

OPERATION & MAINTENANCE MANUAL

DFI No. : D00181

**Facility Type: Water Quality Biofiltration
Swale**



JUNE, 2011

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1. Identification

Drainage Facility ID (DFI): **D00181**

Facility Type: Water Quality Biofiltration Swale

Construction Drawings: (V-File Number) 26V-092

Location: District: 1 (Old 2A)

Highway No.: 092

Mile Post: 31.25; 31.31 (beg./end)

Description: This facility is located along the west side Hwy. 92 adjacent to the southbound travel lane where "A"-Street and Highway 92 intersect. Unobstructed access can be obtained from the right shoulder of the roadway just south of "A"-Street.

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:

Consultant Designer - W&H Pacific, William Evans,
P.E., (503) 362-4675

Facility construction: 1996

Contractor: N/A

4. Storm Drain System and Facility Overview

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

This 300-ft water quality biofiltration swale facility is located south of the "A"-Street and Columbia River Highway (Hwy092) intersection. The swale primarily receives stormwater runoff as it sheet flows from the southbound travel lane of the Columbia River Highway (Hwy 092). The swale also treats water that is conveyed from a drainage ditch after maneuvering overtop a reinforced concrete flow spreader, and a layer of riprap represented by points A and B, respectively, on the Operational Plan; Appendix A.

After treatment the swale directs the water quality flow into a 24-in culvert by way of a Type D inlet at the end of the swale (point C on the Operational Plan). The culvert ties into a grated manhole, which also serves as the outlet for DFI D00180 (a water quality biofiltration swale located north of "A"-Street) before being redirected and discharged into the Columbia River.

A. Maintenance equipment access:

The swale is accessible via the shoulder of the southbound Columbia River Highway (Hwy 092).

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 north toward “A”-Street and Point C –the end of the swale.



Photo 2: Looking south toward the beginning of the 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 Type-D grated inlet and 24-inch diameter outlet pipe serving as the outlet of the swale. This inlet and pipe are noted as point C in Operational Plan; Appendix A.

6. Auxiliary Outlet (High Flow Bypass)

Auxiliary Outlets are provided if the primary outlet control structure can not safely pass the projected high flows. Broad-crested spillway weirs and over flow risers are the two most common auxiliary outlets used in stormwater treatment facility design. The auxiliary outlet feature is either a part of the facility or an additional storm drain feature/structure.

The auxiliary outlet feature for this facility is:

Designed into facility

Other, as noted below

There are no auxiliary outlet features for this facility.

7. Maintenance Requirements

Routine maintenance table for non-proprietary stormwater treatment and storage/detention facilities have been incorporated into ODOT's Maintenance Guide. These tables summarize the maintenance requirements for ponds, swales, filter strips, bioslopes, and detention tanks and vaults. Special maintenance requirements in addition to the routine requirements are noted below when applicable.

The ODOT Maintenance Guide can be viewed at the following website:

<http://www.oregon.gov/ODOT/HWY/OOM/MGuide.shtml>

Maintenance requirements for proprietary structures, such as underground water quality manholes and/or vaults with filter media are noted in Appendix C when applicable.

The following stormwater facility maintenance table (See ODOT Maintenance Guide) should be used to maintain the facility outlined in this Operation and Maintenance Manual or follow the Maintenance requirements outlined in Appendix C when proprietary structure is selected below:

Mark as Required and always include Table 1:

- Table 1 (general maintenance)
- Table 2 (stormwater ponds)
- Table 3 (water quality biofiltration swales)
- Table 4 (water quality filter strips)
- Table 5 (water quality bioslopes)
- Table 6 (detention tank)

- Table 7 (detention vault)
- Appendix C (proprietary structure)
- Special Maintenance requirements:

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

8. Waste Material Handling

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

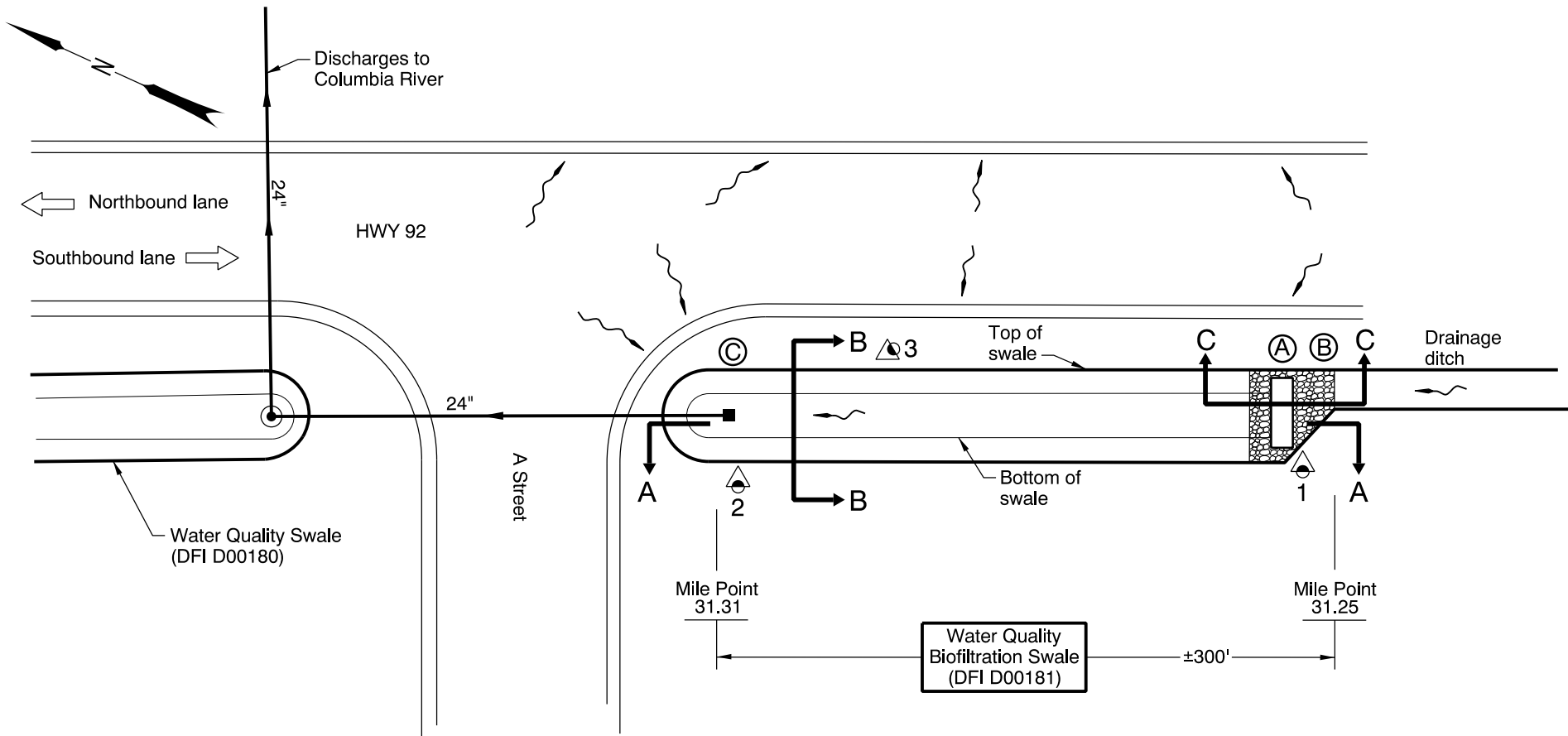
Contact any of the following for more detailed information about management of waste materials found on site:

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

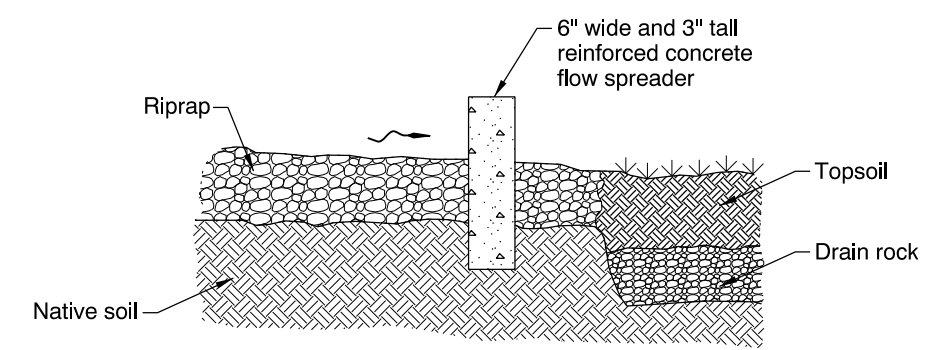
Appendix A

Content:

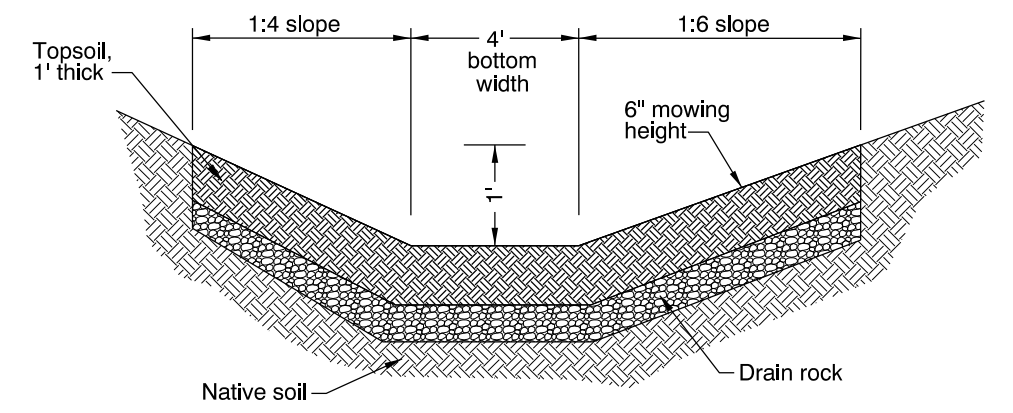
- **Operational Plan and Profile Drawing(s)**



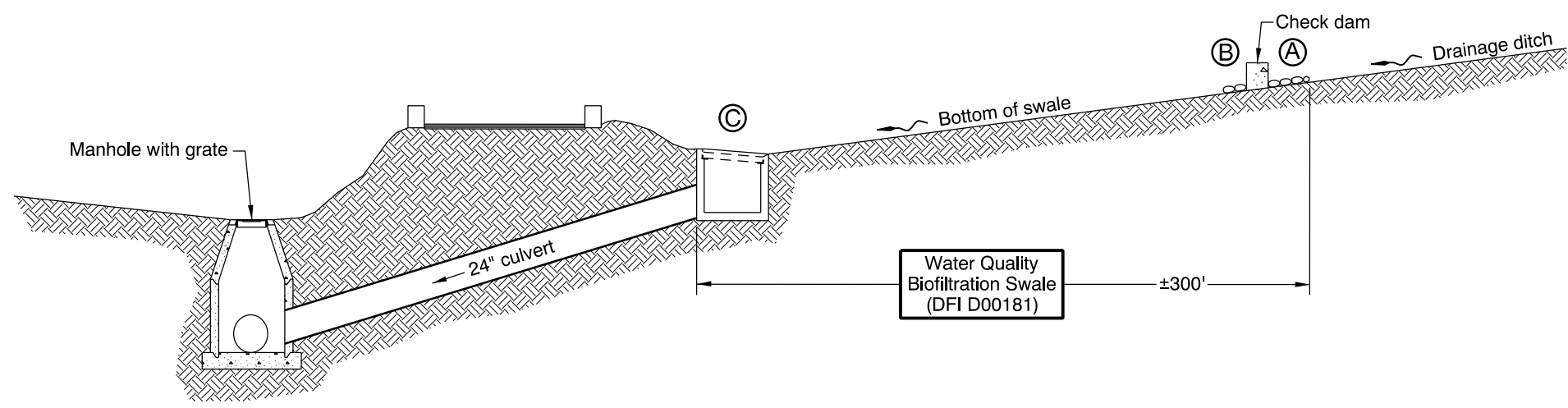
PLAN
N.T.S.



SECTION C-C
N.T.S.



SECTION B-B
N.T.S.



SECTION A-A
N.T.S.

- LEGEND:**
- Photograph location / direction
 - Swale inlet from drainage ditch
 - Riprap and concrete flow spreader at inlet
 - Outlet of swale is Type "D" inlet & connects to a 24" culvert
 - Manhole
 - Inlet
 - Storm Pipe (Facility)
 - Storm Pipe
 - Conveyance Direction
 - Pavement / Facility Flow Path
 - Traffic flow / direction

Sht. 1 of 1	OREGON DEPARTMENT OF TRANSPORTATION
Prepared By: J.D. Koziol	DFI D00181 MAINTENANCE DISTRICT 1 HWY 92 WATER QUALITY BIOFILTRATION SWALE COLUMBIA HIGHWAY MP 31.25-31.31 COLUMBIA COUNTY
Drafted By: S. Wolfer	

Appendix B

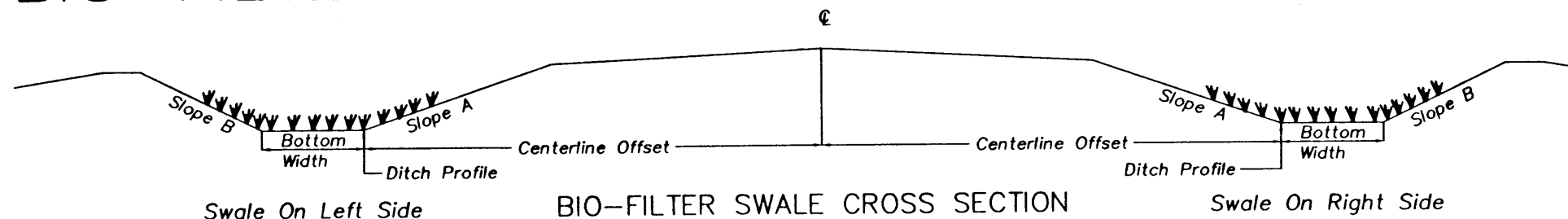
Content:

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

BIO-FILTER SWALE

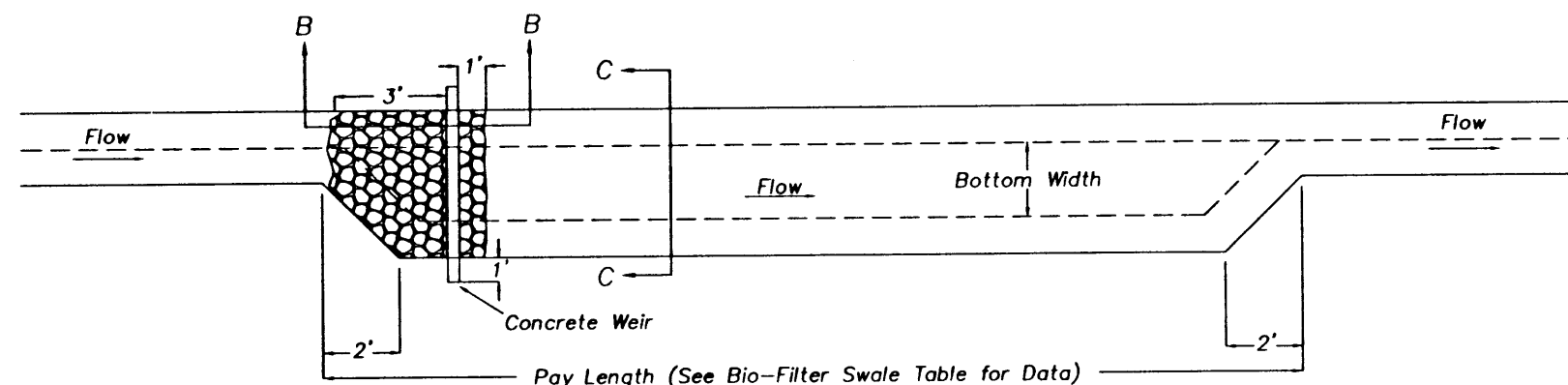
Bio-Filter Swale Table

Station From	Station To	Left Or Right	Slope A	Slope B	Bottom Width (Ft)	Depth (Ft)	Length (Ft)	Channel Slope (%)
573+00	575+50	Rt	6:1	4:1	4	1	250	1.83
610+50	613+50	Rt	6:1	4:1	4	1	300	1.10
615+20	618+20	Rt	6:1	1 1/2:1	4	1	300	0.57
719+70	720+90	Rt	6:1	4:1	4	1	120	1.57
720+90	722+60	Rt	6:1	4:1	4	1	170	1.33
797+90	800+08	Lt	3:1	2:1	4	1	218	0.83
839+45	-	Lt	2:1	2:1	10	1	160	3.12
856+70	860+75	Lt	4:1	4:1	4	1	405	0.75-2.0
897+37	-	Lt	3:1	3:1	6	1	290	1.20
898+50	900+75	Rt	4:1	1 1/2:1	4	1	225	0.98

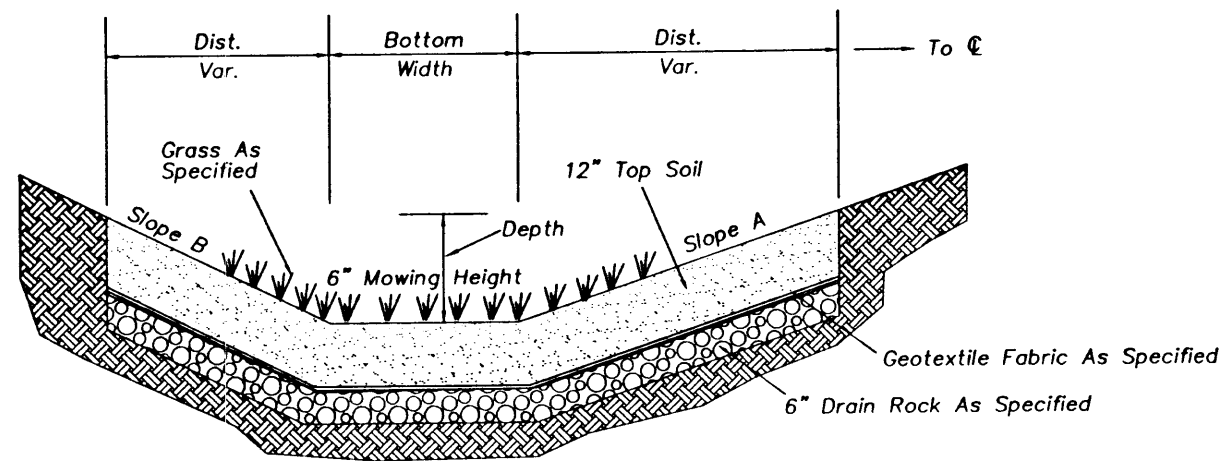


BIO-FILTER SWALE CROSS SECTION

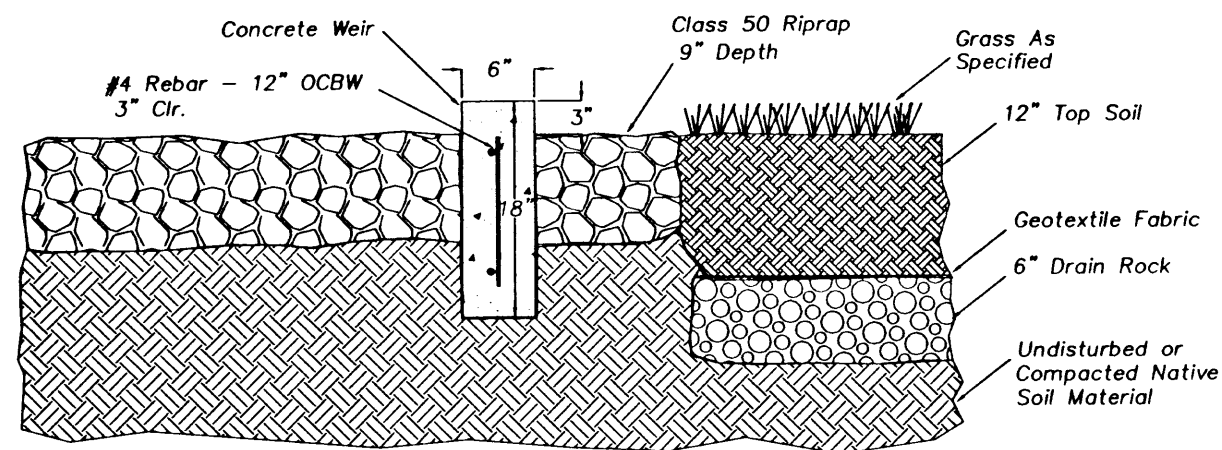
(See Bio-Filter Swale Table For Data)



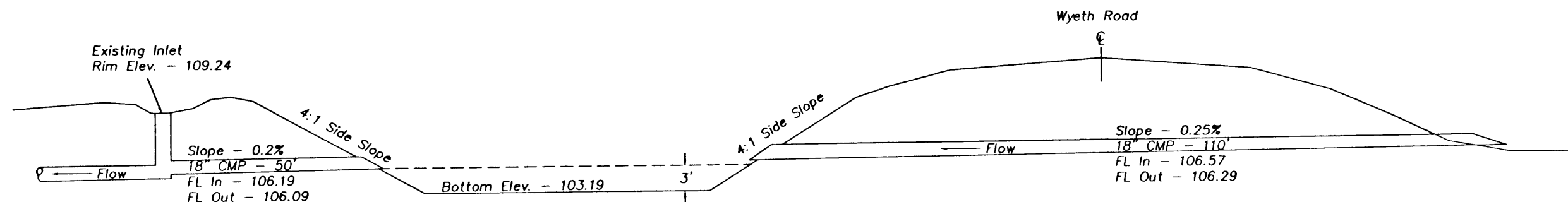
TYPICAL PLAN VIEW - BIO-FILTER SWALE



TYPICAL SECTION C-C



SECTION B - B



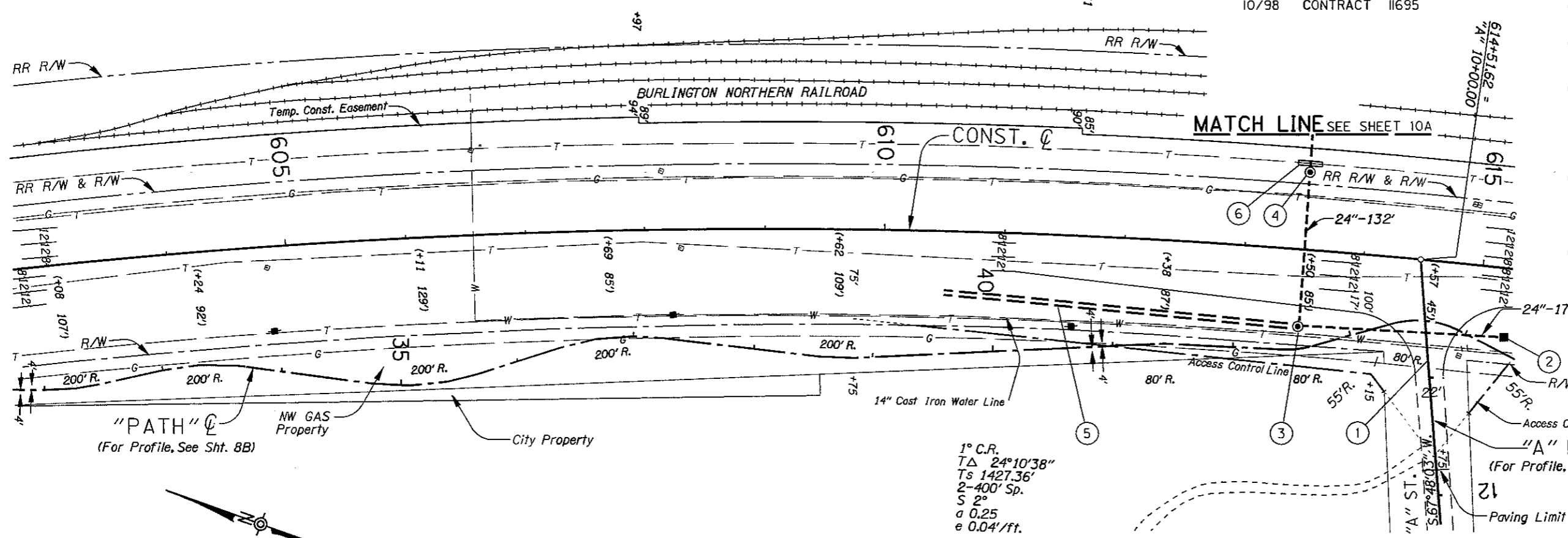
WYETH POND - SECTION A-A (FOR LOCATION SEE SHT 21)

COLUMBIA CITY N.C.L. - WARREN SEC. COLUMBIA RIVER HIGHWAY (LOWER) COLUMBIA COUNTY		
FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
REGION 10	OREGON DIVISION	2B-17

2B-17.DWG 05-OCT-1995 MOM

Sec. 21, T. 5N., R. 1W., W.M.

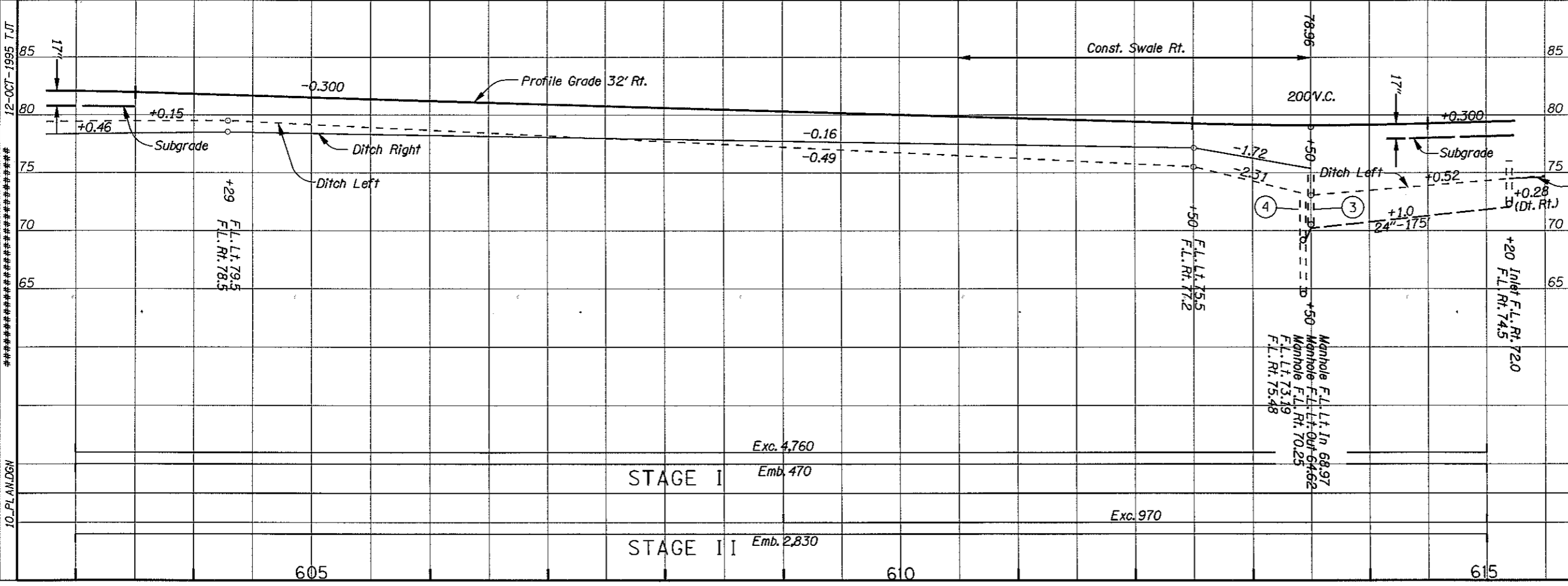
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10/98 CONTRACT 11695



- ① Const. Road Cann.
- ② Sta. 615+20, Rt. Const. "D" Inlet
- ③ Sta. 613+50, Rt. Const. Manhole With Grate Inst. 24" Sew. Pipe - 175' Tr. Exc. - 180 C.Y. (See Drg. No. 2050)
- ④ Sta. 613+50, Lt. Const. Manhole With Grate Inst. 24" Sew. Pipe - 132' Tr. Exc. - 220 C.Y.
- ⑤ Sta. 610+50 To Sta. 613+50, Rt. Const. Swale - 465 S.Y. Dt. Exc. - 230 C.Y. (For Details, See Sheet 2B-17)
- ⑥ Sta. 613+50 Const. Canc. Cap (Type A) - 20 Lin. Ft. (For Details, See Sheet 2B-26)

1° C.R.
TΔ 24°10'38"
Ts 1427.36'
2-400' Sp.
S 2°
a 0.25
e 0.04'/ft.

Ped Path P.I.'s Shown Thus: (+99 111')



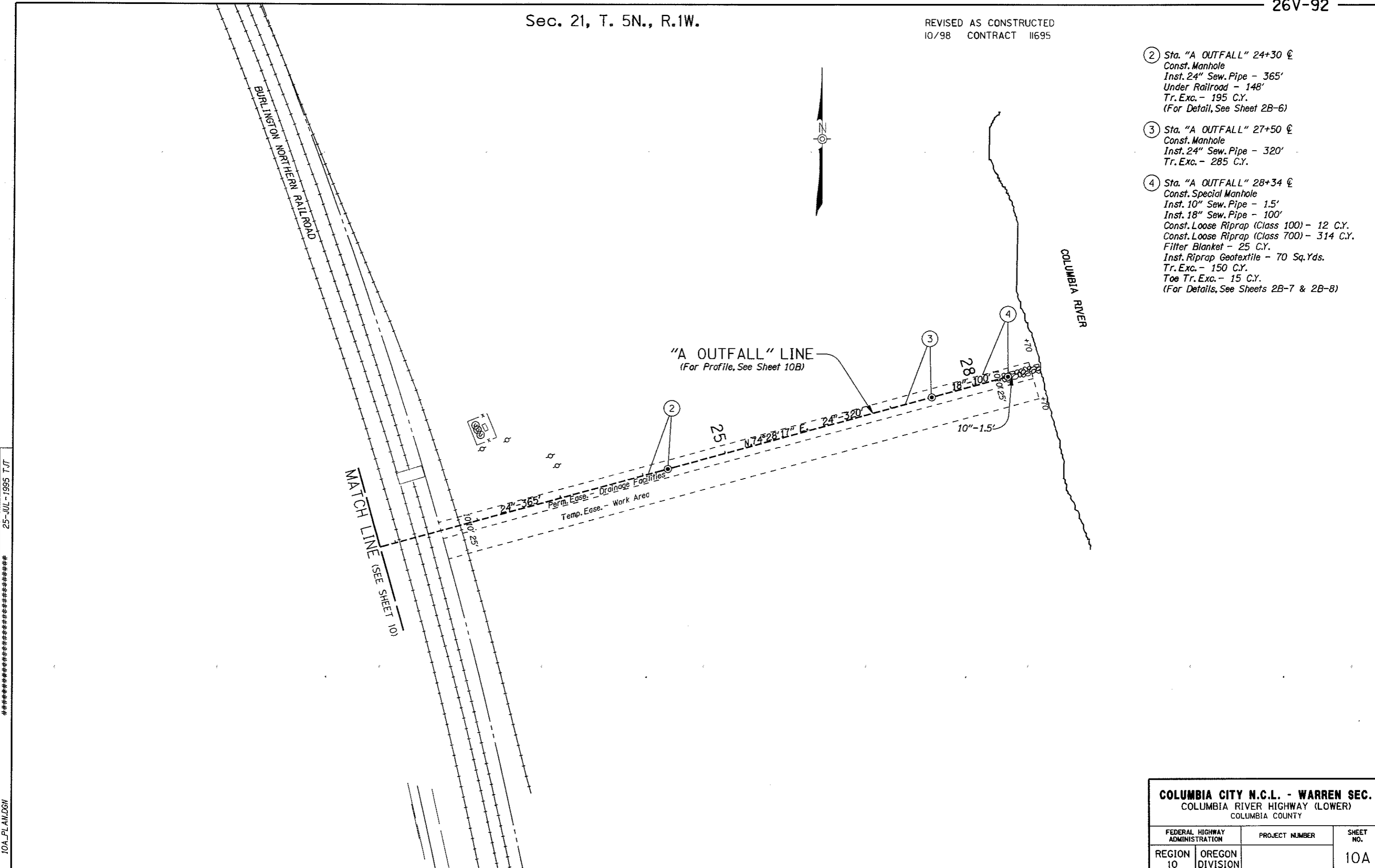
COLUMBIA CITY N.C.L. - WARREN SEC.			
COLUMBIA RIVER HIGHWAY (LOWER)			
COLUMBIA COUNTY			
FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.	
REGION 10	OREGON DIVISION	10	

12-OCT-1995 T.J.T.
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Sec. 21, T. 5N., R.1W.

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10/98 CONTRACT 11695

- ② Sta. "A OUTFALL" 24+30 @
Const. Manhole
Inst. 24" Sew. Pipe - 365'
Under Railroad - 148'
Tr. Exc. - 195 C.Y.
(For Detail, See Sheet 2B-6)
- ③ Sta. "A OUTFALL" 27+50 @
Const. Manhole
Inst. 24" Sew. Pipe - 320'
Tr. Exc. - 285 C.Y.
- ④ Sta. "A OUTFALL" 28+34 @
Const. Special Manhole
Inst. 10" Sew. Pipe - 15'
Inst. 18" Sew. Pipe - 100'
Const. Loose Riprap (Class 100) - 12 C.Y.
Const. Loose Riprap (Class 700) - 314 C.Y.
Filter Blanket - 25 C.Y.
Inst. Riprap Geotextile - 70 Sq.Yds.
Tr. Exc. - 150 C.Y.
Toe Tr. Exc. - 15 C.Y.
(For Details, See Sheets 2B-7 & 2B-8)



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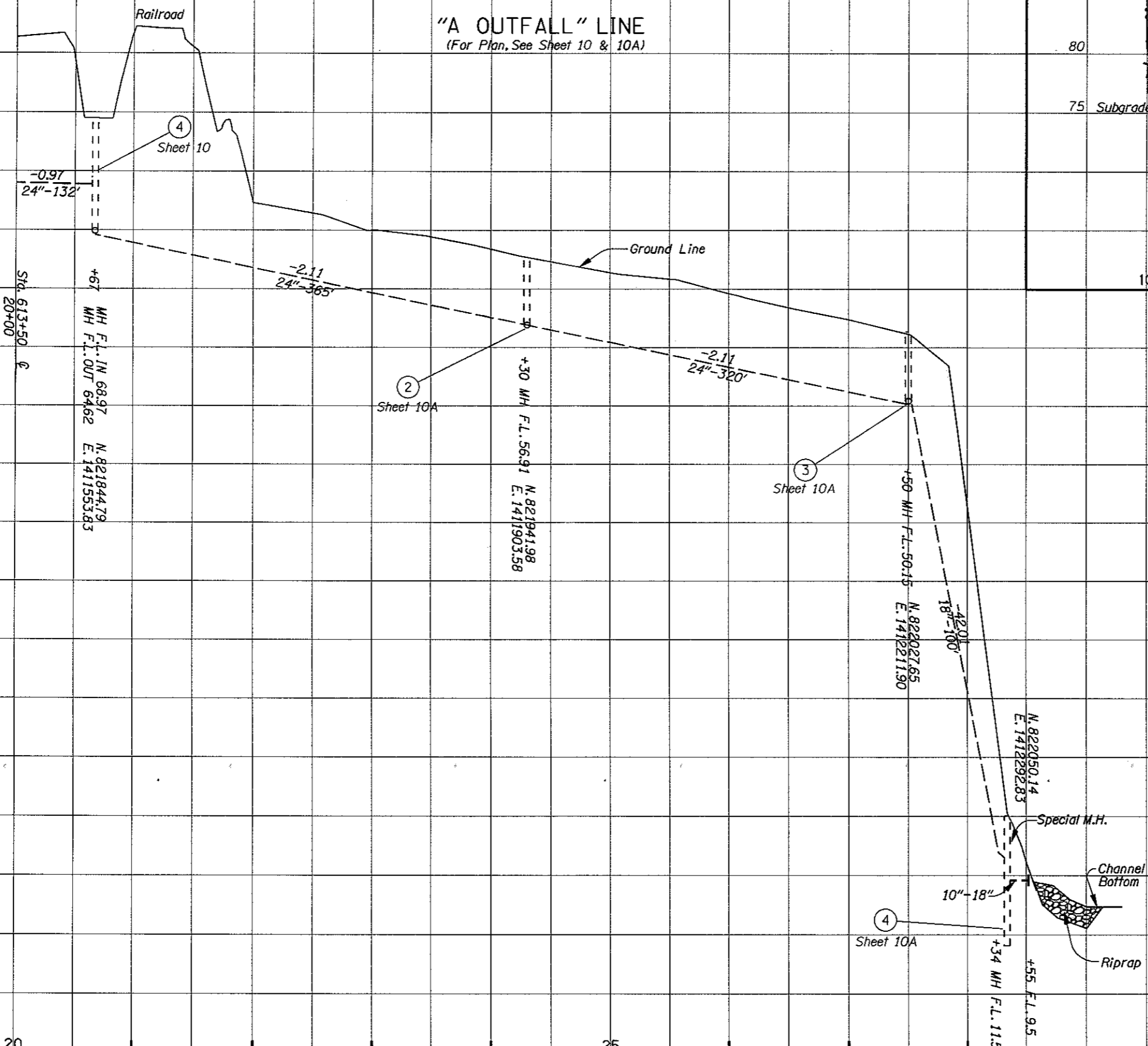
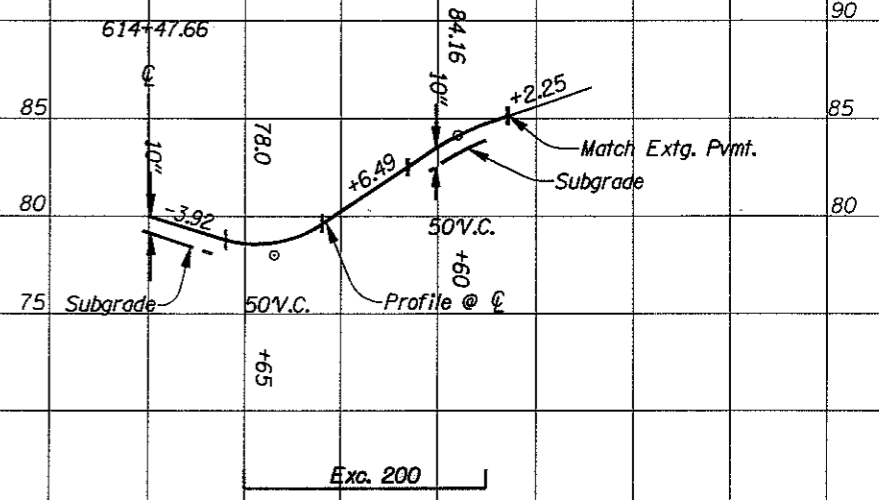
COLUMBIA CITY N.C.L. - WARREN SEC.		
COLUMBIA RIVER HIGHWAY (LOWER)		
COLUMBIA COUNTY		
FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
REGION 10	OREGON DIVISION	10A

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"A" LINE PROFILE (For Plan, See Sheet 10)

"A OUTFALL" LINE (For Plan, See Sheet 10 & 10A)

85
80
75
70
65
60
55
50
45
40
35
30
25
20
15
10
5



COLUMBIA CITY N.C.L. - WARREN SEC.
COLUMBIA RIVER HIGHWAY (LOWER)
COLUMBIA COUNTY

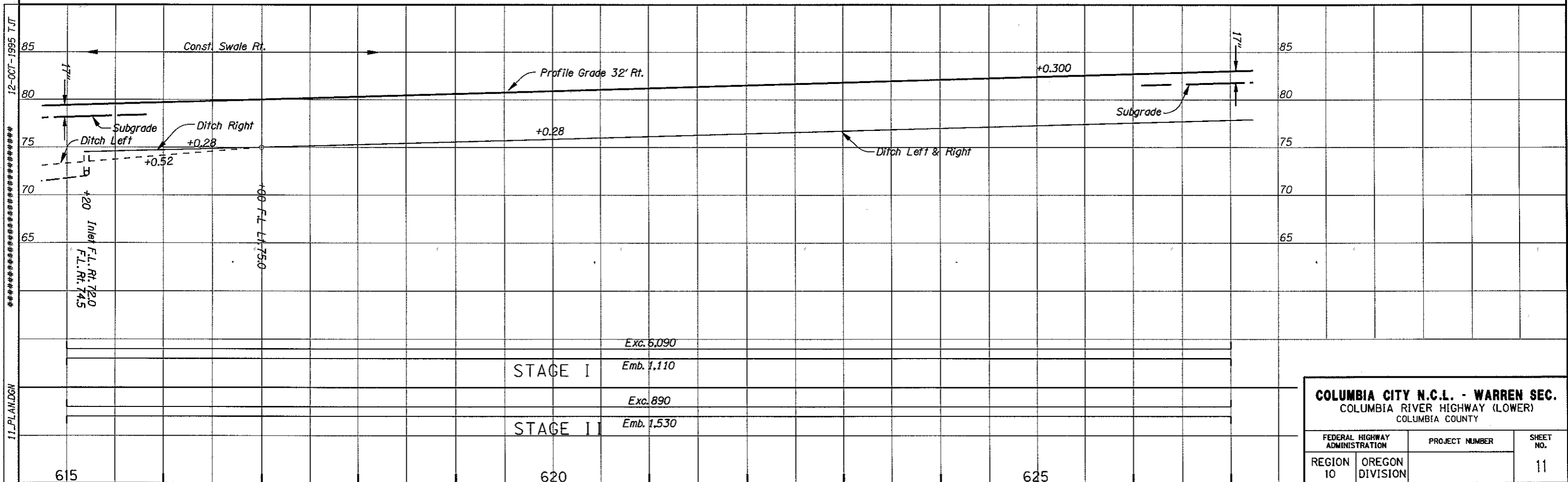
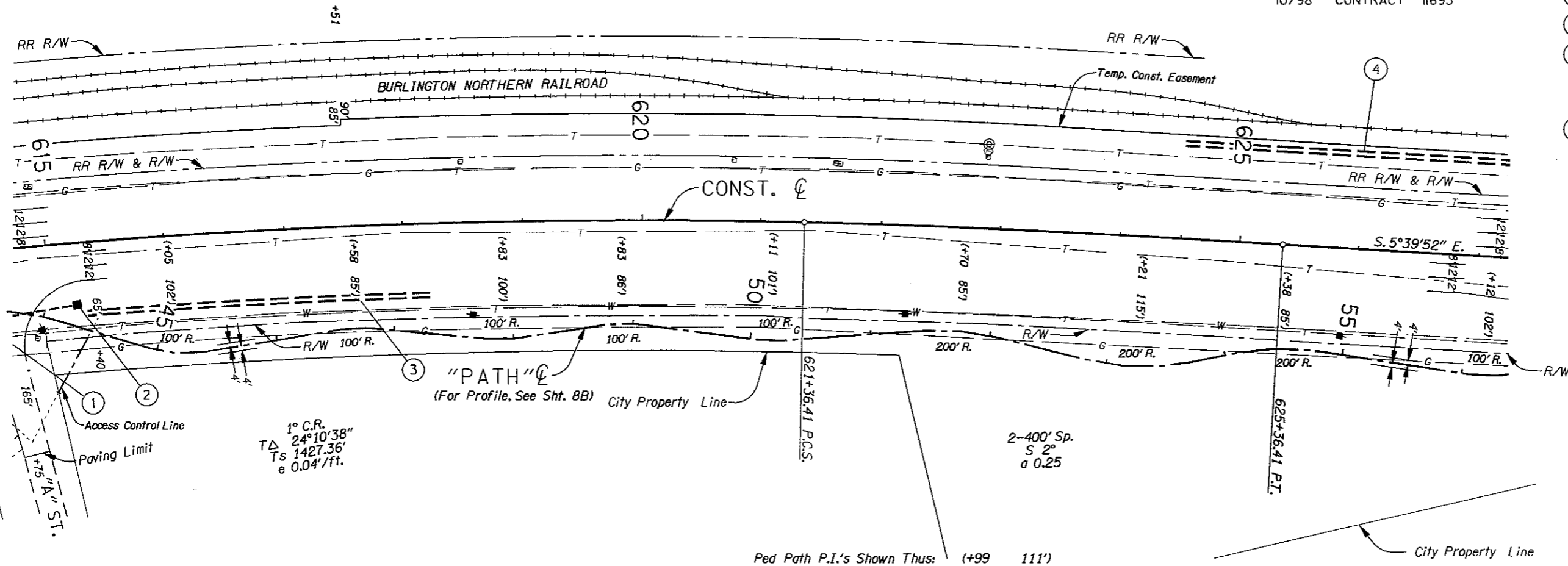
FEDERAL HIGHWAY ADMINISTRATION		PROJECT NUMBER	SHEET NO.
REGION 10	OREGON DIVISION		10B

J.T. 12-OCT-1995 ***** 10B_PROD6N

Sec. 21, 28, T. 5N., R. 1W., W.M.

REVISED AS CONSTRUCTED
10/98 CONTRACT 11695

- ① (See Sheet 10, Note 1)
- ② (See Sheet 10, Note 2)
- ③ Sta. 615+20 To Sta. 618+20, Rt.
Const. Swale - 380 S.Y.
Dt. Exc. - 190 C.Y.
(For Details, See Sheet 2B-17)
- ④ Sta. 624+50 To Sta. 628+80 (Lt.)
Const. V-Bottom Ditch
2:1 Slopes
Dt. Exc. - 254 C.Y.
(For Details, See Sheet 2B-8A)



COLUMBIA CITY N.C.L. - WARREN SEC.
COLUMBIA RIVER HIGHWAY (LOWER)
COLUMBIA COUNTY

FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
REGION 10	OREGON DIVISION	11

12-OCT-1995 T/JT

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