

**PRELIMINARY GEOTECHNICAL SUMMARY  
FOR  
PROPOSED PARKING FACILITY  
THIRD STREET LOT  
DOVER, NH  
CITY OF DOVER  
OFFICE OF THE FINANCE DIRECTOR  
288 CENTRAL AVENUE  
DOVER, NH 03820-4169  
ATTN: DANIEL BARUFALDI**

**JTC Project # 11-GEO-005**



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## Geotechnical Summary

# JOHN TURNER CONSULTING, INC

19 DOVER STREET  
DOVER, NEW HAMPSHIRE  
603-749-1841 (p)/ 603-516-6851 (f)  
NH-MA-ME-VT  
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## MEMORANDUM

**TO:** City of Dover  
Office of the Finance Director  
288 Central Avenue  
Dover, NH 03820-4169



**FROM:** Kyle Urso                      Kevin Martin, P.E.  
Field Engineer                      Geotechnical Engineer

**DATE:** February 24, 2011

**RE:**                      **PRELIMINARY GEOTECHNICAL SUMMARY**  
**PROPOSED PARKING FACILITY**  
**THIRD STREET LOT**  
**DOVER, NEW HAMPSHIRE**

Project No. 11-GEO-005

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This memorandum report presents the findings of a subsurface exploration program and a preliminary evaluation of the conditions encountered as they relate to the feasibility of a proposed parking facility. The contents of this report are subject to the attached *Limitations*.

### BACKGROUND

The purpose of this preliminary geotechnical study is to review the subgrade conditions and feasibility for potential re-use of city owned lots. Future development is uncertain but may include a parking lot or parking garage. A parking garage may be up to 4-7 stories with considerable load.

### SITE & PROJECT DESCRIPTION

The triangular site is presently utilized as a parking lot. The site is relatively level based on visual estimate. A *Site Plan* is in the process of being compiled for the project. Recent survey of the test bores indicates site grades to vary from elevation  $\approx 75-77$  ft. An *Environmental Site Assessment* (ESA) is also being completed for the project. This *ESA* report was not completed at the time of this study. It is noted that the site was prior used as commuter rail station adjacent to the rail tracks. Prior *Sanborn Fire Maps* show a Passenger Station and Baggage Room.

## **SUBSURFACE EXPLORATIONS & LABORATORY TESTING**

### **Test Borings**

The subgrade conditions were reviewed with the completion of four (4) test borings throughout the lot. The test borings (identified as B5 to B8) were advanced to depths of about  $\approx 22-98$  ft utilizing either continuous flight hollow stem augers or NW casing. Soil samples were typically retrieved at no greater than 5 ft intervals with a 2-inch diameter split-spoon sampler. Standard Penetration Tests (SPTs) were performed at the sampling intervals in general accordance with ASTM-D1586 (*Standard Method for Penetration Test and Split-Barrel Sampling of Soils*). Field descriptions and penetration resistance of the soils encountered, observed depth to groundwater, depth to apparent bedrock refusal and other pertinent data are contained on the attached *Test Boring Logs*. The test borings were located by survey as shown on the *Test Boring Location Plan*.

### **Laboratory Testing**

Five (5) selected split-spoon samples obtained from the test borings were submitted to our laboratory for sieve analyses and Atterberg Limits per ASTM Standards. The purpose of the testing was to assess engineering characteristics for design and to assess the suitability of the site soils for re-use as structural fill on the project. The test results are attached for review.

## **SUBGRADE CONDITIONS**

The subgrade conditions are variable across this lot. In general, there is about  $\approx 6-7$  ft of Fill underlain by Fine Sand with variable silt which transitions into a very soft silty Clay which extends about  $\approx 100$  ft below grade. In a strange occurrence, there is about  $\approx 20$  ft of loose, sandy fill at B6. The presence of wood, brick and rubble indicate deep fill in this area.

There is typically about  $\approx 6-7$  ft of fill across the site. The fill is generally clean and granular consisting of a tan to brown, fine to medium Sand with some to little gravel, trace to little silt. Deeper fill ( $\approx 19$  ft) was encountered at B6. The deeper fill consists of a grey to brown, fine to medium Sand with little to some silt, trace to little gravel. Trace amounts of wood, brick, rubble and other matter are embedded in the fill. The deeper fill also extends below the groundwater table. Both the shallow and deeper fill are loose and considered unstable. The loose density suggests minimal compaction.

The parent site soils generally include Sand, silty Sand, sandy Silt, clayey Silt then silty Clay which become finer-grained with depth. The silty Sand & Sandy Silt appear to extend about  $\approx 35$  ft below grade where a Silt & Clay then extend to a depth of about  $\approx 100$  ft. The parent site soils are loose to very soft, unconsolidated alluvium deposits. These alluvium soils are considered weak and unstable.

Test boring refusal, presumably bedrock, was met in test boring B6 at a depth of  $\approx 99$  ft. Given the depth to refusal, only B6 was extended to bedrock. The *USGS Bedrock Geologic Map of New Hampshire (1996)* depicts bedrock in the area to include biotite granofels, mica schist, quartzite and/or phyllite. Such rock types are characteristically hard and of sound quality.

Groundwater was encountered in the test borings about  $\approx 8-9$  ft below grade. It should be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall, temperature, and other factors differing from the time of the measurements. The study was completed at a time of seasonally low groundwater.

### PRELIMINARY GEOTECHNICAL EVALUATION

The subgrade conditions are **NOT** suitable for support of a spread footing foundation for a parking garage. The deep fill and loose alluvium soils are weak, compressible and generally unstable. Deep pilings would be necessary for foundation support. Driven piles may include steel (concrete filled pipe or H-sections) or precast concrete. Pile loads upwards of  $\approx 50-150$  tons should be feasible given the bedrock. Pile loads greater than  $\approx 100$  tons will likely be necessary for a multi-level parking garage. Driven piles would need to extend  $\approx 90-100$  ft below grade to provide adequate end-bearing atop bedrock. Such long piles are expensive and would significantly impact the project.

The subsurface conditions were reviewed with respect to seismic criteria set forth in the *International Building Code (2009)*. Based on the fine-grained composition of the site soils (fine sand, silt and/or clay), the site is not susceptible to liquefaction (complete loss of shear resistance) in the event of an earthquake. Based on interpretation of the *Building Code* together with the project and site conditions, the *Site Classification* (Table 1613.5.2) is "E" (Soft Soil). This Classification will likely impact the structural design of the garage due to increased shear (lateral) loads.

We trust the contents of this memorandum report are responsive to your needs at this time. Should you have any questions or require additional assistance, please do not hesitate to contact our office.

## LIMITATIONS

### Explorations

1. The analyses, recommendations and designs submitted in this report are based in part upon the data obtained from preliminary subsurface explorations. The nature and extent of variations between these explorations may not become evident until construction. If variations then appear evident, it will be necessary to re-evaluate the recommendations of this report.
2. The generalized soil profile described in the text is intended to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized and have been developed by interpretation of widely spaced explorations and samples; actual soil transitions are probably more gradual. For specific information, refer to the individual test pit and/or boring logs.
3. Water level readings have been made in the test pits and/or test borings under conditions stated on the logs. These data have been reviewed and interpretations have been made in the text of this report. However, it must be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall, temperature, and other factors differing from the time the measurements were made.

### Review

4. It is recommended that this firm be given the opportunity to review final design drawings and specifications to evaluate the appropriate implementation of the recommendations provided herein.
5. In the event that any changes in the nature, design, or location of the proposed areas are planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and conclusions of the report modified or verified in writing by John Turner Consulting, Inc.

### Construction

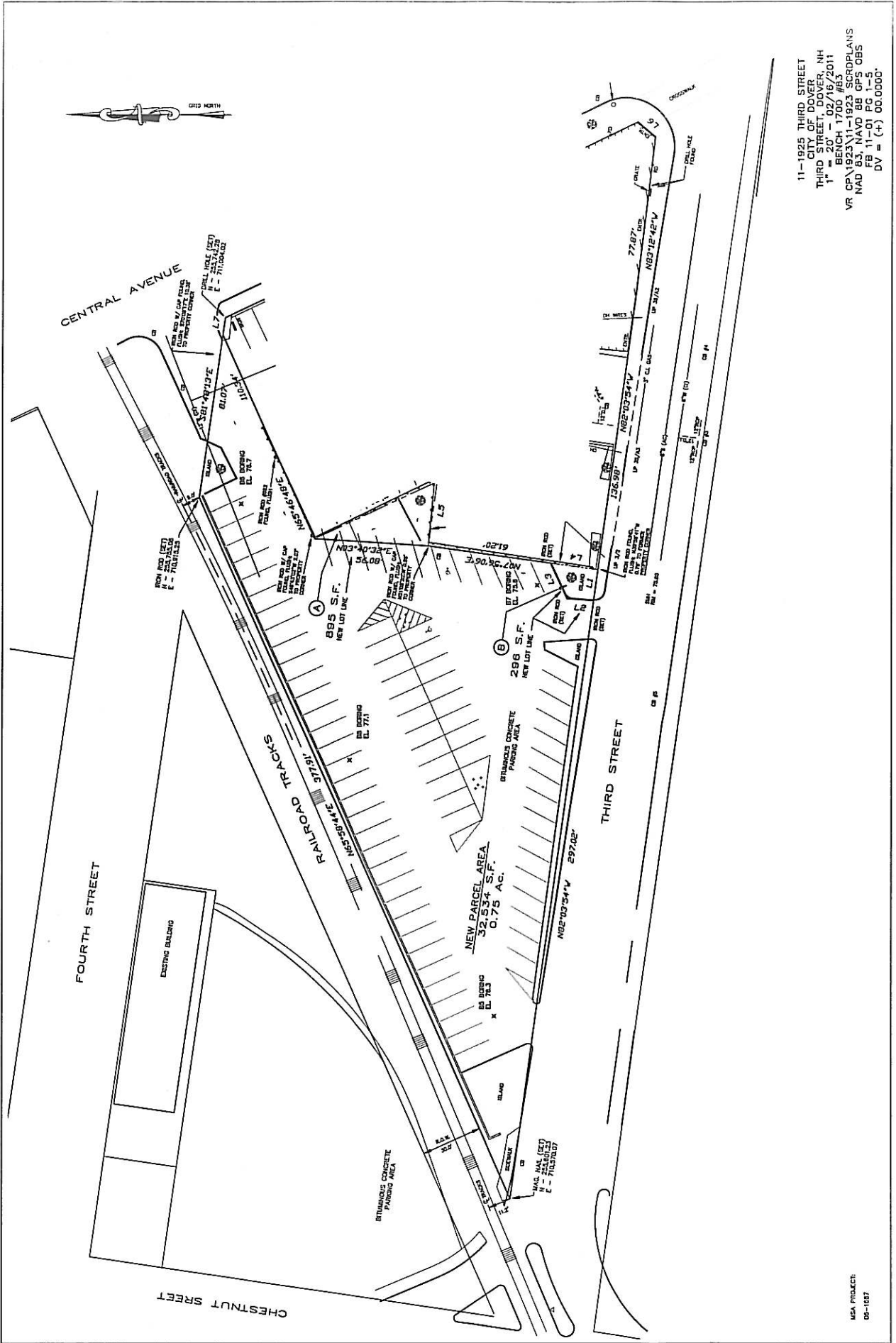
6. It is recommended that this firm be retained to provide geotechnical engineering services during the earthwork phases of the work. This is to observe compliance with the design concepts, specifications, and recommendations and to allow design changes in the event that subsurface conditions differ from those anticipated prior to the start of construction.

### Use of Report

7. This report has been prepared for the exclusive use of the City of Dover in accordance with generally accepted soil and foundation engineering practices. No other warranty, expressed or implied, is made.
8. This report has been prepared for this project by John Turner Consulting, Inc. This report was completed for preliminary design purposes and may be limited in its scope to complete an accurate bid. Contractors wishing a copy of the report may secure it with the understanding that its scope is limited to geotechnical design considerations.

## **Boring Location Plan & Boring Logs**





11-1925 THIRD STREET  
 CITY OF DOVER  
 THIRD STREET, DOVER, NH  
 1" = 20' - 02/16/2011  
 BENCH 1700 #B3  
 VR CP\1925\11-1925 SCRDPLANS  
 NAD 83 NAD 83 OBS  
 FB 11.00 PG 5 OF 5  
 DV = (+) 00.0000

USA PROJECT:  
 05-1027

## BORING LOG

JOHN TURNER CONSULTING, INC.  
19 DOVER STREET  
DOVER, NH 03820

PHONE: 603-749-1841  
FAX: 603-516-6851

CLIENT: City of Dover	BORING #: B5	PHONE: 603-749-1841
PROJECT: Geo-Analysis: 4 City Parking Lots Third Street Parking Lot	LOCATION: See Plan	FAX: 603-516-6851
PROJECT NO: 11-GEO-005	SURFACE ELEVATION: 76.3	
	DATE: 04-Feb-11	
<b>GROUNDWATER OBSERVATIONS</b>		
TYPE OF BORING: 2.25" H.S.A.	DATE: 4-Feb-11	DEPTH: 8.0'
DRILLING CO: Great Works Test Boring	TIME: During Drilling	
DRILLER: Jeff Lee		
JTC REP.: Kyle Urso		

FT	NO.	SAMPLE DEPTH (FT.)	REC. (IN.)	SOIL & ROCK CLASSIFICATION-DESCRIPTION BURMEISTER SYSTEM (SOIL) U.S. CORPS OF ENGINEERS SYSTEM (ROCK)	STRATUM CHANGE (FT.)	BLOWS PER 6 INCHES	PEN (N)
0				Asphalt	0.21		
				Moist, Black, Medium-Fine Sand, Some Gravel, little Silt (FILL) Brick Remnants in spoils	2.5		
	S-1	3-5	12	Moist, Light Brown, Medium-Fine SAND, little Gravel, trace Silt		5-4-3-6	7
5	S-2	5-7	24	Moist, Light Brown, Medium-Fine SAND, little Gravel, trace Silt Moist, Tan, Medium-Fine SAND, little Silt, trace Gravel	5.5	14-12-11-11	23
10	S-3	10-12	16	Wet, Light Brown, Medium-Fine SAND, little Silt, trace Gravel		8-5-5-5	10
15	S-4	15-17	20	Wet, Light Brown, Medium-Fine SAND, little Silt, trace Gravel		2-2-3-5	5
20	S-5	20-22	24	Wet, Light Brown, Medium-Fine SAND, little Silt, trace Gravel	21.7	2-2-3-3	5
	S-5b			Wet, Grayish Brown, Fine SAND, little Silt			
25	S-6	25-27	24	Wet, Grayish Brown, Fine SAND, little Silt grading to Wet, Gray, CLAY, some Silt, trace Sand	26.5	WOH/6-1-1-1	2
				Boring Terminated @ 27.0'			

**REMARKS:** Acker Drill Rig, 2.25" Internal Diameter Hollow Stem Auger

Standard Penetration Tests (SPT) = 140# hammer falling 30" (ASTM D1586)  
Blows are per 6 inches with a 24" long by 2" O.D. by 1 3/8" I.D. split spoon sampler unless otherwise noted  
S = split-spoon sample; C = rock core sample; U = undisturbed

*REMARKS: The stratification lines represent the approximate boundary between soil types and the transition may be gradual. Water level readings have been made in the test borings at times and under conditions stated in the test boring logs. Fluctuations in the level of the groundwater may occur due to other factors than those present at the time measurements were made. Proportions used: trace (0-10%), little (10-20%), some (20-35%), and (35-50%)*

# BORING LOG

JOHN TURNER CONSULTING, INC.  
19 DOVER STREET  
DOVER, NH 03820

PHONE: 603-749-1841  
FAX: 603-516-6851

CLIENT: City of Dover	BORING #: B6	Page 1 of 3
PROJECT: Geo-Analysis: 4 City Parking Lots Third Street Parking Lot	LOCATION: See Plan	
PROJECT NO: 11-GEO-005	SURFACE ELEVATION: 76.8	
	DATE: 07-Feb-11	

TYPE OF BORING: 2.25" H.S.A./Casing @ 10.0		GROUNDWATER OBSERVATIONS		
DRILLING CO: Great Works Test Boring	DATE:	DEPTH:	TIME:	
DRILLER: Jeff Lee				
JTC REP.: Kyle Urso				

FT	NO.	SAMPLE DEPTH (FT.)	REC. (IN.)	SOIL & ROCK CLASSIFICATION-DESCRIPTION BURMEISTER SYSTEM (SOIL) U.S. CORPS OF ENGINEERS SYSTEM (ROCK)	STRATUM CHANGE (FT.)	BLOWS PER 6 INCHES	PEN (N)
0				Asphalt	0.21		
				Moist, Brown, Medium-Fine Sand, Some Gravel, trace Silt (FILL)			
	S-1	3-5	24	Moist, Brown, Medium-Fine Sand, Some Gravel, trace Silt (FILL)		3-1-1-1	2
				Moist, Brown, Medium-Fine SAND, little Gravel, little Silt			
5	S-2	5-7	16	Moist, Tan, Medium-Fine SAND, little Silt, trace Gravel		2-1-1-1	2
				Moist, Tan, Medium-Fine SAND, little Silt, trace Gravel (FILL)		3-2-3-2	5
10	S-4	10-12	10	Gray and Light Brown Coarse-Fine SAND, little Gravel, trace Silt Wood from Railroad tie @ 12.0'		2-4-3-4	7
15	S-5	15-17	10	Moist, Grayish Brown, Fine SAND, Little Silt Wood and Brick in sample		5-4-2-5	6
	S-6	17-19	3	Moist, Grayish Brown, Fine SAND, some Silt Wood and Brick in sample (FILL)	19	WOH/24	
20	S-7	20-22	24	Wet, Gray, SILT, and Fine Sand		WOH/6-1-1-2	2
25	S-8	25-27	24	Wet, Gray, SILT, and Fine Sand		WOH/24	0

**REMARKS:** Steel Track Drill Rig, 2.25" Internal Diameter Hollow Stem Auger, Automatic Hammer

Standard Penetration Tests (SPT) = 140# hammer falling 30" (ASTM D1586)  
Blows are per 6 inches with a 24" long by 2" O.D. by 1 3/8" I.D. split spoon sampler unless otherwise noted  
S = split-spoon sample; C = rock core sample; U = undisturbed

*REMARKS: The stratification lines represent the approximate boundary between soil types and the transition may be gradual. Water level readings have been made in the test borings at times and under conditions stated in the test boring logs. Fluctuations in the level of the groundwater may occur due to other factors than those present at the time measurements were made. Proportions used: trace (0-10%), little (10-20%), some (20-35%), and (35-50%)*

# BORING LOG

JOHN TURNER CONSULTING, INC.  
19 DOVER STREET  
DOVER, NH 03820

PHONE: 603-749-1841  
FAX: 603-516-6851

CLIENT: City of Dover	BORING #: B6	Page 2 of 3
PROJECT: Geo-Analysis: 4 City Parking Lots Third Street Parking Lot	LOCATION: See Plan	
PROJECT NO: 11-GEO-005	SURFACE ELEVATION: 76.8	
	DATE: 07-Feb-11	

TYPE OF BORING: 2.25" H.S.A./Casing @ 10.0		GROUNDWATER OBSERVATIONS		
DRILLING CO: Great Works Test Boring	DATE:	DEPTH:	TIME:	
DRILLER: Jeff Lee				
JTC REP.: Kyle Urso				

FT	NO.	SAMPLE DEPTH (FT.)	REC. (IN.)	SOIL & ROCK CLASSIFICATION-DESCRIPTION BURMEISTER SYSTEM (SOIL) U.S. CORPS OF ENGINEERS SYSTEM (ROCK)	STRATUM CHANGE (FT.)	BLOWS PER 6 INCHES	PEN (N)
30	S-9	30-32	24	Wet, Gray, SILT and Fine Sand		WOH/24	0
35	S-10	35-37	24	Wet, Gray SILT/CLAY, trace fine Sand		WOR/12-WOH/12	0
40	S-11	40-42	24	Wet, Gray SILT/CLAY, trace fine Sand		WOR/24"	0
45							
50	S-12	50-52	24	Wet, Gray SILT/CLAY, trace fine Sand		WOR/24"	0
55							
60	S-13	60-62	24	Wet, Gray SILT/CLAY, trace fine Sand		WOR/24"	0

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19 DOVER STREET  
DOVER, NH 03820

PHONE: 603-749-1841  
FAX: 603-516-6851

CLIENT: City of Dover	BORING #: B6	Page 3 of 3
PROJECT: Geo-Analysis: 4 City Parking Lots Third Street Parking Lot	LOCATION: See Plan	
PROJECT NO: 11-GEO-005	SURFACE ELEVATION: 76.8	
	DATE: 07-Feb-11	

TYPE OF BORING: 2.25" H.S.A./Casing @ 10.0	GROUNDWATER OBSERVATIONS		
DRILLING CO: Great Works Test Boring	DATE:	DEPTH:	TIME:
DRILLER: Jeff Lee			
JTC REP.: Kyle Urso			

FT	NO.	SAMPLE DEPTH (FT.)	REC. (IN.)	SOIL & ROCK CLASSIFICATION-DESCRIPTION BURMEISTER SYSTEM (SOIL) U.S. CORPS OF ENGINEERS SYSTEM (ROCK)	STRATUM CHANGE (FT.)	BLOWS PER 6 INCHES	PEN (N)
70	S-14	70-72	24	Wet, Gray, CLAY/SILT		WOR/24	0
75							
80	S-15	80-82	24	Wet, Gray CLAY/SILT		WOR/24"	0
85							
90	S-16	90-92	24	Wet, Gray CLAY/SILT		WOR/24"	0
95							
				Till or Weathered Rock	98		
100				Tri-Cone Drill Bit Refusal @ 99.0' in Probable Intact BEDROCK			

**REMARKS:** Steel Track Drill Rig, 2.25" Internal Diameter Hollow Stem Auger, Automatic Hammer

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# BORING LOG

JOHN TURNER CONSULTING, INC.  
19 DOVER STREET  
DOVER, NH 03820

PHONE: 603-749-1841  
FAX: 603-516-6851

CLIENT: City of Dover	BORING #: B7
PROJECT: Geo-Analysis: 4 City Parking Lots Third Street Parking Lot	LOCATION: See Plan
PROJECT NO: 11-GEO-005	SURFACE ELEVATION: 75.6
	DATE: 07-Feb-11

TYPE OF BORING: 2.25" H.S.A./Casing @ 10.0	GROUNDWATER OBSERVATIONS		
DRILLING CO: Great Works Test Boring	DATE: 07-Feb-11	DEPTH: 9.0	TIME: During Drilling
DRILLER: Jeff Lee			
JTC REP.: Kyle Urso			

FT	NO.	SAMPLE DEPTH (FT.)	REC. (IN.)	SOIL & ROCK CLASSIFICATION-DESCRIPTION BURMEISTER SYSTEM (SOIL) U.S. CORPS OF ENGINEERS SYSTEM (ROCK)	STRATUM CHANGE (FT.)	BLOWS PER 6 INCHES	PEN (N)
0				Asphalt	0.21		
				Moist, Brown, Medium-Fine Sand, Some Gravel, trace Silt (FILL)			
	S-1	3-5	12	Moist, Brown, Medium-Fine Sand, Some Gravel, trace Silt (FILL)		4-4-5-5	9
5	S-2	5-7	8	Moist, Brown, Medium-Fine Sand, Some Gravel, trace Silt (FILL)	7	3-2-2-7	4
	S-3	7-9	24	Moist, Tan, Medium-Fine SAND, little Silt, trace Gravel		11-8-10-8	18
10	S-4	10-12	16	Wet, Rust Brown and Grayish Brown Mottled, Medium-Fine SAND, little Silt, trace Gravel		2-7-4-4	11
15	S-5	15-17	16	Wet, Medium-Fine SAND, some Silt, trace Gravel		1-1-2-3	3
20	S-6	20-22	24	Wet, Medium-Fine SAND, some SILT, trace Gravel		WHO/6-1-1/12	2
				<b>Boring Terminated @ 22.0'</b>			

**REMARKS:** Steel Track Drill Rig, 2.25" Internal Diameter Hollow Stem Auger, Automatic Hammer

Standard Penetration Tests (SPT) = 140# hammer falling 30" (ASTM D1586)  
Blows are per 6 inches with a 24" long by 2" O.D. by 1 3/8" I.D. split spoon sampler unless otherwise noted  
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# BORING LOG

JOHN TURNER CONSULTING, INC.  
19 DOVER STREET  
DOVER, NH 03820

PHONE: 603-749-1841  
FAX: 603-516-6851

CLIENT: City of Dover	BORING #: B8
PROJECT: Geo-Analysis: 4 City Parking Lots Third Street Parking Lot	LOCATION: See Plan
PROJECT NO: 11-GEO-005	SURFACE ELEVATION: 77.1
	DATE: 07-Feb-11

TYPE OF BORING: 2.25" H.S.A./Casing @ 10.0	GROUNDWATER OBSERVATIONS		
DRILLING CO: Great Works Test Boring	DATE: 07-Feb-11	DEPTH: 9.0	TIME: During Drilling
DRILLER: Jeff Lee			
JTC REP.: Kyle Urso			

FT	NO.	SAMPLE DEPTH (FT.)	REC. (IN.)	SOIL & ROCK CLASSIFICATION-DESCRIPTION BURMEISTER SYSTEM (SOIL) U.S. CORPS OF ENGINEERS SYSTEM (ROCK)	STRATUM CHANGE (FT.)	BLOWS PER 6 INCHES	PEN (N)
0				Asphalt	0.21		
				Moist, Brown, Medium-Fine Sand, Some Gravel, trace Silt (FILL)			
	S-1	3-5	20	Moist, Brown, Medium-Fine Sand, Some Gravel, trace Silt (FILL)		5-3-3-3	6
5	S-2	5-7	8	Moist, Brown, Medium-Fine Sand, Some Gravel, trace Silt	6	3-4-11-9	15
				Buried Asphalt @ 6.0'	6.2		
	S-3	7-9	15	Moist, Tan, Fine SAND, Some Silt, trace Gravel		4-7-6-7	13
10	S-4	10-12	16	Wet, Rust Brown and Grayish Brown Mottled, Fine SAND some Silt, trace Gravel		3-4-5-4	9
15	S-5	15-17	16	Wet, SILT, and Fine Sand		1-1-2-3	3
20	S-6	20-22	24	Wet, Fine SAND, some SILT, trace Gravel grading to Wet, Gray, SILT/CLAY, trace Fine Sand		WHO/6-2-1/12	3
				Boring Terminated @ 22.0'			

**REMARKS:** Steel Track Drill Rig, 2.25" Internal Diameter Hollow Stem Auger, Automatic Hammer

Standard Penetration Tests (SPT) = 140# hammer falling 30" (ASTM D1586)  
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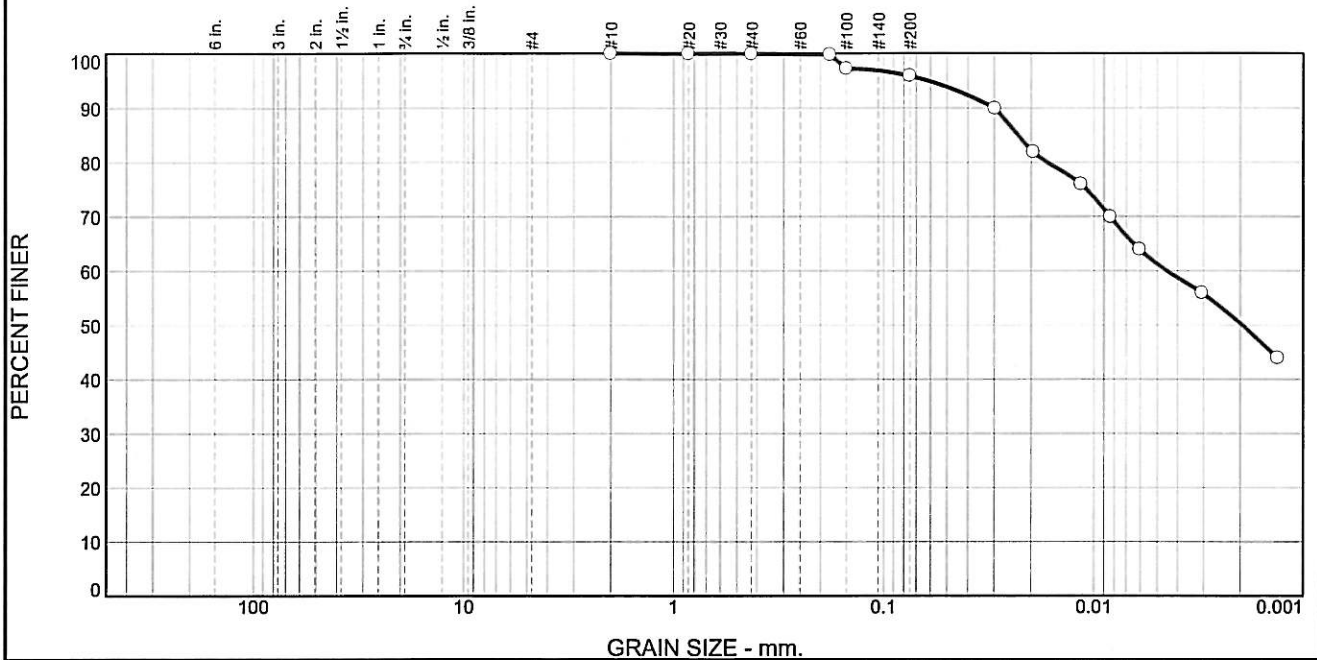
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**Lab Results**





# Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.1	4.0	34.6	61.3

Test Results (ASTM D 422 & ASTM D 1140)			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#10	100.0		
#20	100.0		
#40	99.9		
#80	99.8		
#100	97.3		
#200	95.9		
0.0297 mm.	89.9		
0.0195 mm.	81.9		
0.0115 mm.	75.9		
0.0084 mm.	69.9		
0.0060 mm.	63.9		
0.0030 mm.	55.9		
0.0013 mm.	43.9		

\* (no specification provided)

**Material Description**

CLAY, some silt, trace sand

**Atterberg Limits (ASTM D 4318)**

PL= \_\_\_\_\_ LL= \_\_\_\_\_ PI= \_\_\_\_\_

**Classification**

USCS (D 2487)= \_\_\_\_\_ AASHTO (M 145)= \_\_\_\_\_

**Coefficients**

D<sub>90</sub>= 0.0300      D<sub>85</sub>= 0.0231      D<sub>60</sub>= 0.0045  
D<sub>50</sub>= 0.0020      D<sub>30</sub>= \_\_\_\_\_      D<sub>15</sub>= \_\_\_\_\_  
D<sub>10</sub>= \_\_\_\_\_      C<sub>u</sub>= \_\_\_\_\_      C<sub>c</sub>= \_\_\_\_\_

Remarks


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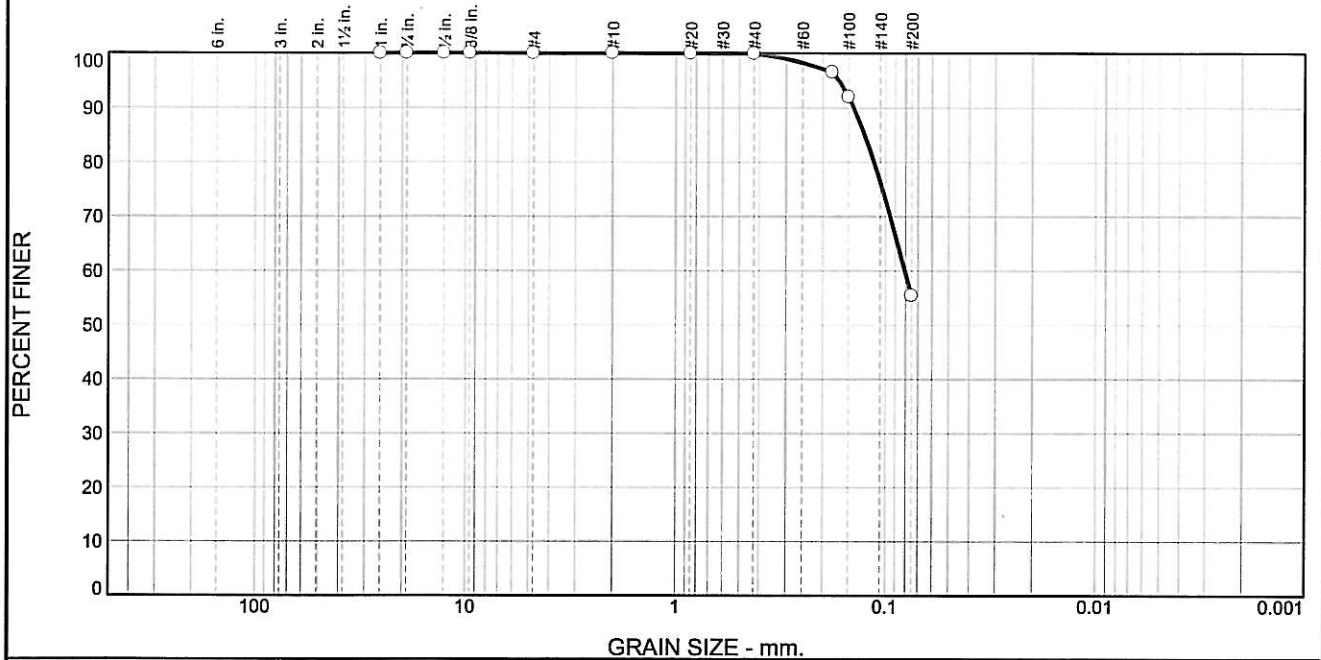
Date Received: 02-11-11      Date Tested: 02-18-11  
Tested By: Nate Cutter  
Checked By: Kyle Urso  
Title: Staff Engineer

Location: B5 S6b (Third Street)      Depth: 25.0 - 27.0 ft      Date Sampled: 02-04-11  
Sample Number: 11-588-004

<b>JOHN TURNER Dover, NH</b>	<b>Client:</b> City of Dover <b>Project:</b> City Parking Lots  <b>Project No:</b> 11-GEO-005 <b>Report #</b> 003
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# Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.1	44.5	55.4	

Test Results (ASTM D 422 & ASTM D 1140)			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1	100.0		
3/4	100.0		
1/2	100.0		
3/8	100.0		
#4	100.0		
#10	100.0		
#20	100.0		
#40	99.9		
#80	96.6		
#100	92.0		
#200	55.4		

**Material Description**

SILT and Fine Sand

**Atterberg Limits (ASTM D 4318)**

PL= \_\_\_\_\_ LL= \_\_\_\_\_ PI= \_\_\_\_\_

**Classification**

USCS (D 2487)= \_\_\_\_\_ AASHTO (M 145)= \_\_\_\_\_

**Coefficients**

D<sub>90</sub>= 0.1416      D<sub>85</sub>= 0.1256      D<sub>60</sub>= 0.0807  
 D<sub>50</sub>= \_\_\_\_\_      D<sub>30</sub>= \_\_\_\_\_      D<sub>15</sub>= \_\_\_\_\_  
 D<sub>10</sub>= \_\_\_\_\_      C<sub>u</sub>= \_\_\_\_\_      C<sub>c</sub>= \_\_\_\_\_

**Remarks**

In-Situ Moisture: 29.6%

**Date Received:** 02-11-11      **Date Tested:** 02-16-11

**Tested By:** Aiden Sullivan

**Checked By:** Nate Cutter

**Title:** Lab Manager

\* (no specification provided)

**Location:** B8 S5 (Third Street)      **Depth:** 15.0 - 17.0 ft      **Date Sampled:** 02-07-11

**Sample Number:** 11-588-007

<b>JOHN TURNER Dover, NH</b>	<b>Client:</b> City of Dover <b>Project:</b> City Parking Lots <b>Project No:</b> 11-GEO-005
<b>Report #</b> 005	

Site Photos

City of Dover  
Third Street  
Dover, NH 03820

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**Northeast Corner of Property Looking North  
Across Railroad Tracks**



**Northeast Corner of Property Looking East**



**Northeast Corner of Property Looking Southeast**



**Northeast Corner of Property Looking South**



**Northeast Corner of Property looking West**



**West end of Property Looking South across 3<sup>rd</sup>  
Street towards Cleaners**