L. Permanent Erosion Control Measures

The following permanent erosion control measures have been designed as part of the Erosion/Sedimentation Control Plan:

1. The drainage conveyance systems have been designed to intercept and convey the 25-year storm. In the case of open channels or swales, this includes the design of measures to resist scour of the channel.

2. All areas disturbed during construction, but not subject to other restoration (paving, riprap, etc.), will be loamed, limed, fertilized, mulched, and seeded. Fabric netting, anchored with staples, shall be placed over the mulch in areas where the finish grade slope is greater than 10 percent. Native topsoil shall be stockpiled and temporarily stabilized with seed and mulch and reused for final restoration when it is of sufficient quality.

3. Catch basins shall be provided with sediment sumps for all outlet pipes that are 12" in diameter or greater.

4. Permanent seeding shall be conducted only in April through May and in late summer until September 15.

5. Rip rap stabilization of shoreline.

M. Timing and Sequence of Erosion/Sedimentation Control Measures

The site is quite stable and is principally a semi-vegetated gravel surface. These conditions will reduce the extent of erosion controls needed compared to projects with fine-grained soils. However, the project will be phased and the Contractor must control fugitive dust emissions, respect and not impede the neighboring land uses, and control sediment laden runoff to 280 NTU or less. For all grading activities, the Contractor shall exercise extreme caution not to overexpose the site by limiting the disturbed area and shall stabilize any steep slopes within 24 hours if final slope grading and stabilization will not be completed within 7 days. Any final slopes shall have the specified erosion control measures installed within 7 days of final stabilization.

The following construction sequence shall be required, (unless otherwise authorized in writing by the Owner's project manager or authorized permit agent).

The description of the work is:

Phase 1: The Contractor will need to perform the following work:

- Mark the Phase 1 work limits.
- Install safety fence and security signs around the perimeter of the site.
- Establish and install construction entrance with gates.
- Install silt fence or barriers along the perimeter and other designated areas requiring Condition 1 silt barrier.
- Install silt sacks and inlet protection at existing structures on Commercial St and the Unitil Property.
- Initialize removal of items slated for demolition and removals.
- Establish Dirtbag™ area and pump system for dewatering activities as necessary.
- Construct a diversion swale to direct as much of the site to the temporary sedimentation swales as possible including the installation of culverts and rip rap where the diversion swale passes under the construction access drives.
- Commence earthwork activity to shape prepared boatyard surface.
- Construct 720 SF Brokerage Building and connect associated utilities.
- Erect Tension Fabric Building and connect associated utilities.
- Construct boat ramps.
- Construct Travel Lift Basin. (To be coordinated with Unitil VRAP efforts.)
- Install Drydock and floating dock system including pile restoration and replacement.
- Trench across site to connect utilities to shorefront elements.
- Install landscaping around the perimeter site.
- Place boatyard prepared stone infiltration surface.

N. Contracting Procedure

The onsite components of the project will be constructed by a General Contractor under contract to the applicant. The Contractor shall submit a schedule for the completion of the work, which will satisfy the following criteria:

1. The construction sequence of Section M should generally be completed in the specified order; however, several separate items may be constructed simultaneously. Work must also be scheduled or phased to prevent the duration of areas exposed or susceptible to erosion as specified below. The intent of this sequence is to provide for erosion control and to have structural measures such as silt barriers and construction entrances in place before large areas of land are denuded.

2. The work shall be conducted in sections which will:
   a) Limit the amount of exposed area to those areas in which work is expected to be undertaken during the preceding 30 days.
   b) Revegetate disturbed areas as rapidly as possible. All areas shall be permanently stabilized within 7 days of final grading and temporarily stabilized within 7 days of initial disturbance or before a predicted storm event of over ½" of rain.
   c) Incorporate planned inlets and drainage system as early as possible into the construction phase. The ditches shall be immediately lined or revegetated as soon as their installation is complete.

3. Once final grade has been established, the Contractor may choose to dormant seed the disturbed areas prior to placement of mulch and placement of fabric netting anchored with staples.
   a) If dormant seed is used for the site, all disturbed areas shall receive 6" of loam and seed at an application rate of 5#/1,000 s.f.
   All areas seeded during the winter months will be inspected in the spring for adequate catch. All areas insufficiently vegetated (less than 75 percent catch) shall be revegetated by replacing loam, seed, and mulch.
   b) If dormant seeding is not used for the site, all disturbed areas shall be revegetated in the spring.

4. The area of denuded, non-stabilized construction shall be limited to the minimum area practicable. An area shall be considered to be denuded until the subbase gravel is installed in parking areas, or the areas of future loam and seed have been loamed, seeded, and mulched. The mulch rate shall be twice the rate specified in the seeding plan. [For example, 115#/1,000 s.f. x 2 = 230#/s.f.]

5. Within the exposed work area, temporary sedimentation sumps shall be provided in any concentrated flow area with a sand filter or chemical coagulation. Additional information is provided in prior sections of this narrative and on the Erosion Control Details of the plan set. Along the sedimentation sumps, barriers shall be provided at sufficient intervals to permit runoff to be accumulated to a minimum depth of 12" before overflowing.

6. The schedule shall be subject to the approval of the Owner.

7. The Contractor must maintain an accurate set of record drawings indicating the date when an area is first denuded, the date of temporary stabilization, and the date of final stabilization.

8. The Contractor must install any added measures which may be necessary to control erosion/sedimentation and fugitive dust emissions from the site, with adjustments made dependent upon forecasted and actual site and weather conditions.

9. The Contractor shall note that no area within 50 feet of a slope with a vertical drop of more than 3' in 50 feet shall remain denuded for a period of over 5 days before it is temporarily stabilized. Temporary stabilization shall be the installation of mulching. All other areas shall be stabilized within 7 days or before a predicted rain event. For construction between September 15 and April 15 of any calendar year, all areas shall be temporarily stabilized at the earlier time frames specified above.

10. The Stormwater Pollution Prevention Plan (SWPPP) is defined to consist of the Erosion Control Report, the Stormwater Management Plan, and the Stormwater O&M Plan. The SWPPP shall be maintained at a secure locked location at the contractor's field trailer from commencement of the project. These documents shall be moved to a designated locked location inside the building(s) at the period when the contractor's trailers are removed and maintained until the Notice of Termination has been filed by the Owner.

A notice and point of contact with cell phone number shall be posted at the trailer to permit access to the records during normal work hours and in case of emergency at other times. All additions and construction records shall be copied via e-mail to the following addresses:

rwoodman@delucahoffman.com
phin@portlandyacht.com

The Owner reserves the right to add additional personnel to this list at the pre-construction conference or at reasonable intervals during the project.

11. The Owner will provide a copy of the NOI acceptance letter to the Contractor. This letter shall be maintained at the site with the SWPPP.

12. Any revisions to the SWPPP must be authorized in writing by the Preparer of the Plan (DeLuca-Hoffman Associates, Inc.) The Preparer of the Plan shall be permitted reasonable time to review and notify the city and other agencies of said changes. Revisions to the SWPPP will be required:

a. Whenever the current provisions prove to be ineffective in minimizing pollutants in stormwater *discharges* from the site;

b. Whenever there is a change in design, construction, or operation at the construction site that has or could have an effect on the discharge of pollutants; and

c. To address issues or deficiencies identified during an inspection by the *qualified representative*, the Department, or other regulatory authority.

13. Should the Owner notify the contractor that the activity on the site is in violation of the SWPPP, the Contractor shall at its sole cost correct the deficiencies and file a photographic log with a list of corrective actions with the Owner within 7 days of notification by the Owner.

14. The project is currently undergoing Environmental Study. The results of this study will be provided as part of the VRAP plan and as an appendix to the SWPPP plan prior to the preconstruction conference, and shall be incorporated by reference when appended.

15. The Contractor shall engage a qualified representative to monitor the work. This representative shall be approved by the Owner prior to the individual being engaged on the project. This inspection shall be a part of the Contractor's Quality Control Plan for the project by the Contractor. The representative's qualifications and duties that he shall perform are as follows:

a. Licensed Professional Engineer or Certified Professional in Erosion Control`

b. Covered by Workman's Compensation Insurance

c. Experienced in this type of work, the specific erosion controls applicable to this project with a resume approved by the engineer

d. Compensated on a unit rate basis with no incentives for reduced costs or subject to any type of compensation for passing inspections

e. Approved by the Owner and the preparer of this plan

The *qualified representatives* shall conduct site inspections in accordance with the following timetable:

a. Where soil disturbance activities are on-going, the *qualified representative* shall conduct a site inspection at least once every seven (7) calendar days.

b. Where soil disturbance activities have been temporarily suspended (e.g. winter shutdown) and temporary stabilization measures have been applied to all disturbed areas, the *qualified representative* shall conduct a site inspection at least once every thirty (30) calendar days. The *owner or operator* shall notify the City's stormwater contact person or, in areas under the jurisdiction of a *regulated traditional land use control MS4*, the MS4 (provided the MS4 is not the *owner or operator* of the construction activity) in writing prior to reducing the frequency of inspections.

c. Where soil disturbance activities have been shut down with partial project completion, the *qualified representative* can stop conducting inspections if all areas disturbed as of the project shutdown date have achieved *final stabilization* and all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational. The *owner or operator* shall notify the City's stormwater contact person in writing prior to the shutdown. If soil disturbance activities are not resumed within 2 years from the date of shutdown, the Contractor shall have the *qualified representative* perform a final inspection and certify that all disturbed areas have achieved *final stabilization*, and all temporary, structural erosion and sediment control measures have been removed, and that all post-construction stormwater management practices have been constructed in conformance with the SWPPP by signing the "Final Stabilization" and "Post-Construction Stormwater Management Practice" certification statements on the Notice of Termination. The *owner or operator* shall then submit the completed Notice of Termination form to the City of Portland.

At a minimum, the *qualified representative* shall inspect all erosion and sediment control practices to ensure integrity and effectiveness, all post-construction stormwater management practices under construction to ensure that they are constructed in conformance with the SWPPP, all areas of disturbance that have not achieved *final stabilization*, all points of discharge to natural surface water bodies located within, or immediately adjacent to, the property boundaries of the construction site, and all points of discharge from the construction site.

The *qualified representative* shall prepare an inspection report subsequent to each and every inspection. At a minimum, the inspection report shall include and/or address the following:

a. Date and time of inspection;

b. Name and title of person(s) performing inspection;

c. A description of the weather which shall be consistent with the National Weather Service Forecast Office, Portland-Gray, ME and soil conditions (e.g. dry, wet, saturated) at the time of the inspection;

d. A description of the condition of the runoff at all points of discharge from the construction site and sampling to determine the turbidity in NTU's. This shall include identification of any *discharges* of sediment from the construction site. Include *discharges* from conveyance systems (i.e. pipes, culverts, ditches, etc.) and overland flow;

e. A description of the condition of all natural surface water bodies located within, or immediately adjacent to, the property boundaries of the construction site which received runoff from disturbed areas. This shall include identification of any *discharge* of sediment to the surface water body;

f. Identification of all erosion and sediment control practices that need repair or maintenance;

g. Identification of all erosion and sediment control practices that were not installed properly or are not functioning as designed and need to be reinstalled or replaced;

h. Description and sketch of areas that are disturbed at the time of the inspection and areas that have been stabilized (temporary and/or final) since the last inspection;

i. Current phase of construction of all post-construction stormwater management practices and identification of all construction that is not in conformance with the SWPPP and technical standards;

j. Corrective action(s) that must be taken to install, repair, replace or maintain erosion and sediment control practices; and to correct deficiencies identified with the construction of the post-construction stormwater management practice(s); and

k. Digital photographs, with date stamp, that clearly show the condition of all practices that have been identified as needing corrective actions. The *qualified representative* shall attach paper color copies of the digital photographs to the inspection report being maintained onsite within seven (7) calendar days of the date of the inspection. The *qualified representative* shall also take digital photographs, with date stamp, that clearly show the condition of the practice(s) after the corrective action has been completed. The *qualified representative* shall attach paper color copies of the digital photographs to the inspection report that documents the completion of the corrective action work within seven (7) calendar days of that inspection.

Within one business day of the completion of an inspection, the *qualified representative* shall notify the owner the appropriate contractor or subcontractor of any corrective actions that need to be taken. The contractor or subcontractor shall begin implementing the corrective actions within one business day of this notification and shall complete the corrective actions in a reasonable time frame, at its sole cost.

All inspection reports shall be signed by the *qualified representative*. The inspection reports shall be maintained on site with the SWPPP and distributed via email at the time of filing.

16. The Owner reserves the right to have quality assurance monitoring of the work. The Contractor shall, at its sole cost, cooperate with the Owner and their quality assurance monitoring of the work including maintaining an accurate schedule for performing the work. The Owner will notify the contractor if any particular elements of the work should be uncovered or available for observation by the Quality Assurance Monitor selected by the Owner. The Owner reserves the right to conduct the quality assurance monitoring during working hours at any time during the project.

O. Provisions for Maintenance of the Erosion/Sedimentation Control Features

The project will be contracted to a General Contractor. The project is subject to the requirements of the local permits, and a state regulated Construction General Permit and Site Location of Development Permit (administered by the City of Portland).

This project requires the Contractor to prepare a list and designate by name, address and telephone number all individuals who will be responsible for implementation, inspection, and maintenance of all erosion control measures identified within this section and as contained in the Erosion and Sedimentation Control Plan of the contract drawings. Specific responsibilities of the qualified representative(s) will include:

1. Execution of the Contractor/Subcontractor Certification contained in Appendix B by any and all parties responsible for erosion control measures on the site as required by the permit authorities.
2. Assuring and certifying the Owner's construction sequence is in conformance with the specified schedule of this section. A weekly certification stating compliance, any deviations, and corrective measures necessary to comply with the erosion control requirements of this section shall be prepared and signed by the qualified representative(s).
3. In addition to the weekly certifications, the representative(s) shall maintain written reports recording construction activities on site which include:
   - Dates when major grading activities occur in a particular areas.
   - Dates when major construction activities cease in a particular area, either temporarily or permanently.
   - Dates when an area is stabilized.
4. Inspection of this project work site on a weekly basis and after each significant rainfall event (0.5 inch or more within any consecutive 24-hour period) during construction until permanent erosion control measures have been properly installed and the site has been stabilized. Inspection of the project work site shall include:
   - Identification of proper erosion control measure installation in accordance with the erosion control detail sheet or as specified in this section.
   - Determine whether each erosion control measure is properly operating. If not, identify damage to the control device and determine remedial measures.
   - Identify areas which appear vulnerable to erosion and determine additional erosion control measures which should be used to improve conditions.
   - Inspect areas of recent seeding to determine percent catch of grass. A minimum catch of 90 percent is required prior to removal of erosion control measures.
   - All erosion controls shall be removed within 30 days of permanent stabilization except for mulch and netting not detrimental to the project. Removals shall include but not be limited to all silt fence or barrier, hay bales, inlet protection, and stone check dams.
   - Accumulated silt/sediment should be removed when the depth of sediment reaches 50 percent of the barrier height. Accumulated silt/sediment should be removed from behind silt fencing when the depth of the sediment reaches 6 inches.
   - Silt sacks should be removed and replaced at least every three months and at any time where the weekly inspection reveals that siltation has significantly retarded the rate of flow through the silt sack.
   - Discharges should be measured during storm events to document the turbidity of stormwater discharge is <280 NTU.
5. If inspection of the site indicates a change should be made to the erosion control plan, to either improve effectiveness or correct a site-specific deficiency, the representative shall immediately implement the corrective measure and notify the Owner of the change.
6. Arranging for an on-site meeting prior to commencing winter construction to assure that all special winter construction measures will be implemented and to review the specific requirements of this plan for winter construction.

All certifications, inspection forms, and written reports prepared by the qualified representative(s) shall be filed with the Owner, and the Permit File contained on the project site. All written certifications, inspection forms, and written reports must be filed within one (1) week of the inspection date.

The Contractor has sole responsibility for complying with the erosion/sediment control report, including control of fugitive dust, and shall be responsible for any monetary penalties resulting from failure to comply with these standards.

Once construction has been completed, long-term maintenance of the stormwater management system will be the responsibility of the applicant. Inspection and Maintenance items with a list of maintenance requirements and frequency are described in a separate document. In the event of defective workmanship or any failure by the contractor and its subcontractors to adhere to the Standards set forth in these documents, the Contractor shall be responsible to correct, at its sole cost, any latent defects together with reimbursement of Owner for any expenses borne by the Owner up to the time of said correction. This provision shall remain in effect beyond any stated or implied warranty period.

P. Preconstruction Conference

Prior to any construction at the site, representatives of the Contractor, the Owner, the City of Portland, and the site design engineer and any personnel identified in the permit conditions shall meet to discuss the scheduling of the site construction and the designation of the responsible parties for implementing the plan. The Contractor shall be responsible for scheduling the meeting. Prior to the meeting, the Contractor will prepare a detailed schedule and a marked-up site plan indicating areas and components of the work and key dates showing date of disturbance and completion of the work. The Contractor shall conduct a meeting with employees and sub-contractors to review the erosion control plan, the construction techniques which will be employed to implement the plan, and provide a list of attendees and items discussed at the meeting to the Owner. Three copies of the schedule, the Contractor's meeting minutes, and marked-up site plan shall be provided to the Owner.

Q. AppendiCES

Appendix A - Seeding Plan

Appendix B - Sample Erosion Control Compliance Certification and Inspection Forms

Appendix C- DirtGlue™ Application and Use Requirements

R. Plan References

Drawings C-6.1 to C-6.4 Erosion/Sediment Control Plans and Details

APPENDIX A

Seeding Plan

PERMANENT SEEDING PLAN (SEED MIX "A")

Project: Canal Landing New Yard

Site Location: Portland, ME

__X__ Permanent Seeding _____ Temporary Seeding

1. **Area to be Seeded:** Approximately __TBD__ acre(s) or _____/M. Sq. Ft.
2. **Instructions on Preparation of Soil:** Prepare a good seed bed for planting method used (do not over compact).
3. **Apply Lime as Follows:** _____ #/acres or __138#__/M Sq. Ft. or per soil test
4. **Fertilize:** _____ pounds of _____ - _____N-P-K/ac.

   __20__ pounds of 10-20-20 N-P-K/M Sq. Ft. or per soil test
5. **Method of Applying Lime and Fertilizer:** Spread and work into the soil before seeding.
6. **Seed with the following mixture:**

   Blue StemRyeSwitch GrassAsterGoldenrodMilkweek
7. **Mulching Instructions**: Apply at the rate of ___ tons per acre or__230__ pounds per M. Sq. Ft.
8. **Application:**

TypeUnit#Tons, Etc. Total Lime138#/1,000 s.f.Total Fertilizer20#/1,000 s.f.Total Seed1#/1,000 s.f.Total Mulch230#/1,000 s.f.Total Other00

9. **Remarks:**

Seeding dates April 15 to May 31 and August 1 until September 1. Permanent seeding should be made prior to September 1 or as a dormant seeding after the first killing frost and before the first snowfall. If seeding cannot be done within these seeding dates, temporary seeding and mulching shall be used to protect the site. Permanent seeding shall be delayed until the next recommended seeding period.

Fertilizer requirements shall be subject to actual test results of the topsoil used for the project. The Contractor shall be responsible for providing topsoil test results for pH and recommended fertilizer application rates to the Owner.

Seed mixture shall be fresh, clean, new crop seed. Seed may be mixed by an appropriate method on the site or may be mixed by the dealer. If the seed is mixed on the site, each variety shall be delivered in the original containers bearing the dealer's guaranteed analysis. If seed is mixed by the dealer, the Seeding Contractor shall furnish to the Owner the dealer's guaranteed statement of the composition of the mixture and the percentage of purity and germination of each variety.

Seed shall be purchased from a recognized distributor and shall test to a minimum percentage of 95% for purity and 85% for germination.

All loam shall have compost or peat admixtures to raise the organic content to 6%.

PERMANENT SEEDING PLAN (SEED MIX "B")

Project: Canal Landing New Yard

Site Location: Portland, ME

__X__ Permanent Seeding _____ Temporary Seeding

1. **Area to be Seeded:** Approximately __TBD__ acre(s) or _____/M. Sq. Ft.
2. **Instructions on Preparation of Soil:** Prepare a good seed bed for planting method used (do not over compact).
3. **Apply Lime as Follows:** _____ #/acres or __138#__/M Sq. Ft. or per soil test
4. **Fertilize:** _____ pounds of _____ - _____N-P-K/ac.

   __20__ pounds of 10-20-20 N-P-K/M Sq. Ft. or per soil test
5. **Method of Applying Lime and Fertilizer:** Spread and work into the soil before seeding.
6. **Seed with the following mixture:**

   35% Tall Fescue30% Creeping Red Fescue20% Perennial Ryegrass15% Annual Ryegrass
7. **Mulching Instructions:** Apply at the rate of ___ tons per acre or__230__ pounds per M. Sq. Ft.
8. **Application:**

TypeUnit#Tons, Etc. Total Lime138#/1,000 s.f.Total Fertilizer20#/1,000 s.f.Total Seed7#/1,000 s.f.Total Mulch230#/1,000 s.f.Total Other00

9. **Remarks:**

Seeding dates April 15 to May 31 and August 1 until September 1. Permanent seeding should be made prior to September 1 or as a dormant seeding after the first killing frost and before the first snowfall. If seeding cannot be done within these seeding dates, temporary seeding and mulching shall be used to protect the site. Permanent seeding shall be delayed until the next recommended seeding period.

Fertilizer requirements shall be subject to actual test results of the topsoil used for the project. The Contractor shall be responsible for providing topsoil test results for pH and recommended fertilizer application rates to the Owner.

Seed mixture shall be fresh, clean, new crop seed. Seed may be mixed by an appropriate method on the site or may be mixed by the dealer. If the seed is mixed on the site, each variety shall be delivered in the original containers bearing the dealer's guaranteed analysis. If seed is mixed by the dealer, the Seeding Contractor shall furnish to the Owner the dealer's guaranteed statement of the composition of the mixture and the percentage of purity and germination of each variety.

Seed shall be purchased from a recognized distributor and shall test to a minimum percentage of 95% for purity and 85% for germination.

All loam shall have compost or peat admixtures to raise the organic content to 6%.

REV	DATE	DESCRIPTION
2	10.31.12	FINAL SITE PLAN APPLICATION SUBMISSION
1	08.21.12	PRELIMINARY APPLICATION TO CITY OF PORTLAND

REVISIONS

STATE OF MAINE — STEPHEN R. BUSHEY — 7429 — LICENSED PROFESSIONAL ENGINEER

P.E. STEPHEN R. BUSHEY
LIC. #7429

PROJECT: CANAL LANDING
SHEET TITLE: EROSION CONTROL NARRATIVE
CLIENT: NEW YARD LLC
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PORTLAND, ME 04101

DeLUCA-HOFFMAN ASSOCIATES, INC.
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DRAWN:	LA	DATE:	
DESIGNED:	RJW	SCALE:	AS SHOWN
CHECKED:	SRB	JOB NO.	3091
FILE NAME:	3091-DET		
SHEET	C-6.5		