwater runoff. Highly effective for "first flush," StormX™ captures gross pollutants as small as 5mm without causing flooding.

History of StormX™

More than 15 years ago, Anto Pratten designed the Pratten Trap as a result of the massive amounts of trash, debris, and polluted sediment in the waterways around Sydney, Australia. To date, there are hundreds of installations in Australia, Singapore, and New Zealand. Additionally, over 10 years ago, two Pratten Traps were installed in Los Angeles County, California. With hundreds of installations worldwide and over 15 years of service, the StormX™/Pratten Trap netting systems have a success rate of zero failures. As of 2010, the Pratten Trap is now distributed to North American markets by Storm Water Systems, Inc. under the name StormX™.

Construction of StormX™

StormX™ is constructed of stainless steel hubs anchored into concrete for a weir configuration or secured directly to concrete or steel pipe outfalls with reusable commercial grade nets. The HDPE nets are UV stabilized with 2.3% carbon black and outlast traditional Nylon nets. Construction of StormX™ allows for the weirs and nets to assist with sediment fallout and collection without causing flooding. Additionally, the system features built-in overflow mechanisms to allow heavy runoff to flow unimpeded during a heavy rain event. As water flows after a rain event, polluted stormwater runoff is emptied at outfall lines, where StormX™ is employed. The reusable, commercial grade nets filter the water and collect trash, litter, and debris.

The StormX systems is available in a variety of standard sizes ranging from 18 to 72 inches in diameter and can be custom fabricated for most pipes when need. Regular maintenance is readily accessible with reusable nets that are easily detached and emptied manually or with mechanical assistance with standard public works equipment.

Sites of Application

While there are three standard models, all units are customized to fit existing individual pipes and/or weir walls. The most applicable application of the StormX™ Full Capture Gross Pollutant Netting Systems is an end-of-pipe outfall line or drainage channel where stormwater is emptied.

Any application where the owner is required to remove trash and debris from industrial wastewater, stormwater, or treated effluent from municipal sewage treatment plants (also known as publicly owned treatment works.)

Any application where there is a desire to control solid and floatable materials in Combined Sewer Overflows. Additionally, StormX™ has the strength to handle powerful stormwater runoff, making it ideal for full capture at all urban hot spots.

General Information

StormX™ is a gross pollutant trap and netting system for stormwater outfall lines designed to capture trash and debris as small as 5mm without flow interruption. StormX™ allows all outfalls the ability to be transformed into a full capture device. Each StormX™ is designed to work effectively and efficiently, according to your specific needs, under a wide range of hydraulic conditions. StormX™ units are designed for integration into new or existing infrastructure and are simple to install and maintain. StormX™ units fit snuggly inside an existing outfall pipe and are secured by expansion anchors or bolts. Overflows in the hub allow total drainage and assurance of bypass if needed.

The StormX™ Gross Pollutant Traps are composed of stainless steel hubs and HDPE nets. We currently manufacture three models of the StormX™ Gross Pollutant Traps: Full Capture, Half Pipe Capture and Weir Wall Capture.

Full Capture: The Full Capture End of Pipe StormX gross pollutant traps are designed and certified as a full capture system.

Half Pipe Capture: The Half Pipe Model is not designed as a full capture system, as it allows overflow. The Half Pipe Model is designed as a "first flush" trash capture device only, and works to prevent potential flooding by providing overflow.

Weir Wall Capture: The Weir Model StormX differ from the other models as the Weir Model StormX allows single or multiple hubs to be placed into a drainage channel by fastening Weir Model StormX units to a poured in place or pre-cast concrete weir wall.

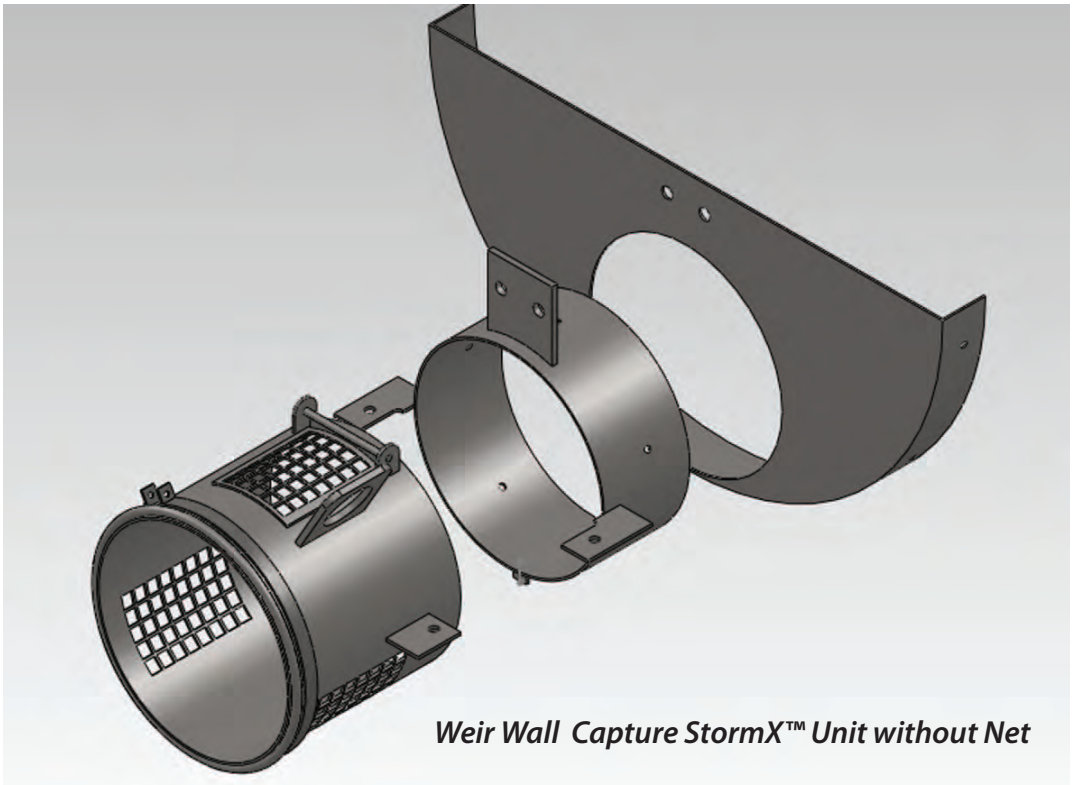
Components & Specifications of StormX™

StormX™ Hubs:

- Fabricated from Types 304 (standard) or Type 316 stainless steel (available by request)
- All plate is minimum of .187" thickness
- All stainless steel StormX™ hubs and components are American manufactured and meet ASTM A-240 Standard Specification for both Type 304 and Type 316 stainless steel plate
- Welders are qualified under AWS (American Welding Society) D-17.1 Standard Specification

StormX™ Nets:

- Exclusive HDPE (high density polyethylene) netting
- All nets contain 2.3% carbon black UV stabilizer, allowing the nets to be reused and insures a longer life than ordinary nylon nets
- Standard length of nets is 5'
- Longer nets can be custom fabricated when longer maintenance periods are foreseen



Weir Wall Capture StormX™ Unit without Net

Full Capture End of Pipe StormX™

Full Capture End of Pipe StormX™

Installation of Full Capture End of Pipe StormX™

The Full Capture End of Pipe StormX™ gross pollutant traps are designed and certified as a full capture system. The connecting hub is inserted into each existing pipe outfall or end, depending on the measurements provided by either you or your contractor. The Full Capture StormX™ model is secured to the pipe interior using stainless steel expansion anchors, epoxy adhesive, dowels or bolts. Hardware is not included as pipe material of construction, wall thickness, and accessibility may dictate what type of anchoring is used.

The Full Capture StormX™ model is manufactured in either one or two pieces to allow for manual or mechanical removal and maintenance of nets. The internal connecting hub allows the StormX™ unit to be anchored into pipe interior (or exterior) by drilling through bolt holes in the internal hub to allow anchoring. Two bolts located on each side of the StormX™ allows the lifting hub to be unbolted from the internal connecting hub, then lifted using a small crane or other lifting device attached to the lifting lug on each StormX™.

Overflows are fabricated into the Full Capture Model StormX™ units to allow a bypass during a significant flow event. Additionally, a service door is located in the top of each unit, along with a ligting lug for mechanical lifting and emptying during maintenance operations.

Note: When installing either a Full Capture Model or Half-Pipe Model StormX™ unit by inserting the stationary hub into the end of the pipe, we recommend using a non-shrink grout to seal the annular space between the pipe interior and the outside diameter of the StormX™ to provide a sealed hub and eliminate trash and debris from getting caught in that space or bypassing the net.

Tools Required for Installation of Full Capture StormX™

The tools required to install StormX™ units may vary with different pipe materials of construction.

Reinforced Concrete Pipe, Weir Wall and Headwall StormX™ Installations:

- Hammer Drill
- Concrete Bits
- Hammer
- Stainless steel expansion anchors or epoxy anchored dowels

Corrugated Steel Pipe:

- Variable Speed Drill
- Drill Bits
- Hammer
- Wrench
- Welded studs or bolts long enough to go through pipe wall

HDPE Pipe:
HDPE profile wall pipe requires either a precast or poured in place concrete headwall be installed around the end of pipe to provide anchoring. HDPE profile wall pipe does not provide the tensile strength necessary to mechanically fasten StormX™ units to the pipe, therefore, the use of a concrete headwall is required. Solid wall HDPE pipe can utilize a flanged connection as long as a backing ring is included, and a flanged StormX™ is purchased (which is a custom order.)

Terra Cotta or Clay Pipe:
Due to the brittle nature of terra cotta or clay pipe, we do not recommend attaching StormX™ units directly to the pipe and recommend use of a headwall attachment, as with the HDPE pipe.

Other Pipe Materials:
Please check with Storm Water Systems for installation procedures on other materials of construction.

Note: All pipe to be connected to StormX™ gross pollutant traps must be structurally sound. It is the responsibility of those ordering or specifying StormX™ to inspect the structural integrity of all pipe to insure it can withstand the StormX™ attachment.

Half-Pipe Capture StormX™

Half-Pipe Capture StormX™

Installation of Half-Pipe Capture StormX™

The Half-Pipe Model is not designed as a full capture system, as it allows overflow. The Half-Pipe Model is designed as a "first flush" trash capture device only and works to prevent potential flooding by providing overflow. The Half-Pipe Model is also manufactured in either one or two piece hubs, depending on the type of maintenance operation used.

The internal connecting hub allows the StormX™ unit to be anchored into the pipe interior (or exterior) by drilling through bolt holes in the internal hub to allow for anchoring.

Note: When installing either a Full Capture Model or Half-Pipe Model StormX™ unit by inserting the stationary hub into the end of the pipe, we recommend using a non-shrink grout to seal the annular space between the pipe interior and the outside diameter of the StormX™ to provide a sealed hub and eliminate trash and debris from getting caught in that space or bypassing the net.

Tools Required for Installation of Half-Pipe StormX™

The tools required to install StormX™ units may vary with different pipe materials of construction.

Reinforced Concrete Pipe, Weir Wall and Headwall StormX™ Installations:

- Hammer Drill
- Concrete Bits
- Hammer
- Stainless steel expansion anchors or epoxy anchored dowels

Corrugated Steel Pipe:

- Variable Speed Drill
- Drill Bits
- Hammer
- Wrench
- Welded studs or bolts long enough to go through pipe wall

HDPE Pipe:
HDPE profile wall pipe requires either a precast or poured in place concrete headwall be installed around the end of pipe to provide anchoring. HDPE profile wall pipe does not provide the tensile strength necessary to mechanically fasten StormX™ units to the pipe, therefore, the use of a concrete headwall is required. Solid wall HDPE pipe can utilize a flanged connection as long as a backing ring is included, and a flanged StormX™ is purchased (which is a custom order.)

Terra Cotta or Clay Pipe:
Due to the brittle nature of terra cotta or clay pipe, we do not recommend attaching StormX™ units directly to the pipe and recommend use of a headwall attachment, as with the HDPE pipe.

Other Pipe Materials:
Please check with Storm Water Systems for installation procedures on other materials of construction.

Note: All pipe to be connected to StormX™ gross pollutant traps must be structurally sound. It is the responsibility of those ordering or specifying StormX™ to inspect the structural integrity of all pipe to insure it can withstand the StormX™ attachment.

Weir Wall Capture StormX™

Weir Wall Capture StormX™

Installation of Weir Wall Capture StormX™

The Weir Model StormX™ differs from the other models as the Weir Model StormX™ allows single or multiple hubs to be placed into a drainage channel by fastening the Weir Model StormX™ units to a poured in place or pre-cast concrete weir wall. Wall height is determined by a hydrologist with consideration given to watershed area, weighted runoff coefficient and design storm intensity, among other factors. The design of the Weir Model StormX™ allows it to have consideration as a full capture device, with overflow capacity.

Weir Model StormX™ units are also made in either one or two piece construction consisting of an inner connecting hub and an outer lifting hub, along with the net. A frame of plate stainless steel around the hubs allows mechanical fastening into the weir wall. Concrete weirs are installed, leaving a blocked opening in the construction to allow for the StormX™ installation. The Weir Model StormX™ does assist with sediment fallout in both the collected trash and debris and in the weir wall itself, as the weir wall and StormX™ elevations can be adjusted prior to construction to allow sediment fallout.

We recommend that 2" diameter PVC weep pipes be cast into the concrete weir walls to allow for total drainage. Weir wall design is not the responsibility of Storm Water Systems and may require a structural engineer's calculations for footing design, wall thickness, reinforcement, and tie-in to banks or walls.

Tools Required for Installation of Weir Wall StormX™

The tools required to install StormX™ units may vary with different pipe materials of construction.

Weir Wall StormX™ Installations:

- Hammer Drill
- Concrete Bits
- Hammer
- Wrench
- Stainless steel expansion anchors or epoxy anchored dowels

Maintenance of StormX™

As previously mentioned, StormX™ units are available in either one or two piece hubs. Before choosing the design, careful consideration must be given as to how the units will be maintained.

Manual Maintenance

With a one-piece hub StormX™ unit, the manual maintenance method must be used. This is done by loosening the band clamp and manually removing the net.

With a two-piece StormX™ unit, manual maintenance can be performed by using the band clamp around the net and manually cleaning the net. The manual method of maintenance requires that the band clamp be loosened to allow removal of the net without removal of the lifting hub.

Mechanical Maintenance

By using the two hub system, maintenance can be performed by unbolting the stationary hub from the removable hub and using a mechanical lifting device for clean out. Two bolts located on each side of the StormX™ unit allows the lifting hub to be unbolted from the internal connecting hub, then lifted using a small crane or other lifting device attached to the lifting lug on each StormX™ unit.

Cost Estimates of Maintenance

Cost estimates of maintenance tasks varies by site and amount of rainfall. When StormX™ is employed in an area with a significant amount of annual rainfall, the unit will need to emptied more often than an area that experiences less rainfall annually.'

Safety Equipment Required

Storm Water Systems strongly recommends maintenance personnel wear gloves, safety glasses, hard hats and steel toe boots when performing maintenance tasks.

Recommended Maintenance Schedules

Maintenance schedule requirements vary from site to site. We strongly recommend routine visual inspection of each StormX™ netting trash trap. We also recommend visual inspection of the nets after each significant rain event, which would mobilize trash and debris, causing it to enter the stormwater infrastructure system. Since the flow is restricted as the net fills (see Flow Chart), it is critical that owners of this product understand the maintenance requirements.

Additionally, it is recommended that sediment build-up should be monitored and removed monthly or on a quarterly basis. As with all maintenance schedules, this is subject to local conditions.

Note: Use of Anti-Seize Lubricant is recommended on all stainless steel StormX™ threaded components. Not using anti-seize lubricant may result in thread/nut locking and bolts may have to be cut off!

ASTM or UL Test	Property	LDPE	HDPE	UHMW
	PHYSICAL			
ASTM-D792	Density (lb/in^3)	0.033	0.035	0.034
	(g/cm^3)	0.92	0.95	0.93
ASTM-D570	Water Absorption, 24 hrs (%)	<0.01	0	0
	MECHANICAL			
ASTM-D638	Tensile Strength (psi)	1,800-2,220	4,600	3,100
ASTM-D638	Tensile Modulus (psi)	-	-	125,000
ASTM-D638	Tensile Elongation at Yield (%)	600	900	-
ASTM-D790	Flexural Strength (psi)	-	-	-
ASTM-D790	Flexural Modulus (psi)	-	200,000	125,000
ASTM-D695	Compressive Strength (psi)	-	-	2,000
ASTM-D695	Compressive Modulus (psi)	-	-	-
ASTM-D785	Hardness, Shore D	D41-D50	D69	D62-D66
ASTM-D256	IZOD Notched Impact (ft-lb/in)	No Break	3	No Break
	THERMAL			
ASTM-D696	Coefficient of Linear Thermal Expansion (x 10^{-3} in./in./°F)	3	6	11
ASTM-D648	Heat Deflection Temp (°F/°C)			
	at 66 psi	120/48	170/76	203/95
	at 264 psi	105/36	150/40	180/82
ASTM-D3418	Approx. Melting Temp (°F/°C)	230/110	260/125	280/138
-	Max Operating Temp (°F/°C)	160/71	180/82	180/82
C177	Thermal Conductivity			
	(BTU-in/ft^2-hr-°F)	-	-	2.92
	(x 10^{-4} cal/cm/-sec-°C)	-	-	10.06
UL94	Flammability Rating	n.r.	n.r.	H-B
	ELECTRICAL			
ASTM-D149	Dielectric Strength (V/mil) short time, 1/8" thick	460-700	450-500	900
ASTM-D150	Dielectric Constant at 1 kHz	2.25-2.30	2.30-2.35	2.30-2.35
ASTM-D150	Dissipation Factor at 1 kHz	0.0002	0.0002	0.0002
ASTM-D257	Volume Resistivity (ohm-cm) at 50% RH	10^{13}	10^{15}	10^{13}
ASTM-D495	Arc Resistance (sec)	135-160	200-250	250-350

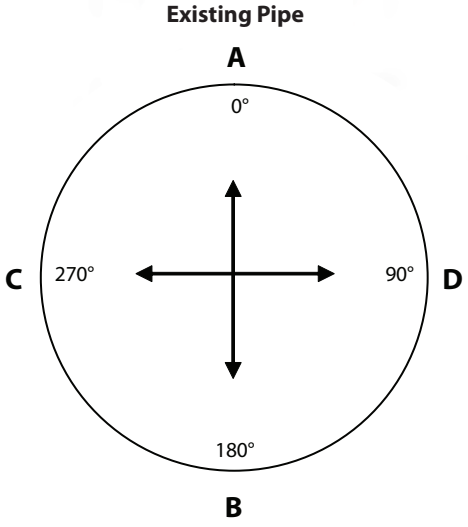
Note: The information herein are typical values intended for reference and comparison purpose only. They should NOT be used as a basis for design specifications or quality control. Contact us for manufacturers' complete material porperty datasheets. All values at 73°F (23°C) unless otherwise noted.

StormX™ Order Form

Company Name _____ Date _____

Contact _____ Phone _____

Full Capture End of Pipe Unit & Half Pipe Capture Unit



StormX 1

Inside Dimensions:

A—B _____

C—D _____

Existing Pipe Material of Construction: _____

StormX 2

Inside Dimensions:

A—B _____

C—D _____

Existing Pipe Material of Construction: _____

StormX 3

Inside Dimensions:

A—B _____

C—D _____

Existing Pipe Material of Construction: _____

Standard Net Length 5'

Custom Net Length Required: _____

Other Requirements: _____

_____

_____