Geotechnical Engineering Structure Report
Final Design Submission
Flatbush Ave. Over Busway
State Project 63-643
West Hartford/Hartford, Connecticut

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Table of Contents

1.0 GENERAL INFORMATION 1
- **1.1 General 1**
- **1.2 Datum 1**
- **1.3 Existing Conditions 1**
- **1.4 Design Criteria 2**
- **1.5 Proposed Structure 2**
- **1.6 Proposed Approach Embankments 2**

2.0 GEOLOGY 2
- **2.1 Alluvial Deposit 3**
- **2.2 Glaciolacustrine Deposit 3**
- **2.3 Glaciofluvial Deposit 3**
- **2.4 Glacial Till 3**
- **2.5 Bedrock 3**

3.0 EXISTING GEOTECHNICAL INFORMATION 4
- **3.1 General 4**
- **3.2 Laboratory Test Data 4**

4.0 SUBSURFACE EXPLORATIONS 4
- **4.1 Test Borings 4**
- **4.2 Field Vane Shear Testing 5**
- **4.3 Observation Wells 5**

5.0 LABORATORY TESTING RESULTS AND INTERPRETATION 5
- **5.1 Constant Rate of Strain (CRS) Consolidation Tests 5**
- **5.2 Incremental Load (IL) Consolidation Tests 5**
- **5.3 Direct Simple Shear (DSS) Tests 6**
- **5.4 Unconfined Rock Compression Tests 6**
- **5.5 Atterberg Limits 7**
- **5.6 Moisture Contents 7**
- **5.7 Minus No. 200 Sieve Tests 8**
- **5.8 Sieve Analyses 8**
- **5.9 Hydrometer Analyses 8**
- **5.10 Corrosivity Tests 8**
- **5.11 Stress History 9**

6.0 SUBSURFACE CONDITIONS 9
- **6.1 Subsurface Profile 9**
- **6.2 Groundwater 11**

7.0 EVALUATION AND RECOMMENDATIONS 11
7.1 Bridge Foundations 11
7.1.1 Foundation Type 11
7.1.2 Pile Lengths 11
7.1.3 Down-drag Loads 12
7.1.4 Down-drag Load Reduction 12
7.1.5 Corrosion Protection of Steel Piles 12
7.1.6 Pile Type Selection 13
7.1.7 Pile Batter 14
7.1.8 Pile Spacing 14
7.1.9 Pile Splicing 14
7.1.10 Pile Load Testing 14
7.1.11 Abutment/Pier Settlement 14
7.1.12 Obstructions 15
7.1.13 Static Design Parameters 15
7.1.14 Seismic Design 15
7.1.15 Abutment and Wingwall Drainage and Backfill Requirements 15
7.2 Approach Embankments 15
7.2.1 Settlements Resulting from Embankment Loads 15
7.2.2 Embankment Settlements 16
7.2.3 Utility Settlements 16
7.2.4 Railway Track Settlement 17
7.2.5 Existing Building Settlement 17
7.2.6 Rate of Settlement 17
7.2.7 Approach Slabs 18
7.2.8 Embankment Stability near Bridge 18
7.3 Construction Considerations 19
7.3.1 Protection of Existing Railroad Against Excavation 19
7.3.2 Vibrations and Construction-Induced Settlements 19
7.3.3 Monitoring of Utilities 19
7.3.4 Monitoring of Amtrak Railway Tracks 19
7.3.5 Monitoring of One-Story Building 19
7.3.6 Dewatering 20
7.4 Special Provisions 20
8.0 LIMITATIONS 20

ATTACHMENTS

Appendix 1 Figures

Appendix 2 Tables and Charts

Appendix 3 2003 Boring Logs

Appendix 4 2008 Boring Logs and CPT Logs

Appendix 5 Consolidation Test Results

2003 Consolidation Tests
2008 Constant Rate of Strain Consolidation Tests
2008 Incremental Load Consolidation Tests

Appendix 6 Strength Test

2003 Triaxial Tests
2008 Direct Simple Shear Tests

Appendix 7 Atterberg Limits and Moisture Contents

2003 Atterberg Limits
2008 Atterberg Limits
2003 Moisture Contents
2008 Moisture Contents

Appendix 8 Gradation and Hydrometer Tests

2003 Gradation and Hydrometer Tests
2008 Gradation Tests
2008 Minus No. 200 Gradation Tests
2008 Hydrometer Tests

Appendix 9 Corrosivity Tests

2003 Corrosivity Tests
2008 Corrosivity Tests

Appendix 10 Unconfined Compression Tests (Rock)

Appendix 11 Limitations

1.0 GENERAL INFORMATION

1.1 General

This report summarizes the final design subsurface exploration program, inferred subsurface conditions, and geotechnical analyses; it also provides geotechnical engineering recommendations for foundation design for the proposed bridge structure which will carry Flatbush Ave. over the proposed Busway in Hartford and West Hartford, Connecticut. The Flatbush portion of Busway is State Project No. 63-643.

The remaining Busway project is State Project No. 155-H025. The Busway project entails the design and construction of a 9.4-mile roadway connecting downtown New Britain and downtown Hartford. The Busway will be part of a dedicated Bus Rapid Transit System. The Busway will be adjacent to and west of the existing Amtrak railroad tracks.

The Busway begins at the intersection of Oakwood Avenue and the Amtrak railroad (Station 332+00), and ends at the intersection of Sigourney Street and Amtrak Railroad (Station 450+00). The location of the proposed bridge is shown on Figures No. 1 and 2 (Appendix 1).

URS Corporation is the Prime Designer for this section of the Busway. Geo**Design**, Inc. (Geo**Design**) is the Geotechnical Subconsultant to URS.

1.2 Datum

All elevations referenced in this report are in feet and are based on NGVD 1929. The coordinates are based on Connecticut Coordinate System, NAD 1983.

1.3 Existing Conditions

Flatbush Ave. (east-west direction) intersects the proposed Busway alignment and Amtrak rail lines (north-south direction) at a 70-degree skew angle between New Park Ave./Flatbush Ave. and the Newfield Ave./Flatbush Ave. intersections. Figure No. 2 depicts the site.

Flatbush Ave. currently intersects the two Amtrak railroad tracks at the at-grade crossing. The existing grade gradually slopes downward from Elev. 74 to Elev. 70 from west to east.

Overhead utilities exist along the south side of Flatbush Avenue and along the west side of Amtrak's right-of-way, north of Flatbush Avenue. A buried fiber optic cable is also present along the west side of the tracks, within the Amtrak right-of-way. These utilities and related appurtenances will need to be relocated and/or replaced to accommodate the construction of this structure. Amtrak railroad crossing lights, gates and signalization exist along both sides of the existing at-grade crossing on Flatbush Avenue. These utilities are to be removed since they will no longer be required.

Existing utilities, including water, gas and sewer, extend under and/or near to Flatbush Ave and Newfield Ave. These will be affected by embankment fill up to 26 feet in height. These utilities are to remain until new utilities are constructed along the new alignment.

A one-story steel building is located to the northeast of the intersection of Newfield and Flatbush Avenues. The building footprint is about 30,000 square feet. One corner of the building is as close as 15 feet to the proposed embankment.

1.4 Design Criteria

Foundation design recommendations are based on AASHTO Load and Resistance Factor Bridge Design Specifications 2004, 3rd Edition with 2006 interims and Connecticut Department of Transportation Geotechnical Engineering Manual, 2005 Edition. Seismic design recommendations are based on AASHTO Load and Resistance Factor Bridge Design Specifications 4th Edition, 2007 (AASHTO LRFD) with 2008 Interims. Recommendations are also based on State of Connecticut Department of Transportation (ConnDOT) Standard Specifications for Roads, Bridges, and Incidental Construction, Form 816 (2004). American Society for Testing and Materials (ASTM) publications were followed as the reference standards for all field and laboratory tests applicable.

1.5 Proposed Structure

A new overpass bridge is proposed at the Flatbush Ave./Amtrak intersection to elevate Flatbush Ave. above the proposed Busway and the existing Amtrak Railroad. The bridge will be approximately 80 feet wide and 170 feet long. It will be supported on two abutments and a center pier. Abutments 1 and 2 will be approximately 17 and 26 feet high respectively. Figures No. 3 and 4 depict profiles of the proposed bridge and approach embankments. Figure 5, 6 and 7 depict profiles along the abutments and the pier.

1.6 Proposed Approach Embankments

To accommodate the grade changes required by the new bridge, embankment fills will be constructed between Newfield and New Park Avenues.

Fill thickness will vary from about 1 to 2 feet at the intersection of Newpark and Flatbush Avenues to 17 feet west of Abutment 1, to 26 feet east of Abutment 2, to 15 feet at the intersection of Newfield and Flatbush Avenues. Embankments will be retained by five retaining walls (RW101 through RW105). As a result, the edges of the embankment will be vertical. Design recommendations for the retaining walls will be included in a separate report.

2.0 GEOLOGY

Published geologic data for this locale indicate that an Alluvial deposit overlies a Glaciolacustrine deposit, the prevalent surficial material in this area, below fill. A Glaciofluvial deposit and Glacial Till underlie the Glaciolacustrine deposit. These unconsolidated materials

overlie bedrock of the Portland Arkose formation. These layers were formed in a bottom to top sequence; thus, the shallower a layer the younger its geological age.

2.1 Alluvial Deposit

Alluvial deposits consist of sediments deposited by present day streams. This deposit is a non-continuous layer with a varying thickness. It consists of fine to medium grained Sand/Silt, with some Clay and little Gravel.

2.2 Glaciolacustrine Deposit

When the late Pleistocene ice sheet in New England retreated about fifteen thousand (15,000) years ago, the Glaciolacustrine deposit was formed in Glacial Lake Hitchcock. The Glaciolacustrine deposit in this area is distinctively featured by alternating layers of clay and silt. Each pair of clay and silt layers is called a "varve", which corresponds to glacial lake deposit of a year: when the glacier melted, melt water streams brought soil particles into Glacial Lake Hitchcock. During the summer, a larger volume of water formed a more turbulent flow. This flow was capable of carrying silt particles (sometimes even larger particles) and settling them on the lake bottom. During the winter, when the volume of melt water decreased and frozen lake surface calmed the water, clay particles were deposited out of suspension. As a result of many years' deposit, the "varved" structure dominated the Glaciolacustrine deposit in this region. The deposit could contain several hundred or even several thousand varves. The thickness of the varves is variable.

Although this deposit contains significant amount of Silt, the literature typically refers to the Glaciolacustrine deposit in this area as Varved Clay. Conforming to tradition, the term "Varved Clay" will be used in this report.

2.3 Glaciofluvial Deposit

Streams of melt water carried and deposited particles and formed this layer the before Varved Clay layer was deposited. The Glaciofluvial deposit consists of a heterogeneous mixture of sand, gravel, silt and clay in order of decreasing quantity.

2.4 Glacial Till

Glacial Till consists of a heterogeneous mixture of different sized particles. The composition of Till demonstrates a wide range of variation in particle size as well as in percentage of each size. Two extremes of these variations are stony till and clayey till. The former contains more than fifty percent of gravels, pebbles, cobbles and boulders. The latter consists of more than fifty percent of clay size particles.

2.5 Bedrock

The Portland Arkose formation, a sedimentary bedrock unit, is the dominating formation in this locale. Its texture ranges from coarse conglomerate to shale.

3.0 EXISTING GEOTECHNICAL INFORMATION

During the preliminary design phase (in 2003) Baker Engineering N.Y. (Baker) and their subcontractors, performed borings and laboratory tests.

3.1 General

Pilot Borings SB-56 through SB-71 (except for SB-68) were drilled along the proposed Busway alignment (from Station 348+00 to Station 359+00). When the borings were performed in 2003, the proposed concept envisioned building a bridge which would carry the railroad over Flatbush Avenue. As a result, most of the pilot borings (except for SB-58 through SB-61) are distant from the currently proposed structure and embankments. For this reason, this report only includes boring logs from only SB-58 through SB-61. It includes test results from all pilot borings in this general area for reference. The Pilot Boring logs are included in Appendix 3.

3.2 Laboratory Test Data

Baker conducted the following laboratory tests on samples retrieved from the pilot borings: Moisture Contents, Atterberg Limits, Sieve Analyses, Hydrometer Analyses, Incremental Load Consolidation Tests (without unload-reload procedure), Triaxial Tests, and Corrosivity Tests. These tests are summarized in Table 3 (Appendix 2). Details and interpretation of each test are provided in the Appendices and in Section 5.2 of this report, respectively. Test results are discussed in Section 5.0.

4.0 SUBSURFACE EXPLORATIONS

Geo**Design** conducted additional subsurface explorations during final design. Details of these explorations are described in this section.

4.1 Test Borings

Geo**Design** coordinated the services of New England Boring Contractors of CT, Inc. (NEBC) to perform Standard Penetration Test (SPT, ASTM D1586) borings at the site. Four structure borings, eight roadway borings, and twelve retaining wall borings were drilled.

GeoDesign also coordinated the services of ConeTec to perform four Cone Penetration Tests (CPT, ASTM D3441) in the vicinity of the proposed bridge abutments.
Boring and CPT locations were initially field located by tape measurement and line of sight. Connecticut Department of Transportation (ConnDOT) survey crews recorded the locations and elevations of the borings by surveying the as drilled boring locations. Boring and CPT locations are shown on Figure No. 2 (Appendix 1) and logs are included in Appendix 4.

4.2 Field Vane Shear Testing

One field vane shear test (ASTM D2573) was performed at approximately Elev. 35 in Boring SB-01-1. The resulting uncorrected and corrected ultimate shear strengths are 670 and 600 psf, respectively. These data are included in Table 6 (Appendix 2). For comparison, field vane shear test results from other tests along the Busway alignment are also included in the table.

4.3 Observation Wells

An observation well was installed in Borings SB-01-3, RW-2 and RW-7. The well installation information is shown on the boring logs (Appendix 4). Observation well readings are summarized in Table 1 (Appendix 2.)

5.0 LABORATORY TESTING RESULTS AND INTERPRETATION

Geo**Design** performed laboratory tests to obtain several important engineering properties of the Varved Clay, including compressibility and strength. These data were also used to verify field classifications, determine material drainage properties, and identify frost susceptibility. Of particular importance was the need to conclusively determine the stress history of the Varved Clay stratum because preliminary design findings provided conflicting results in this critical matter. A SHANSEP approach was also adopted to allow correlation of soil parameters at this intersection with other locations along Busway alignment. More limited testing was also performed on other materials. Test results are included in Appendices 5 through 10.

5.1 Constant Rate of Strain (CRS) Consolidation Tests

Constant rate of strain (CRS) consolidation testing (ASTM D4186) was developed in the early 1970's and since has gradually become more popular because it generates continuous data instead of isolated data points as increment load (IL) testing. In the past CRS tests were significantly more costly than IL testing because the continuous load steps and constant strain control both require close monitoring. As computers and automation technology have improved and become more common, CRS test has become more widely accepted as the state of the art methodology for consolidation test. Geo**Design** retained University of Massachusetts at Amherst (UMass) and GeoTesting Express (GTX) to perform seven CRS tests on soil samples taken at this bridge crossing. Results are included in Table 2 (Appendix 2) and in Appendix 5.

5.2 Incremental Load (IL) Consolidation Tests

Increment load (IL) consolidation testing (ASTM D2435) has been used much longer than CRS testing. As a result, the testing equipment for IL testing is more widely available and the IL tests are easier to perform than CRS tests. Nine IL tests were performed to provide a comparison to existing test data. The tests were performed by three testing labs: TestCon, GTX and UMass. Results from these three laboratories showed comparable results.

The ability to predict maximum past pressures using IL tests depends in part on the selection of the load increments. Loading increments of 4,000 and 8,000 psf were used and at this site the predicted maximum past pressures fall between these values. As a result, the predicted maximum past pressures end up converging around 4,000 psf. Thus, the IL tests yield lower bound (conservative) predicted maximum past pressures as compared to CRS tests. Test results are included in Table 2 (Appendix 2) and in Appendix 5.

5.3 Direct Simple Shear (DSS) Tests

Direct Simple Shear (DSS) tests (ASTM D6528) can simulate shear forces acting horizontally on soil. Because of the horizontal-layered structure of Varved Clay, the shear strength along the varves is lower than the shear strength across the varves. Thus, DSS testing on Varved Clay samples often yield the most conservative shear strength values compared to Triaxial Compression (TC) or Triaxial Extension (TE) tests.

Geo**Design** retained UMass to perform the DSS tests on four soil samples taken with Shelby tubes in Boring SB-01-1 and SB-01-4. DSS test results are included in Appendix 6. The tests were performed using the Stress History And Normalized Soil Engineering Properties (SHANSEP) Method recommended by Ladd & DeGroot in their 2003 article "*Recommended Practice for Soft Ground Site Characterization: Arthur Casagrande Lecture*".

A SHANSEP correlation was developed from these test results. The expression, $S_{u,DSS}/\sigma'_{vc} = 0.17(OCR)^{0.75}$, provides a way to estimate shear strength in the Varved Clay layer by correlating S_u as determined by DSS testing with its over consolidation ratio (OCR) as determined by consolidation testing with the effective stress (σ'_{vc}). Plots depicting the shear strength and normalized shear strength ratio developed from the referenced laboratory tests are included as Chart 4 (Appendix 2).

A tabulation of the resulting calculated minimum shear strength, (S_u), for each tube sample that was tested for consolidation is included in Table 2 (Appendix 2).

At this bridge, using the above referenced data, we calculated a range of shear strength of 417 to 700 psf, and recommend a design shear strength of 600 psf. This value is conservative as it represents the softer zones of the Varved Clay and not the stiffer partially desiccated zones present at the top and bottom of the layer.

5.4 Unconfined Rock Compression Tests

Unconfined Compression Tests (ASTM D2938) provide an indication of intact rock core strength. Geo**Design** retained TestCon to perform two unconfined compression test for rock core taken from boring SB-01-3. The corrected strengths are 5,093 psi and 6,093 psi respectively.

5.5 Atterberg Limits

Atterberg Limits (ASTM 4318) provide the Liquid Limit (LL), the Plastic Limit (PL) and the Plasticity Index (PI) of cohesive soil samples. These tests can characterize cohesive soils and provide a reference to compare soil properties at different depths and locations.

Twenty-five Atterberg Limit tests were performed. The LL ranges from 28% to 62%, the PL ranges from 21% to 50%, and the PI ranges from 2% to 31%. Data are included in Table 4 (Appendix 2) and in Appendix 7. Chart 1 (Appendix 2) depicts Atterberg Limits vs. depth.

Baker performed eight Atterberg Limits in 2003, on samples taken from Boring SB-58 to SB-61. Liquid Limits (LL) range from 24% to 64%. The Plastic Limits (PL) range from 22% to 27%, and the Plasticity Indices (PI) range from 0% to 41%. These data are provided in Table 3 (Appendix 2) and in Appendix 7. These results correlate well with the above listed results. Additional Atterberg Limits were performed in samples taken from pilot borings farther away from the proposed structure. These results are also included in Appendix 7 for reference.

5.6 Moisture Contents

Moisture contents (ASTM 2216), like Atterberg Limits, provide an easy way to characterize and compare cohesive soils. These tests were performed in larger numbers vertically and horizontally throughout the Varved Clay layer to rapidly and economically determine vertical and horizontal trends of soil property variations.

Forty-one moisture content tests were made in Varved Clay samples from borings RW-6, RW-7, RW-8, RW-9, SB-01-1, SB-01-3 and SB-01-4 at approximately 10-foot vertical intervals. Test samples were obtained by cutting split spoon samples vertically to sample several varves. The results indicate a moisture content range of 25% to 65% suggesting a pattern with lower moisture contents (around 30%) at top and bottom of the Varved Clay layer, gradually increasing to higher moisture contents near the middle of the stratum (around 60%) and decreasing to about 30% toward the bottom of the layer. The average moisture content is approximately 50%.

In 2003, Baker performed 17 moisture content tests on samples taken from Boring SB-58 to SB-61. The results correlate well with the above-described test results with average moisture content of 40%. However, because in 2003 more tests were made in lower portions of the Varved Clay layer, the average 2003 moisture content is lower than the 2008 average. Additional moisture content tests were performed on samples from the general area (but far from the proposed structure). These results are included in Appendix 7 but are not plotted in Chart 3.

Chart 3 (Appendix 2) depicts moisture content vs. depth. From these data, it is clear that moisture content first increases with depth and then decreases below the mid-depth of Varved Clay layer, forming a ”D” shape curve. This moisture content distribution is consistent with a high degree of consolidation at the top and bottom drainage surfaces of the Varved Clay layer.

5.7 Minus No. 200 Sieve Tests

Minus No. 200 Sieve Test (ASTM D1140) provides a means of determining the percentage of soil particles finer than 75 um (clay and silt particles).

Seventeen SPT jar samples taken from the Fill layer were washed with No. 200 sieve and weighted according to ASTM D1140 Method A. The results indicate a silt/clay content range of 10.9% to 99.4%. The data are included in Appendix 8.

5.8 Sieve Analyses

Sieve Analyses (ASTM C136) provide the gradation of soil particles larger than the 75um (or No. 200 sieve). The results are useful for evaluating reusability of existing soils and calibrating visual field description of soil samples.

Sieve analyses were performed in both the preliminary design and final design phase. In 2003, Baker performed nine sieve analyses tests on samples from this general area. Although none was taken in Borings SB-58 to SB-60, these data provide general information on soil gradation in the area at the proposed crossing. Results are included in Appendix 8.

In 2008, Geo**Design** performed sieve analyses on four samples in roadway borings close to the proposed structure. Results are included in Appendix 8. These results indicate that shallow soils are granular and include from 7 to 14 percent silt.

5.9 Hydrometer Analyses

In 2008, hydrometer analyses (ASTM D422) were performed on two jar samples and five tube samples of the Varved Clay layer. The results showed a fairly consistent pattern in gradation. Data are included in Table 5 (Appendix 2) and in Appendix 8. Hydrometer test results presenting percent Sand, Silt and Clay vs. depth are summarized on Chart 2 (Appendix 2).

In 2003, Baker performed hydrometer tests on 37 samples from this area. Eleven of these were from the Borings SB-58 to SB-61. These data are included in Tables 3 (Appendix 2) and in Appendix 8.

5.10 Corrosivity Tests

In 2008, pH and Sulfides tests were performed to estimate the corrosion potential of granular fill soils. Four pH tests and four Sulfide tests were performed in samples taken from Borings SB-01-2, SB-01-3 and SB-01-4. No Sulfide was detected in these samples. pH values range from 6.7 to 7.5, with and average value of 7.3. Comparing to neutral pH value of 7, the average pH value indicates slightly alkaline soils. Test results are included in Appendix 9.

In 2003, Baker Engineering performed corrosivity tests on four soil samples. Two samples were tested for pH values, resistivity, sulfate content, sulfide content and chloride content. The other two were tested for pH values and resistivity only. The pH values vary from 6.8 to 7.7. The

average pH is 7.2. This is comparable to the 2008 test results. Resistivity values ranged from 0.013 to 0.054 megohm-cm. A summary of the tests are included in Appendix 9.

5.11 Stress History

To allow us to perform valid settlement analyses, the stress history of Varved Clay was determined to assess whether the consolidation of the varved Clay consists of recompression or both recompression and virgin compression. The results greatly affect the magnitude of settlements. Geo**Design** made use of CPT tests and consolidation tests to estimate the stress history of the Varved Clay.

Three major parameters were studied in detail in the stress history analyses: maximum past pressure, maximum proposed stress and over consolidation ratio (OCR). Maximum past pressure is the largest pressure soil sample has experienced in its geological and recent history. Maximum proposed stress is the largest stress that will induced by embankment fills .

Geo**Design** estimated the maximum past pressure and OCR from both consolidation and CPT tests. A summary of Over Consolidation Ratio (OCR) vs. Depth using CPT test results is included as Chart 5 in Appendix 2. Geo**Design** also computed maximum proposed stresses due to embankment fills, then juxtaposed the maximum past pressure curve, and the maximum proposed stress curve in Charts 6 and 7, Appendix 2. The maximum proposed stress curves in Charts 6 and 7 are based on embankment soil densities of 125 pcf and 60 pcf, respectively. The maximum past pressure curve is based on the estimated maximum pressure obtained by CPT tests. CPT-1 was used because it has the smallest maximum past pressure of the four CPT tests performed at this site. Based on Charts 6 and 7, it can be seen that the maximum proposed stress due to embankment loads at the most influenced points are less than the maximum past pressure. Thus the expected consolidation will be a recompression. However, Chart 6 indicates the maximum proposed stress is close to the maximum past pressure at depths of 55 to 60 feet deep.

Estimated maximum past pressures from consolidation tests were also plotted on the charts. Unlike CPT data, these data are not continuous. They are included to confirm the estimation based on CPT tests. CRS consolidation data correlate well with the CPT data. IL consolidation data, on the other hand, showed a nearly vertical maximum past pressure profile that does not match CPT and CRS consolidation data. The difference between IL consolidation tests and CRS consolidation/CPT test results are addressed in Section 5.2.

6.0 SUBSURFACE CONDITIONS

6.1 Subsurface Profile

Subsurface profiles are shown on Figure No. 3 through 7 (Appendix 1). These profiles depict the generalized subsurface conditions based on the pre-existing and recent subsurface exploration data. The legend for the subsurface profiles is included as Figure No. 8.

The profiles depict a fairly consistent Varved Clay layer, except that the upper portion of this layer exhibits a variable degree of desiccation. Despite small variations in the contents of relatively thin layers above and below the Varved Clay, the soil and rock profile can be summarized as follows:

- **Top Soil/Asphalt** - 0 to 0.5 foot thick;
- **Fill -** 0 to 10 feet thick;
- **Silt/Fine Sand (Alluvium Deposit)-** 0 to 11 feet thick;
- **Varved Clay (Glaciolacustrine Deposit)-** 60 to 95 feet thick;
- **Silt/Fine Sand (Glaciofluvial Deposit) -** 0 to 45 feet thick;
- **Glacial Till-** 10 to 25 feet thick;
- **Bedrock (Siltstone/Shale).**

The **Fill** consists of loose to very dense, poorly graded (fine to medium) Sand, trace to some Silt, and (where present) some fine to coarse Gravel, little Asphalt fragments, trace Ash, trace Cinders, trace Brick/Concrete fragments, and trace Organic Fibers.

Most of the soil samples indicate that the Fill layer is medium dense, poorly graded and widespread. Only three out of twenty-eight borings showed no indications of Fill in the samples.

The **Silt/Fine Sand** layer is erratic through the area of the new bridge and is generally medium dense. It is present in seventeen out of twenty-eight borings. The layer typically consisted of loose to dense Silt and/or fine Sand. SPT N-values indicate that most of the samples have a medium density.

The **Varved Clay** layer was encountered in all borings. The top and bottom ten feet of the layer consisted of stiff to very stiff Clay and Silt. The stiffness decreases toward the middle of the layer. Near the middle of the layer (about 20 to 100 feet depth), the SPT "N" values typically range from Weight of Rod (WOR) or Weight of Hammer (WOH) to 2, indicating a very soft consistency within this zone of the deposit.

The **Silt/Fine Sand (Glaciofluvial Deposit)** underlies the Varved Clay. In thirteen out of twenty-eight borings, which fully penetrated the Varved Clay, five encountered the underlying Silt/Sand/Gravel layer. This stratum consists of medium dense to very dense fine Sand and Silt and with a thickness of up to 45 feet.

Glacial Till was encountered in all borings that fully penetrated the silt/fine sand layer. Its thickness varies from 10 to 25 feet. SPT "N" values indicate the density of this layer ranges from dense to very dense.

Decomposed Bedrock was encountered below the Glacial Till. This very dense layer ranges from three to seven feet thick.

Bedrock (Shale) is at approximately 150 feet below the existing ground surface (approximate Elev. -94). Rock cores were taken in six borings near the proposed abutments. Rock Quality

Designation (RQD) values range from 0 to 53, indicating very poor to fair quality improving with depth.

6.2 Groundwater

Stabilized readings made in the observation well in Boring SB-01-3, RW-2 and RW-7 indicate groundwater levels at approximately Elevation (Elev.) 61 to Elevation 68. Groundwater conditions will vary depending on factors such as temperature, season, precipitation, construction activity and other conditions, which may be different from those at the time of these readings.

7.0 EVALUATION AND RECOMMENDATIONS

7.1 Bridge Foundations

Following are design considerations and design recommendations for the bridge foundations.

7.1.1 Foundation Type

As discussed in Section 7.2 below, significant consolidation (delayed) settlements are predicted near the abutments due to embankment loading of the thick compressible Varved Clay layer. Consideration was given to using shallow foundations to support the bridge abutments in combination with techniques such as use of light-weight fill, pre-loading, surcharging, installing wick-drains, or a combination of these to reduce the consolidation settlements. However, shallow foundations are not recommended due to schedule constraints and the added schedule risks this solution would entail, as compared to a pile supported foundation.

In the area of the bridge abutments, the Varved Clay layer deposit is present at depths of about 5 to 15 feet below the ground surface (Elev. 55 to 65) extending to depths of about 110 to 120 feet (Elev. -30 to -40). The Varved Clay layer overlies very dense Silt/Sand or Glacial Till, over bedrock. To avoid abutment settlements of up to four inches, we recommend that abutments, wingwalls and the pier be supported on deep foundations. We recommend HP-piles driven to refusal in bedrock.

7.1.2 Pile Lengths

Top of bedrock is at approximately Elev. -60 to -70 in the area of the abutments and the pier. Based on a bottom of Pile cap Elevation 65 to 69, we estimate piles lengths of 145 feet at the pier and abutments. Estimated pile lengths include minimum one-foot embedment into the pile cap and into bedrock. Design pile tip elevation is -60 to -70.

We recommend an additional 20 feet be added for test pile lengths. We then recommend the contractor use the information from the test piles to determine the order lengths.

7.1.3 Down-drag Loads

Piles that are driven through a compressible stratum (e.g. varved clay) to an end-bearing stratum must be evaluated for down-drag. Down-drag occurs when a soil layer is compressed and it moves downward relative to the pile. As little as 0.2 inches of downward movement against the pile is enough to initiate the down-drag load.

The magnitude of down-drag forces depends on the friction coefficient between soil and the pile, and the geometry of the pile cross section. For a fixed cross sectional area and friction coefficient, the larger the pile perimeter the higher the down-drag force. In addition, the greater the thickness of down-drag inducing material (in this case Varved Clay in contact with the pile), the greater the down-drag force.

For example, the settlement down-drag force on a Grade 50 Steel HP14x117 pile, which penetrates a 90-foot thick stratum of the Varved Clay, is approximately 30 percent of the pile's ultimate structural capacity. Therefore, the pile is only 70 percent efficient. Smaller piles are even less efficient and are therefore not recommended.

7.1.4 Down-drag Load Reduction

Bitumen is very effective as a coating to reduce the friction between the soil and piles. A one-millimeter thick bitumen coating is sufficient to significantly reduce the down-drag force. The bitumen coating need not be applied to the section of the pile below the bottom of the Varved Clay stratum (about 135 linear feet per pile). We estimate that the down-drag load on a bitumen coated HP14x117 pile will be 10 percent of the down-drag force on an uncoated pile. Thus, bitumen coating will reduce the predicted down-drag force to about 3 percent of pile's ultimate capacity, making a HP 14x117 pile 97 percent efficient. The efficiency decreases with smaller capacity piles since the ratio of the side area to the cross section area increases.

We estimate that bitumen coating of the piles will add approximately 10 percent to the pile's material cost. Thus, we recommend bitumen coating.

Precautions must be taken to prevent damage the bitumen coating with extreme temperatures and while driving through granular soils. To avoid damage to the coating, we recommend that a hole be pre-drilled through the surficial Fill and Silt/Sand layers to the top of the Varved Clay.

7.1.5 Corrosion Protection of Steel Piles

As noted in Section 5.10, pH values of 7.3 and the absence of Sulfide in tested samples (taken in the upper 8 to 15 feet), indicate low corrosive potential. Due to the recommendation to use of bitumen coating, which will provide some protection from corrosion, we do not recommend using a corrosion allowance for the steel piles.

7.1.6 Pile Type Selection

To limit down-drag forces, we recommend steel piles because compared to piles of other materials, steel piles typically provide higher strength, smaller perimeter, and smaller friction coefficients.

ConnDOT has requested that pile tip stresses not exceed 24ksi. We therefore recommend vertical, end-bearing, bitumen coated, Grade 50 steel HP-Piles with a maximum tip stress of 24 ksi. We further recommend pile tip reinforcement with integrally cast cutting teeth (or similar) be used. The following table provides nominal compressive resistances, down-drag loads, and nominal lateral capacities for a selection of HP pile sections. The down-drag loads are based on bitumen coated piles and must be added to the abutment load when determining the required number of piles. Nominal lateral capacities are based on a predicted lateral deflection of 0.6-inches.

Pile Selection	Nominal Compressive Resistance (kips/pile)	Design Down-Drag Load (kips/bitumen coated pile)	Nominal Lateral Capacity (kips/pile)
HP 12x53	**372**	45	20
HP 12x74	**523**	45	20
HP 12x84	**590**	45	20
HP 14x89	**626**	50	25
HP14x117	**825**	50	25

**Lateral Capacity assumes 0.6-inch deflection

We recommend a resistance factor for compression, ($Ø_c$), of 0.6 (for good driving). Resistance factors for the service limit state shall be taken as 1.0, except for global stability where the resistance factor shall be taken as 0.75. Resistance factors for the extreme limit state shall also be taken as 1.0, except for uplift resistance of piles, where resistance factor shall be taken as 0.8. Refer to Section 7.1.10 for use of resistance factors during pile testing.

Although the larger pile is preferred to carry vertical load efficiently, five pile sizes are provided, in case the horizontal loading requires more piles (e.g. batter piles). In this case the smaller pile size may be more efficient overall.

The down-drag load must be added to the abutment load when determining the required capacity and number of piles. However, the live loads need not be considered to act simultaneously with down-drag loads because temporary loads temporarily relieve down-drag loads due to the elastic compression, which acts in the opposite direction as the soil compression, which causes the drag loads.

7.1.7 Pile Batter

Batter piles may be used to supplement the recommended lateral pile capacity if needed. We recommend a maximum pile batter of 1H:4V. In addition, if batter piles are used, the lateral capacity of piles (excluding the batter component) must be reduced to a maximum ultimate lateral capacity of 3 kips per pile.

7.1.8 Pile Spacing

In no case should the piles be spaced closer than three pile diameters. Pile group reduction factors, as applicable, must be applied in accordance with AASHTO LRFD (2006 interims) Section 10.7.2.4, Table 10.7.2.4-1, and Figure 10.7.2.4-1.

7.1.9 Pile Splicing

Due to pile length, shipping, and handling constraints, piles will require at least one splice. Splices shall be made using pre-approved pre-fabricated splice connectors welded to provide the design pile vertical and lateral capacity. Splices shall not be the allowed within 15 feet of the pile cut-off and splices between adjacent piles shall be staggered at least 5 feet vertically.

7.1.10 Pile Load Testing

We recommend the use of PDA testing, which can be completed quickly. Two piles shall be tested at each abutment and at the pier (for a total of six tested piles). The pile load testing resistance factor for PDA Testing ($Ø_{dyn}$) is 0.65.

The test pile selection should be based on a successfully tested indicator pile driving records, considered in relation to the test boring data, as determined by the Geotechnical Engineer.

Preliminary installation criteria for the piles should be based on wave equation analysis employing the characteristics of the pile type, soil conditions, and pile driving hammer and cushions proposed by the Contractor. This installation criteria analysis may be performed by Geo**Design**, or by the Contractor's engineer and submitted for review.

Production pile installation criteria will be based on the passing of a successfully tested indicator pile.

7.1.11 Abutment/Pier Settlement

Settlement of the end-bearing pile-supported structure is expected to be small (on the order of one-quarter inch or less) and should occur largely during bridge construction.

7.1.12 Obstructions

According to the existing utility plan, the footprints of pier and abutments are free of utilities. The fill layer should be pre-augered prior to driving the piles. This will minimize the potential for encountering obstruction during driving.

7.1.13 Static Design Parameters

For design of the abutments, we recommend the following static design parameters:

- Assumed Expanded Shale, Clay and Slate (ESCS) Fill Backfill Material
- Unit weight of ESCS Lightweight Fill = 60 pcf
- ESCS Fill Angle of Internal Friction, phi = 38°
- Coefficient of Friction of ESCS Fill against Wall, tan delta = 0.45
- Coefficient of Passive Earth Pressure, $K_P = 4.0$
- Coefficient of Active Earth Pressure, $K_a = 0.25$

Load Factors for soil loads should be selected based on Table 3.2.1-2 (AASHTO LRFD 2006 interims).

Earth pressure calculations should assume a surface surcharge of 24 inches soil depth or 250 psf.

7.1.14 Seismic Design

Since the proposed bridge is in Seismic Zone 1, per Section 4.7.4.1 of AASHTO LRFD BRIDGE DESIGN SPECIFICATION 2007 with 2008 interims, seismic loads do not need to be analyzed. Thus, seismic parameters have not been provided.

7.1.15 Abutment and Wingwall Drainage and Backfill Requirements

Abutments should be designed to comply with ConnDOT Manual Standard, Plate Number 3.5.2 – U-Type wing wall for wall drainage and backfill requirements.

7.2 Approach Embankments

7.2.1 Settlements Resulting from Embankment Loads

Laboratory testing of the Varved Clay stratum indicates that this layer is over consolidated (refer to Section 5.11). We compared the maximum proposed stress (the sum of the present in-situ stress and the proposed stress increase) to the maximum past pressure and determined that the loading will not exceed the maximum past pressure. Thus, the proposed embankment loading will consolidate the Varved Clay layer through a recompression process. The recompression ratio (RR) was used to estimate consolidation settlement. A RR value of 0.04 was chosen to estimate consolidation settlement and the RocScience software package SETTLE 3D was used to estimate settlements. Manual and spreadsheet calculations were used to validate the SETTLE 3D results.

The following settlement estimates assume that the approach embankments will be comprised of lightweight fill (60 pcf).

7.2.2 Embankment Settlements

We estimate the following settlements directly behind the abutments:

Abutment Number	Consolidation Settlement (in)		Total Settlement (in)	
	At Centerline of Abutment	At Edge of Abutment	At Centerline of Abutment	At Edge of Abutment
1	2.9	1.8	3.1	1.9
2	4.2	3.3	4.6	3.5

Predicted settlements at a distance of approximately 60 feet behind each abutment are about 50 percent more than the above values.

7.2.3 Utility Settlements

The embankments will also cause significant stress increases along Flatbush and Newfield Avenues. Several known subsurface utilities, including water, gas and sewer, are present within the influence zone of the proposed embankments.

These existing utilities are to be abandoned and replaced by new utilities constructed farther away from the influence zone of the new embankments. We selected four of the major utilities to exemplify the magnitude of settlements: 1) the 42-inch water main and 2) the 12-inch gas line under the existing Flatbush Ave.; 3) 12-inch gas line and 4) the 12-inch Water Main under Newfield Ave. We estimated the total settlement of these utilities to be as follows:

Existing Utility	Approximate Location	Maximum Settlement (in)	Maximum Rotation Induced by Settlement (Degrees)
Flatbush Ave. 12-inch Gas Line	Sta. 14+25 to 16+25	1.1	0.05
Flatbush Ave. 42-inch Water Main	Sta.14+00 to 23+00	2.1	0.06
Newfield Ave. 12-inch Water Main	Sta.50+00 to 55+28	0.47	0.18
Newfield Ave. 12-inch Gas Line	Sta.53+50 to 56+00	0.48	0.19

The predicted settlements will be gradual (forming a shallow dish-shaped pattern) with the maximum nearest to the central portion of the embankment and then gradually decreasing with distance away from the embankment. The predicted settlements will be primarily comprised of delayed consolidation settlement. Utility rotations were computed based on estimated

differential settlement, these data are included in the above table. The smaller the rotation, the more gradual the estimated differential settlement.

There are also two water mains under New Park Ave. Because embankment fill along New Park Ave. will be less than two feet thick, the stress change on these two utilities will be small and, correspondingly, predicted settlements will also be small.

7.2.4 Railway Track Settlement

Embankment fill will cause the existing Amtrak railway track to settle. However, due to the use of light weight fill, these settlements will be small. Predicted settlements are as follows:

Track Number	Maximum Settlement (in)	Maximum Rotation Induced by Settlement (Degrees)
Track 1	0.18	0.007
Track 2	0.27	0.01

Although these predicted settlements are small, we recommend that the tracks be monitored to allow re-leveling should settlements exceed acceptable levels.

7.2.5 Existing Building Settlement

Embankment induced settlement will affect the existing one-story building located near the intersection of Flatbush and Newfield Avenues. We estimate the embankment-induced settlements to be up to approximately one inch at the building corner nearest to the construction. Settlement will gradually decrease with distance away from the near corner.

The predicted settlements will require a preconstruction survey and monitoring of the building as the fill is constructed. Refer to Section 7.3.5 for monitoring recommendations.

7.2.6 Rate of Settlement

Because the embankment is relatively narrow (80 feet) as compared to the thickness of the Varved Clay (80 to 100 feet), and because of the anisotropic properties of Varved Clay, horizontal drainage will greatly affect the rate of consolidation.

In estimating the rate of consolidation, we used "*Field Consolidation of Varved Clay*", a report by Professor Richard P. Long, Professor Kent A. Healy and Mr. Peter J. Carey from University of Connecticut. Figure 13 of this report depicts the field-measured apparent coefficient of consolidation for different loading geometries quantified as the ratio of the Varved Clay Thickness and to the Embankment Width (dimension ratio). This figure is reproduced as Chart 8, (Appendix 2). For a dimension ratio of one, the field-measured apparent coefficient of consolidation is 4 ft^2/day. Since the width of Flatbush Ave. is approximately equal to the average thickness of Varved Clay, we selected an equivalent coefficient of consolidation of 4.0 ft^2/day for design.

Using this value, we estimate that consolidation will be essentially complete after approximately 16 months. A portion of this consolidation settlement will occur during construction.

After two to three months, the approximate estimated time to place the embankment fill and construct the roadway pavement, we estimate that approximately 40 percent of the consolidation settlement will have occurred. Thus, we estimate that up to approximately 3 to 4 inches of consolidation settlement of the roadway will remain. If the bridge and roadway need to be put into service at that time, we recommend that the placement of the asphalt wear course be delayed another two to three months. This can be done by placing a tapered asphalt section at the approaches. After this additional waiting period, we estimate that approximately 65 percent of the consolidation settlement will be completed, leaving approximately 2 inches of remaining settlement. To mitigate this remaining settlement, we recommend the use of approach slabs (described in Section 7.2.7). If the waiting period needs to be reduced from those recommended, the wick drains may be used, but based on the time they take to install and their costs, the foregoing recommendations comprise the preferred solution to the roadway settlement.

7.2.7 Approach Slabs

The approach fills are expected to settle differentially relative to the abutments. To mitigate this anticipated differential consolidation settlement, we recommend the use of 20-foot minimum length approach slabs at both approaches. Approach slabs are used to mitigate the settlement between the bridge seat and the abutment backfill to reduce the 'bump' effect felt at high speeds.

7.2.8 Embankment Stability near Bridge

Global stability analyses of the proposed embankments were performed using two-dimensional limit equilibrium analyses. We used the Roc Science software package SLIDE. The assumptions used in slope stability analysis are as follows: the cohesion was assumed to be 600 psf; the friction angle was assumed to be zero. The 600-psf cohesion was conservatively estimated from SHANSEP correlations for soil samples taken near the middle of Varved Clay stratum (See Table 2 in Appendix 2).

Analyses showed that using regular embankment fill (125 pcf), the factor of safety varies from 0.9 to 1.2, depending on analysis method. Using lightweight fill (60 pcf), the factor of safety increases to 1.5 to 1.9.

These values are conservative for two reasons. Firstly, the cohesion of the soil at the top and bottom of the Varved Clay layer is expected to be higher than 600 psf due to the partially desiccated conditions indicated by the lower moisture contents. Secondly, the embankment height decreases along the alignment whereas the model assumes a constant height. Nevertheless, since lightweight embankment fill is recommended for settlement control, the predicted factors are acceptable.

7.3 Construction Considerations

7.3.1 Protection of Existing Railroad Against Excavation

Excavations required to install the piles and pile caps (to approximate Elev. 65) will entail cuts of approximately 10 feet. Based on an approximate 50 foot distance between the centerline of Track No. 2 and the bearing of Abutment No. 2 (closest condition), we do not anticipate that these excavations will encroach on the protected zone adjacent to live railroad tracks.

7.3.2 Vibrations and Construction-Induced Settlements

Vibrations from pile driving may impact the tracks and nearby utilities. See Section 7.3.3 below for recommendations regarding the utilities. For the other structures, we recommend that they be surveyed prior to construction and closely monitored. The threshold/action criteria should be defined and coordinated in advance with Amtrak. The railroad tracks should be monitored in accordance with Amtrak requirements.

7.3.3 Monitoring of Utilities

Existing utilities are present under the existing Flatbush, New Park, and New Field Avenues. These utilities will be influenced by the new embankment fill. The need to monitor these utilities will depend on whether they are to be abandoned. Only those utilities to remain need to be monitored.

For utilities that will remain in service after fill is placed, we recommend that monitoring points be established on each of the utilities at approximately 50 to 75-foot intervals, using steel rods and steel pipe installed to the crown of the buried utility. The monitoring points should be monitored using survey equipment during construction.

7.3.4 Monitoring of Amtrak Railway Tracks

Two active railway tracks extend perpendicular to the proposed Flatbush Avenue Bridge. They are approximately 40 feet and 65 feet west of proposed Abutment 2. We recommend that monitoring points be established on both tracks at 50-foot intervals extending 200 feet on each side of the center line of the proposed Flatbush Ave alignment.

7.3.5 Monitoring of One-Story Building

The existing one-story building located near the intersection of Flatbush and Newfield Avenues will experience approximately 1-inch of differential settlement. We recommend structure data monitoring points (DMPs) be established on the building's three corners closest to Flatbush Avenue filling. The contractor should contact the property owners prior to any work to determine if there are any unusual constraints.

7.3.6 Dewatering

Groundwater is likely to be encountered during foundation installation. Therefore, Contractors should be prepared to control groundwater. Contractors should take extra precaution to dewater in areas where bottom of foundation close to the Varved Clay. A layer of crushed stone placed on top of the Varved Clay is recommended to reduce disturbance to this stratum if it is reached during excavations. If the Varved Clay stratum is disturbed, the disturbed portions must be removed and replaced with crushed stone.

7.4 Special Provisions

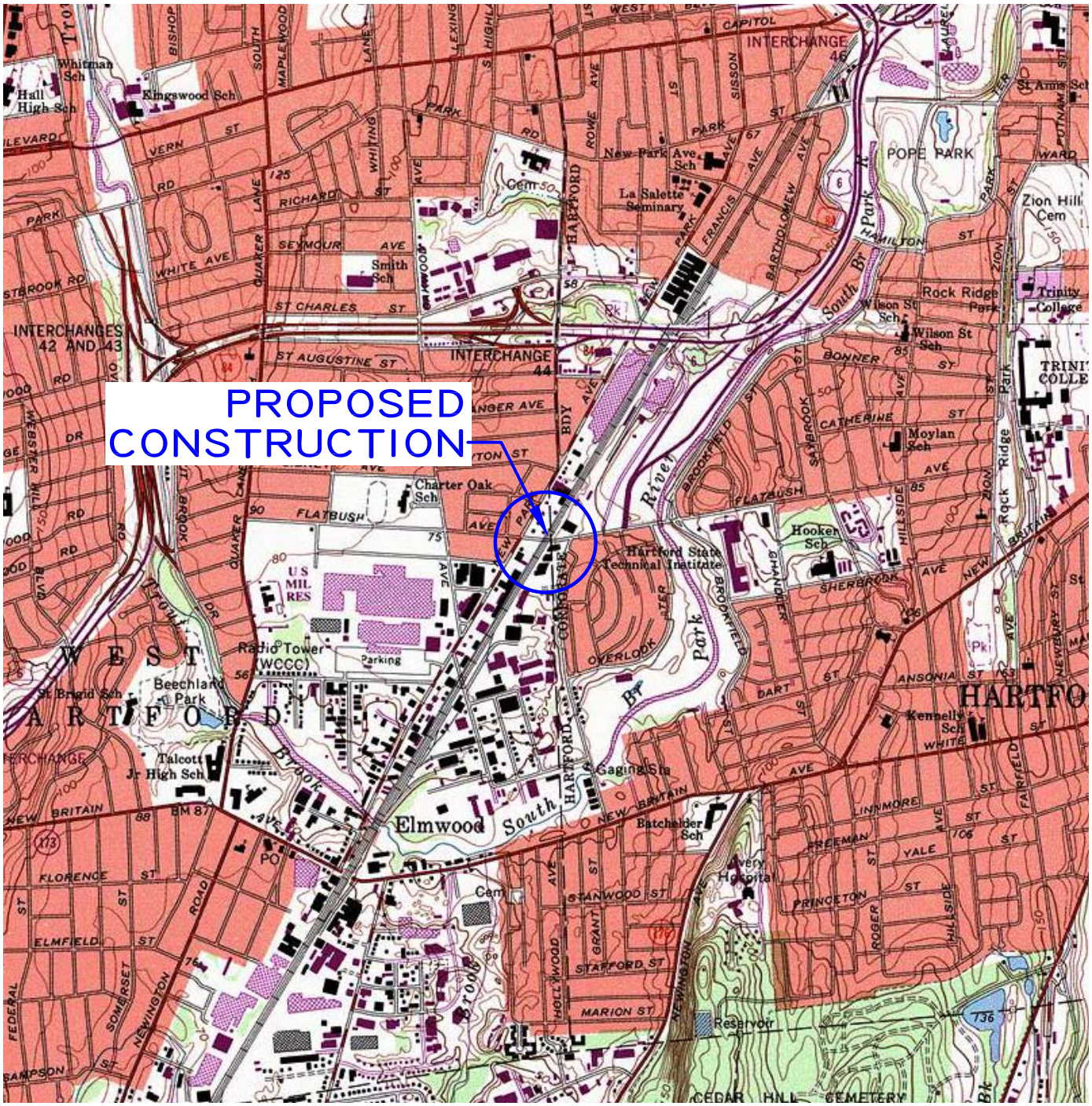
Special provisions will be required to address bitumen coating, geotechnical instrumentation (railroad, utility, and structure monitoring points), light weight fill, wick drains, and vibration monitoring.

8.0 LIMITATIONS

This report is subject to the limitations attached in Appendix 11.

Appendix 1

Figures



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DRAWN BY: SMC | REVIEWED BY: CZ

CONNECTICUT

QUADRANGLE LOCATION

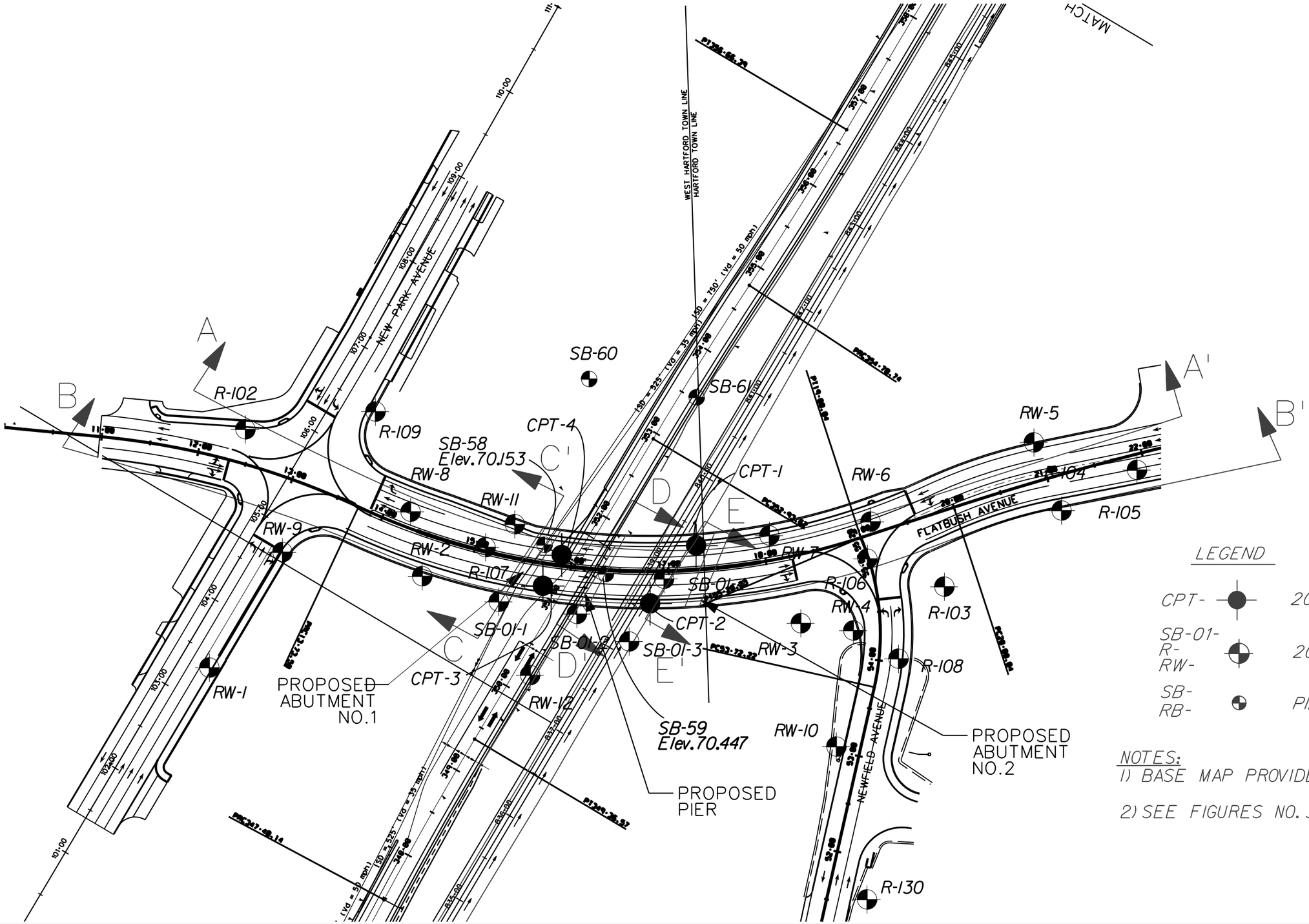
PROJECT LOCATION PLAN
FLATBUSH AVENUE OVER BUSWAY
NEW BRITAIN–HARTFORD BUSWAY
STATE PROJECT NO. 155–H025

REFERENCE:
U.S.G.S. 7.5 MINUTE QUADRANGLE: HARTFORD, CT.
Figure was created using TOPO! 2003 software

SCALE IN FEET
0 1000 2000 4000

PROJECT NO. 380–04
DATE: 10–28–08
FIGURE NO. 1

ACAD FILE No. MA\CL\380\04\FD REPORTS\STRUCTURES\STRUCTURE1 – FLATBUSH OVER BUSWAY\Area Map – Flatbush over Busway.dwg



DESIGNED BY CZ							
DRAWN BY SMC							
CHECKED BY ULF							
APPROVED BY ULF		NO.	DATE		DRWN.	CHKD	APPVD
		REVISIONS					

BORINGS LOCATED BY CT DOT SURVEY.

PRIME DESIGNER:

URS Corporation
500 Enterprise Drive
Suite 3B
Rocky Hill, Ct.

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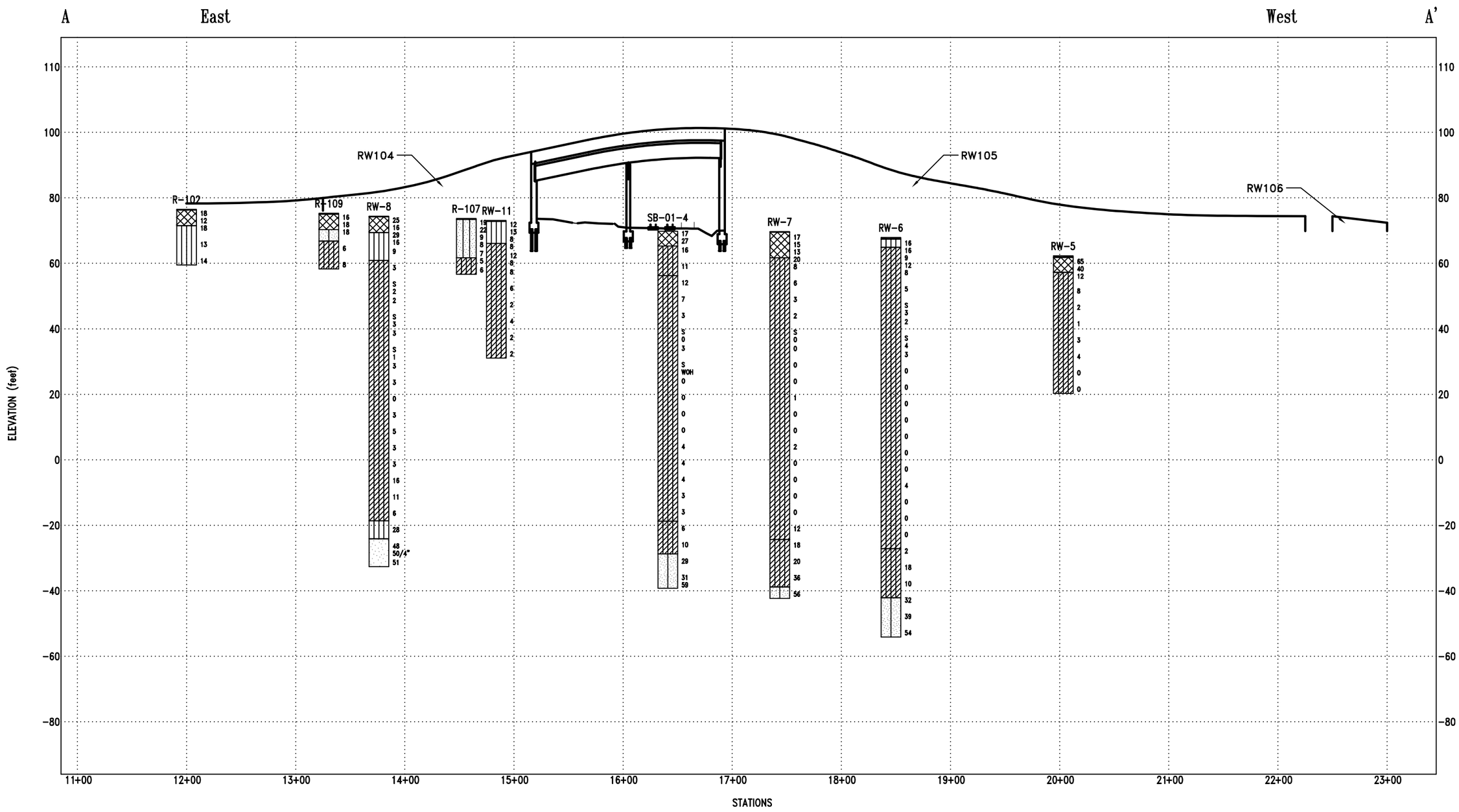
DWG. TITLE
FLATBUSH AVE. OVER BUSWAY
AS-DRILLED EXPLORATION
LOCATION PLAN

PROJECT
NEW BRITAIN – HARTFORD BUSWAY
STATE PROJECT NO. 155-H025

FILE NO. 380-04

SCALE 1" = 100' DATE 7-8-08

FIGURE NO. 2



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0 90

Horizontal Scale (feet)

Vertical Exaggeration: 3x

Notes:
1. Data concerning the various strata have been interpreted at boring locations only. The stratigraphy between borings may vary from that shown.
2. Refer to plan view for subsurface profile location. For strata details and symbol legend, see Subsurface Profile Legend and boring logs appended to this report.
3. Numbers displayed beside boring(s) represent SPT "N" values corresponding to their respective sampling interval. Where coring was performed, numbers represent Recovery and RQD values.

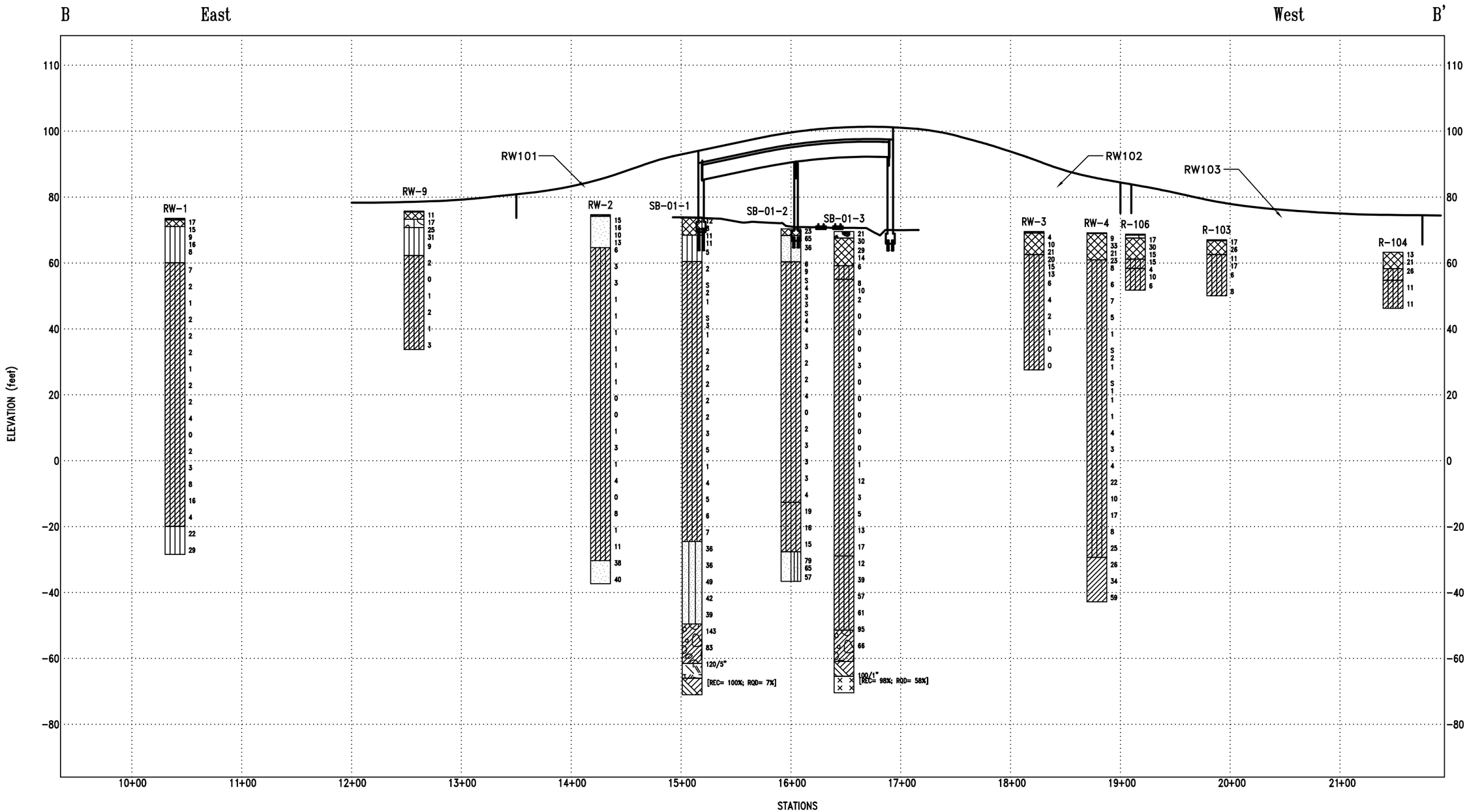
Date: 2/24/09 | Drawn By: MBF | Reviewed By: CZ

SUBSURFACE PROFILE A-A'

Flasbush Ave. Over Busway
New Britain – Hartford Busway /
State Project No. 155-H025

File No.: 0380-004.0 | Figure No.: 3

M:\CL\0380 BUSWAY\04 HTFD SOUTH\gINT\Fatbush Ave (1-19-09)\profile a.dwg



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0 90
Horizontal Scale (feet)
Vertical Exaggeration: 3x

Notes:
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3. Numbers displayed beside boring(s) represent SPT "N" values corresponding to their respective sampling interval. Where coring was performed, numbers represent Recovery and RQD values.

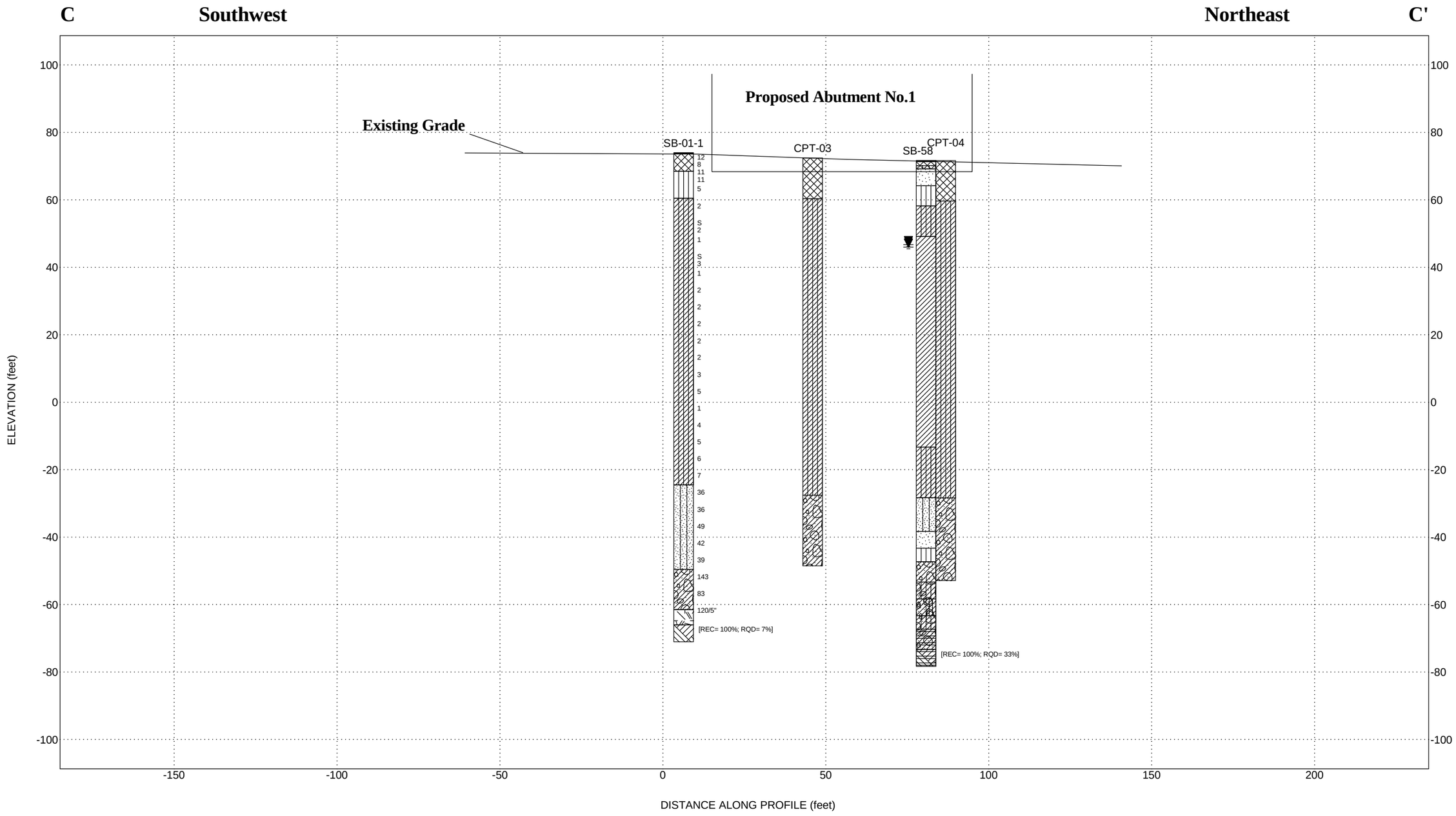
Date: 2/24/09 | Drawn By: MBF | Reviewed By: CZ

SUBSURFACE PROFILE B-B'

Flatbush Ave. Over Busway
New Britain - Hartford Busway /
State Project No. 155-H025

File No.: 0380-004.0 | Figure No.: 4

M:\CL\0380 BUSWAY\04 HTFD SOUTH\gINT\Flatbush Ave (1-19-09)\profile b.dwg



GEO STANDARD 11 X 17 (2/19/04) BUSWAY OVERALL 2009.GPJ FBNWNL01.GDT 2/11/09

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0 30
Horizontal Scale (feet)

Vertical Exaggeration: 1x

Notes:
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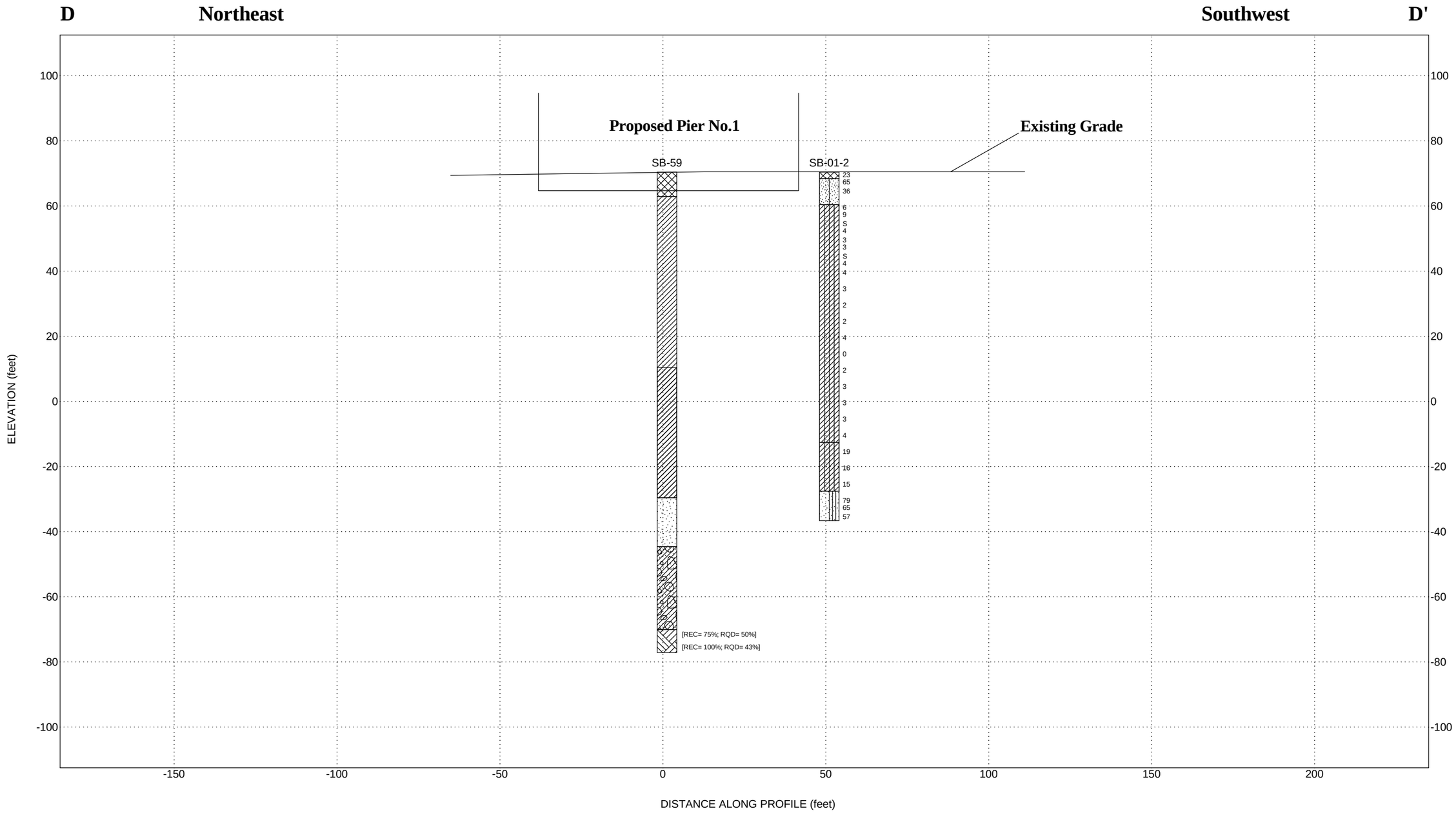
2. Refer to plan view for subsurface profile location. For strata details and symbol legend, see Subsurface Profile Legend and boring logs appended to this report.
3. Numbers displayed beside boring(s) represent SPT "N" values corresponding to their respective sampling interval. Where coring was performed, numbers represent Recovery and RQD values.

SUBSURFACE PROFILE C-C'

Profile Along Abutment No.1
Flatbush Ave. Over Busway
New Britain - Hartford Busway /
State Project No. 155-H025

Date: 2/11/09	Drawn By: DL	Reviewed By: CZ	File No.: 380-04	Figure No.: 5



GEO STANDARD 11 X 17 (2/19/04) BUSWAY OVERALL 2009.GPJ FBNWNL01.GDT 2/11/09

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0 30
Horizontal Scale (feet)

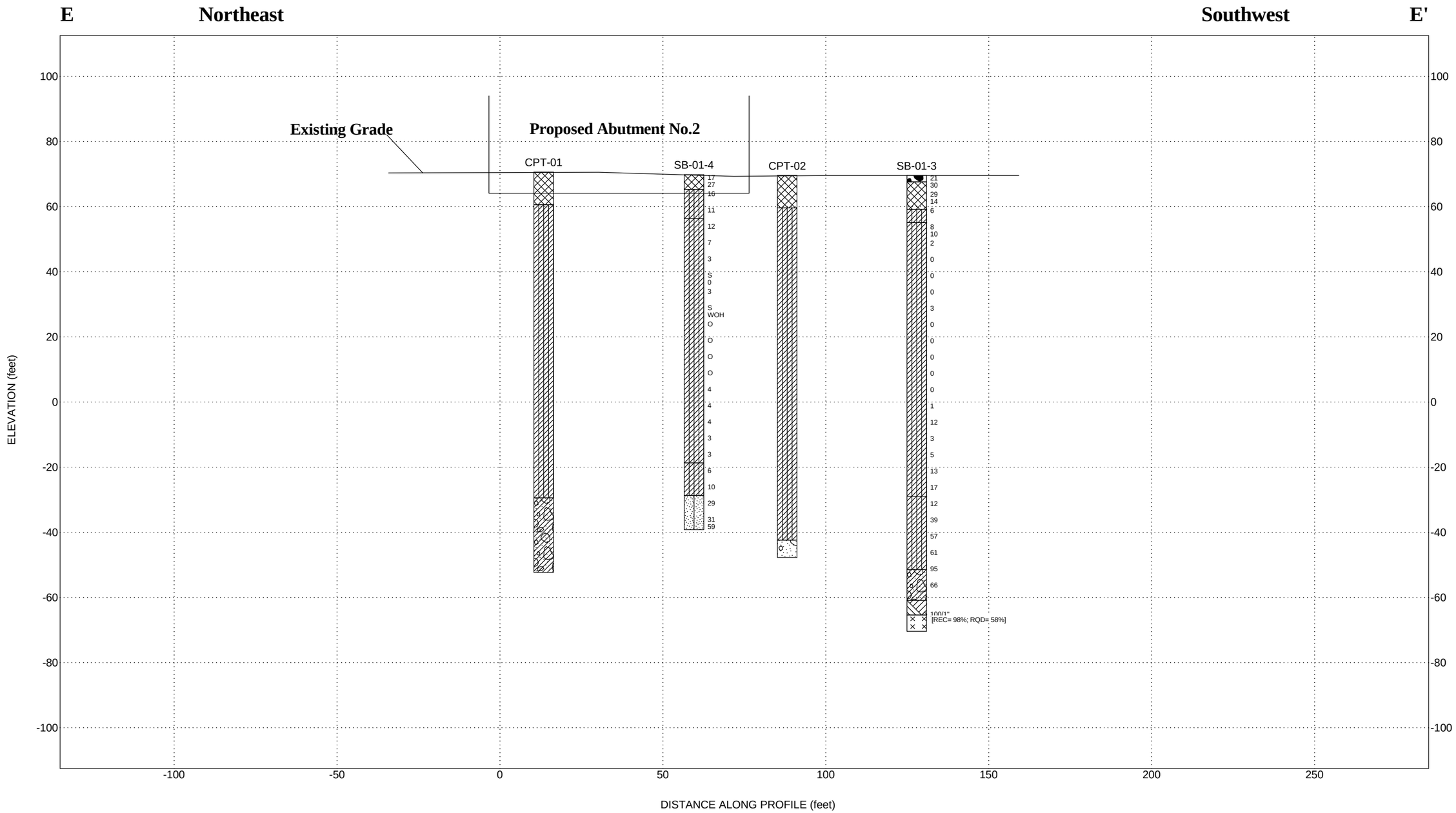
Vertical Exaggeration: 1x

Notes:
1. Data concerning the various strata have been interpreted at boring locations only. The stratigraphy between borings may vary from that shown.
2. Refer to plan view for subsurface profile location. For strata details and symbol legend, see Subsurface Profile Legend and boring logs appended to this report.
3. Numbers displayed beside boring(s) represent SPT "N" values corresponding to their respective sampling interval. Where coring was performed, numbers represent Recovery and RQD values.

SUBSURFACE PROFILE D-D'

Profile Along Pier No.1
Flatbush Ave. Over Busway
New Britain - Hartford Busway /
State Project No. 155-H025

Date: 2/11/09	Drawn By: DL	Reviewed By: CZ	File No.: 380-04	Figure No.: 6



GEO STANDARD 11 X 17 (2/19/04) BUSWAY OVERALL 2009.GPJ FBNWNL01.GDT 2/11/09

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0 30
Horizontal Scale (feet)
Vertical Exaggeration: 1x

Notes:
1. Data concerning the various strata have been interpreted at boring locations only. The stratigraphy between borings may vary from that shown.
2. Refer to plan view for subsurface profile location. For strata details and symbol legend, see Subsurface Profile Legend and boring logs appended to this report.
3. Numbers displayed beside boring(s) represent SPT "N" values corresponding to their respective sampling interval. Where coring was performed, numbers represent Recovery and RQD values.

SUBSURFACE PROFILE E-E'

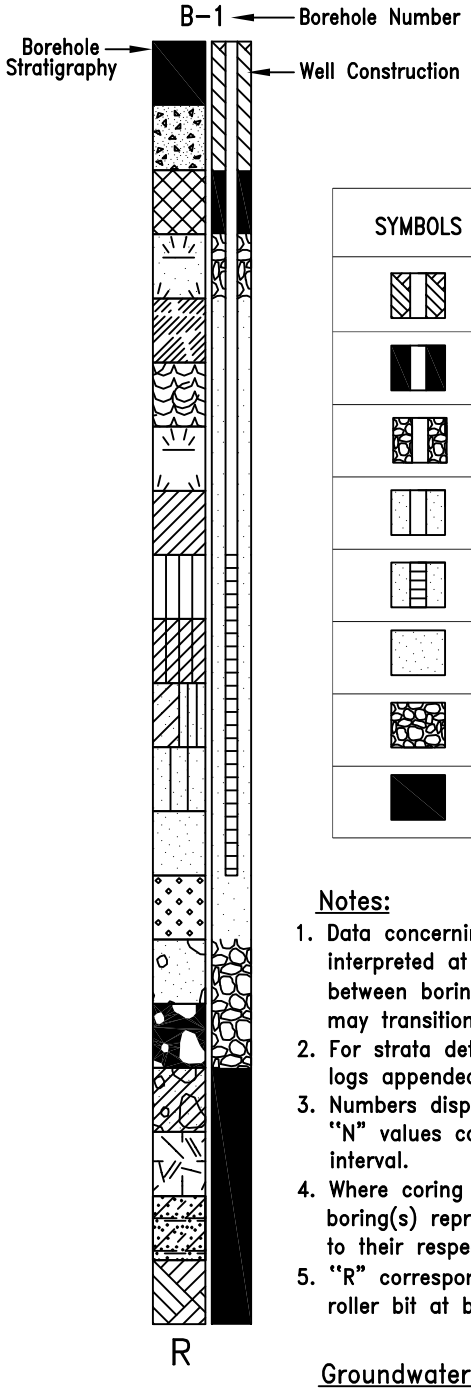
Profile Along Abutment No.2
Flatbush Ave. Over Busway
New Britain - Hartford Busway /
State Project No. 155-H025

Date: 2/11/09	Drawn By: DL	Reviewed By: CZ	File No.: 380-04	Figure No.: 7

STRATIGRAPHY SYMBOLS

SYMBOLS	TYPICAL DESCRIPTIONS OF PREDOMINENT MATERIAL TYPE
	ASPHALT
	CONCRETE
	FILL
	TOPSOIL
	SUBSOIL
	ORGANIC SILT OR CLAY WITH SHELLS
	PEAT
	CLAY
	SILT
	CLAY/SILT MIXTURE
	CLAY/SILT/SAND MIXTURE
	SILT/SAND MIXTURE
	SAND/SILT MIXTURE
	POORLY-GRADED SAND
	WELL-GRADED SAND
	SAND/GRAVEL MIXTURE
	SAND/GRAVEL/SILT MIXTURE
	BOULDERS AND/OR COBBLES
	GLACIAL TILL
	DECOMPOSED BEDROCK
	SANDSTONE
	BEDROCK

EXPLANATION OF BORING



WELL SYMBOLS

SYMBOLS	TYPICAL DESCRIPTIONS
	CEMENT SEAL: 1 PIPE
	BENTONITE SEAL: 1 PIPE
	SLOUGH BACKFILL: 1 PIPE
	FILTER PACK: 1 PIPE
	SLOTTED PIPE WITH FILTER PACK: 1 PIPE
	FILTER PACK AT BOTTOM OF HOLE
	SLOUGH AT BOTTOM OF HOLE
	BENTONITE AT BOTTOM OF HOLE

Notes:

1. Data concerning the various strata have been interpreted at boring locations only. The stratigraphy between borings may vary from that shown, and may transition more gradually within borings.
2. For strata details, see Report and boring logs appended to this report.
3. Numbers displayed beside boring(s) represent SPT "N" values corresponding to their respective sampling interval.
4. Where coring was performed, numbers displayed beside boring(s) represent Recovery and RQD values corresponding to their respective sampling interval.
5. "R" corresponds to refusal of sampler, casing and/or roller bit at bottom of boring.

Groundwater Observations (where applicable)

▽ Water Level Reading at time of drilling.

▼ Water Level Reading after completing drilling.

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SUBSURFACE PROFILE LEGEND

Flatbush Ave. Over Busway
State Project No. 155-H025

DRAWN BY:	CHECKED BY:	DATE:	FIGURE NO.
MJV	CZ	3/04/2009	8

EXPLANATION OF THE FORM - BORING LOG

The following provides an explanation of the various fields on the Boring Log form.

BORING LOG HEADING

Project and Boring Details
Within the upper portion of the Boring Log, details with regards to the Project Name and Location, Boring Number, and Geo**Design**'s file number are provided. In addition, within the upper section of the Boring Log, the Drilling Company's name, and their representative, together with the name of Geo**Design**'s representative, are presented. Details with regards to the dates when the boring was drilled, its coordinates or other location references and the corresponding surface elevation may also be provided. Where applicable, the Datum used is provided in the text of the Report.

Casing and Sampler
This section provides a summary of the typical size of samplers and casings used, together with the type of drilling rig. See below for a description of samplers.

Groundwater Observations
Water levels typically indicated on the Boring Log are levels measured in the boring at the times indicated. In permeable materials, the indicated levels may reflect the location of groundwater. In low permeability soils and/or due to effects of the casing, the accurate determination of groundwater levels may not be possible with only short term observations.

CENTRAL PORTION OF BORING LOG

DEPTH
This column gives the depth scale of the boring, in feet or meters.

CASING BLOWS
Indicates the number of blows per foot (0.3 m) required to advance the casing, using a 136 kg (300-pound) hammer.

SAMPLE INFORMATION

The initial columns provide the sample number, sample type, penetration, recovery and sample depth. The Sample Type Coding is as follows:

A - Auger Sample
C - Core - Diamond Bit - NX double tube, unless otherwise noted.
PS- Undisturbed Piston - 3" (76 mm)
SS - Split-Barrel (Split-Spoon)
SSL - Large Split-Barrel - 3" (76 mm)
ST - Shelby Tube - 3" (76 mm)
V - Vane Test

Blows / 6 inch (0.15 meter) Interval
Representative soil samples were obtained in the boring by split-barrel sampling procedures in general accordance with ASTM D 1586. The split-barrel sampling procedure utilizes a standard 51 mm (2") outside diameter split-barrel sampler that is driven into the bottom of the boring with a 63.5 kg (140-pound) hammer falling a distance of 0.76 m (30"). The number of blows required to advance the sampler in 0.15 m (6") increments is recorded as part of the Standard Penetration Test (SPT). These values are indicated at their depth of occurrence.

The number of blows required to advance the split-barrel sampler the middle two - 0.15 m (6") increments of a 0.61 m (24") penetration is recorded as the Standard Penetration Resistance Value ("N").

Where the sampler advanced by Weight of Rods or Weight of Hammer, the designation WOR and WOH, respectively, was used. In the case of PS or ST samples, the designation PUSH was used.

Coring Time
This column provides the rate in minutes at which the core barrel was advanced into the bedrock (or boulder) in one foot (0.3 m) intervals.

PID Reading - Where Applicable
This column provides results for samples which were screened in the field with a photoionization detector for the presence of volatile organic compounds (including certain petroleum constituents) calibrated relative to benzene in air standard.

Moisture Content (%) - Where Applicable
This column provides moisture content determination results for the samples tested.

SAMPLE DESCRIPTION
This column provides a description of the soil and bedrock units, based on visual observation of the samples, sometimes in conjunction with field and laboratory tests. Each sample was generally described according to the following classification and terminology. In general, description of the soil units followed the Burmister classification system.

SOIL PROPERTIES & DESCRIPTIONS

TEXTURE*

Component		Size (mm)
CLAY		< 0.002 mm
SILT		< #200 Sieve (0.075 mm)
SAND		#200 to #4 Sieve (0.075 mm to 4.75 mm)
	Fine	#200 to #40 Sieve (0.075 mm to 0.425 mm)
	Medium	#40 to #10 Sieve (0.425 mm to 2.00 mm)
	Coarse	#10 to #4 Sieve (2.00 mm to 4.75 mm)
GRAVEL		#4 Sieve to 3 in (4.75 mm to 76 mm)
	Fine	#4 Sieve to 3/4 in (4.75 mm to 19 mm)
	Coarse	3/4 in to 3 in (19 mm to 76 mm)
COBBLES		3 in to 12 in (76 mm to 305 mm)
BOULDERS		> 12 in (305 mm)

*textural classification as determined by sieve and hydrometer analyses

COMPOSITION

Principal Component in Upper Case i.e. >50%
CLAY, SILT, SAND, GRAVEL, COBBLES, BOULDERS

Minor Component Upper and Lower Case i.e.<50%
Clay, Silt, Sand, Gravel, Cobbles, Boulders

DESCRIPTIVE ADJECTIVE	PERCENTAGE REQUIREMENT
trace	<10 %
little	10 - 20 %
some	20 - 35 %
and	35 - 50 %

MOISTURE CONDITION

Dry	Absence of moisture, dusty
Moist	Damp but no visible water
Wet	Visible free water

COHESIVE SOILS

ESTIMATED CONSISTENCY CLASSIFICATION ***	"N" Value
Very Soft	< 2
Soft	2 - 4
Medium	4 - 8
Stiff	8 - 15
Very Stiff	15 - 30
Hard	> 30

*** empirical relationship

COHESIONLESS SOILS

ESTIMATED COMPACTNESS DESCRIPTION ***	"N" Value
Very Loose	< 4
Loose	4 - 10
Medium Dense	10 - 30
Dense	30 - 50
Very Dense	> 50

PLASTICITY - Burmister

Degree of Plasticity	Soil Type	Smallest Diameter of Thread**
Non-Plastic	SILT	None
Slight	Clayey SILT	1/4" (6 mm)
Low	SILT & CLAY	1/8" (3 mm)
Medium	CLAY & SILT	1/16" (1.6 mm)
High	Silty CLAY	1/32" (0.8 mm)
Very High	CLAY	1/64" (0.4 mm)

** moisture at or near optimum

STRUCTURE

Stratified,	>6 mm (1/4")
Laminated,	< 6 mm (1/4")
Parting,	0 to 1.6 mm (1/16")
Seam,	1.6 to 13 mm (1/2")
Layer,	13 to 305 mm (12")
Stratum,	> 305 mm (12")

BEDROCK PROPERTIES & DESCRIPTIONS

RECOVERY AND ROCK QUALITY DESIGNATION (RQD)

Recovery is defined as the length of core obtained expressed as a percentage of the total length cored.

RQD is defined as the total length of sound core pieces, 4 inches (100 mm) or greater in length, excluding drilling breaks, expressed as a percentage of the total length cored. RQD provides an indication of the integrity of the rock mass and relative extent of seams and bedding planes.

Classification	RQD %
Very Poor Quality	0 - 25
Poor Quality	25 - 50
Fair Quality	50 - 75
Good Quality	75 - 90
Excellent Quality	90 - 100

HARDNESS

TYPICAL ROCK TYPES		Moh's Hardness Scale
Hard	Cannot be scratched with knife	> 5.5
Moderately Hard	Can scratch with knife but not fingernail	5.5 - 2.5
Soft	Can be scratched with fingernail	< 2.5
SANDSTONE		
Well Cemented	Capable of scratching a knife blade	5.5 - 2.5
Cemented	Can be scratched with knife	< 2.5
Poorly Cemented	Can be broken apart easily with fingers	

WEATHERING

Fresh	No visible signs of weathering
Slightly Weathered	Slight discoloration of parent material in joints and seams
Moderately Weathered	Less than 35% of rock material is decomposed. Fresh or discolored rock is present.
Highly Weathered	More than 35% of rock material is decomposed. Fresh or discolored rock is present.
Extremely Weathered	All rock material is decomposed to soil. Rock mass structure may still be intact.

SPACING OF DISCONTINUITIES

Bedding	Jointing	Spacing (inches)	Spacing (mm)
Very Thick Bedded	Very Wide	>80	>2000
Thick Bedded	Wide	24 - 80	600 - 2000
Medium Bedded	Moderate	8 - 24	200 - 600
Thin Bedded	Close	2.4 - 8	60 - 200
Very Thin Bedded	Very Close	0.8 - 2.4	20 - 60
Laminated	Shattered	0.24 - 0.8	6 - 20
Thinly Laminated	Fissured	<0.24	<6

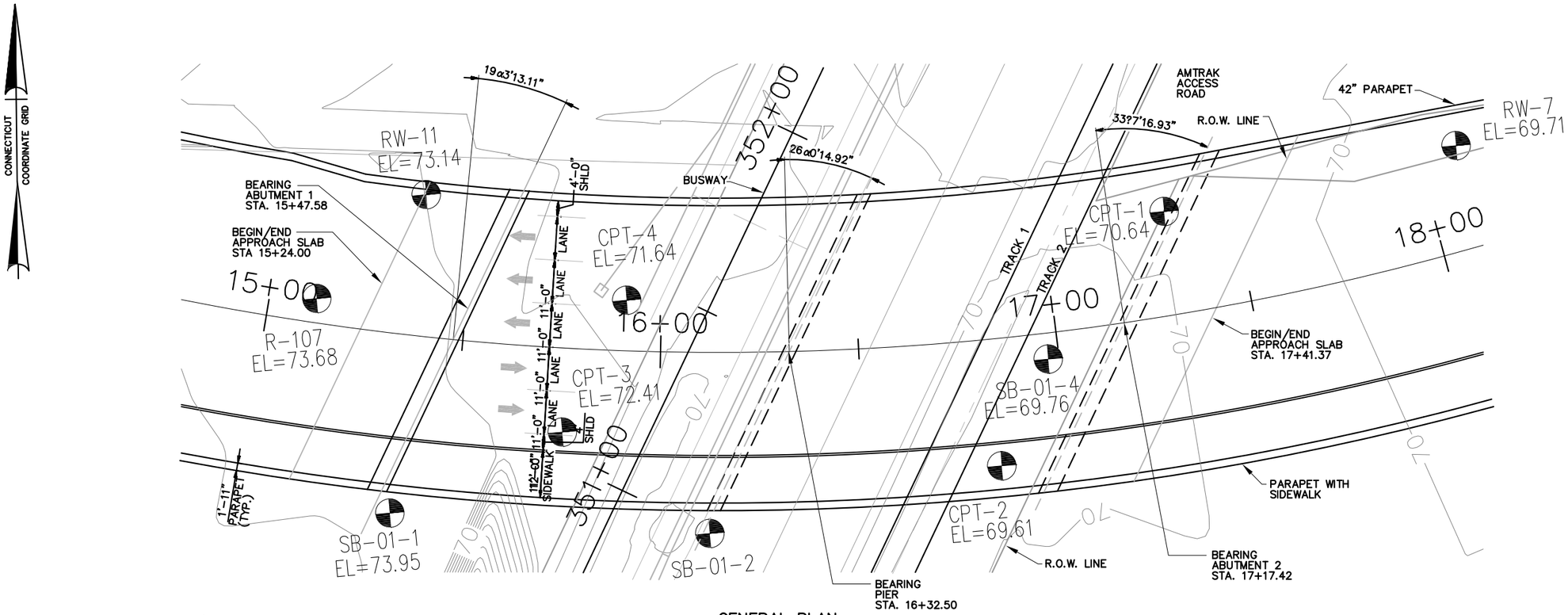
When classification of rock materials has been estimated from disturbed samples, core samples and petrographic analysis may reveal other rock types.

SYMBOL
This column provides a graphical representation of the soil and bedrock units, and inferred geological contacts. See Subsurface Profile Legend.

STRATA DESCRIPTION (ELEVATION/DEPTH)
This column gives the elevation and depth of inferred geological contacts together with a general description of the respective soil and bedrock units. Stratification lines represent approximate boundaries between material types, transitions may be gradual.

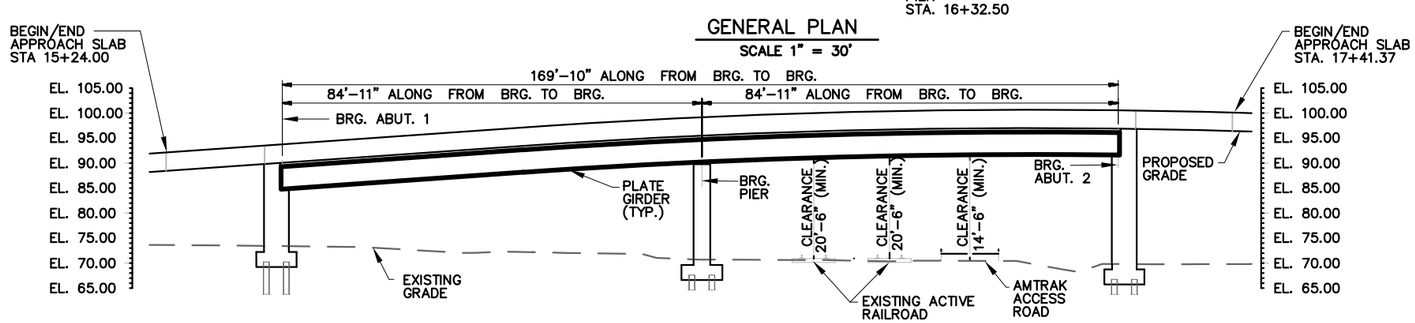
BORING LOG FOOTER

The lower portion of the log provides additional drilling notes within the Remarks section together with additional General Notes. M:\GEN\FORMS\GENNOTES GeoDesign.xls



GENERAL PLAN

SCALE 1" = 30'



ELEVATION

SCALE 1" = 30'

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DESIGNED BY CZ						
DRAWN BY SMC						
CHECKED BY CZ						
APPROVED BY ULF	NO.	DATE		DRWN.	CHKD	APPVD
	REVISIONS					

H. & V. SCALE 1"=30'

30 0 15 30

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DWG. TITLE
FLATBUSH AVENUE OVER BUSWAY
PLAN AND SECTION OF
PROPOSED STRUCTURE

PROJECT
NEW BRITAIN – HARTFORD BUSWAY
STATE PROJECT NO. 155-H025

FILE NO. 380-04

SCALE AS NOTED

DATE 2-20-09

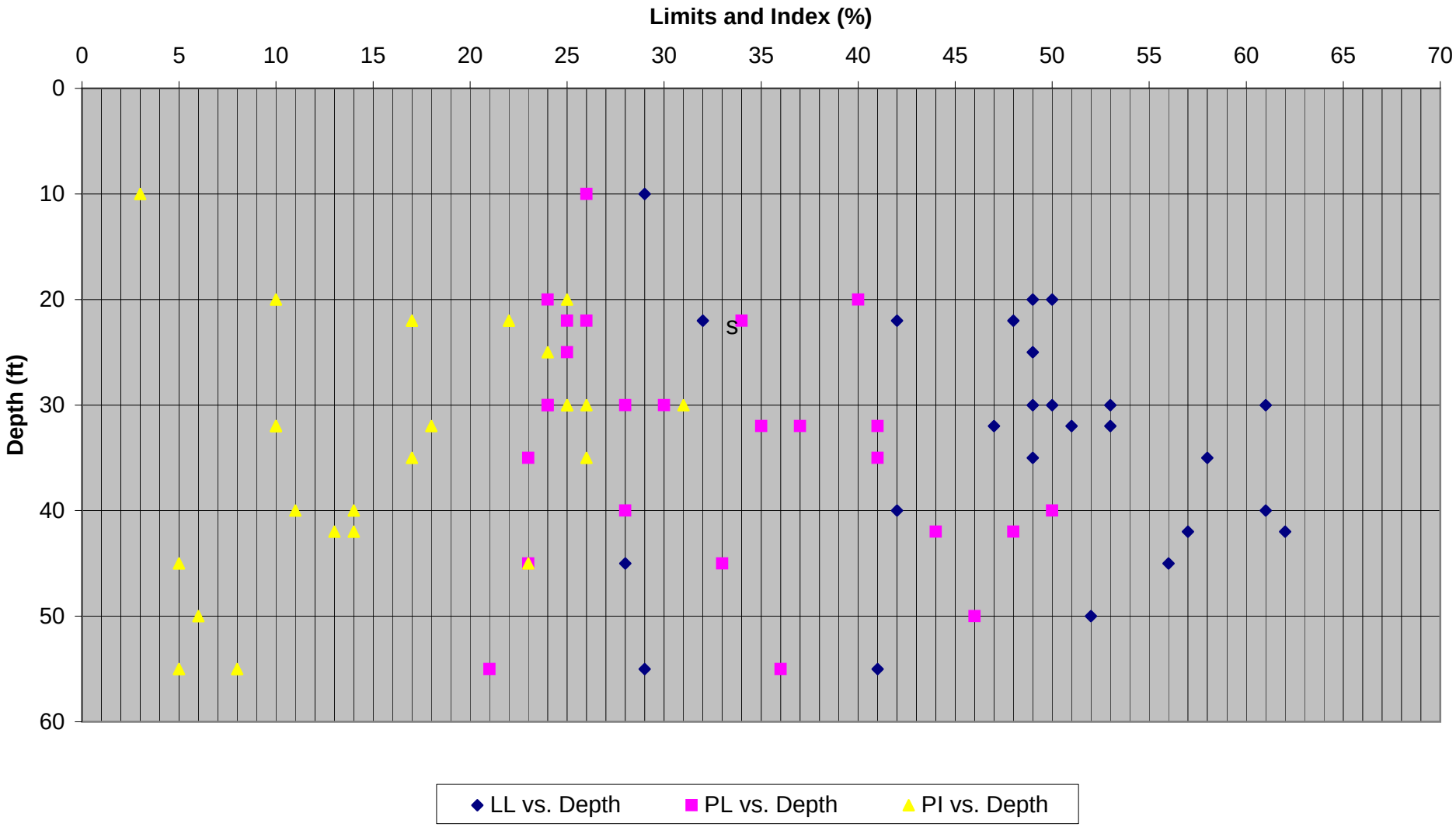
FIGURE NO. 9

Appendix 2

Tables and Charts

New Britain- Hartford Busway, Hartford, CT
Flatbush Ave. Over Busway
CT DOT Project Number: 155-H025
GeoDesign Project Number: 380-04

Chart 1 - Atterberg Limits vs. Depth



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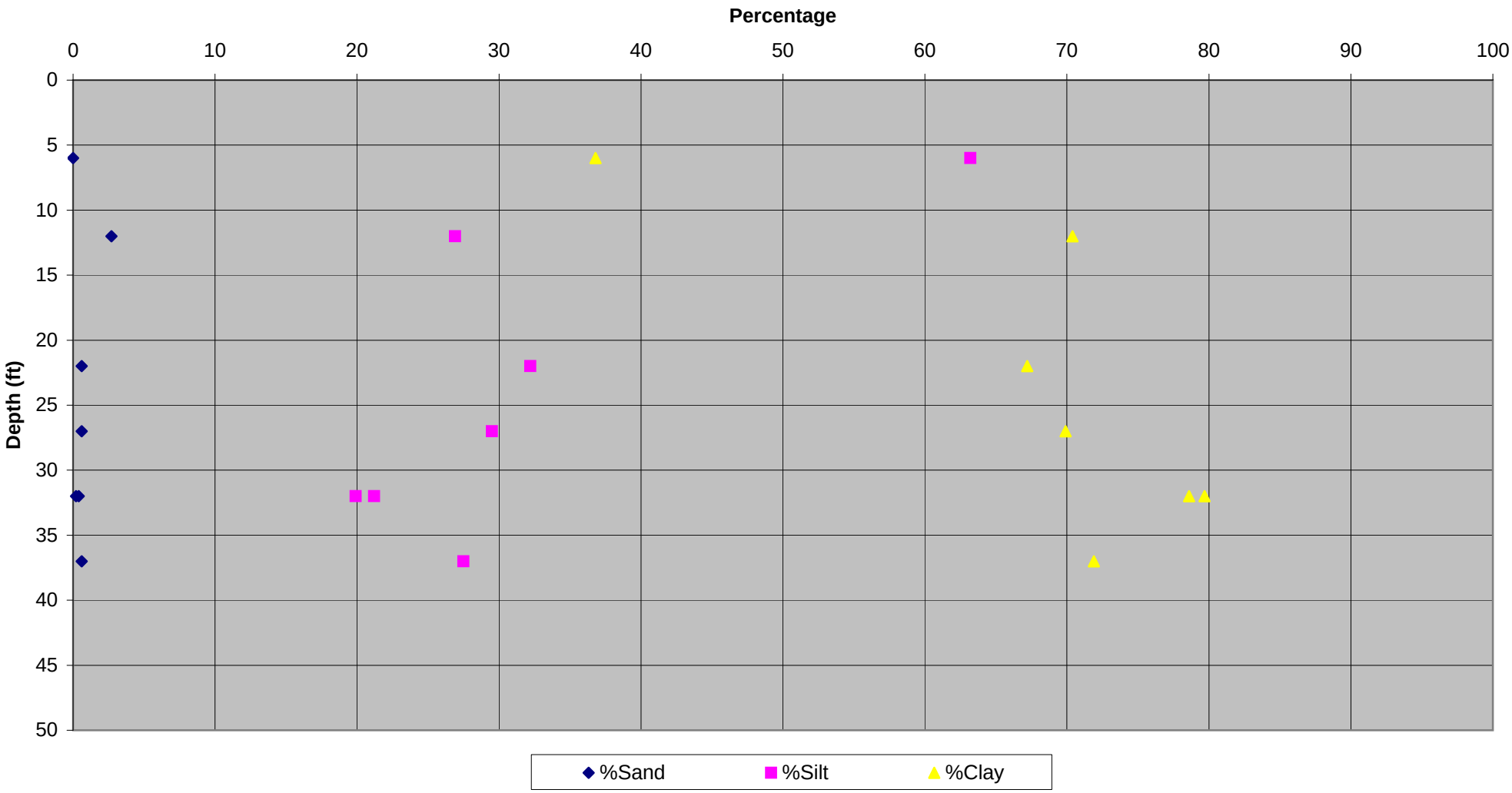
New Britain- Hartford Busway, Hartford, CT
Flatbush Ave. Over Busway
CT DOT Project Number: 155-H025
GeoDesign Project Number: 380-04

Chart 2 - Hydrometer Summary



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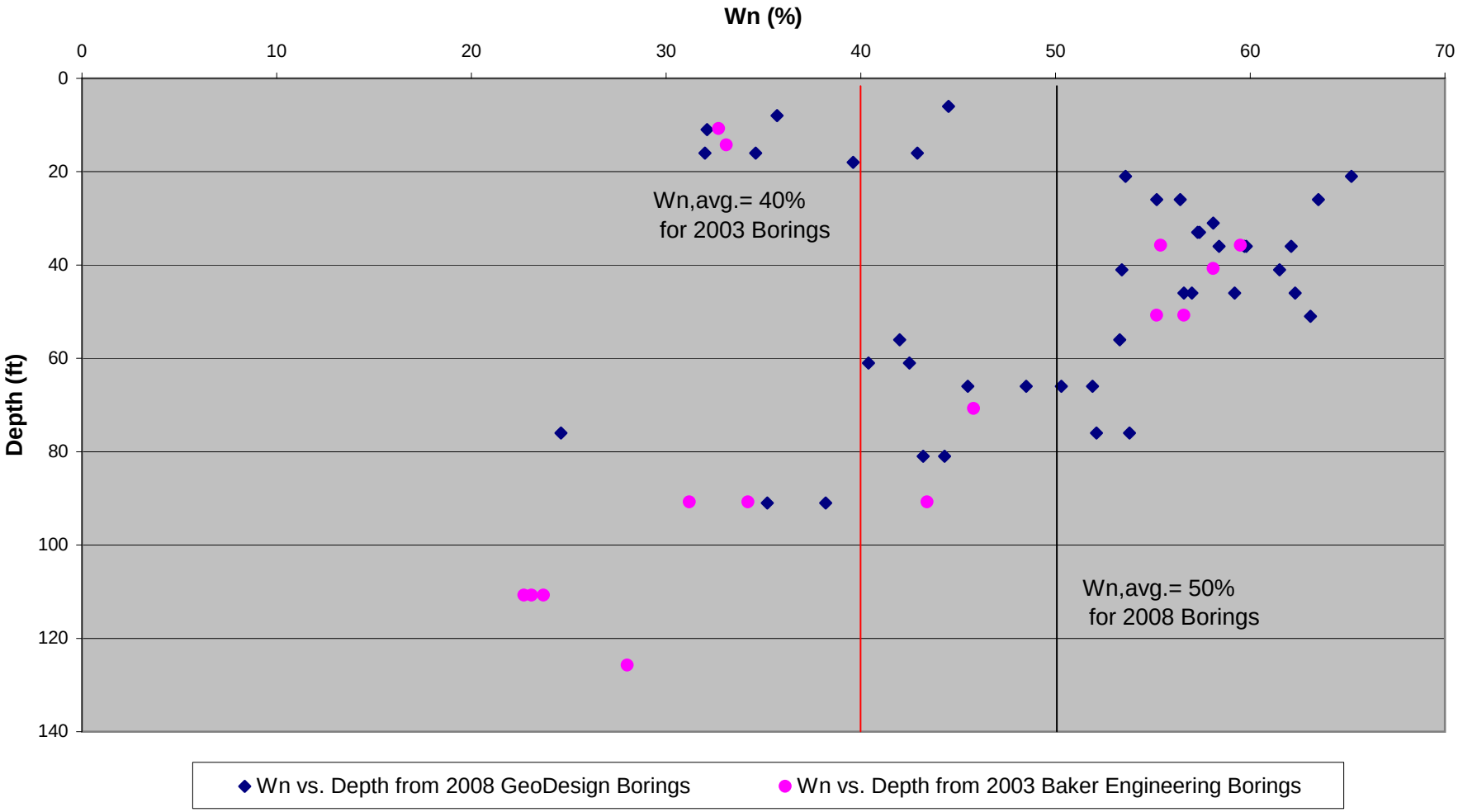
New Britain- Hartford Busway, Hartford, CT
Flatbush Ave. Over Busway
CT DOT Project Number: 155-H025
GeoDesign Project Number: 380-04

Chart 3 - Moisture Content (Wn) vs. Depth



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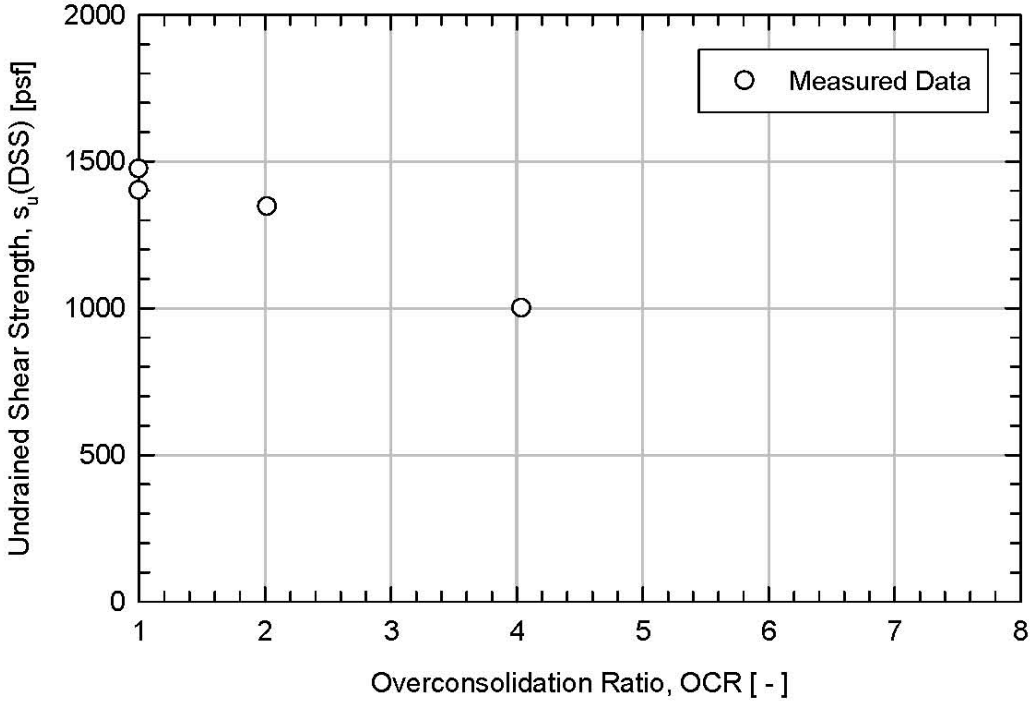


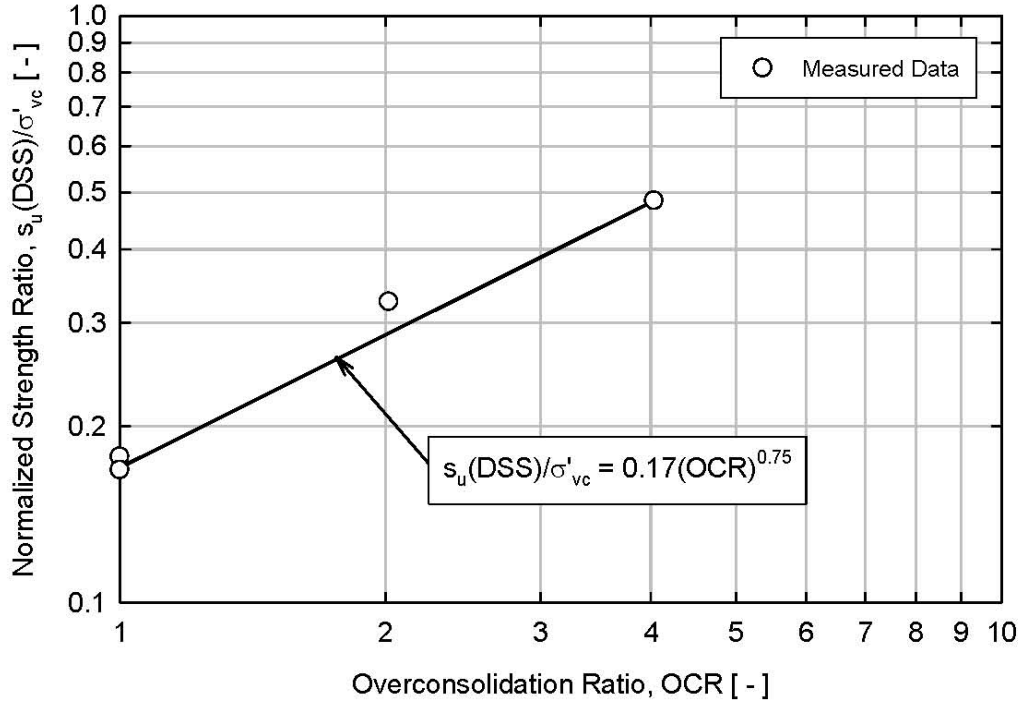
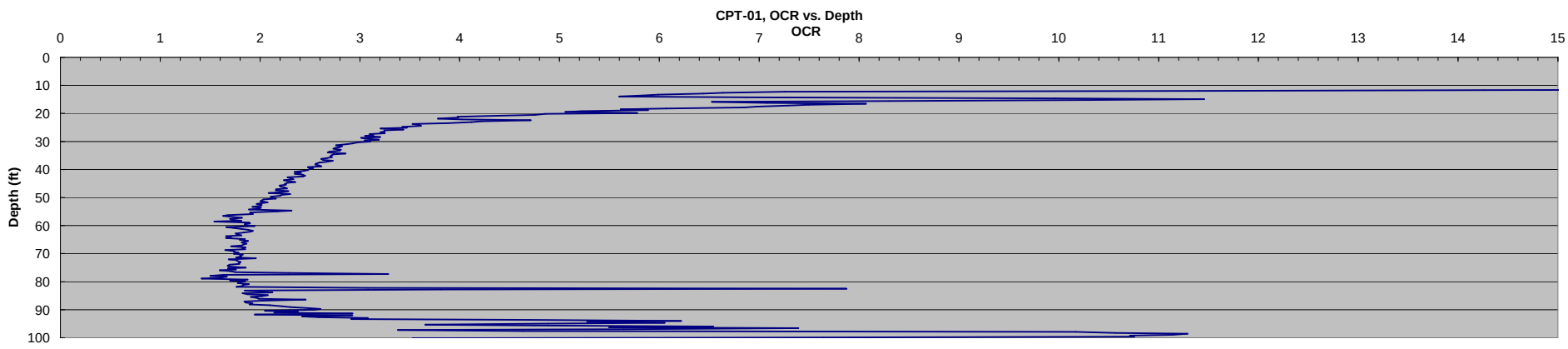
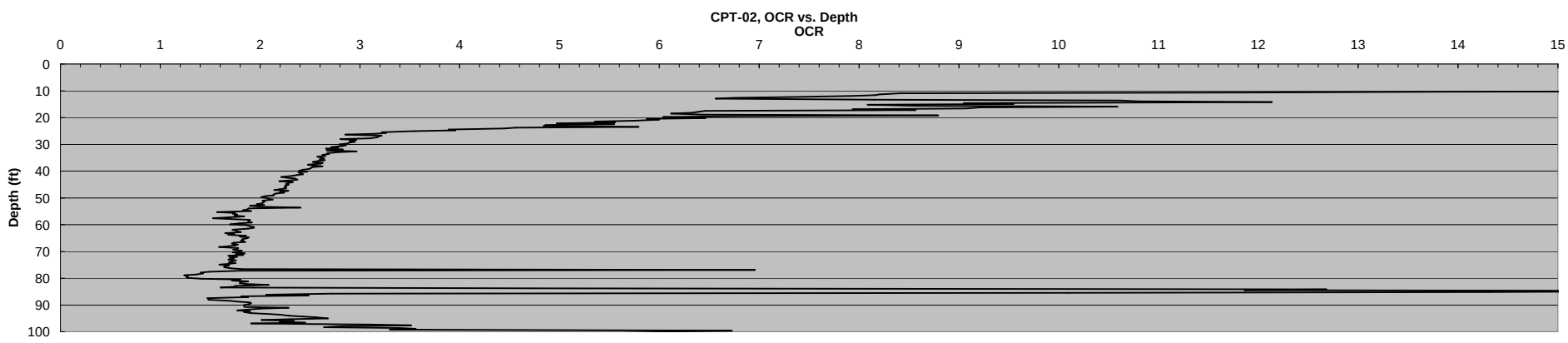
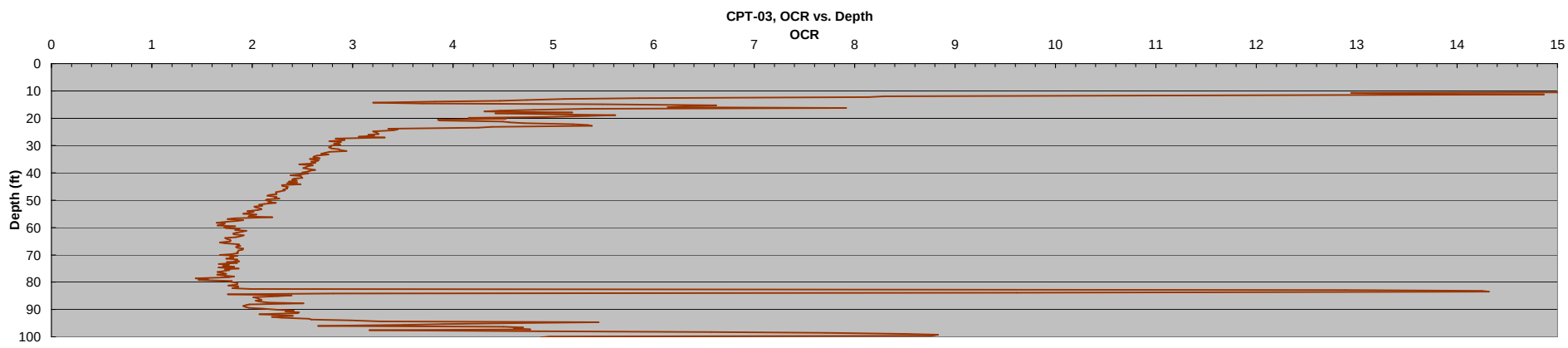


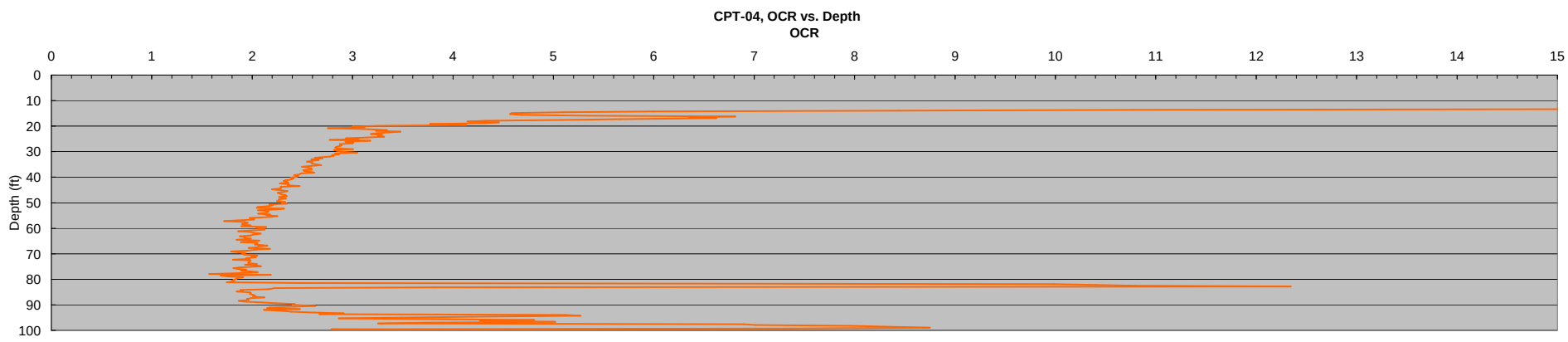
Chart 4
Shear Strength vs. Over Consolidation Ratio

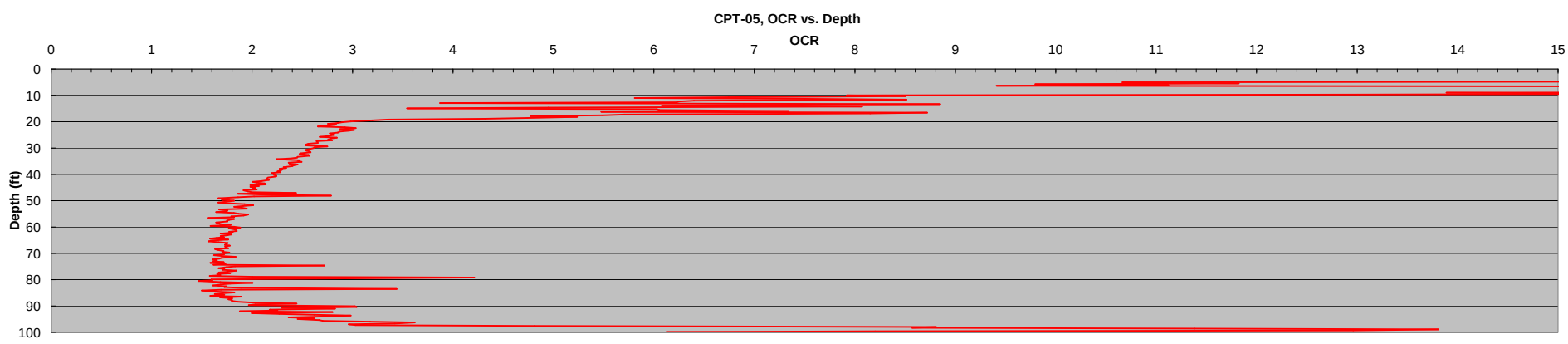
New Britain-Hartford Busway, Hartford, CT
Flatbush Ave. Over Busway (CTDOT Project Number: 155-H025, GeoDesign Project Number: 380-04)
Chart 5 - OCR vs. Depth

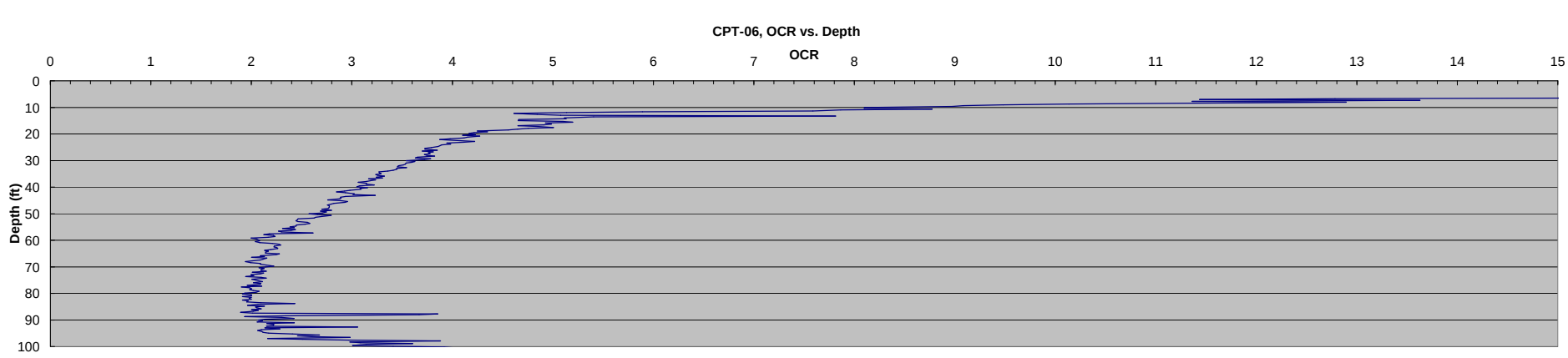






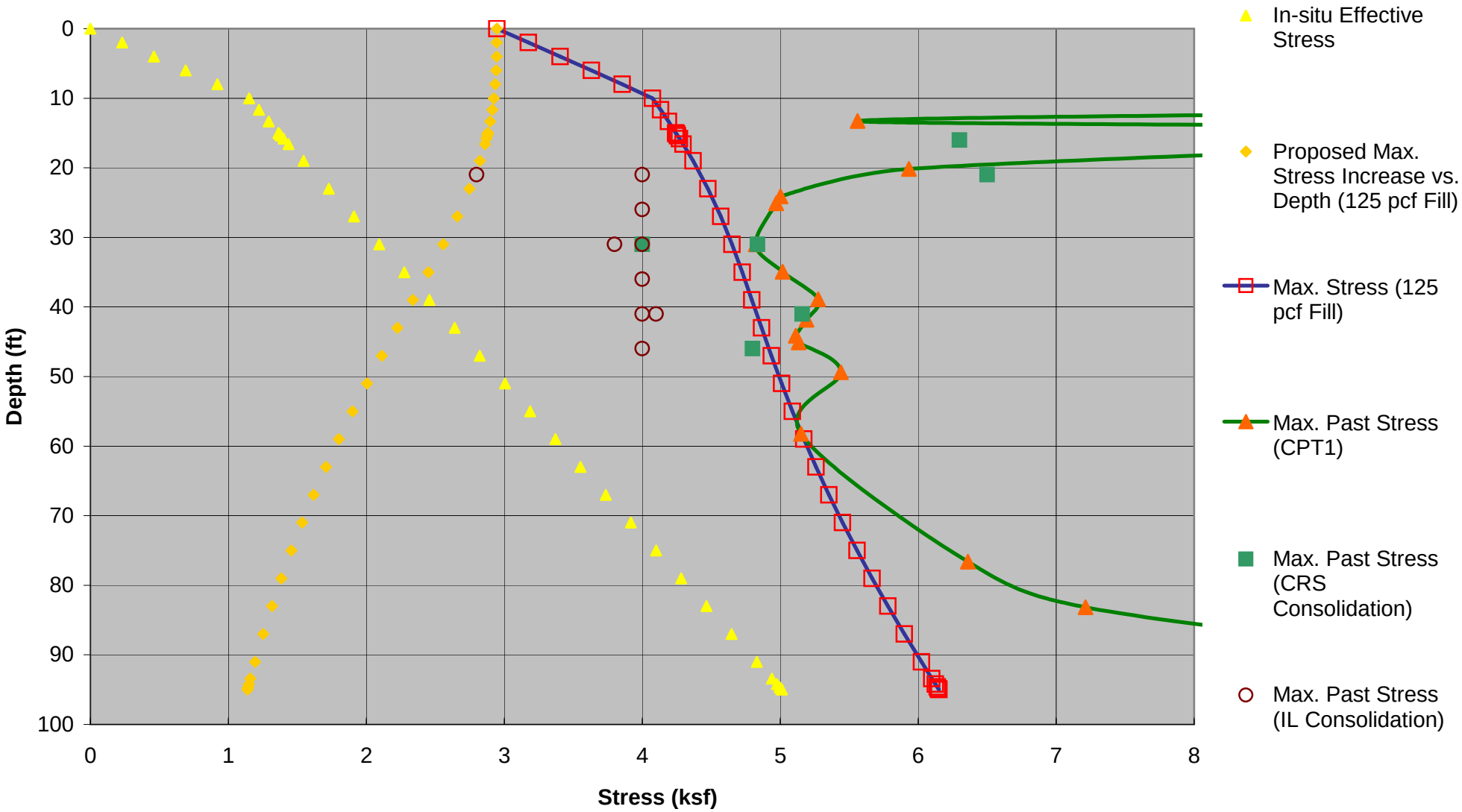






New Britain- Hartford Busway, Hartford, CT
Flatbush Ave. Over Busway (CT DOT Project Number: 155-H025)
GeoDesign Project Number: 380-04

Chart 6- Stress History and Proposed Stress (125 pcf Embankment)



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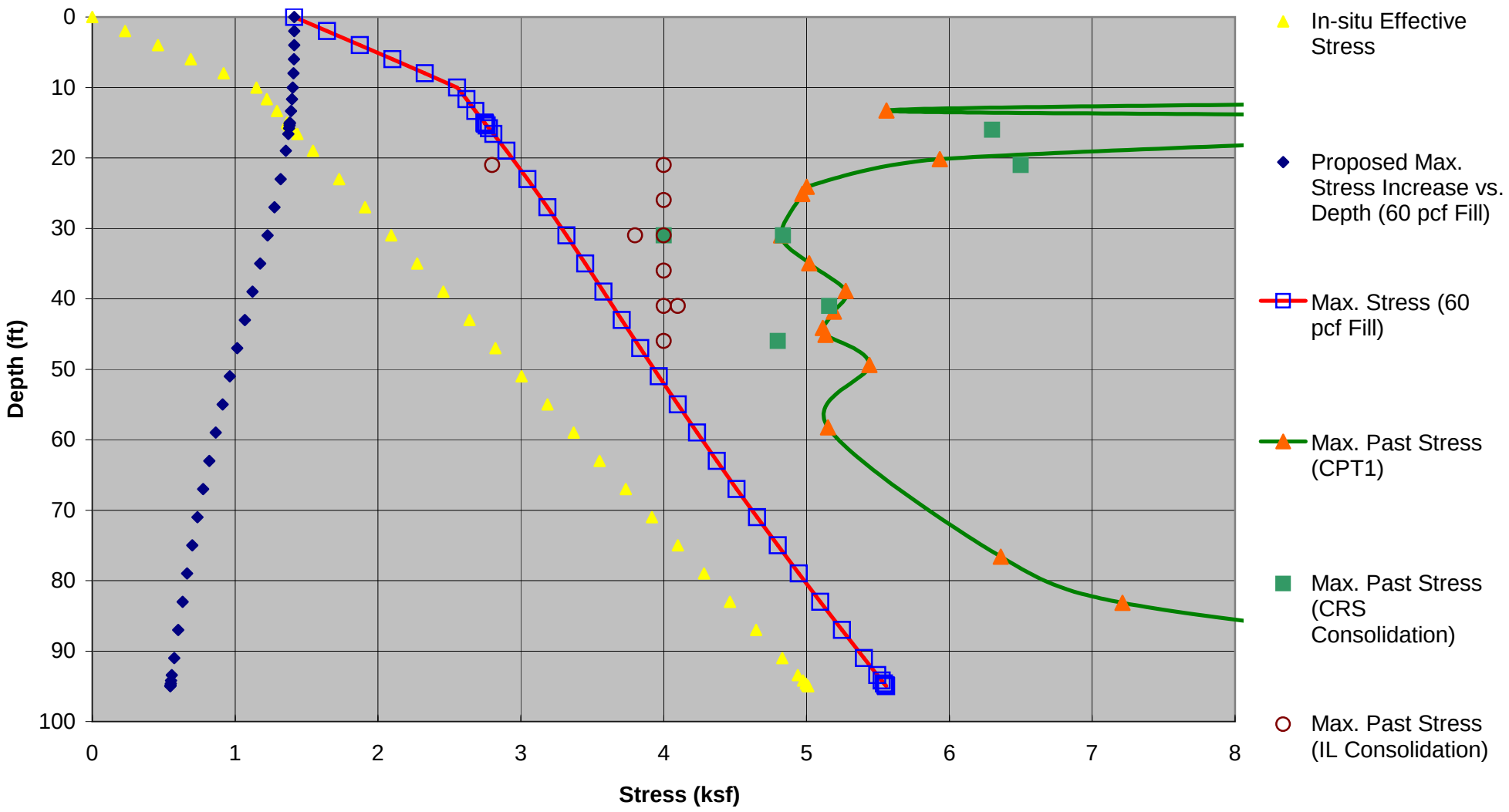
New Britain- Hartford Busway, Hartford, CT
Flatbush Ave. Over Busway (CT DOT Project Number: 155-H025)
GeoDesign Project Number: 380-04

Chart 7- Stress History and Proposed Stress (60 pcf Embankment)



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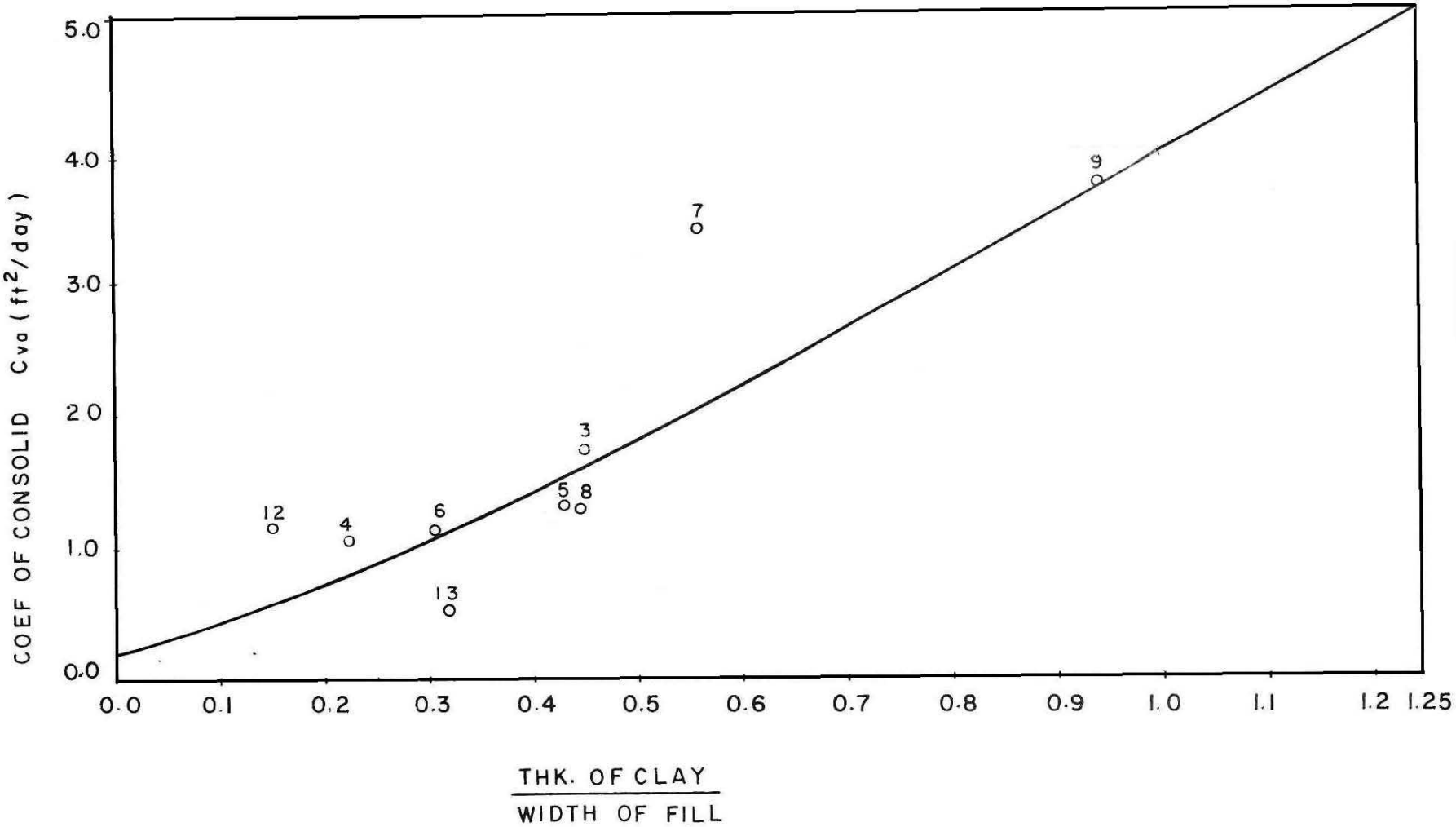


FIELD VALUES OF THE APPARENT COEFFICIENT OF CONSOLIDATION (EHE)

Chart 8

New Britain - Hartford Busway
Flatbush Ave. Over Busway
CT DOT Project Number: 155-H025
West Hartford and Hartford, Connecticut
GeoDesign Project Number: 0380-004.0

Table 1 - Observation Well Readings

Well Location	Location	Ground Surface Elevation	June 10, 2008		June 12, 2008		June 16, 2008		June 18, 2008		June 20, 2008		June 27, 2008		October 24, 2008	
			Depth (ft.)	Elevation (ft.)	Depth (ft.)	Elevation (ft.)	Depth (ft.)	Elevation (ft.)	Depth (ft.)	Elevation (ft.)	Depth (ft.)	Elevation (ft.)	Depth (ft.)	Elevation (ft.)	Depth (ft.)	Elevation (ft.)
SB-01-3	Flat Bush Ave. Over Busway	69.6	**-**	-	**2.3**	67.3	**2.0**	67.6	**1.7**	67.9	**1.7**	67.9	**1.9**	67.8	**2.3**	67.3
RW-2	Flat Bush Ave. Over Busway	74.7	**-**	-	**-**	-	**-**	-	**-**	-	**2.1**	72.6	**3.9**	70.8	**4.2**	70.5
RW-7	Flat Bush Ave. Over Busway	69.7	**-**	-	**-**	-	**8.7**	61.0	**8.5**	61.2	**8.6**	61.1	**6.6**	63.1	**6.5**	63.2

New Britain - Hartford Busway
CT DOT Project Number: 155-H025
Flatbush Ave. Over Busway
West Hartford and Hartford, Connecticut
GeoDesign Project Number: 0380-004.0

Table 2 - Consolidation Test Results and Calculated Shear Strength

Boring No.	Sample No.	Sample Depth (ft)	Tested By	Lab Test No.	Type of Test[1]	Strain at In-situ Stress	SQD[2]	Estimated In-situ Stress (psf)	RR	C_v[3] (ft2/day)	Wn(%)	σ'_p (psf)	OCR[4]	$S_{u,DSS}$[5] (psf)	E(ksf)	E_{ur}(ksf)	Estimated $C\alpha$[6]	Location
RW-4	UP2	46	GTX	C-1	IL	6.0%	D	2500	0.037	0.24	57.6	4000	1.60	605			0.0017	Flatbush Ave. Over Busway
RW-4	UP2	46	GTX	CRC-1	CRS	8.0%	E	2500	0.036	0.20	57.6	4800	1.92	693			0.0016	Flatbush Ave. Over Busway
RW-4	UP1	36	Test Con		IL	2.6%	C	2000	0.032	0.20	54.3	4000	2.00	572			0.00144	Flatbush Ave. Over Busway
RW-6	UP1	21	GTX	CRC-5	CRS	3.5%	C	1400	0.020	0.30	43.7	6500	4.64	753			0.0009	Flatbush Ave. Over Busway
RW-6	UP2	31	GTX	CRC-6A	CRS	3.2%	C	1800	0.030	0.50	61	5000	2.78	658			0.0014	Flatbush Ave. Over Busway
RW-7	UP1	31	GTX	CRC-2A	CRS	2.1%	C	1700	0.028	1.00	55.2	4000	2.35	549			0.0013	Flatbush Ave. Over Busway
RW-8	UP3	41	GTX	C-2	IL	10.0%	E	2500	0.032	0.42	59.5	4000	1.60	605			0.0014	Flatbush Ave. Over Busway
RW-8	UP2	31	Test Con		IL	2.3%	C	2000	0.030	0.23	50.9	3800	1.90	550			0.00135	Flatbush Ave. Over Busway
RW-8	UP1	21	Test Con		IL	2.5%	C	1650	0.035	0.20	55	2800	1.70	417			0.001575	Flatbush Ave. Over Busway
SB-01-1	UP1	21	Test Con		IL	1.8%	B	1300	0.030	0.28	46.2	4000	3.08	513			0.001368	Flatbush Ave. Over Busway
SB-01-1	UP2	31	UMass	CRS141	CRS	1.5%	B	1750	0.030	1.06	53	4835	2.76	638	120	450	0.0014	Flatbush Ave. Over Busway
SB-01-2	UP1	16	GTX	CRC-3	CRS	2.0%	B	1300	0.013	1.00	67.6	6300	4.85	722			0.0006	Flatbush Ave. Over Busway
SB-01-2	UP2	26	Test Con		IL	2.6%	C	1800	0.030	0.25	51.2	4000	2.22	557			0.00135	Flatbush Ave. Over Busway
SB-01-4	UP1	31	Test Con		IL	2.8%	C	2100	0.034	0.24	53.9	4000	1.90	579			0.00153	Flatbush Ave. Over Busway
SB-01-4	UP2	41	UMass	IL474	IL	2.0%	B	2100	0.031	0.80	54	4100	1.95	590			0.0014	Flatbush Ave. Over Busway
SB-01-4	UP2	41	UMass	CRS139	CRS	3.0%	C	2100	0.038	0.18	59	5159	2.46	700	110	240	0.0017	Flatbush Ave. Over Busway

Notes

1. CRS refers to constant strain consolidation test. IL refers to incremental load consolidation test.
2. SQD refers to sample quality evaluation. Sample quality evaluation method:
Terzaghi et al. (1996) Specimen Quality Designation (SQD): A (best) to E (worst)

ε_v at σ'_{vo}	<1	1-2	2-4	4-8	>8
SQD	A	B	C	D	E

3. Cv values were estimated using the proposed range of stresses (s'vo to s'final) from the maximum anticipated embankment load at mid-point of the varved clay layer.
4. OCR was determined using Casagrande Method.
5. $S_{u,DSS}$ is calculalted with SHANSEP correlation from four Direct Simple Shear tests
6. $C\alpha$ is estimated based on $C\alpha$=0.45CR

Table 3 - Summary of Test Results By Baker Engineering

	DEPTH (ft)	WATER CONTENT (%)	LL (%)	PL (%)	CLASS	AVE TOT UNIT WGT (pcf)	CONSOLIDATION TEST DEPTH (ft)	CLASS	e0	INITIAL WATER (%)	Cr	Cc	Cce	MAX PAST VERTICAL (psf)	OCR	TRIAXIAL TEST PISTON DEPTH* (ft)	PHI (deg)	c (psf)	TORSION VANE DEPTH (ft)	VALUE (tsf)
RB-34	1.5-3	27.4			SM															
	10-11.5	41.6	39	23	CL															
	25-26.5	60.6																		
RB-35	7.5-9	38.7																		
	13.5-15	36	21		CL															
	25.5-27	55.6																		
RB-36	4.5-6	31	34	24	CL															
	10-11.5	38.7																		
	25-26.5	58.9																		
RB-37	7.5-9	32	26	26	ML															
	13.5-15	40.1																		
	28.5-30	59.7																		
RB-38	1.5-3	5.2	NP	NP	SP-SM															
	13.5-15	35.3	29	22	CL-ML															
	22.5-24	49.6																		
RB-39	4.5-6	31.5	NP	NP	ML															
	16.5-18	35.8																		
RB-40	4.5-6	33																		
	13.5-15	43	49	24	CL															
	25-26.5	46.8																		
RB-41	4.5-6	59.4					*RB-41 NEAR HO25-117*													
	10-11.5	65.7	62	26	CH															
	16.5-18	66.1																		
	25-26.5	50.9																		
RB-42	7.5-9	10.6	NP	NP	SM															
	16.5-18	40.8																		
	22.5-28.5	10.4	25	14	SC															
SB-56	30.1	62.8	(Clay Portion)				31.7-31.8	CH	1.889	66.1	0.16	0.6	0.2	2500	0.72	30-32	20	210	30.1	0.2
	30.1-30.6	60.3																	30.6	0.2
	30.6	44.5	(Silt Portion)																31.1	0.21
	30.6-31.1	60.5																	37.7	0.2
	31.1	53.6	(Silt Portion)																	
	31.1-31.7	62																		
	31.7-31.8	66.1																		
	31-32	60.2	56	27																
	55-56.5	40.2	41	25	CL															
	75-76.5	27.3																		
	105-106.5	15.2	NP	NP	SM															
SB-57	28.5-30	57.1																		
	55-56.5	45.7	42	23	CL															
	90-91.5	22.5																		
SB-58	10-11.5	32.7					80.3-80.4	CH	1.835	67	0.19	0.66	0.22	6200	1.14				80.1	0.22
	35-36.5	59.5																	80.3	0.2
	50-51.5	56.6	53	25	CH		*SB-58 WITHIN FLATBUSH AVE ABUTMENT, FOR ALTERNATE LAYOUT*													
	80.1	65.1	(Clay Portion)			90.3														
	80.3	38.8	(Silt Portion)																	
	80.3-80.4	67																		
	80.4	44.5	(Entire Varve)																	
	80-80.5		53	25																
	90-91.5	34.2	24	24	ML															
	110-111.5	23.1	NP	NP	SM															
SB-59	7.5-9	27.8					*HAVE CORROSIVITY TEST FOR SB-59*													
	50-51.5	55.2					*SB-59 WITHIN FLATBUSH AVE PIER, FOR ALTERNATE LAYOUT*													
	105-11.5	23.7	NP	NP	ML															
SB-60	13.5-15	33.1	25	22	ML															
	35-36.5	55.4	60	27	CH															
	50-51.5	57.8																		
	70-71.5	45.8	48	23	CL															
	90-91.5	43.4																		
	110-111.5	22.7	NP	NP	ML															
	125-126.5	28	33	25	ML															
SB-61	40-41.5	58.1	64	23	CH															
	90-91.5	31.2	25	23	ML															
SB-62	10.-11	28.6					60.8-60.9	CH	2.02	71	0.23	0.83	0.26	5400	.56/1.03*				60.3	0.25
	35-36.5	59.2	60	26	CH															
	60.3	66.4	(Clay Portion)			108.53														
	60.4	40.7	(Silt Portion)																	
	60.5-60.7	49	(Entire Varve)																	
	60.8-60.9	71																		
	61.1	69.8	74	29																
	61.2	34.9	32	31																
	85-86.5	68.3	34	24	ML															
	115-116.5	11.9	16	14	SP-SM															
	120-121.5	21.6	NP	NP	SM															
SB-63	16.5-18	41.9	41	22	CL															
	50-51.5	57.5	56	25	CH															
	90-91.5	35.9	29	24	ML															
	135-136.5	11.7	NP	NP	SM															
SB-64	4.5-6	33																		
	10.5-12	24.8																		
	13.5-15	40.5																		
	16.5-18	47.4																		
	19.5-21	55																		
	22.5-24	58.3																		
	25-27	61.1																		
	28.5-30	55.2	63	27	CH															
	35-36.5	61.7																		
	40-41.5	57																		
	45-46.5	53.5																		
	50-51.5	48.3																		
	55-56.5	41.4																		
	60-61.5	40.1																		
	65-66.5	51.2																		

Table 3 - Summary of Test Results By Baker Engineering

							CONSOLIDATION TEST									TRIAXIAL TEST			TORSION VANE	
	DEPTH (ft)	WATER CONTENT (%)	LL (%)	PL (%)	CLASS	AVE TOT UNIT WGT (pcf)	DEPTH (ft)	CLASS	e0	INITIAL WATER (%)	Cr	Cc	Cce	MAX PAST VERTICAL (psf)	OCR	PISTON DEPTH* (ft)	PHI (deg)	c (psf)	DEPTH (ft)	VALUE (tsf)
	70-71.5	41.5	44	23	CL															
	75-76.5	41.8																		
	80-81.5	40.8																		
	85-86.5	42.7																		
	90-91.5	40.8																		
	95-96.5	24.1																		
	100-101.5	40.5																		
	110-111.5	23.5	NP	NP	SM															
	135-135.9	9.6			SM															
SB-65	13.5-15	28.9																		
	95-96.5	29.9	24	24	ML															
	125-126.5	14.6																		
SB-66	35-36.5	61.1	60	28	CH															
	70-71.5	47.8	43	24	CL															
	135-136.5	10.8	21	15	SC-SM															
SB-67	45-46.5	54.6	58	27	CH		71.3-71.4	CH	1.674	64.7	0.18	0.73	0.27	4800	1.06	70-72	30	250	70.4	0.25
	70.4	64.1	(Clay Portion)			110.5													70.9	0.27
	70.5-70.8	48.1																	71.3	0.24
	70.9	66.7	(Clay Portion)																	
	70.9-71.3	47																		
	71.3	76.8	(Clay Portion)																	
	71.3-71.4	64.7																		
	71.5-71.8	43.9																		
	71.8-71.9	43.1	(Entire Varve)																	
	71.9	39	(Silt Portion)																	
	70-72	67.8	70	32																
	95-96.5	46.2																		
	105-112	20.3	NP	NP	SM															
SB-68																				
SB-69	7.5-9	36.7	30	25	SM															
	50-51.5	44	56	26	CH															
	95-96.5	34.3	24	24	ML															
	145-146.5	12.1	18	15	GM															
SB-70	13.5-15	29.2					51.1-51.2	CH	1.681	59.6	.16*	0.62	0.23	4100	0.85	50-52	25	40	50.1	0.28
	28.5-30	54																	50.9	0.3
	50.1	71.5	(Clay Portion)			106.6													51.8	0.3
	50.2-50.5	61.3																		
	50.5-50.9	57.1																		
	50.9	70.4	(Clay Portion)																	
	51.1-51.2	59.6																		
	51.4-51.8	57.6																		
	51.8	71.6																		
	50-52	67.4	63	30																
	60-61.5	48.7	52	23	CH															
	105-106.5	24																		
SB-71	10.5-11	34.8																		
	13.5-15	39.2																		
	16.5-18	34.4																		
	19.5-21	43.5																		
	22.5-24	54.1																		
	25-26.5	53																		
	28.5-30	53.5																		
	35-36.5	51																		
	40-41.5	34.8																		
	45-46.5	54.9	56	26	CH															
	50.51.5	54																		
	55-56.5	46.3																		
	60.-61.5	39.5																		
	65-66.5	40																		
	70-71.5	48																		
	75-76.5	37.1																		
	80-81.5	50																		
	85-86.5	38.9	29	25	ML															
	90-91.5	41.4																		
	95.-96.5	23.7																		
	100-101.5	21.3																		
	115-116.5	12	17	16	SM															
SB-72	16.5-18	39.3																		
	25-26.5	49.6	47	24	CL															
	65-66.5	50.5	55	26	CH															
	105-106.5	24.5	20	20	ML															
	135-136.5	12.8			GP-GM															
SB-73	16.5-18	29.9					30.5-30.6	CL	0.853	31.2	0.035	0.18	0.11	4000	1.19	30-32	23	800	30.3	0.45
	28.5-30	33.1	NP	NP	ML														30.7	0.55
	30.3	30.5				127.6														
	30.3-30.6	29.5																		
	30.6-30.7	31.2																		
	30.7	24.3																		
	30.8-31.1	26.8																		
	31.2	26.9																	31.2	0.6
	31.3	24.3	29	21																
	31.4-31.7	23.1																		
	70-71.5	46.1	48	23	CL															
	115-116.5	21.4	NP	NP	SM															
SB-74	7.5-9	27.6	NP	NP	ML		29.5-29.6	CH	1.78*	65	0.17	0.7	0.23	4200	1.9				28.8	0.25
	25-26.5	63.5																		
	28.8	75.3	(Clay Portion)			110.47														
	28.9	34.8	(Silt Portion)																	
	28.9-29	56.2	(Entire Varve)																	
	29.1	68.1	83	31																
	29.5-29.6	65																		
	29.7-29.9	32.8	34	28																
	85-86.5	44.9	58	25	CH															

Hartford Busway South
State Project No.: 155-H025
File No.: 380-04

By: CGE 09/14/07
Modified:CZ 3/4/2009

Table 3 - Summary of Test Results By Baker Engineering

							CONSOLIDATION TEST									TRIAXIAL TEST			TORSION VANE	
	DEPTH (ft)	WATER CONTENT (%)	LL (%)	PL (%)	CLASS	AVE TOT UNIT WGT (pcf)	DEPTH (ft)	CLASS	e0	INITIAL WATER (%)	Cr	Cc	Cce	MAX PAST VERTICAL (psf)	OCR	PISTON DEPTH* (ft)	PHI (deg)	c (psf)	DEPTH (ft)	VALUE (tsf)
	120-121.5	12.8	22	17	GC-GM															
SB-75	16.5-18	43.8																		
	50-51.5	53.3	57	25	CH															
	110-111.5	24.8	NP	NP	ML															
SB-76	10.5-12	53																		
	28.5-30	51.6	59	26	CH															
	80-81.5	43.6	41	25	CL															
	130-131.5	19.2	NP	NP	SP-SM															
SB-77	10-11.5	25.8					41.6-41.7	CL	1.71	62.8	0.16	0.57	0.21	4200	1.84	40-42	13	800	40.2	0.32
	25-26.5	44.1	44	26	CL															
	40.2	76.1	(Clay Portion)			103.3													41.1	0.27
	40.2-40.6	61.1					*SB-77 NEAR WALL HO25-107*												41.5	0.25
	40.6-41.1	63.6																		
	41.1	39.5	(Silt Portion)																	
	41.1-41.5	57.5																		
	41.5	58.9	(Entire Varve)																	
	41.6-41.7	62.8																		
	40-42	72.1	74	43																
	85-86.5	42.3	35	25	ML															
	130-131.5	11.3	17	16	SM															
SB-78	13.5-15	32.1																		
	28.5-30	56.7	51	25	CH															
	80-81.5	43.9	38	24	CL															
	130-131.5	9.9	18	16	SM															
SB-79	13.5-15	41.2																		
	60-61.5	50.1	63	27	CH															
	145-146.5	11.5	20	17	SM															
SB-80	10-11.5	37.4	30	27	ML															
	22.5-24	48.8																		
	40-41.5	46.2	50	27	CH															
	70-71.5	51	55	28	CH															
	100-101.5	44.9	42	24	CL															
	130-131.5	19.1	NP	NP	SP-SM															
SB-81	7.5-9	31.9																		
	16.5-18	53.2																		
	28.5-30	45.9																		
	50-51.5	51	59	27	CH															
SB-82	16.5-18	39.1	36	24	CL															
	50-51.5	60.2	59	27	CH	100.4														
	70.3	46.5	(Disturbed)				*SB-82 NEAR SW-3*													
	70.9	56	(Disturbed)																	
	71.5	61.3	(Disturbed)																	
	95-96.5	46.9	42	25	CL															
	125-126.5	11	NP	NP	SW-SM															
SB-83	7.5-9	35.7	NP	NP	ML															
	28.5-30	44.8																		
	70-71.5	52	59	27	CH															
	130-131.5	10.6	NP	NP	SW-SM															
SB-84	4.5-6	4.5			SW-SM		31.6-31.7	CL/ML	1.27	47.1	0.09	0.31	0.16	3200	1.24	30-32	22	350	30.5	0.3
	25.5-27	46.8	44	25	CL														31.1	0.25
	30-30.5	45.3				106.2													31.5	0.27
	30.5	68	(Clay Portion)				*SB-84 WITHIN PARK STREET BRIDGE PIER*													
	30.6-31.1	50					*SB-84 NEAR HO25-112*													
	31.1	30.9	(Silt Portion)																	
	31.1-31.7	50.7																		
	31.5-31.6	47.2	(Entire Varve)																	
	31.6-31.7	47.1																		
	30-32	65.4	66	30																
	50-51.5	56.5	62	28	CH															
	90-91.5	46.9	58	26	CH															
	130-136.5	11.7	21	17	GP-GM															
SB-85	16.5-18	23.3					*SB-85 NEAR CAPITAL AVE BRIDGE ABUT*													
	25-26.5	46.6	59	29	CH															
	75-76.5	53.1	53	23	CH															
	110-11.5	10.8	17	16	ML															
SB-86	13.5-15	35.1	45	25	CL															
	40-41.5	42.9	56	28	CH															
	75-76.5	43.3	43	24	CL															
	110-111.5	11.6	15	14	SM															
SB-87	16.5-18	55.7	54	26	CH		*SB-87 NEAR HO25-116*													
	22.5-24	59.1																		
	55-56.5	57.4	55	26	CH															
SB-105	7.5-9	41.9					*SB-105 WITHIN OLD PARK RIVER AREA*													

* SB-62, e0 NOT GIVING IN LAB SHEET, BAKER CALCS e0=2.19. SHOULD BE 2.02 BY CGE CALC. SEE FB AVE REPORT.
* SB-62, OCR=.56 FROM LAB DATA, BAKER ASSUMES NORMAL CONSOL., ADJUST WATER TABLE, STRESS AND RECALCULATES OCR=1.03. SEE FB AVE REPORT.

* SB-70, BAKER CALCS Cc=.19. APPEARS TO BE MISCALCULATED. SEE FB AVE REPORT.

* SB-74, e0 NOT GIBING IN LAB SHEET, BAKER CALCS e0=2.04. SHOULD BE 1.78 BY CGE CALC. SEE NEW PARK AVE STATION/KANE BROOK CULVERT REPORT.

* THREE TRIAXIAL SAMPLES TESTED PER PISTON DEPTH SAMPLE

New Britain - Hartford Busway
Flatbush Ave. Over Busway
CT DOT Project Number: 155-H025
West Hartford and Hartford, Connecticut
GeoDesign Project Number: 0380-004.0

Table 4 - Summary of Atterberg Limits

Boring No.	Tube No.	Depth From (ft)	Depth To (ft)	Moisture Content (%)	LL (%)	PL (%)	PI (%)	Tested By	Location
RW-4	UP-2	45	47	54	56	33	23	GeoTesting Express	Flatbush Ave. Over Busway
RW-4	UP-1	35	37	58.1	49	23	26	TestCon	Flatbush Ave. Over Busway
RW-6	S-7	22	24		42	25	17	TestCon	Flatbush Ave. Over Busway
RW-6	S-9	32	34		53	35	18	TestCon	Flatbush Ave. Over Busway
RW-7	UP-1	30	32	60	61	30	31	GeoTesting Express	Flatbush Ave. Over Busway
RW-7	S-9	32	34		51	41	10	TestCon	Flatbush Ave. Over Busway
RW-7	S-12	45	47		28	23	5	TestCon	Flatbush Ave. Over Busway
RW-7	S-14	55	57		29	21	8	TestCon	Flatbush Ave. Over Busway
RW-8	UP-2	30	32		49	24	25	TestCon	Flatbush Ave. Over Busway
RW-8	S-7	22	24		48	26	22	TestCon	Flatbush Ave. Over Busway
RW-8	S-11	42	44		62	48	14	TestCon	Flatbush Ave. Over Busway
RW-8	S-14	55	57		41	36	5	TestCon	Flatbush Ave. Over Busway
RW-9	S-5	10	12		29	26	3	TestCon	Flatbush Ave. Over Busway
RW-9	S-10	35	37		58	41	17	TestCon	Flatbush Ave. Over Busway
SB-01-1	UP-1	20	22	56.1	49	24	25	TestCon	Flatbush Ave. Over Busway
SB-01-1	S-7	22	24		32	34	-2	TestCon	Flatbush Ave. Over Busway
SB-01-1	S-11	40	42		61	50	11	TestCon	Flatbush Ave. Over Busway
SB-01-1	S-13	50	52		52	46	6	TestCon	Flatbush Ave. Over Busway
SB-01-2	UP-2	25	27	51.9	49	25	24	TestCon	Flatbush Ave. Over Busway
SB-01-3	S-10	30	32		53	28	25	TestCon	Flatbush Ave. Over Busway
SB-01-3	S-12	40	42		42	28	14	TestCon	Flatbush Ave. Over Busway
SB-01-4	S-6	20	22		50	40	10	TestCon	Flatbush Ave. Over Busway
SB-01-4	S-8	32	34		47	37	10	TestCon	Flatbush Ave. Over Busway
SB-01-4	S-10	42	44		57	44	13	TestCon	Flatbush Ave. Over Busway
SB-01-4	UP-1	30	32	51.7	50	24	26	TestCon	Flatbush Ave. Over Busway

New Britain - Hartford Busway
Flatbush Ave. Over Busway
CT DOT Project Number: 155-H025
West Hartford and Hartford, Connecticut
GeoDesign Project Number: 0380-004.0

Table 5 - Summary of 2008 Hydrometer Tests

Boring No.	Tube No.	Depth From (ft)	Depth To (ft)	% Sand	% Silt	% Clay	Location
R-101	S-3	4	6	0	63.2	36.8	Flatbush Ave. Over Busway
R-112	S-5	10	12	2.7	26.9	70.4	Flatbush Ave. Over Busway
RW-4	UP-1	35	37	0.6	27.5	71.9	Flatbush Ave. Over Busway
RW-8	UP-2	30	32	0.4	19.9	79.7	Flatbush Ave. Over Busway
SB-01-1	UP-1	20	22	0.6	32.2	67.2	Flatbush Ave. Over Busway
SB-01-2	UP-2	25	27	0.6	29.5	69.9	Flatbush Ave. Over Busway
SB-01-4	UP-1	30	32	0.2	21.2	78.6	Flatbush Ave. Over Busway

New Britain - Hartford Busway
CT DOT Project Number: 155-H025
West Hartford and Hartford, Connecticut
GeoDesign Project Number: 0380-004.0

Table 6 - Summary of Field Vane Shear Tests

Test Date	Boring No.	Drilled to Depth (ft)	Pushed Vane to Depth (ft)	Surface Elevation (ft)	Pushed to Elevation (ft)	Ultimate Shear Strength (psf)	Correction Factor u	Corrected Shear Strength (psf)	Remold Shear Strength (psf)	Sensitivity	Location
6/9/2008	SB-01-3	35	36	70	34	670	0.9	**603**	0	Very Sensitive	Flatbush Ave. Over Busway
5/30/2008	SB-02-3	30	31	54	23	282	0.9	**254**	22	13	Busway Over Park St.
5/23/2008	SB-03-2	25	26.5	44	17	476	0.9	**428**	0	Very Sensitive	Busway Over Capitol Ave.
6/2/2008	SB-06-1	40	41	55	14	454	0.9	**409**	22	21	Old Park Rvier
5/27/2008	SB-06-3	55	56	54	-2	83	0.9	**75**	61	1	Old Park Rvier
5/29/2008	R-126	20	21	47	26	239	0.9	**215**	22	11	Old Park Rvier
6/4/2008	R-112	36	37	60	23	281	0.9	**253**	9	32	Roadway
6/5/2008	RW-31	25	26	64	38	389	0.9	**350**	108	4	Retaining Wall

Appendix 3

2003 Boring Logs

Driller: Al Augustine/GZA	**Connecticut DOT Boring Report**	Hole No.: **SB-58**
Inspector: Mark Martin	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 831123.2
Start Date: 8/12/03	Route No.:	Easting: 1009291.5
Finish Date: 8/14/03	Bridge No.:	Surface Elevation: 71.7
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW/4"	Sampler Type/Size: SS/1-3/8"	Core Barrel Type: NQ/1-7/8"I.D.
Hammer Wt.: 300 Fall: 24"	Hammer Wt.: 140 Fall: 30"	

Groundwater Obs. @ 25.0 after: 0 hours, @25.7 after: 24 hours, @ after: hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT_E (LD4 1/03)

Depth (ft.)	Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
0						0.4'	ASPHALT	
1	A-N		1.5				ELEV. 71.3	71
						1.5'	SILTY GRAVEL (GM) - gray and black fine to coarse gravel, some silt; dry, medium dense, NP; (SUBBASE).	
2	S-1	6 12 14	1.5	1.3				70
						2.5'	ELEV. 70.2	
3							SILTY SAND (SM) - black and dark brown fine sand, some silt, trace fine gravel; dry, loose, NP; (FILL).	69
4	A-N		1.5				ELEV. 69.2	68
							POORLY GRADED SAND WITH SILT (SP-SM) - tan and brown fine sand, little silt; moist, medium dense, NP; (ALLUVIUM).	
5	S-2	9 9 10	1.5	0.3				67
6							Encountered water at 3.2'	66
7	W-N		1.5				POORLY GRADED SAND WITH SILT (SP-SM) - tan and brown fine sand, little silt; moist, medium dense, NP; (ALLUVIUM).	65
						7.5'	ELEV. 64.2	
8	S-3	3 4 6	1.5	0.8			SANDY SILT WITH GRAVEL (ML) - gray silt, some fine sand, little fine gravel; wet, stiff, +PL; (ALLUVIUM).	64
9	W-N		1.0					63
10	S-4	6 5 6	1.5	1.2			SANDY SILT (ML) - gray silt, some fine sand, trace clay; wet, stiff, +PL; (ALLUVIUM).	62
11								61
12	W-N		2.0					60
13								59
						13.5'	ELEV. 58.2	
14	S-5	3 3 5	1.5	1.5			SILTY CLAY (CL-ML) - gray silt, some clay, trace fine sand; moist, stiff, +PL; (GLACIAL LAKE DEPOSIT).	58
15								57
16	W-N		1.5					56
17	S-6	2 1 2	1.5	1.5			SILTY CLAY (CL-ML) - gray silt, some clay, trace fine sand; moist, soft, +PL; (GLACIAL LAKE DEPOSIT).	55
18								54
19	W-N		1.5					53
		1					SILTY CLAY (CL-ML) - gray silt, some clay, trace fine	52

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 145.0' Rock: 5.0' No. of Samples: 31	NOTES:	Sheet **1** of **8** SM-001-M REV. 1/02

Driller: Al Augustine/GZA	**Connecticut DOT Boring Report**	Hole No.: **SB-58**
Inspector: Mark Martin	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 831123.2
Start Date: 8/12/03	Route No.:	Easting: 1009291.5
Finish Date: 8/14/03	Bridge No.:	Surface Elevation: 71.7
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW/4"	Sampler Type/Size: SS/1-3/8"	Core Barrel Type: NQ/1-7/8"I.D.
Hammer Wt.: 300 Fall: 24"	Hammer Wt.: 140 Fall: 30"	

Groundwater Obs. @ 25.0 after: 0 hours, @25.7 after: 24 hours, @ after: hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT E (LD4 1/03)

Depth (ft.)	Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
20	S-7	1 1	1.5	1.5			sand; moist, soft, +PL; (GLACIAL LAKE DEPOSIT).	
21								51
22	W-N		1.5					50
						22.5'	ELEV. 49.2	
23	S-8	WOH/1.5	1.5	1.5			LEAN CLAY (CL) - gray clay, little silt; wet, very soft, +PL; (GLACIAL LAKE DEPOSIT).	49
24	W-N		1.0					48
25	S-9	WOH WOH WOH	1.5	1.5			LEAN CLAY (CL) - gray clay, little silt; wet, very soft, +PL; (GLACIAL LAKE DEPOSIT).	47
26								46
27	W-N		2.0					45
28								44
29	S-10	WOH WOH WOH	1.5	1.5			LEAN CLAY (CL) - gray clay, little silt; wet, very soft, +PL; (GLACIAL LAKE DEPOSIT).	43
30								42
31								41
32	W-N		5.0					40
33								39
34								38
35								37
36	S-11	WOH WOH WOH	1.5	1.5			LEAN CLAY (CL) - gray clay, little silt; wet, very soft, +PL; (GLACIAL LAKE DEPOSIT).	36
37								35
38	W-N		3.5					34
39								33
								32

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 145.0' Rock: 5.0' No. of Samples: 31	NOTES:	Sheet **2** of **8** SM-001-M REV. 1/02

Driller: Al Augustine/GZA	**Connecticut DOT Boring Report**	Hole No.: **SB-58**
Inspector: Mark Martin	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 831123.2
Start Date: 8/12/03	Route No.:	Easting: 1009291.5
Finish Date: 8/14/03	Bridge No.:	Surface Elevation: 71.7
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW/4"	Sampler Type/Size: SS/1-3/8"	Core Barrel Type: NQ/1-7/8"I.D.
Hammer Wt.: 300 Fall: 24"	Hammer Wt.: 140 Fall: 30"	

Groundwater Obs. @ 25.0 after: 0 hours, @25.7 after: 24 hours, @ after: hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT_E (LD4 1/03)

Depth (ft.)	SAMPLES Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
40	S-12	WOR 1 2	1.5	1.5			LEAN CLAY (CL) - gray clay, little silt; wet, very soft, +PL; (GLACIAL LAKE DEPOSIT).	31
41								
42	W-N		3.5					30
43								29
44								28
45								27
46	S-13	WOR WOH 1	1.5	1.5			LEAN CLAY (CL) - gray and reddish brown clay, little silt; wet, very soft, +PL; (GLACIAL LAKE DEPOSIT).	26
47	W-N		3.5					25
48								24
49								23
50	S-14	WOR WOH WOH	1.5	1.5			LEAN CLAY (CL) - gray and reddish brown clay, little silt; wet, very soft, +PL; (GLACIAL LAKE DEPOSIT).	22
51								21
52	W-N		3.5					20
53								19
54								18
55	S-15	WOR WOR WOH	1.5	1.5			LEAN CLAY (CL) - gray and reddish brown clay, little silt; wet, very soft, +PL; (GLACIAL LAKE DEPOSIT).	17
56								16
57	W-N		3.5					15
58								14
59								13
								12

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 145.0' Rock: 5.0' No. of Samples: 31	NOTES:	Sheet **3** of **8** SM-001-M REV. 1/02

Driller: Al Augustine/GZA	**Connecticut DOT Boring Report**	Hole No.: **SB-58**
Inspector: Mark Martin	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 831123.2
Start Date: 8/12/03	Route No.:	Easting: 1009291.5
Finish Date: 8/14/03	Bridge No.:	Surface Elevation: 71.7
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW/4"	Sampler Type/Size: SS/1-3/8"	Core Barrel Type: NQ/1-7/8"I.D.
Hammer Wt.: 300 Fall: 24"	Hammer Wt.: 140 Fall: 30"	

Groundwater Obs. @ 25.0 after: 0 hours, @25.7 after: 24 hours, @ after: hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT_E (LD4 1/03)

Depth (ft.)	SAMPLES Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
60	S-16	WOR WOR WOR	1.5	1.5			LEAN CLAY (CL) - reddish brown clay, little silt; wet, very soft, +PL; (GLACIAL LAKE DEPOSIT).	11
61								
62	W-N		3.5					10
63								9
64								8
65	S-17	WOR WOH WOH	1.5	1.5			LEAN CLAY (CL) - reddish brown clay, little silt; wet, very soft, +PL; (GLACIAL LAKE DEPOSIT).	7
66								6
67	W-N		3.5					5
68								4
69								3
70	S-18	WOR WOH WOH	1.5	1.5			LEAN CLAY (CL) - reddish brown clay, little silt; wet, very soft, +PL; (GLACIAL LAKE DEPOSIT).	2
71								1
72	W-N		3.5					0
73								-1
74								-2
75	S-19	WOR WOR WOR	1.5	1.5			LEAN CLAY (CL) - gray and reddish brown clay, little silt; wet, very soft, +PL; (GLACIAL LAKE DEPOSIT).	-3
76								-4
77	W-N		3.5					-5
78								-6
79								-7
								-8

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 145.0' Rock: 5.0' No. of Samples: 31	NOTES:	Sheet **4** of **8** SM-001-M REV. 1/02

Driller: Al Augustine/GZA	**Connecticut DOT Boring Report**	Hole No.: **SB-58**
Inspector: Mark Martin	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 831123.2
Start Date: 8/12/03	Route No.:	Easting: 1009291.5
Finish Date: 8/14/03	Bridge No.:	Surface Elevation: 71.7
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW/4"	Sampler Type/Size: SS/1-3/8"	Core Barrel Type: NQ/1-7/8"I.D.
Hammer Wt.: 300 Fall: 24"	Hammer Wt.: 140 Fall: 30"	

Groundwater Obs. @ 25.0 after: 0 hours, @25.7 after: 24 hours, @ after: hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT_E (LD4 1/03)

Depth (ft.)	Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
80								
81	UP-1		2.0	0.5				-9
82								-10
83	W-N		3.0					-11
84								-12
85						85.0'	ELEV. -13.3	-13
86	S-20	1 1/1.0	1.5	1.3			SILTY CLAY (CL-ML) - reddish brown silt, some clay; wet, very soft, +PL; (GLACIAL LAKE DEPOSIT).	-14
87								-15
88	W-N		3.5					-16
89								-17
90								-18
91	S-21	4 2 3	1.5	1.5			SILTY CLAY (CL-ML) - reddish brown silt, some clay; wet, medium stiff, +PL; (GLACIAL LAKE DEPOSIT).	-19
92								-20
93	W-N		3.5					-21
94								-22
95								-23
96	S-22	4 4 1	1.5	1.2			SILTY CLAY (CL-ML) - reddish brown silt, some clay; wet, medium stiff, +PL; (GLACIAL LAKE DEPOSIT).	-24
97								-25
98	W-N		3.5					-26
99								-27
								-28

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 145.0' Rock: 5.0' No. of Samples: 31	NOTES:	Sheet **5** of **8** SM-001-M REV. 1/02

Driller: Al Augustine/GZA	**Connecticut DOT Boring Report**	Hole No.: **SB-58**
Inspector: Mark Martin	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 831123.2
Start Date: 8/12/03	Route No.:	Easting: 1009291.5
Finish Date: 8/14/03	Bridge No.:	Surface Elevation: 71.7
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW/4"	Sampler Type/Size: SS/1-3/8"	Core Barrel Type: NQ/1-7/8"I.D.
Hammer Wt.: 300 Fall: 24"	Hammer Wt.: 140 Fall: 30"	

Groundwater Obs. @ 25.0 after: 0 hours, @25.7 after: 24 hours, @ after: hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT_E (LD4 1/03)

Depth (ft.)	Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
100						100.0'	ELEV. -28.3	
101	S-23	12 15 17	1.5	0.8			SANDY SILT (ML) - reddish brown silt and fine sand; wet, dense, NP.	-29
102								-30
103	W-N		3.5					-31
104								-32
105								-33
106	S-24	20 17 17	1.5	0.9			SANDY SILT (ML) - reddish brown silt and fine sand; wet, dense, NP.	-34
107								-35
108	W-N		3.5					-36
109								-37
110						110.0'	ELEV. -38.3	-38
111	S-25	21 19 20	1.5	1.2			POORLY GRADED SAND WITH SILT (SP-SM) - reddish brown fine sand, little silt; wet, dense, NP.	-39
112								-40
113	W-N		3.5					-41
114								-42
115						115.0'	ELEV. -43.3	-43
116	S-26	8 11 17	1.5	1.5			SILT (ML) - reddish brown silt; moist, very stiff, +PL.	-44
117								-45
118	W-N		3.5					-46
119						119.0'	ELEV. -47.3	-47
								-48

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 145.0' Rock: 5.0' No. of Samples: 31	NOTES:	Sheet **6** of **8** SM-001-M REV. 1/02

Driller: Al Augustine/GZA	**Connecticut DOT Boring Report**	Hole No.: **SB-58**
Inspector: Mark Martin	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 831123.2
Start Date: 8/12/03	Route No.:	Easting: 1009291.5
Finish Date: 8/14/03	Bridge No.:	Surface Elevation: 71.7
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW/4"	Sampler Type/Size: SS/1-3/8"	Core Barrel Type: NQ/1-7/8"I.D.
Hammer Wt.: 300 Fall: 24"	Hammer Wt.: 140 Fall: 30"	

Groundwater Obs. @ 25.0 after: 0 hours, @25.7 after: 24 hours, @ after: hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT_E (LD4 1/03)

Depth (ft.)	Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
120								
121	S-27	99 58 50	1.5	0.3			SILTY GRAVEL WITH SAND (GM) - reddish brown medium to coarse gravel, some silt, little fine to coarse sand; moist, very dense, NP; (TILL).	-49
122							Gravel blocked spoon on S-27 and reduced recovery.	-50
123	W-N		3.5					-51
124								-52
125						125.0'	ELEV. -53.3	-53
126	S-28	56 81 100/0.1	1.1	1.1			GRAVELLY SILT WITH SAND (ML) - reddish brown silt, some fine to coarse gravel, little fine to coarse sand; moist, very dense, NP; (TILL).	-54
127								-55
128	W-N		3.9					-56
129								-57
130						130.0'	ELEV. -58.3	-58
131	S-29	110 100/0.1	0.6	0.6			POORLY GRADED GRAVEL WITH SILT AND SAND (GP-GM) - reddish brown fine to coarse gravel, little silt, little fine to coarse sand; wet, very dense, NP; (SHALE BOULDER IN TILL).	-59
132								-60
133	W-N		4.4					-61
134								-62
135						135.0'	ELEV. -63.3	-63
136	S-30	100/0.3	0.3	0.3			GRAVELLY SILT WITH SAND (ML) - reddish brown silt, some fine to coarse gravel, little fine to coarse sand; moist, very dense, NP; (TILL).	-64
137								-65
138	W-N		4.7					-66
139						139.0'	ELEV. -67.3	-67
								-68

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 145.0' Rock: 5.0' No. of Samples: 31	NOTES:	Sheet 7 of 8 SM-001-M REV. 1/02

Driller: Al Augustine/GZA	**Connecticut DOT Boring Report**	Hole No.: **SB-58**
Inspector: Mark Martin	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 831123.2
Start Date: 8/12/03	Route No.:	Easting: 1009291.5
Finish Date: 8/14/03	Bridge No.:	Surface Elevation: 71.7
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW/4"	Sampler Type/Size: SS/1-3/8"	Core Barrel Type: NQ/1-7/8"I.D.
Hammer Wt.: 300 Fall: 24"	Hammer Wt.: 140 Fall: 30"	

Groundwater Obs. @ 25.0 after: 0 hours, @25.7 after: 24 hours, @ after: hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT_E (LD4 1/03)

Depth (ft.)	SAMPLES Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
140	S-31	100/0.1	0.1	0.1			POORLY GRADED GRAVEL WITH SILT (GP-GM) - reddish brown coarse gravel, little silt; wet, very dense, NP; (DECOMPOSED ROCK).	
141								-69
142	W-N		4.9				Attempted to core at 140.0' but barrel blocked off, rock too decomposed to core.	-70
143								-71
144								-72
145						145.0'	ELEV. -73.3	-73
146				5.0	1.65		SILTSTONE; reddish brown, medium hard to hard, slightly weathered.	-74
147	C-1		5.0					-75
148								-76
149								-77
150				100%	33%		ELEV. -78.3	-78
151							End of Boring at 150.0'	-79
152								-80
153								-81
154								-82
155								-83
156								-84
157								-85
158								-86
159								-87
								-88

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 145.0' Rock: 5.0' No. of Samples: 31	NOTES:	Sheet **8** of **8** SM-001-M REV. 1/02

Driller: Seth Murkette/GZA	**Connecticut DOT Boring Report**	Hole No.: **SB-59**
Inspector: Rachael Marks	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 831096.1
Start Date: 7-11-03	Route No.:	Easting: 1009349.1
Finish Date: 7-15-03	Bridge No.:	Surface Elevation: 70.4
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW 4" ID	Sampler Type/Size: SS/ 1-3/8 " ID	Core Barrel Type: NQ/1 7/8" ID
Hammer Wt.: 300 Fall: 24	Hammer Wt.: 140 Fall: 30	

Groundwater Obs. @ after: 0 hours, @ after: hours, @14.7 after: 48 hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT_E (LD4 1/03)

Depth (ft.)	SAMPLES Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
0–1	A-N		1.5					70
2	S-1	7 8 10	1.5	0.9			WELL-GRADED SAND WITH SILT AND GRAVEL (SW-SM) - dark gray to black fine to medium sand, some fine gravel, little silt; moist, medium dense, NP; (FILL).	69
3								68
4	A-N		1.5					67
5	S-2	11 13 11	1.5	0.3			WELL-GRADED SAND WITH SILT AND GRAVEL (SW-SM) - dark gray to black fine to medium sand, some silt, some fine gravel; moist, medium dense, NP; (FILL).	66
6								65
7	A-N		1.5					64
						7.5'	ELEV. 62.9	63
8	S-3	2 5 5	1.5	1.0			SANDY CLAY (CL) - gray to brown clay, some fine sand; moist, stiff, PL; (GLACIAL LAKE DEPOSIT, VARVED CLAY).	62
9	A-N		1.0					61
10–11	S-4	3 2 3	1.5	1.2			SANDY CLAY (CL) - gray to brown clay, some fine sand; moist, medium stiff, +PL; (GLCIAL LAKE DEPOSIT, VARVED CLAY).	60
12								59
13	W-N		2.0					58
14	S-5	2 3 2	1.5	0.8			SANDY CLAY (CL) - gray to brown clay, some fine sand, trace gravel; moist, medium stiff, +PL; (GLACIAL LAKE DEPOSIT, VARVED CLAY).	57
15								56
16	W-N		1.5					55
17	S-6	2 2 2	1.5	0			NO RECOVERY	54
18								53
19	W-N		1.5					52
		2					SANDY CLAY (CL) - gray to brown clay, some fine	51

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 140.0' Rock: 7.5' No. of Samples: 32	NOTES:	Sheet **1** of **8** SM-001-M REV. 1/02

Driller: Seth Murkette/GZA	**Connecticut DOT Boring Report**	Hole No.: **SB-59**
Inspector: Rachael Marks	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 831096.1
Start Date: 7-11-03	Route No.:	Easting: 1009349.1
Finish Date: 7-15-03	Bridge No.:	Surface Elevation: 70.4
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW 4" ID	Sampler Type/Size: SS/ 1-3/8 " ID	Core Barrel Type: NQ/1 7/8" ID
Hammer Wt.: 300 Fall: 24	Hammer Wt.: 140 Fall: 30	

Groundwater Obs. @ after: 0 hours, @ after: hours, @14.7 after: 48 hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT_E (LD4 1/03)

Depth (ft.)	SAMPLES Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
20	S-7	2 3	1.5	1.5			sand; moist, medium stiff, +PL; (GLACIAL LAKE DEPOSIT, VARVED CLAY).	50
21								
22	W-N		1.5					49
23	S-8	1 1 1	1.5	1.5			SANDY CLAY (CL) - gray to brown clay, some fine sand; moist, soft, +PL; (GLACIAL LAKE DEPOSIT, VARVED CLAY).	48
24	A-N		1.0					47
25	S-9	1 1 1	1.5	1.5			SANDY CLAY (CL) - gray to brown clay, some fine sand; moist, soft, +PL; (GLACIAL LAKE DEPOSIT, VARVED CLAY).	46
26								45
27	W-N		2.0					44
28								43
29	S-10	1 1 1	1.5	1.5			SANDY CLAY (CL) - gray to brown clay, some fine sand; moist, soft, +PL; (GLACIAL LAKE DEPOSIT, VARVED CLAY).	42
30								41
31								40
32	W-N		5.0					39
33								38
34								37
35								36
36	S-11	1 1 1	1.5	1.5			SANDY CLAY (CL) - gray to brown clay, some fine sand; moist, soft, +PL; (GLACIAL LAKE DEPOSIT, VARVED CLAY).	35
37								34
38	W-N		3.5					33
39								32
								31

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 140.0' Rock: 7.5' No. of Samples: 32	NOTES:	Sheet **2** of **8** SM-001-M REV. 1/02

Driller: Seth Murkette/GZA	**Connecticut DOT Boring Report**	Hole No.: **SB-59**
Inspector: Rachael Marks	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 831096.1
Start Date: 7-11-03	Route No.:	Easting: 1009349.1
Finish Date: 7-15-03	Bridge No.:	Surface Elevation: 70.4
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW 4" ID	Sampler Type/Size: SS/ 1-3/8 " ID	Core Barrel Type: NQ/1 7/8" ID
Hammer Wt.: 300 Fall: 24	Hammer Wt.: 140 Fall: 30	

Groundwater Obs. @ after: 0 hours, @ after: hours, @14.7 after: 48 hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT_E (LD4 1/03)

Depth (ft.)	SAMPLES Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
40–41	S-12	1 1 1	1.5	1.5			SANDY CLAY (CL) - gray to brown clay, some fine sand; moist, soft, +PL; (GLACIAL LAKE DEPOSIT, VARVED CLAY).	30–29
42–44	W-N		3.5					28–26
45–46	S-13	2 1 2	1.5	1.4			SANDY CLAY (CL) - gray to brown clay, some fine sand; moist, soft, +PL; (GLACIAL LAKE DEPOSIT, VARVED CLAY).	25–24
47–49	W-N		3.5					23–21
50–51	S-14	2 1 1	1.5	1.5			SANDY CLAY (CL) - gray to brown clay, some fine sand; moist, soft, +PL; (GLACIAL LAKE DEPOSIT, VARVED CLAY).	20–19
52–54	W-N		3.5					18–16
55–56	S-15	2 2 2	1.5	0.0			SANDY CLAY (CL) - gray to brown clay, some fine sand; moist, soft, +PL; (GLACIAL LAKE DEPOSIT, VARVED CLAY).	15–14
57–59	W-N		3.5					13–11

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 140.0' Rock: 7.5' No. of Samples: 32	NOTES:	Sheet **3** of **8** SM-001-M REV. 1/02

Driller: Seth Murkette/GZA	**Connecticut DOT Boring Report**	Hole No.: **SB-59**
Inspector: Rachael Marks	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 831096.1
Start Date: 7-11-03	Route No.:	Easting: 1009349.1
Finish Date: 7-15-03	Bridge No.:	Surface Elevation: 70.4
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW 4" ID	Sampler Type/Size: SS/ 1-3/8 " ID	Core Barrel Type: NQ/1 7/8" ID
Hammer Wt.: 300 Fall: 24	Hammer Wt.: 140 Fall: 30	

Groundwater Obs. @ after: 0 hours, @ after: hours, @14.7 after: 48 hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT_E (LD4 1/03)

Depth (ft.)	Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
60						60.0'	ELEV. 10.4	
61	S-16	WOR WOR WOR	1.5	1.5			CLAY WITH SILT (CL) - red and gray clay, some silt; moist, very soft, +PL; (GLACIAL LAKE DEPOSIT).	10
62								9
63	W-N		3.5					8
64								7
65								6
66	S-17	WOH WOH WOH	1.5	1.5			CLAY WITH SILT (CL) - red and gray layered clay, some silt; moist, very soft, +PL; weakly varved (GLACIAL LAKE DEPOSIT).	5
67								4
68	W-N		3.5					3
69								2
70								1
71	S-18	1 3 2	1.5	1.5			CLAY WITH SILT (CL) - red and gray layered clay, some silt; moist, medium stiff, +PL; silt varves (GLACIAL LAKE DEPOSIT).	0
72								-1
73	W-N		3.5					-2
74								-3
75								-4
76	S-19	WOH WOH WOH	1.5	1.5			CLAY WITH SILT (CL) - red and gray layered clay, some silt, trace to little fine sand; moist, very soft, +PL; silt and sand varves (GLACIAL LAKE DEPOSIT).	-5
77								-6
78	W-N		3.5					-7
79								-8
								-9

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 140.0' Rock: 7.5' No. of Samples: 32	NOTES:	Sheet **4** of **8** SM-001-M REV. 1/02

Driller: Seth Murkette/GZA	**Connecticut DOT Boring Report**	Hole No.: **SB-59**
Inspector: Rachael Marks	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 831096.1
Start Date: 7-11-03	Route No.:	Easting: 1009349.1
Finish Date: 7-15-03	Bridge No.:	Surface Elevation: 70.4
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW 4" ID	Sampler Type/Size: SS/ 1-3/8 " ID	Core Barrel Type: NQ/1 7/8" ID
Hammer Wt.: 300 Fall: 24	Hammer Wt.: 140 Fall: 30	

Groundwater Obs. @ after: 0 hours, @ after: hours, @14.7 after: 48 hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT_E (LD4 1/03)

Depth (ft.)	SAMPLES Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
80								-10
81	S-20	5 4 3	1.5	1.1			CLAY WITH SILT (CL)- red and gray layered clay, some silt, trace to little fine sand; moist, medium stiff, +PL; silt and sand varves (GLACIAL LAKE DEPOSIT).	-11
82								-12
83	W-N		3.5					-13
84								-14
85								-15
86	S-21	3 3 3	1.5	1.5			CLAY WITH SILT (CL) - red and gray layered clay, some silt; moist, medium stiff, +PL; silt varves (GLACIAL LAKE DEPOSIT).	-16
87								-17
88	W-N		3.5					-18
89								-19
90								-20
91	S-22	4 4 4	1.5	1.0			CLAY WITH SILT (CL) - red and gray layered clay, some silt; moist, medium stiff, +PL; silt varves (GLACIAL LAKE DEPOSIT).	-21
92								-22
93	W-N		3.5					-23
94								-24
95								-25
96	S-23	4 1 3	1.5	0.0			NO RECOVERY	-26
97								-27
98	W-N		3.5					-28
99								-29

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 140.0' Rock: 7.5' No. of Samples: 32	NOTES:	Sheet **5** of **8** SM-001-M REV. 1/02

Driller: Seth Murkette/GZA	**Connecticut DOT Boring Report**	Hole No.: **SB-59**
Inspector: Rachael Marks	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 831096.1
Start Date: 7-11-03	Route No.:	Easting: 1009349.1
Finish Date: 7-15-03	Bridge No.:	Surface Elevation: 70.4
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW 4" ID	Sampler Type/Size: SS/ 1-3/8 " ID	Core Barrel Type: NQ/1 7/8" ID
Hammer Wt.: 300 Fall: 24	Hammer Wt.: 140 Fall: 30	

Groundwater Obs. @ after: 0 hours, @ after: hours, @14.7 after: 48 hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT_E (LD4 1/03)

Depth (ft.)	Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
100						100.0'	ELEV. -29.6	
101	S-24	9 11 15	1.5	0.5			POORLY GRADED SAND WITH SILT (SP-SM) - reddish brown fine to medium sand, little silt; moist, medium dense, NP.	-30
102								-31
103	W-N		3.5					-32
104								-33
105								-34
106	S-25	7 14 14	1.5	0.5			POORLY GRADED SAND WITH SILT (SP-SM) - reddish brown fine to medium sand, little silt; wet, medium dense, NP.	-35
107								-36
108	W-N		3.5					-37
109								-38
110								-39
111	S-26	11 13 21	1.5	0.6			POORLY GRADED SAND WITH SILT (SP-SM) - reddish brown fine to medium sand, little silt; wet, dense, NP.	-40
112								-41
113	W-N		3.5					-42
114								-43
115						115.0'	ELEV. -44.6	-44
116	S-27	18 24 35	1.5	0.8			SILT (ML) - reddish brown silt, trace clay; moist, hard, -PL; (TILL CONTACT).	-45
117								-46
118	W-N		3.5					-47
119								-48
								-49

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger

Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 140.0' Rock: 7.5'
No. of Samples: 32

NOTES:

SM-001-M REV. 1/02

Driller: Seth Murkette/GZA	**Connecticut DOT Boring Report**	Hole No.: **SB-59**
Inspector: Rachael Marks	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 831096.1
Start Date: 7-11-03	Route No.:	Easting: 1009349.1
Finish Date: 7-15-03	Bridge No.:	Surface Elevation: 70.4
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW 4" ID	Sampler Type/Size: SS/ 1-3/8 " ID	Core Barrel Type: NQ/1 7/8" ID
Hammer Wt.: 300 Fall: 24	Hammer Wt.: 140 Fall: 30	

Groundwater Obs. @ after: 0 hours, @ after: hours, @14.7 after: 48 hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT_E (LD4 1/03)

Depth (ft.)	Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
120	S-28	24 37 45	1.5	0.6			SANDY SILT (ML) - reddish brown silt, some medium to coarse sand; moist, very dense, NP; (TILL).	-50
121								-51
122	W-N		3.5					-52
123								-53
124								-54
125	S-29	45 80 150/0.2	1.2	0.5			SANDY SILT WITH GRAVEL (ML) - reddish brown silt, some fine to coarse sand, some gravel; moist, very dense, NP; (TILL).	-55
126								-56
127	W-N		3.8					-57
128								-58
129								-59
130	S-30	200/0.5	0.5	0.5			SANDY SILT WITH GRAVEL (ML) - reddish brown silt, some fine to coarse sand, some gravel; moist, very stiff, NP; (TILL).	-60
131	W-N		4.5					-61
132								-62
133								-63
134								-64
135	S-31	150/0	0.0	0			NO RECOVERY	-65
136	W-N		5.0					-66
137								-67
138								-68
139								-69

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 140.0' Rock: 7.5' No. of Samples: 32	NOTES:	Sheet 7 of 8 SM-001-M REV. 1/02

Driller: Seth Murkette/GZA	**Connecticut DOT Boring Report**	Hole No.: **SB-59**
Inspector: Rachael Marks	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 831096.1
Start Date: 7-11-03	Route No.:	Easting: 1009349.1
Finish Date: 7-15-03	Bridge No.:	Surface Elevation: 70.4
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW 4" ID	Sampler Type/Size: SS/ 1-3/8 " ID	Core Barrel Type: NQ/1 7/8" ID
Hammer Wt.: 300 Fall: 24	Hammer Wt.: 140 Fall: 30	
Groundwater Obs. @ after: 0 hours, @ after: hours, @14.7 after: 48 hours		

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT E (LD4 1/03)

Depth (ft.)	Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
140	S-32	150/0.3	0.3	0.3				
	W-N		0.2			140.5'	ELEV. -70.1	-70
141				3.0	2.0		SILTSTONE; reddish brown, hard, fresh.	-71
142	C-1		4.0					-72
143								-73
144				75%	50%			-74
145				3.5	1.5		SILTSTONE; reddish brown, hard, fresh, moderately fractured.	-75
146	C-2		3.5					-76
147								-77
148				100%	43%		ELEV. -77.6	
							END OF BORING AT 148.0'	-78
149								-79
150								-80
151								-81
152								-82
153								-83
154								-84
155								-85
156								-86
157								-87
158								-88
159								-89

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 140.0' Rock: 7.5' No. of Samples: 32	NOTES:	Sheet **8** of **8** SM-001-M REV. 1/02

Driller: Mike St. John/NEBC	**Connecticut DOT Boring Report**	Hole No.: **SB-60**
Inspector: Mark Martin	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 831277.2
Start Date: 8/14/03	Route No.:	Easting: 1009344.2
Finish Date: 8/15/03	Bridge No.:	Surface Elevation: 72.5
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW/4"	Sampler Type/Size: SS/1-3/8"	Core Barrel Type: NQ/1-7/8"I.D.
Hammer Wt.: 300 Fall: 24"	Hammer Wt.: 140 Fall: 30"	
Groundwater Obs. @ 13.0 after: 0 hours, @ after: hours, @ after: hours		

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT_E (LD4 1/03)

Depth (ft.)	Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
0						0.3'	ASPHALT	
1	A-N		1.5				ELEV. 72.2	72
2	S-1	3 4 3	1.5	1.3			SANDY SILT (ML) - brown silt and fine sand; moist, loose, NP; (FILL).	71
3								70
4	A-N		1.5					69
5	S-2	8 4 2	1.5	1.5			SANDY SILT (ML) - brown and orange brown silt and fine sand; wet, loose, NP; (FILL).	68
6								67
7	A-N		1.5					66
8	S-3	2 3 3	1.5	1.0			SANDY SILT (ML) - brown and orange brown silt and fine sand; wet, loose, NP; (FILL).	65
9	A-N		1.0					64
10						10.0'	ELEV. 62.5	63
11	S-4	3 3 4	1.5	1.5			SILT WITH SAND (ML) - gray silt, little fine sand, trace clay; wet, medium stiff, +PL; (ALLUVIUM).	62
12								61
13	W-N		2.0					60
14	S-5	3 3 3	1.5	1.5			SILT WITH SAND (ML) - gray silt, little fine sand, trace clay; wet, medium stiff, +PL; (ALLUVIUM).	59
15								58
16	W-N		1.5					57
17	S-6	2 3 3	1.5	1.5		16.5'	ELEV. 56.0	56
18							SILTY CLAY (CL-ML) - gray silt, some clay, trace fine sand; moist, medium stiff, +PL; (GLACIAL LAKE DEPOSIT).	55
19	W-N		1.5					54
		1					SILTY CLAY (CL-ML) - gray silt, some clay, trace fine	53

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 145.0' Rock: 4.0' No. of Samples: 32	NOTES: Boring grouted upon completion. Crowley Chevrolet parking lot.	Sheet **1** of **8**

SM-001-M REV. 1/02

Driller: Mike St. John/NEBC	**Connecticut DOT Boring Report**	Hole No.: **SB-60**
Inspector: Mark Martin	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 831277.2
Start Date: 8/14/03	Route No.:	Easting: 1009344.2
Finish Date: 8/15/03	Bridge No.:	Surface Elevation: 72.5
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW/4"	Sampler Type/Size: SS/1-3/8"	Core Barrel Type: NQ/1-7/8"I.D.
Hammer Wt.: 300 Fall: 24"	Hammer Wt.: 140 Fall: 30"	
Groundwater Obs. @ 13.0 after: 0 hours, @ after: hours, @ after: hours		

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT_E (LD4 1/03)

Depth (ft.)	Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
20	S-7	1 2	1.5	1.5			sand; moist, soft, +PL; (GLACIAL LAKE DEPOSIT).	52
21	W-N		1.5					51
22						22.5'	ELEV. 50.0	50
23	S-8	1 1 1	1.5	1.5			LEAN CLAY (CL) - gray clay, little silt; moist, very soft, +PL; (GLACIAL LAKE DEPOSIT).	49
24	W-N		1.0					48
25	S-9	1 1 1	1.5	1.5			LEAN CLAY (CL) - gray clay, little silt; moist, very soft, +PL; (GLACIAL LAKE DEPOSIT).	47
26								46
27	W-N		2.0					45
28								44
29	S-10	WOR/1.0 1	1.5	1.5			LEAN CLAY (CL) - gray clay, little silt; moist, very soft, +PL; (GLACIAL LAKE DEPOSIT).	43
30	W-N		5.0					42
31								41
32								40
33								39
34								38
35	S-11	WOR/1.0 1	1.5	1.5			LEAN CLAY (CL) - gray clay, little silt; moist, very soft, +PL; (GLACIAL LAKE DEPOSIT).	37
36	W-N		3.5					36
37								35
38								34
39								33

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 145.0' Rock: 4.0' No. of Samples: 32	NOTES: Boring grouted upon completion. Crowley Chevrolet parking lot.	Sheet **2** of **8** SM-001-M REV. 1/02

Driller: Mike St. John/NEBC	**Connecticut DOT Boring Report**	Hole No.: **SB-60**
Inspector: Mark Martin	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 831277.2
Start Date: 8/14/03	Route No.:	Easting: 1009344.2
Finish Date: 8/15/03	Bridge No.:	Surface Elevation: 72.5
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW/4"	Sampler Type/Size: SS/1-3/8"	Core Barrel Type: NQ/1-7/8"I.D.
Hammer Wt.: 300 Fall: 24"	Hammer Wt.: 140 Fall: 30"	
Groundwater Obs. @ 13.0 after: 0 hours, @ after: hours, @ after: hours		

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT E (LD4 1/03)

Depth (ft.)	Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
40	S-12	WOR/1.5	1.5	1.5			LEAN CLAY (CL) - gray clay, little silt; moist, very soft, +PL; (GLACIAL LAKE DEPOSIT).	32
41								
42	W-N		3.5					31
43								30
44								29
45	S-13	WOR/1.5	1.5	1.5			LEAN CLAY (CL) - gray clay, little silt; moist, very soft, +PL; (GLACIAL LAKE DEPOSIT).	28
46								27
47	W-N		3.5					26
48								25
49								24
50	S-14	WOR/1.0 1	1.5	1.5			LEAN CLAY (CL) - gray and reddish brown clay, little silt; moist, very soft, +PL; (GLACIAL LAKE DEPOSIT).	23
51								22
52	W-N		3.5					21
53								20
54								19
55	S-15	WOR/1.0 1	1.5	1.5			LEAN CLAY (CL) - reddish brown clay, little silt; moist, very soft, +PL; (GLACIAL LAKE DEPOSIT).	18
56								17
57	W-N		3.5					16
58								15
59								14
								13

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 145.0' Rock: 4.0' No. of Samples: 32	NOTES: Boring grouted upon completion. Crowley Chevrolet parking lot.	Sheet **3** of **8** SM-001-M REV. 1/02

Driller: Mike St. John/NEBC	**Connecticut DOT Boring Report**	Hole No.: **SB-60**
Inspector: Mark Martin	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 831277.2
Start Date: 8/14/03	Route No.:	Easting: 1009344.2
Finish Date: 8/15/03	Bridge No.:	Surface Elevation: 72.5
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW/4"	Sampler Type/Size: SS/1-3/8"	Core Barrel Type: NQ/1-7/8"I.D.
Hammer Wt.: 300 Fall: 24"	Hammer Wt.: 140 Fall: 30"	
Groundwater Obs. @ 13.0 after: 0 hours, @ after: hours, @ after: hours		
Baker Info: S.O. Number: B25624LPDSOIL41802/42002	File: northern	Template: CDOT_E (LD4 1/03)

Depth (ft.)	SAMPLES Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
60	S-16	WOR/1.5	1.5	1.5			LEAN CLAY (CL) - reddish brown and gray clay, little silt; moist, very soft, +PL; (GLACIAL LAKE DEPOSIT).	12
61								
62	W-N		3.5					11
63								10
64								9
65	S-17	WOR/1.5	1.5	1.5			LEAN CLAY (CL) - reddish brown and gray clay, little silt; moist, very soft, +PL; (GLACIAL LAKE DEPOSIT).	8
66								7
67	W-N		3.5					6
68								5
69								4
70	S-18	WOR/1.5	1.5	1.5			LEAN CLAY (CL) - reddish brown clay, little silt; moist, very soft, +PL; (GLACIAL LAKE DEPOSIT).	3
71								2
72	W-N		3.5					1
73								0
74								-1
75	S-19	WOR/1.5	1.5	1.5			LEAN CLAY (CL) - reddish brown clay, little silt; moist, very soft, +PL; (GLACIAL LAKE DEPOSIT).	-2
76								-3
77	W-N		3.5					-4
78								-5
79								-6
								-7

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 145.0' Rock: 4.0' No. of Samples: 32	NOTES: Boring grouted upon completion. Crowley Chevrolet parking lot.	Sheet **4** of **8** SM-001-M REV. 1/02

Driller: Mike St. John/NEBC	**Connecticut DOT Boring Report**	Hole No.: **SB-60**
Inspector: Mark Martin	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 831277.2
Start Date: 8/14/03	Route No.:	Easting: 1009344.2
Finish Date: 8/15/03	Bridge No.:	Surface Elevation: 72.5
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW/4"	Sampler Type/Size: SS/1-3/8"	Core Barrel Type: NQ/1-7/8"I.D.
Hammer Wt.: 300 Fall: 24"	Hammer Wt.: 140 Fall: 30"	
Groundwater Obs. @ 13.0 after: 0 hours, @ after: hours, @ after: hours		

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT_E (LD4 1/03)

Depth (ft.)	Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
80								
81	S-20	2 2 3	1.5	1.5			LEAN CLAY (CL) - reddish brown clay, little silt; moist, medium stiff, +PL; (GLACIAL LAKE DEPOSIT).	-8
82								-9
83	W-N		3.5					-10
84								-11
85						85.0'	ELEV. -12.5	-12
86	S-21	2 3 3	1.5	1.5			SILT (ML) - reddish brown silt, little clay; wet, medium stiff, +PL; (GLACIAL LAKE DEPOSIT).	-13
87								-14
88	W-N		3.5					-15
89								-16
90								-17
91	S-22	2 2 3	1.5	1.5			SILT (ML) - reddish brown silt, little clay; wet, medium stiff, +PL; (GLACIAL LAKE DEPOSIT).	-18
92								-19
93	W-N		3.5					-20
94								-21
95								-22
96	S-23	6 3 4	1.5	1.5			SILT WITH SAND (ML) - reddish brown silt, little fine sand; wet, medium stiff, +PL; (GLACIAL LAKE DEPOSIT).	-23
97								-24
98	W-N		3.5					-25
99								-26
								-27

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 145.0' Rock: 4.0' No. of Samples: 32	NOTES: Boring grouted upon completion. Crowley Chevrolet parking lot.	Sheet **5** of **8** SM-001-M REV. 1/02

Driller: Mike St. John/NEBC	**Connecticut DOT Boring Report**	Hole No.: **SB-60**
Inspector: Mark Martin	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 831277.2
Start Date: 8/14/03	Route No.:	Easting: 1009344.2
Finish Date: 8/15/03	Bridge No.:	Surface Elevation: 72.5
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW/4"	Sampler Type/Size: SS/1-3/8"	Core Barrel Type: NQ/1-7/8"I.D.
Hammer Wt.: 300 Fall: 24"	Hammer Wt.: 140 Fall: 30"	

Groundwater Obs. @ 13.0 after: 0 hours, @ after: hours, @ after: hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT_E (LD4 1/03)

Depth (ft.)	Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
100								
101	S-24	3 4 4	1.5	1.5			SILT (ML) - reddish brown silt, little clay; wet, stiff, +PL; (GLACIAL LAKE DEPOSIT).	-28
102								-29
103	W-N		3.5					-30
104								-31
105								-32
106	S-25	3 4 7	1.5	1.3			SANDY SILT (ML) - reddish brown silt, some fine sand; wet, medium dense, NP; (GLACIAL LAKE DEPOSIT).	-33
107								-34
108	W-N		3.5					-35
109								-36
110						110.0'	ELEV. -37.5	-37
111	S-26	14 17 26	1.5	1.2			SILTY SAND (SM) - reddish brown fine sand, some silt; wet, dense, NP.	-38
112								-39
113	W-N		3.5					-40
114								-41
115								-42
116	S-27	12 15 23	1.5	0.8			SILTY SAND (SM) - reddish brown fine sand, some silt; wet, dense, NP.	-43
117								-44
118	W-N		3.5					-45
119								-46
								-47

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 145.0' Rock: 4.0' No. of Samples: 32	NOTES: Boring grouted upon completion. Crowley Chevrolet parking lot.	Sheet **6** of **8** SM-001-M REV. 1/02

Driller: Mike St. John/NEBC	**Connecticut DOT Boring Report**	Hole No.: **SB-60**
Inspector: Mark Martin	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 831277.2
Start Date: 8/14/03	Route No.:	Easting: 1009344.2
Finish Date: 8/15/03	Bridge No.:	Surface Elevation: 72.5

Project Description: New Britain to Hartford Busway

Casing Type/Size: HW/4"	Sampler Type/Size: SS/1-3/8"	Core Barrel Type: NQ/1-7/8"I.D.
Hammer Wt.: 300 Fall: 24"	Hammer Wt.: 140 Fall: 30"	

Groundwater Obs. @ 13.0 after: 0 hours, @ after: hours, @ after: hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT E (LD4 1/03)

Depth (ft.)	Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
120						120.0'	ELEV. -47.5	
121	S-28	18 29 42	1.5	1.0			SILT WITH SAND (ML) - reddish brown silt, little fine sand; moist, hard, +PL.	-48
122								-49
123	W-N		3.5					-50
124								-51
125								-52
126	S-29	38 40 41	1.5	1.0			SILT WITH SAND (ML) - reddish brown silt, little sand; moist, hard, +PL.	-53
127								-54
128	W-N		3.5					-55
129								-56
130						130.0'	ELEV. -57.5	-57
131	S-30	21 16 22	1.5	0.4			GRAVELLY SILT WITH SAND (ML) - reddish brown silt, some fine to medium gravel, little fine to coarse sand; moist, dense, NP; (TILL).	-58
132								-59
133	W-N		3.5					-60
134								-61
135	S-31	120	0.5	0.3			GRAVELLY SILT WITH SAND (ML) - reddish brown silt, some fine to medium gravel, little fine to coarse sand; moist, very dense, NP; (TILL).	-62
136								-63
137								-64
138	W-N		4.5					-65
139								-66
								-67

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 145.0' Rock: 4.0' No. of Samples: 32	NOTES: Boring grouted upon completion. Crowley Chevrolet parking lot.	Sheet **7** of **8** SM-001-M REV. 1/02

Driller: Mike St. John/NEBC	**Connecticut DOT Boring Report**	Hole No.: **SB-60**
Inspector: Mark Martin	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 831277.2
Start Date: 8/14/03	Route No.:	Easting: 1009344.2
Finish Date: 8/15/03	Bridge No.:	Surface Elevation: 72.5
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW/4"	Sampler Type/Size: SS/1-3/8"	Core Barrel Type: NQ/1-7/8"I.D.
Hammer Wt.: 300 Fall: 24"	Hammer Wt.: 140 Fall: 30"	
Groundwater Obs. @ 13.0 after: 0 hours, @ after: hours, @ after: hours		

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT_E (LD4 1/03)

Depth (ft.)	SAMPLES Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
140	S-32	120/0.2	0.2	0.1			SANDY SILT WITH GRAVEL (ML) - gray silt, some coarse sand, little fine gravel; wet, very dense, NP; (DECOMPOSED ROCK).	-68
141								-69
142								-70
143	W-N		4.8					-71
144								-72
145				2.3	0.0	145.0'	ELEV. -72.5	-73
146							SILTSTONE; reddish brown, medium hard to hard, moderately to slightly weathered.	-74
147	C-1		4.0					-75
148								-76
149				57%	0%		Core barrel blocked off at 149.0'. ELEV. -76.5	-77
150							End of Boring at 149.0'	-78
151								-79
152								-80
153								-81
154								-82
155								-83
156								-84
157								-85
158								-86
159								-87

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 145.0' Rock: 4.0' No. of Samples: 32	NOTES: Boring grouted upon completion. Crowley Chevrolet parking lot.	Sheet **8** of **8** SM-001-M REV. 1/02

Driller: Al Augustine/GZA	**Connecticut DOT Boring Report**	Hole No.: **SB-61**
Inspector: Mark Martin	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 831257.4
Start Date: 7/11/03	Route No.:	Easting: 1009427.3
Finish Date: 7/15/03	Bridge No.:	Surface Elevation: 70.0
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW/4"	Sampler Type/Size: SS/1-3/8"	Core Barrel Type: NQ/1-7/8"
Hammer Wt.: 300 Fall: 24"	Hammer Wt.: 140 Fall: 30"	

Groundwater Obs. @ 3.7 after: 0 hours, @40.5 after: 48 hours, @ after: hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT_E (LD4 1/03)

Depth (ft.)	Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
0–1	A-N		1.5					69
2–3	S-1	6 17 15	1.5	1.3			SILTY SAND WITH GRAVEL (SM) - red, black, brown and tan fine to coarse sand, some silt, little fine to coarse gravel; moist, dense, NP; (FILL).	68
3–4	A-N		1.5					67
4–5	S-2	8 10 10	1.5	1.3		4.5'	ELEV. 65.5	66
5–6							POORLY GRADED SAND WITH SILT (SP-SM) - tan, gray and brown fine sand, little silt; moist, medium dense, NP; (ALLUVIUM).	65
6–7	A-N		1.5					64
7–8	S-3	6 5 5	1.5	1.2		7.5'	ELEV. 62.5	63
8–9							SILTY SAND (SM) - light gray fine sand, some silt; moist, medium dense, NP; (ALLUVIUM).	62
9–10	W-N		1.0					61
10–11	S-4	2 3 4	1.5	1.5		10.0'	ELEV. 60.0	60
11–12							SILTY CLAY (CL-ML) - gray clay, some silt, trace fine sand; moist, medium stiff, +PL; (GLACIAL LAKE DEPOSIT).	59
12–13	W-N		2.0					58
13–14								57
14–15	S-5	3 3 4	1.5	1.5			SILTY CLAY (CL-ML) - gray clay, some silt, trace fine sand; moist, medium stiff, +PL; (GLACIAL LAKE DEPOSIT).	56
15–16	W-N		1.5					55
16–17								54
17–18	S-6	2 3 3	1.5	1.5			SILTY CLAY (CL-ML) - gray clay, some silt, trace fine sand; moist, medium stiff, +PL; (GLACIAL LAKE DEPOSIT).	53
18–19	W-N		1.5					52
19		1					SILTY, SANDY CLAY (CL-ML) - gray clay, some silt,	51

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger

Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 145.1' Rock: 4.9' No. of Samples: 33	NOTES:	Sheet **1** of **8** SM-001-M REV. 1/02

Driller: Al Augustine/GZA	**Connecticut DOT Boring Report**	Hole No.: **SB-61**
Inspector: Mark Martin	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 831257.4
Start Date: 7/11/03	Route No.:	Easting: 1009427.3
Finish Date: 7/15/03	Bridge No.:	Surface Elevation: 70.0
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW/4"	Sampler Type/Size: SS/1-3/8"	Core Barrel Type: NQ/1-7/8"
Hammer Wt.: 300 Fall: 24"	Hammer Wt.: 140 Fall: 30"	

Groundwater Obs. @ 3.7 after: 0 hours, @40.5 after: 48 hours, @ after: hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT_E (LD4 1/03)

Depth (ft.)	Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
20	S-7	2 1	1.5	1.5			little fine sand; moist, soft, +PL; (GLACIAL LAKE DEPOSIT).	50
21								49
22	W-N		1.5					48
						22.5'	ELEV. 47.5	
23	S-8	WOH 1 1	1.5	1.5			LEAN CLAY (CL) - gray clay; moist, very soft, +PL; (GLACIAL LAKE DEPOSIT).	47
24	W-N		1.0					46
25	S-9	WOH 1/1.0	1.5	1.5			LEAN CLAY (CL) - gray clay; moist, very soft, +PL; (GLACIAL LAKE DEPOSIT).	45
26								44
27	W-N		2.0					43
28								42
29	S-10	WOH WOH 1	1.5	1.5			LEAN CLAY (CL) - gray clay; moist, very soft, +PL; (GLACIAL LAKE DEPOSIT).	41
30	W-N		5.0					40
31								39
32								38
33								37
34								36
35	S-11	WOH WOH 1	1.5	1.5			LEAN CLAY (CL) - gray clay; moist, very soft, +PL; (GLACIAL LAKE DEPOSIT).	35
36								34
37	W-N		3.5					33
38								32
39								31

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 145.1' Rock: 4.9' No. of Samples: 33	NOTES:	Sheet **2** of **8** SM-001-M REV. 1/02

Driller: Al Augustine/GZA	**Connecticut DOT Boring Report**	Hole No.: **SB-61**
Inspector: Mark Martin	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 831257.4
Start Date: 7/11/03	Route No.:	Easting: 1009427.3
Finish Date: 7/15/03	Bridge No.:	Surface Elevation: 70.0
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW/4"	Sampler Type/Size: SS/1-3/8"	Core Barrel Type: NQ/1-7/8"
Hammer Wt.: 300 Fall: 24"	Hammer Wt.: 140 Fall: 30"	

Groundwater Obs. @ 3.7 after: 0 hours, @40.5 after: 48 hours, @ after: hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT_E (LD4 1/03)

Depth (ft.)	SAMPLES Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
40	S-12	WOH WOH 1	1.5	1.5			LEAN CLAY (CL) - gray clay; moist, very soft, +PL; (GLACIAL LAKE DEPOSIT).	30
41								29
42	W-N		3.5					28
43								27
44								26
45	S-13	WOH WOH 1	1.5	1.5			LEAN CLAY (CL) - gray and reddish brown clay; moist, very soft, +PL; (GLACIAL LAKE DEPOSIT).	25
46								24
47	W-N		3.5					23
48								22
49								21
50	S-14	WOH 1 1	1.5	1.5			LEAN CLAY (CL) - gray and reddish brown clay; moist, very soft, +PL; (GLACIAL LAKE DEPOSIT).	20
51								19
52	W-N		3.5					18
53								17
54								16
55	S-15	WOH WOH WOH	1.5	1.5			LEAN CLAY (CL) - gray and reddish brown clay; moist, very soft, +PL; (GLACIAL LAKE DEPOSIT).	15
56								14
57	W-N		3.5					13
58								12
59								11

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 145.1' Rock: 4.9' No. of Samples: 33	NOTES:	Sheet **3** of **8** SM-001-M REV. 1/02

Driller: Al Augustine/GZA	**Connecticut DOT Boring Report**	Hole No.: **SB-61**
Inspector: Mark Martin	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 831257.4
Start Date: 7/11/03	Route No.:	Easting: 1009427.3
Finish Date: 7/15/03	Bridge No.:	Surface Elevation: 70.0
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW/4"	Sampler Type/Size: SS/1-3/8"	Core Barrel Type: NQ/1-7/8"
Hammer Wt.: 300 Fall: 24"	Hammer Wt.: 140 Fall: 30"	

Groundwater Obs. @ 3.7 after: 0 hours, @40.5 after: 48 hours, @ after: hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT_E (LD4 1/03)

Depth (ft.)	SAMPLES Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
60	S-16	WOR WOR 3	1.5	1.5			LEAN CLAY (CL) - gray and reddish brown clay; moist, soft, +PL; (GLACIAL LAKE DEPOSIT).	10
61								9
62	W-N		3.5					8
63								7
64								6
65	S-17	WOR 1 1	1.5	1.5			LEAN CLAY (CL) - gray and reddish brown clay; moist, very soft, +PL; (GLACIAL LAKE DEPOSIT).	5
66								4
67	W-N		3.5					3
68								2
69								1
70	S-18	WOR WOR WOH	1.5	1.3			LEAN CLAY (CL) - gray and reddish brown clay; moist, very soft, +PL; (GLACIAL LAKE DEPOSIT).	0
71								-1
72	W-N		3.5					-2
73								-3
74								-4
75	S-19	WOR WOH WOH	1.5	1.5			LEAN CLAY (CL) - gray and reddish brown clay; moist, very soft, +PL; (GLACIAL LAKE DEPOSIT).	-5
76								-6
77	W-N		3.5					-7
78								-8
79								-9

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 145.1' Rock: 4.9' No. of Samples: 33	NOTES:	Sheet **4** of **8** SM-001-M REV. 1/02

Driller: Al Augustine/GZA	**Connecticut DOT Boring Report**	Hole No.: **SB-61**
Inspector: Mark Martin	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 831257.4
Start Date: 7/11/03	Route No.:	Easting: 1009427.3
Finish Date: 7/15/03	Bridge No.:	Surface Elevation: 70.0
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW/4"	Sampler Type/Size: SS/1-3/8"	Core Barrel Type: NQ/1-7/8"
Hammer Wt.: 300 Fall: 24"	Hammer Wt.: 140 Fall: 30"	

Groundwater Obs. @ 3.7 after: 0 hours, @40.5 after: 48 hours, @ after: hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT_E (LD4 1/03)

Depth (ft.)	Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
80	S-20	1 1 1	1.5	1.5			LEAN CLAY (CL) - gray and reddish brown clay; moist, very soft, +PL; (GLACIAL LAKE DEPOSIT).	-10
81								-11
82	W-N		3.5					-12
83								-13
84								-14
85	S-21	3 4 6	1.5	1.5		85.0'	ELEV. -15.0 SILT (ML) - reddish brown silt; wet, stiff, +PL.	-15
86								-16
87	W-N		3.5					-17
88								-18
89								-19
90	S-22	4 2 3	1.5	1.5			SILT (ML) - reddish brown silt; wet, medium stiff, +PL.	-20
91								-21
92	W-N		3.5					-22
93								-23
94								-24
95	S-23	7 6 7	1.5	1.3			SILT WITH SAND (ML) - reddish brown silt, little fine sand; wet, medium dense, NP.	-25
96								-26
97	W-N		3.5					-27
98								-28
99								-29

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 145.1' Rock: 4.9' No. of Samples: 33	NOTES:	Sheet **5** of **8** SM-001-M REV. 1/02

Driller: Al Augustine/GZA	**Connecticut DOT Boring Report**	Hole No.: **SB-61**
Inspector: Mark Martin	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 831257.4
Start Date: 7/11/03	Route No.:	Easting: 1009427.3
Finish Date: 7/15/03	Bridge No.:	Surface Elevation: 70.0
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW/4"	Sampler Type/Size: SS/1-3/8"	Core Barrel Type: NQ/1-7/8"
Hammer Wt.: 300 Fall: 24"	Hammer Wt.: 140 Fall: 30"	

Groundwater Obs. @ 3.7 after: 0 hours, @40.5 after: 48 hours, @ after: hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT E (LD4 1/03)

Depth (ft.)	Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
100						100.0'	ELEV. -30.0	-30
101	S-24	12 11 17	1.5	0.8			SILTY SAND (SM) - reddish brown fine sand, some silt; moist, medium dense, NP.	-31
102								-32
103	W-N		3.5					-33
104								-34
105								-35
106	S-25	17 19 19	1.5	0.7			SILTY SAND (SM) - reddish brown fine sand, some silt; moist, dense, NP.	-36
107								-37
108	W-N		3.5					-38
109								-39
110						110.0'	ELEV. -40.0	-40
111	S-26	15 19 24	1.5	1.1			POORLY GRADED SAND WITH SILT (SP-SM) - reddish brown fine to medium sand, little silt; moist, dense, NP.	-41
112								-42
113	W-N		3.5					-43
114								-44
115								-45
116	S-27	8 5 9	1.5	1.5			POORLY GRADED SAND WITH SILT (SP-SM) - reddish brown fine to medium sand, little silt; moist, medium dense, NP.	-46
117								-47
118	W-N		3.5					-48
119								-49

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 145.1' Rock: 4.9' No. of Samples: 33	NOTES:	Sheet **6** of **8** SM-001-M REV. 1/02

Driller: Al Augustine/GZA	**Connecticut DOT Boring Report**	Hole No.: **SB-61**
Inspector: Mark Martin	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 831257.4
Start Date: 7/11/03	Route No.:	Easting: 1009427.3
Finish Date: 7/15/03	Bridge No.:	Surface Elevation: 70.0
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW/4"	Sampler Type/Size: SS/1-3/8"	Core Barrel Type: NQ/1-7/8"
Hammer Wt.: 300 Fall: 24"	Hammer Wt.: 140 Fall: 30"	

Groundwater Obs. @ 3.7 after: 0 hours, @40.5 after: 48 hours, @ after: hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT E (LD4 1/03)

Depth (ft.)	Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
120						120.0'	ELEV. -50.0	-50
121	S-28	24 31 49	1.5	1.5			SILT (ML) - reddish brown silt; moist, very dense, NP.	-51
122								-52
123	W-N		3.5					-53
124								-54
125						125.0'	ELEV. -55.0	-55
126	S-29	44 58 64	1.5	0.8			SILT WITH GRAVEL (ML) - reddish brown silt, little fine to medium gravel; moist, very dense, NP; (TILL).	-56
127								-57
128	W-N		3.5					-58
129								-59
130							GRAVELLY SILT WITH SAND (ML) - reddish brown silt, some fine to coarse gravel, little fine to coarse sand; moist, very dense, NP; (TILL).	-60
131	S-30	50 60 44	1.5	1.3				-61
132								-62
133	W-N		3.5					-63
134								-64
135							GRAVELLY SILT WITH SAND (ML) - reddish brown silt, some fine to coarse gravel, little fine to coarse sand; moist, very dense, NP; (TILL).	-65
136	S-31	50 100 100/0.1	1.1	1.1				-66
137								-67
138	W-N		3.9					-68
139								-69

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 145.1' Rock: 4.9' No. of Samples: 33	NOTES:	Sheet 7 of 8 SM-001-M REV. 1/02

Driller: Al Augustine/GZA	**Connecticut DOT Boring Report**	Hole No.: **SB-61**
Inspector: Mark Martin	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 831257.4
Start Date: 7/11/03	Route No.:	Easting: 1009427.3
Finish Date: 7/15/03	Bridge No.:	Surface Elevation: 70.0
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW/4"	Sampler Type/Size: SS/1-3/8"	Core Barrel Type: NQ/1-7/8"
Hammer Wt.: 300 Fall: 24"	Hammer Wt.: 140 Fall: 30"	

Groundwater Obs. @ 3.7 after: 0 hours, @40.5 after: 48 hours, @ after: hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT_E (LD4 1/03)

Depth (ft.)	Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
140	S-32	100/0.2	0.2	0.2			GRAVELLY SILT WITH SAND (ML) - reddish brown silt, some fine to coarse gravel, little fine to coarse sand; moist, very dense, NP; (DECOMPOSED ROCK).	-70
141								-71
142								-72
143	W-N		4.8					-73
144								-74
145	S-33	100/0.1	0.1	0.1	0.0		GRAVELLY SILT WITH SAND (ML) - reddish brown silt, some fine to coarse gravel, little fine to coarse sand; moist, very dense, NP; (RESIDUAL SILTSTONE).	-75
146				3.0				-76
147						147.0'	ELEV. -77.0	-77
148	C-1		4.9				SILTSTONE; reddish brown, medium hard, moderately to slightly weathered.	-78
149								-79
150				61%	0%		ELEV. -80.0	-80
151							End of Boring at 150.0'	-81
152								-82
153								-83
154								-84
155								-85
156								-86
157								-87
158								-88
159								-89

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 145.1' Rock: 4.9' No. of Samples: 33	NOTES:	Sheet **8** of **8** SM-001-M REV. 1/02

Appendix 4

2008 Boring Logs and CPT Logs

SB-Series Boring Logs (Bridge Structure)

RW-Series Boring Logs (Retaining Wall Structures)

R-Series Boring Logs (Roadways)

Cone Penetration Test (CPT) Logs

SB-Series Boring Logs
(Bridge Structure)

Connecticut DOT Boring Report

Inspector: Robert Marshall	Town: Hartford / West Hartford	Hole No.: SB-01-1	
Engineer: Geo**Design**, Inc.	Project No.: 155-H025	Stat./Offset:	
Start Date: 6-13-08	Route No.:	Northing: 831066.2	
Finish Date: 6-18-08	Bridge No.:	Easting: 1009243.3	
		Surface Elevation: 74	

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: HW/4"	Sampler Type/Size: SS/ 1 3/8 " ID	Core Barrel Type: NX(st)
Hammer Wt.: Fall: in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @5' wet sample, 5.7' after 15 minutes

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0						Asphalt		
	S-1	5 6 6 5	24	0		Fill	Medium dense, no recovery	
	S-2	3 4 4 3	24	1			Loose, brown fine to medium SAND, little Silt, trace Asphalt fragments	70
5	S-3	5 5 6 7	24	12		Silt	Medium dense, gray brown to orange brown fine SAND and SILT	
	S-4	7 5 6 6	24	20			Medium dense, gray brown to orange brown SILT, little fine Sand	65
10	S-5	2 2 3 3	24	18			Loose, gray SILT, little fine Sand	
						Clay & Silt (varved)		60
15	S-6	1 1 1 2	24	24			Soft, gray CLAY and SILT with occasional red brown fine Sand partings	55
20	UP-1	P U S H	24	24				
	S-7	1 1 1 1	24	24			Soft, gray CLAY and SILT with occasional red brown fine Sand partings	50
25	S-8	1 0 1 1	24	24			Very soft, gray Silty CLAY layers to 1/4" thick varved with CLAY and SILT layers to 1/8" thick	
30								45

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 140ft Rock: 5ft	NOTES: Pilot hole to 10' with 4" SSA then switched to casing. Open hole after 30ft. Drillers mud used to maintain open hole. Loss of drilling mud below 120 ft. Auger chatter below 122 feet with continued loss of drilling mud. Roller bit advanced approximately 4.5 feet into inferred decomposed bedrock based on increased difficult rate of advance, prior to core run from 140 to 145 feet.	Sheet 1 of 5
No. of Soil Samples: 30 No. of Core Runs: 1		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector: Robert Marshall	Town: Hartford / West Hartford	Hole No.: SB-01-1	
Engineer: Geo**Design**, Inc.	Project No.: 155-H025	Stat./Offset:	
Start Date: 6-13-08	Route No.:	Northing: 831066.2	
Finish Date: 6-18-08	Bridge No.:	Easting: 1009243.3	
		Surface Elevation: 74	

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: HW/4"	Sampler Type/Size: SS/ 1 3/8 " ID	Core Barrel Type: NX(st)
Hammer Wt.: Fall: in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @5' wet sample, 5.7' after 15 minutes

Depth (ft)	SAMPLES: Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
30	UP-2	P U S H	24	24		Clay & Silt (varved) *(con't)*		
	S-9	1 1 2 2	24	24			Soft, gray Silty CLAY layers to 1/4" thick varved with CLAY and SILT layers to 1/8" thick with occasional red brown fine Sand partings	40
35	S-10	WOR 0 1 2	24	24			Very soft, gray Silty CLAY layers to 1/4" thick varved with CLAY and SILT layers to 1/8" thick with occasional red brown fine Sand partings	35
40	S-11	WOR 0 2 2	24	24			Soft, gray Silty CLAY layers to 1/4" thick varved with CLAY and SILT layers to 1/8" thick with occasional red brown fine Sand partings	30
45	S-12	WOR 0 2 3	24	24			Soft, gray brown Silty CLAY layers to 1/4" thick varved with CLAY and SILT layers to 1/8" thick with occasional red brown fine Sand partings	25
50	S-13	WOR 0 2 2	24	24			Soft, gray brown Silty CLAY layers to 1/4" thick varved with CLAY and SILT layers to 1/8" thick with occasional red brown fine Sand partings	20
55	S-14	WOR 0 2 2	24	24			Soft, red brown Silty CLAY layers to 3/4" thick varved with gray brown CLAY and SILT layers to 1-1/2" thick	15
60								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 140ft Rock: 5ft	NOTES: Pilot hole to 10' with 4" SSA then switched to casing. Open hole after 30ft. Drillers mud used to maintain open hole. Loss of drilling mud below 120 ft. Auger chatter below 122 feet with continued loss of drilling mud. Roller bit advanced approximately 4.5 feet into inferred decomposed bedrock based on increased difficult rate of advance, prior to core run from 140 to 145 feet.	Sheet 2 of 5
No. of Soil Samples: 30 No. of Core Runs: 1		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector: Robert Marshall	Town: Hartford / West Hartford	Hole No.: SB-01-1	
Engineer: Geo**Design**, Inc.	Project No.: 155-H025	Stat./Offset:	
Start Date: 6-13-08	Route No.:	Northing: 831066.2	
Finish Date: 6-18-08	Bridge No.:	Easting: 1009243.3	
		Surface Elevation: 74	

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: HW/4"	Sampler Type/Size: SS/ 1 3/8 " ID	Core Barrel Type: NX(st)
Hammer Wt.: Fall: in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @5' wet sample, 5.7' after 15 minutes

Depth (ft)	SAMPLES Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
60	S-15	WOR 0 2 2	24	24		Clay & Silt (varved) *(con't)*	Soft, red brown Silty CLAY layers to 1" thick varved with gray brown CLAY and SILT layers to 3/4" thick	
								10
65	S-16	WOR 1 2 2	24	24			Soft, red brown Silty CLAY layers to 2" thick varved with gray CLAY and SILT layers to 2" thick	
								5
70	S-17	WOR 3 2 2	24	24			Medium, red brown Silty CLAY layers to 2-1/2" thick varved with gray SILT and CLAY layers to 2" thick	
								0
75	S-18	WORWOH 1 1	24	24			Very soft, red brown Silty CLAY layers to 2-1/2" thick varved with gray SILT and CLAY layers to 3" thick	
								-5
80	S-19	WOR 2 2 7	24	24			Medium, red brown Silty CLAY layers to 3" thick varved with gray SILT and CLAY layers to 2" thick	
								-10
85	S-20	2 2 3 5	24	20			Medium, red brown Silty CLAY layers to 1-1/2" thick varved with gray SILT and CLAY layers to 3/4" thick	
								-15
90								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 140ft Rock: 5ft	NOTES: Pilot hole to 10' with 4" SSA then switched to casing. Open hole after 30ft. Drillers mud used to maintain open hole. Loss of drilling mud below 120 ft. Auger chatter below 122 feet with continued loss of drilling mud. Roller bit advanced approximately 4.5 feet into inferred decomposed bedrock based on increased difficult rate of advance, prior to core run from 140 to 145 feet.	Sheet 3 of 5
No. of Soil Samples: 30 No. of Core Runs: 1		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector: Robert Marshall	Town: Hartford / West Hartford	Hole No.: SB-01-1	
Engineer: Geo**Design**, Inc.	Project No.: 155-H025	Stat./Offset:	
Start Date: 6-13-08	Route No.:	Northing: 831066.2	
Finish Date: 6-18-08	Bridge No.:	Easting: 1009243.3	
		Surface Elevation: 74	

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: HW/4"	Sampler Type/Size: SS/ 1 3/8 " ID	Core Barrel Type: NX(st)
Hammer Wt.: Fall: in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @5' wet sample, 5.7' after 15 minutes

Depth (ft)	SAMPLES Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
90	S-21	3 3 3 4	24	24		Clay & Silt (varved) *(con't)*	Medium, red brown Clayey SILT	
								-20
95	S-22	3 3 4 5	24	24			Medium, red brown Clayey SILT	
						Silty Sand		-25
100	S-23	11 16 20 22	24	20			Dense, red brown fine SAND, some Silt	
								-30
105	S-24	20 18 18 40	24	15			Dense, red brown fine SAND, little Silt	
								-35
110	S-25	22 24 25 34	24	16			Dense, red brown Top 12": fine SAND, little Silt Bottom 4": fine to coarse SAND, little fine Gravel, trace Silt	
								-40
115	S-26	34 25 17 18	24	18			Dense, red brown Top 6": fine to coarse SAND, little fine Gravel, trace Silt Bottom 12": fine to medium SAND, trace Silt	
								-45
120								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 140ft Rock: 5ft	NOTES: Pilot hole to 10' with 4" SSA then switched to casing. Open hole after 30ft. Drillers mud used to maintain open hole. Loss of drilling mud below 120 ft. Auger chatter below 122 feet with continued loss of drilling mud. Roller bit advanced approximately 4.5 feet into inferred decomposed bedrock based on increased difficult rate of advance, prior to core run from 140 to 145 feet.	Sheet 4 of 5
No. of Soil Samples: 30 No. of Core Runs: 1		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector: Robert Marshall	Town: Hartford / West Hartford	Hole No.: SB-01-1	
Engineer: Geo**Design**, Inc.	Project No.: 155-H025	Stat./Offset:	
Start Date: 6-13-08	Route No.:	Northing: 831066.2	
Finish Date: 6-18-08	Bridge No.:	Easting: 1009243.3	
		Surface Elevation: 74	

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: HW/4"	Sampler Type/Size: SS/ 1 3/8 " ID	Core Barrel Type: NX(st)
Hammer Wt.: Fall: in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @5' wet sample, 5.7' after 15 minutes

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
120	S-27	22 18 21 32	24	18		Silty Sand *(con't)*	Dense, red brown fine to coarse SAND, some Silt, trace fine to coarse Gravel	
						Glacial Till		-50
125	S-28	35 51 92 90	24	12			Very dense red brown fine to medium SAND, some Silt, trace fine to coarse Gravel	
								-55
130	S-29	62 45 38 49	24	16			Very dense red brown fine to medium SAND, some Silt, trace fine to coarse Gravel	
								-60
135	S-30	120/5"	5	3			Red brown fine to medium SAND, some Silt, some fine Gravel	
						Decomposed Bedrock		-65
140	C-1		60	60	7	Bedrock	Very Poor Quality, Soft to Moderately Hard, Moderately Weathered, red brown, SILTSTONE/SHALE	-70
145							END OF BORING 145ft	-75
150								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 140ft Rock: 5ft	NOTES: Pilot hole to 10' with 4" SSA then switched to casing. Open hole after 30ft. Drillers mud used to maintain open hole. Loss of drilling mud below 120 ft. Auger chatter below 122 feet with continued loss of drilling mud. Roller bit advanced approximately 4.5 feet into inferred decomposed bedrock based on increased difficult rate of advance, prior to core run from 140 to 145 feet.	Sheet 5 of 5
No. of Soil Samples: 30 No. of Core Runs: 1		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Patty Kral	Town:	Hartford / West Hartford	Hole No.:	SB-01-2
Engineer:	Geo**Design**, Inc.	Project No.:	155-H025	Stat./Offset:	
Start Date:	5-12-08	Route No.:		Northing:	831053.6
Finish Date:	5-13-08	Bridge No.:		Easting:	1009323.2
				Surface Elevation:	70.4

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: 4"/ FJ	Sampler Type/Size: SS / 1 3/8" ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @3' after 0 hours, @3' after 12 hours

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0	S-1	8 11 12 14	24	13		Fill	Medium dense, dark brown fine to medium SAND, little Silt, trace Brick fragments, little coarse Gravel	70
	S-2	19 27 38 55	24	16		Sand & Silt	Very dense, red brown fine to medium SAND, some fine Gravel, little Silt	
5	S-3	17 16 20 22	24	15			Dense, brown gray varved fine SAND and SILT	65
10	S-4	4 3 3 2	24	12		Clay & Silt (varved)	Medium, gray Silty CLAY, little fine Sand	60
	S-5	1 5 4 3	24	15			Stiff, gray CLAY	
15	UP-1	P U S H	24	24				55
	S-6	2 2 2 2	24	2			Soft, gray Silty CLAY and coarse GRAVEL	
20	S-7	1 1 2 2	24	0			No recovery	50
	S-8	1 2 1 2	24	24			Loose, varved gray SILT	
25	UP-2	P U S H	24	24				45
	S-9	2 2 2 3	24	22			Loose, varved gray SILT	
30								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 107ft Rock: 0ft	NOTES: Mobile B53 rig, hydraulic safety hammer used.	Sheet 1 of 4
No. of Soil Samples: 22 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector: Patty Kral	Town: Hartford / West Hartford	Hole No.: SB-01-2	
Engineer: Geo**Design**, Inc.	Project No.: 155-H025	Stat./Offset:	
Start Date: 5-12-08	Route No.:	Northing: 831053.6	
Finish Date: 5-13-08	Bridge No.:	Easting: 1009323.2	
		Surface Elevation: 70.4	

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: 4"/ FJ	Sampler Type/Size: SS / 1 3/8" ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @3' after 0 hours, @3' after 12 hours

Depth (ft)	SAMPLES Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
30	S-10	2 2 2 3	24	24		Clay & Silt (varved) *(con't)*	Loose, varved gray SILT with occasional red brown fine SAND partings	40
35	S-11	1 1 2 2	24	24			Loose, gray varved SILT with occasional red brown fine SAND partings	35
40	S-12	WOR 1 1 2	24	24			Very soft, gray varved CLAY and SILT with occasional red brown fine SAND partings	30
45	S-13	WOR 1 1 2	24	24			Very soft, gray varved CLAY and SILT with occasional red brown fine SAND partings	25
50	S-14	WOR 2 2 3	24	24			Soft, gray varved Silty CLAY to 1/4" thick with occasional red brown fine SAND partings to 1/16" thick	20
55	S-15	WOR 0 0 3	24	24			Very soft, gray Silty CLAY to 1" thick varved with red gray Clayey SILT to 1" thick	15
60								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 107ft Rock: 0ft	NOTES: Mobile B53 rig, hydraulic safety hammer used.	Sheet 2 of 4
No. of Soil Samples: 22 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector: Patty Kral	Town: Hartford / West Hartford	Hole No.: SB-01-2	
Engineer: Geo**Design**, Inc.	Project No.: 155-H025	Stat./Offset:	
Start Date: 5-12-08	Route No.:	Northing: 831053.6	
Finish Date: 5-13-08	Bridge No.:	Easting: 1009323.2	
		Surface Elevation: 70.4	

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: 4"/ FJ	Sampler Type/Size: SS / 1 3/8" ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @3' after 0 hours, @3' after 12 hours

Depth (ft)	SAMPLES Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
60	S-16	WOR 1 1 2	24	24		Clay & Silt (varved) *(con't)*	Very soft, gray Silty CLAY to 1" thick varved with red gray Clayey SILT to 1" thick	10
65	S-17	1 1 2 2	24	23			Soft, gray CLAY to 1" thick varved with red gray Clayey SILT to 1/2" thick	5
70	S-18	1 1 2 2	24	24			Soft, gray Silty CLAY to 1" thick varved with red gray Clayey SILT to 1/2" thick	0
75	S-19	1 1 2 2	24	24			Soft, gray Silty CLAY to 1" thick varved with red gray Clayey SILT to 1/2" thick	-5
80	S-20	2 2 2 3	24	20			Medium, Top 16": red brown CLAY and SILT Bottom 4": red brown SILT and fine SAND	-10
						Clay & Silt		
85	S-21	WOR 5 14 17	24	24			Very stiff, red brown Silty CLAY	-15
90								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 107ft Rock: 0ft	NOTES: Mobile B53 rig, hydraulic safety hammer used.	Sheet 3 of 4
No. of Soil Samples: 22 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector: Patty Kral	Town: Hartford / West Hartford	Hole No.: SB-01-2	
Engineer: Geo**Design**, Inc.	Project No.: 155-H025	Stat./Offset:	
Start Date: 5-12-08	Route No.:	Northing: 831053.6	
Finish Date: 5-13-08	Bridge No.:	Easting: 1009323.2	
		Surface Elevation: 70.4	

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: 4"/ FJ	Sampler Type/Size: SS / 1 3/8" ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @3' after 0 hours, @3' after 12 hours

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
90	S-22	6 7 9 4	24	20		Clay & Silt *(con't)*	Very stiff, red brown CLAY and SILT	-20
95	S-23	4 4 11 13	24	14			Very stiff, red brown CLAY and SILT	-25
						Sand & Silt		
100	S-24	34 44 35 23	24	2			Very dense, red brown fine SAND and coarse GRAVEL, little Silt	-30
	S-25	35 33 32 34	24	12			Very dense, red brown fine SAND and SILT	
105	S-26	21 27 30 31	24	7			Very dense, red brown fine SAND and SILT	-35
							END OF BORING 107ft	
110								-40
115								-45
120								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 107ft Rock: 0ft	NOTES: Mobile B53 rig, hydraulic safety hammer used.	Sheet 4 of 4
No. of Soil Samples: 22 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Matt Volovski	Town:	Hartford / West Hartford	Hole No.:	SB-01-3
Engineer:	Geo**Design**, Inc.	Project No.:	155-H025	Stat./Offset:	10' Southwest
Start Date:	6-9-08	Route No.:		Northing:	831030.3
Finish Date:	6-12-08	Bridge No.:		Easting:	1009378.3
				Surface Elevation:	69.6

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: 4" ID/ FJ	Sampler Type/Size: SS/ 1 3/8 " ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @5' wet sample, @2.6' after 4 hours, @2.4' after 6 hours

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0	S-1	3 6 15 11	24	6		Railway Subbase	Medium dense, dark gray to brown fine to coarse GRAVEL, little fine to coarse Sand, trace Asphalt (pieces to 3/4"), trace Silt	
	S-2	14 8 22 16	24	16		Fill	Medium dense, yellow brown to gray brown fine to medium SAND, trace fine Gravel, trace Asphalt, trace Silt	
5	S-3	14 11 18 10	24	16			Medium dense, Top 3": yellow brown to gray brown fine to medium SAND, trace fine Gravel, trace Asphalt, trace Silt Bottom 13": SILT and CLAY, some fine to medium Sand	65
	S-4	7 7 7 8	24	6			Stiff, brown SILT and CLAY, little fine to coarse Sand, trace fine Gravel	
10	S-5	2 3 3 6	24	20		Clay & Silt	Medium, Top 4": brown SILT and CLAY, little fine to coarse Sand, trace fine Gravel Bottom 16": gray to gray brown CLAY and SILT, trace fine to medium Sand	60
15	S-6	4 4 4 4	24	0		Clay & Silt (varved)	No recovery	55
	S-7	4 5 5 6	24	18			Stiff, gray brown CLAY and SILT layers to 1/2" thick varved with Silty CLAY layers to 1/8" thick with occasional red fine Sand partings	
20	S-8	2 1 1 1	24	22			Soft, gray brown CLAY and SILT layers to 3/8" thick varved with Silty CLAY layers to 3/8" thick with occasional red fine Sand partings	50
25	S-9	WOH 0 0 2	24	24			Very soft, gray brown Silty CLAY layers to 1/2" thick varved with CLAY and SILT layers to 1/4" thick with occasional red fine Sand partings	45
30								40

Well Construction

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 135ft Rock: 5ft	NOTES: Pilot hole to 10' with 3 1/4" HSA then switched to 4" casing. Mobile B-53 Rig. Hydraulic safety hammer. Vane shear test at 35'. Drill chatter at 129'. Roller bit advanced through possible rock to 134'. SS sample at 134' yielded 1" penetration after 100 blows. Roller bit refusal at 135'. Core run 135' to 140'. Decomposed bedrock from 130' to 135'	Sheet 1 of 5
No. of Soil Samples: --- No. of Core Runs: 1		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Matt Volovski	Town:	Hartford / West Hartford	Hole No.:	SB-01-3
Engineer:	Geo**Design**, Inc.	Project No.:	155-H025	Stat./Offset:	10' Southwest
Start Date:	6-9-08	Route No.:		Northing:	831030.3
Finish Date:	6-12-08	Bridge No.:		Easting:	1009378.3
				Surface Elevation:	69.6

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: 4" ID/ FJ	Sampler Type/Size: SS/ 1 3/8 " ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @5' wet sample, @2.6' after 4 hours, @2.4' after 6 hours

Depth (ft)	SAMPLES Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Well Construction	Elevation (ft)
30	S-10	WOH 0 0 1	24	24		Clay & Silt (varved) *(con't)*	Very soft, gray brown Silty CLAY layers to 3/4" thick varved with CLAY and SILT layers to 1/4" thick varved with occasional red fine Sand partings		
35	S-11	WORWOH 0 0	24	24			Very soft, gray brown Silty CLAY layers to 1/2" thick varved with CLAY and SILT layers to 1/8" thick with occasional red fine Sand partings		35
40	S-12	WORWOH 3 3	24	24			Soft, gray brown Silty CLAY layers to 3/4" thick varved with CLAY and SILT layers to 1/8" thick with occasional red fine Sand partings		30
45	S-13	WOH 0 0 4	24	24			Very soft, gray brown Silty CLAY layers to 3/4" thick varved with CLAY and SILT layers to 1/8" thick with occasional red fine Sand partings, trace fine Gravel lenses		25
50	S-14	WORWOH 0 2	24	24			Very soft, gray brown Silty CLAY layers to 2 1/2" thick varved with CLAY and SILT layers to 1" thick with occasional red fine Sand partings		20
55	S-15	WOH 0 0 2	24	24			Very soft, gray brown CLAY and SILT layers to 3" thick varved with light brown Silty CLAY layers to 1" thick		15
60									10

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 135ft Rock: 5ft	NOTES: Pilot hole to 10' with 3 1/4" HSA then switched to 4" casing. Mobile B-53 Rig. Hydraulic safety hammer. Vane shear test at 35'. Drill chatter at 129'. Roller bit advanced through possible rock to 134'. SS sample at 134' yielded 1" penetration after 100 blows. Roller bit refusal at 135'. Core run 135' to 140'. Decomposed bedrock from 130' to 135'	Sheet 2 of 5
No. of Soil Samples: --- No. of Core Runs: 1		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Matt Volovski	Town:	Hartford / West Hartford	Hole No.:	SB-01-3
Engineer:	Geo**Design**, Inc.	Project No.:	155-H025	Stat./Offset:	10' Southwest
Start Date:	6-9-08	Route No.:		Northing:	831030.3
Finish Date:	6-12-08	Bridge No.:		Easting:	1009378.3
				Surface Elevation:	69.6

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: 4" ID/ FJ	Sampler Type/Size: SS/ 1 3/8 " ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @5' wet sample, @2.6' after 4 hours, @2.4' after 6 hours

Depth (ft)	SAMPLES Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Well Construction	Elevation (ft)
60	S-16	WOH 0 0 4	24	24		Clay & Silt (varved) *(con't)*	Very soft, gray brown CLAY and SILT layers to 1 1/2" thick varved with light brown Silty CLAY layers to 3/4" thick with occasional red fine Sand partings		
65	S-17	WOH 0 0 2	24	24			Very soft, gray brown CLAY and SILT layers to 1 1/2" thick varved with light brown Silty CLAY layers to 3/4" thick with occasional red fine Sand partings, trace fine to coarse Gravel lenses		5
70	S-18	WOH 0 1 3	24	24			Very soft, gray brown CLAY and SILT layers to 1 1/4" thick varved with brown Silty CLAY layers to 3/4" thick with occasional red fine Sand partings		0
75	S-19	WOR 10 2 5	24	24			Stiff, gray brown CLAY and SILT layers to 2" thick varved with brown Silty CLAY layers to 1" thick, red fine Sand layer 4" thick 8" into sample		-5
80	S-20	1 1 2 1	24	24			Soft, gray brown varved CLAY and SILT		-10
85	S-21	WOH 3 2 4	24	24			Medium, brown Silty CLAY layers to 1" thick varved with gray brown CLAY and SILT layers to 1" thick, trace coarse Gravel lenses		-15
90									-20

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in

Earth: 135ft Rock: 5ft

No. of Soil Samples: --- No. of Core Runs: 1

NOTES: Pilot hole to 10' with 3 1/4" HSA then switched to 4" casing. Mobile B-53 Rig. Hydraulic safety hammer. Vane shear test at 35'. Drill chatter at 129'. Roller bit advanced through possible rock to 134'. SS sample at 134' yielded 1" penetration after 100 blows. Roller bit refusal at 135'. Core run 135' to 140'. Decomposed bedrock from 130' to 135'

SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Matt Volovski	Town:	Hartford / West Hartford	Hole No.:	SB-01-3
Engineer:	Geo**Design**, Inc.	Project No.:	155-H025	Stat./Offset:	10' Southwest
Start Date:	6-9-08	Route No.:		Northing:	831030.3
Finish Date:	6-12-08	Bridge No.:		Easting:	1009378.3
				Surface Elevation:	69.6

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: 4" ID/ FJ	Sampler Type/Size: SS/ 1 3/8 " ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @5' wet sample, @2.6' after 4 hours, @2.4' after 6 hours

Depth (ft)	SAMPLES Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Well Construction	Elevation (ft)
90	S-22	6 6 7 7	24	24		Clay & Silt (varved) *(con't)*	Stiff, gray brown CLAY and SILT layers to 3" thick varved with Silty CLAY layers to 1" thick		
									-25
95	S-23	5 8 9 8	24	15			Very stiff, gray brown CLAY and SILT layers to 4" thick varved with Silty CLAY layers to 3/4" thick, trace fine Sand		
						Clay & Silt			-30
100	S-24	7 5 7 13	24	14			Stiff, red brown SILT and CLAY, trace fine Sand		
									-35
105	S-25	10 19 20 25	24	10			Dense, red brown SILT and CLAY, some fine Sand		
									-40
110	S-26	24 28 29 35	24	14			Very dense, red brown Clayey SILT, some fine Sand		
									-45
115	S-27	26 29 32 36	24	10			Very dense, red brown Clayey SILT, some fine Sand		
120							Very dense,		-50

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 135ft Rock: 5ft	NOTES: Pilot hole to 10' with 3 1/4" HSA then switched to 4" casing. Mobile B-53 Rig. Hydraulic safety hammer. Vane shear test at 35'. Drill chatter at 129'. Roller bit advanced through possible rock to 134'. SS sample at 134' yielded 1" penetration after 100 blows. Roller bit refusal at 135'. Core run 135' to 140'. Decomposed bedrock from 130' to 135'	Sheet 4 of 5
No. of Soil Samples: --- No. of Core Runs: 1		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Matt Volovski	Town:	Hartford / West Hartford	Hole No.:	SB-01-3
Engineer:	Geo**Design**, Inc.	Project No.:	155-H025	Stat./Offset:	10' Southwest
Start Date:	6-9-08	Route No.:		Northing:	831030.3
Finish Date:	6-12-08	Bridge No.:		Easting:	1009378.3
				Surface Elevation:	69.6

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: 4" ID/ FJ	Sampler Type/Size: SS/ 1 3/8 " ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @5' wet sample, @2.6' after 4 hours, @2.4' after 6 hours

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Well Construction	Elevation (ft)
120	S-28	23 32 63 46	24	18		Clay & Silt *(con't)*	Top 8": red brown Clayey SILT, some fine Sand		
						Glacial Till	Bottom 10": red brown to gray brown SILT, some fine to coarse Sand, some fine to coarse Gravel		
125	S-29	22 34 32 55	24	14			Very dense, red brown fine to coarse SAND, some fine Gravel, little Silt		-55
130						Decomposed Bedrock			-60
	S-30	100/1"	1	1			Very dense/spoon refusal, red brown fine to coarse SAND and fine GRAVEL, trace Silt		-65
135	C-1		60	59	58	Bedrock	Fair Quality, Soft, Slightly Weathered, red brown, fine grained, SILTSTONE, fracturing 20°, vertical fracture at 136' Coring time (min/ft): 3,5,7,4,7		-70
140							END OF BORING 140ft		
145									-75
150									-80

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in

Earth: 135ft Rock: 5ft

No. of Soil Samples: --- No. of Core Runs: 1

NOTES: Pilot hole to 10' with 3 1/4" HSA then switched to 4" casing. Mobile B-53 Rig. Hydraulic safety hammer. Vane shear test at 35'. Drill chatter at 129'. Roller bit advanced through possible rock to 134'. SS sample at 134' yielded 1" penetration after 100 blows. Roller bit refusal at 135'. Core run 135' to 140'. Decomposed bedrock from 130' to 135'

SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Robert Marshall	Town:	Hartford / West Hartford	Hole No.:	SB-01-4
Engineer:	Geo**Design**, Inc.	Project No.:	155-H025	Stat./Offset:	6.5' West
Start Date:	6-5-08	Route No.:		Northing:	831089.6
Finish Date:	6-6-08	Bridge No.:		Easting:	1009412.3
				Surface Elevation:	69.8

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: FJ4	Sampler Type/Size: SS / 1 3/8" ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @5' after 0 hours

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0	S-1	3 7 10 17	24	12		Fill	Medium dense, red to brown fine GRAVEL, some fine to coarse Sand, little Brick fragments, trace Ash, trace Asphalt, trace Silt, (fragments to 1/2" in diameter)	
	S-2	19 15 12 13	24	18			Medium dense, brown fine to medium SAND, little Silt, trace Ash	
5	S-5	4 8 8 12	24	18		Clay & Silt	Very stiff, gray brown SILT and CLAY, trace fine Sand, (natural)	65
10	S-4	4 5 6 7	24	24			Stiff, gray brown CLAY and SILT	60
15	S-5	4 5 7 6	24	24		Clay & Silt (varved)	Stiff, brown Silty CLAY layers to 1/4" thick varved with gray brown CLAY and SILT layers to 1/8" thick with occasional red and gray fine Sand partings	55
20	S-6	3 4 3 4	24	24			Medium, brown Silty CLAY layers to 1/4" thick varved with gray brown CLAY and SILT layers to 1/8" thick with occasional red and gray fine Sand partings	50
25	S-7	WOH 0 3 3	24	24			Soft, brown Silty CLAY layers to 3/8" thick varved with CLAY and SILT layers to 1/8" thick with occasional red fine Sand partings	45
30								40

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 109ft Rock: 0ft	NOTES: Pilot hole to 5' with 3 1/4" HSA then switched to 4" casing. Boring advanced open tube below 40' using drillers mud to maintain open hole. Casing later advanced to 50' with boring completed open hole using drillers mud.	Sheet 1 of 4
No. of Soil Samples: 23 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Robert Marshall	Town:	Hartford / West Hartford	Hole No.:	SB-01-4
Engineer:	Geo**Design**, Inc.	Project No.:	155-H025	Stat./Offset:	6.5' West
Start Date:	6-5-08	Route No.:		Northing:	831089.6
Finish Date:	6-6-08	Bridge No.:		Easting:	1009412.3
				Surface Elevation:	69.8

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: FJ4	Sampler Type/Size: SS / 1 3/8" ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @5' after 0 hours

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
30	UP-1	P U S H	24	24		Clay & Silt (varved) *(con't)*		
	S-8	WOH 0 0 0	24	24			Very soft, brown Silty CLAY layers to 1/2" thick varved with gray brown CLAY and SILT layers to 1/4" thick with occasional red fine Sand partings	
35	S-9	WOH 0 3 4	24	24			Soft, brown Silty CLAY layers to 5/8" thick varved with brown CLAY and SILT layers to 1/8" thick, trace coarse Gravel lenses with occasional red fine Sand partings	35
40	UP-2	P U S H	24	24				30
	S-10	WOR 0 WOH 0	24	24			Very soft, brown Silty CLAY layers to 3/4" thick varved with red brown CLAY and SILT layers to 1/8" thick with occasional red fine Sand partings	
45	S-11	- W O H	24	24			Very soft, brown Silty CLAY layers to 3/4" thick varved with red brown CLAY and SILT layers to 1/8" thick with occasional red fine Sand partings with trace fine Gravel lenses	25
50	S-12	- W O H	24	24			Very soft, brown Silty CLAY layers to 1" thick varved with gray brown CLAY and SILT layers to 1/4" thick with occasional red fine Sand partings	20
55	S-13	- W O H	24	24			Very soft, gray brown CLAY and SILT layers to 1 1/2" thick varved with brown Silty CLAY layers to 1" thick	15
60								10

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 109ft Rock: 0ft	NOTES: Pilot hole to 5' with 3 1/4" HSA then switched to 4" casing. Boring advanced open tube below 40' using drillers mud to maintain open hole. Casing later advanced to 50' with boring completed open hole using drillers mud.	Sheet 2 of 4
No. of Soil Samples: 23 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector: Robert Marshall	Town: Hartford / West Hartford	Hole No.: SB-01-4	
Engineer: Geo**Design**, Inc.	Project No.: 155-H025	Stat./Offset: 6.5' West	
Start Date: 6-5-08	Route No.:	Northing: 831089.6	
Finish Date: 6-6-08	Bridge No.:	Easting: 1009412.3	
		Surface Elevation: 69.8	

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: FJ4	Sampler Type/Size: SS / 1 3/8" ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @5' after 0 hours

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
60	S-14	- W O H	24	24		Clay & Silt (varved) *(con't)*	Very soft, gray brown CLAY and SILT layers to 1 1/4" thick varved with brown Silty CLAY layers to 3/4" thick, trace fine Gravel lenses	
65	S-15	WOH 0 4 3	24	24			Soft, gray brown CLAY and SILT layers to 1 1/4" thick varved with brown Silty CLAY layers to 5/8" thick	5
70	S-16	WOH 2 2 2	24	24			Soft, gray brown CLAY and SILT layers to 1 1/4" thick varved with brown Silty CLAY layers to 5/8" thick with occasional red fine Sand partings	0
75	S-17	WOH 0 4 2	24	24			Soft, gray brown CLAY and SILT layers to 1 1/2" thick varved with brown Silty CLAY layers to 1" thick, little fine to coarse Gravel, trace coarse Sand	-5
80	S-18	1 1 2 11	24	24			Soft, Top 20": gray brown CLAY and SILT layers to 2" thick varved with brown Silty CLAY layers to 1" thick Bottom 4": red brown SILT and CLAY, some fine Sand	-10
85	S-19	WOH 0 3 3	24	24			Soft, red brown CLAY and SILT layers to 1 1/2" thick with brown Silty CLAY layers to 1 1/4" thick	-15
90						Clay & Silt		-20

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 109ft Rock: 0ft	NOTES: Pilot hole to 5' with 3 1/4" HSA then switched to 4" casing. Boring advanced open tube below 40' using drillers mud to maintain open hole. Casing later advanced to 50' with boring completed open hole using drillers mud.	Sheet 3 of 4
No. of Soil Samples: 23 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Robert Marshall	Town:	Hartford / West Hartford	Hole No.:	SB-01-4
Engineer:	Geo**Design**, Inc.	Project No.:	155-H025	Stat./Offset:	6.5' West
Start Date:	6-5-08	Route No.:		Northing:	831089.6
Finish Date:	6-6-08	Bridge No.:		Easting:	1009412.3
				Surface Elevation:	69.8

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: FJ4	Sampler Type/Size: SS / 1 3/8" ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @5' after 0 hours

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
90	S-20	4 2 4 4	24	24		Clay & Silt *(con't)*	Medium, red brown CLAY and SILT, little fine Sand	
95	S-21	4 2 8 5	24	24			Stiff, red brown CLAY and SILT, some fine Sand	-25
						Silty Sand		
100	S-22	6 12 17 23	24	14			Medium dense, red brown fine to medium SAND, some Silt	-30
105	S-23	13 16 15 17	24	0			No recovery	-35
	S-24	30 26 33 36	24	22			Very dense, red brown to red fine to medium SAND, some Silt, trace brown Silty Clay pieces to 1/4" in diameter	
110							END OF BORING 109ft	-40
115								-45
120								-50

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 109ft Rock: 0ft	NOTES: Pilot hole to 5' with 3 1/4" HSA then switched to 4" casing. Boring advanced open tube below 40' using drillers mud to maintain open hole. Casing later advanced to 50' with boring completed open hole using drillers mud.	Sheet 4 of 4
No. of Soil Samples: 23 No. of Core Runs: 0		SM-001-M REV. 1/02

RW-Series Boring Logs
(Retaining Wall Structures)

Connecticut DOT Boring Report

Inspector:	Robert Marshall	Town:	Hartford / West Hartford	Hole No.:	RW-1
Engineer:	Geo**Design**, Inc.	Project No.:	155-H025	Stat./Offset:	12' South
Start Date:	6-9-08	Route No.:		Northing:	831998.7
Finish Date:	6-10-08	Bridge No.:		Easting:	1008947.6
				Surface Elevation:	73.6

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: FJ4	Sampler Type/Size: SS/ 1 3/8 " ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @6' wet sample, 21' after 10 minutes

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0						Asphalt		
	S-1	6 9 8 8	24	14		Fill	Medium dense, gray Top 4": fine to coarse GRAVEL, little fine to coarse Sand, little Silt Bottom 10": fine SAND, little Silt	
	S-2	8 7 8 9	24	24		Silt	Medium dense, gray SILT, little fine Sand	70
5	S-3	4 4 5 6	24	18			Loose, gray SILT, trace (-) fine SAND	
	S-4	5 7 9 5	24	22			Medium dense, gray SILT	65
10	S-5	4 4 4 6	24	18			Loose, gray SILT, trace fine Sand	60
						Clay & Silt (varved)		
15	S-6	2 3 4 1	24	2			Medium, gray CLAY and SILT	55
20	S-7	WOR 1 1 1	24	24			Soft, gray Silty CLAY layers to 1/8" thick varved with gray SILT and CLAY layers to 1/8" thick with occasional fine Sand partings	50
25	S-8	WOR 1 0 1	24	24			Very soft, gray Silty CLAY layers to 1/8" thick varved with gray SILT and CLAY layers to 1/8" thick with occasional fine Sand partings	45
30								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 102ft Rock: 0ft	NOTES: Pilot hole to 10' with 4" SSA then switched to 4" casing. Boring advanced open tube below 15' with drillers mud used to maintain open hole.	Sheet 1 of 4
No. of Soil Samples: 22 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Robert Marshall	Town:	Hartford / West Hartford	Hole No.:	RW-1
Engineer:	Geo**Design**, Inc.	Project No.:	155-H025	Stat./Offset:	12' South
Start Date:	6-9-08	Route No.:		Northing:	831998.7
Finish Date:	6-10-08	Bridge No.:		Easting:	1008947.6
				Surface Elevation:	73.6

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: FJ4	Sampler Type/Size: SS/ 1 3/8 " ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @6' wet sample, 21' after 10 minutes

Depth (ft)	SAMPLES Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
30	S-9	1 1 1 2	24	24		Clay & Silt (varved) *(con't)*	Soft, brown CLAY and SILT	
								40
35	S-10	1 1 1 1	24	24			Soft, gray brown varved CLAY and SILT	
								35
40	S-11	1 1 1 1	24	24			Soft, gray brown varved CLAY and SILT	
								30
45	S-12	WOH 0 1 3	24	24			Very soft, red brown Silty CLAY layers to 3/8" thick varved with gray brown CLAY and SILT layers to 1/8" thick	
								25
50	S-13	WOR 1 1 2	24	14			Soft, red brown Silty CLAY layers to 1/2" thick varved with gray brown CLAY and SILT layers to 1/4" thick	
								20
55	S-14	WOR 0 2 3	24	24			Soft, red brown Silty CLAY layers to 1/2" thick varved with gray brown CLAY and SILT layers to 1/4" thick	
								15
60								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 102ft Rock: 0ft	NOTES: Pilot hole to 10' with 4" SSA then switched to 4" casing. Boring advanced open tube below 15' with drillers mud used to maintain open hole.	Sheet 2 of 4
No. of Soil Samples: 22 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Robert Marshall	Town:	Hartford / West Hartford	Hole No.:	RW-1
Engineer:	Geo**Design**, Inc.	Project No.:	155-H025	Stat./Offset:	12' South
Start Date:	6-9-08	Route No.:		Northing:	831998.7
Finish Date:	6-10-08	Bridge No.:		Easting:	1008947.6
				Surface Elevation:	73.6

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: FJ4	Sampler Type/Size: SS/ 1 3/8 " ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @6' wet sample, 21' after 10 minutes

Depth (ft)	SAMPLES Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
60	S-15	WOR 2 2 3	24	24		Clay & Silt (varved) *(con't)*	Soft, red brown Silty CLAY layers to 3/4" thick varved with gray brown CLAY and SILT layers to 1/2" thick	
								10
65	S-16	WOR 0 0 5	24	24			Very soft, red brown Silty CLAY layers 1 3/4" thick varved with CLAY and SILT layers to 1 1/4" thick	
								5
70	S-17	WOR 1 1 2	24	24			Soft, red brown Silty CLAY layers to 5/8" thick varved with gray brown SILT and CLAY layers to 5/8" thick	
								0
75	S-18	WOR 0 3 3	24	24			Soft, red brown Silty CLAY layers to 5/8" thick varved with gray brown SILT and CLAY layers to 5/8" thick	
								-5
80	S-19	WOR 0 8 9	24	24			Stiff, Top 12": red brown Silty CLAY layers to 3/4" thick varved with gray brown CLAY and SILT layers to 1" thick Bottom 12": red brown Clayey SILT, little fine Sand	
								-10
85	S-20	WOR 9 7 10	24	24			Very stiff, red brown Silty CLAY layers to 1" thick varved with red brown SILT and CLAY layers to 1 1/2" thick	
								-15
90								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 102ft Rock: 0ft	NOTES: Pilot hole to 10' with 4" SSA then switched to 4" casing. Boring advanced open tube below 15' with drillers mud used to maintain open hole.	Sheet 3 of 4
No. of Soil Samples: 22 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Robert Marshall	Town:	Hartford / West Hartford	Hole No.:	RW-1
Engineer:	Geo**Design**, Inc.	Project No.:	155-H025	Stat./Offset:	12' South
Start Date:	6-9-08	Route No.:		Northing:	831998.7
Finish Date:	6-10-08	Bridge No.:		Easting:	1008947.6
				Surface Elevation:	73.6

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: FJ4	Sampler Type/Size: SS/ 1 3/8 " ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @6' wet sample, 21' after 10 minutes

Depth (ft)	SAMPLES: Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
90	S-21	2 1 3 3	24	24		Clay & Silt (varved) *(con't)*	Soft to medium, red brown SILT and CLAY with occasional red brown Silty CLAY layers to 1" thick	
						Silt		-20
95	S-22	10 8 14 25	24	24			Medium dense, red brown SILT	-25
100	S-23	9 12 17 22	24	24			Medium dense, red brown SILT	
							END OF BORING 102ft	-30
105								-35
110								-40
115								-45
120								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 102ft Rock: 0ft	NOTES: Pilot hole to 10' with 4" SSA then switched to 4" casing. Boring advanced open tube below 15' with drillers mud used to maintain open hole.	Sheet 4 of 4
No. of Soil Samples: 22 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Ben Brandt	Town:	Hartford / West Hartford	Hole No.:	RW-2
Engineer:	Geo**Design**, Inc.	Project No.:	155-H025	Stat./Offset:	
Start Date:	6-17-08	Route No.:		Northing:	831092.4
Finish Date:	6-18-08	Bridge No.:		Easting:	1009165.1
				Surface Elevation:	74.7

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: HW/4"	Sampler Type/Size: SS/ 1 3/8 " ID	Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @5' wet sample, 4' after 10 min.

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0						Asphalt		
						Sand		
	S-1	5 7 8 11	24	12			Medium dense, gray/red brown fine SAND, trace Silt	
	S-2	8 8 8 11	24	24			Medium dense, gray/red brown fine SAND, trace Silt	70
5	S-3	6 4 6 6	24	24			Medium dense, gray/red brown fine SAND, trace Silt	
	S-4	8 6 7 6	24	14			Medium dense, gray/red brown fine SAND, some Silt	
10						Clay & Silt (varved)		65
	S-5	3 3 3 3	24	14			Medium, gray CLAY and SILT, trace Sand	
15								60
	S-6	2 1 2 1	24	20			Soft, gray Silty CLAY	
20								55
	S-7	3 2 1 2	24	24			Soft, gray Sity CLAY layers to 1/4" thick varved with CLAY and SILT layers to 1/8" thick with occasional red fine Sand partings	
25								50
	S-8	1 0 1 1	24	24			Very soft, gray brown Sity CLAY layers to 1/4" thick varved with CLAY and SILT layers to 1/8" thick with occasional red fine Sand partings	
30								45

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 112ft Rock: 0ft	NOTES: Pilot hole to 9' with 4" SSA, then switched to 4" casing. Open hole below 10' advanced with drillers mud to maintain stability. Mobile B53 rig, hydraulic safety hammer used.	Sheet 1 of 4
No. of Soil Samples: 25 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Ben Brandt	Town:	Hartford / West Hartford	Hole No.:	RW-2
Engineer:	Geo**Design**, Inc.	Project No.:	155-H025	Stat./Offset:	
Start Date:	6-17-08	Route No.:		Northing:	831092.4
Finish Date:	6-18-08	Bridge No.:		Easting:	1009165.1
				Surface Elevation:	74.7

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: HW/4"	Sampler Type/Size: SS/ 1 3/8 " ID	Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @5' wet sample, 4' after 10 min.

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
30	S-9	1 0 1 1	24	24		Clay & Silt (varved) *(con't)*	Very soft, gray brown Sity CLAY layers to 1/4" thick varved with CLAY and SILT layers to 1/4" thick with occasional red fine Sand partings	
								40
35	S-10	WOR 1 0 1	24	24			Very soft, red brown Sity CLAY layers to 1/4" thick varved with gray brown CLAY and SILT layers to 1/4" thick with occasional red fine Sand partings	
								35
40	S-11	WOR 0 1 1	24	24			Very soft, red brown Sity CLAY layers to 1/4" thick varved with gray brown CLAY and SILT layers to 1/4" thick with occasional red fine Sand partings	
								30
45	S-12	WOR 0 1 1	24	24			Very soft, red brown Sity CLAY layers to 1/4" thick varved with gray brown CLAY and SILT layers to 1/4" thick with occasional red fine Sand partings	
								25
50	S-13	WOR 0 1 1	24	24			Very soft, red brown Sity CLAY layers to 1/2" thick varved with CLAY and SILT layers to 1/4" thick with occasional red fine Sand partings	
								20
55	S-14	WOR 0 0 0	24	15			Very soft, red brown Sity CLAY layers to 2" thick varved with CLAY and SILT layers to 2"	
								15
60								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 112ft Rock: 0ft	NOTES: Pilot hole to 9' with 4" SSA, then switched to 4" casing. Open hole below 10' advanced with drillers mud to maintain stability. Mobile B53 rig, hydraulic safety hammer used.	Sheet 2 of 4
No. of Soil Samples: 25 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector: Ben Brandt	Town: Hartford / West Hartford	Hole No.: RW-2	
Engineer: Geo**Design**, Inc.	Project No.: 155-H025	Stat./Offset:	
Start Date: 6-17-08	Route No.:	Northing: 831092.4	
Finish Date: 6-18-08	Bridge No.:	Easting: 1009165.1	
		Surface Elevation: 74.7	

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: HW/4"	Sampler Type/Size: SS/ 1 3/8 " ID	Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @5' wet sample, 4' after 10 min.

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
60	S-15	WOR 0 0 0	24	24		Clay & Silt (varved) *(con't)*	Very soft, gray brown CLAY and SILT layers to 3" thick varved with red brown Silty CLAY layers to 1" thick	
								10
65	S-16	WOR 1 0 1	24	24			Very soft, red brown Silty CLAY layers to 1" thick varved with CLAY and SILT layers to to 3" thick	
								5
70	S-17	1 1 2 2	24	24			Soft, gray brown CLAY and SILT layers to 2" thick varved with red brown Silty CLAY layers to 1" thick	
								0
75	S-18	WOR 0 1 0	24	24			Very soft, gray brown CLAY and SILT layers to 2" thick varved with red brown Silty CLAY layers to 1" thick	
								-5
80	S-19	5 3 1 1	24	16			Soft, red brown Silty CLAY layers to 2" thick varved with gray brown CLAY and SILT layers to 2" thick	
								-10
85	S-20	WOR 0 0 0	24	24			Very soft, red brown Silty CLAY layers to 2" thick varved with gray brown CLAY and SILT layers to 2" thick	
90								-15

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 112ft Rock: 0ft	NOTES: Pilot hole to 9' with 4" SSA, then switched to 4" casing. Open hole below 10' advanced with drillers mud to maintain stability. Mobile B53 rig, hydraulic safety hammer used.	Sheet 3 of 4
No. of Soil Samples: 25 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector: Ben Brandt	Town: Hartford / West Hartford	Hole No.: RW-2	
Engineer: Geo**Design**, Inc.	Project No.: 155-H025	Stat./Offset:	
Start Date: 6-17-08	Route No.:	Northing: 831092.4	
Finish Date: 6-18-08	Bridge No.:	Easting: 1009165.1	
		Surface Elevation: 74.7	

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: HW/4"	Sampler Type/Size: SS/ 1 3/8 " ID	Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @5' wet sample, 4' after 10 min.

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
90	S-21	WOR 4 4 4	24	24		Clay & Silt (varved) *(con't)*	Medium, red brown CLAY and SILT layers to 2" thick varved with Silty CLAY layers to 1" thick	
								-20
95	S-22	4 1 0 1	24	12			Very soft, red brown CLAY and SILT layers to 2" thick varved with Silty CLAY layers to 1" thick	
								-25
100	S-23	7 5 6 7	24	12			Stiff, red brown SILT and CLAY	
								-30
105	S-24	19 19 19 17	24	12		Sand	Dense, fine red brown SAND, some Silt	
								-35
110	S-25	17 20 20 27	24	15			Dense, fine red brown/gray brown SAND, little Silt	
							END OF BORING 112ft	
115								-40
120								-45

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 112ft Rock: 0ft	NOTES: Pilot hole to 9' with 4" SSA, then switched to 4" casing. Open hole below 10' advanced with drillers mud to maintain stability. Mobile B53 rig, hydraulic safety hammer used.	Sheet 4 of 4
No. of Soil Samples: 25 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Ben Brandt	Town:	Hartford / West Hartford	Hole No.:	RW-3
Engineer:	Geo**Design**, Inc.	Project No.:	155-H025	Stat./Offset:	
Start Date:	6-19-08	Route No.:		Northing:	831044.2
Finish Date:	6-19-08	Bridge No.:		Easting:	1009552
				Surface Elevation:	69.6

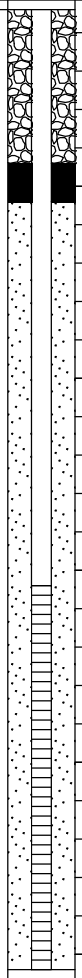
Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: SSA	Sampler Type/Size: SS/ 1 3/8 " ID	Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @3' wet sample, 4.1' after 10 minutes

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0						Asphalt		
						Fill		
	S-1	4 2 2 4	24	12			Loose, red brown fine to coarse SAND, little Silt	
	S-2	5 5 5 11	24	12			Medium dense, gray fine SAND, some fine Gravel, little Silt, trace Asphalt,	65
5	S-3	8 10 11 13	24	12			Medium dense, gray fine SAND, trace Silt	
	S-4	9 9 11 15	24	18		Clay & Silt (varved)	Very stiff, gray brown Silty CLAY layers to 1/4" thick varved with CLAY and SILT layers to 1/4" thick with occasional red fine Sand partings	
10	S-5	5 7 8 9	24	24			Stiff, gray brown Silty CLAY layers to 1/4" thick varved with CLAY and SILT layers to 1/4" thick with occasional red fine Sand partings	60
	S-6	5 6 7 6	24	24			Stiff, gray brown Silty CLAY with occasional red fine Sand partings	
15	S-7	2 3 3 4	24	24			Medium, gray brown Silty CLAY layers to 1/2" thick varved with CLAY and SILT layers to 1/4" thick with occasional red fine Sand partings	55
20	S-8	2 2 2 2	24	24			Soft to medium, gray brown Silty CLAY layers to 1/2" thick varved with CLAY and SILT layers to 1/2" thick with occasional red fine Sand partings	50
25	S-9	1 1 1 1	24	24			Soft, gray brown Silty CLAY layers to 1/2" thick varved with CLAY and SILT layers to 1/4" thick with occasional red fine Sand partings	45
30								40

Well Construction



Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 42ft Rock: 0ft	NOTES: Pilot hole to 9' with 4" SSA, then switched to casing. Open hole below 10' with drillers mud used to maintain open hole. Mobile B53 rig.	Sheet 1 of 2
No. of Soil Samples: 12 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Ben Brandt	Town:	Hartford / West Hartford	Hole No.:	RW-3
Engineer:	Geo**Design**, Inc.	Project No.:	155-H025	Stat./Offset:	
Start Date:	6-19-08	Route No.:		Northing:	831044.2
Finish Date:	6-19-08	Bridge No.:		Easting:	1009552
				Surface Elevation:	69.6

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: SSA	Sampler Type/Size: SS/ 1 3/8 " ID	Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @3' wet sample, 4.1' after 10 minutes

Depth (ft)	SAMPLES: Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Well Construction	Elevation (ft)
30	S-10	WOR 0 1 1	24	24		Clay & Silt (varved) *(con't)*	Very soft, red brown Silty CLAY layers to 1/2" thick varved with CLAY and SILT layers to 1/2" thick with occasional red fine Sand partings		
35	S-11	- W O R	24	24			Very soft, red brown Silty CLAY layers to 1/2" thick varved with CLAY and SILT layers to 1/2" thick with occasional red fine Sand partings		35
40	S-12	- W O R	24	24			Very soft, red brown Silty CLAY layers to 1/2" thick varved with gray brown CLAY and SILT layers to 1/2" thick with occasional red fine Sand partings		30
							END OF BORING 42ft		
45									25
50									20
55									15
60									10

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 42ft Rock: 0ft	NOTES: Pilot hole to 9' with 4" SSA, then switched to casing. Open hole below 10' with drillers mud used to maintain open hole. Mobile B53 rig.	Sheet 2 of 2
No. of Soil Samples: 12 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Matt Volovski	Town:	Hartford / West Hartford	Hole No.:	RW-4
Engineer:	Geo**Design**, Inc.	Project No.:	155-H025	Stat./Offset:	
Start Date:	6-10-08	Route No.:		Northing:	831036.6
Finish Date:	6-11-08	Bridge No.:		Easting:	1009605.8
				Surface Elevation:	69.2

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: FJ4	Sampler Type/Size: SS/ 1 3/8 " ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @16' after 15 minutes, (close to 7' per RW-7 obs. well)

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0						Asphalt		
						Fill		
	S-1	4 6 3 4	24	4			Loose, dark brown fine to coarse GRAVEL, some fine to coarse Sand, trace Asphalt fragments, trace Silt	
	S-2	4 16 17 16	24	16			Dense, gray to orange brown fine to medium SAND, trace fine Gravel, trace Silt, trace Ash	65
5	S-3	6 10 11 8	24	12			Medium dense, brown to orange fine to coarse SAND, little Asphalt fragments, trace fine Gravel, trace Silt	
	S-4	6 11 12 17	24	24			Medium dense,	
						Clay & Silt (varved)	Top 14": brown to orange fine to coarse SAND, little Asphalt fragments, trace fine Gravel, trace Silt Bottom 10": red brown to gray brown CLAY and SILT layers to 1/4" thick varved with occasional fine Sand layers	60
10	S-5	3 4 4 7	24	24			Stiff, gray brown SILT and CLAY, trace fine Sand	
								55
15	S-6	2 2 4 5	24	24			Medium, gray brown CLAY and SILT layers to 1/4" thick varved with Silty CLAY layers to 1/4" thick with occasional gray fine Sand partings	
								50
20	S-7	2 3 4 9	24	24			Medium, gray brown CLAY and SILT layers to 1/2" thick varved with Silty CLAY layers to 1/8" thick with occasional red fine Sand partings	
								45
25	S-8	2 2 3 3	24	24			Medium, gray brown CLAY and SILT	
								40
30								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 112ft Rock: 0ft	NOTES: Pilot hole to 10' with 3 1/4" HSA, then switched to 4" casing. Open hole after 15' using drillers mud to maintain open hole.	Sheet 1 of 4
No. of Soil Samples: 23 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Matt Volovski	Town:	Hartford / West Hartford	Hole No.:	RW-4
Engineer:	Geo**Design**, Inc.	Project No.:	155-H025	Stat./Offset:	
Start Date:	6-10-08	Route No.:		Northing:	831036.6
Finish Date:	6-11-08	Bridge No.:		Easting:	1009605.8
				Surface Elevation:	69.2

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: FJ4	Sampler Type/Size: SS/ 1 3/8 " ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @16' after 15 minutes, (close to 7' per RW-7 obs. well)

Depth (ft)	SAMPLES: Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
30	S-9	1 0 1 2	24	24		Clay & Silt (varved) *(con't)*	Very soft, gray brown Silty CLAY layers to 1/2" thick varved with CLAY and SILT layers to 1/8" thick with occasional red fine Sand partings	
								35
35	UP-1	P U S H	24	24				
	S-10	1 1 1 1	24	24			Very soft, brown Silty CLAY layers to 5/8" thick varved with CLAY and SILT layers to 1/8" thick with occasional red fine Sand partings	30
40	S-11	1 1 0 1	24	24			Very soft, brown varved CLAY and SILT with occasional red fine Sand partings	
								25
45	UP-2	P U S H	24	24				
	S-12	WOH 0 1 1	24	24			Very soft, brown Silty CLAY layers to 3/4" thick varved with gray brown CLAY and SILT layers to 1/2" thick	20
50	S-13	WOH 0 1 1	24	24			Very soft, brown Silty CLAY layers to 1/2" thick varved with CLAY and SILT layers to 3/8" thick varved with occasional red fine Sand partings	
								15
55	S-14	1 WOH 1 2	24	24			Very soft, brown varved CLAY and SILT	
								10
60								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 112ft Rock: 0ft	NOTES: Pilot hole to 10' with 3 1/4" HSA, then switched to 4" casing. Open hole after 15' using drillers mud to maintain open hole.	Sheet 2 of 4
No. of Soil Samples: 23 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector: Matt Volovski	Town: Hartford / West Hartford	Hole No.: RW-4	
Engineer: Geo**Design**, Inc.	Project No.: 155-H025	Stat./Offset:	
Start Date: 6-10-08	Route No.:	Northing: 831036.6	
Finish Date: 6-11-08	Bridge No.:	Easting: 1009605.8	
		Surface Elevation: 69.2	

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: FJ4	Sampler Type/Size: SS/ 1 3/8 " ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @16' after 15 minutes, (close to 7' per RW-7 obs. well)

Depth (ft)	SAMPLES Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
60	S-15	1 2 2 2	24	24		Clay & Silt (varved) *(con't)*	Soft, gray brown CLAY and SILT layers to 1 1/2" thick varved with brown Silty CLAY layers to 1" thick with occasional red fine Sand partings	
								5
65	S-16	1 1 2 3	24	24			Soft, gray brown CLAY and SILT layers to 1 1/2" thick varved with brown Silty CLAY layers to 1" thick with occasional red fine Sand partings	
								0
70	S-17	1 1 3 3	24	24			Soft, gray brown CLAY and SILT layers to 3" thick varved with brown Silty CLAY layers to 1 1/4" thick with occasional red fine Sand partings	
								-5
75	S-18	5 10 12 10	24	16			Very stiff, Top 10": gray brown CLAY and SILT layers to 3" thick varved with brown Silty CLAY layers to 1 1/4" thick with occasional red fine Sand partings Bottom 6": red brown CLAY and SILT layers to 1 1/2", trace fine Sand	
								-10
80	S-19	5 4 6 7	24	20			Stiff, red brown varved CLAY and SILT	
								-15
85	S-20	6 8 9 11	24	24			Very stiff, red brown varved CLAY and SILT	
								-20
90								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 112ft Rock: 0ft	NOTES: Pilot hole to 10' with 3 1/4" HSA, then switched to 4" casing. Open hole after 15' using drillers mud to maintain open hole.	Sheet 3 of 4
No. of Soil Samples: 23 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector: Matt Volovski	Town: Hartford / West Hartford	Hole No.: RW-4	
Engineer: Geo**Design**, Inc.	Project No.: 155-H025	Stat./Offset:	
Start Date: 6-10-08	Route No.:	Northing: 831036.6	
Finish Date: 6-11-08	Bridge No.:	Easting: 1009605.8	
		Surface Elevation: 69.2	

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: FJ4	Sampler Type/Size: SS/ 1 3/8 " ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @16' after 15 minutes, (close to 7' per RW-7 obs. well)

Depth (ft)	SAMPLES Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
90	S-21	3 4 4 4	24	24		Clay & Silt (varved) *(con't)*	Stiff, red brown CLAY and SILT layers to 2" thick varved with Silty CLAY layers to 1 1/4" thick with occasional red fine Sand partings	
								-25
95	S-22	8 11 14 17	24	6			Very stiff, red brown varved CLAY and SILT	
						Clay		-30
100	S-23	10 13 13 16	24	18			Very stiff, red brown CLAY, little Silt	
								-35
105	S-24	13 17 17 18	24	16			Stiff, red brown CLAY, little Silt	
								-40
110	S-25	22 29 30 31	24	16			Very stiff, red brown CLAY, some Silt	
							END OF BORING 112ft	
								-45
115								
								-50
120								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 112ft Rock: 0ft	NOTES: Pilot hole to 10' with 3 1/4" HSA, then switched to 4" casing. Open hole after 15' using drillers mud to maintain open hole.	Sheet 4 of 4
No. of Soil Samples: 23 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Ben Brandt	Town:	Hartford / West Hartford	Hole No.:	RW-5
Engineer:	Geo**Design**, Inc.	Project No.:	155-H025	Stat./Offset:	
Start Date:	6-13-08	Route No.:		Northing:	831229.1
Finish Date:	6-13-08	Bridge No.:		Easting:	1009790.1
				Surface Elevation:	62.3

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: FJ4	Sampler Type/Size: SS/ 1 3/8 " ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @10' wet sample, 6.5' after 10 minutes

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0						Asphalt		
						Fill		
	S-1	38 41 24 13	24	18			Very dense, red brown fine SAND and tan brown Clayey SILT, some fine to coarse Gravel, trace Ash, trace Brick fragments	60
	S-2	12 18 22 19	24	24			Hard, tan brown Clayey SILT with occasional fine orange brown Sand partings	
5						Clay & Silt (varved)		
	S-3	5 6 6 9	24	24			Stiff, gray brown Silty CLAY layers to 1/4" thick varved with CLAY and SILT layers to 1/8" thick with occasional fine orange brown Sand partings	55
10	S-4	4 4 4 4	24	24			Stiff, gray brown Silty CLAY layers to 1/4" thick varved with CLAY and SILT layers to 1/8" thick	50
15	S-5	1 1 1 2	24	24			Soft, gray brown Silty CLAY layers to 1/2" thick varved with CLAY and SILT layers to 1/8" thick	45
20	S-6	WOH 0 1 1	24	12			Soft, gray brown Silty CLAY layers to 1/2" thick varved with CLAY and SILT layers to 1/8" thick with occasional fine red brown Sand partings	40
25	S-7	1 1 2 2	24	24			Soft, gray brown Silty CLAY layers to 1/2" thick varved with CLAY and SILT layers to 1/8" thick with occasional fine red brown Sand partings	35
30								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 42ft Rock: 0ft	NOTES: Pilot hole with 4" SSA to 10' then switched to casing, then open hole below 10' with drillers mud used to maintain open hole. 6 inches of asphalt.	Sheet 1 of 2
No. of Soil Samples: 10 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Ben Brandt	Town:	Hartford / West Hartford	Hole No.:	RW-5
Engineer:	Geo**Design**, Inc.	Project No.:	155-H025	Stat./Offset:	
Start Date:	6-13-08	Route No.:		Northing:	831229.1
Finish Date:	6-13-08	Bridge No.:		Easting:	1009790.1
				Surface Elevation:	62.3

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: FJ4	Sampler Type/Size: SS/ 1 3/8 " ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @10' wet sample, 6.5' after 10 minutes

Depth (ft)	SAMPLES: Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
30	S-8	2 2 2 2	24	24		Clay & Silt (varved) *(con't)*	Soft, red brown Silty CLAY layers to 1/2" thick varved with CLAY and SILT layers to 1/8" thick with occasional fine red Sand partings	30
35	S-9	- W O R	24	18			Very soft, red brown Silty CLAY layers to 1/2" thick varved with gray brown CLAY and SILT layers to 1/8" thick	25
40	S-10	- W O R	24	24			Very soft, red brown Silty CLAY layers to 1/2" thick varved with gray brown CLAY and SILT layers to 1/2" thick	20
							END OF BORING 42ft	
45								15
50								10
55								5
60								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 42ft Rock: 0ft	NOTES: Pilot hole with 4" SSA to 10' then switched to casing, then open hole below 10' with drillers mud used to maintain open hole. 6 inches of asphalt.	Sheet 2 of 2
No. of Soil Samples: 10 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector: Ben Brandt	Town: Hartford / West Hartford	Hole No.: RW-6	
Engineer: Geo**Design**, Inc.	Project No.: 155-H025	Stat./Offset:	
Start Date: 6-13-08	Route No.:	Northing: 831148.0	
Finish Date: 6-17-08	Bridge No.:	Easting: 1009623.5	
		Surface Elevation: 67.9	

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: FJ4	Sampler Type/Size: SS/ 1 3/8 " ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @7' wet sample, 6.5' after 10 minutes

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0						Asphalt		
						Silt		
	S-1	7 8 8 9	24	12			Medium dense, red brown to tan brown SILT, some fine Sand	65
						Clay & Silt (varved)		
	S-2	9 8 8 10	24	12			Very stiff, red brown to tan brown Clayey SILT	
5	S-3	3 4 5 5	24	24			Stiff, gray brown Silty CLAY layers to 1/4" thick varved with CLAY and SILT layers to 1/4" thick with occasional red fine Sand partings	
	S-4	6 6 6 7	24	18			Stiff, gray brown Silty CLAY layers to 1/4" thick varved with CLAY and SILT layers to 1/4" thick with occasional red fine Sand partings	60
10	S-5	3 3 5 6	24	24			Medium, gray brown CLAY and SILT	
								55
15	S-6	2 2 3 4	24	24			Medium, gray CLAY and SILT layers to 1/4" thick varved with Silty CLAY layers to 1/8" thick	
								50
20	UP-1	P U S H	24	24				
	S-7	1 1 2 2	24	24			Soft, gray brown Silty CLAY layers to 1/2" thick varved with CLAY and SILT layers to 1/8" thick with occasional fine Sand partings	45
25	S-8	1 1 1 2	24	24			Soft, gray brown Silty CLAY layers to 1/2" thick varved with CLAY and SILT layers to 1/8" thick with occasional fine Sand partings	
								40
30								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 122ft Rock: 0ft	NOTES: Pilot hole to 10' with 4" SSA then switched to casing advanced to 32' beyond open hole using drillers mud to maintain open hole	Sheet 1 of 5
No. of Soil Samples: 27 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Ben Brandt	Town:	Hartford / West Hartford	Hole No.:	RW-6
Engineer:	Geo**Design**, Inc.	Project No.:	155-H025	Stat./Offset:	
Start Date:	6-13-08	Route No.:		Northing:	831148.0
Finish Date:	6-17-08	Bridge No.:		Easting:	1009623.5
				Surface Elevation:	67.9

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: FJ4	Sampler Type/Size: SS/ 1 3/8 " ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @7' wet sample, 6.5' after 10 minutes

Depth (ft)	SAMPLES: Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
30	UP-2	P U S H	24	24		Clay & Silt (varved) *(con't)*		
	S-9	1 2 2 3	24	24			Soft to medium, gray brown CLAY and SILT layers to 1/2" thick varved with red brown Silty CLAY layers to 1/4" thick with occasional red fine Sand partings	35
35	S-10	2 1 2 2	24	24			Soft to medium, gray brown CLAY and SILT layers to 1/2" thick varved with red brown Silty CLAY layers to 1/4" thick with occasional red fine Sand partings	30
40	S-11	WOR 0 0 0	24	12			Very soft, red brown Silty CLAY layers to 1/2" thick varved with gray brown CLAY and SILT layers to 1/2" thick	25
45	S-12	WOR 0 0 0	24	24			Very soft, red brown Silty CLAY layers to 1/4" thick varved with gray brown CLAY and SILT layers to 1/4" thick	20
50	S-13	WOR 0 0 0	24	24			Very soft, red brown Silty CLAY layers to 1" thick varved with gray brown CLAY and SILT layers to 1" thick	15
55	S-14	WOR 0 0 0	24	12			Very soft, gray brown CLAY and SILT layers to 2" thick varved with red brown Silty CLAY layers to 1" thick	10
60								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 122ft Rock: 0ft	NOTES: Pilot hole to 10' with 4" SSA then switched to casing advanced to 32' beyond open hole using drillers mud to maintain open hole	Sheet 2 of 5
No. of Soil Samples: 27 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Ben Brandt	Town:	Hartford / West Hartford	Hole No.:	RW-6
Engineer:	Geo**Design**, Inc.	Project No.:	155-H025	Stat./Offset:	
Start Date:	6-13-08	Route No.:		Northing:	831148.0
Finish Date:	6-17-08	Bridge No.:		Easting:	1009623.5
				Surface Elevation:	67.9

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: FJ4	Sampler Type/Size: SS/ 1 3/8 " ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @7' wet sample, 6.5' after 10 minutes

Depth (ft)	SAMPLES: Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
60	S-15	WOR 0 0 0	24	12		Clay & Silt (varved) *(con't)*	Very soft, gray brown CLAY and SILT layers to 1 1/4" thick varved with red brown Silty CLAY layers to 1" thick	
								5
65	S-16	WOR 0 0 0	24	24			Very soft, gray brown CLAY and SILT layers to 2" thick varved with red brown Silty CLAY layers to 1" thick	
								0
70	S-17	WOR 0 0 0	24	24			Very soft, red brown Silt CLAY layers to 1 1/2" thick varved with gray brown CLAY and SILT layers to 1 3/4" thick	
								-5
75	S-18	6 3 1 1	24	16			Soft, red brown Silty CLAY layers to 1" thick varved with gray brown CLAY and SILT layers to 1 1/4" thick	
								-10
80	S-19	WOR 0 0 0	24	20			Soft, red brown Silty CLAY layers to 1" thick varved with gray brown CLAY and SILT layers to 1 1/4" thick	
								-15
85	S-20	WOR 0 0 0	24	22			Very soft, Top 18": red brown CLAY and SILT Bottom 4": red brown Silty CLAY layers to 1" thick varved with gray brown CLAY and SILT layers to 1 1/4" thick	
								-20
90								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 122ft Rock: 0ft	NOTES: Pilot hole to 10' with 4" SSA then switched to casing advanced to 32' beyond open hole using drillers mud to maintain open hole	Sheet 3 of 5
No. of Soil Samples: 27 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Ben Brandt	Town:	Hartford / West Hartford	Hole No.:	RW-6
Engineer:	Geo**Design**, Inc.	Project No.:	155-H025	Stat./Offset:	
Start Date:	6-13-08	Route No.:		Northing:	831148.0
Finish Date:	6-17-08	Bridge No.:		Easting:	1009623.5
				Surface Elevation:	67.9

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: FJ4	Sampler Type/Size: SS/ 1 3/8 " ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @7' wet sample, 6.5' after 10 minutes

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
90	S-21	WOR 0 0 5	24	15		Clay & Silt (varved) *(con't)*	Very soft, red brown Silty CLAY layers to 1 1/2" thick varved with gray brown CLAY and SILT layers to 1" thick	
								-25
95	S-22	2 1 1 7	24	21		Clay & Silt	Very soft, red brown CLAY and SILT	
								-30
100	S-23	10 10 8 1	24	12			Very stiff, red brown CLAY and SILT	
								-35
105	S-24	6 4 6 13	24	12			Stiff, red brown CLAY and SILT	
								-40
110	S-25	17 15 17 19	24	12		Silty Sand	Dense, red brown fine SAND, little Silt	
								-45
115	S-26	17 18 21 18	24	16			Dense, red brown fine SAND, little Silt	
								-50
120								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 122ft Rock: 0ft	NOTES: Pilot hole to 10' with 4" SSA then switched to casing advanced to 32' beyond open hole using drillers mud to maintain open hole	Sheet 4 of 5
No. of Soil Samples: 27 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Ben Brandt	Town:	Hartford / West Hartford	Hole No.:	RW-6
Engineer:	Geo**Design**, Inc.	Project No.:	155-H025	Stat./Offset:	
Start Date:	6-13-08	Route No.:		Northing:	831148.0
Finish Date:	6-17-08	Bridge No.:		Easting:	1009623.5
				Surface Elevation:	67.9

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: FJ4	Sampler Type/Size: SS/ 1 3/8 " ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @7' wet sample, 6.5' after 10 minutes

Depth (ft)	SAMPLES: Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
120	S-27	21 24 30 33	24	14		Silty Sand *(con't)*	Very dense, red brown fine SAND, little Silt	
							END OF BORING 122ft	-55
125								-60
130								-65
135								-70
140								-75
145								-80
150								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 122ft Rock: 0ft	NOTES: Pilot hole to 10' with 4" SSA then switched to casing advanced to 32' beyond open hole using drillers mud to maintain open hole	Sheet 5 of 5
No. of Soil Samples: 27 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Matt Volovski	Town:	Hartford / West Hartford	Hole No.:	RW-7
Engineer:	Geo**Design**, Inc.	Project No.:	155-H025	Stat./Offset:	
Start Date:	6-12-08	Route No.:		Northing:	831133.7
Finish Date:	6-13-08	Bridge No.:		Easting:	1009519.8
				Surface Elevation:	69.7

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: HW/4"	Sampler Type/Size: SS/ 1 3/8 " ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @5' wet sample

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0						Asphalt		
						Fill		
	S-1	5 10 7 10	24	12			Medium dense, orange brown fine to coarse SAND, little fine to coarse Gravel, trace Silt, trace Ash	
	S-2	7 8 7 7	24	20			Medium dense, orange to gray brown SILT, some fine to medium Sand, trace Formica, trace Ash	
5								65
	S-3	5 6 7 8	24	20			Medium dense, gray brown to orange brown SILT and fine SAND	
	S-4	6 8 12 10	24	22			Very stiff, Top 8": gray brown to orange brown SILT and fine SAND, little Asphalt pieces (to 1/2" in diameter) Bottom 14": gray brown CLAY and SILT	
						Clay & Silt (varved)		
10								60
	S-5	3 4 4 5	24	24			Stiff, gray brown CLAY and SILT, occasional gray fine Sand partings.	
15								55
	S-6	2 3 3 3	24	24			Medium gray brown CLAY and SILT, occasional gray fine Sand partings	
20								50
	S-7	2 1 2 3	24	24			Soft, gray brown Silty CLAY layers to 1/4" thick varved with CLAY and SILT layers to 1/4" thick with occasional red fine Sand partings	
25								45
	S-8	1 1 1 1	24	24			Soft, gray brown Silty CLAY layers to 3/8" thick varved with CLAY and SILT layers to 1/8" thick with occasional red fine Sand partings	
30								40

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 112ft Rock: 0ft	NOTES: Pilot hole to 10' with 3-1/4" HSA, then switched to 4" casing. Open hole after 15'. Driller's mud used to maintain open hole. Mobile B53 rig, hydraulic safety hammer used.	Sheet 1 of 4
No. of Soil Samples: 26 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector: Matt Volovski	Town: Hartford / West Hartford	Hole No.: RW-7	
Engineer: Geo**Design**, Inc.	Project No.: 155-H025	Stat./Offset:	
Start Date: 6-12-08	Route No.:	Northing: 831133.7	
Finish Date: 6-13-08	Bridge No.:	Easting: 1009519.8	
		Surface Elevation: 69.7	

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: HW/4"	Sampler Type/Size: SS/ 1 3/8 " ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @5' wet sample

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
30	UP-1	P U S H	24	24		Clay & Silt (varved) *(con't)*		
	S-9	WOH 0 0 1	24	24			Very soft, gray brown Silty CLAY layers to 1/2" thick varved with CLAY and SILT layers to 1/4" thick with occasional red fine Sand partings	
35	S-10	WOH 0 0 3	24	24			Very soft, gray brown Silty CLAY layers to 1/2" thick varved with CLAY and SILT layers to 1/4" thick with occasional red fine Sand partings	35
40	S-11	WOH 0 0 2	24	24			Very soft, gray brown varved CLAY and SILT	30
45	S-12	WOH 0 0 3	24	24			Very soft, brown Silty CLAY layers to 3/8" thick varved with gray brown CLAY and SILT layers to 1/4" thick with occasional red fine Sand partings	25
50	S-13	WOH 0 1 2	24	24			Very soft, brown Silty CLAY layers to 1" thick varved with CLAY and SILT layers to 1/4" thick with occasional red fine Sand partings	20
55	S-14	WOH 0 0 0	24	24			Very soft, gray brown CLAY and SILT layers to 1 3/4" thick varved with brown Silty CLAY layers to 1 1/2" thick with occasional red fine Sand partings	15
60								10

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 112ft Rock: 0ft	NOTES: Pilot hole to 10' with 3-1/4" HSA, then switched to 4" casing. Open hole after 15'. Driller's mud used to maintain open hole. Mobile B53 rig, hydraulic safety hammer used.	Sheet 2 of 4
No. of Soil Samples: 26 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector: Matt Volovski	Town: Hartford / West Hartford	Hole No.: RW-7	
Engineer: Geo**Design**, Inc.	Project No.: 155-H025	Stat./Offset:	
Start Date: 6-12-08	Route No.:	Northing: 831133.7	
Finish Date: 6-13-08	Bridge No.:	Easting: 1009519.8	
		Surface Elevation: 69.7	

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: HW/4"	Sampler Type/Size: SS/ 1 3/8 " ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @5' wet sample

Depth (ft)	SAMPLES Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
60	S-15	WOH 0 0 1	24	24		Clay & Silt (varved) *(con't)*	Very soft, gray brown CLAY and SILT layers to 1 3/4" thick varved with brown Silty CLAY layers to 1 1/2" thick with occasional red fine Sand partings	
65	S-16	WOH 0 2 1	24	24			Soft, gray brown CLAY and SILT layers to 1 1/2" thick varved with brown Silty CLAY layers to 1" thick	5
70	S-17	WORWOH 0 0	24	24			Soft, gray brown CLAY and SILT layers to 3" thick varved with brown Silty CLAY layers to 1 1/2" thick with occasional red fine Sand partings	0
75	S-18	WORWOH 0 13	24	24			Very soft, gray brown varved CLAY and SILT	-5
80	S-19	WORWOH 0 1	24	24			Very soft, gray brown CLAY and SILT layers to 2" thick varved with brown Silt CLAY layers to 1 1/2" thick with occasional red fine Sand partings	-10
85	S-20	WORWOH 0 2	24	24			Very soft, brown Silty CLAY layers to 1 1/2" thick varved with gray brown CLAY and SILT layers to 1" thick	-15
90								-20

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 112ft Rock: 0ft	NOTES: Pilot hole to 10' with 3-1/4" HSA, then switched to 4" casing. Open hole after 15'. Driller's mud used to maintain open hole. Mobile B53 rig, hydraulic safety hammer used.	Sheet 3 of 4
No. of Soil Samples: 26 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector: Matt Volovski	Town: Hartford / West Hartford	Hole No.: RW-7	
Engineer: Geo**Design**, Inc.	Project No.: 155-H025	Stat./Offset:	
Start Date: 6-12-08	Route No.:	Northing: 831133.7	
Finish Date: 6-13-08	Bridge No.:	Easting: 1009519.8	
		Surface Elevation: 69.7	

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: HW/4"	Sampler Type/Size: SS/ 1 3/8 " ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @5' wet sample

Depth (ft)	SAMPLES: Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
90	S-21	5 6 6 5	24	24		Clay & Silt (varved) *(con't)*	Stiff, gray brown CLAY and SILT layers to 1 1/2" thick varved with SILT and CLAY layers to 1" thick	
						Clay & Silt		-25
95	S-22	6 9 9 9	24	14			Medium dense, brown SILT and CLAY, little fine Sand	
100	S-23	8 9 11 14	24	19			Medium dense, red brown SILT and CLAY	-30
105	S-24	16 17 19 23	24	10			Dense, red brown Silty CLAY, little fine Sand, little gray brown Clay and Silt pockets, trace hair-like Fiber	-35
						Sandy Silt		-40
110	S-25	21 26 30 32	24	12			Very dense, red brown SILT, some fine Sand	
							END OF BORING 112ft	
115								-45
120								-50

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 112ft Rock: 0ft	NOTES: Pilot hole to 10' with 3-1/4" HSA, then switched to 4" casing. Open hole after 15'. Driller's mud used to maintain open hole. Mobile B53 rig, hydraulic safety hammer used.	Sheet 4 of 4
No. of Soil Samples: 26 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Robert Marshall	Town:	Hartford / West Hartford	Hole No.:	RW-8
Engineer:	Geo**Design**, Inc.	Project No.:	155-H025	Stat./Offset:	4' Southeast
Start Date:	6-12-08	Route No.:		Northing:	831158.3
Finish Date:	6-13-08	Bridge No.:		Easting:	1009153.1
				Surface Elevation:	74.4

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: FJ4	Sampler Type/Size: SS/ 1 3/8 " ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @3' wet sample, 24' after 10 minutes

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0						Asphalt		
	S-1	3 12 13 15	24	4		Fill	Medium dense, gray to dark brown fine to medium SAND, little (+) Silt, trace fine Gravel, trace (-) Asphalt fragments	
	S-2	9 7 9 11	24	18			Medium dense, brown SILT, some fine Sand	70
5						Silt		
	S-3	13 13 16 20	24	18			Medium dense, brown SILT, trace fine Sand, horizontal orange banding	
	S-4	7 7 9 11	24	21			Medium dense, gray brown SILT, trace fine Sand, slight plasticity	65
10	S-5	4 4 5 5	24	16				
						Clay & Silt (varved)		60
15	S-6	WOR 1 2 2	24	20			Soft, gray Top 17": Silty CLAY layers to 1/8" thick varved with SILT and CLAY layers to 1/8" thick with occasional red brown fine Sand partings Bottom 3": SILT and CLAY	
								55
20	UP-1	P U S H	24	12				
	S-7	WOR 1 1 1	24	24			Very soft, gray Silty CLAY layers to 1/8" thick varved with gray brown SILT and CLAY layers to 1/8" thick with occasional fine Sand partings	50
25	S-8	WOR 1 1 1	24	24			Very soft, gray Silty CLAY layers to 1/8" thick varved with gray brown SILT and CLAY layers to 1/8" thick with occasional fine Sand partings	
30								45

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 107ft Rock: 0ft	NOTES: Pilot hole to 10' with 4" SSA then switched to casing.	Sheet 1 of 4
No. of Soil Samples: 23 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Robert Marshall	Town:	Hartford / West Hartford	Hole No.:	RW-8
Engineer:	Geo**Design**, Inc.	Project No.:	155-H025	Stat./Offset:	4' Southeast
Start Date:	6-12-08	Route No.:		Northing:	831158.3
Finish Date:	6-13-08	Bridge No.:		Easting:	1009153.1
				Surface Elevation:	74.4

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: FJ4	Sampler Type/Size: SS/ 1 3/8 " ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @3' wet sample, 24' after 10 minutes

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
30	UP-2	P U S H	24	24		Clay & Silt (varved) *(con't)*		
	S-9	2 1 2 2	24	24			Soft, gray Silty CLAY layers to 3/8" thick varved with gray brown to red brown SILT and CLAY layers to 1/8"	40
35	S-10	WOR 1 2 2	24	24			Soft, gray Silty CLAY layers to 3/8" thick varved with gray brown to red brown SILT and CLAY layers to 1/8" with occasional red brown fine Sand partings to 1/16" thick	35
40	UP-3	P U S H	24	24				
	S-11	WOR 0 1 1	24	24			Very soft, gray brown to red brown Silty CLAY layers to 3/8" thick with occasional red brown fine Sand partings to 1/16" thick	30
45	S-12	WOR 1 2 2	24	24			Soft, red gray varved Silty CLAY layers to 1/2" thick with occasional red brown fine Sand partings to 1/16" thick, trace fine Gravel	25
50	S-13	WOR 1 2 2	24	22			Soft, red gray varved Silty CLAY layers to 1/2" thick with occasional red brown fine Sand partings to 1/16" thick, trace fine Gravel	20
55	S-14	WOR 0 0 0	24	24			Very soft, gray Silty CLAY layers to 1/2" thick varved with red brown Silty CLAY layers to 1" thick, trace fine Sand	15
60								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 107ft Rock: 0ft	NOTES: Pilot hole to 10' with 4" SSA then switched to casing.	Sheet 2 of 4
No. of Soil Samples: 23 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Robert Marshall	Town:	Hartford / West Hartford	Hole No.:	RW-8
Engineer:	Geo**Design**, Inc.	Project No.:	155-H025	Stat./Offset:	4' Southeast
Start Date:	6-12-08	Route No.:		Northing:	831158.3
Finish Date:	6-13-08	Bridge No.:		Easting:	1009153.1
				Surface Elevation:	74.4

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: FJ4	Sampler Type/Size: SS/ 1 3/8 " ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @3' wet sample, 24' after 10 minutes

Depth (ft)	SAMPLES: Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
60	S-15	WOR 0 3 3	24	24		Clay & Silt (varved) *(con't)*	Soft, gray brown Silty CLAY layers to 1" thick varved with red brown Silty CLAY layers to 1" thick	
								10
65	S-16	2 2 3 3	24	13			Medium, gray brown Silty CLAY layers to 1/8" thick varved with red brown Silty CLAY layers to 2" thick	
								5
70	S-17	1 1 2 3	24	24			Soft, red brown Silty CLAY layers to 1" thick varved with gray Silty CLAY layers to 1/2" thick	
								0
75	S-18	WOR 1 2 3	24	24			Soft, red brown Silty CLAY layers to 1" thick varved with gray brown CLAY and SILT layers to 1" thick	
								-5
80	S-19	1 8 8 12	24	24			Stiff to very stiff, red brown to gray brown Clayey SILT layers to 3" varved with red brown Silty CLAY layers to 1" thick	
								-10
85	S-20	2 5 6 8	24	24			Stiff, red brown CLAY and SILT layers to 1 1/4" thick varved with red brown Silty CLAY layers to 1" thick	
								-15
90								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 107ft Rock: 0ft	NOTES: Pilot hole to 10' with 4" SSA then switched to casing.	Sheet 3 of 4
No. of Soil Samples: 23 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Robert Marshall	Town:	Hartford / West Hartford	Hole No.:	RW-8
Engineer:	Geo**Design**, Inc.	Project No.:	155-H025	Stat./Offset:	4' Southeast
Start Date:	6-12-08	Route No.:		Northing:	831158.3
Finish Date:	6-13-08	Bridge No.:		Easting:	1009153.1
				Surface Elevation:	74.4

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: FJ4	Sampler Type/Size: SS/ 1 3/8 " ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @3' wet sample, 24' after 10 minutes

Depth (ft)	SAMPLES: Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
90	S-21	2 3 3 3	24	18		Clay & Silt (varved) *(con't)*	Medium, red brown Clayey SILT with occasional red brown Silty CLAY layers to 1" thick	
						Silt		-20
95	S-22	6 10 18 25	24	20			Medium dense, red brown SILT	
						Sand		-25
100	S-23	21 24 24 30	24	0			Dense/no recovery	
	S-24	41 58 50/4"	16	8			Very dense, red brown fine SAND, little Silt	-30
105	S-25	21 23 28 36	24	15			Very dense, red brown fine to medium SAND, little Silt	
							END OF BORING 107ft	-35
110								
115								-40
120								-45

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 107ft Rock: 0ft	NOTES: Pilot hole to 10' with 4" SSA then switched to casing.	Sheet 4 of 4
No. of Soil Samples: 23 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector: Robert Marshall	Town: Hartford / West Hartford	Hole No.: RW-9	
Engineer: Geo**Design**, Inc.	Project No.: 155-H025	Stat./Offset:	
Start Date: 6-11-08	Route No.:	Northing: 831116.9	
Finish Date: 6-11-08	Bridge No.:	Easting: 1009021.9	
		Surface Elevation: 75.8	

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: FJ4	Sampler Type/Size: SS/ 1 3/8 " ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @5' wet sample

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0						Asphalt		
	S-1	7 6 5 6	24	2		Fill	Medium dense, brown fine to medium SAND, some fine to coarse Gravel, little Silt, trace Asphalt fragments	75
	S-2	7 8 9 14	24	2		Sand & Gravel	Medium dense, gray fine GRAVEL and fine to medium SAND, some Silt, (slightly plastic)	
5	S-3	10 11 14 16	24	17		Silt	Medium dense, orange brown to gray brown SILT, some Sand	70
	S-4	10 14 17 22	24	24			Dense, gray brown SILT, trace fine Sand, horizontal orange brown/gray banding	
10	S-5	3 3 6 7	24	16			Loose, gray Clayey SILT	65
						Clay & Silt (varved)		
15	S-6	1 1 1 1	24	20			Soft, gray Silty CLAY layers to 1/8" thick varved with CLAY and SILT layers to 1/8" thick	60
20	S-7	1 1/12" 0 1	24	24			Very soft, gray Silty CLAY layers to 1/8" thick varved with CLAY and SILT layers to 1/8" thick	55
25	S-8	1/12" 0 1 1	24	24			Very soft, gray brown Silty CLAY layers to 1/4" thick varved with gray brown SILT nad CLAY layers to 1/4" thick with occasional red brown fine Sand partings to 1/16" thick	50
30								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 42ft Rock: 0ft	NOTES: Pilot hole to 5' with 4" SSA, then switched to 4" casing to 10'. Borehole advanced open hole below 10' with drillers mud used to maintain open hole.	Sheet 1 of 2
No. of Soil Samples: 9 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector: Robert Marshall	Town: Hartford / West Hartford	Hole No.: RW-9	
Engineer: Geo**Design**, Inc.	Project No.: 155-H025	Stat./Offset:	
Start Date: 6-11-08	Route No.:	Northing: 831116.9	
Finish Date: 6-11-08	Bridge No.:	Easting: 1009021.9	
		Surface Elevation: 75.8	

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: FJ4	Sampler Type/Size: SS/ 1 3/8 " ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @5' wet sample

Depth (ft)	SAMPLES: Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
30	S-9	WOR/6" 1 1 2	24	24		Clay & Silt (varved) *(con't)*	Soft, gray brown Silty CLAY layers to 1/4" thick varved with gray brown SILT nad CLAY layers to 1/4" thick with occasional red brown fine Sand partings to 1/16" thick	45
35	S-10	WOR/12"0 1 2	24	24			Very soft, gray brown Silty CLAY layers t 1/4" thick varved with gray brown to red brown CLAY and SILT layers to 3/8" thick	40
40	S-11	WOR/6" 2 1 1	24	24			Soft, gray brown Silty CLAY layers t 1/4" thick varved with gray brown to red brown CLAY and SILT layers to 3/8" thick	35
							END OF BORING 42ft	
45								30
50								25
55								20
60								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 42ft Rock: 0ft	NOTES: Pilot hole to 5' with 4" SSA, then switched to 4" casing to 10'. Borehole advanced open hole below 10' with drillers mud used to maintain open hole.	Sheet 2 of 2
No. of Soil Samples: 9 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Matt Volovksi	Town:	Hartford / West Hartford	Hole No.:	RW-10
Engineer:	Geo**Design**, Inc.	Project No.:	155-H025	Stat./Offset:	5' South
Start Date:	6-12-08	Route No.:		Northing:	830918.3
Finish Date:	6-13-08	Bridge No.:		Easting:	1009588.4
				Surface Elevation:	71.3

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: FJ4	Sampler Type/Size: SS/ 1 3/8 " ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @5' wet sample, 10' after 10 minutes

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0	S-1	6 11 11 9	24	22		Topsoil Fill	Medium dense, Top 6": brown to gray brown fine to medium SAND, little Roots, trace Organics, trace Silt Bottom 16": dark brown fine to medium SAND, little fine Gravel, trace Ash, trace Silt	70
	S-2	8 9 10 10	24	16			Medium dense, gray brown to light brown fine to medium SAND, trace Silt, trace fine Gravel, trace Organics	
5	S-3	7 6 6 5	24	16			Medium dense, light brown to brown fine to medium SAND, little Silt, trace Ash	65
	S-4	4 3 4 5	24	20			Loose, brown to gray brown fine to medium SAND, little Silt, trace fine Gravel, trace Ash, (gray fine Gravel layer 2" thick in sample)	
10	S-5	3 5 5 8	24	14		Sand	Medium dense, orange brown to light brown fine SAND, little Silt	60
						Clay & Silt (varved)		
15	S-6	4 3 5 6	24	14			Stiff, gray brown CLAY and SILT with occasional gray fine Sand partings	55
20	S-7	1 1 1 1	24	24			Soft, gray CLAY and SILT with occasional fine Sand partings	50
25	S-8	1 1 1 1	24	24			Soft, gray brown Silty CLAY layers to 1/2" thick varved with CLAY and SILT layers to 1/8" thick with occasional red fine Sand partings	45
30								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 104ft Rock: 0ft	NOTES: Mobile B-53 Rig. Hydraulic safety hammer used. Pilot hole to 10' with 4 1/4" HSA, casing advanced to 15', open hole below 15' with drillers mud used to maintain open hole	Sheet 1 of 4
No. of Soil Samples: 24 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Matt Volovksi	Town:	Hartford / West Hartford	Hole No.:	RW-10
Engineer:	Geo**Design**, Inc.	Project No.:	155-H025	Stat./Offset:	5' South
Start Date:	6-12-08	Route No.:		Northing:	830918.3
Finish Date:	6-13-08	Bridge No.:		Easting:	1009588.4
				Surface Elevation:	71.3

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: FJ4	Sampler Type/Size: SS/ 1 3/8 " ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @5' wet sample, 10' after 10 minutes

Depth (ft)	SAMPLES: Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
30	S-9	1 1 1 2	24	24		Clay & Silt (varved) *(con't)*	Soft, gray brown Silty CLAY layers to 1/2" thick varved with CLAY and SILT layers to 1/4" thick with occasional red fine Sand partings	40
35	S-10	1 0 1 2	24	24			Very soft, gray brown Silty CLAY layers to 1/2" thick varved with CLAY and SILT layers to 1/8" thick with occasional red fine Sand partings	35
40	S-11	1 0 1 1	24	24			Very soft, gray brown Silty CLAY layers to 1/2" thick varved with CLAY and SILT layers to 1/8" thick with occasional red fine Sand partings and coarse Gravel lenses	30
45	S-12	WOH 0 0 3	24	24			Very soft, gray brown Silty CLAY layers to 1/2" thick varved with CLAY and SILT layers to 1/4" thick with occasional red fine Sand partings	25
50	S-13	WOR 0 1 2	24	24			Very soft, gray brown Silty CLAY layers to 1/2" thick varved with CLAY and SILT layers to 1/4" thick with occasional red fine Sand partings	20
55	S-14	1 1 1 2	24	18			Soft, gray brown Silty CLAY layers to 1 1/2" thick varved with CLAY and SILT layers to 1/2" thick with occasional red fine Sand partings	15
60								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 104ft Rock: 0ft	NOTES: Mobile B-53 Rig. Hydraulic safety hammer used. Pilot hole to 10' with 4 1/4" HSA, casing advanced to 15', open hole below 15' with drillers mud used to maintain open hole	Sheet 2 of 4
No. of Soil Samples: 24 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Matt Volovksi	Town:	Hartford / West Hartford	Hole No.:	RW-10
Engineer:	Geo**Design**, Inc.	Project No.:	155-H025	Stat./Offset:	5' South
Start Date:	6-12-08	Route No.:		Northing:	830918.3
Finish Date:	6-13-08	Bridge No.:		Easting:	1009588.4
				Surface Elevation:	71.3

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: FJ4	Sampler Type/Size: SS/ 1 3/8 " ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @5' wet sample, 10' after 10 minutes

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
60	S-15	1 1 1 1	24	24		Clay & Silt (varved) *(con't)*	Soft, gray brown CLAY and SILT layers to 1 1/2" thick varved with Silty CLAY layers to 1" thick with occasional red fine Sand partings	10
65	S-16	1 1 1 2	24	22			Soft, gray brown CLAY and SILT layers to 1 1/2" thick varved with Silty CLAY layers to 1" thick with occasional red fine Sand partings	5
70	S-17	1 1 1 1	24	24			Soft, red brown Silty CLAY layers to 1" thick varved with CLAY and SILT layers to 1" thick with occasional red fine Sand partings	0
75	S-18	WOR 0 1 1	24	24			Soft, red brown Silty CLAY layers to 1" thick varved with CLAY and SILT layers to 1" thick with occasional red fine Sand partings	-5
80	S-19	WOR 1 1 3	24	24			Soft, Top 14": red brown CLAY and SILT Bottom 10": gray brown Silty CLAY layers to 1 1/2" thick varved with CLAY and SILT layers to 1 1/2" thick with occasional red fine Sand partings	-10
						Sandy Silt		
85	S-20	5 9 10 11	24	24			Medium, red brown Clayey SILT and fine SAND	-15
						Clay & Silt		
90								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 104ft Rock: 0ft	NOTES: Mobile B-53 Rig. Hydraulic safety hammer used. Pilot hole to 10' with 4 1/4" HSA, casing advanced to 15', open hole below 15' with drillers mud used to maintain open hole	Sheet 3 of 4
No. of Soil Samples: 24 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Matt Volovksi	Town:	Hartford / West Hartford	Hole No.:	RW-10
Engineer:	Geo**Design**, Inc.	Project No.:	155-H025	Stat./Offset:	5' South
Start Date:	6-12-08	Route No.:		Northing:	830918.3
Finish Date:	6-13-08	Bridge No.:		Easting:	1009588.4
				Surface Elevation:	71.3

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: FJ4	Sampler Type/Size: SS/ 1 3/8 " ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @5' wet sample, 10' after 10 minutes

Depth (ft)	SAMPLES Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
90	S-21	1 1 1 5	24	18		Clay & Silt *(con't)*	Soft, brown CLAY and SILT with occsional tan fine Sand partings	-20
95	S-22	6 6 6 6	24	24			Stiff, brown CLAY and SILT	-25
100	S-23	7 6 7 7	24	24			Stiff, Top 18": brown CLAY and SILT Bottom 6": red brown Clayey SILT, some fine Sand	-30
	S-24	16 17 17 18	24	18			Dense, red brown Clayey SILT, some fine Sand, trace CLAY and SILT pieces to 3/4" in diameter	
105							END OF BORING 104ft	-35
110								-40
115								-45
120								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 104ft Rock: 0ft	NOTES: Mobile B-53 Rig. Hydraulic safety hammer used. Pilot hole to 10' with 4 1/4" HSA, casing advanced to 15', open hole below 15' with drillers mud used to maintain open hole	Sheet 4 of 4
No. of Soil Samples: 24 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Robert Marshall	Town:	Hartford / West Hartford	Hole No.:	RW-11
Engineer:	Geo**Design**, Inc.	Project No.:	155-H025	Stat./Offset:	3' Southeast
Start Date:	6-19-08	Route No.:		Northing:	831145.3
Finish Date:	6-19-08	Bridge No.:		Easting:	1009259.8
				Surface Elevation:	73.1

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: HW 4" ID	Sampler Type/Size: SS/ 1 3/8 " ID	Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @3' wet sample, 6' after ten minutes

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0						Asphalt		
	S-1	5 6 6 5	24	20		Silt	Medium dense, gray to orange brown SILT, little fine Sand	
	S-2	4 6 7 7	24	18			Medium dense, Top 6": brown fine to medium SAND, little Silt Bottom 12": SILT, little fine Sand	70
5	S-3	4 3 5 5	24	17			Loose, gray SILT, trace fine Sand	
	S-4	3 3 5 5	24	19		Clay & Silt (varved)	Loose, gray Clayey SILT	65
10	S-5	3 5 7 6	24	18			Medium dense, Clayey SILT with occasional red brown CLAY and SILT partings	
	S-6	4 3 5 6	24	24			Loose, gray SILT and CLAY layers to 1/8" thick varved with gray brown Silty CLAY layers to 1/8" inch thick	60
15	S-7	3 3 5 7	24	24			Stiff, gray CLAY and SILT	
								55
20	S-8	3 3 3 3	24	12			Medium gray CLAY and SILT with occasional Silty CLAY partings to 1/16" thick	
								50
25	S-9	2 1 1 2	24	24			Soft gray Silty CLAY layers to 1/4" thick (varved)	
								45
30								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 42ft Rock: 0ft	NOTES: Pilot hole to 10' with 4" SSA, then switched to 4" casing. Open hole below 15' advanced with drillers mud to maintain open hole.	Sheet 1 of 2
No. of Soil Samples: 12 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Robert Marshall	Town:	Hartford / West Hartford	Hole No.:	RW-11
Engineer:	Geo**Design**, Inc.	Project No.:	155-H025	Stat./Offset:	3' Southeast
Start Date:	6-19-08	Route No.:		Northing:	831145.3
Finish Date:	6-19-08	Bridge No.:		Easting:	1009259.8
				Surface Elevation:	73.1

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: HW 4" ID	Sampler Type/Size: SS/ 1 3/8 " ID	Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @3' wet sample, 6' after ten minutes

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
30	S-10	WOR 2 2 2	24	24		Clay & Silt (varved) *(con't)*	Soft gray Silty CLAY layers to 1/2" thick varved with gray SILT and CLAY layers to 1/4" thick	40
35	S-11	WOR 0 2 2	24	24			Soft, gray brown Silty CLAY layers to 3/8" thick varved with gray SILT and CLAY layers to 1//4" thick with occasional red brown fine Sand partings	35
40	S-12	WOR 0 2 2	24	24			Soft, gray brown SIlty CLAY layers to 3/8" thick varved with gray SILT and CLAY layers to 1/4" thick with occasional red brown fine Sand partings	30
45							END OF BORING 42ft	25
50								20
55								15
60								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 42ft Rock: 0ft	NOTES: Pilot hole to 10' with 4" SSA, then switched to 4" casing. Open hole below 15' advanced with drillers mud to maintain open hole.	Sheet 2 of 2
No. of Soil Samples: 12 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector: Patty Kral	Town: Hartford / West Hartford	Hole No.: RW-12	
Engineer: Geo**Design**, Inc.	Project No.: 155-H025	Stat./Offset:	
Start Date: 5-12-08	Route No.:	Northing: 830991.2	
Finish Date: 5-12-08	Bridge No.:	Easting: 1009275.3	
		Surface Elevation: 70	

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: HSA 3 ¼"	Sampler Type/Size: SS / 1 3/8" ID	Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @5' after 0 hours

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0	S-1	3 13 18 26	24	1		Fill	Dense, black-brown fine to coarse SAND, little Silt, little fine Gravel, trace Brick fragments, (oil odor/stain)	70
	S-2	28 34 37 41	24	12			Very dense, black-dark brown fine to medium SAND, some Silt, little Brick fragments, trace coarse Gravel, (oil odor/stain)	
5	S-3	7 14 17 25	24	20		Sand & Silt	Dense, gray-brown varved fine SAND and SILT	65
10	S-4	5 6 7 7	24	16			Medium dense, gray SILT, some fine Sand	60
						Silt & Clay (varved)		
15	S-5	2 3 3 4	24	20			Loose, gray varved Clayey SILT	55
20	S-6	1 2 1 2	24	24			Very loose, gray varved Silty CLAY with occasional red brown fine SAND partings	50
25	S-7	1 1 1 2	24	24			Very loose, gray varved Silty CLAY with occasional red brown fine SAND partings	45
30								40

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 42ft Rock: 0ft	NOTES: Mobile B53 rig, hydraulic safety hammer used.	Sheet 1 of 2
No. of Soil Samples: 9 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Patty Kral	Town:	Hartford / West Hartford	Hole No.:	RW-12
Engineer:	Geo**Design**, Inc.	Project No.:	155-H025	Stat./Offset:	
Start Date:	5-12-08	Route No.:		Northing:	830991.2
Finish Date:	5-12-08	Bridge No.:		Easting:	1009275.3
				Surface Elevation:	70

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: HSA 3 ¼"	Sampler Type/Size: SS / 1 3/8" ID	Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @5' after 0 hours

Depth (ft)	SAMPLES: Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
30	S-8	1 2 1 1	24	18		Silt & Clay (varved) *(con't)*	Very loose, gray varved Silty CLAY with occasional red brown fine SAND partings	40
35	S-9	WOH 1 1 2	24	24			Very loose, gray varved SILT and CLAY with occasional red brown fine SAND partings	35
40	S-10	1 0 1 0	24	24			Very loose, gray varved SILT and CLAY with occasional red brown fine SAND partings	30
							END OF BORING 42ft	
45								25
50								20
55								15
60								10

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 42ft Rock: 0ft	NOTES: Mobile B53 rig, hydraulic safety hammer used.	Sheet 2 of 2
No. of Soil Samples: 9 No. of Core Runs: 0		SM-001-M REV. 1/02

R-Series Boring Logs
(Roadways)

Connecticut DOT Boring Report

Inspector:	Robert Marshall	Town:	Hartford / West Hartford	Hole No.:	R-102
Engineer:	Geo**Design**, Inc.	Project No.:	155-H025	Stat./Offset:	
Start Date:	6-11-08	Route No.:		Northing:	831242.5
Finish Date:	6-11-08	Bridge No.:		Easting:	1008984.2
				Surface Elevation:	76.5

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: SSA 4" OD	Sampler Type/Size: SS/ 1 3/8 " ID	Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @5' wet sample

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0						Asphalt		
	S-1	7 10 8 5	24	10		Fill	Medium dense, red brown fine to coarse GRAVEL and fine to medium SAND, little Silt	75
	S-2	4 7 5 7	24	4			Medium dense, red brown to gray fine SAND, little Silt, little fine Gravel	
5	S-3	8 9 9 10	24	20		Silt	Medium dense, red brown to gray SILT, some fine Sand	70
10	S-4	4 6 7 7	24	18			No recovery, re-drove for sample Medium dense, gray SILT, trace fine Sand	65
15	S-5	6 7 7 7	24	24			Medium dense, gray SILT, trace fine Sand	60
							END OF BORING 17ft	
20								55
25								50
30								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 17ft Rock: 0ft	NOTES:	Sheet 1 of 1
No. of Soil Samples: 3 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Robert Marshall	Town:	Hartford / West Hartford	Hole No.:	R-103
Engineer:	Geo**Design**, Inc.	Project No.:	155-H025	Stat./Offset:	5' East
Start Date:	6-11-08	Route No.:		Northing:	831081.5
Finish Date:	6-11-08	Bridge No.:		Easting:	1009698.7
				Surface Elevation:	67.1

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: SSA	Sampler Type/Size: SS/ 1 3/8 " ID	Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @4' wet sample

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0	S-1	10 8 9 15	24	18		Topsoil Fill	Medium dense, Top 4": brown topsoil Bottom 14": gray brown SILT, some fine to medium Sand, trace fine to coarse Gravel	65
	S-2	11 12 14 16	24	20			Medium dense, gray brown fine SAND, some Silt	
5	S-3	5 5 6 8	24	14		Clay & Silt (varved)	Medium dense, orange brown SILT, trace fine Sand varved with occasional gray SILT and CLAY layers to 1/8" thick	60
	S-4	6 8 9 9	24	22			Medium dense, orange brown SILT, trace fine Sand varved with occasional gray SILT and CLAY layers to 1/8" thick	
10	S-5	3 3 3 5	24	24			Medium, gray Silty CLAY layers to 1/8" thick varved with gray SILT and CLAY layers to 1/8" thick	55
15	S-6	3 4 4 5	24	18			Medium, gray Silty CLAY layers to 1/8" thick varved with gray SILT and CLAY layers to 1/8" thick	50
							END OF BORING 17ft	
20								45
25								40
30								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 17ft Rock: 0ft	NOTES:	Sheet 1 of 1
No. of Soil Samples: 6 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Ben Brandt	Town:	Hartford / West Hartford	Hole No.:	R-104
Engineer:	Geo**Design**, Inc.	Project No.:	155-H025	Stat./Offset:	15' South
Start Date:	6-13-08	Route No.:		Northing:	831159.2
Finish Date:	6-13-08	Bridge No.:		Easting:	1009818.4
				Surface Elevation:	63.3

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: 4" OD SSA	Sampler Type/Size: SS/ 1 3/8 " ID	Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @12' wet sample, after 10 minutes 12'

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0	S-1	8 6 7 7	24	18		Fill	Medium dense, tan to light brown fine to medium SAND, trace fine gravel, trace Ash, trace Brick fragments, trace Roots	
	S-2	6 9 12 14	24	18			Medium dense, tan to light brown SILT, some fine to coarse Sand, trace Ash, trace Brick fragments, trace Roots	60
5	S-3	12 13 13 15	24	24		Clayey Silt	Very stiff, tan to light brown Clayey SILT	
						Clay & Silt (varved)		55
10	S-4	6 5 6 8	24	24			Stiff, tan to brown Silty CLAY layers to 1/4" thick varved with CLAY and SILT layers to 1/8" thick	50
15	S-5	6 6 5 6	24	24			Stiff, tan to brown Silty CLAY layers to 1/4" thick varved with CLAY and SILT layers to 1/8" thick	
							END OF BORING 17ft	45
20								40
25								35
30								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 17ft Rock: 0ft	NOTES:	Sheet 1 of 1
No. of Soil Samples: 5 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Ben Brandt	Town:	Hartford / West Hartford	Hole No.:	R-105
Engineer:	Geo**Design**, Inc.	Project No.:	155-H025	Stat./Offset:	
Start Date:	6-13-08	Route No.:		Northing:	831201.0
Finish Date:	6-13-08	Bridge No.:		Easting:	1009895.8
				Surface Elevation:	59.2

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: HW/4"	Sampler Type/Size: SS/ 1 3/8 " ID	Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @15' wet sample

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0						Asphalt		
						Fill		
	S-1	20 16 14 12	24	18			Medium dense to dense, dark brown fine SAND, some Silt, trace Ash, trace Brick fragments	
	S-2	10 18 14 14	24	12			Dense, dark brown fine SAND, trace Silt, trace Ash, trace Brick fragments	55
5	S-3	1 1 2 3	24	12			Soft, gray brown Clayey SILT, trace Ash, trace Brick, trace Roots	
	S-4	3 7 9 12	24	12			Very stiff, gray brown Clayey SILT, trace Roots	
								50
10						Clay & Silt (varved)		
	S-5	7 8 8 10	24	24			Very stiff, tan to brown Clayey SILT with occasional red fine Sand partings	
								45
15	S-6	2 3 2 3	24	24			Medium, gray brown Silty CLAY layers to 1/4" thick varved with CLAY and SILT (layers to 1/8" thick with occasional red fine Sand partings)	
							END OF BORING 17ft	
								40
20								
								35
25								
								30
30								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 17ft Rock: 0ft	NOTES:	Sheet 1 of 1
No. of Soil Samples: 6 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector: Matt Volovski	Town: Hartford / West Hartford	Hole No.: R-106	
Engineer: Geo**Design**, Inc.	Project No.: 155-H025	Stat./Offset:	
Start Date: 6-13-08	Route No.:	Northing: 831110.2	
Finish Date: 6-13-08	Bridge No.:	Easting: 1009620.1	
		Surface Elevation: 68.8	

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: HSA 3 ¼"	Sampler Type/Size: SS/ 1 3/8 " ID	Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @after 30 minutes 13'

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0						Asphalt		
						Pavement		
						Sub-base		
						Fill	Medium dense, Top 2": dark brown fine SAND, some fine to coarse Gravel, trace Silt Bottom 16": orange brown to gray brown fine SAND, trace Ash, trace Silt	
	S-1	4 7 10 14	24	18				
	S-2	12 15 15 16	24	18			Medium dense, Top 4": dark brown fine to coarse SAND, some fine to coarse Gravel, trace Ash, trace Silt Bottom 14": gray to gray brown SILT, some fine Sand, trace Ash	65
5								
	S-3	5 7 8 8	24	20			Medium dense, orange brown to gray brown fine SAND, little Silt, trace Ash	
	S-4	5 7 8 8	24	22		Clay & Silt	Stiff, Top 7": orange brown to gray brown fine SAND, little Silt Bottom 15": orange brown CLAY and SILT, little fine Sand	60
10								
	S-5	1 2 2 2	24	23		Clay & Silt (varved)	Soft, Top 5": orange brown CLAY and SILT, little fine Sand Bottom 18": gray brown CLAY and SILT	
	S-6	3 4 6 6	24	18			Stiff, Top 11": gray brown CLAY and SILT Bottom 7": gray brown CLAY and SILT layers to 1/4" thick varved with Silty CLAY layers to 1/8" thick with occasional red fine Sand partings	55
15								
	S-7	2 2 4 5	24	24			Medium, gray brown CLAY and SILT layers to 1/2" thick varved with Silty CLAY layers to 1/4" thick with occasional red fine Sand partings	
							END OF BORING 17ft	50
20								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 17ft Rock: 0ft	NOTES:	Sheet 1 of 1
No. of Soil Samples: 7 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Robert Marshall	Town:	Hartford / West Hartford	Hole No.:	R-107
Engineer:	Geo**Design**, Inc.	Project No.:	155-H025	Stat./Offset:	
Start Date:	6-20-08	Route No.:		Northing:	831121.8
Finish Date:	6-20-08	Bridge No.:		Easting:	1009229.9
				Surface Elevation:	73.7

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: 4" OD SSA	Sampler Type/Size: SS/ 1 3/8 " ID	Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @2.9' wet sample

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0						Asphalt		
	S-1	6 8 11 13	24	18		Sandy Silt	Medium dense, gray brown SILT, some fine Sand	
	S-2	9 11 11 12	24	16			Medium dense, gray brown SILT, some fine Sand	70
5	S-3	2 4 5 6	24	15			Loose gray brown to orange brown SILT, some fine Sand	
	S-4	3 4 4 5	24	20			Loose, gray Silt, little fine Sand	65
10	S-5	2 3 4 4	24	12			Loose, gray Silt, trace fine Sand	
	S-6	2 2 3 3	24	20		Clay & Silt	Loose, gray Clayey SILT with occasional red brown CLAY and SILT partings, trace Silt	60
15	S-7	3 2 4 5	24	24			Medium, gray CLAY and SILT	
							END OF BORING 17ft	55
20								
								50
25								
								45
30								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 17ft Rock: 0ft	NOTES:	Sheet 1 of 1
No. of Soil Samples: 7 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector: Matt Volovski	Town: Hartford / West Hartford	Hole No.: R-108	
Engineer: Geo**Design**, Inc.	Project No.: 155-H025	Stat./Offset:	
Start Date: 6-13-08	Route No.:	Northing: 831007.9	
Finish Date: 6-13-08	Bridge No.:	Easting: 1009651.7	
		Surface Elevation: 68.6	

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: HSA 3 ¼"	Sampler Type/Size: SS/ 1 3/8 " ID	Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @5' wet sample

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0						Asphalt		
						Sub-base	Medium dense,	
	S-1	11 8 3 4	24	12		Fill	Top 6": gray to gray brown fine to coarse SAND and fine to coarse GRAVEL, little Asphalt fragments, trace Silt Bottom 6": brown fine Sand, trace Ash, trace Silt	
	S-2	5 5 5 6	24	12			Medium dense, brown fine Sand, trace Ash, trace Silt	65
5							Medium dense,	
	S-3	5 5 6 7	24	14			Top 4": tan/brown gray fine SAND and ASPHALT fragments, little fine Gravel, trace Silt Bottom 10": orange brown/gray fine SAND and SILT, trace Organics, trace Ash	
	S-4	7 7 9 12	24	14			Medium dense, orange brown/brown/gray SILT and SAND, little fine Gravel, trace Ash, trace Organics	60
10						Clay & Silt		
	S-5	2 3 5 6	24	18			Stiff, gray CLAY and SILT	
	S-6	4 5 5 6	24	22		Clay & Silt (varved)	Stiff, gray brown CLAY and SILT layers to 1/2" thick varved with Silty CLAY layers to 1/8" thick with occasional gray fine Sand partings	55
15								
	S-7	2 3 3 5	24	23			Medium, gray brown CLAY and SILT layers to 1/2" thick varved with Silty CLAY layers to 1/4" thick with occasional gray fine Sand partings	
							END OF BORING 17ft	50
20								
								45
25								
								40
30								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 17ft Rock: 0ft	NOTES:	Sheet 1 of 1
No. of Soil Samples: 7 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Robert Marshall	Town:	Hartford / West Hartford	Hole No.:	R-109
Engineer:	Geo**Design**, Inc.	Project No.:	155-H025	Stat./Offset:	
Start Date:	6-11-08	Route No.:		Northing:	831260.4
Finish Date:	6-11-08	Bridge No.:		Easting:	1009117
				Surface Elevation:	75.3

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0 -

Casing Size/Type: 4" OD SSA	Sampler Type/Size: SS/ 1 3/8 " ID	Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @5' wet sample

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0						Asphalt		75
	S-1	7 7 9 10	24	12		Fill	Medium dense, gray brown SILT, little fine Sand, trace fine Gravel	
	S-2	10 10 8 11	24	16			Medium dense, Top 8": gray fine to coarse SAND, little fine Gravel, little Silt Bottom 8": red fine SAND, little Silt	
5	S-3	9 9 9 10	24	20		Silty Sand	Medium dense, orange brown fine SAND, some Silt, orange brown horizontal banding	70
						Clayey Silt		
10	S-4	3 3 3 4	24	18			Medium, gray Clayey SILT	65
15	S-5	3 4 4 5	24	20			Medium to stiff, gray Clayey SILT	60
							END OF BORING 17ft	
20								55
25								50
30								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

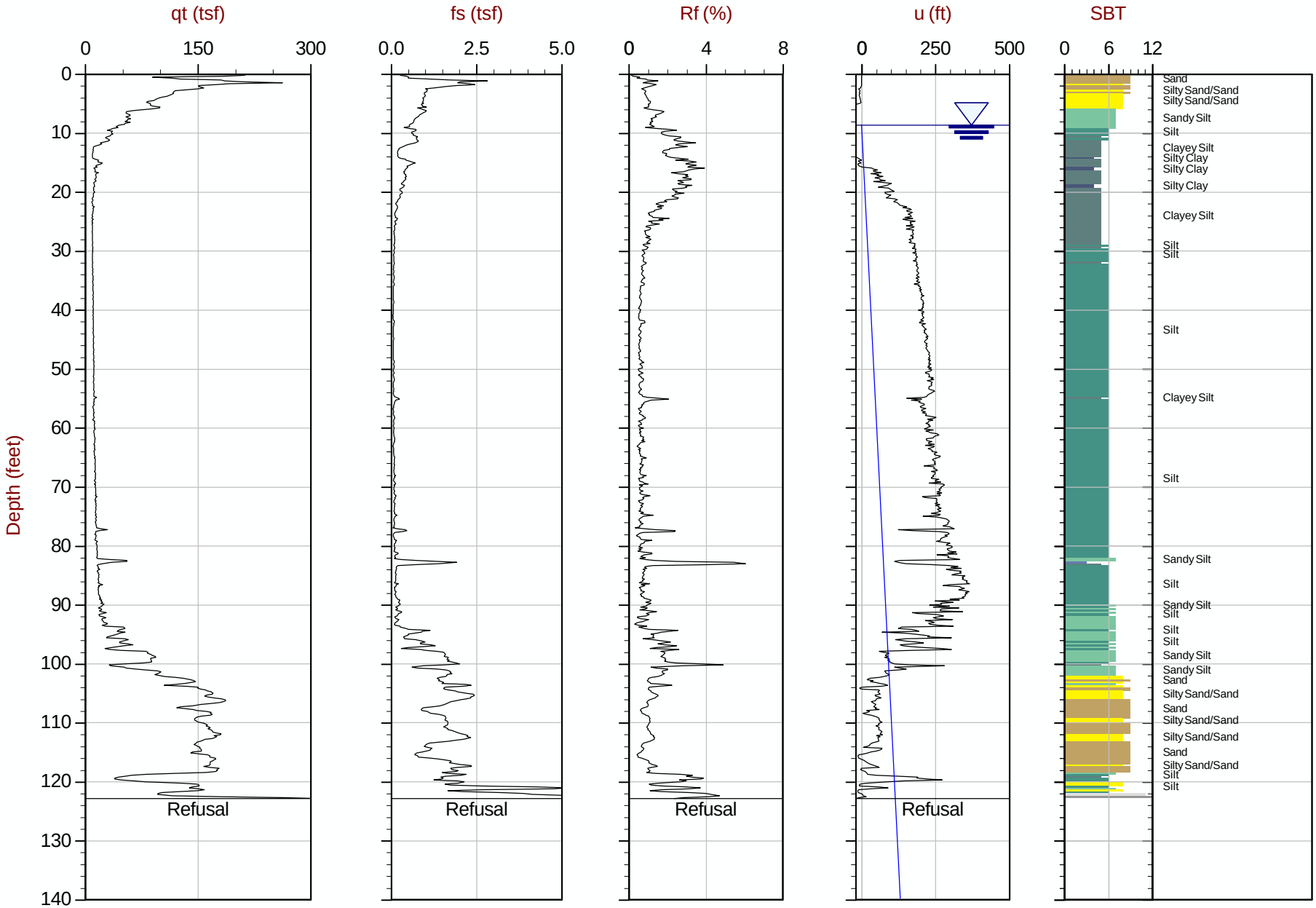
Total Penetration in Earth: 17ft Rock: 0ft	NOTES: 4" of asphalt at top of boring.	Sheet 1 of 1
No. of Soil Samples: 5 No. of Core Runs: 0		SM-001-M REV. 1/02

Cone Penetration Tests (CPT) Logs

New England Boring

Job No: 08-763
Date: 06:18:08 11:20
Site: Hartford Busway

Sounding: CPT-01
Cone: STD 20T AD238



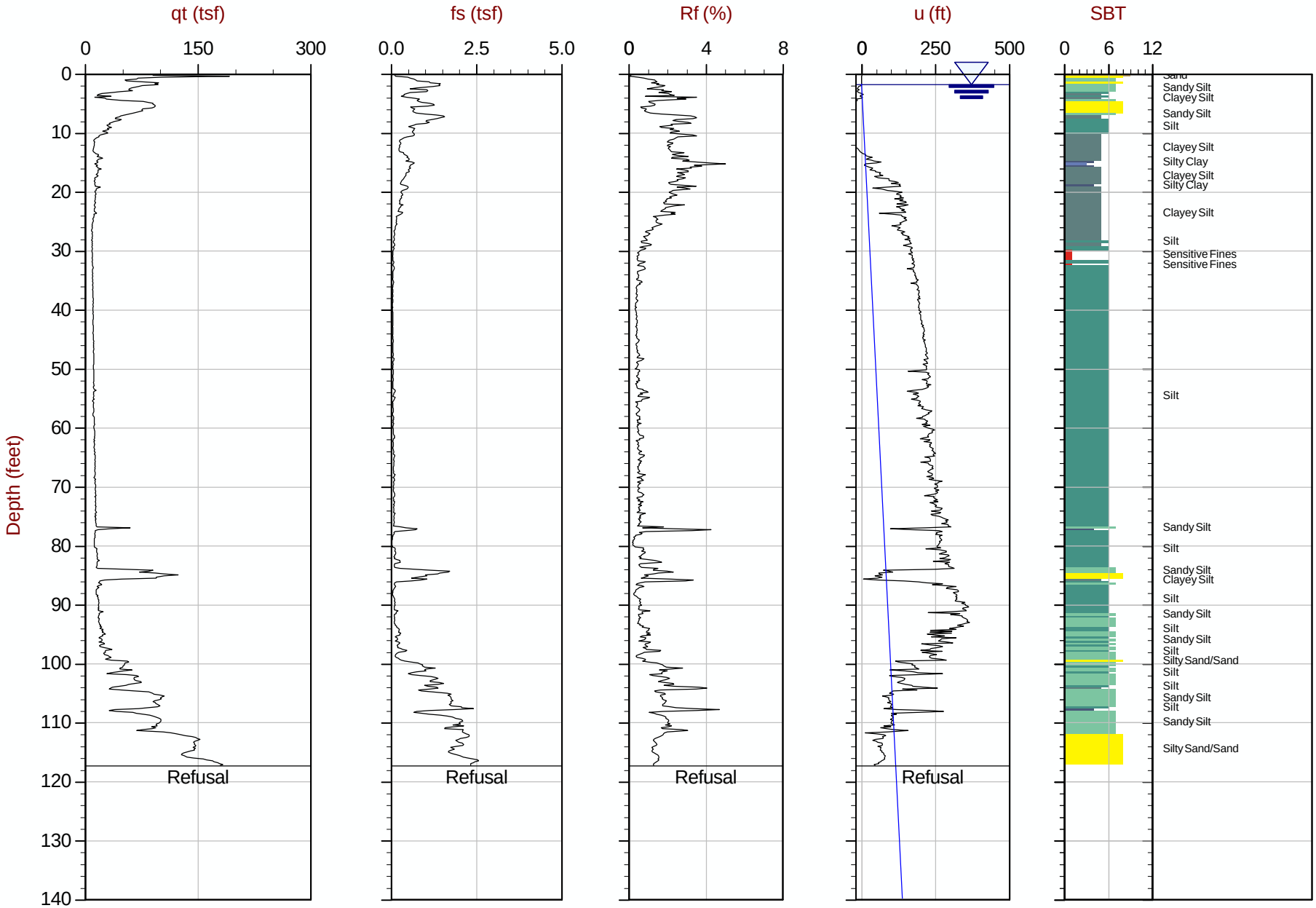
Max Depth: 37.450 m / 122.87 ft
Depth Inc: 0.050 m / 0.164 ft

SBT: Lunne, Robertson and Powell, 1997

New England Boring

Job No: 08-763
Date: 06:18:08 12:27
Site: Hartford Busway

Sounding: CPT-02
Cone: STD 20T AD238



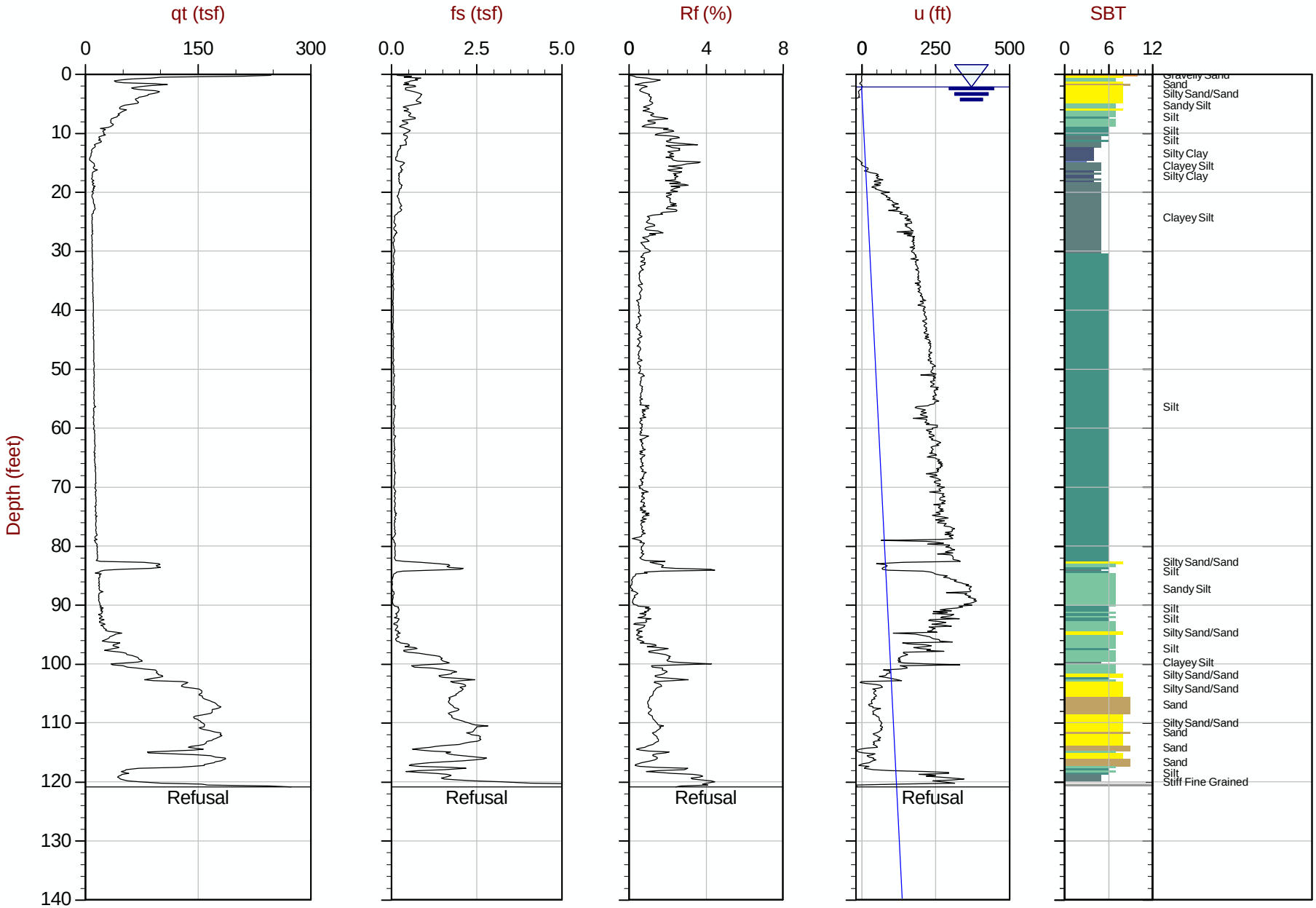
Max Depth: 35.750 m / 117.29 ft
Depth Inc: 0.050 m / 0.164 ft

SBT: Lunne, Robertson and Powell, 1997

New England Boring

Job No: 08-763
Date: 06:18:08 10:04
Site: Hartford Busway

Sounding: CPT-03
Cone: STD 20T AD238



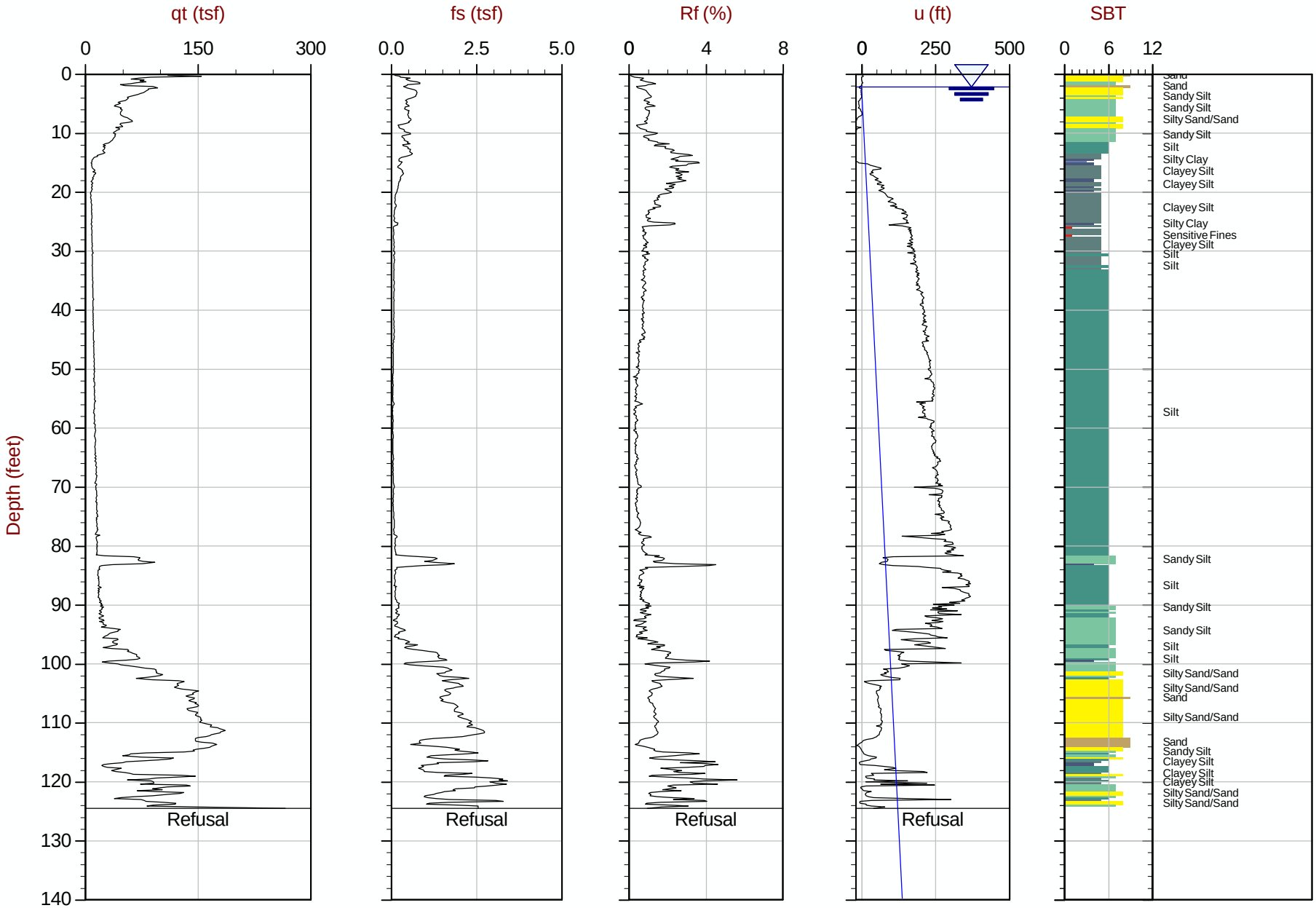
Max Depth: 36.850 m / 120.90 ft
Depth Inc: 0.050 m / 0.164 ft

SBT: Lunne, Robertson and Powell, 1997

New England Boring

Job No: 08-763
Date: 06:18:08 08:44
Site: Hartford, CT

Sounding: CPT-04
Cone: STD 20T AD238



Max Depth: 37.950 m / 124.51 ft
Depth Inc: 0.050 m / 0.164 ft

SBT: Lunne, Robertson and Powell, 1997

Appendix 5

Consolidation Test Results

2003 Consolidation Tests

2008 Constant Rate of Strain Consolidation Tests

2008 Incremental Load Consolidation Tests

2003 Consolidation Tests

LABORATORY TESTING DATA SHEET

Project Name: NEW BRITAIN-HARTFORD BUSWAY CONNECTICUT
Project No.: L17828 — Assigned By: D. Gaffney — Reviewed By: [signature]
Project Engineer: D. SCHULZE — Date: Feb.04 — Date Reviewed: 2/24/04

Boring/ Test Pit No.	Sample No.	Depth ft.	Lab No.	Identification Tests: Water Content %	LL %	PL %	Sieve -200 %	Hyd -2μ %	ORG %	G_s	Dry unit wt. pcf	Density: γ_d MAX (pcf) / W_{opt} (%)	Permeability cm/sec	Strength Tests: Torvane or Type Test	$\bar{\sigma}_c$ psf	Failure Criteria	$\sigma_1 - \sigma_3$ or τ psf	Strain %	Consol. $\frac{C_c}{1+e_0}$	Laboratory Log and Soil Description
SB-56	ST-1	30.0-32.0	401	Average Total Unit Weight (30.0-32.0') = 103.0 Pcf																Gray-brown Varved Soil as follows: Fat Clay (CH) grading to Silt (ML)
		30.1		62.8	(Clay Portion)									Tv= 0.20 tsf						
		30.1-30.6		60.3							62.9			CIU	4320	P/A MAX	2027	5.7		
		30.6		44.5	(Silt Portion)									Tv= 0.20 tsf						Varve thickness varies from 0.5-1.5" Clay portion varies from 0.25-1.25" in thickness and comprises approx. 25-50% of total varve
		30.6-31.1		60.5							65.5			CIU	5760	P/A MAX	2846	5.1		
		31.1		53.6	(entire varve)									Tv= 0.21 tsf						Note: 0.5" piece of Siltstone observed at 30.5'
		31.1-31.7		62.0							63.8			CIU	7200	P/A MAX	3395	6.6		
		31.7-31.8		66.1							61.6			Tv= 0.20 tsf					0.20	
		31.0-32.0		60.2	56	27	95	57		2.85	(Clay Portion)									

GZA GeoEnvironmental, Inc.

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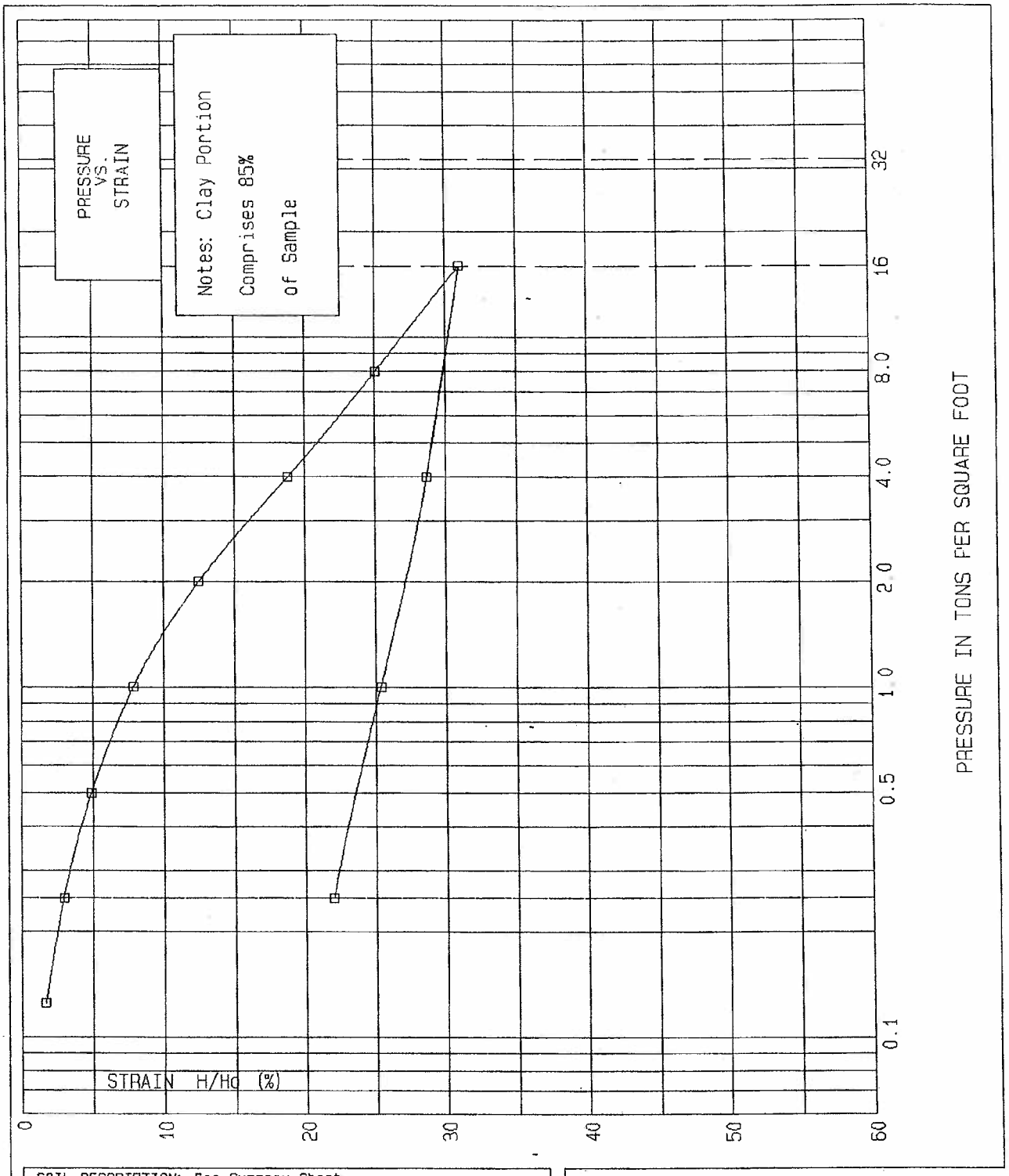
labform1.xls



SOIL DESCRIPTION: See Summary Sheet

SAMPLE DIAM. 2.5 IN.	LIQUID LIMIT 0 %	PLASTIC LIMIT 0 %	SPECIFIC GRAVITY 2.85

	WATER CONTENT, %	DRY UNIT WEIGHT, pcf	VOID RATIO	SATURATION, %	SAMPLE HEIGHT, INCH
INITIAL	66.10	61.55			0.80
FINAL	46.30	78.91			0.62

New Britain-Hartford Busway

CONSOLIDATION TEST

BORING NO.	SB-56	TEST SERIES NO.	C401.1
SAMPLE	ST-1	DATE	2/23/04
DEPTH	31.7-31.8'		
TECH	MST		
REVIEWER	DAS	FILE	L17828

FIGURE

Job Number L17828
Project Name ..... New Britain-Hartford Busway
Test Number C401.1
Sample Description .. See Summary Sheet
Boring Number SB-56
Sample Number ST-1
Depth ..... 31.7-31.8'

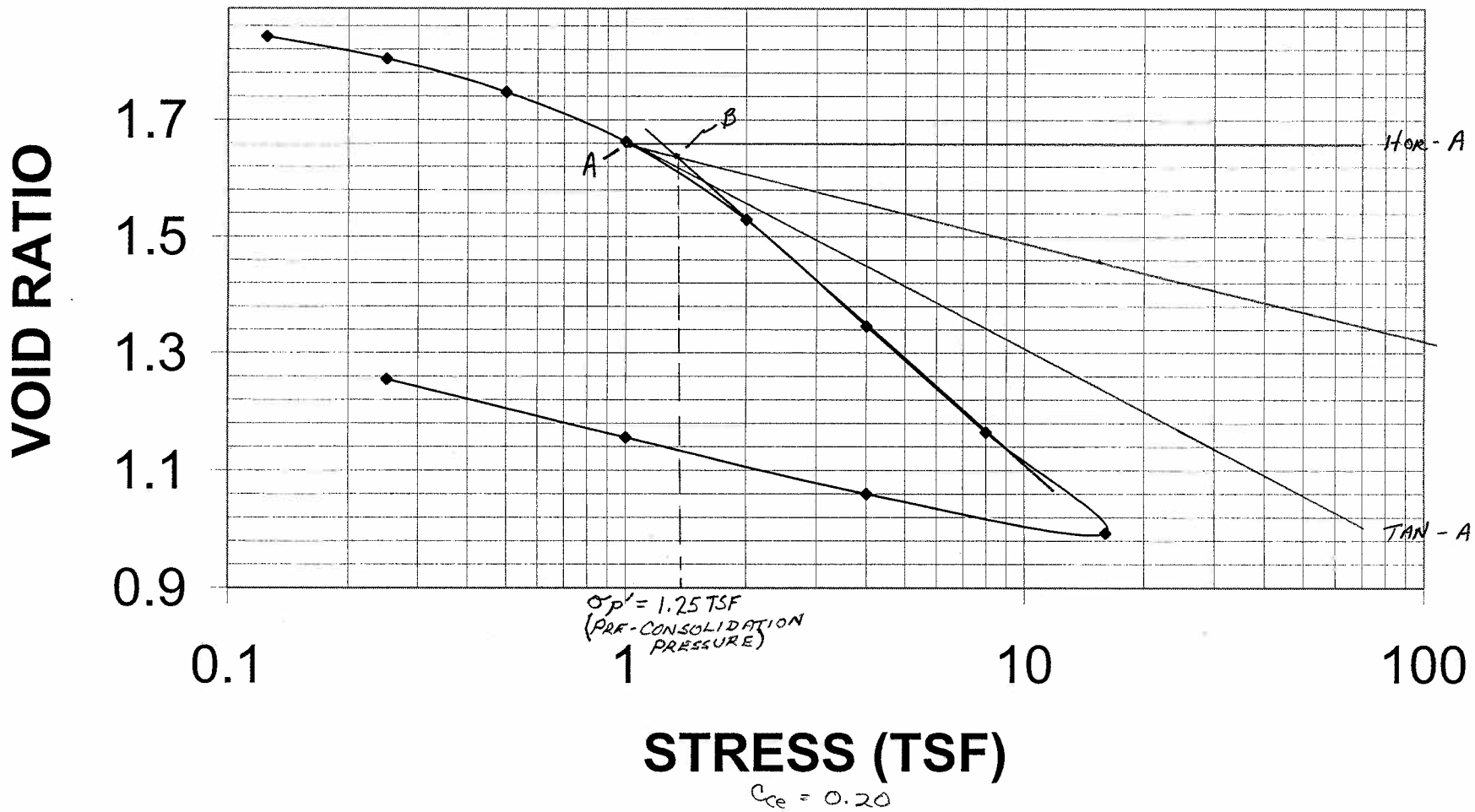
Technician ..... MST
Reviewer ..... DAS

NOTES: Clay Portion
Comprises 85%
of Sample

Specific Gravity ..... 2.8500E+00
Sample Dry Weight ..... 6.3450E+01
Sample Diameter ..... 2.5000E+00
Initial Void Ratio ..... 0.0000E+00
Initial\Sample Height 8.0000E-01
Final Sample Height 6.2400E-01
Initial Water Content .... 6.6100E+01
Final Water Content ..... 4.6300E+01
Liquid Limit ..... 0.0000E+00
Plastic Limit ..... 0.0000E+00
Initial Saturation ..... 0.0000E+00
Final Saturation ..... 0.0000E+00
T50 data excluded
T90 data included

Increment umber	Pressure (TSF)	Final Dial	Percent Strain	Void Ratio	T90 (min)	Cv (T90) (/10000)	C_α
1	0.000	0.0	0.00	1.889			
2	0.125	131.0	1.64	1.842			
3	0.250	236.0	2.95	1.804	11.6	12.01	0.0020
4	0.500	393.0	4.91	1.747	9.6	14.03	0.0024
5	1.000	630.0	7.87	1.662	7.8	16.39	
6	2.000	998.0	12.47	1.529	9.6	12.26	
7	4.000	1505.0	18.81	1.346	10.2	10.18	
8	8.000	2005.0	25.06	1.165	7.8	11.40	0.0039
9	16.000	2481.0	31.01	0.993	6.3	11.99	
10	4.000	2295.0	28.69	1.060			
11	1.000	2030.0	25.37	1.156			
12	0.250	1757.0	21.96	1.255			

SB-56 Consolidation



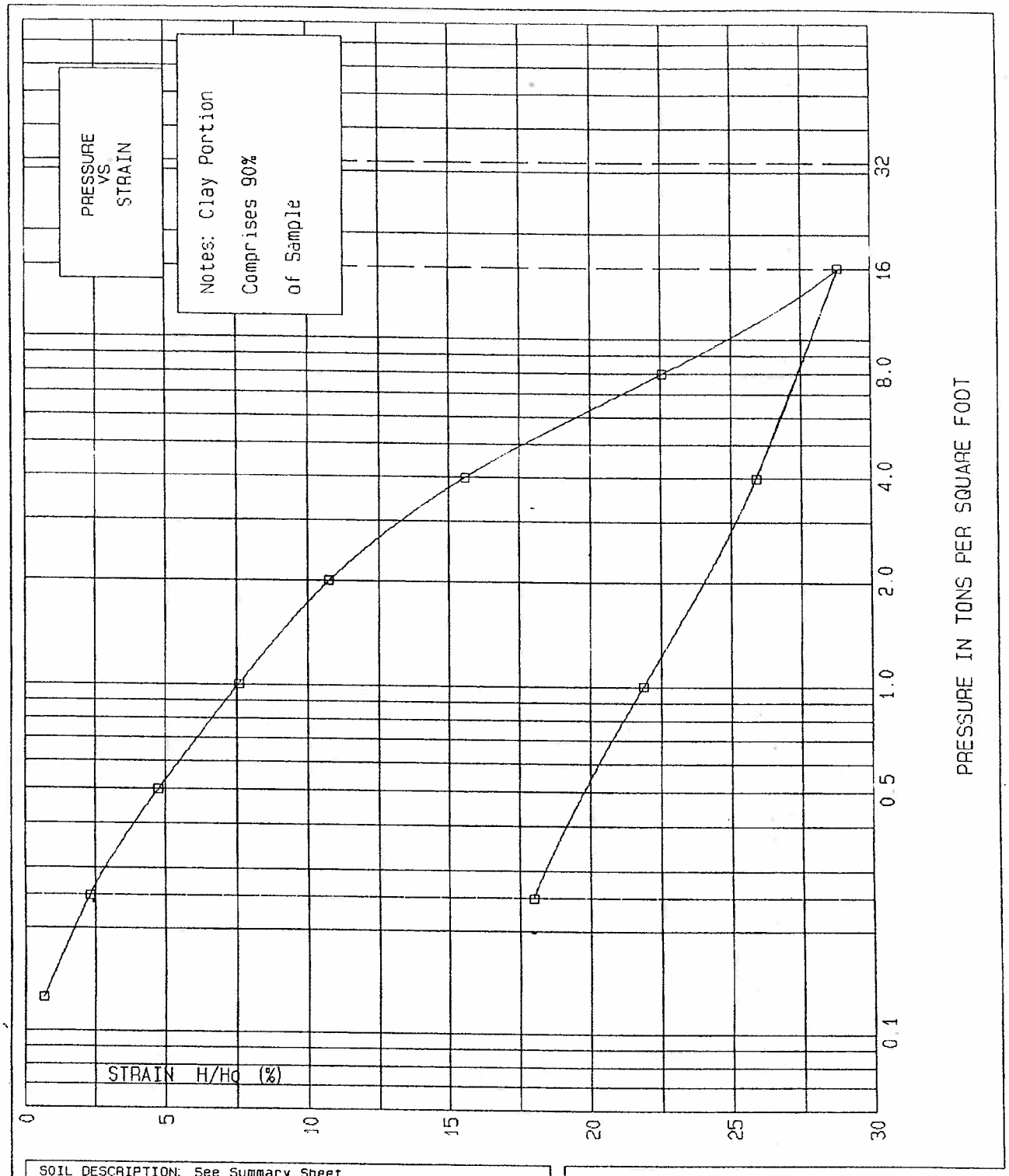
LABORATORY TESTING DATA SHEET

Project Name: NEW BRITAIN-HARTFORD BUSWAY CONNECTICUT
Project No.: L17828
Project Engineer: D. SCHULZE
Assigned By: D. Gaffney
Date: Feb.03
Reviewed By: Don Schulze
Date Reviewed: 2/24/04

Boring/ Test Pit No.	Sample No.	Depth ft.	Lab No.	Identification Tests: Water Content %	LL %	PL %	Sieve -200 %	Hyd -2μ %	ORG %	G_s	Dry unit wt. pcf	Density: γ_d MAX (pcf) W_{opt} (%)	Permeability cm/sec	Strength Tests: Torvane or Type Test	$\bar{\sigma}_c$ psf	Failure Criteria	$\sigma_1 - \sigma_3$ or τ psf	Strain %	Consol.: $\frac{C_c}{1+e_0}$	Laboratory Log and Soil Description
SB-58	UP-1	80.0-82.0	402		Average Total Unit Weight (80.0-80.5') = 90.3 Pcf															Red-brown Varved Soil as follows:
		80.1		65.1	(Clay Portion)									Tv= 0.22 tsf						Fat Clay (CH) grading to Silt (ML)
		80.3		38.8	(Silt Portion)									Tv= 0.20 tsf						
		80.3-80.4		67.0							61.4								0.22	Varve thickness varies from 0.5-1.5" Clay portion varies from 0.25-.5" in thickness and comprises approx. 25-50% of total varve
		80.4		44.5	(entire varve)															
		80.0-80.5*			53	25														
		80.0-80.5*					97	74												* Note: Hydrometer, Specific Gravity, and Atterberg Limit samples taken from clay layers throughout the tube sample
		80.0-80.5*								2.79										

GZA GeoEnvironmental, Inc.
Q:\NEWTON\LAB\LABFORM7.XLS

labform1.xls



SOIL DESCRIPTION: See Summary Sheet

SAMPLE DIAM	2.5 IN.	LIQUID LIMIT	0 %	PLASTIC LIMIT	0 %	SPECIFIC GRAVITY	2.79

	WATER CONTENT, %	DRY UNIT WEIGHT, pcf	VOID RATIO	SATURATION, %	SAMPLE HEIGHT, INCH
INITIAL	67.00	61.41			0.80
FINAL	49.10	74.89			0.66

New Britain-Hartford Busway

CONSOLIDATION TEST

BORING NO.	SB-58	TEST SERIES NO.	C402.1
SAMPLE	UP-1	DATE	2/23/04
DEPTH	80.3-80.4'		
TECH	MST		
REVIEWER	DAS	FILE	L17828

FIGURE

GZA GEOENVIRONMENTAL, INC
ENGINEERS AND SCIENTISTS

Job Number L17828
Project Name ..... New Britain-Hartford Busway
Test Number C402.1
Sample Description .. See Summary Sheet
Boring Number SB-58
Sample Number UP-1
Depth ..... 80.3-80.4'

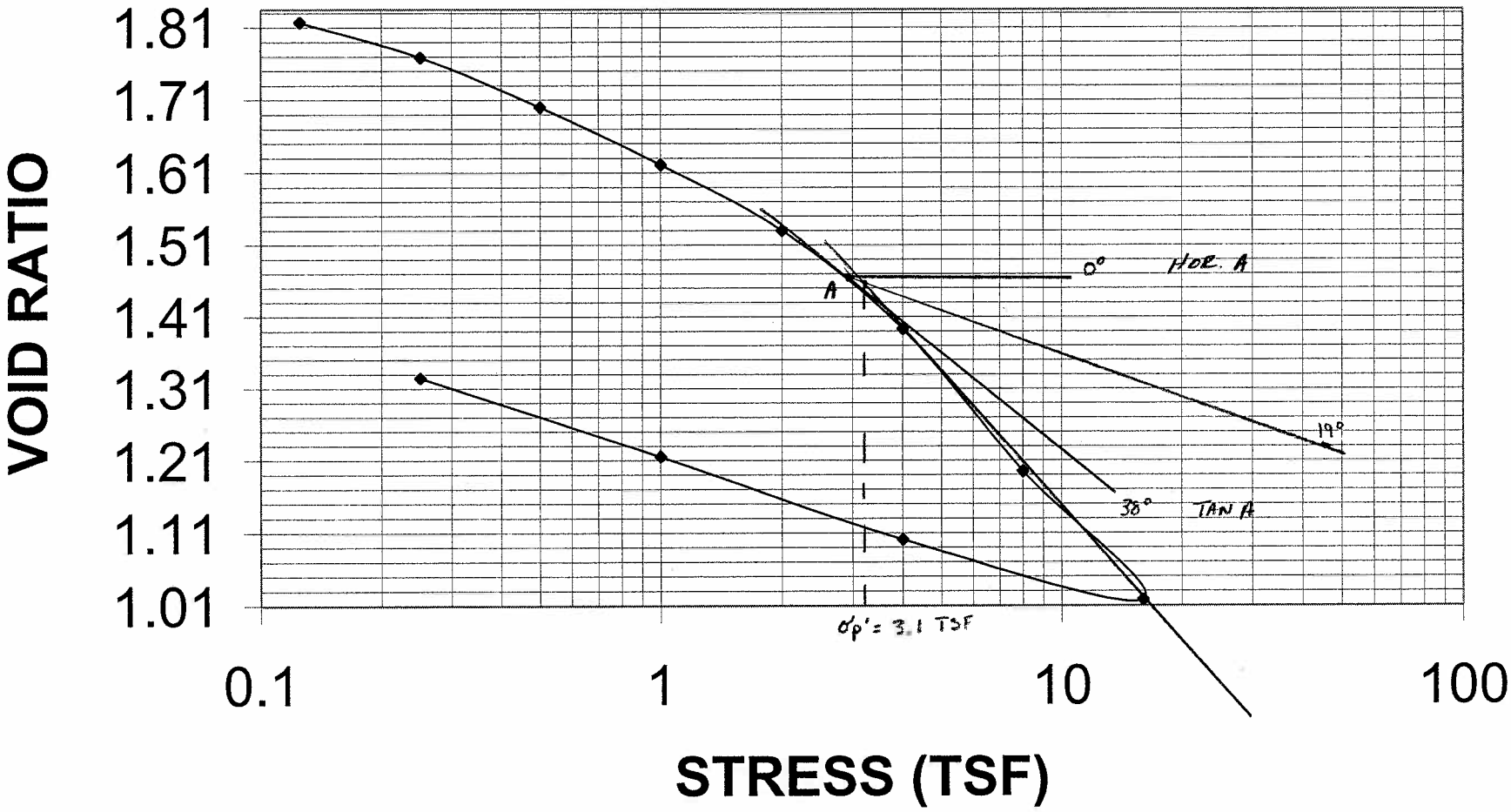
Technician ..... MST
Reviewer ..... DAS

NOTES: Clay Portion
Comprises 90%
of Sample

Specific Gravity ..... 2.7900E+00
Sample Dry Weight ..... 6.3300E+01
Sample Diameter ..... 2.5000E+00
Initial Void Ratio ..... 0.0000E+00
Initial Sample Height 8.0000E-01
Final Sample Height 6.5600E-01
Initial Water Content .... 6.7000E+01
Final Water Content ..... 4.9100E+01
Liquid Limit ..... 0.0000E+00
Plastic Limit ..... 0.0000E+00
Initial Saturation ..... 0.0000E+00
Final Saturation ..... 0.0000E+00
T50 data excluded
T90 data included

Increment umber	Pressure (TSF)	Final Dial	Percent Strain	Void Ratio	T90 (min)	Cv (T90) (/10000)	C_α
1	0.000	0.0	0.00	1.835			
2	0.125	51.0	0.64	1.817			
3	0.250	186.0	2.32	1.769	32.5	4.36	
4	0.500	381.0	4.76	1.700	25.0	5.43	0.0031
5	1.000	605.0	7.56	1.621	17.6	7.30	0.0031
6	2.000	860.0	10.75	1.530	13.7	8.79	
7	4.000	1247.0	15.59	1.393	15.2	7.24	
8	8.000	1805.0	22.56	1.195	25.0	3.82	0.0050
9	16.000	2307.0	28.84	1.018	12.2	6.60	
10	4.000	2071.0	25.89	1.101			
11	1.000	1750.0	21.87	1.215			
12	0.250	1438.0	17.97	1.325			

SB-58 Consolidation



LABORATORY TESTING DATA SHEET

Project Name: NEW BRITAIN-HARTFORD BUSWAY CONNECTICUT
Project No.: L17828 | Assigned By: D. Gaffney | Reviewed By: Don Schulze
Project Engineer: D. SCHULZE | Date: Nov.03 | Date Reviewed: 11/24/03

Boring/ Test Pit No.	Sample No.	Depth ft.	Lab No.	Identification Tests: Water Content %	LL %	PL %	Sieve -200 %	Hyd -2μ %	ORG %	G_s	Dry unit wt. pcf	Density: γ_d MAX (pcf) W_{opt} (%)	Permeability cm/sec	Strength Tests: Torvane or Type Test	$\bar{\sigma}_c$ psf	Failure Criteria	$\sigma_1 - \sigma_3$ or τ psf	Strain %	Consol.: $\frac{G_s}{1+e_0}$	Laboratory Log and Soil Description
SB-62	UP-1	60-62	391		Average Total Unit Weight (60.0-61.9') = 108.53 Pcf															Brown Varved Soil as follows:
		60.3		66.4	(Clay Portion)									Tv= 0.25 tsf						Fat Clay (CH) grading to Silt (ML)
		60.4		40.7	(Silt Portion)															
		60.5 60.7		49.0	(entire varve)															Varve thickness varies from 0.5-2.5" Clay portion varies from 0.125-1.0"
		60.8 60.9		71.0							59.4								0.26	in thickness and comprises approx. 25-40% of total varve
		61.1		69.8	74	29														
		61.2		34.9	32	31														
		61.3					100	90		2.84										
		61.4					100	12												

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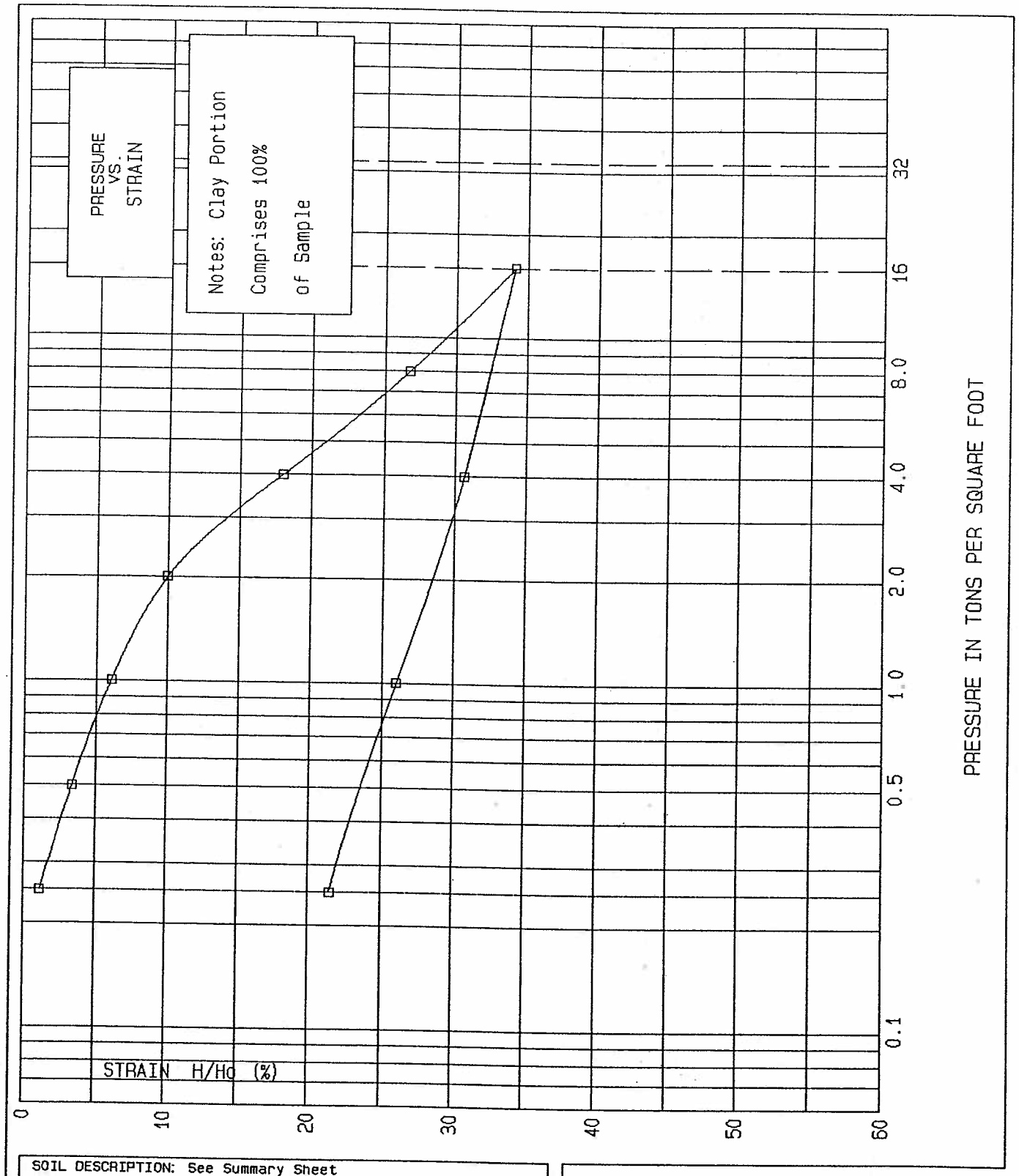
labform1.xls



SOIL DESCRIPTION: See Summary Sheet

SAMPLE DIAM. 2.5 IN.	LIQUID LIMIT 0 %	PLASTIC LIMIT 0 %	SPECIFIC GRAVITY 2.84

	WATER CONTENT, %	DRY UNIT WEIGHT, pcf	VOID RATIO	SATURATION, %	SAMPLE HEIGHT, INCH
INITIAL	71.00	59.37			0.80
FINAL	51.00	76.24			0.62

NEW BRITAIN-HARTFORD BUSWAY

CONSOLIDATION TEST

BORING NO.	SB-62	TEST SERIES NO.	391.1
SAMPLE	UP-1	DATE	11/20/03
DEPTH	60.8-60.9'		
TECH.	MST		
REVIEWER	DAS	FILE	L17828

FIGURE

GZA GEOENVIRONMENTAL, INC.
ENGINEERS AND SCIENTISTS

'ob Number L17828
'roject Name ..... NEW BRITAIN-HARTFORD BUSWAY
'est Number 391.1
'mple Description .. See Summary Sheet
ing Number SB-62
ample Number UP-1
'epth ..... 60.8-60.9'

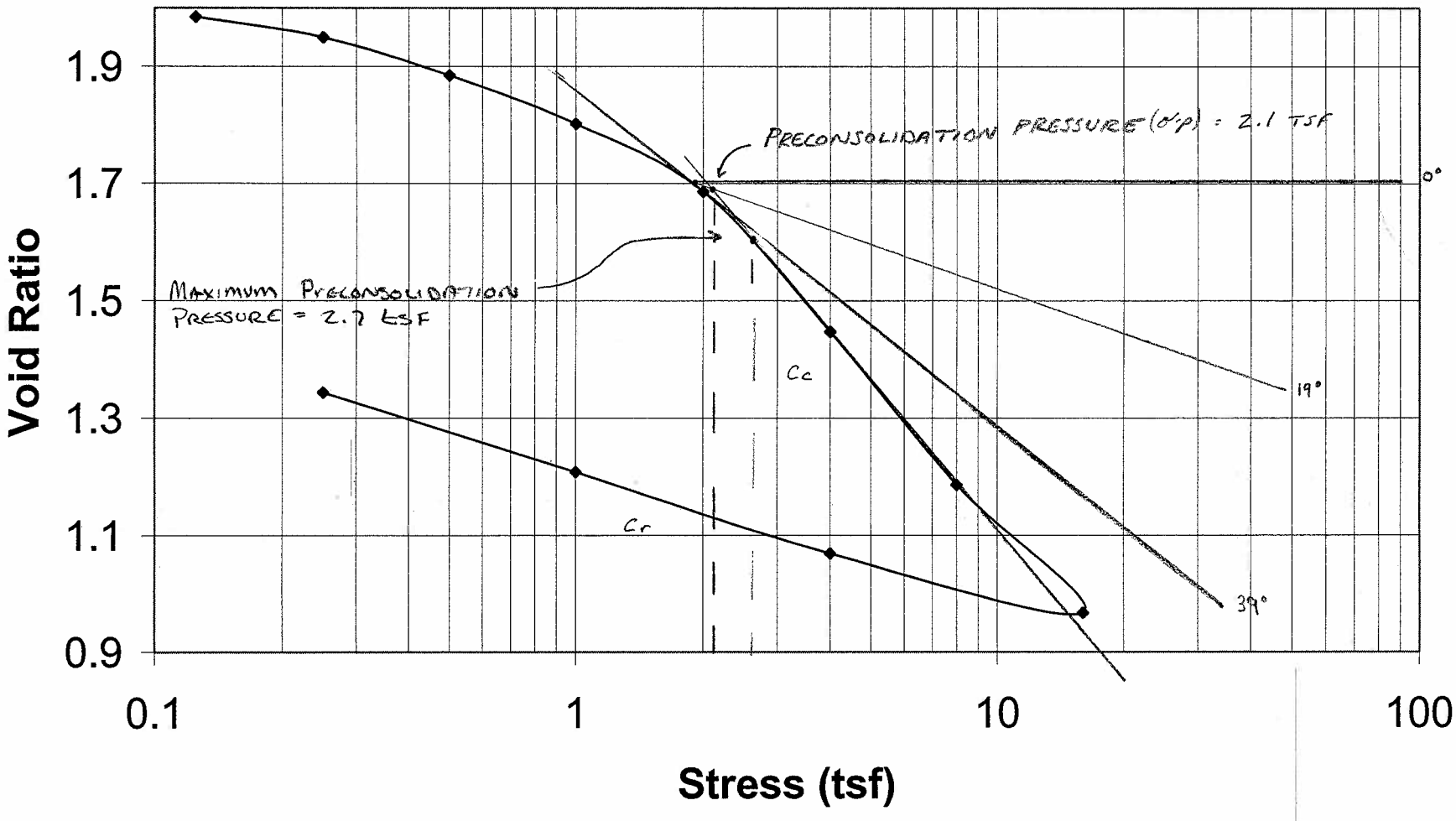
'echnician ..... MST
eviewer ..... DAS

OTES: Clay Portion
omprises 100%
f Sample

pecific Gravity ..... 2.8400E+00
ample Dry Weight ..... 6.1200E+01
ample Diameter ..... 2.5000E+00
nitial Void Ratio ..... 0.0000E+00
nitial Sample Height 8.0000E-01
inal Sample Height 6.2300E-01
nitial Water Content .... 7.1000E+01
inal Water Content ..... 5.1000E+01
iquid Limit ..... 0.0000E+00
lastic Limit ..... 0.0000E+00
nitial Saturation ..... 0.0000E+00
inal Saturation ..... 0.0000E+00
50 data excluded
90 data included

Increment nber	Pressure (TSF)	Final Dial	Percent Strain	Void Ratio	T90 (min)	Cv (T90) (/10000) cm²/sec	C_α
1	0.125	49.0	0.00	1.985			
2	0.250	142.0	1.16	1.950	12.3	11.72	
3	0.500	318.0	3.36	1.885	28.0	4.98	0.0023
4	1.000	538.0	6.11	1.802	17.6	7.52	0.0023
5	2.000	849.0	10.00	1.686	20.3	6.08	
6	4.000	1490.0	18.01	1.447	34.8	3.10	0.010
7	8.000	2190.0	26.76	1.186	25.0	3.52	0.0063
8	16.000	2778.0	34.11	0.967	14.4	4.90	
9	4.000	2503.0	30.67	1.069			
10	1.000	2131.0	26.02	1.208			
11	0.250	1766.0	21.46	1.344			

Consolidation SB-62

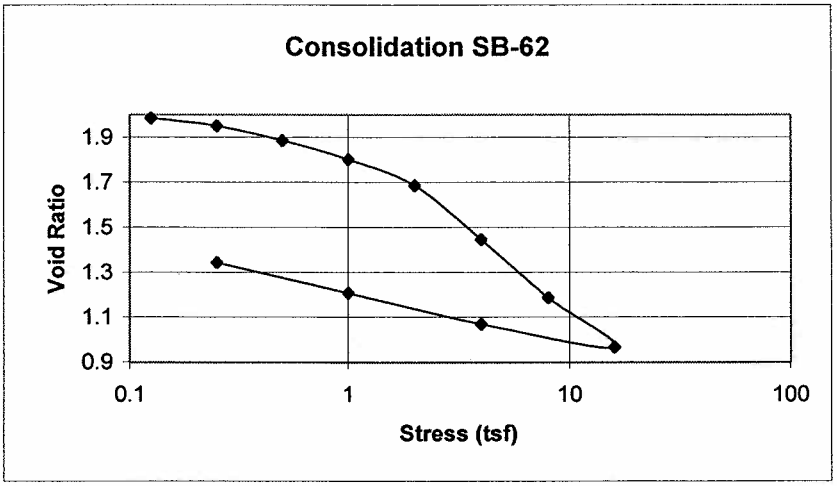


174

Hartford Busway

Consolidation data for SB-62, UP-1

Stress (tsf)	Void Ratio
0.125	1.985
0.25	1.95
0.5	1.885
1	1.802
2	1.686
4	1.447
8	1.186
16	0.967
4	1.069
1	1.208
0.25	1.344



LABORATORY TESTING DATA SHEET

Project Name: NEW BRITAIN-HARTFORD BUSWAY CONNECTICUT
Project No.: L17828
Project Engineer: D. SCHULZE
Assigned By: D. Gaffney
Date: Feb.04
Reviewed By: [signature]
Date Reviewed: 3/24/04

Boring/ Test Pit No.	Sample No.	Depth ft.	Lab No.	Identification Tests: Water Content %	LL %	PL %	Sieve -200 %	Hyd -2μ %	ORG %	G_s	Dry unit wt. pcf	Density: γ_d MAX (pcf) W_{opt} (%)	Perme-ability cm/sec	Strength Tests: Torvane or Type Test	σ_c psf	Failure Criteria	$\sigma_1 - \sigma_3$ or τ psf	Strain %	Consol. $\frac{C_c}{1+e_0}$	Laboratory Log and Soil Description
SB-67	ST-1	70.0-72.0	403		Average Total Unit Weight (70.0-72.0') = 110.5 Pcf															Upper 4.5" of sample appeared to be disturbed
		70.4		64.1	(Clay Portion)									Tv= 0.25 tsf						
		70.5-70.8		48.1							74.2			CIU	7200	P/A MAX	5360	15.4		Brown Varved Soil as follows: Fat Clay (CH) grading to Silt (ML)
		70.9		66.7	(Clay Portion)									Tv= 0.27 tsf						
		70.9-71.3		47.0							76.4			CIU	10800	P/A MAX	5779	15.5		Varve thickness varies from 2.0-4.0" Clay portion varies from 0.75-1.00" in thickness and comprises approx. 25-50% of total varve
		71.3		76.8	(Clay Portion)									Tv= 0.24 tsf						
		71.3-71.4		64.7							64.4								0.27	
		71.5-71.8		43.9							77.6			CIU	14400	P/A MAX	10256	15.6		
		71.8-71.9		43.1	(Entire Varve)															
		71.9		39.0	(Silt Portion)															
		70.0-72.0		67.8	70	32	100	78		2.76	(Clay Portion)									Note: Specific gravity, limits and sieve/hydrometer run on clay portion

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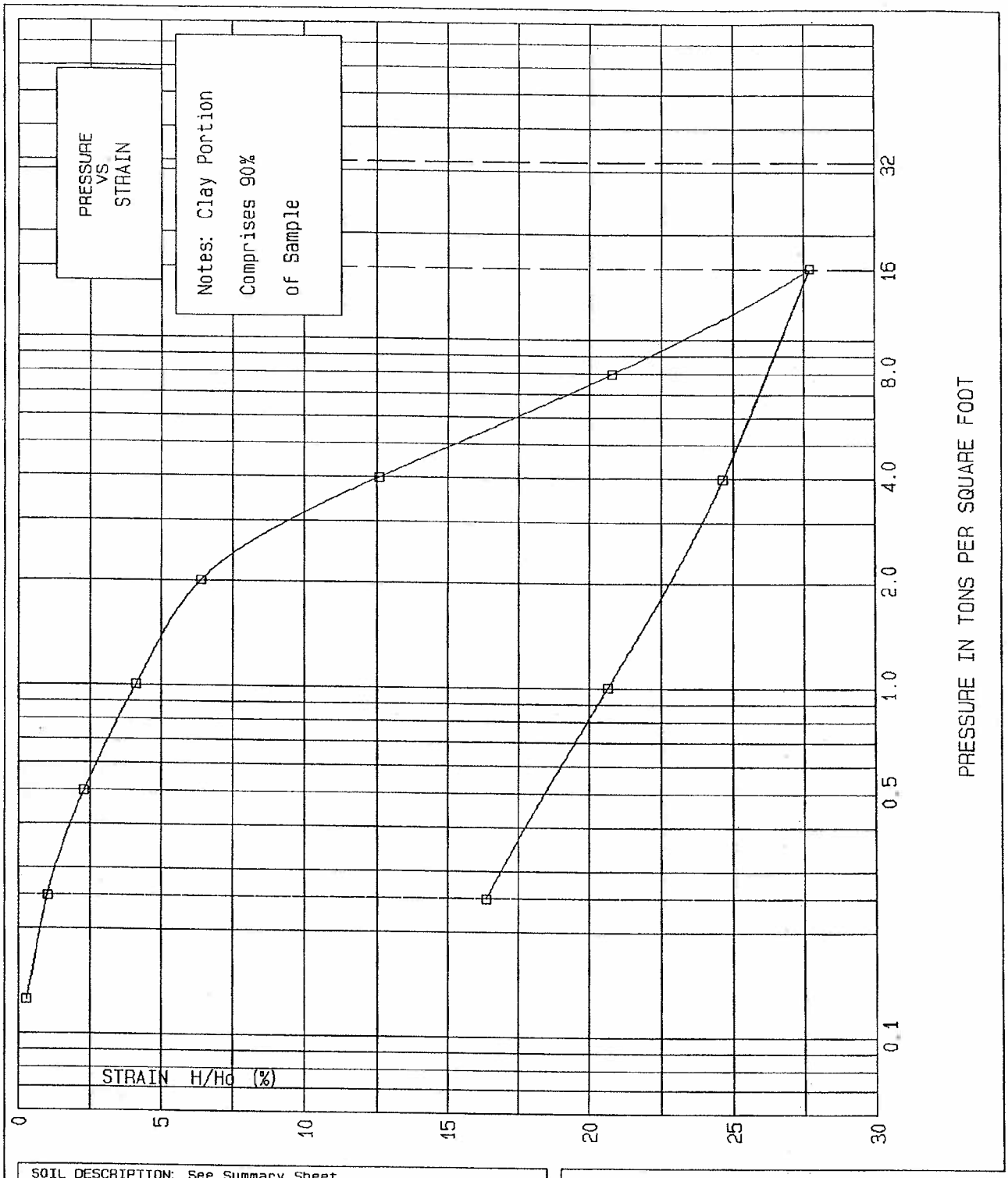
labform1.xls



SOIL DESCRIPTION: See Summary Sheet

SAMPLE DIAM	2.5 IN.	LIQUID LIMIT	0 %	PLASTIC LIMIT	0 %	SPECIFIC GRAVITY	2.76

	WATER CONTENT, %	DRY UNIT WEIGHT, pcf	VOID RATIO	SATURATION, %	SAMPLE HEIGHT, INCH
INITIAL	64.70	64.41			0.80
FINAL	48.10	77.03			0.67

New Britain-Hartford Busway

CONSOLIDATION TEST

BORING NO.	SB-67	TEST SERIES NO.	C403
SAMPLE	ST-1	DATE	3/24/04
DEPTH	71.3-71.4		
TECH.	MST		
REVIEWER	DAS	FILE	L17828

FIGURE

GZA GEOENVIRONMENTAL, INC.
ENGINEERS AND SCIENTISTS

Job Number L17828
Project Name ..... New Britain-Hartford Busway
Test Number C403
Sample Description .. See Summary Sheet
Boring Number SB-67
Sample Number ST-1
Depth ..... 71.3-71.4'

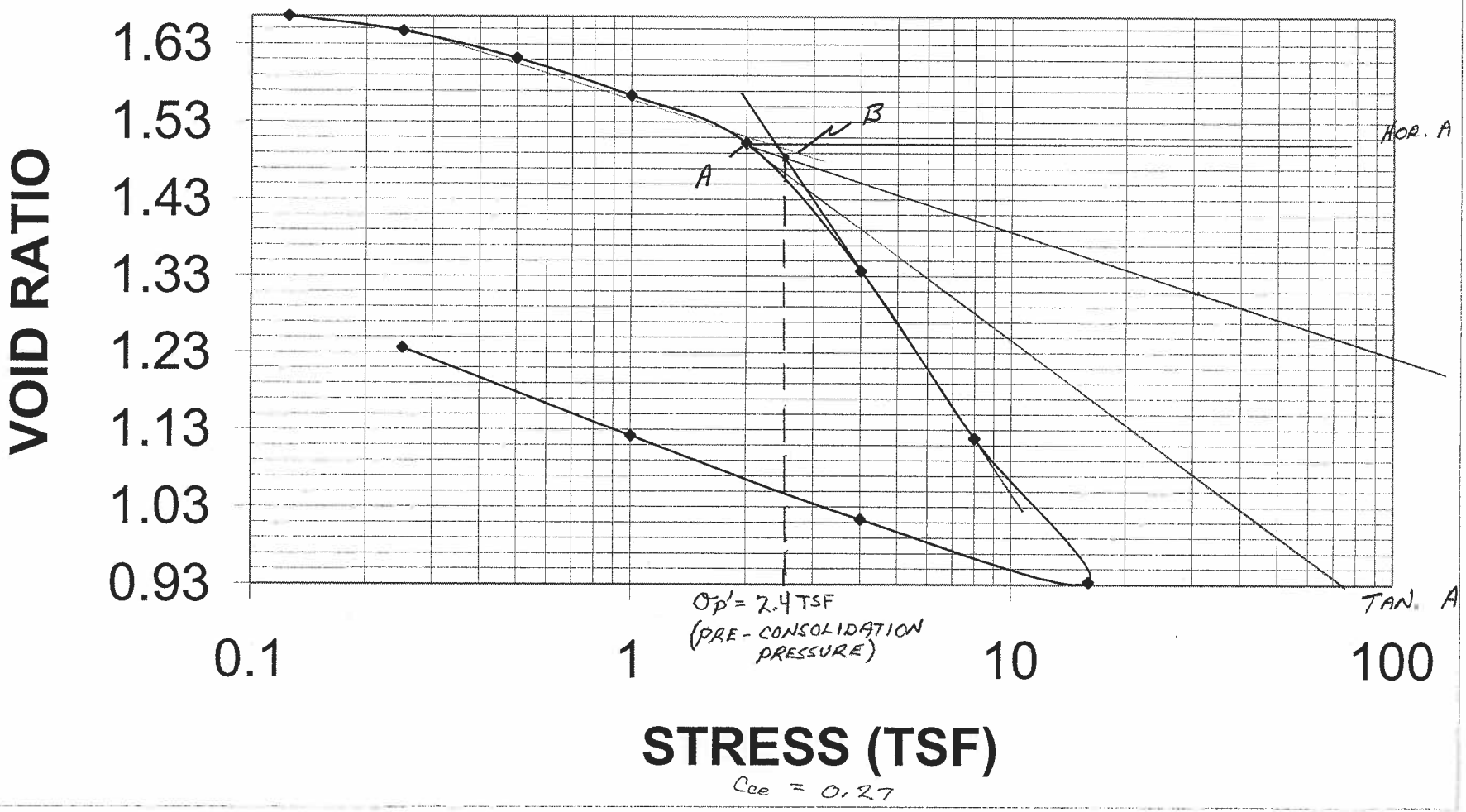
Technician ..... MST
Reviewer ..... DAS

NOTES: Clay Portion
Comprises 90%
of Sample

Specific Gravity ..... 2.7600E+00
Sample Dry Weight ..... 6.6400E+01
Sample Diameter ..... 2.5000E+00
Initial Void Ratio ..... 0.0000E+00
Initial Sample Height 8.0000E-01
Final Sample Height 6.6900E-01
Initial Water Content .... 6.4700E+01
Final Water Content ..... 4.8100E+01
Liquid Limit ..... 0.0000E+00
Plastic Limit ..... 0.0000E+00
Initial Saturation ..... 0.0000E+00
Final Saturation ..... 0.0000E+00
T50 data excluded
T90 data included

Increment umber	Pressure (TSF)	Final Dial	Percent Strain	Void Ratio	T90 (min)	Cv (T90) (/10000)	C_α
1	0.000	0.0	0.00	1.674			
2	0.125	23.0	0.29	1.666			
3	0.250	80.0	1.00	1.647	6.3	22.86	
4	0.500	184.0	2.30	1.612	12.3	11.47	0.0015
5	1.000	329.0	4.11	1.564	7.3	18.72	
6	2.000	511.0	6.39	1.503	7.8	16.79	
7	4.000	1008.0	12.60	1.337	12.3	9.72	
8	8.000	1661.0	20.76	1.119	14.4	7.03	0.0073
9	16.000	2216.0	27.70	0.933	7.3	11.47	
10	4.000	1973.0	24.66	1.014			
11	1.000	1651.0	20.64	1.122			
12	0.250	1310.0	16.37	1.236			

SB-67 Consolidation



Cce = 0.27

LABORATORY TESTING DATA SHEET

Project Name: NEW BRITAIN-HARTFORD BUSWAY CONNECTICUT
Project No.: L17828
Project Engineer: D. SCHULZE
Assigned By: D. Gaffney
Date: Mar.04
Reviewed By: [signature]
Date Reviewed: 3/18/04

Boring/ Test Pit No.	Sample No.	Depth ft.	Lab No.	Identification Tests: Water Content %	LL %	PL %	Sieve -200 %	Hyd -2μ %	ORG %	G_s	Dry unit wt. pcf	Density: γ_d MAX (pcf) / W_{opt} (%)	Perme-ability cm/sec	Strength Tests: Torvane or Type Test	σ_c psf	Failure Criteria	$\sigma_1 - \sigma_3$ or τ psf	Strain %	Consol.: $\frac{C_c}{1+e_0}$	Laboratory Log and Soil Description
SB-70	UP-1	50.0-52.0	404		Average Total Unit Weight (50.0-52.0') = 106.6 Pcf															Brown Varved Soil as follows:
		50.1		71.5	(Clay Portion)									Tv= 0.28 tsf						Fat Clay (CH) grading to Silt (ML)
		50.2-50.5		61.3							64.7			CIU	7200	P/A MAX	3211	2.6		
		50.5-50.9		57.1							67.1			CIU	10800	P/A MAX	4813	4.7		Varve thickness varies from 0.375-1.0"
		50.9		70.4	(Clay Portion)									Tv= 0.30 tsf						Clay portion varies from 0.25-1" in thickness and comprises approx. 70-90% of total varve
		51.1-51.2		59.6							66.6								0.23	
		51.4-51.8		57.6							67.1			CIU	14400	P/A MAX	6756	5.3		
		51.8		71.6	(Clay Portion)									Tv= 0.30 tsf						
		50.0-52.0		67.4	63	30	100	74		2.86	(Clay Portion)									Note: Specific gravity, limits and sieve/hydrometer run on clay portion

GZA GeoEnvironmental, Inc.

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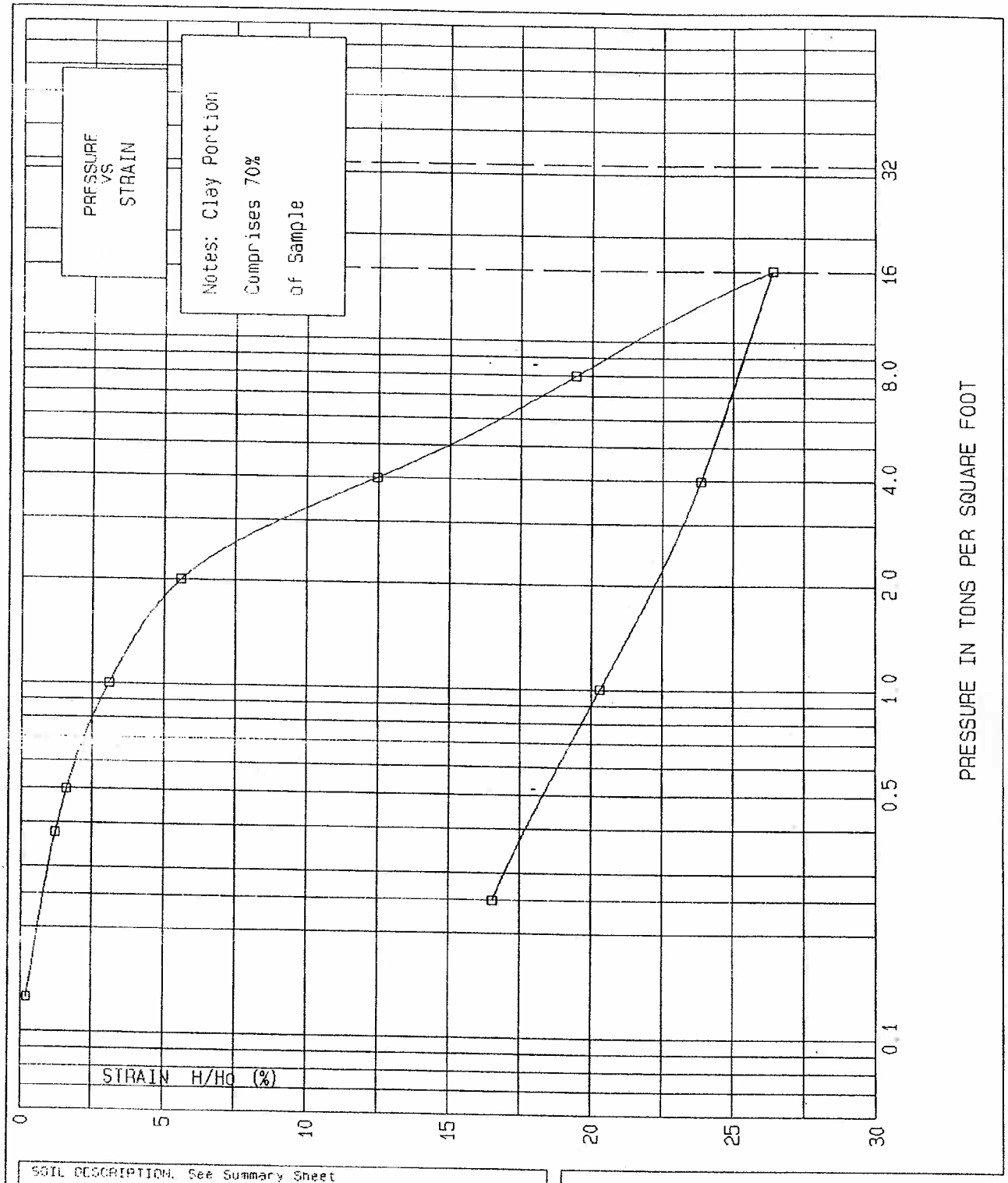
labform1.xls



SOIL DESCRIPTION. See Summary Sheet

SAMPLE DIAM. 2.5 IN.	LIQUID LIMIT 63 %	PLASTIC LIMIT 30 %	SPECIFIC GRAVITY 2.86 -

	WATER CONTENT, %	DRY UNIT WEIGHT, pcf	VOID RATIO	SATURATION, %	SAMPLE HEIGHT, INCH
INITIAL	59 60	66 56			0 80
FINAL	44 90	79 71			0.67

New Britain-Hartford Busway

CONSOLIDATION TEST

BORING NO.	SB-70	TEST SERIES NO.	C404
SAMPLE	UP-1	DATE	3/18/04
DEPTH	51 1-51 2'		
TECH	MST		
REVIEWER	DAS	FILE	L17828

FIGURE

GZA GEOENVIRONMENTAL, INC
ENGINEERS AND SCIENTISTS

Job Number L17828
Project Name ..... New Britain-Hartford Busway
Test Number C404
Sample Description .. See Summary Sheet
Boring Number SB-70
Sample Number UP-1
Depth ..... 51.1-51.2'

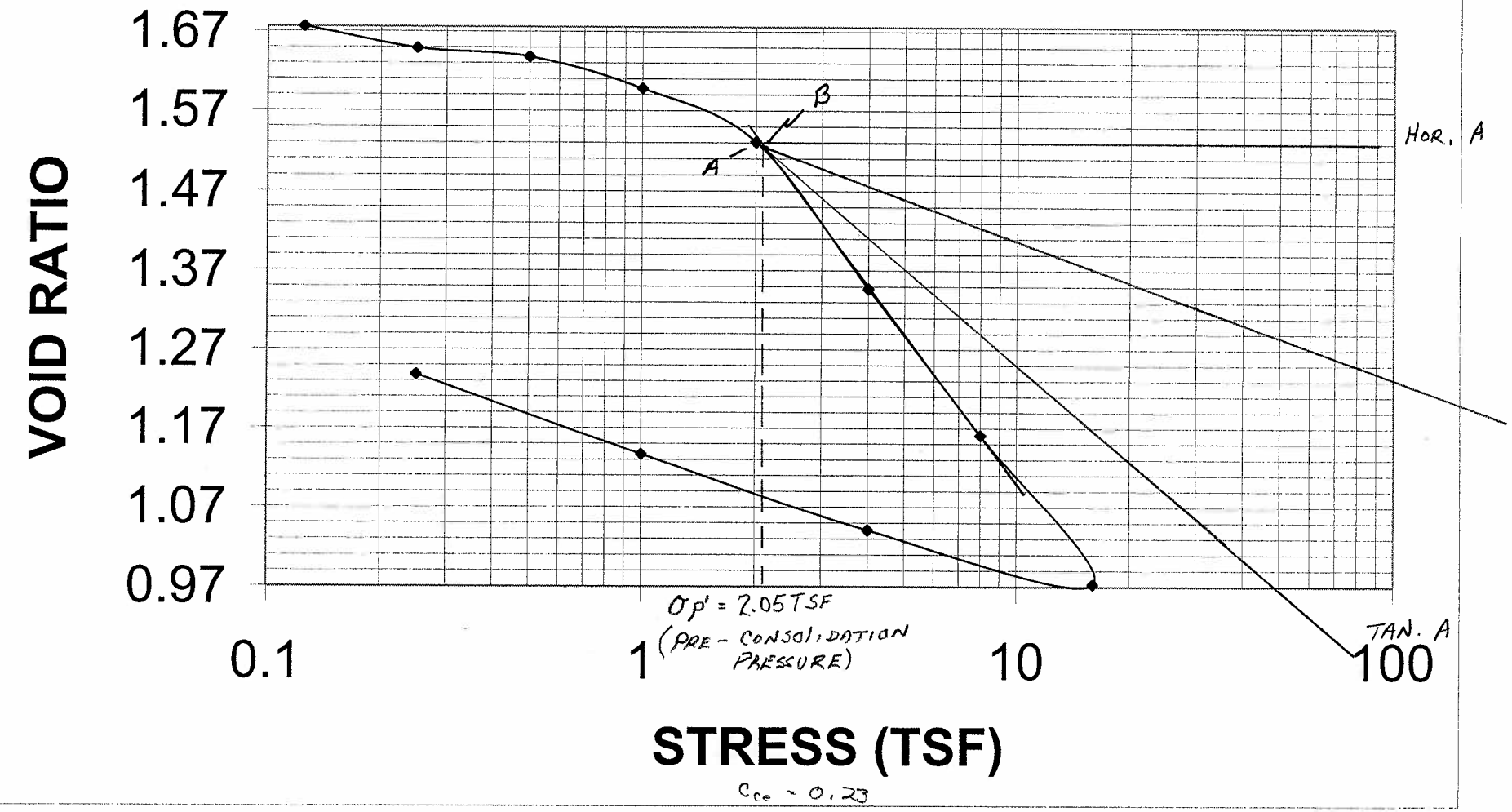
Technician ..... MST
Reviewer ..... DAS

NOTES: Clay Portion
Comprises 70%
of Sample

Specific Gravity ..... 2.8600E+00
Sample Dry Weight ..... 6.8610E+01
Sample Diameter ..... 2.5000E+00
Initial Void Ratio ..... 0.0000E+00
Initial Sample Height 8.0000E-01
Final Sample Height 6.6800E-01
Initial Water Content .... 5.9600E+01
Final Water Content ..... 4.4900E+01
Liquid Limit ..... 6.3000E+01
Plastic Limit ..... 3.0000E+01
Initial Saturation ..... 0.0000E+00
Final Saturation ..... 0.0000E+00
T50 data excluded
T90 data included

Increment umber	Pressure (TSF)	Final Dial	Percent Strain	Void Ratio	T90 (min)	Cv (T90) (/10000)	C_α
1	0.000	0.0	0.00	1.681			
2	0.125	15.0	0.19	1.676			
3	0.375	96.0	1.20	1.649	3.2	44.96	0.0008
4	0.500	128.0	1.60	1.638	3.2	44.32	
5	1.000	248.0	3.10	1.598	3.6	38.64	
6	2.000	447.0	5.59	1.531	4.0	33.37	
7	4.000	998.0	12.47	1.347	10.2	11.84	0.0088
8	8.000	1553.0	19.41	1.161	7.8	13.22	
9	16.000	2112.0	26.40	0.973	6.3	13.76	0.0038
10	4.000	1910.0	23.87	1.041			
11	1.000	1623.0	20.29	1.137			
12	0.250	1323.0	16.54	1.238			

SB-70 Consolidation



$C_{cc} \approx 0.23$

2008

Constant Rate of Strain Consolidation Tests

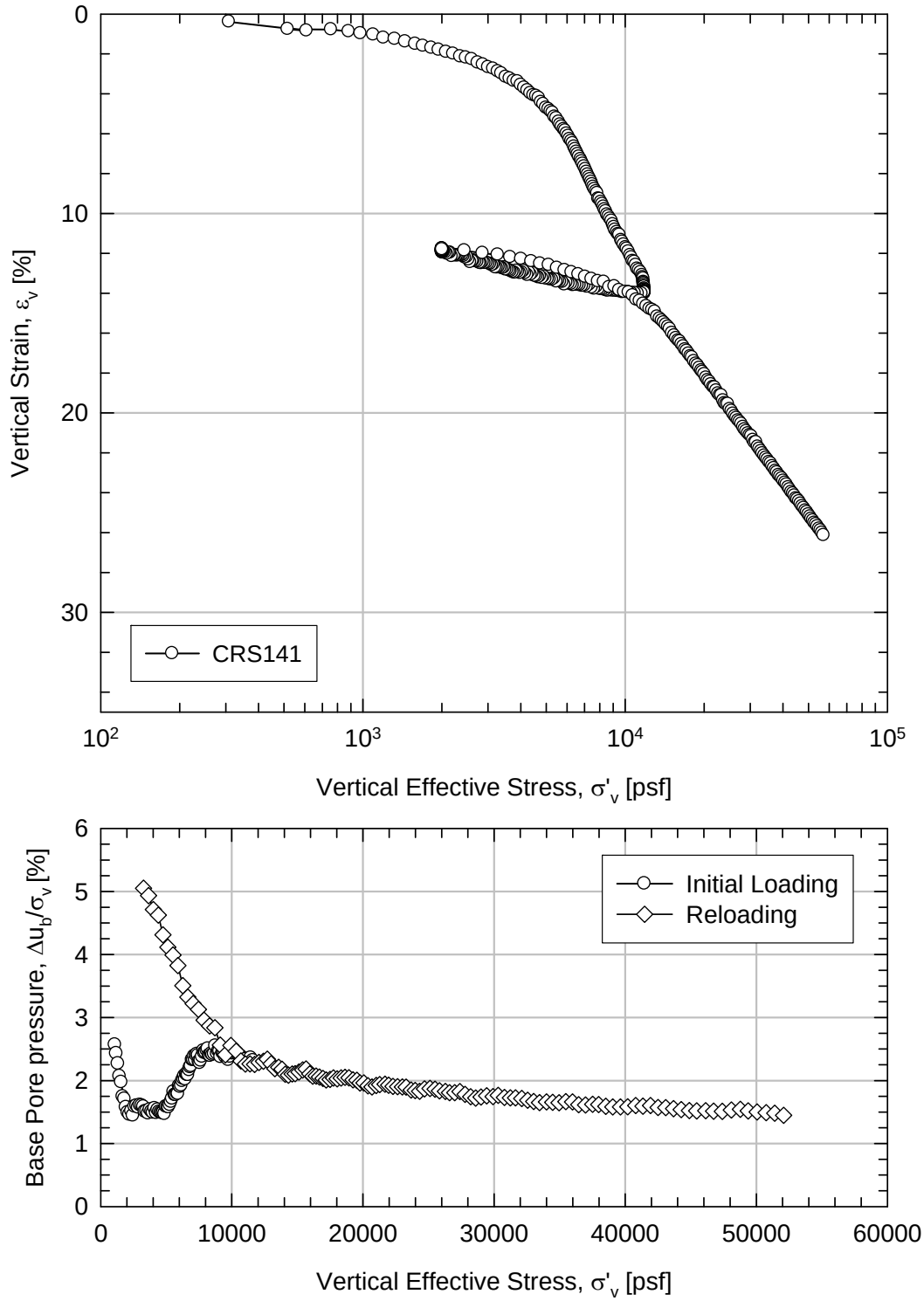


Figure 5.3.6 Vertical strain and normalized base pore pressure versus vertical effective stress for test CRS141 on sample SB-01-1 UP2 30-32 ft.

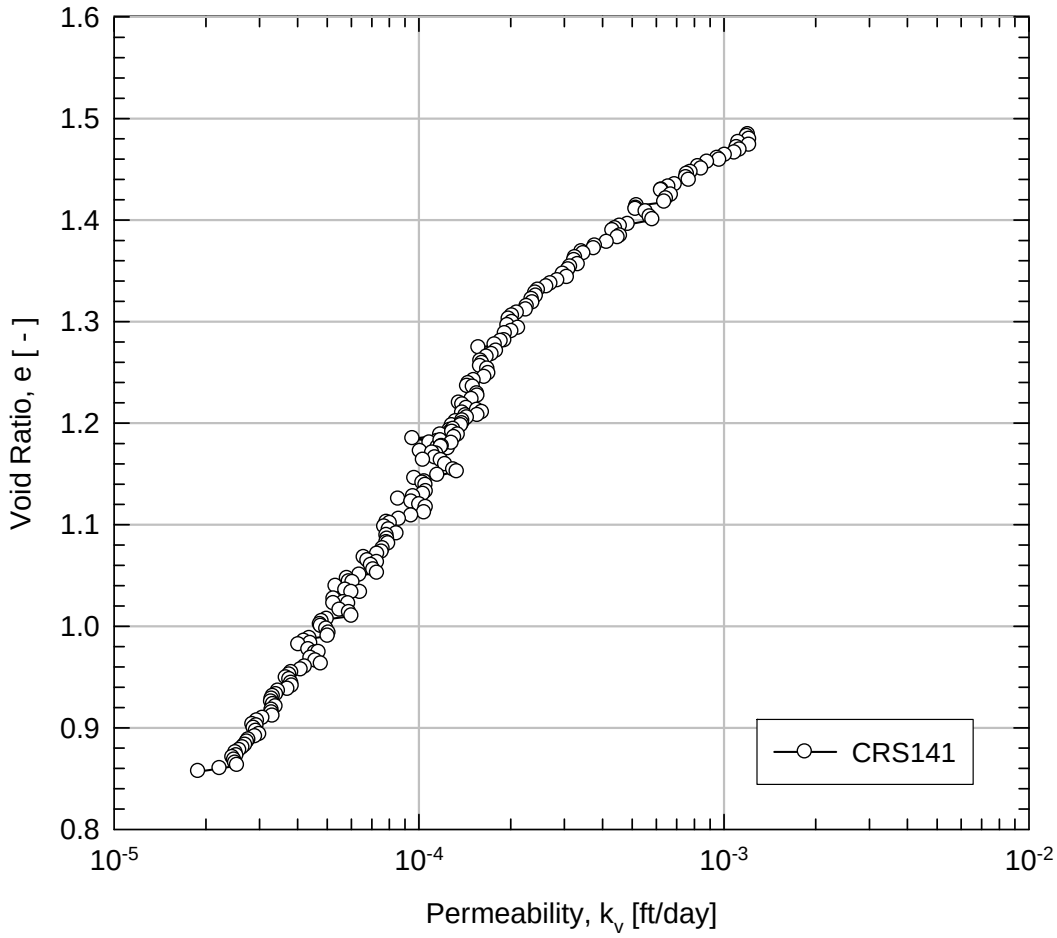
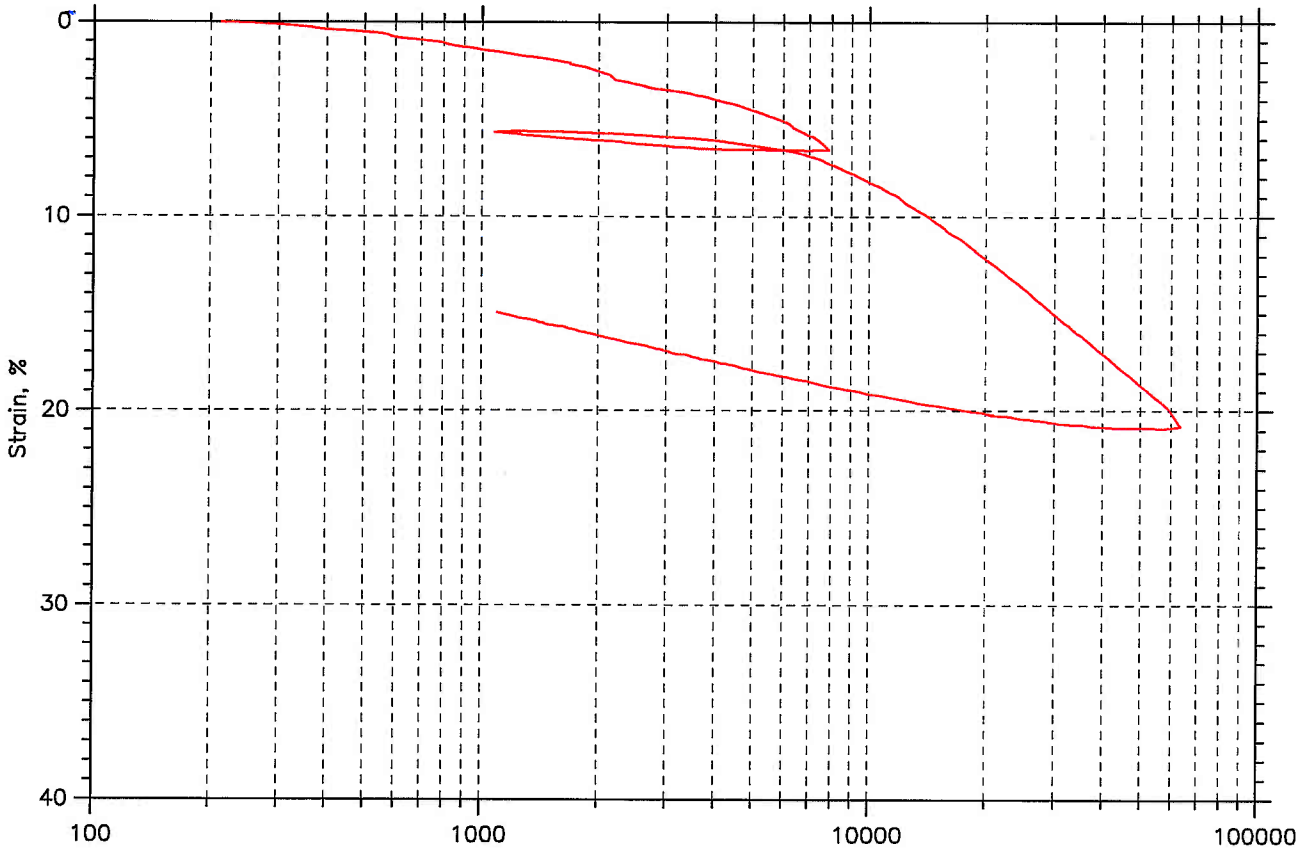


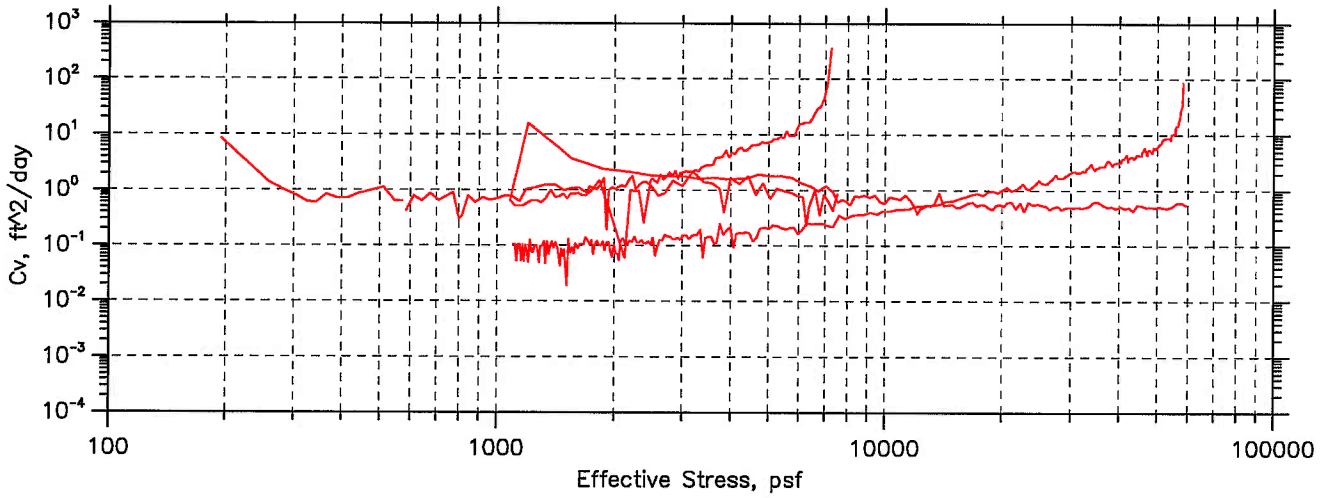
Figure 5.3.7 Void ratio versus permeability for CRS141 on sample SB-01-1 UP2 30-32 ft.

Constant Rate of Consolidation

Constant Strain Rate by ASTM D4186

Summary Report





Project: Hartford Busway	Location: Hartford, CT	Project No.: GTX-8398
Boring No.: SB-01-2	Tested By: md	Checked By: jdt
Sample No.: UP-1	Test Date: 08/10/08	Depth: 15-17
Test No.: CRC-3	Sample Type: tube	Elevation: ---
Description: Moist, brown clay		
Remarks: System K		

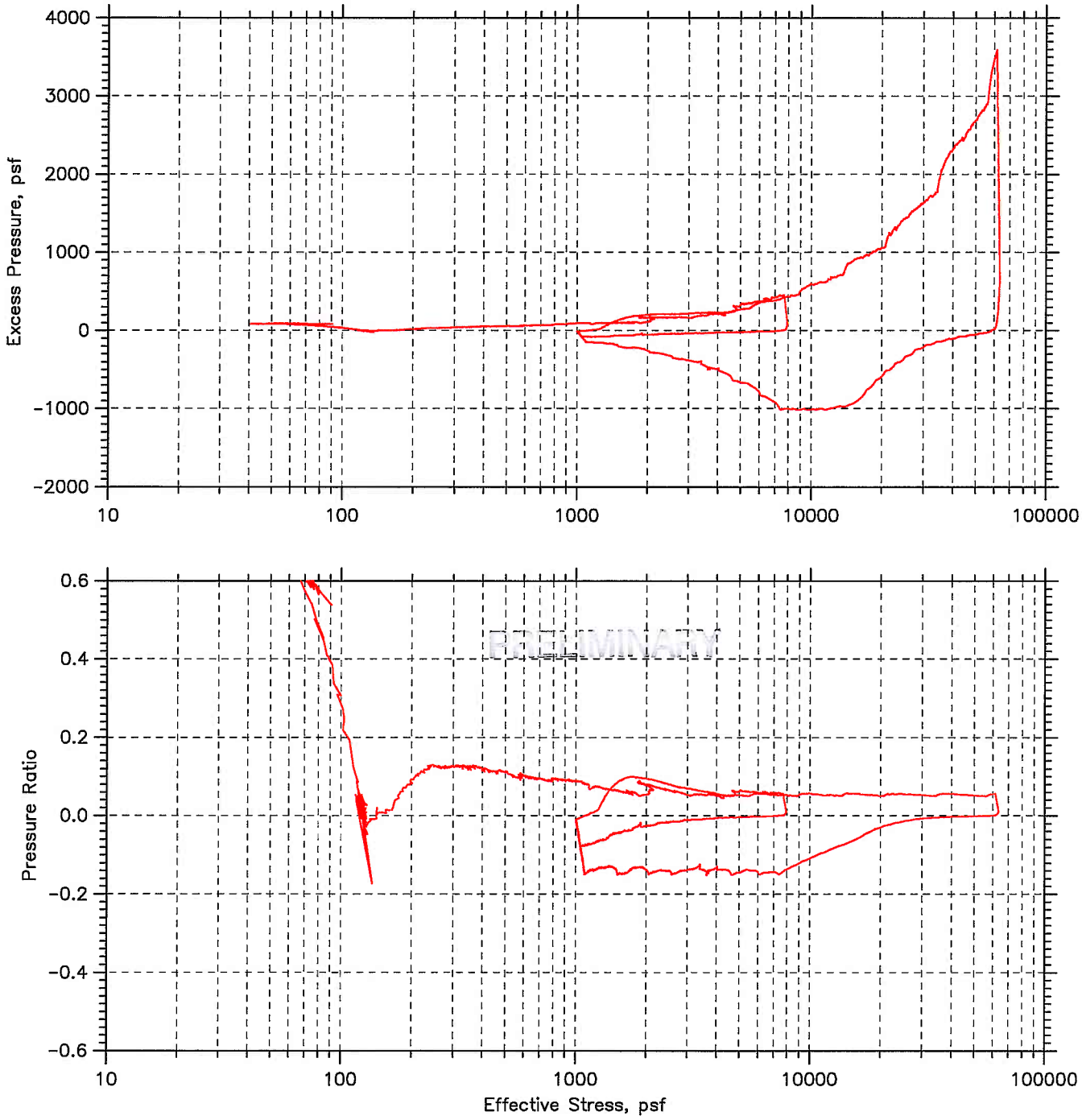
Tue, 26-AUG-2008 16:28:11

Constant Rate of Consolidation

Constant Strain Rate by ASTM D4186

Pressure Curves

PRELIMINARY



Project: Busway South	Location: Hartford, CT	Project No.: GTX-8398
Boring No.: SB-01-2	Tested By: md	Checked By: jdt
Sample No.: UP-1	Test Date: 08/10/08	Depth: 15-17
Test No.: CRC-3	Sample Type: tube	Elevation: ---
Description: Moist, brown clay		
Remarks: System K		

Tue, 19-AUG-2008 08:26:44

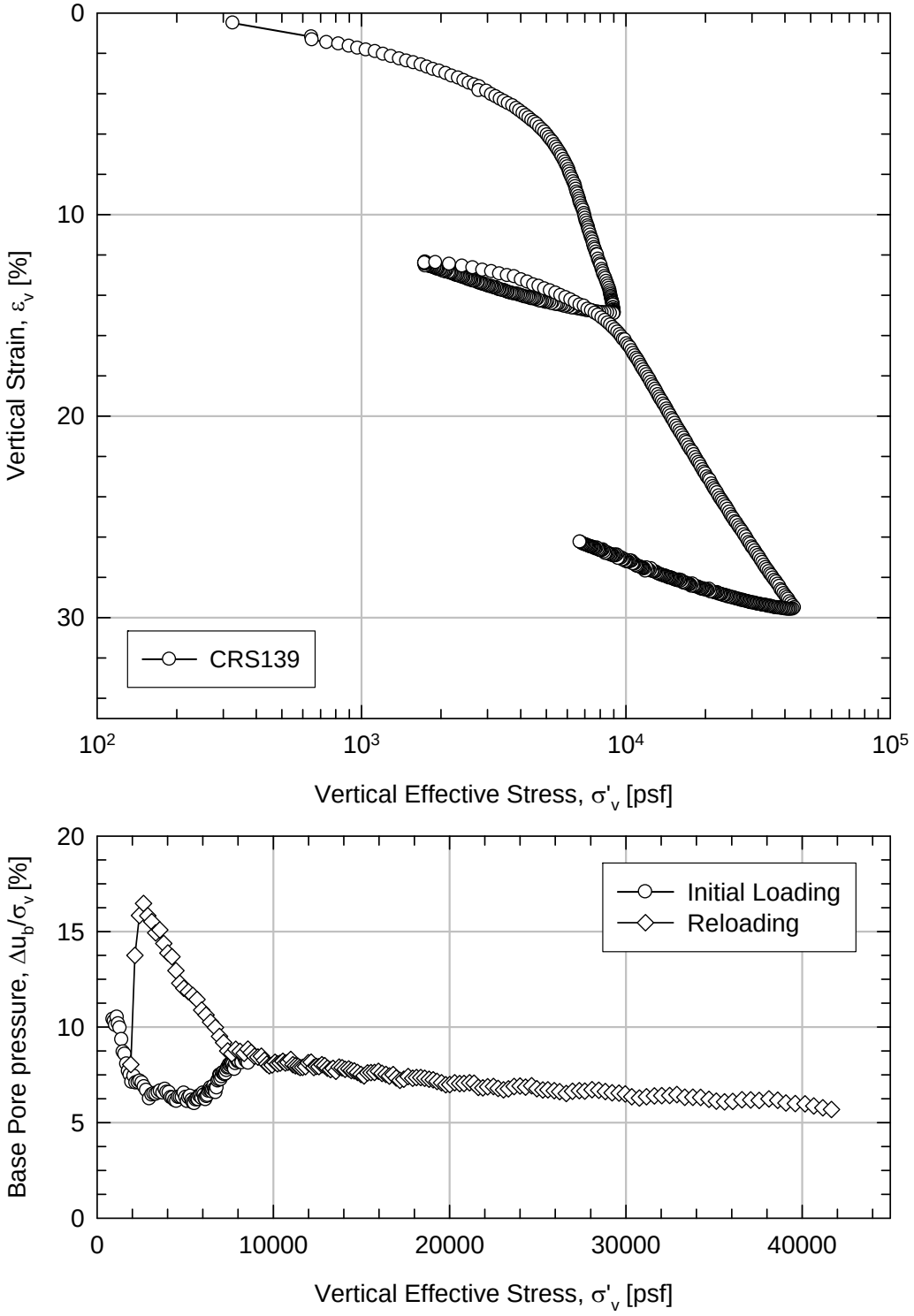


Figure 5.3.2 Vertical strain and normalized base pore pressure versus vertical effective stress for test CRS139 on sample SB-01-4 UP2 40-42 ft.

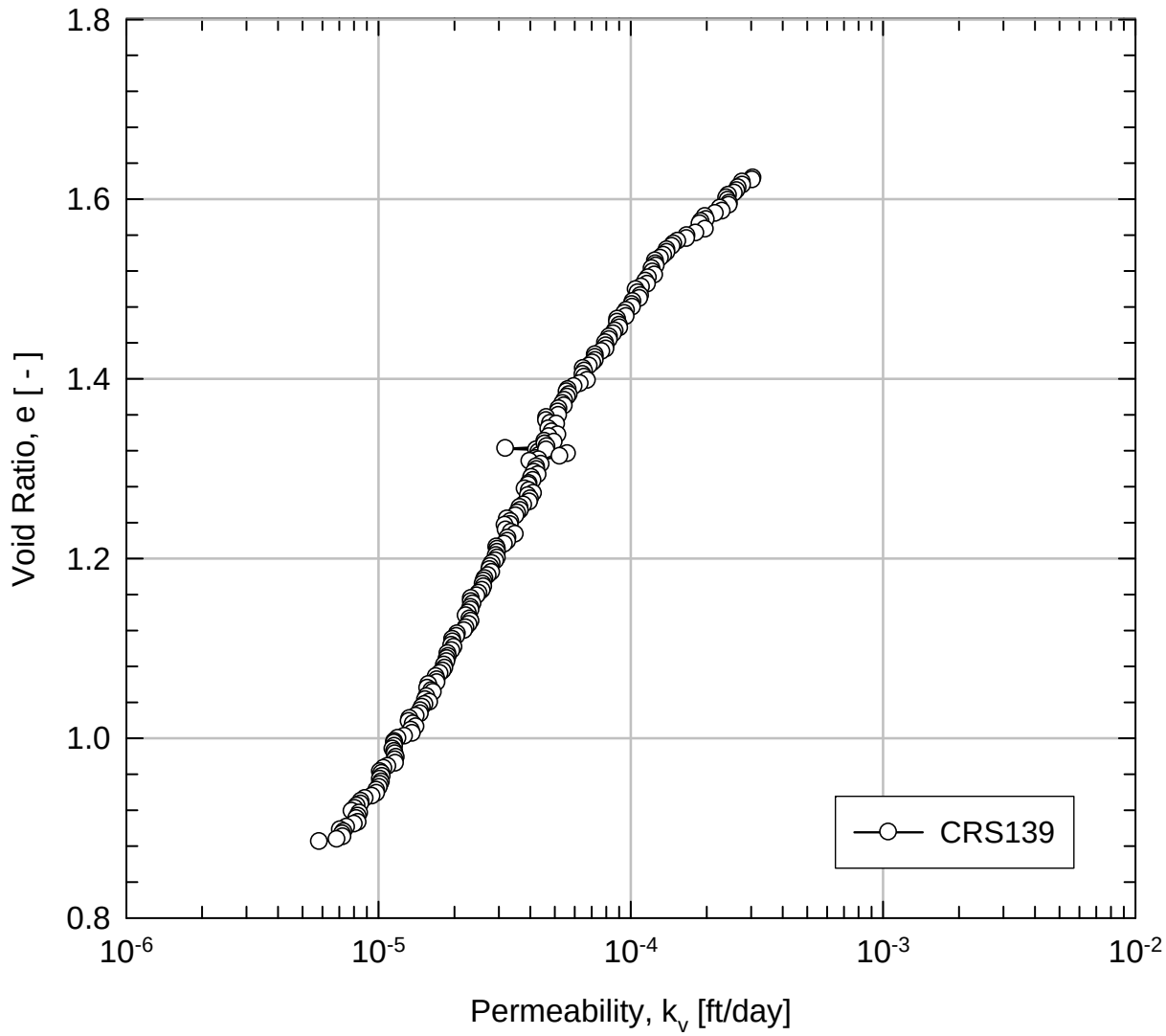
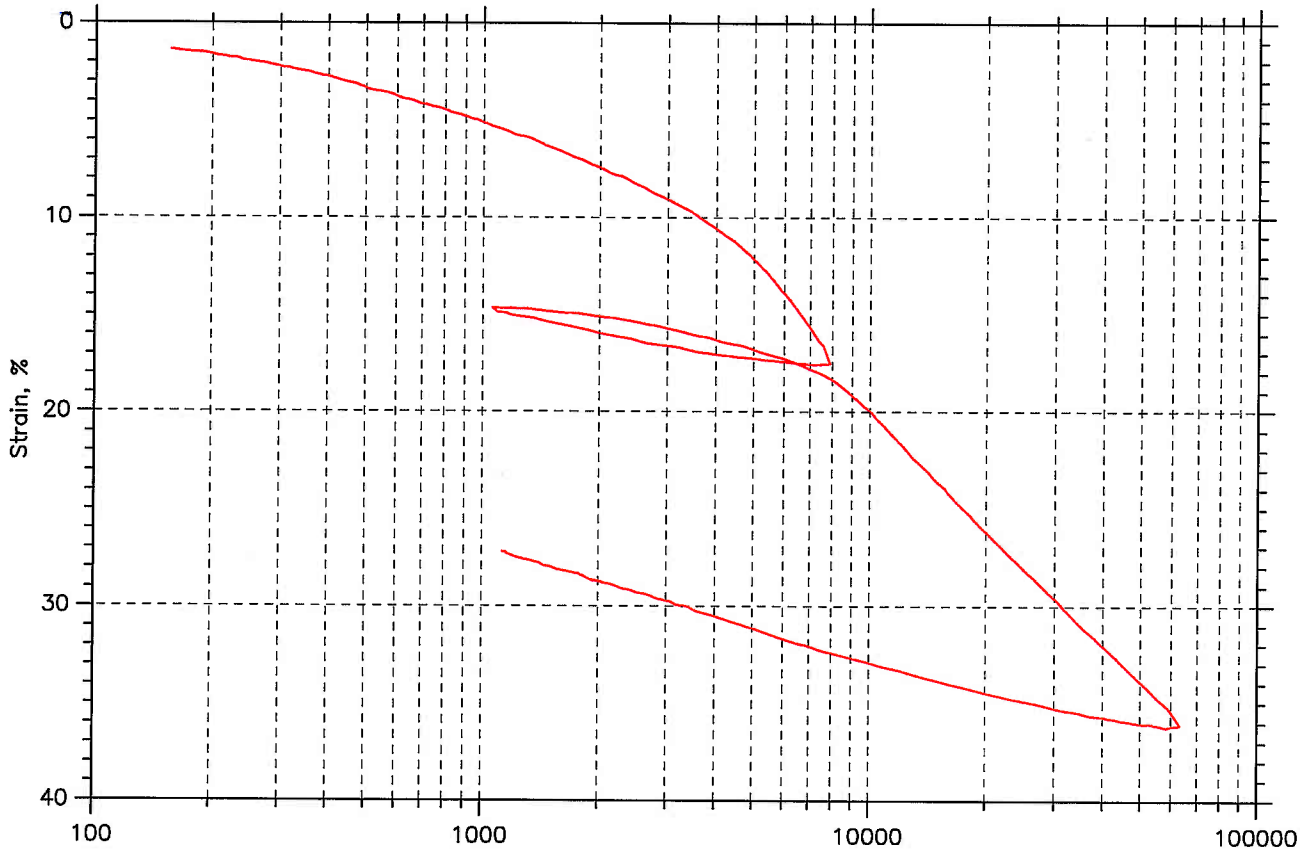


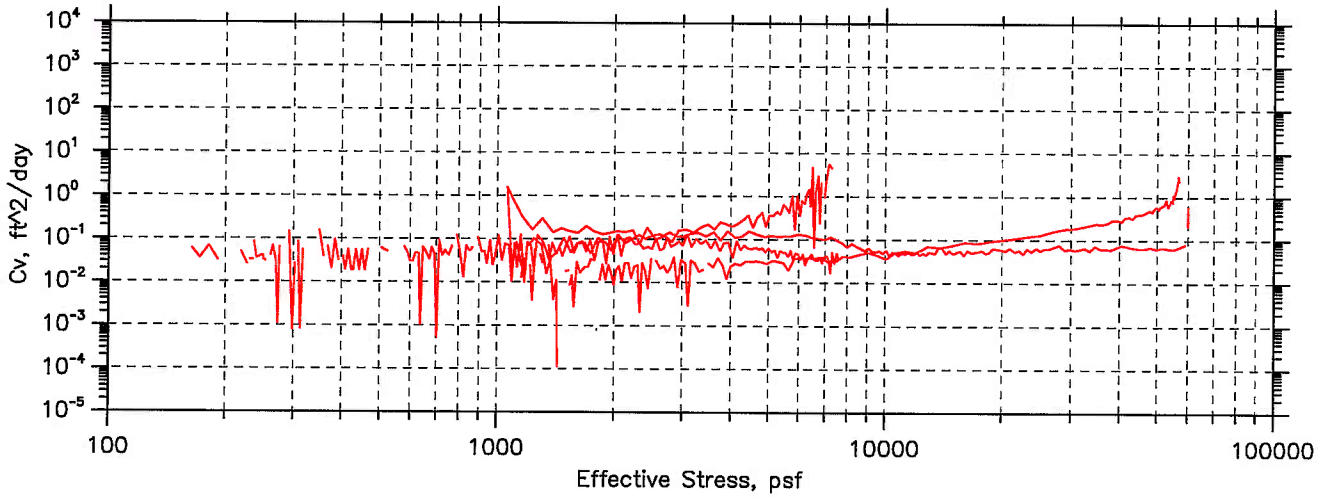
Figure 5.3.3 Void ratio versus permeability for CRS139 on sample SB-01-4 UP2 40-42 ft.

Constant Rate of Consolidation

Constant Strain Rate by ASTM D4186

Summary Report





Project: Hartford Busway	Location: Hartford, CT	Project No.: GTX-8398
Boring No.: RW-4	Tested By: md	Checked By: jdt
Sample No.: UP-2	Test Date: 08/04/08	Depth: 45-47
Test No.: CRC-1	Sample Type: tube	Elevation: ---
Description: Moist, reddish brown silt		
Remarks: System T		

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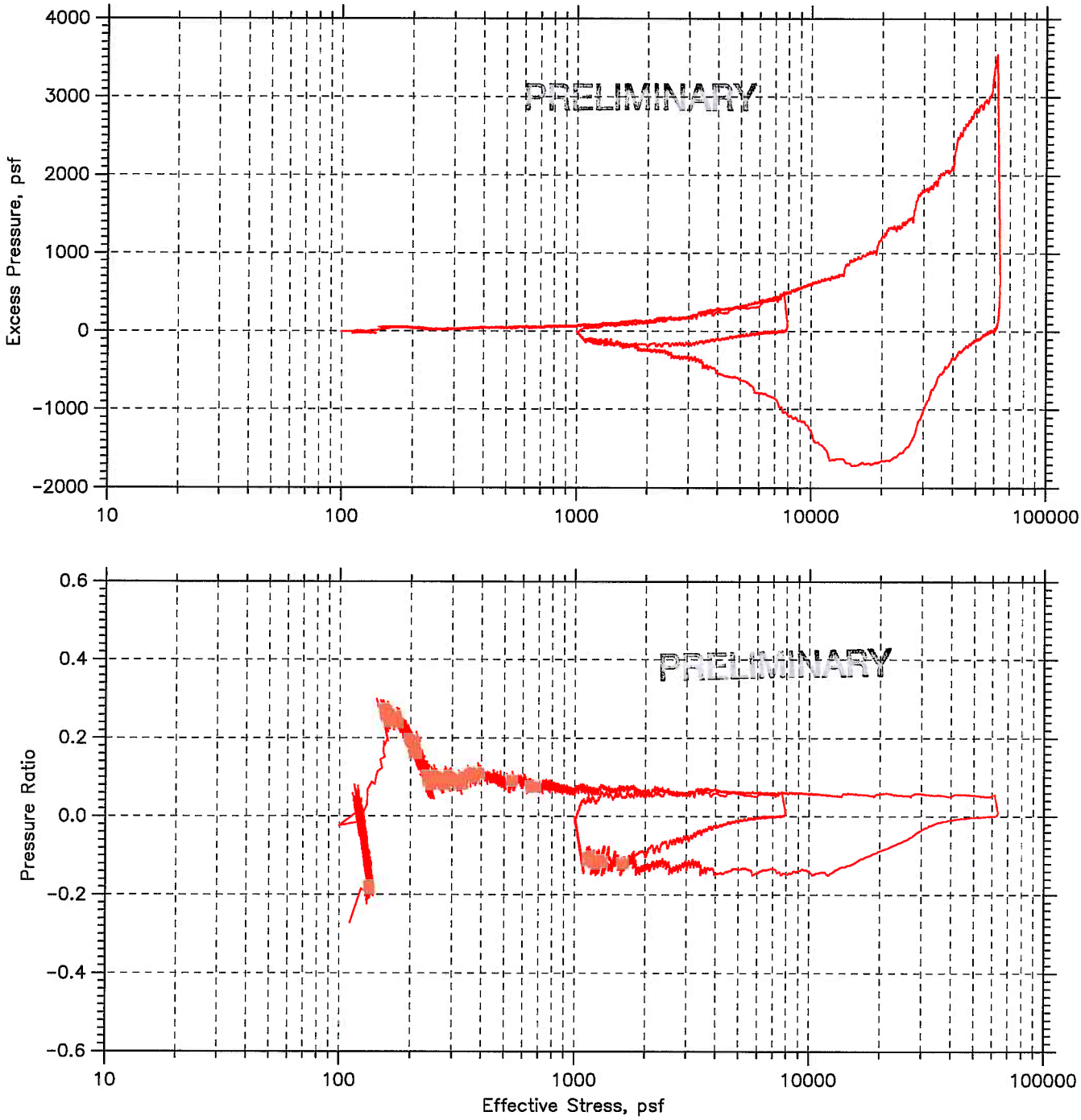
Constant Rate of Consolidation

Constant Strain Rate by ASTM D4186

Pressure Curves



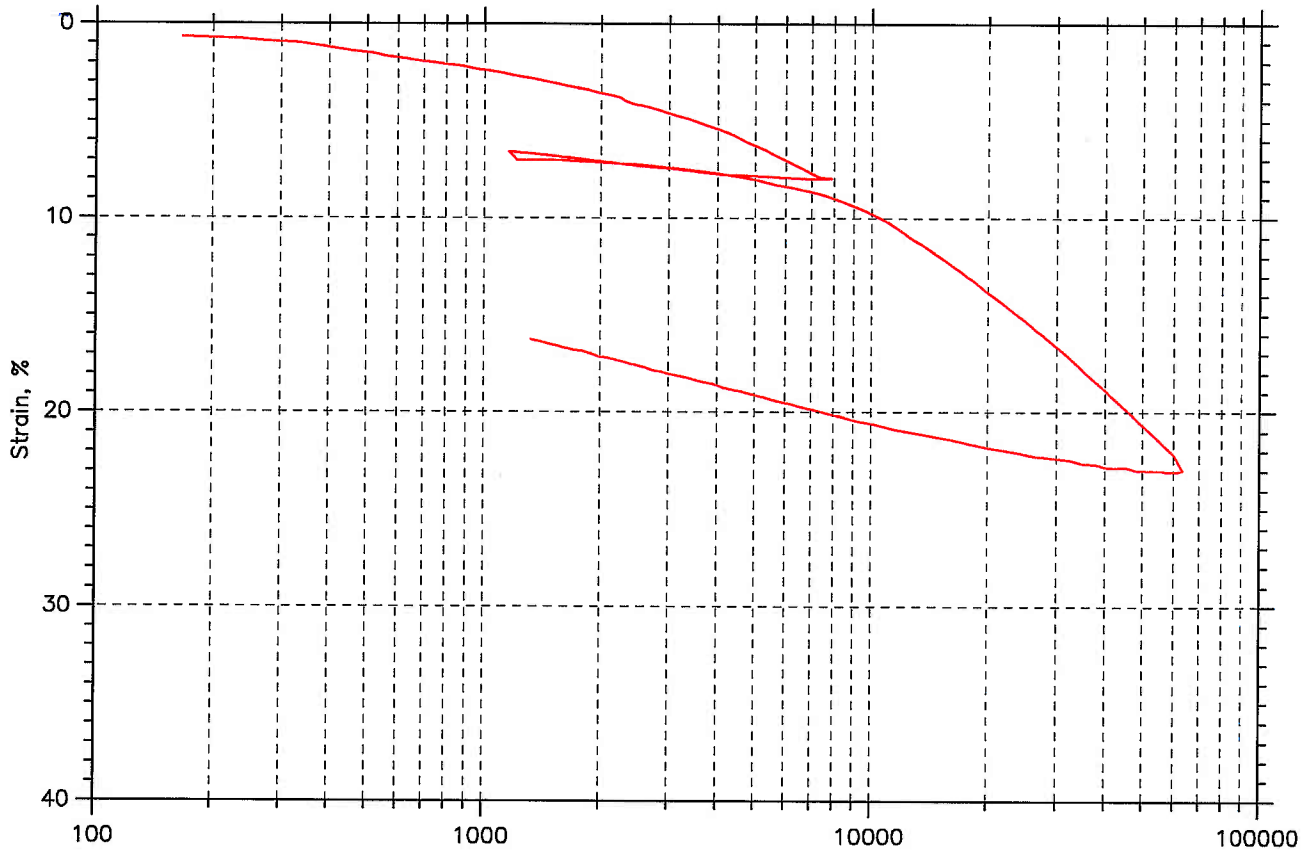
Project: Busway	Location: Hartford CT	Project No.: GTX-8398
Boring No.: RW-4	Tested By: md	Checked By: jdt
Sample No.: UP-2	Test Date: 08/04/08	Depth: 45-47
Test No.: CRC-1	Sample Type: tube	Elevation: ---
Description: Moist reddish brown clay		
Remarks: System T		

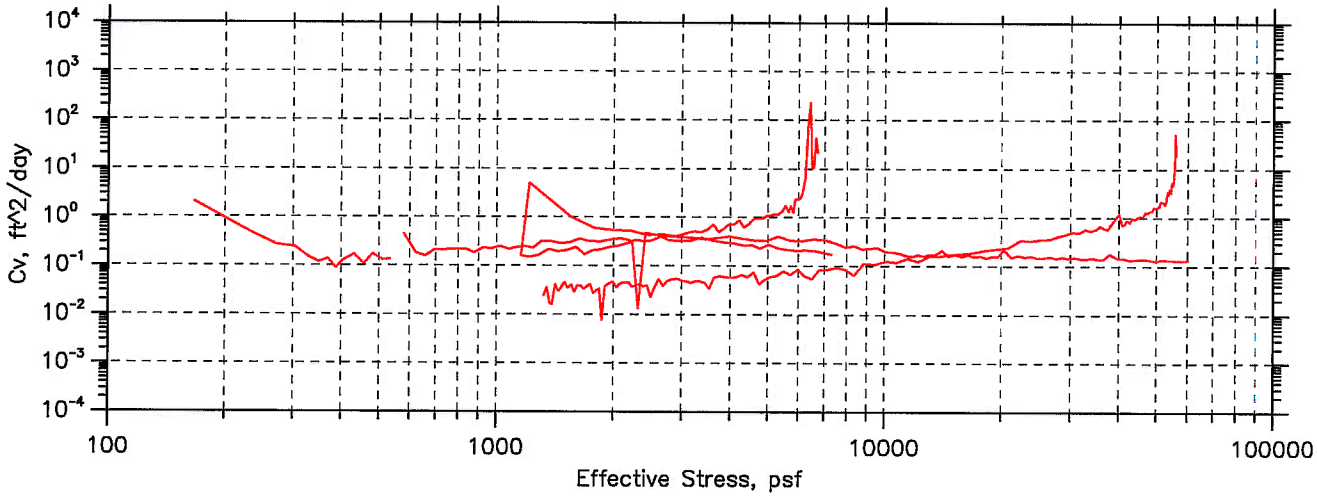
Mon, 18-AUG-2008 14:24:48

Constant Rate of Consolidation

Constant Strain Rate by ASTM D4186

Summary Report





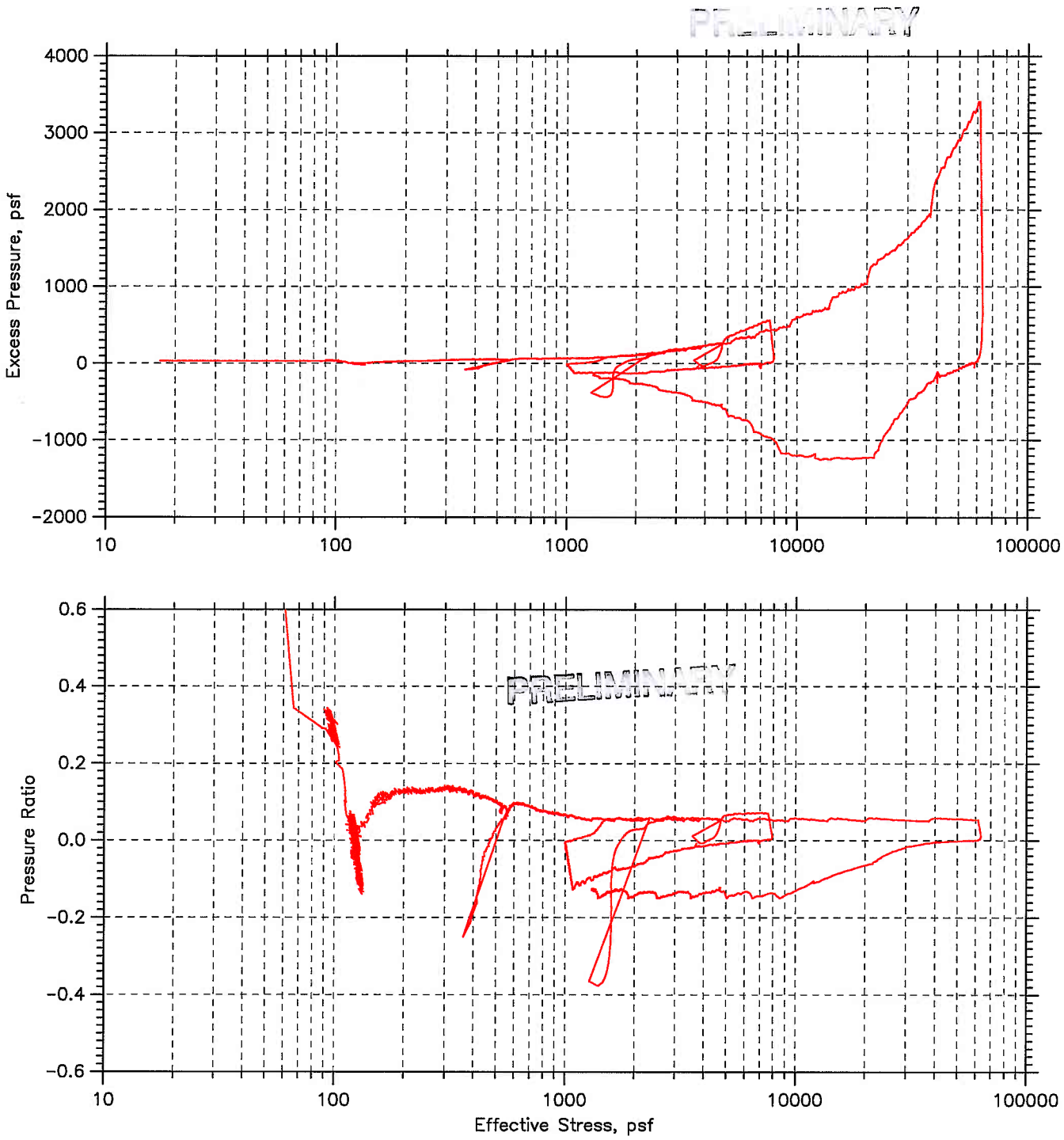
Project: Hartford Busway	Location: Hartford, CT	Project No.: GTX-8398
Boring No.: RW-6	Tested By: md	Checked By: jdt
Sample No.: UP-1	Test Date: 08/13/2008	Depth: 20-22 ft
Test No.: CRC-5	Sample Type: tube	Elevation: ---
Description: Moist, brown clay with sand lenses		
Remarks: System E		

Wed, 27-AUG-2008 15:25:32

Constant Rate of Consolidation

Constant Strain Rate by ASTM D4186

Pressure Curves



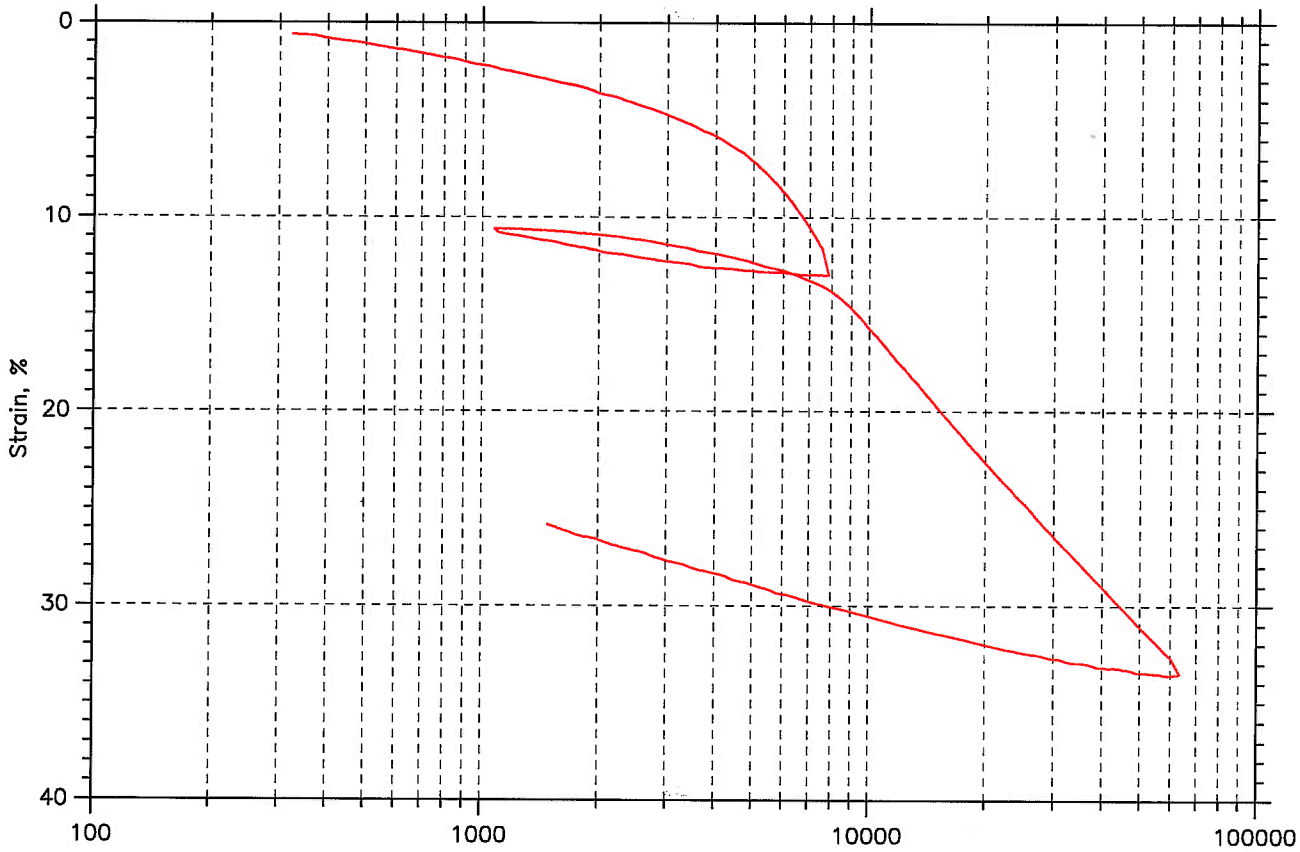
Project: Hartford Busway	Location: Hartford CT	Project No.: Gtx-8398
Boring No.: RW-6	Tested By: md	Checked By: jdt
Sample No.: UP-1	Test Date: 08/13/2008	Depth: 20-22 ft
Test No.: CRC-5	Sample Type: Tube	Elevation:
Description: Moist brown clay w/sand lenses		
Remarks:		

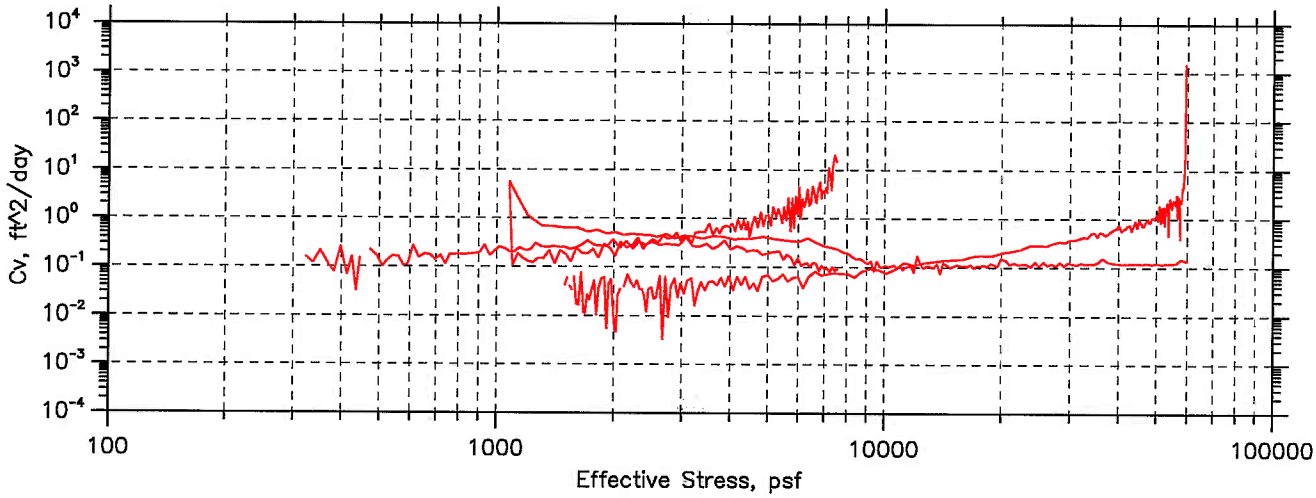
Mon, 18-AUG-2008 14:29:42

Constant Rate of Consolidation

Constant Strain Rate by ASTM D4186

Summary Report





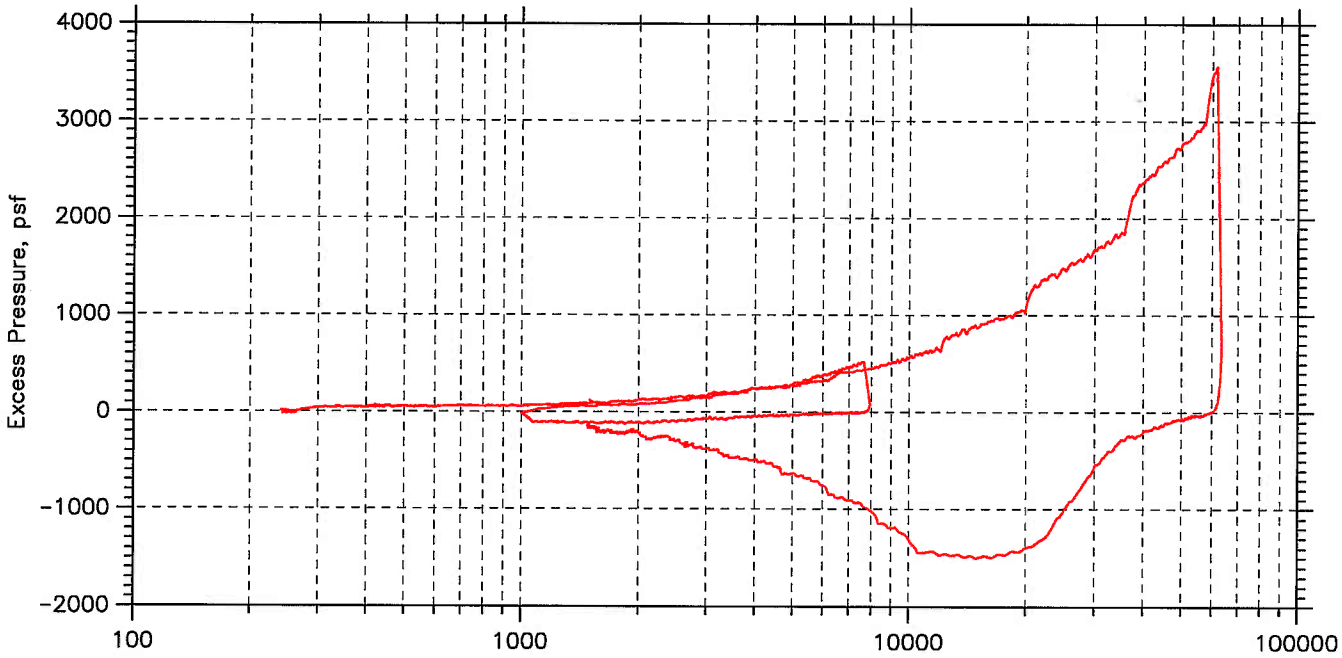
Project: Hartford Busway	Location: Hartford, CT	Project No.: GTX-8398
Boring No.: RW-6	Tested By: md	Checked By: jdt
Sample No.: UP-2	Test Date: 09/07/08	Depth: 30-32 ft
Test No.: CRC-6A	Sample Type: tube	Elevation: ---
Description: Moist, brown layered clay with sand lenses		
Remarks: System T		

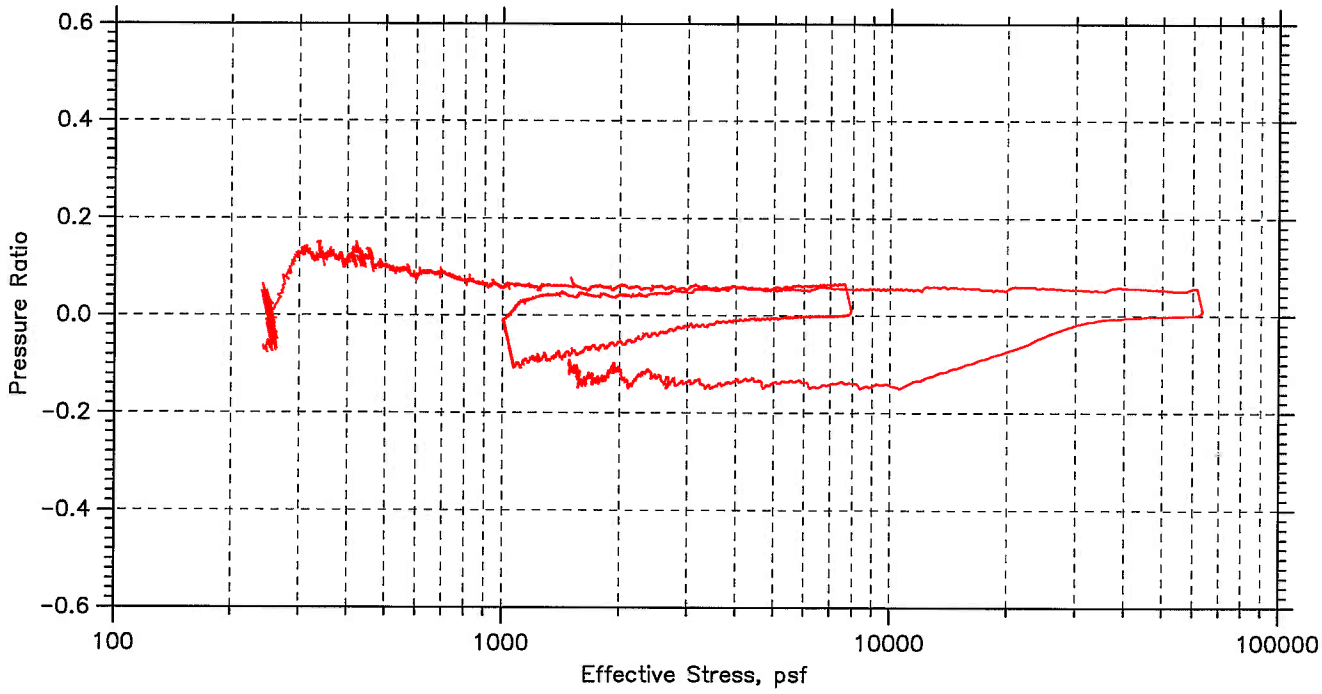
Thu, 18-SEP-2008 13:04:11

Constant Rate of Consolidation

Constant Strain Rate by ASTM D4186

Pressure Curves





Project: Hartford Busway	Location: Hartford, CT	Project No.: GTX-8398
Boring No.: RW-6	Tested By: md	Checked By: jdt
Sample No.: UP-2	Test Date: 09/07/08	Depth: 30-32 ft
Test No.: CRC-6A	Sample Type: tube	Elevation: ---
Description: Moist, brown layered clay with sand lenses		
Remarks: System T		

Thu, 18-SEP-2008 08:55:28

CRC TEST DATA

Project: Hartford Busway
Boring No.: RW-6
Sample No.: UP-2
Test No.: CRC-6A

Location: Hartford, CT
Tested By: md
Test Date: 09/07/08
Sample Type: tube

Project No.: GTX-8398
Checked By: jdt
Depth: 30-32 ft
Elevation: ---

Soil Description: Moist, brown layered clay with sand lenses
Remarks: System T

Estimated Specific Gravity: 2.80
Initial Void Ratio: 1.75
Final Void Ratio: 1.04

Liquid Limit: ---
Plastic Limit: ---
Plasticity Index: ---

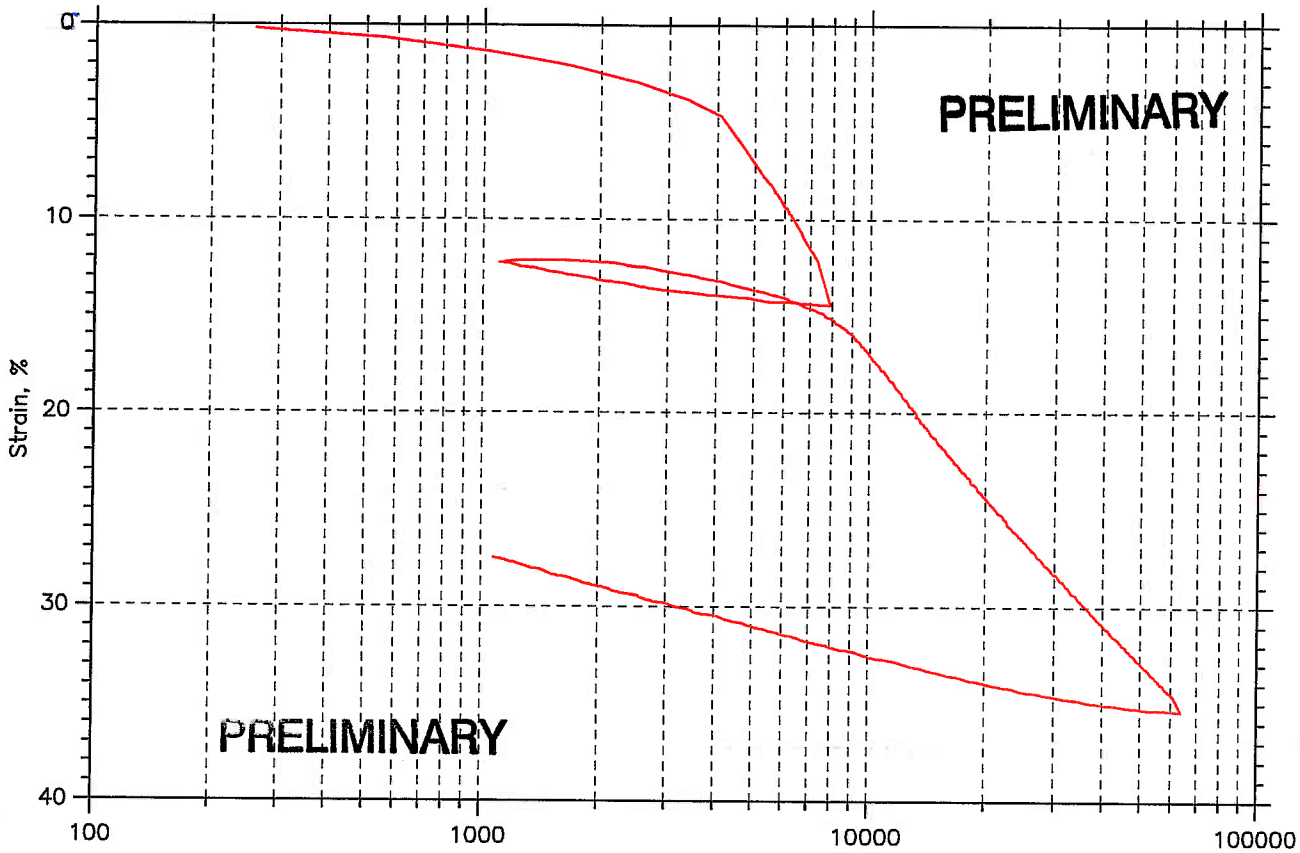
Initial Height: 1.00 in
Specimen Diameter: 2.50 in

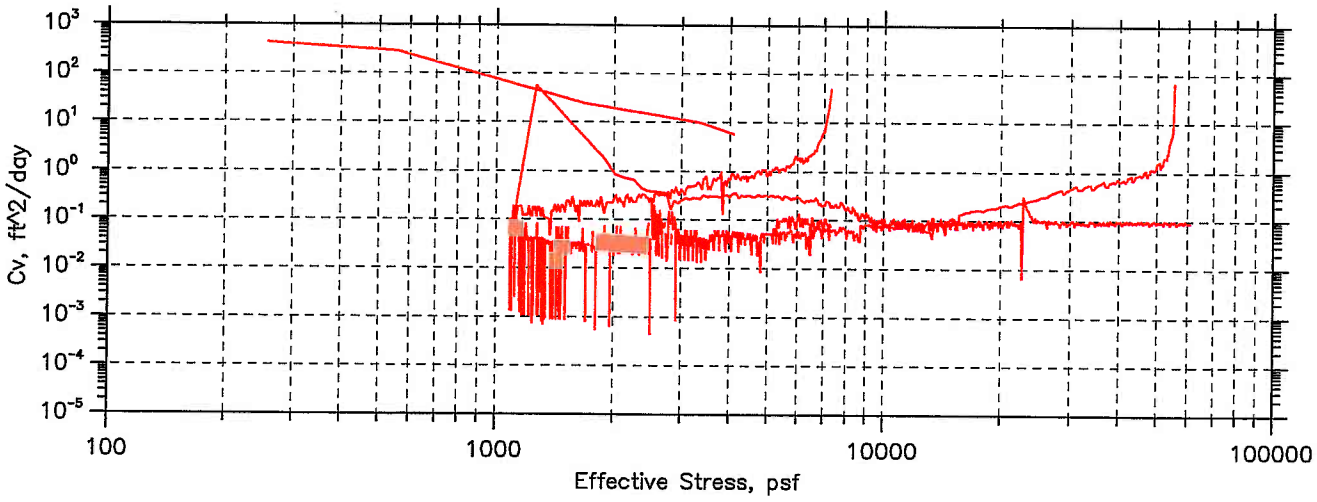
	Before Consolidation		After Consolidation	
	Trimmings	Specimen+Ring	Specimen+Ring	Trimmings
Container ID	Zinnia	RING		3204
Wt. Container + Wet Soil, gm	209.08	337.14	316.33	122.1
Wt. Container + Dry Soil, gm	134.49	286.04	286.04	91.33
Wt. Container, gm	8.17	204.2	204.2	8.18
Wt. Dry Soil, gm	126.32	81.843	81.843	83.15
Water Content, %	59.05	62.43	37.01	37.01
Void Ratio	---	1.75	1.04	---
Degree of Saturation, %	---	99.78	99.99	---
Dry Unit Weight, pcf	---	63.517	85.845	---

Constant Rate of Consolidation

Constant Strain Rate by ASTM D4186

Summary Report





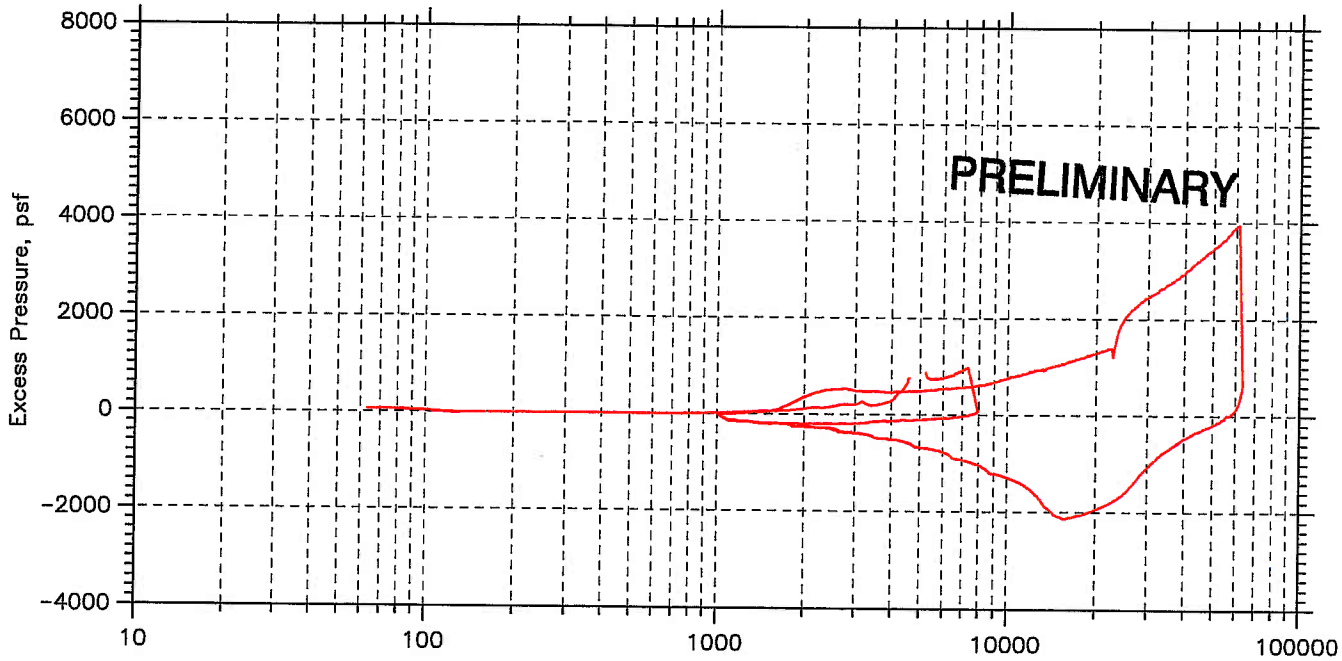
Project: Hartford Busway	Location: Hartford, CT	Project No.: GTX-8398
Boring No.: RW-7	Tested By: njh	Checked By: jdt
Sample No.: UP-1	Test Date: 08/19/08	Depth: 30-32
Test No.: CRC-2A	Sample Type: tube	Elevation: ---
Description: Moist, brown clay		
Remarks: System 0		

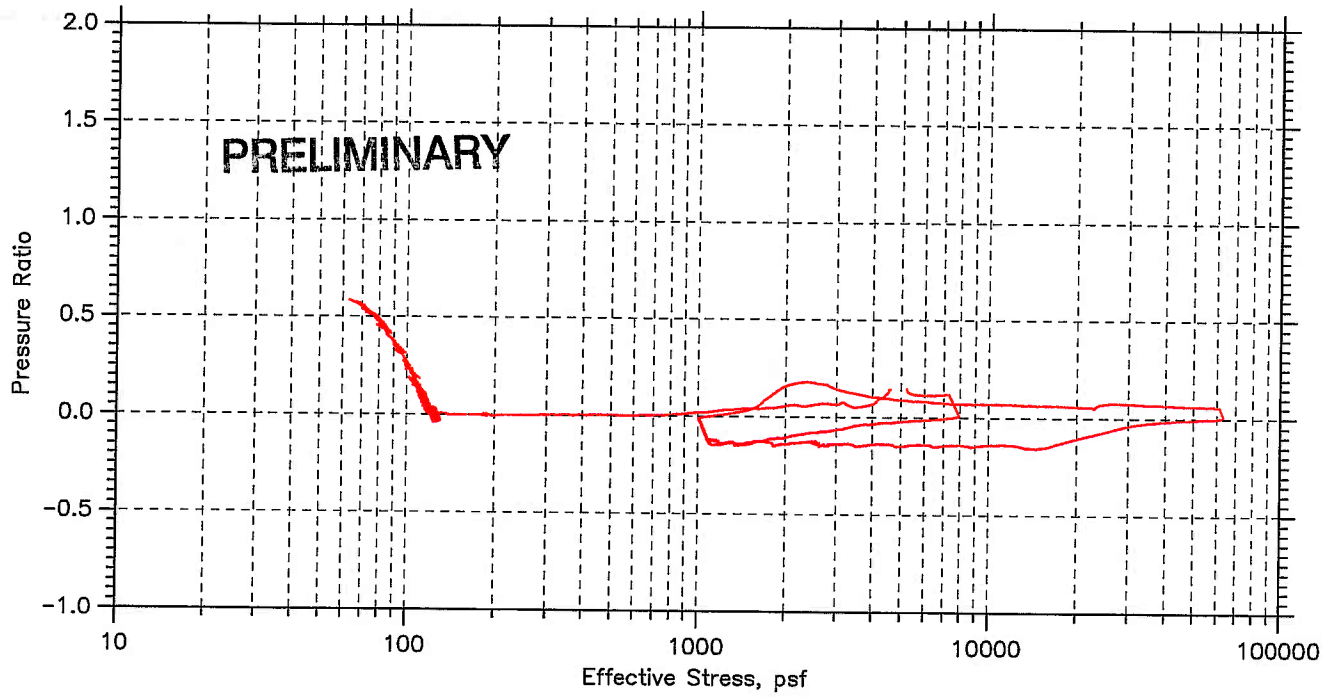
Tue, 26-AUG-2008 16:19:58

Constant Rate of Consolidation

Constant Strain Rate by ASTM D4186

Pressure Curves





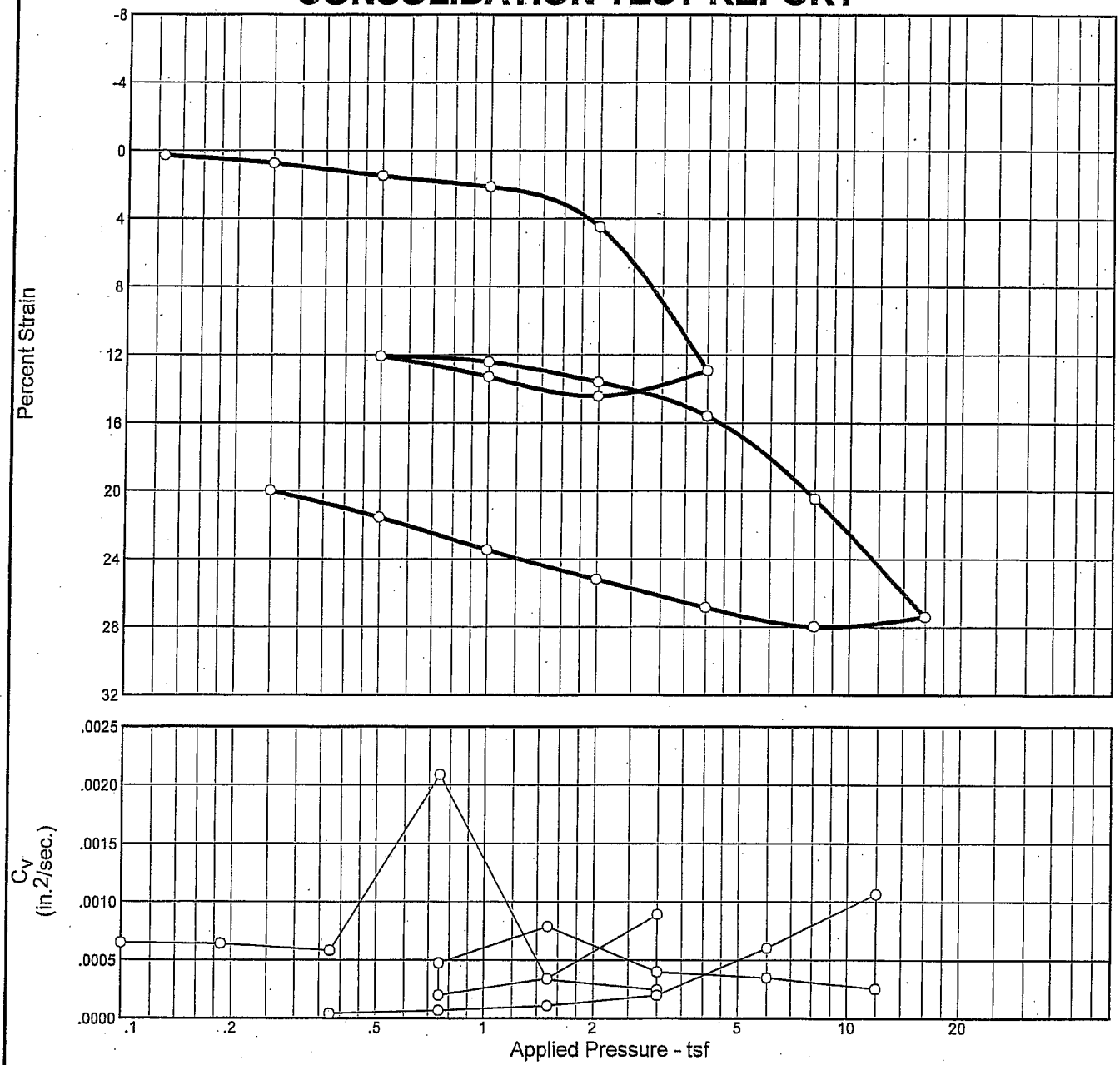
Project: Hartford Busway	Location: Hartford, CT	Project No.: GTX-8398
Boring No.: RW-7	Tested By: njh	Checked By: jdt
Sample No.: UP-1	Test Date: 08/19/08	Depth: 30-32
Test No.: CRC-2A	Sample Type: tube	Elevation: ---
Description: Moist, brown clay		
Remarks: System 0		

Tue, 26-AUG-2008 16:19:58

2008

Incremental Load Consolidation Tests

CONSOLIDATION TEST REPORT



Natural Sat.	Natural Moist.	Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (tsf)	P_c (tsf)	C_c	C_r	Swell Press. (tsf)	Heave %	e_o
98.3 %	46.2 %	74.3	49	25	2.699		1.44	0.53	0.10			1.269

MATERIAL DESCRIPTION	USCS	AASHTO
	CL	A-7-6

Project No.

Project: New Britain-Hartford Busway #155-H025

Source: Boring SB-01-1 (Flatbush Ave., over Busway)

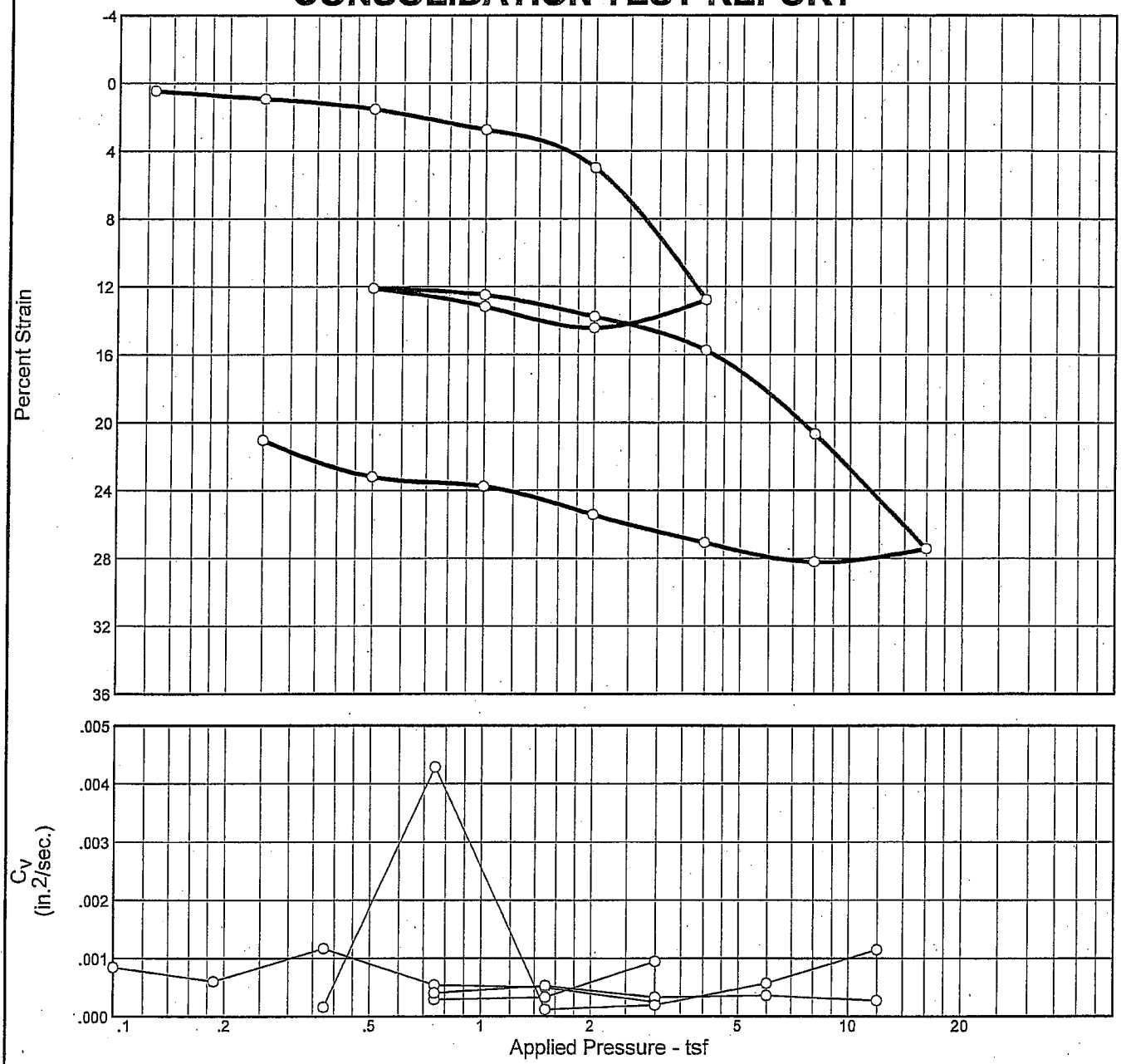
Test-Con, Inc.
P.O. Box 3116
Danbury, CT 06813-3116

Remarks:
Boring No SB-01-1, Sample No UP1, Depth from 20'to 22'

E-MAILED SEP 02 2008

Figure 1

CONSOLIDATION TEST REPORT



Natural Sat.	Natural Moist.	Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (tsf)	P_c (tsf)	C_c	C_r	Swell Press. (tsf)	Heave %	e_o
88.2 %	51.2 %	65.8	49	24	2.712		1.46	0.58	0.11			1.575

MATERIAL DESCRIPTION	USCS	AASHTO
	CL	A-7-6

Project No.

Project: New Britain-Hartford Busway #155-H025

Source: SB-01-2 (Flatbush Ave., over Busway)

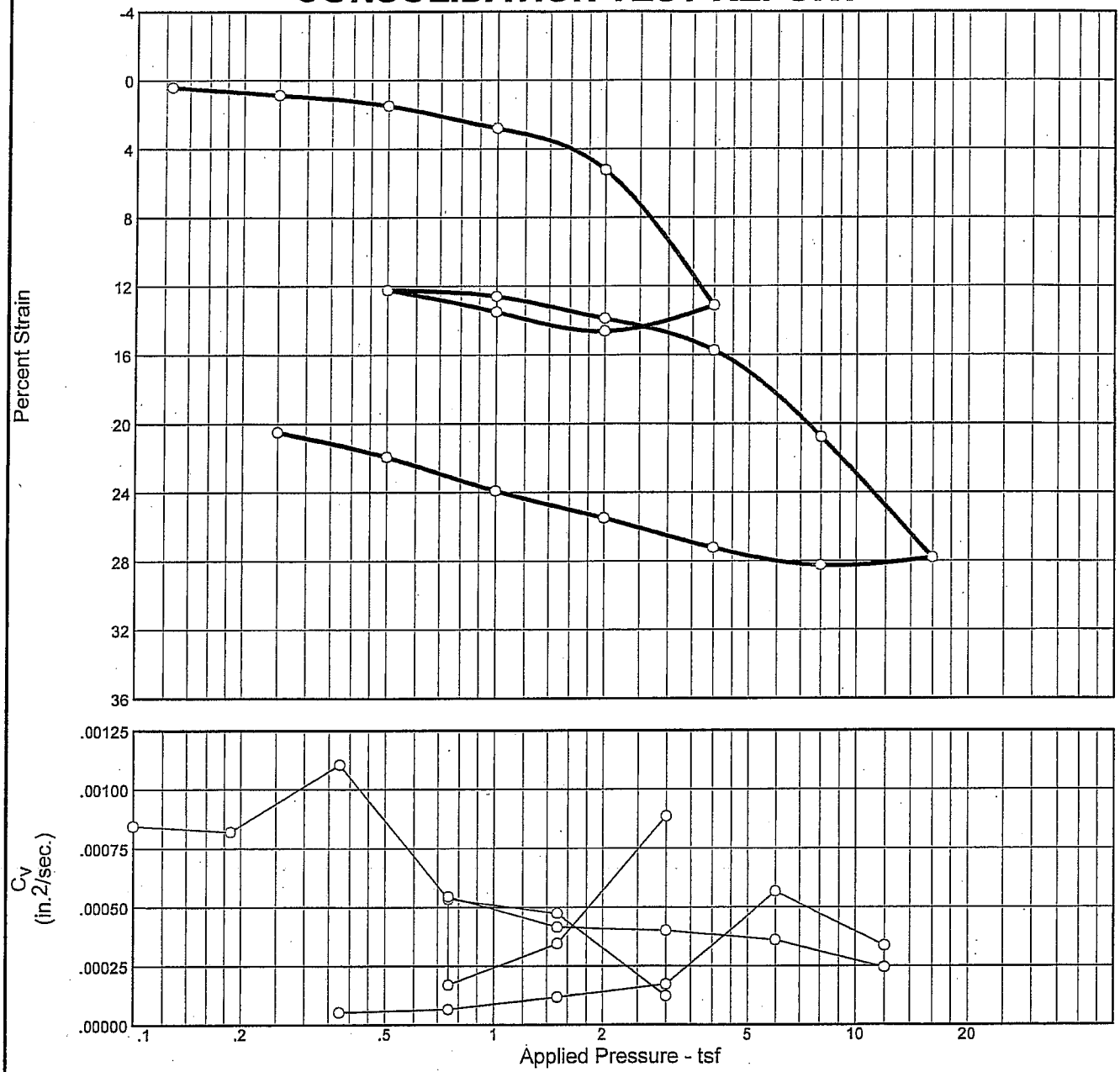
Test-Con, Inc.
P.O. Box 3116
Danbury, CT 06813-3116

Remarks:
Boring SB-01-2, Sample No UP2.
Depth from 25' to 27'

E-MAILED SEP 02 2008

Figure 1

CONSOLIDATION TEST REPORT



Natural Sat.	Natural Moist.	Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (tsf)	P_c (tsf)	C_c	C_r	Swell Press. (tsf)	Heave %	e_o
92.8 %	53.9 %	67.5	50	26	2.907		1.63	0.63	0.12			1.687

MATERIAL DESCRIPTION	USCS	AASHTO
	CH	

Project No.

Project: New Britain-Hartford Busway #155-H025

Source: Boring SB-01-4 (Flatbush Ave., over Busway)

Test-Con, Inc.
P.O. Box 3116
Danbury, CT 06813-3116

Remarks:
Boring No SB-01-4, Sample No UP1, Depth from 30' to 32'

E-MAILED SEP 02 2008

Figure

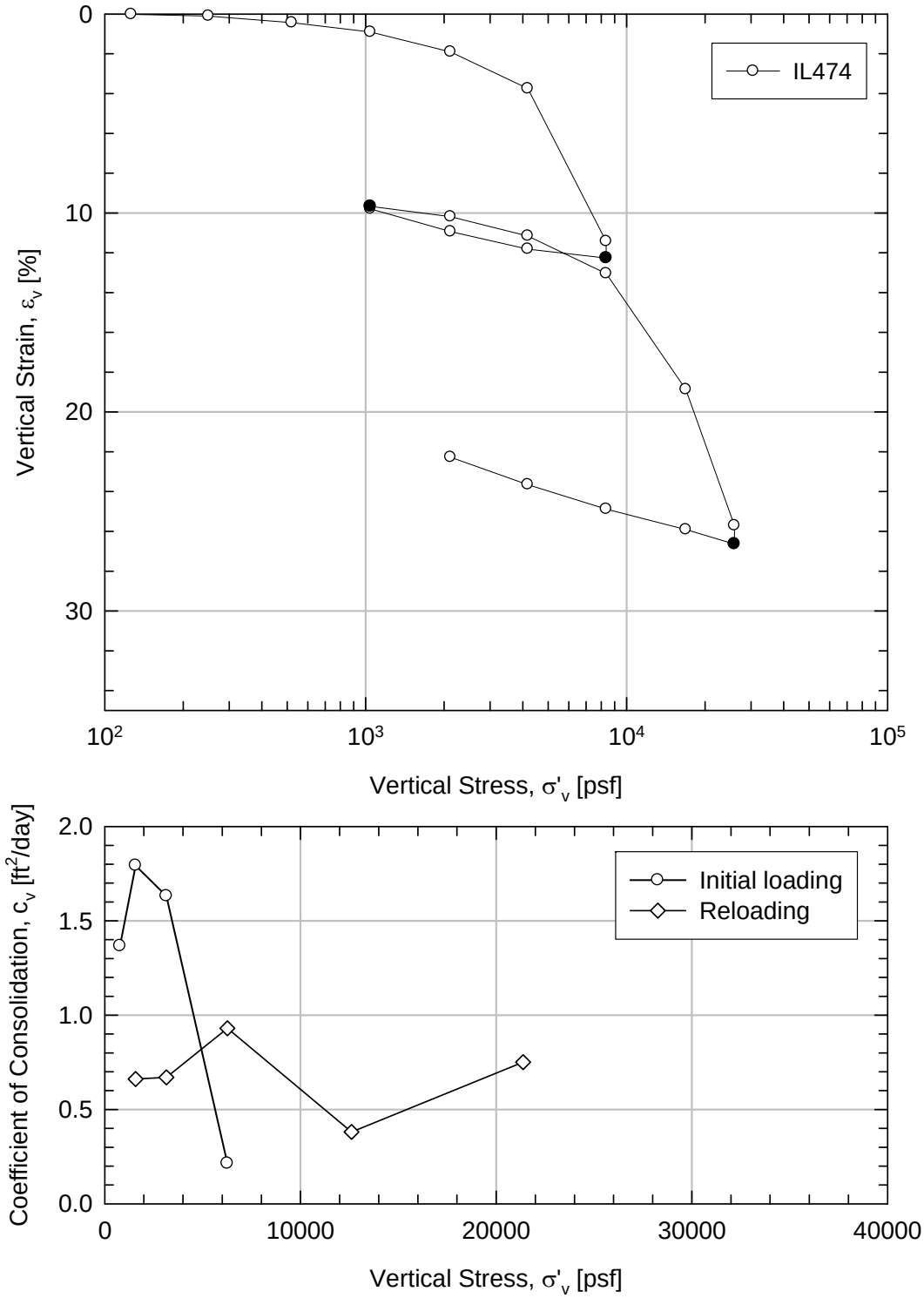
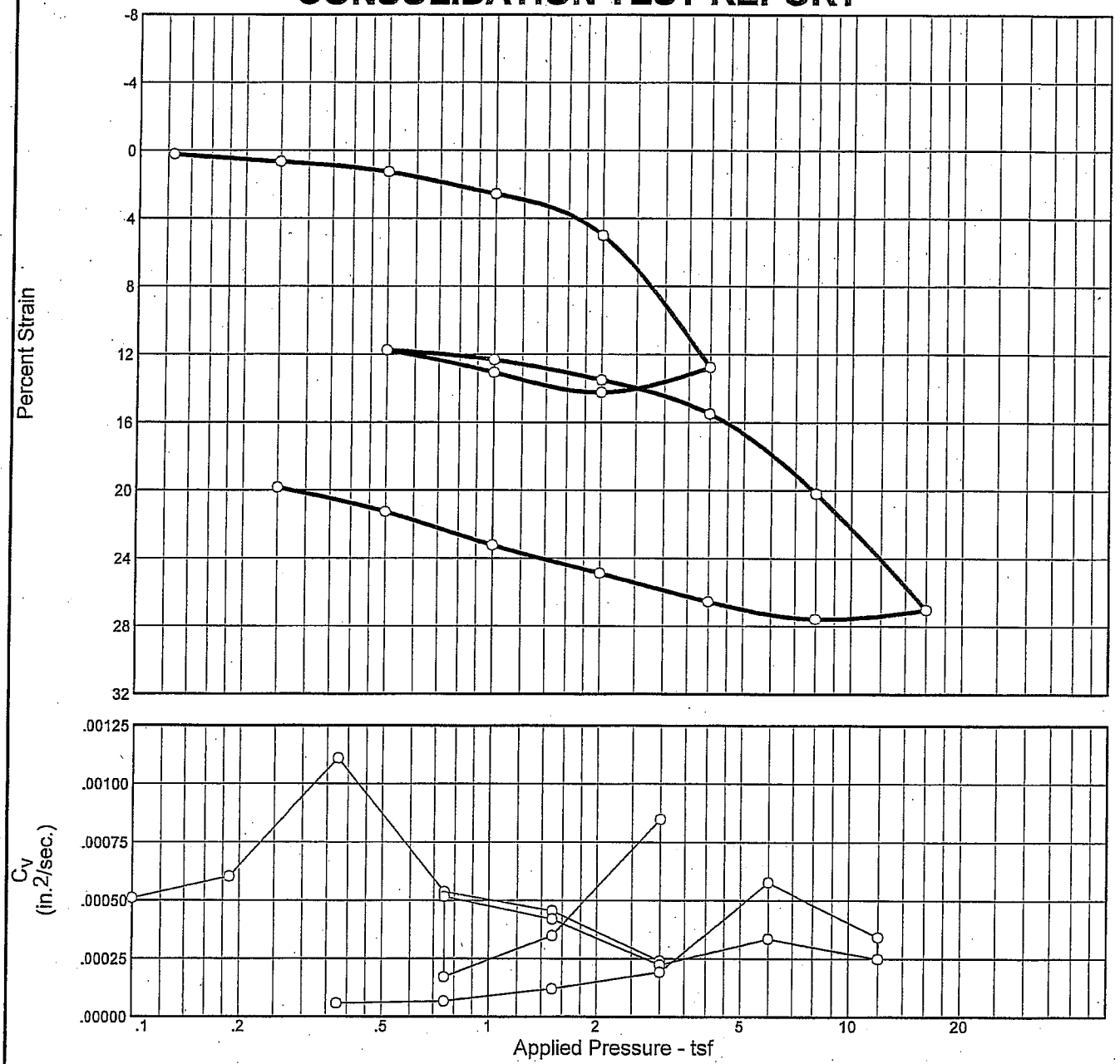


Figure 5.3.25 Vertical strain and coefficient of consolidation versus vertical effective stress for test IL474 on sample SB-01-4 UP2 40-42 ft.

CONSOLIDATION TEST REPORT



Natural Sat.	Natural Moist.	Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (tsf)	P_c (tsf)	C_c	C_r	Swell Press. (tsf)	Heave %	e_o
96.3 %	54.3 %	66.6	49	26	2.679		1.64	0.58	0.11			1.512

MATERIAL DESCRIPTION	USCS	AASHTO
	CL	A-7-6

Project No.

Project: New Britain-Hartford Busway #155-H025

Source: Boring RW-4 (Flatbush Ave., over Busway)

Test-Con, Inc.
P.O. Box 3116
Danbury, CT 06813-3116

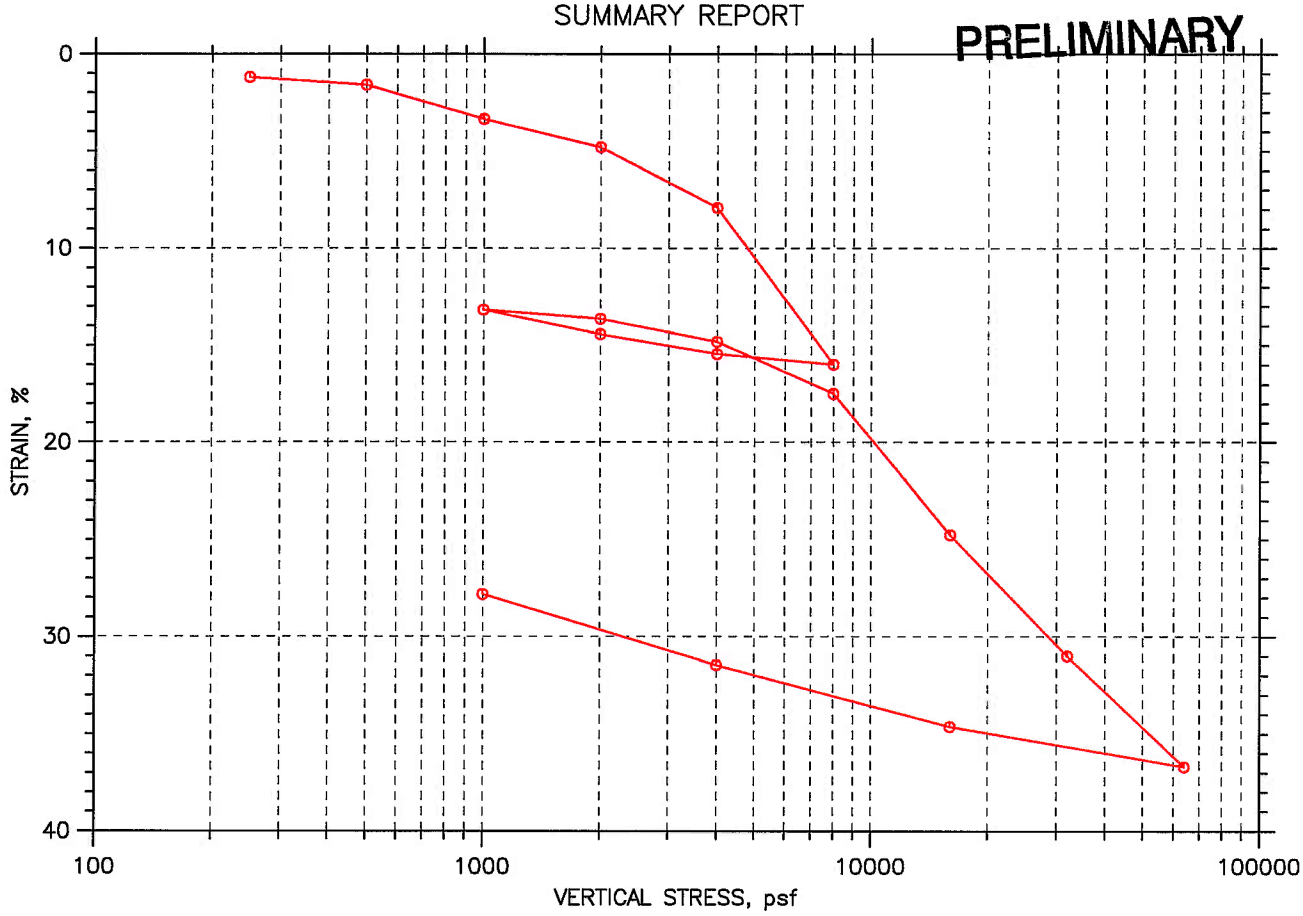
Remarks:
Boring RW-4, Sample No UP1.
Depth from 35' to 37'

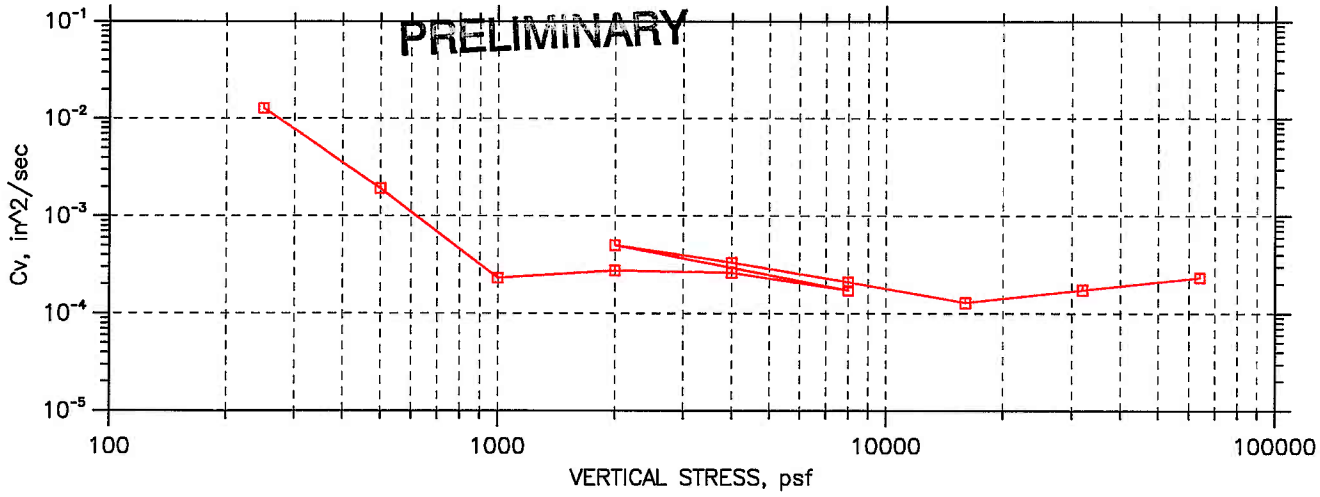
E-MAILED SEP 02 2008

Figure 1

CONSOLIDATION TEST DATA

SUMMARY REPORT

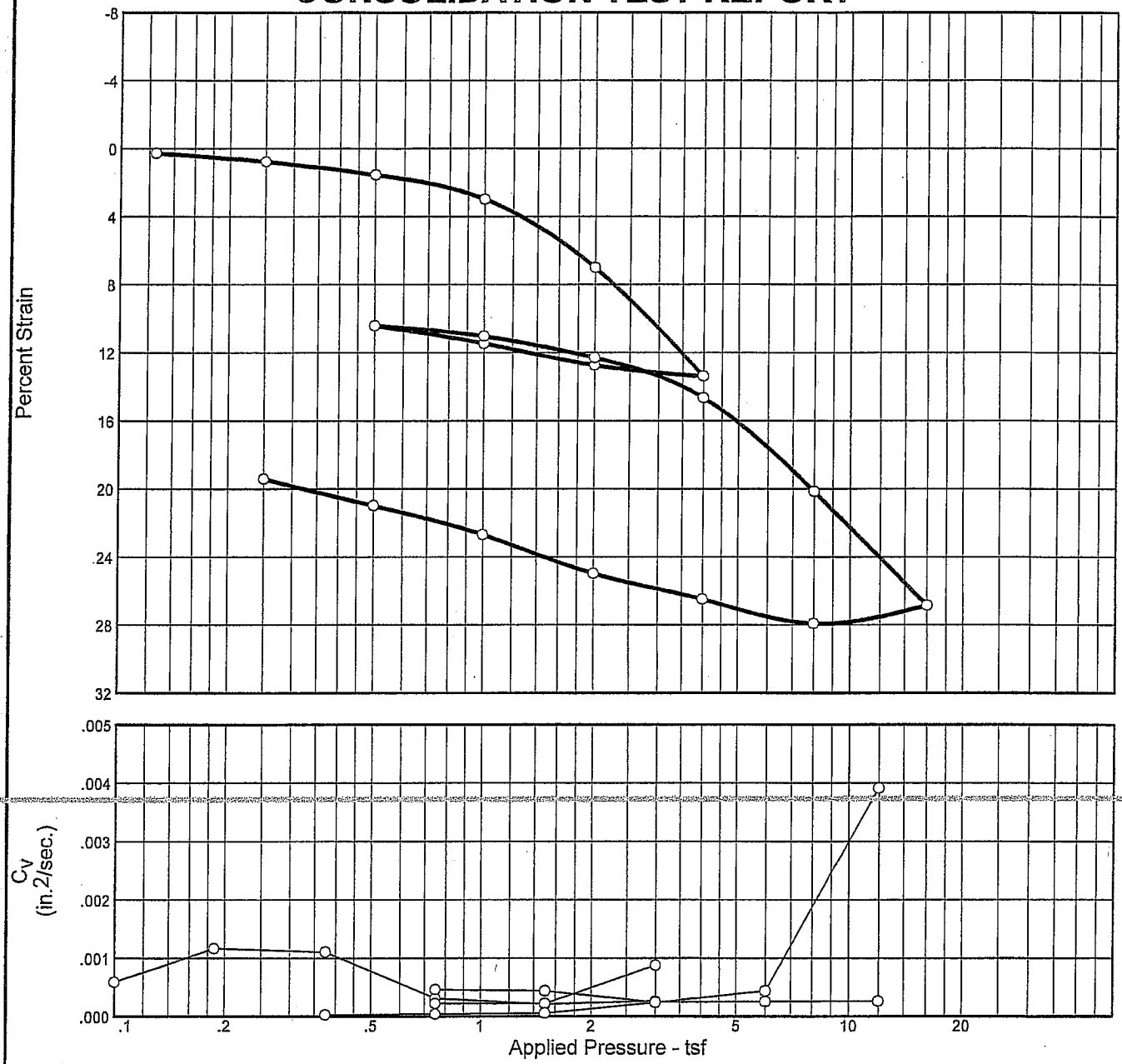




GeoTesting express a subsidiary of Geocomp Corporation	Project: Busway	Location: Hartford CT	Project No.: GTX-8398
	Boring No.: RW-4	Tested By: md	Checked By: jdt
	Sample No.: UP-2	Test Date: 08/04/08	Depth: 45-47 ft
	Test No.: C-1	Sample Type: Tube	Elevation: ---
	Description: Moist reddish brown clay		
	Remarks: System G		

Mon, 18-AUG-2008 14:51:00

CONSOLIDATION TEST REPORT



Natural Sat.	Natural Moist.	Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (tsf)	P_c (tsf)	C_c	C_r	Swell Press. (tsf)	Heave %	e_o
98.7 %	55.0 %	67.2			2.691		1.47	0.56	0.12			1.500

MATERIAL DESCRIPTION	USCS	AASHTO

Project No. **Client:** GeoDesign

Project: New Britain-Hartford Busway #155-H025

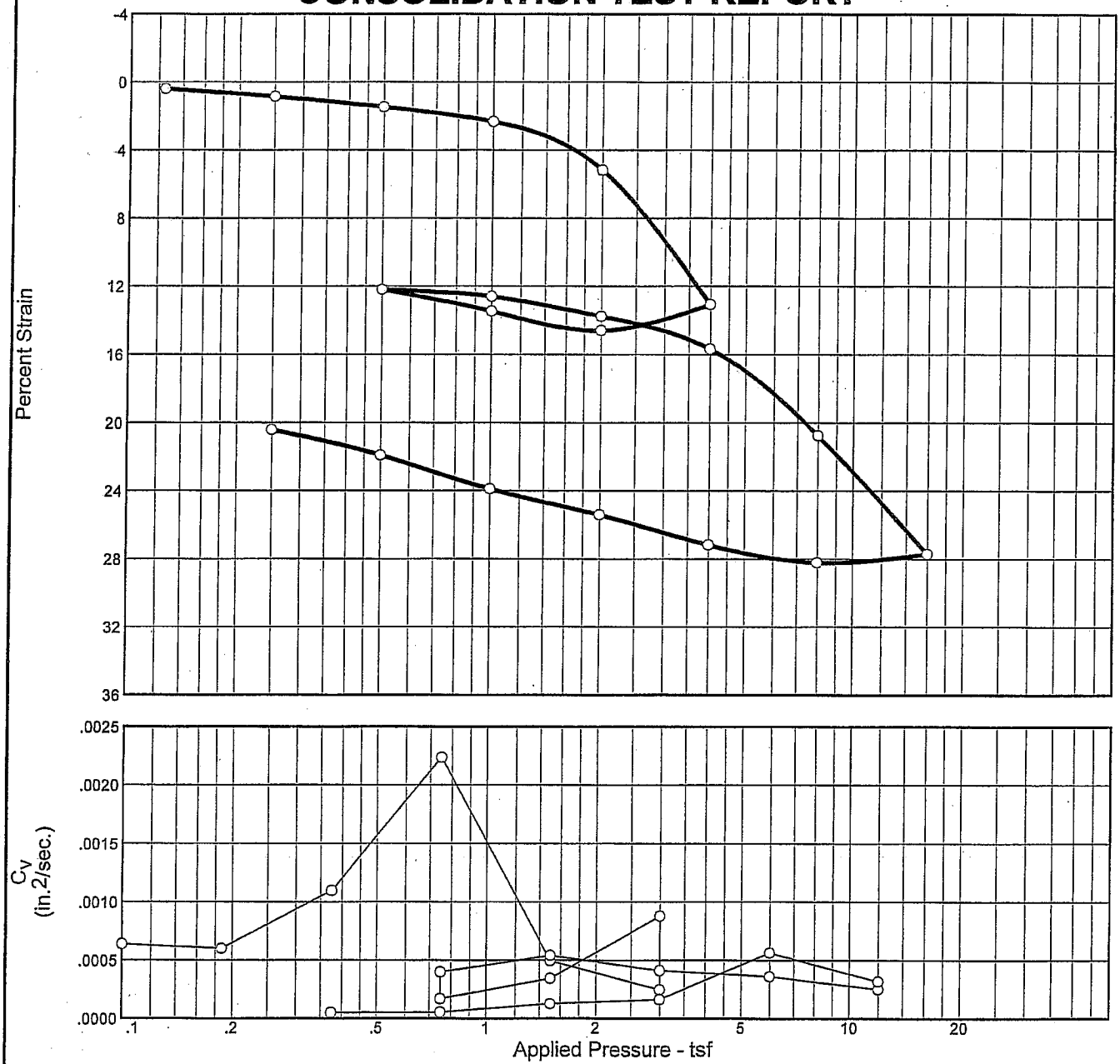
Source: Boring RW-8 (Flatbush **Sample No.:** UP-1 **Elev./Depth:** from 20' to 22'

TEST-CON INCORPORATED
PO BOX 3116
Danbury, CT 06813-3116

Remarks:
Date tested: 09/28/2008.
Boring No: RW-8, Sample No: UP-1, Depth from 20' to 22'.

Figure

CONSOLIDATION TEST REPORT



Natural Sat.	Natural Moist.	Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (tsf)	P_c (tsf)	C_c	C_r	Swell Press. (tsf)	Heave %	e_o
98.9 %	50.9 %	71.1	49	25	2.747		1.53	0.56	0.10			1.412

MATERIAL DESCRIPTION	USCS	AASHTO
	CL	A-7-6

Project No.

Project: New Britain-Hartford Busway #155-H025

Source: Boring RW-8 (Flatbush Ave., over Busway)

Test-Con, Inc.
P.O. Box 3116
Danbury, CT 06813-3116

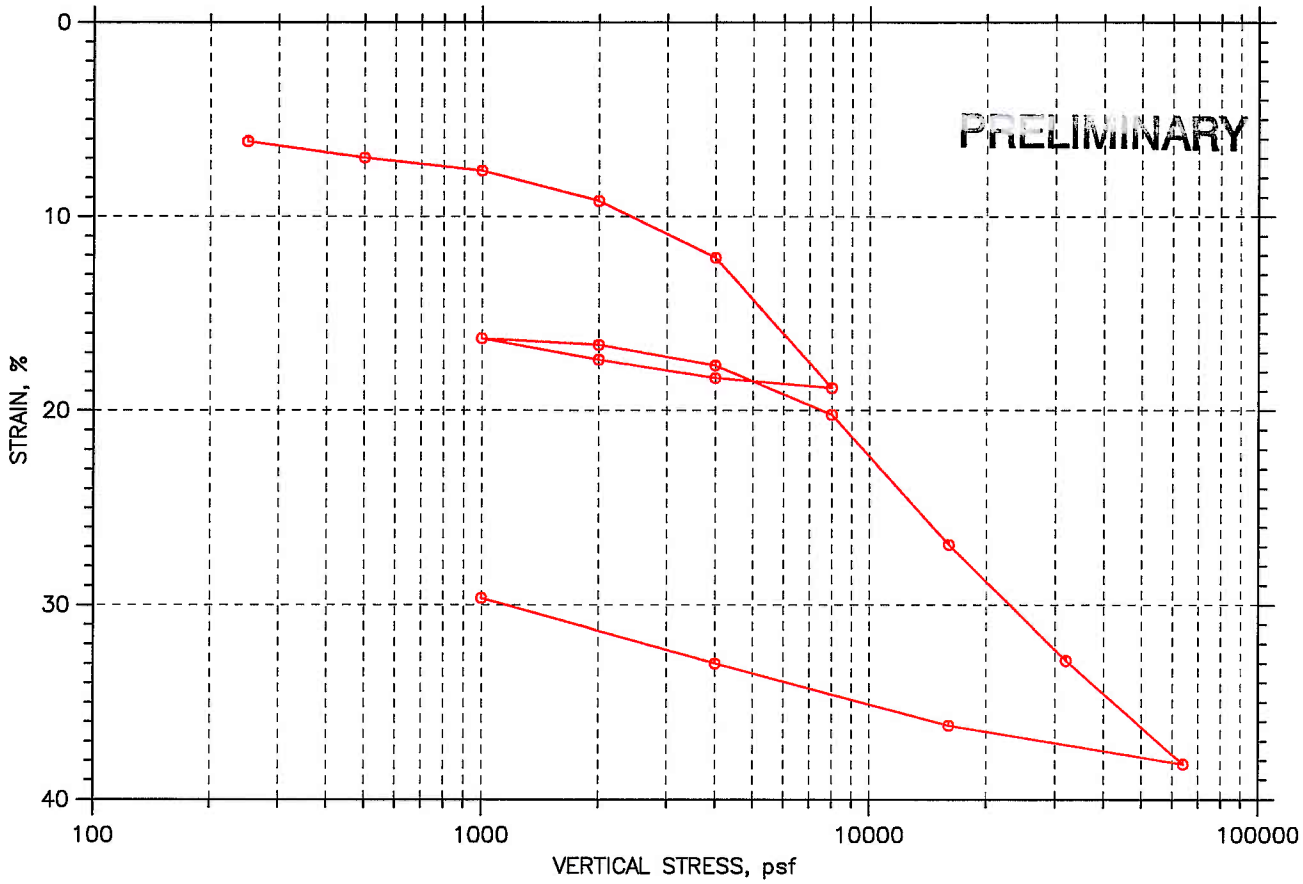
Remarks:
Boring RW-8, Sample No UP2
Depth from 30' to 32'

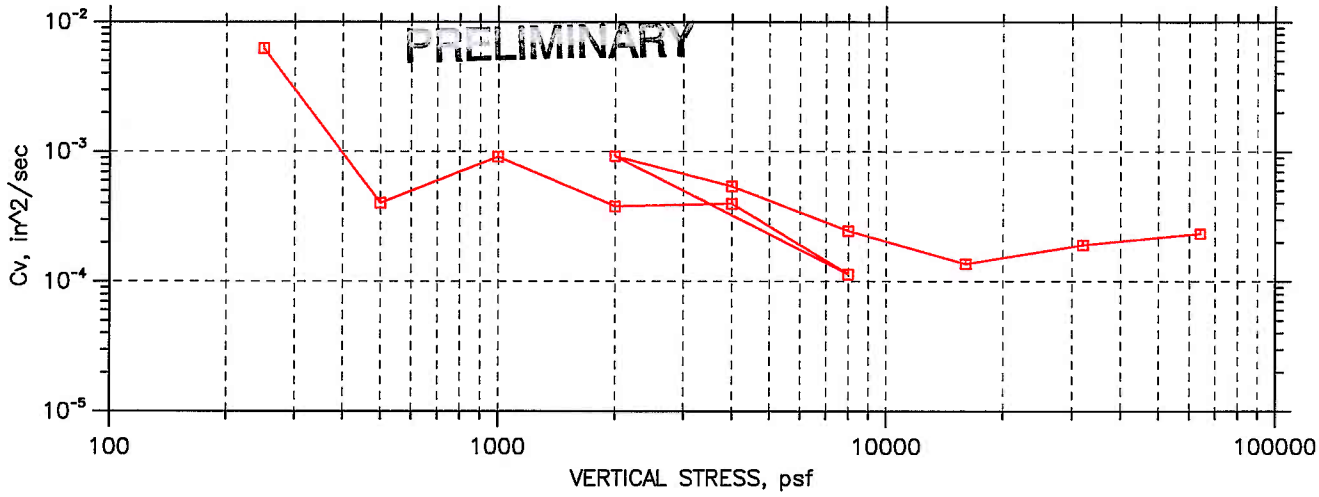
E-MAILED SEP 02 2008

Figure 1

CONSOLIDATION TEST DATA

SUMMARY REPORT





GeoTesting express, a subsidiary of Geocomp Corporation	Project: Busway	Location: Hartford CT	Project No.: GTX-8398
	Boring No.: RW-8	Tested By: md	Checked By: jdt
	Sample No.: UP-3	Test Date: 08/06/08	Depth: 40-42 ft
	Test No.: C-2	Sample Type: Tube	Elevation: ---
	Description: Moist reddish brown clay		
	Remarks: System G		

Mon, 18-AUG-2008 14:51:47

Appendix 6

Strength Tests

2003 Triaxial Strength Tests

2008 Direct Simple Shear Tests

2003 Triaxial Strength Tests

LABORATORY TESTING DATA SHEET

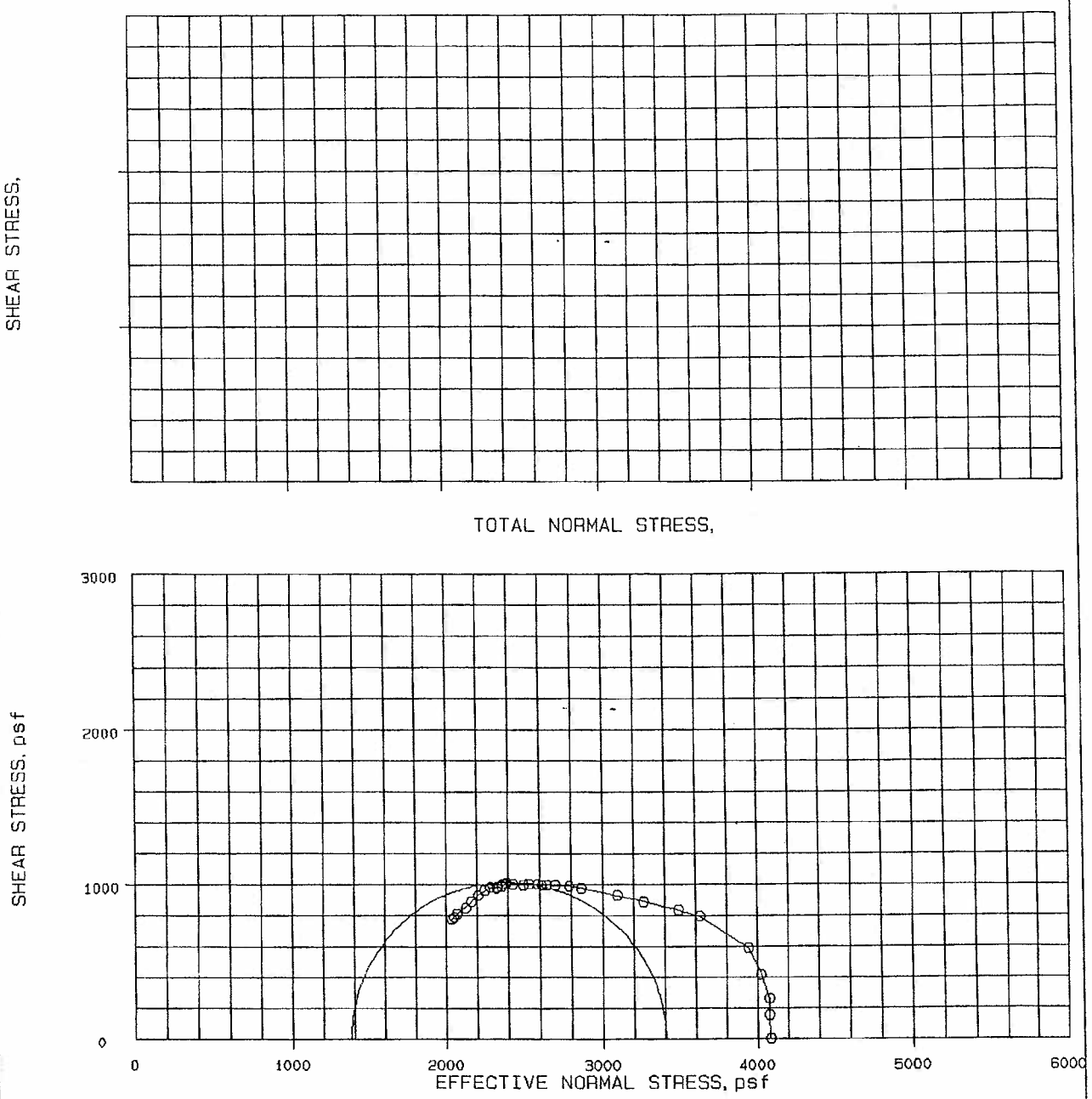
Project Name: NEW BRITAIN-HARTFORD BUSWAY CONNECTICUT
Project No.: L17828 — Assigned By: D. Gaffney — Reviewed By: [signature]
Project Engineer: D. SCHULZE — Date: Feb.04 — Date Reviewed: 2/24/04

Boring/ Test Pit No.	Sample No.	Depth ft.	Lab No.	Identification Tests: Water Content %	LL %	PL %	Sieve -200 %	Hyd -2μ %	ORG %	G_s	Dry unit wt. pcf	Density: γ_d MAX (pcf) / W_{opt} (%)	Permeability cm/sec	Strength Tests: Torvane or Type Test	$\bar{\sigma}_c$ psf	Failure Criteria	$\sigma_1 - \sigma_3$ or τ psf	Strain %	Consol.: $\frac{C_c}{1+e_0}$	Laboratory Log and Soil Description
SB-56	ST-1	30.0-32.0	401		Average Total Unit Weight (30.0-32.0') = 103.0 Pcf															Gray-brown Varved Soil as follows:
		30.1		62.8	(Clay Portion)									Tv= 0.20 tsf						Fat Clay (CH) grading to Silt (ML)
		30.1-30.6		60.3							62.9			CIU	4320	P/A MAX	2027	5.7		
		30.6		44.5	(Silt Portion)									Tv= 0.20 tsf						Varve thickness varies from 0.5-1.5" Clay portion varies from 0.25-1.25"
		30.6-31.1		60.5							65.5			CIU	5760	P/A MAX	2846	5.1		in thickness and comprises approx. 25-50% of total varve
		31.1		53.6	(entire varve)									Tv= 0.21 tsf						Note: 0.5" piece of Siltstone
		31.1-31.7		62.0							63.8			CIU	7200	P/A MAX	3395	6.6		observed at 30.5'
		31.7-31.8		66.1							61.6			Tv= 0.20 tsf					0.20	
		31.0-32.0		60.2	56	27	95	57		2.85	(Clay Portion)									

GZA GeoEnvironmental, Inc.

Q:\NEWTON\LAB\LABFORM7.XLS

labform1.xls



SOIL DESCRIPTION:	See Summary Sheet	
LIQUID LIMIT 0 %	PLASTIC LIMIT 0	SPECIFIC GRAVITY 0

FAILURE CRITERIA $\sigma_1 - \sigma_3$ MAX

REMARKS

NEW BRITAIN-HARTFORD BUSWAY
CONNECTICUT

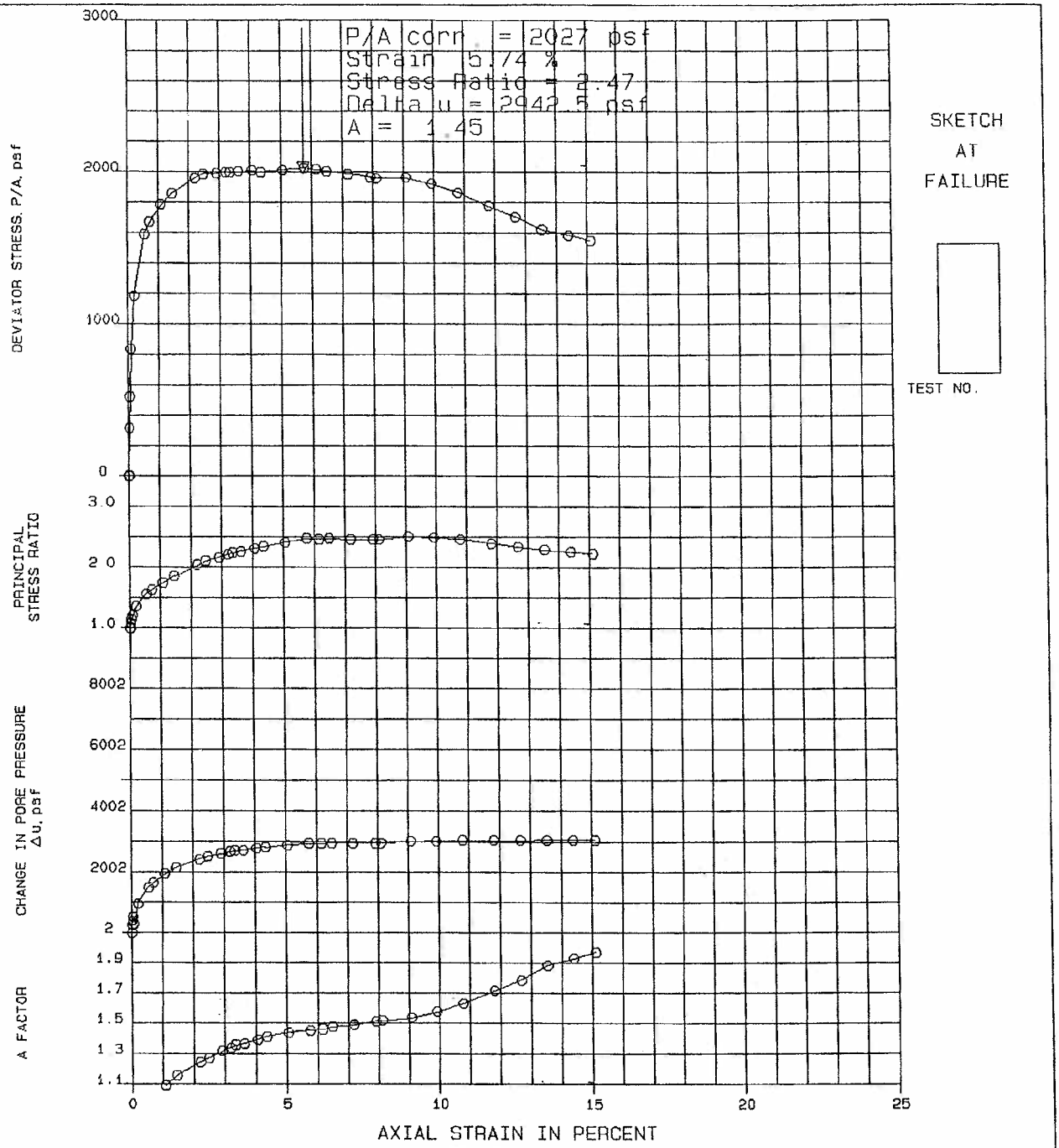
MOHR STRENGTH ENVELOPE

TRIAXIAL COMPRESSION TESTS (CIU)

FIGURE

BORING NO.	SB-56	TEST SERIES NO	401
SAMPLE	ST-1	DATE	Feb.04
DEPTH	30.1-30.6'		
TECH.	MST		
REVIEWER		FILE	L1782B

GZA GEOENVIRONMENTAL, INC.
ENGINEERS AND SCIENTISTS



TEST NO /SYMBOL	INITIAL CONDITIONS: INITIAL WATER CONTENT, %	INITIAL CONDITIONS: INITIAL DRY UNIT WEIGHT, pcf	INITIAL CONDITIONS: SAMPLE HEIGHT & DIAMETER, IN.	CONDITIONS BEFORE SHEAR: INITIAL STRESSES $\bar{\sigma}_1 = \bar{\sigma}_3$, ksf	CONDITIONS BEFORE SHEAR: FINAL BACK PRESSURE, ksf	CONDITIONS BEFORE SHEAR: VOLUMETRIC STRAIN, %	CONDITIONS BEFORE SHEAR: PORE PRESSURE RESPONSE, %	FINAL CONDITIONS: FINAL WATER CONTENT, %	FINAL CONDITIONS: FINAL DRY UNIT WEIGHT,	RATE OF STRAIN, PERCENT PER MINUTE
401 1.1	60.3	62.9	5.821 2.834	4.32	10.08	12.9	95.8	49.6	72.2	.004

SOIL DESCRIPTION: See Summary Sheet

LIQUID LIMIT 0 % PLASTIC LIMIT 0 % SPECIFIC GRAVITY 0

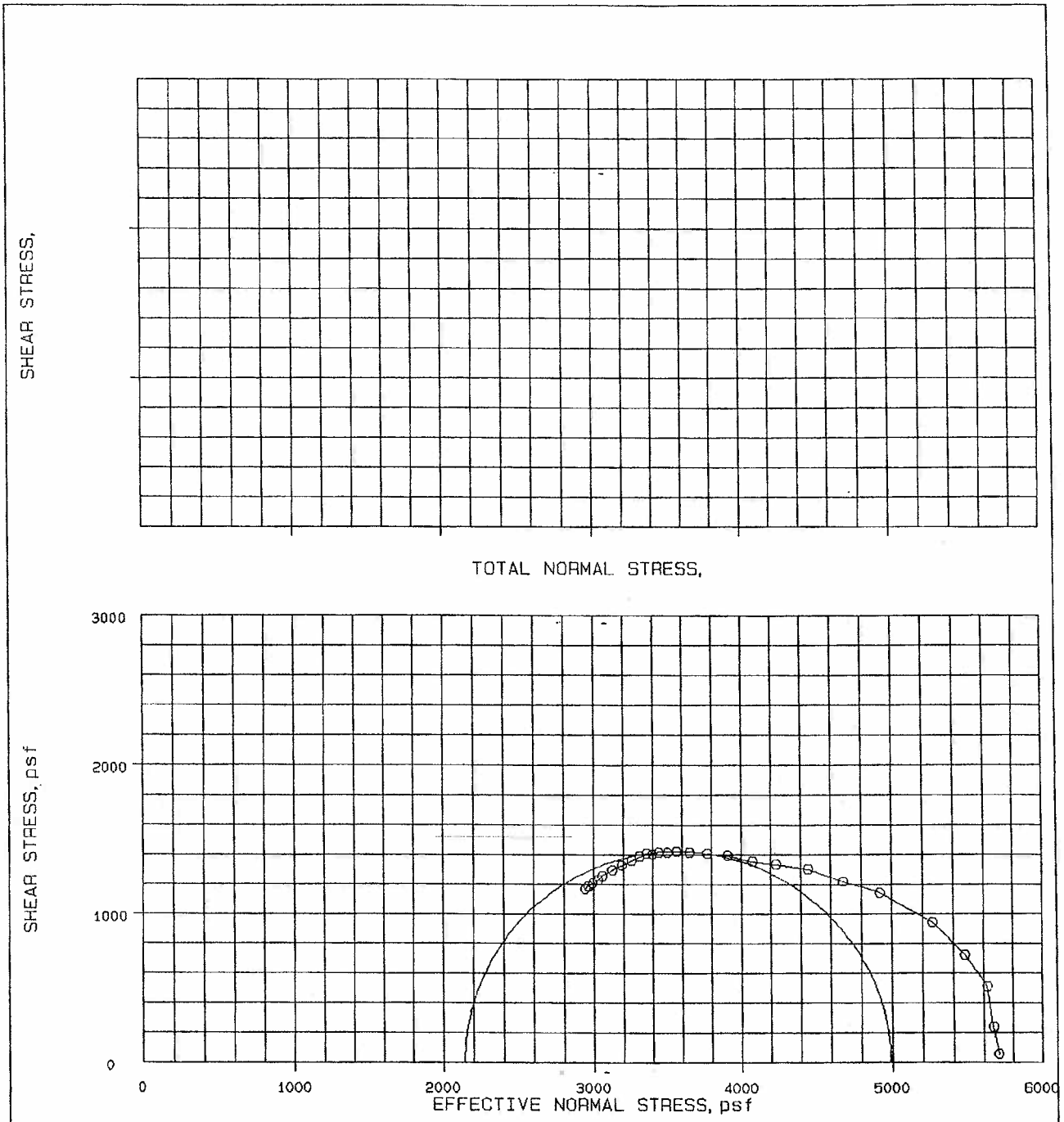
NEW BRITAIN-HARTFORD BUSWAY CONNECTICUT
TRIAXIAL COMPRESSION TESTS ($\overline{CIU}$)

BORING NO. SB-56
SAMPLE ST-1
DEPTH 30.1-30.6'
TECH MST
REVIEWER

TEST SERIES NO. 401
DATE Feb 04
FILE L17828

FIGURE

GZA GEOENVIRONMENTAL, INC.
ENGINEERS AND SCIENTISTS



SOIL DESCRIPTION:	See Summary Sheet	
LIQUID LIMIT 0 %	PLASTIC LIMIT 0	SPECIFIC GRAVITY 0

FAILURE CRITERIA $\sigma_1 - \sigma_3$ MAX

REMARKS

NEW BRITAIN-HARTFORD BUSWAY
CONNECTICUT

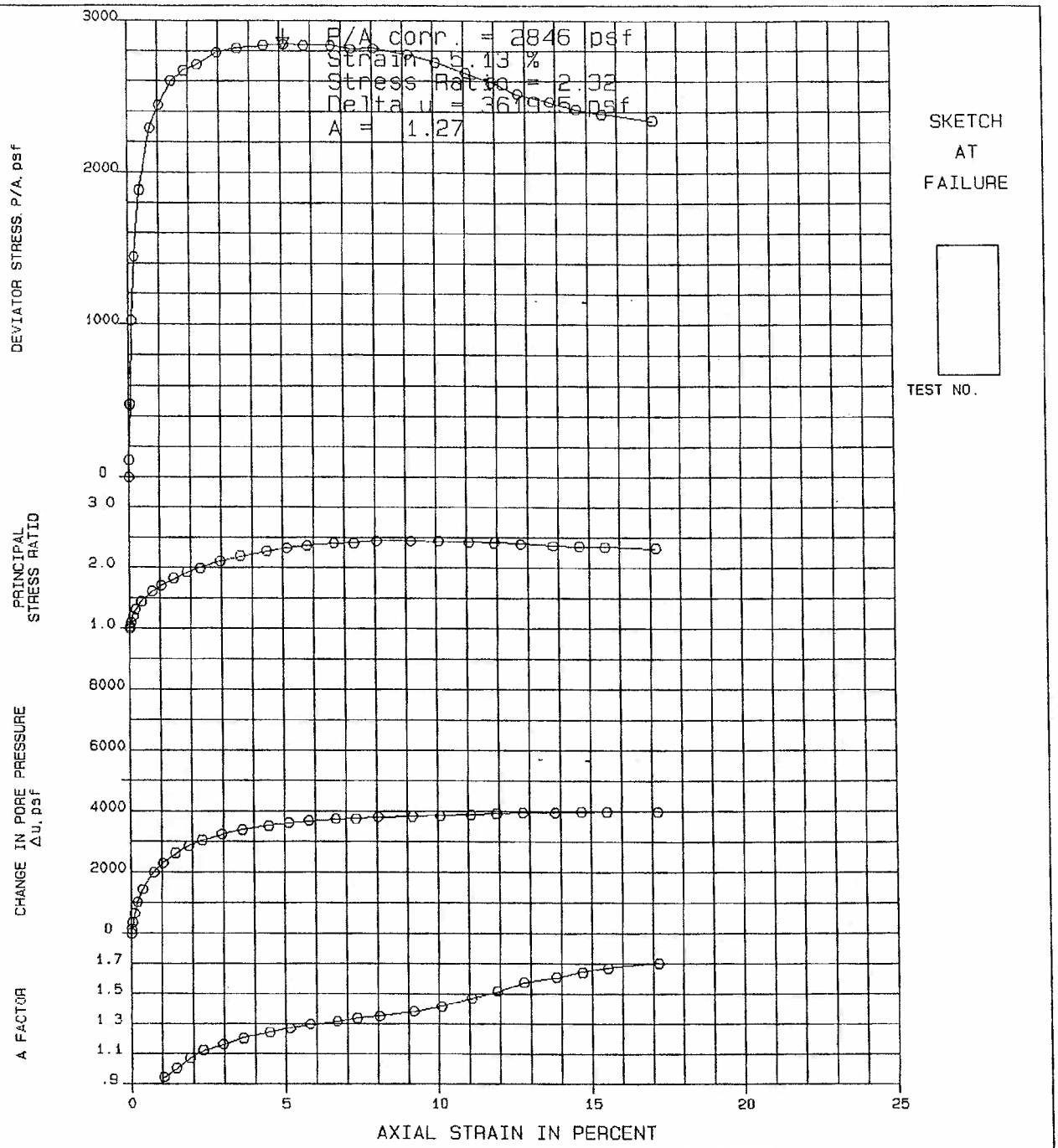
MOHR STRENGTH ENVELOPE

TRIAXIAL COMPRESSION TESTS (CIU)

FIGURE

BORING NO	SB-56	TEST SERIES NO.	401
SAMPLE	ST-1	DATE	Feb.04
DEPTH	30.6-31.1'		
TECH.	MST		
REVIEWER		FILE	L1782B

GZA GEOENVIRONMENTAL, INC.
ENGINEERS AND SCIENTISTS



TEST NO./SYMBOL	INITIAL CONDITIONS: INITIAL WATER CONTENT, %	INITIAL CONDITIONS: INITIAL DRY UNIT WEIGHT, pcf	INITIAL CONDITIONS: SAMPLE HEIGHT & DIAMETER, IN.	CONDITIONS BEFORE SHEAR: INITIAL STRESSES $\bar{\sigma}_1 = \bar{\sigma}_3$, ksf	CONDITIONS BEFORE SHEAR: FINAL BACK PRESSURE, ksf	CONDITIONS BEFORE SHEAR: VOLUMETRIC STRAIN, %	CONDITIONS BEFORE SHEAR: PORE PRESSURE RESPONSE, %	FINAL CONDITIONS: FINAL WATER CONTENT, %	FINAL CONDITIONS: FINAL DRY UNIT WEIGHT,	RATE OF STRAIN, PERCENT PER MINUTE
401 1.2	60.5	65.5	5.703 2.815	5.76	8.64	13.2	95.5	46.8	75.5	.005

SOIL DESCRIPTION: See Summary Sheet

LIQUID LIMIT 0 % PLASTIC LIMIT 0 % SPECIFIC GRAVITY 0

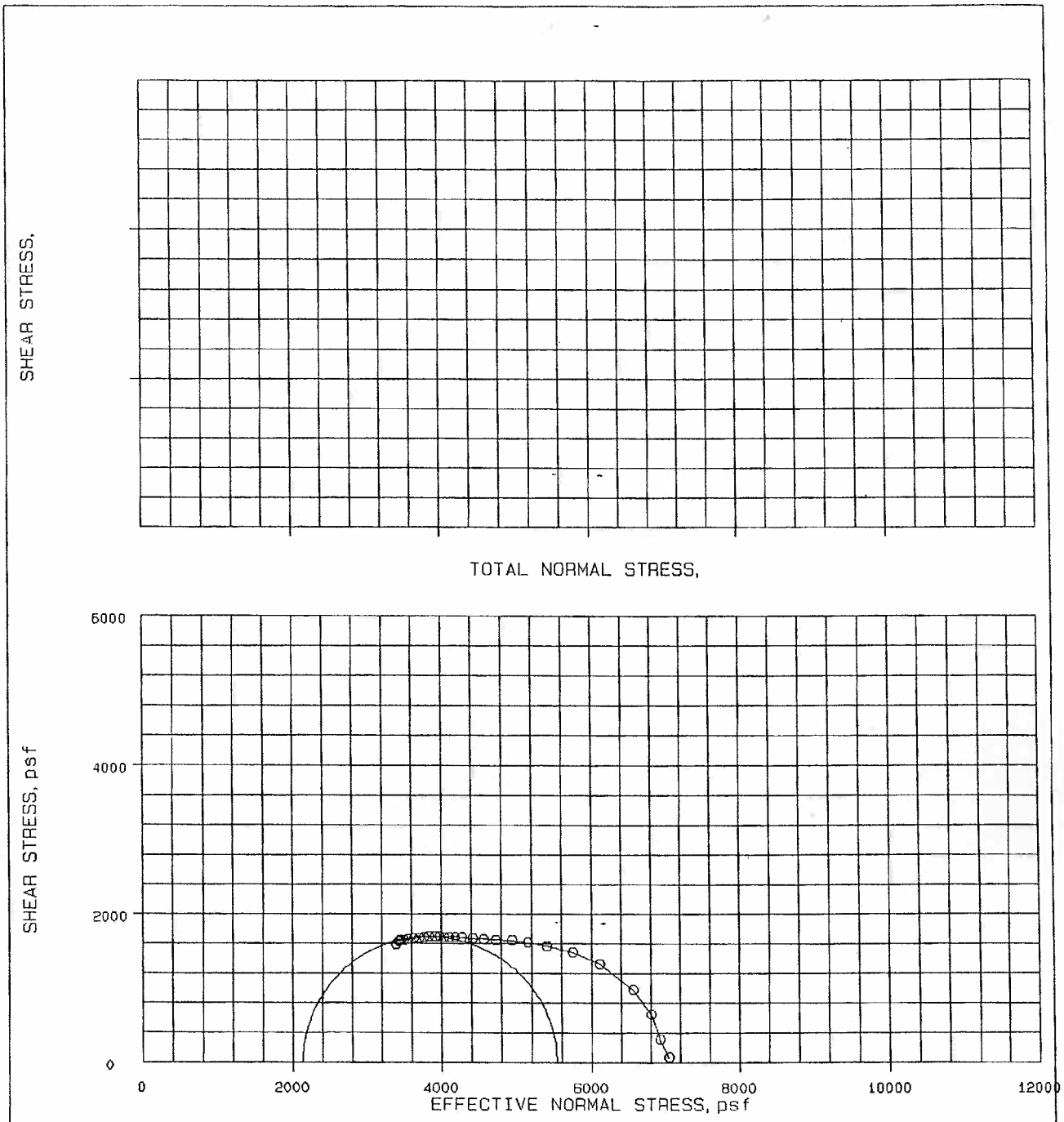
NEW BRITAIN-HARTFORD BUSWAY
CONNECTICUT
TRIAXIAL COMPRESSION TESTS ($\overline{CIU}$)

BORING NO. SB-56
SAMPLE ST-1
DEPTH 30.6-31.1'
TECH. MST
REVIEWER

TEST SERIES NO. 401
DATE Feb.04
FILE L1782B

FIGURE

GZA GEOENVIRONMENTAL, INC.
ENGINEERS AND SCIENTISTS



SOIL DESCRIPTION:	See Summary Sheet				
LIQUID LIMIT	0 %	PLASTIC LIMIT	0	SPECIFIC GRAVITY	0

FAILURE CRITERIA $\sigma_1 - \sigma_3$ MAX

REMARKS

NEW BRITAIN-HARTFORD BUSWAY
CONNECTICUT

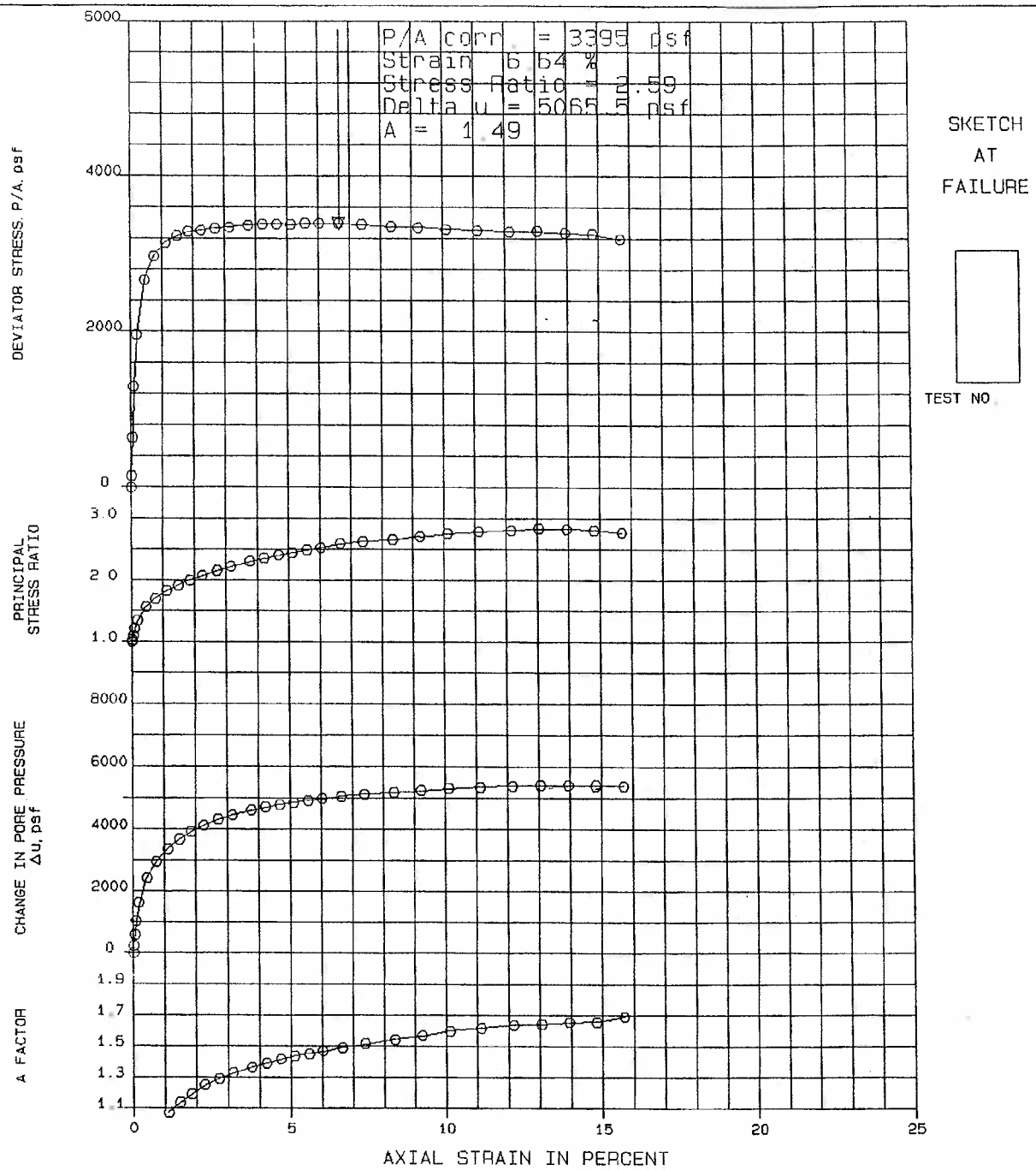
MOHR STRENGTH ENVELOPE

TRIAXIAL COMPRESSION TESTS (CIU)

FIGURE

BORING NO.	SB-56	TEST SERIES NO.	401
SAMPLE	ST-1	DATE	Feb.04
DEPTH	31.1-31.7'		
TECH	MST		
REVIEWER		FILE	L1782B

GZA GEOENVIRONMENTAL, INC.
ENGINEERS AND SCIENTISTS



TEST NO./SYMBOL	INITIAL CONDITIONS: INITIAL WATER CONTENT, %	INITIAL CONDITIONS: INITIAL DRY UNIT WEIGHT, pcf	INITIAL CONDITIONS: SAMPLE HEIGHT & DIAMETER, IN.	CONDITIONS BEFORE SHEAR: INITIAL STRESSES $\bar{\sigma}_1 = \bar{\sigma}_3$, ksf	CONDITIONS BEFORE SHEAR: FINAL BACK PRESSURE, ksf	CONDITIONS BEFORE SHEAR: VOLUMETRIC STRAIN, %	CONDITIONS BEFORE SHEAR: PORE PRESSURE RESPONSE, %	FINAL CONDITIONS: FINAL WATER CONTENT, %	FINAL CONDITIONS: FINAL DRY UNIT WEIGHT,	RATE OF STRAIN, PERCENT PER MINUTE
401 1.3	62	63.9	5.62 2.83	7.2	8.64	11.7	92.8	47.8	72.2	.004

SOIL DESCRIPTION: See Summary Sheet

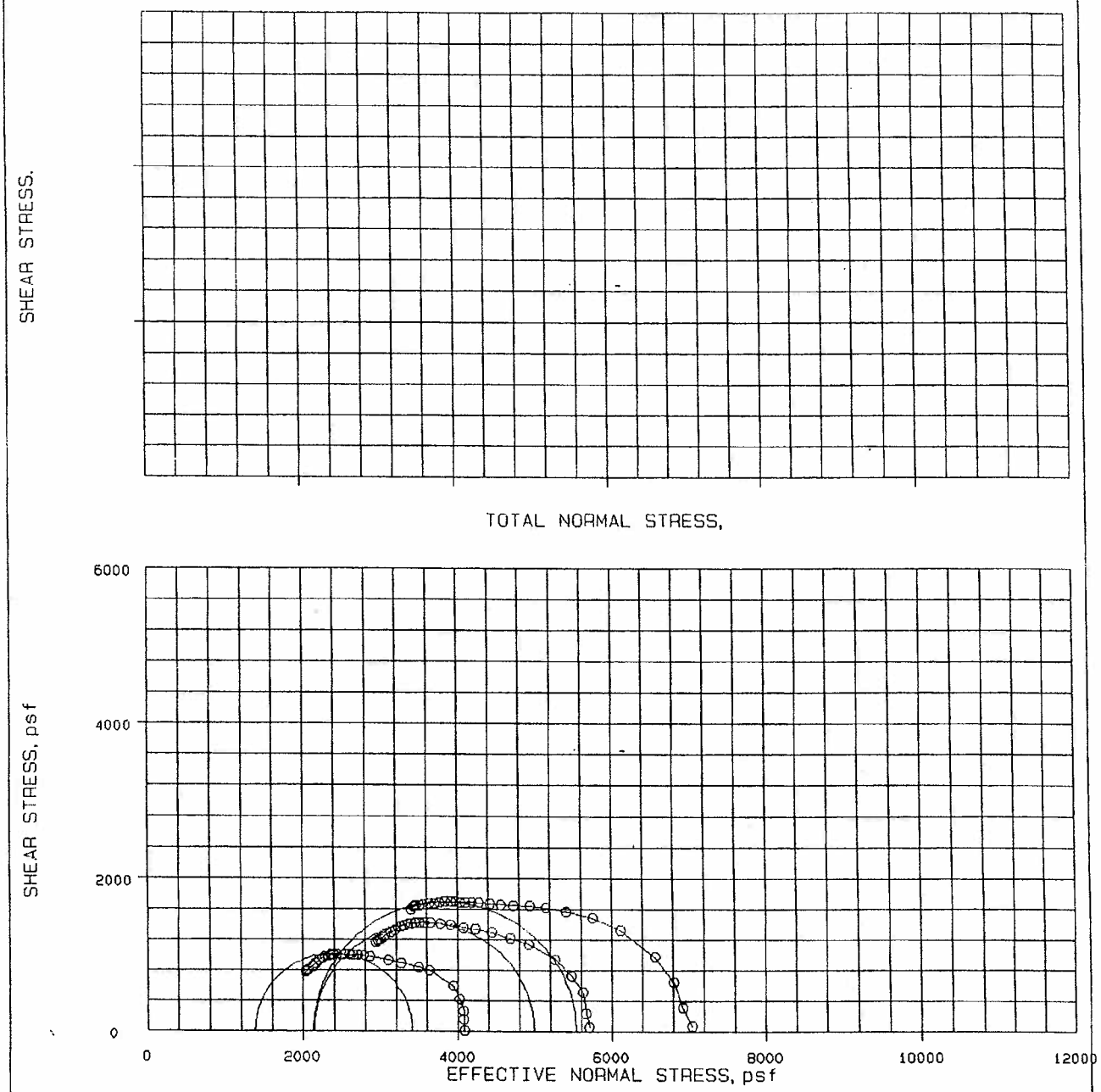
LIQUID LIMIT 0 % PLASTIC LIMIT 0 % SPECIFIC GRAVITY 0

NEW BRITAIN-HARTFORD BUSWAY CONNECTICUT
TRIAXIAL COMPRESSION TESTS ($\bar{C}\bar{I}\bar{U}$)

BORING NO	SB-56	TEST SERIES NO.	401
SAMPLE	ST-1	DATE	Feb.04
DEPTH	31.1-31.7'		
TECH	MST		
REVIEWER		FILE	L1782B

FIGURE

GZA GEOENVIRONMENTAL, INC.
ENGINEERS AND SCIENTISTS



SOIL DESCRIPTION:	See Summary Sheet				
LIQUID LIMIT	0 %	PLASTIC LIMIT	0	SPECIFIC GRAVITY	0

FAILURE CRITERIA $\sigma_1 - \sigma_3$ MAX

REMARKS

NEW BRITAIN-HARTFORD BUSWAY
CONNECTICUT

MOHR STRENGTH ENVELOPE

TRIAXIAL COMPRESSION TESTS (CIU)

FIGURE

BORING NO	SB-56	TEST SERIES	
SAMPLE	ST-1	NO	401
DEPTH	31 1-31 7'	DATE	Feb.04
TECH	MST		
REVIEWER		FILE	L1782B

GZA GEOENVIRONMENTAL, INC
ENGINEERS AND SCIENTISTS

LABORATORY TESTING DATA SHEET

Project Name: NEW BRITAIN-HARTFORD BUSWAY CONNECTICUT
Project No.: L17828
Project Engineer: D. SCHULZE
Assigned By: D. Gaffney
Date: Feb.04
Reviewed By: [signature]
Date Reviewed: 3/24/04

Boring/ Test Pit No.	Sample No.	Depth ft.	Lab No.	Identification Tests: Water Content %	LL %	PL %	Sieve -200 %	Hyd -2μ %	ORG %	G_s	Dry unit wt. pcf	Density: γ_d MAX (pcf) W_{opt} (%)	Permeability cm/sec	Strength Tests: Torvane or Type Test	σ_c psf	Failure Criteria	$\sigma_1 - \sigma_3$ or τ psf	Strain %	Consol. $\frac{C_c}{1+e_0}$	Laboratory Log and Soil Description
SB-67	ST-1	70.0-72.0	403		Average Total Unit Weight (70.0-72.0') = 110.5 Pcf															Upper 4.5" of sample appeared to be disturbed
		70.4		64.1	(Clay Portion)									Tv= 0.25 tsf						
		70.5-70.8		48.1							74.2			CIU	7200	P/A MAX	5360	15.4		Brown Varved Soil as follows: Fat Clay (CH) grading to Silt (ML)
		70.9		66.7	(Clay Portion)									Tv= 0.27 tsf						
		70.9-71.3		47.0							76.4			CIU	10800	P/A MAX	5779	15.5		Varve thickness varies from 2.0-4.0" Clay portion varies from 0.75-1.00" in thickness and comprises approx. 25-50% of total varve
		71.3		76.8	(Clay Portion)									Tv= 0.24 tsf						
		71.3-71.4		64.7							64.4								0.27	
		71.5-71.8		43.9							77.6			CIU	14400	P/A MAX	10256	15.6		
		71.8-71.9		43.1	(Entire Varve)															
		71.9		39.0	(Silt Portion)															
		70.0-72.0		67.8	70	32	100	78		2.76	(Clay Portion)									Note: Specific gravity, limits and sieve/hydrometer run on clay portion

GZA GeoEnvironmental, Inc.

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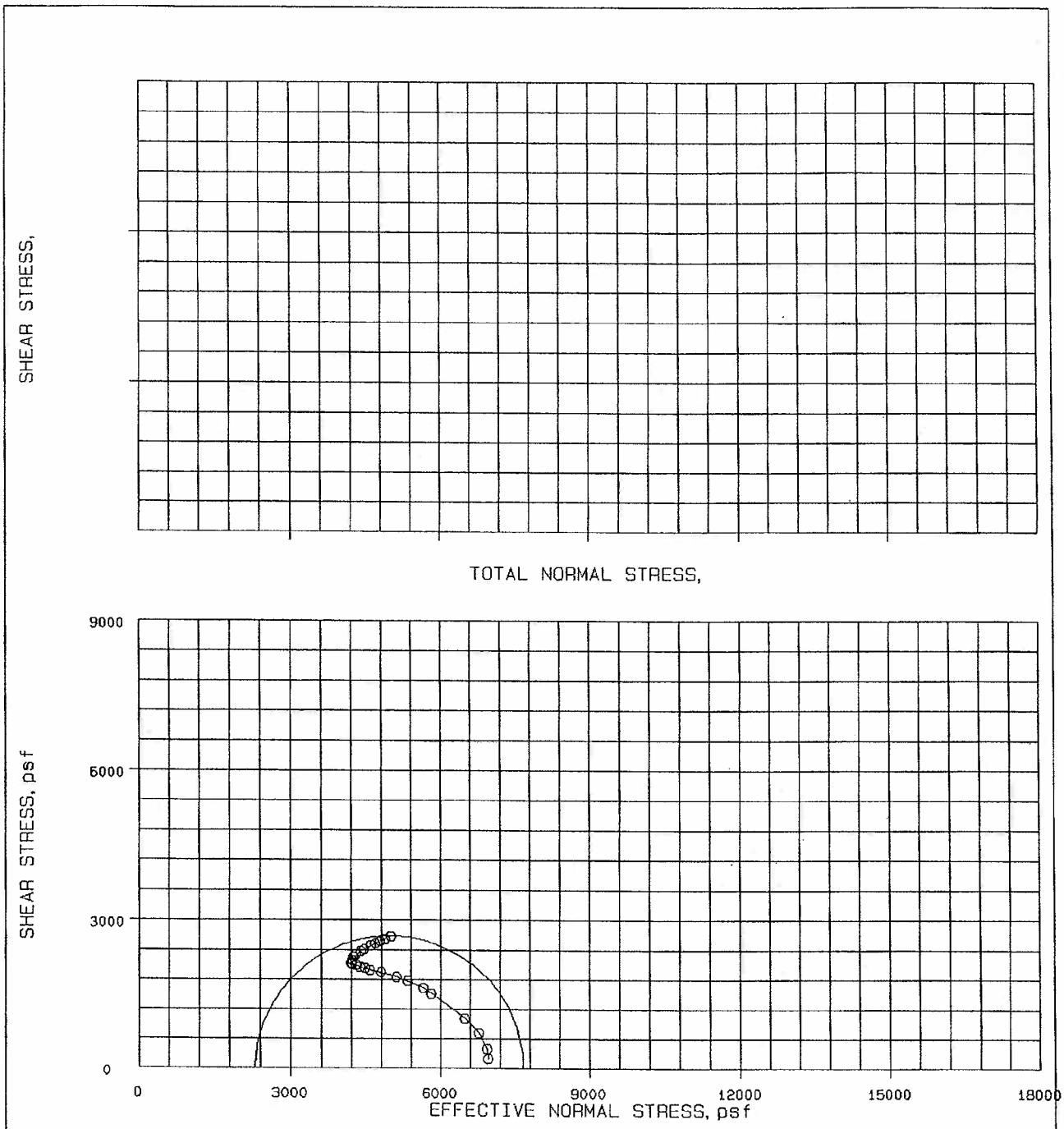
labform1.xls



SOIL DESCRIPTION:		See Summary Sheet			
LIQUID LIMIT	0 %	PLASTIC LIMIT	0	SPECIFIC GRAVITY	2.76

FAILURE CRITERIA P/A MAX

REMARKS

NEW BRITAIN-HARTFORD BUSWAY
CONNECTICUT

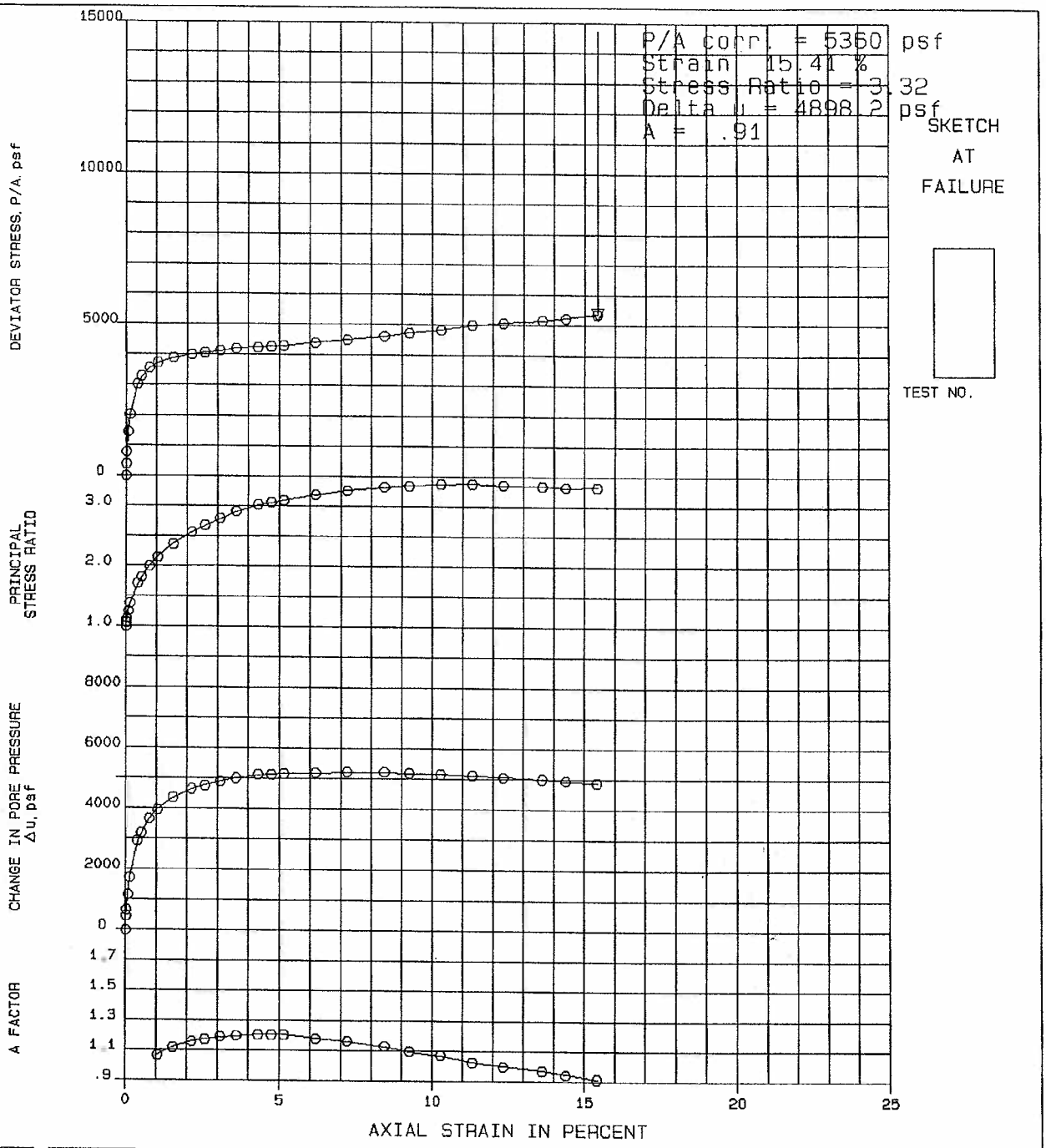
MOHR STRENGTH ENVELOPE

TRIAXIAL COMPRESSION TESTS (CIU)

FIGURE

BORING NO.	SB-67	TEST SERIES NO.	403
SAMPLE	ST-1	DATE	Mar.04
DEPTH	70.5-70.8'		
TECH	MST		
REVIEWER		FILE	L1782B

GZA GEOENVIRONMENTAL, INC.
ENGINEERS AND SCIENTISTS



TEST NO./SYMBOL	INITIAL CONDITIONS: INITIAL WATER CONTENT, %	INITIAL CONDITIONS: INITIAL DRY UNIT WEIGHT, pcf	INITIAL CONDITIONS: SAMPLE HEIGHT & DIAMETER, IN.	CONDITIONS BEFORE SHEAR: INITIAL STRESSES $\bar{\sigma}_1 = \bar{\sigma}_3$, ksf	CONDITIONS BEFORE SHEAR: FINAL BACK PRESSURE, ksf	CONDITIONS BEFORE SHEAR: VOLUMETRIC STRAIN, %	CONDITIONS BEFORE SHEAR: PORE PRESSURE RESPONSE, %	FINAL CONDITIONS: FINAL WATER CONTENT, %	FINAL CONDITIONS: FINAL DRY UNIT WEIGHT,	RATE OF STRAIN, PERCENT PER MINUTE
403.1.1	48.1	74.2	3.998 1.975	7.2	8.64	8	98	39.0	80.7	.03

SOIL DESCRIPTION: See Summary Sheet

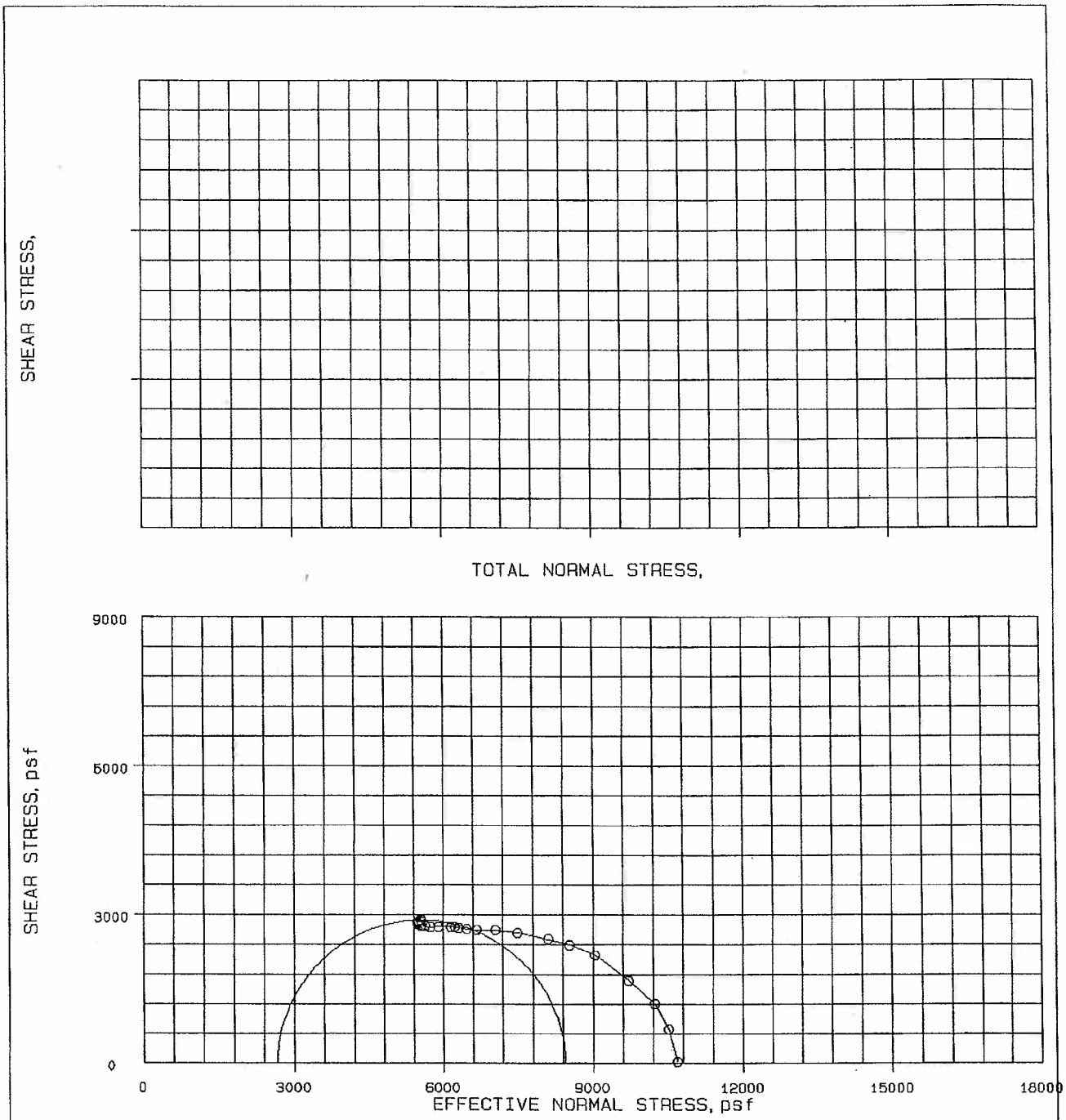
LIQUID LIMIT	0 %	PLASTIC LIMIT	0 %	SPECIFIC GRAVITY	2.76

NEW BRITAIN-HARTFORD BUSWAY
CONNECTICUT
TRIAXIAL COMPRESSION TESTS ($\overline{CIU}$)

BORING NO	SB-67	TEST SERIES NO.	403
SAMPLE	ST-1	DATE	Mar.04
DEPTH	70.5-70.8'		
TECH.	MST		
REVIEWER		FILE	L1782B

FIGURE

GZA GEOENVIRONMENTAL, INC.
ENGINEERS AND SCIENTISTS



SOIL DESCRIPTION:		See Summary Sheet			
LIQUID LIMIT	0 %	PLASTIC LIMIT	0	SPECIFIC GRAVITY	2.76

FAILURE CRITERIA P/A MAX

REMARKS

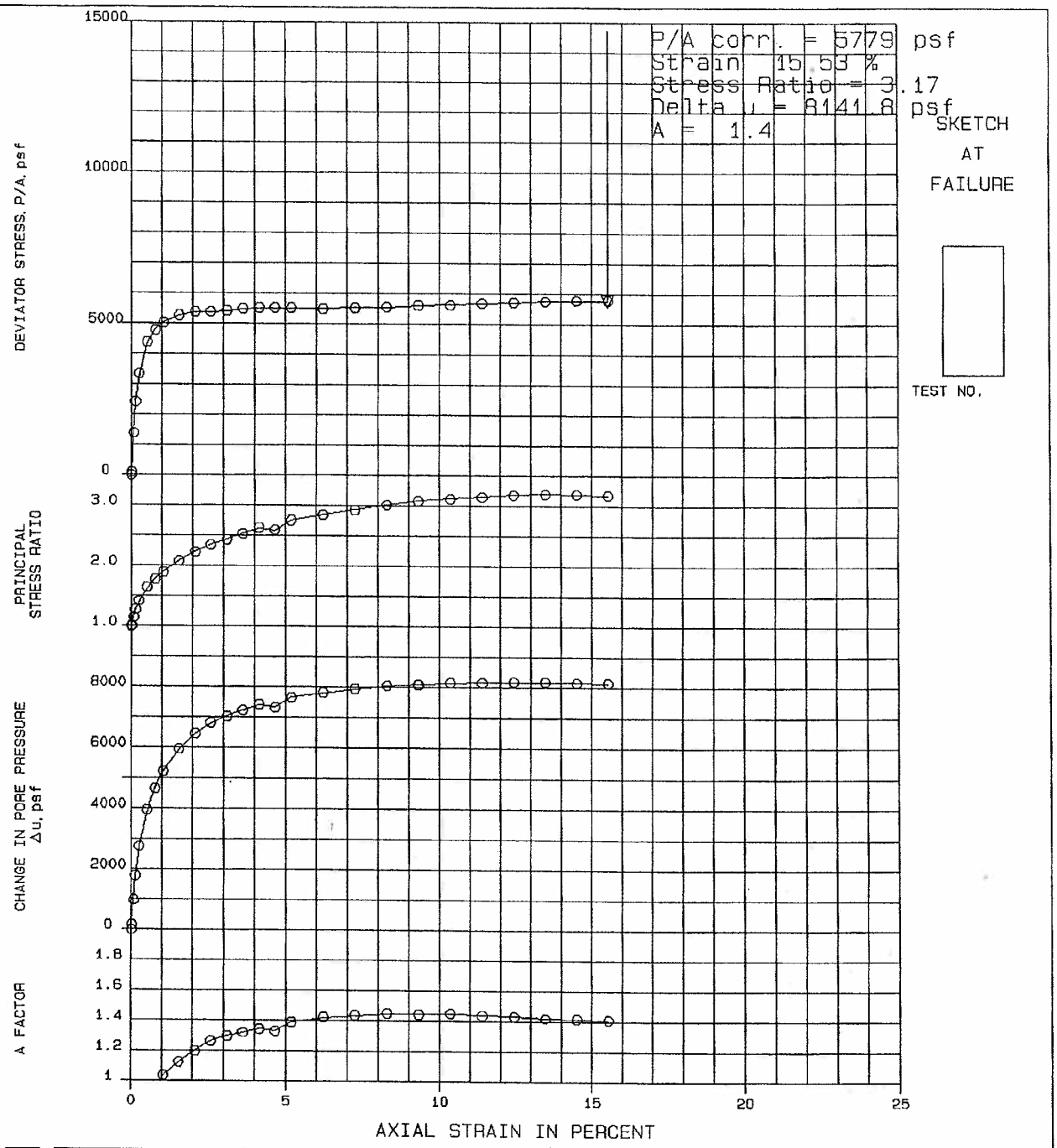
NEW BRITAIN-HARTFORD BUSWAY
CONNECTICUT

MOHR STRENGTH ENVELOPE

TRIAXIAL COMPRESSION TESTS (CIU)

FIGURE

BORING NO	SB-67	TEST SERIES NO	403
SAMPLE	ST-1	DATE	Mar.04
DEPTH	70.9-71.3'		
TECH.	MST		
REVIEWER		FILE	L1782B



TEST NO./SYMBOL	INITIAL CONDITIONS: INITIAL WATER CONTENT, %	INITIAL CONDITIONS: INITIAL DRY UNIT WEIGHT, pcf	INITIAL CONDITIONS: SAMPLE HEIGHT & DIAMETER, IN.	CONDITIONS BEFORE SHEAR: INITIAL STRESSES $\bar{\sigma}_1 = \bar{\sigma}_3$ ksf	CONDITIONS BEFORE SHEAR: FINAL BACK PRESSURE, ksf	CONDITIONS BEFORE SHEAR: VOLUMETRIC STRAIN, %	CONDITIONS BEFORE SHEAR: PORE PRESSURE RESPONSE, %	FINAL CONDITIONS: FINAL WATER CONTENT, %	FINAL CONDITIONS: FINAL DRY UNIT WEIGHT	RATE OF STRAIN, PERCENT PER MINUTE
403.1.2	47	76.4	4.004 1.978	10.8	5.76	10.6	95	39.6	85.5	.03

SOIL DESCRIPTION: See Summary Sheet

LIQUID LIMIT	0 %	PLASTIC LIMIT	0 %	SPECIFIC GRAVITY	2.76

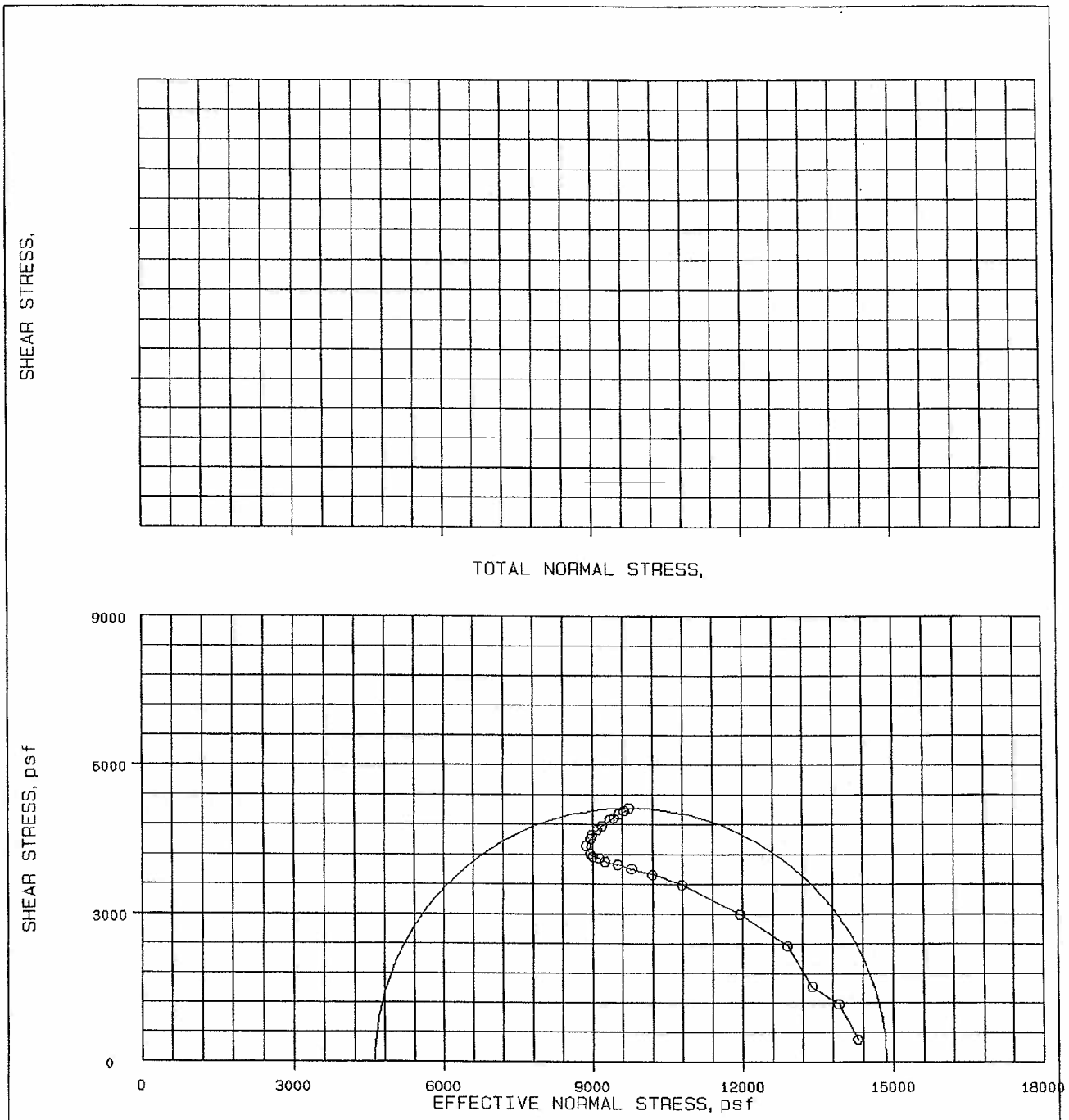
NEW BRITAIN-HARTFORD BUSWAY
CONNECTICUT

TRIAXIAL COMPRESSION TESTS ($\overline{CIU}$)

BORING NO	SB-67	TEST SERIES NO.	403
SAMPLE	ST-1	DATE	Mar.04
DEPTH	70.9-71.3'		
TECH.	MST		
REVIEWER		FILE	L17828

FIGURE

GZA GEOENVIRONMENTAL, INC.
ENGINEERS AND SCIENTISTS



SOIL DESCRIPTION:	See Summary Sheet				
LIQUID LIMIT	0 %	PLASTIC LIMIT	0	SPECIFIC GRAVITY	2.76

FAILURE CRITERIA P/A MAX

REMARKS

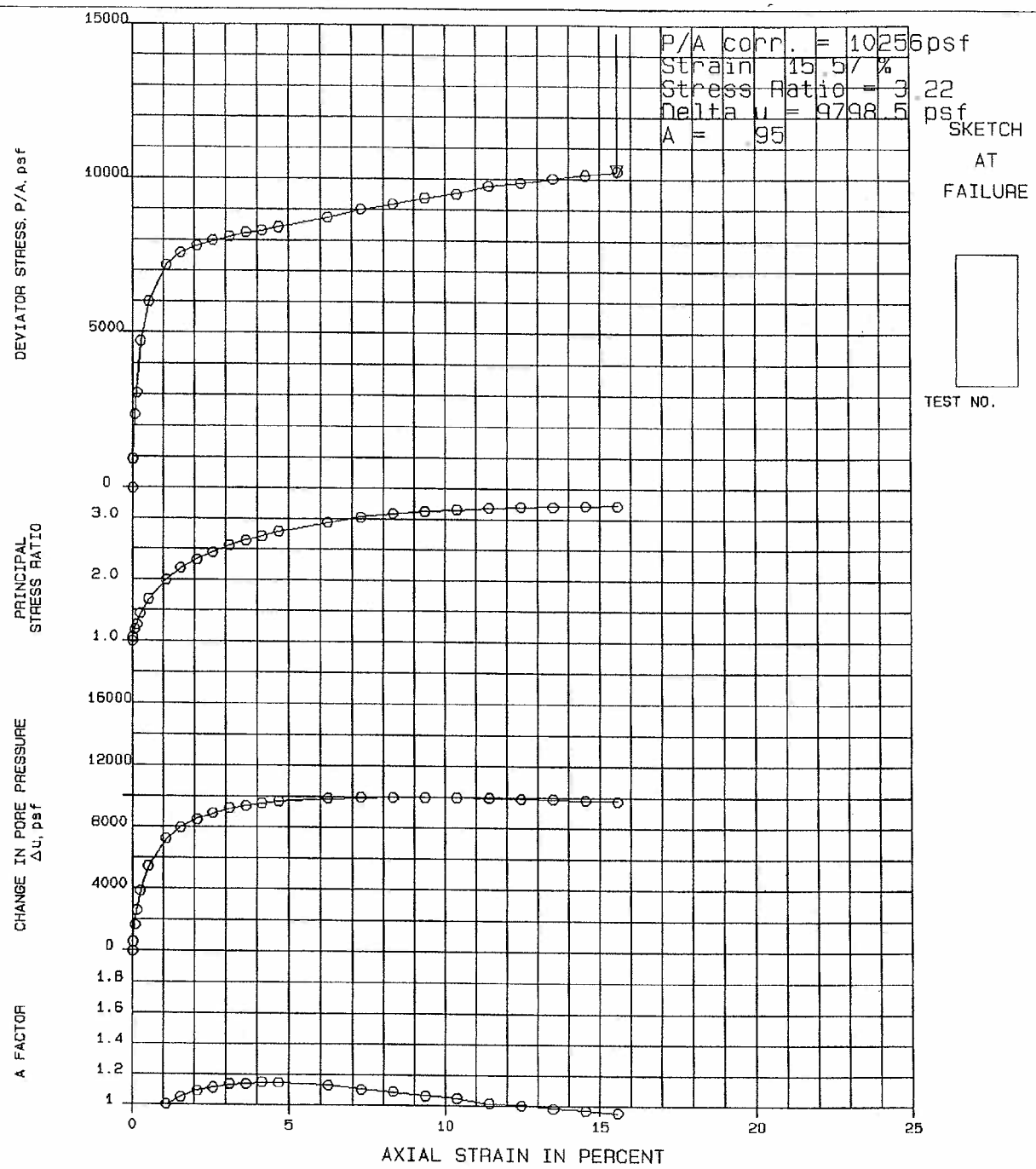
NEW BRITAIN-HARTFORD BUSWAY
CONNECTICUT

MOHR STRENGTH ENVELOPE

TRIAXIAL COMPRESSION TESTS (CIU)

FIGURE

BORING NO	SB-67	TEST SERIES NO.	403
SAMPLE	ST-1	DATE	Mar.04
DEPTH	71.5-71.8'		
TECH.	MST		
REVIEWER		FILE	L1762B



TEST NO./SYMBOL	INITIAL CONDITIONS: INITIAL WATER CONTENT, %	INITIAL DRY UNIT WEIGHT, pcf	SAMPLE HEIGHT & DIAMETER, IN.	CONDITIONS BEFORE SHEAR: INITIAL STRESSES $\bar{\sigma}_1 = \bar{\sigma}_3$, ksf	FINAL BACK PRESSURE, ksf	VOLUMETRIC STRAIN, %	PORE PRESSURE RESPONSE, %	FINAL CONDITIONS: FINAL WATER CONTENT, %	FINAL DRY UNIT WEIGHT,	RATE OF STRAIN, PERCENT PER MINUTE
403.1.3	43.9	77.6	4.002 1.977	14.4	2.16	11.1	95.4	36.1	87.3	.07

SOIL DESCRIPTION: See Summary Sheet

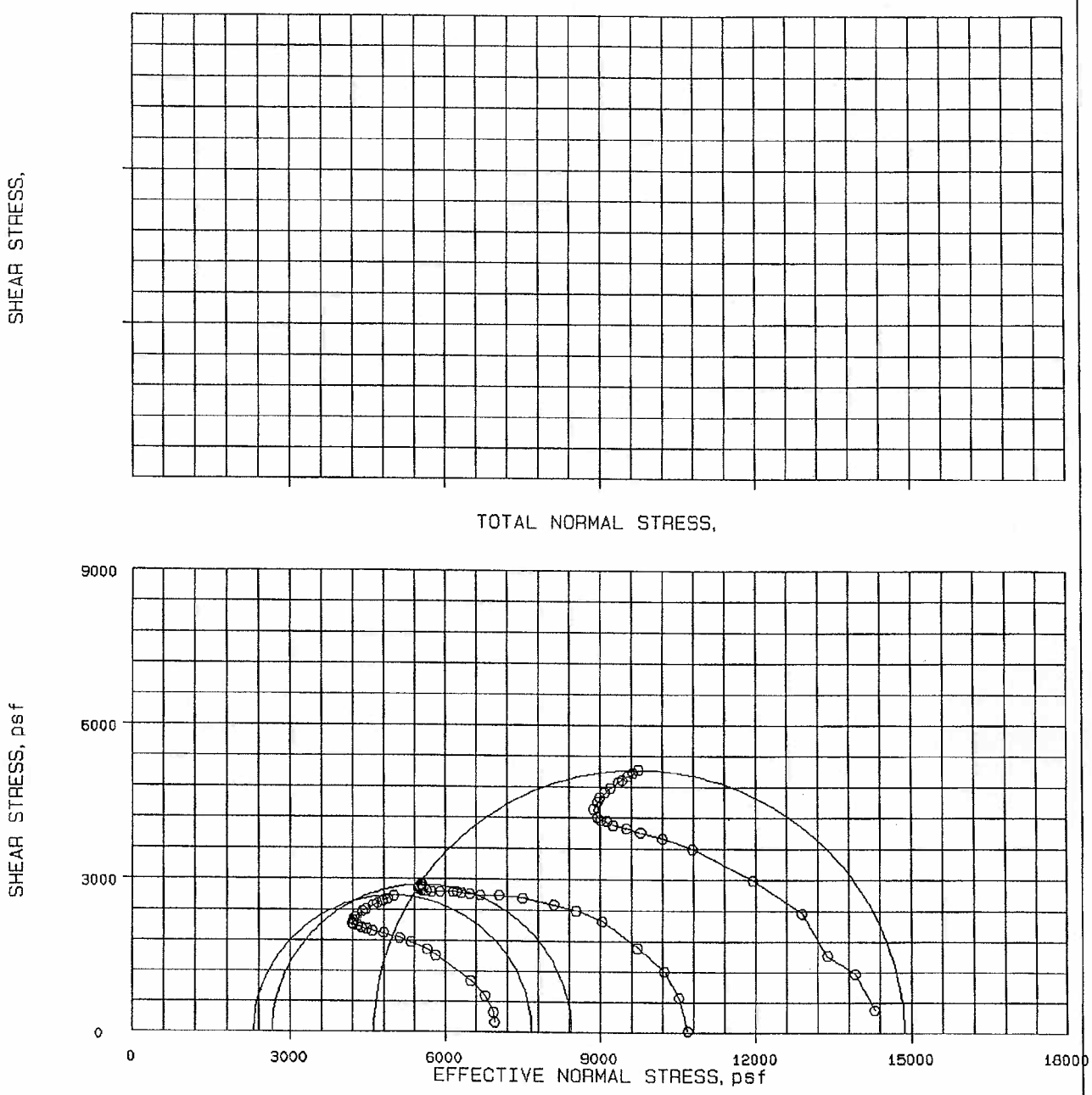
LIQUID LIMIT	0 %	PLASTIC LIMIT	0 %	SPECIFIC GRAVITY	2.76

NEW BRITAIN-HARTFORD BUSWAY
CONNECTICUT
TRIAXIAL COMPRESSION TESTS ($\bar{C}\bar{I}\bar{U}$)

BORING NO	SB-67	TEST SERIES NO.	403
SAMPLE	ST-1	DATE	Mar 04
DEPTH	71.5-71.8'		
TECH	MST		
REVIEWER		FILE	L17628

FIGURE

GZA GEOENVIRONMENTAL, INC.
ENGINEERS AND SCIENTISTS



SOIL DESCRIPTION:	See Summary Sheet				
LIQUID LIMIT	0 %	PLASTIC LIMIT	0	SPECIFIC GRAVITY	2.76

FAILURE CRITERIA P/A MAX

REMARKS

NEW BRITAIN-HARTFORD BUSWAY
CONNECTICUT

MOHR STRENGTH ENVELOPE

TRIAXIAL COMPRESSION TESTS (CIU)

FIGURE

BORING NO.	SB-67	TEST SERIES NO.	403
SAMPLE	ST-1	DATE	Mar.04
DEPTH	71.5-71.8'		
TECH.	MST		
REVIEWER		FILE	L1782B

GZA GEOENVIRONMENTAL, INC.
ENGINEERS AND SCIENTISTS

LABORATORY TESTING DATA SHEET

Project Name: NEW BRITAIN-HARTFORD BUSWAY CONNECTICUT
Project No.: L17828
Project Engineer: D. SCHULZE
Assigned By: D. Gaffney
Date: Mar.04
Reviewed By: [signature]
Date Reviewed: 3/18/04

Boring/ Test Pit No.	Sample No.	Depth ft.	Lab No.	Identification Tests: Water Content %	LL %	PL %	Sieve -200 %	Hyd -2μ %	ORG %	G_s	Dry unit wt. pcf	Density: γ_d MAX (pcf) / W_{opt} (%)	Permeability cm/sec	Strength Tests: Torvane or Type Test	σ_c psf	Failure Criteria	$\sigma_1 - \sigma_3$ or τ psf	Strain %	Consol. $\frac{C_c}{1+e_0}$	Laboratory Log and Soil Description
SB-70	UP-1	50.0-52.0	404		Average Total Unit Weight (50.0-52.0') = 106.6 Pcf															Brown Varved Soil as follows:
		50.1		71.5	(Clay Portion)									Tv= 0.28 tsf						Fat Clay (CH) grading to Silt (ML)
		50.2-50.5		61.3							64.7			CIU	7200	P/A MAX	3211	2.6		
		50.5-50.9		57.1							67.1			CIU	10800	P/A MAX	4813	4.7		Varve thickness varies from 0.375-1.0"
		50.9		70.4	(Clay Portion)									Tv= 0.30 tsf						Clay portion varies from 0.25-1" in thickness and comprises approx. 70-90% of total varve
		51.1-51.2		59.6							66.6								0.23	
		51.4-51.8		57.6							67.1			CIU	14400	P/A MAX	6756	5.3		
		51.8		71.6	(Clay Portion)									Tv= 0.30 tsf						
		50.0-52.0		67.4	63	30	100	74		2.86	(Clay Portion)									Note: Specific gravity, limits and sieve/hydrometer run on clay portion

GZA GeoEnvironmental, Inc.

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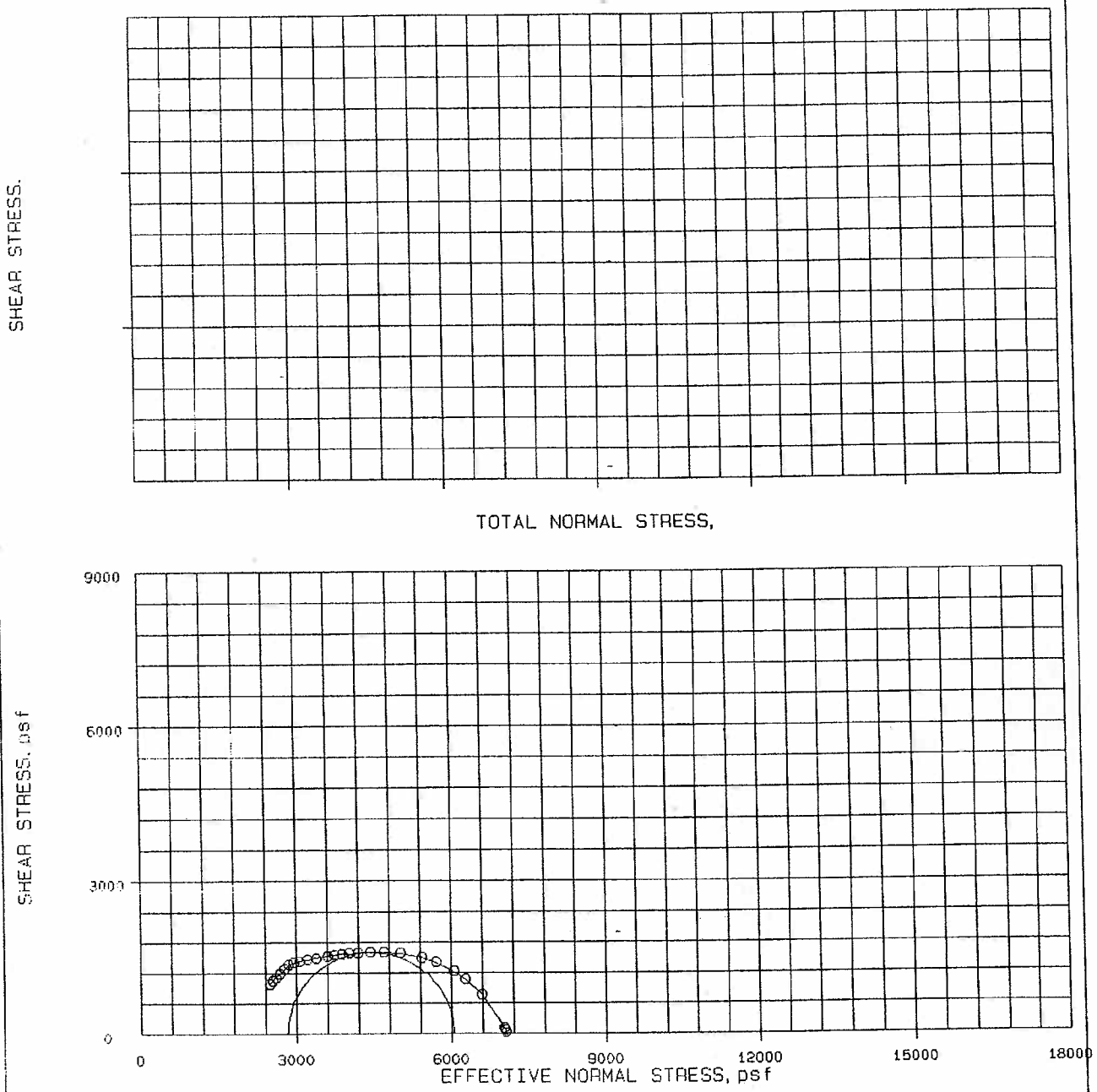
labform1.xls



SOIL DESCRIPTION:		See Summary Sheet			
LIQUID LIMIT	0 %	PLASTIC LIMIT	0	SPECIFIC GRAVITY	2.06

FAILURE CRITERIA

REMARKS

NEW BRITAIN-HARTFORD BUSWAY
CONNECTICUT

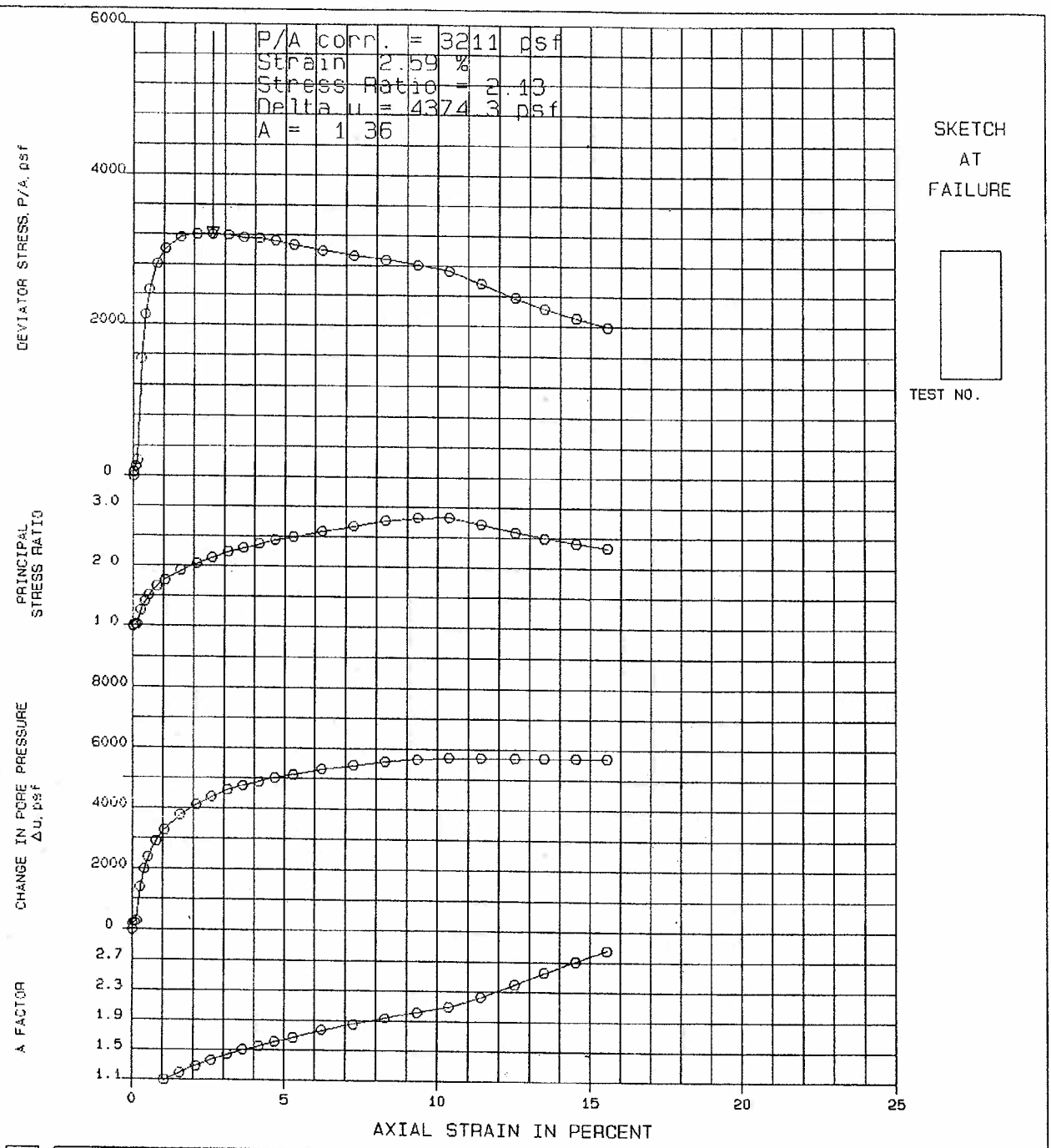
MOHR STRENGTH ENVELOPE

TRIAXIAL COMPRESSION TESTS (CIU)

FIGURE

BORING NO	SB-70	TEST SERIES NO.	404
SAMPLE	UP-1	DATE	Mar.04
DEPTH	50.2-50.5'		
TECH.	MST		
REVIEWER		FILE	L17828

GZA GEOENVIRONMENTAL, INC.
ENGINEERS AND SCIENTISTS



TEST NO./SYMBOL	INITIAL CONDITIONS: INITIAL WATER CONTENT, %	INITIAL DRY UNIT WEIGHT, pcf	SAMPLE HEIGHT & DIAMETER, IN	CONDITIONS BEFORE SHEAR: INITIAL STRESSES $\bar{\sigma}_1 = \bar{\sigma}_3$, ksf	FINAL BACK PRESSURE, ksf	VOLUMETRIC STRAIN, %	PORE PRESSURE RESPONSE, %	FINAL CONDITIONS: FINAL WATER CONTENT, %	FINAL DRY UNIT WEIGHT,	RATE OF STRAIN, PERCENT PER MINUTE
404 1.1	61.3	64.7	4.002 1.971	7.2	8.64	10.8	96	51.2	72.6	03

SOIL DESCRIPTION: See Summary Sheet

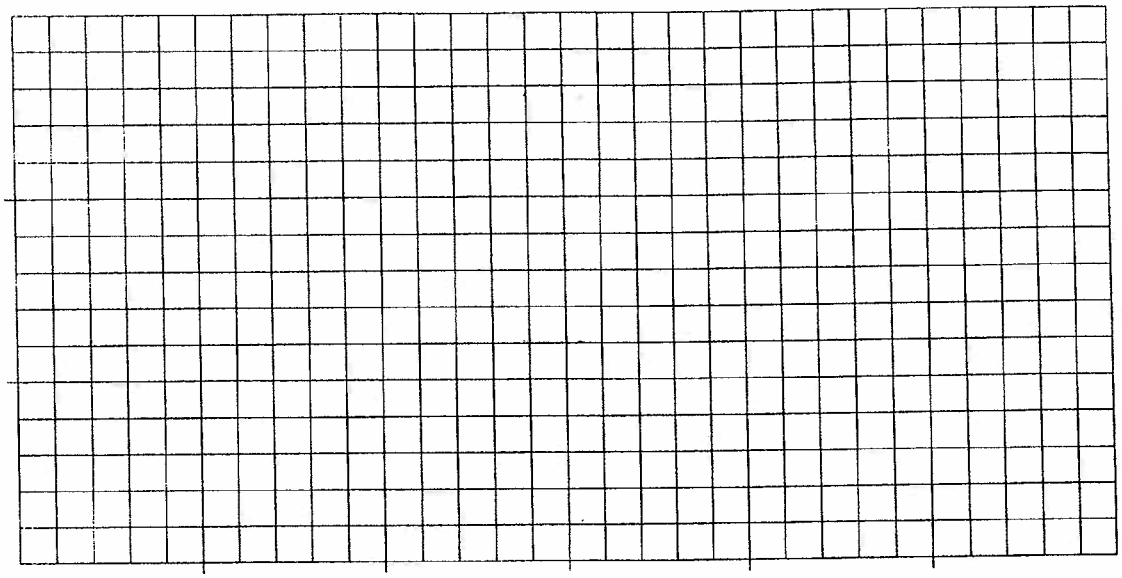
LIQUID LIMIT	0 %	PLASTIC LIMIT	0 %	SPECIFIC GRAVITY	2.86

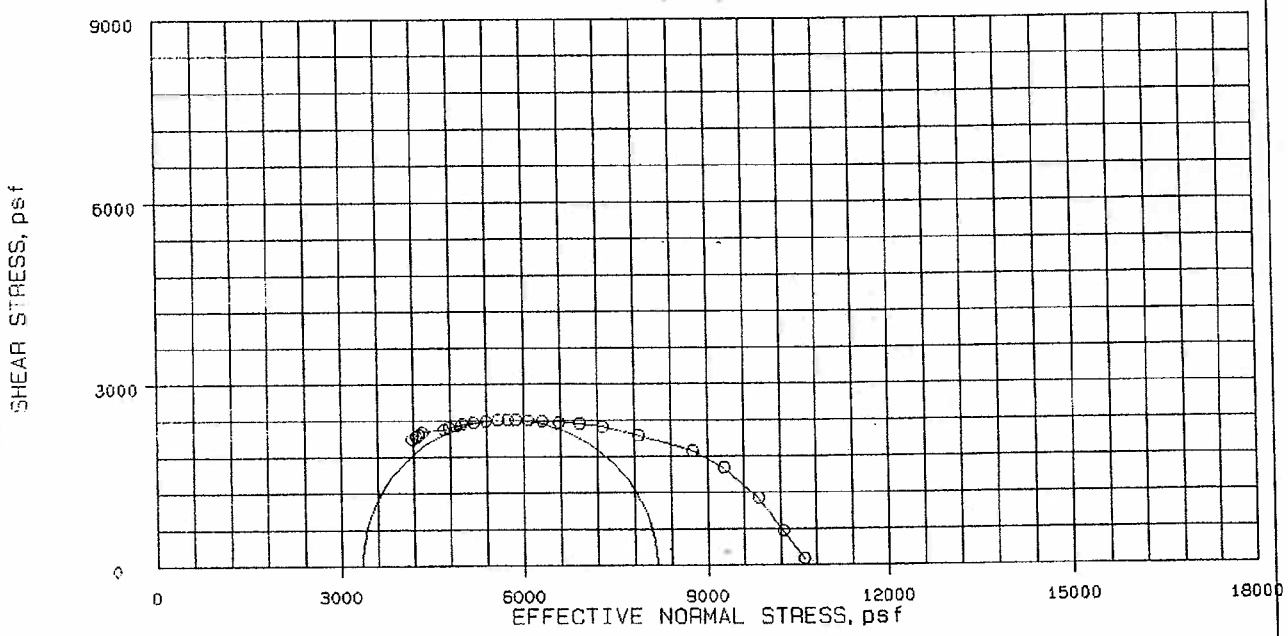
NEW BRITAIN-HARTFORD BUSWAY
CONNECTICUT
TRIAXIAL COMPRESSION TESTS ($\overline{CIU}$)

BORING NO.	SB-70	TEST SERIES NO.	404
SAMPLE	UP-1	DATE	Mar.04
DEPTH	50.2-50.5'		
TECH	MST		
REVIEWER		FILE	L17828

FIGURE

GZA GEOENVIRONMENTAL, INC.
ENGINEERS AND SCIENTISTS





SOIL DESCRIPTION:	See Summary Sheet				
LIQUID LIMIT	0 %	PLASTIC LIMIT	0	SPECIFIC GRAVITY	2.86

FAILURE CRITERIA

REMARKS

NEW BRITAIN-HARTFORD BUSWAY
CONNECTICUT

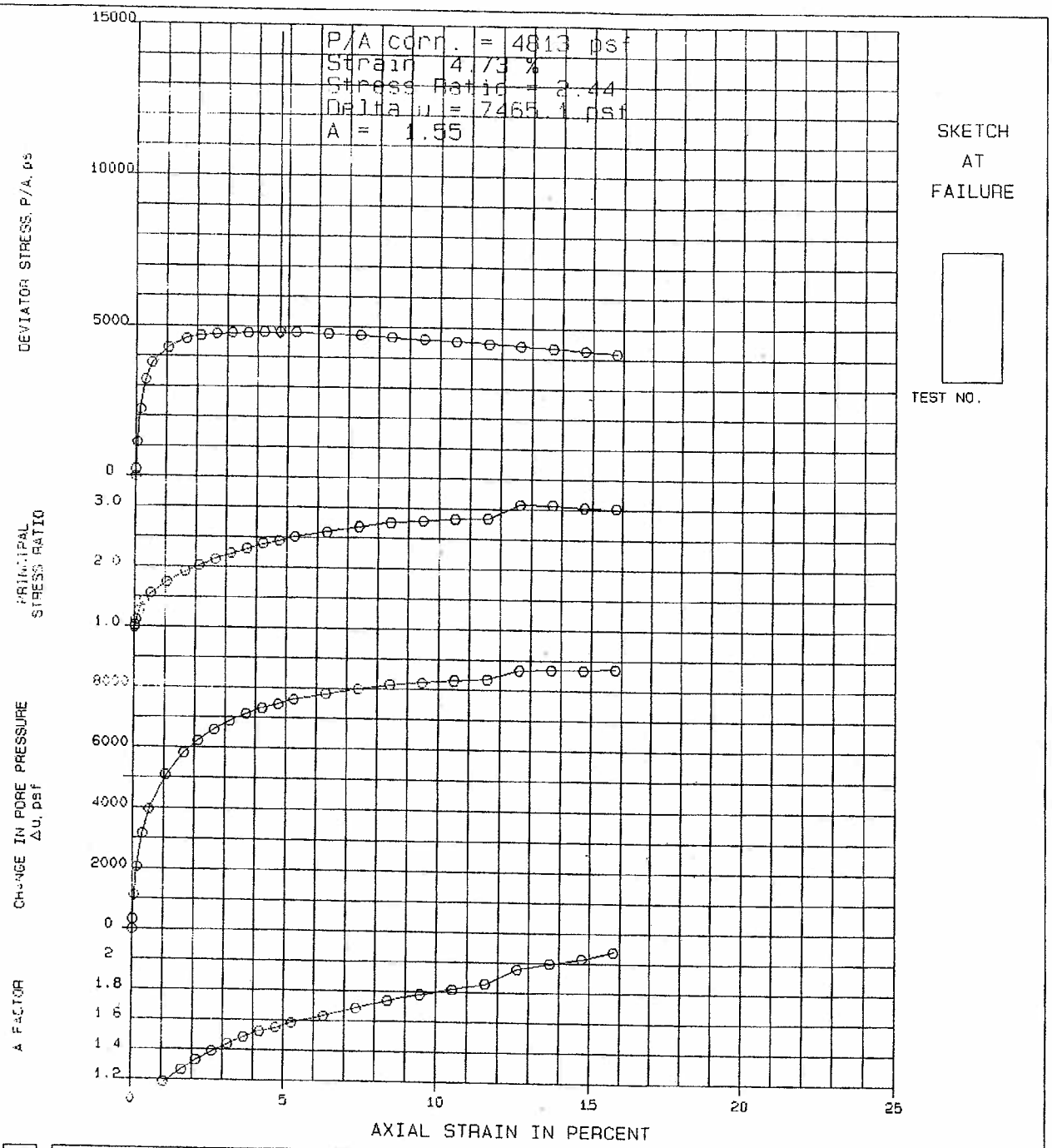
MOHR STRENGTH ENVELOPE

TRIAXIAL COMPRESSION TESTS (CIU)

FIGURE

BORING NO.	SB-70	TEST SERIES NO	404
SAMPLE	UP-1	DATE	Mar.04
DEPTH	50.5-50.9'		
TECH	MST		
REVIEWER		FILE	L1782B

GZA GEOENVIRONMENTAL, INC.
ENGINEERS AND SCIENTISTS



TEST NO /SYMBOL	INITIAL CONDITIONS: INITIAL WATER CONTENT, %	INITIAL CONDITIONS: INITIAL DRY UNIT WEIGHT, pcf	INITIAL CONDITIONS: SAMPLE HEIGHT & DIAMETER, IN.	CONDITIONS BEFORE SHEAR: INITIAL STRESSES $\bar{\sigma}_1 = \bar{\sigma}_3$, ksf	CONDITIONS BEFORE SHEAR: FINAL BACK PRESSURE, ksf	CONDITIONS BEFORE SHEAR: VOLUMETRIC STRAIN, %	CONDITIONS BEFORE SHEAR: PORE PRESSURE RESPONSE, %	FINAL CONDITIONS: FINAL WATER CONTENT, %	FINAL CONDITIONS: FINAL DRY UNIT WEIGHT	RATE OF STRAIN, PERCENT PER MINUTE
404 1.2	57.1	67.1	4.001 1.97	10.8	5.76	14.9	96	44.4	78.9	.02

SOIL DESCRIPTION: See Summary Sheet

LIQUID LIMIT 0 % PLASTIC LIMIT 0 % SPECIFIC GRAVITY 2.86

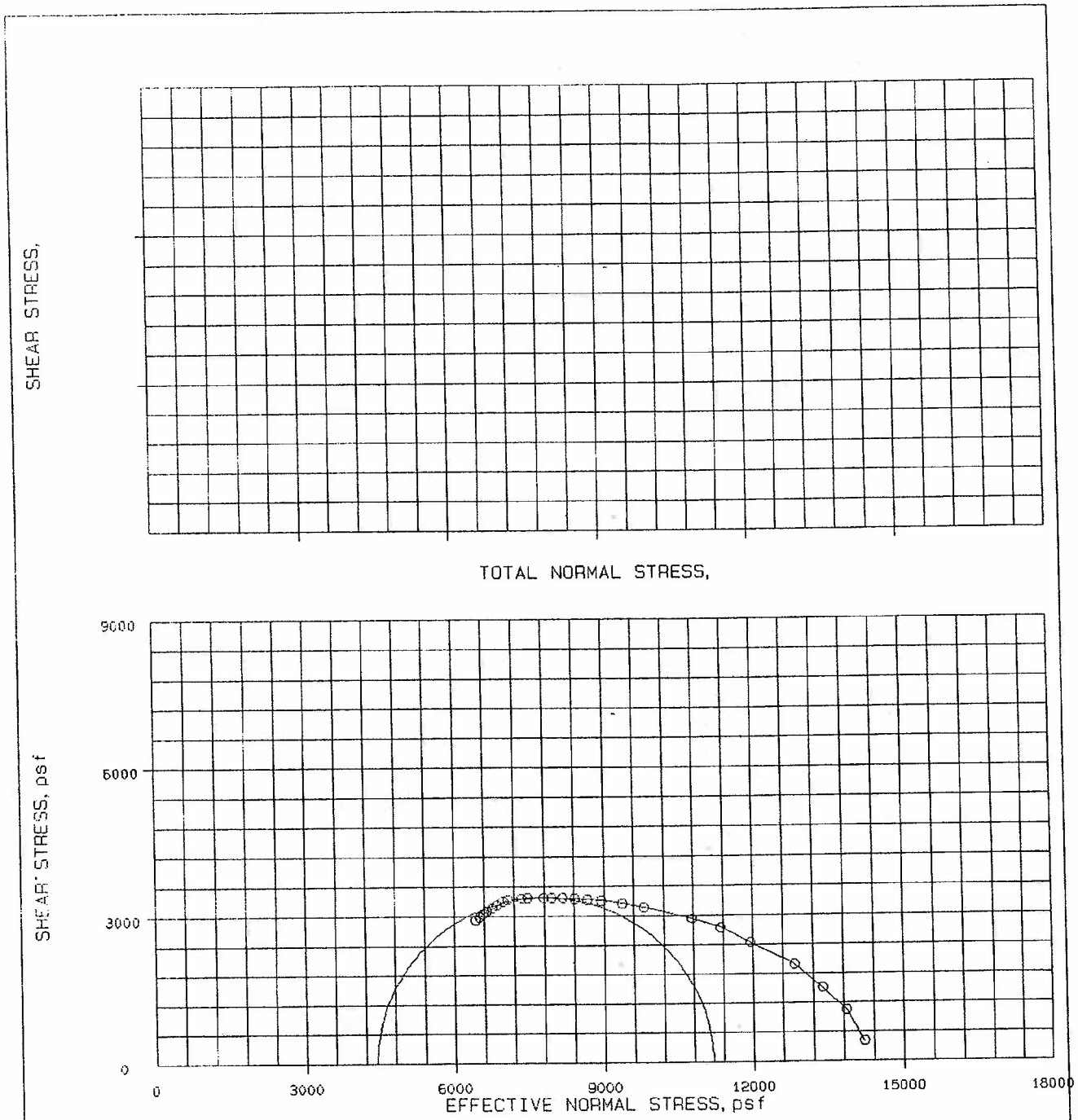
NEW BRITAIN-HARTFORD BUSWAY
CONNECTICUT
TRIAXIAL COMPRESSION TESTS (CIU)

BORING NO SB-70
SAMPLE UP-1
DEPTH 50.5-50.9'
TECH. MST
REVIEWER

TEST SERIES NO. 404
DATE Mar.04
FILE L1782B

FIGURE

GZA GEOENVIRONMENTAL, INC.
ENGINEERS AND SCIENTISTS



SOIL DESCRIPTION:		See Summary Sheet			
LIQUID LIMIT	0 %	PLASTIC LIMIT	0	SPECIFIC GRAVITY	2.86

FAILURE CRITERIA

REMARKS

NEW BRITAIN-HARTFORD BUSWAY
CONNECTICUT

MOHR STRENGTH ENVELOPE

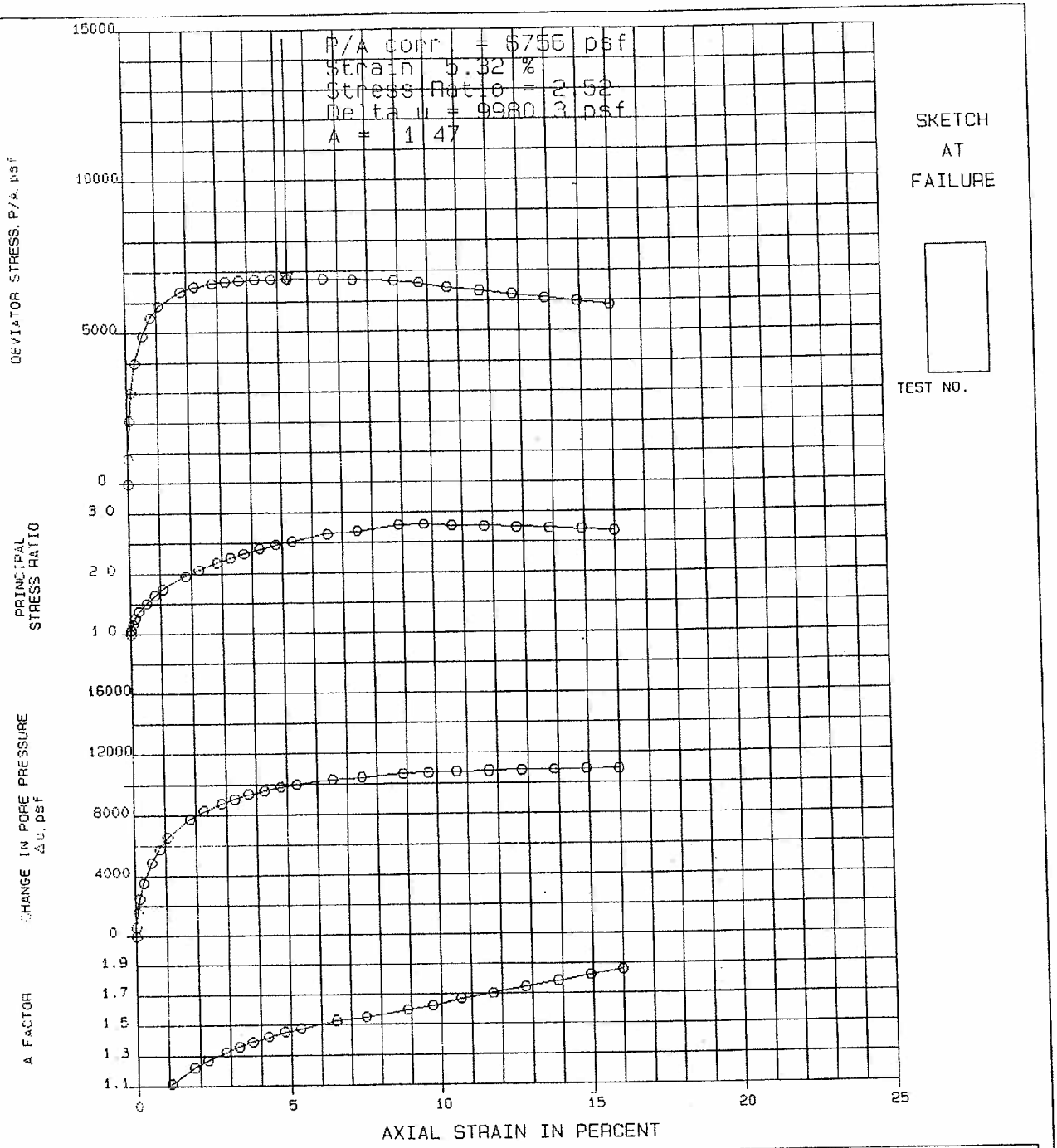
TRIAXIAL COMPRESSION TESTS (CIU)

BORING NO	SB-70	TEST SERIES NO	404
SAMPLE	UP-1	DATE	Mar.04
DEPTH	51.4-51.8'		
TECH.	MST		
REVIEWER		FILE	L1782B

FIGURE

GZA GEOENVIRONMENTAL, INC.
ENGINEERS AND SCIENTISTS

T.10



TEST NO /SYMBOL	INITIAL CONDITIONS: INITIAL WATER CONTENT, %	INITIAL CONDITIONS: INITIAL DRY UNIT WEIGHT, pcf	INITIAL CONDITIONS: SAMPLE HEIGHT & DIAMETER, IN.	CONDITIONS BEFORE SHEAR: INITIAL STRESSES $\sigma_1 = \sigma_3$, ksf	CONDITIONS BEFORE SHEAR: FINAL BACK PRESSURE, ksf	CONDITIONS BEFORE SHEAR: VOLUMETRIC STRAIN, %	CONDITIONS BEFORE SHEAR: PORE PRESSURE RESPONSE, %	FINAL CONDITIONS: FINAL WATER CONTENT, %	FINAL CONDITIONS: FINAL DRY UNIT WEIGHT	RATE OF STRAIN, PERCENT PER MINUTE
404 1 3	57.6	67.1	4.00 / 1.97	14.4	2.16	18.3	92.6	40.8	82.2	.007

SOIL DESCRIPTION: See Summary Sheet

LIQUID LIMIT 0 % PLASTIC LIMIT 0 % SPECIFIC GRAVITY 2.86

NEW BRITAIN-HARTFORD BUSWAY CONNECTICUT TRIAXIAL COMPRESSION TESTS ($\overline{CIU}$)

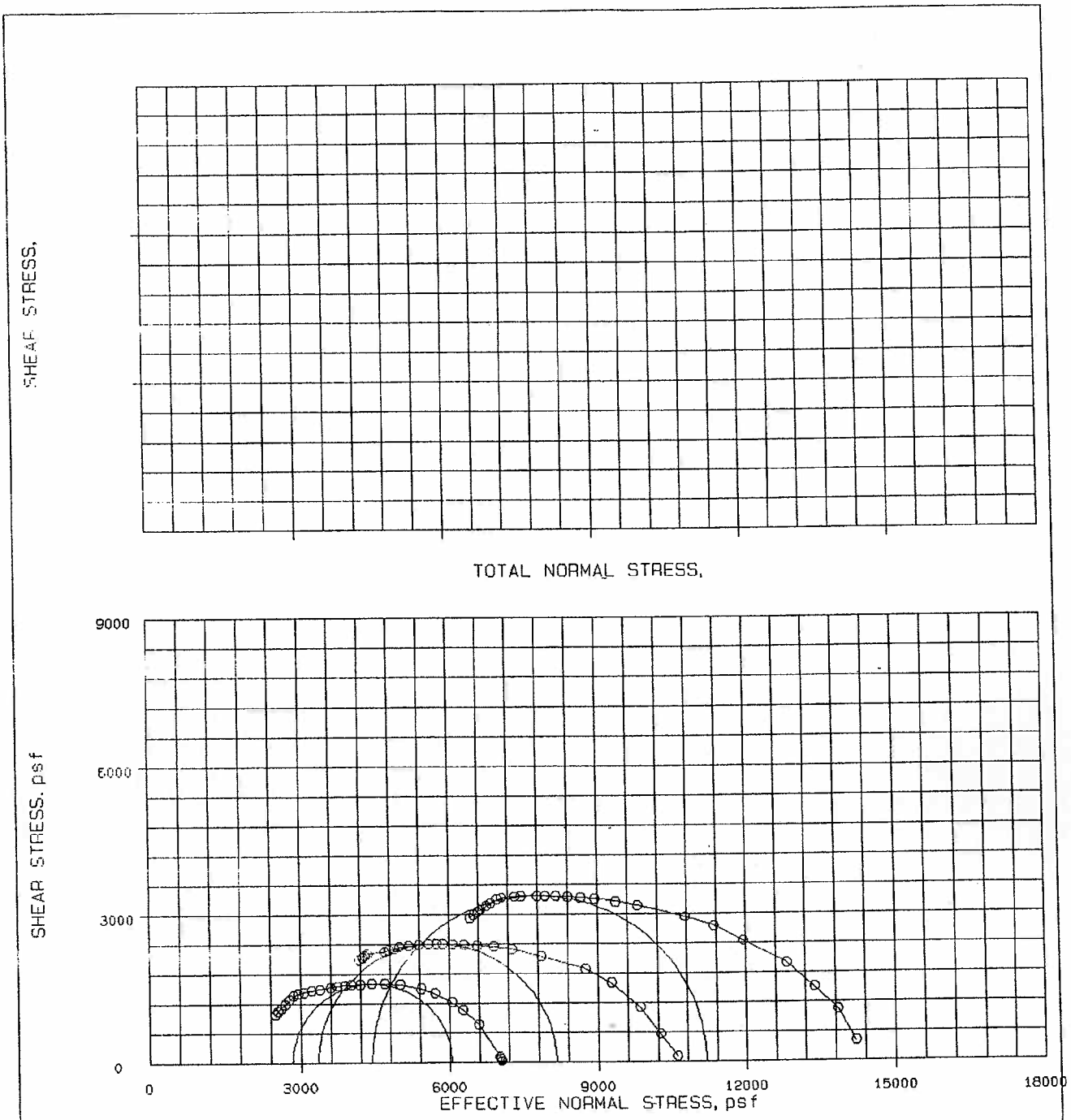
BORING NO. SB-70
SAMPLE UP-1
DEPTH 51.4-51.8'
TECH MST
REVIEWER

TEST SERIES NO. 404
DATE Mar 04
FILE L17828

FIGURE

GZA GEOENVIRONMENTAL, INC.
ENGINEERS AND SCIENTISTS

T 9



SOIL DESCRIPTION:		See Summary Sheet			
LIQUID LIMIT	0 %	PLASTIC LIMIT	0	SPECIFIC GRAVITY	2.66

FAILURE CRITERIA P/A MAX

REMARKS

NEW BRITAIN-HARTFORD BUSWAY
CONNECTICUT

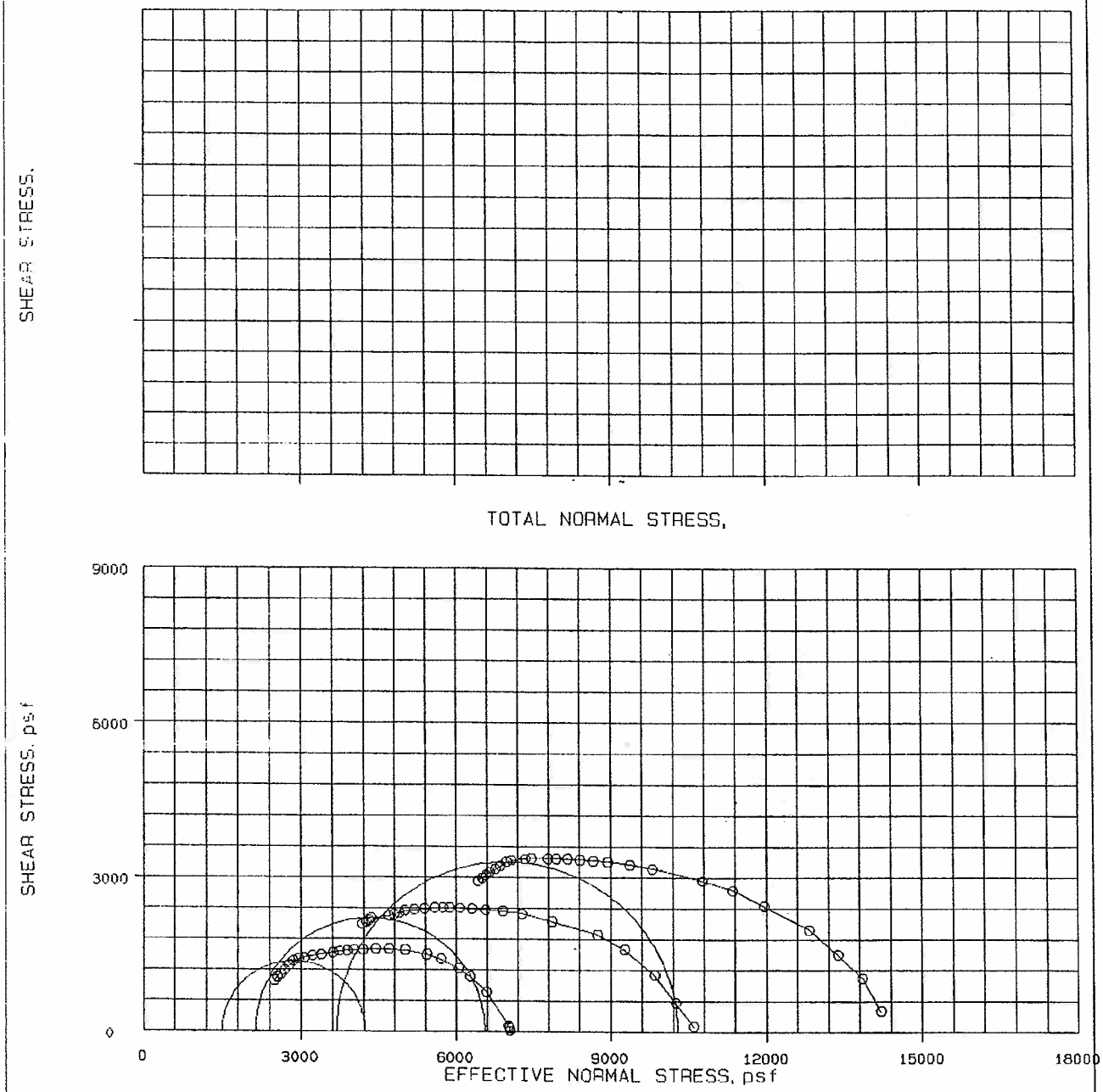
MOHR STRENGTH ENVELOPE

TRIAXIAL COMPRESSION TESTS (CIU)

BORING NO.	SB-70	TEST SERIES NO.	404
SAMPLE	UP-1	DATE	Mar.04
DEPTH	51.4-51.8'		
TECH	MST		
REVIEWER		FILE	L1782B

FIGURE

GZA GEOENVIRONMENTAL, INC.
ENGINEERS AND SCIENTISTS



SOIL DESCRIPTION:	See Summary Sheet				
LIQUID LIMIT	0 %	PLASTIC LIMIT	0	SPECIFIC GRAVITY	2.86

FAILURE CRITERIA σ_1/σ_3 MAX

REMARKS

NEW BRITAIN-HARTFORD BUSWAY
CONNECTICUT

MOHR STRENGTH ENVELOPE

TRIAXIAL COMPRESSION TESTS (CIU)

BORING NO	SB-70	TEST SERIES NO.	404
SAMPLE	UP-1	DATE	Mar.04
DEPTH	51.4-51.8'		
TECH	MST		
REVIEWER		FILE	L1782B

FIGURE

2008 Direct Simple Shear Tests

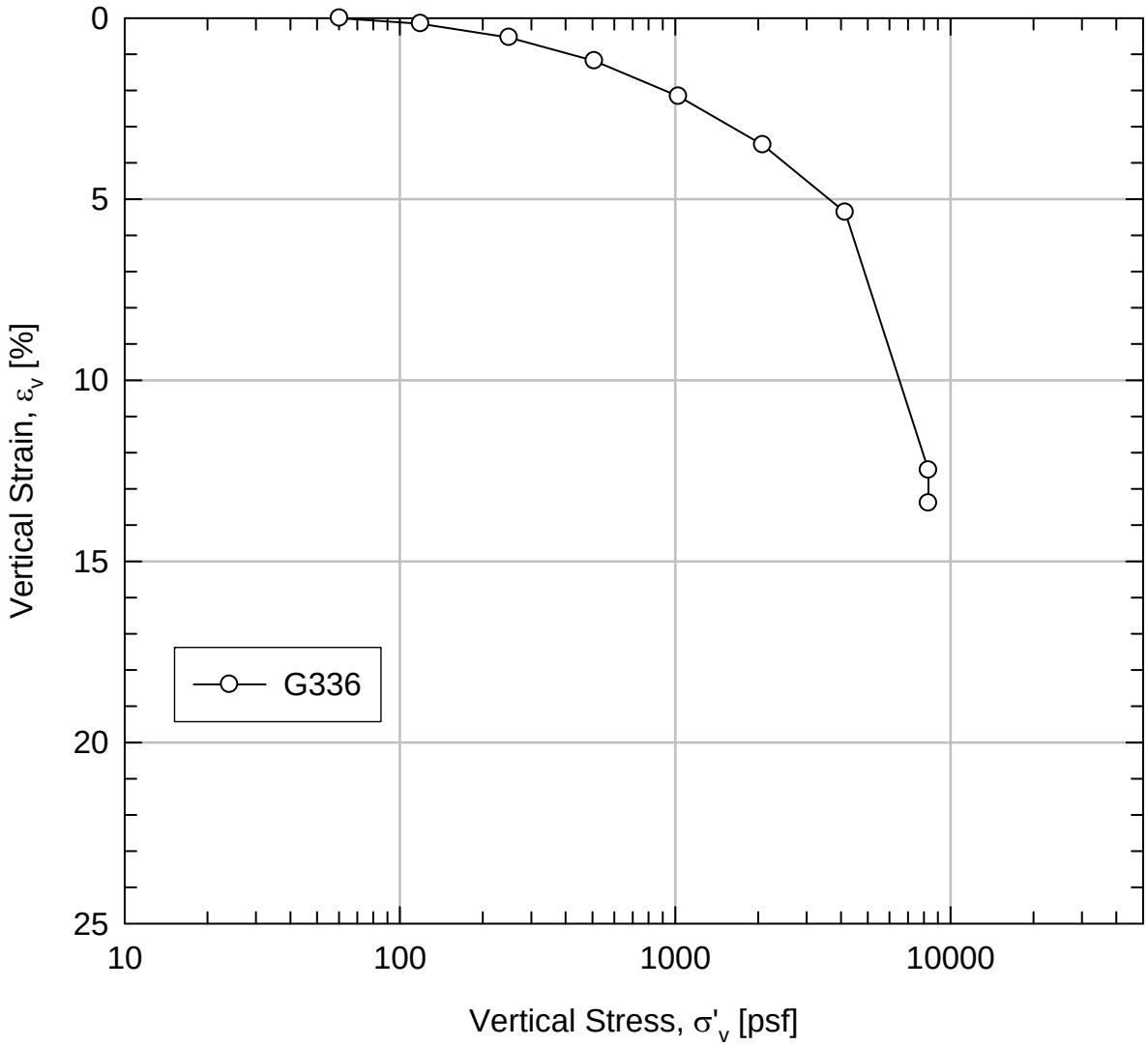


Figure 5.4.1 Vertical strain versus vertical effective stress for test DSS G336 on sample SB-01-04 UP2 40-42 ft.

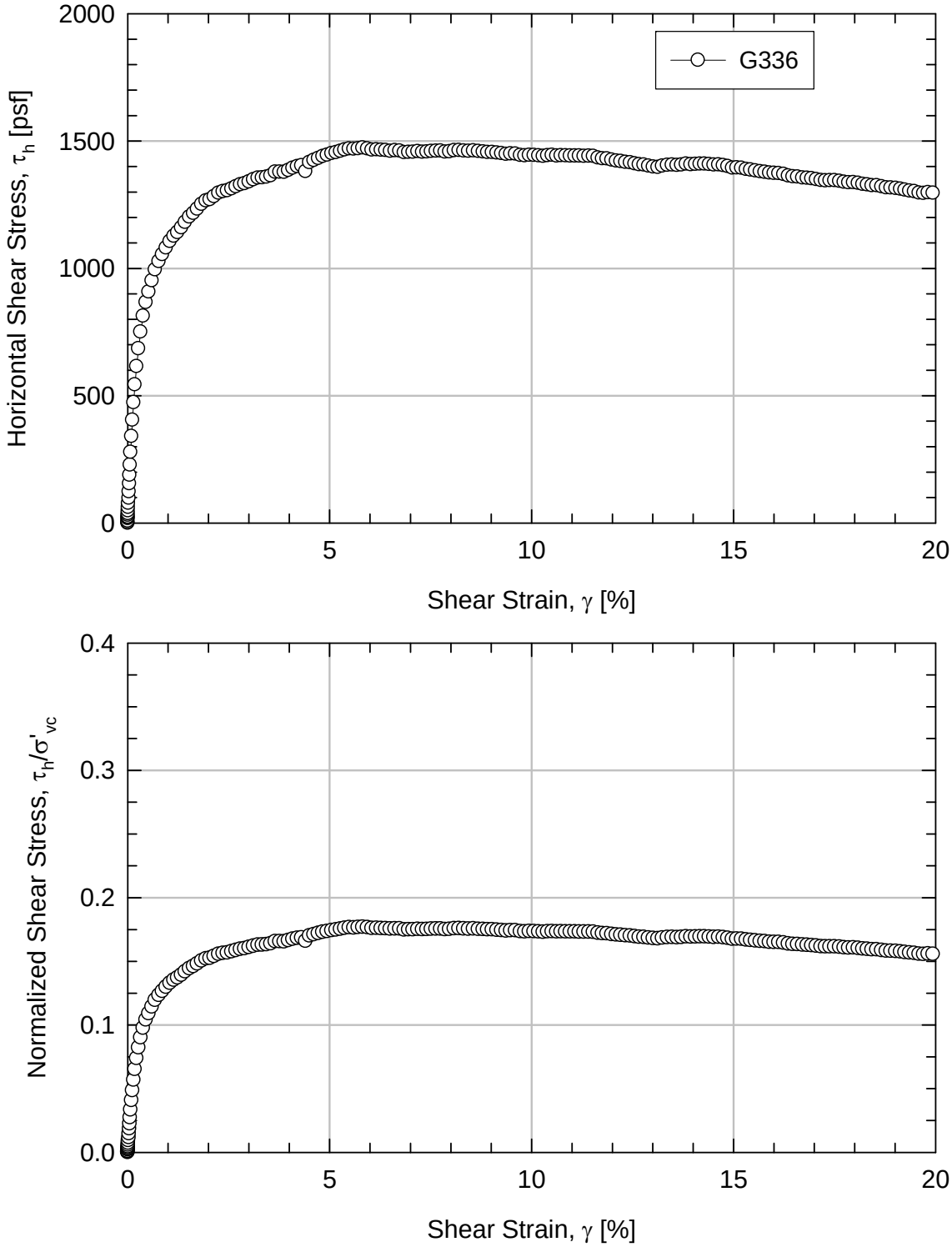


Figure 5.4.2 Horizontal shear stress and normalized shear stress versus shear strain for test DSS G336 on sample SB-01-04 UP2 40-42 ft.

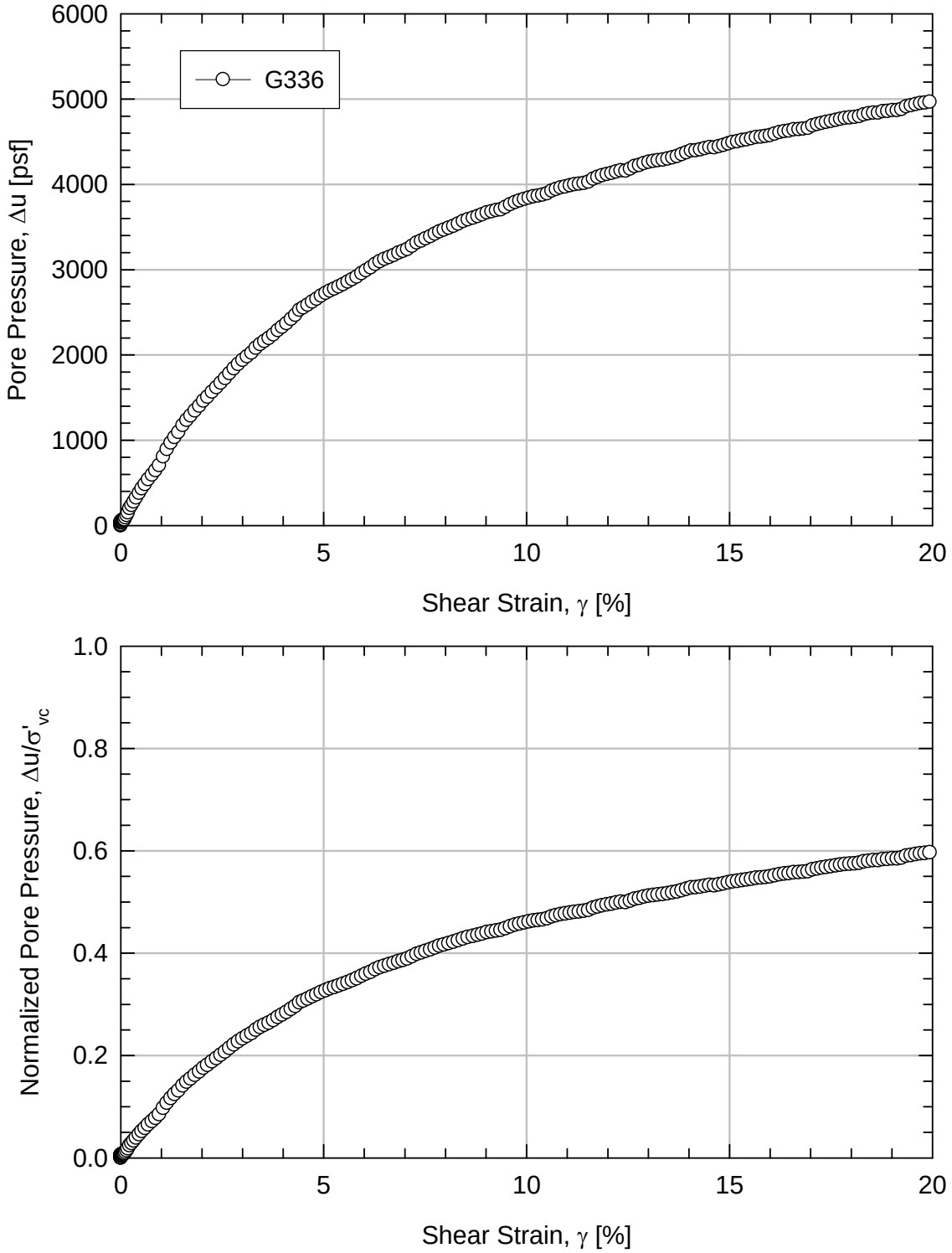


Figure 5.4.3 Pore pressure and normalized pore pressure versus shear strain for test DSS G336 on sample SB-01-04 UP2 40-42 ft.

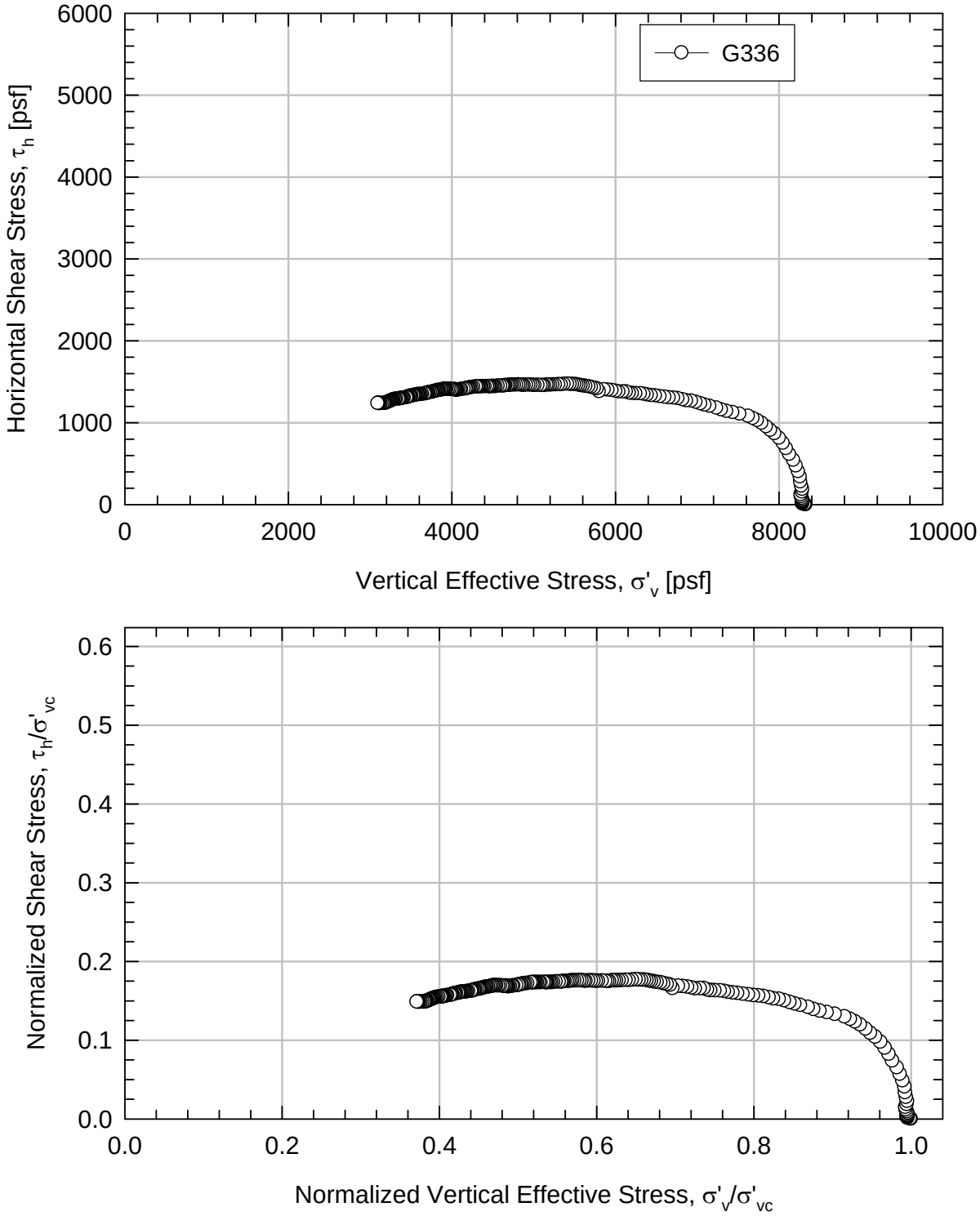


Figure 5.4.4 Horizontal shear stress versus vertical effective stress and normalized shear stress versus normalized vertical effective stress for test DSS G336 on sample SB-01-04 UP2 40-42 ft.

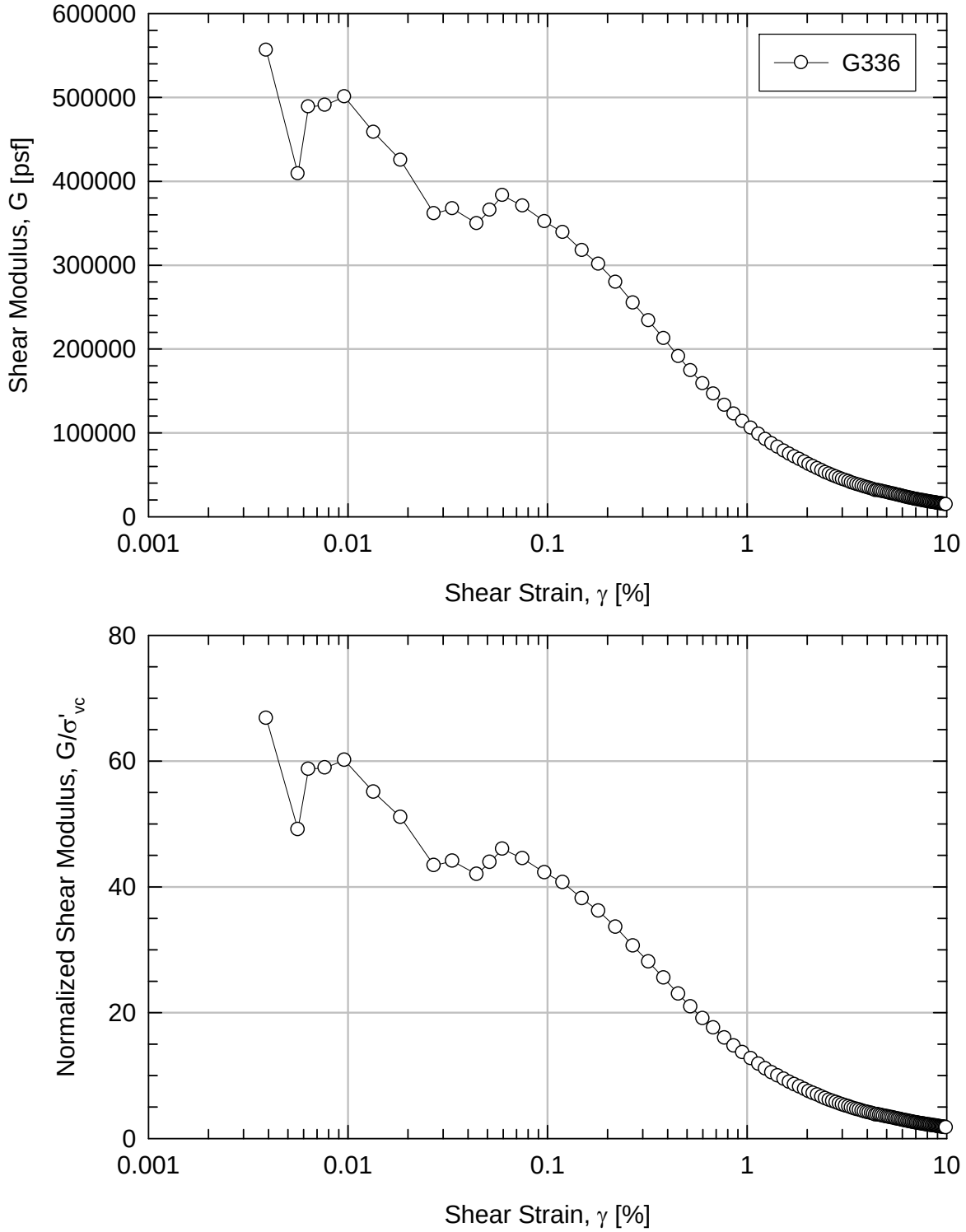


Figure 5.4.5 Shear modulus and normalized shear modulus versus shear strain for test DSS G336 on sample SB-01-04 UP2 40-42 ft.

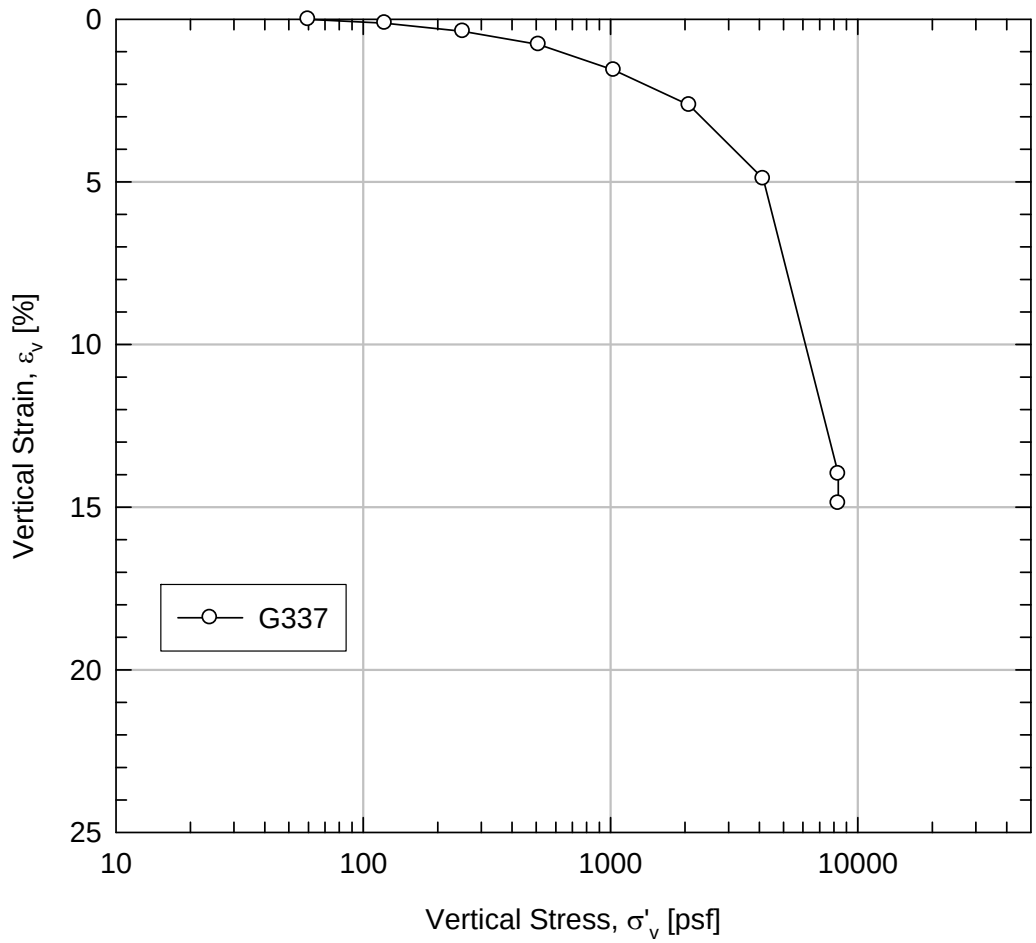


Figure 5.4.6 Vertical strain versus vertical effective stress for test DSS G337 on sample SB-01-1 UP2 30-32 ft

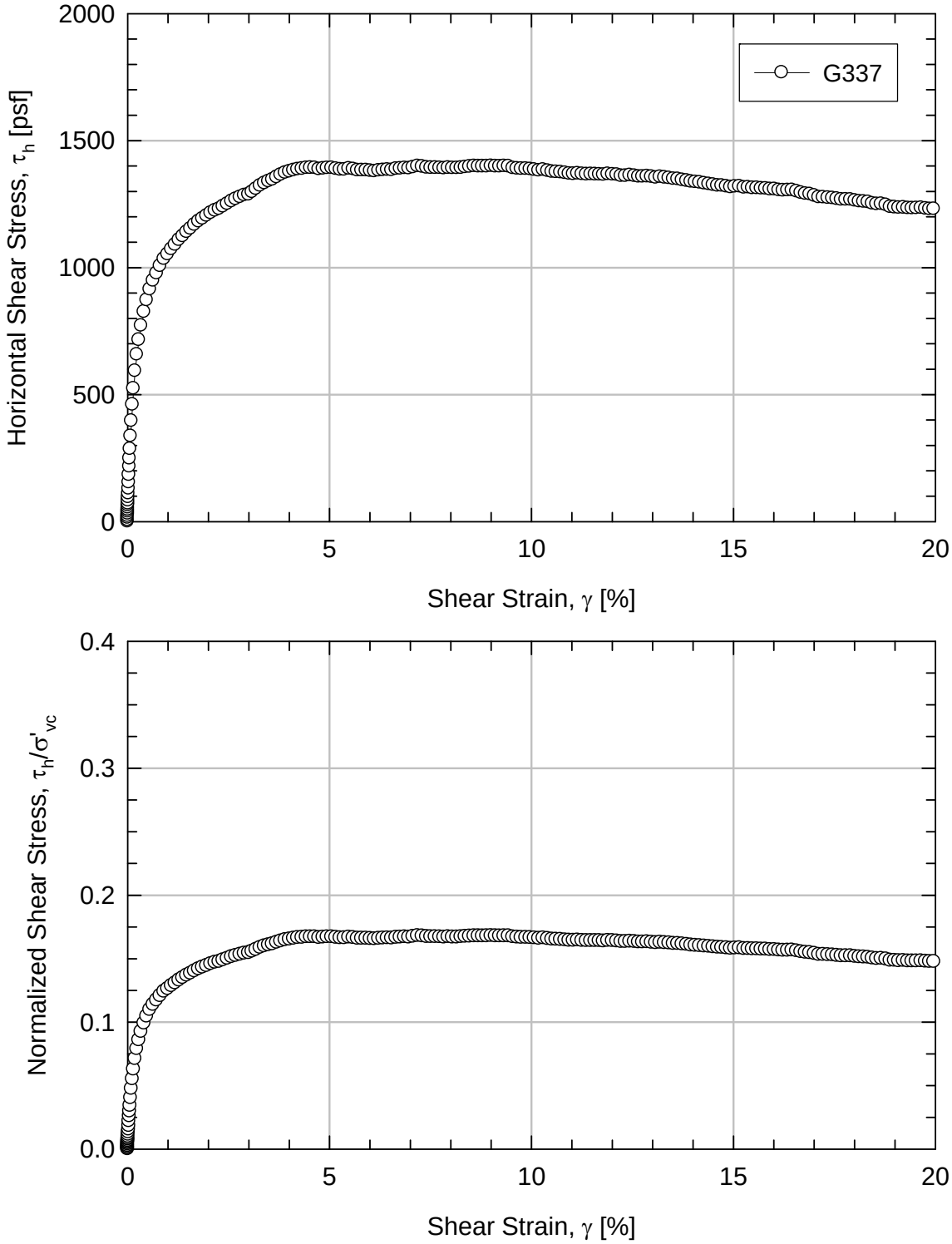


Figure 5.4.7 Horizontal shear stress and normalized shear stress versus shear strain for test DSS G337 on sample SB-01-1 UP2 30-32 ft

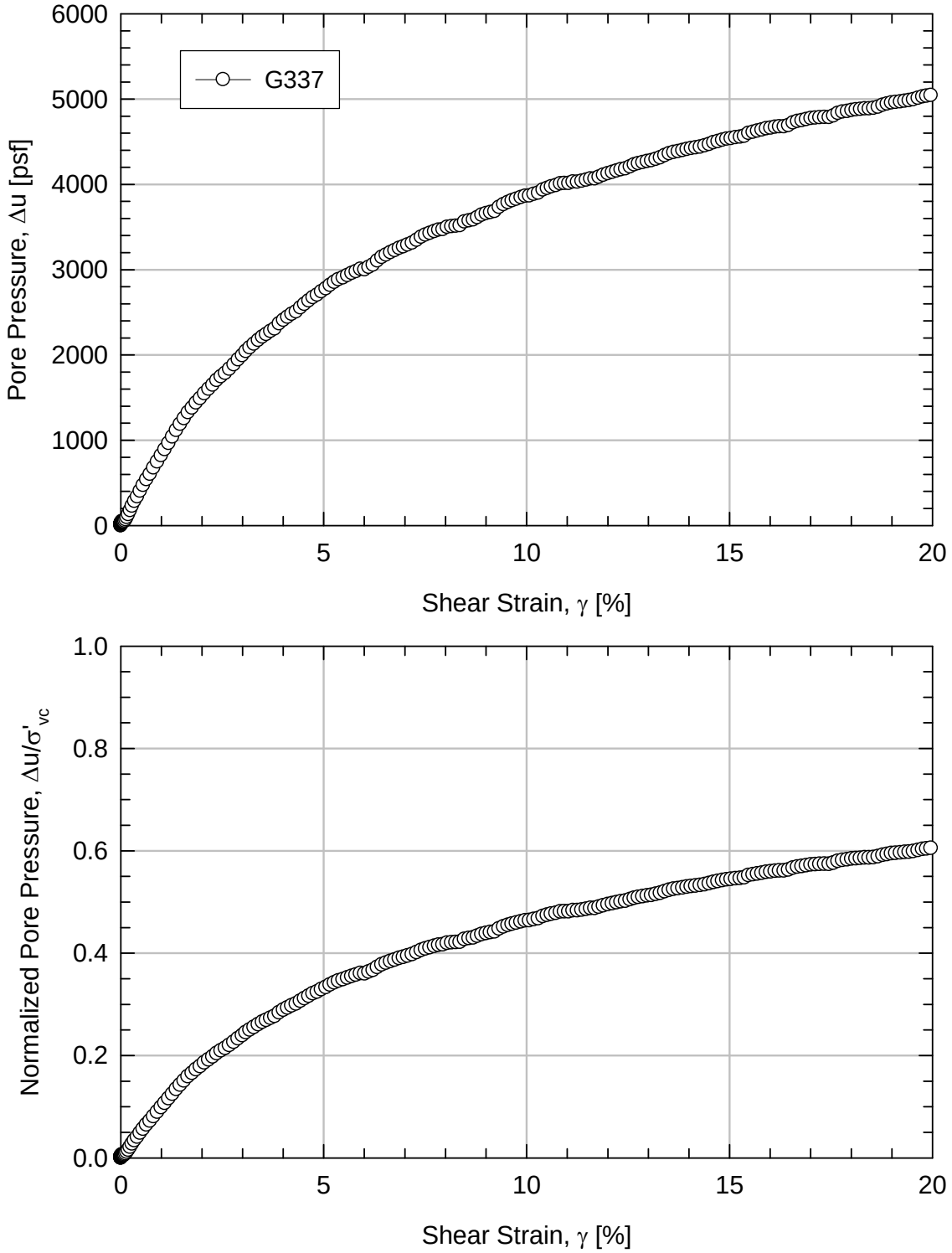


Figure 5.4.8 Pore pressure and normalized pore pressure versus shear strain for test DSS G337 on sample SB-01-1 UP2 30-32 ft

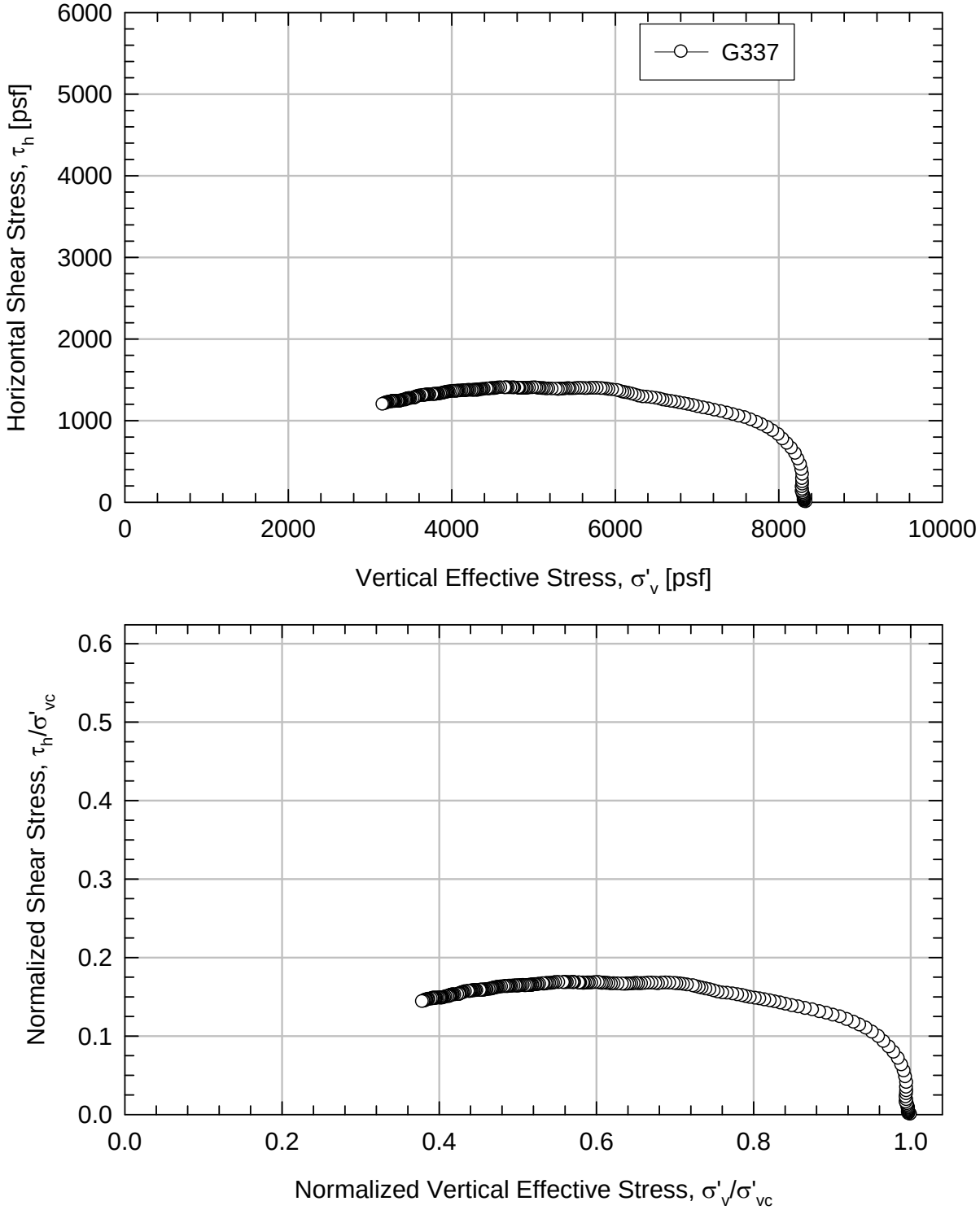


Figure 5.4.9 Horizontal shear stress versus vertical effective stress and normalized shear stress versus normalized vertical effective stress for test DSS G337 on sample SB-01-1 UP2 30-32 ft

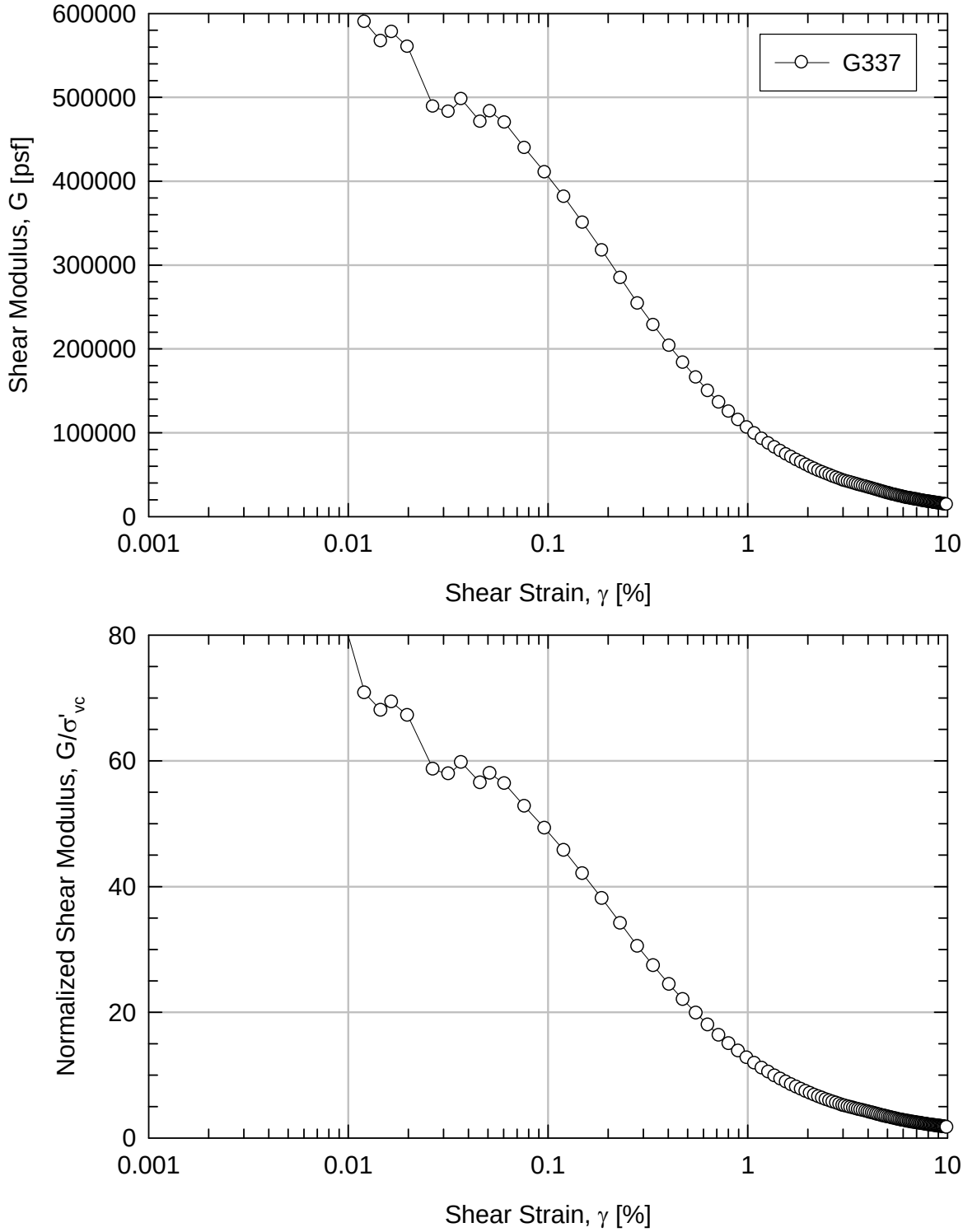


Figure 5.4.10 Shear modulus and normalized shear modulus versus shear strain for test DSS G337 on sample SB-01-1 UP2 30-32 ft.

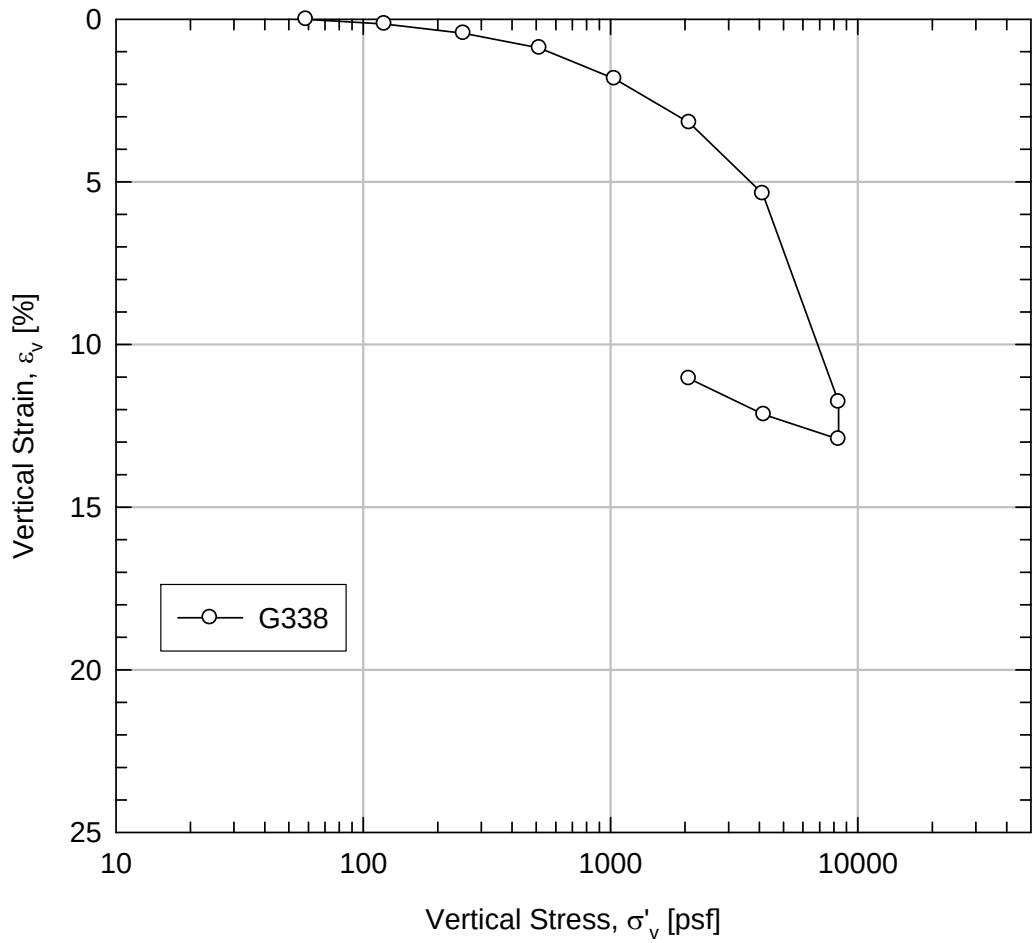


Figure 5.4.11 Vertical strain versus vertical effective stress for test DSS G338 on sample SB-01-04 UP2 40-42 ft.

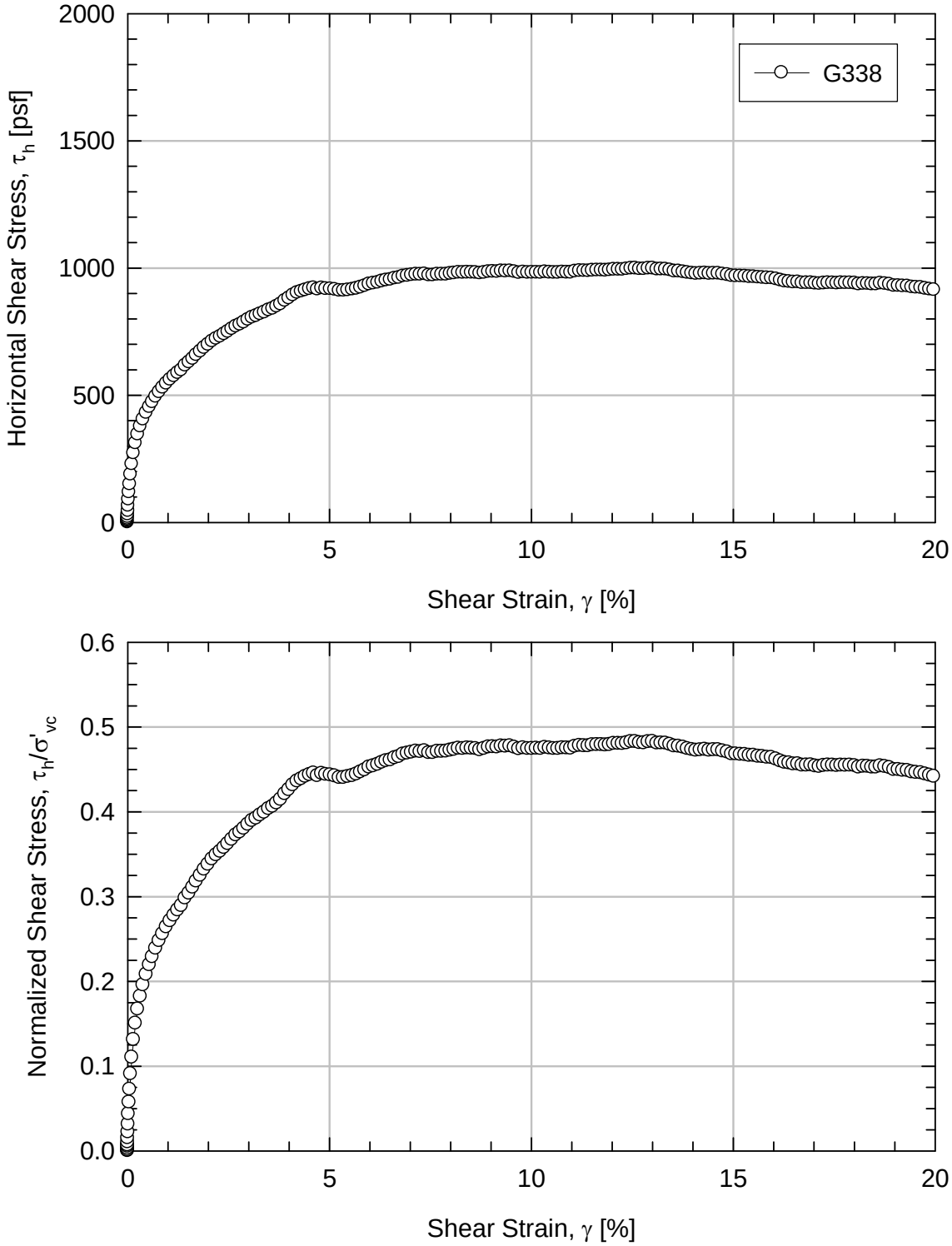


Figure 5.4.12 Horizontal shear stress and normalized shear stress versus shear strain for test DSS G338 on sample SB-01-04 UP2 40-42 ft.

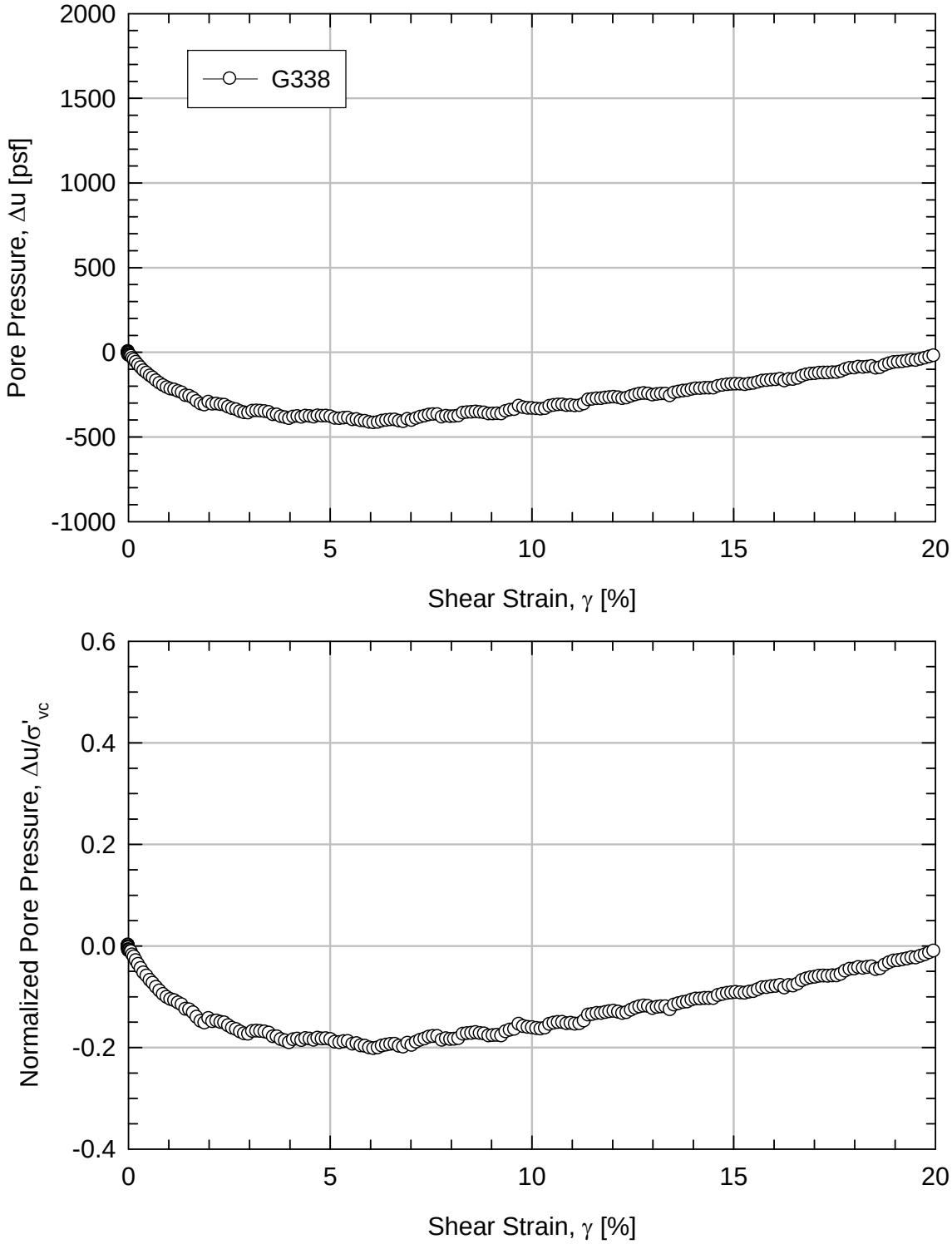


Figure 5.4.13 Pore pressure and normalized pore pressure versus shear strain for test DSS G338 on sample SB-01-04 UP2 40-42 ft.

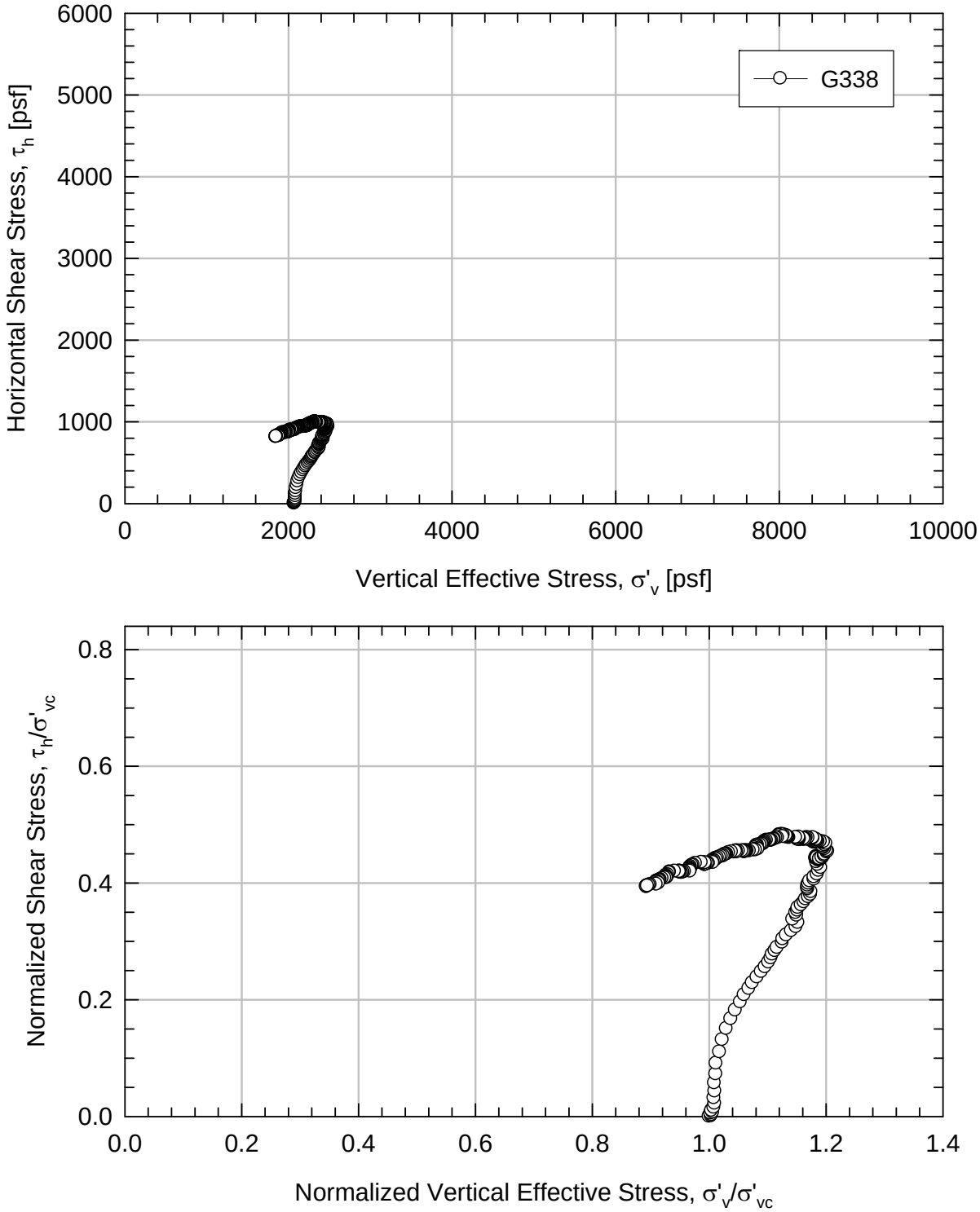


Figure 5.4.14 Horizontal shear stress versus vertical effective stress and normalized shear stress versus normalized vertical effective stress for test DSS G338 on sample SB-01-04 UP2 40-42 ft.

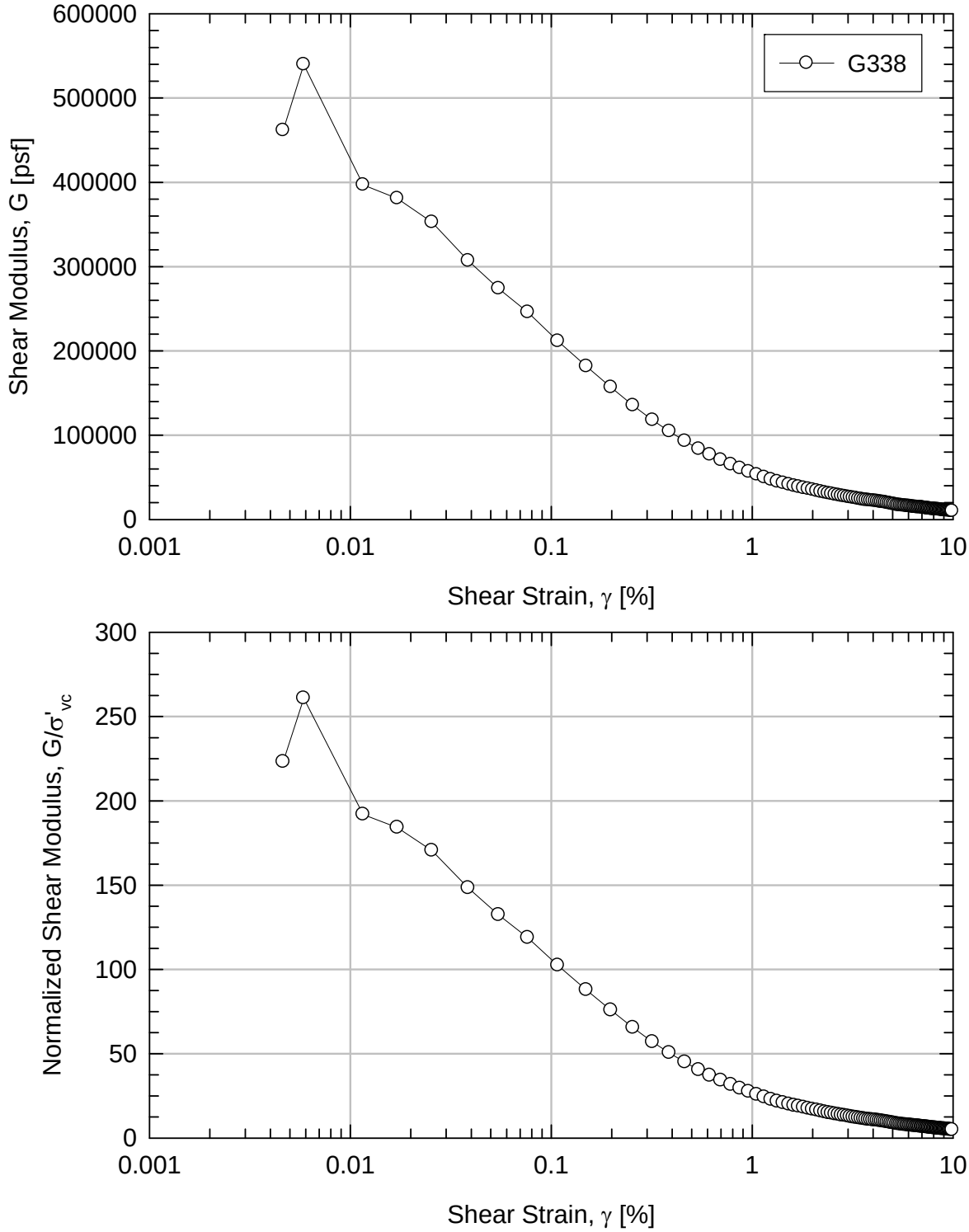


Figure 5.4.15 Shear modulus and normalized shear modulus versus shear strain for test DSS G338 on sample SB-01-04 UP2 40-42 ft.

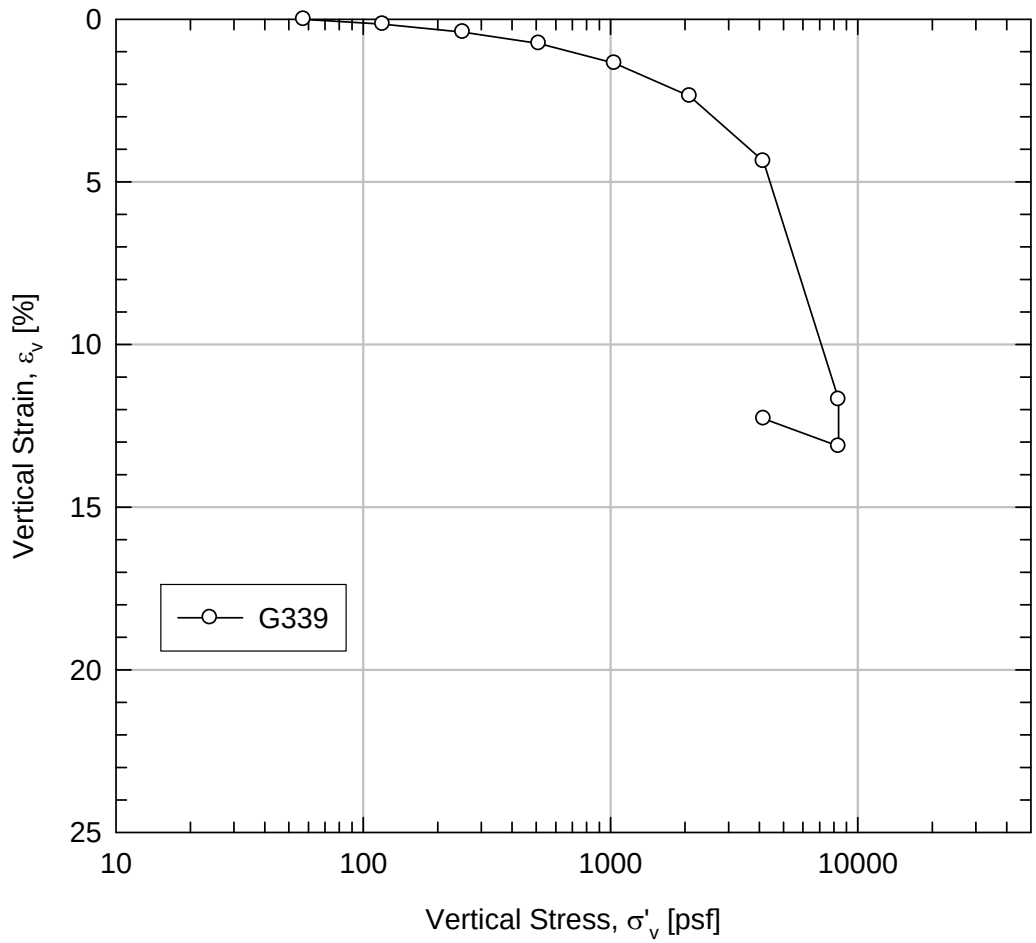


Figure 5.4.16 Vertical strain versus vertical effective stress for test DSS G339 on sample SB-01-1 UP2 30-32 ft.

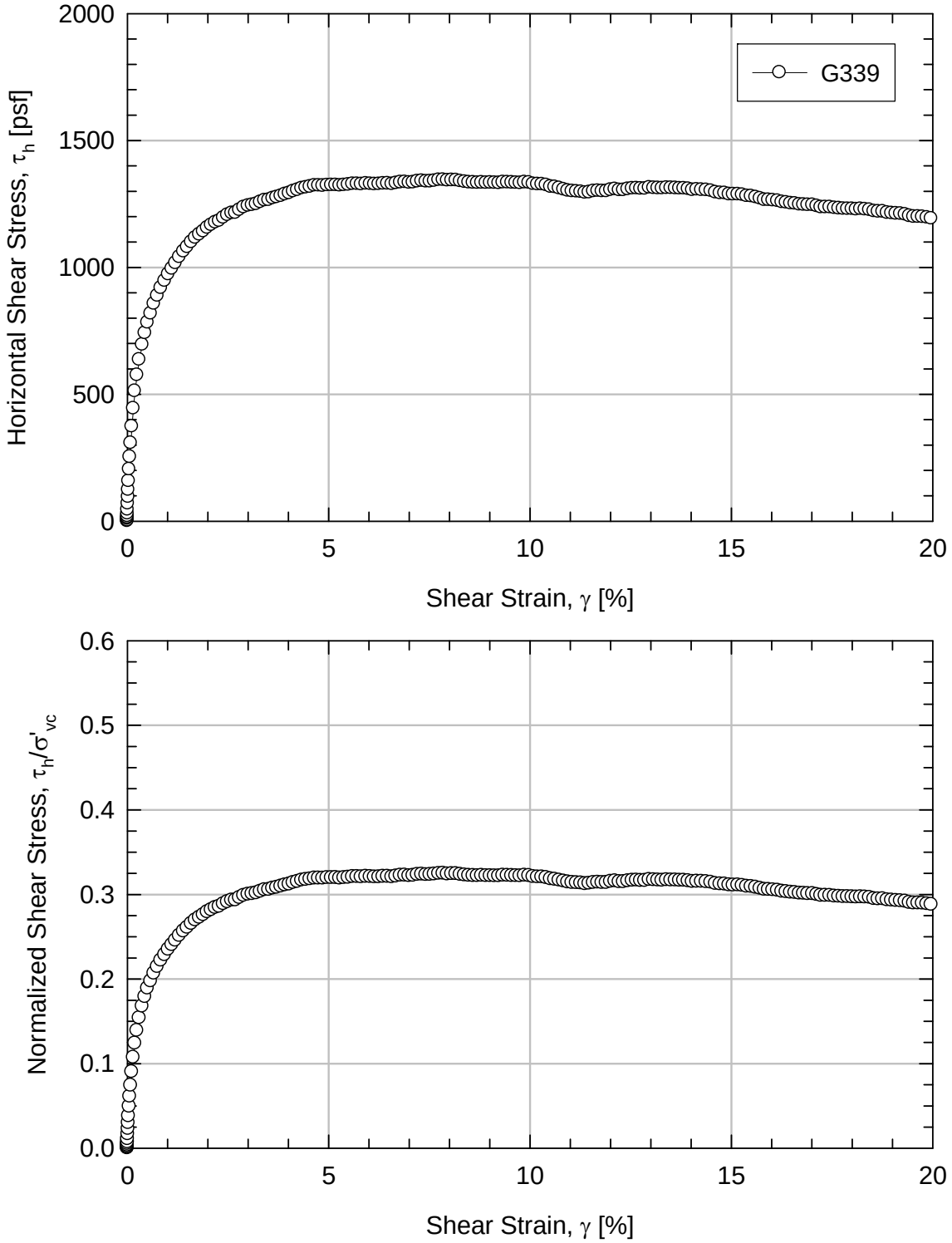


Figure 5.4.17 Horizontal shear stress and normalized shear stress versus shear strain for test DSS G339 on sample SB-01-1 UP2 30-32 ft.

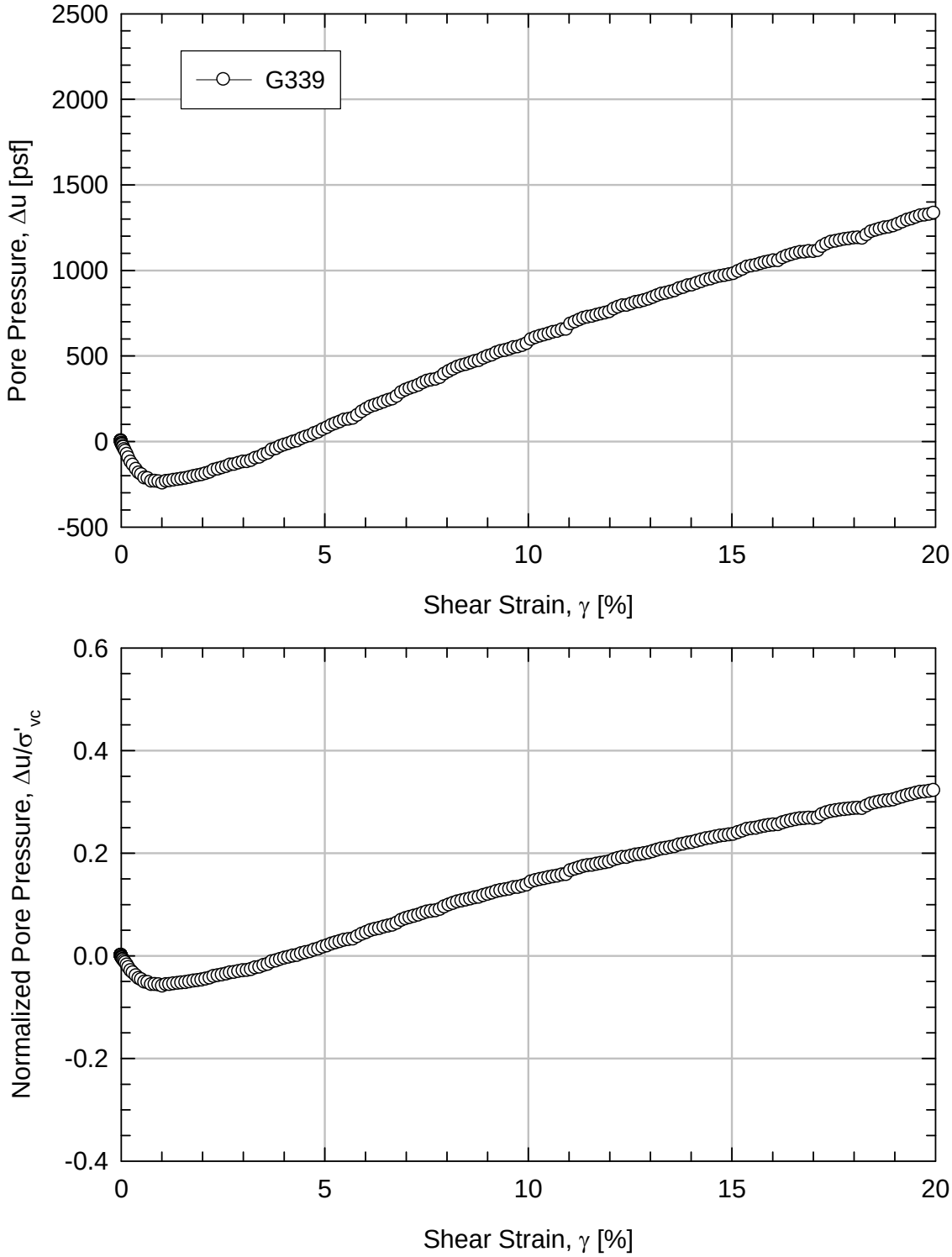


Figure 5.4.18 Pore pressure and normalized pore pressure versus shear strain for test DSS G339 on sample SB-01-1 UP2 30-32 ft.

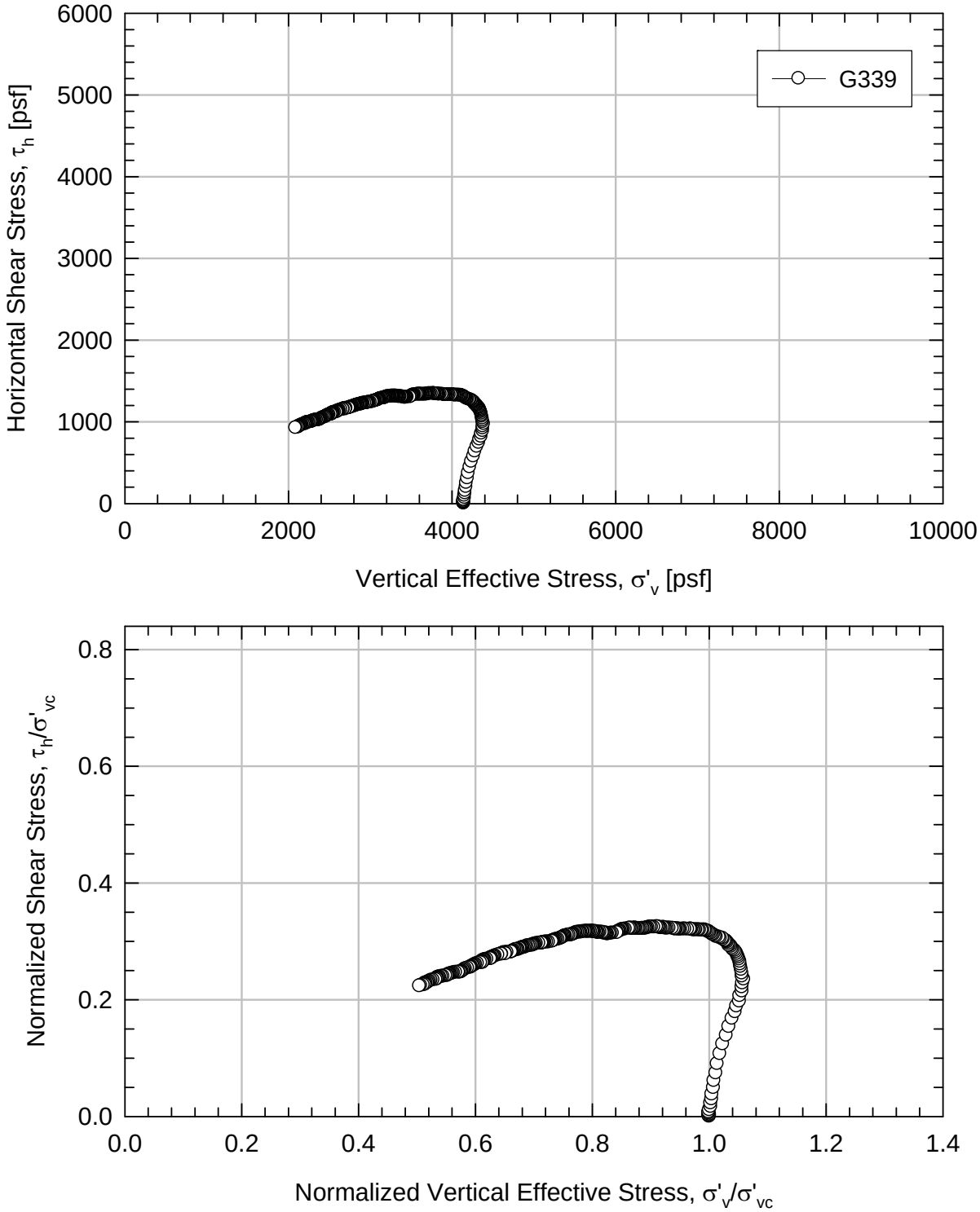


Figure 5.4.19 Horizontal shear stress versus vertical effective stress and normalized shear stress versus normalized vertical effective stress for test DSS G339 on sample SB-01-1 UP2 30-32 ft.

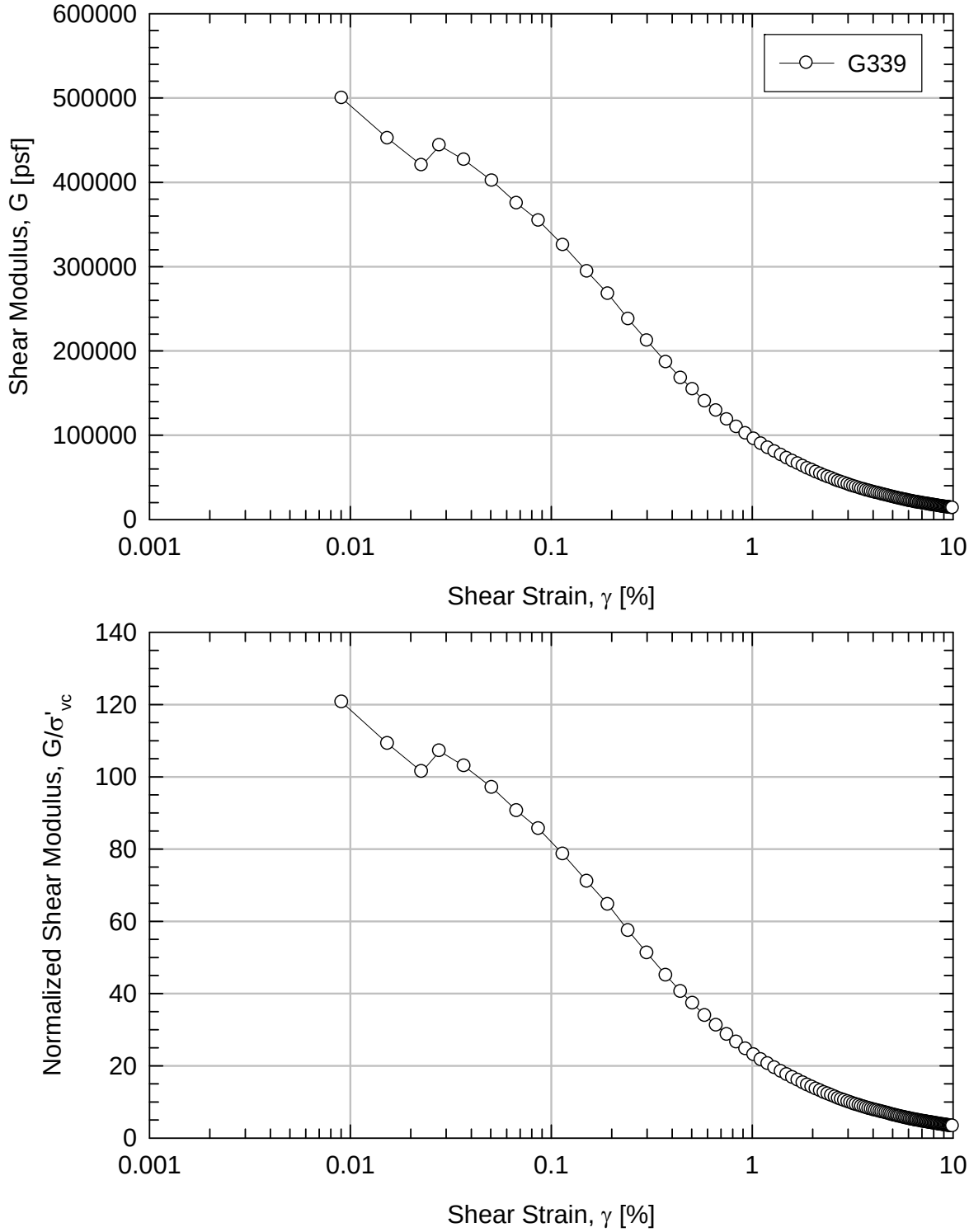
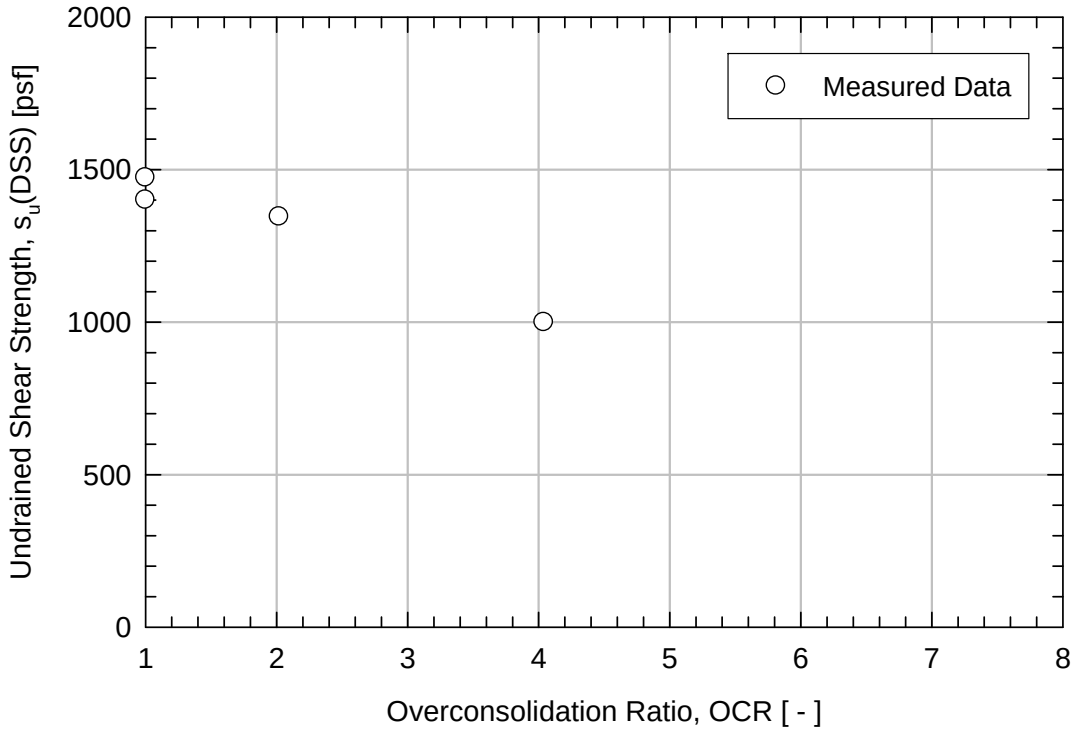
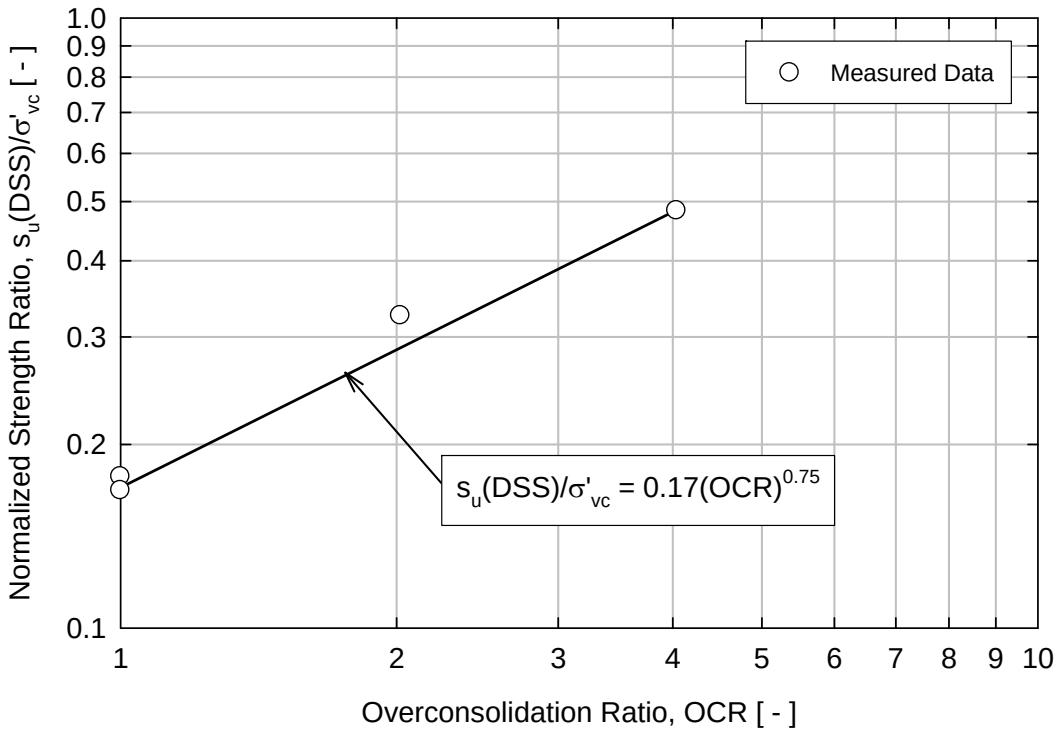


Figure 5.4.20 Shear modulus and normalized shear modulus versus shear strain for test DSS G339 on sample SB-01-1 UP2 30-32 ft.


Measured Data
Undrained Shear Strength, s_u(DSS) [psf]
2000
1500
1000
500
0
1
2
3
4
5
6
7
8
Overconsolidation Ratio, OCR [-]


Measured Data
$s_u(DSS)/\sigma'_{vc} = 0.17(OCR)^{0.75}$
Normalized Strength Ratio, $s_u(DSS)/\sigma'_{vc}$ [-]
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
1
2
3
4
5
6
7
8
9
10
Overconsolidation Ratio, OCR [-]

Appendix 7

Atterberg Limits and Moisture Contents

2003 Atterberg Limits

2008 Atterberg Limits

2003 Moisture Contents

2008 Moisture Contents

2003 Atterberg Limits

LABORATORY TESTING DATA SHEET

Project Name: NEW BRITAIN-HARTFORD BUSWAY CONNECTICUT
Project No.: L17828
Project Engineer: D. SCHULZE
Assigned By: D. GAFFNEY
Date: NOV.03
Reviewed By: Don Schulze
Date Reviewed: 11/18/03

Boring/ Test Pit No.	Sample No.	Depth ft.	Lab No.	Identification Tests: Water Content %	LL %	PL %	Sieve -200 %	Hyd -2μ %	ORG %	G_s	Dry unit wt. pcf	Density: γ_d MAX (pcf) / W_{opt} (%)	Perme-ability cm/sec	Strength Tests: Torvane or Type Test	$\bar{\sigma}_c$ psf	Failure Criteria	$\sigma_1 - \sigma_3$ or τ psf	Strain %	Consol.: $C_c / (1 + e_0)$	Laboratory Log and Soil Description
SB-54	S-6	16.5-18.0	127	20.1	21	20	43	9												Brown Silty sand (SM)
SB-54	S-15	55.0-56.5	128	42.1	44	22	98	44												Red-brown Lean clay (CL)
SB-55	S-4	10.0-11.5	129	18.5	22	20	39	8												Brown Silty sand with gravel (SM)
SB-55	S-17	65.0-66.5	130	33.7	29	22	99	25												Red-brown Silty clay (CL-ML)
SB-55	S-28	120.0-121.5	131	16.1	NP	NP	25													Brown Silty sand (SM)
SB-56	S-15	55.0-56.5	132	40.2	41	25	100	40												Red-brown Lean clay (CL)
SB-56	S-25	105.0-106.5	133	15.2	NP	NP	15													Brown Silty sand (SM)
SB-57	S-15	55.0-56.5	134	45.7	42	23	100	35												Red-brown Lean clay (CL)
SB-58	S-14	50.0-51.5	135	56.6	53	25	100	60												Brown Fat clay (CH)
SB-58	S-21	90.0-91.5	136	34.2	24	24	100	15												Red-brown Silt (ML)
SB-58	S-25	110.0-111.5	137	23.1	NP	NP	30	5												Red-brown Silty sand (SM)

LABORATORY TESTING DATA SHEET

Project Name: NEW BRITAIN-HARTFORD BUSWAY CONNECTICUT
Project No.: L17828
Project Engineer: D. SCHULZE
Assigned By: D. GAFFNEY
Date: NOV.03
Reviewed By: Don Schulze
Date Reviewed: 11/25/03

Boring/ Test Pit No.	Sample No.	Depth ft.	Lab No.	Identification Tests: Water Content %	LL %	PL %	Sieve -200 %	Hyd -2μ %	ORG %	G_s	Dry unit wt. pcf	Density: γ_d MAX (pcf) / W_{opt} (%)	Perme-ability cm/sec	Strength Tests: Torvane or Type Test	$\bar{\sigma}_c$ psf	Failure Criteria	$\sigma_1 - \sigma_3$ or τ psf	Strain %	Consol. $\frac{C_c}{1+e_0}$	Laboratory Log and Soil Description
SB-59	S-25 S-26	105.0-111.5	138	23.7	NP	NP	93	6												Red-brown Silt (ML)
SB-60	S-5	13.5-15.0	139	33.1	25	22	98	17												Gray Silt (ML)
SB-60	S-11	35.0-36.5	140	55.4	60	27	100	55												Gray-brown Fat clay (CH)
SB-60	S-18	70.0-71.5	141	45.8	48	23	100	46												Red-brown Lean clay (CL)
SB-60	S-26	110.0-111.5	142	22.7	NP	NP	76	4												Red-brown Silt with sand (ML)
SB-60	S-29	125.0-126.5	143	28.0	33	25	99	26												Red-brown Silt (ML)
SB-61	S-12	40.0-41.5	144	58.1	64	23	99	64												Brown Fat clay (CH)
SB-61	S-22	90.0-91.5	145	31.2	25	23	100	11												Red-brown Silt (ML)
SB-62	S-11	35.0-36.5	146	59.2	60	26	100	57												Brown Fat clay (CH)
SB-62	S-20	85.0-86.5	147	68.3	34	24	100	28												Red-brown Silt (ML)
SB-62	S-26	115.0-116.5	148	11.9	16	14	8													Red-brown Poorly-graded sand with silt and gravel (SP-SM)
SB-62	S-27	120.0-121.5	149	21.6	NP	NP	19													Red-brown Silty sand (SM)

LABORATORY TESTING DATA SHEET

Project Name: NEW BRITAIN-HARTFORD BUSWAY CONNECTICUT
Project No.: L17828
Project Engineer: D SCHULZE
Assigned By: D. GAFFNEY
Date: NOV.03
Reviewed By: [signature]
Date Reviewed: 11/26/03

Boring/ Test Pit No.	Sample No.	Depth ft.	Lab No.	Identification Tests: Water Content %	LL %	PL %	Sieve -200 %	Hyd -2μ %	ORG %	G_s	Dry unit wt. pcf	Density: γ_d MAX (pcf) W_{opt} (%)	Perme-ability cm/sec	Strength Tests: Torvane or Type Test	$\bar{\sigma}_c$ psf	Failure Criteria	$\sigma_1 - \sigma_3$ or τ psf	Strain %	Consol. $\frac{C_c}{1+e_0}$	Laboratory Log and Soil Description
SB-63	S-6	16.5-18.0	150	41.9	41	22	99	36												Gray-brown Lean clay (CL)
SB-63	S-14	50.0-51.5	151	57.5	56	25	99	56												Brown Fat clay (CH)
SB-63	S-22	90.0-91.5	152	35.9	29	24	100	26												Red-brown Silt (ML)
SB-63	S-31	135.0-136.5	153	11.7	NP	NP	35	6												Red-brown Silty sand with gravel (SM)
SB-64	S-10	28.5-30.0	154	55.2	63	27	100	62												Brown Fat clay (CH)
SB-64	S-18	70.0-71.5	155	41.5	44	23	100	32												Brown Lean clay (CL)
SB-64	S-26	110.0-111.5	156	23.5	NP	NP	23													Red-brown Silty sand (SM)
SB-64	S-31	135.0-135.9	157	9.6	*	*	22		* Insufficient sample for limit test											Red-brown Silty sand with gravel (SM)
SB-65	S-23	95.0-96.5	158	29.9	24	24	100	13												Red-brown Silt (ML)

LABORATORY TESTING DATA SHEET

Project Name: NEW BRITAIN-HARTFORD BUSWAY CONNECTICUT
Project No.: 117828
Project Engineer: D. SCHULZE
Assigned By: D. GAFFNEY
Date: DEC.03
Reviewed By: Don Schulze
Date Reviewed: 12/3/03

Boring/ Test Pit No.	Sample No.	Depth ft.	Lab No.	Identification Tests: Water Content %	LL %	PL %	Sieve -200 %	Hyd -2μ %	ORG %	G_s	Dry unit wt. pcf	Density: γ_d MAX (pcf) W_{opt} (%)	Perme-ability cm/sec	Strength Tests: Torvane or Type Test	$\bar{\sigma}_c$ psf	Failure Criteria	$\sigma_1 - \sigma_3$ or τ psf	Strain %	Consol. $\frac{C_c}{1+e_0}$	Laboratory Log and Soil Description
SB-66	S-11	35.0-36.5	159	61.1	60	28	100	74												Brown Fat clay (CH)
SB-66	S-18	70.0-71.5	160	47.8	43	24	100	29												Brown Lean clay (CL)
SB-66	S-31	135.0-136.5	161	10.8	21	15	16													Red-brown Silty-clayey sand with gravel (SC-SM)
SB-67	S-13	45.0-46.5	162	54.6	58	27	100	65												Brown Fat clay (CH)
SB-67	S-24 S-25	105.0-112.0	163	20.3	NP	NP	20													Red-brown Silty sand (SM)
SB-69	S-3	7.5-9.0	164	36.7	30	25	81	18												Brown Silt with gravel (SM)
SB-69	S-14	50.0-51.5	165	44.0	56	26	100	67												Brown Fat clay (CH)
SB-69	S-23	95.0-96.5	166	34.3	24	24	100	13												Red-brown Silt (ML)
SB-69	S-33	145.0-146.5	167	12.1	18	15	21													Red-brown Silty gravel with sand (GM)
SB-70	S-15	60.0-61.5	168	48.7	52	23	100	42												Brown Fat clay (CH)

LABORATORY TESTING DATA SHEET

Project Name: NEW BRITAIN-HARTFORD BUSWAY CONNECTICUT
Project No.: L17828
Project Engineer: D. SCHULZE
Assigned By: D. GAFFNEY
Date: DEC.03
Reviewed By: [signature]
Date Reviewed: 12/3/05

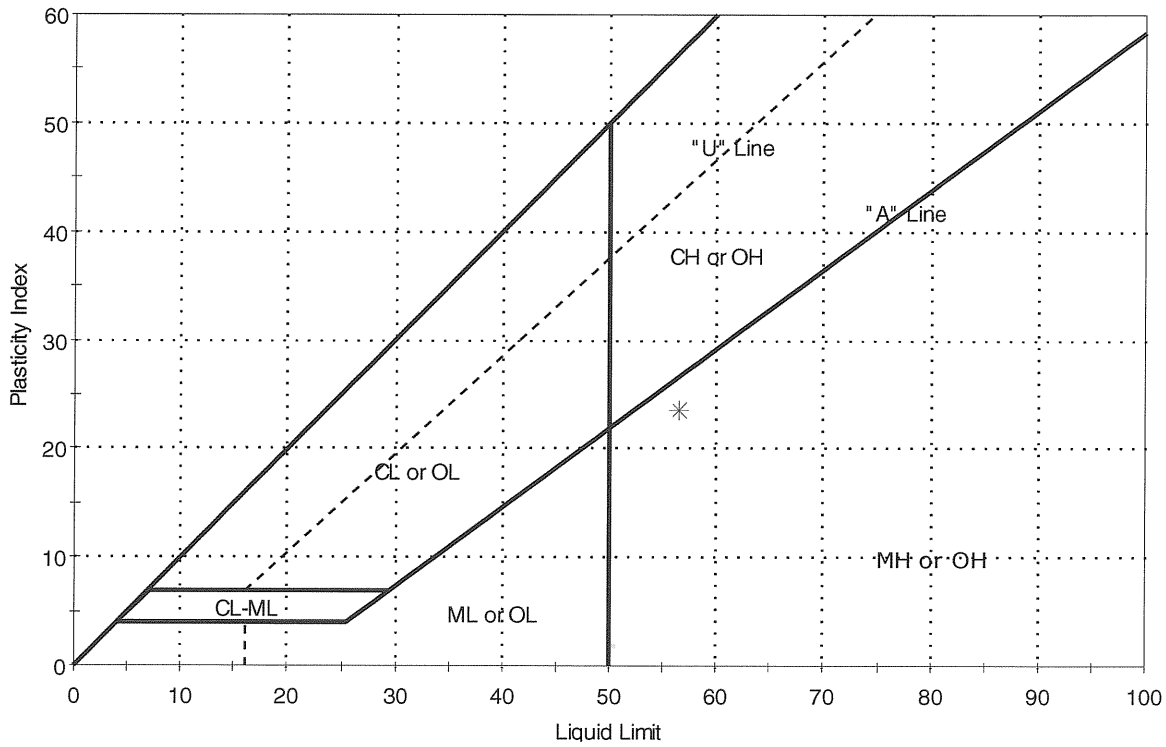
Boring/ Test Pit No.	Sample No.	Depth ft.	Lab No.	Identification Tests: Water Content %	LL %	PL %	Sieve -200 %	Hyd -2μ %	ORG %	G_s	Dry unit wt. pcf	Density: γ_d MAX (pcf) / W_{opt} (%)	Perme-ability cm/sec	Strength Tests: Torvane or Type Test	$\bar{\sigma}_c$ psf	Failure Criteria	$\sigma_1 - \sigma_3$ or τ psf	Strain %	Consol.: $\frac{C_c}{1 + e_0}$	Laboratory Log and Soil Description
SB-71	S-13	45.0-46.5	169	54.9	56	26	100	64												Brown Fat clay (CH)
SB-71	S-21	85.0-86.5	170	38.9	29	25	100	21												Red-brown Silt (ML)
SB-71	S-27	115.0-116.5	171	12.0	17	16	14													Red-brown Silty sand with gravel (SM)
SB-72	S-9	25.0-26.5	172	49.6	47	24	100	41												Brown Lean clay (CL)
SB-72	S-17	65.0-66.5	173	50.5	55	26	100	64												Brown Fat clay (CH)
SB-72	S-25	105.0-106.5	174	24.5	20	20	92	12												Red-brown Silt (ML)
SB-72	S-31	135.0-136.5	175	12.8	*	*	10		* Insufficient sample for limit test											Brown Poorly graded gravel with silt and sand (GP-GM)
SB-73	S-10	28.5-30.0	176	33.1	NP	NP	60													Red-brown Sandy silt (ML)
SB-73	S-18	70.0-71.5	177	46.1	48	23	100	45												Red-brown Lean clay (CL)
SB-73	S-27	115.0-116.5	178	21.4	NP	NP	28													Red-brown Silty sand (SM)

2008 Atterberg Limits

GeoTesting express
a subsidiary of Geocomp Corporation

Client:	GeoDesign, Inc.		
Project:	Hartford Busway		
Location:	Hartford, CT	Project No:	GTX-8398
Boring ID: RW-4	Sample Type: tube	Tested By:	ap
Sample ID:UP-2	Test Date: 08/15/08	Checked By:	jdt
Depth : 45-47 ft	Test Id: 136050		
Test Comment:	---		
Sample Description:	Moist, reddish brown silt		
Sample Comment:	---		

Atterberg Limits - ASTM D 4318-05

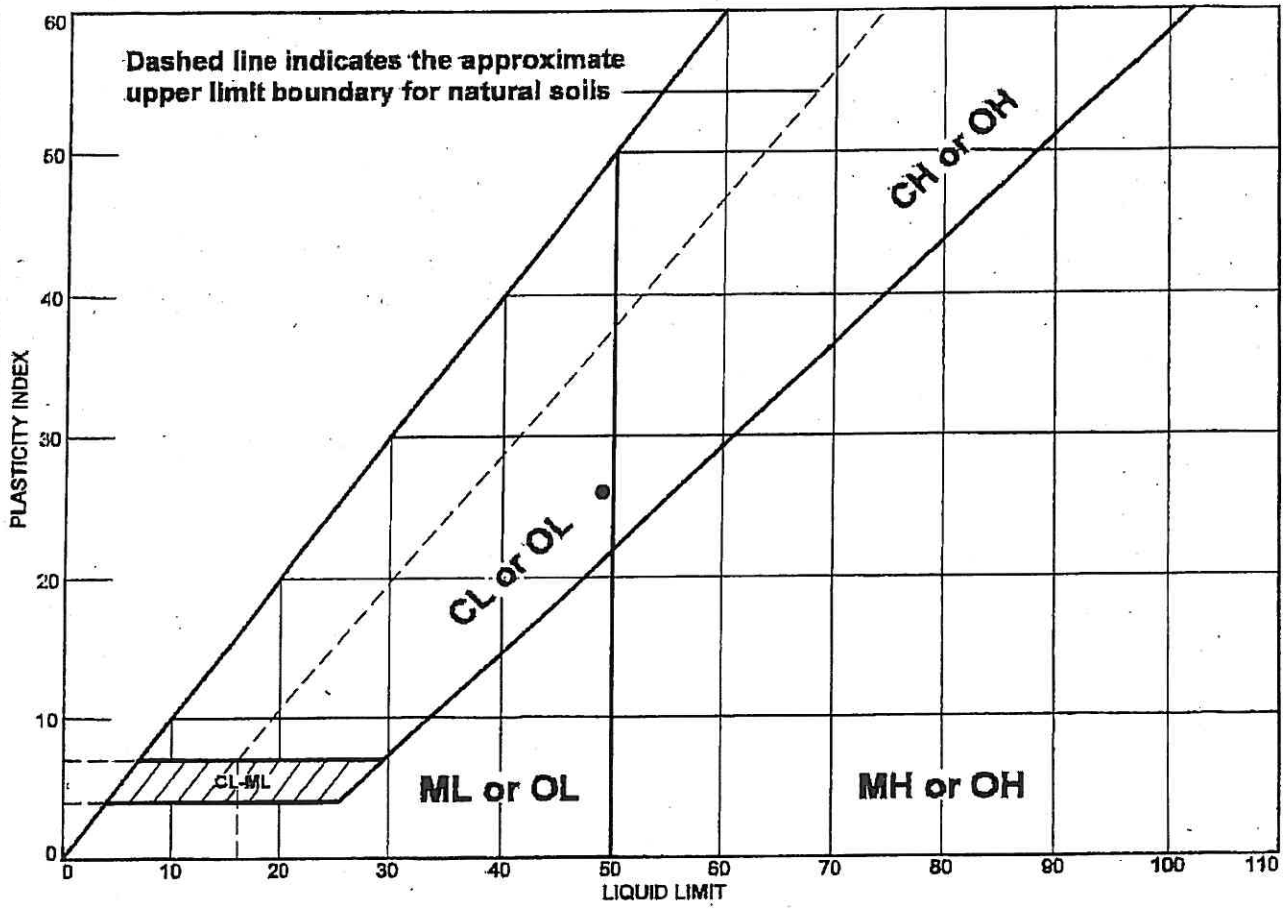


Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
✳	UP-2	RW-4	45-47 ft	54	56	33	23	1	

Sample Prepared using the WET method

Dry Strength: VERY HIGH
Dilentancy: SLOW
Toughness: LOW

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Olive color, lean clay	49	23	26	100.0	99.4	CL

Project No.

Project: New Britain-Hartford Busway #155-H025

● **Sample Source:** Boring RW-4 (Flatbush Ave., over Busway) UP-1

Remarks:

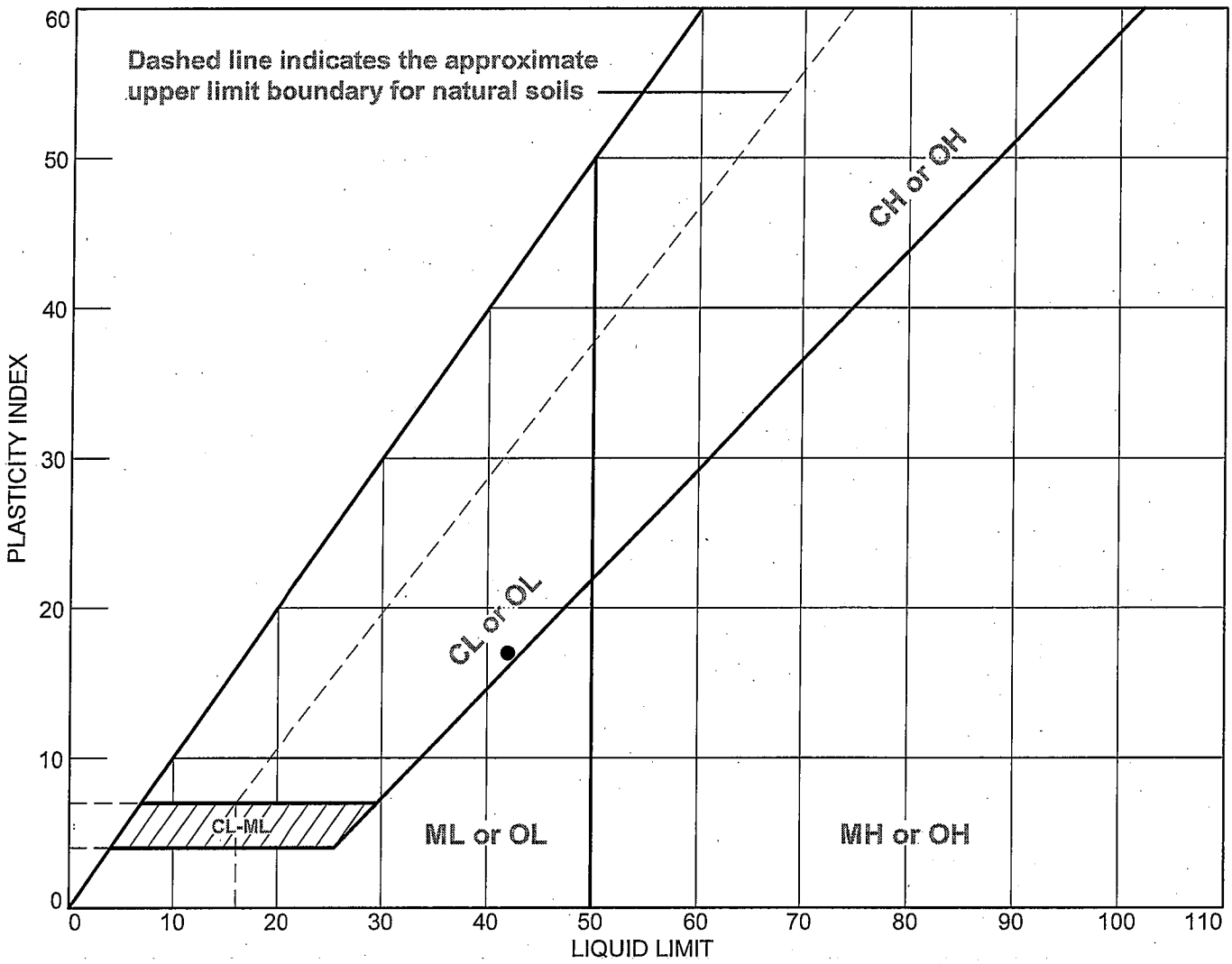
● Sampled and Dropped off by the Client,

TEST-CON INCORPORATED
PO BOX 3116
Danbury, CT 06813-3116

page

Tested By: _____ **Checked By:** _____

LIQUID AND PLASTIC LIMITS TEST REPORT

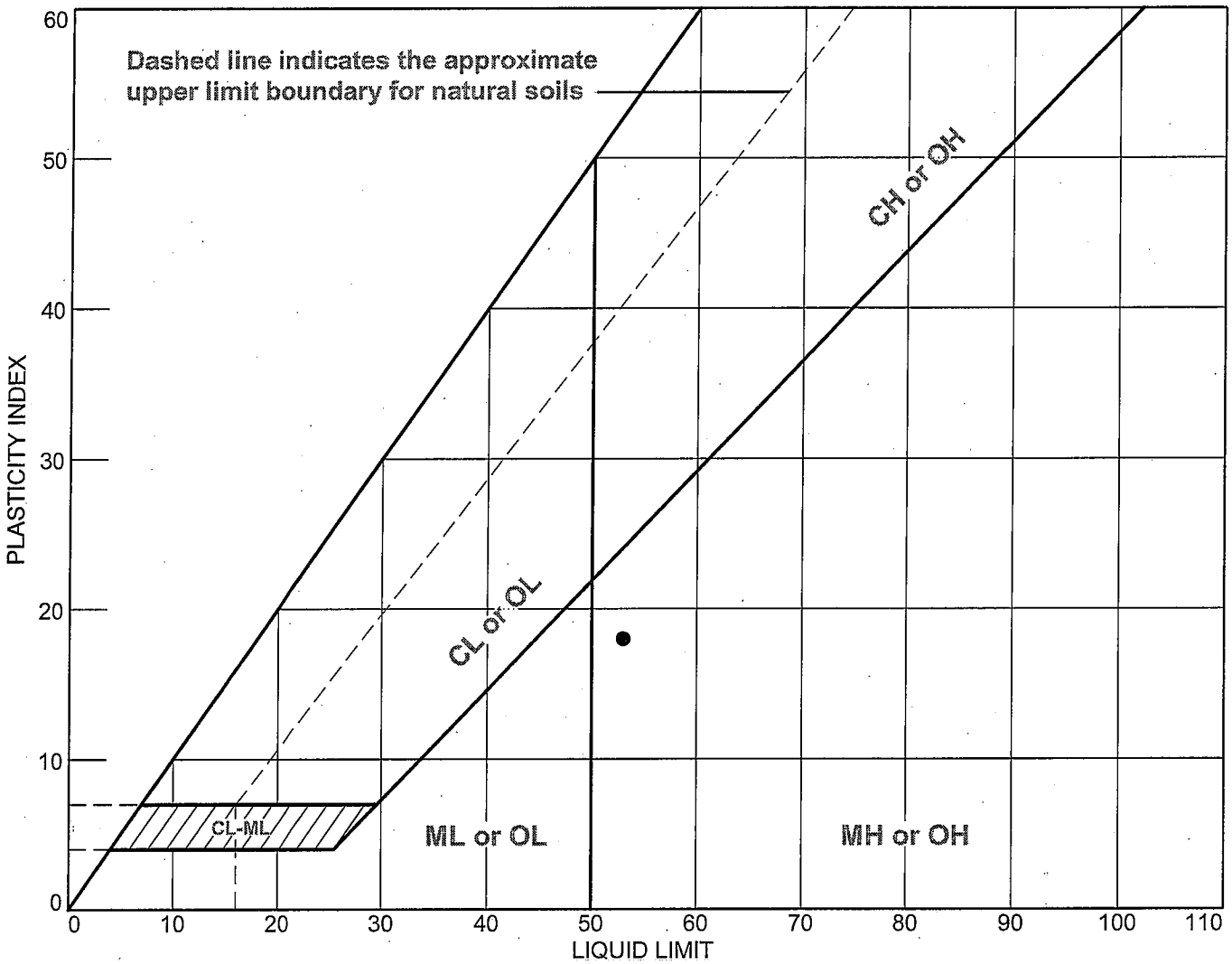


SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	RW-6	S-7	22' - 24'		25	42	17	

TEST-CON INCORPORATED 16 East Franklin Street, PO BOX 3116 DANBURY, CT 06813-3116	**Client:** GeoDesign **Project:** New Britain-Hartford Busway #155-H025 **Project No.:** **Figure**

Tested By: R. DeCesare

LIQUID AND PLASTIC LIMITS TEST REPORT

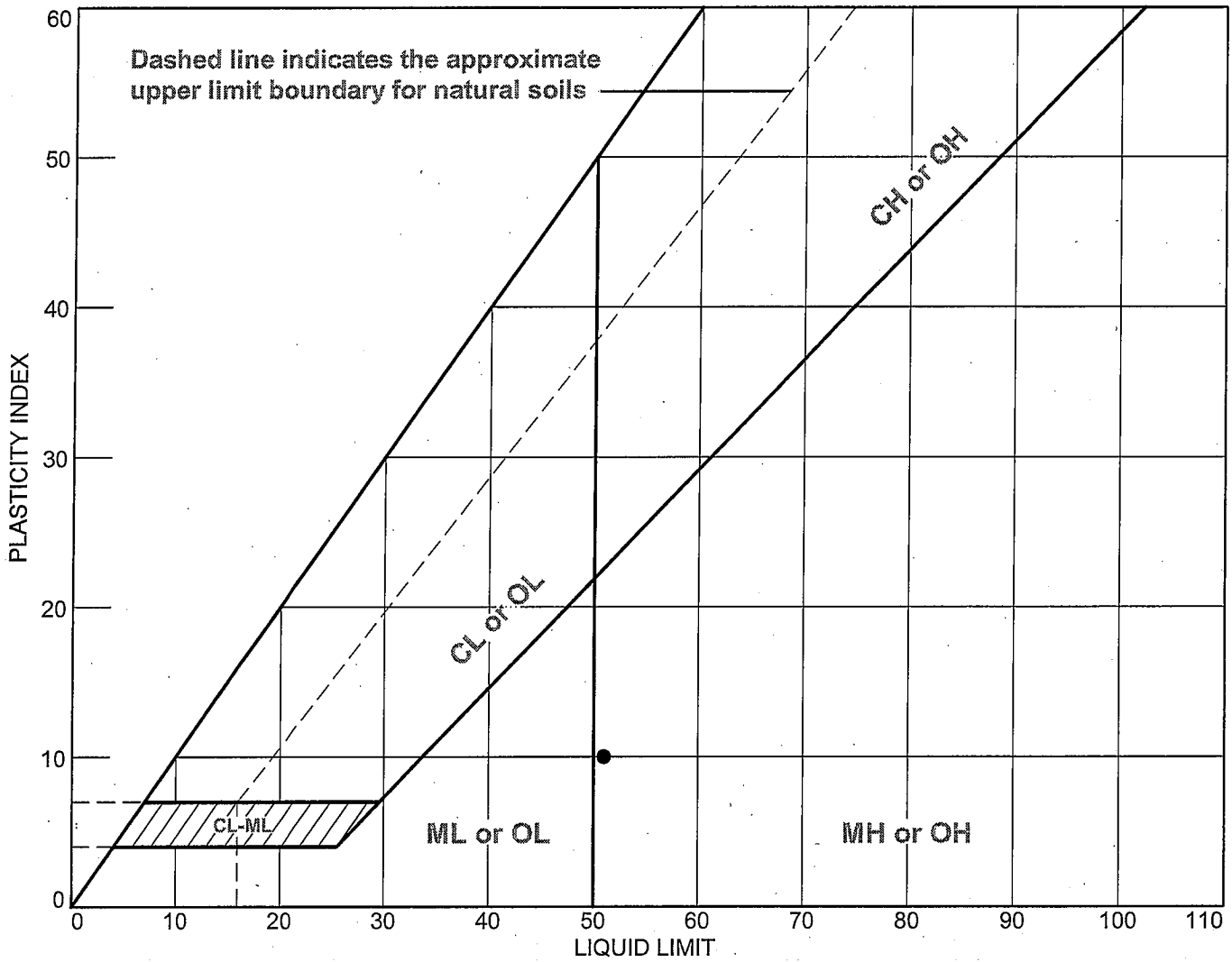


SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	RW - 6	S-9	32' - 34'		35	53	18	

TEST-CON INCORPORATED 16 East Franklin Street, PO BOX 3116 DANBURY, CT 06813-3116	**Client:** GeoDesign **Project:** New Britain-Hartford Busway #155-H025 **Project No.:** **Figure**

Tested By: R. DeCesare

LIQUID AND PLASTIC LIMITS TEST REPORT



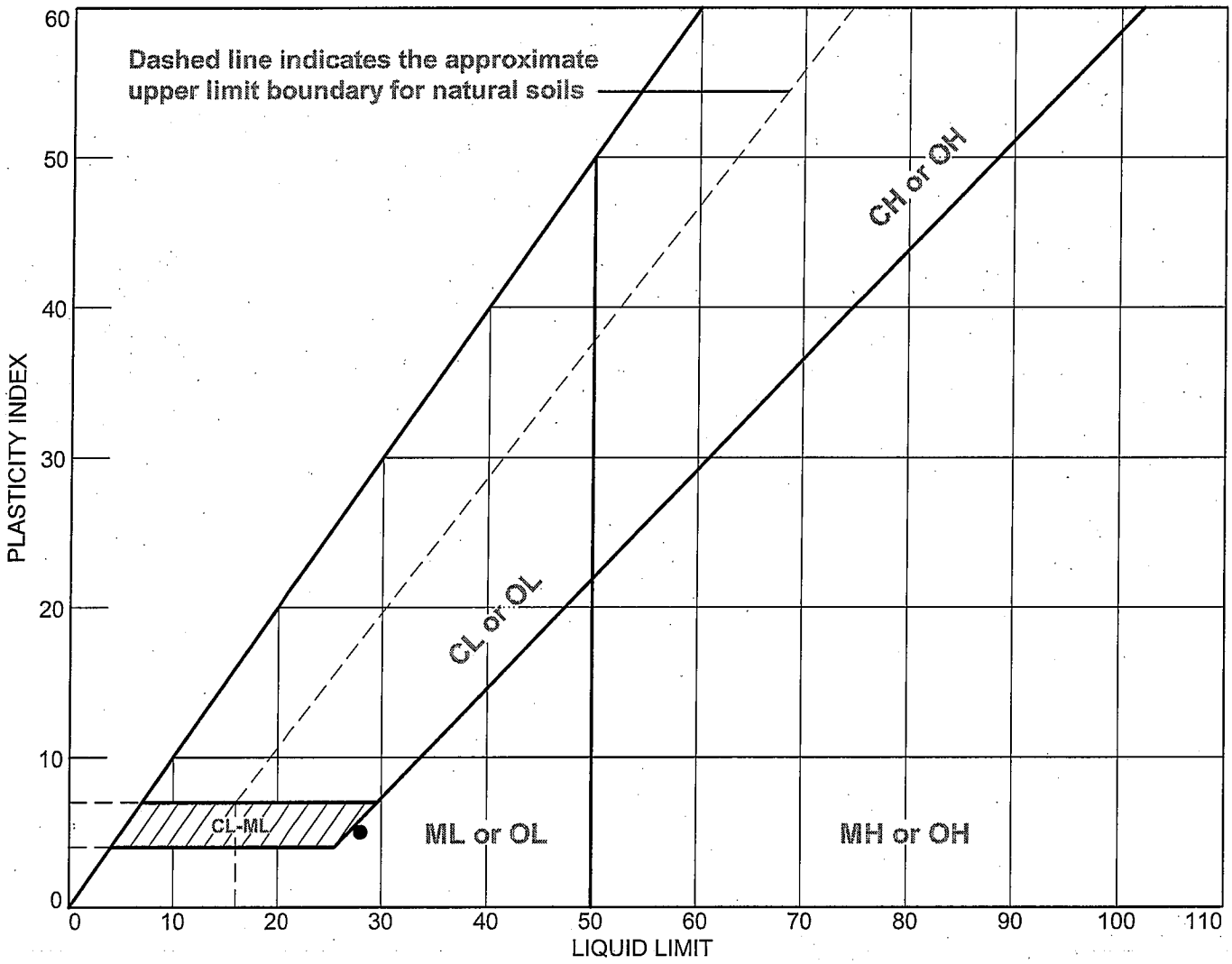
SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	RW-7	S-9	32' - 34'		41	51	10	

TEST-CON INCORPORATED
16 East Franklin Street, PO BOX 3116
DANBURY, CT 06813-3116

Client: GeoDesign
Project: New Britain-Hartford Busway #155-H025
Project No.:
Figure

Tested By: R. DeCesare

LIQUID AND PLASTIC LIMITS TEST REPORT



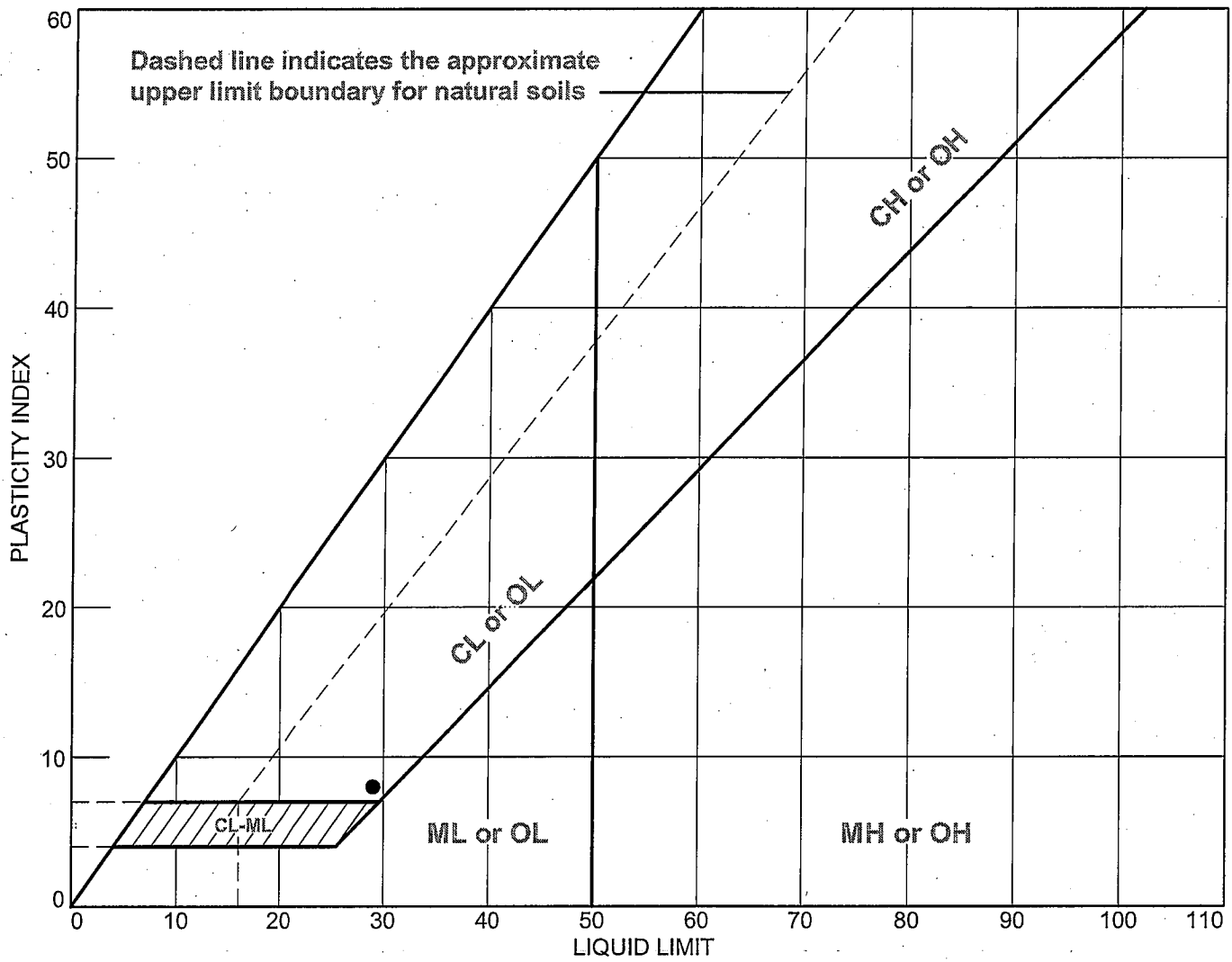
SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	RW-7	S-12	45' - 47'		23	28	5	

TEST-CON INCORPORATED
16 East Franklin Street, PO BOX 3116
DANBURY, CT 06813-3116

Client: GeoDesign
Project: New Britain-Hartford Busway #155-H025
Project No.:
Figure

Tested By: R. DeCesare

LIQUID AND PLASTIC LIMITS TEST REPORT



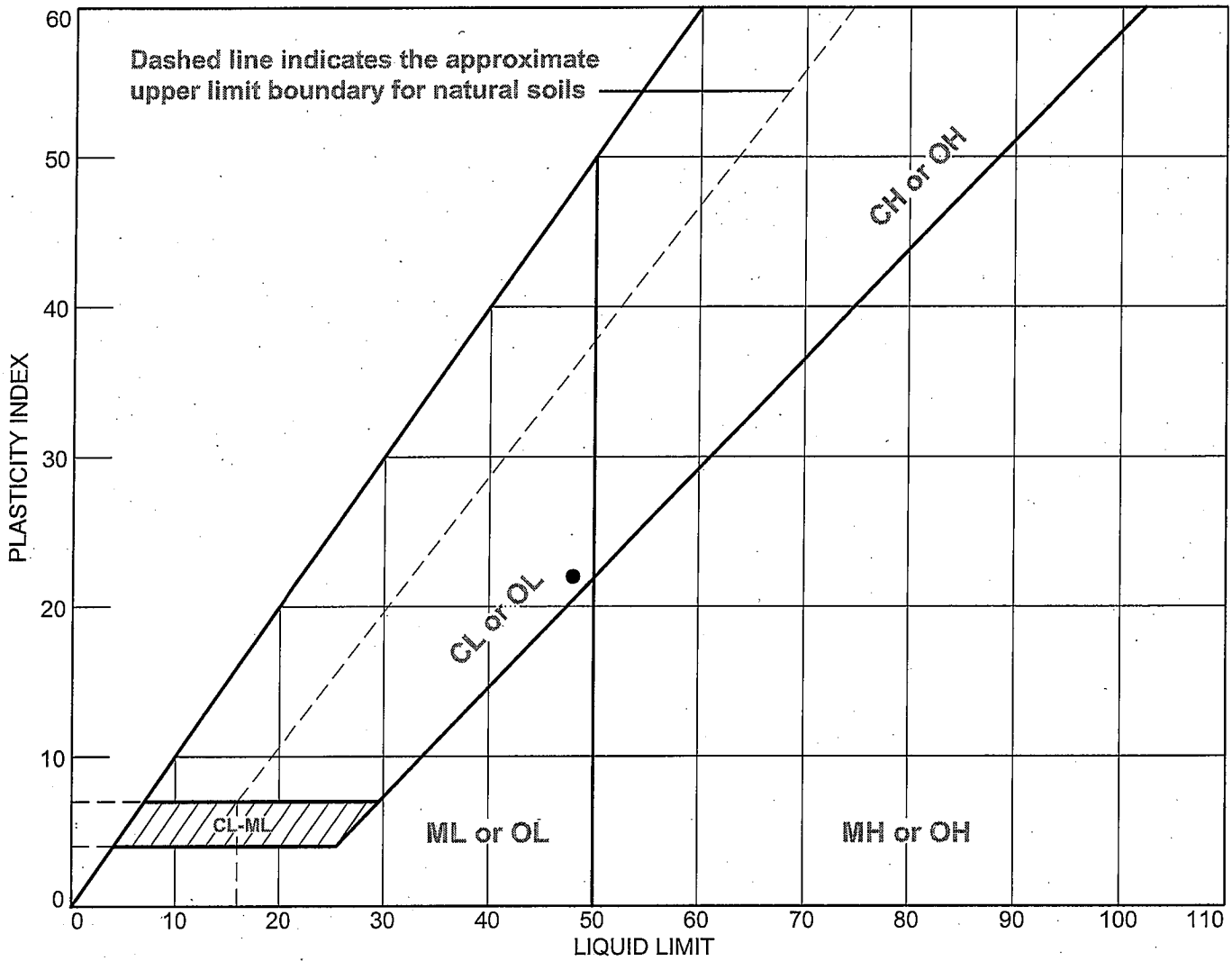
SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	RW-7	S-14	55' - 57'		21	29	8	

TEST-CON INCORPORATED
16 East Franklin Street, PO BOX 3116
DANBURY, CT 06813-3116

Client: GeoDesign
Project: New Britain-Hartford Busway #155-H025
Project No.:
Figure

Tested By: R. DeCesare

LIQUID AND PLASTIC LIMITS TEST REPORT



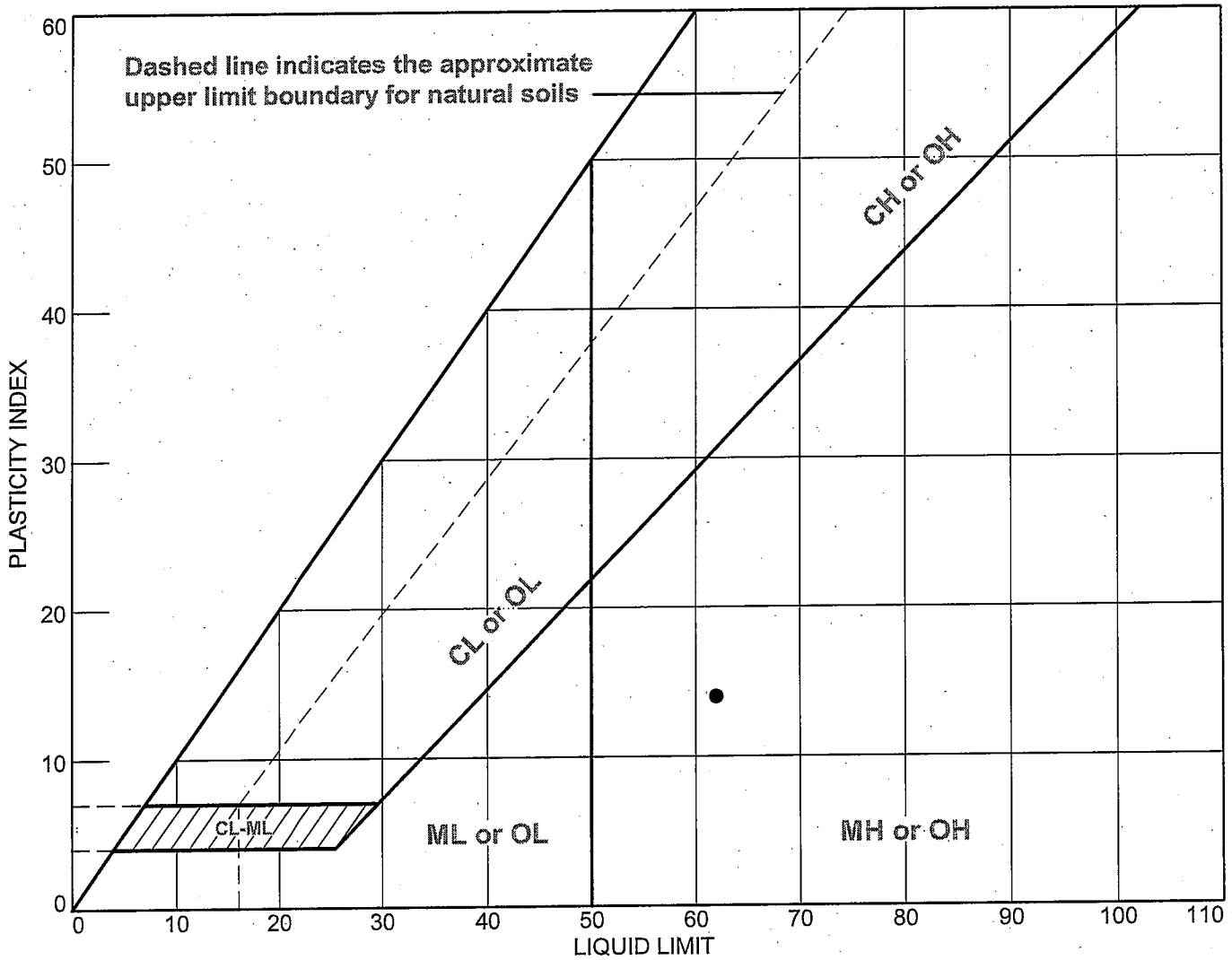
SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	RW-8	S-7	22' - 24'		26	48	22	

TEST-CON INCORPORATED
16 East Franklin Street, PO BOX 3116
DANBURY, CT 06813-3116

Client: GeoDesign
Project: New Britain-Hartford Busway #155-H025
Project No.:
Figure

Tested By: R. DeCesare

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

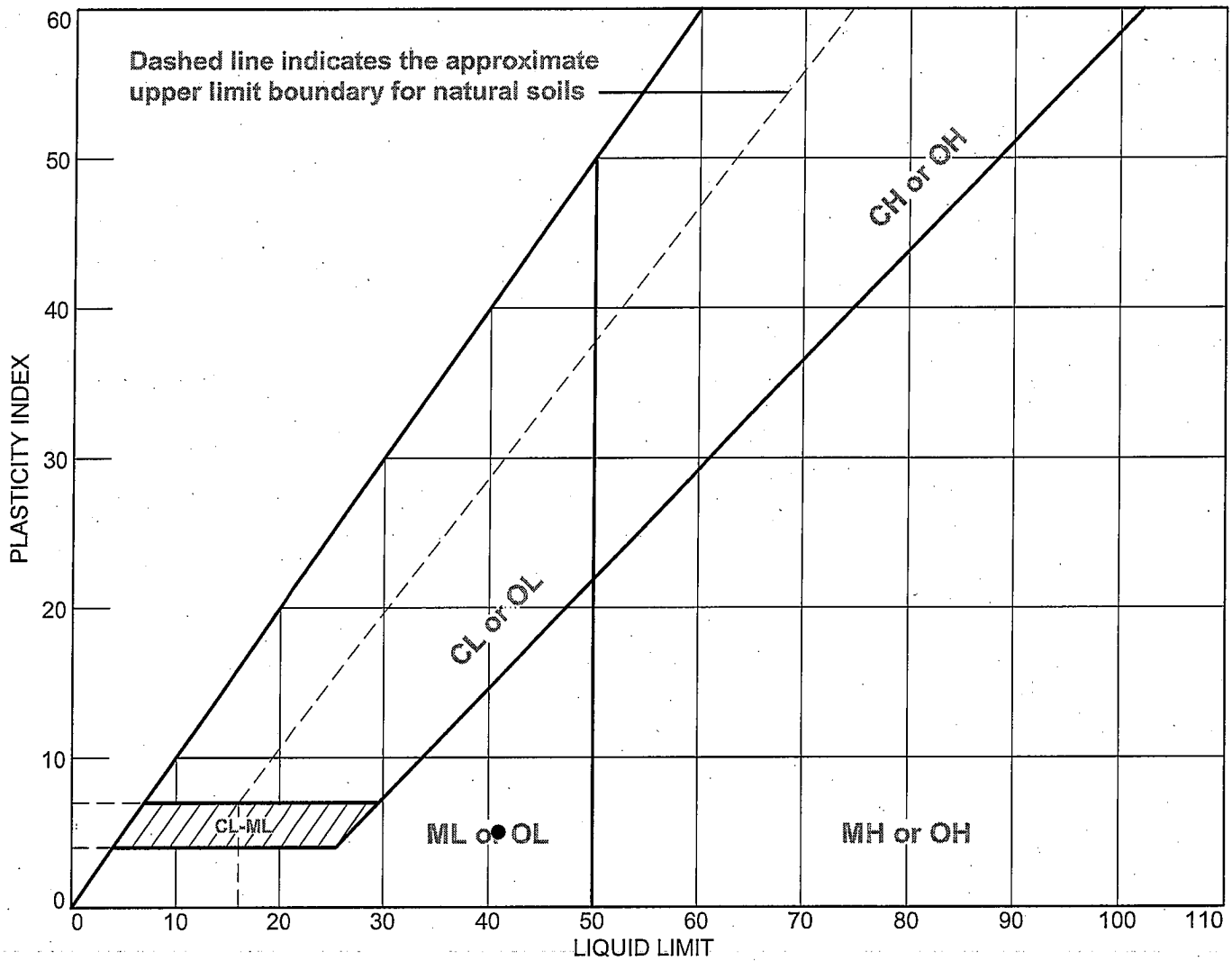
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	RW-8	S-11	42' - 44'		48	62	14	

TEST-CON INCORPORATED
16 East Franklin Street, PO BOX 3116
DANBURY, CT 06813-3116

Client: GeoDesign
Project: New Britain-Hartford Busway #155-H025
Project No.:
Figure

Tested By: R. DeCesare

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	RW-8	S-14	55' - 57'		36	41	5	

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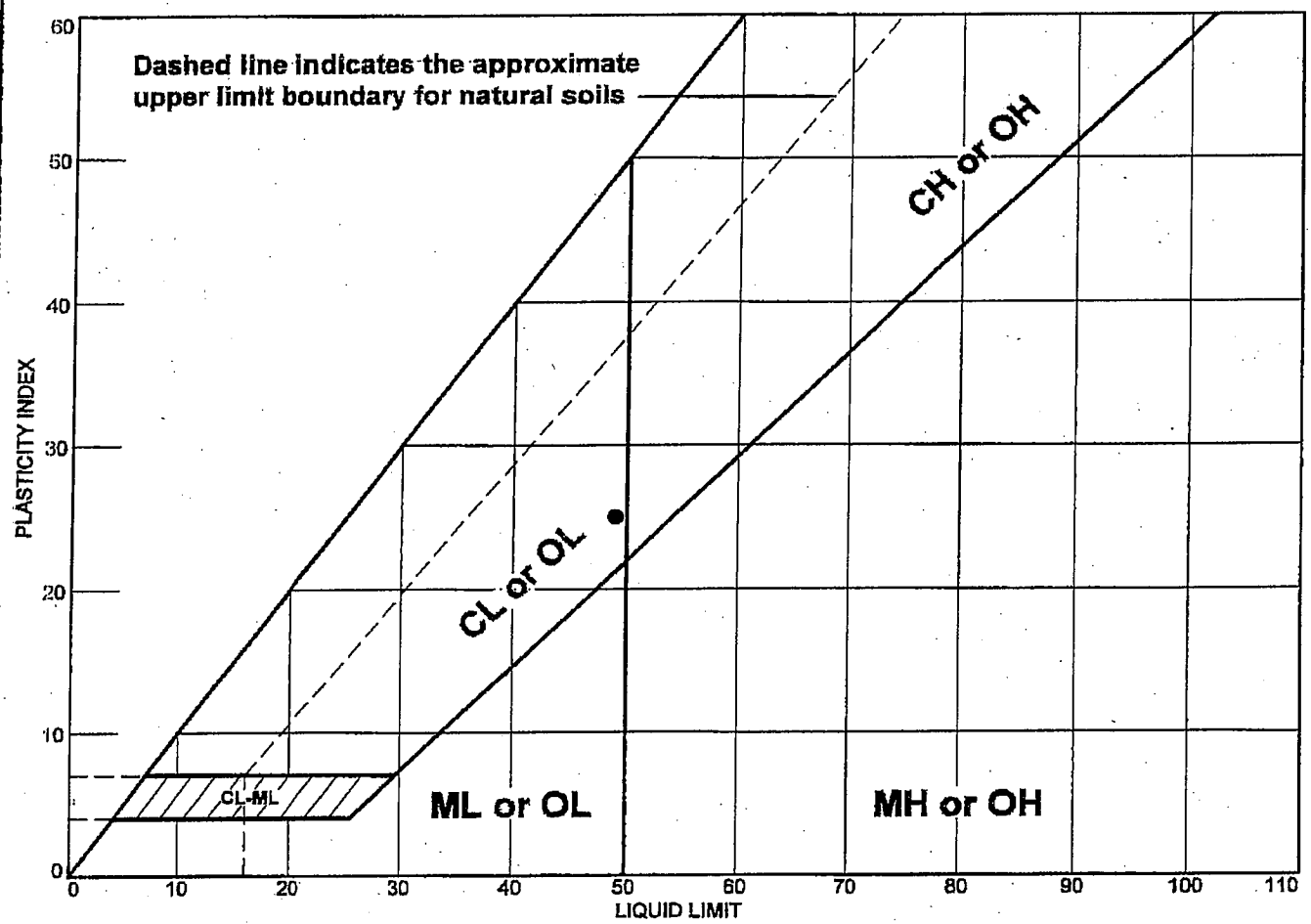
16 East Franklin Street, PO BOX 3116
DANBURY, CT 06813-3116

Client: GeoDesign
Project: New Britain-Hartford Busway #155-H025
Project No.:
Figure

Tested By: R. DeCesare

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●		49	24	25	100.0	99.6	CL

Project No.

Project: New Britain-Hartford Busway #155-H025

● **Sample Source:** Boring RW-8 (Flatbush Ave., over Busway)

Remarks:

● Sampled and Dropped off by the Client,

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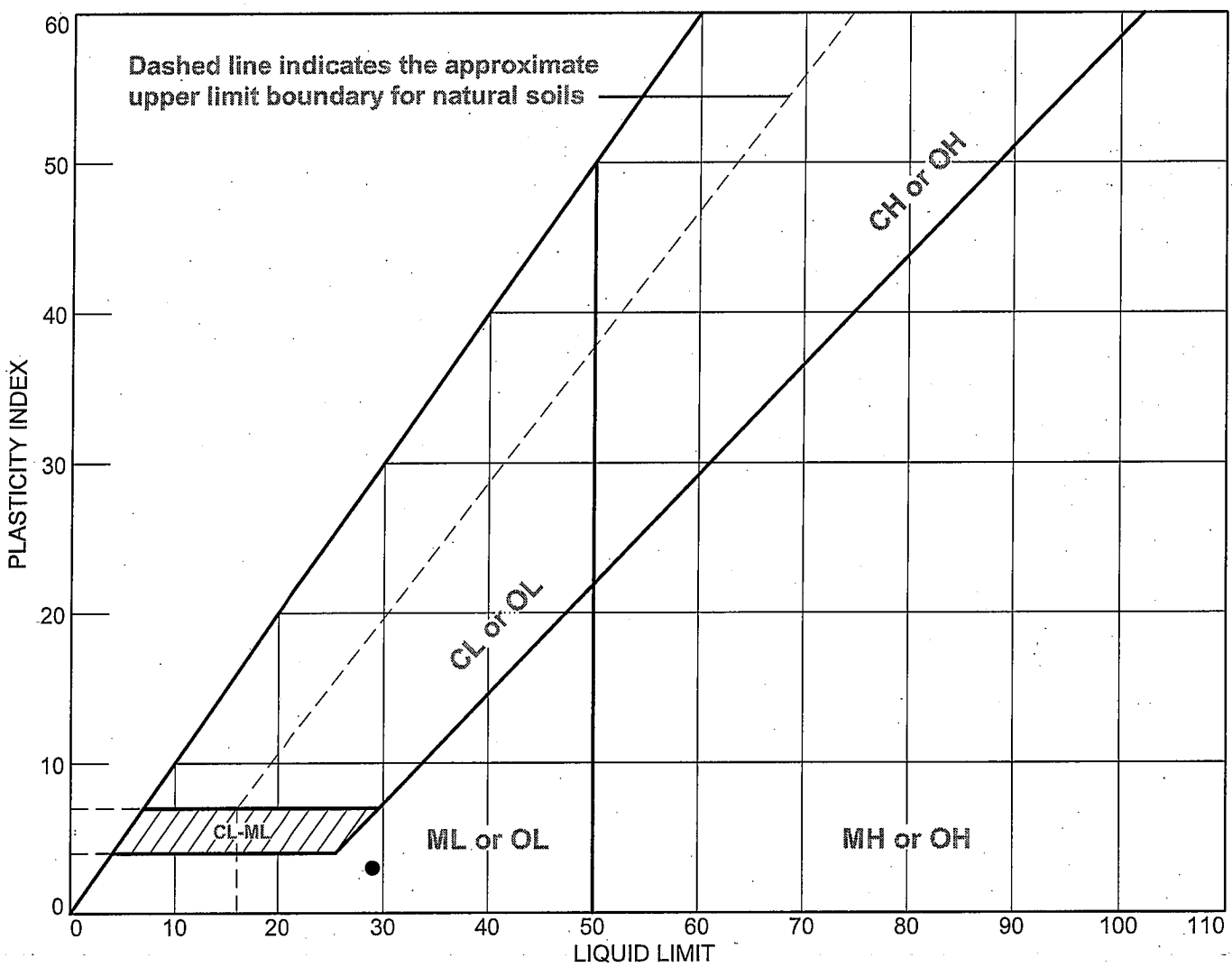
PO BOX 3116
Danbury, CT 06813-3116

LIQUID AND PLASTIC LIMITS TEST REPORT



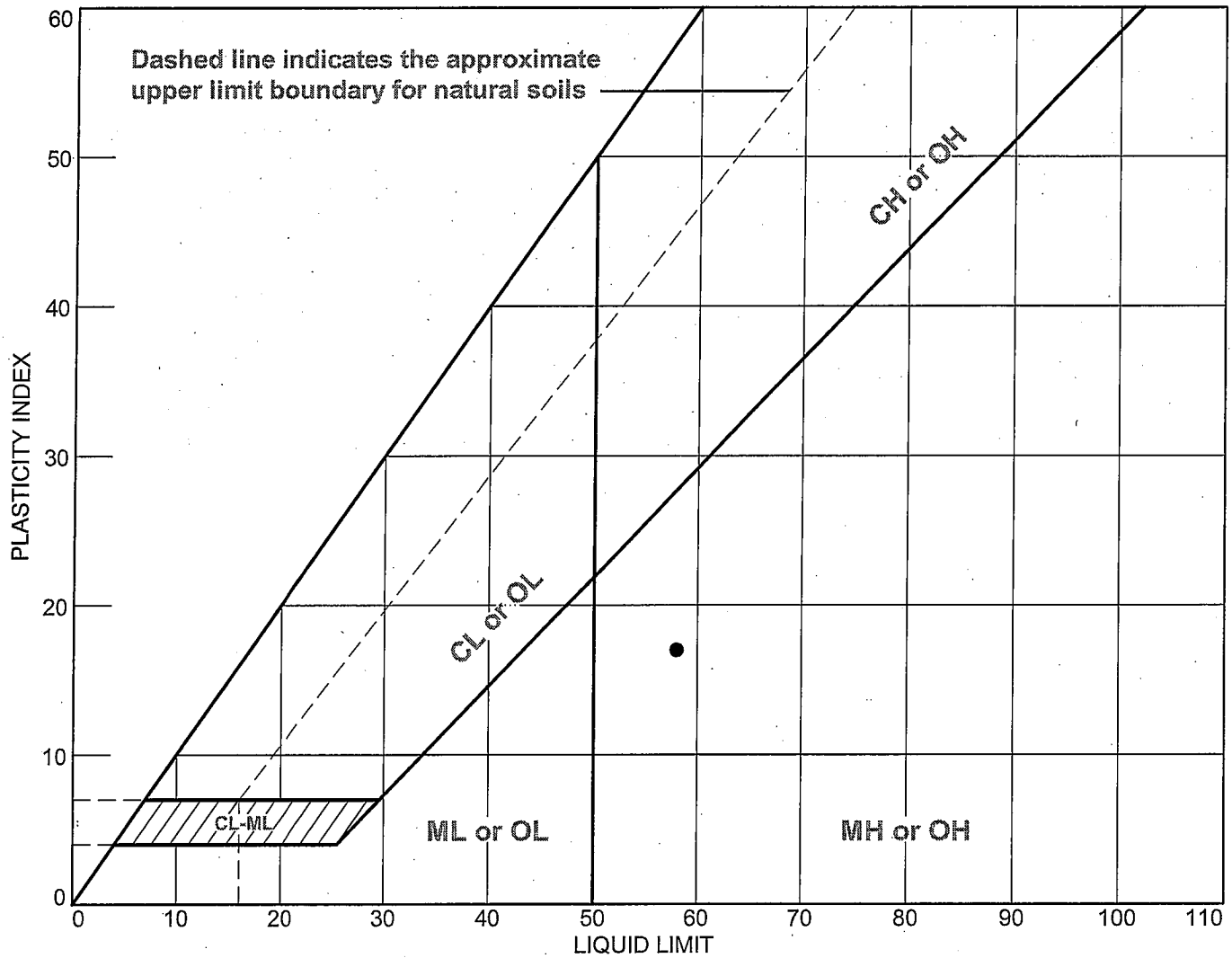
SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	RW-9	S-5	10' - 12'		26	29	3	

TEST-CON INCORPORATED
16 East Franklin Street, PO BOX 3116
DANBURY, CT 06813-3116

Client: GeoDesign
Project: New Britain-Hartford Busway #155-H025
Project No.:
Figure

Tested By: R. DeCesare

LIQUID AND PLASTIC LIMITS TEST REPORT



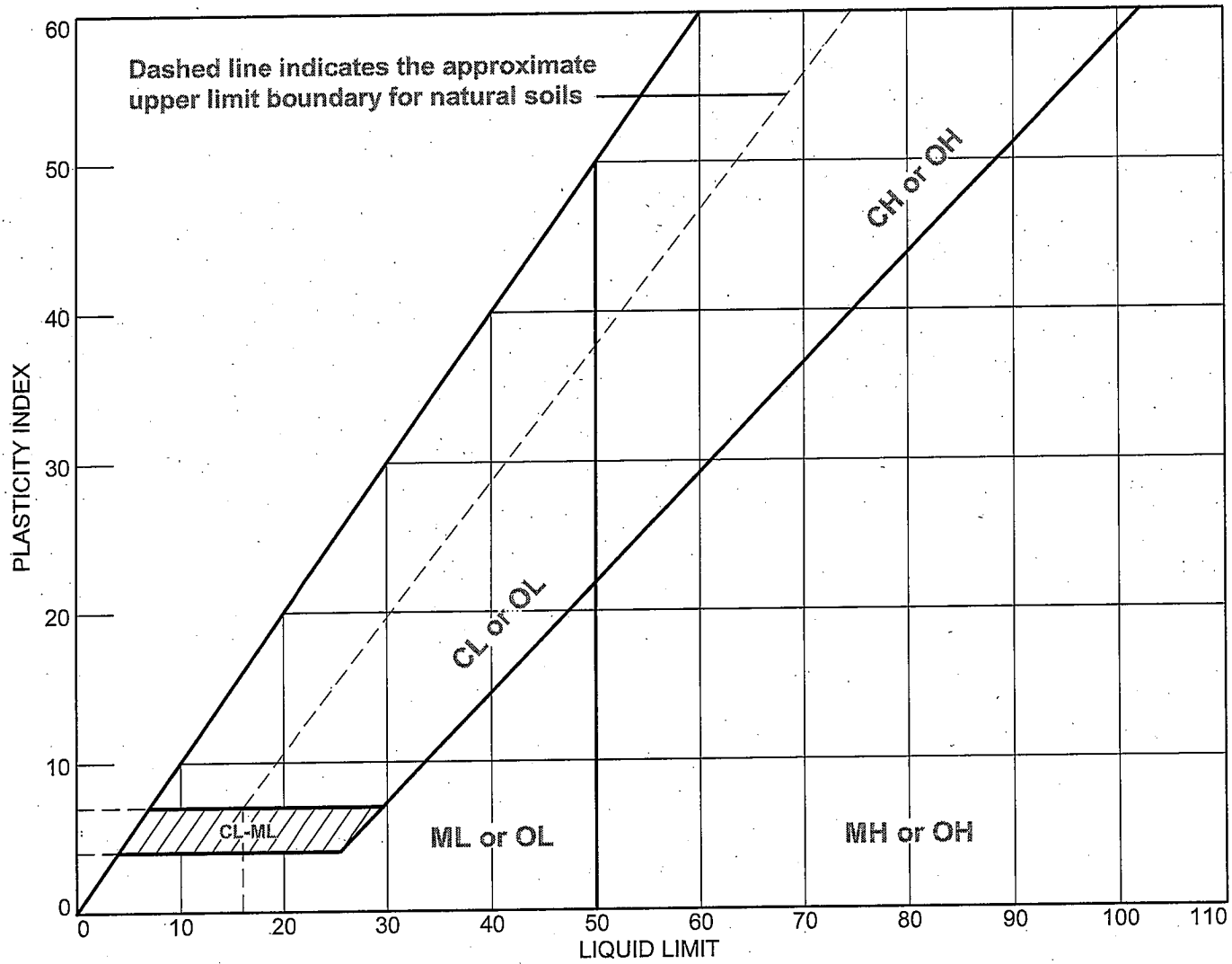
SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	RW-9	S-10	35' - 37'		41	58	17	

TEST-CON INCORPORATED
16 East Franklin Street, PO BOX 3116
DANBURY, CT 06813-3116

Client: GeoDesign
Project: New Britain-Hartford Busway #155-H025
Project No.:
Figure

Tested By: R. DeCesare

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

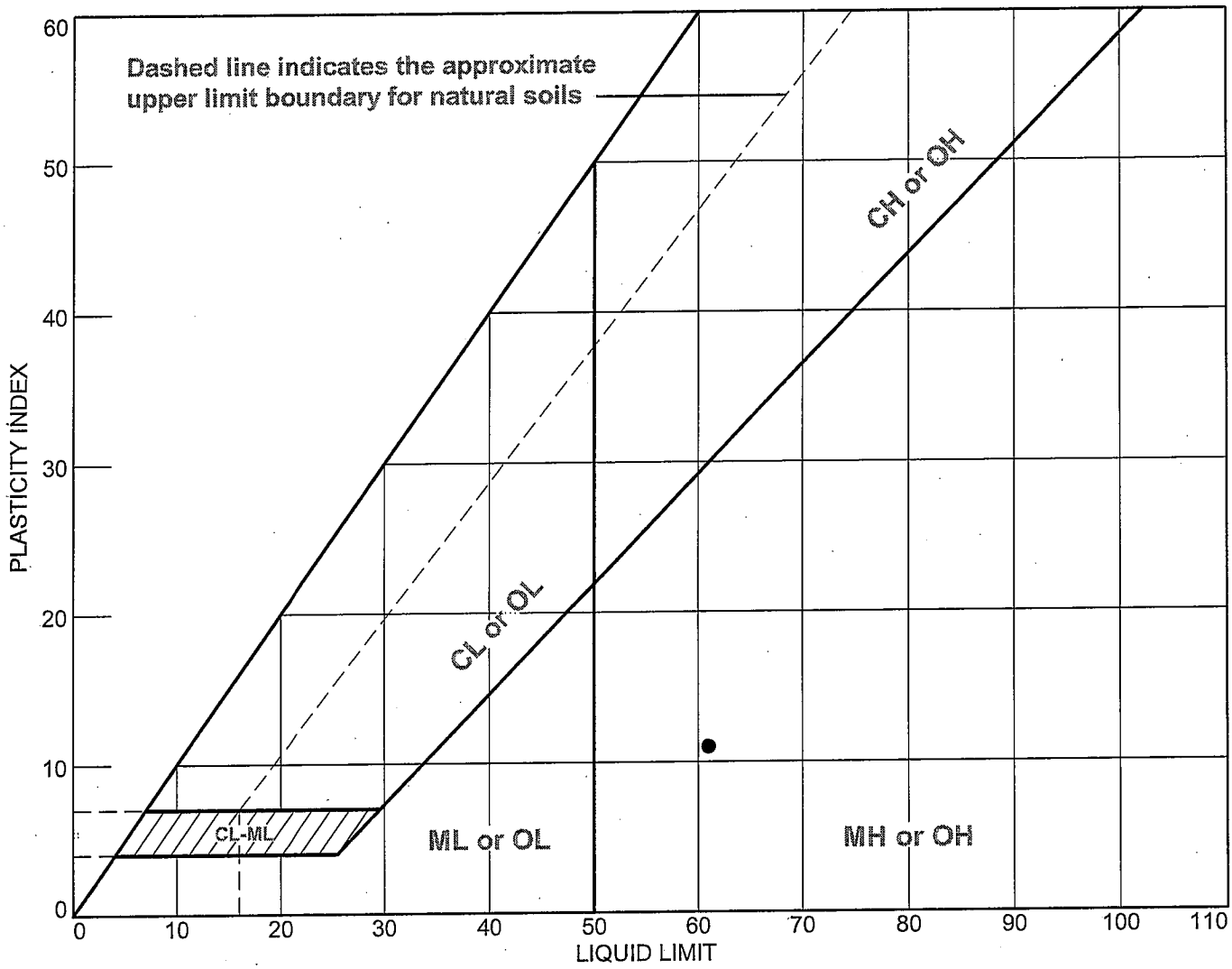
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	SB-01-1 (S-7)	S-7	22' - 24'		34	32	NP	

TEST-CON INCORPORATED
16 East Franklin Street, PO BOX 3116
DANBURY, CT 06813-3116

Client: GeoDesign
Project: New Britain-Hartford Busway #155-H025
Project No.:
Figure

Tested By: R. DeCesare

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

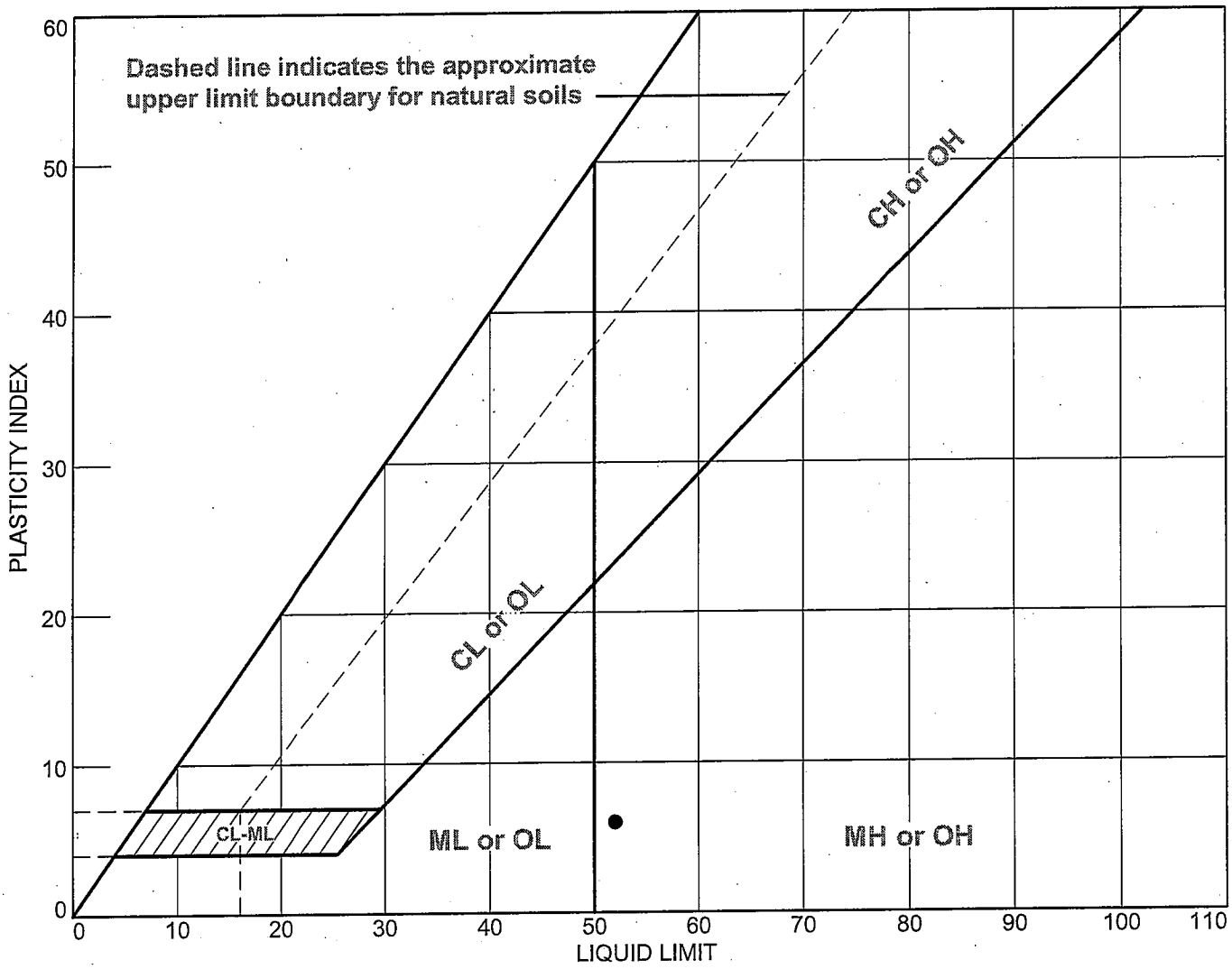
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	SB-01-1	S-11	40' - 42'		50	61	11	

TEST-CON INCORPORATED
16 East Franklin Street, PO BOX 3116
DANBURY, CT 06813-3116

Client: GeoDesign
Project: New Britain-Hartford Busway #155-H025
Project No.:
Figure

Tested By: R. DeCesare

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	SB-01-1 (S-13)	S-13	50' - 52'		46	52	6	

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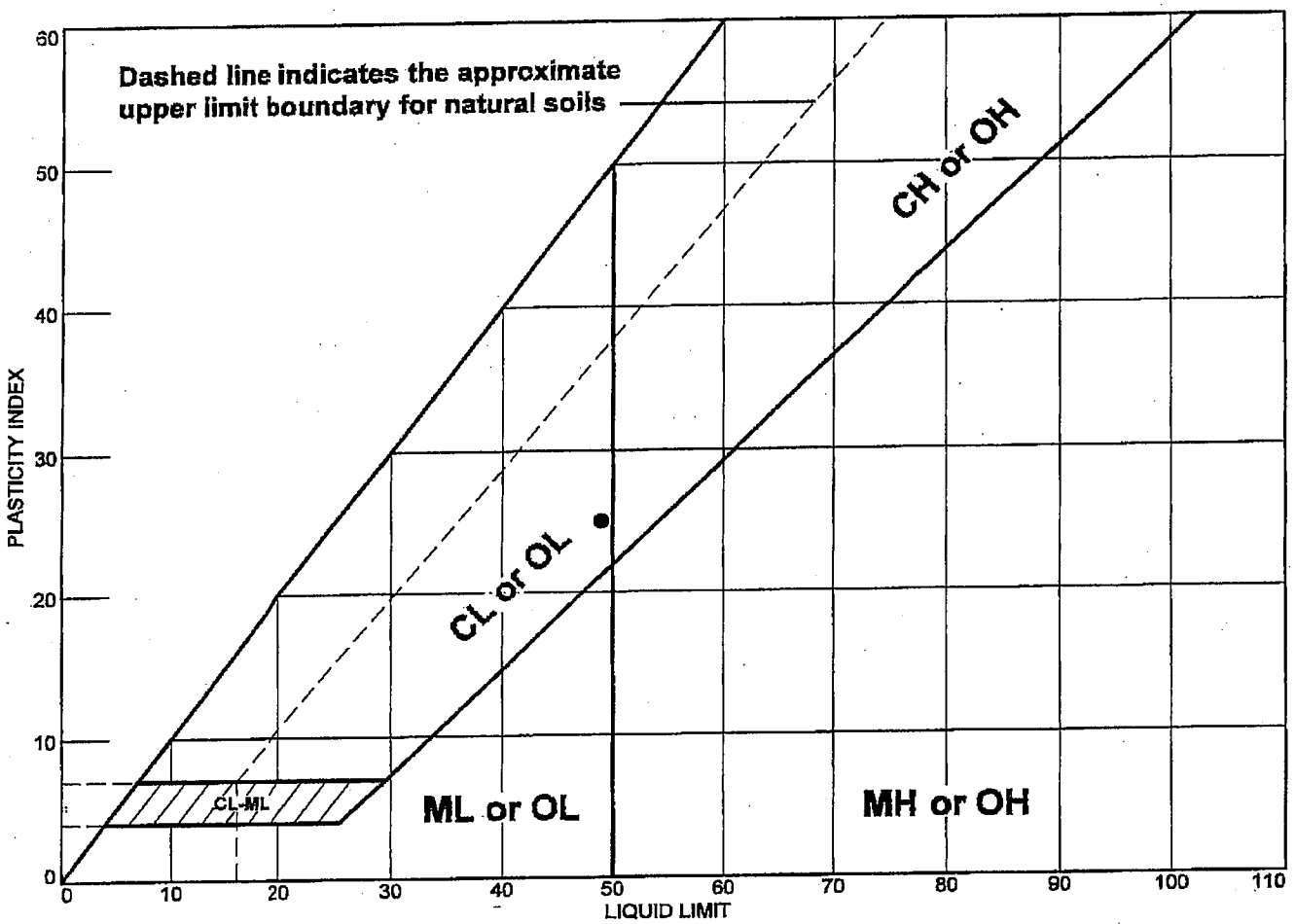
DANBURY, CT 06813-3116

Client: GeoDesign
Project: New Britain-Hartford Busway #155-H025
Project No.:
Figure

Tested By: R. DeCesare

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Olive color, lean clay	49	24	25	100.0	99.4	CL

Project No.

Project: New Britain-Hartford Busway #155-H025

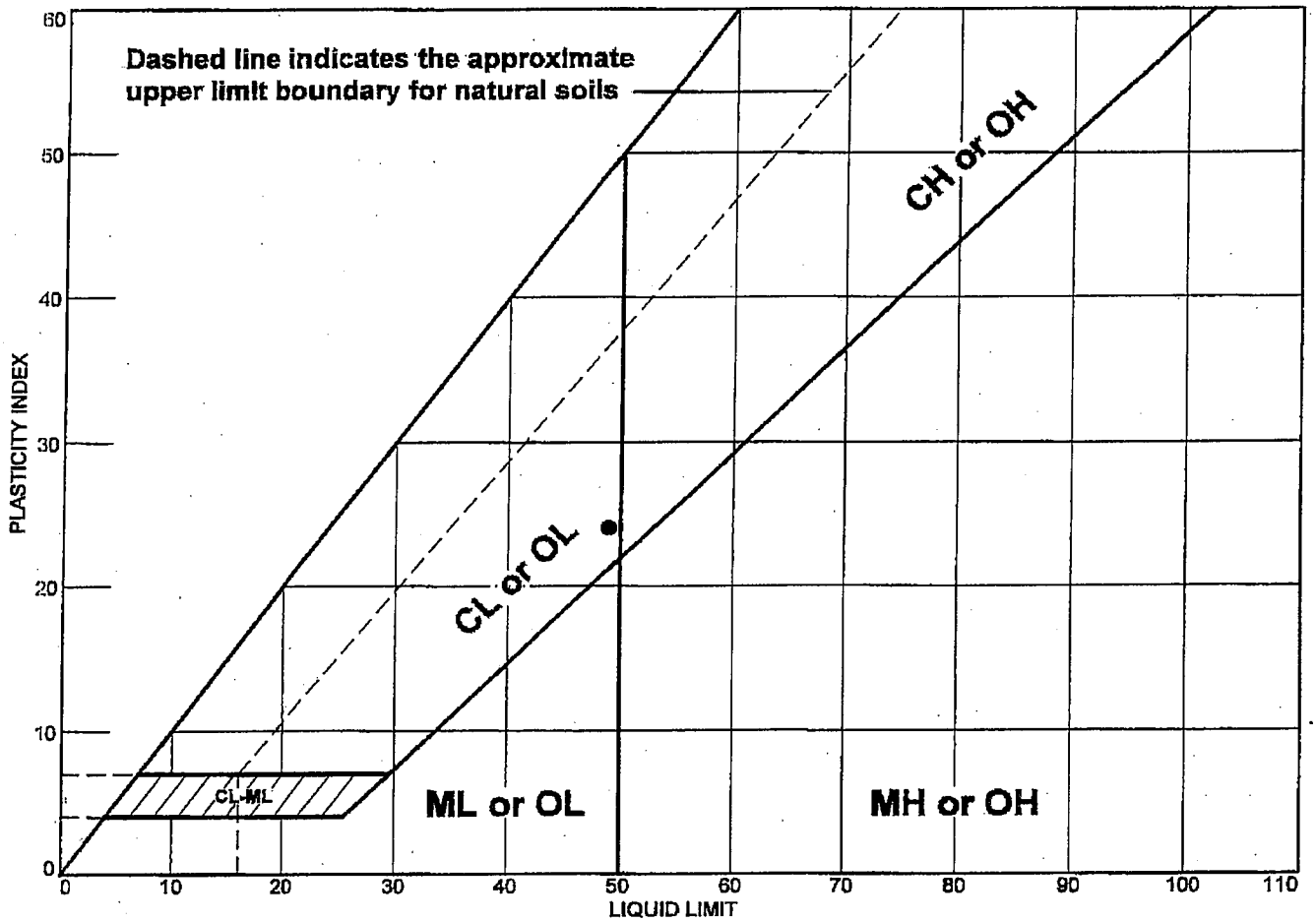
● **Sample Source:** Boring SB-01-1 (Flatbush Ave., over Busway)

Remarks:

● Sampled and Dropped off by the Client,

TEST-CON INCORPORATED
PO BOX 3116
Danbury, CT 06813-3116

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Olive color, lean clay	49	25	24	100.0	99.4	CL

Project No.

Project: New Britain-Hartford Busway #155-H025

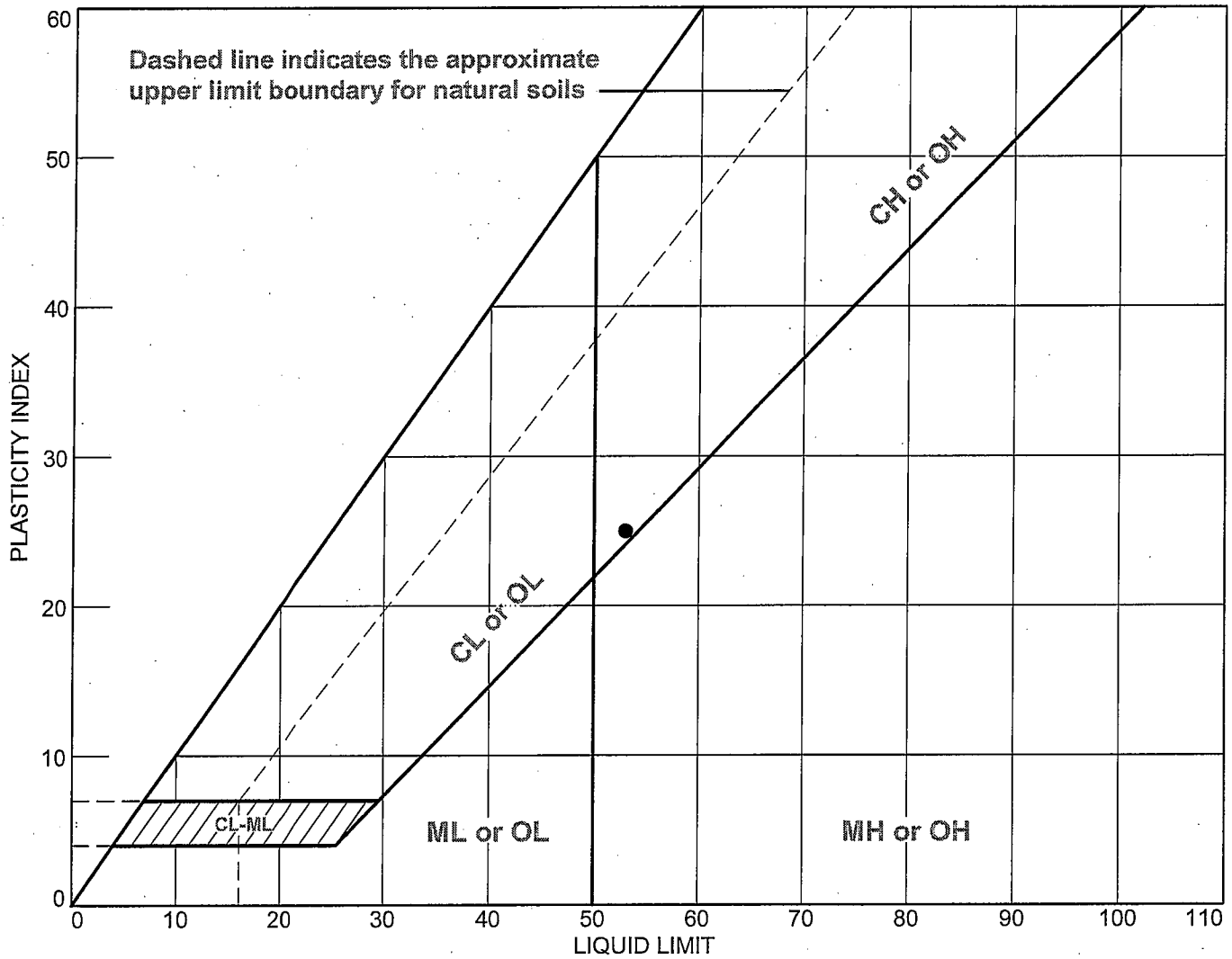
● **Source of Sample:** SB-01-2 (Flatbush Ave., over Busway)

Remarks:

● Sampled and Dropped off by the Client,

TEST-CON INCORPORATED
PO BOX 3116
Danbury, CT 06813-3116

LIQUID AND PLASTIC LIMITS TEST REPORT



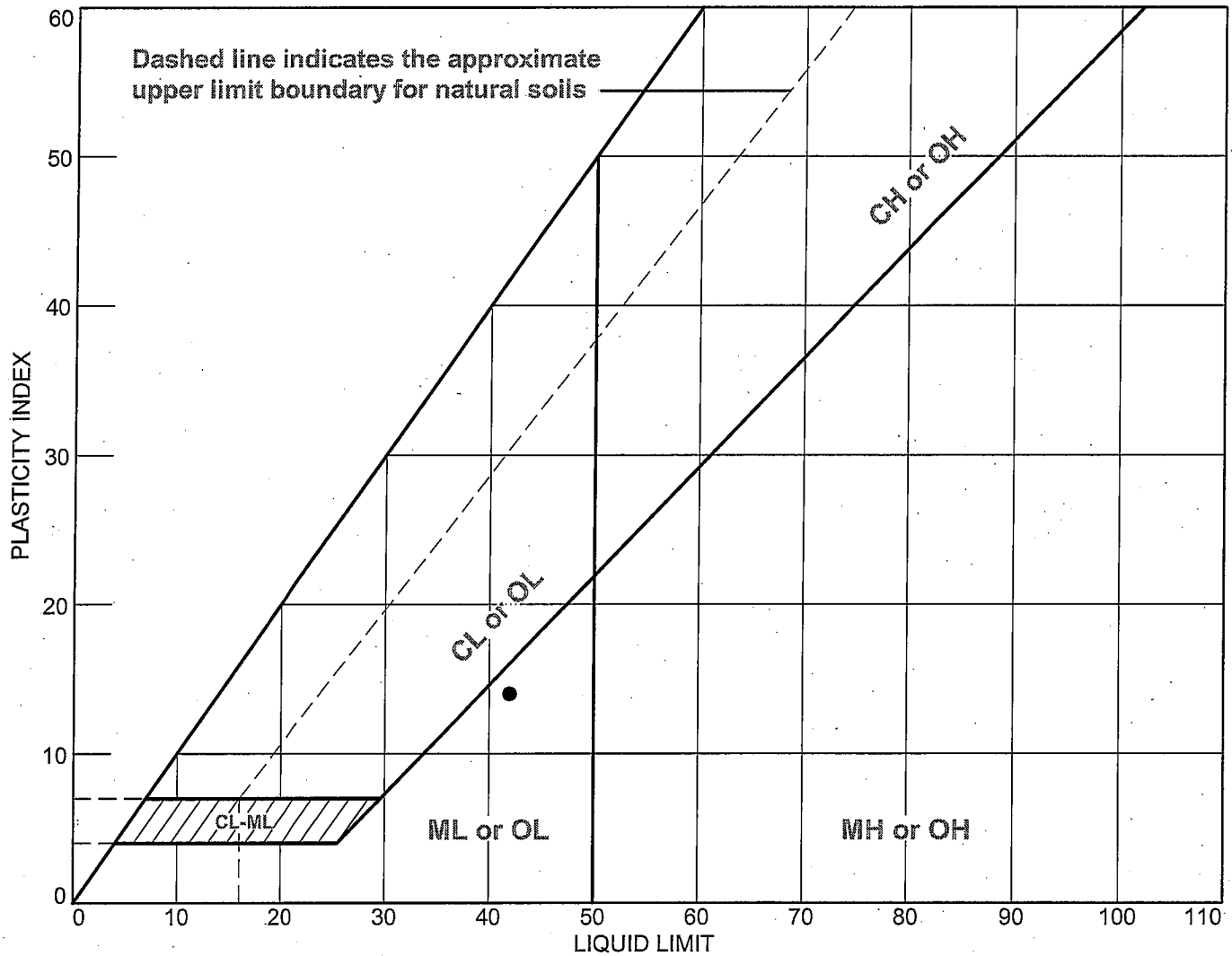
SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	SB-01-3	S-10	30' - 32'		28	53	25	

TEST-CON INCORPORATED
16 East Franklin Street, PO BOX 3116
DANBURY, CT 06813-3116

Client: GeoDesign
Project: New Britain-Hartford Busway #155-H025
Project No.:
Figure

Tested By: R. DeCesare

LIQUID AND PLASTIC LIMITS TEST REPORT



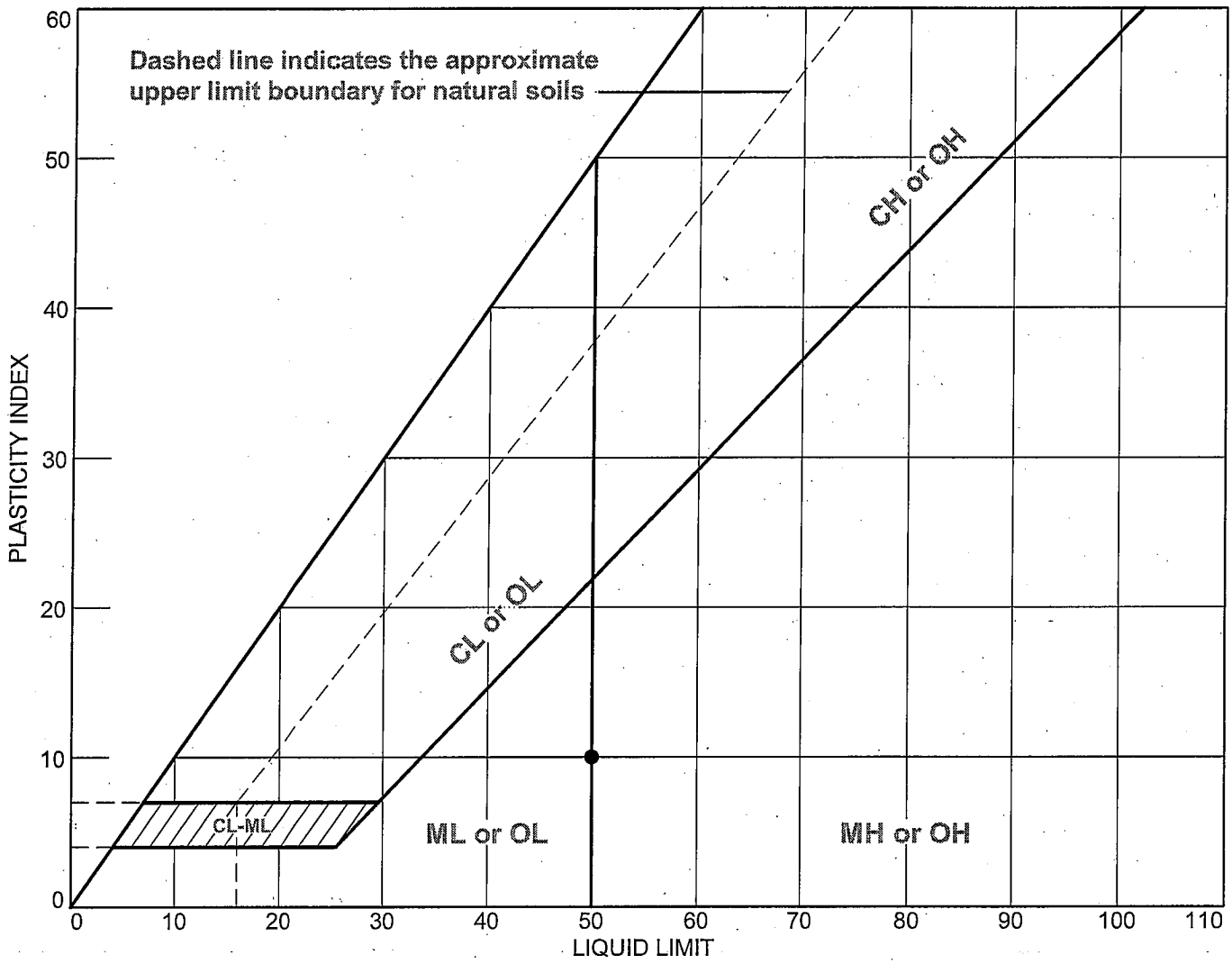
SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	SB-01-3	S-12	40' - 42'		28	42	14	

TEST-CON INCORPORATED
16 East Franklin Street, PO BOX 3116
DANBURY, CT 06813-3116

Client: GeoDesign
Project: New Britain-Hartford Busway #155-H025
Project No.:
Figure

Tested By: R. DeCesare

LIQUID AND PLASTIC LIMITS TEST REPORT



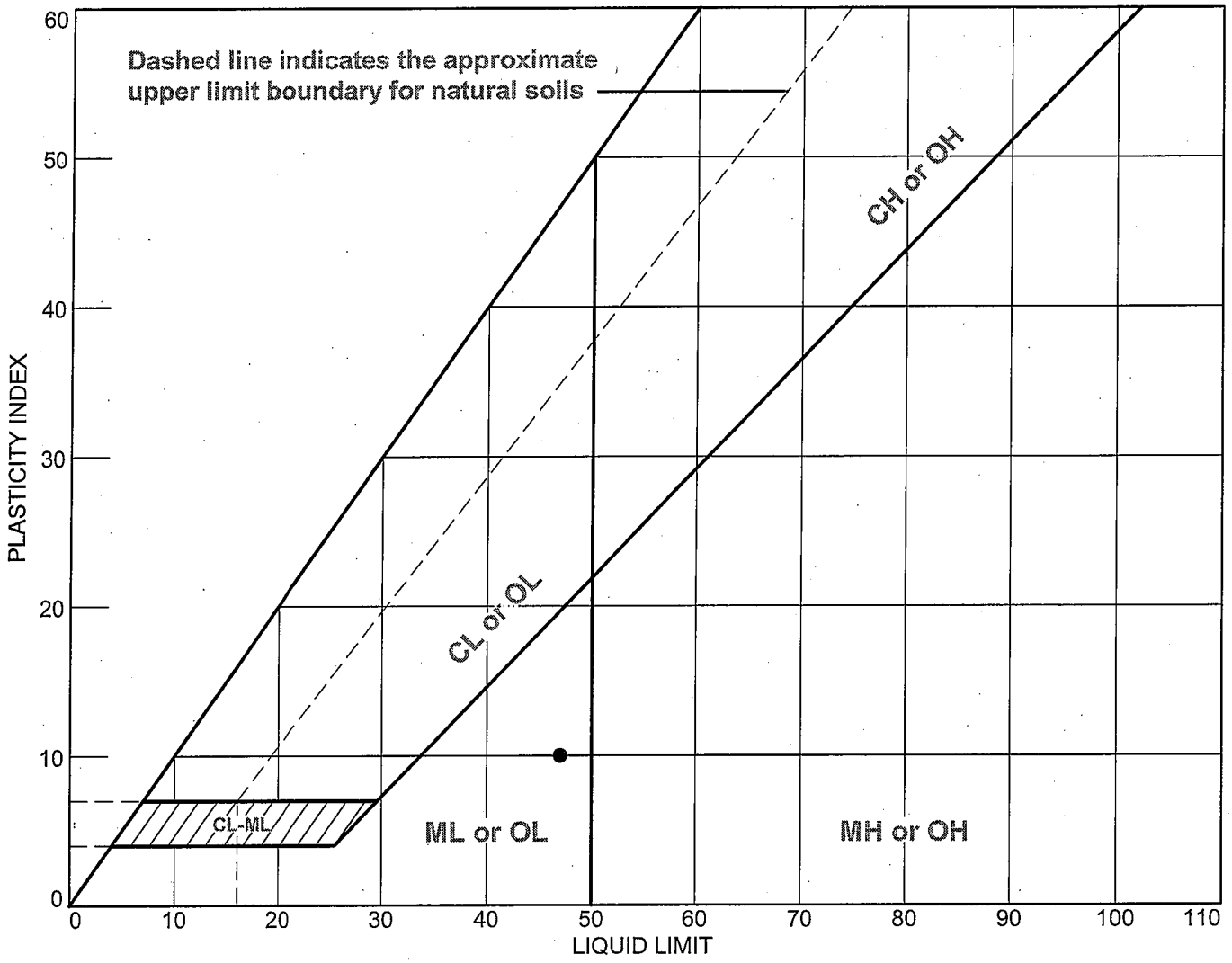
SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	SB-01-4	S-6	20' - 22'		40	50	10	

TEST-CON INCORPORATED
16 East Franklin Street, PO BOX 3116
DANBURY, CT 06813-3116

Client: GeoDesign
Project: New Britain-Hartford Busway #155-H025
Project No.:
Figure

Tested By: R. DeCesare

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	SB-01-4	S-8	32' - 34'		37	47	10	

TEST-CON INCORPORATED
16 East Franklin Street, PO BOX 3116
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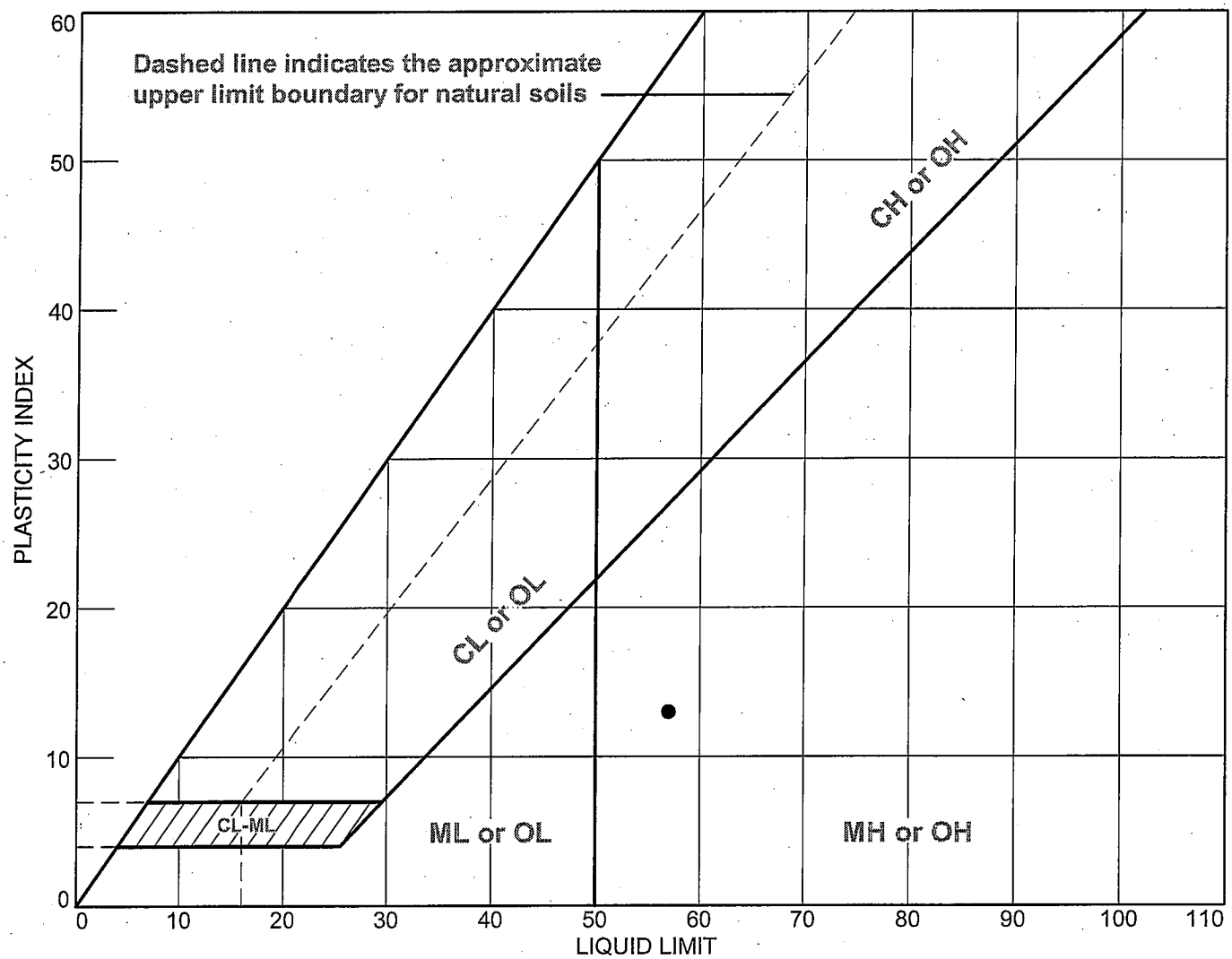
Client: GeoDesign
Project: New Britain-Hartford Busway #155-H025
Project No.:
Figure

Tested By: R. DeCesare

LIQUID AND PLASTIC LIMITS TEST REPORT



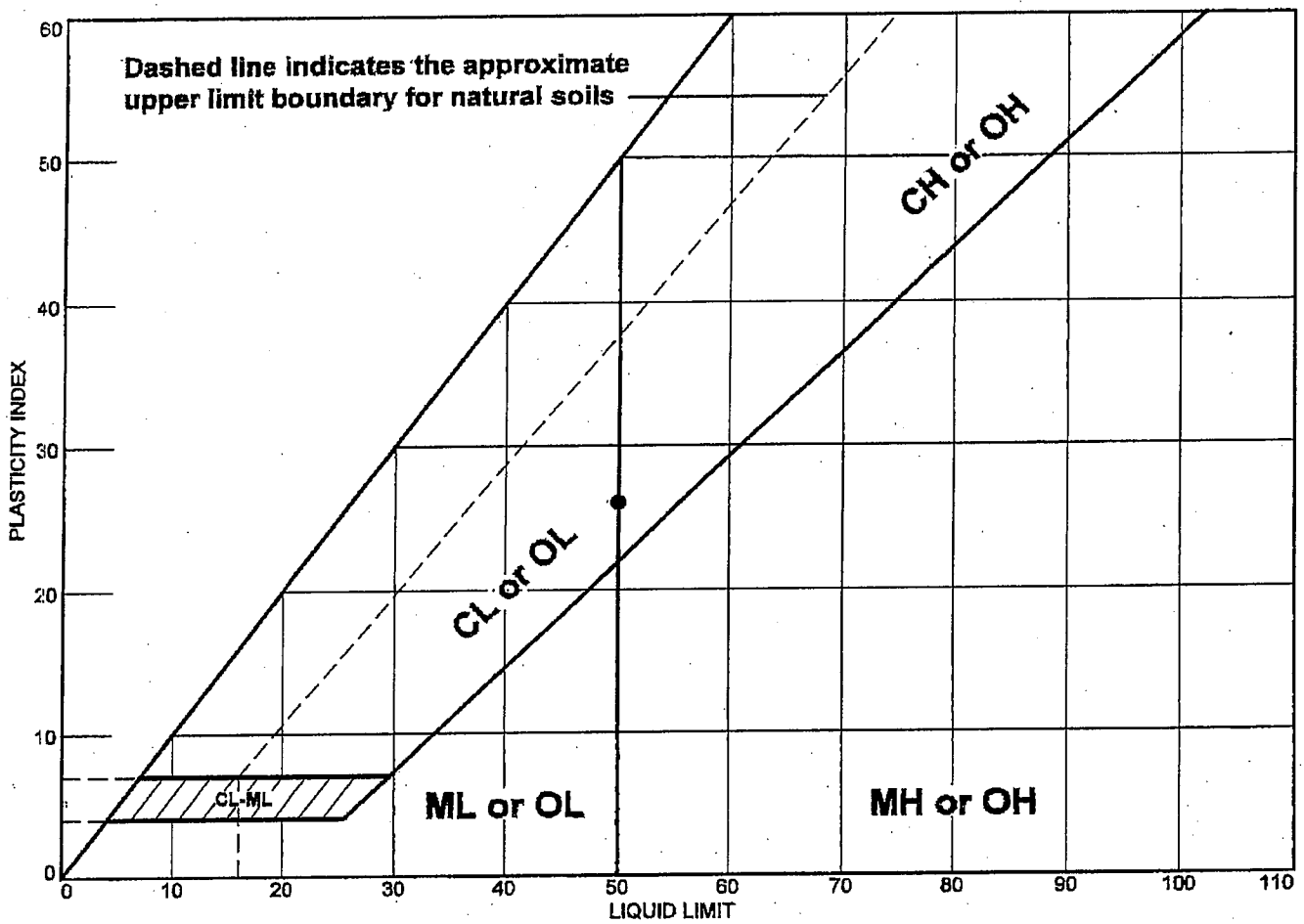
SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	SB-01-4	S-10	42' - 44'		44	57	13	

TEST-CON INCORPORATED
16 East Franklin Street, PO BOX 3116
DANBURY, CT 06813-3116

Client: GeoDesign
Project: New Britain-Hartford Busway #155-H025
Project No.:
Figure

Tested By: R. DeCesare

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Olive Color, fat clay	50	24	26	100.0	99.8	CH

Project No.

Project: New Britain-Hartford Busway #155-H025

● **Sample Source:** Boring SB-01-4 (Flatbush Ave., over Busway)

Remarks:

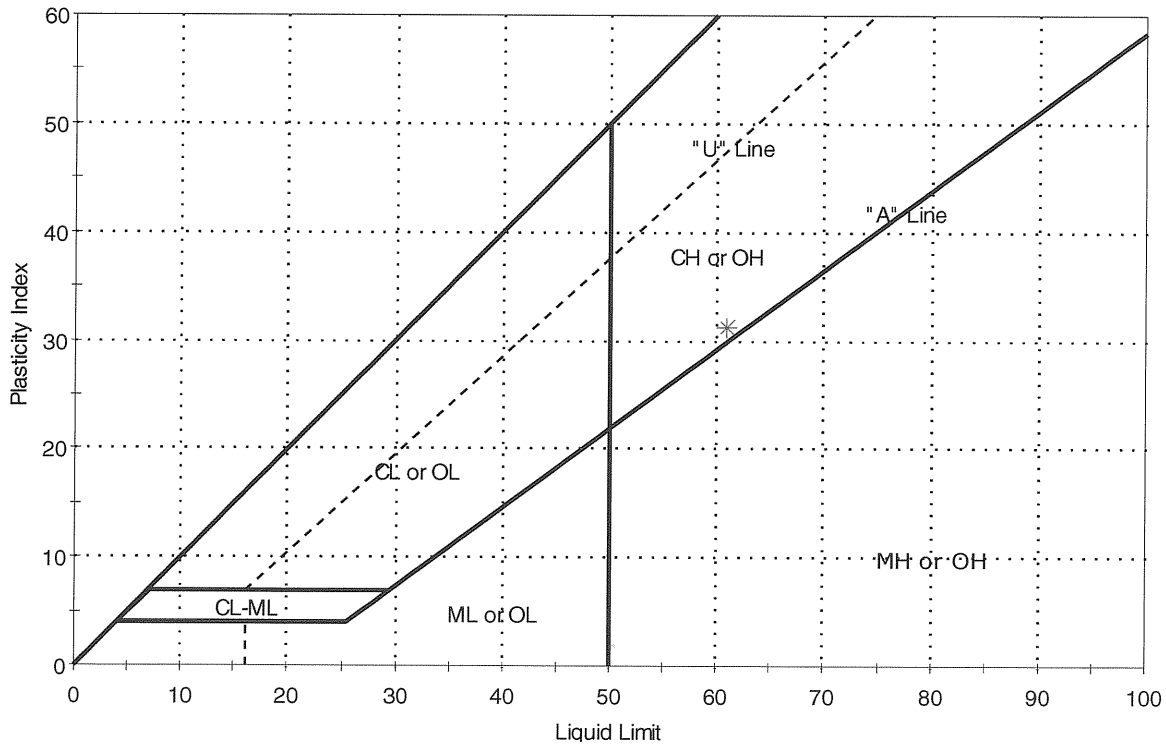
● Sampled and Dropped off by the Client,

TEST-CON INCORPORATED
PO BOX 3116
Danbury, CT 06813-3116

GeoTesting express
a subsidiary of Geocomp Corporation

Client:	GeoDesign, Inc.		
Project:	Hartford Busway		
Location:	Hartford, CT	Project No:	GTX-8398
Boring ID: RW-7	Sample Type: tube	Tested By:	ap
Sample ID:UP-1	Test Date: 08/08/08	Checked By:	jdt
Depth : 30-32 ft	Test Id: 136051		
Test Comment:	---		
Sample Description:	Moist, brown clay		
Sample Comment:	---		

Atterberg Limits - ASTM D 4318-05



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
*	UP-1	RW-7	30-32 ft	60	61	30	31	1	

Sample Prepared using the WET method

Dry Strength: VERY HIGH
Dilentancy: SLOW
Toughness: LOW

2003 Moisture Contents

LABORATORY TESTING DATA SHEET

Project Name: NEW BRITAIN-HARTFORD BUSWAY CONNECTICUT
Project No.: L17828
Assigned By: D. GAFFNEY
Reviewed By: Matthew Coley
Project Engineer: D. SCHULZE
Date: NOV.03
Date Reviewed: 11/11/03

Boring/ Test Pit No.	Sample No.	Depth ft.	Lab No.	Identification Tests: Water Content %	LL %	PL %	Sieve -200 %	Hyd -2μ %	ORG %	G_s	Dry unit wt. pcf	Density: γ_d MAX (pcf) / W_{opt} (%)	Perme-ability cm/sec	Strength Tests: Torvane or Type Test	$\bar{\sigma}_c$ psf	Failure Criteria	$\sigma_1 - \sigma_3$ or τ psf	Strain %	Consol. C_c / $1 + e_0$	Laboratory Log and Soil Description
SB-50	S-2	4.5-6.0	289	32.6																
SB-50	S-10	28.5-30.0	290	55.5																
SB-51	S-5	13.5-15.0	291	49.0																
SB-51	S-13	45.0-46.5	292	21.1																
SB-52	S-10	28.5-30.0	293	23.8																
SB-53	S-13	45.0-46.5	294	41.2																
SB-54	S-21	85.0-86.5	295	24.3																
SB-55	S-10	28.5-30.0	296	54.9																
SB-55	S-25	105.0-106.5	297	20.9																
SB-56	S-19	75.0-76.5	298	27.3																
SB-57	S-10	28.5-30.0	299	57.1																
SB-57	S-22	90.0-91.5	300	22.5																
SB-58	S-4	10.0-11.5	301	32.7																
SB-58	S-11	35.0-36.5	302	59.5																

LABORATORY TESTING DATA SHEET

Project Name: NEW BRITAIN-HARTFORD BUSWAY CONNECTICUT
Project No.: L17828
Project Engineer: D. SCHULZE
Assigned By: D. GAFFNEY
Date: DEC.03
Reviewed By:
Date Reviewed: 12-24-03

Boring/ Test Pit No.	Sample No.	Depth ft.	Lab No.	Identification Tests: Water Content %	LL %	PL %	Sieve -200 %	Hyd -2μ %	ORG %	G_s	Dry unit wt. pcf	Density: γ_d MAX (pcf) / W_{opt} (%)	Perme-ability cm/sec	Strength Tests: Torvane or Type Test	$\bar{\sigma}_c$ psf	Failure Criteria	$\sigma_1 - \sigma_3$ or τ psf	Strain %	Consol.: $\frac{\Delta e}{1 + e_0}$	Laboratory Log and Soil Description
SB-59	S-3	7.5-9.0	303	27.8																
SB-59	S-14	50.0-51.5	304	55.2																
SB-60	S-14	50.0-51.5	305	57.8																
SB-60	S-22	90.0-91.5	306	43.4																
SB-62	S-4	10.0-11.5	307	28.6																
SB-64	S-2	4.5-6.0	308	33.0																
SB-64	S-4	10.5-12.0	309	24.8																
SB-64	S-5	13.5-15.0	310	40.5																
SB-64	S-6	16.5-18.0	311	47.4																
SB-64	S-7	19.5-21.0	312	55.0																
SB-64	S-8	22.5-24.0	313	58.3																
SB-64	S-9	25.0-27.0	314	61.1																
SB-64	S-11	35.0-36.5	315	61.7																
SB-64	S-12	40.0-41.5	316	57.0																

LABORATORY TESTING DATA SHEET

Project Name: NEW BRITAIN-HARTFORD BUSWAY CONNECTICUT
Project No.: L17828 | Assigned By: D. GAFFNEY | Reviewed By: [signature]
Project Engineer: D. SCHULZE | Date: DEC.03 | Date Reviewed: 12-24-03

Boring/ Test Pit No.	Sample No.	Depth ft.	Lab No.	Identification Tests: Water Content %	LL %	PL %	Sieve -200 %	Hyd -2μ %	ORG %	G_s	Dry unit wt. pcf	Density: γ_d MAX (pcf) / W_{opt} (%)	Perme-ability cm/sec	Strength Tests: Torvane or Type Test	$\bar{\sigma}_c$ psf	Failure Criteria	$\sigma_1 - \sigma_3$ or τ psf	Strain %	Consol.: $\frac{C_c}{1 + e_0}$	Laboratory Log and Soil Description
SB-64	S-13	45.0-46.5	317	53.5																
SB-64	S-14	50.0-51.5	318	48.3																
SB-64	S-15	55.0-56.5	319	41.4																
SB-64	S-16	60.0-61.5	320	40.1																
SB-64	S-17	65.0-66.5	321	51.2																
SB-64	S-19	75.0-76.5	322	41.8																
SB-64	S-20	80.0-81.5	323	40.8																
SB-64	S-21	85.0-86.5	324	42.7																
SB-64	S-22	90.0-91.5	325	40.8																
SB-64	S-23	95.0-96.5	326	24.1																
SB-64	S-24	100.0-101.5	327	40.5																

LABORATORY TESTING DATA SHEET

Project Name: NEW BRITAIN-HARTFORD BUSWAY CONNECTICUT
Project No.: L17828 | Assigned By: D. GAFFNEY | Reviewed By: [signature]
Project Engineer: D. SCHULZE | Date: DEC.03 | Date Reviewed: 12/30/03

Boring/ Test Pit No.	Sample No.	Depth ft.	Lab No.	Identification Tests: Water Content %	LL %	PL %	Sieve -200 %	Hyd -2μ %	ORG %	G_s	Dry unit wt. pcf	Density: γ_d MAX (pcf) / W_{opt} (%)	Perme-ability cm/sec	Strength Tests: Torvane or Type Test	$\bar{\sigma}_c$ psf	Failure Criteria	$\sigma_1 - \sigma_3$ or τ psf	Strain %	Consol.: $\frac{G_s}{1+e_0}$	Laboratory Log and Soil Description
SB-65	S-5	13.5-15.0	328	28.9																
SB-65	S-29	125.0-126.5	329	14.6																
SB-67	S-22	95.0-96.5	330	46.2																
SB-70	S-5	13.5-15.0	331	29.2																
SB-70	S-10	28.5-30.0	332	54.0																
SB-70	S-24	105.0-106.5	333	24.0																
SB-71	S-4	10.0-11.5	334	34.8																
SB-71	S-5	13.5-15.0	335	39.2																
SB-71	S-6	16.5-18.0	336	34.4																
SB-71	S-7	19.5-21.0	337	43.5																
SB-71	S-8	22.5-24.0	338	54.1																
SB-71	S-9	25.0-26.5	339	53.0																
SB-71	S-10	28.5-30.0	340	53.5																
SB-71	S-11	35.0-36.5	341	51.0																
SB-71	S-12	40.0-41.5	342	34.8																

LABORATORY TESTING DATA SHEET

Project Name: NEW BRITAIN-HARTFORD BUSWAY CONNECTICUT
Project No.: L17828
Project Engineer: D. SCHULZE
Assigned By: D. GAFFNEY
Date: DEC.03
Reviewed By: Don Schulze
Date Reviewed: 12/30/03

Boring/ Test Pit No.	Sample No.	Depth ft.	Lab No.	Identification Tests: Water Content %	LL %	PL %	Sieve -200 %	Hyd -2μ %	ORG %	G_s	Dry unit wt. pcf	Density: γ_d MAX (pcf) / W_{opt} (%)	Perme-ability cm/sec	Strength Tests: Torvane or Type Test	$\bar{\sigma}_c$ psf	Failure Criteria	$\sigma_1 - \sigma_3$ or τ psf	Strain %	Consol.: $\frac{C_c}{1 + e_0}$	Laboratory Log and Soil Description
SB-71	S-14	50.0-51.5	343	54.0																
SB-71	S-15	55.0-56.5	344	46.3																
SB-71	S-16	60.0-61.5	345	39.5																
SB-71	S-17	65.0-66.5	346	40.0																
SB-71	S-18	70.0-71.5	347	48.0																
SB-71	S-19	75.0-76.5	348	37.1																
SB-71	S-20	80.0-81.5	349	50.0																
SB-71	S-22	90.0-91.5	350	41.4																
SB-71	S-23	95.0-96.5	351	23.7																
SB-71	S-24	100.0-101.5	352	21.3																

LABORATORY TESTING DATA SHEET

Project Name: NEW BRITAIN-HARTFORD BUSWAY CONNECTICUT
Project No.: L17828
Project Engineer: D. SCHULZE
Assigned By: D. GAFFNEY
Date: NOV.03
Reviewed By: Don Schulze
Date Reviewed: 11/18/03

Boring/ Test Pit No.	Sample No.	Depth ft.	Lab No.	Identification Tests: Water Content %	LL %	PL %	Sieve -200 %	Hyd -2μ %	ORG %	G_s	Dry unit wt. pcf	Density: γ_d MAX (pcf) / W_{opt} (%)	Perme-ability cm/sec	Strength Tests: Torvane or Type Test	$\bar{\sigma}_c$ psf	Failure Criteria	$\sigma_1 - \sigma_3$ or τ psf	Strain %	Consol.: $C_c / (1 + e_0)$	Laboratory Log and Soil Description
SB-54	S-6	16.5-18.0	127	20.1	21	20	43	9												Brown Silty sand (SM)
SB-54	S-15	55.0-56.5	128	42.1	44	22	98	44												Red-brown Lean clay (CL)
SB-55	S-4	10.0-11.5	129	18.5	22	20	39	8												Brown Silty sand with gravel (SM)
SB-55	S-17	65.0-66.5	130	33.7	29	22	99	25												Red-brown Silty clay (CL-ML)
SB-55	S-28	120.0-121.5	131	16.1	NP	NP	25													Brown Silty sand (SM)
SB-56	S-15	55.0-56.5	132	40.2	41	25	100	40												Red-brown Lean clay (CL)
SB-56	S-25	105.0-106.5	133	15.2	NP	NP	15													Brown Silty sand (SM)
SB-57	S-15	55.0-56.5	134	45.7	42	23	100	35												Red-brown Lean clay (CL)
SB-58	S-14	50.0-51.5	135	56.6	53	25	100	60												Brown Fat clay (CH)
SB-58	S-21	90.0-91.5	136	34.2	24	24	100	15												Red-brown Silt (ML)
SB-58	S-25	110.0-111.5	137	23.1	NP	NP	30	5												Red-brown Silty sand (SM)

LABORATORY TESTING DATA SHEET

Project Name: NEW BRITAIN-HARTFORD BUSWAY CONNECTICUT
Project No.: L17828
Project Engineer: D. SCHULZE
Assigned By: D. GAFFNEY
Date: NOV.03
Reviewed By: Don Schulze
Date Reviewed: 11/25/03

Boring/ Test Pit No.	Sample No.	Depth ft.	Lab No.	Identification Tests: Water Content %	LL %	PL %	Sieve -200 %	Hyd -2μ %	ORG %	G_s	Dry unit wt. pcf	Density: γ_d MAX (pcf) / W_{opt} (%)	Perme-ability cm/sec	Strength Tests: Torvane or Type Test	$\bar{\sigma}_c$ psf	Failure Criteria	$\sigma_1 - \sigma_3$ or τ psf	Strain %	Consol. $\frac{C_c}{1+e_0}$	Laboratory Log and Soil Description
SB-59	S-25 S-26	105.0-111.5	138	23.7	NP	NP	93	6												Red-brown Silt (ML)
SB-60	S-5	13.5-15.0	139	33.1	25	22	98	17												Gray Silt (ML)
SB-60	S-11	35.0-36.5	140	55.4	60	27	100	55												Gray-brown Fat clay (CH)
SB-60	S-18	70.0-71.5	141	45.8	48	23	100	46												Red-brown Lean clay (CL)
SB-60	S-26	110.0-111.5	142	22.7	NP	NP	76	4												Red-brown Silt with sand (ML)
SB-60	S-29	125.0-126.5	143	28.0	33	25	99	26												Red-brown Silt (ML)
SB-61	S-12	40.0-41.5	144	58.1	64	23	99	64												Brown Fat clay (CH)
SB-61	S-22	90.0-91.5	145	31.2	25	23	100	11												Red-brown Silt (ML)
SB-62	S-11	35.0-36.5	146	59.2	60	26	100	57												Brown Fat clay (CH)
SB-62	S-20	85.0-86.5	147	68.3	34	24	100	28												Red-brown Silt (ML)
SB-62	S-26	115.0-116.5	148	11.9	16	14	8													Red-brown Poorly-graded sand with silt and gravel (SP-SM)
SB-62	S-27	120.0-121.5	149	21.6	NP	NP	19													Red-brown Silty sand (SM)

LABORATORY TESTING DATA SHEET

Project Name: NEW BRITAIN-HARTFORD BUSWAY CONNECTICUT
Project No.: L17828
Project Engineer: D SCHULZE
Assigned By: D. GAFFNEY
Date: NOV.03
Reviewed By: [signature]
Date Reviewed: 11/26/03

Boring/ Test Pit No.	Sample No.	Depth ft.	Lab No.	Identification Tests: Water Content %	LL %	PL %	Sieve -200 %	Hyd -2μ %	ORG %	G_s	Dry unit wt. pcf	Density: γ_d MAX (pcf) W_{opt} (%)	Perme-ability cm/sec	Strength Tests: Torvane or Type Test	$\bar{\sigma}_c$ psf	Failure Criteria	$\sigma_1 - \sigma_3$ or τ psf	Strain %	Consol. $\frac{C_c}{1+e_0}$	Laboratory Log and Soil Description
SB-63	S-6	16.5-18.0	150	41.9	41	22	99	36												Gray-brown Lean clay (CL)
SB-63	S-14	50.0-51.5	151	57.5	56	25	99	56												Brown Fat clay (CH)
SB-63	S-22	90.0-91.5	152	35.9	29	24	100	26												Red-brown Silt (ML)
SB-63	S-31	135.0-136.5	153	11.7	NP	NP	35	6												Red-brown Silty sand with gravel (SM)
SB-64	S-10	28.5-30.0	154	55.2	63	27	100	62												Brown Fat clay (CH)
SB-64	S-18	70.0-71.5	155	41.5	44	23	100	32												Brown Lean clay (CL)
SB-64	S-26	110.0-111.5	156	23.5	NP	NP	23													Red-brown Silty sand (SM)
SB-64	S-31	135.0-135.9	157	9.6	*	*	22		* Insufficient sample for limit test											Red-brown Silty sand with gravel (SM)
SB-65	S-23	95.0-96.5	158	29.9	24	24	100	13												Red-brown Silt (ML)

LABORATORY TESTING DATA SHEET

Project Name: NEW BRITAIN-HARTFORD BUSWAY CONNECTICUT
Project No.: 117828
Project Engineer: D. SCHULZE
Assigned By: D. GAFFNEY
Date: DEC.03
Reviewed By: Don Schulze
Date Reviewed: 12/3/03

Boring/ Test Pit No.	Sample No.	Depth ft.	Lab No.	Identification Tests: Water Content %	LL %	PL %	Sieve -200 %	Hyd -2μ %	ORG %	G_s	Dry unit wt. pcf	Density: γ_d MAX (pcf) W_{opt} (%)	Perme-ability cm/sec	Strength Tests: Torvane or Type Test	$\bar{\sigma}_c$ psf	Failure Criteria	$\sigma_1 - \sigma_3$ or τ psf	Strain %	Consol. $\frac{C_c}{1+e_0}$	Laboratory Log and Soil Description
SB-66	S-11	35.0-36.5	159	61.1	60	28	100	74												Brown Fat clay (CH)
SB-66	S-18	70.0-71.5	160	47.8	43	24	100	29												Brown Lean clay (CL)
SB-66	S-31	135.0-136.5	161	10.8	21	15	16													Red-brown Silty-clayey sand with gravel (SC-SM)
SB-67	S-13	45.0-46.5	162	54.6	58	27	100	65												Brown Fat clay (CH)
SB-67	S-24 S-25	105.0-112.0	163	20.3	NP	NP	20													Red-brown Silty sand (SM)
SB-69	S-3	7.5-9.0	164	36.7	30	25	81	18												Brown Silt with gravel (SM)
SB-69	S-14	50.0-51.5	165	44.0	56	26	100	67												Brown Fat clay (CH)
SB-69	S-23	95.0-96.5	166	34.3	24	24	100	13												Red-brown Silt (ML)
SB-69	S-33	145.0-146.5	167	12.1	18	15	21													Red-brown Silty gravel with sand (GM)
SB-70	S-15	60.0-61.5	168	48.7	52	23	100	42												Brown Fat clay (CH)

LABORATORY TESTING DATA SHEET

Project Name: NEW BRITAIN-HARTFORD BUSWAY CONNECTICUT
Project No.: L17828
Project Engineer: D. SCHULZE
Assigned By: D. GAFFNEY
Date: DEC.03
Reviewed By: [signature]
Date Reviewed: 12/3/05

Boring/ Test Pit No.	Sample No.	Depth ft.	Lab No.	Identification Tests: Water Content %	LL %	PL %	Sieve -200 %	Hyd -2μ %	ORG %	G_s	Dry unit wt. pcf	Density: γ_d MAX (pcf) / W_{opt} (%)	Perme-ability cm/sec	Strength Tests: Torvane or Type Test	$\bar{\sigma}_c$ psf	Failure Criteria	$\sigma_1 - \sigma_3$ or τ psf	Strain %	Consol.: $\frac{C_c}{1 + e_0}$	Laboratory Log and Soil Description
SB-71	S-13	45.0-46.5	169	54.9	56	26	100	64												Brown Fat clay (CH)
SB-71	S-21	85.0-86.5	170	38.9	29	25	100	21												Red-brown Silt (ML)
SB-71	S-27	115.0-116.5	171	12.0	17	16	14													Red-brown Silty sand with gravel (SM)
SB-72	S-9	25.0-26.5	172	49.6	47	24	100	41												Brown Lean clay (CL)
SB-72	S-17	65.0-66.5	173	50.5	55	26	100	64												Brown Fat clay (CH)
SB-72	S-25	105.0-106.5	174	24.5	20	20	92	12												Red-brown Silt (ML)
SB-72	S-31	135.0-136.5	175	12.8	*	*	10		* Insufficient sample for limit test											Brown Poorly graded gravel with silt and sand (GP-GM)
SB-73	S-10	28.5-30.0	176	33.1	NP	NP	60													Red-brown Sandy silt (ML)
SB-73	S-18	70.0-71.5	177	46.1	48	23	100	45												Red-brown Lean clay (CL)
SB-73	S-27	115.0-116.5	178	21.4	NP	NP	28													Red-brown Silty sand (SM)

2008 Moisture Contents

GEO**DESIGN**, INC.

LAB ASSIGNMENT SHEET

Project Name: New Britain-Hartford Busway

Location (*Town,State*): Hartford/West Hartford, CT (Flatbush Ave.) #155-H025

GeoDesign File No.: 380-04

Client / Company Name: URS/Washington Group

Project Engineer's Name: Chi Zhang

Contact Phone: (203) 758 8836 x 119

Page 1 of 6

Date Samples Submitted

Date Results Requested

Samples Collected By Matt Volovski

Date(s) Samples Collected 06/09/08-06/12/08

Assigned to Geo**Design**, Inc.

SAMPLE IDENTIFICATION				IDENTIFICATION TESTS							ROCK STRENGTH	CONSOLIDATION			SOIL STRENGTH			CORROSITIVITY		NOTES
Boring / Test Pit No.	Sample No.	From Depth (ft)	To Depth (ft)	Water Content (%)	Atterberg Limits	Washed Sieve -200 (%)	Hydrometer	Sieve - Hydrometer	Organic Content Determination (%)	Soil Specific Gravity	Unconfined Compressive Strength	Thin Walled Tube Extrusion [1]	Consolidation Test with Coefficent of Consolidation Data (Constant Rate of Strain Consolidation)	Consolidation Test with Coefficent of Consolidation Data (With unload - reload)	Unconsolidated Undrained (UU)	Consoldated Undrained (CIU)	Direct Simple Shear (DSS)	pH	Sulfides	
SB-01-3	S-7	17	19	40																
SB-01-3	S-9	25	27	56																
SB-01-3	S-11	35	37	60																
SB-01-3	S-13	45	47	57																
SB-01-3	S-15	55	57	42																
SB-01-3	S-17	65	67	52																
SB-01-3	S-19	75	77	25																

[1]Tube Extrusion includes Torvane measurements and Natural Water Contents.

Submitted By _____ *Date* _____

Printed Name _____

Samples Received By _____ *Date* _____

Printed Name

GEODESIGN INCORPORATED
984 Southford Rd
Middlbury, CT 06762
Phone: 203 758 8836 Fax: 203 758 8842

GEO**DESIGN**, INC.

LAB ASSIGNMENT SHEET

Project Name: New Britain-Hartford Busway

Location (*Town,State*): Hartford/West Hartford, CT (Flatbush Ave.) #155-H025

GeoDesign File No.: 380-04

Client / Company Name: URS/Washington Group

Project Engineer's Name: Chi Zhang

Contact Phone: (203) 758 8836 x 119

Page 2 of 6

Date Samples Submitted

Date Results Requested

Samples Collected By Ben Brandt

Date(s) Samples Collected 06/13/2008-06/17/2008

Assigned to Geo**Design**, Inc.

SAMPLE IDENTIFICATION				IDENTIFICATION TESTS							ROCK STRENGTH	CONSOLIDATION			SOIL STRENGTH			CORROSITIVITY		NOTES
Boring / Test Pit No.	Sample No.	From Depth (ft)	To Depth (ft)	Water Content (%)	Atterberg Limits	Washed Sieve -200 (%)	Hydrometer	Sieve - Hydrometer	Organic Content Determination (%)	Soil Specific Gravity	Unconfined Compressive Strength	Thin Walled Tube Extrusion [1]	Consolidation Test with Coefficent of Consolidation Data (Constant Rate of Strain Consolidation)	Consolidation Test with Coefficent of Consolidation Data (With unload - reload)	Unconsolidated Undrained (UU)	Consoldated Undrained (CIU)	Direct Simple Shear (DSS)	pH	Sulfides	
RW-6	S-4	7	9	35.7																
RW-6	S-6	15	17	42.9																
RW-6	S-8	25	27	63.5																
RW-6	S-10	35	37	59.8																
RW-6	S-12	45	47	57																
RW-6	S-14	55	57	53.3																
RW-6	S-16	65	67	50.3																

[1]Tube Extrusion includes Torvane measurements and Natural Water Contents.

Submitted By _____ *Date* _____
Printed Name _____
Samples Received By _____ *Date* _____
Printed Name

GEODESIGN INCORPORATED
984 Southford Rd
Middlbury, CT 06762
Phone: 203 758 8836 Fax: 203 758 8842

GEO**DESIGN**, INC.

LAB ASSIGNMENT SHEET

Project Name: New Britain-Hartford Busway

Location (*Town,State*): Hartford/West Hartford, CT (Flatbush Ave.) #155-H025

GeoDesign File No.: 380-04

Client / Company Name: URS/Washington Group

Project Engineer's Name: Chi Zhang

Contact Phone: (203) 758 8836 x 119

Page 3 of 6

Date Samples Submitted

Date Results Requested

Samples Collected By Robert Marshall / Matt Volovski

Date(s) Samples Collected 06/05/2008-06/13/2008

Assigned to Geo**Design**, Inc.

SAMPLE IDENTIFICATION				IDENTIFICATION TESTS							ROCK STRENGTH	CONSOLIDATION			SOIL STRENGTH			CORROSITIVITY		
Boring / Test Pit No.	Sample No.	From Depth (ft)	To Depth (ft)	Water Content (%)	Atterberg Limits	Washed Sieve -200 (%)	Hydrometer	Sieve - Hydrometer	Organic Content Determination (%)	Soil Specific Gravity	Unconfined Compressive Strength	Thin Walled Tube Extrusion [1]	Consolidation Test with Coefficent of Consolidation Data (Constant Rate of Strain Consolidation)	Consolidation Test with Coefficent of Consolidation Data (With unload - reload)	Unconsolidated Undrained (UU)	Consoildated Undrained (CIU)	Direct Simple Shear (DSS)	pH	Sulfides	NOTES
RW-7	S-5	10	12	32.1																
RW-7	S-8	25	27	55.2																
RW-7	S-10	35	37	58.4																
RW-7	S-13	50	52	63.1																
RW-7	S-16	65	67	48.5																
RW-7	S-19	80	82	44.3																
SB-01-4	S-5	5	7	44.5																

[1]Tube Extrusion includes Torvane measurements and Natural Water Contents.

Submitted By		*Date*	
Printed Name			
Samples Received By		*Date*	
Printed Name			

GEODESIGN INCORPORATED
984 Southford Rd
Middlbury, CT 06762
Phone: 203 758 8836 Fax: 203 758 8842

GEO**DESIGN**, INC.

LAB ASSIGNMENT SHEET

Project Name: New Britain-Hartford Busway

Location (*Town,State*): Hartford/West Hartford, CT (Flatbush Ave.) #155-H025

GeoDesign File No.: 380-04

Client / Company Name: URS/Washington Group

Project Engineer's Name: Chi Zhang

Contact Phone: (203) 758 8836 x 119

Page 4 of 6

Date Samples Submitted

Date Results Requested

Samples Collected By Robert Marshall / Matt Volovski

Date(s) Samples Collected 06/05/2008-06/13/2008

Assigned to Geo**Design**, Inc.

SAMPLE IDENTIFICATION				IDENTIFICATION TESTS							ROCK STRENGTH	CONSOLIDATION			SOIL STRENGTH			CORROSITIVITY		NOTES
Boring / Test Pit No.	Sample No.	From Depth (ft)	To Depth (ft)	Water Content (%)	Atterberg Limits	Washed Sieve -200 (%)	Hydrometer	Sieve - Hydrometer	Organic Content Determination (%)	Soil Specific Gravity	Unconfined Compressive Strength	Thin Walled Tube Extrusion [1]	Consolidation Test with Coefficent of Consolidation Data (Constant Rate of Strain Consolidation)	Consolidation Test with Coefficent of Consolidation Data (With unload - reload)	Unconsolidated Undrained (UU)	Consoildated Undrained (CIU)	Direct Simple Shear (DSS)	pH	Sulfides	
SB-01-4	S-6	20	22	53.6																
SB-01-4	S-9	35	37	62.1																
SB-01-4	S-12	40	42	53.4																
SB-01-4	S-15	65	67	45.5																
SB-01-4	S-18	80	82	43.2																
RW-9	S-7	20	22	65.2																
RW-9	S-9	30	32	58.1																

[1]Tube Extrusion includes Torvane measurements and Natural Water Contents.

Submitted By		*Date*	
Printed Name			
Samples Received By		*Date*	
Printed Name			

GEODESIGN INCORPORATED
984 Southford Rd
Middlbury, CT 06762
Phone: 203 758 8836 Fax: 203 758 8842

GEO**DESIGN**, INC.

LAB ASSIGNMENT SHEET

Project Name: New Britain-Hartford Busway

Location (*Town,State*): Hartford/West Hartford, CT (Flatbush Ave.) #155-H025

GeoDesign File No.: 380-04

Client / Company Name: URS/Washington Group

Project Engineer's Name: Chi Zhang

Contact Phone: (203) 758 8836 x 119

Page 5 of 6

Date Samples Submitted

Date Results Requested

Samples Collected By Ben Brandt

Date(s) Samples Collected 61.5

Assigned to Geo**Design**, Inc.

SAMPLE IDENTIFICATION				IDENTIFICATION TESTS							ROCK STRENGTH	CONSOLIDATION			SOIL STRENGTH			CORROSITIVITY		
Boring / Test Pit No.	Sample No.	From Depth (ft)	To Depth (ft)	Water Content (%)	Atterberg Limits	Washed Sieve -200 (%)	Hydrometer	Sieve - Hydrometer	Organic Content Determination (%)	Soil Specific Gravity	Unconfined Compressive Strength	Thin Walled Tube Extrusion [1]	Consolidation Test with Coefficent of Consolidation Data (Constant Rate of Strain Consolidation)	Consolidation Test with Coefficent of Consolidation Data (With unload - reload)	Unconsolidated Undrained (UU)	Consoildated Undrained (CIU)	Direct Simple Shear (DSS)	pH	Sulfides	NOTES
RW-9	S-11	40	42	61.5																
SB-01-1	S-6	15	17	32																
SB-01-1	S-9	32	34	57.4																
SB-01-1	S-12	45	47	62.3																
SB-01-1	S-15	60	62	40.4																
SB-01-1	S-18	75	77	52.1																
SB-01-1	S-21	90	92	38.2																

[1]Tube Extrusion includes Torvane measurements and Natural Water Contents.

Submitted By		*Date*	
Printed Name			
Samples Received By		*Date*	
Printed Name			

GEODESIGN INCORPORATED
984 Southford Rd
Middlbury, CT 06762
Phone: 203 758 8836 Fax: 203 758 8842

GEO**DESIGN**, INC.

LAB ASSIGNMENT SHEET

Project Name: New Britain-Hartford Busway

Location (*Town,State*): Hartford/West Hartford, CT (Flatbush Ave.) #155-H025

GeoDesign File No.: 380-04

Client / Company Name: URS/Washington Group

Project Engineer's Name: Chi Zhang

Contact Phone: (203) 758 8836 x 119

Page 6 of 6

Date Samples Submitted

Date Results Requested

Samples Collected By Robert Marshall

Date(s) Samples Collected 06/12/08-06/13/08

Assigned to Geo**Design**, Inc.

SAMPLE IDENTIFICATION				IDENTIFICATION TESTS							ROCK STRENGTH	CONSOLIDATION			SOIL STRENGTH			CORROSITIVITY		NOTES
Boring / Test Pit No.	Sample No.	From Depth (ft)	To Depth (ft)	Water Content (%)	Atterberg Limits	Washed Sieve -200 (%)	Hydrometer	Sieve - Hydrometer	Organic Content Determination (%)	Soil Specific Gravity	Unconfined Compressive Strength	Thin Walled Tube Extrusion [1]	Consolidation Test with Coefficent of Consolidation Data (Constant Rate of Strain Consolidation)	Consolidation Test with Coefficent of Consolidation Data (With unload - reload)	Unconsolidated Undrained (UU)	Consoildated Undrained (CIU)	Direct Simple Shear (DSS)	pH	Sulfides	
RW-8	S-6	15	17	34.6																
RW-8	S-9	32	34	57.3																
RW-8	S-12	45	47	59.2																
RW-8	S-15	60	62	42.5																
RW-8	S-18	75	77	53.8																
RW-8	S-21	90	92	35.2																

[1]Tube Extrusion includes Torvane measurements and Natural Water Contents.

Submitted By		*Date*	
Printed Name			
Samples Received By		*Date*	
Printed Name			

GEODESIGN INCORPORATED
984 Southford Rd
Middlbury, CT 06762
Phone: 203 758 8836 Fax: 203 758 8842

Appendix 8

Gradation and Hydrometer Tests

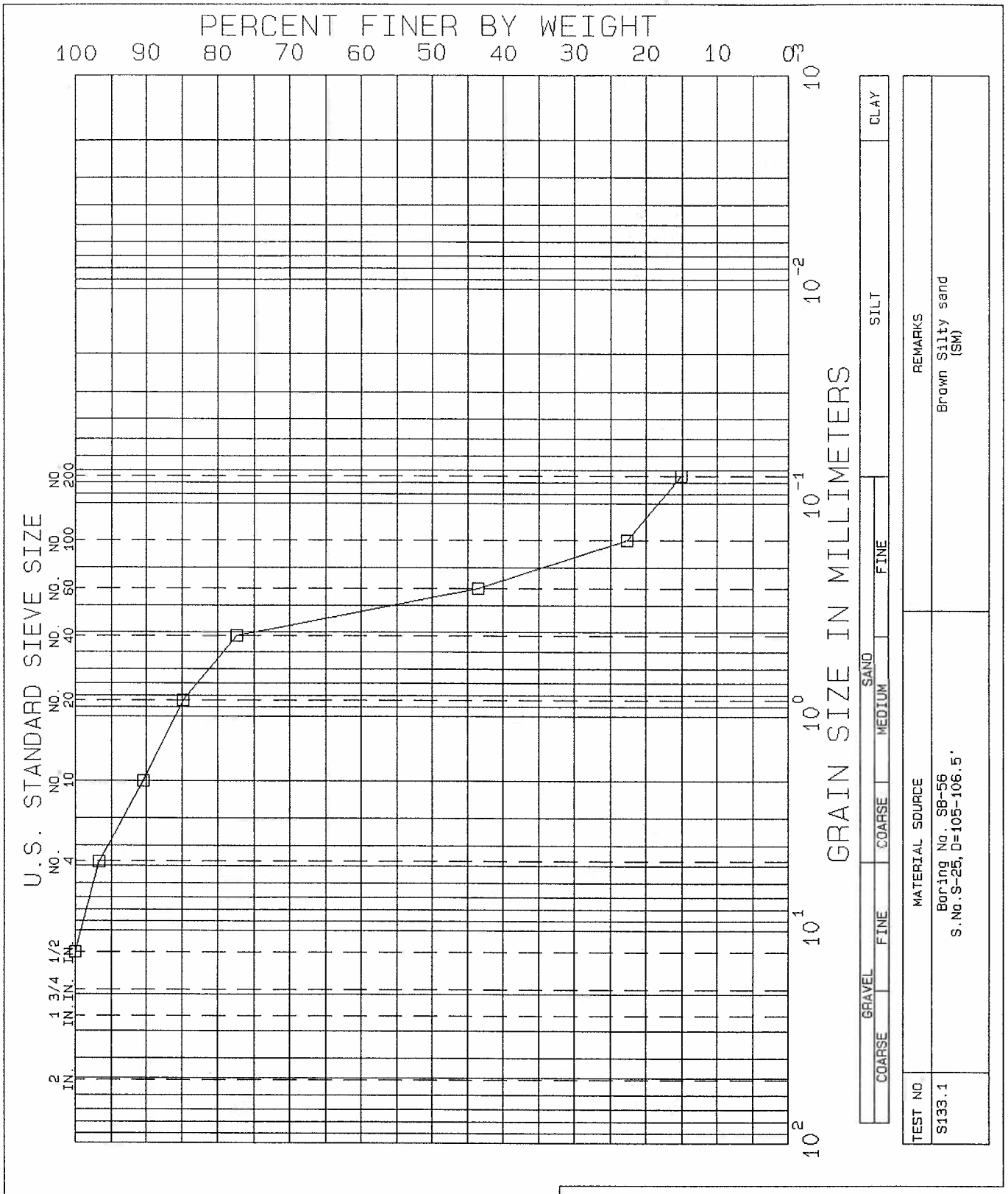
2003 Gradation and Hydrometer Tests

2008 Gradation Tests

2008 Minus No. 200 Gradation Tests

2008 Hydrometer Tests

2003 Gradation and Hydrometer Tests

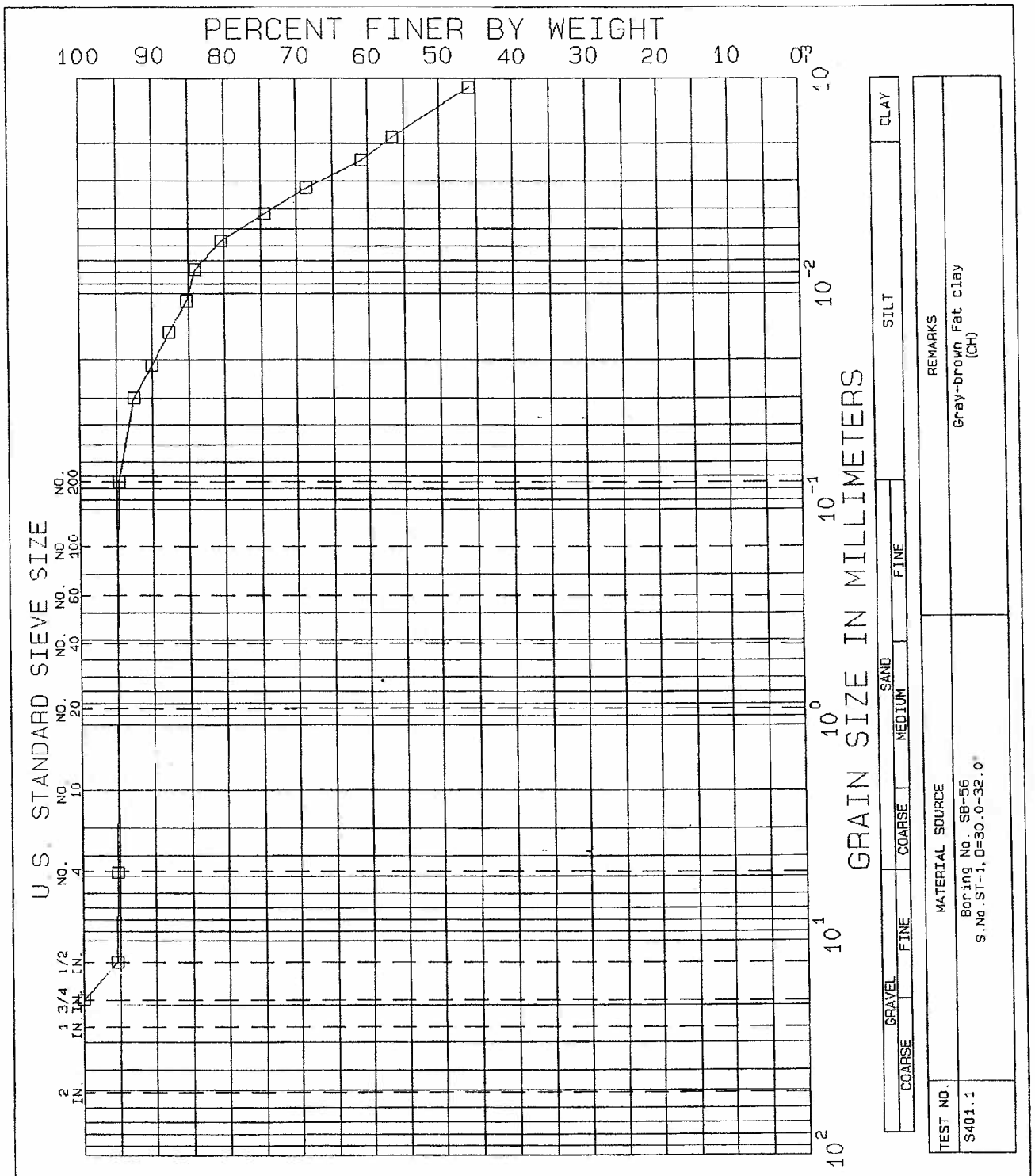


NEW BRITAIN-HARTFORD BUSWAY

CONNECTICUT

GRADATION TESTS

BORING NO	SB-56	TEST SERIES	
SAMPLE	S-25	NO.	133
DEPTH	105-106.5'	DATE	Nov.03
TECH.	PEC		
REVIEWER	MBP	FILE	L17828

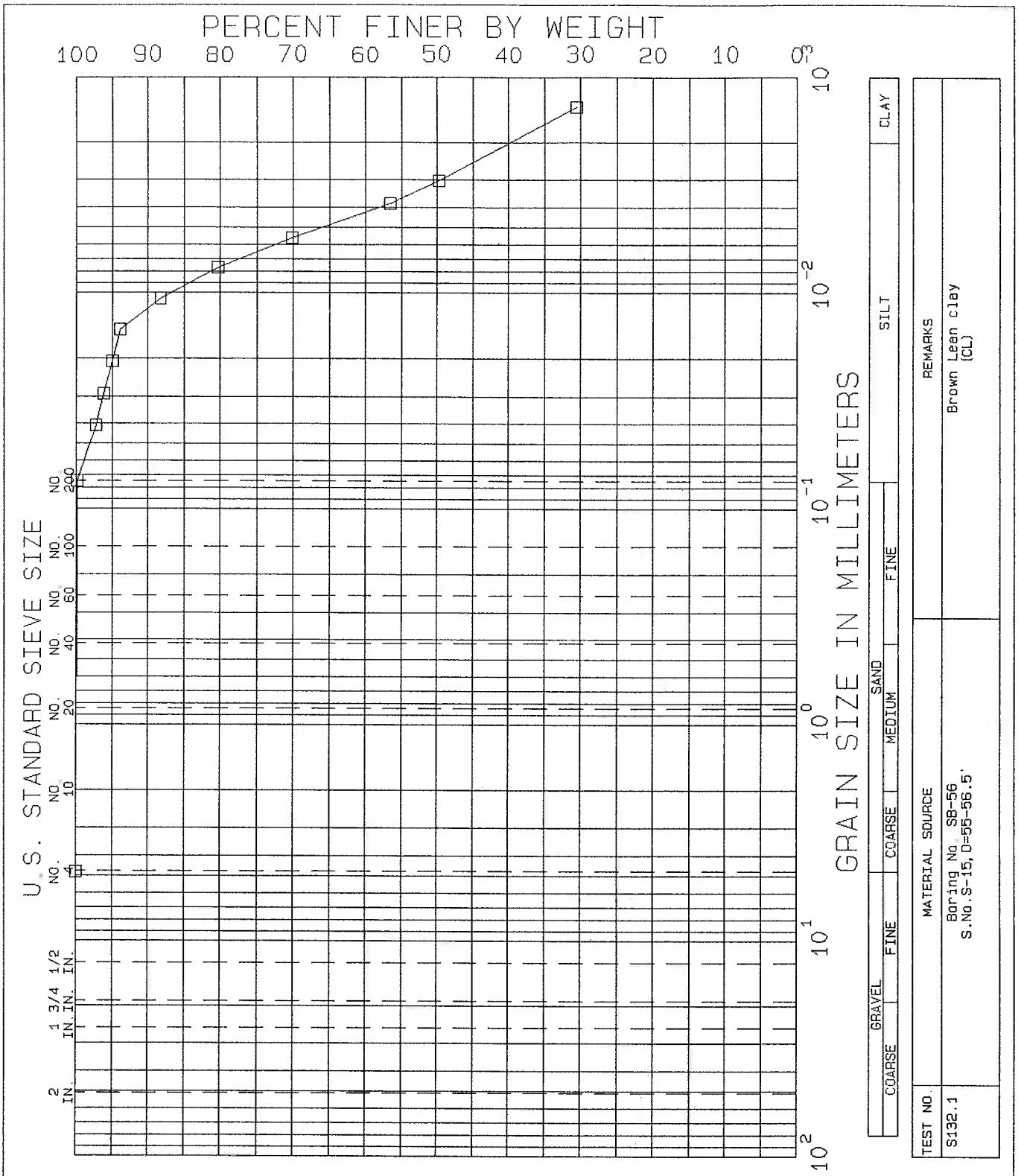


NEW BRITAIN-HARTFORD BUSWAY

CONNECTICUT

GRADATION TESTS

BORING NO.	SB-56	TEST SERIES	
SAMPLE	ST-1	NO	401
DEPTH	30.0-32.0'	DATE	Feb.04
TECH.	PEC		
REVIEWER	MBP	FILE	L17828

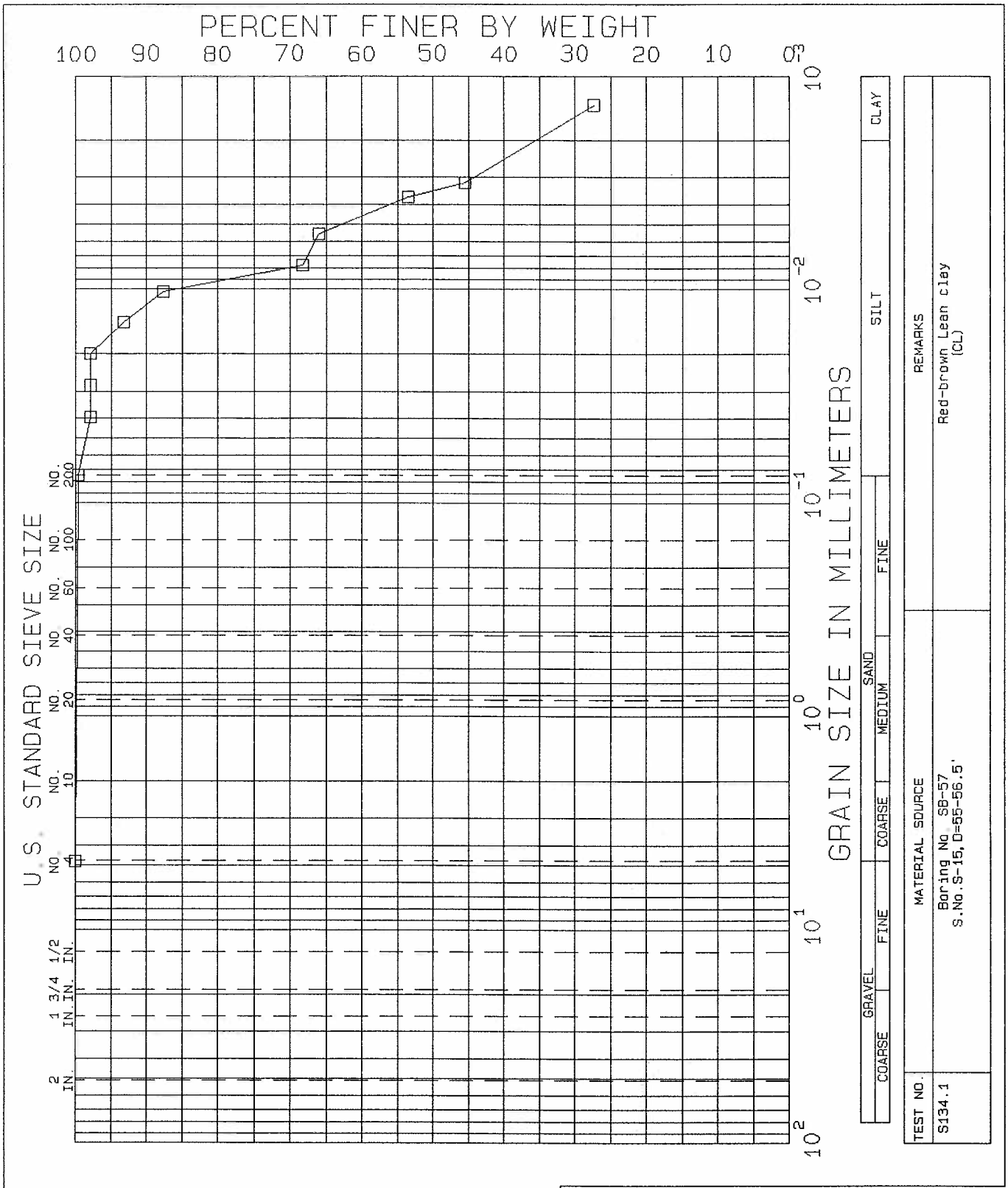


NEW BRITAIN-HARTFORD BUSWAY

CONNECTICUT

GRADATION TESTS

BORING NO.	SB-56	TEST SERIES	
SAMPLE	S-15	NO.	132
DEPTH	55-56.5'	DATE	Nov.03
TECH.	PEC		
REVIEWER	MBP	FILE	L17828

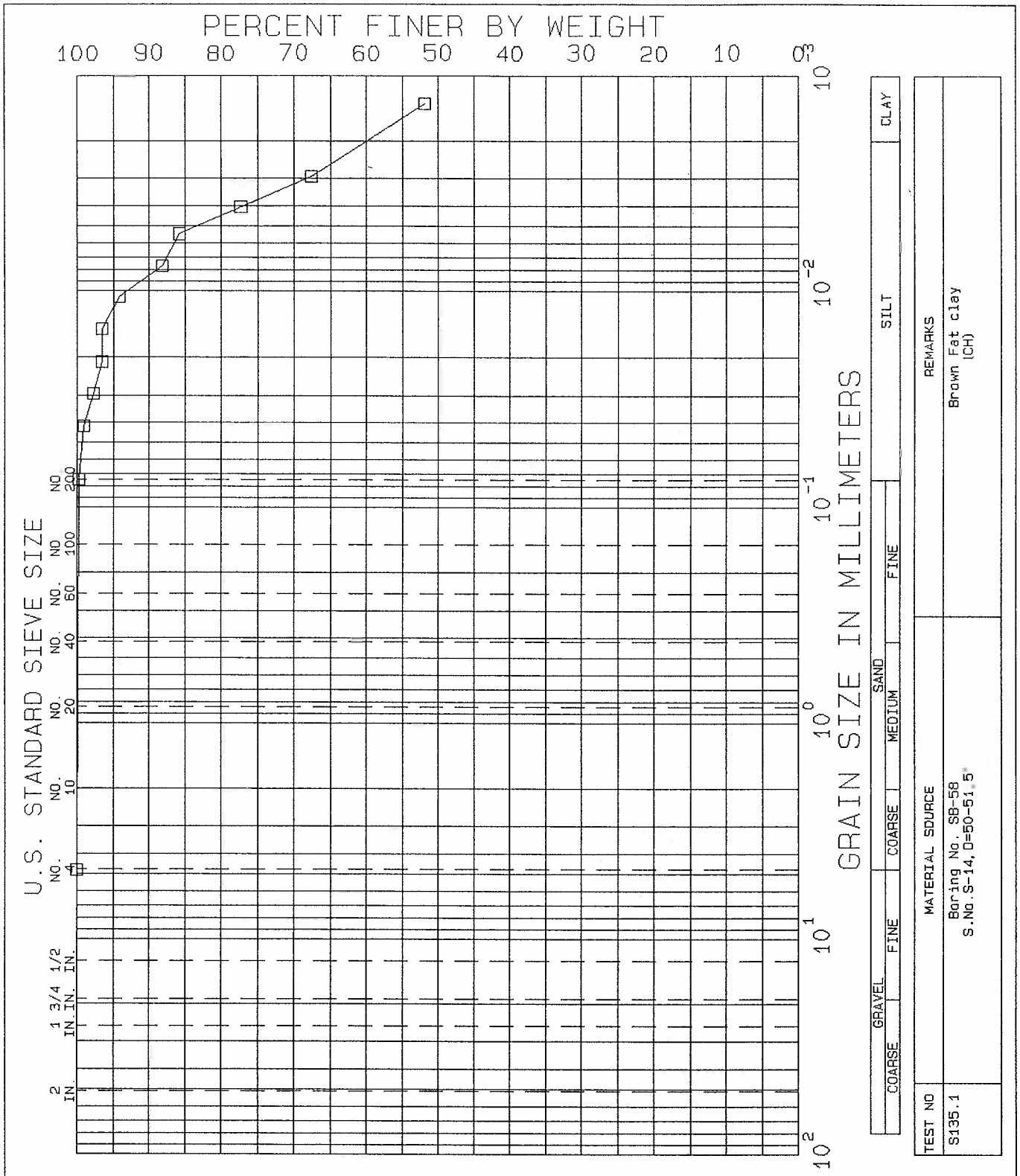


NEW BRITAIN-HARTFORD BUSWAY

CONNECTICUT

GRADATION TESTS

BORING NO.	SB-57	TEST SERIES	
SAMPLE	S-15	NO.	134
DEPTH	55-56.5'	DATE	Nov.03
TECH	PEC		
REVIEWER	MBP	FILE	L17828

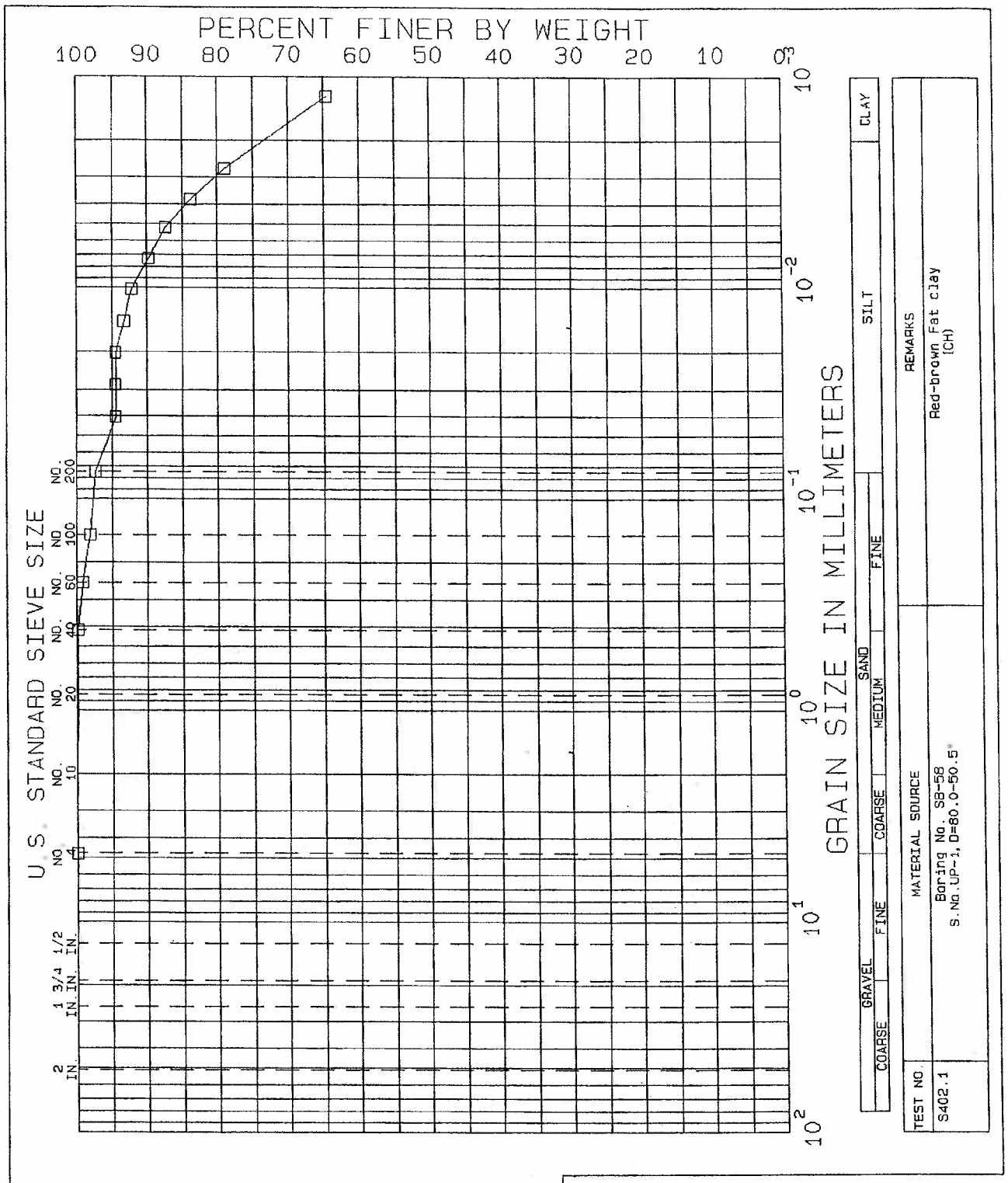


NEW BRITAIN-HARTFORD BUSWAY

CONNECTICUT

GRADATION TESTS

BORING NO.	SB-58	TEST SERIES	
SAMPLE	S-14	NO.	135
DEPTH	50-51.5'	DATE	Nov.03
TECH.	PEC		
REVIEWER	MBP	FILE	L17828

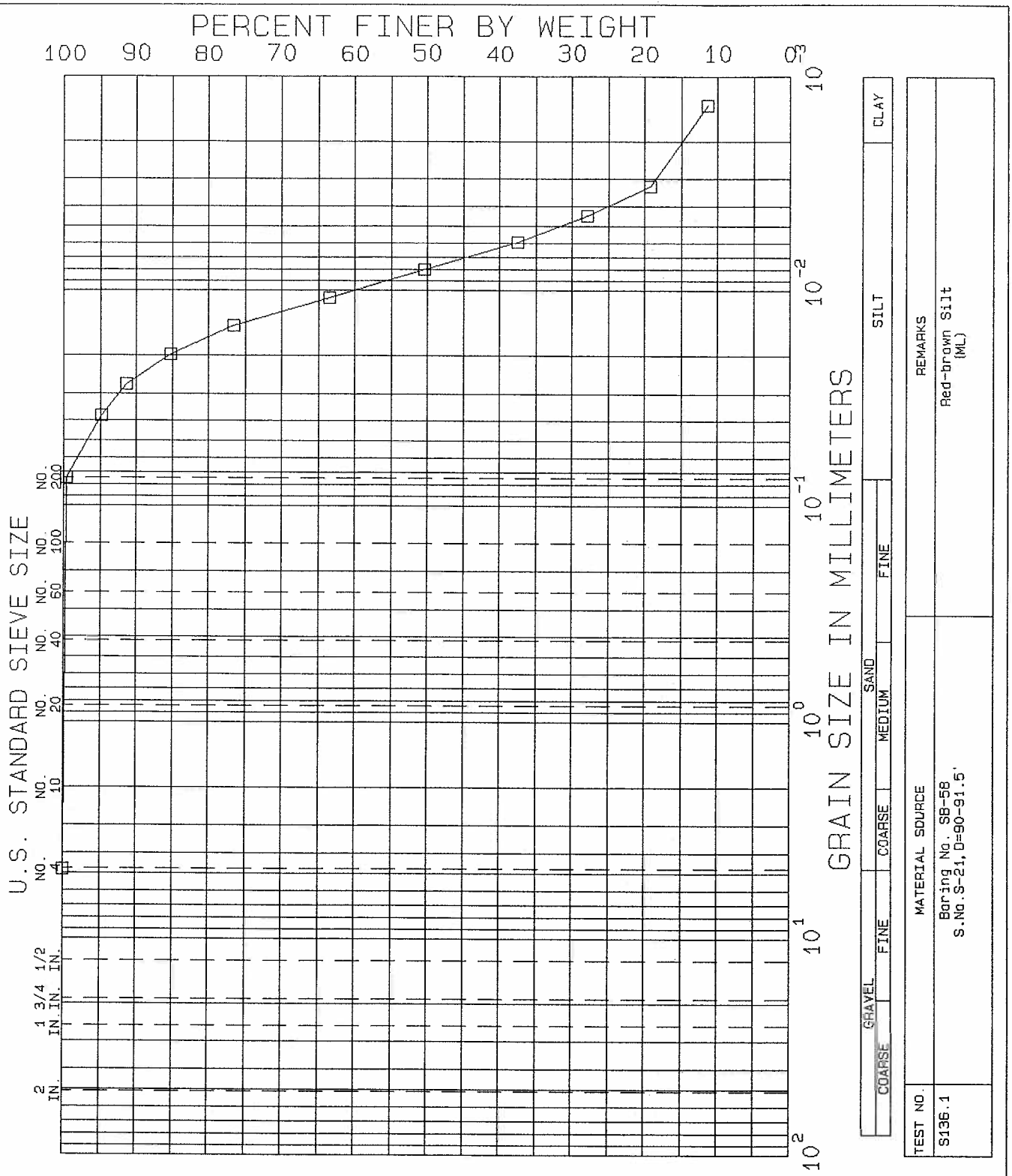


NEW BRITAIN-HARTFORD BUSWAY

CONNECTICUT

GRADATION TESTS

BORING NO.	SB-58	TEST SERIES	
SAMPLE	UP-1	NO	402
DEPTH	80.0-80.5'	DATE	Feb 04
TECH.	PEC		
REVIEWER	MBP	FILE	L17828

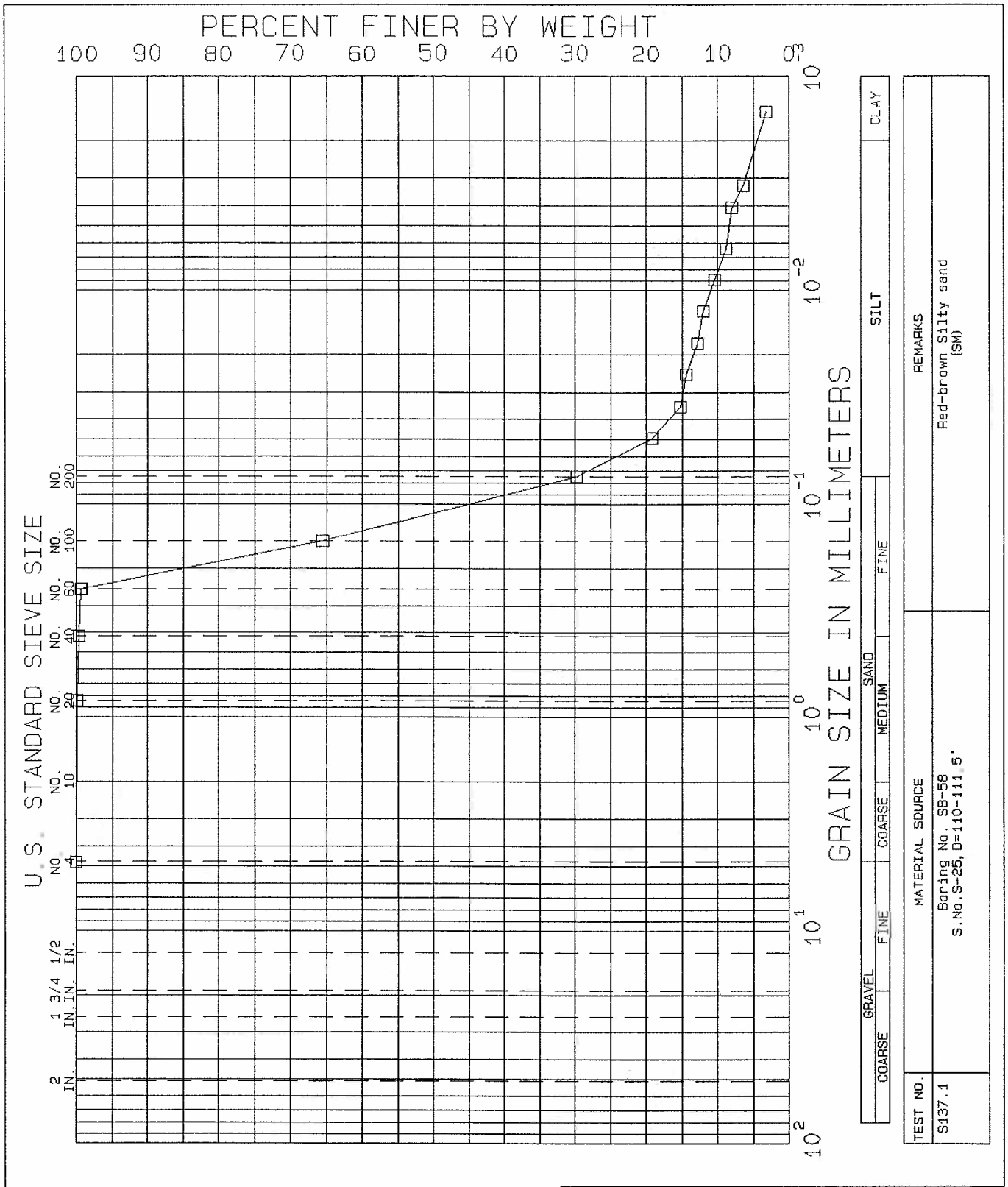


NEW BRITAIN-HARTFORD BUSWAY

CONNECTICUT

GRADATION TESTS

BORING NO.	SB-58	TEST SERIES	
SAMPLE	S-21	NO.	136
DEPTH	90-91.5'	DATE	Nov.03
TECH.	PEC		
REVIEWER	MBP	FILE	L17828

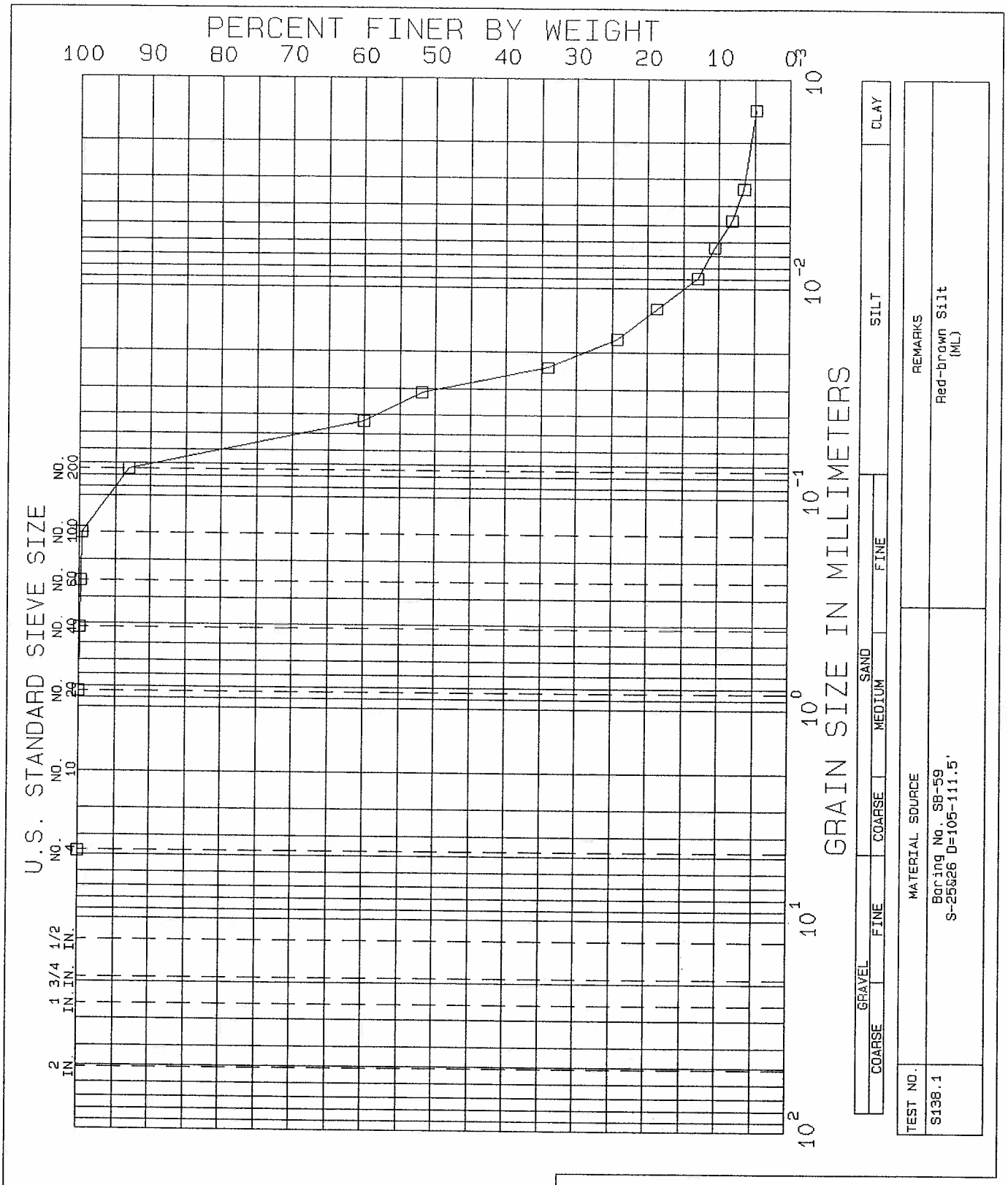


NEW BRITAIN-HARTFORD BUSWAY

CONNECTICUT

GRADATION TESTS

BORING NO.	SB-58	TEST SERIES	
SAMPLE	S-25	NO.	137
DEPTH	110-111.5'	DATE	Nov.03
TECH.	PEC		
REVIEWER	MBP	FILE	L17828

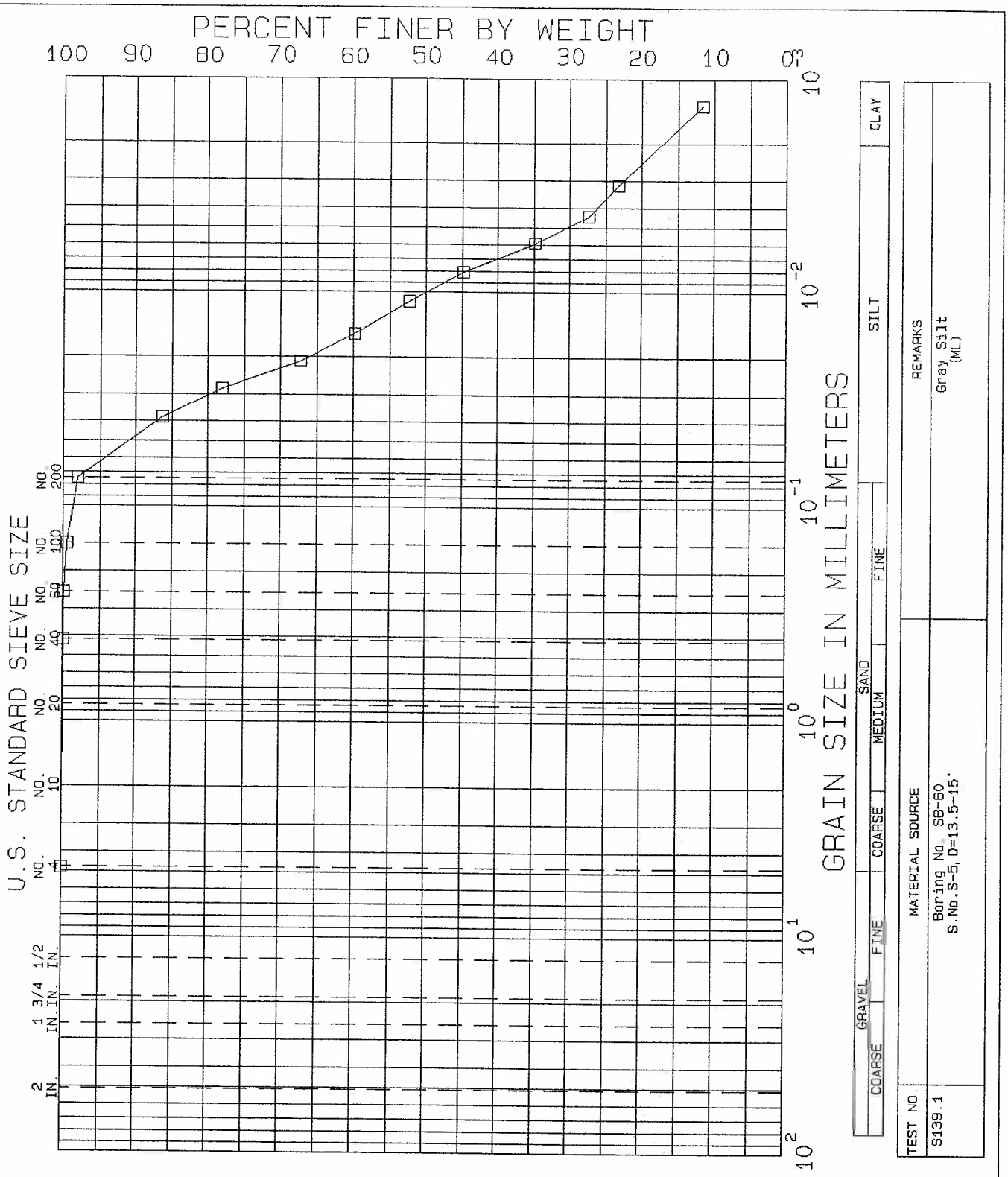


NEW BRITAIN-HARTFORD BUSWAY

CONNECTICUT

GRADATION TESTS

BORING NO.	SB-59	TEST SERIES	
SAMPLE	S25&26	NO.	138
DEPTH	105-111.5'	DATE	Nov 03
TECH.	PEC		
REVIEWER	MBP	FILE	L17828

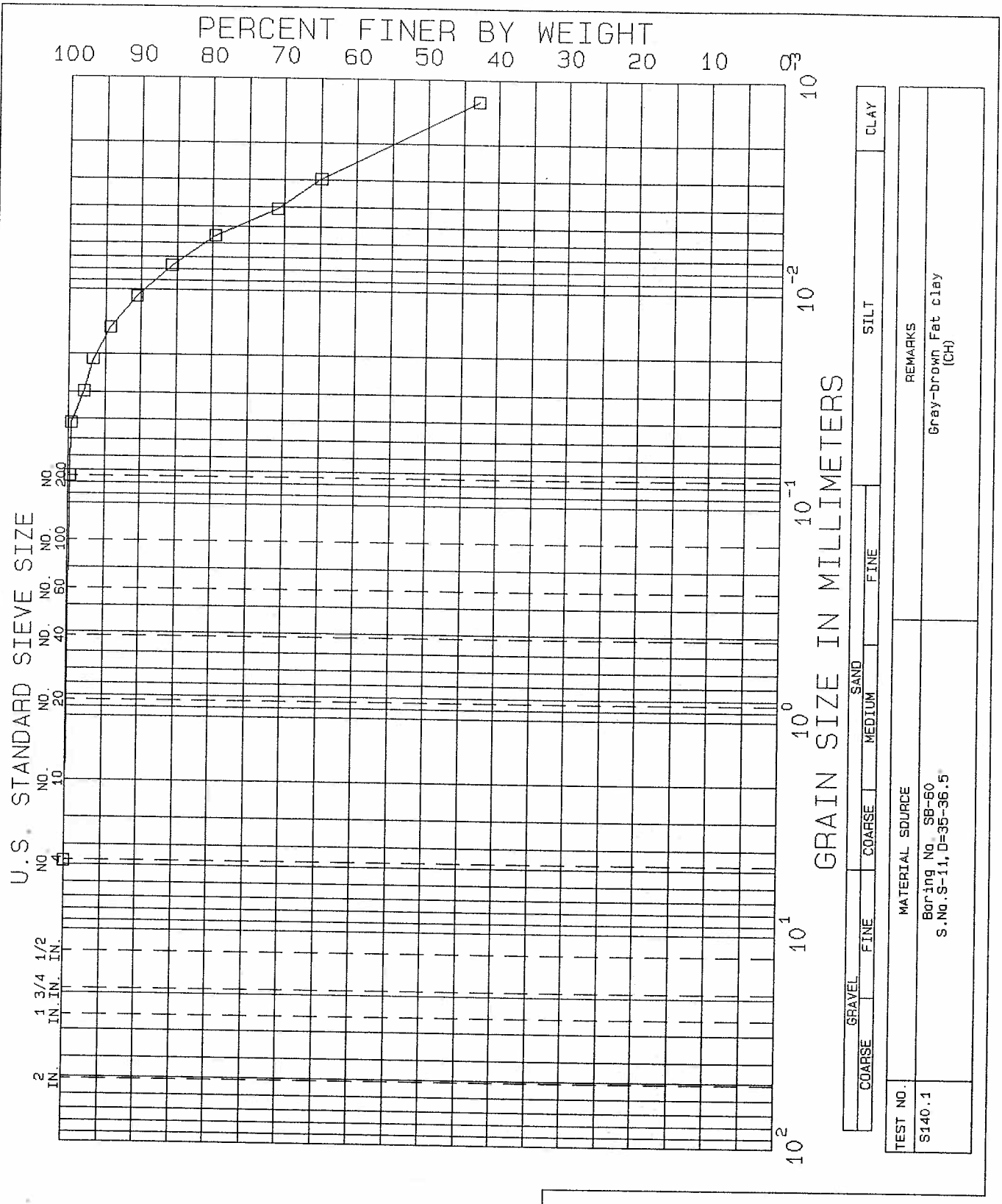


NEW BRITAIN-HARTFORD BUSWAY

CONNECTICUT

GRADATION TESTS

BORING NO.	SB-60	TEST SERIES	
SAMPLE	S-5	NO.	139
DEPTH	13.5-15'	DATE	Nov.03
TECH	PEC		
REVIEWER	MBP	FILE	L17828



NEW BRITAIN-HARTFORD BUSWAY

CONNECTICUT

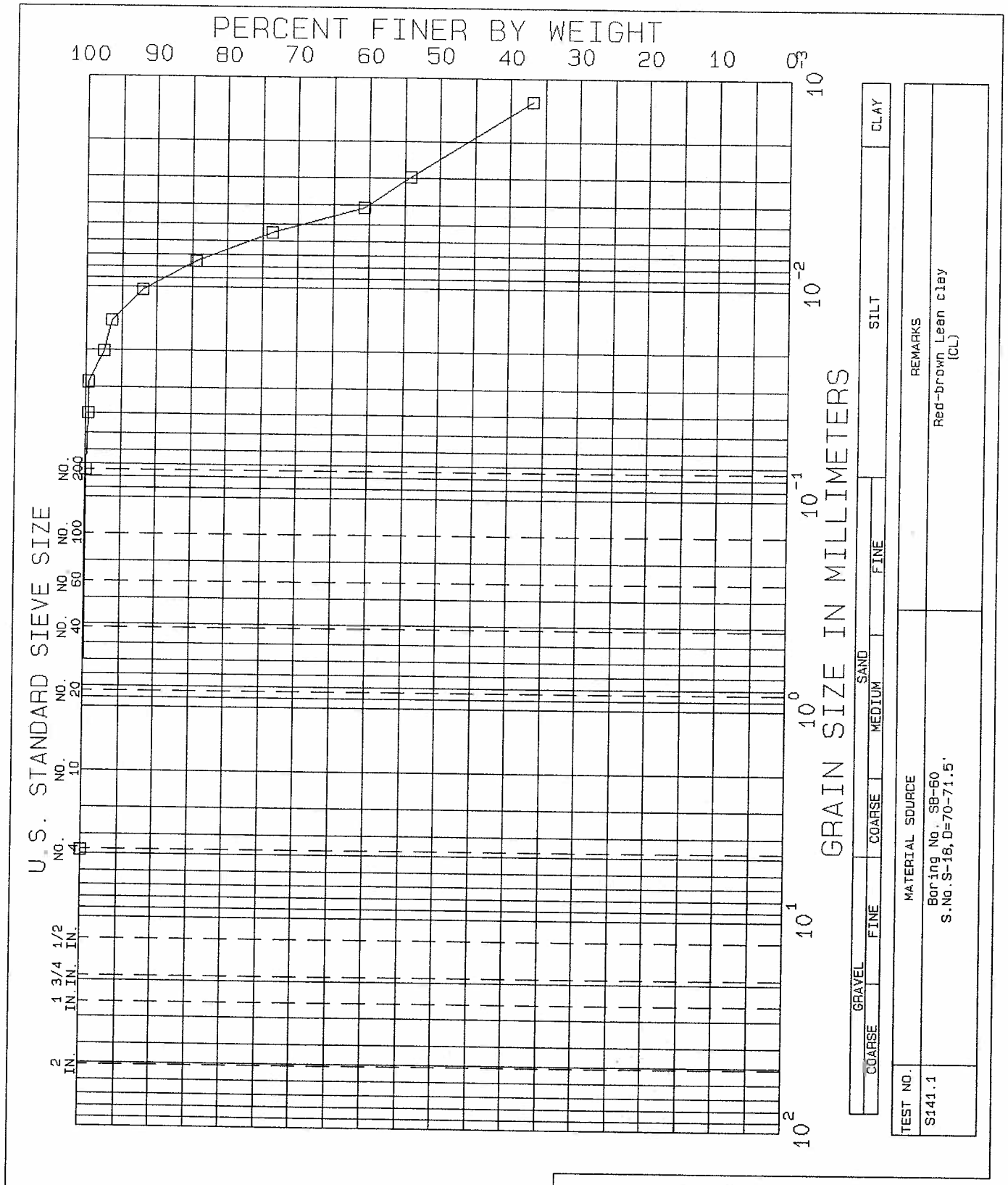
GRADATION TESTS

BORING NO. SB-60
SAMPLE S-11
DEPTH 35-36.5'
TECH PEC
REVIEWER MBP

TEST SERIES
NO. 140
DATE Nov.03

FILE L17828

GZA GEOENVIRONMENTAL, INC.
ENGINEERS AND SCIENTISTS

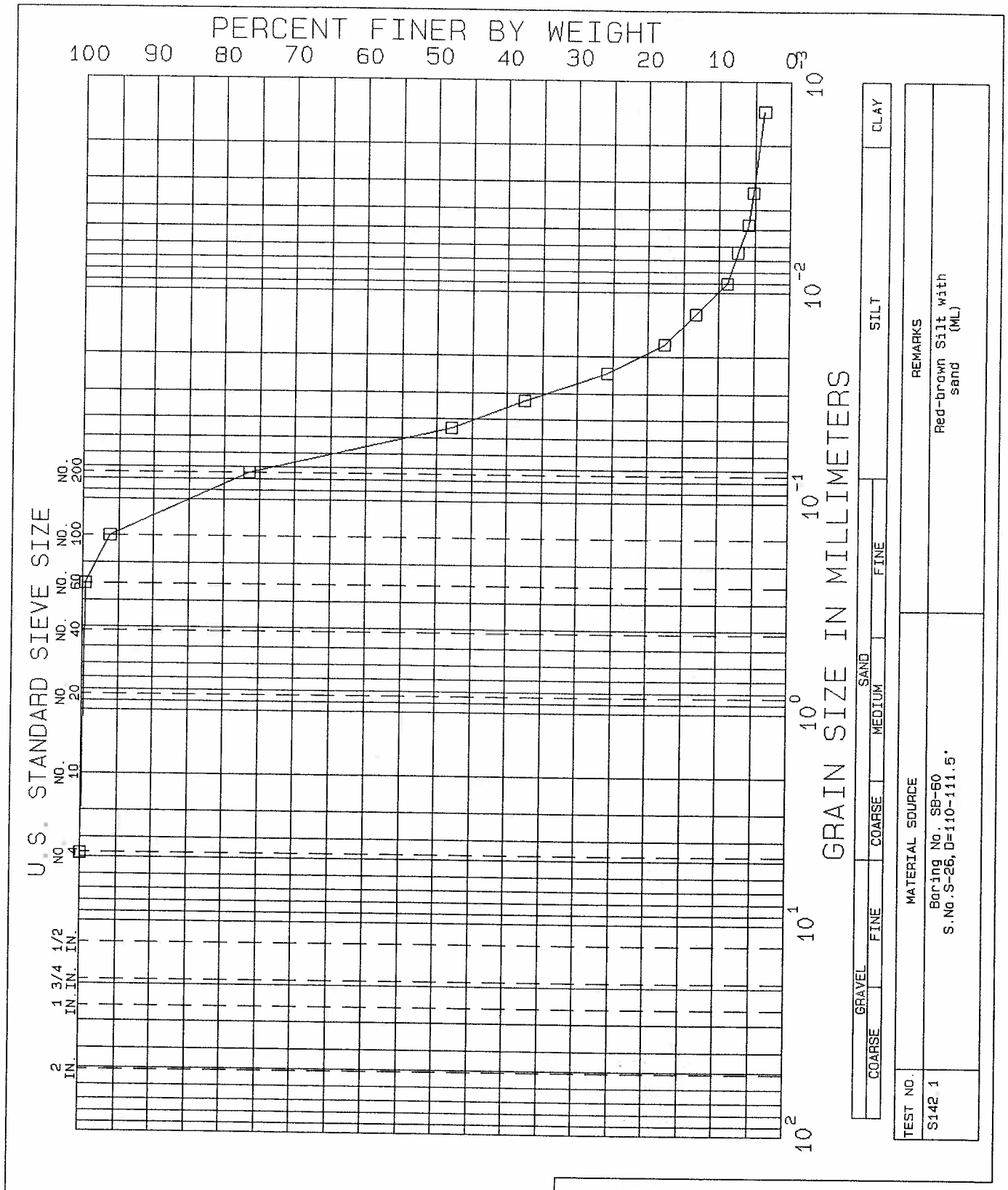


NEW BRITAIN-HARTFORD BUSWAY

CONNECTICUT

GRADATION TESTS

BORING NO.	SB-60	TEST SERIES	
SAMPLE	S-18	NO	141
DEPTH	70-71.5'	DATE	Nov 03
TECH.	PEC		
REVIEWER	MBP	FILE	L17828



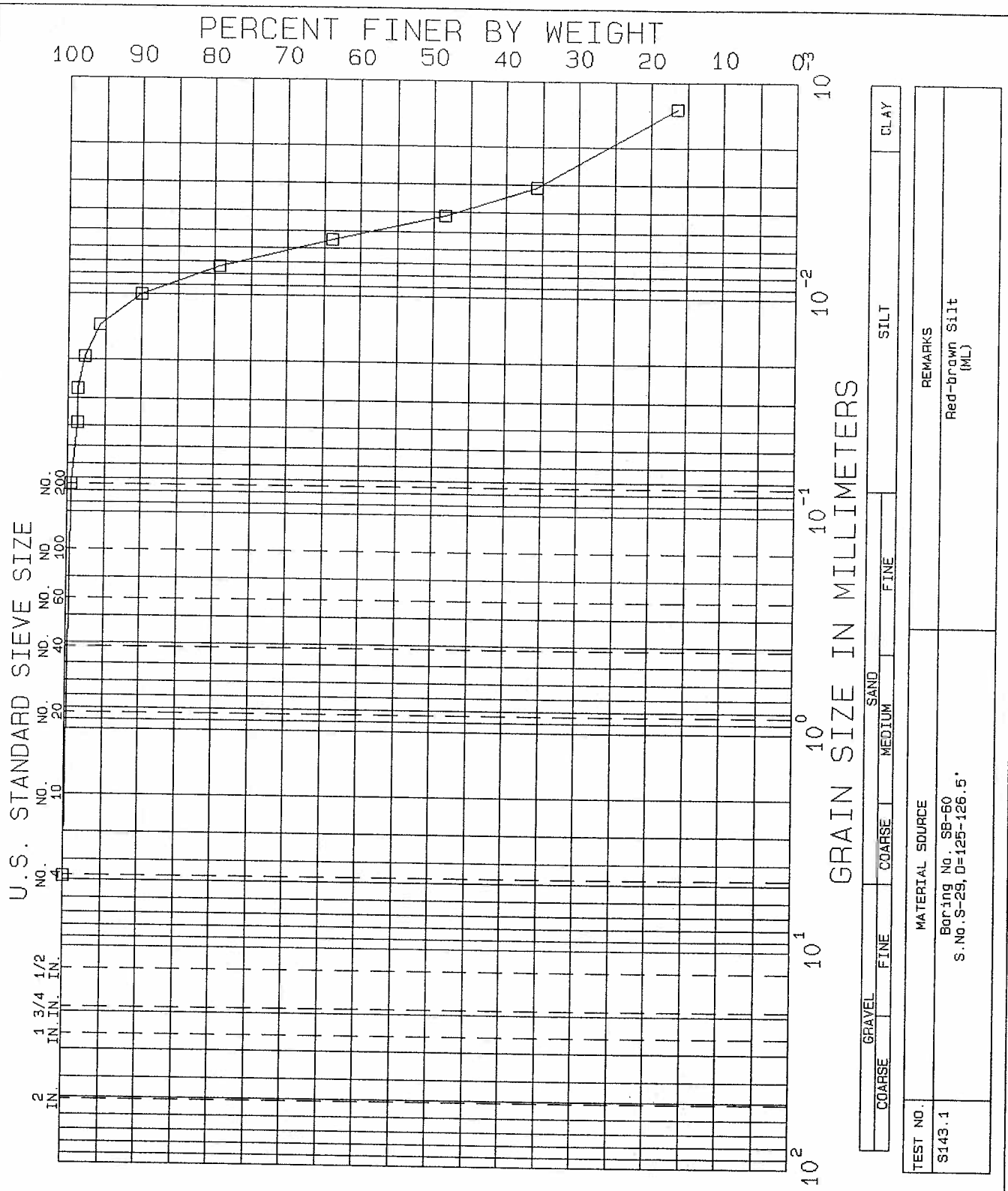
NEW BRITAIN-HARTFORD BUSWAY

CONNECTICUT

GRADATION TESTS

BORING NO.	SB-60	TEST SERIES	
SAMPLE	S-26	NO.	142
DEPTH	110-111.5'	DATE	Nov.03
TECH.	PEC		
REVIEWER	MBP	FILE	L17828

GZA GEOENVIRONMENTAL, INC.
ENGINEERS AND SCIENTISTS

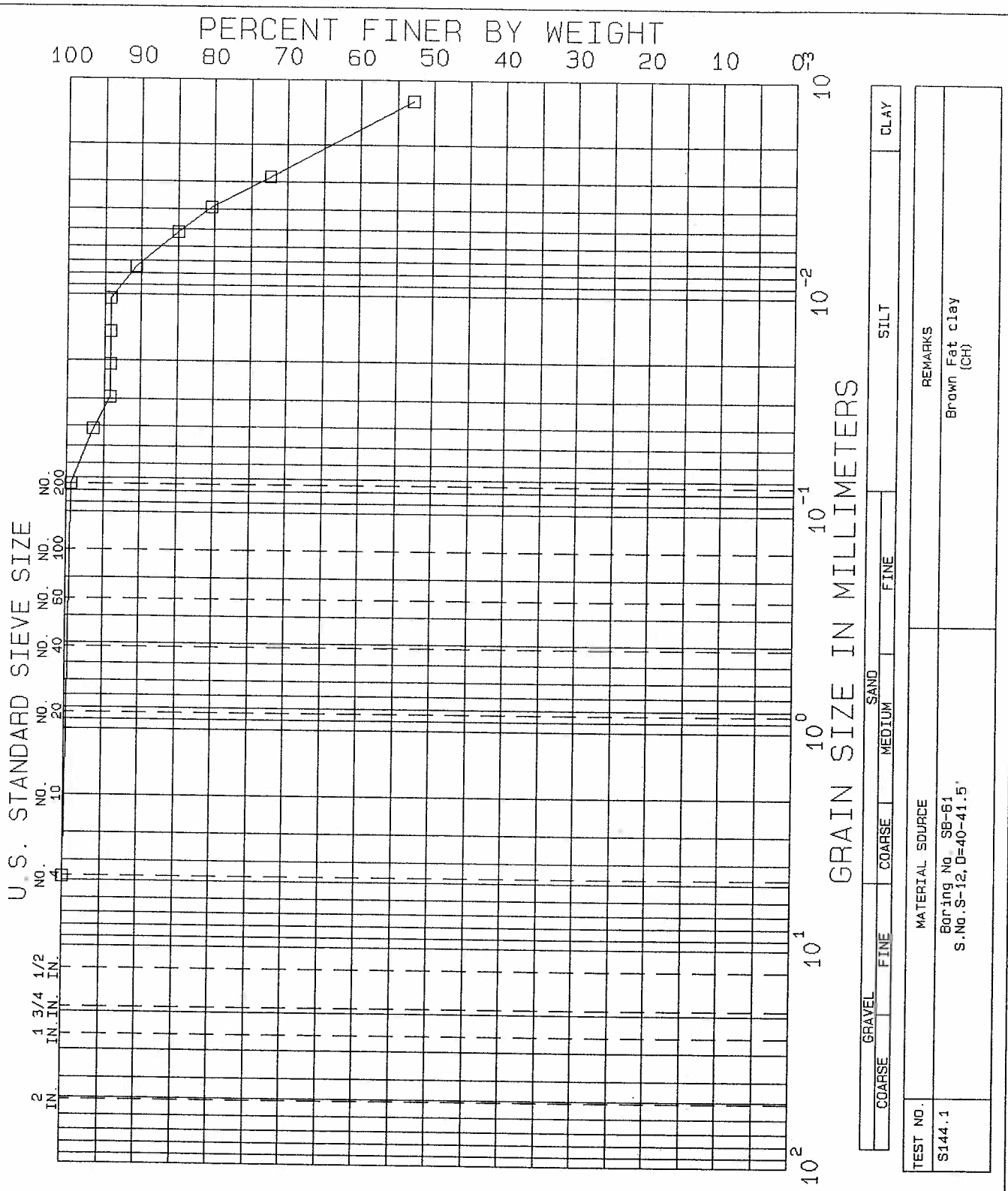


NEW BRITAIN-HARTFORD BUSWAY

CONNECTICUT

GRADATION TESTS

BORING NO.	SB-60	TEST SERIES	
SAMPLE	S-29	NO.	143
DEPTH	125-126.5'	DATE	Nov.03
TECH	PEC		
REVIEWER	MBP	FILE	L17828

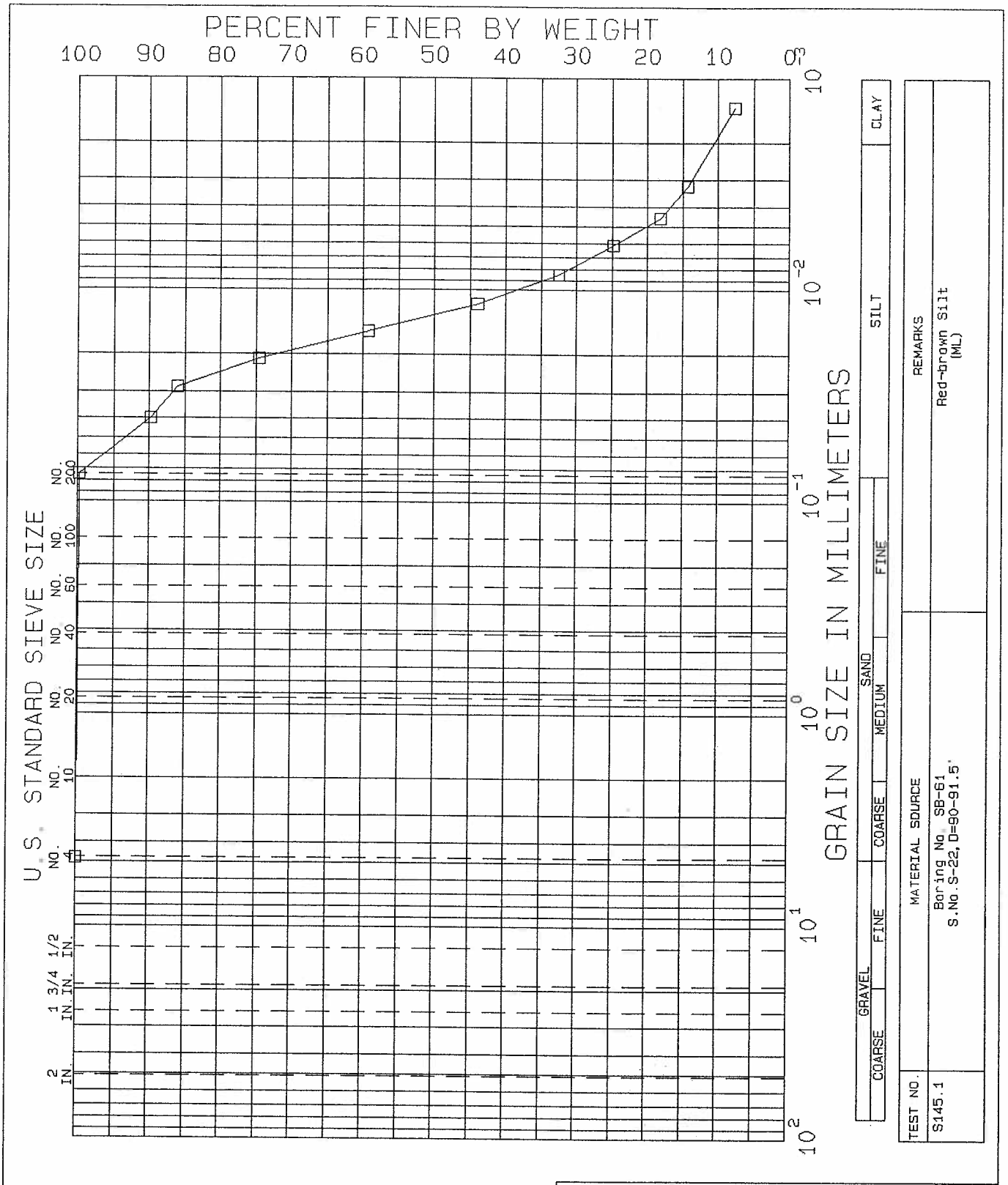


NEW BRITAIN-HARTFORD BUSWAY

CONNECTICUT

GRADATION TESTS

BORING NO	SB-61	TEST SERIES	
SAMPLE	S-12	NO.	144
DEPTH	40-41.5'	DATE	Nov.03
TECH.	PEC		
REVIEWER	MBP	FILE	L17828

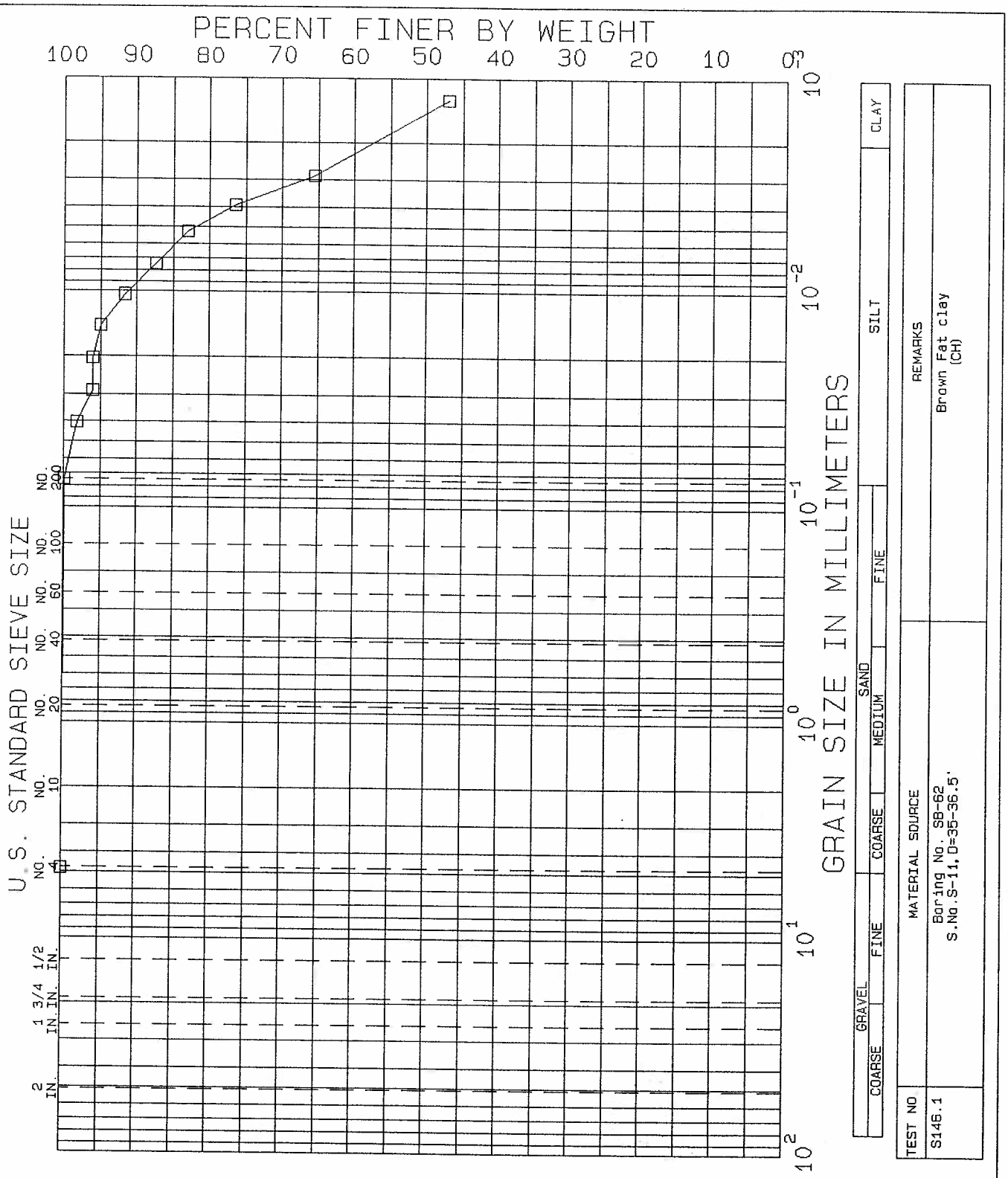


NEW BRITAIN-HARTFORD BUSWAY

CONNECTICUT

GRADATION TESTS

BORING NO.	SB-61	TEST SERIES	
SAMPLE	S-22	NO.	145
DEPTH	90-91.5'	DATE	Nov.03
TECH.	PEC		
REVIEWER	MBP	FILE	L17828

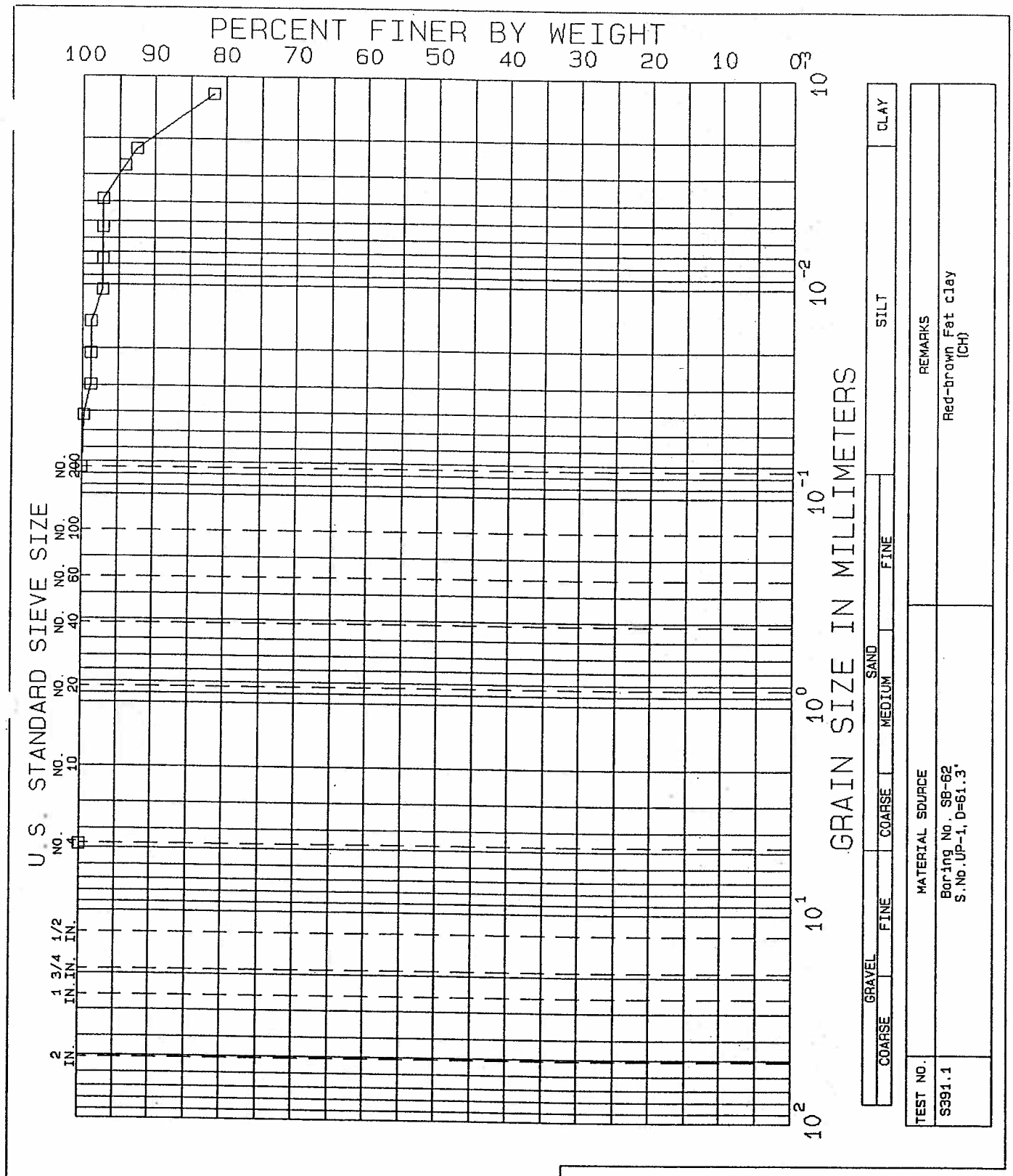


NEW BRITAIN-HARTFORD BUSWAY

CONNECTICUT

GRADATION TESTS

BORING NO.	SB-62	TEST SERIES	
SAMPLE	S-11	NO.	146
DEPTH	35-36.5'	DATE	Nov.03
TECH.	PEC		
REVIEWER	MBP	FILE	L17828



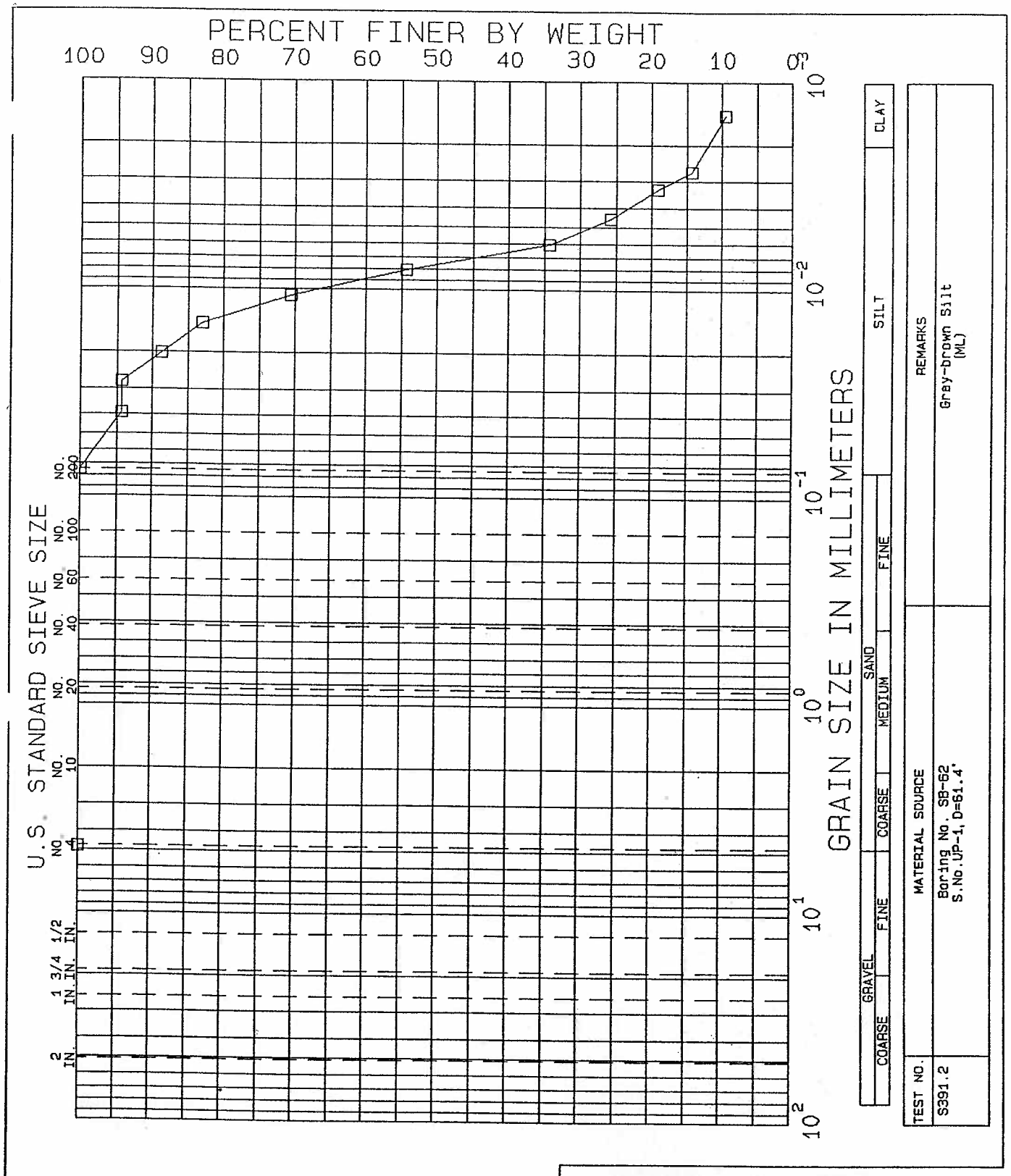
NEW BRITAIN-HARTFORD BUSWAY

CONNECTICUT

GRADATION TESTS

BORING NO.	SB-62	TEST SERIES	
SAMPLE	UP-1	NO.	391
DEPTH	61.3'	DATE	Nov.03
TECH.	PEC		
REVIEWER	MBP	FILE	L17828

GZA GEOENVIRONMENTAL, INC.
ENGINEERS AND SCIENTISTS

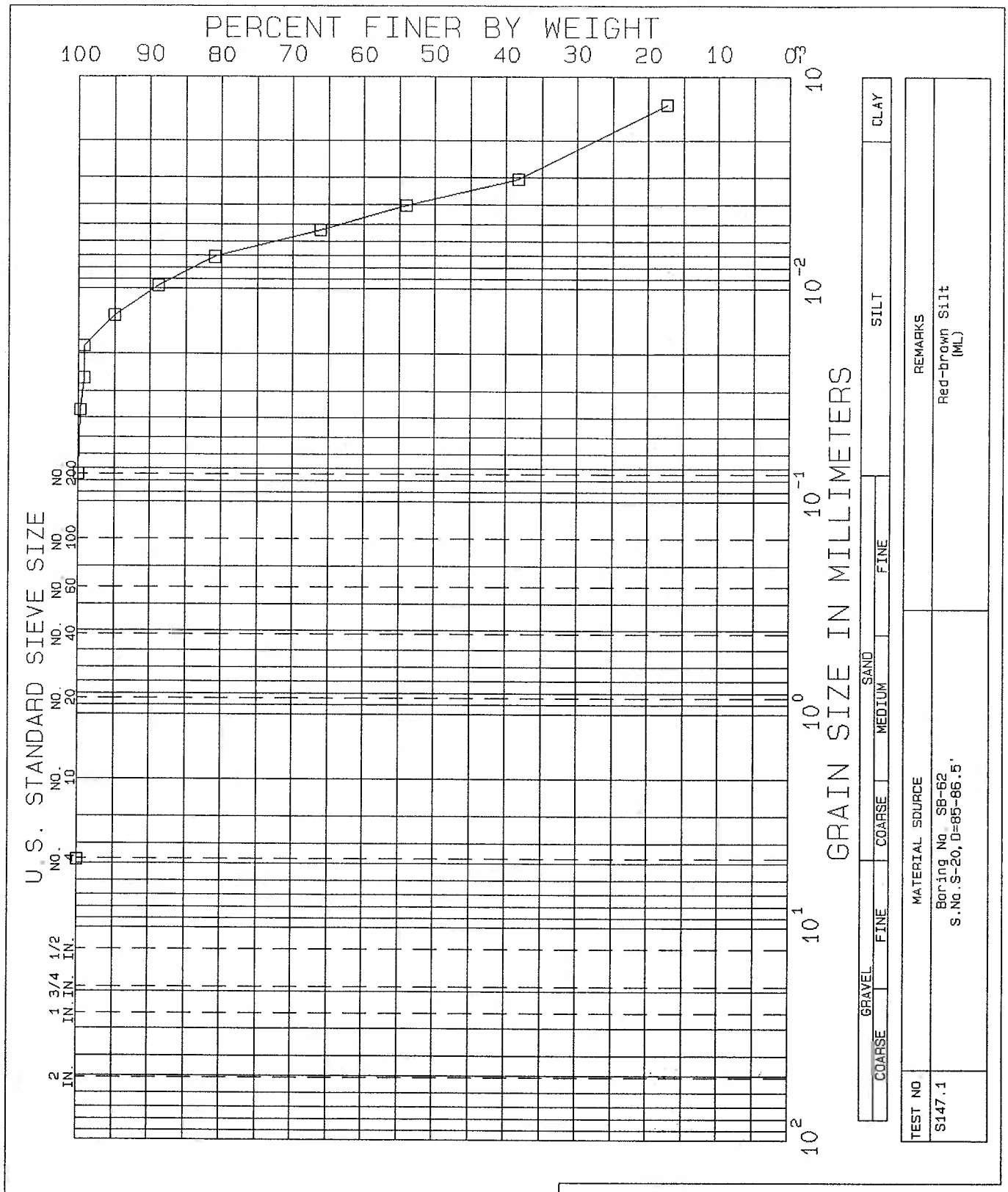


NEW BRITAIN-HARTFORD BUSWAY

CONNECTICUT

GRADATION TESTS

BORING NO.	SB-62	TEST SERIES	
SAMPLE	UP-1	NO.	391
DEPTH	61.4'	DATE	Nov.03
TECH.	PEC		
REVIEWER	MBP	FILE	L17828

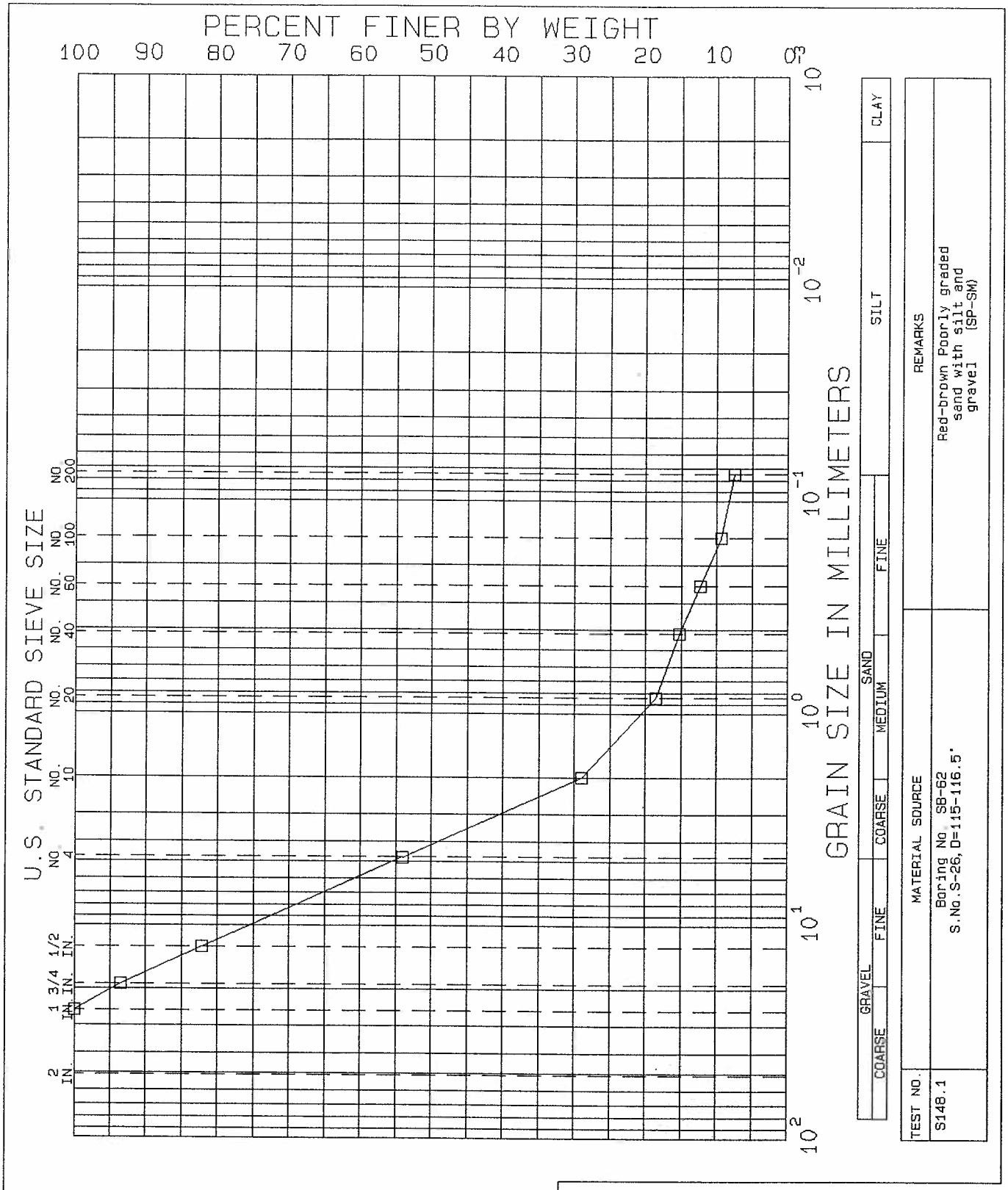


NEW BRITAIN-HARTFORD BUSWAY

CONNECTICUT

GRADATION TESTS

BORING NO	SB-62	TEST SERIES	
SAMPLE	S-20	NO	147
DEPTH	85-86.5'	DATE	Nov 03
TECH.	PEC		
REVIEWER	MBP	FILE	L17828

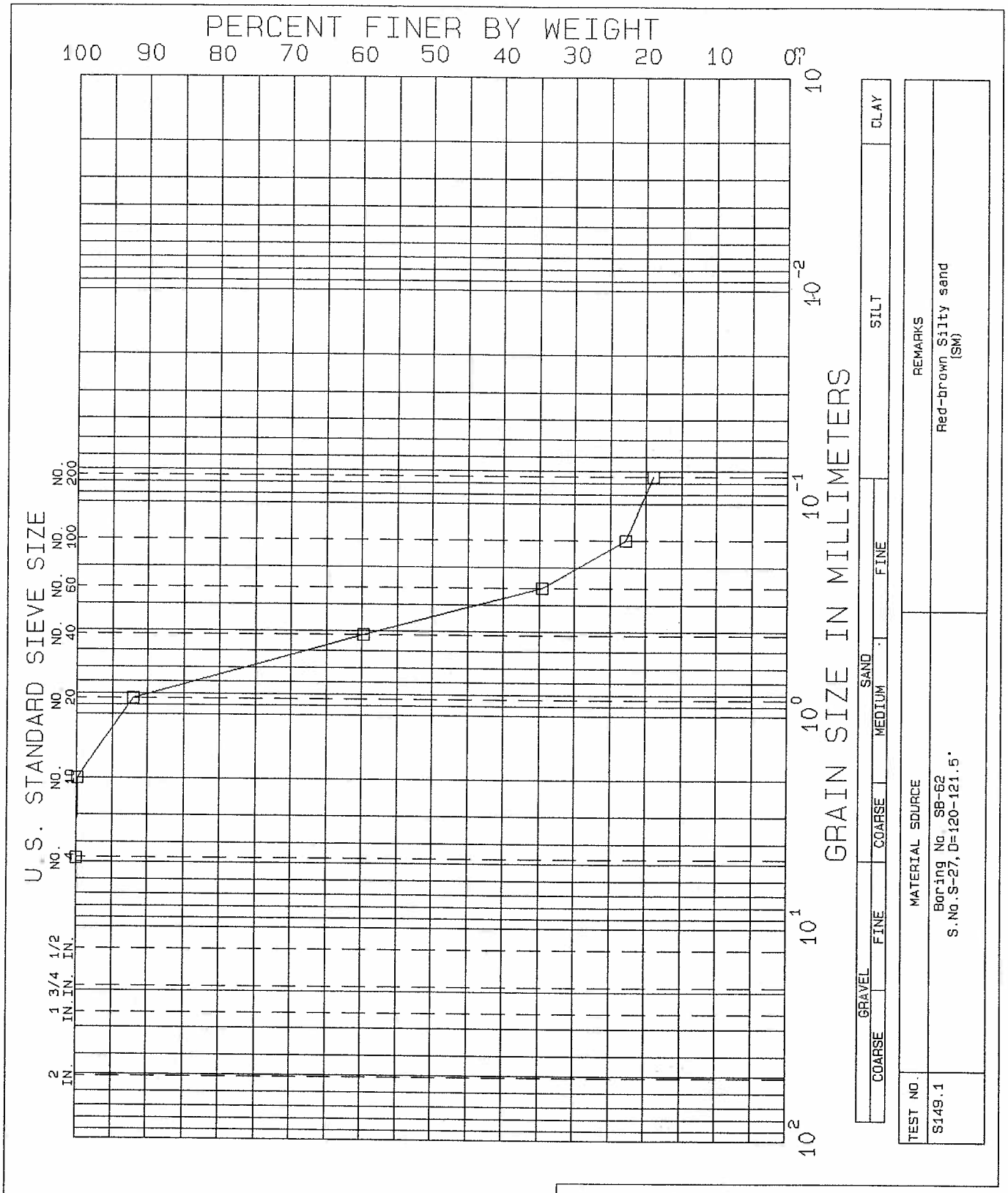


NEW BRITAIN-HARTFORD BUSWAY

CONNECTICUT

GRADATION TESTS

BORING NO.	SB-62	TEST SERIES	
SAMPLE	S-26	NO.	146
DEPTH	115-116.5'	DATE	Nov.03
TECH.	PEC		
REVIEWER	MBP	FILE	L17828

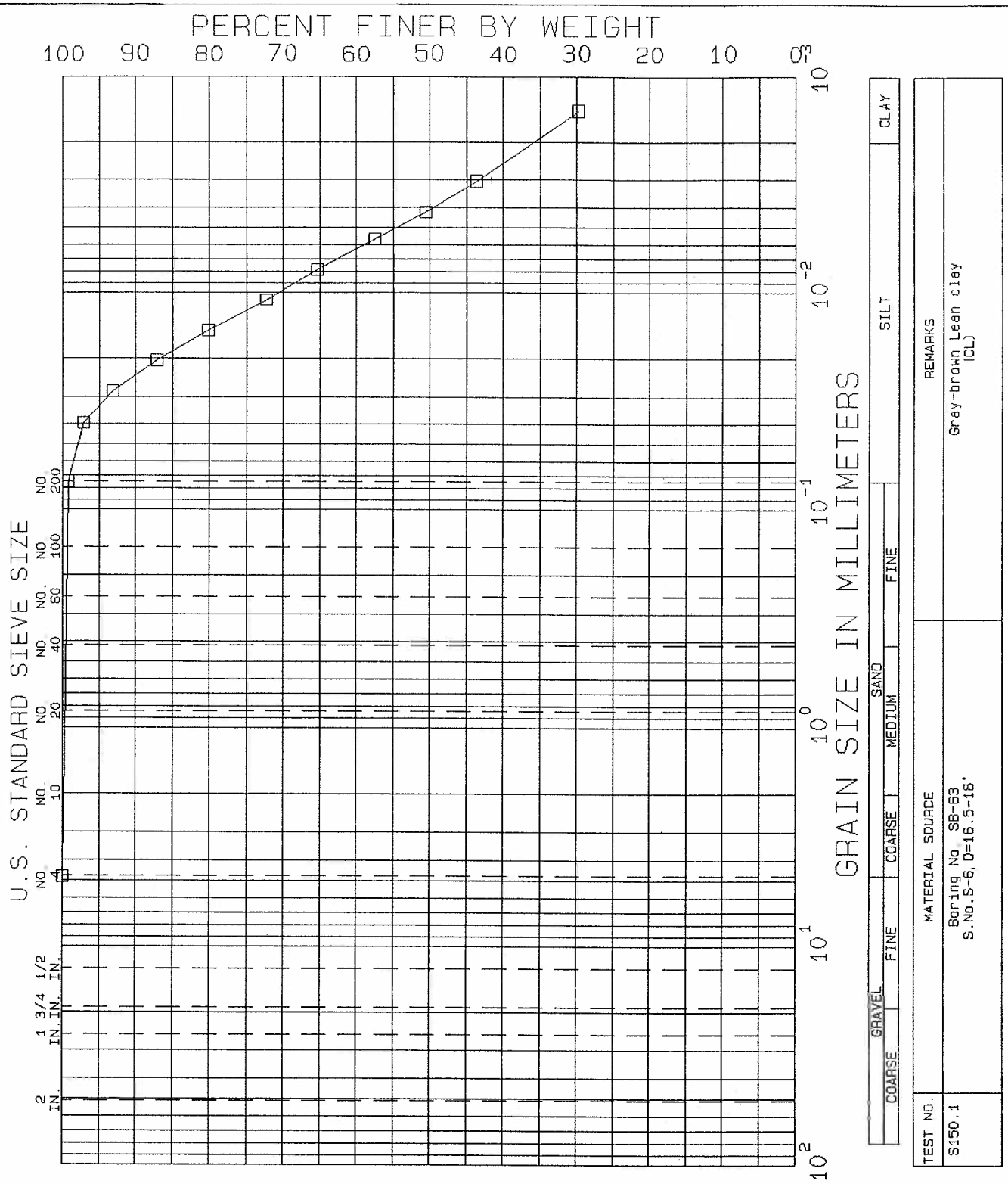


NEW BRITAIN-HARTFORD BUSWAY

CONNECTICUT

GRADATION TESTS

BORING NO.	SB-62	TEST SERIES	
SAMPLE	S-27	NO.	149
DEPTH	120-121.5'	DATE	Nov.03
TECH.	PEC		
REVIEWER	MBP	FILE	L17828

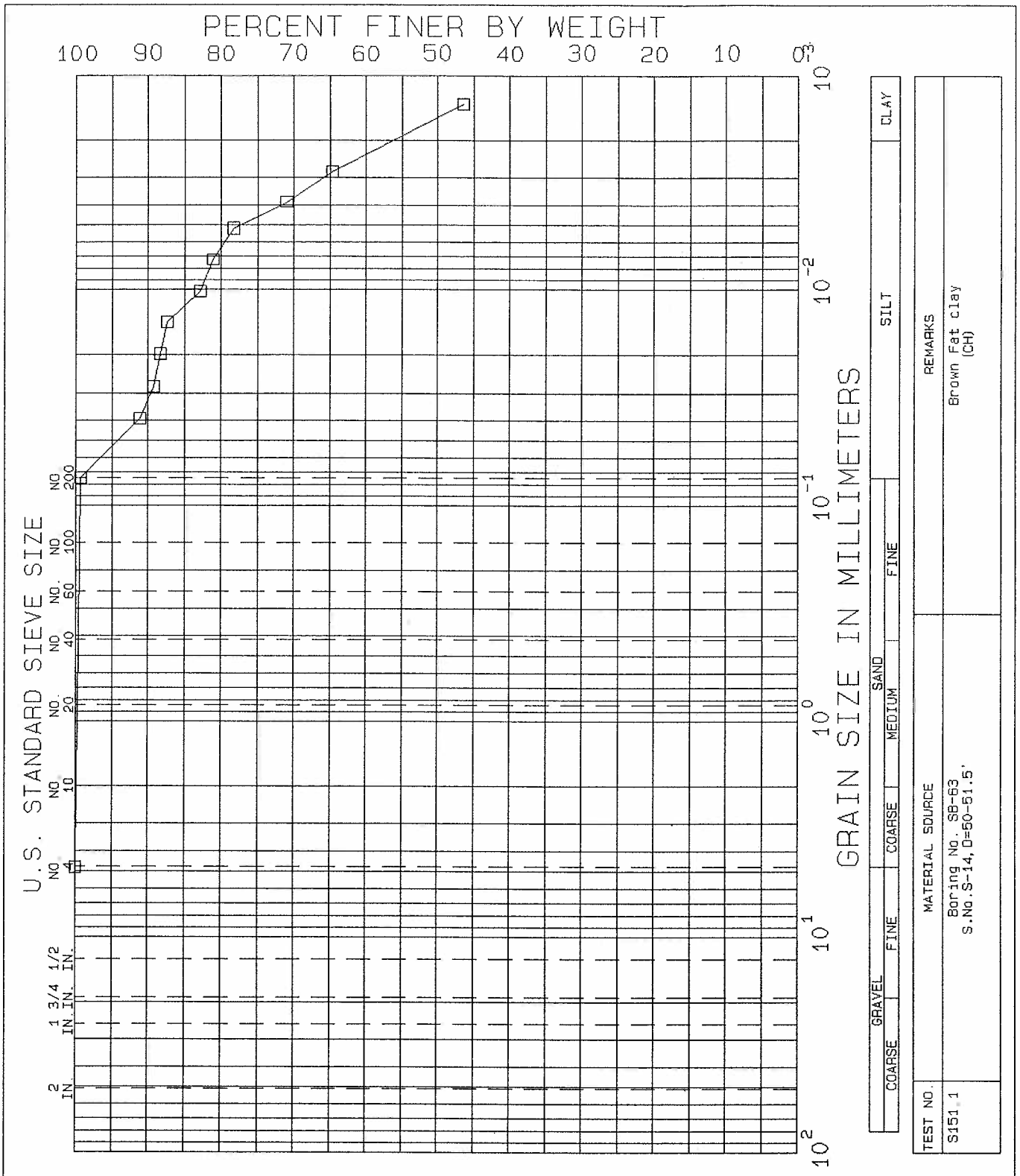


NEW BRITAIN-HARTFORD BUSWAY

CONNECTICUT

GRADATION TESTS

BORING NO.	SB-63	TEST SERIES	
SAMPLE	S-6	NO.	150
DEPTH	16.5-18'	DATE	Nov.03
TECH.	PEC		
REVIEWER	MBP	FILE	L17828

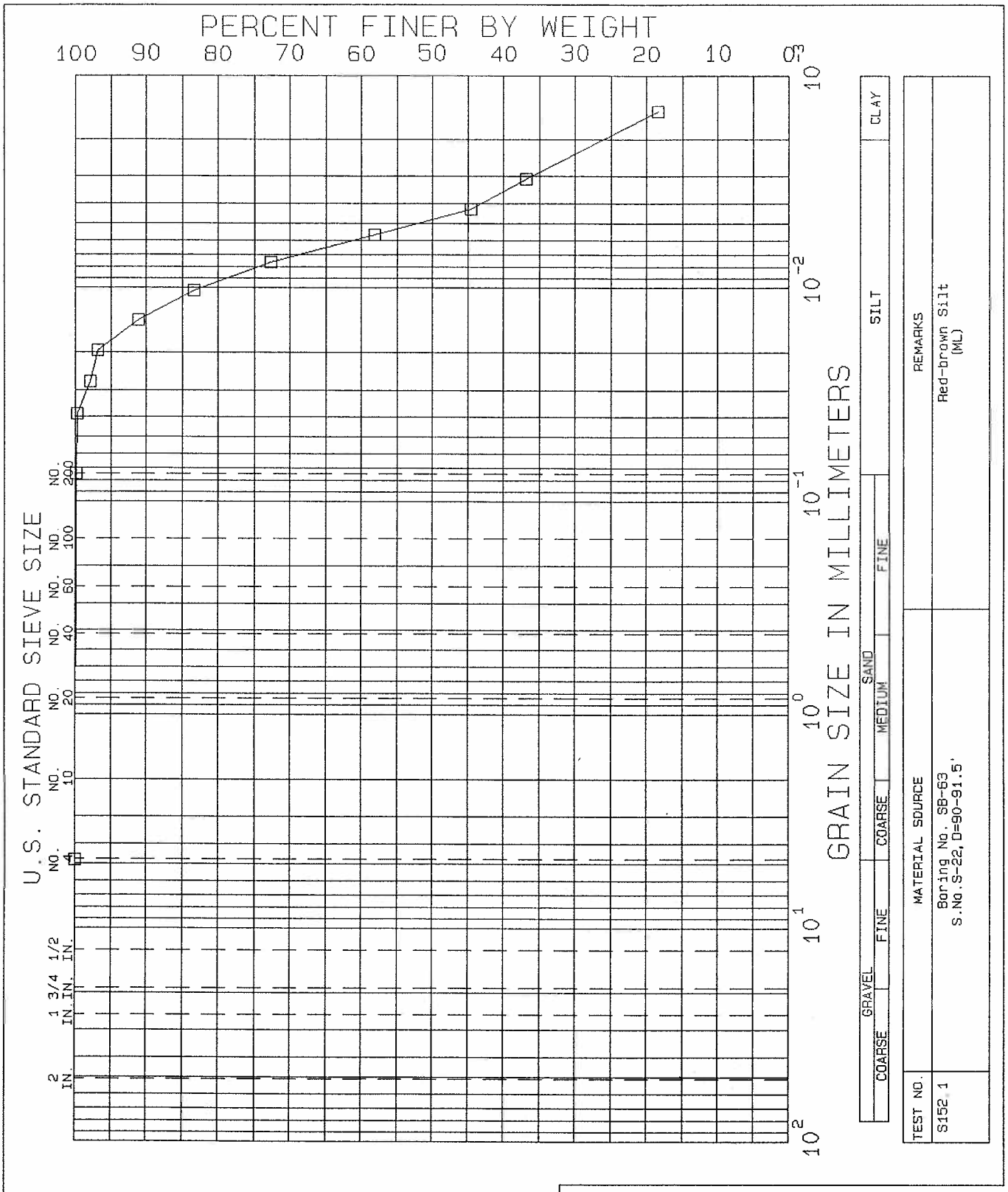


NEW BRITAIN-HARTFORD BUSWAY

CONNECTICUT

GRADATION TESTS

BORING NO.	SB-63	TEST SERIES	
SAMPLE	S-14	NO.	151
DEPTH	50-51.5'	DATE	Nov.03
TECH.	PEC		
REVIEWER	MBP	FILE	L17828

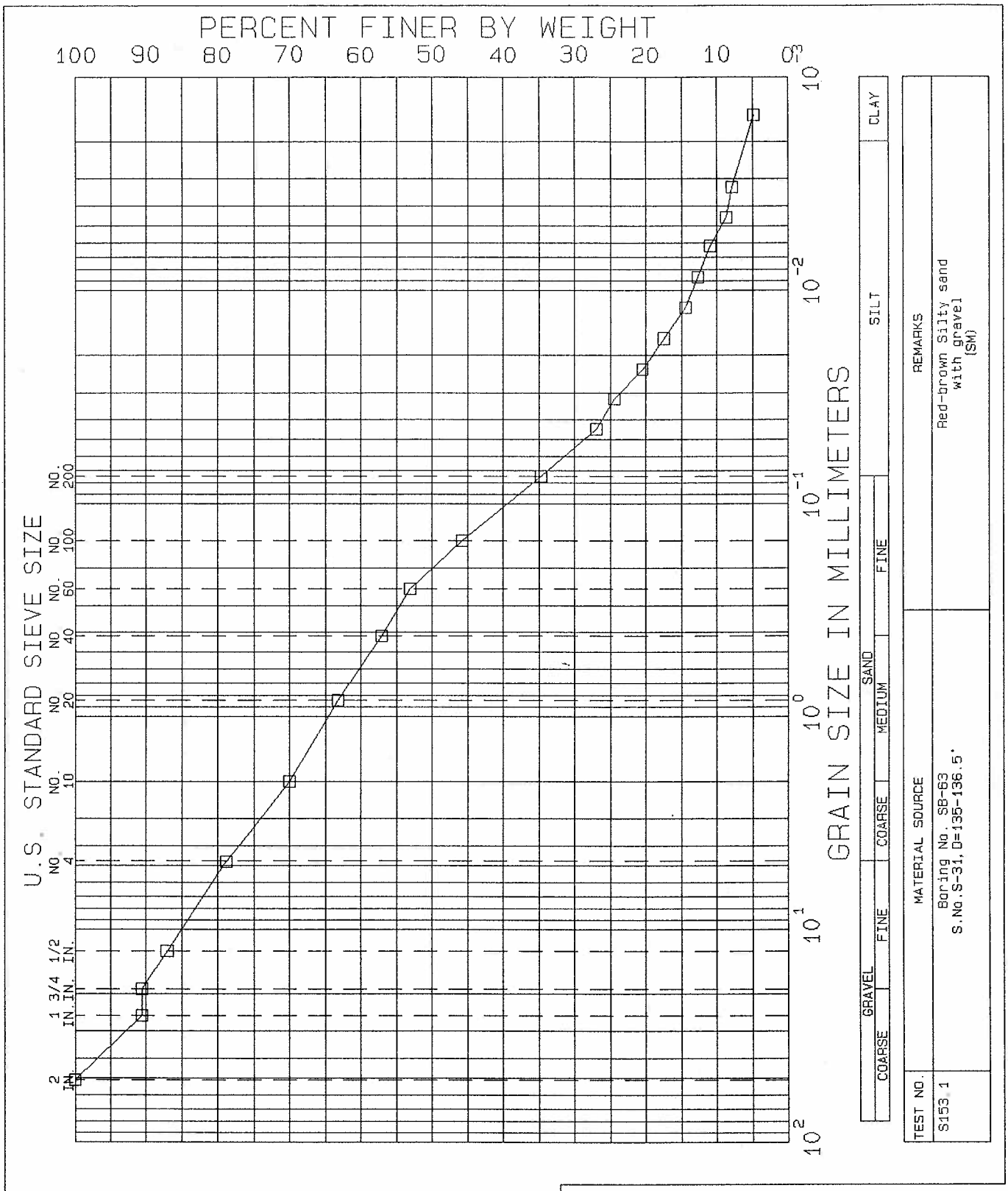


NEW BRITAIN-HARTFORD BUSWAY

CONNECTICUT

GRADATION TESTS

BORING NO.	SB-63	TEST SERIES	
SAMPLE	S-22	NO.	152
DEPTH	90-91.5'	DATE	Nov.03
TECH.	PEC		
REVIEWER	MBP	FILE	L17828

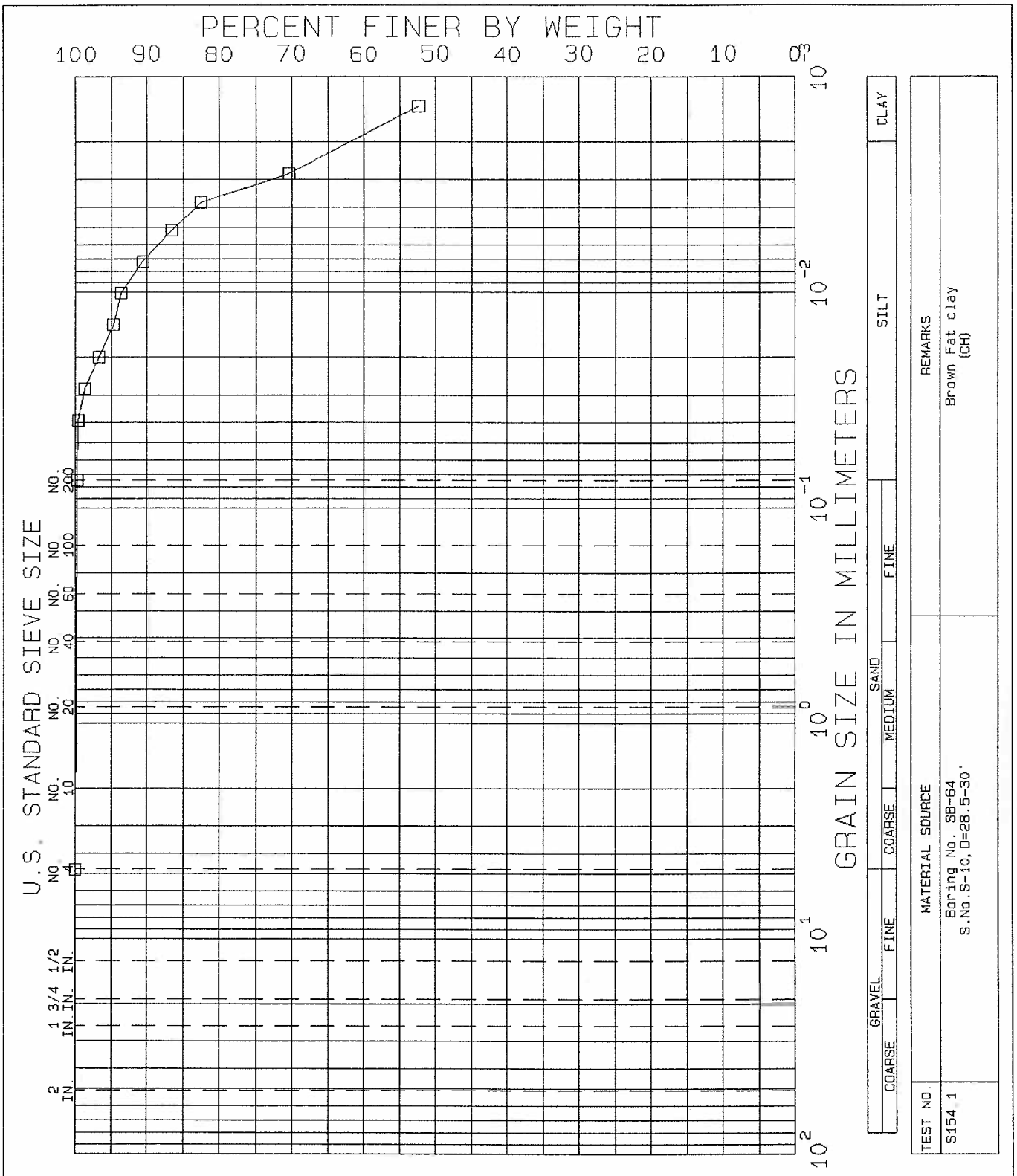


NEW BRITAIN-HARTFORD BUSWAY

CONNECTICUT

GRADATION TESTS

BORING NO.	SB-63	TEST SERIES	
SAMPLE	S-31	NO	153
DEPTH	135-136.5'	DATE	Nov 03
TECH.	PEC		
REVIEWER	MBP	FILE	L17828

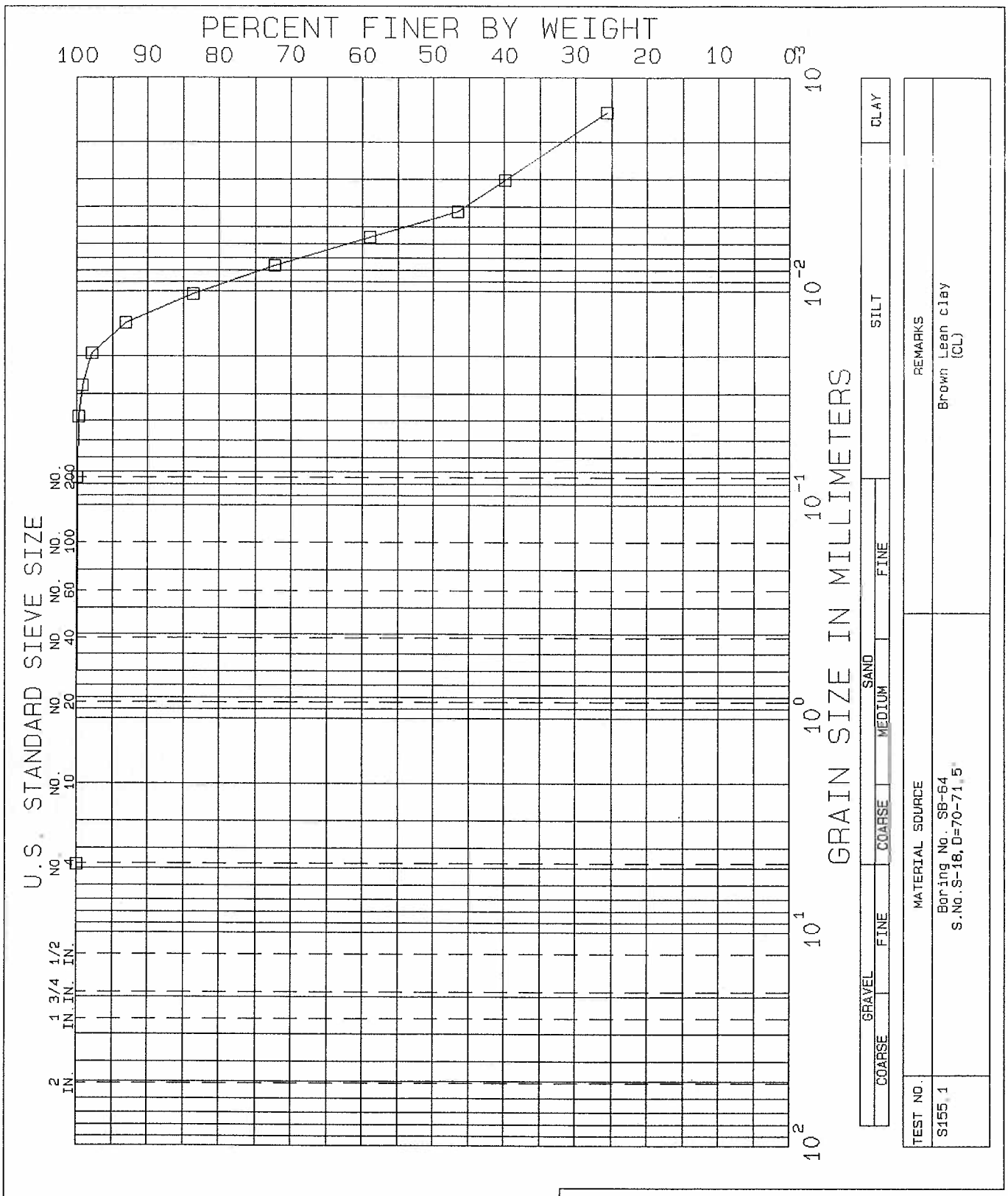


NEW BRITAIN-HARTFORD BUSWAY

CONNECTICUT

GRADATION TESTS

BORING NO.	SB-64	TEST SERIES	
SAMPLE	S-10	NO.	154
DEPTH	28.5-30'	DATE	Nov.03
TECH	PEC		
REVIEWER	MBP	FILE	L17828

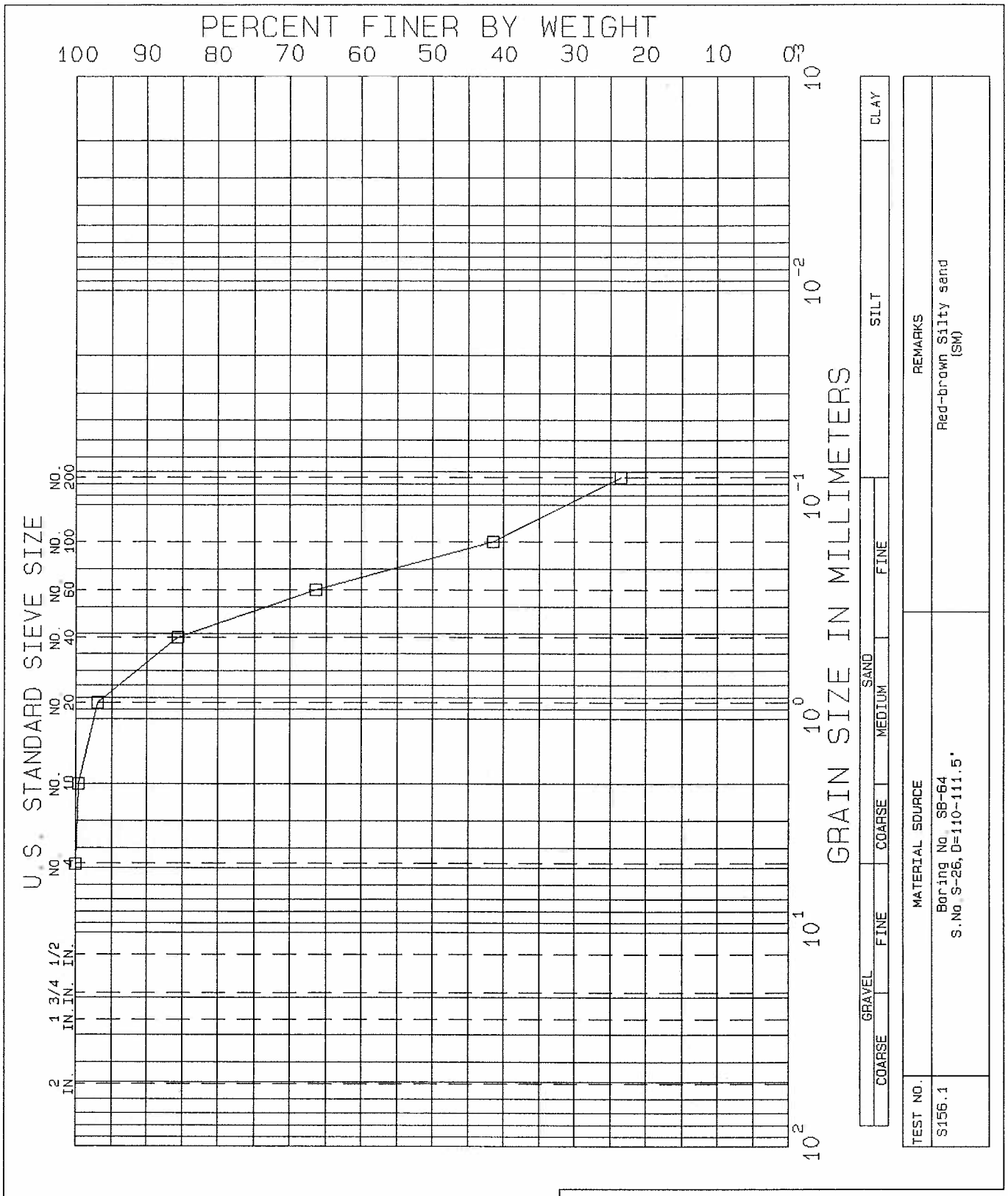


NEW BRITAIN-HARTFORD BUSWAY

CONNECTICUT

GRADATION TESTS

BORING NO.	SB-64	TEST SERIES	
SAMPLE	S-18	NO.	155
DEPTH	70-71.5'	DATE	Nov 03
TECH.	PEC		
REVIEWER	MBP	FILE	L17828

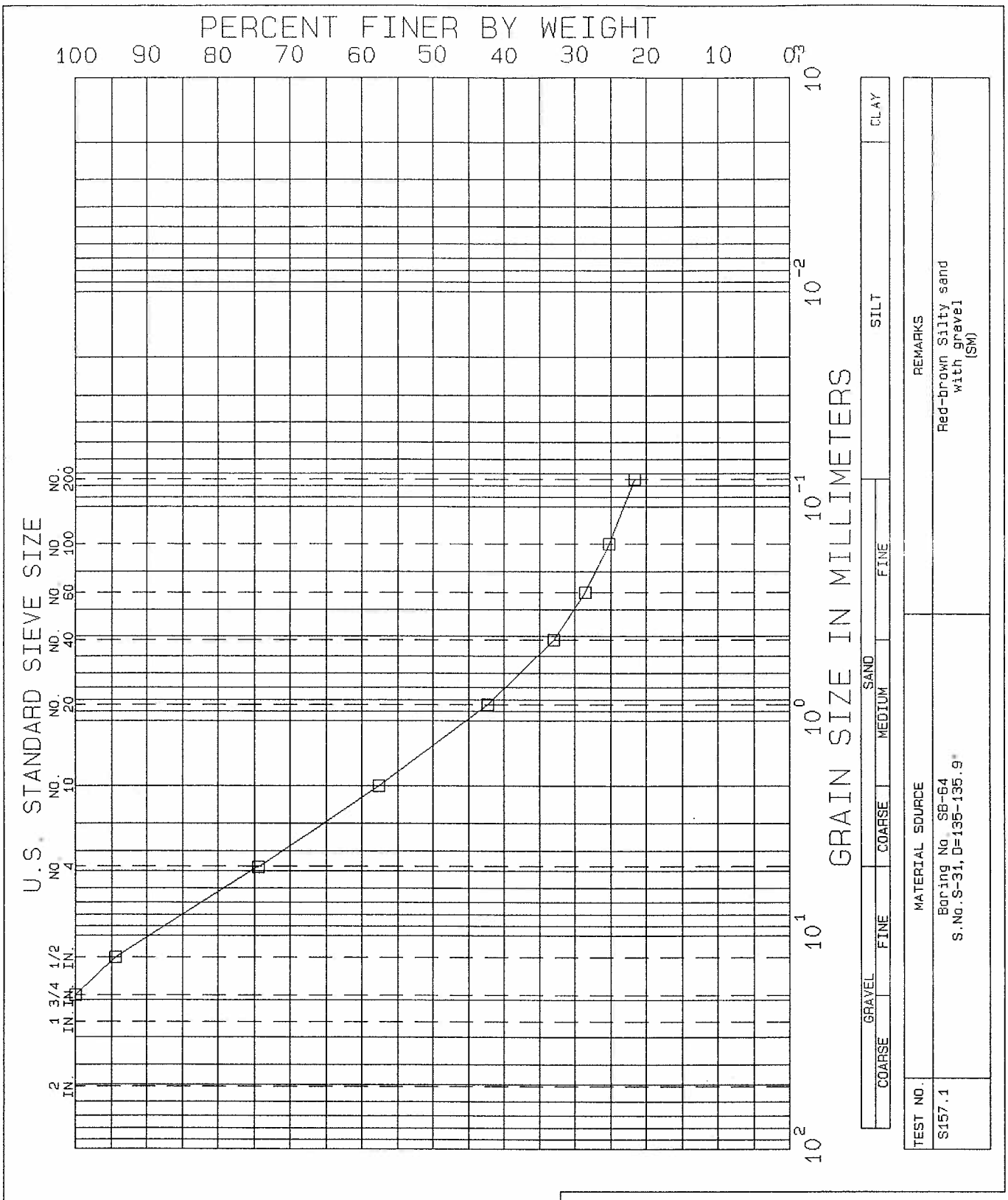


NEW BRITAIN-HARTFORD BUSWAY

CONNECTICUT

GRADATION TESTS

BORING NO.	SB-64	TEST SERIES	
SAMPLE	S-26	NO.	156
DEPTH	110-111.5'	DATE	Nov 03
TECH.	PEC		
REVIEWER	MBP	FILE	L17828

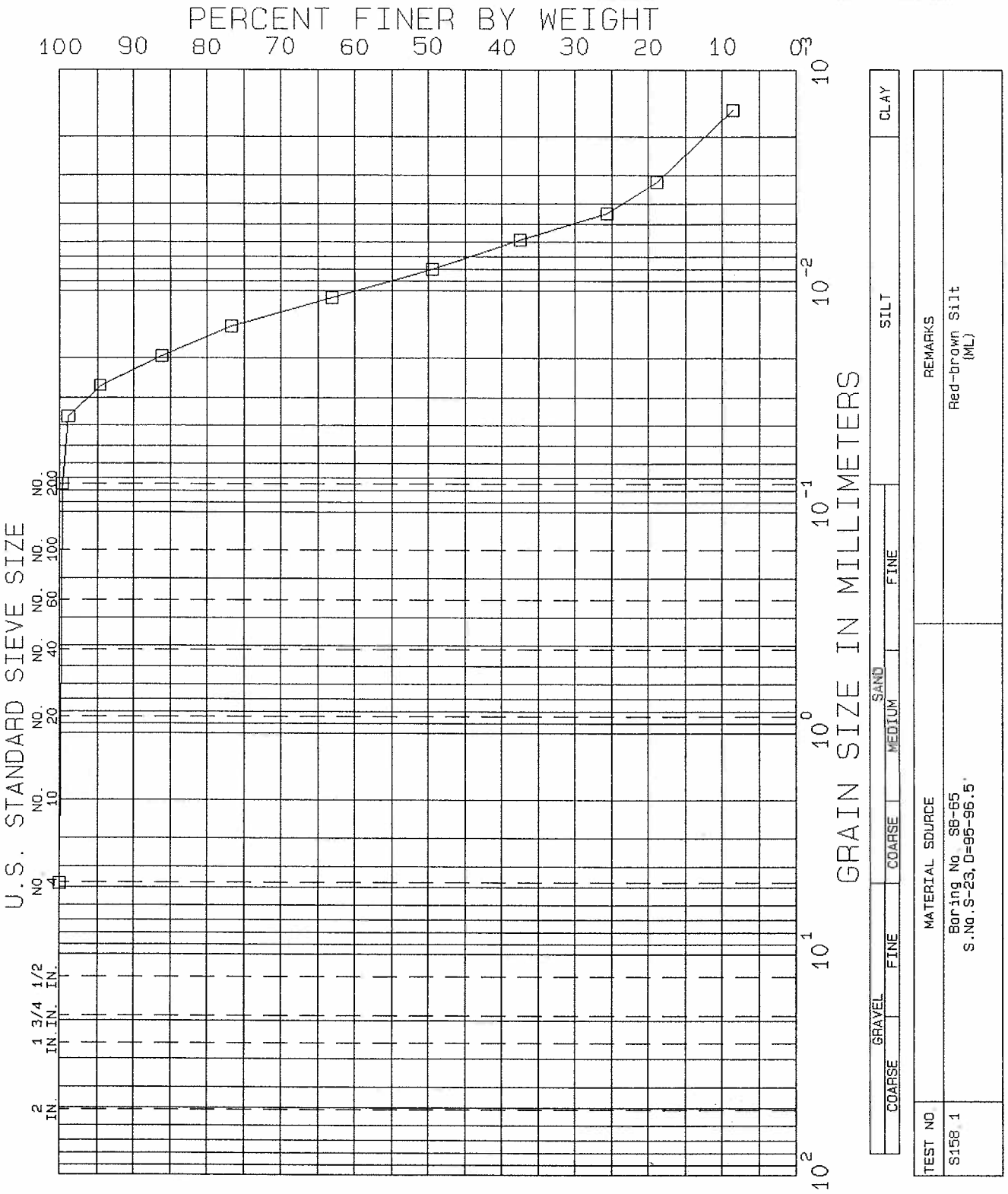


NEW BRITAIN-HARTFORD BUSWAY

CONNECTICUT

GRADATION TESTS

BORING NO.	SB-64	TEST SERIES	
SAMPLE	S-31	NO.	157
DEPTH	135-135.9'	DATE	Nov.03
TECH.	PEC		
REVIEWER	MBP	FILE	L17828

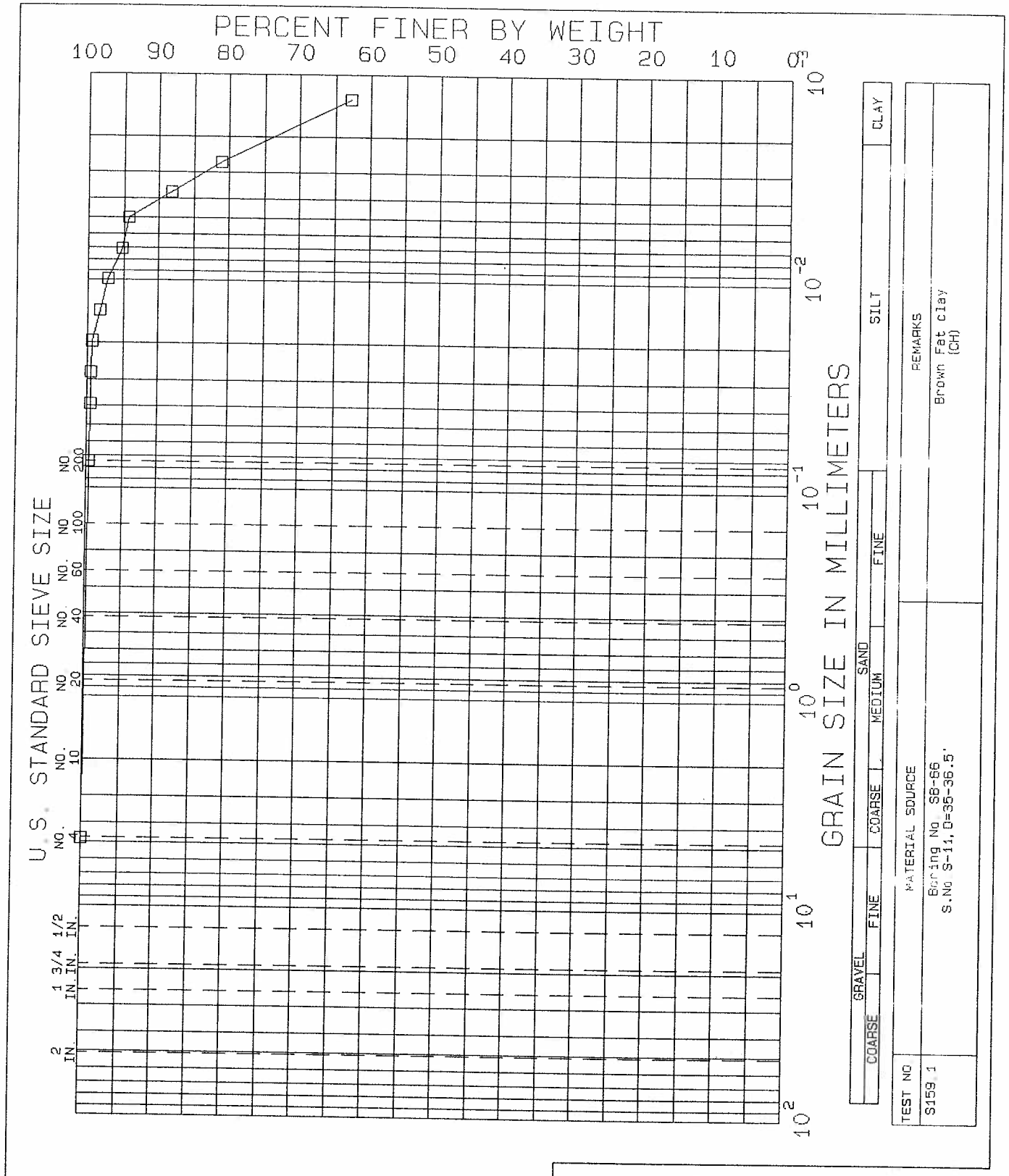


NEW BRITAIN-HARTFORD BUSWAY

CONNECTICUT

GRADATION TESTS

BORING NO	SB-65	TEST SERIES	
SAMPLE	S-23	NO	158
DEPTH	95-96.5'	DATE	Nov.03
TECH.	PEC		
REVIEWER	MBP	FILE	L17828



NEW BRITAIN-HARTFORD BUSWAY

CONNECTICUT

GRADATION TESTS

BORING NO. SB-66
SAMPLE S-11
DEPTH 35-36.5'
TECH. CAG
REVIEWER MBP

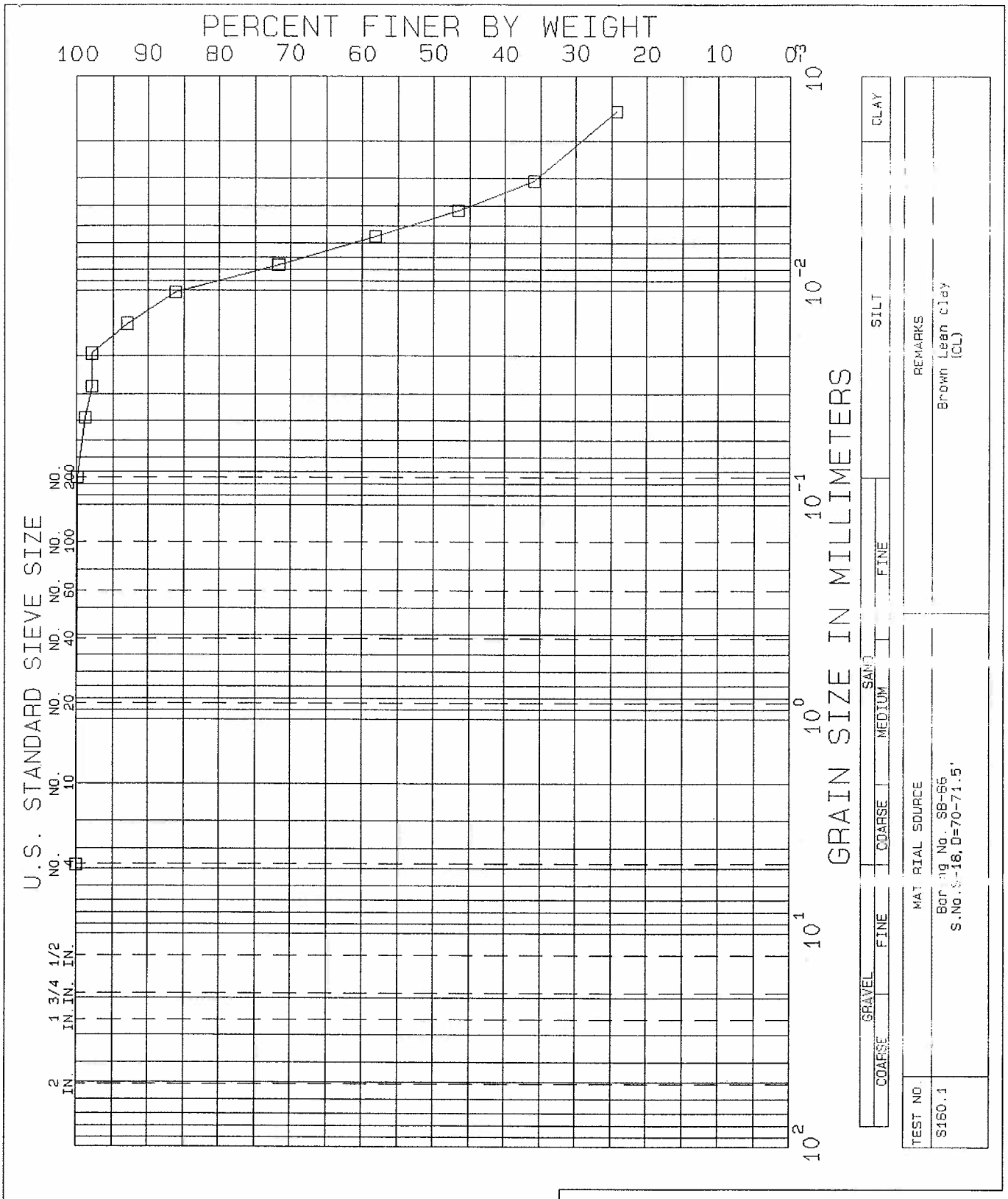
TEST SERIES
NO. 159
DATE Dec 03

FILE L17828

GZA GEOENVIRONMENTAL, INC.
ENGINEERS AND SCIENTISTS

APPENDIX E-9

S.3

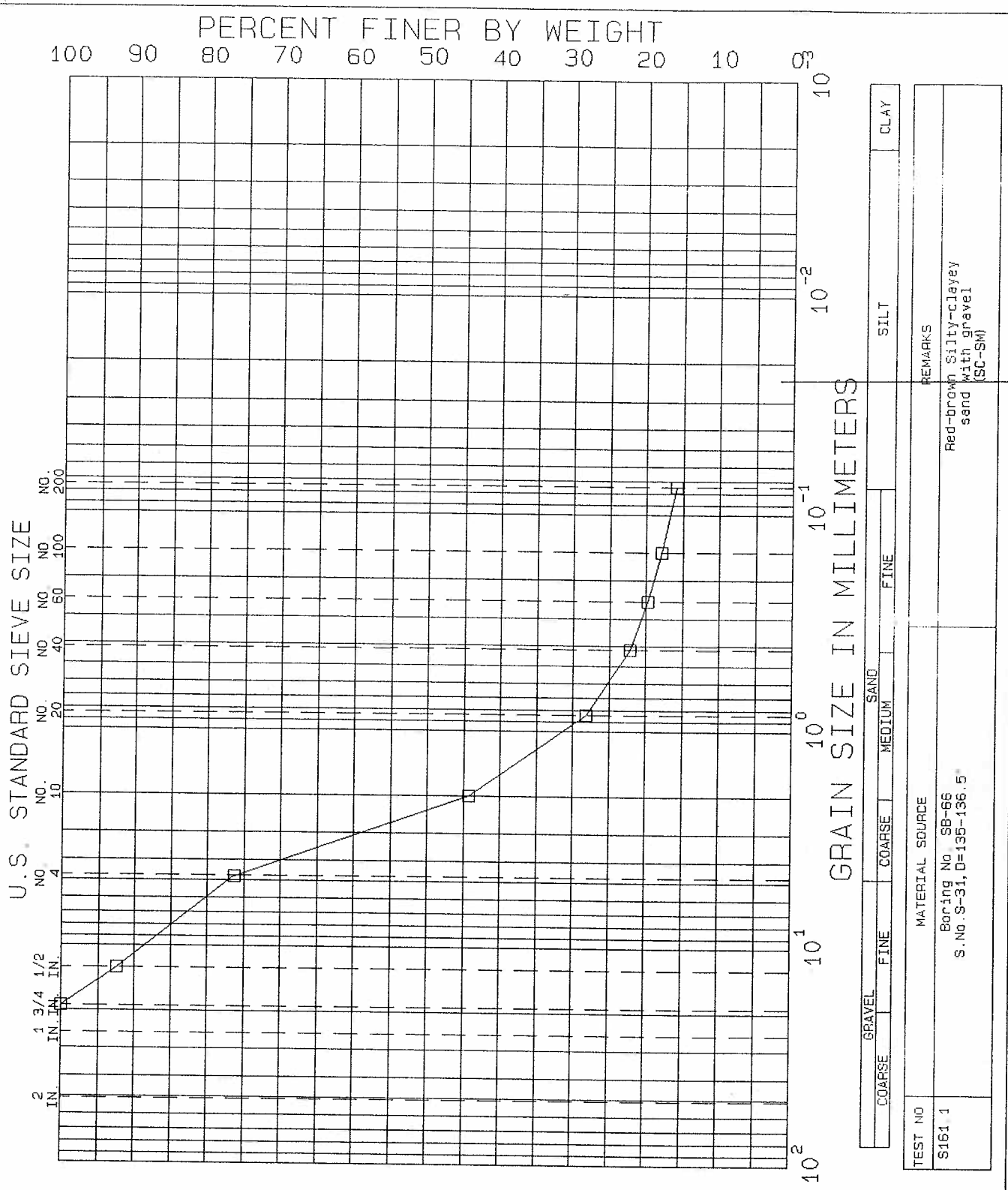


NEW BRITAIN-HARTFORD BUSWAY

CONNECTICUT

GRADATION TESTS

BORING NO.	SB-66	TEST SERIES	
SAMPLE	S-18		
DEPTH	70-71.5'	DATE	Dec 03
TECH.	CAG		
REVIEWER	MBP	FILE	L17828



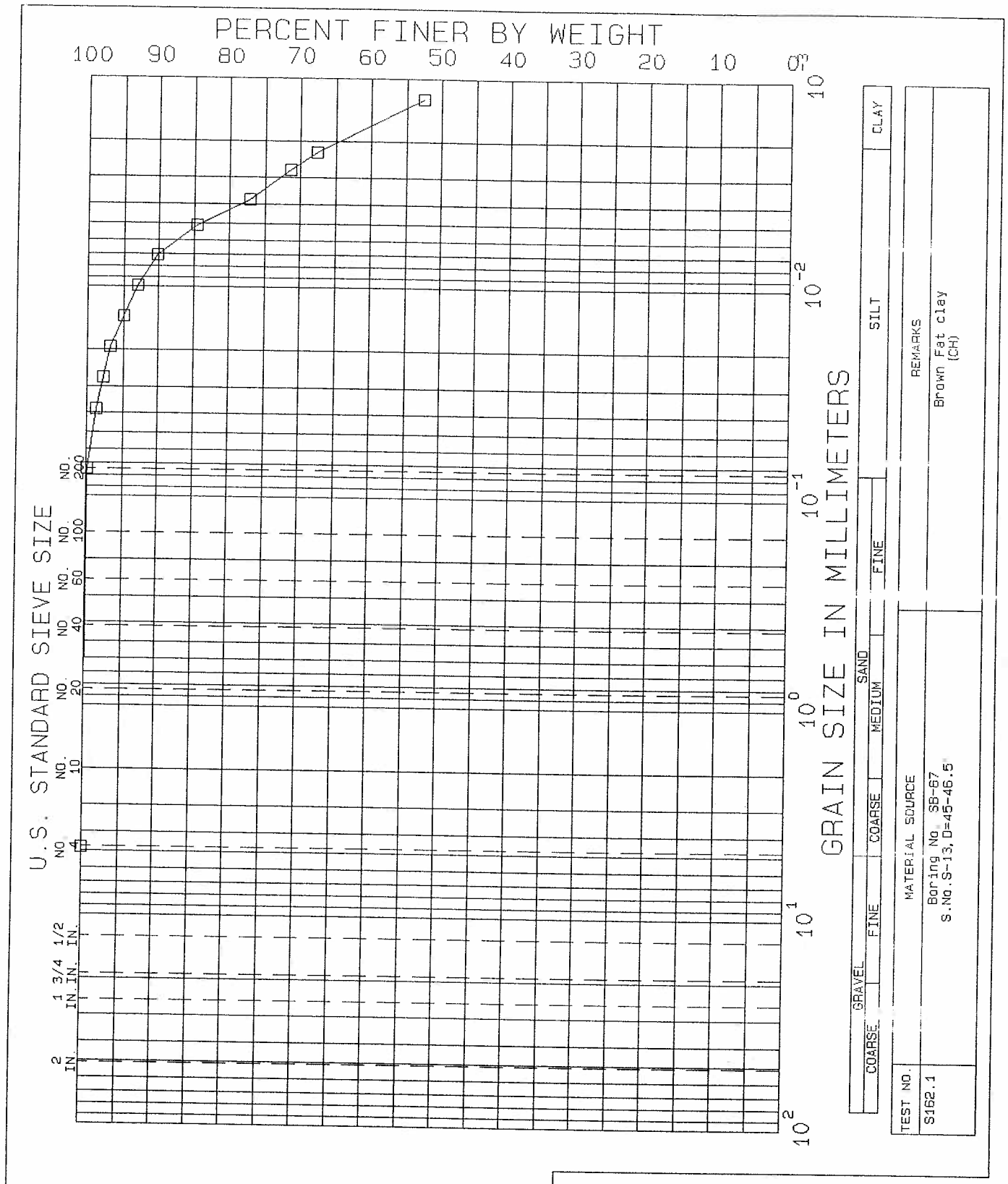
NEW BRITAIN-HARTFORD BUSWAY

CONNECTICUT

GRADATION TESTS

BORING NO	SB-66	TEST SERIES	
SAMPLE	S-31	NO.	161
DEPTH	135-136.5'	DATE	Dec 03
TECH.	CAG		
REVIEWER	MBP	FILE	L17828

GZA GEOENVIRONMENTAL, INC.
ENGINEERS AND SCIENTISTS



NEW BRITAIN-HARTFORD BUSWAY

CONNECTICUT

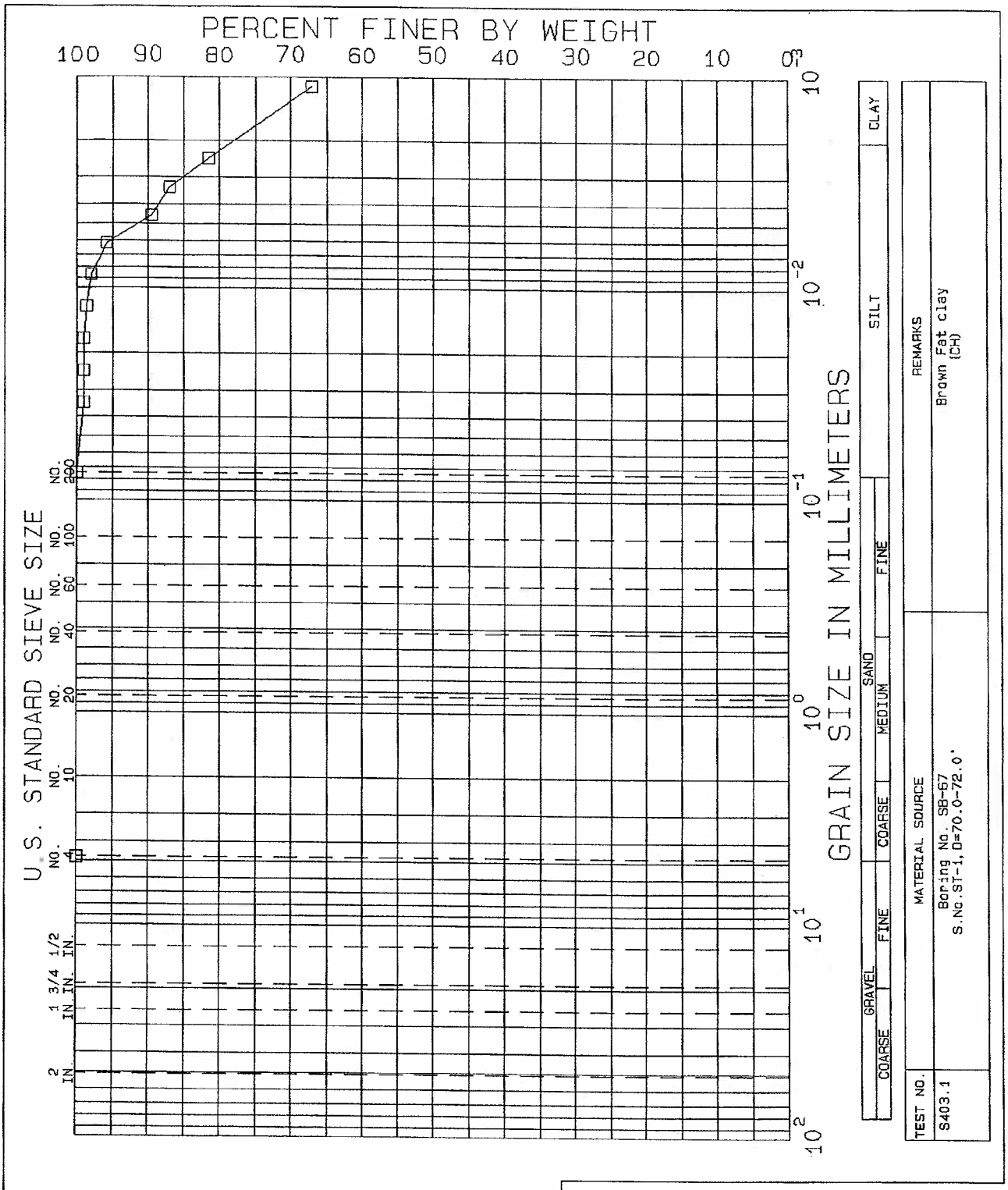
GRADATION TESTS

BORING NO. SB-67
SAMPLE S-13
DEPTH 45-46.5'
TECH CAG
REVIEWER MBP

TEST SERIES
NO. 162
DATE Dec.03

FILE L17828

GZA GEOENVIRONMENTAL, INC.
ENGINEERS AND SCIENTISTS

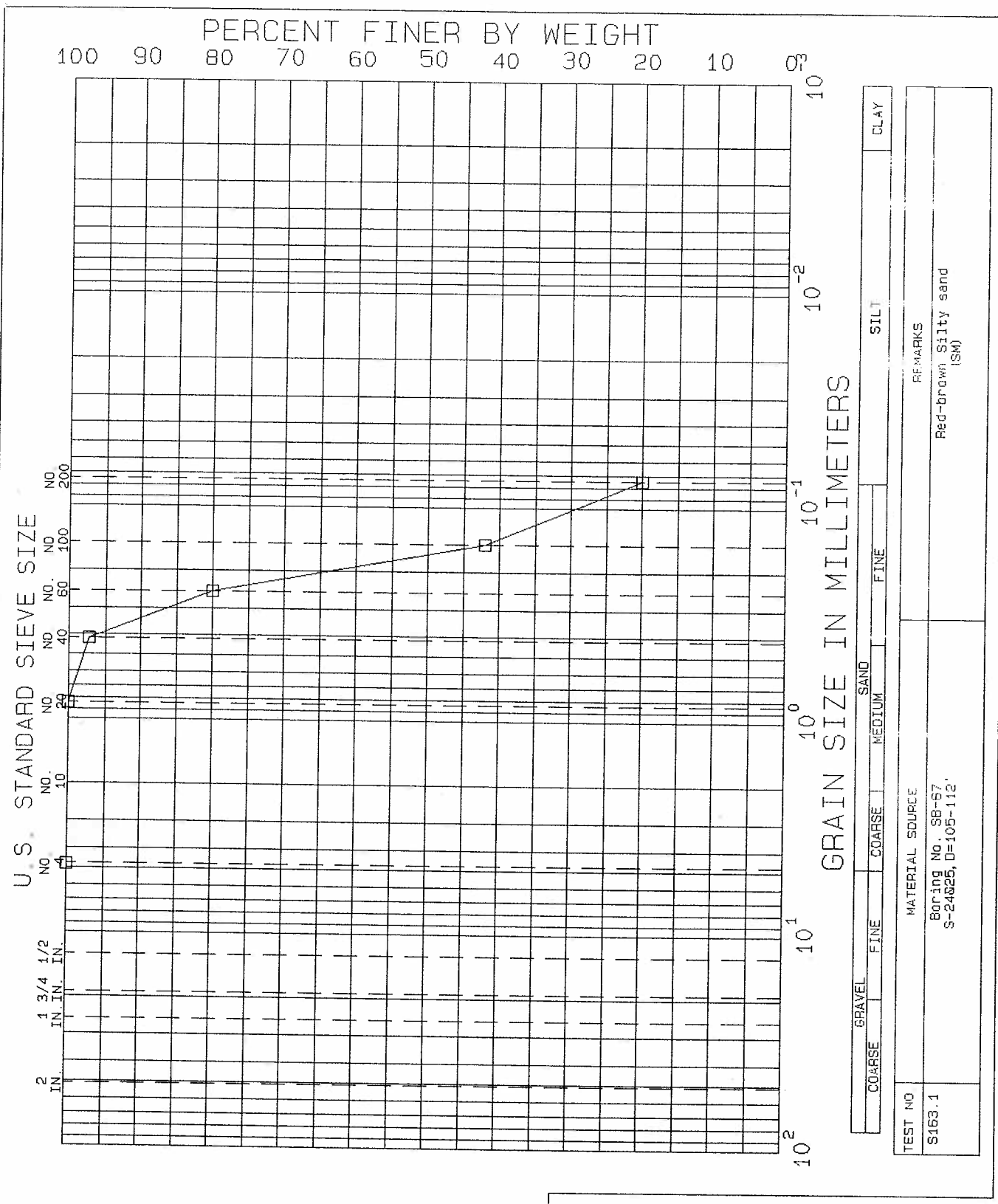


NEW BRITAIN-HARTFORD BUSWAY

CONNECTICUT

GRADATION TESTS

BORING NO.	SB-67	TEST SERIES	
SAMPLE	ST-1	NO.	403
DEPTH	70.0-72.0	DATE	Mar 04
TECH.	PEC		
REVIEWER	MBP	FILE	L17828



NEW BRITAIN-HARTFORD BUSWAY

CONNECTICUT

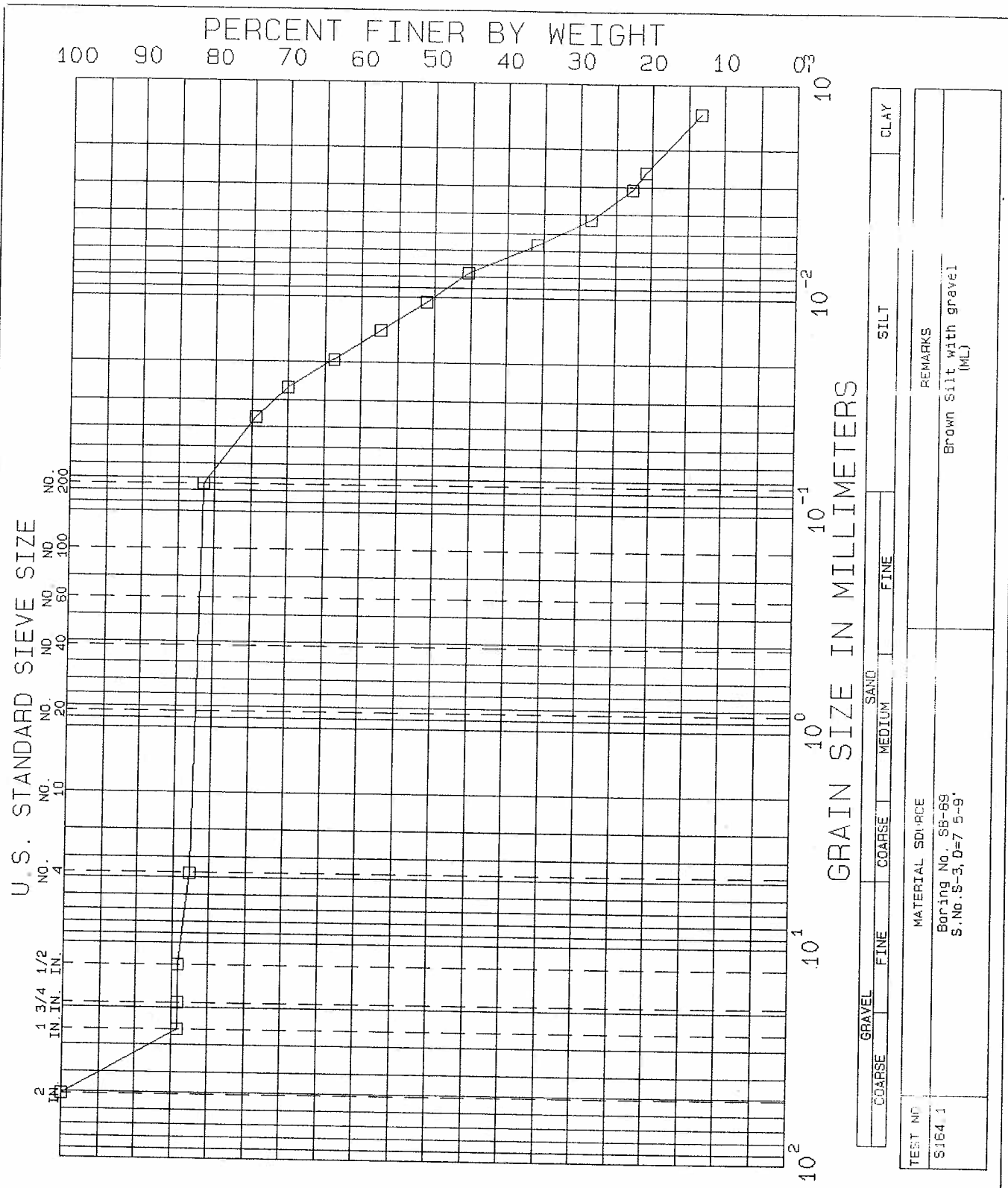
GRADATION TESTS

BORING NO. SB-67
SAMPLE S24&25
DEPTH 105-112'
TECH. CAG
REVIEWER MBP

TEST SERIES
NO. 163
DATE Dec.03

FILE L17828

GZA GEOENVIRONMENTAL, INC.
ENGINEERS AND SCIENTISTS



NEW BRITAIN-HARTFORD BUSWAY

CONNECTICUT

GRADATION TESTS

BORING NO. SB-69
SAMPLE S-3
DEPTH 7.5-9'
TECH. CAG
REVIEWER MBP

TEST SERIES
NO. 164
DATE Dec.03

FILE L17828

GZA GEOENVIRONMENTAL, INC.
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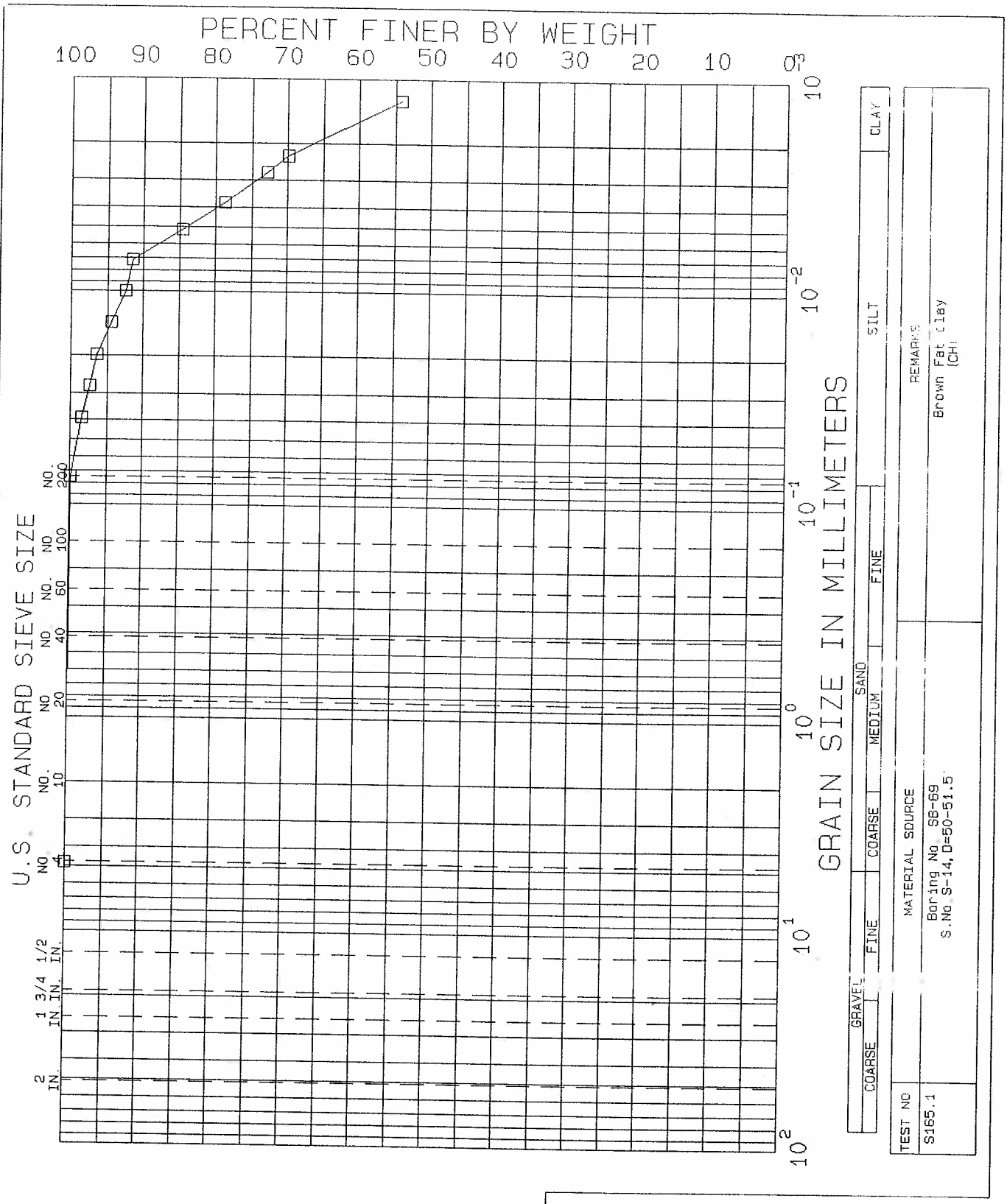

NEW BRITAIN-HARTFORD BUSWAY

CONNECTICUT

GRADATION TESTS

BORING NO.	SB-69	TEST SERIES	
SAMPLE	S-14	NO	165
DEPTH	50-51.5'	DATE	Dec.03
TECH	CAG		
REVIEWER	MBP	FILE	L17828

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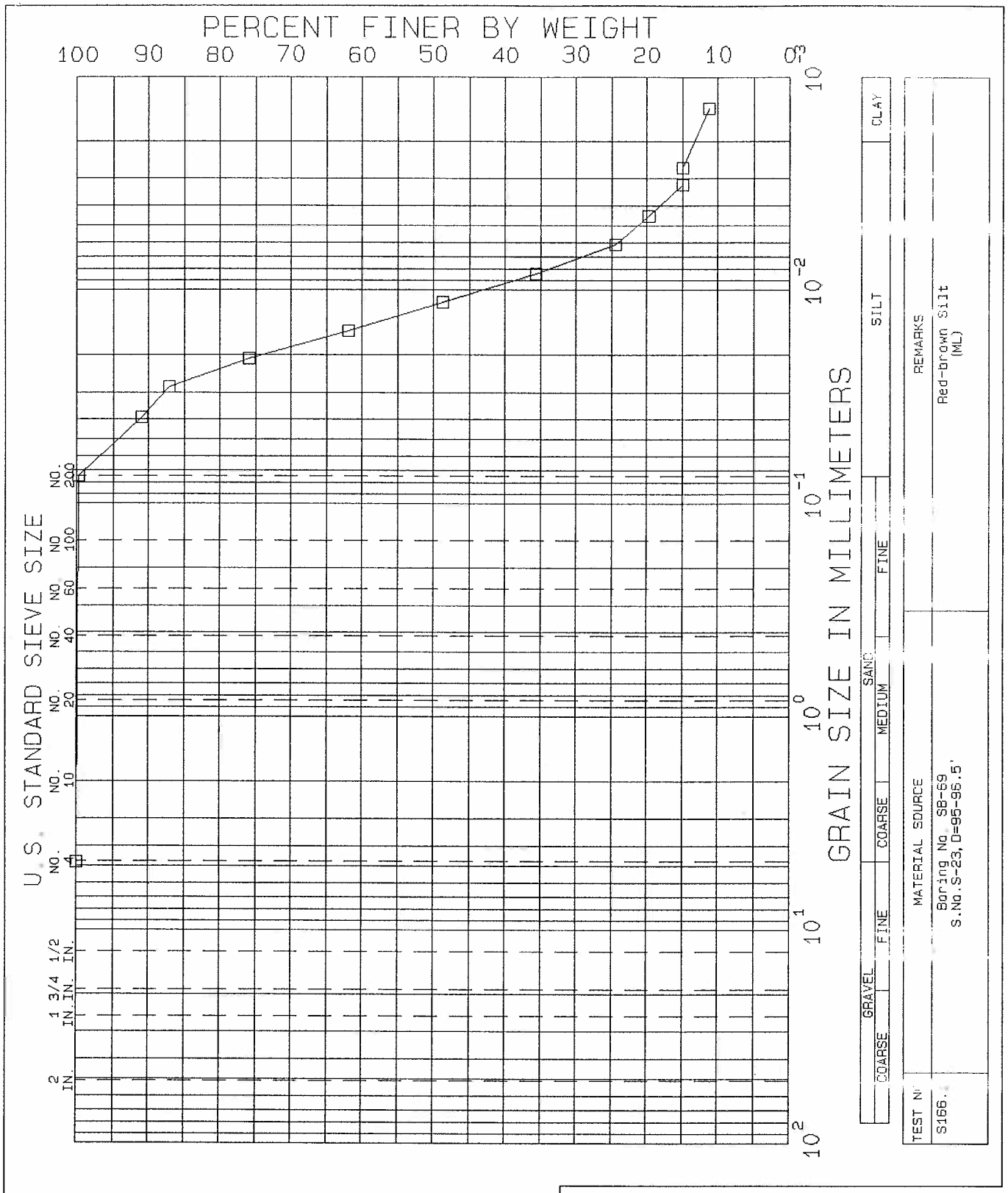
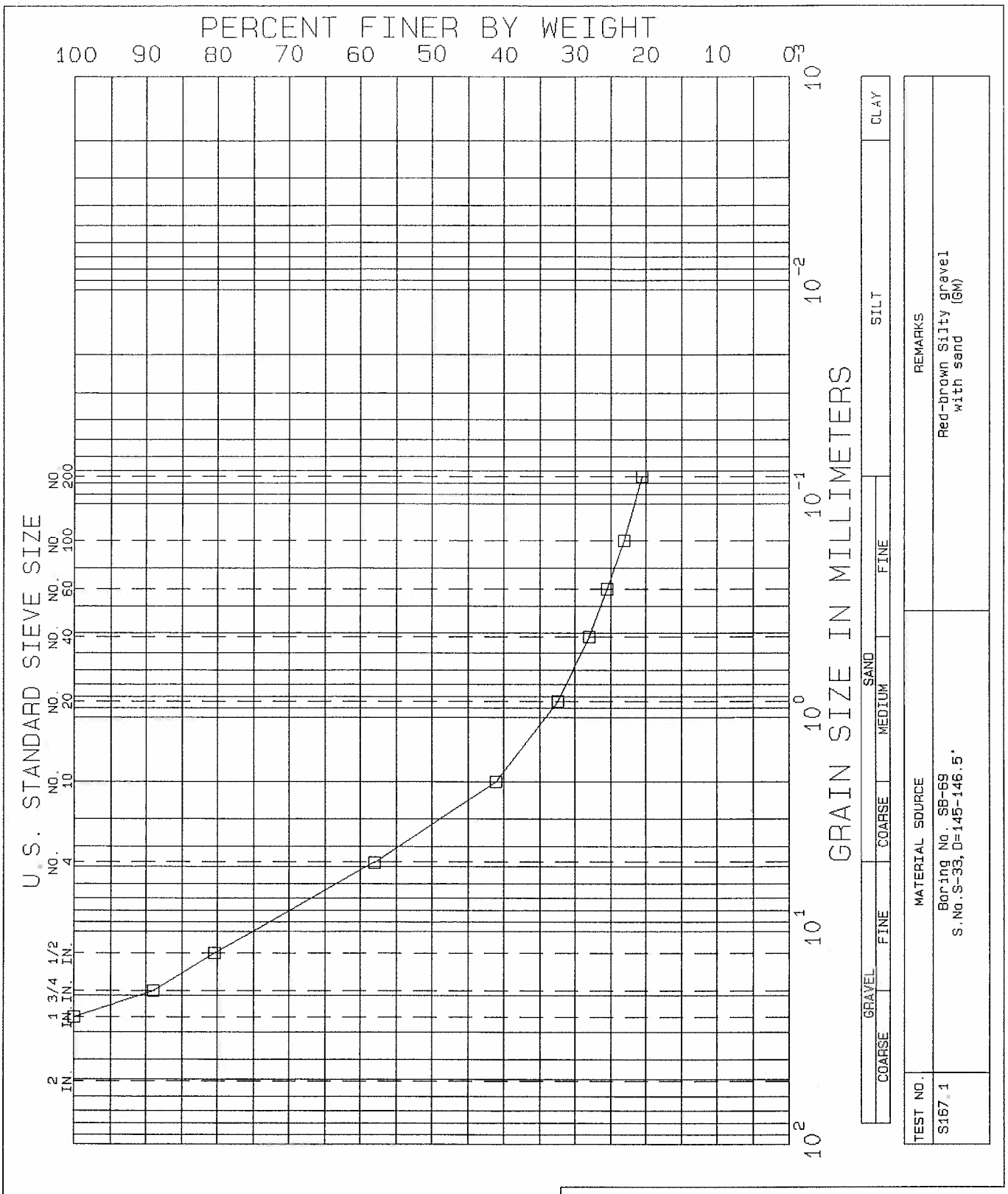


NEW BRITAIN-HARTFORD BUSWAY

CONNECTICUT

GRADATION TESTS

BORING NO.	SB-69	TEST SERIES	
SAMPLE	S-23	NO.	166
DEPTH	95-96.5'	DATE	Dec.03
TECH.	CAG		
REVIEWER	MBP	FILE	L17828

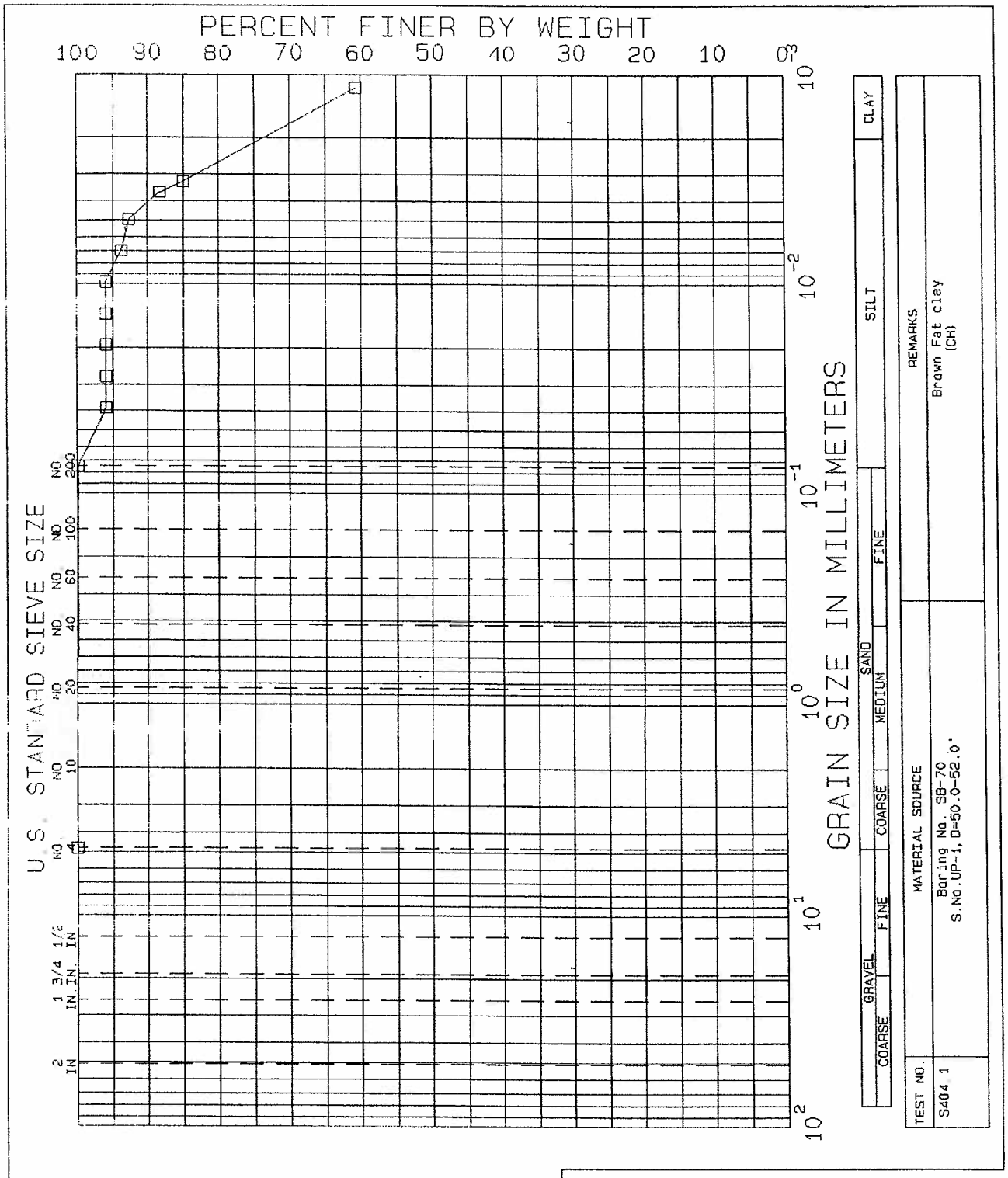


NEW BRITAIN-HARTFORD BUSWAY

CONNECTICUT

GRADATION TESTS

BORING NO.	SB-69	TEST SERIES	
SAMPLE	S-33	NO.	167
DEPTH	145-146.5'	DATE	Dec 03
TECH.	CAG		
REVIEWER	MBP	FILE	L17828



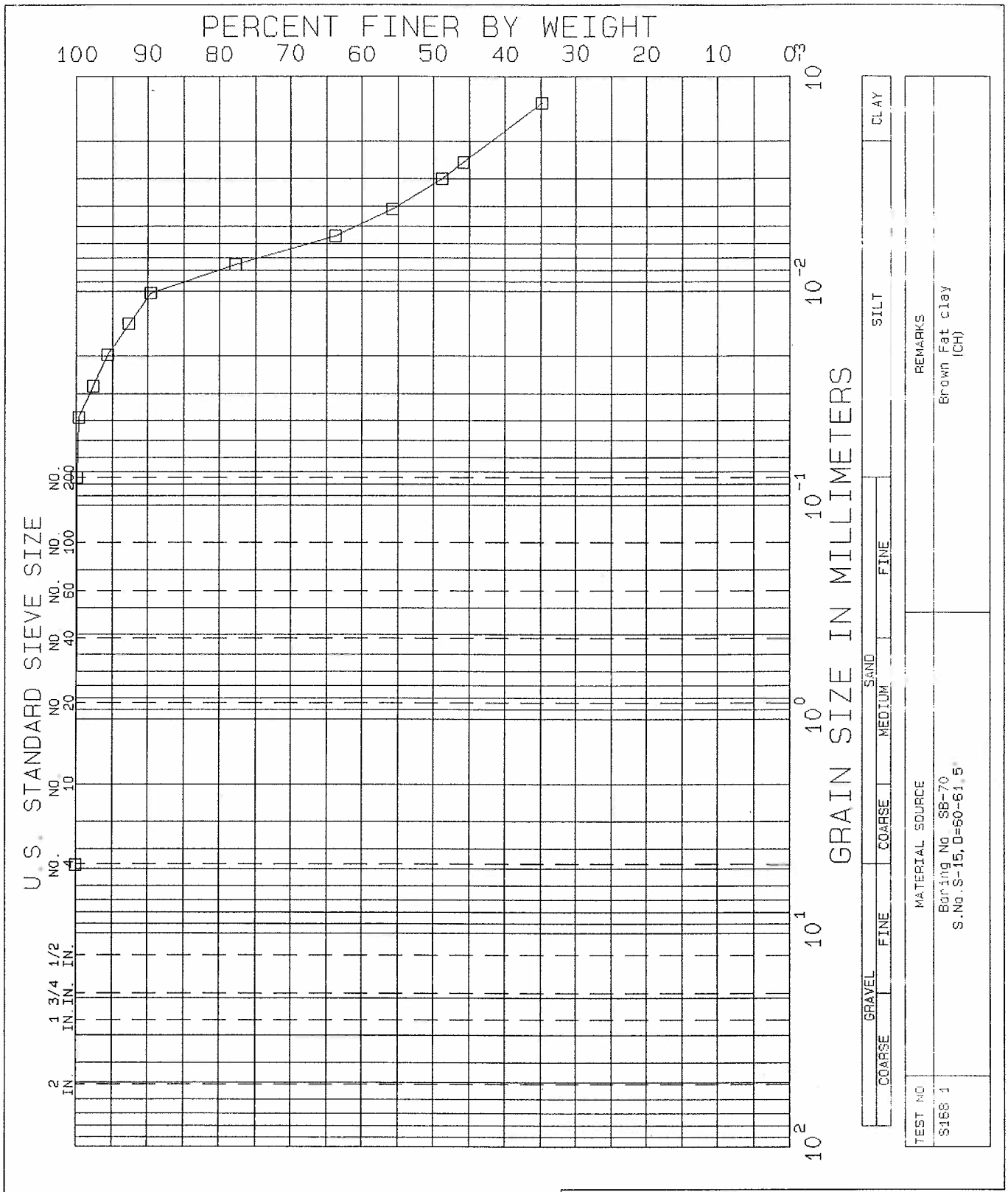
NEW BRITAIN-HARTFORD BUSWAY

CONNECTICUT

GRADATION TESTS

BORING NO.	SB-70	TEST SERIES	
SAMPLE	UP-1	NO.	404
DEPTH	50.0-52.0'	DATE	Mar.04
TECH.	PEC		
REVIEWER	MBP	FILE	L17828

GZA GEOENVIRONMENTAL, INC.
ENGINEERS AND SCIENTISTS

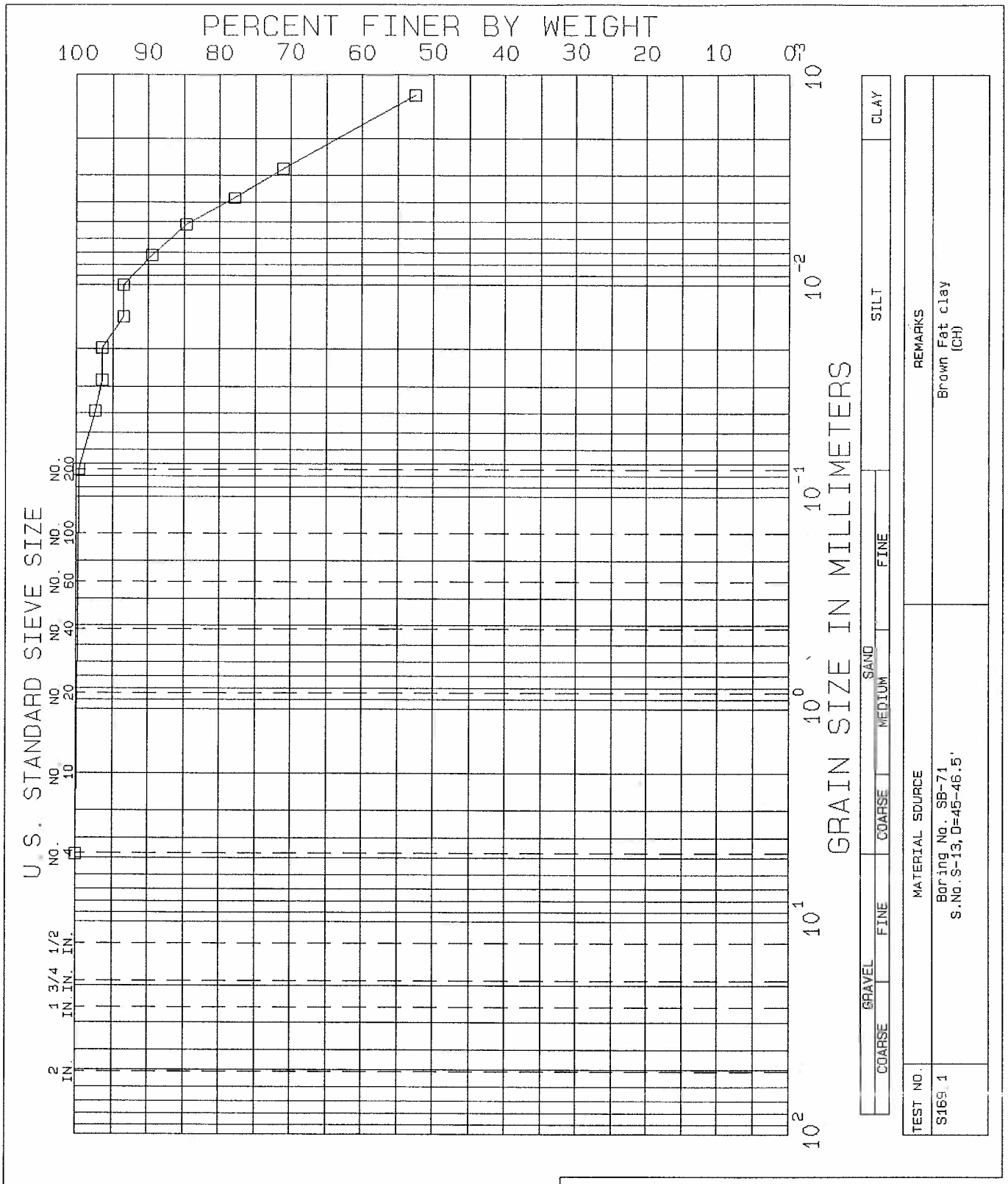


NEW BRITAIN-HARTFORD BUSWAY

CONNECTICUT

GRADATION TESTS

BORING NO.	SB-70	TEST SERIES	
SAMPLE	S-15	NO.	168
DEPTH	60-61.5'	DATE	Dec 03
TECH.	CAG		
REVIEWER	MBP	FILE	L17828

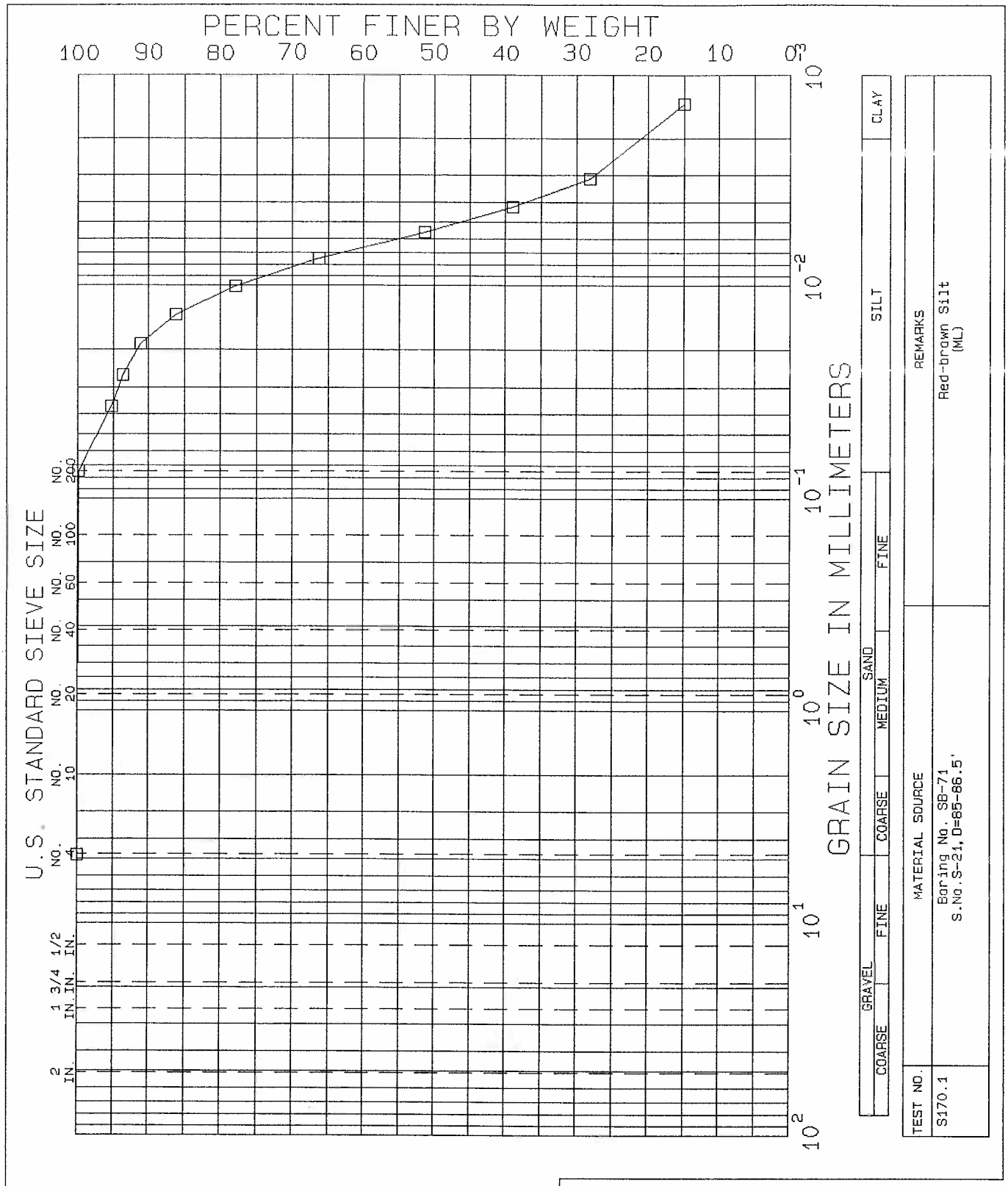


NEW BRITAIN-HARTFORD BUSWAY

CONNECTICUT

GRADATION TESTS

BORING NO.	SB-71	TEST SERIES	
SAMPLE	S-13	NO.	169
DEPTH	45-46.5'	DATE	Dec.03
TECH.	CAG		
REVIEWER	MBP	FILE	L17828

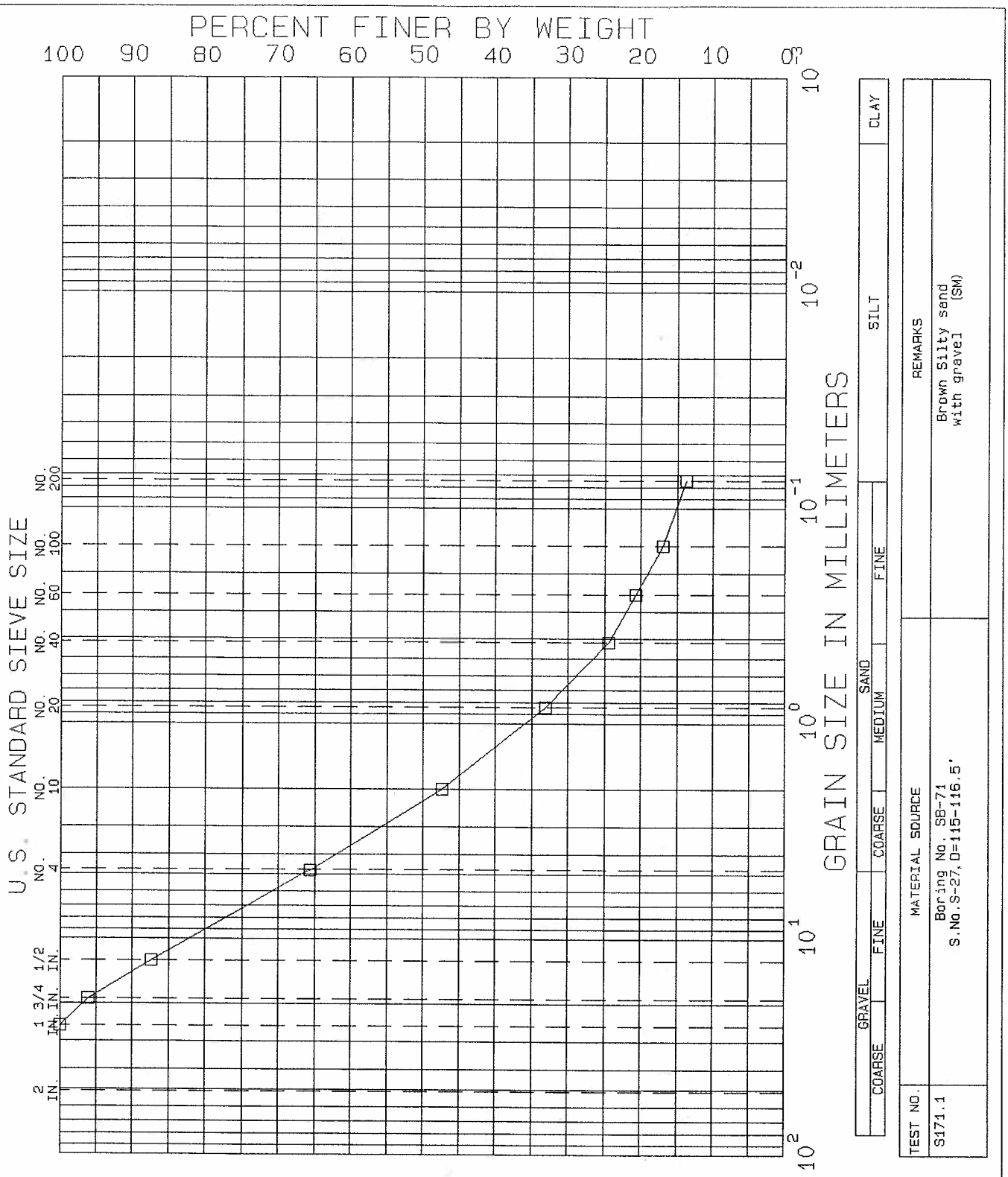


NEW BRITAIN-HARTFORD BUSWAY

CONNECTICUT

GRADATION TESTS

BORING NO.	SB-71	TEST SERIES	
SAMPLE	S-21	NO.	170
DEPTH	85-86.5'	DATE	Dec.03
TECH.	CAG		
REVIEWER	MBP	FILE	L17828



NEW BRITAIN-HARTFORD BUSWAY

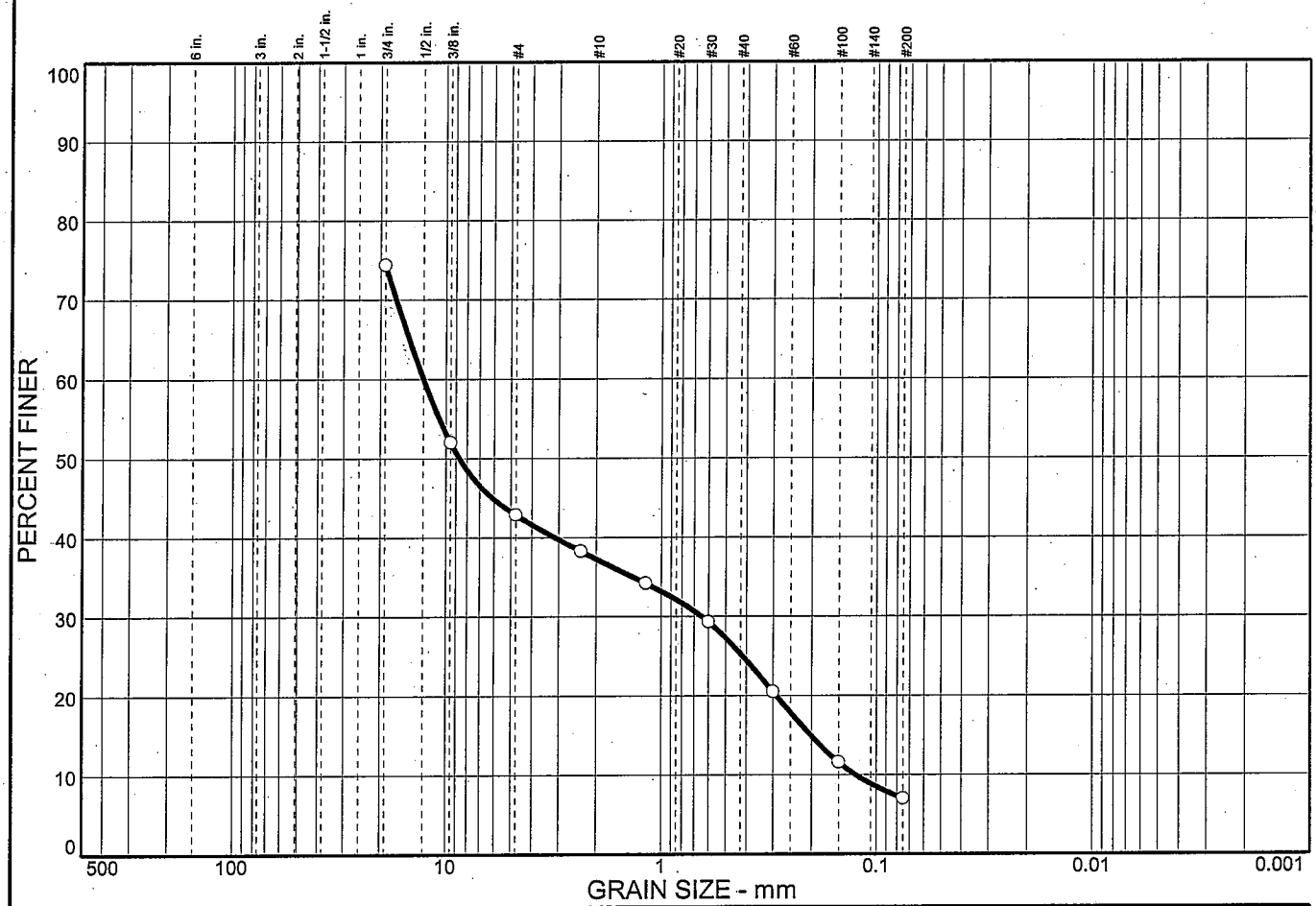
CONNECTICUT

GRADATION TESTS

BORING NO.	SB-71	TEST SERIES	
SAMPLE	S-27	NO	171
DEPTH	115-116.5'	DATE	Dec.03
TECH.	CAG		
REVIEWER	MBP	FILE	L17828

2008 Gradation Tests

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
		35.9	7.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75 in.	74.4		
.375 in.	52.0		
#4	42.9		
#8	38.3		
#16	34.2		
#30	29.3		
#50	20.5		
#100	11.6		
#200	7.0		

* (no specification provided)

Soil Description

Dark brown-Poorly graded gravel with silt and sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= D_{60}= 12.7 D_{50}= 8.66
D_{30}= 0.646 D_{15}= 0.202 D_{10}= 0.125
C_u= 101.76 C_c= 0.26

Classification

USCS= GP-GM AASHTO=

Remarks

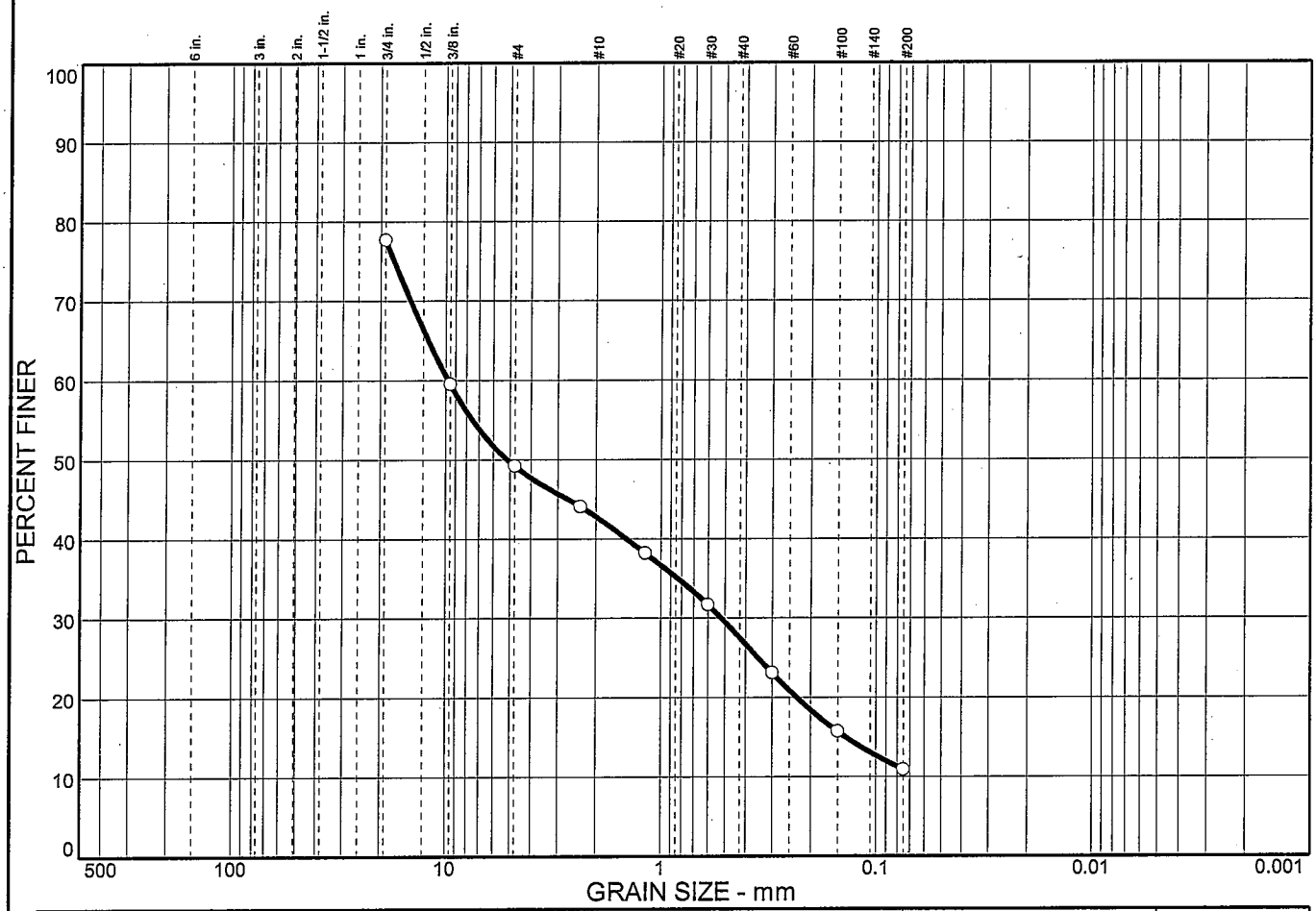
Sample delivered by client on 08/01/08. Tested by M. Mbakwe on 10/08/08.

Sample No.: 29 SA **Source of Sample:** R-100 (S-1) **Date:** 10/08/08
Location: **Elev./Depth:** 0'-2'

TEST-CON INCORPORATED
16 East Franklin Street, PO BOX 3116
DANBURY, CT 06813-3116

Client: GeoDesign
Project: New Britain-Hartford Busway #155-H025
Project No: **Plate**

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
		38.3	10.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75 in.	77.7		
.375 in.	59.5		
#4	49.2		
#8	44.1		
#16	38.2		
#30	31.7		
#50	23.1		
#100	15.7		
#200	10.9		

* (no specification provided)

Soil Description

Dark reddish brown-Poorly graded gravel with silt and sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= D_{60}= 9.75 D_{50}= 5.15
D_{30}= 0.518 D_{15}= 0.138 D_{10}=
C_u= C_c=

Classification

USCS= GP-GM AASHTO=

Remarks

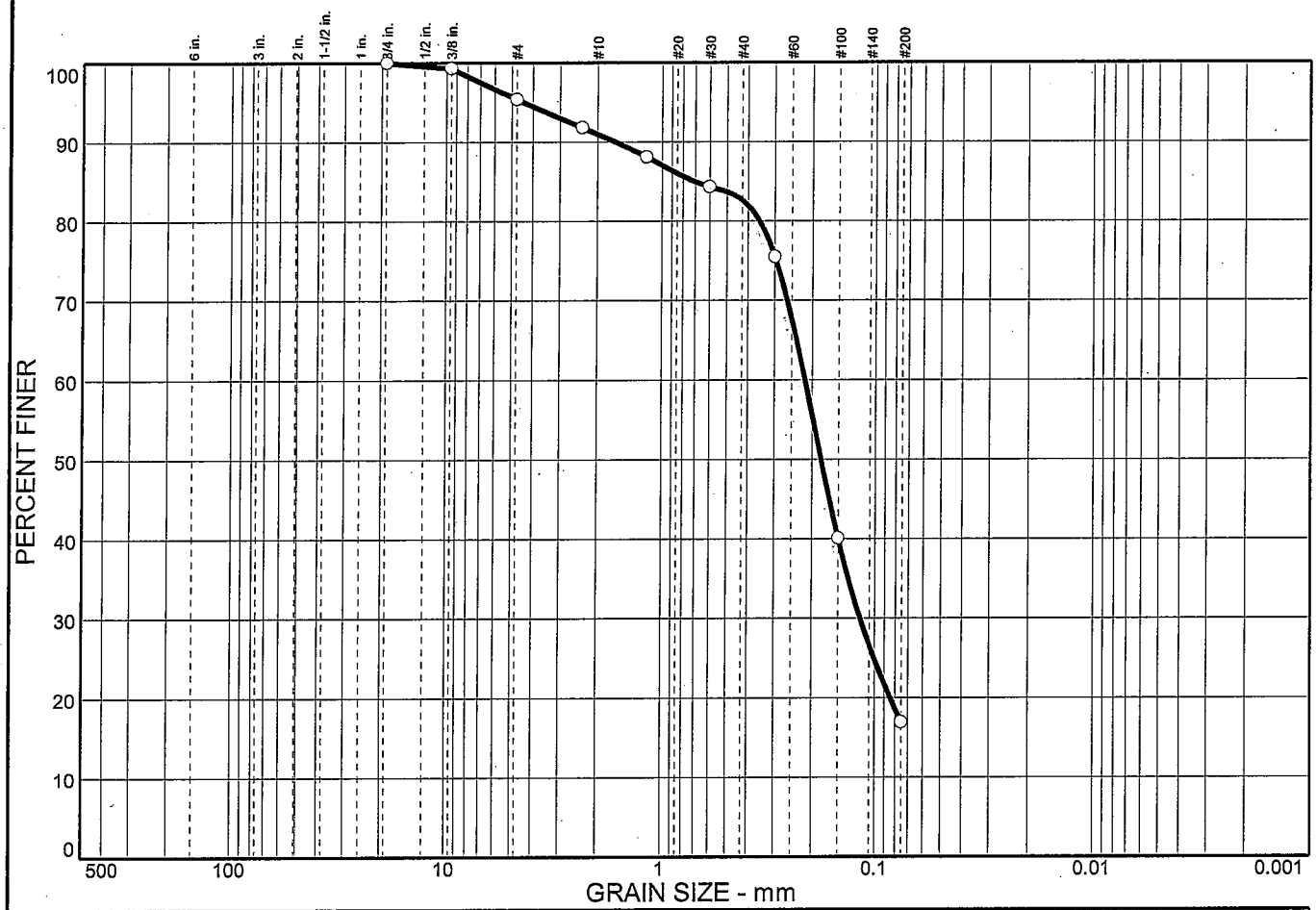
Sample delivered by client on 08/01/08. Tested by M. Mbakwe on 10/08/08.

Sample No.: 30 SA **Source of Sample:** R-102 (S-1) **Date:** 10/08/08
Location: **Elev./Depth:** 0.5'-2.5'

TEST-CON INCORPORATED
16 East Franklin Street, PO BOX 3116
DANBURY, CT 06813-3116

Client: GeoDesign
Project: New Britain-Hartford Busway #155-H025
Project No: **Plate**

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	4.6	78.5	16.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75 in.	100.0		
.375 in.	99.3		
#4	95.4		
#8	91.8		
#16	88.1		
#30	84.3		
#50	75.5		
#100	40.1		
#200	16.9		

* (no specification provided)

Soil Description

Reddish Brown Black-Silty sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 0.706 D_{60}= 0.216 D_{50}= 0.181
D_{30}= 0.117 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO=

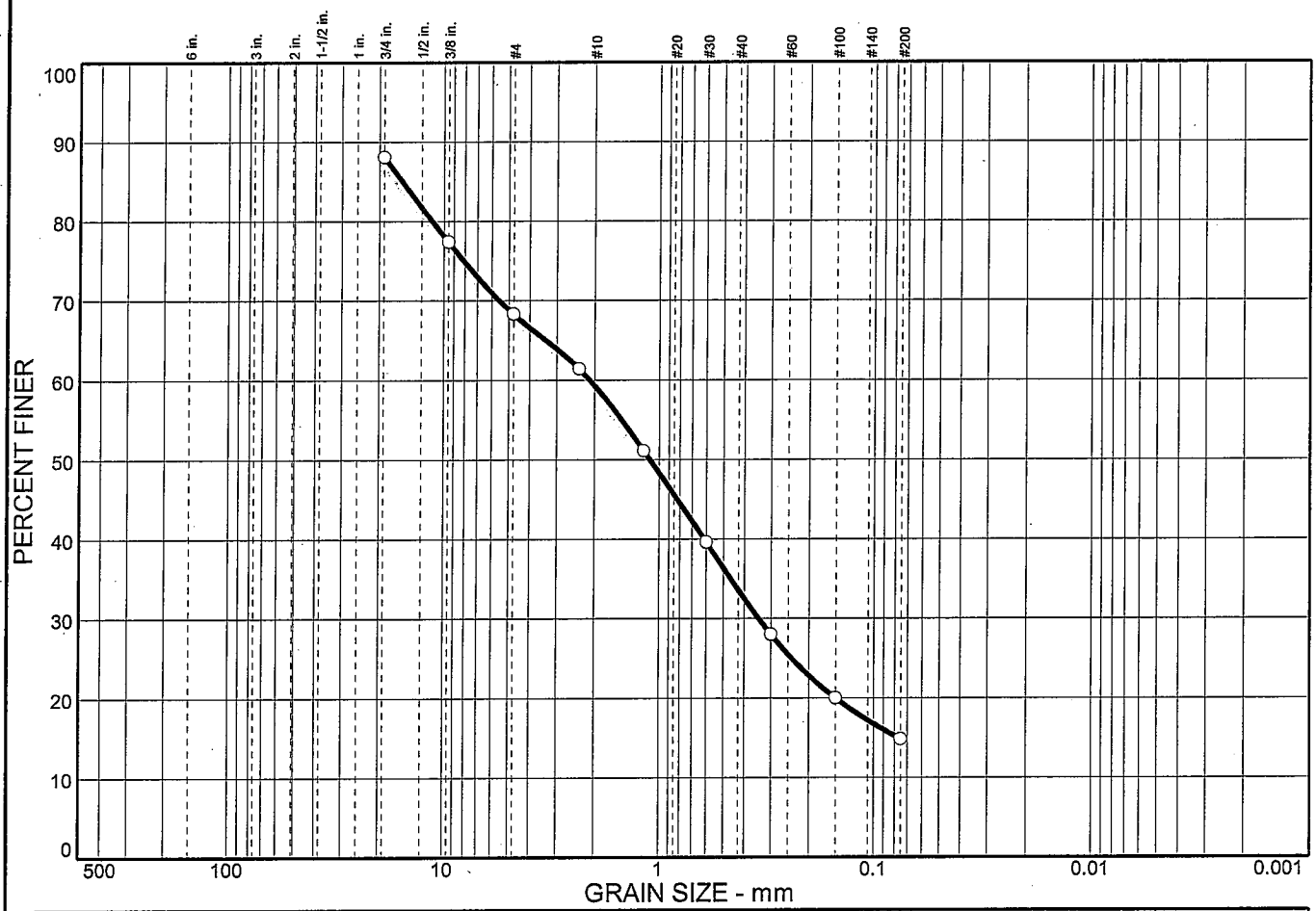
Remarks

Sample delivered by client on 08/01/08. Tested by M. Mbakwe on 10/08/08.

Sample No.: 21 SA **Source of Sample:** R-109 (S-2) **Date:** 10/08/08
Location: **Elev./Depth:** 2.5' - 4.5'

TEST-CON INCORPORATED **16 East Franklin Street, PO BOX 3116** **DANBURY, CT 06813-3116**	**Client:** GeoDesign **Project:** New Britain-Hartford Busway #155-H025 **Project No:** **Plate**

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
		53.5	14.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75 in.	88.1		
.375 in.	77.4		
#4	68.3		
#8	61.4		
#16	51.1		
#30	39.6		
#50	28.0		
#100	20.0		
#200	14.8		

* (no specification provided)

Soil Description

Reddish Brown Gray-Silty sand with gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 15.6 D_{60}= 2.11 D_{50}= 1.10
D_{30}= 0.342 D_{15}= 0.0772 D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO=

Remarks

Sample delivered by client on 08/01/08. Tested by M. Mbakwe on 10/08/08.

Sample No.: 20 SA **Source of Sample:** R-110 (S-1) **Date:** 10/08/08
Location: **Elev./Depth:** 0' - 2'

TEST-CON INCORPORATED 16 East Franklin Street, PO BOX 3116 DANBURY, CT 06813-3116	**Client:** GeoDesign **Project:** New Britain-Hartford Busway #155-H025 **Project No:** **Plate**

2008 Minus No. 200 Gradation Tests

TEST-CON INCORPORATED

16 East Franklin Street
P. O. Box 3116
Danbury, CT 06813-3116
Telephone: (203) 748-3012 Fax: (203) 778-0633
E-Mail: Service@test-con.comWeb-Site: www.test-con.com

LABORATORY TEST CERTIFICATE

Date: 08/19/08

Report #: 30 SA
Technician: R. DeCesare

Client: Geodesign Inc.
984 Southford Rd
Middlebury, CT 06762

Project: New Britain-Hartford Busway #155-H025
Hartford/West Hartford, CT

Description: Dark reddish brown

Date Received: Sample delivered by client on 08/01/08

Identification #: R-102 (S-1) Elevation/Depth: 0.5'- 2.5'

Test Requirements: Material in soil finer than #200 sieve

Remarks: D1140 Method A – Dry mass calculated by oven drying. Specimen was soaked.

SUMMARY DATA

Initial Weight:	334.0 g
Weight After Wash:	297.5 g
Percentage of material finer than #200:	10.9 %

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6/26/08

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P. O. Box 3116
Danbury, CT 06813-3116
Telephone: (203) 748-3012 Fax: (203) 778-0633
E-Mail: Service@test-con.comWeb-Site: www.test-con.com

LABORATORY TEST CERTIFICATE

Date: 08/15/08

Report #: 3 SA
Technician: R. DeCesare

Client: Geodesign Inc.
984 Southford Rd
Middlebury, CT 06762

Project: New Britain-Hartford Busway #155-H025
Hartford/West Hartford, CT

Description: Light Tan

Date Received: Sample delivered by client on 07/28/08

Identification #: R-102 (S-3) Elevation/Depth: 5'-7'

Test Requirements: Material in soil finer than #200 sieve

Remarks: D1140 Method A – Dry mass calculated by oven drying. Specimen was soaked

SUMMARY DATA

Initial Weight:	195.6 g
Weight After Wash:	47.9 g
Percentage of material finer than #200:	75.5 %

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6/26/08

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Danbury, CT 06813-3116
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E-Mail: Service@test-con.com Web-Site: www.test-con.com

LABORATORY TEST CERTIFICATE

Date: 08/19/08

Report #: 31 SA
Technician: R. DeCesare

Client: Geodesign Inc.
984 Southford Rd
Middlebury, CT 06762

Project: New Britain-Hartford Busway #155-H025
Hartford/West Hartford, CT

Description: Light brown

Date Received: Sample delivered by client on 08/01/08

Identification #: R-103 (S-2) Elevation/Depth: 2'- 4'

Test Requirements: Material in soil finer than #200 sieve

Remarks: D1140 Method A – Dry mass calculated by oven drying. Specimen was soaked.

SUMMARY DATA

Initial Weight:	222.4 g
Weight After Wash:	90.5 g
Percentage of material finer than #200:	59.3 %

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6/26/08

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LABORATORY TEST CERTIFICATE

Date: 08/19/08

Report #: 32 SA
Technician: R. DeCesare

Client: Geodesign Inc.
984 Southford Rd
Middlebury, CT 06762

Project: New Britain-Hartford Busway #155-H025
Hartford/West Hartford, CT

Description: Medium brown

Date Received: Sample delivered by client on 08/01/08

Identification #: R-104 (S-2) Elevation/Depth: 2'- 4'

Test Requirements: Material in soil finer than #200 sieve

Remarks: D1140 Method A – Dry mass calculated by oven drying. Specimen was soaked.

SUMMARY DATA

Initial Weight:	145.1 g
Weight After Wash:	32.9 g
Percentage of material finer than #200:	77.3 %

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6/26/08

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Danbury, CT 06813-3116
Telephone: (203) 748-3012 Fax: (203) 778-0633
E-Mail: Service@test-con.comWeb-Site: www.test-con.com

LABORATORY TEST CERTIFICATE

Date: 08/19/08

Report #: 33 SA
Technician: R. DeCesare

Client: Geodesign Inc.
984 Southford Rd
Middlebury, CT 06762

Project: New Britain-Hartford Busway #155-H025
Hartford/West Hartford, CT

Description: Dark brown

Date Received: Sample delivered by client on 08/01/08

Identification #: R-105 (S-1) Elevation/Depth: 1'- 3'

Test Requirements: Material in soil finer than #200 sieve

Remarks: D1140 Method A – Dry mass calculated by oven drying. Specimen was soaked.

SUMMARY DATA

Initial Weight:	130.8 g
Weight After Wash:	82.7 g
Percentage of material finer than #200:	36.7 %

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6/26/08

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Telephone: (203) 748-3012 Fax: (203) 778-0633
E-Mail: Service@test-con.com Web-Site: www.test-con.com

LABORATORY TEST CERTIFICATE

Date: 08/19/08

Report #: 28 SA
Technician: R. DeCesare

Client: Geodesign Inc.
984 Southford Rd
Middlebury, CT 06762

Project: New Britain-Hartford Busway #155-H025
Hartford/West Hartford, CT

Description: Light brown

Date Received: Sample delivered by client on 08/01/08

Identification #: R-106 (S-3) Elevation/Depth: 5'- 7'

Test Requirements: Material in soil finer than #200 sieve

Remarks: D1140 Method A – Dry mass calculated by oven drying. Specimen was soaked.

SUMMARY DATA

Initial Weight:	181.2 g
Weight After Wash:	52.2 g
Percentage of material finer than #200:	71.2 %

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LABORATORY TEST CERTIFICATE

Date: 08/21/08

Report #: 23 SA
Technician: R. DeCesare

Client: Geodesign Inc.
984 Southford Rd
Middlebury, CT 06762

Project: New Britain-Hartford Busway #155-H025
Hartford/West Hartford, CT

Description: Light Brown

Date Received: Sample delivered by client on 08/01/08

Identification #: R-107 (S-1) Elevation/Depth: 0.5' – 2.5'

Test Requirements: Material in soil finer than #200 sieve

Remarks: D1140 Method A – Dry mass calculated by oven drying. Specimen was soaked.

SUMMARY DATA

Initial Weight:	215.6 g
Weight After Wash:	90.2 g
Percentage of material finer than #200:	58.1 %

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LABORATORY TEST CERTIFICATE

Date: 08/21/08

Report #: 22 SA
Technician: R. DeCesare

Client: Geodesign Inc.
984 Southford Rd
Middlebury, CT 06762

Project: New Britain-Hartford Busway #155-H025
Hartford/West Hartford, CT

Description: Light Brown

Date Received: Sample delivered by client on 08/01/08

Identification #: R-108 (S-2) Elevation/Depth: 3'- 5'

Test Requirements: Material in soil finer than #200 sieve

Remarks: D1140 Method A – Dry mass calculated by oven drying. Specimen was soaked.

SUMMARY DATA

Initial Weight:	238.9 g
Weight After Wash:	119.4 g
Percentage of material finer than #200:	50.0 %

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LABORATORY TEST CERTIFICATE

Date: 08/15/08

Report #: 4 SA
Technician: R. DeCesare

Client: Geodesign Inc.
984 Southford Rd
Middlebury, CT 06762

Project: New Britain-Hartford Busway #155-H025
Hartford/West Hartford, CT

Description: Light Tan

Date Received: Sample delivered by client on 07/28/08

Identification #: R-109 (S-1) Elevation/Depth: 0.5'- 2.5'

Test Requirements: Material in soil finer than #200 sieve

Remarks: D1140 Method A – Dry mass calculated by oven drying. Specimen was soaked

SUMMARY DATA

Initial Weight:	225.2 g
Weight After Wash:	61.8 g
Percentage of material finer than #200:	72.9 %

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LABORATORY TEST CERTIFICATE

Date: 08/21/08

Report #: 21 SA
Technician: R. DeCesare

Client: Geodesign Inc.
984 Southford Rd
Middlebury, CT 06762

Project: New Britain-Hartford Busway #155-H025
Hartford/West Hartford, CT

Description: Reddish Brown Black

Date Received: Sample delivered by client on 08/01/08

Identification #: R-109 (S-2) Elevation/Depth: 2.5'- 4.5'

Test Requirements: Material in soil finer than #200 sieve

Remarks: D1140 Method A – Dry mass calculated by oven drying. Specimen was soaked.

SUMMARY DATA

Initial Weight:	242.3 g
Weight After Wash:	205.3 g
Percentage of material finer than #200:	15.2 %

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LABORATORY TEST CERTIFICATE

Date: 08/19/08

Report #: 16 SA
Technician: R. DeCesare

Client: Geodesign Inc.
984 Southford Rd
Middlebury, CT 06762

Project: New Britain-Hartford Busway #155-H025
Hartford/West Hartford, CT

Description: Light Brown/Goldish Color

Date Received: Sample delivered by client on 08/01/08

Identification #: RW-6 (S-1) Elevation/Depth: 1'- 3'

Test Requirements: Material in soil finer than #200 sieve

Remarks: D1140 Method A – Dry mass calculated by oven drying. Specimen was soaked.

SUMMARY DATA

Initial Weight:	121.7 g
Weight After Wash:	31.3 g
Percentage of material finer than #200:	74.3 %

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LABORATORY TEST CERTIFICATE

Date: 08/19/08

Report #: 14 SA
Technician: R. DeCesare

Client: Geodesign Inc.
984 Southford Rd
Middlebury, CT 06762

Project: New Britain-Hartford Busway #155-H025
Hartford/West Hartford, CT

Description: Light Brown, goldish color

Date Received: Sampled delivered by client on 08/01/08

Identification #: RW-7 (S-2) Elevation/Depth: 3'- 5'

Test Requirements: Material in soil finer than #200 sieve

Remarks: D1140 Method A – Dry mass calculated by oven drying. Specimen was soaked.

SUMMARY DATA

Initial Weight:	138.6 g
Weight After Wash:	37.9 g
Percentage of material finer than #200:	72.6 %

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LABORATORY TEST CERTIFICATE

Date: 08/19/08

Report #: 17 SA
Technician: R. DeCesare

Client: Geodesign Inc.
984 Southford Rd
Middlebury, CT 06762

Project: New Britain-Hartford Busway #155-H025
Hartford/West Hartford, CT

Description: Light Brown/Goldish Color

Date Received: Sample delivered by client on 08/01/08

Identification #: RW-8 (S-2) Elevation/Depth: 2.5'- 4.5'

Test Requirements: Material in soil finer than #200 sieve

Remarks: D1140 Method A – Dry mass calculated by oven drying. Specimen was soaked.

SUMMARY DATA

Initial Weight:	129.4 g
Weight After Wash:	32.2 g
Percentage of material finer than #200:	75.1 %

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LABORATORY TEST CERTIFICATE

Date: 08/19/08

Report #: 15 SA
Technician: R. DeCesare

Client: Geodesign Inc.
984 Southford Rd
Middlebury, CT 06762

Project: New Britain-Hartford Busway #155-H025
Hartford/West Hartford, CT

Description: Light Brown, Goldish Color

Date Received: Sample delivered by client on 08/01/08

Identification #: RW-9 (S-3) Elevation/Depth: 5'- 7'

Test Requirements: Material in soil finer than #200 sieve

Remarks: D1140 Method A – Dry mass calculated by oven drying. Specimen was soaked.

SUMMARY DATA

Initial Weight:	161.2 g
Weight After Wash:	44.9 g
Percentage of material finer than #200:	72.1 %

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LABORATORY TEST CERTIFICATE

Date: 09/10/08

Report #: 40 SA
Technician: R. DeCesare

Client: Geodesign Inc.
984 Southford Rd
Middlebury, CT 06762

Project: New Britain-Hartford Busway #155-H025
Hartford/West Hartford, CT

Description: Light brown

Date Received: Sample delivered by client on 08/01/08

Identification #: SB-01-1 (S-3) Elevation/Depth: 5'- 7'

Test Requirements: Material in soil finer than #200 sieve

Remarks: D1140 Method A – Dry mass calculated by oven drying. Specimen was soaked.

SUMMARY DATA

Initial Weight:	217.4 g
Weight After Wash:	123.6 g
Percentage of material finer than #200:	43.1 %

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LABORATORY TEST CERTIFICATE

Date: 09/10/08

Report #: 43 SA
Technician: R. DeCesare

Client: Geodesign Inc.
984 Southford Rd
Middlebury, CT 06762

Project: New Britain-Hartford Busway #155-H025
Hartford/West Hartford, CT

Description: Gray

Date Received: Sample delivered by client on 08/01/08

Identification #: SB-01-3 (S-3) **Elevation/Depth:** 5' – 7'

Test Requirements: Material in soil finer than #200 sieve

Remarks: D1140 Method A – Dry mass calculated by oven drying. Specimen was soaked.

SUMMARY DATA

Initial Weight:	162.4 g
Weight After Wash:	0.9 g
Percentage of material finer than #200:	99.4 %

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E-Mail: Service@test-con.com Web-Site: www.test-con.com

LABORATORY TEST CERTIFICATE

Date: 09/10/08

Report #: 42 SA
Technician: R. DeCesare

Client: Geodesign Inc.
984 Southford Rd
Middlebury, CT 06762

Project: New Britain-Hartford Busway #155-H025
Hartford/West Hartford, CT

Description: Reddish brown

Date Received: Sample delivered by client on 08/01/08

Identification #: SB-01-4 (S-1) **Elevation/Depth:** 0' – 2'

Test Requirements: Material in soil finer than #200 sieve

Remarks: D1140 Method A – Dry mass calculated by oven drying. Specimen was soaked.

SUMMARY DATA

Initial Weight:	194.4 g
Weight After Wash:	160.4 g
Percentage of material finer than #200:	17.5 %

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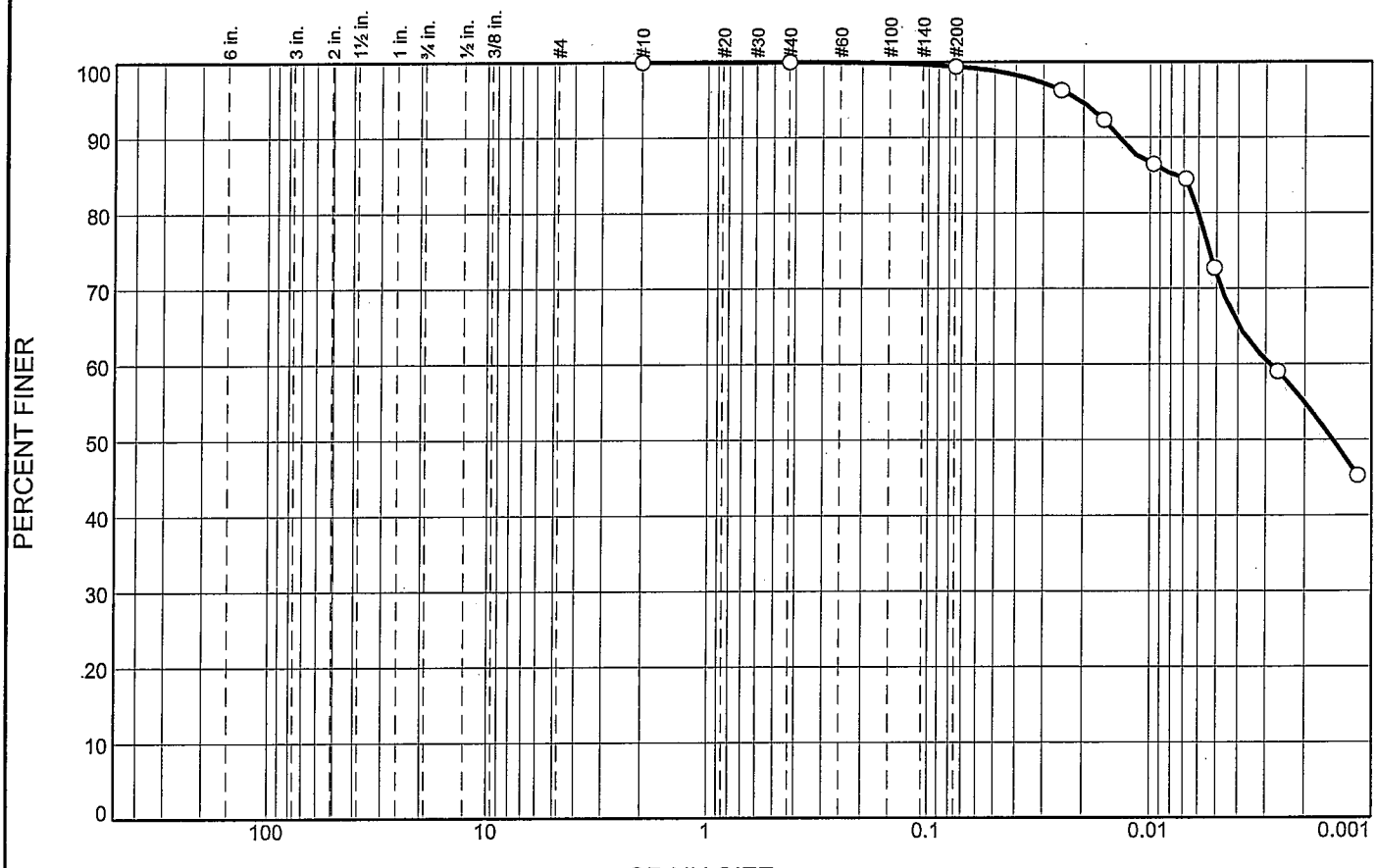
6/26/08

2008 Hydrometer Tests

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.0	0.6	27.5	71.9

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#40	100.0		
#200	99.4		

* (no specification provided)

Material Description

Olive color, lean clay

Atterberg Limits

PL= 23 LL= 49 PI= 26

Coefficients

D_{85}= 0.0077 D_{60}= 0.0029 D_{50}= 0.0015
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-7-6(29)

Remarks

Samples collected 6/5/08-6/18/08.
Sampled and Dropped off by client.

Sample Number: UP1 **Depth:** 35' to 37'
Location: Boring RW-4(Flatbush Ave., Over Busway) **Date:** 8/5/08

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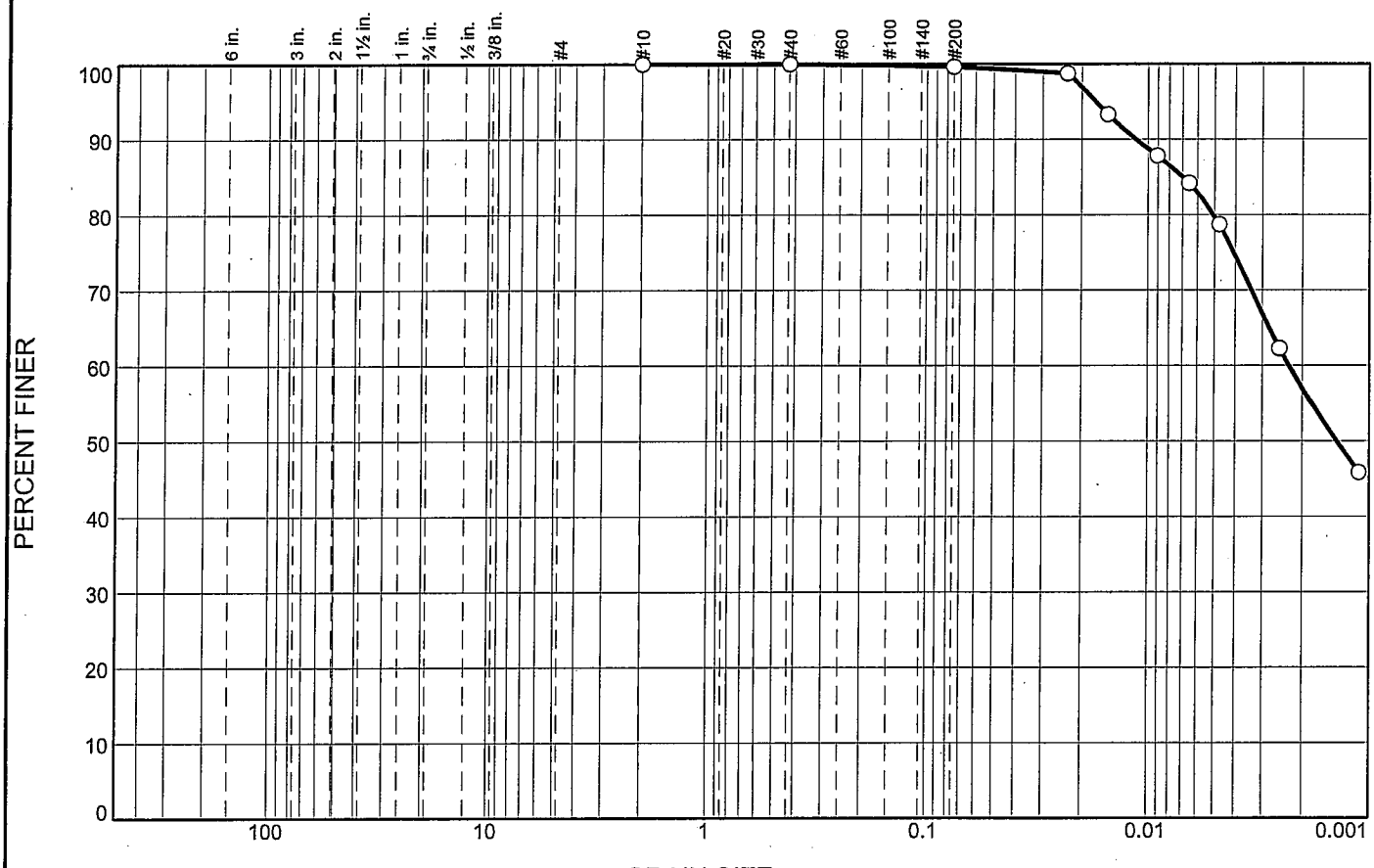
Client: GeoDesign
Project: New Britain-Hartford Busway #155-H025
Project No: **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.0	0.4	19.9	79.7

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#40	100.0		
#200	99.6		

* (no specification provided)

Atterberg Limits

PL= 24 LL= 49 PI= 25

Coefficients

D_{85}= 0.0070 D_{60}= 0.0023 D_{50}= 0.0014
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-7-6(29)

Remarks

Samples collected 6/5/08 - 6/18/08.
Sampled and dropped off by the client.

Sample Number: UP2 **Depth:** 30' to 32'
Location: Boring RW-8 (Flatbush Ave., over Busway **Date:** 8/5/08

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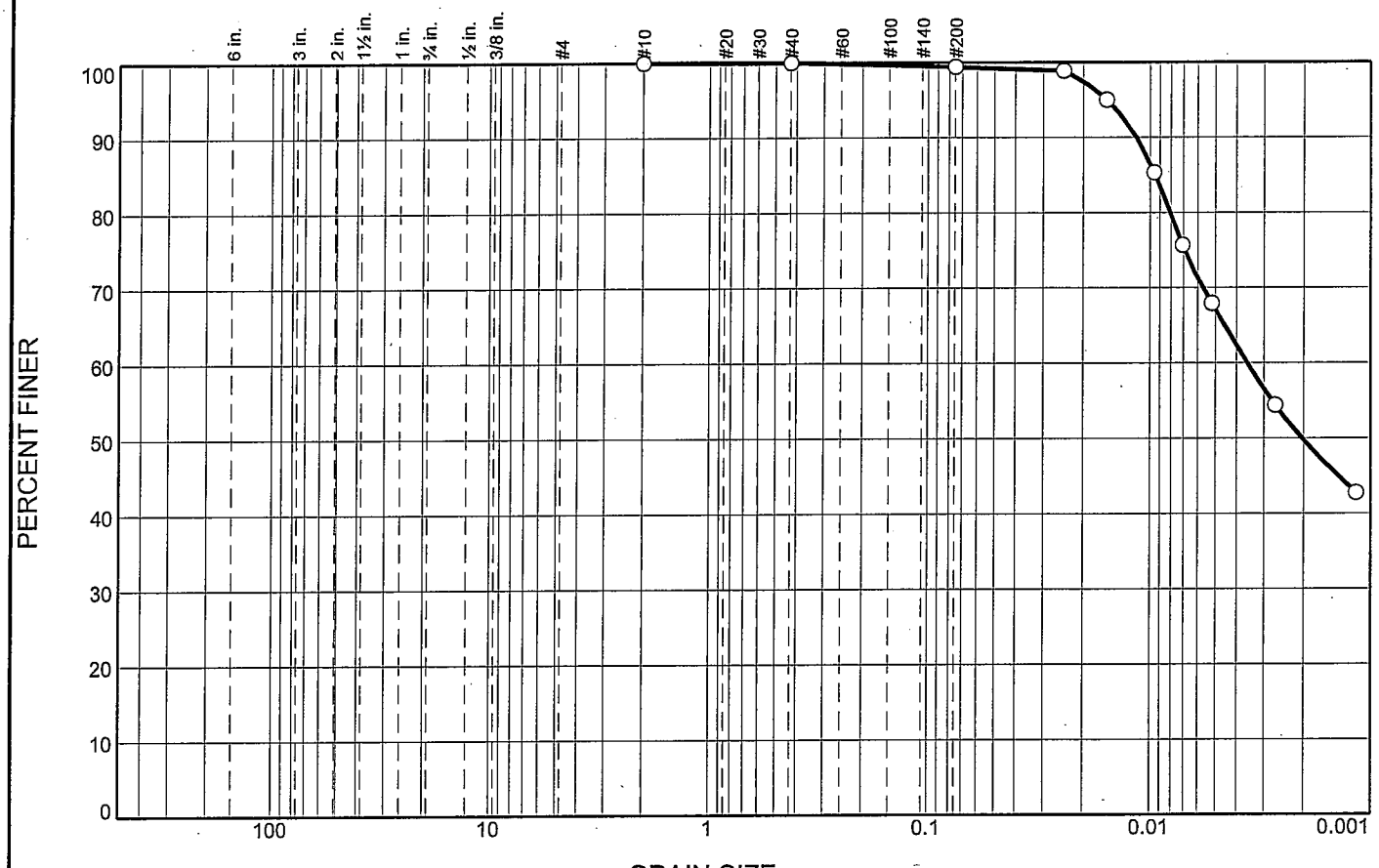
Client: GeoDesign
Project: New Britain-Hartford Busway #155-H025
Project No: **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.0	0.6	32.2	67.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#40	100.0		
#200	99.4		

* (no specification provided)

Material Description

Olive color, lean clay

Atterberg Limits

PL= 24 LL= 49 PI= 25

Coefficients

D_{85}= 0.0094 D_{60}= 0.0036 D_{50}= 0.0020
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-7-6(28)

Remarks

Samples collected 6/5/08-6/18/08.
Sampled and Dropped off by Client.

Sample Number: UP1 **Depth:** 20' to 22'
Location: Boring SB-01-1 (Flatbush Ave., over Busway) **Date:** 8/8/08

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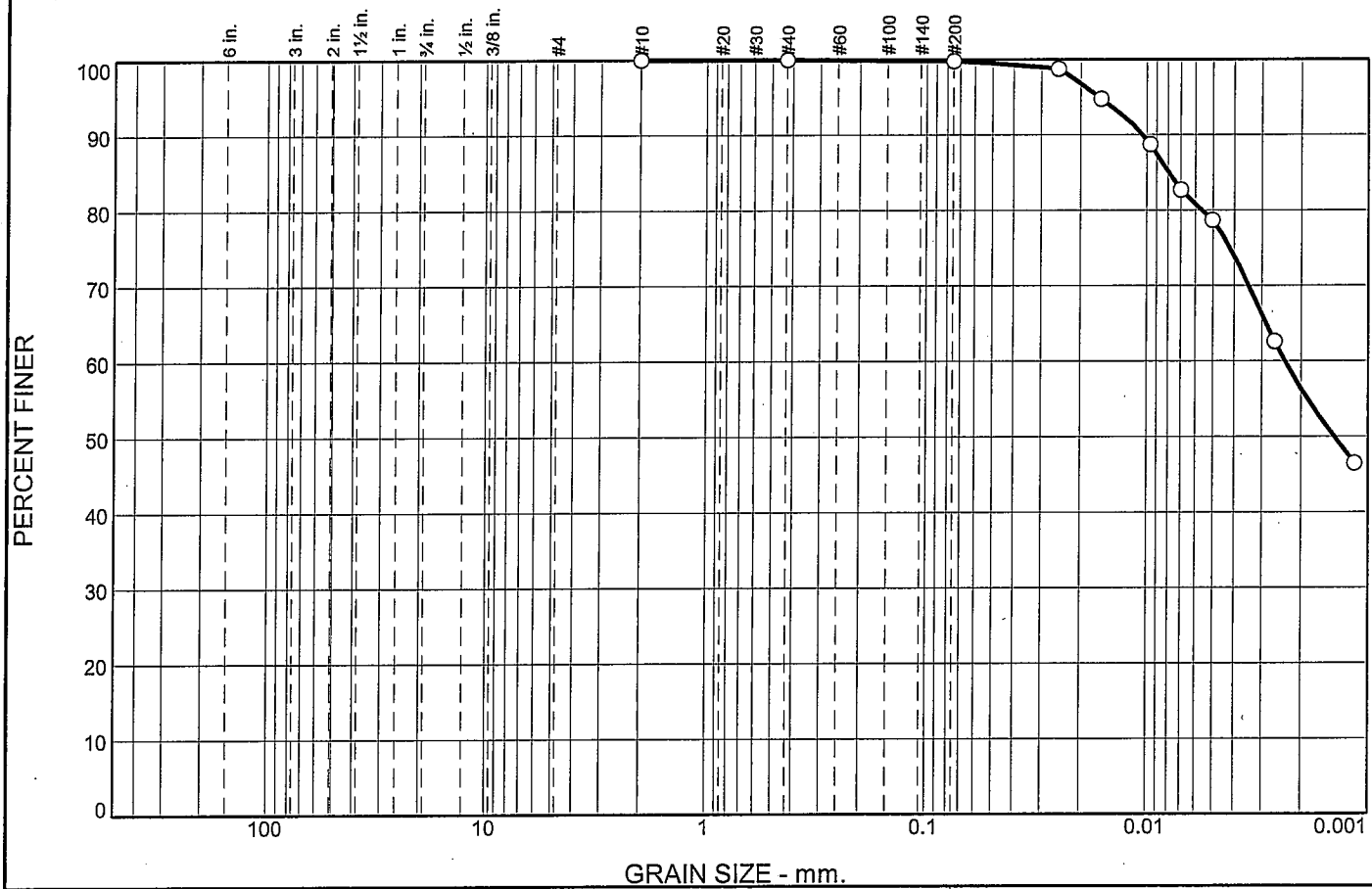
Client: GeoDesign
Project: New Britain-Hartford Busway #155-H025
Project No: **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.0	0.2	21.2	78.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#40	100.0		
#200	99.8		

* (no specification provided)

Material Description

Olive Color, fat clay.

Atterberg Limits

PL= 24 LL= 50 PI= 26

Coefficients

D_{85}= 0.0079 D_{60}= 0.0024 D_{50}= 0.0014
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CH AASHTO= A-7-6(30)

Remarks

Samples collected 6/5/08-6/18/08.
Sampled and Dropped off by the client.

Sample Number: UP1 **Depth:** 30' to 32'
Location: Boring SB-01-4(Flatbush Ave., Over Busway) **Date:** 8/5/08

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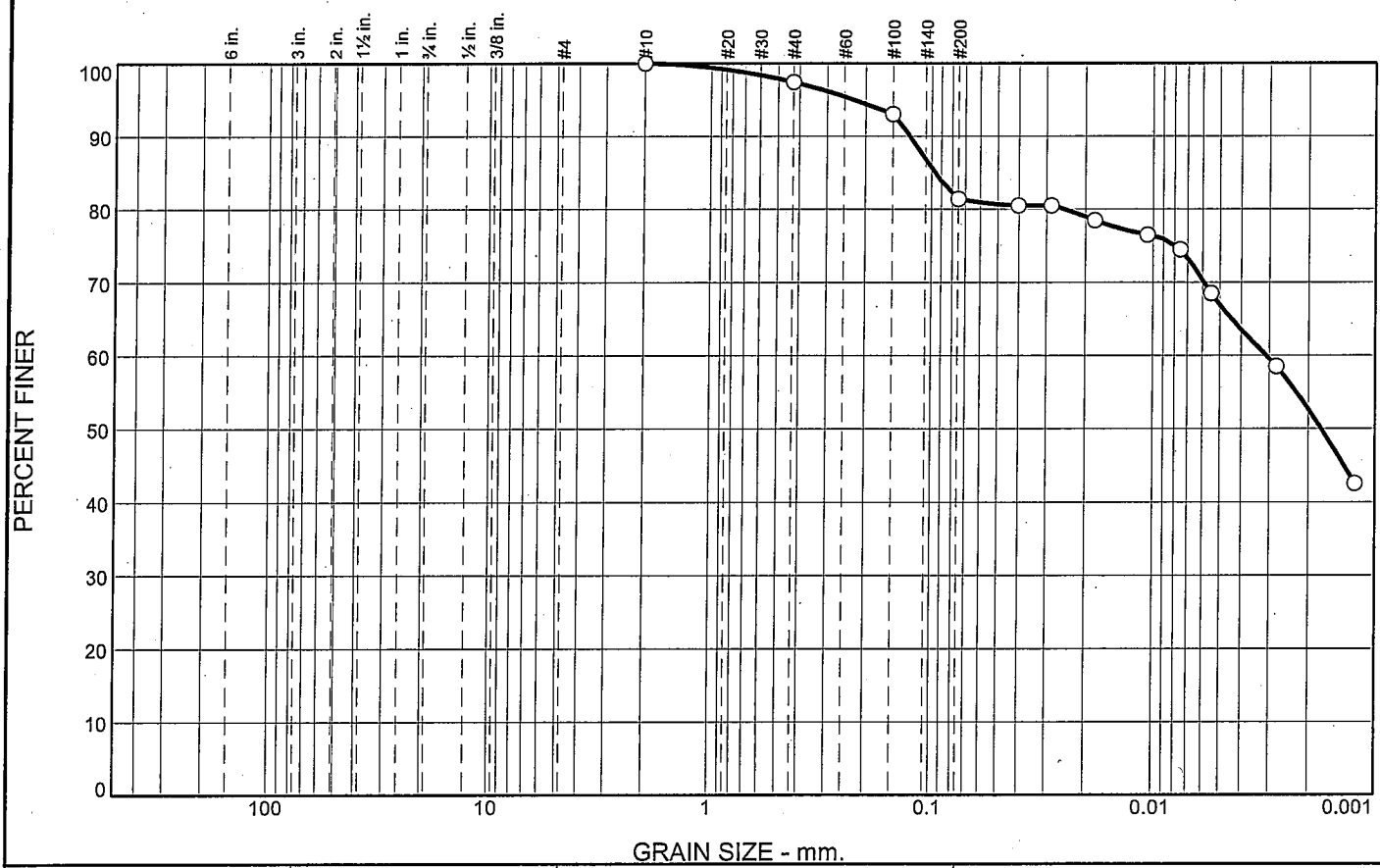
Client: GeoDesign
Project: New Britain-Hartford Busway #155-H025
Project No: **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	2.6	16.0	14.5	66.9

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
# 10	100.0		
# 40	97.4		
# 100	93.0		
# 200	81.4		
0.0402 mm.	80.5		
0.0284 mm.	80.5		
0.0181 mm.	78.5		
0.0106 mm.	76.5		
0.0075 mm.	74.5		
0.0055 mm.	68.5		
0.0028 mm.	58.5		
0.0012 mm.	42.5		

* (no specification provided)

Soil Description

Brown/Grey color

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 0.0962 D_{60}= 0.0031 D_{50}= 0.0017
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample collected by client from 5/20/08 to 6 03/08. Dropped off for test analysis on 7/28 08.

Sample No.: S-9 **Source of Sample:** SB-03-1 **Date:**
Location: Boring SB-03-1 (Busway over Capitol Ave.) **Elev./Depth:** 37' - 39'

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Client: GeoDesign
Project: New Britain-Hartford Busway #155-H025
Project No: **Figure**

Tested By: R. DeCesare

Appendix 9

Corrosivity Tests

2003 Corrosivity Tests

2008 Corrosivity Tests

2003 Corrosivity Tests

R.I. Analytical Laboratories, Inc.

CERTIFICATE OF ANALYSIS

GZA GeoEnvironmental Labs
Date Received: 02/04/2004
Work Order #: 0402-01543

Approved by: R.I. Analytical

Sample # 005
SAMPLE DESCRIPTION: LAB #415 COMPOSITE SB-59
SAMPLE TYPE: COMPOSITE **SAMPLE DATE/TIME:** --

PARAMETER	SAMPLE RESULTS	DET. LIMIT	UNITS	METHOD	DATE ANALYZED	ANALYST
pH	7.0		SU	SW-846 9045C	02/04/2004	LKS
RESISTIVITY	0.014		MEGOHM-CM	SM2510 B	02/05/2004	CCP
SULFATE	<4200	4200	mg/kg dry	SM4500-SO4 E	02/10/2004	EC
SULFIDE	<2.5	2.5	mg/kg dry	EPA 276.2	02/09/2004	EC
CHLORIDE	<4200	4200	mg/kg dry	SM4500-CL B	02/10/2004	EC

Chloride, Sulfate, and Sulfide - Analysis performed on water soluble portion of sample.

Sulfate and Chloride - Increased detection limit due highly colored sample which interfered with test methodology.

Resistivity - Analyzed 5 grams of sample per 50 mls of Type II DI water.

Sample # 006
SAMPLE DESCRIPTION: LAB #417 SB-10 S-1 (1.5-3.0)
SAMPLE TYPE: COMPOSITE **SAMPLE DATE/TIME:** ---

PARAMETER	SAMPLE RESULTS	DET. LIMIT	UNITS	METHOD	DATE ANALYZED	ANALYST
pH	6.8		SU	SW-846 9045C	02/04/2004	LKS
RESISTIVITY	0.054		MEGOHM-CM	SM2510 B	02/05/2004	CCP
SULFATE	<420	420	mg/kg dry	SM4500-SO4 E	02/10/2004	EC
SULFIDE	<2.5	2.5	mg/kg dry	EPA 276.2	02/09/2004	EC
CHLORIDE	<340	340	mg/kg dry	SM4500-CL B	02/10/2004	EC

Chloride, Sulfate, and Sulfide - Analysis performed on water soluble portion of sample.

Sulfate and Chloride - Increased detection limit due highly colored sample which interfered with test methodology.

Resistivity - Analyzed 5 grams of sample per 50 mls of Type II DI water.

R.I. Analytical Laboratories, Inc.

CERTIFICATE OF ANALYSIS

GZA GeoEnvironmental Labs
Date Received: 02/04/2004
Work Order #: 0402-01543

Approved by: R.I. Analytical

Sample # 010
SAMPLE DESCRIPTION: LAB #414 SB-54 S-8 (22.5-24.5)
SAMPLE TYPE: COMPOSITE **SAMPLE DATE/TIME:** ---

PARAMETER	SAMPLE RESULTS	DET. LIMIT	UNITS	METHOD	DATE ANALYZED	ANALYST
pH	7.4		SU	SW-846 9045C	02/04/2004	LKS
RESISTIVITY	0.026		MEGOHM-CM	SM2510 B	02/05/2004	CCP

Resistivity - Analyzed 5 grams of sample per 50 mls of Type II DI water.

Sample # 011
SAMPLE DESCRIPTION: LAB #416 SB-59 S-7 (19.5-21.0)
SAMPLE TYPE: COMPOSITE **SAMPLE DATE/TIME:** ---

PARAMETER	SAMPLE RESULTS	DET. LIMIT	UNITS	METHOD	DATE ANALYZED	ANALYST
pH	7.7		SU	SW-846 9045C	02/04/2004	LKS
RESISTIVITY	0.013		MEGOHM-CM	SM2510 B	02/05/2004	CCP

Resistivity - Analyzed 5 grams of sample per 50 mls of Type II DI water.

2008 Corrosivity Tests

TEST-CON INCORPORATED

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Construction Material Testing & Inspection - Geotechnical Services

SULFIDE TEST REPORT

Client:	GeoDesign Incorporated 984 Southford Rd. Middlebury, CT 06762	**Date:** **Tested by:** **Collected Date:**	9/30/08 York (CT # PH-0723) 7/28/08
Project:	New Britain-Hartford Busway # 155-H025 Hartford/West Hartford, CT	**Matrix:** **Report No.:**	Soil 1 – 10 Sulfide (08090862)

Progress of Work:
The analyses were conducted utilizing appropriate EPA, Standard Methods, and ASTM methods as detailed in the summary tables.

The results of the analysis, which are all reported on an as-received basis unless otheriwise noted, are summarized in the following table(s).

Analysis Results

Boring/Test Pit No.	Sample No.	Depth (ft)	Parameter	Method	Units	Results	MDL
SB-01-2	S-2	2' – 4'	Sulfide	EPA376.1	mg/kg	Not detected	20.0
SB-01-3	S-2	2' – 4'	Sulfide	EPA376.1	mg/kg	Not detected	20.0
SB-01-4	S-2	2' – 4'	Sulfide	EPA376.1	mg/kg	Not detected	20.0
SB-01-3	S-3	5' – 7'	Sulfide	EPA376.1	mg/kg	Not detected	20.0
SB-02-1	S-1	0' – 0.7'	Sulfide	EPA376.1	mg/kg	Not detected	20.0
SB-02-3	S-1	0' – 2'	Sulfide	EPA376.1	mg/kg	Not detected	20.0
SB-02-2	S-2	2' – 4'	Sulfide	EPA376.1	mg/kg	Not detected	20.0
SB-03-2	S-4	7' – 9'	Sulfide	EPA376.1	mg/kg	Not detected	20.0
SB-03-3	S-1	0' – 2'	Sulfide	EPA376.1	mg/kg	Not detected	20.0
SB-03-3	S-4	7' – 9'	Sulfide	EPA376.1	mg/kg	Not detected	20.0

Units Key: For Waters/Liquids: mg/L = ppm ; ug/L – ppb For Soils/Solids: mg/hg = ppm ; ug/kg = ppb

Notes:

1. The MDL (Minimum Detectable Limit) reported is adjusted for any dilution necessary due to the levels of target and/or non-target analytes and matrix interference. This MDL is the REPORTING LIMIT and is based upon the lowest standard utilized for calibration where applicable.
2. Samples are retained for a period of thirty days after submittal of report, unless other arrangements are made.
3. Test-Con's liability for the above data is limited to the dollar value paid to Test-Con for the reference project.
4. All samples were received in proper condition for analysis with proper documentation.

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The above tests/results apply only to specific locations tested/inspected.

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PH OF SOIL MATERIAL REPORT

Date: September 26, 2008

Report #: 1 - 10pH
Technician: R. DeCesare

Client: GeoDesign Incorporated
984 Southford Rd.
Middlebury, CT 06762

Project: New Britain-Harford Busway
155-H025

Date Received: Delivered by Client on 7/28/08

Test Requirements: pH

Summary Data

Boring/Test Pit No.	Sample No.	Depth (ft)	pH Test Results
SB-01-2	S-2	From 2' to 4'	6.7
SB-01-3	S-2	From 2' to 4'	7.4
SB-01-4	S-2	From 2' to 4'	7.4
SB-01-3	S-3	From 5' to 7'	7.5
SB-02-1	S-1	From 0' to 0.7'	5.9
SB-02-3	S-1	From 0' to 2'	3.6
SB-02-2	S-2	From 2' to 4'	5.9
SB-03-2	S-3	From 5' to 7'	7.4
SB-03-3	S-2	From 2' to 4'	3.7
SB-03-3	S4	From 7' to 9'	4.0

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Appendix 10

Unconfined Compression Tests (Rock)

TEST-CON INCORPORATED

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Construction Material Testing & Inspection - Geotechnical Services

ROCK CORE REPORT

Client: GeoDesign Incorporated
984 Southford Rd.
Middlebury, CT 06762
Project: New Britain-Hartford Busway # 155-H025

Date: 9/30/08
Technician: R. DeCesare
Report #: 1 – 5 Core
Page 1 of 2

Progress of Work: As requested, Test-Con performed unconfined compressive strength of rock core samples and the results are as follow:

Identification #:	SB-01-3 (C-1) 135' to 140'	SB-01-3 (C-1) 135' to 140'	SB-06-4 (C-1) 125' to 130"
ACTUAL DEPTH	139.5ft.	138.5ft.	114.5ft.
Total Length of Core Recovered, inches; and No. of pieces of Core, in parenthesis	5.4" (1)	5.9" (2)	5.7" (1)
Sample Height, inches, after cutting and capping	3.7"	1.9"	4.0"
Capping Material	Sulfur	Sulfur	Sulfur
Diameter, inches	2.0"	2.0"	2.0"
Area, square inches	3.14	3.14	3.14
Heigh/Diameter Ratio	1.85 : 1	0.95 : 1	2 : 1
Total Load, lbs.	16252	22247	12820
Load, P.S.I.	5175.8	7085	4082
Correction Factor	0.984	0.860	N/A
Corrected P.S.I.	5093	6093	4082
Date Tested	9/30/08	9/30/08	9/30/08
No. of End Cuts	2	2	2

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Construction Material Testing & Inspection - Geotechnical Services

ROCK CORE REPORT

Client: GeoDesign Incorporated
984 Southford Rd.
Middlebury, CT 06762
Project: New Britain-Hartford Busway # 155-H025

Date: 9/30/08
Technician: R. DeCesare
Report #: 1 – 5 Core
Page 2 of 2

Progress of Work: As requested, Test-Con performed unconfined compressive strength of rock core samples and the results are as follow:

Identification #:	SB-06-4 (C1) 125' to 130'	SB-06-4 (C-2) 130' to 135'
ACTUAL DEPTH	111ft.	122.5ft.
Total Length of Core Recovered, inches; and No. of pieces of Core, in parenthesis	9.1" (1)	4.4" (1)
Sample Height, inches, after cutting and capping	4.0"	4.0"
Capping Material	Sulfur	Sulfur
Diameter, inches	2.0"	2.0"
Area, square inches	3.14	3.14
Heigh/Diameter Ratio	2 : 1	2 : 1
Total Load, lbs.	20015	19383
Load, P.S.I.	6374	6173
Correction Factor	N/A	N/A
Corrected P.S.I.	6374	6173
Date Tested	9/30/08	9/30/08
No. of End Cuts	2	2

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Appendix 11

Limitations

GEOTECHNICAL LIMITATIONS

Explorations

1. The analyses and recommendations submitted in this report are based in part upon the data obtained from widely spaced subsurface explorations. The nature and extent of variations between these explorations may not become evident until further explorations are made and construction occurs. If variations then appear evident, it will be necessary to reevaluate the recommendations of this report.

2. The generalized soil and bedrock profile described in the text is intended to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized and have been developed by interpretations of widely spaced explorations and samples; actual soil and bedrock transitions are probably more erratic. For specific information, refer to the boring logs.

3. The geologic and geomorphologic settings at this site are complex and the uncertain historic site usage has resulted in the varied distribution and stress history of compressible soils across the site. Limited spacing of borings and lab testing can at best, only allow for estimates to be developed for duration and magnitude of consolidation settlements.

4. Water level readings have been made in the drill holes at times and under conditions stated on the boring logs. These data have been reviewed and interpretations have been made in the text of this report. However, it must be noted that fluctuations in the level of the groundwater may occur due to variations in river levels, rainfall, temperature, and other factors occurring since the time measurements were made.

Review

5. In the event that any changes in the nature, design or location, of the proposed bridge the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and conclusions of this report modified or verified in writing by Geo**Design**, Inc. It is recommended that this firm be provided the opportunity for a general review of design and specifications in order that earthwork and foundation recommendations may be properly interpreted and implemented in the design and specifications.

Use of Report

6. This report has been prepared for the exclusive use URS, the Connecticut Department of Transportation (ConnDOT), and other members of the design team for specific application to the construction of Flatbush Ave. Bridge Over New Britain - Hartford Busway located in Hartford, Connecticut, in accordance with generally accepted soil and foundation engineering practices. No other warranty, express or implied, is made.

7. This final design soil and foundation engineering report has been prepared for this project by Geo**Design**. This report is for design purposes only and is not sufficient to prepare an accurate bid. Contractors wishing a copy of the report may secure it with the understanding that its scope is limited to design considerations only.