OPERATION & MAINTENANCE MANUAL

DFI No. : D00347
Facility Type: Water Quality Biofiltration Swale

SEPTEMBER, 2011

INDEX

1. Identification

Drainage Facility ID (DFI):	**D00347**
Facility Type:	Water Quality Biofiltration Swale
Construction Drawings:	(V-File Number) 41V-041
Location:	District: 2C
	Highway No.: 002
	Mile Post: 44.92 / 44.94 (beg./end)
	Description: This facility is located on the north side of US30, I-84 (Hwy 002) just east of Cascade Locks, Oregon alongside the frontage road, leading into town, and west of the bridge overpass. A maintenance access pad is available from the highway (I-84).

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 – URS, Inc., Dale Cerney, P.E., (503) 222-7200
Facility construction:	2008
Contractor:	Wildish Standard Paving 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 on the north side of US30, I-84 (Hwy 002) just east of Cascade Locks, Oregon alongside the frontage road, leading into town, and west of the bridge overpass. A maintenance access pad is available from the highway (I-84).

Stormwater runoff is collected by a catch-basin inlet and 12-inch pipe along the westbound segments of I-84 (Hwy 002) and conveyed to a downward sloping rock-lined channel (the facility inlet); see Point A of the Operational Plan, Appendix A. Once in the swale, the water quality flows meander eastward overtop a series of rock-lined flow spreaders and a grass-lined channel before reaching the facility outlet near “Wa-na-Pa” Street (an extension of the US30 Frontage Road). Stormwater exits the facility at the swale’s outlet (Point B of the Operational Plan) and enters a ditch where flows are conveyed eastward toward Dry Creek – a local creek, flowing around the eastern and northern sides of the highway interchange.

A. Maintenance equipment access:
   Maintenance personnel should find a maintenance access pad directly available from the west side of the facility along I-84 (Hwy 002).

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 west at the facility inlet and a flow spreader. The highway (I-84) is on the left.

Photo 2: Looking east from the facility inlet toward the flow spreaders and facility outlet.

Photo 3: Looking west toward the facility inlet from the riprap pad near the outlet.

5. Facility Haz Mat Spill Feature(s)

It is not likely that this water quality biofiltration swale can be used to store a volume of liquid in the event of a hazardous spill event. However, it may be possible to use sandbags by blocking the flow of contaminated stormwater near the outlet of the swale; see Point B 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
This facility does not have an auxiliary high flow bypass available.

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)**

Water Quality Biofiltration Swale (DFI D00347)

N

±100'

Mile Point 44.92

Mile Point 44.94

Top of swale

Bottom of swale

12"

Maintenance access

Ditch

US-30

Water Quality Biofiltration Swale DFI D00345

Dry Creek

Box culvert

I-84 Off Ramp

Columbia River Hwy/I-84 (Hwy 2)

Westbound

Eastbound

Water Quality Biofiltration Swale DFI D00346

I-84 On Ramp

Frontage Road

PLAN
N.T.S.

Water Quality Biofiltration Swale (DFI D00347)

Top of swale

Bottom of swale

6'

SECTION B-B
N.T.S.

Water Quality Biofiltration Swale (DFI D00347)

±100'

Top of swale

12"

Riprap

Bottom of swale

To Ditch

SECTION A-A
N.T.S.

LEGEND:

- Photo Location / Direction
- (A) Swale Inlet
- (B) Swale Outlet
- (C) Flow Spreader
- (D) Outfall
- Manhole
- Inlet
- Traffic Direction/Flow
- Storm Pipe (Facility)
- Storm Pipe
- Conveyance Direction
- Pavement / Facility Flow Path
- Maintenance Access

Sht. 1 of 1

OREGON DEPARTMENT OF TRANSPORTATION

Prepared By: Craig Fox

Drafted By: H. Gonsior/HDR

DFI D00347
MAINTENANCE DISTRICT 2C HWY 2
WATER QUALITY BIOFILTRATION SWALE
COLUMBIA RIVER HWY MP 44.92-44.94
HOOD RIVER COUNTY

Appendix B

Content:

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

Revised Plan
Sheets Incorporated

INDEX OF SHEETS	
SHEET NO.	DESCRIPTION
1	Title Sheet
1A	Index Of Sheets Cont'd.
1B	Std. Drg. Nos.

Revised Plan
Sheets Incorporated

STATE OF OREGON

DEPARTMENT OF TRANSPORTATION

PLANS FOR PROPOSED PROJECT

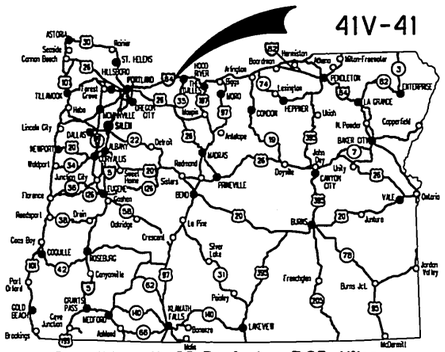
STRUCTURES AND DRAINAGE

I-84:CASCADE LOCKS - 2ND ST(HOOD RIVER)BUNDLE 208

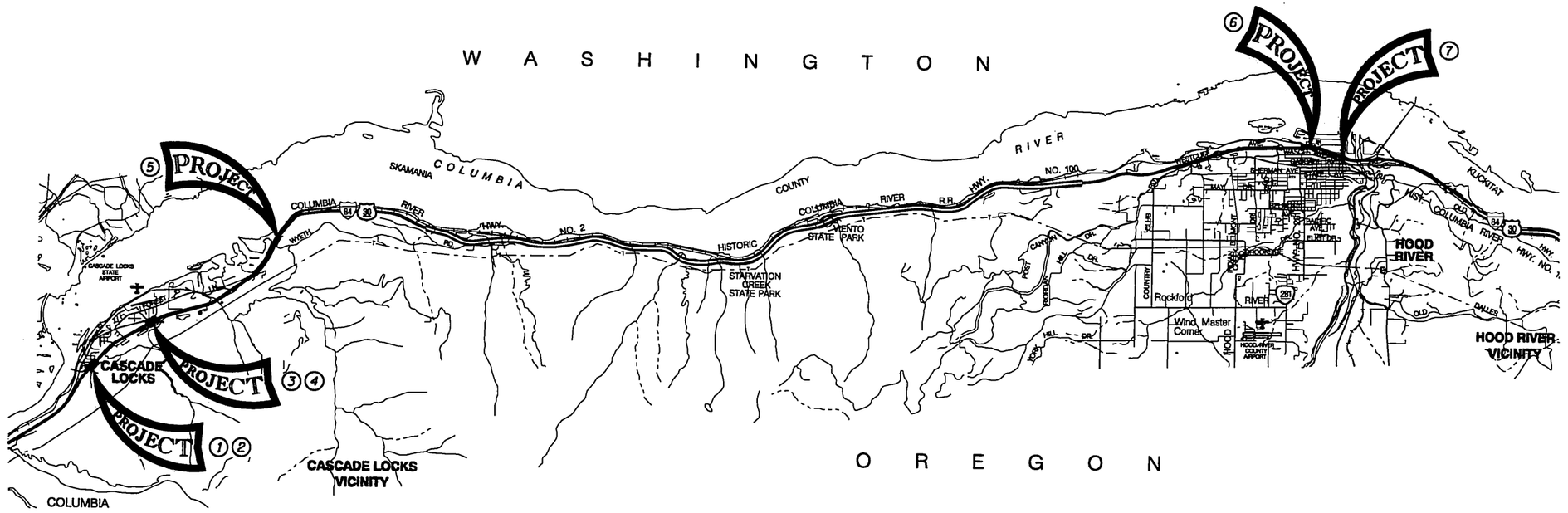
COLUMBIA RIVER HIGHWAY

HOOD RIVER COUNTY

APRIL 2008



Overall Length Of Project - 3.95 Miles



MAP ID	MILE POST	BRIDGE NO.	LOCATION	TYPE OF WORK	SECTION, TOWNSHIP, RANGE
1	43.93E	08610	HWY.2 EB OVER MOODY ST.- BUNDLE 208	REPAIR	Sec.12, T. 2N., R. 7E., W.M.
2	43.93W	08610W	HWY.2 WB OVER MOODY ST.- BUNDLE 208	REPAIR	Sec.12, T. 2N., R. 7E., W.M.
3	45.01W	20742	HWY.2 WB OVER HWY.2 WB CONNECTOR TO HWY.100 - BUNDLE 208	REPLACEMENT	Sec.7, T. 2N., R. 8E., W.M.
4	45.02E	20743	HWY.2 EB OVER HWY.2 WB CONNECTOR TO HWY.100 - BUNDLE 208	REPLACEMENT	Sec.7, T. 2N., R. 8E., W.M.
5	47.31	08623	HWY.2 OVER HERMAN CREEK CONNECTOR - BUNDLE 208	REPAIR	Sec.4, T. 2N., R. 8E., W.M.
6	63.41E	08662	HWY.2 EB OVER UPRR - BUNDLE 208	REPAIR	Sec.25, T. 3N., R. 10E., W.M.
7	63.98	07458	HWY.2 FRONTAGE ROAD (2ND ST.) OVER UPRR - BUNDLE 208	REPAIR	Sec.25, T. 3N., R. 10E., W.M.

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 By Calling The Center. (Note: The Telephone Number For The Oregon Utility Center Is (503) 232-1987.)

OREGON TRANSPORTATION COMMISSION

Gail Achterman	CHAIR
Michael Nelson	VICE-CHAIR
Janice Wilson	COMMISSIONER
Alan Brown	COMMISSIONER
David Lohman	COMMISSIONER
Matthew L. Garrett	DIRECTOR OF TRANSPORTATION

PLANS PREPARED FOR
ODOT
BY:
URS CORPORATION

" I certify this project complies with applicable AASHTO design standards and practices and that any exceptions have been submitted and approved by the ODOT Chief Engineer or her/his delegated authority."

By: _____
Signature

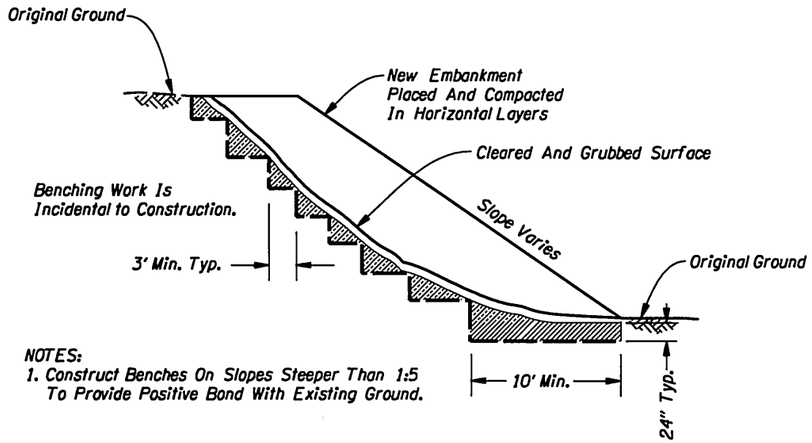
DALE CERNEY, PE, Project Engineer
Print name and title

_____
Concurrence by ODOT Chief Engineer

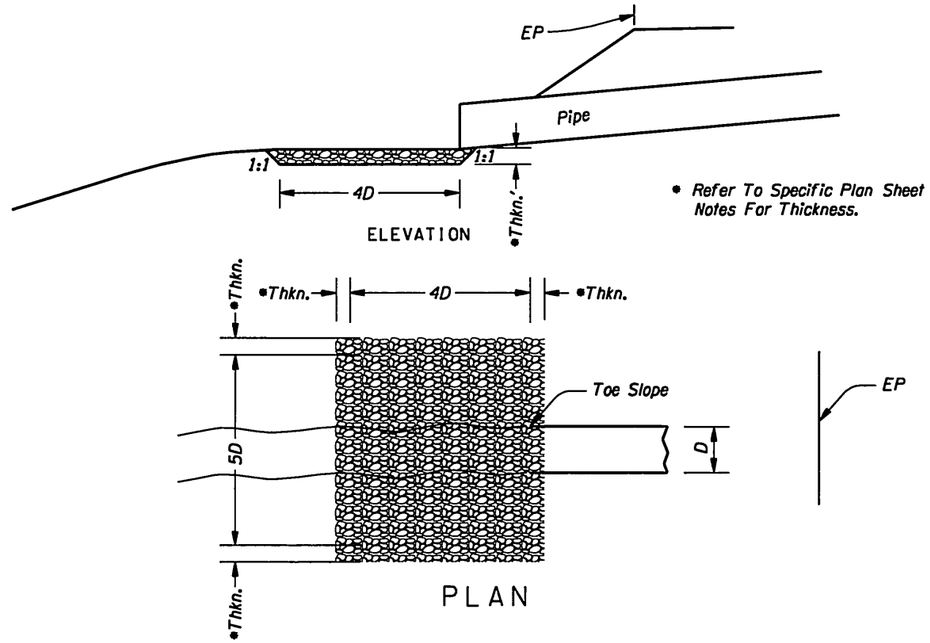
URS
111 S.W. Columbia, Suite 1500
Portland , Oregon 97201
(tel) 503-222-7200
(fax) 503-222-4292

I-84:CASCADE LOCKS - 2ND ST(HOOD RIVER)BUNDLE 208
COLUMBIA RIVER HIGHWAY
HOOD RIVER COUNTY

FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	X-IM-0TIA-S002 (084)	1

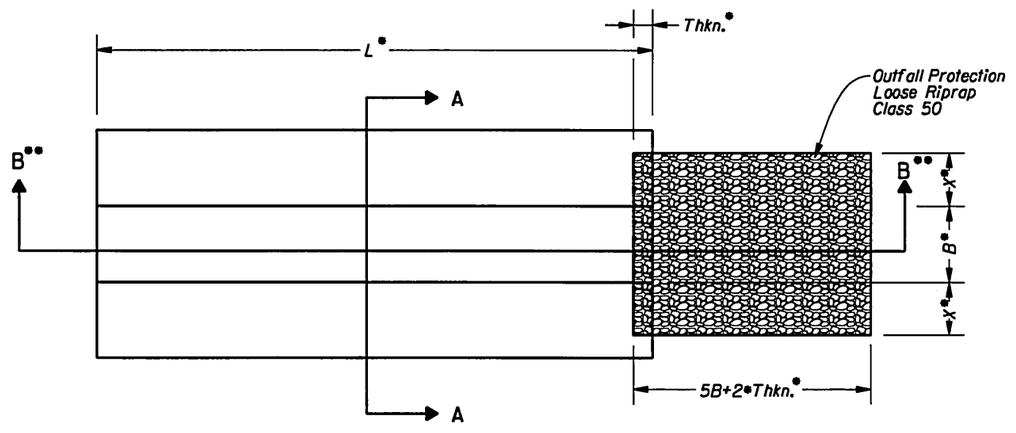


STANDARD EMBANKMENT CONSTRUCTION



RIPRAP CONSTRUCTION AT OUTFALL LOCATIONS

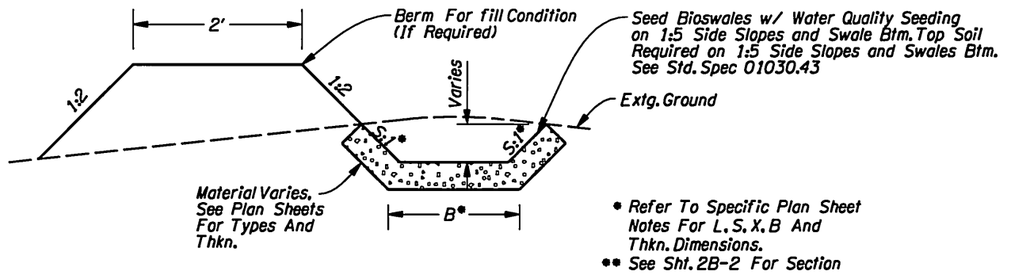
For Details, See Sht. 4A, Notes 1, 20 and 22



STORM WATER BIOSWALES AND CHANNEL OUTFALL PLAN

No Scale

For Details, See Sht. 4A, Notes 15, 16, 17, 19 and 21



SECTION A-A

REGISTERED PROFESSIONAL ENGINEER
79487PE
OREGON
MARCH 13, 2007
DALE CERNEY

RENEWAL DATE: 12-31-2009

OREGON DEPARTMENT OF TRANSPORTATION

URS CORPORATION
HIGHWAYS AND BRIDGES SECTION

I-84:CASCADE LOCKS - 2ND ST(HOOD RIVER)BUNDLE 208

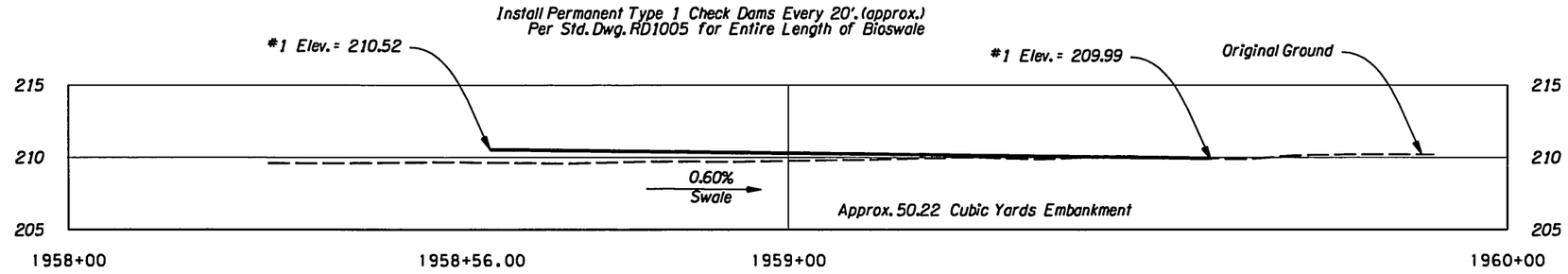
COLUMBIA RIVER HIGHWAY

HOOD RIVER COUNTY

Project Leader - Bob Post
Designed By - Dale Cerney
Drafted By - Serge Valverde

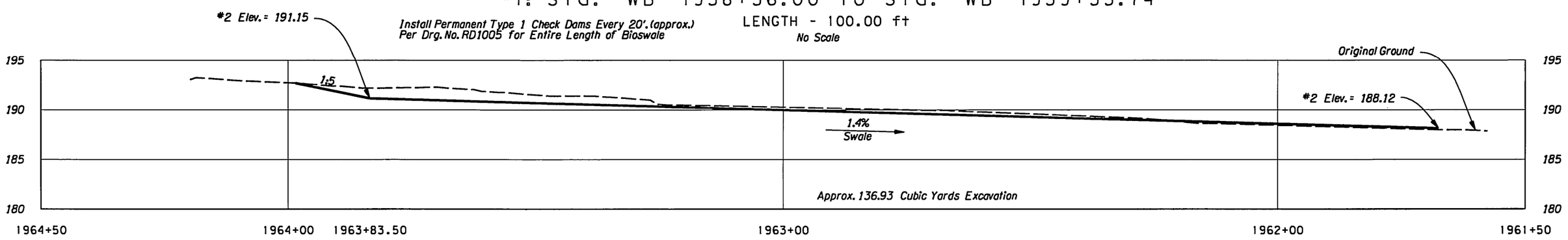
DETAILS

SHEET NO. 2B



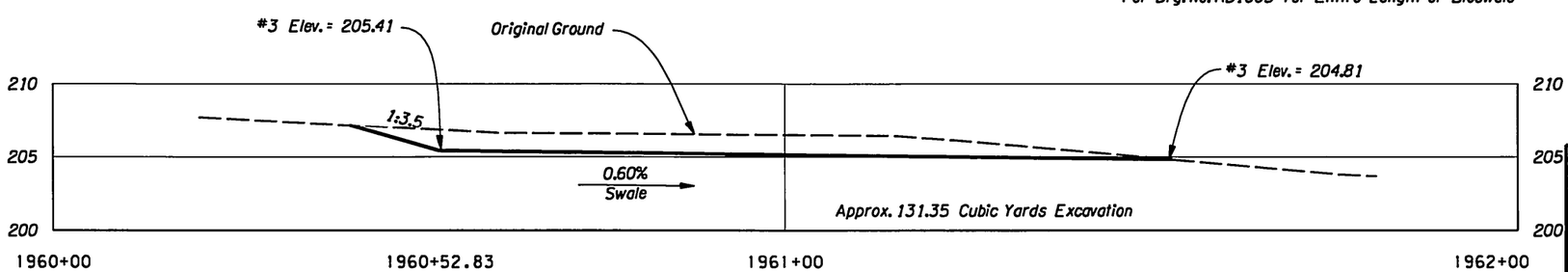
STORMWATER BIOSWALE
SECTION B-B
#1: Sta. "WB" 1958+56.00 To Sta. "WB" 1959+55.74
LENGTH - 100.00 ft

No Scale



STORMWATER BIOSWALE
SECTION B-B
#2: Sta. "WB" 1963+83.50 To Sta. "WB" 1961+72.97
LENGTH - 216.00 ft

No Scale



STORMWATER BIOSWALE
SECTION B-B
#3: Sta. "EB" 1960+52.83 To Sta. "EB" 1961+52.36
LENGTH - 100.00 ft

No Scale

REGISTERED PROFESSIONAL ENGINEER
79487PE
OREGON
MARCH 13, 2007
DALE CERNEY

RENEWAL DATE: 12-31-2009

OREGON DEPARTMENT OF TRANSPORTATION

URS CORPORATION
HIGHWAYS AND BRIDGES SECTION

I-84:CASCADE LOCKS - 2ND ST(HOOD RIVER)BUNDLE 208

COLUMBIA RIVER HIGHWAY

HOOD RIVER COUNTY

Project Leader - Bob Post
Designed By - Dale Cerney
Drafted By - Serge Valverde

DETAILS

SHEET NO. 2B-2

Sec. 7, T. 2N., R. 8E., W.M.

LEGEND:

No work area boundary

(1) Sta. "I-84" 1958+56.00 To Sta. "I-84" 1959+47.09
Install 12" Storm Pipe 0'-5' Depth - 97'
Const. Loose Riprap (Class 50) Outfall Protection
2.68 C.Y. - Thkn.=2.3'
(See Drg. Nos. RD300, RD316, RD326, RD380, RD384 & RD386)
(For Details, See Sht. 2B)

(2) Sta. "I-84" 1959+47.09
Const. Type "G-2" Inlet With Sump - 2
Grate El. = 215.00, Fl. El. = 211.05

(3) Sta. "I-84" 1959+47.09 To
Sta. "I-84" 1960+53.67, 54' Lt.
Const. Asphalt Drainage Curb - 106.5'
(See Drg. No. RD700)

(4) Sta. "I-84" 1960+51.09 Rt.
To Sta. "I-84" 1960+49.49 Rt.
Inst. 12" Storm Pipe 0'-5' Depth - 20'

(5) Sta. "I-84" 1960+51.09 Rt.
Const. Type "G-2" Inlet With Sump - 2
Grate El. = 215.38, Fl. El. = 211.41

(6) Sta. "I-84" 1960+51.09 To
Sta. "I-84" 1961+57.67, 54' Rt.
Const. Asph. Drainage Curb - 106.5'

(7) Sta. "I-84" 1963+57.90 Lt. To
Sta. "I-84" 1963+63.92 Lt.
Inst. 12" Storm Pipe 0'-5' Depth - 27'

(8) Sta. "I-84" 1962+51.32 To
Sta. "I-84" 1963+57.90, 54' Lt.
Const. Asph. Drainage Curb -106.5'

(9) Sta. "I-84" 1963+57.90 Lt
Const. Type "G-2" Inlet With Sump - 2
Grate El. = 215.70, Fl. El. = 208.67

(10) Sta. "I-84" 1963+57.90 Lt. To
Sta. "I-84" 1964+07.37 Rt.
Inst. 12" Storm Pipe 0'-5' Depth - 72'

(11) Sta. "I-84" 1964+07.37 Rt.
Const. Standard Storm Sewer Manhole
Grate El. = 215.26, Fl. El. = 209.67
(See Drg. No. RD336)

(12) Sta. "I-84" 1964+07.37 Lt.
To Sta. "I-84" 1964+61.90 Rt.
Inst. 12" Storm Pipe 0'-5' Depth - 75'

(13) Sta. "I-84" 1964+61.90 Rt.
Const. Type "G-2" Inlet With Sump - 2
Grate El. = 215.61, Fl. El. = 211.62

(14) Sta. "I-84" 1963+55.32 Rt. To
Sta. "I-84" 1964+61.90 Rt.
Const. Asph. Drainage Curb - 106.5'

(15) Sta. "I-84" 1958+56.00, 84.40' Lt.
To Sta "I-84" 1959+55.74, 91.55' Lt.
Const. Stormwater Bioswale #1
L=100', B=6', S=5, X=2.5'
Const. Loose Riprap (Class 50) - 27.74 C.Y., Thkn=1'
(For Details, See Shts. 2B & 2B-2)

(16) Sta. "I-84" 1963+83.50, 178.82' Lt. To
Sta "I-84" 1961+72.97, 227.12' Lt.
Const. Stormwater Bioswale #2
L=216', B=8', S=5, X=2.5'
Const. Loose Riprap (Class 50) - 48.81 C.Y., Thkn=1'
(For Details, See Shts. 2B & 2B-2)

(17) Sta. "I-84" 1960+52.83, 93.66' Rt. To
Sta "I-84" 1961+52.36, 103.38' Rt.
Const. Stormwater Bioswale #3
L=100', B=6', S=5, X=2.5'
Const. Loose Riprap (Class 50) - 27.74 C.Y.
Thkn=1'
(For Details, See Shts. 2B & 2B-2)

(18) See Sht. 3A, Note 2

(19) Sta. "I-84" 1960+49.49 Rt. To
Sta "I-84" 1960+48.28 Rt.
Const. Outfall Channel
Loose Riprap (Class 50) - 2.22 C.Y.
L=15.5', B=2.75', S=2, X=0.25', Thkn=1'
(For Details, See Sht. 2B)

(20) Const. Loose Riprap (Class 50) - 16.21 C.Y.
Thkn. = 2.3'
(For Details, See Sht. 2B)

(21) Sta. "I-84" 1963+63.92 Lt. To
Sta "I-84" 1963+88.13 Lt.
Const. Outfall Channel
Loose Riprap (Class 50) - 15.10 C.Y.
L=99', B=3', S=2, X=0.25', Thkn=1'
(For Details, See Sht. 2B)

(22) Const. Loose Riprap (Class 50) - 18.88 C.Y.
Thkn. = 2.3'
(For Details, See Sht. 2B)

(23) Sta. "I-84" 1960+50.92 Lt.
Sta. "I-84" 1961+40.85 Rt.
Sta. "I-84" 1963+81.11 Rt.
Remove Extg. Inlet & Pipes
Extg. Pipe Data Unknown

(24) Sta. "I-84" 1967+18.62 Lt.
Remove & Salvage Light and Light Pole

(25) Sta. "I-84" 1969+93.89 Rt.
Remove & Const. Type "G-2M" Inlet With Sump
Connect To Extg. Storm Sewer
Contractor To Protect Inlet During Detour Construction.

(26) Sta. "I-84" 1967+18.62 Lt.
Const. Breakaway Light support
Install Luminaire, Conduit And Wiring
Install Pole - 31'
Install Lighting Arm - 16'
(See Drg. Nos. TM629, TM630 And TM635)

REVISIONS	
1	Revised 03-24-2008 Adjusted Note

REGISTERED PROFESSIONAL ENGINEER
79487PE
OREGON
MARCH 13, 2007
DALE CERNEY

RENEWAL DATE: 12-31-2009

BRIDGE NO. 20742 AND 20743

OREGON DEPARTMENT OF TRANSPORTATION

URS CORPORATION
HIGHWAYS AND BRIDGES SECTION

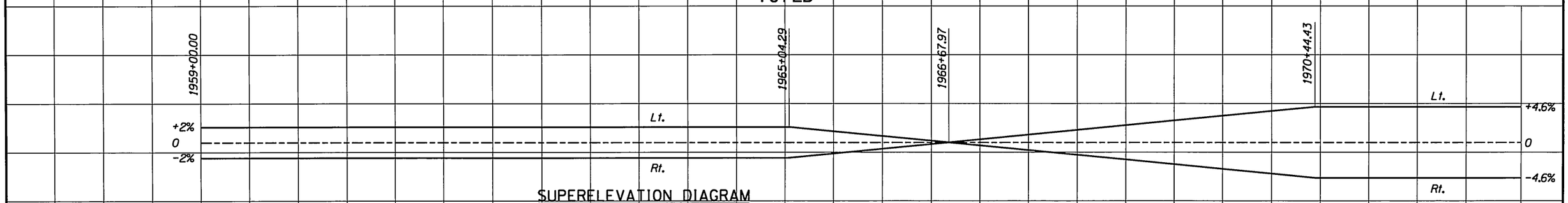
I-84:CASCADE LOCKS - 2ND ST(HOOD RIVER)BUNDLE 208
COLUMBIA RIVER HIGHWAY
HOOD RIVER COUNTY

Project Leader - Bob Post
Designed By - Dale Cerney
Drafted By - Serge Valverde

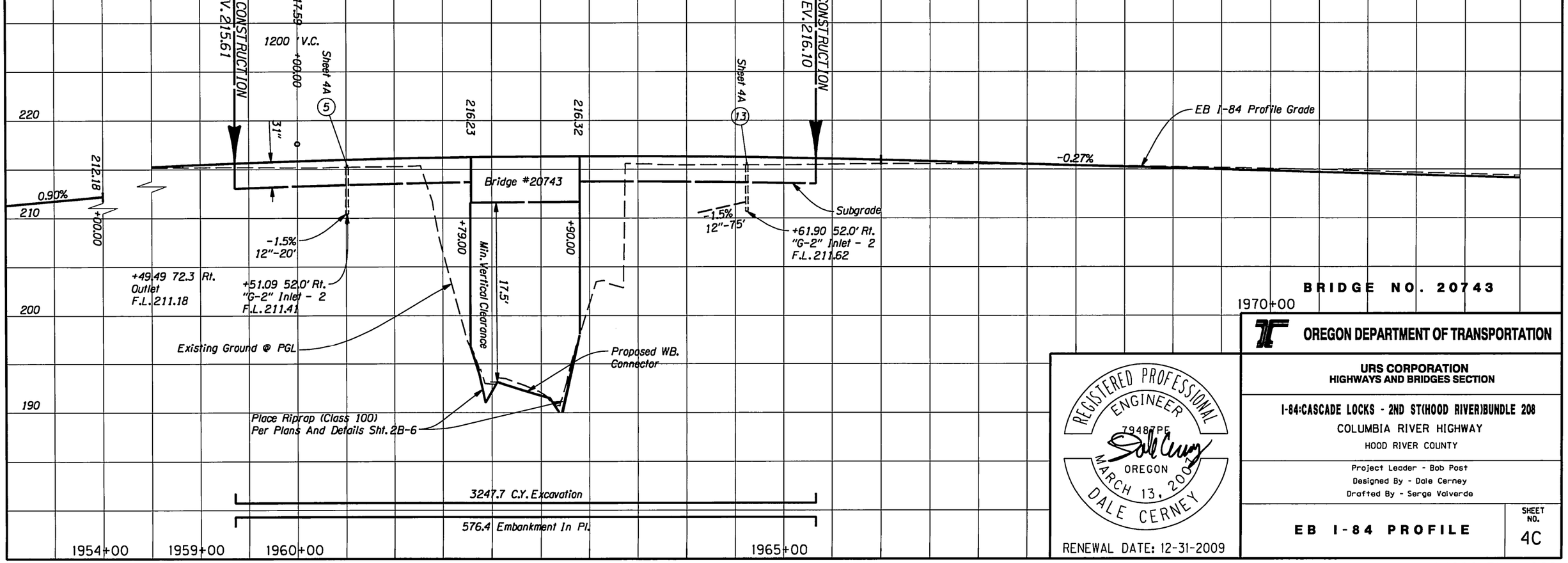
DRAINAGE & UTILITIES

SHEET NO. 4A

Sec. 7, T. 2 N., R. 8 E., W.M.
I-84 EB



SUPERELEVATION DIAGRAM



BRIDGE NO. 20743

OREGON DEPARTMENT OF TRANSPORTATION

URS CORPORATION
HIGHWAYS AND BRIDGES SECTION

I-84:CASCADE LOCKS - 2ND ST(HOOD RIVER)BUNDLE 208
COLUMBIA RIVER HIGHWAY
HOOD RIVER COUNTY

Project Leader - Bob Post
Designed By - Dale Cerney
Drafted By - Serge Valverde

EB I-84 PROFILE

SHEET NO. 4C

REGISTERED PROFESSIONAL ENGINEER
79487PE
OREGON
MARCH 13, 2007
DALE CERNEY
RENEWAL DATE: 12-31-2009