OPERATION & MAINTENANCE MANUAL

DFI No. : D00243
Facility Type: Detention Pond

AUGUST, 2011

INDEX

1. Identification

Drainage Facility ID (DFI):	**D00243**
Facility Type:	Detention Pond
Construction Drawings:	(V-File Number) 25V-061
Location:	District: 2B
	Highway No.: 002
	Mile Post: 13.87; 14.02 (beg./end)
	Description: This facility is located along the north side of Interstate 84 (Hwy 002), between exits 13 and 14, just west of NE 201st Avenue, Gresham, Oregon. Access may be obtained from NE 201st Avenue.

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 –Roadway Engineering Section, Thomas Lulay, P.E. / Managing Engineer, 503-986-3568
Facility construction:	1994
Contractor:	N/A

4. Storm Drain System and Facility Overview

A detention facility is designed to control the quantity of runoff, by reducing the peak discharge and only detaining runoff for some short period of time. These facilities are designed to store and gradually release or attenuate stormwater runoff via a control structure or release mechanism, and completely drain after the design storm has passed. The most common detention facilities include:

- Dry ponds - these are depressed storage areas that store runoff during wet weather and are dry the rest of the time. Usually they are earthen depressions.
- Tanks - these are underground storage facilities that are typically constructed from large diameter pipe.
- Vaults - these are enclosed underground storage facilities. They are typically constructed from reinforced concrete.

This facility is located along the north side of Interstate 84 (Hwy 002), between exits 13 and 14, just west of NE 201st Avenue, Gresham, Oregon. Access may be obtained from NE 201st Avenue.

There are a series of nearly a dozen or more catch-basin inlets, connected to 12 and 15-inch pipes, conveying flows toward this facility. A 21-inch pipe ultimately conveys stormwater runoff into a 4 ft x 5 ft diversion box (sediment vault) at the facility inlet. The 4 ft. x 5 ft. diversion box has two Waterman sluice gates and an overflow bypass pipe, allowing stormwater to either enter the facility, or bypass it altogether once a hazardous material spill has been contained; see Points A and B of the Operational Plan, Appendix A.

The 4 ft x 5 ft diversion box at the facility inlet is used to handle both regularly occurring lower flow (water quality) and higher flow stormwater events. The set of Waterman sluice gates are used as valves to direct the flows through the facility. The slightly higher elevated northern-facing gate valve in this box is being used as a manually operated hazardous material bypass overflow valve. The intent is to leave this gate valve closed at all times, so that all of the flows regularly enter the ponds. The bypass gate valve is only opened after a hazardous material spill event has occurred – and only opened once the spill is over and contained between Ponds 1 and 2 (as a result of having closed their respective sluice gates, beforehand, due to the hazardous material spill); see Points D and F of the Operational Plan.

Stormwater events, occurring after a hazardous material spill has been contained in the ponds and prior to proper cleanup, are sent straight to the 3 ft x 3 ft diversion box (sediment vault) located at the facility outlet; see Points H and I of the Operational Plan. Once the hazardous material has been removed and the ponds cleaned, the bypass overflow valve is closed

again and the sluice gates, between the ponds at Points D and F, are re-opened. With the bypass overflow valve closed and the eastern-facing sluice gate left open at Point B, regularly occurring flows travel from the inlet diversion box into Pond 1 where the water is temporarily detained behind concrete headwall number 2 (Point D) and exits through a 6-inch orifice into Pond 2. The same sort of function could occur in both Ponds 2 and 3 if necessary, as the water is further contained in those cells, before it ever reaches the facility outlet. The design of the facility allows for stormwater to continuously pass through the cells in a metered fashion. Water flows through the orifice openings from west to east and back again, being temporarily detained, prior to release through the facility outlet structure and into a 21-inch storm system pipe; see Points I and H of the Operational Plan.

This is how the system would operate as was originally designed. However, it appears the bypass overflow valve (Point A) is commonly left open, and the bottoms of both Ponds 1 and 2 have settled, or have been scoured away to a point where the headwall orifice openings are now higher than intended. Water now appears to backup and remain behind the headwalls longer than intended and won't pass through to the next pond until the water surfaces reach a high enough point to begin flowing through the openings again. It is recommended that the bottom surfaces of the ponds be restored to their originally intended design heights, and that the bypass overflow valve be operated as suggested above.

A. Maintenance equipment access:
   The facility is accessible via NE 201st Avenue. Access is limited by a gravel pathway and gated entrance or a narrower concrete-paved pathway, depending on which side of the roadway is used to arrive at the facility; see below for more information.

B. Heavy equipment access into facility:

   ☐ Allowed (no limitations)
   ☒ Allowed (with limitations); the facility is accessible via NE 201st Avenue. Access is limited by a gated entrance or a narrow pathway. The gravel pathway along the west side of NE 201st Avenue (north of I-84), leading up to the gated entrance may more easily allow for heavy equipment access. However, the concrete-paved pathway along the east side of NE 201st Avenue (north of I-84) eventually provides more unlimited access all along the south side of the facility.
   ☐ Not allowed

C. Special Features:

☐ Amended Soils
☐ Porous Pavers
☒ Liners; A containment membrane lines the bottom of the ponds/swales.
☐ Underdrains

Photo 1: Detention Pond Facility on left, looking east. I-84 is located to the right.

Photo 2: Detention Pond Facility, looking east. Diversion box (sediment vault), sluice gate and headwall at the facility inlet; Points A and B.

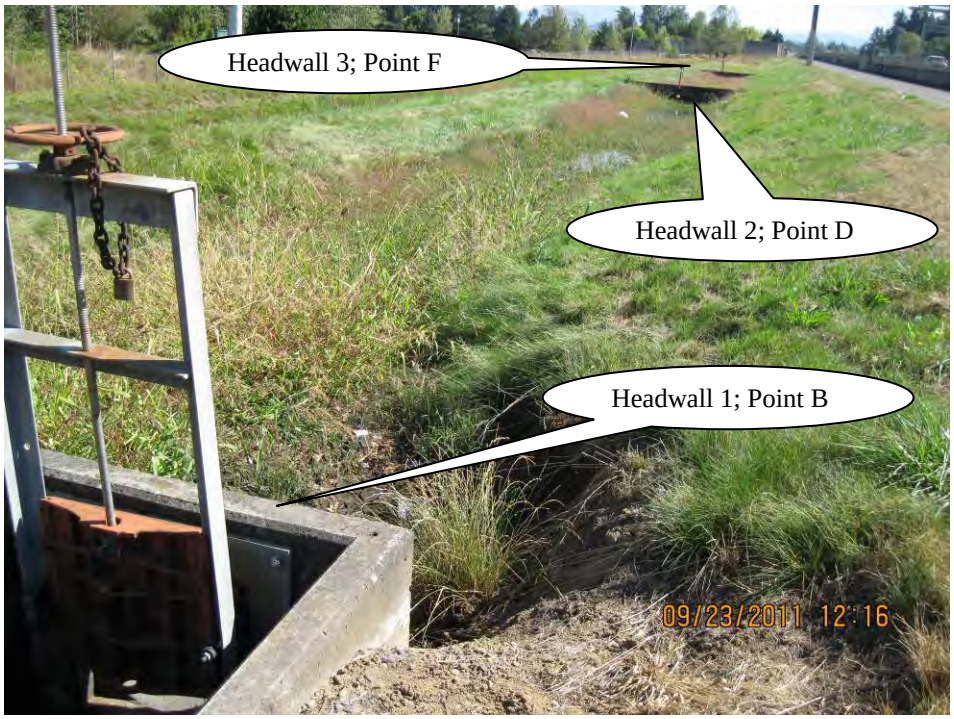


Photo 3: Looking east at overall view of diversion box (sediment vault) near facility inlet at headwalls 2 and 3; Points A, B, D and F of Operational Plan, Appendix A.

Photo 4: Internal view of diversion box (sediment vault), sluice gate and headwall at the facility inlet; Points A and B of Operational Plan, Appendix A.

Photo 5: Looking northeast at sluice gate and headwall 2 at the end of Pond No. 1; Point D of Operational Plan, Appendix A.

Photo 6: Looking northwest at sluice gate and headwall 2 at the end of Pond No. 1; Point D of Operational Plan, Appendix A.

Photo 7: Looking northwest at sluice gate and headwall 2 at the end of Pond No. 1; Point D of Operational Plan, Appendix A. This is a more recent view than earlier photos, showing how the pond's bottom is lower than was originally designed.

Photo 8: Looking east at the turning/terminus point of the facility, prior to it turning back westward. 201st Avenue is located ahead, beyond gated entrance in fence.

Photo 9: Looking eastward into the diversion box (sediment vault) near the facility outlet; Points H & I.

5. Facility Haz Mat Spill Feature(s)

The Detention Pond Facility can be used to store a volume of liquid by closing the Waterman sluice gates at the inlet and outlet diversion boxes (Points B and H), and at the headwalls between Ponds 1 and 2; see Points D and F of the Operational Plan, Appendix A.

Should a hazardous spill event ever occur, the bypass overflow valve at the inlet diversion box, and the separate sluice gates, located at individual headwalls (Points D and F), may be operated as suggested above, separating the ponds, and giving maintenance personnel the ability to temporarily hold the liquids while the spill is contained and eventual removal occurs. The ponds are lined with an impermeable membrane found below the topsoil. Contaminated, hazardous liquids will likely be held within the separate ponds such that staff should be able to pump them out and remove appropriate amounts of topsoil while satisfying properly approved of disposal practices.

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
An auxiliary bypass was not intended as part of the design of the inlet diversion box (sediment vault) at Point A of the Operational Plan. Manual operation of the bypass overflow valve on the north side of the box, could allow high flows to travel directly between the inlet and outlet diversion boxes (Points A and I) if the valve (Waterman sluice gate) were left partway open. However, design of the facility calls for the bypass overflow valve to be left closed on a regular basis and operated only in the event of a hazardous material spill as described above.

☐ Other, as noted below

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: Hazmat containment maintenance requirements. See the Operational Plan and As-constructed drawings for specialized containment facility features.

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

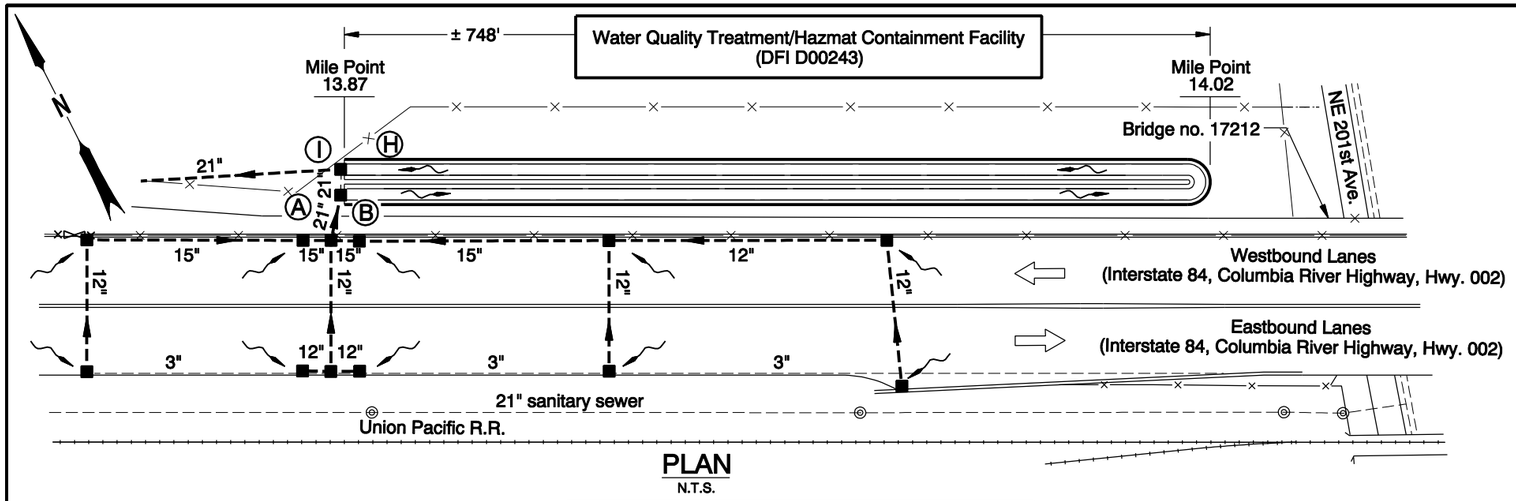
Contact any of the following for more detailed information about management of waste materials found on site:

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

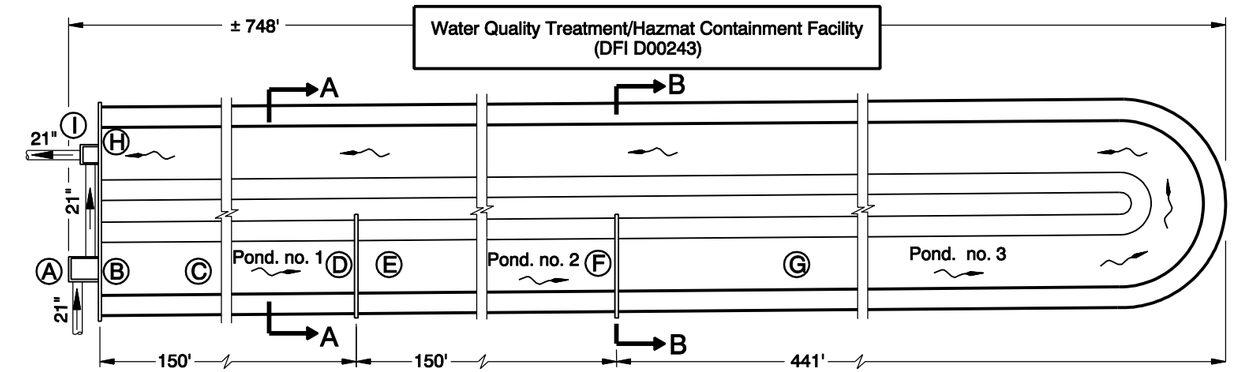
Appendix A

Content:

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



PLAN
N.T.S.



DETAILED PLAN VIEW
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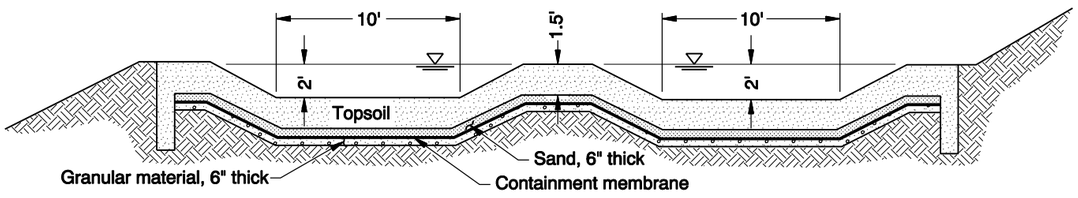

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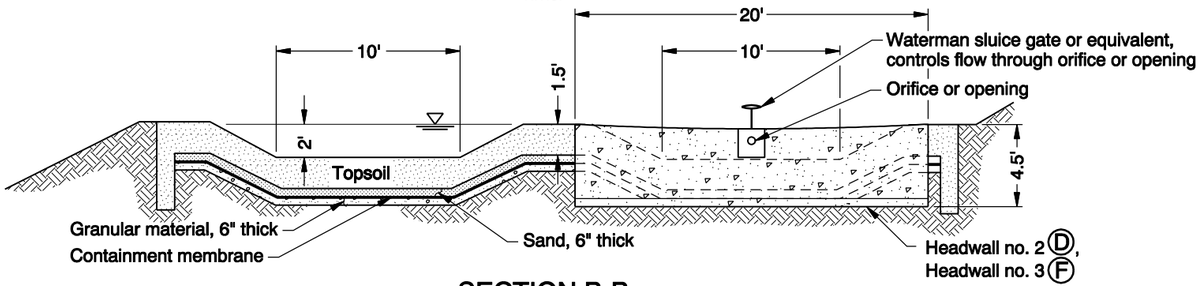

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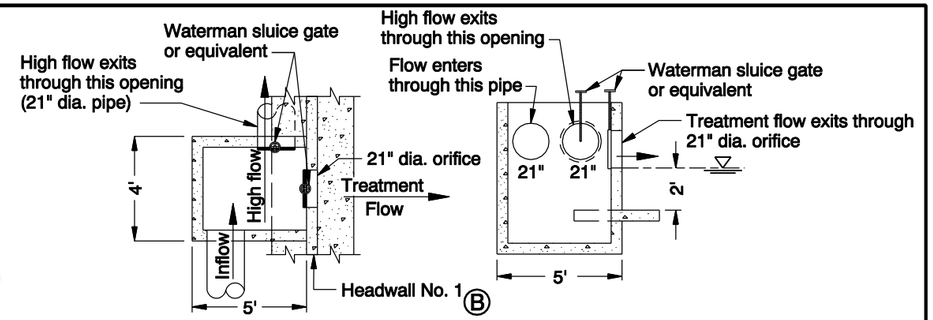
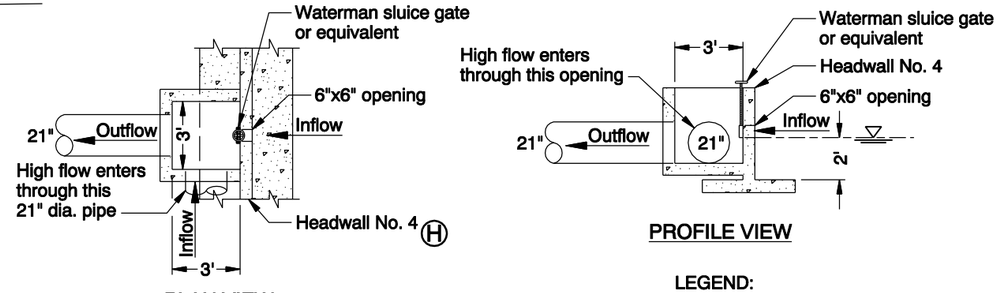
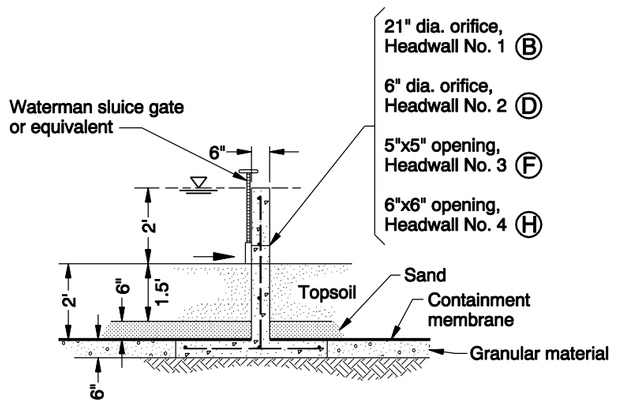


4'X5' DIVERSION BOX Ⓐ FOR WATER QUALITY TREATMENT/HAZMAT CONTAINMENT FACILITY
N.T.S.



3'X3' DIVERSION BOX Ⓘ FOR WATER QUALITY TREATMENT/HAZMAT CONTAINMENT FACILITY
N.T.S.



HEADWALL FOR WATER QUALITY TREATMENT/HAZMAT CONTAINMENT FACILITY
N.T.S.

LEGEND:

- Ⓐ 4'x5' Diversion Box
- Ⓑ Facility Inlet at Headwall No. 1
- Ⓒ Pond No. 1
- Ⓓ Headwall No. 2
- Ⓔ Pond No. 2
- Ⓕ Headwall No. 3
- Ⓖ Pond No. 3
- Ⓗ Facility Outlet at Headwall No. 4
- Ⓘ 3'x3' Diversion Box
- Manhole and/or
- Inlet and/or
- Traffic Flow/Direction
- Storm Pipe (Facility)
- Storm Pipe
- Conveyance Direction
- Pavement / Facility Flow Path
- Concrete Barrier
- Gate
- Fence
- Railroad

Sht. 1 of 1

OREGON DEPARTMENT OF TRANSPORTATION

Prepared By: Wynee Hu

Drafted By: Mathew Bunde

DFI D00243
MAINTENANCE DISTRICT 2B HWY 002
DETENTION POND
COLUMBIA RIVER HIGHWAY MP 13.87-14.02
MULTNOMAH 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	Index Of Sheets Cont'd. & Standard Drawing Nos.
2 Thru 2A-3 Incl.	Typical Sections
2B Thru 2B-18 Incl.	Details
2C Thru 2C-24 Incl.	Traffic Control Plans
2D, 2D-2, 2D-3	Temporary Erosion Control
2E, 2E-2	Wetland Mitigation
2F Thru. 2F-5 Incl.	Pipe Data
2G Thru 2G-3 Incl.	Summary
3, 4, 5, 5A, 6, 6A, 6B, 7, 7A, 7A-2, 7B, 7C, 7D, 7E, 7F, 7G, 7H, 7I, 7J, 7K, 7L, 7M, 7N, 8, 8A, 8B, 9, 9A, 9B, 10, 10A, 10B, 10C, 11, 11A, 12	Plans & Profiles

STATE OF OREGON

DEPARTMENT OF TRANSPORTATION

PLANS FOR PROPOSED PROJECT

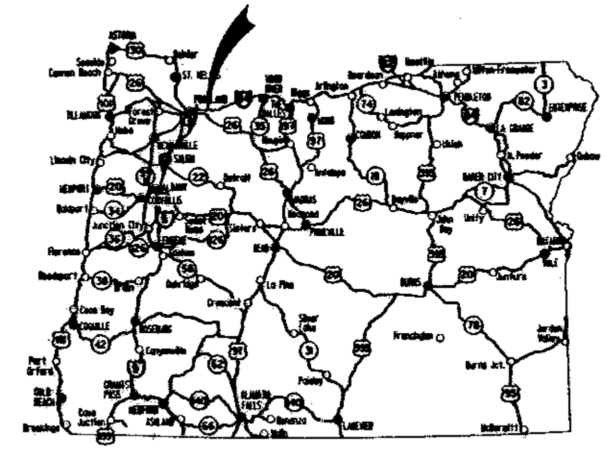
GRADING, STRUCTURES, PAVING, SIGNING, ILLUMINATION, SIGNALS, & LANDSCAPING

N.E. 181ST AVE. - 223RD AVE. SEC.

COLUMBIA RIVER HIGHWAY

MULTNOMAH COUNTY

FEBRUARY, 1994



Length Of Project - 2.11 Miles

Overall Length Of Project - 51.32 Miles

VARIABLE MESSAGE SIGN & END OF CONTRACT PROJECT

M.P. 65.43

50 MILES

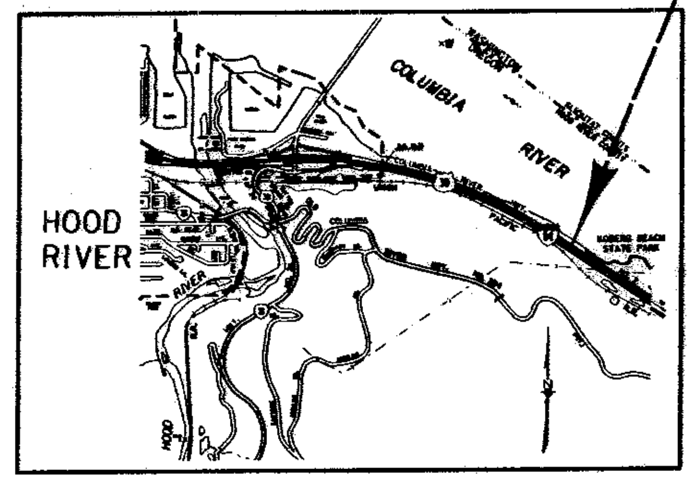
I-NH-S002(5)

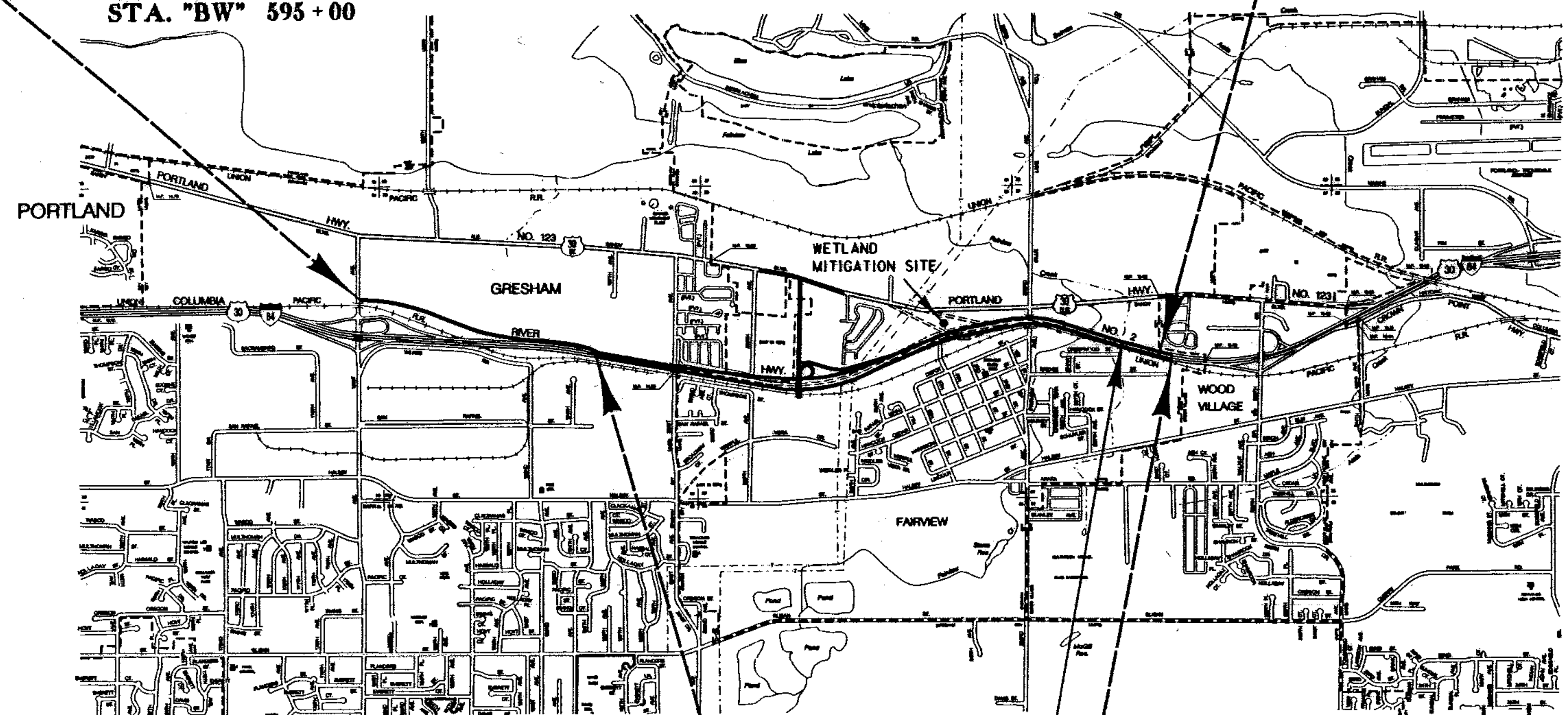
END OF PROJECT

STA. 701 + 10 (M.P. 15.65)

BEGINNING OF CONTRACT PROJECT

STA. "BW" 595 + 00





T. 1 N., R. 3 E., W.M.

EQUA. 692+80.83 Bk. = 694+39.73 Ah.

BEGINNING OF PROJECT I-NH-S002(5)

STA. 606 + 19 (M.P. 14.04)

END OF WORK AREA

STA. "ECON" 708 + 00

OREGON TRANSPORTATION COMMISSION

Michael P. Hollern	CHAIRMAN
John Whitty	VICE CHAIRMAN
Susan Brody	COMMISSIONER
Cynthia J. Ford	COMMISSIONER
Roger L. Breezley	COMMISSIONER
Donald E. Forbes	DIRECTOR OF TRANSPORTATION

REGISTERED PROFESSIONAL ENGINEER 849 OREGON THOMAS D. LULAY Expires Dec. 31, 1994

Thomas D. Lulay

TECHNICAL SERVICES MANAGING ENGINEER

N.E. 181ST AVE. - 223RD AVE. SEC.
COLUMBIA RIVER HIGHWAY
MULTNOMAH COUNTY

FEDERAL HIGHWAY ADMINISTRATION		PROJECT NUMBER	SHEET NO.
REGION 10	OREGON DIVISION	I-NH-S002(5)	1

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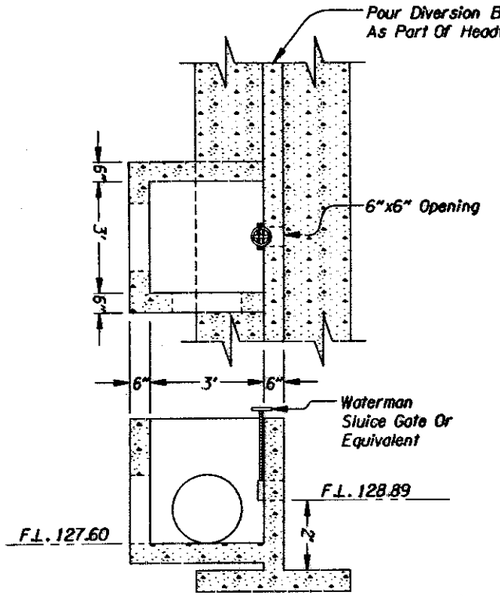
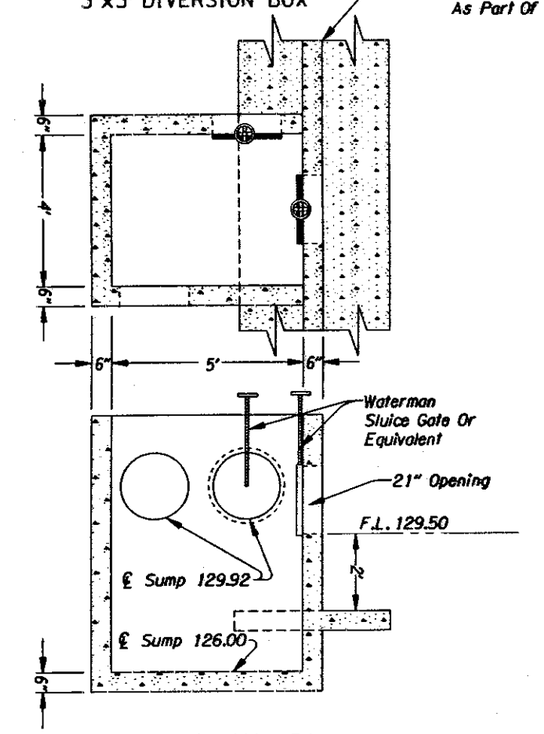
VIEW A1 C626-1974

201 ST. AVE. WATER TREATMENT AND CONTAINMENT FACILITY

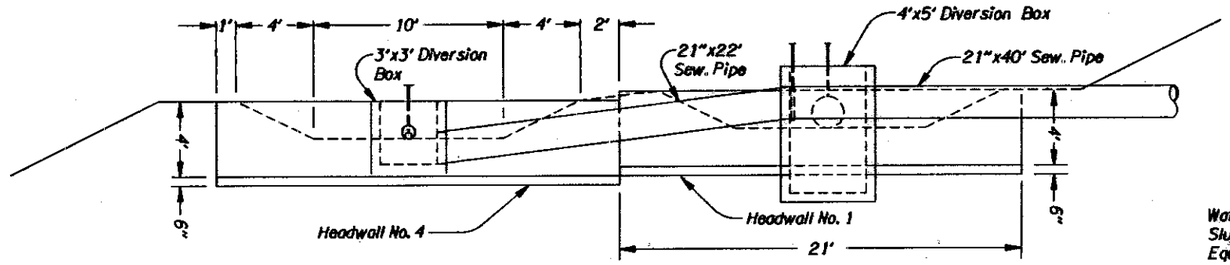
(For Location, See Sht. 5)



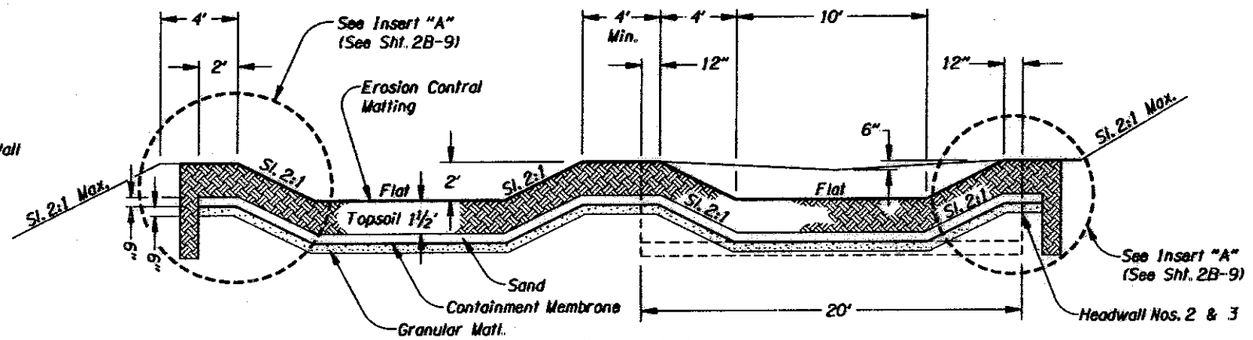
3'x3' DIVERSION BOX



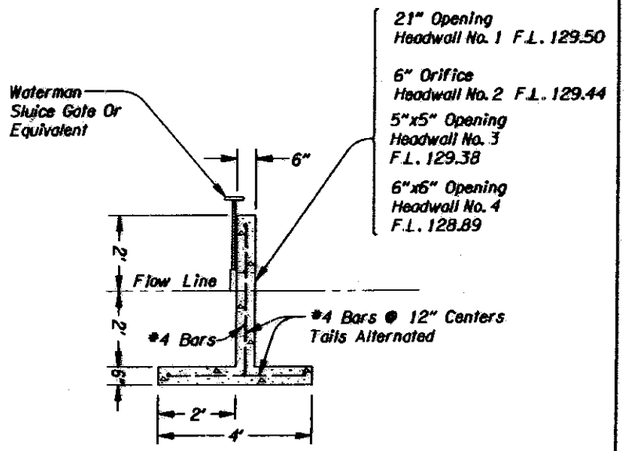
4'x5' DIVERSION BOX



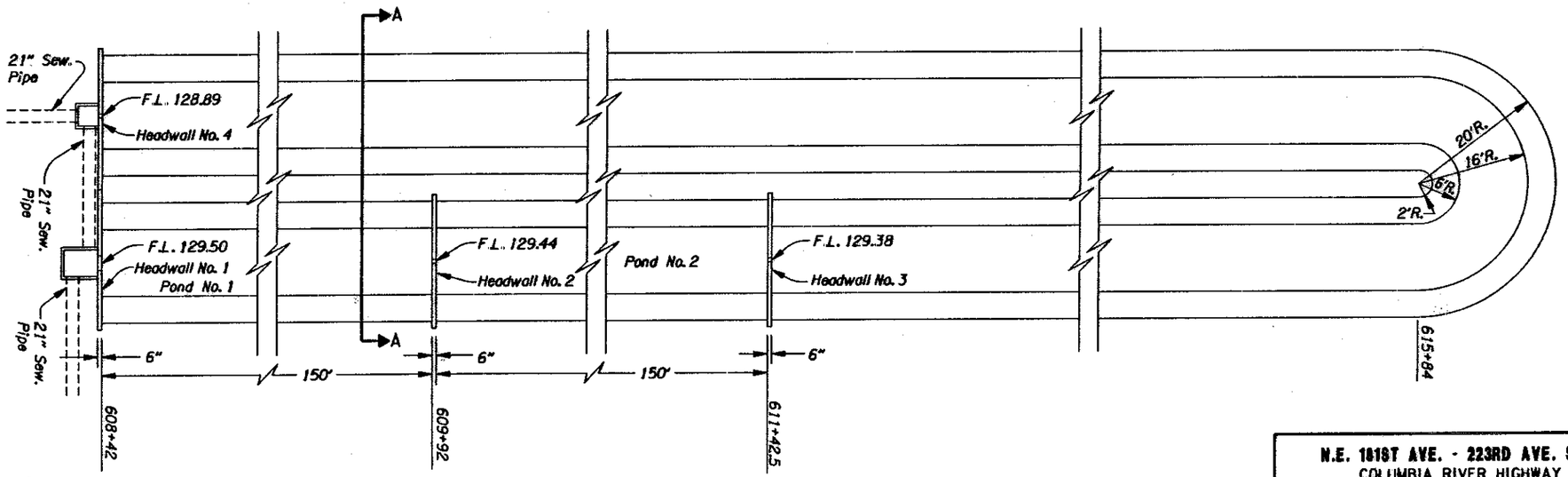
ELEVATION



SECTION A-A



HEADWALL DETAIL



PLAN

N.E. 181ST AVE. - 223RD AVE. SEC. COLUMBIA RIVER HIGHWAY MULTNOMAH COUNTY			
FEDERAL HIGHWAY ADMINISTRATION		PROJECT NUMBER	SHEET NO.
REGION 10	OREGON DIVISION		2B-8

17-DEC-1993 08:14
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VIEW A2

Sec. 29, T. 1 N., R. 3 E., W.M.

NOTE:
All Elevations Base On US Coastal And Geodetic Survey Datum 1983.

BRIDGE DETAILS CHECKED.....

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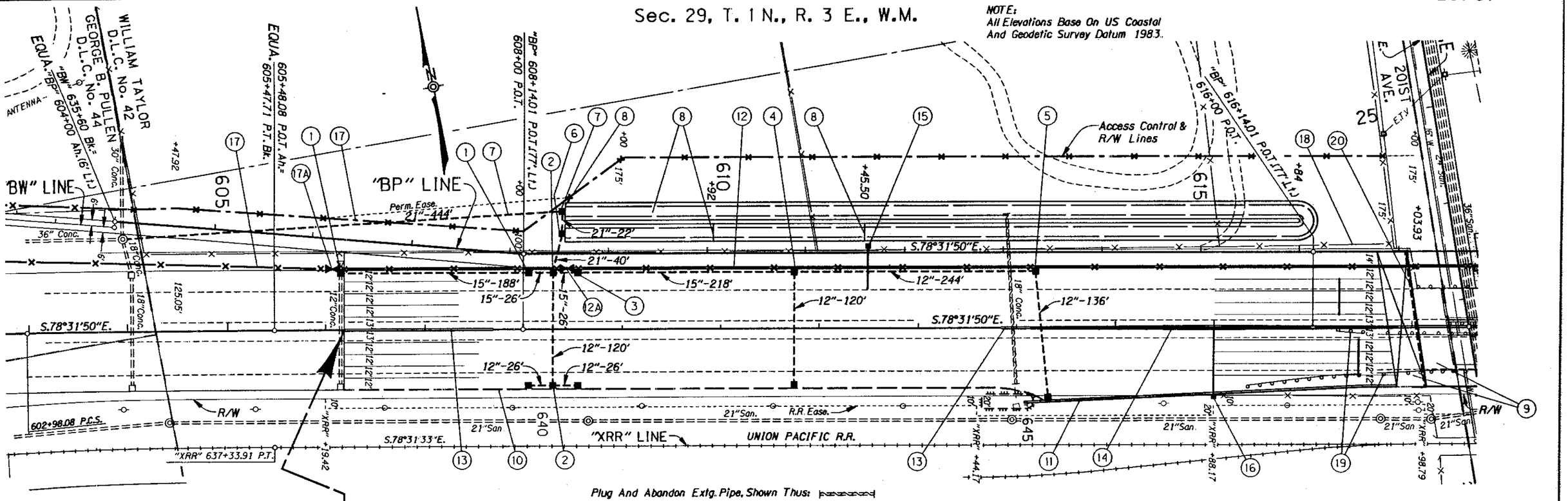
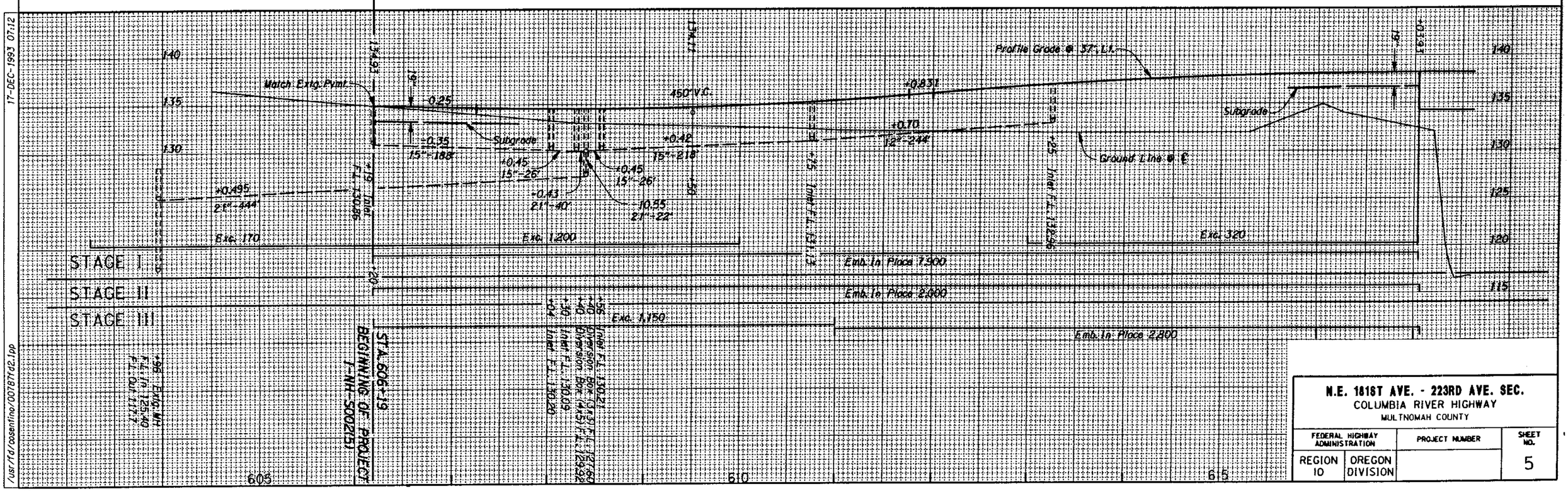
VIEW A1





N.E. 181ST AVE. - 223RD AVE. SEC.
COLUMBIA RIVER HIGHWAY
MULTNOMAH COUNTY

FEDERAL HIGHWAY ADMINISTRATION		PROJECT NUMBER	SHEET NO.
REGION 10	OREGON DIVISION		5

(1) Sta. 608+04
Const. Type "G-2" Inlet - 2
Remove Extg. 12" Culv. Pipe - 8'
Inst. 15" Sew. Pipe - 188'
Connect To Extg. 12" Sew. Pipe
Remove Paved End Slope
Tr. Exc. - 34 C.Y.
(See Drg. No. 2105)

(2) Sta. 608+30
Const. Type "G-2" Inlet - 4
Inst. 12" Sew. Pipe - 172'
Inst. 15" Sew. Pipe - 52'
Tr. Exc. - 38 C.Y.

(3) Sta. 608+56
Const. Type "G-2" Inlet
Inst. 15" Sew. Pipe - 218'
Tr. Exc. - 56 C.Y.

(4) Sta. 610+75
Const. Type "G-2" Inlet - 2
Inst. 12" Sew. Pipe - 364'
Tr. Exc. - 78 C.Y.

(5) Sta. 613+25
Const. Type "G-2" Inlet - 2
Inst. [illegible] Sew. Pipe - 136'
[illegible] 98 C.Y.

(6) Sta. 608+40
[illegible] 5' Diversion Box
Inst. [illegible] Sew. Pipe - 40'
Tr. Exc. - 12 C.Y.
(For Details, See Sht. 2B-8)

(7) Sta. 608+40
Const. 3'x3' Diversion Box
Inst. 21" Sew. Pipe - 466'
Connect To Extg. Manhole
Tr. Exc. - 160 C.Y.
(For Details, See Sht. 2B-8)
(See Drg. Nos. 2091A & 2091B)

(8) Const. 4'x18' Headwall - 4
Const. Grassy Swales
10' Bottom, 2:1 Slopes
Inst. Erosion Control Matting - 3,750 Sq. Yds.
Containment Membrane - 4,250 Sq. Yds.
Selected Granular Matl. - 750 C.Y.
Topsoil - 2,250 C.Y.
Sand Drainage Blanket - 750 C.Y.
(Earthwork Incl. In Main Rdwy. Dist.)
(For Details, See Sht. 2B-8)

(9) See Sht. 6, Note 12

(10) Const. Type "B" Curb
(See Drg. No. 2077 & Sht. 2)

(11) Sta. 613+10 To Sta. 616+85, Rt.
Const. Conc. Shldr. Barrier - 375'
Flare Rate=20:1, W=15', E=0
Pin To Pvmt.
Const. Earth Mound
Topsoil - 16 C.Y.
(For Details, See Sht. 2B-4)
(See Drg. No. 2127)

(12) Sta. 606+19 To Sta. "B" 640+50, Lt.
Const. Conc. Shldr. Barrier - 4,000'
Const. Type "CL-2" Fence
Flare Rate=0, W=0, E=0
(12A) Inst. 4'x24" Chainlink Single Gate
(For Details, See Sht. 2B-10)
(See Drg. Nos. 2117 & 49757)

(13) Sta. 606+19 To Sta. 613+15
Const. Conc. Median Barrier - 700'

(14) Sta. 613+15 To Sta. 616+85
Const. Conc. Median Barrier (Modified) - 370'
(For Details, See Sht. 2B-6)

(15) Sta. 611+50
Const. Cantilever Sign Support
(See Drg. Nos. 49849 & 49852)

(16) Sta. 615+00
Const. Sign Bridge
(See Drg. Nos. 10400, 49748, 49749 & 49750)

(17) Const. Type CL-6 Fence
(17A) Inst. 16'x72" Chainlink Single Gate

(18) Remove Fence

(19) Remove Guard Rail - 325'

(20) Inst. 8" Drain Pipe - 142'
(See Drg. Nos. 49754 & 49763)

(21) Const. Terminal Expansion Joint - 76'
(For Details, See Shts. 2B & 2B-10)

CHECKED

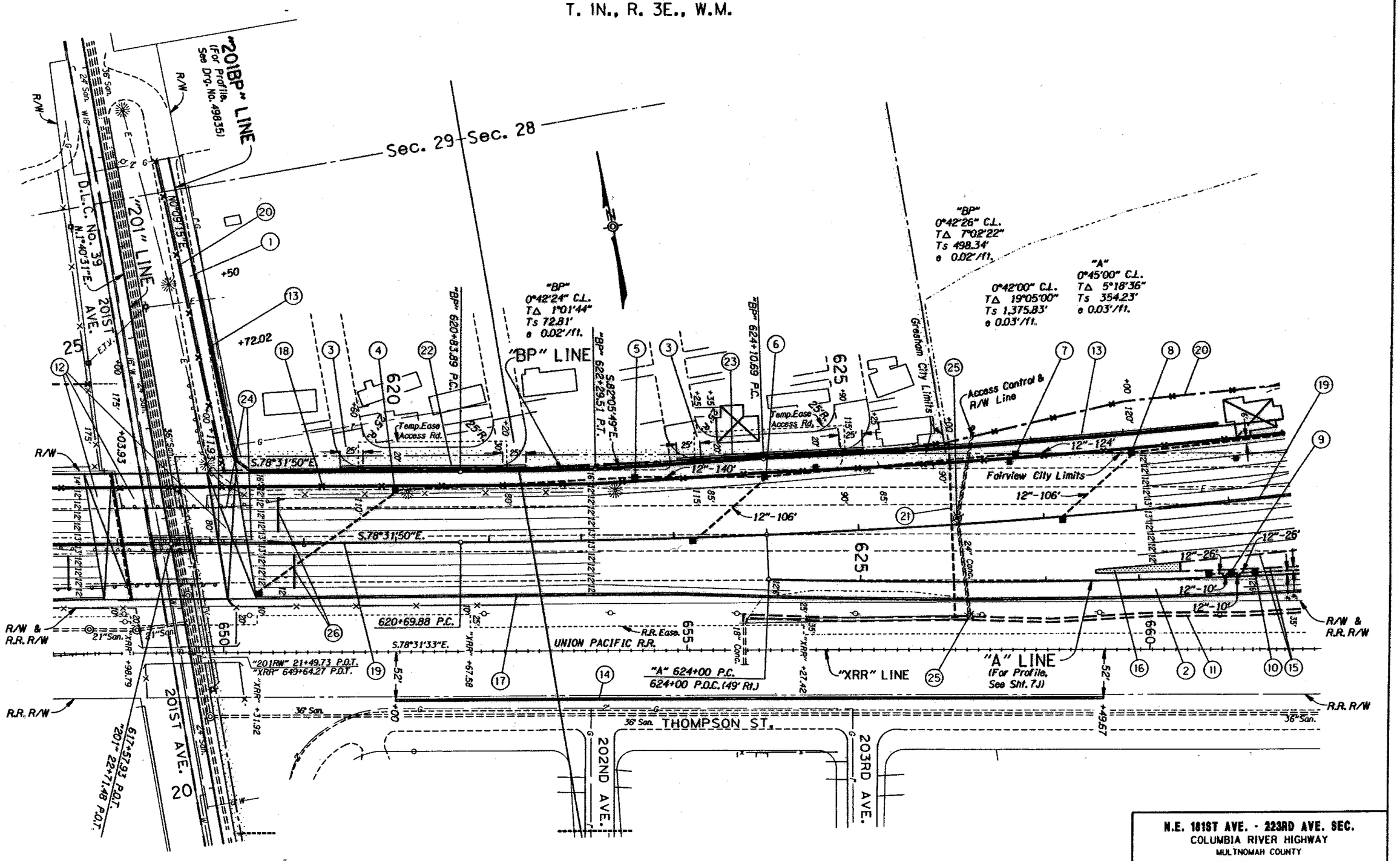
17-DEC-1993 07:5

00787fd2.n11

N.E. 181ST AVE. - 223RD AVE SEC.
COLUMBIA RIVER HIGHWAY
MULTNOMAH COUNTY

PROJECT NUMBER

T. 1N., R. 3E., W.M.



N.E. 181ST AVE. - 223RD AVE. SEC.
COLUMBIA RIVER HIGHWAY
MULTNOMAH COUNTY

FEDERAL HIGHWAY ADMINISTRATION		PROJECT NUMBER	SHEET NO.
REGION 10	OREGON DIVISION		6

DETAILS CHECKED..... BRIDGE DETAILS CHECKED

17-DEC-1993 07:10

/usr/fd/cosentino/007BTld2.pl1

VIEW A1

(1) Const. Bikepath

(2) Const. Exit Ramp
(See Drg. No. 2093)

(3) Const. Road Connection

(4) Sta. 620+00
Const. Type "G-2" Inlet - 2
Inst. 12" Sew. Pipe - 190'
Tr. Exc. - 32 C.Y.

(5) Sta. 622+60
Const. Type "G-2" Inlet
Inst. 12" Sew. Pipe - 258'
Tr. Exc. - 50 C.Y.

(6) Sta. 624+00
Const. Type "G-2" Inlet - 2
Inst. 12" Sew. Pipe - 246'
Tr. Exc. - 50 C.Y.

(7) Sta. 626+75
Const. Type "G-2" Inlet
Inst. 12" Sew. Pipe - 274'
Tr. Exc. - 64 C.Y.

(8) Sta. 628+00
Const. Type "G-2" Inlet - 2
Inst. 12" Sew. Pipe - 230'
Tr. Exc. - 48 C.Y.

(9) Sta. "A" 629+00
Const. Type "G-2" Inlet - 2
Inst. 12" Slotted Drain Pipe - 20'
Inst. 12" Sew. Pipe - 26'
Tr. Exc. - 4 C.Y.
(See Drg. No. 2132)

(10) Sta. "A" 629+26
Const. Type "G-2" Inlet
Inst. 12" Sew. Pipe - 26'
Tr. Exc. - 6 C.Y.

(11) Sta. 623+70 To Sta. 636+50, Rt.
Const. Ditch
5' Bottom, 2:1 Side Slopes
(Earthwork Incl. In Main Rdwy. Dist.)

(12) Bridge No. 17212
Const. Structure - 108'
Rdwy. Width - 122'
And Reinf. Panels At Bridge Ends - 30'-4"
(See Drg. Nos. 49752 Thru 49773 & 49859)

(13) Sta. "201 R/W" 25+50 To Sta. 629+08.96, Lt.
Const. M.S.E. Wall
Const. Precast Soundwall
(See Drg. Nos. 49835 Thru 49839 & 49858)

(14) Sta. 620+00 To Sta. 627+49.67, Rt.
Const. Soundwall
(See Drg. No. 49840)

(15) Const. Type "B" Curb

(16) Const. P.C. Conc. Surfacing - 38 Sq. Yds.
(For Details, See Sht. 2B-2)

(17) Sta. 618+49 To Sta. "A" 637+15
Const. Conc. Shldr. Barrier - 1,812.5'
Flare Rate=0, W=0, E=0
Pin To Pvmt.

(18) See Sht. 5, Notes 12 & 12A

(19) Sta. 618+85 To Sta. 634+72.50
Const. Conc. Median Barrier - 1,787.5'

(20) Const. Type CL-6 Fence

(21) Sta. 626+00
Inst. 24" Culv. Pipe - 190'
Tr. Exc. - 336 C.Y.

(22) Const. Conc. Shldr. Barrier - 150'
Const. Conc. Shldr. Barrier Transition - 50'
(See Drg. No. 2135)

(23) Const. Conc. Shldr. Barrier - 150'
Const. Conc. Shldr. Barrier Transition - 50'

(24) Remove Guard Rail - 200'

(25) Plug And Abandon - Manhole
- Inlet
Granular Backfill - 5 C.Y.

(26) Const. Terminal Expansion Joint - 76'
(For Details, See Shts. 2B & 2B-10)

BRIDGE DETAILS CHECKED

22-DEC-1995 13:02

/usr/fd/cosentino/00787fd2.n11

VIEW A2

N.E. 181ST AVE. - 223RD AVE. SEC.
COLUMBIA RIVER HIGHWAY
MULTNOMAH COUNTY

FEDERAL HIGHWAY ADMINISTRATION		PROJECT NUMBER	SHEET NO.
REGION 10	OREGON DIVISION		6A

To Face Sht 6

BRIDGE DETAILS CHECKED

17-DEC-1993 07:03

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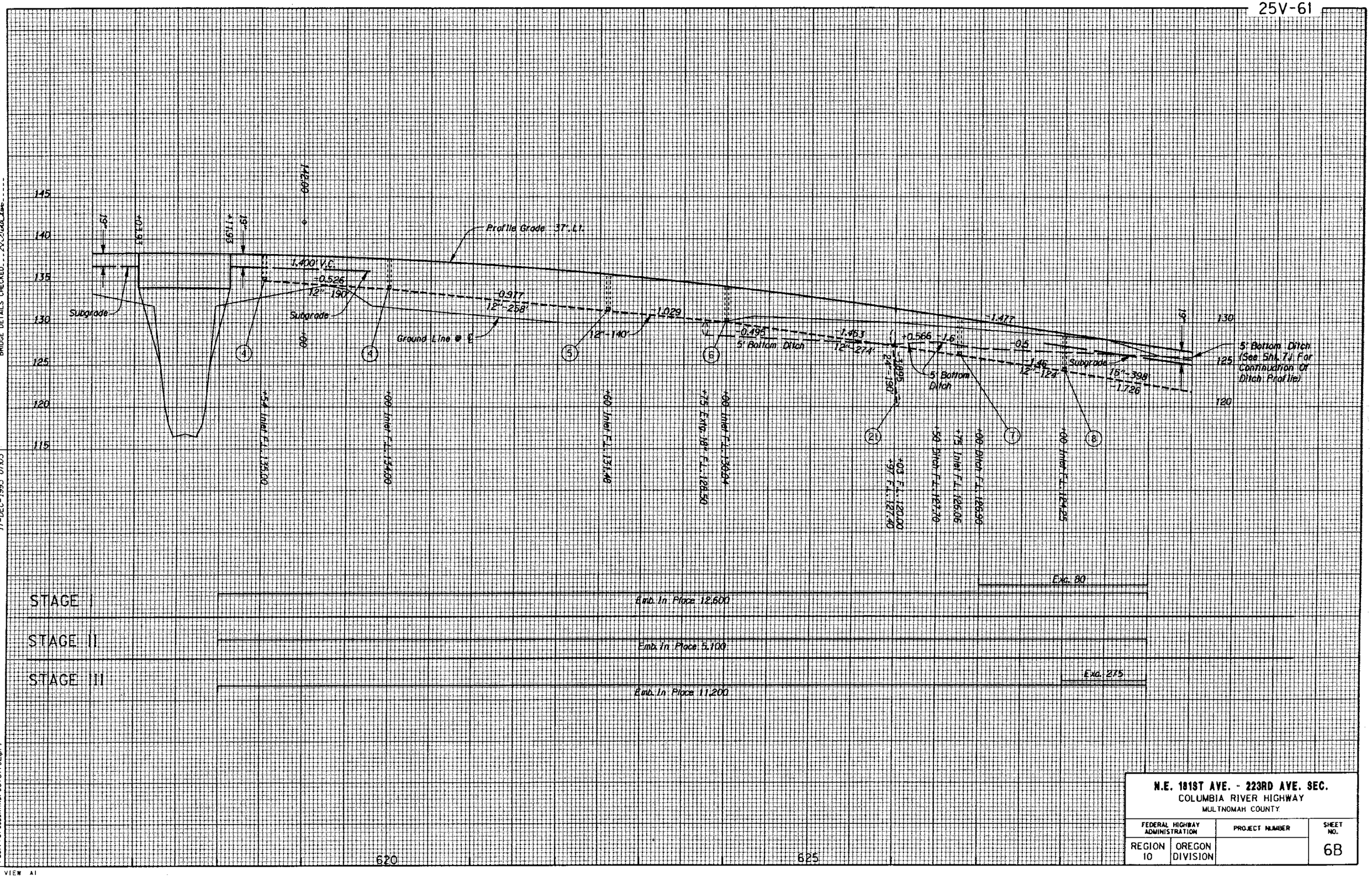
VIEW A1



N.E. 181ST AVE. - 223RD AVE. SEC.
COLUMBIA RIVER HIGHWAY
MULTNOMAH COUNTY

FEDERAL HIGHWAY ADMINISTRATION		PROJECT NUMBER	SHEET NO.
REGION 10	OREGON DIVISION		6B