

OPERATION & MAINTENANCE MANUAL

DFI No.: D00121

**Facility Type: Water Quality Biofiltration
Swale**



MARCH, 2011

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1. Identification

Drainage Facility ID (DFI): **D00121**
Facility Type: Water Quality Biofiltration Swale
Construction Drawings: (V-File Number) 32V-022
Location: District: 2B (Old 2A)
Highway No.: 001
Mile Post: 7.28 / 7.33 (beg./end)]
Description: This facility is located northeast of the I-5 (Hwy 001) and OR 217 (Hwy 144) Interchange between the circular-shaped on and off ramps, leading to and from the OR 217 (Hwy 144) overcrossing.

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, Jeffrey Scheick, P.E., Managing Engineer, 503-781-8200

Facility construction: 1999
Contractor: Kiewitt 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 facility is located east of I-5 (Hwy 001) at the northeast quadrant of the I-5 (Hwy 001) and OR 217 (Hwy 144)/Kruse Way. The water quality swale treats the stormwater runoff from primarily the I-5 northbound off ramp and onramp and a portion of the drainage from Kruse Way. The stormwater runoff is directed from the two ends of the swale to the center. At the center of the swale, the water is collected by an inlet (Point A of the Operational Plan located in Appendix A) and discharged into a nearby wetland area (Point B) via an 18-inch storm pipe. The swale itself is heavily vegetated with cattails more prominent towards the center of the swale.

A. Maintenance equipment access:

Maintenance crew can access the facility directly from the shoulder area alongside the off-ramp, leading from I-5 (Hwy 001) toward Kruse Way. There are no barriers present between the swale and the roadway itself.

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: Photo of WQ swale from the middle looking towards the south to southeast.



Photo 2: WQ swale from center of swale looking towards the north.



Photo 3: Center of WQ swale looking towards the south.

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

The water quality biofiltration swale can be used to store a volume of liquid by blocking the 18-inch diameter outlet pipe located at the outlet of the water quality biofiltration swale. The use of a metal plate or sandbags may be considered when blocking either the outlet structure or the pipe itself. This pipe and the outlet structure are noted as point A on the 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 is no auxiliary outlet 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>

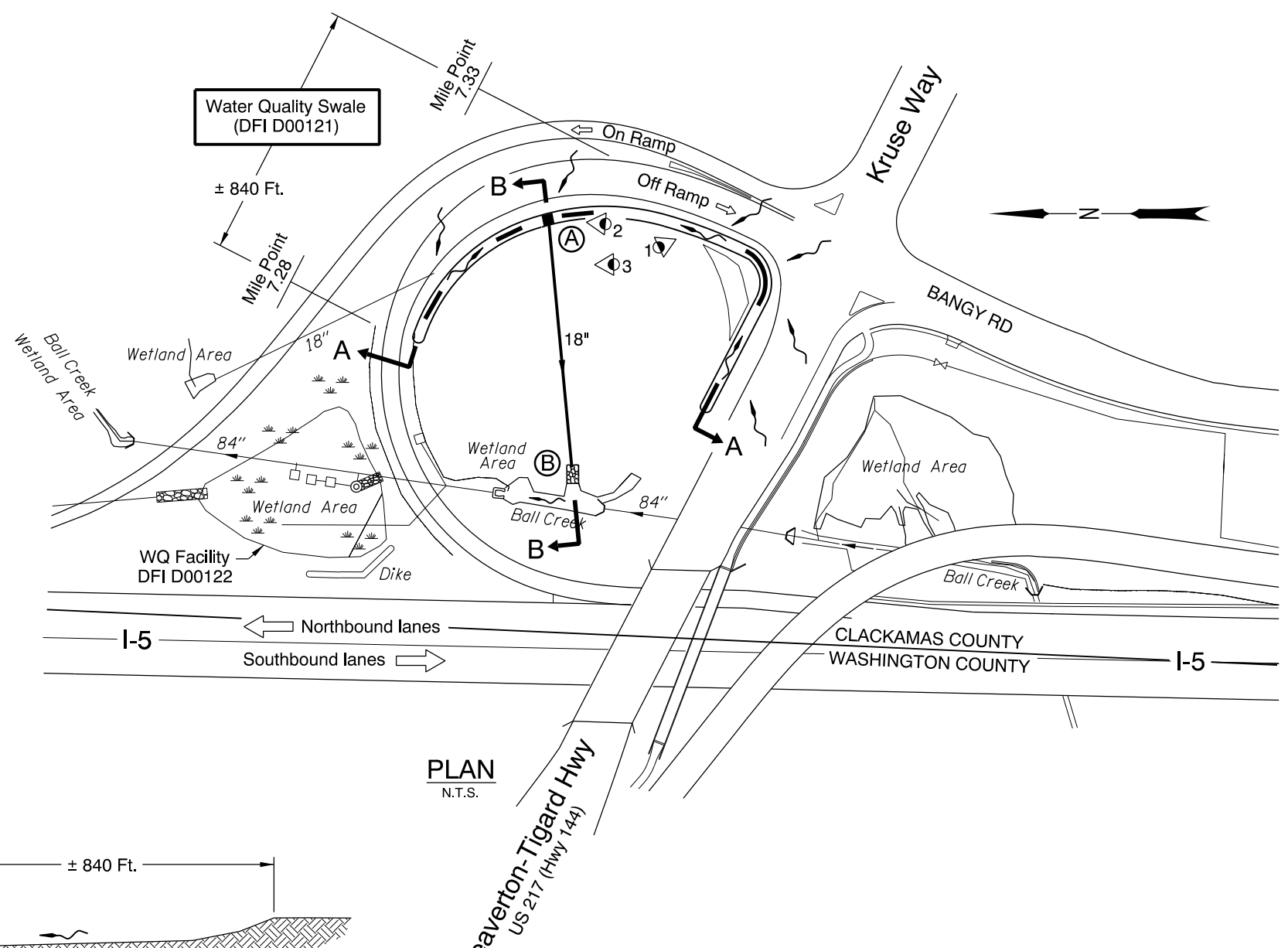
Contact any of the following for more detailed information about management of waste materials found on site:

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

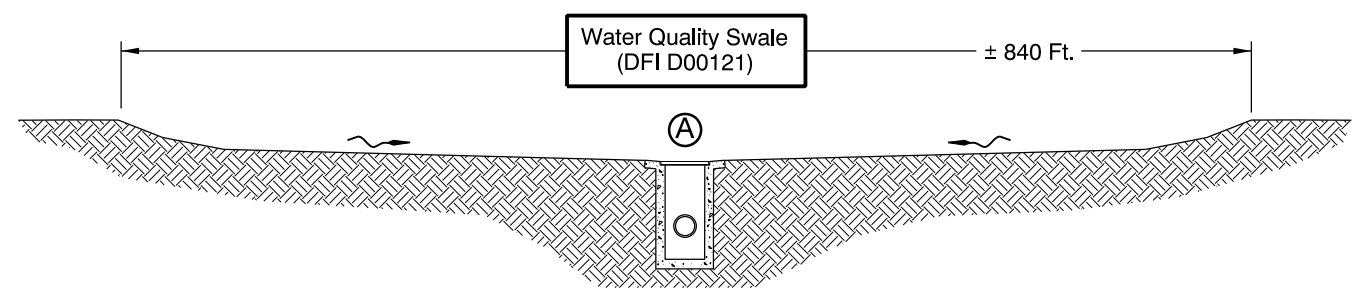
Appendix A

Content:

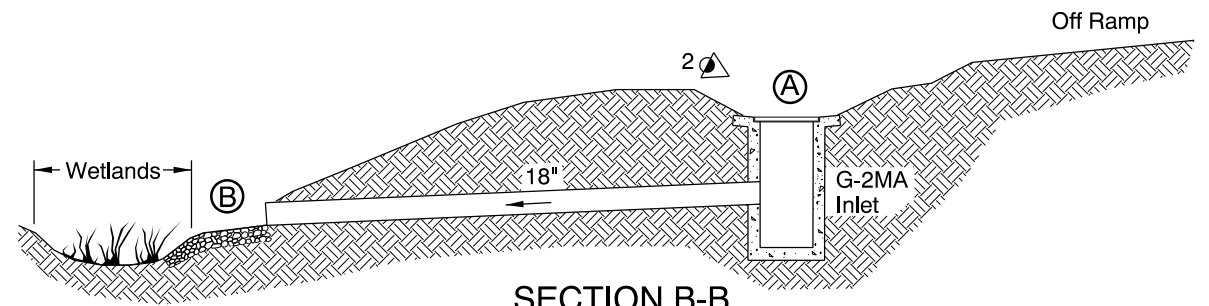
- **Operational Plan and Profile Drawing(s)**



PLAN
N.T.S.



SECTION A-A
N.T.S.



SECTION B-B
N.T.S.

- LEGEND:
- Photo Location / Direction
 - Swale Outlet
 - Outlet with riprap basin
 - Manhole
 - Inlet
 - Storm Pipe (Facility)
 - Storm Pipe
 - Conveyance Direction
 - Pavement / Facility Flow Path

Sht. 1 of 1

OREGON DEPARTMENT OF TRANSPORTATION

Prepared By: M. Wittenbrink
 Drafted By: Jim Holeman

DFI D00121
MAINTENANCE DISTRICT 2B HWY 144
WATER QUALITY SWALE
 BEAVERTON-TIGARD HWY MP 7.28-7.33
 CLACKAMAS COUNTY

Appendix B

Content:

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

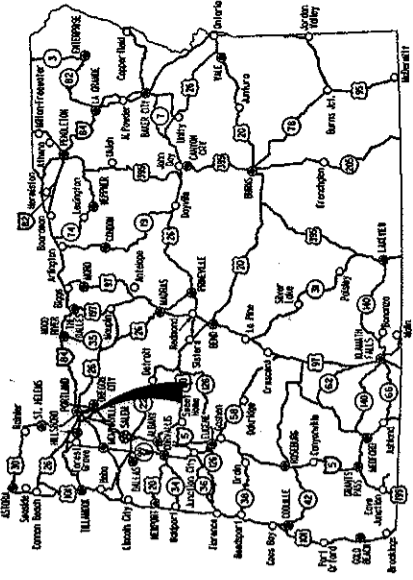
INDEX OF SHEETS	
SHEET NO.	DESCRIPTION
1	Title Sheet
1A	Offsite Wetland Mitigation Vicinity Map & Index Of Sheets Cont'd.
1A-2	Index Of Sheets Cont'd. & Standard Drawing Nos.
1A-3	Standard Drawing Nos.
1B	Signature Sheet
1C	Colored Sheet Layout
1D	Colored Photo
2, 2A Thru 2A-30 Incl.	Typical Sections
2B Thru 2B-21 Incl.	Details
2C, 2C-2	Traffic Control Details
2C-3	Traffic Control Detour Plan
2C-4 Thru 2C-26 Incl., 2C-26A, 2C-7 Thru 2C-35 Incl., 2C-35A, 2C-36 Thru 2C-95 Incl.	Traffic Control Plans
2D Thru 2D-4 Incl., 2D-4A, 2D-5, 2D-6	Water Quality Details
2D-7 Thru 2D-14 Incl.	Water Quality Plans
2E, 2E-2, 2E-2A, 2E-3	Erosion Control Details
2E-4 Thru 2E-22 Incl.	Erosion Control Plans
2F Thru 2F-5 Incl.	Pipe Data
3	Alignment Plan
3A	General Construction Plan
3B	Utility & Drainage Plan
3C	Profile & Super Rate Chart
4	Alignment Plan
4A	General Construction Plan
4B	Utility & Drainage Plan
5	Alignment Plan
5A	General Construction Plan
5B	Utility & Drainage Plan
6	Alignment Plan
6A	General Construction Plan
6A-2	Construction Notes
6B	Utility & Drainage Plan
6C	Profile
7	Alignment & Plan
7A	General Construction Plan
7A-2	Construction Notes
7B, 7B-2, 7C, 7C-2,	Utility & Drainage Plan & Notes
7D	Profile & Super Rate Charts
8	Alignment Plan
8A	General Construction Plan
8A-2	Construction Notes
8A-3	Intersection Construction Plan
8B	Utility & Drainage Plan
8B-2, 8B-3	Sanitary Sewer Relocate Plans And Details
8C	Contour Grading Plan
8D, 8D-2, 8E, 8F, 8F-2, 8F-3, 8G	Profile & Super Rate Charts

STATE OF OREGON
DEPARTMENT OF TRANSPORTATION

PLANS FOR PROPOSED PROJECT

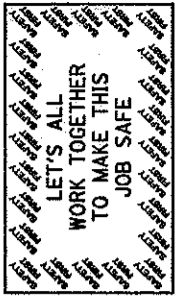
GRADING, STRUCTURES, PAVING, SIGNING, SIGNALS, & ILLUMINATION
**I-5 AT HWY. 217/
KRUSE WAY (UNIT 1) SEC.**

**PACIFIC HIGHWAY
CLACKAMAS & WASHINGTON COUNTIES
NOVEMBER 1999**

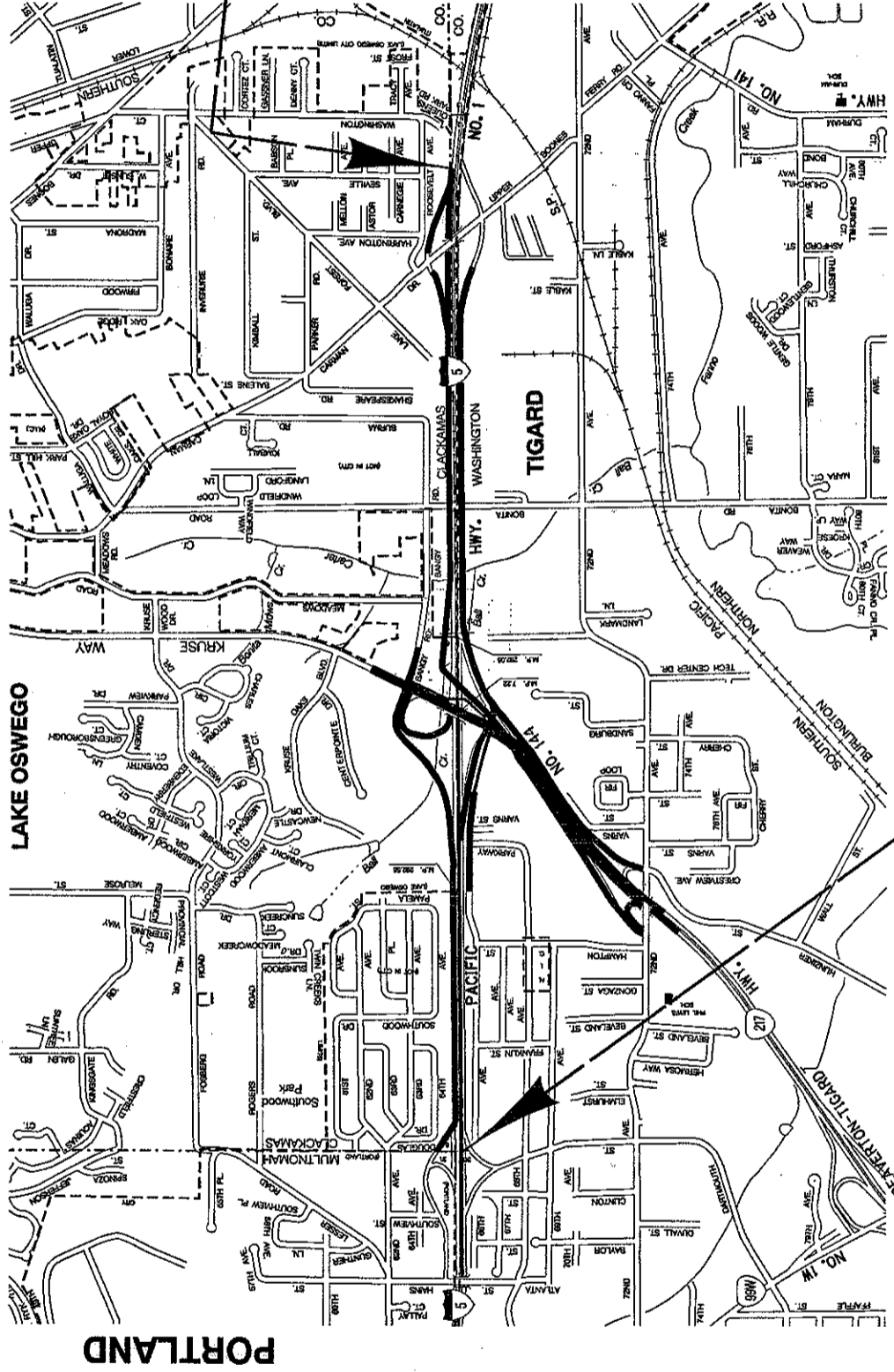


Overall Length Of Project - 3.13 km (1.95 Miles)
Overall Length Of Work Area - 4.80 km (2.98 Miles)

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, Or Answers To Questions About The Rules By Calling (503) 232-1987.



**HPP-ACHPP-ACNH-S001(80)
END OF PROJECT
STA. "L5" 27 + 730.500 (M.P. 291.15)**



**BEGINNING OF PROJECT HPP-ACHPP-ACNH-S001(80)
STA. "L5" 24 + 673 (M.P. 293.05)**

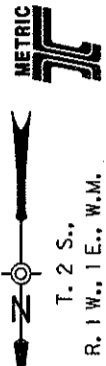
OREGON TRANSPORTATION COMMISSION
Henry H. Hewitt CHAIRMAN
Susan Brody VICE CHAIRMAN
Steven H. Corey COMMISSIONER
Stuart Foster COMMISSIONER
John Russell COMMISSIONER
Grace Crunican DIRECTOR OF TRANSPORTATION



Jeffrey Scheick
TECHNICAL SERVICES MANAGING ENGINEER

**I-5 AT HWY. 217/
KRUSE WAY (UNIT 1) SEC.
PACIFIC HIGHWAY
CLACKAMAS & WASHINGTON COUNTIES**

FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
REGION 10	HPP-ACHPP-ACNH-S001(80)	1

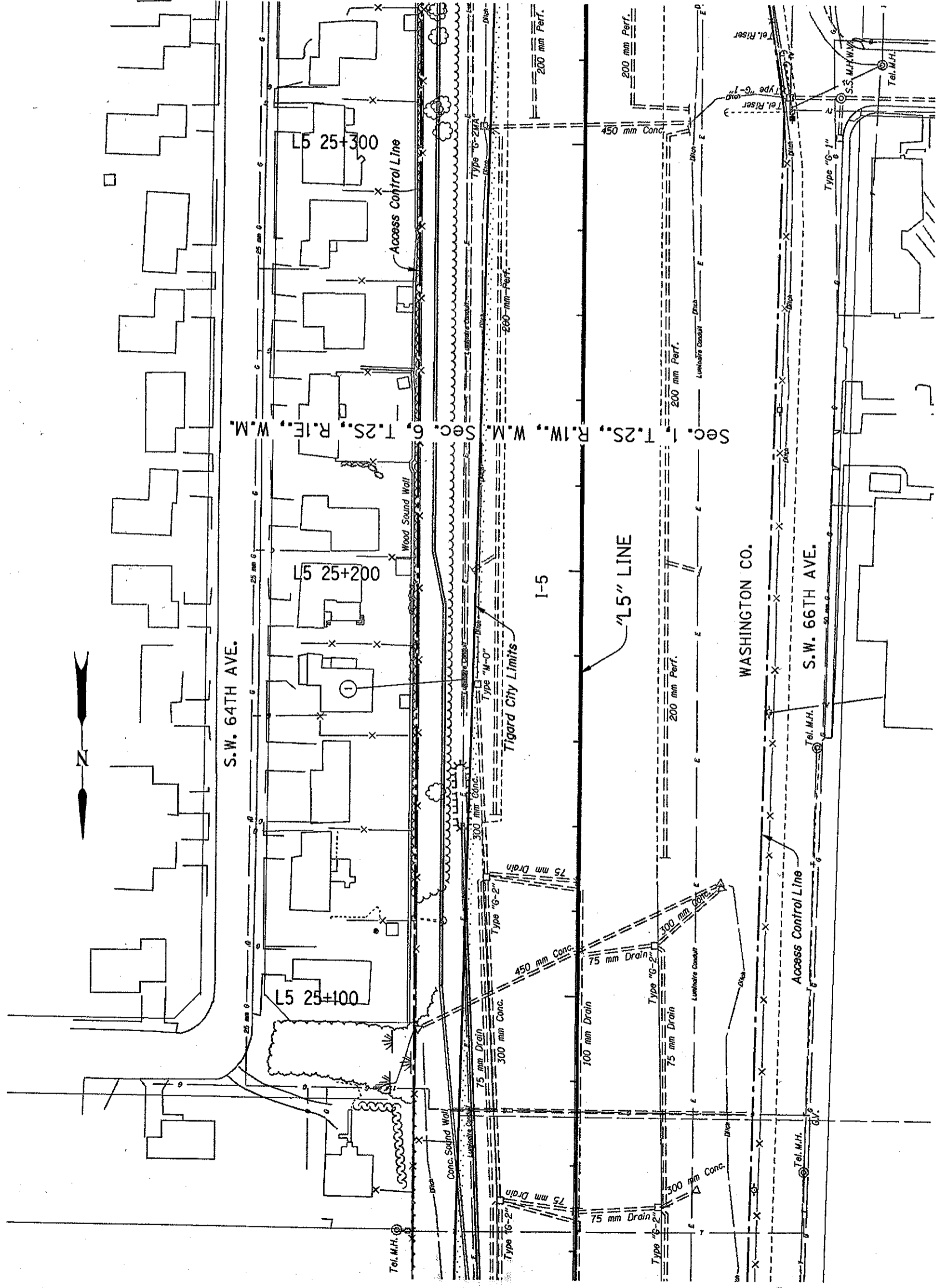


T. 2 S.,
R. 1 W., 1 E., W.M.

**BEGINNING OF PROJECT HPP-ACHPP-ACNH-S001(80)
STA. "L5" 24 + 673 (M.P. 293.05)**

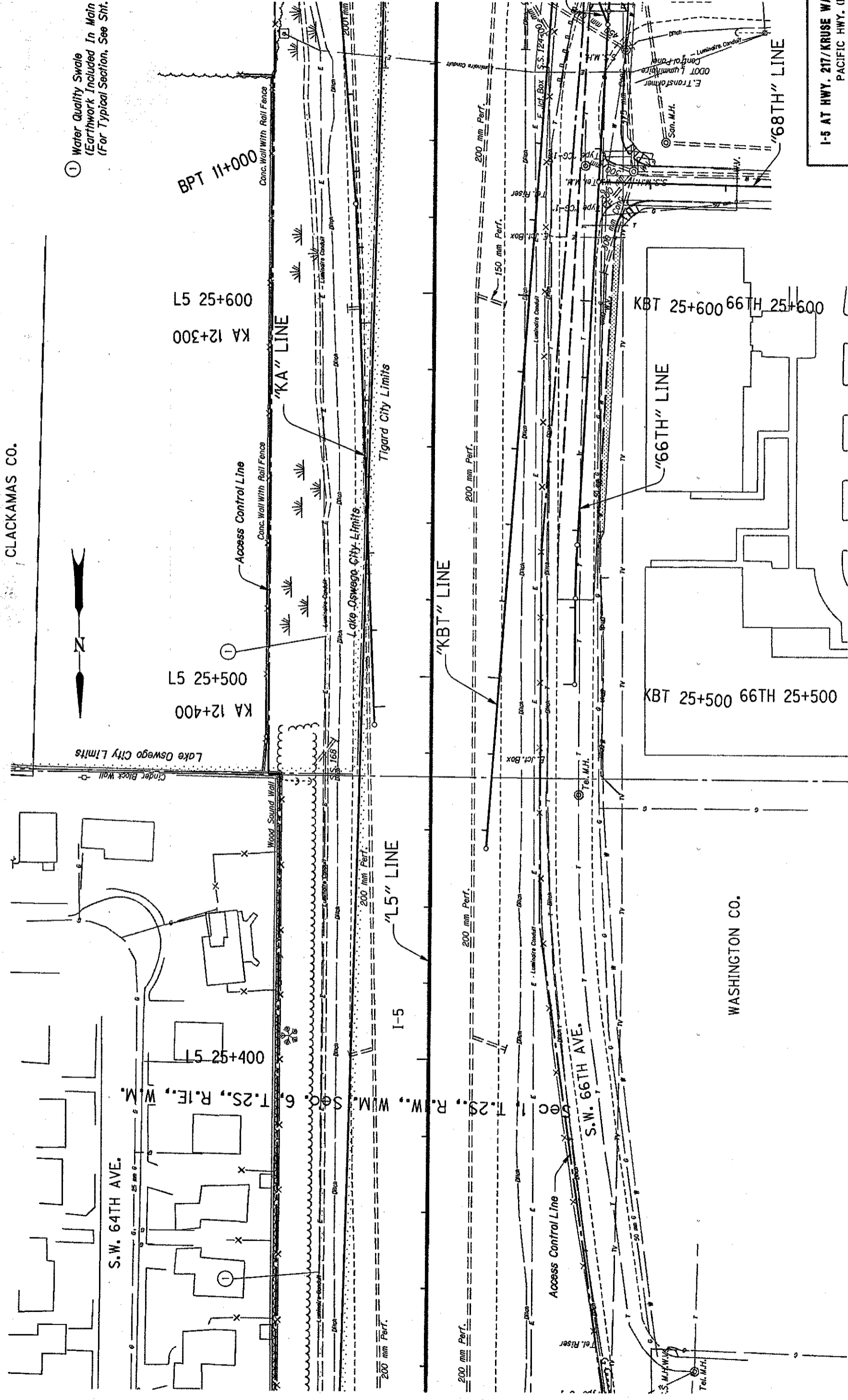
WATER QUALITY PLAN

① Begin Water Quality Swale
Sta. "L5" 25+165 To Sta. "KA" 12+163.45
(Earthwork Included In Main Rdwy. Distr.)
(For Typical Section, See Sht. 2D-5)



I-5 AT HWY. 217/KRUSE WAY (UNIT 1) SEC. PACIFIC HWY. (1-5) CLACKAMAS AND WASHINGTON COUNTIES		PROJECT NUMBER _____	SHEET NO. 2D-7
FEDERAL HIGHWAY ADMINISTRATION REGION OREGON DIVISION 10	PROJECT NUMBER _____		SHEET NO. 2D-7

WATER QUALITY PLAN



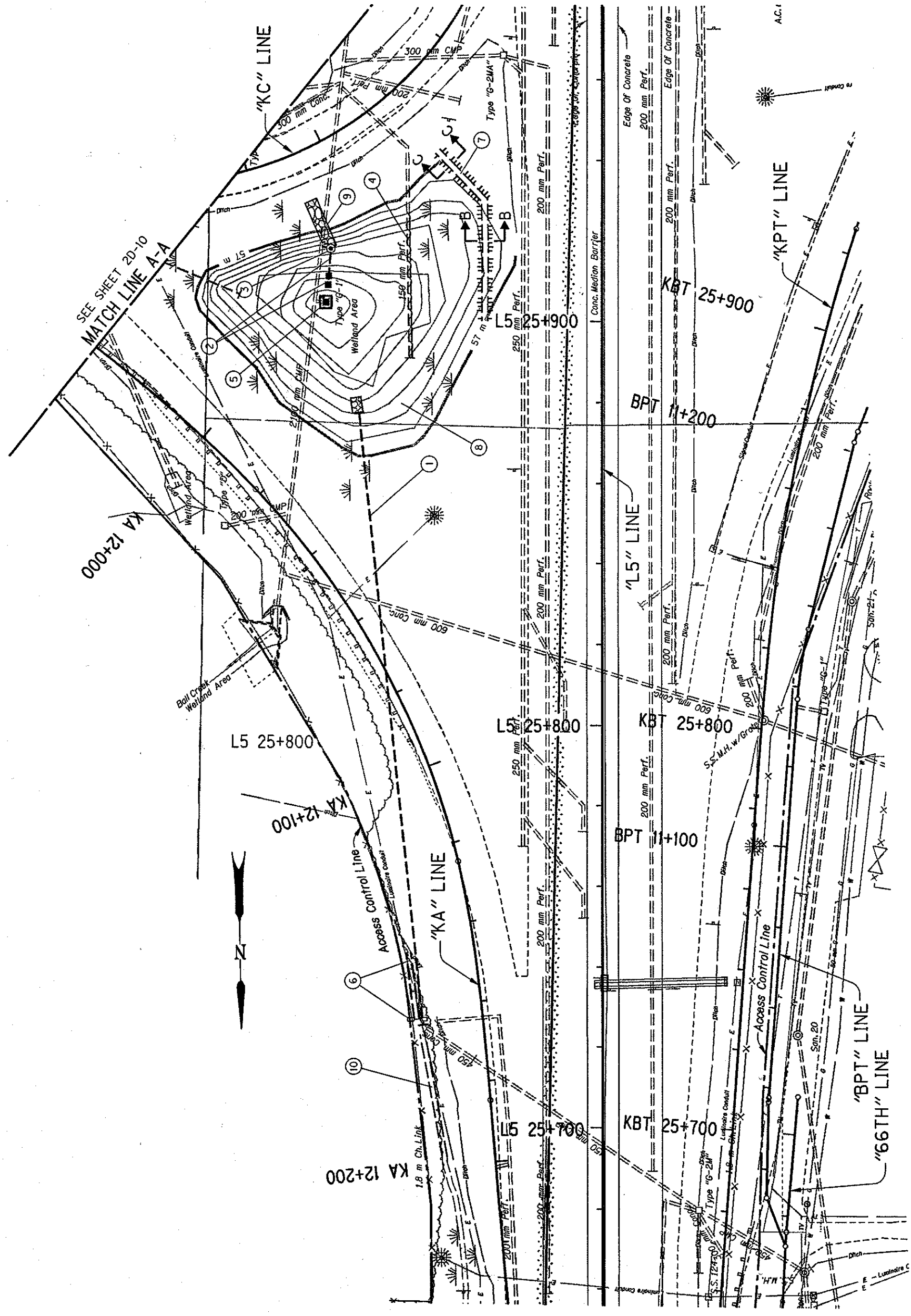
I-5 AT HWY. 217/KRUSE WAY (UNIT 1) SEC.		SHEET NO. 2D-8
PACIFIC HWY. (I-5) CLACKAMAS AND WASHINGTON COUNTIES		
FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	VIEW 3
REGION OREGON 10	DIVISION	

WATER QUALITY PLAN

- ① Const. Riprap Basin
Inst. 900 mm Sewer Pipe - 152 m
Tr. Exc. - 319 m³
(For Details, See Sht. 2B-3)
- ② Water Quality Extended Dry
Detention Outflow Device
Inst. 300 mm Sewer Pipe - 6.0 m
(100 mm Corr. Poly. Sewer Pipe)
Tr. Exc. - 5.4 m³
(For Details, See Sht. 2D-3)
- ③ Const. "Special Manhole"
With Overflow Riser And Cover
Inst. 900 mm C.M.P. - 1.0 m
(Blind Connect To 2100 mm C.M.P.)
Tr. Exc. - 2.1 m³
(For Details, See Sht. 2D)
- ④ Plug Existing 150 mm Perf.
- ⑤ Const. Inlet Protection, Plug Inlet At
Completion Of Project
(For Details See Sht. 2E)
- ⑥ Const. Check Dam
Const. Ditch - 20 m
Di. Exc. - 24 m³
(For Details See Sht. 2E)
- ⑦ Const. Berm To Elev. 57.0
Embankment - 68 m³
(Earthwork Included In Main Hwy. Distr.)
(For Details, See Sht. 2D-6)
- ⑧ Existing Pond
- ⑨ Const. Riprap Mattress
(Class 50) Riprap - 16.2 m³
(For Details, See Sht. 2D-2)
- ⑩ See Sht. 2D-7, Note 1

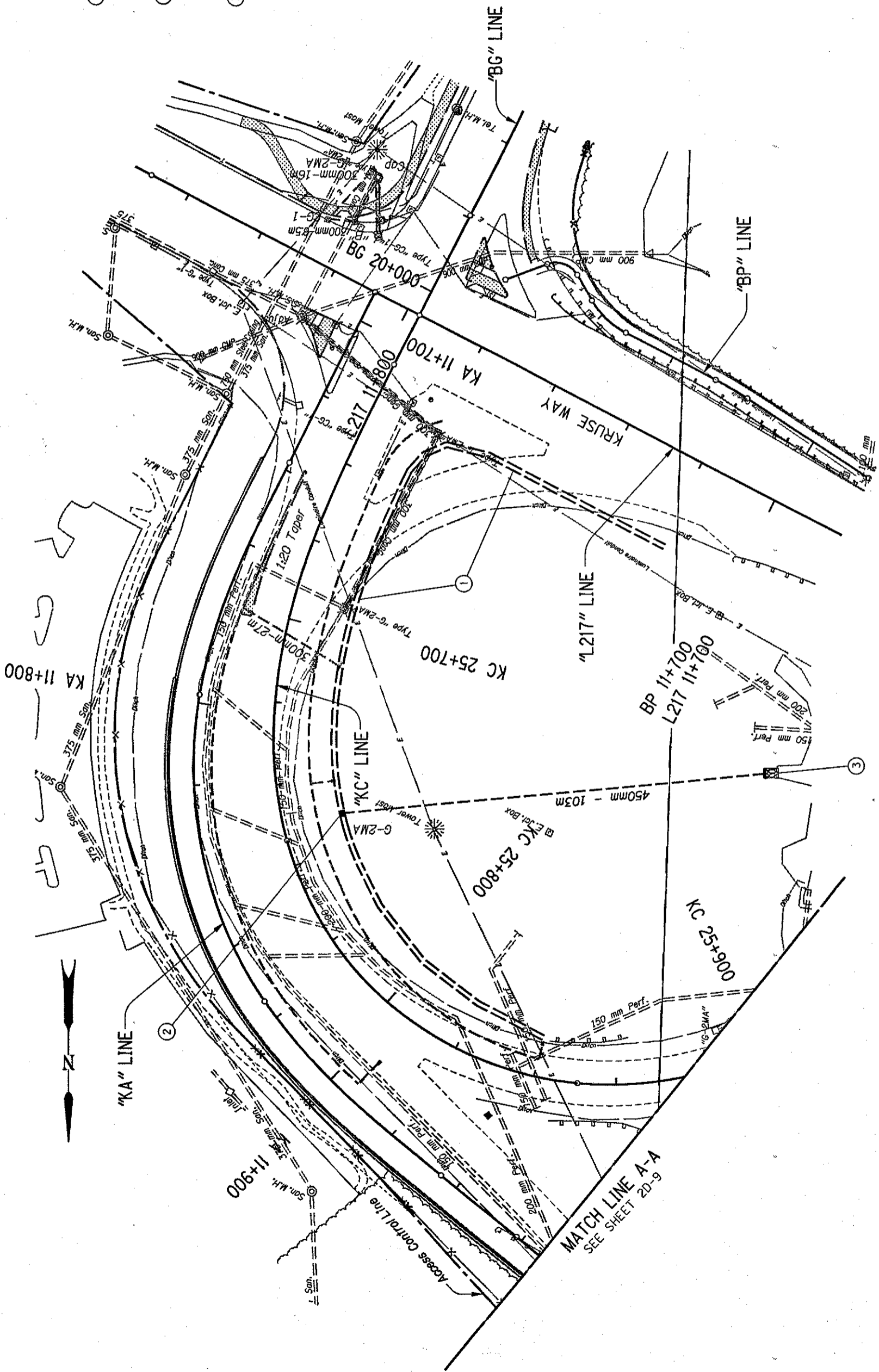
- ⌘ Check Dam In Ditch Section
- ▣ Inlet Protection

I-5 AT HWY. 217/KRUSE WAY (UNIT 1) SEC.		SHEET NO. 2D-9
PACIFIC HWY. (I-5) CLACKAMAS AND WASHINGTON COUNTIES		
FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	VIEW 6
REGION 10	DIVISION	





WATER QUALITY PLAN



- ① Water Quality Swale
(Earthwork Included In Main Rwy. Distr.)
(For Details, See Sht. 2D-5)
- ② Const. Type "G-2MA" Inlet
Inst. 450 mm Pipe - 103 m
Tr. Exc. - 108 m³
- ③ Const. Riprap Basin
(For Details, See Sht. 2B-3)

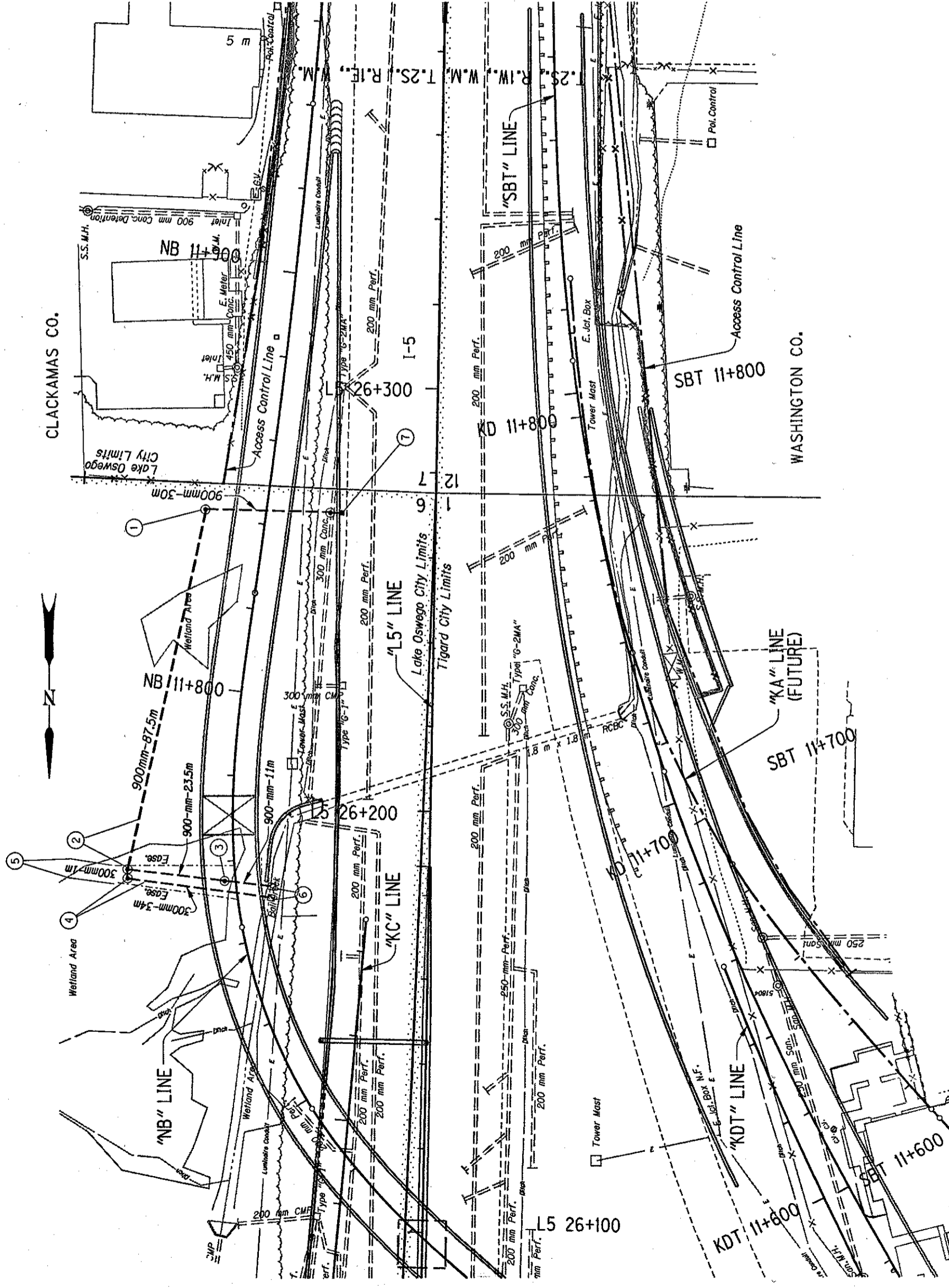
LEGEND	
	Water Quality Swale
	Pipe
	Abandon Pipe
	Inlet
	Manhole

NOTE:
All Dimensions Are Shown In Meters Unless
Otherwise Noted

I-5 AT HWY. 217/KRUSE WAY (UNIT 1) SEC.			
PACIFIC HWY. (I-5)			
CLACKAMAS AND WASHINGTON COUNTIES			
FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.	
REGION 10	OREGON DIVISION	2D-10	VIEW 6



WATER QUALITY PLAN



- ① Const. Manhole
Inst. 900 mm Pipe - 33 m
Tr. Exc. - 315 m³
- ② Const. Manhole
Inst. 900 mm Pipe - 85 m
Tr. Exc. - 442 m³
- ③ Construct Manhole
Inst. 900 mm Pipe - 25 m
Tr. Exc. - 129 m³
Inst. 900 mm Pipe - 10 m
Tr. Exc. - 48 m³
- ④ Const. Water Quality Manhole
Inst. 300 mm Pipe - 1.0 m
Tr. Exc. - 3 m³
Inst. 300 mm Pipe - 35 m
Tr. Exc. - 93 m³
(For Details, See Sht. 2D-4)

- ⑤ Const. Embankment
Embankment - 75 m³
(Earthwork Included In Main Rdwy. Distr.)
(For Details, See Sht. 2D-6)
- ⑥ Const. Riprap Basin - 2
(For Details See Sht. 2B-3)
- ⑦ See Sht. 9B-2, Note 1

I-5 AT HWY. 217/KRUSE WAY (UNIT 1) SEC.		SHEET NO. 2D-11
PACIFIC HWY. (I-5)		
CLACKAMAS AND WASHINGTON COUNTIES		
FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	VIEW 3
REGION 10	OREGON DIVISION	