OPERATION & MAINTENANCE MANUAL

DFI No. D00041
Facility Type: Detention Pond/Water Quality Biofiltration Swale Combo

FEBRUARY, 2011

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1. Identification

Drainage Facility ID (DFI):	**D00041**
Facility Type:	Detention Pond/Water Quality Biofiltration Swale Combo
Construction Drawings:	(V-File Numbers) 38V-117, 42V-023
Location:	District: 3
	Highway No.: 001
	Mile Post: 251.70 to 251.74
	Description: This facility is located just south of the SE Fairview Industrial Dr overpass between the northbound travel lanes of I-5 (Hwy 001) and SE Fairview Industrial Dr/SE 32nd Ave – across from Litchfield Pl, and north of Kuebler Blvd. Access can be obtained from Fairview Industrial Dr/SE 32nd Ave.

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

Engineering Contacts:

Region Technical Center Hydro Unit Manager

Or

Geo-Environmental Senior Hydraulics Engineer (503) 986-3365.

3. Construction

Engineer of Record:	ODOT Designer - Region 2 Tech. Center, Chris Carman, (503) 986-2691
Facility construction:	2005 (Phase 1 - 38V-117) 2010 (Phase 2 - 42V-023)
Contractor:	Hamilton Construction Company (38V-117) K & E Excavating, Inc. (42V-023)

4. Storm Drain System and Facility Overview

A detention facility is designed to control the quantity of runoff, by reducing the peak discharge and only detaining runoff for some short period of time. These facilities are designed to store and gradually release or attenuate stormwater runoff via a control structure or release mechanism, and completely drain after the design storm has passed. The most common detention facilities include:

- Dry ponds - these are depressed storage areas that store runoff during wet weather and are dry the rest of the time. Usually they are earthen depressions.
- Tanks - these are underground storage facilities that are typically constructed from large diameter pipe.
- Vaults - these are enclosed underground storage facilities. They are typically constructed from reinforced concrete.

The biofiltration swale is designed as if it was a separate facility and consists of a grassy-lined facility with a flat trapezoidal cross section and gradual slope. Treatment is provided through sedimentation and filtration processes. If amended soils are present, additional treatment is obtained through infiltration through the amended soil media.

When the flows exceed the water quality flows, the pond/swale combo facility begins to provide detention. Detention is required to reduce or mitigate the increases in discharge, resulting from development. The facility is designed to store and gradually release (or attenuate) stormwater runoff via a control structure or release mechanism, then releasing it slowly over a more extended period of time. The flow control mechanism for this facility involves a 4-inch orifice surrounded by a wirecloth strainer assembly. When flows exceed the water quality design flow, the orifice restricts the flow causing the water to backup within the facility.

This facility is located on the east side of the northbound travel lanes and onramp of I-5 (Hwy 001), just south of the SE Fairview Industrial Dr overpass and north of Kuebler Blvd. **Photo 1** shows the facility with the I-5 (Hwy 001) overpass crossing SE Fairview Industrial Dr/SE 32nd Ave in the background. Access to the facility can be obtained from SE Fairview Industrial Drive/SE 32nd Avenue through an unlocked gate just south of the facility. Refer to the **Operational Plan in Appendix A** for the location of the gate and access point. The gate is northwest of the intersection between SE Fairview Industrial Dr/SE 32nd Ave and Litchfield Pl (**Photo 2**). After entry, a vehicular access path is just above the perimeter of the pond (**Photo 3**).

Stormwater runoff from paved areas along I-5 (Hwy 001) drains into this facility. Locations of these storm drain pipes are noted on the **Operational Plan in Appendix A**.

Stormwater enters the facility through two inlets on the south side of the facility. One inlet, Inlet A, is a 24-inch diameter metal pipe, which receives stormwater from a nearby section of I-5 (Hwy 001) (**Point A on the Operational Plan in Appendix A**; **Photo 4**). The other inlet, Inlet B, is a 12-inch diameter black HDPE pipe, which receives stormwater from the onramp connecting Kuebler Boulevard to I-5 (Hwy 001) (**Point B on the Operational Plan in Appendix A**; **Photo 4**). A flow spreader at the facility entrance is formed of riprap. This flow spreader minimizes erosion and captures sediments from stormwater before its entry to the facility (**Point C on the Operational Plan in Appendix A**; **Photo 4**).

Smaller storm events are treated by the grassy swale at the bottom of the facility. When the runoff exceeds the water quality flow, the facility serves as a detention pond where the release of water is controlled at the flow control manhole at the north end of the facility (**Photo 1**).

After treatment and/or detention, the stormwater exits the pond/swale combo through a Type D ditch inlet structure at the north end of the facility. This structure has a grate, which captures larger debris and prevents it from entering the flow control manhole (**Point D on the Operational Plan in Appendix A; Photos 1, 5**). After passing through the grate, the stormwater enters the flow control manhole via an 18-inch diameter pipe.

Inside the flow control manhole, the stormwater passes through a wirecloth strainer assembly at the bottom of the flow control structure, which further removes debris from the stormwater. This wirecloth strainer assembly must be kept unobstructed to ensure effective operation of the facility (**Point E on the Operational Plan in Appendix A; Photos 6, 7, 8, 9**).

Once leaving the facility, the stormwater is discharged into a 24-inch diameter conveyance line, which transports the stormwater to a downstream storm sewer pipe beneath SE Fairview Industrial Drive/SE 32nd Avenue.

North of the flow control manhole, there is an area drain, which discharges to the downstream conveyance line as part of the facility. A manhole at the north of the facility's property indicates the area drain's connection to the conveyance line (**Point F on the Operational Plan in Appendix A; Photo 10**).

The facility was built in two phases, Phase I and Phase II. Most of the facility built during Phase I: the pond/swale combo, Inlet A, the flow control manhole, the conveyance line, etc. (**38V-117 in Appendix B**.) In Phase II, Inlet B and its related onramp inlets were added. Also, the diameter of the lower orifice in the flow control device in the flow control manhole was widened from 1 inch to 4 inches (**42V-023 in Appendix B**.)

A. Maintenance equipment access:
The facility can be accessed from SE Fairview Industrial Drive/SE 32nd Avenue. The facility is across from Litchfield Place where it intersects with SE Fairview Industrial Drive/SE 32nd Avenue. An unlocked gate northwest of this intersection is the entrance to the facility (**Photo 2**). After entry, a circuitous vehicular access path is just above the perimeter pond (**Photo 3**).

B. Heavy equipment access into facility:

☐ Allowed (no limitations)
☒ Allowed (with limitations)
Heavy equipment is allowed around the perimeter of the facility. Assess the condition of the pond prior to entering with heavy equipment. The pond may not support the weight of heavy equipment when wet.

☐ Not allowed

C. Special Features:

☒ Amended Soils
☐ Porous Pavers
☐ Liners
☐ Underdrains

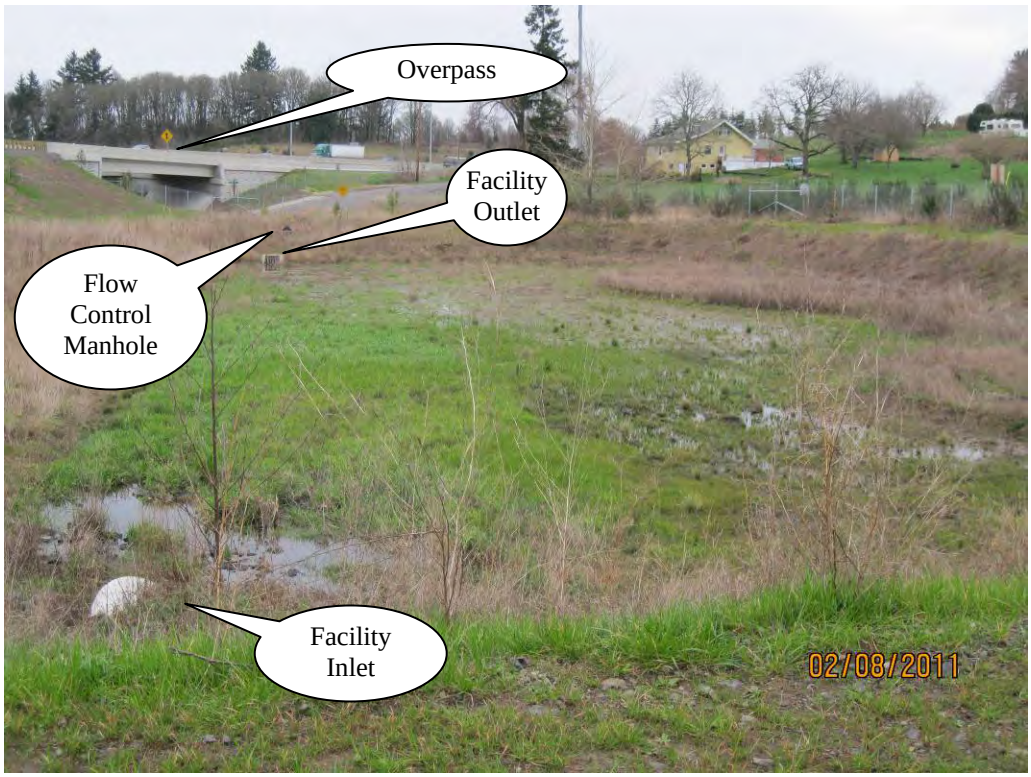


Photo 1: Facing northeast along facility. Metal inlet pipe at the bottom of photo. (Black plastic inlet pipe off to left not in photo.) Outlet beneath overpass (SE Fairview Industrial Drive and I-5 (Hwy 001)) at top of photo.

Photo 2: This photo shows the access gate for the facility.

Photo 3: Vehicular maintenance access, which circles the pond/swale combo, is indicated by tire tracks.

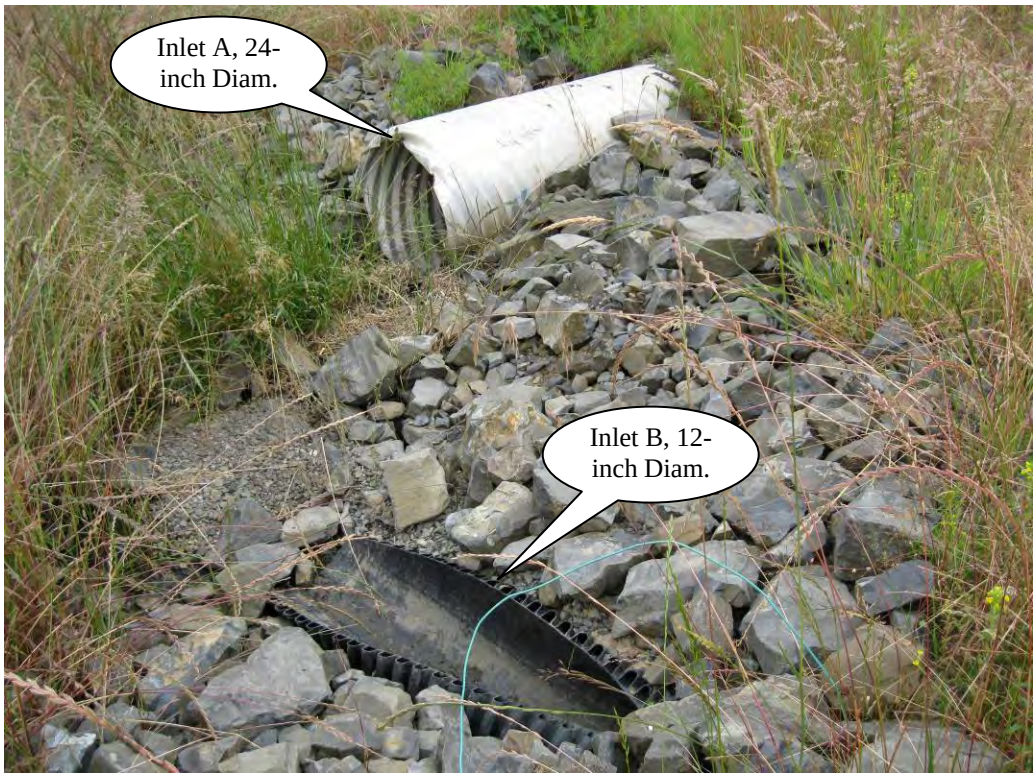


Photo 4: This photo shows the two facility inlets, Inlet A and Inlet B, at the south end of the facility. Flow spreader underneath formed of riprap. (Points A, B and C on the Operational Plan in Appendix A.)

Photo 5: Ditch inlet structure at north end of pond/swale combo (Point D on the Operational Plan in Appendix A.)

Photo 6: Photo looking north at the flow control manhole (two access lids) in the foreground and the SE Fairview Industrial Drive overpass in the background. (Point E on the Operational Plan in Appendix A.)

Photo 7: Interior view from Access S to flow control manhole (Point E on Operational Plan in Appendix A)

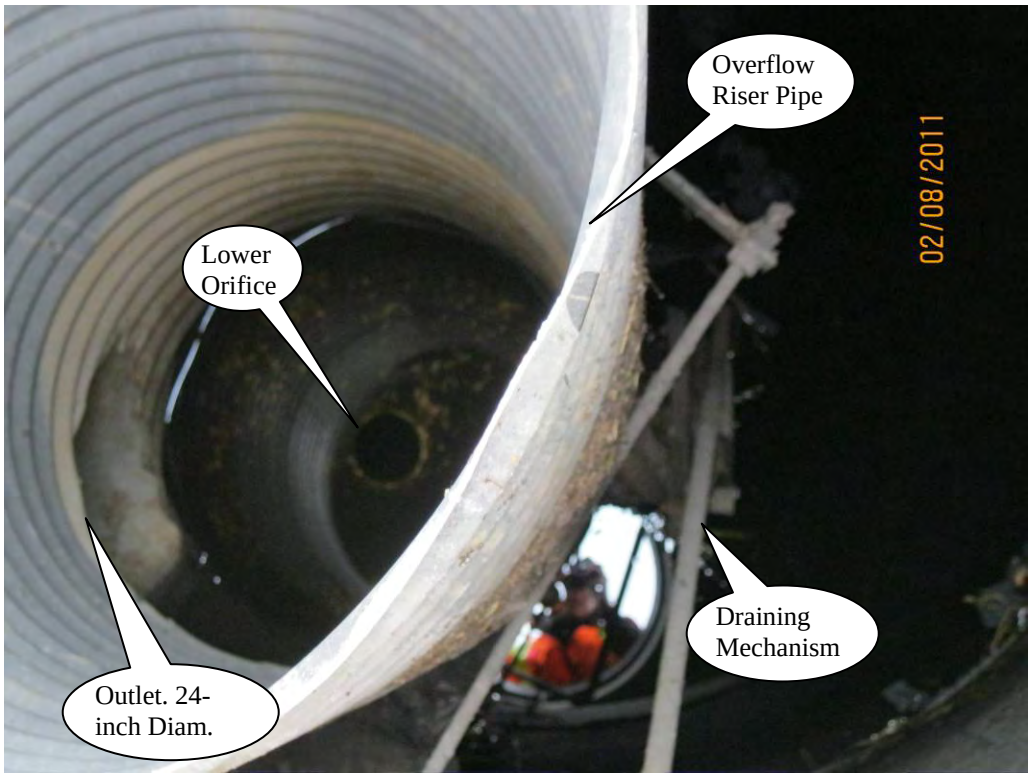


Photo 8: Interior view from Access N to flow control manhole. Top of overflow riser pipe, lower orifice, outlet from manhole, draining mechanism (Point E on Operational Plan in Appendix A)

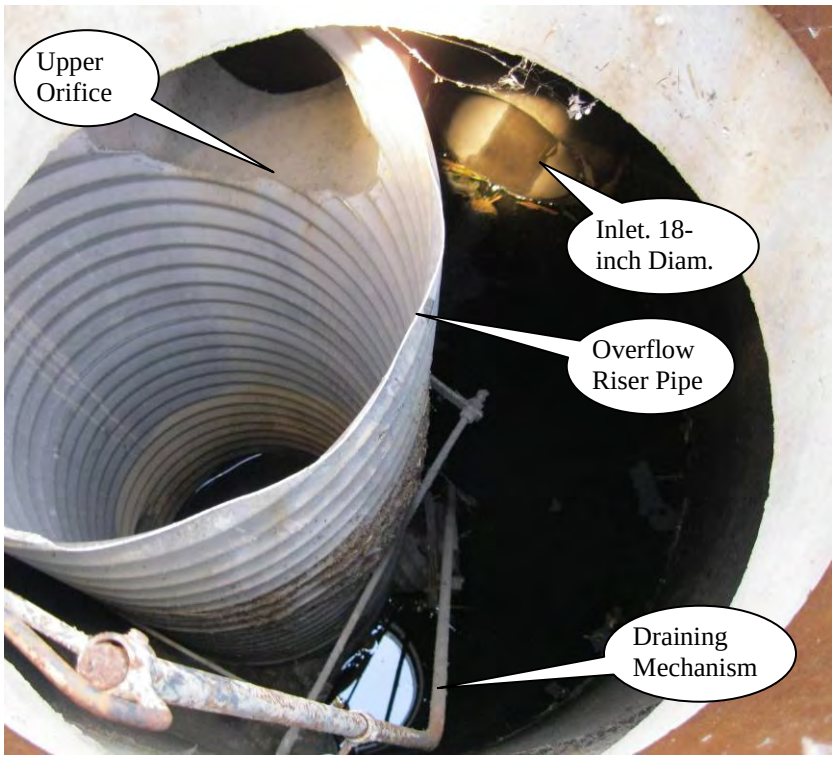


Photo 9: Interior view from Access N to flow control manhole. Shows draining mechanism and top of riser pipe. Inlet illuminated by flashlight (Point E on Operational Plan in Appendix A)

Photo 10: Manhole at connection between facility conveyance line and pipe from area drain in the foreground (Point F on the Operational Plan in Appendix A). The facility conveyance line discharges into the stormwater system underneath SE Fairview Industrial Drive/SE 32nd Avenue.

5. Facility Haz Mat Spill Feature(s)

To pond/swale combo facility can be used to store a volume of liquid by blocking the outlet control structure grate inlet and 18-inch outlet pipe at the outlet of the pond/swale combo. The use of sandbags or a metal plate placed overtop the grate is suggested. This grate and pipe is notes as **Point D on the Operational Plan in Appendix A; Photo 5**.

6. Auxiliary Outlet (High Flow Bypass)

Auxiliary Outlets are provided if the primary outlet control structure cannot safely pass the projected high flows. Broad-crested spillway weirs and over flow risers are the two most common auxiliary outlets used in stormwater 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:

This facility was designed to detain increased stormwater runoff volumes. Detained water is slowly released from the pond through the lower orifice in the riser pipe in the flow control manhole (**Photo 8**). In the event that the lower orifice becomes plugged or the flows exceed the capacity of the facility, the water is released through the high flow riser found within the flow control manhole (**Point E on the Operational Plan in Appendix A; Photos 7, 8, 9**).

The auxiliary high flow bypass for the flow control manhole consists of a 24-inch diameter pipe that rises above the outlet pipe in the flow control manhole. If stormwater enters the flow control manhole more quickly than the lower orifice can convey stormwater, the water level within the manhole will rise until water enters the riser pipe through its upper orifice. The water will then discharge through the 24-inch outlet pipe (**Flow Control Structure Detail, Operational Plan, Appendix A; also see 38V-117, sheet GJ-5 from Appendix B**; **Photos 7, 8, 9**).

If the lower orifice clogs, and the flow control manhole fills with water, use of the draining mechanism will quickly reduce the water level inside the manhole. The draining mechanism releases a removable watertight cap in the riser pipe, thus enabling flows to leave directly through the flow control manhole outlet and bypass the lower orifice, the upper orifice and the top of the riser pipe (**Operational Plan, Appendix A; Photos 8, 9**).

☐ Other, as noted below

7. Maintenance Requirements

Routine maintenance tables 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 C 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 C 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 C (proprietary structure)
- ☐ Special Maintenance requirements: None.

Note: Special maintenance Requirements Require Concurrence from ODOT SR Hydraulics Engineer.

8. Waste Material Handling

Material removed from the facility is defined as waste by DEQ. Refer to the roadwaste section of the ODOT Maintenance Yard Environmental Management System (EMS) Policy and Procedures Manual for disposal options: http://egov.oregon.gov/ODOT/HWY/OOM/EMS.shtml

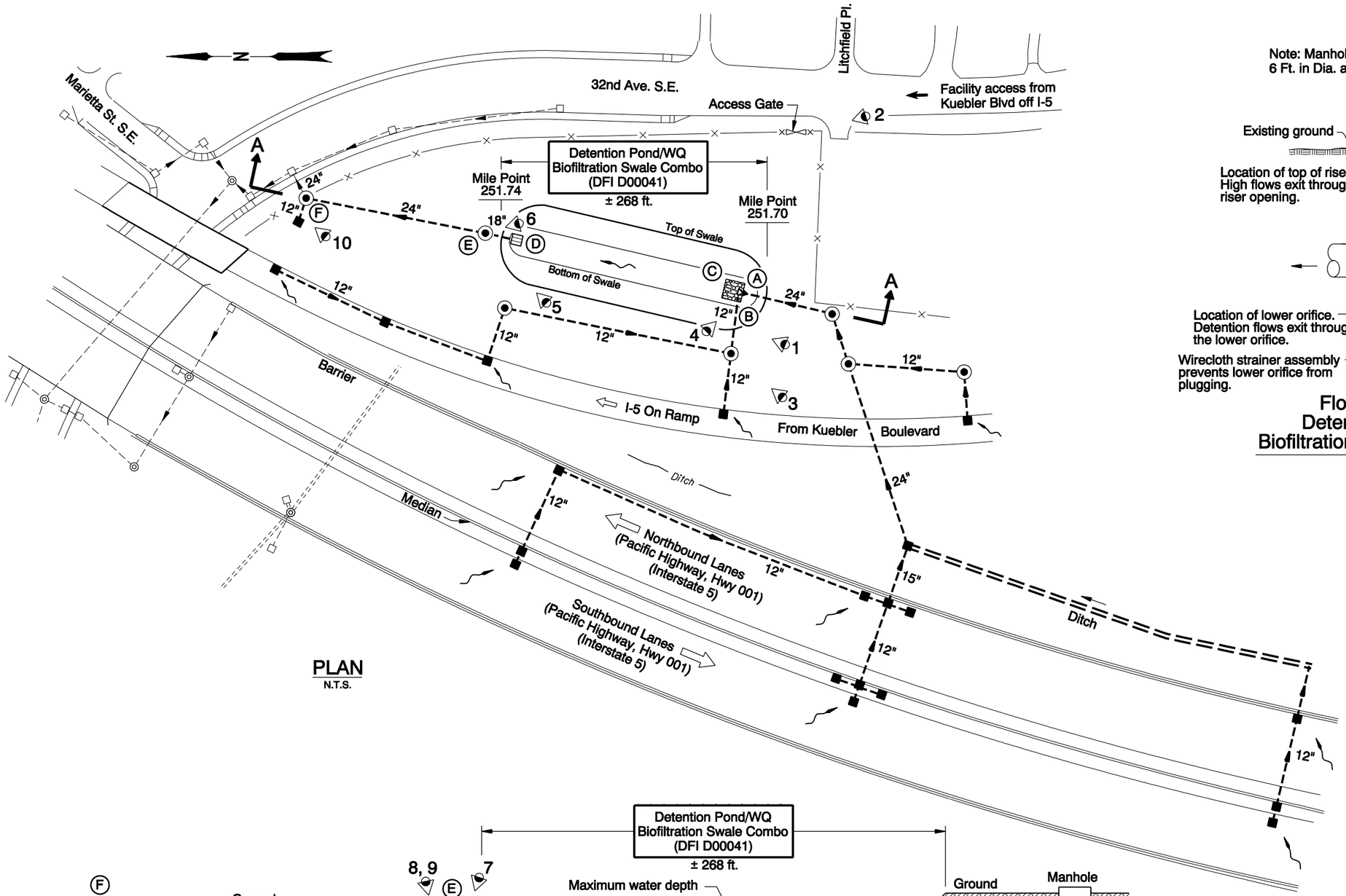
Contact any of the following for more detailed information about management of waste materials found on site:

ODOT Clean Water Unit	(503) 986-3008
ODOT Statewide Hazmat Coordinator	(503) 229-5129
ODOT Region Hazmat Coordinator	(503) 986-2647
ODEQ Northwest Region Office	(503) 229-5263

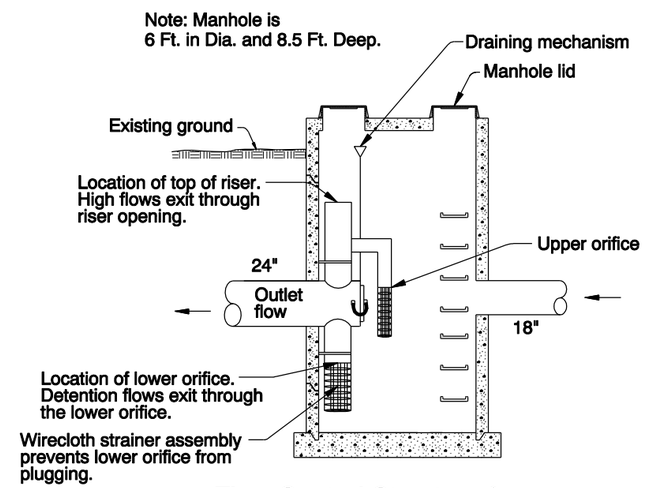
Appendix A

Content:

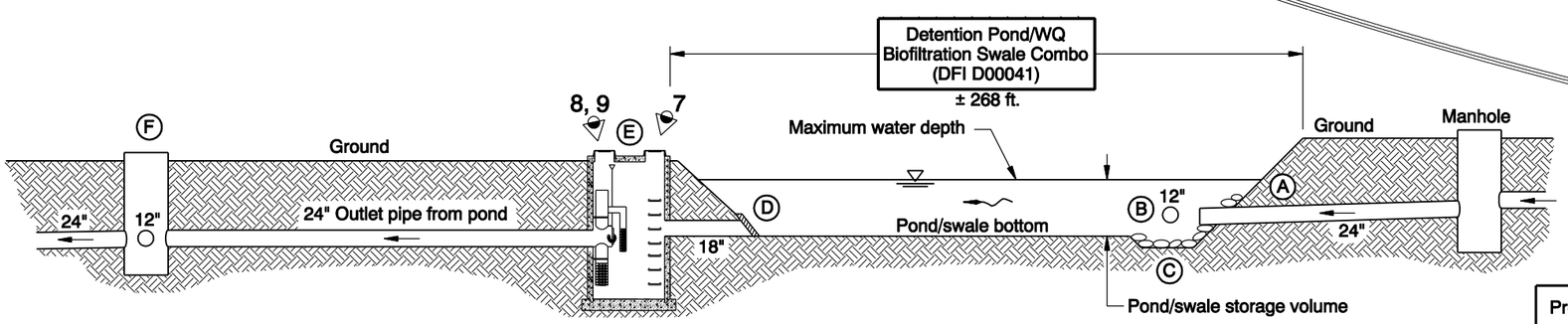
- **Operational Plan and Profile Drawing(s)**



PLAN
N.T.S.



Flow Control Structure for Detention Pond/Water Quality Biofiltration Swale Combo (DFI D00041)



SECTION A-A
N.T.S.

LEGEND:

- Photo Location / Direction
- (A) Facility Inlet A
- (B) Facility Inlet B
- (C) Flow Spreader
- (D) Type 'D' Ditch Inlet Structure
- (E) Flow Control Manhole - 6' Dia.
- (F) Manhole Connecting Area Drain To Conveyance Line
- Access Gate
- Manhole
- Inlet
- Storm Pipe (Facility)
- Storm Pipe
- Conveyance Direction
- Pavement / Facility Flow Path

Sht. 1 of 1

OREGON DEPARTMENT OF TRANSPORTATION

Prepared By: Wynee Hu

Drafted By: Jim Holeman

DFI D00041
MAINTENANCE DISTRICT 3 HWY 001
DETENTION POND/WQ BIOFILTRATION SWALE
PACIFIC HIGHWAY MP 251.70-251.74
MARION COUNTY

Appendix B

Content:

- **ODOT Project Plan Sheets**
  - ***Cover/Title Sheet***
  - ***Water Quality/Detention Plan Sheets***
  - ***Other Details***

Revised Plan
Sheets Incorporated

42V-23

INDEX OF SHEETS	
SHEET NO.	DESCRIPTION
1	Title Sheet
1A	Index Of Sheets Cont'd.
1A-2	Standard Drg. Nos.

Revised Plan
Sheets Incorporated

STATE OF OREGON
DEPARTMENT OF TRANSPORTATION

PLANS FOR PROPOSED PROJECT

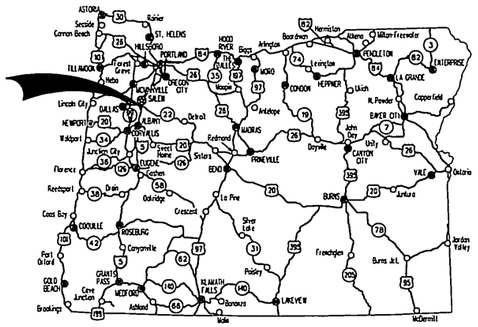
GRADING, DRAINAGE, STRUCTURE, PAVING, SIGNING, ILLUMINATION, SIGNALS, & ROADSIDE DEVELOPMENT

I-5 @ KUEBLER INTERCHANGE IMPROVEMENTS SEC.

PACIFIC HIGHWAY

MARION COUNTY

JANUARY 2009

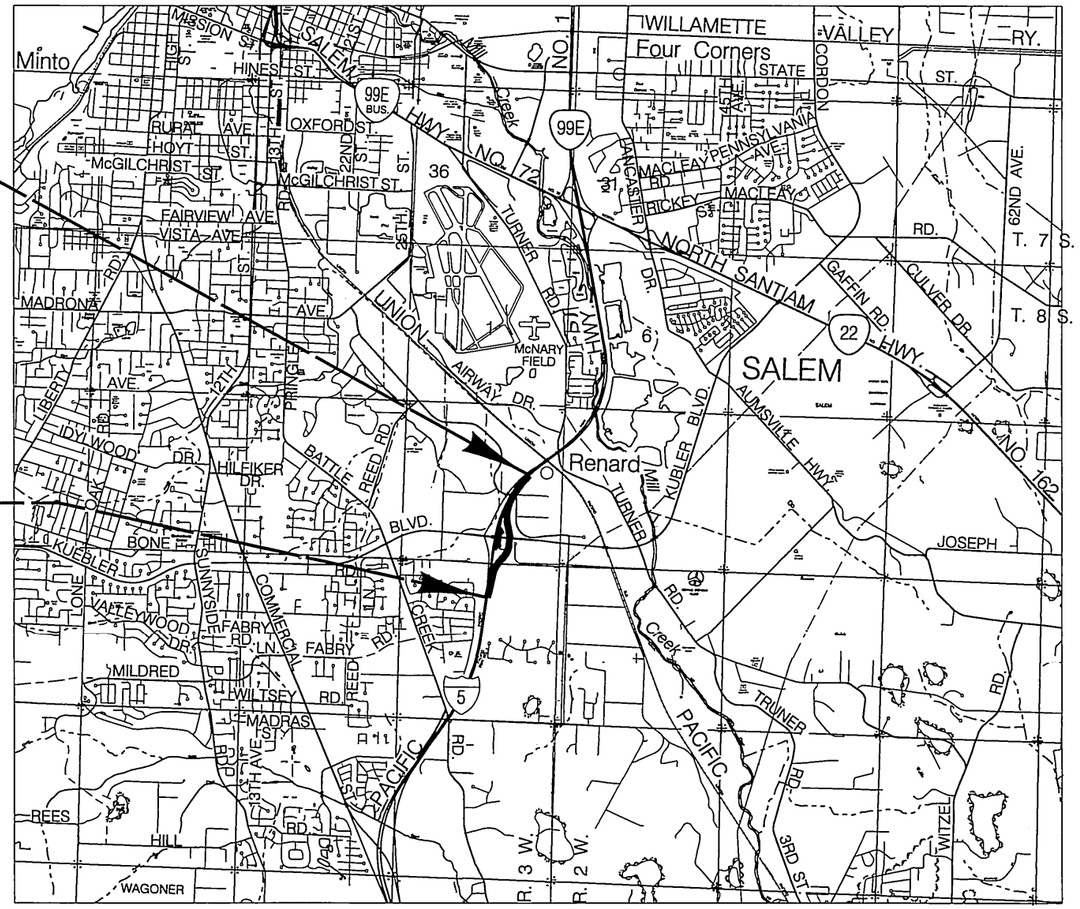


Overall Length Of Project - 0.87 Miles

ATTENTION:
Oregon Law Requires You To Follow Rules Adopted By The Oregon Utility Notification Center. Those Rules Are Set Forth In OAR 952-001-0010 Through OAR 952-001-0090. You May Obtain Copies Of The Rules By Calling The Center. (Note: The Telephone Number For The Oregon Utility Center Is (503) 232-1987.)

BEGINNING OF PROJECT
OTIA-S001(320)
STA. "L"468+91.84 (M.P. 252.08)

END OF PROJECT
OTIA-S001(320)
STA. "L"514+84.46 (M.P. 251.21)



T. 8 S.,
R. 3 W., W.M.

OREGON TRANSPORTATION INVESTMENT ACT

LET'S ALL WORK TOGETHER TO MAKE THIS JOB SAFE

OREGON TRANSPORTATION COMMISSION

Gail Achterman	CHAIR
Michael Nelson	VICE-CHAIR
Janice Wilson	COMMISSIONER
Alan Brown	COMMISSIONER
David Lohman	COMMISSIONER
Matthew L. Garrett	DIRECTOR OF TRANSPORTATION

These plans were developed using ODOT design standards. Exceptions to these standards, if any, have been submitted and approved by the ODOT Chief Engineer or their delegated authority.

By: 12-8-08
Signature & date

Steven B. Cooley - R2 Tech Center Manager
Print name and title

Concurrence by ODOT Chief Engineer

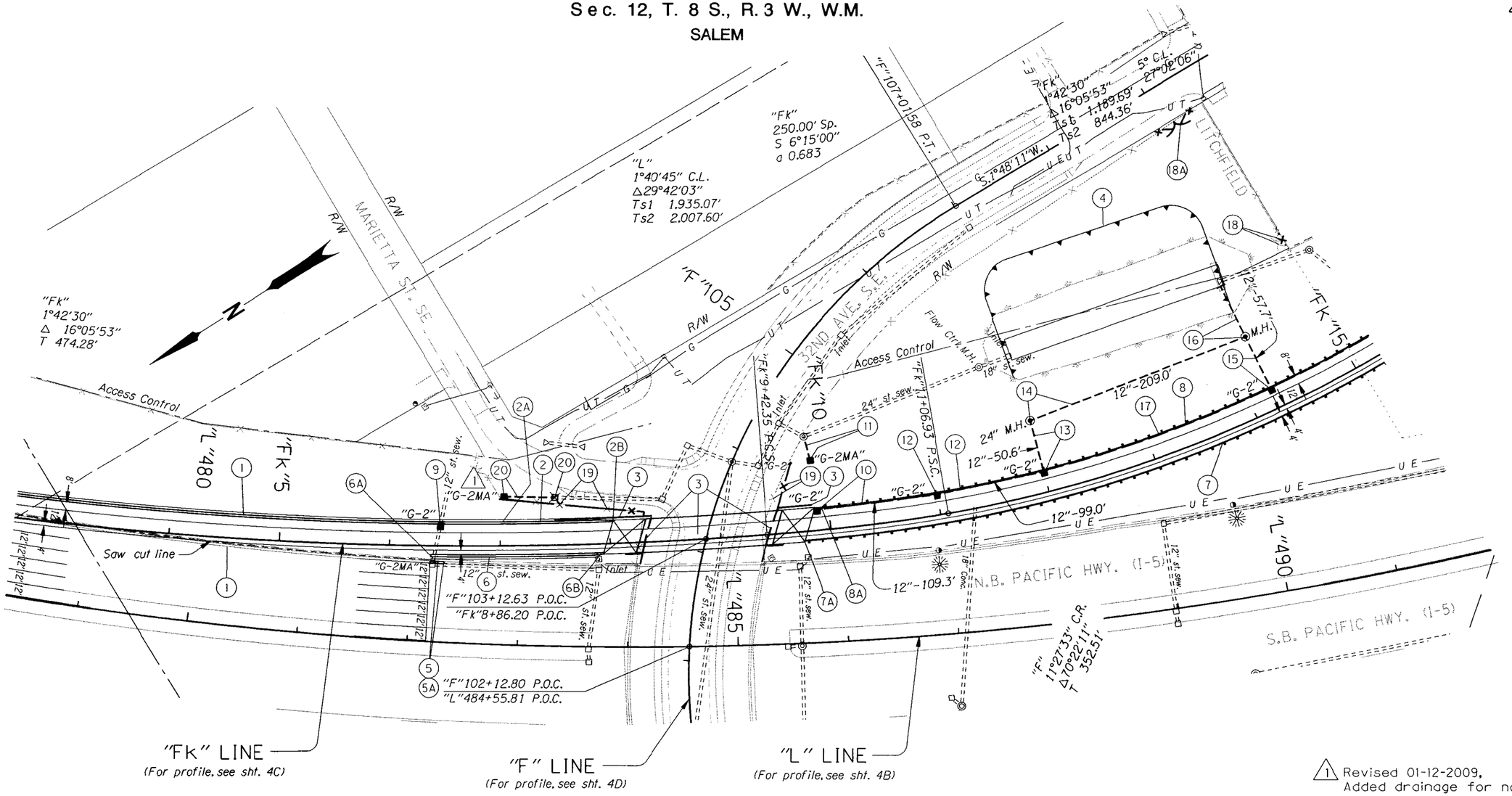
I-5 @ KUEBLER INTERCHANGE IMPROVEMENTS SEC.
PACIFIC HIGHWAY
MARION COUNTY

FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	STATE	1

CHARGE NUMBER: PE001237-010

STRUCTURAL DETAILS CHECKED MWS

Sec. 12, T. 8 S., R. 3 W., W.M.
SALEM



1 Revised 01-12-2009, Added drainage for note 20

REGISTERED PROFESSIONAL ENGINEER 14,931 Carol A. Cartwright OREGON JUL 25, 1990 CAROL A. CARTWRIGHT

RENEWS: 12-31-2009

OREGON DEPARTMENT OF TRANSPORTATION

REGION 2 TECH CENTER

I-5 @ KUEBLER INTERCHANGE IMPROVEMENTS SEC.
PACIFIC HIGHWAY
MARION COUNTY

Design Team Leader - Carol Cartwright
Designed By - John Lucas
Drafted By - Deborah Gentner-Day

GENERAL CONSTRUCTION

SHEET NO. 4

STRUCTURAL DETAILS CHECKED MAS

(1) See sht. 3, note 1
Remove & reinstall extg. conc. shldr. barrier

(2) Sta. "L"482+17.0, Rt. To Sta. "Fk"8+03.4, Lt.
Const. precast conc. shldr. barrier - 151'
(2A) Connect to reinstalled barrier
(2B) Const. conc. barrier transition to bridge rail - 14.2'
Plug scuppers
(For details, see sht. 2B-3)
(See drg. no. RD520)

(3) Sta. "Fk"8+27.0 To Sta. "Fk"9+48.5
Structure No. 20665
Const. structure - 121.5'
Rdwy. width - 28'
Reinf. panel at bridge ends
Const. retaining walls
(For drg. nos., see sht. 1A)

(4) Reconst. swale/detention pond
(For details, see sht. GJ-1)

(5) Sta. "L"482+17.0 To Sta. "L"482+29.5
Remove extg. conc. shldr. barrier - 12.5'
Const. conc. barrier trailing end terminal
(5A) Connect to extg. conc. shldr. barrier
(See drg. no. RD510)

(6) Sta. "Fk"6+37.0 To Sta. "Fk"7+94.2
Const. precast conc. shldr. barrier - 151'
(6A) Const. conc. barrier trailing end terminal
(6B) Const. conc. barrier transition to bridge rail - 6.2'
(For details, see sht. 2B-3)

(7) Sta. "Fk"9+75.4 To Sta. "Fk"22+00.8
Const. guardrail - 1,275' (type 2A)
Const. guardrail - 12.5' (type 3)
(7A) Const. guardrail transition to conc. bridge rail
(See drg. nos. RD400, RD405, RD410, RD415 & BR203)

(8) Sta. "Fk"9+86.4 To Sta. "K"699+30.6
Const. guardrail - 1,300' (type 2A)
Const. guardrail - 12.5' (type 3)
(8A) Const. guardrail transition to conc. bridge rail

(9) Sta. "Fk"6+45.75
Const. type "G-2" inlet
Connect to extg. 12" sew. pipe
(See drg. no. RD364)

(10) Sta. "Fk"9+88.6 To Sta. "Fk"10+99.4
Const. type "G-2" inlet
Inst. 12" sew. pipe - 109.3'
5' depth
(See drg. nos. RD300, RD326, RD380, RD384 & RD386)

(11) Sta. "Fk"9+87.0 To Sta. "Fk"9+83.1
Const. type "G-2MA" inlet
Inst. 12" sew. pipe - 22.5'
5' depth
Connect to extg. manhole
(See drg. nos. RD336 & RD364)

(12) Sta. "Fk"10+99.4 To Sta. "Fk"12+00
Const. type "G-2" inlet
Inst. 12" sew. pipe - 99.0'
5' depth

(13) Sta. "Fk"12+00 To Sta. "Fk"12+00
Const. type "G-2" inlet
Inst. 12" sew. pipe - 50.6'
5' depth
Inst. slope anchors
(See drg. no. RD330)

(14) Sta. "Fk"12+00 To Sta. "Fk"14+22.7
Const. manhole, 24" dia.
Inst. 12" sew. pipe - 209'
5' depth
(See drg. nos. RD342, RD344 & RD356)

(15) Sta. "Fk"14+22.7 To Sta. "Fk"14+22.7
Const. type "G-2" inlet
Inst. 12" sew. pipe - 57.7'
5' depth
Inst. slope anchors

(16) Sta. "Fk"14+22.7 To Sta. "Fk"14+22.7
Const. manhole
Inst. 12" sew. pipe - 51.5'
5' depth

(17) Const. P.C. Conc. drainage curb
(See drg. no. RD700)

(18) Remove extg. double "CL-6" locked gate
Const. type "CL-6" fence
Connect to extg. fence
(18A) Remove extg. fence
Reinstall double "CL-6" locked gate
Connect to extg. fence
(See drg. no. RD815)

(19) Remove extg. type "CL-6" fence
Rebuild type "CL-6" fence

△1 (20) Sta. "Fk"7+03.8 To Sta. "Fk"7+50.8
12" sew. pipe (in pl.)
Remove extg. inlet
Const. type "G-2MA" inlet
Extend - 46.5', 5' depth

△1 Revised 01-12-2009, Added note 20

REGISTERED PROFESSIONAL ENGINEER
14,931
Carol A. Cartwright
OREGON
JUL 25, 1990
CAROL A. CARTWRIGHT
RENEWS: 12-31-2009

OREGON DEPARTMENT OF TRANSPORTATION

REGION 2 TECH CENTER

I-5 @ KUEBLER INTERCHANGE IMPROVEMENTS SEC.
PACIFIC HIGHWAY
MARION COUNTY

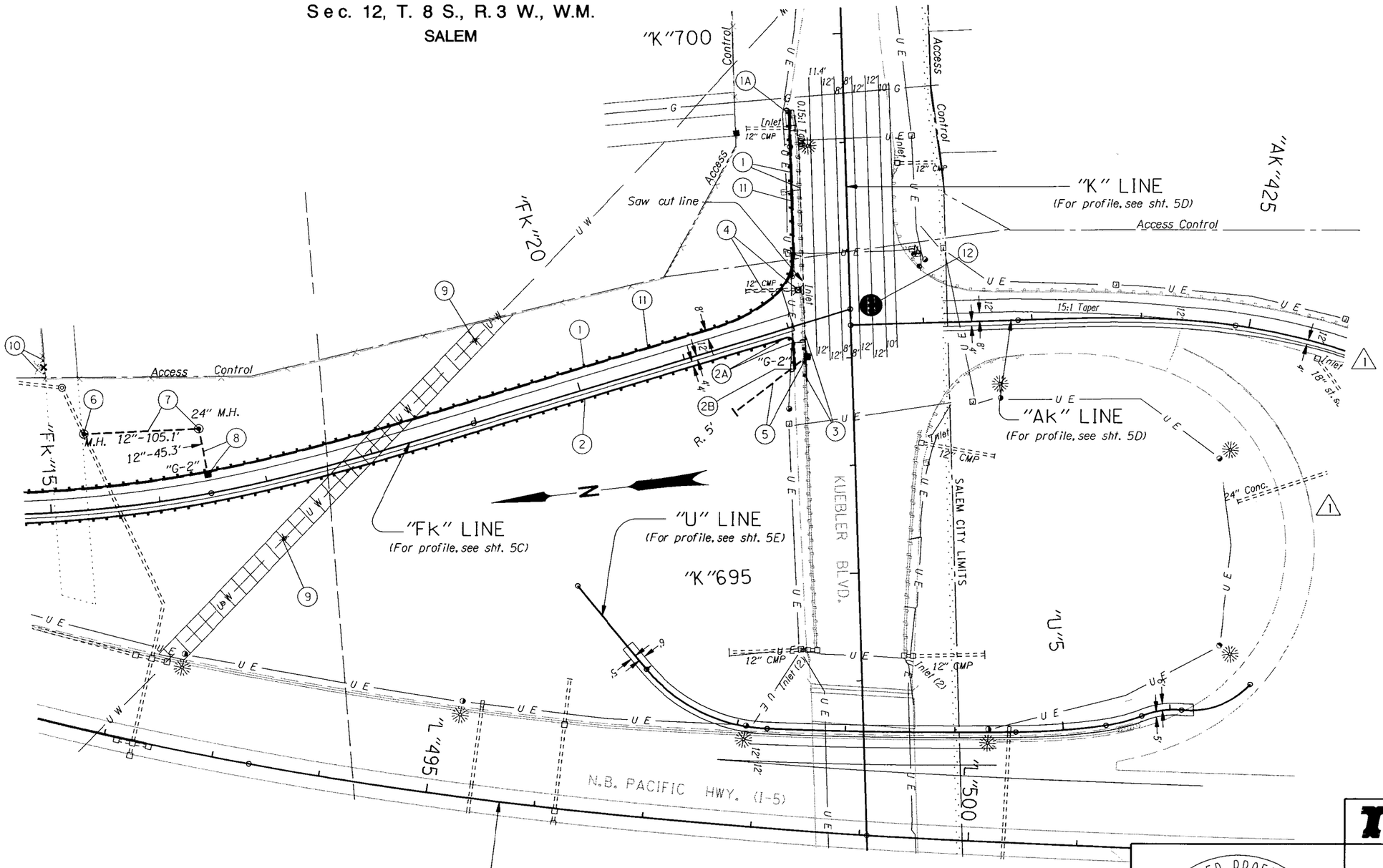
Design Team Leader - Carol Cartwright
Designed By - John Lucas
Drafted By - Deborah Gentner-Day

NOTES

SHEET NO. 4A

Sec. 12, T. 8 S., R. 3 W., W.M.
SALEM

42V-23



1 Revised 01-12-2009, Removed extg. guardrail

Restricted work area Shown thus: (For details, see sht. 2B)

Plug And Abandon Extg. Pipe Shown Thus:

1 See sht. 4A, note 8
Remove extg. guardrail - 150'
Const. guardrail
1A Const. guardrail terminal, non flared
Test level 3
(See drg. no. RD420)

2 See sht. 4A, note 7
Const. guardrail
2A Const. anchor - 3 (type 1 mod.)
2B Inst. end piece (type B)

3 Sta. "K"696+78.5 To Sta. "K"697+70.9±
Remove extg. guardrail - 100'
Const. guardrail terminal, non-flared
Test level 3
Inst. shin protectors
Flare rate=0, W=1', E=0
(For details, see sht. 2B)
(See drg. no. RD420)

4 Sta. "K"697+65
Remove inlet
Plug & abandon extg. pipe

5 Sta. "K"697+02.4
Const. type "G-2" inlet
Inst. 12" sew. pipe - 86.5'
5' depth
Inst. slope anchors

6 Sta. "Fk"15+36.6
Const. manhole

7 Sta. "Fk"15+36.6 To Sta. "Fk"16+47.6
Const. manhole, 24" dia.
Inst. 12" sew. pipe - 105.1'
5' depth

8 Sta. "Fk"16+47.6 To Sta. "Fk"16+47.6
Const. type "G-2" inlet
Inst. 12" sew. pipe - 45.3'
5' depth
Inst. slope anchors

9 Adjust water valve box - 2

10 See sht. 4A, Note 18

11 See sht. 4A, Note 17
Const. P.C. Conc. drainage curb

12 Remove extg. traffic signal
Inst. traffic signal
(For drg. nos., see sht. 1A)

REGISTERED PROFESSIONAL ENGINEER
14,931
Carol A. Cartwright
OREGON
JUL 25, 1990
CAROL A. CARTWRIGHT
RENEWS: 12-31-2009

OREGON DEPARTMENT OF TRANSPORTATION

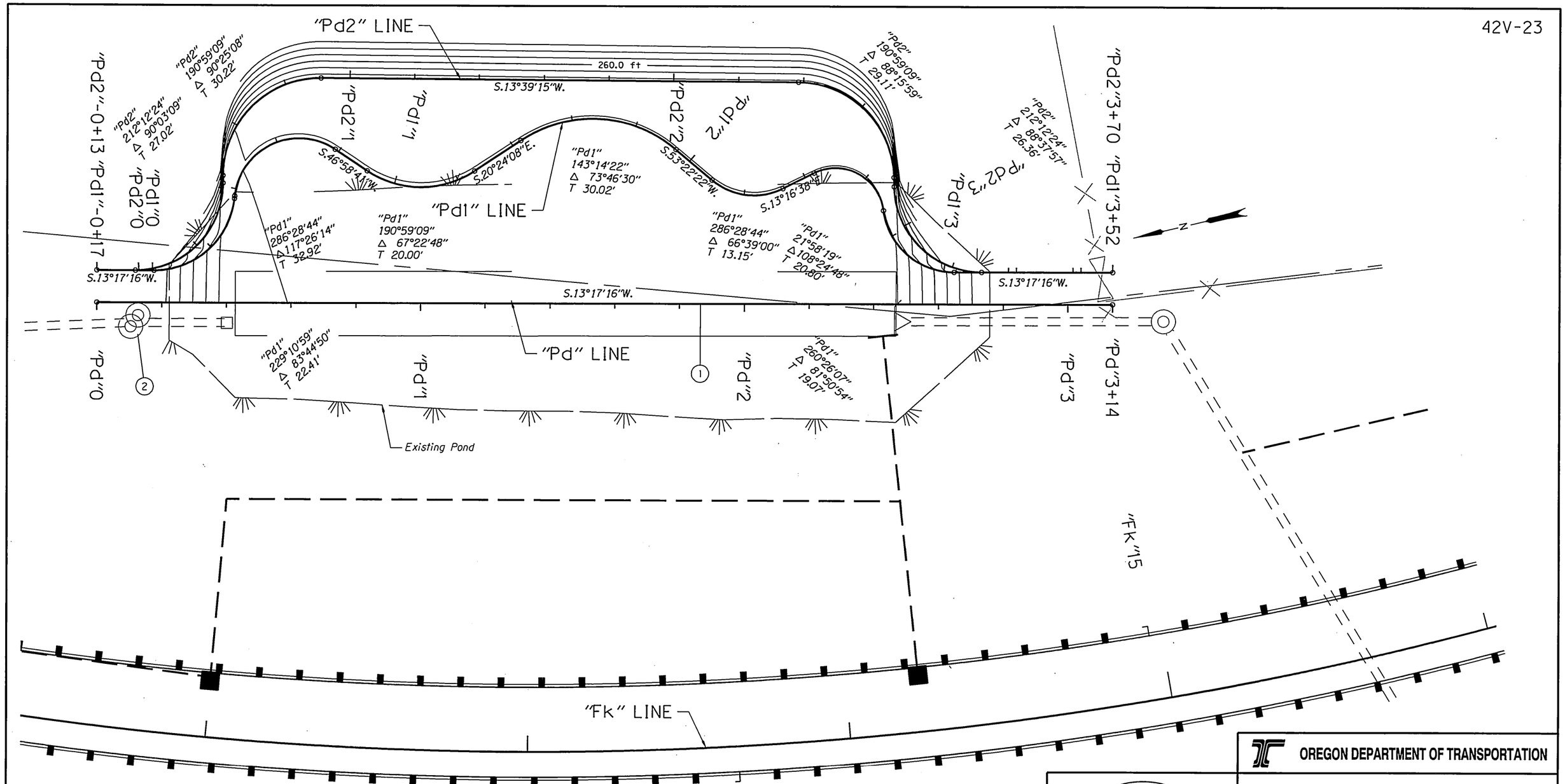
REGION 2 TECH CENTER

I-5 @ KUEBLER INTERCHANGE IMPROVEMENTS SEC.
PACIFIC HIGHWAY
MARION COUNTY

Design Team Leader - Carol Cartwright
Designed By - John Lucas
Drafted By - Deborah Gentner-Day

GENERAL CONSTRUCTION

SHEET NO. 5A



(1) Sta. "Pd"0+38.90 to Sta. "Pd"2+45.57
Const. swale/detention pond
Biofiltration Soil Media - 192 cu. yds.
Gen. Exc. - 2260 cu. yds.

(2) Modify existing flow control device.
For details, see sheet GJ-3.

REGISTERED PROFESSIONAL ENGINEER
17807
OREGON
JULY 25, 1995
CHRIS CARMAN

RENEWAL DATE: 12-31-2009

OREGON DEPARTMENT OF TRANSPORTATION

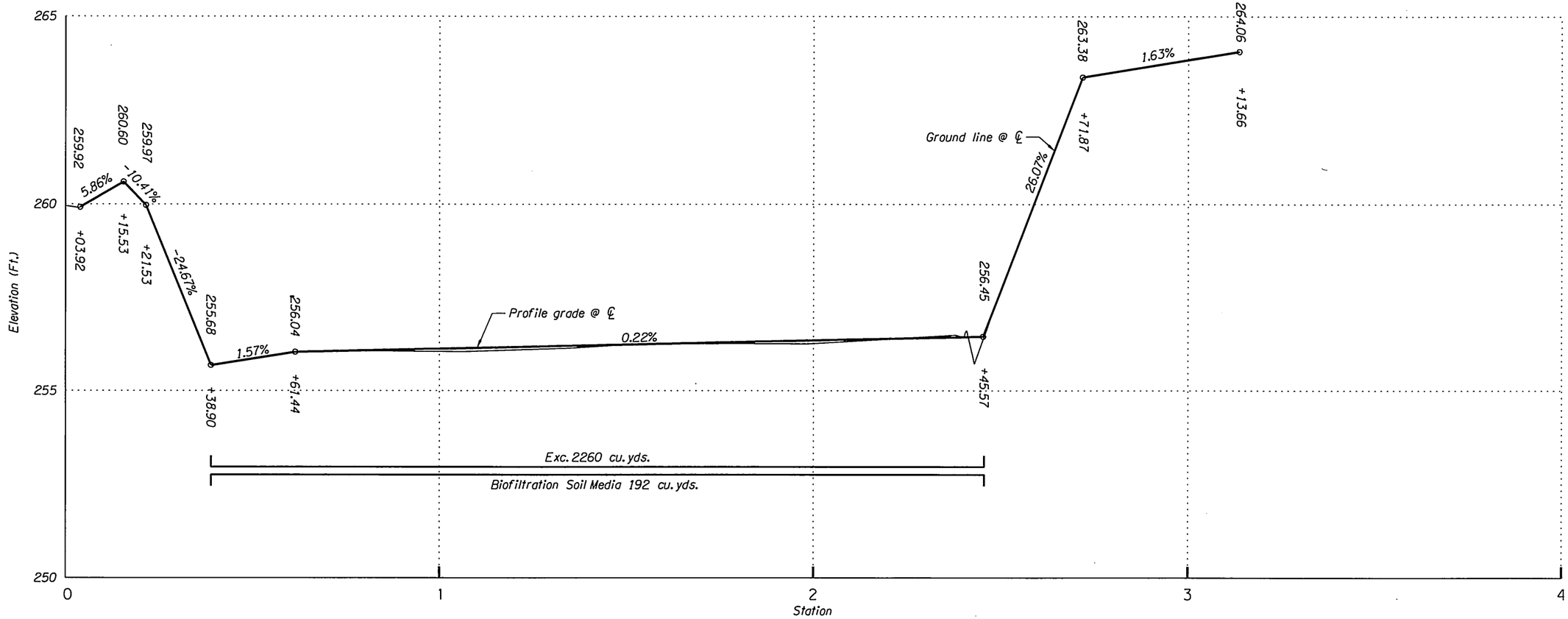
REGION 2 TECH CENTER

I-5 @ KUEBLER INTERCHANGE IMPROVEMENTS SEC.
PACIFIC HIGHWAY
MARION COUNTY

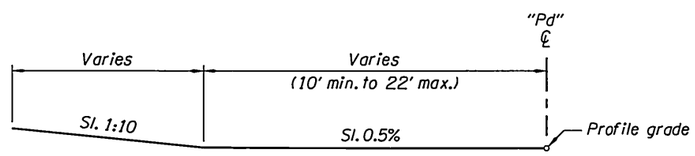
Reviewed By - Bruce Carmichael, P.E.
Designed By - Chris Carman, P.E.
Drafted By - Sandra Gish

STORMWATER WATER QUALITY PLAN

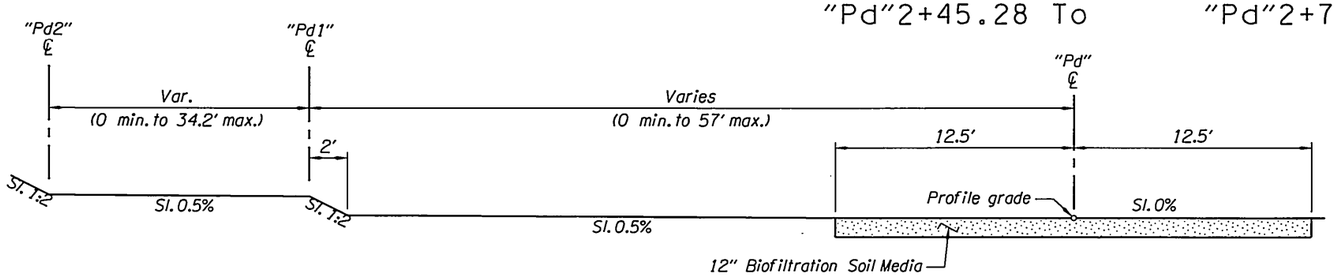
STRUCTURE NO. ---
BDS DWG. NO. ---
SHEET NO. GJ-1



"Pd" LINE PROFILE



STA. "Pd"0+15.53 To STA. "Pd"0+38.90 (Taper section)
"Pd"2+45.28 To "Pd"2+71.87 (Taper section)



STA. "Pd"0+38.90 To STA. "Pd"2+45.28

SWALE TYPICAL SECTIONS

NOTE:
Side-slopes are shown as vert. to horiz.

REGISTERED PROFESSIONAL ENGINEER 17807 OREGON JULY 25, 1995 CHRIS CARMAN

RENEWAL DATE: 12-31-2009

OREGON DEPARTMENT OF TRANSPORTATION

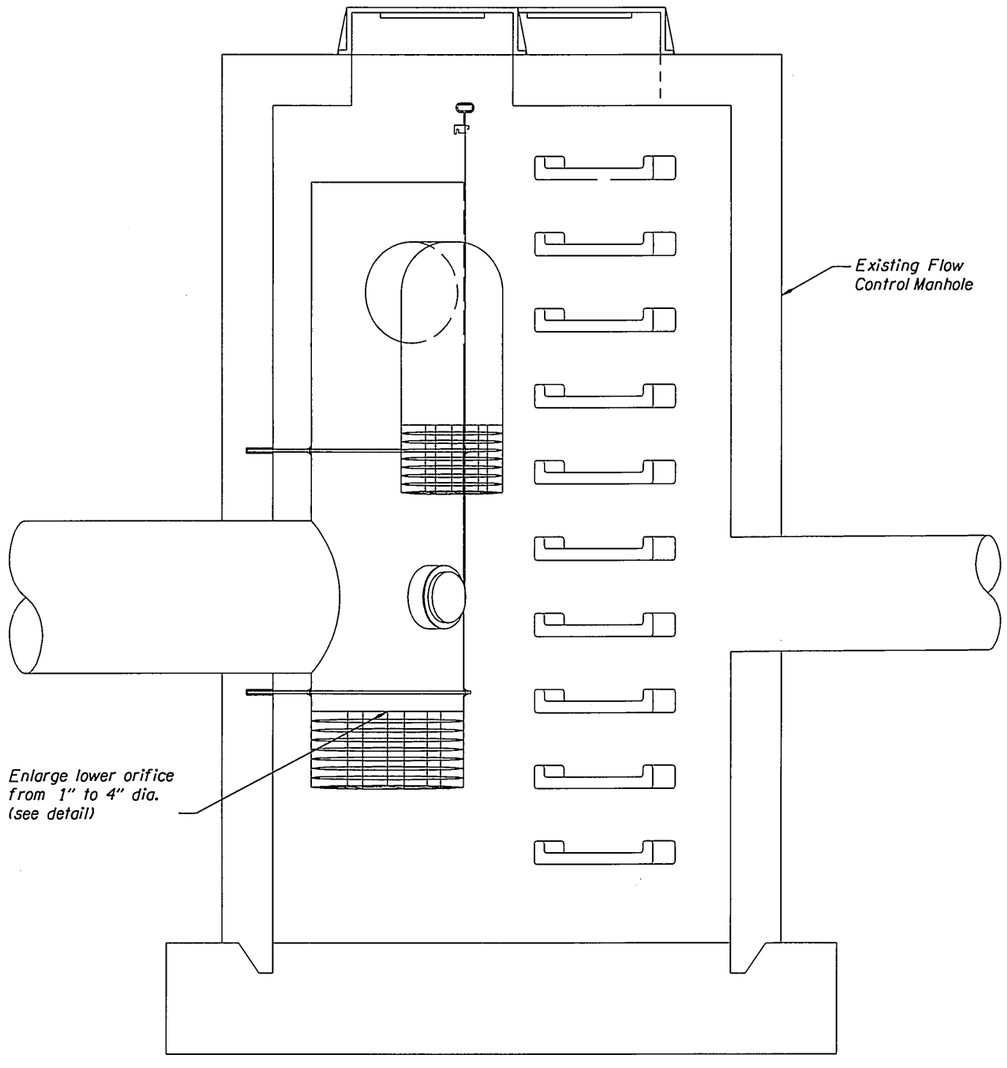
REGION 2 TECH CENTER

I-5 @ KUEBLER INTERCHANGE IMPROVEMENTS SEC.
PACIFIC HIGHWAY
MARION COUNTY

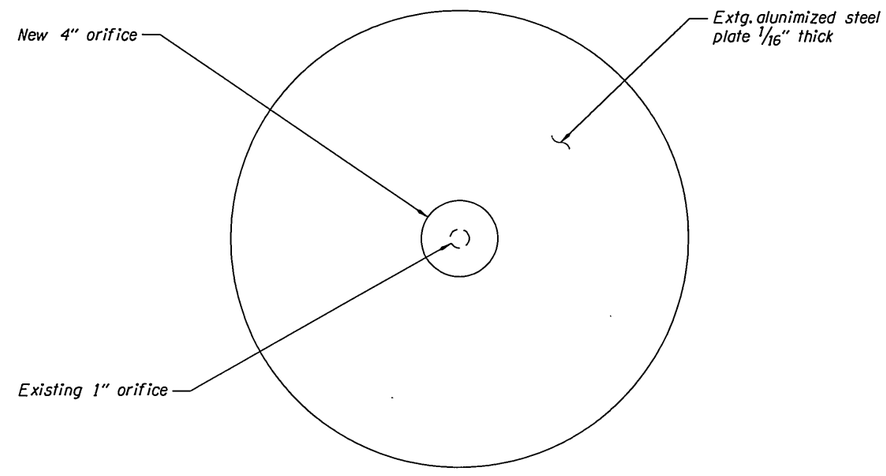
Reviewed By - Bruce Carmichael, P.E.
Designed By - Chris Carman, P.E.
Drafted By - Sandra Gish

STORMWATER WATER QUALITY PROFILE

STRUCTURE NO. ---
BDS DWG. NO. ---
SHEET NO. GJ-2



EXISTING FLOW CONTROL MANHOLE DETAIL



BOTTOM ALUNIMIZED STEEL
PLATE DETAIL

REGISTERED PROFESSIONAL ENGINEER
17807
OREGON
JULY 25, 1995
CHRIS CARMAN

RENEWAL DATE: 12-31-2009

OREGON DEPARTMENT OF TRANSPORTATION

REGION 2 TECH CENTER

I-5 @ KUEBLER INTERCHANGE IMPROVEMENTS SEC.
PACIFIC HIGHWAY
MARION COUNTY

Reviewed By - Bruce Carmichael, P.E.
Designed By - Chris Carman, P.E.
Drafted By - Sandra Gish

STORMWATER WATER QUALITY DETAILS

STRUCTURE NO. ---
BDS DWG. NO. ---
SHEET NO. GJ-3

38V-117

INDEX OF SHEETS	
SHEET NO.	DESCRIPTION
1	Title Sheet
1A	Index Of Sheets Cont'd.
1A-2	Index Of Sheets Cont'd.
1A-3	Index Of Sheets Cont'd.
1A-4	Standard Drawing Nos.
1B	Layout Sheet

STATE OF OREGON

DEPARTMENT OF TRANSPORTATION

PLANS FOR PROPOSED PROJECT

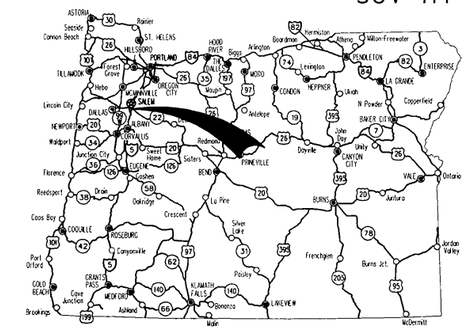
GRADING, DRAINAGE, STRUCTURES, PAVING, SIGNING, ILLUMINATION, SIGNALS & ROADSIDE DEVELOPMENT

I-5: N. SANTIAM HWY. - KUEBLER BLVD. (SALEM) SEC.

PACIFIC HIGHWAY

MARION COUNTY

OCTOBER 2005



Overall Length Of Project - 4.02 km (2.49 Miles)

ATTENTION:
Oregon Law Requires You To Follow Rules Adopted By The Oregon Utility Notification Center. Those Rules Are Set Forth In OAR 952-001-0010 Through OAR 952-001-0090. You May Obtain Copies Of The Rules By Calling The Center. (Note: The Telephone Number For The Oregon Utility Center Is (503) 232-1987.)

OREGON TRANSPORTATION INVESTMENT ACT

LET'S ALL WORK TOGETHER TO MAKE THIS JOB SAFE

OTIA-NH-IM-S001(196)
BEGINNING OF PROJECT
STA. "L" 10+280 (M.P. 254.58)

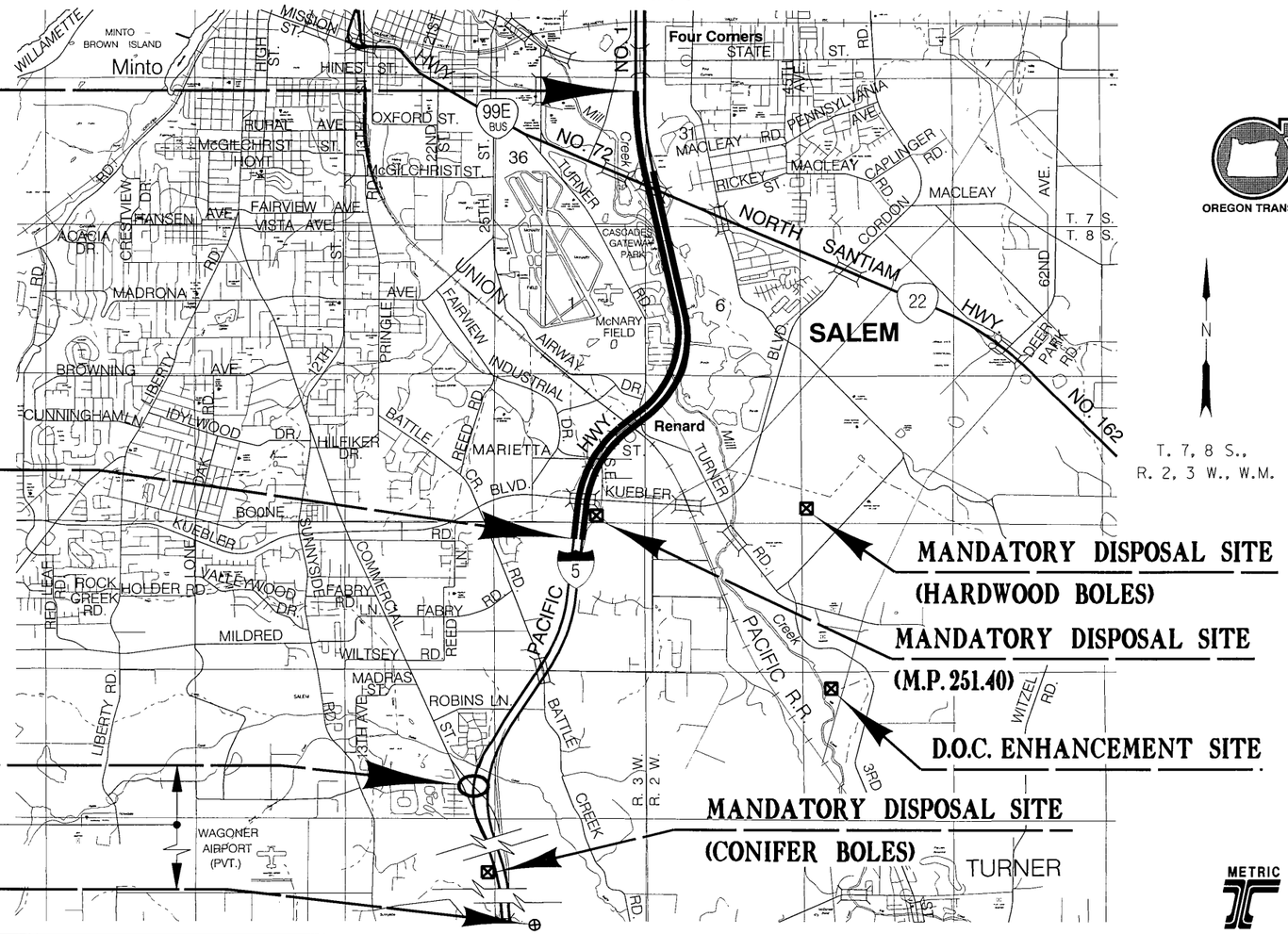
END OF WORK AREA
STA. "L" 15+682.3 (M.P. 251.22)

NO WORK AREA

OTIA-NH-IM-S001(196)
END OF PROJECT
STA. "LS" 18+664.61 (M.P. 249.38)

Approx. 28 Mi. South

PROSPECTIVE MATERIAL SOURCE
(M.P. 221.13)



OREGON TRANSPORTATION COMMISSION

Stuart Foster	CHAIRMAN
Gail L. Achterman	COMMISSIONER
Mike Nelson	COMMISSIONER
Randall Papé	COMMISSIONER
Janice J. Wilson	COMMISSIONER
Bruce A. Warner	DIRECTOR OF TRANSPORTATION

REGISTERED PROFESSIONAL ENGINEER 13,704 OREGON JULY 16, 1987 CATHERINE M. NELSON Expires Dec. 31, 2006

Catherine M. Nelson
TECHNICAL SERVICES MANAGING ENGINEER

METRIC

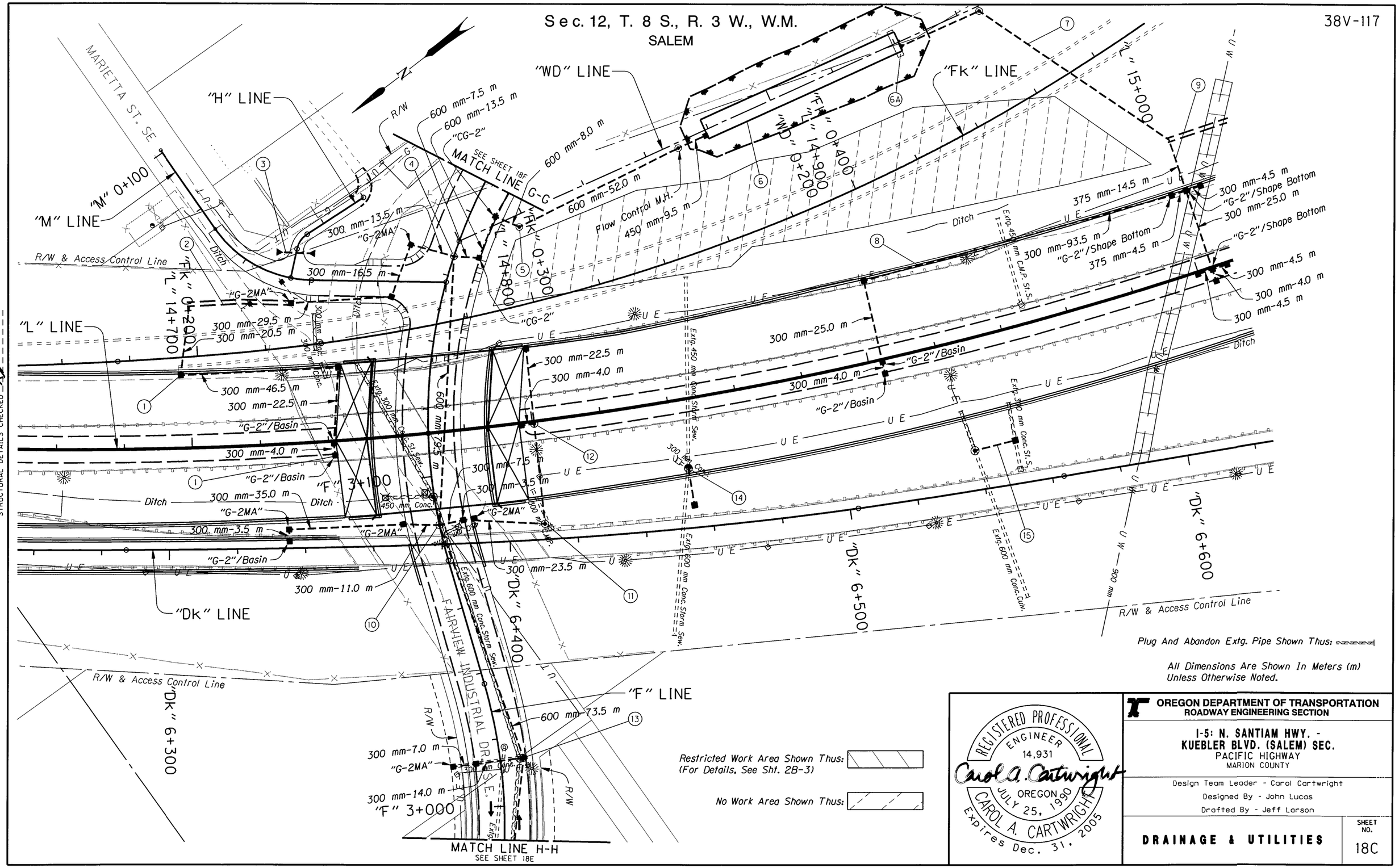
I-5: N. SANTIAM HWY. - KUEBLER BLVD. (SALEM) SEC. PACIFIC HIGHWAY MARION COUNTY		
FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	OTIA-NH-IM-S001(196)	1

PE000950

F:\ODOT_DATA\Projects\13284Kuebler\13284r2.tsl 8/2/2005 12:26:38 PM hwye07x

1:1000 - 1

Sec. 12, T. 8 S., R. 3 W., W.M.
SALEM



Plug And Abandon Extg. Pipe Shown Thus:

All Dimensions Are Shown In Meters (m)
Unless Otherwise Noted.

Restricted Work Area Shown Thus:
(For Details, See Sht. 2B-3)

No Work Area Shown Thus:

STRUCTURAL DETAILS CHECKED

REGISTERED PROFESSIONAL ENGINEER
14,931
Carol A. Cartwright
OREGON
JULY 25, 1990
CAROL A. CARTWRIGHT
Expires Dec. 31, 2005

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

I-5: N. SANTIAM HWY. -
KUEBLER BLVD. (SALEM) SEC.
PACIFIC HIGHWAY
MARION COUNTY

Design Team Leader - Carol Cartwright
Designed By - John Lucas
Drafted By - Jeff Larson

DRAINAGE & UTILITIES

SHEET NO. 18C

(1) Sta. "L"14+697.2 To Sta. "L"14+744.4
Const. Type "G-2" Open Grade HMAC Inlet
With Basin - 2
0.45 m Deep
Const. Type "G-2" Open Grade HMAC Inlet - 2
Shape Bottom
Adjust Inlet For Wearing Course - 3
Inst. 300 mm Sew. Pipe - 93.5 m
1.5 m Depth

(2) Const. Ditch
"V" Bottom, 1:3 Slopes
Dt. Exc. - 33 m^3

(3) Sta. "H"0+007.6
Inst. 450 mm Culv. Pipe - 11.5 m
1.5 m Depth
Const. Paved End Slope, Lt. & Rt.

(4) Sta. "F"3+150.2 To Sta. "F"3+213.2
Const. Manhole
Const. Type "CG-2" Inlet - 3
Shape Bottom
Const. Type "G-2MA" Inlet With Basin - 2
0.45 m Deep
Inst. 300 mm Sew. Pipe - 59.5 m
1.5 m Depth
Inst. 600 mm Sew. Pipe - 29.0 m
1.5 m Depth

(5) Sta. "Fk"3+150.2 To Sta. "Fk"3+213.2
Const. Manhole
Const. Flow Control Manhole
Const. Type "D Mod." Inlet With Basin
0.45 m Deep
Inst. 450 mm Sew. Pipe - 9.0 m
1.5 m Depth
Inst. 600 mm Sew. Pipe - 52.0 m
1.5 m Depth
(For Details, See Sht. GJ-2)

(6) Const. Water Quality Swale
Const. Flow Spreader
(For Details, See Sht. GJ-2 & GJ-7A)

(7) See Sht. 18F, Note 11

(8) Sta. "L"14+904.0 To Sta. "L"14+999.7
Const. Type "G-2" Open Grade HMAC Inlet
With Basin - 2
0.45 m Deep
Const. Type "G-2" Open Grade HMAC Inlet
Shape Bottom
Adjust Inlet For Wearing Course - 2
Inst. 300 mm Sew. Pipe - 122.5 m
1.5 m Depth

(9) See Sht. 19A, Note 1

(10) Sta. "F"3+087.0 To Sta. "F"3+167.1
Const. Manhole
Const. Type "G-2" Inlet
With Basin
0.45 m Deep
Const. Type "CG-2" Inlet
Shape Bottom
Const. Type "G-2MA" Inlet With Basin - 3
0.45 m Deep
Inst. 300 mm Sew. Pipe - 84.0 m
1.5 m Depth
Inst. 600 mm Sew. Pipe - 79.5 m
1.5 m Depth

(11) Sta. "L"14+800.5
Const. Manhole
Inst. 300 mm Sew. Pipe - 30.0 m
1.5 m Depth
Connect To Extg. 300 mm Sew. Pipe

(12) Sta. "L"14+800.5
Const. Manhole
Const. Type "G-2" Open Grade HMAC Inlet
With Basin - 2
0.45 m Deep
Adjust Inlet For Wearing Course - 2
Inst. 300 mm Sew. Pipe - 26.5 m
1.5 m Depth

(13) Sta. "F"3+013.5 To Sta. "F"3+087.0
Const. Manhole
Const. Type "CG-2" Inlet
Shape Bottom
Const. Type "G-2MA" Inlet With Basin
0.45 m Deep
Inst. 300 mm Sew. Pipe - 21.0 m
1.5 m Depth
Inst. 600 mm Sew. Pipe - 73.5 m
1.5 m Depth

(14) Sta. "L"14+842.8
Major Adjust Manhole
Const. Type "G-2MA" Inlet With Basin
0.45 m Deep
Inst. 300 mm Sew. Pipe - 11.0 m
1.5 m Depth

(15) Sta. "L"14+923.9 To Sta. "L"14+935.7
Const. Manhole
Const. Type "G-2MA" Inlet With Basin
0.45 m Deep
Inst. 300 mm Sew. Pipe - 12.5 m
1.5 m Depth

REGISTERED PROFESSIONAL ENGINEER
14,931
Carol A. Cartwright
OREGON
JULY 25, 1990
CAROL A. CARTWRIGHT
Expires Dec. 31, 2005

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

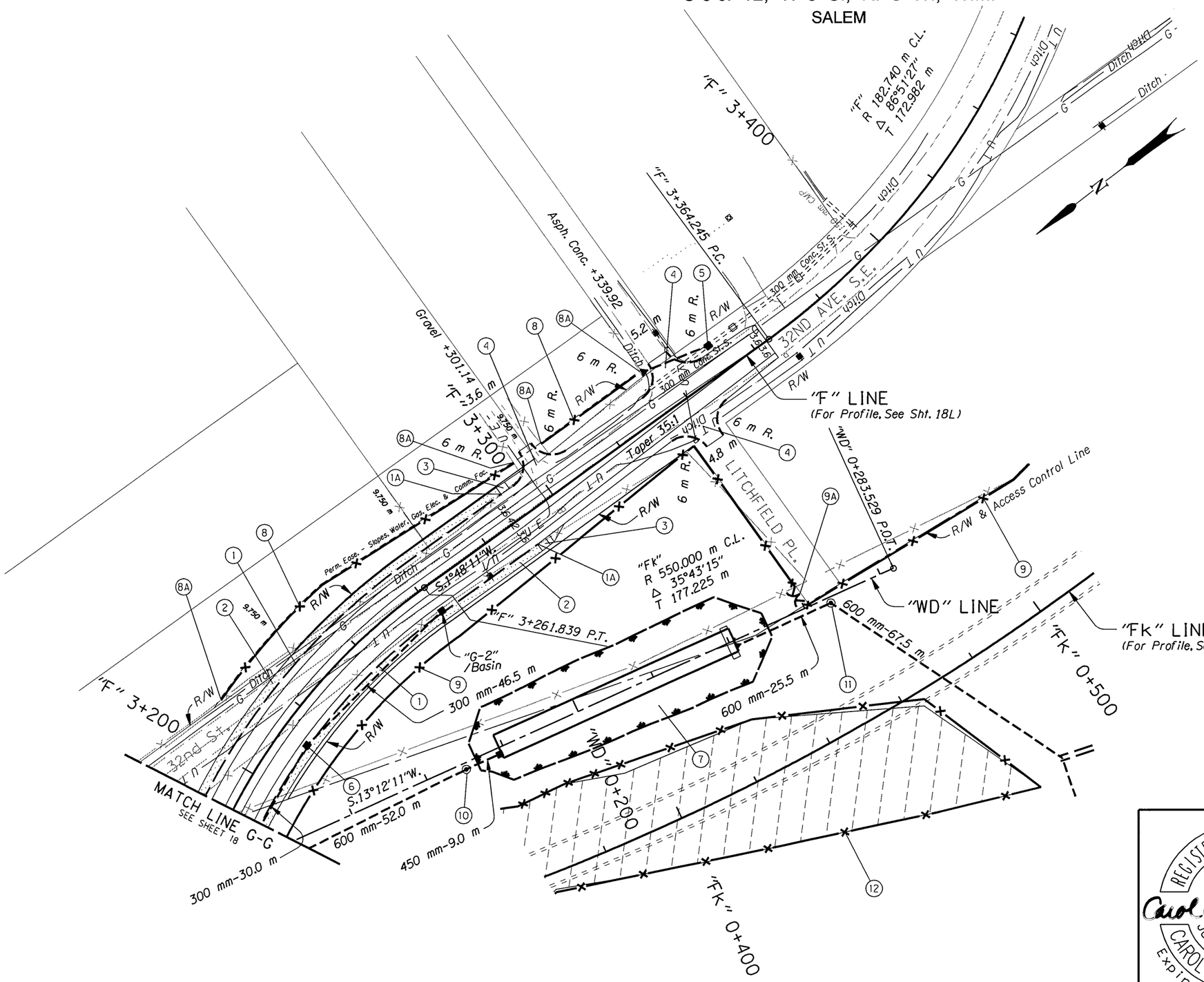
I-5: N. SANTIAM HWY. -
KUEBLER BLVD. (SALEM) SEC.
PACIFIC HIGHWAY
MARION COUNTY

Design Team Leader - Carol Cartwright
Designed By - John Lucas
Drafted By - Jeff Larson

NOTES

SHEET NO.
18D

Sec. 12, T. 8 S., R. 3 W., W.M.
SALEM



1 Const. Curb & Gutter
1A Const. Curb Ending - 2

2 Const. P.C. Conc. Sidewalk

3 Const. Ramp At End Of Walk - 2
(For Details, See Sht. 2B-4)

4 Const. Approach - 3

5 Sta. "F"3+334.5 To Sta. "F"3+351.5
Const. Type "G-2MA" Inlet With Basin
0.45 m Deep
Connect To Extg. 300 mm Sew. Pipe
Inst. 300 mm Sew. Pipe - 17.5 m
1.5 m Depth
Const. Paved End Slope

6 Sta. "F"3+213.2 To Sta. "F"3+261.9
Const. Type "CG-2" Inlet With Basin
0.45 m Deep
Const. Type "CG-2" Inlet
Shape Bottom
Inst. 300 mm Sew. Pipe - 76.5 m
1.5 m Depth

7 See Sht. 18D, Note 6
Const. Water Quality Swale

8 Sta. "F"3+214.6 To Sta. "F"3+334.7
Const. Type CL-6 Fence
8A Connect To Extg. Fence

9 See Sht. 18B, Note 16
Const. Type CL-6 Fence
9A Inst. Double Type "CL-6" Locked Gate - 4.2 m

10 See Sht. 18D, Note 5
Const. Manhole
Inst. 600 mm Sew. Pipe

11 Sta. "Fk"0+430.6 To Sta. "L"15+004.3
Const. Manhole
Inst. 600 mm Sew. Pipe - 93.0 m
1.5 m Depth
Const. Paved End Slope

12 Const. Temp. Type Orange Plastic Fence

No Work Area Shown Thus:

All Dimensions Are Shown In Meters (m)
Unless Otherwise Noted.

REGISTERED PROFESSIONAL ENGINEER
14,931
Carol A. Cartwright
OREGON
JULY 25, 1990
CAROL A. CARTWRIGHT
Expires Dec. 31, 2005

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

I-5: N. SANTIAM HWY. -
KUEBLER BLVD. (SALEM) SEC.
PACIFIC HIGHWAY
MARION COUNTY

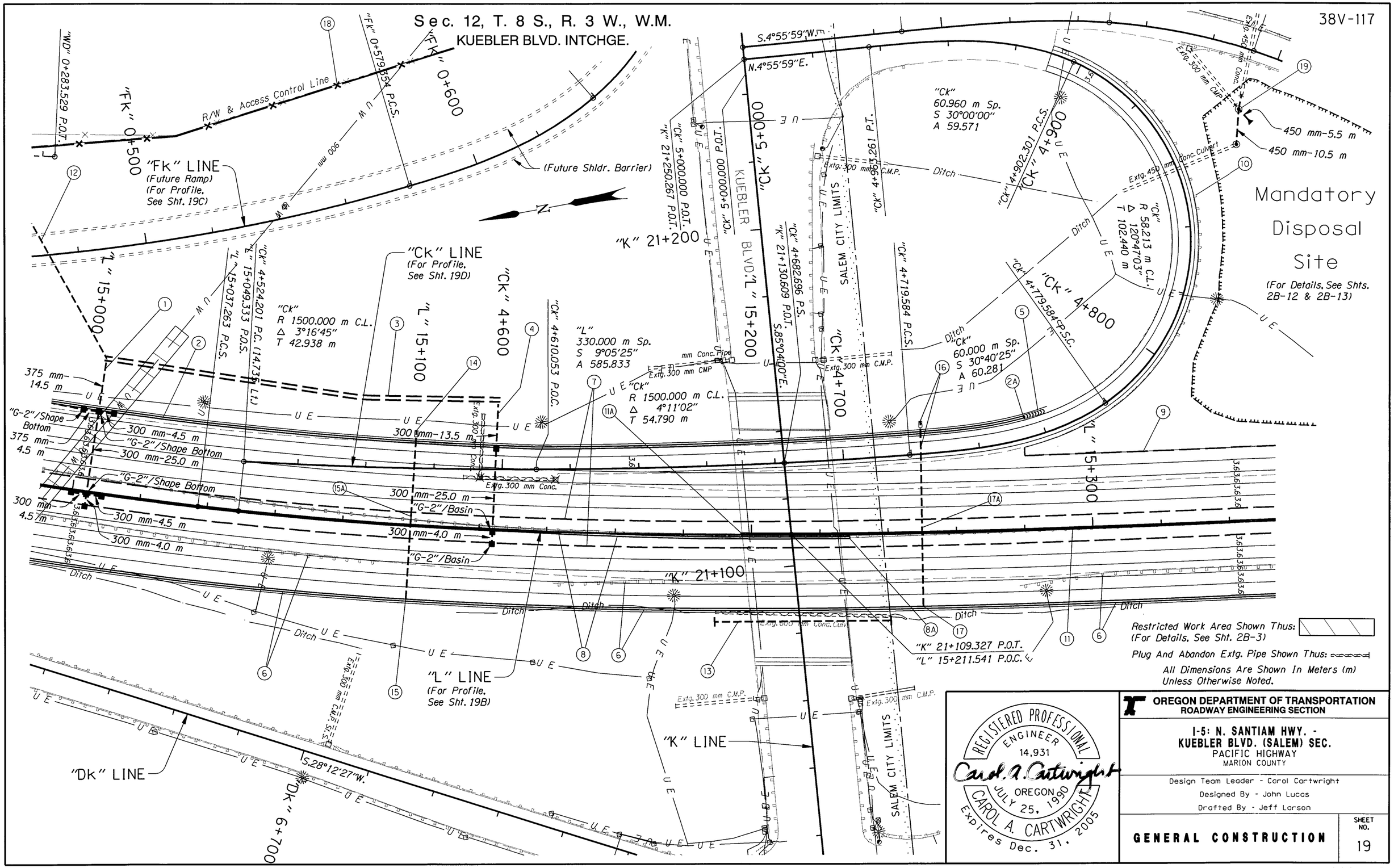
Design Team Leader - Carol Cartwright
Designed By - John Lucas
Drafted By - Jeff Larson

GENERAL CONSTRUCTION

SHEET NO. 18F

Sec. 12, T. 8 S., R. 3 W., W.M.

KUEBLER BLVD. INTCHGE.



Restricted Work Area Shown Thus:
(For Details, See Sht. 2B-3)

Plug And Abandon Extg. Pipe Shown Thus:

All Dimensions Are Shown In Meters (m) Unless Otherwise Noted.

REGISTERED PROFESSIONAL ENGINEER 14,931 OREGON JULY 25, 1990 CAROL A. CARTWRIGHT Expires Dec. 31, 2005

Carol A. Cartwright

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

I-5: N. SANTIAM HWY. - KUEBLER BLVD. (SALEM) SEC.
PACIFIC HIGHWAY
MARION COUNTY

Design Team Leader - Carol Cartwright
Designed By - John Lucas
Drafted By - Jeff Larson

GENERAL CONSTRUCTION

SHEET NO. 19

(1) Sta. "L" 14+999.7 To Sta. "L" 15+008.9
Const. Type "G-2" Open Grade HMAC Inlet
With Basin - 4
0.45 m Deep
Const. Type "G-2" Open Grade HMAC Inlet - 3
Shape Bottom
Adjust Inlet For Wearing Course - 4
Inst. 300 mm Sew. Pipe - 42.5 m
1.5 m Depth
Inst. 375 mm Sew. Pipe - 19.0 m
1.5 m Depth

(2) See Sht. 18B, Note 8
Const. Precast Conc. Shldr. Barrier
(2A) Connect To Impact Attenuator
(For Details, See Sht. 2B-5)

(3) Const. Ditch
"V" Bottom, 1:3 Slopes
Dt. Exc. - 335 m^3

(4) Sta. "L" 15+124.0
Const. Type "G-2" Open Grade HMAC Inlet
With Basin - 2
0.45 m Deep
Const. Type "G-2" Open Grade HMAC Inlet
Shape Bottom
Adjust Inlet For Wearing Course - 2
Inst. 300 mm Sew. Pipe - 42.5 m
1.5 m Depth

(5) Sta. "L" 15+280.7
Inst. Impact Attenuator
(For Details, See Sht. 2B-5)

(6) See Sht. 18B, Note 13
Remove Extg. Guardrail
Const. Precast Conc. Shldr. Barrier

(7) Const. Low Profile Mountable Curb

(8) See Sht. 14B, Note 16
Remove Extg. Metal Median Barrier
Const. Precast Tall Conc. Median Barrier
(8A) Const. Conc. Barrier Trailing End Terminal
(For Details, See Sht. 2B-8)

(9) Const. Mod. Low Profile Mountable Curb
(For Details, See Sht. 2B-4)

(10) Sta. "Ck" 4+807.4 To Sta. "Ck" 4+888.8
Remove Extg. Guardrail - 83.8 m

(11) Sta. "L" 15+197.0 To Sta. "L" 15+682.3
Remove Extg. Conc. Median Barrier - 487.0 m
Const. Precast Tall Conc. Median Barrier - 487.0 m
(Reflectorized)
(11A) Const. Conc. Barrier Trailing End Terminal
(For Details, See Sht. 2B-8)

(12) See Sht. 18F, Note 11
Inst. 600 mm Sew. Pipe

(13) Sta. "L" 15+189.4 To Sta. "L" 15+240.5
Inst. 600 mm Culv. Pipe - 52.0 m
1.5 m Depth

(14) Sta. "L" 15+100.0
Const. Open Grade Wearing Surface Drain
Const. Outlet Protection Block
(For Details, See Sht. 2B-2)

(15) Sta. "L" 15+100.0
Const. Open Grade Wearing Surface Drain
(15A) Connect To Wearing Surface Drain

(16) Sta. "L" 15+250.0
Const. Open Grade Wearing Surface Drain
Const. Outlet Protection Block

(17) Sta. "L" 15+250.0
Const. Open Grade Wearing Surface Drain
(17A) Connect To Wearing Surface Drain

(18) See Sht. 18B, Note 16
Remove Extg. Fence
Const. Type CL-6 Fence
Connect To Extg. Fence

(19) Sta. "Wk" 10+020.8 To Sta. "Wk" 10+030.7
Const. Manhole - 2
300 mm Culv. Pipe - 22 m (In Pl.)
Extend - 1.5 m
1.5 m Depth
450 mm Culv. Pipe - 36 m (In Pl.)
Extend - 4.0 m
1.5 m Depth
Inst. 450 mm Sew. Pipe - 16.0 m
1.5 m Depth
Const. Paved End Slope

REGISTERED PROFESSIONAL ENGINEER
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Carol A. Cartwright
OREGON
JULY 25, 1990
CAROL A. CARTWRIGHT
Expires Dec. 31, 2005

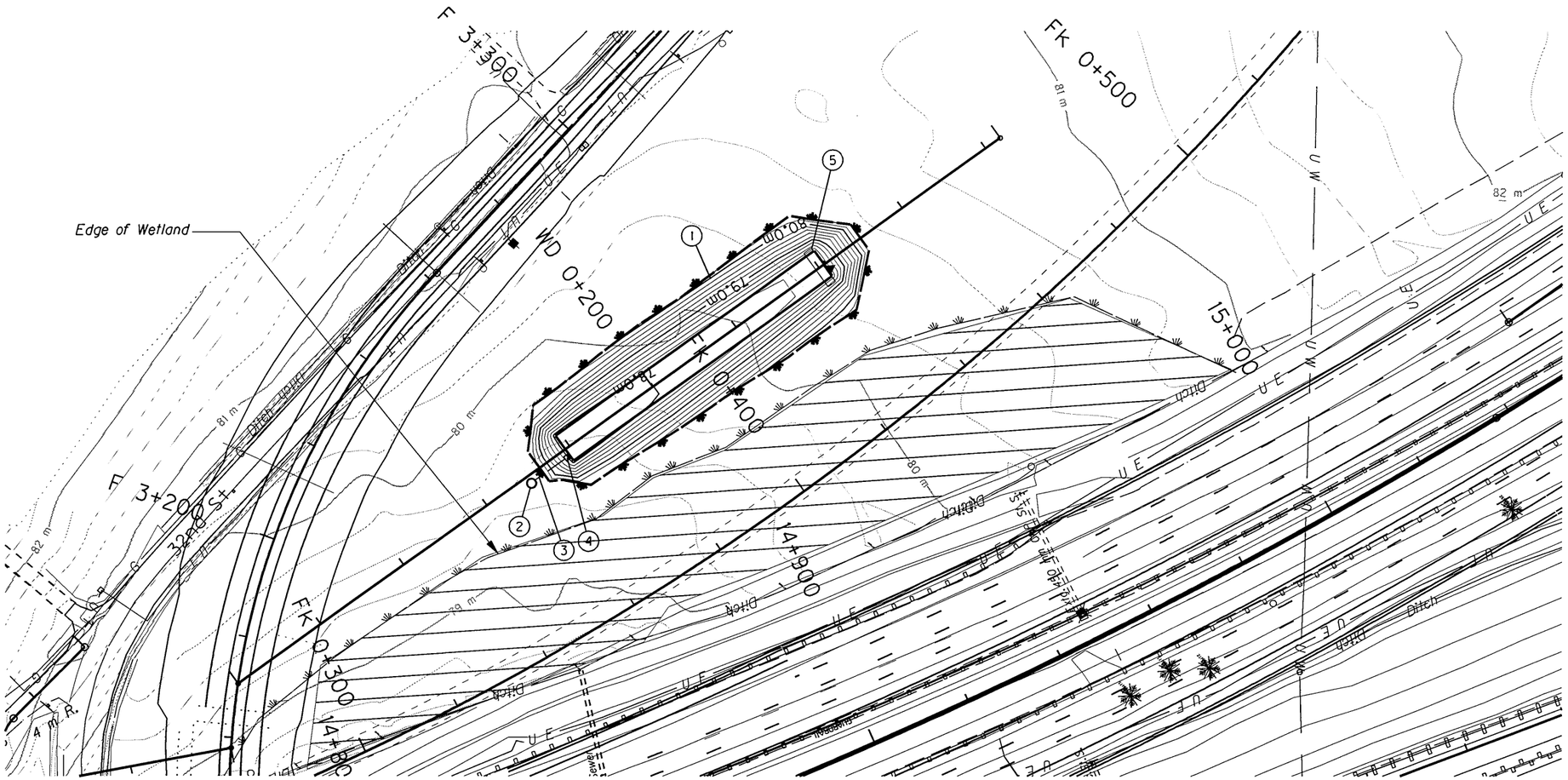
OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

I-5: N. SANTIAM HWY. -
KUEBLER BLVD. (SALEM) SEC.
PACIFIC HIGHWAY
MARION COUNTY

Design Team Leader - Carol Cartwright
Designed By - John Lucas
Drafted By - Jeff Larson

NOTES

SHEET NO.
19A



① Sta "L" 14+859.96 To 14+941.74 Lt.
Construct Detention Pond (See Below For Details)
Top Area = 1,528 m²
Top Perimeter = 180 m
Bottom Area = 380 m²
Bottom Perimeter = 137 m

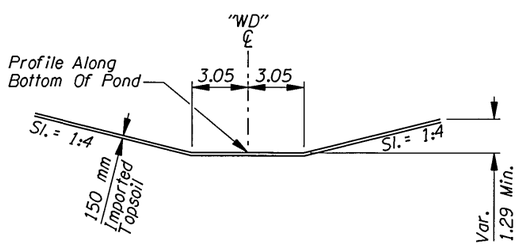
② Flow Control Manhole
(See Sheet GJ-5 For Details)
M.H. Rim = ± 79.40 m

③ Install 450 mm Culv. Pipe - 9.5
(For Details. See Sht. GJ-5)

④ Install Modified Type "D" Inlet
(For Details. See Sht. GJ-5 and RD370)

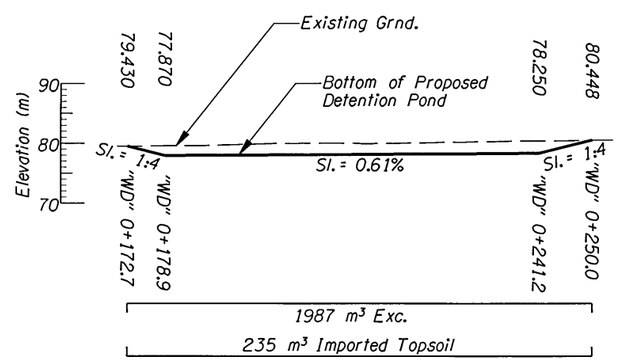
⑤ Const. Flow Spreader
(For Details See Sht. GJ-7A)
Loose Riprap. Class 25 - 3.5 m³

PLAN
Scale = 1:1000



Sta. "WD" 0+172.7 To Sta. "WD" 0+250.0

TYPICAL SECTION
Scale: 1:300



PROFILE "WD"
Scale: 1:1000

NOTES:
1. Side-Slopes Are Shown As Vert. To Horiz.
2. All dimensions are in meters (m) except as noted.

REGISTERED PROFESSIONAL ENGINEER
17807
OREGON
JULY 25, 1995
CHRIS CARMAN
EXPIRES: December 31, 2005

OREGON DEPARTMENT OF TRANSPORTATION
REGION 2 TECH CENTER

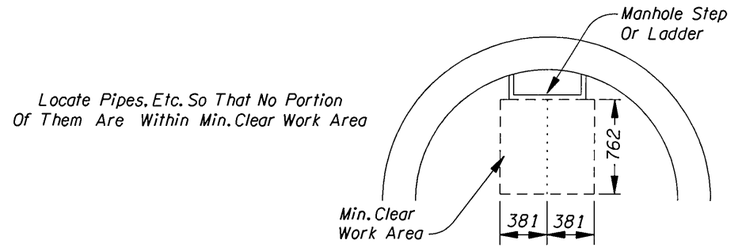
I-5: N. SANTIAM HWY. - KUEBLER BLVD. (SALEM) SEC.
PACIFIC HIGHWAY
MARION COUNTY

Reviewed By - Alvin Shoblom
Designed By - Chris Carman
Drafted By - Chris Shearer

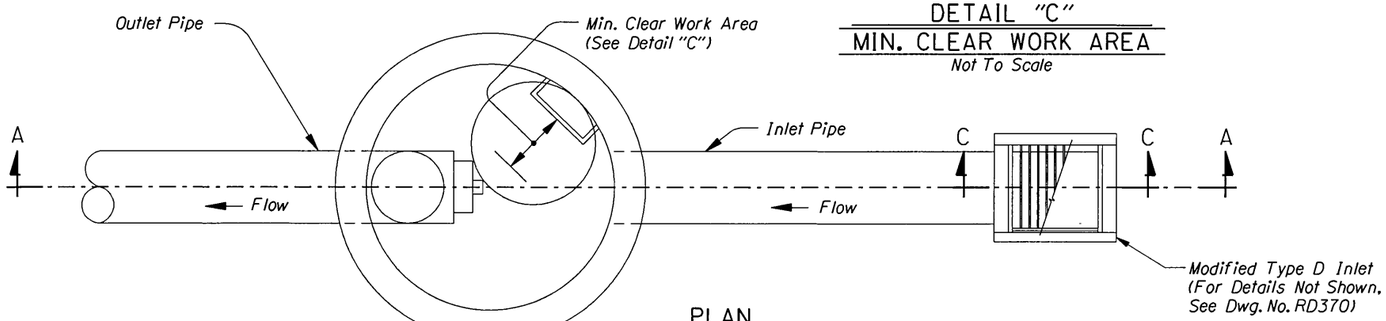
WATER QUALITY/ DETENTION PLAN

SHEET NO. GJ-2

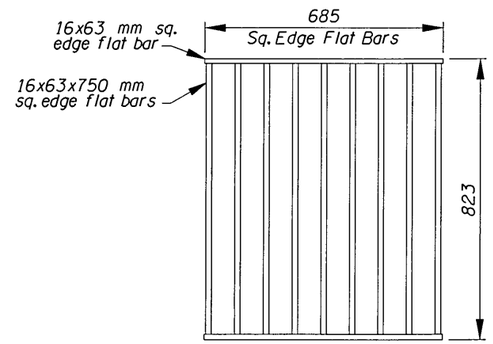
NOTES:
1. Hardware, Fasteners And Anchors To Be Stainless Steel; Use 3 mm Stainless Steel Cable.
2. For Manhole Details Not Shown, See RD346
3. Hardware, Fasteners, Anchors, Fittings, Appurtenances, Labor, And Equipment Are Incidental.



DETAIL "C"
MIN. CLEAR WORK AREA
Not To Scale



PLAN
OUTLET STRUCTURES
Not To Scale



GRATE PLAN
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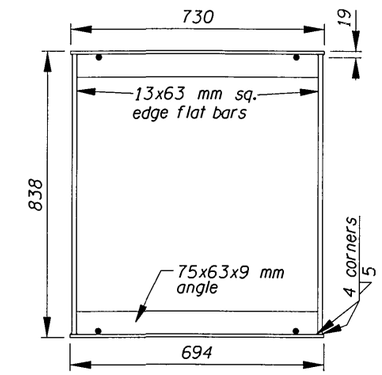

FRAME PLAN
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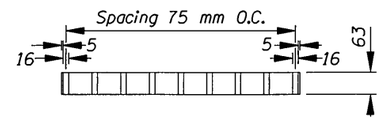

GRATE SECTION, TYPE 1
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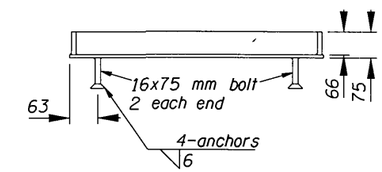

FRAME SECTION
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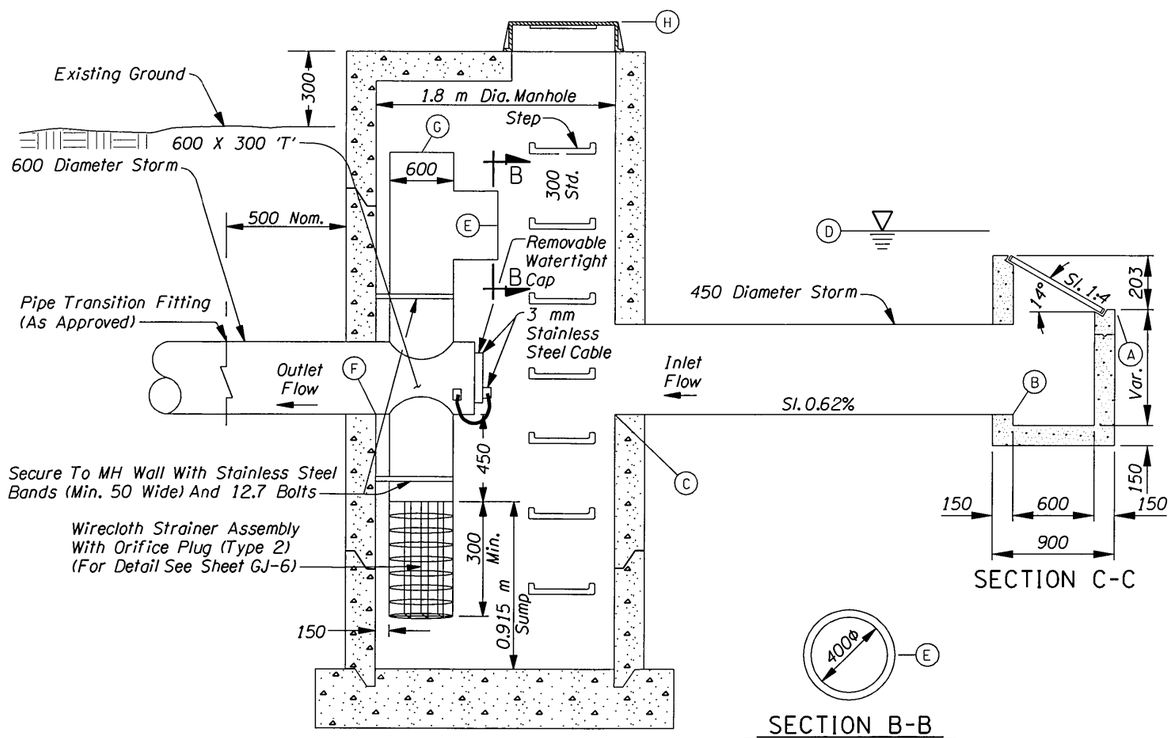


SECTION A-A
FLOW CONTROL MANHOLE
Not To Scale

SECTION C-C

SECTION B-B
UPPER ORIFICE
Not To Scale

I5 - WATER QUALITY/DETENTION		
	ELEVATION (m)	DESCRIPTION
A	77.870	Elev. Of Pond Bottom
B	77.100	Fl. Elev. Of Inlet Pipe
C	77.050	Fl. Elev. Of Inlet Pipe
D	78.60	Elev. Of Detention Water Surface 50 yr. Storm
E	78.015	Cntr. Of Upper Orifice
F	76.965	Fl. Elev. Of Outlet Pipe
G	78.90	Auxilary Overflow
H	79.40±	Rim Elevation

Side-Slopes Are Shown As Vert. To Horiz.

All Dimensions Shown Are In Millimeters (mm) Unless Otherwise Noted

REGISTERED PROFESSIONAL ENGINEER
17807
OREGON
JULY 25, 1995
CHRIS CARMAN
EXPIRES: December 31, 2005

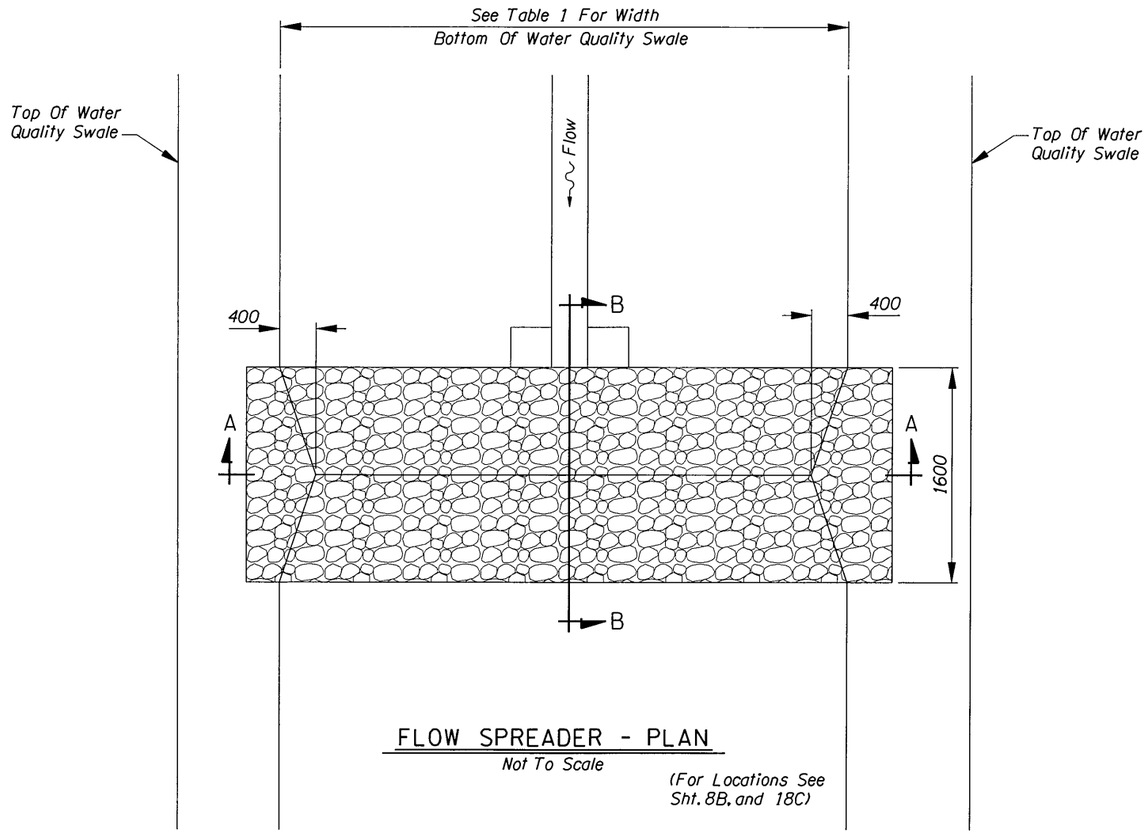
OREGON DEPARTMENT OF TRANSPORTATION
REGION 2 TECH CENTER

I-5: NORTH SANTIAM HWY. - KUEBLER BLVD. (SALEM) SEC.
PACIFIC HIGHWAY
MARION COUNTY

Reviewed By - Alvin Shoblom
Designed By - Chris Carman
Drafted By - Chris Shearer

DETAILS

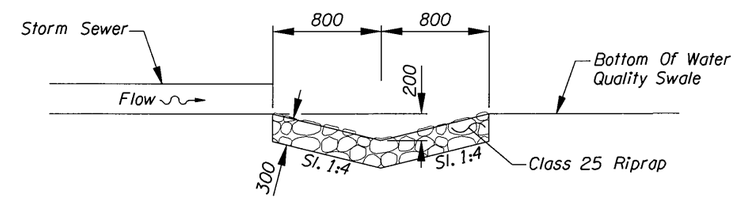
SHEET NO.
GJ-5



FLOW SPREADER - PLAN

Not To Scale

(For Locations See Sht. 8B. and 18C)



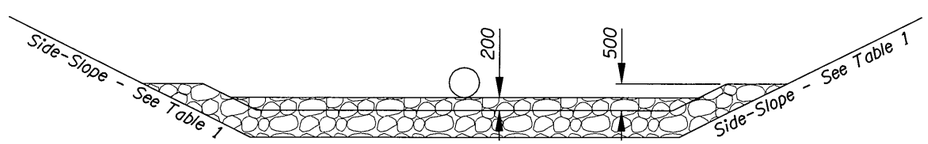
SECTION B-B

Not To Scale

Table 1

Location	Width (m)	Side-Slope
Sta. "A" 0+972.6 17.5 Rt.	4.8	1:2
Sta. "WD" 0+241.1 1.4 Rt.	6.1	1:4

NOTES:
1. Side-Slopes Are Shown As Vert. To Horiz.
2. All Dimensions Shown Are In Millimeters (mm) Unless Otherwise Noted



SECTION A-A

Not To Scale

REGISTERED PROFESSIONAL ENGINEER 17807 OREGON JULY 25, 1995 CHRIS CARMAN

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SHEET NO. GJ-7A