

OPERATION & MAINTENANCE MANUAL

Filterra

Manual prepared: December 2018

DFI No. D00831



Figure 1: DFI No. D00831, looking west

1. Identification

Drainage Facility ID (DFI): D00831
Facility Type:
Construction Drawings: V-File Numbers – None, City Plans
Location: District: 4
Highway No.: 91
Mile Post: 83.95, right side

2. Manual Purpose

The purpose of this manual is to outline inspection needs and summarize maintenance actions for planted water quality catch basins.

3. Facility Location

The location map below details the facility location. The highway, mile posts, side streets, access location, and stormwater flow directions are noted on the map.

Facility location type: Curb and Gutter (travel lane)

Flow direction:

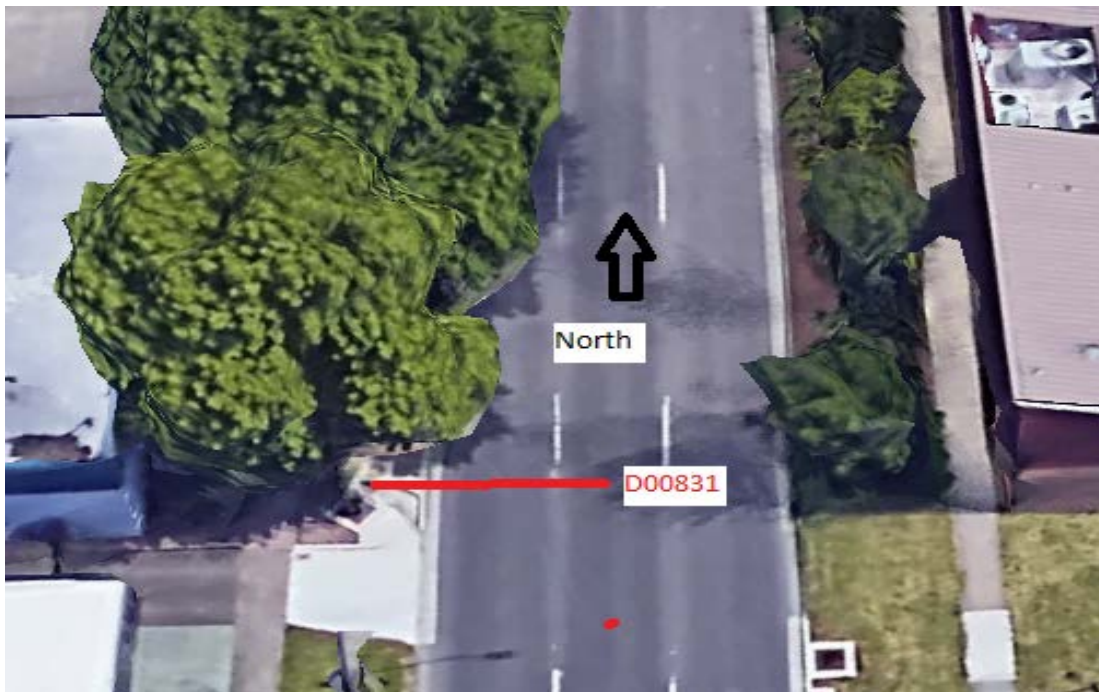


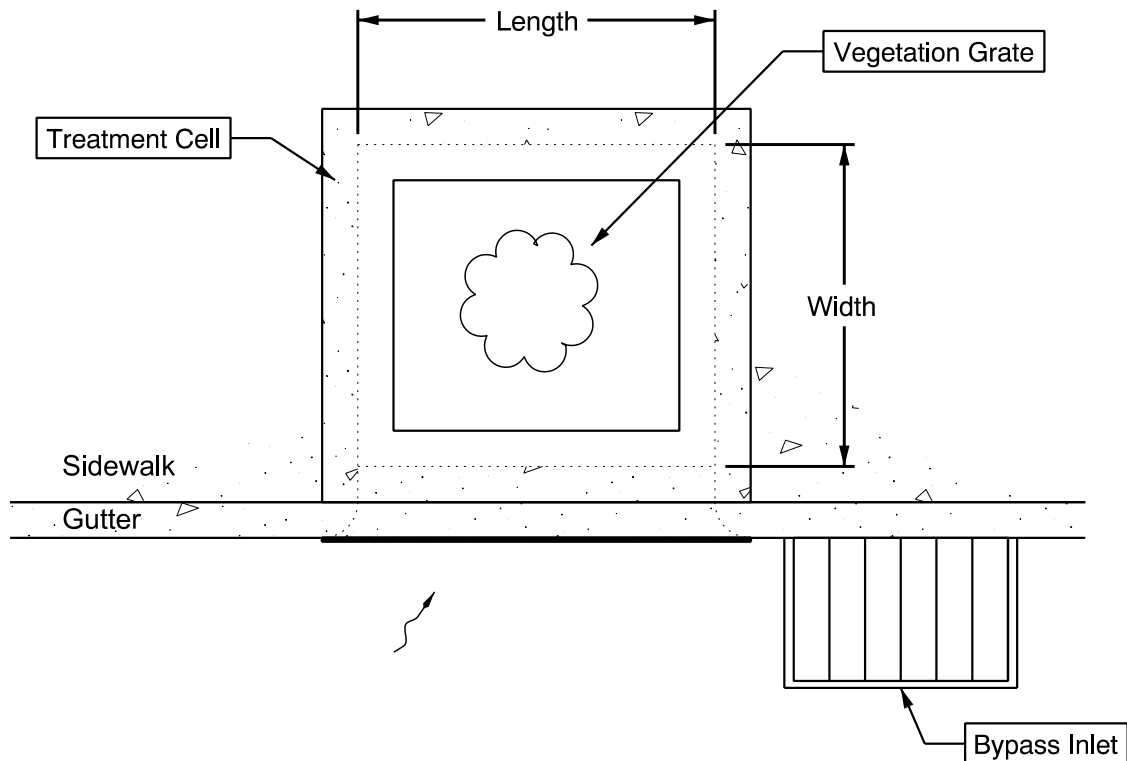
Figure 2: Facility Location Map

4. Facility Summary

The length and width of the WQ Catch Basin is based on the dimensions of the inside of the treatment cell.

The length and width of the WQ Catch Basin is:

Length (Feet)	Width (Feet)	Designation Number ¹
4	4	FT0404



Site Specific Information: N/A

¹ The Filterra and MWS designation number is associated with the dimensions of this type of proprietary structure. See appendix C of the Standard Operation Manual for Water Quality Catch Basins to view the Configuration Details for additional information.

5. Facility Access

Maintenance access to the facility: Curb and gutter (travel lane)

Lane Closure Needed

Water quality catch basins do not typically have access roads/access pads, nor are they gated, as they are located in urban areas alongside sidewalks and curbs. Use caution when accessing these facilities as there may be pedestrians or cyclists in the vicinity.

6. Operational Components / Maintenance Items

Classification and Standard Operational (Op) Plan:

This facility is classified as a:

<input checked="" type="checkbox"/> Filterra (Op Plan A)	<input type="checkbox"/> WQ Planter (Op Plan B)	<input type="checkbox"/> MWS (Op Plan C)
A Filterra is a single chamber treatment cell that utilizes filter media, a plant, and a perforated underdrain.	A WQ Planter is a single chamber treatment cell that utilizes plants, filter media, and a perforated underdrain. The auxiliary outlet is located inside of the treatment cell.	A <u>Modular Wetland System</u> is a three chamber treatment cell that utilizes plants, filter media, filter media cartridges, and a perforated underdrain network.
A standard operational plan illustrates the general facility footprint configuration and explains the purpose of each facility component. Operational plans (A and B) are provided in the Standard Operation Manual.		

See Appendix A for the site specific operational plan.

Operational Components

The facility components table (**Table 1**) has been provided to highlight the applicable components for this facility. The component is in use when the box contains an “x” (e.g.).

The Standard Operation Manual for Water Quality Catch Basins (implemented April 2018) outlines facility operation, typical footprint configuration, and component definitions and details. A link to the manual is attached to the feature marker in TransGIS. <https://gis.odot.state.or.us/TransGIS/>

Maintenance Items

Operational components marked in **Table 1** should be inspected and maintained according to Section 7. Each facility component is defined and detailed in the Standard Operation Manual using the associated ID number indicated below.

Table 1: Facility Components		ID #
Facility Inlet		
Inlet Grate	<input type="checkbox"/>	C1
Curb Inlet	<input checked="" type="checkbox"/>	C2
Sidewalk Chute	<input type="checkbox"/>	C3
Bypass Inlet	<input checked="" type="checkbox"/>	C4
Treatment		
Plantings (Tree or Shrub)	<input checked="" type="checkbox"/>	C5
Filter Media	<input checked="" type="checkbox"/>	C6
Filter Media Cartridge	<input type="checkbox"/>	C7
Outfall Type		
Waterbody (Creek/Lake/Ocean)	<input type="checkbox"/> C <input type="checkbox"/> L <input type="checkbox"/> O	C8
Ditch	<input type="checkbox"/>	C9
Storm Drain System	<input checked="" type="checkbox"/>	C10

7. Maintenance

Maintenance Frequency/Maintain Records

- Inspect per manufacturer requirements. Preferably prior to the rainy season.
- Clean and maintain as necessary. Refer to Activity 125 in the Maintenance Guide for conditions when maintenance is needed.
- Keep a record of inspections, maintenance, and repairs.

Maintenance Guide/Maintenance Actions

Proprietary Water Quality Catch Basins have an operation and maintenance manual provided by the manufacturer. See Appendix C of the Standard Operational Manual for Water Quality Catch Basins. These manuals provided guidelines on maintenance procedures for the facilities. A link to the manual is attached to the feature marker in TransGIS. <https://gis.odot.state.or.us/TransGIS/>

The Maintenance Guide outlines the standard maintenance actions for water quality facilities under Activity 125.

There are standard maintenance tables for standard ODOT designs. The maintenance tables describe the maintenance component, the defect or problem, the condition when maintenance is needed, and the recommended maintenance to correct the problem. Use the following tables to maintain ODOT Water Quality Catch Basins:

- Table 1 (General Maintenance): Contains general maintenance and inspection guidelines that are applicable to all ODOT water quality facilities

The ODOT Maintenance Guide can be viewed at the following website:

<http://www.oregon.gov/ODOT/HWY/OOM/pages/mguide.aspx>

8. Waste Material Handling

Material removed from the facility is defined as waste by the Department of Environmental Quality (DEQ). Refer to the road waste section of the ODOT Maintenance Yard Environmental Management System (EMS) Policy and Procedures Manual for disposal options:

<http://www.oregon.gov/ODOT/HWY/OOM/pages/ems.aspx>

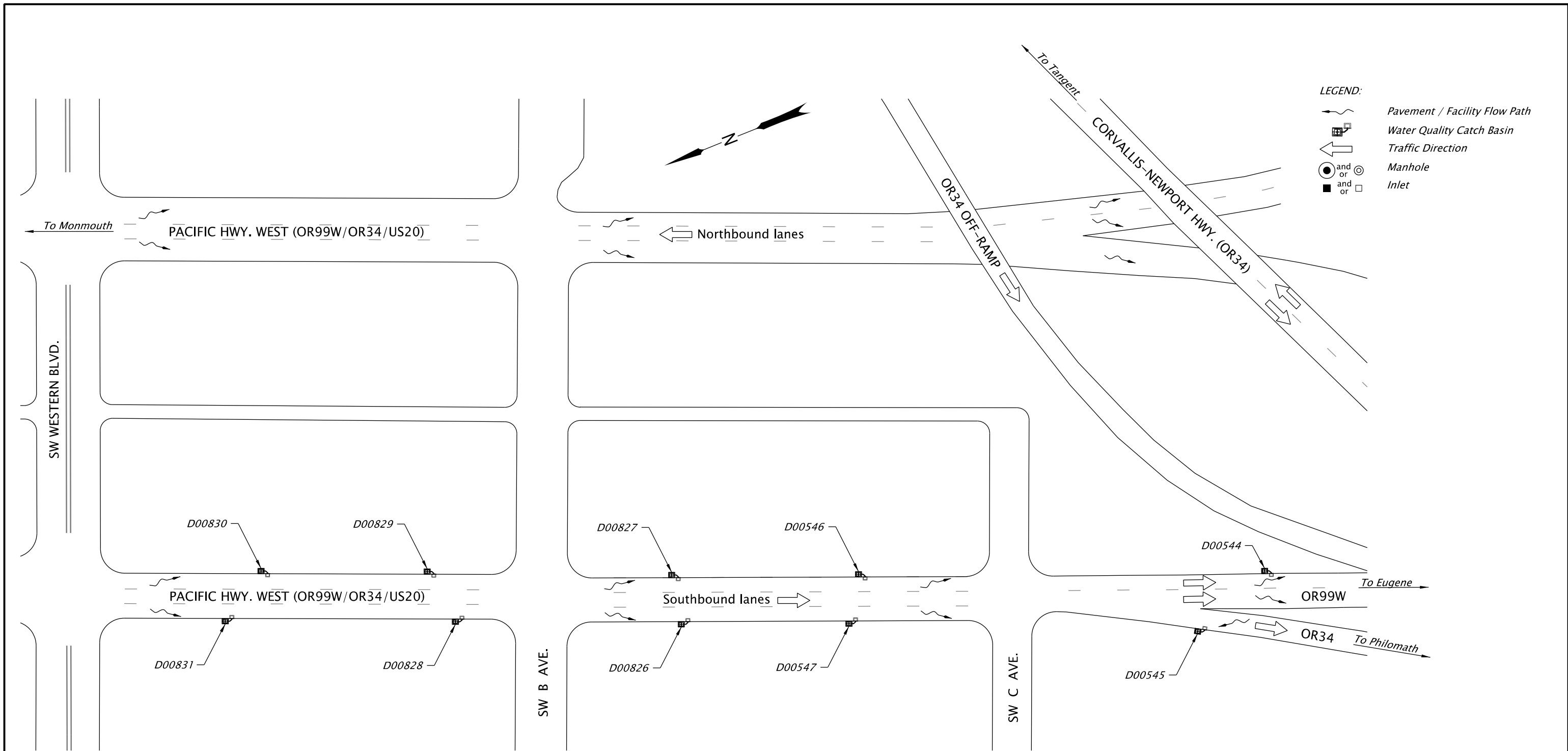
Contact any of the following for more detailed information about management of waste materials found on site:

ODOT Clean Water Unit	(503) 986-3008
ODOT Statewide Hazmat Coordinator	(503) 667-7442
ODOT Region 1 Hazmat Coordinator	(503) 731-8290
ODOT Region 2 Hazmat Coordinator	(503) 986-2647
ODOT Region 3 Hazmat Coordinator	(541) 957-3594
ODOT Region 4 Hazmat Coordinator	(541) 388-6186
ODOT Region 5 Hazmat Coordinator	(541) 963-1590
ODEQ Northwest Region Office	(503) 229-5263

A Appendix A – Site Specific Operational Plan

Contents:

Operational Plan: DFI D00831



PLAN
N.T.S.

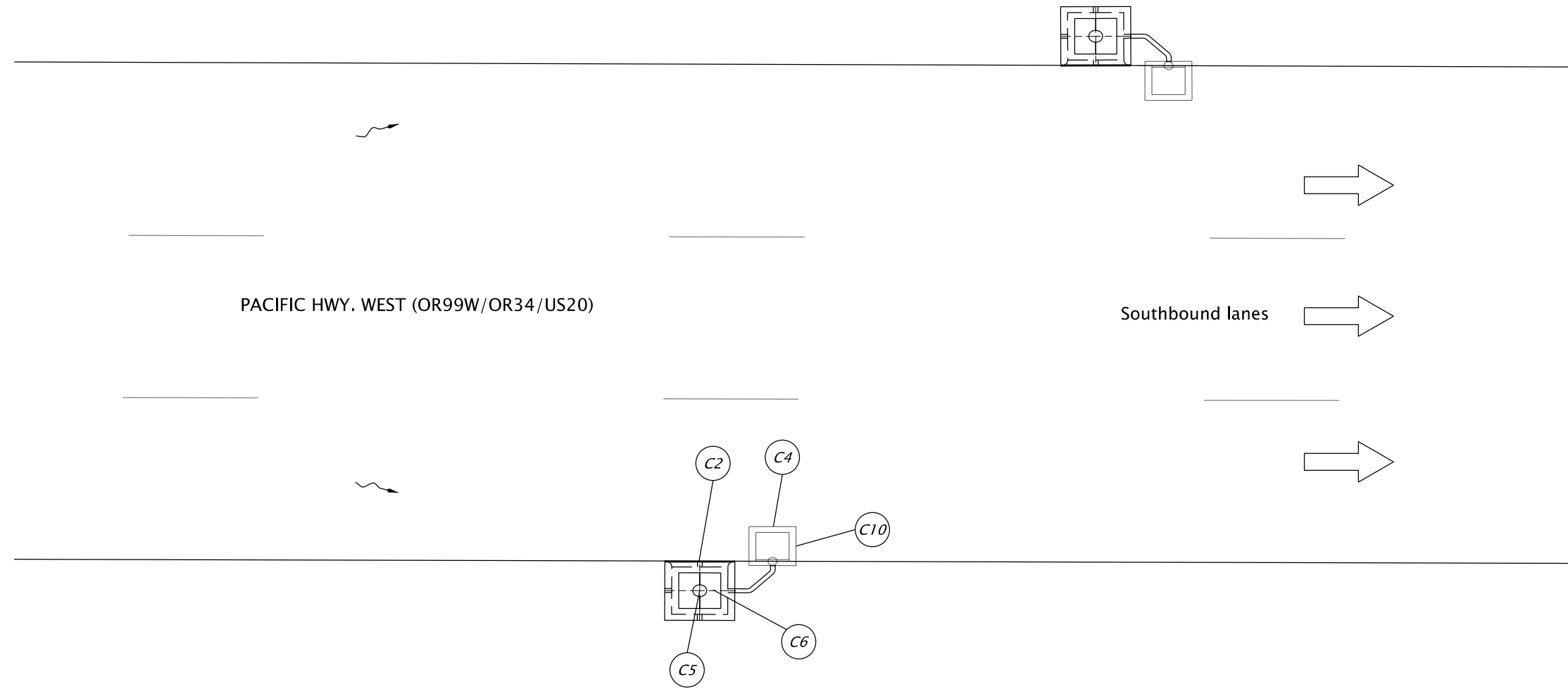


Sheet 1 of 2

Prepared By:
Consultant Design

Drafted By:
Jeff Coon

OR99W: SW WESTERN BLVD. - SW C AVE.
MAINTENANCE DISTRICT 4 US20
WATER QUALITY CATCH BASIN
 PACIFIC HIGHWAY WEST
 BENTON COUNTY



PACIFIC HWY. WEST (OR99W/OR34/US20)

Southbound lanes

TYPICAL WATER QUALITY CATCH BASIN
N.T.S.

Sheet 2 of 2

Prepared By:
Consultant Design

Drafted By:
Jeff Coon



OREGON DEPARTMENT
OF TRANSPORTATION

OR99W: SW WESTERN BLVD. - SW C AVE.
MAINTENANCE DISTRICT 4 US20
WATER QUALITY CATCH BASIN
PACIFIC HIGHWAY WEST
BENTON COUNTY

B Appendix B – Project Contract Plans

Contents:

Site Specific Subset of Project Contract Plan xxV-xxx

STORM WATER RETROFIT 4TH STREET

PROJECT NO. 652414

GENERAL NOTES

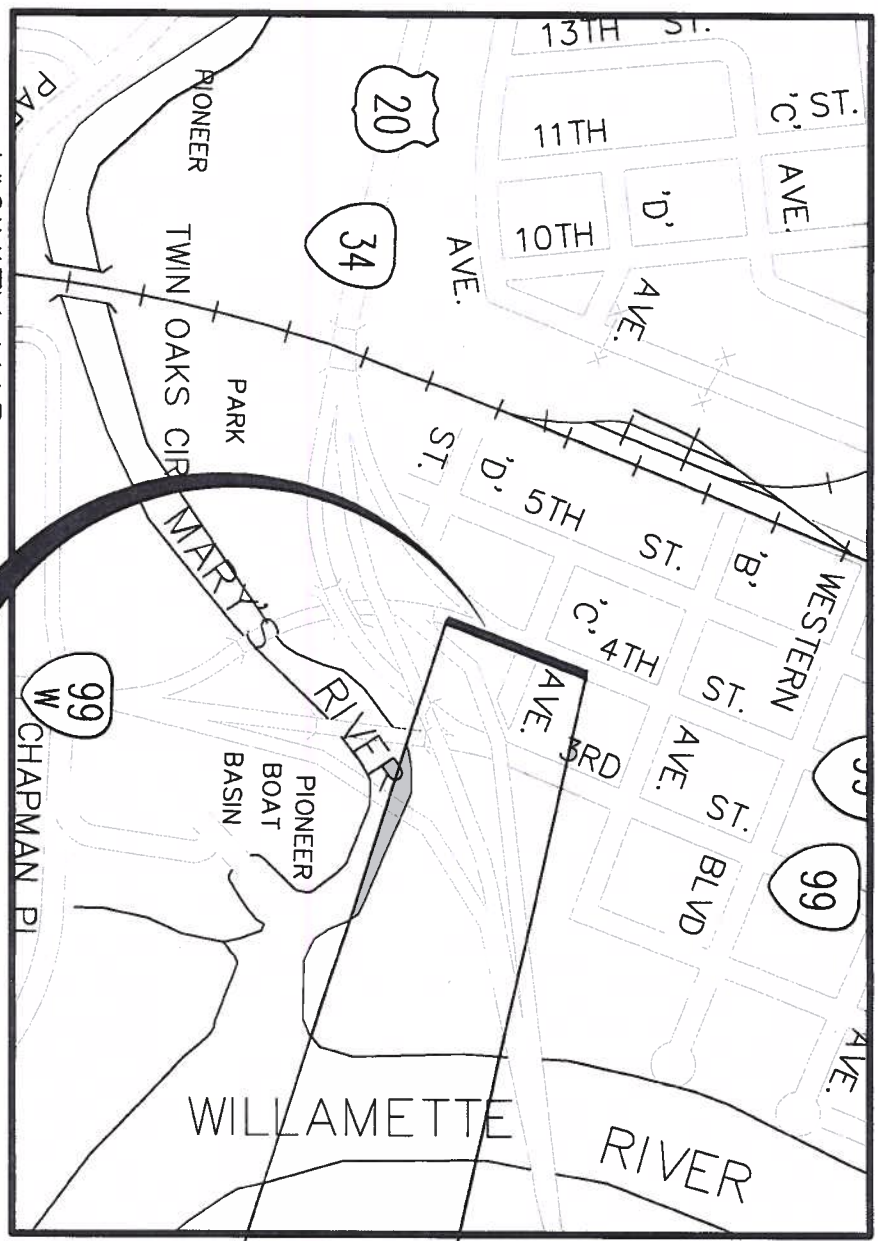
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 (NOTE: THE TELEPHONE NUMBER FOR THE OREGON UTILITY NOTIFICATION CENTER IS (503)392-1987, OR DIAL 811.

SHEET INDEX

SHEET 1	COVER SHEET
SHEET 2	4TH STREET PIPE PLAN
SHEET 3	DETAILS
SHEET 4	DETAILS
TC-1	TRAFFIC CONTROL PLAN
TC-2	TRAFFIC CONTROL PLAN
TC-3	TRAFFIC CONTROL PLAN

THIS RECORD DRAWING HAS BEEN PREPARED BASED UPON INFORMATION FURNISHED BY OTHERS. CITY OF CORVALLIS IS RELYING UPON THE ACCURACY AND COMPLETENESS OF THE INFORMATION FURNISHED BUT ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OF THIS RECORD DRAWING OR FOR ANY ERRORS OR OMISSIONS WHICH MAY HAVE BEEN INCORPORATED INTO IT AS A RESULT. THOSE USING THIS RECORD DOCUMENT ARE ADVISED TO OBTAIN INDEPENDENT VERIFICATION OF ITS ACCURACY BEFORE APPLYING IT FOR ANY PURPOSE.



VICINITY MAP
 NOT TO SCALE

PROJECT LOCATION
 4TH AND 3RD STREET

EXISTING

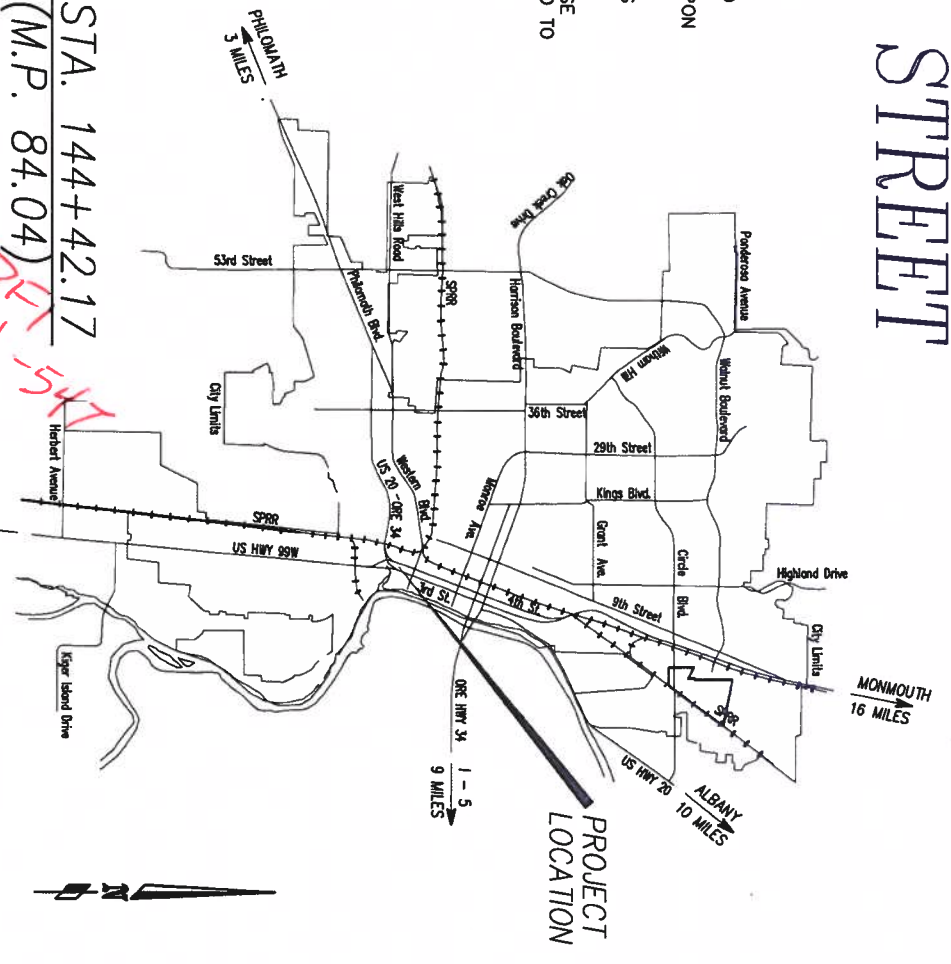
W	WATERLINE
SS	SEWER
SD	STORM DRAIN
G	GAS LINE
PH	UNDERGROUND POWER
PH	UNDERGROUND TELEPHONE
PH	UNDERGROUND TV CABLE
X	FENCE
X	CURB
○	STORM DRAIN MANHOLE
○	SEWER MANHOLE

PROPOSED

○	GUTTER INLET CATCH BASIN
○	CURB INLET CATCH BASIN
○	WATER VALVE
○	FIRE HYDRANT
○	WATER METER
○	UTILITY METER
○	UTILITY PESTICIDE
○	CLEANOUT
○	STREET SIGN
○	BENCH MARK/IRM
○	UTILITY POLE WITH DOWN GUY

PROPOSED

○	CURB AND GUTTER
○	STORM DRAIN
○	SAW CUT
○	STORM DRAIN MANHOLE
○	CURB INLET
○	FILTERBA UNIT
○	GRAND LIGHTS



LOCATION MAP
 NOT TO SCALE

STA. 144+42.17
 (M.P. 84.04)
 STA. 148+45.17
 (M.P. 84.12)

ABBREVIATIONS

RECORD DRAWING
 DATE: 7/12/12

AC	ASPHALT CONCRETE	(N)	NORTH
AGG	AGGREGATE	N/S	NOT TO SCALE
APPROX	APPROXIMATE	PCC	PORTLAND CEMENT CONCRETE
BLVD	BOULEVARD	PH	PHONE
CI	CAST IRON	(S)	SOUTH
CONC	CONCRETE	S	SLOPE
COOP	CORPORATION	SS	SEWER
DA	DIAMETER	SD	STORM DRAIN
(E)	EAST	SF	SQUARE FEET
ELEV	ELEVATION	SIT	SHEET
EX	EXISTING	ST	STREET
FH	FIRE HYDRANT	STA	STATION
FT	FEET	STD	STANDARD
E	INVERT ELEVATION	STL	STEEL
LF	LINEAL FEET	TBD	TO BE DETERMINED
MAX	MAXIMUM	TEMP	TEMPORARY
MH	MANHOLE	TV	TELEVISION
MIN	MINIMUM	TYP	TYPICAL
W	WEST	W	WITH

CITY OF CORVALLIS Public Works Department	STORM WATER RETRO FIT 4TH STREET PROJECT NUMBER 652414 COVER
	SHEET NO. 1 of 4



CITY OF CORVALLIS
Public Works Department

**STORM WATER RETRO FIT
4TH STREET
PIPE LAYOUT**

PROJECT NUMBER 652414



79X P. J. VAN BUREN
100X P. J. VAN BUREN
6/17/11
7/12/12

NO. DATE DESCRIPTION OF REVISION

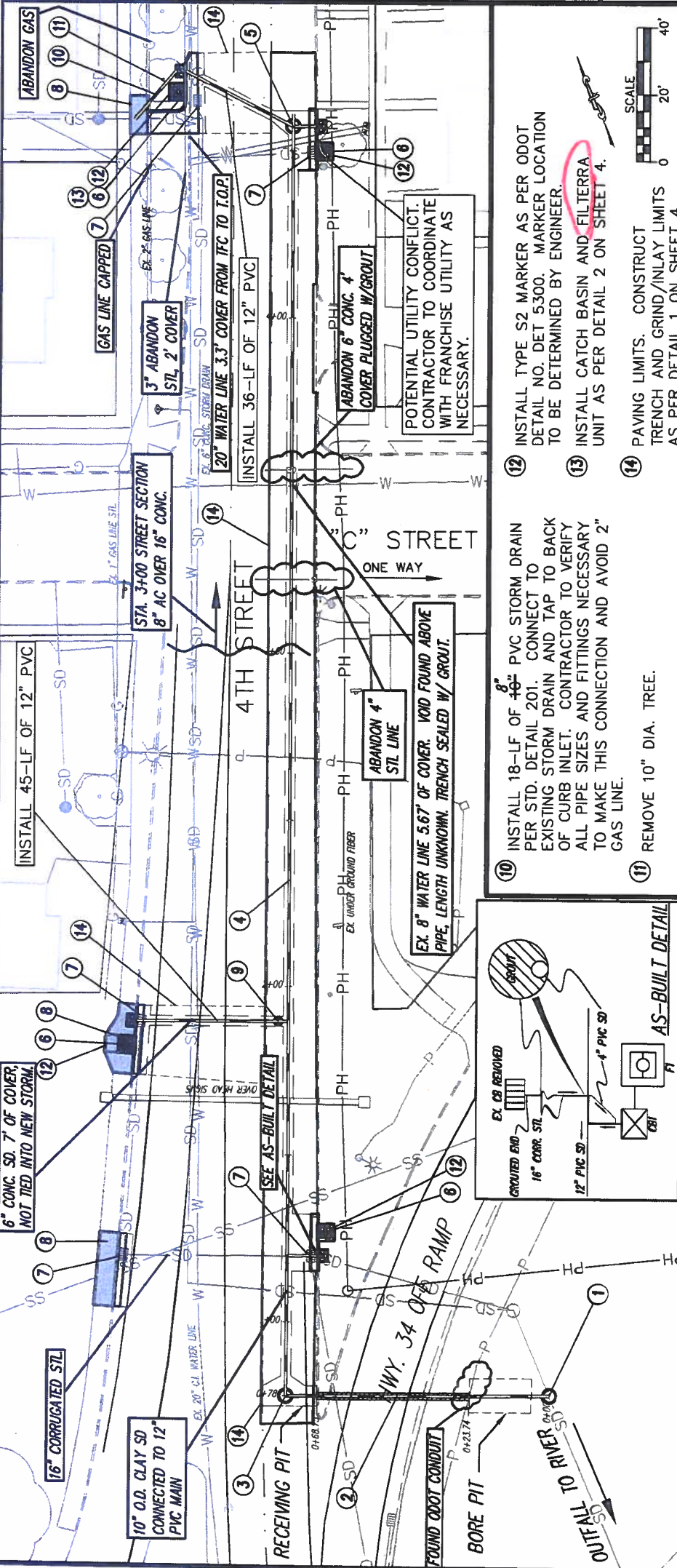
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2 7/12/12 100X P. J. VAN BUREN

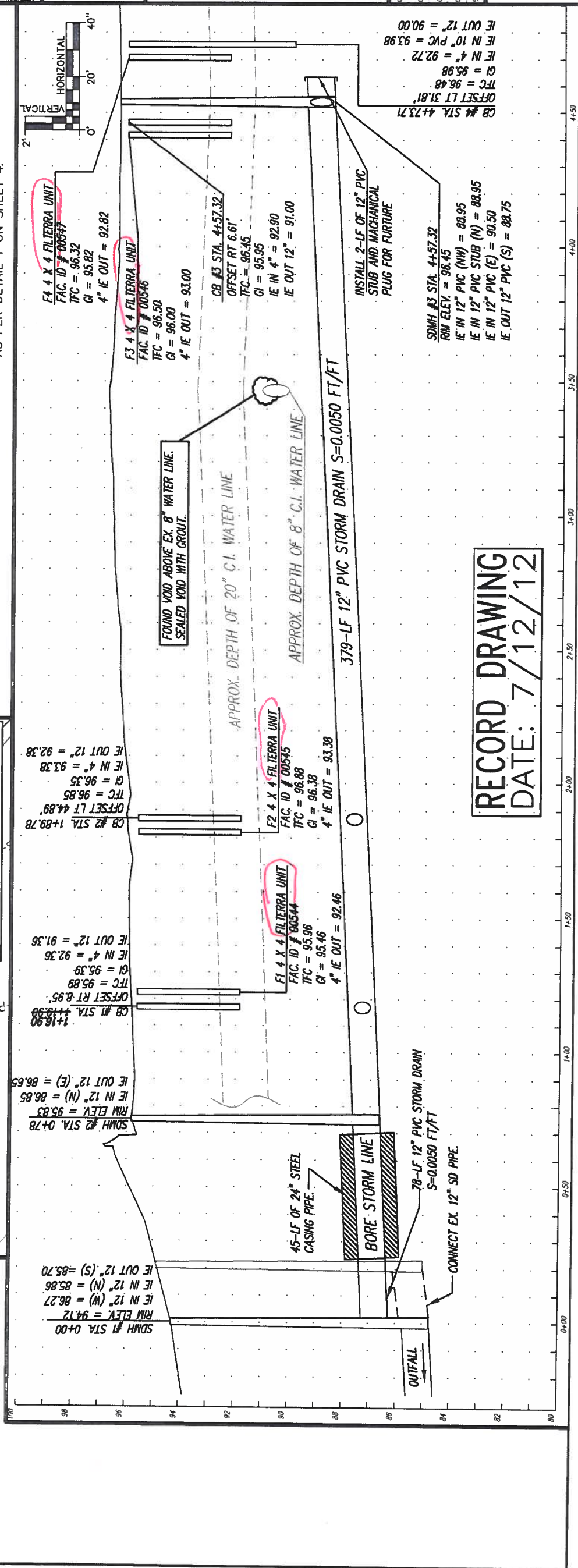
3 7/12/12 65-93.15

DESIGNED: J. F. COON
DRAWN: S. BOB
CHECKED: J. F. COON
DATE: AS SHOWN
SCALE: AS SHOWN

Sheet No. 2 of 4

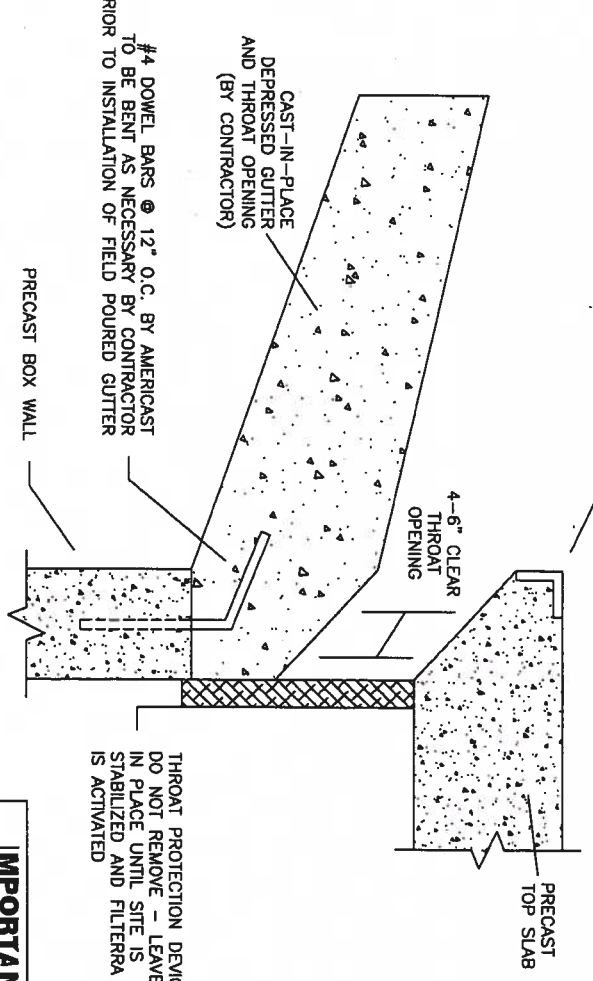


- 1 STA. 0+00 INSTALL NEW MANHOLE #1 PER STD. DETAIL 203B. CONSTRUCT POURED IN PLACE BASE. REMOVE 12" CORRUGATED PIPE AS REQUIRED.
- 2 DIRECTIONAL BORE APPROX. 45-LF OF 24" STEEL CASING PIPE WITH 78-LF OF 12" PVC STORM DRAIN PIPE USING NYLON SPACERS IN CASING. CAP ENDS WITH RUBBER BOOTS AND FILL ANNULAR SPACE AS SPECIFIED.
- 3 STA. 0+78 INSTALL NEW MANHOLE #2 PER STD. DETAIL 203.
- 4 INSTALL 379-LF OF 12" PVC STORM DRAIN PER STD. DETAIL
- 5 STA. 4+57.32 INSTALL NEW MANHOLE #3 PER STD. DETAIL 203.
- 6 INSTALL CATCH BASIN PER STD. DETAIL 209. INSTALL 4'X4' FILTERRA UNIT AS PER DETAILS ON SHEET 3. CONTRACTOR TO PICK UP AT ODOT YARD.
- 7 REMOVE EXISTING GUTTER INLET. INSTALL STANDARD CURB AND GUTTER PER STD. DETAIL 103 AS DIRECTED BY ENGINEER.
- 8 INSTALL STANDARD SIDEWALK PER STD. DETAIL 106.
- 9 INSTALL 4" CLEAN OUT FOR MAINTENANCE ACCESS.



RECORD DRAWING
DATE: 7/12/12

STANDARD 90° NOSING
(OTHER NOSING AVAILABLE
UPON REQUEST)



SECTION VIEW
STANDARD FILTERRA THROAT OPENING

IMPORTANT
FILTERRA FLOWLINE MUST BE AT A HIGHER ELEVATION THAN BYPASS FLOWLINE (DROP INLET OR OTHER)

#4 DOWEL BARS @ 12" O.C. BY AMERICAST TO BE BENT AS NECESSARY BY CONTRACTOR PRIOR TO INSTALLATION OF FIELD POURED GUTTER

THROAT PROTECTION DEVICE DO NOT REMOVE - LEAVE IN PLACE UNTIL SITE IS STABILIZED AND FILTERRA IS ACTIVATED

MODIFICATIONS OF DRAWINGS ARE ONLY PERMITTED BY WRITTEN AUTHORIZATION FROM FILTERRA

DRAWING AVAILABLE IN TIF FILE FORMAT.

AMERICAST
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FILTERRA® THROAT OPENING AND GUTTER OR FAUNE DETAIL

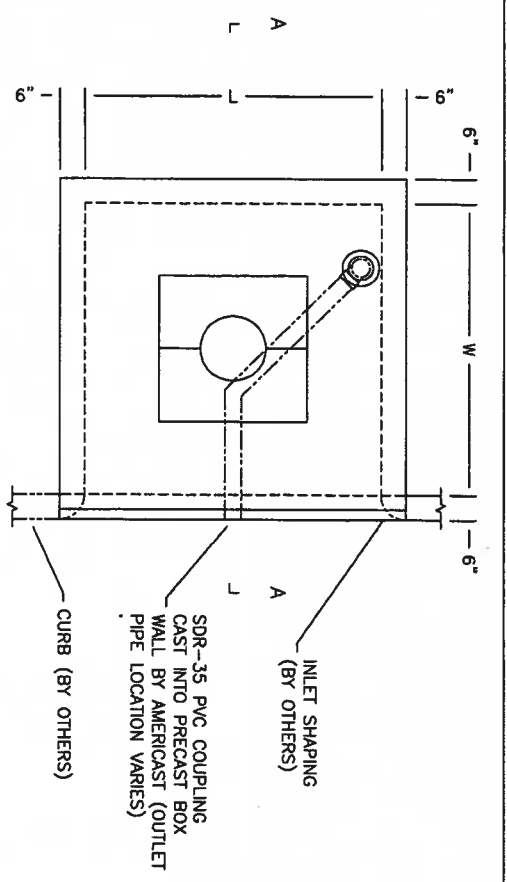
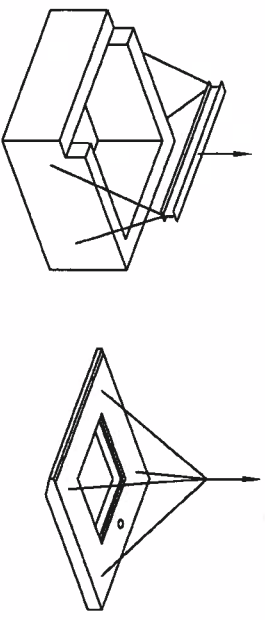
DATE: 02-26-09 DWG: CGT-5

filterra
US PAT. 6,277,274 AND 6,589,321

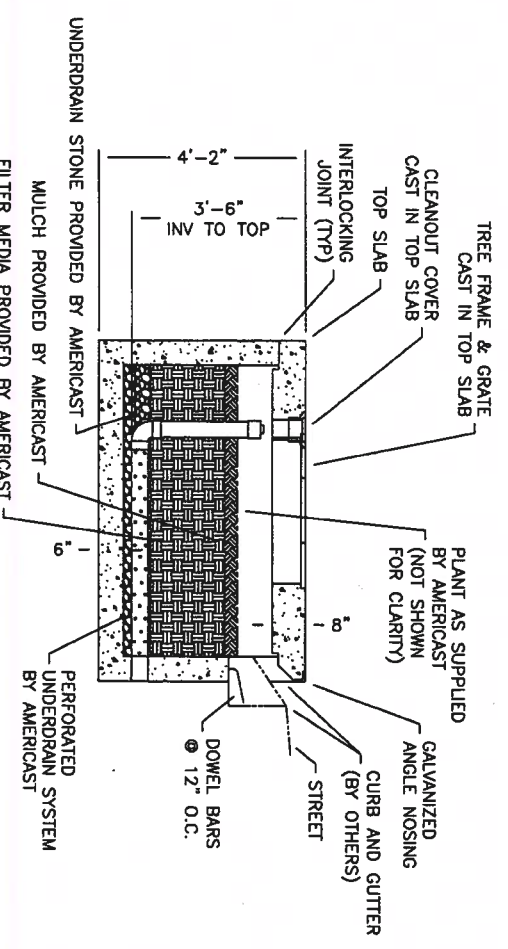
Americast Filterra Weights and Lifting Details

WESTERN ZONE

4'-0" Throat	Top Only		Box + Media		Spreader Bar	
	Pounds	Tons	Pounds	Tons	Min	Max
4x4	1,808	0.90	9,180	4.59	5.00 ft	7.50 ft



PLAN VIEW



SECTION A-A

DESIGNATION	L	W	TREE GRATE QTY & SIZE	OUTLET PIPE
4 x 4	4'-0"	4'-0"	(1) 3x3	4" SDR-35 PVC
6 x 6	6'-0"	6'-0"	(1) 3x3	4" SDR-35 PVC

MODIFICATIONS OF DRAWINGS ARE ONLY PERMITTED BY WRITTEN AUTHORIZATION FROM FILTERRA

DRAWING AVAILABLE IN TIF FILE FORMAT.

AMERICAST
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FILTERRA® UNIT PRECAST CONFIGURATION WESTERN ZONE

DATE: 03-17-09 DWG: WZ FTST-3

filterra
US PAT. 6,277,274 AND 6,589,321

RECORD DRAWING
DATE: 7/12/12



CITY OF CORVALLIS
Public Works Department

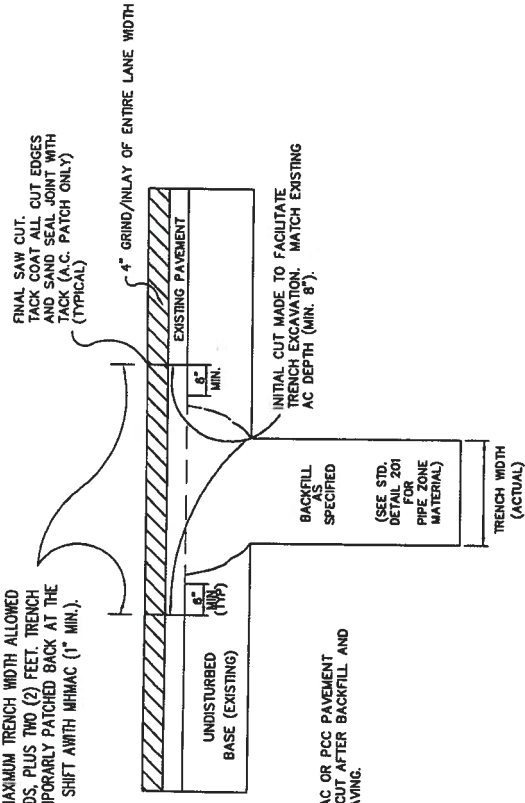
**STORM WATER RETRO FIT
4TH STREET
PROJECT NUMBER 652414
DETAILS**

ATTENTION:
Oregon law requires you follow rules adopted by the Oregon Utility Modification Center. These rules are set forth in OAR 852-001-0010 through OAR 852-001-0090. You may obtain copies of the rules by calling the center.
Note: the telephone number for the Oregon Utility Modification Center is (800) 332-2344

NO.	DATE	DESCRIPTION OF REVISION	BY
1	6/17/11	75% PLAN REVIEW	SP
2	9/15/11	100% PLAN REVIEW	SP
3	7/12/12	AS-BUILT'S	SP

DESIGNER: L. NORDEN
DRAWN: S. ROOP
CHECKED: L. NORDEN
DATE: 6/5/09
SCALE: AS SHOWN
SHEET NO.

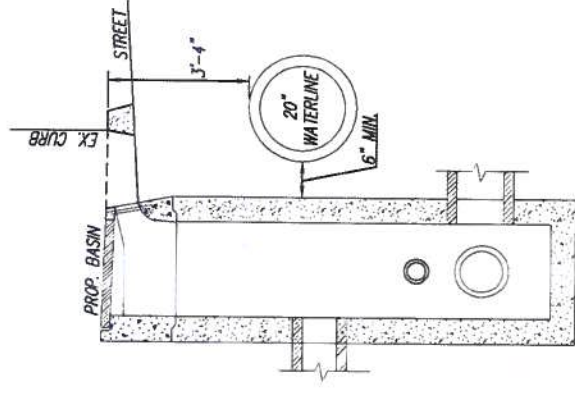
PAY LIMITS: MAXIMUM TRENCH WIDTH ALLOWED PER STANDARDS, PLUS TWO (2) FEET. TRENCH SHALL BE TEMPORARILY PATCHED BACK AT THE END OF WORK SHIFT WITH MHMAC (1" MIN.).



NOTES:

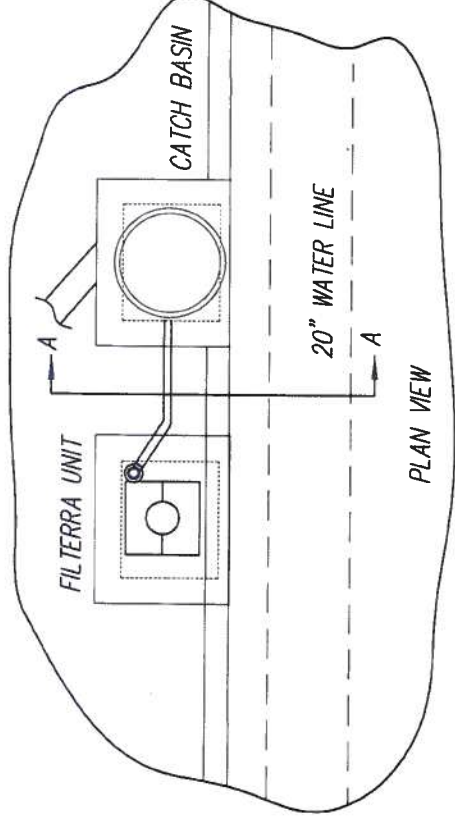
- 1) ALL EXISTING AC OR PCC PAVEMENT SHALL BE SAWCUT AFTER BACKFILL AND PRIOR TO REPAVING.

1
4
NTS
TRENCH PATCH DETAIL



SECTION A - A

2
4
NTS
BASIN LAYOUT FOR WATER LINE CONFLICT



RECORD DRAWING
DATE: 7/12/12

CITY OF CORVALLIS
Public Works Department

STORM WATER RETRO FIT
4TH STREET
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NO	DATE	DESCRIPTION OF REVISION
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3	7/12/12	AS-BUILT'S

DESIGNED: J. JACKSON
DRAWN: S. BOOP
CHECKED: J. JACKSON
DATE: AS SHOWN
SCALE: AS SHOWN

Sheet No.

4 of 4

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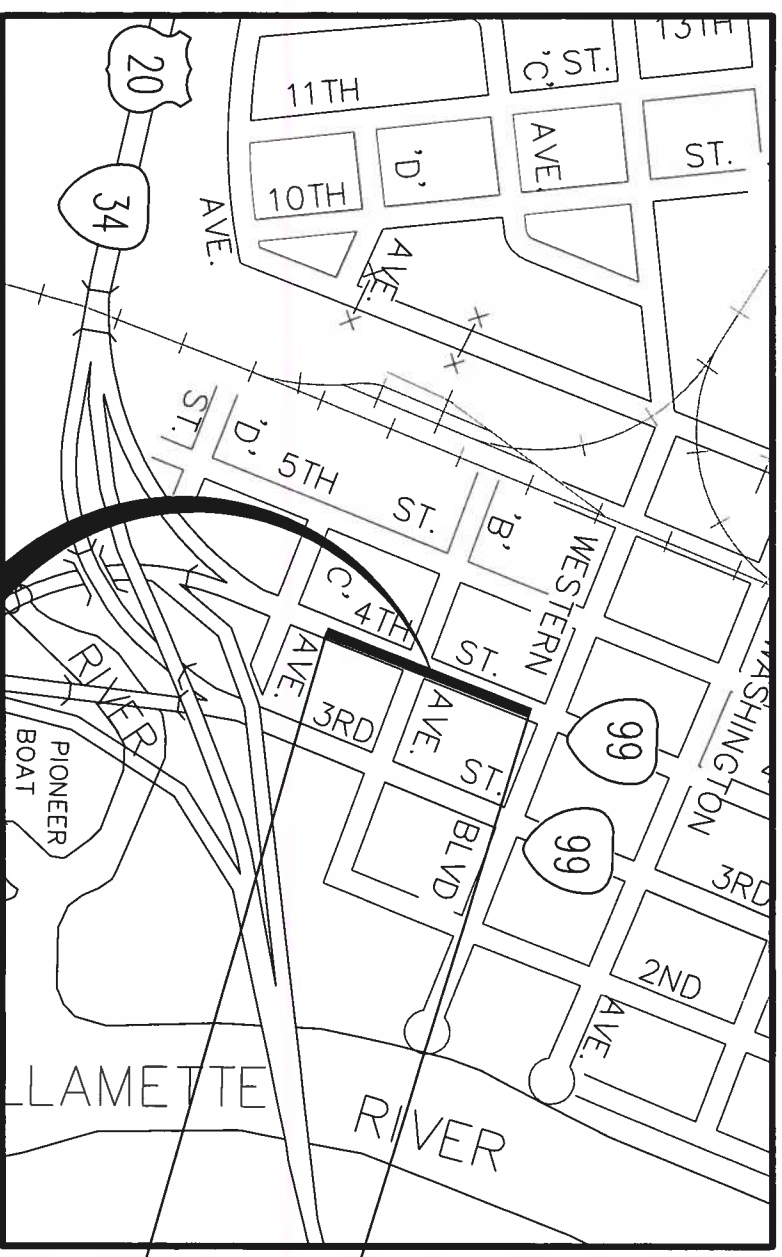
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**STORM DRAIN HWY. 99W PHASE I
 (CORVALLIS) SEC., HIGHWAY 99W
 PROJECT NO. 653430**

SHEET INDEX

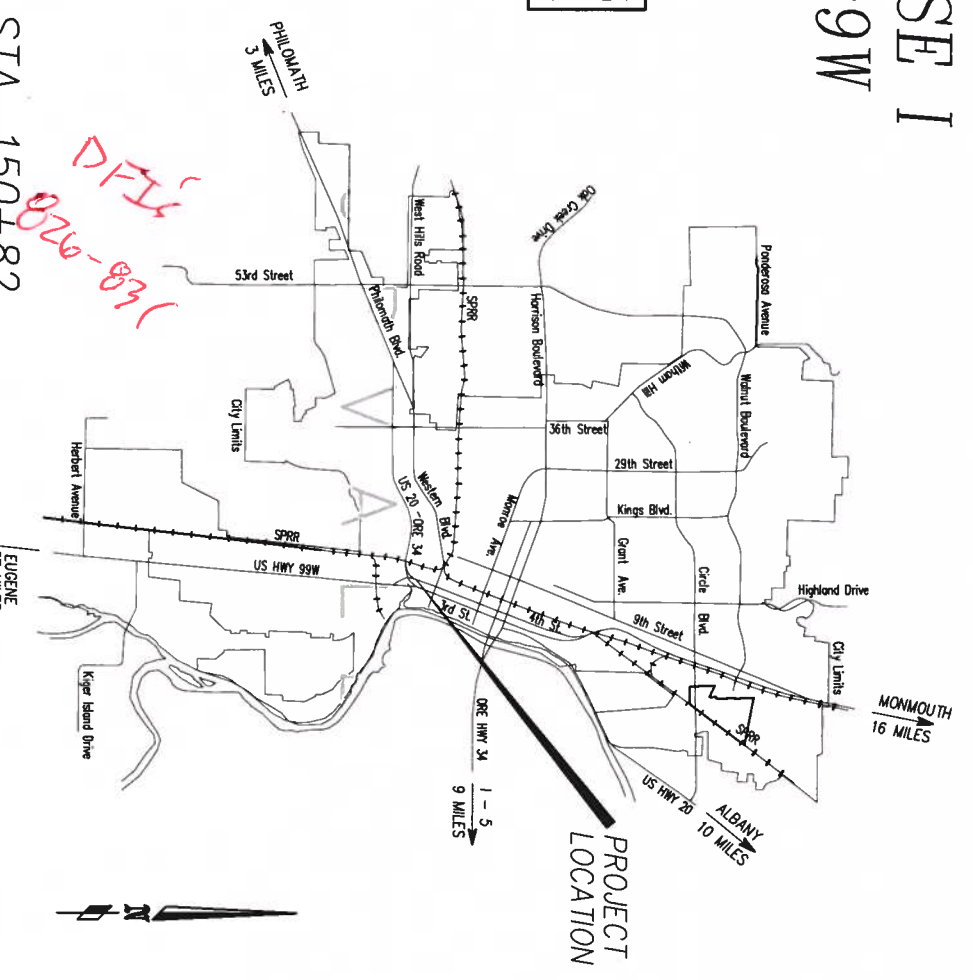
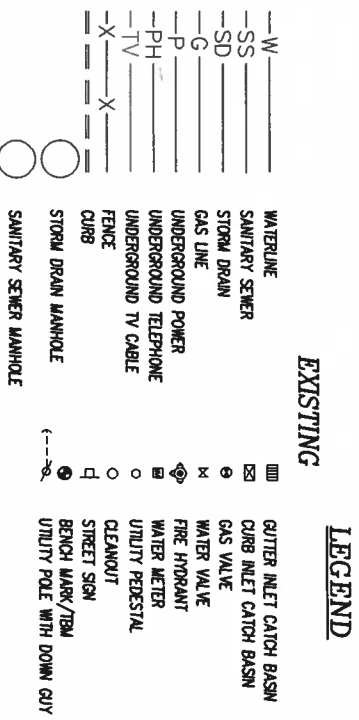
SHEET 1	COVER SHEET
SHEET 2	STORM DRAIN LAYOUT
SHEET 3	STORM DRAIN LAYOUT
SHEET 4	FILTERRA INSTALL DETAIL
SHEET 5	FILTERRA APRON EXHIBITS
SHEET 6	GRIND/INLAY PLAN
SHEET TC-1	TRAFFIC CONTROL PLAN
SHEET TC-2	TRAFFIC CONTROL PLAN
SHEET TC-3	TRAFFIC CONTROL PLAN

**RECORD DRAWING
 DATE: 12/18/13**



**VICINITY MAP
 NOT TO SCALE**

**PROJECT LOCATION
 4TH STREET FROM 'C' STREET TO WESTERN BLVD.**



**LOCATION MAP
 NOT TO SCALE**

STA. 142+42
 (M.P. 84.04)

STA. 150+82
 (M.P. 83.92)

ABBREVIATIONS

AC	ASPHALT CONCRETE	LF	LINEAL FEET	ST	STREET
AGG	AGGREGATE	LT	LEFT	STA	STATION
APPROX	APPROXIMATE	MAX	MAXIMUM	STD	STANDARD
BCR	BENCH CURB RETURN	MH	MANHOLE	STL	STEEL
C.A.B.	CRUSHED AGGREGATE BASE	MIN	MINIMUM	S/W	SIDEWALK
CB	CATCH BASIN	(N)	NORTH	SY	SQUARE YARD
CR	CAST IRON	NO.	NUMBER	TBD	TO BE DETERMINED
CONC	CONCRETE	N/S	NOT TO SCALE	TEMP	TEMPORARY
C.T.B.	CEMENT TREATED BASE	OC	ON CENTER	TV	TELEVISION
DIA	DIAMETER	PCC	PORTLAND CEMENT CONCRETE	TYP	TYPICAL
(E)	EAST	PH	PHONE	(N)	NORTH
ECR	END CURB RETURN	QTY	QUANTITY	W	WIDTH
ELEV	ELEVATION	RT	RIGHT	W/	WITH
EX	EXISTING	(S)	SOUTH		
FH	FIRE HYDRANT	S	SLOPE		
F.O.C.	FACE OF CURB	SS	SANITARY SEWER		
FT	FEET	SD	STORM DRAIN		
HP	HIGH POINT	SF	SQUARE FEET		
IE	INVERT ELEVATION	SHT	SHEET		



ATTENTION:
 Oregon law requires you follow rules adopted by the Oregon Utility Notification Center. These rules are set forth in OAR 952-001-0010 through 952-001-0090. You may obtain copies of the rules by calling the center. (Note: the telephone number for the Oregon Utility Notification Center is (503) 232-5198.)

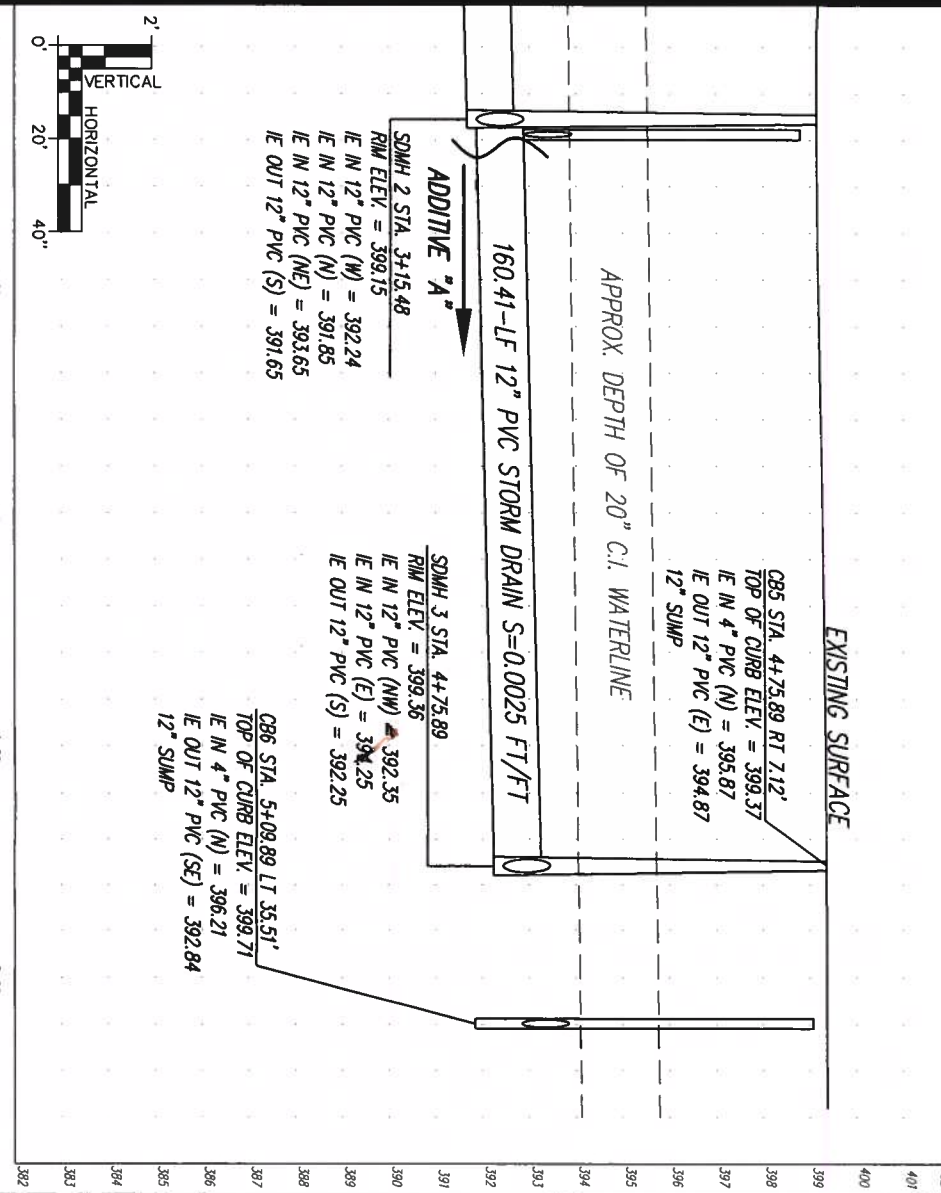
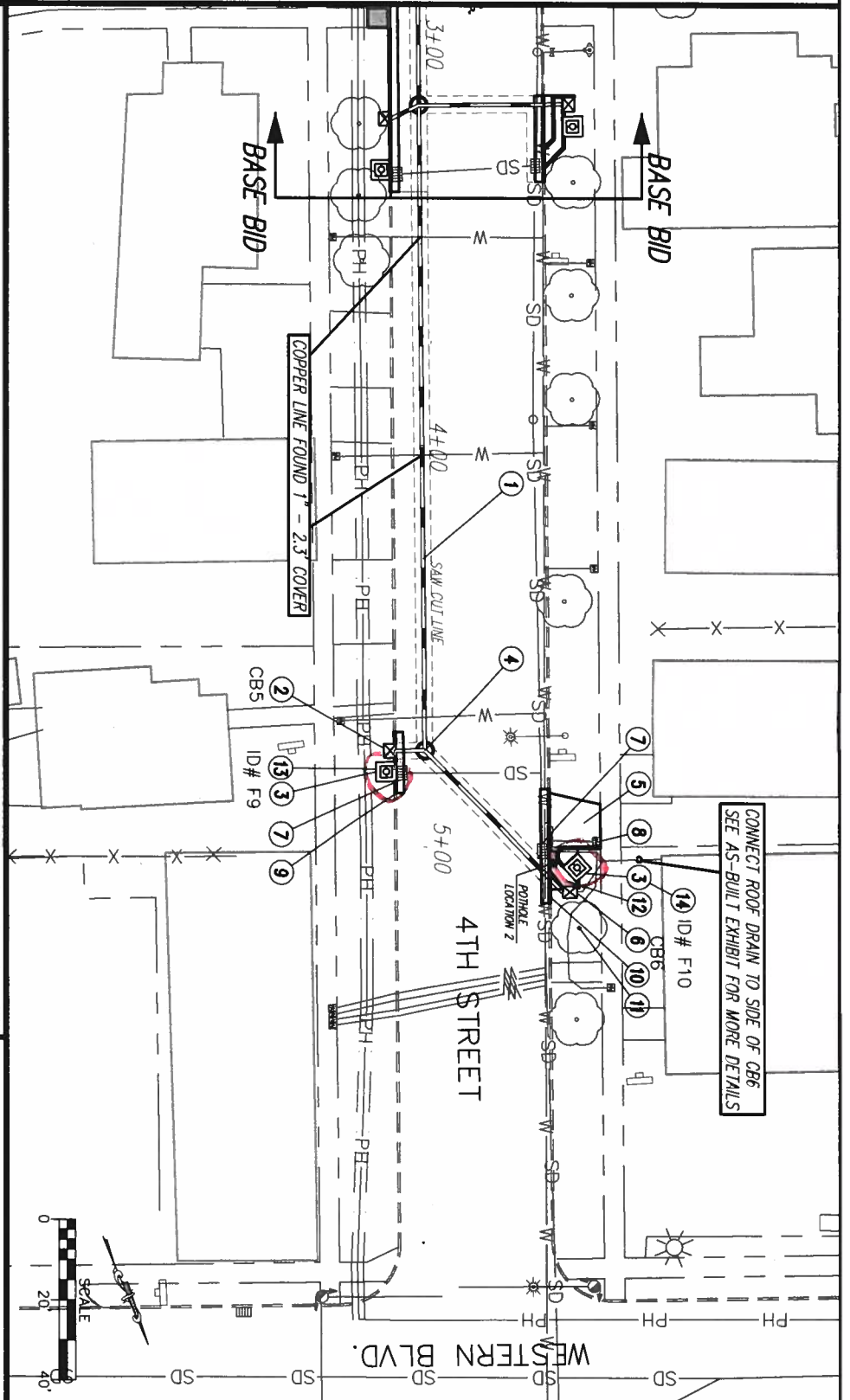
**STORM DRAIN HWY.99W PHASE I
 PROJECT NUMBER 653430
 COVER**

CORVALLIS
 PUBLIC WORKS DEPARTMENT

CITY OF CORVALLIS
 Public Works Department

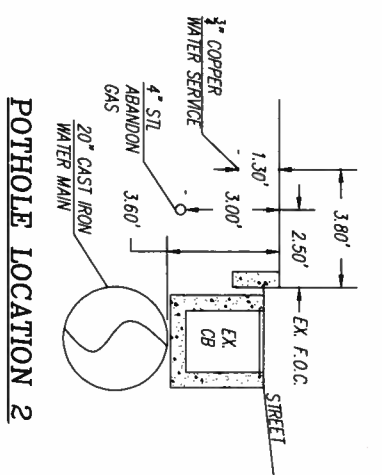
- 1 INSTALL 160.41-LF OF 12" PVC STORM PIPE. S= 0.0025 FT/FT.
- 2 STA. 4+75.89 INSTALL CB5 PER STD. DETAIL 209. INSTALL APPROX. 7-LF OF 12" PVC PIPE FROM CB5 TO MH3, S= 0.0871 FT/FT.
- 3 INSTALL FILTERRA UNIT AS PER DETAIL ON SHEET 4. INSTALL 4" PVC PIPE TO ACCOMPANYING CATCH BASIN.
- 4 STA. 4+75.89 INSTALL STORM DRAIN MANHOLE #3 AS PER STD. DETAIL 203.
- 5 REMOVE APPROX. 16.95-SY OF EXISTING DRIVEWAY AND INSTALL 8" PCC DRIVEWAY PER STD. DETAIL 108.
- 6 STA. 5+09.89 INSTALL CB6 PER STD. DETAIL 209. INSTALL APPROX. 49-LF OF 12" PVC PIPE FROM CB6 TO MH3, S= 0.0100 FT/FT. SEE "POTHOLE LOCATION 2" ON THIS SHEET FOR EX. 20" WATER LINE LOCATION.
- 7 REMOVE EXISTING GUTTER INLET. PLUG AND ABANDON IN PLACE EXISTING STORM PIPE ENCOUNTERED DURING REMOVAL AS APPROVED BY THE ENGINEER.
- 8 EXISTING 3/4" COPPER WATER SERVICE. CITY CREWS WILL HOT TAP NEW SERVICE. CONTRACTOR RESPONSIBLE FOR ALL TRAFFIC CONTROL, EQUIPMENT TO EXPOSE THE LINE, SHORING IF NECESSARY, BACKFILLING AND COMPACTION. CONTRACTOR SHALL NOTIFY ENGINEER 1 WEEK PRIOR TO WORK BEING DONE FOR SCHEDULING.
- 9 INSTALL 16-LF OF CURB AND GUTTER AS PER STD. DETAIL 103.
- 10 INSTALL 30-LF OF CURB AND GUTTER AS PER STD. DETAIL 103.
- 11 PROTECT EXISTING TREE.
- 12 INSTALL 3.77-SY OF 8" DEPTH CONCRETE APRON. SEE EXHIBIT C ON SH. 5.
- 13 INSTALL TYPE S2 MARKER AS PER ODOT DETAIL NO. DET 5300. MARKER LOCATION TO BE DETERMINED BY ENGINEER.

EXISTING STREET SECTION IS 8" AC OVER 16" OF CTB. SEE DETAIL ON SHEET 6.



CONNECT ROOF DRAIN TO SIDE OF CB6
SEE AS-BUILT EXHIBIT FOR MORE DETAILS

RECORD DRAWING
DATE: 12/18/13



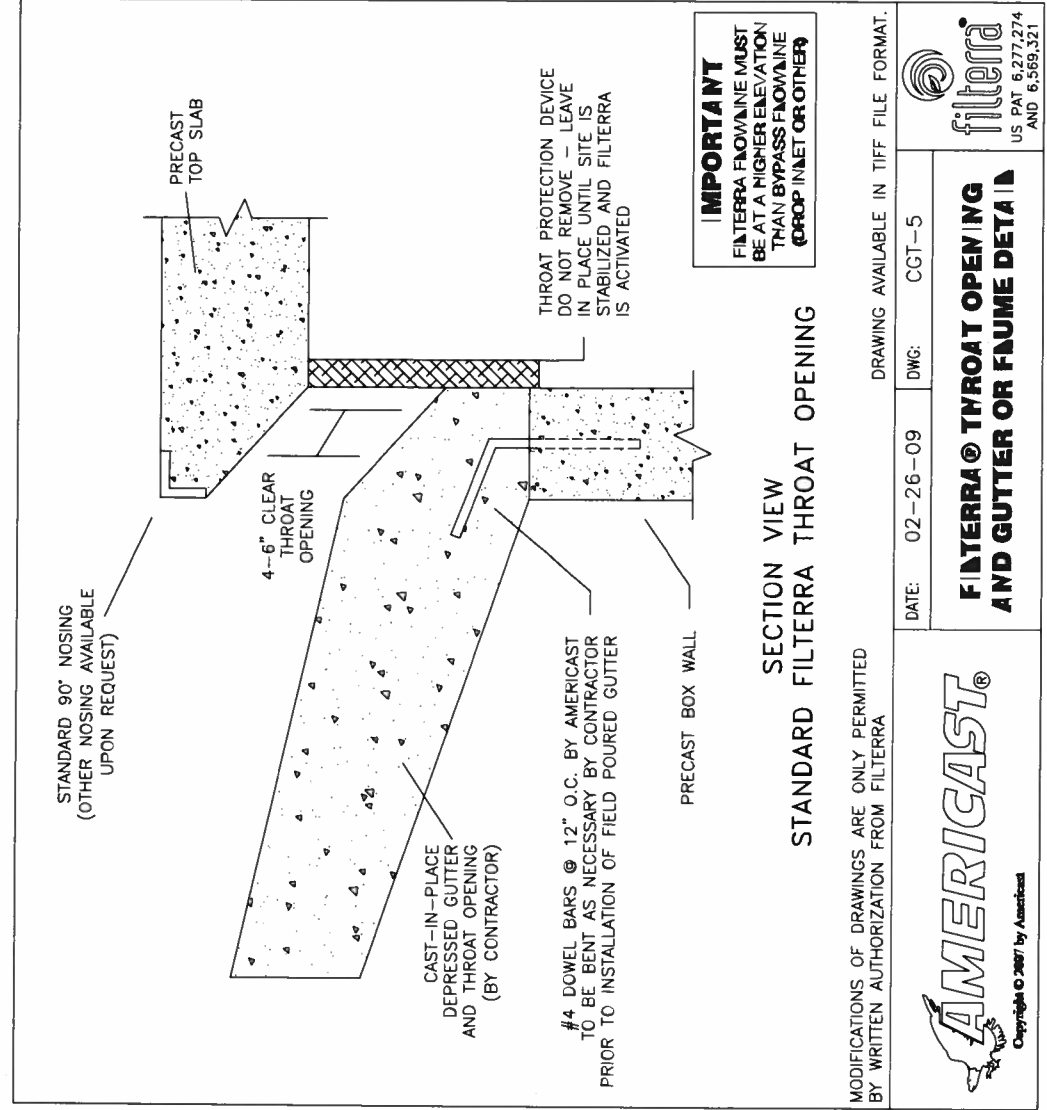
CITY OF CORVALLIS
Public Works Department

STORM DRAIN HWY.99W PHASE I
ADDITIVE "A"
PROJECT NUMBER 653430
STORM DRAIN LAYOUT

REGISTERED PROFESSIONAL ENGINEER
OSMA B. TACHIBANA
OREGON

NO.	DATE	DESCRIPTION OF REVISION
1	12/11/12	50% PLAN REVIEW
2	4/10/13	75% PLAN REVIEW
3	6/14/13	100% PLAN REVIEW
4	12/18/13	AS BUILTS

3 of 6

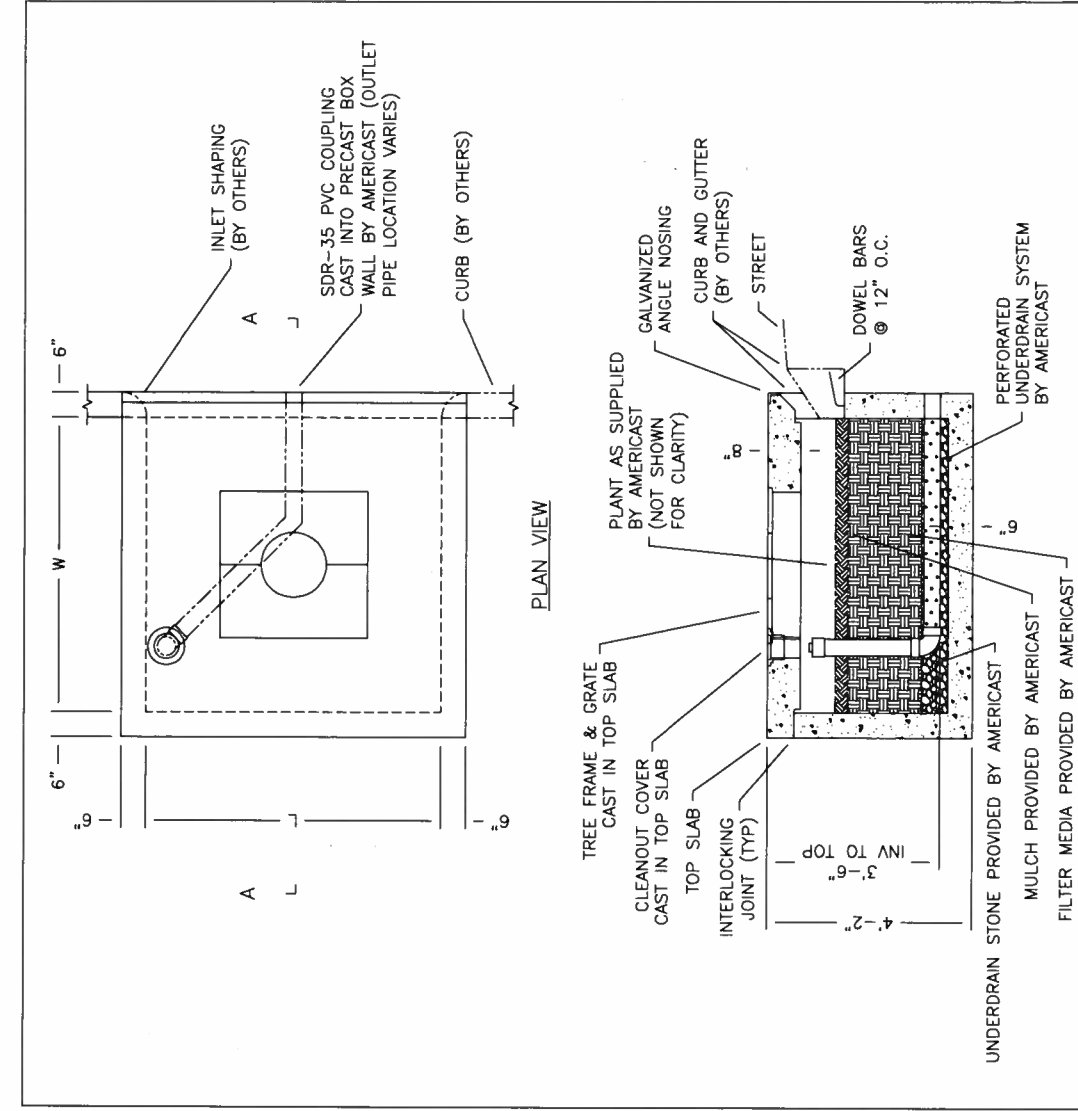


AMERICAST®
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filterra®
US PAT. 6,277,274 AND 6,569,321

DATE: 02-26-09 DWG: CGT-5
filterra® THROAT OPENING AND GUTTER OR FRAME DETAIL

MODIFICATIONS OF DRAWINGS ARE ONLY PERMITTED BY WRITTEN AUTHORIZATION FROM FILTERRA. DRAWING AVAILABLE IN TIFF FILE FORMAT.



SECTION A-A

DESIGNATION	L	W	TREE GRATE QTY & SIZE	OUTLET PIPE
4 x 4	4'-0"	4'-0"	(1) 3x3	4" SDR-35 PVC
6 x 6	6'-0"	6'-0"	(1) 3x3	4" SDR-35 PVC

MODIFICATIONS OF DRAWINGS ARE ONLY PERMITTED BY WRITTEN AUTHORIZATION FROM FILTERRA. DRAWING AVAILABLE IN TIFF FILE FORMAT.

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filterra®
US PAT. 6,277,274 AND 6,569,321

DATE: 03-17-09 DWG: WZ FTST-3
PRECAST FILTERRA® UNIT STANDARD CONFIGURATION WESTERN ZONE



CITY OF CORVALLIS
Public Works Department

STORM DRAIN HWY. 99W PHASE I
BASE BID
PROJECT NUMBER 653430
FILTERRA UNIT INSTALL DETAIL

ATTENTION: Origin file requires you follow rules adopted by the Oregon Utility Notification Center. Most rules are set forth in OAR 853-001-0010 through OAR 853-001-0020. For any other copies of the rules by the Oregon Utility Notification Center is (800) 332-2344.



NO.	DATE	DESCRIPTION OF REVISION
1	12/17/13	FOR PLAN REVIEW
2	4/6/16	FOR PLAN REVIEW
3	6/16/16	FOR PLAN REVIEW
4	6/16/16	FOR PLAN REVIEW
5	12/18/16	FOR BILLS

DESIGNED: J. PEGONI
DRAWN: S. P. SPO
CHECKED: J. PEGONI
DATE:
SCALE: AS SHOWN
Sheet No.

RECORD DRAWING
DATE: 12/18/13

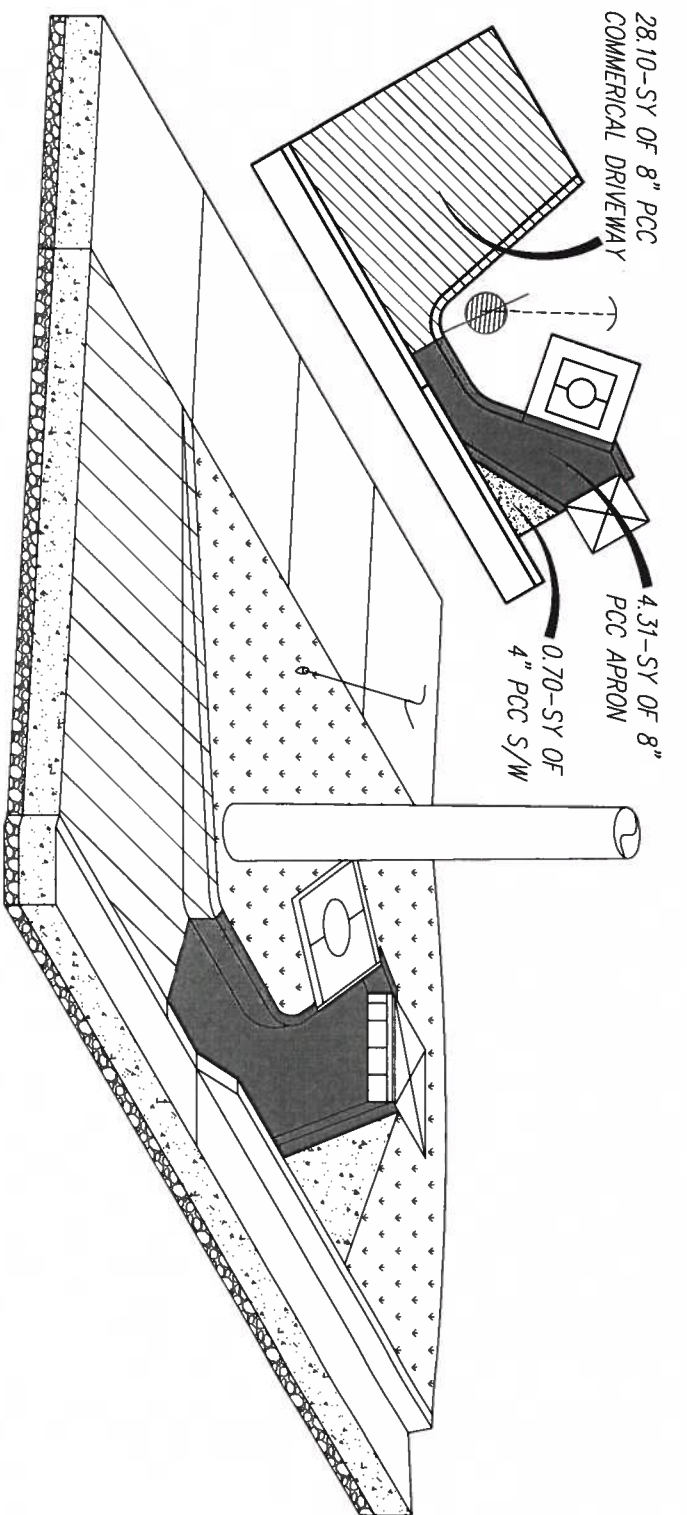


Exhibit A
Base Bid

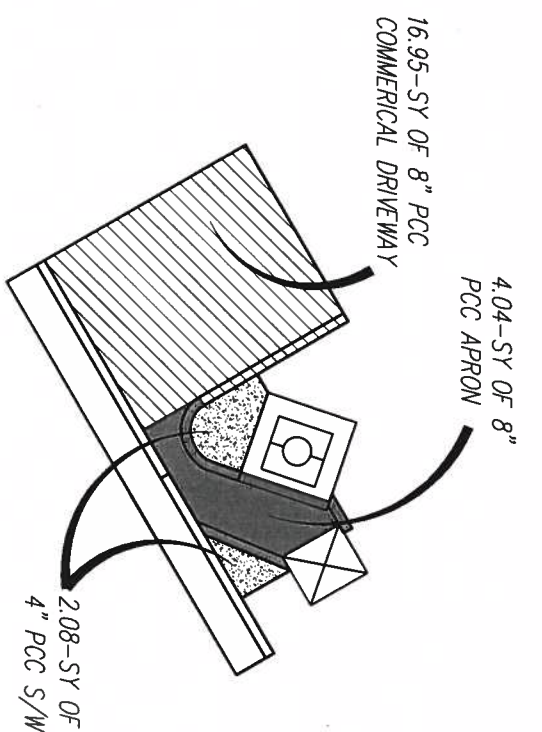


Exhibit C
Additive "A"

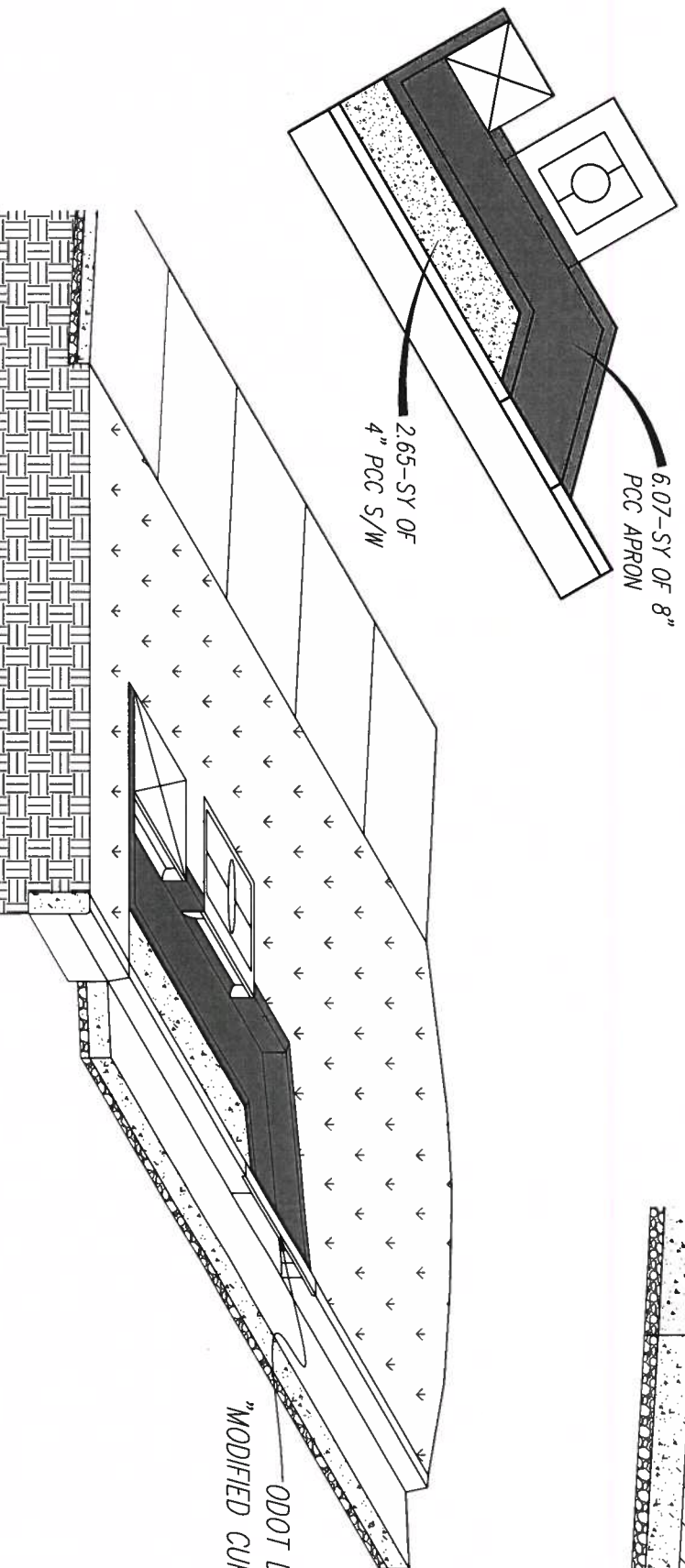
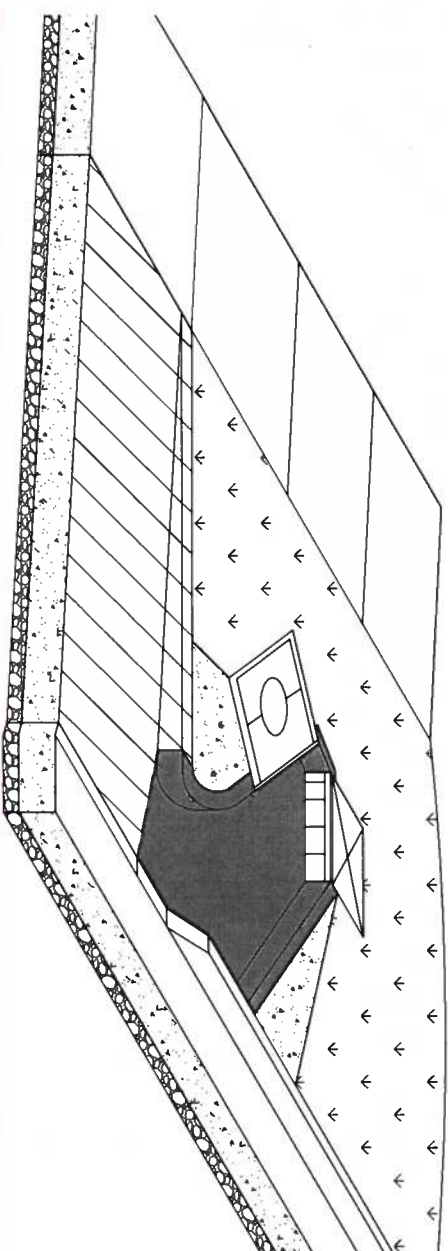
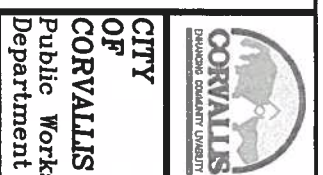


Exhibit B
Base Bid



RECORD DRAWING
DATE: 12/18/13

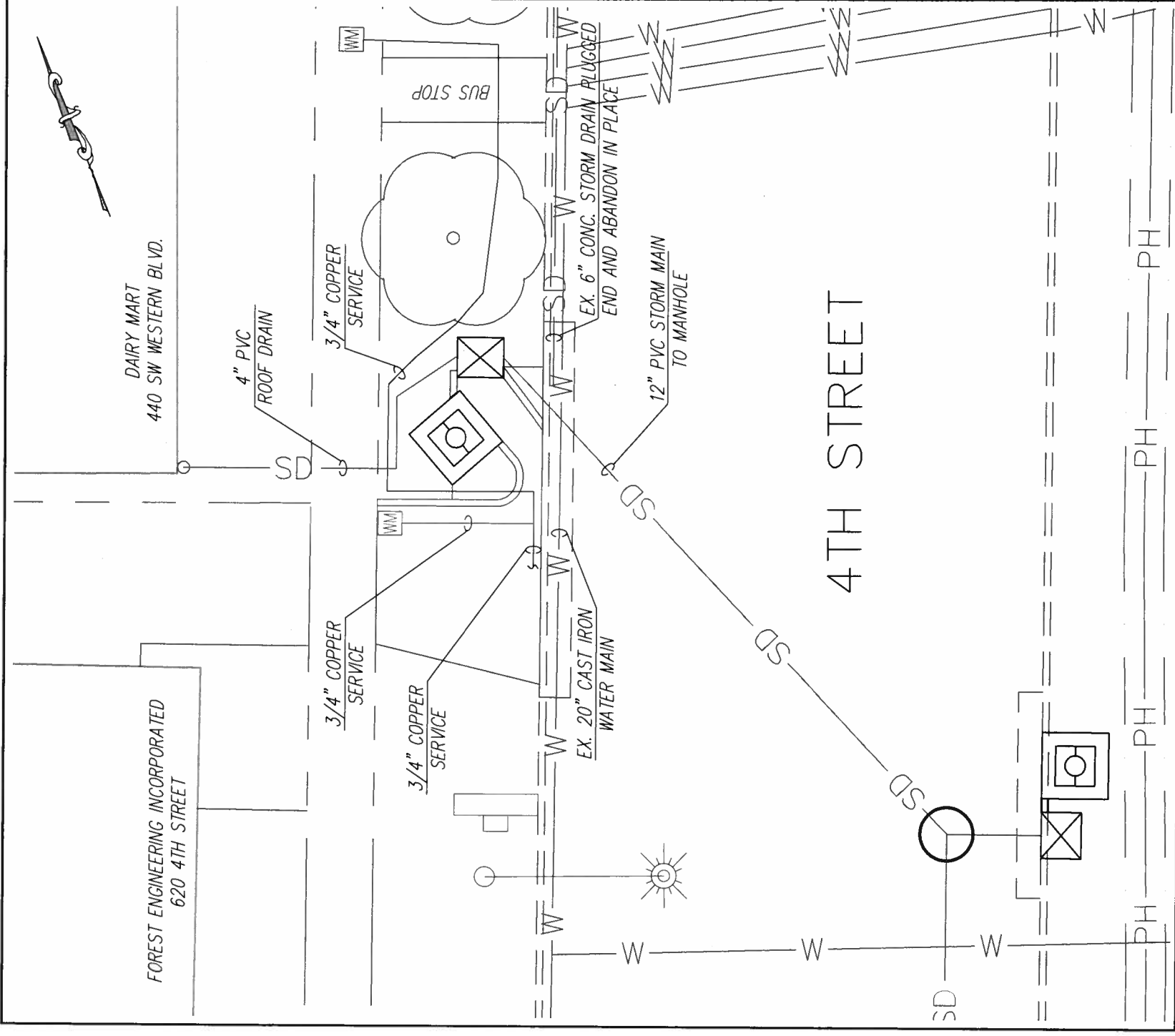


STORM DRAIN HWY.99W PHASE I
BASE BID
PROJECT NUMBER 653430
FILTERRA UNIT LAYOUT

ATTENTION:
Oregon law requires you follow rules adopted by the Oregon Utility Notification Center. Those rules are set forth in OAR 552-001-0010 through OAR 552-001-0090. You may obtain copies of the rules by calling the center.
(Note: the telephone number for the Oregon Utility Notification Center is (800) 332-2344)



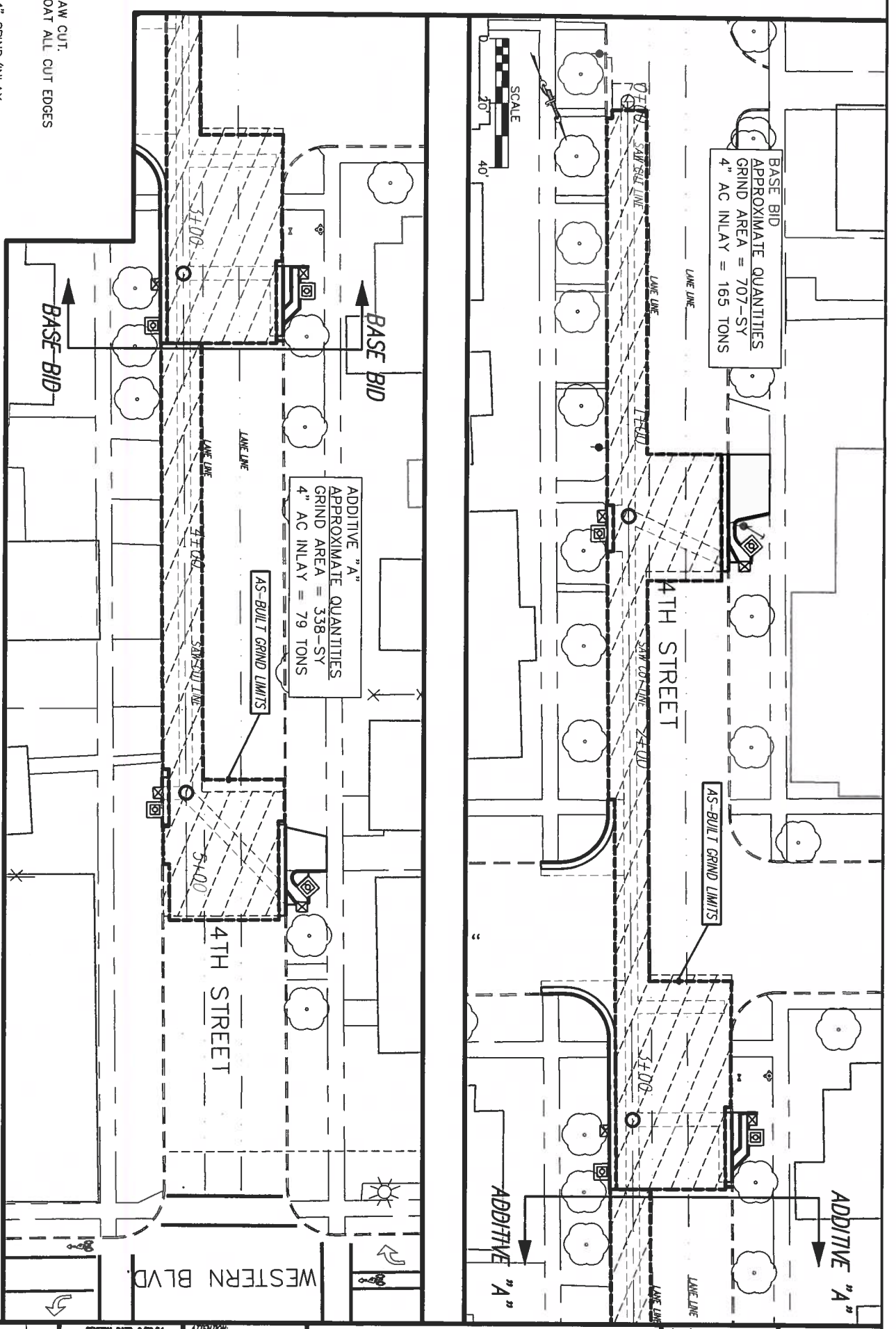
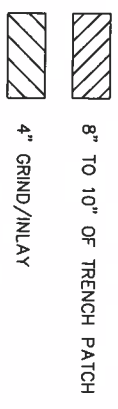
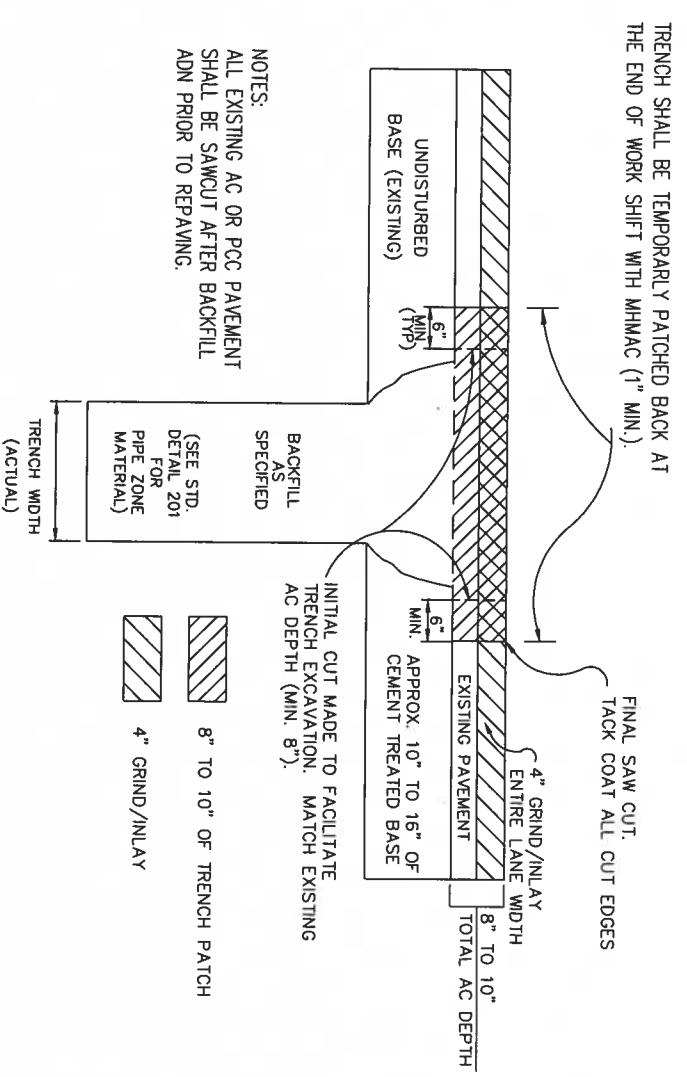
NO.	DATE	DESCRIPTION OF REVISION	BY
1	12/11/12	60x6 PLAN REVIEW	SP
2	4/16/13	9x9 PLAN REVIEW	SP
3	6/19/13	100% PLAN REVIEW	SP
4	11/18/13	REBUILT	SP



CITY OF CORVALLIS
Public Works Department
As Built Exhibit

DESIGNED	J. TACCHINI
DRAWN	S. BOND
CHECKED	J. TACCHINI
DATE	12/18/15
SCALE:	1" = 10'

- GENERAL NOTES:**
1. STRIPING DONE BY OTHERS. TEMPORARY "STICK AND STOMPS" MARKERS TO BE INSTALLED BY CONTRACTOR.
 2. GRIND LIMITS ARE APPROXIMATE AND WILL BE DETERMINED BY THE ENGINEER. CONTRACTOR WILL BE RESPONSIBLE FOR ALL DAMAGE DUE TO CONSTRUCTION ACTIVITIES OUTSIDE OF WORK ZONE.



RECORD DRAWING
DATE: 12/18/13

TRENCH PATCH/GRIND DETAIL

NTS



CITY OF CORVALLIS
Public Works Department

STORM DRAIN HWY.99W PHASE I
BASE BID AND ADDITIVE "A"
PROJECT NUMBER 653430
GRIND/INLAY PLAN

ATTENTION:
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(Note: the telephone number for the Oregon Utility Notification Center is (800) 332-2344)



NO.	DATE	DESCRIPTION OF REVISION	BY
1	12/17/12	SGA PLANNING	JP
2	4/1/13	9-X PLACEMENT	JP
3	6/14/13	10-X PLACEMENT	JP
4	11/14/13	15 PULL	JP

6 of 6

Filterterra Owner's Manual



filterterra[®]
Bioretention Systems

C NTECH[®]
ENGINEERED SOLUTIONS



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Appendix 2 – Planting Requirements for Filtererra Systems.....	13

Enclosed

Local Area Filtererra Plant List



Introduction

Thank you for your purchase of the Filterra® Bioretention System. Filterra is a specially engineered stormwater treatment system incorporating high performance biofiltration media to remove pollutants from stormwater runoff. The system’s biota (vegetation and soil microorganisms) then further breakdown and absorb captured pollutants. All components of the system work together to provide a sustainable long-term solution for treating stormwater runoff.

The Filterra system has been delivered to you with protection in place to resist intrusion of construction related sediment which can contaminate the biofiltration media and result in inadequate system performance. These protection devices are intended as a best practice and cannot fully prevent contamination. It is the purchaser’s responsibility to provide adequate measures to prevent construction related runoff from entering the Filterra system.

Included with your purchase is Activation of the Filterra system by the manufacturer as well as a 1-year warranty from delivery of the system and 1-year of routine maintenance (mulch replacement, debris removal, and pruning of vegetation) up to twice during the first year after activation.

Design and Installation

Each project presents different scopes for the use of Filterra systems. Information and help may be provided to the design engineer during the planning process. Correct Filterra box sizing (by rainfall region) is essential to predict pollutant removal rates for a given area. The engineer shall submit calculations for approval by the local jurisdiction. The contractor is responsible for the correct installation of Filterra units as shown in approved plans. A comprehensive installation manual is available at www.ContechES.com.

Activation Overview

Activation of the Filterra system is a procedure completed by the manufacturer to place the system into working condition. This involves the following items:

- Removal of construction runoff protection devices
- Planting of the system’s vegetation
- Placement of pretreatment mulch layer using mulch certified for use in Filterra systems.

Activation MUST be provided by the manufacturer to ensure proper site conditions are met for Activation, proper installation of the vegetation, and use of pretreatment mulch certified for use in Filterra systems.



Minimum Requirements

The minimum requirements for Filterra Activation are as follows:

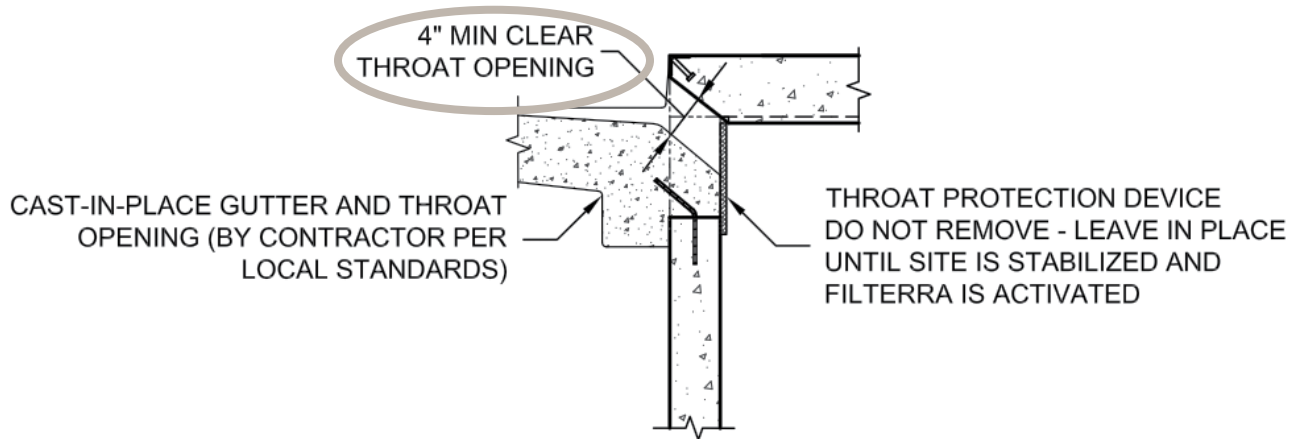
1. The site landscaping must be fully stabilized, i.e. full landscaping installed and some grass cover (not just straw and seed) is required to reduce sediment transport. Construction debris and materials should be removed from surrounding area.



2. Final paving must be completed. Final paving ensures that paving materials will not enter and contaminate the Filterra system during the paving process, and that the plant will receive runoff from the drainage area, assisting with plant survival for the Filterra system.



3. Filterra throat opening should be at least 4" in order to ensure adequate capacity for inflow and debris.



An Activation Checklist is included on page 12 to ensure proper conditions are met for Contech to perform the Activation services. A charge of \$500.00 will be invoiced for each Activation visit requested by Customer where Contech determines that the site does not meet the conditions required for Activation.

Filterra Plant Selection Overview

A Plant List has been enclosed with this packet highlighting recommended plants for Filterra systems in your area. Keep in mind that plants are subject to availability due to seasonality and required minimum size for the Filterra system. Plants installed in the Filterra system are container plants (max 15 gallon) from nursery stock and will be immature in height and spread at Activation.

It is the responsibility of the owner to provide adequate irrigation when necessary to the plant of the Filterra system.

The "Planting Requirements for Filterra Systems" document is included as an appendix and discusses proper selection and care of the plants within Filterra systems.

Warranty Overview

Refer to the Contech Engineered Solutions LLC Stormwater Treatment System LIMITED WARRANTY for further information. The following conditions may void the Filterra system's warranty and waive the manufacturer provided Activation and Maintenance services:

- Unauthorized activation or performance of any of the items listed in the activation overview
- Any tampering, modifications or damage to the Filterra system or runoff protection devices
- Removal of any Filterra system components
- Failure to prevent construction related runoff from entering the Filterra system
- Failure to properly store and protect any Filterra components (including media and underdrain stone) that may be shipped separately from the vault

Routine Maintenance Guidelines

With proper routine maintenance, the biofiltration media within the Filterra system should last as long as traditional bioretention media. Routine maintenance is included by the manufacturer on all Filterra systems for the first year after activation. This includes a maximum of 2 visits to remove debris, replace pretreatment mulch, and prune the vegetation. More information is provided in the Operations and Maintenance Guidelines. Some Filterra systems also contain pretreatment or outlet bays. Depending on site pollutant loading, these bays may require periodic removal of debris, however this is not included in the first year of maintenance, and would likely not be required within the first year of operation.

These services, as well as routine maintenance outside of the included first year, can be provided by certified maintenance providers listed on the Contech website. Training can also be provided to other stormwater maintenance or landscape providers.



Why Maintain?

All stormwater treatment systems require maintenance for effective operation. This necessity is often incorporated in your property's permitting process as a legally binding BMP maintenance agreement. Other reasons to maintain are:

- Avoiding legal challenges from your jurisdiction's maintenance enforcement program.
- Prolonging the expected lifespan of your Filterra media.
- Avoiding more costly media replacement.
- Helping reduce pollutant loads leaving your property.

Simple maintenance of the Filterra is required to continue effective pollutant removal from stormwater runoff before discharge into downstream waters. This procedure will also extend the longevity of the living biofilter system. The unit will recycle and accumulate pollutants within the biomass, but is also subjected to other materials entering the inlet. This may include trash, silt and leaves etc. which will be contained above the mulch layer. Too much silt may inhibit the Filterra's flow rate, which is the reason for site stabilization before activation. Regular replacement of the mulch stops accumulation of such sediment.

When to Maintain?

Contech includes a 1-year maintenance plan with each system purchase. Annual included maintenance consists of a maximum of two (2) scheduled visits. Additional maintenance may be necessary depending on sediment and trash loading (by Owner or at additional cost). The start of the maintenance plan begins when the system is activated.

Maintenance visits are scheduled seasonally; the spring visit aims to clean up after winter loads including salts and sands while the fall visit helps the system by removing excessive leaf litter.

It has been found that in regions which receive between 30-50 inches of annual rainfall, (2) two visits are generally required; regions with less rainfall often only require (1) one visit per annum. Varying land uses can affect maintenance frequency; e.g. some fast food restaurants require more frequent trash removal. Contributing drainage areas which are subject to new development wherein the recommended erosion and sediment control measures have not been implemented may require additional maintenance visits.

Some sites may be subjected to extreme sediment or trash loads, requiring more frequent maintenance visits. This is the reason for detailed notes of maintenance actions per unit, helping the Supplier and Owner predict future maintenance frequencies, reflecting individual site conditions.

Owners must promptly notify the (maintenance) Supplier of any damage to the plant(s), which constitute(s) an integral part of the bioretention technology. Owners should also advise other landscape or maintenance contractors to leave all maintenance to the Supplier (i.e. no pruning or fertilizing) during the first year.



Exclusion of Services

Clean up due to major contamination such as oils, chemicals, toxic spills, etc. will result in additional costs and are not covered under the Supplier maintenance contract. Should a major contamination event occur the Owner must block off the outlet pipe of the Filterra (where the cleaned runoff drains to, such as drop inlet) and block off the throat of the Filterra. The Supplier should be informed immediately.

Maintenance Visit Summary

Each maintenance visit consists of the following simple tasks (detailed instructions below).

1. Inspection of Filterra and surrounding area
2. Removal of tree grate and erosion control stones
3. Removal of debris, trash and mulch
4. Mulch replacement
5. Plant health evaluation and pruning or replacement as necessary
6. Clean area around Filterra
7. Complete paperwork

Maintenance Tools, Safety Equipment and Supplies

Ideal tools include: camera, bucket, shovel, broom, pruners, hoe/rake, and tape measure. Appropriate Personal Protective Equipment (PPE) should be used in accordance with local or company procedures. This may include impervious gloves where the type of trash is unknown, high visibility clothing and barricades when working in close proximity to traffic and also safety hats and shoes. A T-Bar or crowbar should be used for moving the tree grates (up to 170 lbs ea.). Most visits require minor trash removal and a full replacement of mulch. See below for actual number of bagged mulch that is required in each media bay size. Mulch should be a double shredded, hardwood variety. Some visits may require additional Filterra engineered soil media available from the Supplier.

Box Length	Box Width	Filter Surface Area (ft ²)	Volume at 3" (ft ³)	# of 2 ft ³ Mulch Bags
4	4	4	4	2
6	4	6	6	3
8	4	8	8	4
6	6	9	9	5
8	6	12	12	6
10	6	15	15	8
12	6	18	18	9
13	7	23	23	12

Maintenance Visit Procedure

Keep sufficient documentation of maintenance actions to predict location specific maintenance frequencies and needs. An example Maintenance Report is included in this manual.



1. Inspection of Filterra and surrounding area

- Record individual unit before maintenance with photograph (numbered). Record on Maintenance Report (see example in this document) the following:

Record on Maintenance Report the following:

Standing Water	yes		no
Damage to Box Structure	yes		no
Damage to Grate	yes		no
Is Bypass Clear	yes		no

If yes answered to any of these observations, record with close-up photograph (numbered).



2. Removal of tree grate and erosion control stones

- Remove cast iron grates for access into Filterra box.
- Dig out silt (if any) and mulch and remove trash & foreign items.

3. Removal of debris, trash and mulch

Record on Maintenance Report the following:

Silt/Clay	yes		no
Cups/ Bags	yes		no
Leaves	yes		no
Buckets Removed	_____		



- After removal of mulch and debris, measure distance from the top of the Filterra engineered media soil to the top of the top slab. Compare the measured distance to the distance shown on the approved Contract Drawings for the system. Add Filterra media (not top soil or other) to bring media up as needed to distance indicated on drawings.

Record on Maintenance Report the following:

Distance to Top of Top Slab (inches)	_____
Inches of Media Added	_____



4. Mulch replacement

- Add double shredded mulch evenly across the entire unit to a depth of 3”.
- Refer to Filterra Mulch Specifications for information on acceptable sources.
- Ensure correct repositioning of erosion control stones by the Filterra inlet to allow for entry of trash during a storm event.
- Replace Filterra grates correctly using appropriate lifting or moving tools, taking care not to damage the plant.



5. Plant health evaluation and pruning or replacement as necessary

- Examine the plant’s health and replace if necessary.
- Prune as necessary to encourage growth in the correct directions

Record on Maintenance Report the following:

Height above Grate	_____	(ft)
Width at Widest Point	_____	(ft)
Health	healthy unhealthy	
Damage to Plant	yes no	
Plant Replaced	yes no	



6. Clean area around Filterra

- Clean area around unit and remove all refuse to be disposed of appropriately.



7. Complete paperwork

- Deliver Maintenance Report and photographs to appropriate location (normally Contech during maintenance contract period).
- Some jurisdictions may require submission of maintenance reports in accordance with approvals. It is the responsibility of the Owner to comply with local regulations.

Appendix 1 – Filterra® Activation Checklist



Project Name: _____ Company: _____

Site Contact Name: _____ Site Contact Phone/Email: _____

Site Owner/End User Name: _____ Site Owner/End User Phone/Email: _____

Preferred Activation Date: _____ (provide 2 weeks minimum from date this form is submitted)

Site Designation	System Size	Final Pavement / Top Coat Complete	Landscaping Complete / Grass Emerging	Construction materials / Piles / Debris Removed	Throat Opening Measures 4" Min. Height	Plant Species Requested
		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	

Attach additional sheets as necessary.

NOTE: A charge of \$500.00 will be invoiced for each Activation visit requested by Customer where Contech determines that the site does not meet the conditions required for Activation. ONLY Contech authorized representatives can perform Activation of Filterra systems; unauthorized Activations will void the system warranty and waive manufacturer supplied Activation and 1st Year Maintenance.

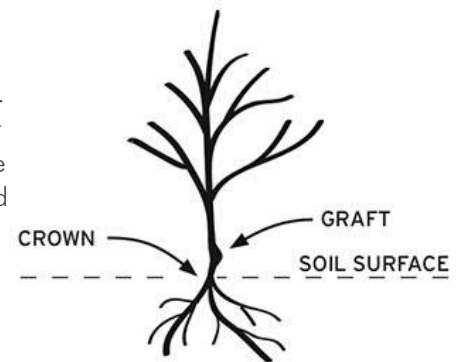
Signature _____

Date _____

Appendix 2 – Planting Requirements for Filterra® Systems

Plant Material Selection

- Select plant(s) as specified in the engineering plans and specifications.
- Select plant(s) with full root development but not to the point where root bound.
- Use local nursery container plants only. Ball and burlapped plants are not permitted.
- For precast Filterra systems with a tree grate, plant(s) must not have scaffold limbs at least 14 inches from the crown due to spacing between the top of the mulch and the tree grate. Lower branches can be pruned away provided there are sufficient scaffold branches for tree or shrub development.
- For precast Filterra systems with a tree grate, at the time of installation, it is required that plant(s) must be at least 6" above the tree grate opening at installation for all Filterra configurations. This DOES NOT apply to Full Grate Cover designs.
- Plant(s) shall not have a mature height greater than 25 feet.
- For standard 21" media depth, a 7 – 15 gallon container size shall be used. Media less than 21" (Filterra boxes only) will require smaller container plants.
- For precast Filterra systems, plant(s) should have a single trunk at installation, and pruning may be necessary at activation and maintenance for some of the faster growing species, or species known to produce basal sprouts.



Plant Installation

- During transport protect the plant leaves from wind and excessive jostling.
- Prior to removing the plant(s) from the container, ensure the soil moisture is sufficient to maintain the integrity of the root ball. If needed, pre-wet the container plant.
- Cut away any roots which are growing out of the container drain holes. Plants with excessive root growth from the drain holes should be rejected.
- Plant(s) should be carefully removed from the pot by gently pounding on the sides of the container with the fist to loosen root ball. Then carefully slide out. Do not lift plant(s) by trunk as this can break roots and cause soil to fall off. Extract the root ball in a horizontal position and support it to prevent it from breaking apart. Alternatively the pot can be cut away to minimize root ball disturbance.
- Remove any excess soil from above the root flare after removing plant(s) from container.
- Excavate a hole with a diameter 4" greater than the root ball, gently place the plant(s).
- If plant(s) have any circling roots from being pot bound, gently tease them loose without breaking them.
- If root ball has a root mat on the bottom, it should be shaved off with a knife just above the mat line.
- Plant the tree/shrub/grass with the top of the root ball 1" above surrounding media to allow for settling.
- All plants should have the main stem centered in the tree grate (where applicable) upon completion of installation.
- With all trees/shrubs, remove dead, diseased, crossed/rubbing, sharply crotched branches or branches growing excessively long or in wrong direction compared to majority of branches.
- To prevent transplant shock (especially if planting takes place in the hot season), it may be necessary to prune some of the foliage to compensate for reduced root uptake capacity. This is accomplished by pruning away some of the smaller secondary branches or a main scaffold branch if there are too many. Too much foliage relative to the root ball can dehydrate and damage the plant.
- Plant staking may be required.

Mulch Installation

- Only mulch that has been meeting Contech Engineered Solutions' mulch specifications can be used in the Filterra system.
- Mulch must be applied to a depth of 3" evenly over the surface of the media.

Irrigation Requirements

- Each Filterra system must receive adequate irrigation to ensure survival of the living system during periods of drier weather.
- Irrigation sources include rainfall runoff from downspouts and/or gutter flow, applied water through the tree grate or in some cases from an irrigation system with emitters installed during construction.
- At Activation: Apply about one (cool climates) to two (warm climates) gallons of water per inch of trunk diameter over the root ball.
- During Establishment: In common with all plants, each Filterra plant will require more frequent watering during the establishment period. One inch of applied water per week for the first three months is recommended for cooler climates (2 to 3 inches for warmer climates). If the system is receiving rainfall runoff from the drainage area, then irrigation may not be needed. Inspection of the soil moisture content can be evaluated by gently brushing aside the mulch layer and feeling the soil. Be sure to replace the mulch when the assessment is complete. Irrigate as needed**.
- Established Plants: Established plants have fully developed root systems and can access the entire water column in the media. Therefore irrigation is less frequent but requires more applied water when performed. For a mature system assume 3.5 inches of available water within the media matrix. Irrigation demand can be estimated as 1" of irrigation demand per week. Therefore if dry periods exceed 3 weeks, irrigation may be required. It is also important to recognize that plants which are exposed to windy areas and reflected heat from paved surfaces may need more frequent irrigation. Long term care should develop a history which is more site specific.

** Five gallons per square yard approximates 1 inch of water Therefore for a 6' by 6' Filterra approximately 20-60 gallons of water is needed. To ensure even distribution of water it needs to be evenly sprinkled over the entire surface of the filter bed, with special attention to make sure the root ball is completely wetted. NOTE: if needed, measure the time it takes to fill a five gallon bucket to estimate the applied water flow rate then calculate the time needed to irrigate the Filterra. For example, if the flow rate of the sprinkler is 5 gallons/minute then it would take 12 minutes to irrigate a 6' by 6' filter.





9025 Centre Pointe Drive, Suite 400
West Chester, OH 45069
info@conteches.com | 800-338-1122
www.ContechES.com

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