

Mission: To enhance the region's economy and quality of life by providing efficient cargo and air passenger access to national and global markets.



February 11, 2021

Jeff K. Schatz, R.G.
Oregon Department of Environmental Quality
Northwest Region Cleanup Program
700 NE Multnomah Street, Suite 600
Portland, OR 97232

Re: Terminal 4 Stormwater Source Control Measures – 100% Design Plan Sets and Operation and Maintenance Plans for Vegetated Infiltration Basins

Dear Jeff,

Please find attached the 100% plan sets for the design of two stormwater source control measures (SCMs) at Terminal 4 plus the operation and maintenance (O&M) plan for each SCM. The SCMs are vegetated infiltration basins to treat stormwater runoff from two drainage basins, labeled K1 and M. The Port of Portland (Port) requests review of the attached plan sets and O&M plans by the Oregon Department of Environmental Quality (DEQ).

The 100% design plan sets reflect the design progression of the vegetated infiltration basins identified in the 30% and 60% design plan sets reviewed by DEQ. DEQ approved the 30% plan sets in October 2020 and comments received in January 2021 on the 60% plan sets have been incorporated into the 100% design plan sets and O&M plans. Please find attached a response to DEQ comment matrix on the 60% plan set deliverable, including the performance monitoring plan. The performance monitoring plan is included as Section 5 of each O&M Plan.

Finally, the SCM design for Drainage Basin K1 is being completed by Kinder Morgan, while the Port continues to complete the SCM design for Drainage Basin M. Kinder Morgan is best suited to implement a stormwater SCM because Drainage Basin K1 is within their current operations at Terminal 4 and part of their Oregon DEQ 1200-Z stormwater permit. The Port and Kinder Morgan are coordinating closely on the designs to ensure the SCMs reflect the direction by DEQ on source control for the Portland Harbor Superfund Site. The Port will continue to submit the required deliverables to DEQ for both SCM basins under the Port's current DEQ cleanup agreements.

Mr. Schatz
February 11, 2021
Page 2

The schedule overall to construct both stormwater SCMs in 2021 is on target, dependent on receiving DEQ and local permitting approvals.

Please call me at 503-349-7526 with any questions.

Sincerely,

A handwritten signature in black ink, appearing to read "Kelly Madalinski", written in a cursive style.

Kelly Madalinski
Harbor Environmental Manager

Attachment(s)

1. 100% Plan Set and O&M Plan– Basin M Source Control Measure
2. 100% Plan Set and O&M Plan – Basin K1 Source Control Measure
3. Response to DEQ Comments Matrix on 60% Plan Sets

Attachment 1
100% Plan Set and O&M Plan
Basin M Source Control Measure

CAN YOU SEE THE AIRPLANES? THE ADJACENT SAMPLES SHOW THREE DIFFERENT LEVELS OF SHADING. SETTINGS FOR VIEWING AND PRINTING DRAWING CONTENT ARE OPTIMIZED WHEN ALL THREE PLANES ARE VISIBLE. THIS GUIDANCE IS PROVIDED FOR REFERENCE ONLY.

GENERAL INFORMATION SHEETS			ELECTRICAL SHEETS		
SHEET NUMBER		DESCRIPTION			
1	GI0.01	DRAWING INDEX	22	E0.01	ELECTRICAL LEGEND AND NOTES
2	GI0.02	CITY INFORMATION AND DIRECTIVES	23	E0.02	ELECTRICAL SITE PLAN
3	GI0.03	SITE PLAN AND VICINITY MAP	24	E1.01	ELECTRICAL PUMP DETAILS
4	GI0.04	LEGEND, ABBREVIATIONS AND NOTES	25	E2.01	ELECTRICAL ONE-LINE DIAGRAM
5	GI0.05	SURVEY CONTROL PLAN	26	E3.01	ELECTRICAL CONTROLS 1
6	GI0.06	WORK AREAS	27	E3.02	ELECTRICAL CONTROLS 2
<u>CIVIL SHEETS</u>			<u>LANDSCAPE SHEETS</u>		
			28	L1.01	LANDSCAPE PLAN
7	C0.01	EROSION CONTROL COVER	29	L1.02	LANDSCAPE DETAILS
8	C0.02	EROSION AND SEDIMENT CONTROL NOTES	30	L2.01	IRRIGATION PLAN
9	C1.01	EROSION AND SEDIMENT CONTROL PLAN	31	L2.02	IRRIGATION DETAILS
10	C1.02	EROSION AND SEDIMENT CONTROL DETAILS			
11	C2.01	PROJECT SYSTEM OVERVIEW			
12	C3.01	BIOINFILTRATION BASIN GEOMETRY			
13	C4.01	DRAINAGE AND GRADING PLAN			
14	C5.01	STORMWATER SYSTEM PROFILE			
15	C5.02	SWALE PROFILE			
16	C6.01	CIVIL DETAILS 1			
17	C6.02	CIVIL DETAILS 2			
18	C6.03	CIVIL DETAILS 3			
19	C6.04	CIVIL DETAILS 4			
20	C6.10	PUMP DETAILS 1			
21	C6.11	PUMP DETAILS 2			

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light

dark

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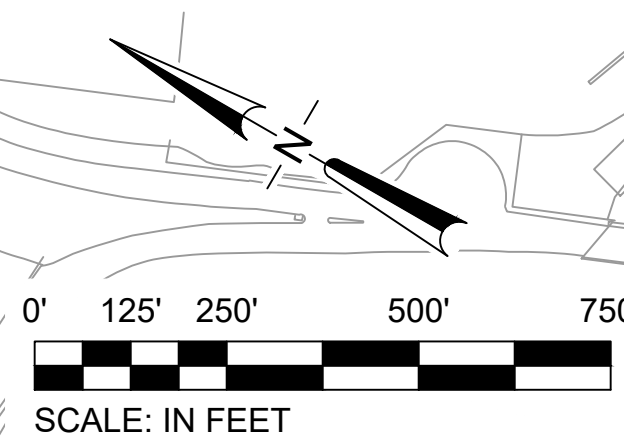


REGISTERED PROFESSIONAL
ENGINEER
53166PE
OREGON
07/11/2017
TRINH N. TRAN
EXPIRES: 06/30/2022

DRAWING SCALE IS REDUCED 50% WHEN SHEET SIZE IS 11" x 17"



CAN YOU SEE THE AIRPLANES? THE ADJACENT SAMPLES SHOW THREE DIFFERENT LEVELS OF SHADING. SETTINGS FOR VIEWING AND PRINTING DRAWING CONTENT ARE OPTIMIZED WHEN ALL THREE PLANES ARE VISIBLE. THIS GUIDANCE IS PROVIDED FOR REFERENCE ONLY.



SCALE: IN FEET

(E) MAIN GATE

N. TERMINAL RD

(E) IRM BULK FACILITY

(E) RAIL YARD

(E) PARKING

PROJECT LOCATION

KINDER MORGAN
(SODA ASH BLDG)

(N) TEMP. CONSTRUCTION
ENTRANCE

WAREHOUSE

(N) TEMP. STAGING
AND STOCKPILE AREA

(E) OUTFALL

(E) TOP OF BANK

GREENWAY SETBACK
(50' FR. TOB)

BERTH 405

BERTH 408

(E) 24' PAVED
ACCESS ROAD

SLIP 1

WHEELER BAY

N. WEYERHAEUSER AVE

LOMBARD ST

N. JERSEY ST

N. IVANHOE ST

N. SYRACUSE ST

N. WILLAMETTE BLVD

N. EDISON ST

DECATUR ST

N. RENO AVE

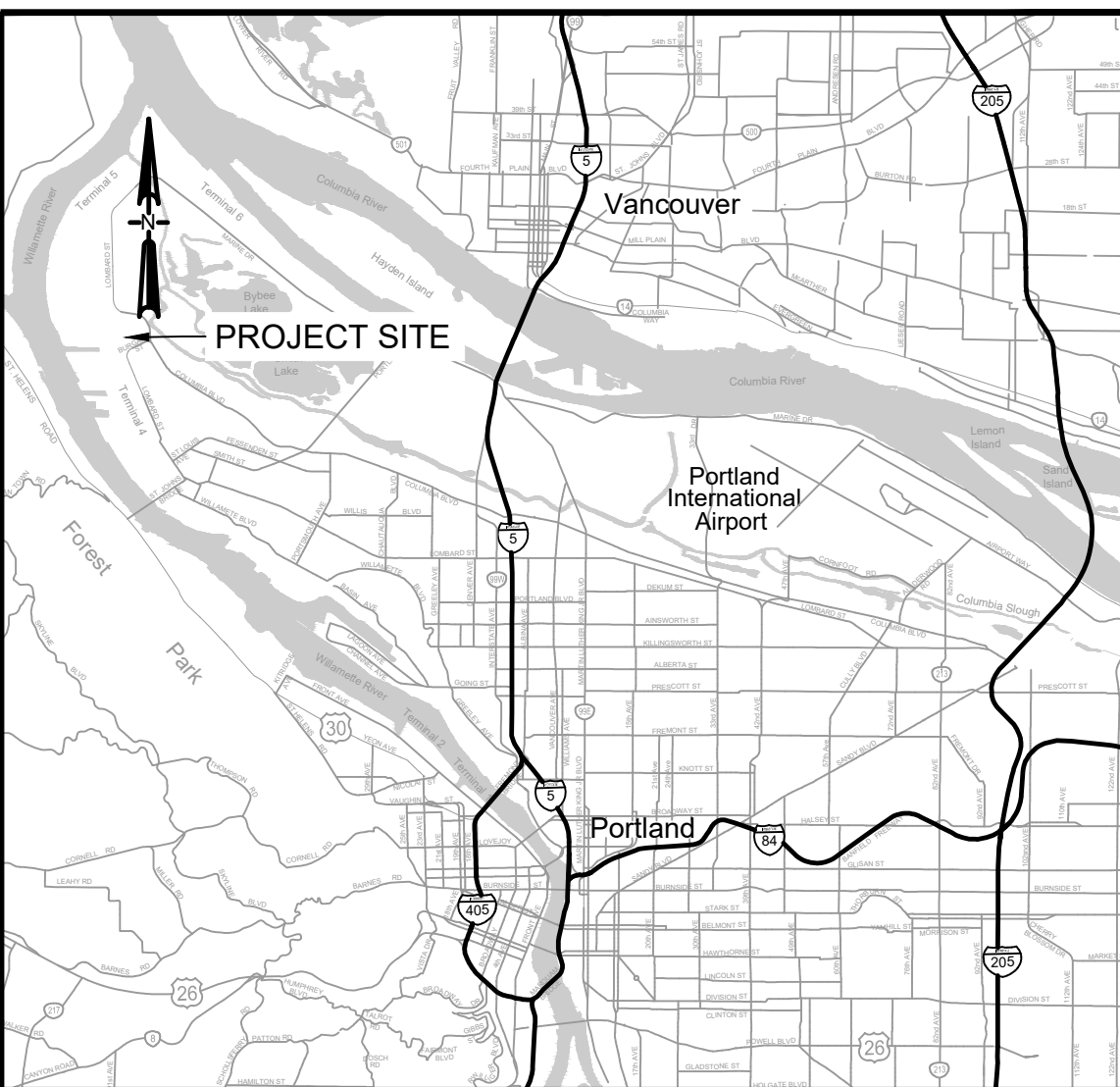
N. ST. JOHN AVE

N. CATLINE AVE

NOTES:

1. ALL IMPROVEMENTS ARE ON EXISTING GRAVEL SURFACES.
2. THERE IS NO DISTURBANCE WITHIN GREENWAY ZONE.
3. THE TOTAL AREA OF DISTURBANCE IS 0.35 AC

- PROPERTY LINE
- INGRESS/EGRESS
- APPROX. TOP OF BANK UNDER DOCK
- APPROX. GREENWAY SETBACK (50' FR. TOB)



VICINITY MAP
SCALE: N.T.S.

1 SITE PLAN AND VICINITY MAP
SCALE: 1" = 250'

PORT OF PORTLAND
Possibilities in every direction since 1891.

WHPacific

9450 SW COMMERCE CIRCLE STE 300, WILSONVILLE, OR 97070
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2019D013

DESIGN NUMBER

Geosyntec
consultants

920 SW 6TH AVE STE 600, PORTLAND, OR 97204
TEL: 503-222-9518

102695

PROJECT NUMBER



TERMINAL 4

BASIN M STORMWATER IMPROVEMENTS

SITE PLAN AND VICINITY MAP

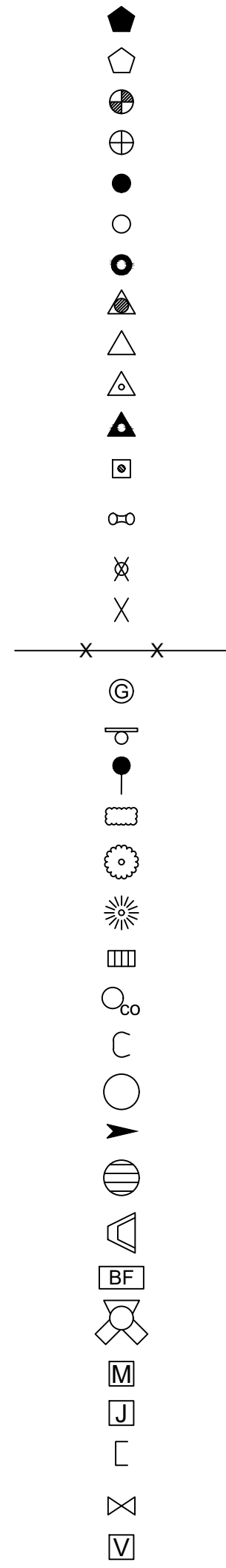
SUBMITTED BY	ROGER ANDERSON
DESIGN BY	T. TRAN
DRAWN BY	T. TRAN
CHECKED BY	J. SHUTE, D. PANKANI
DATE	FEB 2021
SHEET NO.	3
TYPE: CD	
DRAWING NO.	T4 2021-500
DISC. SHT. NO.	G10.03

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IF ELECTRONIC SIGNATURE IS BROKEN OR MISSING - THIS IS NOT A LEGAL DRAWING

DRAWING SCALE IS REDUCED 50% WHEN SHEET SIZE IS 11" x 17"

LEGEND:



FOUND BRASS PLUG
SET BRASS PLUG
FOUND BRASS CAP
SET BRASS CAP
FOUND IRON ROD
SET IRON ROD
FOUND IRON PIPE
FOUND P.K. NAIL
SET P.K. NAIL
FOUND 9/16" STAINLESS STEEL ROD IN MON. BOX
SET 9/16" STAINLESS STEEL ROD IN MON. BOX
HUB AND TACK

BOLLARD

GATE POST
FENCE POST
FENCE LINE
GUARD POST
SIGN POST

RAILROAD SWITCH
SHRUB

DECIDUOUS TREE

EVERGREEN TREE

CATCH BASIN
CLEANOUT
CULVERT
MANHOLE
STORM OR SANITARY FLOW ARROW
MANHOLE WITH SLOTTED GRATE

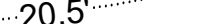
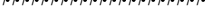
OUTFALL

BACKFLOW DEVICE

FIRE HYDRANT

METER
JUNCTION BOX
UTILITY LINE CAP

VALVE
VAULT LID

	OVERHEAD POWER LINE
	DITCH CENTERLINE
	MAJOR CONTOUR
	MINOR CONTOUR
	EXISTING MAJOR CONTOUR
	EXISTING MINOR CONTOUR
	EXISTING ELECTRICAL LINE
	EXISTING BARBED WIRE FENCE
	EXISTING WATER LINE
	EXISTING STORM SEWER
	EXISTING EDGE OF PAVEMENT
	NEW STORM LINE
	NEW ELECTRICAL LINE
	TO BE REMOVED
	NEW SEDIMENT FENCE
	NEW EDGE OF PAVEMENT

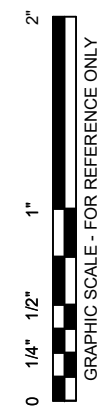
ABBREVIATION	DESCRIPTION
(E), EXISTING	EXISTING
(N)	NEW
AC, A.C.	ASPHALT CONCRETE
ACI	AMERICAN CONCRETE INSTITUTE
APPROX	APPROXIMATE
ASCE	AMERICAN SOCIETY OF CIVIL ENGINEERS
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS
AWG	AMERICAN WIRE GAUGE
BLDG	BUILDING
BMPS	BEST MANAGEMENT PRACTICES
BOT	BOTTOM
CB	CATCHBASIN
CFS	CUBIC FEET PER SECOND
CIP	CAST IRON PIPE
CO	CLEANOUT
CONC	CONCRETE
CY	CUBIC YARD
DEQ	DEPARTMENT OF ENVIRONMENTAL QUALITY
DIA	DIAMETER
E	ELECTRICAL LINE, EAST, EASTING
(E)	EXISTING
EG	EXISTING GROUND
ELEV	ELEVATION
ESC	EROSION AND SEDIMENT CONTROL
ESCP	EROSION AND SEDIMENT CONTROL PLAN
EXIST	EXISTING
FG	FINISH GROUND
FT	FEET
G	GAS LINE
GALV	GALVANIZED
HDPE	HIGH DENSITY POLYETHYLENE
IE, I.E., INV	INVERT
LB	POUND
LF	LINEAL FEET
MAX	MAXIMUM
MH	MANHOLE
MIN	MINIMUM
N	NORTH, NORTHING
(N)	NEW
NE	NORTHEAST
NTS	NOT TO SCALE
NW	NORTHWEST
OFF	OFFSET
PE	PROFESSIONAL ENGINEER
PVC	POLYVINYL CHLORIDE
R	RADIUS
RIM	RIM ELEVATION
S	SLOPE, SOUTH
SF	SQUARE FEET
SD	STORM SEWER LINE
STA	STATION
SW	SOUTHWEST
TEMP	TEMPORARY
TYP	TYPICAL
VERT	VERTICAL
W	WATER LINE
W/	WITH
WA	WORK AREA
WQ	WATER QUALITY

The diagram illustrates three types of reference symbols used in technical drawings:

- VIEW TITLE:** A circle containing the number 4, with a horizontal line extending to the right. Labels include "DETAIL TITLE NUMBER" pointing to the circle, "VIEW TITLE" pointing to the horizontal line, and "SCALE: 1" = 50'" pointing to the line below the circle.
- DETAIL REFERENCE:** A circle divided horizontally, with "X" in the top half and "G10.04" in the bottom half. Labels include "VIEW NUMBER" pointing to the "X" and "DISCIPLINE SHEET NUMBER" pointing to "G10.04".
- SECTION REFERENCE:** A triangle divided horizontally, with "X" in the top half and "G10.04" in the bottom half, with a horizontal line extending to the right. Labels include "VIEW NUMBER" pointing to the "X" and "DISCIPLINE SHEET NUMBER" pointing to "G10.04".



ATTENTION: OREGON LAW REQUIRES YOU TO FOLLOW RULES ADOPTED BY THE OREGON UTILITY NOTIFICATION CENTER. THOSE RULES ARE SET FORTH IN OAR 952-0011-0010 THROUGH OAR 952-0011-0090, YOU MAY OBTAIN COPIES OF THE RULES BY CALLING THE CENTER. (NOTE: THE TELEPHONE NUMBER FOR THE OREGON UTILITY NOTIFICATION CENTER IS 1-800-332-2344 or 811).

[illegible]

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2019D013

102695

PROJECT NUMBER

TERMINAL 4

BASIN M STORMWATER IMPROVEMENTS

LEGEND, ABBREVIATIONS AND NOTES

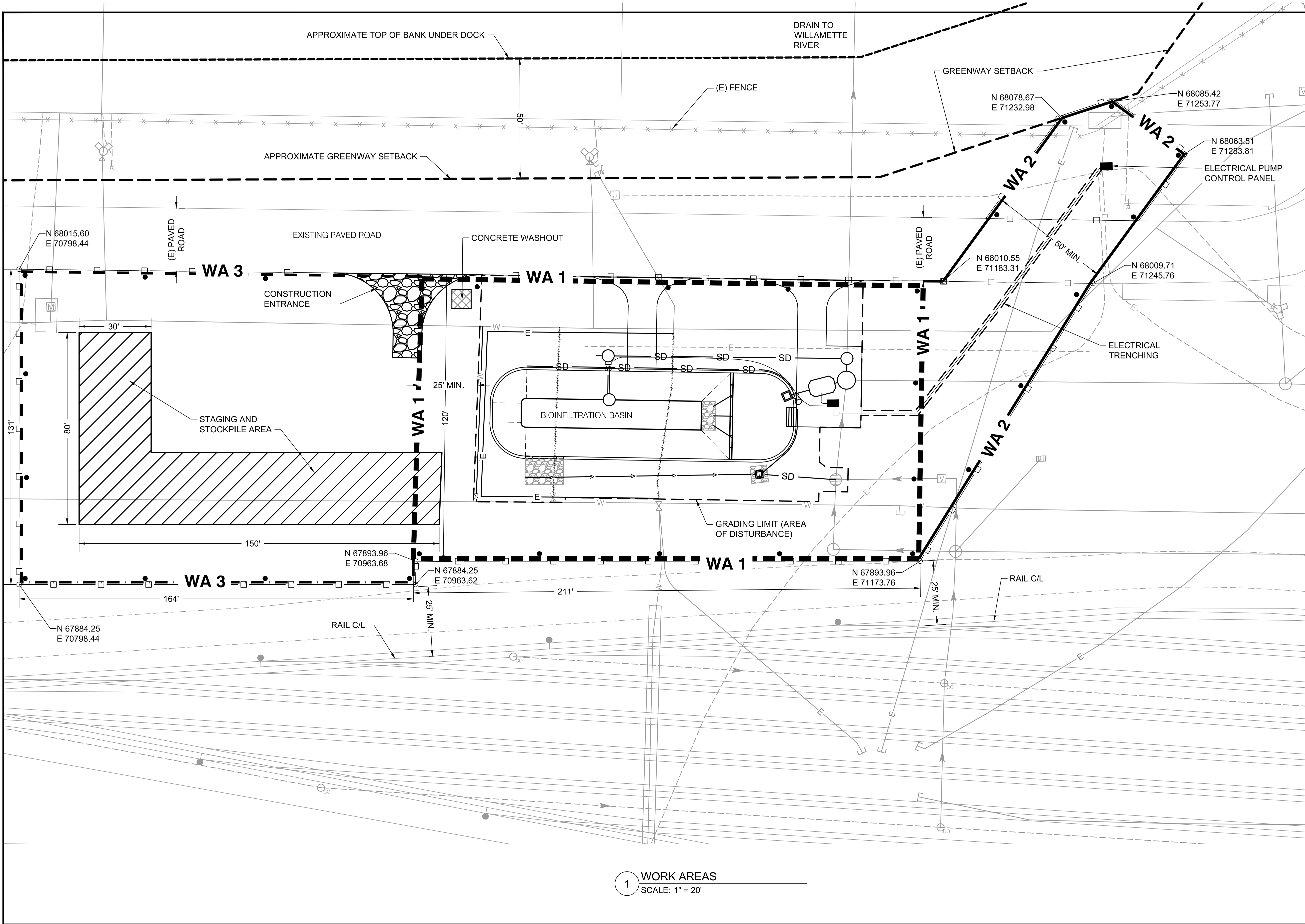
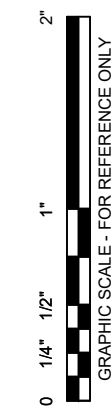
SUBMITTED BY	ROGER ANDERSON	
DESIGN BY	T. TRAN	
DRAWN BY	T. TRAN	
CHECKED BY	J. SHUTE, D. PANKANI	
DATE	F. FEB 2021	
SHEET NO.	4	TYPE: CD
DRAWING NO.	T4 2021-500	DISC. SHT. NO. GI0.04

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0 1/4" 1/2" 1" 2"
GRAPHIC SCALE - FOR REFERENCE ONLY

PRINTED: 2/8/2021 10:43:51 AM TTRAN p:\geosyntec consultants inc\229220-0237142.01\execution\drawings\civil\p0023714w-gj-survey.dwg IF ELECTRONIC SIGNATURE IS BROKEN OR MISSING - THIS IS NOT A LEGAL DRAWING DRAWING SCALE IS REDUCED 50% WHEN SHEET SIZE IS 11" x 17"

CAN YOU SEE THE AIRPLANES? THE ADJACENT SAMPLES SHOW THREE DIFFERENT LEVELS OF SHADING. SETTINGS FOR VIEWING AND PRINTING CONTENT ARE OPTIMIZED WHEN ALL THREE PLANES ARE VISIBLE. THIS GUIDANCE IS PROVIDED FOR REFERENCE ONLY.



THE AREA BELOW IS TO BE LEFT BLANK - FOR USE BY CITY FOR PERMIT REVIEW STAMP ONLY.

LEGEND

- WA 1 WORK AREA 1 BOUNDARY
- WA 2 WORK AREA 2 BOUNDARY
- WA 3 WORK AREA 3 BOUNDARY
- 3' STAKE AT 50' MAX SPACING (CONTRACTOR PROVIDED)
- SEDIMENT FENCE TO COVER WORK AREAS (SEE EROSION CONTROL SHEET C1.01)

GENERAL NOTE:

- WORK AREA 1: MAIN PROJECT WORK AREA, WHICH INCLUDES BIOINFILTRATION BASIN, ACCESS, UTILITY RELOCATION, PUMPS, ELECTRICAL AND ASSOCIATED APPURTENANCES. CONTRACTOR TO USE CONSTRUCTION ENTRANCE IN WORK AREA 3 FOR ENTERING AND LEAVING WORK SITE ONTO EXISTING PAVED ROAD. TWENTY FIVE (25) FEET CLEARANCE FROM RAIL C/L IS REQUIRED. CONSTRUCTION VEHICLES ARE NOT ALLOWED NORTH OF EXISTING ROAD.
- WORK AREA 2: INCLUDES ADDITIONAL ELECTRICAL WORK OUTSIDE OF BIOINFILTRATION BASIN. ONLY ELECTRICAL TRENCHING AND ELECTRICAL CONTROL PANEL WORK WILL BE ALLOWED IN WORK AREA 2. BEFORE ELECTRICAL WORK AND TRENCHING NORTH OF (E) ROAD, CONTRACTOR TO SUBMIT TO PORT A PLAN AND SCHEDULE AT LEAST ONE WEEK IN ADVANCE. TEMPORARY SILT FENCE IS PERMITTED ONLY FOR THE DURATION OF WORK NORTH OF (E) ROAD.
- WORK AREA 3: INCLUDES TEMPORARY STAGING AND STOCKPILE AREA. ALL WORK ON THE SOUTH SIDE OF (E) PAVED ROAD MUST ACCESS AND LEAVE AT CONSTRUCTION ENTRANCE IN WORK AREA 3. TWENTY FIVE (25) FEET CLEARANCE FROM RAIL C/L IS REQUIRED. CONSTRUCTION VEHICLES ARE NOT ALLOWED NORTH OF EXISTING ROAD.
- WORK AREA LIMITS ARE APPROXIMATE ONLY.
- DOCK IS LOAD RESTRICTED. NO VEHICLES OR EQUIPMENT ALLOWED ON DOCK.

STOCKPILE ESTIMATED QUANTITIES:

FINISH GRADE EXCAVATION	450 CY
ENGINEERED SOIL MEDIA FILL (24")	345 CY
LOAMY SAND FILL (30")	300 CY
GRAVEL ACCESSSES (18")	110 CY
DRAINAGE SWALE (6")	30 CY

TOTAL COMMON EXCAVATION 1235 CY

(HAUL TO ONSITE. COORDINATE WITH PORT FOR LOCATION DURING CONSTRUCTION)

1 WORK AREAS
SCALE: 1" = 20'

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Possibilities in every direction since 1891.

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2019D013
DESIGN NUMBER

102695
PROJECT NUMBER

TERMINAL 4

BASIN M STORMWATER IMPROVEMENTS

WORK AREAS

SUBMITTED BY	ROGER ANDERSON
DESIGN BY	R. ANDERSON, T. TRAN
DRAWN BY	T. TRAN
CHECKED BY	J. SHUTE, D. PANKANI
DATE	FEB 2021
SHEET NO.	6
TYPE:	CD
DRAWING NO.	T4 2021-500
DISC. SHT. NO.	G10.06

light

perm

back

can you see the airplanes? the adjacent samples show three different levels of shading. settings for viewing and printing drawing content are optimized when all three planes are visible. this guidance is provided for reference only.

0

1/4"

1/2"

1"

2"

GRAPHIC SCALE FOR REFERENCE ONLY

STANDARD EROSION/SEDIMENT CONTROL (ESCP) NOTES:

REFER TO GENERAL PERMIT NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM STORMWATER DISCHARGE PERMIT, ISSUED BY OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY PURSUANT TO ORS 468B.050 AND SECTION 402 OF THE FEDERAL CLEAN WATER ACT.

1. HOLD A PRE-CONSTRUCTION MEETING OF PROJECT CONSTRUCTION PERSONNEL THAT INCLUDES THE INSPECTOR TO DISCUSS EROSION AND SEDIMENT CONTROL MEASURES AND CONSTRUCTION LIMITS.

2. ALL INSPECTIONS MUST BE MADE IN ACCORDANCE WITH DEQ 1200-CA PERMIT REQUIREMENTS.

3. INSPECTION LOGS MUST BE KEPT IN ACCORDANCE WITH DEQ 1200-CA PERMIT REQUIREMENTS.

4. RETAIN A COPY OF THE ESCP AND ALL REVISIONS ON SITE AND MAKE AVAILABLE ON REQUEST TO DEQ, AGENT, OR THE LOCAL MUNICIPALITY. DURING INACTIVE PERIODS OF GREATER THAN SEVEN (7) CONSECUTIVE CALENDAR DAYS, RETAIN THE ESCP AT THE CONSTRUCTION SITE OR AT ANOTHER LOCATION.

5. ALL PERMIT REGISTRANTS MUST IMPLEMENT THE ESCP. FAILURE TO IMPLEMENT ANY OF THE CONTROL MEASURES OR PRACTICES DESCRIBED IN THE ESCP IS A VIOLATION OF THE PERMIT.

6. THE ESCP MUST BE ACCURATE AND REFLECT SITE CONDITIONS.

7. SUBMISSION OF ALL ESCP REVISIONS IS NOT REQUIRED. SUBMITTAL OF THE ESCP REVISIONS IS ONLY UNDER SPECIFIC CONDITIONS. SUBMIT ALL NECESSARY REVISION TO DEQ OR AGENT WITHIN 10 DAYS.

8. PHASE CLEARING AND GRADING TO THE MAXIMUM EXTENT PRACTICAL TO PREVENT EXPOSED INACTIVE AREAS FROM BECOMING A SOURCE OF EROSION.

9. IDENTIFY, MARK, AND PROTECT (BY FENCING OFF OR OTHER MEANS) CRITICAL RIPARIAN AREAS AND VEGETATION INCLUDING IMPORTANT TREES AND ASSOCIATE ROOTING ZONES, AND VEGETATION AREAS TO BE PRESERVED. IDENTIFY VEGETATIVE BUFFER ZONES BETWEEN THE SITE AND SENSITIVE AREAS (E.G. WETLANDS), AND OTHER AREAS TO BE PRESERVED, ESPECIALLY IN PERIMETER AREAS.

10. PRESERVE EXISTING VEGETATION WHEN PRACTICAL AND RE-VEGETATE OPEN AREAS. RE-VEGETATE OPEN AREAS WHEN PRACTICABLE BEFORE AND AFTER GRADING OR CONSTRUCTION. IDENTIFY THE TYPE OF VEGETATIVE SEED MIX USED.

11. MAINTAIN AND DELINEATE ANY EXISTING NATURAL BUFFER WITHIN THE 50-FEET OF WATERS OF STATE.

12. INSTALL PERIMETER SEDIMENT CONTROL, INCLUDING STORM DRAIN INLET PROTECTION AS WELL AS SEDIMENT BASINS, TRAPS AND BARRIERS PRIOR TO LAND DISTURBANCE.

13. CONTROL PEAK FLOW RATES AND TOTAL STORMWATER VOLUME, TO MINIMIZE EROSION AT OUTLETS AND DOWNSTREAM CHANNELS AND STREAMBANKS.

14. CONTROL SEDIMENT AS NEEDED ALONG THE SITE PERIMETER AND AT ALL OPERATIONAL INTERNAL STORM DRAIN INLETS AT ALL TIMES DURING CONSTRUCTION, BOTH INTERNALLY AND AT THE SITE BOUNDARY.

15. ESTABLISH CONCRETE TRUCK AND OTHER CONCRETE EQUIPMENT WASHOUT AREAS BEFORE BEGINNING CONCRETE WORK.

16. APPLY TEMPORARY AND/OR PERMANENT SOIL STABILIZATION MEASURES IMMEDIATELY ON ALL DISTURBED AREAS AS GRADING PROGRESSES. TEMPORARY OR PERMANENT STABILIZATION MEASURES ARE NOT REQUIRED FOR AREAS THAT ARE INTENDED TO BE LEFT UNVEGITATED, SUCH AS DIRT ACCESS ROADS OR UTILITY POLE PADS.

17. ESTABLISH MATERIAL AND WASTE STORAGE AREAS, AND OTHER NON-STORMWATER CONTROLS.

18. PREVENT TRACKING OF SEDIMENT ONTO PUBLIC OF PRIVATE ROADS USING BMPS SUCH AS: GRAVELED (OR PAVED) EXITS AND PARKING AREAS, GRAVEL ALL UNPAVED ROADS LOCATED ONSITE, OR USE AN EXIT TIRE WASH. THESE BMPS MUST BE IN PLACE PRIOR TO LAND-DISTURBING ACTIVITIES.

19. WHEN TRUCKING SATURATED SOILS FROM THE SITE, EITHER USE WATER-TIGHT TRUCKS OR DRAIN LOADS ON SITE.

20. CONTROL PROHIBITED DISCHARGES FROM LEAVING THE CONSTRUCTION SITE, I.E., CONCRETE WASH-OUT, WASTEWATER FROM CLEANOUT OF STUCCO, PAINT AND CURING COMPOUNDS.

21. USE BMPS TO PREVENT OR MINIMIZE STORMWATER EXPOSURE TO POLLUTANTS FROM SPILLS; VEHICLE AND EQUIPMENT FUELING, MAINTENANCE, AND STORAGE; OTHER CLEANING AND MAINTENANCE ACTIVITIES; WASTE HANDLING ACTIVITIES. THESE POLLUTANTS INCLUDE FUEL, HYDRAULIC FLUID, AND OTHER OILS FROM VEHICLES AND MACHINERY, AS WELL AS DEBRIS, FERTILIZER, PESTICIDES AND HERBICIDES, PAINTS, SOLVENTS, CURING COMPOUNDS, AND ADHESIVES FROM CONSTRUCTION OPERATIONS.

22. IMPLEMENT THE FOLLOWING BMPS WHEN APPLICABLE: WRITTEN SPILL

PREVENTION AND RESPONSE PROCEDURES, EMPLOYEE TRAINING ON SPILL PREVENTION AND PROPER DISPOSAL PROCEDURES, SPILL KITS IN ALL VEHICLES, REGULAR MAINTENANCE SCHEDULE FOR VEHICLES AND MACHINERY, MATERIAL DELIVERY AND STORAGE CONTROLS, TRAINING AND SIGNAGE, AND COVERED STORAGE AREAS FOR WASTE AND SUPPLIES.

23. USE WATER, SOIL-BINDING AGENT OR OTHER DUST CONTROL TECHNIQUE AS NEEDED TO AVOID WIND-BLOWN SOIL.

24. THE APPLICATION RATE OF FERTILIZERS USED TO REESTABLISH VEGETATION MUST FOLLOW MANUFACTURER'S RECOMMENDATIONS TO MINIMIZE NUTRIENT RELEASES TO SURFACE WATERS. EXERCISE CAUTION WHEN USING TIME-RELEASE FERTILIZERS WITHIN ANY WATERWAY RIPARIAN ZONE.

25. IF AN ACTIVE TREATMENT SYSTEM (FOR EXAMPLE, ELECTRO-COAGULATION, FLOCCULATION, FILTRATION, ETC.) FOR SEDIMENT OR OTHER POLLUTANT REMOVAL IS EMPLOYED, SUBMIT AN OPERATION AND MAINTENANCE PLAN (INCLUDING SYSTEM SCHEMATIC, LOCATION OF SYSTEM, LOCATION OF INLET, LOCATION OF DISCHARGE, DISCHARGE DISPERSION DEVICE DESIGN, AND A SAMPLING PLAN AND FREQUENCY) BEFORE OPERATING THE TREATMENT SYSTEM. OBTAIN PLAN APPROVAL BEFORE OPERATION THE TREATMENT SYSTEM. OPERATE AND MAINTAIN THE TREATMENT SYSTEM ACCORDING TO MANUFACTURER'S SPECIFICATIONS.

26. TEMPORARILY STABILIZE SOILS AT THE END OF THE SHIFT BEFORE HOLIDAYS AND WEEKENDS, IF NEEDED. THE REGISTRANT IS RESPONSIBLE FOR ENSURING THAT SOILS ARE STABLE DURING RAIN EVENTS AT ALL TIMES OF THE YEAR.

27. AS NEEDED BASED ON WEATHER CONDITIONS, AT THE END OF EACH WORKDAY SOIL STOCKPILES MUST BE STABILIZED OR COVERED, OR OTHER BMPS MUST BE IMPLEMENTED TO PREVENT DISCHARGES TO SURFACE WATERS OR CONVEYANCE SYSTEMS LEADING TO SURFACE WATER.

28. CONSTRUCTION ACTIVITIES MUST AVOID OR MINIMIZE EXCAVATIONS AND BARE GROUND ACTIVITIES DURING WET WEATHER.

29. SEDIMENT FENCE: REMOVE TRAPPED SEDIMENT BEFORE IT REACHES ONE THIRD OF THE ABOVE GROUND HEIGHT AND BEFORE FENCE REMOVAL.

30. OTHER SEDIMENT BARRIERS (SUCH AS BIOBAGS): REMOVE SEDIMENT BEFORE IT REACHES TWO INCHES DEPTH ABOVE GROUND HEIGHT AND BEFORE BMP REMOVAL.

31. CATCH BASINS: CLEAN BEFORE RETENTION CAPACITY HAS BEEN REDUCED BY FIFTY PERCENT. SEDIMENT BASINS AND SEDIMENT TRAPS: REMOVE TRAPPED SEDIMENT BEFORE DESIGN CAPACITY HAS BEEN REDUCED BY FIFTY PERCENT AND AT COMPLETION OF PROJECT.

32. WITHIN 24 HOURS, SIGNIFICANT SEDIMENT THAT HAS LEFT THE CONSTRUCTION SITE, MUST BE REMEDIATED. INVESTIGATE THE CAUSE OF THE SEDIMENT RELEASE AND IMPLEMENT STEPS TO PREVENT A RECURRENCE OF THE DISCHARGE WITHIN THE SAME 24 HOURS. ANY IN-STREAM CLEAN UP OF SEDIMENT SHALL BE PERFORMED ACCORDING TO THE OREGON DIVISION OF STATE LANDS REQUIRED TIME FRAME.

33. THE INTENTIONAL WASHING OF SEDIMENT INTO STORM SEWERS OR DRAINAGE WAYS MUST NOT OCCUR. VACUUMING OR DRY SWEEPING AND MATERIAL PICKUP MUST BE USED TO CLEAN UP RELEASED SEDIMENTS.

34. THE ENTIRE SITE MUST BE TEMPORARILY STABILIZED USING VEGETATION OR A HEAVY MULCH LAYER, TEMPORARY SEEDING, OR OTHER METHOD SHOULD CONSTRUCTION ACTIVITIES CEASE FOR 30 DAYS OR MORE.

35. PROVIDE TEMPORARY STABILIZATION FOR THAT PORTION OF THE SITE WHERE CONSTRUCTION ACTIVITIES CEASE FOR 14 DAYS OR MORE WITH A COVERING OF BLOWN STRAW, OR AN ADEQUATE COVERING OF COMPOST MULCH UNTIL WORK RESUMES ON THAT PORTION OF THE SITE.

36. DO NOT REMOVE TEMPORARY SEDIMENT CONTROL PRACTICES UNTIL PERMANENT VEGETATION OR OTHER COVER OF EXPOSED AREAS IS ESTABLISHED. ONCE CONSTRUCTION IS COMPLETE AND THE SITE IS STABILIZED, ALL TEMPORARY EROSION CONTROLS AND RETAINED SOILS MUST BE REMOVED AND DISPOSED OF PROPERLY, UNLESS DOING SO CONFLICTS WITH LOCAL REQUIREMENTS.

LOCAL AGENCY-SPECIFIC EROSION CONTROL NOTES:

1. ALL PUMPING OF SEDIMENT LADEN WATER SHALL BE DISCHARGED OVER AN UNDISTURBED, PREFERABLY VEGETATED AREA, AND THROUGH A SEDIMENT CONTROL BMP (I.E. FILTER BAG).

2. ALL EXPOSED SOILS MUST BE COVERED DURING THE WET WEATHER PERIOD, OCTOBER 01 - MAY 31.

PRE-CONSTRUCTION, CLEARING, AND DEMOLITION NOTES:

1. ALL BASE ESC MEASURES (INLET PROTECTION, PERIMETER SEDIMENT CONTROL, GRAVEL CONSTRUCTION ENTRANCES, ETC.) MUST BE IN PLACE, FUNCTIONAL, AND APPROVED IN AN INITIAL INSPECTION, PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITIES.

2. SEDIMENT BARRIERS APPROVED FOR USE INCLUDE SEDIMENT FENCE, STRAW WATTLES, OR OTHER APPROVED MATERIALS.

3. SENSITIVE RESOURCES INCLUDING, BUT NOT LIMITED TO, TREES, WETLANDS, AND RIPARIAN PROTECTION AREAS SHALL BE CLEARLY DELINEATED WITH ORANGE CONSTRUCTION FENCING OR CHAIN LINK FENCING IN A MANNER THAT IS CLEARLY VISIBLE TO ANYONE IN THE AREA. NO ACTIVITIES ARE PERMITTED TO OCCUR BEYOND THE CONSTRUCTION BARRIER.

4. CONSTRUCTION ENTRANCES SHALL BE INSTALLED AT THE BEGINNING OF CONSTRUCTION AND MAINTAINED FOR THE DURATION OF THE PROJECT. ADDITIONAL MEASURES INCLUDING, BUT NOT LIMITED TO, STREET SWEEPING, AND VACUUMING, MAY BE REQUIRED TO INSURE THAT ALL PAVED AREAS ARE KEPT CLEAN FOR THE DURATION OF THE PROJECT.

5. RUN-ON AND RUN-OFF CONTROLS SHALL BE IN PLACE AND FUNCTIONING PRIOR TO BEGINNING SUBSTANTIAL CONSTRUCTION ACTIVITIES. RUN-ON AND RUN-OFF CONTROL MEASURES INCLUDE: CHECK DAMS

GRADING & UTILITY EROSION & SEDIMENT CONSTRUCTION NOTES:

1. LONG TERM SLOPE STABILIZATION MEASURES SHALL INCLUDE THE ESTABLISHMENT OF PERMANENT VEGETATIVE COVER VIA SEEDING WITH APPROVED MIX AND APPLICATION RATE.

2. TEMPORARY SLOPE STABILIZATION MEASURES SHALL INCLUDE: COVERING EXPOSED SOIL WITH PLASTIC SHEETING, STRAW MULCHING, WOOD CHIPS, OR OTHER APPROVED MEASURES.

3. STOCKPILED SOIL OR STRIPPING SHALL BE PLACED IN A STABLE LOCATION AND CONFIGURATION. DURING "WET WEATHER" PERIODS, STOCKPILES SHALL BE COVERED WITH PLASTIC SHEETING OR STRAW MULCH. SEDIMENT FENCE IS REQUIRED AROUND THE PERIMETER OF THE STOCKPILE.

4. EXPOSED CUT OR FILL AREAS SHALL BE STABILIZED THROUGH THE USE OF TEMPORARY SEEDING AND MULCHING, EROSION CONTROL BLANKETS OR MATS, MID-SLOPE SEDIMENT FENCES OR WATTLES, OR OTHER APPROPRIATE MEASURES. SLOPES EXCEEDING 25% MAY REQUIRE ADDITIONAL EROSION CONTROL MEASURES.

5. AREAS SUBJECT TO WIND EROSION SHALL USE APPROPRIATE DUST CONTROL MEASURES INCLUDING THE APPLICATION OF A FINE SPRAY OF WATER, PLASTIC SHEETING, STRAW MULCHING, OR OTHER APPROVED MEASURES.

6. CONSTRUCTION ENTRANCES SHALL BE INSTALLED AT THE BEGINNING OF CONSTRUCTION AND MAINTAINED FOR THE DURATION OF THE PROJECT. ADDITIONAL MEASURES INCLUDING, BUT NOT LIMITED TO, TIRE WASHES, STREET SWEEPING, AND VACUUMING MAYBE REQUIRED TO INSURE THAT ALL PAVED AREAS ARE KEPT CLEAN FOR THE DURATION OF THE PROJECT.

7. ACTIVE INLETS TO STORM WATER SYSTEMS SHALL BE PROTECTED THROUGH THE USE OF APPROVED INLET PROTECTION MEASURES. ALL INLET PROTECTION MEASURES ARE TO BE REGULARLY INSPECTED AND MAINTAINED AS NEEDED.

8. SATURATED MATERIALS THAT ARE HAULED OFF-SITE MUST BE TRANSPORTED IN WATER-TIGHT TRUCKS TO ELIMINATE SPILLAGE OF SEDIMENT AND SEDIMENT-LADEN WATER.

9. AN AREA SHALL BE PROVIDED FOR THE WASHING OUT OF CONCRETE TRUCKS IN A LOCATION THAT DOES NOT PROVIDE RUN-OFF THAT CAN ENTER THE STORM WATER SYSTEM. IF THE CONCRETE WASH-OUT AREA CAN NOT BE CONSTRUCTED GREATER THAN 50' FROM ANY DISCHARGE POINT, SECONDARY MEASURES SUCH AS BERMS OR TEMPORARY SETTTLING PITS MAY BE REQUIRED. THE WASH-OUT SHALL BE LOCATED WITHIN SIX FEET OF TRUCK ACCESS AND BE CLEANED WHEN IT REACHES 50% OF THE CAPACITY.

10. SWEEPINGS FROM EXPOSED AGGREGATE CONCRETE SHALL NOT BE TRANSFERRED TO THE STORM WATER SYSTEM, SWEEPINGS SHALL BE PICKED UP AND DISPOSED IN THE TRASH.

11. AVOID PAVING IN WET WEATHER WHEN PAVING CHEMICALS CAN RUN-OFF INTO THE STORM WATER SYSTEM.

12. USE BMPS SUCH AS CHECK-DAMS, BERMS, AND INLET PROTECTION TO PREVENT RUN-OFF FROM REACHING DISCHARGE POINTS.

13. COVER CATCH BASINS, MANHOLES, AND OTHER DISCHARGE POINTS WHEN APPLYING SEAL COAT, TACK COAT, ETC. TO PREVENT INTRODUCING THESE MATERIALS TO THE STORM WATER SYSTEM.

GENERAL NOTES:

1. THE EROSION AND SEDIMENT CONTROL (ESC) PLANS SHOWN ARE FOR GENERAL GUIDANCE PURPOSES ONLY. IMPLEMENTATION OF THE ESC PLAN AND THE CONSTRUCTION, MAINTENANCE, REPLACEMENT, AND UPGRADING OF ESC FACILITIES WHICH CONFORM TO PORT OF PORTLAND (PORT) ESC REQUIREMENTS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR UNTIL ALL CONSTRUCTION IS COMPLETED AND APPROVED. STAGE EROSION CONTROL WITH CONSTRUCTION PHASING. EROSION CONTROL MAY NOT BE INSTALLED IN WORK AREA NOT OCCUPIED BY CONTRACTOR UNLESS OTHERWISE DIRECTED BY THE PORT.

2. THE ESC MEASURES SHALL BE IN PLACE PRIOR TO ANY GROUND-DISTURBING WORK OR PAVEMENT REMOVAL UNLESS OTHERWISE APPROVED BY THE PORT.

3. THE ESC MEASURES SHALL REMAIN FUNCTIONAL AND IN PLACE UNTIL THEY HAVE SERVED THEIR INTENDED PURPOSE AND THE WORK AREA HAS BEEN PERMANENTLY PROTECTED AND STABILIZED. CONTRACTOR TO RETURN TO SITE AND REMOVE ALL ESC WHEN NO LONGER NEEDED. RESTORE ALL AREAS DISTURBED BY REMOVAL OF THE ESC MEASURES. REMOVED ESC MEASURES SHALL BECOME PROPERTY OF THE CONTRACTOR.

4. THE ESC MEASURES SHOWN ON THE PLANS ARE MINIMUM REQUIREMENTS FOR THE ANTICIPATED SITE CONDITIONS. CONSTRUCT MEASURES IN CONJUNCTION WITH ALL EXCAVATION AND GRADING ACTIVITIES. DURING THE CONSTRUCTION PERIOD THESE MEASURES SHALL BE UPGRADED AS NEEDED TO INSURE THAT SEDIMENT AND SEDIMENT-LADEN WATER DOES NOT LEAVE THE CONSTRUCTION SITE, ENTER THE DRAINAGE SYSTEM, TRACK ON ROADWAYS, OR VIOLATE APPLICABLE WATER STANDARDS.

5. INSPECT ESC MEASURES DAILY AND MAINTAIN AS NECESSARY TO ENSURE THEIR CONTINUED FUNCTIONING.

6. ESC MEASURES ON AN INACTIVE SITE(S) SHALL BE INSPECTED AND MAINTAINED A MINIMUM OF EVERY 2 WEEKS OR WITHIN 24 HOURS FOLLOWING A STORM EVENT (DEFINED AS 1/2" OF RAIN OR MORE DURING A 24-HOUR PERIOD).

7. THE PORT HAS A NPDES GENERAL PERMIT 1200-CA.

8. THE PERMITTEE IS REQUIRED TO MEET ALL THE CONDITIONS OF THE 1200-CA PERMIT. THIS ESCP AND GENERAL CONDITIONS HAVE BEEN DEVELOPED TO FACILITATE COMPLIANCE WITH THE 1200-CA PERMIT REQUIREMENTS. IN CASES OF DISCREPANCIES OR OMISSIONS, THE 1200-CA PERMIT REQUIREMENTS SUPERCEDE REQUIREMENTS OF THIS PLAN.

9. ALL CATCH BASINS, INLETS, AND STORM LINES SHALL BE CLEANED PRIOR TO ACCEPTANCE OF THE PROJECT. THE CLEANING OPERATION SHALL NOT FLUSH SEDIMENT-LADEN WATER INTO THE DOWNSTREAM SYSTEM.

10. IMPLEMENT ESC MEASURES AS REQUIRED OR DIRECTED BY THE PORT TO CONTROL EROSION AND SEDIMENT FROM DEWATERING OPERATIONS. LAND APPLY DISCHARGE FROM DEWATERING OPERATIONS WHENEVER POSSIBLE.

11. EROSION CONTROL MEASURES, ANY ASSOCIATED UPGRADES, AND REMOVAL AND RESTORATION EFFORTS SHALL BE CONSIDERED INCIDENTAL TO OTHER ITEMS OF WORK ON THE PROJECT.

12. SEEDING SHALL BE PERFORMED DURING THE PERIOD BETWEEN SEPTEMBER 1 AND OCTOBER 15, UNLESS OTHERWISE APPROVED OR DIRECTED BY THE PORT. SEEDING ON STOCKPILE AREAS SHALL BE COMPLETED PRIOR TO SEPTEMBER 1.

13. ALL GRADED OR DISTURBED UNPAVED SURFACES SHALL BE PERMANENTLY STABILIZED BY SEEDING, OR WHERE APPROVED.

14. THE ESCP MEASURES SHOWN ON THIS PLAN ARE MINIMUM REQUIREMENTS FOR ANTICIPATED SITE CONDITIONS. DURING THE CONSTRUCTION PERIOD, UPGRADE THESE MEASURES AS NEEDED TO COMPLY WITH ALL APPLICABLE LOCAL, STATE AND FEDERAL EROSION AND SEDIMENT CONTROL REGULATIONS.

15. CONTRACTOR IS RESPONSIBLE FOR PROVIDING A EROSION AND SEDIMENT CONTROL INSPECTOR THAT SHALL BE CERTIFIED IN ONE OF THE ACCEPTABLE CERTIFICATIONS REQUIRED IN THE 1200-CA PERMIT.

16. PRIOR TO START OF CONSTRUCTION CONTRACTOR SHALL TRANSFER OWNERSHIP OF 1200-CA PERMIT FROM PORT OF PORTLAND TO CONTRACTOR'S REPRESENTATIVE.

17. ALL STOCKPILED SOILS MUST BE COVERED WITH PLASTIC SHEETING DURING THE WET WEATHER PERIOD, OCTOBER 1 - MAY 31.

18. THESE EROSION AND SEDIMENT CONTROL PLANS ASSUME "DRY WEATHER" CONSTRUCTION. "WET WEATHER" CONSTRUCTION MEASURES NEED TO BE APPLIED BETWEEN OCTOBER 1 AND MAY 31.

19. DEWATERING FOR UTILITY INSTALLATION, UNCLASSIFIED EXCAVATION, AND/OR UNSUITABLE EXCAVATION MUST MEET REQUIREMENTS OF SECTION 312319. BIOFILTER BAGS SHALL BE USED FOR ALL DEWATERING OPERATIONS.

DATE

BY

REVISION

DATE

BY

REVISION

PORT OF PORTLAND

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WHPacific

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2019D013

DESIGN NUMBER

Geosyntec

consultants

920 SW 6TH AVE STE 600, PORTLAND, OR 97204
TEL. 503-222-9518

102695

PROJECT NUMBER

TERMINAL 4

BASIN M STORMWATER IMPROVEMENTS

EROSION AND SEDIMENT CONTROL NOTES

SUBMITTED BY

DESIGN BY

DRAWN BY

CHECKED BY

DATE

SHEET NO.

DRAWING NO.

ROGER ANDERSON

T. TRAN

T. TRAN

J. SHUTE, D. PANKANI

FEB 2021

8

T4 2021-500

TYPE: CD

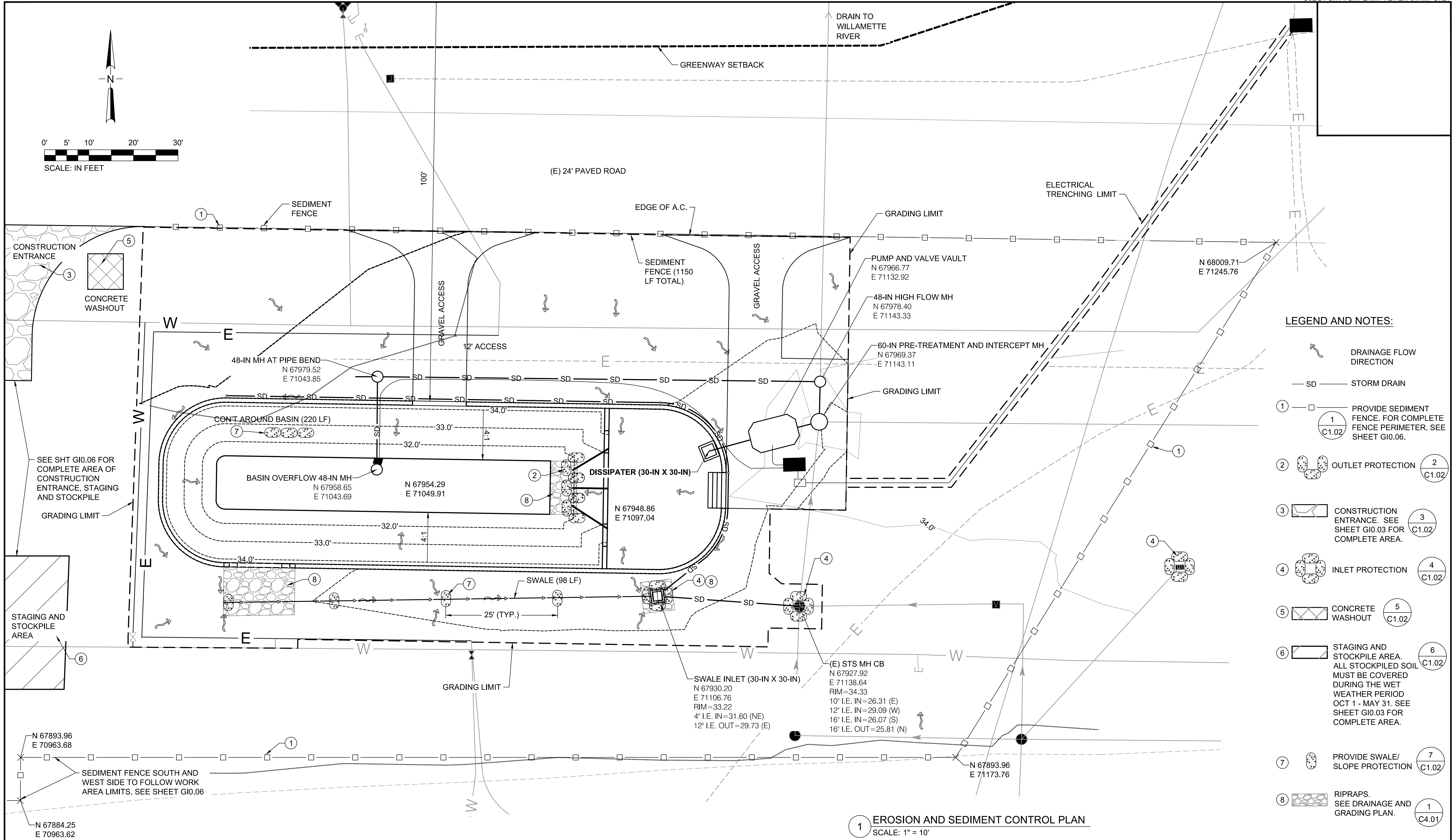
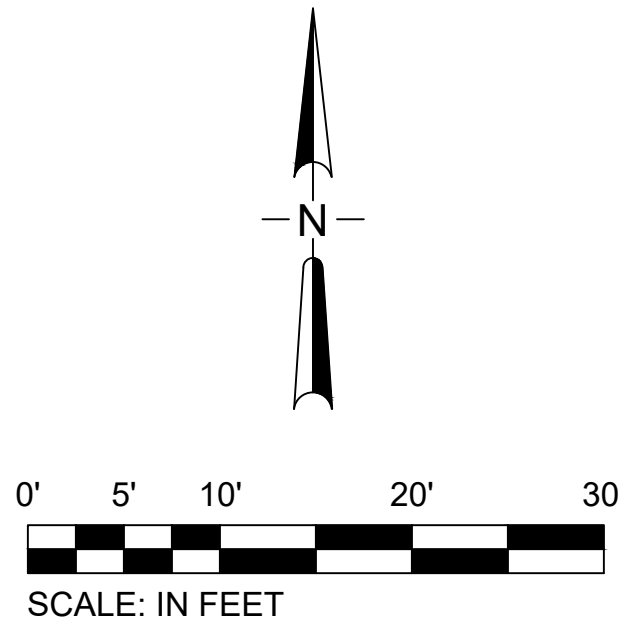
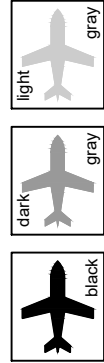
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IF ELECTRONIC SIGNATURE IS BROKEN OR MISSING - THIS IS NOT A LEGAL DRAWING

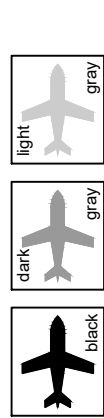
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2019D013 DESIGN NUMBER	102695 PROJECT NUMBER
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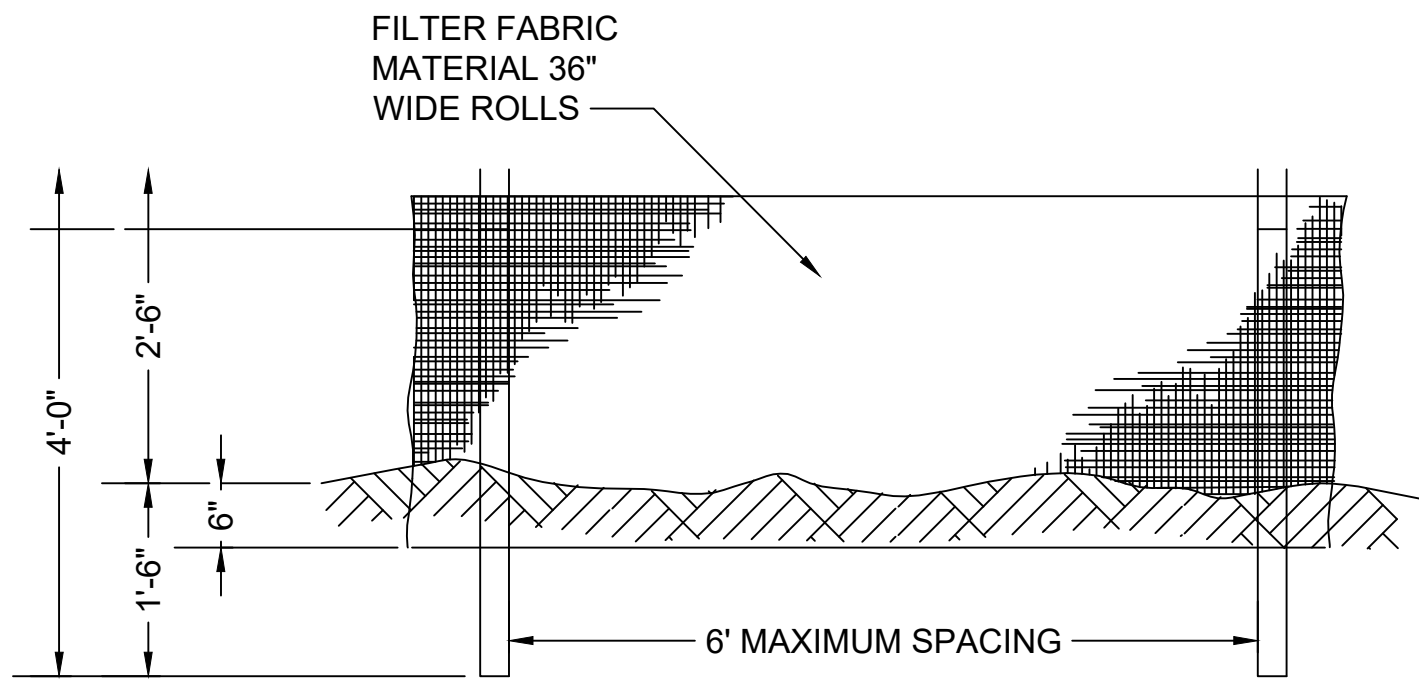
TERMINAL 4
BASIN M STORMWATER IMPROVEMENTS
EROSION AND SEDIMENT CONTROL PLAN

SUBMITTED BY	ROGER ANDERSON	
DESIGN BY	T. TRAN	
DRAWN BY	T. TRAN	
CHECKED BY	J. SHUTE, D. PANKANI	
DATE	FEB 2021	
SHEET NO.	9	TYPE: CD
DRAWING NO.	T4 2021-500	DISC. SHT. NO. C1.01

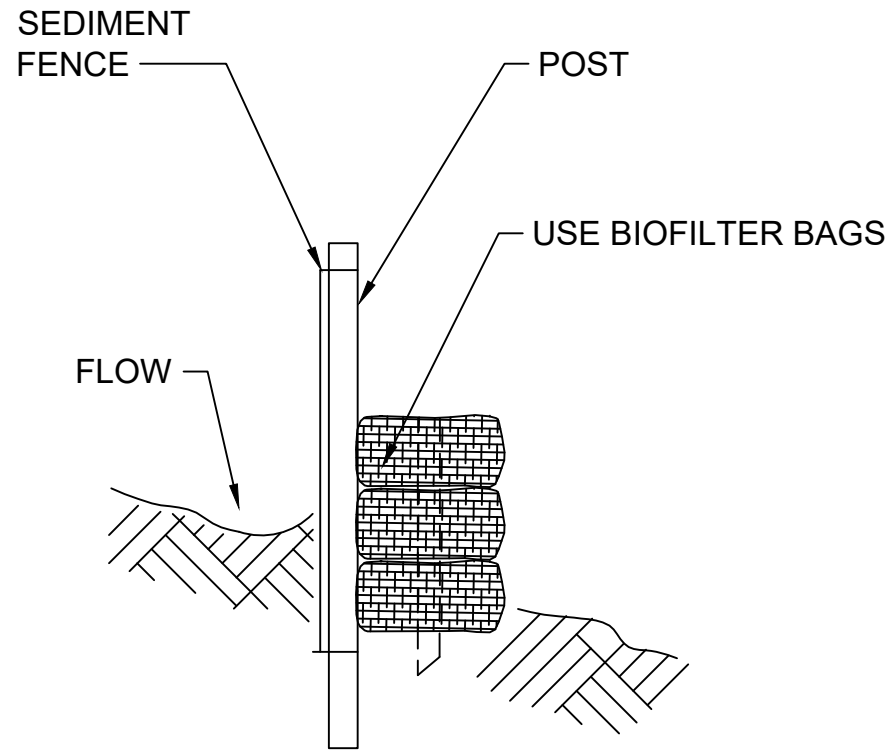


CAN YOU SEE THE AIRPLANES? THE ADJACENT SAMPLES SHOW THREE DIFFERENT LEVELS OF SHADING. SETTINGS FOR VIEWING AND PRINTING DRAWING CONTENT ARE OPTIMIZED WHEN ALL THREE PLANES ARE VISIBLE. THIS GUIDANCE IS PROVIDED FOR REFERENCE ONLY.

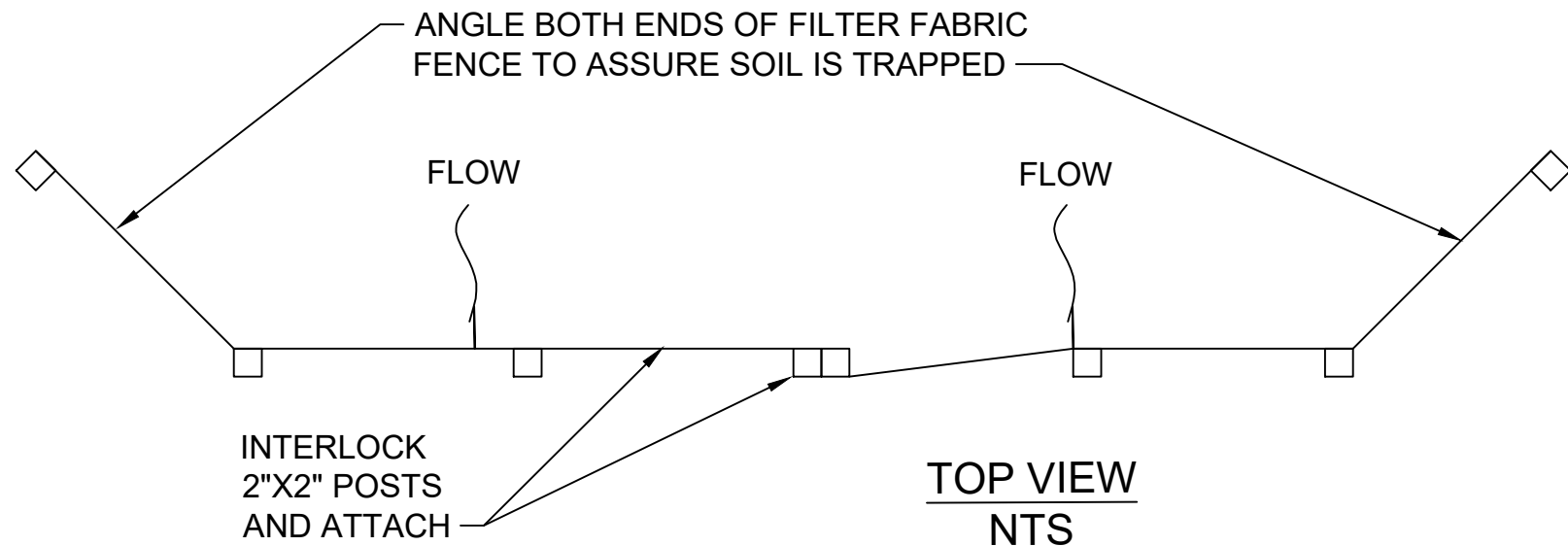
THE AREA BELOW IS TO BE LEFT BLANK - FOR USE BY CITY FOR PERMIT REVIEW STAMP ONLY.



FRONT VIEW
NTS

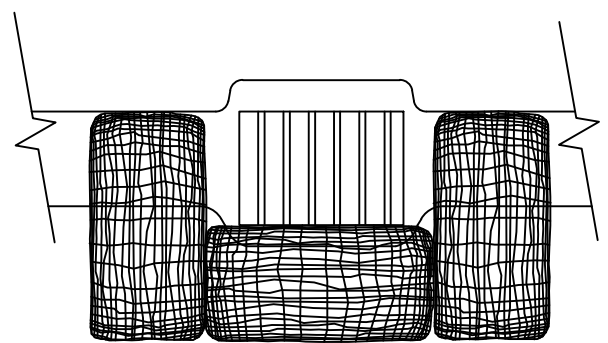
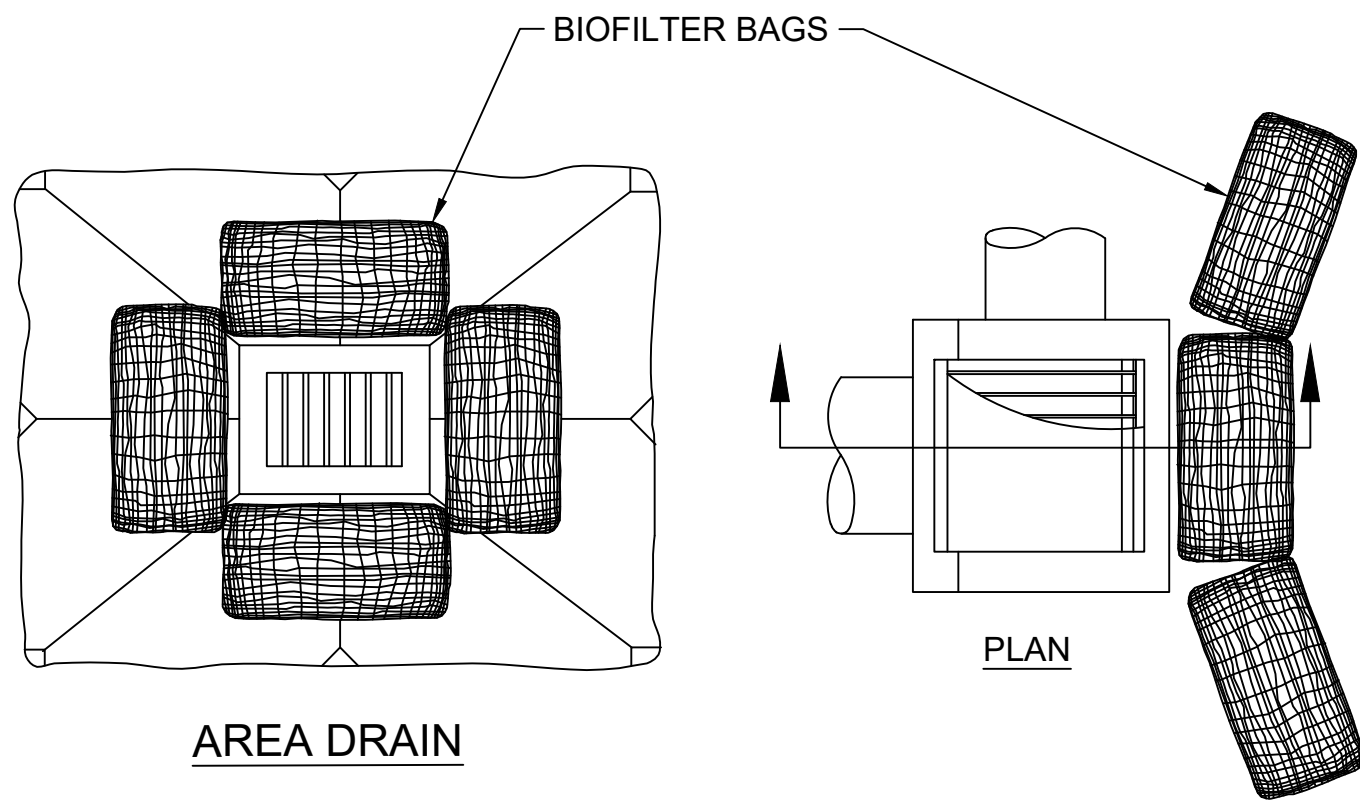


SIDE VIEW
NTS



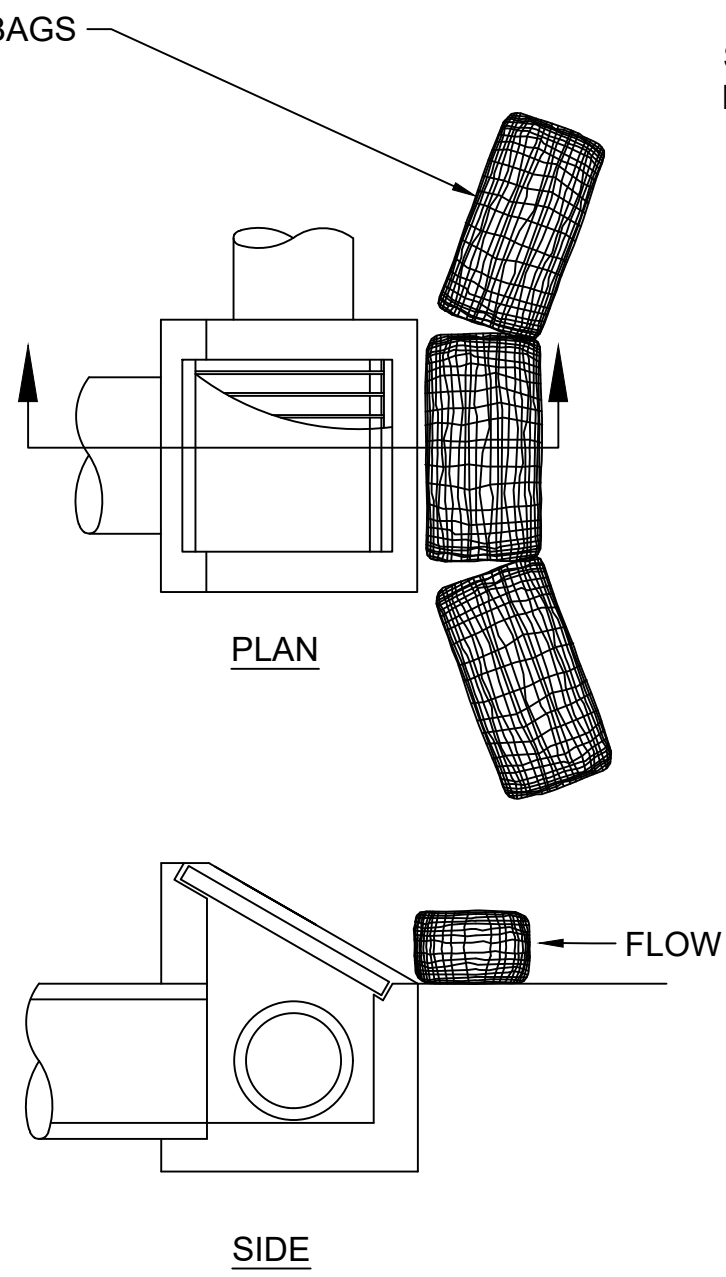
TOP VIEW
NTS

1 SEDIMENT FENCE
SCALE: NTS



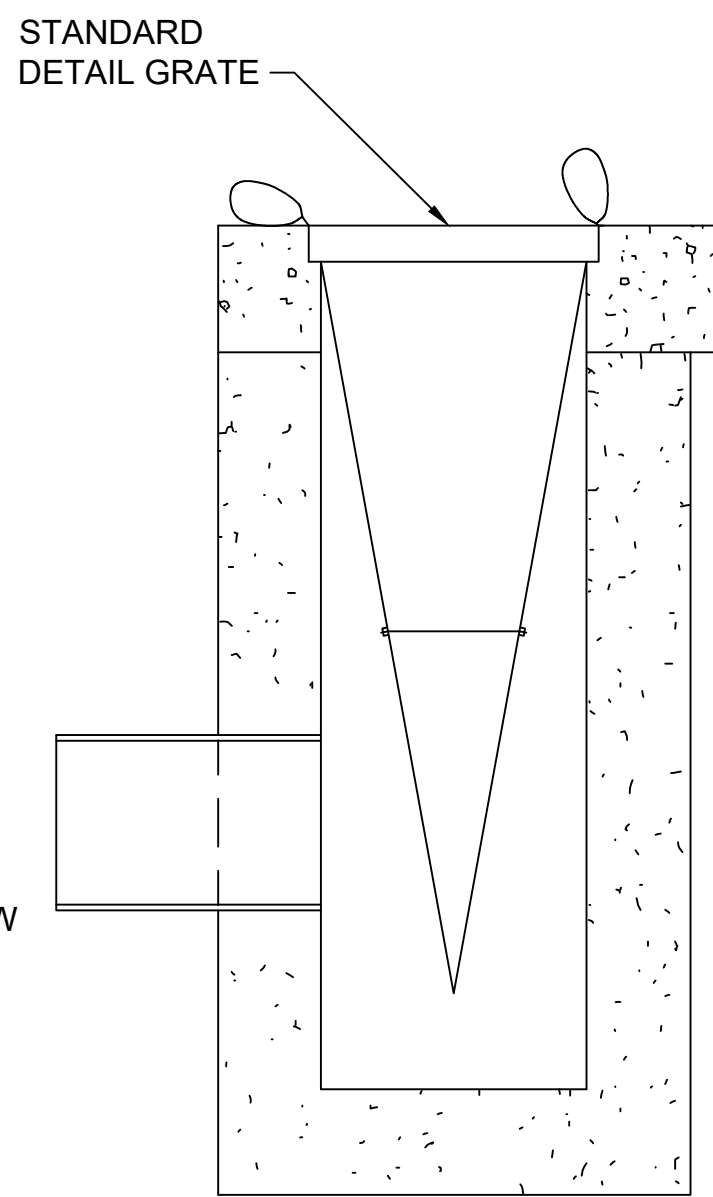
AREA DRAIN

CATCH BASIN

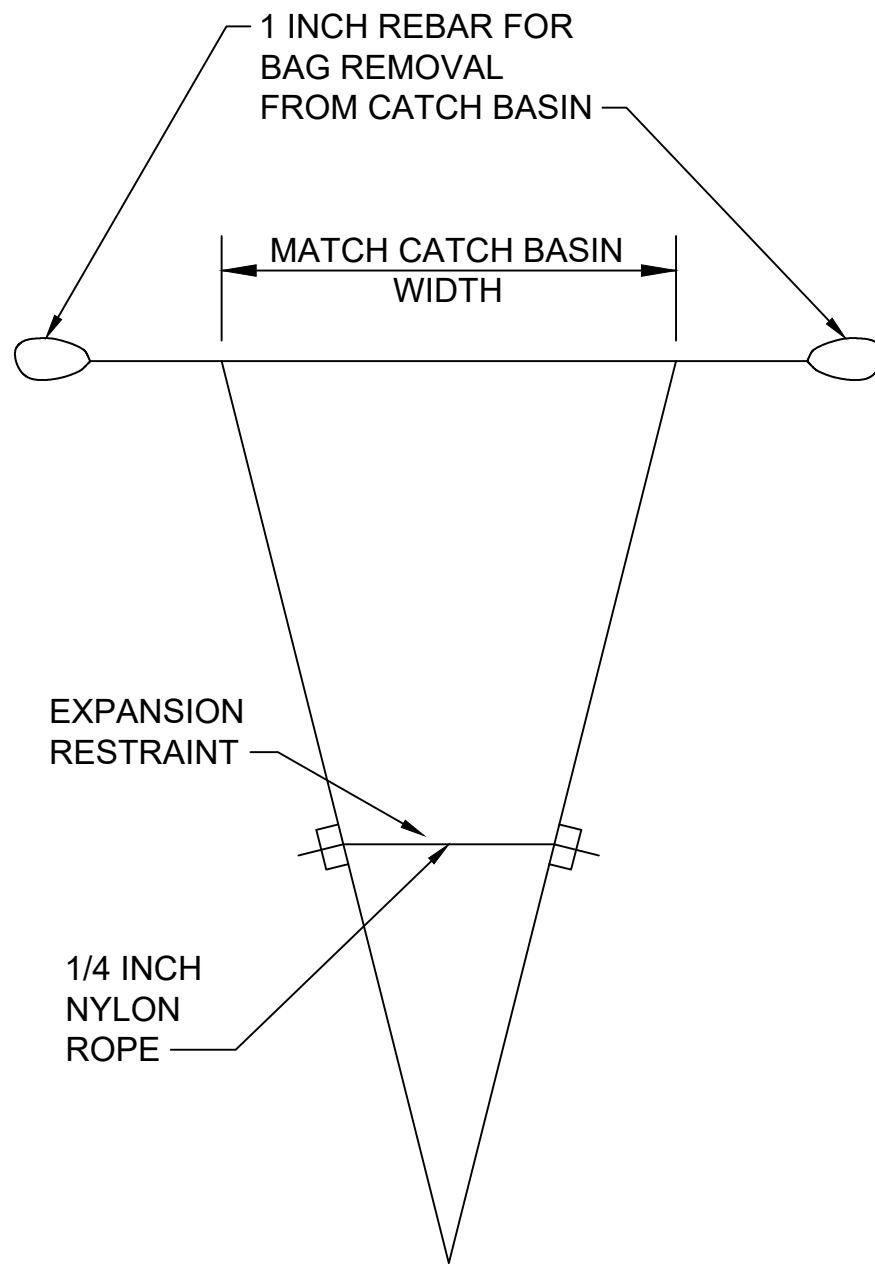


SIDE

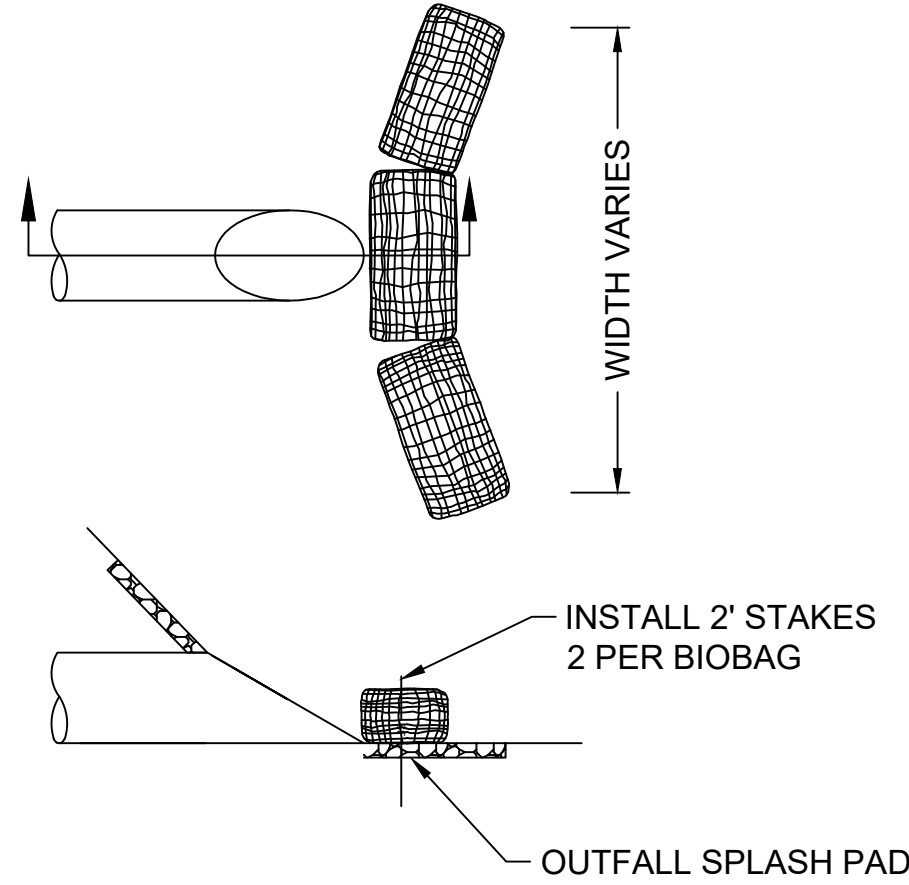
DITCH INLET



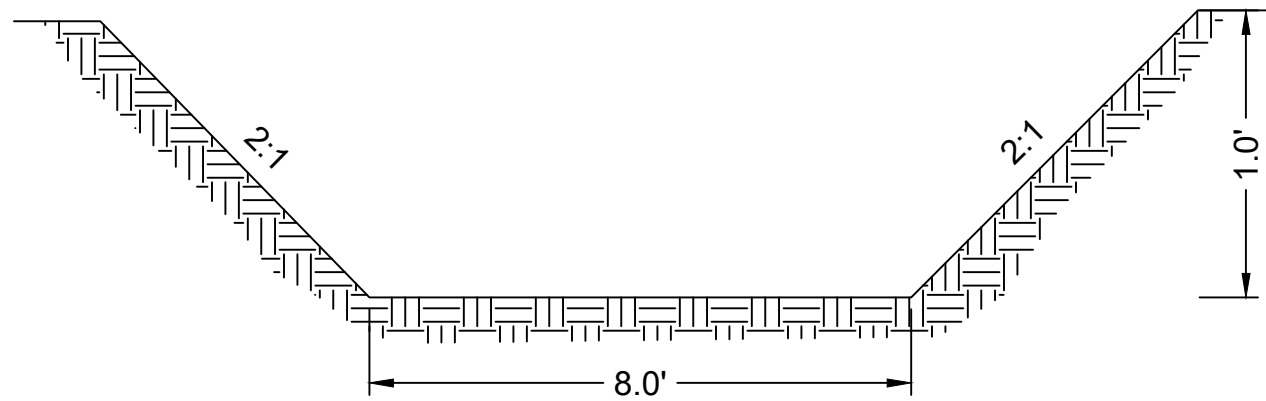
INSTALLATION DETAIL



SILT SACK DETAIL



2 OUTLET PROTECTION
SCALE: NTS

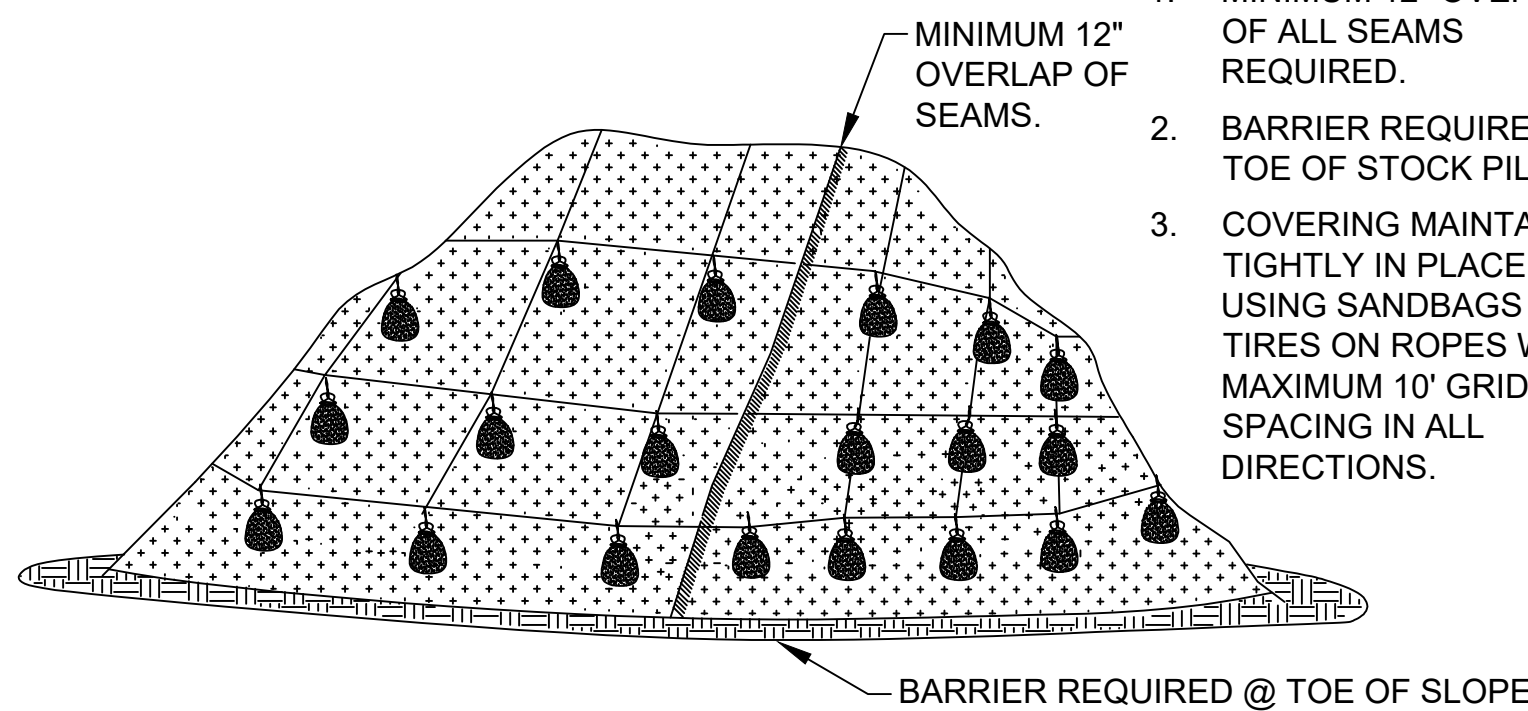


WASHOUT LENGTH TO BE 8'

NOTES:

1. USED FOR CONCRETE TRUCK WASHOUT ONLY. MAY BE LOCATED TO FACILITATE CONSTRUCTION.
2. DO NOT OVER FILL PIT.
3. THE PIT MUST BE LOCATED WITHIN 6' OF A ROADWAY AND DOES NOT HAVE TO BE LINED.
4. THE PIT MUST BE LOCATED WITHIN 6 FEET OF WHERE TRUCKS CAN PARK.
5. FULL CONCRETE PIT MUST BE HAULED OFF-SITE. NO ON-SITE DISCHARGE IS ALLOWED.
6. WASHOUT WATER SHOULD NOT BE RELEASED TO STORM DRAINS.

5 CONCRETE WASHOUT
SCALE: NTS



6 PLASTIC SHEETING FOR WET WEATHER
(OCT 1 - MAY 31)
SCALE: NTS

NOTES:

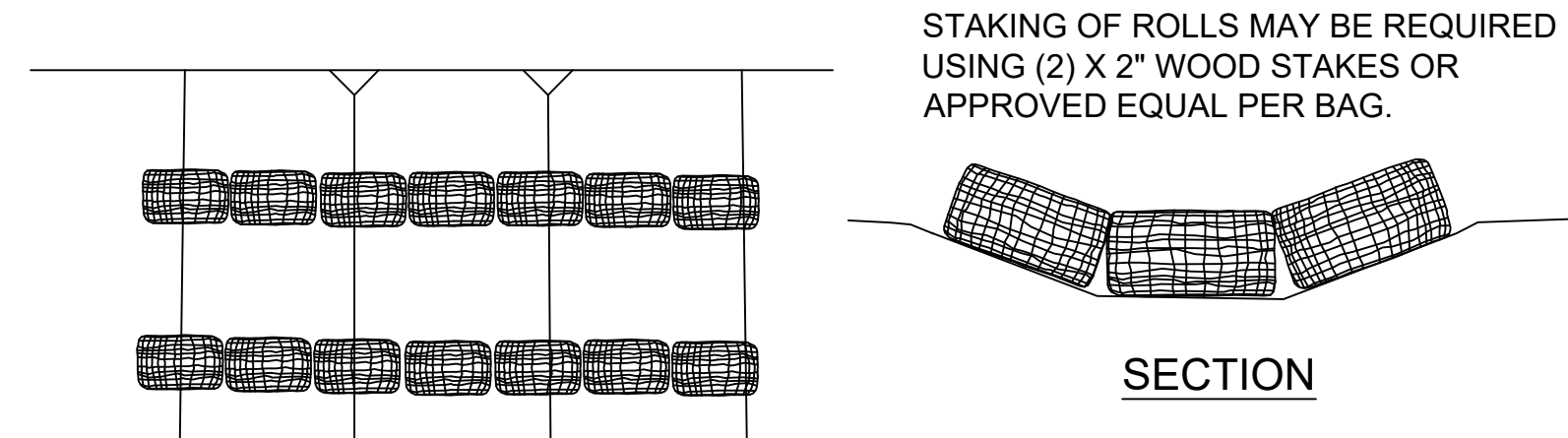
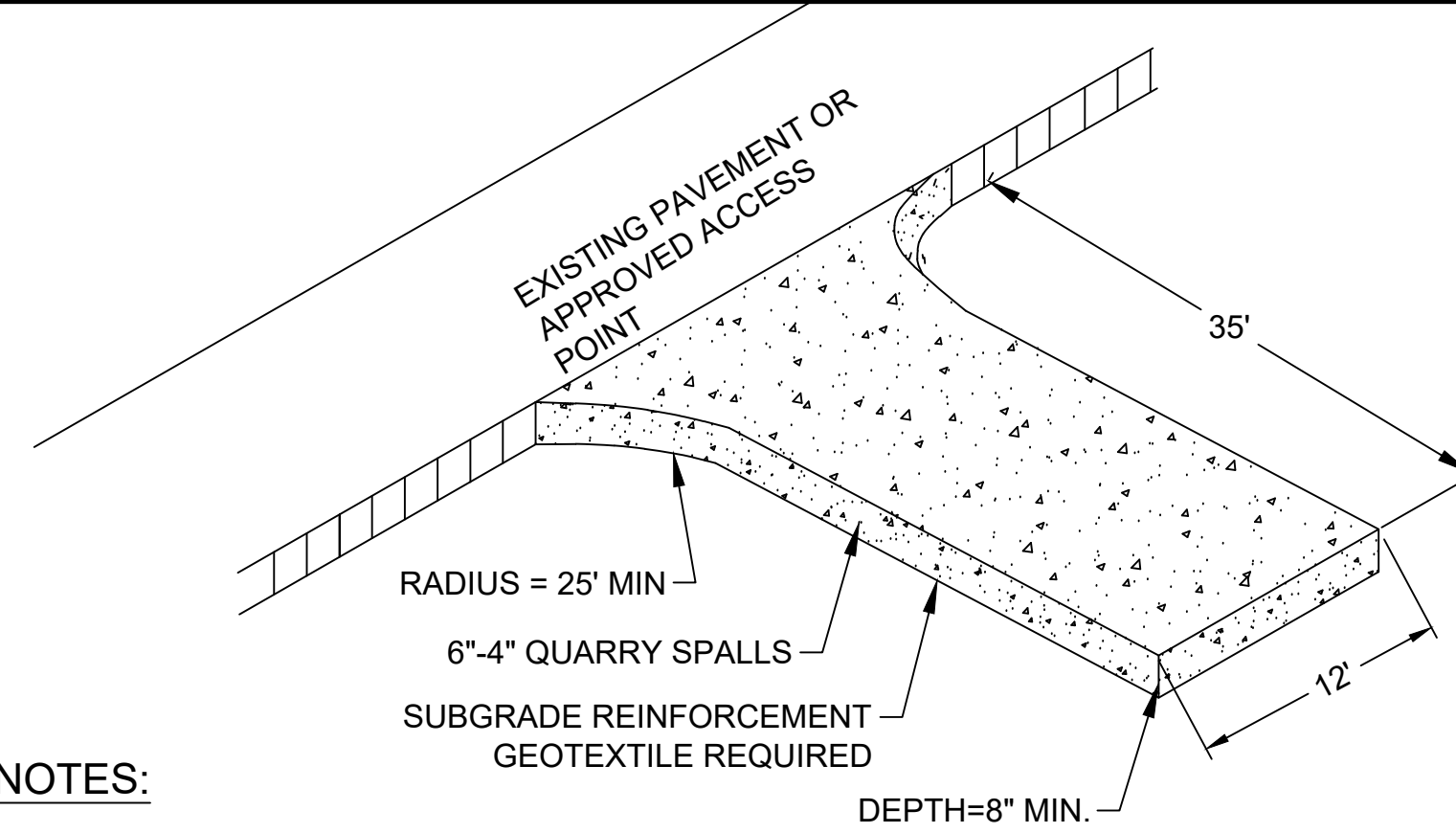
1. MINIMUM 12" OVERLAP OF ALL SEAMS REQUIRED.
2. BARRIER REQUIRED @ TOE OF STOCK PILE.
3. COVERING MAINTAINED TIGHTLY IN PLACE BY USING SANDBAGS OR TIRES ON ROPES WITH A MAXIMUM 10' GRID SPACING IN ALL DIRECTIONS.

BARRIER REQUIRED @ TOE OF SLOPE

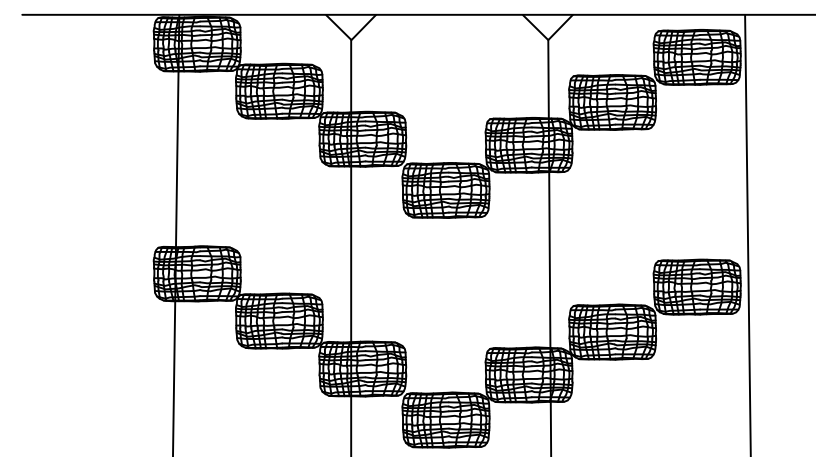
NOTES:

1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT-OF-WAYS. THIS MAY REQUIRE TOP DRESSING, REPAIR AND/OR CLEAN OUT OF ANY MEASURES USED TO TRAP SEDIMENT.
2. WHEN NECESSARY, WHEELS SHALL BE CLEANED PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF-WAY.
3. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN.
4. WHERE RUNOFF CONTAINING SEDIMENT LADEN WATER IS LEAVING THE SITE VIA THE CONSTRUCTION ENTRANCE, OTHER MEASURES SHALL BE IMPLEMENTED TO DIVERT RUNOFF THROUGH AN APPROVED FILTERING SYSTEM.

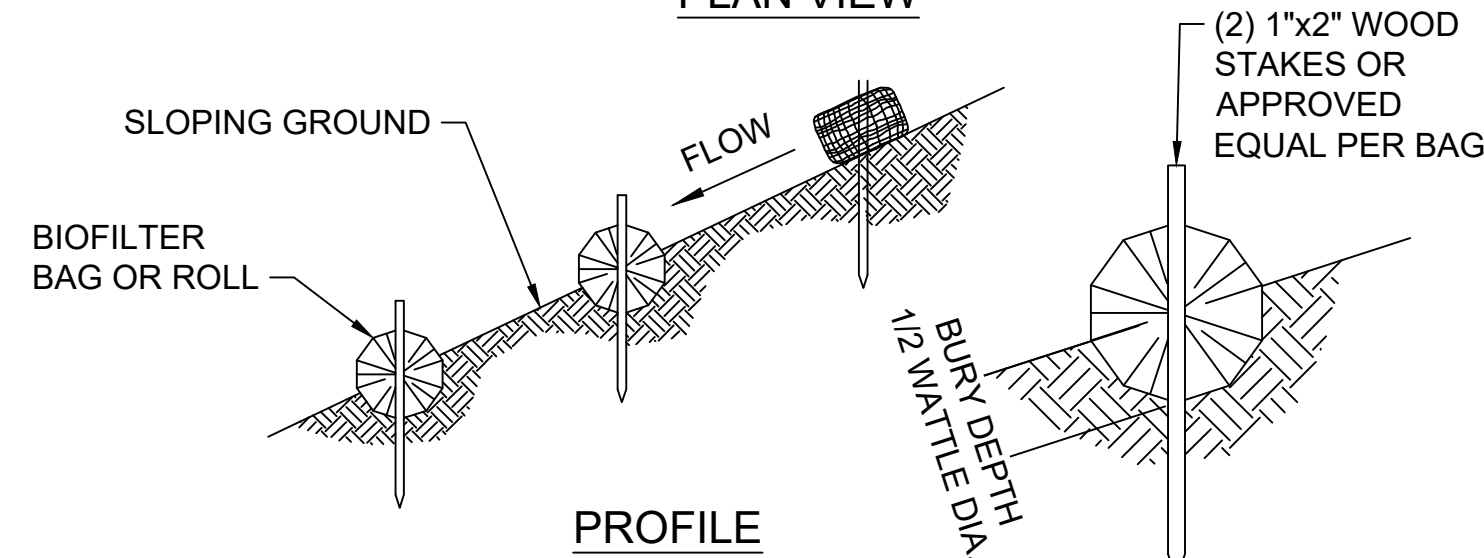
3 CONSTRUCTION ENTRANCE
SCALE: NTS



SWALE



PLAN VIEW



PROFILE

SLOPE

SECTION

7 SWALE/SLOPE PROTECTION
SCALE: NTS

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2019D013
DESIGN NUMBER

Geosyntec
consultants
920 SW 6TH AVE STE 600, PORTLAND, OR 97204
TEL. 503-222-9518

102695
PROJECT NUMBER

TERMINAL 4

BASIN M STORMWATER IMPROVEMENTS

EROSION AND SEDIMENT CONTROL DETAILS

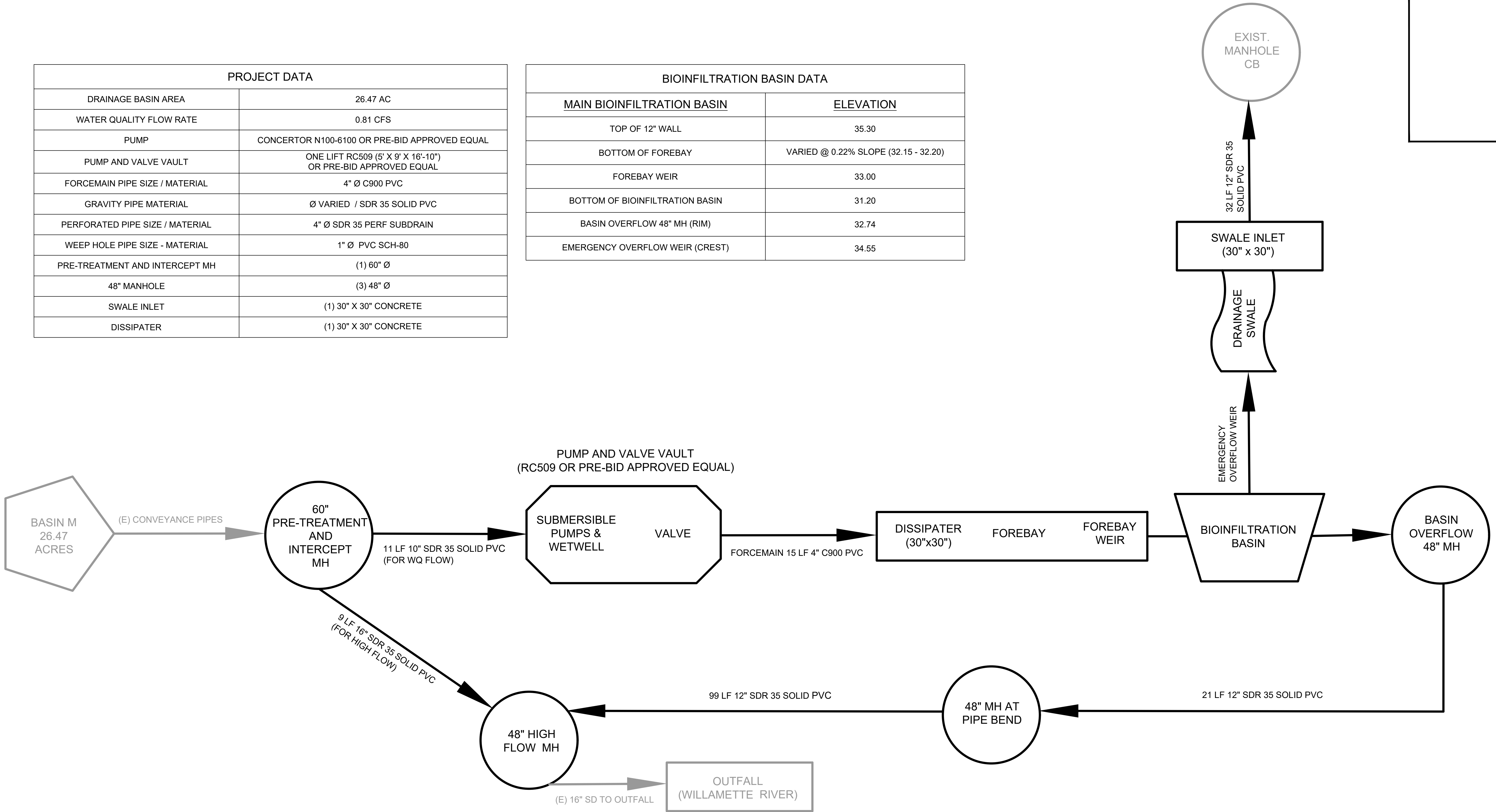
SUBMITTED BY	ROGER ANDERSON
DESIGN BY	T. TRAN
DRAWN BY	T. TRAN
CHECKED BY	J. SHUTE, D. PANKANI
DATE	FEB 2021
SHEET NO.	10
TYPE: CD	
DRAWING NO.	T4 2021-500
DISC. SHT. NO.	C1.02



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PROJECT DATA	
DRAINAGE BASIN AREA	26.47 AC
WATER QUALITY FLOW RATE	0.81 CFS
PUMP	CONCERTOR N100-6100 OR PRE-BID APPROVED EQUAL
PUMP AND VALVE VAULT	ONE LIFT RC509 (5' X 9' X 16'-10") OR PRE-BID APPROVED EQUAL
FORCEMAIN PIPE SIZE / MATERIAL	4" Ø C900 PVC
GRAVITY PIPE MATERIAL	Ø VARIED / SDR 35 SOLID PVC
PERFORATED PIPE SIZE / MATERIAL	4" Ø SDR 35 PERF SUBDRAIN
WEEP HOLE PIPE SIZE - MATERIAL	1" Ø PVC SCH-80
PRE-TREATMENT AND INTERCEPT MH	(1) 60" Ø
48" MANHOLE	(3) 48" Ø
SWALE INLET	(1) 30" X 30" CONCRETE
DISSIPATER	(1) 30" X 30" CONCRETE

BIOINFILTRATION BASIN DATA	
<u>MAIN BIOINFILTRATION BASIN</u>	<u>ELEVATION</u>
TOP OF 12" WALL	35.30
BOTTOM OF FOREBAY	VARIED @ 0.22% SLOPE (32.15 - 32.20)
FOREBAY WEIR	33.00
BOTTOM OF BIOINFILTRATION BASIN	31.20
BASIN OVERFLOW 48" MH (RIM)	32.74
EMERGENCY OVERFLOW WEIR (CREST)	34.55

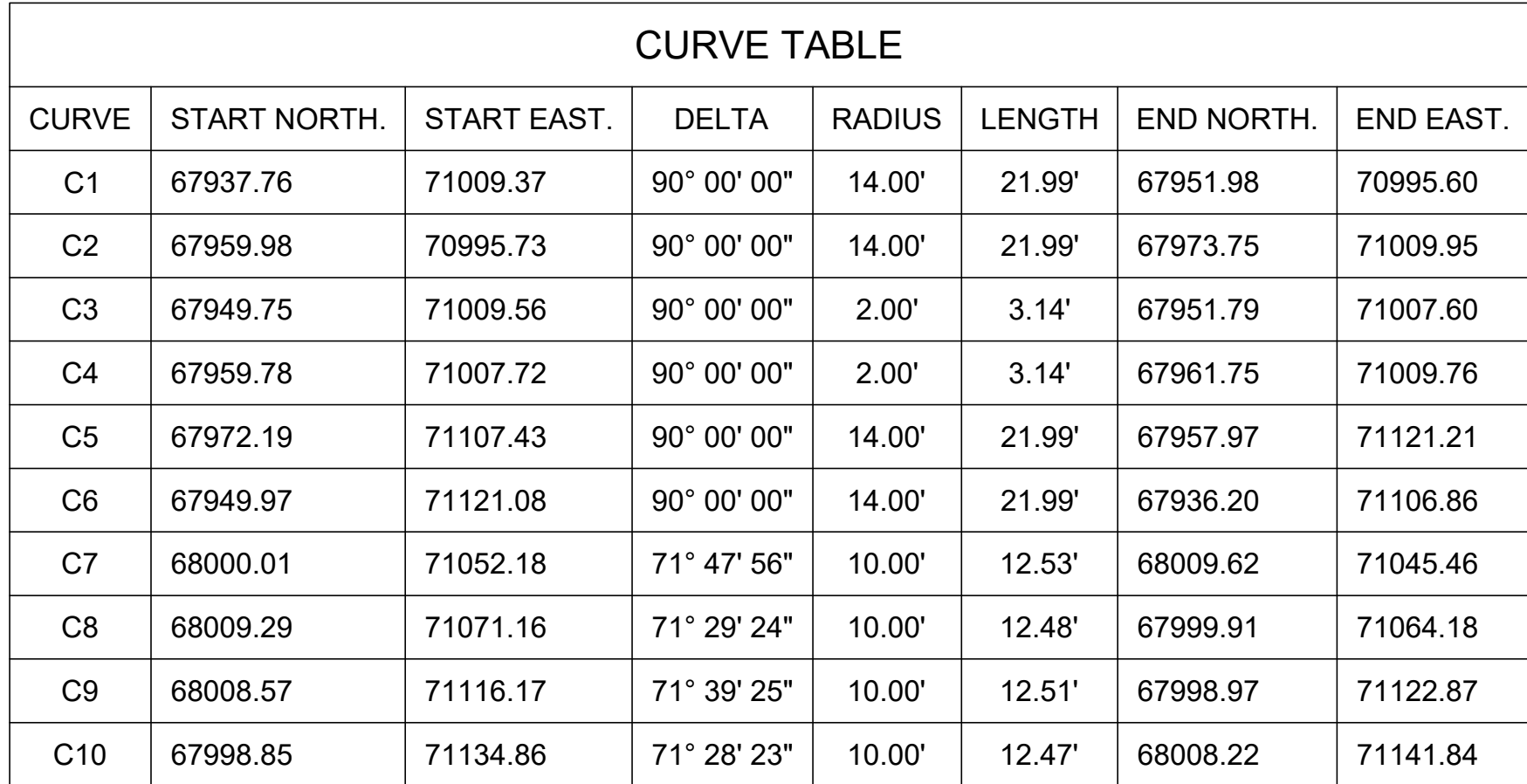


1 PROJECT SYSTEM OVERVIEW
SCALE: N.T.S.

[illegible]

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2019D013 _____ DESIGN NUMBER	102695 _____ PROJECT NUMBER

	TERMINAL 4	SUBMITTED BY	ROGER ANDERSON		
	BASIN M STORMWATER IMPROVEMENTS	DESIGN BY	T. TRAN		
		DRAWN BY	T. TRAN		
		CHECKED BY	J. SHUTE, D. PANKANI		
	PROJECT SYSTEM OVERVIEW	DATE	FEB 2021		
		SHEET NO.	11	TYPE: CD	
		DRAWING NO.	DISC. SHT. NO.		
T4 2021-500		C2.01			



POINT	FG	NORTH.	EAST.	NOTE
1	31.20	67949.75	71009.56	INFILTR. BASIN BOT.
2	31.20	67951.79	71007.60	INFILTR. BASIN BOT.
3	31.20	67959.78	71007.72	INFILTR. BASIN BOT.
4	31.20	67961.75	71009.76	INFILTR. BASIN BOT.
5	31.20	67960.58	71082.75	INFILTR. BASIN BOT.
6	31.20	67948.59	71082.55	INFILTR. BASIN BOT.
7	34.14	67936.50	71025.35	FG EXTERIOR
8	34.20	67937.50	71025.37	INTERIOR TOP BANK
9	34.55	67936.60	71022.35	EMERG. WEIR CREST
10	34.55	67937.50	71022.37	EMERG. WEIR CREST
11	34.55	67936.76	71012.36	EMERG. WEIR CREST
12	34.55	67937.66	71012.37	EMERG. WEIR CREST
13	34.30	67936.76	71009.36	FG EXTERIOR
14	34.20	67937.76	71009.37	INTERIOR TOP BANK
15	34.54	67951.99	70994.60	FG EXTERIOR
16	34.20	67951.98	70995.60	INTERIOR TOP BANK
17	34.71	67959.99	70994.73	FG EXTERIOR
18	34.20	67959.98	70995.73	INTERIOR TOP BANK
19	34.94	67974.75	71009.96	FG EXTERIOR
20	34.20	67973.75	71009.95	INTERIOR TOP BANK
21	34.45	67974.08	71051.76	FG EXTERIOR
22	34.20	67973.08	71051.75	INTERIOR TOP BANK
23	34.45	67973.89	71063.76	FG EXTERIOR
24	34.20	67972.89	71063.75	INTERIOR TOP BANK
25	34.01	67973.19	71107.45	FG EXTERIOR

GEOMETRIC POINT TABLE				
POINT	FG	NORTH.	EAST.	NOTE
26	32.17	67972.18	71107.43	FOREBAY BOTTOM
27	33.78	67957.95	71122.21	FG EXTERIOR
28	32.20	67957.98	71121.20	FOREBAY BOTTOM
29	33.70	67949.95	71122.08	FG EXTERIOR
30	32.20	67949.96	71121.07	FOREBAY BOTTOM
31	33.33	67935.20	71106.84	FG EXTERIOR
32	32.17	67936.21	71106.86	FOREBAY BOTTOM
33	34.20	67936.38	71095.36	INTERIOR TOP BANK
34	34.20	67936.40	71094.36	INTERIOR TOP BANK
35	34.20	67941.38	71095.44	FOREBAY WEIR TOP WALL
36	34.20	67941.39	71094.44	FOREBAY WEIR TOP WALL
37	33.00	67946.38	71095.52	FOREBAY WEIR CREST
38	33.00	67946.39	71094.52	FOREBAY WEIR CREST
39	33.00	67962.38	71095.78	FOREBAY WEIR CREST
40	33.00	67962.39	71094.78	FOREBAY WEIR CREST
41	34.20	67967.38	71095.86	FOREBAY WEIR TOP WALL
42	34.20	67967.39	71094.86	FOREBAY WEIR TOP WALL
43	34.20	67972.37	71095.94	INTERIOR TOP BANK
44	34.20	67972.39	71094.94	INTERIOR TOP BANK
45	34.87	68000.01	71052.18	GRAVEL ACCESS
46	35.07	68009.62	71045.46	GRAVEL ACCESS
47	35.17	68012.42	71037.38	MATCH (E) GRADE
48	34.93	68011.89	71079.37	MATCH (E) GRADE
49	34.93	68009.29	71071.16	GRAVEL ACCESS
50	34.82	67999.91	71064.18	GRAVEL ACCESS

[illegible]

LINE TABLE						
LINE #	START NORTH.	START EAST.	DIRECTION	LENGTH	END NORTH.	END EAST.
L1	67936.40	71094.36	N89° 04' 58.86"W	85.00'	67937.76	71009.37
L2	67951.98	70995.60	N0° 55' 01.14"E	8.00'	67959.98	70995.73
L3	67973.75	71009.95	S89° 04' 58.86"E	85.00'	67972.39	71094.94
L4	67972.39	71094.94	S0° 55' 01.14"W	36.00'	67936.40	71094.36
L5	67948.59	71082.55	N89° 04' 58.86"W	73.00'	67949.75	71009.56
L6	67951.79	71007.60	N0° 55' 01.14"E	8.00'	67959.78	71007.72
L7	67961.75	71009.76	S89° 04' 58.86"E	73.00'	67960.58	71082.75
L9	67936.20	71106.86	N89° 04' 58.86"W	11.50'	67936.38	71095.36
L10	67936.38	71095.36	N0° 55' 01.14"E	36.00'	67972.37	71095.94
L11	67972.37	71095.94	S89° 04' 58.86"E	11.50'	67972.19	71107.43
L12	67957.97	71121.21	S0° 55' 01.14"W	8.00'	67949.97	71121.08
L13	67974.08	71051.76	N0° 55' 01.14"E	25.94'	68000.01	71052.18
L14	67999.91	71064.18	S0° 55' 01.14"W	26.03'	67973.89	71063.76

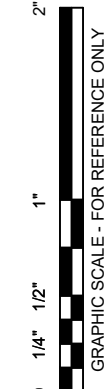
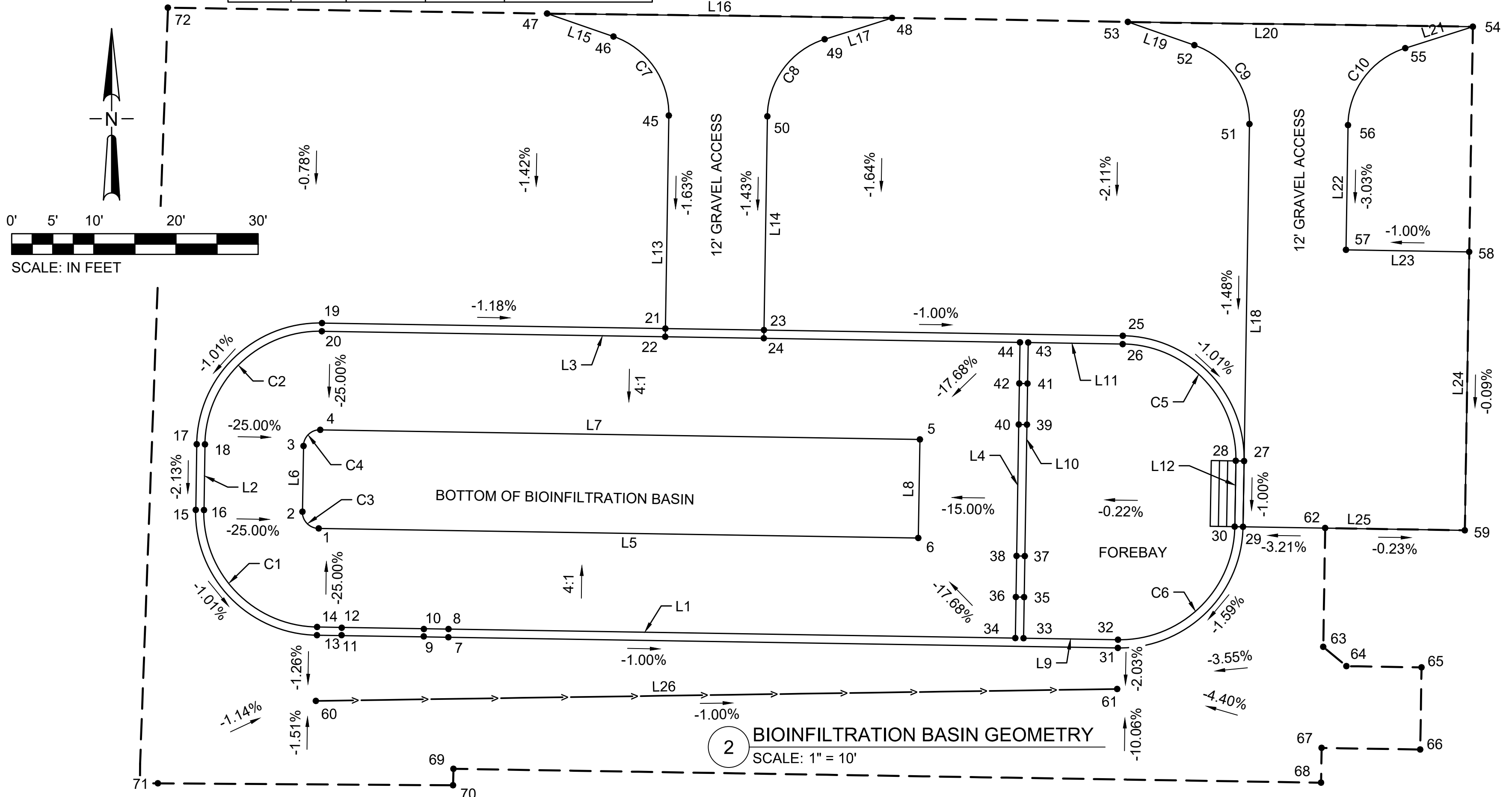
GEOMETRIC POINT TABLE				
POINT	FG	NORTH.	EAST.	NOTE
51	34.39	67998.97	71122.87	GRAVEL ACCESS
52	34.71	68008.57	71116.17	GRAVEL ACCESS
53	34.82	68011.40	71108.06	MATCH (E) GRADE
54	34.69	68010.83	71150.06	MATCH (E) GRADE
55	34.54	68008.22	71141.84	GRAVEL ACCESS

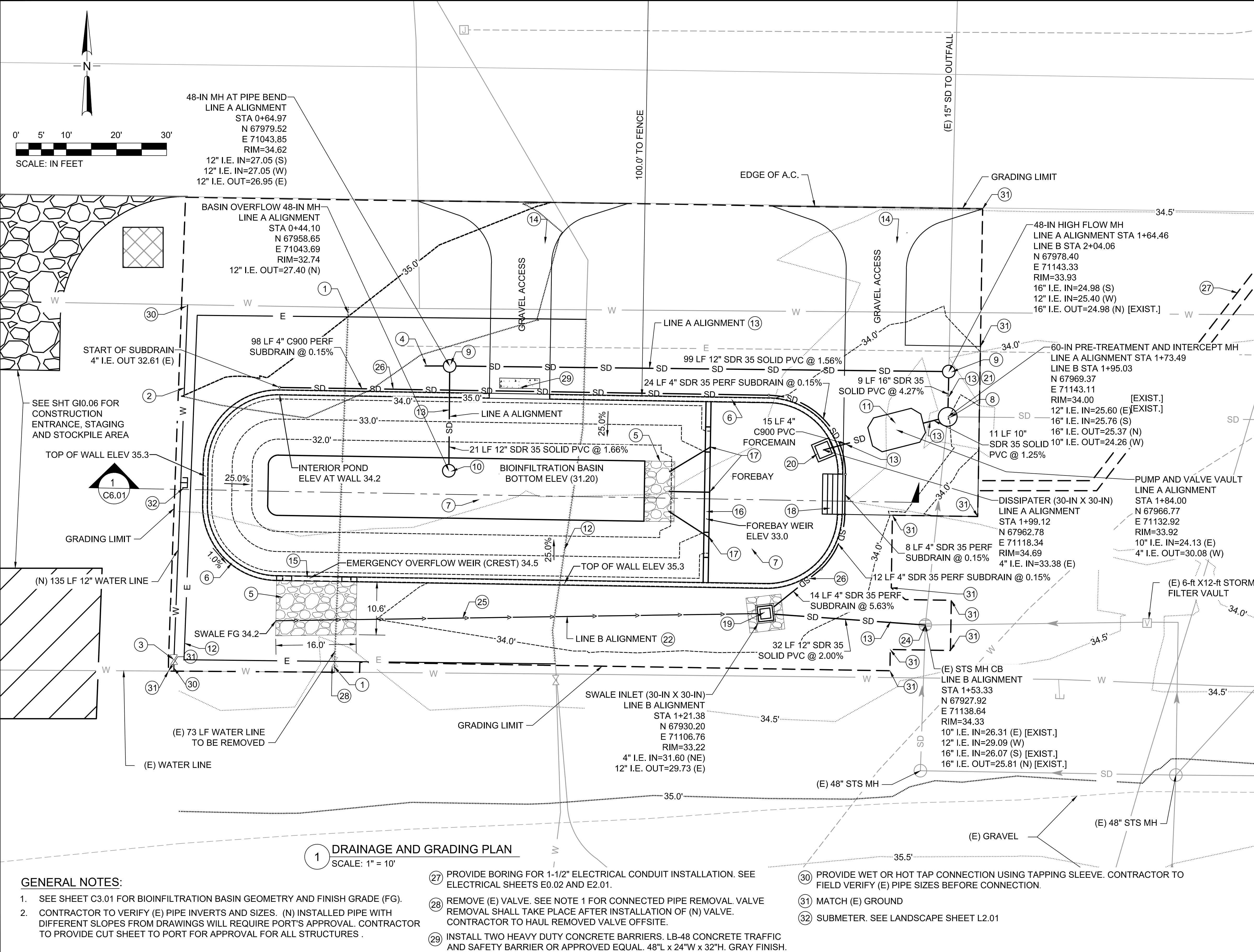
GEOMETRIC POINT TABLE				
POINT	FG	NORTH.	EAST.	NOTE
56	34.32	67998.85	71134.86	GRAVEL ACCESS
57	33.86	67983.66	71134.62	GRAVEL ACCESS
58	34.01	67983.42	71149.62	MATCH (E) GRADE
59	33.98	67949.52	71149.08	MATCH (E) GRADE
60	34.20	67928.76	71009.23	SWALE BOTTOM
61	33.22	67930.20	71106.76	SWALE BOTTOM

LINE TABLE						
LINE #	START NORTH.	START EAST.	DIRECTION	LENGTH	END NORTH.	END EAST.
L15	68009.62	71045.46	N70° 52' 54.76"W	8.55'	68012.42	71037.38
L16	68012.42	71037.38	S89° 16' 25.22"E	42.00'	68011.89	71079.37
L17	68011.89	71079.37	S72° 24' 25.13"W	8.62'	68009.29	71071.16
L18	67998.97	71122.87	S0° 55' 01.14"W	49.02'	67949.95	71122.08
L19	68011.40	71108.06	S70° 44' 24.08"E	8.58'	68008.57	71116.17
L20	68010.83	71150.06	N89° 12' 47.37"W	42.00'	68011.40	71108.06
L21	68008.22	71141.84	N72° 23' 24.45"E	8.62'	68010.83	71150.06
L22	67983.66	71134.62	N0° 55' 01.14"E	15.19'	67998.85	71134.86
L23	67983.42	71149.62	N89° 04' 58.86"W	15.00'	67983.66	71134.62
L24	67949.52	71149.08	N0° 55' 01.14"E	33.90'	67983.42	71149.62
L25	67949.95	71122.08	S89° 04' 58.86"E	27.00'	67949.52	71149.08
L26	67928.76	71009.23	N89° 09' 16.53"E	97.55'	67930.20	71106.76

GEOMETRIC POINT TABLE				
POINT	FG	NORTH.	EAST.	NOTE
62	34.02	67949.79	71132.08	MATCH (E) GRADE
63	34.20	67935.33	71131.85	MATCH (E) GRADE
64	34.22	67932.98	71134.67	MATCH (E) GRADE
65	34.21	67932.83	71143.81	MATCH (E) GRADE
66	34.43	67922.84	71143.65	MATCH (E) GRADE
67	34.36	67923.03	71131.65	MATCH (E) GRADE

GEOMETRIC POINT TABLE				
POINT	FG	NORTH.	EAST.	NOTE
68	34.46	67918.80	71131.58	MATCH (E) GRADE
69	34.51	67920.49	71025.96	MATCH (E) GRADE
70	34.34.45	37918.48	71025.91	MATCH (E) GRADE
71	34.45	67918.72	70989.99	MATCH (E) GRADE
72	35.32	68013.14	70991.21	MATCH (E) GRADE





- KEY NOTES:**

 - ① REMOVE (E) WATERLINE. CUT A MINIMUM OF 18" AT TEE. CAP AND GROUT END OF CUT. FILL WITH CLSM OR OTHER APPROVED MATERIAL. REMOVAL SHALL TAKE PLACE AFTER INSTALLATION OF (N) WATERLINE.
 - ② INSTALL (N) WATERLINE. MATCH (E) PIPE SIZE & MATERIAL OF REMOVED PIPE IN NOTE 1 ABOVE. CONTRACTOR TO FIELD VERIFY BEFORE CONSTRUCTION. POTHOLE IF NECESSARY. (ASSUME 12" C900 PVC FOR PIPE AND 2" VALVE FOR BIDDING.)
 - ③ INSTALL (N) WATER VALVE. 4
C6.03
 - ④ INSTALL 5-LF 12" STUB AND CAP FOR FUTURE FACILITY EXPANSION
 - ⑤ INSTALL RIPRAP. 5
C6.02
 - ⑥ INSTALL CONCRETE STEM WALL AND FOOTING FOR BIOINFILTRATION BASIN & FOREBAY 2
C6.01
 - ⑦ INSTALL FOREBAY AND BIOINFILTRATION BASIN 1
C6.01
 - ⑧ REMOVE (E) 48" MH. INSTALL (N) 60" PRETREATMENT AND INTERCEPT MH. SOLID LID. 4
C6.02 3
C6.02
 - ⑨ INSTALL 48" STANDARD MANHOLE. SOLID LID. 2
C6.02 3
C6.02
 - ⑩ INSTALL BASIN 48" OVERFLOW MANHOLE. 6
C6.02
 - ⑪ INSTALL PUMP STATION, WETWELL AND CONTROLS. ALSO, SEE SHEET E0.02 FOR ELECTRICAL COMPONENTS. 1
C6.10 1
C6.11
 - ⑫ REMOVE (E) UG ELECTRICAL AND INSTALL (N) LINE PER ELECTRICAL PLANS.
 - ⑬ INSTALL (N) STORM PIPES PER PLANS. TRENCH BACKFILL 1
C6.02
 - ⑭ INSTALL 12 FEET WIDE GRAVEL ACCESS 1
C6.03
 - ⑮ INSTALL EMERGENCY WEIR AT WALL 2
C6.03
 - ⑯ INSTALL FOREBAY WEIR 3
C6.03
 - ⑰ INSTALL WEEP HOLES 5
C6.03
 - ⑱ INSTALL FOREBAY STEPS 4
C6.01
 - ⑲ INSTALL SWALE INLET (30" x 30") 6
C6.03
 - ⑳ INSTALL DISSIPATER (30" x 30") 1
C6.04
 - ㉑ REMOVE (E) STORM PIPE. SIZE UNKNOWN. CONTRACTOR TO VERIFY.
 - ㉒ LINE A ALIGNMENT - STORM PIPE SYSTEM 1
C5.01
 - ㉓ LINE B ALIGNMENT - SWALE PROFILE 1
C5.02
 - ㉔ PIPE TO EXISTING MANHOLE CONNECTION 2
C6.04
 - ㉕ CONSTRUCT SWALE 3
C6.04
 - ㉖ PROVIDE 4" C900 PERF SUBDRAIN ALONG STEM WALL AND CONNECT TO SWALE INLET. 2
C6.01

1. SEE SHEET C3.01 FOR BIOINFILTRATION BASIN GEOMETRY AND FINISH GRADE (FG).
2. CONTRACTOR TO VERIFY (E) PIPE INVERTS AND SIZES. (N) INSTALLED PIPE WITH DIFFERENT SLOPES FROM DRAWINGS WILL REQUIRE PORT'S APPROVAL. CONTRACTOR TO PROVIDE CUT SHEET TO PORT FOR APPROVAL FOR ALL STRUCTURES .

- | | |
|--|---|
| <p>(27) PROVIDE BORING FOR 1-1/2" ELECTRICAL CONDUIT INSTALLATION. SEE ELECTRICAL SHEETS E0.02 AND E2.01.</p> <p>(28) REMOVE (E) VALVE. SEE NOTE 1 FOR CONNECTED PIPE REMOVAL. VALVE REMOVAL SHALL TAKE PLACE AFTER INSTALLATION OF (N) VALVE. CONTRACTOR TO HAUL REMOVED VALVE OFFSITE.</p> <p>(29) INSTALL TWO HEAVY DUTY CONCRETE BARRIERS. LB-48 CONCRETE TRAFFIC AND SAFETY BARRIER OR APPROVED EQUAL. 48"L x 24"W x 32"H. GRAY FINISH.</p> | <p>(30) PROVIDE WET OR HOT TAP CONNECTION USING TAPPING SLEEVE. CONTRACTOR TO FIELD VERIFY (E) PIPE SIZES BEFORE CONNECTION.</p> <p>(31) MATCH (E) GROUND</p> <p>(32) SUBMETER. SEE LANDSCAPE SHEET L2.01</p> |
|--|---|

A	DATE	BY	REVISION	APP	B	DATE	BY	REVISION	APP

The image contains three logos. On the left is the 'PORT OF PORTLAND' logo, featuring a stylized diamond icon and the text 'PORT OF PORTLAND' with the tagline 'Possibilities in every direction since 1891.' in the middle. On the right is the 'WHPacific' logo, with 'WHPacific' in a large, bold, serif font and 'Engineering • Planning • Construction' in a smaller, sans-serif font below it. On the far right is the 'Geosyntec consultants' logo, with 'Geosyntec' in a large, bold, sans-serif font and 'consultants' in a smaller, bold, sans-serif font below it.

TERMINAL 4
BASIN M STORMWATER IMPROVEMENTS
DRAINAGE AND GRADING PLAN

Sanitary Sewer Collection System Plan View

Stationing: 0+10 to 2+10

Key Features and Components:

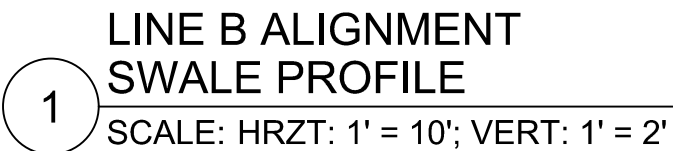
- Manholes (MH):**
 - 48-IN HIGH FLOW MH (Station 0+60):** (N) 67978.40, (E) 71143.33, RIM=33.93, 16" I.E. IN=24.98 (S), 12" I.E. IN=25.40 (W), 16" I.E. OUT=24.98 (N).
 - 60-IN PRE-TREATMENT AND INTERCEPT MH (Station 1+80):** (N) 67969.37, (E) 71143.11, RIM=34.00, 12" I.E. IN=25.60 (E), 16" I.E. IN=25.76 (S), 16" I.E. OUT=25.37 (N), 10" I.E. OUT=24.26 (W).
 - 48-IN MH AT PIPE BEND (Station 0+65):** (N) 67979.52, (E) 71043.85, RIM=34.62, 12" I.E. IN=27.05 (S), 12" I.E. IN=27.05 (W), 12" I.E. OUT=26.95 (E).
- Pump and Valve Vault (Station 1+80):** (N) 67966.77, (E) 71132.92, RIM=33.92, 10" I.E. IN=24.13 (E), 4" I.E. OUT=30.08 (W).
- Bioinfiltration Basin (Station 0+15):** ELEV = 31.20.
- Pipes:**
 - 21 LF 12" SDR 35 SOLID PVC @ 1.66%
 - 99 LF 12" SDR 35 SOLID PVC @ 1.56%
 - 9 LF 16" SDR 35 SOLID PVC @ 4.27%
 - 11 LF 10" SDR 35 SOLID PVC @ 1.25%
- Other Structures:**
 - 12" WIDE WALL:** ELEV = 35.30 (multiple locations).
 - DISSIPATOR:** RIM 34.69, DISSIPATOR WEIR 33.44.
 - 4" FORCE MAIN OUTLET:** 32.85.
 - 1" WEEP HOLE:** 32.19.
- Elevations:**
 - EXISTING GROUND (EG):** 34.32, 34.12, 34.33, 33.93, 34.44, 32.37, 34.57, 31.20, 34.69, 32.03, 34.82, 34.55, 34.89, 34.56, 34.82, 34.53, 34.80, 34.50, 34.81, 34.40, 34.82, 34.30, 34.68, 34.20, 34.53, 34.12, 34.35, 33.99, 34.15, 33.87, 34.00, 33.92, 34.06, 33.98, 33.87, 33.95, 34.08, 33.88, 34.30, 32.19, 34.40, 32.18.
 - FINISHED GROUND (FG):** 34.32, 34.12.

1

#	DATE	BY	REVISION	APP	#	DATE	BY	REVISION	APP

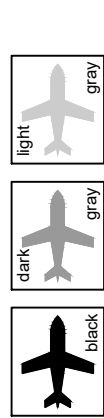
The image contains three logos. On the left is the 'PORT OF PORTLAND' logo, featuring a stylized compass rose icon and the text 'PORT OF PORTLAND' with the tagline 'Possibilities in every direction since 1891.' in the middle. On the right is the 'WHPacific' logo, with 'WHPacific' in a large, bold, serif font and 'INCORPORATED' in a smaller, all-caps, sans-serif font below it. On the far right is the 'Geosyntec consultants' logo, with 'Geosyntec' in a large, bold, sans-serif font and 'consultants' in a smaller, all-caps, sans-serif font below it.

TERMINAL 4	SUBMITTED BY	ROGER ANDERSON	
BASIN M STORMWATER IMPROVEMENTS	DESIGN BY	T. TRAN	
	DRAWN BY	T. TRAN	
	CHECKED BY	J. SHUTE, D. PANKANI	
STORMWATER SYSTEM PROFILE	DATE	FEB 2021	
	SHEET NO.	14	TYPE: CD
	DRAWING NO.	DISC. SHT. NO.	
	T4 2021-500	C5.01	

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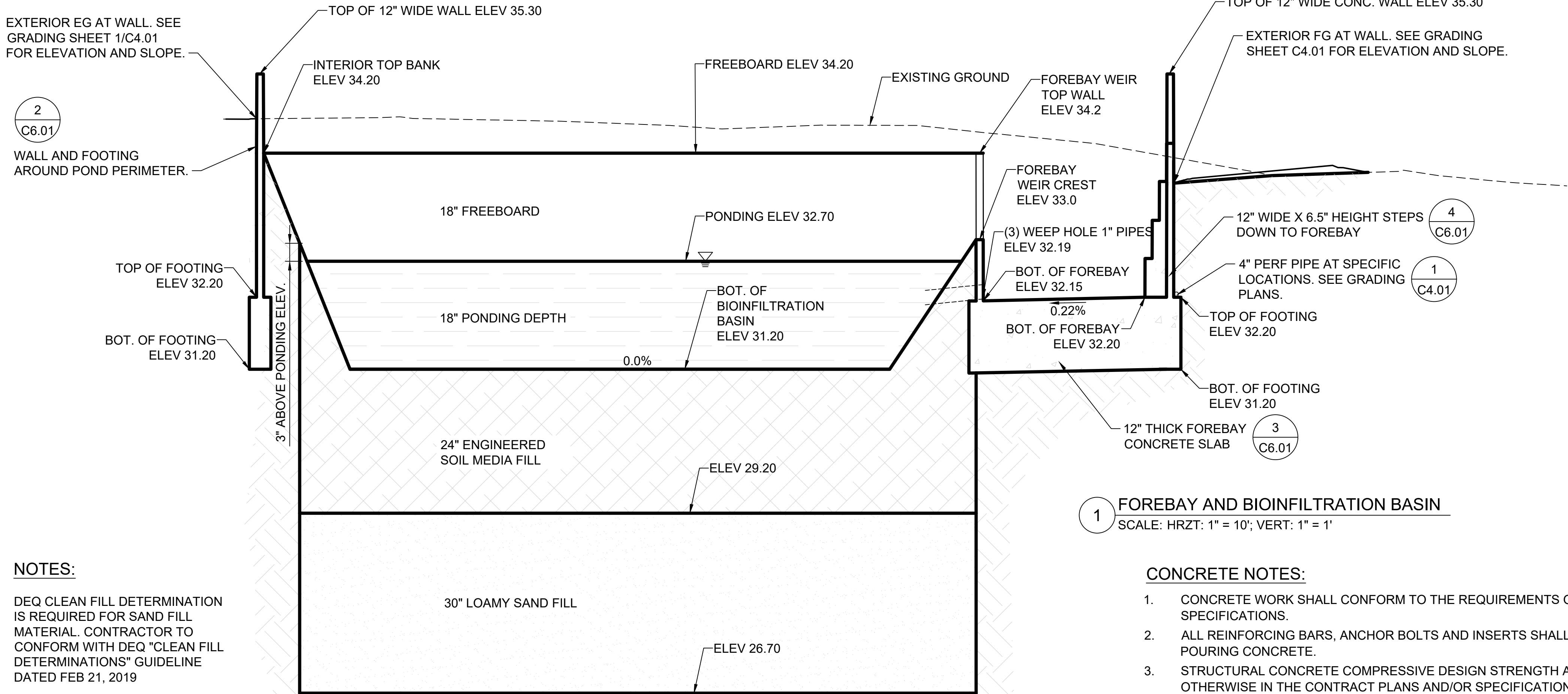
 PORT OF PORTLAND <i>Possibilities in every direction since 1891.</i>	
WHPacific 9450 SW COMMERCE CIRCLE STE 300- WILSONVILLE, OR 97070 TEL. 503-988-8787, FAX. 458-215-3632	Geosyntec  consultants 920 SW 6TH AVE STE 600, PORTLAND, OR 97204 TEL. 503-222-9518
2019D013 _____ DESIGN NUMBER	102695 _____ PROJECT NUMBER

TERMINAL 4	SUBMITTED BY		ROGER ANDERSON	
	DESIGN BY		T. TRAN	
BASIN M STORMWATER IMPROVEMENTS	DRAWN BY		T. TRAN	
	CHECKED BY		J. SHUTE, D. PANKANI	
SWALE PROFILE	DATE		FEB 2021	
	SHEET NO.		15	TYPE: CD
	DRAWING NO.		DISC. SHT. NO.	
	T4 2021-500		C5.02	



CAN YOU SEE THE AIRPLANES? THE ADJACENT SAMPLES SHOW THREE DIFFERENT LEVELS OF SHADING. SETTINGS FOR VIEWING AND PRINTING DRAWING CONTENT ARE OPTIMIZED WHEN ALL THREE PLANES ARE VISIBLE. THIS GUIDANCE IS PROVIDED FOR REFERENCE ONLY.

THE AREA BELOW IS TO BE LEFT BLANK - FOR USE BY CITY FOR PERMIT REVIEW STAMP ONLY.



NOTES:

DEQ CLEAN FILL DETERMINATION IS REQUIRED FOR SAND FILL MATERIAL. CONTRACTOR TO CONFORM WITH DEQ "CLEAN FILL DETERMINATIONS" GUIDELINE DATED FEB 21, 2019

1 FOREBAY AND BIOINFILTRATION BASIN

SCALE: HRZT: 1" = 10'; VERT: 1" = 1'

CONCRETE NOTES:

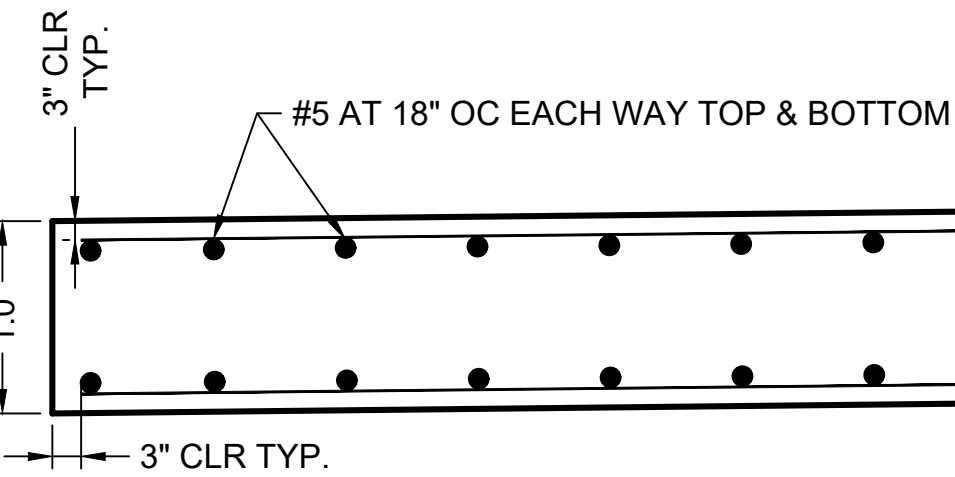
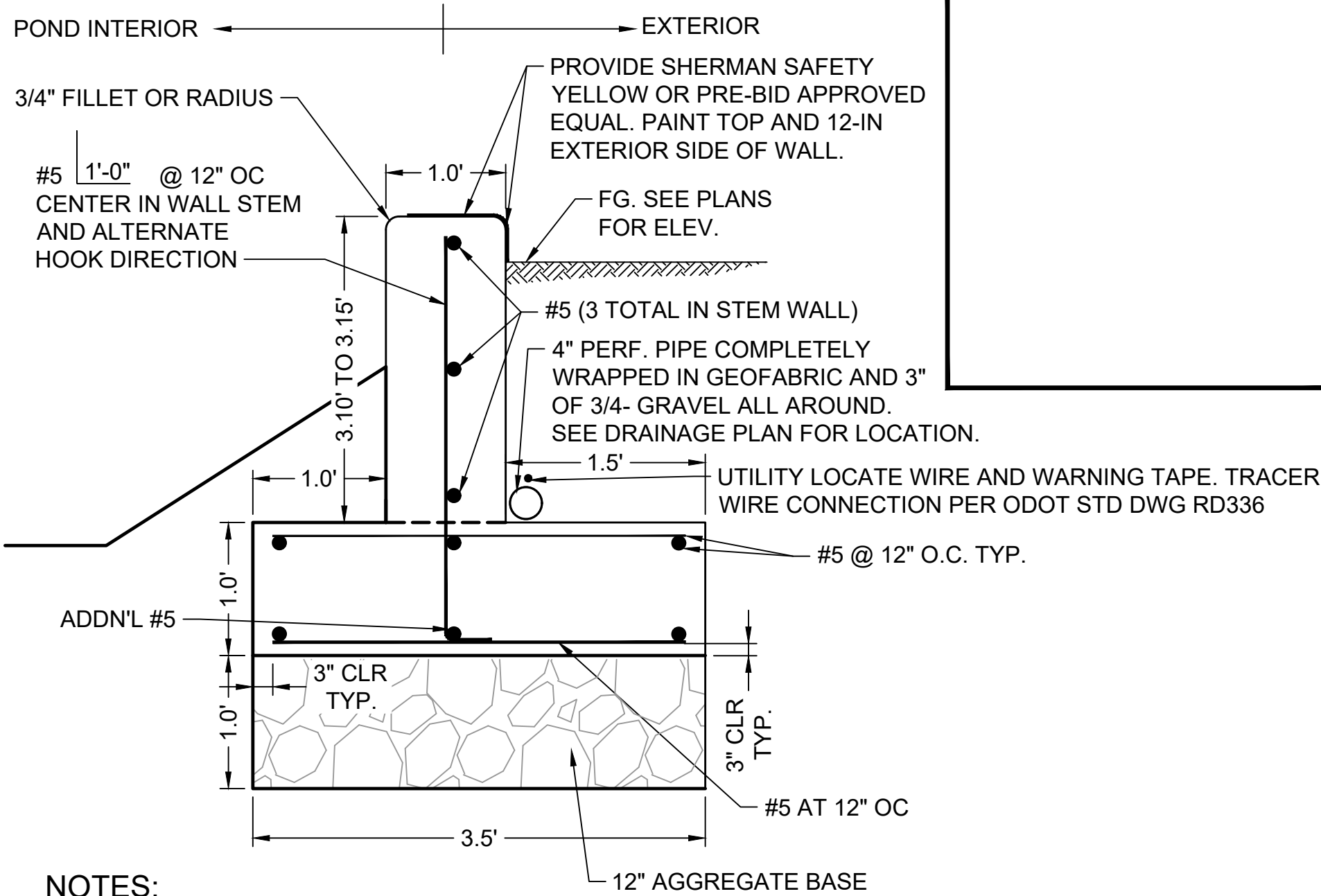
- CONCRETE WORK SHALL CONFORM TO THE REQUIREMENTS OF PORT OF PORTLAND SPECIFICATIONS.
- ALL REINFORCING BARS, ANCHOR BOLTS AND INSERTS SHALL BE WELL SECURED PRIOR TO POURING CONCRETE.
- STRUCTURAL CONCRETE COMPRESSIVE DESIGN STRENGTH AT 28 DAYS, UNLESS NOTED OTHERWISE IN THE CONTRACT PLANS AND/OR SPECIFICATIONS SHALL BE AS FOLLOWS:
FOOTING - 4500 PSI (MIN.)
STEM - 4500 PSI (MIN.)
- STRUCTURAL CONCRETE MIX WATER/CEMENT RATIO SHALL BE 0.45 AND CEMENT SHALL BE ASTM C150 TYPE V.
- ALL EXPOSED CONCRETE EDGES SHALL HAVE 3/4" CHAMFER OR FILLET.
- SPECIAL INSPECTION SHALL BE PROVIDED FOR ALL CONCRETE CONSTRUCTION AS SPECIFIED BY ACI 318.
- CONCRETE MIX DESIGN SHALL BE APPROVED BY THE ENGINEER.

NOTES:

- ALL REINFORCEMENT SHALL BE EPOXY COATED, WITH 3" CLEARANCE TO ALL CONCRETE EDGES.
- SEE CONCRETE NOTES.

2 CONCRETE STEM WALL AND FOOTING (BASIN AND FOREBAY)

SCALE: NTS



3 FOREBAY CONCRETE SLAB SECTION

SCALE: NTS

REINFORCING STEEL:

- DETAILING, FABRICATION AND PLACEMENT OF REINFORCING BARS (UNLESS OTHERWISE NOTED) MUST FOLLOW THE A.C.I. MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES, A.C.I. 315 LATEST EDITION.
- ALL REINFORCING BARS SHALL CONFORM TO THE STANDARD SPECIFICATION FOR DEFORMED BILLET-STEEL BARS FOR CONCRETE REINFORCEMENT, ASTM DESIGNATION A615: GRADE 60.
- REINFORCING STEEL SHALL HAVE A MINIMUM CONCRETE COVER AS TABULATED BELOW, UNLESS OTHERWISE NOTED.
FOOTINGS AND SLABS CAST AGAINST EARTH = 3-IN
ALL ELSE = 2-IN
- ALL DOWELS FROM FOOTINGS INTO WALLS SHALL BE THE SAME SIZE AN SPACING AS THE WALL VERTICAL REINFORCEMENT AND LAPPED WITH REINFORCEMENT UNLESS INDICATED OTHERWISE.
- BOTTOM STEEL OF SLABS, FOOTING AND GRADE BEAMS SHALL BE SUPPORTED OFF OF THE EARTH OR FORMS BY PRECAST CONCRETE BLOCKS WIRED TIED TO THE REINFORCEMENT.
- WHERE CONTINUOUS BARS ARE CALLED OUT, PROVIDE CONTACT SPLICES (AS REQUIRED) IN ACCORDANCE WITH REINFORCING STEEL NOTE. STAGGER SPLICES OF ALL CONTINUOUS BARS.
- WHERE LAP LENGTHS ARE NOT SHOWN ON THE PLANS, LAP AS SHOWN BELOW:

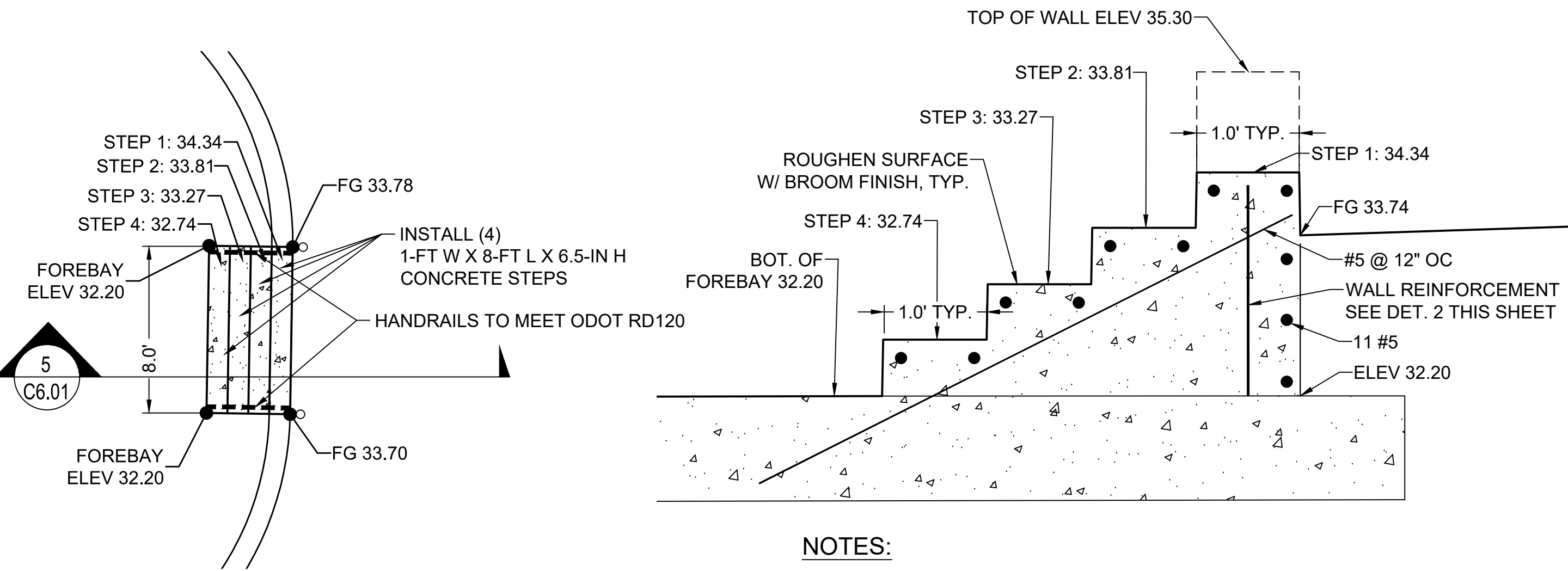
REINFORCED CONCRETE LAP SPLICES

f_c = 4500 PSI AT 28 DAYS

REINFORCEMENT SIZE

	#5	#6
TOP BAR*	3'-3"	4'-0"
OTHER	2'-6"	3'-0"

(*TOP BARS ARE BARS WITH MORE THAN 12 IN. OF FRESH CONCRETE CAST BELOW THEM.)



NOTES:

- FOREBAY CONCRETE STEPS AND HANDRAILS TO MEET ODOT RD120.

4 FOREBAY STEPS PLAN

SCALE: HRZT: 1" = 5'

NOTES:

- TYPICAL SLAB REINFORCEMENT AND HANDRAILS NOT SHOWN FOR CLARITY.
- FOREBAY CONCRETE STEPS AND HANDRAILS TO MEET ODOT RD120.
- REINFORCEMENT SHALL BE CONSTRUCTED PER PLANS. EPOXY COATED, WITH 3" CLEARANCE TO ALL CONCRETE EDGES. SEE CONCRETE NOTES.

5 FOREBAY STEPS SECTION VIEW

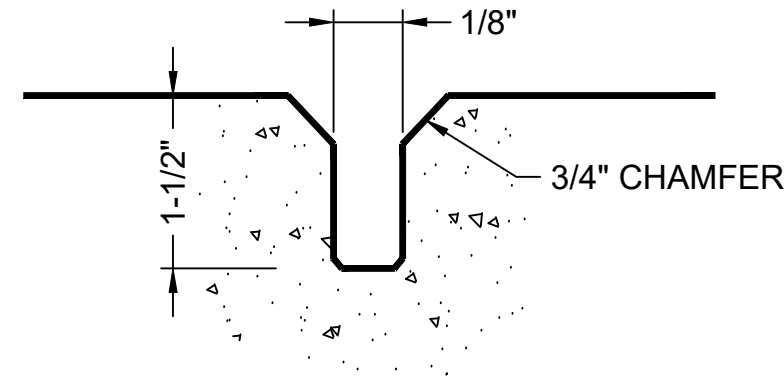
SCALE: HRZT: 1" = 1'-0"

NOTE(S):

- JOINTS SHALL BE EQUALLY SPACED IN BOTH DIRECTIONS AT A MAXIMUM SPACING OF 20'-0".
- JOINT MAY BE FORMED WITH 1/8" HARDBOARD AND CUT BACK TO THE ROOT OF THE CHAMFER ON THE EXPOSED FACE.

6 WEAKENED PLANE JOINT

SCALE: NTS



PORT OF PORTLAND
Possibilities in every direction since 1891.

WHPacific
9450 SW COMMERCE CIRCLE STE 300, WILSONVILLE, OR 97070
TEL. 503-666-8787; FAX. 458-215-3632

2019D013

DESIGN NUMBER

Geosyntec
consultants
920 SW 6TH AVE STE 600, PORTLAND, OR 97204
TEL. 503-222-9518

102695

PROJECT NUMBER



TERMINAL 4

BASIN M STORMWATER IMPROVEMENTS

CIVIL DETAILS 1

SUBMITTED BY ROGER ANDERSON

DESIGN BY T. TRAN

DRAWN BY T. TRAN

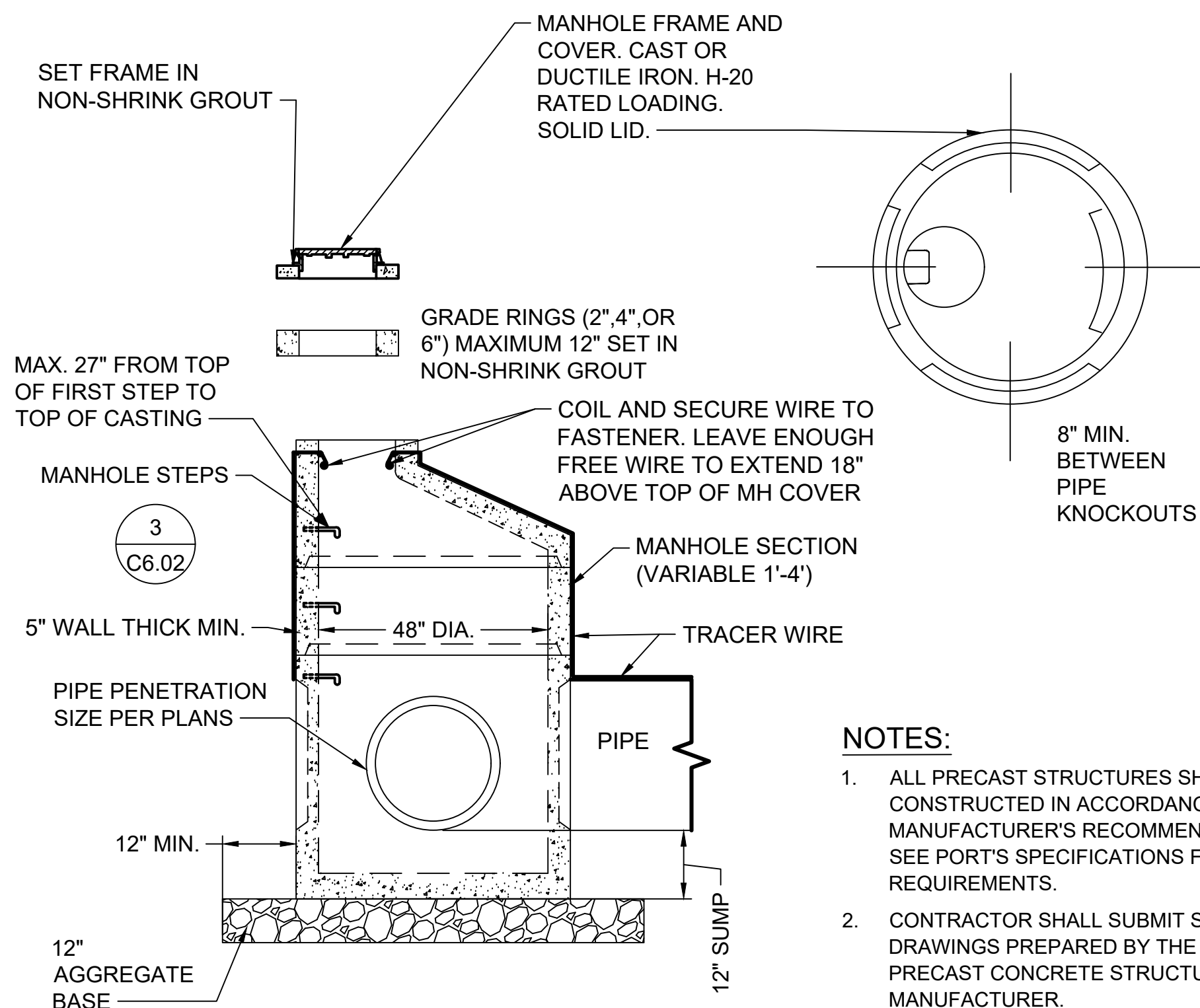
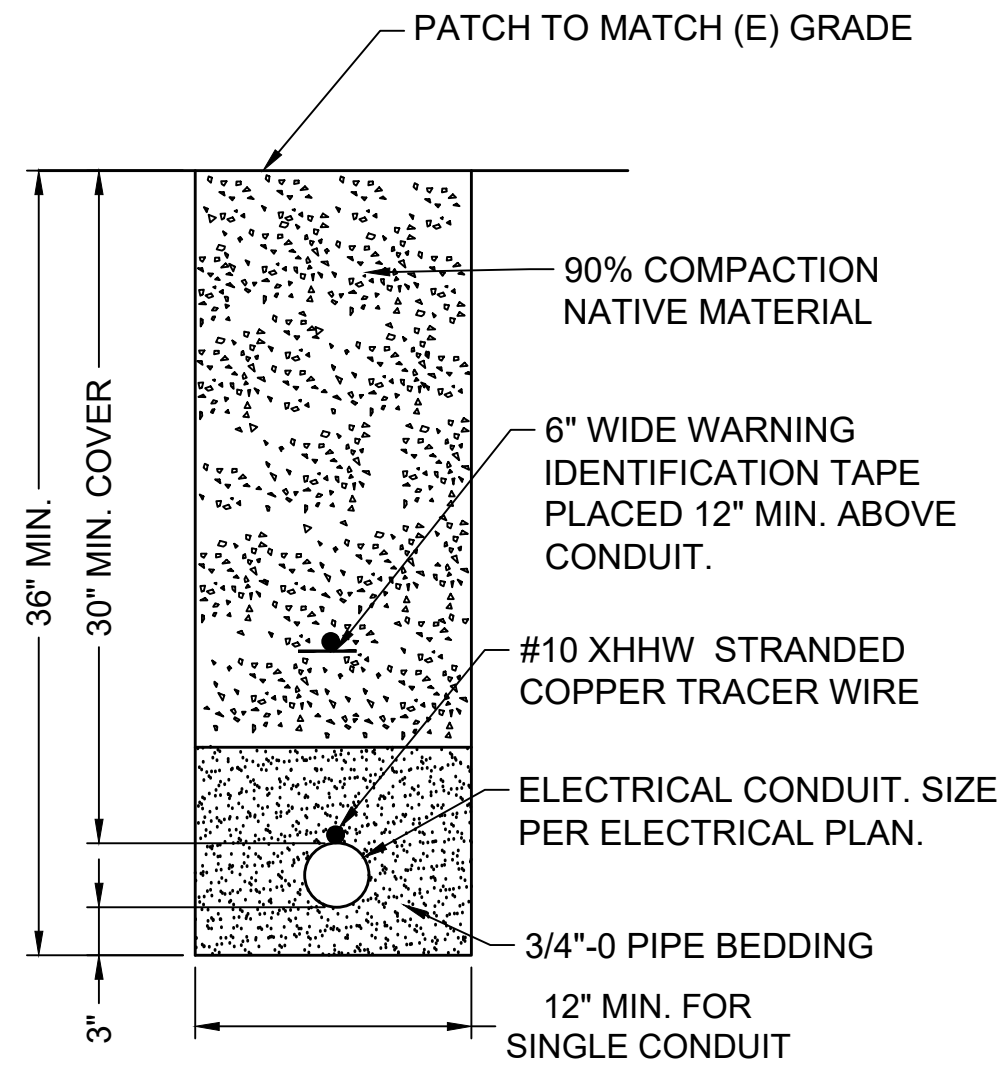
CHECKED BY J. SHUTE, D. PANKANI

DATE FEB 2021

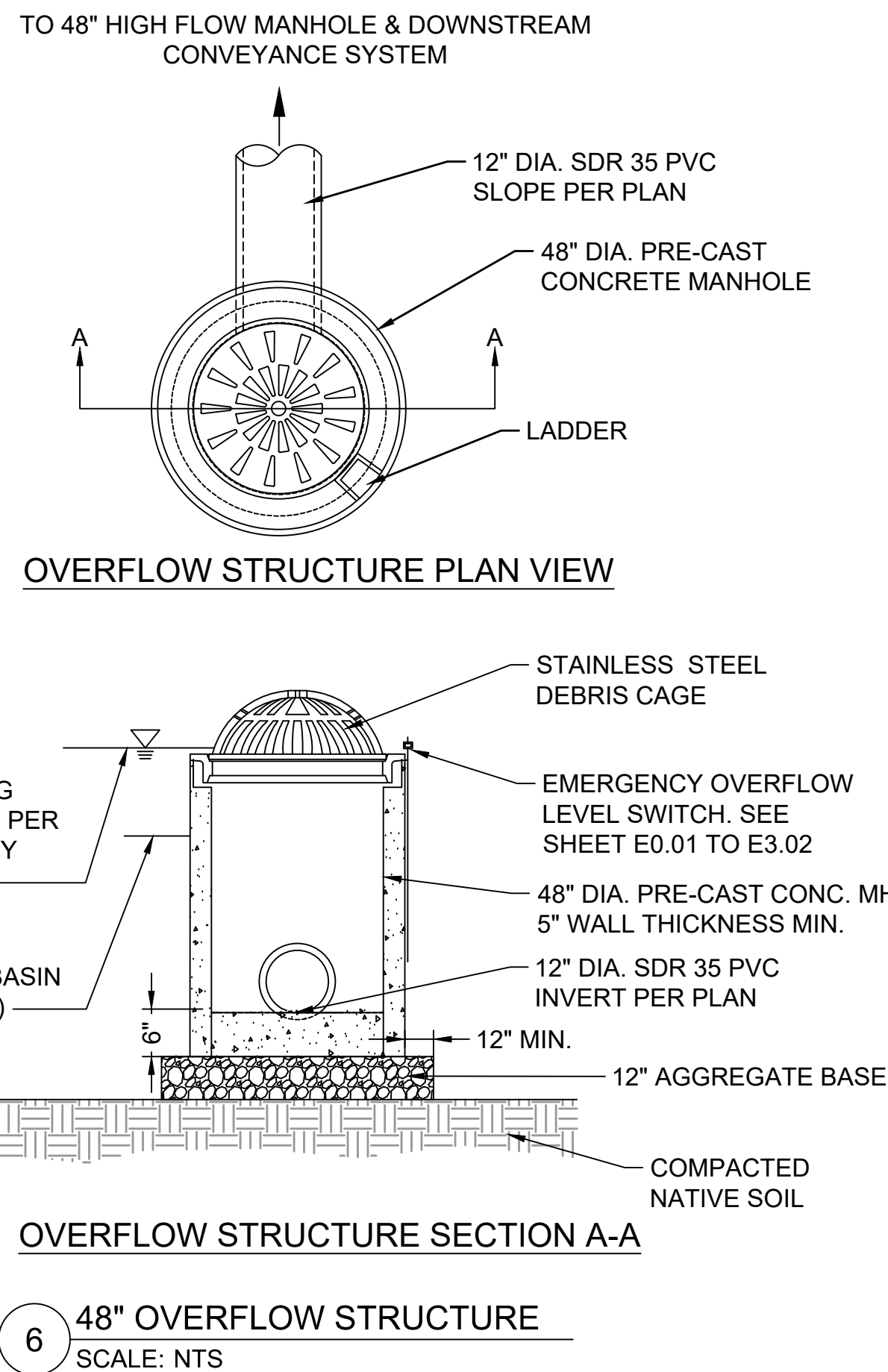
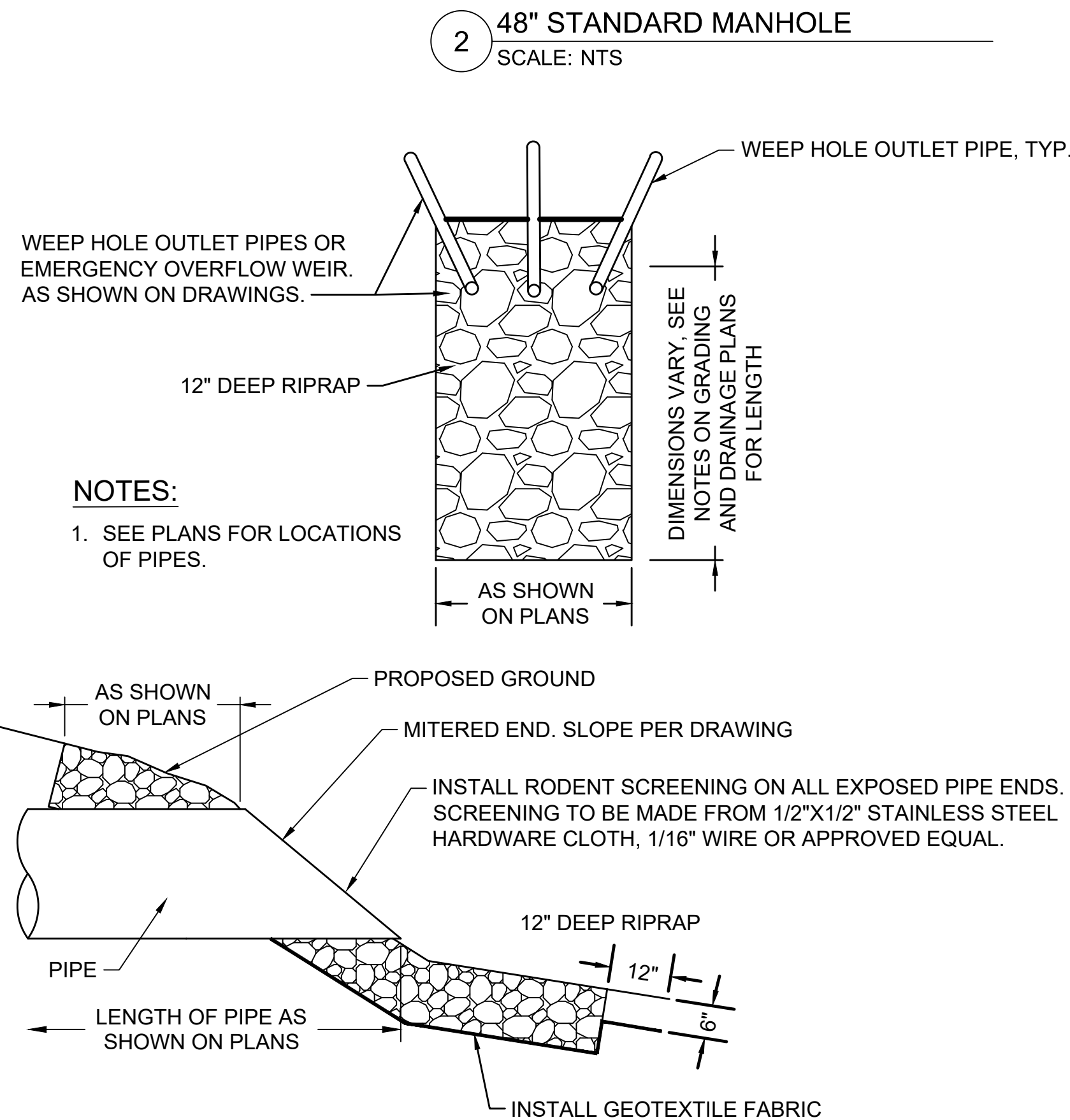
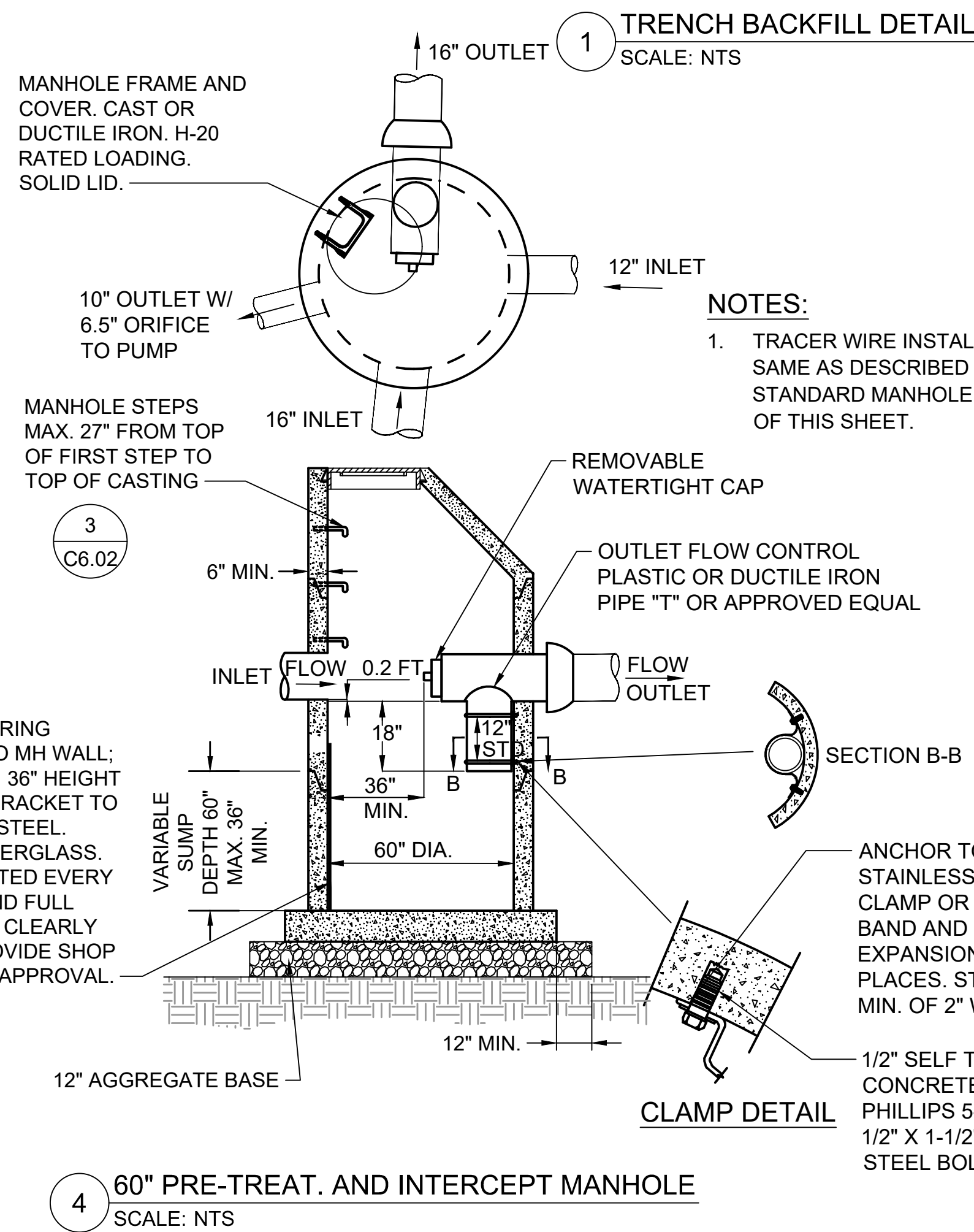
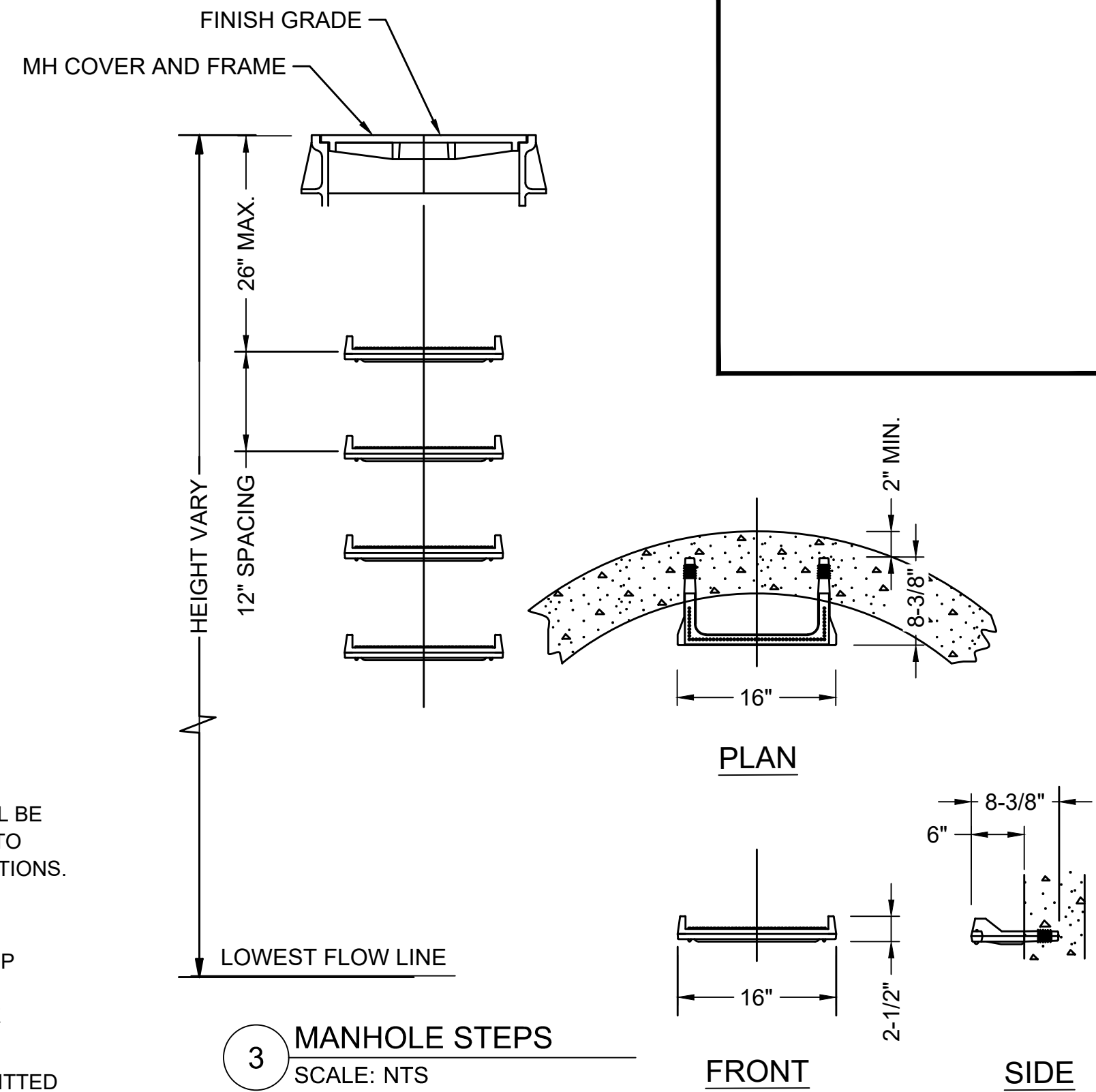
SHEET NO. 16

TYPE: CD

DISC. SHT. NO. C6.01



- ## NOTES:
1. ALL PRECAST STRUCTURES SHALL BE CONSTRUCTED IN ACCORDANCE TO MANUFACTURER'S RECOMMENDATIONS SEE PORT'S SPECIFICATIONS FOR REQUIREMENTS.
 2. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS PREPARED BY THE PRECAST CONCRETE STRUCTURE MANUFACTURER.
 3. SHOP DRAWINGS SHALL BE SUBMITTED AND APPROVED BY PORT PRIOR TO FABRICATION.



#	DATE	BY	REVISION	APP	#	DATE	BY	REVISION	APP

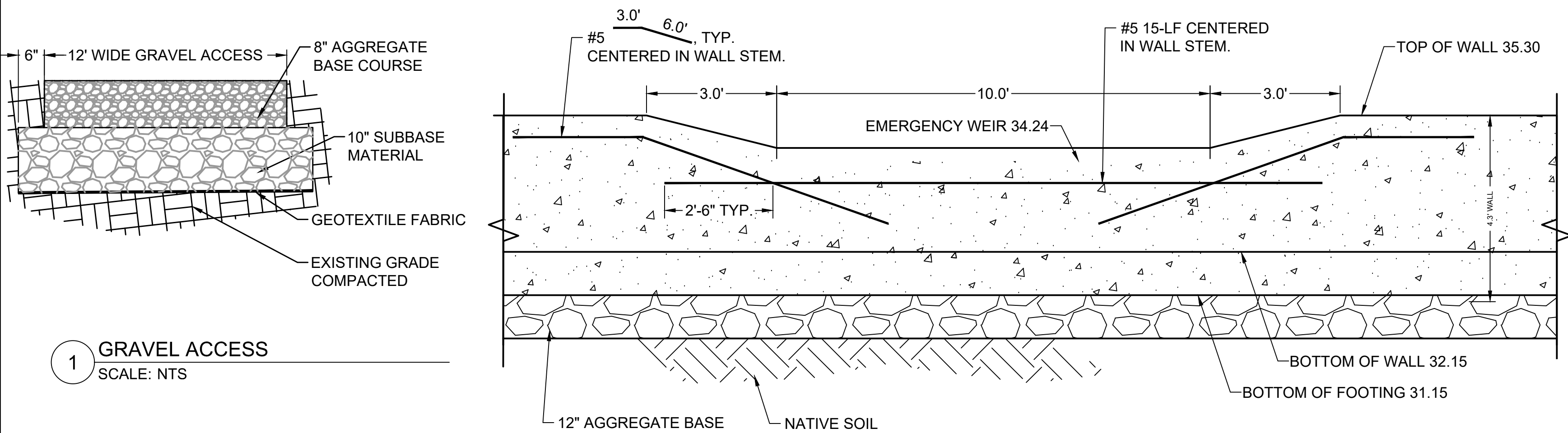
 PORT OF PORTLAND <i>Possibilities in every direction since 1891.</i>	
WHPacific 9450 SW COMMERCE CIRCLE STE 300, WILSONVILLE, OR 97070 TEL. 503-968-8787; FAX. 503-215-3632	Geosyntec  consultants 920 SW 6TH AVE STE 600, PORTLAND, OR 97204 TEL. 503-222-9518
2019D013 DESIGN NUMBER	102695 PROJECT NUMBER



	TERMINAL 4
	BASIN M STORMWATER IMPROVEMENTS
	CIVIL DETAILS 2

SUBMITTED BY	ROGER ANDERSON	
DESIGN BY	T. TRAN	
DRAWN BY	T. TRAN	
CHECKED BY	J. SHUTE, D. PANKANI	
DATE	FEB 2021	
SHEET NO.	17	TYPE: CD
DRAWING NO.	T4 2021-500	DISC. SHT. NO. C6.02

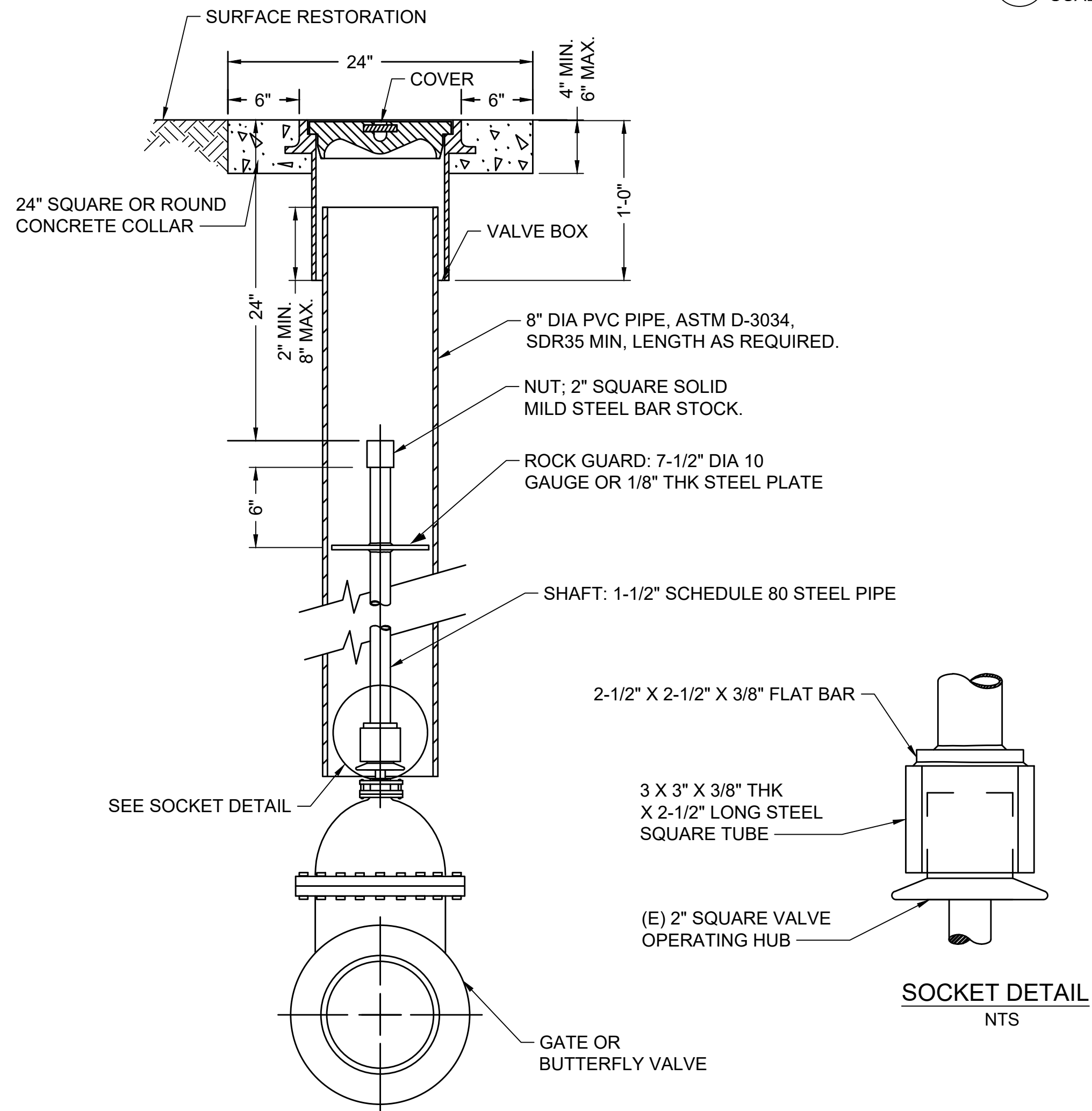
CAN YOU SEE THE AIRPLANES? THE ADJACENT SAMPLES SHOW THREE DIFFERENT LEVELS OF SHADING. SETTINGS FOR VIEWING AND PRINTING DRAWING CONTENT ARE OPTIMIZED WHEN ALL THREE PLANES ARE VISIBLE. THIS GUIDANCE IS PROVIDED FOR REFERENCE ONLY.



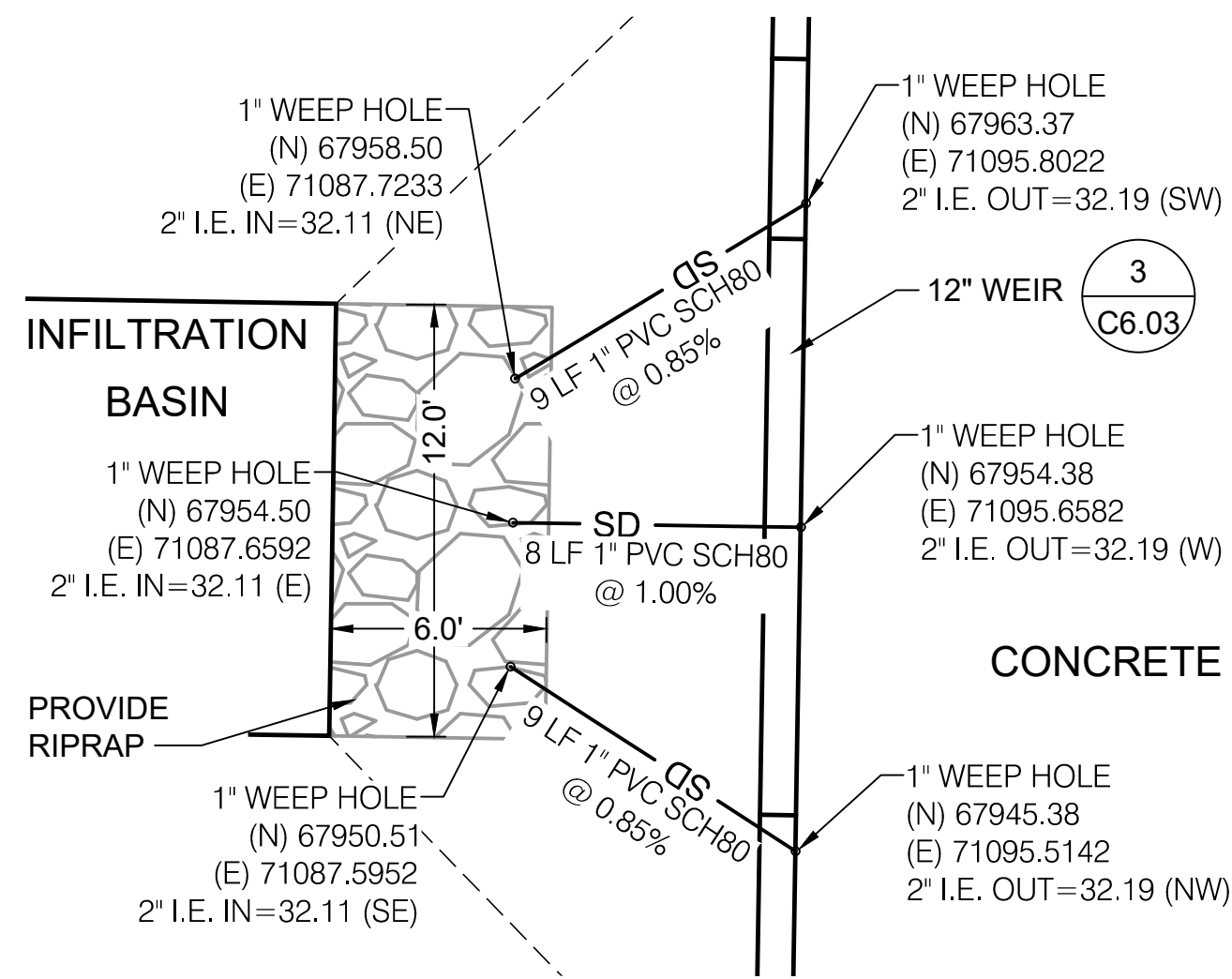
1 GRAVEL ACCESS
SCALE: NTS

NOTE:

TYPICAL WALL REINFORCEMENTS NOT SHOWN FOR CLARITY. SEE DETAIL C6.01.



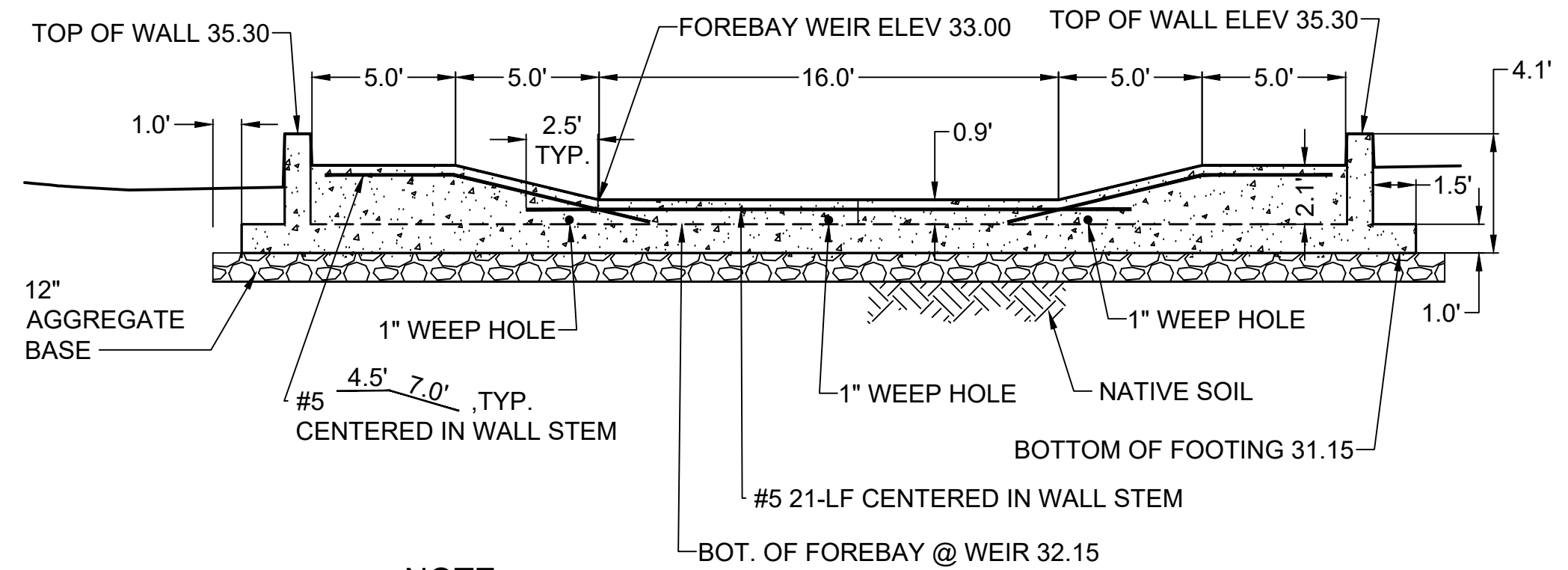
4 WATER VALVE
SCALE: NTS



NOTES:

1. INSTALL RODENT SCREENING ON ALL EXPOSED PIPE ENDS. SCREENING TO BE MADE FROM 1/2"x1/2" STAINLESS STEEL HARDWARE CLOTH, 1/16" WIRE OR APPROVED EQUAL. AFFIX TO CONCRETE WHERE PIPE ENDS ARE EMBEDDED IN WALL.

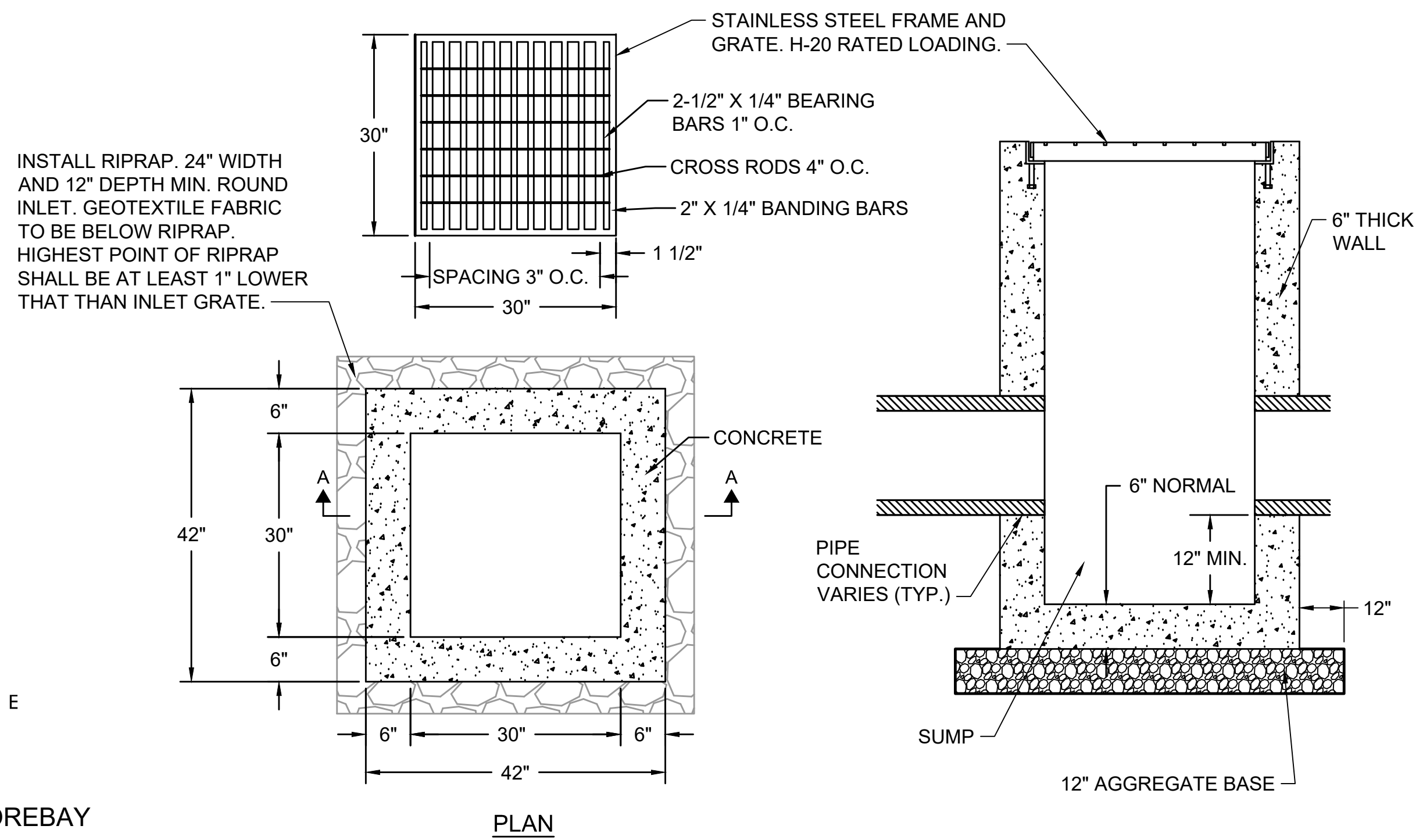
5 WEEP HOLES
SCALE: NTS



NOTE:

TYPICAL WALL REINFORCEMENTS NOT SHOWN FOR CLARITY. SEE DETAIL C6.01.

3 FOREBAY WEIR
SCALE: 1" = 5'



SECTION A-A

NOTES:

1. ALL PRECAST INLETS SHALL CONFORM TO REQUIREMENTS IN SPECIFICATIONS.
2. ALL CONCRETE SHALL BE COMMERCIAL GRADE CONCRETE.
3. KNOCKOUTS ALLOWED FOR PRECAST OPTION.
4. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR THE STRUCTURE AND GRATE CONFIRMING THAT BOTH ARE STRUCTURALLY ADEQUATE FOR H2O LOADING.

6 SWALE INLET
SCALE: NTS

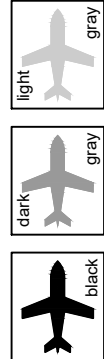
[illegible]

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WHPacific 9450 SW COMMERCE CIRCLE STE 300, WILSONVILLE, OR 97070 TEL. 503-968-8787; FAX. 458-215-3632	Geosyntec  consultants 920 SW 6TH AVE STE 800, PORTLAND, OR 97204 TEL. 503-222-9518
2019D013 _____ DESIGN NUMBER	102695 _____ PROJECT NUMBER

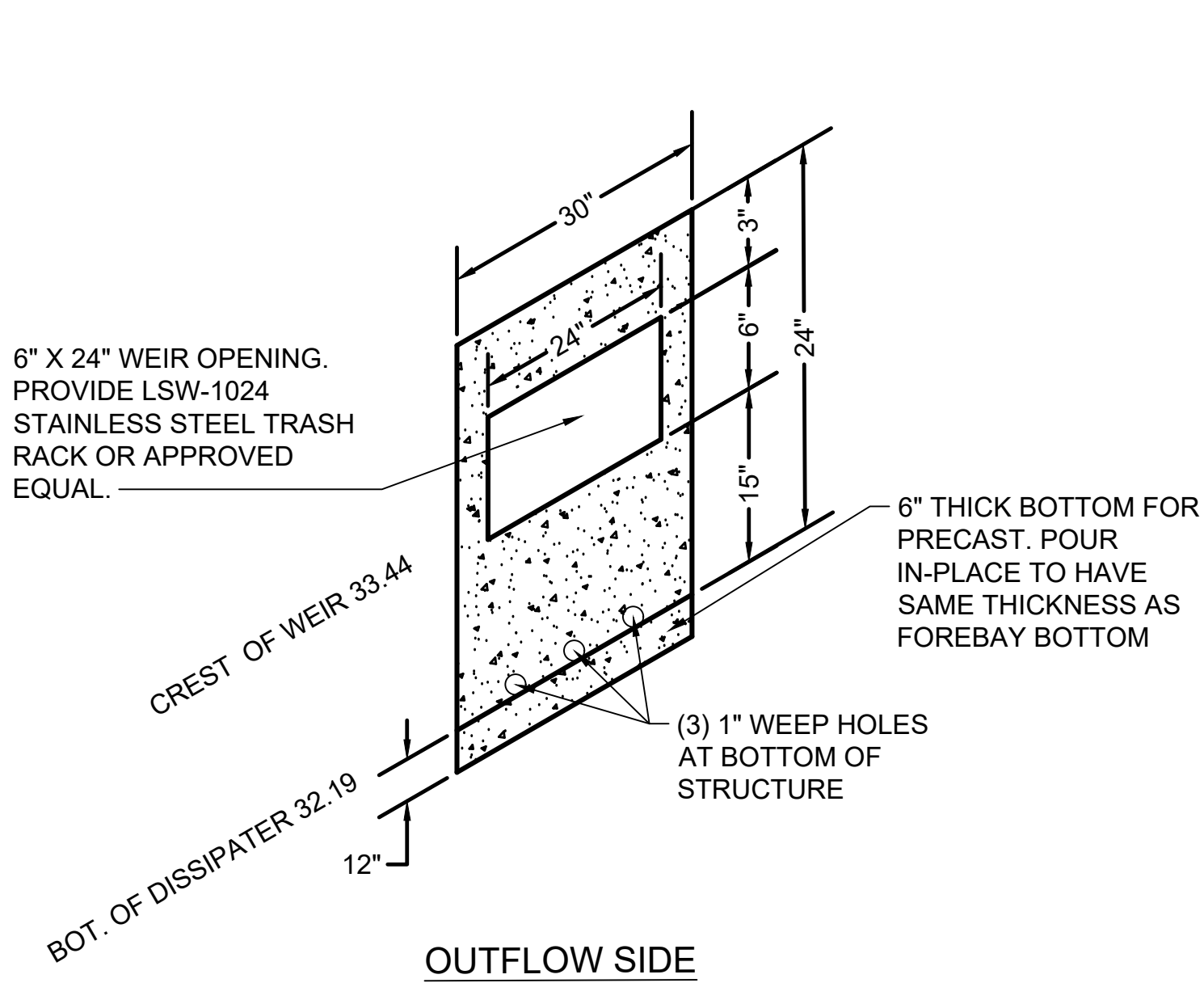


TERMINAL 4	SUBMITTED BY		ROGER ANDERSON	
	DESIGN BY		T. TRAN	
BASIN M STORMWATER IMPROVEMENTS	DRAWN BY		T. TRAN	
	CHECKED BY		J. SHUTE, D. PANKANI	
CIVIL DETAILS 3	DATE		FEB 2021	
	SHEET NO.		18	TYPE: CD
	DRAWING NO.		DISC. SHT. NO.	
	T4 2021-500		C6.03	

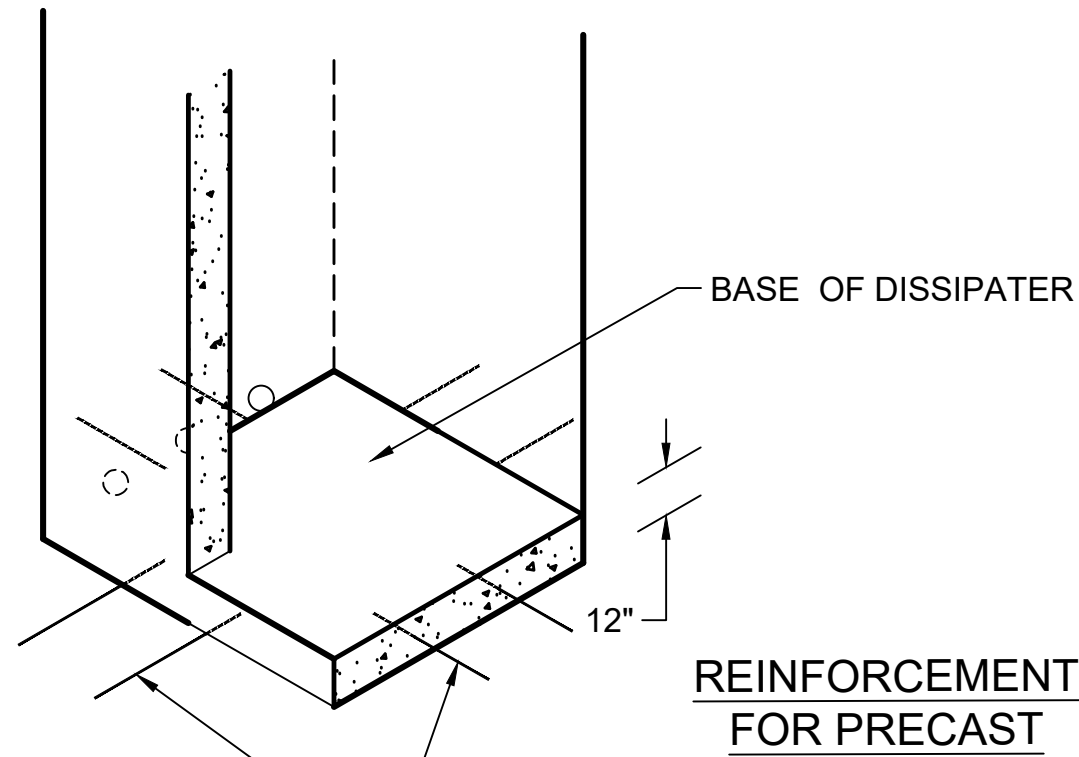
CAN YOU SEE THE AIRPLANES? THE ADJACENT SAMPLES SHOW THREE DIFFERENT LEVELS OF SHADING. SETTINGS FOR VIEWING AND PRINTING DRAWING CONTENT ARE OPTIMIZED WHEN ALL THREE PLANES ARE VISIBLE. THIS GUIDANCE IS PROVIDED FOR REFERENCE ONLY.



THE AREA BELOW IS TO BE LEFT BLANK - FOR USE BY CITY FOR PERMIT REVIEW STAMP ONLY.

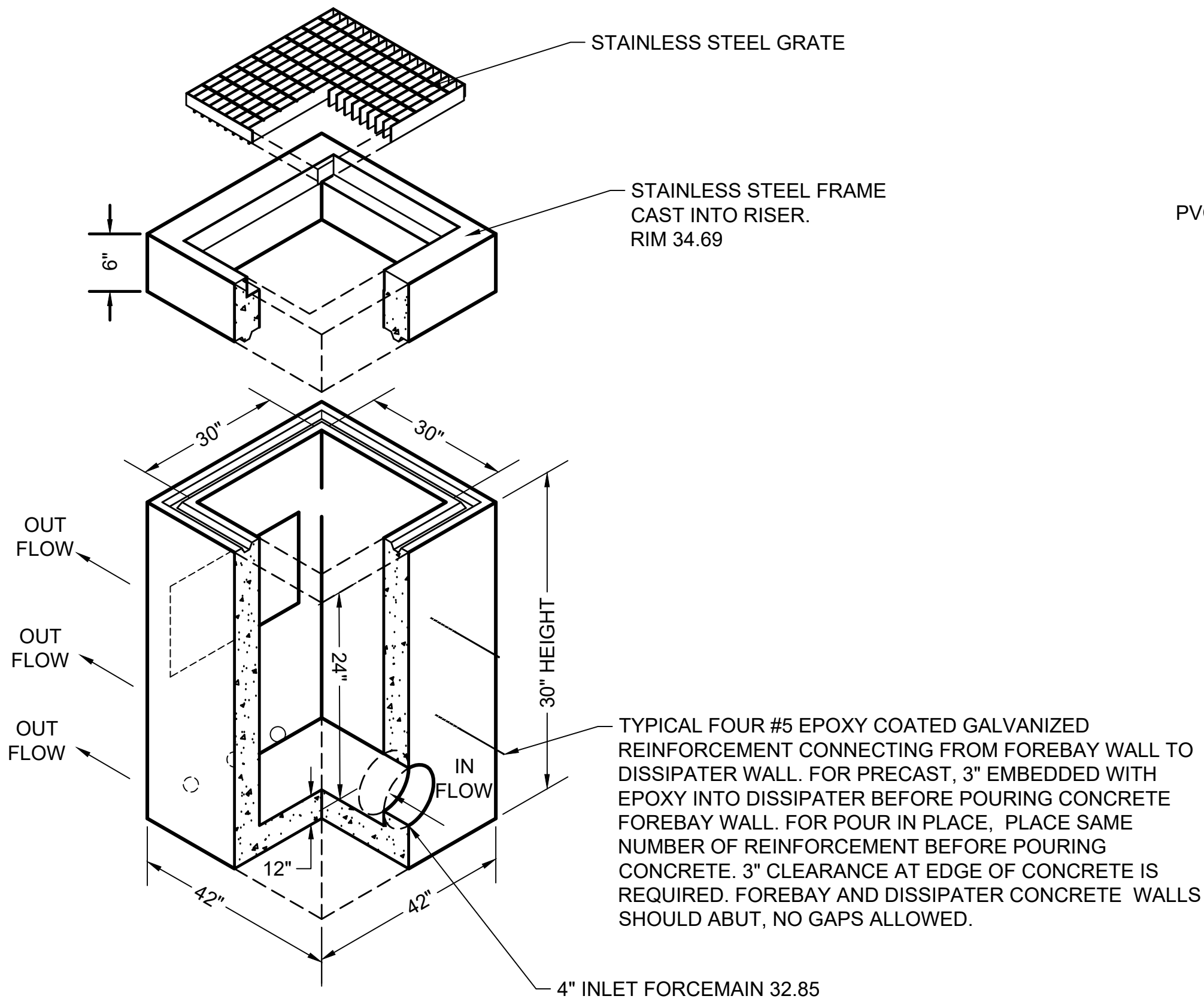


NOTES:
BASE DISSIPATER THICKNESS SHALL MATCH FOREBAY SLAB THICKNESS.



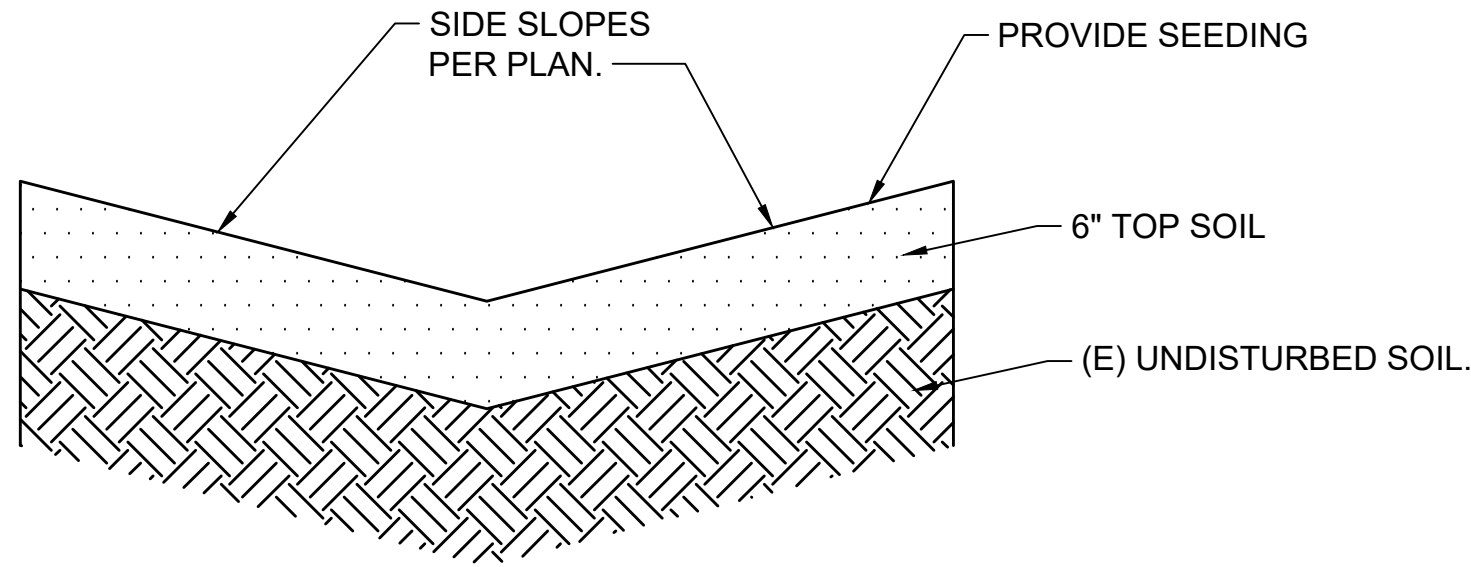
FOR PRECAST, PROVIDE 36" #5 EPOXY COATED GALVANIZED REINFORCEMENT WITH A MINIMUM 4" EMBEDDED IN CONCRETE BASE, SEALED WITH CONCRETE EPOXY, SET AND LEVEL BEFORE POURING FOREBAY SLAB. IF SPACE IS UNAVAILABLE, LESS THAN 36" IS ALLOWED. TWO (2) REINFORCEMENT EACH SIDE AT 12" OC APPLY TO ALL FOUR (4) SIDES. BASE OF DISSIPATER TO LEVEL AND MATCH SAME ELEVATION WITH TOP OF FOREBAY SLAB. SEE FOREBAY CONCRETE SLAB DETAIL 3/C6.01

1 DISSIPATER STRUCTURE
SCALE: NTS

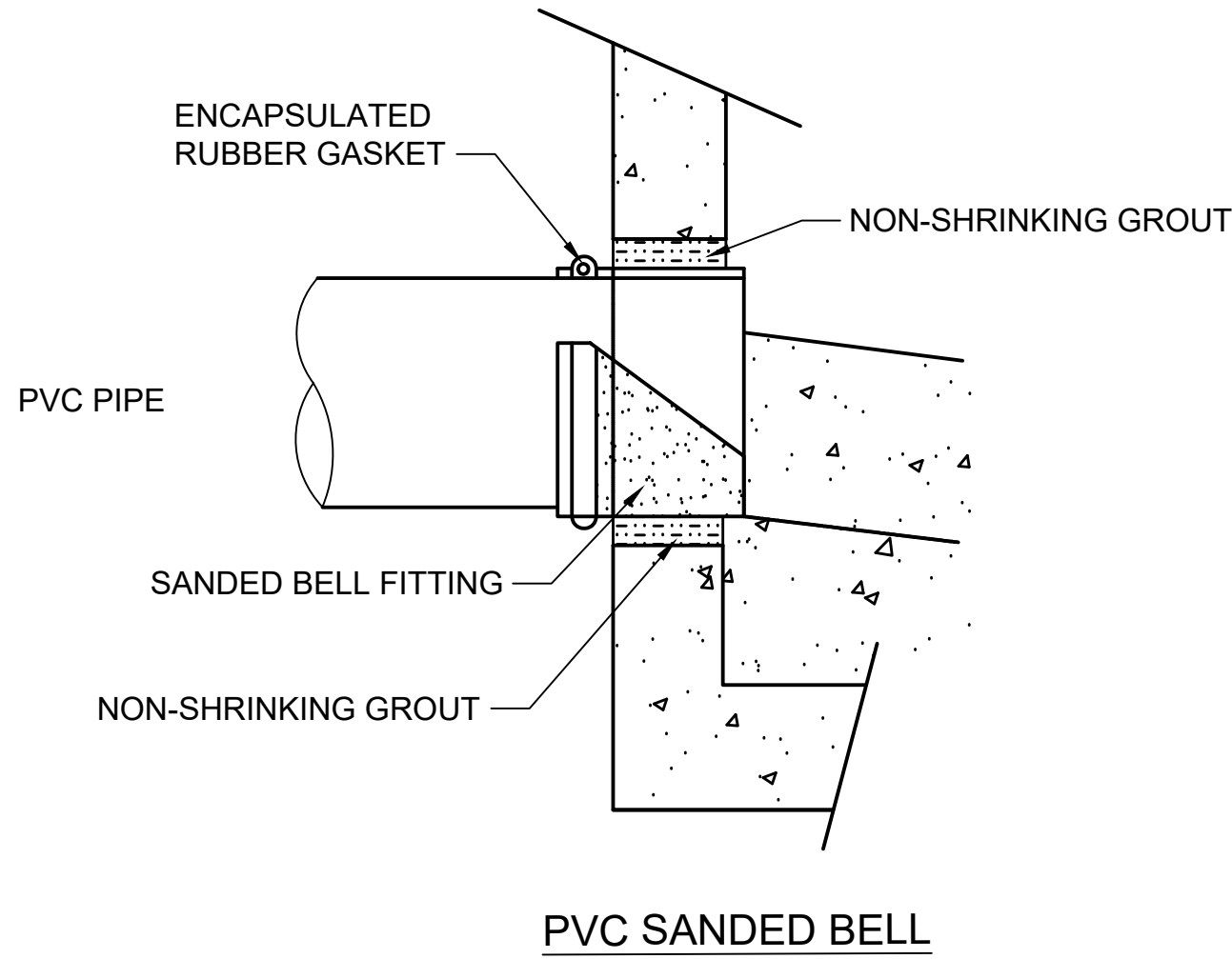


REINFORCEMENT FOR POUR-IN-PLACE

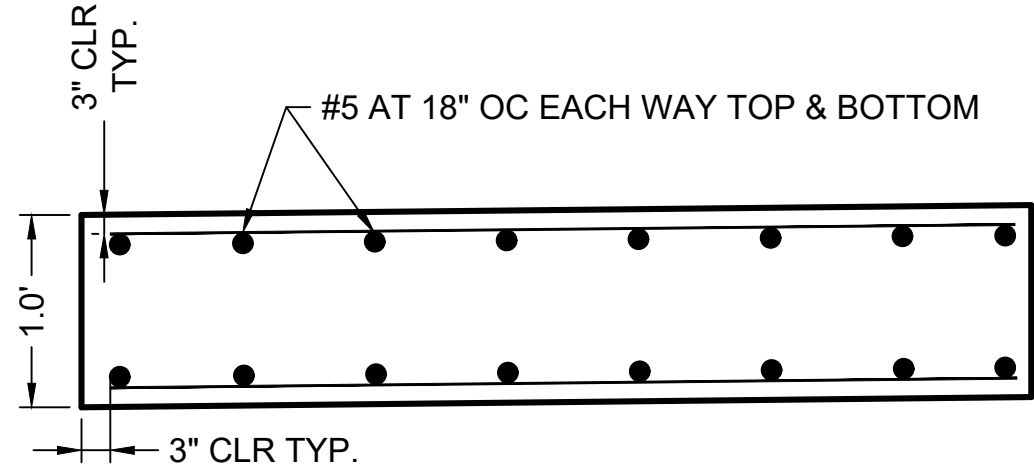
- PROVIDE #5 REINFORCEMENT AT 12" OC BOTH DIRECTIONS (HORZ. AND VERT.) FOR WALLS. 3" GAP AT EACH CONCRETE EDGE.
- BASE OF DISSIPATER TO LEVEL AND MATCH SAME ELEVATION WITH TOP OF FOREBAY SLAB. SEE FOREBAY CONCRETE SLAB DETAIL 3/C6.01



3 SWALE
SCALE: NTS



2 MANHOLE CONNECTION
SCALE: NTS

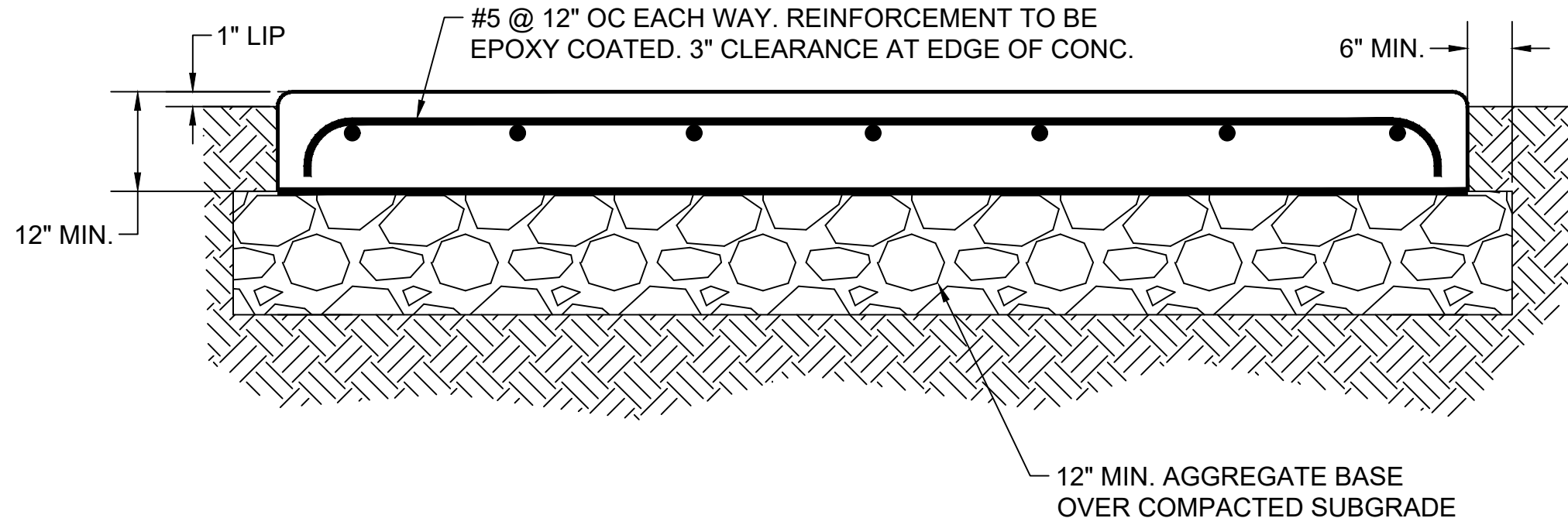


SLAB PLAN VIEW

NOTES:

- CONTRACTOR TO VERIFY FINAL DIMENSIONS WITH EQUIPMENT SUBMITTAL.
- PAD TO HAVE UNISTRUT BOLTED. CONTRACTOR TO VERIFY WITH ELECTRICIAN FOR THE INSTALLATION.
- UNDERLAY EQUIPMENT BASE WITH 1/4" NON-SHRINK GROUT.

SLAB SECTION VIEW



4 EQUIPMENT PAD DETAIL
SCALE: NTS

DATE	BY	REVISION	DATE	BY	REVISION

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WHPacific
9450 SW COMMERCE CIRCLE STE 300, WILSONVILLE, OR 97094
TEL. 503-968-8787, FAX. 458-215-3632

2019D013
DESIGN NUMBER

Geosyntec consultants
920 SW 6TH AVE STE 600, PORTLAND, OR 97204
TEL. 503-222-9518

102695
PROJECT NUMBER

REGISTERED PROFESSIONAL ENGINEER
53166PE
OREGON
07/11/2017
T. TRAN
EXPIRES: 06/30/2022

TERMINAL 4	SUBMITTED BY	ROGER ANDERSON
BASIN M STORMWATER IMPROVEMENTS	DESIGN BY	T. TRAN
	DRAWN BY	T. TRAN
CIVIL DETAILS 4	CHECKED BY	J. SHUTE, D. PANKANI
	DATE	FEB 2021
	SHEET NO.	19
	DRAWING NO.	T4 2021-500
	TYPE:	CD
	DISC. SHT. NO.	C6.04

CAN YOU SEE THE AIRPLANES? THE ADJACENT SAMPLES SHOW THREE DIFFERENT LEVELS OF SHADING. SETTINGS FOR VIEWING AND PRINTING DRAWING CONTENT ARE OPTIMIZED WHEN ALL THREE PLANES ARE VISIBLE. THIS GUIDANCE IS PROVIDED FOR REFERENCE ONLY.



PUMP STRUCTURE REQUIREMENTS:

- OVERALL STRUCTURE HEIGHT FROM 10'-10" TO 24'-10" (USING STANDARD HEIGHT STRUCTURAL COMPONENTS)
- 2" & 4" VALVE VAULT EXTENSION RISERS TO INCREASE HEADROOM OR FORCE MAIN COVER WHEN REQUIRED
- SAFETY GRATING FOR VALVE VAULT HATCH
- H2O LOAD RATING ON HATCHES
- LADDER EXTENSION FOR VALVE VAULT ACCESS
- ADMIXTURE FOR HYDROGEN SULFIDE PROTECTION
- NON-FIBRATED EXTERIOR DAMPPROOFING
- DISCHARGE PIPING & VALVES SIZE 2"-4"
- PIPING MATERIALS (PVC OR DI)
- DISCHARGE POSITION #1, #2 (STD) OR #3
- BYPASS OUTLET/INLET WITH ISOLATION VALVE AND QUICK CONNECT (2"-4")
- DISCHARGE PRESSURE GAUGES
- VENTING WITH ODOR CONTROL
- CONTROL PANEL PLACEMENT
- TRANSDUCER/FLOAT LEVEL CONTROL
- INTERIOR/EXTERIOR JUNCTION BOXES
- ALUMINUM & STAINLESS TRASH BASKETS
- STAINLESS PORTABLE HOIST (300#, 1000#)

REQUIREMENTS ARE FROM THE ONE-LIFT BASIS OF DESIGN.
PROVIDE THESE OR PREBID APPROVED EQUAL.

NOTES:

1. THE BASIS OF DESIGN OF THE PUMP AND VALVE VAULT IS ONE-LIFT RC509. PROVIDE ONE-LIFT OR PRE-BID APPROVED EQUAL. ANY DEVIATION FROM ONE-LIFT NEEDS TO BE ACCEPTED BY PORT AUTHORITY 10 DAYS PRIOR TO BID DUE DATE. PRODUCT CUT SHEET IS REQUIRED AT LEAST 10 DAYS PRIOR TO FABRICATION.



TOP SLAB = 3 TONS

VALVE VAULT = 6.5 TONS

- USUALLY TOP SLAB & VALVE VAULT ARE FACTORY SEALED, AND SHIP AS 1-PIECE = 9.5 TONS

2' RISER SECTION - 2 TONS

3' RISER SECTION - 3 TONS

4' RISER SECTION - 4 TONS

BASE SECTION W/FLOAT COLLAR & FILLETS - 11.0 TONS

2' VALVE VAULT EXTENSION (NOT SHOWN) - 2.2 TONS

4' VALVE VAULT EXTENSION (NOT SHOWN) - 4.5 TONS



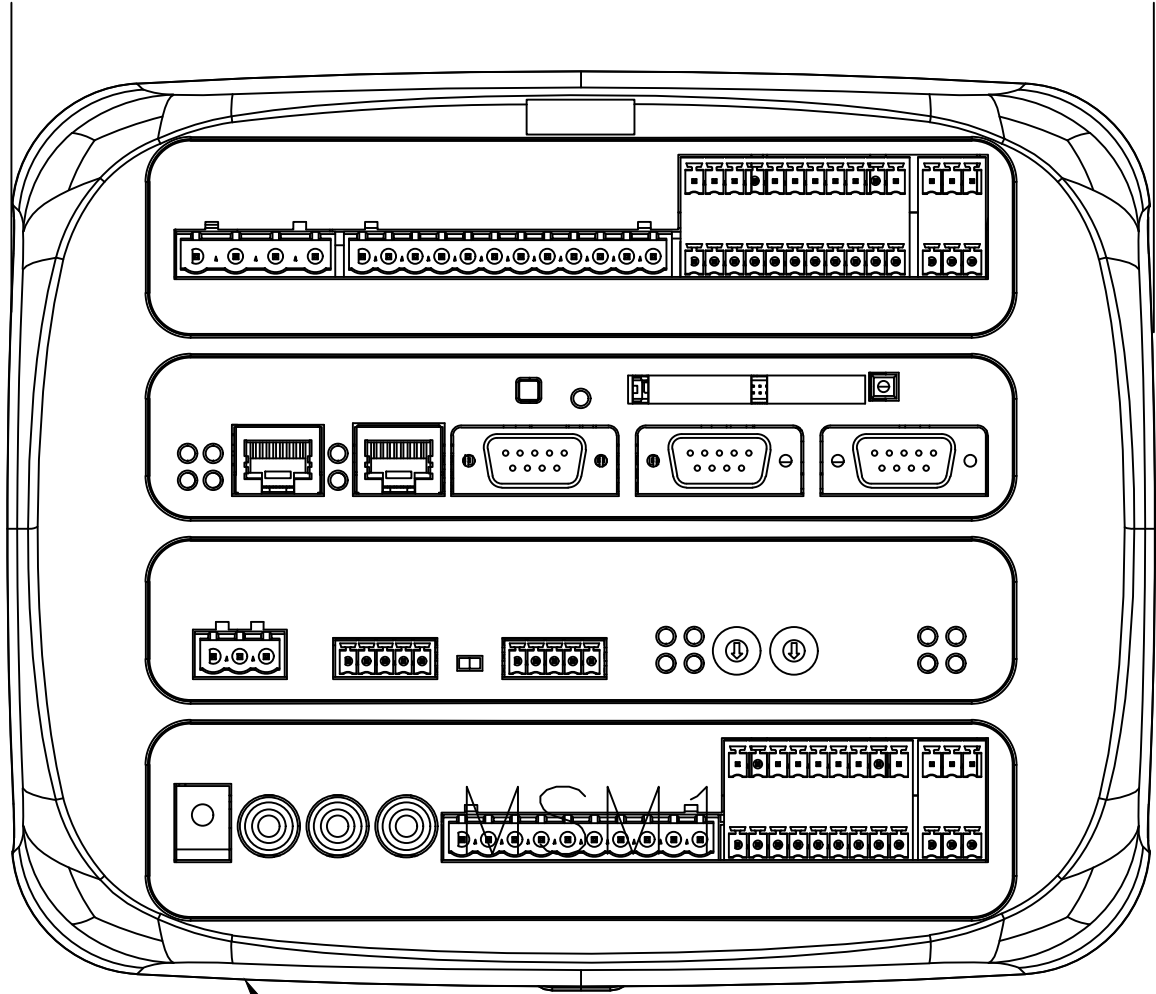
1 PUMP AND VALVE VAULT
SCALE: HRZT: N.T.S.

[illegible]

 PORT OF PORTLAND <i>Possibilities in every direction since 1891.</i>	
WHPacific 9450 SW COMMERCE CIRCLE STE 300- WILSONVILLE, OR 97070 TEL. 503-968-8787, FAX. 458-215-3632	Geosyntec  consultants 920 SW 6TH AVE STE 600, PORTLAND, OR 97204 TEL. 503-222-9518
DESIGN013 PROJECT NUMBER	102695 PROJECT NUMBER



TERMINAL 4	SUBMITTED BY		ROGER ANDERSON	
	DESIGN BY		T. TRAN	
BASIN M STORMWATER IMPROVEMENTS	DRAWN BY		T. TRAN	
	CHECKED BY		J. SHUTE, D. PANKANI	
PUMP DETAILS 1	DATE		FEB 2021	
	SHEET NO.		20	TYPE: CD
	DRAWING NO.		DISC. SHT. NO.	
	T4 2021-500		C6.10	



A top-down view of the Multismart Keypad. The central feature is a large rectangular keypad area labeled "MULTISMART KEYPAD". Surrounding the keypad are several circular speaker grilles. A large circular speaker array is located on the right side, and a smaller circular speaker array is located on the bottom right. The entire unit is enclosed in a rectangular frame with rounded corners.

1. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR MULTISMART BASE UNIT AND KEYBOARD DISPLAY PREPARED BY THE PUMP MANUFACTURER. SHOP DRAWINGS SHALL BE SUBMITTED AND APPROVED BY PORT PRIOR TO PURCHASE OR FABRICATION.
2. SEE ELECTRICAL SHEET E3.01 AND E3.02 FOR CONTROLS.

1. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR MULTISMART BASE UNIT AND KEYBOARD DISPLAY PREPARED BY THE PUMP MANUFACTURER. SHOP DRAWINGS SHALL BE SUBMITTED AND APPROVED BY PORT PRIOR TO PURCHASE OR FABRICATION.
2. SEE ELECTRICAL SHEET E3.01 AND E3.02 FOR CONTROLS.

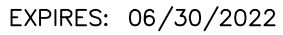
1 MULTISMART BASE UNIT AND KEYBOARD DISPLAY
SCALE: N.T.S.

The image shows the logos for three organizations. On the left is the Port of Portland logo, featuring a stylized compass rose icon and the text "PORT OF PORTLAND" in a bold, sans-serif font, with the tagline "Possibilities in every direction since 1891." below it. In the center is the WHPacific logo, with "WHPacific" in a large, bold, serif font, and the address "9450 SW COMMERCE CIRCLE STE 300, WILSONVILLE, OR 97070" and phone/fax numbers "TEL. 503-968-8787, FAX. 458-215-3632" below it. On the right is the Geosyntec consultants logo, with "Geosyntec" in a large, bold, serif font, "consultants" in a smaller, bold, sans-serif font, and the address "920 SW 6TH AVE STE 600, PORTLAND, OR 97204" and phone number "TEL. 503-222-9518" below it.



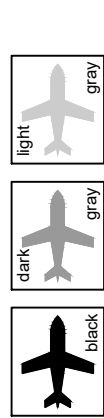
920 SW 6TH AVE STE 600, PORTLAND, OR 97204
TEL. 503-222-9518

102695



PUMP DETAILS 2

SUBMITTED BY	ROGER ANDERSON	
DESIGN BY	T. TRAN	
DRAWN BY	T. TRAN	
CHECKED BY	J. SHUTE, D. PANKANI	
DATE	FEB 2021	
SHEET NO.	21	TYPE: CD
DRAWING NO. T4 2021-500		DISC. SHT. NO. C6.11



CAN YOU SEE THE AIRPLANES? THE ADJACENT SAMPLES SHOW THREE DIFFERENT LEVELS OF SHADING. SETTINGS FOR VIEWING AND PRINTING DRAWING CONTENT ARE OPTIMIZED WHEN ALL THREE PLANES ARE VISIBLE. THIS GUIDANCE IS PROVIDED FOR REFERENCE ONLY.

THE AREA BELOW IS TO BE LEFT BLANK - FOR USE BY CITY FOR PERMIT REVIEW STAMP ONLY.

LEGEND:	
	FOUND BRASS PLUG
	SET BRASS PLUG
	FOUND BRASS CAP
	SET BRASS CAP
	FOUND IRON ROD
	SET IRON ROD
	FOUND IRON PIPE
	FOUND P.K. NAIL
	SET P.K. NAIL
	FOUND 9/16" STAINLESS STEEL ROD IN MON. BOX
	SET 9/16" STAINLESS STEEL ROD IN MON. BOX
	HUB AND TACK
	SECTION CORNER
	SECTION QUARTER CORNER
	T. 2N, 1E
	BOLLARD
	DOLPHIN
	FIRE ALARM
	FLAG POLE
	GATE POST
	FENCE POST
	FENCE LINE
	GUARD POST
	GUARD RAIL
	JERSEY BARRIERS
	PILING
	SIGN POST
	AIRPLANE TIEDOWN
	RAILROAD SWITCH
	SOIL BORING
	SHRUB
	DECIDUOUS TREE
	EVERGREEN TREE
	AIRCRAFT FUEL HANDHOLE
	AIRCRAFT FUEL HIGH POINT
	AIRCRAFT FUEL HYDRANT
	AIRCRAFT FUEL LOW POINT
	CATCH BASIN
	CLEANOUT
	CULVERT
	MANHOLE
	ROOF DRAIN
	STORM OR SANITARY FLOW ARROW
	MANHOLE WITH SLOTTED GRATE
	OUTFALL
	OIL / WATER SEPARATOR
	TRENCH DRAIN
	SANITARY PUMP STATION
	AIR VALVE
	BACKFLOW DEVICE
	UTILITY LINE CONTINUATION

	BLOW-OFF VALVE
	FIRE DEPARTMENT CONNECTION
	HOSE BIB
	FIRE HYDRANT
	METER
	PIV VALVE
	SHIP WATER CONNECTION
	IRRIGATION CONTROL BOX
	CAMERA
	TELEPHONE RISER
	TELEPHONE BOOTH
	BASE CAN - L868 - 12" DIAMETER BASE CAN
	BASE CAN - L867 - 16" DIAMETER BASE CAN
	GATE CARD READER
	CATENARY POLE
	GATE ARM
	GROUNDING ROD
	ELECTRICAL OR COMMUNICATIONS VAULT 444 LA
	ELECTRICAL OR COMMUNICATIONS VAULT 644 LA
	DUCT MARKER (BRASS)
	DUCT MARKER (CONCRETE)
	ELECTRICAL HANDHOLE
	JUNCTION BOX
	TAXIWAY EDGE LIGHT - BLUE ELEVATED ON BASE CAN
	TAXIWAY EDGE LIGHT - IN-PAVEMENT
	RUNWAY EDGE LIGHT - SEMI FLUSH
	RUNWAY GUARD LIGHT - ELEVATED
	LAND & HOLD SHORT LIGHT - IN-PAVEMENT
	RUNWAY ELEVATED THRESHOLD LIGHT - RED/GREEN
	STOP BAR LIGHT - ELEVATED RED/RED
	STOP BAR LIGHT - IN-PAVEMENT RED/YELLOW
	RUNWAY TOUCH DOWN ZONE LIGHT
	RUNWAY THRESHOLD LIGHT - GREEN/RED
	TAXIWAY LIGHT - CLEAR/GREEN/YELLOW
	TAXIWAY CLEARANCE BAR LIGHT - BLANK YELLOW
	L852C BI-DIRECTIONAL LIGHT - GREEN/GREEN
	L852D BI-DIRECTIONAL LIGHT - GREEN/GREEN
	MICROWAVE SENSOR
	TAXIWAY REFLECTOR
	RUNWAY OR TAXIWAY LIGHT
	TAXIWAY STAKE MOUNTED REFLECTOR
	TRANSFORMER
	UTILITY POLE
	GUY ANCHOR
	STREET LIGHTING (SINGLE LUMINAIRE)
	STREET LIGHTING (DOUBLE LUMINAIRE)
	STREET LIGHTING (HIGH MAST)
	SIGNAL CONTROLLER
	STREET SIGNAL
	MONITORING WELL
	HAND BOX

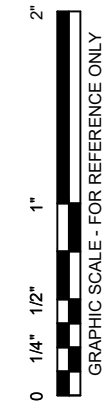
	UTILITY LINE CAP
	STAND PIPE
	UNIDENTIFIED UTILITY FEATURE
	VALVE
	VAULT LID
	SHOT ON PIPE OR CONDUIT
	AIRCRAFT FUEL LINE
	ELECTRICAL LINE
	OVERHEAD POWER LINE
	FAA COMMUNICATIONS LINE
	FAA ELECTRICAL LINE
	FAA LINE
	NATURAL GAS LINE
	SANITARY SEWER LINE
	STORM SEWER LINE
	STORM SEWER PERFORATED LINE
	DEICING STORM SEWER LINE
	CONCENTRATED DEICING STORM SEWER LINE
	DILUTE DEICING STORM SEWER LINE
	TELEPHONE LINE
	COMMUNICATIONS LINE
	FIBER OPTIC LINE
	WATER LINE
	FIRE WATER LINE
	UNKNOWN UTILITY LINE
	ABANDONED UTILITY LINE
	DITCH CENTERLINE
	MAJOR CONTOUR
	MINOR CONTOUR
	EXISTING MAJOR CONTOUR
	EXISTING MINOR CONTOUR
	HAND-OFF-AUTO SWITCH
	N.O. RELAY CONTACT
	GROUND
	THERMAL OVERLOAD
	CIRCUIT BREAKER
	SWITCH
	MOTOR (PUMP)

NOTE:

THIS IS A STANDARD (TYPICAL) LEGEND. NOT ALL SYMBOLS ARE NECESSARILY USED ON THIS PROJECT. ALSO, ADDITIONAL SYMBOLS MAY BE INTRODUCED ON DRAWINGS AND DEFINED THEREIN.

GENERAL ELECTRICAL NOTES:

- CONTRACTOR IS STRONGLY ENCOURAGED TO VISIT AND CAREFULLY EXAMINE THOSE PORTIONS OF THE SITE AFFECTED BY THIS WORK BEFORE SUBMITTING PROPOSALS, SO AS TO BECOME FAMILIAR WITH EXISTING CONDITIONS AND DIFFICULTIES THAT WILL AFFECT EXECUTION OF THE WORK.
- ALL ELECTRICAL WORK AND MATERIALS MUST CONFORM TO THE LATEST STANDARDS FOR THE NATIONAL ELECTRICAL CODE AND ANY OTHER APPLICABLE CODES. MATERIALS SHALL BE LISTED BY THE UNDERWRITER'S LABORATORIES, INC. SHOULD PLANS AND CODES CONFLICT, THE CODE TAKES PREFERENCE. MAKE NO CHANGES, EVEN IN CASE OF CONFLICT, WITHOUT FIRST OBTAINING APPROVAL OF THE CONTRACTING OFFICER.
- PROVIDE AS USED HERE ON THE DRAWINGS, PROVIDE IS AN ALL-INCLUSIVE TERM REQUIRING CONTRACTOR TO FURNISH, INSTALL, WIRE AND CONNECT ALL SPECIFIED EQUIPMENT AS WELL AS COMPONENTS, ACCESSORIES, WIRING, AND MOUNTING HARDWARE TO INSURE THAT SPECIFIED EQUIPMENT FUNCTIONS TO MEET SYSTEM(S) REQUIREMENTS.
- UNLESS OTHERWISE NOTED, ALL POWER CIRCUIT CONDUCTORS SHALL BE COPPER AND MINIMUM #12 AWG IN 1" CONDUIT.
- A GREEN, COPPER GROUND WIRE SHALL BE INSTALLED IN ALL CONDUIT SYSTEMS AND SHALL BE BONDED TO ALL ENCLOSURES, BOXES, AND EQUIPMENT.
- EXISTING CONDITIONS AND UTILITIES INDICATED ARE TAKEN FROM EXISTING CONSTRUCTION DOCUMENTS, VARIOUS SURVEYS, AND FIELD INVESTIGATIONS.
- IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO PROTECT EXISTING UTILITIES FROM DAMAGE. THE CONTRACTOR SHALL BEAR ALL EXPENSE FOR REPAIR OR REPLACEMENT OF UTILITIES OR OTHER PROPERTY DAMAGED BY OPERATIONS IN CONJUNCTION WITH THE COMPLETION OF THIS WORK.



	DATE	BY	REVISION		DATE	BY	REVISION
	2/8/2021						
	3:27:23 PM						
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	p:\geosyntec consultants incl\229220-0237142.01\execution\drawings\civil\p0023714w-e-electrical.dwg						



PORT OF PORTLAND
Possibilities in every direction since 1891.



9450 SW COMMERCE CIRCLE STE 300, WILSONVILLE, OR 97070
TEL. 503-966-8787; FAX. 458-215-3632



Geosyntec
consultants
920 SW 6TH AVE STE 600, PORTLAND, OR 97204
TEL. 503-222-9518

2019D013
DESIGN NUMBER

102695
PROJECT NUMBER

	TERMINAL 4		SUBMITTED BY		ROGER ANDERSON	
	BASIN M STORMWATER IMPROVEMENTS		DESIGN BY		P. SITGES, N. FREEMAN	
			DRAWN BY		N. FREEMAN	
	ELECTRICAL LEGEND AND NOTES		CHECKED BY		W. FOSTER	
			DATE		FEB 2021	
			SHEET NO.	22	TYPE: CD	
			DRAWING NO.		T4 2021-500	DISC. SHT. NO. E0.01

IF ELECTRONIC SIGNATURE IS BROKEN OR MISSING - THIS IS NOT A LEGAL DRAWING

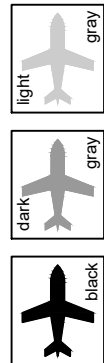
DRAWING SCALE IS REDUCED 50% WHEN SHEET SIZE IS 11" x 17"



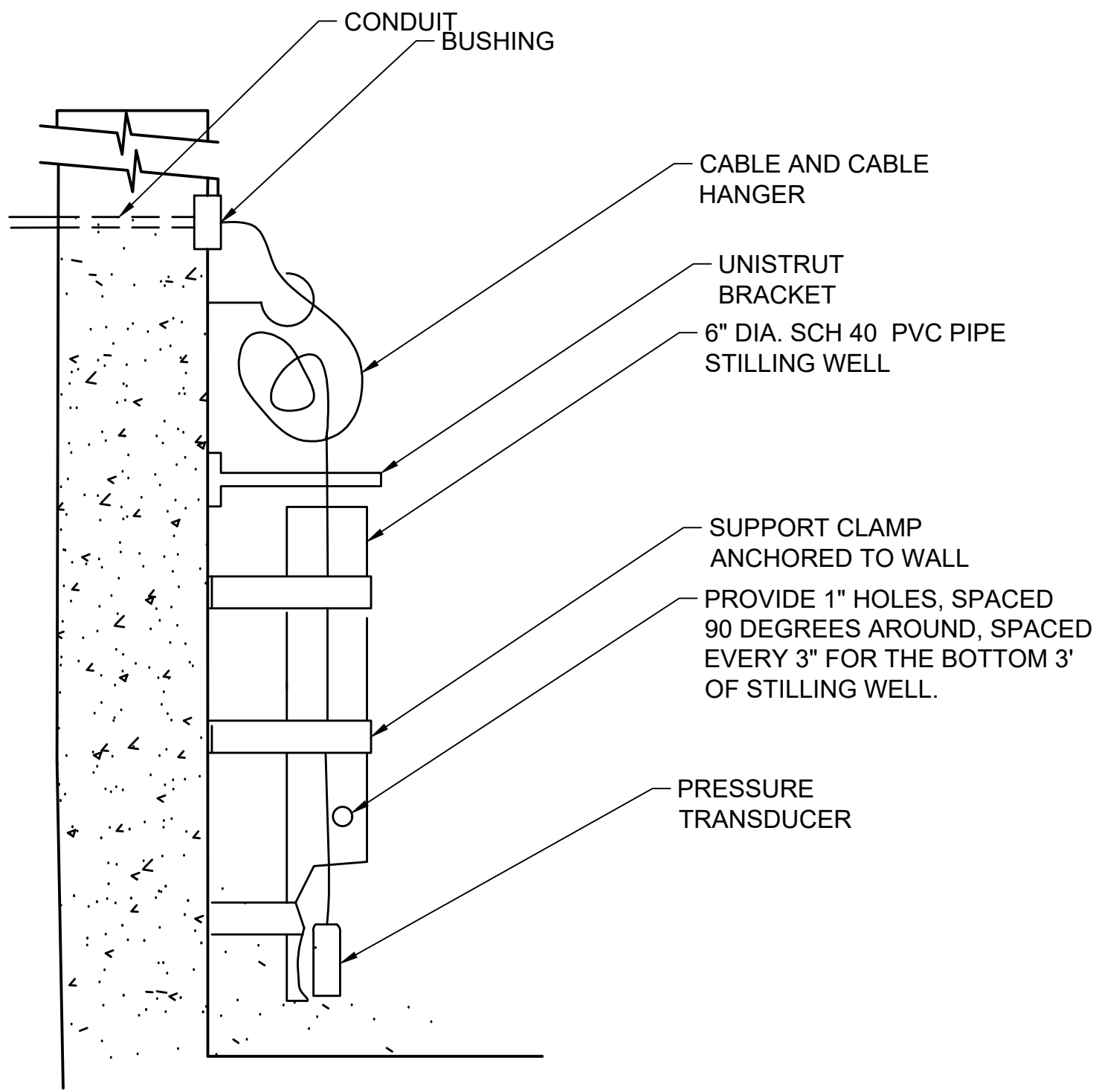
- ## KEY NOTES:
- ① EXISTING PANEL "DP".
 - ② PROVIDE NEW CIRCUIT FROM PANEL 'DP' FOR M-PUMP CONTROL CABINET. SEE SHEET E2.01 FOR WIRE AND CONDUIT SIZES. COORDINATE TRENCHING WITH CIVIL.
 - ③ NEW PEDESTAL MOUNTED BASIN M-PUMP CONTROL PANEL. SEE SHEET E3.01 AND E3.02 FOR CONTROLS SCHEMATICS. PAD TO BE 6'X8'X18".
 - ④ 2-1" RMC CONDUITS FOR PUMPS AND (1) 1" RMC CONDUIT FOR TRANSDUCER AND FLOW METERS. PROVIDE SEAL OFFS FOR CONDUIT ENTERING/LEAVING THE WET WELL.
 - ⑤ NEW BIOINFILTRATION BASIN OVERFLOW TRANSDUCER SENSOR. PROVIDE 1-1" SCHEDULE 40 PVC CONDUIT FROM CONTROL PANEL TO SENSOR. SET TRANSDUCER TO ALARM AT 32.74 ELEVATION. MOUNT SENSOR ON OVERFLOW BASIN DRAIN. SEE DETAIL 1 ON SHEET E1.01.
 - ⑥ CONDUIT FOR CONTROLS FROM M-PUMP CONTROL PANEL, SEE SHEET E1.01 FOR MORE INFORMATION.
 - ⑦ PROVIDE 24" X 18" X 24" DEEP, TIER 15, QUAZITE UNDERGROUND HANDHOLE.
 - ⑧ EXISTING UNDERGROUND ELECTRICAL LINE. CONTRACTOR TO VERIFY CONDUIT IS NOT IN SERVICE AND REMOVE AS NECESSARY FOR CONSTRUCTION ACTIVITIES.
 - ⑨ PROTECT ENERGIZED CONDUIT.

										</									
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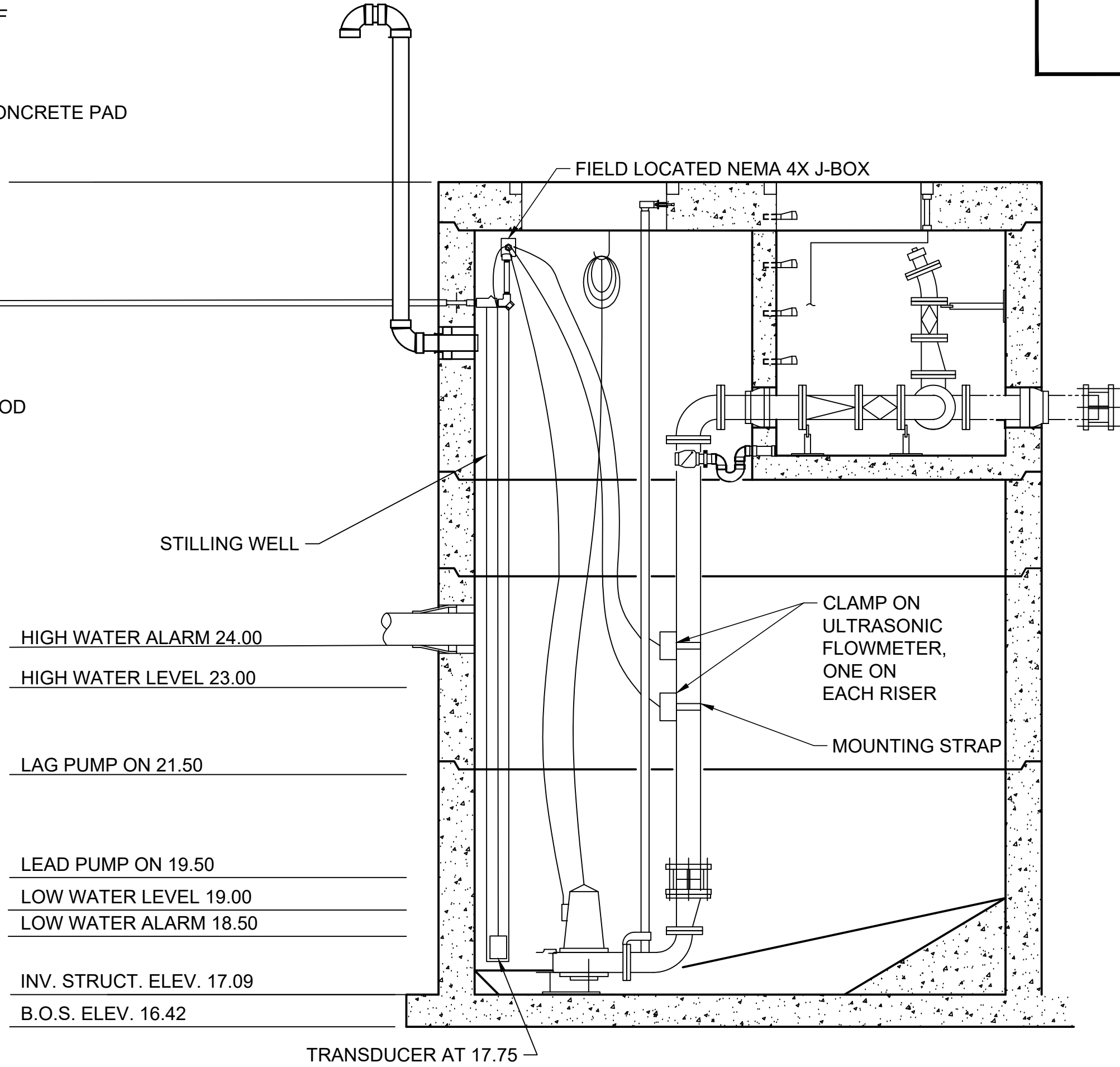
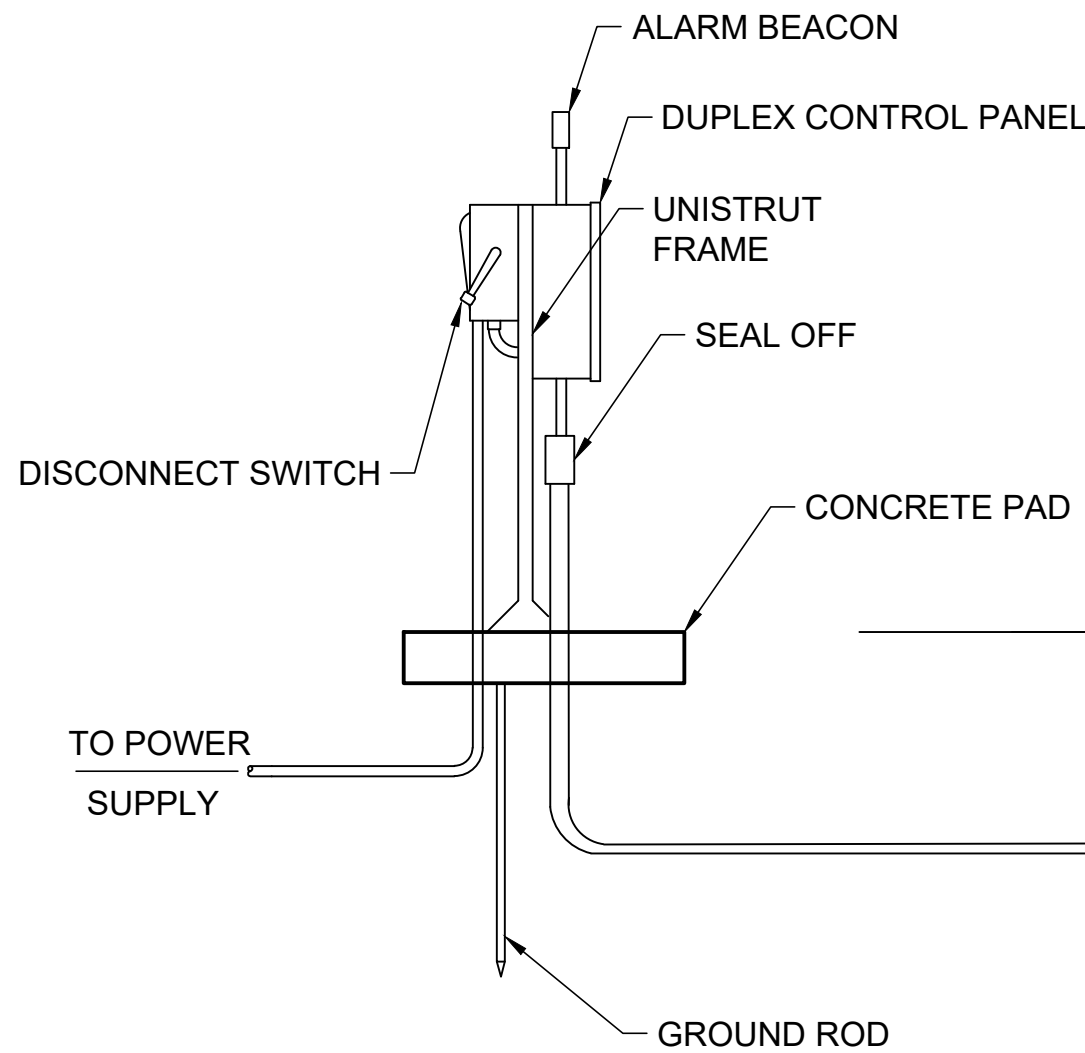
CAN YOU SEE THE AIRPLANES? THE ADJACENT SAMPLES SHOW THREE DIFFERENT LEVELS OF SHADING. SETTINGS FOR VIEWING AND PRINTING DRAWING CONTENT ARE OPTIMIZED WHEN ALL THREE PLANES ARE VISIBLE. THIS GUIDANCE IS PROVIDED FOR REFERENCE ONLY.



THE AREA BELOW IS TO BE LEFT BLANK - FOR USE BY CITY FOR PERMIT REVIEW STAMP ONLY.

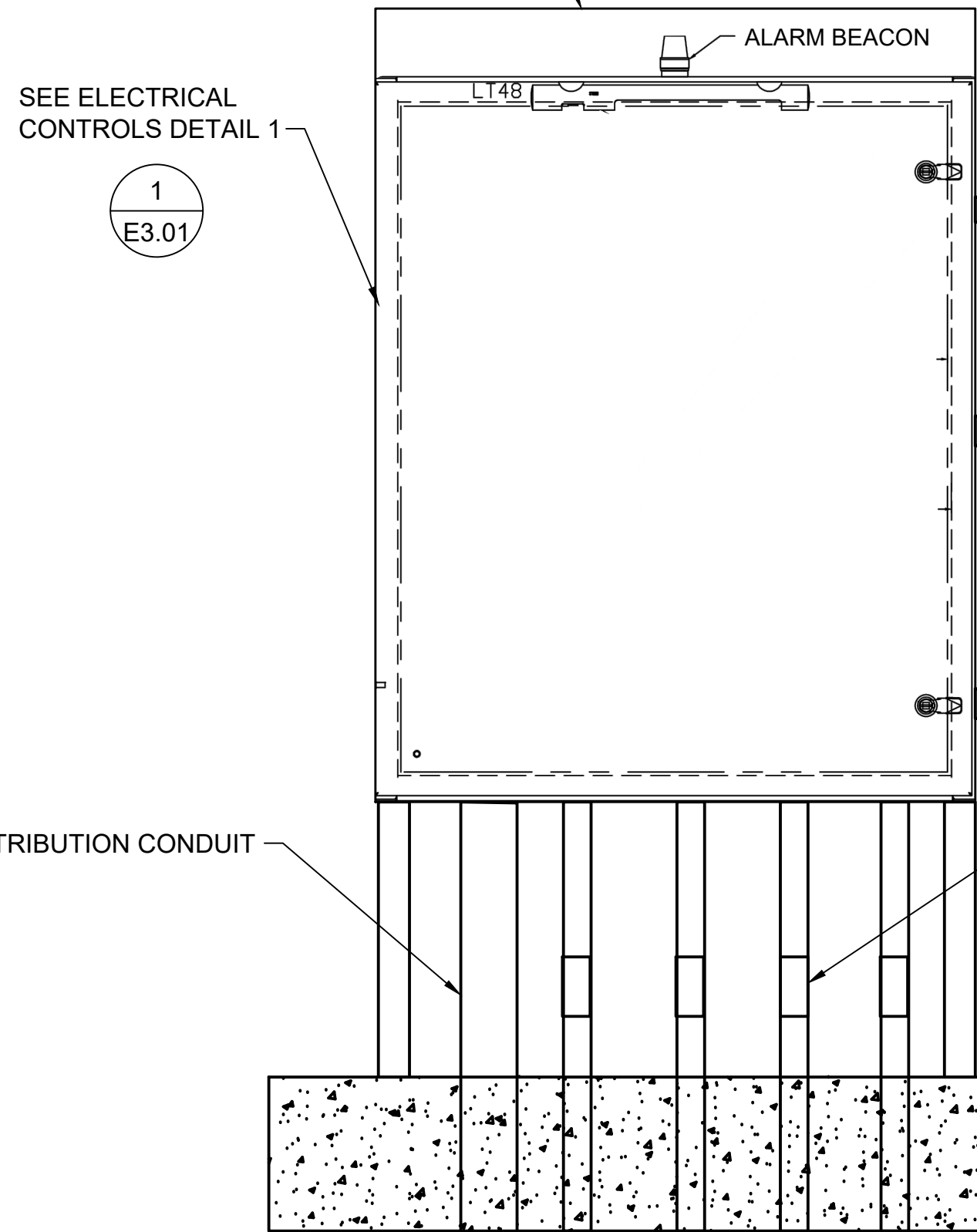


1 TRANSDUCER WELL DETAIL
SCALE: N.T.S.



2 ELECTRICAL PUMP DETAILS
SCALE: 1"=20'

MAIN DISCONNECT LOCATED ON BACK OF EQUIPMENT RACK.



3 PUMP STAT CONTROL PANEL
SCALE: N.T.S.

SENSAPHONE WITH CELLULAR MODEM. SEE SPECIFICATIONS

UNISTRUT FRAME

SEAL OFFS

CONCRETE PAD, SEE CIVIL SHEET C6.04, DETAIL 4 FOR PAD DETAILS.

4
C6.04

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TEL. 503-222-9518

2019D013
DESIGN NUMBER

102695
PROJECT NUMBER

TERMINAL 4

BASIN M STORMWATER IMPROVEMENTS

ELECTRICAL PUMP DETAILS

SUBMITTED BY	ROGER ANDERSON
DESIGN BY	P. SITGES, N. FREEMAN
DRAWN BY	N. FREEMAN
CHECKED BY	W. FOSTER
DATE	FEB 2021
SHEET NO.	24
TYPE: CD	
DRAWING NO.	T4 2021-500
DISC. SHT. NO.	E1.01

CAN YOU SEE THE AIRPLANES? THE ADJACENT SAMPLES SHOW THREE DIFFERENT LEVELS OF SHADING. SETTINGS FOR VIEWING AND PRINTING DRAWING CONTENT ARE OPTIMIZED WHEN ALL THREE PLANES ARE VISIBLE. THIS GUIDANCE IS PROVIDED FOR REFERENCE ONLY.

③

*NEW LOAD TO PANEL 'DP'

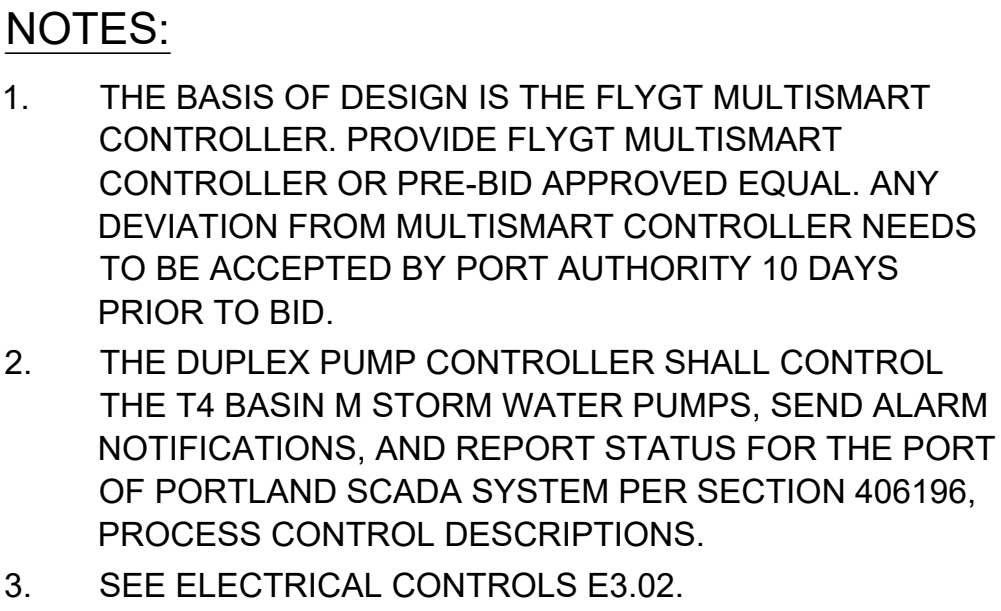


- ① BASIN 'M' PUMP STATION CONTROL PANEL.
SEE SHEET E1.01 FOR DETAILS.
- ② BIOINFILTRATION OVERFLOW BASIN
TRANSDUCER.
- ③ PANEL 'DP' IS A SIEMENS, 480V, 3 PHASE, 3
WIRE PANELBOARD. ALL EXISTING LOADS
REMAIN. PROVIDE NEW 40A/3P BREAKER
COMPATIBLE WITH PANEL 'DP' AND PROVIDE
A NEW TYPEWRITTEN LEGEND.
- ④ 480V, 60A, 3 POLE, NON-FUSED SAFETY
SWITCH IN A NEMA 4X ENCLOSURE.

[illegible]

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2019D013 _____ DESIGN NUMBER	102695 _____ PROJECT NUMBER

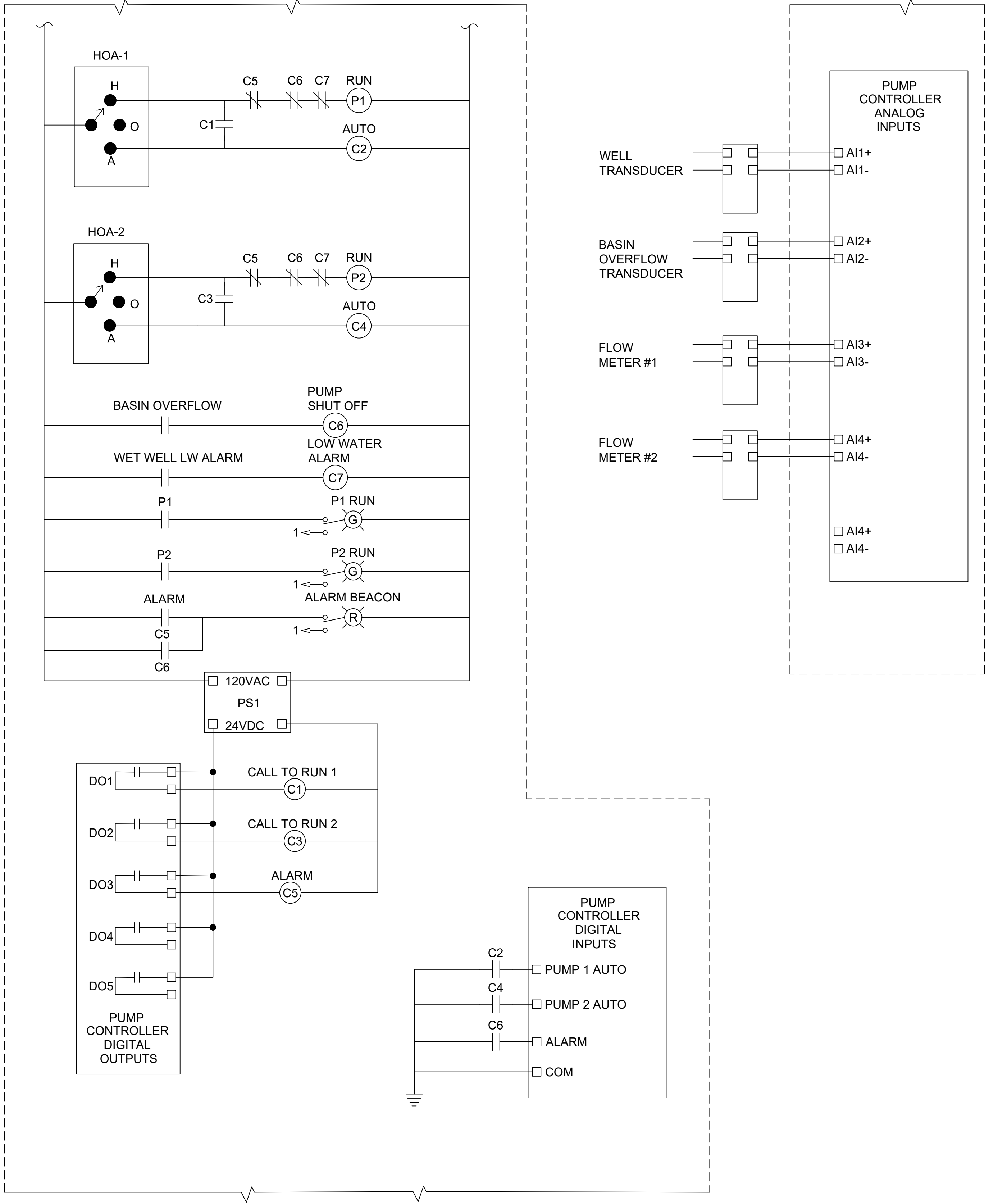
	TERMINAL 4	SUBMITTED BY		ROGER ANDERSON		
		DESIGN BY		P. SITGES, N. FREEMAN		
	BASIN M STORMWATER IMPROVEMENTS	DRAWN BY		N. FREEMAN		
		CHECKED BY		W. FOSTER		
	ELECTRICAL ONE-LINE DIAGRAM	DATE		FEB 2021		
		SHEET NO.		25	TYPE: CD	
		DRAWING NO.		DISC. SHT. NO.		
T4 2021-500		E2.01				



1

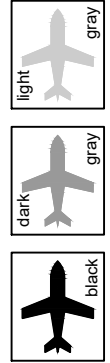
SUBMITTED BY	ROGER ANDERSON	
DESIGN BY	P. SITGES, N. FREEMAN	
DRAWN BY	N. FREEMAN	
CHECKED BY	W. FOSTER	
DATE	FEB 2021	
SHEET NO.	26	TYPE: CD
DRAWING NO.	T4 2021-500	DISC. SHT. NO. E3.01

LE IS REDUCED 50% WHEN SHEET SIZE IS 11" x 17"



The image displays three logos. On the left is the Port of Portland logo, featuring a stylized compass rose icon and the text "PORT OF PORTLAND" in a bold, sans-serif font, with the tagline "Possibilities in every direction since 1891." below it. In the center is the WHPacific logo, with "WHPacific" in a large, bold, serif font and "Engineering • Construction • Environmental" in a smaller, sans-serif font below it. On the right is the Geosyntec consultants logo, with "Geosyntec" in a large, bold, sans-serif font and "consultants" in a smaller, sans-serif font below it.

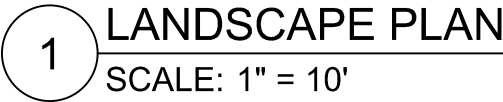
	TERMINAL 4	SUBMITTED BY		ROGER ANDERSON		
		DESIGN BY		P. SITGES, N. FREEMAN		
	BASIN M STORMWATER IMPROVEMENTS	DRAWN BY		N. FREEMAN		
		CHECKED BY		W. FOSTER		
	ELECTRICAL CONTROLS 2	DATE		FEB 2021		
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		DRAWING NO.		DISC. SHT. NO.		
T4 2021-500		E3.02				

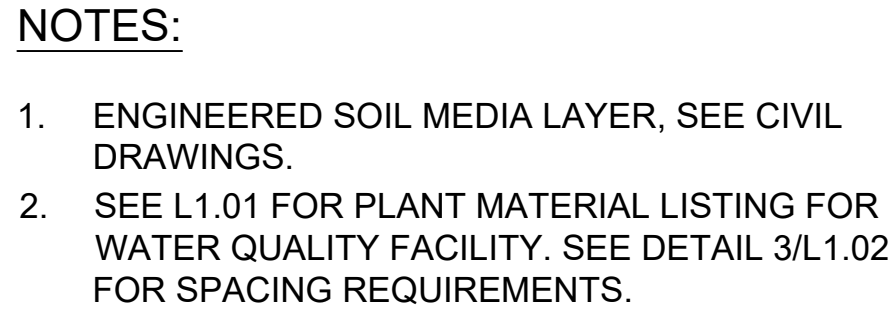


ZONE A

ZONE B*

* SEE DETAIL 4/L1.02 FOR ZONE B PLANTING LAYOUT MATRIX

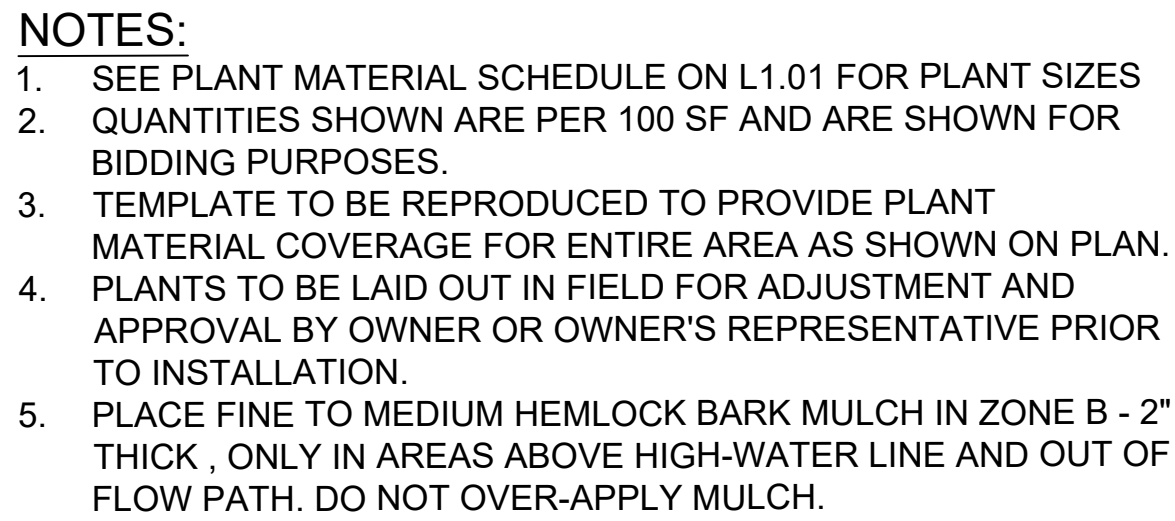




2 WATER QUALITY BASIN DETAIL
SCALE: NTS



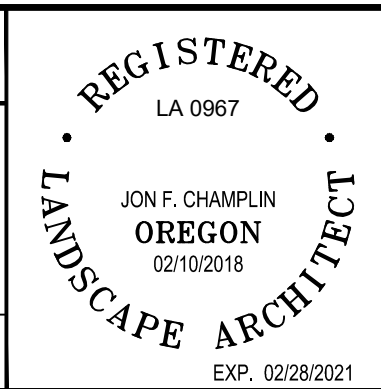
3 PLANT SPACING DETAIL
SCALE: NTS



4 ZONE B PLANTING LAYOUT MATRIX
SCALE: NTS

[illegible]

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DESIGN013 PROJECT NUMBER	102695 PROJECT NUMBER



TERMINAL 4
BASIN M STORMWATER IMPROVEMENTS
LANDSCAPE DETAILS



- CLASS 200 PVC IRRIGATION PIPES,
INSTALL ABOVE GROUND
- — POINT OF CONNECTION, SEE DETAIL #5
ON SHEET L2.02
- ☐ CONTROLLER: RAINBIRD ESP9V1
CONTROLLER
- ☐ M BADGER RECORDALL LEAD-FREE METER: MODEL 70
- ☐ BF 1" BACKFLOW PREVENTER: APOLLO 4A-105-A4F
- ☒ ELECTRIC CONTROL VALVE: RAINBIRD PEB SERIES
- ☉ APOLLO 77C-104-01A BRASS BALL VALVE -
3/4" MANUAL DRAIN VALVE
- ☒ BALL VALVE - SAME SIZE AS MAINLINE
- VALVE NUMBER
- ☒ X X" VALVE SIZE
- ☒ X X VALVE GALLONS PER MINUTE

HEAD LEGEND:

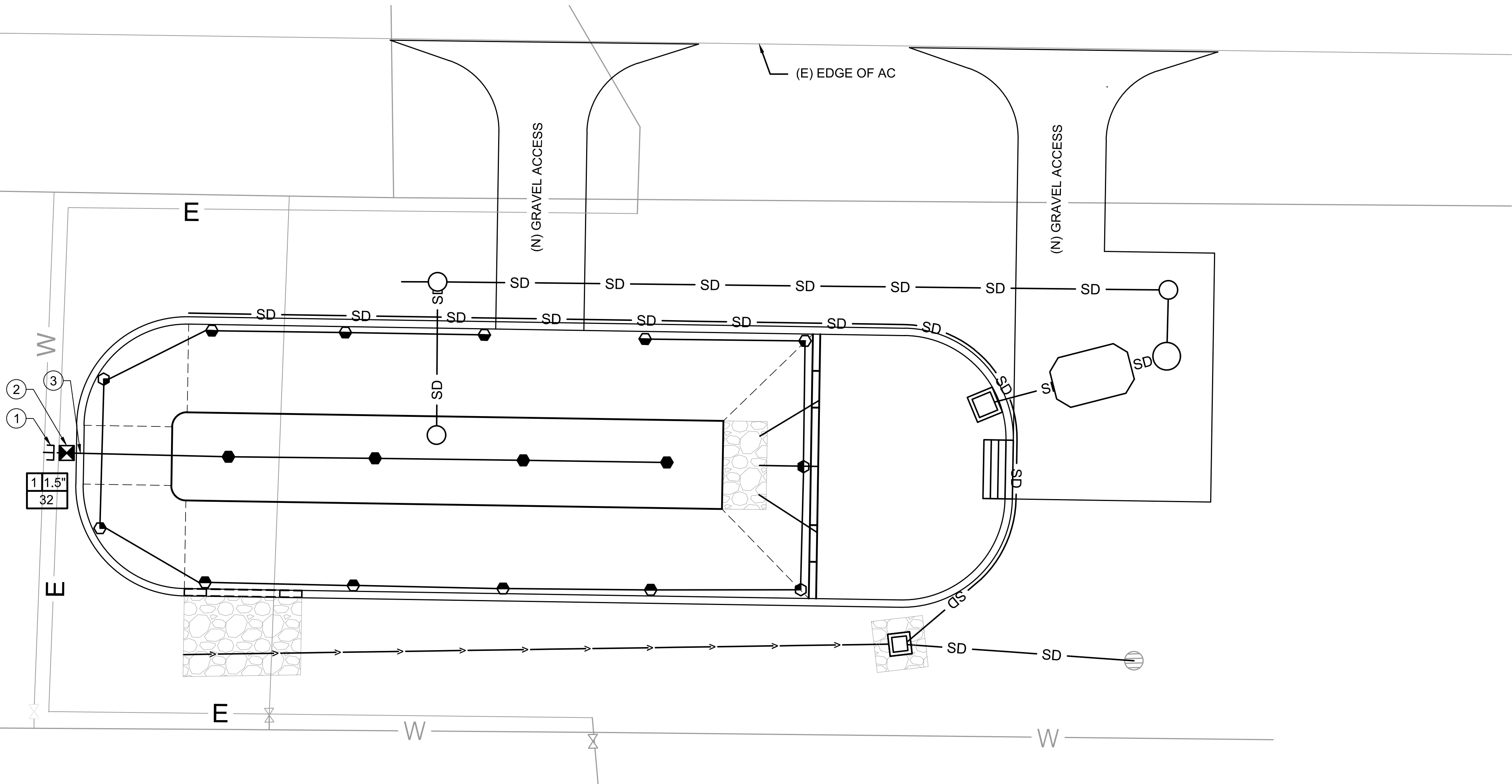
HEAD COMPANY & CAT. NO.		RADIUS	G.P.M.	P.S.I.
	RAINBIRD R-VAN24 AND R-VAN24-360 NOZZLES. INSTALL ON PA-8S-P45 SHRUB ADAPTER.	17-23	0.84-3.48	45

IRRIGATION SYSTEM DESIGN NOTES:

1. PROVIDE AND INSTALL NOZZLES AS REQUIRED TO FIT PLANTING AREAS TO ENSURE PROPER COVERAGE.
2. THE IRRIGATION SYSTEM IS BASED ON AN AVAILABLE WATER PRESSURE OF 55 PSI MINIMUM AT THE POINT OF CONNECTION. CONTRACTOR SHALL VERIFY PRESSURE PRIOR TO BEGINNING WORK.

IN THE HYDRAULIC DESIGN AND PIPE SIZING,
DO NOT EXCEED THE FOLLOWING G.P.M. OF
WATER USAGE PER SCHEDULED PIPE SIZE.

FLOW	PIPE SIZE	
1 - 12 GAL.	3/4"	CLASS 200 PVC
12 - 20 GAL.	1"	CLASS 200 PVC
20 - 30 GAL.	1 1/4"	CLASS 200 PVC
30 - 45 GAL.	1 1/2"	CLASS 200 PVC
45 - 60 GAL.	2"	CLASS 200 PVC
60 - 90 GAL.	2 1/2"	CLASS 200 PVC



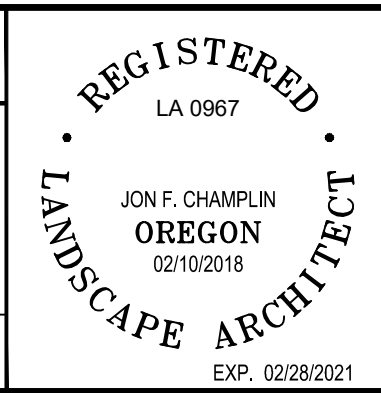
KEY NOTES:

- ① POINT OF CONNECTION, SEE DETAIL #5 ON SHEET L2.02.
- ② AUTOMATIC CONTROL VALVE AND BATTERY OPERATED CONTROLLER.
- ③ USE 45° ELBOWS TO ROUTE IRRIGATION PIPE UP AND OVER CONCRETE PERIMETER WALLS AND WEIRS.

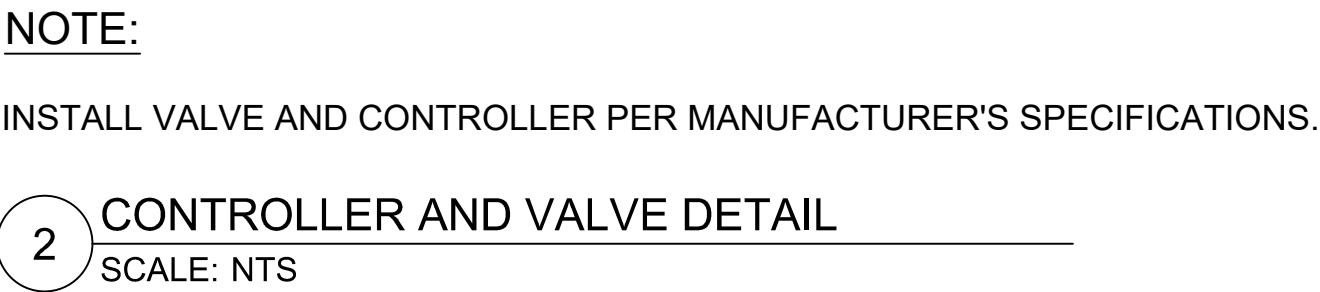
1 IRRIGATION PLAN
SCALE: 1" = 10'

#	DATE	BY	REVISION	APP	#	DATE	BY	REVISION	APP

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2019D013 _____ DESIGN NUMBER	102695 _____ PROJECT NUMBER



TERMINAL 4
BASIN M STORMWATER IMPROVEMENTS
IRRIGATION PLAN

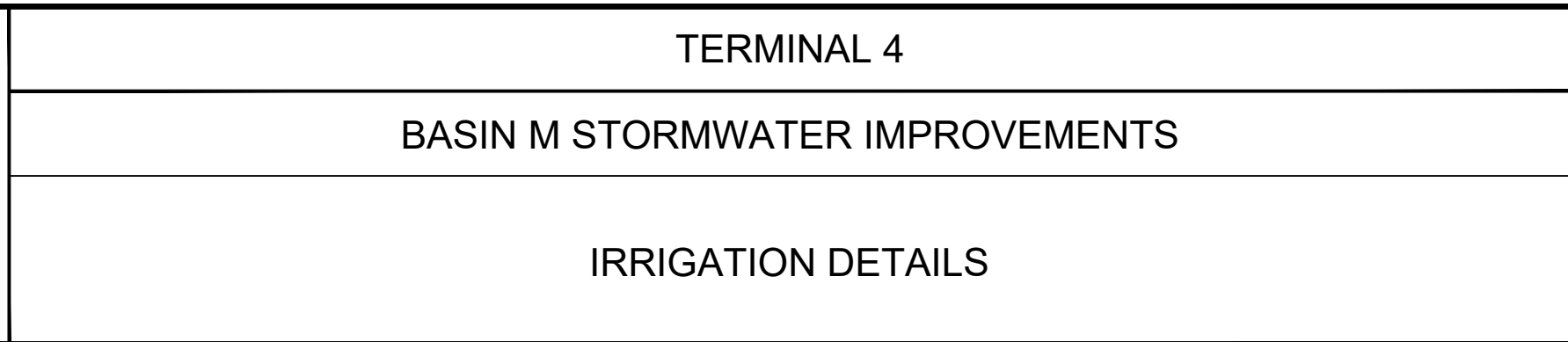


-
- Diagram illustrating a vertical support structure with numbered callouts (1 through 10) and dimensions (40", 32", 12" MIN.).

3 HOSE BIBB
SCALE: NTS



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2019D013 DESIGN NUMBER	102695 PROJECT NUMBER



SUBMITTED BY	ROGER ANDERSON	
DESIGN BY	J. CHAMPLIN	
DRAWN BY	J. CHAMPLIN	
CHECKED BY	M. SMYTH	
DATE	FEB 2021	
SHEET NO.	31	TYPE: CD
DRAWING NO. T4 2021-500		DISC. SHT. NO. L2.02



Prepared for
Port of Portland

P.O. Box 3529
Portland, OR 97208

Port of Portland Terminal 4

Operation & Maintenance Plan

Basin M

Vegetated Infiltration Basin

Prepared
02/2021

Geosyntec
consultants

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1 INTRODUCTION

This operation and maintenance plan (O&M plan) documents best practices for maintaining performance of the stormwater treatment and infiltration basin designed and constructed at the Port of Portland Terminal 4 (T4) in Basin M (Site). This O&M plan will be submitted to the City of Portland for permitting along with other permit application documents, based on the City of Portland 2016 Stormwater Management Manual (SWMM) requirements. In addition, the O&M plan also complies with requirements in Section 3.3.2 of the *City of Portland 2020 SWMM* and Section 7.2 of the *City of Portland 2020 Source Control Manual (SCM)*.

The SWMM defines a retrofit as the installation of a new stormwater facility to treat stormwater from existing impervious area. The SWMM manual distinguishes between City-required retrofits, retrofits required by State or Federal agencies, and owner-initiated retrofits. The Basin M facility is a retrofit required by Oregon Department of Environmental Quality (DEQ) and is therefore a State-required retrofit that does not add or replace any impervious area. A detailed discussion of the basis of design for the facility is presented in the Stormwater Report¹. This report will be available in the Port's Technical Reference Center (TRC).

This facility is a vegetated bio-infiltration basin designed to filter stormwater through engineered media prior to infiltrating into native soils. The goal is to treat stormwater runoff from Basin M to reduce pollutant loads to the Willamette River as required by Oregon DEQ pursuant to the *Voluntary Agreement for Remedial Investigation, Source Control Measures, and Feasibility Study* (DEQ No. LQVC-NWR-03-18), December 4, 2003 (ECSI #2356).

2 SITE AND SYSTEM OVERVIEW

The Site is in the Willamette River (main stem) watershed and is located at T4, which has an address of 11040 N Lombard St, Portland OR (see Figure 1). T4 occupies approximately 283 acres on the east bank of the lower Willamette River downstream from the St. Johns Bridge in north Portland, between River Miles 4.1 and 4.6. T4 is zoned heavy industrial with River Industrial and Prime Industrial overlays. Facility contacts are as follows:

Facilities Owner Contact Information

Name: Port of Portland
Address: 11040 N Lombard St,
City: Portland, OR 97203
Telephone Number: 503-240-2006

Facilities Operator Contact Information

Name: Port of Portland
Address: 11040 N Lombard St,
City: Portland, OR 97203
Telephone Number: 503-240-2006

Site Legal Description

SECTION 02 1N 1W, TL 100 91.96 ACRES

¹ WHPacific and Geosyntec, 2021. Port of Portland Terminal 4 Stormwater Report, Basin M Vegetated Infiltration Basins. Prepared for the Port of Portland. February.

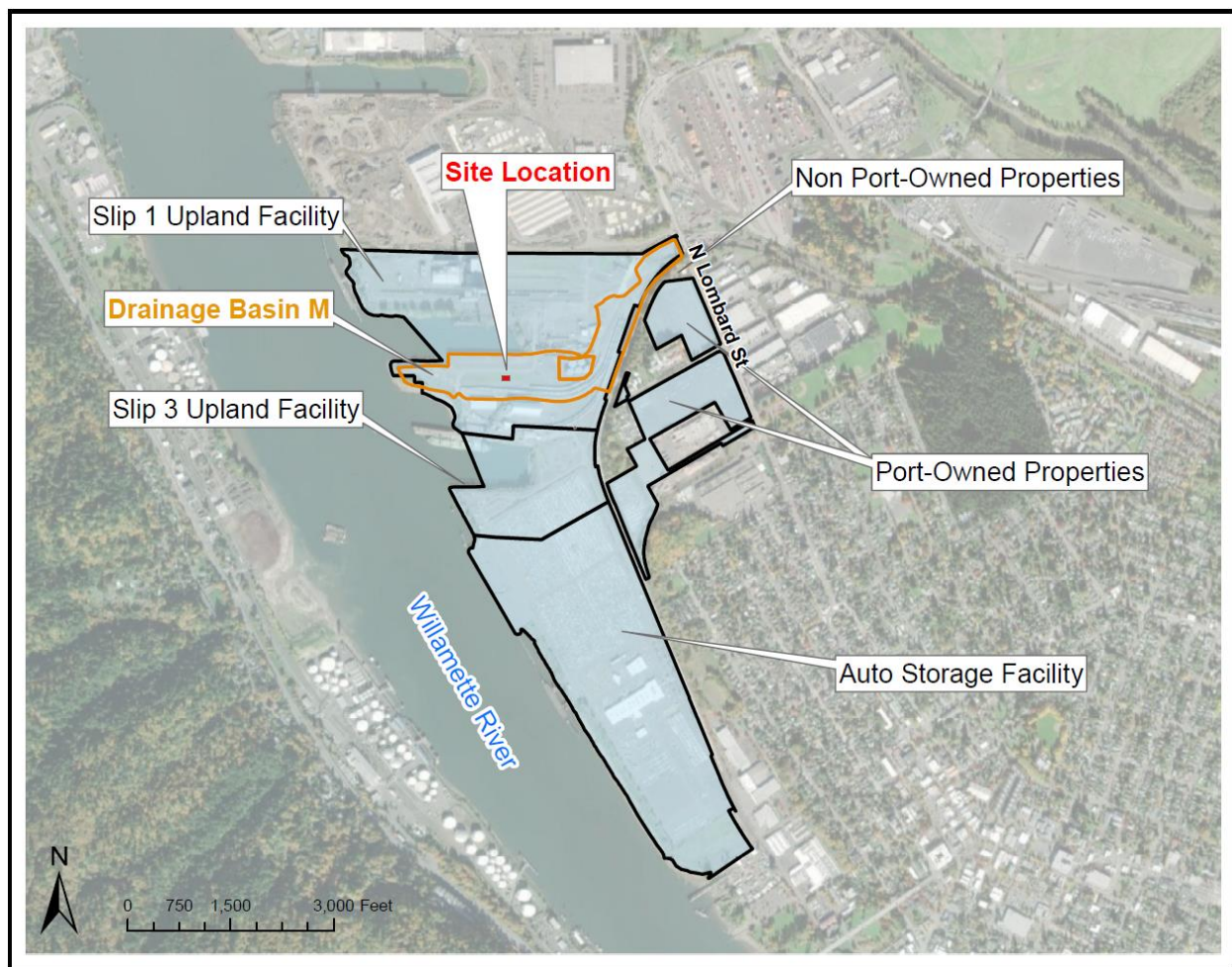


Figure 1. Site Location Map

Structural stormwater treatment for Basin M consists of a single vegetated infiltration basin and its accompanying conveyances (see Appendix F for design or record drawings). Per Section 1.3.2 of the SWMM, the City's stormwater management approach prioritizes vegetation and infiltration to meet stormwater requirements and to maximize environmental benefits. The City's Discharge Hierarchy ranks full onsite infiltration as Level 1 and is required to the maximum extent practicable for sites with design infiltration rates of 2 inches per hour or more. Level 2 allows offsite discharge to a storm system, and both water quality treatment and flow control are required. The Basin M facility is a vegetated basin that treats inflows via filtration through engineered media prior to infiltrating. It is designed to capture, treat and infiltrate greater than 90% of the average annual runoff volume and is therefore considered a Level 2 facility. Although the drainage area to this facility does not have any industrial activities and is therefore not covered under an NPDES permit, the design also meets the sizing requirements of a Tier II corrective action for NPDES permits. Refer to the Stormwater Report for further discussions of sizing and estimated performance.

2.1 Drainage Area

Basin M is approximately 26.5 acres, relatively flat, and includes a mix of land uses. The drainage area is approximately 53 percent impervious. Table 1 shows a summary of the areas treated by the facility.

Table 1: Stormwater Facility Drainage Area

	Drainage Category (ac)			
Location	Roofs	Paved Roads	Other Paved Areas	Pervious Areas
Basin M	0.2	2.3	11.5	12.4

2.2 Stormwater Conveyance

Table 2 presents a list of relevant stormwater conveyance system components, their facility ID number, and a reference for where they can be located on design drawings. A brief description of the listed components follows the table.

Table 2: Key Stormwater Conveyance Components

Facility ID #	Name	Drawing Ref. Sheet # (See Appendix F)
F1	Intercept Manhole	C6.02
F2	Wet well and Pumps	C6.10
F3	Valve Box	C6.03
G1	Other Stormwater Pipes, Manholes and Catch Basins	Varies

2.2.1 *F1: Intercept manhole*

The intercept manhole functions as a flow diversion/sedimentation manhole and is included in the design to direct stormwater runoff to the basin for treatment and infiltration. The Basin M facility is designed to capture stormwater flows up to a specified maximum flow volume beyond which flows bypass the treatment system. The sump in the intercept manhole is helpful for settling out coarse sediment that would otherwise discharge to the pump wet well. The “T” shape of the outlet pipe offers spill control benefits by delaying the migration of floatable liquids in the event of a spill and allowing them to be pumped out and safely disposed of.

2.2.2 *F2: Wet Well and Pumps*

Flows up to the design capture flow rate discharge from the intercept manhole to a wet well. The wet well contains two pumps in a duplex configuration. The pumps control the volume and rate of stormwater sent to the Basin M treatment facility. Among several other benefits, the duplex

configuration provides redundancy and allows the pumps to take turns pumping thereby reducing wear on any one pump. Pump maintenance will follow the manufacturer's recommendations specified in Appendix B.

2.2.3 F3: Valve Box

The valve box sits downstream of the wet well and pumps, between the wet well and the inlet to the treatment system. The box conceals and protects fittings and valves that prevent backflow.

2.2.4 G1: Other Stormwater Pipes, Manholes and Catch Basins

Both upstream and downstream stormwater conveyance system elements deliver stormwater flows to and from the treatment system. Most of the upstream conveyance already exists and will not be modified as part of this project. However, some downstream elements and elements immediately upstream of the treatment system will be modified.

2.3 Treatment System Components

The infiltration basin is approximately 19 feet wide, 80 feet long, and 1.5 feet deep. Table 3 presents a list of relevant stormwater conveyance system components, their Facility ID number, and a reference for where they can be located on design drawings.

Table 3: Key Stormwater Conveyance and Treatment System Components

Facility ID #	Name	Drawing Ref. Sheet #
F4	Infiltration Basin Sediment Forebay	C4.01 & C6.01
F5	Infiltration Basin Main Bed	C4.01 & C6.01
F6	Infiltration Basin Overflow Structure	C6.02

2.3.1 F4: Basin Sediment Forebay

The infiltration basin design includes a sediment forebay that accepts flows from the pumps and allows additional settling of coarse sediment. The sediment forebay also serves to dissipate and calm flows prior to discharging into the main part of the basin for treatment and infiltration. The concrete floor of the sediment forebay makes it easy to remove accumulated sediment. Removing sediment from the forebay increases the longevity of the main basin by delaying clogging, which slows infiltration rates.

2.3.2 F5: Treatment and Infiltration Basin Bed

The infiltration basin bed consists of side slopes, riprap on the east side near the weir from the pretreatment forebay, media for pollutant removal, appropriate vegetation, a stand-pipe overflow structure, and infrastructure for water level monitoring.

2.3.3 F6: Infiltration Basin Overflow Outlet Structure

The primary outlet pathway for the infiltration basin is infiltration. However, some high-rainfall storm events may occasionally exceed the infiltration capacity of the facility and overflow back into the conveyance system to be discharged to surface waters. An outlet structure has been provided for such overflows consisting of a manhole with a beehive grate.

3 INSPECTION AND VISUAL INDICATORS OF PERFORMANCE

The long-term performance of the stormwater treatment facility depends on proper operation and maintenance. Maintenance needs that are undetected (and therefore ignored) can lead to poor performance and potential failure of system components. General inspection procedures include visiting key components of the treatment system and looking for structural damage, debris/pollutant accumulation, erosion, prolonged ponding, clogging, vegetation distress, noxious odors and weeds, or any evidence of excessive wear. Specific inspection procedures are provided in Section 4 and inspection forms are provided in Appendix C. A photo log of treatment system components will be maintained as it and can be helpful in estimating costs of needed repairs, documenting the extent of problems, and for comparison between inspections. Pictures will be stored in a centralized location, labeled with the facility ID #, inspection date, and any other identifying information that could be useful in comparing photographs and illustrating maintenance needs.

3.1 Inspection Frequency

The SWMM requires that all components be inspected at least quarterly for the first two years, twice a year thereafter, and within 48 hours of major rainfall events (defined as greater than 1 inch of precipitation in 24 hours). Rainfall data can be obtained from the City of Portland's HYDRA network using the nearby Shipyard rain gage (<https://or.water.usgs.gov/non-usgs/bes/shipyard.html>).

The aforementioned SWMM-required inspection intervals will be the default inspection intervals for this facility. However, it is important to note that specific conveyance and treatment system components may require more frequent inspection than the minimum inspection interval required by the SWMM. Any such requirements are described in Section 4. This manual (incl. the design/record drawings in Appendix F) should be present at any inspections during the first two years.

3.2 Inspection Equipment

Appropriate equipment must be brought into the field to ensure safety and effectiveness of inspections. Below is a recommended list of equipment needed to perform stormwater facility inspections:

- Clipboard
- An inspection form for each component being inspected (see inspection forms in Appendix C)
- Writing utensil

- Manhole lid remover
- Long pole and measuring device for estimating depth of collected sediment in structures
- Communication equipment (e.g., charged cell phone)
- Safety equipment (safety vest, hard hat, traffic management equipment)
- Protective clothing, gloves, and boots
- Confined space entry permit and equipment, if necessary
- As-built drawings and O&M manual for the Site
- Camera

3.3 **Inspection Forms**

Inspection forms for the various treatment components can be found in Appendix C. The inspection forms list the various features of each component requiring inspection to ensure continued performance. Inspectors are not limited by the checklist and are encouraged to inspect and document other characteristics of the BMPs that they deem important. Inspectors should provide a rating for each component listed on the form. Ratings used to prioritize the need for maintenance and repair are as follows:

- 0** No deficiencies identified
- 1** Continue to monitor – Maintenance is not needed at this time, but a potential problem or maintenance need may develop. Examples are minor erosion, concrete cracks, or slight sediment accumulation. Depending on the issue encountered, an increased inspection frequency may be warranted.
- 2** Routine maintenance required – Maintenance is needed but is not urgent. This maintenance may be most efficiently done in conjunction with other maintenance needs. A good example of this is trash and debris removal where it is not completely blocking inlets or other conveyances.
- 3** Immediate repairs are necessary – This item requires immediate attention because failure of this facility has occurred or is likely to occur soon. Excessive overflows, spills, or damage to property/equipment is imminent or has begun. This may include significant erosion or sediment accumulation, structural failure of a feature, clogged pipe, etc.
- NA** Not applicable – This feature is not being used at this time or is not present in a particular component.

4 **MAINTENANCE ACTIVITIES**

This section provides a summary of required and recommended inspection and maintenance activities for the key components of the treatment system.

4.1 **Intercept Manhole**

The intercept manhole should be inspected at the frequency required by the SWMM (see Section 3.1). Regular maintenance will consist of clearing debris from the manhole sump to ensure design flow rates are met. Sediment removal should occur when approximately 30 percent of the total sump capacity is reached. Major maintenance could include structural repairs of the manhole and diversion wall.

4.2 Wet Well and Pumps

The wet well should be inspected at the same time the infiltration basin is inspected. All pump inspection and maintenance requirements should follow the original equipment manufacturer (OEM) requirements. A compilation of OEM operation and maintenance manuals is provided as Appendix B.

4.3 Valve Box

The valve box should be inspected at the same time the wet well is inspected. Regular maintenance might include removing accumulated debris, or resealing joints. Major maintenance could include valve repair or replacement.

4.4 Upstream Conveyances

Upstream conveyances should be inspected in conjunction with typical Site practices. Catch basin and manhole sumps should be cleaned out as necessary.

4.5 Treatment and Infiltration Basin

Each feature of the treatment and infiltration basin serves a specific function, as described in Section 2.3. By understanding the function of each feature better decisions can be made about the inspection and maintenance needs of each component. Below is a list of basin components and the potential maintenance needs anticipated. Routine and major maintenance needs are summarized in Table 4 and Table 5, respectively.

4.5.1 *Inlet and Energy Dissipator*

The inlet is the pipe leading to the sedimentation forebay and terminates in a reinforced concrete energy dissipation structure (see drawing C6.04). Routine maintenance activities include removing any accumulated trash or debris that could impede the flow of stormwater. Major maintenance could include structural repairs such as a cracked pipe and cracked/broken energy dissipation structure.

4.5.2 *Sedimentation Forebay*

The sedimentation forebay provides pretreatment of stormwater to remove coarse sediment through settling. Routine maintenance activities include removing accumulated sediment and debris, which should be done at least biennially or once the depth of sediment reaches 30% of the total design capacity for sediment storage, whichever comes first. Major maintenance could include concrete resurfacing, regrading, or other structural repairs.

4.5.3 *Basin Divider*

The basin divider is the berm that separates the sedimentation forebay from the media bed and infiltration area, as well as the weir that conveys flow between the two components. Routine maintenance could include repair of minor erosion and clearing of the weep holes that drain water between the forebay and the media bed. Major maintenance could include restoration of the weir to the design elevation, or structural repairs.

4.5.4 Media bed

The media bed provides treatment and infiltration benefits. The media bed requires general maintenance to prevent any rill or gully development and to prevent crusts from forming on its surface. Routine maintenance activities include raking the surface of the media between the plants, and removal of minor amounts of sediment. Major maintenance includes removal of large amounts of sediment, or full replacement of the engineered media. Sediment should be removed from the media bed when it reaches a depth of four inches, or preferably sooner. Erosion features must be addressed when they are more than two inches deep.

The maximum ponding time allowed by the SWMM is 30 hours. When ponding times (after end of rainfall) approaches 30 hours, minor maintenance such as media raking and surface sediment and debris removal will be performed. If such minor maintenance does not successfully restore the facility infiltration rates, major maintenance, such as replacement of the media, may occur. If the actual ponding time is close to the maximum allowed ponding time of 30 hours, major maintenance will occur.

4.5.5 Vegetation

Vegetation in the media bed helps combat media compaction and crusting. The design of the media filtration basin includes an irrigation system (see Appendix F sheets L2.01 and L2.02). The irrigation system should be operated and maintained per routine landscaping best practices required to support healthy vegetation. Routine vegetation maintenance includes watering plants during establishment, weeding, thinning, and trimming during the growing season, and removal of detritus. Major maintenance includes removing and replacing all vegetation, which may also be triggered by the need for major maintenance of other system components (i.e. full replacement of the media). Note that per the SWMM, healthy vegetation must cover at least 90% of the stormwater facility surface area, and grass must be between four and nine inches tall. This threshold should be reached by the end of the third year following completed installation.

4.5.6 Basin Side Walls

Basin side walls keep stormwater contained within the facility. Routine maintenance could include repair and mitigation of minor rills and gullies. Major maintenance could include armoring and regrading slopes. Erosion features must be addressed when they are more than two inches deep.

4.5.7 Outlet Structure

Infiltration is the primary discharge pathway for flows exiting the media bed. Flows in excess of the basin's infiltration capacity exit via one overflow structure consisting of a sedimentation manhole with a beehive grate. This component is expected to see very infrequent use. Routine maintenance will include removal of debris and trash on the beehive grate and in the manhole, and removal of accumulated sediment in the sump. The outlet pipe within the structure must be kept free of obstructions and sediment collected in the sump must be periodically removed. Major maintenance could include structural repairs or replacement of the beehive grate.

Table 4: Infiltration Basin Routine Maintenance Triggers

Routine maintenance is needed if any of the following are true:
Sediment in forebay has accumulated to at least 30 percent of design depth.
Trash & debris in media basin.
Noxious weeds, unwanted vegetation.
Holes, raised burrows.
Presence of vectors.
Crusting of surface of media bed, prolonged presence of standing water.
Up to 4 inches of fine sediment build-up on media bed.
Formation of rills and gullies greater than 2 inches in depth on the media bed, side slopes, or other areas.
Loss of vegetation on side slopes or media bed.

Table 5: Infiltration Basin Major Maintenance Triggers

Major maintenance is needed if any of the following are true:
Large quantities of sediment on media bed. Presence of fine sediment at depths of 6-inches or more below surface of media bed.
Severe erosion such as the formation of deep gullies.
Excessive soil displacement, areas of settlement and presence of holes in media bed.
Deterioration and/or damage to structural components including inlet and outlet structures.
Infiltration performance significantly lowered to the point where water ponds on media bed for longer than 30 hours and is not restored by minor maintenance. Per SWMM the facility shall not pond water for longer than 30 hours.
Contamination from a spill that impacts a significant portion of the media bed.
Full vegetation mortality not associated with climate.

4.6 General

4.6.1 *Sediment Removal and Disposal*

Accumulated sediment should be removed and properly disposed of in a landfill.

4.6.2 *Vectors and Pest Control*

Vectors such as mosquitoes may become an issue in the sedimentation forebay, or in the infiltration basin's media bed if extended ponding is observed. First, any maintenance to reduce unnecessary ponding, such as raking the media or removing trash and debris, should be completed to mitigate the problem. If the problem persists, use Integrated Pest Management (IPM) strategies.

In addition, burrowing animals could cause issues in the media bed. In this case, animals may need to be trapped and relocated and burrows filled.

5 PERFORMANCE MONITORING

Performance monitoring will be conducted upon completion and commissioning of the treatment system. The objectives for performance monitoring are to monitor and confirm the biofiltration basin is functioning as designed. The following sections describe the performance monitoring plan.

5.1 Instrumentation

In order to monitor the performance of the infiltration basin, the following instrumentation will be installed:

- Pressure transducer in the intercept manhole to monitor water level continuously
- Pressure transducer in the media bed section of the infiltration basin to monitor water level continuously
- Pump flow meter with volume totalizer to monitor flow from the wet well to the forebay continuously (MultiSmart™ flow measurements may be used in place of a flow meter)

5.2 In-situ Infiltration Rate and Drawdown Time

The in-situ infiltration rate of the basin will be monitored and compared to the design infiltration rate of 20 in/h. This calculation will verify that the basin can infiltrate the diverted flow rate and will help determine if there is excess capacity to provide treatment for future development. The drawdown time of the basin will also be monitored to verify that it conforms with BES's requirement of less than 30 hours of drawdown from brim full to the basin bottom as per Section 1.3.4 of the SWMM.

The in-situ infiltration rate and drawdown time will be calculated quarterly for the first year. If a notable decrease in infiltration rate or increase in drawdown time is observed in the first year, quarterly calculations will continue for the second year. Otherwise, calculations will be performed annually. If annual calculations in years 2, 3, 4, or 5 indicate a noticeable decrease in infiltration rate, then semi-annual calculations will be conducted the following year.

To perform these calculations, drawdown periods will be isolated from the time series data for the pressure transducer in the media bed section of the infiltration basin. Infiltration rates will be estimated at different water levels using Equation 1, where dL is the change in water level over the time period dt , A_L is the average surface area of the water in the basin at the range of water levels observed, A_i is the surface area of the basin at the infiltration surface, and i is the infiltration rate.

$$i = \frac{A_L * dL}{A_i * dt} \quad \text{Equation 1}$$

Overall drawdown time will be calculated by determining the amount of time required for the water level in the media basin to drop to zero. If the total drawdown period after rainfall ends exceeds 30 hours for any rainfall event, corrective maintenance will be performed as described in Section 4.5.4.

5.3 Annual Volume Diverted to Infiltration Basin

The total volume of runoff routed to the basin will be measured with the flow totalizer (or the MultiSmart™ Pump Station Manager). Cumulative totals will be collected on a routine basis and annual totals will be tallied.

5.4 Discharge Frequency

In addition to the runoff volume routed to the infiltration basin, the frequency of discharge to the Basin M outfall will be collected. The frequency will be determined by analyzing the water level data for the diversion manhole and the media bed portion of the infiltration basin. The number of days per year when the water level exceeds the elevation of the diversion structure or the rim elevation of the overflow structure will be recorded. The rainfall record for each of these days will also be summarized.

5.5 Monitoring Frequency

The following monitoring frequencies are expected for the life of the system. More frequent monitoring may be necessary for the startup period, and for periods following major maintenance:

- Pressure transducer and pump station data will be recorded continuously by the programmable logic controller (PLC). Data should be collected at least monthly from the PLC.
- Infiltration rates and drawdown times should be analyzed quarterly for the first year of operation and annually thereafter (see Section 5.2)
- Discharge frequency should be analyzed annually

For the purposes of this manual, the operating year of the infiltration basin shall span from July 1 through June 30 of the following year.

5.6 Performance Reporting

Two types of performance reports will be produced and supplied to DEQ: Comprehensive Reports and Annual Summary Reports. For the purposes of these reports, as the operating year will span from July 1 through June 30 of the following year. Reports will be provided to DEQ by October 1 directly following the end of the infiltration basin operating year.

If any significant deviations from the initial designs and anticipated performance occur within the first year, DEQ will be notified and consulted as soon as feasible.

5.6.1 *Comprehensive Reports*

Comprehensive Reports will be produced and supplied to DEQ for the first year and fifth year. Internal monitoring will continue in accordance with Section 5.5 throughout the operation of the basin.

Comprehensive Reports will summarize each of the performance metrics described above including:

- Average annual infiltration rate at discrete water levels (e.g., 6, 12, and 18 inches)

- Annual maximum drawdown time following a storm event
- Annual total volume diverted to the infiltration basin
- Number of days per year with discharge to the outfall
- Total rainfall depth per year
- Any proposed adaptive management measures for DEQ's consideration

These performance metrics will be compared to previous years' metrics as well as design criteria using comparative plots and tables. Any deviations greater than 30 percent in relation to the preceding year will be noted, and any root causes for the deviations that are identified will be presented and discussed. Photographs and data analyses may be included as necessary to support explanations.

In addition, the trigger, remedy, and result of any major maintenance will be explained in the report. Completed inspection and maintenance forms and relevant photographs will be included as appendices to the report.

5.6.2 Annual Summary Reports

Annual Summary Reports will be produced and supplied to DEQ for years two through four. These reports will include the following for the preceding infiltration basin operating year:

- A description of the trigger, remedy, and result of any major maintenance events
- All completed inspection forms (see Appendix C)
- All completed maintenance forms (see Appendix D)
- Any relevant photographs

6 FINANCIAL RESPONSIBILITY

The Port of Portland is the owner of the facility and is responsible for all current and ongoing operation and maintenance activities. The SWMM recommends a facility maintenance fund for both operating procedures (regular maintenance) and capital procedures (major overhauls or replacement). An estimate of annual and maintenance costs has been developed and the Port is able and willing to fund ongoing operation and maintenance for the facility. The name and contact information for the responsible party is shown below:

Responsible Party

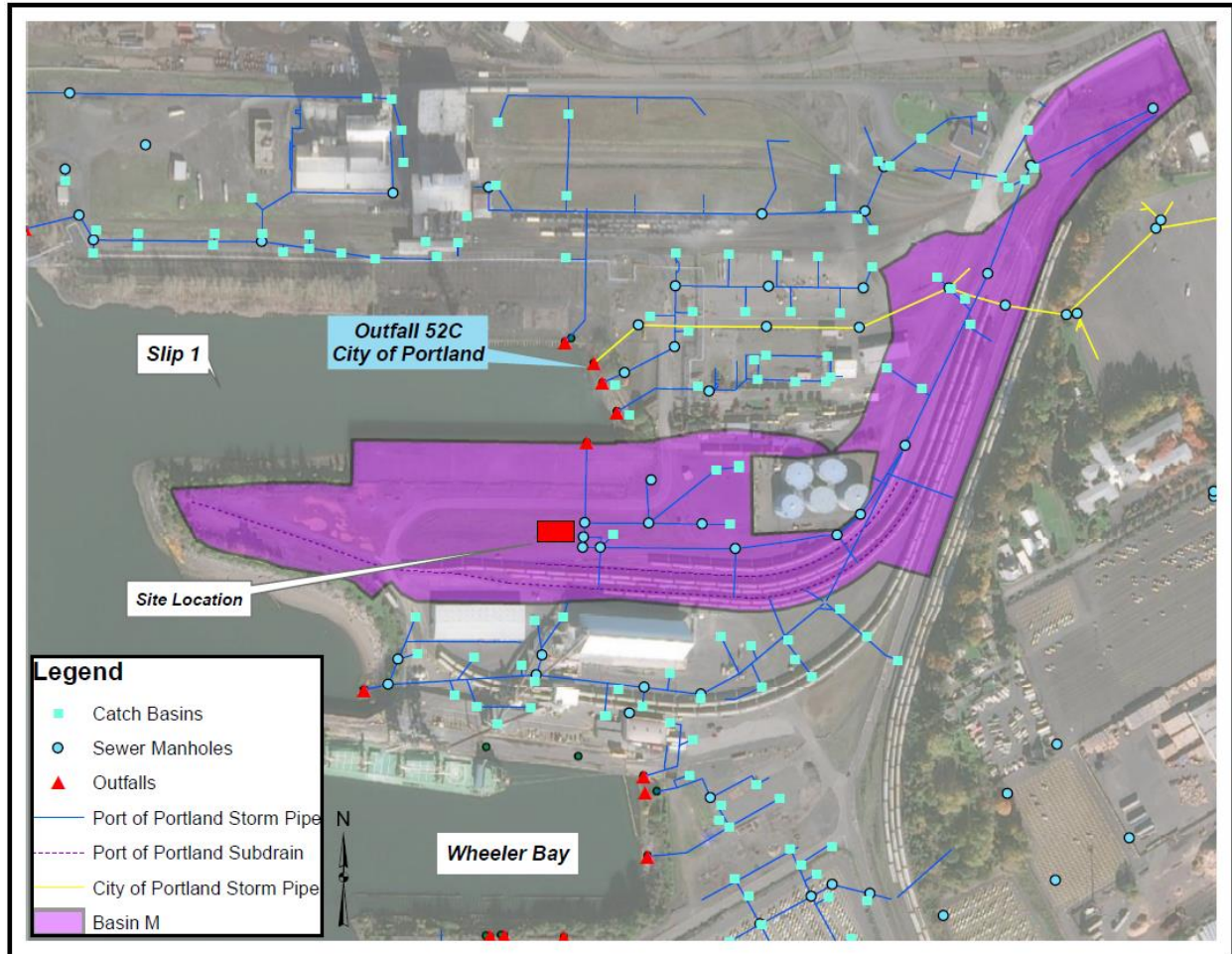
Name: Port of Portland
Address: 11040 N Lombard St,
City: Portland, OR 97203
Telephone Number: 503-240-2006

7 INSPECTION AND MAINTENANCE LOGS

Portland City Code requires property owners to keep a record of inspection and maintenance activities. See Appendix E for a sample maintenance log showing the minimum information to be recorded as documentation of inspection and maintenance activities.

Appendix A

Stormwater Facilities Map



Appendix B1

Original Equipment Manufacturer Manuals – MultiSmart™

[Intentionally omitted. Will be added after construction]

Appendix B2

Original Equipment Manufacturer Manuals – Pumps

[Intentionally omitted. Will be added after construction]

Appendix C

Inspection Forms

VEGETATED INFILTRATION BASIN INSPECTION FORM

Inspector's Name: _____ Date: _____
 Location/Facility ID: _____ Time: _____
 Weather: _____
 Date of Last Rainfall: _____ Amount: _____ inches

Reason for Inspection: Routine Complaint Major Event (spill or >1" in 24hrs)
 (Circle One)

INSPECTION SCORING - For each facility inspection item, insert one of the following scores:

0 = No deficiencies identified	3 = Immediate repair necessary
1 = Monitor (potential for future problem)	N/A = Not applicable
2 = Routine maintenance required	

FEATURES

1) Inlet

_____ Structure damaged
 _____ Structure clogged or obstructed
 _____ Scour / erosion present
 _____ Other: _____

2) Sediment Forebay

_____ > 30% design sediment capacity accumulation
 _____ Vectors / pests present
 _____ Structural integrity
 _____ Other: _____

3) Basin Divider

_____ Sediment / debris blocking weir
 _____ Weir integrity
 _____ Erosion
 _____ Other: _____

4) Vegetation

_____ Trimming or detritus removal needed
 _____ Loss of vegetation cover
 _____ Noxious weeds
 _____ Abnormal plant mortality
 _____ Other: _____

5) Media Bed

_____ > 2" of sediment / debris accumulation
 _____ Trash accumulation
 _____ Crusting of surface of media bed
 _____ Holes / loss of media / channelization/scour
 _____ Evidence of burrowing animals / vectors / pests
 _____ Standing water / saturated patches
 _____ Other: _____

6) Side Slopes

_____ Rill / gully erosion
 _____ Evidence of burrowing animals / pests
 _____ Slope slippage
 _____ Structural integrity
 _____ Other: _____

7) Outlet

_____ Structure damaged
 _____ Structure clogged or obstructed
 _____ Beehive grate displaced
 _____ Other: _____

Inspection Summary and Comments: _____

OVERALL FACILITY RATING (Circle One)

0 = No Deficiencies Identified	2 = Routine Maintenance Required
1 = Monitor (potential for future problem exists)	3 = Immediate Repair Necessary

CONVEYANCES INSPECTION FORM

Inspector's Name: _____

Date: _____

Location/Facility ID: _____

Time: _____

Weather: _____

Date of Last Rainfall: _____

Amount: _____ inches

Reason for Inspection: Routine Complaint Major Event (spill or >1" in 24hrs)
(Circle One)

INSPECTION SCORING - For each facility inspection item, insert one of the following scores:

0 = No deficiencies identified

3 = Immediate repair necessary

1 = Monitor (potential for future problem)

N/A = Not applicable

2 = Routine maintenance required

FEATURES**1) Intercept Manhole**

_____ Evidence of improper weir height (see Design Drawings)

_____ Sediment / debris build-up

_____ Cracks / mechanical damage

_____ Inlet / outlet piping damaged

_____ Poor seal to piping

_____ Access problems

_____ Other: _____

2) Wet Well and Pumps

_____ Sediment / debris build-up

_____ Cracks / mechanical damage

_____ Inlet / outlet piping damaged

_____ Poor seal to piping

_____ Access problems

_____ Other: _____

3) Valve Box

_____ Leaks / water present

_____ Sediment / debris present

_____ Cracks / mechanical damage

_____ Other: _____

4) Upstream Manholes, Catch Basins

_____ Clogged catch basins

_____ Sediment / debris build-up

_____ Cracks / mechanical damage

_____ Other: _____

Inspection Summary and Comments: _____

OVERALL FACILITY RATING (Circle One)

0 = No Deficiencies Identified

2 = Routine Maintenance Required

1 = Monitor (potential for future problem exists)

3 = Immediate Repair Necessary

Appendix D

Maintenance Forms

**PORT OF PORTLAND****VEGETATED INFILTRATION BASIN
MAINTENANCE FORM**

Work Completed By: _____

Completion Date: _____

Completion Time: _____

Location/Facility ID: _____

Maintenance Category:

(Circle all that apply)

Routine

Major

MAINTENANCE ACTIVITIES PERFORMED**LANDSCAPE WORK**

____ Mowing
____ Weed control
____ Trimming, detritus removal
____ Revegetation

ROUTINE WORK**SEDIMENT / DEBRIS REMOVAL**

____ Near inlet/outlet
____ Sediment forebay
____ Media bed

MINOR EROSION REPAIR

____ Near inlet/outlet
____ On media bed
____ Side slopes
____ Grade control
____ Repair of animal burrows

MEDIA BED

____ Media scraping / raking
____ Minor addition / replacement of media

PEST CONTROL

____ Vector abatement
____ Weed control
____ Trapping

MAJOR WORK**MAJOR EROSION REPAIR**

____ Near inlet/outlet
____ Media bed
____ Side slopes

MEDIA REPLACEMENT

____ Full media replacement

STRUCTURAL REPAIR

____ Inlet / outlet structures
____ Sedimentation forebay
____ Weir
____ Regrading
____ Other (specify below)

OTHER WORK: _____

ESTIMATED TOTAL MANHOURS: _____

EQUIPMENT / MATERIAL USED: _____

COMMENTS / ADDITIONAL INFO: _____

**CONVEYANCE
MAINTENANCE FORM**

Work Completed By: _____

Completion Date: _____

Completion Time: _____

Location/Facility ID: _____

Maintenance Category:
(Circle all that apply)

Routine

Major

MAINTENANCE ACTIVITIES PERFORMED**ROUTINE WORK****SEDIMENT / DEBRIS REMOVAL**

- ____ Intercept manhole
____ Wet well
____ Valve box
____ Upstream manholes, catch basins

MINOR STRUCTURAL REPAIR

- ____ Joint seals
____ Crack seals
____ Replacement of covers / grates

MINOR MECHANICAL REPAIR

- ____ Pumps

MAJOR WORK**STRUCTURAL REPAIR**

- ____ Cover / grate frame replacement
____ Structure resurfacing
____ Removal / replacement of structure
____ Restoration of diversion weir

MAJOR MECHANICAL REPAIR

- ____ Pumps

OTHER WORK: _____

ESTIMATED TOTAL MANHOURS: _____

EQUIPMENT / MATERIAL USED: _____

COMMENTS / ADDITIONAL INFO: _____

Appendix E

Maintenance Log



MAINTENANCE LOG

Location / Facility ID _____

[illegible]

Appendix F

Basin M Vegetated Infiltration Basin Record Drawings

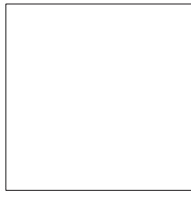
[Intentionally omitted. Will be added after construction]

Attachment 2
100% Plan Set and O&M Plan
Basin K1 Source Control Measure

OWNER-INITIATED BASIN M STORMWATER TREATMENT

PREPARED FOR:
KINDER MORGAN BULK TERMINALS, INC.
LOCATED IN SEC. 2, T. 1N, R. 1W W.M.
MULTNOMAH COUNTY, PORTLAND, OREGON

BDS STAMP



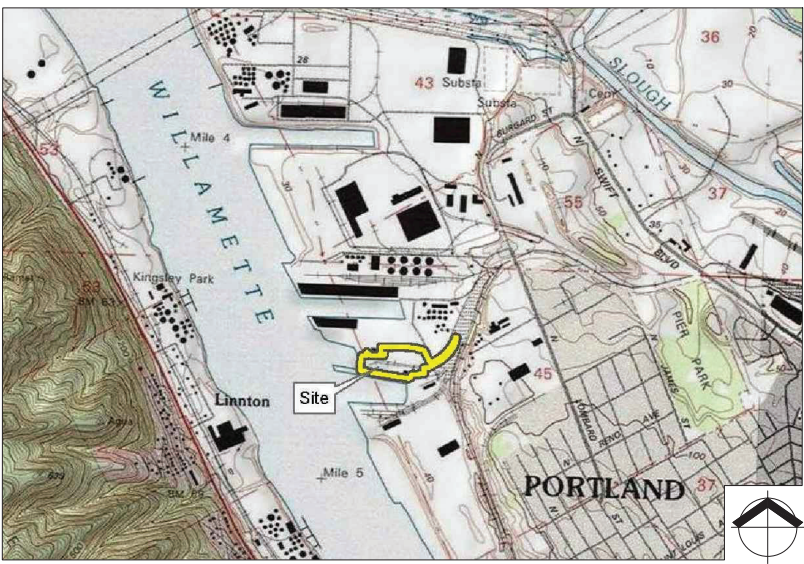
PROJECT CONTACTS

CLIENT KINDER MORGAN BULK TERMINALS 11040 N. LOMBARD ST PORTLAND, OREGON 97203 P: 360-693-5300 NOA.LIDSTONE@KINDERMORGAN.COM	OWNER PORT OF PORTLAND 7200 NE AIRPORT WAY PORTLAND, OREGON 97218 GREG THEISEN GREG.THEISEN@PORTOFPORTLAND.COM
ENGINEER MAUL, FOSTER & ALONGI, INC. 3140 NE BROADWAY STREET PORTLAND, OREGON 97232 P: 971-544-2139 BROOKE HARMON, PE BHARMON@MAULFOSTER.COM	SURVEYOR MINISTER-GLAESER SURVEYING INC. 2200 E. EVERGREEN BLVD VANCOUVER, WASHINGTON 98661 P: 360-694-3313 CRAIG GALVIN CAGALVIN@SURVEY.COM

PROJECT SUMMARY

SITE ADDRESS:
11040 N. LOMBARD ST
PORTLAND, OR 97203

WORK DESCRIPTION:
OWNER INITIATED STORMWATER RETROFIT PROPOSED PROJECT INCLUDES CONSTRUCTION OF A FOREBAY AND STORMWATER BIOINFILTRATION BASIN TO TREAT AND INFILTRATE RUNOFF FROM KINDER MORGAN BULK SODA ASH FACILITY DRAINAGE BASIN M. STORMWATER CONVEYANCE SYSTEM MODIFICATIONS INCLUDE INSTALLATION OF A FLOW-CONTROL MANHOLE, PUMP STATION, AND GRAVITY AND PRESSURE PIPING.



VICINITY MAP

NOT TO SCALE

GENERAL NOTES

- SURVEY PERFORMED BY MINISTER-GLAESER SURVEYING, INC. ON SEPTEMBER 10, 2020.
- HORIZONTAL DATUM: OREGON STATE PLANE COORDINATE SYSTEM NORTH ZONE, NAD 83 HARN. ELEVATION DATUM: NAVD 86
- ORDINARY HIGH WATER (OHW) MARK OBTAINED FROM THE CITY OF PORTLAND BUREAU OF PLANNING AND SUSTAINABILITY. AS SURVEYED BY THE US ARMY CORPS OF ENGINEERS IN 2004, APPROXIMATE TOP OF BANK (TOB) LINE DERIVED BY MFA USING 2010 BATHYMETRIC CONTOUR DATA AND 2014 REGIONAL LIDAR ELEVATION DATA. THE GREENWAY SETBACK WAS DEFINED 25 FEET FROM TOP OF BANK AND THE GREENWAY BUFFER WAS DEFINED 50 FEET FROM THE GREENWAY SETBACK (OR 75 FEET FROM TOP OF BANK). THE 100-YEAR FLOOD LINE WAS OBTAINED FROM THE FEMA NATIONAL FLOOD HAZARD LAYER.
- CONTRACTOR TO VERIFY ALL UTILITY LOCATIONS AND DEPTHS PRIOR TO CONSTRUCTION. A MINIMUM OF TWO FULL BUSINESS DAYS PRIOR TO BEGINNING CONSTRUCTION, THE CONTRACTOR SHALL CALL 811 (UTILITY NOTIFICATION CENTER) FOR LOCATION MARK-UP OF EXISTING UTILITIES AND SHALL NOTIFY THE PORT (MIKE SHIELDS, MIKE.SHIELDS@PORTOFPORTLAND.COM).
- ALL CONSTRUCTION, MATERIALS, AND WORKMANSHIP SHALL CONFORM TO THE LATEST STANDARDS AND PRACTICES OF THE CITY OF PORTLAND AND THE LATEST EDITION OF THE "OREGON STANDARD SPECIFICATIONS FOR CONSTRUCTION" PREPARED BY ODOT/APWA.
- IN CASE OF A CONFLICT BETWEEN THE REGULATORY STANDARDS OR SPECIFICATIONS, THE MORE STRINGENT REQUIREMENT WILL PREVAIL.
- ANY CHANGES TO THE DESIGN AND/OR CONSTRUCTION SHALL BE APPROVED BY THE CLIENT OR ENGINEER.
- APPROVAL OF THESE PLANS DOES NOT CONSTITUTE AN APPROVAL OF ANY OTHER CONSTRUCTION NOT SPECIFICALLY SHOWN ON THE PLANS. PLANS FOR STRUCTURES SUCH AS BRIDGES, BUILDINGS, TANKS, VAULTS, ROCKERIES, AND RETAINING WALLS MAY REQUIRE A SEPARATE REVIEW AND APPROVAL BY THE BUILDING DEPARTMENT PRIOR TO CONSTRUCTION.
- A COPY OF THESE APPROVED PLANS SHALL BE ON THE JOB SITE WHENEVER CONSTRUCTION IS IN PROGRESS.
- IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN ALL CONSTRUCTION EASEMENTS AND TRADE PERMITS NECESSARY TO PERFORM THE WORK.
- THE CONTRACTOR IS RESPONSIBLE FOR ALL CONSTRUCTION STAKING.
- PUBLIC AND PRIVATE DRAINAGE WAYS SHALL BE PROTECTED FROM POLLUTION. NO MATERIAL IS TO BE DISCHARGED TO OR DEPOSITED IN STORMWATER SYSTEMS THAT MAY RESULT IN VIOLATION OF STATE OR FEDERAL WATER QUALITY STANDARDS.
- ALL CONSTRUCTION WITHIN THE PUBLIC RIGHT-OF-WAY SHALL HAVE AN APPROVED PUBLIC RIGHT-OF-WAY WORK PERMIT PRIOR TO ANY CONSTRUCTION ACTIVITY WITHIN THE RIGHT-OF-WAY.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ADEQUATE SAFEGUARDS, SAFETY DEVICES, PROTECTIVE EQUIPMENT, FLAGGERS, AND ANY OTHER NEEDED ACTIONS TO PROTECT THE LIFE, HEALTH, AND SAFETY OF THE PUBLIC, AND TO PROTECT PROPERTY IN CONNECTION WITH THE PERFORMANCE OF WORK COVERED BY THE CONTRACTOR. ALL TRAFFIC CONTROL DEVICES SHALL CONFORM TO THE LATEST ADOPTED EDITION OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (MUTCD) PUBLISHED BY THE U.S. DEPARTMENT OF TRANSPORTATION. TWO-WAY TRAFFIC MUST BE MAINTAINED AT ALL TIMES ON THE ADJACENT PUBLIC STREETS.
- ANY PUBLIC OR PRIVATE CURB, GUTTER, SIDEWALK, OR ASPHALT DAMAGED DURING CONSTRUCTION SHALL BE REPAIRED TO CITY OF PORTLAND STANDARDS AND PRACTICES.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE INTEGRITY OF ADJACENT UTILITIES WHICH MAY INCLUDE, BUT ARE NOT LIMITED TO, WATER, SANITARY SEWER, STORMWATER, POWER, TELEPHONE, CABLE TV, GAS, IRRIGATION, AND STREET LIGHTING. THE CONTRACTOR SHALL NOTIFY RESIDENTS AND BUSINESSES 48 HOURS IN ADVANCE OF ANY WORK AFFECTING ACCESS OR SERVICE AND SHALL MINIMIZE INTERRUPTIONS TO DRIVEWAYS FOR RESIDENTS AND BUSINESSES ADJACENT TO THE PROJECT.
- RAIL TRACKS WILL REMAIN OPERATIONAL DURING CONSTRUCTION. CONTRACTOR SHALL COORDINATE WITH KINDER MORGAN AND PORT WHEN WORKING WITHIN 25 FEET OF CLEARANCE OF TRACKS.
- BASIN M IS LABELED AS BASIN K1 IN THE PORT OF PORTLAND'S STORMWATER PLAN.

SHEET INDEX

- C0.0 COVER SHEET
- C1.0 CONSTRUCTION NOTES
- C1.1 MASTER LEGEND
- C2.0 EXISTING CONDITION PLAN
- C3.0 EROSION AND SEDIMENT CONTROL
- C3.1 EROSION CONTROL DETAILS
- C4.0 SITE PLAN
- C4.1 TREATMENT SYSTEM
- C4.2 TREATMENT SYSTEM DETAILS
- C4.3 TREATMENT SYSTEM DETAILS II
- C4.4 FORCE MAIN AND STORM PROFILES
- C5.0 PUMP STATION AND MANHOLE DETAILS
- C6.0 STANDARD DETAILS
- L1.0 PLANTING PLAN
- C-8DS BDS COMMENT SHEET

MAUL FOSTER & ALONGI
3140 NE BROADWAY STREET
PORTLAND, OR 97232
PHONE 971.544.2139
WWW.MAULFOSTER.COM



OWNER-INITIATED BASIN M
STORMWATER TREATMENT
KINDER MORGAN BULK TERMINALS INC.
PORTLAND, OREGON

REVISION	DATE	DESCRIPTION
C	2/20/2021	PERMIT PLAN SET
B	10/17/2020	LOBBY PLAN SET
A	11/20/2020	60% PLAN SET

PROJECT: 1017.01.10
DESIGNED BY: HARMON
DRAWN: D. YARBIN
CHECKED: A. BAHAKI
SCALE

SHEET TITLE

COVER SHEET

SHEET
C0.0

100% DESIGN

CONSTRUCTION NOTES

BDS STAMP

EROSION AND SEDIMENT CONTROL NOTES

- APPROVAL OF THE EROSION, SEDIMENT AND POLLUTION CONTROL PLAN (ESPCP) DOES NOT CONSTITUTE AN APPROVAL OF PERMANENT ROAD OR DRAINAGE DESIGN (E.G., SIZE AND LOCATION OF ROADS, PIPES, RESTRICTIONS, CHANNELS, RETENTION FACILITIES, UTILITIES, ETC.).
- THE IMPLEMENTATION OF THE ESPCP AND THE CONSTRUCTION, MAINTENANCE, REPLACEMENT, AND UPGRADING OF THESE ESPCP FACILITIES IS THE RESPONSIBILITY OF THE APPLICANT/CONTRACTOR UNTIL ALL CONSTRUCTION IS COMPLETED AND APPROVED AND VEGETATION/LANDSCAPING IS ESTABLISHED.
- THE BOUNDARIES OF THE CLEARING LIMITS SHOWN ON THIS PLAN SHALL BE CLEARLY FLAGGED IN THE FIELD PRIOR TO CONSTRUCTION. DURING THE CONSTRUCTION PERIOD, NO DISTURBANCE BEYOND THE FLAGGED CLEARING LIMITS SHALL BE PERMITTED. THE FLAGGING SHALL BE MAINTAINED BY THE APPLICANT/CONTRACTOR FOR THE DURATION OF CONSTRUCTION. THE CONTRACTOR SHALL MAINTAIN A 12-FOOT MINIMUM CLEARANCE BETWEEN THE WORK AREA AND ALL RAIL LINES.
- ALL ESPCP MEASURES SHOWN SHALL BE INSTALLED AS PER THE DETAIL DRAWINGS IN THE CITY OF PORTLAND (CITY) EROSION CONTROL MANUAL (AVAILABLE THROUGH THE OFFICE OF PLANNING AND DEVELOPMENT REVIEW, 1900 SW 4TH AVE., PORTLAND, OREGON).
- TEMPORARY ESPCP MEASURES SHALL BE INSTALLED BEFORE STARTING DRAINAGE DISTURBING ACTIVITIES.
- ESPCP MEASURES SHALL NOT BE REMOVED UNTIL PERMANENT STABILIZATION MEASURES ARE COMPLETED.
- THE IMPLEMENTATION OF THIS ESPCP AND THE CONSTRUCTION, MAINTENANCE, REPLACEMENT AND UPGRADING OF THESE ESPCP FACILITIES IS THE RESPONSIBILITY OF THE CONTRACTOR UNTIL ALL CONSTRUCTION IS COMPLETED AND APPROVED AND VEGETATION/LANDSCAPING IS ESTABLISHED.
- THE ESPCP FACILITIES SHOWN ON THIS PLAN MUST BE CONSTRUCTED IN CONJUNCTION WITH ALL CLEARING AND GRADING ACTIVITIES, AND IN SUCH A MANNER AS TO ENSURE THAT SEDIMENT AND SEDIMENT-LADEN WATER DO NOT ENTER THE DRAINAGE SYSTEM OR ROADWAYS, OR VIOLATE APPLICABLE WATER QUALITY STANDARDS.
- THE ESPCP FACILITIES SHOWN ON THIS PLAN ARE THE MINIMUM REQUIREMENTS FOR ANTICIPATED SITE CONDITIONS. DURING THE CONSTRUCTION PERIOD, THESE ESPCP FACILITIES SHALL BE UPGRADED TO ENSURE THAT SEDIMENT AND SEDIMENT-LADEN WATER DO NOT LEAVE THE SITE.
- THE ESPCP FACILITIES SHALL BE INSPECTED DAILY DURING CONSTRUCTION BY THE APPLICANT/CONTRACTOR AND MAINTAINED AS NECESSARY TO ENSURE THEIR CONTINUED FUNCTIONING.
- THE ESPCP FACILITIES ON INACTIVE SITES SHALL BE INSPECTED AND MAINTAINED A MINIMUM ONCE A MONTH, OR WITHIN 24 HOURS FOLLOWING A STORM EVENT.
- ADDITIONAL MEASURES MAY BE REQUIRED TO INSURE THAT ALL PAVED AREAS ARE KEPT CLEAN FOR THE DURATION OF THE PROJECT.
- IF SEDIMENT IS OBSERVED, SWEEPING SHALL BE DONE DAILY IN ORDER TO ENSURE SEDIMENT DOES NOT LEAVE THE SITE.

STORMWATER SYSTEM CONSTRUCTION

- ALL MATERIALS AND INSTALLATION OF STORM SEWERS AND DRAINAGE SYSTEMS SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS IN THE LATEST ADICTION OF THE "OREGON STANDARD SPECIFICATIONS FOR CONSTRUCTION" BY THE AMERICAN PUBLIC WORKS ASSOCIATION AND THE OREGON DEPARTMENT OF TRANSPORTATION, WHEREVER THE STANDARD SPECIFICATIONS REFER TO THE "STATE," "SECRETARY," OR "WHEN REFERENCE IS MADE TO THE DEPARTMENT OF TRANSPORTATION IT SHALL BE UNDERSTOOD THAT THE STANDARD SPECIFICATIONS SHOULD READ THE "CLINIT".
- PRESSURE PIPE INSIDE THE WET WELL AND VALVE VAULT SHALL BE DUCTILE IRON (DI) CLASS 52 MEETING THE SPECIFICATIONS OF ANSI C15.1/AWWA 21.5.1. DI PIPE SHALL BE FACTORY LINED WITH CEMENT MORTAR AND BITUMINOUS SEAL COAT AND COATED OUTSIDE WITH ASPHALTIC SEAL COAT.
 - PIPE FITTINGS SHALL BE FLANGED DI CLASS 350.
 - FLANGES SHALL CONFORM TO ANSI SPECIFICATION B16.1 FOR CLASS 125 FLANGES AND SHALL CONFORM IN ALL OTHER RESPECTS TO ANSI/AWWA C110/A21.11. FLANGE GASKETS SHALL BE FULL FACE, 1/8" THICK, RED RUBBER OR APPROVED EQUAL.
- MECHANICAL JOINTS SHALL INCLUDE ACCESSORY GLANDS, GASKETS, AND BOLTS, SHALL CONFORM TO THE REQUIREMENTS OF ANSI/AWWA C111/A21.11, EXCEPT WHERE SPECIFICALLY MODIFIED IN AWWA C153 FOR COMPACT DI FITTINGS. JOINTS SHALL BE RATED FOR A WORKING PRESSURE OF 350 PSI.
- DI PIPE RESTRAINTS SHALL BE MEGALUG SERIES 1100 OR 2100 BY EBAA IRON, INC., OR APPROVED EQUAL. RESTRAINING GASKETS SHALL BE US PIPE "FIELD-LOCK" 350, OR APPROVED EQUAL.
- DI PIPE SHALL BE INSTALLED IN ACCORDANCE WITH AWWA C600.
- PRESSURE PIPE (FM) OUTSIDE THE WET WELL AND VALVE VAULT, GRAVITY PIPE (STRM) SHALL BE C900 PVC DR 18 WITH GASKETS MEETING ASTM F477 AND JOINTS MEETING ASTM D3139.
- INSTALL DETECTABLE TRACER WIRE OVER ALL NONMETALLIC PIPES. PLACE WIRE 6 INCHES ABOVE THE TOP OF THE PIPE FOR THE FULL LENGTH OF THE PIPE. MAKE ENDS ACCESSIBLE IN MANHOLES OR AT PIPE ENDS.
- PRESSURE PIPE SHALL BE TESTED FOR LEAKS USING HYDROSTATIC PRESSURE IN ACCORDANCE WITH ASTM F2164 OR AWWA C151.
- PIPE TRENCHES SHALL MEET THE FOLLOWING REQUIREMENTS:
 - TRENCH SHALL BE WIDE ENOUGH TO ALLOW FOR PROPER INSTALLATION OF PIPE, INCLUDING ALL JOINTS, BENDS AND THRUST BLOCKS.
 - PROVIDE 6-INCH CLEARANCE BELOW AND 12 INCHES ON EACH SIDE OF PIPE IN ROCK, BOULDERS AND LARGE STONES.
 - TRENCH BOTTOM SHALL HAVE A MINIMUM OF 4 INCHES OF SAND, PEA GRAVEL, OR 1/4-INCH-MINUS GRAVEL AS BEDDING.
 - PIPE TRENCH BACKFILL SHALL BE 1/4-INCH-MINUS GRAVEL AND EXTEND TO TOP OF PIPE. BACKFILL COMPACTION SHALL BE AT LEAST 95% MODIFIED PROCTOR DENSITY.
- PIPE LENGTHS SHOWN ON THE PLANS ARE TO THE CENTER OF THE STRUCTURE.

- THE CONTRACTOR SHALL INCLUDE A CONCRETE CASING AROUND ALL GRAVITY AND FORCE MAIN LINES THAT HAVE LESS THAN 2-FT OF MINIMUM COVER.
- KINDER MORGAN WILL CONTRACT WITH A LICENSED SURVEYOR TO SURVEY AS-BUILT CONDITIONS TO CONFIRM CONSTRUCTION WAS CONSISTENT WITH THE PLANS PRIOR TO APPROVING PAYMENT.
- THE CONTRACTOR SHALL POINOLE ALL UTILITY CROSSINGS AND CONNECTIONS TO EXISTING STORMWATER SYSTEM AT LEAST THREE DAYS BEFORE START OF CONSTRUCTION USING VACUUM EXCAVATION. KINDER MORGAN WILL CONTRACT WITH A LICENSED SURVEYOR TO SURVEY THE UNCOVERED UTILITY ELEVATIONS AND PROVIDE THE INFORMATION TO THE ENGINEER PRIOR TO THE START OF CONSTRUCTION.
- CONTRACTOR SHALL INVESTIGATE THE CONDITION AND TYPE OF EXISTING PIPING AND CONNECT THE EXISTING PIPES TO NEW MANHOLES AND PIPES WITH APPROPRIATE COUPLINGS AS APPROVED BY ENGINEER.
- MANHOLES SHALL BE PRECAST CONCRETE MEETING THE REQUIREMENTS OF ASTM C408.
 - MANHOLES SHALL BE EQUIPPED WITH H-20 RATED COVERS.
- MANHOLE EXCAVATIONS SHALL BE BACKFILLED WITH 1/2-INCH MINUS AGGREGATE AND COMPACTED.
- THE CONTRACTOR SHALL RESTORE EXISTING GROUND SURFACES AFTER MANHOLE INSTALLATIONS.
- PUMPS, GUIDERAILS, FLOATS, TRANSDUCERS, AND CONTROLLER WILL BE FURNISHED BY KINDER MORGAN AND INSTALLED BY THE CONTRACTOR.
- CONTRACTOR WILL BE RESPONSIBLE FOR FURNISHING AND INSTALLING THE PRECAST CONCRETE WET WELL, MANHOLES, ACCESS HATCHES AND ALL PIPING AND FITTINGS IN THE WET WELL.
- CONTRACTOR WILL BE RESPONSIBLE FOR FURNISHING AND INSTALLING THE PRECAST CONCRETE VALVE VAULT, ACCESS HATCHES, VALVES, AND PIPES.
- THE CONTRACTOR WILL BE RESPONSIBLE FOR CONSTRUCTING A CONCRETE PAD FOR THE PUMP STATION CONTROLLER AND THE CONTROLLER ENCLOSURE.
- ELECTRICAL CONNECTIONS TO THE CONTROLLER WILL BE PROVIDED BY KINDER MORGAN'S ELECTRICIAN.
- OVERFLOWS WILL BE MONITORED USING A TRANSDUCER. CONTRACTOR SHALL INSTALL LEVEL TRANSDUCER IN THE FLOW CONTROL MANHOLE AT THE OVERFLOW ELEVATION AND CONNECT TO THE PUMP CONTROL PANEL/DATA LOGGER.
 - DATA LOGGER: HTI-1100
 - WEB INTERFACE: HIGH TIDE TECHNOLOGIES TELEMETRY VIEW
- CONTRACTOR SHALL INSTALL A FLOW METER FURNISHED BY KINDER MORGAN BETWEEN THE PUMP STATION AND FOREBAY (INSTALLED PER MANUFACTURER GUIDELINES) AND CONNECT TO THE PUMP CONTROL PANEL/DATA LOGGER.

EXCAVATION

- ALL SOIL EXCAVATION AND MANAGEMENT SHALL BE CONDUCTED CONSISTENT WITH THE PORT TERMINAL A INTERIM CONTAMINATED MEDIA MANAGEMENT PLAN (CMMP).
- CONSISTENT WITH THE CITY OF PORTLAND SOURCE CONTROL MANUAL, ALL SOIL WILL BE CONSIDERED POTENTIALLY CONTAMINATED AND WILL BE STOCKPILED ON IMPERVIOUS SURFACES OR PLASTIC SHEETING. THE STOCKPILE WILL BE PROTECTED CONSISTENT WITH THESE PLANS. KINDER MORGAN SHALL COLLECT SOIL CHARACTERIZATION SAMPLES AND REVIEW ANALYTICAL REPORT PRIOR TO CONTRACTOR DISPOSAL.
- CONTRACTOR IS RESPONSIBLE FOR THE TRANSPORT AND DISPOSAL OF THE EXCAVATED SOIL. FOR BIDDING PURPOSES, ASSUME DISPOSAL AT A SUBTITLE D LANDFILL. KINDER MORGAN WILL PROVIDE CHARACTERIZATION DATA TO THE CONTRACTOR TO CONFIRM DISPOSAL LOCATION.

BIOINFILTRATION AND SEDIMENTATION FACILITIES

- THE CONTRACTOR SHALL NOT ALLOW HEAVY EQUIPMENT TO ENTER PROPOSED BIOINFILTRATION FACILITY EXCAVATION AND SHALL NOT PLACE HEAVY LOADS WITHIN THE FACILITY FOOTPRINT TO PREVENT SUBSFACE SOIL AND ENGINEERED SOIL MEDIA (ESM) OVER-COMPACTION. FOOT TRAFFIC IN THE BIOINFILTRATION FACILITY SHALL BE MINIMIZED TO THE EXTENT PRACTICABLE.
- THE ESM SHALL BE A MINIMUM 24 INCHES DEEP AND SHALL CONSIST OF A BLEND OF 60% FILTER SAND, 20% COCONUT COIR PITH, AND 20% VIRGIN GRANULAR ACTIVATED CARBON (GAC). THE SAND AND GAC SHALL BE MECHANICALLY BLENDED OFF-SITE TO CREATE A UNIFORM BLEND. BLENDED MATERIAL SHALL BE TESTED TO DEMONSTRATE IT MEETS THE FOLLOWING:

PARAMETER	TEST METHOD	REQUIREMENT
TOTAL POROSITY	ASTM D1557	>40%±85% MDD
MAXIMUM DRY DENSITY	ASTM D1557	<105 LB/CF
PERMEABILITY	ASTM D2434	>30IN/Hr @85% MDD
PERCENT PASSING 200 SIEVE	ASTM D422	<3%; ALL MATERIALS PASSING 200 SIEVE SHALL BE NON-PLASTIC
COEFFICIENT OF UNIFORMITY [D60/D10]	ASTM D422	<4
pH		6.0 TO 8.0
CHLORIDE		<300 PPM
SALINITY		<3.0 MMHCO/CM AS ELECTRICAL CONDUCTIVITY

- THE COCONUT COIR PITH SHALL BE FREE OF STONES, STUMPS, ROOTS OR OTHER SIMILAR OBJECTS LARGER THAN 5 MILLIMETERS. IT SHALL CONFORM TO THE FOLLOWING REQUIREMENTS:
 - BE AGED FOR A MINIMUM OF SIX MONTHS.
 - BE RINSED AND WASHED DURING PRODUCTION WITH NON-SALINE WATER.
 - BE SCREENED TO REMOVE COARSE FIBERS DURING PRODUCTIONS.
 - BE DECOMPRESSED AND REHYDRATED PRIOR TO BLENDING.
 - ELECTRICAL CONDUCTIVITY LESS THAN 2.0 MMHOS/CM.
 - IT SHALL HAVE A MOISTURE CONTENT LESS THAN 20%.

- THE FILTER SAND SHALL CONSIST OF CLEAN, WASHED SILICA SAND AND SHALL MEET THE FOLLOWING REQUIREMENTS:

FILTER SAND SPECIFICATION	
U.S. SIEVE NUMBER	PERCENT PASSING
4	100
10	95-100
18	80-100
35	20-70
60	5-25
100	0-5
200	0-2

- THE CONTRACTOR SHALL PROVIDE SAMPLING DATA OF IMPORTED SAND FILL TO CONFIRM MATERIAL MEETS SEQ. CLEAN FILL CRITERIA.

- GAC SHALL BE CALGON F400 OR AN APPROVED EQUAL. IT SHALL BE FREE OF STONES, STUMPS, ROOTS OR OTHER SIMILAR OBJECTS LARGER THAN 5 MILLIMETERS. IT SHALL CONFORM TO THE FOLLOWING REQUIREMENTS:

PARAMETER	REQUIREMENT
PASSING NO. 12 SIEVE	95-100
PASSING NO. 40 SIEVE	0-4
IODINE NUMBER	>1000 MG/G
EFFECTIVE SIZE	0.55 - 0.75 MM
UNIFORMITY COEFFICIENT [D60/D10]	<2.0
APPARENT DENSITY	0.5 - 0.6 G/CM ³

- THREE INCHES OF MULCH SHALL BE PLACED ABOVE THE ESM TO SUPPORT PLANT GROWTH.

- CONSTRUCTION OF BIOINFILTRATION FACILITY:
 - PROTECT THE SOIL: THE ESM SHALL BE PROTECTED FROM ALL SOURCES OF CONTAMINATION, INCLUDING WEEDS, WHILE AT THE SUPPLIER, IN CONVEYANCE, AND AT THE PROJECT SITE.
 - WET AND WINTER CONDITIONS: HAULING AND PLACEMENT OF THE ESM WILL NOT BE ALLOWED WHEN THE WEATHER IS TOO WET OR THE GROUND IS FROZEN OR SATURATED AS DETERMINED BY THE ENGINEER.
 - PLACEMENT OF THE ESM: PLACE THE MATERIAL IN LOOSE LIFTS, NOT TO EXCEED 8 INCHES EACH AND EACH LIFT SHALL BE COMPACTED WITH A WATER-FILLED LANDSCAPE ROLLER. DO NOT OTHERWISE MECHANICALLY COMPACT THE MATERIAL.
 - TIMING OF PLANT INSTALLATION: WEATHER PERMITTING, INSTALL PLANTS AS SOON AS POSSIBLE AFTER PLACING AND GRADING THE ESM IN ORDER TO MINIMIZE EROSION AND FURTHER OVER-COMPACTION.
 - INSTALL IRRIGATION FOR NEWLY PLANTED PLANTS TO IMPROVE SURVIVAL RATE. THE CONTRACTOR SHALL WARRANTY THE PLANTS FOR 1-YEAR.
 - PROTECTION OF INSTALLED ESM: IN ALL CASES, PROTECT THE INSTALLED MATERIAL FROM FOOT OR EQUIPMENT TRAFFIC. INSTALL TEMPORARY FENCING AS NEEDED TO KEEP WORKERS, PEDESTRIANS, AND EQUIPMENT OUT OF THE AREA.
 - UNDER NO CIRCUMSTANCES SHOULD MATERIALS AND EQUIPMENT BE STORED INSIDE THE BIOINFILTRATION BASIN.

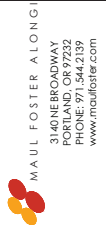
- THE FOREBAY SHALL BE LINED WITH A 40-MIL LINEAR LOW-DENSITY POLYETHYLENE (LLDPE) LINER, OR AN APPROVED EQUAL. THE LINER SHALL BE KEYED INTO THE TOP OF THE SLOPE USING AN ANCHOR TRENCH AS SHOWN ON THESE PLANS AND INCLUDE PIPE BOOT. INSTALLED PER MANUFACTURER RECOMMENDATIONS.
 - A MINIMUM OF 6 INCHES OF DRAIN ROCK SHALL BE PLACED OVER THE LINER.
 - THE CONTRACTOR SHALL REMOVE ALL COBBLES AND ROCKS FROM THE SUBSURFACE SOILS BELOW THE LINERS TO A MINIMUM DEPTH OF SIX INCHES.

- CONTRACTOR SHALL FURNISH AND INSTALL A STAFF GAUGE IN THE BIOINFILTRATION BASIN TO MEASURE SEDIMENT ACCUMULATION, WITH '0' SET AT FACILITY BOTTOM ELEVATION AS NOTED ON THESE PLANS.

- CONTRACTOR SHALL INSTALL LEVEL TRANSDUCER AT BIOINFILTRATION BASIN OVERFLOW ELEVATION AND CONNECT TO THE PUMP CONTROL PANEL/DATA LOGGER.

ECOBLOCKS

- THE CONTRACTOR SHALL FURNISH AND INSTALL ECO-BLOCKS AROUND THE PUMP STATION, FOREBAY, AND BIOINFILTRATION BASIN. THE OUTSIDE EDGES OF ECOBLOCKS SHALL BE PAINTED TRAFFIC YELLOW WITH 2-INCH REFLECTIVE STRIPS ON THE TOP OUTSIDE EDGE. KINDER MORGAN MUST APPROVE ECOBLOCK SPACING.



OWNER-INITIATED BASIN M
STORMWATER TREATMENT
KINDER MORGAN BULK TERMINALS INC.
PORTLAND, OREGON

NO.	DATE	DESCRIPTION
A	10/30/2020	6/26 PM 4:31 PM
B	10/11/2020	10:05 PM 4:31 PM
C	10/11/2020	10:05 PM 4:31 PM
D	10/11/2020	10:05 PM 4:31 PM
E	10/11/2020	10:05 PM 4:31 PM
F	10/11/2020	10:05 PM 4:31 PM
G	10/11/2020	10:05 PM 4:31 PM
H	10/11/2020	10:05 PM 4:31 PM
I	10/11/2020	10:05 PM 4:31 PM
J	10/11/2020	10:05 PM 4:31 PM
K	10/11/2020	10:05 PM 4:31 PM
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Y	10/11/2020	10:05 PM 4:31 PM
Z	10/11/2020	10:05 PM 4:31 PM

PROJECT: 1017.01.10
DESIGNED BY: HARMON
DRAWN BY: D.VARON
CHECKED BY: A. BANASE
SCALE

SHEET TITLE
CONSTRUCTION
NOTES AND
SPECIFICATIONS

SHEET
C1.0

100% DESIGN

ABBREVIATIONS

AC	ACRE, ASPHALT CONCRETE PAVEMENT	LB	POUND(S)
ACOE	ARMY CORPS OF ENGINEERS	LF	LINEAR FEET
AD	AREA DRAIN	LONG.	LONGITUDINAL
AGG	AGGREGATE	LT	LEFT
AIR	AIR RELIEF	MAX	MAXIMUM
AMSL	ABOVE MEAN SEA LEVEL	MFA	MAUL FOSTER & ALONGI, INC.
AP	ANGLE POINT	MFR	MANUFACTURER
APN	APPARENT PARCEL NUMBER	MH	MANHOLE
APPD	APPROVED	MIC	MONUMENT (IN CASE)
APPROX. ±	APPROXIMATE (E, L, Y)	MIN	MINIMUM, MINUTE
ASPH	ASPHALT	MISC	MISCELLANEOUS
ASSY	ASSEMBLY	MJ	MECHANICAL JOINT
BCR	BEGIN CURB RETURN	MON	MONUMENT (SURFACE)
BF	BUTTERFLY	MW	MONITORING WELL
BGS	BELOW GROUND SURFACE	N	NORTH
BLDG	BUILDING	N/A	NOT APPLICABLE
BLVD	BOULEVARD	NAT G. NG	NATURAL GAS
BM	BENCHMARK	NE	NORTHEAST
BMP	BEST MANAGEMENT PRACTICE	NO.	NUMBER
BO	BLOW-OFF	NTS	NOT TO SCALE
BOC	BACK OF CURB	NW	NORTHWEST
BOT, BTM	BOTTOM	OC	ON CENTER
B.O.W.	BOTTOM OF WALL	OD	OUTSIDE DIAMETER
BVC	BEGIN VERTICAL CURVE	OHP	OVERHEAD POWER
CB	CATCH BASIN	OT	OWNERSHIP TIE
CDF	CONTROLLED DENSITY FILL	P	PIPE
CEM	CEMENT	P TRAN	PAD MOUNTED TRANSFORMER
CF	CUBIC FEET	PC	POINT OF CURVATURE
CFS	CUBIC FEET PER SECOND	PCC	PORTLAND CEMENT CONCRETE
CIP	CAST IRON PIPE	PEN	PENETRATION
CIR	CIRCLE	PERF	PERFORATE (E, ED, ES, ION)
CK	CHECK	P.L., PL	PROPERTY LINE, PLACE
CL, L	CENTERLINE	POW V	POWER VOLT
CMP	CORRUGATED METAL PIPE	PP	PROPOSED
CO	CLEANOUT	PROP.	PROPOSED
COMP	COMPACTION	PS	PUMP STATION
CONC	CONCRETE	PSF	POUNDS PER SQUARE FOOT
CPE	CORRUGATED POLYETHYLENE	PSI	POUNDS PER SQUARE INCH
CPL	COUPLING	PT	POINT OF TANGENT
CT	COURT	PV	PLUG VALVE
CTR	CENTER	PVI	POINT OF VERTICAL INTERSECTION
CULV	CULVERT	PVC	POLYVINYL CHLORIDE
CY	CUBIC YARD	PVMT	PAVEMENT
D	DEPTH	R, RAD	RADIUS
DEG	DEGREE(S)	RC	REINFORCED CONCRETE
DI	DUCTILE IRON	RCP	REINFORCED CONCRETE PIPE
DIA	DIAMETER	RD	ROAD DRAIN
DIM	DIMENSION(S)	RED	REDUCER
DIP, D.I.P.	DUCTILE IRON PIPE	REQD	REQUIRED
DOT	DEPARTMENT OF TRANSPORTATION	REOT	REQUIREMENT
DR	DEPARTMENT OF TRANSPORTATION	REV	REVISION
DTL	DETAIL	ROW	RIGHT OF WAY
DWG(S)	DRAWING(S)	RT	RIGHT
E	EAST	S	SOUTH, SLOPE
EA	EACH	SB	SOIL BORING
ECR	END CURB RETURN	SCH	SCHEDULE
EG	EXISTING GROUND	SD	STORM DRAIN
EL, ELEV	ELEVATION	SDR	STANDARD DIMENSION RATIO
ELB, ELL	ELBOW	SE	SOUTHEAST
ELEC	ELECTRIC(AL)	SF	SQUARE FEET
ENGR	ENGINEER	SH	SHEET
ENTR	ENTRANCE	SL	SLOPE
EP, EOP	EDGE OF PAVEMENT	SPEC	SPECIFICATIONS
EQ	EQUAL(LY)	SQ	SQUARE
ESC	EROSION CONTROL	SQ IN	SQUARE INCHES
ESMT	EASEMENT	SURF	SURFACE
EST	ESTIMATE(D)	ST	STREET
EVC	END VERTICAL CURVE	STA	STATION
EXC	EXCAVATE	STD	STANDARD
EX, EXTG.	EXISTING	STL	STEEL
EW	EACH WAY	STRM	STORM
FF	FINISH FLOOR	STRUCT	STRUCTURE(E, AL)
FG	FINISH GRADE	SSWR	SANITARY SEWER
FI	FIRE HYDRANT	SW, SW	SIDEWALK, SOUTHWEST
FL	FLOW LINE	TB	THRUST BLOCK
FLG	FLANGE	TBM	TEMPORARY BENCHMARK
FM	FORCE MAIN	TC	TOP OF CURB
FT	FEET, FOOT	TEL, TELE	TELEPHONE
GAL	GALLON(S)	TEMP	TEMPORARY
GM	GAS METER	TP	TOP OF PAVEMENT, TEL POLE
GND	GROUND	TURN	TURNING POINT
GP	GUARD POST	TW	TOP OF WALL
GPM	GALLONS PER MINUTE	TYP	TYPICAL
GRD	GRADE	UG	UNDERGROUND
GV	GAS VALVE, GATE VALVE	UGE	UNDERGROUND ELECTRIC
HDP	HIGH DENSITY POLYETHYLENE	UTL	UTILITY
HGT, HT	HEIGHT	VC	VERTICAL CURVE
HP	HORSEPOWER	VERT	VERTICAL
HORIZ	HORIZONTAL	VOL	VOLUME
HYD	HYDRANT	W	WIDTH, WEST
ID	INSIDE DIAMETER	W/	WITH
IE	INVERT ELEVATION	WATER	WATER
IN	INCH(ES)	WATER	WATER METER
INTX	INTERSECTION	W/O	WITHOUT
INV	INVERT	WSE	WATER SURFACE ELEVATION
IP	IRON PIPE	WV	GATE/GENERAL WATER VALVE
L	LENGTH	YD	YARD
LAT	LATERAL	YR	YEAR

GENERAL LEGEND

GAS/POWER/TELEPHONE SYMBOLS

SYMBOL	EXIST.	PROP.	DESCRIPTION
			GAS METER
			GAS VALVE
			PAD MOUNTED TRANSFORMER
			POWER VAULT
			TRANSMISSION TOWER
			UTILITY POLE
			UTILITY POLE ANCHOR
			TELEPHONE RISER
			TELEPHONE VAULT
			LIGHT POLE

SURVEY SYMBOLS

SYMBOL	THEOR./ EXIST.	FOUND/ PROP.	DESCRIPTION
			ANGLE POINT
			BENCH MARK
			BLOCK CORNER
			IRON PIPE
			MONUMENT
			OWNERSHIP TIE
			SECTION DATA
			SECTION CENTER
			SECTION CORNER
			QUARTER CORNER
			SIXTEENTH CORNER
			CLOSING CORNER
			MEANDER CORNER
			WITNESS CORNER
			SPOT ELEVATION

	EXISTING GRADE MAJOR CONTOUR
	EXISTING GRADE MINOR CONTOUR
	EXISTING STORM DRAIN PIPE
	EXISTING WATER PIPE
	EXISTING SANITARY SEWER PIPE
	EXISTING AC PAVEMENT
	EXISTING CONCRETE SURFACING
	EXISTING GRAVEL SURFACING
	EXISTING BUILDING
	EXISTING FENCE LINE
	EXISTING ROAD CENTERLINE
	EXISTING RIGHT-OF-WAY
	EXISTING PROPERTY LINE

WATER SYMBOLS

SYMBOL	EXIST.	PROP.	DESCRIPTION
			CAP/PLUG
			COUPLING
			GUARD POST / BOLLARD
			REDUCER
			THRUST BLOCK
			WATER METER
			DOUBLE CHECK VALVE ASSEMBLY
			FIRE HYDRANT
			AIR RELIEF
			BLOW-OFF VALVE
			CHECK VALVE
			GATE VALVE
			BENDS:
			90 DEGREE BEND
			45 DEGREE BEND
			22.5 DEGREE BEND
			11.25 DEGREE BEND
			VERTICAL BEND
			TEE
			CROSS

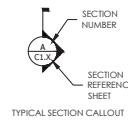
SANITARY/STORM SEWER SYMBOLS

SYMBOL	EXIST.	PROP.	DESCRIPTION
			SAN. SEWER CLEAN OUT
			SAN. SEWER MANHOLE
			STORM DRAIN CATCH BASIN
			STORM DRAIN CULVERT
			STORM DRAIN MANHOLE
			DRY WELL
			AREA DRAIN
			PROPOSED GRADE MAJOR CONTOUR (5.0' INTERVAL)
			PROPOSED GRADE MINOR CONTOUR (1.0' INTERVAL)
			PROPOSED STORM DRAIN PIPE
			PROPOSED WATER PIPE
			PROPOSED SANITARY SEWER PIPE
			PROPOSED AC PAVEMENT
			PROPOSED CONCRETE SURFACING
			PROPOSED GRAVEL SURFACING
			PROPOSED BUILDING
			PROPOSED FENCE LINE
			PROPOSED ROAD CENTERLINE
			PROPOSED RIGHT-OF-WAY
			PROPOSED PROPERTY LINE

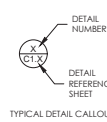
BDS STAMP

MISCELLANEOUS SYMBOLS

SYMBOL	EXIST.	PROP.	DESCRIPTION
			MONITORING WELL
			INLET PROTECTION PILLOW
			CONSTRUCTION ENTRANCE
			PROPOSED SPOT SHOT



TYPICAL SECTION CALLOUT



TYPICAL DETAIL CALLOUT

MAUL FOSTER & ALONGI
3140 NE BROADWAY STREET
PORTLAND, OR 97232
PHONE 971.5442.139
www.mfauldsfirm.com

KINDER MORGAN



OWNER-INITIATED BASIN M
STORMWATER TREATMENT
KINDER MORGAN BULK TERMINALS, INC.
PORTLAND, OREGON

NO.	DATE	DESCRIPTION
1	11/07/2020	PERMANENT PLAN SET
2	11/07/2020	100% PLAN SET
3	11/07/2020	40% PLAN SET

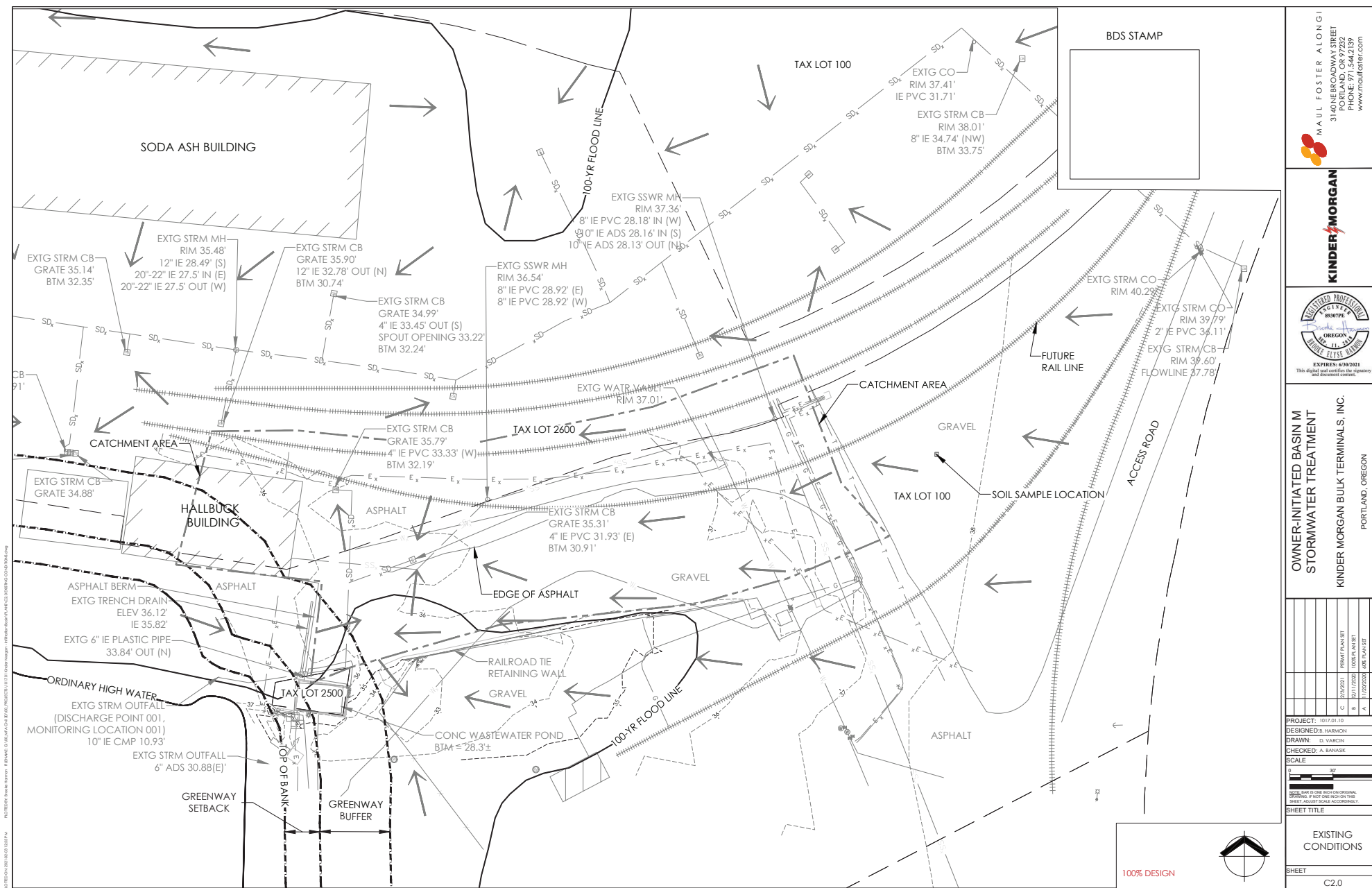
PROJECT: 1017.01.10
DESIGNED: S. HARMON
DRAWN: D. VERCIN
CHECKED: A. BANASK
SCALE

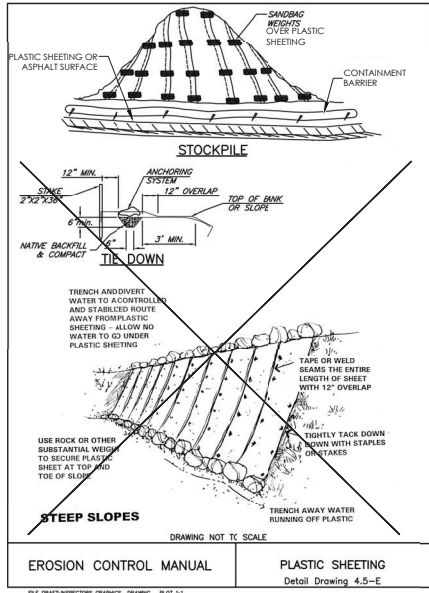
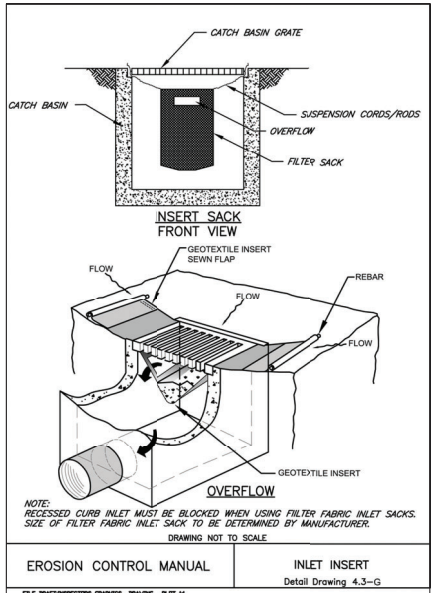
SHEET TITLE

MASTER LEGEND

SHEET
C 1.1

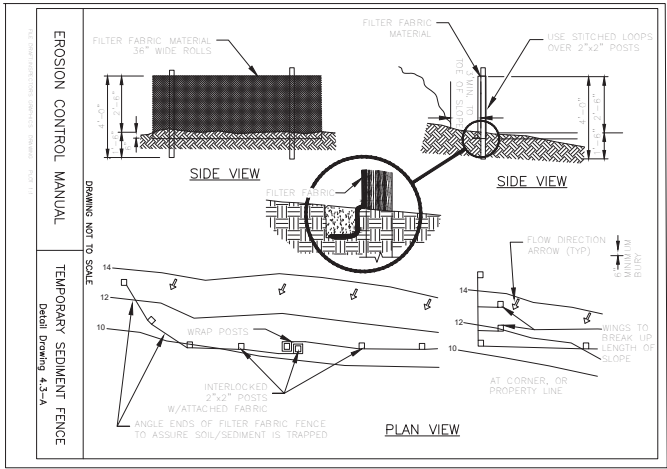
100% DESIGN





NOTE:
SOURCE CONTROL MANUAL/CONTAMINATED MEDIA MANAGEMENT PLAN REQUIREMENTS FOR STOCKPILE PROTECTION INCLUDE:

1. SOIL STOCKPILES SHALL BE LOCATED ON EITHER PAVEMENT OR PLASTIC SHEETING.
2. STOCKPILES SHALL BE COVERED WITH PLASTIC FILM OR SHEETING TO PREVENT CONTACT WITH PRECIPITATION AT THE END OF EACH WORKDAY.
3. STOCKPILES SHALL HAVE A CONTAINMENT BARRIER AROUND THE PERIMETER TO PREVENT STORMWATER RUN-ON AND MATERIAL RUNOFF. BARRIERS MAY CONSIST OF SAND BAG BARRIER, BERM, OR EQUAL ALTERNATIVE.
4. EXCAVATED SOIL SHALL BE SAMPLED AND DESIGNATED FOR OFF-SITE DISPOSAL IN ACCORDANCE WITH ALL APPLICABLE REGULATIONS.



BDS STAMP

MAUL FOSTER ALONGI
3140 NE BROADWAY STREET
PORTLAND, OR 97232
PHONE 971.544.2139
www.moulfoister.com

KINDER MORGAN

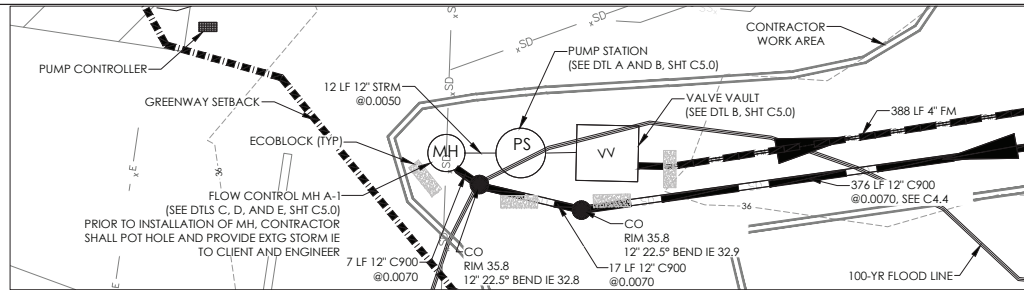
REGISTERED PROFESSIONAL ENGINEER
STATE OF OREGON
EXPIRES: 6/30/2021
This digital seal verifies the engineer and document content.

OWNER-INITIATED BASIN
STORMWATER TREATMENT
KINDER MORGAN BULK TERMINALS, INC.
PORTLAND, OREGON

NO.	DATE	DESCRIPTION
1	11/20/2020	605 PLAN SET
2	11/20/2020	1005 PLAN SET
3	11/20/2020	1005 PLAN SET

PROJECT: 1017.01.10
DESIGNED: S. HARMON
DRAWN: D. VASCHIN
CHECKED: A. BANAGIR
SCALE:
DRAWING NOT TO SCALE
SHEET TITLE
EROSION CONTROL DETAILS
SHEET
C3.1

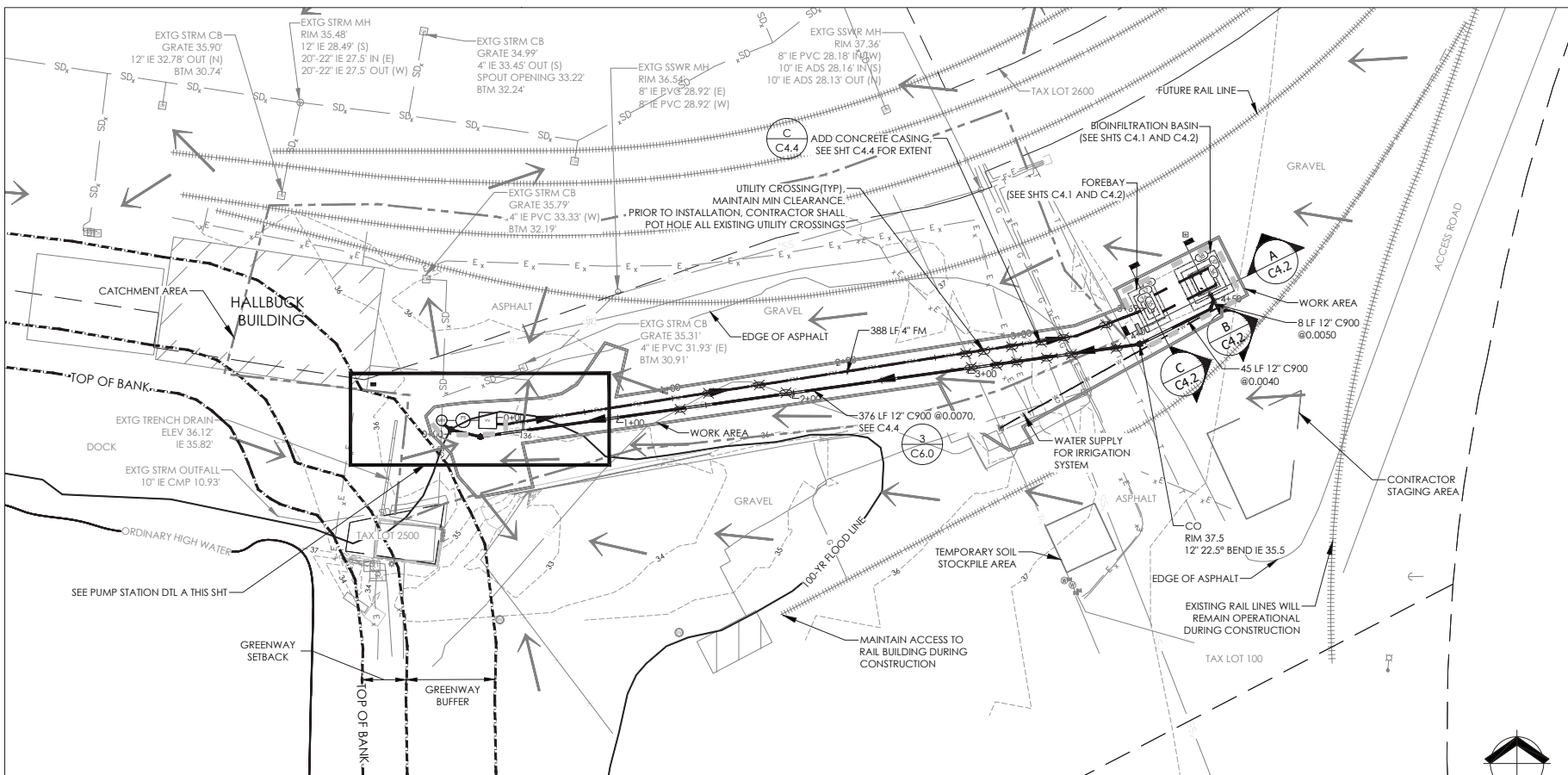
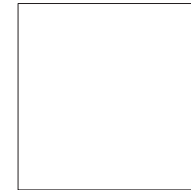
100% DESIGN



BASIN M PUMP STATION
SCALE: 1" = 10'

EARTHWORK QUANTITIES	
CUT OUTSIDE 100-YR FLOOD PLAIN	183 CY
FILL OUTSIDE 100-YR FLOOD PLAIN (PS, MH, VV, TRENCH, OVER- EXCAVATION UNDER BASIN)	138 CY
CUT INSIDE 100-YR FLOOD PLAIN	30 CY
FILL INSIDE 100-YR FLOOD PLAIN (PS, VV, TRENCH)	30 CY
WORK AREA WITHIN 100-YR PLAIN	2,000 SF
WORK AREA	14,700 SF (0.33 AC)
STOCKPILE AREA	2,250 SF
STAGING AREA	880 SF
BIOFILTRATION BASIN SURFACE AREA	650 SF

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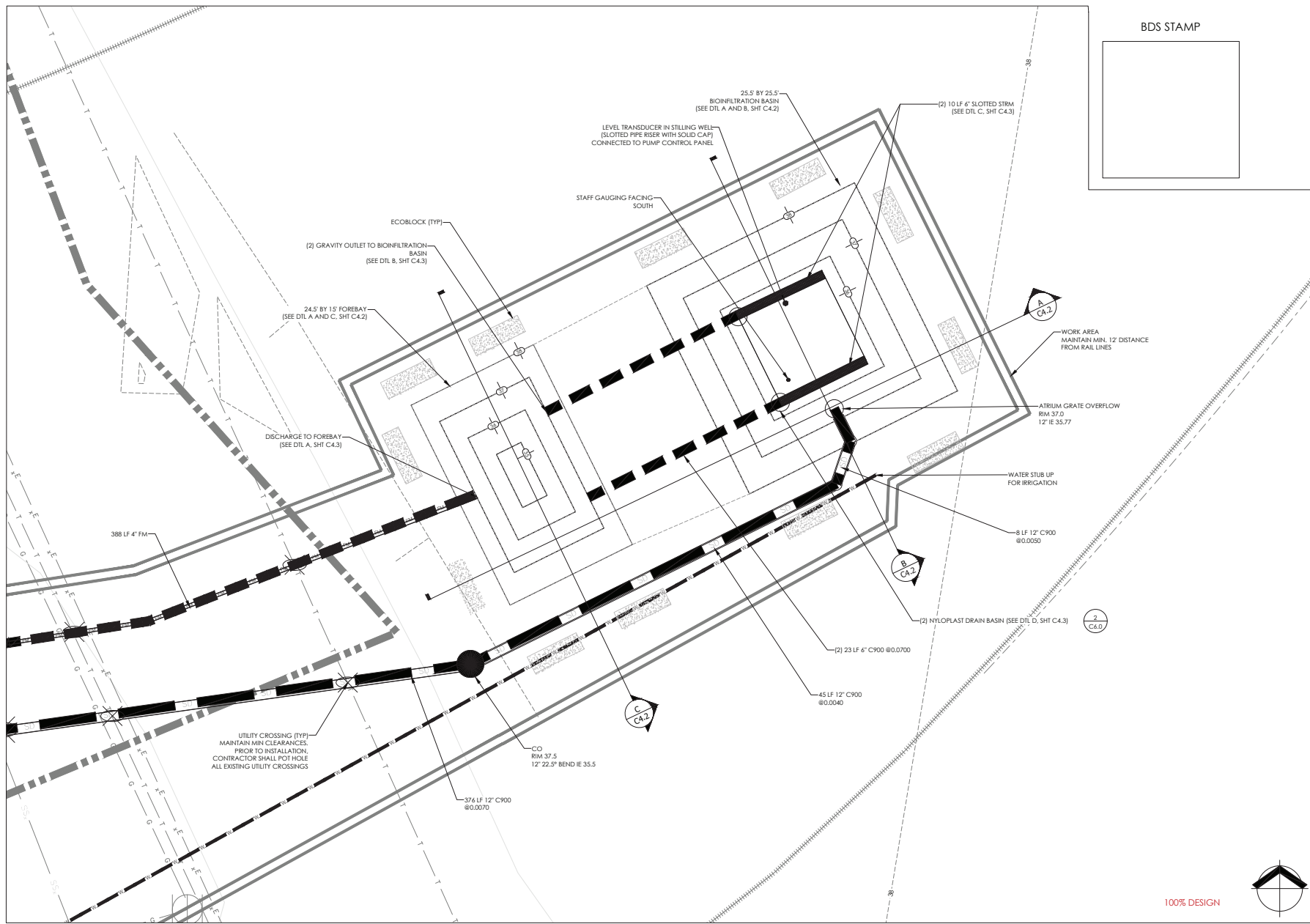
KINDER MORGAN



OWNER-INITIATED BASIN M
STORMWATER TREATMENT
KINDER MORGAN BULK TERMINALS, INC.
PORTLAND, OREGON

PROJECT:	1017.01.10
DESIGNED:	D. HARMON
DRAWN:	D. VARCIN
CHECKED:	A. BANASKI
SCALE:	AS SHOWN
SHEET TITLE:	SITE PLAN
SHEET:	C4.0

PROJECT: 1017.01.10
DRAWN: D. VARCHIN
CHECKED: A. BANASIK
SCALE: 1" = 10'
DATE: 11/20/2020
SHEET: C4.1



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KINDER MORGAN

REGISTERED PROFESSIONAL ENGINEER
NO. 98978
STATE OF OREGON
EXPIRES: 6/30/2021
This stamp certifies the engineer and documents comply.

**OWNER-INITIATED BASIN M
STORMWATER TREATMENT**

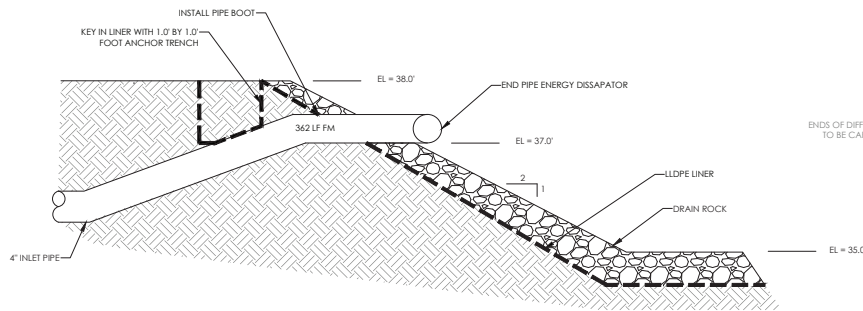
KINDER MORGAN BULK TERMINALS, INC.
PORTLAND, OREGON

NO.	DATE	DESCRIPTION
1	11/20/2020	PERMANENT SET
2	11/20/2020	NO. 98978, AN SET
3	11/20/2020	NO. 98978, AN SET

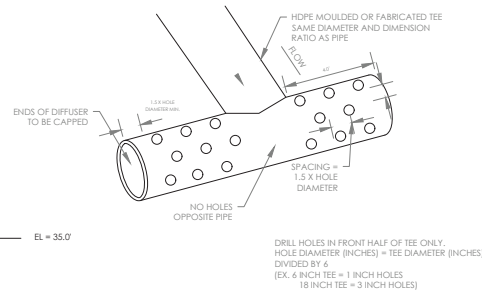
PROJECT: 1017.01.10
DESIGNED: S. HARMON
DRAWN: D. VARCHIN
CHECKED: A. BANASIK
SCALE: 1" = 10'
DATE: 11/20/2020
SHEET: C4.1

TREATMENT SYSTEM

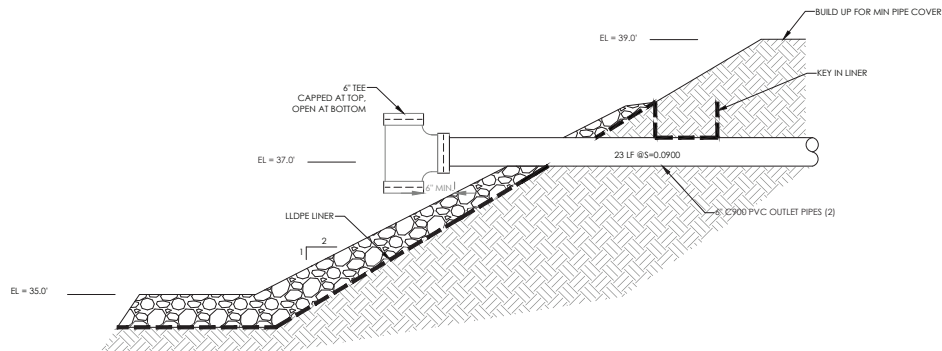
SHEET
C4.1



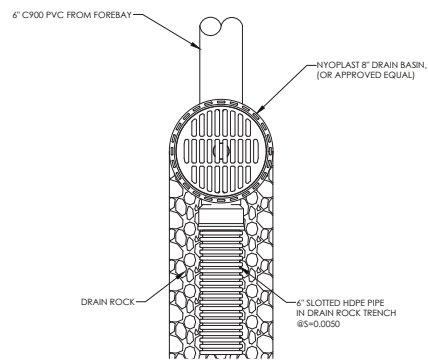
A FOREBAY INLET ENERGY DISSIPATOR DETAIL
SCALE: NTS



D FLOW SPREADER DETAIL
SCALE: NTS

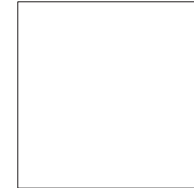


B FOREBAY OUTLET DETAIL
SCALE: NTS



C FLOW SPREADER INLET PLAN VIEW
SCALE: NTS

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KINDER MORGAN

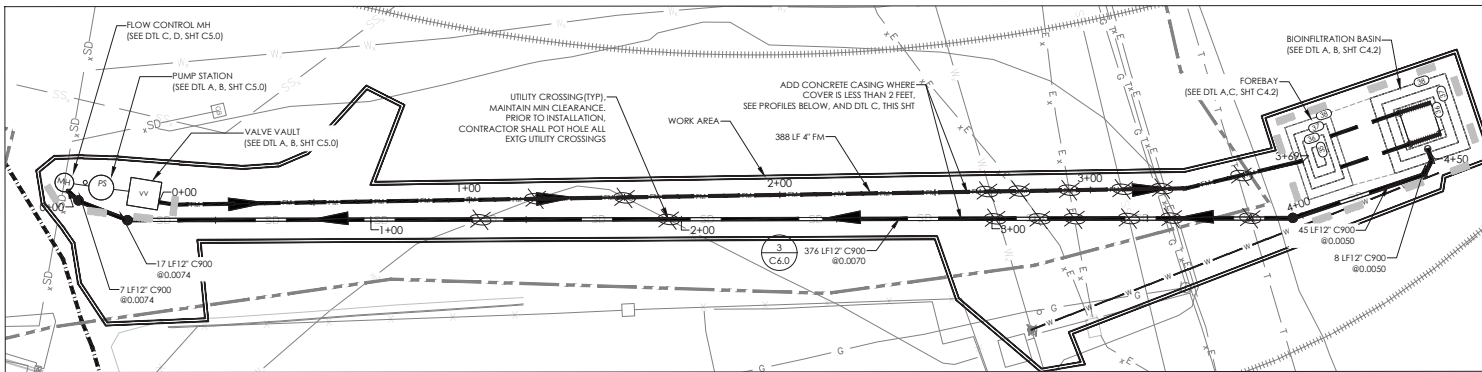


OWNER-INITIATED BASIN M
STORMWATER TREATMENT
KINDER MORGAN BULK TERMINALS, INC.
PORTLAND, OREGON

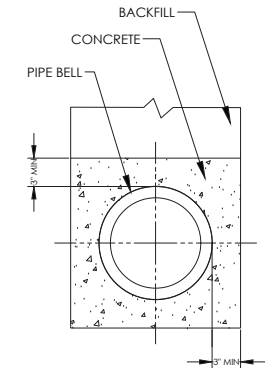
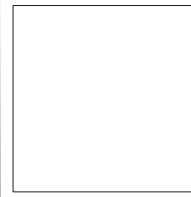
REVISION	DATE	DESCRIPTION
C	2/20/2021	PERM PLAN SET
B	12/11/2020	LOOSE PLAN SET
A	11/20/2020	60% PLAN SET

PROJECT:	1017.01.10
DESIGNED BY:	HARMON
DRAWN BY:	D. VARCHIN
CHECKED BY:	A. BARNAGE
SCALE:	SCALE AS NOTED
SHEET TITLE:	TREATMENT SYSTEM DETAILS II
SHEET:	C4.3

100% DESIGN

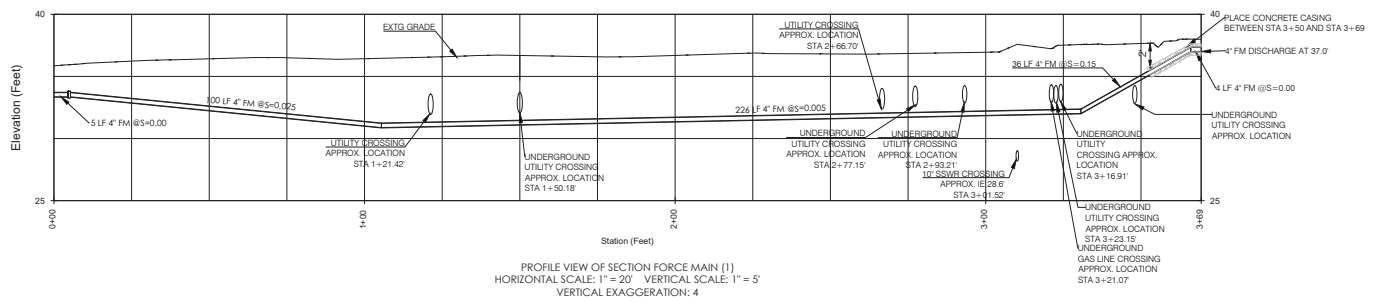


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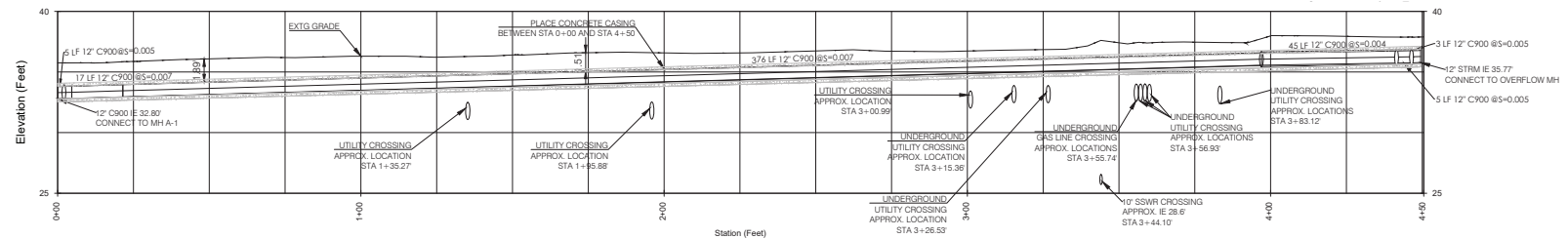
C CONCRETE CASING
SCALE: NTS

NOTE:
EXTENT OF CONCRETE CASING IS SUBJECT TO
CHANGE FOLLOWING POTHOLING RESULTS.
CONCRETE CASING IS NOT REQUIRED WHEN
PIPE IS AT LEAST 2-FEET BELOW GRADE.



PROFILE VIEW OF SECTION FORCE MAIN (1)
HORIZONTAL SCALE: 1" = 20' VERTICAL SCALE: 1" = 5'
VERTICAL EXAGGERATION: 4

A FORCE MAIN PROFILE
SCALE: AS NOTED



PROFILE VIEW OF SECTION GRAVITY LINE
HORIZONTAL SCALE: 1" = 20' VERTICAL SCALE: 1" = 5'
VERTICAL EXAGGERATION: 4

B STORM LINE PROFILE
SCALE: AS NOTED

100% DESIGN



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OWBER-INITIATED BASIN M
STORMWATER TREATMENT
KINDER MORGAN BULK TERMINALS, INC.
PORTLAND, OREGON

NO.	DATE	DESCRIPTION
1	10/17/10	PROJECT: 10171010
2	10/17/10	DESIGNED: S. HARMON
3	10/17/10	DRAWN: D. VARCIN
4	10/17/10	CHECKED: A. BANASIK
5	10/17/10	SCALE

PROJECT: 10171010
DESIGNED: S. HARMON
DRAWN: D. VARCIN
CHECKED: A. BANASIK
SCALE
1" = 20'
1" = 5'

SHEET TITLE

FORCE MAIN AND STORM PROFILES

SHEET

C4.3

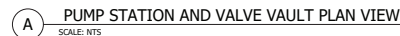


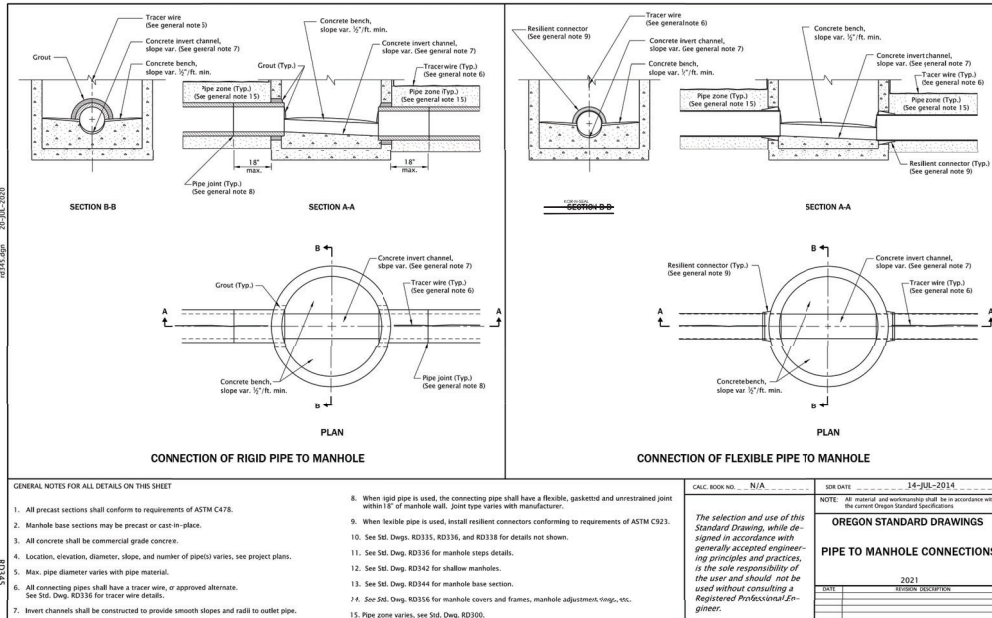
SHEAR GATE NOTES:

- 1. SHEAR GATE SHALL BE CAST FROM ASTM A8 CLASS 308 AS REQUIRED.
- 2. GATE SHALL BE 8" DIAM. UNLESS OTHERWISE SPECIFIED. GATE SHALL BE JOINED TO THE STRUCTURE BY BOLTING (THROUGH FLANGE), WELDING, OR OTHER SECURE MEANS.
- 3. LIFTING LUGS AS SPECIFIED BY MFR. WITH HANDLE EXTENDING TO WITHIN ONE FOOT OF COVER AND ADJUSTABLE HOOK LATCH FASTENED TO FRAME OR OTHER HARD SURFACE. LUGS SHALL BE 1/2" THICK. LUGS DO NOT CREATE A TRIP HAZARD OR REDUCE SURFACE SPACE. MUST BE OPERATIONAL WITHOUT ENTERING MATERIALS.
- 4. GATE SHALL NOT OPEN BEYOND THE CLEAR OPENING BY LIMITED JUNE MOVEMENT, STOP TAB, OR SOME OTHER MEANS.
- 5. NEOPRENE RUBBER CASING REQUIRED BETWEEN RISER AND GATE FLANGE AND 3/4" MIN. GAP REQUIRED.
- 6. MATING SURFACES SHALL BE 3/4" MIN. TO BE MACHINED FOR PROPER FIT.
- 7. LATCHING BOLTING BOLTS SHALL BE 3/8" DIA. STAINLESS STEEL.
- 8. ALTERNATE CLEANOUT/SHEAR GATES TO THE DESIGN WHICH ARE ACCEPTABLE PROVIDED THEY MEET THE MATERIAL SPECIFICATIONS ABOVE AND HAVE A SIX (6), 10-3/8" BOLT CIRCLE FOR BOLTING TO THE FLANGE.

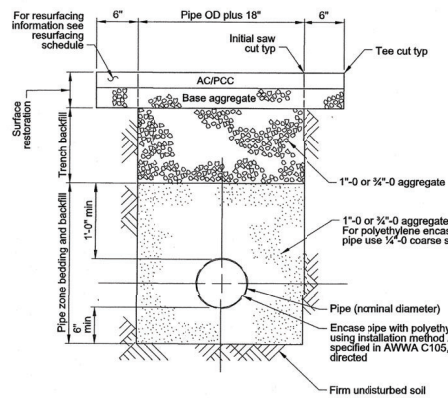
- ① 4" CLASS 350 FLANGED DI PIPE
- ② 4" 90° ELBOW, FLANGED DI
- ③ 4" AWWA SWING CHECK VALVE, WEIGHT & LEVER TYPE
- ④ 4" ECCENTRIC PLUG VALVE, MHEI-ACTUATED W/ WHEEL ORIENTED HORIZONTALLY
- ⑤ 4" MJ SLEEVE, RESTRAINED
- ⑥ 4" TEE, FLANGED DI
- ⑦ DI-TO-PVC COUPLING
- ⑧ 4" C900 PVC DR 17 PIPE
- ⑨ DISCHARGE PIPE ANCHOR BRACKET
- ⑩ (4) 2" CONDUITS TO PUMP CONTROL PANEL TO BE CORED THROUGH SIDE OF WET WELL. KOR-N-SEAL FLEXIBLE BOOT, CONTRACTOR TO COORDINATE EXACT CONDUIT SIZE AND LOCATION OF CORE WITH ELECTRICIAN.
- ⑪ SUPPORT BRACKET
- ⑫ 3" TO 4" REDUCER

1. THE PERMITTING DOCUMENTS CONTAIN LIMITED ELECTRICAL TRADEWORK INFORMATION. ELECTRICAL LOAD CALCULATIONS SHALL BE PERFORMED BY AN ELECTRICIAN LICENSED IN THE STATE OF OREGON. ELECTRICAL CONTRACTOR SHALL APPLY FOR ELECTRICAL PERMIT.
2. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH APPLICABLE NEC AND STATE OF OREGON ELECTRICAL CODE.
3. KINDER MORGAN'S ELECTRICIAN WILL PROVIDE POWER CONNECTIONS TO THE PUMP STATION.
4. CONTRACTOR SHALL INSTALL ALL REQUIRED PUMP STATION APPEARANCES TO PROVIDE A FUNCTIONAL SYSTEM PER MANUFACTURER'S RECOMMENDATIONS.
5. CONTRACTOR TO CONFIRM LOCATION OF PUMP STATION CONTROL PANEL WITH KINDER MORGAN AND ELECTRICIAN PRIOR TO INSTALLATION.
6. KINDER MORGAN'S ELECTRICIAN WILL COORDINATE WITH THE KINDER MORGAN TO PROVIDE DISCONNECT BOX, AND AUXILIARY POWER CONNECTION IN COMPLIANCE WITH SELECTED PUMPS.
7. DUPLEX PUMP DUTY POINT: 72 GPM AND 32 TDH.
8. CONTRACTOR SHALL INSTALL KINDER MORNING FURNISHED PUMP STATION EQUIPMENTS.
9. MANHOLE ELEVATIONS ARE SUBJECT TO CHANGE FOLLOWING POtholing RESULTS.
10. SEASONAL HIGH GROUNDWATER AT PUMP STATION LOCATION IS APPROXIMATELY 15" TO 20" BELOW GROUND SURFACE.





1 PIPE TO MANHOLE CONNECTION DETAIL
SCALE: NTS



3 TRENCH SECTION
SCALE: NTS

Notes:

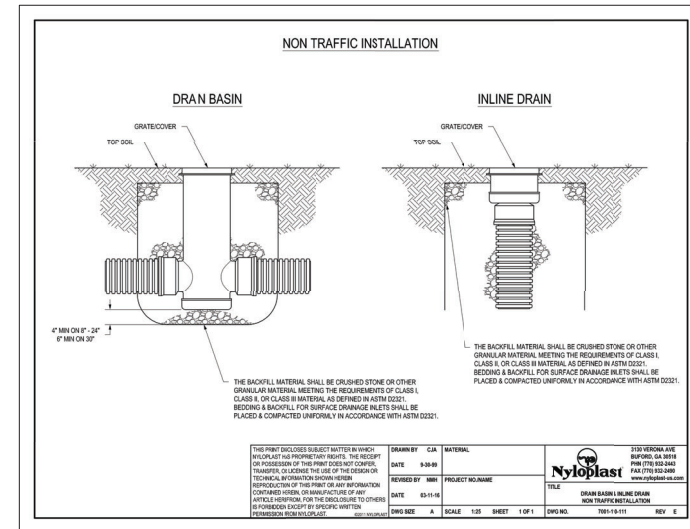
- For compaction requirements see project general notes and specifications.
- For pipe diameter above 18", install as specified.

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user.

**PORTLAND WATER BUREAU
CITY OF PORTLAND, OREGON**

Standard Drawing No. **P-815**

Effective Date: April 9, 2009
Cust. Book No. PWB 1
Baseline Report Date: April 9, 2009



2 NYLOPLAST DRAIN BASIN DETAIL
SCALE: NTS

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3140 NE BROADWAY STREET
PORTLAND, OR 97232
PHONE: 971.544.2139
www.maulfooster.com

KINDER MORGAN

REGISTERED PROFESSIONAL ENGINEER
PORTLAND, OREGON
EXPIRES: 6/30/2021
The digital seal verifies the engineer and document content.

**OWNER-INITIATED BASIN M
STORMWATER TREATMENT**
KINDER MORGAN BULK TERMINALS, INC.
PORTLAND, OREGON

REV	DATE	DESCRIPTION
C	2/20/2020	PRELIM PLAN SET
B	2/21/2020	100% PLAN SET
A	1/25/2020	60% PLAN SET

PROJECT: 1017.01.10
DESIGNED: S. HARMON
DRAWN: D. VASCIN
CHECKED: A. BANASIK
SCALE

SCALE AS NOTED
SCALE: 1/2" = 1'-0" (ORIGINAL)
DRAWING: 1/2" = 1'-0" (NOT ONE RECORD THIS SHEET - ADJUST SCALE ACCORDINGLY)

SHEET TITLE

STANDARD DETAILS

SHEET

C6.0

100% DESIGN

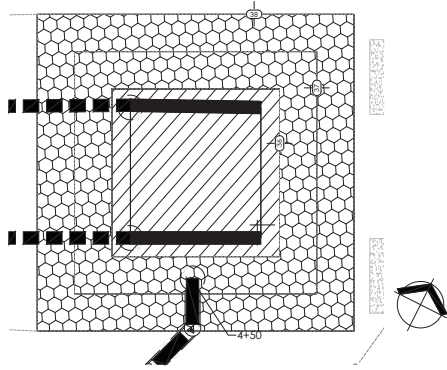
PLANT MATERIAL LEGEND

UPPER VEGETATION IN BASIN

SYM	QTY	COMMON NAME	BOTANICAL NAME	SIZE	SPACING	COMMENTS
	45	TUFTED HAIRGRASS	DESCHAMPSIA CESPIOSA	1 GAL	2'-0", O.C., TRI	GROUPS OF 3 & 9
	45	BLUE OAT GRASS	HELICTOTRICHON SEMPERVIRENS	1 GAL	2'-0", O.C., TRI	GROUPS OF 3 & 9
	45	BIRCHLEAF SPIRAEA	SPIRAEA BETULIFOLIA	1 GAL	2'-0", O.C., TRI	GROUPS OF 3 & 9

LOWER VEGETATION IN BASIN

SYM	QTY	COMMON NAME	BOTANICAL NAME	SIZE	SPACING	COMMENTS
	16	ORANGE NEW ZEALAND SEDGE	CAREX TESTACEA	1 GAL	2'-0", O.C., TRI	GROUPS OF 3 & 5
	18	SPREADING RUSH	JUNCUS PATENS	1 GAL	2'-0", O.C., TRI	GROUPS OF 5 & 8
	18	SLOUGH SEDGE	CAREX OBNUPTA	1 GAL	2'-0", O.C., TRI	GROUPS OF 5 & 8



A VEGETATED BIOFILTRATION BASIN PLANTING PLAN
1" = 5'

GENERAL LANDSCAPE NOTES

- PRIOR TO CONSTRUCTION, THE FOLLOWING SHALL BE SUBMITTED TO THE LANDSCAPE ARCHITECT:
 - NURSERY NAME, ADDRESS, PHONE NUMBER AND CONTACT PERSON ALONG WITH PROOF OF AVAILABILITY OF PROPOSED PLANT MATERIAL.
 - PLANTING SCHEDULE INDICATING ANTICIPATED INSTALLATION DATES.
 - IRRIGATION PLAN (SEE IRRIGATION SUBMITTALS ON THIS PAGE).
- CONTRACTOR TO VERIFY WITH OWNER AND UTILITY COMPANIES THE LOCATIONS OF ALL UTILITIES PRIOR TO CONSTRUCTION. TO DETERMINE IN THE FIELD THE ACTUAL LOCATIONS AND ELEVATIONS OF ALL EXISTING UTILITIES, WHETHER SHOWN ON THE PLANS OR NOT, THE CONTRACTOR SHALL CALL UTILITY PROTECTION SERVICE 72 HOURS PRIOR TO CONSTRUCTION.
- EXAMINE FINISH SURFACE, GRADES, TOPSOIL QUALITY AND DEPTH. DO NOT START ANY WORK UNTIL UNSATISFACTORY CONDITIONS HAVE BEEN CORRECTED. VERIFY LIMITS OF WORK BEFORE STARTING.
- QUANTITIES SHOWN ARE INTENDED TO ASSIST CONTRACTOR IN EVALUATING THEIR OWN TAKE OFFS AND ARE NOT GUARANTEED AS ACCURATE REPRESENTATIONS OF REQUIRED MATERIALS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR HIS BID QUANTITIES AS REQUIRED BY THE PLANS AND SPECIFICATIONS.
- CONTRACTOR SHALL DESIGN AND INSTALL AN AUTOMATIC UNDERGROUND IRRIGATION SYSTEM SUFFICIENT TO WATER ALL OF THE PROPOSED LANDSCAPE. SEE IRRIGATION NOTES. ALL IRRIGATION SLEEVING SHALL BE COORDINATED AS REQUIRED.
- THE CONTRACTOR SHALL WARRANT ALL LIVING PLANTING MATERIALS FOR A PERIOD OF ONE YEAR AFTER DATE OF SUBSTANTIAL COMPLETION, AGAINST DEFECTS INCLUDING DEATH AND UNSATISFACTORY GROWTH.
- REMOVE AND REPLACE DEAD PLANTING MATERIALS IMMEDIATELY.
- REPLACE PLANTING MATERIALS THAT ARE MORE THAN 25 PERCENT DEAD OR IN AN UNHEALTHY CONDITION AT END OF WARRANTY PERIOD.

IRRIGATION SUBMITTALS

CONTRACTOR SHALL SUBMIT THE FOLLOWING DATA TO THE LANDSCAPE ARCHITECT BEFORE BEGINNING WORK:

- CONTRACTOR SHALL SUBMIT ALL PRODUCTS TO BE INSTALLED IN THIS SYSTEM. PRODUCT DATA SHALL INCLUDE THE MANUFACTURER'S NAME, CATALOG NUMBERS, TECHNICAL DATA, AND MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION, OPERATION, AND MAINTENANCE.
- CONTRACTOR SHALL SUBMIT AN IRRIGATION PLAN THAT SHOWS ALL IRRIGATION SYSTEM PIPING INCLUDING LAYOUT, LOCATION, TYPE, SIZE, CAPACITIES, AND FLOW CHARACTERISTICS OF IRRIGATION SYSTEM COMPONENTS. INCLUDE WATER METERS, BACKFLOW PREVENTERS, CONTROLLER, VALVES, PIPING, DRAIN VALVES, SPRINKLERS AND DEVICES, ACCESSORIES, AND WIRING. SHOW AREAS OF SPRINKLER SPRAY AND OVERSPRAY. SHOW WIRE SIZE AND NUMBER OF CONDUCTORS FOR EACH CONTROL CABLE.
- CONTRACTOR SHALL TEST THE WATER PRESSURE AT POINT OF CONNECTIONS AND SUBMIT THE FINDINGS. FOLLOWING COMPLETION OF INSTALLATION THE CONTRACTOR SHALL SUBMIT THE FOLLOWING TO THE OWNER:
 - THREE SETS OF ALL KEYS, TOOLS, OR OTHER SPECIAL DEVICES TO ADJUST, MAINTAIN, GAIN ACCESS TO, OR OTHERWISE OPERATE THE SYSTEM.
 - AN AS-BUILT DRAWING SHOWING LOCATION OF ALL IRRIGATION COMPONENTS.

BDS STAMP

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PORTLAND, OR 97232
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www.moulfofster.com

KINDER MORGAN

REGISTERED
LANDSCAPE ARCHITECT
OREGON
EXPIRES: 6/30/2021
This design and seal certifies the signature and education credits.

OWNER-INITIATED BASIN M
STORMWATER TREATMENT
KINDER MORGAN BULK TERMINALS, INC.
PORTLAND, OREGON

REV	DATE	DESCRIPTION
C	2/20/2021	FINAL PLANS SET
B	2/21/2020	NOISE PLANS SET
A	10/20/2008	AS-BUILT PLANS SET

PROJECT: 1017.01.10
DESIGNED: C. RLEY
DRAWN: C. RLEY
CHECKED: A. BANAGIK
SCALE
SCALE AS NOTED
THIS SET IS THE ONLY ORIGINAL
DRAWING. IF ANY ONE REVISION THIS
SET IS ADJUST SCALE ACCORDINGLY.
SHEET TITLE
PLANTING PLAN
SHEET
L1.0

100% DESIGN

OPERATIONS AND MAINTENANCE PLAN

KINDER MORGAN PORT OF PORTLAND TERMINAL 4 OWNER-INITIATED STORMWATER RETROFIT AND TREATMENT SYSTEM



Prepared for
KINDER MORGAN BULK TERMINALS, INC.

11040 NORTH LOMBARD STREET
PORTLAND, OR 97203
MULTNOMAH

February 11, 2021
Project No. 1017.01.10

Prepared by
Maul Foster & Alongi, Inc.
3140 NE Broadway Street, Portland, OR 97232

OPERATIONS AND MAINTENANCE PLAN
KINDER MORGAN PORT OF PORTLAND TERMINAL 4
OWNER-INITIATED STORMWATER RETROFIT AND TREATMENT SYSTEM

*The material and data in this plan were prepared
under the supervision and direction of the undersigned.*

MAUL FOSTER & ALONGI, INC.



Brooke Harmon, PE
Project Engineer

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1 SITE DESCRIPTION

Maul Foster & Alongi, Inc., has prepared this Operation and Maintenance (O&M) Plan on behalf of Kinder Morgan, Inc. (Kinder Morgan). This O&M Plan addresses the operation and maintenance procedures for the Basin M¹ stormwater treatment and infiltration system consistent with the design requirements outlined in the 2020 City of Portland (City) Stormwater Management Manual (Stormwater Manual) and 2020 Source Control Manual (SCM). The stormwater system improvements and treatment and infiltration system were designed consistent with the National Pollutant Discharge Elimination System Stormwater Discharge Permit No. 1200-Z (1200-Z Permit) Tier II corrective action requirements and therefore qualify as an owner-initiated stormwater retrofit project. Per Section 1.2.4 of the Stormwater Manual, owner-initiated stormwater retrofit projects do not have to comply with the Stormwater Manual, however, the Stormwater Manual design requirements were used as guidelines. This O&M plan will be submitted to City of Portland for permitting along with other permit application documents, based on the City of Portland 2016 Stormwater Management Manual (SWMM) requirements.

1.1 Site Background

The Kinder Morgan facility encompasses approximately 9.8 acres and is located at the Port of Portland Terminal 4 in section 02, township 1 north, range 1 west of the Willamette Meridian (the facility). The facility is located at 11040 North Lombard Street in Portland, Oregon and is bounded to the west by the Willamette River and to the east by North Terminal Road. The site is owned by the Port of Portland and leased by Kinder Morgan.

The facility is a river-dependent active bulk storage and transfer site that primarily handles soda ash. Soda ash is delivered by rail from mines, stored in the Soda Ash Building and loaded onto ships or rail.

Stormwater runoff generated at the site discharges to the Willamette River consistent with the National Discharge Elimination Systems Stormwater Discharge Permit No. 1200-Z (Permit) issued by the Oregon Department of Environmental Quality and administered by the City of Portland Bureau of Environmental Services. Stormwater from Kinder Morgan's Drainage Basin M¹ triggered Permit Tier II corrective action requirements (i.e., installation of stormwater treatment or mass-reduction measures).

1.2 Stormwater Treatment and Infiltration System

The Basin M stormwater treatment and infiltration system consists of a flow- and spill-control manhole, pump station, pretreatment forebay, and bioinfiltration basin. Stormwater runoff from Basin M¹ is collected in catch basins and conveyed to a spill- and flow-control manhole. The manhole directs design flows to the pump station and traps leaks, spills and sediment. Stormwater gravity-flows from

¹ Kinder Morgan's Basin M is referred to as Basin K1 by the Port of Portland.

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the manhole to the pump station and is pumped to the pretreatment forebay for sedimentation. Pretreated stormwater is then conveyed to the vegetated bioinfiltration basin for treatment (biofiltration) and infiltration. Flows in excess of the bioinfiltration basin capacity overflow from the manhole to the existing Willamette River outfall. Overflows from the bioinfiltration basin are routed to the river outfall via the flow- and spill-control manhole. The layout of the Basin M treatment system is depicted on Sheet C4.0 in the attached Drawings.

2 OPERATIONS AND MAINTENANCE RESPONSIBILITIES

Kinder Morgan assumes financial responsibility for the O&M of the stormwater treatment and infiltration system and will incorporate the costs of operating and maintaining the system into their annual budget. On-site training will be provided to the pump station operators designated by Kinder Morgan prior to startup. Inspection and maintenance activities will be performed by trained Kinder Morgan staff.

3 TREATMENT AND INFILTRATION SYSTEM OPERATION

The stormwater conveyance, treatment and infiltration system is described in the following sections and shown in the attached Drawings.

3.1 Flow- and Spill-Control Manhole

A flow- and spill-control manhole is located upstream of the bioinfiltration basin to provide oil control and direct design flows to the basin, while allowing flows in excess of the design capacity to bypass the system. The flow- and spill-control manhole is equipped with:

- A tee outlet that traps oils and floatables.
- A two-foot deep sump that traps sediment.
- An orifice designed to convey flows up to the design flow to the pump station and ultimately to the downstream bioinfiltration basin.
- A restrictor plate with a sheer gate that can be pulled to drain the manhole in the event that the orifice plugs up.
- An overflow weir that will convey flows exceeding the design capacity to bypass treatment and infiltration, and discharge to the river.

Overflows from the flow-and spill- control manhole will be monitored using a transducer. The transducer will be connected to the pump station controller panel/data logger.

3.2 Pump Station

The pump station consists of a wet well with pumps, pipes, and fittings and a valve vault with pipes, valves, and fittings. The wet well contains two 2.7-horsepower submersible pumps capable of pumping up to 72 gallons-per-minute for a total pump station capacity of 144 gallons-per-minute. The pumps are set to operate in a lead and lag configuration. The pumps convey stormwater from the wet well to the pretreatment forebay through a valve vault containing check valves, plug valves, and fittings.

The pump station includes a flow meter and totalizer that measures volumes discharged to the bioinfiltration basin. Information from flow meter and totalizer will be saved in the pump station data logger (HTT-1100, High Tide Technologies Telemetry View).

3.3 Pretreatment Forebay and Bioinfiltration Basin

The pretreatment forebay provides time for suspended particles to settle (sedimentation). The forebay is lined with a linear low-density polyethylene (LLDPE) liner to limit infiltration in the forebay. The LLDPE liner is covered with rock to protect the liner.

The bioinfiltration basin consists of two flow spreaders, vegetation, and an engineered soil mix (ESM). The flow spreaders include a slotted pipe in a rock trench. Each trench distributes flows across the basin to minimize the potential for channeling and ensure plant survival. Vegetation treats runoff via bioinfiltration and plant uptake of pollutants. The ESM consists of a blend of granular activated carbon, sand and coconut coir pith and filters suspended and dissolved pollutants prior to infiltration.

The bioinfiltration basin has a level gauge to track sediment buildup in the basin and evaluate the need for maintenance. The bioinfiltration basin also has a pressure transducer that measures water levels in the basin. The transducer will be set at the initial surface elevation of the ESM to measure ponding above the ESM, and will be wired into the pump station controller, which monitors and records flow volumes discharged into the basin. Information from the transducer will be saved in the pump station data logger.

Overflows from the bioinfiltration basin are conveyed to the downstream side of the spill- and flow-control manhole and discharge to the river. Most overflows will occur at the flow- and spill-control manhole, and overflows from the basin are expected to be rare.

4 INSPECTION AND MAINTENANCE SCHEDULE

The treatment facility is maintained consistent with the inspection findings and the procedures outlined in the following sections.

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4.1 Inspections

The pump station, forebay, and bioinfiltration basin will be inspected monthly to observe for accumulation of stormwater solids and debris. Pipes, valves, and fittings inside the wet well and valve vault are inspected monthly for leaks, breaks, or other evidence of deterioration or damage and are maintained/repaired as needed. The pump station wet well and forebay will be inspected annually during the dry season for solids buildup. Inspections will be recorded on the monthly inspection form (example is provided in Appendix B) that will be included in the facility's Stormwater Pollution Control Plan and updated as needed.

4.2 Forebay Maintenance

If more than four inches of sediment, trash, and/or debris is observed in the forebay (over the rock layer) during the dry season inspection, sediment will be removed using a vacuum truck. Kinder Morgan will work with the vacuum truck operator to ensure sediment is removed slowly to limit disturbance of the rock layer and minimize the potential to damage the liner. No heavy equipment will be allowed to enter the proposed forebay. Any damage to the LLDPE liner will be repaired by a qualified contractor. Forebay outlet structures will be inspected for plugging and, if needed, cleaned.

4.3 Bioinfiltration Basin Maintenance

The bioinfiltration basin has a temporary irrigation system that will be used during the first two to three dry seasons following planting to ensure plant survival during the summer. The irrigation system may be used beyond the first three seasons during heat waves and extended dry periods, based on inspections of the vegetation. The vegetation cover in the basin bottom should reach to approximately 80 percent for the first three years and the basin side slopes should reach approximately 70 percent. Vegetation coverage should reach 90 percent after the first three years. This vegetative cover is slightly lower than the Stormwater Manual requirements to account for the lower organic content of the ESM (relative to bioretention soil specified in the Stormwater Manual), but higher expected pollutant removal. Grass is recommended to be between four and nine inches tall.

Basin maintenance and cleanup will be conducted at the end of summer, prior to the onset of the rainy season. The following maintenance tasks will be conducted, if needed.

Maintenance Component	Defect	Conditions Requiring Maintenance	Results Expected from Maintenance
General	Trash & Debris	If trash and debris accumulation exceeds approximately 5 cubic feet (equal to one standard-size garbage can).	Trash and debris are removed by hand and disposed of off site.

Maintenance Component	Defect	Conditions Requiring Maintenance	Results Expected from Maintenance
Side Slopes	Erosion	Eroded damage over two inches deep where cause of damage is still present or where there is potential for continued erosion.	Slopes should be stabilized using appropriate erosion-control measure(s), e.g., raking/regrading, rock reinforcement, sediment-control booms, vegetation.
ESM Surface	Sediment	Accumulated sediment that exceeds 4 inches (based on level gauge measurements).	Sediment cleaned out to the finished grade and replanted.
Vegetation	Poisonous Vegetation and Noxious Weeds	Poisonous or nuisance vegetation, and noxious weeds (Himalayan blackberry etc.) are observed.	Complete eradication of noxious weeds may not be possible. Poisonous or nuisance vegetation must be removed via mechanical measures (herbicide use in water quality facilities is prohibited).
Vegetation	Wetland Vegetation	Vegetation becomes sparse (less than 90 percent coverage) and does not provide adequate filtration, OR vegetation is crowded out by very dense clumps of cattail, which do not allow water to flow through the clumps.	Determine cause of lack of vigor of vegetation and correct. Replant as needed. For excessive cattail growth, cut cattail shoots back and compost off site. Normally, wetland vegetation requires minimal thinning/removal of dead plant matter. This should be performed during the annual maintenance.

The bioinfiltration basin ESM filtration rate will be monitored using the water level data collected by the pressure transducer in the basin. This data will be evaluated by a professional engineer consistent with the most current version of the Permit.

If ponding duration approaches 30 hours after the end of rainfall, media scraping and debris removal will be performed. If minor maintenance does not successfully restore the infiltration rates, major maintenance, such as replacement of the media, will occur. The maximum ponding time allowable by the Stormwater Manual is 30 hours after the end of rainfall.

4.4 Pump Station Maintenance

Pipes, valves, and fittings inside the wet well and valve vault are inspected for leaks, breaks, and other evidence of deterioration or damage, and are maintained/repared as needed. The pump station wet well bottom is inspected annually during the dry season for solids buildup. If at least six inches of solids is observed at the bottom, the wet well is pressure-washed, and washwater is vacuumed out of the wet well. Washwater and solids are not discharged into the stormwater system. Kinder Morgan

manages the water and materials removed from the wet well consistent with all applicable disposal regulations.

Wet wells are enclosed spaces where harmful chemicals and vapors can accumulate. Therefore, maintenance that requires entering a wet well should be conducted by an individual trained and permitted to work in confined spaces.

4.5 Flow- and Spill-Control Manhole Maintenance

Maintenance Component	Defect	Conditions Requiring Maintenance	Results Expected from Maintenance
General	Trash & Debris	When material exceeds one foot of depth (the manhole has a two-foot deep sump for trapping sediment and oils/floatables). Schedule removal with a qualified vacuum truck service.	No visible trash or debris.
	Oil/Fuel	When the layer of oil, fuel, or other floating liquid is two inches deep or more. Schedule removal with a qualified vacuum truck service.	No visible sheen.
Outlet	Damaged or Missing Outlet Tee	Any damaged or missing manhole outlet tee. Install or repair tee fitting.	Visible tee fitting on outlet.

Manholes are enclosed spaces where harmful chemicals and vapors can accumulate. Therefore, maintenance that requires entering a manhole should be conducted by an individual trained and permitted to work in confined spaces.

4.6 System Troubleshooting

4.6.1 Pump Station

The pumps are set to operate in a lead and lag configuration; if one pump fails, the second pump will remain operational. A high-level alarm is triggered to alert the operator to a bypass, which may be caused by equipment failure,² and the gravity overflow system will be used to discharge stormwater until the rain stops. Once stormwater stops entering the pump station, the pump and level transmitters are inspected. Once the water is drawn down with a dewatering pump, the components can be

² A bypass may also be caused by a storm event that exceeds the pump station capacity; no troubleshooting is necessary if an alarm is triggered while the pumps are operating.

accessed safely (the wet well is considered a confined space). The failed components are replaced as soon as practicable.

For questions about maintenance procedures and for troubleshooting support, please contact the following:

Whitney Equipment—Pump Stations

Jason Morse

Office Phone: (360) 694-9715

Cell: (503) 310-9893

jmorse@weci.com

4.6.2 Flow- and Spill-Control Manhole

If the orifice becomes plugged, the shear gate may be pulled when the water level in the manhole drops after the storm to the bypass weir elevation to drain the remainder of the runoff. This will allow for (confined space) entry into the manhole to unplug or replace the orifice.

5 PERFORMANCE MONITORING

Performance monitoring will be conducted following construction completion and commissioning of the bioinfiltration basin treatment system.

5.1 Data Recording

The following instrumentation is included to monitor the performance of the infiltration basin:

- A pressure transducer in the flow- and spill-control manhole
- A pressure transducer in the bioinfiltration basin
- Totalizing flow meter on the force main between the pump station and forebay
- High Tide Technology remote terminal unit (RTU)

Pressure transducer and pump station data will be downloaded monthly from the RTU.

5.2 Infiltration Rate

To confirm the design filtration rate through the ESM is being met, the infiltration rate of the bioinfiltration basin will be calculated utilizing data from the basin transducer. Calculations will be performed quarterly for the first year, and, if a notable decrease in infiltration rate or increase in drawdown time is observed in the first year, quarterly calculations will continue for the second year. Otherwise calculations will be performed annually. If annual calculations in years 2, 3, 4, or 5 indicate

a noticeable decrease in infiltration rate, then semi-annual calculations will be conducted the following year. The filtration rate will also be confirmed every five years consistent with the 1200-Z Permit requirements for Tier II facilities.

Data from the transducer in the bioinfiltration basin will be used to determine infiltration rates; drawdown periods will be analyzed following a storm event. Infiltration rates will be calculated with the following equation:

$$i = \frac{A_L * dL}{A_i * dt}$$

Where,

i = infiltration rate

A_L = average cross-sectional area of water in the basin

A_i = cross-sectional area of the basin at the infiltration surface

$\frac{dL}{dt}$ = change in water level over the time period

5.3 Discharge Frequency

The frequency of overflows to the river via Discharge Point 001 will be recorded. The number of occurrences at both the flow- and spill-control manhole and bioinfiltration basin will be recorded, i.e., the numbers of days per year when water levels were above the flow-control manhole weir elevation or above the overflow rim elevation in the bioinfiltration basin. The corresponding rainfall data will also be evaluated. Rainfall data from the City of Portland Shipyard Rain Gage will be utilized (<https://or.water.usgs.gov/non-usgs/bes/shipyard.html>). Discharge frequency will be analyzed annually.

5.4 Performance Reporting

Two types of performance reports will be prepared and submitted to the Oregon Department of Environmental Quality (DEQ): Comprehensive Reports and Annual Summary Reports. Reports will be submitted to DEQ by October 1, for the July 1 through June 30 reporting year.

A report demonstrating that the bioinfiltration basin is functioning consistent with the design will be submitted to BES every five years consistent with 1200-Z Permit requirements. The submittal deadline is not known at this time, but it is likely that it will be required along with 1200-Z Permit renewal applications.

If any significant deviations from the initial designs and anticipated performance occur within the first year, DEQ will be notified and consulted as soon as feasible.

5.4.1 Comprehensive Reports

Comprehensive Reports will be prepared and submitted to DEQ for the first and fifth year. Comprehensive reports will summarize the following performance metrics:

- Average annual infiltration rate at discrete water levels (e.g., 6, 12, and 18 inches)
- Annual maximum drawdown time following a storm event
- Annual volume routed to the bioinfiltration basin
- Number of days per year with discharge to the Willamette River
- Annual rainfall depth
- Any proposed adaptive management measures for DEQ's consideration

These metrics will be compared to previous years' metrics and the design criteria. Deviations greater than 30 percent as compared to the previous year will be noted, and causes will be evaluated.

5.4.2 Annual Summary Reports

Annual Summary Reports will be prepared and submitted to DEQ for years two through four. Annual Summary Reports will include the following:

- A description of the trigger, remedy, and result of any major maintenance events
- All completed inspection forms (see Appendix B)
- All completed maintenance forms (see Appendix B)
- Any relevant photographs

5.4.3 1200-Z Permit Reports

A report demonstrating that the bioinfiltration basin is functioning consistent with the design will be submitted to BES every five years consistent with 1200-Z Permit requirements. The report will include transducer data and infiltration rate calculations, and a determination, made by a licensed professional engineer, whether the calculated rates are consistent with the design criteria. If the engineer determines that the filtration rate does not meet the design criteria, the report will include recommended improvements to restore or enhance the filtration capacity.

LIMITATIONS

The services undertaken in completing this O&M plan were performed consistent with generally accepted professional consulting principles and practices. No other warranty, express or implied, is made. These services were performed consistent with our agreement with our client. This plan is solely for the use and information of our client unless otherwise noted. Any reliance on this plan by a third party is at such party's sole risk.

Opinions and recommendations contained in this report apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, or the use of segregated portions of this plan.

APPENDIX A

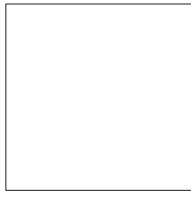
DRAWINGS



OWNER-INITIATED BASIN M STORMWATER TREATMENT

PREPARED FOR:
KINDER MORGAN BULK TERMINALS, INC.
LOCATED IN SEC. 2, T. 1N, R. 1W W.M.
MULTNOMAH COUNTY, PORTLAND, OREGON

BDS STAMP



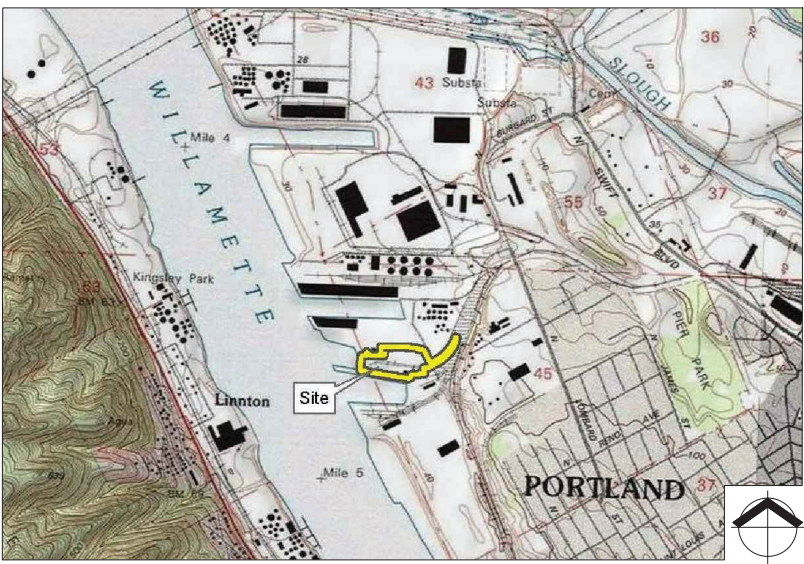
PROJECT CONTACTS

CLIENT KINDER MORGAN BULK TERMINALS 11040 N. LOMBARD ST PORTLAND, OREGON 97203 P: 360-693-5300 NOA.LIDSTONE@KINDERMORGAN.COM	OWNER PORT OF PORTLAND 7200 NE AIRPORT WAY PORTLAND, OREGON 97218 GREG THEISEN GREG.THEISEN@PORTOFPORTLAND.COM
ENGINEER MAUL, FOSTER & ALONGI, INC. 3140 NE BROADWAY STREET PORTLAND, OREGON 97232 P: 971-544-2139 BROOKE HARMON, PE BHARMON@MAULFOSTER.COM	SURVEYOR MINISTER-GLAESER SURVEYING INC. 2300 E. EVERGREEN BLVD VANCOUVER, WASHINGTON 98661 P: 360-694-3313 CRAIG GALVIN CAGALVIN@SURVEY.COM

PROJECT SUMMARY

SITE ADDRESS:
11040 N. LOMBARD ST
PORTLAND, OR 97203

WORK DESCRIPTION:
OWNER INITIATED STORMWATER RETROFIT PROPOSED PROJECT INCLUDES CONSTRUCTION OF A FOREBAY AND STORMWATER BIOINFILTRATION BASIN TO TREAT AND INFILTRATE RUNOFF FROM KINDER MORGAN BULK SODA ASH FACILITY DRAINAGE BASIN M. STORMWATER CONVEYANCE SYSTEM MODIFICATIONS INCLUDE INSTALLATION OF A FLOW-CONTROL MANHOLE, PUMP STATION, AND GRAVITY AND PRESSURE PIPING.



VICINITY MAP

NOT TO SCALE

GENERAL NOTES

- SURVEY PERFORMED BY MINISTER-GLAESER SURVEYING, INC. ON SEPTEMBER 10, 2020.
- HORIZONTAL DATUM: OREGON STATE PLANE COORDINATE SYSTEM NORTH ZONE, NAD 83 HARN. ELEVATION DATUM: NAVD 88
- ORDINARY HIGH WATER (OHW) MARK OBTAINED FROM THE CITY OF PORTLAND BUREAU OF PLANNING AND SUSTAINABILITY. AS SURVEYED BY THE U.S. ARMY CORPS OF ENGINEERS IN 2004, APPROXIMATE TOP OF BANK (TOB) LINE DERIVED BY MFA USING 2010 BATHYMETRIC CONTOUR DATA AND 2014 REGIONAL LIDAR ELEVATION DATA. THE GREENWAY SETBACK WAS DEFINED 25 FEET FROM TOP OF BANK AND THE GREENWAY BUFFER WAS DEFINED 50 FEET FROM THE GREENWAY SETBACK (OR 75 FEET FROM TOP OF BANK). THE 100-YEAR FLOOD LINE WAS OBTAINED FROM THE FEMA NATIONAL FLOOD HAZARD LAYER.
- CONTRACTOR TO VERIFY ALL UTILITY LOCATIONS AND DEPTHS PRIOR TO CONSTRUCTION. A MINIMUM OF TWO FULL BUSINESS DAYS PRIOR TO BEGINNING CONSTRUCTION, THE CONTRACTOR SHALL CALL 811 (UTILITY NOTIFICATION CENTER) FOR LOCATION MARK-UP OF EXISTING UTILITIES AND SHALL NOTIFY THE PORT (MIKE SHIELDS, MIKE.SHIELDS@PORTOFPORTLAND.COM).
- ALL CONSTRUCTION, MATERIALS, AND WORKMANSHIP SHALL CONFORM TO THE LATEST STANDARDS AND PRACTICES OF THE CITY OF PORTLAND AND THE LATEST EDITION OF THE "OREGON STANDARD SPECIFICATIONS FOR CONSTRUCTION" PREPARED BY ODOT/APWA.
- IN CASE OF A CONFLICT BETWEEN THE REGULATORY STANDARDS OR SPECIFICATIONS, THE MORE STRINGENT REQUIREMENT WILL PREVAIL.
- ANY CHANGES TO THE DESIGN AND/OR CONSTRUCTION SHALL BE APPROVED BY THE CLIENT OR ENGINEER.
- APPROVAL OF THESE PLANS DOES NOT CONSTITUTE AN APPROVAL OF ANY OTHER CONSTRUCTION NOT SPECIFICALLY SHOWN ON THE PLANS. PLANS FOR STRUCTURES SUCH AS BRIDGES, BUILDINGS, TANKS, VAULTS, ROCKERIES, AND RETAINING WALLS MAY REQUIRE A SEPARATE REVIEW AND APPROVAL BY THE BUILDING DEPARTMENT PRIOR TO CONSTRUCTION.
- A COPY OF THESE APPROVED PLANS SHALL BE ON THE JOB SITE WHENEVER CONSTRUCTION IS IN PROGRESS.
- IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN ALL CONSTRUCTION EASEMENTS AND TRADE PERMITS NECESSARY TO PERFORM THE WORK.
- THE CONTRACTOR IS RESPONSIBLE FOR ALL CONSTRUCTION STAKING.
- PUBLIC AND PRIVATE DRAINAGE WAYS SHALL BE PROTECTED FROM POLLUTION. NO MATERIAL IS TO BE DISCHARGED TO OR DEPOSITED IN STORMWATER SYSTEMS THAT MAY RESULT IN VIOLATION OF STATE OR FEDERAL WATER QUALITY STANDARDS.
- ALL CONSTRUCTION WITHIN THE PUBLIC RIGHT-OF-WAY SHALL HAVE AN APPROVED PUBLIC RIGHT-OF-WAY WORK PERMIT PRIOR TO ANY CONSTRUCTION ACTIVITY WITHIN THE RIGHT-OF-WAY.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ADEQUATE SAFEGUARDS, SAFETY DEVICES, PROTECTIVE EQUIPMENT, FLAGGERS, AND ANY OTHER NEEDED ACTIONS TO PROTECT THE LIFE, HEALTH, AND SAFETY OF THE PUBLIC, AND TO PROTECT PROPERTY IN CONNECTION WITH THE PERFORMANCE OF WORK COVERED BY THE CONTRACTOR. ALL TRAFFIC CONTROL DEVICES SHALL CONFORM TO THE LATEST ADOPTED EDITION OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (MUTCD) PUBLISHED BY THE U.S. DEPARTMENT OF TRANSPORTATION. TWO-WAY TRAFFIC MUST BE MAINTAINED AT ALL TIMES ON THE ADJACENT PUBLIC STREETS.
- ANY PUBLIC OR PRIVATE CURB, GUTTER, SIDEWALK, OR ASPHALT DAMAGED DURING CONSTRUCTION SHALL BE REPAIRED TO CITY OF PORTLAND STANDARDS AND PRACTICES.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE INTEGRITY OF ADJACENT UTILITIES WHICH MAY INCLUDE, BUT ARE NOT LIMITED TO, WATER, SANITARY SEWER, STORMWATER, POWER, TELEPHONE, CABLE TV, GAS, IRRIGATION, AND STREET LIGHTING. THE CONTRACTOR SHALL NOTIFY RESIDENTS AND BUSINESSES 48 HOURS IN ADVANCE OF ANY WORK AFFECTING ACCESS OR SERVICE AND SHALL MINIMIZE INTERRUPTIONS TO DRIVEWAYS FOR RESIDENTS AND BUSINESSES ADJACENT TO THE PROJECT.
- RAIL TRACKS WILL REMAIN OPERATIONAL DURING CONSTRUCTION. CONTRACTOR SHALL COORDINATE WITH KINDER MORGAN AND PORT WHEN WORKING WITHIN 25 FEET OF CLEARANCE OF TRACKS.
- BASIN M IS LABELED AS BASIN K1 IN THE PORT OF PORTLAND'S STORMWATER PLAN.

SHEET INDEX

- C0.0 COVER SHEET
- C1.0 CONSTRUCTION NOTES
- C1.1 MASTER LEGEND
- C2.0 EXISTING CONDITION PLAN
- C3.0 EROSION AND SEDIMENT CONTROL
- C3.1 EROSION CONTROL DETAILS
- C4.0 SITE PLAN
- C4.1 TREATMENT SYSTEM
- C4.2 TREATMENT SYSTEM DETAILS
- C4.3 TREATMENT SYSTEM DETAILS II
- C4.4 FORCE MAIN AND STORM PROFILES
- C5.0 PUMP STATION AND MANHOLE DETAILS
- C6.0 STANDARD DETAILS
- L1.0 PLANTING PLAN
- C-8DS BDS COMMENT SHEET

MAUL FOSTER & ALONGI
3140 NE BROADWAY STREET
PORTLAND, OR 97232
PHONE 971.544.2139
WWW.MAULFOSTER.COM



OWNER-INITIATED BASIN M
STORMWATER TREATMENT
KINDER MORGAN BULK TERMINALS INC.
PORTLAND, OREGON

REVISION	DATE	DESCRIPTION
C	2/20/2021	PERMIT PLAN SET
B	10/17/2020	LOBBY PLAN SET
A	11/20/2020	60% PLAN SET

PROJECT: 1017.01.10
DESIGNED BY: HARMON
DRAWN: D. YARBIN
CHECKED: A. BAHAKR
SCALE

SHEET TITLE

COVER SHEET

SHEET
C0.0

PERMIT DOCUMENT

CONSTRUCTION NOTES

EROSION AND SEDIMENT CONTROL NOTES

1. APPROVAL OF THE EROSION, SEDIMENT AND POLLUTION CONTROL PLAN (ESPCP) DOES NOT CONSTITUTE AN APPROVAL OF PERMANENT ROAD OR DRAINAGE DESIGN (E.G., SIZE AND LOCATION OF ROADS, PIPES, RESTRICTIONS, CHANNELS, RETENTION FACILITIES, UTILITIES, ETC.).
2. THE IMPLEMENTATION OF THE ESPCP AND THE CONSTRUCTION, MAINTENANCE, REPLACEMENT, AND UPGRADING OF THESE ESPCP FACILITIES IS THE RESPONSIBILITY OF THE APPLICANT/CONTRACTOR UNTIL ALL CONSTRUCTION IS COMPLETED AND APPROVED AND VEGETATION/LANDSCAPING IS ESTABLISHED.
3. THE BOUNDARIES OF THE CLEARING LIMITS SHOWN ON THIS PLAN SHALL BE CLEARLY FLAGGED IN THE FIELD PRIOR TO CONSTRUCTION. DURING THE CONSTRUCTION PERIOD, NO DISTURBANCE BEYOND THE FLAGGED CLEARING LIMITS SHALL BE PERMITTED. THE FLAGGING SHALL BE MAINTAINED BY THE APPLICANT/CONTRACTOR FOR THE DURATION OF CONSTRUCTION. THE CONTRACTOR SHALL MAINTAIN A 12-FOOT MINIMUM CLEARANCE BETWEEN THE WORK AREA AND ALL RAIL LINES.
4. ALL ESPCP MEASURES SHOWN SHALL BE INSTALLED AS PER THE DETAIL DRAWINGS IN THE CITY OF PORTLAND (CITY) EROSION CONTROL MANUAL (AVAILABLE THROUGH THE OFFICE OF PLANNING AND DEVELOPMENT REVIEW, 1900 SW 4TH AVE., PORTLAND, OREGON).
5. TEMPORARY ESPCP MEASURES SHALL BE INSTALLED BEFORE STARTING GROUND DISTURBING ACTIVITIES.
6. ESPCP MEASURES SHALL NOT BE REMOVED UNTIL PERMANENT STABILIZATION MEASURES ARE COMPLETED.
7. THE IMPLEMENTATION OF THIS ESPCP AND THE CONSTRUCTION, MAINTENANCE, REPLACEMENT AND UPGRADING OF THESE ESPCP FACILITIES IS THE RESPONSIBILITY OF THE CONTRACTOR UNTIL ALL CONSTRUCTION IS COMPLETED AND APPROVED AND VEGETATION/LANDSCAPING IS ESTABLISHED.
8. THE ESPCP FACILITIES SHOWN ON THIS PLAN MUST BE CONSTRUCTED IN CONJUNCTION WITH ALL CLEARING AND GRADING ACTIVITIES, AND IN SUCH A MANNER AS TO ENSURE THAT SEDIMENT AND SEDIMENT-LADEN WATER DO NOT ENTER THE DRAINAGE SYSTEM OR ROADWAYS, OR VIOLATE APPLICABLE WATER QUALITY STANDARDS.
9. THE ESPCP FACILITIES SHOWN ON THIS PLAN ARE THE MINIMUM REQUIREMENTS FOR ANTICIPATED SITE CONDITIONS. DURING THE CONSTRUCTION PERIOD, THESE ESPCP FACILITIES SHALL BE UPGRADED TO ENSURE THAT SEDIMENT AND SEDIMENT-LADEN WATER DO NOT LEAVE THE SITE.
10. THE ESPCP FACILITIES SHALL BE INSPECTED DAILY DURING CONSTRUCTION BY THE APPLICANT/CONTRACTOR AND MAINTAINED AS NECESSARY TO ENSURE THEIR CONTINUED FUNCTIONING.
11. THE ESPCP FACILITIES ON INACTIVE SITES SHALL BE INSPECTED AND MAINTAINED A MINIMUM ONCE A MONTH, OR WITHIN 24 HOURS FOLLOWING A STORM EVENT.
12. ADDITIONAL MEASURES MAY BE REQUIRED TO INSURE THAT ALL PAVED AREAS ARE KEPT CLEAN FOR THE DURATION OF THE PROJECT.
- 12.1. IF SEDIMENT IS OBSERVED, SWEEPING SHALL BE DONE DAILY IN ORDER TO ENSURE SEDIMENT DOES NOT LEAVE THE SITE.

STORMWATER SYSTEM CONSTRUCTION

13. ALL MATERIALS AND INSTALLATION OF STORM SEWERS AND DRAINAGE SYSTEMS SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS IN THE LATEST ADICTION OF THE "OREGON STANDARD SPECIFICATIONS FOR CONSTRUCTION" BY THE AMERICAN PUBLIC WORKS ASSOCIATION AND THE OREGON DEPARTMENT OF TRANSPORTATION, WHEREVER THE STANDARD SPECIFICATIONS REFER TO THE "STATE," "SECRETARY," OR WHEN REFERENCE IS MADE TO THE DEPARTMENT OF TRANSPORTATION IT SHALL BE UNDERSTOOD THAT THE STANDARD SPECIFICATIONS SHOULD READ THE "CLINET".
14. PRESSURE PIPE INSIDE THE WET WELL AND VALVE VAULT SHALL BE DUCTILE IRON (DI) CLASS 52 MEETING THE SPECIFICATIONS OF ANSI C15.1/AWWA 21.5.1. DI PIPE SHALL BE FACTORY LINED WITH CEMENT MORTAR AND BITUMINOUS SEAL COAT AND COATED OUTSIDE WITH ASPHALTIC SEAL COAT.
- 14.1. PIPE FITTINGS SHALL BE FLANGED DI CLASS 350.
- 14.2. FLANGES SHALL CONFORM TO ANSI SPECIFICATION B16.1 FOR CLASS 125 FLANGES AND SHALL CONFORM IN ALL OTHER RESPECTS TO ANSI/AWWA C110/A21.11. FLANGE GASKETS SHALL BE FULL FACE, 1/8" THICK, RED RUBBER OR APPROVED EQUAL.
- 14.3. MECHANICAL JOINTS SHALL INCLUDE ACCESSORY GLANDS, GASKETS, AND BOLTS, SHALL CONFORM TO THE REQUIREMENTS OF ANSI/AWWA C111/A21.11, EXCEPT WHERE SPECIFICALLY MODIFIED IN AWWA C153 FOR COMPACT DI FITTINGS. JOINTS SHALL BE RATED FOR A WORKING PRESSURE OF 350 PSI.
- 14.4. DI PIPE RESTRAINTS SHALL BE MEGALUG SERIES 1100 OR 2100 BY EBAA IRON, INC., OR APPROVED EQUAL. RESTRAINING GASKETS SHALL BE US PIPE "FIELD-LOCK" 350, OR APPROVED EQUAL.
- 14.5. DI PIPE SHALL BE INSTALLED IN ACCORDANCE WITH AWWA C600.
15. PRESSURE PIPE (FM) OUTSIDE THE WET WELL AND VALVE VAULT, GRAVITY PIPE (STRM) SHALL BE C900 PVC DR 18 WITH GASKETS MEETING ASTM F477 AND JOINTS MEETING ASTM D3139.
16. INSTALL DETECTABLE TRENCH WIRE OVER ALL NONMETALLIC PIPES. PLACE WIRE 6 INCHES ABOVE THE TOP OF THE PIPE FOR THE FULL LENGTH OF THE PIPE. MAKE ENDS ACCESSIBLE IN MANHOLES OR AT PIPE ENDS.
17. PRESSURE PIPE SHALL BE TESTED FOR LEAKS USING HYDROSTATIC PRESSURE IN ACCORDANCE WITH ASTM F2164 OR AWWA C151.
18. PIPE TRENCHES SHALL MEET THE FOLLOWING REQUIREMENTS:
- 18.1. TRENCH SHALL BE WIDE ENOUGH TO ALLOW FOR PROPER INSTALLATION OF PIPE, INCLUDING ALL JOINTS, BENDS AND THRUST BLOCKS.
- 18.2. PROVIDE 6-INCH CLEARANCE BELOW AND 12 INCHES ON EACH SIDE OF PIPE IN ROCK, BOULDERS AND LARGE STONES.
- 18.3. TRENCH BOTTOM SHALL HAVE A MINIMUM OF 4 INCHES OF SAND, PEA GRAVEL, OR 1/4-INCH MINUS GRAVEL AS BEDDING.
- 18.4. PIPE TRENCH BACKFILL SHALL BE 1/4-INCH MINUS GRAVEL AND EXTEND TO TOP OF PIPE. BACKFILL COMPACTION SHALL BE AT LEAST 95% MODIFIED PROCTOR DENSITY.
19. PIPE LENGTHS SHOWN ON THE PLANS ARE TO THE CENTER OF THE STRUCTURE.

20. THE CONTRACTOR SHALL INCLUDE A CONCRETE CASING AROUND ALL GRAVITY AND FORCE MAIN LINES THAT HAVE LESS THAN 2-FT OF MINIMUM COVER.
21. KINDER MORGAN WILL CONTRACT WITH A LICENSED SURVEYOR TO SURVEY AS-BUILT CONDITIONS TO CONFIRM CONSTRUCTION WAS CONSISTENT WITH THE PLANS PRIOR TO APPROVING PAYMENT.
22. THE CONTRACTOR SHALL POINOLE ALL UTILITY CROSSINGS AND CONNECTIONS TO EXISTING STORMWATER SYSTEM AT LEAST THREE DAYS BEFORE START OF CONSTRUCTION USING VACUUM EXCAVATION. KINDER MORGAN WILL CONTRACT WITH A LICENSED SURVEYOR TO SURVEY THE UNCOVERED UTILITY ELEVATIONS AND PROVIDE THE INFORMATION TO THE ENGINEER PRIOR TO THE START OF CONSTRUCTION.
23. CONTRACTOR SHALL INVESTIGATE THE CONDITION AND TYPE OF EXISTING PIPING AND CONNECT THE EXISTING PIPES TO NEW MANHOLES AND PIPES WITH APPROPRIATE COUPLINGS AS APPROVED BY ENGINEER.
24. MANHOLES SHALL BE PRECAST CONCRETE MEETING THE REQUIREMENTS OF ASTM C408.
- 24.1. MANHOLES SHALL BE EQUIPPED WITH H-20 RATED COVERS.
- 24.2. MANHOLE EXCAVATIONS SHALL BE BACKFILLED WITH 1/2-INCH MINUS AGGREGATE AND COMPACTED.
- 24.3. THE CONTRACTOR SHALL RESTORE EXISTING GROUND SURFACES AFTER MANHOLE INSTALLATIONS.
25. PUMPS, GUIDERAILS, FLOATS, TRANSDUCERS, AND CONTROLLER WILL BE FURNISHED BY KINDER MORGAN AND INSTALLED BY THE CONTRACTOR.
26. CONTRACTOR WILL BE RESPONSIBLE FOR FURNISHING AND INSTALLING THE PRECAST CONCRETE WET WELL, MANHOLES, ACCESS HATCHES AND ALL PIPING AND FITTINGS IN THE WET WELL.
27. CONTRACTOR WILL BE RESPONSIBLE FOR FURNISHING AND INSTALLING THE PRECAST CONCRETE VALVE VAULT, ACCESS HATCHES, VALVES, AND PIPES.
28. THE CONTRACTOR WILL BE RESPONSIBLE FOR CONSTRUCTING A CONCRETE PAD FOR THE PUMP STATION CONTROLLER AND THE CONTROLLER ENCLOSURE.
29. ELECTRICAL CONNECTIONS TO THE CONTROLLER WILL BE PROVIDED BY KINDER MORGAN'S ELECTRICIAN.
30. OVERFLOWS WILL BE MONITORED USING A TRANSDUCER. CONTRACTOR SHALL INSTALL LEVEL TRANSDUCER IN THE FLOW CONTROL MANHOLE AT THE OVERFLOW ELEVATION AND CONNECT TO THE PUMP CONTROL PANEL/DATA LOGGER.
- 30.1. DATA LOGGER: HTI-1100
- 30.2. WEB INTERFACE: HIGH TIDE TECHNOLOGIES TELEMETRY VIEW
31. CONTRACTOR SHALL INSTALL A FLOW METER FURNISHED BY KINDER MORGAN BETWEEN THE PUMP STATION AND FOREBAY (INSTALLED PER MANUFACTURER GUIDELINES) AND CONNECT TO THE PUMP CONTROL PANEL/DATA LOGGER.

EXCAVATION

32. ALL SOIL EXCAVATION AND MANAGEMENT SHALL BE CONDUCTED CONSISTENT WITH THE PORT TERMINAL A INTERIM CONTAMINATED MEDIA MANAGEMENT PLAN (CMMP).
33. CONSISTENT WITH THE CITY OF PORTLAND SOURCE CONTROL MANUAL, ALL SOIL WILL BE CONSIDERED POTENTIALLY CONTAMINATED AND WILL BE STOCKPILED ON IMPERVIOUS SURFACES OR PLASTIC SHEETING. THE STOCKPILE WILL BE PROTECTED CONSISTENT WITH THESE PLANS. KINDER MORGAN SHALL COLLECT SOIL CHARACTERIZATION SAMPLES AND REVIEW ANALYTICAL REPORT PRIOR TO CONTRACTOR DISPOSAL.
34. CONTRACTOR IS RESPONSIBLE FOR THE TRANSPORT AND DISPOSAL OF THE EXCAVATED SOIL. FOR BIDDING PURPOSES, ASSUME DISPOSAL AT A SUBTILE D LANDFILL. KINDER MORGAN WILL PROVIDE CHARACTERIZATION DATA TO THE CONTRACTOR TO CONFIRM DISPOSAL LOCATION.

BIOINFILTRATION AND SEDIMENTATION FACILITIES

35. THE CONTRACTOR SHALL NOT ALLOW HEAVY EQUIPMENT TO ENTER PROPOSED BIOINFILTRATION FACILITY EXCAVATION AND SHALL NOT PLACE HEAVY LOADS WITHIN THE FACILITY FOOTPRINT TO PREVENT SUBSFACE SOIL AND ENGINEERED SOIL MEDIA (ESM) OVER-COMPACTION. FOOT TRAFFIC IN THE BIOINFILTRATION FACILITY SHALL BE MINIMIZED TO THE EXTENT PRACTICABLE.
36. THE ESM SHALL BE A MINIMUM 24 INCHES DEEP AND SHALL CONSIST OF A BLEND OF 60% FILTER SAND, 20% COCONUT COIR PITH, AND 20% VIRGIN GRANULAR ACTIVATED CARBON (GAC). THE SAND AND GAC SHALL BE MECHANICALLY BLENDED OFF-SITE TO CREATE A UNIFORM BLEND. BLENDED MATERIAL SHALL BE TESTED TO DEMONSTRATE IT MEETS THE FOLLOWING:

PARAMETER	TEST METHOD	REQUIREMENT
TOTAL POROSITY	ASTM D1557	>40% @85% MDD
MAXIMUM DRY DENSITY	ASTM D1557	<105 LB/CF
PERMEABILITY	ASTM D2434	>30IN/Hr @85% MDD
PERCENT PASSING 200 SIEVE	ASTM D422	<3%; ALL MATERIALS PASSING 200 SIEVE SHALL BE NON-PLASTIC
COEFFICIENT OF UNIFORMITY [D60/D10]	ASTM D422	<4
pH		6.0 TO 8.0
CHLORIDE		<300 PPM
SALINITY		<3.0 MMHCO/CM AS ELECTRICAL CONDUCTIVITY

37. THE COCONUT COIR PITH SHALL BE FREE OF STONES, STUMPS, ROOTS OR OTHER SIMILAR OBJECTS LARGER THAN 5 MILLIMETERS. IT SHALL CONFORM TO THE FOLLOWING REQUIREMENTS:
- BE AGED FOR A MINIMUM OF SIX MONTHS.
 - BE RINSED AND WASHED DURING PRODUCTION WITH NON-SALINE WATER.
 - BE SCREENED TO REMOVE COARSE FIBERS DURING PRODUCTIONS.
 - BE DECOMPRESSED AND REHYDRATED PRIOR TO BLENDING.
 - ELECTRICAL CONDUCTIVITY LESS THAN 2.0 MMHOS/CM.
 - IT SHALL HAVE A MOISTURE CONTENT LESS THAN 20%.

38. THE FILTER SAND SHALL CONSIST OF CLEAN, WASHED SILICA SAND AND SHALL MEET THE FOLLOWING REQUIREMENTS:

FILTER SAND SPECIFICATION	
U.S. SIEVE NUMBER	PERCENT PASSING
4	100
10	95-100
18	80-100
35	20-70
60	5-25
100	0-5
200	0-2

- 38.1. THE CONTRACTOR SHALL PROVIDE SAMPLING DATA OF IMPORTED SAND FILL TO CONFIRM MATERIAL MEETS DEQ CLEAN FILL CRITERIA.

39. GAC SHALL BE CALGON F400 OR AN APPROVED EQUAL. IT SHALL BE FREE OF STONES, STUMPS, ROOTS OR OTHER SIMILAR OBJECTS LARGER THAN 5 MILLIMETERS. IT SHALL CONFORM TO THE FOLLOWING REQUIREMENTS:

PARAMETER	REQUIREMENT
PASSING NO. 12 SIEVE	95-100
PASSING NO. 40 SIEVE	0-4
IODINE NUMBER	>1000 MG/G
EFFECTIVE SIZE	0.55 - 0.75 MM
UNIFORMITY COEFFICIENT [D60/D10]	<2.0
APPARENT DENSITY	0.5 - 0.6 G/CM ³

40. THREE INCHES OF MULCH SHALL BE PLACED ABOVE THE ESM TO SUPPORT PLANT GROWTH.

41. CONSTRUCTION OF BIOINFILTRATION FACILITY:

- 41.1. PROTECT THE SOIL: THE ESM SHALL BE PROTECTED FROM ALL SOURCES OF CONTAMINATION, INCLUDING WEEDS, WHILE AT THE SUPPLIER, IN CONVEYANCE, AND AT THE PROJECT SITE.
- 41.2. WET AND WINTER CONDITIONS: HAULING AND PLACEMENT OF THE ESM WILL NOT BE ALLOWED WHEN THE WEATHER IS TOO WET OR THE GROUND IS FROZEN OR SATURATED AS DETERMINED BY THE ENGINEER.
- 41.3. PLACEMENT OF THE ESM: PLACE THE MATERIAL IN LOOSE LIFTS, NOT TO EXCEED 8 INCHES EACH AND EACH LIFT SHALL BE COMPACTED WITH A WATER-FILLED LANDSCAPE ROLLER. DO NOT OTHERWISE MECHANICALLY COMPACT THE MATERIAL.
- 41.4. TIMING OF PLANT INSTALLATION: WEATHER PERMITTING, INSTALL PLANTS AS SOON AS POSSIBLE AFTER PLACING AND GRADING THE ESM IN ORDER TO MINIMIZE EROSION AND FURTHER OVER-COMPACTION.
- 41.5. INSTALL IRRIGATION FOR NEWLY PLANTED PLANTS TO IMPROVE SURVIVAL RATE. THE CONTRACTOR SHALL WARRANTY THE PLANTS FOR 1-YEAR.
- 41.6. PROTECTION OF INSTALLED ESM: IN ALL CASES, PROTECT THE INSTALLED MATERIAL FROM FOOT OR EQUIPMENT TRAFFIC. INSTALL TEMPORARY FENCING AS NEEDED TO KEEP WORKERS, PEDESTRIANS, AND EQUIPMENT OUT OF THE AREA.
- 41.7. UNDER NO CIRCUMSTANCES SHOULD MATERIALS AND EQUIPMENT BE STORED INSIDE THE BIOINFILTRATION BASIN.
42. THE FOREBAY SHALL BE LINED WITH A 40-MIL LINEAR LOW-DENSITY POLYETHYLENE (LLDPE) LINER, OR AN APPROVED EQUAL. THE LINER SHALL BE KEYED INTO THE TOP OF THE SLOPE USING AN ANCHOR TRENCH AS SHOWN ON THESE PLANS AND INCLUDE PIPE BOOTHS, INSTALLED PER MANUFACTURER RECOMMENDATIONS.
- 42.1. A MINIMUM OF 6 INCHES OF DRAIN ROCK SHALL BE PLACED OVER THE LINER.
- 42.2. THE CONTRACTOR SHALL REMOVE ALL COBBLES AND ROCKS FROM THE SUBSURFACE SOILS BELOW THE LINERS TO A MINIMUM DEPTH OF SIX INCHES.

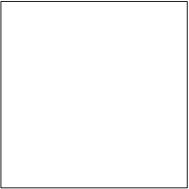
43. CONTRACTOR SHALL FURNISH AND INSTALL A STAFF GAUGE IN THE BIOINFILTRATION BASIN TO MEASURE SEDIMENT ACCUMULATION, WITH '0' SET AT FACILITY BOTTOM ELEVATION AS NOTED ON THESE PLANS.

44. CONTRACTOR SHALL INSTALL LEVEL TRANSDUCER AT BIOINFILTRATION BASIN OVERFLOW ELEVATION AND CONNECT TO THE PUMP CONTROL PANEL/DATA LOGGER.

ECOBLOCKS

45. THE CONTRACTOR SHALL FURNISH AND INSTALL ECO-BLOCKS AROUND THE PUMP STATION, FOREBAY, AND BIOINFILTRATION BASIN. THE OUTSIDE EDGES OF ECOBLOCKS SHALL BE PAINTED TRAFFIC YELLOW WITH 2-INCH REFLECTIVE STRIPS ON THE TOP OUTSIDE EDGE. KINDER MORGAN MUST APPROVE ECOBLOCK SPACING.

BDS STAMP



MAUL FOSTER ALONG
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PORTLAND, OR 97232
PHONE: 971.544.2139
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KINDER MORGAN



OWNER-INITIATED BASIN M
STORMWATER TREATMENT
KINDER MORGAN BULK TERMINALS INC.
PORTLAND, OREGON

NO.	DATE	DESCRIPTION
A	10/30/2020	6/26 PM AS SET
B	10/11/2020	1000 PM AS SET
C	2/20/2021	PERMIT PLAN SET

PROJECT: 1017.01.10
DESIGNED BY: HARMON
DRAWN BY: VARGEN
CHECKED BY: A. BANASE
SCALE:

SHEET TITLE
CONSTRUCTION
NOTES AND
SPECIFICATIONS

SHEET
C1.0

PERMIT DOCUMENT

ABBREVIATIONS

AC	ACRE, ASPHALT CONCRETE PAVEMENT	LB	POUND(S)
ACOE	ARMY CORPS OF ENGINEERS	LF	LINEAR FEET
AD	AREA DRAIN	LONG.	LONGITUDINAL
AGG	AGGREGATE	LT	LEFT
AIR	AIR RELIEF	MAX	MAXIMUM
AMSL	ABOVE MEAN SEA LEVEL	MFA	MAUL FOSTER & ALONGI, INC.
AP	ANGLE POINT	MFR	MANUFACTURER
APN	APPARENT PARCEL NUMBER	MH	MANHOLE
APPD	APPROVED	MIC	MONUMENT (IN CASE)
APPROX. ±	APPROXIMATE (E, L, Y)	MIN	MINIMUM, MINUTE
ASPH	ASPHALT	MISC	MISCELLANEOUS
ASSY	ASSEMBLY	MJ	MECHANICAL JOINT
BCR	BEGIN CURB RETURN	MON	MONUMENT (SURFACE)
BF	BUTTERFLY	MW	MONITORING WELL
BGS	BELOW GROUND SURFACE	N	NORTH
BLDG	BUILDING	N/A	NOT APPLICABLE
BLVD	BOULEVARD	NAT G. NG	NATURAL GAS
BM	BENCHMARK	NE	NORTHEAST
BMP	BEST MANAGEMENT PRACTICE	NO.	NUMBER
BO	BLOW-OFF	NTS	NOT TO SCALE
BOC	BACK OF CURB	NW	NORTHWEST
BOT, BTM	BOTTOM	OC	ON CENTER
B.O.W.	BOTTOM OF WALL	OD	OUTSIDE DIAMETER
BVC	BEGIN VERTICAL CURVE	OHP	OVERHEAD POWER
CB	CATCH BASIN	OT	OWNERSHIP TIE
CDF	CONTROLLED DENSITY FILL	P	PIPE
CEM	CEMENT	P TRAN	PAD MOUNTED TRANSFORMER
CF	CUBIC FEET	PC	POINT OF CURVATURE
CFS	CUBIC FEET PER SECOND	PCC	PORTLAND CEMENT CONCRETE
CIP	CAST IRON PIPE	PEN	PENETRATION
CIR	CIRCLE	PERF	PERFORATE (E, ED, ES, ION)
CK	CHECK	P.L., PL	PROPERTY LINE, PLACE
CL, L	CENTERLINE	POW V	POWER VOLT
CMP	CORRUGATED METAL PIPE	PP	PROPOSED
CO	CLEANOUT	PROP.	PROPOSED
COMP	COMPACTION	PS	PUMP STATION
CONC	CONCRETE	PSF	POUNDS PER SQUARE FOOT
CPE	CORRUGATED POLYETHYLENE	PSI	POUNDS PER SQUARE INCH
CPL	COUPLING	PT	POINT OF TANGENT
CT	COURT	PV	PLUG VALVE
CTR	CENTER	PVI	POINT OF VERTICAL INTERSECTION
CULV	CULVERT	PVC	POLYVINYL CHLORIDE
CY	CUBIC YARD	PVMT	PAVEMENT
D	DEPTH	R, RAD	RADIUS
DEG	DEGREE(S)	RC	REINFORCED CONCRETE
DI	DUCTILE IRON	RCP	REINFORCED CONCRETE PIPE
DIA	DIAMETER	RD	ROAD DRAIN
DIM	DIMENSION(S)	RED	REDUCER
DIP, D.I.P.	DUCTILE IRON PIPE	REQD	REQUIRED
DOT	DEPARTMENT OF TRANSPORTATION	REOT	REVISION
DR	DETAIL	REV	REVISION
DTL	DETAIL	ROW	RIGHT OF WAY
DWG(S)	DRAWING(S)	RT	RIGHT
E	EAST	S	SOUTH, SLOPE
EA	EACH	SB	SOIL BORING
ECR	END CURB RETURN	SCH	SCHEDULE
EG	EXISTING GROUND	SD	STORM DRAIN
EL, ELEV	ELEVATION	SDR	STANDARD DIMENSION RATIO
ELEC	ELECTRIC(AL)	SE	SOUTHEAST
ELB, ELL	ELBOW	SF	SQUARE FEET
ENGR	ENGINEER	SH	SHEET
ENTR	ENTRANCE	SL	SLOPE
EP, EOP	EDGE OF PAVEMENT	SPEC	SPECIFICATIONS
EQ	EQUAL(LY)	SQ	SQUARE
ESC	EROSION CONTROL	SQ IN	SQUARE INCHES
ESMT	EASEMENT	SURF	SURFACE
EST	ESTIMATE(D)	ST	STREET
EVC	END VERTICAL CURVE	STA	STATION
EXC	EXCAVATE	STD	STANDARD
EX, EXTG.	EXISTING	STL	STEEL
EW	EACH WAY	STRM	STORM
FF	FINISH FLOOR	STRUCT	STRUCTURE(E, AL)
FG	FINISH GRADE	SSWR	SANITARY SEWER
FI	FIRE HYDRANT	SW, SW	SIDEWALK, SOUTHWEST
FL	FLOW LINE	TB	THRUST BLOCK
FLG	FLANGE	TBM	TEMPORARY BENCHMARK
FM	FORCE MAIN	TC	TOP OF CURB
FT	FEET, FOOT	TEL, TELE	TELEPHONE
GAL	GALLON(S)	TEMP	TEMPORARY
GM	GAS METER	TP	TOP OF PAVEMENT, TEL POLE
GND	GROUND	TURN	TURNING POINT
GP	GUARD POST	TW	TOP OF WALL
GPM	GALLONS PER MINUTE	TYP	TYPICAL
GRD	GRADE	UG	UNDERGROUND
GV	GAS VALVE, GATE VALVE	UGE	UNDERGROUND ELECTRIC
HDP	HIGH DENSITY POLYETHYLENE	UTL	UTILITY
HGT, HT	HEIGHT	VC	VERTICAL CURVE
HP	HORSEPOWER	VERT	VERTICAL
HORIZ	HORIZONTAL	VOL	VOLUME
HYD	HYDRANT	W	WIDTH, WEST
ID	INSIDE DIAMETER	W/	WITH
IE	INVERT ELEVATION	WATER	WATER
IN	INCHES(S)	WATER	WATER METER
INTX	INTERSECTION	W/O	WITHOUT
INV	INVERT	WSE	WATER SURFACE ELEVATION
IP	IRON PIPE	WV	GATE/GENERAL WATER VALVE
L	LENGTH	YD	YARD
LAT	LATERAL	YR	YEAR

GENERAL LEGEND

GAS/POWER/TELEPHONE SYMBOLS

SYMBOL	EXIST.	PROP.	DESCRIPTION
			GAS METER
			GAS VALVE
			PAD MOUNTED TRANSFORMER
			POWER VAULT
			TRANSMISSION TOWER
			UTILITY POLE
			UTILITY POLE ANCHOR
			TELEPHONE RISER
			TELEPHONE VAULT
			LIGHT POLE

SURVEY SYMBOLS

SYMBOL	THEOR./ EXIST.	FOUND/ PROP.	DESCRIPTION
			ANGLE POINT
			BENCH MARK
			BLOCK CORNER
			IRON PIPE
			MONUMENT
			OWNERSHIP TIE
			SECTION DATA
			SECTION CENTER
			SECTION CORNER
			QUARTER CORNER
			SIXTEENTH CORNER
			CLOSING CORNER
			MEANDER CORNER
			WITNESS CORNER
			SPOT ELEVATION

	EXISTING GRADE MAJOR CONTOUR
	EXISTING GRADE MINOR CONTOUR
	EXISTING STORM DRAIN PIPE
	EXISTING WATER PIPE
	EXISTING SANITARY SEWER PIPE
	EXISTING AC PAVEMENT
	EXISTING CONCRETE SURFACING
	EXISTING GRAVEL SURFACING
	EXISTING BUILDING
	EXISTING FENCE LINE
	EXISTING ROAD CENTERLINE
	EXISTING RIGHT-OF-WAY
	EXISTING PROPERTY LINE

WATER SYMBOLS

SYMBOL	EXIST.	PROP.	DESCRIPTION
			CAP/PLUG
			COUPLING
			GUARD POST / BOLLARD
			REDUCER
			THRUST BLOCK
			WATER METER
			DOUBLE CHECK VALVE ASSEMBLY
			FIRE HYDRANT
			AIR RELIEF
			BLOW-OFF VALVE
			CHECK VALVE
			GATE VALVE
			BENDS:
			90 DEGREE BEND
			45 DEGREE BEND
			22.5 DEGREE BEND
			11.25 DEGREE BEND
			VERTICAL BEND
			TEE
			CROSS

SANITARY/STORM SEWER SYMBOLS

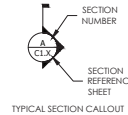
SYMBOL	EXIST.	PROP.	DESCRIPTION
			SAN. SEWER CLEAN OUT
			SAN. SEWER MANHOLE
			STORM DRAIN CATCH BASIN
			STORM DRAIN CULVERT
			STORM DRAIN MANHOLE
			DRY WELL
			AREA DRAIN

	PROPOSED GRADE MAJOR CONTOUR (5.0' INTERVAL)
	PROPOSED GRADE MINOR CONTOUR (1.0' INTERVAL)
	PROPOSED STORM DRAIN PIPE
	PROPOSED WATER PIPE
	PROPOSED SANITARY SEWER PIPE
	PROPOSED AC PAVEMENT
	PROPOSED CONCRETE SURFACING
	PROPOSED GRAVEL SURFACING
	PROPOSED BUILDING
	PROPOSED FENCE LINE
	PROPOSED ROAD CENTERLINE
	PROPOSED RIGHT-OF-WAY
	PROPOSED PROPERTY LINE

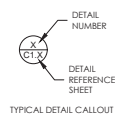
BDS STAMP

MISCELLANEOUS SYMBOLS

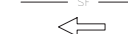
SYMBOL	EXIST.	PROP.	DESCRIPTION
			MONITORING WELL
			INLET PROTECTION PILLOW
			CONSTRUCTION ENTRANCE
			PROPOSED SPOT SHOT



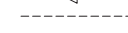
TYPICAL SECTION CALLOUT



TYPICAL DETAIL CALLOUT



PROPOSED SEDIMENT FENCE



PROPOSED FLOW DIRECTION



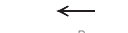
PROPOSED GRADE BREAK



PROPOSED DITCH FLOW LINE



PROPOSED COMPOST SOCK



PROPOSED PAINT STRIPE



PROPOSED TRUNCATED DOMES



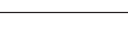
EXISTING FLOW DIRECTION



EXISTING OVERHEAD POWER



EXISTING UNDERGROUND POWER



EXISTING UNDERGROUND TELEPHONE



EXISTING UNDERGROUND GAS

MAUL FOSTER & ALONGI
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KINDER MORGAN



OWNER-INITIATED BASIN M
STORMWATER TREATMENT
KINDER MORGAN BULK TERMINALS, INC.
PORTLAND, OREGON

NO.	DATE	DESCRIPTION
1	2/24/2021	PERMIT PLAN SET
2	7/21/2022	100% PLAN SET
3	1/10/2022	40% PLAN SET

PROJECT: 1017.01.10
DESIGNED: S. HARMON
DRAWN: D. VERCIN
CHECKED: A. BANASK
SCALE

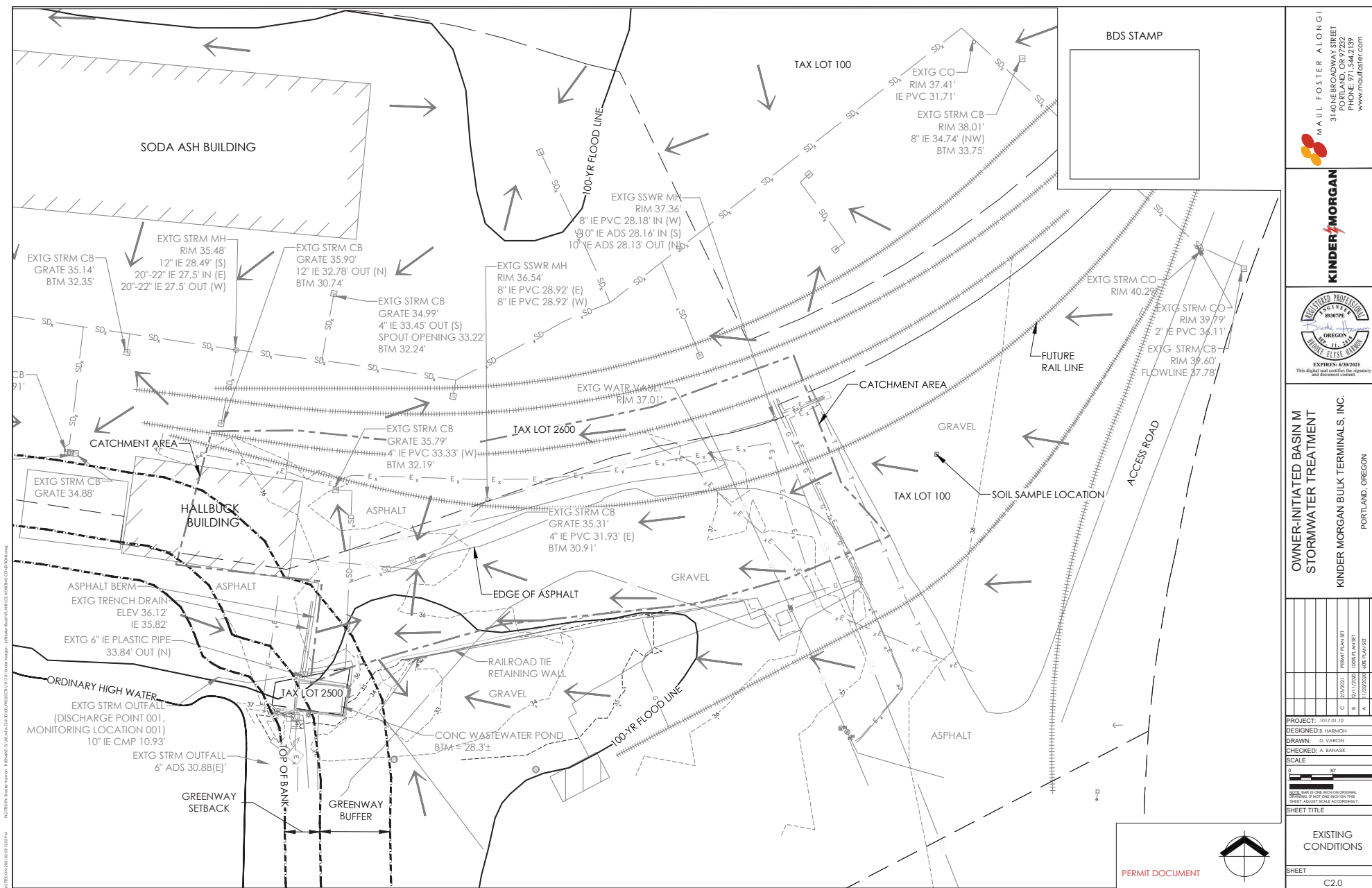
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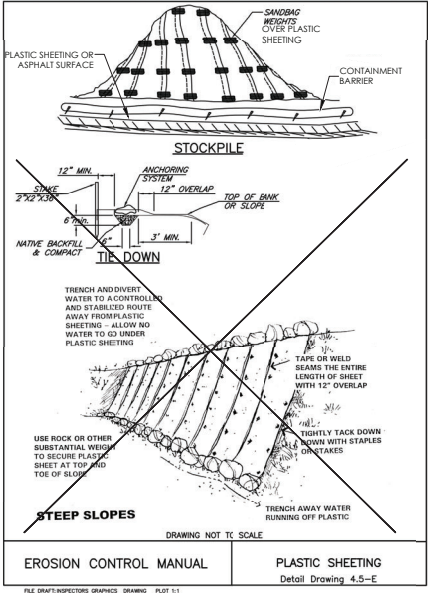
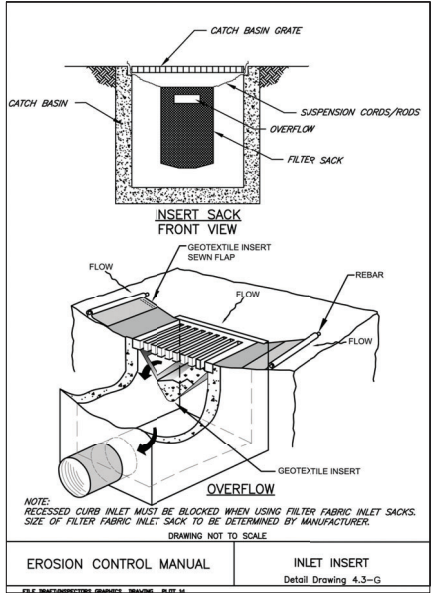
MASTER LEGEND

SHEET

C 1.1

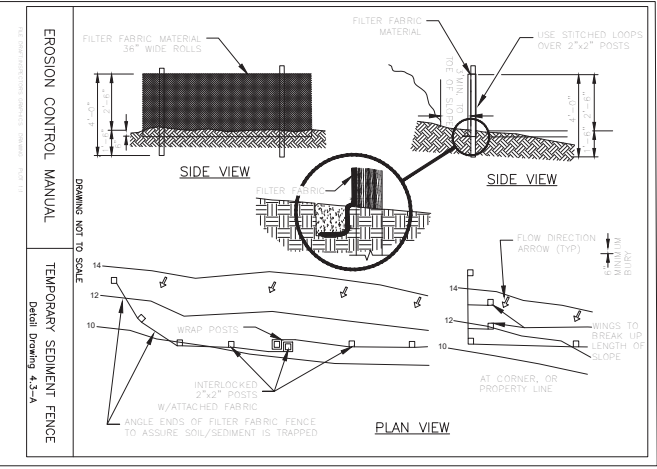
PERMIT DOCUMENT



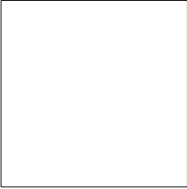


NOTE: SOURCE CONTROL MANUAL/CONTAMINATED MEDIA MANAGEMENT PLAN REQUIREMENTS FOR STOCKPILE PROTECTION INCLUDE:

1. SOIL STOCKPILES SHALL BE LOCATED ON EITHER PAVEMENT OR PLASTIC SHEETING.
2. STOCKPILES SHALL BE COVERED WITH PLASTIC FILM OR SHEETING TO PREVENT CONTACT WITH PRECIPITATION AT THE END OF EACH WORKDAY.
3. STOCKPILES SHALL HAVE A CONTAINMENT BARRIER AROUND THE PERIMETER TO PREVENT STORMWATER RUN-ON AND MATERIAL RUNOFF. BARRIERS MAY CONSIST OF SAND BAG BARRIER, BERM, OR EQUAL ALTERNATIVE.
4. EXCAVATED SOIL SHALL BE SAMPLED AND DESIGNATED FOR OFF-SITE DISPOSAL IN ACCORDANCE WITH ALL APPLICABLE REGULATIONS.



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KINDER MORGAN

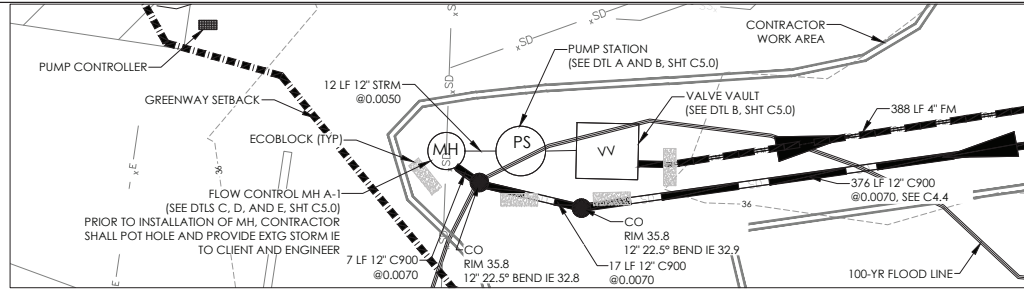
REGISTERED PROFESSIONAL ENGINEER
 NO. 10776
 STATE OF OREGON
 EXPIRES: 6/30/2021
 This digital seal verifies the engineer and document content.

OWNER-INITIATED BASIN M
 STORMWATER TREATMENT
 KINDER MORGAN BULK TERMINALS, INC.
 PORTLAND, OREGON

NO.	DATE	DESCRIPTION
1	11/20/2020	6/5/PLAN SET
2	11/20/2020	10/25/PLAN SET
3	11/20/2020	10/25/PLAN SET

PROJECT: 1017.01.10
 DESIGNED: S. HARMON
 DRAWN: D. VASCHIN
 CHECKED: A. BANAGIK
 SCALE:
 DRAWING NOT TO SCALE
 SHEET TITLE
 EROSION CONTROL DETAILS
 SHEET
 C3.1

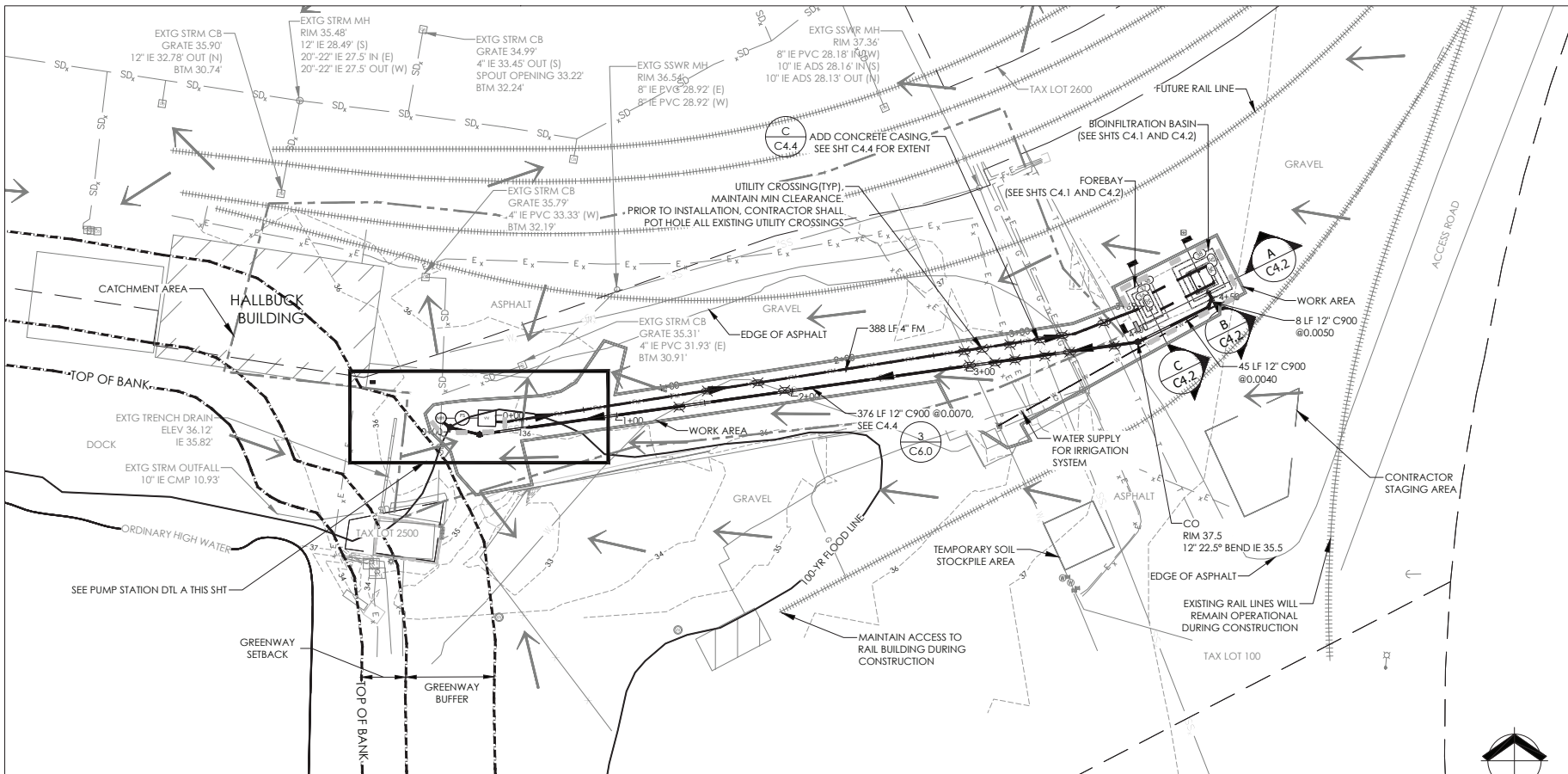
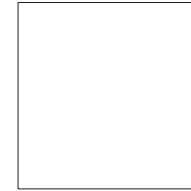
PERMIT DOCUMENT



BASIN M PUMP STATION
SCALE: 1" = 10'

EARTHWORK QUANTITIES	
CUT OUTSIDE 100-YR FLOOD PLAIN	183 CY
FILL OUTSIDE 100-YR FLOOD PLAIN (PS, MH, VV, TRENCH, OVER- EXCAVATION UNDER BASIN)	138 CY
CUT INSIDE 100-YR FLOOD PLAIN	30 CY
FILL INSIDE 100-YR FLOOD PLAIN (PS, VV, TRENCH)	30 CY
WORK AREA WITHIN 100-YR PLAIN	2,000 SF
WORK AREA	14,700 SF (0.33 AC)
STOCKPILE AREA	2,250 SF
STAGING AREA	880 SF
BIOFILTRATION BASIN SURFACE AREA	650 SF

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KINDER MORGAN BULK TERMINALS, INC.
PORTLAND, OREGON

NO.	DATE	DESCRIPTION
1	11/20/2022	100% PLAN SET
2	11/20/2022	100% PLAN SET
3	11/20/2022	100% PLAN SET

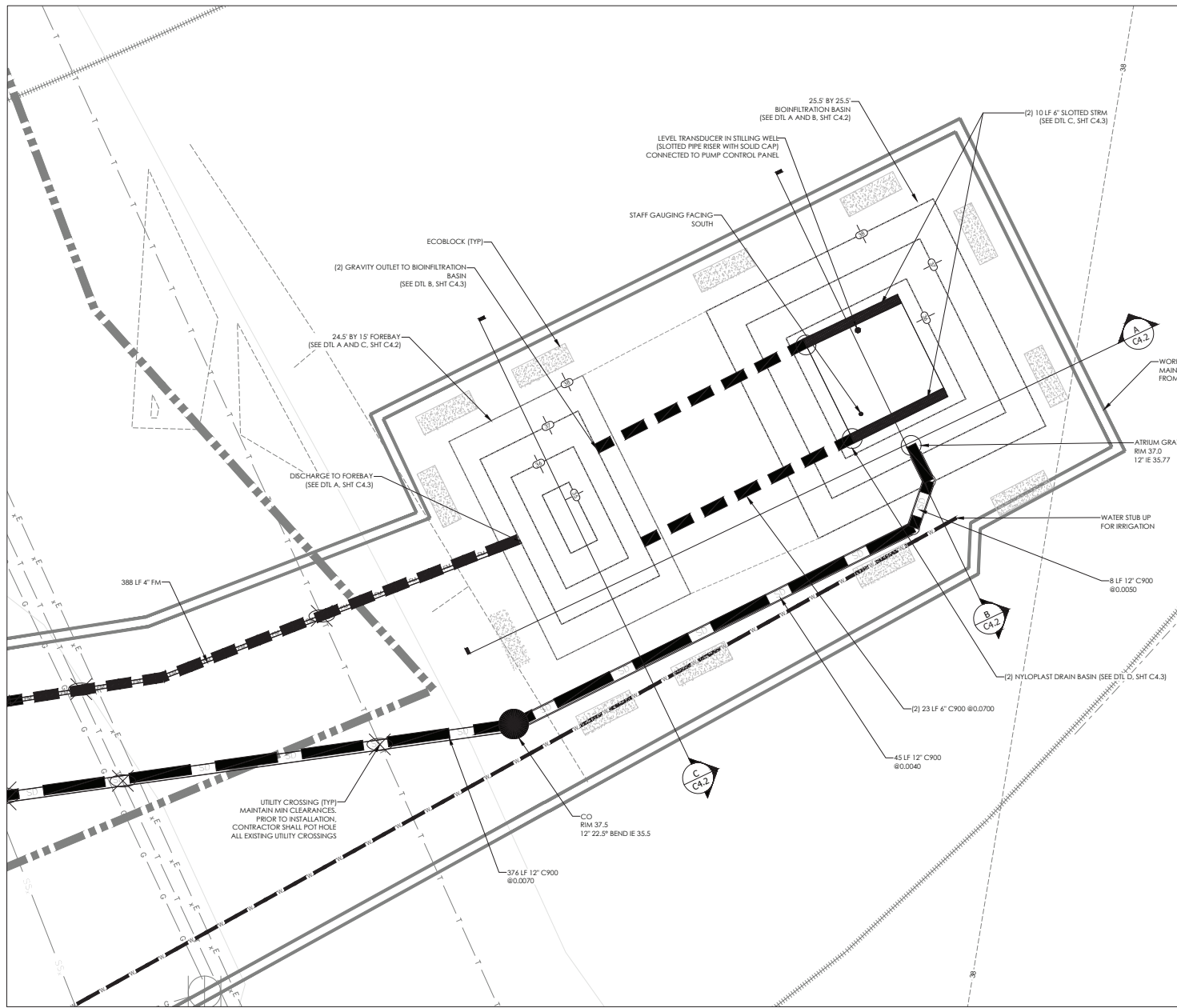
PROJECT: 1017.01.10
DESIGNED: D. HARMON
DRAWN: D. VARCIN
CHECKED: A. BANASKI
SCALE: 1" = 30'

SHEET TITLE

SITE PLAN

SHEET
C4.0

PROJECT: 1017.01.10
DRAWN: D. VARCHIN
CHECKED: A. BANASIK
SCALE: 1" = 10'
DATE: 11/20/2020
SHEET: C4.1



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KINDER MORGAN

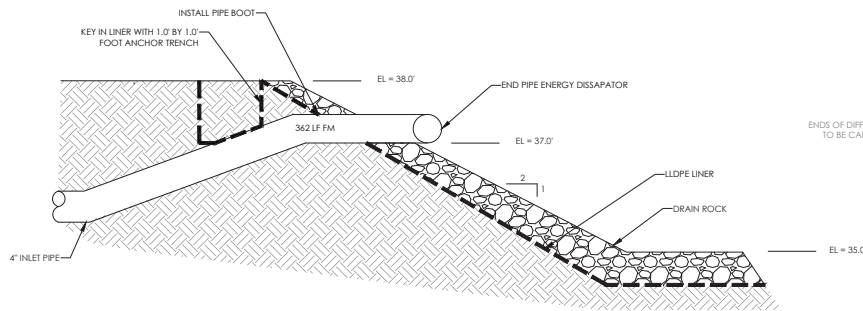
REGISTERED PROFESSIONAL ENGINEER
NO. 98978
STATE OF OREGON
EXPIRES: 6/30/2021
This stamp certifies the engineer and documents content.

OWNER-INITIATED BASIN M
STORMWATER TREATMENT
KINDER MORGAN BULK TERMINALS, INC.
PORTLAND, OREGON

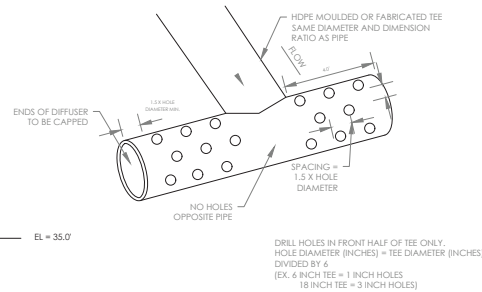
NO.	DATE	DESCRIPTION
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3	11/20/2020	ASB PLAN SET
4	11/20/2020	ASB PLAN SET
5	11/20/2020	ASB PLAN SET
6	11/20/2020	ASB PLAN SET
7	11/20/2020	ASB PLAN SET
8	11/20/2020	ASB PLAN SET
9	11/20/2020	ASB PLAN SET
10	11/20/2020	ASB PLAN SET

PROJECT: 1017.01.10
DESIGNED: S. HARMON
DRAWN: D. VARCHIN
CHECKED: A. BANASIK
SCALE: 1" = 10'
DATE: 11/20/2020
SHEET: C4.1

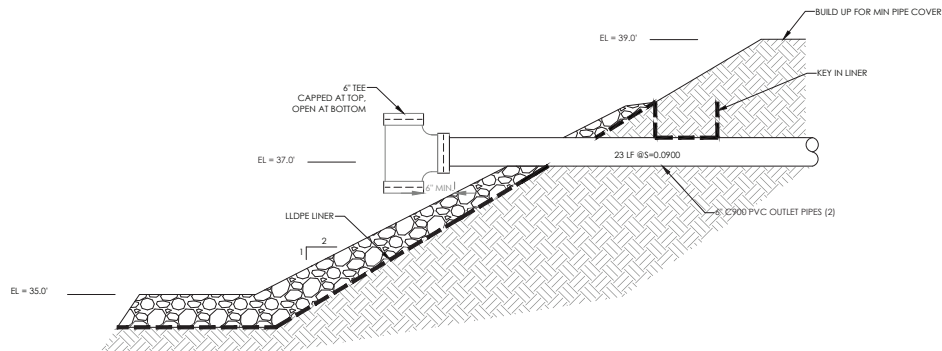
SHEET TITLE
TREATMENT SYSTEM
SHEET
C4.1



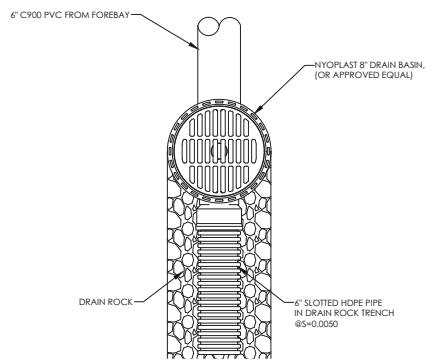
A FOREBAY INLET ENERGY DISSIPATOR DETAIL
SCALE: NTS



D FLOW SPREADER DETAIL
SCALE: NTS

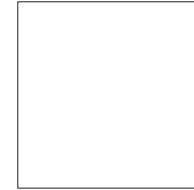


B FOREBAY OUTLET DETAIL
SCALE: NTS



C FLOW SPREADER INLET PLAN VIEW
SCALE: NTS

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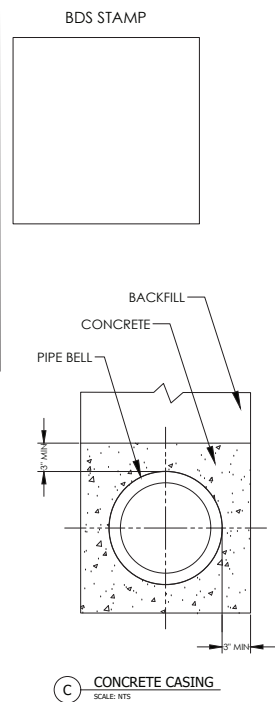
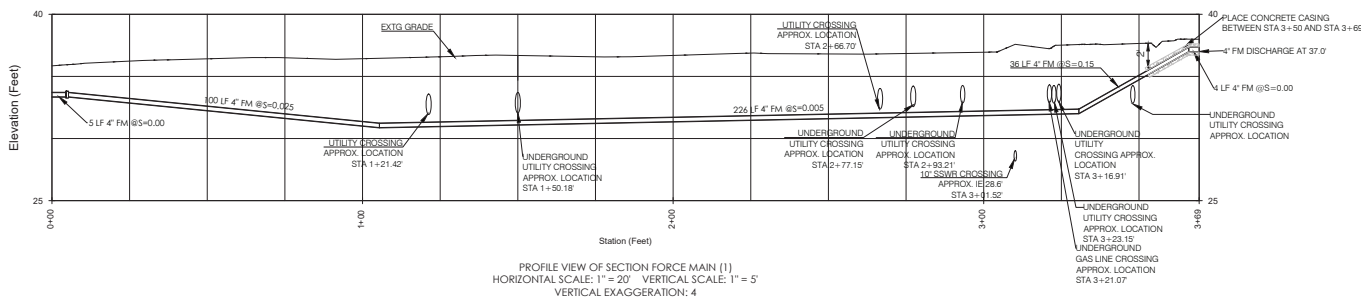
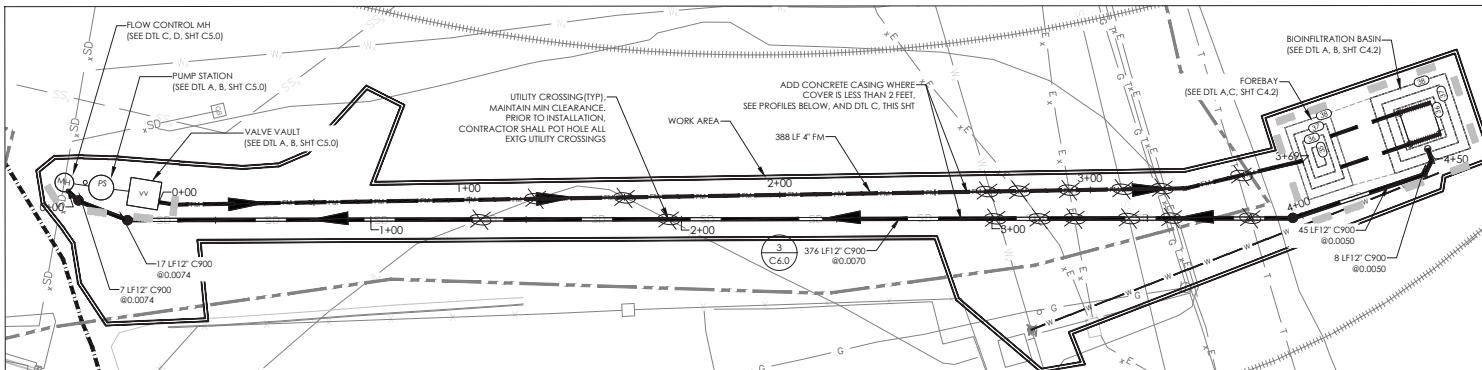


OWNER-INITIATED BASIN M
STORMWATER TREATMENT
KINDER MORGAN BULK TERMINALS, INC.
PORTLAND, OREGON

PROJECT	DATE	DESCRIPTION
C	2/20/2021	PRELIMINARY SET
B	12/11/2020	LOOSE PLAN SET
A	11/20/2020	60% PLAN SET

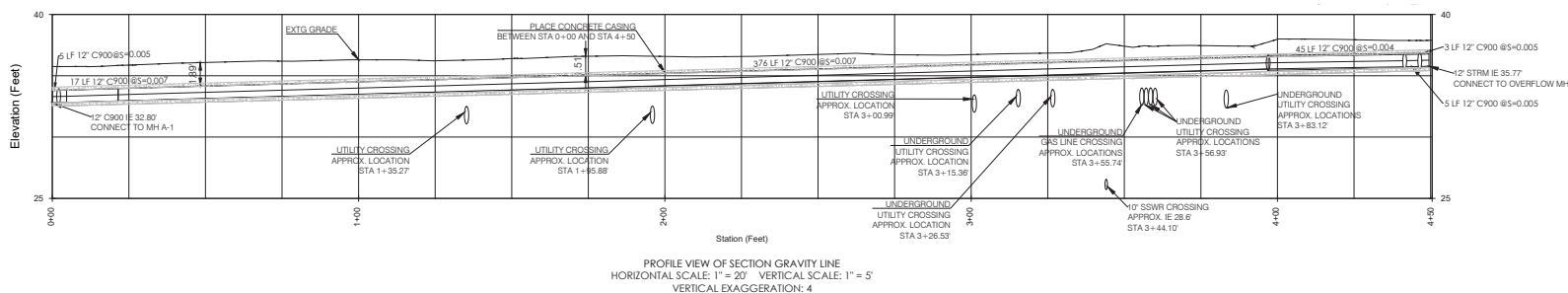
PROJECT:	1017.01.10
DESIGNED:	D. HARMON
DRAWN:	D. VARCHI
CHECKED:	A. BARNER
SCALE:	SCALE AS NOTED
SHEET TITLE:	TREATMENT SYSTEM DETAILS II
SHEET:	C4.3

PERMIT DOCUMENT



NOTE:
EXTENT OF CONCRETE CASING IS SUBJECT TO
CHANGE FOLLOWING POTHOLING RESULTS.
CONCRETE CASING IS NOT REQUIRED WHEN
PIPE IS AT LEAST 2-FEET BELOW GRADE.

A FORCE MAIN PROFILE
SCALE: AS NOTED



B STORM LINE PROFILE
SCALE: AS NOTED

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KINDER MORGAN

REGISTERED PROFESSIONAL
ENGINEER
STATE OF OREGON
EXPIRES: 6/30/2021
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and document content.

OWBER-INITIATED BASIN M
STORMWATER TREATMENT
KINDER MORGAN BULK TERMINALS, INC.
PORTLAND, OREGON

NO.	DATE	DESCRIPTION
1	10/17/10	PROJECT
2	10/17/10	DESIGNED
3	10/17/10	DRAWN
4	10/17/10	CHECKED
5	10/17/10	SCALE

PROJECT: 10171010
DESIGNED: S. HARMON
DRAWN: D. VARCHIN
CHECKED: A. BANASIK
SCALE: 1\"/>

SHEET TITLE

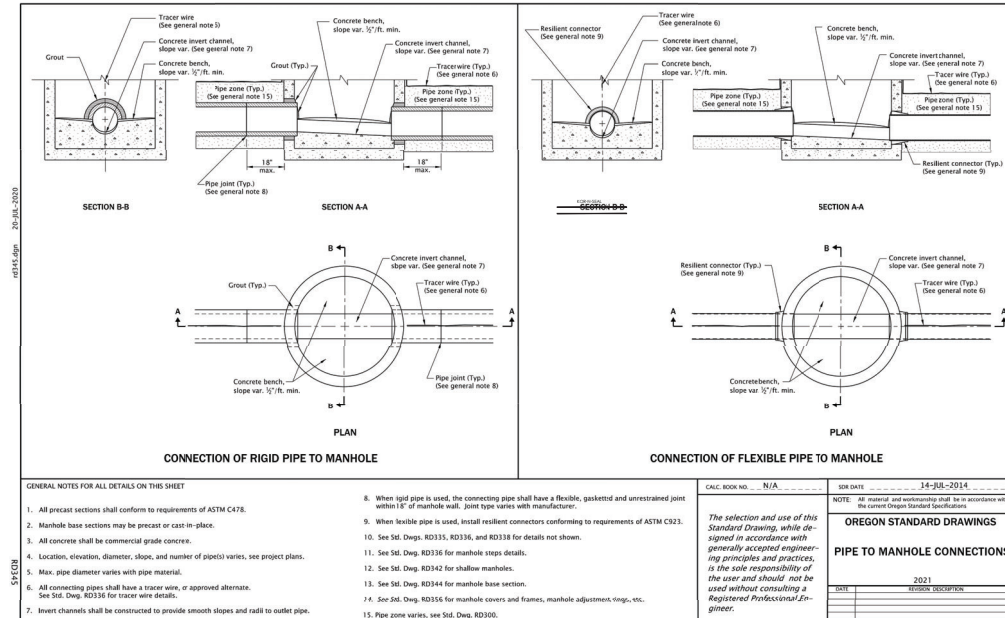
FORCE MAIN AND
STORM PROFILES

SHEET

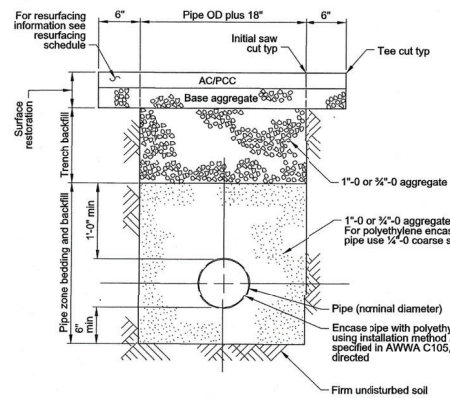
C4.3

PERMIT DOCUMENT





1 PIPE TO MANHOLE CONNECTION DETAIL
SCALE: NTS



Notes:

- For compaction requirements see project general notes and specifications.
- For pipe diameter above 18", install as specified.

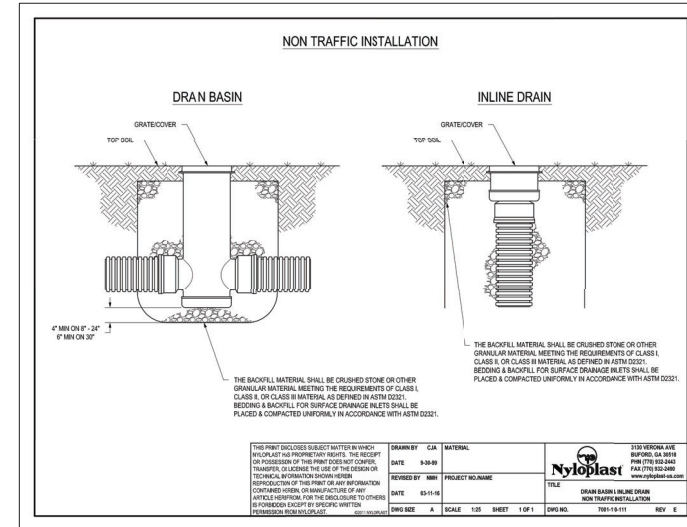
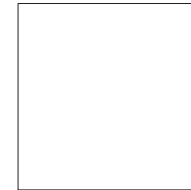
The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user.

PORTLAND WATER BUREAU
CITY OF PORTLAND, OREGON
Standard Drawing No. P-815

Effective Date: April 9 2009 **Standard Drawing No.:** P-815
Calc. Book No.: PWB 1
Baseline Report Date: April 9 2009

3 TRENCH SECTION
SCALE: NTS

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2 NYLOPLAST DRAIN BASIN DETAIL
SCALE: NTS

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PORTLAND, OREGON
EXPIRES: 6/30/2021
The digital seal verifies the engineer and document content.

OWNER-INITIATED BASIN M STORMWATER TREATMENT
KINDER MORGAN BULK TERMINALS, INC.
PORTLAND, OREGON

REV	DATE	DESCRIPTION
C	2/2/2020	PRELIM PLAN SET
B	2/21/2020	100% PLAN SET
A	1/25/2020	60% PLAN SET

PROJECT: 1017.01.10
DESIGNED BY: D. HARMON
DRAWN: D. VASCIN
CHECKED: A. BANASIK
SCALE:
SCALE AS NOTED
SHEET TITLE:
STANDARD DETAILS:
SHEET: C6.0

PERMIT DOCUMENT

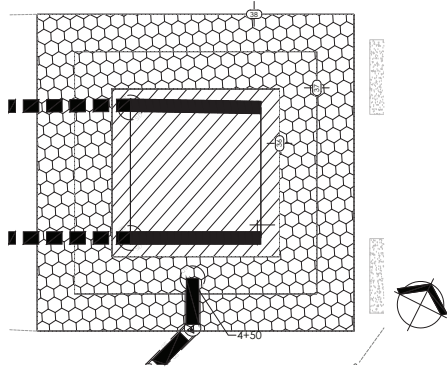
PLANT MATERIAL LEGEND

UPPER VEGETATION IN BASIN

SYM	QTY	COMMON NAME	BOTANICAL NAME	SIZE	SPACING	COMMENTS
	45	TUFTED HAIRGRASS	DESCHAMPSIA CESPIOSA	1 GAL	2'-0", O.C., TRI	GROUPS OF 3 & 9
	45	BLUE OAT GRASS	HELICTOTRICHON SEMPERVIRENS	1 GAL	2'-0", O.C., TRI	GROUPS OF 3 & 9
	45	BIRCHLEAF SPIRAEA	SPIRAEA BETULIFOLIA	1 GAL	2'-0", O.C., TRI	GROUPS OF 3 & 9

LOWER VEGETATION IN BASIN

SYM	QTY	COMMON NAME	BOTANICAL NAME	SIZE	SPACING	COMMENTS
	16	ORANGE NEW ZEALAND SEDGE	CAREX TESTACEA	1 GAL	2'-0", O.C., TRI	GROUPS OF 3 & 5
	18	SPREADING RUSH	JUNCUS PATENS	1 GAL	2'-0", O.C., TRI	GROUPS OF 5 & 8
	18	SLOUGH SEDGE	CAREX OBNUPTA	1 GAL	2'-0", O.C., TRI	GROUPS OF 5 & 8



A VEGETATED BIOFILTRATION BASIN PLANTING PLAN
1" = 5'

GENERAL LANDSCAPE NOTES

- PRIOR TO CONSTRUCTION, THE FOLLOWING SHALL BE SUBMITTED TO THE LANDSCAPE ARCHITECT:
 - NURSERY NAME, ADDRESS, PHONE NUMBER AND CONTACT PERSON ALONG WITH PROOF OF AVAILABILITY OF PROPOSED PLANT MATERIAL.
 - PLANTING SCHEDULE INDICATING ANTICIPATED INSTALLATION DATES.
 - IRRIGATION PLAN (SEE IRRIGATION SUBMITTALS ON THIS PAGE).
- CONTRACTOR TO VERIFY WITH OWNER AND UTILITY COMPANIES THE LOCATIONS OF ALL UTILITIES PRIOR TO CONSTRUCTION. TO DETERMINE IN THE FIELD THE ACTUAL LOCATIONS AND ELEVATIONS OF ALL EXISTING UTILITIES, WHETHER SHOWN ON THE PLANS OR NOT, THE CONTRACTOR SHALL CALL UTILITY PROTECTION SERVICE 72 HOURS PRIOR TO CONSTRUCTION.
- EXAMINE FINISH SURFACE, GRADES, TOPSOIL QUALITY AND DEPTH. DO NOT START ANY WORK UNTIL UNSATISFACTORY CONDITIONS HAVE BEEN CORRECTED. VERIFY LIMITS OF WORK BEFORE STARTING.
- QUANTITIES SHOWN ARE INTENDED TO ASSIST CONTRACTOR IN EVALUATING THEIR OWN TAKE OFFS AND ARE NOT GUARANTEED AS ACCURATE REPRESENTATIONS OF REQUIRED MATERIALS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR HIS BID QUANTITIES AS REQUIRED BY THE PLANS AND SPECIFICATIONS.
- CONTRACTOR SHALL DESIGN AND INSTALL AN AUTOMATIC UNDERGROUND IRRIGATION SYSTEM SUFFICIENT TO WATER ALL OF THE PROPOSED LANDSCAPE. SEE IRRIGATION NOTES. ALL IRRIGATION SLEEVING SHALL BE COORDINATED AS REQUIRED.
- THE CONTRACTOR SHALL WARRANT ALL LIVING PLANTING MATERIALS FOR A PERIOD OF ONE YEAR AFTER DATE OF SUBSTANTIAL COMPLETION, AGAINST DEFECTS INCLUDING DEATH AND UNSATISFACTORY GROWTH.
- REMOVE AND REPLACE DEAD PLANTING MATERIALS IMMEDIATELY.
- REPLACE PLANTING MATERIALS THAT ARE MORE THAN 25 PERCENT DEAD OR IN AN UNHEALTHY CONDITION AT END OF WARRANTY PERIOD.

IRRIGATION SUBMITTALS

- CONTRACTOR SHALL SUBMIT THE FOLLOWING DATA TO THE LANDSCAPE ARCHITECT BEFORE BEGINNING WORK:
- CONTRACTOR SHALL SUBMIT ALL PRODUCTS TO BE INSTALLED IN THIS SYSTEM. PRODUCT DATA SHALL INCLUDE THE MANUFACTURER'S NAME, CATALOG NUMBERS, TECHNICAL DATA, AND MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION, OPERATION, AND MAINTENANCE.
 - CONTRACTOR SHALL SUBMIT AN IRRIGATION PLAN THAT SHOWS ALL IRRIGATION SYSTEM PIPING INCLUDING LAYOUT, LOCATION, TYPE, SIZE, CAPACITIES, AND FLOW CHARACTERISTICS OF IRRIGATION SYSTEM COMPONENTS. INCLUDE WATER METERS, BACKFLOW PREVENTERS, CONTROLLER, VALVES, PIPING, DRAIN VALVES, SPRINKLERS AND DEVICES, ACCESSORIES, AND WIRING. SHOW AREAS OF SPRINKLER SPRAY AND OVERSPRAY. SHOW WIRE SIZE AND NUMBER OF CONDUCTORS FOR EACH CONTROL CABLE.
 - CONTRACTOR SHALL TEST THE WATER PRESSURE AT POINT OF CONNECTIONS AND SUBMIT THE FINDINGS.
- FOLLOWING COMPLETION OF INSTALLATION THE CONTRACTOR SHALL SUBMIT THE FOLLOWING TO THE OWNER:
- THREE SETS OF ALL KEYS, TOOLS, OR OTHER SPECIAL DEVICES TO ADJUST, MAINTAIN, GAIN ACCESS TO, OR OTHERWISE OPERATE THE SYSTEM.
 - AN AS-BUILT DRAWING SHOWING LOCATION OF ALL IRRIGATION COMPONENTS.

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OWNER-INITIATED BASIN M
STORMWATER TREATMENT
KINDER MORGAN BULK TERMINALS, INC.
PORTLAND, OREGON

REV	DATE	DESCRIPTION
C	2/20/2021	REINAT PLANS SET
B	2/21/2020	NOISE PLANS SET
A	10/20/2008	ASB PLANS SET

PROJECT: 1017.01.10
DESIGNED: C. RELEY
DRAWN: C. RELEY
CHECKED: A. BANAGIR
SCALE
SCALE AS NOTED
SHEET TITLE
PLANTING PLAN
SHEET
L1.0

PERMIT DOCUMENT

PERMIT DOCUMENT

	C	1/24/2009	PRIME PLAN SET
	B	12/11/2008	DIST PLAN SET
	A	11/16/2008	GEN'L PLAN SET
REUSE	DATE	DESCRIPTION	

PROJECT: 107721-10
DESIGNED & DRAWN:
DRAWN: D. YARCIN
CHECKED: A. BANASIK
SCALE:

SHEET TITLE

BDS COMMENT SHEET

SHEET

OWNER-INITIATED BASIN M
STORMWATER TREATMENT

KINDER MORGAN BULK TERMINALS, INC.

PORTLAND, OREGON



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APPENDIX B

INSPECTIONS & MAINTENANCE RECORDS



Stormwater Treatment System Inspection Record
Kinder Morgan Bulk Terminals, Inc.
Portland, Oregon

Inspection Date: _____

Checklist Item	(Yes/No)	Additional Information (e.g., Location, Source, Detailed Description, Corrective Action Implemented [if applicable] and Implementation Date)
Pump Station Wet Well and Valve Vault		
Monthly. Are there any leaks, breaks, or evidence of damage in the piping, fittings and appurtenances within the wet well?		
Monthly. Are there any leaks, breaks, or evidence of damage in the piping, valves, and fittings within the valve vault?		
Dry season. Drain pump station wet well and inspect for sedimentat accumulation. If more than six inches of solids is observed in the wet well, pressure wash wet the well and manage the wash water and solids consistent with applicable disposal regulations.		
Forebay and Bioinfiltration Basn		
Monthly. Inspect any accumulation of stormwater solids and debris.		
Dry season. Inspect for sediment accumulation. If more than a foot of sediment, trash, and/or debris is observed in the forebay (over the rock layer) during the dry season inspection, sediment will be removed using a vacuum truck.		
Stormwater System Maintenance: Note stormwater treatment system maintenance activities performed this month.		
Inspected By:	Signature:	
<i>I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.</i>		

Attachment 3
Response to DEQ Comments Matrix on 60% Plan Sets

Response to Oregon DEQ Comments
Vegetated Infiltration Basin Designs; Terminal 4 Slips 1 and 3
February 10, 2021

ID No.	Section Name/Topic	OR DEQ Comment	Response
1 - General Comments	General Comments	1. The discrepancy between the nomenclature of the stormwater basins as used by the Port of Portland and Kinder Morgan is confusing and the basin terminology should be made consistent. For example, the design plans submitted for basin K1 (i.e., as designated by the Port) are labeled as being for basin M based on current usage by Kinder Morgan. This creates a potentially confusing situation since the SCM on the south side of Slip 1 is in a stormwater basin designated “M” by the Port. For convention in preparing these comments, DEQ is using the Port stormwater basin nomenclature.	The Port acknowledges the confusion on nomenclature for this stormwater basin. Please note KinderMorgan’s current 1200-Z Industrial Stormwater Permit uses the basin M label based on the previous Port labeling for stormwater basins at Terminal 4. KinderMorgan plans to update the terminology for this basin when their current permit expires and they receive a new permit.
2 - General Comments	General Comments	2. The notes on the basin plans should include prescriptive requirements for waste management, equipment decontamination and testing requirements/procedures for DEQ approval of the imported fill materials. If these details are included in contractor specifications or in the DEQ- approved interim CMMP in place for Terminal 4, the plan sets should reference those information sources accordingly.	The 100% design plan set (Sheet C6.01) will reference the relevant contractor specifications for requirements for waste management, equipment decontamination, and testing requirements/procedures, as applicable.
3 - Specific Comments – Basin M	60% Plans Sheets G10.02, G10.05, C6.03	3. DEQ assumes that Sheets G10.02 City Information and Directives, G10.05 Survey Control Plan and C6.03 Civic Details 3 for basin M (Port) will be included as complete figures in the 100% design plans.	G10.05 and C6.03 have been completed in the 100% design plans. G10.02 will be completed after the City of Portland review.
4 - Specific Comments – Basin M	60% Plans Sheet C1.01	4. Sheet C1.01 Erosion and Sediment Control Plan - Please indicate locations for planned soil stockpiles and equipment staging.	Locations of planned temporary soil stockpiles and equipment staging are shown in the 100% design plans (C1.01)
5 - Specific Comments – Basin M	60% Plans Sheets C4.01, C5.01, C6.01	5. DEQ notes that elevations for selected features on Sheet C4.01 Grading Plan, Sheet C5.01 Stormwater System Profile and Sheet C6.01 Civil Details 1 are not consistent. As an example, the bottom elevation of the forebay is shown as 32.19 feet on C4.01 and C5.01 but is shown 32.15 feet on Sheet C6.01. In addition, the force main outlet is shown at an elevation of 33.02 feet (Station 2+1.02) on Sheet C4.01 but as 32.38 feet on Sheet C5.01. If the discrepancies are due to different survey stationing it is not clear from the information provided. Please clarify or correct as appropriate.	The discrepancies noted have been corrected in the 100% design as follows: • <i>Bottom elevation of forebay: 32.19’ (confirmed on sheets C4.01, C5.01, C6.01)</i> • <i>Force main outlet IE: 33.02’ (confirmed on C4.01, C5.01)</i>
6 - Specific Comments – Basin M	60% Plans Sheets C6.01, L1.02	6. Sheet C6.01 Civil Details 1 – DEQ understands that additional details will be developed in the 100% design plan. However, please add the following information to this sheet to help clarify the design: a. The elevation of the force main outlet; b. The location and dimensions of the rip-rap pad below the weep hole pipes;	Sheet C6.01 in the 100% design plans has the requested information and distinguishes between engineering fill and planting media in a consistent manner on Sheet C6.01 and L1.02.

**Response to Oregon DEQ Comments
Vegetated Infiltration Basin Designs; Terminal 4 Slips 1 and 3
February 10, 2021**

		c. The difference/distinction between engineering fill and planting media. As a related point, this plan shows 24 inches of engineered fill at the bottom of the basin while the landscaping plan (Sheet L1.02) shows 18 inches of growing medium; d. The size specifications for the rip-rap and fill materials.	
7 - Specific Comments – Basin K1	60% Plans Sheets C2.01	7. DEQ suggests that the design plans for the basin K1 (Port) SCM should include a sheet similar to sheet C2.01 for basin M (Port), which provides a conceptual overview of the major system components.	See Sheet C4.0.
8 - Specific Comments – Basin K1	60% Plans Sheets C3.0	8. Sheet C3.0 Erosion and Sediment Control - Based on the inferred overland flow in the area of the basin K1 (Port) SCM, it is unclear why silt fencing was not proposed on the down-gradient side of the work area.	Silt fencing extent and location was revised, see Sheet C3.0.
9 - Specific Comments – Basin K1	60% Plans Sheets C4.2, C1.0	9. Sheet C4.2 Treatment System Details - This figure should show the planting media, including its thickness and elevation. Item 22 on Sheet C1.0 Construction Notes and Specifications indicates that a minimum of three inches of "mulch" will be placed above the engineered fill shown in Sheet C4.2. Please revise accordingly.	Mulch layer was added to the bioinfiltration basin detail, see Sheet C4.2.
10 - Specific Comments – Basin K1	60% Plans Sheets C4.2, C1.0	10. Sheet C6.0 Standard Details - The figure is not appropriately scaled for easy reading of the explanatory print and design details. Please revise the figure so that details can be more easily discerned by the reader.	See revised Sheet C6.0
11 - Specific Comments – Basin K1	Missing Planting Plan	11. The plan sets for Basin K1 should include a detailed planting plan.	See Sheet L1.0.
12 - General Comments	O&M Plan	12. In consideration of the fact that the SCM designs are presented as 60% complete and the Port's contention that the design is not likely to significantly change, the Operations and Maintenance Plan is surprisingly incomplete, with only one of seven sections presented in draft form. Early agreement on the content of the O&M plan will help avoid delays in implementation of the SCM.	Complete O&M Plans for Basins M and K1 will be submitted as part of the 100% design package. The purpose of sending a preliminary O&M plan was to receive DEQ input on performance monitoring (Section 5) since this is not a specific requirement of the City of Portland Stormwater Management Manual but rather is included specifically for the purpose of coordinating DEQ-related aspects.
13 - General Comments	Basin M O&M Plan	13. The O&M Plan in Attachment 3 only specifies coverage for basin M (Port). Please present an O&M Plan for basin K1 (Port).	A complete O&M plan for both Basins M and K1 will be submitted as part of the 100% design package. See also response to Comment 12 above.
14 - General Comments	Basin M O&M Plan	14. Basin designs and O&M Plans submitted as part of the 100% design for basins K1 and M should include documentation that the requirements of the 2020 City of Portland Stormwater Management Manual have been met.	Noted. The O&M Plans for Basins M and K1 were developed in accordance with the 2020 City of Portland Stormwater Management Manual and the 2020 City of Portland Source Control Manual. The complete O&M Plans to be submitted with the 100% design package will state that City requirements have been met.
15 - Specific Comments	Basin M O&M Plan Section 5.1	15. Section 5.1 Instrumentation - This section suggests that a pressure transducer would be installed in the engineered media bed instead of in the basin above the media bed. Please clarify the actual intended location of the referenced pressure transducer.	The proposed location and profile of the media bed pressure transducer stilling well are shown on Sheets E0.02 and E1.01 in the 100% design plans. The pressure transducer is intended to measure the depth of ponding above the media bed surface and the data collected will be analyzed to evaluate drawdown rate.

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16 - Specific Comments	Basin M O&M Plan Section 5.2	16. Section 5.2 In-Situ Infiltration Rate and Drawdown Time - If decreases in calculated infiltration rate and/or increases in infiltration time are observed after the first year following SCM installation (e.g., decreases are observed in years 2 or 3), it is not clear from this section if this condition would trigger the need for quarterly calculations the following year. DEQ is concerned that the engineered media will perform well for the first year but performance may subsequently decrease due to clogging. Following the first year, DEQ recommends semi-annual measurements of infiltration rates during the wet and dry seasons for a total of three years. The infiltration rates and drawdown time should then be reevaluated at the five-year mark.	Data used to determine infiltration rates will be collected continuously using pressure transducers. Section 5.2 provides information on when calculations will be triggered, specifically stating: <i>If a notable decrease in infiltration rate or increase in drawdown time is observed in the first year, then quarterly calculations will continue for the second year. Otherwise, calculations will be performed annually.</i> The Port proposes to add a statement that if annual calculations in years 2, 3, 4, or 5 indicate a noticeable decrease in infiltration rate, then semi-annual calculations will be conducted the following year. Otherwise, calculations will be performed annually.
17 - Specific Comments	Basin M O&M Plan Section 5.2	17. Section 5.2 In-Situ Infiltration Rate and Drawdown Time - DEQ expects that the completed O&M Plans for basins K1 (Port) and M (Port) submitted as part of the 100% design will meet all requirements in Section 3.3 of the 2020 City of Portland Stormwater Management Manual and will describe in more detail corrective maintenance actions to be performed in the event that drawdown times greater than 30 hours are observed following installation.	The final O&M Plans for Basins M and K1 will follow the 2020 City of Portland Stormwater Management Manual and the 2020 City of Portland Source Control Manual. The complete O&M Plans to be submitted with the 100% design package will meet all requirements in Section 3.3 of the 2020 City of Portland Stormwater Management Manual. The corrective maintenance actions to be performed in case of drawdown times approaching or in excess of 30 hours are described in Section 4: Maintenance Activities.
18 - Specific Comments	Basin M O&M Plan Section 5.6	18. Section 5.6 Performance Reporting - The language describing the frequency of reporting for performance monitoring for basin M (Port) seems to suggest that a report would be prepared after the first year and only every five years thereafter. As part of the source control oversight obligations, DEQ will expect annual reporting for basins K1 and M (Port) for at least the first five years following installation. Such reporting should describe performance problems (i.e., if encountered) and actions taken to address them.	The five year frequency is generally based on the 1200-Z Industrial Stormwater Permit under the National Pollutant Discharge Elimination System (NPDES). The draft 2021 1200-Z permit requires that infiltration rates for mass reduction measures installed during previous permit cycles be validated within the first six months of the permit's effective date. We presume the intent of this new permit requirement is that mass reduction measures be validated at least once every permit cycle for existing measures, which would equate to every 5 years. The reports described in the 60% O&M Plan were intended to be comprehensive reports involving information on data collection, processing, analysis, and interpretation. In the full O&M Plan submitted as part of the 100% design package these will be referred to as, "Comprehensive Reports." The Port proposes to prepare these comprehensive reports at the same frequency described in the 60% submittal (after the first year, and again at five years). For years 2, 3, and 4, the Port proposes to prepare, "Annual Summary Reports." These are proposed to include a brief summary narrative describing any major performance issues encountered and corrective actions taken to remedy them during the preceeding year, as well as a copy of all maintenance and inspection forms completed during that year (see Appendix C and D of the 100% O&M Plan Submittal).
19 - Specific Comments	Basin M O&M Plan Section 5.6	19. Section 5.6 Performance Reporting - The performance monitoring plan for basin M (Port) does not provide explanation regarding what constitutes a "significant" deviation from the previous years' (or quarters') metrics. What percent change would be considered significant? Please clarify.	Section 5.6 has been updated to state that any deviation greater than 30 percent in relation to the preceding year will be noted. Root causes for any noted deviations will be investigated.
20 - Specific Comments	Basin M O&M Plan Section 5.6	20. Section 5.6 Performance Reporting - The plan does not establish protocols for notification to, and consultation with, DEQ in the event that initial (i.e., as designed) infiltration calculations, observed drawdown and/or discharge frequency indicate there are performance issues that will need to be addressed through adaptive management.	The Port understands this comment to particularly pertain to the first year of operation of the infiltration basin. Additional text has been included in the O&M Plan for DEQ notification during the first year of monitoring. During subsequent years, the Port will be submitting annual reports to DEQ, which provides the notification and consultation DEQ is seeking.

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		DEQ expects to be involved in decisions of this kind that could affect future source control determinations.	
21 - Specific Comments	Basin M O&M Plan Section 5.6	21. Section 5.6 Performance Reporting - In addition to those listed, additional metrics that should be established and evaluated as part of performance monitoring for the basin K1 (Port) and basin M (Port) SCMs include (i.e., although not a comprehensive list) vegetation coverage, vegetation height, accumulated sediment depth, evidence of erosion and depth of erosion features. Operation and Maintenance and Performance Monitoring plans for the stormwater basins should comply with relevant provisions of the City of Portland Stormwater Management Manual.	These details are included in the O&M Plan as part of the 100% design package. The manual will comply with relevant provisions of the City of Portland Stormwater Management Manual.