OPERATION & MAINTENANCE MANUAL

DFI No. : D00192
Facility Type: Water Quality Biofiltration Swale

JUNE, 2011

INDEX

1. Identification

Drainage Facility ID (DFI):	**D00192**
Facility Type:	Water Quality Biofiltration Swale
Construction Drawings:	(V-File Number) 39V-010
Location:	District: 2B (Old 2A)
	Highway No.: 140
	Mile Post: 5.0; 5.1 (beg./end)]
	Description: This facility is located along the westbound travel lane of Hillsboro-Silverton Highway (Hwy 140) near SW Lukas Road. Facility access is found along the roadway shoulder adjacent to the site.

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 1 Tech. Center, Daniel C. Gunther, (503) 731- 8299

Facility construction: 2005
Contractor: N/A

4. Storm Drain System and Facility Overview

A water quality swale is a flat-bottomed open channel designed to treat stormwater runoff from highway pavement areas. This type of facility is lined with grass. Treatment by trapping sedimentation occurs when stormwater runoff flows through the grass.

This water quality biofiltration swale is located along the shoulder of the westbound travel lane of Hillsboro-Silverton Highway (Hwy 140).

This 557-ft facility treats stormwater runoff from the nearby travel lanes. The swale conveys ditch flows from both the eastern and western ends of the swale. A separate 24-inch diameter inlet pipe also conveys additional stormwater flows from a piping system and series of inlets west of the facility (point A of the Operational Plans; Appendix A). The separate flows simultaneously converge at an inlet/outlet structure (point C of the Operational Plans; Appendix A), serving as the swale outlet.

The treated water discharges to an 18-inch pipe and ditch outfall located south of this water quality facility on the opposite side of the highway (point D of the Operational Plans; Appendix A).

A. Maintenance equipment access:

This swale can be accessed by maintenance crews from the shoulder along the westbound travel lane. The swale is lined with several rock check dams noted as point B in Operational Plans; Appendix A, so heavy equipment access into this swale is limited.

B. Heavy equipment access into facility:

☐ Allowed (no limitations)
☒ Allowed (with limitations): several rock check dams placed within swale area
☐ Not allowed

C. Special Features:

☐ Amended Soils
☐ Porous Pavers
☐ Liners
☒ Underdrains

Photo 1: This photo depicts swale and its relative position to Hillsboro-Silverton Highway.

5. Facility Haz Mat Spill Feature(s)

The water quality biofiltration swale can be used to store a volume of liquid by blocking the 18-inch diameter outlet pipe located at the outlet of the water quality biofiltration swale. This pipe is noted as point D in Operational Plans; Appendix A.

6. Auxiliary Outlet (High Flow Bypass)

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
There is no auxiliary outlet structure for this facility.

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 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:

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

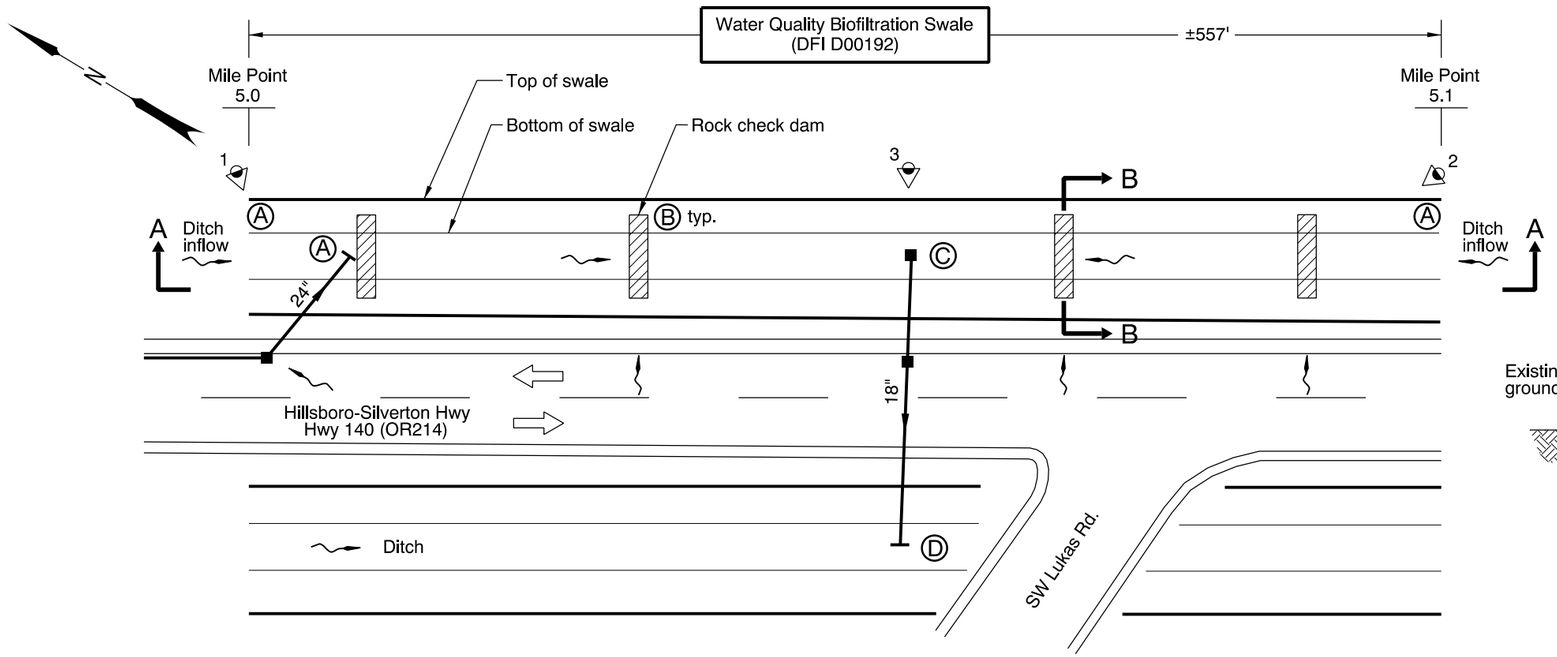
Contact any of the following for more detailed information about management of waste materials found on site:

ODOT Clean Water Unit	(503) 986-3008
ODOT Statewide Hazmat Coordinator	(503) 229-5129
ODOT Region Hazmat Coordinator	(503) 731-8304
ODEQ Northwest Region Office	(503) 229-5263

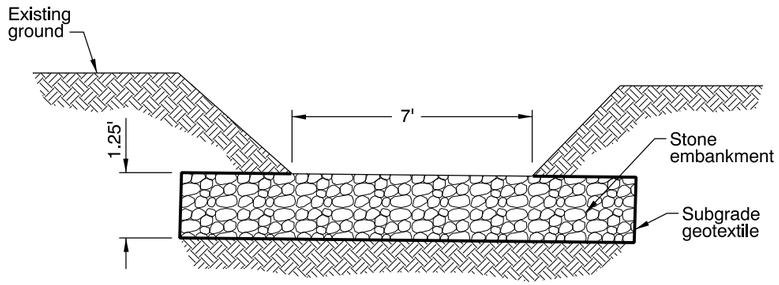
Appendix A

Content:

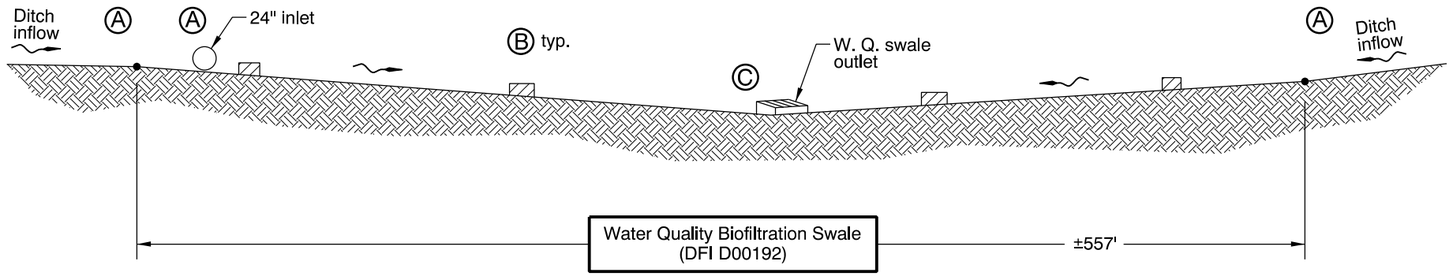
- **Operational Plan and Profile Drawing(s)**



PLAN
N.T.S.



SECTION B-B (ROCK CHECK DAM AT POINT Ⓑ, TYP.)
N.T.S.



SECTION A-A
N.T.S.

LEGEND:

- Photo Location / Direction
- Ⓐ Swale inlet from drainage ditch to the north and south. Also, 24" diameter pipe
- Ⓑ Rock check dam flow spreader
- Ⓒ Swale outlet is Type "D" inlet which connects to 18" pipe which discharges to drainage ditch
- Ⓓ Outfall to ditch
- Manhole and/or
- Inlet and/or
- Traffic direction / Flow
- Storm Pipe (Facility)
- Storm Pipe
- Conveyance Direction
- Pavement / Facility Flow Path

Sht. 1 of 1

OREGON DEPARTMENT OF TRANSPORTATION

Prepared By: J. D. Koziol

Drafted By: Y. Garzenelli

DFI D00192
MAINTENANCE DISTRICT 2B HWY 140
WATER QUALITY BIOFILTRATION SWALE
HILLSBORO-SILVERTON HWY MP 5.0-5.1
WASHINGTON COUNTY

Appendix B

Content:

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

39V-010

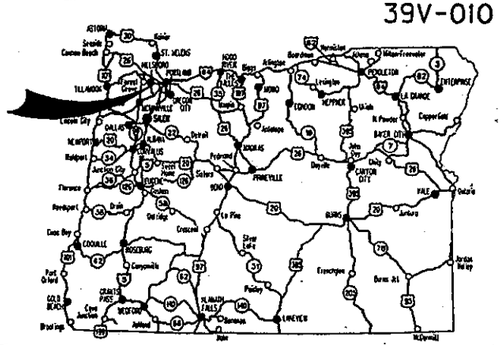
INDEX OF SHEETS	
SHEET NO.	DESCRIPTION
1	Title Sheet
1A	Title Sheet Continued
2, 2A	Typical Sections
2B	Details
2C Thru 2C-3 Incl.	Traffic Control Plans
2D	Pipe Data Sheet
3	Alignment & General Construction
3A	Drainage & Utilities
4	Alignment & General Construction
4A	Drainage & Utilities
4B	Profile
5	Alignment & General Construction
5A	Drainage & Utilities
5A-2	Notes
6	Alignment & General Construction
6A	Drainage & Utilities
PERMANENT PAVEMENT MARKINGS	
ST, ST-2	Striping Plan
GEO/HYDRO	
GA Thru GA-4 Incl.	Erosion Control Plans
GJ, GJ-2	Water Quality Details
PERMANENT SIGNING	
S-08492 Thru S-08496 Incl.	Signing Plan

STATE OF OREGON
DEPARTMENT OF TRANSPORTATION
PLANS FOR PROPOSED PROJECT

GRADING, DRAINAGE, PAVING, STRIPING, & SIGNING

OR219: HILLSBORO - SILVERTON HWY. AT UNGER RD. SEC.

HILLSBORO - SILVERTON HIGHWAY
WASHINGTON COUNTY
NOVEMBER 2005

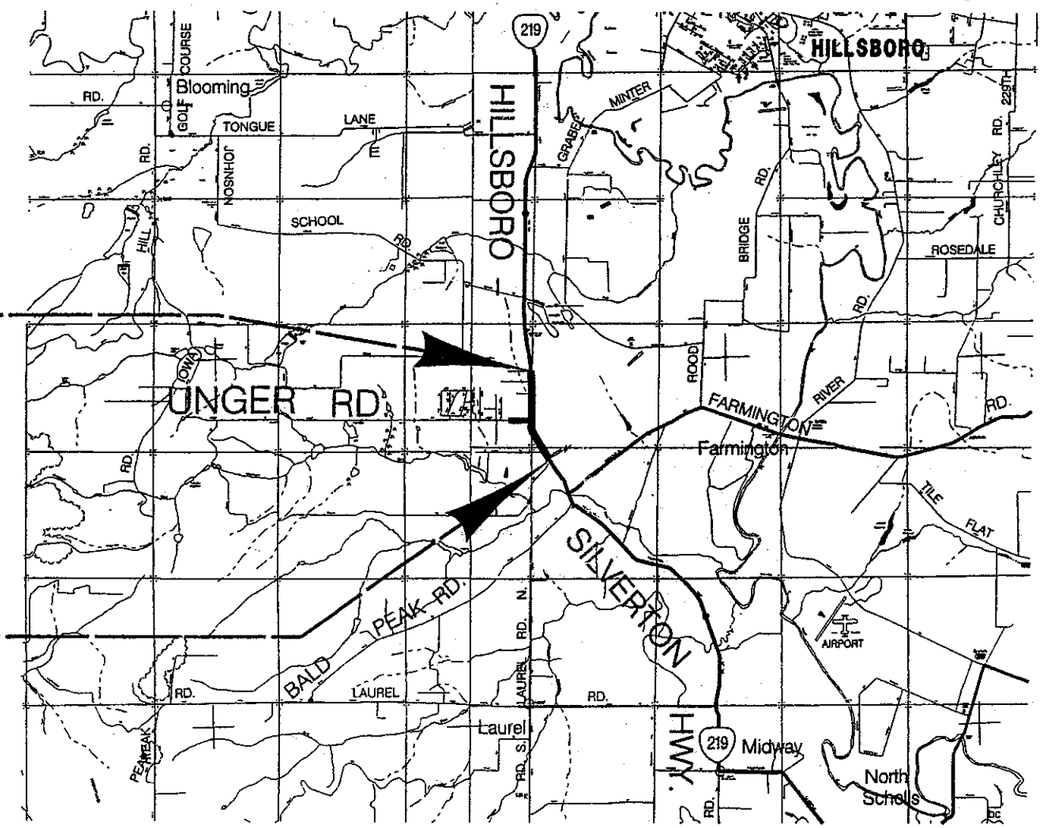


Overall Length Of Project - 0.96 km (0.59 Miles)

AS CONSTRUCTED
Wayne A. Statler
PROJECT MANAGER
2 MAR 2007
DATE

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.)

LET'S ALL WORK TOGETHER TO MAKE THIS JOB SAFE



N

T. 1 S., R. 2 W., R 3 W., W.M.

BEGINNING OF PROJECT
STA. "HS" 7+159 (M.P. 4.54)

END OF PROJECT
STA. "HS" 8+115 (M.P. 5.14)

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
STATE HIGHWAY ENGINEER

METRIC

OR219: HILLSBORO - SILVERTON HWY. AT UNGER RD. SEC.
HILLSBORO - SILVERTON HIGHWAY
WASHINGTON COUNTY

FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	X-STP-S140(030)	1

PE000529 000

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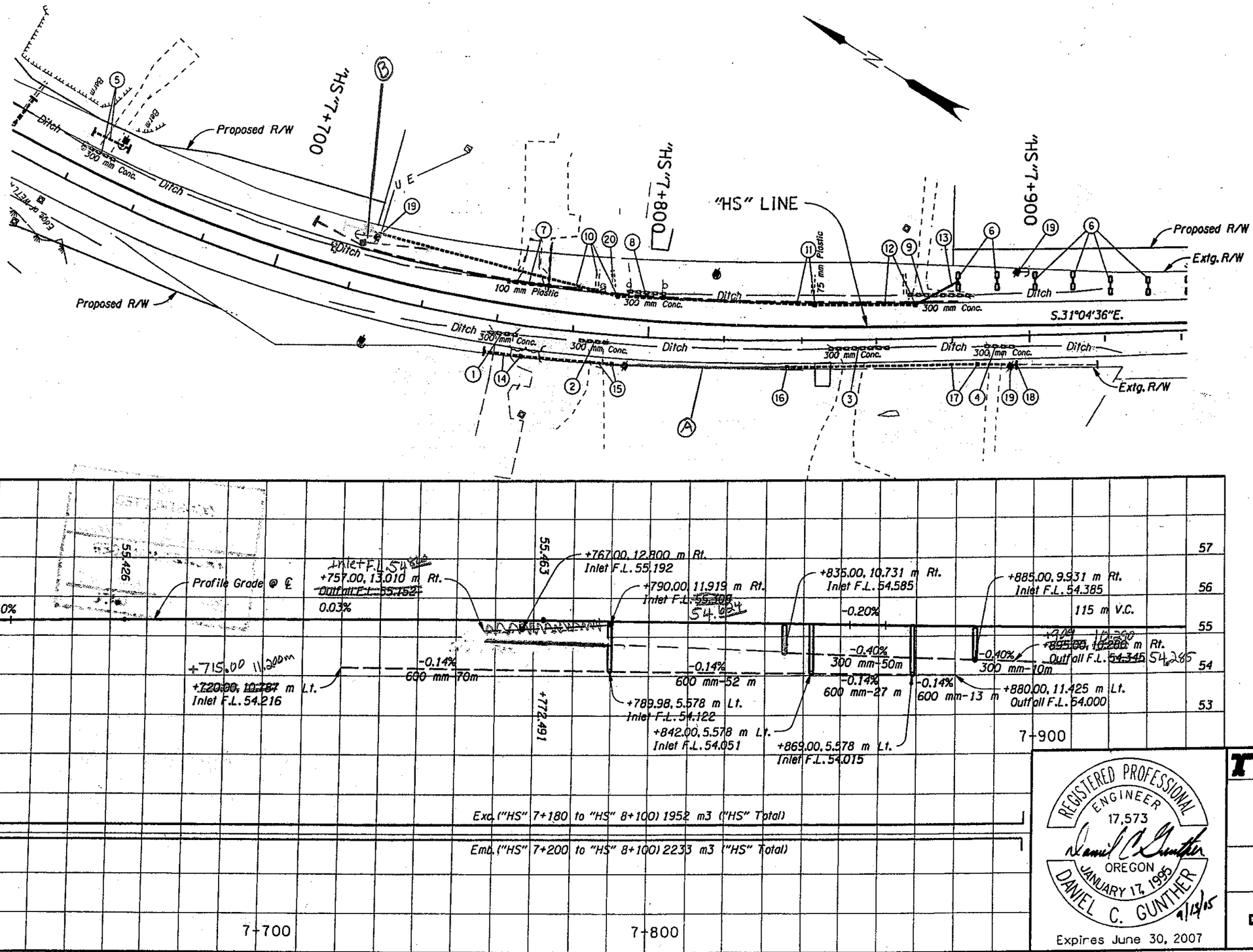

CONSTRUCTED
Wayne A Stahlecker
PROJECT MANAGER
2 Mar 2007
DATE

NOTE:
1. All Dimensions Shown Are In Meters (m) Unless Otherwise Noted.
2. Remove Extg. Pipe Shown Thus: ~~~~

REGISTERED PROFESSIONAL ENGINEER
17,573
OREGON
JANUARY 17, 1995
DANIEL C. GUNTHER
9/13/05
Expires June 30, 2007

OREGON DEPARTMENT OF TRANSPORTATION
REGION 1 GEO/HYDRO UNIT

OR219: HILLSBORO-SILVERTON HWY
AT UNGER ROAD
HILLSBORO-SILVERTON HIGHWAY
WASHINGTON COUNTY

Project Leader - Sandy Van Bemmel
Designed By - Stephen Hay
Drafted By - David Haase

DRAINAGE & UTILITIES

SHEET NO. 5A

(1) Sta. "HS" 7+757, Rt.
Remove Exist. Culv. Pipe - 9.0 m

(2) Sta. "HS" 7+781, Rt.
Remove Exist. Culv. Pipe - 8.0 m

(3) Sta. "HS" 7+846, Rt.
Remove Exist. Culv. Pipe - 16 m

(4) Sta. "HS" 7+890, Rt.
Remove Exist. Culv. Pipe - 8 m

(5) See Sht. 4A, Note 13

(6) Sta. "HS" 7+880 to 8+050 Lt.
Const. Check Slot Structure - 18
Dt. Exc. - 7.5 m3
Stone Embankment - 7.5 m3
Subgrade Geotextile - 108 m2
(For Details, See Sheet GJ)

(7) Sta. "HS" 7+761 Lt.
Remove Exist. Culv. Pipe - 12.0 m

(8) Sta. "HS" 7+793 Lt.
Remove Exist. Culv. Pipe - 11.0 m

(9) Sta. "HS" 7+867 Lt.
Remove Exist. Culv. Pipe - 17.0 m

(10) Sta. "HS" 7+790 Lt.
Const. Type "G-2" Inlet
Inst. 600 mm Storm Sew. Pipe - 70 m
1.5 m Depth
Extend 100 mm Drain Pipe - 4 m
Connect to Inlet
Inst. Sloped End Section - 1
(See Drg. No. RD364)

(11) Sta. "HS" 7+842 Lt.
Const. Type "G-2" Inlet
Inst. 600 mm Storm Sew. Pipe - 52 m
1.5 m Depth
Extend 75 mm Drain Pipe - 3 m
Connect to Inlet

(12) Sta. "HS" 7+869 Lt.
Const. Type "G-2" Inlet
Inst. 600 mm Storm Sew. Pipe - 27 m
1.5 m Depth
Extend 75 mm Drain Pipe - 3 m
Connect to Inlet

(13) Sta. "HS" 7+880 Lt.
Inst. 600 mm Storm Sew. Pipe - 13 m
1.5 m Depth
Connect to Inlet
Inst. Sloped End Section - 1

(14) Sta. "HS" 7+767 Rt.
Const. Type "D" Inlet
Inst. 300 mm Storm Sew. Pipe - 10 m
1.5 m Depth
Inst. Sloped End Section - 1
(See Drg. No. RD370)

(15) Sta. "HS" 7+790 Rt.
Const. Type "D" Inlet
Inst. 300 mm Storm Sew. Pipe - 23 m
1.5 m Depth

(16) Sta. "HS" 7+835, Rt.
Const. Type "D" Inlet

(17) Sta. "HS" 7+885, Rt.
Const. Type "D" Inlet
Inst. 300 mm Storm Sew. Pipe - 50 m
1.5 m Depth

(18) Sta. "HS" 7+895 16.5m
Inst. 300 mm Storm Sew. Pipe - ~~10 m~~
1.5 m Depth
Connect to Inlet
Inst. Sloped End Section - 1

(19) Relocate Utility Pole - 3
(By others)

(20) Extend 100 mm Drain Pipe - 4 m
Connect To Inlet

(A) Installed 23.2m of 300mm
of Storm sew Pipe
"HS" 7+813 - 7+836 RT

(B) Installed extra G-2 inlet
"HS" 7+718 LT, extended 600mm
storm Sew. Pipe 3m "HS" 7+715 LT

AS CONSTRUCTED
Wayne A Stalen
PROJECT MANAGER
2 MAR 2007
DATE

REGISTERED PROFESSIONAL ENGINEER
17,573
OREGON
JANUARY 17, 1995
DANIEL C. GUNTHER
4/13/05
Expires June 30, 2007

OREGON DEPARTMENT OF TRANSPORTATION
REGION 1 GEO/HYDRO UNIT

OR219: HILLSBORO-SILVERTON HWY
AT UNGER ROAD
HILLSBORO-SILVERTON HIGHWAY
WASHINGTON COUNTY

Project Leader - Sandy Van Bemmel
Designed By - Stephen Hay
Drafted By - David Haase

NOTES

SHEET NO. 5A-2

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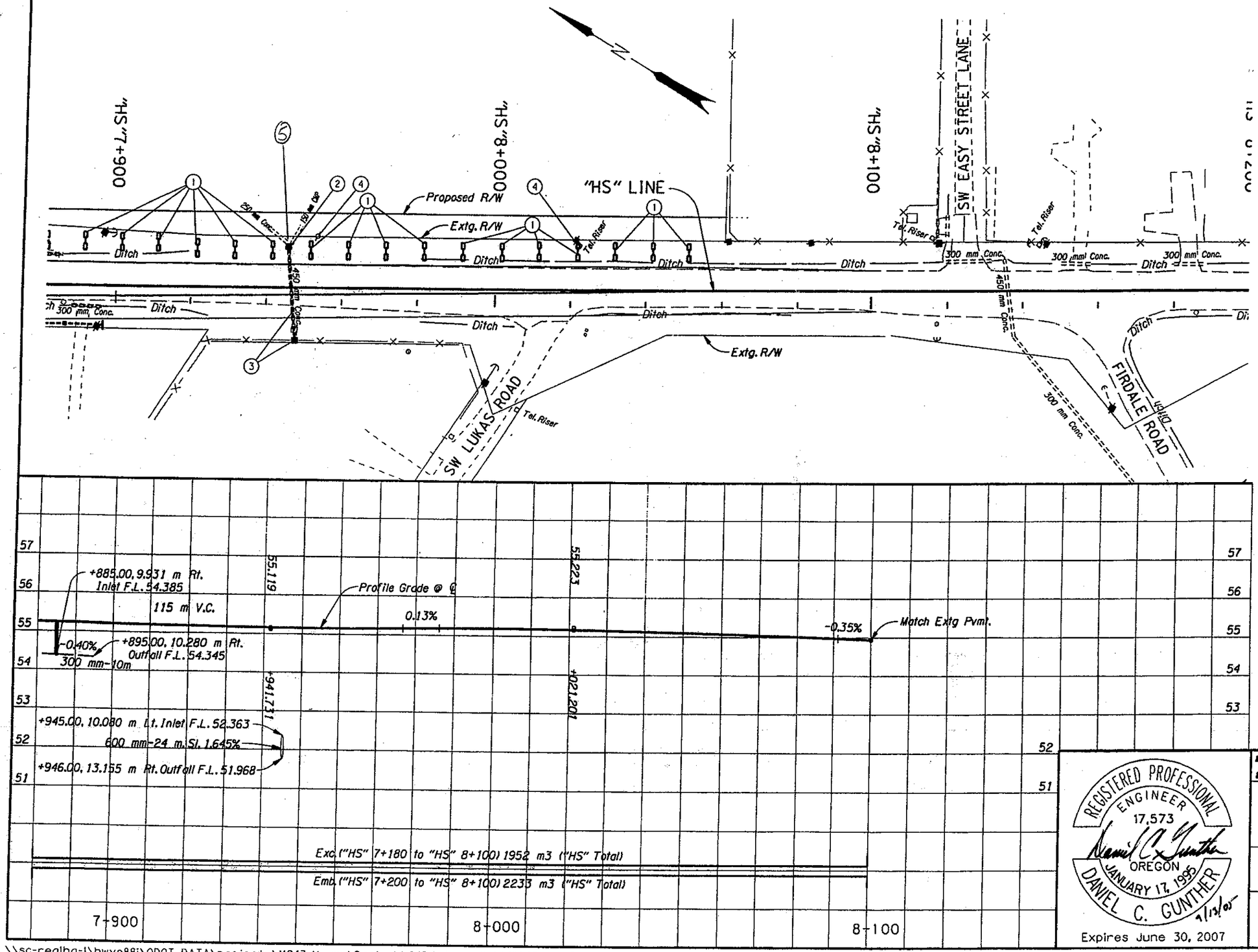

(1) See Sht. 5A-2, Note 6

(2) Sta "HS" 7+945 Lt.
Const. Type "G-2MA" Inlet
(See Drg No. RD364)

(3) Sta "HS" 7+946 Rt.
Remove Inlet
Remove Exist. Culv. Pipe - 23 m
Const. Type "D" Cast in Place Inlet
Connect Extg. 450 mm Culv. Pipe
Inst. 600 mm Culv. Pipe - 24 m
3.0 m Depth

(4) Relocate Utility Pole - 2
(By others)

(5) Type "D" inlet installed "HS" 7+945 LT

AS CONSTRUCTED
Wayne A. Stafler
PROJECT MANAGER
2 MAR 2007
DATE

NOTE:
1. All Dimensions Shown Are In Meters (m) Unless Otherwise Noted.
2. Remove Extg. Pipe Shown Thus: ----

REGISTERED PROFESSIONAL ENGINEER
17,573
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JANUARY 17, 1995
DANIEL C. GUNTHER
9/13/05
Expires June 30, 2007

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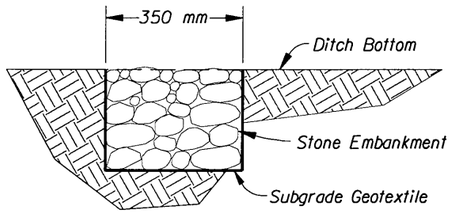
WASHINGTON COUNTY

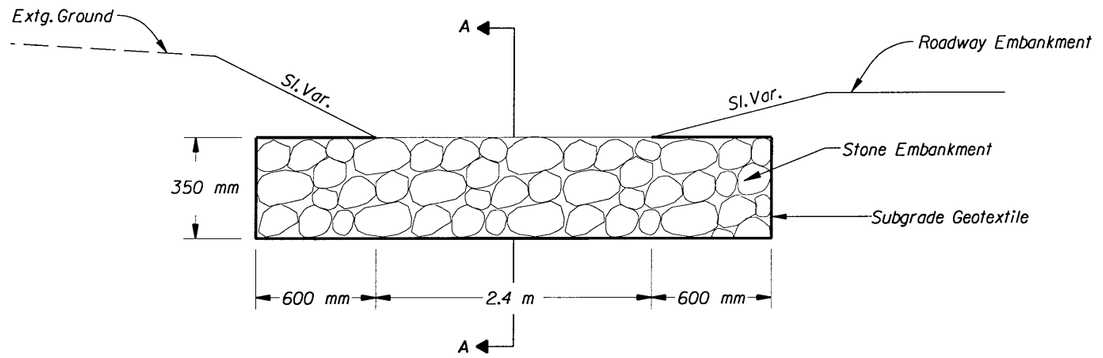
Project Leader - Sandy Van Bemmel
Designed By - Stephen Hay
Drafted By - David Haase

DRAINAGE & UTILITIES

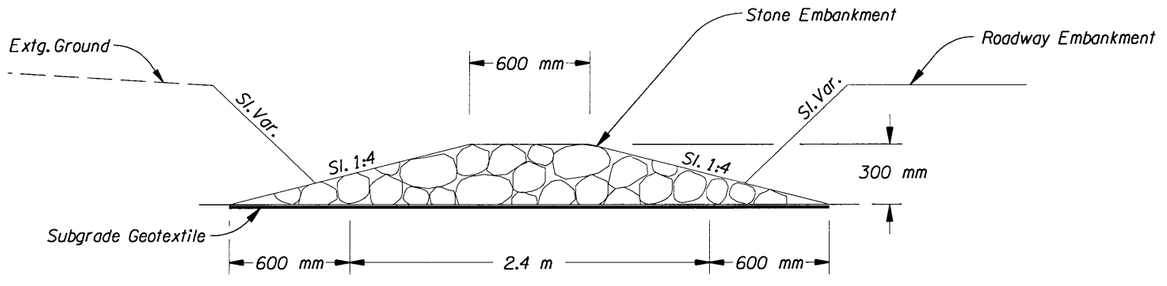
SHEET NO. 6A



SECTION A-A



PERMANENT CHECK SLOT
FLAT BOTTOM DITCH
STA. "HB" 7+400 To STA. "HS" 7+560 Lt.
"HS" 7+600 Lt.
"HS" 7+880 To "HS" 8+050 Lt.
"FB" 0+044



PERMANENT CHECK DAM
FLAT BOTTOM DITCH
STA. "HS" 7+573 Lt.

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

REGISTERED PROFESSIONAL ENGINEER
17,573
OREGON
JANUARY 17, 1995
DANIEL C. GUNTHER
9/13/05
EXPIRES: 06/30/2007

OREGON DEPARTMENT OF TRANSPORTATION
REGION 1 GEO/HYDRO UNIT

OR219: HILLSBORO-SILVERTON HWY
AT UNGER ROAD
HILLSBORO-SILVERTON HIGHWAY
WASHINGTON COUNTY

Reviewed By - Dan Gunther
Designed By - Stephen Hay
Drafted By - Charlotte Gerken

WATER QUALITY DETAILS

SHEET NO. GJ