OPERATION & MAINTENANCE MANUAL

DFI No.: D00156
Facility Type: Water Quality Biofiltration Swale

AUGUST, 2011

INDEX

1. Identification

Drainage Facility ID (DFI):	**D00156**
Facility Type:	Water Quality Biofiltration Swale
Construction Drawings:	(V-File Number) 31V-41
Location:	District: 1 (Old 2A)
	Highway No.: 102
	Mile Post: 89.78 (beg./end)
	Description: This facility is located on the north side of OR 47 (Hwy 102) approximately 900 feet northwest of Porter Road. The facility can be located by an access pullout with access gate on the north side of 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:	County Designer - Washington County Engineering, Jim Perkins, P.E., 503-846-7900
Facility construction:	1998
Contractor:	Huffman-Wright 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.

The swale is located on the north side of US 47 (Hwy 102) approximately 900 feet north of Porter Road. The swale lies with an access control area adjacent to Council Creek and is near a conservation easement. The swale can be accessed through a locked gate.

The swale treats stormwater runoff on both sides of the highway for a distance of approximately 660 feet. Stormwater runoff is conveyed by a roadway ditch on the north side of US 47 (Hwy 102) and a curb along the south side. A series of inlets both on the north and south collect the runoff at a low (sag) point in the roadway.

A split-flow manhole located upstream of the facility (Point A of the Operational Plan, Appendix A) is used to bypass the water quality flows into the facility and convey the high flows through a separate 15-inch pipe and conveyance system that discharges into Council Creek. The high flows do not receive treatment.

The low flows are first pretreated through a pollution control manhole (Photo 2 and Point B in the Operational Plan) before being conveyed by a 12-inch storm pipe to the water quality swale. The treated stormwater leaves the water quality swale through a 10-inch culvert and is ultimately discharged into Council Creek.

A. Maintenance equipment access:
   Maintenance access can be obtained from US 47 (Hwy 102). The facility contains a gravel access pullout (Photo 1).

B. Heavy equipment access into facility:

   ☐ Allowed (no limitations)
   ☒ Allowed (with limitations) – Facility is within a locked access control area. Access to the swale requires a key.
   ☐ Not allowed

C. Special Features:

   ☐ Amended Soils
   ☐ Porous Pavers
   ☐ Liners
   ☐ Underdrains

Photo 1: Looking east at inlets along OR 47 (Hwy 102). WQ Swale and WQ Manhole are located within the Access Control Area on the other side of the fencing.

Photo 2: Water Quality Manhole located within Access Control Area.

Photo 3: Water quality biofiltration swale.

Photo 4: US47 (Hwy 102) located north of the access pullout. Runoff along the north side flows within a roadside ditch as shown. Runoff along the south side is conveyed by a concrete curb.

5. Facility Haz Mat Spill Feature(s)

The swale can not be effectively used to store a volume of liquid. The swale disperses the runoff to a nearby field with no outlet control.

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
There are no auxiliary outlet features provided for in 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

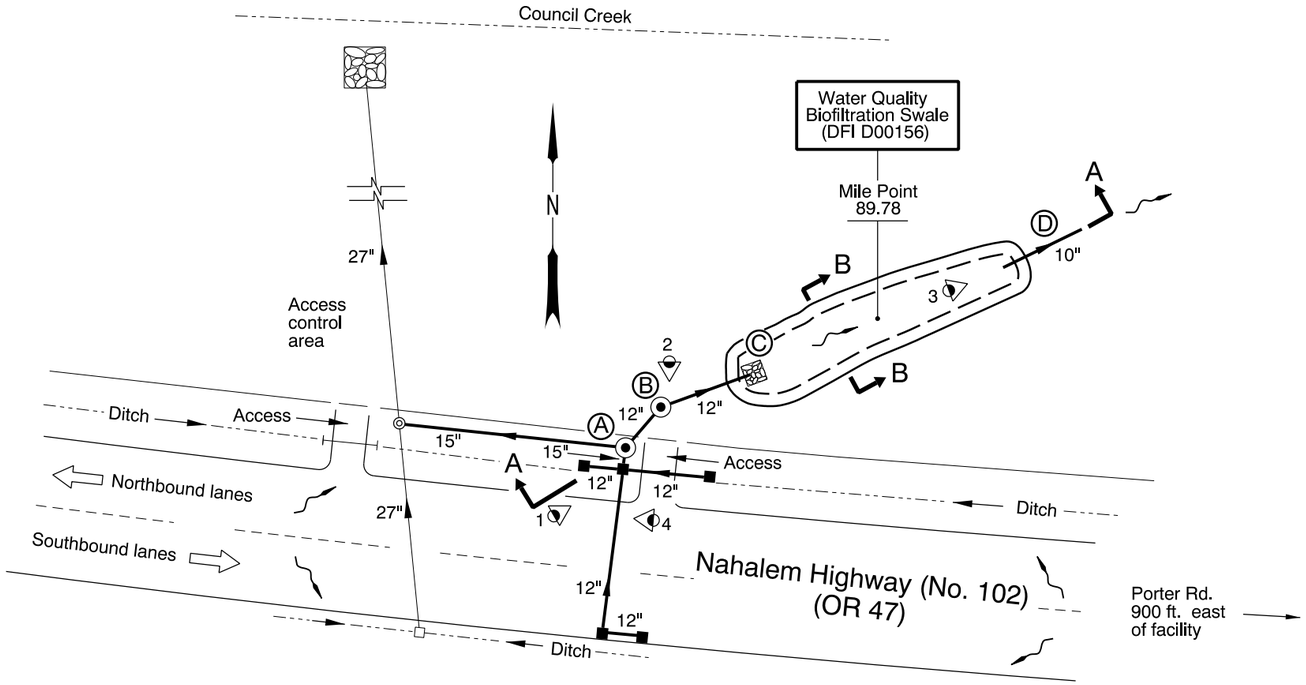
Contact any of the following for more detailed information about management of waste materials found on site:

ODOT Clean Water Unit	(503) 986-3008
ODOT Statewide Hazmat Coordinator	(503) 229-5129
ODOT Region Hazmat Coordinator	(503) 731-8290
ODEQ Northwest Region Office	(503) 229-5263

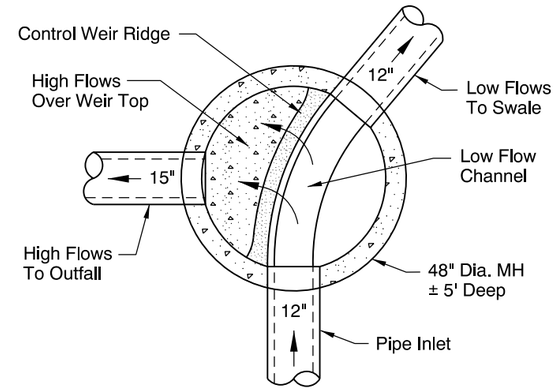
Appendix A

Content:

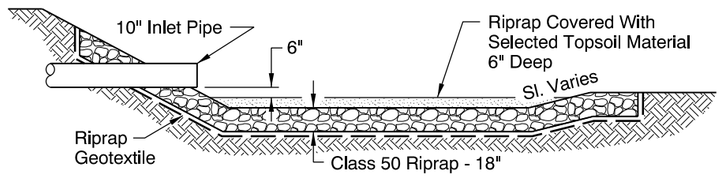
- **Operational Plan and Profile Drawing(s)**



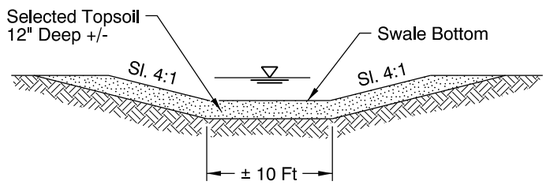
PLAN
N.T.S.



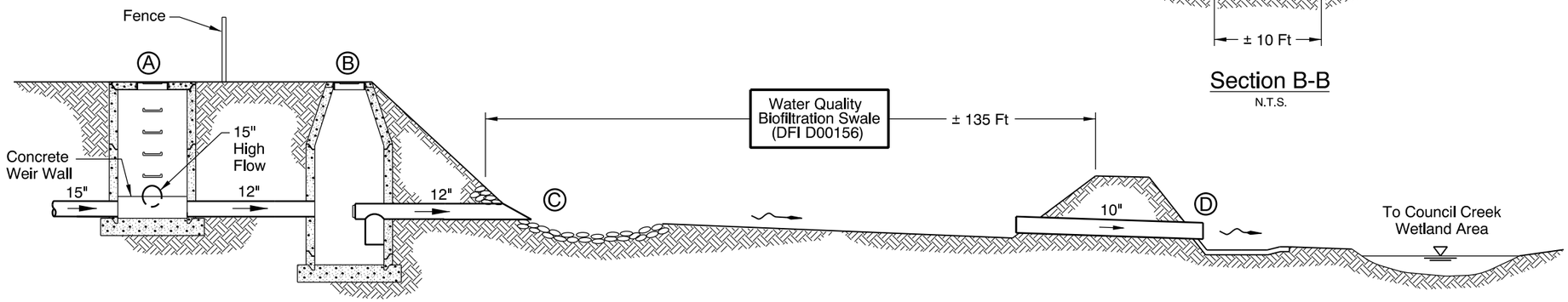
HIGH-LOW SPLIT FLOW MANHOLE DETAIL AT POINT Ⓐ
N.T.S.



SWALE INLET/RIPRAP BASIN AT POINT Ⓓ
N.T.S.



Section B-B
N.T.S.



Section A-A
N.T.S.

LEGEND:

- Photo Location / Direction
- Ⓐ High-Low Split Flow Manhole
- Ⓑ Pollution Control Manhole
- Ⓒ Swale inlet/Flow Spreader
- Ⓓ Culvert/Facility Outlet
- Riprap Basin
- Manhole (and or)
- Inlet (and or)
- Storm Pipe (Facility)
- Storm Pipe
- Conveyance Direction
- Pavement / Facility Flow Path
- Gate

Sht. 1 of 1

OREGON DEPARTMENT OF TRANSPORTATION

Prepared By: Bob Knorr

Drafted By: Jim Holeman

DFI D00156
MAINTENANCE DISTRICT 1 HWY 102
WATER QUALITY SWALE
NEHALEM HWY 102 MP 89.78
WASHINGTON COUNTY

Appendix B

Content:

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

INDEX OF SHEETS	
SHEET NO.	DESCRIPTION
1	Title Sheet
1A	Index Of Sheets Cont'd. & Standard Drawing Nos.
1B	Sheet Layout
2, 2A Thru 2A-9 Incl.	Typical Sections
2B Thru 2B-20 Incl.	Details
2C Thru 2C-9 Incl.	Traffic Control Plans
2D Thru 2D-3 Incl.	Erosion Control Details
2D Thru 2D-18 Incl.	Erosion Control Plans
2E Thru 2E-4 Incl.	Pipe Data
2F	Summary
3	Alignment & General Construction
3A	Drainage & Utilities
3B	Profile
4	Alignment & General Construction
4A, 4A-2	Drainage & Utilities
4B, 4C, 4D	Alignment & General Construction
4E	Drainage & Utilities
4F, 4G	Profile
5	Alignment & General Construction
5A	Drainage & Utilities
5B	Profile
6	Alignment & General Construction
6A, 6A-2	Drainage & Utilities
6B	Profile
7	Alignment & General Construction
7A, 7A-2	Drainage & Utilities
7B	Profile
8	Alignment & General Construction
8A, 8A-2	Drainage & Utilities
8B	Profile
9	Alignment & General Construction
9A, 9A-2	Drainage & Utilities
9B, 9C	Profiles
10	Alignment & General Construction
10A, 10A-2	Drainage & Utilities
10B, 10C	Profiles
11	Alignment & General Construction
11A, 11A-2	Drainage & Utilities
11B	Alignment & General Construction
11C	Drainage & Utilities
11D, 11E	Profiles
12	Alignment & General Construction
12A, 12A-2	Drainage & Utilities
12B	Profile

25-SEP-1998 10:20

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STATE OF OREGON

DEPARTMENT OF TRANSPORTATION

PLANS FOR PROPOSED PROJECT

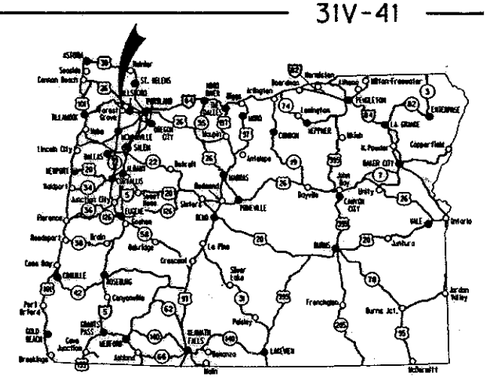
GRADING, STRUCTURE, PAVING, SIGNING, SIGNAL, & STRIPING

COUNCIL CR. - QUINCE ST. (FOREST GROVE) SEC.

NEHALEM HIGHWAY

WASHINGTON COUNTY

OCTOBER 1998



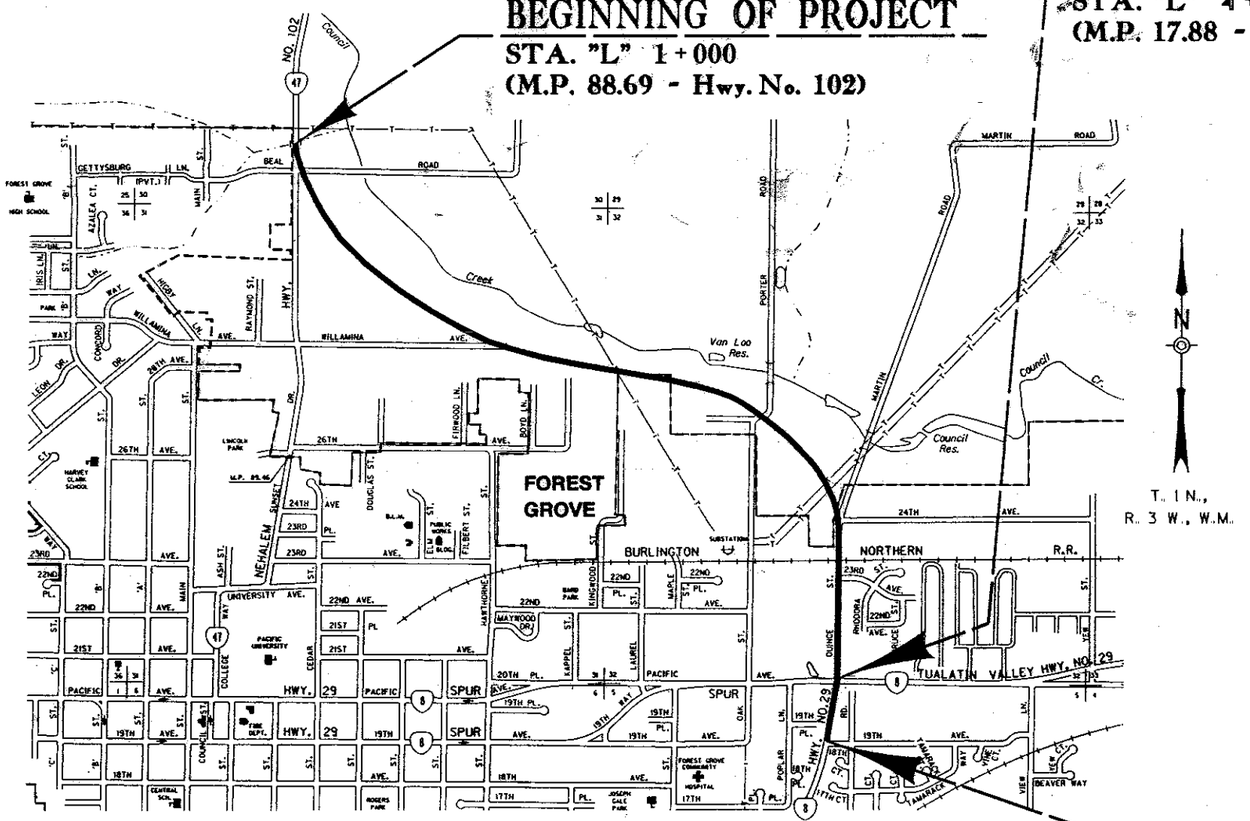
Overall Length Of Project - 3.33 km (2.07 Miles)

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 From The Center.

NH-S102(4)
BEGINNING OF PROJECT
STA. "L" 1+000
(M.P. 88.69 - Hwy. No. 102)

NH-S102(4)
END OF PROJECT
STA. "L" 4+130
(M.P. 17.88 - Hwy. No. 29)

LET'S ALL WORK TOGETHER TO MAKE THIS JOB SAFE



END OF CONTRACT PROJECT

STA. "L" 4+327.1
(M.P. 17.76 - Hwy. No. 29)

OREGON TRANSPORTATION COMMISSION

Henry H. Hewitt	CHAIRMAN
Susan Brody	VICE CHAIRMAN
Steven H. Corey	COMMISSIONER
Stuart Foster	COMMISSIONER
John Russell	COMMISSIONER
Grace Crunican	DIRECTOR OF TRANSPORTATION

PLANS PREPARED BY:
WASHINGTON COUNTY

REGISTERED PROFESSIONAL ENGINEER — OREGON — JULY 16, 1985 — RICHARD B. RAETZ — Exp 12/31/98

REGISTERED PROFESSIONAL ENGINEER — 13,040 — OREGON — JULY 26, 1985 — JAMES D. PERKINS — Exp 12/31/98

OREGON DEPARTMENT OF TRANSPORTATION CONCURRENCE

TECHNICAL SERVICES MANAGING ENGINEER — DATE 9/29/98

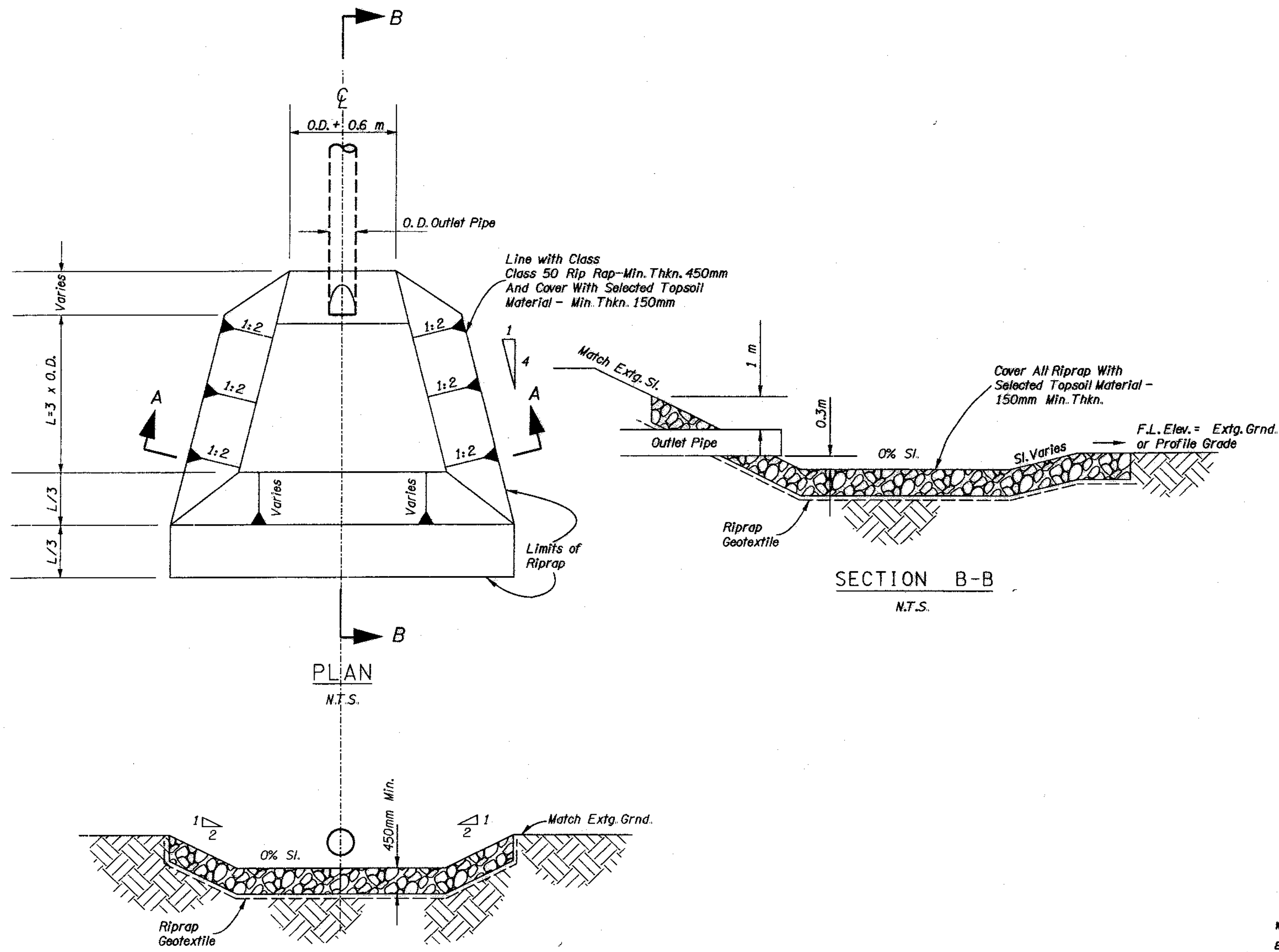
COUNCIL CR. - QUINCE ST. (FOREST GROVE) SEC.
NEHALEM HIGHWAY
WASHINGTON COUNTY

FEDERAL HIGHWAY ADMINISTRATION		PROJECT NUMBER	SHEET NO.
REGION 10	OREGON DIVISION		1

METRIC

VIEW B2 C134-1442

OUTLET BASIN



PLAN
N.T.S.

SECTION B-B
N.T.S.

SECTION A-A
N.T.S.

WASHINGTON COUNTY ENGINEERING

COUNCIL CR.-QUINCE ST. (FOREST GROVE) SEC. NEHALEM HWY. WASHINGTON COUNTY			
FEDERAL HIGHWAY ADMINISTRATION		PROJECT NUMBER	SHEET NO.
REGION 10	OREGON DIVISION	NH-S102 (4)	2B-6

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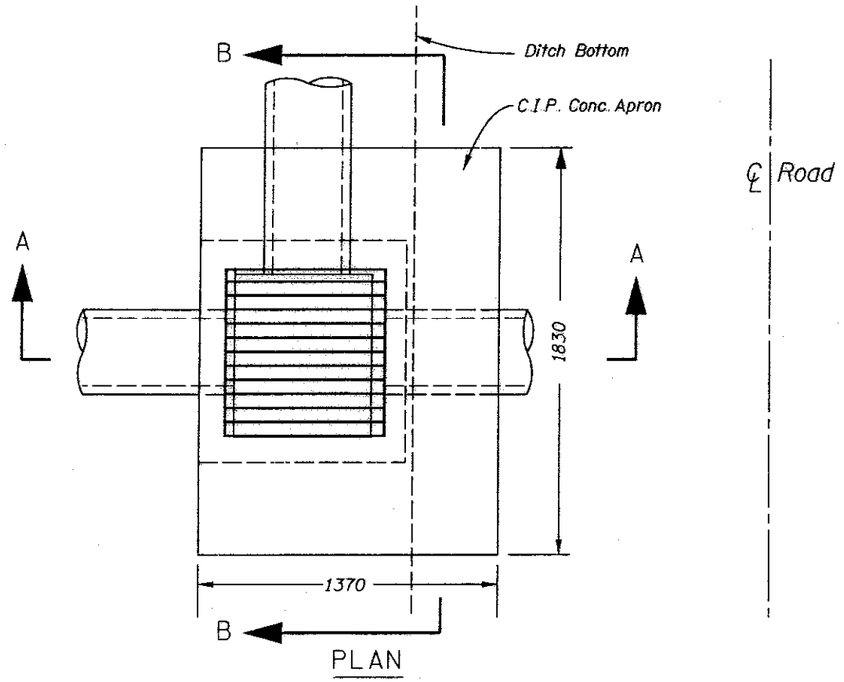
VIEW 1

TYPE 'D' MODIFIED INLET

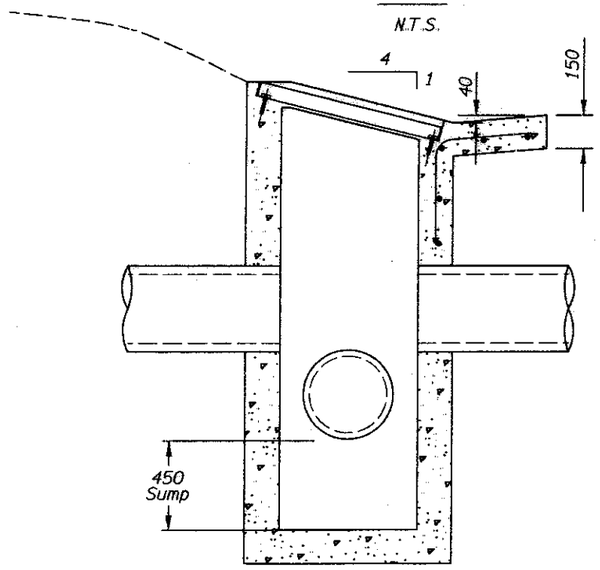
"All Dimensions Are In mm Unless Otherwise Noted"



PLAN

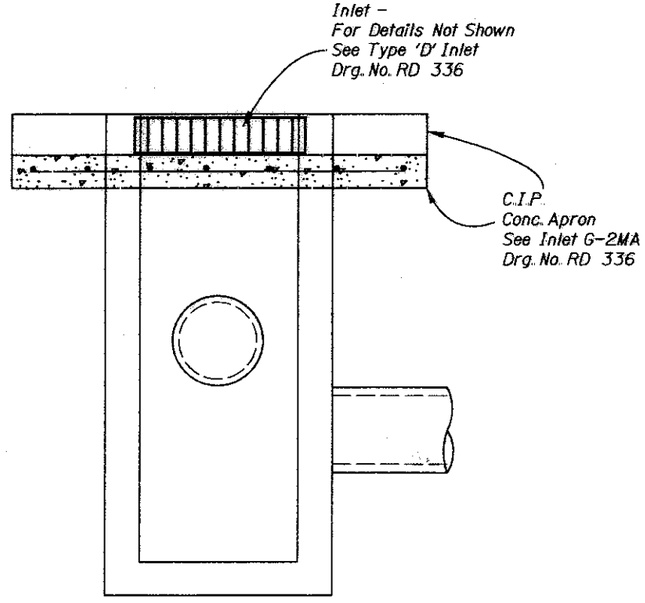
N.T.S.

NOTE: Locate Inlet At Backside of Ditch And Face Grate To Road Centerline



SECTION A-A

N.T.S.



SECTION B-B

N.T.S.

WASHINGTON COUNTY ENGINEERING

COUNCIL CR.-QUINCE ST. (FOREST GROVE) SEC. NEHALEM HWY. WASHINGTON COUNTY			
FEDERAL HIGHWAY ADMINISTRATION		PROJECT NUMBER	SHEET NO.
REGION 10	OREGON DIVISION	NH-S102 (4)	2B-7

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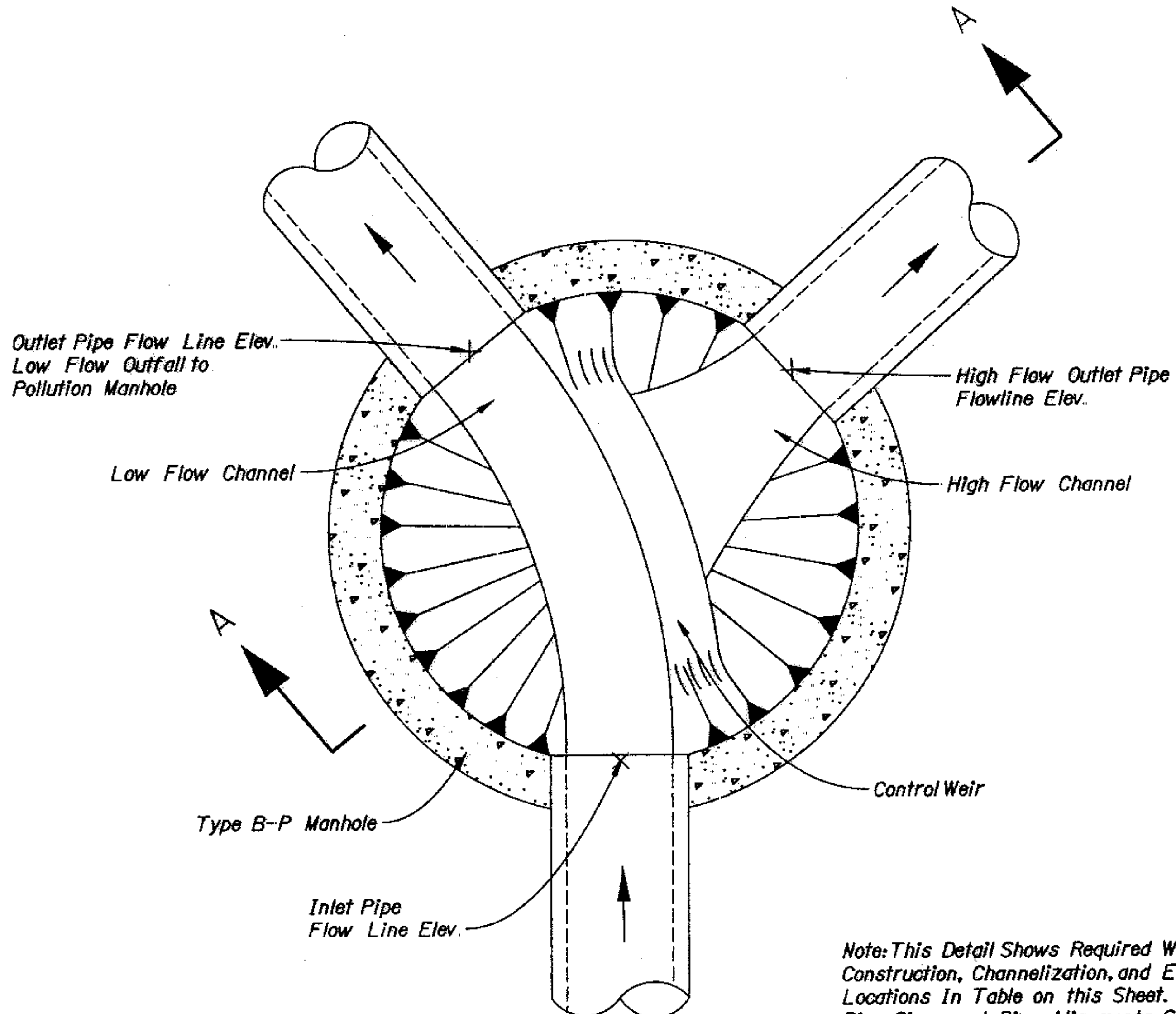
VIEW 2

CONTROL MANHOLE

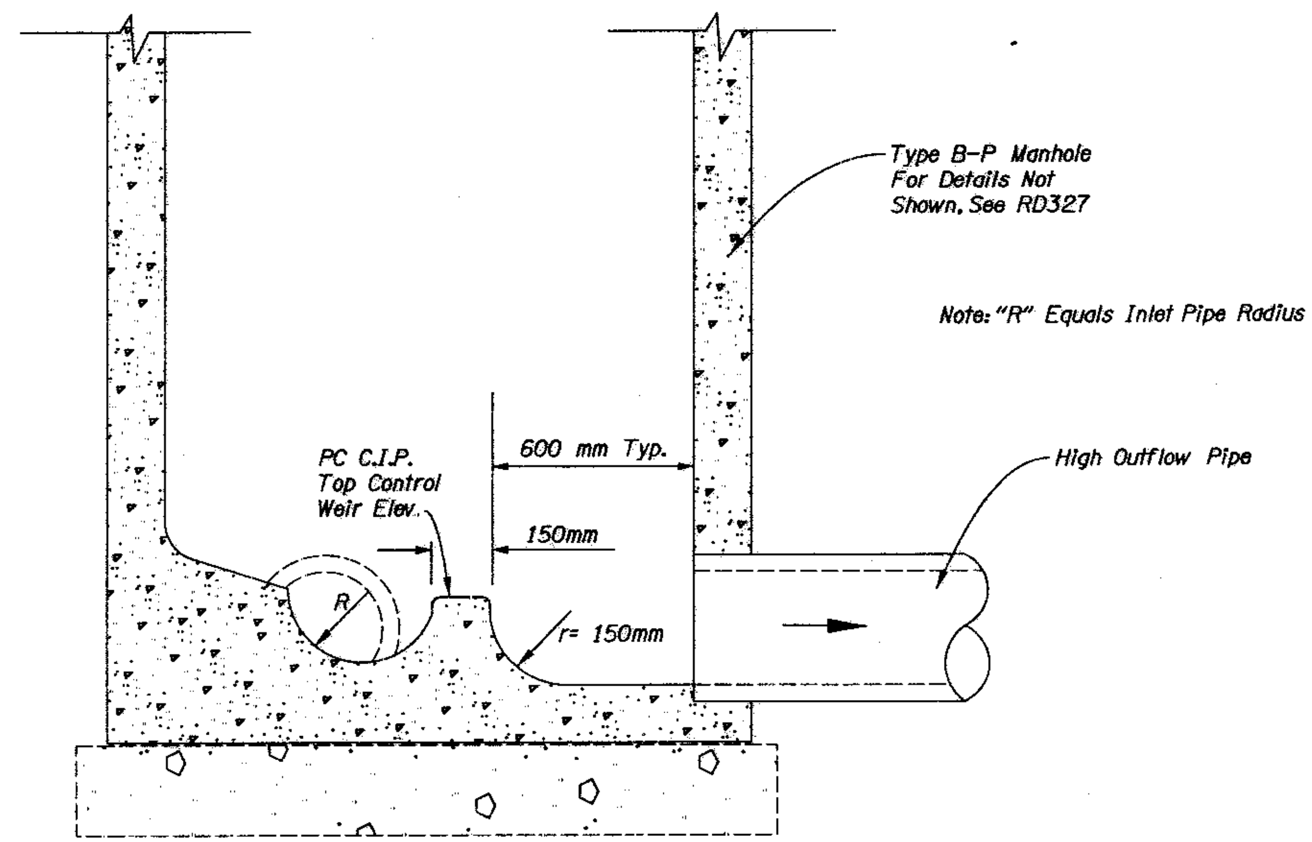
Sta.	Sheet/Note	Top Weir Elev.	Flow Line Pipe Elevation		
			Inlet	High Flow	Low Flow
1+457	4A-2 Note 6	49.280	49.120	49.100	49.100
1+848	6A-2 Note 7	49.400	49.246	49.220	49.220
2+155	7A-2 Note 5	49.250	49.080	49.070	49.070
2+566	8A-2 Note 6	48.980	48.817	48.800	48.800
2+805	9A-2 Note 6	50.350	50.175	50.170	50.170
3+385	11A-2 Note 3	48.825	48.665	48.645	48.645



PLAN

N.T.S.

Note: This Detail Shows Required Weir Construction, Channelization, and Elevation Locations In Table on this Sheet. For Pipe Sizes and Pipe Alignments See Plans.



SECTION A-A

N.T.S.

WASHINGTON COUNTY ENGINEERING

COUNCIL CR.-QUINCE ST. (FOREST GROVE) SEC. NEHALEM HWY. WASHINGTON COUNTY			
FEDERAL HIGHWAY ADMINISTRATION		PROJECT NUMBER	SHEET NO.
REGION 10	OREGON DIVISION	NH-S102 (4)	2B-8

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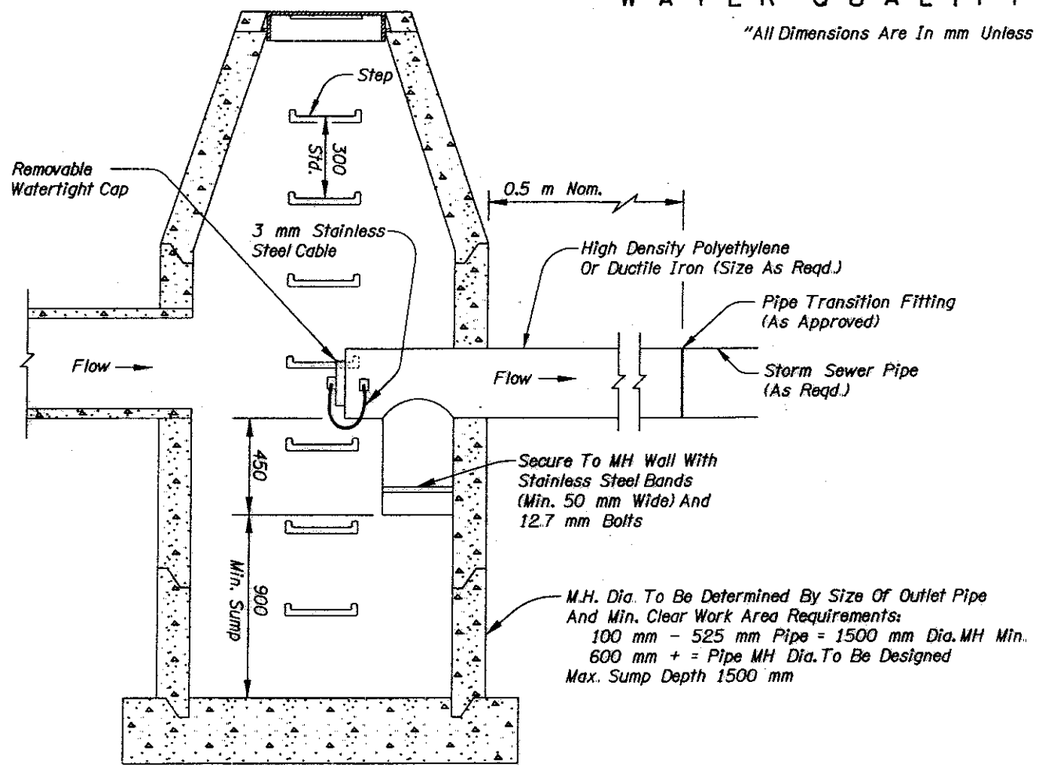
VIEW 3

DETAILS

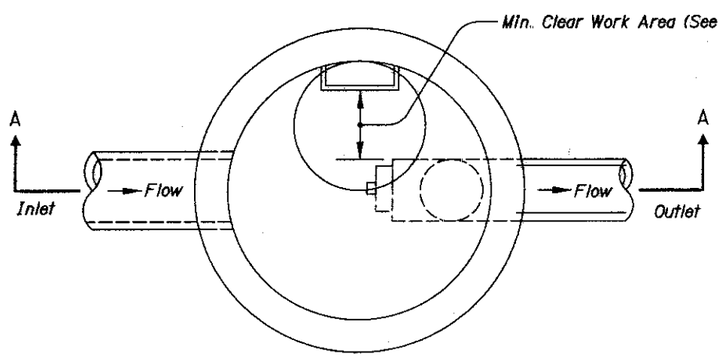
WATER QUALITY MANHOLE

"All Dimensions Are In mm Unless Otherwise Noted"

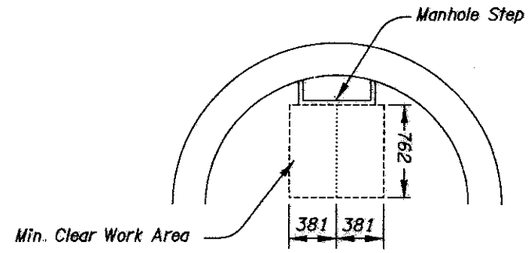


SECTION A-A

(For Details Not Shown, See USA Standard Manhole Drawing 010-ST)



PLAN



DETAIL "A"

Locate Pipes, Etc. So That No Portion Of Them Are Are Within Min. Clear Work Area

NOTES:

1. *Hardware, Fasteners And Anchors To Be Stainless Steel; Use 3 mm Stainless Steel Cable*
2. *See Pipe Data Sheet And Plan Sheets For Pipe Size(s).*
3. *See Pipe Data Sheet And Plan Sheets For Manhole Size(s).*
4. *See Pipe Data Sheet And Plan Sheets For Sump Depth.*
5. *Manhole And Base Per Manhole Standard Drawings.*
6. *Hardware, Fasteners, Anchors, Fittings, Appurtenances, Labor And Equipment Is Incidental To Water Quality Manhole Item.*

WASHINGTON COUNTY ENGINEERING

COUNCIL CR.-QUINCE ST. (FOREST GROVE) SEC.
NEHALEM HWY.
WASHINGTON COUNTY

FEDERAL HIGHWAY ADMINISTRATION		PROJECT NUMBER	SHEET NO.
REGION 10	OREGON DIVISION	NH-S102 (4)	2B-9

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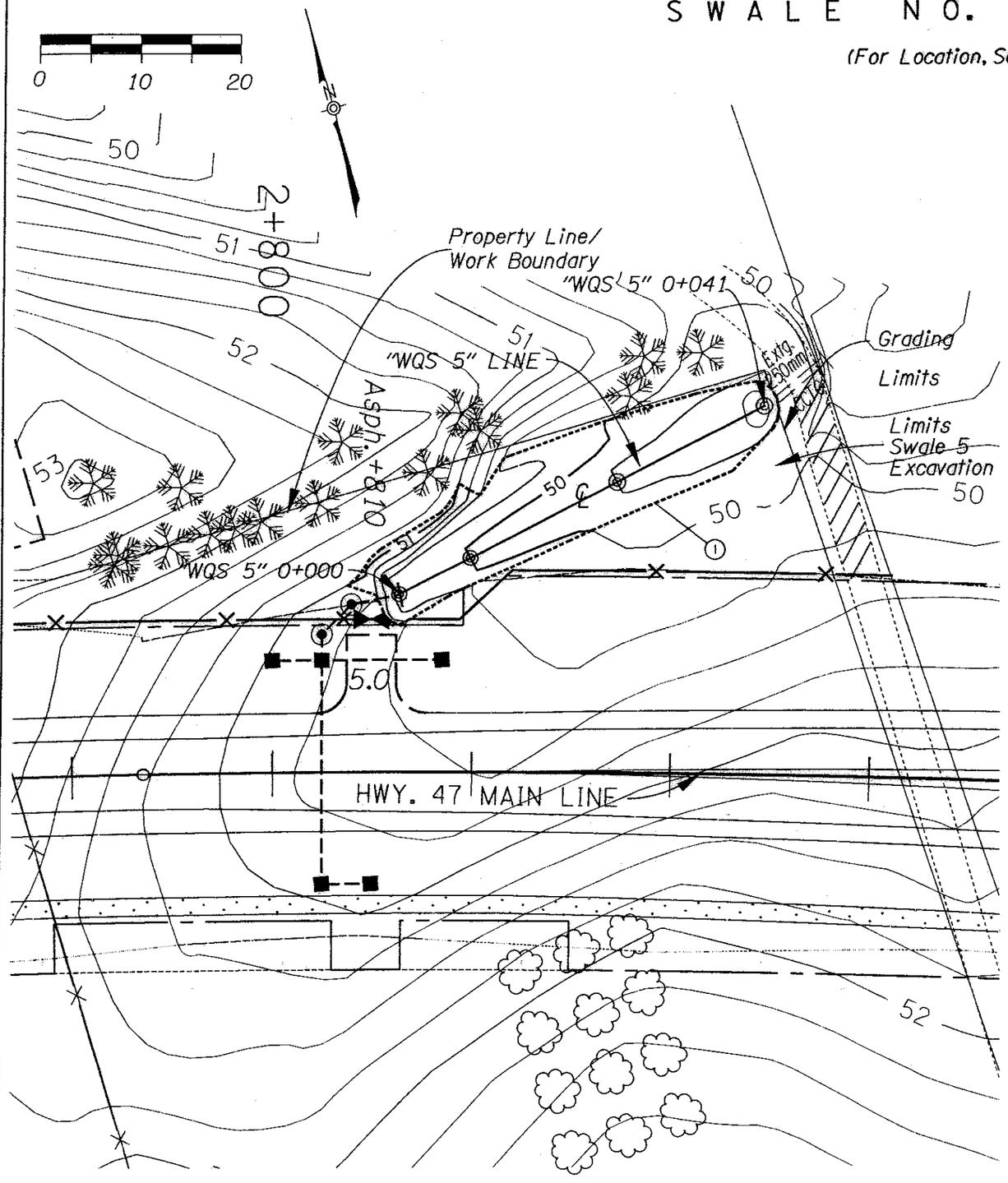
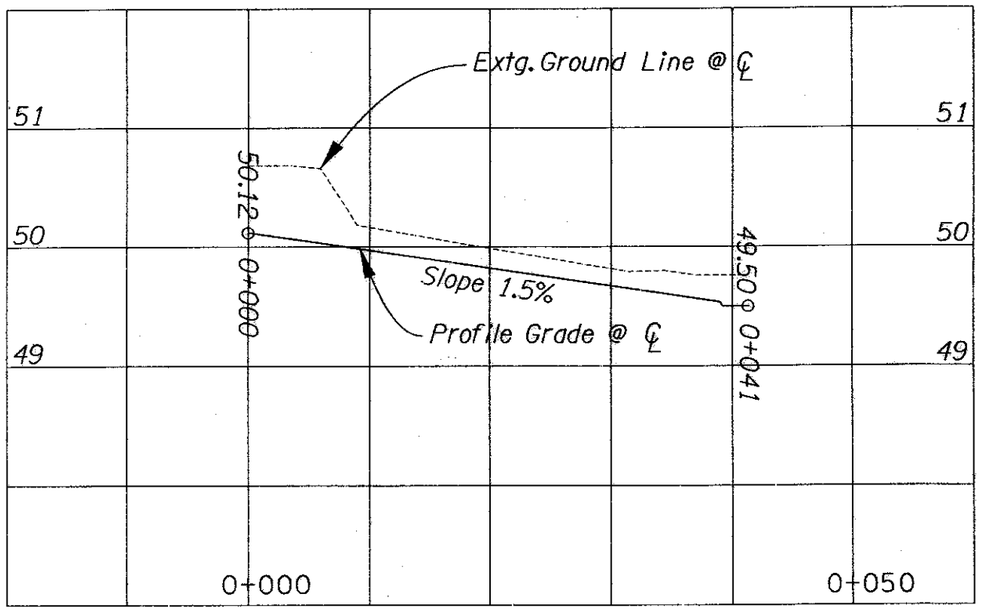
VIEW 4

SWALE NO. 5 DETAILS

(For Location, See Sht. 9A-2, Note 8)

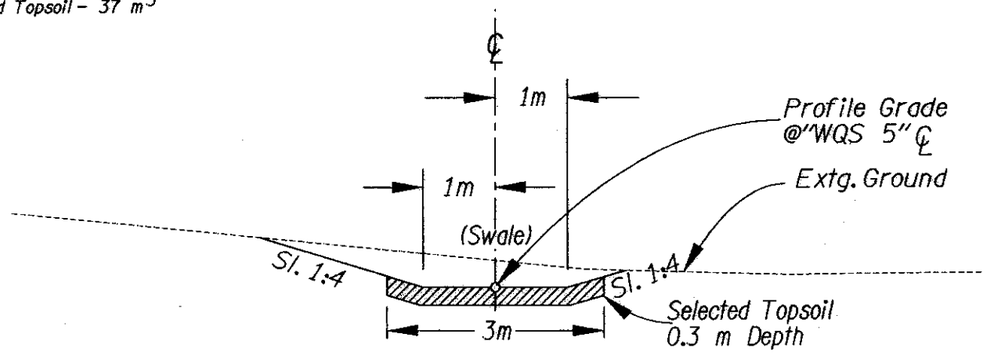


"W.Q.S. 5" LINE



① Const. Water Quality Swale
Swale Exc. - 64 m^3
Selected Topsoil - 37 m^3

"W.Q.S. 5"



STA."WQS 5" 0+000.0 TO STA."WQS 5" 0+041

WASHINGTON COUNTY ENGINEERING

COUNCIL CR.-QUINCE ST. (FOREST GROVE) SEC.
NEHALEM HWY.
WASHINGTON COUNTY

FEDERAL HIGHWAY ADMINISTRATION		PROJECT NUMBER	SHEET NO.
REGION 10	OREGON DIVISION	NH-S102 (4)	2B-14

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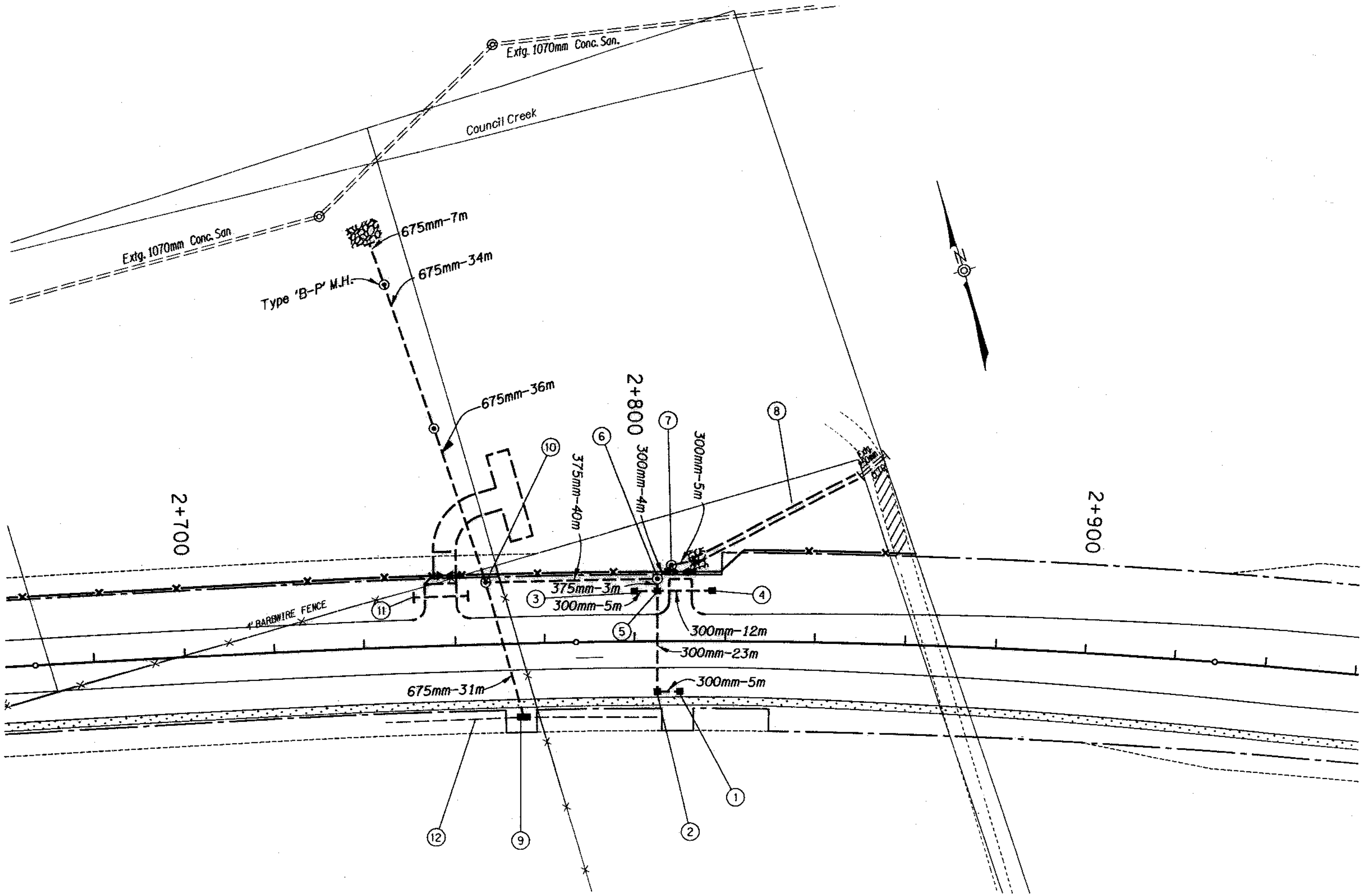
VIEW 3

DRAINAGE & UTILITIES
Sec. 32, T. 1N, R. 3W, W.M.



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

WASHINGTON COUNTY ENGINEERING

COUNCIL CR.-QUINCE ST. (FOREST GROVE) SEC.
NEHALEM HWY.
WASHINGTON COUNTY

FEDERAL HIGHWAY ADMINISTRATION		PROJECT NUMBER	SHEET NO.
REGION 10	OREGON DIVISION	NH-S102 (4)	9A

22 AUG 98

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VIEW 6

(1) Sta. 2+810, 11.365 m Rt.
Const. Type "D" Mod. Inlet
Inst. 300mm Sew. Pipe - 5 m
Tr. Exc. - 4 m^3
(For Details, See Sht. 2B-7)

(2) Sta. 2+805, 11.365 m Rt.
Const. Type "D" Mod. Inlet
Inst. 300 mm Sew. Pipe - 23 m
Tr. Exc. - 17 m^3
(For Details, See Sht. 2B-7)

(3) Sta. 2+800, 11.365 m Lt.
Const. Type "D" Mod. Inlet
Inst. 300 mm Sew. Pipe - 5m
Tr. Exc. - 4 m^3
(For Details, See Sht. 2B-7)

(4) Sta. 2+817, 11.365 m Lt.
Const. Type "D" Mod. Inlet
Inst. 300 mm Sew. Pipe - 12 m
Tr. Exc. - 9 m^3
(For Details, See Sht. 2B-7)

(5) Sta. 2+805, 11.365 m Lt.
Const. Type "D" Mod. Inlet
Inst. 375 mm Sew. Pipe - 3 m
Tr. Exc. - 3 m^3
(For Details, See Sht. 2B-7)

(6) Sta. 2+805, 14 m Lt.
Const. Type "B-P" Control Manhole
Inst. 375 mm Sew. Pipe - 40 m
Inst. 300 mm Sew. Pipe - 4 m
Tr. Exc. - 37 m^3
(For Details, See Sht. 2B-8)

(7) Sta. 2+808, 17 m Lt.
Const. Water Quality Manhole
Inst. 300 mm Sew. Pipe - 5 m
Const. Outlet Basin
Const. Loose Riprap (Class 50) - 4 m^3
Tr. Exc. - 3 m^3
(For Details, See Sht. 2B-6 & 2B-9)

(8) Const. Water Quality Swale No. 5
(For Details, See Sht. 2B-14)

(9) Sta. 2+775, 16.5 m Rt.
Const. Double Type "D" Inlet
Inst. 675 mm Sew. Pipe - 31 m
Tr. Exc. - 46 m^3
(For Profile, See Sht. 9C)
(See Drg. No. RD336)

(10) Sta. 2+767, 14 m Lt. To STA 2+745.88 m Lt.
Const. Type "A-P" Manhole - 2
Const. Type "B-P" Manhole
Inst. 675 mm Sew. Pipe - 77 m
Const. Outlet Basin
Const Loose Riprap (Class 50) - 7 m^3
Tr. Exc. - 120 m^3
(For Details, See Sht. 2B-6
(For Profile, See Sht. 9C)
(See Drg. No. RD327)

(11) Sta. 2+758, 11.06m Lt.
Inst. 300 mm Culv. Pipe - 12 m
Tr. Exc. - 9 m^3

(12) Const. Aggregate Ditch Lining - 60 m^2

To Face Sht. 9A

WASHINGTON COUNTY ENGINEERING

COUNCIL CR.-QUINCE ST. (FOREST GROVE) SEC.
NEHALEM HWY.
WASHINGTON COUNTY

FEDERAL HIGHWAY ADMINISTRATION		PROJECT NUMBER	SHEET NO.
REGION 10	OREGON DIVISION	NH-S102 (4)	9A-2

22 AUG 98

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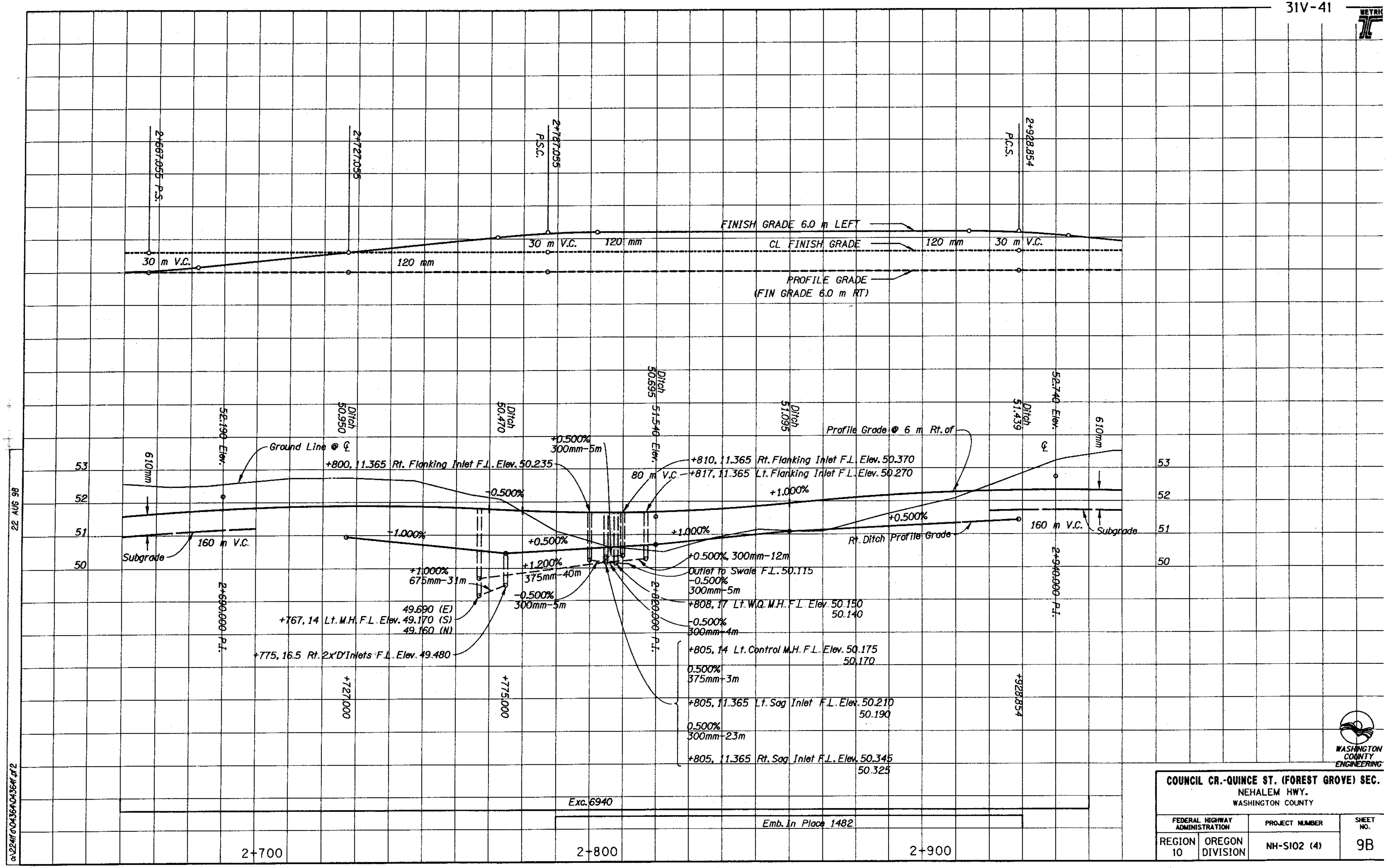
VIEW 5



2+667.055 P.S.
2+727.055
2+787.055 P.S.C.
2+928.854 P.C.S.
FINISH GRADE 6.0 m LEFT
CL FINISH GRADE
PROFILE GRADE
(FIN GRADE 6.0 m RT)
30 m V.C.
120 mm
Ground Line @ ℄
Profile Grade @ 6 m Rt. of
52.190 Elev.
Ditch 50.950
Ditch 50.470
Ditch 50.695
51.546 Elev.
Ditch 51.095
Ditch 51.439
52.740 Elev.
610mm
+0.500% 300mm-5m
+800, 11.365 Rt. Flanking Inlet F.L. Elev. 50.235
+810, 11.365 Rt. Flanking Inlet F.L. Elev. 50.370
+817, 11.365 Lt. Flanking Inlet F.L. Elev. 50.270
80 m V.C.
-0.500%
+1.000%
-1.000%
+0.500%
160 m V.C.
Subgrade
Rt. Ditch Profile Grade
+1.200% 375mm-40m
+1.000% 675mm-31m
-0.500% 300mm-5m
+0.500%, 300mm-12m
Outlet to Swale F.L. 50.115
-0.500% 300mm-5m
+808, 17 Lt. W.Q. M.H. F.L. Elev. 50.150 50.140
-0.500% 300mm-4m
49.690 (E)
+767, 14 Lt. M.H. F.L. Elev. 49.170 (S)
49.160 (N)
+775, 16.5 Rt. 2x'D' Inlets F.L. Elev. 49.480
+805, 14 Lt. Control M.H. F.L. Elev. 50.175 50.170
0.500% 375mm-3m
+805, 11.365 Lt. Sag Inlet F.L. Elev. 50.210 50.190
0.500% 300mm-23m
+805, 11.365 Rt. Sag Inlet F.L. Elev. 50.345 50.325
2+690.000 P.I.
2+820.000 P.I.
2+940.000 P.I.
+727.000
+775.000
+928.854
53
52
51
50
Exc. 6940
Emb. In Place 1482
2+700
2+800
2+900
22 AUG 98

WASHINGTON COUNTY ENGINEERING

COUNCIL CR.-QUINCE ST. (FOREST GROVE) SEC.
NEHALEM HWY.
WASHINGTON COUNTY

FEDERAL HIGHWAY ADMINISTRATION		PROJECT NUMBER	SHEET NO.
REGION 10	OREGON DIVISION	NH-S102 (4)	9B

JUL 1997

4-17-97

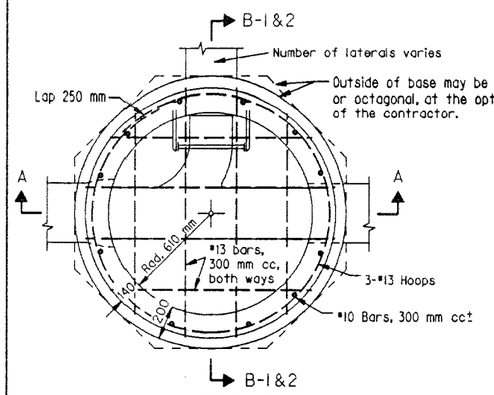
nt7360a/rd327.met

RD327

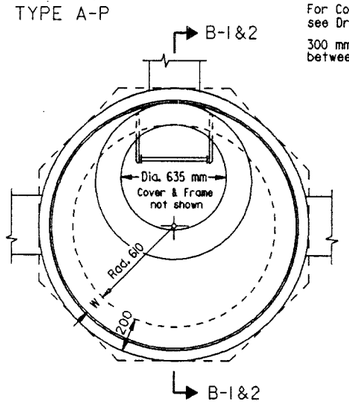
PRECAST MANHOLE
TYPE A-P

NOTES:
For Cast-in-Place Manhole see Drg. No. RD324.
For Cover and Frame details see Drg. No. RD324.
300 mm min. wall is required between pipes in manhole.

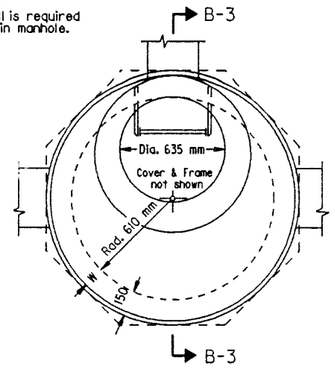
● All dimensions are in mm unless otherwise noted.



PLAN OF BASE
(Base, Risers & Cone)

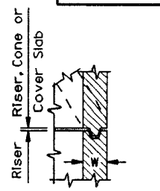


TOP VIEW
(Base, Risers & Cone)



TOP VIEW
(Base & Cone)

NOTE: Shape bottom of manhole as shown on "Plan of Base" and Section A-A for "Base, Risers & Cone"



ALTERNATE JOINT

MINIMUM DEPTH OF MANHOLE TYPE A-P

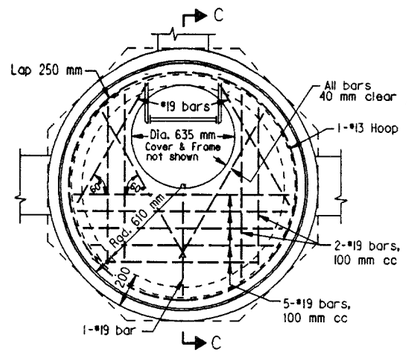
⌀D(mm)	H(mm)
200	1675
250	1750
300	1825
375	1900
450	1975
525	2050
600	2125

⌀D Is inside diameter of the largest pipe entering or leaving base.

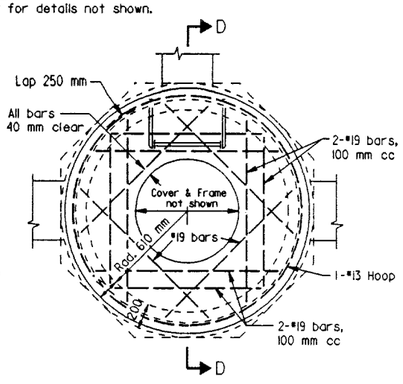
NOTE: When depth is less than minimum for manhole type A-P, use shallow manhole type B or type B-P.

SHALLOW PRECAST MANHOLE
TYPE B-P

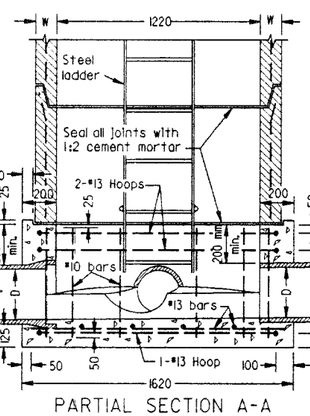
NOTE: See Manhole type A-P for details not shown.



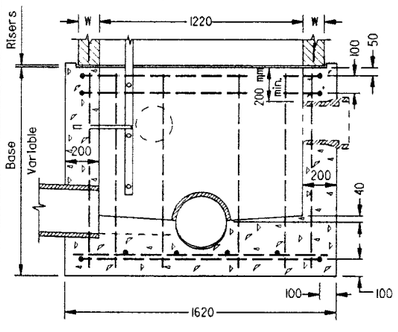
TOP VIEW
(Base, Riser & Cover Slab)



TOP VIEW
(Base & Cover Slab)

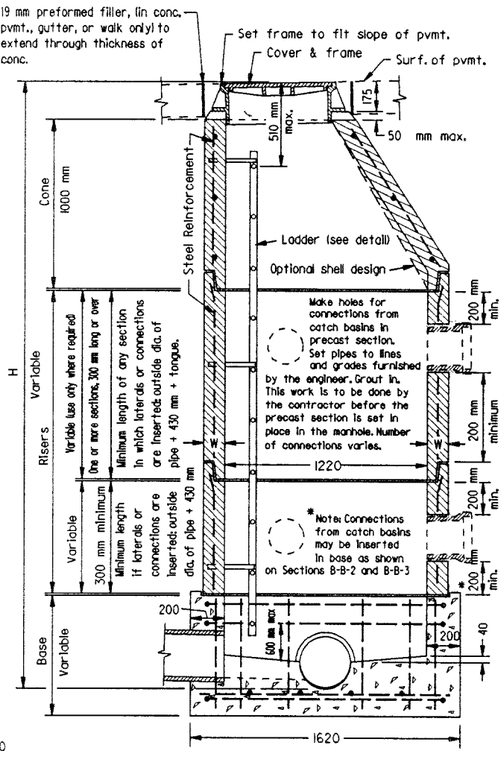


PARTIAL SECTION A-A
(Base, Risers & Cone)



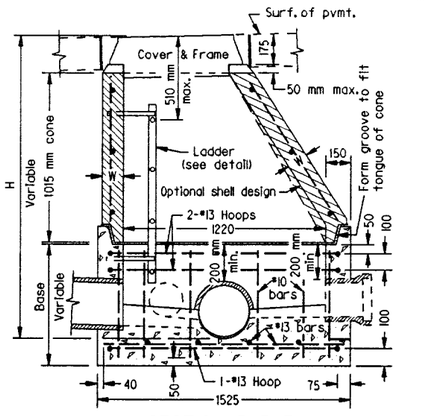
SECTION B-B-2
(Base for Manholes)

NOTE: Set pipes for catch basin connections in base, to grade and directions furnished by the engineer.

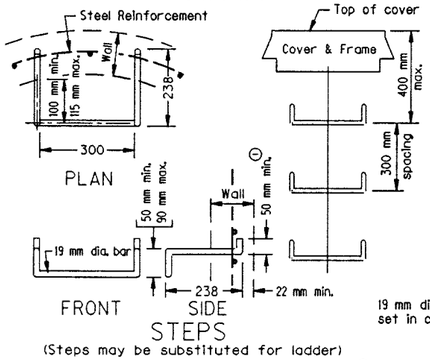


SECTION B-B-1
(Base, Risers & Cone)

NOTE: Use Section B-B-3 when length of risers become less than minimum shown.

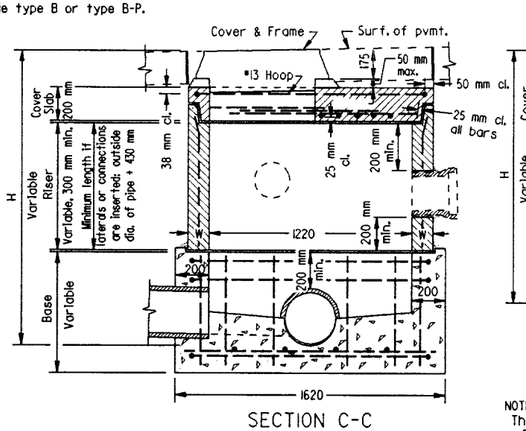


SECTION B-B-3
(Base & Cone)



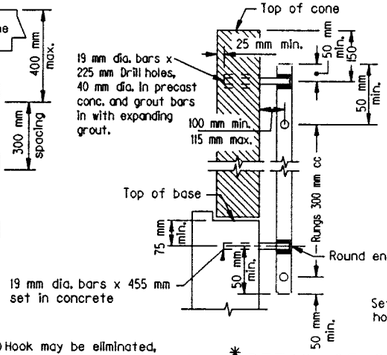
STEPS
(Steps may be substituted for ladder)

See Current Qualified Products List (QPL) For Acceptable Alternate Manhole Steps



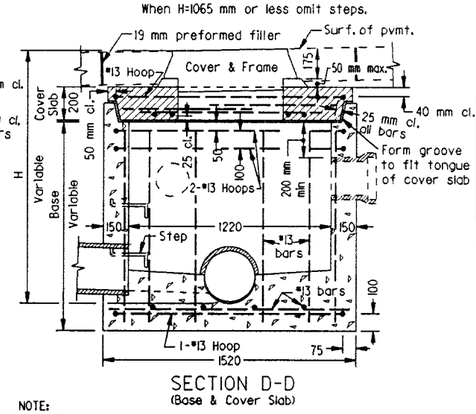
SECTION C-C
(Base, Riser & Cover Slab)

NOTE: Use Section D-D when length of riser becomes less than minimum shown.



① Hook may be eliminated, provided steps will withstand a "pull" force of 450 kg without loosening.

* DETAIL OF STEEL LADDER
* See Steps



SECTION D-D
(Base & Cover Slab)

NOTE: The risers, cones and cover slabs shall meet the requirements of the current AASHTO Standard Specification M199M

LEGEND

- Cast-in-Place concrete
- Precast concrete
- 1:2 cement mortar
- Sewer pipe

W 100 mm min. (For tolerance see AASHTO M199M)

NOTE: All material and workmanship shall be in accordance with the current State of Oregon Standard Specifications for Highway Construction.

OREGON
DEPARTMENT OF TRANSPORTATION
STANDARD

MANHOLES

JANUARY 1996

REVISIONS	
DATE	DESCRIPTION
8-96	REVISED REINFORCEMENT
4-97	REVISED STEPS DETAIL

APPROVED
Sam Johnston
STANDARDS ENGINEER

DRG. NO. RD327