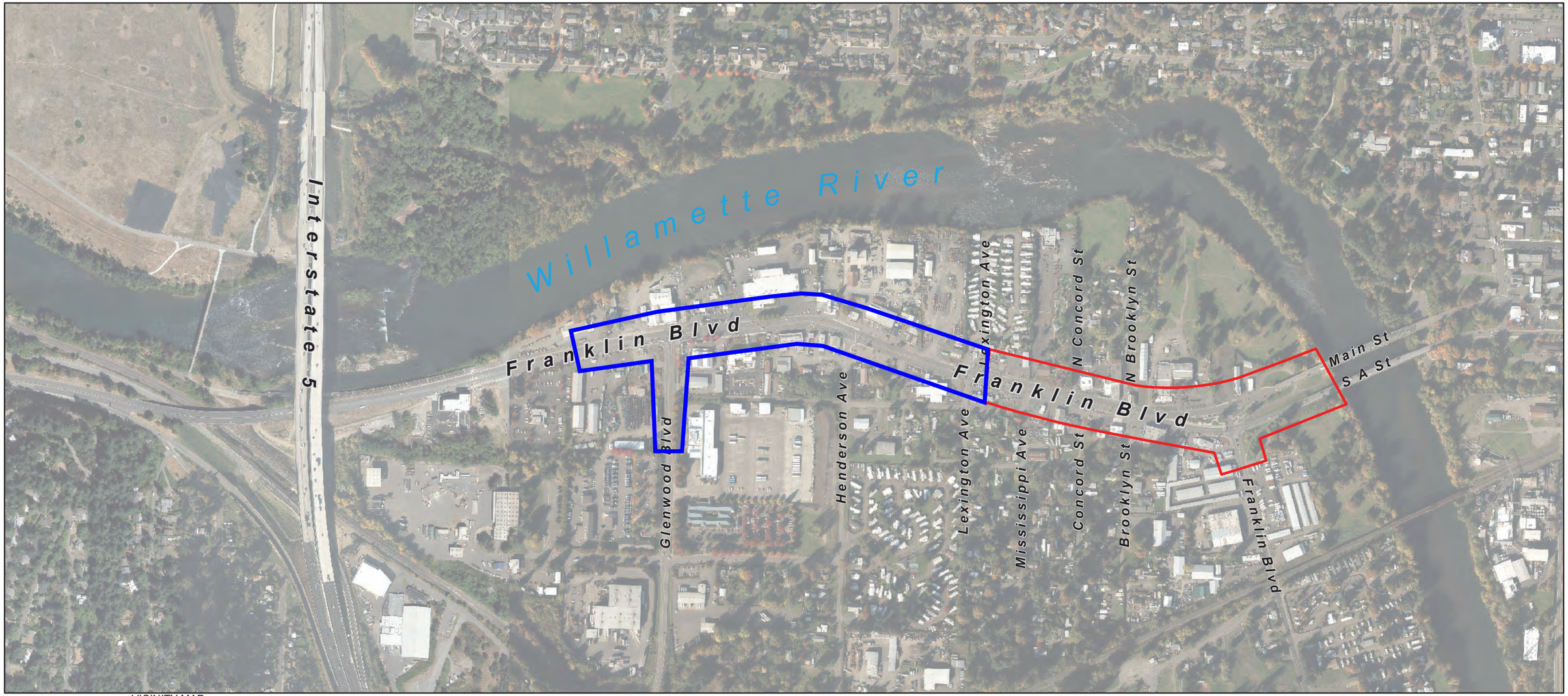
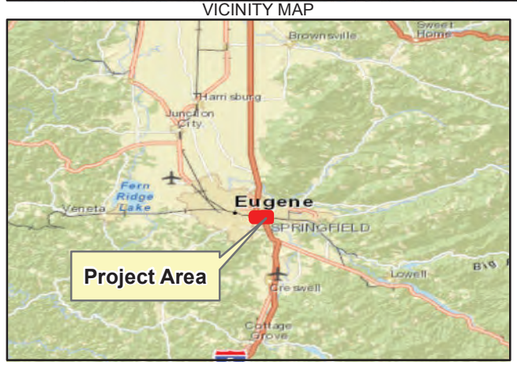


VICINITY MAP



LEGEND

Phase 1 Project Boundary

Phase 2 Project Boundary

N

0 400 800 1,600 Feet

Streetmap Source: Esri, DeLorme, NAVTEQ, TomTom, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand)

FIGURE 1

Site Location

OR 126B and McVay Highway: Mississippi Avenue - UPRR Tracks
Franklin Blvd. I-5 Bridge to McVay, Springfield, OR

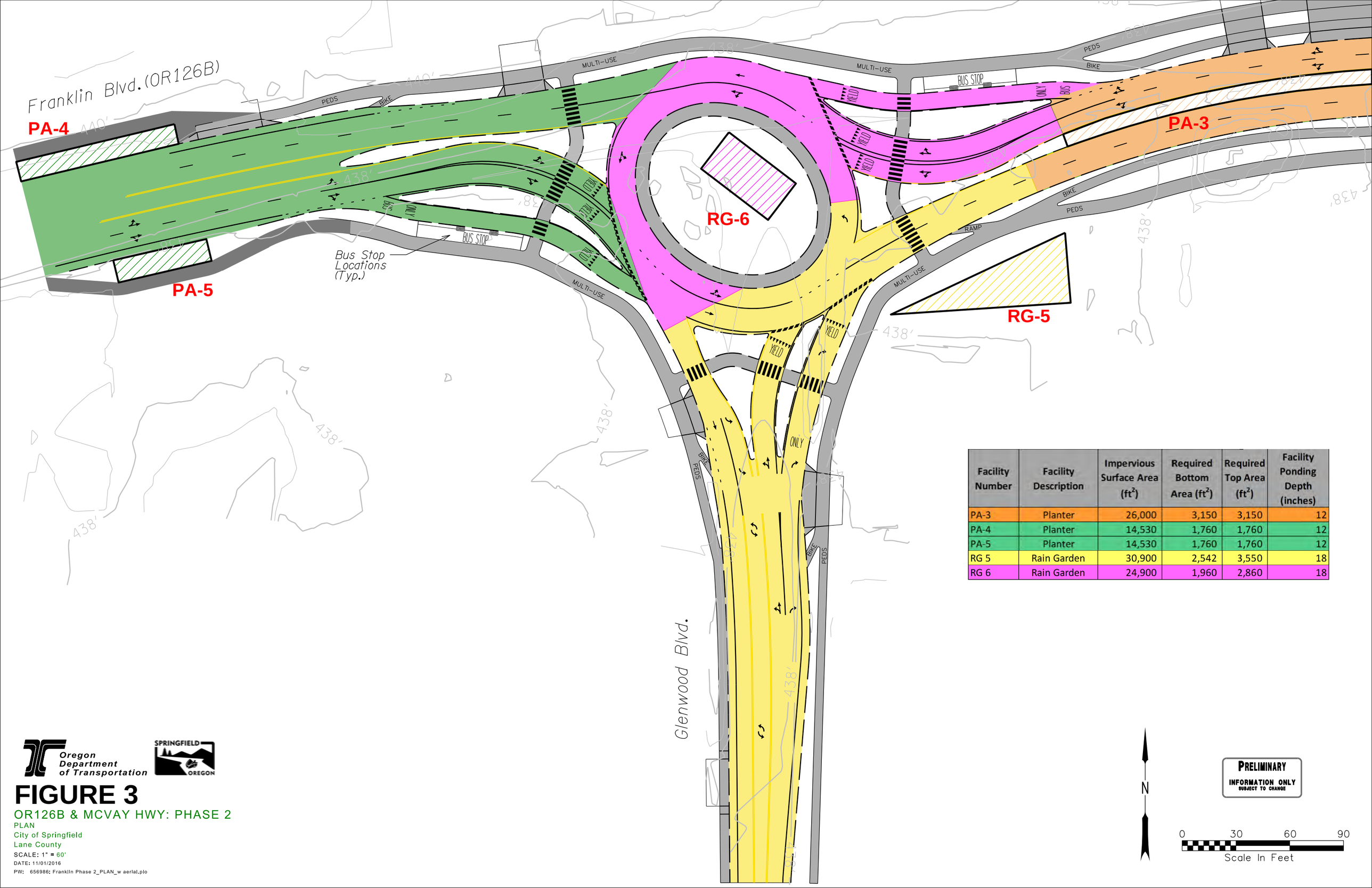
C:\USERS\GGEE\DOCUMENTS\GIS\FRANKLIN\MAPFILES\FIGURE_1_SITEMAP.MXD GGEE 7/14/2015 1:36:38 PM

CH2MHILL

Facility Number	Required Top Area (ft2)	Length (ft)	Width (ft)
PA-1	2450	245	10
PA-2	2060	206	10
PA-3	3150	315	10
PA-4	1760	126	14
PA-5	1760	100	18
RG 1	2345	67	35
RG 2	3195	71	45
RG 3	2760	60	46
RG 4	2320	58	40
RG 5	3550	71	50
RG 6	2860	65	44

FIGURE 2

OR126B & MCVAY HWY: PHASE 2
City of Springfield
Lane County



Facility Number	Facility Description	Impervious Surface Area (ft^2)	Required Bottom Area (ft^2)	Required Top Area (ft^2)	Facility Ponding Depth (inches)
PA-3	Planter	26,000	3,150	3,150	12
PA-4	Planter	14,530	1,760	1,760	12
PA-5	Planter	14,530	1,760	1,760	12
RG 5	Rain Garden	30,900	2,542	3,550	18
RG 6	Rain Garden	24,900	1,960	2,860	18

Oregon Department of Transportation

SPRINGFIELD OREGON

FIGURE 3

OR126B & MCVAY HWY: PHASE 2

PLAN

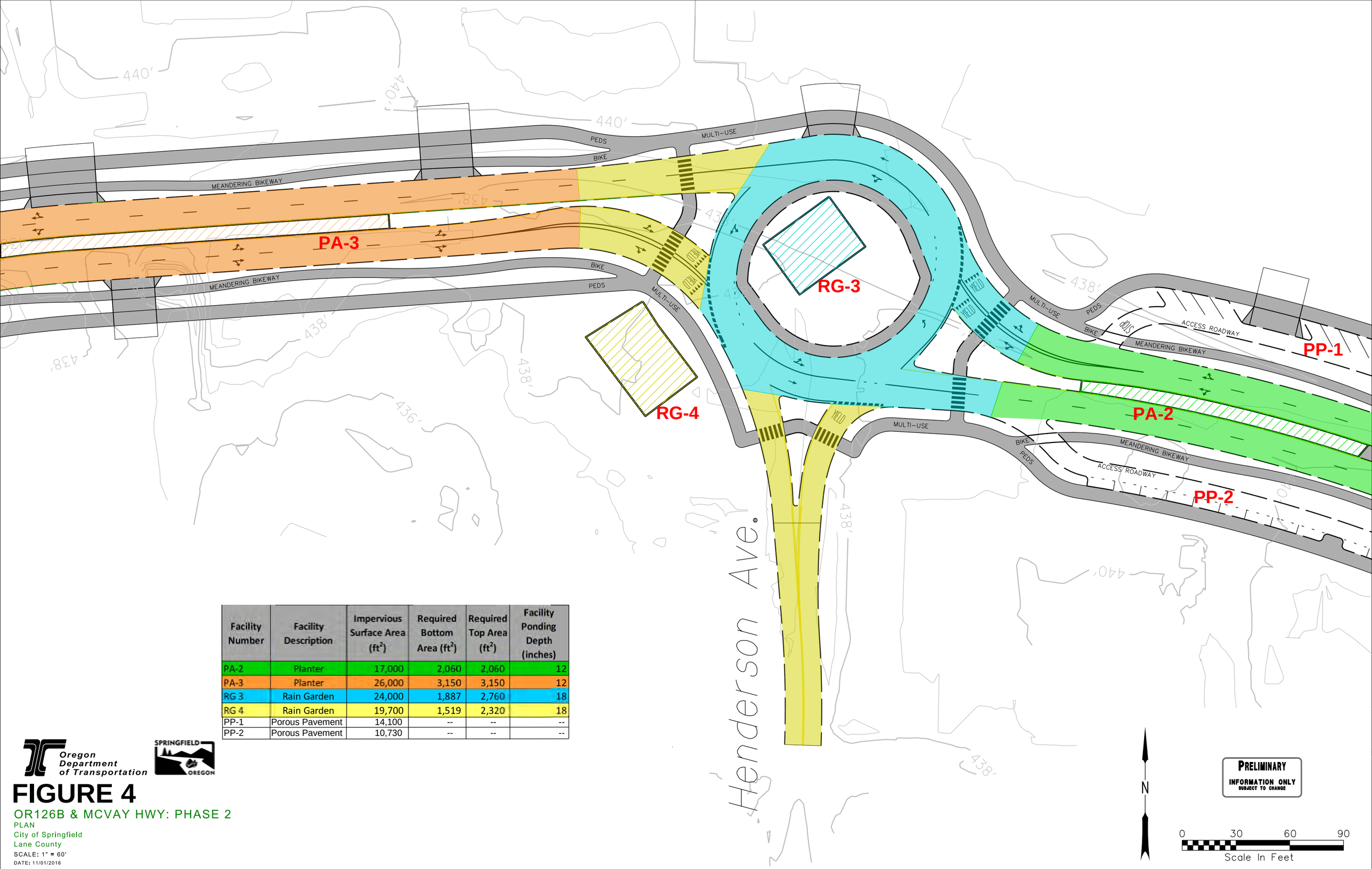
City of Springfield

Lane County

SCALE: 1" = 60'

DATE: 11/01/2016

PW: 656986: FranklIn Phase 2_PLAN_w aerlal.plo



Facility Number	Facility Description	Impervious Surface Area (ft^2)	Required Bottom Area (ft^2)	Required Top Area (ft^2)	Facility Ponding Depth (inches)
PA-2	Planter	17,000	2,060	2,060	12
PA-3	Planter	26,000	3,150	3,150	12
RG 3	Rain Garden	24,000	1,887	2,760	18
RG 4	Rain Garden	19,700	1,519	2,320	18
PP-1	Porous Pavement	14,100	--	--	--
PP-2	Porous Pavement	10,730	--	--	--

Oregon Department of Transportation

SPRINGFIELD OREGON

FIGURE 4

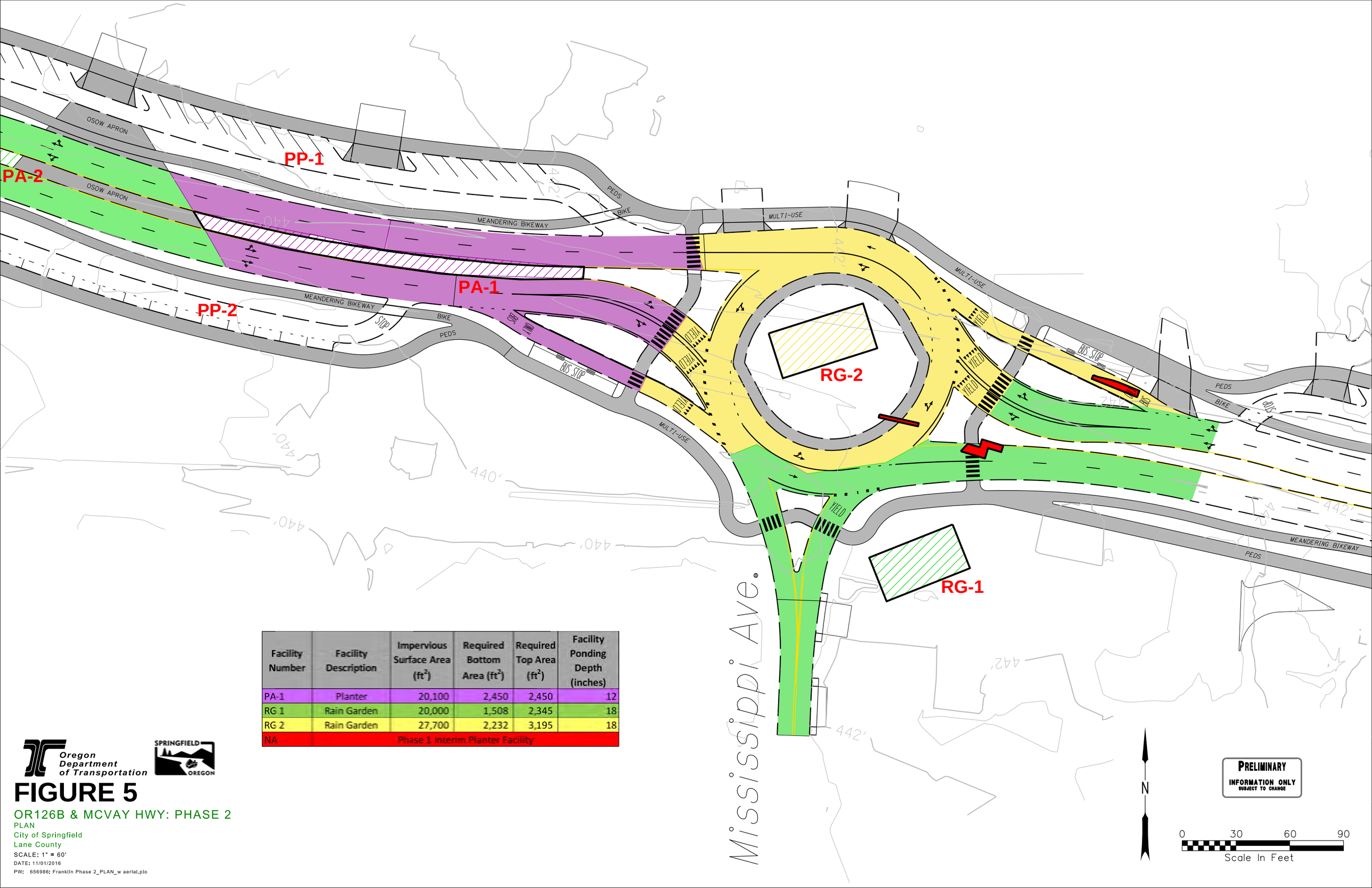
OR126B & MCVAY HWY: PHASE 2

PLAN
City of Springfield
Lane County
SCALE: 1" = 60'
DATE: 11/01/2016
PW: 656986: Franklin Phase 2_PLAN_w aerial.plo

N

PRELIMINARY
INFORMATION ONLY
SUBJECT TO CHANGE

0 30 60 90
Scale In Feet



Facility Number	Facility Description	Impervious Surface Area (ft^2)	Required Bottom Area (ft^2)	Required Top Area (ft^2)	Facility Ponding Depth (inches)
PA-1	Planter	20,100	2,450	2,450	12
RG 1	Rain Garden	20,000	1,508	2,345	18
RG 2	Rain Garden	27,700	2,232	3,195	18
NA	Phase 1 Interim Planter Facility				

Oregon Department of Transportation

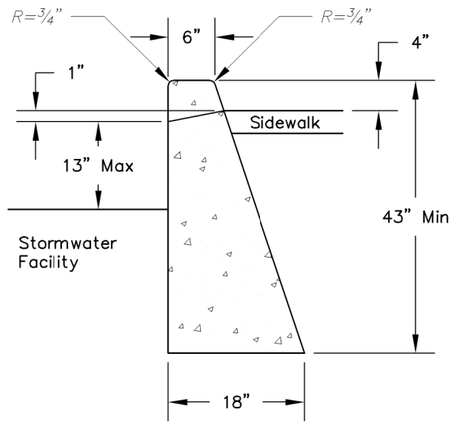
SPRINGFIELD OREGON

FIGURE 5

OR126B & MCVAY HWY: PHASE 2

PLAN
City of Springfield
Lane County

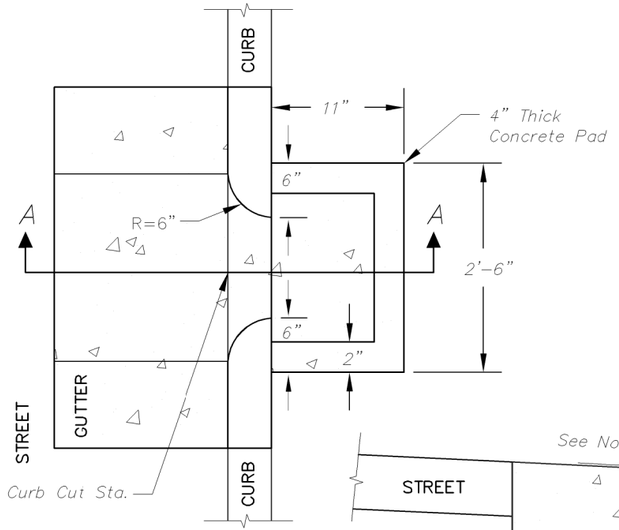
SCALE: 1" = 60'
DATE: 11/01/2016
PW: 656986: Franklin Phase 2_PLAN_w aerial.plo



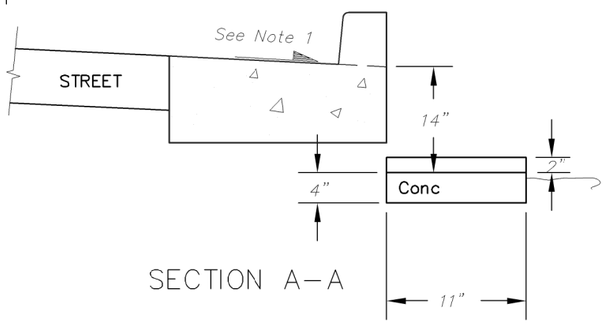
PLANTER WALL

Note:

1. Finish All Exposed Concrete Surfaces, Including Inside Face of Planter Wall, According To 00440.41.



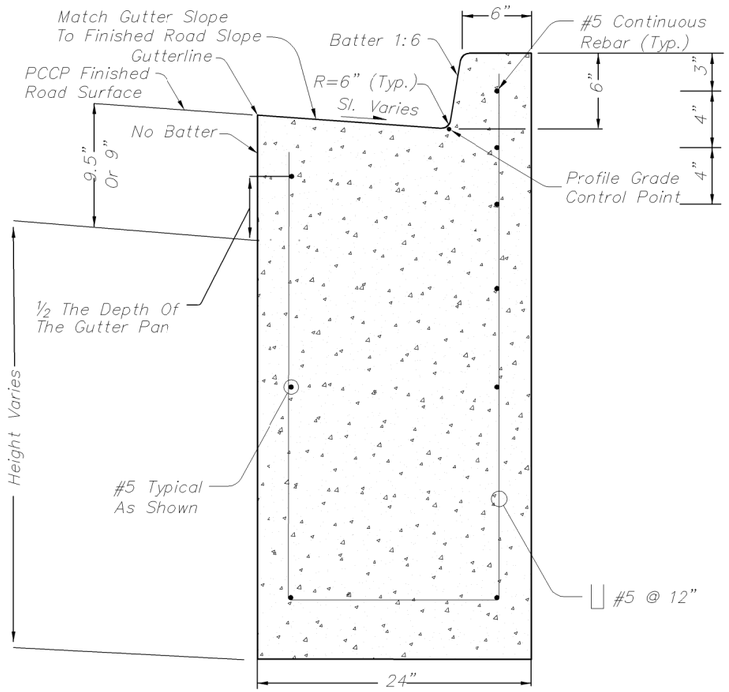
CURB CUT



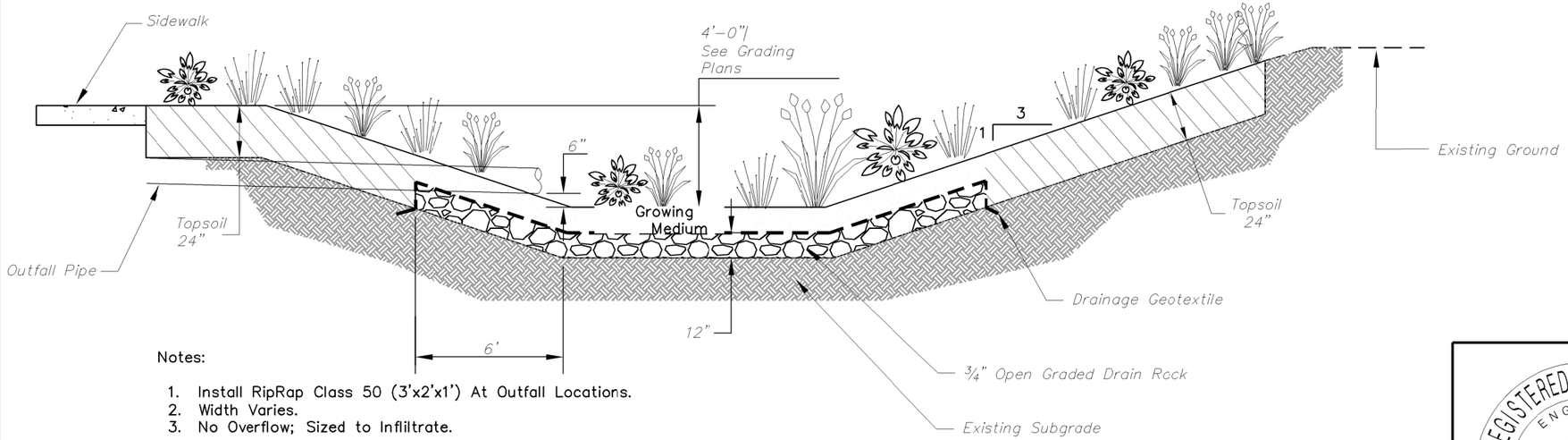
SECTION A–A

Note:

1. Maintain Gutter Slope.



PLANTER WALL WITH CURB AND GUTTER



Notes:

1. Install RipRap Class 50 (3'x2'x1') At Outfall Locations.
2. Width Varies.
3. No Overflow; Sized to Infiltrate.

INFILTRATION RAINGARDEN (RG–X)

rev. no.	dAte	Revision
.	.	.
.	.	.
.	.	.
.	.	.

656986dd07.dwg

656986

PLOT DATE: 6/23/2016 PLOT TIME: 3:48 PM USER: RB013390

REGISTERED PROFESSIONAL ENGINEER
15058
OREGON
JULY 25, 1990
RICHARD E. ATTANASIO
EXPIRES: 12-31-2017

SPRINGFIELD
TRANSPORTATION DIVISION

OREGON DEPARTMENT OF TRANSPORTATION

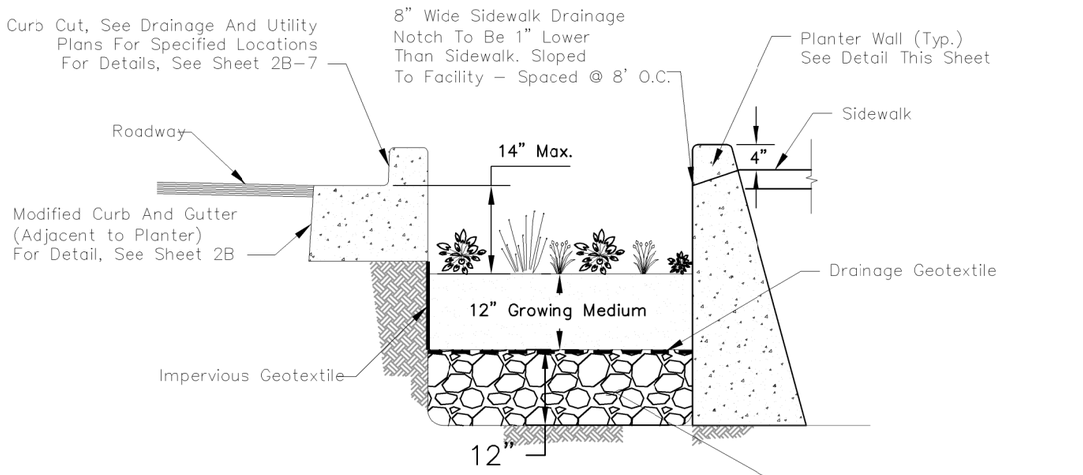
ch2m

OR126B & McVAY HWY:
MISSISSIPPI AVE – UPRR TRACKS
(PHASE 1)
LANE COUNTY

Design Team Leader – S KATKO
Designed By – P PERALTA
Drafted By – S ATWOOD

DETAILS

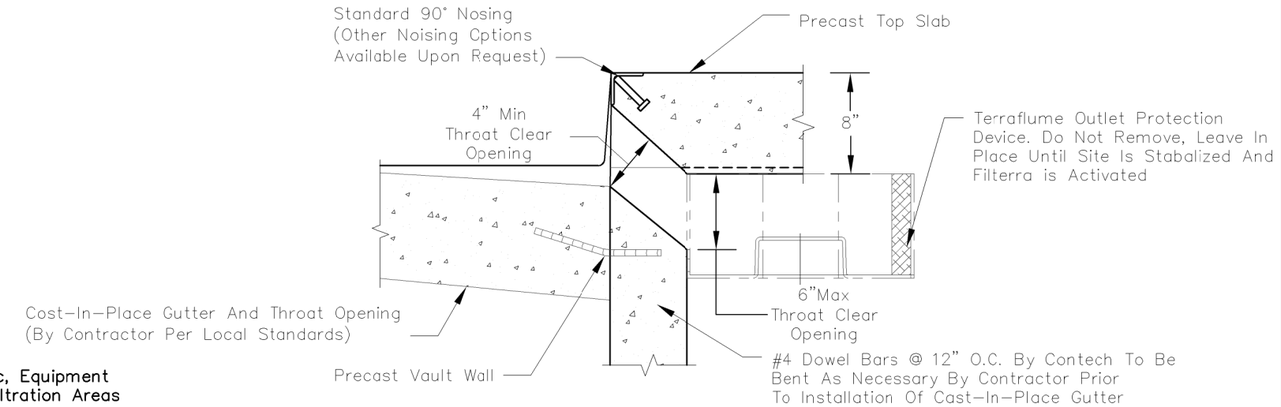
6



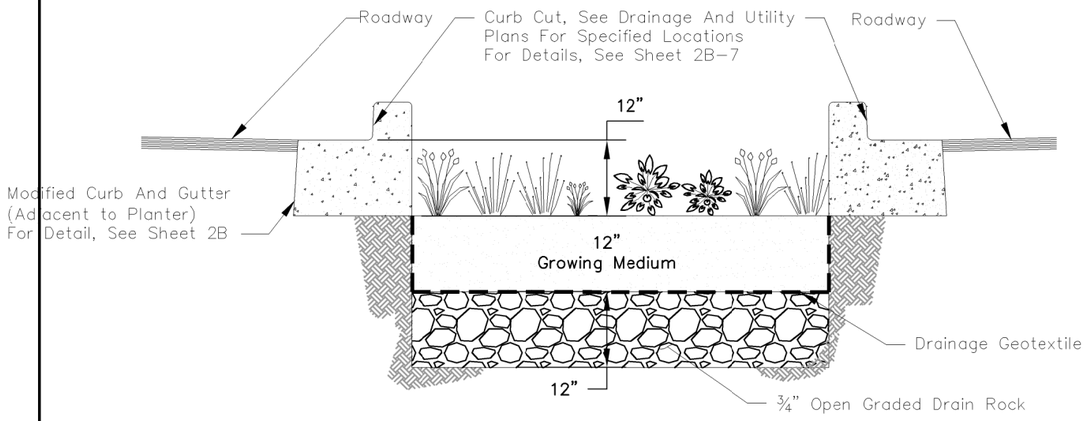
STORMWATER PLANTER
(PA–X)

Notes:

1. Provide Protection From All Vehicle Traffic, Equipment Staging, And Foot Traffic In Proposed Infiltration Areas Prior To, During, And After Construction.
2. Growing Medium: 12" – See Specifications.
3. Vegetation: See GN Shts.
4. Width Varies
5. No Overflow; Sized to Infiltrate Storm Event.



SECTION VIEW
STANDARD CURB INLET WITH TERRAFLUME



MEDIAN STORMWATER PLANTER
(PB–X)

Notes:

1. Provide Protection From All Vehicle Traffic, Equipment Staging, And Foot Traffic In Proposed Infiltration Areas Prior To, During, And After Construction.
2. Dimensions: Depth Of Raingarden: See Details.
3. Growing Medium: 12" – See Specifications.
4. Vegetation: See GN Shts.
5. Width Varies.
6. No Overflow; Sized to Infiltrate

rev. no.	dAte	Revision
.	.	.
.	.	.
.	.	.
.	.	.

656986d08.dwg

656986

SPRINGFIELD
TRANSPORTATION DIVISION

OREGON DEPARTMENT OF TRANSPORTATION

ch2m

REGISTERED PROFESSIONAL ENGINEER
15058
OREGON
JULY 25, 1990
RICHARD E. ATTANASIO
EXPIRES: 12-31-2017

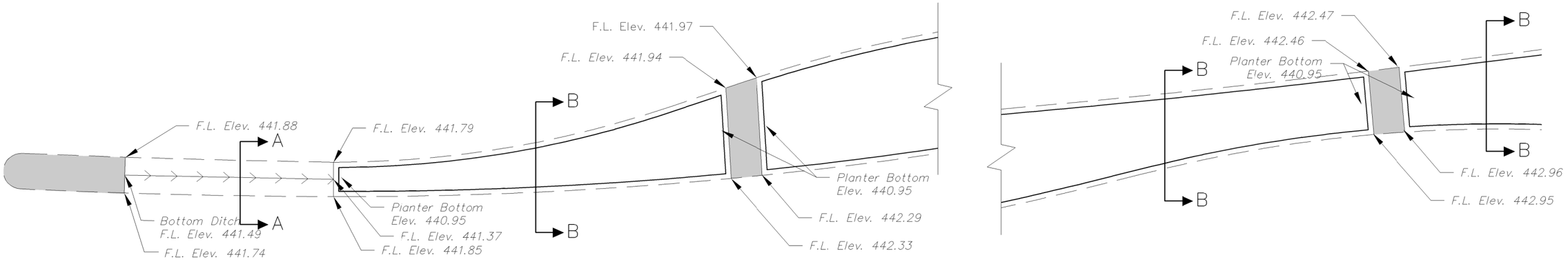
OR126B & McVAY HWY:
MISSISSIPPI AVE – UPRR TRACKS
(PHASE 1)
LANE COUNTY

Design Team Leader – S KATKO
Designed By – R BELLOC
Drafted By – R BELLOC

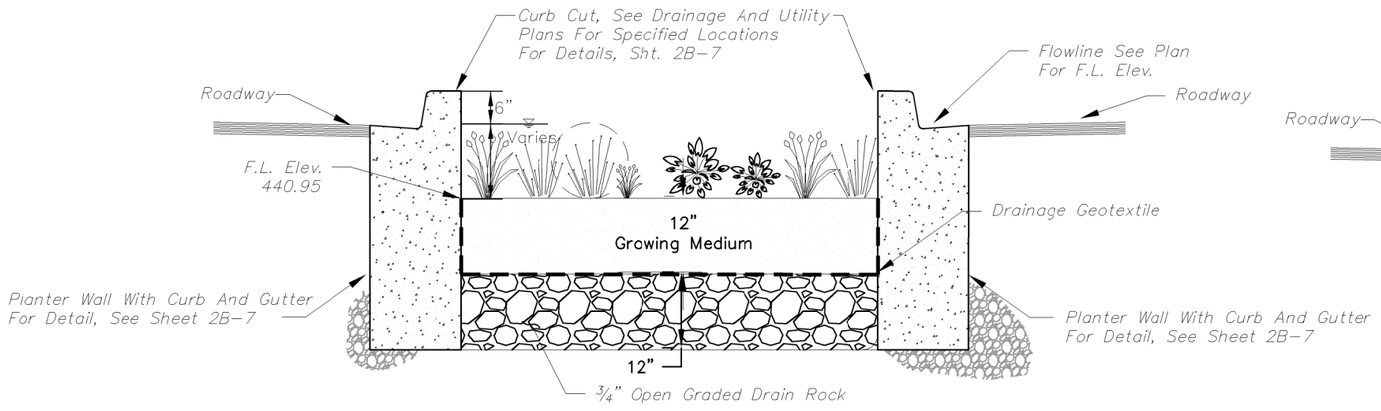
DETAILS

7

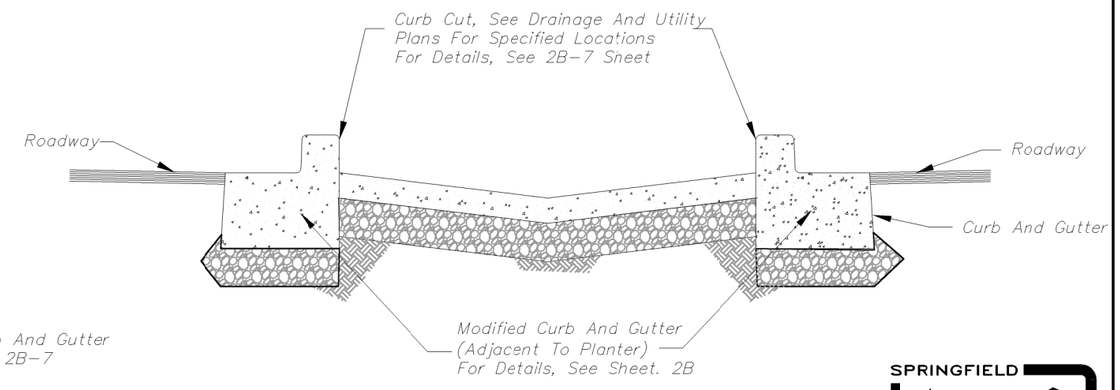
PLOT DATE:6/23/2016 PLOT TIME:3:48 PM USER:RB013390



PLAN
MODIFIED MEDIAN STORMWATER PLANTER
(P–C1, PD–1)



SECTION B–B
(PC–1)



SECTION A–A
(PD–1)

Notes:

1. Provide Protection From All Vehicle Traffic, Equipment Staging, And Foct Traffic In Proposed Infiltration Areas Prior To, During, And After Construction.
2. Dimensions: Depth Of Raingarden: See Details.
3. Growing Medium: 12" – See Specifications.
4. Width Varies.
5. No Overflow; Sized to Infliltrate.
6. Height Varies.

rev. no.	dAte	Revision
.	.	.
.	.	.
.	.	.
.	.	.

SPRINGFIELD
TRANSPORTATION DIVISION

REGISTERED PROFESSIONAL ENGINEER
15058
OREGON
JULY 25, 1990
RICHARD E. ATTANASIO
RENEWS
EXPIRES: 12-31-2017

OREGON DEPARTMENT OF TRANSPORTATION

ch2m

OR126B & McVAY HWY:
MISSISSIPPI AVE – UPRR TRACKS
(PHASE 1)
LANE COUNTY

Design Team Leader – S KATKO
Designed By – R BELLOC
Drafted By – S ATWOOD

DETAILS

8

656986d009.dwg
656986

PLOT DATE:6/23/2016 PLOT TIME:3:48 PM USER:RB013390

Attachment A

Project Vicinity Map

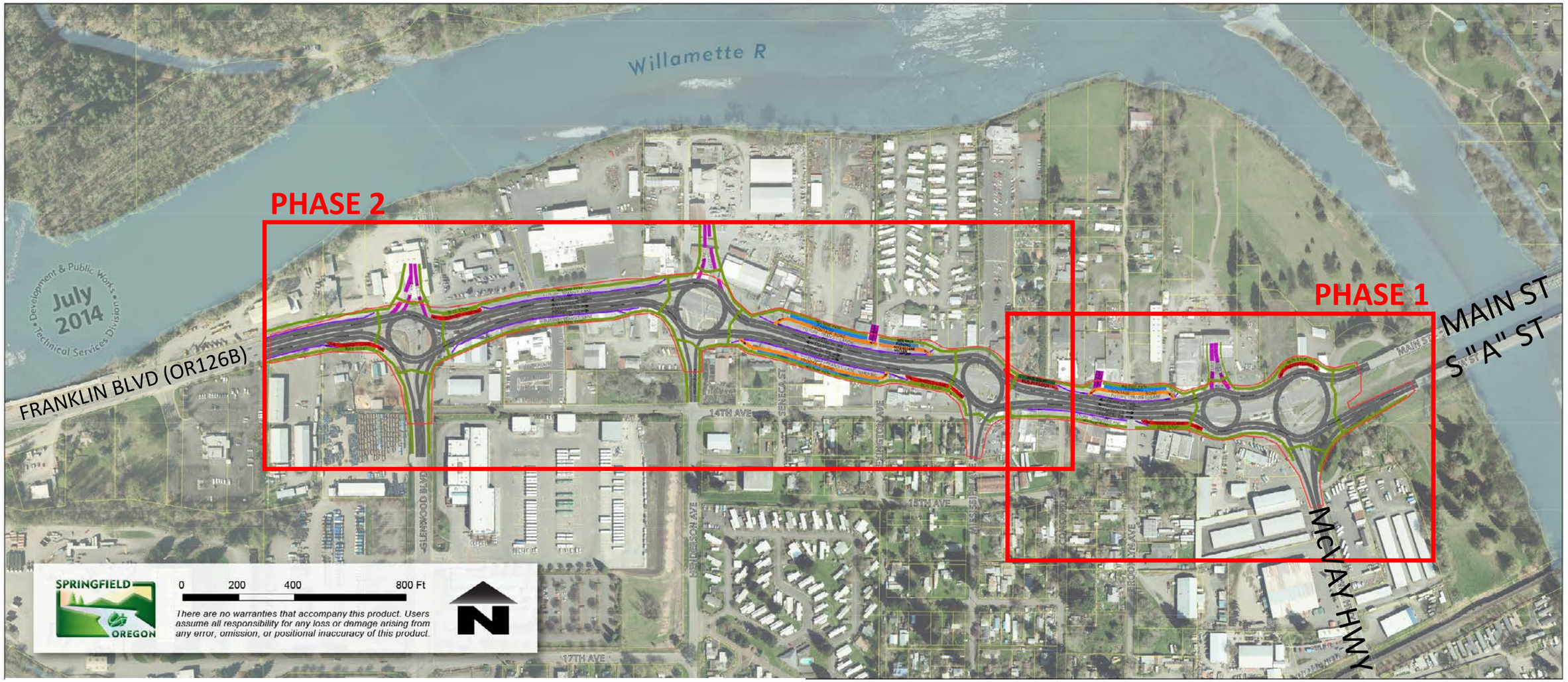


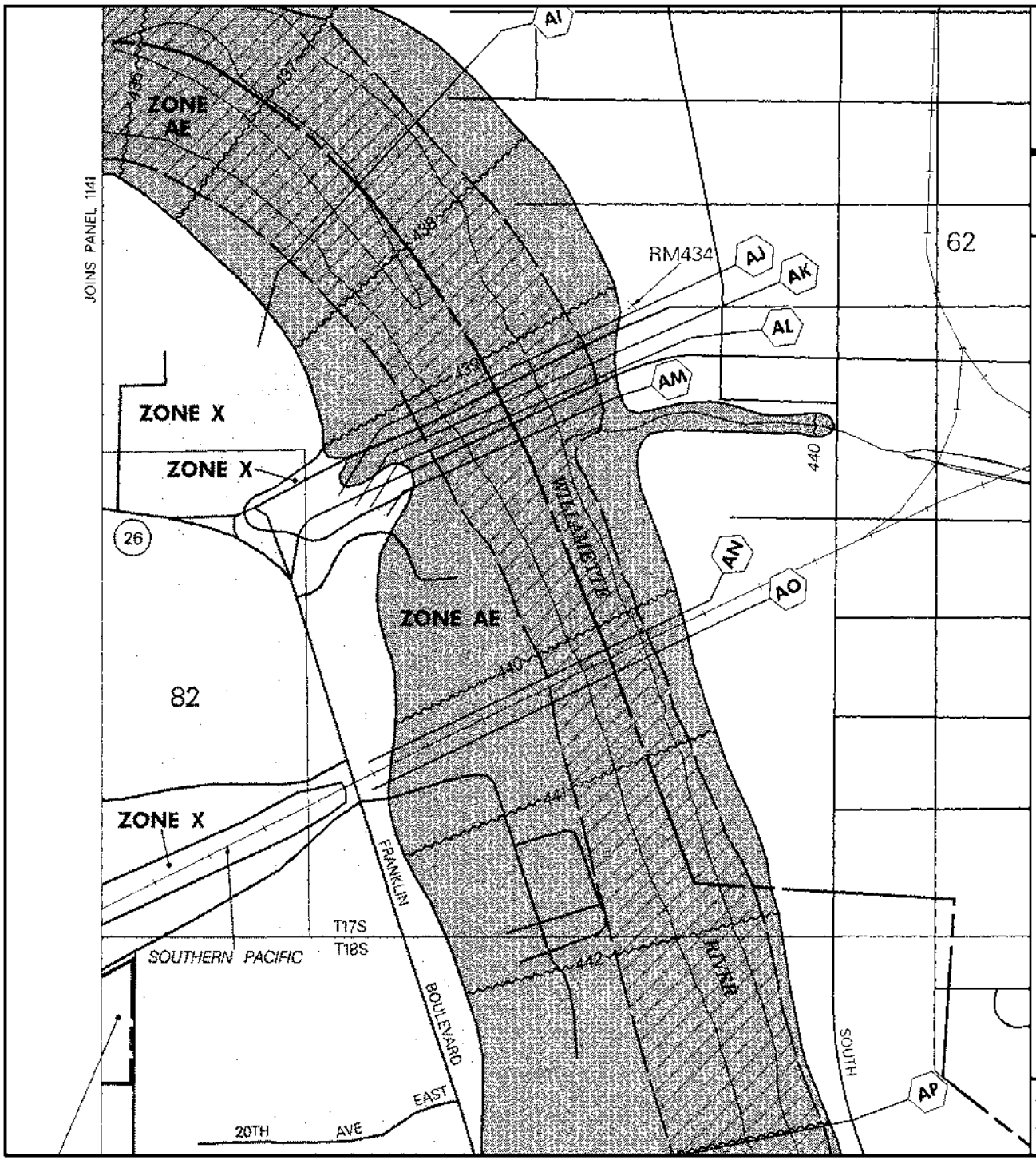
FIGURE 1.

Project Vicinity Map

OR126B & McVay Hwy: Mississippi Ave - UPRR Tracks; Phase 2
City of Springfield
Lane County

Attachment B

FEMA Flood Plain Maps and Profiles



APPROXIMATE SCALE IN FEET

500 0 500

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

LANE COUNTY, OREGON AND INCORPORATED AREAS

PANEL 1142 OF 2975

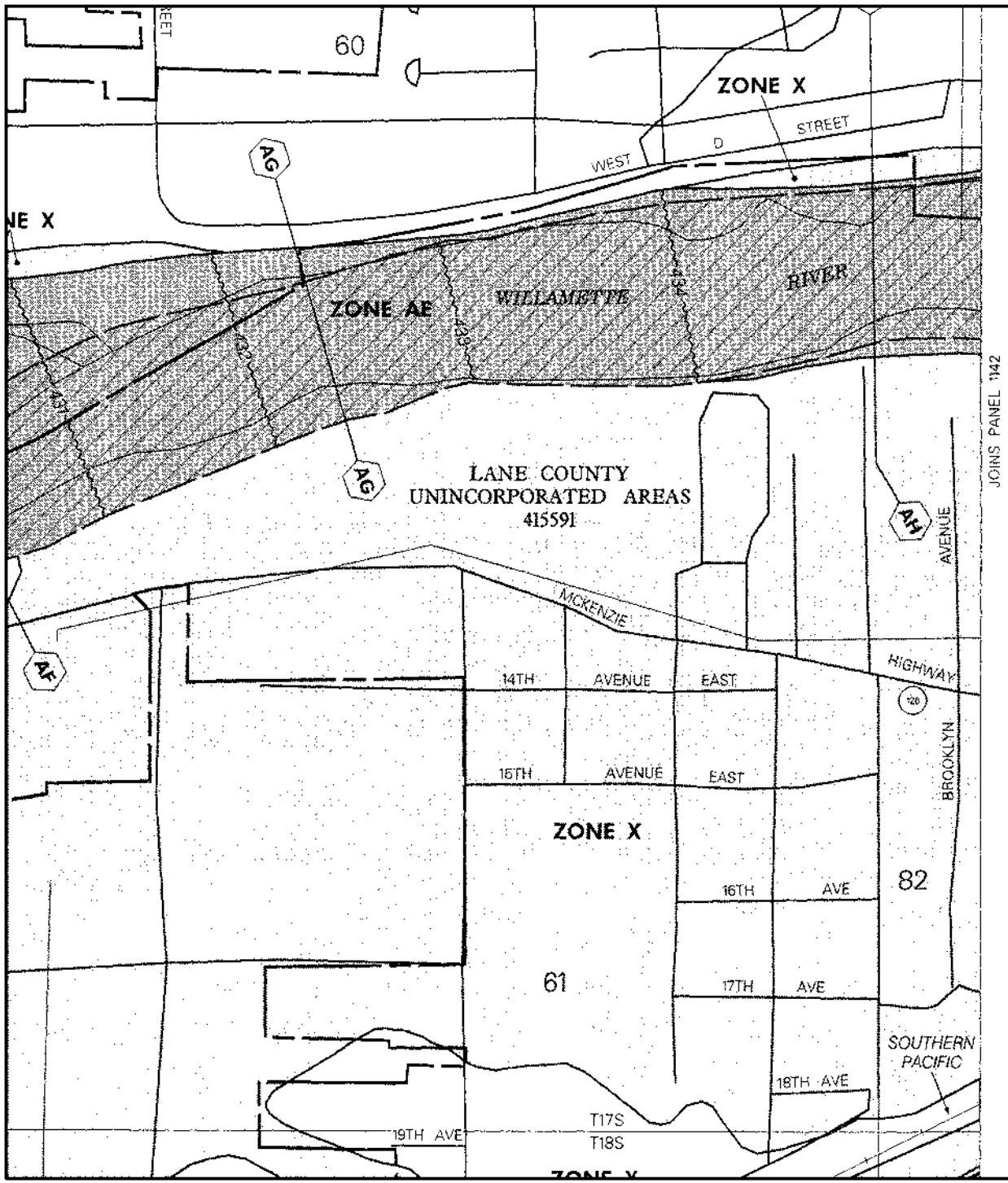
(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS: COMMUNITY	NUMBER	PANEL	SUFFIX
EUGENE, CITY OF	410137	1142	F
SPRINGFIELD, CITY OF	410596	1142	F
LANE COUNTY UNINCORPORATED AREAS	415591	1142	F

MAP NUMBER
41039C1142 F

EFFECTIVE DATE:
JUNE 2, 1999

Federal Emergency Management Agency



APPROXIMATE SCALE IN FEET

500 0 500

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

LANE COUNTY, OREGON AND INCORPORATED AREAS

PANEL 1141 OF 2975

(SEE MAP INDEX FOR PANELS NOT PRINTED)

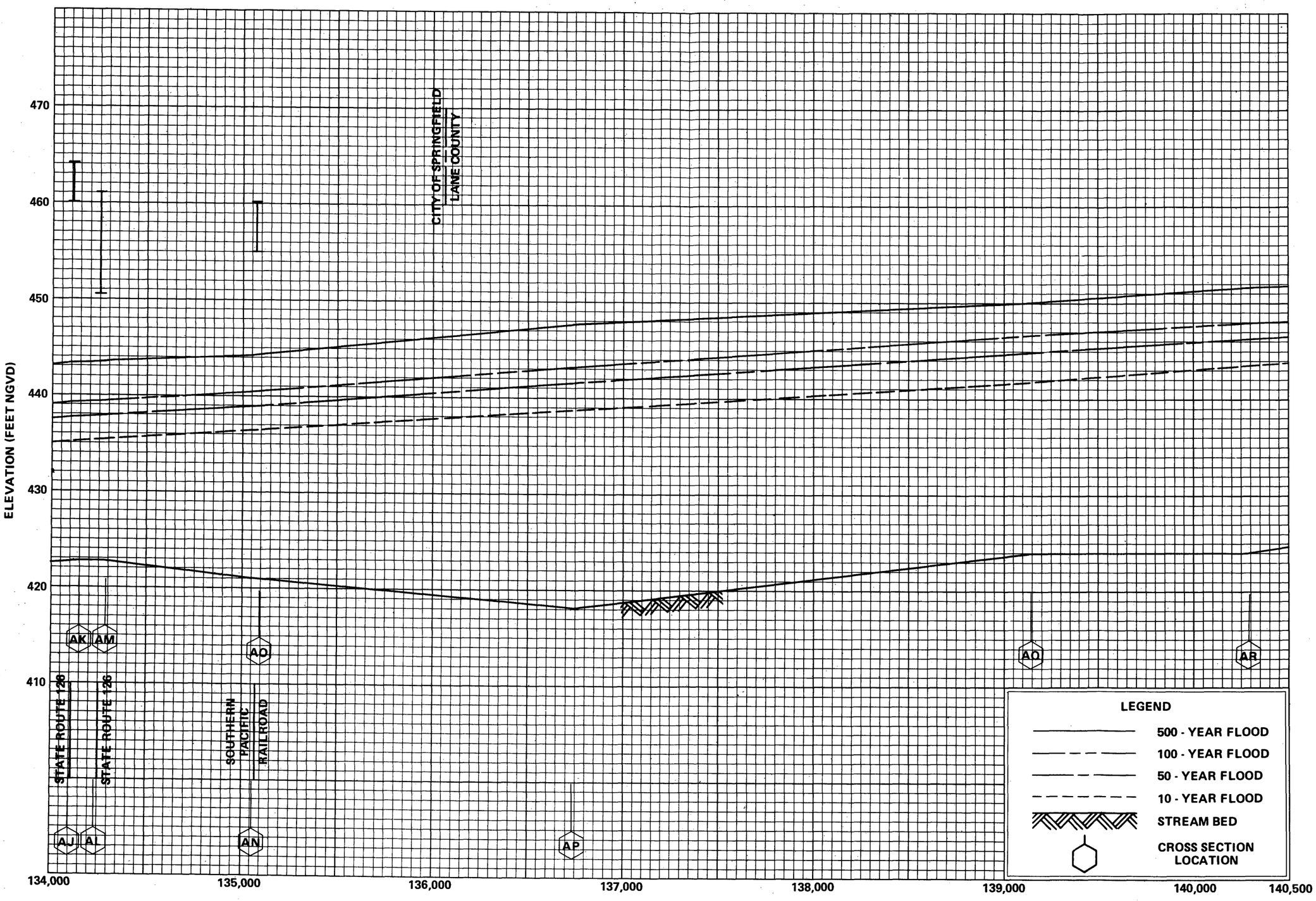
CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
EUGENE, CITY OF	410137	1141	F
SPRINGFIELD, CITY OF	415592	1141	F
LANE COUNTY			
UNINCORPORATED AREAS	415591	1141	F

MAP NUMBER
41039C1141 F

EFFECTIVE DATE:
JUNE 2, 1999

Federal Emergency Management Agency



FLOOD PROFILES

WILLAMETTE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

LANE COUNTY, OR
AND INCORPORATED AREAS

193P

Attachment C

NRCS Web Soil Survey Soil Type Descriptions

Lane County Area, Oregon

23—Camas-Urban land complex

Map Unit Setting

National map unit symbol: 235y
Elevation: 400 to 1,200 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Camas and similar soils: 50 percent
Urban land: 40 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Camas

Setting

Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy and gravelly alluvium

Typical profile

H1 - 0 to 14 inches: gravelly sandy loam
H2 - 14 to 60 inches: very gravelly sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 9 to 17 inches to strongly contrasting textural stratification
Natural drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Available water storage in profile: Very low (about 1.1 inches)

Interpretive groups

Land capability classification (irrigated): 4w
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A
Other vegetative classification: Well drained < 15% Slopes (G002XY002OR)

Description of Urban Land

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8

Data Source Information

Soil Survey Area: Lane County Area, Oregon
Survey Area Data: Version 11, Sep 15, 2014

Lane County Area, Oregon

30—Cloquato-Urban land complex

Map Unit Setting

National map unit symbol: 2367
Elevation: 300 to 800 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Cloquato and similar soils: 45 percent
Urban land: 40 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cloquato

Setting

Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium from mixed sources

Typical profile

H1 - 0 to 14 inches: silt loam
H2 - 14 to 50 inches: silt loam
H3 - 50 to 60 inches: stratified sand to silt loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water storage in profile: High (about 11.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B
Other vegetative classification: Well drained < 15% Slopes (G002XY002OR)

Description of Urban Land

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8

Data Source Information

Soil Survey Area: Lane County Area, Oregon
Survey Area Data: Version 11, Sep 15, 2014

Lane County Area, Oregon

97—Newberg-Urban land complex

Map Unit Setting

National map unit symbol: 239x
Elevation: 300 to 850 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Newberg and similar soils: 50 percent
Urban land: 35 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Newberg

Setting

Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Recent silty alluvium

Typical profile

H1 - 0 to 14 inches: fine sandy loam
H2 - 14 to 65 inches: fine sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water storage in profile: Moderate (about 8.4 inches)

Interpretive groups

Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: A

Description of Urban Land

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8

Data Source Information

Soil Survey Area: Lane County Area, Oregon
Survey Area Data: Version 11, Sep 15, 2014

Lane County Area, Oregon

95—Newberg fine sandy loam

Map Unit Setting

National map unit symbol: 239v
Elevation: 290 to 850 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Newberg and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Newberg

Setting

Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Recent silty alluvium

Typical profile

H1 - 0 to 14 inches: fine sandy loam
H2 - 14 to 65 inches: fine sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water storage in profile: Moderate (about 8.4 inches)

Interpretive groups

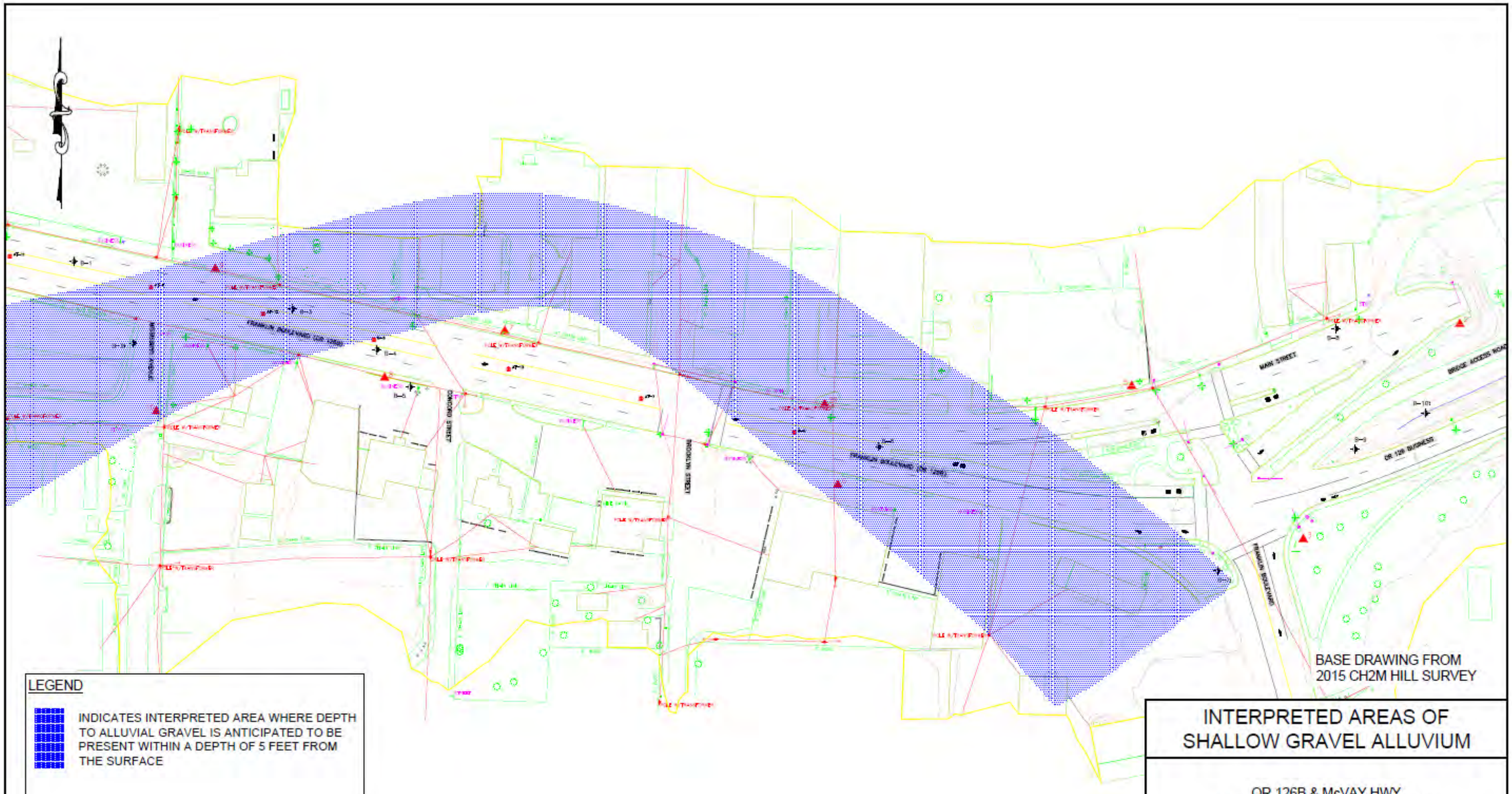
Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: A

Data Source Information

Soil Survey Area: Lane County Area, Oregon
Survey Area Data: Version 11, Sep 15, 2014

Attachment D

Geotechnical Draft Design Memorandum



LEGEND

INDICATES INTERPRETED AREA WHERE DEPTH TO ALLUVIAL GRAVEL IS ANTICIPATED TO BE PRESENT WITHIN A DEPTH OF 5 FEET FROM THE SURFACE

0 50 100 200
APPROXIMATE SCALE (FEET)

NOTES:

1. SEE GEOTECHNICAL DATA REPORT FOR ACTUAL GRAVEL DEPTHS
2. INTERPRETATION ASSUMES THAT DATA FROM AT-6, AT-7, AT-12, AND AT-13 MISREPRESENT DEPTH TO NATIVE GRAVEL DUE TO PRIOR TRENCH FILL ALONG CENTERLINE

BASE DRAWING FROM 2015 CH2M HILL SURVEY

INTERPRETED AREAS OF SHALLOW GRAVEL ALLUVIUM

OR 126B & McVAY HWY
MISSISSIPPI AVE - UPPR TRACKS
SPRINGFIELD, OREGON

PROJECT NO. 2845.1.1	FIGURE NO. 4

Northwest Geotech, Inc.

Attachment E

Inlet and Conveyance Calculations

Table 1. Stormwater Facility Sizing Summary; OR 126B & McVay Highway Phase 2.

Facility Number	Facility Description	Impervious Surface Area (ft^2)	Required Bottom Area (ft^2)	Required Top Area (ft^2)	Facility Ponding Depth (inches)
PA-1	Planter	20,100	2,450	2,450	12
PA-2	Planter	17,000	2,060	2,060	12
PA-3	Planter	26,000	3,150	3,150	12
PA-4	Planter	14,530	1,760	1,760	12
PA-5	Planter	14,530	1,760	1,760	12
RG-1	Rain Garden	20,000	1,508	2,345	18
RG-2	Rain Garden	27,700	2,232	3,195	18
RG-3	Rain Garden	24,000	1,887	2,760	18
RG-4	Rain Garden	19,700	1,519	2,320	18
RG-5	Rain Garden	30,900	2,542	3,550	18
RG-6	Rain Garden	24,900	1,960	2,860	18
PP-1	Porous Pavement	14,100	--	--	--
PP-2	Porous Pavement	10,730	--	--	--

Stormwater Surface Filtration/Infiltration Facility Sizing Spreadsheet
24 Hour Storm, NRCS Type 1A Rainfall Distribution
City of Eugene

Version 2.1

Project Information

Project Name:	OR126 Phase 2	**Date:**	10/24/2016
Project Address:	Franklin Blvd	**Permit Number:**	
	Springfield, OR	**Catchment ID:**	PA 1
Designer:	Theresa Ring		
Company:	CH2M		

Instructions:

1. Complete this form for each drainage catchment in the project site that is to be sized per the Presumptive Approach.
2. Provide a distinctive Catchment ID for each facility coordinated with the site basin map to correlate the appropriate calculations with the facility.
3. The maximum drainage catchment to be modeled per the Presumptive Approach is 1 acre (43,560 SF)
4. For infiltration facilities in Class A or B soils where no infiltration testing has been perfromed use an infiltration rate of 0.5 in/hr. For all facilities use a maximum soil infiltration rate of 2.5 in/hr for topsoil/growing medium.

Design Requirements:

Choose "Yes" from the dropdown boxes below next to the design standards requirements for this facility.

Pollution Reduction (PR)	Yes
Flow Control (FC)	Yes
Destination (DT)	Yes

*An infiltration facility must be chosen as the facility type to meet destination requirements

Site Data-Post Development

Total Square Footage Impervious Area=	20100	sqft	**Total Square Footage Pervious Area=**	0	sqft
Impervious Area CN=	98		**Pervious Area CN=**	85	
Total Square Footage of Drainage Area=	20100	sft	**Time of Concentration Post Development=**	5	min
Weighted Average CN=	98				

Site Data-Pre Development (Data in this section is only used if Flow Control is required)

Pre-Development CN=	85		**Time of Concentration Pre-Development=**	10	min

Soil Data

Tested Soil Infiltration Rate=	2.5	in/hr (See Note 4)	**Destination Design=**	1.25	in/hr
Design Soil Infiltration Rate=	2.5	in/hr	**Soil Infiltration Rate**		

Design Storms Used For Calculations

Requirement	24-hour		Design Storm
Pollution Reduction	1.0	inches	Water Quality
Flow Control	3.6	inches	Flow Control
Destination	4.8	inches	Flood Control

Facility Data

Facility Type=	Infiltration Stormwater Planter		**Facility Surface Area=**	2450	sqft
Surface Width=	10	ft	**Facility Surface Perimeter=**	510	ft
Surface Length=	245	ft	**Facility Bottom Area=**	2450	sqft
Facility Side Slopes=	0	to 1	**Facility Bottom Perimeter=**	510	ft
Max. Ponding Depth in Stormwater Facility=	12	in	**Basin Volume=**	2450.0	cf
Depth of Growing Medium (Soil)=	12	in	**Ratio of Facility Area to Impervious Area=**	0.122	

Pollution Reduction-Calculation Results

Peak Flow Rate to Stormwater Facility =	0.105	cfs	Peak Facility Overflow Rate=	0.000	cfs
Total Runoff Volume to Stormwater Facility =	1322	cf	Total Overflow Volume=	0	cf
Max. Depth of Stormwater in Facility=	0.0	in			
Drawdown Time=	0.2	hours			

Yes **Facility Sizing Meets Pollution Reduction Standards?**

YES **Meets Requirement of No Facility Flooding?**
YES **Meets Requirement for Maximum of 18 Hour Drawdown Time?**

Flow Control-Calculation Results

Peak Flow Rate to Stormwater Facility =	0.434	cfs	Peak Facility Overflow Rate=	0.000	cfs
Total Runoff Volume to Stormwater Facility =	5626	cf	Total Overflow Volume=	0	cf
Max. Depth of Stormwater in Facility=	2.3	in	Peak Off-Site Flow Rate Filtration Facility Underdrain=	N\A	cfs
Drawdown Time=	0.2	hours			

Pre-Development Runoff Data 6.00

Peak Flow Rate =	0.240	cfs
Total Runoff Volume =	3524	cf

Yes **Facility Sizing Meets Flow Control Standards?**

YES **Meets Requirement for Post Development offsite flow less or equal to Pre-Development Flow?**
YES **Meets Requirement for Maximum of 18 Hour Drawdown Time?**

Destination-Calculation Results

Peak Flow Rate to Stormwater Facility =	0.583	cfs	Peak Facility Overflow Rate=	0.000	cfs
Total Runoff Volume to Stormwater Facility =	7628	cf	Total Overflow Volume=	0	cf
Max. Depth of Stormwater in Facility=	11.7	in			
Drawdown Time=	7.5	hours			

Yes **Facility Sizing Meets Destination Standards?**

YES **Meets Requirement of No Facility Flooding?**
YES **Meets Requirement for Maximum of 30 hour Drawdown Time?**

Stormwater Surface Filtration/Infiltration Facility Sizing Spreadsheet
24 Hour Storm, NRCS Type 1A Rainfall Distribution
City of Eugene

Version 2.1

Project Information

Project Name:	OR126 Phase 2	**Date:**	10/24/2016
Project Address:	Franklin Blvd	**Permit Number:**	
	Springfield, OR	**Catchment ID:**	PA-2
Designer:	Theresa Ring		
Company:	CH2M		

Instructions:

1. Complete this form for each drainage catchment in the project site that is to be sized per the Presumptive Approach.
2. Provide a distinctive Catchment ID for each facility coordinated with the site basin map to correlate the appropriate calculations with the facility.
3. The maximum drainage catchment to be modeled per the Presumptive Approach is 1 acre (43,560 SF)
4. For infiltration facilities in Class A or B soils where no infiltration testing has been perfromed use an infiltration rate of 0.5 in/hr. For all facilities use a maximum soil infiltration rate of 2.5 in/hr for topsoil/growing medium.

Design Requirements:

Choose "Yes" from the dropdown boxes below next to the design standards requirements for this facility.

Pollution Reduction (PR)	Yes
Flow Control (FC)	Yes
Destination (DT)	Yes

*An infiltration facility must be chosen as the facility type to meet destination requirements

Site Data-Post Development

Total Square Footage Impervious Area=	17000	sqft	**Total Square Footage Pervious Area=**	0	sqft
Impervious Area CN=	98		**Pervious Area CN=**	85	
Total Square Footage of Drainage Area=	17000	sft	**Time of Concentration Post Development=**	5	min
Weighted Average CN=	98				

Site Data-Pre Development (Data in this section is only used if Flow Control is required)

Pre-Development CN=	85		**Time of Concentration Pre-Development=**	10	min

Soil Data

Tested Soil Infiltration Rate=	2.5	in/hr (See Note 4)	**Destination Design=**	1.25	in/hr
Design Soil Infiltration Rate=	2.5	in/hr	**Soil Infiltration Rate**		

Design Storms Used For Calculations

Requirement	24-hour		Design Storm
Pollution Reduction	1.0	inches	Water Quality
Flow Control	3.6	inches	Flow Control
Destination	4.8	inches	Flood Control

Facility Data

Facility Type=	Infiltration Stormwater Planter		**Facility Surface Area=**	2060	sqft
Surface Width=	10	ft	**Facility Surface Perimeter=**	432	ft
Surface Length=	206	ft	**Facility Bottom Area=**	2060	sqft
Facility Side Slopes=	0	to 1	**Facility Bottom Perimeter=**	432	ft
Max. Ponding Depth in Stormwater Facility=	12	in	**Basin Volume=**	2060.0	cf
Depth of Growing Medium (Soil)=	12	in	**Ratio of Facility Area to Impervious Area=**	0.121	

Pollution Reduction-Calculation Results

Peak Flow Rate to Stormwater Facility =	0.089	cfs	Peak Facility Overflow Rate=	0.000	cfs
Total Runoff Volume to Stormwater Facility =	1118	cf	Total Overflow Volume=	0	cf
Max. Depth of Stormwater in Facility=	0.0	in			
Drawdown Time=	0.2	hours			

Yes **Facility Sizing Meets Pollution Reduction Standards?**

YES **Meets Requirement of No Facility Flooding?**
YES **Meets Requirement for Maximum of 18 Hour Drawdown Time?**

Flow Control-Calculation Results

Peak Flow Rate to Stormwater Facility =	0.367	cfs	Peak Facility Overflow Rate=	0.000	cfs
Total Runoff Volume to Stormwater Facility =	4759	cf	Total Overflow Volume=	0	cf
Max. Depth of Stormwater in Facility=	2.4	in	Peak Off-Site Flow Rate Filtration Facility Underdrain=	N\A	cfs
Drawdown Time=	0.2	hours			

Pre-Development Runoff Data 6.00

Peak Flow Rate =	0.203	cfs
Total Runoff Volume =	2980	cf

Yes **Facility Sizing Meets Flow Control Standards?**

YES **Meets Requirement for Post Development offsite flow less or equal to Pre-Development Flow?**
YES **Meets Requirement for Maximum of 18 Hour Drawdown Time?**

Destination-Calculation Results

Peak Flow Rate to Stormwater Facility =	0.493	cfs	Peak Facility Overflow Rate=	0.000	cfs
Total Runoff Volume to Stormwater Facility =	6451	cf	Total Overflow Volume=	0	cf
Max. Depth of Stormwater in Facility=	11.8	in			
Drawdown Time=	7.7	hours			

Yes **Facility Sizing Meets Destination Standards?**

YES **Meets Requirement of No Facility Flooding?**
YES **Meets Requirement for Maximum of 30 hour Drawdown Time?**

Stormwater Surface Filtration/Infiltration Facility Sizing Spreadsheet
24 Hour Storm, NRCS Type 1A Rainfall Distribution
City of Eugene

Version 2.1

Project Information

Project Name:	OR126 Phase 2	**Date:**	10/24/2016
Project Address:	Franklin Blvd	**Permit Number:**	
	Springfield, OR	**Catchment ID:**	PA 3
Designer:	Theresa Ring		
Company:	CH2M		

Instructions:

1. Complete this form for each drainage catchment in the project site that is to be sized per the Presumptive Approach.
2. Provide a distinctive Catchment ID for each facility coordinated with the site basin map to correlate the appropriate calculations with the facility.
3. The maximum drainage catchment to be modeled per the Presumptive Approach is 1 acre (43,560 SF)
4. For infiltration facilities in Class A or B soils where no infiltration testing has been perfromed use an infiltration rate of 0.5 in/hr. For all facilities use a maximum soil infiltration rate of 2.5 in/hr for topsoil/growing medium.

Design Requirements:

Choose "Yes" from the dropdown boxes below next to the design standards requirements for this facility.

Pollution Reduction (PR)	Yes
Flow Control (FC)	Yes
Destination (DT)	Yes

*An infiltration facility must be chosen as the facility type to meet destination requirements

Site Data-Post Development

Total Square Footage Impervious Area=	26000	sqft	**Total Square Footage Pervious Area=**	0	sqft
Impervious Area CN=	98		**Pervious Area CN=**	85	
Total Square Footage of Drainage Area=	26000	sft	**Time of Concentration Post Development=**	5	min
Weighted Average CN=	98				

Site Data-Pre Development (Data in this section is only used if Flow Control is required)

Pre-Development CN=	85		**Time of Concentration Pre-Development=**	10	min

Soil Data

Tested Soil Infiltration Rate=	2.5	in/hr (See Note 4)	**Destination Design=**	1.25	in/hr
Design Soil Infiltration Rate=	2.5	in/hr	**Soil Infiltration Rate**		

Design Storms Used For Calculations

Requirement	24-hour		Design Storm
Pollution Reduction	1.0	inches	Water Quality
Flow Control	3.6	inches	Flow Control
Destination	4.8	inches	Flood Control

Facility Data

Facility Type=	Infiltration Stormwater Planter		**Facility Surface Area=**	3150	sqft
Surface Width=	9	ft	**Facility Surface Perimeter=**	718	ft
Surface Length=	350	ft	**Facility Bottom Area=**	3150	sqft
Facility Side Slopes=	0	to 1	**Facility Bottom Perimeter=**	718	ft
Max. Ponding Depth in Stormwater Facility=	12	in	**Basin Volume=**	3150.0	cf
Depth of Growing Medium (Soil)=	12	in	**Ratio of Facility Area to Impervious Area=**	0.121	

Pollution Reduction-Calculation Results

Peak Flow Rate to Stormwater Facility =	0.136	cfs	Peak Facility Overflow Rate=	0.000	cfs
Total Runoff Volume to Stormwater Facility =	1709	cf	Total Overflow Volume=	0	cf
Max. Depth of Stormwater in Facility=	0.0	in			
Drawdown Time=	0.2	hours			

Yes **Facility Sizing Meets Pollution Reduction Standards?**

YES **Meets Requirement of No Facility Flooding?**
YES **Meets Requirement for Maximum of 18 Hour Drawdown Time?**

Flow Control-Calculation Results

Peak Flow Rate to Stormwater Facility =	0.561	cfs	Peak Facility Overflow Rate=	0.000	cfs
Total Runoff Volume to Stormwater Facility =	7278	cf	Total Overflow Volume=	0	cf
Max. Depth of Stormwater in Facility=	2.4	in	Peak Off-Site Flow Rate Filtration Facility Underdrain=	N\A	cfs
Drawdown Time=	0.2	hours			

Pre-Development Runoff Data 6.00

Peak Flow Rate =	0.311	cfs
Total Runoff Volume =	4558	cf

Yes **Facility Sizing Meets Flow Control Standards?**

YES **Meets Requirement for Post Development offsite flow less or equal to Pre-Development Flow?**
YES **Meets Requirement for Maximum of 18 Hour Drawdown Time?**

Destination-Calculation Results

Peak Flow Rate to Stormwater Facility =	0.754	cfs	Peak Facility Overflow Rate=	0.000	cfs
Total Runoff Volume to Stormwater Facility =	9867	cf	Total Overflow Volume=	0	cf
Max. Depth of Stormwater in Facility=	11.9	in			
Drawdown Time=	7.7	hours			

Yes **Facility Sizing Meets Destination Standards?**

YES **Meets Requirement of No Facility Flooding?**
YES **Meets Requirement for Maximum of 30 hour Drawdown Time?**

Stormwater Surface Filtration/Infiltration Facility Sizing Spreadsheet
24 Hour Storm, NRCS Type 1A Rainfall Distribution
City of Eugene

Version 2.1

Project Information

Project Name:	OR126 Phase 2	**Date:**	10/24/2016
Project Address:	Franklin Blvd	**Permit Number:**	
	Springfield, OR	**Catchment ID:**	PA4
Designer:	Theresa Ring		
Company:	CH2M		

Instructions:

1. Complete this form for each drainage catchment in the project site that is to be sized per the Presumptive Approach.
2. Provide a distinctive Catchment ID for each facility coordinated with the site basin map to correlate the appropriate calculations with the facility.
3. The maximum drainage catchment to be modeled per the Presumptive Approach is 1 acre (43,560 SF)
4. For infiltration facilities in Class A or B soils where no infiltration testing has been perfromed use an infiltration rate of 0.5 in/hr. For all facilities use a maximum soil infiltration rate of 2.5 in/hr for topsoil/growing medium.

Design Requirements:

Choose "Yes" from the dropdown boxes below next to the design standards requirements for this facility.

Pollution Reduction (PR)	Yes
Flow Control (FC)	Yes
Destination (DT)	Yes

*An infiltration facility must be chosen as the facility type to meet destination requirements

Site Data-Post Development

Total Square Footage Impervious Area=	14530	sqft	**Total Square Footage Pervious Area=**	0	sqft
Impervious Area CN=	98		**Pervious Area CN=**	85	
Total Square Footage of Drainage Area=	14530	sft	**Time of Concentration Post Development=**	5	min
Weighted Average CN=	98				

Site Data-Pre Development **(Data in this section is only used if Flow Control is required)**

Pre-Development CN=	85		**Time of Concentration Pre-Development=**	10	min

Soil Data

Tested Soil Infiltration Rate=	2.5	in/hr (See Note 4)	**Destination Design=**	1.25	in/hr
Design Soil Infiltration Rate=	2.5	in/hr	**Soil Infiltration Rate**		

Design Storms Used For Calculations

Requirement	24-hour		Design Storm
Pollution Reduction	1.0	inches	Water Quality
Flow Control	3.6	inches	Flow Control
Destination	4.8	inches	Flood Control

Facility Data

Facility Type=	Infiltration Stormwater Planter		**Facility Surface Area=**	1760	sqft
Surface Width=	14	ft	**Facility Surface Perimeter=**	279	ft
Surface Length=	125.72	ft	**Facility Bottom Area=**	1760	sqft
Facility Side Slopes=	0	to 1	**Facility Bottom Perimeter=**	279	ft
Max. Ponding Depth in Stormwater Facility=	12	in	**Basin Volume=**	1760	cf
Depth of Growing Medium (Soil)=	12	in	**Ratio of Facility Area to Impervious Area=**	0.121	

Pollution Reduction-Calculation Results

Peak Flow Rate to Stormwater Facility =	0.076	cfs	Peak Facility Overflow Rate=	0.000	cfs
Total Runoff Volume to Stormwater Facility =	955	cf	Total Overflow Volume=	0	cf
Max. Depth of Stormwater in Facility=	0.0	in			
Drawdown Time=	0.2	hours			

Yes **Facility Sizing Meets Pollution Reduction Standards?**

YES **Meets Requirement of No Facility Flooding?**
YES **Meets Requirement for Maximum of 18 Hour Drawdown Time?**

Flow Control-Calculation Results

Peak Flow Rate to Stormwater Facility =	0.314	cfs	Peak Facility Overflow Rate=	0.000	cfs
Total Runoff Volume to Stormwater Facility =	4067	cf	Total Overflow Volume=	0	cf
Max. Depth of Stormwater in Facility=	2.4	in	Peak Off-Site Flow Rate Filtration Facility Underdrain=	N\A	cfs
Drawdown Time=	0.2	hours			

Pre-Development Runoff Data 6.00

Peak Flow Rate =	0.174	cfs
Total Runoff Volume =	2547	cf

Yes **Facility Sizing Meets Flow Control Standards?**

YES **Meets Requirement for Post Development offsite flow less or equal to Pre-Development Flow?**
YES **Meets Requirement for Maximum of 18 Hour Drawdown Time?**

Destination-Calculation Results

Peak Flow Rate to Stormwater Facility =	0.422	cfs	Peak Facility Overflow Rate=	0.000	cfs
Total Runoff Volume to Stormwater Facility =	5514	cf	Total Overflow Volume=	0	cf
Max. Depth of Stormwater in Facility=	11.9	in			
Drawdown Time=	7.7	hours			

Yes **Facility Sizing Meets Destination Standards?**

YES **Meets Requirement of No Facility Flooding?**
YES **Meets Requirement for Maximum of 30 hour Drawdown Time?**

Stormwater Surface Filtration/Infiltration Facility Sizing Spreadsheet
24 Hour Storm, NRCS Type 1A Rainfall Distribution
City of Eugene

Version 2.1

Project Information

Project Name:	OR126 Phase 2	**Date:**	10/24/2016
Project Address:	Franklin Blvd	**Permit Number:**	
	Springfield, OR	**Catchment ID:**	PA 5
Designer:	Theresa Ring		
Company:	CH2M		

Instructions:

1. Complete this form for each drainage catchment in the project site that is to be sized per the Presumptive Approach.
2. Provide a distinctive Catchment ID for each facility coordinated with the site basin map to correlate the appropriate calculations with the facility.
3. The maximum drainage catchment to be modeled per the Presumptive Approach is 1 acre (43,560 SF)
4. For infiltration facilities in Class A or B soils where no infiltration testing has been perfromed use an infiltration rate of 0.5 in/hr. For all facilities use a maximum soil infiltration rate of 2.5 in/hr for topsoil/growing medium.

Design Requirements:

Choose "Yes" from the dropdown boxes below next to the design standards requirements for this facility.

Pollution Reduction (PR)	Yes
Flow Control (FC)	Yes
Destination (DT)	Yes

*An infiltration facility must be chosen as the facility type to meet destination requirements

Site Data-Post Development

Total Square Footage Impervious Area=	14530	sqft	**Total Square Footage Pervious Area=**	0	sqft
Impervious Area CN=	98		**Pervious Area CN=**	85	
Total Square Footage of Drainage Area=	14530	sft	**Time of Concentration Post Development=**	5	min
Weighted Average CN=	98				

Site Data-Pre Development (Data in this section is only used if Flow Control is required)

Pre-Development CN=	85		**Time of Concentration Pre-Development=**	10	min

Soil Data

Tested Soil Infiltration Rate=	2.5	in/hr (See Note 4)	**Destination Design=**	1.25	in/hr
Design Soil Infiltration Rate=	2.5	in/hr	**Soil Infiltration Rate**		

Design Storms Used For Calculations

Requirement	24-hour		Design Storm
Pollution Reduction	1.0	inches	Water Quality
Flow Control	3.6	inches	Flow Control
Destination	4.8	inches	Flood Control

Facility Data

Facility Type=	Infiltration Stormwater Planter		**Facility Surface Area=**	1760	sqft
Surface Width=	17.6	ft	**Facility Surface Perimeter=**	235.2	ft
Surface Length=	100	ft	**Facility Bottom Area=**	1760	sqft
Facility Side Slopes=	0	to 1	**Facility Bottom Perimeter=**	235	ft
Max. Ponding Depth in Stormwater Facility=	12	in	**Basin Volume=**	1760.0	cf
Depth of Growing Medium (Soil)=	12	in	**Ratio of Facility Area to Impervious Area=**	0.121	

Pollution Reduction-Calculation Results

Peak Flow Rate to Stormwater Facility =	0.076	cfs	Peak Facility Overflow Rate=	0.000	cfs
Total Runoff Volume to Stormwater Facility =	955	cf	Total Overflow Volume=	0	cf
Max. Depth of Stormwater in Facility=	0.0	in			
Drawdown Time=	0.2	hours			

Yes **Facility Sizing Meets Pollution Reduction Standards?**

YES **Meets Requirement of No Facility Flooding?**
YES **Meets Requirement for Maximum of 18 Hour Drawdown Time?**

Flow Control-Calculation Results

Peak Flow Rate to Stormwater Facility =	0.314	cfs	Peak Facility Overflow Rate=	0.000	cfs
Total Runoff Volume to Stormwater Facility =	4067	cf	Total Overflow Volume=	0	cf
Max. Depth of Stormwater in Facility=	2.4	in	Peak Off-Site Flow Rate Filtration Facility Underdrain=	N\A	cfs
Drawdown Time=	0.2	hours			

Pre-Development Runoff Data 6.00

Peak Flow Rate =	0.174	cfs
Total Runoff Volume =	2547	cf

Yes **Facility Sizing Meets Flow Control Standards?**

YES **Meets Requirement for Post Development offsite flow less or equal to Pre-Development Flow?**
YES **Meets Requirement for Maximum of 18 Hour Drawdown Time?**

Destination-Calculation Results

Peak Flow Rate to Stormwater Facility =	0.422	cfs	Peak Facility Overflow Rate=	0.000	cfs
Total Runoff Volume to Stormwater Facility =	5514	cf	Total Overflow Volume=	0	cf
Max. Depth of Stormwater in Facility=	11.9	in			
Drawdown Time=	7.7	hours			

Yes **Facility Sizing Meets Destination Standards?**

YES **Meets Requirement of No Facility Flooding?**
YES **Meets Requirement for Maximum of 30 hour Drawdown Time?**

Stormwater Surface Filtration/Infiltration Facility Sizing Spreadsheet
24 Hour Storm, NRCS Type 1A Rainfall Distribution
City of Eugene

Version 2.1

Project Information

Project Name:	OR126 Phase 2	**Date:**	10/24/2016
Project Address:	Franklin Blvd	**Permit Number:**	
	Springfield, OR	**Catchment ID:**	RG 1
Designer:	Theresa Ring		
Company:	CH2M		

Instructions:

1. Complete this form for each drainage catchment in the project site that is to be sized per the Presumptive Approach.
2. Provide a distinctive Catchment ID for each facility coordinated with the site basin map to correlate the appropriate calculations with the facility.
3. The maximum drainage catchment to be modeled per the Presumptive Approach is 1 acre (43,560 SF)
4. For infiltration facilities in Class A or B soils where no infiltration testing has been perfromed use an infiltration rate of 0.5 in/hr. For all facilities use a maximum soil infiltration rate of 2.5 in/hr for topsoil/growing medium.

Design Requirements:

Choose "Yes" from the dropdown boxes below next to the design standards requirements for this facility.

Pollution Reduction (PR)	Yes
Flow Control (FC)	Yes
Destination (DT)	Yes

*An infiltration facility must be chosen as the facility type to meet destination requirements

Site Data-Post Development

Total Square Footage Impervious Area=	20000	sqft	**Total Square Footage Pervious Area=**	0	sqft
Impervious Area CN=	98		**Pervious Area CN=**	85	
Total Square Footage of Drainage Area=	20000	sft	**Time of Concentration Post Development=**	5	min
Weighted Average CN=	98				

Site Data-Pre Development (Data in this section is only used if Flow Control is required)

Pre-Development CN=	85		**Time of Concentration Pre-Development=**	10	min

Soil Data

Tested Soil Infiltration Rate=	2.5	in/hr (See Note 4)	**Destination Design=**	1.25	in/hr
Design Soil Infiltration Rate=	2.5	in/hr	**Soil Infiltration Rate**		

Design Storms Used For Calculations

Requirement	24-hour		Design Storm
Pollution Reduction	1.0	inches	Water Quality
Flow Control	3.6	inches	Flow Control
Destination	4.8	inches	Flood Control

Facility Data

Facility Type=	Infiltration Rain Garden		**Facility Surface Area=**	2345	sqft
Surface Width=	35	ft	**Facility Surface Perimeter=**	204	ft
Surface Length=	67	ft	**Facility Bottom Area=**	1508	sqft
Facility Side Slopes=	3	to 1	**Facility Bottom Perimeter=**	168	ft
Max. Ponding Depth in Stormwater Facility=	18	in	**Basin Volume=**	2950.5	cf
Depth of Growing Medium (Soil)=	12	in	**Ratio of Facility Area to Impervious Area=**	0.117	

Pollution Reduction-Calculation Results

Peak Flow Rate to Stormwater Facility =	0.104	cfs	Peak Facility Overflow Rate=	0.000	cfs
Total Runoff Volume to Stormwater Facility =	1315	cf	Total Overflow Volume=	0	cf
Max. Depth of Stormwater in Facility=	0.1	in			
Drawdown Time=	0.2	hours			

Yes **Facility Sizing Meets Pollution Reduction Standards?**

YES **Meets Requirement of No Facility Flooding?**
YES **Meets Requirement for Maximum of 18 Hour Drawdown Time?**

Flow Control-Calculation Results

Peak Flow Rate to Stormwater Facility =	0.432	cfs	Peak Facility Overflow Rate=	0.000	cfs
Total Runoff Volume to Stormwater Facility =	5598	cf	Total Overflow Volume=	0	cf
Max. Depth of Stormwater in Facility=	5.7	in	Peak Off-Site Flow Rate Filtration Facility Underdrain=	N\A	cfs
Drawdown Time=	0.2	hours			

Pre-Development Runoff Data 6.00

Peak Flow Rate =	0.239	cfs
Total Runoff Volume =	3506	cf

Yes **Facility Sizing Meets Flow Control Standards?**

YES **Meets Requirement for Post Development offsite flow less or equal to Pre-Development Flow?**
YES **Meets Requirement for Maximum of 18 Hour Drawdown Time?**

Destination-Calculation Results

Peak Flow Rate to Stormwater Facility =	0.580	cfs	Peak Facility Overflow Rate=	0.000	cfs
Total Runoff Volume to Stormwater Facility =	7590	cf	Total Overflow Volume=	0	cf
Max. Depth of Stormwater in Facility=	17.9	in			
Drawdown Time=	13.2	hours			

Yes **Facility Sizing Meets Destination Standards?**

YES **Meets Requirement of No Facility Flooding?**
YES **Meets Requirement for Maximum of 30 hour Drawdown Time?**

Stormwater Surface Filtration/Infiltration Facility Sizing Spreadsheet
24 Hour Storm, NRCS Type 1A Rainfall Distribution
City of Eugene

Version 2.1

Project Information

Project Name:	OR126 Phase 2	**Date:**	10/24/2016
Project Address:	Franklin Blvd	**Permit Number:**	
	Springfield, OR	**Catchment ID:**	RG 2
Designer:	Theresa Ring		
Company:	CH2M		

Instructions:

1. Complete this form for each drainage catchment in the project site that is to be sized per the Presumptive Approach.
2. Provide a distinctive Catchment ID for each facility coordinated with the site basin map to correlate the appropriate calculations with the facility.
3. The maximum drainage catchment to be modeled per the Presumptive Approach is 1 acre (43,560 SF)
4. For infiltration facilities in Class A or B soils where no infiltration testing has been perfromed use an infiltration rate of 0.5 in/hr. For all facilities use a maximum soil infiltration rate of 2.5 in/hr for topsoil/growing medium.

Design Requirements:

Choose "Yes" from the dropdown boxes below next to the design standards requirements for this facility.

Pollution Reduction (PR)	Yes
Flow Control (FC)	Yes
Destination (DT)	Yes

*An infiltration facility must be chosen as the facility type to meet destination requirements

Site Data-Post Development

Total Square Footage Impervious Area=	27700	sqft	**Total Square Footage Pervious Area=**	0	sqft
Impervious Area CN=	98		**Pervious Area CN=**	85	
Total Square Footage of Drainage Area=	27700	sft	**Time of Concentration Post Development=**	5	min
Weighted Average CN=	98				

Site Data-Pre Development (Data in this section is only used if Flow Control is required)

Pre-Development CN=	85		**Time of Concentration Pre-Development=**	10	min

Soil Data

Tested Soil Infiltration Rate=	2.5	in/hr (See Note 4)	**Destination Design=**	1.25	in/hr
Design Soil Infiltration Rate=	2.5	in/hr	**Soil Infiltration Rate**		

Design Storms Used For Calculations

Requirement	24-hour		Design Storm
Pollution Reduction	1.0	inches	Water Quality
Flow Control	3.6	inches	Flow Control
Destination	4.8	inches	Flood Control

Facility Data

Facility Type=	Infiltration Rain Garden		**Facility Surface Area=**	3195	sqft
Surface Width=	45	ft	**Facility Surface Perimeter=**	232	ft
Surface Length=	71	ft	**Facility Bottom Area=**	2232	sqft
Facility Side Slopes=	3	to 1	**Facility Bottom Perimeter=**	196	ft
Max. Ponding Depth in Stormwater Facility=	18	in	**Basin Volume=**	4131.0	cf
Depth of Growing Medium (Soil)=	12	in	**Ratio of Facility Area to Impervious Area=**	0.115	

Pollution Reduction-Calculation Results

Peak Flow Rate to Stormwater Facility =	0.145	cfs	Peak Facility Overflow Rate=	0.000	cfs
Total Runoff Volume to Stormwater Facility =	1821	cf	Total Overflow Volume=	0	cf
Max. Depth of Stormwater in Facility=	0.0	in			
Drawdown Time=	0.2	hours			

Yes **Facility Sizing Meets Pollution Reduction Standards?**

YES **Meets Requirement of No Facility Flooding?**
YES **Meets Requirement for Maximum of 18 Hour Drawdown Time?**

Flow Control-Calculation Results

Peak Flow Rate to Stormwater Facility =	0.598	cfs	Peak Facility Overflow Rate=	0.000	cfs
Total Runoff Volume to Stormwater Facility =	7754	cf	Total Overflow Volume=	0	cf
Max. Depth of Stormwater in Facility=	5.2	in	Peak Off-Site Flow Rate Filtration Facility Underdrain=	N\A	cfs
Drawdown Time=	0.2	hours			

Pre-Development Runoff Data 6.00

Peak Flow Rate =	0.331	cfs
Total Runoff Volume =	4856	cf

Yes **Facility Sizing Meets Flow Control Standards?**

YES **Meets Requirement for Post Development offsite flow less or equal to Pre-Development Flow?**
YES **Meets Requirement for Maximum of 18 Hour Drawdown Time?**

Destination-Calculation Results

Peak Flow Rate to Stormwater Facility =	0.804	cfs	Peak Facility Overflow Rate=	0.000	cfs
Total Runoff Volume to Stormwater Facility =	10512	cf	Total Overflow Volume=	0	cf
Max. Depth of Stormwater in Facility=	17.7	in			
Drawdown Time=	13.0	hours			

Yes **Facility Sizing Meets Destination Standards?**

YES **Meets Requirement of No Facility Flooding?**
YES **Meets Requirement for Maximum of 30 hour Drawdown Time?**

Stormwater Surface Filtration/Infiltration Facility Sizing Spreadsheet
24 Hour Storm, NRCS Type 1A Rainfall Distribution
City of Eugene

Version 2.1

Project Information

Project Name:	OR126 Phase 2	**Date:**	10/24/2016
Project Address:	Franklin Blvd	**Permit Number:**	
	Springfield, OR	**Catchment ID:**	RG 3
Designer:	Theresa Ring		
Company:	CH2M		

Instructions:

1. Complete this form for each drainage catchment in the project site that is to be sized per the Presumptive Approach.
2. Provide a distinctive Catchment ID for each facility coordinated with the site basin map to correlate the appropriate calculations with the facility.
3. The maximum drainage catchment to be modeled per the Presumptive Approach is 1 acre (43,560 SF)
4. For infiltration facilities in Class A or B soils where no infiltration testing has been perfromed use an infiltration rate of 0.5 in/hr. For all facilities use a maximum soil infiltration rate of 2.5 in/hr for topsoil/growing medium.

Design Requirements:

Choose "Yes" from the dropdown boxes below next to the design standards requirements for this facility.

Pollution Reduction (PR)	Yes
Flow Control (FC)	Yes
Destination (DT)	Yes

*An infiltration facility must be chosen as the facility type to meet destination requirements

Site Data-Post Development

Total Square Footage Impervious Area=	24000	sqft	**Total Square Footage Pervious Area=**	0	sqft
Impervious Area CN=	98		**Pervious Area CN=**	85	
Total Square Footage of Drainage Area=	24000	sft	**Time of Concentration Post Development=**	5	min
Weighted Average CN=	98				

Site Data-Pre Development (Data in this section is only used if Flow Control is required)

Pre-Development CN=	85		**Time of Concentration Pre-Development=**	10	min

Soil Data

Tested Soil Infiltration Rate=	2.5	in/hr (See Note 4)	**Destination Design=**	1.25	in/hr
Design Soil Infiltration Rate=	2.5	in/hr	**Soil Infiltration Rate**		

Design Storms Used For Calculations

Requirement	24-hour		Design Storm
Pollution Reduction	1.0	inches	Water Quality
Flow Control	3.6	inches	Flow Control
Destination	4.8	inches	Flood Control

Facility Data

Facility Type=	Infiltration Rain Garden		**Facility Surface Area=**	2760	sqft
Surface Width=	46	ft	**Facility Surface Perimeter=**	212	ft
Surface Length=	60	ft	**Facility Bottom Area=**	1887	sqft
Facility Side Slopes=	3	to 1	**Facility Bottom Perimeter=**	176	ft
Max. Ponding Depth in Stormwater Facility=	18	in	**Basin Volume=**	3546.0	cf
Depth of Growing Medium (Soil)=	12	in	**Ratio of Facility Area to Impervious Area=**	0.115	

Pollution Reduction-Calculation Results

Peak Flow Rate to Stormwater Facility =	0.125	cfs	Peak Facility Overflow Rate=	0.000	cfs
Total Runoff Volume to Stormwater Facility =	1578	cf	Total Overflow Volume=	0	cf
Max. Depth of Stormwater in Facility=	0.0	in			
Drawdown Time=	0.2	hours			

Yes **Facility Sizing Meets Pollution Reduction Standards?**

YES **Meets Requirement of No Facility Flooding?**
YES **Meets Requirement for Maximum of 18 Hour Drawdown Time?**

Flow Control-Calculation Results

Peak Flow Rate to Stormwater Facility =	0.518	cfs	Peak Facility Overflow Rate=	0.000	cfs
Total Runoff Volume to Stormwater Facility =	6718	cf	Total Overflow Volume=	0	cf
Max. Depth of Stormwater in Facility=	5.4	in	Peak Off-Site Flow Rate Filtration Facility Underdrain=	N\A	cfs
Drawdown Time=	0.2	hours			

Pre-Development Runoff Data 6.00

Peak Flow Rate =	0.287	cfs
Total Runoff Volume =	4207	cf

Yes **Facility Sizing Meets Flow Control Standards?**

YES **Meets Requirement for Post Development offsite flow less or equal to Pre-Development Flow?**
YES **Meets Requirement for Maximum of 18 Hour Drawdown Time?**

Destination-Calculation Results

Peak Flow Rate to Stormwater Facility =	0.696	cfs	Peak Facility Overflow Rate=	0.000	cfs
Total Runoff Volume to Stormwater Facility =	9108	cf	Total Overflow Volume=	0	cf
Max. Depth of Stormwater in Facility=	17.9	in			
Drawdown Time=	13.2	hours			

Yes **Facility Sizing Meets Destination Standards?**

YES **Meets Requirement of No Facility Flooding?**
YES **Meets Requirement for Maximum of 30 hour Drawdown Time?**

Stormwater Surface Filtration/Infiltration Facility Sizing Spreadsheet
24 Hour Storm, NRCS Type 1A Rainfall Distribution
City of Eugene

Version 2.1

Project Information

Project Name:	OR126 Phase 2	**Date:**	10/24/2016
Project Address:	Franklin Blvd	**Permit Number:**	
	Springfield, OR	**Catchment ID:**	RG 4
Designer:	Theresa Ring		
Company:	CH2M		

Instructions:

1. Complete this form for each drainage catchment in the project site that is to be sized per the Presumptive Approach.
2. Provide a distinctive Catchment ID for each facility coordinated with the site basin map to correlate the appropriate calculations with the facility.
3. The maximum drainage catchment to be modeled per the Presumptive Approach is 1 acre (43,560 SF)
4. For infiltration facilities in Class A or B soils where no infiltration testing has been perfromed use an infiltration rate of 0.5 in/hr. For all facilities use a maximum soil infiltration rate of 2.5 in/hr for topsoil/growing medium.

Design Requirements:

Choose "Yes" from the dropdown boxes below next to the design standards requirements for this facility.

Pollution Reduction (PR)	Yes
Flow Control (FC)	Yes
Destination (DT)	Yes

*An infiltration facility must be chosen as the facility type to meet destination requirements

Site Data-Post Development

Total Square Footage Impervious Area=	19700	sqft	**Total Square Footage Pervious Area=**	0	sqft
Impervious Area CN=	98		**Pervious Area CN=**	85	
Total Square Footage of Drainage Area=	19700	sft	**Time of Concentration Post Development=**	5	min
Weighted Average CN=	98				

Site Data-Pre Development (Data in this section is only used if Flow Control is required)

Pre-Development CN=	85		**Time of Concentration Pre-Development=**	10	min

Soil Data

Tested Soil Infiltration Rate=	2.5	in/hr (See Note 4)	**Destination Design=**	1.25	in/hr
Design Soil Infiltration Rate=	2.5	in/hr	**Soil Infiltration Rate**		

Design Storms Used For Calculations

Requirement	24-hour		Design Storm
Pollution Reduction	1.0	inches	Water Quality
Flow Control	3.6	inches	Flow Control
Destination	4.8	inches	Flood Control

Facility Data

Facility Type=	Infiltration Rain Garden		**Facility Surface Area=**	2320	sqft
Surface Width=	40	ft	**Facility Surface Perimeter=**	196	ft
Surface Length=	58	ft	**Facility Bottom Area=**	1519	sqft
Facility Side Slopes=	3	to 1	**Facility Bottom Perimeter=**	160	ft
Max. Ponding Depth in Stormwater Facility=	18	in	**Basin Volume=**	2940.0	cf
Depth of Growing Medium (Soil)=	12	in	**Ratio of Facility Area to Impervious Area=**	0.118	

Pollution Reduction-Calculation Results

Peak Flow Rate to Stormwater Facility =	0.103	cfs	Peak Facility Overflow Rate=	0.000	cfs
Total Runoff Volume to Stormwater Facility =	1295	cf	Total Overflow Volume=	0	cf
Max. Depth of Stormwater in Facility=	0.1	in			
Drawdown Time=	0.2	hours			

Yes **Facility Sizing Meets Pollution Reduction Standards?**

YES **Meets Requirement of No Facility Flooding?**
YES **Meets Requirement for Maximum of 18 Hour Drawdown Time?**

Flow Control-Calculation Results

Peak Flow Rate to Stormwater Facility =	0.425	cfs	Peak Facility Overflow Rate=	0.000	cfs
Total Runoff Volume to Stormwater Facility =	5514	cf	Total Overflow Volume=	0	cf
Max. Depth of Stormwater in Facility=	5.5	in	Peak Off-Site Flow Rate Filtration Facility Underdrain=	N\A	cfs
Drawdown Time=	0.2	hours			

Pre-Development Runoff Data 6.00

Peak Flow Rate =	0.235	cfs
Total Runoff Volume =	3454	cf

Yes **Facility Sizing Meets Flow Control Standards?**

YES **Meets Requirement for Post Development offsite flow less or equal to Pre-Development Flow?**
YES **Meets Requirement for Maximum of 18 Hour Drawdown Time?**

Destination-Calculation Results

Peak Flow Rate to Stormwater Facility =	0.572	cfs	Peak Facility Overflow Rate=	0.000	cfs
Total Runoff Volume to Stormwater Facility =	7476	cf	Total Overflow Volume=	0	cf
Max. Depth of Stormwater in Facility=	17.7	in			
Drawdown Time=	13.0	hours			

Yes **Facility Sizing Meets Destination Standards?**

YES **Meets Requirement of No Facility Flooding?**
YES **Meets Requirement for Maximum of 30 hour Drawdown Time?**

Stormwater Surface Filtration/Infiltration Facility Sizing Spreadsheet
24 Hour Storm, NRCS Type 1A Rainfall Distribution
City of Eugene

Version 2.1

Project Information

Project Name:	OR126 Phase 2	**Date:**	10/24/2016
Project Address:	Franklin Blvd	**Permit Number:**	
	Springfield, OR	**Catchment ID:**	RG 5
Designer:	Theresa Ring		
Company:	CH2M		

Instructions:

1. Complete this form for each drainage catchment in the project site that is to be sized per the Presumptive Approach.
2. Provide a distinctive Catchment ID for each facility coordinated with the site basin map to correlate the appropriate calculations with the facility.
3. The maximum drainage catchment to be modeled per the Presumptive Approach is 1 acre (43,560 SF)
4. For infiltration facilities in Class A or B soils where no infiltration testing has been perfromed use an infiltration rate of 0.5 in/hr. For all facilities use a maximum soil infiltration rate of 2.5 in/hr for topsoil/growing medium.

Design Requirements:

Choose "Yes" from the dropdown boxes below next to the design standards requirements for this facility.

Pollution Reduction (PR)	Yes
Flow Control (FC)	Yes
Destination (DT)	Yes

*An infiltration facility must be chosen as the facility type to meet destination requirements

Site Data-Post Development

Total Square Footage Impervious Area=	30900	sqft	**Total Square Footage Pervious Area=**	0	sqft
Impervious Area CN=	98		**Pervious Area CN=**	85	
Total Square Footage of Drainage Area=	30900	sft	**Time of Concentration Post Development=**	5	min
Weighted Average CN=	98				

Site Data-Pre Development (Data in this section is only used if Flow Control is required)

Pre-Development CN=	85		**Time of Concentration Pre-Development=**	10	min

Soil Data

Tested Soil Infiltration Rate=	2.5	in/hr (See Note 4)	**Destination Design=**	1.25	in/hr
Design Soil Infiltration Rate=	2.5	in/hr	**Soil Infiltration Rate**		

Design Storms Used For Calculations

Requirement	24-hour		Design Storm
Pollution Reduction	1.0	inches	Water Quality
Flow Control	3.6	inches	Flow Control
Destination	4.8	inches	Flood Control

Facility Data

Facility Type=	Infiltration Rain Garden		**Facility Surface Area=**	3550	sqft
Surface Width=	50	ft	**Facility Surface Perimeter=**	242	ft
Surface Length=	71	ft	**Facility Bottom Area=**	2542	sqft
Facility Side Slopes=	3	to 1	**Facility Bottom Perimeter=**	206	ft
Max. Ponding Depth in Stormwater Facility=	18	in	**Basin Volume=**	4629.8	cf
Depth of Growing Medium (Soil)=	12	in	**Ratio of Facility Area to Impervious Area=**	0.115	

Pollution Reduction-Calculation Results

Peak Flow Rate to Stormwater Facility =	0.161	cfs	Peak Facility Overflow Rate=	0.000	cfs
Total Runoff Volume to Stormwater Facility =	2032	cf	Total Overflow Volume=	0	cf
Max. Depth of Stormwater in Facility=	0.0	in			
Drawdown Time=	0.2	hours			

Yes **Facility Sizing Meets Pollution Reduction Standards?**

YES **Meets Requirement of No Facility Flooding?**
YES **Meets Requirement for Maximum of 18 Hour Drawdown Time?**

Flow Control-Calculation Results

Peak Flow Rate to Stormwater Facility =	0.667	cfs	Peak Facility Overflow Rate=	0.000	cfs
Total Runoff Volume to Stormwater Facility =	8649	cf	Total Overflow Volume=	0	cf
Max. Depth of Stormwater in Facility=	5.0	in	Peak Off-Site Flow Rate Filtration Facility Underdrain=	N\A	cfs
Drawdown Time=	0.2	hours			

Pre-Development Runoff Data 6.00

Peak Flow Rate =	0.369	cfs
Total Runoff Volume =	5417	cf

Yes **Facility Sizing Meets Flow Control Standards?**

YES **Meets Requirement for Post Development offsite flow less or equal to Pre-Development Flow?**
YES **Meets Requirement for Maximum of 18 Hour Drawdown Time?**

Destination-Calculation Results

Peak Flow Rate to Stormwater Facility =	0.896	cfs	Peak Facility Overflow Rate=	0.000	cfs
Total Runoff Volume to Stormwater Facility =	11726	cf	Total Overflow Volume=	0	cf
Max. Depth of Stormwater in Facility=	17.6	in			
Drawdown Time=	12.8	hours			

Yes **Facility Sizing Meets Destination Standards?**

YES **Meets Requirement of No Facility Flooding?**
YES **Meets Requirement for Maximum of 30 hour Drawdown Time?**

Stormwater Surface Filtration/Infiltration Facility Sizing Spreadsheet
24 Hour Storm, NRCS Type 1A Rainfall Distribution
City of Eugene

Version 2.1

Project Information

Project Name:	OR126 Phase 2	**Date:**	10/24/2016
Project Address:	Franklin Blvd	**Permit Number:**	
	Springfield, OR	**Catchment ID:**	RG 6
Designer:	Theresa Ring		
Company:	CH2M		

Instructions:

1. Complete this form for each drainage catchment in the project site that is to be sized per the Presumptive Approach.
2. Provide a distinctive Catchment ID for each facility coordinated with the site basin map to correlate the appropriate calculations with the facility.
3. The maximum drainage catchment to be modeled per the Presumptive Approach is 1 acre (43,560 SF)
4. For infiltration facilities in Class A or B soils where no infiltration testing has been perfromed use an infiltration rate of 0.5 in/hr. For all facilities use a maximum soil infiltration rate of 2.5 in/hr for topsoil/growing medium.

Design Requirements:

Choose "Yes" from the dropdown boxes below next to the design standards requirements for this facility.

Pollution Reduction (PR)	Yes
Flow Control (FC)	Yes
Destination (DT)	Yes

*An infiltration facility must be chosen as the facility type to meet destination requirements

Site Data-Post Development

Total Square Footage Impervious Area=	24900	sqft	**Total Square Footage Pervious Area=**	0	sqft
Impervious Area CN=	98		**Pervious Area CN=**	85	
Total Square Footage of Drainage Area=	24900	sft	**Time of Concentration Post Development=**	5	min
Weighted Average CN=	98				

Site Data-Pre Development (Data in this section is only used if Flow Control is required)

Pre-Development CN=	85		**Time of Concentration Pre-Development=**	10	min

Soil Data

Tested Soil Infiltration Rate=	2.5	in/hr (See Note 4)	**Destination Design=**	1.25	in/hr
Design Soil Infiltration Rate=	2.5	in/hr	**Soil Infiltration Rate**		

Design Storms Used For Calculations

Requirement	24-hour		Design Storm
Pollution Reduction	1.0	inches	Water Quality
Flow Control	3.6	inches	Flow Control
Destination	4.8	inches	Flood Control

Facility Data

Facility Type=	Infiltration Rain Garden		**Facility Surface Area=**	2860	sqft
Surface Width=	44	ft	**Facility Surface Perimeter=**	218	ft
Surface Length=	65	ft	**Facility Bottom Area=**	1960	sqft
Facility Side Slopes=	3	to 1	**Facility Bottom Perimeter=**	182	ft
Max. Ponding Depth in Stormwater Facility=	18	in	**Basin Volume=**	3675.8	cf
Depth of Growing Medium (Soil)=	12	in	**Ratio of Facility Area to Impervious Area=**	0.115	

Pollution Reduction-Calculation Results

Peak Flow Rate to Stormwater Facility =	0.130	cfs	Peak Facility Overflow Rate=	0.000	cfs
Total Runoff Volume to Stormwater Facility =	1637	cf	Total Overflow Volume=	0	cf
Max. Depth of Stormwater in Facility=	0.0	in			
Drawdown Time=	0.2	hours			

Yes **Facility Sizing Meets Pollution Reduction Standards?**

YES **Meets Requirement of No Facility Flooding?**
YES **Meets Requirement for Maximum of 18 Hour Drawdown Time?**

Flow Control-Calculation Results

Peak Flow Rate to Stormwater Facility =	0.538	cfs	Peak Facility Overflow Rate=	0.000	cfs
Total Runoff Volume to Stormwater Facility =	6970	cf	Total Overflow Volume=	0	cf
Max. Depth of Stormwater in Facility=	5.4	in	Peak Off-Site Flow Rate Filtration Facility Underdrain=	N\A	cfs
Drawdown Time=	0.2	hours			

Pre-Development Runoff Data 6.00

Peak Flow Rate =	0.298	cfs
Total Runoff Volume =	4365	cf

Yes **Facility Sizing Meets Flow Control Standards?**

YES **Meets Requirement for Post Development offsite flow less or equal to Pre-Development Flow?**
YES **Meets Requirement for Maximum of 18 Hour Drawdown Time?**

Destination-Calculation Results

Peak Flow Rate to Stormwater Facility =	0.722	cfs	Peak Facility Overflow Rate=	0.000	cfs
Total Runoff Volume to Stormwater Facility =	9449	cf	Total Overflow Volume=	0	cf
Max. Depth of Stormwater in Facility=	17.9	in			
Drawdown Time=	13.2	hours			

Yes **Facility Sizing Meets Destination Standards?**

YES **Meets Requirement of No Facility Flooding?**
YES **Meets Requirement for Maximum of 30 hour Drawdown Time?**

Attachment F

Infiltration Rain Garden; Operation and Maintenance Manual

OPERATION & MAINTENANCE MANUAL

Facility Type: Infiltration Rain Garden

July, 2016

INDEX

1. Identification

Facility Type:	Infiltration Rain Garden	
Construction Drawings:	OR126B & McVay Hwy (Phase 1)	
Location:	District:	5
	Highway No.:	OR 126B
	Mile Post:	0.90; 1.28
	Description:	These facilities are located on the west side of the Willamette River at the intersection with McVay Hwy.

2. Facility Contact Information

Contact the Engineer of Record, Region Technical Center or Geo-Environmental's Senior Hydraulics engineer for:

- Operational clarification
- Maintenance clarification
- Repair or restoration assistance

3. Construction

Engineer of Record:	Richard Attanasio/CH2M & Steven Katko/CH2M
Facility Construction:	2016-2017
Contractor:	

4. Storm Drain System and Facility Overview

An infiltration rain garden is a flat-bottomed open channel designed to treat stormwater runoff from highway pavement areas. This type of facility is lined with various kinds of vegetation. Treatment by trapping sedimentation occurs when stormwater runoff flows through the vegetation and filtrates into a treatment media. Rain gardens are Low Impact Development Approach facilities (LIDA) as defined by the City of Springfield.

There are approximately 2,800 sf of rain gardens in the project, distributed between three facilities. One rain garden is located in the center of each of the roundabouts, and a third is located southeast of the road at the intersection of Hwy 126 and McVay Hwy. Each rain garden has 12" of ¾" drain rock and 12" of growing medium in the garden floor with 24" of topsoil around the sides. Vegetation, included bushes and trees, will be established to aid with treatment. Sizes vary depending on the expected amount of

runoff to be treated. Each rain garden is approximately 4’ deep with side slopes of 3:1 (H:V). The water outfall pipe exits 6” above the rain garden floor onto a 3’ x 2’ x1’ riprap pad.

The rain garden located in the west roundabout, RG-1, has a bottom area of 333 sf and treats water from almost 11, 300 sf of roadway. Runoff drains from the roadway to inlets located in the gutters. These are both curb and grate inlets. Runoff also drains from the truck apron of the roundabout to a grate inlet. It is conveyed through a pollution control manhole before entering the rain garden. There is one pollution control manhole and one outfall in this facility.

The rain garden located in the east roundabout, RG-2, has a bottom area of 1,054 sf and treats water from over 23,000 sf of roadway. Runoff drains from the roadway to inlets located in the gutters. These are both curb and grate inlets. Runoff also drains from the truck apron of the roundabout to a grate inlet. It is conveyed through a pollution control manhole before entering the rain garden. There are two pollution control manholes and two outfalls in this facility.

The rain garden located in the southeast corner of the intersection of OR-126 and McVay Hway, RG-3, has a bottom area of 1,416 sf and treats water from 3over 36,088 sf of roadway. Runoff drains from the roadway to inlets located in the gutters. These are both curb and grate inlets. Runoff also drains from the truck apron of the roundabout to a grate inlet. It is conveyed through a pollution control manhole before entering the rain garden. There is one pollution control manhole and one outfall in this facility.

The pollution control manholes are underground facilities designed to removed sediment and debris from stormwater by allowing it to settle in the 24” sump in the manhole while the water continues through the manhole and is conveyed to the rain gardens. These manholes are 72” in diameter and at least 5’ deep.

A. Maintenance equipment access:

Maintenance crews can access the facility via access driveways located in each of the roundabouts. RG-3 can be accessed by foot as there is no access driveway.

B. Heavy equipment access into facility:

- ☐ Allowed (no limitations)
- ☐ Allowed (with limitations)
- ☒ Not allowed

C. Special Features:

- ☒ Amended Soils
- ☐ Porous Pavers
- ☐ Liners
- ☐ Underdrains

5. Facility Haz Mat Spill Feature(s)

The infiltration rain garden can be used to store a volume of liquid as there is no outlet or overflow and the facility does not allow liquid to pass except through infiltration.

In the event of a hazardous material spill a spill response form is contained in Appendix C.

6. Auxiliary Outlet

Auxiliary Outlets are provided if the primary outlet control structure can not safely pass the projected high flows. Broad-crested spillway weirs and over flow risers are the two most common auxiliary outlets used in stormwater treatment facility design. The auxiliary outlet feature is either a part of the facility or an additional storm drain feature/structure.

The auxiliary outlet feature for this facility is:

☐Designed into facility

☒Other, as noted below

The infiltration rain gardens are designed to capture flows up to and including the 25-year storm event. There are no auxiliary outlets for the facilities.

7. Maintenance Requirements

Routine maintenance table for non-proprietary stormwater treatment and storage/detention facilities have been incorporated into ODOT's Maintenance Guide. These tables summarize the maintenance requirements for ponds, swales, filter strips, bioslopes, and detention tanks and vaults. Special maintenance requirements in addition to the routine requirements are noted below when applicable.

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

http://www.oregon.gov/ODOT/HWY/OOM/MGuide.shtml

Maintenance requirements for proprietary structures, such as underground water quality manholes and/or vaults with filter media are noted in Appendix B when applicable

The following stormwater facility maintenance table (See ODOT Maintenance Guide) should be used to maintain the facility outlined in this Operation and Maintenance Manual or follow the Maintenance requirements outlined in Appendix B when proprietary structure is selected below:

- ☒ Table 1 (general maintenance)
- ☐ Table 2 (stormwater ponds)
- ☒ Table 3 (water quality biofiltration swales)
- ☐ Table 4 (water quality filter strips)
- ☐ Table 5 (water quality bioslopes)
- ☐ Table 6 (detention tank)
- ☐ Table 7 (detention vault)
- ☒ Appendix B (proprietary structure)
- ☒ Special Maintenance requirements:

Inspections are required for all system components for proper operation, maintenance requirements, and structural stability. Inspections should be completed quarterly for the first two years after installation and twice per year beyond then. Inspections should also occur within 48 hours after a major storm event.

In addition to what is contained on Tables 1 and 3 from the ODOT Maintenance guide, the following table, Table 8, represents maintenance that is required for the rain gardens. Additional Maintenance information can be found in the City of Eugene's Stormwater System Operations and Maintenance Manual found in Appendix B.

Table 8: Maintenance of Rain Gardens and Stormwater Planters

Maintenance Component	Defect or Problem	Condition When Maintenance is Needed	Recommended Maintenance to Correct Problem
Rain Garden Components	Vegetation Growth	Vegetation growth is minimal or suffering.	Mulch should be replenished as needed to ensure healthy growth.

Maintenance Component	Defect or Problem	Condition When Maintenance is Needed	Recommended Maintenance to Correct Problem
	Vegetation	Dead vegetation exceeds 10% of area coverage or filter function is impaired.	Remove and replace immediately where soils are exposed or within 3 months to maintain cover density.
	Nuisance and prohibited vegetation	Invasive vegetation from Eugene Plant List (e.g. Blackberries, English Ivy) contributes up to 25% of vegetation.	Invasive vegetation should be removed and replaced.
	Low rock levels	Only one layer of rock exists above native soil.	Replace rocks or other armoring.
Pollution Control Manhole	Inlet is clogged.	Conveyance capacity is plugged.	Inlets should be cleared to ensure unrestricted stormwater flow into manhole.
	Outlets plugged	Conveyance capacity is 50% plugged.	Remove and clear debris from outlet pipes.
	Plugged pipes.	Reduced conveyance capacity.	Clear sediment and debris from piping.

8. Waste Material Handling

Material removed from the facility is defined as waste by DEQ.

Contact the city of Springfield Operations Division at 541-726-3694.

APPENDIX A

ODOT Project Plan Sheets

APPENDIX B

CITY OF EUGENE STORMWATER SYSTEM OPERATIONS & MAINTENANCE MANUAL

Stormwater System

Operations & Maintenance Manual

City of Eugene Public Works Department

Maintenance Division

Revised November 2015

Approved by

Jeff Lankston, PWM Director

Table of Contents

Introduction

Purpose of Manual

The Stormwater System Operations and Maintenance (O&M) Manual serves as a guide to current operational procedures and practices related to the City's street surface and piped or "closed" stormwater conveyance system and facilities. This manual provides City personnel and the community with a guide to the maintenance activities associated with this portion of the stormwater system. Operations and maintenance responsibilities related to stormwater open waterways reside with the Parks & Open Space Division (POS) and are defined in the Draft Open Waterway Maintenance Plan dated February 2003.

Operational & Maintenance Goals:

The Surface Section of Public Works Maintenance Division is charged with the responsibility of effectively and efficiently managing, operating and maintaining the City's public stormwater collection system. Integrated into these goals is the pursuant of public safety, emergency response on a 24/7 basis, adherence to regulatory permit requirements, response to public service requests, public outreach and education.

Characteristics:

Current O&M Programs

A variety of operations and maintenance (O&M) programs are currently employed to maintain the City of Eugene's stormwater conveyance system. Individual programs range from the inspection and data collection of system components to the cleaning and repair of conveyance facilities. These programs are divided into three program groups.

The first program group is comprised of several individual inspection, monitoring, and data collection efforts involving different areas of the stormwater system. These include current support activities provided by other divisions such as mapping and Geographic Information System (GIS) information. While these efforts do not directly involve work on the physical components of the system, they do provide important information regarding the extent, characteristics, and condition of the system. Mapping provides a vital resource for optimizing O&M activities.

The second program group involves the routine maintenance of the physical components of the system such as storm lines, inlets, culverts, and catch basins. This includes the scheduling of preventive maintenance designed to reduce the need for emergency repairs and provide more information about the condition of the system. Maintenance of the constructed drainage system and natural system requires different operational practices.

The third program group includes the unscheduled corrective maintenance of system components. This involves such activities as the repair and rehabilitation of all aspects of the stormwater conveyance system. Also, corrective maintenance includes any regularly scheduled maintenance activities, apart from the routine maintenance of the system, which requires immediate attention by city personnel.

O&M Program Implementation

In order for the stormwater system to function properly, the inlets, catch basins, and small diameter connecting lines must be kept free of obstructing debris and built-up sediments. To accomplish this, the City operates a program of routine system maintenance.

According to the Comprehensive Stormwater Management Plan (CSWMP): "Operations and Maintenance (O&M) of the storm drainage system are performed on a regular basis to ensure the system functions as designed and to protect the public investment of the constructed system. The costs associated with operations and maintenance include channel cleaning, vegetation management, pipe system cleaning, street sweeping, leaf pickup, storm system rehabilitation, and equipment purchases. The Stormwater Plan requires internal operations to be reviewed to establish guidelines for routine maintenance of pipes, channels, catch basins, inlets and roadside ditches that minimize impact to water quality and natural resources. O&M plans for all public stormwater facilities are to be evaluated and updated to balance flood protection, runoff conveyance, water quality enhancement, and natural resource area management."

O&M Program Status

The stormwater system, from a conveyance standpoint, is presently being maintained as completely and efficiently as possible with the existing facilities, available equipment, and staff.

Fundamental Operations & Maintenance System Needs:

The goals of Maintenance Division's storm system O&M policies are:

- To ensure compatibility with the City of Eugene's Storm Drainage Master Plan
- To ensure compatibility with the City of Eugene's policies regarding the preservation of wetlands
- To establish system maintenance priorities
- To fulfill City responsibilities while limiting and/or reducing the City's liability exposure

Implicit, broader goals of the O&M policies are listed below:

- To effectively manage the existing stormwater collection system
- To provide adequate and necessary levels of flood protection
- To comply with Army Corps of Engineers and Soil Conservation Service maintenance guidelines and regulations
- To improve operation efficiency and reduce costs of continual system maintenance practices
- To eliminate recurring maintenance problems

Collection System Limits & Jurisdictions:

According to the present policy the Public Works Maintenance Division operation and maintenance (O&M) jurisdictional limits include all curb and gutter (C&G) public streets within the city limits, and as defined by adopted agreement within portions of Lane County. Within these boundaries includes all street drainage inlets, public stormwater piped systems, and outlets structures. Presently this system includes about 500 centerline miles of public C&G streets, paved alleys and off street bike paths, 600 miles of pipe line, 15,000 inlets and catch basins, and 3,600 inlet/outlets storm pipe to ditch. The City is not responsible to clean or maintain private stormwater systems.
The Parks and Open Space Division accepts the O&M responsibilities for public ditches, channels, and open waterways within these boundaries. In many situations the conveyance drainage network changes between piped vs. open systems. Effective divisional coordination is imperative to effectively meet the permit requirements, best management practices and departmental goals.

Section 1: Supporting Information Management Systems

1.1 Mapping and Geographic System Needs

Purpose

The purpose of mapping and Geographic Information System is to create and maintain accurate, up-to-date maps and records of the system components. These records are necessary in maintaining a comprehensive stormwater system inventory and to aid in monitoring conditions within the system. A Geographic Information System, or GIS (the City's specific system known as GeoDart a customized version of Arc GIS), is utilized to maintain a visual or graphic record of the physical characteristics of the stormwater conveyance system.

Current Practice

Public Works Engineering (PWE) staff use GIS computer applications to create, update or amend infrastructure maps using data gathered in the field from such sources as as-constructed project plans. A variety of task-specific maps for stormwater operations and maintenance activities are furnished upon request.

1.2 Infrastructure Inventory & Maintenance Management System

Purpose

The Maintenance Management System (MMS) is a computerized data management system designed for entry, analysis, and reporting of infrastructure information. MMS serves as a basis for the current stormwater system infrastructure inventory to be used in the processing of stormwater system-related work orders and for tracking maintenance activities.

Current Practice

Public Works staff collects and assesses infrastructure data from the field. Activities include, but are not limited to the daily tracking, inventory, and maintenance of the stormwater conveyance system.

Operational Stormwater activities are currently managed and tracked through the use of our Maintenance Management System. The SWAT module allows for real-time data entry specific to the ongoing cleaning, inspection and field verifications that are performed daily by our field staff. The results of the activities are tracked and reported on. Additionally a follow-up work order are generated when a deficiency in the infrastructure is discovered.

1.3 Map Revisions

Purpose

A formal map revision process is maintained to ensure the City's stormwater conveyance system maps and asset attributes are accurate and kept up to date. This responsibility is shared throughout the Public Works Department, however due to the working knowledge of the collection system the Surface and Subsurface Stormwater Sections place a high priority on this practice.

Current Practice

The Field Investigator is lead on this process and mapping inaccuracies once observed, however operations staff share this responsibility. The process includes making a field investigation of the site, system assessment which may include cleaning and closed circuit television inspection support. Based on field findings revisions are documented. These map corrections are routed to Engineering staff in the Mapping & Development Group who is charged with revising the GIS and updating the MMS and Cassworks.

1.4 Educational Information & Outreach

Purpose

Develop a comprehensive information and education program for the public, school children, city personnel, and others about natural resources and stormwater pollution problems from both non-point and point sources and show the impacts of their actions on Eugene's water quality.

Beginning in the spring of 1991, the City began a public involvement/education process to support the Comprehensive Management Program. Public communication played a central role in leading to the City council's adoption to the Program in November, 1993.

Current Practice

Ongoing outreach activities include but are not limited to:

- Bi-annual community survey on awareness of stormwater issues
- Staffed displays at community events.
- Distribution of City-wide newsletters twice a year that focuses on stormwater and surface water-related issues.
- Presentations to civic and community groups, teachers and children.
- Placement of internal policies about recycling and reusing materials.
- Development of curriculum for children taught at local school districts that help children understand how their actions affect water quality.

1.5 Support Role for Public Work's Capital Improvement Projects

Purpose

To perform visual inspections, identify deficiencies and research the stormwater system, during the planning phase of Capital Improvement Projects and Pavement Preservation Projects within the boundaries of the projects. In addition, Maintenance supplies Engineering with historical information on stormwater issues that are within the project boundaries.

Current Practice

Once PWE identifies the boundaries of Capital Improvement Projects (CIP) and Pavement Preservation Projects (PPP), maintenance staff cleans catch basins, lateral and main lines. Once storm lines are cleaned a visual or television inspection is performed to identify deficiencies and storm line mapping of the stormwater system is correct. Identified structure and or stormwater line deficiencies are documented along with map corrections and sent to PWE's project manager, along with any historical stormwater information. Repair or replacement recommendations are often included.

1.6 Response for Request for Service

Purpose

To capture and track details for services that is being requested. A "request for service" identifies what service is being requested, pertinent information to identify the scope of work, time, date, location, and provide a conduit for follow up with the requesting stake holder.

Current Practice

Public Works Maintenance uses the Maintenance Management System (MMS) to record and track request for services. When a request for service is taken, the address, service details, caller name and phone number of the caller is logged into the MMS. The request is sent to the Maintenance Team Supervisor or lead person who is responsible for the service that is being requested. The supervisor or lead takes the request for service (RFS) and converts it to a work order (WO) and assigns it to the appropriate staff that responds, inspects and or performs the work that is needed to complete the

service request. Staff may contact the person requesting service for more information. Once the work order has been completed, staff closes out the work order by entering pertinent data, comments and date when the work was completed.

Section 2: System Condition and Monitoring

2.1 Television Inspection

Purpose

Closed circuit television (CCTV) inspection of the stormwater conveyance system provides a means of visually assessing the condition of the system. The technique is well suited for determining pipe joint conditions, root intrusion, and can be used for analyzing structural deficiencies, line and grade. Also, CCTV inspections are utilized for assessing portions of the system in preparation for rehabilitation or reconstruction projects prior to the design phase or construction and serves as an alternative to excavation for assessing problems in enclosed systems.

CCTV inspection is a widely accepted standard of inspection of piped sewer systems where physical inspection is not practical or safe. Monitoring activities, such as TV inspection, provides information for construction, repair, and rehabilitation of the stormwater system.

Current Practice

Although a future program is planned, there is presently no regularly scheduled CCTV inspection program for the stormwater system. Inspection is done on an as-needed basis to assess specific problem areas.

2.2 Systematic Field Investigation (SFI)

Purpose

Systematic Field Investigation (SFI) is an important tool to locate and inventory features of the public stormwater collection system; identify and correct sources of pollutants entering the system; gather land use stormwater runoff data for use in pollutant loads assessment modeling; identify stormwater quality problem areas in Eugene; gather baseline data on urban stormwater quality; gather data for use in decision making related to stormwater management programs; locate illicit connections or illegal dumping activities. SFI provides system component location and condition information for construction, repair, and rehabilitation of the stormwater system and is considered an information gathering technique. SFI provides inventory information for construction, repair, rehabilitation and illegal connection/discharge enforcement of the stormwater system. To observe the condition of the stormwater system features to assess system integrity and water quality; field inspect and classify components not yet inventoried (SFI program); administer pre-storm inspection of flood control facilities with the assistance of the Army Corp of Engineers to qualify for a reduction of Federal Emergency Management Administration municipal insurance rates.

Current Practice

Investigation of the piped and open drainage system commenced in the summer of 1996. Current work activities include:

- Work with the Sub Surface Stormwater Maintenance Crew to assess, inspect and map the details of the public and private stormwater system.
- Work with Public Works Engineering to inspect and assess piped stormwater system prior to street paving projects.
- Systematically inspect stormwater outfalls to identify illicit discharges.
- Conduct annual dry-weather field screening inspections, and where flow is observed, identify its source.

2.3 New Construction Plan Review

Purpose

Public Works Maintenance (PWM) has two technicians that perform plan reviews for the Engineering Division for Public Improvements and the Permit and Information Center for Privately Engineered Public Improvements (PEPI). These technicians perform plan review to provide recommendations to the Engineering Division to ensure that the proposed infrastructure can be maintained by the Maintenance Division.

Current Practice

The PWM Surface Technical Team works with the City's Engineering Division to ensure that CIP and privately engineered designs meet maintenance standards for maintainability, efficiency, and effectiveness. Staff from the PWM's Surface Technical Team attend Engineering project scoping meetings at the beginning of each project. Also, staff meets weekly with Public Works Engineering (PWE) Land Use Review Survey (LURS) Team staff to review private land use development proposals. Together the combined staff teams review the sites and the existing City infrastructure for completeness, failures, and provisions for future improvements. PWM Surface Technicians then review the proposed public improvement designs to ensure that the infrastructure can be efficiently and effectively accessed by Maintenance equipment without compromising traffic and pedestrian safety.

To ensure that maintenance needs are met, PWM Surface Techs review and make recommendations on all Engineering CIP plans during the 30%, 60% and 90% completion stage. These reviews result in design changes to reduce risks from traffic during maintenance operations and to increase operational efficiency.

PWM staff is members of the City of Eugene APWA/Eugene Specifications committee. At the end of each construction season and prior to the next Engineering design season PWM staff review specifications and detailed drawings for compliance, maintenance compatibility, and operational efficiency. These reviews result in changes to the specifications and amendments to adopted documents.

PWM Surface Technicians work with PWE staff to reviewing PEPI plans to ensure that sanitary and storm infrastructure improvements meet maintenance standards and specifications for installation and code compliance.

All land use changes including plats, partitions, and subdivisions are routed from the Planning and Development Department to the PWM Surface Technical staff to ensure that the site has adequate existing infrastructure to support future development and/or that all provisions are in place to provide that infrastructure when needed. Wastewater and stormwater connections to the City's existing infrastructure are subject to approval by the PWM Surface Technical staff through the building permit process.

Section 3: Related Street Maintenance

3.1 Street Sweeping

Purpose

The purpose of the street sweeping program is to collect street debris and refuse material from all public curb and gutter streets and a select group of unimproved streets. Also, sweeping is effective in removing safety hazards such as broken glass, sand, and other debris, particularly after vehicular accidents or winter sanding operations. In addition, sweeping operations are effective at reducing stormwater pollutants such as sediments, hydrocarbons, heavy metals, and debris/litter. Furthermore, keeping refuse and debris out of the stormwater system helps the stormwater conveyance by decreased solids loading, and lowers the risk of system blockages.

Current Practice

The Stormwater Surface Maintenance Team currently uses mechanical broom high dump sweepers, regenerative air recirculation high dump sweepers, and regenerative air recalculating rear dump sweepers for use on streets, alleys, bike paths and as a backup. Mechanical broom and air sweepers operate on a fixed route schedule determined by the supervisor. Daily routing may be interrupted to respond to special situations such as post-vehicular accident cleanup or winter street sand recovery. The sweeping cycle for a given street alternates between the use of a mechanical broom and a regenerative air sweeper.

The sweeping schedule requires the downtown core and the primary University streets to be swept a minimum once a week, the industrial core once a week, arterial and major collector streets every one to two weeks depending on the debris loading, and residential streets once every six weeks. For the most part, this schedule is followed very closely. Depending on the number of special and emergency call-outs, and equipment availability residential streets may be swept once every six to eight weeks. Since the City only has one sweeper small enough for bike paths and alleys, these facilities get swept approximately twice a year.

3.2 Autumn Leaf Collection

During autumn months, leaves piled up in the public right-of-way are collected from the street, gutter and catch basin grates to minimize blockage of gutters and inlets. This practice allows stormwater to enter the system more freely, effectively reducing the potential of flooding streets and private property.

Current Practice

After raking the fallen leaves in their yard, residents may place the leaves in the public rights-of-way the weekend prior to their scheduled leaf collection by Public Works Maintenance. Residents are required to place leaves in such a manner as not to plug the gutter and catch basins. Property owners with driveway culverts are responsible for keeping their culverts clear of leaves during rainstorms.

Unless a weather emergency or other hazard exists which requires an immediate response, PWM crews follow an established schedule that ensures systematic coverage and provides efficient leaf collection service for Eugene citizens. Collection usually begins the first week or two of November, and continues until collection is complete in mid-January. The program provides two rounds of collection on both improved and unimproved streets. . Established priority bike lanes receive service on a weekly basis during the program scheduled timeframe. Planned collection schedules are published in advance, and weekly updates confirm any necessary adjustment and provide a convenient reminder for citizens. Maps and scheduling information is available on the City web site at: http://www.eugene-or.gov/leaf

3.3 Debris Removal in Right-of-Way & Litter Control

Purpose

To collect large items of illegally dumped refuse and debris in public rights-of-way prior to street sweeping operations. To keep streets, sidewalks, and other public rights-of-way clear of impediments or obstructions; keep stormwater systems clear of debris; maintain aesthetically pleasing public areas and rights-of-way.

Current Practice

The Stormwater Surface Maintenance Team investigates illegal dumping in public rights-of-ways and waterway channels and follows up with cleaning operations. This includes the recovery of dead animals from streets and sidewalks. Cleanup of trash from illegal dumping in public rights-of-way and channels is conducted on an as-needed basis. The Amazon Channel is inspected by POS on a regular basis for litter and debris. The removal of shopping carts, tires, bed springs, and other household appliances from the City's channels reduces the risk of further pollution and promotes public perception of these channels as public assets rather than common dumping grounds. With the City divided into grids, areas of high illegal dumping activity are inspected and cleaned up more frequently. When illegal dump sites are located the debris is searched for items, such as mail that might identify the responsible party. Any information found at the dump site that identifies the responsible party is turned over to the Department of Public Safety. Daily schedules may be interrupted to respond to special situation call-outs from the Department of Public Safety. Illegal dump materials are recycled whenever possible.

3.4 Dead Animal Pick Up

Purpose

Dead animals (typically dogs, cats, or deer) in the right-of-way should be removed as soon as possible once notice is received. Procedures are in place to ensure that animal carcasses are disposed of promptly and properly with regard for employee and public health.

Current Practice

Dead animal removal from the right-of-way is the responsibility of the Public Works Maintenance Division. Once aware of the animal location maintenance staff responds to the location the same work day and use the following procedures to ensure proper removal and disposal.

All proper personal protective equipment (PPE) is provided to staff that include protective gloves, coveralls, safety vest and biodegradable bags. If the removal is from the street, the vehicle is equipped with a strobe light and four-way flashers.

Domestic animals such as cats and dogs are taken to the tri-agency animal regulation authority. Tags are filled out with location, animal type and color information is given to the animal regulation staff to allow pet owners the opportunity to identify their animals. These animals are then properly disposed of by the animal regulation authority.

Non-domestic animals such as squirrels, raccoons, possum, nutria and deer are removed from the right-of way, bagged if practical and taken to Short Mountain Lane County Landfill and buried.

The Stormwater Surface Maintenance supervisor tracks the location, date and animal type for statistical assessment. This information is used by the Transportation Section to determine if the animal crossing signs are needed at particular street locations. In addition, services are prepared for animal collections and used by field staff to track specific site information. Service request information is entered into a database system and used in tracking the various work activities performed by the PWM.

3.5 Surface Vegetation Control

Purpose

The purpose of the vegetation control is to remove over grown vegetation that has become a safety hazard to the public or is creating a stormwater conveyance issue on pedestrian paths, bike paths or all curb and gutter streets. Furthermore, keeping vegetation out of the stormwater system helps the stormwater conveyance by decreasing the chance of blockage.

Current Practice

Vegetation removal is performed annually during the summer months. By using the vegetation removal route books of pedestrian/bike paths and traffic calming devices staff can systematically remove vegetation from the right-of-way. Proper signing and traffic control in the work area is required at all times. Vegetation is removed by the use of hand and power tools. Once vegetation is removed and the work area cleaned, the debris is either taken to the recycle area at PWM facility or to the local debris recyclers. When an area has been completed it is logged completed, dated and signed in the route books.

The proper PPE shall be used when removing vegetation with all power and hand tools. All proper PPE is provided to staff that include protective gloves, safety vest, protective eye wear, hard hat, ear plugs, face shield and chaps. Staff receives training on traffic control and proper equipment usage along with safety procedures on all equipment used for vegetation removal.

3.6 Periodic Review of Street Sweeper Routes

Purpose

Route design plans are developed and periodically reviewed for effectiveness; routing may be affected by topography, neighborhood boundaries, crew sizes, available equipment, or other conditions.

Current Practice

It is policy for the Surface Operations Section to do an annual review of the City's sweeper routes. This review will be conducted by the Surface Stormwater Supervisor and Team during the summer months to avoid peak leaf and sweeping seasons. The purpose of the review is to gauge the effectiveness and efficiency of the City's sweeping program in meeting the community's need and producing equivalent workloads for the operators. The review will take into account available equipment, new equipment, new streets or subdivisions, staffing resources, parking requirement, streets widths, availability of through driveways and alleys, operational needs and traffic patterns. Review will be done through a combination of experience, mathematical evaluation and observations by the supervisor and assigned sweeper staff. This annual review will be in a written format, even if routing has no changes or impacts.

Section 4: Stormwater System: Scheduled-Preventive Maintenance & Repair

4.1 Catch Basin Cleaning

Purpose

Routine cleaning of the piped stormwater system is required to maximize or facilitate proper functioning of the system. This insures relatively trouble-free operation of the City's stormwater catch basins, curb inlets, and bubbler systems. These structures must be kept free of obstructing debris to minimize street and surface flooding. Cleaning is also undertaken to reduce the amount of contaminants, sediments, and other pollutants entering the MS4.

Current Practice

The Subsurface Stormwater Maintenance Team routinely cleans catch basins on improved streets. The cleaning program currently combines specialized sewer jet-vacuum trucks with crews assigned to this work group to vacuum and collect sediments and debris from catch basins, as well as, pressure jet open the catch basin system and connecting lines. Additional wastewater collection jet-vacuum trucks are available if required during flooding conditions.

Maintenance scheduling follows a general goal to clean 50% of all public catch basins and connecting lines in the system approximately once a year. Scheduling is currently based on the city stormwater grid maps which are broken down for mapping purposes into rectangular sheets. The practice has been to clean all catch basins within a selected grid area in a given period of time. Historic problem areas and seasonal influences are also controlling factors.

Catch basins on private property, constructed privately for the purpose of draining private lots are not cleaned by city crews. Lines connecting a private catch basin into the city storm system are not the maintenance responsibility of the City; however, catch basins connected to private pipes will often allow material from the private system to migrate into the public catch basin as it is cleaned. When this occurs, the private line as it enters the public catch basin is cleaned to prevent further migration of debris and sediment.

4.2 Jet Cleaning Pipe Segments

Purpose

Routine cleaning and preventive maintenance of the piped stormwater system is required to maximize or facilitate proper functioning of the system to insure relatively trouble-free operation of the city's stormwater structures. These structures must be kept free of obstructing debris and built-up sediments. Experience has shown that like routine catch basin cleaning, pipe segment and connecting line cleaning helps reduce stormwater system overflow and street flooding during periods of heavy precipitation.

Cleaning is also done to reduce the amount of contaminants reaching waterways and to minimize street and surface flooding. To accomplish this, the City currently supports the program of routine stormwater system maintenance with the general goal of cleaning 50% of all inlets, catch basins, and connecting lines at approximately once a year.

Current Practice

In conjunction with catch basin cleaning, the Subsurface Stormwater Maintenance Team periodically cleans pipe segments and/or manholes on improved streets. The cleaning program currently combines specialized sewer jet/vacuum trucks with crews assigned to the Subsurface Stormwater Maintenance Team to vacuum and collect sediments and debris from pipe segments and/or manholes as well as pressure jet open the system's connecting lines. Additional jet/vacuum trucks and a jet-only truck from wastewater collections are available if flooding conditions warrant the need for extra resources. Any piped system inlet structures that are obstructed by debris or material that cannot be vacuumed are cleaned by hand. The obstructing material is then removed from the site in a small dump or pickup truck. Collected material is placed in the holding tank and eventually deposited at the regional stormwater waste management facility for drying and pretreatment prior to land filling.

If needed at the time of catch basin cleaning, pipe segments and/or manholes may be cleaned concurrently. The general goal of the program is to clean 50% of all inlets, catch basins, and connecting lines at least once a year. Scheduling is

currently based on the city stormwater grid maps which are broken down into arbitrarily established rectangular sheets. The intent is to clean all catch basins within a selected grid area in a given period of time.

Pipe segments and/or manholes constructed privately for the purpose of draining private lots are not cleaned by city crews. Lines connecting a private catch basin into the city storm system are not the maintenance responsibility of the City; however, catch basins connected to private pipes will often allow material from the private system to migrate into a public catch basin as it is cleaned. When this occurs, the private line as it enters the public catch basin is cleaned to prevent further migration of debris and sediment.

4.3 Water Quality Systems

Purpose

Periodic cleaning and preventive maintenance of sedimentation manholes and drywell systems is required to maximize or facilitate proper functioning of the system to insure their relatively trouble-free operation. These structures must be kept free of obstructing debris and built-up sediments. Cleaning is done to remove sediments and floatable materials (oil, debris) from sedimentation manholes and to minimize clogging of the drywell filtration media (drain rock & fabric) which could cause surcharging and street and surface flooding.

Current Practice

Sedimentation manholes: The Subsurface Stormwater Maintenance Team cleans sedimentation manholes on as-needed basis. There are many sedimentation manholes in the public stormwater system. Cleaning is combined with the catch basin and pipe segment cleaning program. The program currently utilizes specialized sewer jet/vacuum trucks assigned to the Subsurface Stormwater Maintenance Team to vacuum and collect sediments and debris from sedimentation manholes as well as pressure jet open the manhole system's connecting lines. Additional wastewater collection combination trucks are available if required by flooding conditions. Debris is disposed of at the regional stormwater waste management facility.

Drywells: Drywells exist as part of the public system. Applications of registration for a majority of the drywells related to the public system have been submitted to the Oregon Department of Environmental Quality (DEQ). The operation and maintenance practices related to drywells are designed to comply with Oregon DEQ Underground Injection Control Rules (UIC) OAR 340-044-0018.

Water Quality Devices: Mechanical stormwater treatment facilities and devices shall be cleaned in accordance with the manufacturers' specifications. Cleaning procedures utilize specialized sewer jet/vacuum trucks assigned to the Subsurface Stormwater Maintenance Team to vacuum and collect sediments and debris as well as pressure jet clean the devices' connecting lines. Debris is disposed of at the regional stormwater waste management facility.

4.4 Inlet & Outlet Vegetation Control

Purpose

The purpose of the vegetation control is to remove over grown vegetation that has become a safety hazard to the public or is creating a stormwater conveyance issues around inlets and outlets. Furthermore, removing vegetation around inlets and outlets helps the stormwater conveyance by decreasing the chance of blockage.

Current Practice

Annual clearing of vegetation around inlets and outlets is performed in the summer and fall months. Vegetation is removed by the use of hand and power tools. Proper signing and traffic control in the work area is required at all times. During the heavy precipitation months, staff inspects and clears vegetation and debris from inlets and outlets that are identified in the Rain Storm Check List before heavy rain is predicted. All vegetation that is removed is taken to PWM Facility's recycle area or to the local recyclers.

The proper PPE shall be used when removing vegetation with all power and hand tools. All proper PPE is provided to staff that include protective gloves, safety vest, protective eye wear, hard hat, ear plugs, face shield and chaps. Staff receives training on traffic control and proper equipment usage along with safety procedures on all equipment used for vegetation removal.

The proper PPE shall be used when removing vegetation with all power and hand tools. All proper PPE is provided to staff that include protective gloves, safety vest, protective eye wear, hard hat, ear plugs, face shield and chaps. Staff receives training on traffic control and proper equipment usage along with safety procedures on all equipment used for vegetation removal.

4.5 Pipe System Repairs

Purpose

To repair structural deficiencies in the stormwater piped system when deficiencies are identified through visual inspections such as CCTV. Making repairs on the stormwater piped system is necessary to maintain stormwater conveyance and to maintain the integrity of the City's infrastructure.

Current Practice

Storm line maintenance repairs typically consist of spot repairs, short pipe section replacement, realignment and trenchless lining repairs.

Conventional open trench point, replacement or realignment repairs can be performed by either City staff, contracted under PWM's prevailing Digs Service Contract, or assigned to PWE under the CIP. Based on depth, location, and complexity the Subsurface Team decides the most favorable route to pursue excavation repairs. Generally repairs over 8 feet in depth and over 18 inch in diameter are contracted out.

Lining repairs like open trench repairs can be performed by either City staff or contracted under PWM's prevailing No-Dig Service Contract. Currently the sewer repair crew can perform trenchless repairs up to 4 foot in length and 15 inch diameter. Again, the Subsurface Supervisor can pursue trenchless repairs in larger diameter pipe and of additional length under PWM's service contract or assignment to the CIP.

In both cases repairs are prioritized by the condition of the deficiencies.

Section 5: Piped Stormwater System: Unscheduled-Corrective Maintenance

5.1 Grate Replacement

Purpose

Gutter inlet catch basin grates serve as a screen to allow drainage of street surface runoff while minimizing the amount of obstructing material such as leaves, branches, and debris that can enter the stormwater conveyance system. Grates serve this function while intending to reduce the chances of personal injury or vehicular damage while being driven, ridden, or walked upon. During grate replacement the new grates are installed with the current standard, corrosion resistant, a bike-proof/wheelchair-proof grate design.

Current Practice

The catch basin grate replacement program takes place during the winter months focusing on damaged or missing grates which are replaced on an as-needed basis.

5.2 Concrete Repair: Catch Basins, Manholes, Inlets, Curb & Gutter Sections

Purpose

The primary purpose of concrete repair is to restore the structural integrity and extend the useful life of catch basins, inlets, curb and gutter sections and other related features. Also, repairs are done in an effort to provide unimpeded conveyance of the stormwater that the structures are intended to carry. In areas of close contact with motorists, bikers or pedestrians, keeping these structures in good repair to eliminate or minimize the chances of personal injury or vehicular damage is also an important factor.

Current Practice

Damage and defects to stormwater system structures such as catch basins, inlets, curb and gutter sections are reported by way of citizen complaints or PWM staff observations of the system. After a report of damage has been made, a service request form is submitted, followed by a supervisor or crew leader site visit to assess the damage and determine the type of repair work necessary. The Surface Maintenance Team then performs the necessary repairs.

5.3 Piped System Blockage Response:

Purpose

During heavy rainfall events, the sudden runoff of stormwater on curb and guttered streets can often cause a rapid accumulation of leaves and debris on storm inlet grates. Localized street flooding often occurs as a result of a blockage to the inlets. Blockages may also occur at the downstream inlets from ditches and swales on non-curb and guttered (unimproved) streets, resulting in flooding. Occasionally, leaves and debris or roots will enter the piped system and create a blockage in a manhole or pipe segment. These incidents are responded to by maintenance staff to eliminate the blockages as quickly as possible to protect private and public property from serious or costly damage.

Current Practice

This activity takes place primarily during heavy rainfall events, or as notified by the general public, the Police Department, or Public Works staff. Most blockages are caused by an accumulation of leaf matter on catch basin grates or root blockages in pipes. Depending on the severity of the blockage, removal is performed with hand tools or heavy equipment, such as a jet/vacuum truck or backhoe.

Section 6: Storm Emergency, Flooding and Spill Response

6.1 Storm Readiness and Preparation

Purpose

The purpose of storm readiness and preparation is to have equipment and materials on hand and ready to deal with storm event related problems such as high water and flooding. The idea behind storm readiness is to insure the best possible conveyance capabilities of the public stormwater system during peak storm and flood events. During peak storms, water quality is difficult to control. Most control methods would be included in the cleanup effort after the water level has dropped following a storm event.

Current Practice

Current practice is to keep an ongoing inventory of equipment and supplies to deal with storm event related problems such as high water and flooding. Supplies and equipment are kept at the Public Works Maintenance Facility located at 1820 Roosevelt Boulevard.

6.2 Storm Response and Routing Procedures:

Purpose

To prevent or minimize storm related damage to City property and infrastructure caused by flooding, system component blockage, or mudslides. Additionally to prevent or minimize private property damage or personal injury caused by storm related actions which could result from a blockage of the public stormwater system. The idea behind storm response is to insure the best possible conveyance capabilities of the public stormwater system during peak storm and flood events. During peak storms, water quality is difficult to control. Most control methods would be included in the cleanup effort after the water levels have dropped following a storm event.

Current Practice

To monitor the weather and respond accordingly, maintenance staff response increases as storm intensity increases. Known problem areas are monitored as the water levels rise. Every effort is made to reduce the risk of property damage.

6.3 Spill Response

Purpose

Maintain an on-call team trained in spill response procedures involving environmentally hazardous materials and a vehicle equipped for such spill mitigation. Coordinate efforts with other local response teams such as the City of Eugene Fire and Police Departments, Lane County, and state agencies.

Current Practice

The City's Public Works Department is responsible for protecting the City's infrastructure and drainage ways from environmentally harmful spills and discharges. Quite often, Public Works staff is the first to discover discharges of materials that present a threat to the environment.

Frequently the discharged or dumped material has entered or has the immediate potential to enter the piped stormwater system or an open drainage way. Trained staff responds to spills of minor magnitude as a matter of routine operations and maintenance procedures.

To be prepared for a large, potentially damaging spill, the Maintenance Division keeps a team of twenty to thirty staff members trained in emergency spill response and clean-up. All work teams within the Division are represented, providing the Department with a pool of trained and variously skilled staff that might prove necessary in the event of a major spill or other environmentally threatening situation. Trained on-call personnel include operators of equipment such

as jet/vacuum machines, street sweepers, back-hoes, and hydraulic excavators as well as a team of Public Works supervisors trained in the Incident Command system. .

Section 7: Appendix

7.1 List of Acronyms

CCTV	Closed Circuit Television Inspection
CB	Catch Basin
CI	Curb Inlet
C&G	Curb and Gutter
CIP	Capital Improvement Project
CSWMP	Comprehensive Stormwater Management Plan
IGA	Inter Governmental Agreement
MOA	Memorandum of Agreement
MMS	Maintenance Management System
NPDES	National Pollutant Discharge Elimination System
O&M	Operations & Maintenance
PWE	Public Works Engineering
PWM	Public Works Maintenance
PPE	Personal Protective Equipment
PPP	Pavement Preservation Program
POS	Parks & Open Space Division
SFI	Systematic Field Investigation

APPENDIX C

SPILL RESPONSE FORM

SPILL RESPONSE FORM

Location	**Date**
Address	**Phone**

Release Information

Date of spill	**Person who discovered the spill**
Time spill started	**Time spill was stopped**
Material spilled	**Estimated amount released**

Attach a copy of the SDS (safety data sheet), if available.

Mark the location of the spill and the direction of flow on a site drawing

Was there a threat to public safety?	☐No ☐Yes
Is there a potential for future release?	☐No ☐Yes
Did anyone come in direct contact with the spill?	☐No ☐Yes

If yes, describe

Describe how the release occurred. Include details such as the source of the release, the cause, contributing factors, weather, activities occurring prior to or during the release, and the dates and time of the activities

The release impacted (check all that apply) ☐ Surface water ☐Groundwater ☐Soil ☐ Air

Describe any impacts from the release (such as fish kill, evacuation, etc.)

Response Action

Who was notified and when did the notification occur.

Describe actions taken in response to the release. Include details such as actions taken to contain the release, actions taken by the first responders, and other immediate actions to protect people or the environment.

Yard **Date**

Recovery Action

Who performed the site cleanup

If City or ODOT did not perform the cleanup, list the cleanup company's

Name

Address

Phone Project manager

Describe cleanup activities. Include what actions were taken and when the actions were taken.

Were soil or water samples collected? ☐No ☐Yes

If yes, who collected the samples?

Mark the sample collection and locations on a copy of the site map. Attach copies of the sample results.

How much contaminated soil was removed from the site (estimate volume)?

Has all the contamination been removed from site? ☐No ☐Yes

Estimated volume of contaminated soil remaining, if any

Was a hazardous waste determination made? ☐No ☐Yes

List hazardous substances

Were contaminated materials taken off-site for disposal? ☐No ☐Yes

If yes, attach copies of receipts and/or documentation for disposal.

List the name and address of the disposal location

Facility phone Facility contact

These answers are True and Complete to the best of my ability.

Name **Date** **Position**

Signature

Keep this form and all related documentation on file at the yard

Accompanying documentation

- ☐ A copy of the SDS for the spilled product
- ☐ A site map that shows the location of spill and the flow direction
- ☐ A site map that shows the location of samples
- ☐ Receipts for disposal of hazardous material
- ☐ Receipts and/or documentation for disposal of contaminated material (such as soil)