

# **OPERATION & MAINTENANCE MANUAL**

**DFI No. : D00173**

**Facility Type: Water Quality Biofiltration  
Swale**



**JUNE, 2011**

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## 1. Identification

Drainage Facility ID (DFI): **D00173**  
Facility Type: Water Quality Biofiltration Swale  
Construction Drawings: (V-File Number) 26V-092  
Location: District: 1 (Old 2A)  
Highway No.: 092  
Mile Post: 32.67; 32.72 (beg./end)  
Description: This facility is located along the *west side Hwy. 92 adjacent to the southbound travel lane. Unobstructed access can be obtained from the right shoulder of the roadway.*

## 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 facility is located along the west side Hwy. 92 adjacent to the southbound travel lane. Unobstructed access can be obtained from the right shoulder of the roadway. The swale was constructed as part of an existing roadside ditch. Flows from both the roadway and ditch enter the swale from the north, overtopping riprap and a small 6-inch by 3-inch concrete knee wall flow spreader. As the water flows south it is treated as it slows and spreads out within the swale before re-entering the ditch just prior to a commercial driveway approach.

A. Maintenance equipment access:

Unobstructed access can be obtained from the right should of southbound Hwy. 92.

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 at water quality swale. Hwy 92 is located to the right.



Photo 2: Looking south at the exit point to the water quality swale. Hwy 92 is located to the left.

## 5. Facility Haz Mat Spill Feature(s)

The water quality biofiltration swale can possibly be used to store a volume of liquid by blocking the culvert located at the commercial

driveway approach to the south of the facility. Sandbags may be one way to best accomplish this.

## 6. Auxiliary Outlet (High Flow Bypass)

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

The auxiliary outlet feature for this facility is:

Designed into facility

Other, as noted below

There is no auxiliary outlet feature for this facility.

## 7. Maintenance Requirements

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

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

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

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

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

- Table 1 (general maintenance)
- Table 2 (stormwater ponds)
- Table 3 (water quality biofiltration swales)
- Table 4 (water quality filter strips)

- Table 5 (water quality bioslopes)
- Table 6 (detention tank)
- Table 7 (detention vault)
- Appendix C (proprietary structure)
- Special Maintenance requirements:

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

## **8. Waste Material Handling**

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

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

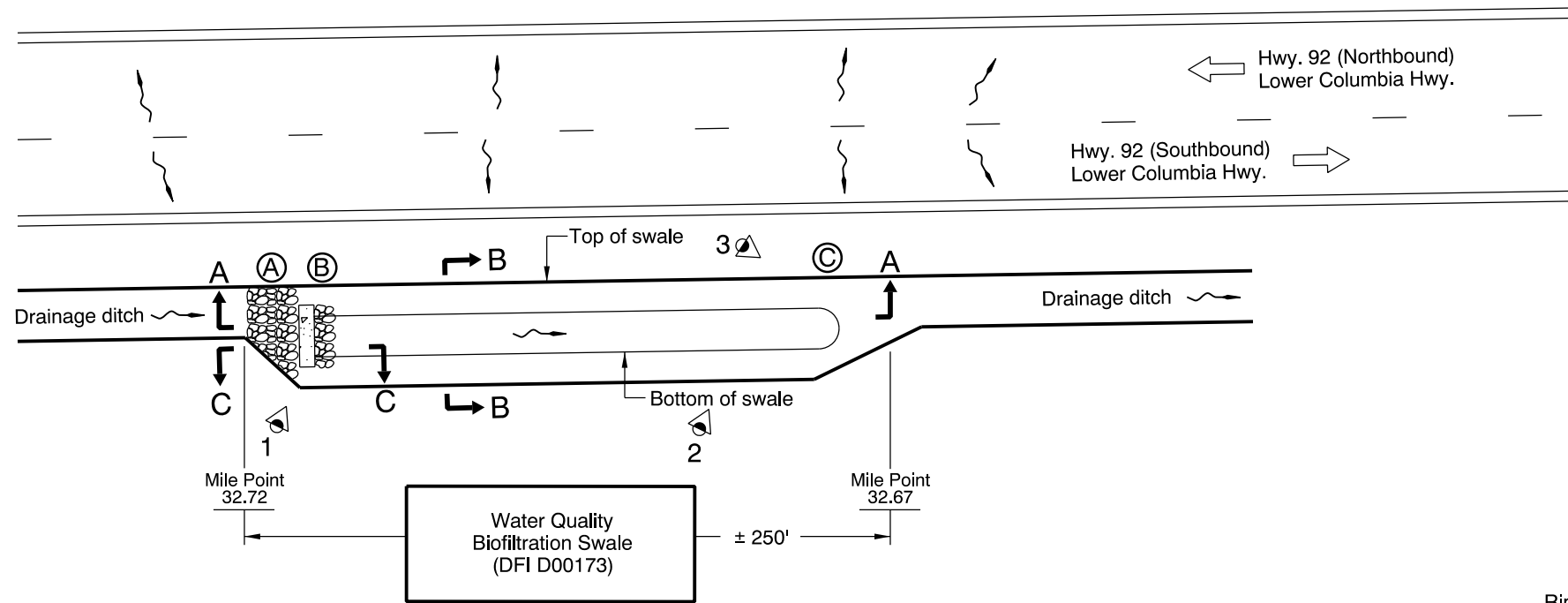
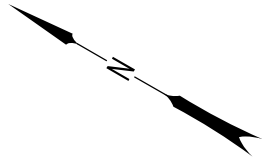
ODOT Clean Water Unit	(503) 986-3008
ODOT Statewide Hazmat Coordinator	(503) 229-5129
ODOT Region Hazmat Coordinator	(503) 731-8304
ODEQ Northwest Region Office	(503) 229-5263

# Appendix A

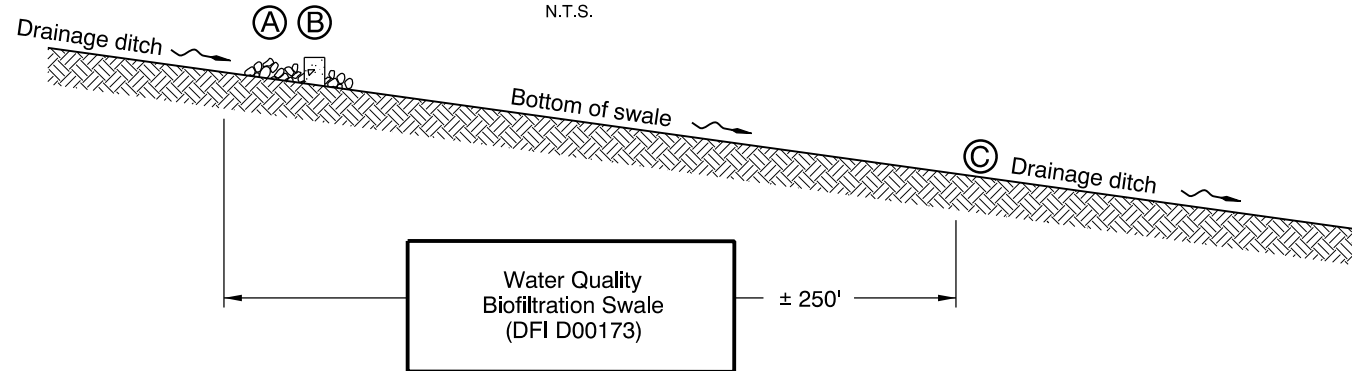
## Content:

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

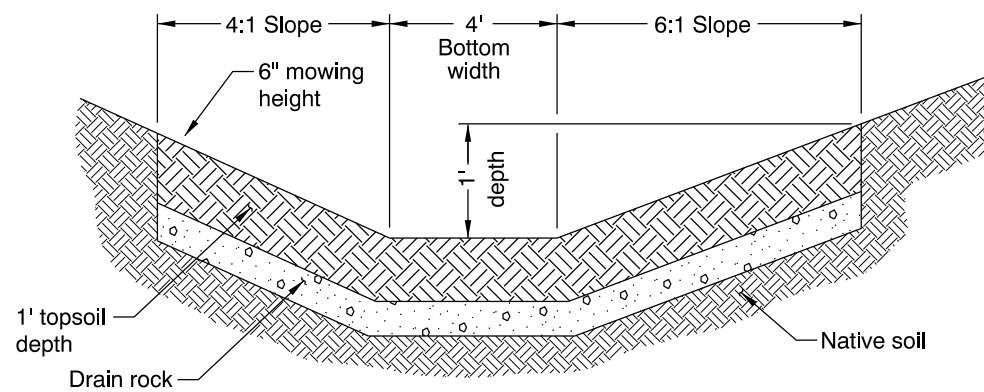




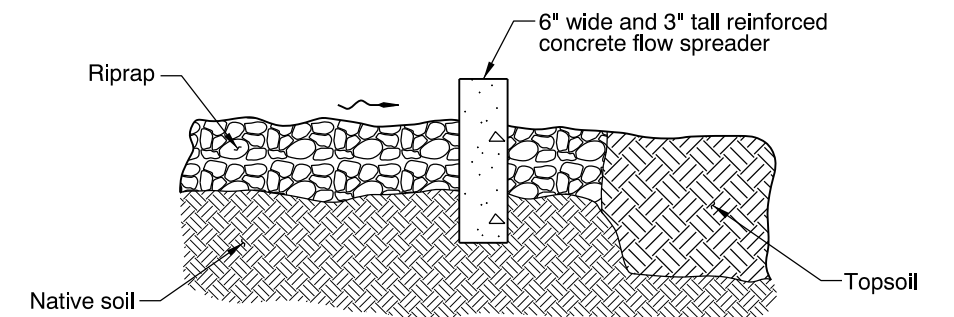
**PLAN**  
N.T.S.



**SECTION A-A**  
N.T.S.



**SECTION B-B**  
N.T.S.



**SECTION C-C**  
N.T.S.

**LEGEND:**

- Photo Location / Direction
- Swale Inlet from Drainage Ditch
- Riprap and Concrete Flow Spreader at Inlet
- Water Quality Swale Outlet to Drainage Ditch
- Manhole
- Inlet
- Storm Pipe (Facility)
- Storm Pipe
- Conveyance Direction
- Pavement / Facility Flow Path
- Traffic Direction / Flow

Sht. 1 of 1

OREGON DEPARTMENT OF TRANSPORTATION

Prepared By: J.D. Koziol  
 Drafted By: R. Odear

**DFI D00173**  
**MAINTENANCE DISTRICT 1 HWY 92**  
**WATER QUALITY BIOFILTRATION SWALE**  
 COLUMBIA HIGHWAY MP 32.67-32.72  
 COLUMBIA COUNTY

# Appendix B

## Content:

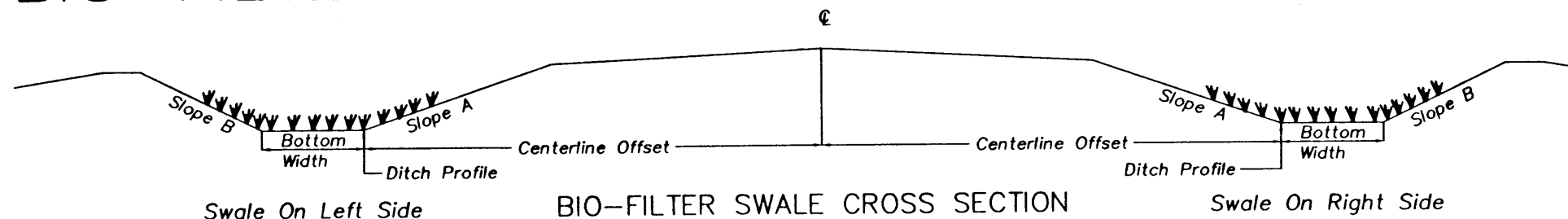
- **ODOT Project Plan Sheets**
  - *Cover/Title Sheet*
  - *Water Quality/Detention Plan Sheets*
  - *Other Details*



# BIO-FILTER SWALE

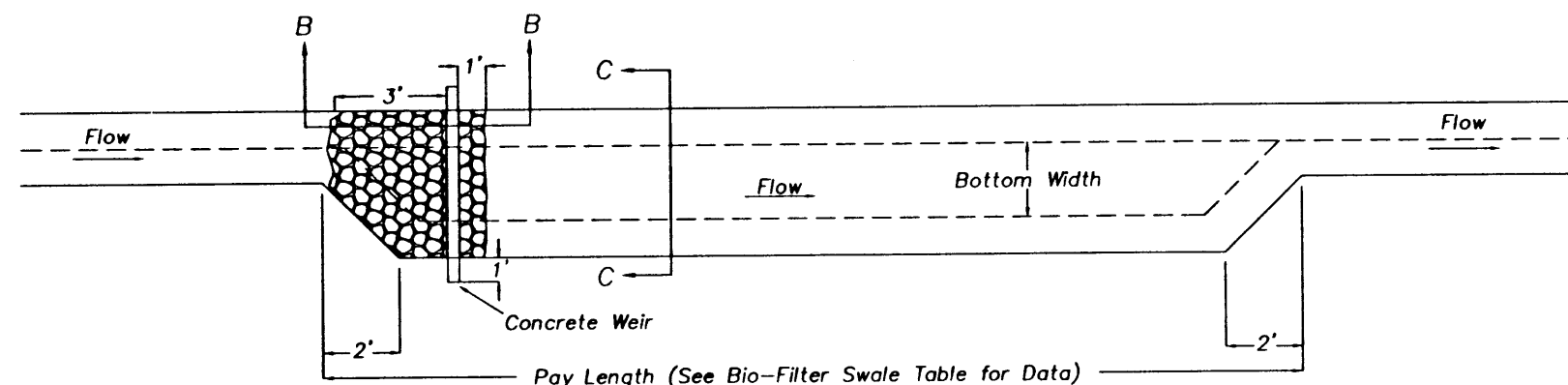
Bio-Filter Swale Table

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

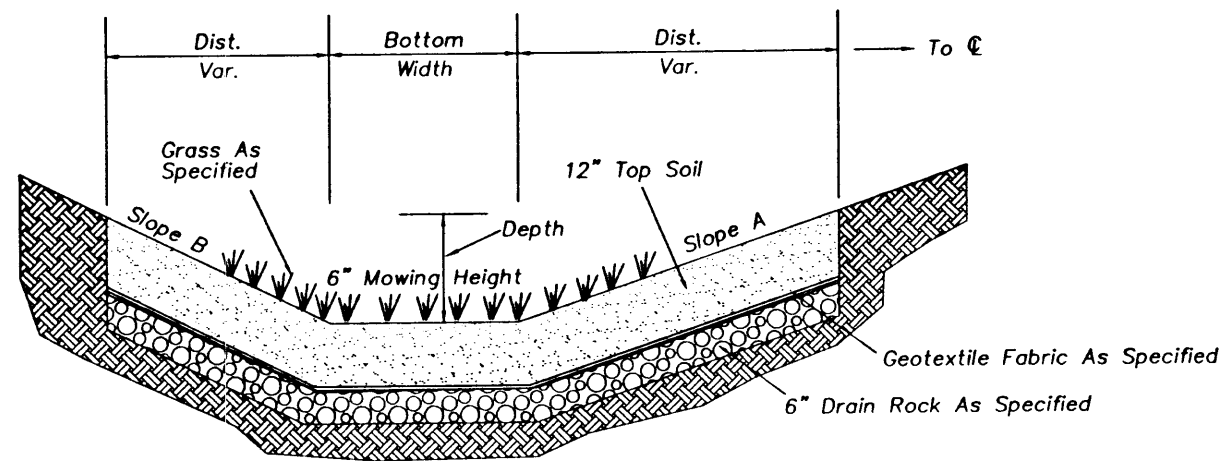


BIO-FILTER SWALE CROSS SECTION

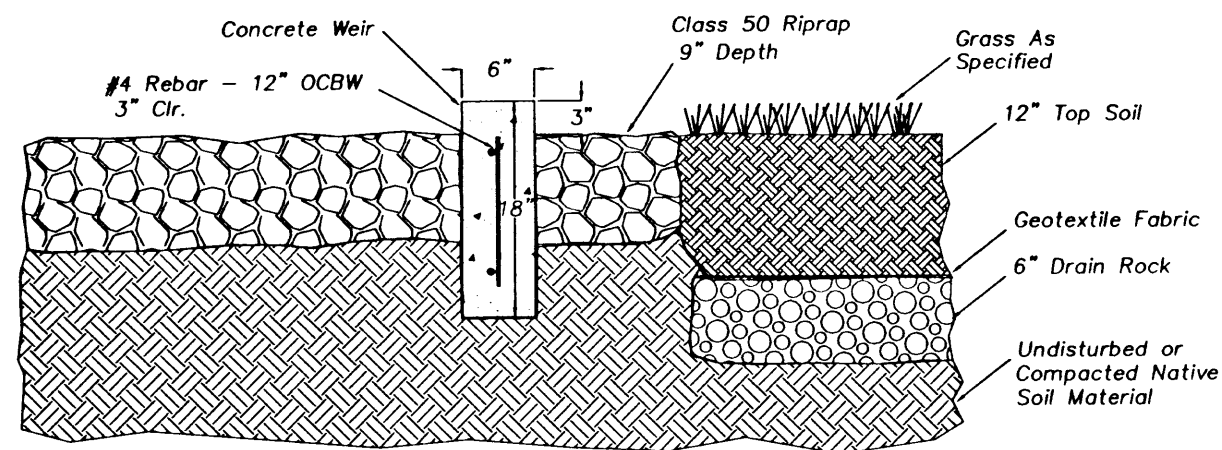
(See Bio-Filter Swale Table For Data)



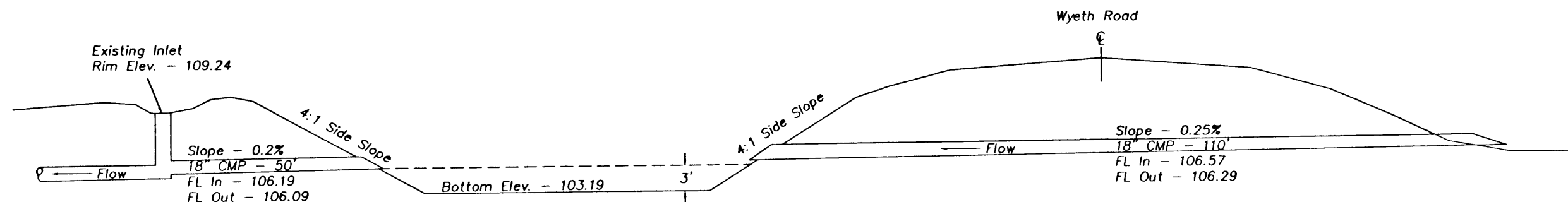
TYPICAL PLAN VIEW - BIO-FILTER SWALE



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

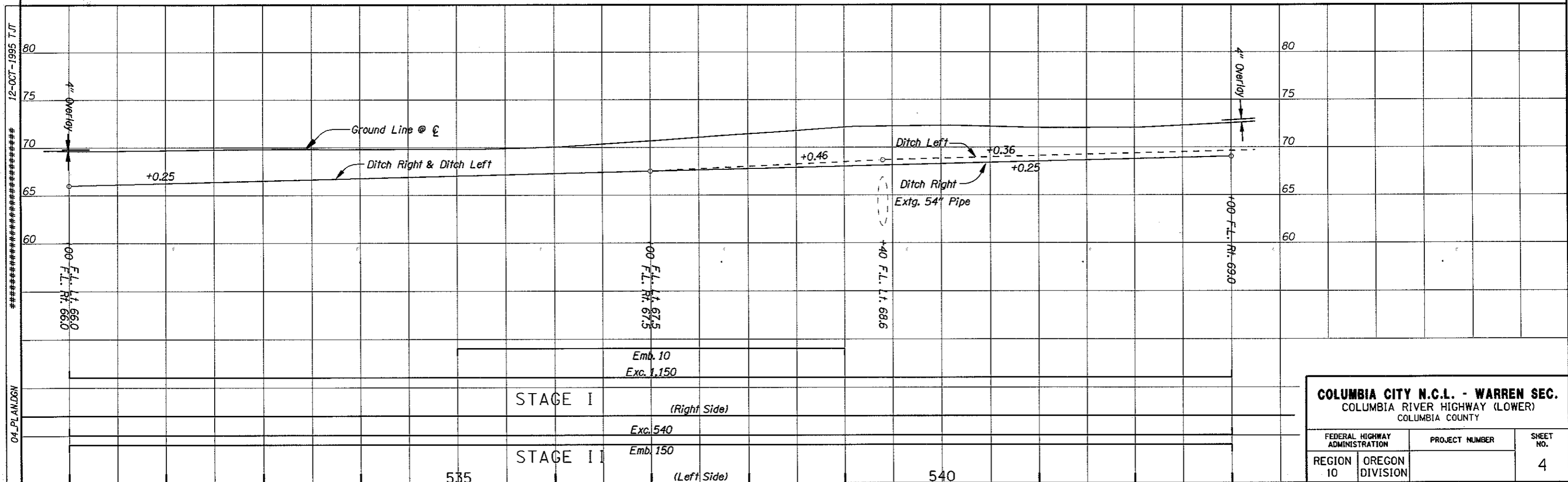
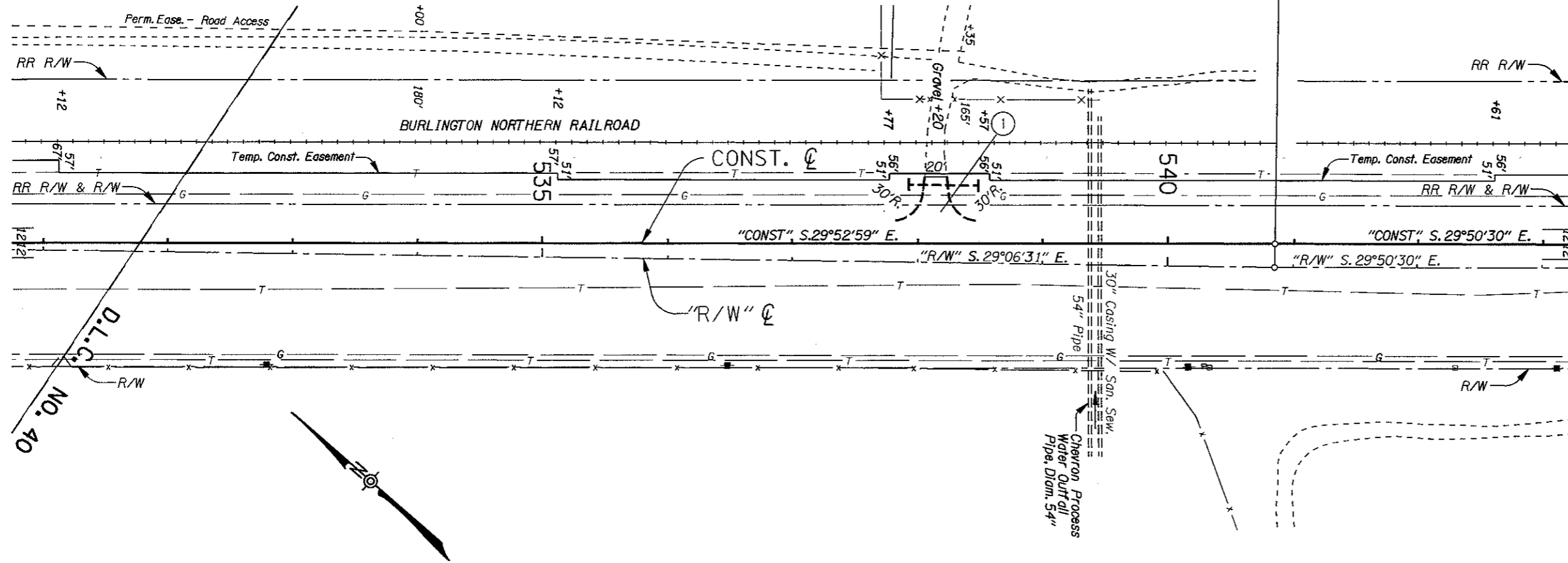
2B-17.DWG 05-OCT-1995 MOM

Sec. 17, T. 5N., R. 1W., W.M.

"R/W" 540+85.00 Δ 0°43'59" Lt.  
"CONST" 540+84.38 (19' Lt.) Δ 0°02'29" Rt.

REVISED AS CONSTRUCTED  
10/98 CONTRACT 11695

① Sta. 538+20, Lt.  
Const. Appr.  
Inst. 12" Culv. Pipe - 56'  
Tr. Exc. - 18 C.Y.



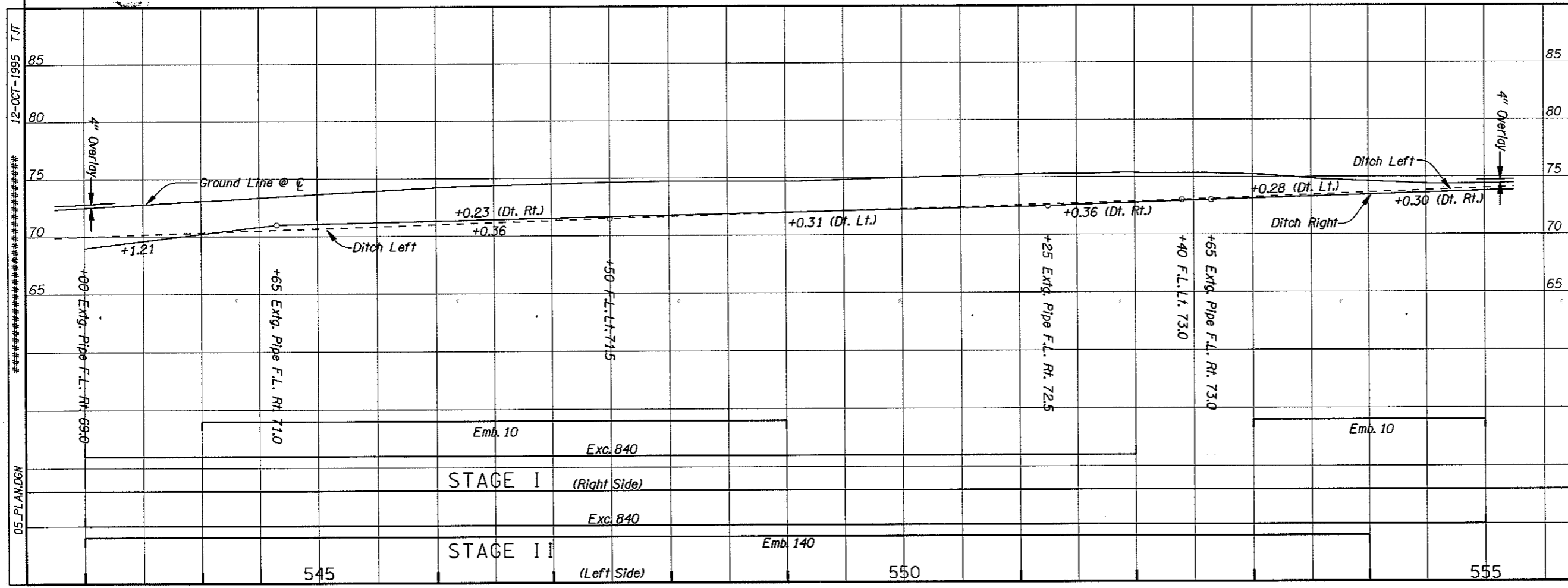
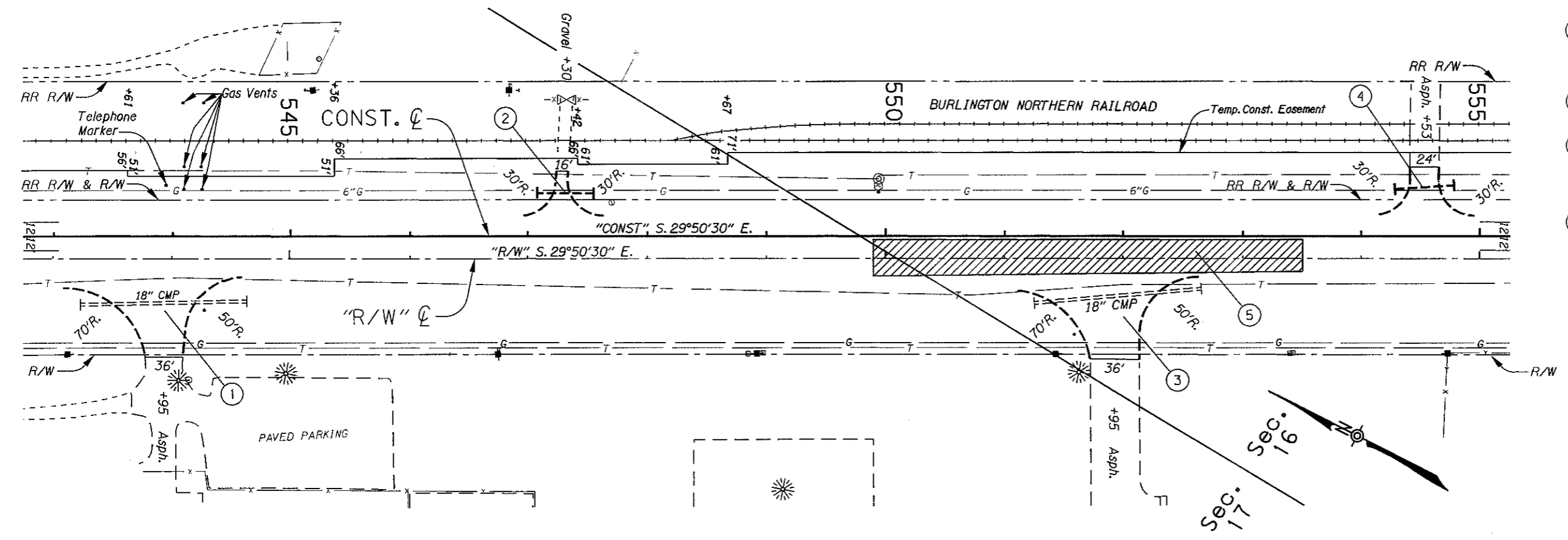
<b>COLUMBIA CITY N.C.L. - WARREN SEC.</b>			
COLUMBIA RIVER HIGHWAY (LOWER)			
COLUMBIA COUNTY			
FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.	
REGION 10	OREGON DIVISION	4	

12-OCT-1995 T.JT  
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T. 5N., R. 1W., W.M.

REVISED AS CONSTRUCTED  
10/98 CONTRACT 11695

- ① Sta. 543+95, Rt. Const. Appr.
- ② Sta. 547+30, Lt. Const. Appr. Inst. 12" Culv. Pipe - 50' Tr. Exc. - 10 C.Y.
- ③ Sta. 551+95, Rt. Const. Appr.
- ④ Sta. 554+53, Lt. Const. Appr. Inst. 12" Culv. Pipe - 50' Tr. Exc. - 12 C.Y.
- ⑤ Sta. 548+90 To Sta. 553+50 Grind And Inlay 2" Of Class "B" A.C. Before Overlay With 4" Of Class "B" A.C.



12-OCT-1995 T.J.  
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Emb. 10	Exc. 840
STAGE I	(Right Side)
Exc. 840	
STAGE II	(Left Side)
Emb. 140	

<b>COLUMBIA CITY N.C.L. - WARREN SEC.</b>		
COLUMBIA RIVER HIGHWAY (LOWER)		
COLUMBIA COUNTY		
FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
REGION 10	OREGON DIVISION	5