OPERATION & MAINTENANCE MANUAL

DFI No.: D00157
Facility Type: Water Quality Biofiltration Swale

AUGUST, 2011

INDEX

1. Identification

Drainage Facility ID (DFI):	**D00157**
Facility Type:	Water Quality Biofiltration Swale
Construction Drawings:	(V-File Number) 31V-41
Location:	District: 1 (Old 2A)
	Highway No.: 102
	Mile Post: 89.95 (beg./end)
	Description: This facility is located at the northeast corner of the intersection of OR 47 (Hwy 102) with Porter Road. Access can be obtained from Porter Road.

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.

This facility is located at the northeast corner of the intersection of OR 47 (Hwy 102) with Porter Road. Access can be obtained from Porter Road.

The swale treats stormwater runoff on both sides of the highway for a distance of approximately 754 feet. The swale is located within a low (sag) point on US 47 (Hwy 102). Stormwater runoff is conveyed by roadside ditches, ditch inlets and storm piping on both sides of the highway near the intersection. Drainage at the northeast corner of the intersection drains directly into the swale. Runoff collected by the inlets at the other corners is directed into two 12-inch storm pipes that discharge flows directly to the swale. See Photos 2 and 3 and Points A and B on the Operational Plan, Appendix A.

There is an additional larger-sized storm piping system directing water around the swale by collecting what appear to be ditch flows from beyond the roadway surfaces themselves; that is, from behind a sidewalk on the south side of the highway. These flows are directed to a manhole (Point D) north of the swale. Stormwater flowing from the roadway surfaces and ditches north of the sidewalk, however, are directed toward and treated by the swale before being discharged via the facility outlet structure (Point C) into the same manhole at Point D. From this structure all of the water is conveyed northward by a 27-inch storm pipe toward Council Creek.

A. Maintenance equipment access:
   Maintenance access can be obtained when heading north on Porter Road, along the eastside shoulder, just after its intersection with US 47 (Hwy 102).

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: Looking south towards the water quality biofiltration swale and the facility inlets A and B; see the Operational Plan, Appendix A.

Photo 2: Looking south at Inlet A.

Photo 3: Looking west towards Inlet B and the Porter Road intersection with the highway.

Photo 4: Outlet structure for WQ Swale along Porter Road.

5. Facility Haz Mat Spill Feature(s)

The water quality biofiltration swale can be used to store a volume of liquid by blocking the 15-inch diameter outlet pipe located at the outlet of the

swale facility. This pipe is noted as part of the outlet structure at Point C on the Operational Plan, Appendix A. The use of sandbags or a steel plate may be used to block the outlet structure's grated inlet ahead of the pipe.

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

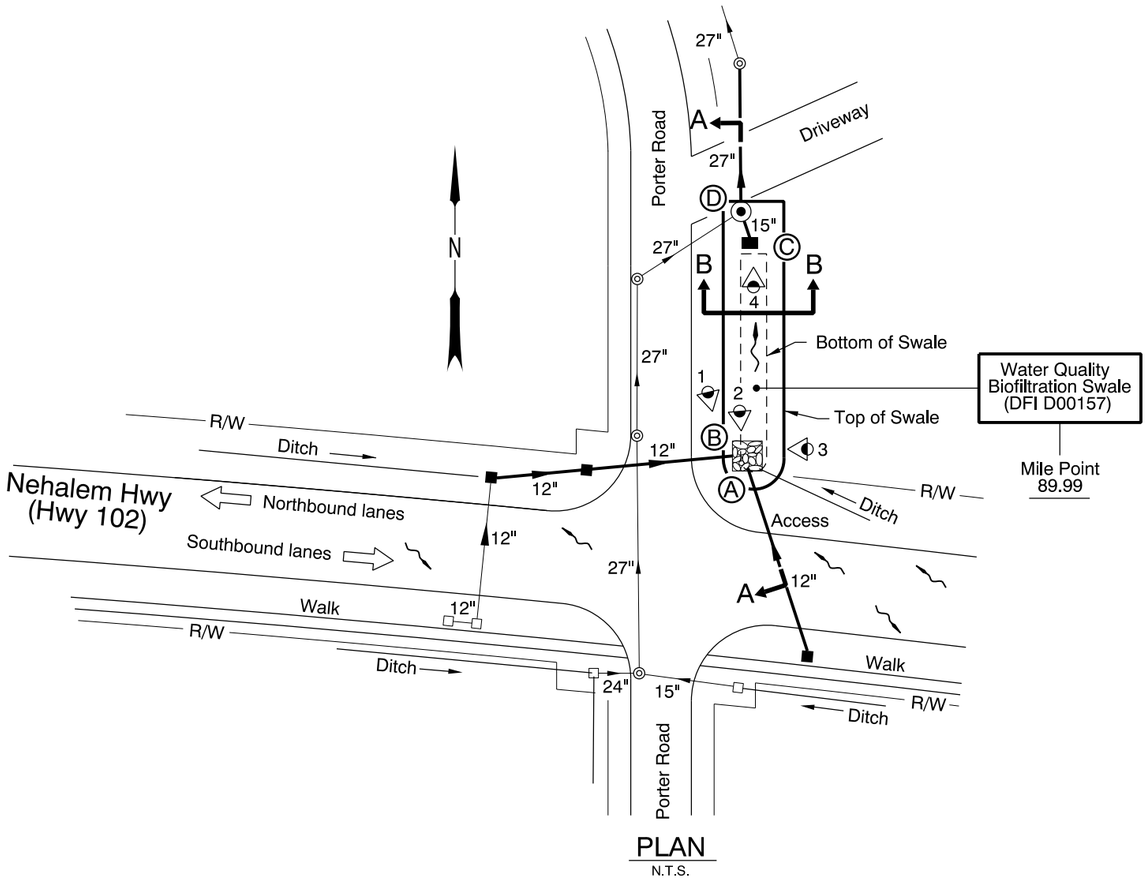
Contact any of the following for more detailed information about management of waste materials found on site:

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

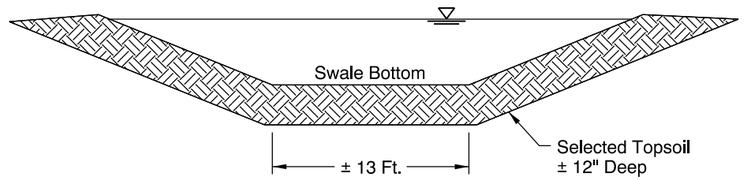
Appendix A

Content:

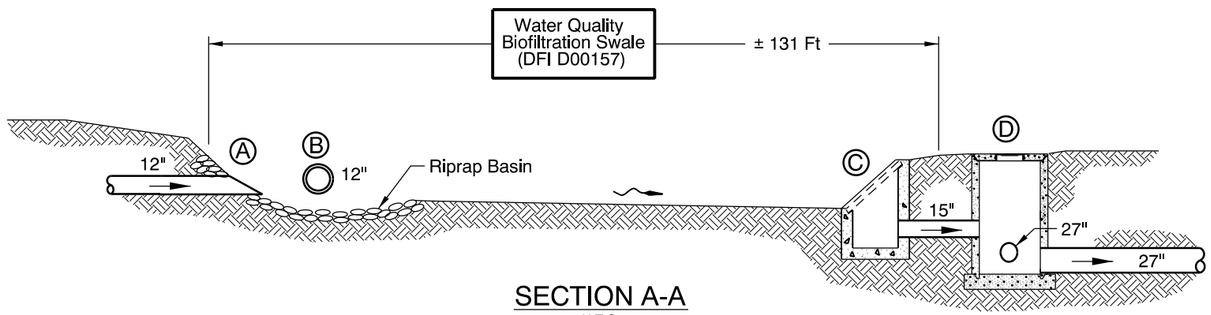
- **Operational Plan and Profile Drawing(s)**



PLAN
N.T.S.



SECTION B-B
N.T.S.



SECTION A-A
N.T.S.

LEGEND:

- Photo Location / Direction
- Swale Facility Pipe Inlet A
- Swale Facility Pipe Inlet B
- Double Type-D Inlet/Facility Outlet
- Flat Top Manhole
- Riprap Basin
- Manhole and or
- Inlet and or
- Storm Pipe (Facility)
- Storm Pipe
- Conveyance Direction
- Pavement / Facility Flow Path

Sht. 1 of 1

OREGON DEPARTMENT OF TRANSPORTATION

Prepared By: Bob Knorr

Drafted By: Jim Holeman

DFI D00157
MAINTENANCE DISTRICT 1 HWY 102
WATER QUALITY BIOFILTRATION SWALE
NEHALEM HWY 102 MP 89.99
WASHINGTON COUNTY

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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

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STATE OF OREGON

DEPARTMENT OF TRANSPORTATION

PLANS FOR PROPOSED PROJECT

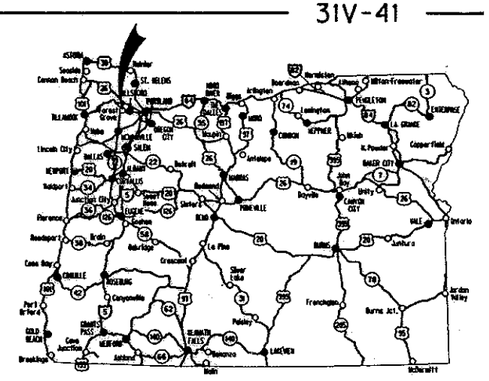
GRADING, STRUCTURE, PAVING, SIGNING, SIGNAL, & STRIPING

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

NEHALEM HIGHWAY

WASHINGTON COUNTY

OCTOBER 1998



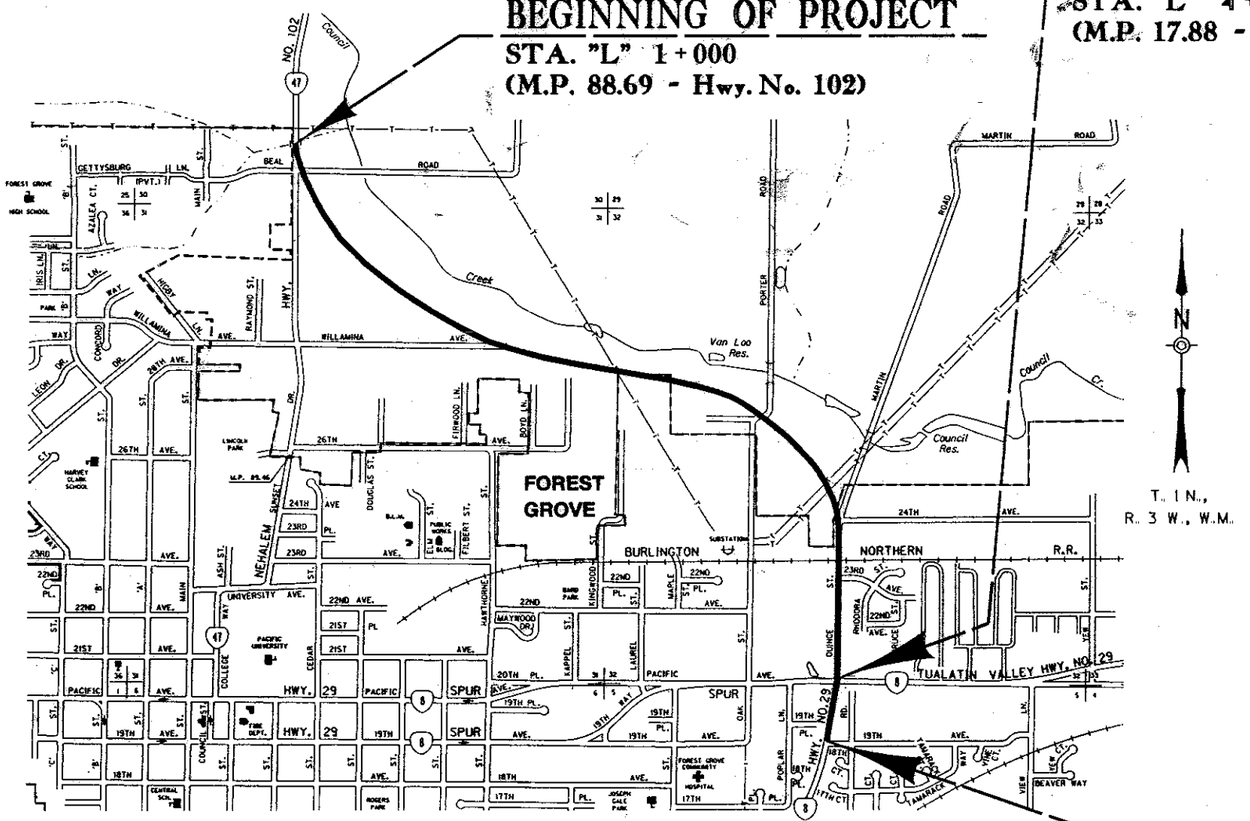
Overall Length Of Project - 3.33 km (2.07 Miles)

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

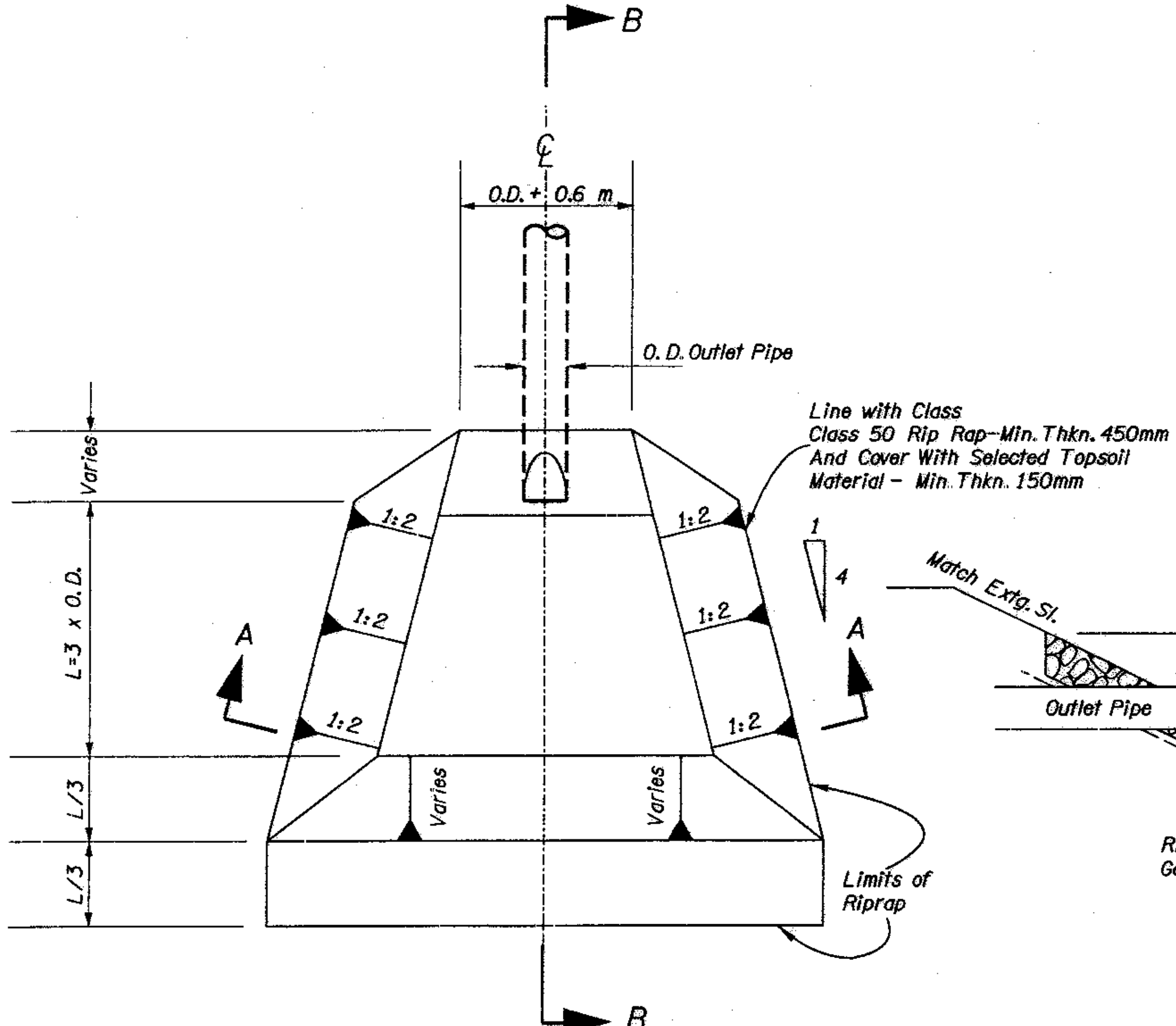
COUNCIL CR. - QUINCE ST. (FOREST GROVE) SEC.
NEHALEM HIGHWAY
WASHINGTON COUNTY

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

METRIC

VIEW B2 C134-1442

OUTLET BASIN



PLAN

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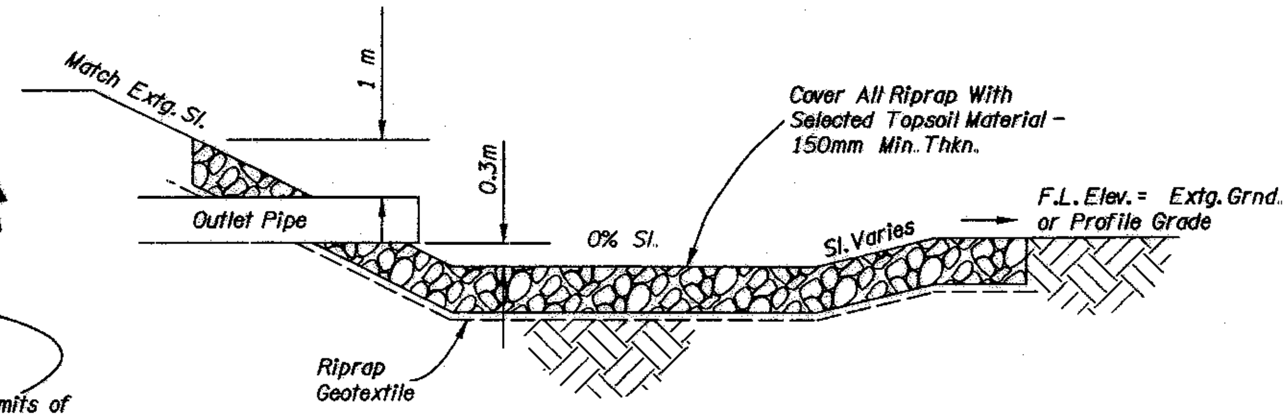
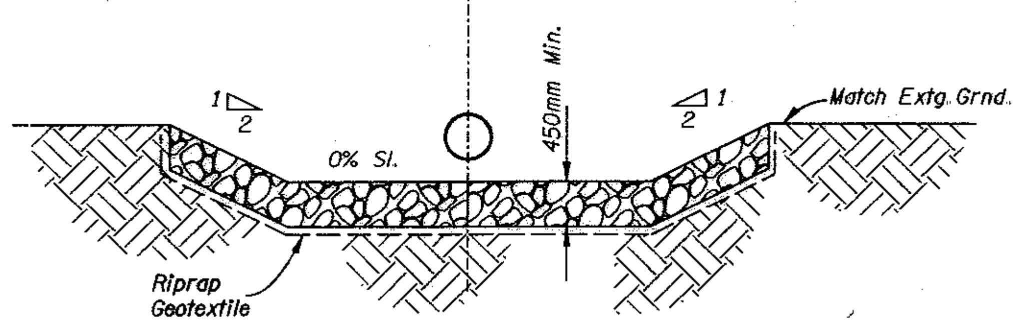


SECTION B-B

N.T.S.



SECTION A-A

N.T.S.

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WASHINGTON COUNTY ENGINEERING

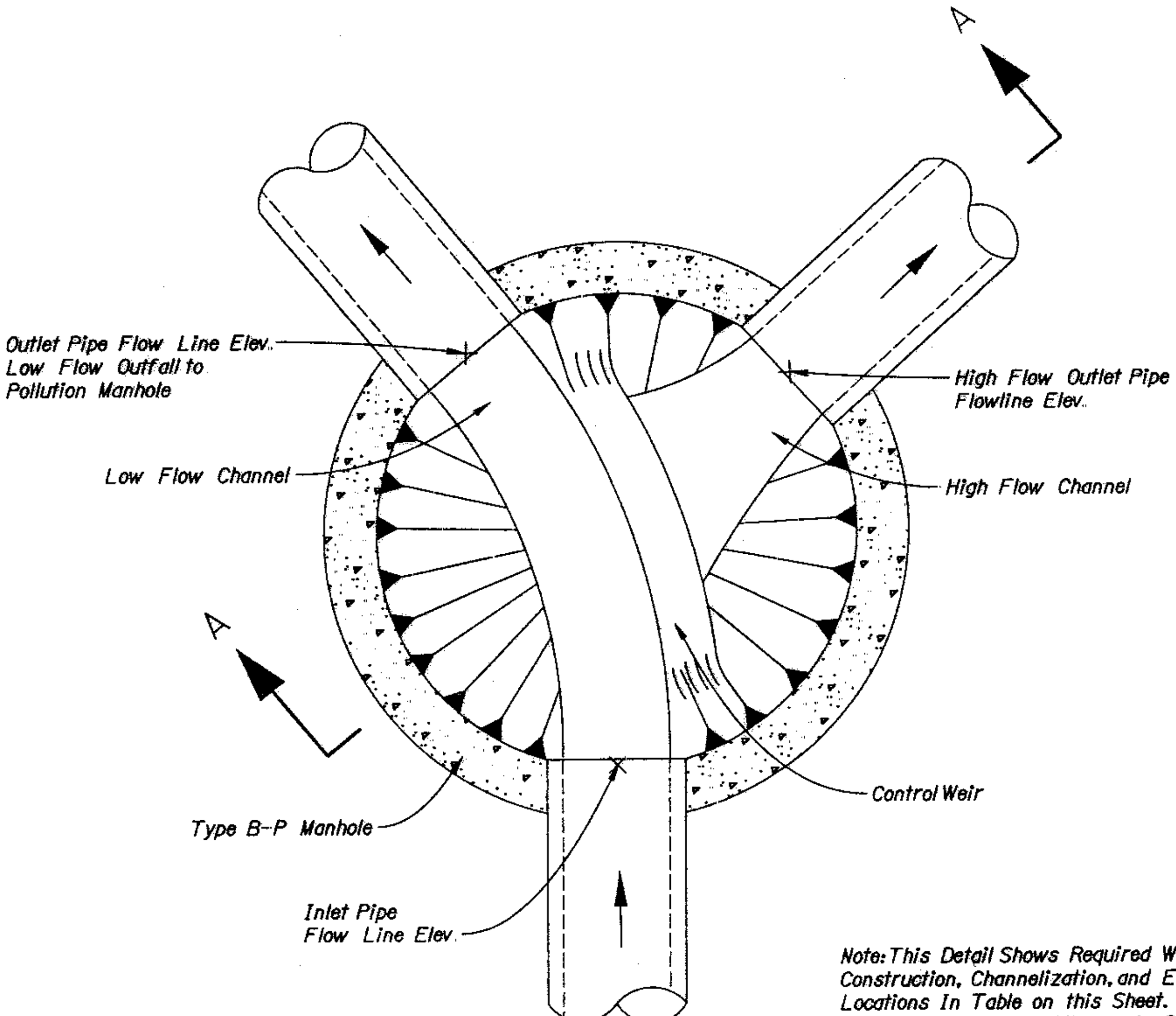
COUNCIL CR.-QUINCE ST. (FOREST GROVE) SEC.
NEHALEM HWY.
WASHINGTON COUNTY

FEDERAL HIGHWAY ADMINISTRATION		PROJECT NUMBER	SHEET NO.
REGION 10	OREGON DIVISION	NH-S102 (4)	2B-6

VIEW 1

CONTROL MANHOLE

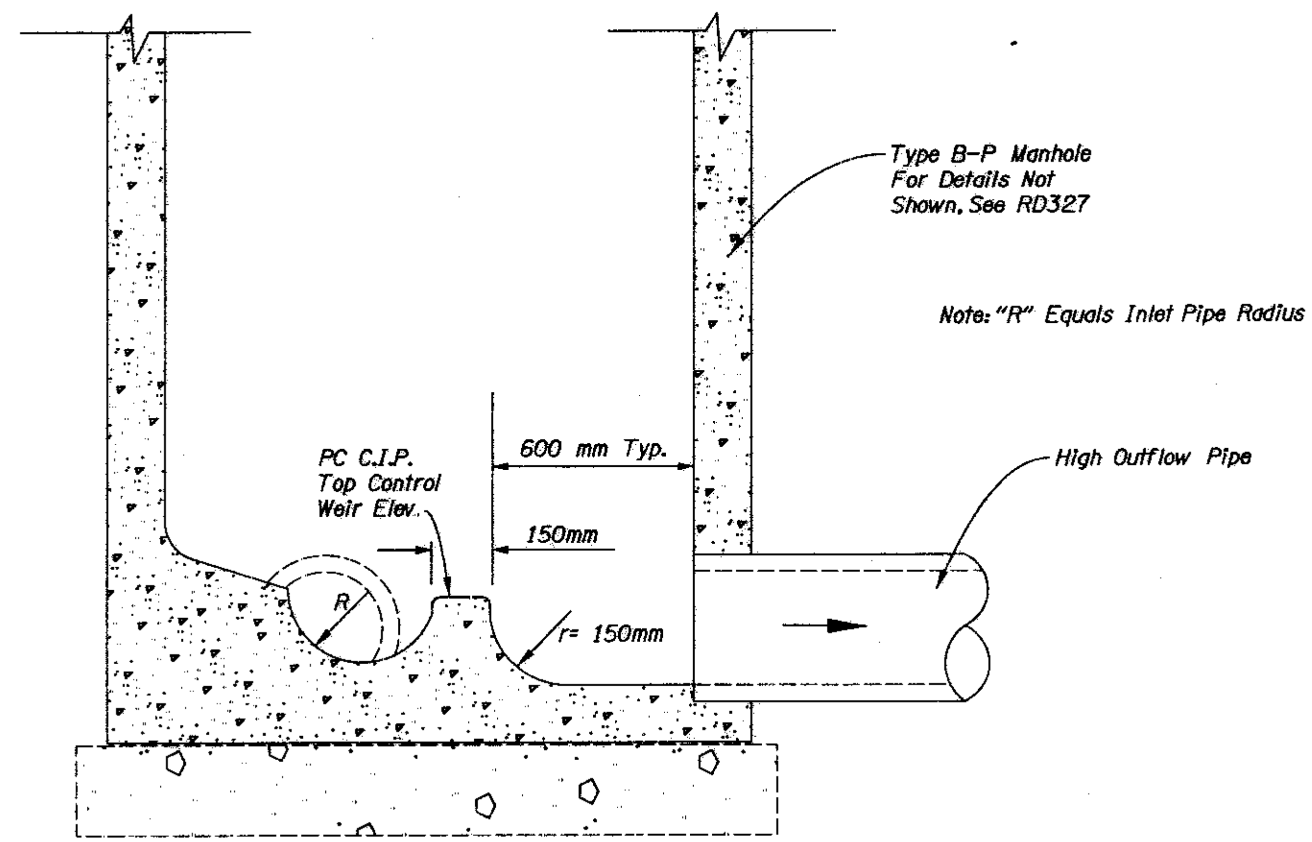
Sta.	Sheet/Note	Top Weir Elev.	Flow Line Pipe Elevation		
			Inlet	High Flow	Low Flow
1+457	4A-2 Note 6	49.280	49.120	49.100	49.100
1+848	6A-2 Note 7	49.400	49.246	49.220	49.220
2+155	7A-2 Note 5	49.250	49.080	49.070	49.070
2+566	8A-2 Note 6	48.980	48.817	48.800	48.800
2+805	9A-2 Note 6	50.350	50.175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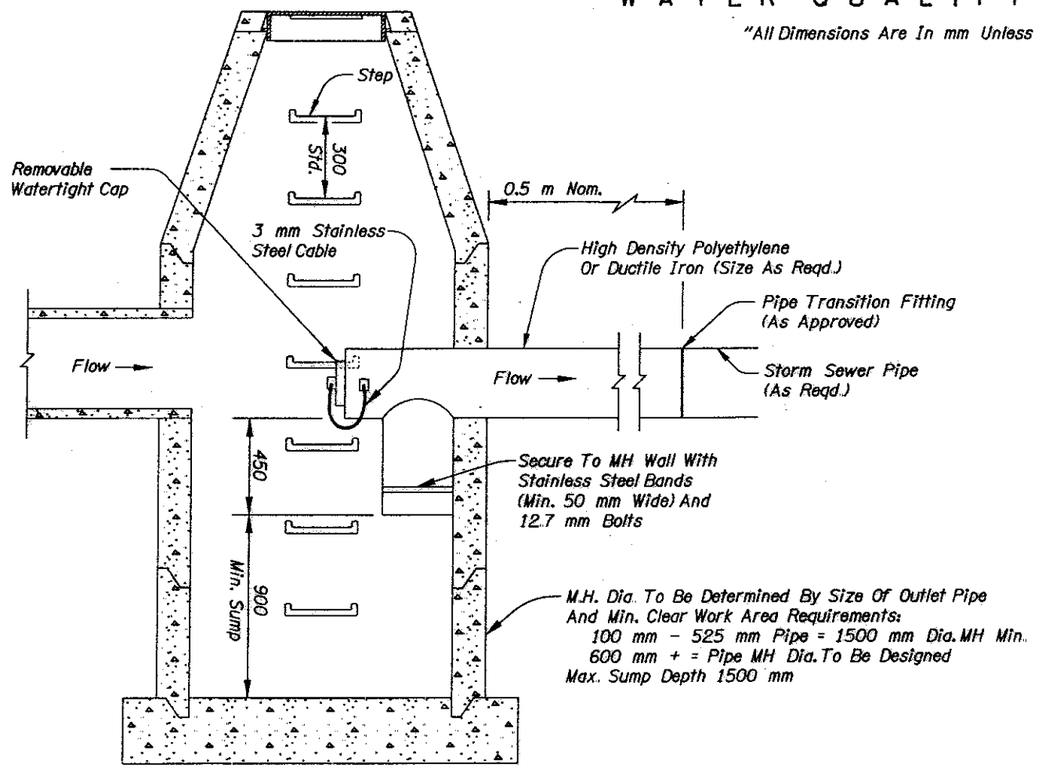
VIEW 3

DETAILS

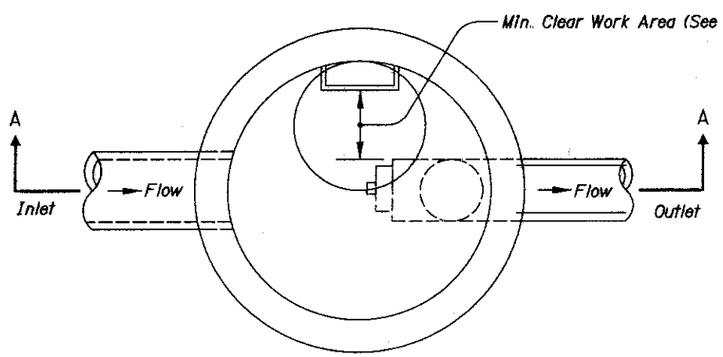
WATER QUALITY MANHOLE

"All Dimensions Are In mm Unless Otherwise Noted"

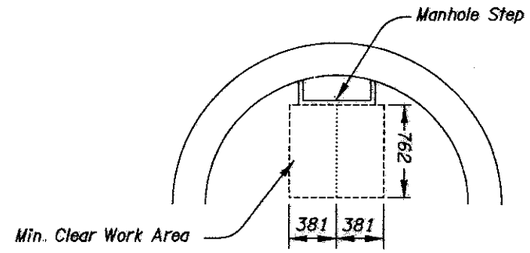


SECTION A-A

(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

20 AUG 98

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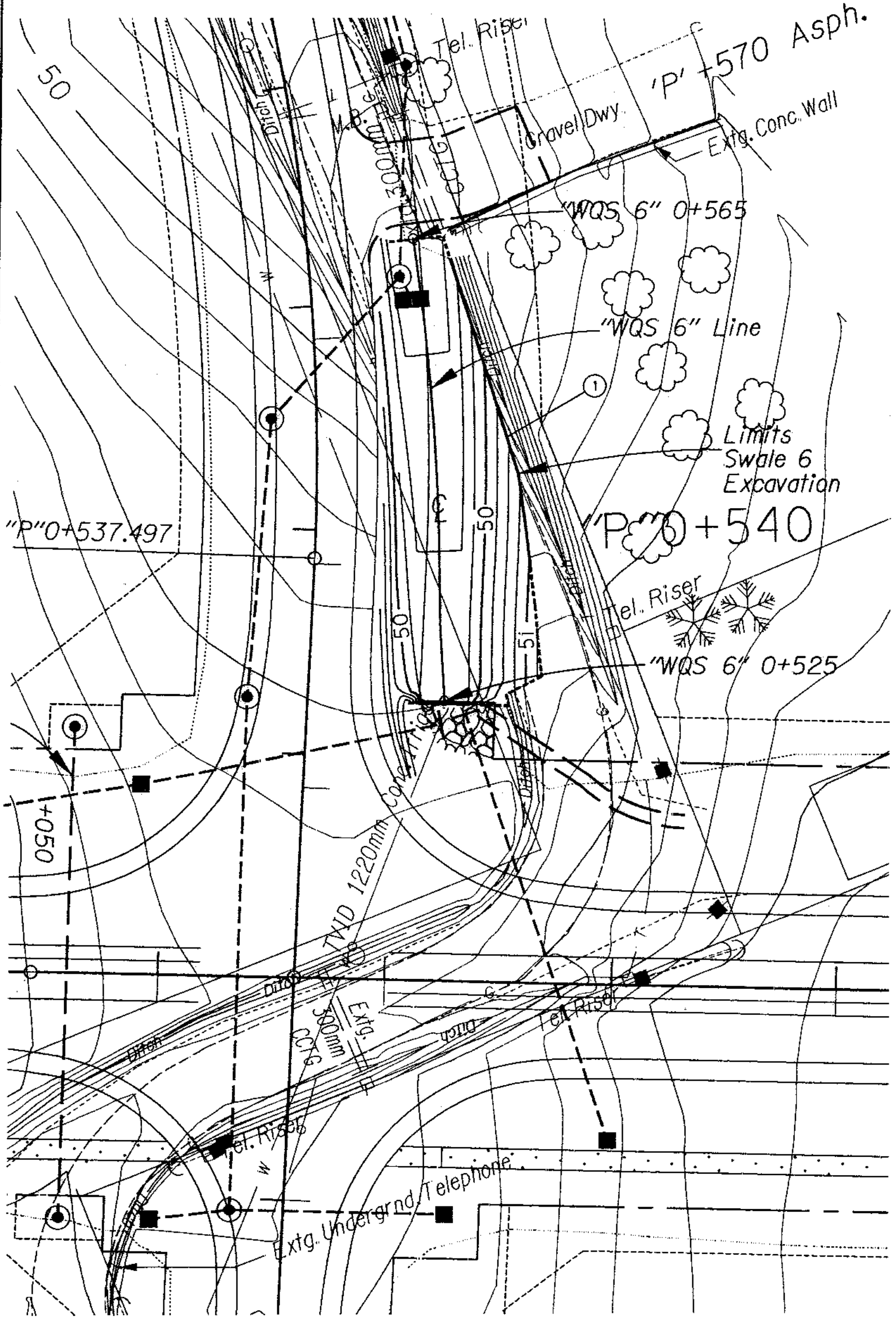
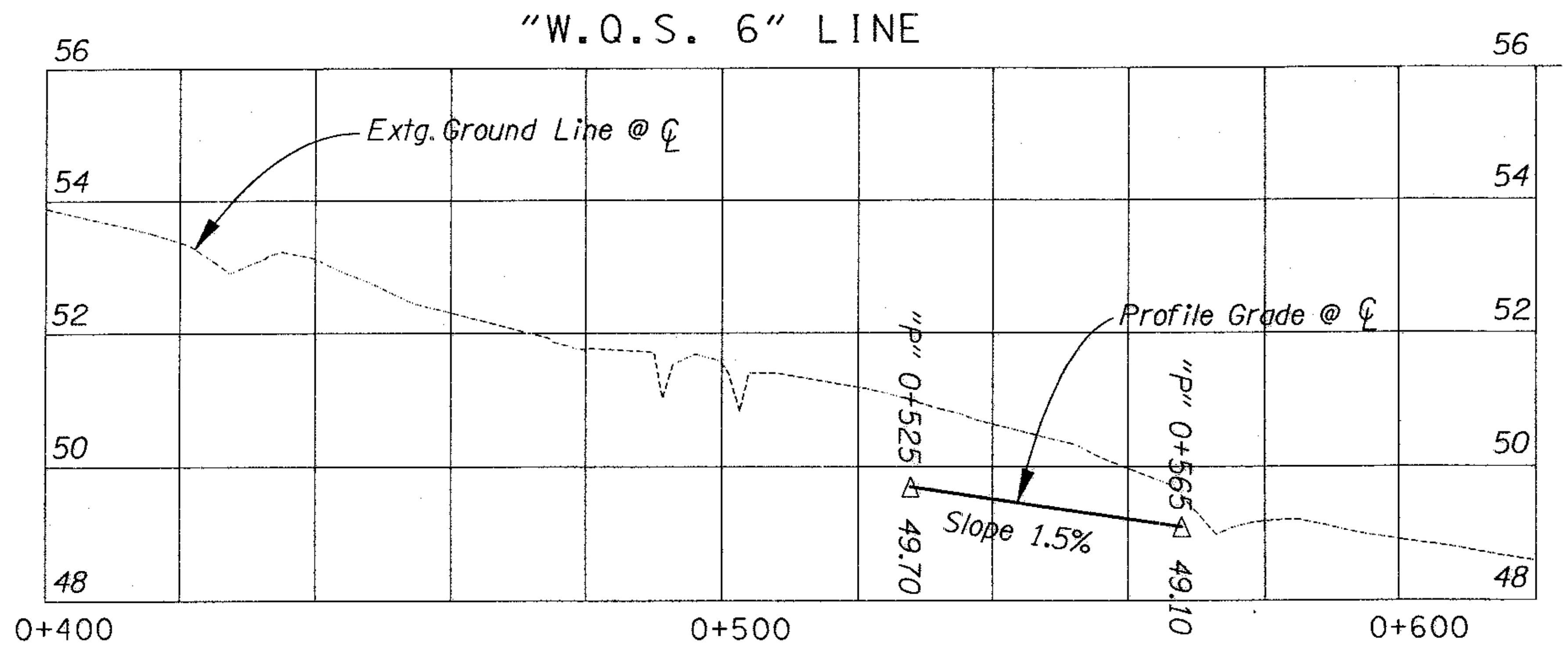
VIEW 4

SWALE NO. 6 DETAILS

(For Location, See Sht. 10A-2, Note 14)

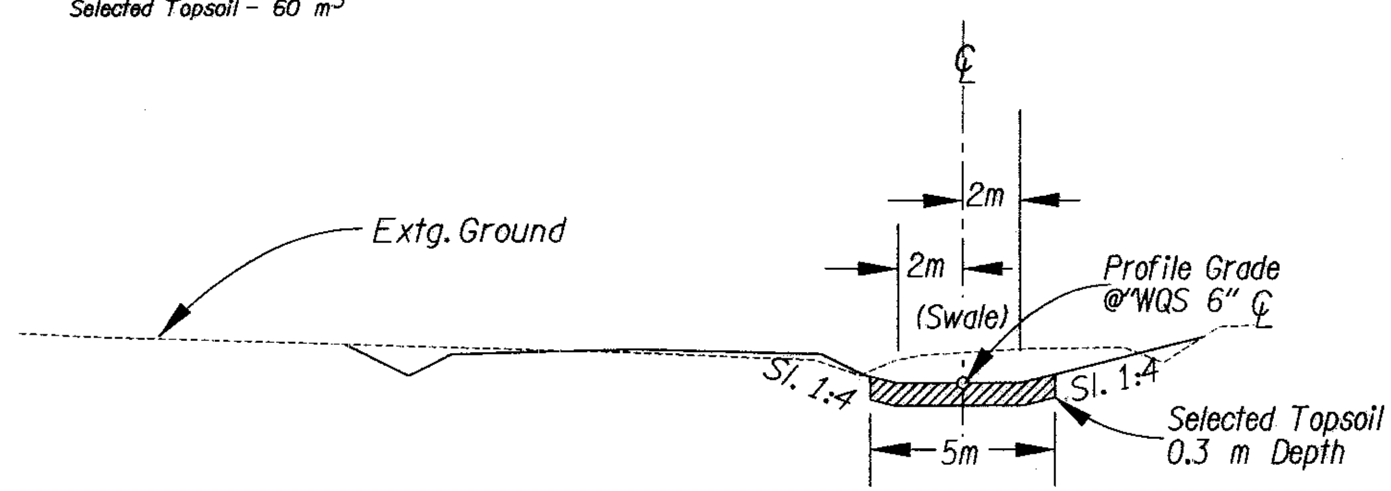


"W.Q.S. 6" LINE



① Const. Water Quality Swale Earthwork Included In Mainline Roadwork Selected Topsoil – 60 m^3

"W.Q.S. 6"



STA. "WQS 6" 0+525.0 TO STA. "WQS 6" 0+565.0

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-15

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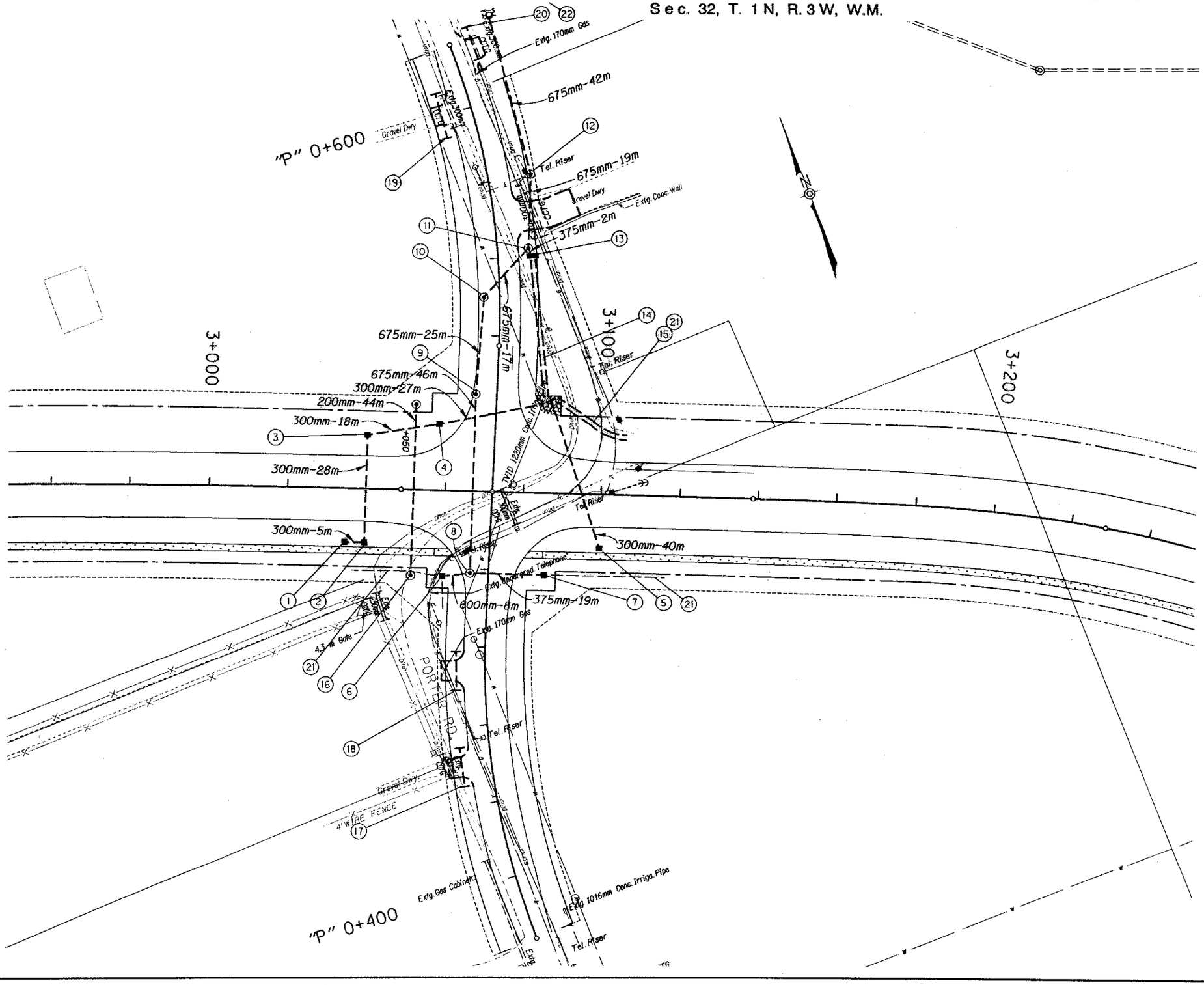
VIEW 4

D R A I N A G E & U T I L I T I E S

Sec. 32, T. 1 N, R. 3 W, 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)	10A

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VIEW 2

(1) Sta. 3+035, 13.765 m Rt.
Const. Type "D" Mod. Inlet
Inst. 300 mm Sew. Pipe - 5 m
Tr. Exc. - 5 m^3
(For Details, See Sht. 2B-7)

(2) Sta. 3+040, 13.765 m Rt.
Const. Type "D" Mod. Inlet
Inst. 300 mm Sew. Pipe - 28 m
Tr. Exc. - 25 m^3
(For Details, See Sht. 2B-7)

(3) Sta. 3+040, 13.765 m Lt.
Const. Type "D" Mod. Inlet
Inst. 300 mm Sew. Pipe - 18 m
Tr. Exc. - 16 m^3
(For Details, See Sht. 2B-7)

(4) Sta. 3+058, 17 m Lt.
Const. Type "D" Mod. Inlet
Inst. 300 mm Sew. Pipe - 27 m
Tr. Exc. - 24 m^3
(For Details, See Sht. 2B-7)

(5) Sta. 3+100, 13.765 m Rt.
Const. Type "D" Mod. Inlet
Inst. 300 mm Sew. Pipe - 40 m
Tr. Exc. - 36 m^3
(For Details, See Sht. 2B-7)

(6) Sta. 3+060, 22 m Rt.
Const. Double Type "D" Inlet
Inst. 600 mm Sew. Pipe - 8 m
Tr. Exc. - 22 m^3
(See Drg. No. RD336)

(7) Sta. 3+086, 21 m Rt.
Const. Double Type "D" Inlet
Inst. 375 mm Sew. Pipe - 19 m
Tr. Exc. - 39 m^3

(8) Sta. 3+067, 21m Rt.
Const. Type "A-P" Manhole
Inst. 675 mm Sew. Pipe - 46 m
Tr. Exc. - 132 m^3
(See Drg. No. RD327)

(9) Sta. 3+067, 25 m Lt.
(Sta. "P" 0+525, 5 m Lt.)
Const. Type "B-P" Manhole
Inst. 675 mm Sew. Pipe - 25 m
Tr. Exc. - 72 m^3

(10) Sta. "P" 0+550, 4 m Lt.
Const. Type "B-P" Manhole
Inst. 675 mm Sew. Pipe - 17 m
Tr. Exc. - 40 m^3

(11) Sta. "P" 0+562, 8 m Rt.
Const. Type "B-P" Manhole
Inst. 675 mm Sew. Pipe - 19 m
Tr. Exc. - 29 m^3

(12) Sta. "P" 0+580, 11 m Rt.
Const. Type "B-P" Manhole
Inst. 675 mm Sew. Pipe - 42 m
Const. Outlet Basin
Const. Loose Riprap (Class 100) - 7 m^3
Tr. Exc. - 63 m^3
(For Details, See Sht. 2B-6)

(13) Sta. "P" 0+560, 9 m Rt.
Const. Double Type "D" Inlet
Inst. 375 mm Sew. Pipe - 2m
Tr. Exc. - 2 m^3

(14) Const. Water Quality Swale No. 6
(For Details, See Sht. 2B-15)

(15) Sta. 3+100, 14 m Lt.
Const. Ditch
"V" Bottom, 1:3 Side Slopes
Const. Outlet Basin
Const. Loose Riprap (Class 50) - 4 m^3
(For Details, See Sht. 2B-6)

(16) Sta. 3+052, 22 m Rt. To 22 m Lt.
Const. USA Std. Manhole-2
Inst. 200 mm San. Sew. Pipe - 44 m
Tr. Exc. - 35 m^3
(For Profile, See Sht. 15A)
(See USA Std. Drg. No. 010-ST)

(17) Sta. "P" 0+430, 7.3 m Lt.
Inst. 300 mm Culv. Pipe - 10 m
Tr. Exc. - 7.2 m^3

(18) Sta. "P" 0+454, 7.3 m Lt.
Inst. 300 mm Culv. Pipe - 10 m
Tr. Exc. - 7 m^3

(19) Sta. "P" 0+600, 7.3 m Lt.
Inst. 300 mm Culv. Pipe -10 m
Tr. Exc. - 7 m^3

(20) Sta. "P" 0+615, 7.3 m Rt.
Inst. 300 mm Culv. Pipe - 10m
Tr. Exc. - 7 m^3

(21) Const. Aggretate Ditch Lining - 140m^2

(22) Sta. "P" 0+650, Rt.
Inst. 300 mm Culv. Pipe - 10m
Tr. Exc. - 7 m^3
Locate At Direction of Engineer
(ROW Obligation)

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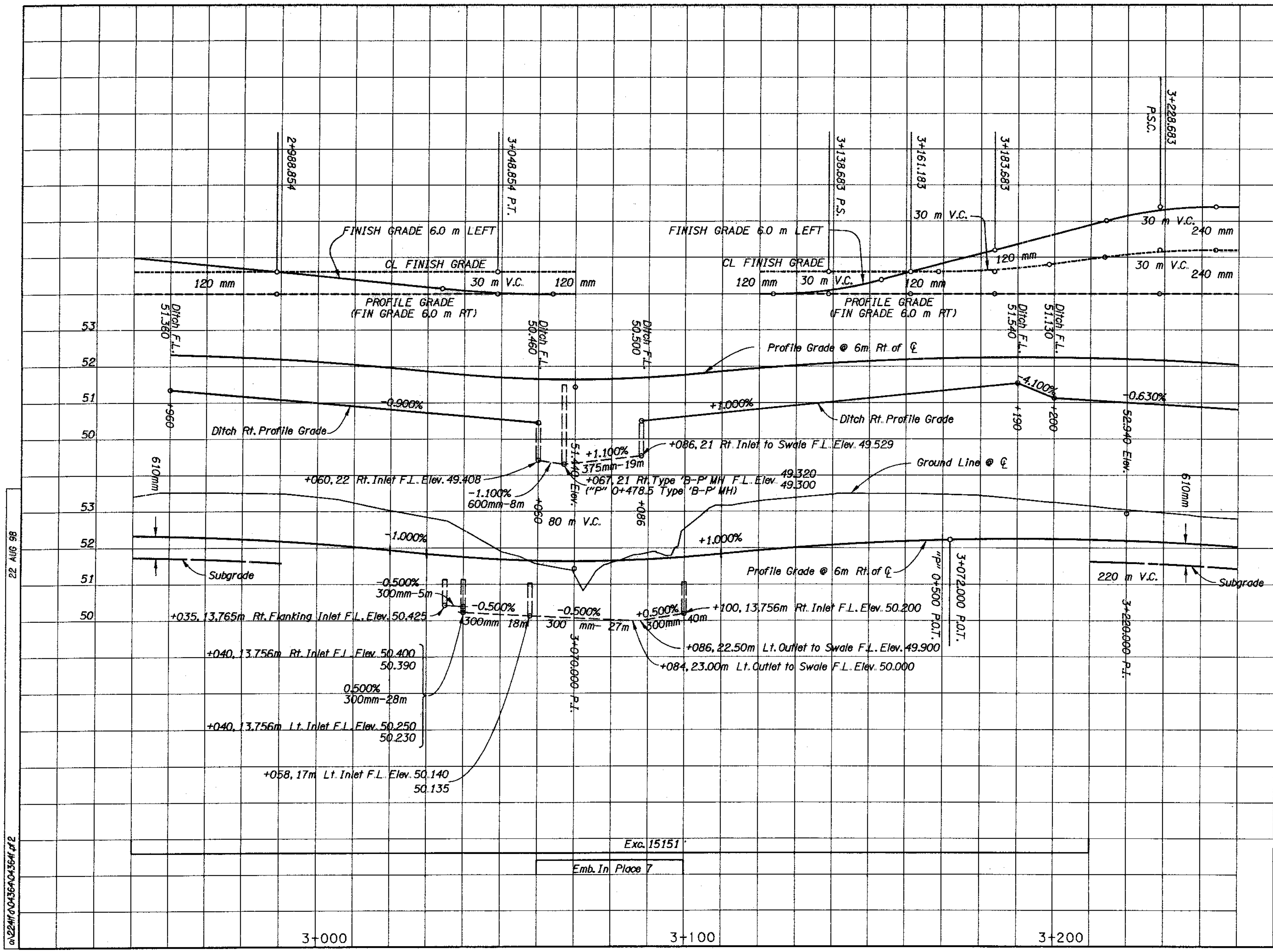
VIEW 6

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)	10A-2


2+988.854
3+048.854 P.T.
3+138.683 P.S.
3+161.183
3+183.683
3+228.683
P.S.C.
FINISH GRADE 6.0 m LEFT
CL FINISH GRADE
120 mm
30 m V.C.
PROFILE GRADE
(FIN GRADE 6.0 m RT)
240 mm
Ditch F.L. 51.360
Ditch F.L. 50.460
Ditch F.L. 50.500
Ditch F.L. 51.540
Ditch F.L. 51.130
Profile Grade @ 6m Rt. of ℄
-0.900%
+1.000%
-4.100%
-0.630%
Ditch Rt. Profile Grade
+960
+190
+200
52.940 Elev.
+1.100%
375mm-19m
+086, 21 Rt. Inlet to Swale F.L. Elev. 49.529
Ground Line @ ℄
+060, 22 Rt. Inlet F.L. Elev. 49.408
+067, 21 Rt. Type 'B-P' MH F.L. Elev. 49.320 49.300
("P" 0+478.5 Type 'B-P' MH)
-1.100%
600mm-8m
51.440 Elev.
610mm
80 m V.C.
+060
+086
-1.000%
+1.000%
Subgrade
Profile Grade @ 6m Rt. of ℄
"P" 0+500 P.O.T.
3+072.000 P.O.T.
220 m V.C.
3+220.000 P.I.
-0.500%
300mm-5m
-0.500%
300mm 18m
-0.500%
300 mm- 27m
+0.500%
300mm 40m
+035, 13.765m Rt. Flanking Inlet F.L. Elev. 50.425
+100, 13.756m Rt. Inlet F.L. Elev. 50.200
3+070.000 P.I.
+086, 22.50m Lt. Outlet to Swale F.L. Elev. 49.900
+084, 23.00m Lt. Outlet to Swale F.L. Elev. 50.000
+040, 13.756m Rt. Inlet F.L. Elev. 50.400 50.390
0.500%
300mm-28m
+040, 13.756m Lt. Inlet F.L. Elev. 50.250 50.230
+058, 17m Lt. Inlet F.L. Elev. 50.140 50.135
Exc. 15151
Emb. In Place 7
53
52
51
50
3+000
3+100
3+200
22 AUG 98
VIEW 2

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)	10B

"P" LINE

"P" 0+500.000 P.O.T.
3+072.000 P.O.C.

54.074 Elev.
53.963 Elev.
51.521 Elev.
51.760 Elev.
51.681 Elev.
48.861 Elev.
48.612 Elev.

Cold Plane

55
54
53
52
51
50
49
48
47

"P" 0+368

-0.618%

510mm

36 m V.C.

Subgrade

"P" 0+402.000 P.I.

-3.300%

32 m V.C.

Ground Line @

+1.000%

-1.000%

Profile Grade @ ℄

16 m V.C.

-3.000%

Subgrade

510mm

28 m V.C.

-1.77

"P" 0+632

-1.01.1%
675mm-46m

-1.100%
675mm-17m

-1.100%
675mm-25m

-1.121%
675mm-19m

-1.143%
675mm-42m

"P" 0+602.000 P.I.

STA. "P" 0+383.228

STA. "P" 0+617.016

Mainline 3+067.21m Rt. ("P" 0+478.5, 5m Lt.
Manhole F.L. Elev. - 49.320
49.300

+620.11m Rt. Outlet F.L. Elev. 47.600

+525.5m Lt. Manhole 48.835
48.815

+550 4m Lt. Manhole
48.540
48.520

+562.8m Rt. Manhole 48.333
48.313

+580.11m Rt. Manhole 48.100
48.080

"P" 0+476.000 P.I.

"P" 0+500.000 P.I.

"P" 0+508.000 P.I.

Exc. 1171

Exc. 1027

Emb. In Place 13

0+400

0+500

0+600

0+620

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)	10C

22 AUG 98

d:\224fl\DGN\36A\04364f.pf3

VIEW 2

JUL 1997

4-17-97

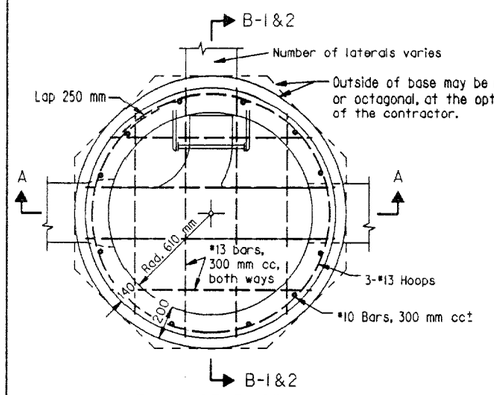
nt7360a/rd327.met

RD327

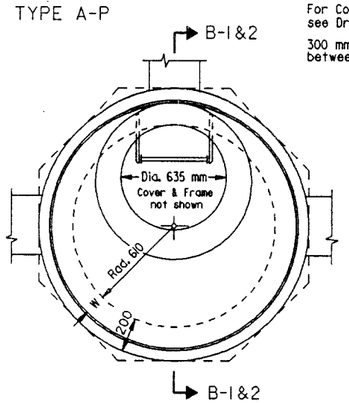
PRECAST MANHOLE
TYPE A-P

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.

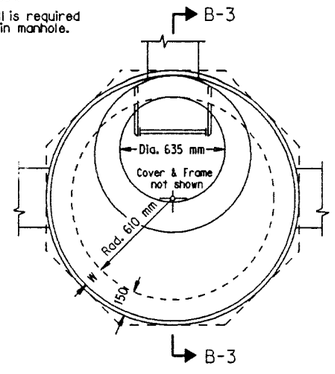
● All dimensions are in mm unless otherwise noted.



PLAN OF BASE
(Base, Risers & Cone)

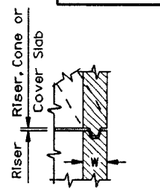


TOP VIEW
(Base, Risers & Cone)



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

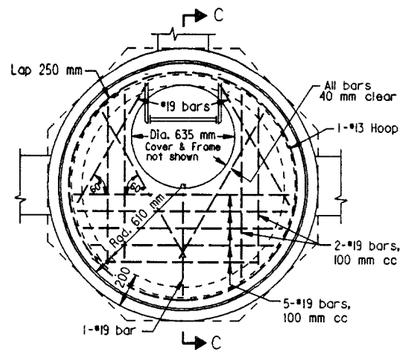
⌀D(mm)	H(mm)
200	1675
250	1750
300	1825
375	1900
450	1975
525	2050
600	2125

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

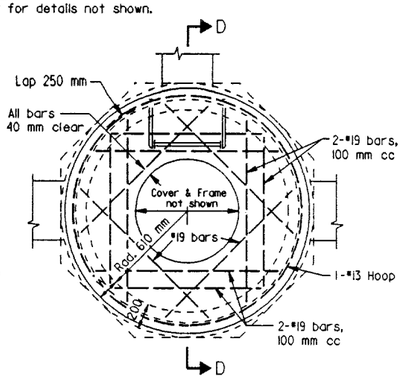
NOTE: When depth is less than minimum for manhole type A-P, use shallow manhole type B or type B-P.

SHALLOW PRECAST MANHOLE
TYPE B-P

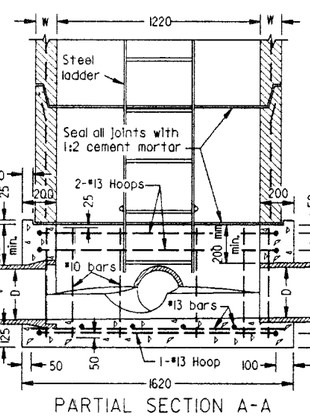
NOTE: See Manhole type A-P for details not shown.



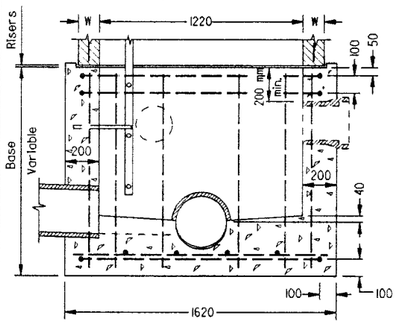
TOP VIEW
(Base, Riser & Cover Slab)



TOP VIEW
(Base & Cover Slab)

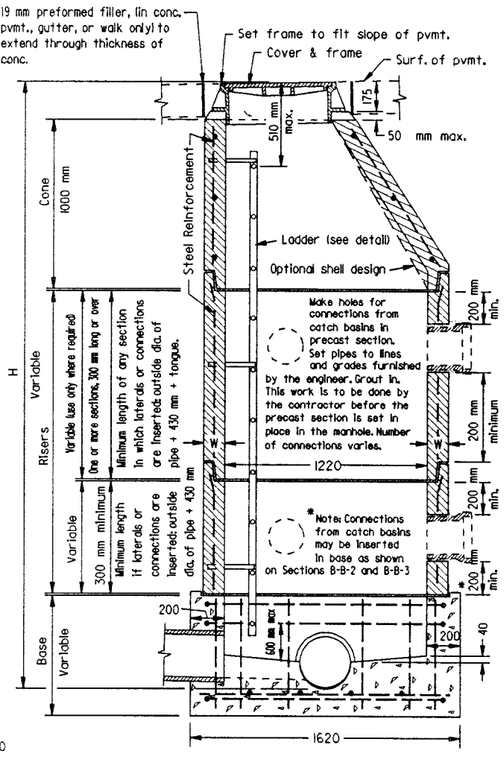


PARTIAL SECTION A-A
(Base, Risers & Cone)



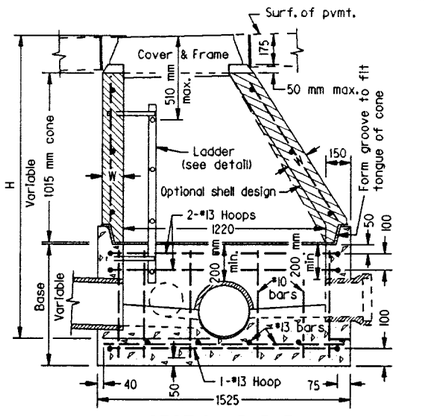
SECTION B-B-2
(Base for Manholes)

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

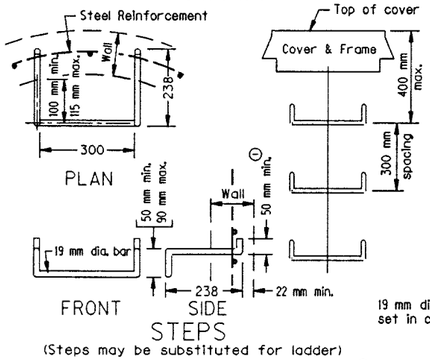


SECTION B-B-1
(Base, Risers & Cone)

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

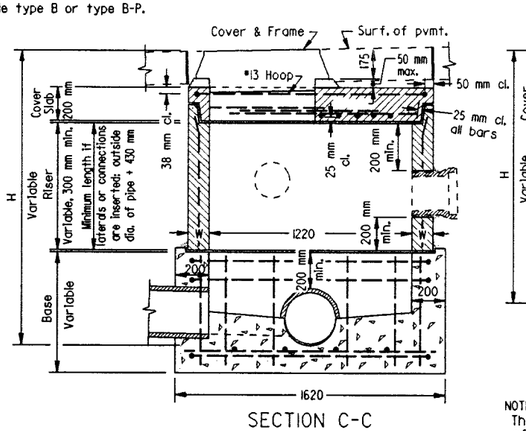


SECTION B-B-3
(Base & Cone)



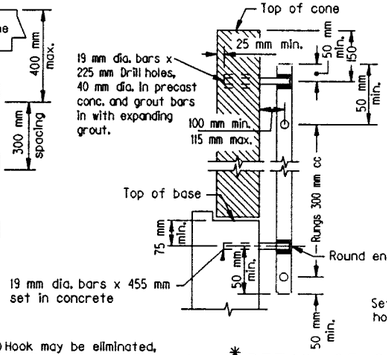
STEPS
(Steps may be substituted for ladder)

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



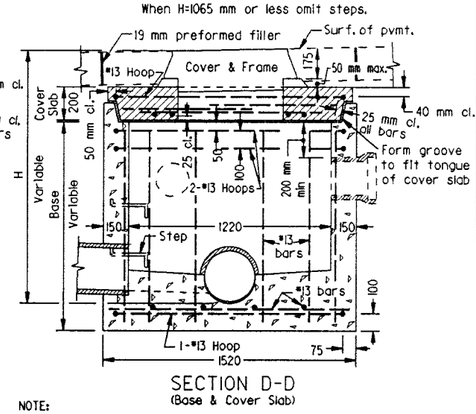
SECTION C-C
(Base, Riser & Cover Slab)

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