OPERATION & MAINTENANCE MANUAL

DFI No. D00083
Facility Type: Water Quality Biofiltration Swale

JULY, 2011

INDEX

1. Identification

Drainage Facility ID (DFI):	**DFI D00083**
Facility Type:	Water Quality Biofiltration Swale
Construction Drawings:	(V-File Number) 37V-041
Location:	District: 2B (Old 2A)
	Highway No.: 047
	Mile Post: 68.36/68.39 (beg./end)
	Description: This facility is located at the southeastern quadrant of OR26 (Hwy 047) and SW Cedar Hills Blvd. Facility access is obtained from the eastbound on ramp to the highway.

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 Henry Minton Allen, (503) 731-8200
Facility construction:	2004
Contractor:	Mowat Construction Company

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 facility is designed to handle and treat water quality flows collected by a series of inlets along the south side of US 26 (Hwy 047) and along the east bound highway on-ramp. The drainage is conveyed by a 12-inch storm pipe to a high-low split flow diversion manhole structure, (see point A of the Operational Plan, Appendix A), where stormwater flows are directed into the swale for treatment. The higher flows drain to a detention pond (DFI D00084) west of the swale facility, through the 12-inch diameter storm pipe and a modified manhole (point H of the Operational Plan, Appendix A).

A water quality manhole (DFI D00232) is located upstream of the swale. This manhole is used to remove debris and some oils.

A. Maintenance equipment access:
   Access to the facility can be obtained from the eastbound on ramp to US 26 (Hwy 047). A maintenance pad is located between the onramp and the facility.

B. Heavy equipment access into facility:

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

C. Special Features:

   ☐ Amended Soils
   ☐ Porous Pavers
   ☐ Liners
   ☐ Underdrains

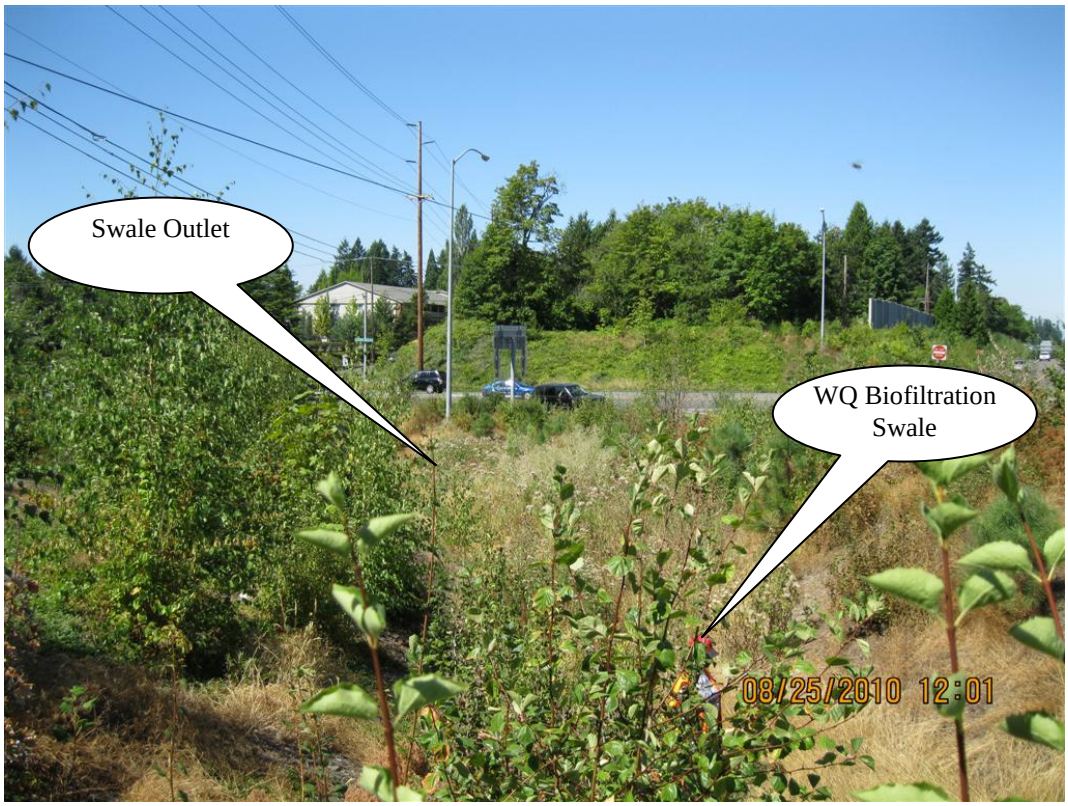


Photo 1: WQ biofiltration swale looking towards Cedar Hills Blvd. The swale is fairly deep as shown by the adjacent tall banks.

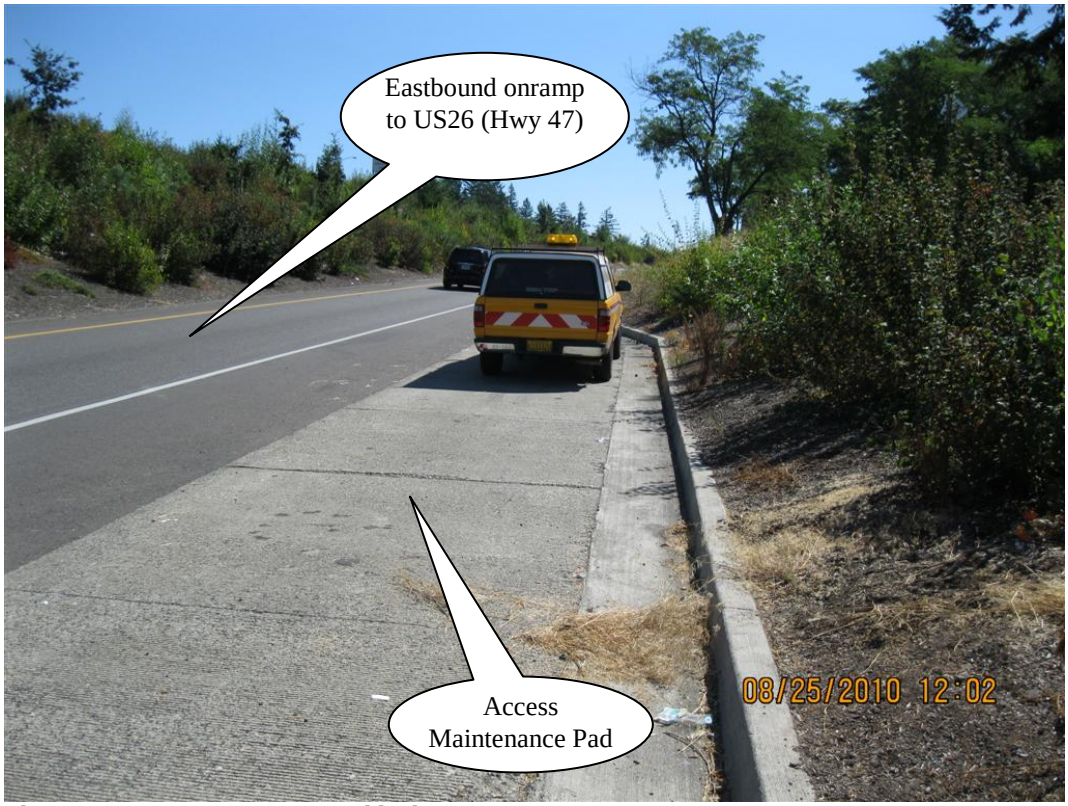


Photo 2: Access maintenance pad looking east.

Photo 1: Looking east at the water quality biofiltration swale.

5. Facility Haz Mat Spill Feature(s)

The water quality biofiltration swale can be used to store a volume of liquid by blocking the 12-inch diameter outlet pipe located at the outlet structure of the adjoining detention pond (DFI D00084). This pipe is noted as Point F on the Operational Plans.

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

The split flow manhole is designed to bypass high flows. See split flow manhole detail provided on the Operational plan. High flows drain out the 18-inch pipe draining to the west (Point A).

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 or 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

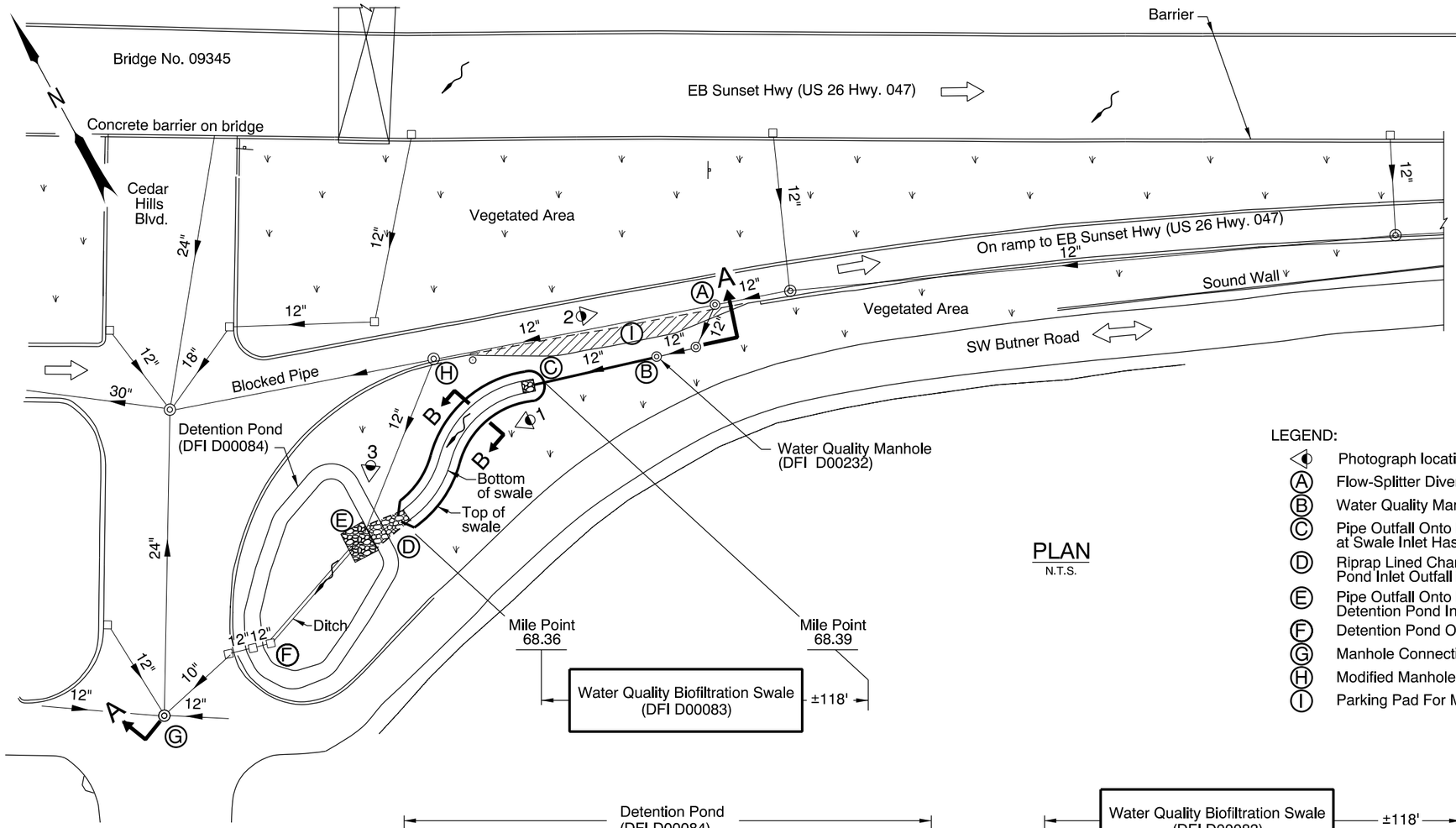
Contact any of the following for more detailed information about management of waste materials found on site:

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:

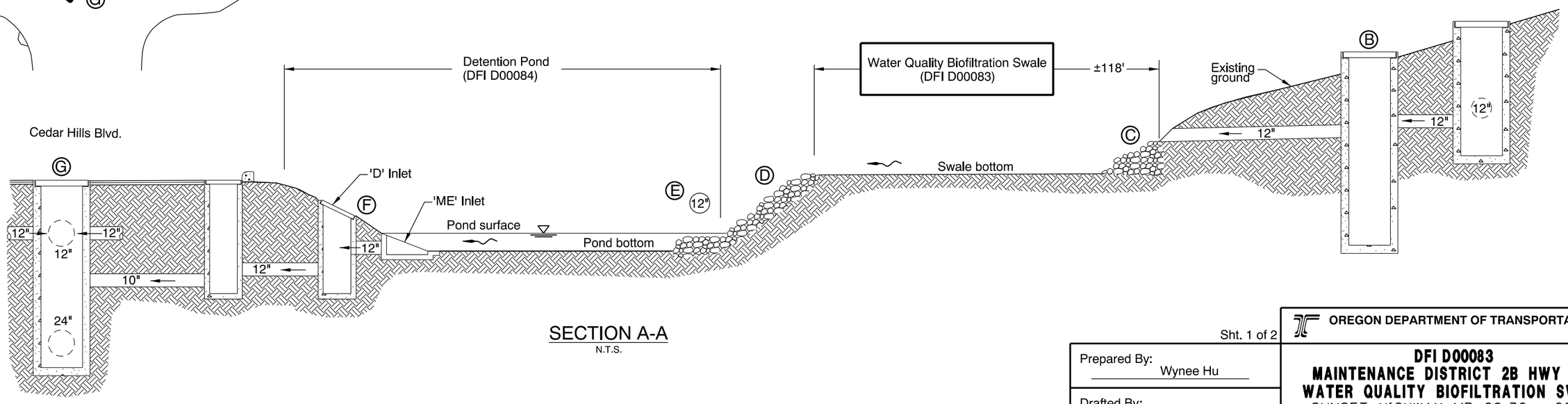
- **Operational Plan and Profile Drawing(s)**



PLAN
N.T.S.

LEGEND:

- Photograph location / direction
- Ⓐ Flow-Splitter Diversion Manhole
- Ⓑ Water Quality Manhole (DFI D00232)
- Ⓒ Pipe Outfall Onto Riprap Flow Spreader at Swale Inlet Has Paved End Slope
- Ⓓ Riprap Lined Channel is Swale Outlet Into Detention Pond Inlet Outfall is on Riprap Flow Spreader
- Ⓔ Pipe Outfall Onto Riprap Flow Spreader At Detention Pond Inlet Has Paved End Slope
- Ⓕ Detention Pond Outlet Structures (for DFI D00084)
- Ⓖ Manhole Connecting Facilities to Conveyance Lines
- Ⓗ Modified Manhole, Western Pipe Connection Sealed Here
- Ⓘ Parking Pad For Maintenance Bordered By Curb
- Channel
- Manhole and or
- Inlet and or
- Storm Pipe (Facility)
- Storm Pipe
- Conveyance Direction
- Pavement / Facility Flow Path
- Riprap
- Concrete Barrier or Curb
- Maintenance Access



SECTION A-A
N.T.S.

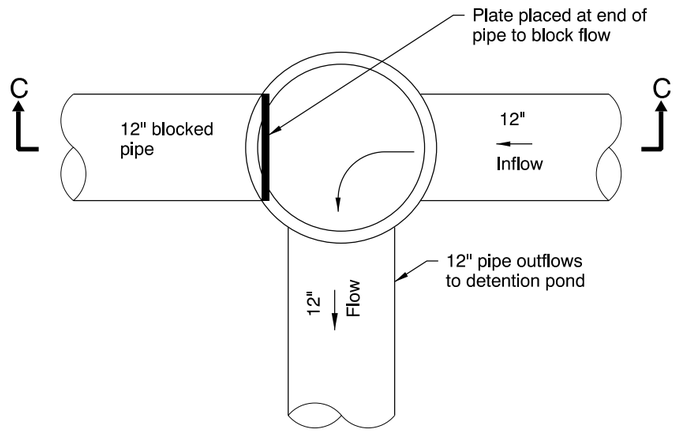
Sht. 1 of 2

OREGON DEPARTMENT OF TRANSPORTATION

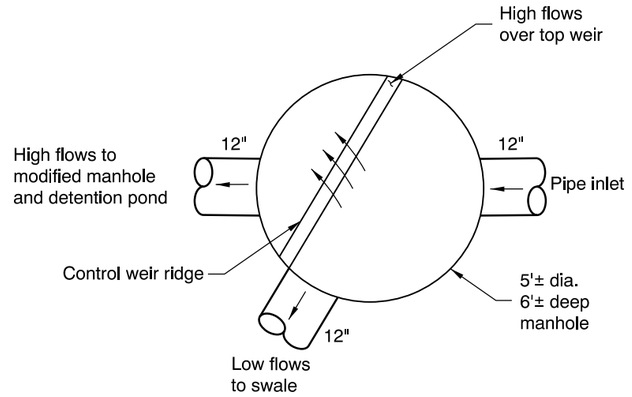
Prepared By: Wynee Hu

Drafted By: Rodney Schultz

DFI D00083
MAINTENANCE DISTRICT 2B HWY 047
WATER QUALITY BIOFILTRATION SWALE
SUNSET HIGHWAY MP 68.36 - 68.39
WASHINGTON COUNTY

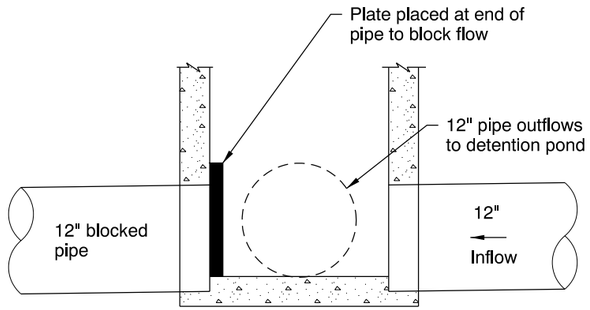


PLAN



FLOW SPLITER DIVERSION MANHOLE AT POINT Ⓐ

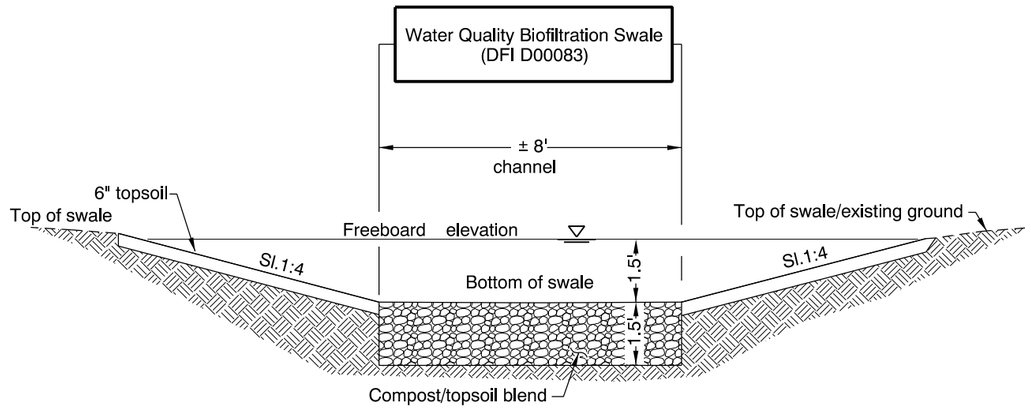
N.T.S.



SECTION C-C

MODIFIED MANHOLE DETAIL AT POINT Ⓗ

N.T.S.



SECTION B-B

N.T.S.

Sht. 2 of 2

OREGON DEPARTMENT OF TRANSPORTATION

Prepared By: Wynee Hu

Drafted By: Rodney Schultz

DFI D00083
MAINTENANCE DISTRICT 2B HWY 047
WATER QUALITY BIOFILTRATION SWALE
SUNSET HIGHWAY MP 68.36 - 68.39
WASHINGTON COUNTY

Appendix B

Content:

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

37V-41

INDEX OF SHEETS	
SHEET NO.	DESCRIPTION
1	Title Sheet
1A, 1A-2	Index Of Sheets Cont'd.
1A-3	Std. Drg. Nos.
1B	Sheet Layout
2, 2A, 2A-2 Thru 2A-65 Incl.	Typical Sections
2B, 2B-2 Thru 2B-18 Incl.	Details
2C, 2C-2	Traffic Control Details
2CA, 2CA-2, 2CA-2A, 2CA-3 Thru 2CA-57 Incl.	Traffic Control Plans - Murray Work Area
2CB, 2CB-2 Thru 2CB-12 Incl.	Traffic Control Plans - Cornell Work Area
2D, 2D-2, Thru 2D-12, Incl.	Pipe Data Sheet

STATE OF OREGON

DEPARTMENT OF TRANSPORTATION

PLANS FOR PROPOSED PROJECT

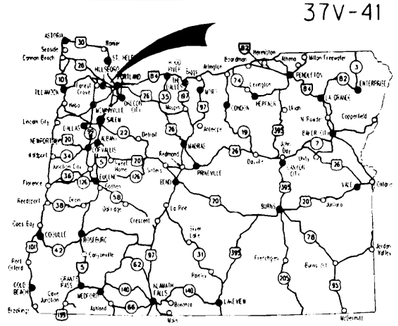
GRADING, DRAINAGE, STRUCTURES, PAVING, SIGNING, ILLUMINATION, SIGNALS, & ROADSIDE DEVELOPMENT

US26: CORNELL RD. - OR217 (BEAVERTON) SEC.

SUNSET HIGHWAY

WASHINGTON COUNTY

MARCH 2004

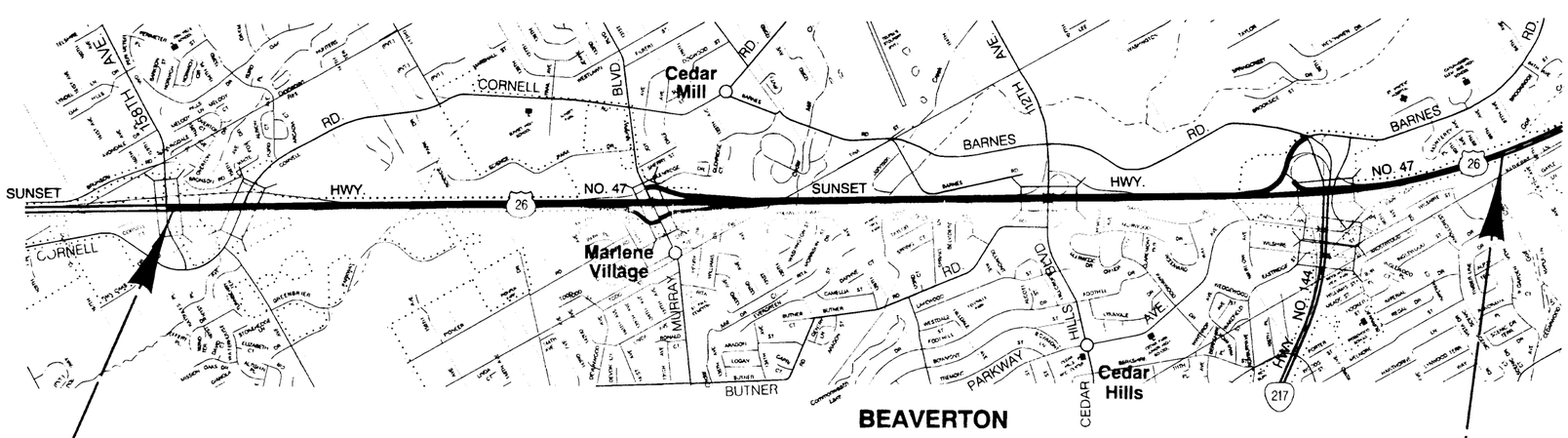


Overall Length Of Project - 6.51 km (4.05 Miles)

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.)

OTIA
OREGON TRANSPORTATION INVESTMENT ACT

LET'S ALL WORK TOGETHER TO MAKE THIS JOB SAFE



BEGINNING OF PROJECT
NH-OTIA-S047(052)
STA. "LW" 91+660.00 (M.P. 65.68)

END OF PROJECT
NH-OTIA-S047(052)
STA. "L" 98+160.00 (M.P. 69.73)

METRIC

OREGON TRANSPORTATION COMMISSION

Stuart Foster	CHAIRMAN
Gail L. Achterman	COMMISSIONER
Mike Nelson	COMMISSIONER
Randall Papé	COMMISSIONER
John Russell	COMMISSIONER
Bruce A. Warner	DIRECTOR OF TRANSPORTATION

REGISTERED PROFESSIONAL ENGINEER
13,704
OREGON
JULY 16, 1987
CATHERINE M. NELSON
Expires Dec. 31, 2004

Catherine M. Nelson
TECHNICAL SERVICES MANAGING ENGINEER

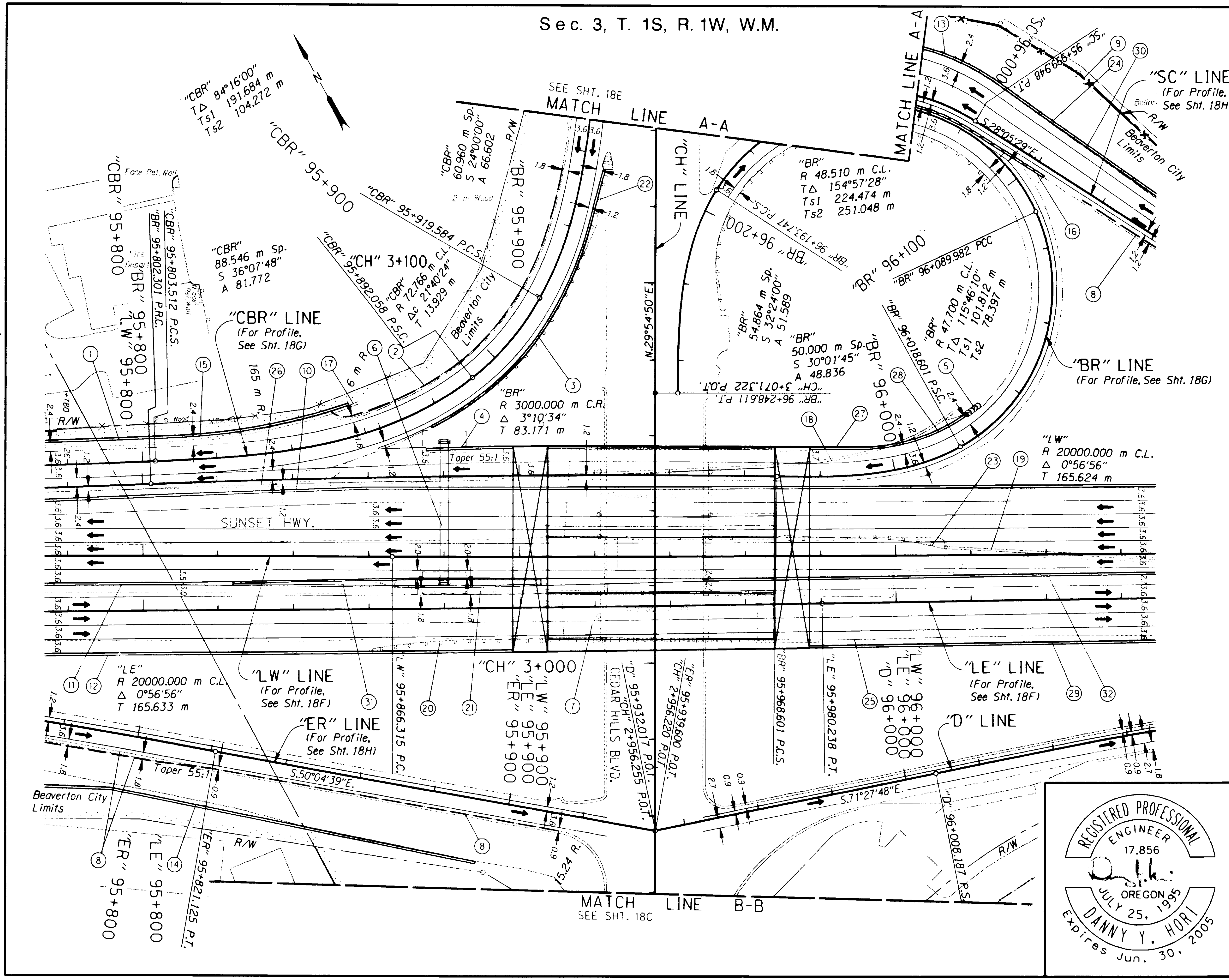
US26: CORNELL RD. - OR217 (BEAVERTON) SEC.
SUNSET HIGHWAY
WASHINGTON COUNTY

FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	NH-OTIA-S047(052)	1

PE000656/C0341403-011

F:\ODOT DATA\Projects\13459 Cornell 217\13459r1.tsl 1/16/2004 1:19:56 PM bwve07p

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



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

REGISTERED PROFESSIONAL ENGINEER 17,856
OREGON
JULY 25, 1995
DANNY Y. HORI
Expires Jun. 30, 2005

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

US26: CORNELL RD. - OR217 (BEAVERTON) SEC.
SUNSET HIGHWAY
WASHINGTON COUNTY

Design Team Leader - David Joe Polly
Designed By - Danny Y. Hori
Drafted By - Tien Nguyen

GENERAL CONSTRUCTION

SHEET NO. 18

STRUCTURAL DETAILS CHECKED

(1) Sta. "CBR" 95+770.98 To Sta. "CBR" 95+809.47, Lt.
Const. Conc. Shldr. Barrier (Reflectorized) - 38.4 m
Grout Barrier (Plug Scuppers)
Flare Rate=0, W=0, E=0.6 m

(2) Remove Extg. Curb
Const. Mountable Curb & Gutter
(For Details, See Sht. 2B-3)
(See Drg. No. RD700)

(3) Sta. "CBR" 95+876.38 To Sta. "CBR" 95+956.00, Rt.
Const. Cast-In-Place Conc. Shldr. Barrier (Reflectorized) - 84.4 m
Flare Rate=20:1, W=0.61 m, E=0
Protect Leading End W/Extg. Impact Attenuator
(See Drg. No. RD505)

(4) Sta. "BR" 95+875.55 To Sta. "BR" 95+898.83, Lt.
Const. Conc. Shldr. Barrier (Reflectorized) -23.3 m
Pin Barrier To Rdwy.
Grout Barrier (Plug Scuppers)
Flare Rate=0, W=0, E=0.6 m
Const. Conc. Barrier Transition To Bridge Rail

(5) Inst. Impact Attenuator
Obstacle Width - 0.6 m
Number Of Bays - 3
(For Details, See Sht. 2B-8)

(6) Bridge No. 19808
Sta. "LW" 95+880.00
Const. Sign Truss And Footings
(For Drg. Nos., See Sht. 1A-2)

(7) Bridge No. 9345
Sta. "LW" 95+907.73 To Sta. "LW" 95+967.47
Remove Extg. Bridge Rail
Remove Extg. Asph. Conc. Surfacing
Const. Bridge Rail
Const. Structure
Const. Structural Overlay
Const. Reinf. Panel At Bridge End W/Bridge Rail - 2
(For Drg. Nos., See Sht. 1A)

(8) Remove Extg. Curb
Const. Low Profile Mountable Curb

(9) Const. Type CL-6 Fence

(10) See Sht. 16, Note 2
Const. Conc. Median Barrier

(11) See Sht. 17, Note 19
Const. Single Slope Conc. Barrier

(12) See Sht. 17, Note 5
Const. Conc. Shldr. Barrier

(13) See Sht. 18E, Note 1
Const. Conc. Shldr. Barrier

(14) See Sht. 14, Note 5
Const. Soundwall No. 515

(15) Sta. "CBR" 95+809.47 To Sta. "CBR" 95+857.71, Lt.
Const. Cast-In-Place Conc. Shldr. Barrier (Reflectorized) - 46.5 m
Flare Rate=20:1, W=2.3 m, E=0.6 m
Const. Conc. Barrier Buried Terminal
(For Details, See Sht. 2B-11)
(See Drg. Nos. RD505 & RD510)

(16) Remove Extg. Conc. Traffic Separator
Const. Type "C" Traffic Separator (600 mm Width)
With 300 mm Drain
(See Drg. No. RD705)

(17) See Sht. 16, Note 9
Remove Extg. Conc. Barrier

(18) Sta. "BR" 95+850.03, Rt. To Sta. "BR" 96+022.12, Lt.
Remove Extg. Conc. Barrier - 169 m

(19) Sta. "LW" 96+012.92, Lt. To Sta. "LW" 96+197.56, Rt.
Remove Extg. Conc. Barrier - 185 m

(20) Sta. "LE" 95+861.18 To Sta. "LE" 95+907.42, Rt.
Remove Extg. Guardrail - 47 m

(21) Sta. "LE" 95+861.48 To Sta. "LE" 95+907.50, Lt.
Remove Extg. Guardrail - 47 m

(22) Sta. "CBR" 95+896.40 To Sta. "CBR" 95+954.31, Rt.
Remove Extg. Guardrail - 62 m

(23) Sta. "LW" 95+967.85 To Sta. "LW" 95+013.73, Lt.
Remove Extg. Guardrail - 47 m

(24) Sta. "SC" 95+984.57 To Sta. "SC" 96+161.83, Lt.
Remove Extg. Guardrail - 180 m

(25) Remove Extg. Curb

(26) Remove Extg. Conc. Traffic Separator

(27) Sta. "BR" 95+976.91 To Sta. "BR" 95+989.29, Lt.
Const. Conc. Shldr. Barrier (Reflectorized) - 11.8 m
Pin Barrier To Rdwy.
Grout Barrier (Plug Scuppers)
Flare Rate=0, W=0, E=0.6 m
Const. Conc. Barrier Transition To Bridge Rail

(28) Sta. "BR" 95+989.29 To Sta. "BR" 96+024.96, Lt.
Const. Cast-In-Place Conc. Shldr. Barrier (Reflectorized) - 32.0 m
Flare Rate=0, W=0, E=0.6 m

(29) Sta. "LE" 95+976.37 To Sta. "LE" 96+195.29, Rt.
Const. Conc. Shldr. Barrier (Reflectorized) - 218.9 m
Grout Barrier (Plug Scuppers)
Flare Rate=0, W=0, E=0
Const. Conc. Barrier Transition To Bridge Rail

(30) Sta. "SC" 96+000.06 To Sta. "SC" 96+099.79, Lt.
Const. Conc. Shldr. Barrier (Reflectorized) - 99.7 m
Pin Barrier To Rdwy.
Grout Barrier (Plug Scuppers)
Flare Rate=0, W=0, E=0.6 m

(31) Sta. "LW" 95+811.13 To Sta. "LW" 95+905.69, Rt.
Const. Single Slope Conc. Barrier Mod. - 94.6 m
Connect To Mod. Median Barrier On Bridge Deck
(For Details, See Shts. 2B-4, 2B-5, 2B-7, 2B-12 & Bridge Drgs.)

(32) Sta. "LW" 95+967.74 To Sta. "LW" 96+200.44, Rt.
Const. Single Slope Conc. Barrier (Reflectorized) - 232.8 m
Flare Rate=0, W=0, E=0
Connect To Extg. Conc. Barrier
(For Details, See Shts. 2B-4 & 2B-5)

STRUCTURAL DETAILS CHECKED

REGISTERED PROFESSIONAL ENGINEER
17,856
OREGON
JULY 25, 1995
DANNY Y. HORI
Expires Jun. 30, 2005

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

US26: CORNELL RD. - OR217 (BEAVERTON) SEC.
SUNSET HIGHWAY
WASHINGTON COUNTY

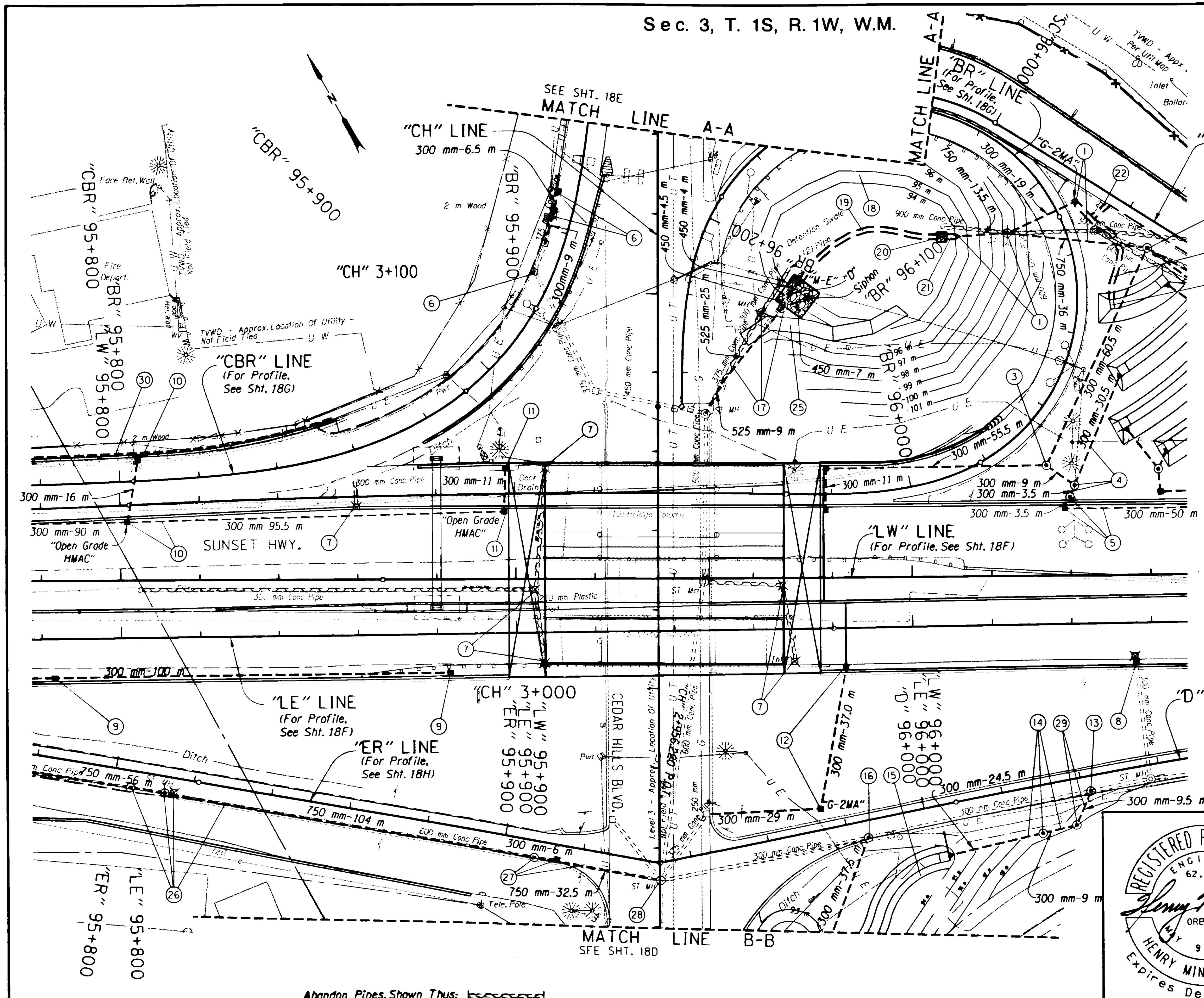
Design Team Leader - David Joe Polly
Designed By - Danny Y. Hori
Drafted By - Tien Nguyen

GENERAL CONSTRUCTION NOTES

SHEET NO. 18A

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

37V-41



Revised 2/18/2004
⚠ Removed Bubble & Leader Line

REGISTERED PROFESSIONAL ENGINEER 62,609
OREGON
MAY 9, 2000
HENRY MINTON ALLEN
Expires Dec. 31, 2005

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

US26: CORNELL RD. - OR217 (BEAVERTON) SEC.
SUNSET HIGHWAY
WASHINGTON COUNTY

Design Team Leader - Eileen J. Phelan
Designed By - Henry M. Allen
Drafted By - Tien Nguyen

DRAINAGE & UTILITIES

SHEET NO. 18B

(1) Sta. "BR" 96+092.55, Lt.
Remove Manhole
Const. Manhole, Large, 1500 mm Dia.
Const. Type "G-2MA" Inlet
Inst. 300 mm Storm Sew. Pipe - 19.0 m
3 m Depth
Inst. 750 mm Storm Sew. Pipe - 49.5 m
6 m Depth
Const. Paved End Slope - 4.6 m^2

(2) Sta. "SC" 96+049.10, Rt.
Const. Manhole, Large, 1500 mm Dia.
Const. Type "G-1" Inlet - 4
Inst. 300 mm Storm Sew. Pipe - 136 m
3 m Depth
Inst. 750 mm Storm Sew. Pipe - 69.0 m
6 m Depth
Const. Paved End Slope - 4
9.6 m^2 (Total)

(3) Sta. "BR" 96+030.25, Rt.
Const. Manhole
Const. Type "G-2" Open Graded HMAC Inlet - 2
Inst. 300 mm Storm Sew. Pipe - 11.0 m
1.5 m Depth
Inst. 300 mm Storm Sew. Pipe - 64.5 m
3 m Depth
Const. Wearing Surface Drain - 32.0 m
Const. Wearing Surface Drain Outlet - 2
(See Drg. No. RD314)

(4) Sta. "LW" 96+041.03, Lt.
Const. Manhole, Type Diversion, "High-Low"
Inst. 300 mm Storm Sew. Pipe - 34.0 m
1.5 m Depth
Const. Paved End Slope - 2.4 m^2
(For Details, See Sht. GHJ-19)

(5) Sta. "LW" 96+039.85, Lt.
Const. Manhole, Type Pollution Control
Const. Type "G-2" Open Graded HMAC Inlet - 2
Inst. 300 mm Storm Sew. Pipe - 53.5 m
1.5 m Depth
(For Details, See Sht. GHJ-30)

(6) Sta. "CBR" 95+936.03, Lt.
Remove Inlet
Adjust Inlet - 2
Const. Type "G-2" Inlet - 2
Inst. 300 mm Storm Sew. Pipe - 6.5 m
1.5 m Depth
Inst. 300 mm Storm Sew. Pipe - 9.0 m
3 m Depth

(7) Remove Inlet - 6

(8) Sta. "LE" 96+056.07, Rt.
Remove Inlet
Const. Type "G-2" Open Graded HMAC Inlet
Remove Extg. Pipe - 1.5 m

(9) Sta. "LE" 95+783.23, Rt.
Const. Type "G-2" Open Graded HMAC Inlet - 2
Inst. 300 mm Storm Sew. Pipe - 100.0 m
1.5 m Depth

(10) Sta. "LW" 95+801.64, Lt.
Const. Type "G-2" Inlet
Const. Type "G-2" Open Graded HMAC Inlet
Inst. 300 mm Storm Sew. Pipe - 111.5 m
3 m Depth
Rock Exc. - 12 m^3

(11) Sta. "LW" 95+897.15, Lt.
Const. Type "G-2" Inlet
Const. Type "G-2" Open Graded HMAC Inlet
Inst. 300 mm Storm Sew. Pipe - 11.0 m
3 m Depth

(12) Sta. "D" 95+946.09, Rt.
Const. Type "G-2" Open Graded HMAC Inlet
Const. Type "G-2MA" Inlet
Inlet F.L. 92.800
Inst. 300 mm Storm Sew. Pipe - 66.0 m
1.5 m Depth
Inst. 3 Piece Elbow - 2
Inst. Slip Joint
Inst. Slope Anchor - 6
Connect To Extg.
Const. Wearing Surface Drain - 16.5 m
Const. Wearing Surface Drain Outlet
(For Details, See Sht. GHJ-4)

(13) Sta. "D" 96+042.07, Rt.
Const. Manhole, Type Diversion, "High-Low"
Manhole Flow Line, See Sht. GHJ-18
(For Details, See Sht. GHJ-18)

(14) Sta. "D" 96+028.13, Rt.
Const. Manhole, Type Pollution Control
Inst. 300 mm Storm Sew. Pipe - 33.5 m
6 m Depth
Manhole Flow Line 93.968
Outfall Flow Line 93.600
Const. Paved End Slope - 2.4 m^2
(For Details, See Sht. GHJ-29)

(15) Const. Water-Quality Swale "S1"
(For Details, See Sht. GHJ-47)

(16) Sta. "D" 95+984.89, Rt.
Const. Manhole, Mod.
Inst. 300 mm Storm Sew. Pipe - 37.5 m
1.5 m Depth
Manhole Flow Line Match Extg. (93.194±)
Outfall Flow Line 90.950
Const. Paved End Slope - 2.4 m^2
(For Details, See Sht. GHJ-6)

(17) Sta. "BR" 96+250.48, Lt.
Remove Manhole
Reconst. Manhole
Const. Manhole, Large, 1800 mm Dia.
Remove Inlet
Const. Type "M-E" Inlet
Const. Type "D" Detention Modified Inlet
Const. Siphon Box
Reconst. Inlet
Remove Pipe - 15 m
Inst. 450 mm Storm Sew. Pipe - 15.5 m
3 m Depth
Inst. 525 mm Storm Sew. Pipe - 34.0 m
3 m Depth
Connect To Extg.
Const. Loose Riprap Blanket (Class 50) - 60 MG
8 m Wide x 8 m Long x 0.45 m Thick Around Inlets
Riprap Geotextile, Type 2 - 80 m^2
Tr. Resurf. - 18 m^2
(For Details, See Shts. GHJ-5 & GHJ-6)

(18) Regrade Detention Basin
Clearing And Grubbing - 0.8 ha
Gen. Exc. - 4500 m^3
(For Details, See Sht. GHJ-44)

(19) Sta. "BR" 96+115.61, Lt.
Const. Loose Riprap Channel (Class 25) - 240 MG
Riprap Geotextile, Type 2 - 270 m^2
(For Details, See Sht. GHJ-8)

(20) Sta. "BR" 96+110.69, Lt.
Const. Loose Riprap Basin (Class 100) - 44 MG
Riprap Geotextile, Type 2 - 60 m^2
(For Details, See Sht. GHJ-9)

(21) Sta. "BR" 96+103.82, Lt.
Const. Loose Riprap Channel (Class 350) - 26 MG
Riprap Geotextile, Type 2 - 25 m^2
(For Details, See Sht. GHJ-8)

(22) Sta. "SC" 96+034.54, Rt.
Const. Loose Riprap Channel (Class 25) - 22 MG
Riprap Geotextile, Type 2 - 34 m^2
Dt. Exc. - 14 m^3
(For Details, See Sht. GHJ-8)

(23) Sta. "BR" 96+068.63, Rt.
Const. Loose Riprap Channel (Class 25) - 130 MG
Riprap Geotextile, Type 2 - 204 m^2
Dt. Exc. - 81 m^3
(For Details, See Sht. GHJ-8)

(24) Sta. "BR" 96+067.66, Rt.
Const. Loose Riprap Basin (Class 25) - 2.5 MG
Riprap Geotextile, Type 2 - 6.5 m^2
(For Details, See Sht. GHJ-9)

(25) Const. Access Road
Aggregate Base (75mm - 0) - 110 MG
Subgrade Geotextile - 191 m^2
(For Details, See Sht. GHJ-7)

(26) Sta. "ER" 95+804.38, Rt.
Remove Manhole
Const. Manhole, Large, 1500 mm Dia.
Remove Inlet
Remove Pipe - 104.0 m
Inst. 750 mm Storm Sew. Pipe - 104.0 m
6 m Depth

(27) Sta. "ER" 95+908.02, Rt.
Const. Manhole, Large, 1500 mm Dia.
Const. Type "G-2" Inlet
Remove Pipe - 32.5 m
Inst. 300 mm Storm Sew. Pipe - 6.0 m
3 m Depth
Inst. 750 mm Storm Sew. Pipe - 32.5 m
6 m Depth
Tr. Resurf. - 32 m^2

(28) Sta. "ER" 95+940.44, Rt.
Remove Manhole
Const. Manhole, Large, 2400 mm Dia.
Connect To Extg. - 6

(29) Sta. "D" 96+036.93, Rt.
Const. Manhole
Inst. 300 mm Storm Sew. Pipe - 9.5 m,
3 m Depth
Manhole Flow Line 94.100 W., 95.542 E.

(30)
Sta. "CBR" 95+773.05 To Sta. "CBR" 95+857.74, Lt.
Const. Conc. Barrier Drain - 83.0 m
Drain To Gutter
Emb. In Place - 40 m^3
(For Details, See Sht. GHJ-1)

REGISTERED PROFESSIONAL ENGINEER
62,609
OREGON
MAY 9, 2000
HENRY MINTON ALLEN
Expires Dec. 31, 2005

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

US26: CORNELL RD. - OR217 (BEAVERTON) SEC.
SUNSET HIGHWAY
WASHINGTON COUNTY

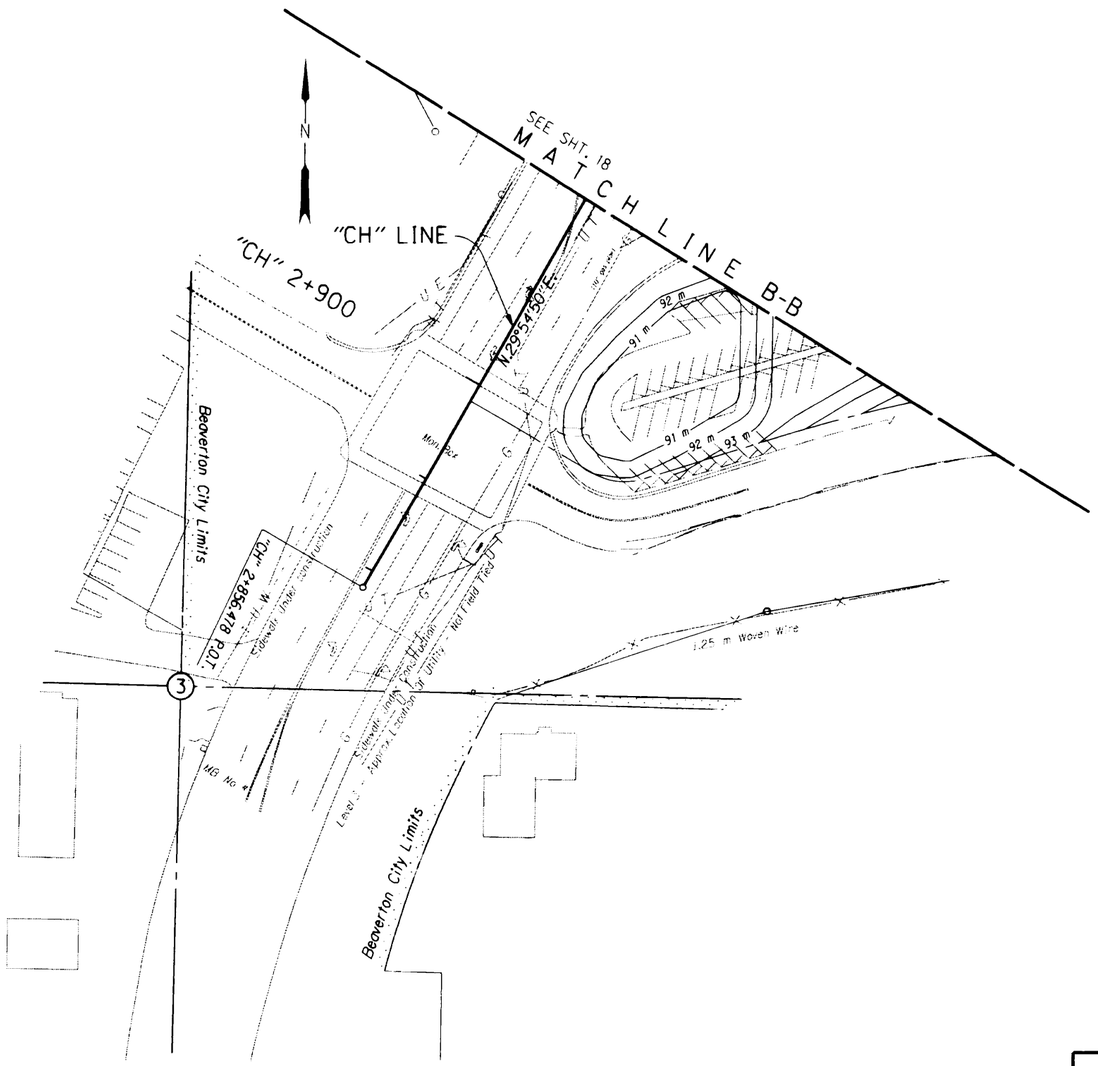
Design Team Leader - Eileen J. Phelan
Designed By - Henry M. Allen
Drafted By - Tien Nguyen

DRAINAGE & UTILITIES NOTES

SHEET NO. 18B-2

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

37V-41



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

REGISTERED PROFESSIONAL ENGINEER
17,856
OREGON
JULY 25, 1995
DANNY Y. HORI
Expires Jun. 30, 2005

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

US26: CORNELL RD. - OR217 (BEAVERTON) SEC.
SUNSET HIGHWAY
WASHINGTON COUNTY

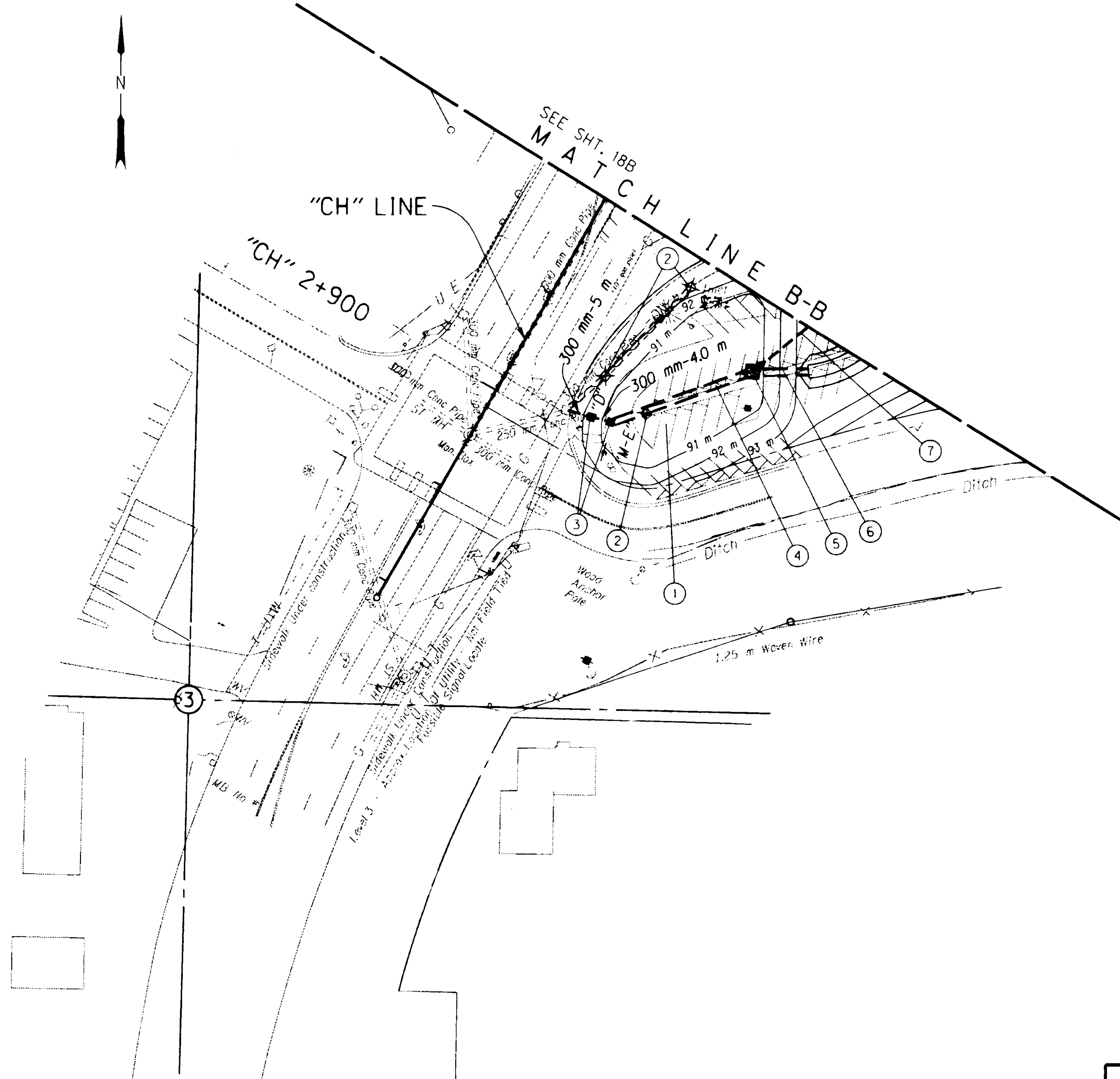
Design Team Leader - David Joe Polly
Designed By - Danny Y. Hori
Drafted By - Tien Nguyen

GENERAL CONSTRUCTION

SHEET NO. 18C

scdata3 nwye07w ODOT_DATA PROJECTS 13459_Cornell_217 13459gt1.dgn 12-22-2005 2:56:56 PM nwye07w

1:1000 - 4



① Const. Detention Basin
Removal Of Pvmt. - 1880 m²
Clearing And Grubbing - 0.2 ha
Gen. Exc. - 3600 m³
(For Details, See Sht. GHJ-46)

② Remove Inlet - 3
Remove Pipe - 32 m

③ Sta. "D" 95+933.98, Rt.
Const. Type "M-E" Detention Modified Inlet
Const. Type "D" Inlet
Lip Elev. 91.550
Inst. 300 mm Storm Sew. Pipe - 9 m
1.5 m Depth
Connect To Existing
Trench Resurfacing - 2 m²
(For Details, See Sht. GHJ-5)

④ Sta. "D" 95+963.17, Rt.
Const. Loose Riprap Channel (Class 25) - 162 MG
Riprap Geotextile, Type 2 - 165 m²
(For Details, See Sht. GHJ-8)

⑤ Sta. "D" 95+964.14, Rt.
Const. Loose Riprap Basin (Class 25) - 18 MG
Riprap Geotextile, Type 2 - 16 m²
(For Details, See Sht. GHJ-9)

⑥ Sta. "D" 95+973.85, Rt.
Const. Loose Riprap Channel (Class 25) - 41 MG
Riprap Geotextile, Type 2 - 58 m²
(For Details, See Sht. GHJ-8)

⑦ See Sht. 18B-2, Note 16

REGISTERED PROFESSIONAL ENGINEER 62,609
OREGON
MAY 9, 2000
HENRY MINTON ALLEN
Expires Dec. 31, 2005

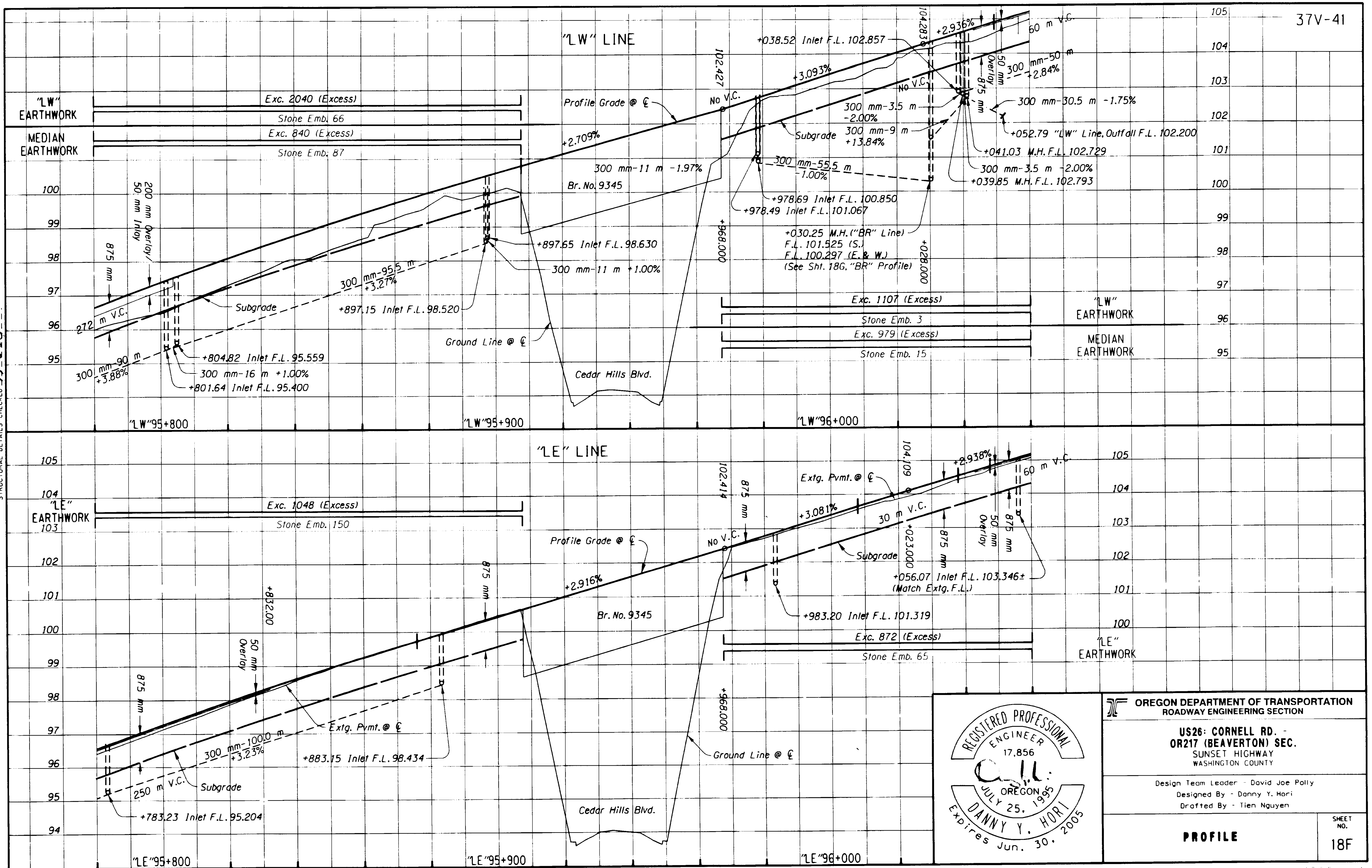
OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

US26: CORNELL RD. - OR217 (BEAVERTON) SEC.
SUNSET HIGHWAY
WASHINGTON COUNTY

Design Team Leader - Eileen J. Phelan
Designed By - Henry M. Allen
Drafted By - Tien Nguyen

DRAINAGE & UTILITIES

SHEET NO. 18D



"LW" LINE
"LW" EARTHWORK
Exc. 2040 (Excess)
Stone Emb. 66
MEDIAN EARTHWORK
Exc. 840 (Excess)
Stone Emb. 87
Profile Grade @ ℄
No V.C.
102.427
104.283
+3.093%
+2.936%
+2.709%
60 m V.C.
+038.52 Inlet F.L. 102.857
50 mm Overlay
875 mm
300 mm-50 m +2.84%
300 mm-30.5 m -1.75%
+052.79 "LW" Line, Outfall F.L. 102.200
300 mm-3.5 m -2.00%
300 mm-9 m +13.84%
Subgrade
+041.03 M.H. F.L. 102.729
300 mm-3.5 m -2.00%
+039.85 M.H. F.L. 102.793
300 mm-11 m -1.97%
300 mm-55.5 m -1.00%
Br. No. 9345
+978.69 Inlet F.L. 100.850
+978.49 Inlet F.L. 101.067
+030.25 M.H. ("BR" Line)
F.L. 101.525 (S.)
F.L. 100.297 (E. & W.)
(See Sht. 18G, "BR" Profile)
+968.000
+028.000
200 mm Overlay/
50 mm Inlay
875 mm
+897.65 Inlet F.L. 98.630
300 mm-11 m +1.00%
300 mm-95.5 m +3.27%
+897.15 Inlet F.L. 98.520
Subgrade
272 m V.C.
Ground Line @ ℄
Exc. 1107 (Excess)
Stone Emb. 3
Exc. 979 (Excess)
Stone Emb. 15
"LW" EARTHWORK
MEDIAN EARTHWORK
+804.82 Inlet F.L. 95.559
300 mm-16 m +1.00%
+801.64 Inlet F.L. 95.400
300 mm-90 m +3.88%
Cedar Hills Blvd.
"LW"95+800
"LW"95+900
"LW"96+000
"LE" LINE
"LE" EARTHWORK
Exc. 1048 (Excess)
Stone Emb. 150
102.414
875 mm
104.109
Extg. Pvmt. @ ℄
+2.938%
60 m V.C.
+3.081%
30 m V.C.
+023.000
875 mm
50 mm Overlay
875 mm
Profile Grade @ ℄
No V.C.
Subgrade
+2.916%
+056.07 Inlet F.L. 103.346±
(Match Extg. F.L.)
+832.00
875 mm
Br. No. 9345
+983.20 Inlet F.L. 101.319
Exc. 872 (Excess)
Stone Emb. 65
"LE" EARTHWORK
50 mm Overlay
875 mm
+968.000
Extg. Pvmt. @ ℄
300 mm-100.0 m +3.23%
+883.15 Inlet F.L. 98.434
Ground Line @ ℄
250 m V.C.
Subgrade
+783.23 Inlet F.L. 95.204
Cedar Hills Blvd.
"LE"95+800
"LE"95+900
"LE"96+000
105
104
103
102
101
100
99
98
97
96
95
94
STRUCTURAL DETAILS CHECKED

REGISTERED PROFESSIONAL ENGINEER
17,856
OREGON
JULY 25, 1995
DANNY Y. HORI
Expires Jun. 30, 2005

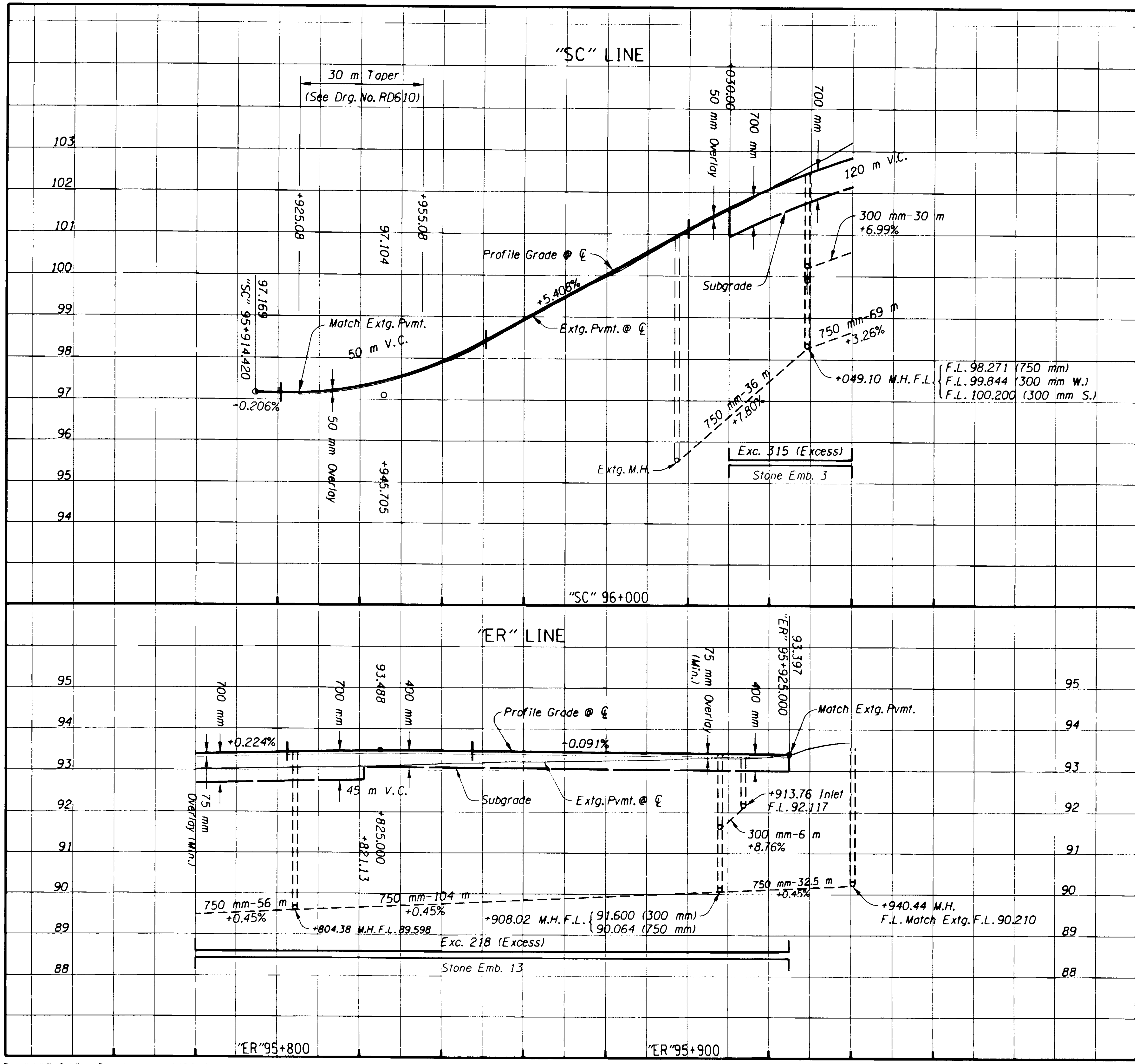
OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

US26: CORNELL RD. - OR217 (BEAVERTON) SEC.
SUNSET HIGHWAY
WASHINGTON COUNTY

Design Team Leader - David Joe Polly
Designed By - Danny Y. Hori
Drafted By - Tien Nguyen

PROFILE

SHEET NO. 18F



REGISTERED PROFESSIONAL ENGINEER 17,856 OREGON JULY 25, 1995 DANNY Y. HORI Expires Jun. 30, 2005

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

US26: CORNELL RD. - OR217 (BEAVERTON) SEC.
SUNSET HIGHWAY
WASHINGTON COUNTY

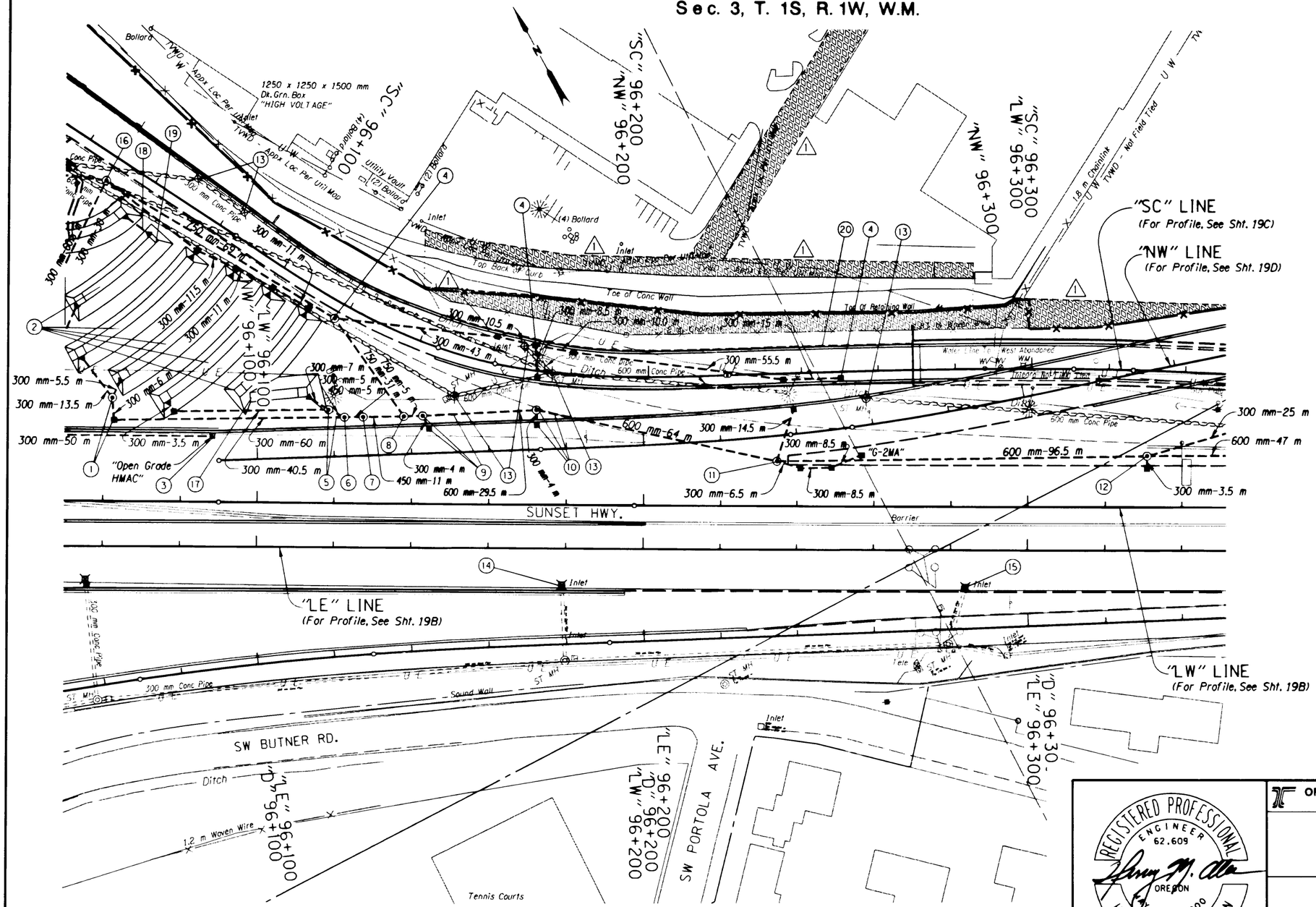
Design Team Leader - David Joe Polly
Designed By - Danny Y. Hori
Drafted By - Tien Nguyen

PROFILE

SHEET NO. 18H

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

37V-41



⚠1 *Areas Not To Be Occupied Before 5/1/2004. Shown Thus:*

Abandon Pipes, Shown Thus:

Revised 2/3/2004

⚠1 Restricted R/W.

REGISTERED PROFESSIONAL ENGINEER 62,609 OREGON HENRY MINTON ALLEN Expires Dec. 31, 2005

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

US26: CORNELL RD. - OR217 (BEAVERTON) SEC.
SUNSET HIGHWAY
WASHINGTON COUNTY

Design Team Leader - Eileen J. Phelan
Designed By - Henry M. Allen
Drafted By - Tien Nguyen

DRAINAGE & UTILITIES

SHEET NO. 19A

F:\ODOT_DATA\Projects\13459_Cornell_217\13459ct1.plt 2/3/2004 1:52:35 PM hwye07n

1:1000 - 5

① Sta. "LW" 96+062.17, Lt.
Const. Manhole, Type Diversion, "Low-Low"
Const. Type "G-1" Inlet
Inst. 300 mm Storm Sew. Pipe - 85.0 m
1.5 m Depth
Const. Paved End Slope - 2
4.8 m^2 (Total)
(For Details, See Sht. GHJ-21)

② Const. Water-Quality Swales
"N1, N2, N3, N4, N5" - 5
(For Details, See Sht. GHJ-45)

③ See Sht. 18B-2, Note 5

④ Sta. "SC" 96+117.78, Rt.
Const. Manhole, Large, 1500 mm Dia.
Const. Type "G-2" Inlet - 6
Inst. 300 mm Storm Sew. Pipe - 99.5 m
1.5 m Depth
Inst. 300 mm Storm Sew. Pipe - 43.0 m
6 m Depth
Inst. 750 mm Storm Sew. Pipe - 31.0 m
6 m Depth

⑤ Sta. "LW" 96+118.96, Lt.
Const. Manhole, Type Diversion, "Low-Low"
Const. Type "G-1" Inlet
Inst. 300 mm Storm Sew. Pipe - 56.0 m
1.5 m Depth
Const. Paved End Slopes - 2
4.8 m^2 (Total)
(For Details, See Sht. GHJ-21)

⑥ Sta. "NW" 96+122.99, Lt.
Const. Manhole, Type Diversion, "Low-Low"
Inst. 450 mm Storm Sew. Pipe - 5.0 m
1.5 m Depth
(For Details, See Sht. GHJ-21)

⑦ Sta. "NW" 96+127.81, Lt.
Const. Manhole, Type Pollution Control
Inst. 450 mm Storm Sew. Pipe - 11.0 m
1.5 m Depth
(For Details, See Sht. GHJ-30)

⑧ Sta. "NW" 96+138.32, Lt.
Const. Manhole, Type Diversion, "High-Low"
Inst. 750 mm Storm Sew. Pipe - 5.0 m
3 m Depth
(For Details, See Sht. GHJ-19)

⑨ Sta. "NW" 96+143.24, Lt.
Const. Manhole, Large, 1500 mm Dia.
Const. Type "G-2" Open Graded HMAC Inlet
Inst. 300 mm Storm Sew. Pipe - 4.0 m
1.5 m Depth
Inst. 600 mm Storm Sew. Pipe - 29.5 m
3 m Depth

⑩ Sta. "NW" 96+172.69, Lt.
Const. Manhole, Shallow
Const. Type "G-2" Open Graded HMAC Inlet
Inst. 300 mm Storm Sew. Pipe - 4.0 m
1.5 m Depth
Inst. 600 mm Storm Sew. Pipe - 64.0 m
6 m Depth

⑪ Sta. "LW" 96+234.77, Lt.
Const. Manhole
Const. Type "G-2" Open Graded HMAC Inlet - 3
Const. Type "G-2MA" Inlet
Inst. 300 mm Storm Sew. Pipe - 17.0 m
1.5 m Depth
Inst. 300 mm Storm Sew. Pipe - 21.0 m
3 m Depth
Inst. 600 mm Storm Sew. Pipe - 96.5 m
6 m Depth

⑫ Sta. "LW" 96+330.89, Lt.
Const. Manhole
Const. Type "G-2" Open Graded HMAC Inlet
Inst. 300 mm Storm Sew. Pipe - 3.5 m
3 m Depth
Inst. 600 mm Storm Sew. Pipe - 47.0 m
6 m Depth

⑬ Remove Inlets - 4
Remove Manholes - 3

⑭ Sta. "LE" 96+179.11, Rt.
Remove Inlet
Const. Type "G-2" Open Graded HMAC Inlet
Remove Extg. Pipe - 1.0 m

⑮ Sta. "LE" 96+283.60, Rt.
Remove Inlet
Const. Type "G-2" Open Graded HMAC Inlet
Remove Extg. Pipe - 0.5 m

⑯ See Sht. 18B-2, Note 2

⑰ Sta. "NW" 96+098.56, Lt.
Const. Loose Riprap Channel (Class 25) - 16 MG
Riprap Geotextile, Type 2 - 24 m^2
For Details, See Sht. GHJ-8)

⑱ Sta. "SC" 96+057.96, Rt.
Inst. 300 mm Storm Sew. Pipe - 8.5 m
1.5 m Depth
Const. Paved End Slopes - 2
4.8 m^2 (Total)

⑲ Sta. "SC" 96+067.55, Rt.
Const. Loose Riprap Basin (Class 25) - 2.5 MG
Riprap Geotextile, Type 2 - 6.5 m^2
(For Details, See Sht. GHJ-9)

⑳ Sta. "SC" 96+145.00 To Sta. "SC" 96+269.00, Lt.
Const. Conc. Barrier Drain - 121.5 m
Drain To Inlet +170.00
Emb. In Place - 290 m^3
(For Details, See Sht. GHJ-1)

REGISTERED PROFESSIONAL ENGINEER
62,609
OREGON
MAY 9, 2000
HENRY MINTON ALLEN
Expires Dec. 31, 2005

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

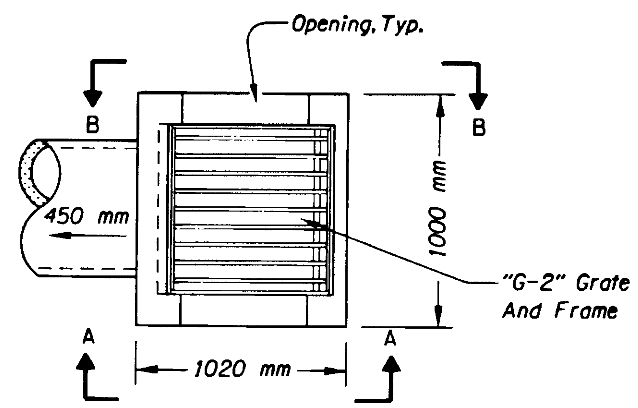
US26: CORNELL RD. - OR217 (BEAVERTON) SEC.
SUNSET HIGHWAY
WASHINGTON COUNTY

Design Team Leader - Eileen J. Phelan
Designed By - Henry M. Allen
Drafted By - Tien Nguyen

DRAINAGE & UTILITIES NOTES

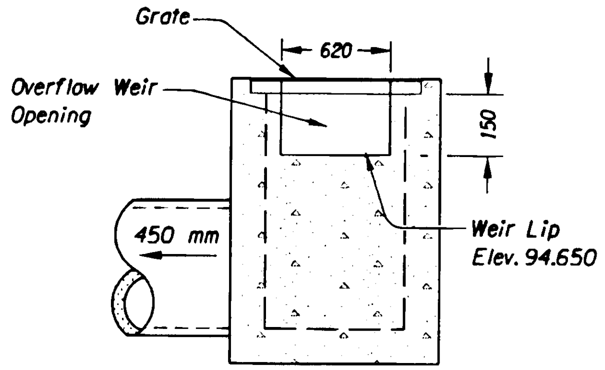
SHEET NO. 19A-2

SIPHON BOX WITH "G-2" GRATE

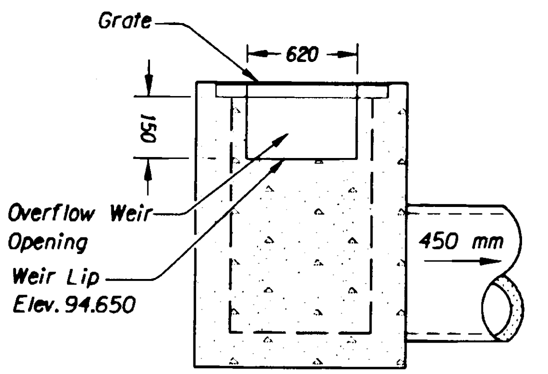


PLAN

Note:
For Details Not Shown, See RD364 & RD376

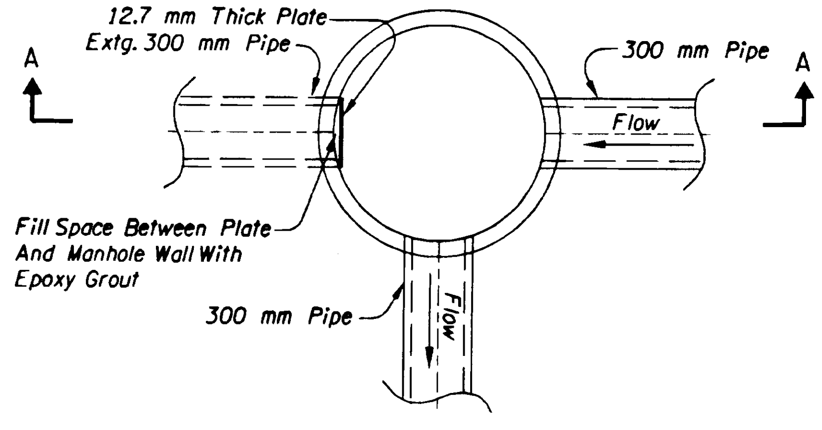


SECTION A-A

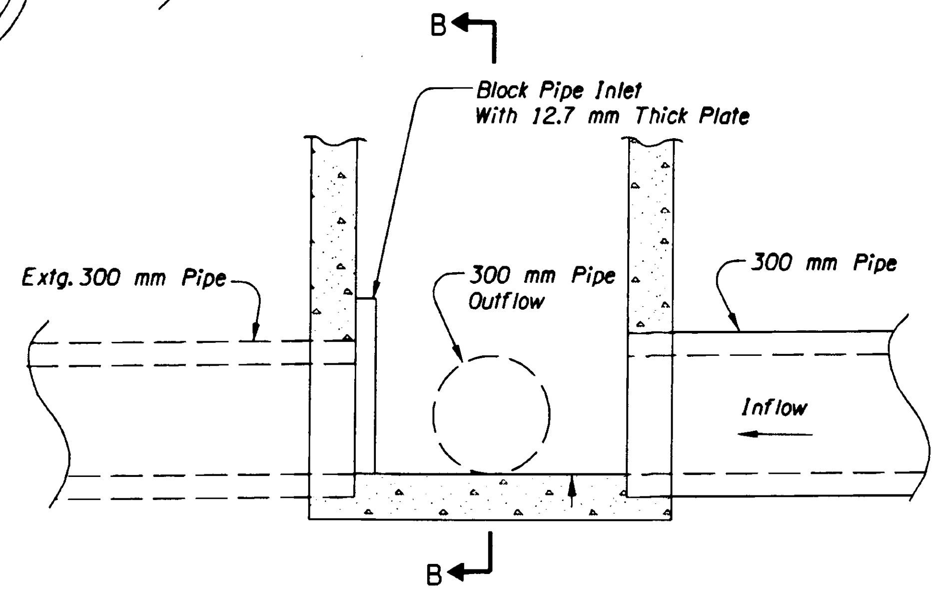


SECTION B-B

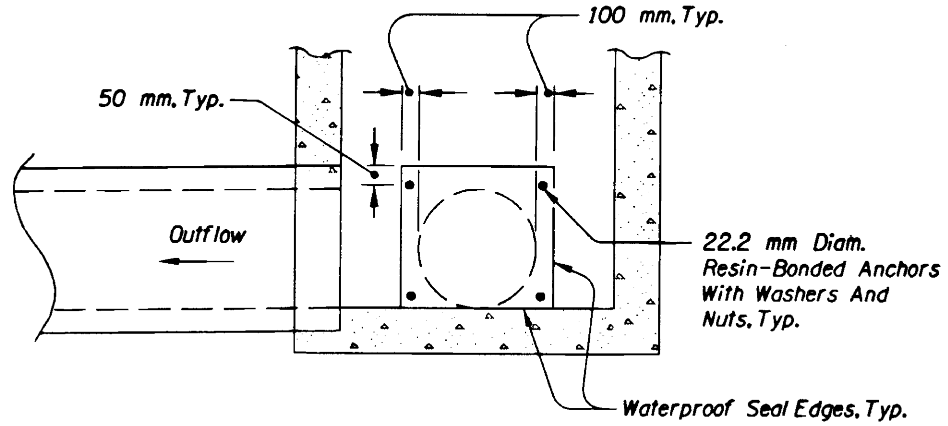
MANHOLE MODIFIED



PLAN



SECTION A-A



SECTION B-B

Note:
For Details Not Shown, See Sht. GHJ-20

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

REGISTERED PROFESSIONAL ENGINEER 62,609
OREGON
MAY 9, 2000
HENRY MINTON ALLEN
Expires Dec. 31, 2005

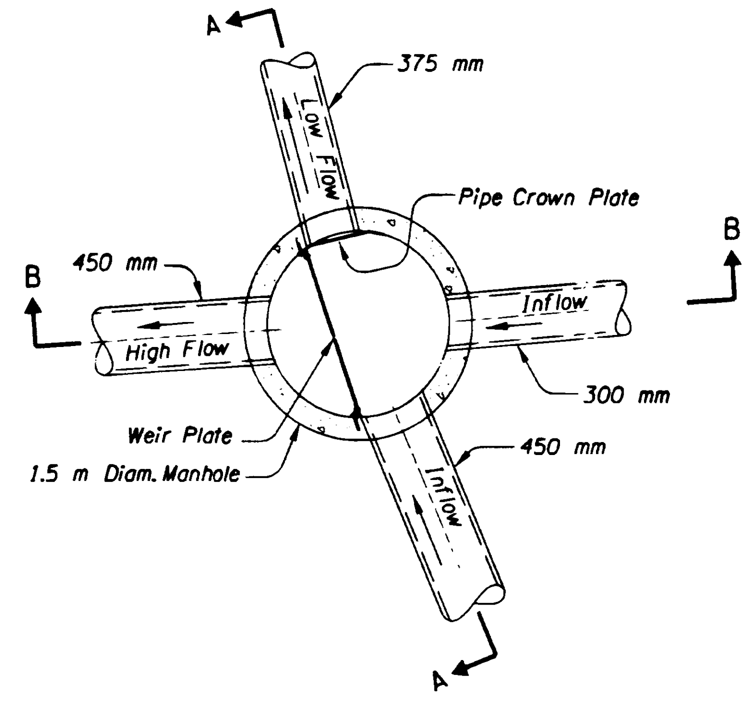
OREGON DEPARTMENT OF TRANSPORTATION
GEO / HYDRO SECTION

US26: CORNELL RD. - OR217 (BEAVERTON) SEC.
SUNSET HIGHWAY
WASHINGTON COUNTY

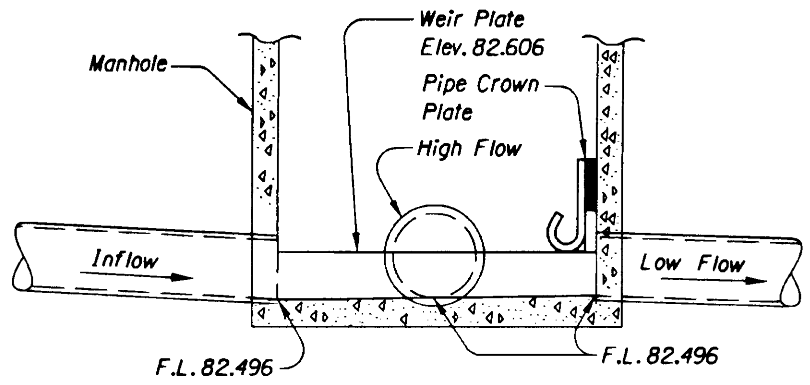
Project Leader - Naveen Chandra
Designed By - Henry M. Allen
Drafted By - Martin G. Casillas

WATER QUALITY DETAILS

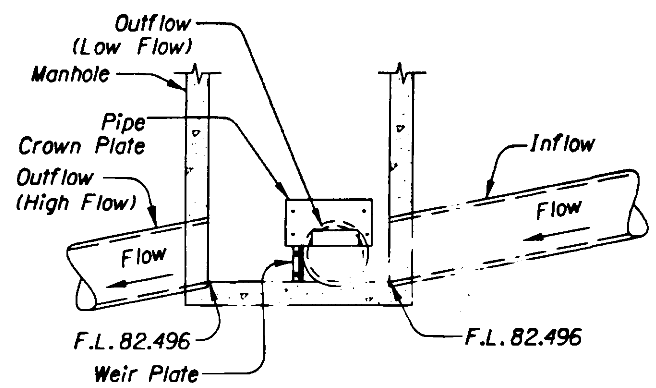
SHEET NO. GHJ-6



PLAN



SECTION A-A

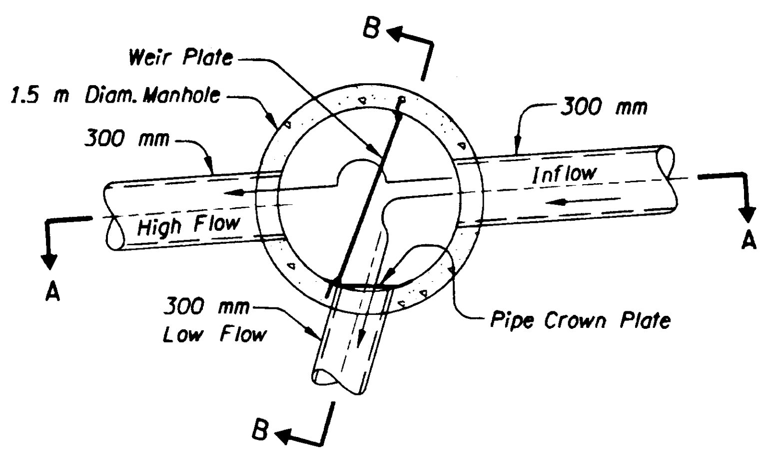


SECTION B-B

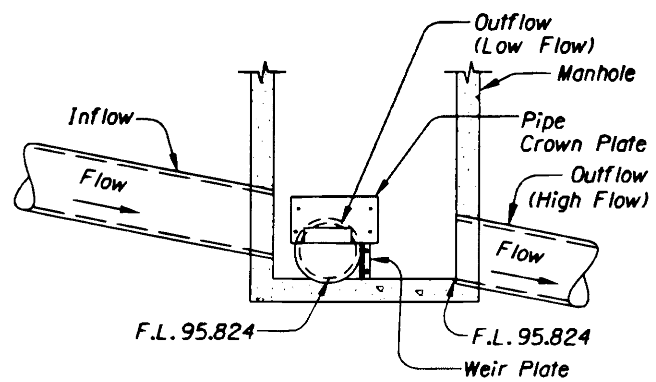
For Details Not Shown, See Sht. GHJ-20

DIVERSION MANHOLE "HIGH-LOW" LOW FLOW STRAIGHT THROUGH

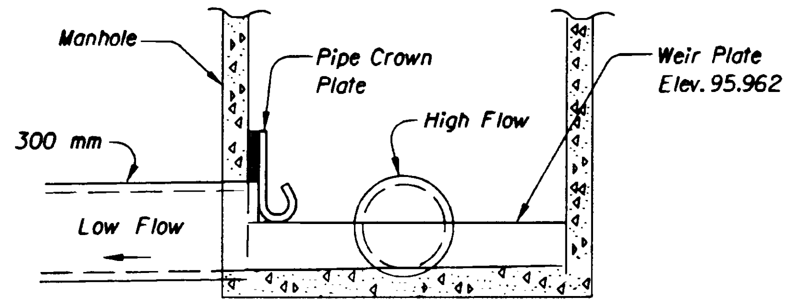
Sta. "CBR"95+523, Lt.



PLAN



SECTION A-A



SECTION B-B

For Details Not Shown, See Sht. GHJ-20

DIVERSION MANHOLE "HIGH-LOW", LOW FLOW TO SIDE

Sta. "D"96+042, Rt.

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

REGISTERED PROFESSIONAL ENGINEER 62,609 OREGON 9, 2000 HENRY MINTON ALLEN Expires Dec. 31, 2005

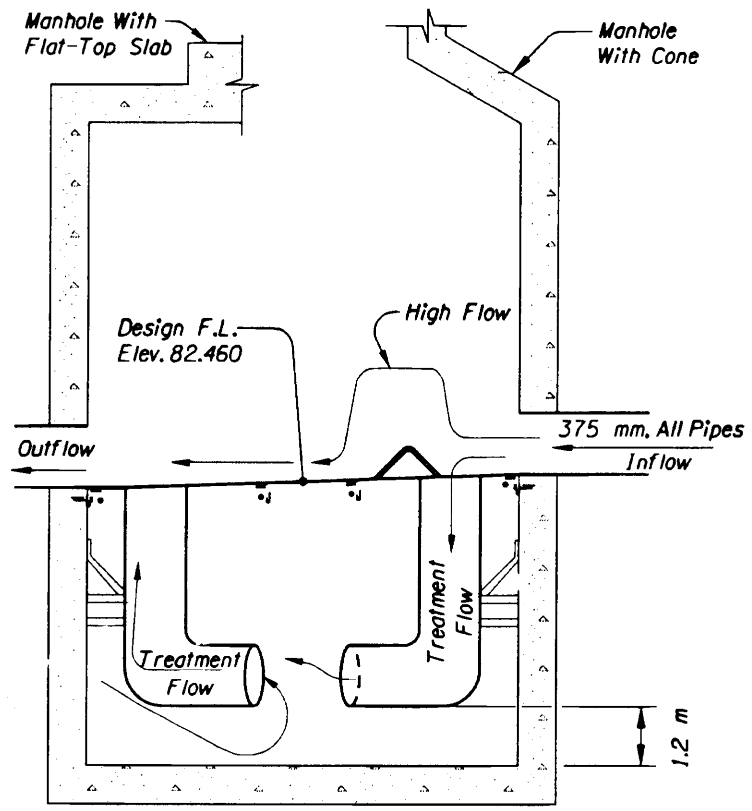
OREGON DEPARTMENT OF TRANSPORTATION
GEO / HYDRO SECTION

US26: CORNELL RD. - OR217 (BEAVERTON) SEC.
SUNSET HIGHWAY
WASHINGTON COUNTY

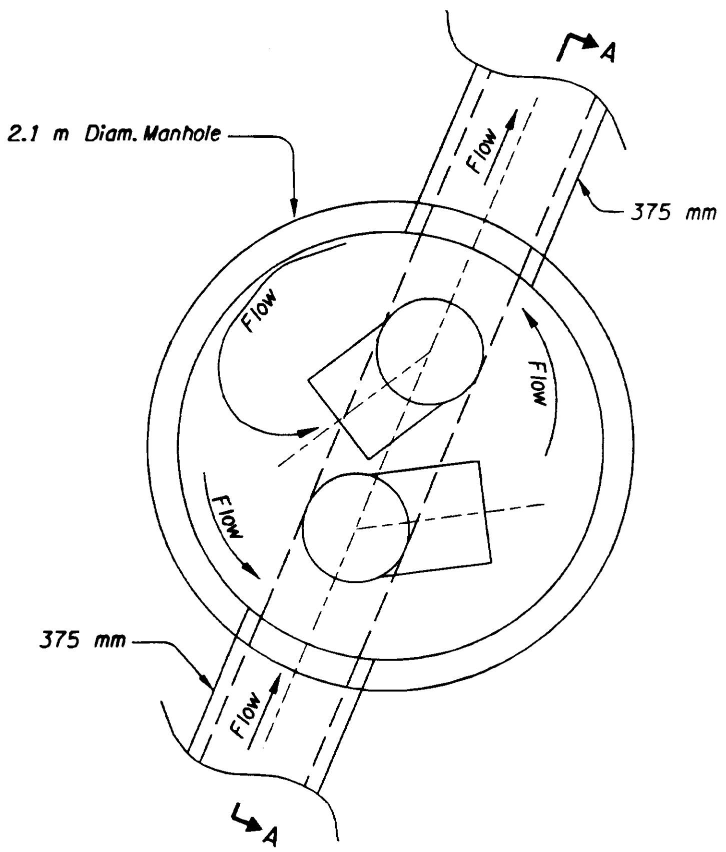
Project Leader - Naveen Chandra
Designed By - Henry M. Allen
Drafted By - Martin G. Casillas

WATER QUALITY DETAILS

SHEET NO. GHJ-18



SECTION A-A

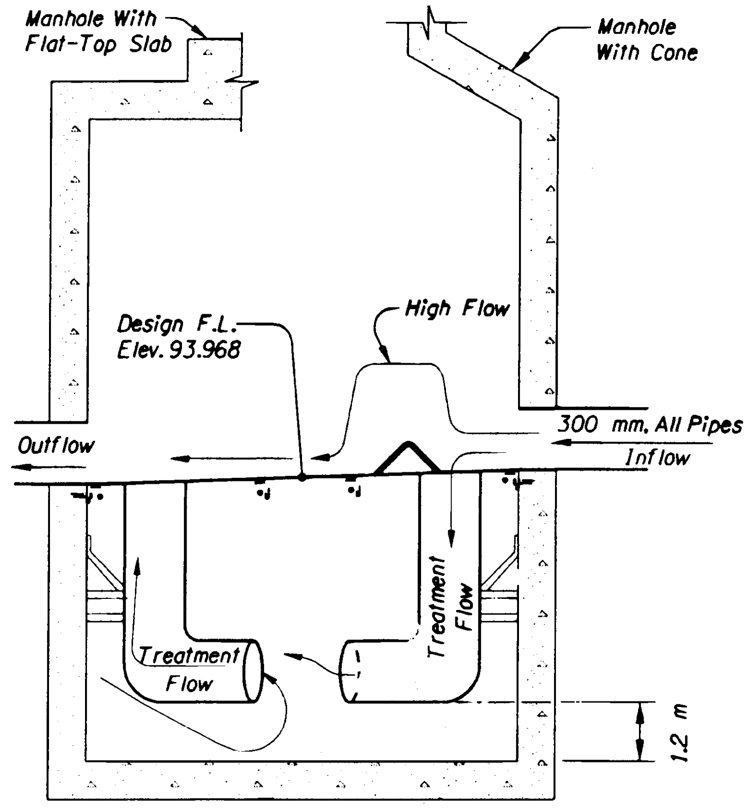


PLAN

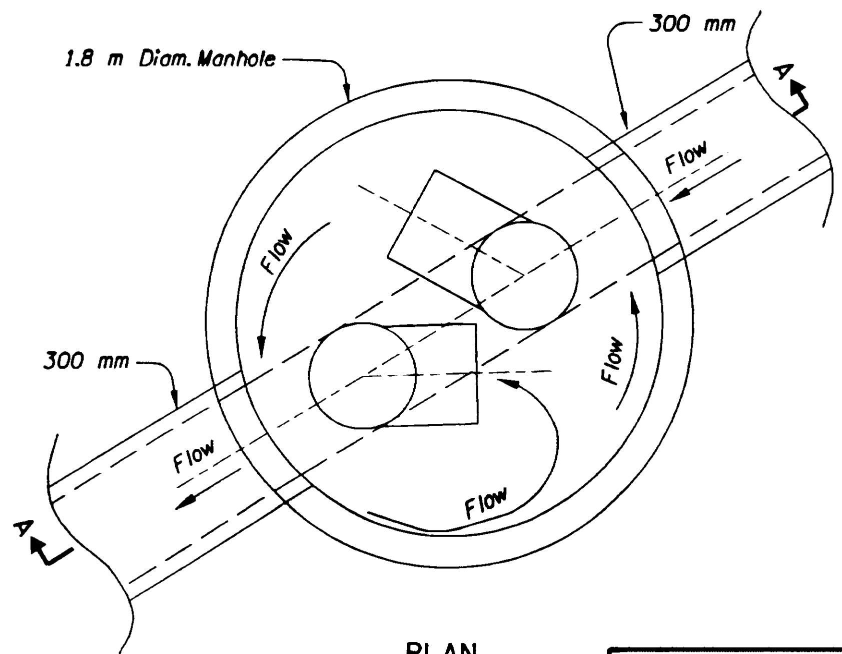
For Details Not Shown, See Sht. GHJ-31

POLLUTION CONTROL MANHOLE

Sta. "CBR"95+522, Lt.



SECTION A-A



PLAN

For Details Not Shown, See Sht. GHJ-31

POLLUTION CONTROL MANHOLE

Sta. "D"96+028, Rt.

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

REGISTERED PROFESSIONAL ENGINEER 62,609
OREGON
MAY 9, 2000
HENRY MINTON ALLEN
Expires Dec. 31, 2005

OREGON DEPARTMENT OF TRANSPORTATION
GEO / HYDRO SECTION

US26: CORNELL RD. - OR217 (BEAVERTON) SEC.
SUNSET HIGHWAY
WASHINGTON COUNTY

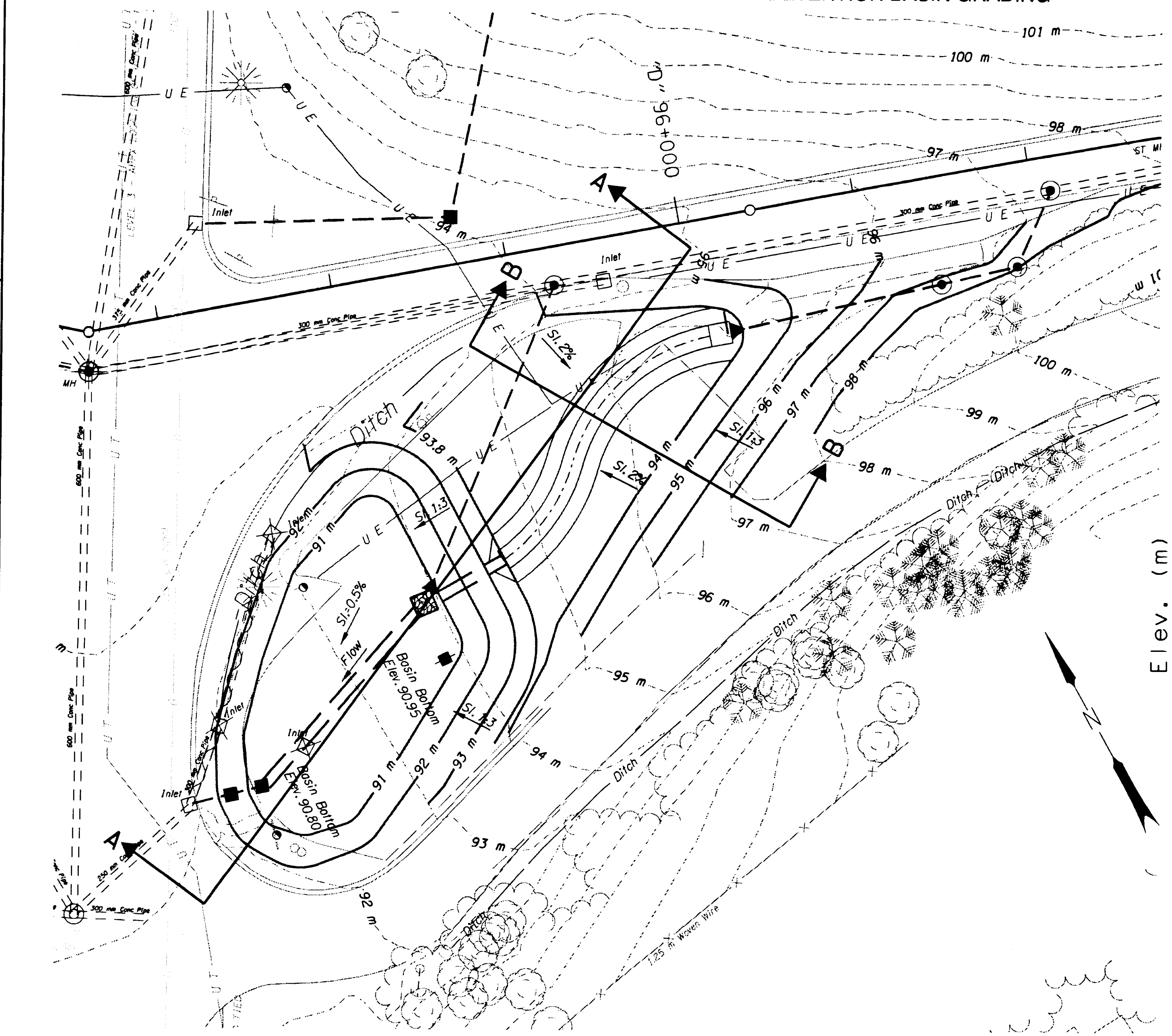
Project Leader - Naveen Chandra
Designed By - Henry M. Allen
Drafted By - Martin G. Casillas

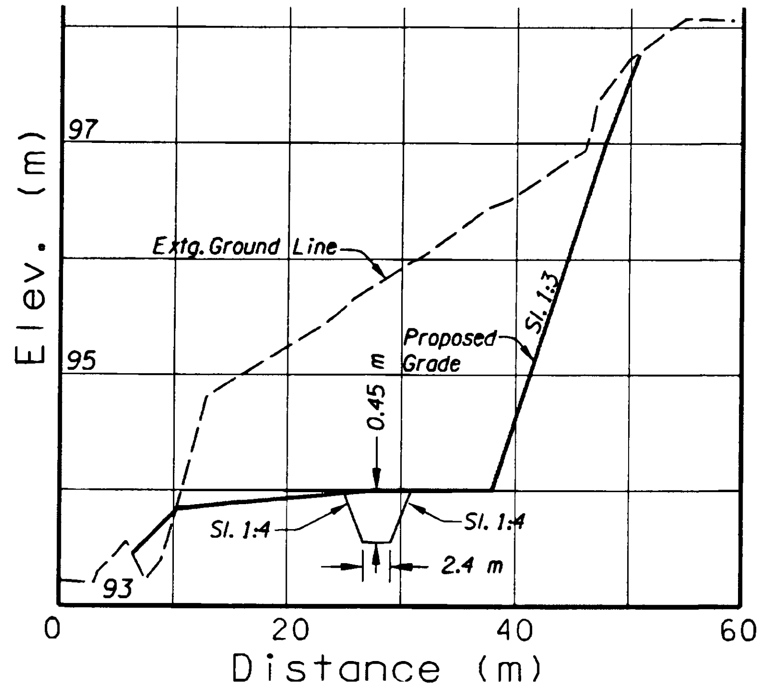
WATER QUALITY DETAILS

SHEET NO. GHJ-29

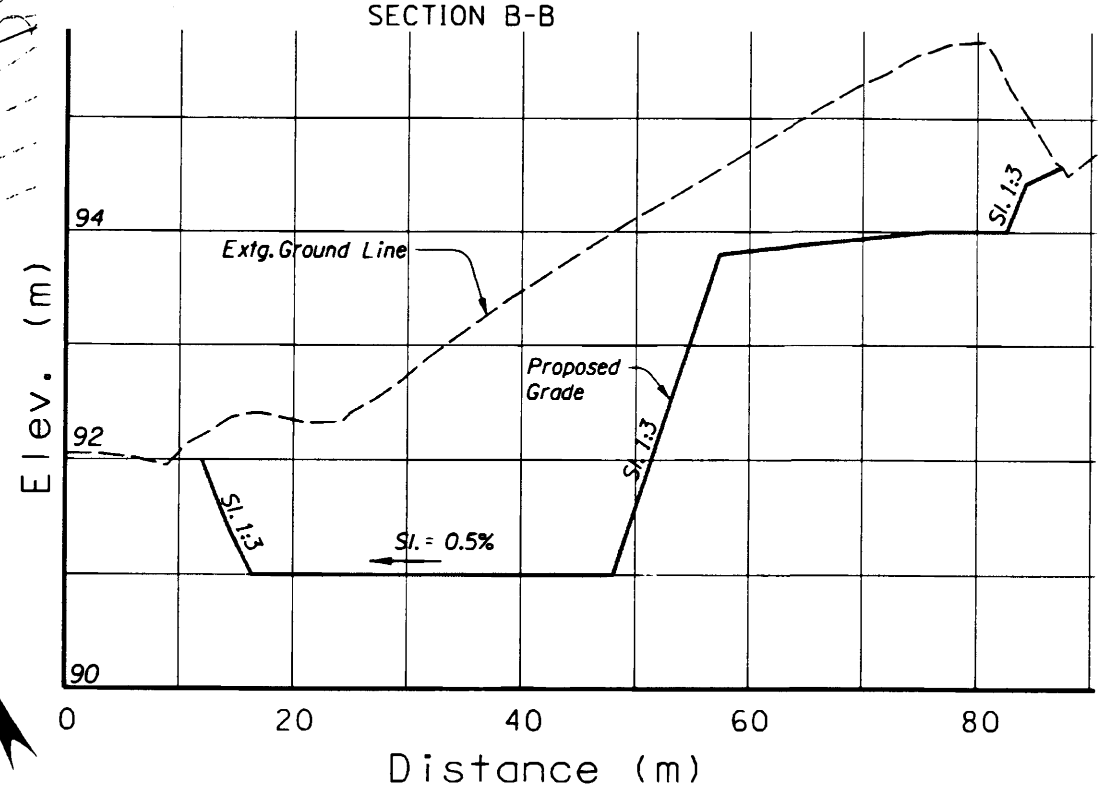
CEDAR HILLS BLVD. SE.

DETENTION BASIN GRADING





SECTION B-B



SECTION A-A

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

REGISTERED PROFESSIONAL ENGINEER 62,609
OREGON
MAY 9, 2000
HENRY MINTON ALLEN
Expires Dec. 31, 2005

OREGON DEPARTMENT OF TRANSPORTATION
GEO / HYDRO SECTION

US26: CORNELL RD. - OR217 (BEAVERTON) SEC.
SUNSET HIGHWAY
WASHINGTON COUNTY

Project Leader - Naveen Chandra
Designed By - Henry M. Allen
Drafted By - Martin C. Casillas

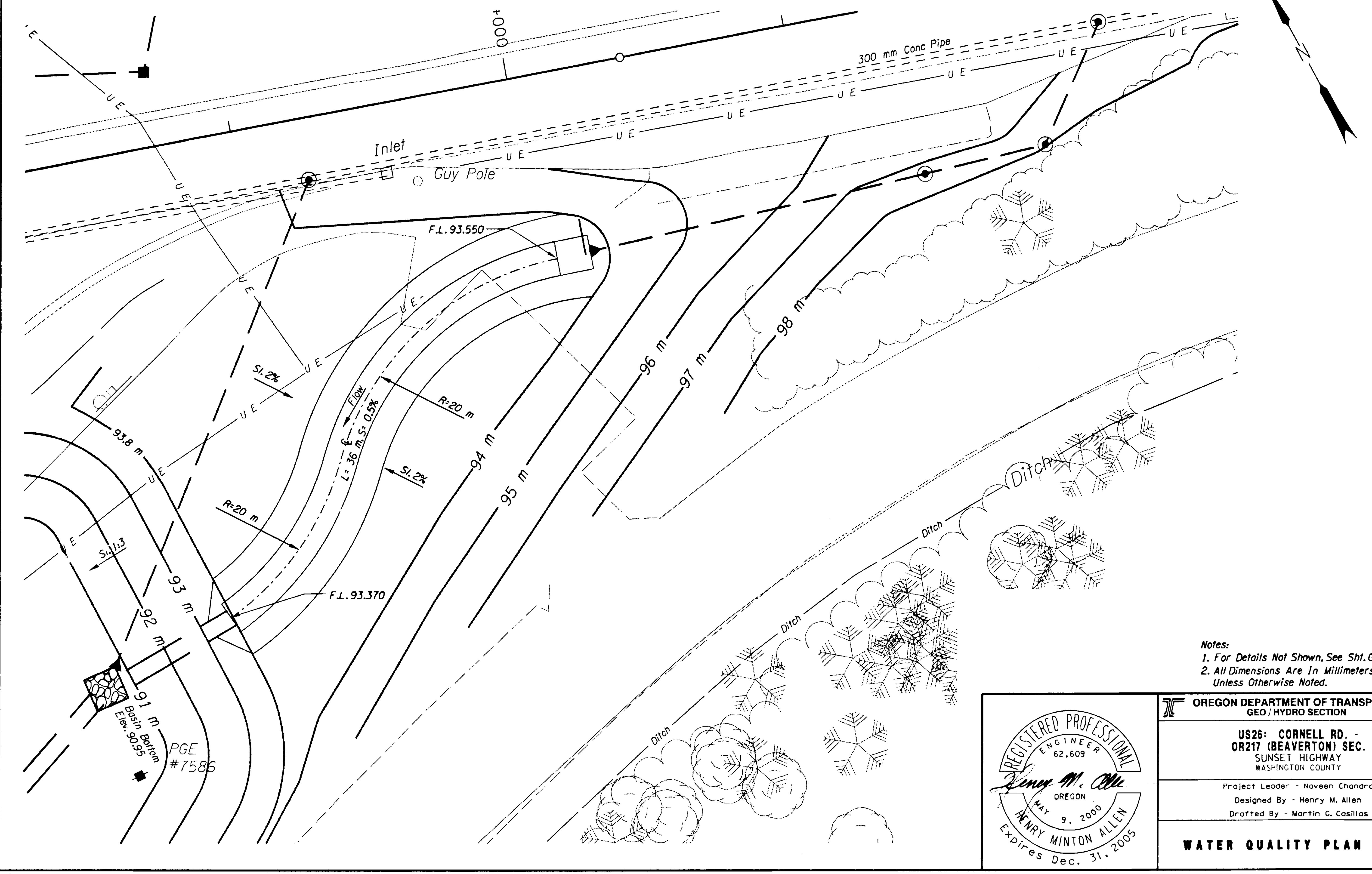
WATER QUALITY PLAN

SHEET NO. GHJ-46

THIS IS THE FILE NAME LOCATION \\screg\Nwye66c\ODOT_DAT A\projects\0602I_wq\Swales\0602Iwq.dl9 1/16/2004 8:02:27 AM

VIEW 3

WATER QUALITY SWALE "S1"



Notes:

1. For Details Not Shown, See Sht. GHJ-48.

2. All Dimensions Are In Millimeters (mm) Unless Otherwise Noted.

REGISTERED PROFESSIONAL ENGINEER 62,609 OREGON MAY 9, 2000 HENRY MINTON ALLEN Expires Dec. 31, 2005

OREGON DEPARTMENT OF TRANSPORTATION
GEO / HYDRO SECTION

US26: CORNELL RD. - OR217 (BEAVERTON) SEC.
SUNSET HIGHWAY
WASHINGTON COUNTY

Project Leader - Naveen Chandra
Designed By - Henry M. Allen
Drafted By - Martin G. Casillas

WATER QUALITY PLAN

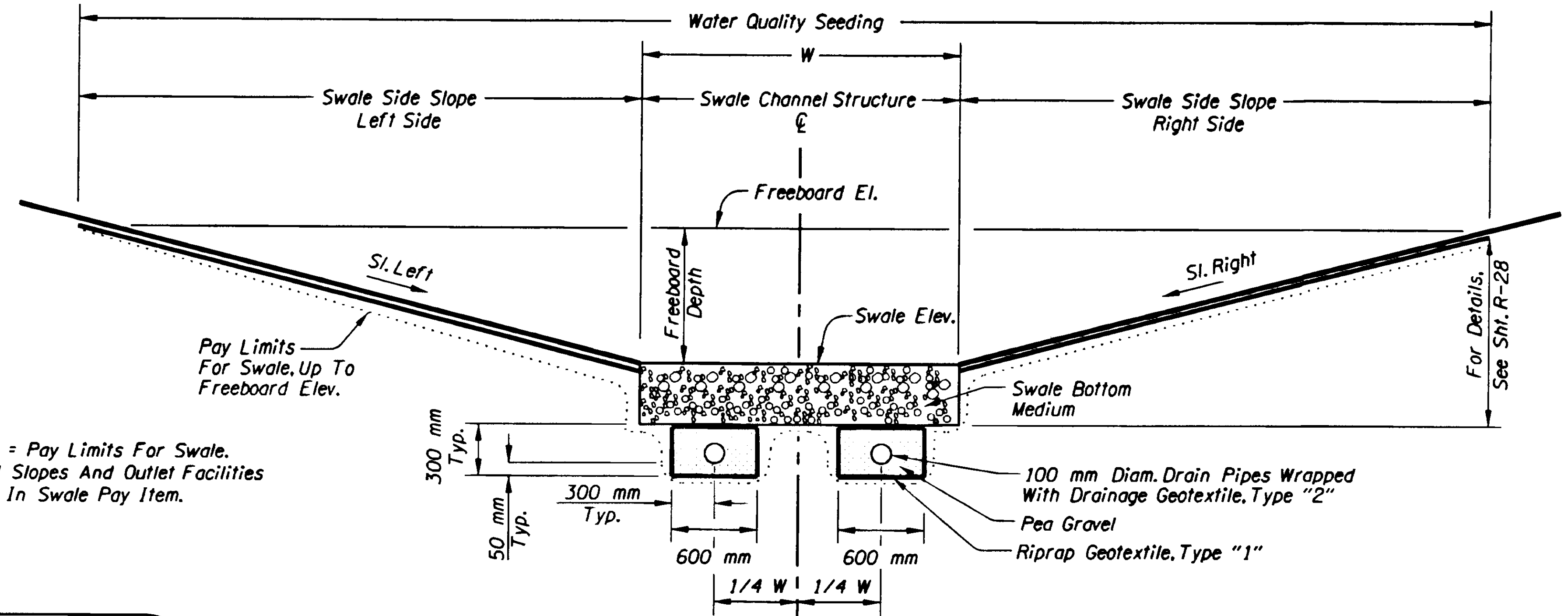
SHEET NO. GHJ-47

THIS IS THE FILE NAME LOCATION \\screg\\wye66c\ODOT_DATA\projects\06021_wq\Swales\250\06021wq.dt10 1/16/2004 8:05:26 AM

VIEW 4 VIEW 4

WATER QUALITY SWALE GENERAL DETAILS

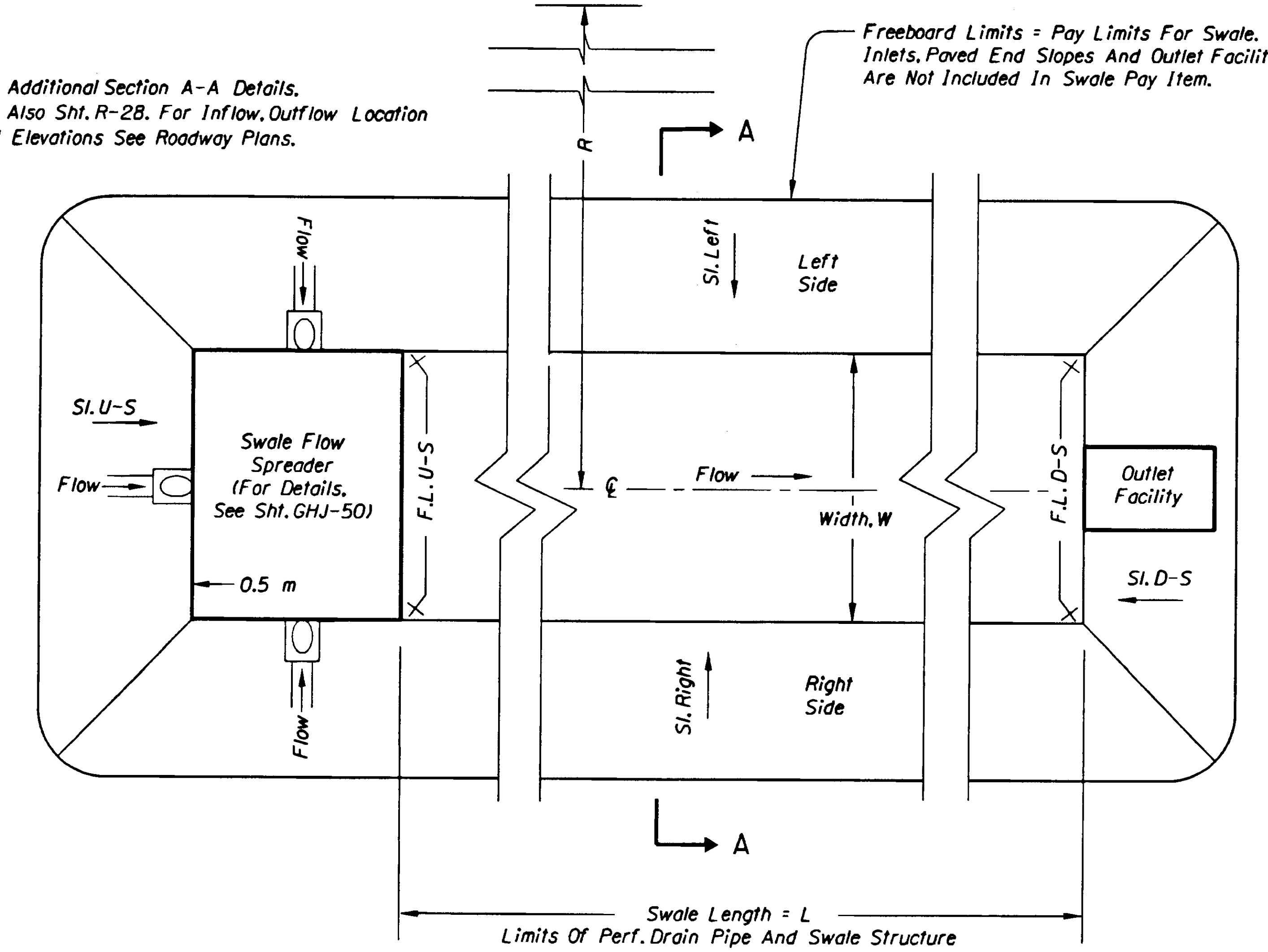
PLAN AND TYPICAL CROSS-SECTION



Note:
See Sht. R-28 For Seeding, Planting, And Swale Bottom Medium Details.

SECTION A-A, AND UNDER DRAIN

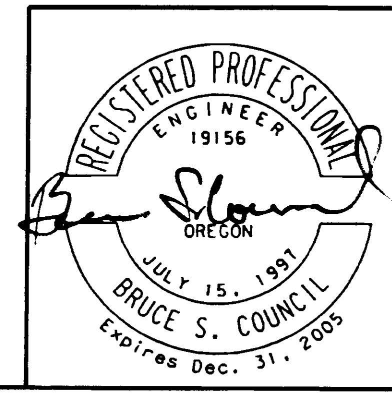
For Additional Section A-A Details, See Also Sht. R-28. For Inflow, Outflow Location And Elevations See Roadway Plans.



Note:
For Swale Specifics, See Sht. GHJ-49.

PLAN

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



OREGON DEPARTMENT OF TRANSPORTATION
GEO / HYDRO SECTION

US26: CORNELL RD. - OR217 (BEAVERTON) SEC.
SUNSET HIGHWAY
WASHINGTON COUNTY

Project Leader - Naveen Chandra
Designed By - Henry M. Allen
Drafted By - Martin C. Casillas

WATER QUALITY DETAILS

SHEET NO. GHJ-48

WATER QUALITY SWALES
SITE SPECIFIC INFORMATION

Notes:
1) U-S= Upstream, D-S= Downstream
2) See Site Plans For Pipe Inverts At Inlets.
3) "C-T Blend" = Compost-Topsoil Blend,
"Rock+C-T" = Drain Rock With Compost-Topsoil Blend.

Swale ID	L, m	W, m	F.L. U-S, m	F.L. D-S, m	Long. Slope, %	Centerline Curve Radius, m	Swale Sideslopes				Freeboard Depth, m	Swale Bottom Medium	No. Under-Drain Segments	Under Drain Tie-In Location	Swale Outlet Facility
							U-S	Left	Right	D-S					
WCW	340	1.2	See GHJ-32	See GHJ-32	Varies	None	1:3	1:4	1:6	1:4	0.3	Rock+C-T	2	"G-2MA" Mod. Inlet	"G-2MA" Mod. Inlet
WCE	322	2.4	See GHJ-33	See GHJ-33	Varies	None	1:20	1:6	1:4	1:18	0.3	Rock+C-T	2	"G-2MA" Mod. Inlet	"G-2MA" Mod. Inlet
WC1	82	2.4	68.062	66.543	1.85	None	1:4	1:3	1:6	1:4	0.3	C-T Blend	2	"D" Mod. Inlet	"M-E" Mod. Inlet
WC2A	30	0.6	70.673	70.197	1.50	None	1:2	1:2	1:2	1:2	0.3	C-T Blend	1	"D" Mod. Inlet	"D" Mod. Inlet
WC2B	474	0.7	70.815	70.637	0.32	None	1:3	1:3	1:3	1:3	0.3	C-T Blend	1	"D" Mod. Inlet	"D" Mod. Inlet
WC2C	37	0.8	71.042	70.839	0.55	None	1:4	1:4	1:4	1:4	0.45	C-T Blend	1	"D" Mod. Inlet	"D" Mod. Inlet
WC2D	41	0.9	72.556	71.634	Varies	None	1:5	1:5	1:5	1:5	0.3	Rock+C-T	1	"D" Mod. Inlet	"D" Mod. Inlet
WC3A	50	2.4	70.195	69.961	0.5	None	1:4	Var.	Var.	1:4	.8	C-T Blend	2	"D" Mod. Inlet	"V"-Bottom Ditch
WC3B	50	2.4	74.408	74.158	0.5	80	1:4	1:4	1:6	1:4	0.45	C-T Blend	2	"D" Mod. Inlet	"M-E" Mod. Inlet
MA1	31.5	2.4	72.160	72.000	0.51	None	1:3	1:3	Var.	1:6	0.45	C-T Blend	None	N.A.	"M-E" Mod. Inlet
CBR	See GHJ-43	2.4	See GHJ-43	See GHJ-43	Varies	None	1:4	1:4	1:4	1:4	0.45	C-T Blend	None	N.A.	"D" Inlet
N1a	23	2.4	102.150	102.035	0.5	100	1:4	1:4	1:4	1:4	0.45	C-T Blend	None	N.A.	Riprap Basin
N1b	12.3	2.4	101.812	101.750	0.5	25	1:4	1:4	1:4	1:4	0.45	C-T Blend	None	N.A.	Channel
N2	36	2.4	102.750	102.570	0.5	100	1:4	1:4	1:4	1:4	0.45	C-T Blend	None	N.A.	Pipe
N3	36	2.4	103.350	103.170	0.5	100	1:4	1:4	1:4	1:4	0.45	C-T Blend	None	N.A.	Pipe
N4	36	2.4	103.850	103.670	0.5	100	1:4	1:4	1:4	1:4	0.45	C-T Blend	None	N.A.	Pipe
N5a	12.6	2.4	104.404	104.341	0.5	None	1:4	1:4	1:4	1:4	0.45	C-T Blend	None	N.A.	Channel
N5b	24	2.4	104.150	104.030	0.5	100	1:4	1:4	1:4	1:4	0.45	C-T Blend	None	N.A.	Pipe
S1	36	2.4	93.550	93.370	0.5	20, Each	1:4	1:4	1:4	1:4	0.45	C-T Blend	None	N.A.	Channel

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

REGISTERED PROFESSIONAL ENGINEER 19156 OREGON JULY 15, 1997 BRUCE S. COUNCIL Expires Dec. 31, 2005

REGISTERED PROFESSIONAL ENGINEER 62,609 OREGON MAY 9, 2000 HENRY MINTON ALLEN Expires Dec. 31, 2005

OREGON DEPARTMENT OF TRANSPORTATION
GEO / HYDRO SECTION

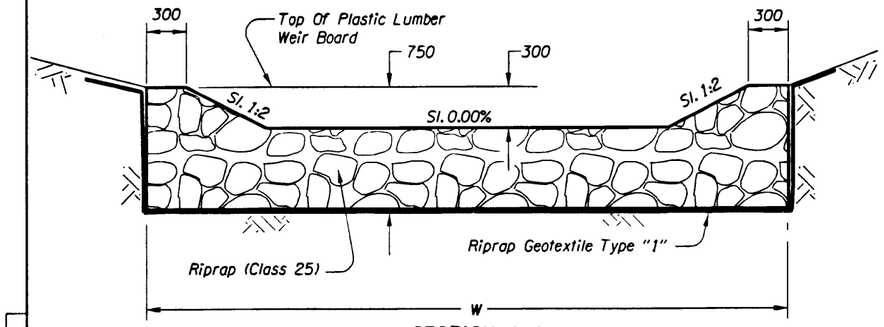
US26: CORNELL RD. - OR217 (BEAVERTON) SEC.
SUNSET HIGHWAY
WASHINGTON COUNTY

Project Leader - Naveen Chandra
Designed By - Henry M. Allen
Drafted By - Martin C. Casillas

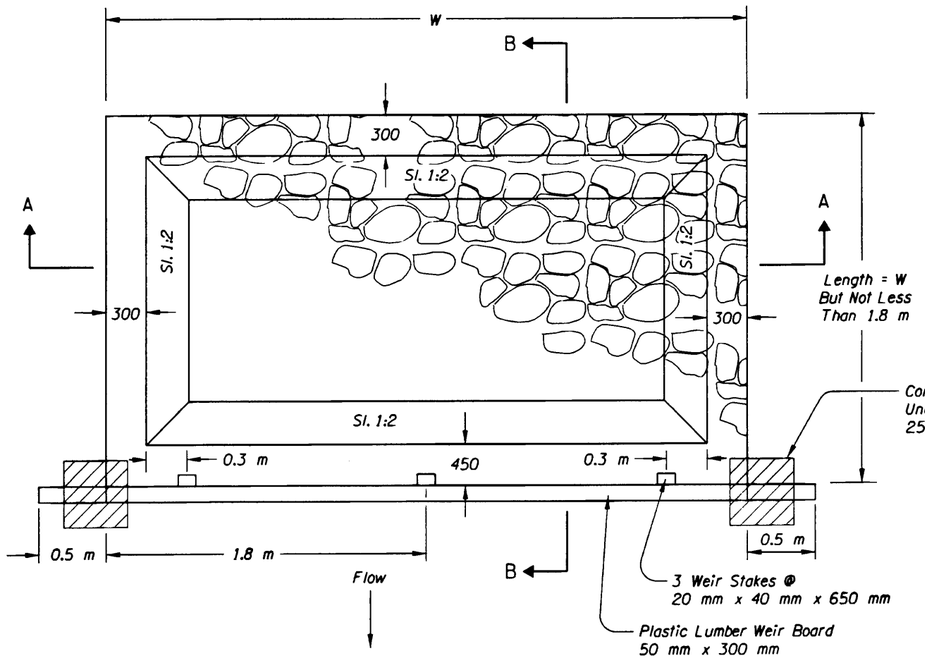
WATER QUALITY DETAILS

SHEET NO. GHJ-49

WATER QUALITY SWALE FLOW SPREADER



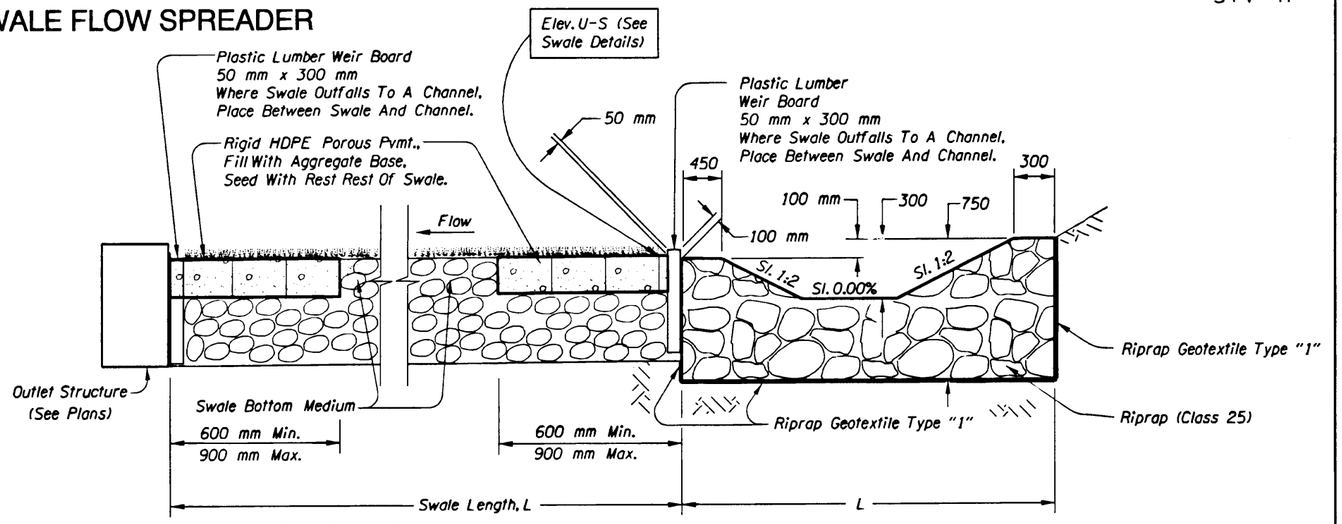
SECTION A-A



Note:
Swale Bottom Medium May Consist Of Compost-Topsoil Blend Or Drain Rock With Compost-Topsdoil Blend.

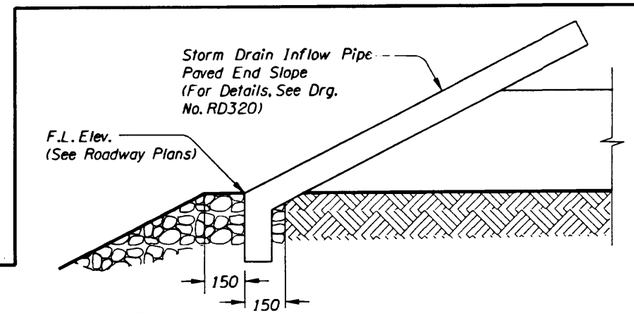
PLAN

SWALE FLOW SPREADER



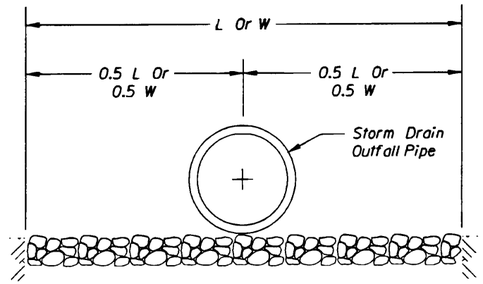
SECTION B-B

Note:
Place A Section Of Rigid HDPE Porous Pavement At The Upstream And Downstream Ends Of Each Swale Or Swale Segment.



Note:
Pipe F.I. Elev. And Top Of Weir Board Elev. Are The Same.

SECTION THROUGH SIDE PIPE OUTLET



LOOKING AT A SIDE

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

REGISTERED PROFESSIONAL ENGINEER 62,609 OREGON MAY 9, 2000 HENRY MINTON ALLEN Expires Dec. 31, 2005

OREGON DEPARTMENT OF TRANSPORTATION
GEO / HYDRO SECTION

US26: CORNELL RD. - OR217 (BEAVERTON) SEC.
SUNSET HIGHWAY
WASHINGTON COUNTY

Project Leader - Naveen Chandra
Designed By - Henry M. Allen
Drafted By - Martin G. Casillas

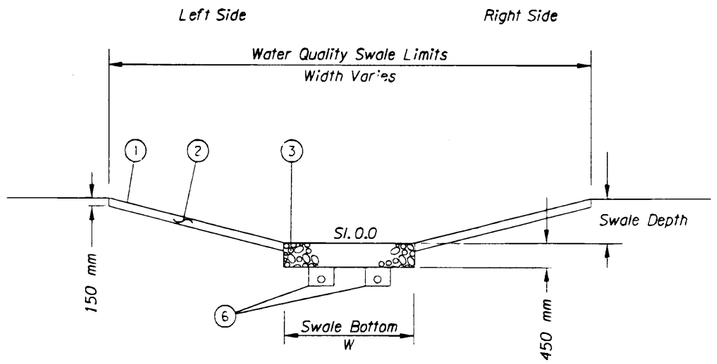
WATER QUALITY DETAILS

SHEET NO. GHJ-50

R O A D S I D E D E V E L O P M E N T

CEDAR MILL CREEK ENHANCEMENT AREA

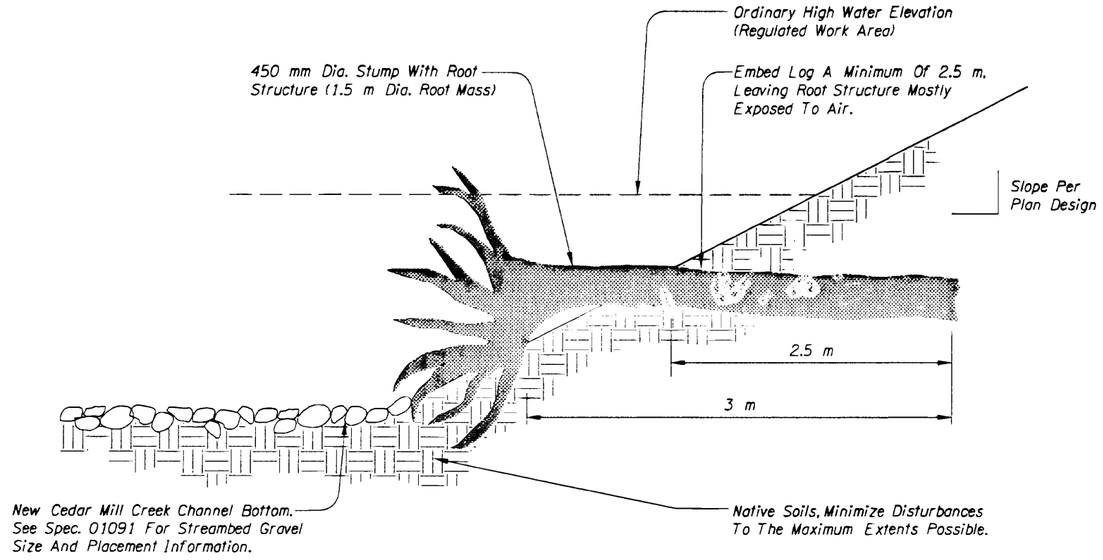
12/02/03



Min. Swale Length - 33 m
Min. (Max.) Longitudinal Swale Slope - .005 (0.5%)
Min. Swale Depth - 0.45 m

VEGETATED STORM WATER QUALITY SWALE

Detail Shown For Reference Only. Design By H. Allen (ODOT).



STREAM BANK LOG WITH ROOT WAD

1. *Provide And Install Jute Mat Per Specifications.*
2. *Provide And Place 150 mm Deep Topsoil Throughout Swale.*
3. *Swale Bottom Medium - Provide And Place 450 mm Deep Medium In Bottom Of Swale, Continuous Full Length Of Swale. Medium Composed Of Compost-Topsoil Blend Or Drain Rock With Compost-Topsoil Blend.*
4. *Not Used*
5. *Seed Swale Using Mix No. 4. See Specifications.*
6. *Under Drains, Where Recommended By The Engineer. Contact Henry Allen 503-731-8299.*
7. *For Details Not Shown, See Water-Quality Swale Details In GHJ Series Sheets.*

NOTE:
Recruit Log With Root Wad From Conifer Material Within Project Clearing Limits. See Specs.

The Log Must Be Anchored And/Or Ballasted To Maintain Design Placement. Details Of The Anchoring And/Or Ballast Will Be Provided By The Engineer At The Time Of Installation.

W&H PACIFIC
9755 SW Barnes Rd
Suite 300
Portland, Oregon
97225
(503)526-0455
(503)526-0775 Fax
whpacific.com

REGISTERED
317
MICHAEL D. SMYTH
OREGON
4/4/94
LANDSCAPE ARCHITECT

OREGON DEPARTMENT OF TRANSPORTATION
ENVIRONMENTAL SECTION

US26: CORNELL RD. - OR217 (BEAVERTON) SEC.
SUNSET HIGHWAY
WASHINGTON COUNTY

Reviewed By - Mark A. Hadley
Designed By - Mike D. Smyth
Drafted By - Tammy J. Taggart

BIO-STABILIZATION DETAILS

SHEET NO.
R28

c:\projects\0001\3017 Murray Blvd\MicroStation\0602lcm.dtl

VIEW 2

VIEW 2