Form # P 04

DISPLAY THIS CARD ON PRINCIPAL FRONTAGE OF WORK

CITY OF PORTLAND

BUILDING INSPECTION

PERMIT

Permit Number: 031071

Please Read Application And Notes, If Any, Attached

This is to certify that Theodore Logan & Son Inc/[illegible]gford &

has permission to Foundation only

AT 34 Blueberry Rd [illegible] 238A A006001

provided that the person or persons, firm or corporation accepting this permit shall comply with all of the provisions of the Statutes of Maine and of the Ordinances of the City of Portland regulating the construction, maintenance and use of buildings and structures, and of the application on file in this department.

Apply to Public Works for street line and grade if nature of work requires such information.

Notification of inspection must be given and written permission procured before this building or part thereof is lathed or closed-in. 24 HOUR NOTICE IS REQUIRED.

A certificate of occupancy must be procured by owner before this building or part thereof is occupied.

OTHER REQUIRED APPROVALS

Fire Dept. _____

Health Dept. _____

Appeal Board _____

Other _____
Department Name

9/6/03
Director - Building & Inspection Services

PENALTY FOR REMOVING THIS CARD

City of Portland, Maine - Building or Use Permit Application

389 Congress Street, 04101 Tel: (207) 874-8703, Fax: (207) 874-8716

Permit No:	Issue Date:	CBL:
03-1071		238A A006001

Location of Construction:	Owner Name:	Owner Address:	Phone:
34 Blueberry Rd	Theodore Logan & Son Inc	971 Congress St	774-6321
Business Name:	**Contractor Name:**	**Contractor Address:**	**Phone**
	Langford & Low, Inc.	PO Box 662 Portland	2077975141
Lessee/Buyer's Name	**Phone:**	**Permit Type:**	**Zone:**
		Foundation Only/Commercial	

Past Use:	Proposed Use:	Permit Fee:	Cost of Work:	CEO District:
Vancant	Foundation only 11,000 Sq.ft. Storage/Office Builder (See Permit #030979 for info/zoning approvals)		$0.00	3

FIRE DEPT: ☐ Approved ☐ Denied

Signature:

INSPECTION:
Use Group: Type: FOUNDATION ONLY 9/5/03

Signature:

Proposed Project Description:
Foundation only – S.W. Code Performance Special Insp. (1705 Doc4)

PEDESTRIAN ACTIVITIES DISTRICT (P.A.D.)

Action: ☐ Approved ☐ Approved w/Conditions ☐ Denied

Signature: Date:

Permit Taken By:	Date Applied For:
mjn	09/05/2003

1. This permit application does not preclude the Applicant(s) from meeting applicable State and Federal Rules.
2. Building permits do not include plumbing, septic or electrical work.
3. Building permits are void if work is not started within six (6) months of the date of issuance. False information may invalidate a building permit and stop all work..

Zoning Approval

Special Zone or Reviews	Zoning Appeal	Historic Preservation
☐ Shoreland	☐ Variance	☐ Not in District or Landmark
☐ Wetland	☐ Miscellaneous	☐ Does Not Require Review
☐ Flood Zone	☐ Conditional Use	☐ Requires Review
☐ Subdivision	☐ Interpretation	☐ Approved
☐ Site Plan	☐ Approved	☐ Approved w/Conditions
Maj ☐ Minor ☐ MM ☐	☐ Denied	☐ Denied
Date:	Date:	Date:

CERTIFICATION

I hereby certify that I am the owner of record of the named property, or that the proposed work is authorized by the owner of record and that I have been authorized by the owner to make this application as his authorized agent and I agree to conform to all applicable laws of this jurisdiction. In addition, if a permit for work described in the application is issued, I certify that the code official's authorized representative shall have the authority to enter all areas covered by such permit at any reasonable hour to enforce the provision of the code(s) applicable to such permit.

SIGNATURE OF APPLICANT ADDRESS DATE PHONE

RESPONSIBLE PERSON IN CHARGE OF WORK, TITLE DATE PHONE

1.0 INTRODUCTION

Theodore Logan & Son is planning a new 12,000 square foot facility in Portland, Maine. This report describes the geotechnical investigation performed by URS Corporation (URS) for the proposed construction. The objective of this investigation was to identify and characterize the subsurface conditions in the area of the planned construction, evaluate geotechnical issues relative to design, construction and performance of the new structure, and provide specific geotechnical-related recommendations for construction. Work on this project was conducted in accordance with the scope of services presented in our May 28, 2002 proposal.

The building site is located on the west side of Blueberry Road in Portland, Maine. A site location map is provided as Figure 1.

1.1 PROPOSED CONSTRUCTION

The proposed facility will consist of an approximate 12,000 square foot warehouse and commercial painting shop on a slab-on-grade/spread footing foundation. Finished grade for the floor slab is currently proposed to be 82 feet msl. Cuts of less than 3 feet on the east side of the building and fill depths of up to 10 feet on west, rear, of the building are anticipated. The rear of the building will be used to maneuver and paint large, heavy, structural steel under controlled conditions. Parking and outside work areas are to be paved. Figure 2, Boring Location Plan, outlines the footprint the new facility and parking area.

Specific structural details of the building are not yet available but we understand that the new structure might have:

- Steel frame/insulated wall panels,
- Slab-on grade floors with exterior frost walls,
- Interior columns on 40 foot to 50 foot spacings placed on spread footings,
- Column loads in the in the 150 kip to 200 kip range, and
- Conventional office and loading dock areas.

The existing site topography is sloping down from southeast to northwest across the site (Figure 2). Ground surface elevations range from approximately elevation 93 feet, at the southeast corner of the property to elevation 70 feet along the rear, west property line. The center of the property, where the building is to be located, ranges in elevation from 83 feet to 77 feet. The site is wooded.

1.2 PURPOSE AND SCOPE OF SERVICES

The purposes of the geotechnical investigation are to characterize the subsurface conditions in the proposed construction areas, and to provide recommendations for design and construction activities including site preparation, earthwork, foundations, and soil improvement. To accomplish these purposes, a geotechnical investigation was performed that includes conducting a subsurface exploration and preparing a geotechnical report in accordance with the applicable local building codes (i.e., Building Officials and Code Administrators [BOCA] 1996 National Building Code).

In summary, the scope of work for the geotechnical investigation is described below.

Task 1) Review of readily available information including construction plans, topographic plans, geologic maps, and geotechnical reports for the site and surrounding area;

Task 2) Perform subsurface exploration program to evaluate soil conditions at the site.

Task 3) Undertake a limited laboratory-testing program of representative soil samples to confirm field classification and evaluate soil-engineering parameters if required.

Task 4) Perform an engineering analyses and geotechnical recommendations for the proposed parking area, building foundations, including bearing capacity, total and differential settlement, friction coefficients, soil improvement (if needed) and subgrade moduli; and

Task 5) Preparation of an engineering report that will be submitted at the conclusion of our study.

Subsequent to the to field exploration program, URS review soil samples and determined that laboratory testing to characterize sample was not warranted given the limited soil depths and URS experience from near-by explorations.

2.0 GEOTECHNICAL INVESTIGATION

2.1 SUBSURFACE EXPLORATIONS

The field exploration for this geotechnical study was performed on August 8, 2002. Great Works Pump and Test Boring, Inc. of Rollingsford, New Hampshire, drilled the borings and auger probes under the supervision of a URS Geologist. The borings were B-1 to B-4. Drilling was performed using an all-terrain vehicle mounted Mobile B-57 drill rigs equipped with 3.5-inch inside diameter hollow-stem augers. Soil samples were obtained using a standard split-barrel sampler and the Standard Penetration Test (SPT), in general accordance with the procedures described in America Society for Testing Materials (ASTM) D 1586. Driving resistances from the SPT tests (i.e., blow counts) are recorded in the boring logs. Refusal interpretation was performed by drilling a second boring approximately 10 feet from the initial boring. Refusal at nearly the same depth was interpreted to be on bedrock.

A URS field representative maintained a record of field activities, classified the soils and rock encountered, and maintained a log of the borings. Soil samples were generally taken at 5-foot depth intervals with 2-foot split-barrel samplers starting at the ground surface.

Exploration reports (boring logs) are presented in Appendix A. URS has retained representative soil samples at their Augusta, Maine office. These samples will be retained for a period of one year, until August 2003, at which time they will be disposed. Field estimated boring locations are shown on Figure 2. We understand final exploration locations will be surveyed by SYTDesign Consultants, Cumberland, Maine.

2.2 GEOTECHNICAL CONDITIONS

2.2.1 Regional Geology Bedrock

The site is located near the interface of two Ordovician-age bedrock groups: the Cape Elizabeth Formation and the Spring Point Formation. Both rock formations are highly metamorphosed.

The Cape Elizabeth Formation is characterized by interbedded pelite and sandstone. The Spring Point Formation is characterized by mafic and feltic volcanics. Rock outcrops from the Spring Point Formation are present on the adjacent property.

Surficial Geology

Surficial geology is characterized by sandy glacial outwash deposits underlain by glaciomarine sediments and glacial till. The outwash deposits transition into and are inter-fingered with a thick underlying glaciomarine fine grain sediment known regionally as the Presumpscot Formation. The Presumpscot Formation overlies a discontinuous glacial till deposit. Glacial till is formed below advancing glacial ice and is characterized as a dense heterogeneous mixture of clay, silt, sand, and boulders. Where till is absent, the overlying Presumpscot Formation is in direct contact with the bedrock.

2.2.2 Subsurface Conditions

URS prepared the following generalized description of the major strata encountered beneath the proposed facility based on our exploration program, which were drilled in the vicinity of the proposed building.

- Boring B-1 (northeast corner) indicated approximately 6 feet of sand (Unified Soil Classification System {USCS} SP) overlying a stiff silty clay (USCS CL) and glacial till. Refusal, interpreted to be bedrock, was at 15.75 feet below ground surface (bgs). Surface elevation at B-2 was approximately 80 feet. Therefore, bedrock is at approximately elevation 64 feet.

- Boring B-2 (northwest corner) indicated approximately 5 feet of sand (USCS SP) overlying a stiff to medium silty clay (USCS CL). Refusal, interpreted to be bedrock, was at 16.75 feet bgs. Surface elevation at B-2 was approximately 77 feet. Therefore, bedrock is at approximately elevation 60 feet msl.

- Boring B-3 (southwest corner) indicated approximately 5 feet of sand (USCS SP) overlying a stiff silty clay (USCS CL) and a very thin (less the 12 inches) stratum of glacial till. Refusal, interpreted to be bedrock, was at 8.5 feet bgs.

Surface elevation at B-3 was approximately 80 feet. Therefore, bedrock is at approximately elevation 71 feet.

- Boring B-4 (southeast corner) indicated approximately 2.5 feet of sand (USCS SP) and glacial till. Refusal, interpreted to be bedrock, was at 2.5 feet bgs. Surface elevation at B-4 was approximately 83.5 feet msl. Therefore, bedrock is at approximately elevation 81 feet msl.

Estimated groundwater depths were between 2 to 5 feet bgs in the borings. While water depths measured in borings immediately following drilling are not accurate measurements of static groundwater levels, they do indicate that groundwater, at the time of exploration, was only a few feet bgs.

2.2.3 Laboratory Testing

A review of soil samples and in-situ classification results from the current exploration program indicates that laboratory testing was not required to characterize the site soils. Rather, data and experience from other representative projects can be used. The following information is a summary of that data.

Sands

The sands in the upper portion of the deposit are relatively clean and can be assumed to contain generally less than 10 percent fines (minus 200 sieve material by weight.)

Silty Clay

Silty clays underlying the site has the following characteristics:

- Liquid Limit: 32,
- Plastic Index: 20,
- Natural water content: 25 to 45 percent depending upon stiffness,
- Undrained Shear Strength: 1000 psf for the stiff soil in the deposit,

- Consolidation: Over consolidated (stiff) to slightly over consolidated (medium to soft).

2.2.4 Seismic Categorization

The BOCA® National Building Code is used by Portland, Maine for seismic design. Using that code, the interpreted peak velocity-related acceleration coefficient (Av) for the site is 0.11 (Figure 1610.1.3(1) BOCA® Code).

Based on our understanding that the proposed building uses, we believe the building would be in the Group I Seismic Hazard Exposure Group (reference Table 1610.1.5 BOCA® Code). Thus, the Seismic Performance Category would be C. The proceeding categorization must be confirmed based upon actual use by the building designer.

The site coefficient, based upon subsurface conditions equivalent to "S", is 1.0 for the site area (reference Table 1610.3.1).

2.2.5 Soil Liquefaction

During seismic events, loose saturated sand layers may liquefy (i.e., lose shear strength due to shaking), which may cause differential settlements, lateral spreading, and loss of bearing capacity. Liquefiable soils were not identified at the proposed building site.

3.0 EVALUATION AND RECOMMENDATIONS

3.1 FOUNDATION SYSTEM EVALUATION

URS recommendations the following foundation design criteria for proposed building:

- The allowable bearing capacity for the footings, founded on soil, is 2000 pounds per square foot;
- Settlements associated with this bearings capacity will be 1-inch or less;
- Strip footing should have a minimum width of 2 feet and individual column footings a minimum width of 3 feet;
- Exterior footings bottoms should be at least 4 feet finished exterior grade for frost protection, except where footings are underlain by bedrock;
- Bedrock should be excavated at least six inches below the bottom of the footings or floor slab;
- All footings and slab should be underlain by at least six inches. of the ¾ inch coarse aggregate (ME DOT 703.14);
- Subslab and perimeter foundation drainage should be incorporated into the foundation design so as to control groundwater below the bottom of the foundation. Drainage is especially important with foundations on bedrock; and
- The foundation drainage should incorporate a perforated pipe that has a free drainage outlet at all times.

The proposed structure may share footings on both bedrock and soil if the structure is reasonably flexible. Brittle finishes, such as brick or glass, should not span footings transitioning from bedrock to soil unless structural isolation between the new and old buildings is included.

3.1.1 Parking Lot Area

The soils underlying the proposed parking lot are suitable as a subgrade once the site has been prepared. Bedrock should be at least 6-inches below the paved surface. The silty clay, which underlies the northwestern portion of the parking lot, will consolidate slightly due to fill placement. The amount of settlement resulting from this consolidation is dependant upon the thickness of the silty clay layer and filling depth. Paving should be delayed as long as possible after fill placement to limit post-paving settlement.

3.2 SITE PREPARATION

3.2.1 Subgrade Preparation

The soil subgrade should be stripped of pavement, vegetation, roots and debris. The building subgrades should be proof-rolled with a large vibratory roller or loaded dump truck. Proof rolling should be observed by a knowledgeable geotechnical engineer. Areas of soft, loose, or otherwise objectionable soils should be over-excavated and replaced with non-structural fill. Proof-rolling should be done immediately prior to footing and slab placement.

3.2.2 Backfill

Backfill outside of building footprints should consist of common borrow. Common borrow is soil suitable for embankment construction. It should be free from frozen material, perishable rubbish, peat, and other unsuitable material. Common borrow should be compacted to 90 percent of "Modified Proctor" density. The moisture content should be sufficient to provide the required compaction and stable embankment. In no case should the moisture content exceed 4 percent above optimum. The maximum particle size in the field should be 6 inches to permit compaction. The on-site soils at the existing gravel parking lot meet the criteria for common borrow.

Backfill placed beneath the building footprint should be granular borrow. Granular borrow should consist of sand or gravel of hard durable particles free from vegetable matter, lumps or balls of clay, and other deleterious substances. The gradation of that portion passing a 3-inch sieve should meet the gradation requirements of the following table.

Percentage by Weight Passing Square Mesh Sieves	
Sieve Designation	**Material for Embankment Construction**
No. 40	0 to 70
No. 200	0 to 20

Granular borrow should contain no particles or fragments with a maximum dimension in excess of the compacted thickness of the layer being placed, typically 6 inches. Granular borrow beneath structures should be compacted to 95 percent of "Modified Proctor" density.

3.3 PAVEMENT DESIGN

Design information related to expected traffic loads or pavement construction materials were not available at this stage of the design. For planning purposes only, general recommendations are provided for truck access and work areas.

Subgrades of areas to be paved should be proof-rolled with heavy rubber-tired equipment to detect possible soft areas. The upper 8 inches of subgrade soils in paved areas should be scarified, moisture-conditioned, and rolled to provide a smooth, unyielding surface compacted to at least 95 percent of "Modified Proctor" density. Subgrade soils should be maintained in a moist condition until covered with the recommended thickness of aggregate base.

A California Bearing Ratio (CBR) of 15 can be assumed for the granular subgrade soils if drainage is provided. Typical flexible pavement sections used in Maine for projects similar to the Distribution facility include:

Area	Bituminous Surface Course	Bituminous Base Course	Aggregate Base
Access Roads/Heavy Traffic Areas	2 inches	2 inches	15 inches
Auto Parking	1 inch	2 inches	12 inches

Material used in construction of paved areas should conform to the appropriate sections of Maine Department of Transportation Standards Specifications for Highways and Bridges. The designers of the facility should prepare a pavement design specifically for expected traffic loads, when known. The truck maneuvering areas may require additional thickness or different bituminous concrete formulation given the type of load to which the area is subjected. The design of such areas is beyond the scope of this report.

Rigid pavements should be underlain by at least 12 inches of dense aggregate base. The anticipated subgrade for rigid pavement is:

- 12 inches of dense aggregate base,
- a variable depth of dense compacted common borrow, and
- a variable depth of proof-rolled sandy soil overlying bedrock.

Based upon this profile, URS recommends that the modulus of vertical subgrade reaction of 700,000 pounds per cubic foot be used for rigid pavement design.

Pavement underdrainage should be designed to control the groundwater to a depth of 3 feet below pavement surface to limit frost damage. Care should be exercised in locating and constructing utilities to limit damage to the pavement. Aggregate base should be placed in thin lifts and in a manner to prevent segregation, and compacted (to at least 95 percent "Modified Proctor" density) to provide a smooth unyielding surface.

3.4 FLOOR SLABS

3.4.1 Modules of Subgrade Reaction

The anticipated subgrade for the slab-on-grade floor for the expansion is:

- 6 inches dense coarse aggregate,
- a variable depth of dense compacted granular borrow, and
- a variable depth proof-rolled sandy soil, silty clay or bedrock.

Based on this profile, URS recommends that modulus of vertical subgrade reaction of 600,000 pounds per cubic foot be used for slab design.

3.4.2 Vapor Barrier

The use of the 6 inches of coarse aggregate will act as a capillary breach and, thus, limit moisture migration from the subgrade soils to the bottom of the floor slab. If, for other reasons, a vapor barrier is required, we recommend a 3-inch sand layer be placed over the coarse aggregate prior to installing a membrane type vapor barrier.

3.5 RETAINING WALLS

We are not aware of any significant retaining walls currently proposed for the project. If significant retaining walls (generally over 6 feet in height) are to be constructed, these walls should be reviewed by a geotechnical engineer and specific design recommendations prepared.

For low walls such as loading docks, the following design parameters are recommended. These recommendations assume a fully drained wall – a critical assumption – and structure fill backfill.

- Soil Unit Weight, $\gamma = 135$ pounds per cubic foot
- At Rest Coefficient of Lateral Earth Pressure, $K_{0,} = 0.6$

- Active Coefficient of Lateral Earth Pressure, K_a, 0.3

The lateral load against the retaining wall can be assumed to a triangular loading equal to:

$$P = K\gamma d$$

Where

P = load at depth, d, behind the wall,

K = the appropriate lateral earth pressure coefficient, and

γ = soil unit weight

The At Rest Coefficient should be used for walls that are rigid and unyielding, such as loading dock walls. The Active Coefficient is used for walls where some outward movement can occur such as freestanding walls. Figure 3 graphically shows these loading diagrams. Also, note that reinforced earth/articulated block walls require additional analysis.

Surcharges above the walls, such as wheel loads or soil stock piles, also cause lateral load. These are generally approximated by a rectangular loading diagram (see Figure 3). For irregular or unusual wall configurations or surcharges, specific lateral loading diagram should be developed by a geotechnical engineer.

Lateral soil loads on retaining walls resulting from earthquake forces can be approximated by a triangular loading diagram. Figure 3 presents this diagram using the approach suggested by Seed and Whitman (Design of Earth Retaining Structures for Dynamic Loads, ASCE, 1970). This approach is conservative. Should earthquake loads be a significant design criteria, a more rigorous evaluation of the specific wall may result in reduced design loads.

3.6 CORROSIVITY/SULPHATE ISSUES

Sulphate and pH-related problems with native soils in Maine are rare. Granular borrow used to raise site grades, and coarse aggregate placed beneath slabs and footing, are also expected to be benign with a pH similar to the in-situ sand. Regional groundwater pH is in the range of 6.0 to

6.5. Type IIA, moderate sulphate resistant, air-entrained, cement is typically used in Maine. The specific experience of a local concrete supplier should be sought by the designer.

3.7 EXCAVATION AND EMBANKMENT SLOPES

3.7.1 Temporary Excavations

All excavations must comply with Occupational Safety and Health Administration (OSHA) requirements. Cuts greater than four feet in depth should be shored and/or sloped. Particular care should be taken when excavating into the loose sand below the groundwater table. All braced or support excavations should be designed by a competent geotechnical engineer familiar with site soils. The sides of the temporary excavations may be sloped at 1.5H to 1V (horizontal to vertical) or flatter. Flatter slopes may be required depending on the strength and homogeneity of the soils encountered during excavation, especially in areas where silty clay is encountered. Runoff water should be prevented from entering the excavations and be collected and disposed of appropriately to prevent water standing within and adjacent to the excavations. Materials should not be stockpiled closer than ten feet from the edges of excavations.

3.8 UTILITY INSTALLATION

The bedrock surface in the southeastern portion of the site are likely to be above the depth for buried utilities (four to six feet). Therefore, the cost to install the utilities in this area may be higher. If possible, utilities should be located in the northeastern portion of the site to reduce cost. A test pit exploration program is suggested to more clearly delineate bedrock depths if this information is required.

3.9 SEDIMENT CONTROLS

Dewatering of excavations may generate water with a high silty sand or silty clay content. Because the silty clay may contain as much as 50 percent clay size fraction, removing sufficient sediment from the water to reduce turbidity to acceptable levels may be difficult. URS is aware

of heighten concerns by regulatory agencies resulting from excessive turbidity in construction "water" discharges.

The contractor should develop a sediment control plan that specifically addresses clay fraction removal. It is likely that additional sediment removal measures, beyond that normally taken at construction sites, will be required.