

VII. APPENDICES

M. Geotechnical Engineering Report

**GEOTECHNICAL ENGINEERING REPORT
FOR PROPOSED
COSTCO WHOLESALE STORE
CROMPOND ROAD & TACONIC STATE
PARKWAY
YORKTOWN HEIGHTS, NEW YORK**

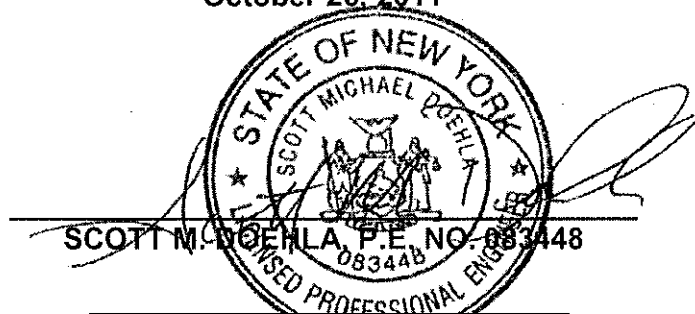
PREPARED FOR:

**COSTCO WHOLESALE CORPORATION
45940 HORSESHOE DRIVE, STE. 150
STERLING, VA 20166**

PREPARED BY:

**TECTONIC ENGINEERING & SURVEYING CONSULTANTS P.C.
70 PLEASANT HILL ROAD
MOUNTAINVILLE, NEW YORK 10953
(P) 845.534.5959
(F) 845.534.5655**

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**GEOTECHNICAL ENGINEERING REPORT
FOR PROPOSED
COSTCO WHOLESALE STORE
YORKTOWN HEIGHTS, NEW YORK**

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YORKTOWN HEIGHTS, NEW YORK**

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EXECUTIVE SUMMARY

A geotechnical investigation was performed for the proposed Costco Wholesale store to be located at the corner of Crompond Road and the Taconic State Parkway in the Town of Yorktown, New York. The following presents a brief summary of the findings of the investigation and our geotechnical recommendations for the design and construction of the proposed building and related improvements.

The Costco Wholesale building is proposed within a variably sloping, previously developed property which includes a motel building, a garden center/nursery, and a private residence. The site generally slopes downward from east to west with the high areas having elevations on the order of +476 feet and low elevations of about +386 feet. Surface grades drop approximately 27 feet within the proposed building pad. With proposed site grading ranging from approximately +440 to +444 feet within the parking areas and the finish floor of the building proposed to be +444 feet, cuts ranging up to approximately 16 feet will be required to reach proposed grade in the parking areas and cuts ranging up to approximately 10 feet will be required in the southeast section of the proposed building pad. Fills ranging up to approximately 32 feet will be required in the area immediately west of the proposed building pad.

The encountered subsurface conditions consist of a localized areas of existing fill overlying native soils consisting predominately of medium dense to very dense glacial till and highly decomposed bedrock overly progressively less weathered gneiss bedrock. The glacial till consists of silty, sandy gravel and silty, gravelly sand with cobbles and boulders. The gneiss is variably weathered and fractured, but the majority of the gneiss is relatively competent. Groundwater was encountered within and overlying the bedrock. However, it is not anticipated to impact building design provided proper perimeter drainage is provided.

The excavated rock may be used as a source of fill. For rock fill to be used effectively, the rock fill needs to be processed as required to meet gradation requirements that vary with the locations that the fill will be placed. Coarser rock fill can comprise the majority of the fill, but the upper zone needs to consist of progressively finer materials to "choke off" voids within the rock fill and prevent the loss of near surface fills. The majority of the site grading

is anticipated to require filling and the use of imported fills, since the on-site soils are very moisture sensitive and should only be used below pavement and landscape areas.

The anticipated subgrade materials at the bearing depth of the building's foundation are anticipated to range from dense glacial till, bedrock of varying degrees of weathering and structural fill placed over native soil materials. These materials are all suitable for shallow foundation support. However, due to this variation in subgrade material and the difficulty of accurately predicting where each transition will take place, plans will need to incorporate alternate foundation details for the different bearing strata or plans should be based on the bearing on weakest material, structural fill. To maintain acceptable differential settlements between building areas supported on bedrock and those supported on fill, transition zones will need to be constructed by overexcavating bedrock near the contact and replacing the rock with compacted fill such that the fill thickness gradually increases towards the bedrock-fill contact. The proposed gas station will fall completely within fill.

The site soils are not subject to liquefaction induced settlement, nor are the site conditions conducive to sinkhole development. Due to the high silt content of the site soils, their use as structural fill is discouraged since they are moisture sensitive and their use can result in substantial construction delays if weather conditions are not optimal. If economics dictates that these soils must be used, they should only be used as fill beneath paved areas or as general fill within landscaped areas. They should not be used as fill beneath the building pad nor should they be used to as fills behind the retaining walls.

1.0 INTRODUCTION

Tectonic Engineering & Surveying Consultants, P.C. has performed a subsurface investigation and geotechnical engineering evaluation for the proposed Costco Wholesale store in Yorktown, New York. The purpose of the study was to identify the subsurface conditions and develop geotechnical recommendations for the design and construction of the building and related improvements. This report presents our findings and recommendations.

Our scope of services was provided in accordance with our proposal dated July 8, 2011 titled "PN 11-548, REVISION 1, PROPOSAL FOR GEOTECHNICAL ENGINEERING SERVICES, PROPOSED COSTCO WHOLESALE RETAIL STORE, CROMPOND ROAD & MOHANSIC AVENUE, YORKTOWN HEIGHTS, NEW YORK".

The following sections provide general descriptions of our scope of services, the existing site conditions, the performed investigations and the findings. These are followed by a discussion of the findings and conclusions and our recommendations.

2.0 SCOPE OF SERVICES

The scope of services for the proposed Costco Wholesale store included the following:

- Locating and obtaining surface elevations at fifty-nine (59) of the proposed boring and test pit locations by a survey crew.
- Drilling, sampling and logging of sixty-six (66) borings and fourteen (14) test pits in the proposed building, fuel service, parking, and driveway areas.
- Laboratory testing of select soil samples as deemed necessary to establish engineering characteristics. Testing included moisture content, gradation, pH and sulfate and chloride contents.
- Performance of geotechnical engineering evaluation of the subsurface conditions and laboratory test results as they relate to the design and construction of the proposed building foundations, retaining walls, site grading and pavement support.
- Preparation of this engineering report presenting the results of the subsurface investigation and engineering analysis, and providing our geotechnical recommendations for the design and construction of the proposed building and related improvements.

3.0 SITE AND PROJECT DESCRIPTIONS

The project site is located on the north side of Crompond Road (U.S. Route 202) immediately west of the Taconic State Parkway in the Town of Yorktown, Westchester County, New York. The existing conditions of the project site are shown on a survey drawing entitled "Survey of Property at 3200 & 3220 Crompond Road, Prepared for Retail Store Construction Co., Inc." dated April 26, 2002 by J. Henry Carpenter & Co. The project site currently consists of four individual properties that will be combined and developed as one parcel. The combined area of the four properties is 18.751 acres. The ground surface across all four properties generally trends downward from east to west, with a high elevation of approximately +476 feet in the southeast corner and a low elevation of approximately +386 feet near the southwest corner.

The largest of the four properties encompasses the northern portion of the site and consists of 14.235 acres. It is adjoined to the north by lands owned by New York State, to the east by a southbound exit ramp of the Taconic State Parkway, to the west by private property and to the south by other properties to be included as part of this project. This property contains a former motel complex which includes an approximately 5,500 square foot (sf) one to two-story building, a 10,000 sf one to two-story building, a 530 sf one-story storage building, overhead and buried utilities servicing the motel buildings, paved parking areas around the buildings including two driveways from Crompond Road, shed buildings, and wetlands. The western approximately 4.4 acres and 1 acre in the northeast corner consists of delineated wetland and a 100-foot wetland buffer zone. The wetland delineation and 100-foot buffer zone was determined by others. The developed areas constitute the eastern portion of the property, and are generally level with respect to elevation. The area between the motel building and the wetland is wooded with brush and scattered trees, and slopes downward towards the wetland from the motel complex. An underground sewage disposal area is identified on the aforementioned survey within the northern-central portion of this property. Retaining walls, generally less than 4 feet in height, are present along some of the boundaries between paved and unpaved areas.

The property located on the southeastern section of the proposed site contains a former gas station and fronts Crompond Road to the south and the southbound exit ramp of the Taconic State Parkway to the east. The former gas station is adjoined by either asphalt or gravel-paved areas on all sides, and contains a one-story brick building and a fueling area. Two driveways, which extend from Crompond Road to the motel complex, north of the gas station, adjoin the east and west property lines of the gas station. The western driveway, which is approximately 5 feet lower in elevation than the gas station, is separated from the gas station by a wooden railroad tie retaining wall. Overhead and buried utilities are present throughout the gas station property.

The southwestern portion of the site contains the two remaining properties that comprise the Costco site. The larger of the two properties consists of a garden center and encompasses approximately 4.8 acres. This property extends from the gas station property on the east to Old Crompond Road on the west. The smaller property, which is a private residence located on approximately ¼ acre, contains a 2-story house with smaller shed and garage buildings. The private residence is adjoined on all sides by the garden center property, except on the southwest where it borders Old Crompond Road. The garden center property contains a retail center and tree nursery business, which was in operation at the time of the subsurface investigation. The property contains three one-story structures that are used for the garden center business, as well as designated areas for storage and growth of the trees and shrubs contained within the nursery. Unpaved paths allow access between different areas within the nursery property. The nursery comprises the eastern two-thirds of the property. The remainder of the property is wooded. The ground surface across this property generally trends downward towards the west.

Based on our review of the drawing entitled "Preliminary Site Plan", drawing CSP-9 by TRC Engineers, Inc., we understand that the proposed construction will include a new Costco Wholesale building, parking and driveway areas, a gas station area, stormwater management ponds, retaining walls, and significant site grading. The proposed Costco project is to consist of the construction of a 151,092 square foot retail building, a gas station, paved parking and driveways and other improvements. The proposed building is

to have a finish floor elevation of approximately +444 feet. Surface grades within the proposed parking lot are anticipated to range between approximately El. +439 and +444 feet. The driveway will extend from Crompond Road into the site towards the southeast building corner. Final grades along the road will range from El. +444 feet near the building to El. +462 feet near Crompond Road, which will require cuts of up to 10 feet.

Based on the preceding, cuts of up to 10 feet will be required to reach proposed grade in the eastern portion of the proposed building pad and approximately 16 feet of cut will be required to achieve the parking lot grades within the parking area immediately south of the building. Near the western portion of the site, fills of up to approximately 32 feet will be required to construct the proposed parking lot grades. Fills below the proposed building pad are anticipated to be on the order of 17 feet.

Seven (7) retaining walls are proposed on the site. The largest retaining wall in both length and height will be approximately 1,500 feet in length and up to 21 feet in height, and will retain a 1.5 to 1 (Horizontal to Vertical) slope with a height of up to 32 feet. This wall extends towards the north from the southwest portion of the site, then turns east at the proposed stormwater ponds and loops completely around the pond. This wall and slope will require significant filling along the western boundary and cutting near the building and stormwater pond areas. Another wall is proposed along the northern property border, allowing the first wall to extend up to El. +430 feet while separating the site from the neighboring property to the north at grades between El. +420 feet to El. +442 feet, and will retain fill on the Costco side of the wall. Two other walls will also support the slope below the parking lot, but will have lesser wall and slope heights than the larger wall. These walls are located in the southwest corner of the site. The remaining retaining walls will retain cuts into the existing landscape. One wall within the northeast portion of the site will separate a driveway area from an adjacent wetland, and is anticipated to be approximately 6 feet in maximum height. Another 6-foot high wall will retain the eastern portion of the site, which slopes upward from the subject property towards the Taconic State Parkway exit ramp, and the last wall will be located near the southeast portion of the site, and will retain the new entrance driveway from the parking area, which will be up to approximately 15.5 feet lower in elevation.

The proposed fueling station will be located in the southwest corner of the site, within the existing garden/nursery area. Fills on the order of 20 feet are anticipated to construct the proposed grades within the fueling station area. A stormwater management pond, consisting of two basins set at El. +417 feet, are proposed within the northern portion of the site. Construction of the basins will require cuts of up to 17 feet from existing grade. The larger retaining wall will constitute the outer extent of the basins, which will also have a drop inlet structure and an emergency overflow spillway, both of which will outlet to the west.

4.0 SUBSURFACE INVESTIGATION

The subsurface investigation consisted of the drilling, sampling, and logging of a total of sixty-six (66) test borings and fourteen (14) test pits, and was accomplished in two phases. The first phase consisted of forty-six (46) test borings and nine (9) test pits conducted in 2009, and the second phase consisted of twenty (20) test borings and five (5) test pits performed in 2011. The borings and test pits performed in 2011 were done so to ensure the geotechnical investigation requirements of the Costco Wholesale Development Requirements were met based on the revised site layout.

A total of 25 borings and four test pits were performed for the proposed building and 4 borings were performed in the area of the proposed fuel station. The remaining borings and test pits were located in the proposed parking, driveway, and retaining wall areas of the site. The investigation also included the installation of three (3) groundwater observation wells within completed boreholes. The locations of the boring and test pits are shown on the Boring and Test Pit Location Plan included as Figure 1.

4.1 Initial Subsurface Investigation - 2009

The initial borings were performed between October 29, 2009 and November 6, 2009 by General Borings, Inc. using an ATV mounted drill rig. The borings were advanced using 4-1/4 inch diameter hollow-stem augers through overburden soils and an NX double-tube diamond core barrel through bedrock. The boring depths ranged from 4.5-feet to 29 feet below existing grade.

Standard Penetration Testing (SPT) and split spoon sampling was typically performed at 2-foot intervals to a depth of 12 feet then at maximum 5-foot intervals thereafter. Bedrock was cored at twelve locations for lengths ranging from 2.5 to 5 feet. Groundwater observation wells were installed at borings B-2, B-15, and B-42.

Nine (9) test pits were excavated by General Borings, Inc. utilizing a Ford 625E backhoe on November 5, 2009. The test pits, identified as TP-1 through TP-9, were excavated to depths ranging from 3 to 11 feet below the ground surface. Bedrock refusal for the backhoe was encountered within all test pits except TP-7 and TP-9.

4.2 Supplemental Subsurface Investigation – 2011

The second phase of investigation included 20 borings performed between August 29 and September 6, 2011 by General Borings, Inc. using an ATV mounted drill rig. The borings were identified as B-101 through B-120, and were advanced using 3-1/4 inch diameter hollow-stem augers through overburden soils and an NX double-tube diamond core barrel through bedrock. The boring depths ranged from 5 feet to 27 feet below existing grade.

Standard Penetration Testing (SPT) and split spoon sampling was typically performed at 2-foot intervals to a depth of 12 feet then at maximum 5-foot intervals thereafter. Bedrock was cored at seven locations for lengths ranging from 5 to 7 feet.

Infiltration testing was performed within one of the borings within the proposed stormwater management ponds. The infiltration testing was conducted by setting 4-inch diameter steel casing in-place at a depth of 4.5 feet below grade, filling the casing with 24 inches of water, and allowing the water to drain from the bottom of the casing and measuring the drop in water level over a one-hour period. Three one-hour tests were performed at boring B-119. Infiltration testing could not be conducted at boring B-120 due to the shallow bedrock conditions.

Five (5) test pits, identified as TP-101 through TP-105, were excavated by General Borings, Inc. utilizing a Kobota excavator on August 31, 2011. The test pits were excavated to depths ranging from 1.6 feet to 10 feet below the ground surface. Bedrock refusal for the backhoe was encountered within all test pits.

All drilling, sampling and excavation activities were observed on a full-time basis by either an engineering geologist or a geotechnical engineer from Tectonic for conformance to ASTM Standards. Tectonic's representatives collected soil and rock samples for laboratory testing and prepared logs of subsurface conditions. Copies of the boring and test pit logs are included in Appendix I.

5.0 LABORATORY TESTING

Laboratory testing was performed on selected soil samples to evaluate the engineering and corrosivity characteristics of the soils. Laboratory testing included determination of moisture contents; grain size distributions; Atterberg limits; California Bearing Ratio (CBR); and pH, sulfate and chloride contents. The results of the laboratory testing is included to this report as Appendix II.

6.0 SUBSURFACE CONDITIONS

The subsurface conditions at the boring and test pit locations typically consist of areas of existing fill, native soil, and bedrock. In previously undeveloped areas, the native soils are overlain by a layer of topsoil. The existing fill found at the site is the result of previous development and is most prevalent in areas surrounding the motel complex and within the garden/nursery. In addition to the fill identified within the borings and test pits, fill is likely present at relatively significant depths near the crest of man-made slopes such as the one at the western section of the paved area west of the motel, as well as near below-grade structures such as against the foundation of the motel, which has a basement. The fill within the existing garden/nursery consists primarily of organic materials such as wood chips, mulch and peat soil, which is highly organic.

The native soil underlying the topsoil, pavement, or fill (where encountered) generally consists of medium dense to very dense glacial till and residual soil, that which results from the decomposition of the underlying bedrock. The glacial till generally consists of silty, gravelly sand or silty, sandy gravel. Both soil types contain cobbles and boulders. Where present, the residual soil grades into a highly weathered bedrock and then transitions to more competent bedrock. Upon excavation, the residual soils typically consist of sandy, silty gravel with some less weathered gravel fragments of the underlying bedrock. The bedrock consists of variably weathered, variably fractured gneiss.

Groundwater was measured within 23 borings and four test pits. These groundwater depths range from 4 to 18.5 feet below existing grade. Within the building footprint, groundwater elevations ranged from approximately El. +418 feet to +447 feet. Groundwater may also be present in a perched condition overlying the bedrock.

The following subsections provide general descriptions of the encountered soil, bedrock and groundwater conditions. The table at the end of this section provides the depth and elevation at which bedrock was encountered at each of the boring and test pit locations. Also provided is the depth and elevation that groundwater was encountered (if encountered). It is noted that the depth to bedrock and the corresponding elevation are based on the depth to auger refusal for borings and the depth to excavator refusal for the test pits since the transition from residual soil to bedrock is gradual. Detailed descriptions of the encountered soil, bedrock and groundwater conditions can be found on the boring and test pit logs contained in Appendix I.

6.1 Existing Fill

Existing fill was encountered within 20 borings. The fill was encountered within developed areas of the site where the site grades have been altered to support existing features such as pavements and structures. The fill within the motel property generally consists of silty sand with gravel, which may be native soil re-used to level sloping areas of the site. Within the garden center/nursery property, the fill generally consists of organic materials such as mulch mixed with soil. The sandy fill within the motel property is generally in a loose to medium dense

condition, whereas the fill with the nursery property is in a very loose to loose condition. It should be noted that fill was encountered within four of the six borings performed within the proposed fueling station and canopy footprints. Where encountered, the fill generally extends to depths between 2 and 6 feet below grade but was encountered up to a depth of 10 feet at boring B-45.

6.2 Native Soils

The native soils typically consist of glacial till and/or residual soil overlain by a thin layer of topsoil. The topsoil, where encountered, is generally comprised of dark brown silt with varying amounts of sand, gravel and decomposed organics. There are also cobbles and boulders projecting through the topsoil within several areas of the site. The boulders were typically 4 feet or less in size, although larger boulders may also be present.

The glacial till (till) soils consist of sands and gravels with lesser amounts of cobbles, boulders and silt. Most typically, the till consists of brown or gray coarse to fine sand with from approximately 10 to 35 percent gravel and from 10 to 35 percent silt. Samples recovered from the borings which appeared to contain higher concentrations of gravel and trace amounts of silt are likely the result of fracturing of cobbles or boulders within the till upon sampling. The cobble and boulder content of the till at the test pit locations typically ranged from 10 to 35 percent. Drill chattering and rough and irregular augering indicates a significant cobble and boulder content at the boring locations. With the exception of the upper 2 feet, Standard Penetration Test (SPT) "N" values in the till were typically in excess of 20 blows per foot (bpf), and rarely less than 10 bpf. Split-spoon sampler refusal, which is defined as more than 50 blows for less than 6 inches of sampler penetration, was common when sampling below a depth of 5 feet. These N values indicate that the till is typically in a medium dense to very dense condition.

Sequences of residual soil, which is a soil resulting from the complete weathering of bedrock, and highly decomposed bedrock overlie more competent bedrock at many of the boring and test pit locations. On sampling within the borings or on excavation

within test pits, these materials typically have a composition of coarse to fine gravel with from approximately 10 to 40 percent sand and from a trace to approximately 35 percent silt. They also contain larger pieces of less weathered bedrock. Generally the coarseness of the material increases with depth and the silt content decreases with depth. The residual soil and highly decomposed bedrock generally extends several feet or less in depth. The residual soil and intermediate soil – rock materials described as highly decomposed bedrock, typically result in SPT N values in excess of 50 bpf or split-spoon sampler refusal.

6.3 Bedrock

The encountered bedrock consists of variably weathered and variably fractured gneiss. The depth to bedrock and the corresponding bedrock elevation at those boring and test pit locations that encountered bedrock is provided in the table at the end of Section 6.4. For the purpose of this report, the depth and corresponding elevation of bedrock at each location has been defined as the depth at which auger or backhoe refusal was encountered since there was often a gradual transition from highly weathered soil like materials to more competent bedrock.

The bedrock was cored at borings B-4, B-10, B-12, B-13, B-15, B-16, B-19A, B-20A, B-21, B-44, B-45, B-101, B-102, B-103, B-104, B-105, B-106, and B-108 in lengths of 5 to 7 feet. The core recoveries generally consisted of slightly to moderately weathered, slightly to highly fractured, medium grained, medium to hard gneiss or granite. Occasional cores were observed to be less or more weathered and fractured, with some cores exhibiting very poor recovery and highly weathered and fractured conditions. Rock core recovery was generally good, but ranged from 0 to 100 percent. The Rock Quality Designation (RQD) of the cored intervals, which is defined as the cumulative sum of the length of the core pieces having lengths greater than or equal to 4 inches divided by the length of the core run, expressed as a percent, ranged from 0 to 90 percent. These RQDs indicate very poor to good rock mass conditions.

6.4 Groundwater

Groundwater was encountered at 23 of the boring locations and four test pits. Within the proposed building footprint, groundwater was encountered between El. +418 feet and +447 feet. Groundwater was also encountered between El. +454 feet and +457 feet within the borings performed within the southeast parking area. Within the proposed gas station footprint, groundwater was encountered between El. +409.5 feet and +424.5 feet within two of the borings.

Within the infiltration tests conducted at boring B-119, the drop in water level over a one-hour period was measured as follows:

<u>Test No.</u>	<u>Water Level Drop (in.)</u>
1	2.0
2	3.0
3	2.0

It should be noted that groundwater levels will vary as a function of season, weather conditions and as a result of the proposed construction. Consequently, groundwater should be anticipated to be encountered at other depths at other times.

Summary of Subsurface Conditions

Boring/ Test Pit I.D.	Ground Surface Elevation ¹ (feet)	Depth to Bedrock ² (feet)	Bedrock Elevation ² (feet)	Depth to Groundwater ³ (feet)	Groundwater Elevation ³ (feet)
B-1	+414.61	15.5	+399.11	NE	Less than El +399
B-2	+440.19	20.5	+419.69	NE	Less than El +419
B-3	+415.94	8.5	+407.44	18.5	+397.44
B-4	+428.35	13.5	+414.85	NE	Less than El +414
B-5	+443.68	NE	Less than El. +423	NE	Less than El +423
B-6	+449.53	18.5	+431.03	NE	Less than El +431
B-7	+414.2	13	+401.2	NE	Less than El +401
B-8	+416	11.5	+404.5	NE	Less than El +404.5
B-9	+435.82	18.5	+417.32	17.5	+418.32
B-10	+450	7	+443	NE	Less than El +443
B-11	+417.56	10.25	+407.31	9	+408.56
B-12	+445.13	14.5	+430.63	NE	Less than El +430.8
B-13	+453	8.5	+444.5	NE	Less than El +444.5
B-14	+420.16	15.75	+404.41	NE	Less than El +404.4
B-15	+453	13.5	+439.5	NE	Less than El +439.5
B-16	+453	6	+447	NE	Less than El +447
B-17	+422.22	14.5	+407.72	NE	Less than El +407.7
B-18	+438.69	16	+422.69	NE	Less than El +422.7

Boring/ Test Pit I.D.	Ground Surface Elevation ¹ (feet)	Depth to Bedrock ² (feet)	Bedrock Elevation ² (feet)	Depth to Groundwater ³ (feet)	Groundwater Elevation ³ (feet)
B-19A	+453.8	17	+436.8	NE	Less than El. +436.8
B-20A	+460.7	15.5	+445.2	NE	Less than El. +445.2
B-21	+456	6.5	+449.5	NE	Less than El. +449.5
B-22	+420.61	5	+415.61	NE	Less than El. +415.6
B-22A	+420.61	5	+415.61	NE	Less than El. +415.6
B-23	+434.99	5	+429.99	NE	Less than El. +429.99
B-24	+428.42	8.5	+419.92	NE	Less than El. +419.9
B-25	+442	4.5	+437.5	NE	Less than El. +437.5
B-26	+447	11.5	+435.5	NE	Less than El. +435.5
B-27	+449	8.5	+440.5	NE	Less than El. +440.5
B-28	+451	NE	Less than El. +441	5.5	+445.5
B-29	+455	NE	Less than El. +445	4	+451
B-30	+454	NE	Less than El. +444	7.5	+446.5
B-31	+454	NE	Less than El. +444	5	+449
B-32	+427.1	NE	Less than El. +417.1	NE	Less than El. +417.1
B-33	+452.05	NE	Less than El. +452.05	NE	Less than El. +452.05
B-34	+456.93	NE	Less than El. +446.93	NE	Less than El. +446.93
B-35	+461	NE	Less than El. +451	6.5	+454.5
B-36	+462	NE	Less than El. +452	5.5	+456.5
B-37	+462	NE	Less than El. +452	6.5	+455.5
B-38	+444.99	NE	Less than El. +434.99	9	+435.99
B-39	+442.48	7	+435.48	NE	Less than El. +435.48
B-40	+449.28	NE	Less than El. +439.28	NE	Less than El. +439.28
B-41	+445.03	NE	Less than El. +435.03	NE	Less than El. +435.03
B-42	+430.55	22.5	+408.05	21.5	+409.05
B-43	+444.89	25	+419.89	20	+424.89
B-44	+440.63	23	+417.63	NE	Less than El. +417.63
B-45	+437.01	24	+413.01	NE	Less than El. +413.01
B-46	+458.52	NE	Less than El. +448.52	7.5	+451.02
B-101	+449.9	16.5	+433.4	7	+442.9
B-102	+449.9	10.0	+443.9	6.5	+443.4
B-103	+454.7	18.5	+436.2	7	+447.7
B-104	+453.0	20	+433.0	6	+447.0
B-105	+453.7	9.5	+444.2	NE	Less than El. +444.2
B-106	+450.6	18.5	+432.1	NE	Less than El. +432.1
B-107	+435.7	14	+421.7	NE	Less than El. +421.7
B-108	+448.8	10.5	+438.3	7	+441.8
B-109	+461.0	15	+446.0	4	+457.0
B-110	+458.0	21.8	+436.2	8	+450.0
B-111	+417.3	9	+408.3	NE	Less than El. +408.3
B-112	+413.3	13	+400.3	NE	Less than El. +400.3
B-113	+412.1	13.5	+398.6	NE	Less than El. +398.6
B-114	+410.7	19	+391.7	NE	Less than El. +391.7
B-115	+398.3	7.5	+390.8	NE	Less than El. +390.8
B-116	+405.3	13.5	+391.8	NE	Less than El. +391.8
B-117	+402.0	5.5	+396.5	NE	Less than El. +396.5
B-118	+409.6	11.5	+398.1	9.2	+400.4
B-119	+426.9	11.5	+415.4	8.75	+418.15
B-120	+431.4	5	+426.4	NE	Less than El. +426.4
TP-1	+421.39	6.25	+415.14	NE	Less than El. +415.14
TP-2	+452	6.6	+445.4	6.4	+451.02

Boring/ Test Pit I.D.	Ground Surface Elevation ¹ (feet)	Depth to Bedrock ² (feet)	Bedrock Elevation ² (feet)	Depth to Groundwater ³ (feet)	Groundwater Elevation ³ (feet)
TP-3	+417.17	5.3	+411.87	NE	Less than El. +411.87
TP-5	+425.03	7.5	+438.5	NE	Less than El. +438.5
TP-6	+464	6.4	+457.6	NE	Less than El. +457.6
TP-7	+464	NE	Less than El. +454	10	Less than El. +454
TP-8	+415.61	3	+412.61	NE	Less than El. +412.61
TP-9	+421	NE	Less than El. +410	NE	Less than El. +410
TP-101	+447.4	5	+442.4	NE	Less than El. +442.4
TP-102	+451.5	10	+441.5	8	+443.5
TP-103	+453.5	9	+444.5	8	+445.5
TP-104	+437.1	5	+432.1	NE	Less than El. +432.1
TP-105	+405	1.8	+403.2	NE	Less than El. +403

Notes:

1. Ground surface elevation was determined either by Tectonic survey crew or estimated based on surface elevations shown on the untitled site survey drawing provided by Client. Refer to individual boring logs for surface elevation reference.
2. Depth to bedrock is taken as the depth to auger refusal in test borings and excavator refusal in test pits. Where "NE" is indicated, bedrock was not encountered to the total depth explored by the boring or test pit.
3. The depth and elevation of groundwater will vary with changing seasons, weather conditions and other factors. Groundwater should be anticipated to be encountered at other depths and elevations at other times.

N.E. = Not Encountered

7.0 DESIGN CONSIDERATIONS

Based on our review of The Costco Wholesale Development Requirements, Version 2009.1, revised July 2009, we understand that the proposed building will be a one-story structure with concrete slab-on-grade floors. The structure is anticipated to consist of CMU or precast concrete walls. Typical wall loads are identified to be 4.5 kips per foot. Typical column loads are identified to be 150 kips. The maximum total allowable settlement of the building, gas station and gas tanks is 1 inch and the maximum differential settlement is ½ inch in 50 feet. The slab loading is identified to be 150 pounds per square foot (psf) dead load and 350 psf live load for a total load of 500 psf. The pavement design life is 20 years and heavy duty paving is to be designed to accommodate 30 trucks per day (Traffic Index of 7.0). Light duty paving is to be designed to accommodate 6,600 cars per day (Traffic Index of 5.0).

8.0 DISCUSSION AND CONCLUSIONS

The main geotechnical issues impacting the proposed construction are the substantial grade changes that are proposed across the site, the locally shallow bedrock conditions, and the presence of uncontrolled fill materials found at various locations throughout the site. As discussed in Section 3, fills of up to 32 feet are required to reach proposed final grades in the western end of the site. Cuts of up to 16 feet will be required to construct the proposed parking areas on the eastern side of the site. Additionally, the bedrock was found at or above the proposed finish floor elevation within six of the borings and test pits performed within the southeast corner of the proposed building footprint. The cut-fill transition occurs within the building footprint at a point approximately 1/4 of the building's width from the west wall of the building. Due to the cut/fill transition occurring within the building the foundation design will require special considerations to properly address the difference in stiffness between the bedrock and fill, and to help reduce differential settlements to acceptable limits.

Based on the elevation at which bedrock was encountered at the boring and test pit locations and the proposed grading indicated on Figure 1, it is anticipated that the required depth of rock removal will range up to approximately 5 feet in the southeast area of the building pad in order to construct the proposed grades, and up to 15 feet within the stormwater management ponds. Deeper excavations in rock may be required for the installation of buried utilities in these areas.

Although the upper cored intervals of the bedrock are occasionally highly weathered and highly fractured, it should be assumed that the degree of weathering decreases with depth. Only the upper highly weathered zones and zones identified as completely weathered or residual soil should be considered rippable (i.e. able to be excavated with a ripping bar mounted on a large dozer). Rock not removed by ripping should be assumed to require the use of excavator mounted hydraulic hammers (hoe-rams) or controlled blasting techniques for removal. The use of explosives (blasting) as a means of rock removal may be a feasible alternative, if allowed by local Code officials.

Existing fill is present at various locations across the project site. The fill is generally the result of previous site grading activities to construct the existing pavements and surface features at the site. The existing fill within the motel complex property generally consists of soil materials mixed with debris. The fill is greatest adjacent to paved areas that were leveled, and is also anticipated to be present against the existing building foundations. The fill within the nursery property generally consists of mulch or other organic materials. These materials are very soft and compressible. All fill materials should be completely removed from the proposed building footprints and zones of influence of foundations. The foundation zone of influence is defined by 1 to 1 (Horizontal to Vertical) lines sloping downward and outward from the base of the foundation. Fill materials may remain in-place within landscape and parking areas provided that there are trace (or less) organic materials present and the fill appears to be in a dense condition at the time of construction. The mulch fill found within the nursery property should be completely removed.

The proposed construction will require demolition of several structures across the site. The removal of each structure should proceed as a controlled excavation and should be backfilled with the appropriate materials (depending on the location with respect to the final site plan) and compacted to the project specifications. Foundations, slabs, and other structural elements may require excavator-mounted hoe-rams in order to allow for removal.

Due to the high silt content of the native till, the use of the native soils as fill is discouraged as it is highly moisture sensitive and its use can result in substantial delays if weather conditions are not ideal. The excavated rock could be processed to create a suitable fill material. For rock fill to be effectively used, the excavated rock will require processing to meet specific gradation requirements that vary with the location that the fill will be placed. As described in detail in Section 9, coarser rock fill can be utilized to raise grade for the majority of the proposed fill height within parking and landscape areas of the site. The exception is the upper zones that will require progressively finer materials to "choke off" the voids within the rock fill and prevent the loss of the upper soil fill such as structural fill for building support, subbase material for parking areas, or topsoil within landscape areas, from migrating into the voids.

Foundations for the proposed building, gas station and other structures can bear on the bedrock, the dense to very dense overburden soils, or structural fill placed over these materials. Each of these materials has a different allowable bearing pressure. The better quality, slightly weathered gneiss bedrock can be assumed to have a minimum net allowable bearing capacity of 15 tons per square foot (tsf), whereas the more weathered bedrock can be assumed to have a net allowable bearing capacity of 8 tsf. The dense to very dense glacial till and other materials described as soil or intermediate materials in Section 6 can be assumed to have a net allowable bearing capacity of 3 tsf. We recommend that foundations bearing on compacted structural fill be designed for a net allowable bearing pressure of 2 tsf.

Based on the results of the borings and test pits, it is anticipated that the subgrade material within the proposed building pad will vary from competent bedrock in the southern portion, dense glacial till and highly decomposed bedrock and residual soil in the majority of the building pad, to structural fill placed over native soils elsewhere. Due to this variation and the difficulty of accurately predicting where each transition will take place, plans should consider that foundations may need to be deepened to encounter native soils or bedrock, or plans should be based on the bearing strata with the lowest allowable bearing capacity, structural fill. The gas station area can be assumed to bear on structural fill.

To minimize differential settlement between building areas supported on shallow bedrock and those supported on fill, a transition zone should be formed whereby the thickness of the fill gradually increases. This is recommended since foundations bearing on bedrock will settle negligibly and foundations bearing on structural fill can be expected to settle in the range of $\frac{3}{4}$ to 1 inch. An abrupt transition will exceed the allowable differential settlement criteria of $\frac{1}{2}$ inch in 50 feet. The transition can be designed by assuming that the depth of influence of a foundation is two times the foundation width (i.e., a foundation bearing on structural fill placed over bedrock will settle less as a result of the presence of the bedrock when the fill thickness is less than 2 times the foundation width). For a 2.5 feet wide wall footing, the differential settlement criteria can be conservatively met by undercutting bedrock 5 feet at the transition point and gradually transitioning the overcut back for a distance of 100 feet. Alternately, the transition can be achieved by stepping the

overcut back to subgrade elevation at 5 locations within this distance. It is noted, however, that the exact requirements of the transition zone will need to be evaluated at the time of construction as other factors will come into play such as the amount of overblast within the rock subgrade, the degree of weathering of the bedrock near the transition point and how quickly the bedrock drops down towards the east.

Other conclusions that can be drawn from the investigation are as follows:

- Based on the groundwater conditions noted in Section 6 and the proposed grading, groundwater is not anticipated to impact building design if perimeter drainage is provided. Water tight construction or a permanent dewatering system is not anticipated. Seepage can be expected within the deeper rock cuts and localized seepage should be anticipated elsewhere due to the dense soil and rock conditions. It is also noted that water may be encountered within the overburden soils in deeper cuts, especially during the spring or following periods of rain.
- Groundwater was encountered at an elevation approximately +418.15 feet within the stormwater management pond area.
- The site soils and proposed fill are not subject to liquefaction induced settlement during an earthquake event.
- Karst or other conditions that can result in sinkhole development were not encountered. Therefore, there is not a sinkhole hazard at the site provided rock fill is properly choked.
- There are many cobbles and boulders on the ground surface, as well as within the glacial till soils. Some are of such size that they will need to be broken before being utilized as fill.
- The on-site materials may be used as general fill outside the building area. Although not encouraged, the on-site soils may also be used as fill beneath pavements provided these materials have a maximum particle size of 4 inches and are free of trash, debris, roots, vegetation, peat or other deleterious materials. It is again noted, however, that the site soils are highly moisture sensitive due to their high silt content. Consequently, their use can result in construction delays if their water content is not suitable for compaction.
- The on-site soils will readily soften and the bearing capabilities of these soils will be greatly reduced if exposed to construction traffic, wet weather or perched groundwater. Construction dewatering and protection of subgrades should be performed as necessary to maintain the load-carrying capability of the native soil.
- The proposed retaining walls in the fill areas of the site will receive lateral load from the proposed building, unless the building's foundations are lowered so that the zone of influence does not intercept the wall face.

- The retaining walls within the cut portions of the site will support excavations into medium dense to dense native soils. The retaining wall which surrounds the proposed stormwater management ponds may require excavation into rock and may retain rock or fill placed after the removal of rock.
- The retained zone behind the retaining walls in the eastern portion of the site will retain the slope to the Taconic State Parkway or an existing wetland. The disturbance to the retained zone will likely need to be minimized, and as a result, the retaining walls may require bracing or substantial strengthening to achieve adequate resistance to the earth pressures that will develop.
- The impact of the proposed excavations on any nearby existing structures should be performed to ensure that neighboring structures, including roadways and buried utilities, are not adversely affected by the construction. If necessary, excavation support should be provided as designed by a New York State licensed Professional Engineer.

9.0 RECOMMENDATIONS

The following sections include our geotechnical recommendations for design and construction of the proposed Costco building and associated site improvements. These recommendations are based on the results of our subsurface investigation, laboratory testing, and experience in the general vicinity of the project site.

9.1 Building Foundations

As discussed in Section 8, the results of the subsurface investigation indicate that the foundation subgrade materials at the building pad will vary between competent bedrock, decomposed bedrock, residual soil, dense glacial till, and structural fill. Since these subsurface materials all have a different allowable bearing capacity and the exact transition between these different bearing materials is unknown, alternate foundation designs will need to be provided or all the foundations will need to be designed for the material with the lowest bearing capacity, the fill. Our recommended net allowable bearing pressure for each of the potential bearing materials is provided below:

- Fill placed and compacted as described in Section 10 can be assumed to have a net allowable bearing pressure of 2 tons per square foot (tsf).

- Dense to very dense till (undisturbed brown or gray, silty, sandy gravels or silty, gravelly sands with cobbles and boulders typically encountered below an approximately 2 feet layer consisting of topsoil and loose to medium dense soils) or materials described as residual soil or decomposed bedrock on the boring or test pit logs can be assumed to have a minimum net allowable bearing pressure of 3 tons per square foot.
- Gneiss bedrock described as moderately to highly weathered and highly fractured can be assumed to have a net allowable bearing pressure of 8 tsf.
- Gneiss bedrock described on the boring logs as slightly weathered and slightly to moderately fractured can be assumed to have a net allowable bearing pressure of 15 tsf.

The geotechnical engineer will need to evaluate the bearing strata on exposure of the subgrade and designate the appropriate foundation detail for use unless all the building's foundations are designed to bear on structural fill.

Isolated spread footings should have a minimum width of 3 feet and continuous wall footings should have a minimum width of 2 feet. For the purposes of frost protection, exterior footings bearing on soil or highly decomposed bedrock should bear at least 3.5 feet below finished exposed grade. There is no frost dictated minimum foundation bearing depth for foundations bearing on competent bedrock. Interior footings should bear at least 2 feet below the finished floor slab elevation in heated building areas.

In building areas transitioning from rock to fill bearing, transition zones will need to be constructed so that the project allowable differential settlement requirement of $\frac{1}{2}$ inch in 50 feet is satisfied. As discussed in Section 8, this is required since foundations bearing on competent bedrock will settle negligibly and foundations bearing on fill can be expected to range from $\frac{3}{4}$ inch to 1 inch. To maintain allowable differential settlements along the wall lines, rock at the transition point should be overexcavated a depth 2 times the width of the foundation, and the rock should be tapered or stepped up gradually to the proposed subgrade elevation over a horizontal distance of 50 feet and the subgrade in the transition zone re-established with compacted structural fill. If steps are utilized, they should have a

maximum height of 12 inches and they should be spaced as evenly as possible. The width of the overexcavated section should extend at least $\frac{1}{2}$ the overcut depth on each side of the footing. At a point where the overcut is 5 feet, the cut should extend at least 2.5 feet beyond each side of the proposed foundation. Attached to this report as Figure II is a recommended detail for use in constructing the transition zones.

Column footings will similarly need to be overcut to comply with the differential settlement requirements. As excavation proceeds from areas of fill bearing to rock bearing, the first column footing that would bear on bedrock should be overcut to a depth equal to $2B$ (where B is the width of the footing) and replaced with compacted structural fill. As with the wall footings, the overcut should extend laterally beyond each edge of the foundation a distance equal to $\frac{1}{2}$ the depth of overcut.

As discussed in Section 8, the actual requirements of the transition zones may be modified on exposure of the subgrade based on conditions such as the amount of overblast occurring within the rock subgrades, the degree of weathering of the bedrock near the transition and quickness at which bedrock drops within the fill zone. It may be cost effective to perform probe holes at the foundation locations near the transition to identify the depth to rock in fill zones and other factors that could reduce the amount of overcut and structural fill placement within the transition zones.

9.2 Foundation Drainage

Slab underdrains should not be required for the proposed building based upon groundwater observations made during the subsurface investigation. Damproofing should be provided for all foundation walls where the outside grade is higher than the slab elevation. A perimeter drain should be installed as described in Section 9.4. Surface water runoff from areas surrounding the building and from roof drains should be positively drained away from the building in accordance with the recommendation of the project civil engineer.

9.3 Slabs-on-Grade

The concrete slabs-on-grade should be supported on free draining, minimum 6 inch thick layer of $\frac{1}{2}$ to $\frac{3}{4}$ inch crushed stone placed on a subgrade consisting of bedrock, decomposed rock materials, dense to very native soils, or structural fill placed over these materials. The gradation specification for the crushed stone is provided in Section 10.

A vapor barrier consisting of a polyethylene membrane at least 6 mils thick should be placed beneath all moisture sensitive slab-on-grade floors. A coefficient of friction of 0.3 should be used between the slab and the vapor barrier. If concrete is cast directly against structural fill or dense to very dense native soils, a coefficient of friction of 0.45 can be used.

For design of concrete slabs-on-grade floors with the crushed stone base thickness indicated above, a short term subgrade modulus of 250 pounds per cubic inch (pci) is recommended. Design should be in accordance with the latest edition of the American Concrete Institute (ACI 360). The subgrade modulus is suitable for estimating distributions of bearing pressure beneath the slab and for estimating bending moments and shears within the slab. It is not intended for the purpose of calculating total of differential settlements.

To prevent cracking of the slab due to the transition from rock to fill bearing, it is recommended that a transition zone be constructed as with the foundations. The depth of influence of the slab can be approximated as 4 feet. If regions of the slab's stone base bears directly on bedrock in the vicinity of the transition zone, the rock should be overexcavated to a depth of 4 feet near the transition zone and gradually transitioned up to the subgrade elevation towards the east over a distance of at least 25 feet. This assumes that systematic overblasting has not resulted in a slab subgrade consisting of a significant thickness of structural fill. It is also recommended that steel reinforcing be utilized within the slab at least in the vicinity of the transition zone.

9.4 Foundation and Site Retaining Walls

Foundation retaining walls, if any, and site retaining walls should be designed in accordance with the following criteria:

Soil Parameter	Structural Backfill/In-Situ Soil	
	Level Backfill	1.5:1 (H:V) Slope
Angle of internal friction	34°	34°
Active earth pressure coefficient (K_a) for horizontal backfill surface ⁽¹⁾	0.28	0.70
At rest earth pressure coefficient (K_o) for horizontal backfill surface ⁽²⁾	0.44	NA
Passive earth pressure coefficient (K_p) ⁽³⁾	3.54	2.77 ⁽⁵⁾
Coefficient of base friction ⁽⁴⁾	0.45	0.45
Total unit weight of soil (pounds per cubic foot)	125	125

- 1) Use for free standing walls where movement of up to 0.0025 X height of wall is both possible and tolerable. Otherwise, use at-rest coefficient.
- 2) Use for walls restrained against outward lateral movement including basement walls and frost cut-off walls.
- 3) Assume passive pressure below a depth of 3.5 feet only.
- 4) Coefficient of base friction applies to mass concrete placed directly against the in-situ soils or structural fill.
- 5) Passive earth pressure coefficient assumes downslope angle at the front of the wall is no steeper than 18 degrees (3 to 1, Horizontal to Vertical).

We recommend a coefficient of base friction of 0.65 for retaining wall founded on competent bedrock and 0.45 for retaining walls founded on the glacial till materials.

Additional loading due to temporary and permanent surcharges, such as automobiles, should be added to the lateral loading exerted by the backfill. Loads due to supported structures and slopes should be applied in appropriate combinations with the lateral loads. The earth pressure coefficients may need to be adjusted for sloping backfill behind of in front of the wall.

The load from the building and floor slab on the western portion of the building pad will influence the lateral loading on Retaining Wall No. 1 and should be incorporated into the design of this wall.

Unless bearing on competent bedrock as determined by the geotechnical engineer, footings for all concrete cast-in-place retaining structures should be designed to bear a minimum of 3.5 feet below the finished grade in front of the wall for frost protection. All footings should bear on dense to very dense native soils, bedrock or materials identified to be intermediate between rock and soil. Retaining wall subgrades should be prepared and protected as described in this report and should be approved by the observing geotechnical engineer. Allowable net bearing pressures should be as indicated for building foundations.

Walls should be backfilled in accordance with Section 9 of this report. Placement and compaction of backfill should be observed and tested by a geotechnical engineer to monitor that proper compaction is being achieved.

Measures should be taken to reduce the potential for moisture buildup behind walls. Drainage measures should include a zone of granular non-expansive soil backfill immediately adjacent to the walls and installation of footing drains. The drains should consist of a 12-inch wide layer of crushed stone or clean gravel behind the wall with a collector pipe at the footing elevation drained to the stormwater management system. The gradation specification for the drainage material is provided in Section 12.5. The stone or gravel should be separated from the natural soils or controlled fill by a permeable geotextile having an equivalent opening size of 70 to 100.

9.5 Seismic Site Coefficients and Liquefaction Potential

As part of our investigation, we have evaluated an appropriate site coefficient for use in seismic design. Due to the variation of bearing materials across the site, the New York State Building Code (Code) site class varies from Site Class B, rock, to Site Class D, a stiff soil profile, which characterizes the proposed fill. Per the Code, the lowest Site Class for the building, Site Class D, has a maximum spectral response acceleration at short periods (S_{mS}) equal to 0.498g and at 1-second periods (S_{m1}) equal to 0.166g. The appropriate reductions should be applied to these values to obtain the design spectral response acceleration ordinates for the site.

Liquefaction of soils can be caused by a strong vibratory motion due to earthquakes. Both research and historical data indicate that loose, granular soils saturated by a shallow groundwater table are most susceptible to liquefaction. Liquefaction occurs when an earthquake and associated ground shaking of sufficient duration results in the loss of grain-to-grain contact due to a rapid increase in pore water pressure, causing the soil to behave as a fluid for short periods. Based on the results of the borings and SPT sampling, the subsurface conditions at the site should be considered as having a very low potential for liquefaction. This is due to the medium dense to very dense soil conditions and relatively deep groundwater conditions.

9.6 Pavements

The proposed pavements can be supported on the dense to very dense native soils typically encountered below a depth of approximately 2 feet at the boring and test pit locations, on the variably weathered bedrock, or on fill placed over these materials. Subgrades consisting of native soil should be proofrolled under the observation of the project geotechnical engineer. Subgrade preparation and proofrolling should be performed in accordance with the recommendations provided in Section 9 of this report.

A California Bearing Ratio (CBR) value of 10 was selected for design of both the "Standard Duty" and "Heavy Duty" asphalt concrete pavement sections. The traffic data used in the design is as presented previously in this report. The results of ongoing CBR testing will be used to determine the final recommended pavement sections.

We recommend that the "Standard Duty" and "Heavy Duty" asphalt concrete pavement sections consist of the following:

Asphalt Concrete Pavements	
Pavement Section Type	Recommended Section
Standard Duty	1 inch AC Type 6F Top Course (Item 403.1701) 2 inches AC Type 3 Binder Course (Item 403.13) 6 inches Type 2 Aggregate Subbase (Item 304.03)
Heavy Duty	2 inches AC Type 6F Top Course (Item 403.1701) 3 inches AC Type 3 Binder Course (Item 403.13) 6 inches Type 2 Aggregate Subbase (Item 304.03)
Notes:	All Item Nos. are indicated in New York State Department of Transportation Standard Specifications

If a perimeter cut-off drain is not utilized, it is recommended that pavement drains be incorporated in the pavement areas not receiving rock fill. This is due to subsurface seepage that can be expected and the relatively impermeable nature of the native subgrade materials. Without drains, in extreme conditions, water within the stone beneath the pavement may freeze and result in failure of the pavement unless significant overblasting was performed to allow a thicker layer of free draining fill and grading was performed so that water would not pool locally within the drainage layer. The underdrains should be positively outletted to the storm drainage system.

Although the glacial till and other native soils are not expected to comprise a significant fraction of the pavement subgrade, it is noted that these materials are frost heave susceptible due to their high silt content. It is recommended that in the limited areas these comprise the subgrade, that they be undercut to such a distance that there is at least 18 inches of granular structural fill between native soils and the aggregate subbase. Also, if the native till is used as fill beneath the pavement, this fill should be terminated at least 18 inches below the aggregate subbase and structural fill should be used as the remainder of the fill.

9.7 Light Pole Foundations

Light pole foundations can be designed utilizing Brom's method or utilizing a computer program such as LPILE. Most of the light pole foundations are anticipated to be constructed within fill materials. A conservative approach to the design would be to assume structural fill conditions at all locations. Criteria for each subsurface condition are provided in the following table.

Material	γ (Pcf)	ϕ (Degrees)	C (Psf)	K_1 (Pci)	ϵ_{50}	K_a	K_p
Structural Fill	120	34	0	90	NA	0.28	3.54
Dense Native Soils	125	36	0	225	NA	0.26	3.85
Weathered Bedrock	145	0	8,000	2,000	.004	N/A	N/A

Notes: The depth to bedrock will vary and should be confirmed during construction. Plans should specify minimum socket depth.

- γ = Design unit weight (pounds per cubic foot)
- ϕ = Angle of internal friction (degrees)
- C = Rock mass cohesion (psf)
- K_1 = Coefficient of lateral subgrade reaction (pounds per cubic inch)
- ϵ_{50} = Strain at 50 percent of the maximum principal stress difference
- K_a = Active earth pressure coefficient
- K_p = Passive earth pressure coefficient

9.8 Slope Stability

The western portion of the site will consist of relatively steep (1.5 to 1, Horizontal to Vertical) slopes supported at the base by retaining walls. The construction of the proposed walls and slopes is not anticipated to result in unacceptable factors of safety against global stability failure of the wall-slope configuration; however, the

slopes themselves will need to be reinforced to maintain stability and also will need surface protection to prevent erosion and future stability issues. Based on our analysis of the proposed slope and wall configurations, we recommend that the slopes be designed as reinforced soil slopes, incorporating a geosynthetic reinforcement that will be anchored some distance back from the face of the slope. Our analysis indicates that the reinforcement length will likely need to be approximately $\frac{1}{2}$ the total slope height to maintain stability of the slope. This assumes that the slope will be backfilled using structural fill meeting the gradation criteria presented in Section 10.5.

The design of the walls at the base of the slopes must account for increased lateral earth pressure as a result of the slope above the wall. If these walls are to consist of mechanically-stabilized earth (MSE) walls, which typically include segmental block units at the face and horizontal layers of geosynthetic reinforcement, the reinforcement will not only act to resist the lateral forces on the wall blocks, but will also improve the overall factor of safety of the wall-slope configuration. In order to maintain an adequate factor of safety against global stability failure, the length of the geosynthetic for the MSE wall should be equal to or greater than the length of the geosynthetic for the overlying slope, when measured from the front face of the segmental blocks.

Stability at the surface of the slopes must include measures to prevent erosion of the slope. Surface water resulting from precipitation that can be intercepted at the top of the slope and diverted to the stormwater management system should be maximized if possible to reduce the volume of water flowing onto and down the slopes. Surface stabilization can be achieved using one of several alternatives including rip-rap, permanent erosion control fabric or matting which promotes vegetative growth, or others.

10.0 EARTHWORK CONSTRUCTION CRITERIA

The following sections present our recommendations regarding earthwork, slope construction, excavations, and construction monitoring.

10.1 General Site Preparation

Initially the site should be cleared of debris and subsurface obstructions and stripped of trees, brush, and vegetation. Existing structures should be completely demolished and removed to expose a natural soil subgrade. Topsoil and subsoils that contain appreciable amounts of organic materials should be stripped and stockpiled separately for re-use in landscape areas (if warranted). The areas to be cleared and stripped include building, retaining wall, parking, sidewalks, underground utilities and areas to be filled. We recommend a removal of at least 24 inches in all areas to receive fill. The limits of the surface preparation should be the footprint of the proposed improvements plus no less than 10 feet beyond the perimeter where possible. Debris and vegetation from the clearing operations should be removed from the site and disposed of at a legal dump site.

10.2 Excavation and Shoring

As discussed, the excavation of bedrock will require the use of either mechanical breakage or controlled blasting. Mechanical breakage is generally accomplished by hydraulic hoe-rams mounted to excavator arms which fracture the rock to a size small enough to fit within an excavator's bucket. If utilized, controlled blasting should be performed by a qualified contractor licensed and insured for use of explosives and it should be performed in a manner that will minimize damage to underlying bedrock that will serve as foundation subgrades. Blasting should also be conducted in a manner that will minimize ground vibrations at adjacent structures and also limit the amount of air overblast pressure. A blast monitoring program should be implemented to control blasting through limitations on peak particle velocity and air over-blast (sound level) at adjacent structures. In addition, blasting mats should be utilized to minimize the hazard of flyrock to adjacent structures and to personnel on-site. Final and temporary cuts in bedrock should be thoroughly scaled to remove any loose rock blocks.

The controlled blasting program should be executed with care by an experienced contractor to ensure that overblast or overbreakage of the bedrock which will serve as the subgrade for foundations, slabs or slopes does not become overly disturbed. After

blasting and excavation of the overblast materials, the geotechnical engineer should inspect the resulting subgrade to identify if the resulting subgrade has been overly disturbed by blasting. Any areas identified to consist of overblasted rock should be excavated and backfilled with lean concrete having a minimum compressive strength of 2,000 psi at 28 days.

If there is to be a separate payment for soil and rock excavation, we recommend that rock be defined in the specifications as follows:

Rock is defined for payment purposes as indurated material, boulders over one (1) cubic yard in volume and masonry or concrete that cannot be broken or removed by mechanical equipment such as power shovels, scoops, excavators, or heavy duty ripping equipment at least as powerful as a Caterpillar D9L with a Kelly Ripper KR400D-1 single shank ripper attachment and without the use of explosives or drills. The classification does not include materials that can be removed by means other than drilling and blasting or drilling and wedging but which, for reasons of economy in excavating, the Contractor prefers to remove by drilling and blasting.

Abundant oversize materials should be expected when excavating the native soils. Boulders in excess of 3 feet may be present. Large, heavy duty excavation equipment will be required to excavate the site soils.

Any vertical cut in soil or decomposed bedrock above 4 feet in height should be sloped back for safety unless sheeting or a bracing system is used. OSHA and other applicable agency requirements pertaining to worker safety should be met during excavation, dewatering, and backfilling activities. Design of all shoring and bracing should be performed by a licensed Professional Engineer.

10.3 Subgrade Preparation

All building, pavement, retaining wall, and slab subgrades should be inspected by the geotechnical engineer prior to fill or concrete placement. Foundation subgrades

should be prepared by removing all materials loosened by machine excavation. Native soil subgrades or soil surfaces to receive fill should be proofrolled under the direction of the geotechnical engineer. Any soil found to be soft during proofrolling should be removed. The area of removal should be within the zone of influence of the footing. Proofrolling should be performed using a minimum of 4 passes of a 12-ton vibratory roller in open areas, or a 1.5-ton trench roller in confined areas. Overexcavated areas should be backfilled with materials suitable for the area they are encountered. Structural fill can be utilized in pavement and slab-on-grade areas. Structural fill can also be used beneath foundations provided the foundations are designed for structural fill bearing. If foundations are designed to bear on native soils or bedrock, overexcavated areas beneath these foundations should be backfilled with lean concrete. Lean concrete should have a minimum unconfined compressive strength of 2,000 pounds per square inch at 28 days.

10.4 Protection of Subgrades and Dewatering

The site soils are susceptible to disturbance. Soil subgrades should be protected from the effects of frost, construction traffic, groundwater, and surface water. The necessary protection should be provided immediately after stripping and excavation, and be maintained until fill, concrete, or asphalt pavement is placed. Temporary surface drainage measures are recommended to divert runoff away from the proposed construction limits. Well defined temporary construction-access roadways, using gravel or crushed stone materials combined with geotextile fabrics, should be considered to avoid extensive surface soil disturbance and the need for costly and time consuming corrective measures. Additionally, soil erosion control measures should be implemented in accordance with NYSDEC regulations to reduce stormwater pollution of nearby watersheds.

Groundwater and/or groundwater seepage may be encountered during deeper excavations. If encountered, dewatering should be performed to maintain a water level at least 2 feet below the deepest excavation within soil areas. Dewatering should also be performed in a manner that will prevent loosening or migration of the subgrade soils. Methods such as a well point system or a system of sumps placed

outside the footing excavations may be practical. Sumping directly in the footing excavations should not be performed.

10.5 Fill and Backfill Materials and Placement

As discussed in Section 8, rock fill may be used to raise grade in at least the deeper fill areas outside the proposed building footprints. To prevent excessive settlement of improvements placed over the rock fill and/or the development of sinkholes, the rock fill needs to be placed in strict accordance with the requirements of this section.

Rock fill should be excavated and then processed, as necessary, to meet two gradation requirements; a coarser Type II blast rock fill to comprise the majority of the fill height and then a finer rock fill, Type I blast rock fill, to be placed above the Type II fill. The Type I fill is then capped with a coarse gravel choke stone layer and then the surface fills are placed. These will consist of structural fill beneath the building, structural fill and possibly native soil fill beneath the parking lot, and topsoil in landscape areas.

The requirements of the two rock fill types and the limits of their placement are as follows:

Type I Rock Fill: Type I rock fill shall be well-graded rock with a maximum size of 8 inches. Well-graded is defined as having at least twenty five percent less than 2 ½ inches in size and at least ten percent less than 1/2 inch in size. The Type I rock fill may be placed up to within 2 feet of the subgrade in building and pavement areas and to within 2 feet the base of light poles or the inverts of utilities. The Type I fill must be capped with a compacted 8-inch thick "choke stone" layer consisting of a well graded mixture of gravel with a maximum stone size of 2 ½ inches.

Type II Rock Fill: Type II rock fill shall be well-graded rock with a maximum size of 18 inches. Well graded is defined as having at least twenty-five percent less than 6 inches in size and at least 10 percent less than 3/4 inch

in size. Type II rock fill may be placed at depths greater than 6 feet below the subgrade of the building slab and foundations and pavement areas. A minimum 2 feet thick layer of Type I rock fill shall be placed over Type II Rock Fill, which in turn shall have a minimum 8-inch thick choke stone layer applied.

The rock fill shall be placed in lifts no thicker than 4/3 of the largest rock size (e.g., 24 inches for the Type II Rock Fill). The fill shall be compacted with a vibratory roller having a minimum static weight of 12 tons. The required number of passes along with the evaluation of whether the rock fill needs to be flooded to aid compaction will need to be determined based on observation of the fill placement by the geotechnical engineer.

Structural fill placed to establish subgrade elevation beneath the buildings and pavement or as backfill behind retaining walls should be a well-graded durable granular material conforming to the following gradation:

<u>Sieve Size</u>	<u>Percent Finer by Weight</u>
3 inch	100
¾ inch	30-70
No. 40	5-40
No. 200	0-10

As discussed in Section 8, the on-site soils are undesirable for use as structural fill due to their high silt content. They are moisture sensitive and their use can result in substantial construction delays unless weather conditions are optimal. Due to their comparatively low strength and elastic modulus, they should not be used as fill beneath the building or as fill behind retaining walls. If the material must be used based on cost considerations and the potential for construction delays are understood and accepted, they may be used to raise grade within the proposed paved areas away from the building. To limit the potential for frost heave, we recommend that these fills be capped with a minimum 18 inch thick layer of structural fill. On-site soils used as fill should be free of debris, organic materials

and particles more than 4 inches in smallest dimension. The moisture content at the time of placement and compaction should be no more than 2 percent of the optimum.

All soil fill (structural or general) placed at the site with the exception of fill in landscaped areas should be compacted to at least 95 percent of the maximum dry density as determined by ASTM D1557. Fill in landscaped areas can be compacted to 90 percent of the maximum density. The lift thickness for the fill soils will vary depending on the type of compaction equipment used. Fills should generally be placed in uniform horizontal lifts not exceeding 8 inches in loose thickness in open areas. In confined areas, the loose lift thickness should be reduced to 4 inches or less and each lift should be compacted with sufficient passes of hand operated vibratory or impact compaction equipment. Compaction within 5 feet of foundation walls or site retaining walls should be done with hand-operated equipment.

Fill placed against existing slopes should be benched into the glacial till within the existing slope

A geotechnical engineer with appropriate field and laboratory support should inspect the stripping operations, inspect all footing and slab and pavement subgrades, approve materials for use as fill, and test backfill materials for compliance with the recommended compaction.

Free draining crushed aggregate below floor slabs and as drainage materials behind retaining walls should be Underdrain Filter Type I materials as specified in the New York State Department of Transportation Standard Specifications as follows:

<u>Sieve Size</u>	<u>Percent Finer by Weight</u>
1 inch	100
1/2 inch	30 – 100
1/4 inch	0 – 30
No. 4	0 – 10
No. 8	0 – 5

11.0 CONSTRUCTION MONITORING

A geotechnical engineer familiar with the existing subsurface conditions and having the appropriate laboratory and field testing support should be engaged by the owner to observe that all earthwork is performed in accordance with the specifications and the design criteria provided in this report.

The following work should be performed under the observation of the geotechnical engineer:

- Initial site preparation including stripping
- Blasting (if utilized)
- Benching of existing soils slopes
- Proofrolling
- Dewatering (if required)
- Placement and compaction of all fill
- Footing, floor slab, retaining wall, and pavement subgrade preparation
- Retaining wall construction
- Reinforced soil slope construction
- Pavement construction

All materials proposed for use as soil fill should be tested and approved prior to delivery or use on-site. All fill materials should be tested as they are being placed to verify that the required compaction is being achieved. We further recommend that the project plans and specifications be reviewed by the geotechnical consultant prior to final completion of bidding documents. It should be noted that upon review of those documents, some recommendations presented herein may be revised or modified.

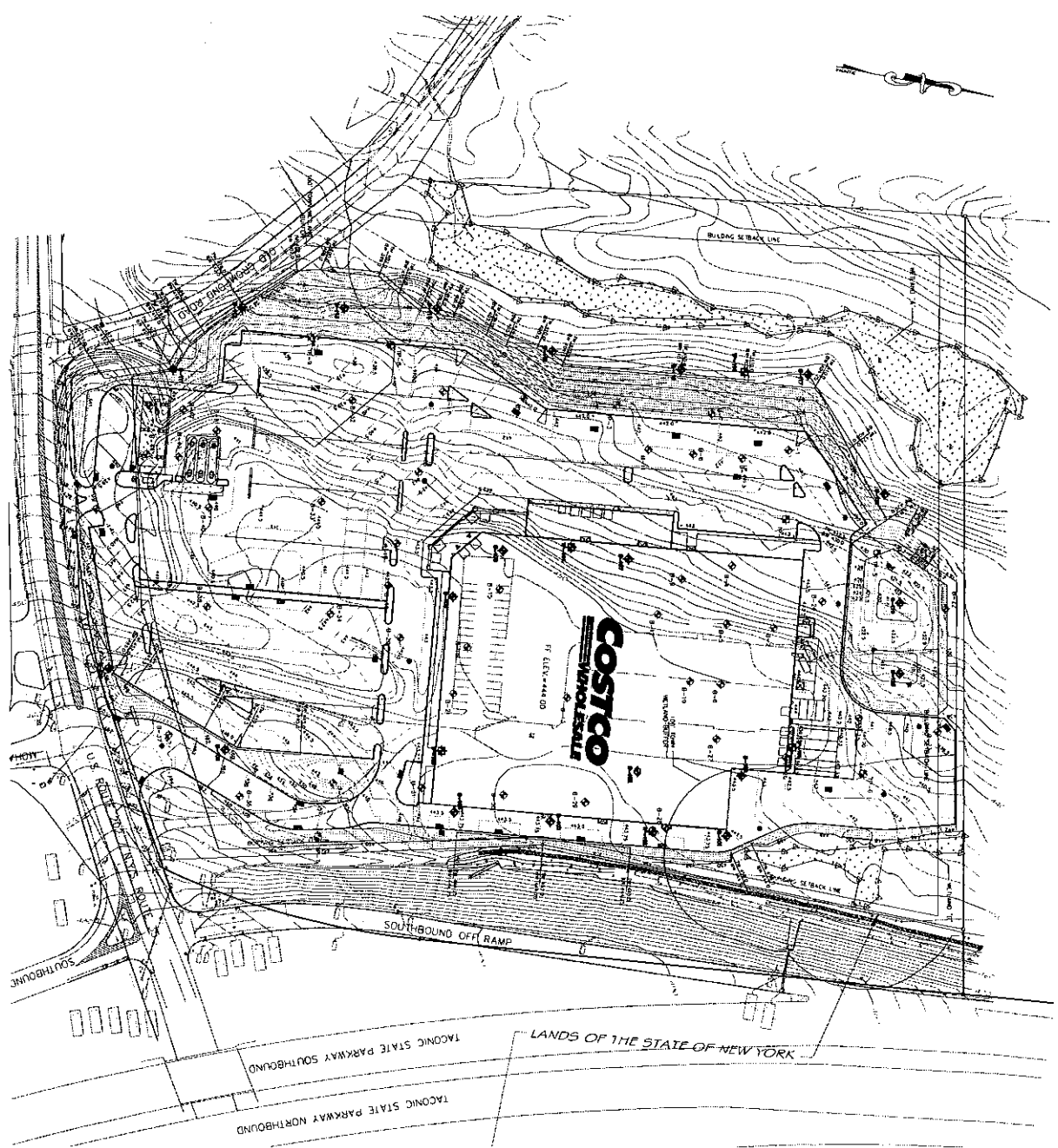
12.0 LIMITATIONS

Our professional services have been performed using that degree of care and skill ordinarily exercised under similar circumstances by reputable geotechnical engineers and geologists practicing in this or similar situations. The interpretation of the field data is based on good judgment and experience. However, no matter how qualified the geotechnical engineer or detailed the investigation, subsurface conditions cannot always be predicted beyond the points of actual sampling and testing. No other warranty, expressed or implied, is made as to the professional advice included in this report.

The recommendations contained in this report are intended for design purposes only. Contractors and others involved in the construction of this project are advised to make an independent assessment of the soil, bedrock, and groundwater conditions for the purpose of establishing quantities, schedules and construction techniques.

This report has been prepared for the exclusive use of Costco Wholesale Inc. for the specific application to the proposed Costco Whole building described in this report. In the event that any changes in the design or location of the proposed improvements are planned, the conclusions and recommendations contained in this report shall not be considered valid unless reviewed and verified in writing by Tectonic. It is recommended that Tectonic be retained to provide construction monitoring and inspection services to ensure proper implementation of the recommendations contained herein, which would otherwise limit our professional liability.

FIGURE I



LEGEND

ADJACENT ZONING LOCATION

NOTES

1. SHOWN LOCATIONS WERE SURVEYED ON-JOB BY TECTONIC'S SURVEY DEPARTMENT. ALL DIMENSIONS ARE AS SHOWN UNLESS OTHERWISE NOTED. DIMENSIONS ARE SHOWN IN FEET AND INCHES. DIMENSIONS ARE SHOWN EAST/WEST.



TECTONIC
 1000 ROUTE 92
 SUITE 100
 GREAT BRIDGE, NEW YORK 11745
 TEL: 609-426-1111
 FAX: 609-426-1112
 WWW.TECTONICINC.COM

PREPARED BY: TECTONIC
 CHECKED BY: TECTONIC
 DATE: 11/11/11

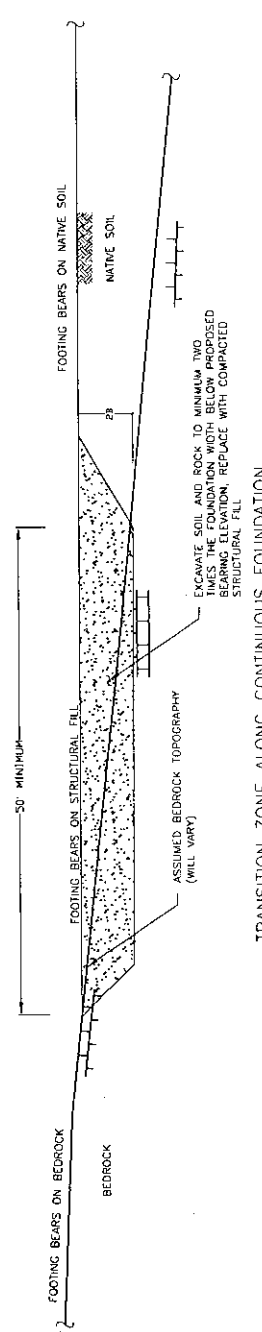
PROJECT: COSTCO WHOLESALE
 ADDRESS: 1000 ROUTE 92, GREAT BRIDGE, NEW YORK

SHEET NO. 1 OF 1
 SCALE: AS SHOWN
 DATE: 11/11/11

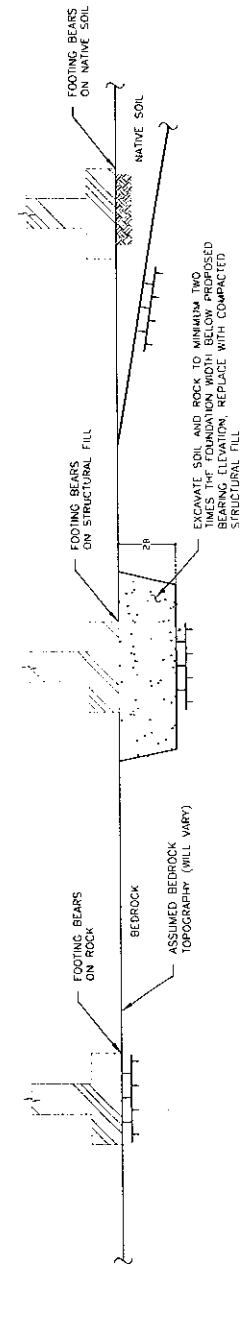
FIGURE II

NOTES

1. ALL SUBGRADES, WHETHER CONSISTING OF SOIL OR BEDROCK, SHOULD BE INSPECTED BY A GEOTECHNICAL ENGINEER PRIOR TO THE PLACEMENT OF STRUCTURAL FILL OR CONCRETE.
2. BENCHES INTO ROCK OR SOIL SHOULD BE CONSTRUCTED TO BE 1:1 (HORIZONTAL TO VERTICAL). IF PRACTICAL, WHERE A 1:1 BENCH IS IMPRACTICAL, THE BENCH MAY BE FLATTER. IN NO INSTANCE SHALL ANY BENCH BE STEEPER THAN 1:1.
3. IN NO INSTANCE SHALL THE VERTICAL HEIGHT OF ANY ONE BENCH EXCEED 2 FEET.
4. STRUCTURAL FILL SHALL MEET THE REQUIREMENTS OF SECTION 10.5 OF THIS REPORT AND COMPACTED TO AT LEAST 95 PERCENT OF THE MODIFIED PROCTOR DENSITY AS DETERMINED BY ASTM D1557. THE GEOTECHNICAL ENGINEER SHOULD TEST AND DOCUMENT COMPACTION OF EACH LIFT OF FILL.
5. THE SOIL AND BEDROCK INTERFACES INDICATED ON THIS DRAWING ARE SHOWN FOR ILLUSTRATION PURPOSES ONLY. AN ASSESSMENT OF ACTUAL CONDITIONS WILL BE REQUIRED DURING CONSTRUCTION.
6. THE PROJECT STRUCTURAL ENGINEER SHOULD BE ADVISED OF THESE PROPOSED TRANSITION ZONES AND CONSULTED REGARDING THE NEED FOR ADDITIONAL STEEL REINFORCEMENT OR CONTROL JOINTS WITHIN THE CONTINUOUS FOOTING AND FOUNDATION WALL ALONG THE TRANSITION ZONE.



TRANSITION ZONE ALONG CONTINUOUS FOUNDATION



TRANSITION ZONE AT COLUMN FOOTING



• PLANNING
 • SURVEYING
 • CONSTRUCTION MANAGEMENT
TECTONIC
 TECTONIC Engineering & Surveying Consultants P.C. Phone: (518) 783-1630
 36 British American Boulevard, Suite 101 Fax: (518) 783-1544
 Latham, New York 12110 www.tectonicengineering.com

TRANSITION ZONE DETAIL

PROPOSED COSTCO WHOLESALE
 CROMFOND ROAD & TACONIC STATE PARKWAY
 YORKTOWN, NEW YORK

Date	10/29/11	Work Order	5352.02	Drawing No.	FIGURE II	Rev	0
Scale	NTS						

APPENDIX I

CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Charles Kennedy	
CONTRACTOR: General Borings, Inc.				10/30/09		NE	DRILLER: Erick Delpriore	
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 414.6	
POWER AUGER:	3 1/4"	0 TO 15.5'	MON. WELL	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO		DATUM: See Remarks	
ROT. DRILL:		TO	SCREEN DEPTH:	---	TO ---		DATE START: 10/30/09	
CASING:		TO	WEATHER: Clear	TEMP: 65°F			DATE FINISH: 10/30/09	
DIAMOND CORE:		TO	DEPTH TO ROCK: 15.5'					
Dietrich D-50 Truck Mount SPT with Safety Hammer			*CHANGES IN STRATA ARE INFERRED					

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)			ELEVATION (FT.)		
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)				MOISTURE	1	2		3	4
								PLASTIC LIMIT %	WATER CONTENT %	LIQUID LIMIT %				
								X	○	△				
								10	20	30	40	50		
								STANDARD PENETRATION (BLOWS/FT.)						
								10	20	30	40	50		
1	13	2 8 5	S-1	5		M SM	Topsoil Bwn c-f SAND, some Silt, some c-f Gravel							
2		11												
3	44	20 21 23	S-2	9		M GW-GM	Bwn c-f GRAVEL, and c-f Sand, trace Silt							
4		18												
5	13	18 4 9 9	S-3	13		M SM	Bwn m-f SAND, and Silt, trace f Gravel					409.6		
6		11												
7	65	30 35 39	S-4	18		M GM	Bwn c-f GRAVEL, some m-f Sand, little Silt					55		
8														
9														
10	150+	53 100	S-5	11		M SW	Bwn c-f SAND, little f Gravel, trace Silt					150		
	100+	50/0	S-6	2		M SW	Same					104		
11		100/2					Possible Boulder or Weathered Bedrock							
12														
13														
14														
15	50+	50/0	S-7	0			No Recovery - Auger Refusal @ 15.5'					399.6		
16														
17							End of Boring at 15.5'							
18														
19														
20												394.6		
21														
22														
23														
24														
25												389.6		

REMARKS: Surface elevation determined on-site by Tectonic's Survey Crew.

BORING LOG 5352-01.GPJ TECTONIC ENG.GDT 10/26/11

CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Charles Kennedy		
CONTRACTOR: General Borings, Inc.				11/5/09		NE	DRILLER: Erick Delpriore		
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 440.2		
POWER AUGER:	3 1/4"	0 TO 20.5'	MON. WELL <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		DATUM: See Remarks				
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---		DATE START: 11/5/09				
CASING:		TO	WEATHER: Clear TEMP: 65°F		DATE FINISH: 11/5/09				
DIAMOND CORE:		TO	DEPTH TO ROCK: 20.5'		UNCONFINED COMPRESS. STRENGTH (TONS/FT)				
Dietrich D-50 Truck Mount SPT with Safety Hammer			*CHANGES IN STRATA ARE INFERRED			1 2 3 4 5			ELEVATION (FT.)

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)					ELEVATION (FT.)	
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	ROD (%)				MOISTURE	1	2	3	4		5
1	5	2	S-1	16		M	Bwn c-f SAND, and c-f Gravel, trace Silt, with brick (FILL)								
2		7													
3	39	13	S-2	10		M	Same, with some f Gravel, brick (FILL)								
4		18													
5	14	21	S-3	8		M	Same (FILL)							435.2	
6		20													
7	28	5	S-4	16		M SP-SM	Bwn c-f SAND, and f Gravel, little Silt								
8		9													
9	50+	11	S-5	2		M SP	Bwn c-f SAND, and f Gravel, trace Silt (Residual soil) (Possible Boulder)								
10		17													
11	75+	25	S-6	4		M SP	Bwn m-f SAND, little f Gravel, trace Silt (Possible Boulder)							75430.2	
12															
13															
14															
15	75+	13	S-7	2		M SP-SM	Bwn c-f SAND, some c Gravel, trace Silt (Possible Boulder)							75425.2	
16		17													
17															
18															
19															
20	100+	11	S-8	0			No Recovery - Auger Refusal @ 20.5'							100420.2	
21															
22							End of Boring at 20.5'								
23															
24															
25														415.2	

REMARKS: Surface elevation determined on-site by Tectonic's Survey Crew.

CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Charles Kennedy	
CONTRACTOR: General Borings, Inc.				10/30/09		NE	DRILLER: Erick Delproire	
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 415.9	
POWER AUGER:	3 1/4"	0 TO 8.5'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks		
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 10/30/09		
CASING:		TO	WEATHER: Overcast TEMP: 68°F			DATE FINISH: 10/30/09		
DIAMOND CORE:		TO	DEPTH TO ROCK: 8.5'			UNCONFINED COMPRESS. STRENGTH (TONS/FT)		
Dietrich D-50 Truck Mount SPT with Safety Hammer			*CHANGES IN STRATA ARE INFERRED			1 2 3 4 5		

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)					ELEVATION (FT.)
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)				MOISTURE	PLASTIC LIMIT %	WATER CONTENT %	LIQUID LIMIT %	STANDARD PENETRATION (BLOWS/FT.)	
1	8	3 4 4	S-1	10		M SM	3" Topsoil Bwn c-f SAND, some Silt, little f Gravel							
2		4												
3	9	5 4 3	S-2	13		M SM	Same, with little Silt							
4														
5	121+	11 46 75/4	S-3	10		M GW-GM	Bwn c-f GRAVEL, and c-f Sand, trace Silt							410.9
6														
7	50+	50/2	S-4	2		M GP	Tn c-f GRAVEL, little c-f Sand, trace Silt (Residual soil)							
8														
9							Auger refusal @ 8.5'							
10							End of Boring at 8.5'							405.9
11														
12														
13														
14														
15														400.9
16														
17														
18														
19														
20														395.9
21														
22														
23														
24														
25														390.9

REMARKS: Surface elevation determined on-site by Tectonic's Survey Crew.

CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Charles Kennedy	
CONTRACTOR: General Borings, Inc.				10/30/09		NE	DRILLER: Erick Delprioire	
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 428.4	
POWER AUGER:	3 1/4"	0 TO 13.5'	MON. WELL	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO	DATUM: See Remarks		
ROT. DRILL:		TO	SCREEN DEPTH:	---	TO	---	DATE START: 10/30/09	
CASING:		TO	WEATHER: Clear	TEMP: 70°F		DATE FINISH: 10/30/09		
DIAMOND CORE:	NQ	13.5 TO 18.5'	DEPTH TO ROCK: 13.5'		UNCONFINED COMPRESS. STRENGTH (TONS/FT)			
Dietrich D-50 Truck Mount SPT with Safety Hammer			*CHANGES IN STRATA ARE INFERRED					

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)					ELEVATION (FT.)								
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)				MOISTURE	1	2	3	4		5							
									PLASTIC LIMIT %	WATER CONTENT %		LIQUID LIMIT %										
									X	---		---										
									10	20	30	40	50									
									STANDARD PENETRATION (BLOWS/FT.)													
									10	20	30	40	50									
1	13	3 6 7	S-1	9		M SM	6" Topsoil Bwn c-f SAND, and Silt, trace c-f Gravel															
2		7																				
3	97+	28 37	S-2	11		M SW-SM	Lgt bwn c-f SAND, some c-f Gravel, trace Silt												97			
4		60/2					Possible Boulder															
5																						
6	92+	53 42 50/5	S-3	10		M SW-SM	Same, with c-f Gravel												423.4			
7																						
8																						
9	60	25 28 32	S-4	16		M SW	Same, with c-f Gravel (Residual soil)															
10		41																				
11	74	35 37 37 50/5	S-5	13		M SW	Bwn c-f SAND, some f Gravel, trace Silt												74			
12																						
13																						
14	2						Auger refusal @ 13.5'															
15	2																					
16	2		C-1	54/60	62		Gy, slightly to moderately weathered, moderately fractured, medium grained, moderately hard, Biotite Garnet GNEISS												413.4			
17	2																					
18	3																					
19																						
20							End of Boring at 18.5'												408.4			
21																						
22																						
23																						
24																						
25																			403.4			

REMARKS: Surface elevation determined on-site by Tectonic's Survey Crew.

CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Adam Watson
CONTRACTOR: General Borings, Inc.				11/3/09		NE	DRILLER: Rick Posa
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 443.7
POWER AUGER:	3 1/4"	0 TO 20'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		DATUM: See Remarks		
ROT. DRILL:		TO	SCREEN DEPTH: -- TO --		DATE START: 11/3/09		
CASING:		TO	WEATHER: Overcast TEMP: 55°F		DATE FINISH: 11/3/09		
DIAMOND CORE:		TO	DEPTH TO ROCK: --		UNCONFINED COMPRESS. STRENGTH (TONS/FT)		
Mobile B-53 ATV Rig with Safety Hammer			*CHANGES IN STRATA ARE INFERRED		1 2 3 4 5 ● PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- ○ --- △ 10 20 30 40 50 ● STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50		

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)			ELEVATION (FT.)
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RCD (%)				MOISTURE	1	2	
1	6	1	S-1	12		M	SM					
2		2										
3	12	4	S-2	15		M	SM					
4		5										
5	29	12	S-3	15		M	SP-SM					438.7
6		14										
7	100+	15	S-4	3		M	SP-SM					100
		19										
8	100+	33	S-5	2		M	SP					100
9		100/3										
10	100+	100/5	S-6	0								100
11		100/1										
12												
13												
14												
15												
16	21	6	S-7	18		M	SM					428.7
17		8										
18		13										
19		15										
20												423.7
21												
22												
23												
24												
25												418.7

REMARKS: Surface elevation determined on-site by Tectonic's Survey Crew.

TECTONIC ENGINEERING & SURVEYING CONSULTANTS P.C.			PROJECT No. 5352.01			BORING No. B-6							
			PROJECT: Costco - Yorktown										
			LOCATION: Yorktown Heights, NY			SHEET No. 1 of 1							
CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Adam Watson						
CONTRACTOR: General Borings, Inc.				11/3/09		NE	DRILLER: Erick Delprioire						
METHOD OF ADVANCING BORING		DIA.	DEPTH				SURFACE ELEVATION: 449.5						
POWER AUGER:		3 1/4"	0 TO 18.5'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		DATUM: See Remarks							
ROT. DRILL:			TO	SCREEN DEPTH: --- TO ---		DATE START: 11/3/09							
CASING:			TO	WEATHER: Overcast TEMP: 55°F		DATE FINISH: 11/3/09							
DIAMOND CORE:			TO	DEPTH TO ROCK: 18.5'		UNCONFINED COMPRESS. STRENGTH (TONS/FT)							
Dietrich D-50 Truck Mount SPT with Safety Hammer				*CHANGES IN STRATA ARE INFERRED		1 2 3 4 5							
DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT %			ELEVATION (FT.)	
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)				MOISTURE	10	20		30
1							3" Asphalt Concrete Pavement						
2	53	13 16 37 51	S-1	17		M SM	Bwn c-f SAND, little f Gravel, trace Silt						
3	50+	50/5	S-2	4		M SM	Same						
4													
5	75+	75/4	S-3	4		M SM	Same						444.5
6													
7													
8													
9							Boulder @ 8.5'						
10													439.5
11													
12													
13													
14	91+	23 41 50/6	S-4	11		M SP	Bwn c-f SAND, little c-f Gravel, trace Silt						91
15	100+	100/5	S-5	3		M SP	Same						100
16													134.5
17							Weathered bedrock below 16.5'						
18													
19							Auger refusal @ 18.5'						
20							End of Boring at 18.5'						429.5
21													
22													
23													
24													
25													424.5

REMARKS: Surface elevation determined on-site by Tectonic's Survey Crew.

BORING LOG 5352-01.GPJ TECTONIC ENG.GDT 10/26/11

CLIENT: Costco Wholesale		GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Charles Kennedy	
CONTRACTOR: General Borings, Inc.			11/2/09		NE	DRILLER: Erick Delprioire	
METHOD OF ADVANCING BORING	DIA.		DEPTH		SURFACE ELEVATION: 414.2		
POWER AUGER:	3 1/4"	0 TO 13'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		DATUM: See Remarks		
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---		DATE START: 11/2/09		
CASING:		TO	WEATHER: Clear TEMP: 65°F		DATE FINISH: 11/2/09		
DIAMOND CORE:		TO	DEPTH TO ROCK: 13'		UNCONFINED COMPRESS. STRENGTH (TONS/FT)		
Dietrich D-50 Truck Mount SPT with Safety Hammer		*CHANGES IN STRATA ARE INFERRED					

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)			ELEVATION (FT.)					
			SAMPLE NUMBER	RECOV.	MOISTURE				1	2	3		4	5			
			LENGTH (IN.)	RQD (%)					PLASTIC LIMIT %	WATER CONTENT %	LIQUID LIMIT %						
									STANDARD PENETRATION (BLOWS/FT.)								
1	8	3	S-1	19		M	OL	Bwn ORGANIC SILT, and m-f Sand, trace f Gravel									
2		4															
3	37	11	S-2	14		M	SM	Bwn c-f SAND, and f Gravel, little Silt									
4		17															
5	87+	20	S-3	11		M	SM	Same									409.2
6		23															
7	99	31	S-4	18		M	SW	Same, trace Silt									99
8		37															
9	25+	50/3	S-5	8		M	SW	Bwn c-f SAND, and c-f Gravel, trace Silt									
10	50+	52	S-6	0				No Recovery - Possible boulder or weathered rock									404.2
11		25/5															
12		50/1															
13								Auger refusal @ 13'									
14								End of Boring at 13'									
15																	399.2
16																	
17																	
18																	
19																	
20																	394.2
21																	
22																	
23																	
24																	
25																	389.2

REMARKS: Surface elevation determined on-site by Tectonic's Survey Crew.

CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Charles Kennedy	
CONTRACTOR: General Borings, Inc.				11/2/09		NE	DRILLER: Erick Delprioire	
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 416.0	
POWER AUGER:	3 1/4"	0 TO 11.5'	MON. WELL	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO	DATUM: See Remarks		
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---		DATE START: 11/2/09			
CASING:		TO	WEATHER: TEMP:		DATE FINISH: 11/2/09			
DIAMOND CORE:		TO	DEPTH TO ROCK: ---		UNCONFINED COMPRESS. STRENGTH (TONS/FT)			
Dietrich D-50 Truck Mount SPT with Safety Hammer			*CHANGES IN STRATA ARE INFERRED			1 2 3 4 5		

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)			ELEVATION (FT.)	
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)				MOISTURE	1	2		3
1	15	3	S-1	6		M	SM						
2		8											
3	14	7	S-2	6		M	SM						
4		7											
5	79	18	S-3	14		M	SM						411.0
6		32											
7	51	47	S-4	0									
8		45											
9	50+	17	S-5	9		M	SM						
10		20											
11		31											
12		48											
13		35											
14		50/3											
15													
16													
17													
18													
19													
20													
21													
22													
23													
24													
25													391.0

REMARKS: Surface elevation estimated based on topographic data shown on the untitled survey drawing provided by the Client.

CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Charles Kennedy	
CONTRACTOR: General Borings, Inc.				10/30/09		17.5'	DRILLER: Erick Delprioire	
METHOD OF ADVANCING BORING				DIA.		DEPTH		SURFACE ELEVATION: 435.8
POWER AUGER:			3 1/4"	0 TO 18.5'		MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		DATUM: See Remarks
ROT. DRILL:				TO		SCREEN DEPTH: --- TO ---		DATE START: 10/30/09
CASING:				TO		WEATHER: Clear TEMP: 65°F		DATE FINISH: 10/30/09
DIAMOND CORE:				TO		DEPTH TO ROCK: 18.5'		UNCONFINED COMPRESS. STRENGTH (TONS/FT) ● 1 2 3 4 5
Dietrich D-50 Truck Mount SPT with Safety Hammer			*CHANGES IN STRATA ARE INFERRED					

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	STANDARD PENETRATION (BLOWS/FT.)			ELEVATION (FT.)
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)				MOISTURE	PLASTIC LIMIT %	WATER CONTENT %	
1	7	2	S-1	8		M	SM					430.8
2		4										
3	54	6										
4		10	S-2	19		M	SW-SM				425.8	
5		20										
6	91	20	S-3	19		M	SW				420.8	
7		34										
8	100	27										
9		45	S-4	16		M	SW				415.8	
10	53	54										
11		37	S-5	13		M	SW				410.8	
12		23										
13		23										
14		62	S-6	9		M	SW-SM					
15	50+	38										
16		46										
17		67										
18		24										
19		29										
20		32										
21												
22												
23												
24												
25												

REMARKS: Surface elevation determined on-site by Tectonic's Survey Crew.

BORING LOG 5352-01.GPJ TECTONIC.ENG.GDT 10/26/11

CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Adam Watson
CONTRACTOR: General Borings, Inc.				11/3/09		NE	DRILLER: Erick Delprioire
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 450.0
POWER AUGER:	3 1/4"	0 TO 7'	MON. WELL	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO	DATUM: See Remarks	
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 11/3/09	
CASING:		TO	WEATHER: Overcast	TEMP: 55°F		DATE FINISH: 11/3/09	
DIAMOND CORE:	NQ	7 TO 12'	DEPTH TO ROCK: 7'			UNCONFINED COMPRESS. STRENGTH (TONS/FT)	ELEVATION (FT.)
Dietrich D-50 Truck Mount SPT with Safety Hammer			*CHANGES IN STRATA ARE INFERRED			1 2 3 4 5	

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)			ELEVATION (FT.)	
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	ROD (%)				MOISTURE	1	2		3
1							3" Asphalt Concrete Pavement						
2	78	21 36 42 50/6	S-1	18		M	GP	Bwn f GRAVEL, some c-f Sand, trace Silt					78
3			S-2	2		M	SP	Bwn c-f SAND, little f Gravel, trace Silt (Weathered Bedrock)					
4													
5													445.0
6	50+	73 50/2	S-3	7		M	SP	Same (Weathered Bedrock)					
7								Auger refusal @ 7'					
8	1.5												
9	2												
10	2		C-1	54/60	50			Slightly weathered, slightly to moderately fractured, c-f grained, hard GRANITE					440.0
11	1												
12	1												
13								End of Boring at 12'					
14													
15													435.0
16													
17													
18													
19													
20													430.0
21													
22													
23													
24													
25													425.0

REMARKS: Surface elevation estimated based on topographic data shown on the untitled survey drawing provided by the Client.

CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Charles Kennedy	
CONTRACTOR: General Borings, Inc.				11/2/09		9'	DRILLER: Erick Delprioire	
METHOD OF ADVANCING BORING	DIA.	DEPTH				SURFACE ELEVATION: 417.6		
POWER AUGER:	3 1/4"	0 TO 10.25'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks		
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 11/2/09		
CASING:		TO	WEATHER: Clear TEMP: 65°F			DATE FINISH: 11/2/09		
DIAMOND CORE:		TO	DEPTH TO ROCK: 10.25'			UNCONFINED COMPRESS. STRENGTH (TONS/FT)		
Dietrich D-50 Truck Mount SPT with Safety Hammer			*CHANGES IN STRATA ARE INFERRED			1 2 3 4 5		

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU6 IN.)	SAMPLES				UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)					ELEVATION (FT.)			
			SAMPLE NUMBER	RECOV.		MOISTURE				PLASTIC LIMIT %	WATER CONTENT %	LIQUID LIMIT %	STANDARD PENETRATION (BLOWS/FT.)					
				LENGTH (IN.)	RQD (%)								1	2		3	4	5
1	25	5 7 18	S-1	14		M	SM											
2		22 35																
3	88+	38 50/4	S-2	1		M	GM									88		
4																		
5	52	16 24 28 30	S-3	13		M	GW									412.6		
6		23																
7	61	22 39 40	S-4	17		M	GW									61		
8		33																
9	76	29 47	S-5	17		M	GW									76		
10	50+	50/2 50/3	S-6	2		M										407.6		
11																		
12																		
13																		
14																		
15																402.6		
16																		
17																		
18																		
19																		
20																397.6		
21																		
22																		
23																		
24																		
25																392.6		

REMARKS: Surface elevation determined on-site by Tectonic's Survey Crew.

CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Charles Kennedy	
CONTRACTOR: General Borings, Inc.				10/29/09		NE	DRILLER: Erick Delproire	
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 445.1	
POWER AUGER:	3 1/4"	0 TO 14.5'	MON. WELL	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO	DATUM: See Remarks		
ROT. DRILL:		TO	SCREEN DEPTH:	---	TO	---	DATE START: 10/29/09	
CASING:		TO	WEATHER:		TEMP:		DATE FINISH: 10/29/09	
DIAMOND CORE:	NQ	14.5 TO 19.5'	DEPTH TO ROCK:	14.5'		UNCONFINED COMPRESS. STRENGTH (TONS/FT)		
Dietrich D-50 Truck Mount SPT with Safety Hammer			*CHANGES IN STRATA ARE INFERRED			1 2 3 4 5		

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)					ELEVATION (FT.)
			SAMPLE NUMBER	RECOV.					STANDARD PENETRATION (BLOWS/FT.)	PLASTIC LIMIT %	WATER CONTENT %	LIQUID LIMIT %		
LENGTH (IN.)	ROD (%)	MOISTURE		10	20	30	40	50						
1	8	3	S-1	10	M	SM	Bwn m-f SAND, and Silt, trace f Gravel							
2		4												
3	81	21	S-2	8	M	SM	Bwn c-f SAND, some f Gravel, trace Silt							
4		34												
5		47												
6	50+	50/1	S-3	9	M	SW-SM	Same f Gravel							
7		23												
8		50/3												
9														
10	50+	50/2	S-4	1	M	GP	two pieces f GRAVEL - Possible Weathered Bedrock							
11														
12														
13														
14														
15	1.25						Auger refusal @ 14.5'							
16	1													
17	1		C-1				Gy GNEISS							
18	1.25													
19	1													
20							End of Boring at 19.5'							
21														
22														
23														
24														
25														420.1

REMARKS: Surface elevation determined on-site by Tectonic's Survey Crew.

CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Chris Duffy
CONTRACTOR: General Borings, Inc.				11/6/09		NE	DRILLER: Rick Posa
METHOD OF ADVANCING BORING	DIA.	DEPTH	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		DATUM: See Remarks		
POWER AUGER:	3 1/4"	0 TO 8.5'	SCREEN DEPTH: --- TO ---		DATE START: 11/6/09		
ROT. DRILL:		TO	WEATHER: Overcast TEMP:		DATE FINISH: 11/6/09		
CASING:		TO	DEPTH TO ROCK: 8.5'		UNCONFINED COMPRESS. STRENGTH (TONS/FT)		
DIAMOND CORE:	NX	8.5 TO 13.5'	Mobile B-53 ATV Rig with Safety Hammer		*CHANGES IN STRATA ARE INFERRED		

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	STANDARD PENETRATION (BLOWS/FT.)					ELEVATION (FT.)	
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)				MOISTURE	1	2	3	4		5
1	93+	20 43 50/5	S-1	7		D	SW	4" Asphalt Wh-bwn-gy c-f SAND, and Gravel Possible Boulder							93
2															
3															
4	58	34 32 26 21	S-2	12		M	SM	Gy-bwn c-f SAND, little f Gravel, little Silt							448.0
5															
6	48	13 32 16 24	S-3	14		M	SM	Tn c-f SAND, some f Gravel, some Silt							
7															
8	50+	31 50/4	S-4	7		M	SM	Same							
9								Auger refusal @ 8.5'							
10	2.5														
11	3														
12	3		C-1	57/60	88			Wht, blk, rd, fresh, slightly fractured, c-f grained, hard GNEISS fractures @ 45 degrees from vertical							
13	3.5														
14	3.5														
15								End of Boring at 13.5'							438.0
16															
17															
18															
19															
20															433.0
21															
22															
23															
24															
25															428.0

REMARKS: Surface elevation estimated based on topographic data shown on the untitled survey drawing provided by the Client.

CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Charles Kennedy
CONTRACTOR: General Borings, Inc.				11/2/09		NE	DRILLER: Erick Delpriore
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 420.2
POWER AUGER:	3 1/4"	0 TO 15.75'	MON. WELL	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO	DATUM: See Remarks	
ROT. DRILL:		TO	SCREEN DEPTH:	---	TO	---	DATE START: 11/2/09
CASING:		TO	WEATHER: Clear	TEMP: 65°F		DATE FINISH: 11/2/09	
DIAMOND CORE:		TO	DEPTH TO ROCK: 15.75'			UNCONFINED COMPRESS. STRENGTH (TONS/FT)	
Dietrich D-50 Truck Mount SPT with Safety Hammer			*CHANGES IN STRATA ARE INFERRED				

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)					ELEVATION (FT.)
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. FGD (%)				MOISTURE	1	2	3	4	
1	5	3	S-1	24		M	SM		●					415.2
2		2												
3	29	10	S-2	20		M	SM		●					415.2
4		12												
5	62	17	S-3	19		M	SM		●					415.2
6		25												
7	100+	30	S-4	12		M	GM		●					100
8		32												
9	52	48	S-5	15		M	SM		●					100
10		50												
11	100+	50/2	S-6	2		M	SM		●					10.2
12		50/3												
13									Auger advanced through weathered bedrock materials to 15.75'					
14									Auger refusal @ 15.75'					
15									End of Boring at 15.75'					
16														405.2
17														
18														
19														
20														400.2
21														
22														
23														
24														
25														395.2

REMARKS: Surface elevation determined on-site by Tectonic's Survey Crew.

CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Charles Kennedy
CONTRACTOR: General Borings, Inc.				11/2/09		NE	DRILLER: Rick Posa
METHOD OF ADVANCING BORING	DIA.	DEPTH		MON. WELL <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		SURFACE ELEVATION: 453.0	
POWER AUGER:	3 1/4"	0 TO 13.5'	SCREEN DEPTH: 4 TO 14'		DATUM: See Remarks		
ROT. DRILL:			WEATHER: Clear TEMP: 68°F		DATE START: 11/2/09		
CASING:			DEPTH TO ROCK: 13.5'		DATE FINISH: 11/2/09		
DIAMOND CORE:	NQ	13.5 TO 18.5'	UNCONFINED COMPRESS. STRENGTH (TONS/FT)		ELEVATION (FT.)		
Mobile B-53 ATV Rig with Safety Hammer			*CHANGES IN STRATA ARE INFERRED				

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)			ELEVATION (FT.)		
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	ROD (%)				MOISTURE	1	2		3	4
1	15	2 6	S-1	10		M	SW-SM	3.5" Asphalt Concrete Pavement						
2		9						Bwn c-f SAND, some c-f Gravel, trace Silt						
3	50+	17 50/5	S-2	2		M	GW	Bwn c GRAVEL, some m-f SAND, trace Silt						
4														
5	159	51 59 100	S-3	16		M	SW-SM	Gy c-f SAND, and c-f Gravel, trace Silt (Residual soil)						159 448.0
6		85												
7	100+	71 100/5	S-4	8		M	SW	Same						100
8														
9	87	65 51 36	S-5	15		M	GW	Gy c-f GRAVEL, and c-f Sand, trace Silt (Residual Soil)						87
10		40												443.0
11	76	27 32 44	S-6	11		M	GW	Same						76
12		48												
13														
14	1							Auger refusal @ 13.5'						
15	2													438.0
16	2		C-1	54/60	90			Gy, slightly fractured, slightly weathered, moderately hard, medium grained GNEISS						
17	3													
18	2													
19								End of Boring at 18.5'						
20														433.0
21														
22														
23														
24														
25														428.0

REMARKS: Surface elevation estimated based on topographic data shown on the untitled survey drawing provided by the Client.

BORING LOG 5352-01.GPJ TECTONIC ENG.GDT 10/26/11

CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Charles Kennedy	
CONTRACTOR: General Borings, Inc.							DRILLER: Erick Delprioire	
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 453.0	
POWER AUGER:	3 1/4"	0 TO 6'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks		
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 11/3/09		
CASING:		TO	WEATHER: Clear TEMP: 67°F			DATE FINISH: 11/3/09		
DIAMOND CORE:		TO	DEPTH TO ROCK: ---			UNCONFINED COMPRESS. STRENGTH (TONS/FT)		
Dietrich D-50 Truck Mount SPT with Safety Hammer			*CHANGES IN STRATA ARE INFERRED			1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- ○ --- △ 10 20 30 40 50 STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50		

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)					ELEVATION (FT.)	
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	ROD (%)				MOISTURE	1	2	3	4		5
1	122+	31 47 75/3	S-1	4		M	SM								122
2															
3	75+	75/3	S-2	1			GP								75
4															
5															448.0
6															
7	1														
8	1														
9	1		C-1	60/60	57										
10	2														443.0
11	2														
12															
13															
14															
15															438.0
16															
17															
18															
19															
20															433.0
21															
22															
23															
24															
25															428.0

REMARKS: Surface elevation estimated based on topographic data shown on the untitled survey drawing provided by the Client.

CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Charles Kennedy		
CONTRACTOR: General Borings, Inc.							DRILLER: Erick Delproire		
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 422.2		
POWER AUGER:	3 1/4"	0 TO 14.5'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		DATUM: See Remarks				
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---		DATE START: 11/3/09				
CASING:		TO	WEATHER: TEMP:		DATE FINISH: 11/3/09				
DIAMOND CORE:		TO	DEPTH TO ROCK: ---						
Mobile B-53 ATV Rig with Safety Hammer			*CHANGES IN STRATA ARE INFERRED						

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)			ELEVATION (FT.)
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RCD (%)				MOISTURE	1	2	
1	5	3	S-1	8		M	SM		●			417.2
2		2							WATER CONTENT %			
3	38	17	S-2	12		M	SM		●			412.2
4		21							PLASTIC LIMIT %			
5	50+	41	S-3	2		M	SM		●			407.2
6		50/2							LIQUID LIMIT %			
7	75+	75/4	S-4	3		M	SM		●			402.2
8									STANDARD PENETRATION (BLOWS/FT.)			
9	75+	75/3	S-5	0					●			397.2
10									REMARKS: Surface elevation determined on-site by Tectonic's Survey Crew.			
11	100	42	S-6						●			
12		50										
13		50										
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												

BORING LOG 5352-01.GPJ TECTONIC ENG.GDT 10/26/11

REMARKS: Surface elevation determined on-site by Tectonic's Survey Crew.

CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Chris Duffy	
CONTRACTOR: General Borings, Inc.				11/6/09		NE	DRILLER: Rick Posa	
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 438.7	
POWER AUGER:	3 1/4"	0 TO 16'	MON. WELL	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO	DATUM: See Remarks		
ROT. DRILL:		TO	SCREEN DEPTH:	---	TO	---	DATE START: 11/6/09	
CASING:		TO	WEATHER: Overcast	TEMP:		DATE FINISH: 11/6/09		
DIAMOND CORE:		TO	DEPTH TO ROCK: 16'			UNCONFINED COMPRESS. STRENGTH (TONS/FT)		
Mobile B-53 ATV Rig with Safety Hammer			*CHANGES IN STRATA ARE INFERRED			1 2 3 4 5		

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)			ELEVATION (FT.)	
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RCQD (%)				MOISTURE	1	2		3
1	2	WOH 1	S-1	2		M Pt	Mulch/wood chips, trace Silty SAND						
2		1											
3	4	2	S-2	3		M Pt	Same						
4		2											
5	23	1 9	S-3	7		M SM	Top 2" Dk bwn c-f SAND, some Silt						433.7
6		14				D SW	Bottom 5" Gy-bwn-rd-wh c-f SAND, and Gravel						
7	50+	23	S-4	10		D SW	Residual soil/decomposed rock						
8		40											
9	104	50/5											
10		43	S-5	14		D SW	Same						104
11	48	49											
12		55	S-6	4		D SW	Same						428.7
13		38											
14		16											
15		23											
16	50+	25	S-7	0			No Recovery - Auger refusal @ 16'						423.7
17		28											
18							End of Boring at 16'						
19													
20													418.7
21													
22													
23													
24													
25													413.7

REMARKS: Surface elevation determined on-site by Tectonic's Survey Crew.

CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Charles Kennedy
CONTRACTOR: General Borings, Inc.				11/2/09		NE	DRILLER: Rick Posa
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 453.8
POWER AUGER:	3 1/4"	0 TO 8'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		DATUM: See Remarks		
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---		DATE START: 11/2/09		
CASING:		TO	WEATHER: Clear TEMP: 65°F		DATE FINISH: 11/2/09		
DIAMOND CORE:		TO	DEPTH TO ROCK: Not Encountered'		UNCONFINED COMPRESS. STRENGTH (TNS/FT)		
Mobile B-53 ATV Rig with Safety Hammer			*CHANGES IN STRATA ARE INFERRED		1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- O --- Δ 10 20 30 40 50 STANDARD PENETRATION (BLOWS/FT.) ● 10 20 30 40 50		

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES				UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)								
			SAMPLE NUMBER	RECOV.		MOISTURE				PLASTIC LIMIT %	WATER CONTENT %	LIQUID LIMIT %	STANDARD PENETRATION (BLOWS/FT.)	10	20	30	40	50
				LENGTH (IN.)	RQD (%)													
1	4	1	S-1	17		M	Mulch (FILL)	[Cross-hatched pattern]	●	113	448.8	100	83	443.8				
2		2																
3	16	7																
4		9	S-2	14		M	Bwn ORGANIC SILT, and c-f Sand, some c-f Gravel	[Cross-hatched pattern]	●	113	448.8	100	83	443.8				
5	113	48																
6		52																
7		61	S-3	13		M	Bwn c-f SAND, and f Gravel, little Silt	[Dotted pattern]	●	113	448.8	100	83	443.8				
8		88																
9	83	31																
10		39	S-4	1		M	Same with trace f Gravel (Possible Boulder)	[Dotted pattern]	●	113	448.8	100	83	443.8				
11		44																
12		51																
13			S-5	17		M	Bwn c-f SAND, and f Gravel, little Silt	[Dotted pattern]	●	113	448.8	100	83	443.8				
14																		
15																		
16																		
17																		
18																		
19																		
20																		
21																		
22																		
23																		
24																		
25							End of Boring at 10'											

REMARKS: Surface elevation determined on-site by Tectonic's Survey Crew.

BORING LOG 5352-01.GPJ TECTONIC ENG.GDT 10/26/11

CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Adam Watson			
CONTRACTOR: General Borings, Inc.				11/3/09		NE	DRILLER: Rick Posa			
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 453.8			
POWER AUGER:	3 1/4"	0 TO 17'	MON. WELL	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO	DATUM: See Remarks				
ROT. DRILL:		TO	SCREEN DEPTH:	---	TO	---	DATE START: 11/3/09			
CASING:		TO	WEATHER: Overcast	TEMP: 55°F		DATE FINISH: 11/3/09				
DIAMOND CORE:	NQ	17 TO 22'	DEPTH TO ROCK: 17'		UNCONFINED COMPRESS. STRENGTH (TONS/FT)		ELEVATION (FT.)			
Mobile B-53 ATV Rig with Safety Hammer			*CHANGES IN STRATA ARE INFERRED			1			2	3

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)					ELEVATION (FT.)				
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	ROD (%)				MOISTURE	1	2	3	4		5			
1							See Boring B-19 for subsurface data from 0 to 10 feet											
2																		
3																		
4																		
5																	448.8	
6																		
7																		
8																		
9																		
10																		
11	100+	27 100/2	S-1	4		D	GP									443.8		
12																		
13																		
14																		
15	100+	100/5	S-2	3		M	GP										438.8	
16																		
17																		
18	2																	
19	2																	
20	2		C-1	53/60	62													433.8
21	2																	
22	2																	
23																		
24																		
25																428.8		

REMARKS: Surface elevation determined on-site by Tectonic's Survey Crew.

BORING LOG 5352-01.GPJ TECTONIC ENG.GDT 10/26/11

CLIENT: Costco Wholesale		GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Charles Kennedy
CONTRACTOR: General Borings, Inc.			11/2/09		NE	DRILLER: Rick Posa
METHOD OF ADVANCING BORING	DIA.		DEPTH		SURFACE ELEVATION: 460.7	
POWER AUGER:	3 1/4"	0	TO	8'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	DATUM: See Remarks
ROT. DRILL:			TO		SCREEN DEPTH: --- TO ---	DATE START: 11/2/09
CASING:			TO		WEATHER: Clear TEMP: 65°F	DATE FINISH: 11/2/09
DIAMOND CORE:			TO		DEPTH TO ROCK: ---	UNCONFINED COMPRESS. STRENGTH (TONS/FT)

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)			ELEVATION (FT.)			
			SAMPLE NUMBER	RECOV.					MOISTURE	1	2		3	4	5
				LENGTH (IN.)	RQD (%)										
1	2	1	S-1	15	M	Mulch (FILL)									
2		2													
3	7	3	S-2	18	M	Same (FILL)									
4		4													
5	8	4	S-3	10	M	Tn c-f SAND, some Silt, trace f Gravel						455.7			
6		5													
7	42	18	S-4	16	M	Bwn m-f SAND, little Silt, trace f Gravel									
8		24													
9	131	29	S-5	18	M	Bwn c-f SAND, and f Gravel, trace Silt						131			
10		34										450.7			
11		42													
12		48													
13		54													
14		60													
15		66										445.7			
16		72													
17		78													
18		84													
19		90													
20		96										440.7			
21															
22															
23															
24															
25												435.7			

BORING LOG 5352-01.GPJ TECTONIC ENG.GDT 10/26/11

REMARKS: Surface elevation determined on-site by Tectonic's Survey Crew.

CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Adam Watson	
CONTRACTOR: General Borings, Inc.				11/3/09		NE	DRILLER: Rick Posa	
METHOD OF ADVANCING BORING	DIA.	DEPTH		MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		SURFACE ELEVATION: 460.7		
POWER AUGER:	3 1/4"	0 TO 15.5'	SCREEN DEPTH: --- TO ---			DATUM: See Remarks		
ROT. DRILL:		TO	WEATHER: Overcast TEMP: 55°F			DATE START: 11/3/09		
CASING:		TO	DEPTH TO ROCK: 15.5'			DATE FINISH: 11/3/09		
DIAMOND CORE:	NQ	15.5 TO 20.5'	UNCONFINED COMPRESS. STRENGTH (TONS/FT)			ELEVATION (FT.)		
Mobile B-53 ATV Rig with Safety Hammer			*CHANGES IN STRATA ARE INFERRED					

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES				UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)					ELEVATION (FT.)		
			SAMPLE NUMBER	RECOV.		MOISTURE				1	2	3	4	5			
				LENGTH (IN.)	ROD (%)											PLASTIC LIMIT %	WATER CONTENT %
										STANDARD PENETRATION (BLOWS/FT.)							
										10	20	30	40	50			
1																	
2																	
3																	
4																	
5																	455.7
6																	
7																	
8																	
9																	
10																	
11	100+	80 100/3	S-1	8			SP	Bwn-tn c-f SAND, trace Silt Possible Boulder or Weathered Bedrock									450.7
12																	
13																	
14																	
15																	445.7
16	3							Auger refusal @ 15.5'									
17	3																
18	3		C-1	56/60	88			Slightly weathered, moderately to slightly fractured, c-f grained, hard GRANITE									
19	3																
20	3																440.7
21								End of Boring at 20.5'									
22																	
23																	
24																	
25																	435.7

REMARKS: Surface elevation determined on-site by Tectonic's Survey Crew.

CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Charles Kennedy					
CONTRACTOR: General Borings, Inc.				11/4/09		NE	DRILLER: Erick Delproire					
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 456.0					
POWER AUGER:	3 1/4"	0 TO 6.5'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		DATUM: See Remarks							
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---		DATE START: 11/4/09							
CASING:		TO	WEATHER: TEMP:		DATE FINISH: 11/4/09							
DIAMOND CORE:	NQ	6.5 TO 11.5'	DEPTH TO ROCK: 6.5'		UNCONFINED COMPRESS. STRENGTH (TONS/FT)							
Dietrich D-50 Truck Mount SPT with Safety Hammer			*CHANGES IN STRATA ARE INFERRED		<table border="1"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td><td>5</td> </tr> </table>			1	2	3	4	5
1	2	3	4	5								

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES				UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	STANDARD PENETRATION (BLOWS/FT.)					ELEVATION (FT.)		
			SAMPLE NUMBER	RECOV.		MOISTURE				PLASTIC LIMIT %	WATER CONTENT %	LIQUID LIMIT %	10	20		30	40
LENGTH (IN.)	RQD (%)			X	⊗		Δ										
1							3" Asphalt advanced to 1'										
2	98+	26 48 50/3	S-1	11		M	SM	Bwn m-f SAND, little c-f Gravel, little Silt, decomposed rock									98
3																	
4	50+	50/3	S-2	3		M	SW-SM	Same, trace Silt									
5																	451.0
6								Auger refusal @ 6.5'									
7	1																
8	1																
9	1.5		C-1	60/60	75			Gy, highly weathered, highly fractured, soft to moderately hard, GNEISS, with occasional soil seams, fractures oriented between 0 and 90 degrees from horizontal									
10	2																446.0
11	2																
12								End of Boring at 11.5'									
13																	
14																	
15																	441.0
16																	
17																	
18																	
19																	
20																	436.0
21																	
22																	
23																	
24																	
25																	431.0

REMARKS: Surface elevation estimated based on topographic data shown on the untitled survey drawing provided by the Client.

CLIENT: Costco Wholesale

CONTRACTOR: General Borings, Inc.

GROUND WATER

DATE: 10/30/09

TIME

DEPTH

INSPECTOR: Charles Kennedy

DRILLER: Erick Delprioire

METHOD OF ADVANCING BORING

DIA.

DEPTH

SURFACE ELEVATION: 420.6

POWER AUGER: 3 1/4" 0 TO 5'

MON. WELL YES NO

DATUM: See Remarks

ROT. DRILL: TO

SCREEN DEPTH: --- TO ---

DATE START: 10/30/09

CASING: TO

WEATHER: Clear TEMP: 63°F

DATE FINISH: 10/30/09

DIAMOND CORE: TO

DEPTH TO ROCK: ---

UNCONFINED COMPRESS. STRENGTH (TONS/FT)

Dietrich D-50 Truck Mount SPT with Safety Hammer

*CHANGES IN STRATA ARE INFERRED

1 2 3 4 5

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)			ELEVATION (FT.)	
			SAMPLE NUMBER	RECOV.					PLASTIC LIMIT %	WATER CONTENT %	LIQUID LIMIT %		
				LENGTH (IN.)	ROD (%)								MOISTURE
1	15	4 6 9 29	S-1	18		M	SM	3" Topsoil					
2								Bwn c-f SAND, some Silt, little f Gravel					
3													
4	147+	17 47 100/4	S-2			M	SW-SM	Bwn c-f SAND, and c-f Gravel, trace Silt					147
5								Auger refusal @ 5'					415.6
6								End of Boring at 5'					
7													
8													
9													
10													410.6
11													
12													
13													
14													
15													405.6
16													
17													
18													
19													
20													400.6
21													
22													
23													
24													
25													395.6

REMARKS: Surface elevation determined on-site by Tectonic's Survey Crew.

CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Adam Watson	
CONTRACTOR: General Borings, Inc.				11/3/09		NE	DRILLER: Erick Delproire	
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 435.0	
POWER AUGER:	3 1/4"	0 TO 5'	MON. WELL	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO		DATUM: See Remarks	
ROT. DRILL:		TO	SCREEN DEPTH:	---	TO	---	DATE START: 11/3/09	
CASING:		TO	WEATHER: Overcast		TEMP: 55°F		DATE FINISH: 11/3/09	
DIAMOND CORE:		TO	DEPTH TO ROCK: 5'					
Dietrich D-50 Truck Mount SPT with Safety Hammer			*CHANGES IN STRATA ARE INFERRED					

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)					ELEVATION (FT.)	
			SAMPLE NUMBER	RECOV.					MOISTURE	1	2	3	4		5
				LENGTH (IN.)	RQD (%)										
1	5	2	S-1	19	M	SM	Bwn c-f SAND, and c-f Gravel, some Silt	●	10	20	30	40	50	430.0	
2		2													
3	75+	46 75/5	S-2	8	M	SM									●
4															
5	100+	100/4	S-3	3	M	SM	Bwn c-f SAND, little Silt Auger refusal @ 5'	●	100						
6							End of Boring at 5'								
7															
8															
9															
10														425.0	
11															
12															
13															
14															
15														420.0	
16															
17															
18															
19															
20														415.0	
21															
22															
23															
24															
25														410.0	

REMARKS: Surface elevation determined on-site by Tectonic's Survey Crew.

BORING LOG 5352-01.GPJ TECTONIC ENG.GDT 10/26/11

CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Charles Kennedy		
CONTRACTOR: General Borings, Inc.				11/2/09		NE	DRILLER: Erick Delpriore		
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 428.4		
POWER AUGER:	3 1/4"	0 TO 8.5'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		DATUM: See Remarks				
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---		DATE START: 11/2/09				
CASING:		TO	WEATHER: Clear TEMP: 30°F		DATE FINISH: 11/2/09				
DIAMOND CORE:		TO	DEPTH TO ROCK: 8.5'		UNCONFINED COMPRESS. STRENGTH (TONS/FT)				
Dietrich D-50 Truck Mount SPT with Safety Hammer			*CHANGES IN STRATA ARE INFERRED						

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES				UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)					ELEVATION (FT.)	
			SAMPLE NUMBER	RECOV.		MOISTURE				1	2	3	4	5		
LENGTH (IN.)	RQD (%)	PLASTIC LIMIT %		WATER CONTENT %	LIQUID LIMIT %											
1	25	2 11 14	S-1	10		M	SM	5" Topsoil								
2		20 21 50/2	S-2	10		M	SM	Bwn c-f SAND, some f Gravel, little Silt								
3	71+							Bwn m-f SAND, little c-f Gravel, little Silt								71
4																
5																
6	75+	25 75/2	S-3	8		M	SM	Bwn m-f SAND, some c-f Gravel, little Silt (c Gravel stuck in tip)								423.4
7								Weathered Bedrock								
8	50+	50/0	S-4					No Recovery								
9								Auger refusal @ 8.5'								
10								End of Boring at 8.5'								418.4
11																
12																
13																
14																
15																413.4
16																
17																
18																
19																
20																408.4
21																
22																
23																
24																
25																403.4

REMARKS: Surface elevation determined on-site by Tectonic's Survey Crew.

CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Charles Kennedy
CONTRACTOR: General Borings, Inc.				10/24/09		NE	DRILLER: Erick Delproire
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 442.0
POWER AUGER:	3 1/4"	0 TO 4.5'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		DATUM: See Remarks		
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---		DATE START: 10/24/09		
CASING:		TO	WEATHER: Clear TEMP: 65°F		DATE FINISH: 10/24/09		
DIAMOND CORE:		TO	DEPTH TO ROCK: 4.5'		UNCONFINED COMPRESS. STRENGTH (TONS/FT)		
Dietrich D-50 Truck Mount SPT with Safety Hammer			*CHANGES IN STRATA ARE INFERRED		1 2 3 4 5		

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	STANDARD PENETRATION (BLOWS/FT.)					ELEVATION (FT.)					
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)				MOISTURE	PLASTIC LIMIT %	WATER CONTENT %	LIQUID LIMIT %	1		2	3	4	5	
1	15	4 6 9 50/5	S-1	11		M	SM												
2																			
3							Augered to 4.5'												
4							Auger refusal @ 4.5'												
5							End of Boring at 4.5'												437.0
6																			
7																			
8																			
9																			
10																			432.0
11																			
12																			
13																			
14																			
15																			427.0
16																			
17																			
18																			
19																			
20																			422.0
21																			
22																			
23																			
24																			
25																			417.0

REMARKS: Surface elevation estimated based on topographic data shown on the untitled survey drawing provided by the Client.

CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Charles Kennedy	
CONTRACTOR: General Borings, Inc.				10/29/09		NE	DRILLER: Erick Delprioire	
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 447.0	
POWER AUGER:	3 1/4"	0 TO 10'	MON. WELL	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO	DATUM: See Remarks		
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---		DATE START: 10/29/09			
CASING:		TO	WEATHER: TEMP:		DATE FINISH: 10/29/09			
DIAMOND CORE:		TO	DEPTH TO ROCK: ---		UNCONFINED COMPRESS. STRENGTH (TONS/FT)			
Dietrich D-50 Truck Mount SPT with Safety Hammer			*CHANGES IN STRATA ARE INFERRED			1 2 3 4 5		

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)			ELEVATION (FT.)			
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	ROD (%)				MOISTURE	1	2		3	4	5
									PLASTIC LIMIT %	WATER CONTENT %	LIQUID LIMIT %				
									X	⊗	Δ				
									STANDARD PENETRATION (BLOWS/FT.)						
									10	20	30	40	50		
1							4" Asphalt Concrete								
2	108+	17 33 75/3	S-1	10		M SP-SM	Bwn m-f SAND, trace Silt (Possible FILL)								108
3							No Recovery								75
4	75+	75/1	S-2	0											
5															
6	50+	78 50/2	S-3	10		M GW	Bwn c-f SAND, some f Gravel, trace Silt (residual Soil)								442.0
7															
8															
9	77	17 30 47 61	S-4	18		M SP-SM	Bwn m-f SAND, trace f Gravel, trace Silt (Residual Soil)								77
10															437.0
11	138+	32 38 100/5	S-5	0			No Recovery								138
12							End of Boring at 11.5'								
13															
14															
15															432.0
16															
17															
18															
19															
20															427.0
21															
22															
23															
24															
25															422.0

REMARKS: Surface elevation estimated based on topographic data shown on the untitled survey drawing provided by the Client.

CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Adam Watson	
CONTRACTOR: General Borings, Inc.				11/3/09		NE	DRILLER: Rick Posa	
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 449.0	
POWER AUGER:	3 1/4"	0 TO 8.5'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		DATUM: See Remarks			
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---		DATE START: 11/3/09			
CASING:		TO	WEATHER: Overcast TEMP: 55°F		DATE FINISH: 11/3/09			
DIAMOND CORE:		TO	DEPTH TO ROCK: ---		UNCONFINED COMPRESS. STRENGTH (TONS/FT)		ELEVATION (FT.)	
Mobile B-53 ATV Rig with Safety Hammer			*CHANGES IN STRATA ARE INFERRED					

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU6 IN.)	SAMPLES				UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)			ELEVATION (FT.)
			SAMPLE NUMBER	RECOV.		MOISTURE				PLASTIC LIMIT %	WATER CONTENT %	LIQUID LIMIT %	
				LENGTH (IN.)	RQD (%)								
1	42	10 17 25 29	S-1	17		M	SM	3" Asphalt Concrete Blk c-f SAND, some f Gravel, little Silt					
2		15 21 35 50/2	S-2	13		M	GM	Bwn c-f GRAVEL, some c-f Sand, little Silt					
3	56	24 38 51 61	S-3	14		M	SM	Wh-bwn c-f SAND, some c-f Gravel, some Silt					89 444.0
4		47 100/5	S-4	9		M	GP	Wh-bwn c-f Gravel, little c-f Sand					100
5	89	100/6	S-5	4		M	SM	Blk-wh c-f SAND, some f Gravel, some Silt					100
6	100+												
7													
8	100+												
9													
10								End of Boring at 8.5'					439.0
11													
12													
13													
14													
15													434.0
16													
17													
18													
19													
20													429.0
21													
22													
23													
24													
25													424.0

REMARKS: Surface elevation estimated based on topographic data shown on the untitled survey drawing provided by the Client.

BORING LOG 5352-01.GPJ TECTONIC ENG.GDT 10/26/11

CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Adam Watson	
CONTRACTOR: General Borings, Inc.				11/3/09	3:00 pm	5.5'	DRILLER: Erick Delproire	
METHOD OF ADVANCING BORING	DIA.	DEPTH				SURFACE ELEVATION: 451.0		
POWER AUGER:	3 1/4"	0 TO 10'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		DATUM: See Remarks			
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---		DATE START: 11/3/09			
CASING:		TO	WEATHER: Overcast TEMP: 55°F		DATE FINISH: 11/3/09			
DIAMOND CORE:		TO	DEPTH TO ROCK: Not Encountered*		UNCONFINED COMPRESS. STRENGTH (TONS/FT)			
Dietrich D-50 Truck Mount SPT with Safety Hammer			*CHANGES IN STRATA ARE INFERRED		1 2 3 4 5			

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES				UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)			ELEVATION (FT.)
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	ROD (%)	MOISTURE				1	2	3	
1	6	1	S-1	15		M	SM	6" Topsoil					
2		5						Bwn c-f SAND, little f Gravel, some Silt					
3	23	7	S-2	12		M	SM	Same					
4		6											
5	48	12	S-3	7		M	SM	Bwn c-f SAND, and f Gravel, little Silt					446.0
6		11											
7	61	11	S-4	12		W	SM	Same					61
8		12											
9	37	12	S-5	10		W	SM	Same					441.0
10		11											
11		12						End of Boring at 10'					
12		12											
13		12											
14		12											
15		12											436.0
16		12											
17		12											
18		12											
19		12											
20		12											431.0
21		12											
22		12											
23		12											
24		12											
25		12											426.0

REMARKS: Surface elevation estimated based on topographic data shown on the untitled survey drawing provided by the Client.

CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Adam Watson
CONTRACTOR: General Borings, Inc.				11/3/09	2:00 pm	4'	DRILLER: Rick Posa
METHOD OF ADVANCING BORING	DIA.	DEPTH		SURFACE ELEVATION: 455.0			
POWER AUGER:	3 1/4"	0 TO 10'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks	
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 11/3/09	
CASING:		TO	WEATHER: Overcast TEMP: 55°F			DATE FINISH: 11/3/09	
DIAMOND CORE:		TO	DEPTH TO ROCK: Not Encountered'			UNCONFINED COMPRESS. STRENGTH (TONS/FT)	
Mobile B-53 ATV Rig with Safety Hammer			*CHANGES IN STRATA ARE INFERRED			1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- O --- Δ 10 20 30 40 50	

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES				UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	STANDARD PENETRATION (BLOWS/FT.)					ELEVATION (FT.)
			SAMPLE NUMBER	RECOV.		MOISTURE				PLASTIC LIMIT %	WATER CONTENT %	LIQUID LIMIT %			
				LENGTH (IN.)	RQD (%)										
1	21	3	S-1	15		M	SM								
		4													
2		17	S-2	14		M	SM								
		18													
3	23	10	S-3	16		W	SM								
		13													
4		12	S-4	24		W	SM								
		10													
5	14	7	S-5	18		W	SM								
		7													
6		8													
7	13	5													
8		5													
9	34	9													
10		13													
		21													
		29													
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															
21															
22															
23															
24															
25															

REMARKS: Surface elevation estimated based on topographic data shown on the untitled survey drawing provided by the Client.

BORING LOG 5352-01.GPJ TECTONIC ENG.GDT 10/26/11

CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Charles Kennedy
CONTRACTOR: General Borings, Inc.				11/4/09		5'	DRILLER: Erick Delprioire
METHOD OF ADVANCING BORING	DIA.	DEPTH				SURFACE ELEVATION: 454.0	
POWER AUGER:	3 1/4"	0 TO 8'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		DATUM: See Remarks		
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---		DATE START: 11/4/09		
CASING:		TO	WEATHER: Overcast TEMP: 55°F		DATE FINISH: 11/4/09		
DIAMOND CORE:		TO	DEPTH TO ROCK: ---		UNCONFINED COMPRESS. STRENGTH (TONS/FT)		
Dietrich D-50 Truck Mount SPT with Safety Hammer			*CHANGES IN STRATA ARE INFERRED		1 2 3 4 5		

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)					ELEVATION (FT.)	
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)				MOISTURE	1	2	3	4		5
1	14	3	S-1	18		M	Bwn c-f SAND, little f Gravel, little Silt (FILL)	[Cross-hatched pattern]	●						
2		6													
3	31	8	S-2	15		M	Same with brick (FILL)	[Cross-hatched pattern]							
4		10													
5	42	17	S-3	18		W	Top 12" Same (Possible FILL) Bottom 6" Dk gy ORGANIC SILT, little c-f Sand	[Dotted pattern]							
6		25													
7	9	7	S-4	19		W	Gy SILT, and c-f Sand (mottled) interbedded layers of Silt and Sand	[Vertical lines pattern]							
8		4													
9	21	5	S-5	20		W	Gy SILTY CLAY, trace c-f Sand	[Vertical lines pattern]							
10		7													
11		13					End of Boring at 10'								
12		22													
13															
14															
15															
16															
17															
18															
19															
20															
21															
22															
23															
24															
25															

BORING LOG 5352.01.GPJ TECTONIC ENG.GDT 10/26/11

REMARKS: Surface elevation estimated based on topographic data shown on the untitled survey drawing provided by the Client.

CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Charles Kennedy	
CONTRACTOR: General Borings, Inc.				11/4/09		5'	DRILLER: Erick Delprioire	
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 454.0	
POWER AUGER:	3 1/4"	0 TO 8'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		DATUM: See Remarks			
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---		DATE START: 11/4/09			
CASING:		TO	WEATHER: Clear TEMP: 65°F		DATE FINISH: 11/4/09			
DIAMOND CORE:		TO	DEPTH TO ROCK: ---		UNCONFINED COMPRESS. STRENGTH (TONS/FT)			
Dietrich D-50 Truck Mount SPT with Safety Hammer			*CHANGES IN STRATA ARE INFERRED		1 2 3 4 5			

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)			ELEVATION (FT.)	
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RCO (%)				MOISTURE	1	2		3
1	11	7	S-1	24		M	ML						
2		5											
3	10	4	S-2	20		M	SM						
4		6											
5	8	4	S-3	21		M	SM						449.0
6		9											
7	14	6	S-4	17		M	ML						
8		8											
9	18	5	S-5	20		M	ML						
10		11											444.0
11													
12													
13													
14													
15													
16													439.0
17													
18													
19													
20													434.0
21													
22													
23													
24													
25													429.0

REMARKS: Surface elevation estimated based on topographic data shown on the untitled survey drawing provided by the Client.

TECTONIC ENGINEERING & SURVEYING CONSULTANTS P.C.	PROJECT No. 5352.01	BORING No. B-32
	PROJECT: Costco - Yorktown	
	LOCATION: Yorktown Heights, NY	
		SHEET No. 1 of 1

CLIENT: Costco Wholesale	GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Charles Kennedy
CONTRACTOR: General Borings, Inc.		11/2/09		NE	DRILLER: Rick Posa
METHOD OF ADVANCING BORING					SURFACE ELEVATION: 427.1
POWER AUGER:	DIA. 3 1/4"	DEPTH 0 TO 8'		MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	DATUM: See Remarks
ROT. DRILL:		TO		SCREEN DEPTH: --- TO ---	DATE START: 11/2/09
CASING:		TO		WEATHER: Clear TEMP: 71°F	DATE FINISH: 11/2/09
DIAMOND CORE:		TO		DEPTH TO ROCK: ---	
Mobile B-53 ATV Rig with Safety Hammer				*CHANGES IN STRATA ARE INFERRED	

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)			ELEVATION (FT.)			
			SAMPLE NUMBER	RECOV.					MOISTURE	1	2		3	4	5
				LENGTH (IN.)	RQD (%)										
									PLASTIC LIMIT %	WATER CONTENT %	LIQUID LIMIT %				
									10	20	30	40	50		
									STANDARD PENETRATION (BLOWS/FT.)						
									10	20	30	40	50		
1	2	1	S-1	12		M	Decomposed Mulch (FILL)								
2		1													
3	11	3	S-2	18		M	Or SILT, some m-f Sand, little f Gravel								
4		5													
5	62	6	S-3	15		M	Lgt bwn c-f SAND, and c-f Gravel, trace Silt (Decomposed bedrock)							62	422.1
6		17													
7	106	28	S-4	13		M	Same							106	
8		34													
9	46	47	S-5	14		M	Same								
10		43													417.1
11		50					End of Boring at 10'								
12		56													
13		71													
14		14													
15		19													
16		27													
17		31													
18															
19															
20															407.1
21															
22															
23															
24															
25															402.1

REMARKS: Surface elevation determined on-site by Tectonic's Survey Crew.

BORING LOG 5352-01.GPJ TECTONIC ENG.GDT 10/26/11

CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Charles Kennedy	
CONTRACTOR: General Borings, Inc.				11/5/09		NE	DRILLER: Erick Delproire	
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 452.1	
POWER AUGER:	3 1/4"	0 TO 8'	MON. WELL	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO	DATUM: See Remarks		
ROT. DRILL:		TO	SCREEN DEPTH:	---	TO	---	DATE START: 11/5/09	
CASING:		TO	WEATHER: Clear	TEMP: 65°F		DATE FINISH: 11/5/09		
DIAMOND CORE:		TO	DEPTH TO ROCK: ---	UNCONFINED COMPRESS. STRENGTH (TONS/FT)				
Dietrich D-50 Truck Mount SPT with Safety Hammer			*CHANGES IN STRATA ARE INFERRED				1 2 3 4 5 ● PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- ⊗ --- Δ 10 20 30 40 50 ● STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50	

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)			ELEVATION (FT.)	
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	ROD (%)				MOISTURE	1	2		3
1	13	12	S-1	16		M	Mulch (FILL)						
2		1											
3	16	2	S-2	14		M SW-SM	Bwn c-f SAND, and c-f Gravel, trace Silt						
4		14											
5	118	35	S-3	17		M SW-SM	Same, with some f Gravel						118 447.1
6		54											
7	50+	64	S-4	5		M SW-SM	Same						
8		88											
9	90	100	S-5	18		M SW-SM	Same, with some f Gravel						90 442.1
10		50/0											
11		68					End of Boring at 10'						
12		52											
13		38											
14		41											
15													437.1
16													
17													
18													
19													
20													432.1
21													
22													
23													
24													
25													427.1

REMARKS: Surface elevation determined on-site by Tectonic's Survey Crew.

CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Charles Kennedy
CONTRACTOR: General Borings, Inc.				11/5/09		NE	DRILLER: Erick Delprioire
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 456.9
POWER AUGER:	3 1/4"	0 TO 10'	MON. WELL	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO	DATUM: See Remarks	
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---		DATE START: 11/5/09		
CASING:		TO	WEATHER: Clear		TEMP: 77°F	DATE FINISH: 11/5/09	
DIAMOND CORE:		TO	DEPTH TO ROCK: Not Encountered'		UNCONFINED COMPRESS. STRENGTH (TONS/FT)		
Dietrich D-50 Truck Mount SPT with Safety Hammer			*CHANGES IN STRATA ARE INFERRED				

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)					ELEVATION (FT.)	
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)				MOISTURE	1	2	3	4		5
									PLASTIC LIMIT %	WATER CONTENT %		LIQUID LIMIT %			
									X	⊗		Δ			
									STANDARD PENETRATION (BLOWS/FT.)						
									10	20	30	40	50		
1	99+	24 49 50/2	S-1	12		M	SM	4" Topsoil							99
2								Bwn c-f SAND, and c-f Gravel, little Silt							
3	109	29 47 62 98	S-2	18		M	SW	Bwn c-f SAND, little f Gravel, trace Silt							109
4															
5	111+	32 61 50/3	S-3	12		M	SW	Bwn m-f SAND, and c-f Gravel, trace Silt							111 451.9
6	100+	100/3	S-4	1		M	GW	Gy c-f GRAVEL, some m-f Sand, trace Silt							100
7															
8															
9	100+	65 100/3	S-5	4		M	GW	Same							100
10								Possible Weathered Bedrock							446.9
11								End of Boring at 10'							
12															
13															
14															
15															441.9
16															
17															
18															
19															
20															436.9
21															
22															
23															
24															
25															431.9

REMARKS: Surface elevation determined on-site by Tectonic's Survey Crew.

CLIENT: Costco Wholesale	GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Chris Duffy	
CONTRACTOR: General Borings, Inc.		11/6/09	1:00 pm	6.5'	DRILLER: Rick Posa	
METHOD OF ADVANCING BORING	DIA.	DEPTH	SURFACE ELEVATION: 461.0			
POWER AUGER: 3 1/4"	0 TO 4'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		DATUM: See Remarks		
ROT. DRILL:		SCREEN DEPTH: --- TO ---		DATE START: 11/6/09		
CASING:		WEATHER: Overcast TEMP:		DATE FINISH: 11/6/09		
DIAMOND CORE:		DEPTH TO ROCK: 9.8'		UNCONFINED COMPRESS. STRENGTH (TONS/FT)		
Mobile B-53 ATV Rig with Safety Hammer		*CHANGES IN STRATA ARE INFERRED			1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- ○ --- Δ 10 20 30 40 50 STANDARD PENETRATION (BLOWS/FT.) ● 10 20 30 40 50	

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)					ELEVATION (FT.)	
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)				MOISTURE	1	2	3	4		5
1	5	2	S-1	7		M	SM								
2		3													
3	25	11	S-2	0											
4		14													
5	28	15	S-3	10		M	SM							456.0	
6		13													
7	13	6	S-4	14		W	SM								
8		7													
9	42	26	S-5	16		W	SM								
10		11												451.0	
		31													
		50/2													
11															
12															
13															
14															
15														446.0	
16															
17															
18															
19															
20														441.0	
21															
22															
23															
24															
25														436.0	

REMARKS: Surface elevation estimated based on topographic data shown on the untitled survey drawing provided by the Client.

BORING LOG 5352-01.GPJ TECTONIC ENG.GDT 10/26/11

CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Charles Kennedy	
CONTRACTOR: General Borings, Inc.				11/4/09		8'	DRILLER: Erick Delprioire	
METHOD OF ADVANCING BORING	DIA.	DEPTH				SURFACE ELEVATION: 462.0		
POWER AUGER:	3 1/4"	0 TO	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		DATUM: See Remarks			
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---		DATE START: 11/4/09			
CASING:		TO	WEATHER: Clear TEMP: 69°F		DATE FINISH: 11/4/09			
DIAMOND CORE:		TO	DEPTH TO ROCK: ---		UNCONFINED COMPRESS. STRENGTH (TONS/FT)			
Dietrich D-50 Truck Mount SPT with Safety Hammer			*CHANGES IN STRATA ARE INFERRED		1 2 3 4 5			

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)			ELEVATION (FT.)
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	ROD (%)				MOISTURE	PLASTIC LIMIT %	WATER CONTENT %	
1	5	1	S-1	14		M	SM					
2		2										
3	23	3	S-2	18		M	SM					
4		4										
5	24	11	S-3	12		M	SM					457.0
6		12										
7	46	13	S-4	3		M	SM					
8		11										
9	35	17	S-5	6		W	GM					452.0
10		27										
11												
12												
13												
14												
15												447.0
16												
17												
18												
19												
20												442.0
21												
22												
23												
24												
25												437.0

REMARKS: Surface elevation estimated based on topographic data shown on the untitled survey drawing provided by the Client.

CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Charles Kennedy
CONTRACTOR: General Borings, Inc.				11/3/09		NE	DRILLER: Rick Posa
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 445.0
POWER AUGER:	3 1/4"	0 TO 9'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks	
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 11/3/09	
CASING:		TO	WEATHER: Clear TEMP: 72°F			DATE FINISH: 11/3/09	
DIAMOND CORE:		TO	DEPTH TO ROCK: ---			UNCONFINED COMPRESS. STRENGTH (TONS/FT)	
Mobile B-53 ATV Rig with Safety Hammer			*CHANGES IN STRATA ARE INFERRED			1 2 3 4 5 ● ○ × △	

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	STANDARD PENETRATION (BLOWS/FT.)			ELEVATION (FT.)
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RCD (%)				MOISTURE	PLASTIC LIMIT %	WATER CONTENT %	
1	100+	4 100/0	S-1	3			Decomposed Mulch (FILL)					445.0
2	27	6 12 15 19	S-2	12		M	Dk bwn c-f SAND, and f Gravel, little Silt, with wood (FILL)					444.0
3		5 6 6 5	S-3	13		M	Same, with c-f Gravel, trace Silt, no wood					443.0
4	12	11 5 6 5	S-4	8		M	Dk bwn c-f SAND, and f Gravel, little Silt, with wood (FILL)					442.0
5		4 2 4 6	S-5	15		M	Bwn c-f SAND, and c-f Gravel, some Clayey Silt (Mottled)					441.0
6	11	11 12 14 16	S-6	20		W	Bwn m-f SAND, and Clayey Silt, little f Gravel					440.0
7	6	13 16	S-7	12		W	Same					439.0
8							End of Boring at 12'					438.0
9												437.0
10												436.0
11												435.0
12												434.0
13												433.0
14												432.0
15												431.0
16												430.0
17												429.0
18												428.0
19												427.0
20												426.0
21												425.0
22												424.0
23												423.0
24												422.0
25												421.0

REMARKS: Surface elevation determined on-site by Tectonic's Survey Crew.

CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Charles Kennedy	
CONTRACTOR: General Borings, Inc.				11/5/09		NE	DRILLER: Erick Delpriore	
METHOD OF ADVANCING BORING	DIA.	DEPTH		SURFACE ELEVATION: 442.5				
POWER AUGER:	3 1/4"	0 TO 7'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		DATUM: See Remarks			
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---		DATE START: 11/5/09			
CASING:		TO	WEATHER: Clear TEMP: 65°F		DATE FINISH: 11/5/09			
DIAMOND CORE:		TO	DEPTH TO ROCK: 7'		UNCONFINED COMPRESS. STRENGTH (TONS/FT)			
Dietrich D-50 Truck Mount SPT with Safety Hammer			*CHANGES IN STRATA ARE INFERRED		1 2 3 4 5			

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)			ELEVATION (FT.)	
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RCO (%)				MOISTURE	1	2		3
1	3	1	S-1	15		M	Mulch (FILL)						
2		1											
3	7	3	S-2	12		M	Same						
4		4											
5	71	24	S-3	16		M SM	Bwn c-f SAND, and c-f Gravel, little Silt (Residual Soil)						437.5
6	100+	30											
7		41	S-4	2		M GP	Two pieces c Gravel Auger refusal @ 7'						100
8		74											
9							End of Boring at 7'						
10													432.5
11													
12													
13													
14													
15													427.5
16													
17													
18													
19													
20													422.5
21													
22													
23													
24													
25													417.5

REMARKS: Surface elevation determined on-site by Tectonic's Survey Crew.

CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Charles Kennedy	
CONTRACTOR: General Borings, Inc.				11/5/09		NE	DRILLER: Rick Posa	
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 449.3	
POWER AUGER:	3 1/4"	0 TO 8'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		DATUM: See Remarks			
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---		DATE START: 11/5/09			
CASING:		TO	WEATHER: TEMP:		DATE FINISH: 11/5/09			
DIAMOND CORE:		TO	DEPTH TO ROCK: ---		UNCONFINED COMPRESS. STRENGTH (TONS/FT)			
Mobile B-53 ATV Rig with Safety Hammer			*CHANGES IN STRATA ARE INFERRED		1 2 3 4 5			

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)					ELEVATION (FT.)	
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	ROD (%)				MOISTURE	1	2	3	4		5
1	4	12	S-1	12		M	Mulch								
2		4													
3	15	7	S-2	14		M SM	Bwn c-f SAND, some f Gravel, little Silt.								
4		6													
5	38	12	S-3	18		M SP	Bwn c-f SAND, little f Gravel, trace Silt							444.3	
6		31													
7	75	34	S-4	13		M SP-SM	Same							75	
8		56													
9	76	44	S-5	10		M SP	Same							76	
10		38												439.3	
11							End of Boring at 10'								
12															
13															
14															
15														434.3	
16															
17															
18															
19															
20														429.3	
21															
22															
23															
24															
25														424.3	

REMARKS: Surface elevation estimated based on topographic data shown on the untitled survey drawing provided by the Client.

CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Charles Kennedy	
CONTRACTOR: General Borings, Inc.				11/5/09		NE	DRILLER: Erick Delprioire	
METHOD OF ADVANCING BORING							SURFACE ELEVATION: 445.0	
POWER AUGER:	DIA.	DEPTH	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		DATUM: See Remarks			
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---		DATE START: 11/5/09			
CASING:		TO	WEATHER: TEMP:		DATE FINISH: 11/5/09			
DIAMOND CORE:		TO	DEPTH TO ROCK: ---		UNCONFINED COMPRESS. STRENGTH (TONS/FT)			
Dietrich D-50 Truck Mount SPT with Safety Hammer			*CHANGES IN STRATA ARE INFERRED		1 2 3 4 5			

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES				UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)			ELEVATION (FT.)	
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RCQD (%)	MOISTURE				1	2	3		4
1	28	6 11 17	S-1	18		M	SM							
2		28 49	S-2	12		M	SM							
3	99+	50/3												
4		57 58 49	S-3	24		M	SM							
5	107	100												
6		100 50/0	S-4	6		M	SM							
7	50+													
8		62 91 50/2	S-5	12		M	SM							
9	141+													
10														440.0
11														
12														
13														
14														
15														435.0
16														
17														
18														
19														
20														430.0
21														
22														
23														
24														425.0
25														420.0

REMARKS: Surface elevation determined on-site by Tectonic's Survey Crew.

CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Charles Kennedy		
CONTRACTOR: General Borings, Inc.				11/4/09		21.5'	DRILLER: Rick Posa		
METHOD OF ADVANCING BORING		DIA.	DEPTH		SURFACE ELEVATION: 430.6				
POWER AUGER:		3 1/4"	0 TO 23.5'		MON. WELL	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO	DATUM: See Remarks	
ROT. DRILL:			TO		SCREEN DEPTH: 13 TO 23'		DATE START: 11/4/09		
CASING:			TO		WEATHER: Clear TEMP: 67°F		DATE FINISH: 11/4/09		
DIAMOND CORE:		NQ	23.5 TO 25'		DEPTH TO ROCK: 25.2'		UNCONFINED COMPRESS. STRENGTH (TONS/FT)		
Mobile B-53 ATV Rig with Safety Hammer					*CHANGES IN STRATA ARE INFERRED				ELEVATION (FT.)

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY	UNCONFINED COMPRESS. STRENGTH (TONS/FT)			ELEVATION (FT.)		
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)				MOISTURE	1	2		3	4
								PLASTIC LIMIT %	WATER CONTENT %	LIQUID LIMIT %				
								X	⊗	Δ				
								10	20	30	40	50		
								STANDARD PENETRATION (BLOWS/FT.)						
								10	20	30	40	50		
1	1	0	S-1	18		M	Decomposed Mulch							
2		0												
3	1	0	S-2	18		M	Same							
4		1												
5	2	1	S-3	20		M	Same						425.6	
6		0												
7	4	1	S-4	24		M	Same							
8		2												
9	8	2	S-5	18		M	Top 9" Same							
10		4				SM	Bwn c-f SAND, some c Gravel, little Silt						420.6	
11	14	6	S-6	12		M	Lgt bwn c-f SAND, and c-f Gravel, trace Silt							
12		7												
13		7												
14		9												
15													415.6	
16	26	10	S-7	13		M	Same with some c-f Gravel							
17		13												
18		13												
19		16												
20													410.6	
21	50+	50/0	S-8	0			No Recovery							
22														
23			C-1				Boulder							
24														
25													405.6	

REMARKS: Surface elevation determined on-site by Tectonic's Survey Crew.

BORING LOG 5352-01.GPJ TECTONIC ENG.GDT 10/26/11

CLIENT: Costco Wholesale

CONTRACTOR: General Borings, Inc.

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES				UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)					ELEVATION (FT.)
			SAMPLE NUMBER	RECOV.		MOISTURE				1	2	3	4	5	
				LENGTH (IN.)	RQD (%)										
100+	100/2	S-9	1		W	GP	Bwn c-f GRAVEL, trace f Sand, trace Silt								100
26							End of Boring at 25.2'								
27															
28															
29															
30															400.6
31															
32															
33															
34															
35															395.6
36															
37															
38															
39															
40															390.6
41															
42															
43															
44															
45															385.6
46															
47															
48															
49															
50															380.6
51															
52															
53															
54															
55															375.6

BORING LOG 5352-01.GPJ TECTONIC ENG.GDT 10/26/11

REMARKS: Surface elevation determined on-site by Tectonic's Survey Crew.

CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Charles Kennedy	
CONTRACTOR: General Borings, Inc.				11/4/09		20'	DRILLER: Rick Posa	
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 444.9	
POWER AUGER:	3 1/4"	0 TO 25'	MON. WELL	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO	DATUM: See Remarks		
ROT. DRILL:		TO	SCREEN DEPTH:	---	TO	---	DATE START: 11/4/09	
CASING:		TO	WEATHER:	Clear	TEMP:	75°F	DATE FINISH: 11/4/09	
DIAMOND CORE:		TO	DEPTH TO ROCK:	25.25'		UNCONFINED COMPRESS. STRENGTH (TONS/FT)		
Mobile B-53 ATV Rig with Safety Hammer			*CHANGES IN STRATA ARE INFERRED				1 2 3 4 5 ● PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- ○ --- △ 10 20 30 40 50 ● STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50	

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)			ELEVATION (FT.)	
			SAMPLE NUMBER	RECOV.					MOISTURE	PLASTIC LIMIT %	WATER CONTENT %		LIQUID LIMIT %
				LENGTH (IN.)	RQD (%)								
1	2	1	S-1	18	M	Wood chips (FILL)							
2		1											
3	3	1	S-2	1	M	Wood chips (FILL)							
4		2											
5	9	5	S-3	15	M	Bwn c-f SAND, little Silt, little f Gravel					439.9		
6		4											
7	12	6	S-4	20	M	Same with f Gravel							
8		6											
9	31	12	S-5	16	M	Or-bwn m-f SAND, little f Gravel. trace Silt							
10		13									434.9		
11	41	18	S-6	18	M	Same							
12		23											
13		10											
14		19											
15		22											
16	169+	53	S-7	12	M	Bwn m-f SAND, and f Gravel, little Silt (Weathered Bedrock)					429.9		
17		69									169		
18		100/4											
19													
20	100+	100/4	S-8	3	M	Bwn c-f SAND, and c-f Gravel, trace Silt (Weathered Bedrock)					424.9		
21													
22													
23													
24													
25											419.9		

REMARKS: Surface elevation determined on-site by Tectonic's Survey Crew.

BORING LOG 5352-01.GPJ TECTONIC ENG.GDT 10/26/11

CLIENT: Costco Wholesale

CONTRACTOR: General Borings, Inc.

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/IN.)	SAMPLES				UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)					ELEVATION (FT.)
			SAMPLE NUMBER	RECOV.		MOISTURE				1	2	3	4	5	
				LENGTH (IN.)	RQD (%)										
	100+	100/3	S-9	2		W	SM								100
26							Bwn c-f SAND, some f Gravel, little Silt (Weathered Bedrock)								
27							End of Boring at 25.25'								
28															
29															
30															414.9
31															
32															
33															
34															
35															409.9
36															
37															
38															
39															
40															404.9
41															
42															
43															
44															
45															399.9
46															
47															
48															
49															
50															394.9
51															
52															
53															
54															
55															389.9

REMARKS: Surface elevation determined on-site by Tectonic's Survey Crew.

CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Charles Kennedy		
CONTRACTOR: General Borings, Inc.				11/4/09		NE	DRILLER: Rick Posa		
METHOD OF ADVANCING BORING		DIA.	DEPTH		SURFACE ELEVATION: 440.6				
POWER AUGER:		3 1/4"	0 TO 25'		MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		DATUM: See Remarks		
ROT. DRILL:			TO		SCREEN DEPTH: --- TO ---		DATE START: 11/4/09		
CASING:			TO		WEATHER: Clear TEMP: 70°F		DATE FINISH: 11/4/09		
DIAMOND CORE:		NQ	23 TO 28'		DEPTH TO ROCK: 23'		UNCONFINED COMPRESS. STRENGTH (TONS/FT)		
Mobile B-53 ATV Rig with Safety Hammer				*CHANGES IN STRATA ARE INFERRED				1 2 3 4 5	

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)			ELEVATION (FT.)
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)				MOISTURE	PLASTIC LIMIT %	WATER CONTENT %	
1	6	2 3 3	S-1	15		M						
2		5										
3	25	11 12 13	S-2	15		M						
4		19										
5	15	8 8 7	S-3	12		M SM	Bwn c-f SAND, some c-f Gravel, little Silt					435.6
6		5 5										
7	9	4 5	S-4	6		M SM	Same, little to some f Gravel					
8		5 5										
9	10	4 5 5	S-5	20		M SW-SM	Bwn m-f SAND, some f Gravel, little Silt					430.6
10		5										
11	15	6 9	S-6	18		M SM	Bwn m-f SAND, and Silt, trace f Gravel					
12		11										
13												
14												
15												
16	32	16 18 14	S-7	16		M SM	Bwn c-f SAND, little Silt, little f Gravel					425.6
17		22										
18												
19												
20												
21	106	25 37 69	S-8			M SW-SM	Bwn c-f SAND, some f Gravel, little Silt					420.6
22		81										
23												
24	3											
25	3											415.6

REMARKS: Surface elevation determined on-site by Tectonic's Survey Crew.

BORING LOG 5352-01.GPJ TECTONIC ENG.GDT 10/26/11

CLIENT: Costco Wholesale

CONTRACTOR: General Borings, Inc.

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLG IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)					ELEVATION (FT.)	
			SAMPLE NUMBER	RECOV.					MOISTURE	1	2	3	4		5
				LENGTH (IN.)	RQD (%)										
26	3		C-1	59/60	73		Gy, moderately weathered, highly fractured, moderately hard GNEISS, fractures between 0 and 45 degrees from horizontal								
27	3														
28	3														
29							End of Boring at 28'								
30															410.6
31															
32															
33															
34															
35															405.6
36															
37															
38															
39															
40															400.6
41															
42															
43															
44															
45															395.6
46															
47															
48															
49															
50															390.6
51															
52															
53															
54															
55															385.6

REMARKS: Surface elevation determined on-site by Tectonic's Survey Crew.


CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Charles Kennedy																					
CONTRACTOR: General Borings, Inc.				11/5/09		NE	DRILLER: Rick Posa																					
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 437.0																					
POWER AUGER:	3 1/4"	0 TO 24'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		DATUM: See Remarks																							
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---		DATE START: 11/5/09																							
CASING:		TO	WEATHER: Clear TEMP: 70°F		DATE FINISH: 11/5/09																							
DIAMOND CORE:	NQ	24 TO 29'	DEPTH TO ROCK: 24'		UNCONFINED COMPRESS. STRENGTH (TONS/FT)																							
Mobile B-53 ATV Rig with Safety Hammer			*CHANGES IN STRATA ARE INFERRED		<table border="1"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td><td>5</td> </tr> <tr> <td>PLASTIC LIMIT %</td> <td colspan="2">WATER CONTENT %</td> <td colspan="2">LIQUID LIMIT %</td> </tr> <tr> <td>X</td> <td colspan="2">O</td> <td colspan="2">A</td> </tr> <tr> <td>10</td><td>20</td><td>30</td><td>40</td><td>50</td> </tr> </table>				1	2	3	4	5	PLASTIC LIMIT %	WATER CONTENT %		LIQUID LIMIT %		X	O		A		10	20	30	40	50
1	2	3	4	5																								
PLASTIC LIMIT %	WATER CONTENT %		LIQUID LIMIT %																									
X	O		A																									
10	20	30	40	50																								

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	STANDARD PENETRATION (BLOWS/FT.)					ELEVATION (FT.)
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)				MOISTURE	1	2	3	4	
1	3	1/12	S-1	12		M	Decomposed mulch (FILL)	[Cross-hatched pattern]						
2		1												
3	3	2	S-2	12		M	Same (FILL)							
4		1												
5	3	1	S-3	12		M	Same (FILL)							432.0
6		1												
7	2	1	S-4	12		M	Same (FILL)							
8		1												
9	2	1	S-5	12		M	Same (FILL)							
10		1												427.0
11	5	2	S-6	14		M SM	Gy m-f SAND, some Silt, little f Gravel	[Dotted pattern]						
12		3												
13	31	12	S-7	18		M SM	Gy c-f SAND, some c-f Gravel, some Silt							
14		14												
15		17												
16	41	19	S-8	20		M SM	Same with little Silt							422.0
17		22												
18		27												
19														
20	100+	100/5	S-9	4		M SW-SM	Bwn c-f SAND, some f Gravel, trace Silt (Weathered bedrock)							417.0
21														
22														
23														
24							Auger Refusal @ 24'							
25	2												412.0	

REMARKS: Surface elevation determined on-site by Tectonic's Survey Crew.

CLIENT: Costco Wholesale

CONTRACTOR: General Borings, Inc.

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES				UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)					ELEVATION (FT.)
			SAMPLE NUMBER	RECOV.		MOISTURE				1	2	3	4	5	
				LENGTH (IN.)	RQD (%)										
26	3						Bwn, moderately weathered, moderately fractured, medium grained, hard GNEISS, fractures between 0 and 90 degrees from horizontal								
27	3		C-1	60/60	83										
28	4														
29	3														
30							End of Boring at 29'							407.0	
31															
32															
33															
34															
35														402.0	
36															
37															
38															
39															
40														397.0	
41															
42															
43															
44															
45														392.0	
46															
47															
48															
49															
50														387.0	
51															
52															
53															
54															
55														382.0	

REMARKS: Surface elevation determined on-site by Tectonic's Survey Crew.

CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Charles Kennedy	
CONTRACTOR: General Borings, Inc.				11/2/09		7.5'	DRILLER: Rick Posa	
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 458.5	
POWER AUGER:	3 1/4"	0 TO 8'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		DATUM: See Remarks			
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---		DATE START: 11/2/09			
CASING:		TO	WEATHER: TEMP:		DATE FINISH: 11/2/09			
DIAMOND CORE:		TO	DEPTH TO ROCK: ---					

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)					ELEVATION (FT.)	
			SAMPLE NUMBER	RECOV.					MOISTURE	1	2	3	4		5
				LENGTH (IN.)	RQD (%)										
1	14	3-8	S-1	18	M	4" Mulch Bwn c-f SAND, some f Gravel, little Silt (FILL)	[Cross-hatched]								
2		9													
3	34	10-24	S-2	15	M	SM Bwn c-f SAND, some c-f Gravel, little Silt	[Dotted]								
4		25-28													
5	42	17-25	S-3	18	M	SW-SM Bwn c-f SAND, and f Gravel, trace Silt (Residual Soil)	[Dotted]						453.5		
6		13													
7	9	2-4	S-4	19	W	SW Same, little f Gravel	[Dotted]								
8		5-7													
9	21	6-13	S-5	20	W	SW-SM Same, with little f Gravel	[Dotted]								
10		18-22											448.5		
11						End of Boring at 10'									
12															
13															
14															
15													443.5		
16															
17															
18															
19															
20													438.5		
21															
22															
23															
24															
25													433.5		

REMARKS: Surface elevation determined on-site by Tectonic's Survey Crew.

BORING LOG 5352-01.GPJ TECTONIC ENG.GDT 10/26/11

CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Bryan Figurski	
CONTRACTOR: General Borings, Inc.				8/30/11		7'	DRILLER: John	
METHOD OF ADVANCING BORING	DIA.	DEPTH		SURFACE ELEVATION: 449.9				
POWER AUGER:	3 1/4"	0 TO 16.5'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		DATUM: See Remarks			
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---		DATE START: 8/30/11			
CASING:		TO	WEATHER: Clear TEMP: 85°F		DATE FINISH: 8/30/11			
DIAMOND CORE:	NQ	16.5 TO 21.5'	DEPTH TO ROCK: 16.5'		UNCONFINED COMPRESS. STRENGTH (TONS/FT)			
B-53 ATV Rig			*CHANGES IN STRATA ARE INFERRED		1 2 3 4 5			

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES				UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)			ELEVATION (FT.)	
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)	MOISTURE				1	2	3		4
1	9	2 7	S-1	12		M	SM	0-4" Topsoil						
2		52						Bwn c-f SAND, some Silt						
3								Augered through boulder						
4	28	5 10 18	S-2	20		M	SM	Bwn c-f SAND, some Silt, little c Gravel						
5		21											444.9	
6	34	11 17 17	S-3	20		M	SM	Bwn m-f SAND, some Clayey Silt						
7		21												
8	18	7 11	S-4	16		W	SM	Bwn-blk c-f SAND, some Silt						
9		14												
10	23	1 14 22	S-5	16		W	SM	Bwn c-f SAND, some c-f Gravel, little Silt						439.9
11		15												
12														
13														
14														
15														
16	50+	30 50/5	S-6			W	SM	Bwn c-f SAND, some c-f Gravel, little Silt Auger refusal @ 16.5'						434.9
17	2													
18	1							Cored 16.5' to 18.5' with Sand seams (Poor recovery, auger to 18.5' due to core barrel seizing in hole)						
19	1.5		C-1	59/60	70			Gy, slightly weathered, f-medium grained, moderately hard, GNEISS						429.9
20	1													
21	1													
22								End of Boring at 21.5'						
23														
24														
25														424.9

REMARKS: Surface elevations determined on-site by Tectonic's Survey Crew. Depth to bedrock indicates depth to auger refusal. Bedrock may be present at shallower depth as indicated under "Description of Material."

CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Bryan Figurski		
CONTRACTOR: General Borings, Inc.				9/2/11	12:00 pm	6.5'	DRILLER: Eric		
METHOD OF ADVANCING BORING	DIA.	DEPTH						SURFACE ELEVATION: 449.9	
POWER AUGER:	3 1/4"	0 TO 10'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO				DATUM: See Remarks		
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---				DATE START: 9/2/11		
CASING:		TO	WEATHER: Clear TEMP: 80°F				DATE FINISH: 9/2/11		
DIAMOND CORE:	NQ	10 TO 15'	DEPTH TO ROCK: 10'				UNCONFINED COMPRESS. STRENGTH (TONS/FT)		
B-53 ATV Rig			*CHANGES IN STRATA ARE INFERRED					ELEVATION (FT.)	

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	STANDARD PENETRATION (BLOWS/FT.)					ELEVATION (FT.)	
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RCQD (%)				MOISTURE	1	2	3	4		5
1	6	2	S-1	14		M	SM	0-4" Topsoil							
2		3						Bwn c-f SAND, some Silt, little c-f Gravel							
3	26	17	S-2	10		M	SM	Same							
4		16													
5		10						Augered through Cobble							
6	95+	18	S-3	14		M	GW	Bwn c-f GRAVEL, some Sand, little Silt							444.9
7		45				W									
8		50/4													
9								Auger refusal @ 10'							
10															439.9
11	1														
12	1														
13	1		C-1	36/60	43			Cored 10' to 15'							
14	1.5							Gy, moderately weathered, highly fractured, m-f grained, hard GNEISS							
15	1														434.9
16								End of Boring at 15'							
17															
18															
19															
20															429.9
21															
22															
23															
24															
25															424.9

REMARKS: Surface elevations determined on-site by Tectonic's Survey Crew. Depth to bedrock indicates depth to auger refusal. Bedrock may be present at shallower depth as indicated under "Description of Material."

CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Bryan Figurski
CONTRACTOR: General Borings, Inc.				8/29/11		7'	DRILLER: Eric
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 454.7

POWER AUGER:	3 1/4"	0 TO 18.5'	MON. WELL	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO	DATUM: See Remarks
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 8/29/11
CASING:		TO	WEATHER: Clear	TEMP: 80°F	DATE FINISH: 8/29/11	

DIAMOND CORE:	NQ	18.5 TO 23.5'	DEPTH TO ROCK: 18.5'			UNCONFINED COMPRESS. STRENGTH (TONS/FT)	ELEVATION (FT.)
B-53 ATV Rig			*CHANGES IN STRATA ARE INFERRED				

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)			ELEVATION (FT.)	
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	ROD (%)				MOISTURE	1	2		3
1	11	2	S-1	18		M	SM						
2	50+	50/4	S-2	4		M							
3													
4													
5													
6	12	4	S-3	18		M	SM						449.7
7		6											
8	15	6	S-4	16		W	SM						
9		7											
10	33	5	S-5	12		W	SM						444.7
11		8											
12		11											
13		16											
14		17											
15	50+	20	S-6	3		W	SM						439.7
16													
17													
18													
19	1.5												
20	1												434.7
21	1		C-1	39/60	57								
22	1												
23	1.5												
24													
25													429.7

REMARKS: Surface elevations determined on-site by Tectonic's Survey Crew. Depth to bedrock indicates depth to auger refusal. Bedrock may be present at shallower depth as indicated under "Description of Material." Groundwater depth estimated based on sample moisture content.

BORING LOG 5352-02.GPJ TECTONIC ENG.GDT 10/26/11

CLIENT: Costco Wholesale		GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Bryan Figurski	
CONTRACTOR: General Borings, Inc.			8/26/11		6'	DRILLER: Eric	
METHOD OF ADVANCING BORING	DIA.	DEPTH		SURFACE ELEVATION: 453.0			
POWER AUGER:	3 1/4"	0 TO 20'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		DATUM: See Remarks		
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---		DATE START: 8/29/11		
CASING:		TO	WEATHER: Clear TEMP: 80°F		DATE FINISH: 8/29/11		
DIAMOND CORE:	NQ	20 TO 27'	DEPTH TO ROCK: 20'		UNCONFINED COMPRESS. STRENGTH (TONS/FT)		
B-53 ATV Rig		*CHANGES IN STRATA ARE INFERRED				1 2 3 4 5	

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)			ELEVATION (FT.)		
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)				MOISTURE	1	2		3	4
1	6	3	S-1	12		M	SM	0-4" Topsoil Bwn c-f SAND, some Silt						
2		3												
3	5	3	S-2	18		M	SM	Bwn c-f SAND, and Silt						
4		2												
5	9	4	S-3	24		M	SM	Bwn c-f SAND, some Silt (mottling)					448.0	
6		7												
7	19	8	S-4	18		W	SM	Same						
8		11												
9	66	29	S-5	14		W	SM	Bwn-blk Same						66
10		31												443.0
11	64	40	S-6	18		W	SM	Same						64
12		12												
13		24												
14		40												
15		40												
16	95+	34	S-7	12		W	SM	Bwn c-f SAND, some Silt (decomposed rock)						95
17		45												
18		50/4												
19														
20								Auger refusal @ 20' No recovery						433.0
21	.5	50/1	S-8	0										
22	.5		C-1	0/24	0									
23	1													
24	.5													
25	1		C-2	4/60	0			Highly weathered rock, indicated by drill cuttings 4" recovery						428.0

REMARKS: Surface elevations determined on-site by Tectonic's Survey Crew. Depth to bedrock indicates depth to auger refusal. Bedrock may be present at shallower depth as indicated under "Description of Material."

BORING LOG 5352-02.GPJ TECTONIC ENG.GDT 10/26/11

CLIENT: Costco Wholesale
CONTRACTOR: General Borings, Inc.

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)					ELEVATION (FT.)	
			SAMPLE NUMBER	RECOV.					MOISTURE	1	2	3	4		5
				LENGTH (IN.)	RQD (%)										
26	.5														
27	1														
28						End of Boring at 27'									
29															
30															423.0
31															
32															
33															
34															
35															418.0
36															
37															
38															
39															
40															413.0
41															
42															
43															
44															
45															408.0
46															
47															
48															
49															
50															403.0
51															
52															
53															
54															
55															398.0

REMARKS: Surface elevations determined on-site by Tectonic's Survey Crew. Depth to bedrock indicates depth to auger refusal. Bedrock may be present at shallower depth as indicated under "Description of Material."

CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Bryan Figurski																					
CONTRACTOR: General Borings, Inc.							DRILLER: Eric																					
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 453.7																					
POWER AUGER:	3 1/4"	0 TO 9.5'	MON. WELL	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO	DATUM: See Remarks																						
ROT. DRILL:		TO	SCREEN DEPTH:	---	TO	---	DATE START: 9/1/11																					
CASING:		TO	WEATHER: Clear	TEMP: 80°F		DATE FINISH: 9/1/11																						
DIAMOND CORE:	NQ	9.5 TO 14.5'	DEPTH TO ROCK: 9.5'			UNCONFINED COMPRESS. STRENGTH (TONS/FT)																						
B-53 ATV Rig			*CHANGES IN STRATA ARE INFERRED			<table border="1"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td><td>5</td> </tr> <tr> <td>PLASTIC LIMIT %</td><td colspan="2">WATER CONTENT %</td><td colspan="2">LIQUID LIMIT %</td> </tr> <tr> <td>X</td><td>⊗</td><td>⊙</td><td>△</td><td></td> </tr> <tr> <td>10</td><td>20</td><td>30</td><td>40</td><td>50</td> </tr> </table>			1	2	3	4	5	PLASTIC LIMIT %	WATER CONTENT %		LIQUID LIMIT %		X	⊗	⊙	△		10	20	30	40	50
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X	⊗	⊙	△																									
10	20	30	40	50																								

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES				UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)					ELEVATION (FT.)
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	ROD (%)	MOISTURE				1	2	3	4	5	
1	37	3 12 25 30	S-1	12		M	SM								
2															
3	50+	43 50/4	S-2	6		M	Same Augered to 5'								
4															
5															
6	71	34 43 28 40	S-3	14		M	Same							448.7	
7															
8	24	7 17	S-4	12		M	Same								
9		50/2					Auger refusal @ 9.5'								
10	1													443.7	
11	1.5														
12	1.5		C-1	32/60	31		Bwn-gy, highly weathered, highly fractured, moderately hard, m-f grained GNEISS								
13	1														
14	1.5														
15							End of Boring at 14.5'							438.7	
16															
17															
18															
19															
20														433.7	
21															
22															
23															
24															
25														428.7	

BORING LOG 5352-02.GPJ TECTONIC ENG.GDT 10/26/11

REMARKS: Surface elevations determined on-site by Tectonic's Survey Crew. Depth to bedrock indicates depth to auger refusal. Bedrock may be present at shallower depth as indicated under "Description of Material."

CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Bryan Figurski																					
CONTRACTOR: General Borings, Inc.							DRILLER: Eric																					
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 450.6																					
POWER AUGER:	3 1/4"	0 TO 18.5'	MON. WELL	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO	DATUM: See Remarks																						
ROT. DRILL:		TO	SCREEN DEPTH:	---	TO	---	DATE START: 9/2/11																					
CASING:		TO	WEATHER:	Clear	TEMP:	80°F	DATE FINISH: 9/2/11																					
DIAMOND CORE:	NQ	18.5 TO 23.5'	DEPTH TO ROCK: 18.5'			UNCONFINED COMPRESS. STRENGTH (TONS/FT)																						
B-53 ATV Rig			*CHANGES IN STRATA ARE INFERRED			<table border="1"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td><td>5</td> </tr> <tr> <td>PLASTIC LIMIT %</td><td colspan="2">WATER CONTENT %</td><td colspan="2">LIQUID LIMIT %</td> </tr> <tr> <td>X</td><td>⊗</td><td>⊗</td><td>Δ</td><td>Δ</td> </tr> <tr> <td>10</td><td>20</td><td>30</td><td>40</td><td>50</td> </tr> </table>			1	2	3	4	5	PLASTIC LIMIT %	WATER CONTENT %		LIQUID LIMIT %		X	⊗	⊗	Δ	Δ	10	20	30	40	50
1	2	3	4	5																								
PLASTIC LIMIT %	WATER CONTENT %		LIQUID LIMIT %																									
X	⊗	⊗	Δ	Δ																								
10	20	30	40	50																								

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	STANDARD PENETRATION (BLOWS/FT.)					ELEVATION (FT.)
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)				MOISTURE	1	2	3	4	
1	18	3 7 11	S-1	12		M	0-4" Topsoil Bwn c-f SAND, some c-f Gravel, little Silt (FILL)							
2		6 7												
3	19	11 8	S-2	8		M	Same with glass pieces							
4		4 4												
5	8	4 4	S-3	3		M	Bwn c-f SAND, some c-f Gravel, little Silt (FILL)							445.6
6		3 2												
7	10	3 7	S-4	4		M	Same (Gravel in tip)							
8		9												
9	62	15 25 37	S-5	20		M SW-SM	Gy-bwn c-f SAND, some c-f Gravel, little Silt (weathered rock)							
10		42												
11	50+	32 50/3	S-6	6		M SW	Same							440.6
12														
13														
14														
15														435.6
16	53	22 21 32	S-7	16		M SW-SM	Gy-bwn c-f GRAVEL, some c-f Sand, little Silt (weathered rock)							
17		21												
18							Auger refusal @ 18.5'							
19	1													
20	1.5													430.6
21	1.5		C-1	41/60	50		Bwn-gy, highly weathered, highly fractured, moderately hard m-f grained GNEISS							
22	1													
23	1													
24							End of Boring at 23.5'							
25														425.6

REMARKS: Surface elevations determined on-site by Tectonic's Survey Crew. Depth to bedrock indicates depth to auger refusal. Bedrock may be present at shallower depth as indicated under "Description of Material."

BORING LOG 5352.02.GPJ TECTONIC.ENG.GDT 10/26/11

CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Bryan Figurski	
CONTRACTOR: General Borings, Inc.							DRILLER: Eric	
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 435.7	
POWER AUGER:	3 1/4"	0 TO 14'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		DATUM: See Remarks			
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---		DATE START: 9/1/11			
CASING:		TO	WEATHER: Clear TEMP: 80°F		DATE FINISH: 9/1/11			
DIAMOND CORE:		TO	DEPTH TO ROCK: 14'					

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES			MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)			ELEVATION (FT.)		
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)					1	2	3		4	5
1	5	1	S-1	12		M	SW-SM	0-4" Topsoil Bwn c-f SAND, some c-f Gravel, little Silt		PLASTIC LIMIT %: X WATER CONTENT %: ⊗ LIQUID LIMIT %: △ STANDARD PENETRATION (BLOWS/FT.): ●					
2		2													
3	40	10	S-2	14		M	GM	Bwn c-f GRAVEL, some c-f Sand, little Silt							
4		20													
5	67	39	S-3	14		M	GM	Same (Possible weathered rock)							67 430.7
6		41													
7	31	26	S-4	12		M	GM	Same							
8		21													
9	34	30	S-5	10			GW	Bwn c-f SAND, and c-f Gravel, trace Silt Augered through weathered rock							
10		3													
11		28													
12		30													
13		24													
14		20						Auger refusal @ 14'							
15		14						End of Boring at 14'					425.7		
16		50/3											420.7		
17															
18															
19															
20													415.7		
21															
22															
23															
24															
25													410.7		

REMARKS: Surface elevations determined on-site by Tectonic's Survey Crew. Depth to bedrock indicates depth to auger refusal. Bedrock may be present at shallower depth as indicated under "Description of Material."

CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Bryan Figurski																			
CONTRACTOR: General Borings, Inc.				8/29/11		7'	DRILLER: Eric																			
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 448.8																			
POWER AUGER:	3 1/4"	0 TO 10.5'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		DATUM: See Remarks																					
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---		DATE START: 8/29/11																					
CASING:		TO	WEATHER: Clear TEMP: 80°F		DATE FINISH: 8/29/11																					
DIAMOND CORE:	NQ	10.5 TO 15.5'	DEPTH TO ROCK: 10.5'		UNCONFINED COMPRESS. STRENGTH (TONS/FT)		ELEVATION (FT.)																			
B-53 ATV Rig			*CHANGES IN STRATA ARE INFERRED		<table border="1"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td><td>5</td> </tr> <tr> <td>PLASTIC LIMIT %</td> <td colspan="2">WATER CONTENT %</td> <td colspan="2">LIQUID LIMIT %</td> </tr> <tr> <td>X</td> <td colspan="2">O</td> <td colspan="2">Δ</td> </tr> <tr> <td>10</td><td>20</td><td>30</td><td>40</td><td>50</td> </tr> </table>				1	2	3	4	5	PLASTIC LIMIT %	WATER CONTENT %		LIQUID LIMIT %		X	O		Δ		10	20	30
1	2	3	4	5																						
PLASTIC LIMIT %	WATER CONTENT %		LIQUID LIMIT %																							
X	O		Δ																							
10	20	30	40	50																						

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES				UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	STANDARD PENETRATION (BLOWS/FT.)					ELEVATION (FT.)
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	ROD (%)	MOISTURE				1	2	3	4	5	
1	6	2 3 3	S-1	12		M	SM	0 - 6" Topsoil Bwn c-f SAND, some Silt, little c-f Gravel							
2		9 17													
3	23	10 13	S-2	16		M	SW-SM	Bwn-gy c-f SAND, some c-f Gravel, trace Silt							
4		15 7													
5	28	14 14	S-3	16		M	SM	Bwn-blk c-f SAND, some Silt, trace c-f Gravel							443.8
6		16 13													
7	46	21 25	S-4	16		M	GW	Gy c-f GRAVEL, and bwn-blk c-f Sand, trace Silt							
8		30				W									
9	85+	28 35 50/2	S-5	6		W	SM	Bwn c-f SAND, little c-f Gravel, trace Silt							85
10								Auger refusal @ 10.5'							438.8
11	1														
12	1														
13	.5		C-1	26/60	27			Gy, highly fractured, highly weathered, m-f grained, moderately hard, GNEISS							
14	1														
15	1														433.8
16								End of Boring at 15.5'							
17															
18															
19															
20															428.8
21															
22															
23															
24															
25															423.8

REMARKS: Surface elevations determined on-site by Tectonic's Survey Crew. Depth to bedrock indicates depth to auger refusal. Bedrock may be present at shallower depth as indicated under "Description of Material."

CLIENT: Costco Wholesale		GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Bryan Figurski
CONTRACTOR: General Borings, Inc.			8/30/11		4'	DRILLER: Eric
METHOD OF ADVANCING BORING	DIA.		DEPTH		SURFACE ELEVATION: 461.0	
POWER AUGER:	3 1/4"	0 TO 15'		MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	DATUM: See Remarks	
ROT. DRILL:		TO		SCREEN DEPTH: --- TO ---	DATE START: 8/30/11	
CASING:		TO		WEATHER: Clear TEMP: 85°F	DATE FINISH: 8/30/11	
DIAMOND CORE:		TO		DEPTH TO ROCK: 15'	UNCONFINED COMPRESS. STRENGTH (TONS/FT)	
B-53 ATV Rig		*CHANGES IN STRATA ARE INFERRED			1 2 3 4 5	

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)			ELEVATION (FT.)	
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)				MOISTURE	1	2		3
1	16	6	S-1	12		M	SM						
2		8											
3	27	11	S-2	10		M	SM						
4		16											
5	68	26	S-3	4		W	SM						456.0
6		42											
7	60	17	S-4	20		W	SM						
8		16											
9	68	44	S-5	20		W	SP-SM						68
10		19											
11	77+	35	S-6	24		W	SP-SM						77
12		49											
13		32											
14		27											
15	50+	50/2	S-7	0									446.0
16		50/3											
17													
18													
19													
20													441.0
21													
22													
23													
24													
25													436.0

REMARKS: Surface elevations determined on-site by Tectonic's Survey Crew. Depth to bedrock indicates depth to auger refusal. Bedrock may be present at shallower depth as indicated under "Description of Material." Groundwater depth estimated based on sample moisture content.

CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Bryan Figurski	
CONTRACTOR: General Borings, Inc.				8/30/11		8'	DRILLER: Eric	
METHOD OF ADVANCING BORING	DIA.	DEPTH				SURFACE ELEVATION: 458.0		
POWER AUGER:	3 1/4"	0	TO 20'	MON. WELL	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	DATUM: See Remarks		
ROT. DRILL:			TO	SCREEN DEPTH: ---	TO ---	DATE START: 8/30/11		
CASING:			TO	WEATHER: Clear	TEMP: 85°F	DATE FINISH: 8/30/11		
DIAMOND CORE:			TO	DEPTH TO ROCK: 21.8'		UNCONFINED COMPRESS. STRENGTH (TONS/FT)		
B-53 ATV Rig			*CHANGES IN STRATA ARE INFERRED					

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)			ELEVATION (FT.)	
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)				MOISTURE	1	2		3
1	14	6	S-1	2		M	0-3" Asphalt Bwn c-f SAND, some Silt, brick (FILL)						
2		8											
3	15	9	S-2	18		M	Bwn m-f SAND, and Silt						
4		7											
5	40	8	S-3	14		M	Bwn c-f SAND, little Silt					453.0	
6		12											
7	28	19	S-4	12		M	Same						
8		18											
9	29	16	S-5	18		W	Bwn-gy c-f SAND, some c-f Gravel, little Silt (weathered rock)					448.0	
10		12											
11	46	17	S-6	16		W	Same						
12		21											
13		16											
14		12											
15		16											
16	40	8	S-7	18		W	Same, with Silt seams					443.0	
17		12											
18		16											
19		30											
20		40											
21	75	10	S-8	14		W	Bwn-blk c-f SAND, decomposed rock with Silt lenses					438.0	
22		18											
23		22											
24		28											
25		50/3					End of Boring at 21.9'					433.0	

REMARKS: Surface elevations determined on-site by Tectonic's Survey Crew. Depth to bedrock indicates depth to auger refusal. Bedrock may be present at shallower depth as indicated under "Description of Material." Groundwater depth estimated based on sample moisture content.

CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Bryan Figurski	
CONTRACTOR: General Borings, Inc.							DRILLER: Eric	
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 417.3	
POWER AUGER:	3 1/4"	0 TO 9'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		DATUM: See Remarks			
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---		DATE START: 9/6/11			
CASING:		TO	WEATHER: Rain TEMP: 65°F		DATE FINISH: 9/6/11			
DIAMOND CORE:		TO	DEPTH TO ROCK: 9'		UNCONFINED COMPRESS. STRENGTH (TONS/FT)		ELEVATION (FT.)	
B-53 ATV Rig			*CHANGES IN STRATA ARE INFERRED					

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)			ELEVATION (FT.)	
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)				MOISTURE	1	2		3
1	16	5 5 11	S-1	6		M	6" Topsoil						
2		12											
3	45	21 24 21	S-2	12		M	Bwn c-f SAND, some c-f Gravel, little Silt						
4		30											
5	58	16 28 30	S-3	14		M	Bwn c-f GRAVEL, little c-f Sand, little Silt						412.3
6	100+	100/5	S-4	0			No recovery						100
7													
8													
9							Auger refusal @ 9'						
10							End of Boring at 9'						407.3
11													
12													
13													
14													
15													402.3
16													
17													
18													
19													
20													397.3
21													
22													
23													
24													
25													392.3

REMARKS: Surface elevations determined on-site by Tectonic's Survey Crew. Depth to bedrock indicates depth to auger refusal. Bedrock may be present at shallower depth as indicated under "Description of Material."

CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Bryan Figurski		
CONTRACTOR: General Borings, Inc.				DRILLER: Eric					
METHOD OF ADVANCING BORING	DIA.	DEPTH						SURFACE ELEVATION: 413.3	
POWER AUGER:	3 1/4"	0 TO 13'		MON. WELL	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO	DATUM: See Remarks		
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---		DATE START: 9/6/11				
CASING:		TO	WEATHER: Rain		TEMP: 70°F		DATE FINISH: 9/6/11		
DIAMOND CORE:		TO	DEPTH TO ROCK: 13'		UNCONFINED COMPRESS. STRENGTH (TONS/FT)				
B-53 ATV Rig			*CHANGES IN STRATA ARE INFERRED						

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)					ELEVATION (FT.)	
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)				MOISTURE	1	2	3	4		5
1	3	1	S-1	6		M	Mulch (FILL)								
2		5													
3	13	6	S-2	18		M SM	Bwn c-f SAND, some Silt, little c-f Gravel								
4		7													
5	83	33	S-3	14		M SM	Same							83	408.3
6		38													
7	65	41	S-4	12		M GM	Bwn c-f GRAVEL, some c-f Sand, little Silt							65	
8		25													
9	27	40	S-5	12		M SM	Bwn c-f SAND, some c-f Gravel, little Silt								
10		50/5													
11		14													
12		15													
13		12					Auger refusal @ 13'								
14		50/3					End of Boring at 13'								
15															
16															
17															
18															
19															
20															
21															
22															
23															
24															
25															

REMARKS: Surface elevations determined on-site by Tectonic's Survey Crew. Depth to bedrock indicates depth to auger refusal. Bedrock may be present at shallower depth as indicated under "Description of Material."

CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Bryan Figurski	
CONTRACTOR: General Borings, Inc.							DRILLER: Eric	
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 412.1	
POWER AUGER:	3 1/4"	0 TO 13.5'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		DATUM: See Remarks			
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---		DATE START: 9/6/11			
CASING:		TO	WEATHER: Rain TEMP: 70°F		DATE FINISH: 9/6/11			
DIAMOND CORE:		TO	DEPTH TO ROCK: 13.5'		UNCONFINED COMPRESS. STRENGTH (TONS/FT)			
B-53 ATV Rig			*CHANGES IN STRATA ARE INFERRED			1 2 3 4 5		ELEVATION (FT.)

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	STANDARD PENETRATION (BLOWS/FT.)					ELEVATION (FT.)			
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RCD (%)				MOISTURE	PLASTIC LIMIT %	WATER CONTENT %	LIQUID LIMIT %	1		2	3	4
1	2	1	S-1	4		M	Mulch (FILL)										
2		1															
3	5	2	S-2	0		M	Same										
4		3					Augered through Cobbles										
5		2															
6	77	29	S-3	18		M GM	Bwn c-f GRAVEL, some c-f Sand, little Silt										407.1
7		36															
8	67	41	S-4	6		M GM	Same										67
9		43															
10	50+	34	S-5	1			c-f GRAVEL (Possible Bedrock)										402.1
11		41															
12		26															
13		28															
14		50/4					Auger refusal @ 13.5'										
15							End of Boring at 13.5'										
16																	
17																	
18																	
19																	
20																	
21																	
22																	
23																	
24																	
25																	

REMARKS: Surface elevations determined on-site by Tectonic's Survey Crew. Depth to bedrock indicates depth to auger refusal. Bedrock may be present at shallower depth as indicated under "Description of Material."

CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Bryan Figurski	
CONTRACTOR: General Borings, Inc.							DRILLER: Eric	
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 410.7	
POWER AUGER:	3 1/4"	0 TO 19'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks		
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 9/6/11		
CASING:		TO	WEATHER: Rain TEMP: 70°F			DATE FINISH: 9/6/11		
DIAMOND CORE:		TO	DEPTH TO ROCK: 19'			UNCONFINED COMPRESS. STRENGTH (TONS/FT)		
B-53 ATV Rig			*CHANGES IN STRATA ARE INFERRED			1 2 3 4 5		

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)					ELEVATION (FT.)	
			SAMPLE NUMBER	RECOV.					MOISTURE	PLASTIC LIMIT %	WATER CONTENT %	LIQUID LIMIT %	STANDARD PENETRATION (BLOWS/FT.)		
LENGTH (IN.)	ROD (%)	10		20	30	40	50								
1	4	2	S-1	8		M	Mulch (FILL)								
2		4													
3	11	4	S-2	12		M SM	Bwn c-f SAND, some Silt, little c-f Gravel								
4		7					Augered to 5'								
5		2													
6	82	23	S-3	12		M SM	Same							82	405.7
7		35													
8	90	47	S-4	14		M SM	Same							90	
9		30													
10	67	32	S-5	14		M SM	Bwn-blk c-f SAND, some Silt, little c-f Gravel (weathered bedrock)							67	400.7
11		41													
12		49					Augered to 15'								
13		50/3													
14		21													
15		43													
16	56	24	S-6	14		M SM	Bwn c-f SAND, and c-f Gravel, little Silt								
17		32													
18		50													
19							Auger refusal @ 19'								
20							End of Boring at 19'								
21															
22															
23															
24															
25															385.7

REMARKS: Surface elevations determined on-site by Tectonic's Survey Crew. Depth to bedrock indicates depth to auger refusal. Bedrock may be present at shallower depth as indicated under "Description of Material."

CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Bryan Figurski																					
CONTRACTOR: General Borings, Inc.							DRILLER: Eric																					
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 398.3																					
POWER AUGER:	3 1/4"	0 TO 7.5'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks																						
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 8/31/11																						
CASING:		TO	WEATHER: Clear TEMP: 80°F			DATE FINISH: 8/31/11																						
DIAMOND CORE:		TO	DEPTH TO ROCK: 7.5'			UNCONFINED COMPRESS. STRENGTH (TONS/FT)																						
B-53 ATV Rig			*CHANGES IN STRATA ARE INFERRED			<table border="1"> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> </tr> <tr> <td>PLASTIC LIMIT %</td> <td colspan="2">WATER CONTENT %</td> <td colspan="2">LIQUID LIMIT %</td> </tr> <tr> <td>X</td> <td colspan="2">O</td> <td colspan="2">A</td> </tr> <tr> <td>10</td> <td>20</td> <td>30</td> <td>40</td> <td>50</td> </tr> </table>			1	2	3	4	5	PLASTIC LIMIT %	WATER CONTENT %		LIQUID LIMIT %		X	O		A		10	20	30	40	50
1	2	3	4	5																								
PLASTIC LIMIT %	WATER CONTENT %		LIQUID LIMIT %																									
X	O		A																									
10	20	30	40	50																								

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/IN.)	SAMPLES				UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)					ELEVATION (FT.)	
			SAMPLE NUMBER	RECOV.		MOISTURE				1	2	3	4	5		
				LENGTH (IN.)	RQD (%)											PLASTIC LIMIT %
1	25	19	S-1	13		M	SM									
2		16														
3	71+	21	S-2	8		M	SM									
4		50/3														
5																393.3
6																
7																
8																
9																
10																
11																
12																
13																
14																
15																
16																
17																
18																
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21																
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23																
24																
25																

REMARKS: Surface elevations determined on-site by Tectonic's Survey Crew. Depth to bedrock indicates depth to auger refusal. Bedrock may be present at shallower depth as indicated under "Description of Material."

CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Bryan Figurski	
CONTRACTOR: General Borings, Inc.							DRILLER: Eric	
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 405.3	
POWER AUGER:	3 1/4"	0 TO 13.5'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks		
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 8/31/11		
CASING:		TO	WEATHER: Clear TEMP: 80°F			DATE FINISH: 8/31/11		
DIAMOND CORE:		TO	DEPTH TO ROCK: 13.5'			UNCONFINED COMPRESS. STRENGTH (TONS/FT)		
B-53 ATV Rig			*CHANGES IN STRATA ARE INFERRED			1 2 3 4 5		

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)			ELEVATION (FT.)		
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RCOD (%)				MOISTURE	1	2		3	4
1	17	4 13	S-1	8		M	GW	0-3" Topsoil Gy c-f GRAVEL, some Sand, little Silt						
2		50/2												
3								Augered through Boulder to 3'						
4	41	11 14 27	S-2	16		M	SP-SM	Bwn-blk c-f SAND, trace Silt (Weathered rock)						
5		38												
6	50+	12 50/3	S-3	6		M	SP-SM	Same						400.3
7														
8								Augered to 9'						
9														
10	50+	30 50/1	S-4	6		M	SP-SM	Same						395.3
11														
12														
13								Auger refusal @ 13.5'						
14								End of Boring at 13.5'						
15														390.3
16														
17														
18														
19														
20														385.3
21														
22														
23														
24														
25														380.3

REMARKS: Surface elevations determined on-site by Tectonic's Survey Crew. Depth to bedrock indicates depth to auger refusal. Bedrock may be present at shallower depth as indicated under "Description of Material."

CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Bryan Figurski																					
CONTRACTOR: General Borings, Inc.							DRILLER: Eric																					
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 402.0																					
POWER AUGER:	3 1/4"	0 TO 5.5'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks																						
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 8/31/11																						
CASING:		TO	WEATHER: Clear TEMP: 80°F			DATE FINISH: 8/31/11																						
DIAMOND CORE:		TO	DEPTH TO ROCK: 5.5'			UNCONFINED COMPRESS. STRENGTH (TONS/FT)																						
B-53 ATV Rig			*CHANGES IN STRATA ARE INFERRED			<table border="1"> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> </tr> <tr> <td>PLASTIC LIMIT %</td> <td>WATER CONTENT %</td> <td>LIQUID LIMIT %</td> <td colspan="2"></td> </tr> <tr> <td>X</td> <td>⊗</td> <td>Δ</td> <td colspan="2"></td> </tr> <tr> <td>10</td> <td>20</td> <td>30</td> <td>40</td> <td>50</td> </tr> </table>			1	2	3	4	5	PLASTIC LIMIT %	WATER CONTENT %	LIQUID LIMIT %			X	⊗	Δ			10	20	30	40	50
1	2	3	4	5																								
PLASTIC LIMIT %	WATER CONTENT %	LIQUID LIMIT %																										
X	⊗	Δ																										
10	20	30	40	50																								

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES				UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	STANDARD PENETRATION (BLOWS/FT.)					ELEVATION (FT.)
			SAMPLE NUMBER	RECOV.		MOISTURE				1	2	3	4	5	
				LENGTH (IN.)	ROD (%)										
1	6	1 3 3	S-1	4		M	Topsoil, Gravel in spoon								
2	50+	4 50/1	S-2	1		M	Gravel in spoon								
3						GM	Augered through Boulder from 2.5' to 5'								
4															
5	50+	50/3	S-3	3		M	Gy c-f Gravel (rock fragments)							397.0	
6							End of Boring at 5.5'								
7															
8															
9															
10														392.0	
11															
12															
13															
14															
15														387.0	
16															
17															
18															
19															
20														382.0	
21															
22															
23															
24															
25														377.0	

REMARKS: Surface elevations determined on-site by Tectonic's Survey Crew. Depth to bedrock indicates depth to auger refusal. Bedrock may be present at shallower depth as indicated under "Description of Material."

BORING LOG 5352-02.GPJ TECTONIC ENG.GDT 10/26/11

CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Bryan Figurski	
CONTRACTOR: General Borings, Inc.				9/1/11	10:50 am	9.2'	DRILLER: Eric	
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 409.6	
POWER AUGER:	3 1/4"	0 TO 11.5'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		DATUM: See Remarks			
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---		DATE START: 9/1/11			
CASING:		TO	WEATHER: Clear TEMP: 80°F		DATE FINISH: 9/1/11			
DIAMOND CORE:		TO	DEPTH TO ROCK: 11.5'		UNCONFINED COMPRESS. STRENGTH (TONS/FT)			
B-53 ATV Rig			*CHANGES IN STRATA ARE INFERRED			1 2 3 4 5		ELEVATION (FT.)

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)			ELEVATION (FT.)		
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. ROD (%)				MOISTURE	1	2		3	4
1	8	3 4 4	S-1	12		M	SM	0-4" Topsoil Bwn c-f SAND, some Silt, little c-f Gravel						
2		8												
3	98+	20 48 50/3	S-2	12		M	SM	Bwn c-f SAND, some c-f Gravel, little Silt						98
4								Augered to 5'						
5														404.6
6	57+	4 7 50/4	S-3	6		M	SM	Bwn-blk c-f SAND, little Silt, little c-f Gravel (weathered rock)						
7														
8								Augered through weathered rock to 10'						
9														
10														399.6
11	50+	42 50/5	S-4	5		W	GP	Gy c-f GRAVEL, little c-f Sand, trace Silt (weathered rock)						
12								End of Boring at 11.5'						
13														
14														
15														394.6
16														
17														
18														
19														
20														389.6
21														
22														
23														
24														
25														384.6

REMARKS: Surface elevations determined on-site by Tectonic's Survey Crew. Depth to bedrock indicates depth to auger refusal. Bedrock may be present at shallower depth as indicated under "Description of Material."

CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Bryan Figurski		
CONTRACTOR: General Borings, Inc.				9/1/11	9:00 am	8.75'	DRILLER: Eric		
METHOD OF ADVANCING BORING	DIA.	DEPTH				SURFACE ELEVATION: 426.9			
POWER AUGER:	3 1/4"	0 TO 11.5'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		DATUM: See Remarks				
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---		DATE START: 8/31/11				
CASING:		TO	WEATHER: Clear TEMP: 80°F		DATE FINISH: 8/31/11				
DIAMOND CORE:		TO	DEPTH TO ROCK: 11.5'		UNCONFINED COMPRESS. STRENGTH (TONS/FT)				
B-53 ATV Rig			*CHANGES IN STRATA ARE INFERRED						ELEVATION (FT.)

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES				UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)					ELEVATION (FT.)			
			SAMPLE NUMBER	RECOV.		MOISTURE				PLASTIC LIMIT %			WATER CONTENT %			LIQUID LIMIT %		
				LENGTH (IN.)	RQD (%)					10	20	30	40	50		10	20	30
1	15	2 5 10	S-1	12		M	SW-SM	Bwn c-f SAND, some c-f Gravel, trace Silt										
2		8																
3	15	10 8 7	S-2	12		M	GW	Gy c-f GRAVEL, some c-f Sand, little Silt										
4		5																
5	7	8 4 3	S-3	10		M	SM	Bwn c-f SAND, some Silt										421.9
6		3																
7	3	1 2	S-4	2		M	GM	Gy c-f GRAVEL, trace c-f Sand, Gravel in tip										
8		13																
9	93+	34 43 50/4	S-5	12		M	SM	Gy c-f SAND, some Silt, little c-f Gravel										93
10																		416.9
11	50+	25 50/1	S-6	6		W	GM	Gy c-f GRAVEL, some c-f Sand, little Silt										
12								End of Boring at 11.5'										
13																		
14																		
15																		411.9
16																		
17																		
18																		
19																		
20																		406.9
21																		
22																		
23																		
24																		
25																		401.9

REMARKS: Surface elevations determined on-site by Tectonic's Survey Crew. Depth to bedrock indicates depth to auger refusal. Bedrock may be present at shallower depth as indicated under "Description of Material."

PROJECT No. 5352.02
 PROJECT: Costco-Yorktown
 LOCATION: Yorktown, NY

BORING No. B-120

SHEET No. 1 of 1

CLIENT: Costco Wholesale			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Bryan Figurski	
CONTRACTOR: General Borings, Inc.							DRILLER: Eric	
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 431.4	
POWER AUGER:	3 1/4"	0 TO 5'	MON. WELL	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO	DATUM: See Remarks		
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---		DATE START: 9/1/11			
CASING:		TO	WEATHER: Clear		TEMP: 80°F	DATE FINISH: 9/1/11		
DIAMOND CORE:		TO	DEPTH TO ROCK: 5'		UNCONFINED COMPRESS. STRENGTH (TONS/FT)			
B-53 ATV Rig			*CHANGES IN STRATA ARE INFERRED			1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X ⊗ Δ 10 20 30 40 50 STANDARD PENETRATION (BLOWS/FT.) ● 10 20 30 40 50		

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)					ELEVATION (FT.)
			SAMPLE NUMBER	RECOV.					MOISTURE	1	2	3	4	
LENGTH (IN.)	ROD (%)	PLASTIC LIMIT %		WATER CONTENT %	LIQUID LIMIT %									
1	9	1 3 6	S-1	12		M	SM	0-6" Topsoil Bwn c-f SAND, some Silt						
2		11 17												
3	47	30 50/5	S-2	12		M	SM	Bwn c-f SAND, little Silt, little c-f Gravel						
4														
5								Auger refusal @ 5'						426.4
6								End of Boring at 5'						
7														
8														
9														
10														421.4
11														
12														
13														
14														
15														416.4
16														
17														
18														
19														
20														411.4
21														
22														
23														
24														
25														406.4

REMARKS: Surface elevations determined on-site by Tectonic's Survey Crew. Depth to bedrock indicates depth to auger refusal. Bedrock may be present at shallower depth as indicated under "Description of Material."

LEGEND FOR SOIL DESCRIPTION

COARSE GRAINED SOIL: (Coarser than No. 200 sieve)

DESCRIPTIVE TERM & GRAIN SIZE

<u>TERM</u>	<u>SAND</u>	<u>GRAVEL</u>
coarse - c	No. 4 Sieve to No. 10 Sieve	3" to 3/4"
medium - m	No. 10 Sieve to No. 40 Sieve	
fine - f	No. 40 Sieve to No. 200 Sieve	3/4" to 3/16"
<u>COBBLES</u>	3" to 10"	<u>BOULDERS</u> 10" +

GRADATION DESIGNATIONS

fine, f
 medium to fine, m-f
 medium, m
 coarse to medium, c-m
 coarse, c
 coarse to fine, c-f

PROPORTIONS OF COMPONENT

Less than 10% coarse to medium
 Less than 10% coarse
 Less than 10% coarse and fine
 less than 10% fine
 Less than 10% medium and fine
 All greater than 10%

FINE GRAINED SOIL: (Finer than No. 200 Sieve)

<u>DESCRIPTION</u>	<u>PLASTICITY INDEX</u>	<u>PLASTICITY</u>
Silt	0 - 1	none
Clayey Silt	2 - 5	slight
Silt & Clay	6 - 10	low
Clay & Silt	11 - 20	medium
Silty Clay	21 - 40	high
Clay	greater than 40	very high

PROPORTION:

<u>DESCRIPTIVE TERM</u>	<u>PERCENT OF SAMPLE WEIGHT</u>
trace	1 - 10
little	10 - 20
some	20 - 35
and	35 - 50

The primary component is fully capitalized

COLOR:

Blue - blue	Gy - gray	Wh - white
Blk - black	Or - orange	Yl - yellow
Bwn - brown	Rd - red	Lgt - light
Gn - green	Tn - tan	Dk - dark

SAMPLE NOTATION:

S - Split Spoon Soil Sample	WOC - Weight of Casing
U - Undisturbed Tube Sample	WOR - Weight of Rods
C - Core Sample	WOH - Weight of Hammer
B - Bulk Soil Sample	PPR - Compressive Strength based on Pocket Pentrometer
NR - No Recovery of Sample	TV - Shear Strength (tsf) based on Torvane

ADDITIONAL CLASSIFICATIONS:

New York City Building Code soil classifications are given in parentheses at the end of each description of material, if applicable. See Sections 1804.2 of the 2008 Building Code for further details.

TECTONIC			W.O. No. 5352.02		Date: 8/31/2011		TEST PIT	
			Project: Costco		TP-101			
			Location: Yorktown, NY					
(800) 829-6531								
Client: Costco Wholesale				Depth to Seepage: NE		Inspector: Bryan Figurski		
Contractor: General Borings, Inc.				Depth to Groundwater: NE		Surface Elevation: 447.4		
Equipment: Kobota Excavator				Depth to Bedrock: 5'		Datum:		
SAMPLES		Unified Soil Classification	DESCRIPTION OF MATERIAL	Strata Change (ft.)	REMARKS			
Sample No.	Moisture							
			Asphalt Concrete Pavement	0.25	442.4			
		GP	3/4" Crushed Stone	0.5				
	M	SM	Bwn c-f SAND, some Silt, little c-f Gravel, few Cobbles					
			Bucket Refusal @ 5'					
			Surface elevation determined on-site by Tectonic's survey crew.					
PARTICLE SIZE			PROPORTION (exclusive of boulders & cobbles)	PROPORTION (boulders & cobbles)	MOISTURE			
Boulder: 10"(+)	Sand: No.200 Sieve-3/16"		trace: 0-10%	sparse: 0-10%	D: dry			
Cobble: 3-10"	Silt/Clay: No.200 Sieve (-)		little: 10-20%	few: 10-35%	M: moist			
Gravel: 3/16"-3"			some: 20-35% and: 35-50%	many: 35-65%	W: wet			

TECTONIC (800) 829-6531		W.O. No. 5352.02	Date: 8/31/2011	TEST PIT TP-102		
		Project: Costco				
		Location: Yorktown, NY				
Client: Costco Wholesale			Depth to Seepage: 7.5'	Inspector: Bryan Figurski		
Contractor: General Borings, Inc.			Depth to Groundwater: 8'	Surface Elevation: 451.5		
Equipment: Kobota Excavator			Depth to Bedrock: 10'	Datum:		
SAMPLES		Unified Soil Classification	DESCRIPTION OF MATERIAL	Strata Change (ft.)	REMARKS	
Sample No.	Moisture					
			Topsoil	0.5		
	M	SM	Bwn c-f SAND, some Silt, little c-f Gravel, sparse Cobbles			
	W		Mottling @ 6-7' GW @ 8'			
			Bucket Refusal @ 10' End of Test Pit @ 10'		441.5	
					Surface elevation determined on-site by Tectonic's survey crew.	
PARTICLE SIZE		PROPORTION (exclusive of boulders & cobbles)		PROPORTION (boulders & cobbles)		MOISTURE
Boulder: 10"(+)	Sand: No.200 Sieve-3/16"	trace:	0-10%	sparse:	0-10%	D: dry
Cobble: 3-10"	Silt/Clay: No.200 Sieve (-)	little:	10-20%	few:	10-35%	M: moist
Gravel: 3/16"-3"		some:	20-35%	many:	35-65%	W: wet
		and:	35-50%			

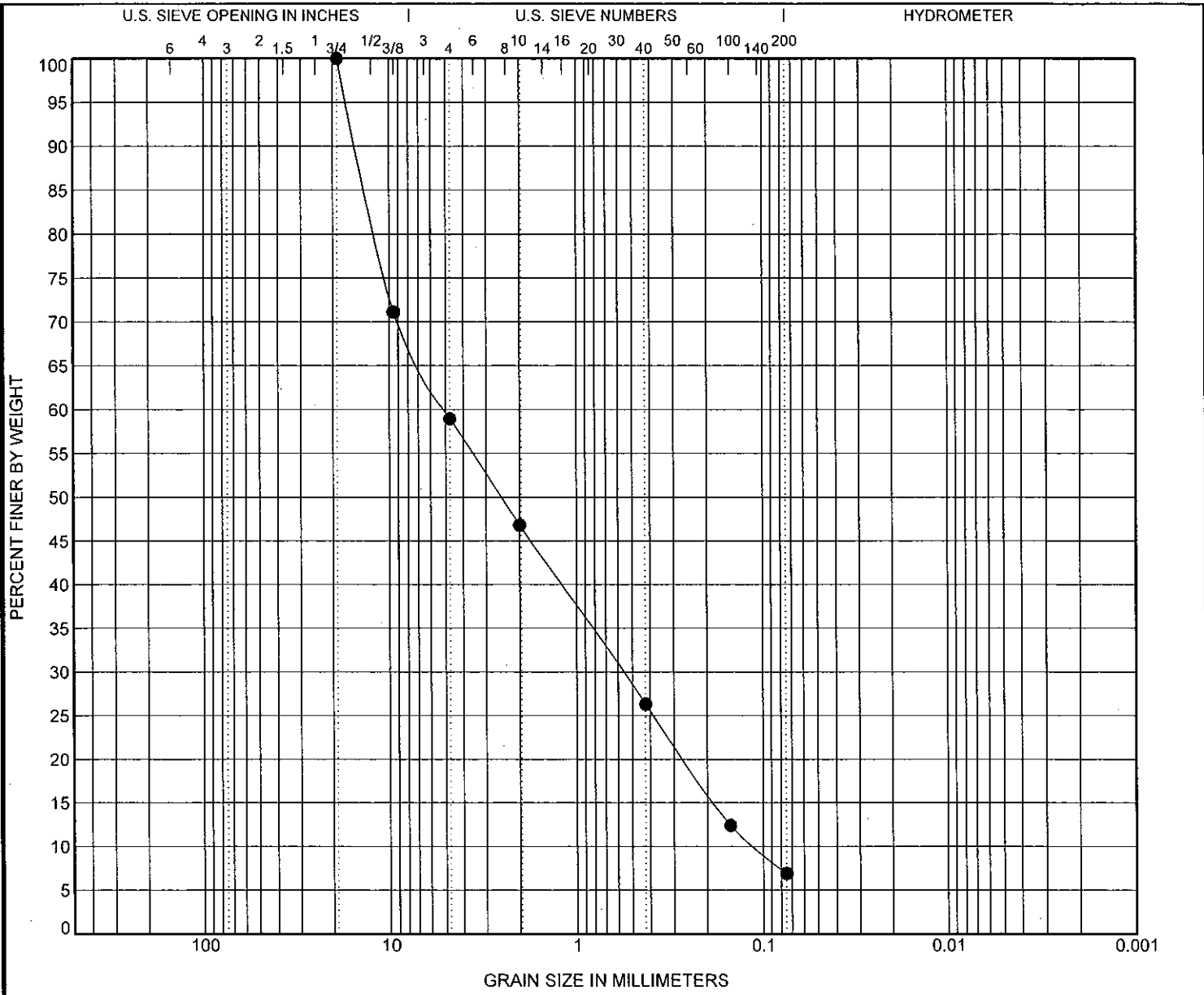
TECTONIC (800) 829-6531			W.O. No.	5352.02	Date:	8/31/2011 <th colspan="2" rowspan="2">TEST PIT TP-103</th>	TEST PIT TP-103	
			Project:	Costco		Location:		
Client: Costco Wholesale			Depth to Seepage:	7'		Inspector:	Bryan Figurski	
Contractor: General Borings, Inc.			Depth to Groundwater:	8'		Surface Elevation:	4535	
Equipment: Kobota Excavator			Depth to Bedrock:	9'		Datum:		
SAMPLES		Unified Soil Classification	DESCRIPTION OF MATERIAL			Strata Change (ft.)	REMARKS	
Sample No.	Moisture							
	M	SM	Topsoil Bwn c-f SAND, some Silt, little c-f Gravel, sparse boulder and cobbles Mottling @ 5-6' Seepage @ 7' Refusal on bedrock @ 9' End of Test Pit @ 9'			0.3	444.5	
PARTICLE SIZE Boulder: 10"(+) Sand: No.200 Sieve-3/16" Cobble: 3-10" Silt/Clay: No.200 Sieve (-) Gravel: 3/16"-3"			PROPORTION (exclusive of boulders & cobbles) trace: 0-10% little: 10-20% some: 20-35% and: 35-50%		PROPORTION (boulders & cobbles) sparse: 0-10% few: 10-35% many: 35-65%		MOISTURE D: dry M: moist W: wet	

Surface elevation determined on-site by Tectonic's survey crew.

TECTONIC (800) 829-6531		W.O. No. 5352.02	Date: 8/31/2011	TEST PIT TP-104	
		Project: Costco			
		Location: Yorktown, NY			
Client: Costco Wholesale			Depth to Seepage: NE	Inspector: Bryan Figurski	
Contractor: General Borings, Inc.			Depth to Groundwater: NE	Surface Elevation: 437.1	
Equipment: Kobota Excavator			Depth to Bedrock: 5'	Datum:	
SAMPLES		Unified Soil Classification	DESCRIPTION OF MATERIAL	Strata Change (ft.)	REMARKS
Sample No.	Moisture				
	M	SM	Topsoil	0.3	
			Bwn c-f SAND, some Silt, little c-f Gravel (few cobbles & boulders)		
			Bucket refusal @ 5' possible bedrock		432.1
			End of Test Pit @ 5'		
					Surface elevation determined on-site by Tectonic's survey crew.
PARTICLE SIZE			PROPORTION (exclusive of boulders & cobbles)	PROPORTION (boulders & cobbles)	MOISTURE
Boulder: 10"(+)	Sand: No.200 Sieve-3/16"		trace: 0-10%	sparse: 0-10%	D: dry
Cobble: 3-10"	Silt/Clay: No.200 Sieve (-)		little: 10-20%	few: 10-35%	M: moist
Gravel: 3/16"-3"			some: 20-35%	many: 35-65%	W: wet
			and: 35-50%		

TECTONIC (800) 829-6531		W.O. No. 5352.02	Date: 8/31/2011	TEST PIT TP-105		
		Project: Costco				
		Location: Yorktown, NY				
Client: Costco Wholesale		Depth to Seepage: NE	Inspector: Bryan Figurski			
Contractor: General Borings, Inc.		Depth to Groundwater: NE	Surface Elevation: 405+/-			
Equipment: Kobota Excavator		Depth to Bedrock: 1.8'	Datum:			
SAMPLES		Unified Soil Classification	DESCRIPTION OF MATERIAL	Strata Change (ft.)	REMARKS	
Sample No.	Moisture					
	M	SM	Topsoil	0.3	Surface elevation esimated based on topography shown on untitled survey drawing provided by the Client.	
			Bwn c-f SAND, some Silt, little c-f Gravel			
			Bucket Refusal @ 1.8'	1.8		
			End of Test Pit @ 1.8'			
PARTICLE SIZE		PROPORTION (exclusive of boulders & cobbles)		PROPORTION (boulders & cobbles)		MOISTURE
Boulder: 10*(+)	Sand: No.200 Sieve-3/16"	trace:	0-10%	sparse:	0-10%	D: dry
Cobble: 3-10"	Silt/Clay: No.200 Sieve (-)	little:	10-20%	few:	10-35%	M: moist
Gravel: 3/16"-3"		some:	20-35%	many:	35-65%	W: wet
		and:	35-50%			

APPENDIX II



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Sample Identification	Classification					WC%	LL	PL	PI	Cc	Cu
● B-5 4.0 S-3	Tn c-f SAND, and f Gravel, trace Silt					4.4				0.57	45.60

Sample Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay	Source of Material
● B-5 4.0 S-3	19	5.038	0.561	0.11	41.0	52.0	6.9		Boring

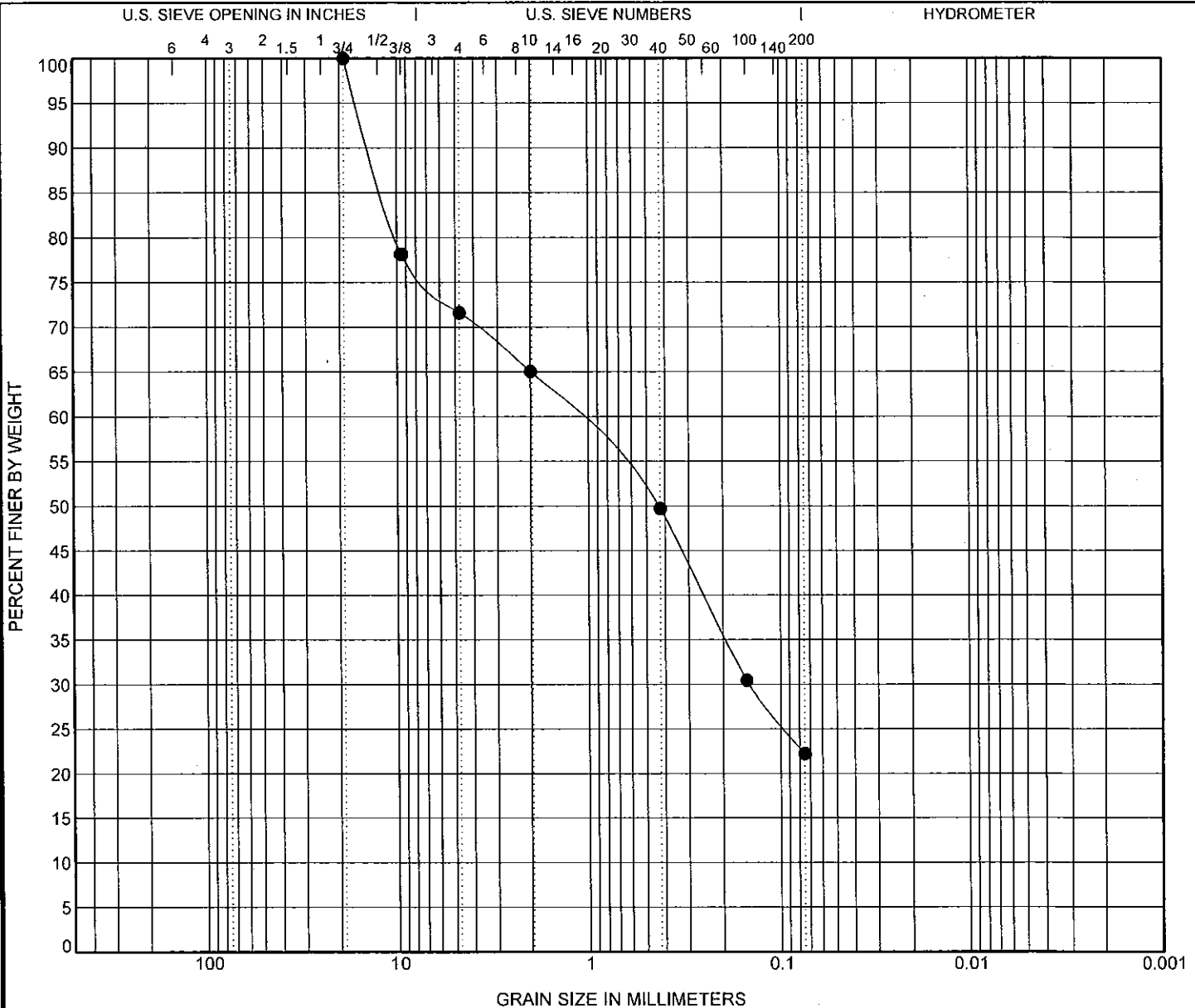
TECTONIC ENGINEERING & SURVEYING CONSULTANTS P.C.

2570 Route 9W
 Cornwall, NY 12518
 Telephone: (845) 534-3450 Fax: (854) 534-3556

GRAIN SIZE DISTRIBUTION

Project No: 5352.01 Date: 1/12/10
 Project: COSTCO
 Location: Yorktown Heights, NY

GRAIN SIZE DISTRIBUTION 5352.01.GPJ TECTONIC ENG.GDT 1/12/10



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

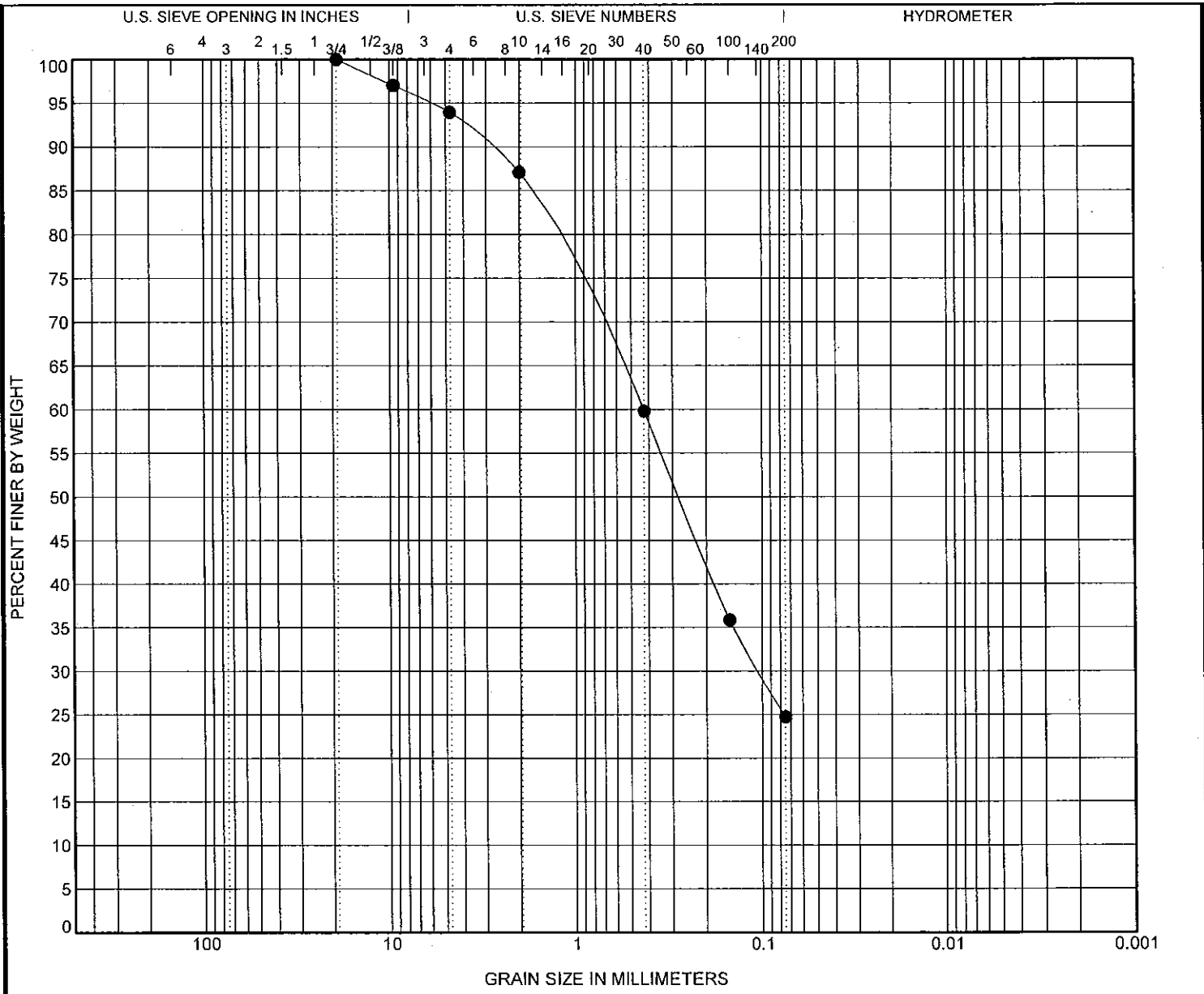
Sample Identification	Classification					WC%	LL	PL	PI	Cc	Cu
● B-13 5.0 S-3	Tn c-f SAND, some f Gravel, some Silt					9.5					

Sample Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay	Source of Material
● B-13 5.0 S-3	19	1.2	0.144		28.4	49.4	22.2		Boring

TECTONIC ENGINEERING & SURVEYING
CONSULTANTS P.C.
2570 Route 9W
Cornwall, NY 12518
Telephone: (845) 534-3450 Fax: (854) 534-3556

GRAIN SIZE DISTRIBUTION
Project No: 5352.01 Date: 1/12/10
Project: COSTCO
Location: Yorktown Heights, NY

GRAIN SIZE DISTRIBUTION 5352.01.GPJ TECTONIC ENG.GDT 1/12/10



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

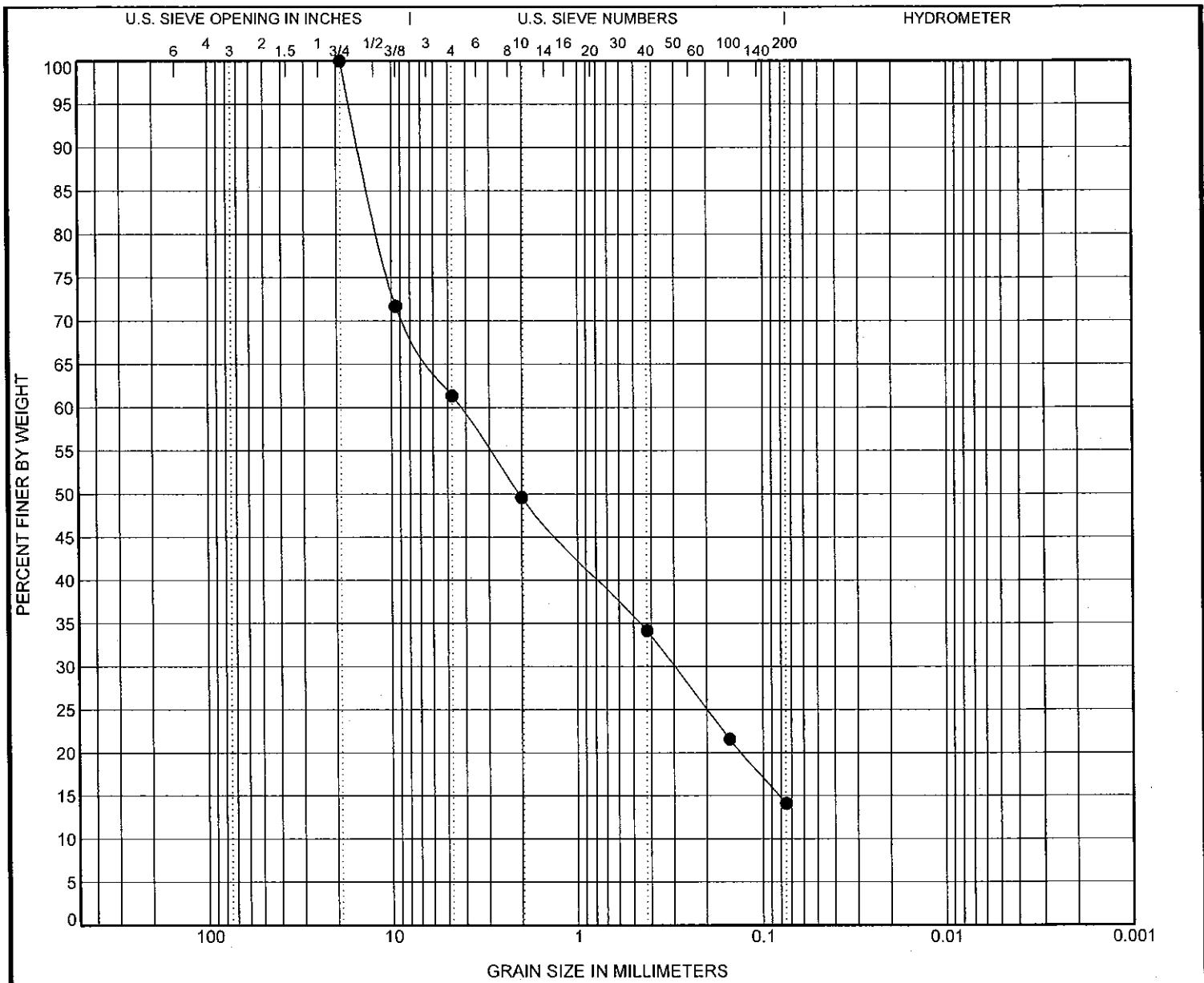
Sample Identification	Classification					WC%	LL	PL	PI	Cc	Cu
● B-20 4.0 S-3	Tn c-f SAND, some Silt, trace f Gravel					7.7					

Sample Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay	Source of Material
● B-20 4.0 S-3	19	0.429	0.104		6.0	69.2	24.7		Boring

GRAIN SIZE DISTRIBUTION 5352.01.GPJ TECTONIC ENG.GDT 1/12/10

TECTONIC ENGINEERING & SURVEYING
CONSULTANTS P.C.
2570 Route 9W
Cornwall, NY 12518
Telephone: (845) 534-3450 Fax: (854) 534-3556

GRAIN SIZE DISTRIBUTION
Project No: 5352.01 Date: 1/12/10
Project: COSTCO
Location: Yorktown Heights, NY



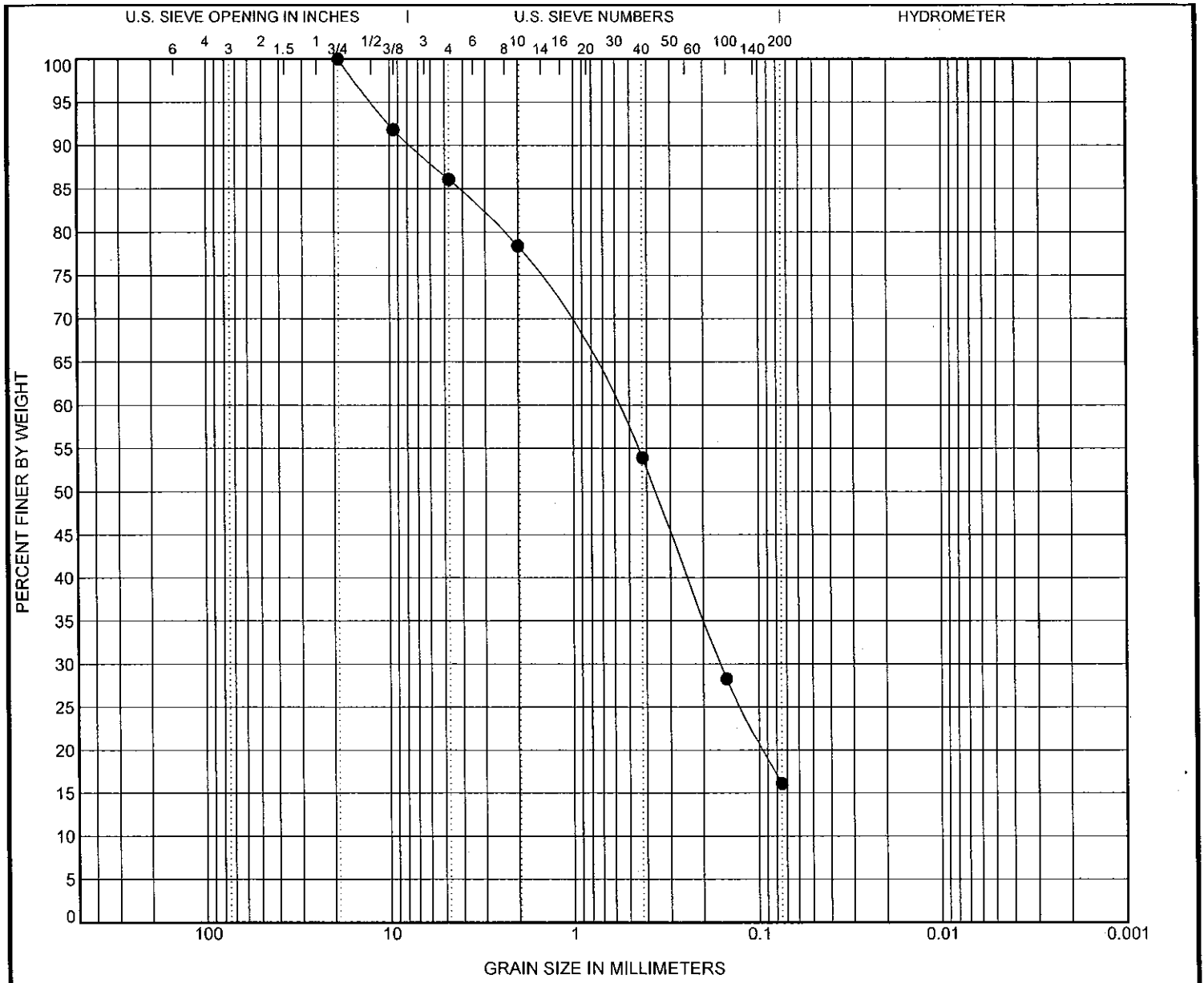
COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Sample Identification			Classification					WC%	LL	PL	PI	Cc	Cu
●	B-28	4.0 S-3	Tn c-f SAND, and f Gravel, little Silt					8.6					

Sample Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay	Source of Material
●	B-28	4.0 S-3	19	4.296	0.301		38.6	47.2	14.1		Boring

GRAIN SIZE DISTRIBUTION 5352.01.GPJ TECTONIC ENG.GDT 1/12/10

<h1>TECTONIC</h1> <p>ENGINEERING & SURVEYING CONSULTANTS P.C.</p> <p>2570 Route 9W Cornwall, NY 12518 Telephone: (845) 534-3450 Fax: (845) 534-3556</p>	<h2>GRAIN SIZE DISTRIBUTION</h2>	
	Project No: 5352.01	Date: 1/12/10
	Project: COSTCO	Location: Yorktown Heights, NY



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Sample Identification	Classification					WC%	LL	PL	PI	Cc	Cu
● B-43 4.0 S-3	Tn c-f SAND, little Silt, little f Gravel					11.1					

Sample Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay	Source of Material
● B-43 4.0 S-3	19	0.623	0.161		13.9	70.0	16.1		Boring

TECTONIC ENGINEERING & SURVEYING
CONSULTANTS P.C.

2570 Route 9W
Cornwall, NY 12518
Telephone: (845) 534-3450 Fax: (845) 534-3556

GRAIN SIZE DISTRIBUTION

Project No: 5352.01 Date: 1/12/10
Project: COSTCO
Location: Yorktown Heights, NY

GRAIN SIZE DISTRIBUTION 5352.01.GPJ TECTONIC ENG.GDT. 1/12/10



California Bearing Ratio

ASTM D 1883

Work Order #: 5352.01

Date Tested: 12/31/2009

Project: Costco, Yorktown Heights

Soil ID: BS-1 Bwn c-f SAND, little c-f Gravel, little Silt, Roots & Grass	Sampled: 12/17/09
Maximum Dry Density: 120.1	Optimum Moisture Content: 9.6%

CBR point #1: Sample Preparation: ASTM D 1557 method C, 56 blows per layer, soaked for 96 hours

Dry Density before soak (PCF): **105.76** 88.1%
 Dry Density after soak (PCF): **108.13** 90.0%

Moisture Content before compaction: -
 Moisture Content after compaction: **16.1%**
 Moisture Content of top 1" after soak: **21.3%**

Sample Height Swell after soak: -

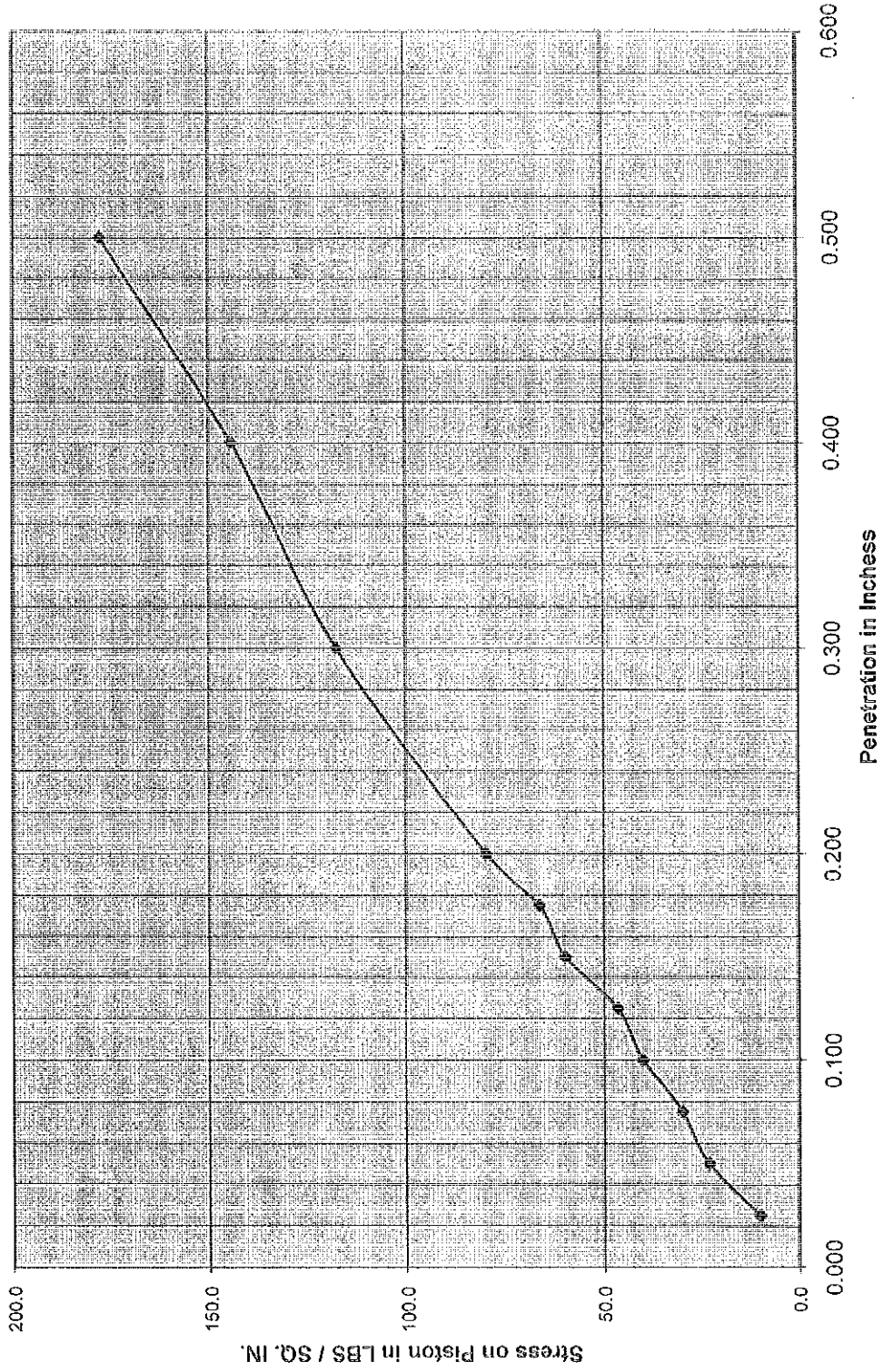
Bearing Ratio : **5.32%**

Piston Area (square inches): 3.01

Surcharge Weight amount: 10.0 lbs

PENETRATIO N (Inches)	RING DEFLECTION	LOAD	STRESS (PSI)	CORRECTED STRESS	BEARING RATIO
0.025	0.003	30	10.0	-	
0.050	0.007	70	23.3	-	
0.075	0.009	90	29.9	-	
0.100	0.012	120	39.9	-	3.987
0.125	0.014	140	46.5	-	
0.150	0.018	180	59.8	-	
0.175	0.02	200	66.4	-	
0.200	0.024	240	79.7	-	5.316
0.300	0.036	355	117.9	-	6.207
0.400	0.044	435	144.5	-	6.283
0.500	0.054	535	177.7	-	6.836

Load Penetration curve



Series1



California Bearing Ratio

ASTM D 1883

Work Order #: 5352.01

Project: Costco, Yorktown Heights

Date Tested: 12/31/2009

Soil ID: BS-1 Bwn c-f SAND, little c-f Gravel, little Silt, Roots & Grass Sampled: 12/17/09
Maximum Dry Density: 120.1 Optimum Moisture Content: 9.6%

CBR point #2: Sample Preparation: ASTM D 1557 method C, 25 blows per layer, soaked for 96 hours

Dry Density before soak (PCF): 110.6 92.1%

Dry Density after soak (PCF): 97.5 81.2%

Moisture Content before compaction: -

Moisture Content after compaction: 11.9%

Moisture Content of top 1" after soak: 23.9%

Sample Height Swell after soak: -

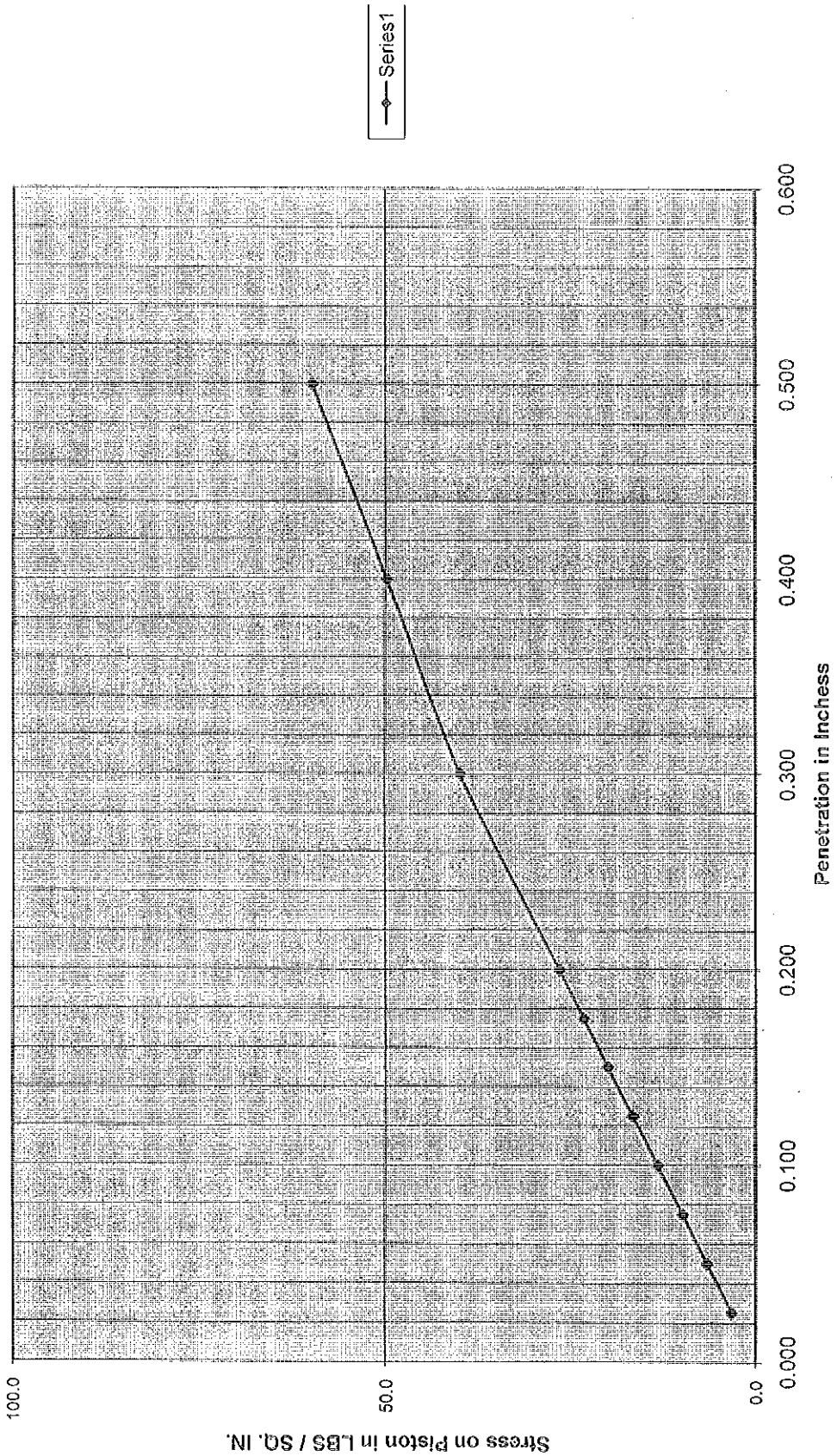
Bearing Ratio : 1.77%

Piston Area (square inches): 3.01

Surcharge Weight amount: 10.0 lbs

PENETRATIO N (Inches)	RING DEFLECTION	LOAD	STRESS (PSI)	CORRECTED STRESS	BEARING RATIO
0.025	0.001	10	3.3	-	
0.050	0.002	20	6.6	-	
0.075	0.003	30	10.0	-	
0.100	0.004	40	13.3	-	1.329
0.125	0.005	50	16.6	-	
0.150	0.006	60	19.9	-	
0.175	0.007	70	23.3	-	
0.200	0.008	80	26.6	-	1.772
0.300	0.012	120	39.9	-	2.098
0.400	0.015	150	49.8	-	2.167
0.500	0.018	180	59.8	-	2.300

Load Penetration curve





California Bearing Ratio

ASTM D 1883

Work Order #: 5352.01

Date Tested: 12/31/2009

Project: Costco, Yorktown Heights

Soil ID: BS-1 Bwn c-f SAND, little c-f Gravel, little Silt, Roots & Grass	Sampled: 12/17/09
Maximum Dry Density: 120.1	Optimum Moisture Content: 9.6%

CBR point #3: Sample Preparation: ASTM D 1557 method C, 10 blows per layer, soaked for 96 hours

Dry Density before soak (PCF): 114.6 95.4%
 Dry Density after soak (PCF): 107.66 89.6%

Moisture Content before compaction: -
 Moisture Content after compaction: 9.1%
 Moisture Content of top 1" after soak: 20.6%

Sample Height Swell after soak: -

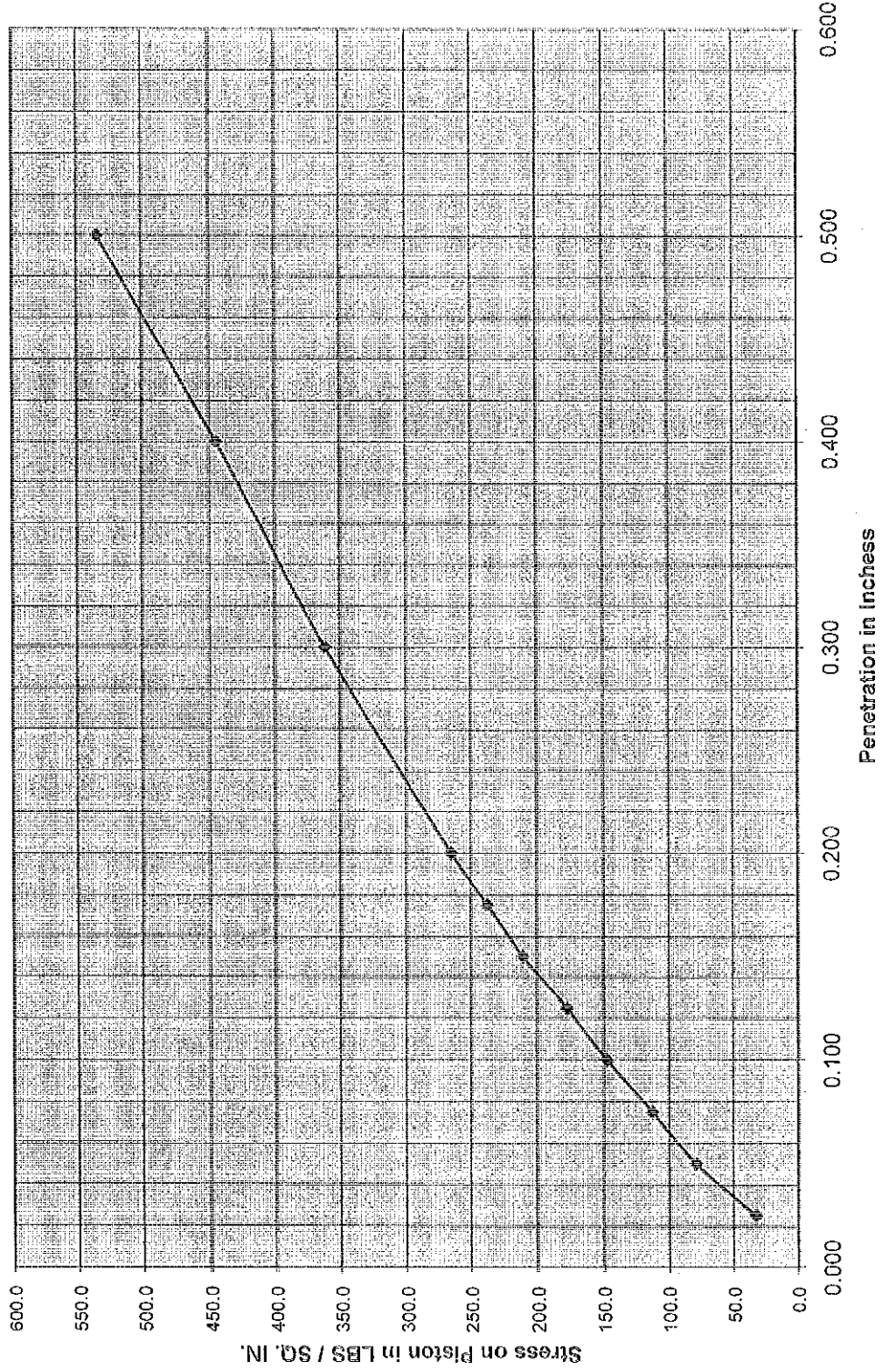
Bearing Ratio : 17.72%

Piston Area (square inches): 3.01

Surcharge Weight amount: 10.0 lbs

PENETRATIO N (Inches)	RING DEFLECTION	LOAD	STRESS (PSI)	CORRECTED STRESS	BEARING RATIO
0.025	0.01	100	33.2	-	
0.050	0.024	240	79.7	-	
0.075	0.034	340	113.0	-	
0.100	0.045	445	147.8	-	14.784
0.125	0.054	535	177.7	-	
0.150	0.064	635	211.0	-	
0.175	0.072	715	237.5	-	
0.200	0.081	800	265.8	-	17.719
0.300	0.11	1090	362.1	-	19.059
0.400	0.135	1340	445.2	-	19.356
0.500	0.162	1610	534.9	-	20.572

Load Penetration curve



Series1



REPORT OF TESTING
Lab Resistivity ASTM G-57

Project : **Material Testing**

Date: **January 8, 2010**

Client: **Tectonic Engineering**

QCQA Proj No.:

Scope: Six samples were delivered to our office for the purpose of resistivity testing. The samples were identified as B-9 S-2, B-9 S-3, B-9 S-4, B-29 S-2, B-29 S-3, and B-29 S-4. The samples were composited into 2 samples (B-9 S-2 to S-4) and (B-29 S-2 to S-4) for testing. Both samples were tested at the "as received" moisture content. Composite sample B-9 was then also tested at a "saturated" condition. Testing was performed utilizing a Nilsson Soil Resistance Meter Model 400.

Results of the testing are as follows:

Sample ID	Lab Resistivity	
	Moisture %	ohm - cm
B-9 S-2,3,4 0 - 9 ft.	As Received	390,000
	Saturated	47,000
B-29 S-2,3,4 0 - 8 ft.	As Received	11,000

If you should have any questions or require additional information please contact our office.

Respectfully Submitted,
QCQA Labs, Inc.

William G. Stanton
Lab Manager



Environmental Laboratories, Inc.
 587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
 Tel. (860) 645-1102 Fax (860) 645-0823



Analysis Report

January 07, 2010

FOR: Attn: Mr. Scott Doehla
 Tectonic Engineering
 70 Pleasant Hill Road
 Mountainville, NY 10953

Sample Information

Matrix: SOIL
 Location Code: TECTONIC
 Rush Request:
 P.O.#:

Custody Information

Collected by:
 Received by: LB
 Analyzed by: see "By" below

Date Time
 01/05/10 0:00
 01/05/10 17:00

Laboratory Data

SDG ID: GAS64834
 Phoenix ID: AS64834

Project ID:

Client ID: B-44 S-7

Parameter	Result	RL	Units	Date	Time	By	Reference
Percent Solid	88		%	01/06/10		S/JL	E160.3
Chloride	58	11	mg/kg	01/06/10		B/E	9056
pH - Soil	7.37	0.10	PH	01/07/10	0:40	EW/LK	4500-H B/9045
Sulfate	< 34	34	mg/kg	01/06/10		B/E	9056

1 = This parameter is not certified by NY NELAC for this matrix. NY NELAC does not offer certification for all parameters.

Comments:

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

ND=Not detected BDL=Below Detection Level RL=Reporting Level

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Phyllis Shiller, Laboratory Director

January 07, 2010



Environmental Laboratories, Inc.
 587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
 Tel. (860) 645-1102 Fax (860) 645-0823



Analysis Report
 January 07, 2010

FOR: Attn: Mr. Scott Doehla
 Tectonic Engineering
 70 Pleasant Hill Road
 Mountainville, NY 10953

Sample Information

Matrix: SOIL
 Location Code: TECTONIC
 Rush Request:
 P.O.#:

Custody Information

Collected by:
 Received by: LB
 Analyzed by: see "By" below

Date Time
 01/05/10 0:00
 01/05/10 17:00

Laboratory Data

SDG ID: GAS64834
 Phoenix ID: AS64835

Project ID:

Client ID: B-15 S-5

Parameter	Result	RL	Units	Date	Time	By	Reference
Percent Solid	97		%	01/06/10		S/JL	E160.3
Chloride	< 10	10	mg/kg	01/06/10		B/E	9056
pH - Soil	7.08	0.10	PH	01/07/10	0:40	EW/LK	4500-H B/9045
Sulfate	< 31	31	mg/kg	01/06/10		B/E	9056

1 = This parameter is not certified by NY NELAC for this matrix. NY NELAC does not offer certification for all parameters.

Comments:

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

ND=Not detected BDL=Below Detection Level RL=Reporting Level

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Phyllis Shiller, Laboratory Director
 January 07, 2010



Environmental Laboratories, Inc.

587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823



QA/QC Report

January 07, 2010

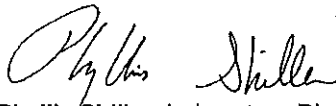
QA/QC Data

SDG I.D.: GAS64834

Parameter	Blank	Dup	LCS	LCSD	LCS	MS	MS Dup	RPD
		RPD	%	%	RPD	Rec %	Rec %	
QA/QC Batch 144934, QC Sample No: AS64896 (AS64834, AS64835)								
Chloride	BDL	NC	91.6			92.2		
QA/QC Batch 144936, QC Sample No: AS64896 (AS64834, AS64835)								
Nitrate as Nitrogen	BDL	NC	99.0			96.7		
QA/QC Batch 144935, QC Sample No: AS64896 (AS64834, AS64835)								
Nitrite as Nitrogen	BDL	NC	99.0			95.3		
QA/QC Batch 144937, QC Sample No: AS64896 (AS64834, AS64835)								
Sulfate	BDL	NC	94.9			97.5		
QA/QC Batch 144929, QC Sample No: AS65201 (AS64834, AS64835)								
pH - Sludge		0.90	98.0					

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

- RPD - Relative Percent Difference
- LCS - Laboratory Control Sample
- LCSD - Laboratory Control Sample Duplicate
- MS - Matrix Spike
- MS Dup - Matrix Spike Duplicate
- NC - No Criteria


 Phyllis Shiller, Laboratory Director
 January 07, 2010



CHAIN OF CUSTODY RECORD

587 East Middle Turnpike, P.O. Box 370, Manchester, CT 06040
 Email: service@phoenixlabs.com Fax: (860) 645-0823

Client Services (860) 645-8726

Temp Pg of

Data Delivery:

Fax #:
 Email:

Customer: Tectonic
 Address: _____

Project: _____
 Report to: Scott Daehla
 Invoice to: _____

Project P.O.: _____
 Phone #: _____
 Fax #: _____

Client Sample - Information - Identification

Sampler's Signature _____ Date _____

Matrix Code: _____
 DW=drinking water WW=wastewater S=solid O=other
 GW=groundwater SL=sludge A=air

Phoenix Sample #	Customer Sample Identification	Sample Matrix	Date Sampled	Time Sampled
64834	B-44 S-7	S	1-5	-
64835	B-15 S-5	S	1-5	-

Analysis Request
 PH Sulfate Chloride
 Soil VOA (Methanol) S, Benfale (H2O)
 GL Soil container () oz
 40 ml VOA Val (Asst) (HCl)
 GL Amber 1000ml (Asst) (H2SO4)
 PL Asst () 250ml () 500ml () 1000ml
 PL H2SO4 () 250ml () 500ml () 1000ml
 PL HNO3 250ml
 Bacteria Boile

Relinquished by:	Accepted by:	Date:	Time:
	<u>John Brisola</u>	1-5-10	18:00

Turnaround: 1 Day* 2 Days* 3 Days* Standard Other

* SURCHARGE APPLIES

CTRI: RCP Cert. GW Protect. GA Mobility GB Mobility SW Protect. Res. Vol. Ind. Vol. Res. Criteria Other

MA: MCP Cert. GW-1 GW-2 GW-3 S-1 S-2 S-3 MWRA eSMART Other

Data Format: Excel PDF GIS/Key EQUIS Other

Data Package: ASP-A NJ Reduced Deliv. * NJ Hazsite EDD Phoenix Std Report Other

State where samples were collected: _____

Comments, Special Requirements or Regulations:
 Rcvd without Chain of Custody
 Run analysis listed per Scott Daehla (LB)

TECTONIC

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www.tectonicengineering.com

Regional Offices Albany, NY
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