Reviewed for Code Compliance
Inspections Division
Approved with Conditions

Date: 10/07/14

GRAVEL WETLAND #1 PLAN VIEW

SCALE: 1" = 20'

GRAVEL WETLAND #1 SECTION B-B

SCALE: H:1" = 20', V: 1" = 4'

NOTES

1. SUBSURFACE GRAVEL WETLANDS WERE DESIGNED PER THE UNIVERSITY OF NEW HAMPSHIRE STORMWATER CENTER'S (UNHSC) DESIGN SPECIFICATIONS, DATED JUNE 2009.
2. WETLAND SOIL: THE WETLAND SOIL SHOULD BE SIMILAR TO A NATIVE WETLAND SOIL WITH LOW HYDRAULIC CONDUCTIVITY. THIS SOIL CAN BE MANUFACTURED USING COMPOST, SAND, AND SOME FINE SOILS. SURFACE INFILTRATION RATES SHOULD BE BETWEEN 3.5 X 10-5 CM/SEC AND 3.5 X 10-6 CM/SEC. ORGANIC CONTENT SHOULD BE >15%, AND CLAY CONTENT SHOULD BE <15% TO PREVENT THE MIGRATION OF FINES INTO THE SUBSURFACE GRAVEL LAYER. THE EXISTING HYDRIC SOILS REMOVED FROM IMPACTED WETLAND AREAS MAY ALSO BE USED. IF USED, THE EXISTING HYDRIC SOILS SHALL BE SOD CUT AND THE MATERIAL ROLLED AND PROPERLY MAINTAINED PRIOR TO PLACEMENT IN THE GRAVEL WETLAND ZONES.
3. THE 3" THICK GRADED FILTER OR CHOKER COURSE IS INTENDED TO PREVENT THE WETLAND SOIL FROM MIGRATING DOWN INTO THE CRUSHED STONE SUB-LAYER. MATERIAL COMPATIBILITY MUST MEET THE FOLLOWING FHWA CRITERIA:
   D15 (COARSE SUB-LAYER) ≤ 5 X D85 (GRADED FILTER)
   D50 (COARSE SUB-LAYER) ≤ 25 X D50 (GRADED FILTER)
4. THE COARSE SUB-LAYER MATERIAL SHALL BE AN ANGULAR CRUSHED STONE MEETING THE REQUIREMENTS OF MDOT 703.22 TYPE C.
5. GEOTEXTILES SHOULD NOT BE USED BETWEEN HORIZONTAL LAYERS OF THIS SYSTEM, AS THEY MAY CLOG DUE TO FINES AND MAY RESTRICT ROOT GROWTH
6. THE SEASONAL HIGH GROUNDWATER ELEVATION IN THE AREA OF GRAVEL WETLAND #1 IS APPROXIMATELY 67.0 BASED ON TEST PIT TP-ST-1:
7. CONSTRUCTION OVERSIGHT: THE OWNER WILL RETAIN THE SERVICES OF A PROFESSIONAL ENGINEER TO INSPECT THE CONSTRUCTION AND STABILIZATION OF ALL STORMWATER MANAGEMENT STRUCTURES. IF NECESSARY, THE INSPECTING ENGINEER WILL INTERPRET THE CONSTRUCTION PLAN FOR THE CONTRACTOR. ONCE ALL STORMWATER MANAGEMENT STRUCTURES ARE CONSTRUCTED AND STABILIZED, THE INSPECTING ENGINEER WILL NOTIFY THE CITY IN WRITING WITHIN 30 DAYS TO STATE THAT THE SYSTEMS HAVE BEEN COMPLETED, ACCOMPANYING THE ENGINEER'S NOTIFICATION MUST BE A LOG OF THE ENGINEER'S INSPECTIONS GIVING THE DATE AND TIME OF EACH INSPECTION AND THE ITEMS INSPECTED ON EACH VISIT AND INCLUDING ANY TESTING DATA OR SIEVE ANALYSIS DATA OF EVERY MINERAL SOIL AND SOIL MEDIA SPECIFIED IN THE PLANS AND USED ON SITE.
8. CONSTRUCTION SEQUENCE: THE SUBSURFACE GRAVEL WETLAND MUST NOT BE INSTALLED UNTIL THE AREA THAT DRAINS TO THE WETLAND HAS BEEN PERMANENTLY STABILIZED WITH PAVEMENT OR OTHER STRUCTURE, 90% VEGETATION COVER, OR OTHER PERMANENT STABILIZATION UNLESS THE RUNOFF FROM THE CONTRIBUTING DRAINAGE AREA IS DIVERTED AROUND THE STRUCTURE UNTIL STABILIZATION IS COMPLETE.
9. COMPACTION: WETLAND SOIL AND SUBSURFACE MATERIAL MUST BE COMPACTED TO BETWEEN 90% AND 95% STANDARD PROCTOR.
10. TEST PIT TP-ST-1 REVEALED GLACIOMARINE SOILS AT DEPTHS BELOW 4.0'. A PERMEABILITY TEST CONFORMING TO ASTM D2434 MAY BE COMPLETED ON THIS MATERIAL TO DETERMINE IF IT MEETS THE REQUIREMENTS FOR LOW PERMEABILITY CLAY LINER MATERIAL. IF THE NATIVE CLAY IS FOUND TO HAVE A PERMEABILITY OF LESS THAN 1 X 10-6 CM/SEC, NO ADDITIONAL CLAY LINER IS NECESSARY.
11. CONSTRUCTION OVERSIGHT: INSPECTION BY A PROFESSIONAL ENGINEER WILL OCCUR AT A MINIMUM:
   AFTER THE PRELIMINARY CONSTRUCTION OF THE STRUCTURE'S GRADES AND ONCE THE SUBSURFACE DRAIN PIPES ARE INSTALLED BUT NOT BACKFILLED.
   AFTER THE CRUSHED STONE LAYER IS CONSTRUCTED AND PRIOR TO THE INSTALLATION OF THE WETLAND SOIL.
   AFTER THE WETLAND SOIL HAS BEEN INSTALLED AND SEEDED.
   AFTER ONE YEAR TO INSPECT HEALTH OF THE VEGETATION AND MAKE CORRECTIONS.
12. TESTING AND SUBMITTALS: THE CONTRACTOR SHALL IDENTIFY THE LOCATION OF THE SOURCE OF EACH COMPONENT OF THE SUBSURFACE GRAVEL WETLAND SYSTEM. ALL RESULTS OF FIELD AND LABORATORY TESTING SHALL BE SUBMITTED TO THE DESIGN ENGINEER FOR CONFIRMATION. THE CONTRACTOR SHALL:
   PERFORM A SIEVE ANALYSIS CONFORMING TO ASTM C136 (STANDARD TEST METHOD FOR SIEVE ANALYSIS OF FINE AND COURSE AGGREGATES 1996A) ON EACH MATERIAL USED IN THE SUBSURFACE GRAVEL WETLAND SYSTEM.
   PERFORM A HYDROMETER GRAIN SIZE ANALYSIS ON THE WETLAND SOIL.
   DETERMINE ORGANIC CONTENT OF THE WETLAND SOIL PER ASTM D2974.
   PERFORM A PERMEABILITY TEST ON THE WETLAND SOIL CONFORMING TO ASTM D2434 WITH THE MIXTURE COMPACTED TO 90% TO 95% OF MAXIMUM DRY DENSITY BASED ON ASTM D698.
13. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL MATERIALS AND CONSTRUCTION PROCEDURES UTILIZED IN THE CONSTRUCTION OF THE SUBSURFACE GRAVEL WETLAND SYSTEM AND FOR MAINTENANCE AND PROTECTION OF THE CONSTRUCTED SYSTEM UNTIL APPROVAL AND ACCEPTANCE BY THE DESIGN ENGINEER.
14. UPON COMPLETION OF INSTALLATION OF THE WETLAND SOIL LAYER AND ESTABLISHMENT OF 90% OF VEGETATION WITHIN THE STRUCTURE, THE CONTRACTOR SHALL FLOOD THE BASIN TO THE WATER QUALITY ELEVATION WITH CLEAN WATER AND MONITOR THE WATER LEVEL TO CONFIRM A 24-48 HOUR DRAIN TIME. IF NECESSARY THE FLOW CONTROL ORIFICE MAY BE ADJUSTED TO ACHIEVE THE 24-48 HOUR DRAIN TIME.

REV	DATE	DESCRIPTION
4	08.11.14	RELEASED TO CITY - FINAL PLANS
3	07.03.14	FINAL PLAN SUBMISSION TO CITY PER CONDITIONS OF APPROVAL
2	04.17.14	FINAL PLAN SUBMISSION TO CITY
1	02.10.14	SUBMITTED TO CITY OF PORTLAND

REVISIONS

STATE OF MAINE
STEPHEN R. BUSHEY
No. 7429
LICENSED
PROFESSIONAL ENGINEER

P.E. STEPHEN BUSHEY
LIC. # 7429

PROJECT: PH WARREN AVENUE, LLC
COMMERCIAL SITE
421 WARREN AVENUE

SHEET TITLE: GRAVEL WETLAND #1 PLAN VIEW AND SECTIONS

CLIENT: PH WARREN AVENUE, LLC
C/O PETER HOLMES
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CHECKED:	SRB	JOB NO.	SP-M104
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SHEET	C-4.1		

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