# OPERATION & MAINTENANCE MANUAL

## DFI No. D00052
## Facility Type: Water Quality Biofiltration Swale


**DECEMBER, 2011**

**INDEX**

## 1. Identification

| | |
|---|---|
| Drainage Facility ID (DFI): | **D00052** |
| Facility Type: | Water Quality Biofiltration Swale |
| Construction Drawings: | (V-File Number) 34V-107 |
| Location: | District: 1 |
| | Highway No.: 009 |
| | Mile Post: 4.35 / 4.37 (beg./end) |
| | Description: This facility is located in the southwest corner of the intersection of US 101 (Hwy 009-Oregon Coast Hwy.) and OR 202 (Hwy 102 – Nehalem Hwy.). Access may be obtained from the right shoulder. |

## 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

Or

Geo-Environmental Senior Hydraulics Engineer (503) 986-3365.

## 3. Construction

| | |
|---|---|
| Engineer of Record: | ODOT Designers: Region 2 Tech. Center, T. Yamada, K. Austin, 503-986-2990 |
| Facility construction: | 2001 |
| Contractor: | NB Hatch 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 sediment occurs when stormwater runoff flows through the grass.

This facility is located in the southwest corner of the intersection of US 101 (Hwy 009-Oregon Coast Hwy.) and OR 202 (Hwy 102 – Nehalem Hwy.). This is a round-a-bout configured intersection where access may be obtained from the right shoulder of EB US 101.

Stormwater from the roundabout and a portion of US 101 is directed to the swale. A 12-inch diameter swale inlet directs water into the western most portion of the swale (Point A of the Operational Plan in Appendix A). This swale is cut unusually deep, perhaps to accommodate the storm pipe conveyance system (Photo 2). Water conveyed into the swale undergoes treatment as it flows through the length of the channel. The treated water flows out of the swale through a ditch inlet (Point B on the Operational Plan in Appendix A; Photo 3, Photo 4). The swale outlets into a nearby manhole where it is combined with other stormwater flow (some from facilities DFI D00050 and DFI D00051). At this point it discharges into a 24-inch outfall into Young's Bay (Photo 4).

A. Maintenance equipment access:
   This facility is located in the southwest corner of the intersection of US 101 (Hwy 009-Oregon Coast Hwy.) and OR 202 (Hwy 102 – Nehalem Hwy.). The facility is located along the radius of the round-a-bout configured intersection where access may be obtained from the right shoulder of EB US 101 as one is rounding the intersection, heading right, toward Nehalem Highway.

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 towards the west to south-west at the swale inlet.

Photo 2: Looking towards the west of the swale from new the swale outlet.

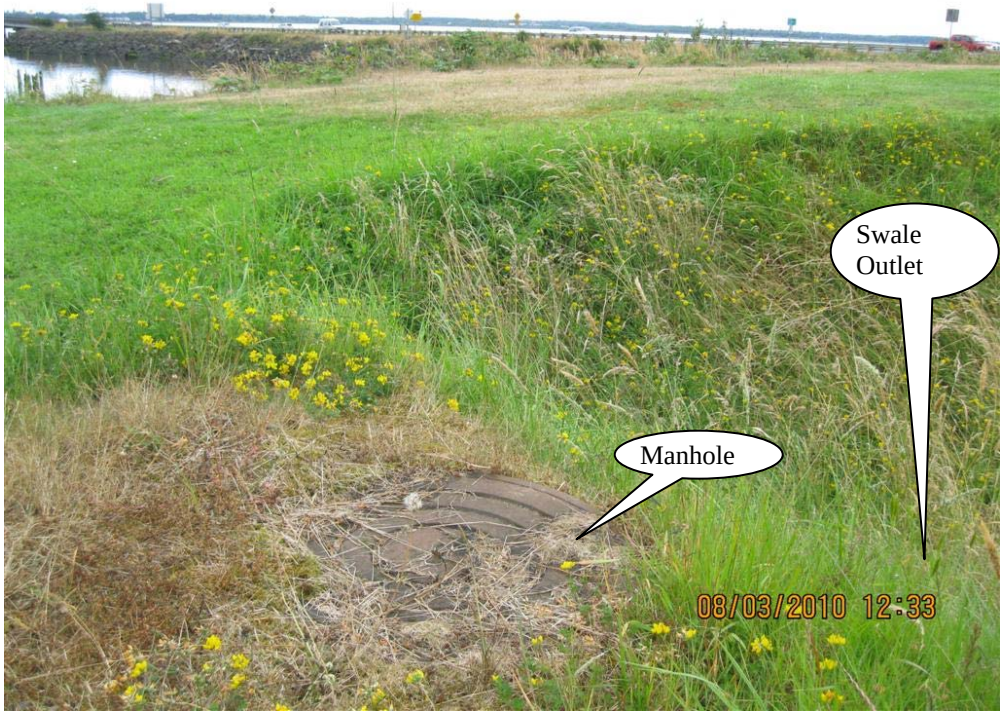


Photo 3: Swale outlet (Point B) and nearby manhole (Point C) looking west to southwest.

Photo 4: Swale outlet (Point B) and nearby manhole (Point C) looking south towards Young's Bay.

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

The swale can be used to store a volume of liquid by blocking the 12-inch diameter outlet pipe and open-grated inlet located at the outlet of the swale. This pipe and inlet are noted as Point B on the Operational Plan, Appendix A. Sandbags and steel plates may be considered useful options to blocking the grated inlet.

## 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
The auxiliary outlet is included in the design of the swale by including deeper channels and pipes connecting to adjacent swales. By linking the swales, stormwater can flow into neighboring facilities and slow down while undergoing treatment.

☐ 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:

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 road waste 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

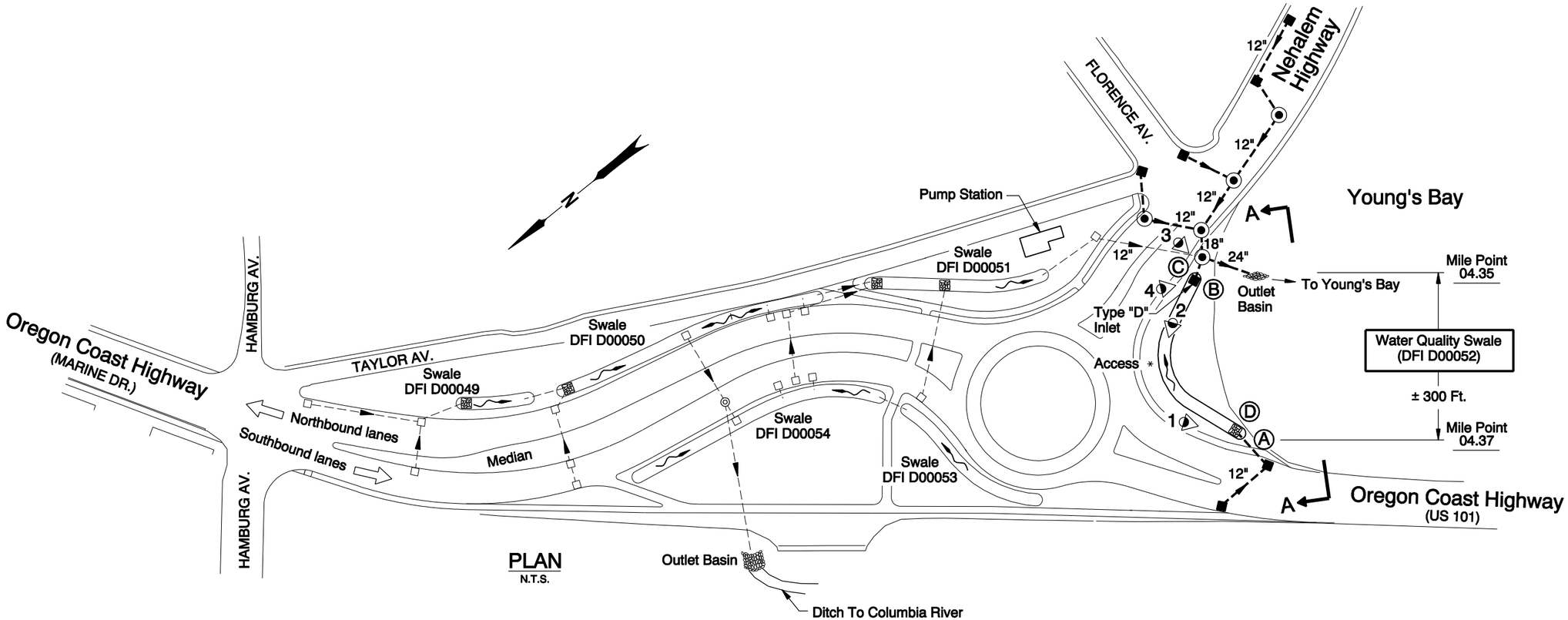
Contact any of the following for more detailed information about management of waste materials found on site:

| | |
|---|---|
| ODOT Clean Water Unit | (503) 986-3008 |
| ODOT Statewide Hazmat Coordinator | (503) 229-5129 |
| ODOT Region Hazmat Coordinator | (503) 986-2647 |
| ODEQ Northwest Region Office | (503) 229-5263 |

# Appendix A

**Content:**

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




Sht. 1 of 1

OREGON DEPARTMENT OF TRANSPORTATION

Prepared By: M. Wittenbrink

Drafted By: Jim Holeman

**DFI D00052**
**MAINTENANCE DISTRICT 1 HWY 9**
**WATER QUALITY BIOFILTRATION SWALE**
OREGON COAST HIGHWAY MP 04.35-04.37
CLATSOP COUNTY

G:\01_009_D00052\Operational Plan\DFI_D00052.dgn :: Default 9/29/2011 10:49:31 AM hwye94w

DFI_D00052.dgn

# 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, 2A, 2A-2 | Typical Sections |
| 2B Thru 2B-6 Incl. | Details |
| 2C | Traffic Control Detour & Details |
| 2C-2 Thru 2C-21 Incl. | Traffic Control Plans |
| 2D, 2D-2 | Erosion Control Details |
| 2D-3 Thru 2D-4 Incl. | Erosion Control Plans |
| 2E | Pipe Data |
| 3 | "ML", "MR" Line Alignment |
| 3A, 3B | General Construction |
| 3C | "ML", "MR" Line Profile |
| 4 | "ML", "MR", "MC", "C", "TL", "TR" Line Alignment |
| 4A, 4B | General Construction |
| 4C | "ML", "MR" Line Profile |
| 4D | "C" Line Profile |
| 5 | "MC", "TL", "TR" Line Alignment |
| 5A, 5B | General Construction |
| 5C | "MC" Line Profile |
| 6 | "TL", "TR" Line Alignment |
| 6A, 6B | General Construction |
| 6C | "TL", "TR" Line Profile |
| 7 | "TL" Line Alignment |
| 7A, 7B | General Construction |
| 7C | "TL" Line Profile |
| | |

STATE OF OREGON

# DEPARTMENT OF TRANSPORTATION

PLANS FOR PROPOSED PROJECT

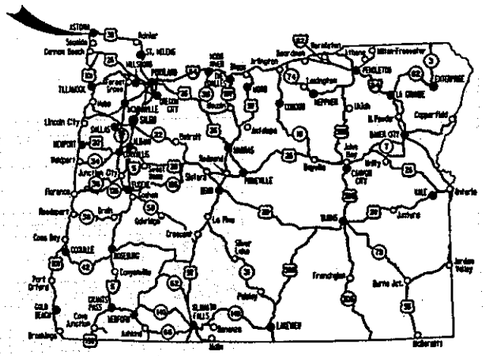
## GRADING, PAVING, & SIGNING

# US-101 AT NEHALEM HWY. (ASTORIA) SEC.

## OREGON COAST & NEHALEM HWYS.

## CLATSOP COUNTY

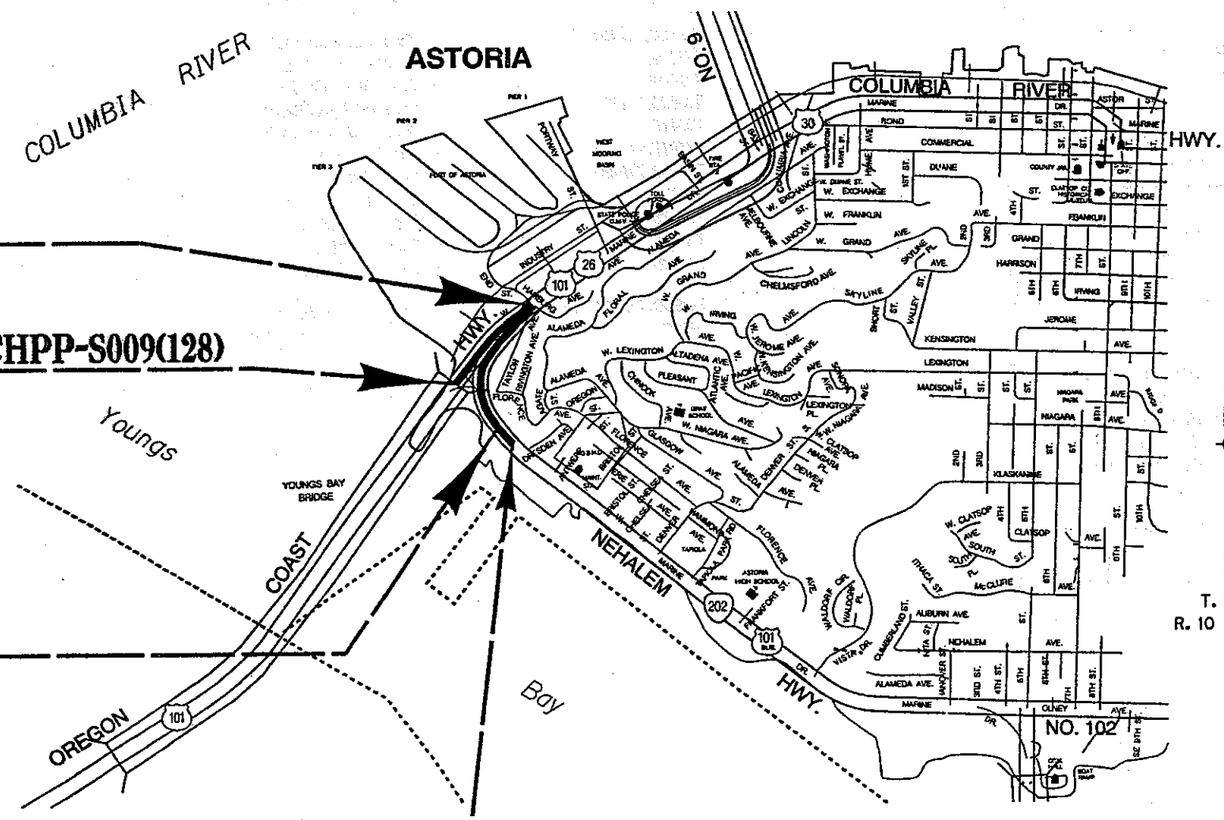
## OCTOBER 2001



Overall Length Of Project - 0.61 km (0.38 Mile)

**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.

LET'S ALL WORK TOGETHER TO MAKE THIS JOB SAFE




**NH-HPP-ACHPP-S009(128)**
**BEGINNING OF PROJECT**
**STA. 'MR" 10+060**

**END OF PROJECT** **NH-HPP-ACHPP-S009(128)**
**STA. 'MR" 10+450**

**NH-HPP-ACHPP-S009(128)**
**END OF PROJECT**
**STA. 'TL" 30+640**

AS CONSTRUCTED
PROJECT MANAGER
8/20/07
C.Lite

**END OF CONTRACT PROJECT**
**STA. 30+733.049**

OREGON TRANSPORTATION COMMISSION

| | |
|---|---|
| Steven H. Corey | CHAIRMAN |
| Gail L. Achterman | COMMISSIONER |
| Stuart Foster | COMMISSIONER |
| Randall Papé | COMMISSIONER |
| John Russell | COMMISSIONER |
| Bruce A. Warner | DIRECTOR OF TRANSPORTATION |

REGISTERED PROFESSIONAL ENGINEER
13,704
OREGON
JULY 16, 1987
CATHERINE M. NELSON
Expires Dec. 31, 2002

Catherine M. Nelson

ACTING TECHNICAL SERVICES MANAGING ENGINEER

**US-101 AT NEHALEM HWY.**
**(ASTORIA) SEC.**
OREGON COAST & NEHALEM HWYS.
CLATSOP COUNTY

| FEDERAL HIGHWAY ADMINISTRATION | PROJECT NUMBER | SHEET NO. |
|---|---|---|
| OREGON DIVISION | NH-HPP-ACHPP-S009(128) | 1 |

METRIC

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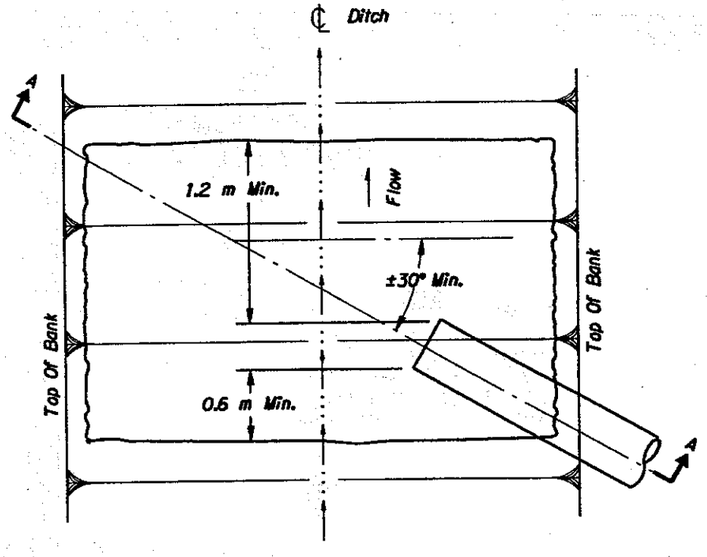
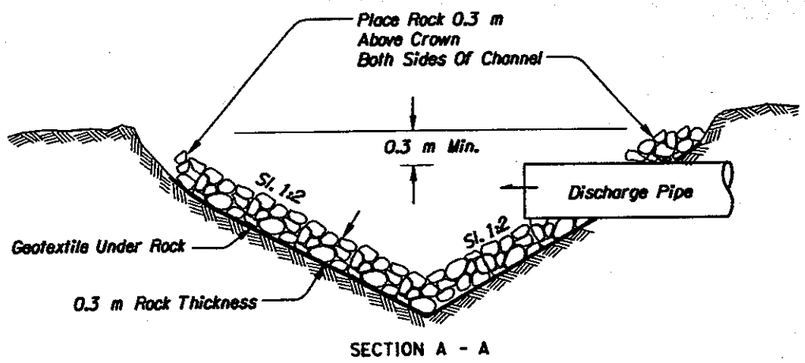
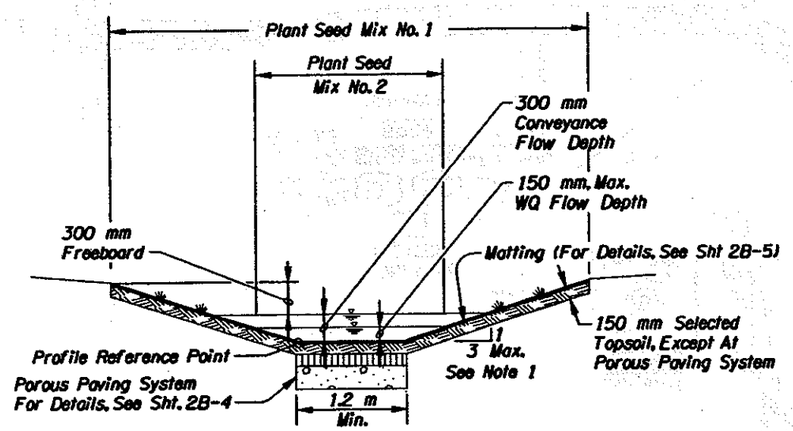



PLAN




SECTION A - A

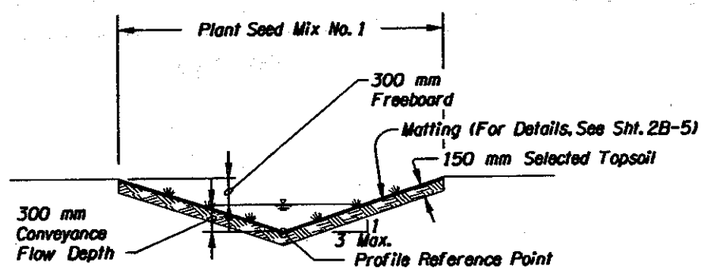
OUTLET BASIN




Eastside Ditch
Sta. "ML" 20+125.3 Lt. To Sta. "ML" 20+217.8 Lt.
Sta. "ML" 20+275.6 Lt. To Sta. "TL" 30+424.9 Lt.

Southside Ditch:
Sta. "MC" 10+403.2 Lt. To Sta. "TL" 30+489.3 Rt.

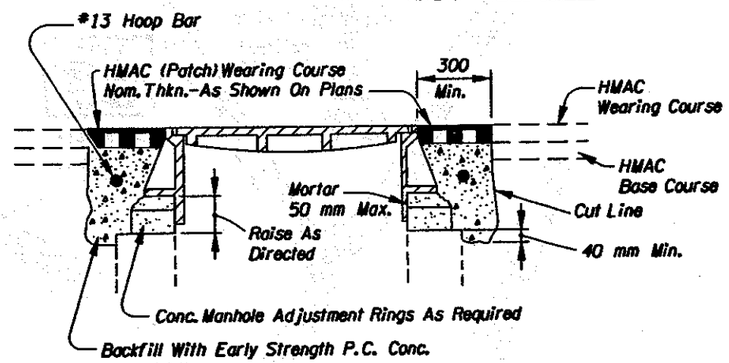
NOTE:
1. Increase Slope To 1V : 2H Adjacent To Existing Wastewater Pump Station (Sta. "TL" 30+432.7 Lt. To Sta. "TL" 30+452.9 Lt.)




Westside ditch:
Sta. "MC" 10+342.9 Rt. To Sta. "MR" 10+163.4 Rt.

Eastside Ditch:
Sta. "ML" 20+217.8 Lt. To Sta. "ML" 20+275.6 Lt.

DRAINAGE SWALE DETAIL




1. Cover Manhole With Building Paper And Const. HMAC Base And Wearing Courses.
2. Sawcut Square Or Circular Excavation Around Manhole 300 mm Min. From M.H. Frame. Orient Diagonal Of Square So That Its Is Parallel To Roadway Center Line.
3. Raise Manhole Frame And Cover To Finish Grade By Installing Conc. Rings And Leveling Mortar.
4. Backfill With Early Strength P.C. Conc. And HMAC Wearing Course.

METHOD "A"
MANHOLE ADJUSTMENT SEQUENCE

Note:
All Dimensions Are In Millimeters (mm) Unless Otherwise Indicated.

REGISTERED PROFESSIONAL ENGINEER
62601PE
OREGON
NOVEMBER 9, 1999
TIMOTHY G. YAMADA
EXPIRES: 6/30/2002

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

U.S.-101 AT NEHALEM HWY. (ASTORIA) SEC.
OREGON COAST & NEHALEM HWYS.
CLATSOP COUNTY

Designed By - Tim Yamada
Drafted By - Rob Luke

DETAILS

SHEET NO. 2B-6

15-AUG-2001 09:51
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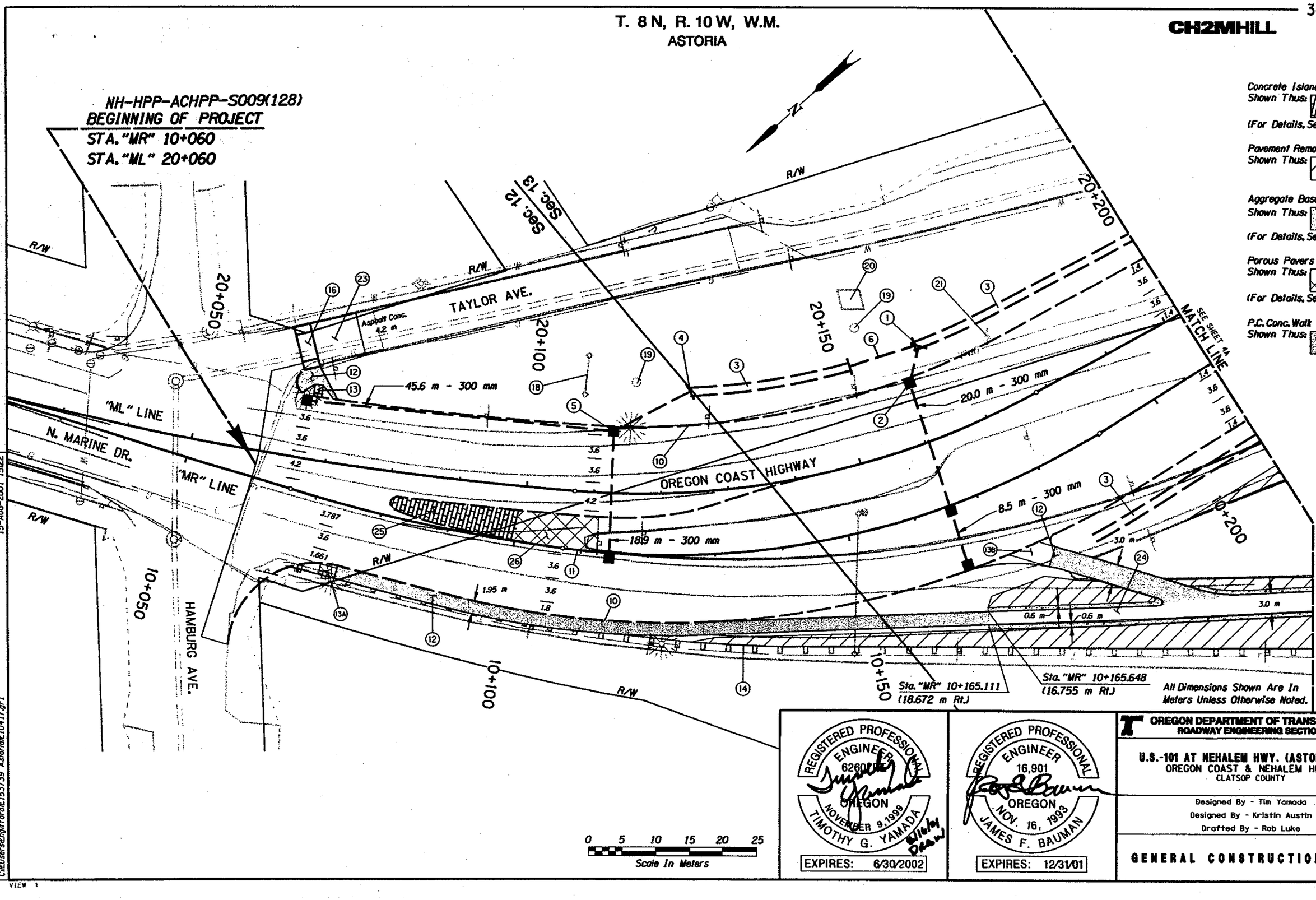
VIEW 6

# T. 8 N, R. 10 W, W.M.
ASTORIA

CH2MHILL

NH-HPP-ACHPP-S009(128)
BEGINNING OF PROJECT
STA. "MR" 10+060
STA. "ML" 20+060




Concrete Island
Shown Thus:
(For Details, See Sht. 2B-4)

Pavement Removal
Shown Thus:

Aggregate Base
Shown Thus:
(For Details, See Sht. 2B-4)

Porous Pavers
Shown Thus:
(For Details, See Sht. 2B-4)

P.C. Conc. Walk
Shown Thus:

0 5 10 15 20 25
Scale In Meters

REGISTERED PROFESSIONAL ENGINEER
6260
OREGON
NOVEMBER 9,1999
TIMOTHY G. YAMADA
Visiting Design
EXPIRES: 6/30/2002

REGISTERED PROFESSIONAL ENGINEER
16,901
OREGON
NOV. 16, 1993
JAMES F. BAUMAN
EXPIRES: 12/31/01

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

U.S.-101 AT NEHALEM HWY. (ASTORIA) SEC.
OREGON COAST & NEHALEM HWYS.
CLATSOP COUNTY

Designed By - Tim Yamada
Designed By - Kristin Austin
Drafted By - Rob Luke

GENERAL CONSTRUCTION

SHEET NO. 3A

15-AUG-2001 15:22
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VIEW 1
VIEW 1

CH2MHILL

① Sta. "ML" 20+164.65
Inst. 300 mm Sew. Pipe Outfall - 5.8 m
Trench Exc. - 4.1 m³
Inst. Outlet Basin
(For Details, See Sht. 2B-6)

② Sta. "ML" 20+161.03
Const. Type "CG-2" Inlet - 2
Const. Type "G-2" Inlet
Inst. 300 mm Sew. Pipe - 28.5 m
Trench Exc. - 19.7 m³
(See Drg. No. RD336)

③ Const. Drainage Swale
(For Details, See Sht. 2B-6)

④ Sta. "ML" 20+125.26
Inst. 300 mm Sew. Pipe Outfall - 12.8 m
Trench Exc. - 11.2 m³
Inst. Outlet Basin
(For Details, See Sht. 2B-6)

⑤ Sta. "ML" 20+112.60
Const. Type "CG-2" Inlet
Const. Type "G-2" Inlet - 2
Inst. 300 mm Sew. Pipe - 64.5 m
Trench Exc. - 57.4 m³
(See Drg. No. RD336)

⑥ Sta. "ML" 20+152.65
Inst. 450 mm Culvert Pipe - 10.0 m
Trench Exc. 9.8 m³

⑩ Const. Type "A" Curb
(See Drg. No. RD700)

⑪ Const. Type "F" Curb
(See Drg. No. RD700)

⑫ Const. P.C. Conc. Walk

⑬ Const. Sidewalk Ramp
(See Drg. No. RD725)

⑬A Const. Modified Sidewalk Ramp
(For Details, See Sht. 2B-4)

⑬B Const. Modified Sidewalk Ramp (Bikeway)
(See Drg. No. RD725, General Note 7)

⑭ Sta. "MR" 10+068 To Sta. "MC" 10+453
Remove Extg. Guardrail - 384 m

⑯ Const. P.C. Conc. Driveway, Option A
(See Drg. No. 720)

⑱ Maintain And Protect Historic Sign

⑲ Maintain And Protect Stone Monument - 2

⑳ Maintain And Protect Historic Statue

㉑ Remove Utility Pole

㉓ Const. Asphalt Conc. Connection
(See Drg. No. 715)

㉔ Sawcut Extg. Pavement To Maintain 3.0 m Wide Asphalt Conc. Path.
(For Details, See Sht. 2B-4)
Const. Connection Between P.C. Conc. Walks And Asphalt Conc. Path As Directed By Engineer.

㉕ Const. Conc. Island - 65 m²
Stamped Conc. Island Surfacing
(For Details, See Sht 2B-4)

㉖ Const. Porous Paver System - 60 m²
(For Details, See Sht 2B-4)

REGISTERED PROFESSIONAL ENGINEER
6260[illegible]
OREGON
NOVEMBER 9,1999
TIMOTHY G. YAMADA
EXPIRES: 6/30/2002

REGISTERED PROFESSIONAL ENGINEER
16,901
OREGON
NOV. 16, 1993
JAMES F. BAUMAN
EXPIRES: 12/31/01

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

U.S.-101 AT NEHALEM HWY. (ASTORIA) SEC.
OREGON COAST & NEHALEM HWYS.
CLATSOP COUNTY

Designed By - Tim Yamada
Designed By - Kristin Austin
Drafted By - Rob Luke

GENERAL CONSTRUCTION

SHEET NO. 3B

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VIEW 1

VIEW 1

CH2MHILL

"ML" LINE

NH-HPP-ACHPP-S009(128)
BEGINNING OF PROJECT
STA. "ML" 20+060

-0.72%
475 mm
Subgrade
9.254
30.000 m V.C.
+116000
Profile Grade ℄
Ground Line ℄
"ML" 20+159.739 Type "G-2" Inlet (19.99 m Rt.)
F.L. 7.55
"ML" 20+160.15 Type "G-2" Inlet (10.00 m Rt.)
F.L. 7.51
"ML" 20+161.03 Type "CG-2" Inlet (10.00 m Lt.)
F.L. 7.01 W.
F.L. 7.01 S.E.
-1.73%
475 mm
300 mm - 18.9 m
-4.87%
300 mm - 45.6 m
-0.50%
"ML" 20+065.80 Type "G-2" Inlet (9.58 m Lt.)
F.L. 7.70
"ML" 20+112.60 Type "CG-2" Inlet (10.00 m Lt.)
F.L. 7.47 N.
F.L. 7.47 W.
F.L. 7.47 S.
"ML" 20+112.60 Type "G-2" Inlet (8.90 m Rt.)
F.L. 8.39
300 mm - 12.8 m
-1.80%
"ML" 20+125.26 Outfall (15.04 m Lt.)
F.L. 7.24
F.L. Swale 7.16
300 mm - 20.0 m
-2.50%
-1.03%
450 mm
10.0 m
-1.03%
F.L. Swale 6.9
F.L. Swale 6.8
300 mm - 8.5 m
-0.50%
300 mm - 5.8 m
-3.60%
Subgrade
-1.03%
"ML" 20+164.55 Outfall (13.91 m Lt.)
F.L. 6.80
Drainage Swale

20+050 20+100 20+150 20+200

"ML" Line
Earthwork Quantities:
Exc. 590 m3
Emb. 1000 m3
Ditch Exc. 260 m3

"MR" LINE

BEGINNING OF PROJECT
STA. "MR" 10+060

-0.08%
475 mm
Subgrade
9.727
70.000 m V.C.
+120.000
Profile Grade ℄
Ground Line ℄
-2.15%
475 mm
F.L. Swale 7.66
Drainage Swale
Subgrade
-3.84%

10+050 10+100 10+150 10+200

"MR" Line
Earthwork Quantities:
Exc. 1190 m3
Emb. 910 m3
Ditch Exc. 100 m3

All Dimensions Shown Are In Meters Unless Otherwise Noted.

REGISTERED PROFESSIONAL ENGINEER
62607PE
OREGON
NOVEMBER 9, 1999
TIMOTHY G. YAMADA
EXPIRES: 6/30/2002

REGISTERED PROFESSIONAL ENGINEER
16,901
OREGON
NOV. 16, 1993
JAMES F. BAUMAN
EXPIRES: 12/31/01

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

U.S.-101 AT NEHALEM HWY. (ASTORIA) SEC.
OREGON COAST & NEHALEM HWYS.
CLATSOP COUNTY

Designed By - Timothy Yamada
Designed By - Kristin Austin
Drafted By - Rob Luke

PROFILE

SHEET NO. 3C

15-AUG-2001 10:43
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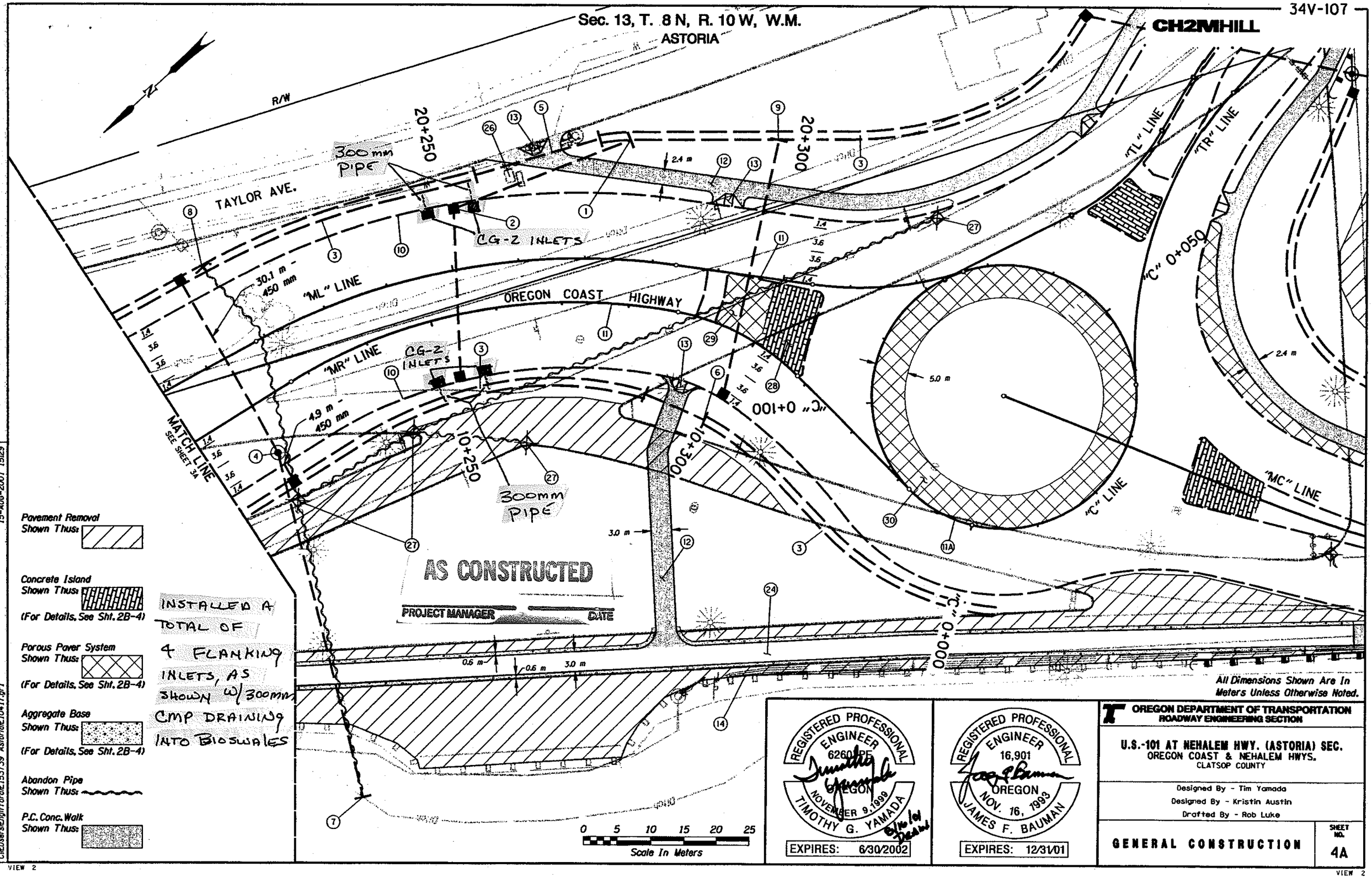
VIEW 1

Sec. 13, T. 8 N, R. 10 W, W.M.
ASTORIA

CH2MHILL




All Dimensions Shown Are In Meters Unless Otherwise Noted.

REGISTERED PROFESSIONAL ENGINEER 62601PE OREGON NOVEMBER 9,1999 TIMOTHY G. YAMADA
EXPIRES: 6/30/2002

REGISTERED PROFESSIONAL ENGINEER 16,901 OREGON NOV. 16, 1993 JAMES F. BAUMAN
EXPIRES: 12/31/01

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

U.S.-101 AT NEHALEM HWY. (ASTORIA) SEC.
OREGON COAST & NEHALEM HWYS.
CLATSOP COUNTY

Designed By - Tim Yamada
Designed By - Kristin Austin
Drafted By - Rob Luke

GENERAL CONSTRUCTION

SHEET NO. 4A

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VIEW 2

VIEW 2

CH2MHILL

① Sta. "ML" 20+275.58
Inst. 450 mm Sew. Pipe Outfall - 28.5 m
Trench Exc. - 23.0 m³
Inst. Outlet Basin
(For Details, See Sht. 2B-6)

② Sta. "ML" 20+251.75
Const. Type "CG-2" Inlet - 2
Inst. 300 mm Sew. Pipe - 25.6 m
Trench Exc. - 20.3 m³

③ Const. Drainage Swale
(For Details, See Sht. 2B-6)

④ Sta. "MR" 10+219.74
Const. Manhole
(See Drg. No. RD327)
Const. Type "D "mod. Inlet - 2
(For Details, See Sht. 2B-4)
Inst. 450 mm Sew. Pipe - 35.0 m
Trench Exc. 29.2 m³

⑤ Sta. "ML" 20+255.29
Inst. 300 mm Culvert Pipe - 19.6 m
Trench Exc. - 14.5 m³

⑥ Sta. "MR" 10+284.69
Inst. 300 mm Culvert Pipe - 9.8 m
Trench Exc. - 5.9 m³

⑦ Sta. "MR" 10+203.11
Inst. 450 mm Sew. Pipe Outfall - 53.5 m
Trench Exc. - 87.6 m³
Inst. Outlet Basin
Remove Extg. Sew. Pipe
(For Details, See Sht. 2B-6)

⑧ Sta. "ML" 20+216.95
Cut Extg. Sew. Pipe At Proposed Ditch
I.E. 6.35
Inst. Outlet Basin
(For Details, See Sht. 2B-6)

⑨ Sta. "ML" 20+296.17
Inst. 300 mm Sew. Pipe Outfall - 39.5 m
Trench Exc. - 6.5 m³
Inst. Outlet Basin
(For Details, See Sht. 2B-6)
Const. Type "CG-2" Inlet - 1

⑩ Const. Type "A" Curb

⑪ Const. Type "F" Curb

⑪A Const. Type "B" Curb
(See Drg. No. RD700)

⑫ Const. P.C. Conc. Walk

⑬ Const. Sidewalk Ramp - 3

⑭ See Sht. 3B, Note 14

㉔ See Sht. 3B, Note 24

㉖ Abandon RV Dump Site (By Others)

㉗ Remove Inlet - 4

㉘ Const. Conc. Island - 84 m²
Stamped Conc. Island Surfacing
(For Details, See Sht 2B-4)

㉙ Const. Porous Paver System - 63 m²

㉚ Const. Porous Paver System - 550 m²
(For Details, See Sht 2B-4)

REGISTERED PROFESSIONAL ENGINEER
6206
OREGON
NOVEMBER 9,1999
TIMOTHY G. YAMADA
EXPIRES: 6/30/2002

REGISTERED PROFESSIONAL ENGINEER
16,901
OREGON
NOV. 16, 1993
JAMES F. BAUMAN
EXPIRES: 12/31/01

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

U.S.-101 AT NEHALEM HWY. (ASTORIA) SEC.
OREGON COAST & NEHALEM HWYS.
CLATSOP COUNTY

Designed By -Tim Yamada
Designed By - Kristin Austin
Drafted By - Rob Luke

GENERAL CONSTRUCTION

SHEET NO. 4B

VIEW 2

VIEW 2

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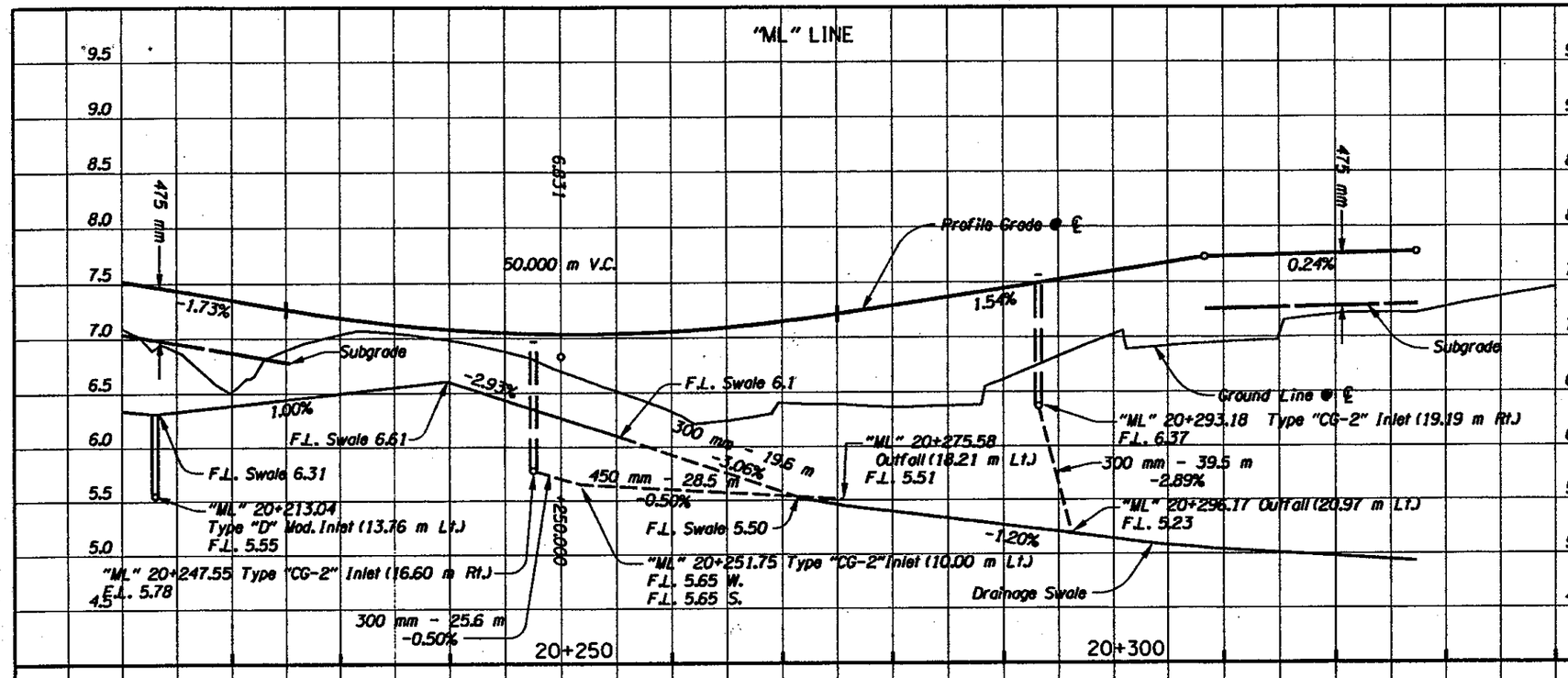
CH2MHILL

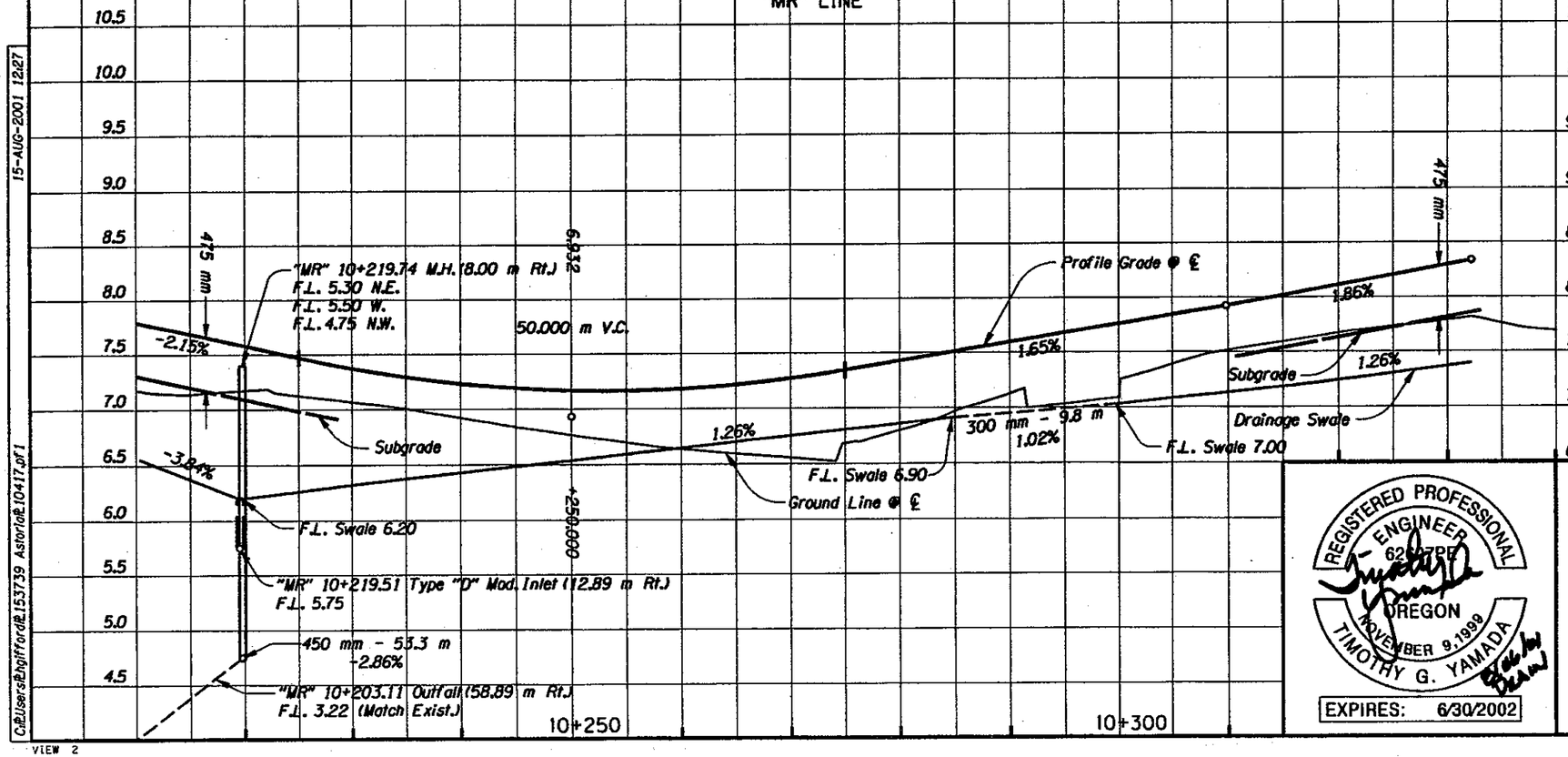
## "ML" LINE




"ML" Line
Earthwork Quantities:

| | |
|---|---|
| Exc. | 490 m3 |
| Emb. | 1100 m3 |
| Ditch Exc. | 460 m3 |

## "MR" LINE




"MR" Line
Earthwork Quantities:

| | |
|---|---|
| Exc. | 520 m3 |
| Emb. | 620 m3 |
| Ditch Exc. | 390 m3 |

All Dimensions Shown Are In Meters Unless Otherwise Noted.

REGISTERED PROFESSIONAL ENGINEER
62[illegible]PE
OREGON
NOVEMBER 9,1999
TIMOTHY G. YAMADA
EXPIRES: 6/30/2002

REGISTERED PROFESSIONAL ENGINEER
16,901
OREGON
NOV. 16, 1993
JAMES F. BAUMAN
EXPIRES: 12/31/01

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

U.S.-101 AT NEHALEM HWY. (ASTORIA) SEC.
OREGON COAST & NEHALEM HWYS.
CLATSOP COUNTY

Designed By - Timothy Yamada
Designed By - Kristin Austin
Drafted By - Rob Luke

PROFILE

SHEET NO. 4C

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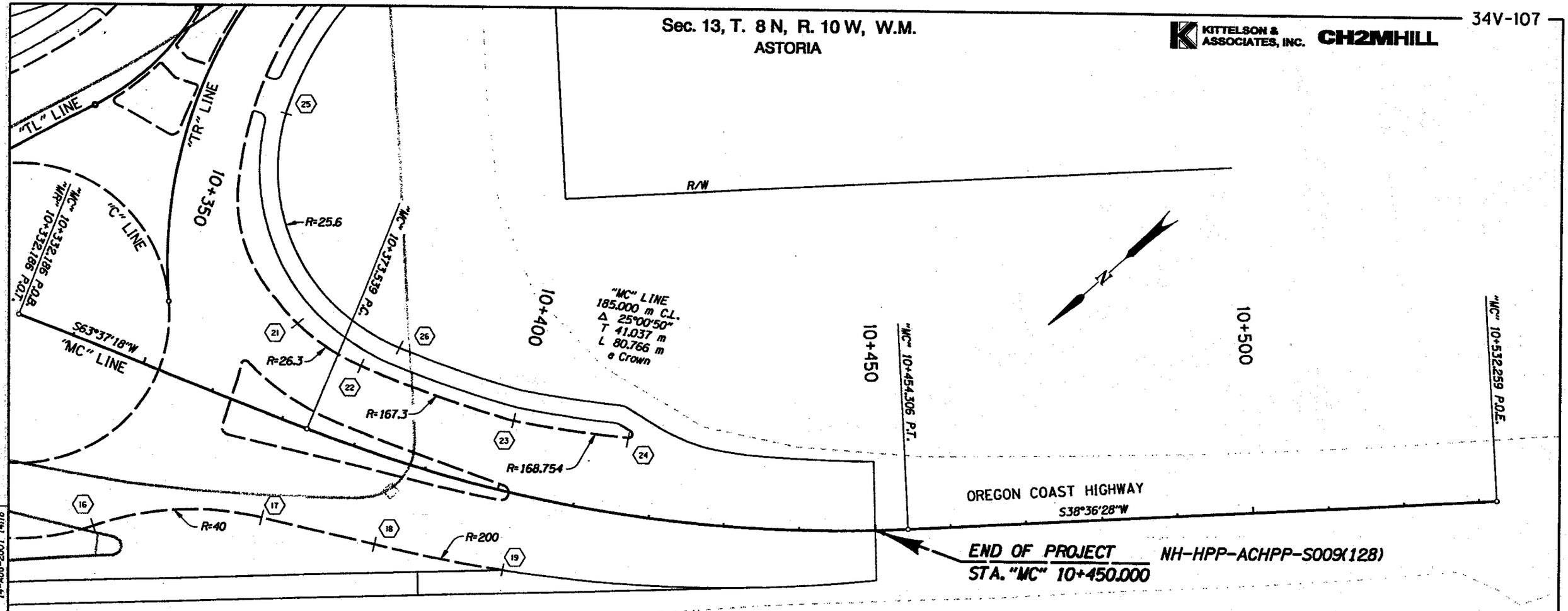
VIEW 2

VIEW 2

Sec. 13, T. 8 N, R. 10 W, W.M.
ASTORIA

KITTELSON & ASSOCIATES, INC. CH2MHILL




| Point No. | Station |
|---|---|
| 16 | "C" 0+011.374 (10.000 Rt.) |
| 17 | "MC" 10+372.423 (13.194 Rt.) |
| 18 | "MC" 10+386.636 (11.507 Rt.) |
| 19 | "MC" 10+402.993 (10.248 Rt.) |
| 21 | "MC" 10+363.364 (14.613 Lt.) |
| 22 | "MC" 10+377.070 (10.407 Lt.) |
| 23 | "MC" 10+399.805 (9.463 Lt.) |
| 24 | "MC" 10+415.681 (10.181 Lt.) |
| 25 | "TR" 40+458.805 (11.702 Rt.) |
| 26 | "MC" 10+381.358 (14.424 Lt.) |

0 5 10 15 20 25
Scale In Meters

All Dimensions Shown Are In Meters Unless Otherwise Noted.

REGISTERED PROFESSIONAL ENGINEER 59547 OREGON SEPT 22, 1998 LEE A. RODEGERDTS
8/16/01
EXP: 12/31/02

REGISTERED PROFESSIONAL ENGINEER 16,901 OREGON NOV. 16, 1993 JAMES F. BAUMAN
EXPIRES: 12/31/01

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

U.S.-101 AT NEHALEM HWY. (ASTORIA) SEC.
OREGON COAST & NEHALEM HWYS.
CLATSOP COUNTY

Designed By - Lee Rodegerdts
Designed By - Kristin Austin
Drafted By - Rob Luke

ALIGNMENT

SHEET NO. 5

14-AUG-2001 14:18
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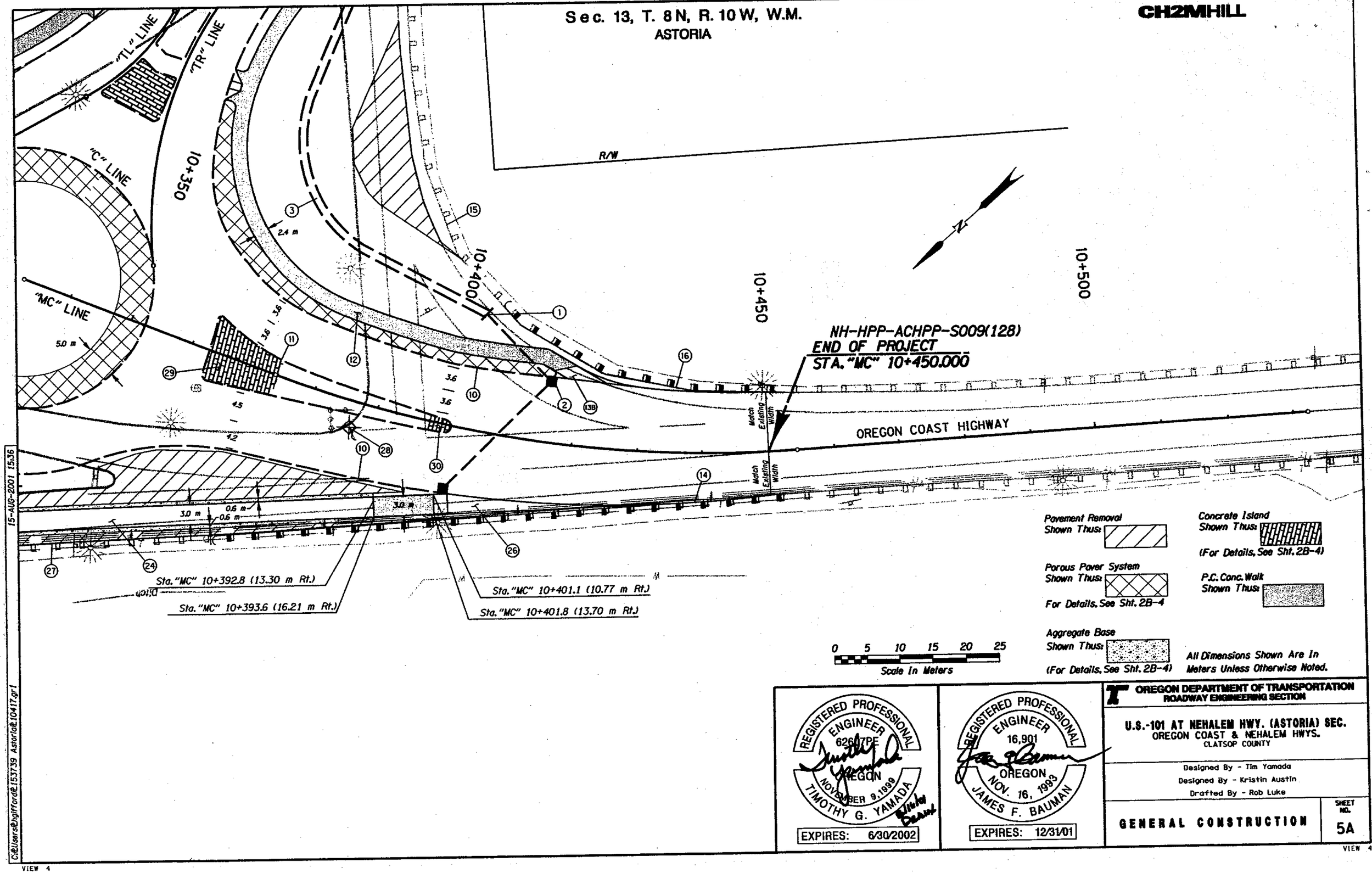
VIEW 4

VIEW 4

Sec. 13, T. 8 N, R. 10 W, W.M.
ASTORIA

CH2MHILL




Pavement Removal
Shown Thus:

Concrete Island
Shown Thus:
(For Details, See Sht. 2B-4)

Porous Paver System
Shown Thus:
For Details, See Sht. 2B-4

P.C. Conc. Walk
Shown Thus:

Aggregate Base
Shown Thus:
(For Details, See Sht. 2B-4)

0 5 10 15 20 25
Scale In Meters

All Dimensions Shown Are In Meters Unless Otherwise Noted.

REGISTERED PROFESSIONAL ENGINEER
62607PE
OREGON
NOVEMBER 9, 1999
TIMOTHY G. YAMADA
EXPIRES: 6/30/2002

REGISTERED PROFESSIONAL ENGINEER
16,901
OREGON
NOV. 16, 1993
JAMES F. BAUMAN
EXPIRES: 12/31/01

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

U.S.-101 AT NEHALEM HWY. (ASTORIA) SEC.
OREGON COAST & NEHALEM HWYS.
CLATSOP COUNTY

Designed By - Tim Yamada
Designed By - Kristin Austin
Drafted By - Rob Luke

GENERAL CONSTRUCTION

SHEET NO. 5A

VIEW 4

15-AUG-2001 15:36
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VIEW 4

CH2MHILL

① *Sta. "MC" 10+403.39*
*Inst. 300 mm Sew. Pipe Outfall - 14.3 m*
*Trench Exc. - 11.1 m³*
*Inst. Outlet Basin*
*(For Details, See Sht. 2B-6)*

② *Sta. "MC" 10+415.68*
*Const. Type "CG-2" Inlet - 2*
*Inst. 300 mm Sew. Pipe - 23.3 m*
*Trench Exc. - 16.7 m³*

③ *Const. Drainage Swale*
*(For Details, See Sht. 2B-6)*

⑩ *Const. Type "A" Curb*

⑪ *Const. Type "F" Curb*

⑫ *Const. P.C. Conc. Walk*

⑬B *Const. Sidewalk Ramp (Bikeway)*

⑭ *Sta. "MC" 10+373.9 (26.2 Rt.)*
*To Sta. "MC" 10+453.0 (6.6 Rt.)*
*Const. Guardrail - 87.63 m (Type 2A)*
*Const. Anchor (Type 1)*
*Inst. End Piece (Type B)*
*Const. Guardrail Connection*
*(See Drg. No. RD400, RD405, RD415, RD417, RD440)*

⑮ *Sta. "TL" 30+627 To Sta. "MC" 10+453*
*Remove Extg. Guardrail - 245 m ±*

⑯ *Sta. "MC" 10+406.4 (19.4 Lt.)*
*To Sta. "MC" 10+453.0 (8.9 Lt.)*
*Const. Guardrail - 45.72 m (Type 2A)*
*Const. Anchor (Type 1)*
*Inst. End Piece (Type B)*
*Const. Guardrail Connection*

㉔ *See Sht. 3B, Note 24*

㉖ *Const. Asphalt Ramp*
*(For Details, See Sht. 2B-4)*

㉗ *See Sht. 3B, Note 14*

㉘ *Remove Inlet*

㉙ *Const. Conc. Island - 87 m²*
*Stamped Conc. Island Surfacing*
*(For Details, See Sht 2B-4)*

㉚ *Const. Conc. Island - 8 m²*
*Stamped Conc. Island Surfacing*
*(For Details, See Sht 2B-4)*

REGISTERED PROFESSIONAL ENGINEER 62607PE OREGON NOVEMBER 9,1999 TIMOTHY G. YAMADA
EXPIRES: 6/30/2002

REGISTERED PROFESSIONAL ENGINEER 16,901 OREGON NOV. 16, 1999 JAMES F. BAUMAN
EXPIRES: 12/31/01

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

U.S.-101 AT NEHALEM HWY. (ASTORIA) SEC.
OREGON COAST & NEHALEM HWYS.
CLATSOP COUNTY

Designed By - Tim Yamada
Designed By - Kristin Austin
Drafted By - Rob Luke

GENERAL CONSTRUCTION

SHEET NO. 5B

VIEW 4



VIEW 4

Sec. 13, T. 8 N, R. 10 W, W.M.
ASTORIA

CH2MHILL

TAYLOR AVE.

FLORENCE AVE.

"MR" LINE

"ML" LINE

"TL" LINE

"TR" LINE

"C" LINE

"MC" LINE

OREGON COAST HIGHWAY

NEHALEM HWY.

R/W

30+450

30+500

30+550

40+450

15.1 m - 300 mm

21.0 m - 300 mm

18.0 m - 300 mm

18.2 m - 300 mm

1.95 m

41.4 m - 450 mm

19.2 m - 300 mm

17.7 m - 300 mm

31.1 m - 300 mm

2.9 m - 300 mm

11.1 m - 450 mm

14.1 m - 600 mm

Asphalt Conc. 3.6 m

Asphalt Conc. 3.5 m

Asphalt Conc. 3.0 m

Asphalt Conc. 10.4 m

MATCH LINE
SEE SHEET 7A

Concrete Island
Shown Thus:
(For Details, See Sht. 2B-4)

Pavement Removal
Shown Thus:

Porous Paver System
Shown Thus:
For Details, See Sht. 2B-4

Abandoned Pipe
Shown Thus:

P.C. Conc. Walk
Shown Thus:

0 5 10 15 20 25
Scale In Meters

All Dimensions Shown Are In Meters Unless Otherwise Noted.

REGISTERED PROFESSIONAL ENGINEER
6260
OREGON
NOVEMBER 9,1999
TIMOTHY G. YAMADA
EXPIRES: 6/30/2002

REGISTERED PROFESSIONAL ENGINEER
16,901
OREGON
NOV. 16, 1993
JAMES F. BAUMAN
EXPIRES: 12/31/01

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

U.S.-101 AT NEHALEM HWY. (ASTORIA) SEC.
OREGON COAST & NEHALEM HWYS.
CLATSOP COUNTY

Designed By - Tim Yamada
Designed By - Kristin Austin
Drafted By - Rob Luke

GENERAL CONSTRUCTION

SHEET NO. 6A

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VIEW 5

VIEW 5

CH2MHILL

① *Sta. "TL" 30+499.26*
*Const. 1200 mm MH w/ Type "G-2" Inlet*
*Const. 1200 mm MH w/ Type "CG-2" Inlet*
*Const. Type "G-2" Inlet*
*Inst. 300 mm Sew. Pipe - 55.3 m*
*Trench Exc. - 86.1 m³*

② *Sta. "TL" 30+517.72*
*Const. Manhole*
*Const. Type "CG-2" Inlet*
*Inst. 300 mm Sew. Pipe - 49.1 m*
*Trench Exc. - 67.1 m³*

③ *Sta. "TL" 30+547.99*
*Const. Manhole*
*Const. Type "G-2" Inlet - 2*
*Inst. 300 mm Sew. Pipe - 35.9 m*
*Trench Exc. - 27.2 m³*

④ *Const. Drainage Swale*
*(For Details, See Sht. 2B-6)*

⑤ *Sta. "TL" 30+491.30*
*Const. 1500 mm Manhole*
*Inst. 300 mm Sew. Pipe - 2.9 m*
*Inst. 450 mm Sew. Pipe - 52.5*
*Const. Type "D" Mod. Inlet*
*Const. Type "D" Inlet*
*Trench Exc. - 55.0 m³*

⑥ *Sta. "TL" 30+499.33*
*Inst. 600 mm Sew. Pipe Outfall - 14.1 m*
*Trench Exc. - 26.2 m³*
*Inst. Outlet Basin*
*(For Details, See Sht. 2B-6)*

⑩ *Const. Type "A" Curb*

⑪ *Const. Type "F" Curb*

⑫ *Const. P.C. Conc. Walk*

⑬ *Const. Sidewalk Ramp - 3*

⑬A *Const. Modified Sidewalk Ramp*
*(For Details, See Sht. 2B-4)*

⑭ *Sta. "TL" 30+486.8 (17.6 Rt.)*
*To Sta. "TL" 30+640.8 (6.6 Rt.)*
*Const. Guardrail - 160.02 m (Type 2A)*
*Const. Anchor (Type 1)*
*Inst. End Piece (Type B)*

⑮ *Const. Street Connection*

⑯ *Const. P.C. Conc. Driveway, Option A - 4*

㉑ *Relocate Utility Pole*
*(By Others)*

㉓ *Const. Asphalt Conc. Connection - 4*

㉔ *Remove Inlet*

㉖ *Adjust Inlet - 2*

㉗ *Adjust Valve Box (By City Of Astoria)*

㉙ *Adjust Manhole, Method A -5*
*(For Details, See Sht. 2B-6)*

㉚ *See Sht. 5B, Note 15*

㉛ *Const. Conc. Island - 57 m²*
*Stamped Conc. Island Surfacing*
*(For Details, See Sht 2B-4)*

㉜ *Const. Conc. Island - 3 m²*
*Stamped Conc. Island Surfacing*
*(For Details, See Sht 2B-4)*

REGISTERED PROFESSIONAL ENGINEER
6260PE
OREGON
NOVEMBER 9,1999
TIMOTHY G. YAMADA
EXPIRES: 6/30/2002

REGISTERED PROFESSIONAL ENGINEER
16,901
OREGON
NOV. 16, 1993
JAMES F. BAUMAN
EXPIRES: 12/31/01

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

**U.S.-101 AT NEHALEM HWY. (ASTORIA) SEC.**
OREGON COAST & NEHALEM HWYS.
CLATSOP COUNTY

Designed By - Tim Yamada
Designed By - Kristin Austin
Drafted By - Rob Luke

**GENERAL CONSTRUCTION**

SHEET NO. 6B

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VIEW 5

VIEW 5

CH2MHILL

## "TL" LINE

475 mm
Profile Grade @ ℄
-1.18%
Subgrade
Ground Line @ ℄
-2.34%
-1.20%
Drainage Swale
F.L. Swale 4.57
"TL" 30+473.834 Type "D" Inlet (19.04 m Lt.)
F.L. 4.12
450 mm - 41.4 m
-2.20%
600 mm - 14.1 m
-0.50%

"TL" 30+491.30 M.H.(18.10 m Rt.)
F.L. 2.90 S.W.
F.L. 3.20 N.E.
F.L. 3.08 S.E.
F.L. 3.50 N.W.

"TL" 30+489.50 MH W/ Type "CG-2" Inlet (9.00 m Lt.)
F.L. 3.86 SW.
F.L. 3.86 SE.

"TL" 30+499.26 M.H.W/ Type "G-2" Inlet (10.42 m Rt.)
F.L. 3.33 N.E.
F.L. 3.33 S.
F.L. 3.18 N.W.

"TL" 30+499.552 Type "G-2" Inlet (21.197 m Lt.)
F.L. 3.93 NW.
50.000 m V.C.

"TL" 30+519.75
Type "CG-2" Inlet (11.48 m Lt.)
F.L. 3.84 W.

300 mm - 15.1 m
-0.50%
300 mm - 21.0 m
-2.52%
450 mm - 11.1 m
0.88%
300 mm - 18.0 m
2.25%
300 mm - 19.2 m
0.57%

"TL" 30+517.72 M.H.(7.42 m Rt.)
F.L. 3.44 S.
F.L. 3.44 W.
F.L. 3.44 E.

300 mm - 31.1 m
0.50%

"TL" 30+499.33 Outfall (29.63 m Rt.)
F.L. 2.83

"TL" 30+547.99 M.H.(5.51 m Rt.)
F.L. 3.59 E.
F.L. 3.59 N.

475 mm
0.50%
Subgrade
300 mm - 17.7 m
0.50%

"TL" 30+552.35
Type "G-2" Inlet (12.42 m Lt.)
F.L. 3.68 W.
F.L. 3.68 S.

"TL" Line
Earthwork Quantities:
Exc. 2280 m3
Emb. 470 m3
Ditch Exc. 1080 m3

30+400 | 30+450 | 30+500 | 30+550

## "TR" LINE

475 mm
Profile Grade @ ℄
-1.87%
Subgrade
Ground Line @ ℄
-2.40%
475 mm
Subgrade
-0.98%
Drainage Swale
F.L. Swale 4.65
300 mm - 2.9 m
-29.17%
"TL" 30+489.33 Type "D" Mod. Inlet (20.24 m Rt.)
F.L. 4.35

40+450 | 40+500

Note:
Earthwork Quantities For "TR" Line Are Included In "TL" Line Totals.

All Dimensions Shown Are In Meters Unless Otherwise Noted.

REGISTERED PROFESSIONAL ENGINEER
62907PE
OREGON
NOVEMBER 9,1999
TIMOTHY G. YAMADA
8/16/01
EXPIRES: 6/30/2002

REGISTERED PROFESSIONAL ENGINEER
16,901
OREGON
NOV. 16, 1993
JAMES F. BAUMAN
EXPIRES: 12/31/01

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

U.S.-101 AT NEHALEM HWY. (ASTORIA) SEC.
OREGON COAST & NEHALEM HWYS.
CLATSOP COUNTY

Designed By - Timothy Yamada
Designed By - Kristin Austin
Drafted By - Rob Luke

PROFILE

SHEET NO. 6C

15-AUG-2001 11:37
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VIEW 5
VIEW 5