Sebago Technics
Engineering Expertise You Can Build On

City of Portland

SITE LOCATION OF DEVELOPMENT
38 MRSA §§ 481-499
Permit Application

for

Merrill Industries, Inc.
601A Danforth Street
Portland, ME 04102

042 A003

prepared by:

Sebago Technics, Inc.

December 2004

DEPT. OF BUILDING INSPECTION
CITY OF PORTLAND, ME
JAN - 3 2005
RECEIVED

STATE OF MAINE
DONALD G. MCKINNEY
PROFESSIONAL ENGINEER

One Chabot Street, P.O. Box 1339, Westbrook, Maine 04098-1339 Ph. 207-856-0277 Fax 856-2206

Permit Application
and
Submission Checklist

Department of Environmental Protection
Bureau of Land & Water Quality
17 State House Station
Augusta, Maine 04333
Telephone: 207-287-2111

FOR DEP USE **FORM A PAGE 1 02/02**
ATS # _____
L- _____
Total Fees: _____
Date: Received _____

****

PERMIT APPLICATION
SITE LOCATION OF DEVELOPMENT LAW, 38 M.R.S.A. § § 481-490

Please type or print:

This application is for (check the one that applies):

20 acre development	☐	Structure	☐	
Planning Permit	☐	Subdivision	☐	
Metallic Mining	☐	Amendment	☐	
Marine Oil Terminal	☐			

Name of Applicant: **Merrill Industries, Inc.**

Address: **601A Danforth Street** Telephone/Fax: **(207) 772-3254 / (207) 772-3156**

Name of local contact or agent: **Same**

Address: _____ Telephone/Fax: _____

Name of development: **Warehouse No. 7**

Location of development including road, street, or nearest route number: **Same**

For entrance road (if available): UTM Northing_____ UTM Easting _____

City/Town/Plantation: **Portland**, County: **Cumberland**, Tax Map #_____, Lot # _____

Type of development: **Warehouse**

Was this development started prior to obtaining a license? **No** Is this development or any portion of the site currently subject to enforcement action? **No**

Will a Natural Resources Protection Act (NRPA) permit be required for this project? **No** Has the NRPA permit application (PBR, Tier, full NRPA) been submitted as part of this application? **No**

Will a Traffic Permit be required for this project? **No** Has the Maine Department of Transportation been contacted? **No**

Is the development located in the watershed of a body of water most at risk or in a sensitive or threatened region or watershed? **No** If yes, which one?

Existing DEP permit number (if applicable): **#03/44 – 6592 - 05170**

Name(s) of department staff person(s) present at the pre-application meeting:
Sarah Hopkins, City of Portland Planning Department

Name(s) of department staff person(s) otherwise contacted concerning this application:

_____

CERTIFICATION

The person responsible for preparing this application and/or attaching pertinent site and design information hereto, by signing below, certifies that the application for development approval is complete and accurate to the best of his/her knowledge.

Signature: _____

Name (print): **DONALD T. MCELHINNEY**

Date: _____

Re/Cert/Lic No.: _____
Engineer **4267**
Geologist _____
Soil Scientist _____
Land Surveyor _____
Site Evaluator _____
Active Member of the Maine Bar _____
Professional Landscape Architect _____
Other _____

If the signature below is not the applicant's signature, attach letter of agent authorization signed by applicant.

"I certify under penalty of law that I have personally examined the information submitted in this document and all attachments thereto and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the information is true, accurate, and complete. I authorize the Department to enter the property that is the subject of this application, at reasonable hours, including buildings, structures or conveyances on the property, to determine the accuracy of any information provided herein. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

_____
Signature of applicant

December 17, 2004
Date

SUBMISSIONS CHECKLIST

If a provision is not applicable, put "NA"

Section 1. Development description

A. Narrative

X 1. Objectives and details

X 2. Existing facilities (with dates of construction)

B. Topographic map

X 1. Location of development boundaries

X 2. Quadrangle name

C. Construction plan

X 1. Outline of construction sequence (major aspects)

2. Dates

D. Drawings

X 1. Development facilities

X a. Location, function and ground area

N/A b. Length/cross-sections for roads

X 2. Site work (nature and extent)

X 3. Existing facilities (location, function ground area and floor area)

4. Topography

X a. Pre- and post-development (contours 2 ft or less)

X b. Previous construction, facilities and lot lines

X **Section 2. Title, right or interest** (copy of document)

Section 3. Financial capacity

X A. Estimated costs

B. Financing

X 1. Letter of commitment to fund

2. Self-financing

___ a. Annual report

___ b. Bank statement

3. Other

___ a. Cash equity commitment

___ b. Financial plan

___ c. Letter

___ 4. Affordable housing information

Section 4. Technical ability (description)

X A. Prior experience (statement)

X B. Personnel (documents)

Section 5. Noise

X A. Developments producing a minor noise impact (statement)

___ 1. Residential developments

___ 2. Certain non-residential subdivisions

___ 3. Schools and hospitals

X 4. Other developments

X a. Type, source and location of noise

X b. Uses, zoning and plans

X c. Protected locations

X d. Minor nature of impact
X e. Demonstration
N/A B. Developments producing a major noise impact (full noise study)
1. Baseline
a. Uses, zoning and plans
b. Protected locations
c. Quiet area
2. Noise generated by the development
a. Type, source and location of noise
b. Sound levels
c. Control measures
d. Comparison with regulatory limits
e. Comparison with local limits

X **Section 6. Visual quality and scenic character**(narrative, description, visual impact analysis)

X **Section 7. Wildlife and fisheries** (narrative)

X **Section 8. Historic sites** (narrative)

X **Section 9. Unusual natural areas** (narrative)

Section 10. Buffers
X A. Site plan and narrative

Section 11. Soils
X A. Soil survey map and report
1. Class A (High intensity) Soil Survey
2. Class B (High intensity) Soil Survey
3. Class C (Medium High-Intensity) Soil Survey
X 4. Class D (Medium Intensity) Soil Survey
X B. Geotechnical investigation
N/A C. Hydric soils mapping

Section 12. Stormwater management
X A. Narrative
X 1. Development location
X 2. Surface water on or abutting the site
X 3. Downstream ponds and lakes
X 4. General topography
X 5. Flooding
X 6. Alterations to natural drainage ways
X 7. Alterations to land cover
X 8. Modeling assumptions
X 9. Water quantity control
X 10. Water quality treatment
X 11. Off-site credits
X 12. Compensation fees
X 13. Development impacts
X B. Maps
X 1. U.S.G.S. map with site boundaries
X 2. S.C.S. soils map with site boundaries
X C. Drainage Plans (a pre-development plan and a post-development plan)
X 1. Contours

X 2. Plan elements
X 3. Land cover types and boundaries
X 4. Soil group boundaries
X 5. Stormwater quantity subwatershed boundaries
X 6. Stormwater quality subwatershed boundaries
X 7. Watershed analysis points
X 8. Hydrologic flow lines
X 9. Runoff storage areas
X 10. Roads and drives
X 11. Buildings, parking lots, and other facilities
X 12. Drainage system layout for storm drains, catch basins, and culverts
X 13. Natural and man-made open drainage channels
X 14. Wetlands
X 15. Flooded areas
X 16. Benchmark
X 17. Stormwater detention, retention, and infiltration facilities
X 18. Stormwater treatment facilities
X 19. Drainage easements

X D. Runoff analysis (pre-development and post development)
X 1. Curve number computations
X 2. Time of concentration calculations
X 3. Travel time calculations
X 4. Peak discharge calculations
X 5. Reservoir routing calculations

X E. Stormwater quantity control plan
N/A 1. Variance submissions (if applicable)
a. Submissions for discharge to the ocean, great pond, or major river
i. Map
ii. Drainage plan
iii. Drainage system design
iv. Outfall design
v. Easements
b. Submissions for discharge to a buffer
i. Road and buffer plan
ii. Ditch turn-out designs and calculations
iii. Buffer restrictions or easments
c. Submissions for discharge to a public stormwater system
i. Letter of permission
ii. Proof of capacity
ii. Outfall analysis and design

X 2. Sizing of storm drains and culverts
N/A 3. Stormwater ponds and basins
a. Impoundment sizing calculations
b. Inlet calculations
c. Outlet calculations
d. Emergency spillway calculations
e. Subsurface investigation report
f. Embankment specifications
g. Embankment seepage controls
h. Outlet seepage controls
i. Detail sheet
j. Basin cross sections
k. Basin plan sheet

N/A 4. Infiltration systems
a. Well locations map

b. Sand and gravel aquifer map
c. Subsurface investigation report with test pit or boring logs
d. Permeability analysis
e. Infiltration structure design
f. Pollutant generation and transport analysis
g. Monitoring and operations plan
i. Locations of storage points of potential contaminants
ii. Locations of observation wells and infiltration monitoring plan
iii. Groundwater quality monitoring plan

N/A 5. Drainage easement declarations.

X F. Stormwater quality treatment plan peak discharge calculations

X 1. Basic stabilization plan

X a. Ditches, swales, and other open channel stabilization

X b. Culvert and storm-drain outfall stabilization

X c. Earthen slope and embankment stabilization

X d. Disturbed area stabilization

X e. Gravel roads and drives stabilization

N/A 2. 80% TSS removal plan

a. Calcualtions for TSS removal achieved for each site subwatershed

N/A 3. Sliding scale TSS removal plan

a. Impervious area calculation
b. Determination of the required TSS removal
c. Calculations for TSS removal achieved for each site subwatershed

N/A 4. Phosphorus control plan

a. Calculations for the site's allowable phosphorus export
b. Calculations for determining the developed site's phosphorus export
c. Calculations for determining any phosphorus compensation fees

N/A 5. Offset Credits

a. TSS credit determination
i. Location map
ii. Scaled plan
iii. Title and right
iv. Demolition plan
v. Vegetation plan
vi. Offset credit calculation
vii. New treatment level calculation

b. Phosphorus credit determination
i. Location map
ii. Scaled plan
iii. Title and right
iv. Demolition plan
v. Vegetation plan
vi. Offset credit calculation
vii. Calculation for the new allowable export

X 6. Runoff treatment measures

X a. structural measures

X i. Design drawings and specifications

X ii. Design calculations

X iii. Maintenance plan

N/A iv. TSS removal or phosphorus treatment factor determinations

X v. Stabilization plan

N/A b. Vegetated buffers

i. Soil survey
ii. Buffer plan
iii. Turnout and level spreader designs

____ iv. Deed restrictions
N/A 7. Control plan for thermal impacts to coldwater fisheries
N/A 8. Control plan for other pollutants
____ 9. Engineering inspection of stormwater management facilities

____ **Section 13. Maintenance of common facilities or property**
N/A A. Components of the maintenance plan
____ 1. Maintenance of facilities by owner or operator
____ a. Site owner or operator
____ b. Contact person responsible for maintenance
____ c. Tranfer mechanism
____ d. List of facilities to be maintained
____ e. List of inspection and maintenance tasks for each facility
____ f. Identifications of any deed covenants, easements, or restrictions
____ g. Sample maintenance log
____ h. Copies of any third-party maintenance contracts
N/A 2. Maintenance of facilities by homeowner's association
____ a. Incorporation documents for the association
____ b. Membership criteria
____ c. Association officer responsible for maintenance
____ d. Establishment of fee assessment for maintenance work
____ e. Establishment of lien system
____ f. Reference to department order(s) in association charter
____ g. Tranfer mechanism from developer to association
____ h. List of facilities to be maintained
____ i. Identification of any deed covenants, easements, or restrictions
____ j. Renewal of covenants and leases
____ k. List of inspection and maintenance tasks for each facility
____ l. Sample maintenance log
____ m. Copies of any third-party maintenance contracts
N/A 3. Maintenance of facilities by municipality or municipal district
____ a. Identification of the municipal department or utility district
____ b. Contact person responsible for maintenance
____ c. Evidence of acceptance of maintenance responibility
____ d. Tranfer mechanism from developer
____ e. List of facilities to be maintained
____ f. List of inspection and maintenance tasks for each facility
____ g. Identifications of any deed covenants, easements, or restrictions
____ h. Sample maintenance log
X B. General inspection and maintenance requirements
____ 1. Drainage easements
____ 2. Ditches, culverts, and catch-basin systems
____ 3. Roadways and parking surfaces
____ 4. Stormwater detention and retention facilities
____ a. Embankment inspection and maintenance
____ b. Outlet inspection and clean-out
____ c. Spillway maintenance
____ d. Sediment removal and disposal
N/A 5. Stormwater infiltration facilities
____ a. Sediment protection plan
____ b. Infiltration rehabilitation plan
____ c. Sediment removal and disposal
____ d. Groundwater monitoring plan
X 6. Proprietary treatment devices
____ 7. Buffers

____ 8. Other practices and measures

Section 14. Erosion and Sedimentation Control

X A. Narrative
X 1. Soil types
X 2. Existing erosion problems
X 3. Critical areas
X 4. Protected natural resources
X 5. Erosion control measures
X 6. Site stabilization
X B. Implementation schedule
X C. Erosion and sediment control plan
X 1. Pre-development and post-development contours
X 2. Plan scale and elements
X 3. Land cover types and boundaries
X 4. Existing erosion problems
X 5. Critical areas
X 6. Protected natural resources
X 7. Locations (general)
X 8. Locations of controls
X 9. Disturbed areas
X D. Details and specifications (for both temporary and permanent measures)
X E. Design calculations
X F. Stabilization plan
X 1. Temporary seeding
X 2. Permanent seeding
____ 3. Sodding
X 4. Temporary mulching
X 5. Permanent mulching
X G. Winter construction plan
X 1. Dormant seeding
X 2. Winter mulching
____ H. Third-party inspections
____ 1. Inspector's name, address, and telephone number
____ 2. Inspector's qualifications
____ 3. Inspection schedule
____ 4. Contractor contact
____ 5. Reporting protocol

Section 15. Groundwater

X A. Narrative
X 1. Location and maps
X 2. Quantity
X 3. Sources
X 4. Measures to prevent degradation
X B. Groundwater protection plan – SPCC Plan
N/A C. Monitoring plan
____ 1. Monitoring points
____ 2. Monitoring frequency
____ 3. Background conditions
____ 4. Monitoring parameters
____ 5. Personnel qualifications
____ 6. Proof of training
____ 7. Equipment and methods

___ 8. Quality assurance/quality control
___ 9. Reporting requirements
___ 10. Remedial action plan

N/A D. Monitoring well installation report

___ 1. Well location map
___ 2. Elevation data
___ 3. Well installation data
___ 4. Well construction details
___ 5. Borehole logs
___ 6. Summary of depth measurements
___ 7. Characteristics of subsurface strata
___ 8. Well installation contract
___ 9. Schematic cross-sections
___ 10. Monitoring point summary table
___ 11. Protective casing
___ 12. On-site well identification

Section 16. Water supply

X A. Water supply method

___ 1. Individual wells (evidence of sufficient/healthful supply)
___ a. Support of findings by well drillers
___ b. Support of findings by geologist
___ 2. Common well(s) (reports)
___ a. Hydrogeology report
___ b. Engineering report
___ c. Well installation report
___ d. Long-term safe yield and zone of influence determination
X e. Public water supply
___ i. Proposed well or wells
___ ii. Existing well or wells
___ iii. Water quality analysis
___ 3. Well construction in shallow-to-bedrock areas
___ 4. Additional information
___ 5. Off-site utility company or public agency
___ 6. Other sources

N/A B. Subsurface wastewater disposal systems (locations of systems and wells)

N/A C. Total usage (statement re: total anticipated water usage)

Section 17. Wastewater disposal

___ A. On-site subsurface wastewater disposal systems (investigation results)

___ 1. Site plan
___ 2. Soil conditions summary table
___ 3. Logs of subsurface explorations
___ 4. Additional test pits, borings or probes
___ a. Soil conditions A
___ b. Soils with Profiles 8 and 9 parent material
___ c. Soil conditions D
___ d. Disposal field length 60 feet or greater
___ 5. 3-bedroom design
___ 6. Larger disposal systems
___ a. System design details
___ b. Plan view
___ c. Cross sections
___ d. Test pit data

____ e. Mounding analysis
____ B. Nitrate-nitrogen impact assessment
1. When required
____ a. Exempted____
i. Conventional systems meeting certain setbacks
____ ii. Denitrification systems
____ b. Special conditions and other exemptions
____ 2. Assumptions
____ a. Initial concentration
____ b. Background concentration
____ c. Contribution from development
____ d. Mixing and dilution
____ e. Severe-drought scenario
____ f. Wastewater flow to subsurface wastewater disposal fields
____ 3. Assessment report minimum requirements
____ a. Narrative and calculations
____ b. Site plan
____ i. Well locations
____ ii. 10 mg/l and 8 mg/l isocons
____ iii. Groundwater contours and groundwater flow divides
____ c. References
____ 4. Denitrification systems
____ a. Design plans and specifications
____ b. Installation information
____ c. Monitoring plan
____ d. Maintentance
____ e. Backup system
____ D. Municipal facility or utility company letter
____ E. Storage or treatment lagoons

__X__ **Section 18. Solid waste** (list: type, quantity, method of collection and location)
____ A. Commercial solid waste facility (final disposal location)
____ B. Off-site disposal of construction/demolition debris (final disposal location)
____ C. On-site disposal of woodwaste/land clearing debris
____ 1. Applicability of rules (evidence re: applicability of rules)
2. Burning of wood wastes
____ a. Delineation on site plan
____ b. Plans for handling unburned woodwaste and woodash
____ c. Evidence of capacity to accept waste (approved facility)
____ d. Usage of materials
____ e. Data on mixing ratios and application rates
____ D. Special or Hazardous Waste

__X__ **Section 19. Flooding**
__X__ A. Explanation of flooding impact
____ B. Site plan showing 100-year flood elevation
____ C. Hydrology analysis
__X__ D. FEMA flood zone map with site boundaries

__N/A__ **Section 20. Blasting**
____ A. Assessment
____ B. Blasting plan

Section 1

Development Description

Section 1

Development Description

A. Narrative

The proposed development is a 56,100 square foot heated cargo storage warehouse located on an approximately 2 acre parcel in the northwest corner of the site. The structure will be as manufactured by Rubb Buildings of Sanford, Maine. It will be galvanized tubular steel frame, insulated and covered with sheet vinyl set on a concrete foundation with concrete floor. The building will be similar in scale and design to the previously constructed Rubb VI now located on the southeast section of the site. The development will include a 400 linear foot rail siding.

The Merrill's Marine Terminal site includes approximately 15 acres of upland and 15 acres of intertidal and submerged land adjacent to the Veterans Memorial bridge, the main line of Springfield Terminal Railroad, Danforth and West Commercial Streets.

The site was originally permitted for its current use as a dry cargo marine terminal by the Maine Department of Environmental Protection Board Order on February 11, 1981 (Order #03/44-6592-05170) and modified August 26, 1981. Condition Compliance was satisfied on July 2, 1981. These included provisions for stormwater and erosion control and coal handling performance standards. Currently, the site includes 10 buildings covering approximately 220,000 square feet, three open paved storage pads, a 79,200 square foot wharf, a 1,200 foot 35' mlw berth, and a small boat marina.

On January 25, 1984, MDEP by staff order approved: 1) the addition of three breasting dolphins east of the main wharf, together with floating accessway docks; 2) two permanent lagoons inboard of the wharf; and 3) Rubb I, a 82' x 325' warehouse.

On October 29, 1984, MDEP by Order #L-6592-29-A-N approved the installation of an air supported cover and the use of the existing steel storage tanks for holding black liquor, caustic and latex. These uses were all discontinued before 1989.

On March 25, 1985, MDEP by Order #L-6592-29-B-N approved the erection of Rubb II, an 82' x 325' warehouse on the wharf structure.

On April 22, 1987, MDEP by Order #L-659-2-29/03-C-A approved the filling of intertidal wetland to create an additional acre of upland, and ordered compliance with a detailed noise control protocol.

The Maintenance Building was permitted by the City of Portland initially on May 3, 1985 and for an addition on December 9, 1996.

On May 22, 1990 and July 31, 1990, MDEP by Order #L-6592-29-H-N approved the construction of 35,000 square feet of additional warehouse space in the central area adjacent to the railroad siding. (Now occupied by the relocated Rubb II.)

On October 13, 1993, the City of Portland permitted "liftable cargo cover" Rubb III.

On August 17, 1995, the City of Portland permitted Rubb IV.

On April 3, 1996, MDEP by Order #L-6592-29-I-N approved the construction of a new breasting dolphin 150' east of the main wharf structure.

On September 6 and November 14, 2000 and March 27, 2001, the City of Portland permitted an extension to Rubb I, the relocation of Rubb II, the replacement of Rubb II with Rubb V, and the addition of a Vortec Stormwater System on the southeasterly bank to replace a system formerly serviced by settlement tanks.

B. Topographic Map

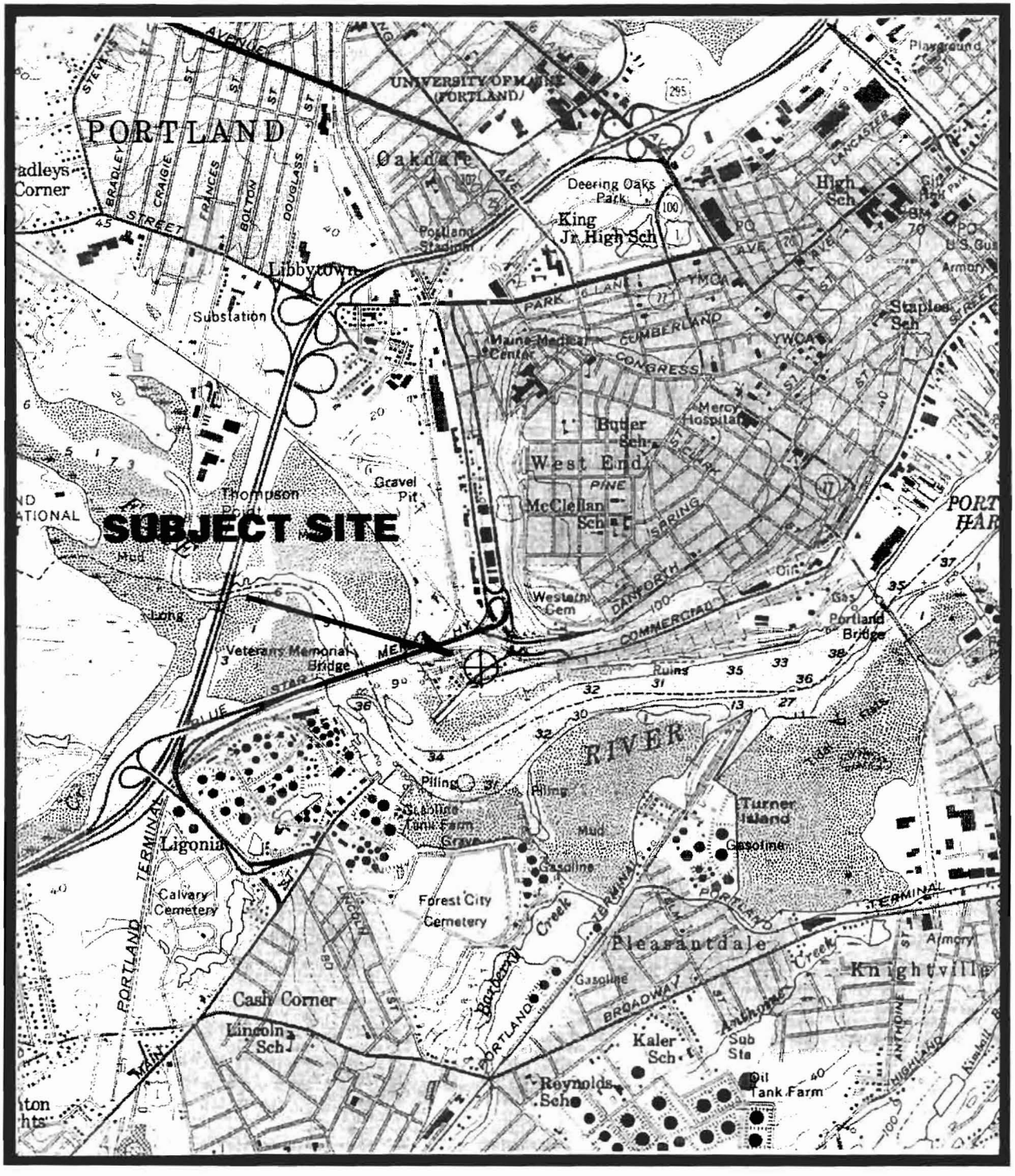
Figure 1 (USGS map) shows the proposed site location.

C. Drawings

All appropriate site drawings are contained within Appendix 1. The plans include the Owen Haskell site survey and existing conditions plan, as well as the following site plans:

Sheet	Title
1 of 5	Grading Plan
2 of 5	Excavation and Subgrade Prep
3 of 5	Partial Foundation Plan (West)
4 of 5	Partial Foundation Plan (East)
5 of 5	Foundation and Slab Details

FIGURE 1



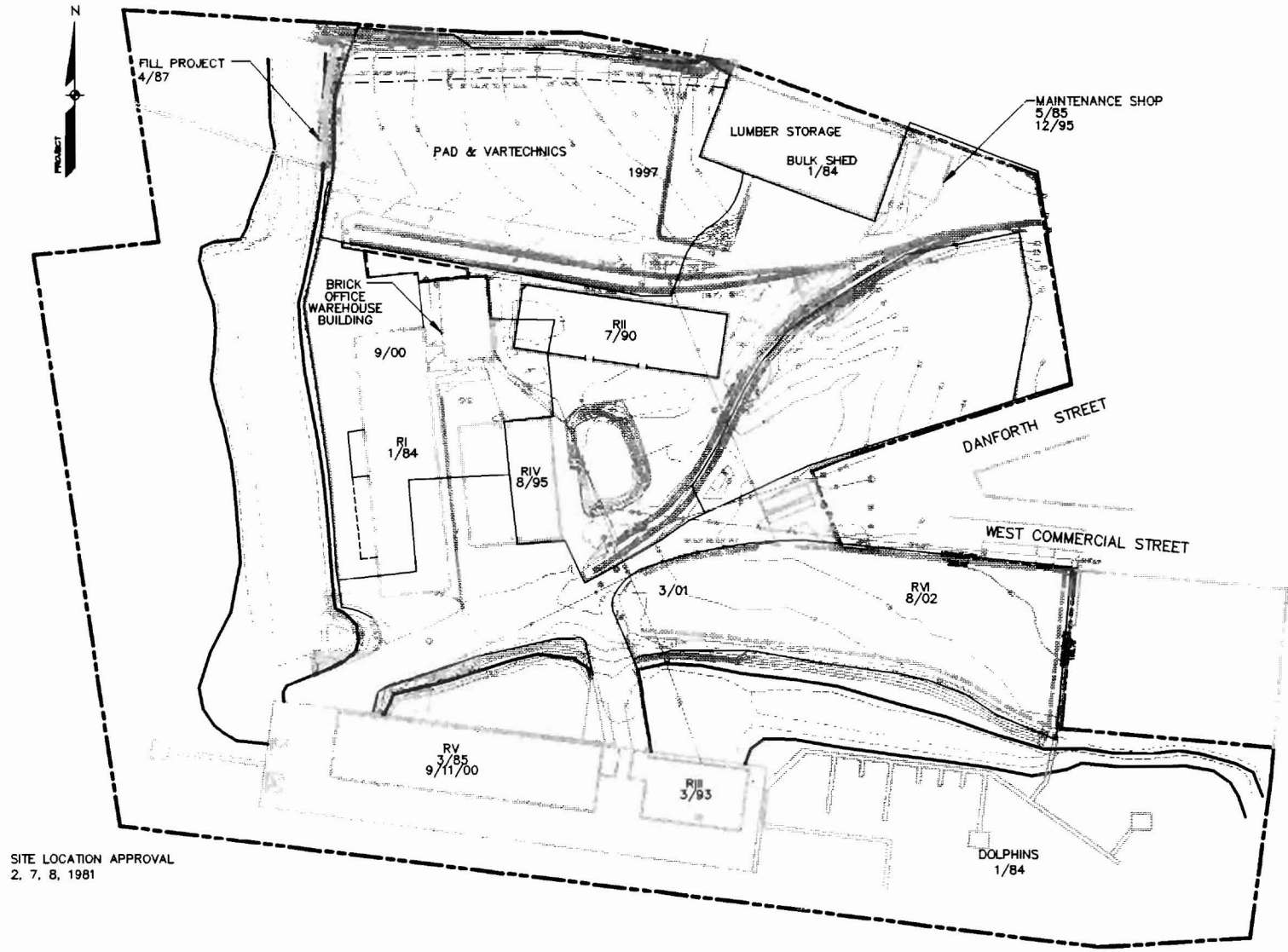
SITE LOCATION MAP

NEW WAREHOUSE
MERRILL INDUSTRIES
DANFORTH STREET
PORTLAND, MAINE

SCALE: 1:24.000

Sebago Technics
Engineering Expertise You Can Build On
One Chabot Street
Westbrook, Me 04098-1339
Tel (207) 856-0277

FIGURE 8



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SITE DEVELOPMENT MAP

OF

NEW WAREHOUSE, MERRILL INDUSTRIES
DANFORTH STREET
PORTLAND, MAINE

FOR:
MERRILL INDUSTRIES
PORTLAND, ME

SCALE: 1"=200'
DATE: 12/15/2004
SHEET: 1 OF 1

Section 2

Title, Right or Interest

Section 2

Right, Title or Interest

Please see Land Title Survey dated September 28, 2004 by Owen Haskell Surveyors.

Section 3

Financial Capacity

Section 3

Financial Capacity

Please see attached letter from Key Bank.

KeyBank

December 9, 2004

State of Maine
Department of Environmental Protection
Augusta, Maine

RE: Merrill Industries

To whom it may concern:

Please be advised that Merrill Industries has been a valued KeyBank client for several years. P. D. Merrill has discussed with us the company's plans to construct another warehouse building on their property on Danforth Street at an approximate cost of $3,000,000. Based on our knowledge of the company and our previous experience with them, we believe they have the financial capability to complete the proposed project. Please let me know if you have any questions or need any additional information.

Sincerely,

Eric S. Christensen
Senior Vice President

Section 4

Technical Ability

Section 4

Technical Ability
Merrill Industries, Inc.

The attached information from Merrill Industries and Sebago Technics, Inc. demonstrates the depth of the team to undertake the project permitting, design, construction, and operation of the project.

Merrill has erected six similar structures over the last 20 years. It employs qualified geotechnical, structural and civil engineers, and competent contractors.

Section 4

Technical Ability
Sebago Technics, Inc.

Sebago Technics, Inc. (STI) has been retained to prepare the City of Portland Site Location of Development application. This effort has included site stormwater analysis and drainage facilities by our civil engineering group and overall preparation of the permit application by our staff.

STI has prepared numerous SLOD applications and has been involved in hundreds of site development projects in Maine over the last 20 years.

Company Background

The firm was established in 1981. The company as a whole has grown to approximately 60 professionals. The firm consists of civil/site engineers, surveyors, landscape architects, soil scientists, and other professionals. In 1986, a computer-aided design drafting (CADD) division was established to further enhance our scope of available services. Sebago Technics, Inc. provides full-range technical assistance to developers, contractors and municipalities in the areas of commercial, residential and industrial developments.

Key Personnel

Walter P. Stinson, P.E.

President and founder of Sebago Technics, is a Registered Professional Engineer with a background that includes experience with the Department of Agriculture, Soil Conservation Service. He has a strong interest in land management, experience in grading and drainage practices, and maintains a strong involvement in all significant projects of the firm.

Charles L. Brown, P.L.S.

A Registered Land Surveyor, he joined the firm in 1984. His expertise in boundary and topographic surveying provides comprehensive land planning and design services to clients.

Shawn M. Frank, P.E.

A Registered Professional Engineer, he joined the firm in 1985 as a design engineer. His nearly 20 years of practice in consulting engineering firms provides the required experience to allow for effective project management.

Donald T. McElhinney, P.E.

The Vice President of Environmental Engineering is a professional engineer with over 30 years experience in the environmental field.

Section 5

Noise

Section 5

Noise

This project will substantially reduce noise emission from the site because it will supplant the current recycled metal stockpiling and load out operation which will be discontinued.

Section 6

Visual Quality & Scenic Character

Section 6

Visual Quality and Scenic Character

The recycled metal stockpile will be replaced by a single structure which will complement six existing structures on the site in terms of size, shape and color.

Section 7

Wildlife and Fisheries

Section 7

Wildlife and Fisheries

The Department of Inland Fisheries and Wildlife has been contacted regarding the presence of any essential, significant or special concern habitat located on the property. The attached request for review was filed and has not, as of yet, been reviewed.

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P.O. Box 1339
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Fax 856-2206

December 1, 2004
04480

Mr. Warren Eldridge
Maine Department of Inland Fisheries & Wildlife
358 Shaker Road
Gray, ME 04039

Inland Fisheries and Wildlife Review
Merrill Industries Site, Danforth Street, Portland

Dear Mr. Eldridge:

I wish to request your review of the habitat files for any essential or significant wildlife habitats associated with the proposed development with the Merrill Industries site, Danforth Street, Portland, Maine.

I have included a copy of the USGS quadrangle for Portland which depicts the project site, the existing conditions plan, and the proposed development plan for the property.

We are currently preparing a Site Location Application for this project and wish to include any information you may have on this site in our application.

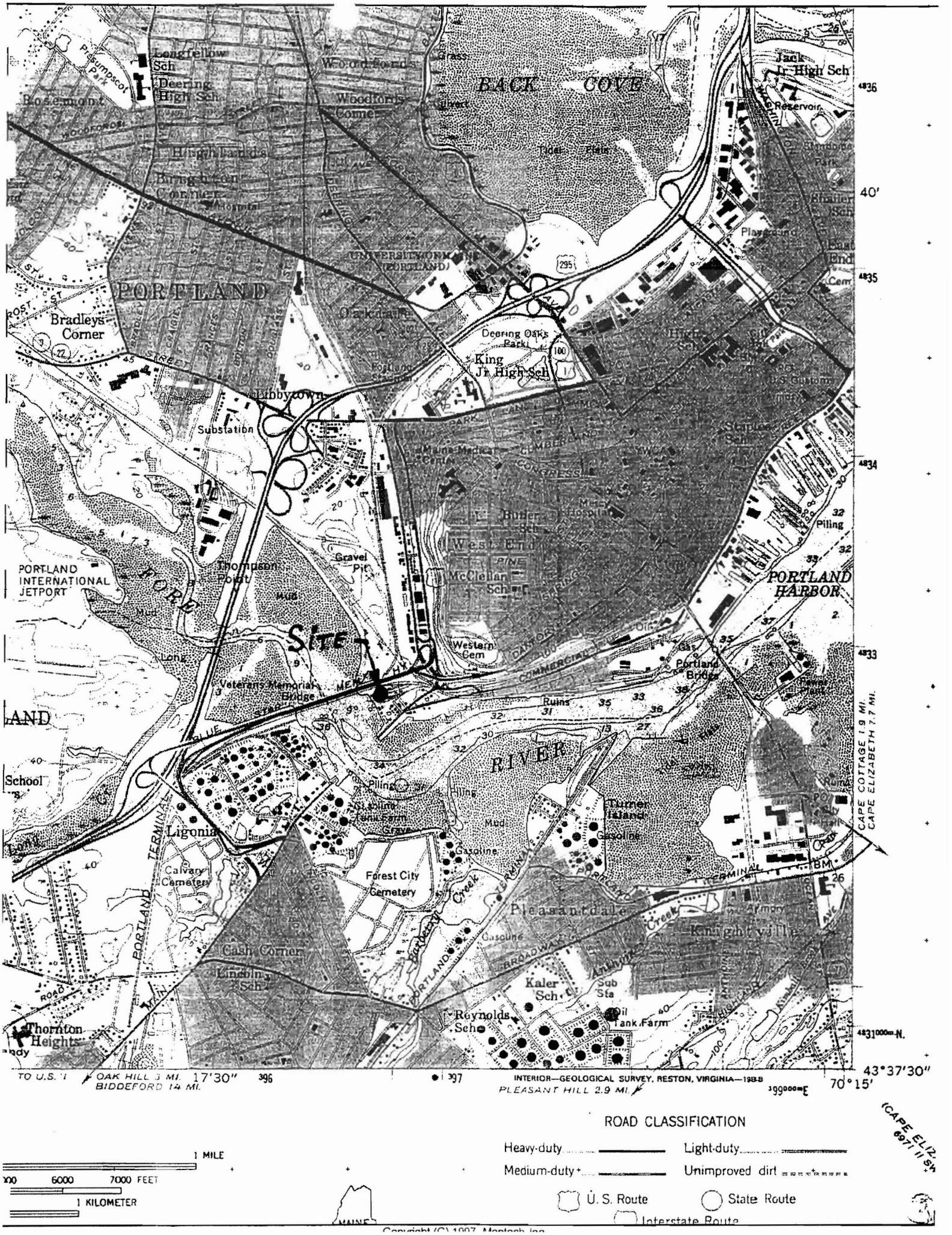
If you have any questions on this project, please do not hesitate to contact me. I look forward to hearing from you.

Sincerely,

SEBAGO TECHNICS, INC.

Donald T. McElhinney, P.E.
Vice President, Environmental Engineering

DTM:jc
Enc.



Section 8

Historic Sites

Section 8

Historic Sites

A request for review by the Maine Historic Preservation Commission (MHPC) has been filed. The MHPC has not yet responded to the request.

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04098-1339
Ph. 207-856-0277
Fax 856-2206

December 1, 2004
04480

Mr. Earle G. Shettleworth, Jr.
Maine Historic Preservation Commission
55 Capitol Street
State House Station 65
Augusta, ME 04333

Historic Preservation Commission Review
Merrill Industries Site, Danforth Street, Portland

Dear Mr. Shettleworth:

I wish to request your review of the Historic Preservation Commission database for any historic significance to the proposed development with the Merrill Industries site, Danforth Street, Portland, Maine.

I have included a copy of the USGS quadrangle for Portland which depicts the project site, the existing conditions plan, and the proposed development plan for the property.

We are currently preparing a Site Location Application for this project and wish to include any information you may have on this site in our application.

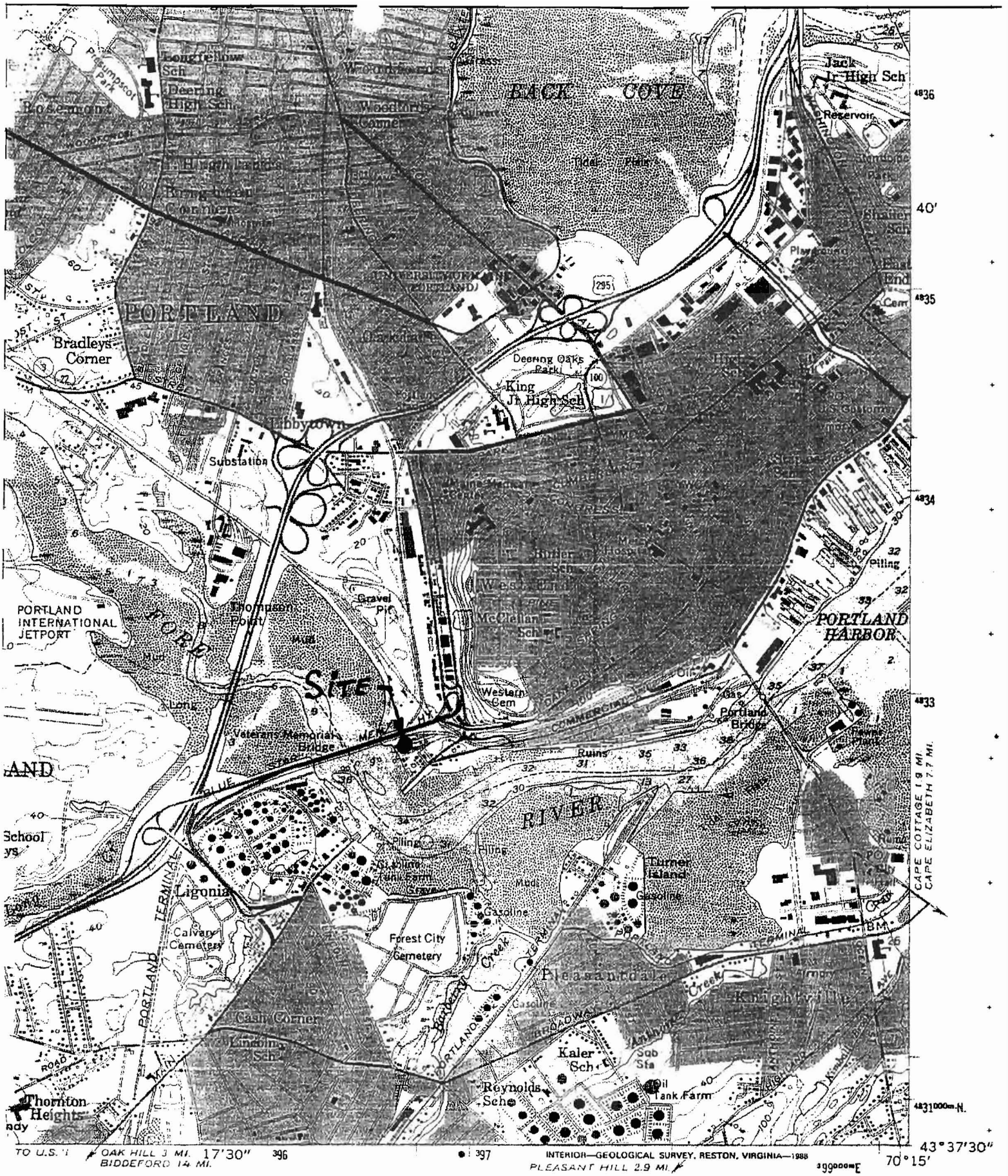
If you have any questions on this project, please do not hesitate to contact me. I look forward to hearing from you.

Sincerely,

SEBAGO TECHNICS, INC.

Donald T. McElhinney, P.E.
Vice President, Environmental Engineering

DTM:jc
Enc.



INTERIOR—GEOLOGICAL SURVEY, RESTON, VIRGINIA—1988

ROAD CLASSIFICATION

Heavy-duty ——— Light-duty - - - -

Medium-duty ——— Unimproved dirt - - - -

U.S. Route State Route Interstate Route

1 MILE

0 6000 7000 FEET

1 KILOMETER

Section 9

Unusual Natural Areas

Section 9

Unusual Natural Areas

This project has been reviewed by the Maine Natural Heritage Program and no record of any rare features were found to occur on the property based upon the Natural Heritage database (see attached letter).

STATE OF MAINE
DEPARTMENT OF CONSERVATION
157 HOSPITAL STREET
93 STATE HOUSE STATION
AUGUSTA, MAINE 04333-0093

JOHN ELIAS BALDACCI
GOVERNOR

PATRICK K. MCGOWAN
COMMISSIONER

December 6, 2004

Donald T. McElhinney
Vice President, Environmental Engineering
Sebago Technics
One Chabot Street
P.O. Box 1339
Westbrook, ME 04098-1339

Re: Rare and exemplary botanical features, Danforth Street, Portland.

Dear Mr. McElhinney:

I have searched the Natural Areas Program's Biological and Conservation Data System files in response to your request of December 1, 2004 for information on the presence of rare or unique botanical features documented from the vicinity of the project site in the City of Portland, Maine. Rare and unique botanical features include the habitat of rare, threatened or endangered plant species and unique or exemplary natural communities. Our review involves examining maps, manual and computerized records, other sources of information such as scientific articles or published references, and the personal knowledge of staff or cooperating experts.

Our official response covers only botanical features. For authoritative information and official response for zoological features you must make a similar request to the Maine Department of Inland Fisheries and Wildlife, 284 State Street, Augusta, Maine 04333.

According to the information currently in our Biological and Conservation Data System files, there are no rare botanical features documented specifically within the project area. This lack of data may indicate minimal survey efforts rather than confirm the absence of rare botanical features. You may want to have the site inventoried by a qualified field biologist to ensure that no undocumented rare features are inadvertently harmed.

If a field survey of the project area is conducted, please refer to the enclosed supplemental information regarding rare and exemplary botanical features documented to occur in the vicinity of the project site. The list may include information on features that have been known to occur historically in the area as

MAINE NATURAL AREAS PROGRAM
MOLLY DOCHERTY, DIRECTOR

PHONE: (207) 287-8044
FAX: (207) 287-8040
TTY: (207) 287-2213

well as recently field-verified information. While historic records have not been documented in several years, they may persist in the area if suitable habitat exists. The enclosed list identifies features with potential to occur in the area, and it should be considered if you choose to conduct field surveys.

This finding is available and appropriate for preparation and review of environmental assessments, but it is not a substitute for on-site surveys. Comprehensive field surveys do not exist for all natural areas in Maine, and in the absence of a specific field investigation, the Maine Natural Areas Program cannot provide a definitive statement on the presence or absence of unusual natural features at this site.

The Natural Areas Program is continuously working to achieve a more comprehensive database of exemplary natural features in Maine. We would appreciate the contribution of any information obtained should you decide to do field work. The Natural Areas Program welcomes coordination with individuals or organizations proposing environmental alteration, or conducting environmental assessments. If, however, data provided by the Natural Areas Program are to be published in any form, the Program should be informed at the outset and credited as the source.

The Natural Areas Program has instituted a fee structure of $75.00 an hour to recover the actual cost of processing your request for information. You will receive an invoice for $75.00 for our services.

Thank you for using the Natural Areas Program in the environmental review process. Please do not hesitate to contact me if you have further questions about the Natural Areas Program or about rare or unique botanical features on this site.

Sincerely,

Toni Bingel Pied

Toni Bingel Pied
GIS Specialist/Assistant Ecologist
93 State House Station
Augusta, ME 04333-0093
207-287-8044
toni.pied@maine.gov

Enclosures

Rare or Exemplary Botanical Features in the Project Vicinity

Documented within a four mile radius of the proposed development, Merrill Industries site, Danforth Street, Portland.

Scientific Name Common Name	Last Seen	State Rarity	Global Rarity	State Legal Status	Federal Legal Status	Habitat Description
Adlumia fungosa Allegheny Vine		S1	G4	T		Wet or recently burned woods, rocky wooded slopes.
Allium canadense Wild Garlic		S2	G5	SC		Alluvial woods, thickets, and meadows.
Allium tricoccum Wild Leek		S3	G5	SC		Rich hardwood forests, usually alluvial.
Arabis missouriensis Missouri Rockcress		S1	G4G5Q	T		Circumneutral bluffs, ledges or rocky woods.
Asplenium platyneuron Ebony Spleenwort		S2	G5	SC		Rich partly forested slopes, rocky ledges, and dry, circumneutral outcrops.
Aureolaria pedicularia Fern-leaved False Foxglove		S3	G5	SC		Dry deciduous woods and clearings.
Carex polymorpha Variable Sedge		S1	G3	E		In Maine, habitat is between downslope seeps (with horsetails and wetland sedges) and upslope mixed oak/huckleberry forest. Preferred soil type is Deerfield Loamy Sand. All Maine occurrences are from coastal towns where climate is moderated by the ocean.
Carex recta Salt-marsh Sedge		S1	G4	T		Saltmarshes and coastal shores.

Rare or Exemplary Botanical Features in the Project Vicinity

Documented within a four mile radius of the proposed development, Merrill Industries site, Danforth Street, Portland.

Scientific Name Common Name	Last Seen	State Rarity	Global Rarity	State Legal Status	Federal Legal Status	Habitat Description
Carex sterilis Dioecious Sedge		S2	G4	T		Wet calcareous soils.
Chimaphila maculata Spotted Wintergreen		S2	G5	E		Dry woods.
Eleocharis engelmannii Engelmann's Spikerush		SH	G4?	PE		Wet sand, peat or mud
Eriocaulon parkeri Parker's Pipewort		S3	G3	SC		Fresh to brackish tidal mud and estuaries.
Hippuris vulgaris Common Mare's-tail		S3	G5	SC		Shallow, quiet water, or seldom on mud
Lobelia siphilitica Great Blue Lobelia		SX	G5	PE		Rich low woods and swamps
Lonicera dioica Mountain Honeysuckle		S1?	G5	E		Rocky banks, dry woods and thickets.
Phegopteris hexagonoptera Broad Beech Fern		S2	G5	SC		Rich, often rocky, hardwood forests.

Rare or Exemplary Botanical Features in the Project Vicinity

Documented within a four mile radius of the proposed development, Merrill Industries site, Danforth Street, Portland.

Scientific Name Common Name	Last Seen	State Rarity	Global Rarity	State Legal Status	Federal Legal Status	Habitat Description
Polygala cruciata Marsh Milkwort		SH	G5T4	PE		Wet pinelands, savannas, peats, and sands.
Potamogeton vaseyi Vasey's Pondweed		S1	G4	T		Quiet muddy or calcareous waters.
Proserpinaca pectinata Comb-leaved Mermaid-weed		S1	G5	SC		Sandy bogs of the coastal plain
Prunus maritima Beach Plum		S1	G4	E		Sandy soil along or near the coast.
Ranunculus ambigens Water-plantain Spearwort		SH	G4	PE		Sloughs, ditches, and muddy swamps.
Saxifraga pensylvanica Swamp Saxifrage		S3	G5	T		Wet meadows, swamps, boggy thickets, and seeping banks
Selaginella apoda Creeping Spike-moss		S1	G5	E		Meadows, lawns, and streambanks.
Spartina saltmarsh Salt-hay Saltmarsh		S3	G5			Saltmarshes dominated by Spartina grasses. May form large expanses behind dunes, or may be found in pockets along larger rivers. Peat is typically more than a meter thick.

Rare or Exemplary Botanical Features in the Project Vicinity

Documented within a four mile radius of the proposed development, Merrill Industries site, Danforth Street, Portland.

Scientific Name Common Name	Last Seen	State Rarity	Global Rarity	State Legal Status	Federal Legal Status	Habitat Description
Suaeda calceoliformis American Sea-blite		S1	G5	T		Rocky or gravelly saltmarshes and sea-strands.
Triosteum aurantiacum Wild Coffee		S1	G5	E		Rich woods and thickets.
Wolffia columbiana Columbia Water-meal		S2	G5	T		Ponds, and still waters.
Zannichellia palustris Horned Pondweed		S2	G5	SC		Fresh, brackish or alkaline waters, and stream edges.

STATE RARITY RANKS

S1 Critically imperiled in Maine because of extreme rarity (five or fewer occurrences or very few remaining individuals or acres) or because some aspect of its biology makes it especially vulnerable to extirpation from the State of Maine.

S2 Imperiled in Maine because of rarity (6-20 occurrences or few remaining individuals or acres) or because of other factors making it vulnerable to further decline.

S3 Rare in Maine (on the order of 20-100 occurrences).

S4 Apparently secure in Maine.

S5 Demonstrably secure in Maine.

SH Occurred historically in Maine, and could be rediscovered; not known to have been extirpated.

SU Possibly in peril in Maine, but status uncertain; need more information.

SX Apparently extirpated in Maine (historically occurring species for which habitat no longer exists in Maine).

Note: **State Ranks** determined by the Maine Natural Areas Program.

GLOBAL RARITY RANKS

G1 Critically imperiled globally because of extreme rarity (five or fewer occurrences or very few remaining individuals or acres) or because some aspect of its biology makes it especially vulnerable to extirpation from the State of Maine.

G2 Globally imperiled because of rarity (6-20 occurrences or few remaining individuals or acres) or because of other factors making it vulnerable to further decline.

G3 Globally rare (on the order of 20-100 occurrences).

G4 Apparently secure globally.

G5 Demonstrably secure globally.

Note: **Global Ranks** are determined by The Nature Conservancy.
T indicates subspecies rank, **Q** indicates questionable rank, **HYB** indicates hybrid species.

STATE LEGAL STATUS

Note: State legal status is according to 5 M.R.S.A. § 13076-13079, which mandates the Department of Conservation to produce and biennially update the official list of Maine's endangered and threatened plants. The list is derived by a technical advisory committee of botanists who use data in the Natural Areas Program's database to recommend status changes to the Department of Conservation.

E ENDANGERED; Rare and in danger of being lost from the state in the foreseeable future, or federally listed as Endangered.

T THREATENED; Rare and, with further decline, could become endangered; or federally listed as Threatened.

SC SPECIAL CONCERN; Rare in Maine, based on available information, but not sufficiently rare to be considered Threatened or Endangered.

PE POSSIBLY EXTIRPATED; Not known to currently exist in Maine; not field-verified (or documented) in Maine over the past 20 years.

FEDERAL STATUS

LE Listed as Endangered at the national level.

LT Listed as Threatened at the national level.

Please note that species names follow Flora of Maine: A Manual for Identification of Native and Naturalized Vascular Plants of Maine, Arthur Haines and Thomas F. Vining, 1998, V.F. Thomas Co., 219 Dead River Road, Bowdoin, ME 04287.

Where entries appear as binomials, all representatives (subspecies and varieties) of the species are rare in Maine; where names appear as trinomials, only that particular variety or subspecies is rare in Maine, not the species as a whole.

Sebago Technics
Engineering Expertise You Can Build On

sebagotechnics.com
One Chabot Street
P.O. Box 1339
Westbrook, Maine
04098-1339
Ph. 207-856-0277
Fax 856-2206

December 1, 2004
04480

Ms. Sarah Holbrook
Department of Conservation
159 Hospital Street
State House Station 93
Augusta, ME 04333

Natural Heritage Program Review
Merrill Industries Site, Danforth Street, Portland

Dear Ms. Holbrook:

I wish to request your review of the Natural Heritage Program's files for any rare vascular plants, natural communities, registered critical areas, or other natural features of special concern in the vicinity of the proposed development with the Merrill Industries site, Danforth Street, Portland, Maine.

I have included a copy of the USGS quadrangle for Portland which depicts the project site, the existing conditions plan, and the proposed development plan for the property.

We are currently preparing a Site Location Application for this project and wish to include any information you may have on this site in our application. I understand your Department will be invoicing us at a rate of $75.00 an hour for the time spent researching this information, with a minimum of $50.00 for less than an hour.

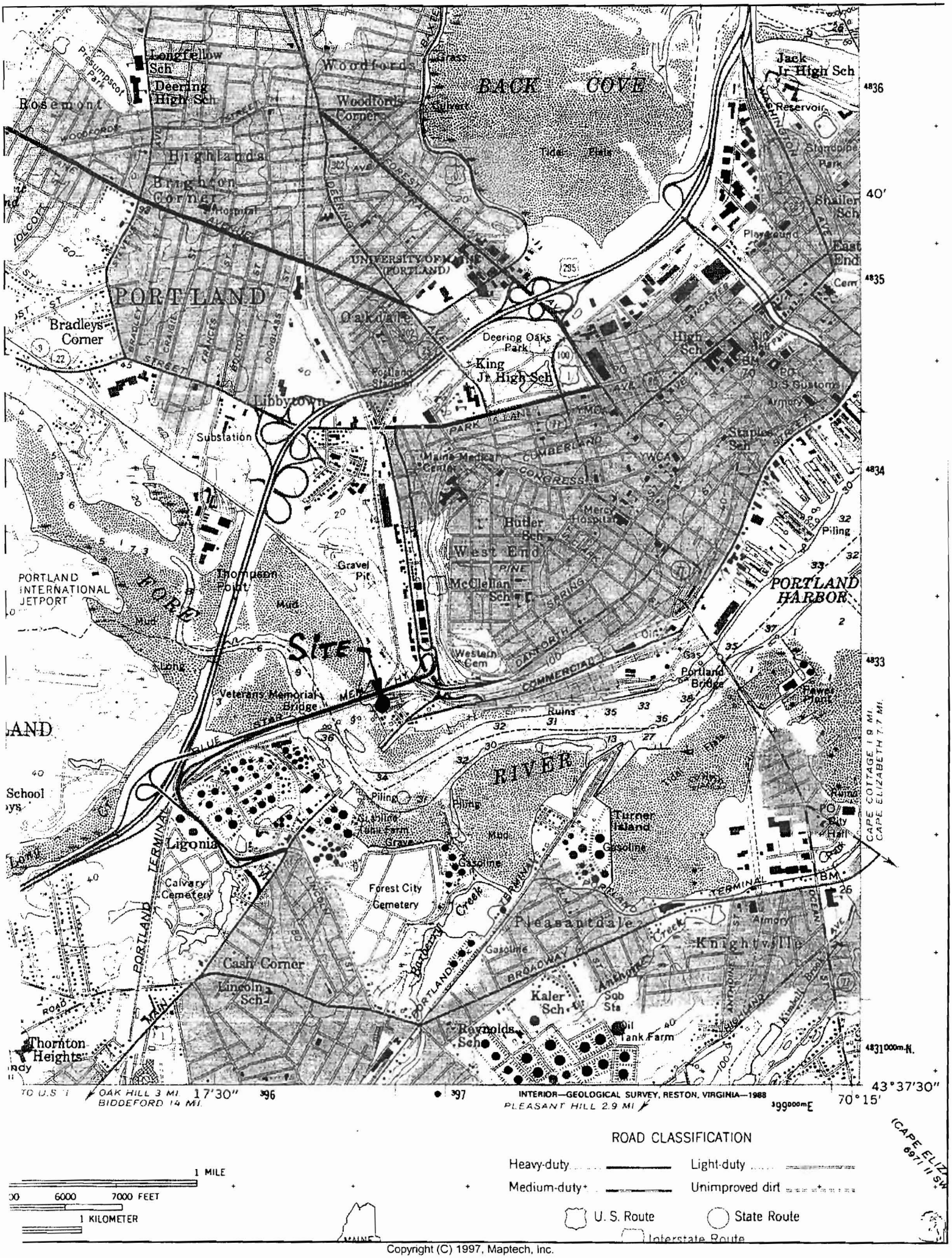
If you have any questions on this project, please do not hesitate to contact me. I look forward to hearing from you.

Sincerely,

SEBAGO TECHNICS, INC.

Donald T. McElhinney, P.E.
Vice President, Environmental Engineering

DTM:jc
Enc.



Section 10

Buffers

Section 10

Buffers

The proposed structure will provide a permanent buffer between shipping activities (movement of trucks, rail cars, ship operations) and the area north of the Veterans Bridge (Mercy Hospital).

Section 11

Soils

Section 11

Soils

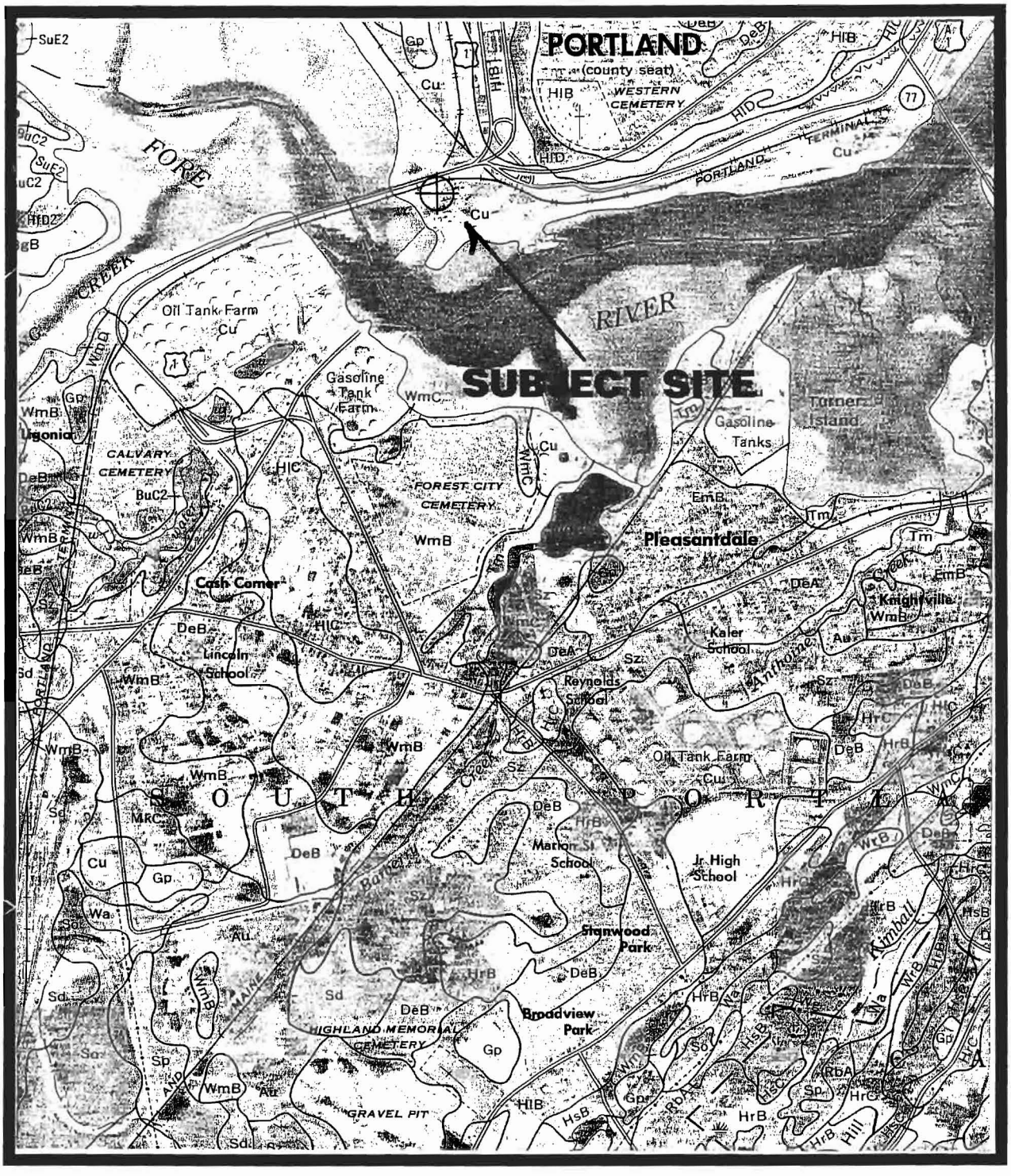
A. Soil Survey Map and Report

In accordance with the SLOD Permit Application instructions, a copy of the Class D Soils Survey from the Cumberland County Soil Survey, USDA, Soil Conservation Service, August 1974 is attached (Figure 3). The soils on site are classified as Cut and Fill Land (Cu) which consists of excavated soil material and bedrock. The material consists of sandy, clayey, silty, cobbley and gravelly sediments, separately or in various combinations.

B. Geotechnical Investigation

See attached Geotechnical Report.

FIGURE 3



MEDIUM INTENSITY SOIL SURVEY

CUMBERLAND COUNTY

SHEET # 86

SCALE 1:20,000

Sebago Technics
Engineering Expertise You Can Build On
One Chabot Street
Westbrook, Me 04098-1339
Tel (207) 856-0277

GEI Consultants, Inc.

1021 Main Street
Winchester, MA 01890-1970
781•721•4000
781•721•4073 Fax

July 8, 2004
Project 04082-2

Mr. P. D. Merrill
Merrill Marine Terminal Services, Inc.
601 Danforth Street
Portland, Maine 04102

Re: **Subsurface Investigation and Settlement Analysis**
Proposed Rubb Warehouse No. 7
Merrill Marine Terminal
Portland, Maine

Dear Mr. Merrill:

This letter summarizes the results of our subsurface investigation and settlement analysis for the proposed Rubb Warehouse No. 7 at the Merrill Marine Terminal in Portland Maine. This work was performed in accordance with our proposal dated April 20, 2004.

Project Description

The footprint of the proposed warehouse is shown on Figure 1. The warehouse will consist of a Rubb fabric building supported on shallow footing foundations with a reinforced concrete slab-on-grade floor. The design floor elevation is at El. 22 and up to 4 to 6 feet of fill will have to be placed in portions of the building footprint to create a level surface for the building. The design storage load is 1,000 psf. The Rubb building is very flexible, and it can tolerate relatively large differential settlements. We understand that you would prefer a concrete floor, but would also consider using a flexible asphalt pavement. A concrete floor must be designed to prevent excessive cracking that could result in contamination of the stored product with concrete residue from the floor. Selection of the type of floor will be based on both cost and serviceability considerations.

Existing Subsurface Data

There is a considerable amount of existing soil boring and laboratory test data available from previous investigations at the Merrill Marine Terminal. We reviewed this existing information and have incorporated applicable data from these previous investigations in the evaluation performed for this project.

The following existing soil borings are located close to the location of the proposed warehouse: D-14, B-402, B-216, B-302, B-1, B-2 and B-3. Information on compressibility and preconsolidation of the organic silt and clay strata is available from laboratory consolidation tests performed on samples obtained from the mudflat areas on the south and west sides of the marine terminal and from a storage area located north of the bridge that borders the north side of the marine terminal.

Subsurface Investigation

We engaged Northeast Diamond Drilling Co. to perform two soil borings (B-501 and B-502) to evaluate the thickness of the compressible organic silt and clay strata at the proposed warehouse location and to obtain undisturbed samples for laboratory consolidation tests. The boring locations are shown on Figure 1 and boring logs are contained in Appendix A. These boring locations were selected to obtain samples for laboratory testing from portions of the proposed warehouse footprint that have experienced the least amount of surcharge from previous bulk storage loading.

The borings were advanced by driving a 4-inch ID casing and cleaning out the casing with a roller bit. Standard 2-inch OD (1⅜-inch ID) split spoon samples were obtained in accordance with ASTM D1586 at intervals varying from 5 to 10 feet. Eight undisturbed 3-inch-diameter thin-wall tube samples of the organic silt and clay were obtained with a hydraulic fixed-piston (Osterberg) sampler. The borings were advanced to refusal at depths of 49.6 feet in B-501 and 72.4 feet in B-502.

Laboratory Testing

Five one-dimensional consolidation tests were performed to obtain data on compressibility and preconsolidation of the organic silt and clay strata. Compression curves from the consolidation tests are contained in Appendix B. The test specimen from B-502 U4 appeared to be disturbed by the presence of a piece of gravel that damaged the cutting edge of the thin-wall tube and the test results for this specimen proved to be unusable.

Compressibility indices from the consolidation tests are plotted in Figure 2 and pre-consolidation pressures from the consolidation tests are plotted in Figure 3, along with the data from the previous investigations.

Subsurface Soil Conditions

The general soil profile in the area of the proposed warehouse consists of: 10–20 feet of granular fill and sand; 30-50 feet of soft organic silt and clay; and about 5-10 feet of sand and/or glacial till overlying bedrock.

The granular fill varies from widely-graded sand with gravel to narrowly-graded silty fine sand. The natural sand underlying the fill typically consists of narrowly-graded silty to clayey fine sand. The standard penetration test N-values in the granular fill and sand

indicates that the in-place density of the soil typically ranges from very loose to medium dense, with most of the soil in a loose condition.

The thickness of the soft organic silt and clay increases from about 30 feet at the west end of the warehouse to about 50 feet at the east end. At the west end there is about 10 feet of organic silt overlying about 20 feet of clay. At the east end there is no organic silt and the clay is about 50 feet thick.

The clay is an older marine deposit of glacial origin and the upper portion of the clay stratum has undergone significant geologic preconsolidation due to desiccation. The organic silt is a more recent deposit that has not experienced the same geologic preconsolidation as the clay. The preconsolidation data from the consolidation tests indicate that the preconsolidation profile for the clay at the warehouse location is similar to the preconsolidation profile obtained from the previous tests on samples from the mudflat areas. However, the organic silt at the warehouse location shows significantly higher preconsolidation than indicated by the previous tests on samples from the mudflat areas. This preconsolidation is probably due to surface surcharge loadings.

At the east end of the warehouse the clay stratum contains layers of silty to clayey fine sand varying from less than an inch to several feet in thickness. A surficial geology map for the Portland area indicates that the glacial marine clay stratum transitions to a glacial marine sand to the northeast of the marine terminal site, and this transition can be seen in the northeastern-most borings from the previous site investigations.

The groundwater level at the east end of the warehouse appears to be about El. 13 based on previous measurements performed in boring B-3. The groundwater level at the west end of the warehouse is tidal, and an average level of El. 5 (approximate mean tide level) was assumed for analysis.

Settlement Analyses

We performed one-dimensional settlement analyses to estimate the magnitude of settlement due to compression of the soft organic silt and clay strata under the weight of the new fill and storage loading. Analyses were performed for the soil profiles from borings B-501 (west end) and B-502 (east end) using a recompression index of 0.02 and a virgin compression index of 0.20 for both the organic silt and clay. For the analyses at the east end we applied an adjustment for the estimated percentage of sand layers in the clay stratum. We used the preconsolidation profile shown in Figure 3 where it is greater than the existing vertical effective stress, and we assumed an overconsolidation ratio of 1.05 due to aging where the preconsolidation profile in Figure 3 is less than the existing effective stress. The stresses in the organic silt and clay strata due to the weight of the fill (500 to 600 psf) and storage loading (1,000 psf) were calculated using the Boussinesq elastic solution for uniform loading over a rectangular area, with the fill and storage loading applied over the full warehouse footprint. The settlement calculations were performed using the computer program SAF distributed by Prototype Engineering, Inc.

The estimated settlement due to compression of the organic silt and clay is in the range of 1 to 3 inches. The estimated settlements for the specific cases analyzed are as follows:

Location	Est. Settlement, inches	Notes
West End - South side (boring B-501)	1.0	Location with least preconsolidation, stress increase is less at side
West End - Center in Scrap Steel Storage Area	1.5	Assumed full preconsolidation by steel storage surcharge, stress increase is greatest at center
East End – South side (boring B-502)	2.5 (3.5)	Location with least preconsolidation, stress increase is less at side
East End – Center in Salt Storage Shed Area	3.0 (4.0)	Assumed the existing surcharge is equivalent to a ground level at El. 24, stress increase is greatest at center.

Number in ( ) is the value before adjustment for sand layers.

Differential settlements resulting from the compression of the organic silt and clay are expected to be relatively gradual because the differences in the estimated settlements are largely due to differences in the compression within the lower portion of the clay stratum.

There is a significant potential for differential settlements due to local variations in compression of the loose fill and sand overlying the organic silt and clay, which is not reflected in the settlement analyses summarized above. Because these soils are highly variable and are located directly below the structure, they may produce relatively sharp differential settlements across short distances. These sharp differential settlements can be reduced by providing a layer of compacted fill below the structure

Conclusions and Recommendations

Our subsurface investigation and analyses indicate that the existing preconsolidation of the organic silt and clay is sufficient to prevent large settlements under the weight of the new fill and storage loading. Therefore, we conclude that preloading is not required. It is our understanding that the estimated settlement of 1 to 3 inches due to deep-seated compression of the silt and clay is within the tolerable limits for the Rubb building superstructure. The floor slab should be designed with sufficient reinforcing and control joints to tolerate settlements of this magnitude.

We recommend that the following minimum thicknesses of controlled compacted fill be placed below the footings and floor slab to reduce differential settlements due to the loose fill and sand directly below the structure (includes the 9-inch minimum thickness of Structural Fill directly below the floor slab per our recommendations for the slab design):

- Area surcharged by a minimum 30-foot height of the steel storage pile

  Footings - none
  Floor slab - 1.5 feet

- Areas below the edges of the steel storage pile that may not have been surcharged by a 30-ft height of the storage pile

  Footings - 1.5 feet
  Floor slab - 3 feet

- Other areas

  Footings – 3 feet
  Floor slab - 5 feet

The controlled fill should be a widely-graded sand and gravel with less than 30% silt and should not contain rubble, clay or organic material. If the existing onsite fill is reused, materials that do not fit this description should be separated out and should only be used outside the structure. The natural silty-clayey fine sand below the existing fill is not suitable for reuse as controlled fill below the structure. The fill should be compacted to at least 92% of the maximum dry density obtained from ASTM method D-1557. If the fill material is highly variable, it may be more appropriate to specify a suitable compaction procedure instead of performing field density testing.

We have assumed that the warehouse building will be heated. If it is not heated, a fill material that is not susceptible to frost heave must be placed within the depth of potential ground freezing below the structure. The freezing depth can be reduced by providing insulation below the floor slab and around the perimeter of the structure.

We recommend an allowable bearing pressure of 2 tsf for footings bearing on a minimum 3-foot thickness of compacted fill. The compacted fill below the footing should have a minimum width equal to the width of the footing plus three feet on each side of the footing. Exterior footings should bear at a minimum depth of 4 feet below exterior grade for frost protection.

For the floor slab design we recommend a Westergaard modulus of subgrade reaction of k=100 pounds per cubic inch in accordance with the design criteria in "Slab Thickness for Industrial Concrete Floors on Grade" by the Portland Cement Association. At least 9 inches of Structural Fill meeting the gradation and compaction requirements in Table 1 should be placed immediately below the floor slab. A vapor barrier should be provided below the floor slab and the slab should be provided with suitable joints for crack control.

Please call David Shields at 781-721-4032 or Mike Yako at 781-721-4043 if you have any questions.

Sincerely,

GEI CONSULTANTS, INC.

David R. Shields, P.E.
Senior Technical Consultant

Francis D. Leathers, P.E.
Principal

STATE OF MAINE
FRANCIS DOPP LEATHERS
No. 5571
REGISTERED PROFESSIONAL ENGINEER

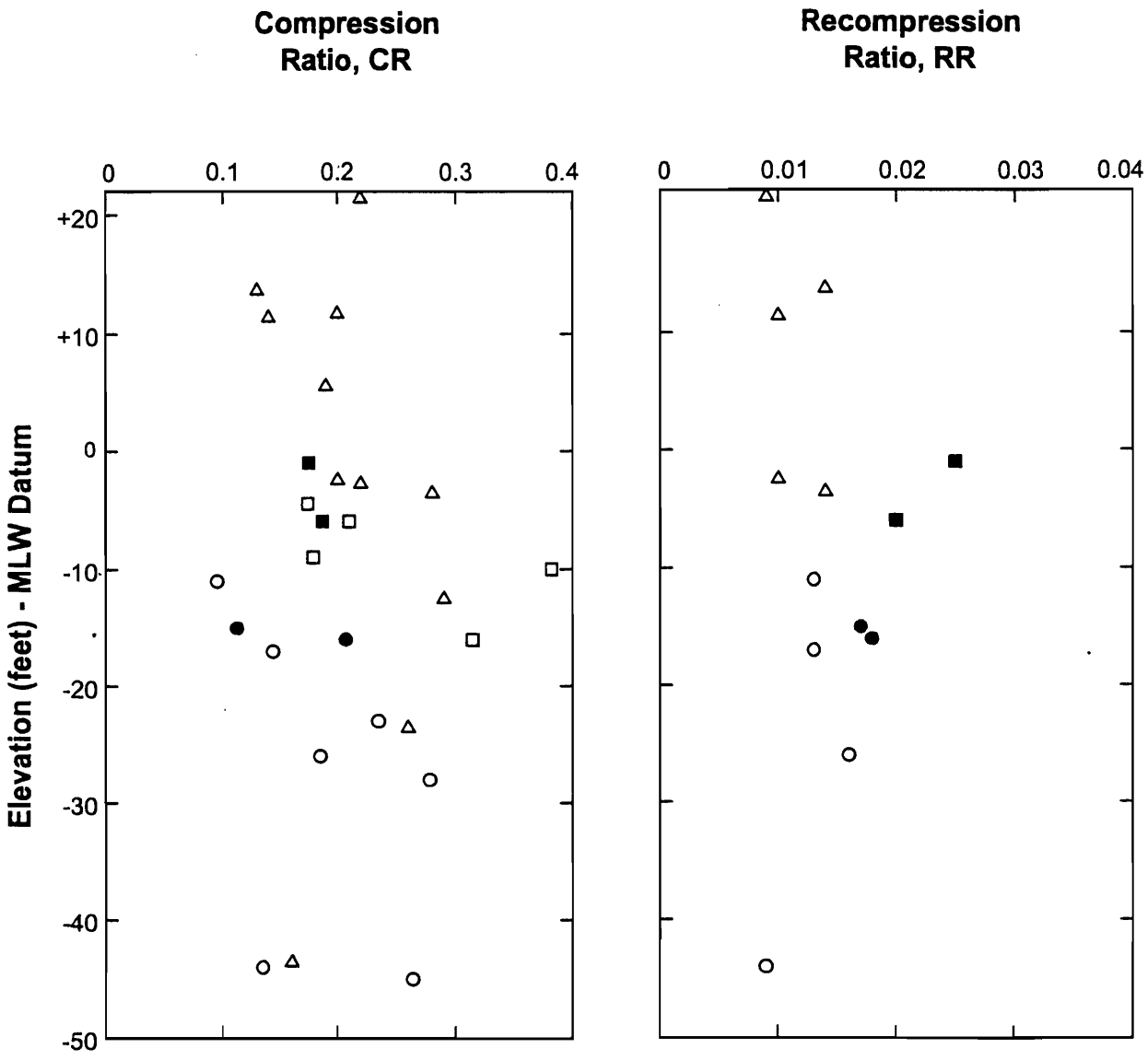
DRS:FDL/rr
Attachment
M:\PROJECT\2004\04082\04082-2\Merrill Warehouse Rpt 2.doc

Table 1 - Requirements for Structural Fill
Rubb Warehouse No. 7
Merrill's Marine Terminal
Portland, Maine

Structural Fill shall consist of hard, durable sand and gravel, free of clay, organic matter, surface coatings, and other deleterious materials. Soil finer than the No. 200 sieve (the "fines") shall be nonplastic. Structural Fill shall meet the following gradation requirements:

Sieve Size	Percent Passing by Weight
3 Inches	100
½ Inch	50 – 100
No. 4	35– 85
No. 16	20 – 65
No. 50	5 - 40
No. 200 (fines)	0 – 8

Structural Fill shall be compacted in maximum 9-inch-thick, loose lifts to at least 95 percent of the maximum dry density determined in accordance with ASTM D1557 (Modified AASHTO Compaction).

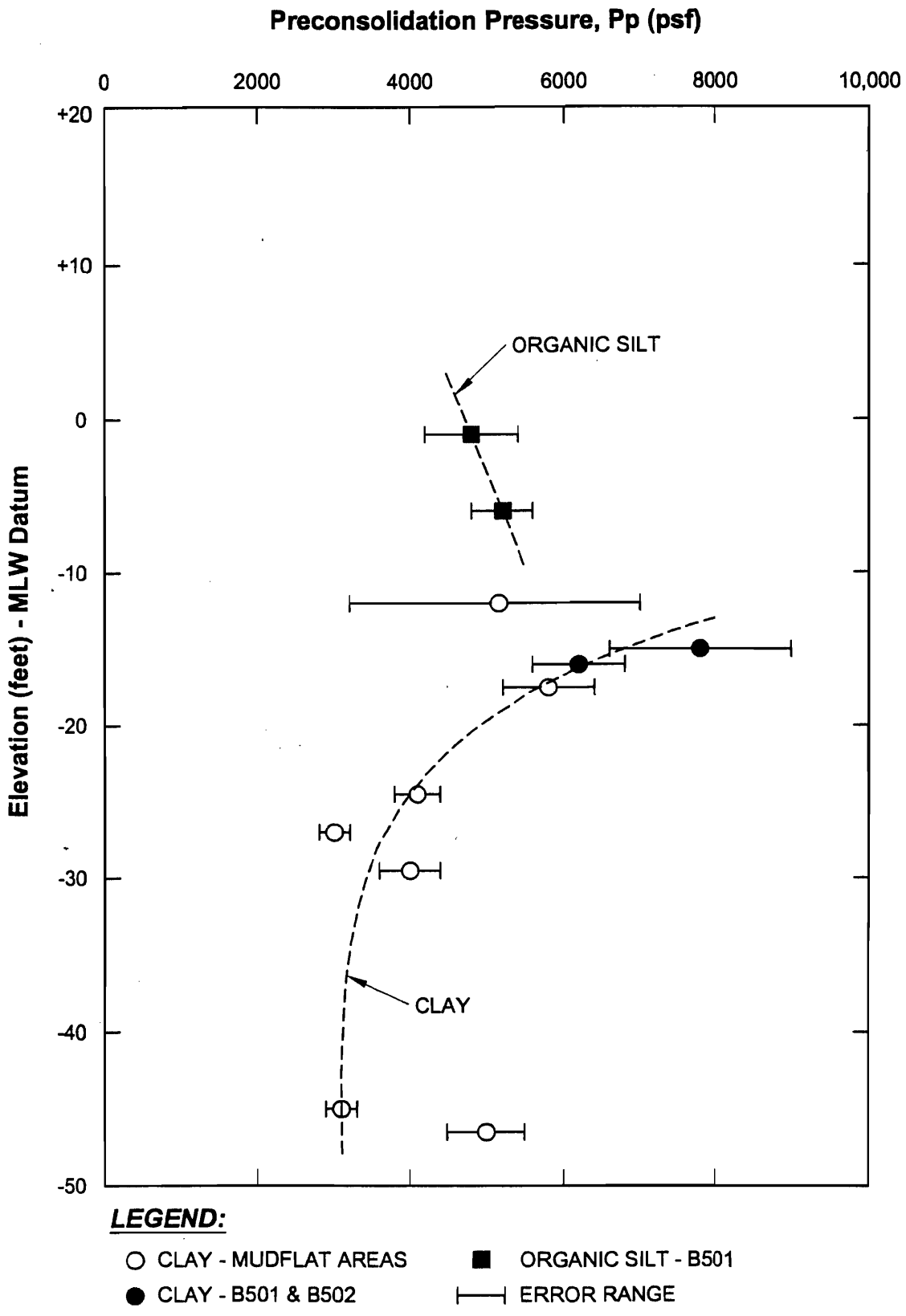


LEGEND:

- ○ CLAY - MUDFLAT AREAS
- □ ORGANIC SILT - MUDFLAT AREAS
- △ CLAY - STORAGE AREA NORTH OF TERMINAL
- ● CLAY - B501 & B502
- ■ ORGANIC SILT - B501

Merrill Marine Terminal Services, Inc. Portland, Maine	Rubb Warehouse No. 7 Merrill's Marine Terminal	COMPRESSION INDEX DATA
GEI Consultants, Inc.	Project 04082–2	July 2004 Fig. 2

04082–03 jam 7/01/04



Merrill Marine Terminal Services, Inc. Portland, Maine	Rubb Warehouse No. 7 Merrill's Marine Terminal	PRECONSOLIDATION DATA
GEI Consultants, Inc.	Project 04082–2	July 2004 Fig. 3

04082-02 jam 7/01/04

Appendix A

Boring Logs

GEI Consultants, Inc. 1021 Main Street Winchester, MA 01890	Project: Rubb VII Warehouse Merrill's Marine Terminal Location: S. Portland, ME	Boring No.: B-501

Client:	Merrill Marine Terminal Services, Inc.	**Boring Location:**	See Plan	**Drilling Method:**	CWB
Driller:	Northeast Diamond Drilling, Inc.	**Ground Elevation (ft):**	16 (est.)	**Auger ID/OD:**	N/A
Operator:	J. O'Leary	**Datum:**	MLW	**Casing ID/OD:**	HW 4.0"/4.5"
Logged By:	S. DiBartolo	**Total Depth (ft):**	49.6	**Sampler:**	2-1/2" O.D. Split Spoon
Date Start/Finish:	05/06/04-05/07/04	**Water Level Depth (ft):**	NM	**Hammer Wt./Fall:**	140# Donut Hammer/ 30"

ABBREVIATIONS:
S = Split Spoon Sample; A = Auger Sample; U = Thin Wall Tube Sample; C = Rock Core Sample; NV,BV = Rock Coring; NA,NM = not Applicable, not Measured
HSA = Hollow Stem Auger Boring; SSA = Solid Stem Auger Boring; CWB = Cased Wash Boring; Open = Open Hole Boring; Pen. = Penetration length; Rec. = Recovery Length
WOC = weight of casing; WOR = weight of rods; WOH = weight of 300lb. hammer; RQD = Rock Quality Designation; OVM = Organic Vapor Meter; ppm = parts per million
S_u = Insitu Field Vane Shear Strength (psf); $S_{u(lab)}$ = Lab Vane Shear Strength (psf); S_v = Pocket Torvane Shear Strength (tsf); Q_p = Pocket Penetrometer Unconfined Compressive Strength (tsf)

Elevation (ft.)	Casing Blow (/1ft.)	Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Drill Times (min) or RQD (%)	Top Elevation (ft.)	Water Level*	Graphic Log	USCS Visual Descriptions and Remarks	Layer
	PUSH	0								**0.0 FEET/ El. 16.0 FEET**	ASPHALT
15	33		S1	24/18	0.7 - 2.7	14-15-20-23	15.3			ASPHALT/GRAVEL **0.7 FEET/ El. 15.3 FEET** S1: SILTY SAND (SM), fine to coarse, 15% nonplastic silt, 10% fine gravel, pieces of coal & slag, brown (FILL)	FILL
	62										
	60										
	13										
	17	5	S2	24/11	4.0 - 6.0	6-7-8-6	12.0			S2A: NARROWLY GRADED SAND (SP), fine to medium, <5% silt, 15% fine gravel, brick fragment, brown-black (FILL)	
10	34									**5.1 FEET/ El. 10.9 FEET** S2B: NARROWLY GRADED SAND (SP), fine to medium, <5% silt, <5% fine gravel, brown	SAND
	67										
	42				●						
	14										
	13	10	S3	24/9	9.0 - 11.0	8-5-4-5	7.0			S3: NARROWLY GRADED SAND (SP), medium to coarse, 5% silt, 15% gravel, gray	
5	15										
	12										
	15										
	11										
	14	15	S4	24/12	14.0 - 16.0	4-2-1-3	2.0			S4A: Similar to S3	
0	13									**14.9 FEET/ El. 1.1 FEET** S4B: ORGANIC SAND & SILT (SM-OL), fine sand and low plasticity organic silt, shell fragments, dark gray	ORGANIC SILT
	18		U1	24/13	16.0 - 18.0	PUSH	0.0				
	20										
	21										
	23	20	S5	24/24	19.0 - 21.0	1-2-1-2	-3.0			S5: SANDY ORGANIC SILT-CLAY (OL-CL), low plasticity, 35% fine sand, organic, trace shell fragments, gray-black Qp=0.25,0.25,0.25 tsf; Sv=2.5,2,2 tsf	
-5	20										
	25		U2	24/18	21.0 - 23.0	PUSH	-5.0				
	23										
	22									**23.5 FEET/ El. -7.5 FEET**	CLAY
	24	25	S6	24/24	24.0 - 26.0	1-2-1-3	-8.0			S6: LEAN CLAY (CL), medium plasticity,<5% fine sand, gray Qp=0,0,0 tsf; Sv=0.5,0,0.5 tsf.	
-10	16										
	20		U3	24/24	26.0 - 28.0	PUSH	-10.0				
	24										
	20						-13.0			S7: LEAN CLAY (CL), medium plasticity, <5% fine sand, occ. thin lens of fine sand,	

Remarks:

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Project No.: 04082-2

GEI Consultants, Inc. 1021 Main Street Winchester, MA 01890	Project:	Rubb VII Warehouse Merrill's Marine Terminal	Boring No.:	B-501
	Location:	S. Portland, ME		

Client:	Merrill Marine Terminal Services, Inc.	**Boring Location:**	See Plan	**Drilling Method:**	CWB
Driller:	Northeast Diamond Drilling, Inc.	**Ground Elevation (ft):**	16 (est.)	**Auger ID/OD:**	N/A
Operator:	J. O'Leary	**Datum:**	MLW	**Casing ID/OD:**	HW 4.0"/4.5"
Logged By:	S. DiBartolo	**Total Depth (ft):**	49.6	**Sampler:**	2-1/2" O.D. Split Spoon
Date Start/Finish:	05/06/04-05/07/04	**Water Level Depth (ft):**	NM	**Hammer Wt./Fall:**	140# Donut Hammer/ 30"

ABBREVIATIONS:
S = Split Spoon Sample; A = Auger Sample; U = Thin Wall Tube Sample; C = Rock Core Sample; NV,BV = Rock Coring; NA,NM = not Applicable, not Measured
HSA = Hollow Stem Auger Boring; SSA = Solid Stem Auger Boring; CWB = Cased Wash Boring; Open = Open Hole Boring; Pen. = Penetration length; Rec. = Recovery Length
WOC = weight of casing; WOR = weight of rods; WOH = weight of 300lb. hammer; RQD = Rock Quality Designation; OVM = Organic Vapor Meter; ppm = parts per million
S_u = Insitu Field Vane Shear Strength (psf); $S_{u(lab)}$ = Lab Vane Shear Strength (psf); S_v = Pocket Torvane Shear Strength (tsf); Q_p = Pocket Penetrometer Unconfined Compressive Strength (tsf)

Elevation (ft.)	Casing Blow (/1ft.)	Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Drill Times (min) or RQD (%)	Top Elevation (ft.)	Water Level*	Graphic Log	USCS Visual Descriptions and Remarks	Layer
	34	30	S7	24/24	29.0 - 31.0	WOR-WOR-WOH-3				gray Qp=0,0,0.25 tsf; Sv=2,2,2 tsf. Sv=2 tsf in bottom of U4	CLAY
-15	16						-15.0				
	15		U4	24/23	31.0 - 33.0	PUSH					
	13										
	19						-18.0			S8: LEAN CLAY (CL), medium plasticity, <5% fine sand, gray Qp=0,0,0 tsf; Sv=1,1,1 tsf.	
	13	35	S8	24/24	34.0 - 36.0	WOH-WOH-WOH-3					
-20	18										
	18									**37.5 FEET/ El. -21.5 FEET**	
	19										CLAY AND SAND
	24						-23.0			S9: INTERBEDDED LEAN CLAY (CL) & SILTY SAND (SM), layers of medium plasticity clay, layers of fine sand with 15% nonplastic silt, gray Qp=0 tsf; Sv=2 tsf.	
	16	40	S9	24/24	39.0 - 41.0	WOH-WOH-WOH-3					
-25											
							-28.0			S10A (0-3"): LEAN CLAY (CL), medium plasticity, gray	
										44.3 FEET/ El. -28.3 FEET	SAND
		45	S10	24/22	44.0 - 46.0	3-12-13-29				S10B (3-14"): CLAYEY SAND (SC), fine, low plasticity, gray	
										45.3 FEET/ El. -29.3 FEET	TILL
-30										S10C (14-22"): CLAYEY SAND & GRAVEL (SC-GC), 40% fine to coarse sand, 35% gravel, 25% medium plasticity clay, dark gray (TILL)	
			S11	5/3	49.2 - 49.6	64/5"	-33.2			S11: Similar to S10C	
		50					-33.6			BOTTOM OF BOREHOLE, 49.6 FEET/ EL. -33.6 FEET.	
-35											
		55									
-40											

Remarks:

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Project No.: 04082-2

GEI Consultants, Inc. 1021 Main Street Winchester, MA 01890	Project: Rubb VII Warehouse Merrill's Marine Terminal Location: S. Portland, ME	Boring No.: B-502

Client:	Merrill Marine Terminal Services, Inc.	**Boring Location:**	See Plan	**Drilling Method:**	CWB
Driller:	Northeast Diamond Drilling, Inc.	**Ground Elevation (ft):**	19 (est.)	**Auger ID/OD:**	N/A
Operator:	J. O'Leary	**Datum:**	MLW	**Casing ID/OD:**	HW 4.0"/4.5"
Logged By:	S. DiBartolo	**Total Depth (ft):**	72.4	**Sampler:**	2-1/2" O.D. Split Spoon
Date Start/Finish:	05/05/04-05/06/04	**Water Level Depth (ft):**	2.9	**Hammer Wt./Fall:**	140# Donut Hammer/ 30"

ABBREVIATIONS:
S = Split Spoon Sample; A = Auger Sample; U = Thin Wall Tube Sample; C = Rock Core Sample; NV,BV = Rock Coring; NA,NM = not Applicable, not Measured
HSA = Hollow Stem Auger Boring; SSA = Solid Stem Auger Boring; CWB = Cased Wash Boring; Open = Open Hole Boring; Pen. = Penetration length; Rec. = Recovery Length
WOC = weight of casing; WOR = weight of rods; WOH = weight of 300lb. hammer; RQD = Rock Quality Designation; OVM = Organic Vapor Meter; ppm = parts per million
S_u = Insitu Field Vane Shear Strength (psf); $S_{u(lab)}$ = Lab Vane Shear Strength (psf); S_v = Pocket Torvane Shear Strength (tsf); Q_p = Pocket Penetrometer Unconfined Compressive Strength (tsf)

Elevation (ft.)	Casing Blow (/1ft.)	Depth (ft.)	Sample Information: Sample No.		Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Drill Times (min) or RQD (%)	Top Elevation (ft.)	Water Level*	Graphic Log	USCS Visual Descriptions and Remarks	Layer
	PUSH	0									**0.0 FEET/ El. 19.0 FEET**	CONCRETE
	PUSH										CONCRETE PAD	
	38										**0.5 FEET/ El. 18.5 FEET**	FILL
	32		S1		24/15	1.5 - 3.5	9-14-16-12	17.5	▽		S1: WIDELY GRADED SAND (SW). fine to coarse, 5% nonplastic silt, 5% fine gravel, brown (FILL)	
15	8											
	24	5	S2		24/8	4.0 - 6.0	7-13-14-6	15.0			S2: WIDELY GRADED SAND (SW), fine to coarse, 15% gravel, <5% nonplastic silt brown (FILL)	
	24											
	12											
	17											
10	7											
	10	10	S3		24/6	9.0 - 11.0	4-3-2-3	10.0			S3: NARROWLY GRADED SAND (SP), medium to coarse, 5% fine gravel, <5% nonplastic silt, brown (FILL)	
	12											
	19											
	20											
5	23		S4		24/12	13.5 - 15.5	8-8-9-9	5.5			S4: NARROWLY GRADED SAND (SP), fine sand, 5% fine gravel, root fibers, trace brick, brown & gray (FILL)	
	21	15									**14.3 FEET/ El. 4.7 FEET**	SANDY CLAY
	5											
	5		S5		24/18	16.0 - 18.0	4-4-3-3	3.0			S5: SANDY LEAN CLAY (CL), low plasticity, 30% interbedded fine sand layers, gray Qp=0.5,0.25,0 tsf; Sv=3.0,2.0,2.0 tsf	
	7											
0	12		U1		24/24	18.0 - 20.0	PUSH	1.0			Qp=0.5,0.75 tsf; Sv=2.5 tsf in bottom of U1	
	16	20										
	12		S6		24/17	20.0 - 22.0	5-5-5-3	-1.0			S6: INTERBEDDED NARROWLY GRADED SAND (SP) & LEAN CLAY (CL), interbedded layers of low plasticity clay and fine sand, gray Qp=0,0.25 tsf; Sv=2.5,3.5 tsf.	
	11											
	11										**23.0 FEET/ El. -4.0 FEET**	CLAY
-5	15											
	15	25	S7		24/24	24.0 - 26.0	WOR-WOR-WOR-WOH	-5.0			S7: LEAN CLAY (CL), low plasticity, pockets of organic material, dark gray Qp=0.25,0,0 tsf; Sv=2,0.5,0.5 tsf.	
	12											
	11		U2		24/24	26.0 - 28.0	PUSH	-7.0			Qp=0.25.0.25 tsf; Sv=2.5 tsf in bottom of U2	
	13											
-10	18											

Remarks:

Water level measured @ 0730hrs on 5/6/04. .

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Project No.: 04082-2

GEI Consultants, Inc. 1021 Main Street Winchester, MA 01890	Project: Rubb VII Warehouse Merrill's Marine Terminal Location: S. Portland, ME	Boring No.: B-502

Client:	Merrill Marine Terminal Services, Inc.	**Boring Location:**	See Plan	**Drilling Method:**	CWB
Driller:	Northeast Diamond Drilling, Inc.	**Ground Elevation (ft):**	19 (est.)	**Auger ID/OD:**	N/A
Operator:	J. O'Leary	**Datum:**	MLW	**Casing ID/OD:**	HW 4.0"/4.5"
Logged By:	S. DiBartolo	**Total Depth (ft):**	72.4	**Sampler:**	2-1/2" O.D. Split Spoon
Date Start/Finish:	05/05/04-05/06/04	**Water Level Depth (ft):**	2.9	**Hammer Wt./Fall:**	140# Donut Hammer/ 30"

ABBREVIATIONS:

S = Split Spoon Sample; A = Auger Sample; U = Thin Wall Tube Sample; C = Rock Core Sample; NV,BV = Rock Coring; NA,NM = not Applicable, not Measured

HSA = Hollow Stem Auger Boring; SSA = Solid Stem Auger Boring; CWB = Cased Wash Boring; Open = Open Hole Boring; Pen. = Penetration length; Rec. = Recovery Length

WOC = weight of casing; WOR = weight of rods; WOH = weight of 300lb. hammer; RQD = Rock Quality Designation; OVM = Organic Vapor Meter; ppm = parts per million

S_u = Insitu Field Vane Shear Strength (psf); $S_{u(lab)}$ = Lab Vane Shear Strength (psf); S_v = Pocket Torvane Shear Strength (tsf); Q_p = Pocket Penetrometer Unconfined Compressive Strength (tsf)

Elevation (ft.)	Casing Blow (/1ft.)	Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Drill Times (min) or RQD (%)	Top Elevation (ft.)	Water Level*	Graphic Log	USCS Visual Descriptions and Remarks	Layer
	18	30									CLAY
	19										
	20										
	28						-14.0				
-15	22		U3	24/23	33.0 - 35.0	PUSH					
	24	35					-16.0			S8: LEAN CLAY (CL), low plasticity, 5% fine sand, layers of fine to medium sand, dark gray	
	34		S8	24/21	35.0 - 37.0	3-4-11-19				Qp=0.75,0.25,0.25 tsf; Sv=1.5,2.0,3.5 tsf.	
	46										
	65										
-20	85									**39.0 FEET/ El. -20.0 FEET**	SAND
	81	40									
	87										
	70						-23.0			S9: NARROWLY GRADED SAND WITH GRAVEL (SP), fine to medium sand, 35% gravel, <5% nonplastic silt, gray	
	65		S9	24/9	42.0 - 44.0	47-20-20-21					
-25	67										
	83	45									
	77									**46.5 FEET/ El. -27.5 FEET**	CLAY
	75										
	67										
-30	26						-30.0			S10: LEAN CLAY (CL), low plasticity, 10% fine sand in lenses, gray	
	28	50	S10	24/24	49.0 - 51.0	3-2-4-5				Qp=0.25,0.25,0 tsf; Sv=2.0,2.0,1.5 tsf.	
	49						-32.0				
	60		U4	24/22	51.0 - 53.0	PUSH					
	54										
-35	50										
	52	55									
	50										
	51										
	45										
-40	62						-40.0			S11: SANDY LEAN CLAY (CL), low plasticity, 20% fine sand in clay matrix, lenses	

Remarks:

Water level measured @ 0730hrs on 5/6/04.

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

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Project No.: 04082-2

GEI Consultants, Inc. 1021 Main Street Winchester, MA 01890	Project: Rubb VII Warehouse Merrill's Marine Terminal Location: S. Portland, ME	Boring No.: B-502

Client:	Merrill Marine Terminal Services, Inc.	**Boring Location:**	See Plan	**Drilling Method:**	CWB
Driller:	Northeast Diamond Drilling, Inc.	**Ground Elevation (ft):**	19 (est.)	**Auger ID/OD:**	N/A
Operator:	J. O'Leary	**Datum:**	MLW	**Casing ID/OD:**	HW 4.0"/4.5"
Logged By:	S. DiBartolo	**Total Depth (ft):**	72.4	**Sampler:**	2-1/2" O.D. Split Spoon
Date Start/Finish:	05/05/04-05/06/04	**Water Level Depth (ft):**	2.9	**Hammer Wt./Fall:**	140# Donut Hammer/ 30"

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Elevation (ft.)	Casing Blow (/1ft.)	Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Drill Times (min) or RQD (%)	Top Elevation (ft.)	Water Level*	Graphic Log	USCS Visual Descriptions and Remarks	Layer
	55	60	S11	24/24	59.0 - 61.0	6-6-1-3				of fine sand, gray	CLAY
	35 4 59		U5	24/0	61.0 - 63.0	PUSH	-42.0				
-45										**63.5 FEET/ El. -44.5 FEET**	SANDY CLAY
		65	S12	24/24	64.0 - 66.0	9-9-7-7	-45.0			S12: SANDY LEAN CLAY (CL), low plasticity, 25% fine sand in clay matrix, lenses of fine sand, gray Qp=0.75,0,0.25 tsf; Sv=2.0,1.5,1.0 tsf.	
-50		70									
			S13	17/17	71.0 - 72.4	WOH-2-50/5"	-52.0			S13A (0-11"): SANDY LEAN CLAY (CL), similar to S12 Qp=0.5 tsf; Sv=3.5 tsf.	
										71.9 FEET/ El. -52.9 FEET	TILL
							-53.4			S13B (11-17"): SANDY LEAN CLAY WITH GRAVEL (CL), low plasticity, 35% gravel, 10% fine sand, gray (TILL) BOTTOM OF BOREHOLE, 72.4 FEET/ EL. -53.4 FEET.	
-55		75									
-60		80									
-65		85									
-70											

Remarks:

Water level measured @ 0730hrs on 5/6/04.

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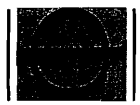
* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Project No.: 04082-2

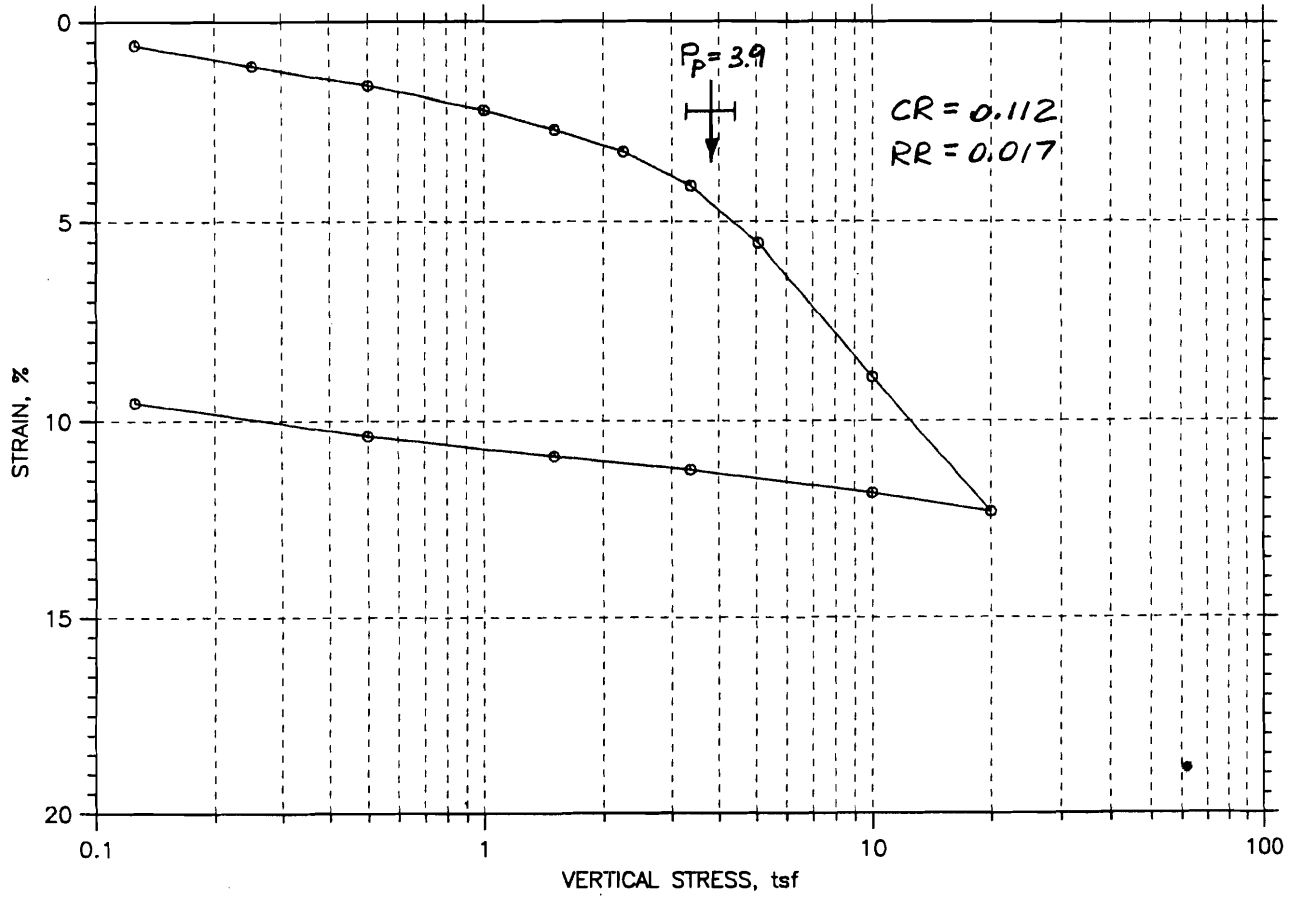


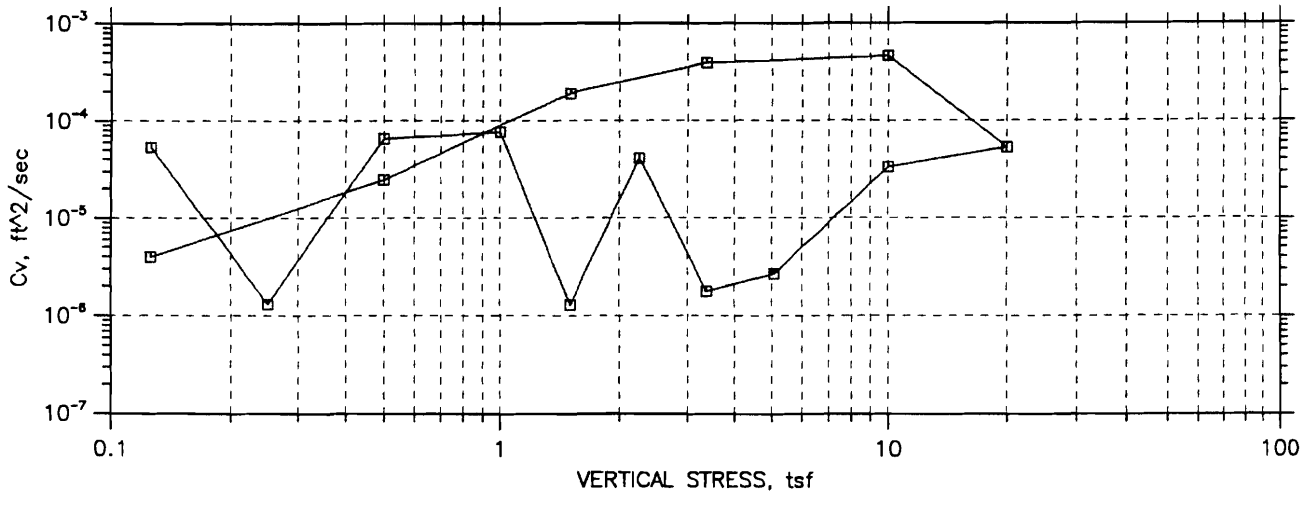
Appendix B

Consolidation Tests

CONSOLIDATION TEST DATA

SUMMARY REPORT





Project: Merrill Marine Terminal	Location: RUBB VII Warehouse	Project No.: 04082-2
Boring No.: B-502	Tested By: D. Aghjayan	Checked By:
Sample No.: U3	Test Date: 05/14/04	Depth: 33.4 ft
Test No.: C2	Sample Type: Tube	Elevation: -14.4
Description: Lean CLAY, some fine sand, dark gray		
Remarks: Initial water content = 22.4 %		

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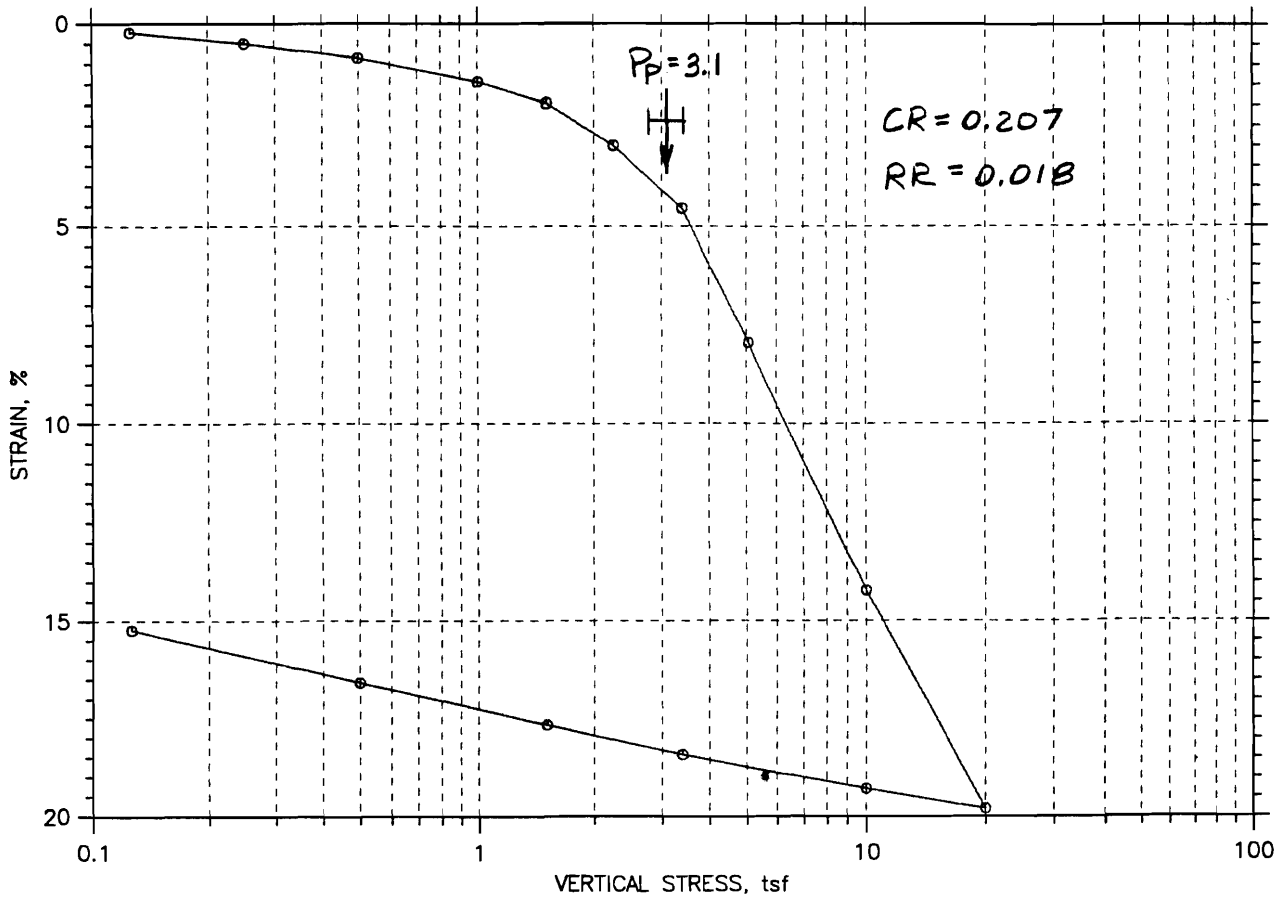
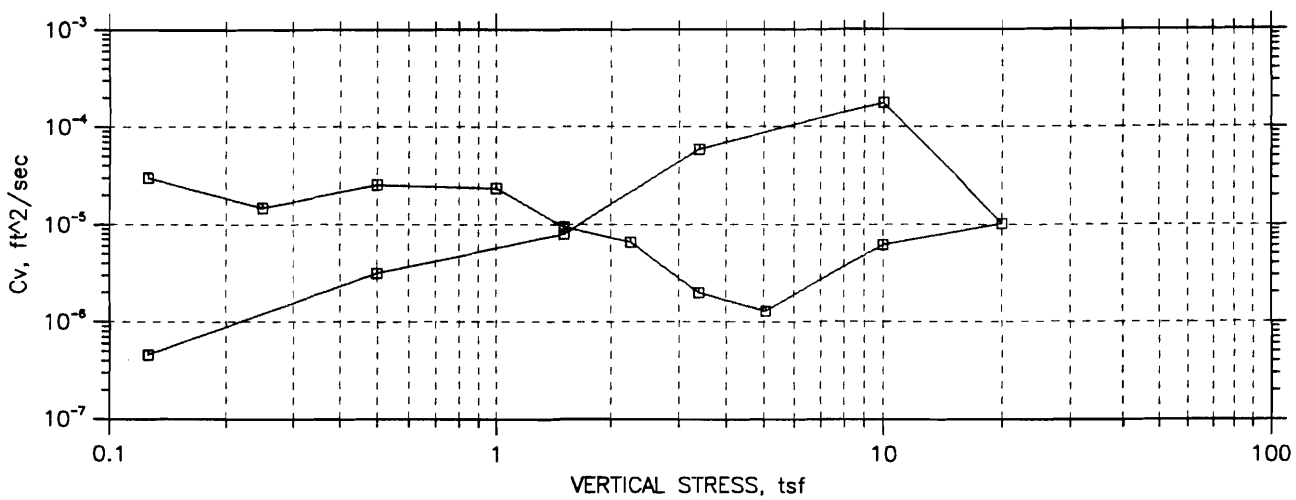
CONSOLIDATION TEST DATA

SUMMARY REPORT





Project: Merrill Marine Terminal	Location: RUBB VII Warehouse	Project No.: 04082-2
Boring No.: B-501	Tested By: C. Wheeler	Checked By:
Sample No.: U4	Test Date: 05/18/04	Depth: 32.4 ft
Test No.: C3	Sample Type: Tube	Elevation: -16.4
Description: Lean gray CLAY		
Remarks: Initial water content = 35.21 %		

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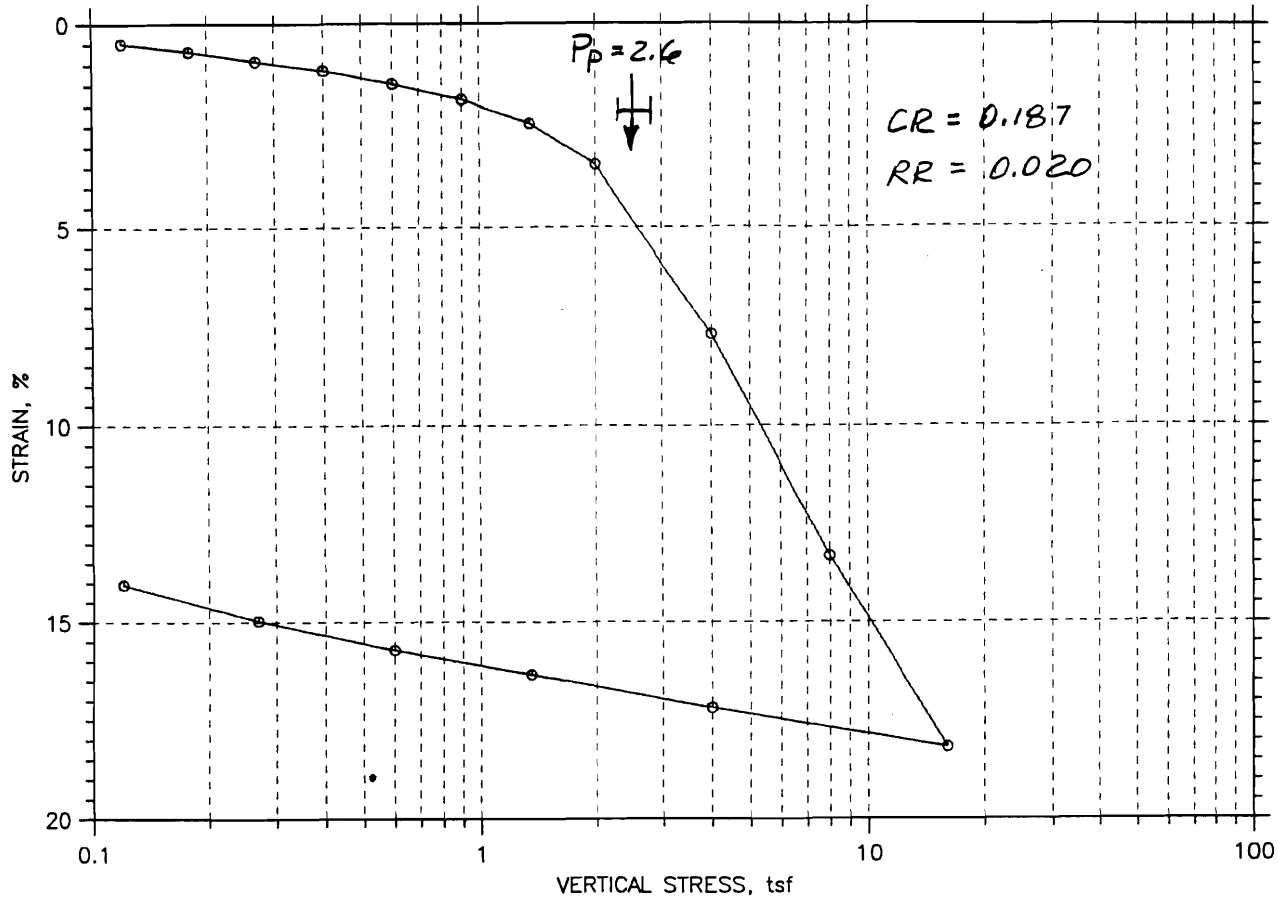
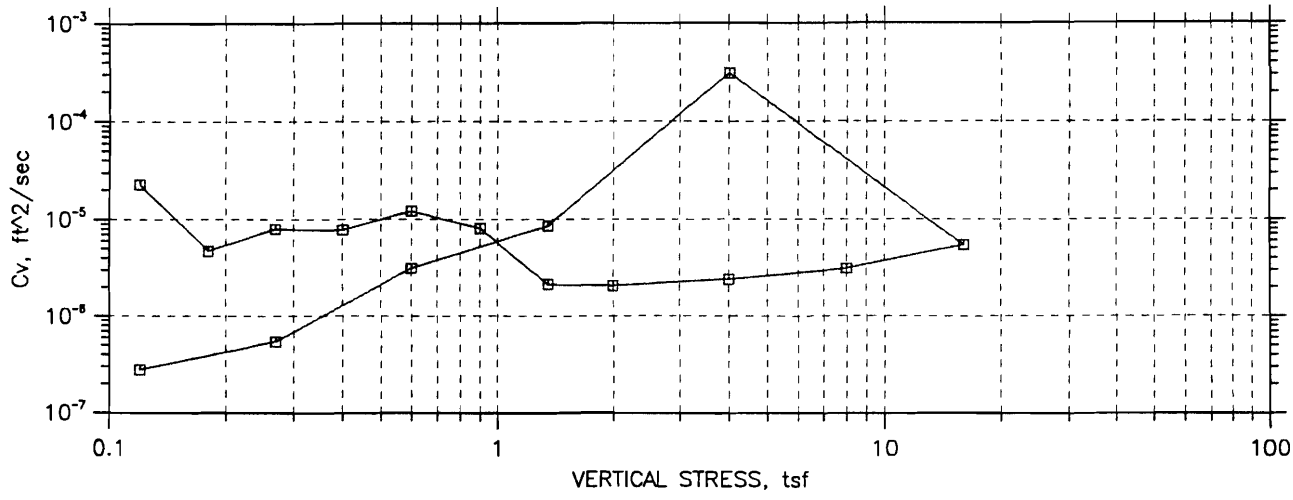
CONSOLIDATION TEST DATA

SUMMARY REPORT





Project: Merrill Marine Terminal	Location: RUBB VII Warehouse	Project No.: 04082-2
Boring No.: B-501	Tested By: D. Aghjayan	Checked By:
Sample No.: U2	Test Date: 05/19/04	Depth: 21.7 ft
Test No.: C4	Sample Type: Tube	Elevation: -5.7
Description: Organic SILT, trace fine sand, dark gray		
Remarks: Initial water content = 31.33 %		

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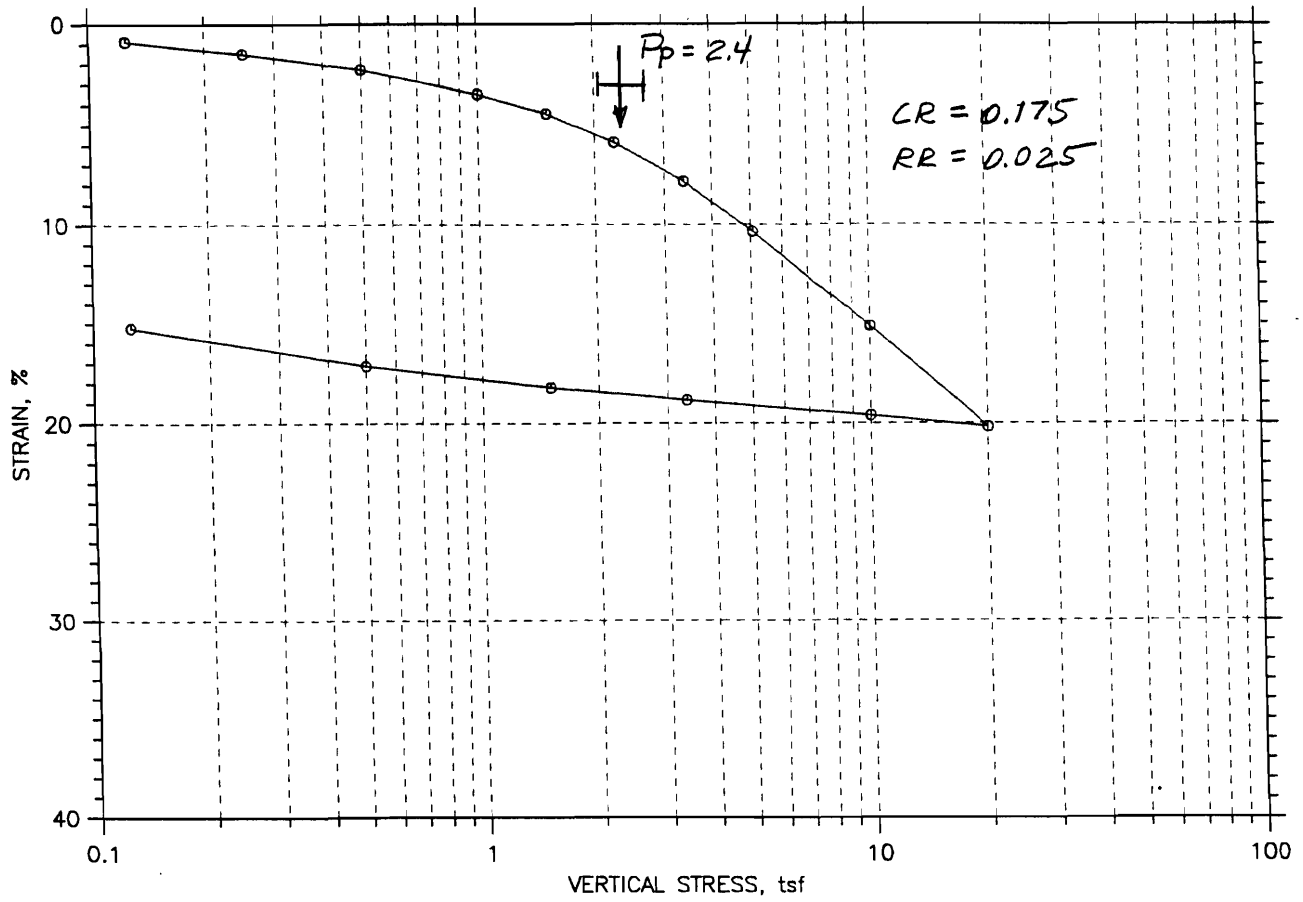
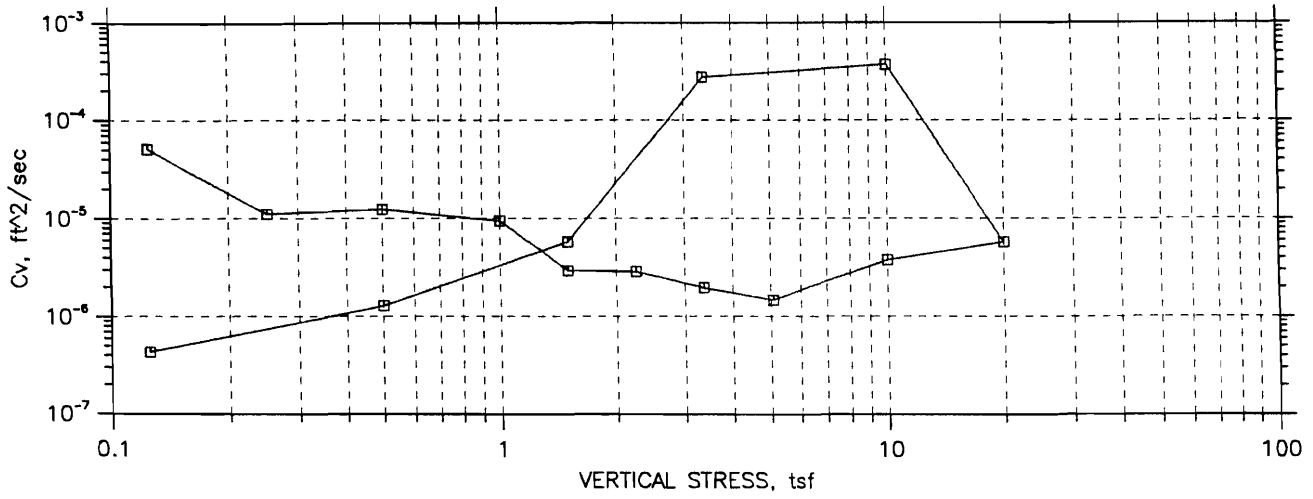
CONSOLIDATION TEST DATA

SUMMARY REPORT





Project: Merrill Marine Terminal	Location: RUBB VII Warehouse	Project No.: 04082-2
Boring No.: B-501	Tested By: D. Aghjayan	Checked By:
Sample No.: U1	Test Date: 05/24/04	Depth: 16.7 ft
Test No.: C5	Sample Type: Tube	Elevation: -0.7
Description: Organic SILT, trace fine sand, dark gray		
Remarks: Initial water content = 33.30 %		

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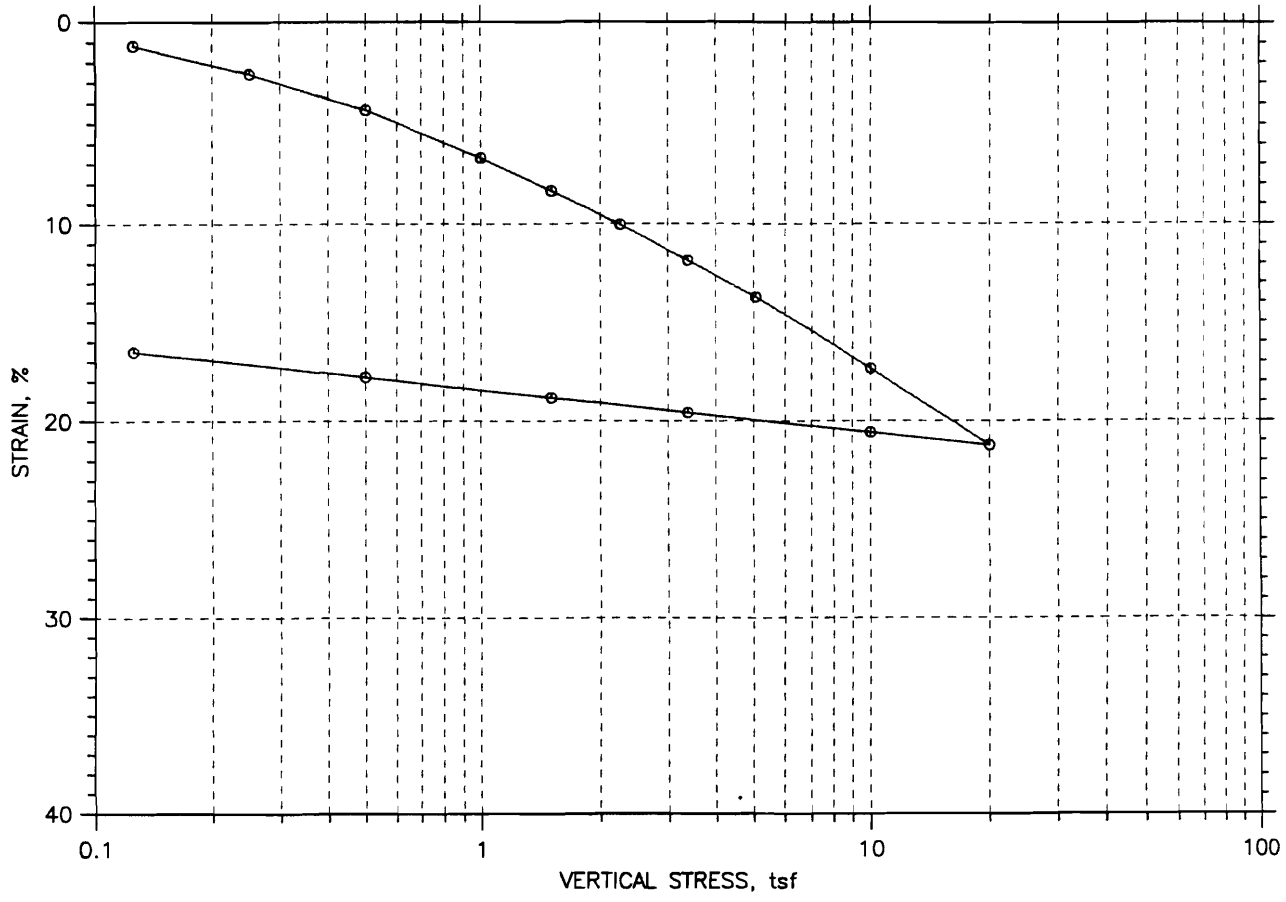
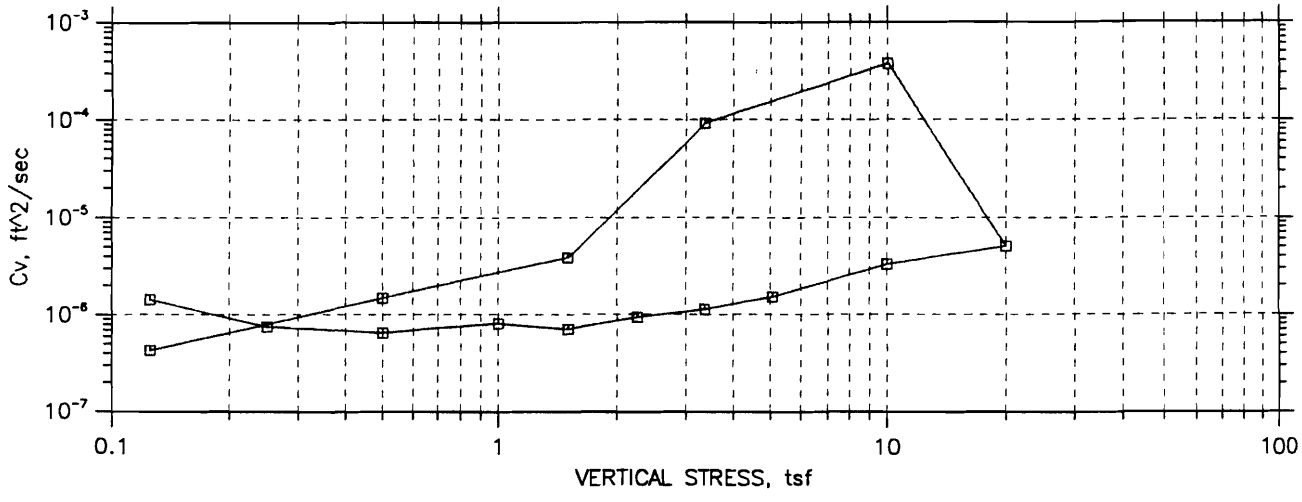
CONSOLIDATION TEST DATA

SUMMARY REPORT





Project: Merrill Marine Terminal	Location: RUBB VII Warehouse	Project No.: 04082-2
Boring No.: B-502	Tested By: D. Aghjayan	Checked By:
Sample No.: U4	Test Date: 05/17/04	Depth: 51.7 ft
Test No.: C1	Sample Type: Tube	Elevation: -32.7 ft
Description: Lean Silty CLAY, gray		
Remarks: Tube cutting edge damaged. Specimen appeared to be disturbed.		
Initial water content = 33.85%		

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Section 12

Stormwater Management

Section 12

Stormwater Management
Merrill's Marine Terminal
Danforth Street
Portland, Maine

A. Narrative

The following Stormwater Management Plan has been prepared for Merrill's Marine Terminal to evaluate stormwater runoff and erosion control associated with the proposed construction of a 56,500 square foot building at the Terminal's current Recycled Metal Handling and Storage Area. The site is currently paved with bituminous pavement, and is used to store scrap metal.

The current paved surface was installed in 1997 to provide a clean and stable work area for the Recycled Metal Handling and Storage Area. Prior to the installation of the paved pad, the site surface was bare compacted soil. A catch basin and stormwater treatment unit were installed at the west end of the site during construction of the paved pad in order to treat the runoff prior to discharge to the Fore River.

Preliminary site grading associated with the proposed building construction was completed such that the drainage area tributary to the catch basin and stormwater treatment unit remains virtually unchanged from its current condition. This report was prepared under the assumption that no new areas of the site will drain to the stormwater collection system.

Because the ground cover will remain impervious and site grading will ensure the subwatershed boundaries will remain unchanged, no new stormwater controls are proposed.

1. Development Location

The site is located on the banks of the Fore River at the southern end of the Portland peninsula. The total area studied is approximately 2.6 acres, which lie within the Waterfront Zoning District. The site drains directly to the Fore River.

2. Surface Water on or Abutting the Site

There is no surface water on the site. As noted above, the Fore River abuts the site to the west.

3. Downstream Lakes and Ponds

There are no downstream lakes or ponds as the entire site drains to the Fore River.

4. General Topography

The existing ground slopes west at 1-2% to an existing catch basin and stormwater treatment unit and is discharged directly to the Fore River.

5. Flooding

There are no areas, buildings, or facilities either on the site or downstream of the site that have been historically affected by flooding, or are expected to be affected.

6. Alterations to Natural Drainage Ways

There are no natural streams or channels on the site.

7. Alterations to Land Cover

The proposed building will be constructed on an area that is currently bituminous pavement. With the construction of the proposed building, the land cover will remain impervious.

8. Modeling Assumptions

The quantitative analysis of peak runoff rates from the development utilized the USDA Soil Conservation Service (SCS) TR-20 Runoff Simulation Model, as contained in the HydroCAD computer software program (Version 6.0). Runoff curve numbers of 98 were used for both pre and post-developed conditions, as the existing ground cover is impervious and the site will remain impervious with the construction of the proposed building. Times of concentration and travel times were determined from site topographic maps in accordance with SCS procedures. A maximum length of 150 feet was used for sheet flow.

Preliminary site grading was used to analyze the post-developed condition. The analysis of the post-developed condition assumes that the site is to be graded such that that the area tributary to the existing catch basin and stormwater treatment unit remain unchanged from the pre-developed condition.

All of the watershed's peak runoff rates were analyzed for the 2, 10 and 25-year frequency, 24-hour duration storm events. A Type III rainfall distribution was applied to these storms. The rainfall amounts for southwest Cumberland County are as follows:

Storm Frequency Precipitation (in./24 hr)	
2-year	3.0
10-year	4.7
25-year	5.5

9. Stormwater Quantity Control

The following table summarizes the results of stormwater calculations for the design storm events for the project areas. Calculations and computer modeling sheets are provided with this report.

Table 1 - Stormwater Runoff Summary Table
Pre-Development vs. Post-Development

Study Point	Total Watershed Area (Ac)		Avg. Weighted Curve No. (Cn)		Peak Rates of Runoff (cfs)					
					2-Year		10-Year		25-Year	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
1	2.6	2.6	98	98	7.7	7.2	12.2	11.4	14.1	13.4

As the above result table shows, Study Point 1, which represents the outfall from the stormwater treatment unit, shows a decrease in the post-development flow rate compared to the existing condition for the 2, 10 and 25-year/24-hour design storms. The observed decrease is caused by the change in the site grading surrounding the proposed building, which will increase the time of concentration for the subwatershed compared to the pre-developed condition.

Based on the results of this evaluation, as well as the fact that the site discharges directly to the Fore River, the proposed stormwater design is not expected to cause flooding, erosion, or other adverse conditions downstream of the site.

10. Water Quality Treatment

The existing stormwater treatment unit, Vortechnics Model 5000, will be retained and continue to provide treatment to runoff prior to discharge to the Fore River.

Furthermore, the development is expected to improve the quality of the runoff from the site due to the planned change in land use. The runoff from the site currently includes grease, oil, and metal sediment and debris from the existing scrap metal piles. The runoff from the site after project completion will consist of runoff from the roof of the proposed building and surrounding pavement.

11. Off-Site Credits

No Total Suspended Solids or Phosphorus off-set credits are proposed to be used for the development.

12. Compensation Fee

No compensation fee is required.

B. Drainage Area Maps

1. Topographic Map

A copy of the USGS 7.5 minute topographic map showing the site boundaries is included in this submission. (Figure 1)

2. Soils Map

A copy of the Cumberland County Medium Intensity Soils Survey showing the site boundaries is included in this submission. (Figure 3)

C. Drainage Plans

The pre-development and post-development drainage plans showing information in Subsections C.1 through C.19 are enclosed.

D. Runoff Analysis

The pre and post-development runoff analysis of the site was prepared in accordance with acceptable engineering practice as provided under the DEP Stormwater Law. The analysis was prepared using the HydroCAD watershed analysis model, Release 6.0. HydroCAD uses the SCS TR-20 methodology. Calculations are included with this section and include the following information for each pre-development and post-development subwatershed:

curve number computations, time of concentration calculations, travel time calculations, peak discharge calculations, and reservoir routing calculations.

E. Stormwater Quantity Control Plan

1. Variance Submissions: Not Applicable

2. Drainage System Sizing

Calculations are attached showing that the water elevation in the stormwater collection system does not exceed that of the catch basin inlet in the 25-year design storm.

3. Stormwater Detention and Retention System Submissions

No stormwater detention or retention systems are proposed.

G. Stormwater Quality Treatment Plan

1. Basic Stabilization

a. Ditches and Swales - No ditches or swales are planned for the site.

b. Culvert and Storm Drain Outfalls - The existing stormwater collection system discharges to a riprap slope on the bank of the Fore River. The riprap slope was designed to stabilize the river bank, which is subject to ocean waves and storms and has more than adequately served as an outfall for the stormwater collection system on the site.

The stormwater analysis shows that the peak flows discharged from the stormwater collection will be reduced by the proposed project. Therefore, we feel that the riprap bank slope will continue to serve as an adequate outfall for the system after completion of the proposed project.

c. Earthen Slopes and Embankments - No steep or long slopes are planned on the site.

d. Disturbed Areas - None of the disturbed area is proposed to be revegetated. Details for paving and other proposed permanent surface treatments are shown on the plans.

e. Gravel Drives and Roads - No new gravel drives or roads are proposed on the site.

f. Maintenance - The Maintenance Plan of Stormwater Management Facilities is provided in this submittal.

2. 80 % TSS Removal - Not Applicable

3. Sliding Scale TSS Removal - Not Applicable

4. Phosphorus Removal - Not Applicable

5. Control Plan for Thermal Impacts - The development is not anticipated to cause thermal impacts to the coldwater fisheries of the Fore River or Casco Bay.

6. Control Plan for Other Pollutants - Not Applicable

Prepared by,

SEBAGO TECHNICS, INC.

Michael Tadema-Wielandt
Design Engineer

Donald T. McElhinney, P.E.
Project Manager

MTW/DTM:mtw/dlf/jc
December 15, 2004

NOTICE OF INTENT TO COMPLY WITH MAINE CONSTRUCTION GENERAL PERMIT

PLEASE TYPE OR PRINT IN *BLACK INK ONLY*

Name of Applicant:	MERRILL INDUSTRIES	**Name of Owner or Lessee:**	MERRILL INDUSTRIES
Mailing Address:	114 Eben Hill Road	**Town/City:**	Yarmouth
State: ME	**Zip Code:** 04096	**Daytime phone: (with area code)**	207 846-0100
Email if available:			
Project Location: (Town/City):	PORTLAND	**UTM Northing: (if known)**	N43.642011°
UTM Easting: (if known)	W70.279321°		
Map #: 72	**Block** A	**Lot #:** 3, 7, 15	
Size of disturbed area proposed:	2 Ac ±		
Creating a common plan of development or sale?	**Yes**	**No** X	**Part of a larger project?** **Yes** X **No**
Name of waterbody(ies) to which the disturbed area drains, or name municipality if drains to an MS4:	FORE RIVER		
Does site drain to an Impaired Waterbody (C)? If so, give name:	No, Fore River.		
Detailed directions to site, including address if available:	601 DANFORTH STREET		

Description of project and its purpose:

Insulated, vinyl clad insulated steel warehouse structure mounted on concrete spread footing foundation with concrete floor and asphalt paved yard. Building average approximately 56,100 sf

I am filing notice of my intent to carry out work which meets the requirements of the Construction General Permit (effective 2/17/03). I have a copy of the Construction General Permit. I have read and will comply with all of the standards. I have attached all the required submittals. *Notification forms cannot be accepted without the necessary attachments.*

- ☒ ALL: A check for $100 (non-refundable) made payable to: "Treasurer, State of Maine" if ESC plan is attached for review. Otherwise, check for $75.
- ☒ ALL: A U.S.G.S. topo map or Maine Atlas & Gazetteer map with the project site clearly marked.
- ☒ ALL: Drawing of the proposed activity (site plan)
- ☐ IF this form is not being signed by the landowner or lessee of the property, attach documentation showing authorization to sign.
- ☐ IF disturbed area drains to an Impaired Waterbody (C), attach an ESC plan.
- ☐ IF disturbed area drains to any other waterbody and is 3 or more acres, EITHER (1) attach an ESC plan OR (2) include a statement (letter) that an ESC plan has been certified and by whom, from the person who certified the plan.
- ☐ IF any construction activity will occur in essential habitat, attach written approval from the Dept. of Inland Fisheries & Wildlife.

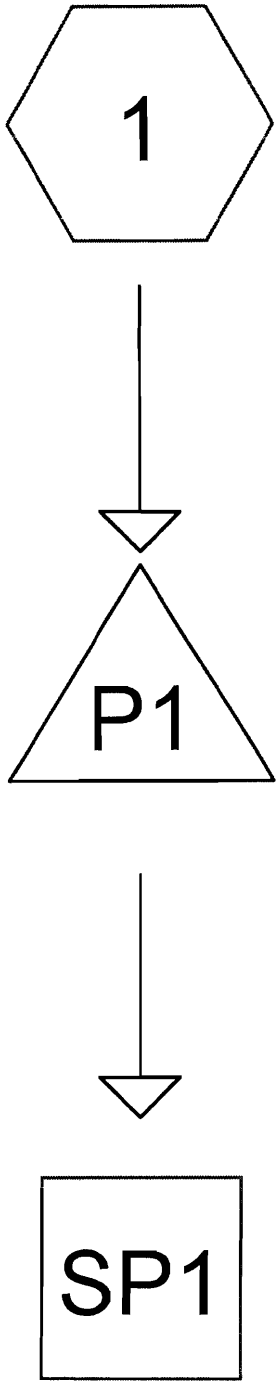
I authorize staff of the Departments of Environmental Protection to access the project site for the purpose of determining compliance with the general permit. I also understand that ***this permit is not valid until approved by the Department or 14 days after receipt by the Department, whichever is less.***

Signature of Applicant:		**Date:**	12/17/04

Keep a copy as a record of permit. Send the form with attachments via certified mail to the Maine Dept. of Environmental Protection at **the appropriate regional office.** The DEP will send a copy to the Town Office as evidence of the DEP's receipt of notification. No further authorization by DEP will be issued after receipt of notice. An approved NOI is valid until 7/1/04. **Work carried out in violation of any standard is subject to enforcement action.**

OFFICE USE ONLY	Ck.#		Staff	Staff	
NOI #	FP	Date	Acc. Date	Def. Date	After Photos

PRE-DEVELOPMENT DRAINAGE CALCULATIONS



Subcat Reach Pond Link

Drainage Diagram for 04480_PRE
Prepared by {enter your company name here} 12/14/2004

Time span=5.00-20.00 hrs, dt=0.02 hrs, 751 points
Runoff by SCS TR-20 method, UH=SCS, Type III 24-hr Rainfall=3.00"
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: (new node)
Tc=5.0 min CN=98 Area=2.577 ac Runoff= 7.73 cfs 0.556 af

Reach SP1: (new node)
Inflow= 7.73 cfs 0.556 af
Outflow= 7.73 cfs 0.556 af

Pond P1: (new node)
Peak Storage= 13 cf Inflow= 7.73 cfs 0.556 af
Primary= 7.73 cfs 0.556 af Outflow= 7.73 cfs 0.556 af

Runoff Area = 2.577 ac Volume = 0.556 af Average Depth = 2.59"

Subcatchment 1: (new node)

Runoff = 7.73 cfs @ 12.07 hrs, Volume= 0.556 af

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.02 hrs
Type III 24-hr Rainfall=3.00"

Area (ac)	CN	Description
2.577	98	Paved parking & roofs

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	150	0.0120	1.2		**Sheet Flow, SHEET FLOW** Smooth surfaces n= 0.011 P2= 3.00"
2.9	390	0.0120	2.2		**Shallow Concentrated Flow, SHALLOW CONCENTRATED FLO** Paved Kv= 20.3 fps
5.0	540	Total			

Reach SP1: (new node)

Inflow = 7.73 cfs @ 12.07 hrs, Volume= 0.556 af
Outflow = 7.73 cfs @ 12.07 hrs, Volume= 0.556 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.02 hrs

Pond P1: (new node)

Inflow = 7.73 cfs @ 12.07 hrs, Volume= 0.556 af
Outflow = 7.73 cfs @ 12.07 hrs, Volume= 0.556 af, Atten= 0%, Lag= 0.0 min
Primary = 7.73 cfs @ 12.07 hrs, Volume= 0.556 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.02 hrs

Peak Elev= 10.08' Storage= 13 cf
Plug-Flow detention time= 0.2 min calculated for 0.555 af (100% of inflow)
Storage and wetted areas determined by Prismatic sections

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
8.00	0	0	0
11.80	13	25	25
12.00	181	19	44
13.00	2,666	1,424	1,468

Primary OutFlow (Free Discharge)
1=Culvert
2=Broad-Crested Rectangular Weir

#	Routing	Invert	Outlet Devices
1	Primary	8.30'	**18.0" x 5.0' long Culvert** Ke= 0.560 Outlet Invert= 8.20' S= 0.0200 '/' n= 0.011 Cc= 0.900
2	Primary	12.50'	**7.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2

Time span=5.00-20.00 hrs, dt=0.02 hrs, 751 points
Runoff by SCS TR-20 method, UH=SCS, Type III 24-hr Rainfall=4.70"
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: (new node)
Tc=5.0 min CN=98 Area=2.577 ac Runoff= 12.22 cfs 0.890 af

Reach SP1: (new node)
Inflow= 12.22 cfs 0.890 af
Outflow= 12.22 cfs 0.890 af

Pond P1: (new node)
Peak Storage= 21 cf Inflow= 12.22 cfs 0.890 af
Primary= 12.22 cfs 0.890 af Outflow= 12.22 cfs 0.890 af

Runoff Area = 2.577 ac Volume = 0.890 af Average Depth = 4.14"

Time span=5.00-20.00 hrs, dt=0.02 hrs, 751 points
Runoff by SCS TR-20 method, UH=SCS, Type III 24-hr Rainfall=5.50"
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

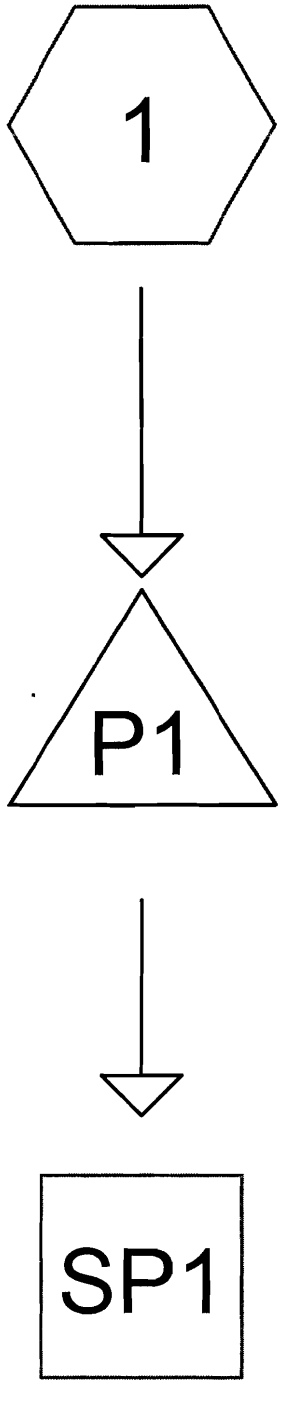
Subcatchment 1: (new node)
Tc=5.0 min CN=98 Area=2.577 ac Runoff= 14.33 cfs 1.046 af

Reach SP1: (new node)
Inflow= 14.07 cfs 1.046 af
Outflow= 14.07 cfs 1.046 af

Pond P1: (new node)
Peak Storage= 55 cf Inflow= 14.33 cfs 1.046 af
Primary= 14.07 cfs 1.046 af Outflow= 14.07 cfs 1.046 af

Runoff Area = 2.577 ac Volume = 1.046 af Average Depth = 4.87"

POST-DEVELOPMENT DRAINAGE CALCULATIONS



Subcat Reach Pond Link

Drainage Diagram for 04480_POST
Prepared by {enter your company name here} 12/14/2004

Time span=5.00-20.00 hrs, dt=0.02 hrs, 751 points
Runoff by SCS TR-20 method, UH=SCS, Type III 24-hr Rainfall=3.00"
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: (new node)
Tc=7.2 min CN=98 Area=2.586 ac Runoff= 7.21 cfs 0.558 af

Reach SP1: (new node)
Inflow= 7.21 cfs 0.558 af
Outflow= 7.21 cfs 0.558 af

Pond P1: (new node)
Peak Storage= 13 cf Inflow= 7.21 cfs 0.558 af
Primary= 7.21 cfs 0.558 af Outflow= 7.21 cfs 0.558 af

Runoff Area = 2.586 ac Volume = 0.558 af Average Depth = 2.59"

Subcatchment 1: (new node)

Runoff = 7.21 cfs @ 12.10 hrs, Volume= 0.558 af

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.02 hrs
Type III 24-hr Rainfall=3.00"

Area (ac)	CN	Description
2.586	98	Paved parking & roofs

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	85	0.0060	0.8		**Sheet Flow, SHEET FLOW** Smooth surfaces n= 0.011 P2= 3.00"
5.1	435	0.0050	1.4		**Shallow Concentrated Flow, SHALLOW CONCENTRATED FLO** Paved Kv= 20.3 fps
0.3	85	0.0470	4.4		**Shallow Concentrated Flow, SHALLOW CONCENTRATED FLO** Paved Kv= 20.3 fps
7.2	605	Total			

Reach SP1: (new node)

Inflow = 7.21 cfs @ 12.10 hrs, Volume= 0.558 af
Outflow = 7.21 cfs @ 12.10 hrs, Volume= 0.558 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.02 hrs

Pond P1: (new node)

Inflow = 7.21 cfs @ 12.10 hrs, Volume= 0.558 af
Outflow = 7.21 cfs @ 12.10 hrs, Volume= 0.558 af, Atten= 0%, Lag= 0.0 min
Primary = 7.21 cfs @ 12.10 hrs, Volume= 0.558 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.02 hrs

Peak Elev= 9.98' Storage= 13 cf
Plug-Flow detention time= 0.2 min calculated for 0.557 af (100% of inflow)
Storage and wetted areas determined by Prismatic sections

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
8.00	0	0	0
11.80	13	25	25
12.00	181	19	44
13.00	2,666	1,424	1,468

Primary OutFlow (Free Discharge)
1=Culvert
2=Broad-Crested Rectangular Weir

#	Routing	Invert	Outlet Devices
1	Primary	8.30'	**18.0" x 5.0' long Culvert** Ke= 0.560 Outlet Invert= 8.20' S= 0.0200 '/' n= 0.011 Cc= 0.900
2	Primary	12.50'	**7.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.

Time span=5.00-20.00 hrs, dt=0.02 hrs, 751 points
Runoff by SCS TR-20 method, UH=SCS, Type III 24-hr Rainfall=4.70"
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: (new node)
Tc=7.2 min CN=98 Area=2.586 ac Runoff= 11.39 cfs 0.893 af

Reach SP1: (new node)
Inflow= 11.40 cfs 0.893 af
Outflow= 11.40 cfs 0.893 af

Pond P1: (new node)
Peak Storage= 19 cf Inflow= 11.39 cfs 0.893 af
Primary= 11.40 cfs 0.893 af Outflow= 11.40 cfs 0.893 af

Runoff Area = 2.586 ac Volume = 0.893 af Average Depth = 4.14"

Time span=5.00-20.00 hrs, dt=0.02 hrs, 751 points
Runoff by SCS TR-20 method, UH=SCS, Type III 24-hr Rainfall=5.50"
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: (new node)
Tc=7.2 min CN=98 Area=2.586 ac Runoff= 13.35 cfs 1.050 af

Reach SP1: (new node)
Inflow= 13.35 cfs 1.050 af
Outflow= 13.35 cfs 1.050 af

Pond P1: (new node)
Peak Storage= 24 cf Inflow= 13.35 cfs 1.050 af
Primary= 13.35 cfs 1.050 af Outflow= 13.35 cfs 1.050 af

Runoff Area = 2.586 ac Volume = 1.050 af Average Depth = 4.87"

STORMWATER COLLECTION SYSTEM SIZING

Subcatchment 1: (new node)

Runoff = 13.35 cfs @ 12.10 hrs, Volume= 1.050 af

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.02 hrs
Type III 24-hr Rainfall=5.50"

Area (ac)	CN	Description
2.586	98	Paved parking & roofs

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	85	0.0060	0.8		**Sheet Flow, SHEET FLOW** Smooth surfaces n= 0.011 P2= 3.00"
5.1	435	0.0050	1.4		**Shallow Concentrated Flow, SHALLOW CONCENTRATED FLO** Paved Kv= 20.3 fps
0.3	85	0.0470	4.4		**Shallow Concentrated Flow, SHALLOW CONCENTRATED FLO** Paved Kv= 20.3 fps
7.2	605	Total			

Reach SP1: (new node)

Inflow = 13.35 cfs @ 12.10 hrs, Volume= 1.050 af
Outflow = 13.35 cfs @ 12.10 hrs, Volume= 1.050 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.02 hrs

Pond P1: (new node)

Inflow = 13.35 cfs @ 12.10 hrs, Volume= 1.050 af
Outflow = 13.35 cfs @ 12.10 hrs, Volume= 1.050 af, Atten= 0%, Lag= 0.0 min
Primary = 13.35 cfs @ 12.10 hrs, Volume= 1.050 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.02 hrs

Peak Elev= 11.71' Storage= 24 cf
Plug-Flow detention time= 0.2 min calculated for 1.048 af (100% of inflow)
Storage and wetted areas determined by Prismatic sections

PEAK ELEVATION IN 25YR. DESIGN STORM SHOWS WATER DOES NOT SURCHARGE CATCH BASIN INLET.
CATCH BASIN RIM: 11.8

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
8.00	0	0	0
11.80	13	25	25
12.00	181	19	44
13.00	2,666	1,424	1,468

Primary OutFlow (Free Discharge)
1=Culvert
2=Broad-Crested Rectangular Weir

#	Routing	Invert	Outlet Devices
1	Primary	8.30'	**18.0" x 5.0' long Culvert** Ke= 0.560 Outlet Invert= 8.20' S= 0.0200 '/' n= 0.011 Cc= 0.900
2	Primary	12.50'	**7.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2

Section 13

Maintenance of Common Facilities or Property

Section 13

Maintenance of Common Facilities or Property

The entire site is maintained to a high standard of housekeeping and orderliness. Maintenance of these standards is assured by the need to prevent customer cargoes from degradation or contamination and by the need to maximize available space on the site while allowing immediate access to all areas.

Section 14

Erosion and Sedimentation Control

Section 14

Erosion and Sedimentation Control Plan

Introduction

This Erosion and Sediment Control Plan has been prepared to provide guidelines for soil erosion and sedimentation control during the construction of the Merrill's Marine Terminal Rubb Building VII. This plan has been developed using the Maine Department of Environmental Protection's Best Management Practices and the standards.

Construction Phase

The principal erosion control structures will be silt fence and sediment filtering insert to protect watercourses and the existing catch basin on site. The control of runoff to limit erosion hazards will be facilitated by surface grading of the reclaimed area, which will minimize velocities of runoff and promote sheet flow until it reaches the protected drainage courses.

In order to protect soil, water and wildlife resources of this development and adjacent lands, only those areas necessary to construct the utilities, building and the stormwater management system will be disturbed.

Procedures

A. Prior to the start of construction, check dams will be staked across the drainage courses to protect against construction related erosion. A stone check dam shall be installed around the existing catch basin at the West end of the site, and a sediment filter insert shall be installed in the catch basin to reduce sediment discharge. Prior to the start of construction, a pre-construction meeting shall be held with the owner, site contractor, site design engineer, municipal engineer and the third party inspector (if required) to discuss the scheduling of the site construction.

B. Those areas undergoing actual construction will be left in an untreated or unvegetated condition for a minimum length of time. Areas that will not be completed within 14 days of disturbance shall be protected with temporary erosion control measures.

C. At a minimum, the silt fences shall be inspected and repaired once a week or immediately following any significant rainfall or snow melt. Sediment trapped behind these barriers shall be excavated and re-graded onto the site when it reaches a depth of 6 inches. All silt fences shall be installed where shown on the plans and according to the engineer's specifications.

D. Unless otherwise authorized by the project engineer, any fill used on the site will meet MDOT Standard 703.18 for common borrow, 703.06(b) for subbase aggregate, and 703.06(a) for base.

E. If final seeding of the disturbed areas is not completed by September 15th of the year of construction, then after that date these areas shall be graded and smoothed, then seeded to a winter cover crop of Rye at the rate of 112 lbs./acre or 3 lbs./1,000 square feet. The Rye seeding will be preceded by an application of 3 tons of lime and 1,000 lbs. of 10-10-10 fertilizer or its equivalent per acre. If the Rye seeding cannot be completed by October 15th, then on that date hay mulch will be applied at a rate of 2 tons per acre to provide winter protection. If Rye does not make adequate growth by December 1st, then on that date additional hay mulch at the above rates will be added.

Winter Construction

The winter construction period is from November 1 through April 15.

If the construction site is not stabilized with pavement, a gravel base, 75% mature vegetation cover, or riprap by November 15, then the site needs to be protected with over-winter stabilization. An area considered open is any area not stabilized with pavement, vegetation, mulching, erosion control mats, riprap, or gravel base on a road.

To the extent practicable, winter excavation and earthwork shall be completed such that (excluding building footprint area) no more than 1 acre of the site is without stabilization at any one time. To the extent practicable, no construction activity shall result in a non-stabilized area that exceeds this limit. In the event that the site construction cannot feasibly be achieved without exceeding the one-acre limit, the contractor shall prepare a detailed plan to intercept and contain sediment from the exposed work area. In no event shall runoff be allowed to discharge from the exposed work area without prior containment for removal of sediments.

If final stabilization has not been completed on any areas of the construction site by November 15 of the construction year, then winter stabilization measures shall be taken to protect the site from soil erosion. The contractor shall make reasonable efforts to limit the exposed area to those areas in which work is expected to be undertaken during the proceeding 15 days and that can be mulched in one day prior to any snow event. All areas shall be considered to be denuded until the subbase gravel is installed in roadway/parking areas or the areas of future loam and seed have been loamed, seeded and mulched. Hay and straw mulch rate shall be a minimum of 150 lbs./1,000 s.f. (3 tons/acre) and shall be properly anchored.

The contractor must install any added measures that may be necessary to control erosion/sedimentation from the site dependent upon the actual site and weather conditions. Continuation of earthwork operations on additional areas shall not begin until the exposed soil surface on the area being worked has been stabilized, in order to minimize areas without erosion control protection.

A. Soil Stockpiles

Stockpiles of soil or subsoil will be mulched for over winter protection with hay or straw at twice the normal rate or at 150 lbs/1,000 s.f. (3 tons per acre) or with a four-inch layer of wood-waste erosion control mix. This will be done within 24 hours of stocking and re-established prior to any rainfall or snowfall. Any soil stockpile will not be placed (even covered with hay or straw) within 100 feet from any natural resources.

B. Sediment Barriers

During frozen conditions, sediment barriers shall consist of wood-waste filter berms as frozen soil prevents the proper installation of hay bales and sediment silt fences.

C. Mulching

All areas shall be considered to be denuded until areas of future loam and seed have been loamed, seeded and mulched. Hay and straw mulch shall be applied at a rate of 150 lb. per 1,000 square feet or 3 tons/acre (twice the normal accepted rate of 75-lbs./1,000 s.f. or 1.5 tons/acre) and shall be properly anchored. Mulch shall not be spread on top of snow. The snow will be removed down to a one-inch depth or less prior to application.

After each day of final grading, the area will be properly stabilized with anchored hay or straw or erosion control matting. An area shall be considered to have been stabilized when exposed surfaces have been either mulched with straw or hay at a rate of 150 lb. per 1,000 square feet (3 tons/acre) and adequately anchored that ground surface is not visible through the mulch. Between the dates of November 1 and April 15, all mulch shall be anchored either by peg line, mulch netting, asphalt emulsion chemical, tack or wood cellulose fiber. Cover is sufficient when the ground surface is not visible though the mulch.

After November 1st, all disturbed soils will be mulched within seven days, prior to any storm event or prior to any work shutdown lasting more than 24 hours. Soils brought to final grade need to be mulched and anchored by the end of each workday, unless the exposed area is otherwise protected via a sediment control plan to contain and collect sediment.

D. Mulching on Slopes and Ditches

Slopes shall not be left exposed for a maximum of three days, prior to a storm event (rain or snow) of prior to any work shutdown lasting more than 24 hours (including weekends and holidays) unless fully mulched and anchored with peg and netting, or with erosion control blankets. Mulching shall be applied at a rate of 230 lbs/1,000 s.f. on all slopes greater than 8%. Mulch netting shall be used to anchor mulch in all drainage ways with a slope greater than 3% for slopes exposed to direct winds and for all other slopes greater that 8%.

Erosion control blankets shall be used in lieu of mulch in all drainage ways with slopes 8%. Erosion control mix can be used to substitute erosion control blankets on all slopes except ditches.

E. Seeding

Between the dates of October 15th and April 1st, loam or seed will not be required. During periods of above freezing temperatures, finished areas shall be fine graded and either protected with mulch or temporarily seeded and mulched until such time as the final treatment can be applied. If the date is after November 1st and if the exposed area has been loamed, final graded with a uniform surface, then the area may be dormant seeded at a rate of 3 times higher than specified for permanent seed and then mulched. Dormant seeding may be placed prior to the placement of mulch and fabric netting anchored with staples. If dormant seeding is used for the site, all disturbed areas shall receive 4" of loam and seed at an application rate of 5 lbs/1000 s.f. All areas seeded during the winter will be inspected in the spring for adequate catch. All areas not sufficiently vegetated (less than 75% catch) shall be re-vegetated by replacing loam, seed and mulch.

If dormant seeding is not used for the site, all disturbed areas shall be re-vegetated in the spring.

F. Trench Dewatering

Water from building excavation and construction trench dewatering will pass first through a filter bag or secondary containment structure (e.g. hay bale lined pool) prior to discharge. The discharge site shall be selected to avoid flooding, icing, and sediment discharges to a protected resource. In no case shall the filter bag or containment structure be located within 100 feet of a protected natural resource.

G. Inspection and Monitoring

Maintenance measures shall be applied as needed during the entire construction season. After each rainfall, snow storm or period of thawing and runoff, the site contractor shall perform a visual inspection of all installed erosion control measures and perform repairs as needed to ensure their continuous function. Following the temporary and or final seeding and mulching, the contractor shall in the spring inspect and repair any damages and/ or unestablished spots. Established vegetative cover means a minimum of 85 to 90% of areas vegetated with vigorous growth.

Revegetation Plan

Revegetation measures shall commence immediately upon completion of construction except as noted under Paragraph E above. All disturbed areas not otherwise stabilized shall be graded, smoothed, and prepared for final seeding as follows:

A. Four inches of screened loam shall be spread over disturbed areas and smoothed to a uniform surface. Loam shall be free from clay lumps, subsoil, and other deleterious materials.

B. In lieu of soil tests, agricultural limestone shall be spread at a rate of three tons per acre. 10-20-20 fertilizer shall follow at the rate of 800 lbs per acre. These two soil amendments shall be incorporated into the soil prior to seeding.

C. Following seed bed preparation, the swales and road ditches, fill areas, and back slopes shall be seeded to a mixture of 35% Creeping Red Fescue, 6% Red Top, 24% Kentucky Bluegrass, 10% Perennial Ryegrass, 20% Annual Ryegrass and 5% White Dutch Clover. Sod may be substituted for seed only.

D. Hay mulch at a rate of one to two tons per acre shall be applied following seeding. A suitable binder such as RMB Plus will be used on hay mulch according to manufacturer's recommendations.

Monitoring Schedule

Maintenance measures will be applied as needed during the entire construction cycle. After each rainfall, a visual inspection will be made by the contractor of all installed erosion control measures and repairs will be made as needed to ensure their continuing function as designed. Following the final seedings, the site will be inspected every fourteen days until the seedings have been 75% established. Reseeding will be carried out, with follow-up inspections, in the event of any failures. All erosion control measures will be removed within 10 days after vegetation is adequately established. The applicant shall be responsible for making arrangements for the inspections.

Prepared By:

SEBAGO TECHNICS, INC.

Michael Tadema-Wielandt
Design Engineer

MTW:mtw/dlf
December 15, 2004

Section 15

Groundwater

Section 15

Groundwater

A. Narrative

1. Location

According to the Maine Geological Survey (MGS) Significant Sand and Gravel Aquifer Map for Cumberland, Kennebec, Lincoln and Sagadahoc Counties (Figure 2), the project site located in Portland, Maine is not located on a significant sand and gravel aquifer.

The project site consists primarily of the Presumpscot Formation as shown on the MGS Surficial Geology Map for the Portland, Maine quadrangle (Figure 3). The formation consists of Artificial Fill (AF) with variable mixtures of surficial sediments, rock fragments, and artificial materials transported and dumped to build up roads, waterfronts, etc.

The MGS Bedrock Geologic Map (Figure 5) shows that bedrock below the project site is made up of the Spring Point Formation. Bedrock consists of greenish-grey plagioclase-quartz-biotite-chlorite amphibole phyllite, schist, and gneiss representing metamorphosed volcanic tuffs and flows.

2. Quantity

The site is currently impervious and will remain in that condition with the addition of the project.

3. Sources

There will be no water or wastewater facilities located in the new warehouse.

4. Measures to Prevent Degradation

Not applicable.

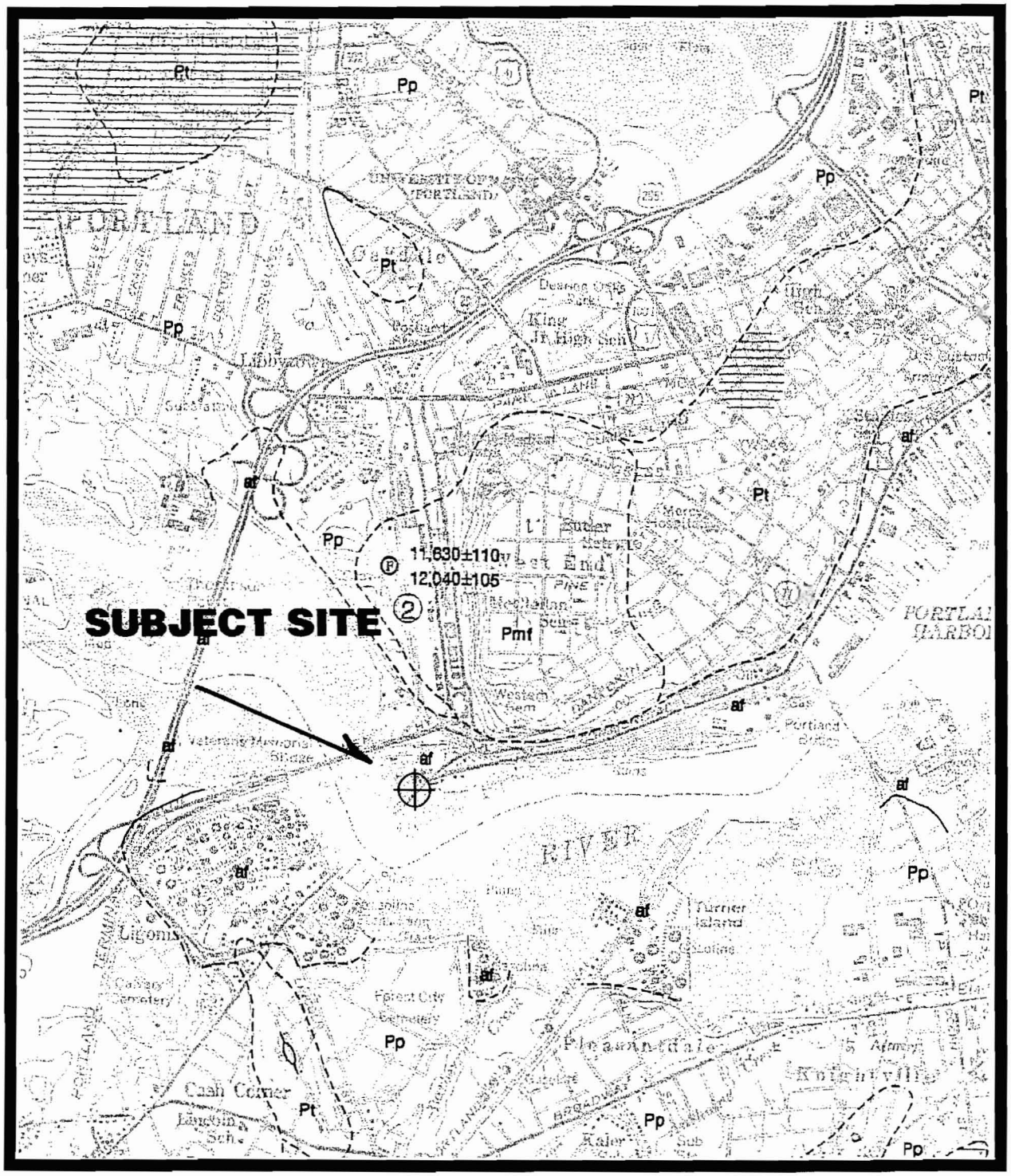
B. Groundwater Protection Plan

Not applicable.

C. Monitoring Plan

Not applicable.

FIGURE 4



SURFICIAL GEOLOGY MAP

PORTLAND WEST, ME

MAP # 97-51

SCALE: 1 = 24,000

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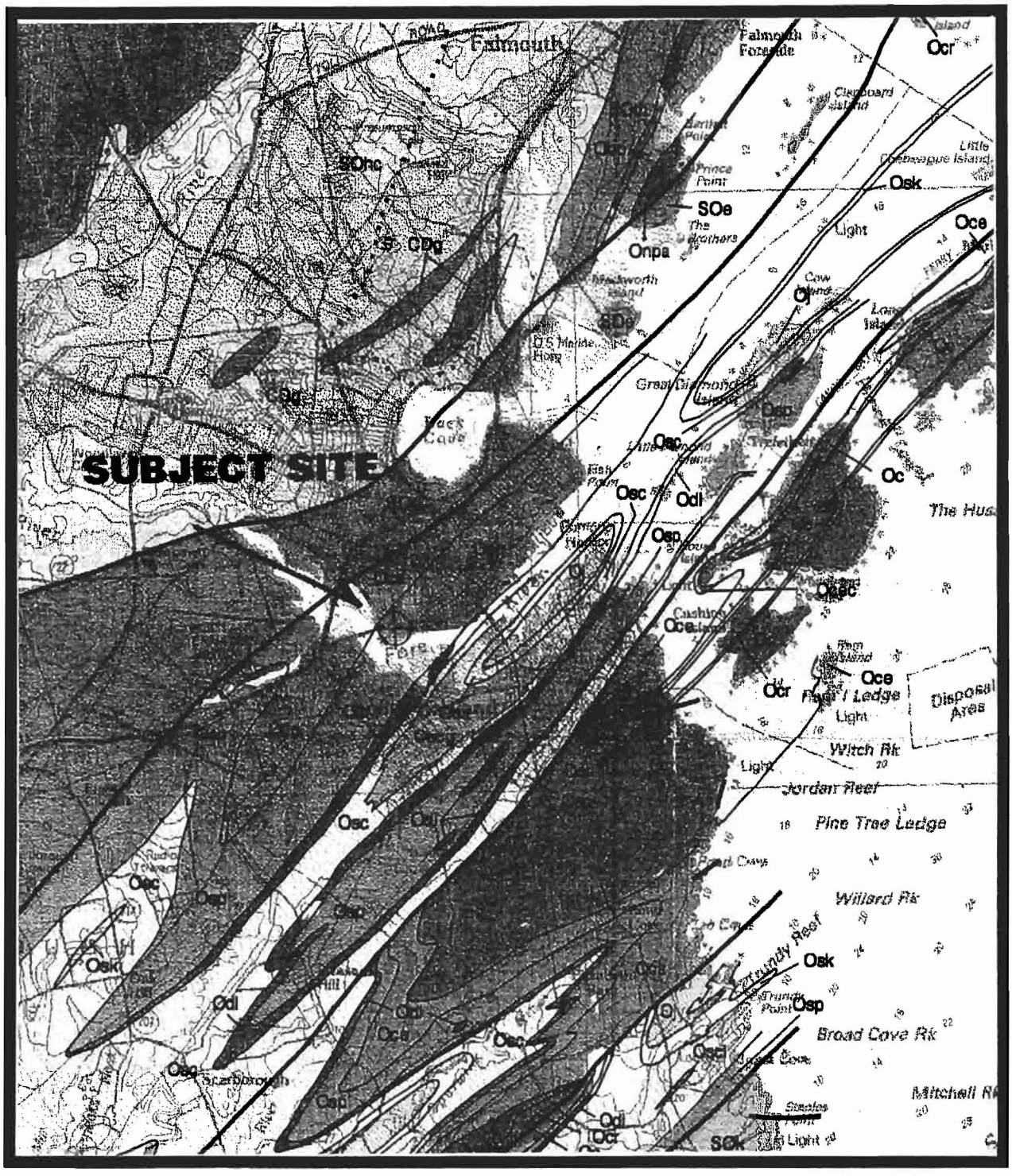
FIGURE 5



BEDROCK GEOLOGY MAP

PORTLAND, ME

MAP # 98-1

SCALE: 1:100,000

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Section 16

Water Supply

Section 16

Water Supply

Off-Site Utility Company or Public Agency

The Portland Water District supplies water to the Merrill Industries site. The new warehouse will not contain any water use or wastewater facilities.

Private Wells

There are no wells located on site and we are not aware of any wells in the near site vicinity.

Section 17

Wastewater Disposal

Wastewater Disposal

There are no new wastewater disposal facilities to be located in the new warehouse. All wastewater generated on site is discharged to the Portland wastewater collection system and ultimately treated at the Portland wastewater treatment facility operated by the Portland Water District.

Section 18

Solid Waste

Section 18

Solid Waste

No change in solid waste disposal volumes is anticipated by this development. Current solid waste requirements are accommodated by Pine Tree Waste of South Portland. A 10 yard container is emptied weekly. Periodically, larger containers are brought in to handle any non-routine requirements.

Section 19

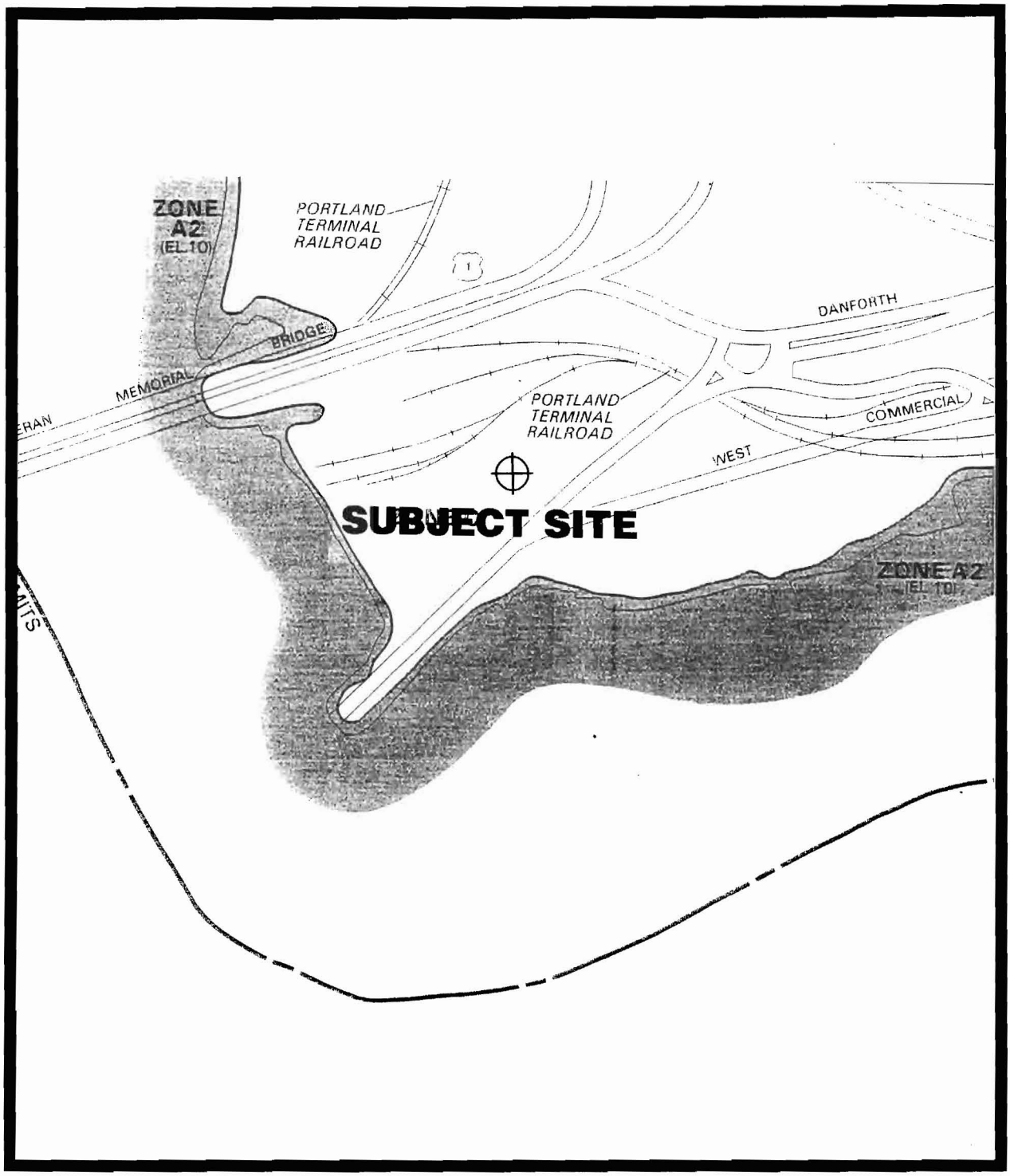
Flooding

Section 19

Flooding

Figure 6 - FEMA Floodplain Map shows the Zone A2 flood elevation 10. As indicated on the project site plan (Sheet 1 of 5), the facility construction will all occur between elevations 17 and 23. Therefore, construction will occur above the flood area.

FIGURE 6



FEMA FLOODPLAIN MAP

MERRILL INDUSTRIES

PORTLAND, ME

MAP 230051-0016B

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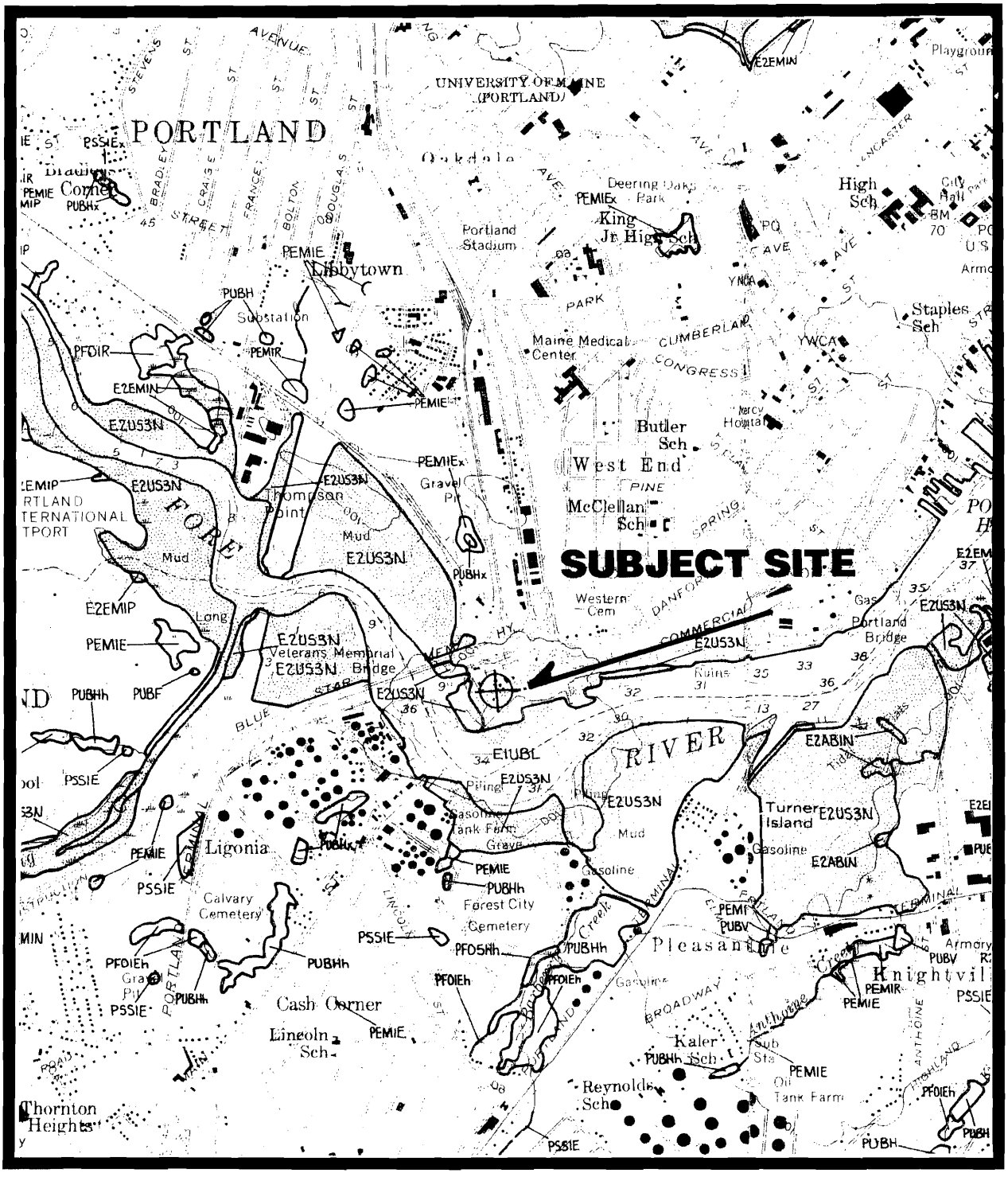
FIGURE 7



NATIONAL WETLANDS INVENTORY

USGS 7.5 MIN. QUADRANGLE

PORTLAND WEST

1:24,000

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Section 20

Blasting

Section 20

Blasting

The site subsurface does not contain ledge and it is not anticipated that blasting will be required for the project. Please refer to the Geotechnical Report located in Section 11.

Section 21

Air Emissions

Section 21

Air Emissions

This project will not generate air emissions requiring an air emissions license.

Section 22

Odors

Section 22

Odors

The addition of this warehouse facility for the storage of paper products to the site is not anticipated to generate any odors.

Section 23

Water Vapor

Section 23

Water Vapor

This project will not generate water vapor emissions impacting the environment.

Section 24

Sunlight

Section 24

Sunlight

The construction of the warehouse will not adversely impact sunlight access on abutting properties associated with the site.

Section 25

Notices

Section 25

Notices

Merrill Industries and the City of Portland will be conducting the public participation program for this project within the framework of the City's process of approval. Notices to abutters will be compiled by the City, and the program will be initiated in January, 2005.