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July 1, 2014

Brookfield Properties
250 Vesey Street
New York, NY 10281

Attention: Mr. Henry Caso

Re: Geotechnical Data Report
Manhattan West SW Tower
New York, New York
MRCE File No. 9560E

Gentlemen:

At your request, we have conducted a subsurface investigation for the proposed southwest tower of the Manhattan West project. The site in Manhattan is located immediately east of Dyer Avenue between 31st Street and the Amtrak Rail cut.

This data report summarizes previous and current investigations and describes subsurface conditions on site and our foundation recommendations.

EXHIBITS

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Plate No. 2	Viele Map: 1865
Plate No. 3	Manhattan Atlas: 1891
Plate No. 4	Manhattan Atlas: 1899
Drawing No. B-1	Boring Location Plan
Drawing No. GS-1	Geologic Section A-A
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Drawing No. GS-8	Geologic Section H-H
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Plate No. 5	Plot of RQD vs Elevation
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Drawing No. RC-1	Rock Core Classification Criteria
Appendix A	MRCE Boring Logs
Appendix B	Laboratory Data of Rock Strength and Modulus
Appendix C	Selected Photographs of Rock Core
Appendix D	Orientation of Rock Joints
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Appendix G	Existing Flow Fill Adjacent to Dyer Avenue Retaining Wall – Design Drawing
Appendix H	Existing Mechanically Stabilized Earth Wall – Design Drawings

SITE AND PROJECT DESCRIPTION

The SW Tower site is located on the north side of 31st Street between the street and the railroad tracks that enter Penn Station, on the block between Dyer Avenue and Ninth Avenue, immediately to the east of Dyer Avenue, as shown on Plate No 1. A high-rise residential tower with a single basement level approximately elevation +11 will be constructed on the site. The northern edge of the building will overhang the existing precast concrete deck over the rail cut and will cantilever off of caisson foundations that are to be installed through the existing capping beam supporting the precast deck. The remainder of the building will be supported on spread footing foundations on rock.

All elevations in this report reference the Borough President of Manhattan (BPM) datum, which is 2.75 ft above Mean Sea Level at Sandy Hook, N.J. Track level elevations used by Amtrak and Long Island Rail Road (LIRR) are referenced to the Penn RR Tunnels Datum, (PRR) which is 300.025 feet above BPM.

Sidewalk grades at 31st street generally slope down from Elev. +38 (BPM) at Ninth Avenue to Elev. +25.5 at the west end of the site (Dyer Ave). Track grades are at approximately Elev. – 15 BPM (+285 PRR). During construction of the deck over the rail cut, the soil and rock was removed to approximately elevation +3 in approximately the northern 20 feet of the lot to facilitate construction of the foundations for the precast deck. A survey of the existing grades on the site will be performed in the near future and will be included in an addendum to this report, to be issued at a later date.

Existing Amtrak Retaining Wall. The existing Amtrak retaining wall was originally approximately 45 feet high until partial removal to construct the capping beam to carry the pre-cast segmental deck over the tracks. The retaining wall was constructed around 1908 when the rock cut for the railroad was excavated. As-built drawings of the 1908 retaining wall are included in Appendix F. The lower approximate 25 foot high retaining wall remains in place. That wall is approximately 8' foot thick, pinned to the cut rock face by rock bolts, spaced approximately every six feet along the retaining wall. Drainage channels were framed on the back side of the wall also approximately every six feet. Some drainage channels have been blocked by cap construction, but have been supplemented by weep holes drilled horizontally through the lower position (track level) of the wall.

Existing Dyer Avenue Bridge. The existing Dyer Avenue Bridge is located immediately adjacent to the western property line of the site. The bridge rests on spread footings on the bedrock which are typically founded beneath the elevation of the planned basement excavation. All of the soil under the bridge has been removed with the exposed top of rock at Elevation +6 to +9.

Existing Dyer Avenue Retaining Wall. A brick wall runs the length of the upper lot along full length of the lot adjacent to Dyer Avenue. The brick wall appears to be a remnant basement wall from a demolished building that once occupied the site. The brick wall is approximately 2 feet thick and for most of its length and founded on bedrock. Near the middle of the wall, the bedrock dips and the wall is founded on concrete fill placed over the bedrock. That dip may be related to the weathering feature that was repaired at the capping beam cut. There is limited lateral support at the top of the wall. A trapezoidal shaped zone of flow-fill was placed adjacent to the Dyer Avenue retaining wall to accommodate high vertical construction surcharge loading without applying significant lateral load to

the brick wall. The engineered flow fill is discussed more detail in the description of the Fill (F1) stratum later in this report. The front facing panels of the MSE wall are metal grids with filter fabric. The facing has been given a 5 year design life.

Existing Mechanically Stabilized Earth (MSE) Wall. A MSE wall was installed in 2013 along the northern edge of the upper lot to facilitate construction of the precast deck over the rail cut. The MSE Wall is 20 feet wide and runs the full length of the site in the east west direction. It extends from the top of rock to existing grade. Additional information regarding the MSE wall can be found in the description of Fill (F1) stratum, later in this report.

Local Geology. The project area is located on the Manhattan Prong, which is at the southern tip of the New England Uplands. It is composed of ancient, durable, highly folded and metamorphosed crystalline rock. The bedrock at the site was historically known as the Manhattan Schist, but is currently mapped as the Hartland Formation. The Hartland is typically a gneissic schist with layers of schistose gneiss, granofels, mica schist and hornblende schist. The formation has frequent intrusions of granite and granitic pegmatite.

The bedrock at the site is the Hartland Formation. Usually the Hartland consists of gneissic schist to schistose gneiss with scattered thin layers and veins of hornblende schist and pegmatite. However, the project location has an unusually large amount of hornblende schist. The hornblende schist is concentrated along a band that runs diagonally to the southeast corner of the site. The overall trend of the hornblende schist is roughly N-S, in a band up to 100 feet wide. The typical gneissic schist was found to the NE and SW of the hornblende schist band. Pegmatite and granite are scattered across the entire site. Borings usually encountered pegmatite thicknesses less than 5 feet. However, the pegmatite intrusions were over 20 feet thick in boring GB-204AP is significant as pegmatite are often the hardest formation in the New York City area.

Prior to early development, the area that is now midtown Manhattan consisted of low hills and meadowlands dissected by occasional streams. These features are shown on the 1865 Viele map on Plate No. 2. That map shows the site to have been covered by rock outcroppings and meadow. The original bedrock surface has since been altered by construction of buildings, the rail cut and the precast concrete deck by the Manhattan West Project.

SITE HISTORY

We researched the 1891 atlas to identify former structures at the site. Plate No. 3 shows the site area usage as of 1891 and Plate No 4 the site area usage as of 1899. 1899 is the latest dated drawing available in our files that precedes the rock cut for the railroad.

The 1891 Atlas indicates that the site was mainly occupied by what appears to be primarily residential buildings with yards and a wallpaper factory. No basements are indicated on the map, however remnants of shallow basements were encountered during the platform construction.

All of the buildings on the site had been demolished by 1899, likely in anticipation of the rock cut.

SUBSURFACE INVESTIGATIONS

Previous Investigations by MRCE. Between September 7 and 15, 2005 Mueser Rutledge Consulting Engineers performed a two boring investigation (B-101 and B-102). The boring locations are shown in Drawing B-1 and the boring logs are included in Appendix A.

Between December 15, 2007, and March 24, 2008, MRCE performed a supplemental investigation consisting of 5 borings designated GB-204AP thru GB-208, drilled by Warren George, Inc.

Borings were made using one truck-mounted drill rig using rotary techniques. NX-rock cores were recovered in each boring in 5 foot lengths using a double tube core barrel (2-inch diameter rock samples).

Representative soil samples were obtained with a 2-inch O.D. (1-3/8 inch I.D.) split-spoon sampler driven with a manual 140-pound hammer free falling 30 inches to obtain the Standard Penetration Test (SPT) resistance, also termed N-value, expressed in blows per foot. The SPT N-value is an indication of the density of the material sampled. Where soils were too dense for the sampler to penetrate a full 12 inches, or where demolition debris, gravel, cobbles or boulders were encountered, the sampler was driven until 100 blows were administered and the actual penetration of the sampler was measured and recorded. Recovered split-spoon soil samples were placed in jars and were delivered along with the rock core to our Soil Mechanics laboratory in Manhattan for verification of field classifications. Individual descriptions of soil and rock samples are provided on boring logs attached in Appendix A. The terminology used in MRCE soil descriptions is provided on Drawing No. GS-R. Rock core classification terminology and criteria used on the boring logs are shown on Drawing No. RC-1.

Descriptions of recovered rock cores, core recoveries and Rock Quality Designations (RQDs) are provided on the boring logs. Rock recovery is the length of core recovered divided by the length of the core run expressed as a percentage. RQD is the sum of the length of core fragments recovered four inches or greater between natural breaks divided by the length of the core run expressed as a percentage. RQD is a measure of the relative frequency of jointing or natural fracturing of the bedrock. Selected samples of rock core from the gneissic schist and hornblende schist formations were sent out for strength testing, as described later herein.

Oriented rock coring was performed in borings performed GB-204AP through GB-208. Oriented rock core is similar to normal rock coring, except that the core barrel continuously striates the side of the rock core with carbide tipped scribe blades as it is cored. The scribe blades are located at the tip of the inner core barrel that contains three blades on one side and a single scribe located directly opposite the center of the other three scribes. The striations are established along predetermined compass direction relative to the position of the drill rig. That allows the absolute orientation of the jointing planes to be known, allowing strike, dip direction, and dip angle of joints and foliation planes to be determined in the laboratory.

Two observation wells were installed to monitor ground water within the site in Borings GB-204AP and GB-206P. These wells are contained within the PVC casings installed to clear the boring locations and may be accessed for future readings.

Upon completion, the borings were tremie-grouted. The PVC casings used to clear utilities were removed. PVC casings surrounding piezometers were left in place and covered with a steel plate to allow access for future water level readings.

Lab Testing. In February 2008 ten core samples sent to Sor Testing Laboratories, Inc to be tested for Unconfined Compressive Strength (UCS), Modulus of Elasticity and Brazilian Tensile Strength Eight of the core samples were taken from boring located in the lot on the north side of the rail cut and two were taken from borings located within the footprint of the Southwest Tower. Five of the core samples

tested were gneissic schist and five of were hornblende schist. Results of that testing are provided in Appendix B.

In summary, based on all the specimens, the gneissic schist had a maximum UCS value of 6850 psi, a minimum value of 2040 psi with an average value of 5124 psi. The maximum Modulus of Elasticity value was 9.8×10^6 psi, the minimum was 9.1×10^6 psi, and the average value was 9.36×10^6 psi. The maximum Brazilian test value or tensile strength, was 2150 psi, the minimum was 1580 psi, with an average value of tensile strength of 1802 psi. For the hornblende schist, the maximum UCS value was 11,140 psi, the minimum was 5090 psi, and the average value was 6122 psi. The maximum Modulus of Elasticity value was 17.4×10^6 psi, the minimum was 11.5×10^6 psi, and the average was 13.33×10^6 psi. The maximum tensile strength value was 2720 psi, the minimum tensile strength value was 1340 psi with an average of 2168 psi.

Samples of pegmatite were not sent out for strength testing. In the New York City area pegmatites typically have UCS values ranging from 5000 psi to over 30,000 psi, with values most commonly 10,000 to 30,000 psi. Strength values often vary depending on the amount of mica present, its orientation and the size of the crystals. Note under the Stratum R description below, the Mohs hardness of pegmatite (principally quartzite) exceeds the hardness of steel.

SUBSURFACE CONDITIONS

General soil conditions consist of an approximately ten foot thick granular fill layer underlain by bedrock. Occasionally a discontinuous layer of decomposed rock was encountered above the bedrock. Our interpretation of the subsurface strata is shown on individual boring logs. The subsurface material stratification at the site is illustrated on Geologic Sections A-A, B-B and C-C on drawings GS-1, GS-2 and GS-3. Geologic section marks are shown in plan on Drawing B-1.

Although the top of bedrock (stratum R) on the geologic section has been shown using a smooth line derived from linear interpolation, the actual surface of bedrock is expected to be somewhat variable.

General descriptions of the materials encountered are summarized below in order of their occurrence with depth:

Stratum F1 - Fill (NYC Class 7) A granular fill layer that ranges from seven to 15 feet in thickness was encountered. Stratum F1 consists of loose to compact black, gray and red fine to coarse sand, some to trace silt, clay, mica, gravel rock fragment, trace of brick fragments. Remnant foundations and slabs can be anticipated to be found in this Stratum.

In the west end of the site, adjacent to the Dyer Avenue Retaining Wall a trapezoidal shaped wedge of flow-fill was placed to strengthen the wall. The flow fill is doweled into a remnant base slab and to the rock below. There is a 4 foot wide area adjacent to the Dyer Avenue Retaining Wall where the flow fill is approximately 8 feet thick. It tapers on a slope of approximately 2:1 to a thickness of approximately 2feet. A copy of the design drawing for the placement of the flow fill is included in Appendix G.

Along the north edge of the upper portion of the site, a mechanically stabilized earth (MSE) wall was installed within the fill to provide excavation support for the construction of the foundations for the existing precast concrete deck over the rail cut. The MSE wall is 20' wide and extends the entire length of the project site. The wall was designed to support a uniform live load pressure of 1000 psf on the ground surface beyond a distance of 3 feet from the face of the wall with no load allowed in the 3 feet

immediately south of the face of the wall. Design drawings of the MSE wall are included in Appendix H.

Stratum DR - Decomposed Rock (NYC Class 1d) A thin layer of decomposed rock overlies the bedrock in some locations. It ranged from 0.2 to 1 foot thick where encountered by the borings.

Stratum R - Bedrock (NYC Class 1a to 1c) The dominant rock type at the site, is gneissic schist. Roughly half the cored rock at the site was gneissic schist. The gneissic schist rock is typically a hard to medium hard, unweathered to slightly weathered gray gneissic schist, trace pegmatite, schistose gneiss, mica schist, jointed to massive, with iron stained and occasionally weathered joints. Isolated bones of more highly weathered rock have been encountered, requiring remedial concrete facing to presence and weather project exposed forces.

The rock cored at the site was approximately 60% schist and 40% pegmatite/granite. The hornblende schist is generally a hard to medium hard unweathered to slightly weathered gray to black hornblende schist, jointed to closely jointed, with mineral coated, iron stained and occasionally weathered joints.

In addition to the gneissic and hornblende schist, pegmatite is also found, sometimes locally abundant. Veins of granite and pegmatite are scattered throughout the rock mass. However locally there were large bodies of pegmatite consisting of medium hard to hard slightly weathered to unweathered white, gray and pink pegmatite and granite, closely jointed to massive, with iron stained and occasionally weathered joints.

Recoveries of all rock types typically ranged between 60% and 100% averaging about 95%. Rock quality designation (RQD) ranged between 33% and 100%. A plot of RQD versus elevation is shown on Plate No. 5. Top of rock elevations vary from Elev. +14 to +28. (Drawing C-2). Photographs of selected rock core are provided in Appendix C.

Oriented rock coring was performed on all of the five borings. The orientation of the rock joints from oriented cores are presented as stereographic projections in Appendix D.

Drawing No. R-1 provides an explanation of the stereonet construction. A plot of joint discontinuities in rock core is shown on Plate No. 6. Across the site the joints in all rock types do not follow a distinct preferred trend. In general, joints in the pegmatite and granite tend to have a random orientation with a dip ranging from 0° to 60°. Virtually all of the joints in the hornblende schist cross the foliation with dips ranging from 0° to 40°, with many less than 10°. Foliation in the hornblende schist was fairly steep, with a dip angle typically 50° to 90°. Joint surfaces were frequently mineral-coated, often with pyrite. Joints in the gneissic schist and schistose gneiss also showed no preferred direction. The rock was often poorly to moderately foliated and joints parallel to foliation tended to occur in the well foliated rock. Orientation of the foliation was variable and inconsistent across the site, but the dip angles tended to range from 25° to 60°. Joints crossing the foliation generally had a dip angle that ranged from 0° to 40°. Individual polar plots of joint discontinuities for each boring are provided in Appendix D.

Petrography was not performed on the rock from the site, so the exact minerals and their percentages have not been determined. In general, the gneissic schist consists primarily of quartz, feldspar and mica in varying amounts, with trace amounts of garnet. Where the rock was described as a schistose gneiss less mica was present. The hornblende schist is composed predominantly of hornblende, with varying amounts of feldspar and quartz. The pegmatite and granite contain varying amounts of quartz and feldspar, with modest to small amounts of mica.

The Mohs hardness values for these minerals are as follows: quartz (7), feldspar (6), mica (2 to 3), garnet (6.5 to 7.5), and hornblende (5 to 6). The Mohs scale measures the relative hardness of materials on a scale of 1 to 10. For context, on that hardness scale talc has a value of 1, diamond has a value of 10, a knife blade equals to 5.5 and a steel file 6.5.

Groundwater. Groundwater level was observed in observation wells installed in Borings GB-204AP and GB-206P. Groundwater dropped in elevation toward the tracks, from Elev. -7 to Elev. -28. All of the groundwater levels measured are depressed below high tide (Approx. +2 BPM), indicating local artificial pumping. Data from these wells are included in Appendix E.

Very truly yours,

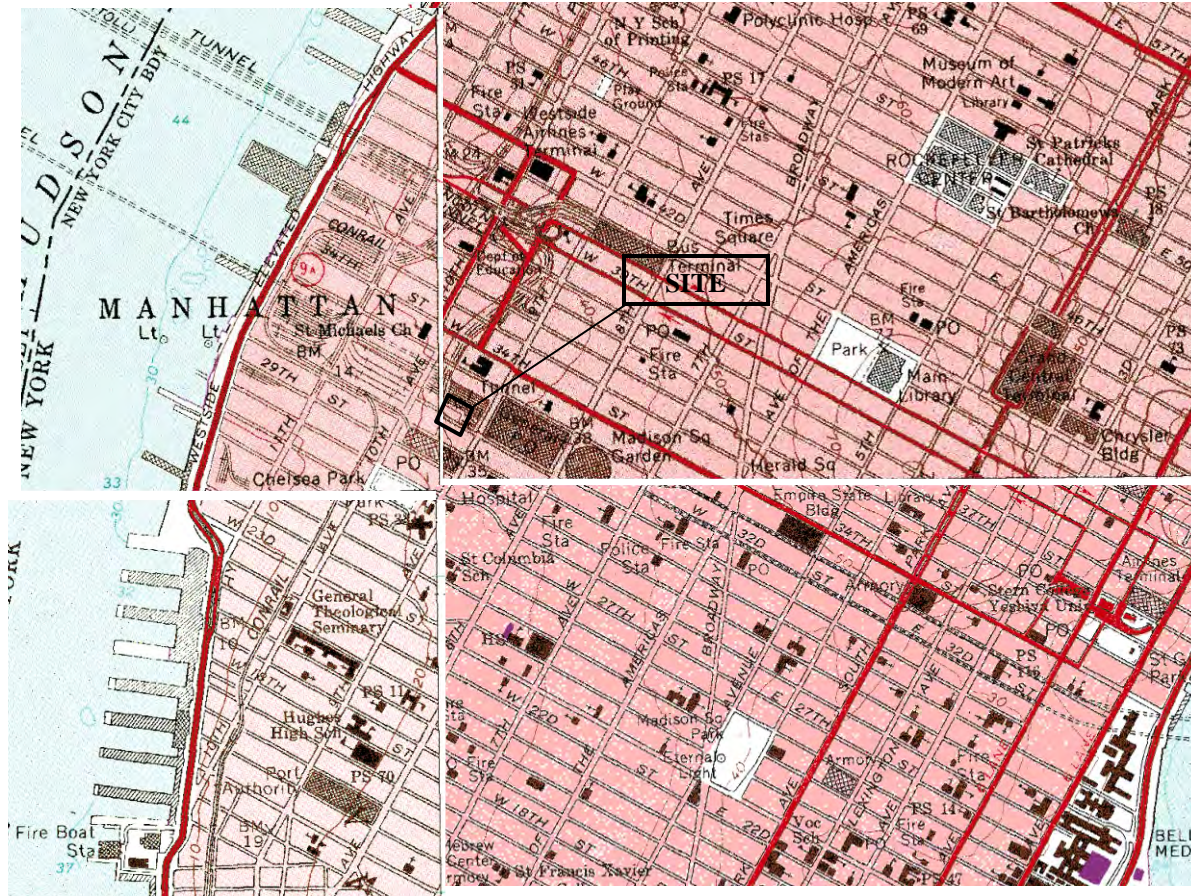
MUESER RUTLEDGE CONSULTING ENGINEERS

By: _____
David R. Good, PE

Attachments

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EXHIBITS



SOURCE: U.S. Geological Survey Quadrangle Maps

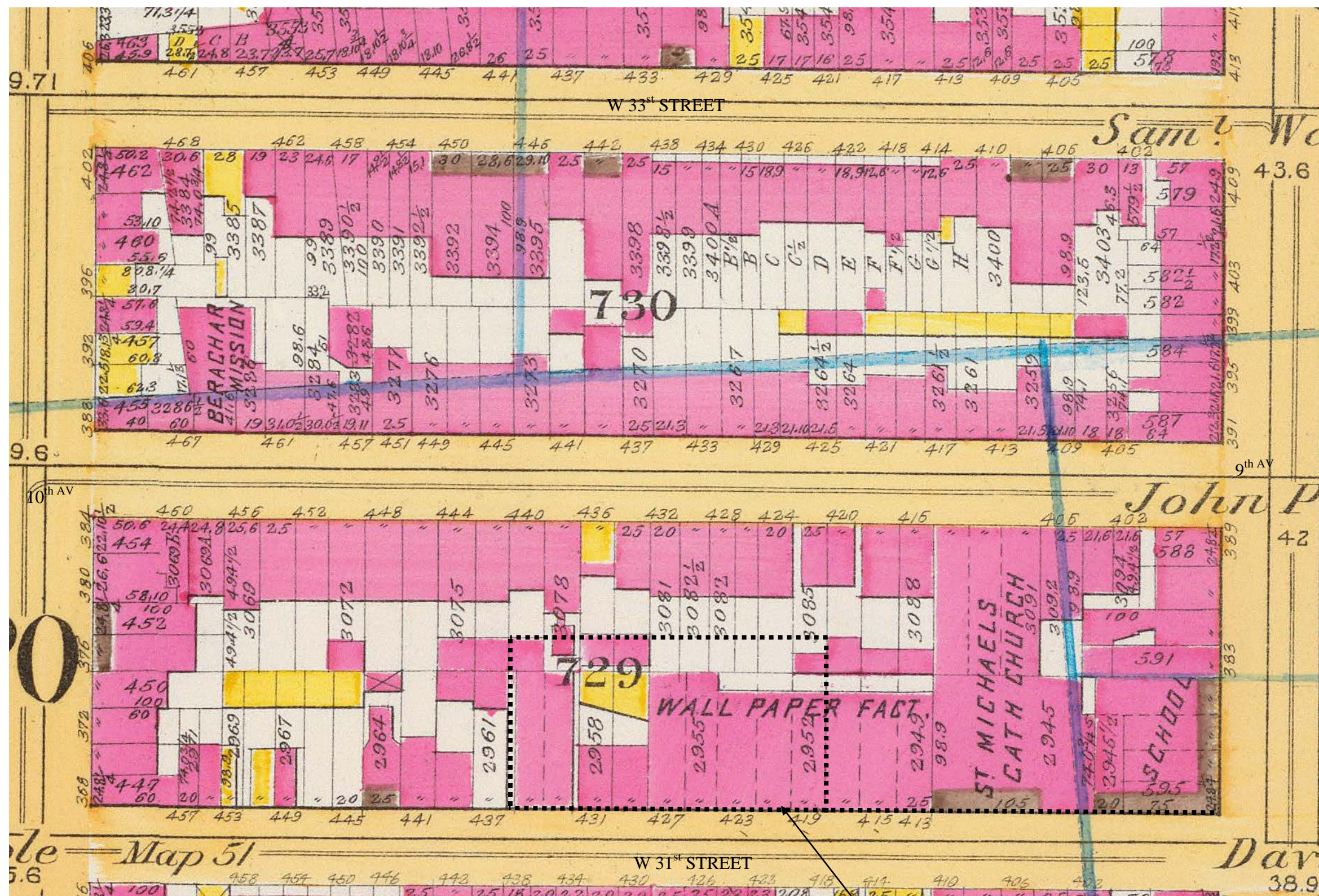
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<div>BROOKFIELD PROPERTIES</div>			
NEW YORK		NEW YORK	
<div>MUESER RUTLEDGE CONSULTING ENGINEERS</div> <div>225 WEST 34TH STREET, NEW YORK, NY 10122</div>			
SCALE NTS	MADE BY: IAB CH'KD BY: DRG	DATE: 01/02/2014 DATE: 01/02/2014	FILE NO. 9560
<div>SITE LOCATION PLAN</div>			PLATE NO. 1



SOURCE:

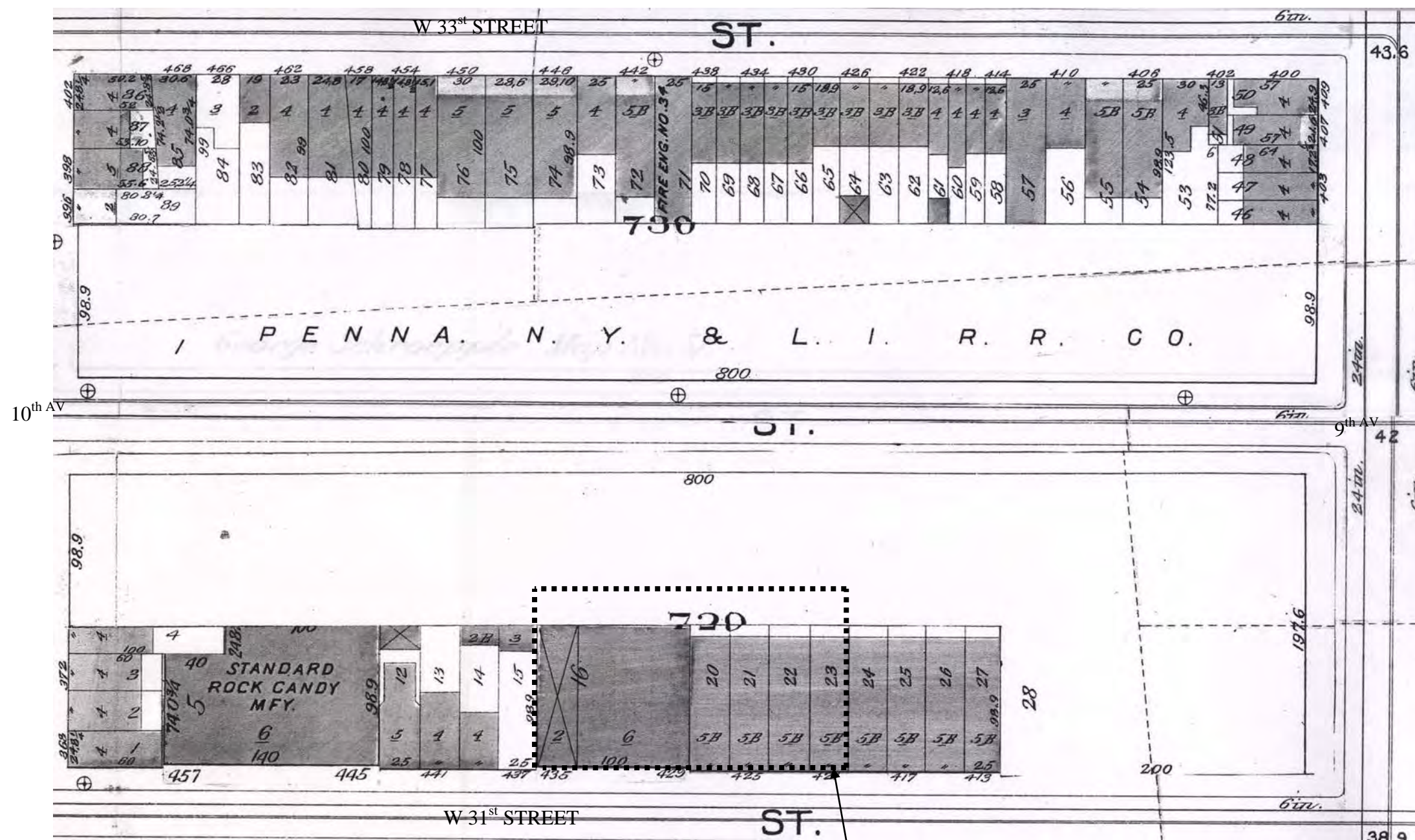
Topographical Atlas of the City of New York
By Egbert L. Viele, dated 1865

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225 WEST 34 TH STREET, NEW YORK, NY 10122			
SCALE 1"=1000'	MADE BY: IAB CH'KD BY: DRG	DATE: 01/02/2014 DATE:01/02/2014	FILE NO. 9560E
1865 VIELE MAP			PLATE NO. 2



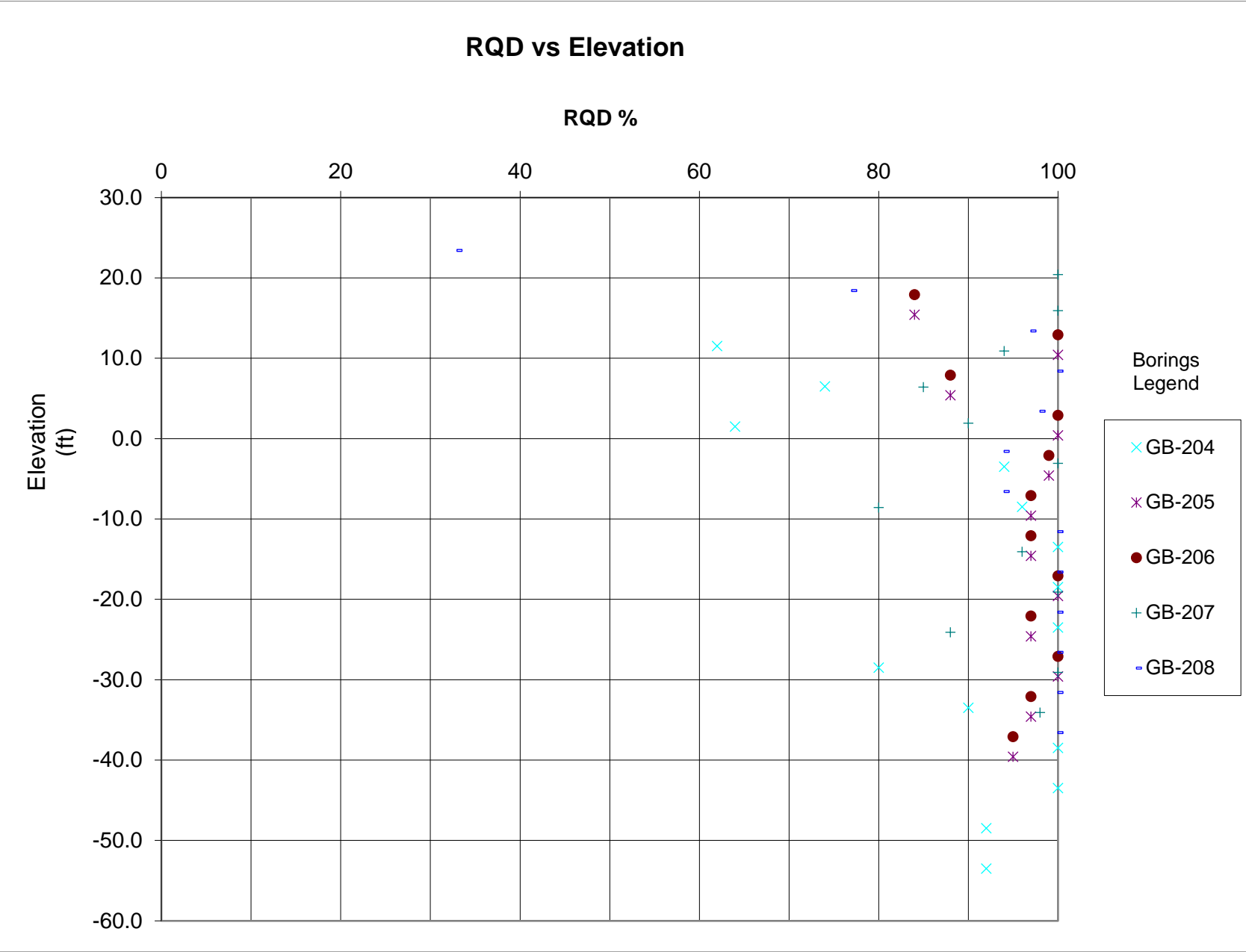
Approximate Site
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SCALE 1"=75'	MADE BY: IAB CHK'D BY: DRG	DATE: 01/02/2014 DATE: 01/02/2014	FILE NO. 9560E
1891 MANHATTAN ATLAS			PLATE NO. 3



Approximate Site
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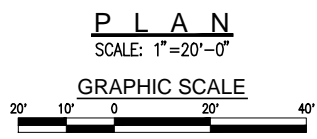
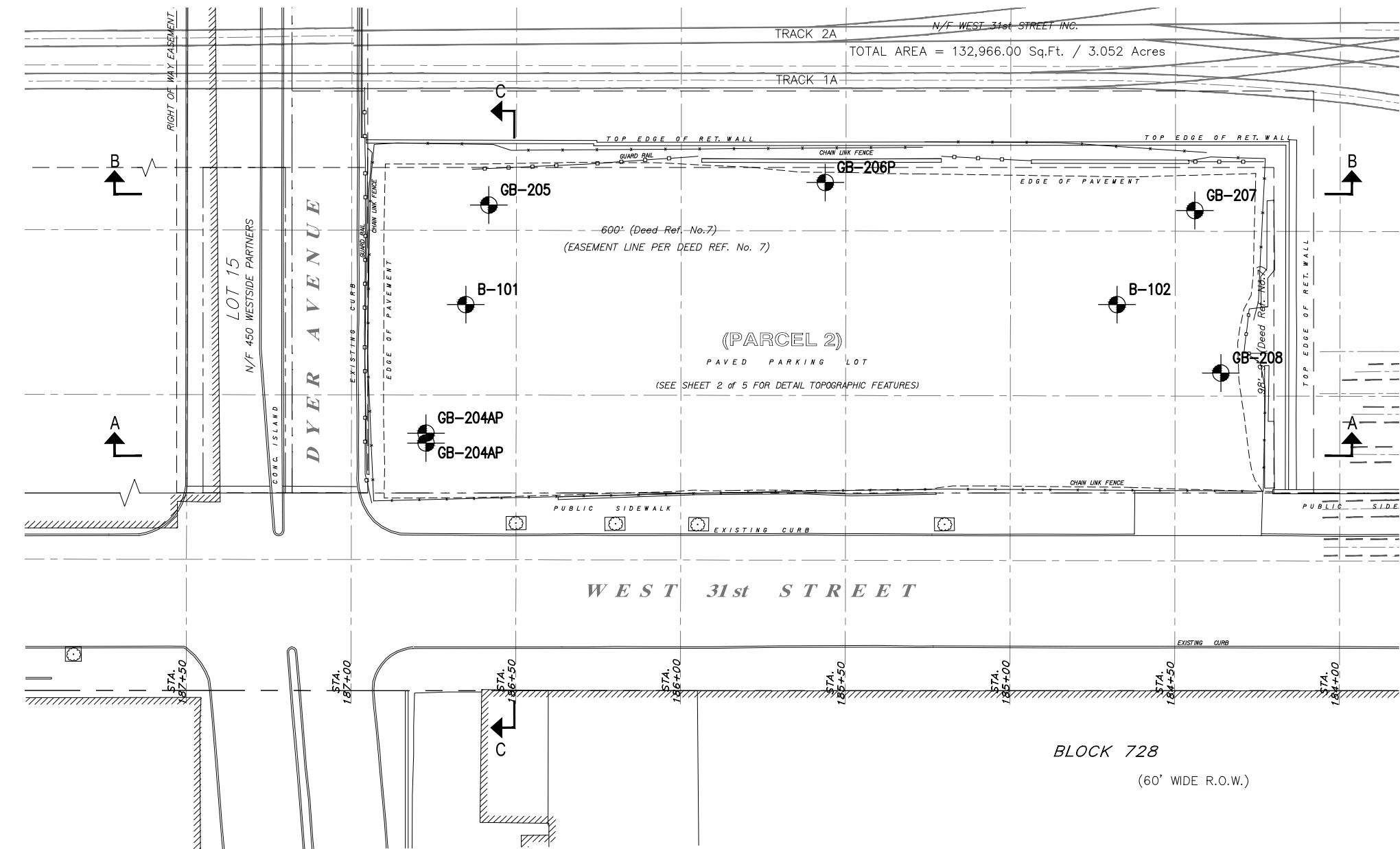
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1899 MANHATTAN ATLAS			PLATE NO. 4



RQD vs elevation

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		FILE NO. 9560E
ROCK QUALITY DESIGNATION (RQD) vs ELEVATION		PLATE NO. 5

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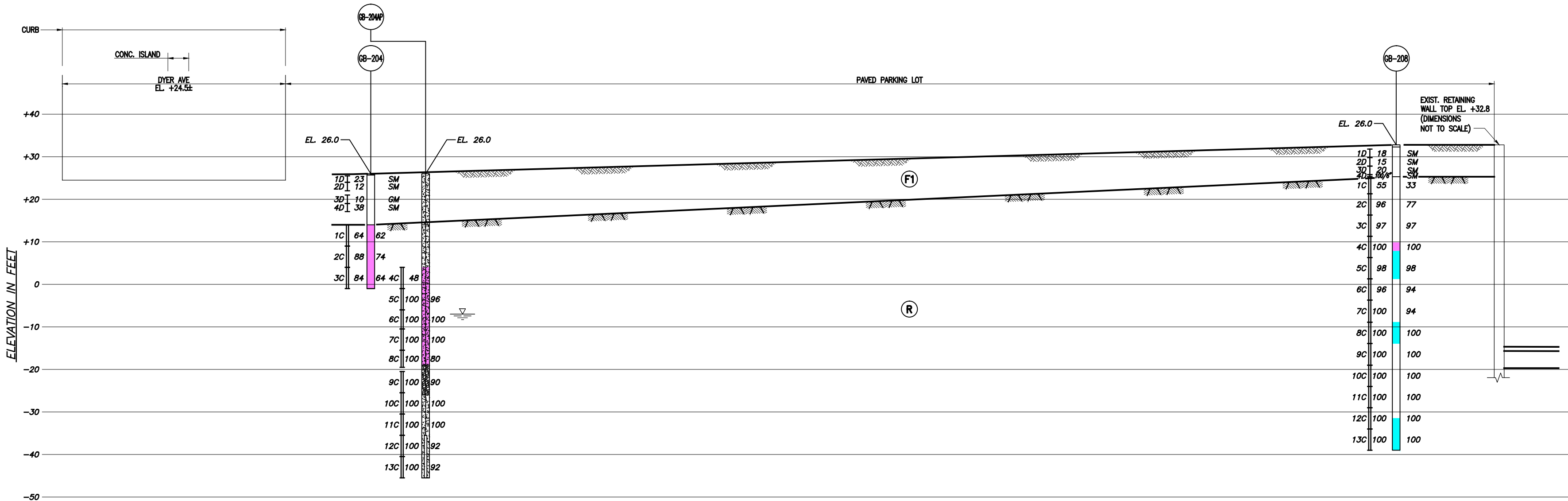
- X-XXX - BORING MADE BY WGI DRILLING UNDER THE INSPECTION OF MRCE IN SEPT. 2005 AND BETWEEN DEC 2007 AND MARCH 2008.

NOTES:

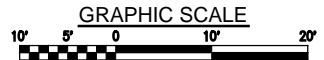
1. BASE PLAN FROM TOPOGRAPHIC MAP AT STREET LEVEL, SHEET NO. 2 OF 5 DATED 06-04-07 PROVIDED BY MEDINA CONSULTANTS.
2. ELEVATIONS ARE SHOWN IN FEET AND REFER TO BOROUGH PRESIDENT OF MANHATTAN DATUM, WHICH IS 2.75 FEET ABOVE M.S.L. AT SANDY HOOK, NJ 1929.
3. BORING ELEVATIONS WERE ESTIMATED BY MRCE BASED ON EXISTING SURVEY PLAN.
4. FOR GEOLOGIC SECTIONS, SEE DRAWINGS GS-1 TO GS-3.

MANHATTAN WEST SOUTHWEST TOWER			
NEW YORK		NEW YORK	
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NEW YORK		NEW YORK	
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14 PENN PLAZA — 225 W. 34TH STREET, NY, NY 10122			
SCALE AS NOTED	MADE BY: L.L. CHK'D BY: I.A.B.	DATE: 01-XX-2014 DATE: 01-XX-2014	FILE NUMBER 9560
BORING LOCATION PLAN			DRAWING NUMBER B-1

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GEOLOGIC SECTION A-A
SCALE: 1"=10'-0"



NOTES:

- FOR GENERAL NOTES AND BORING AND SECTIONS LOCATIONS SEE DRAWING NO. B-1.
- BORINGS ILLUSTRATED ON GEOLOGIC SECTIONS ARE IN SOME CASES PROJECTED ON THE SECTION AND/OR OFFSET FOR CLARITY. STRATIFICATIONS SHOWN ON SECTIONS ARE NECESSARY INTERPOLATIONS BETWEEN AND BEYOND BORINGS AND MAY NOT REPRESENT THE ACTUAL SUBSURFACE CONDITIONS.

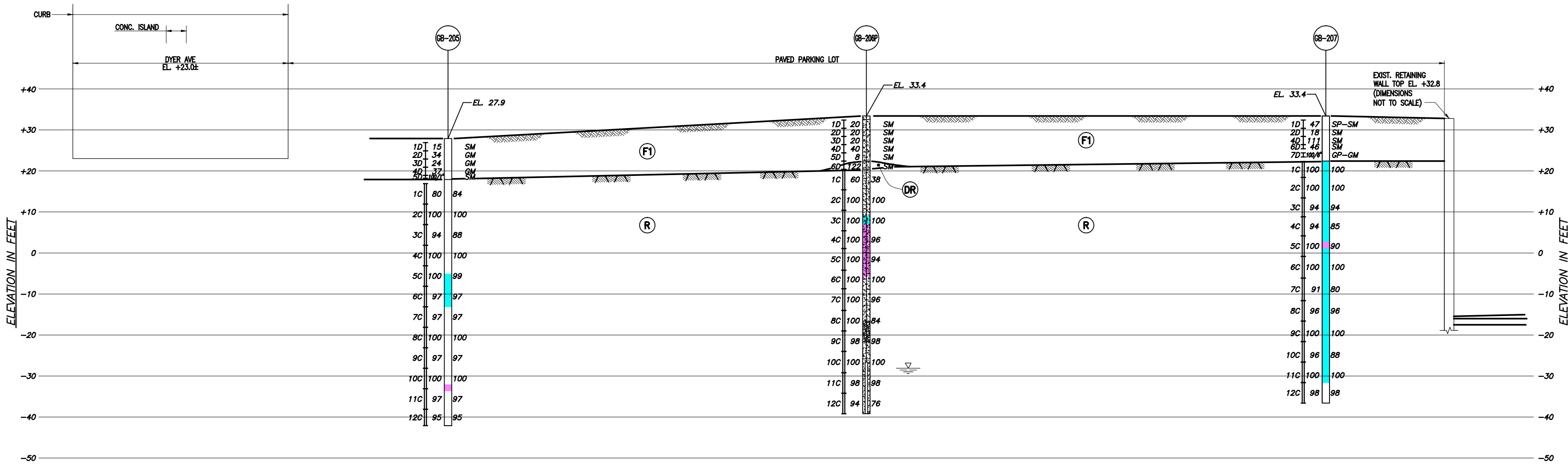
LEGEND:

- INDICATES PEGMATITE OR GRANITE
- INDICATES HORNBLENDE SCHIST
- NON-SHADED ROCK INDICATES GNEISSIC SCHIST OR SCHISTOSE GNEISS

GENERAL STRATA DESCRIPTIONS:

- (F1)** **FILL** - LOOSE TO COMPACT BLACK AND GRAY, OCCASIONALLY RED FINE TO COARSE SAND WITH SOME TO TRACE OF SILT, CLAY, MICA, GRAVEL AND ROCK FRAGMENTS, BRICK.
- (R)** **ROCK** - MEDIUM HARD TO HARD, SLIGHTLY WEATHERED TO UN-WEATHERED, GRAY GNEISS, GNEISSIC SCHIST AND HORNBLENDE SCHIST, TRACE PEGMATITE, MODERATELY JOINTED TO JOINTED WITH SOME IRON STAINED JOINTS AND MINERAL COATED JOINTS.
- (DR)** **DECOMPOSED ROCK** - GRAY MICACEOUS FINE TO MEDIUM SAND, SOME SILT AND ROCK FRAGMENTS.

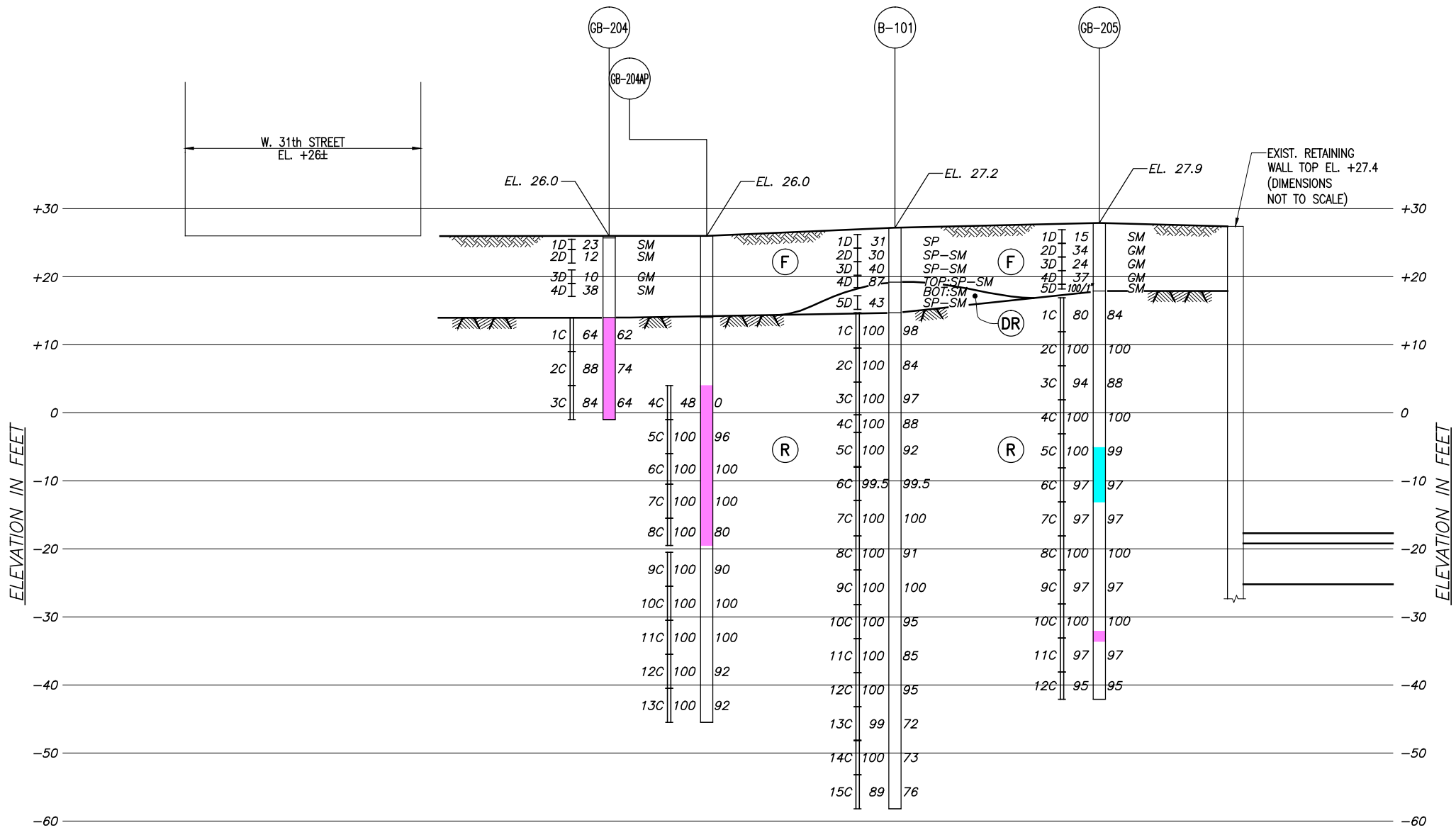
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SCALE AS NOTED	MADE BY: LL CHKD BY: I.A.B.	DATE: 01-XX-2014 DATE: 01-XX-2014	FILE NUMBER 9560
GEOLOGICAL SECTION A-A			DRAWING NUMBER GS-1



GEOLOGIC SECTION B-B
SCALE: 1"=10'-0"
GRAPHIC SCALE
10' 5' 0' 10' 20'

- NOTES:**
- 1. FOR GENERAL NOTES AND BORING AND SECTIONS LOCATIONS SEE DRAWING NO. B-1.
 - 2. FOR LEGEND AND GENERAL STRATA DESCRIPTIONS SEE DRAWING NO. GS-1.

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NEW YORK		NEW YORK	
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GEOLOGICAL SECTION B-B			DRAWING NUMBER GS-2



GEOLOGIC SECTION C-C
SCALE: 1"=10'-0"

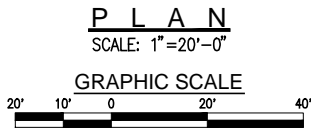
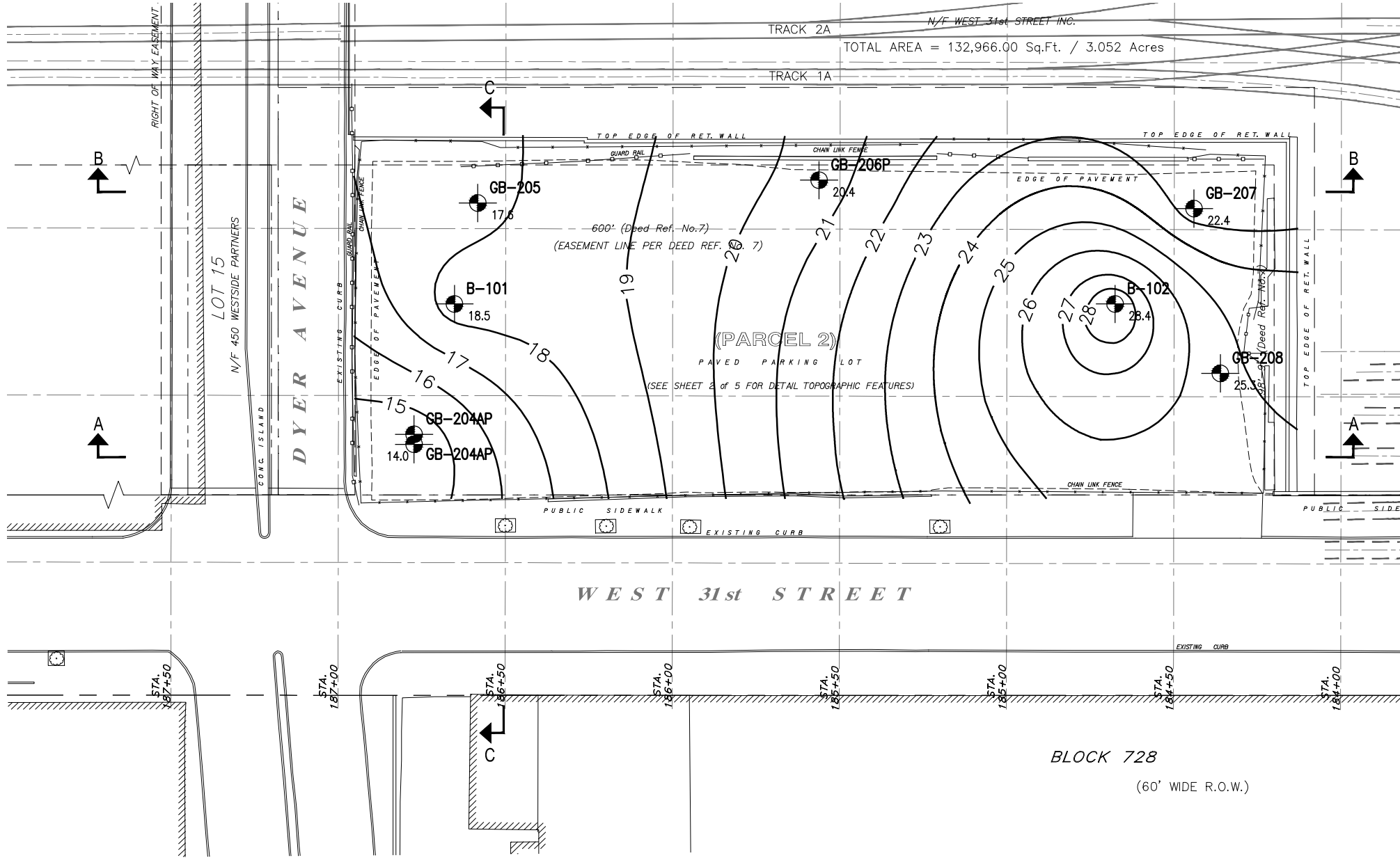


NOTES:

1. FOR GENERAL NOTES AND BORING AND SECTIONS LOCATIONS SEE DRAWING NO. B-1.
2. FOR LEGEND AND GENERAL STRATA DESCRIPTIONS SEE DRAWING NO. GS-1.

MANHATTAN WEST SOUTHWEST TOWER			
NEW YORK		NEW YORK	
BROOKFIELD PROPERTIES			
NEW YORK		NEW YORK	
MUESER RUTLEDGE CONSULTING ENGINEERS			
14 PENN PLAZA — 225 W. 34TH STREET, NY, NY 10122			
SCALE AS NOTED	MADE BY: L.L. CHK'D BY: I.A.B.	DATE: 01-XX-2014 DATE: 01-XX-2014	FILE NUMBER 9560
GEOLOGICAL SECTION C-C			DRAWING NUMBER GS-3

Printed by: Ira Beer
Printed on: Thursday, Jan 16, 2014 - 08:13:30 AM
Last saved by: lbeer on Thursday, Jan 16, 2014 - 8:12:55 AM
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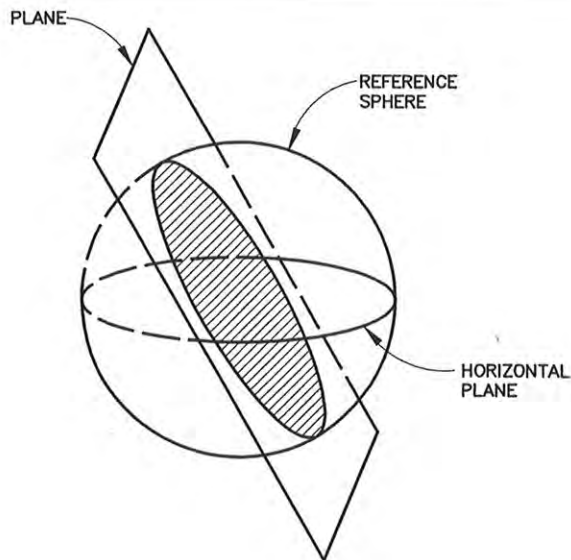
LEGEND:

- X-XXX
- BORING MADE BY WGI DRILLING UNDER THE INSPECTION OF MRCE
IN SEPT. 2005 AND BETWEEN DEC 2007 AND MARCH 2008.
-21.9
- ELEVATION OF TOP OF STRATUM R.

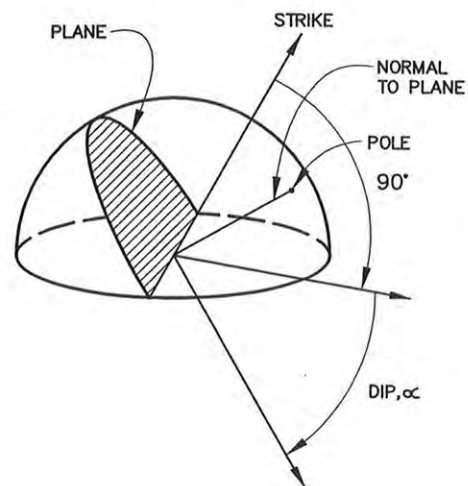
NOTES:

- FOR PLAN NOTES, SEE DRAWING B-1.
- ELEVATIONS OF TOP OF ROCK (STRATUM R) ARE SHOWN AT THE BORING LOCATIONS. SURFACE ELEVATION OF ROCK BETWEEN BORINGS WILL VARY.
- ELEVATIONS REFERENCE BOROUGH PRESIDENT OF MANHATTAN (BPM) DATUM.

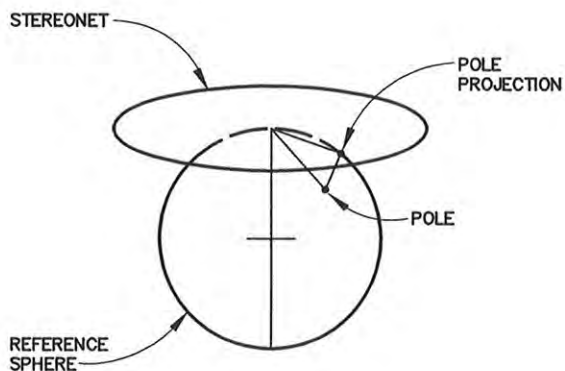
MANHATTAN WEST SOUTHWEST TOWER			
NEW YORK		NEW YORK	
BROOKFIELD PROPERTIES			
NEW YORK		NEW YORK	
MUESER RUTLEDGE CONSULTING ENGINEERS			
14 PENN PLAZA – 225 W. 34TH STREET, NY, NY 10122			
SCALE AS NOTED	MADE BY: L.L. CHK'D BY: I.A.B.	DATE: 01–XX–2014 DATE: 01–XX–2014	FILE NUMBER 9560
CONTOUR PLAN – TOP OF STRATUM R			DRAWING NUMBER C–2



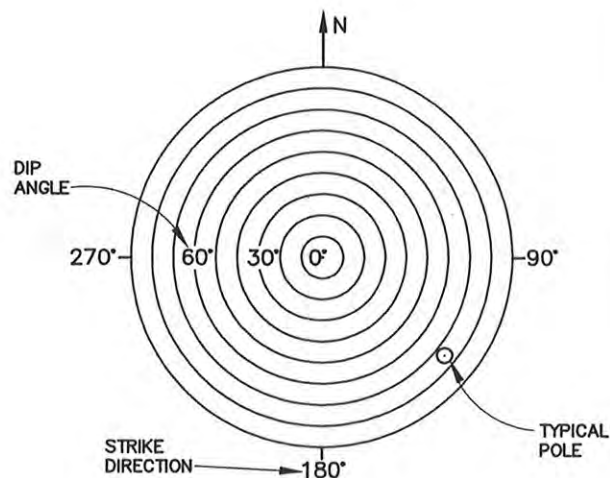
(A) TYPICAL PLANE AND REFERENCE SPHERE



(B) INTERSECTION OF NORMAL TO PLANE AND UPPER HEMISPHERE LOCATES POLE



(C) PROJECTION OF POLE ONTO EQUAL AREA, UPPER HEMISPHERE STERIONET



(D) TYPICAL EQUAL AREA STERIONET AND POLE

NOTE:

- FIGURES (A), (B), AND (C) SHOW PROJECTION OF POLE LOCATION ON UPPER HEMISPHERE EQUAL AREA STERIONET. TYPICAL NET SHOWN IN FIGURE (D) IS GRAPHED TO ALLOW PLOTTING OF POLE PROJECTION DIRECTLY USING STRIKE AND DIP ANGLES.

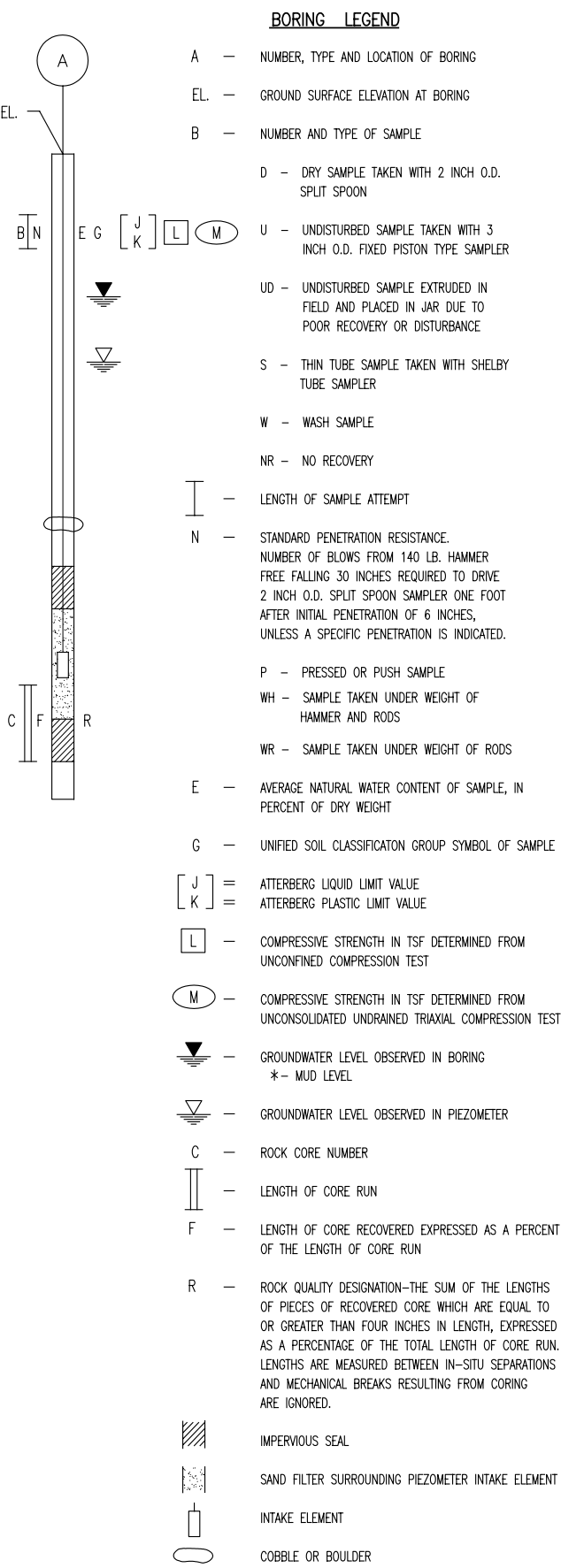
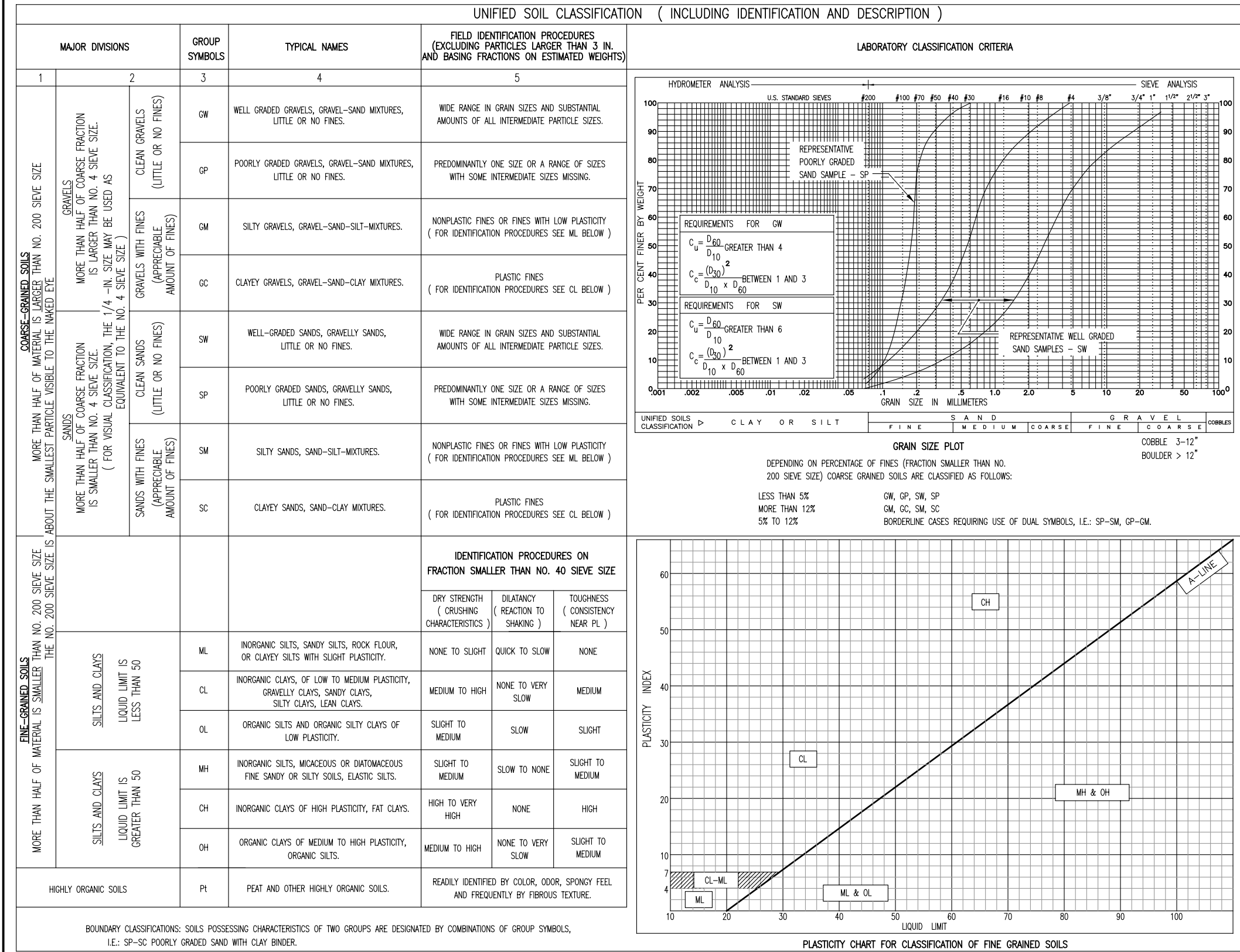


MUESER RUTLEDGE CONSULTING ENGINEERS
225 WEST 34th STREET - 14 PENN PLAZA
NEW YORK, NY 10122

STEREONET REFERENCE DRAWING

DRAWING NO.

R-1



DEGREE OF COMPACTION FOR NON-PLASTIC SOIL		TERMINOLOGY USED IN MRCE SOIL DESCRIPTIONS			DESCRIPTION OF CONSTITUENT PERCENTAGES AS USED IN SOIL SAMPLE CLASSIFICATIONS
DEGREE OF COMPACTION	BLOWS* PER FOOT	CONSISTENCY OF CLAY AND CLAYEY SILT ⁺			
		CONSISTENCY	UNCONFINED COMPRESSIVE STRENGTH (TSF)	IDENTIFICATION CHARACTERISTICS	
LOOSE	0 TO 10	SOFT	LESS THAN 0.5	EASILY REMOLDED WITH SLIGHT FINGER PRESSURE	1% TO 12% - "TRACE" 13% TO 30% - "SOME" 31% TO 49% - ADJECTIVE FORM OF SOIL GROUP (EG. SANDY) EQUAL AMOUNT - "AND" (EG. SAND AND GRAVEL)
MEDIUM COMPACT	11 TO 29	MEDIUM	0.5 TO 1.0	REQUIRES SUBSTANTIAL PRESSURE FOR REMOLDING	
COMPACT	30 TO 50	STIFF	1.0 TO 4.0	DIFFICULT TO REMOLD WITH FINGERS	
VERY COMPACT	GREATER THAN 50	HARD	GREATER THAN 4.0	CANNOT BE REMOLDED WITH FINGERS	
* STANDARD PENETRATION RESISTANCE USING 140 LB. HAMMER FREE FALLING 30 INCHES TO DRIVE A 2 INCH O.D. SPLIT-SPOON SAMPLER.		+ NONPLASTIC SILTS ARE DESCRIBED USING DEGREE OF COMPACTION AS PRESENTED FOR NON-PLASTIC SOIL.			

TABLE R-1 ROCK CORE CLASSIFICATION CRITERIA							
HARDNESS/SOUNDNESS CLASSIFICATION	TYPICAL GEOLOGIC CLASSIFICATION	IDENTIFICATION CHARACTERISTICS	GENERAL MINIMUM CORING CHARACTERISTICS				INTACT SPECIMEN TYPICAL MINIMUM COMPRESSIVE STRENGTH
			NX OR LARGER		BX OR SMALLER		
			REC	RQD	REC	RQD	PSI
HARD ROCK UNWEATHERED MAY BE JOINTED	-CRYSTALLINE IGNEOUS, OR METAMORPHIC ROCKS -HIGHLY SILICEOUS SEDIMENTARY ROCKS	- UNWEATHERED FABRIC - RINGS WHEN STRUCK WITH BAR - SHARP AND HARD FRACTURE SURFACE WHEN BROKEN MECHANICALLY - MAY BE JOINTED, BUT JOINTS ARE GENERALLY TIGHT. JOINTS MAY BE IRON STAINED. - DOES NOT DISINTEGRATE UPON EXPOSURE - DOES NOT SLAKE IN WATER	95 OR MORE	85 OR MORE	85 OR MORE	75 OR MORE	3000
MEDIUM HARD ROCK SLIGHTLY WEATHERED MAY BE CLOSELY JOINTED	AS FOR HARD ROCKS AND: - MODERATELY SILICEOUS SEDIMENTARY ROCKS - CERTAIN CALCAREOUS ROCKS	AS FOR HARD ROCK, EXCEPT: - FABRIC MAY BE IRON STAINED - MAY BE CLOSELY JOINTED, BUT JOINTS ARE GENERALLY TIGHT. JOINTS HAVE SLIGHT WEATHERING OR MAY BE IRON STAINED.	70	50	50	40	1500
INTERMEDIATE ROCK MODERATELY WEATHERED MAY BE CLOSELY JOINTED	AS FOR MEDIUM HARD ROCKS AND: - MOST SEDIMENTARY ROCKS OTHER THAN COMPACTION SHALES - MOST CALCAREOUS ROCKS WHICH ARE NOT POROUS	AS FOR MEDIUM HARD ROCK, EXCEPT: - MODERATELY WEATHERED FABRIC - WEATHERED JOINTS - THUDS WHEN STRUCK BY BAR - CAN BE INDENTED WITH A STEEL NAIL - BREAKS READILY WITH HAMMER - PIECES OF WEATHERED SURFACE CAN BE BROKEN OFF BY HAND - DOES NOT DISINTEGRATE UPON EXPOSURE - UNWEATHERED PIECES DO NOT SLAKE	50	35	35	25	500
WEATHERED ROCK HIGHLY WEATHERED MAY BE BROKEN	AS FOR INTERMEDIATE ROCKS AND: - COMPACTION SEDIMENTARIES - CALCAREOUS ROCKS WITH SOIL-FILLED CAVITIES	AS FOR INTERMEDIATE ROCK, EXCEPT: - HIGHLY WEATHERED FABRIC - CAN BE BROKEN EASILY, CRUMBLES WITH DIFFICULTY BY HAND - CAN BE SCRAPPED BY KNIFE - MAY SOFTEN UPON EXPOSURE - MAY SLAKE IN WATER - STANDARD PENETRATION RESISTANCE EXCEEDS 50 BLOWS/FOOT	LESS THAN 50	LESS THAN 35	LESS THAN 35	LESS THAN 25	150
DECOMPOSED ROCK (RESIDUAL SOILS)	ALL ROCK TYPES	- ROCK TEXTURE AND STRUCTURE OFTEN PRESERVED - GENERALLY SOIL-LIKE IN CONSISTENCY - CAN BE CRUMPLED BY SLIGHT HAND PRESSURE - CAN BE PEELED WITH A KNIFE - STANDARD PENETRATION RESISTANCE LESS THAN 50 BLOWS/FOOT	WHEN RECOVERED WITH SOIL SAMPLING TECHNIQUES, DESCRIBED AS FOR SOILS INCLUDING USC GROUP SYMBOLS. (WTHD ROCK) ADDED TO DESCRIPTION.				

NOTES:

1. ROCK CORE DESCRIPTIONS REPRESENT ONLY THE MATERIAL RECOVERED IN THE CORING OPERATIONS.

2. GENERAL MINIMUM CORING CHARACTERISTICS ASSUME ROCK CORING WITH A DOUBLE TUBE SERIES "M" OR EQUIVALENT CORE BARREL USING GOOD CORING TECHNIQUES AND EQUIPMENT.

3. REC - RECOVERY IS THE LENGTH OF CORE RECOVERED, EXPRESSED AS A PERCENTAGE OF THE LENGTH OF CORE RUN.

4. RQD - ROCK QUALITY DESIGNATION IS THE SUM OF THE LENGTHS OF CORE PIECES FOUR INCHES OR LONGER EXPRESSED AS A PERCENTAGE OF THE TOTAL LENGTH OF CORE RUN. LENGTHS ARE MEASURED BETWEEN IN-SITU SEPARATIONS; MECHANICAL BREAKS RESULTING FROM CORING AND VERTICAL JOINTS ARE IGNORED.

TABLE R-4 ROCK CORE SKETCH KEY

SKETCH SYMBOLS

JOINT ORIENTATION AND CONDITION

Joint

Healed Joint

Broken

Part of Core Not Recovered

Cavities or Vugs in Core

Clay

Sand

Parallel

- //

Crossing

- X

Foliation

- F

Stratification

- S

Unfoliated or Unstratified

- U

Mechanical Break

- MB

SURFACE

-

CONDITION

Curved

- C

Slick

- 1

Irregular

- I

Smooth

- 2

Straight

- S

Rough

- 3

TABLE R-2 WEATHERING AND JOINTING DEFINITIONS

DEGREE OF FABRIC WEATHERING

FABRIC WEATHERING

CHARACTERISTIC

Unweathered

UnW

No decomposition or discoloration rings when struck

Slightly Weathered

SIW

Iron Stained Rings when struck

Moderately Weathered

MdW

Deteriorated fabric Thuds when struck

Highly Weathered

HiW

Friable, easily broken by hand

Decomposed

Dec

Soil-like

DEGREE OF JOINT WEATHERING

JOINT WEATHERING

CHARACTERISTIC

Iron stained joints

FeJts

Indicates movement of water along joints

Weathered joints

WJts

Joints are not tight and do not match. Joints have friable edges.

DEGREE OF JOINTING

JOINTING

JOINT FREQUENCY

Massive

Mssv

Less than 1 joint in 4 feet

Blocky

Blky

1 joint every 2 to 4 feet

Moderately Jointed

MdJtd

1 joint every foot to 2 feet

Jointed

Jtd

1 to 2 joints per foot

Closely Jointed

ClJtd

2 to 4 joints per foot

Broken

Bkn

More than 4 joints per foot

Vertical joints are ignored in RQD and joint frequency evaluations, but are noted in written descriptions and and on core sketches.

TABLE R-3 ABBREVIATIONS FOR ROCK CORE CLASSIFICATION

Blocky

Blky

Intermediate

Int

Broken

Bkn

Light

Lt

Brown

brn

Lignite

lign

Calcareous or Calcite

calc

Limestone

lms

Cavities

cvts

Jointed

Jtd

Chlorite

chl

Joints

Jts

Clay, Clayey

cl

Massive

Mssv

Closely Jointed

ClJtd

Medium Hard

MdHd

Coating on joint surface

coat

Mica, Micaceous

Mic

Crushed

crsh

Moderately Jointed

MdJtd

Dark

dk

Moderately Weathered

MdW

Decomposed

Dec

Pockets

pkts

Ditto

do

Quartz

qtz

Dolomite, Dolomitic

Dol

Recovery

Rec

Iron stained Joints

FeJts

Rock Quality Designation

RQD

Iron Stained

FeStn

Sand

sa

Feldspar

feld

Sandstone

ss

Foliation

Fol

Schist, Schistose

sch

Fractured

frct

Shale

sh

Fragments

fgmts

Shear zone

Sz

Gneiss, Gneissic

gns

Siliceous

sil

Gouge

gog

Silt

si

Granite, Granitic

gr

Slickensided

slks

Gray

gry

Slightly Weathered

SIW

Hard

Hd

Unweathered

UnW

Highly Weathered

HiW

Weathered

Wthd

Hornblende

Hbl

Weathered Joints

WJts

Injected

inj

Vein

Vn

Interbedded

Intrbd

Vertical Joints

VJts

MUESER RUTLEDGE CONSULTING ENGINEERS

225 WEST 34th STREET - 14 PENN PLAZA

NEW YORK, NY 10122

ROCK CORE CLASSIFICATION CRITERIA

RC-1

DRAWING NO.

APPENDIX A
MRCE BORING LOGS

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

PROJECT: 9TH AVENUE DEVELOPMENT
LOCATION: NEW YORK, NEW YORK

BORING NO. GB-204
SHEET 1 OF 3
FILE NO. 9560
SURFACE ELEV. 26 +/-
RES. ENGR. E. RUBINSTEIN/S. HWANG

DAILY PROGRESS	SAMPLE			SAMPLE DESCRIPTION	STRATA	DEPTH	CASING	REMARKS
	NO.	DEPTH	BLOWS/6"				BLOWS	
01:15	1D	0.5	10-14	Light brown fine to coarse sand, some brick fragments, silt, trace grave (Fill) (SM) Do 1D (Fill) (SM)	F1	0.3	DRILLED	**Asphalt from 0' to 0.3'. Rig facing North 3 scratches 120° bearing.
3-16-08		2.0	9				AHEAD	
Sunday	2D	2.0	4-3				4"	
Cloudy		4.0	9-5					
40°F						5		
	3D	5.0	4-4					
		7.0	6-2					
	4D	7.0	4-29					
		8.9	9-100/5"			10	▼	
02:30						12		
08:30				Medium hard slightly weathered pink & white pegmatite, jointed to moderately jointed, weathered joints	R		8*	1' of core was soil. soil. *Coring time in minutes per foot.
03-17-08							9*	
Monday	1C	12.0	REC=64%			15	9*	
Sunny		17.0	RQD=62%				8*	
& Windy							10*	
38°F							10*	
	2C	17.0	REC=88%				10*	
		22.0	RQD=74%			20	9*	
							9*	
							8*	
	3C	22.0	REC=84%	0.2'-6': Hard slightly weathered light gray & white pegmatite blocky, iron stained joints & weathered joints 2.6'-4.4': Slightly weathered light gray granite, jointed to closely jointed, FeJts & WJts Medium hard slightly weathered gray granite & pegmatite, jointed to closely jointed, iron stained joints & weathered joints			9*	End of Boring at 27'. Lost core bit in hole. Relocated hole 3' North.
		27.0	RQD=64%				9*	
						25	9*	
							9*	
						27	9*	
11:13								
						30		
						35		
						40		
						45		
						50		

**MUESER RUTLEDGE CONSULTING ENGINEERS
ROCK CORE SKETCH**

BORING NO. GB-204

SHEET 2 OF 3

FILE NO. 9560

SURFACE ELEV. 26+

RES. ENGR. ERUBINSTEIN

PROJECT 9TH AVE

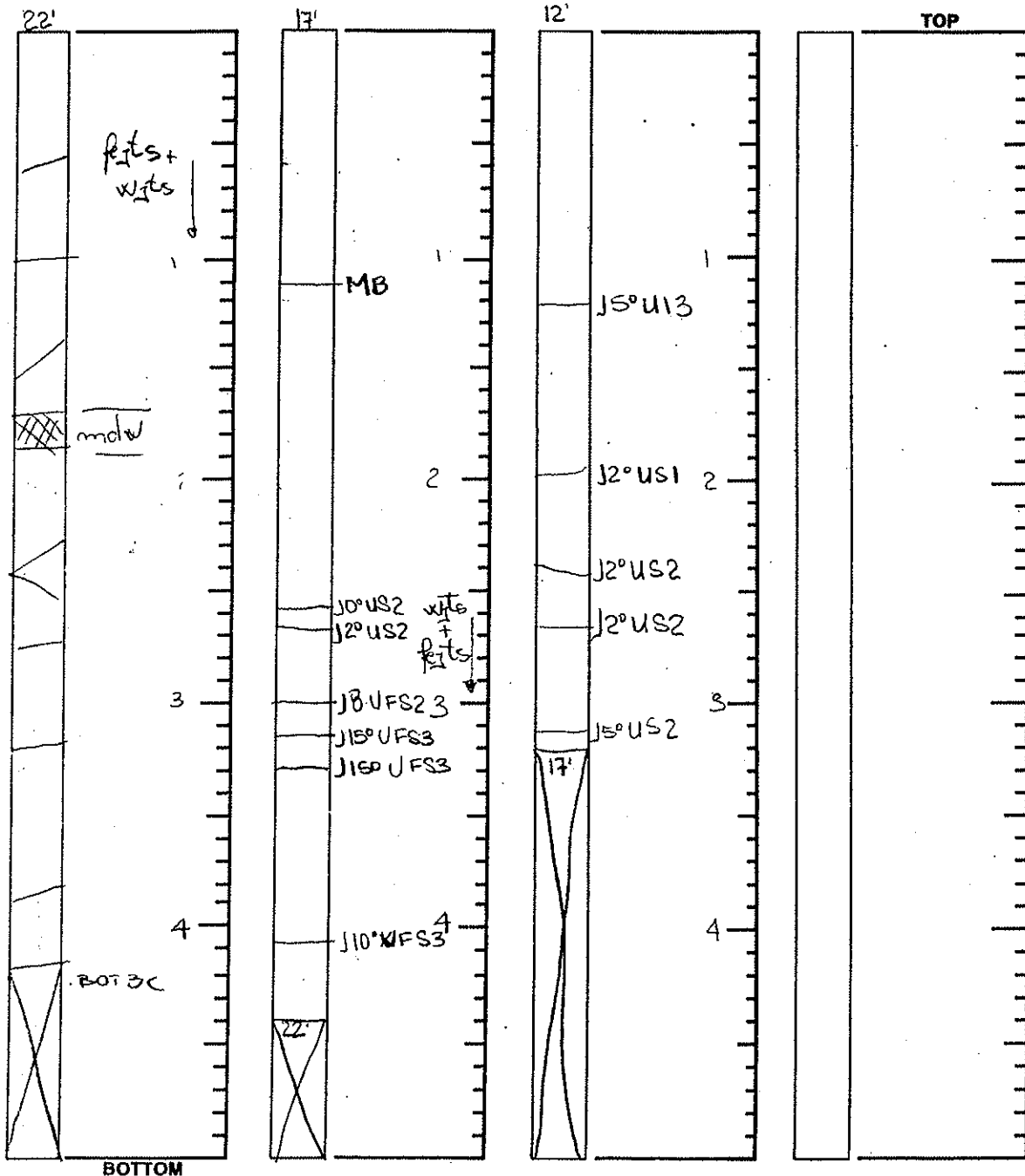
LOCATION NY, NY

Run No.	REC / RQD
3C	84/104

Run No.	REC / RQD
2C	88/74

Run No.	REC / RQD
1C	64/62

Run No.	REC / RQD



**ROCK CORE SKETCH
LEGEND**

JOINTING

- J - Joint
- MB - Mechanical Break
- ∠ - Angle w/ Horizontal
- // - Parallel
- X - Crossing
- F - Foliation
- S - Stratification
- U - Unfoliated or Unstratified

SURFACE

- C - Curved
- I - Irregular
- S - Straight

CONDITION

- 1 - Slick
- 2 - Smooth
- 3 - Rough

SKETCH SYMBOLS

- Joint
- Healed Joint
- Broken
- Part of Core Not Recovered
- Cavities or Vugs in Core
- Clay
- Sand
- Empty Space

NOTES ORIENTED CORE

MUESER RUTLEDGE CONSULTING ENGINEERS

PROJECT <u>9TH AVENUE DEVELOPMENT</u> LOCATION <u>NEW YORK, NEW YORK</u> BORING LOCATION <u>SEE BORING LOCATION PLAN</u>	BORING NO. <u>GB-204</u> SHEET <u>3</u> OF <u>3</u> FILE NO. <u>9560</u> SURFACE ELEV. <u>26 +/-</u> DATUM <u>BOROUGH PRESIDENT OF MANHATTAN</u>
---	--

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG	TYPE OF FEED DURING CORING	CASING USED	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO	
TRUCK	ACKER SOILMAX MECHANICAL	DIA., IN. <u>4</u>	DEPTH, FT. FROM <u>0</u>	TO <u>10</u>	
SKID	HYDRAULIC <u>X</u>	DIA., IN. _____	DEPTH, FT. FROM _____	TO _____	
BARGE	OTHER _____	DIA., IN. _____	DEPTH, FT. FROM _____	TO _____	
OTHER	_____				

TYPE AND SIZE OF:	DRILLING MUD USED <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
D-SAMPLER <u>2" O. D. SPLIT SPOON</u>	DIAMETER OF ROTARY BIT, IN. <u>3-7/8, 2-7/8</u>
U-SAMPLER _____	TYPE OF DRILLING MUD _____
S-SAMPLER _____	
CORE BARREL <u>NX DOUBLE TUBE</u>	AUGER USED <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
CORE BIT <u>NX DIAMOND BIT</u>	TYPE AND DIAMETER, IN. _____
DRILL RODS <u>NWJ</u>	
	CASING HAMMER, LBS. <u>140</u> AVERAGE FALL, IN. <u>30</u>
	SAMPLER HAMMER, LBS. <u>140</u> AVERAGE FALL, IN. <u>30</u>

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
					NO WATER LEVEL OBSERVATIONS MADE.

PIEZOMETER INSTALLED ☐ YES ☒ NO SKETCH SHOWN ON _____

STANDPIPE:	TYPE _____	ID, IN. _____	LENGTH, FT. _____	TOP ELEV. _____
INTAKE ELEMENT:	TYPE _____	OD, IN. _____	LENGTH, FT. _____	TIP ELEV. _____
FILTER:	MATERIAL _____	OD, IN. _____	LENGTH, FT. _____	BOT. ELEV. _____

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING	LIN. FT. <u>12</u>	NO. OF 3" SHELBY TUBE SAMPLES _____
3.5" DIA. U-SAMPLE BORING	LIN. FT. _____	NO. OF 3" UNDISTURBED SAMPLES _____
CORE DRILLING IN ROCK	LIN. FT. _____	OTHER: ROCK ORIENTED CORING <u>18</u>

BORING CONTRACTOR	WARREN GEORGE INC.
DRILLER	MIKE KELLY HELPERS SAMMY COLON
REMARKS	BOREHOLE GROUTED AFTER LOSING CORE BIT IN HOLE.
RESIDENT ENGINEER	EMILY RUBINSTEIN DATE 03-17-08
CLASSIFICATION CHECK:	CHERYL J. MOSS TYPING CHECK: ROBERTO REALE

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

PROJECT: 9TH AVENUE DEVELOPMENT
LOCATION: NEW YORK, NEW YORK

BORING NO. GB-204AP
SHEET 1 OF 7
FILE NO. 9560
SURFACE ELEV. 26.0 +/-
RES. ENGR. E. RUBINSTEIN/R.REALE

DAILY PROGRESS	SAMPLE			SAMPLE DESCRIPTION	STRATA	DEPTH	CASING	REMARKS
	NO.	DEPTH	BLOWS/6"				BLOWS	
11:45 03-17-08 Monday Sunny 38°F					F1		DRILLED	Offset hole drilled to 24 feet.
							AHEAD	
							4" 3"	
						5		
						10	▼	
						12	▼	
						15		
						20		
	4C	22.0	REC=48%	Gray and pink weathered pegmatite iron stained joints and weathered joints, broken			6*	
		27.0	RQD=0%				8*	
							6*	
					25	7*		
						8*		
						8*		
	5C	27.0	REC=100%	Hard unweathered gray and pink pegmatite, jointed, iron stained joints		7*		
		32.0	RQD=96%			7*		
					30	8*		
						6*		
						8*		
	6C	32.0	REC=100%	Hard unweathered pink and gray pegmatite, massive	R		8*	
		36.5	RQD=100%				6*	
						35	8*	
						8*		
	7C	36.5	REC=100%	Hard unweathered gray and pink pegmatite, massive			9*	
		41.5	RQD=100%				8*	
							9*	
				40		9*		
						10*		
						10*		
						10*		
	8C	41.5	REC=100%	Hard unweathered gray and pink pegmatite, trace gneissic schist, blocky to jointed			10*	
		45.5	RQD=80%				10*	
						45	10*	
						10*		
	9C	46.5	REC=100%	Hard unweathered gray gneissic schist, trace pegmatite, blocky to moderately jointed			9*	
		51.5	RQD=90%				9*	
							10*	
						50	10*	
						10*		
						9*		
09:30								
10:30 03-18-08 Tuesday Cloudy 43°F	8C	41.5	REC=100%	Hard unweathered gray and pink pegmatite, trace gneissic schist, blocky to jointed		10*		
		45.5	RQD=80%			10*		
						10*		
					45	10*		
						10*		
	9C	46.5	REC=100%	Hard unweathered gray gneissic schist, trace pegmatite, blocky to moderately jointed		9*		
		51.5	RQD=90%			9*		
						10*		
					50	10*		
						10*		
						9*		

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

PROJECT: 9TH AVENUE DEVELOPMENT
LOCATION: NEW YORK, NEW YORK

BORING NO. GB-204AP
SHEET 2 OF 7
FILE NO. 9560
SURFACE ELEV. 26.0 +/-
RES. ENGR. E. RUBINSTEIN/R.REALE

DAILY PROGRESS	SAMPLE			SAMPLE DESCRIPTION	STRATA	CASING		REMARKS
	NO.	DEPTH	BLOWS/6"			DEPTH	BLOWS	
Cont'd 03-18-08	10C	51.5	REC=100%	Hard unweathered gray gneissic schist, trace hornblende schist, blocky	R			
		56.5	RQD=100%				8*	
							8*	
				55		8*		
						9*		
	11C	56.5	REC=100%	Do 10C			10*	
		61.5	RQD=100%				9*	
							10*	
				60		9*		
						9*		
	12C	61.5	REC=100%	Hard unweathered gray gneissic schist, trace pegmatite blocky to moderately jointed			10*	
		66.5	RQD=92%				9*	
							9*	
				65		10*		
						9*		
13C	66.5	REC=100%	Hard unweathered gray gneissic schist, trace pegmatite moderately jointed		8*			
	71.5	RQD=92%			9*			
					9*			
06:00					70	8*		
						9*		
					71.5			
					75			
					80			
					85			
					90			
					95			
					100			









End of boring at 71.5'.

BORING NO. GB-206AD
SHEET 3 OF 7
FILE NO. 9560
RFACE ELEV. 26.0±
RES. ENGR. ERR/RR

BORING NO. GB-206A-D
SHEET 3 **OF** 7
FILE NO. 956D
SURFACE ELEV. 26.0 ±
RES. ENGR. ERR / RR

Run No.	REC / RQD
4C	48%



- ROCK CORE SKETCH
LEGEND**
- JOINTING**
- J - Joint
MB - Mechanical Break
K - Angle w/ Horizontal
// - Parallel
X - Crossing
F - Foliation
S - Stratification
U - Unfoliated or Unstratified
- SURFACE**
- C - Curved
I - Irregular
S - Straight
- CONDITION**
- 1 - Slick
2 - Smooth
3 - Rough
- SKETCH SYMBOLS**
- | | |
|---|----------------------------|
|  | Joint |
|  | Healed Joint |
|  | Broken |
|  | Part of Core Not Recovered |
|  | Cavities or Vugs in Core |
|  | Clay |
|  | Sand |
|  | Empty Space |

NOTES

**MUESER RUTLEDGE CONSULTING ENGINEERS
ROCK CORE SKETCH**

BORING NO. GB-204A-P
SHEET 2 OF 7
FILE NO. 9560
SURFACE ELEV. 26.01
RES. ENGR. ERR

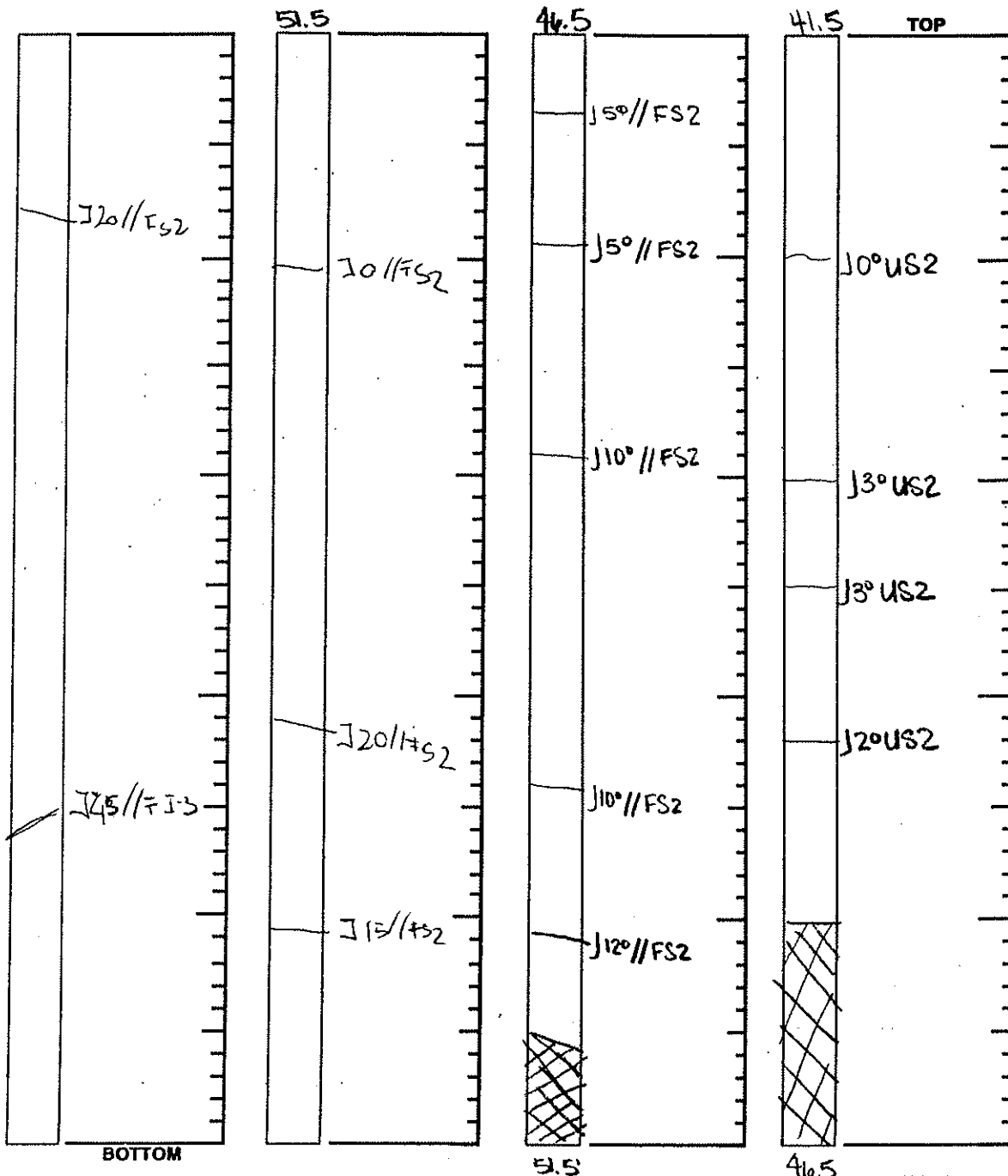
PROJECT 9TH AVE
LOCATION NEW YORK, NY

Run No.	REC / RQD
11C	100/100

Run No.	REC / RQD
10C	100/100

Run No.	REC / RQD
9C	100/90

Run No.	REC / RQD
8C	100/80



ROCK CORE SKETCH LEGEND	
JOINTING	
J	- Joint
MB	- Mechanical Break
K	- Angle w/ Horizontal
//	- Parallel
X	- Crossing
F	- Foliation
S	- Stratification
U	- Unfolded or Unstratified
SURFACE	
C	- Curved
I	- Irregular
S	- Straight
CONDITION	
1	- Slick
2	- Smooth
3	- Rough
SKETCH SYMBOLS	
	Joint
	Healed Joint
	Broken
	Part of Core Not Recovered
	Cavities or Vugs in Core
	Clay
	Sand
	Empty Space

NOTES

**MUESER RUTLEDGE CONSULTING ENGINEERS
ROCK CORE SKETCH**

BORING NO. GB-2044P
 SHEET 5 OF 7
 FILE NO. 9560
 SURFACE ELEV. 26.05
 RES. ENGR. RR

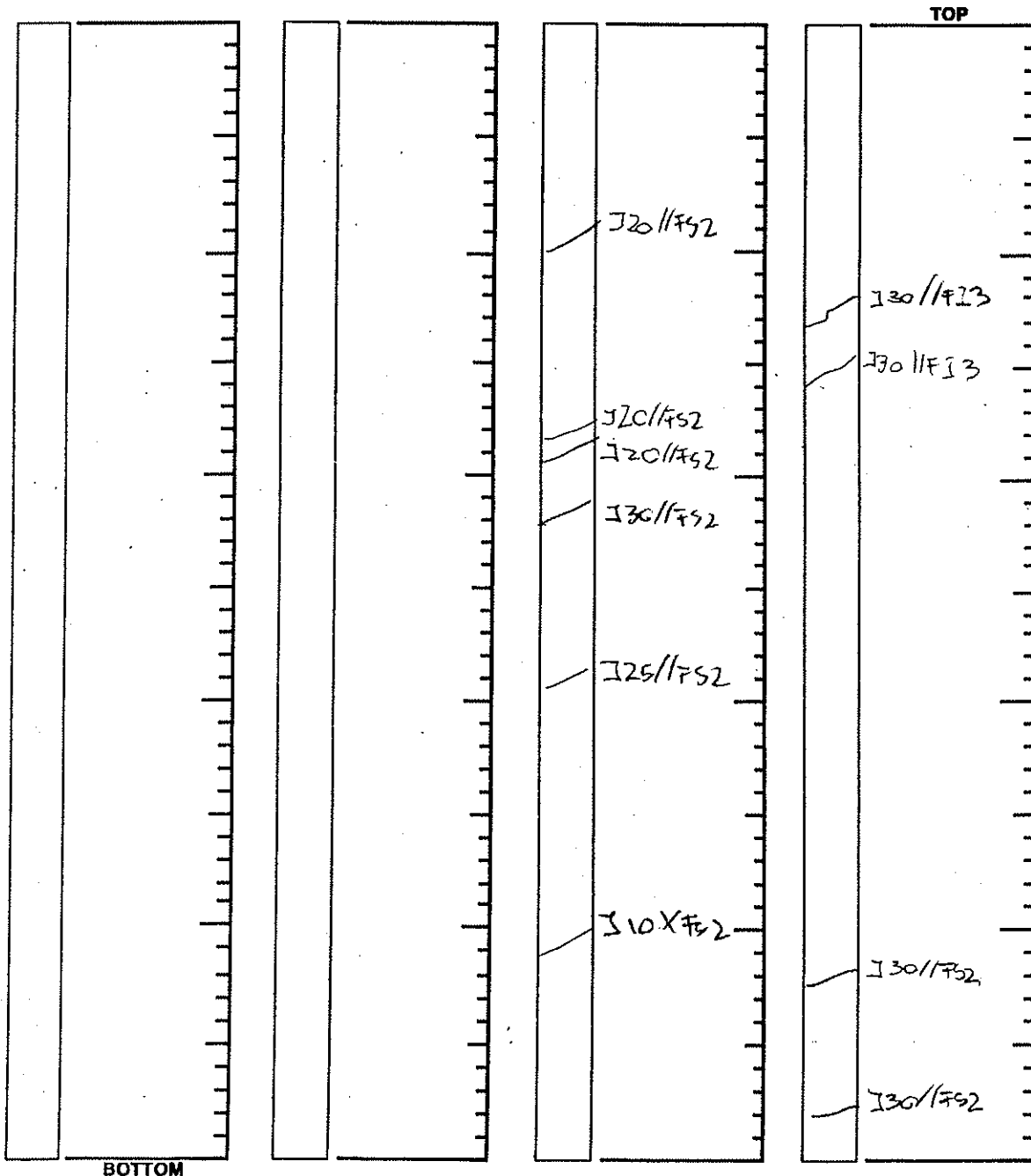
PROJECT 9th Avenue Development
 LOCATION NEW YORK, NY

Run No.	REC / RQD

Run No.	REC / RQD

Run No.	REC / RQD
13C	100/92

Run No.	REC / RQD
12C	100/92



ROCK CORE SKETCH LEGEND	
JOINTING	
J	- Joint
MB	- Mechanical Break
K	- Angle w/ Horizontal
//	- Parallel
X	- Crossing
F	- Foliation
S	- Stratification
U	- Unfoliated or Unstratified
SURFACE	
C	- Curved
I	- Irregular
S	- Straight
CONDITION	
1	- Slick
2	- Smooth
3	- Rough
SKETCH SYMBOLS	
	Joint
	Healed Joint
	Broken
	Part of Core Not Recovered
	Cavities or Vugs in Core
	Clay
	Sand
	Empty Space

SCALE: 1 division = 0.1 feet

NOTES _____

PROJECT 2th Avenue Development PIEZOMETER NO. GB-204A P
LOCATION NEW YORK, NY
PIEZOMETER LOCATION SEE BLP DATE OF INSTALLATION _____
☐ SEE SKETCH ON BACK RES. ENG. RR

 Sand
  Bentonite
 Gravel
  Grout

GROUND SURFACE ELEV. 26.0±

PIEZOMETER NO. GB-204A⁷

MUESER RUTLEDGE CONSULTING ENGINEERS

PROJECT 9TH AVENUE DEVELOPMENT	BORING NO. GB-204AP
LOCATION NEW YORK, NEW YORK	SHEET 7 OF 7
BORING LOCATION SEE BORING LOCATION PLAN	FILE NO. 9560
	SURFACE ELEV. 26.0 +/-
	DATUM BOROUGH PRESIDENT OF MANHATTAN

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG	TYPE OF FEED	CASING USED	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	
TRUCK <input checked="" type="checkbox"/>	DURING CORING			
	MECHANICAL	DIA., IN. 3	DEPTH, FT. FROM 0 TO 12	
SKID <input type="checkbox"/>	HYDRAULIC <input checked="" type="checkbox"/>	DIA., IN. 4	DEPTH, FT. FROM 0 TO 10	
BARGE <input type="checkbox"/>	OTHER	DIA., IN.	DEPTH, FT. FROM	TO
OTHER <input type="checkbox"/>				

TYPE AND SIZE OF:	DRILLING MUD USED <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
D-SAMPLER 2" O.D. SPLIT SPOON	DIAMETER OF ROTARY BIT, IN. 3-7/8, 2-7/8
U-SAMPLER	TYPE OF DRILLING MUD
S-SAMPLER	
CORE BARREL NX DOUBLE TUBE	AUGER USED <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
CORE BIT NX DIAMOND	TYPE AND DIAMETER, IN.
DRILL RODS NWJ	
	CASING HAMMER, LBS. 300 AVERAGE FALL, IN. 30
	SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
					NO WATER LEVEL OBSERVATIONS MADE.

PIEZOMETER INSTALLED ☒ YES ☐ NO **SKETCH SHOWN ON** _____

STANDPIPE:	TYPE	ID, IN.	LENGTH, FT.	TOP ELEV.
INTAKE ELEMENT:	TYPE	OD, IN.	LENGTH, FT.	TIP ELEV.
FILTER:	MATERIAL	OD, IN.	LENGTH, FT.	BOT. ELEV.

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING	LIN. FT.	NO. OF 3" SHELBY TUBE SAMPLES	
3.5" DIA. U-SAMPLE BORING	LIN. FT.	NO. OF 3" UNDISTURBED SAMPLES	
CORE DRILLING IN ROCK	LIN. FT.	OTHER: ORIENTED CORE	50'

BORING CONTRACTOR	WARREN GEORGE INC.
DRILLER	CARLOS MALDONADO/MIKE KELLY
REMARKS	PIEZOMETER INSTALLED (ORIENTED CORE)
RESIDENT ENGINEER	ROBERTO REALE
CLASSIFICATION CHECK:	CHERYL J. MOSS
TYPING CHECK:	ROBERTO REALE

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

PROJECT: 9TH AVENUE DEVELOPMENT
LOCATION: NEW YORK, NEW YORK

BORING NO. GB-205
SHEET 1 OF 6
FILE NO. 9560
SURFACE ELEV. 27.9 +/-
RES. ENGR. RR/SM/ER

DAILY PROGRESS	SAMPLE			SAMPLE DESCRIPTION	STRATA	DEPTH	CASING	REMARKS
	NO.	DEPTH	BLOWS/6"				BLOWS	
10:00							DRILLED	3 Scribes 260°F from
03-19-08	1D	1.0	22-7	Red brown coarse to fine sand, some gravel, brick, silt, trace concrete (Fill) (SM)			AHEAD	phiscian 0' to 0.4'
Wednesday		3.0	8-8				4" 3"	asphalt.
Heavy Rain	2D	3.0	4-9	Red brick, some coarse to fine sand, some silt (Fill) (GM)				
41°F		5.0	25-17		F1	5	↓	
	3D	5.0	12-13	Red brown coarse to fine sand, some brick, some silt (Fill) (GM)				
		7.0	11-15					
	4D	7.0	12-22	Do 3D (GM)				
		9.0	15-11					
	5D	9.0	33-100/1"	Gray micaceous fine to coarse sand, some silt, trace gravel, brick (Fill) (SM)		10	↓	
14:00		9.7						
14:00	1C	11.0	REC=80%	Hard slightly weathered gray gneissic schist, trace pegmatite, moderately jointed, iron s stained joints and weathered joints			5*	*Coring time in
03-19-08		16.0	RQD=84%				6*	minutes per foot.
Wednesday							8*	
Rain						15	6*	
35°F							6*	
	2C	16.0	REC=100%	Hard unweathered gray gneissic schist, moderately jointed			5*	
		21.0	RQD=100%				6*	
							6*	
						20	5*	
							6*	
	3C	21.0	REC=94%	Hard slightly weathered gray gneissic schist, moderately jointed, iron stained joints and weathered joints			6*	3 Scratches bearing
		26.0	RQD=88%				7*	280°.
							6*	
						25	6*	
							6*	
	4C	26.0	REC=100%	Hard unweathered gray gneissic schist, trace pegmatite, moderately jointed			5*	
		31.0	RQD=100%				6*	
							7*	
						30	7*	
							7*	
	5C	31.0	REC=100%	Hard unweathered gray hornblende schist and gneissic schist, jointed, mineral joints	R		8*	
		36.0	RQD=99%				7*	
							7*	
						35	5*	
10:00							4*	
22:00	6C	36.0	REC=97%	Hard unweathered gray hornblende schist, moderately jointed, mineral coated joints			5*	
03-19-08		41.0	RQD=97%				4*	
Wednesday							5*	
Overcast						40	4*	
40°F							5*	
	7C	41.0	REC=97%	Hard unweathered gneissic schist, some schistose gneiss, moderately jointed			4*	
		46.0	RQD=97%				5*	
							5*	
						45	4*	
							4*	
	8C	46.0	REC=100%	Do 7C			4*	
		51.0	RQD=100%				5*	
						50	4*	
							4*	

**MUESER RUTLEDGE CONSULTING ENGINEERS
ROCK CORE SKETCH**

BORING NO. GB-205

SHEET 3 OF 6

FILE NO. 9560

SURFACE ELEV. 27.9±

RES. ENGR. RR

PROJECT 9th Avenue Development

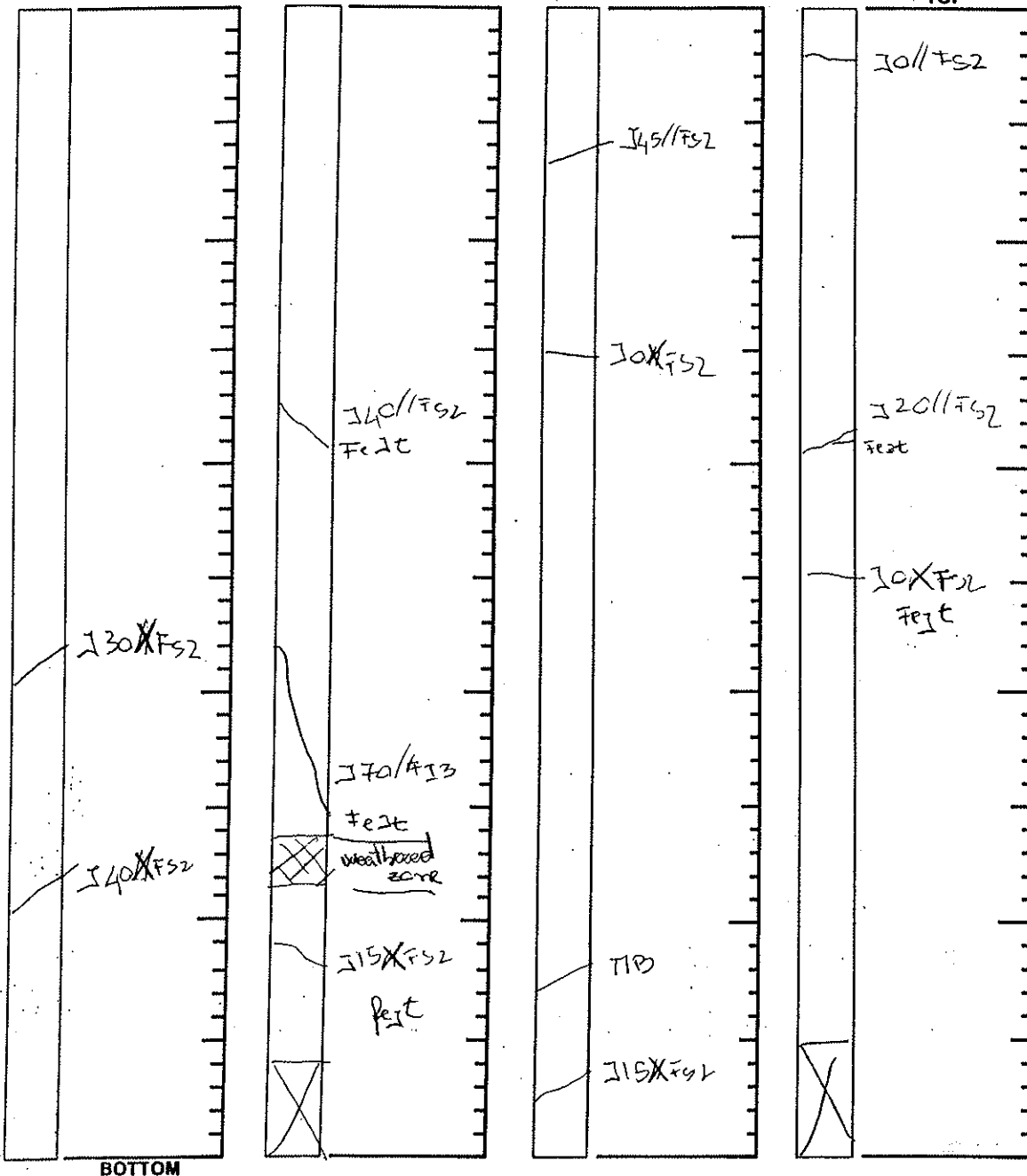
LOCATION NEW YORK, NY

Run No.	REC / RQD
4C	100/100

Run No.	REC / RQD
3C	94/88

Run No.	REC / RQD
2C	100/100

Run No.	REC / RQD
1C	100/84



ROCK CORE SKETCH LEGEND	
JOINTING	
J	- Joint
MB	- Mechanical Break
⋈	- Angle w/ Horizontal
//	- Parallel
X	- Crossing
F	- Foliation
S	- Stratification
U	- Unfoliated or Unstratified
SURFACE	
C	- Curved
I	- Irregular
S	- Straight
CONDITION	
1	- Slick
2	- Smooth
3	- Rough
SKETCH SYMBOLS	
	Joint
	Healed Joint
	Broken
	Part of Core Not Recovered
	Cavities or Vugs in Core
	Clay
	Sand
	Empty Space

SCALE: 1 division = 0.1 feet

NOTES

MUESER RUTLEDGE CONSULTING ENGINEERS
ROCK CORE SKETCH

BORING NO. 6B-205
SHEET 4 OF 6
FILE NO. 9560
SURFACE ELEV. 27.9±
RES. ENGR. S. HWANG

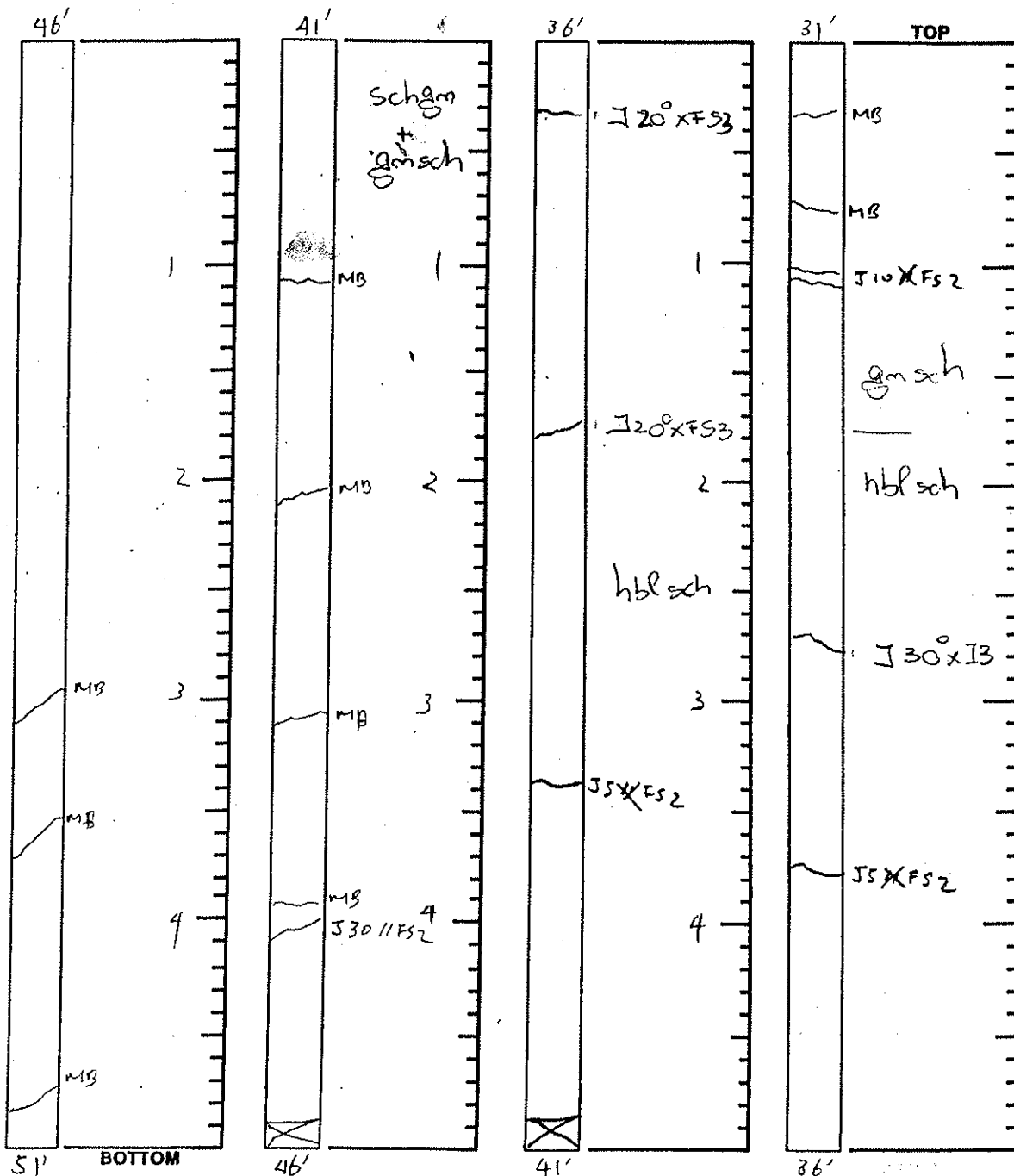
PROJECT 9TH AVE DEVELOPMENT
LOCATION NEW YORK, NY

Run No.	REC / RQD
8C	100 / 100

Run No.	REC / RQD
7C	97 / 97

Run No.	REC / RQD
6C	97 / 97

Run No.	REC / RQD
5C	100 / 99



ROCK CORE SKETCH LEGEND	
JOINTING	
J	- Joint
MB	- Mechanical Break
K	- Angle w/ Horizontal
//	- Parallel
X	- Crossing
F	- Foliation
S	- Stratification
U	- Unfolded or Unstratified
SURFACE	
C	- Curved
I	- Irregular
S	- Straight
CONDITION	
1	- Slick
2	- Smooth
3	- Rough
SKETCH SYMBOLS	
	Joint
	Healed Joint
	Broken
	Part of Core Not Recovered
	Cavities or Vugs in Core
	Clay
	Sand
	Empty Space

SCALE: 1 division = 0.1 feet

NOTES

MUESER RUTLEDGE CONSULTING ENGINEERS
ROCK CORE SKETCH

BORING NO. GR-205

SHEET 5 OF 6

FILE NO. 9560

SURFACE ELEV. 27.9±

RES. ENGR. S. HWANG

PROJECT 9TH AVE DEVELOPMENT

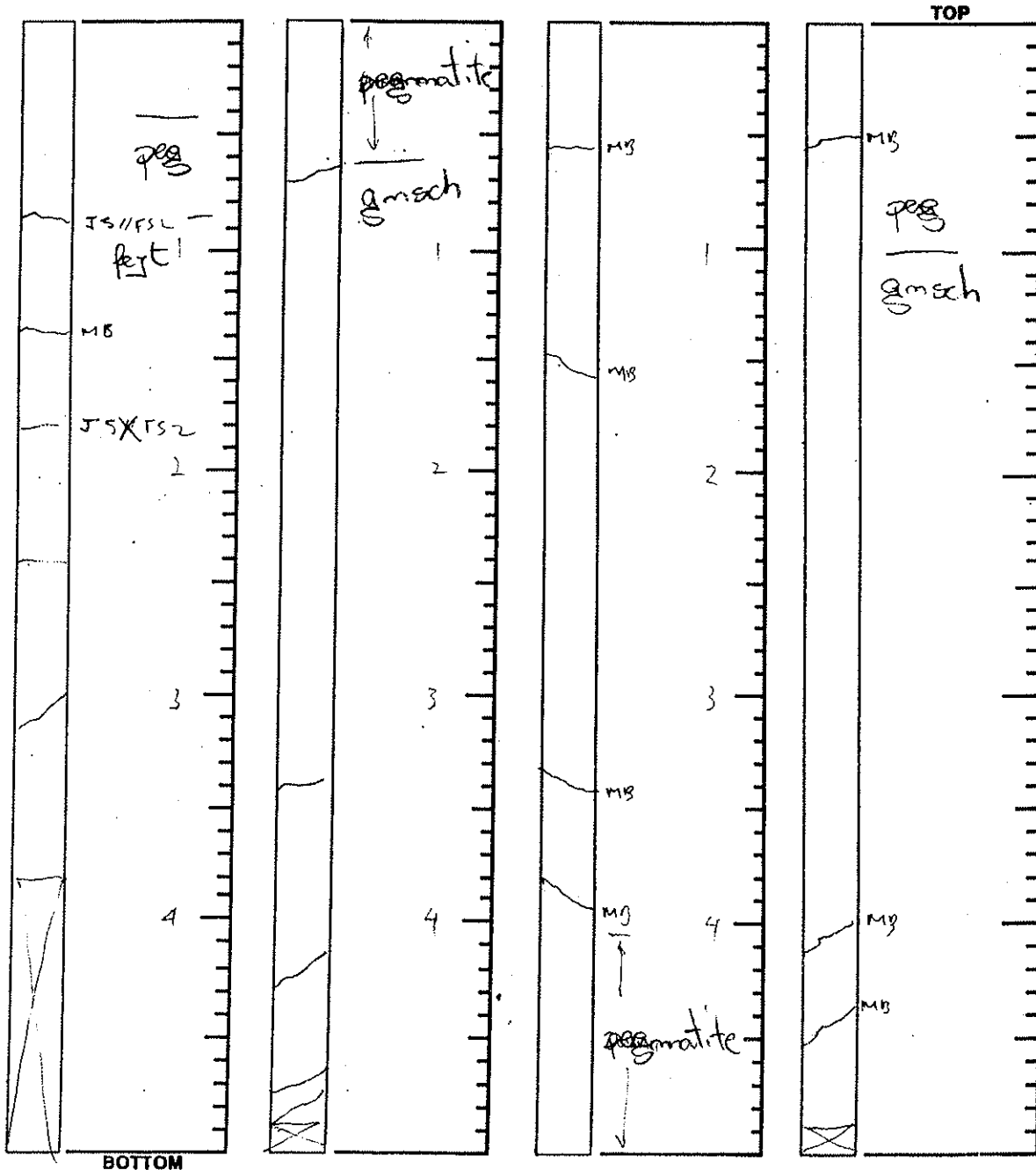
LOCATION NEW YORK, NY

Run No.	REC / RQD
12C	95/95

Run No.	REC / RQD
11C	97/97

Run No.	REC / RQD
10C	100/100

Run No.	REC / RQD
9C	97/97



ROCK CORE SKETCH LEGEND	
JOINTING	
J	- Joint
MB	- Mechanical Break
K	- Angle w/ Horizontal
//	- Parallel
X	- Crossing
F	- Foliation
S	- Stratification
U	- Unfoliated or Unstratified
SURFACE	
C	- Curved
I	- Irregular
S	- Straight
CONDITION	
1	- Slick
2	- Smooth
3	- Rough
SKETCH SYMBOLS	
	Joint
	Healed Joint
	Broken
	Part of Core Not Recovered
	Cavities or Vugs in Core
	Clay
	Sand
	Empty Space

NOTES

MUESER RUTLEDGE CONSULTING ENGINEERS

PROJECT 9TH AVENUE DEVELOPMENT	BORING NO. GB-205
LOCATION NEW YORK, NEW YORK	SHEET 6 OF 6
BORING LOCATION SEE BORING LOCATION PLAN	FILE NO. 9560
	SURFACE ELEV. 27.9 +/-
	DATUM BOROUGH PRESIDENT OF MANHATTAN

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG	TYPE OF FEED	CASING USED	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO	
TRUCK <input checked="" type="checkbox"/>	MECHANICAL	DIA., IN. 3			DEPTH, FT. FROM 0 TO 10
SKID <input type="checkbox"/>	HYDRAULIC <input checked="" type="checkbox"/>	DIA., IN. 4			DEPTH, FT. FROM 0 TO 5
BARGE <input type="checkbox"/>	OTHER	DIA., IN.			DEPTH, FT. FROM TO
OTHER <input type="checkbox"/>					

TYPE AND SIZE OF:	DRILLING MUD USED <input type="checkbox"/> YES <input type="checkbox"/> NO
D-SAMPLER 2" O.D. SPLIT SPOON	DIAMETER OF ROTARY BIT, IN.
U-SAMPLER	TYPE OF DRILLING MUD
S-SAMPLER	
CORE BARREL NX DOUBLE TUBE	AUGER USED <input type="checkbox"/> YES <input type="checkbox"/> NO
CORE BIT NX DIAMOND	TYPE AND DIAMETER, IN.
DRILL RODS NWJ	
	CASING HAMMER, LBS. AVERAGE FALL, IN.
	SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
					NO WATER LEVEL OBSERVATIONS MADE.

PIEZOMETER INSTALLED ☐ YES ☒ NO **SKETCH SHOWN ON** _____

STANDPIPE:	TYPE	ID, IN.	LENGTH, FT.	TOP ELEV.
INTAKE ELEMENT:	TYPE	OD, IN.	LENGTH, FT.	TIP ELEV.
FILTER:	MATERIAL	OD, IN.	LENGTH, FT.	BOT. ELEV.

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING	LIN. FT.	10	NO. OF 3" SHELBY TUBE SAMPLES	
3.5" DIA. U-SAMPLE BORING	LIN. FT.		NO. OF 3" UNDISTURBED SAMPLES	
CORE DRILLING IN ROCK	LIN. FT.	59	OTHER:	59' OF ORIENTED ROCK CORING

BORING CONTRACTOR WARREN GEORGE INC.	
DRILLER CARLOS MALDONADO	HELPERS BEN SCOTT
REMARKS BOREHOLE TREMIE GROUTED UPON COMPLETION. (ORIENTED CORE)	
RESIDENT ENGINEER RR/SH/ER	DATE 03-20-08
CLASSIFICATION CHECK: CHERYL J. MOSS	TYPING CHECK: ROBERTO REALE

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

PROJECT: 9TH AVENUE DEVELOPMENT
LOCATION: NEW YORK, NEW YORK

BORING NO. GB-206P
SHEET 1 OF 8
FILE NO. 9560
SURFACE ELEV. 33.4 +/-
RES. ENGR. E. RUBINSTEIN/R. REALE

DAILY PROGRESS	SAMPLE			SAMPLE DESCRIPTION	STRATA	DEPTH	CASING	REMARKS
	NO.	DEPTH	BLOWS/6"				BLOWS	
07:00							DRILLED	0' to 4' Asphalt.
03-20-08	1D	1.0	7-10	Gray red coarse to fine sand, sm brick, silt, trace gravel, concrete (Fill) (SM)			AHEAD	
Thursday		3.0	10-10				4" 3"	
Cloudy	2D	3.0	8-10	Red brown coarse to fine sand, some brick, silt, trace concrete, gravel (Fill) (SM)				
& Windy		5.0	10-9					
41°F	3D	5.0	6-6	Red brown coarse to fine sand, some brick, gravel, silt (Fill) (SM)	F1		5	
		7.0	14-12					
	4D	7.0	13-30	Brown coarse to fine sand, some gravel, silt, trace brick (Fill) (SM)				
		9.0	10-7					
	5D	9.0	17-3	Red brown fine to coarse sand, some silt, brick, gravel, trace mica (Fill) (SM)			10	
		11.0	5-3				11	
	6D	11.0	5-43	Gray micaceous fine to medium sand, some silt, rock fgmts (Decomposed Rock) (SM)	DR			
		13.0	79-60				13	
	1C	13.0	REC=60%	Intermediate slightly weathered to moderately weathered gray gneissic schist, closely jointed to jointed weathered joints			6*	3 Scratches 310°
		18.0	RQD=38%				15	6*
							6*	
							8*	
							8*	
	2C	18.0	REC=100%	Hard unweathered gray gneissic schist, trace pegmatite, hornblende schist, blocky, iron stained joints			10*	
		23.0	RQD=100%				20	10*
							10*	
							10*	
							10*	
	3C	23.0	REC=100%	Hard unweathered gray gneissic schist, hornblende schist and pegmatite, moderately jointed, iron stained joints			9*	
		28.0	RQD=100%				25	9*
							10*	
							11*	
							8*	
	4C	28.0	REC=100%	Hard unweathered gray granite massive				
		32.3	RQD=96%				30	30 - Losing water.
02:00								
02:00	5C	32.3	REC=100%	Hard unweathered gray granite, moderately jointed	R			
03-20-08		37.6	RQD=94%				10*	
Thursday							35	12*
Cloudy							16*	
41°F							10*	
	6C	37.6	REC=100%	Hard unweathered gray gneissic schist and granite, moderately jointed			11*	
		42.1	RQD=100%				12*	
22:00							40	13*
22:00							12*	
03-20-08							15*	
Thursday	7C	42.1	REC=100%	Hard unweathered gray gneissic schist, moderately jointed, iron stained joints			15*	
Cloudy		47.4	RQD=96%				20*	
38°F							45	20*
08:00							20*	
08:30							20*	
03-21-08	8C	47.4	REC=100%	Hard unweathered gray gneissic schist, moderately jointed, iron stained joints			15*	
Friday		52.4	RQD=84%				5*	
Sunny							50	5*
33°F							5*	
							5*	

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

PROJECT: 9TH AVENUE DEVELOPMENT
LOCATION: NEW YORK, NEW YORK

BORING NO. GB-206P
SHEET 2 OF 8
FILE NO. 9560
SURFACE ELEV. 33.4 +/-
RES. ENGR. E. RUBINSTEIN/R. REALE

DAILY PROGRESS	SAMPLE			SAMPLE DESCRIPTION	STRATA	CASING		REMARKS
	NO.	DEPTH	BLOWS/6"			DEPTH	BLOWS	
07:00					R		5*	
							5*	
	9C	52.4	REC=98%	Hard unweathered gray gneissic schist, trace			4*	
		57.4	RQD=98%	pegmatite massive			5*	
						55	4*	
							5*	
	10C	57.4	REC=100%	Hard unweathered gray gneissic schist,			5*	
		62.6	RQD=100%	massive			4*	
							5*	
						60	5*	
							4*	
	11C	62.6	REC=98%	Do 10C			4*	
		67.6	RQD=98%				5*	
							4*	
						65	5*	
							5*	
							4*	
	12C	67.6	REC=94%	Hard slightly weathered gray gneissic schist,			5*	
		72.6	RQD=76%	massive to jointed, iron stained joints			4*	
						70	4*	
							5*	
						72	5*	End of boring at 72'.
						75		
						80		
						85		
						90		
						95		
						100		

**MUESER RUTLEDGE CONSULTING ENGINEERS
ROCK CORE SKETCH**

BORING NO. GB-206P

SHEET 3 OF 8

FILE NO. 9560

SURFACE ELEV. 33.4 +/-

RES. ENGR. ERUBINSTEIN

PROJECT QTH AVE

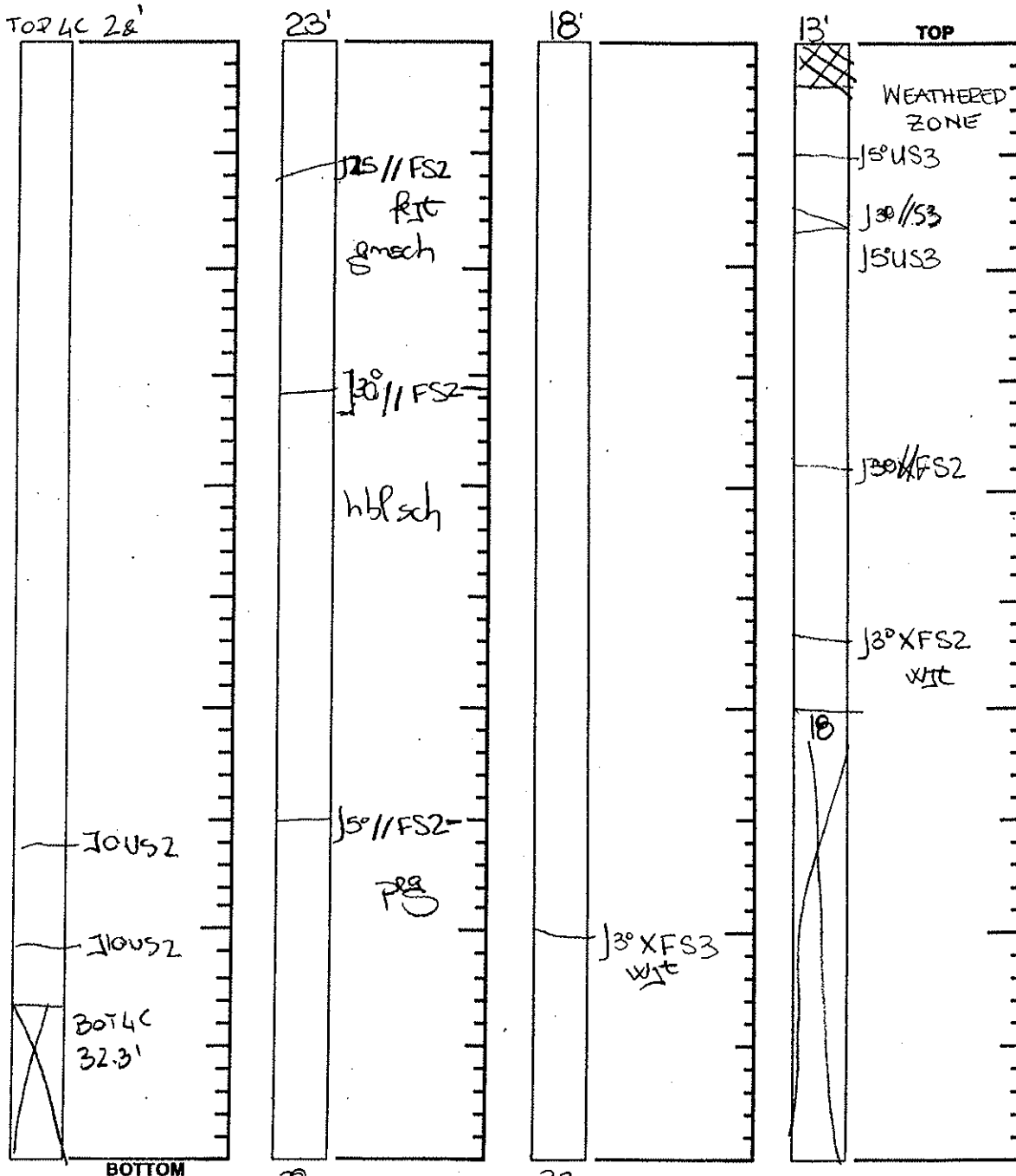
LOCATION NY, NY

Run No.	REC / RQD
4C	100/96

Run No.	REC / RQD
3C	100/100

Run No.	REC / RQD
2C	100/100

Run No.	REC / RQD
1C	60/38



ROCK CORE SKETCH LEGEND	
JOINTING	
J	- Joint
MB	- Mechanical Break
K	- Angle w/ Horizontal
//	- Parallel
X	- Crossing
F	- Foliation
S	- Stratification
U	- Unfolded or Unstratified
SURFACE	
C	- Curved
I	- Irregular
S	- Straight
CONDITION	
1	- Slick
2	- Smooth
3	- Rough
SKETCH SYMBOLS	
	Joint
	Healed Joint
	Broken
	Part of Core Not Recovered
	Cavities or Vugs in Core
	Clay
	Sand
	Empty Space

NOTES NIL

**MUESER RUTLEDGE CONSULTING ENGINEERS
ROCK CORE SKETCH**

BORING NO. 63-2067

SHEET 4 OF 8

FILE NO. Q560

SURFACE ELEV. 33.4±

RES. ENGR. RD/ERR

PROJECT 9th Avenue Development

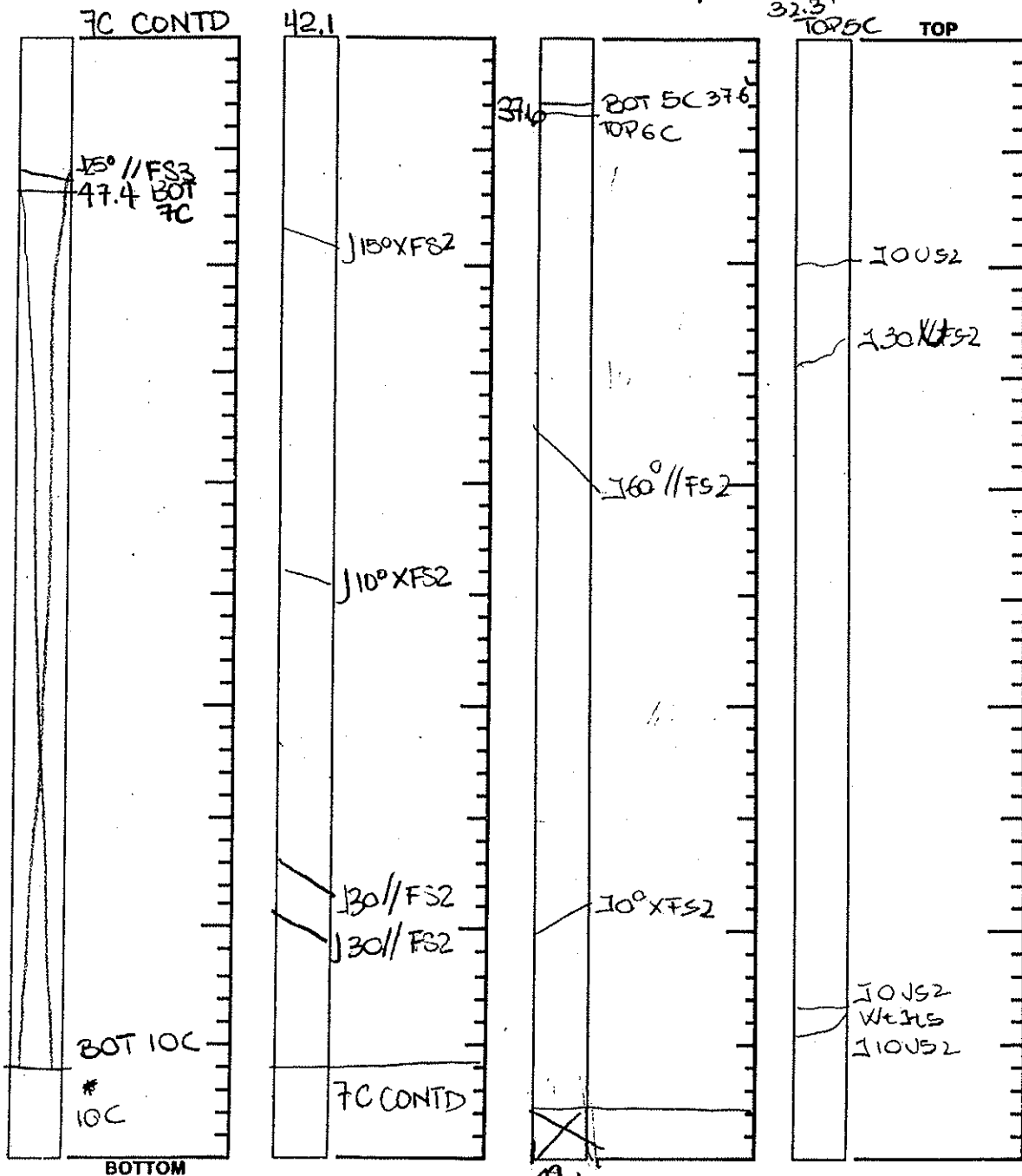
LOCATION NEW YORK, NY

Run No.	REC / RQD
7C	100/96

Run No.	REC / RQD
7C	100/96

Run No.	REC / RQD
5C	100/94
6C	100/100

Run No.	REC / RQD
5C	100/94



**ROCK CORE SKETCH
LEGEND**

JOINTING

- J - Joint
- MB - Mechanical Break
- ∠ - Angle w/ Horizontal
- // - Parallel
- X - Crossing
- F - Foliation
- S - Stratification
- U - Unfoliated or Unstratified

SURFACE

- C - Curved
- I - Irregular
- S - Straight

CONDITION

- 1 - Slick
- 2 - Smooth
- 3 - Rough

SKETCH SYMBOLS

- Joint
- Healed Joint
- Broken
- Part of Core Not Recovered
- Cavities or Vugs in Core
- Clay
- Sand
- Empty Space

NOTES NIL

* CONTINUING FROM OTHER BOX

**MUESER RUTLEDGE CONSULTING ENGINEERS
ROCK CORE SKETCH**

BORING NO. GB-206P

SHEET 5 OF 8

FILE NO. 9560

SURFACE ELEV. 33.4 ±

RES. ENGR. SK SHETTY

PROJECT 9TH AVENUE DEVELOPMENT

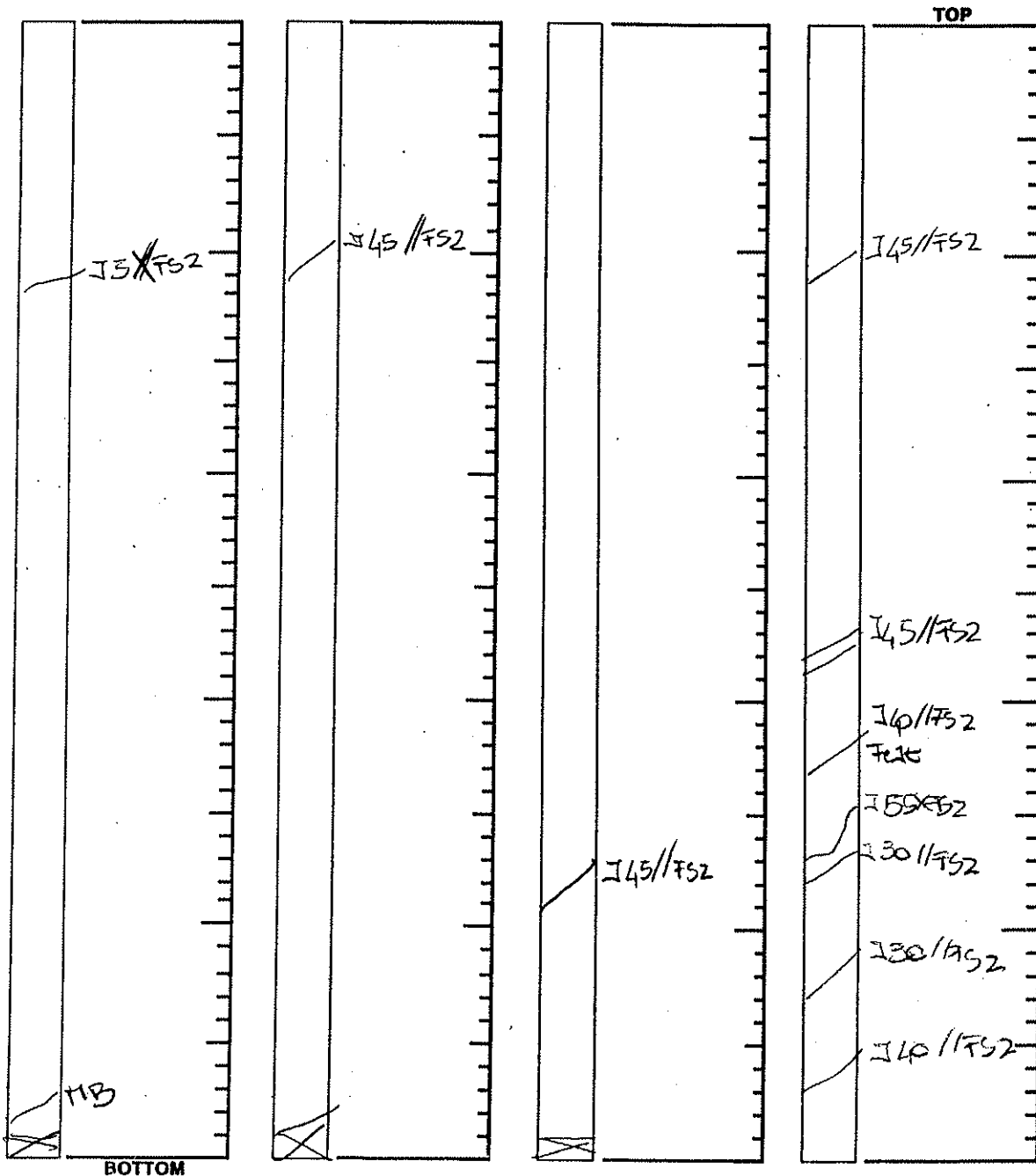
LOCATION 9TH AVENUE, 34TH STREET

Run No.	REC / RQD
11C	98/98

Run No.	REC / RQD
10C	100/100

Run No.	REC / RQD
9C	98/98

Run No.	REC / RQD
8C	100/84



**ROCK CORE SKETCH
LEGEND**

JOINTING

- J - Joint
- MB - Mechanical Break
- X - Angle w/ Horizontal
- // - Parallel
- X - Crossing
- F - Foliation
- S - Stratification
- U - Unfoliated or Unstratified

SURFACE

- C - Curved
- I - Irregular
- S - Straight

CONDITION

- 1 - Slick
- 2 - Smooth
- 3 - Rough

SKETCH SYMBOLS

- Joint
- Healed Joint
- Broken
- Part of Core Not Recovered
- Cavities or Vugs in Core
- Clay
- Sand
- Empty Space

NOTES NIL partly foliated

BORING NO. GB-206P
SHEET 6 OF 8
FILE NO. 9560
RFACE ELEV. 33.4±
RES. ENGR. S.K. SHETTY
RR

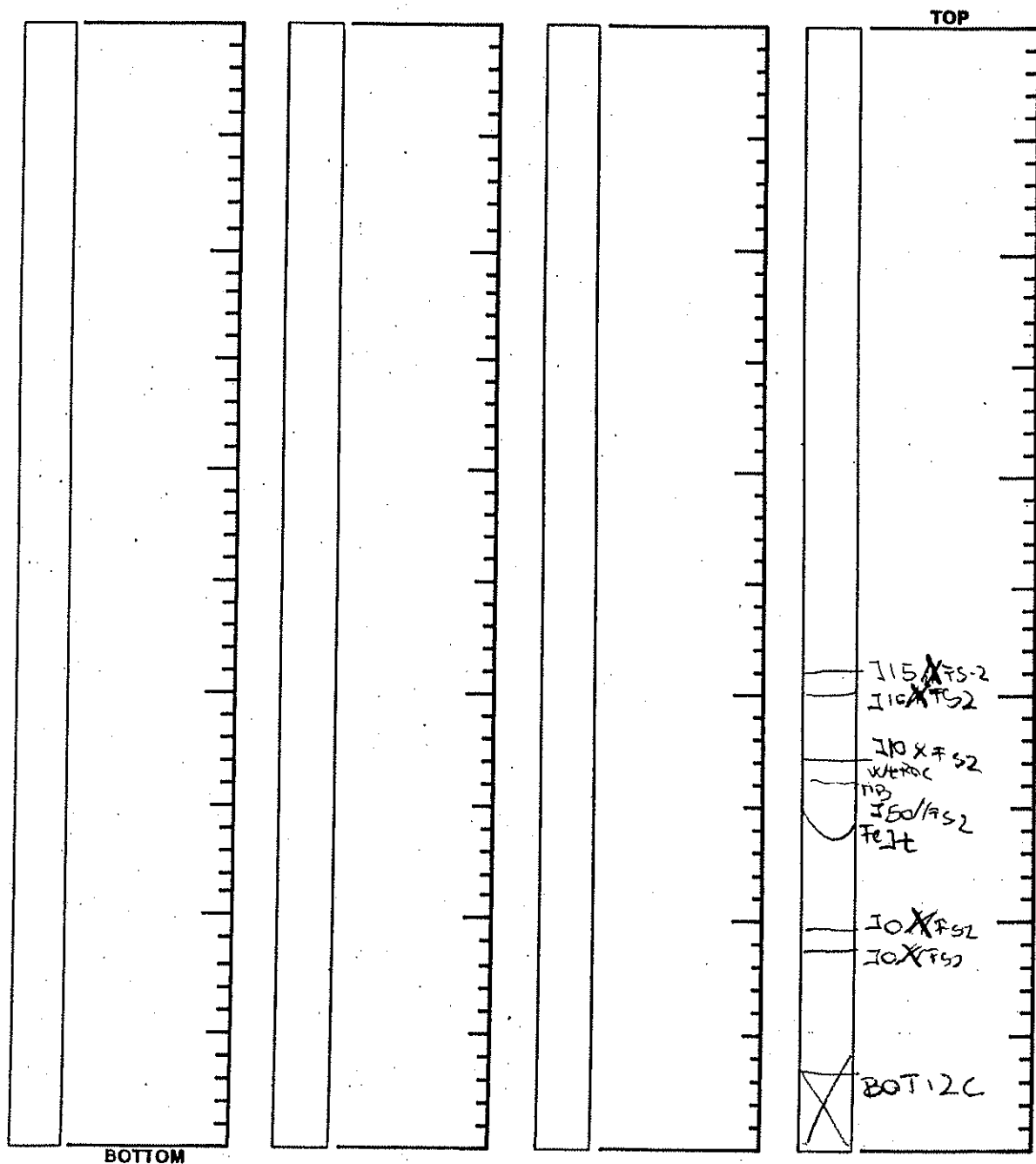
PROJECT 9TH AVENUE DEVELOPMENT
LOCATION 9TH AVE. 3RD STREET









Run No.	REC / RQD

Run No.	REC / RQD

Run No.	REC / RQD



Run No.	REC / RQD
12 C	
67.6'	
72.6'	24/76



- ROCK CORE SKETCH
LEGEND**
- JOINTING**
- J - Joint
- MB - Mechanical Break
- K - Angle w/ Horizontal
- // - Parallel
- X - Crossing
- F - Foliation
- S - Stratification
- U - Unfolded or Unstratified
- SURFACE**
- C - Curved
- I - Irregular
- S - Straight
- CONDITION**
- 1 - Slick
- 2 - Smooth
- 3 - Rough
- SKETCH SYMBOLS**
-  Joint
-  Healed Joint
-  Broken
-  Part of Core Not Recovered
-  Cavities or Vugs in Core
-  Clay
-  Sand
-  Empty Space

NOTES NIL

PROJECT 9th Avenue Development PIEZOMETER NO. GB-206P
LOCATION NEW YORK, NY
PIEZOMETER LOCATION GB-206P DATE OF INSTALLATION 3/2/08
☐ SEE SKETCH ON BACK RES. ENG. RR

 Sand
  Bentonite
 Gravel
  Grout

GROUND SURFACE ELEV. +33.4 ±

PIEZOMETER NO. GB-2067

MUESER RUTLEDGE CONSULTING ENGINEERS

PROJECT 9TH AVENUE DEVELOPMENT	BORING NO. GB-206P
LOCATION NEW YORK, NEW YORK	SHEET 8 OF 8
BORING LOCATION SEE BORING LOCATION PLAN	FILE NO. 9560
	SURFACE ELEV. 33.4 +/-
	DATUM BOROUGH PRESIDENT OF MANHATTAN

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG	TYPE OF FEED	CASING USED	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
TRUCK ACKER SOILMAX	MECHANICAL	DIA., IN. 4	DEPTH, FT. FROM 0	TO 5
SKID	HYDRAULIC	DIA., IN. 3	DEPTH, FT. FROM 0	TO 10
BARGE	OTHER	DIA., IN.	DEPTH, FT. FROM	TO
OTHER				

TYPE AND SIZE OF:	DRILLING MUD USED
D-SAMPLER 2" O.D. SPLIT SPOON	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
U-SAMPLER	DIAMETER OF ROTARY BIT, IN. 4-7/8, 3-7/8
S-SAMPLER	TYPE OF DRILLING MUD REVERT
CORE BARREL NX DOUBLE TUBE	
CORE BIT NX DIAMOND	AUGER USED
DRILL RODS NWJ	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
	TYPE AND DIAMETER, IN.
	CASING HAMMER, LBS. AVERAGE FALL, IN.
	SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
					NO WATER LEVEL OBSERVATIONS MADE.

PIEZOMETER INSTALLED ☐ YES ☒ NO **SKETCH SHOWN ON** _____

STANDPIPE:	TYPE	ID, IN.	LENGTH, FT.	TOP ELEV.
INTAKE ELEMENT:	TYPE	OD, IN.	LENGTH, FT.	TIP ELEV.
FILTER:	MATERIAL	OD, IN.	LENGTH, FT.	BOT. ELEV.

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING	LIN. FT. 13	NO. OF 3" SHELBY TUBE SAMPLES
3.5" DIA. U-SAMPLE BORING	LIN. FT.	NO. OF 3" UNDISTURBED SAMPLES
CORE DRILLING IN ROCK	LIN. FT.	OTHER: ORIENTED CORING 60

BORING CONTRACTOR WARREN GEORGE INC.	
DRILLER GILL CLINTON	HELPERS SAM COLON
REMARKS BOREHOLE GROUTED UPON COMPLETION.	
RESIDENT ENGINEER EMILY RUBINSTEIN/ROBERTO REALE/S. SHETTY	DATE 03-21-08
CLASSIFICATION CHECK: CHERYL J. MOSS	TYPING CHECK: ROBERTO REALE

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

PROJECT: 9TH AVENUE DEVELOPMENT
LOCATION: NEW YORK, NEW YORK

BORING NO. GB-207
SHEET 1 OF 7
FILE NO. 9560
SURFACE ELEV. 33.4 +/-
RES. ENGR. PAUL SHIM

DAILY PROGRESS	SAMPLE			SAMPLE DESCRIPTION	STRATA	DEPTH	CASING	REMARKS
	NO.	DEPTH	BLOWS/6"				BLOWS	
07:30					**		DRILLED	**Asphalt at 0-1'.
03-22-08	1D	1.0	10-38	Dark gray coarse to fine sand, some brick,	F1		AHEAD	
Saturday		3.0	9-10	trace silt (Fill) (SP-SM)			3"	
Partly	2D	3.0	9-9	Gray fine sand, sm gvl, silt, tr brick (Fill) (SM)				
Cloudy		5.0	9-7			5		
36°F	4D	5.0-6.0	34-100	Gray c-f sand, sm brick, gvl, silt (Fill) (SM)				
	5D	6.0-7.0	11-16	Red brown brick (Fill) (SM)				
	6D	7.0-8.0	16-46	Gray gvl, sm c-f sand, brick, silt (Fill) (SM)				
	7D	9.0	100/6"	Black gray gravel, trace brick, coarse to fine		10	▼	
		10.0		sand, silt (Fill) (GP-GM)		11		
	1C	11.1	REC=100%	Hard unweathered gray hornblende trace	R		6*	3 scratches
		15.0	RQD=100%	pegmatite, jointed, mineral coated joints			9*	295°
							5*	
						15	5*	
	2C	15.0	REC=100%	Medium hard, unweathered gray hornblende				
		20.0	RQD=100%	schist, jointed to closely jointed, iron stained			9*	
				joints and mineral joints			6*	
							6*	
						20	6*	
	3C	20.0	REC=94%	Hard unweathered gray hornblende schist,				
		24.6	RQD=94%	trace pegmatite, jointed, mineral coated joints			5*	
							4*	
							5*	
	4C	24.6	REC=94%	Hard unweathered to moderately weathered		25	6*	
		29.2	RQD=85%	gray hornblende, trace pegmatite, jointed,				
				mineral coated joints and weathered joints			8*	
							6*	
							5*	
	5C	29.2	REC=100%	Hard slightly weathered gray hornblende		30	6*	
		34.2	RQD=90%	schist, trace pegmatite, jointed, iron stained				
				joints and mineral coated joints			6*	
							5*	
							4*	
	6C	34.2	REC=100%	Hard unweathered gray hornblende schist,		35	5*	
		39.5	RQD=100%	jointed, iron stained joints				
							4*	
							4*	
							4*	
	7C	39.5	REC=91%	Hard unweathered gray hornblende schist,		40	5*	
		45.0	RQD=80%	jointed, iron stained joints				
							4*	
							6*	
							8*	
						45	6*	
	8C	45.0	REC=96%	Hard unweathered gray hornblende schist,				
		50.0	RQD=96%	moderately jointed, mineral coated joints			7*	
							6*	
							8*	
						50	4*	

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

PROJECT: 9TH AVENUE DEVELOPMENT
LOCATION: NEW YORK, NEW YORK

BORING NO. GB-207
SHEET 2 OF 7
FILE NO. 9560
SURFACE ELEV. 33.4 +/-
RES. ENGR. PAUL SHIM

DAILY PROGRESS	SAMPLE			SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS	
	NO.	DEPTH	BLOWS/6"						
18:53 07:00 03-24-08 Monday Clear 34°F	9C	50.0	REC=100%	Hard unweathered gray hornblende schist, massive	R			*Coring time in minutes per foot.	
		55.0	RQD=100%				6*		
							5*		
							4*		
						55	3*		
	10C	55.0	REC=96%	Hard unweathered gray hornblende schist, moderately jointed, mineral coated joints					5*
		60.0	RQD=88%				5*		
							5*		
						60	7*		
	11C	60.0	REC=100%	Hard unweathered gray hornblende schist, trace pegmatite, blocky					6*
		65.0	RQD=100%				4*		
							5*		
						65	5*		
					4*				
					4*				
					5*				
					4*				
				70	5*	End of boring at 70'.			

MUESER RUTLEDGE CONSULTING ENGINEERS
ROCK CORE SKETCH

BORING NO. GB-207

SHEET 3 OF 7

FILE NO. 9560

SURFACE ELEV. 33.41

RES. ENGR. P. SUM

PROJECT 9TH AVENUE DEVELOPMENT

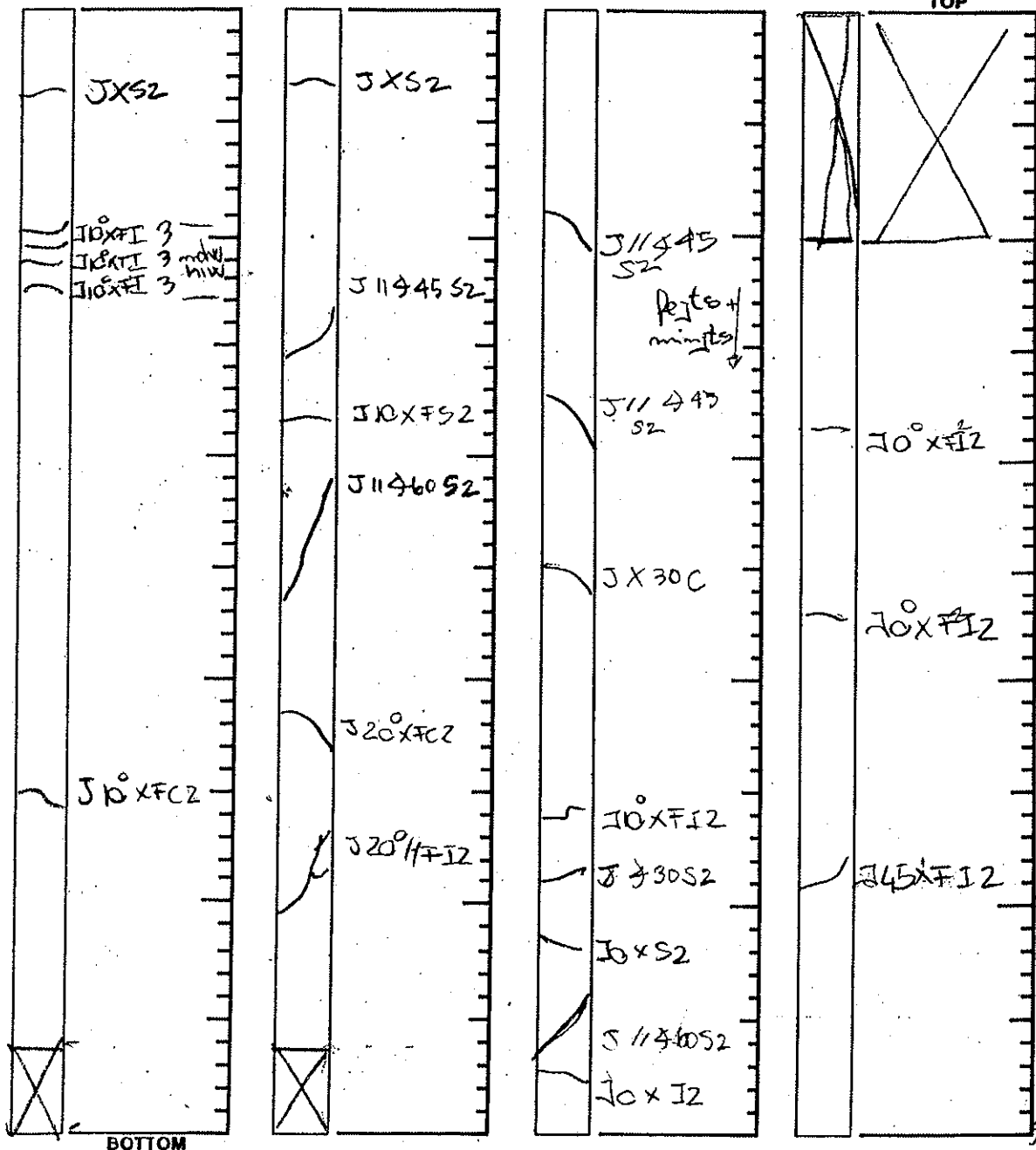
LOCATION 9TH AVENUE, 33RD STREET

Run No.	REC / RQD
4C	94/85

Run No.	REC / RQD
3C	94/89

Run No.	REC / RQD
2C	100/80

Run No.	REC / RQD
1C	100/100



ROCK CORE SKETCH LEGEND	
JOINTING	
J	- Joint
MB	- Mechanical Breal
*	- Angle w/ Horizont
//	- Parallel
X	- Crossing
F	- Foliation
S	- Stratification
U	- Unfoliated or Unstratified
SURFACE	
C	- Curved
I	- Irregular
S	- Straight
CONDITION	
1	- Slick
2	- Smooth
3	- Rough
SKETCH SYMBOLS	
	Joint
	Healed Joint
	Broken
	Part of Core Not Recovered
	Cavities or Vugs in Core
	Clay
	Sand
	Empty Space

NOTES

**MUESER RUTLEDGE CONSULTING ENGINEERS
ROCK CORE SKETCH**

BORING NO. GB-207

SHEET A OF 7

FILE NO. 9560

SURFACE ELEV. 33.4±

RES. ENGR. P. SHUM

PROJECT 9TH AVENUE DEVELOPMENT

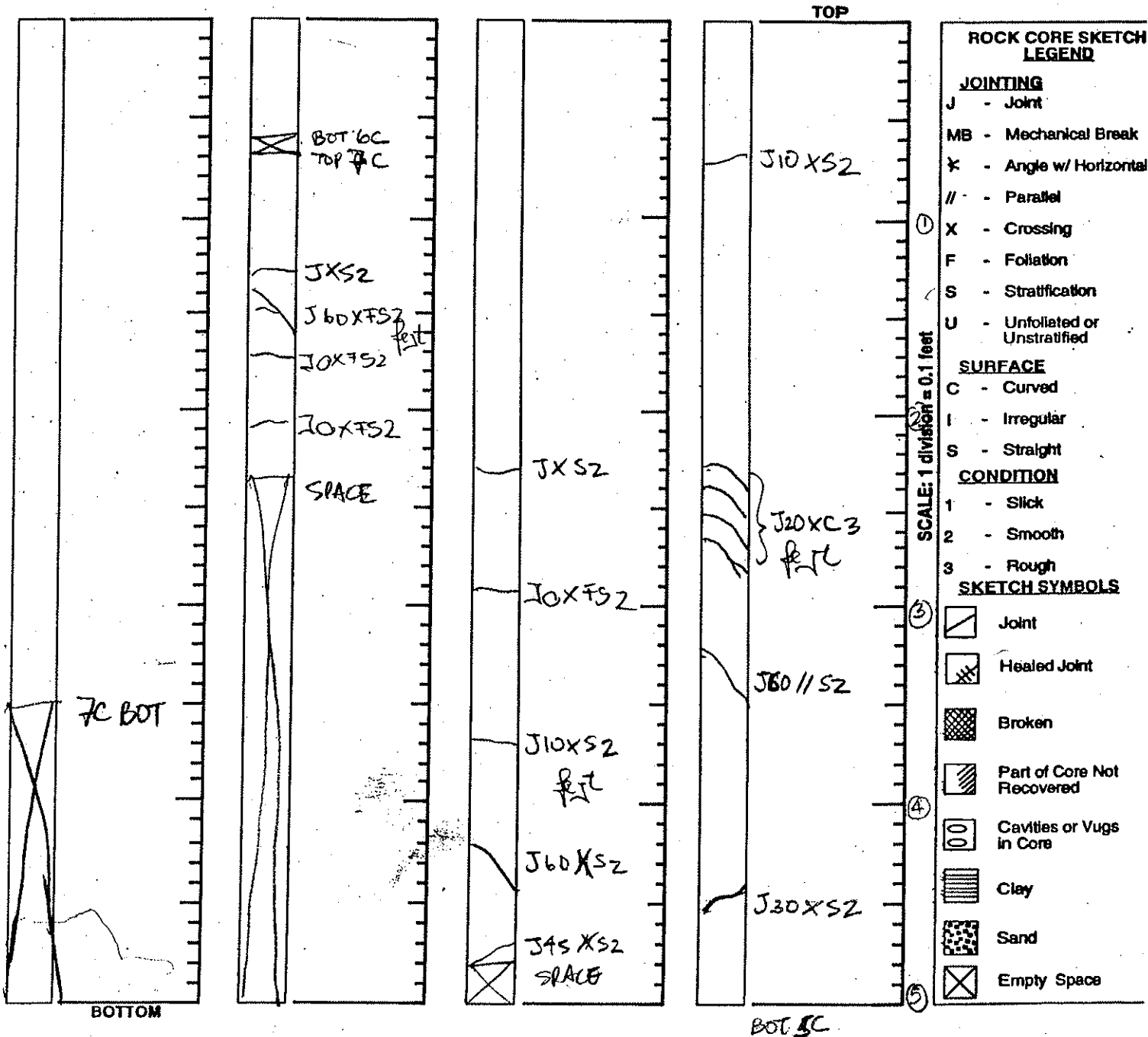
LOCATION 9TH AVENUE 33RD STREET

Run No.	REC / RQD

Run No.	REC / RQD
7C	91/80

Run No.	REC / RQD
6C	100/100

Run No.	REC / RQD
5C	100/90



NOTES

**MUESER RUTLEDGE CONSULTING ENGINEERS
ROCK CORE SKETCH**

BORING NO. GB-207

SHEET 5 OF 7

FILE NO. 9560

SURFACE ELEV. 33.4±

RES. ENGR. P. SHIM

PROJECT 9TH AVENUE DEVELOPMENT

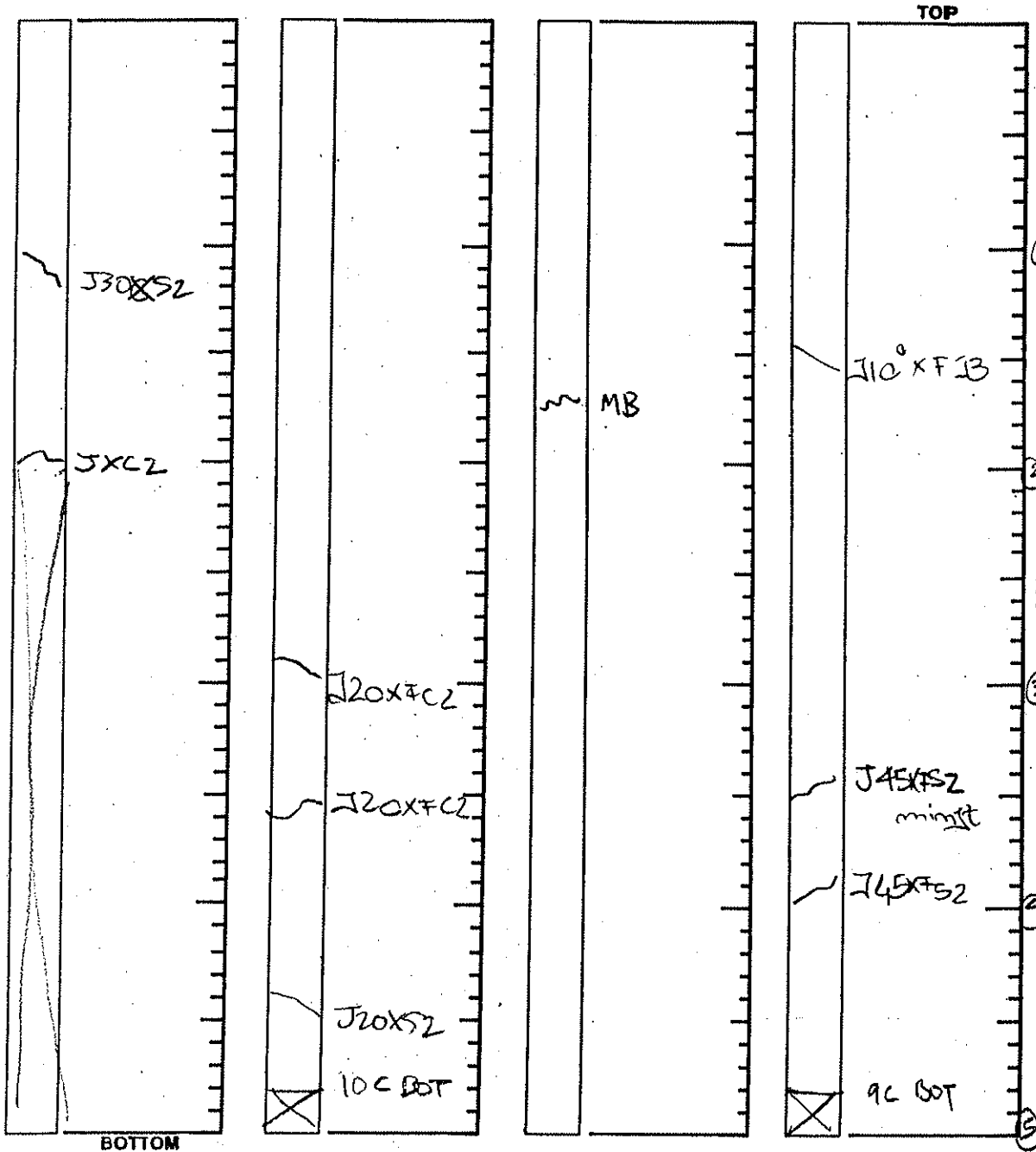
LOCATION 9TH AVENUE, 33RD STREET

Run No.	REC / RQD
11C	100/100

Run No.	REC / RQD
10C	96/88

Run No.	REC / RQD
9C	100/100

Run No.	REC / RQD
8C	96/96



ROCK CORE SKETCH LEGEND	
JOINTING	
J	- Joint
MB	- Mechanical Break
K	- Angle w/ Horizontal
//	- Parallel
X	- Crossing
F	- Foliation
S	- Stratification
U	- Unfolded or Unstratified
SURFACE	
C	- Curved
I	- Irregular
S	- Straight
CONDITION	
1	- Slick
2	- Smooth
3	- Rough
SKETCH SYMBOLS	
	Joint
	Healed Joint
	Broken
	Part of Core Not Recovered
	Cavities or Vugs in Core
	Clay
	Sand
	Empty Space

NOTES _____

MUESER RUTLEDGE CONSULTING ENGINEERS
ROCK CORE SKETCH

BORING NO. CB-207

SHEET 6 OF 7

FILE NO. 9560

SURFACE ELEV. 33.4±

RES. ENGR. D. Janke

PROJECT 9th Avenue

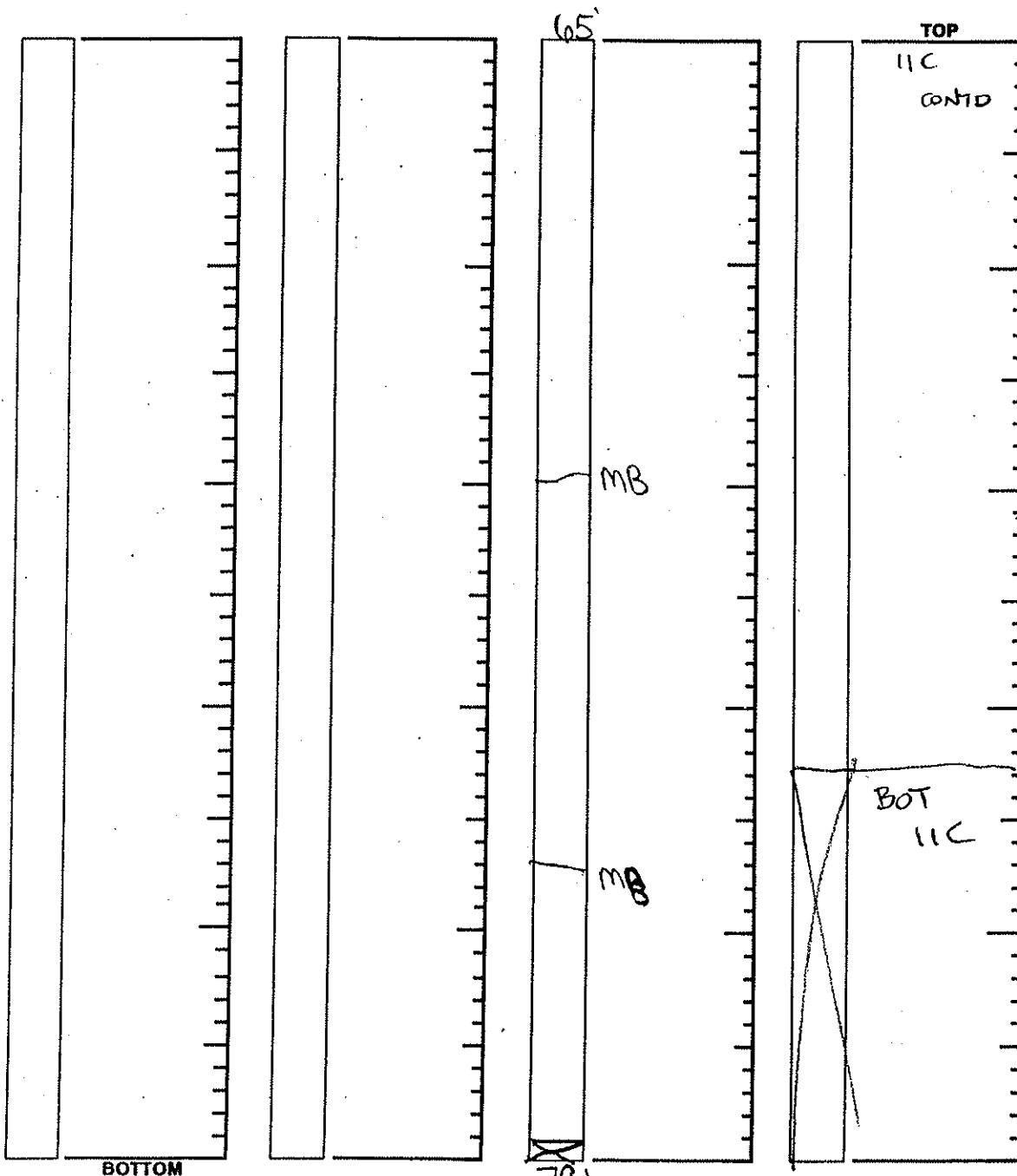
LOCATION New York, NY

Run No.	REC / RQD

Run No.	REC / RQD

Run No.	REC / RQD
12C	98/98

Run No.	REC / RQD
11C	100/100



**ROCK CORE SKETCH
LEGEND**

JOINTING

- J - Joint
- MB - Mechanical Break
- ∠ - Angle w/ Horizontal
- // - Parallel
- X - Crossing
- F - Foliation
- S - Stratification
- U - Unfoliated or Unstratified

SURFACE

- C - Curved
- I - Irregular
- S - Straight

CONDITION

- 1 - Slick
- 2 - Smooth
- 3 - Rough

SKETCH SYMBOLS

- Joint
- Healed Joint
- Broken
- Part of Core Not Recovered
- Cavities or Vugs in Core
- Clay
- Sand
- Empty Space

NOTES

MUESER RUTLEDGE CONSULTING ENGINEERS

PROJECT 9TH AVENUE DEVELOPMENT LOCATION NEW YORK, NEW YORK BORING LOCATION SEE BORING LOCATION PLAN	BORING NO. GB-207 SHEET 7 OF 7 FILE NO. 9560 SURFACE ELEV. 33.4 +/- DATUM BOROUGH PRESIDENT OF MANHATTAN
--	---

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG	TYPE OF FEED	CASING USED	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO	
TRUCK	ACKER SOILMAX	DIA., IN.	3	DEPTH, FT. FROM	0 TO 10
SKID	HYDRAULIC	DIA., IN.	X	DEPTH, FT. FROM	TO
BARGE	OTHER	DIA., IN.		DEPTH, FT. FROM	TO
OTHER					

TYPE AND SIZE OF:	DRILLING MUD USED
D-SAMPLER 2" O.D. SPLIT SPOON	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
U-SAMPLER	DIAMETER OF ROTARY BIT, IN.
S-SAMPLER	TYPE OF DRILLING MUD
CORE BARREL NX DOUBLE TUBE	AUGER USED
CORE BIT NX DIAMOND	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
DRILL RODS NWJ	TYPE AND DIAMETER, IN.
	CASING HAMMER, LBS.
	AVERAGE FALL, IN.
	SAMPLER HAMMER, LBS. 140
	AVERAGE FALL, IN. 30

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
					NO WATER LEVEL OBSERVATIONS MADE.

PIEZOMETER INSTALLED ☐ YES ☒ NO SKETCH SHOWN ON _____

STANDPIPE:	TYPE	ID, IN.	LENGTH, FT.	TOP ELEV.
INTAKE ELEMENT:	TYPE	OD, IN.	LENGTH, FT.	TIP ELEV.
FILTER:	MATERIAL	OD, IN.	LENGTH, FT.	BOT. ELEV.

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING	LIN. FT.	10	NO. OF 3" SHELBY TUBE SAMPLES	
3.5" DIA. U-SAMPLE BORING	LIN. FT.		NO. OF 3" UNDISTURBED SAMPLES	
CORE DRILLING IN ROCK	LIN. FT.		OTHER: ORIENTED CORE	60

BORING CONTRACTOR	WARREN GEORGE INC.
DRILLER	CLINTON JR.
REMARKS	HELPERS SAMUEL COLON
BOREHOLE GROUTED UPON COMPLETION. (ORIENTED CORE)	
RESIDENT ENGINEER	PAUL SHIM
CLASSIFICATION CHECK:	CJM/FM
TYPING CHECK:	ROBERTO REALE

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

PROJECT: 9TH AVENUE DEVELOPMENT
LOCATION: NEW YORK, NEW YORK

BORING NO. GB-208
SHEET 1 OF 8
FILE NO. 9560
SURFACE ELEV. 32.8 +/-
RES. ENGR. D. JANKE/R. REALE

DAILY PROGRESS	SAMPLE			SAMPLE DESCRIPTION	STRATA	DEPTH	CASING	REMARKS
	NO.	DEPTH	BLOWS/6"				BLOWS	
09:15					ASPHALT	0.5	DRILLED	Asphalt 0' to 0.5'.
03-24-08	1D	1.0	10-9	Gray coarse to fine sand, some brick, gravel, silt (Fill) (SM)	F1		AHEAD	
Monday		3.0	9-7				4"	
Clear	2D	3.0	5-5	Red brown brick fragments and coarse to fine sand, some gravel, silt (Fill) (SM)		5		Boring offset 6' east and 15' north from surveyed location.
36°F		5.0	10-10					
	3D	5.0	10-9	Gray gravelly coarse to fine sand, some silt, trace concrete (Fill) (SM)				
		7.0	11-19					
	4D	7.0	100/6"	Brown black fine to coarse sand, some silt, gravel, trace concrete, mica (Fill) (SM)		7.5	4*	
		7.5					2*	
	1C	7.5	REC=55%	Intermediate slightly weathered gray gneissic, schist jointed to broken		10	4*	
		11.5	RQD=33%				3*	3 scratches 320°.
	2C	11.5	REC=96%	Medium hard slightly weathered gray gneissic schist, jointed, weathered joints and iron stained joints, trace clayey joints	R		4*	
		16.5	RQD=77%				4*	
						15	5*	
							4*	
							4*	
	3C	16.5	REC=97%	Hard unweathered gray gneissic mica schist, blocky, trace iron stained joints			4*	
		21.5	RQD=97%					
						20		
	4C	21.5	REC=100%	Hard unweathered gray gneissic schist, some hornblende schist, pegmatite, blocky, mineral coated joints				
		26.5	RQD=100%					
						25		
	5C	26.5	REC=98%	Hard unweathered dark gray hornblende schist, trace pegmatite, blocky, mineral coated joints				
		31.5	RQD=98%					
						30		
02:00							4*	*Coring time in minutes per foot.
02:00	6C	31.5	REC=96%	Hard unweathered gray gneissic schist, some pegmatite, blocky			5*	
03-24-08		36.5	RQD=94%				4*	
Monday						35	4*	
Clear							4*	
36°F							4*	
	7C	36.5	REC=100%	Hard unweathered gray gneissic schist, trace hornblende schist, moderately jointed			4*	
		41.7	RQD=94%			40	4*	
							5*	
							4*	
	8C	41.7	REC=100%	Hard unweathered dark gray hornblende schist, moderately jointed, slightly iron stained joints			5*	
		46.7	RQD=100%			45	4*	
							4*	
							4*	
	9C	46.7	REC=100%	Hard unweathered gray gneissic schist, trace pegmatite, moderately jointed, iron stained joints			5*	
		51.8	RQD=100%			50	4*	
							4*	
							5*	

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

PROJECT: 9TH AVENUE DEVELOPMENT
LOCATION: NEW YORK, NEW YORK

BORING NO. GB-208
SHEET 2 OF 8
FILE NO. 9560
SURFACE ELEV. 32.8 +/-
RES. ENGR. D. JANKE/R. REALE

DAILY PROGRESS	SAMPLE			SAMPLE DESCRIPTION	STRATA	CASING		REMARKS
	NO.	DEPTH	BLOWS/6"			DEPTH	BLOWS	
09:30	10C	51.8	REC=100%	Hard unweathered gray gneissic schist, blocky	R			End of boring at 71.8'.
		56.8	RQD=100%				5*	
							4*	
						55	4*	
						5*		
	11C	56.8	REC=100%	Hard unweathered dark gray gneiss, pegmatite and to hornblende schist, blocky			4*	
		61.8	RQD=100%				4*	
							5*	
						60	4*	
						5*		
	12C	61.8	REC=100%	Hard unweathered gray gneissic schist and hornblende schist, blocky			4*	
		66.8	RQD=100%				4*	
							4*	
						65	5*	
						4*		
	13C	66.8	REC=100%	Hard unweathered dark gray hornblende schist, trace pegmatite, massive			5*	
		71.8	RQD=100%				4*	
							4*	
						70	4*	
						5*		
						71.8	4*	
						75		
				80				
				85				
				90				
				95				
				100				

**MUESER RUTLEDGE CONSULTING ENGINEERS
ROCK CORE SKETCH**

BORING NO. CB-208

SHEET 3 OF 8

FILE NO. 9560

SURFACE ELEV. 32.8±

RES. ENGR. D. Janke

PROJECT 9th Avenue

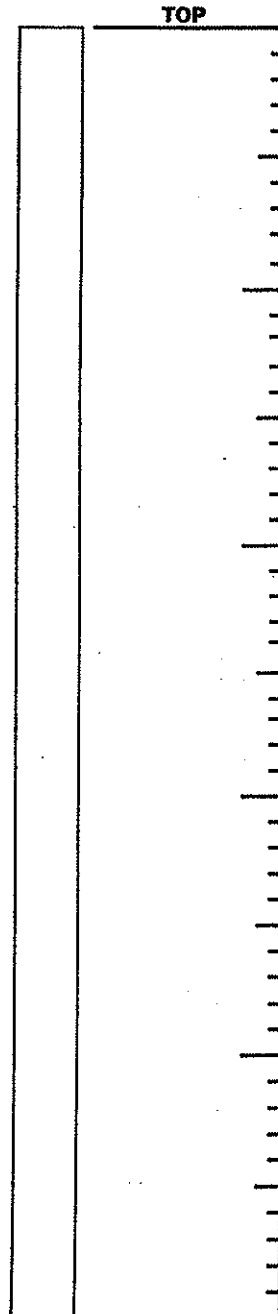
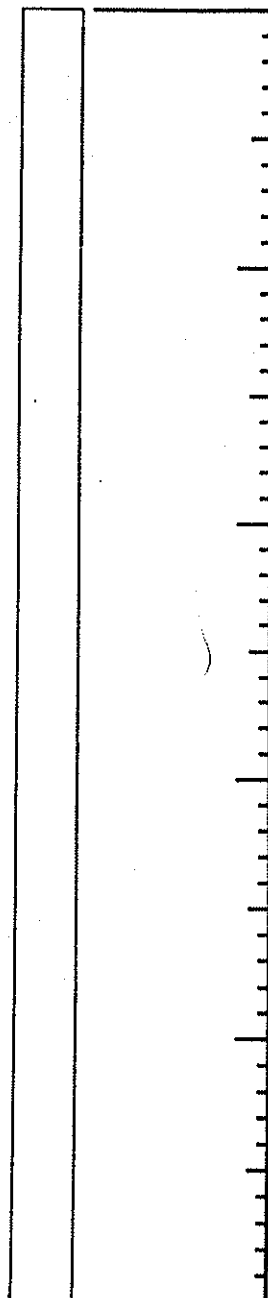
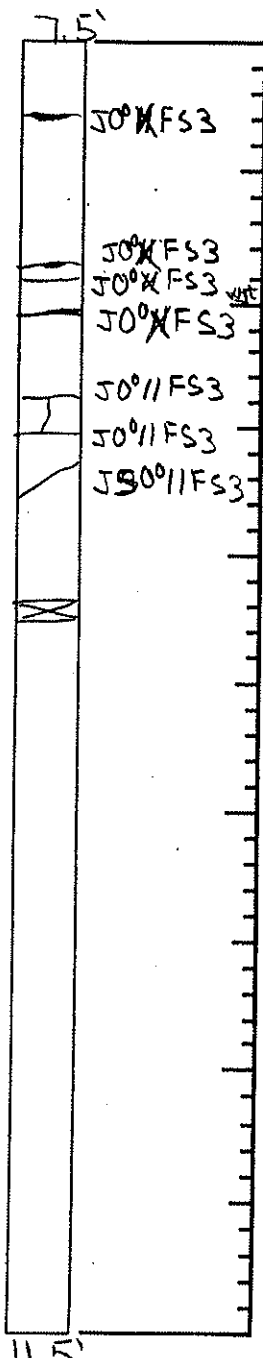
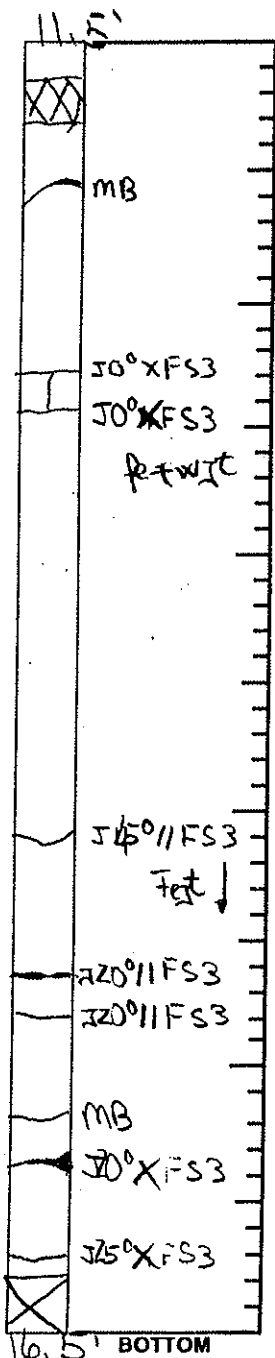
LOCATION New York, NY

Run No.	REC / RQD
2C	96/77

Run No.	REC / RQD
1C	55/33

Run No.	REC / RQD

Run No.	REC / RQD



SCALE: 1 division = 0.1 feet

**ROCK CORE SKETCH
LEGEND**

JOINTING

- J - Joint
- MB - Mechanical Break
- X - Angle w/ Horizontal
- // - Parallel
- X - Crossing
- F - Foliation
- S - Stratification
- U - Unfoliated or Unstratified

SURFACE

- C - Curved
- I - Irregular
- S - Straight

CONDITION

- 1 - Slick
- 2 - Smooth
- 3 - Rough

SKETCH SYMBOLS

- Joint
- Healed Joint
- Broken
- Part of Core Not Recovered
- Cavities or Vugs in Core
- Clay
- Sand
- Empty Space

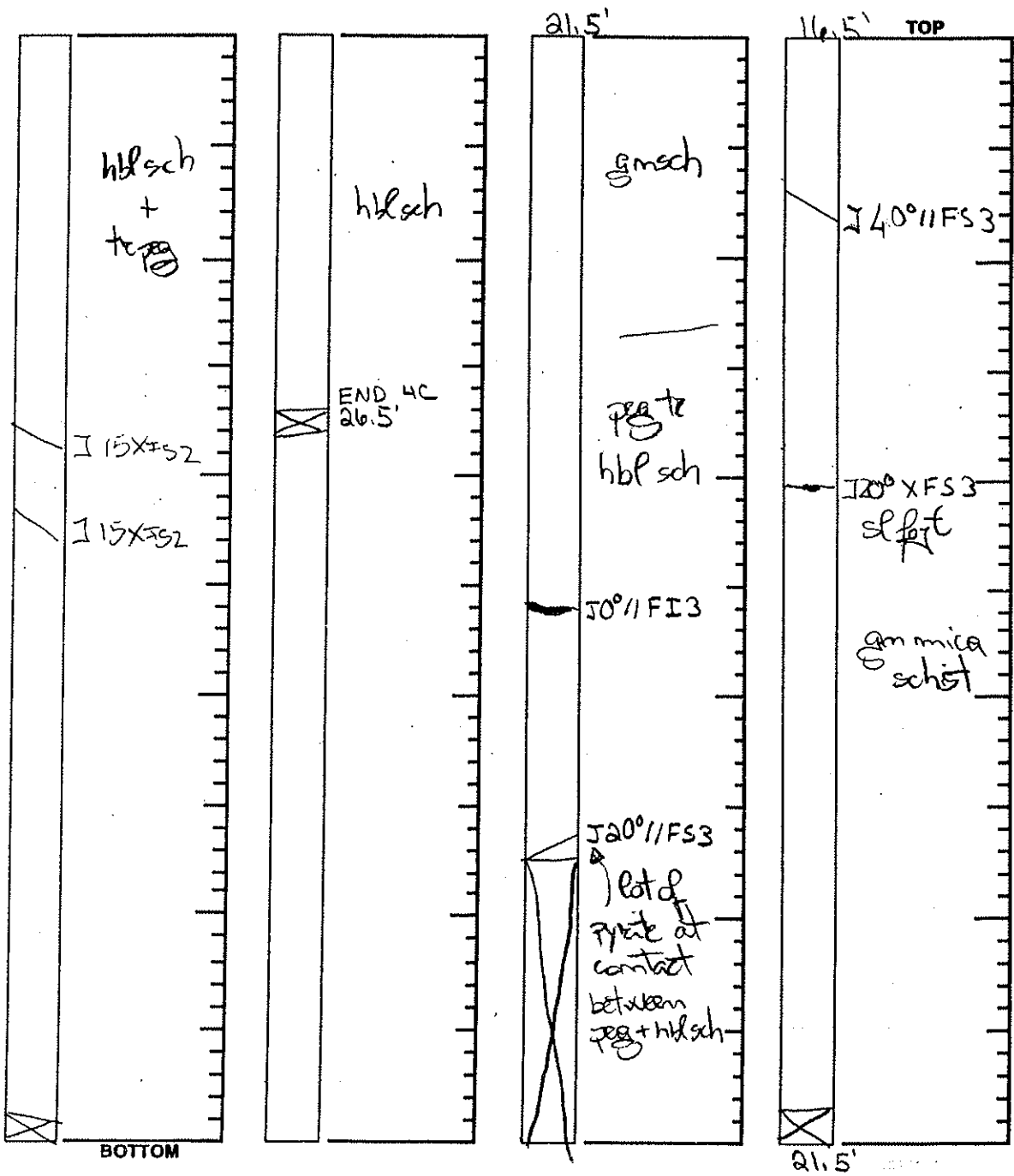
NOTES

**MUESER RUTLEDGE CONSULTING ENGINEERS
ROCK CORE SKETCH**

BORING NO. CB-208
SHEET 4 **OF** 8
FILE NO. 9650
SURFACE ELEV. 32.8
RES. ENGR. D. JONKE

PROJECT 9th Avenue
LOCATION New York, NY

Run No.	REC / RQD	Run No.	REC / RQD	Run No.	REC / RQD	Run No.	REC / RQD
5C	98/98	4C	100/100	4C	100/100	3C	97/97



ROCK CORE SKETCH LEGEND	
JOINTING	
J	- Joint
MB	- Mechanical Break
K	- Angle w/ Horizontal
//	- Parallel
X	- Crossing
F	- Foliation
S	- Stratification
U	- Unfoliated or Unstratified
SURFACE	
C	- Curved
I	- Irregular
S	- Straight
CONDITION	
1	- Slick
2	- Smooth
3	- Rough
SKETCH SYMBOLS	
	Joint
	Healed Joint
	Broken
	Part of Core Not Recovered
	Cavities or Vugs In Core
	Clay
	Sand
	Empty Space

NOTES _____

**MUESER RUTLEDGE CONSULTING ENGINEERS
ROCK CORE SKETCH**

BORING NO. GB-208

SHEET 5 OF 8

FILE NO. 9560

SURFACE ELEV. 32.81

RES. ENGR. RR

PROJECT 9th Avenue

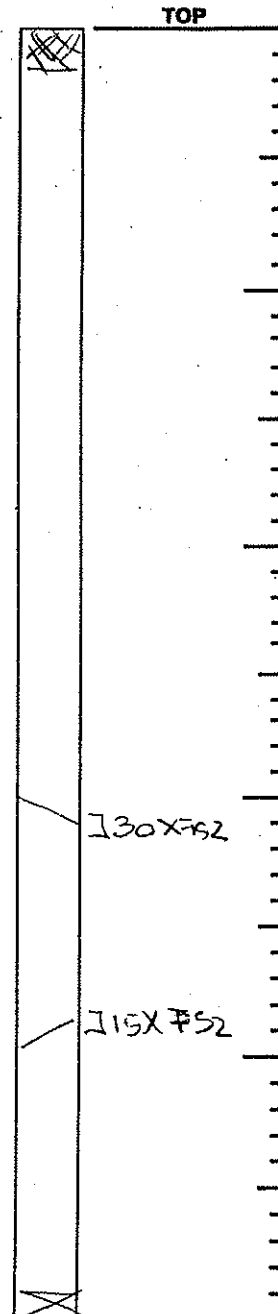
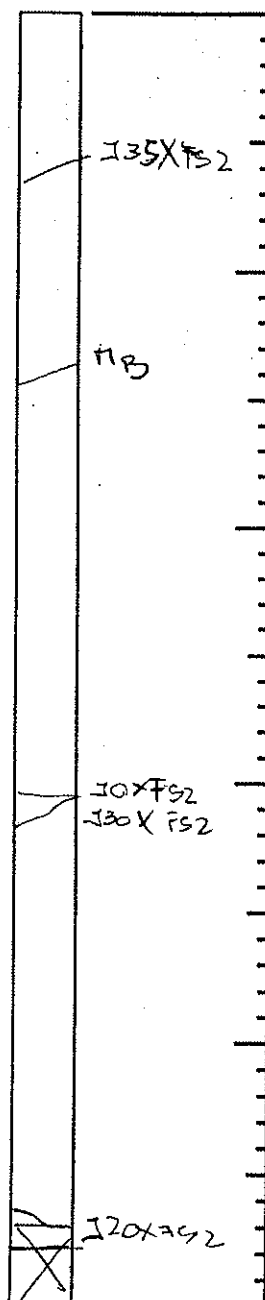
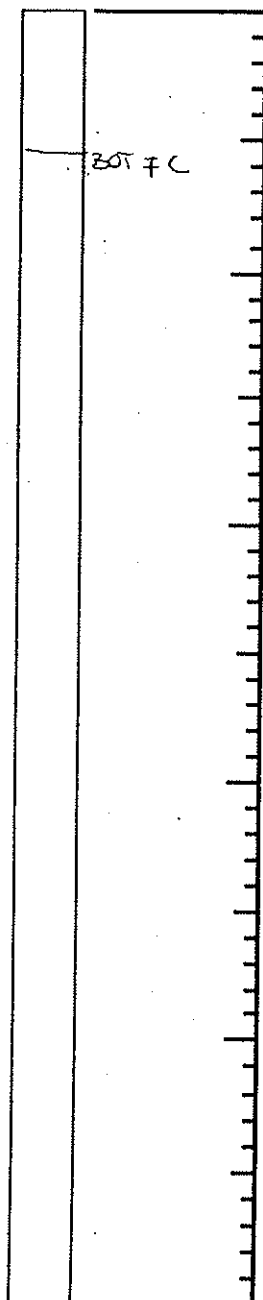
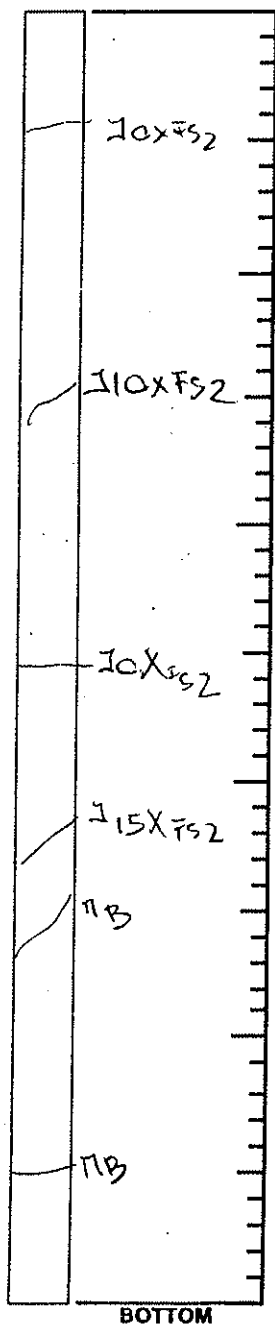
LOCATION NEW YORK, NY

Run No.	REC / RQD
8C	100/100

Run No.	REC / RQD
7C	100/94

Run No.	REC / RQD
7C	100/94

Run No.	REC / RQD
6C	96/94



ROCK CORE SKETCH LEGEND	
JOINTING	
J	- Joint
MB	- Mechanical Break
∠	- Angle w/ Horizontal
//	- Parallel
X	- Crossing
F	- Foliation
S	- Stratification
U	- Unfoliated or Unstratified
SURFACE	
C	- Curved
I	- Irregular
S	- Straight
CONDITION	
1	- Slick
2	- Smooth
3	- Rough
SKETCH SYMBOLS	
	Joint
	Healed Joint
	Broken
	Part of Core Not Recovered
	Cavities or Vugs in Core
	Clay
	Sand
	Empty Space

NOTES

**MUESER RUTLEDGE CONSULTING ENGINEERS
ROCK CORE SKETCH**

BORING NO. GB-208

SHEET 6 OF 8

FILE NO. 9560

SURFACE ELEV. 32.8±

RES. ENGR. RR

PROJECT 9th Avenue Dev.

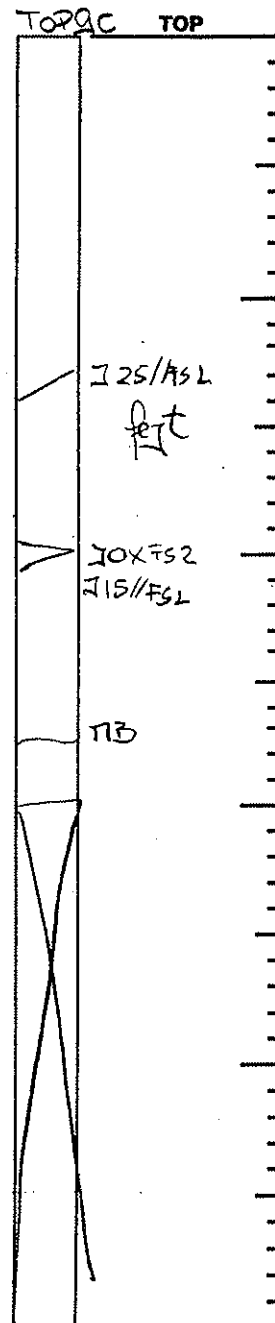
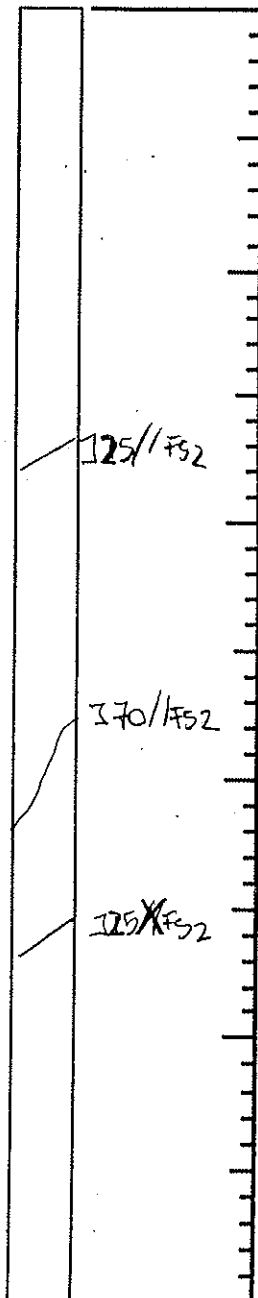
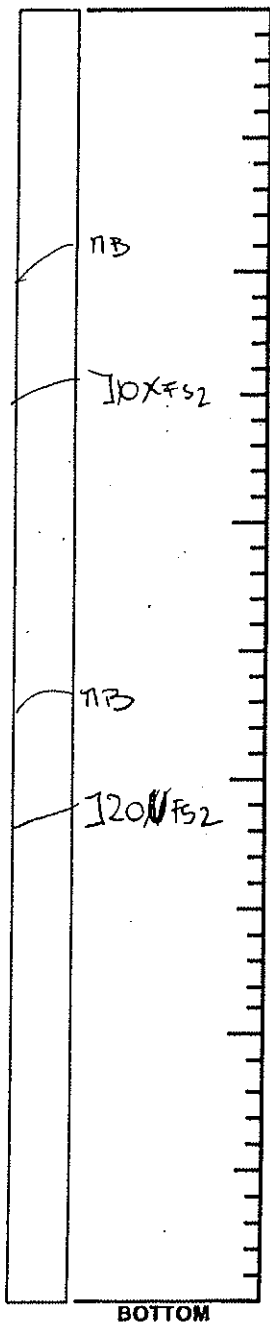
LOCATION 9th Av and 31st street

Run No.	REC / RQD
11C	100/100

Run No.	REC / RQD
10C	100/100

Run No.	REC / RQD
9C	100/100

Run No.	REC / RQD
9C	100/100



**ROCK CORE SKETCH
LEGEND**

JOINTING

- J - Joint
- MB - Mechanical Break
- K - Angle w/ Horizontal
- // - Parallel
- X - Crossing
- F - Foliation
- S - Stratification
- U - Unfoliated or Unstratified

SURFACE

- C - Curved
- I - Irregular
- S - Straight

CONDITION

- 1 - Slick
- 2 - Smooth
- 3 - Rough

SKETCH SYMBOLS

- Joint
- Healed Joint
- Broken
- Part of Core Not Recovered
- Cavities or Vugs in Core
- Clay
- Sand
- Empty Space

SCALE: 1 division = 0.1 feet

NOTES

**MUESER RUTLEDGE CONSULTING ENGINEERS
ROCK CORE SKETCH**

BORING NO. GB-208

SHEET 7 OF 8

FILE NO. 9560

SURFACE ELEV. 328+

RES. ENGR. RR

PROJECT 5th Av

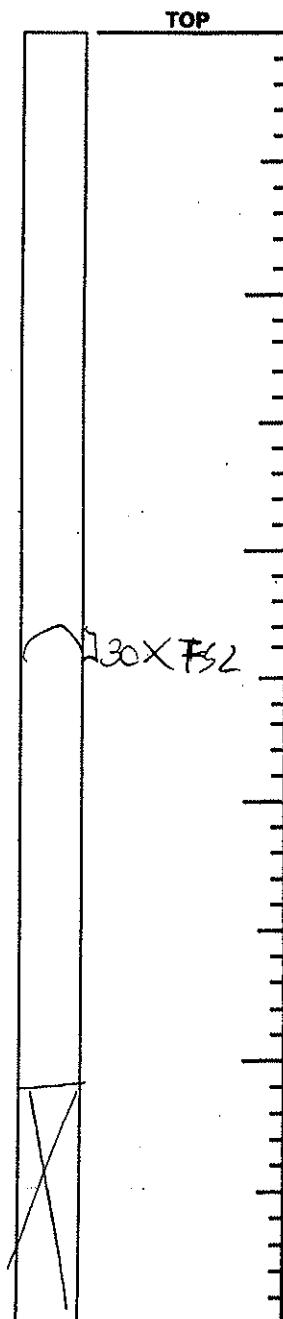
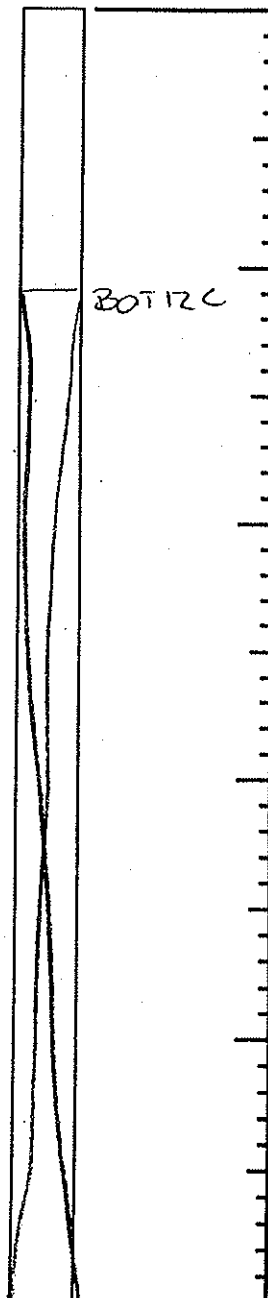
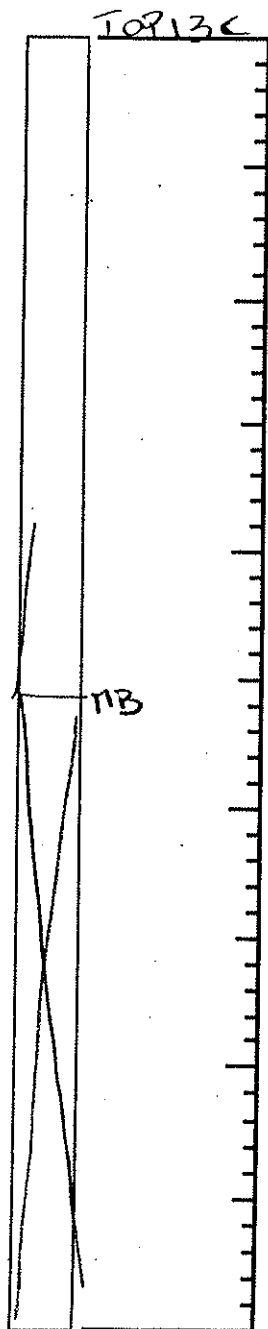
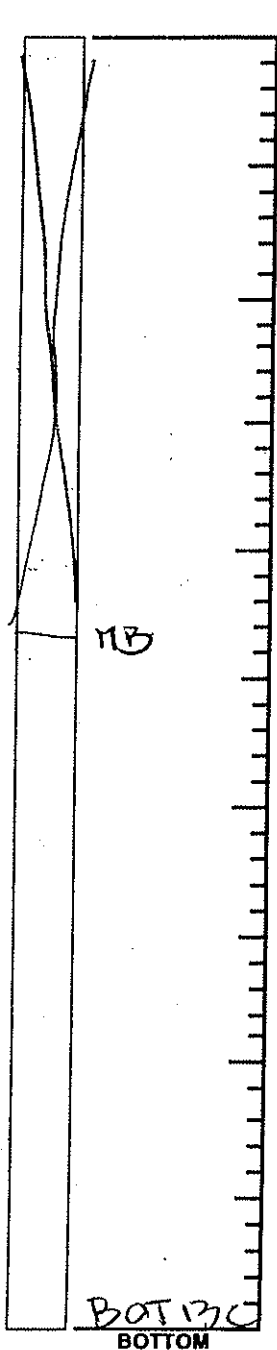
LOCATION NEW YORK, NY

Run No.	REC / RQD
13C	100/100

Run No.	REC / RQD
13C	100/100

Run No.	REC / RQD
12C	100/100

Run No.	REC / RQD
12C	100/100



SCALE: 1 division = 0.1 feet

**ROCK CORE SKETCH
LEGEND**

JOINTING

- J - Joint
- MB - Mechanical Break
- K - Angle w/ Horizontal
- // - Parallel
- X - Crossing
- F - Foliation
- S - Stratification
- U - Unfoliated or Unstratified

SURFACE

- C - Curved
- I - Irregular
- S - Straight

CONDITION

- 1 - Slick
- 2 - Smooth
- 3 - Rough

SKETCH SYMBOLS

- Joint
- Healed Joint
- Broken
- Part of Core Not Recovered
- Cavities or Vugs in Core
- Clay
- Sand
- Empty Space

NOTES

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING NO. GB-208
 SHEET 8 OF 8
 FILE NO. 9560
 SURFACE ELEV. 32.8 +/-
 DATUM BOROUGH PRESIDENT OF
MANHATTAN

PROJECT 9TH AVENUE DEVELOPMENT
 LOCATION NEW YORK, NEW YORK
 BORING LOCATION SEE BORING LOCATION PLAN

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG		TYPE OF FEED	CASING USED	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
TRUCK	<input checked="" type="checkbox"/>	DURING CORING	DIA., IN. <u>4</u>	DEPTH, FT. FROM	<u>0</u> TO <u>7.5</u>
SKID		MECHANICAL	DIA., IN. <u></u>	DEPTH, FT. FROM	<u></u> TO <u></u>
BARGE		HYDRAULIC <input checked="" type="checkbox"/>	DIA., IN. <u></u>	DEPTH, FT. FROM	<u></u> TO <u></u>
OTHER		OTHER	DIA., IN. <u></u>	DEPTH, FT. FROM	<u></u> TO <u></u>

TYPE AND SIZE OF:	DRILLING MUD USED	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
D-SAMPLER <u>2" O.D. SPLIT SPOON</u>	DIAMETER OF ROTARY BIT, IN. <u></u>		
U-SAMPLER <u></u>	TYPE OF DRILLING MUD <u></u>		
S-SAMPLER <u></u>			
CORE BARREL <u>NX DOUBLE TUBE</u>	AUGER USED	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
CORE BIT <u>NX DIAMOND</u>	TYPE AND DIAMETER, IN. <u></u>		
DRILL RODS <u>NWJ</u>			
	CASING HAMMER, LBS. <u></u>	AVERAGE FALL, IN. <u></u>	
	SAMPLER HAMMER, LBS. <u>140</u>	AVERAGE FALL, IN. <u>30</u>	

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
					NO WATER LEVEL OBSERVATIONS MADE.

PIEZOMETER INSTALLED ☐ YES ☒ NO SKETCH SHOWN ON

STANDPIPE:	TYPE	ID, IN.	LENGTH, FT.	TOP ELEV.
INTAKE ELEMENT:	TYPE	OD, IN.	LENGTH, FT.	TIP ELEV.
FILTER:	MATERIAL	OD, IN.	LENGTH, FT.	BOT. ELEV.

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING	LIN. FT. <u></u>	NO. OF 3" SHELBY TUBE SAMPLES	<u></u>
3.5" DIA. U-SAMPLE BORING	LIN. FT. <u></u>	NO. OF 3" UNDISTURBED SAMPLES	<u></u>
CORE DRILLING IN ROCK	LIN. FT. <u></u>	OTHER: 8" PVC VACTRON	<u>2'</u>

BORING CONTRACTOR WARREN GEORGE INC.
 DRILLER CLINTON/CARLOS MALDONADO HELPERS SAM/BEN SCOTT
 REMARKS BOREHOLE GROUTED UPON COMPLETION. (ORIENTED CORE)
 RESIDENT ENGINEER DAVID JANKE/ROBERTO REALE DATE 03-24-08
 CLASSIFICATION CHECK: CJM/FM TYPING CHECK: ROBERTO REALE

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

PROJECT: NINTH AVENUE TOWER PROJECT
LOCATION: NEW YORK, NEW YORK

BORING NO. B-101
SHEET 1 OF 8
FILE NO. 9560
SURFACE ELEV. APPROX. +31
RES. ENGR. S.W. LEE

DAILY PROGRESS	SAMPLE			SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS		REMARKS
	NO.	DEPTH	BLOWS/6"				4"	3"	
13:10							4"	3"	2" Asphalt at surface.
09-12-05	1D	1.0	20-19	Red gray brick fragment, some coarse to fine sand, trace concrete, steel, asphalt (Fill) (SP)	F1				Boring is at west end of parking lot.
Monday		3.0	12-14						
Sunny	2D	3.0	16-20	Red brown brick fragment, some coarse to fine sand, trace asphalt, silt (Fill) (SP-SM)		5			
80°F		5.0	10-16						
14:40	3D	5.0	18-17	Do 2D (Fill) (SP-SM)					
		7.0	23-19						Rod chatter.
07:30	4D	7.0	18-18	Top 1': Do 3D (Fill) (SP-SM)	DR	8			Milky gray wash.
09-13-05		8.8	69-100/4"	Bot 8": Green brown coarse to fine sand, some silt, trace mica (SM)		10			
Tuesday									
Sunny	5D	10.0	17-19	Green brown coarse to fine sand, some rock fgmts, tr mica, si (Decomposed Rock) (SP-SM)			10.7*		
80°F		12.0	24-41				10.7*		
	1C	12.5	REC=100%	Hard slightly weathered gray gneissic schist, pegmatite, blocky, iron stained joints	R	12.5	5*		*Coring time in minutes per foot.
		17.7	RQD=98%				6*		
						15	6*		
							7*		
							9*		
	2C	17.7	REC=100%	Hard unweathered gray gneissic schist moderately jointed, iron stained joints			6*		
		22.7	RQD=84%				6*		
						20	7*		
							6*		
							7*		
	3C	22.7	REC=100%	Hard unweathered gray gneissic schist, blocky, iron stained joints			11*		
		27.5	RQD=97%				13*		
						25	12*		
							14*		
							14*		
	4C	27.5	REC=100%	Hard slightly weathered gray gneissic schist, blocky, slight iron stained joints			15*		
		30.1	RQD=88%				17*		
14:40						30	20*		
07:20	5C	30.1	REC=100%	Hard slightly weathered gray gneissic schist, blocky, slight iron stained joints with a weathered zone			14*		
09-14-05		35.1	RQD=92%				15*		
Wednesday							13*		
Sunny							15*		
80°F						35	17*		
	6C	35.1	REC=99.5%	Hard unweathered gray gneissic schist, massive			14*		
		40.1	RQD=99.5%				17*		
							16*		
							20*		
						40	27*		
	7C	40.1	REC=100%	Hard unweathered gray schistose gneiss, trace pegmatite, massive			9*		
		45.3	RQD=100%				8*		
							10*		
							12*		
						45	14*		
	8C	45.3	REC=100%	Hard unweathered gray schistose gneiss and gneissic schist, trace pegmatite, massive			6*		
		50.3	RQD=91%				8*		
							8*		
							10*		
						50	12*		

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

PROJECT: NINTH AVENUE TOWER PROJECT
LOCATION: NEW YORK, NEW YORK

BORING NO. B-101
SHEET 2 OF 8
FILE NO. 9560
SURFACE ELEV. APPROX. +31
RES. ENGR. S.W. LEE

DAILY PROGRESS	SAMPLE			SAMPLE DESCRIPTION	STRATA	CASING		REMARKS
	NO.	DEPTH	BLOWS/6"			DEPTH	BLOWS	
Cont'd 09-14-05 14:40 07:00 09-15-05 Thursday Sunny Rain 80°F	9C	50.3	REC=100%	Hard unweathered gray gneissic schist, massive	R		3*	
		55.4	RQD=100%				3*	
							2*	
							3*	
						55	3*	
	10C	55.4	REC=100%	Hard slightly weathered gray gneissic schist, moderately jointed, iron stained joints			3*	
		60.4	RQD=95%				4*	
							3*	
							4*	
						60	4*	
	11C	60.4	REC=100%	Hard slightly weathered gray gneissic schist, trace pegmatite, moderately jointed			8*	
		65.4	RQD=85%				9*	
							9*	
							12*	
						65	14*	
	12C	65.4	REC=100%	Do 11C			9*	
		70.4	RQD=95%				9*	
							10*	
					10*			
			70		12*			
13C	70.4	REC=99%	hard unweathered gray gneissic schist, trace pegmatite, moderately jointed		8*			
	75.3	RQD=72%			8*			
					7*			
					8*			
				75	9*			
14C	75.3	REC=100%	Hard unweathered gray gneissic schist, trace pegmatite, moderately jointed		7*			
	80.4	RQD=73%			7*			
					6*			
					7*			
				80	6*			
15C	80.4	REC=89%	Hard unweathered gray gneissic schist, trace pegmatite, moderately jointed		11*			
	85.4	RQD=76%			13*			
					16*			
					18*			
				85	22*			
15:00						85.4		End of boring at 85.4'.
						90		
						95		
						100		

MUESER RUTLEDGE CONSULTING ENGINEERS
ROCK CORE SKETCH

BORING NO. B-101

SHEET 3 OF 8

FILE NO. 9560

SURFACE ELEV.

RES. ENGR. S-W Lee

PROJECT Ninth Avenue Tower Project

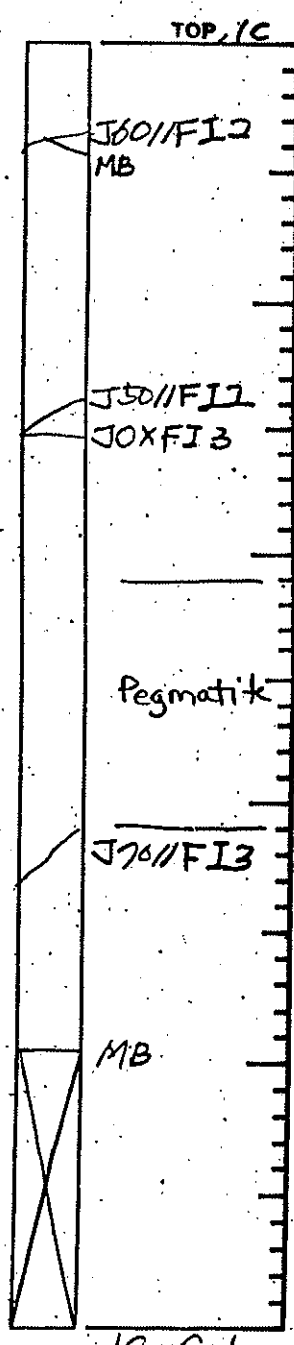
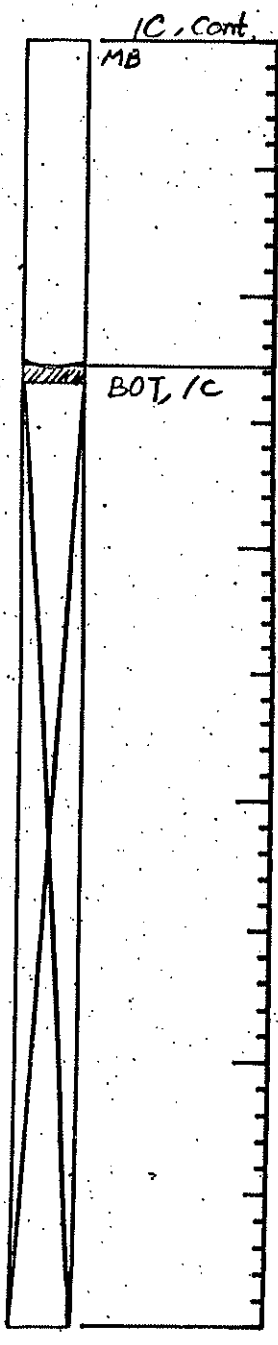
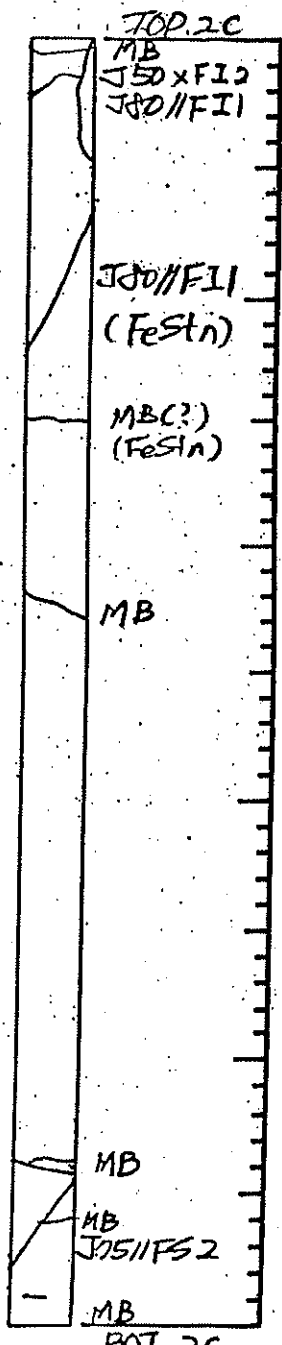
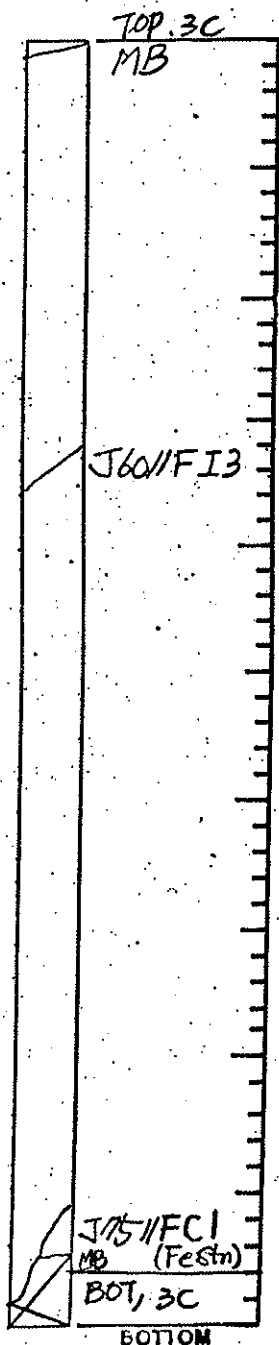
LOCATION New York, NY

Run No.	REC / ROD
3C	100 / 97

Run No.	REC / ROD
2C	100 / 84

Run No.	REC / ROD
1C	100 / 98

Run No.	REC / ROD
1C	100 / 98



ROCK CORE SKETCH
LEGEND

JOINTING

- J - Joint
- MB - Mechanical Break
- K - Angle w/ Horizontal
- // - Parallel
- X - Crossing
- F - Foliation
- S - Stratification
- U - Unfoliated or Unstratified

SURFACE

- C - Curved
- I - Irregular
- S - Straight

CONDITION

- 1 - Slack
- 2 - Smooth
- 3 - Rough

SKETCH SYMBOLS

- Joint
- Healed Joint
- Broken
- Part of Core Not Recovered
- Cavities or Vugs in Core
- Clay
- Sand
- Empty Space

SCALE: 1 division = 0.1 feet

NOTES Three grooves: S43°E, One groove: N43°W (project)
Fixing Arm: " , Screw: "

MUESER RUTLEDGE CONSULTING ENGINEERS
ROCK CORE SKETCH

BORING NO. B-101
SHEET 4 OF 8
FILE NO. 9560
SURFACE ELEV. _____
RES. ENGR. S-W Lee

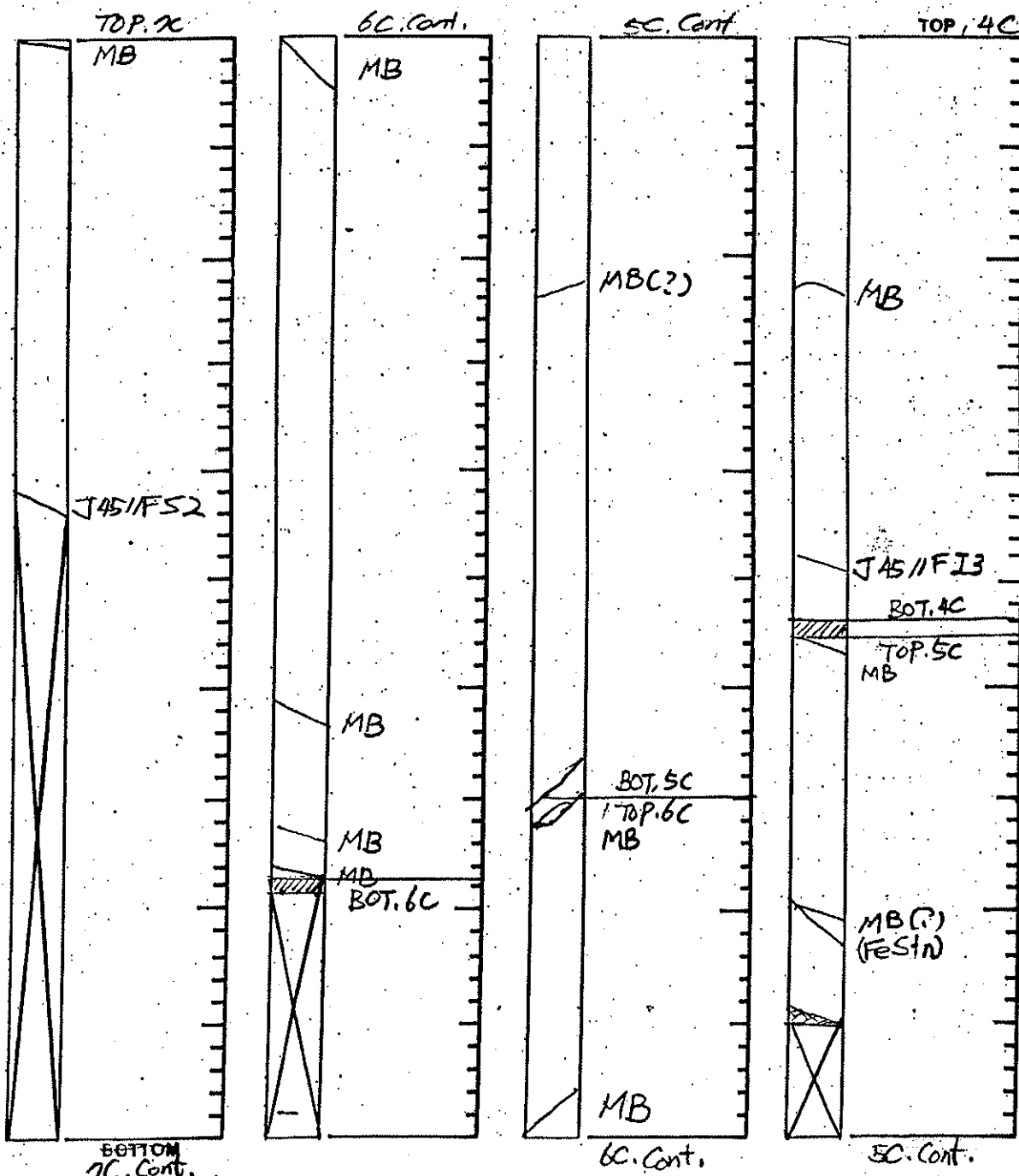
PROJECT Ninth Avenue Tower Project
LOCATION New York, NY

Run No.	REC / ROD
7C	100 / 100

Run No.	REC / ROD
6C	99.5 / 99.5

Run No.	REC / ROD
5C	100 / 92

Run No.	REC / ROD
4C	100 / 88



ROCK CORE SKETCH LEGEND	
JOINTING	
J	Joint
MB	Mechanical Break
∠	Angle w/ Horizontal
//	Parallel
X	Crossing
F	Foliation
S	Stratification
U	Unfoliated or Unstratified
SURFACE	
C	Curved
I	Irregular
S	Straight
CONDITION	
1	Stick
2	Smooth
3	Rough
SKETCH SYMBOLS	
	Joint
	Healed Joint
	Broken
	Part of Core Not Recovered
	Cavities or Vugs in Core
	Clay
	Sand
	Empty Space

NOTES: Three grooves: S43°E, One groove: N43°W (project)
Fixing Arm: " , Screw: "

MUESER RUTLEDGE CONSULTING ENGINEERS
ROCK CORE SKETCH

BORING NO. B-101
 SHEET 5 OF 8
 FILE NO. 9560
 SURFACE ELEV. _____
 RES. ENGR. S-W Lee

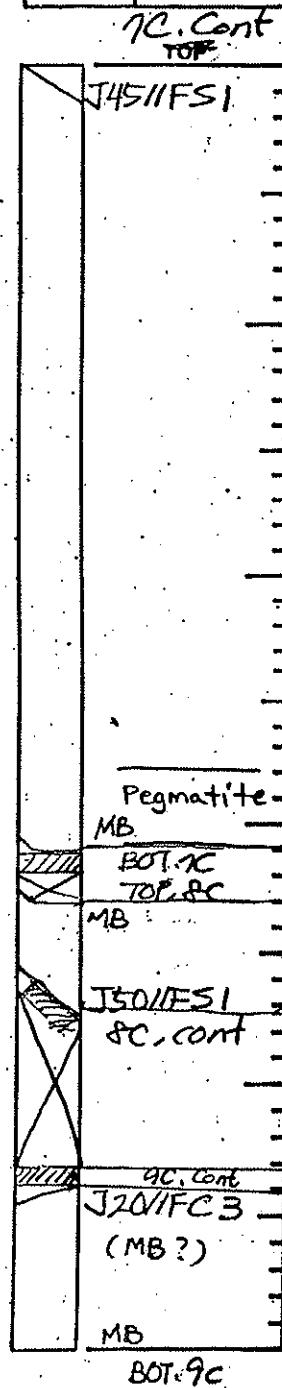
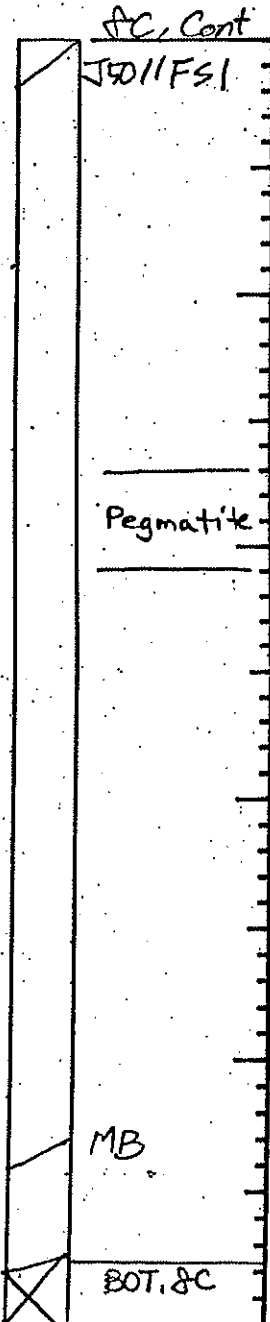
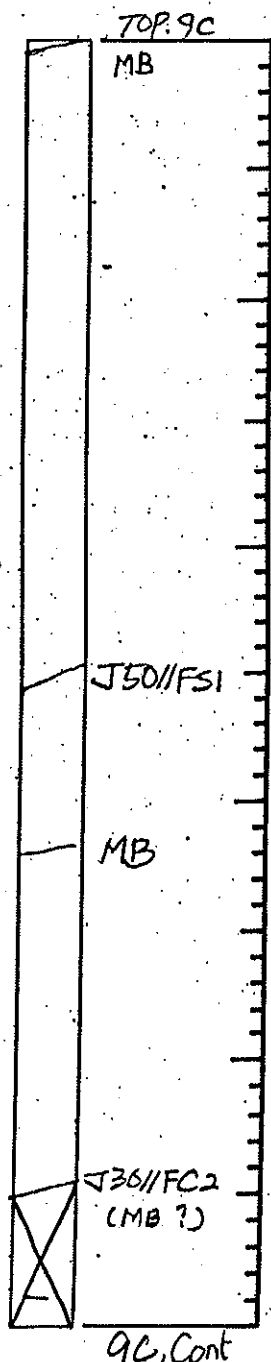
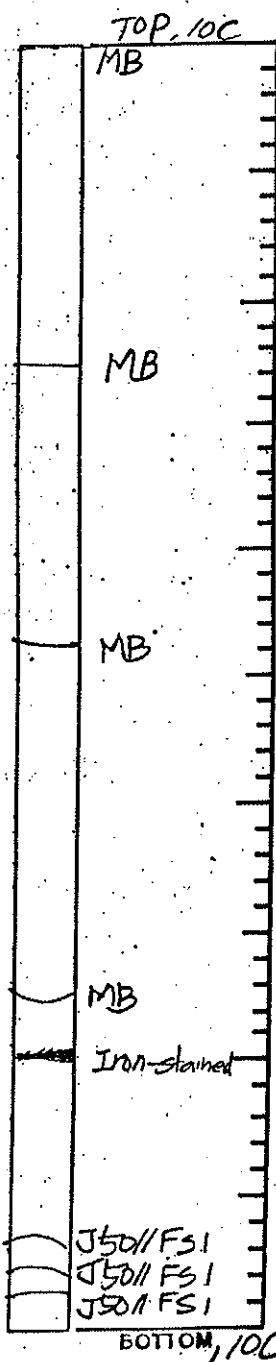
PROJECT Ninth Avenue Tower Project
 LOCATION New York, NY

Run No.	REC / RQD
10C	100/ 95

Run No.	REC / RQD
9C	100/ 100

Run No.	REC / RQD
8C	100/ 91

Run No.	REC / RQD
7C	100/ 100



ROCK CORE SKETCH LEGEND	
JOINTING	
J	- Joint
MB	- Mechanical Break
∠	- Angle w/ Horizontal
//	- Parallel
X	- Crossing
F	- Foliation
S	- Stratification
U	- Unfoliated or Unstratified
SURFACE	
C	- Curved
I	- Irregular
S	- Straight
CONDITION	
1	- Slick
2	- Smooth
3	- Rough
SKETCH SYMBOLS	
	Joint
	Healed Joint
	Broken
	Part of Core Not Recovered
	Cavities or Vugs in Core
	Clay
	Sand
	Empty Space

NOTES Three grooves: S 43° E, One groove: N 43° W (project)
Fixing Arm: " Screw: "

MUESER RUTLEDGE CONSULTING ENGINEERS
ROCK CORE SKETCH

BORING NO. B-101
SHEET 6 OF 8
FILE NO. 9560
SURFACE ELEV. _____
RES. ENGR. S-W Lee

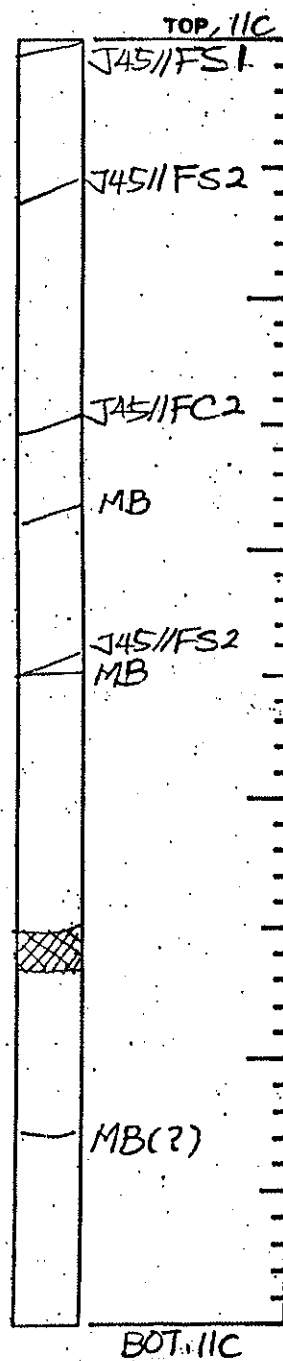
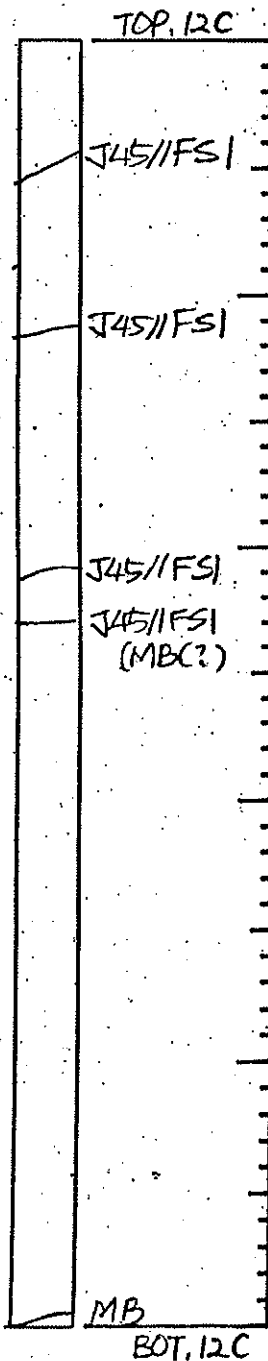
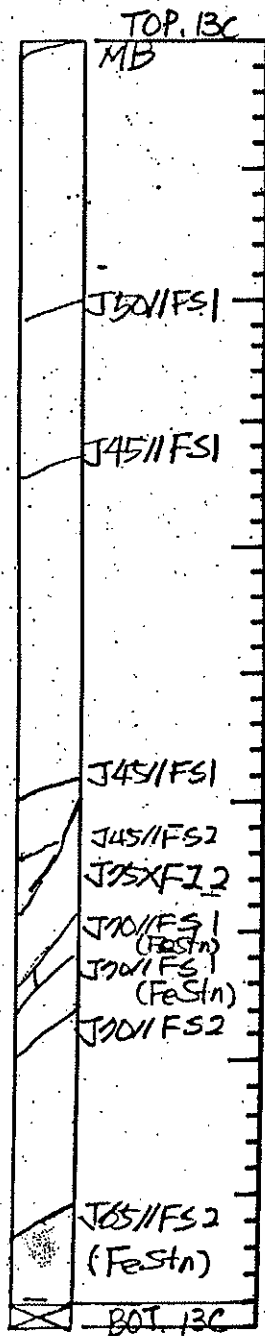
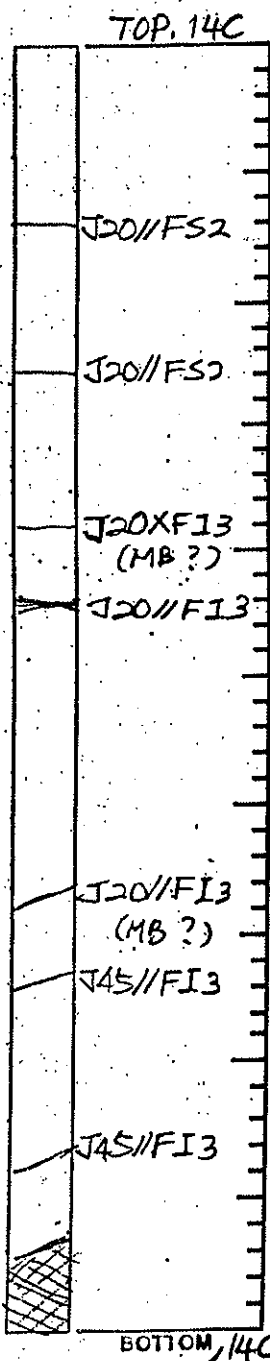
PROJECT Ninth Avenue Tower Project
LOCATION New York, NY

Run No.	REC / ROD
14C	100/ 73

Run No.	REC / ROD
13C	99/ 72

Run No.	REC / ROD
12C	100/ 95

Run No.	REC / ROD
11C	100/ 85



ROCK CORE SKETCH LEGEND	
JOINTING	
J	Joint
MB	Mechanical Break
K	Angle w/ Horizontal
//	Parallel
X	Crossing
F	Foliation
S	Stratification
U	Unfoliated or Unstratified
SURFACE	
C	Curved
I	Irregular
S	Straight
CONDITION	
1	Stick
2	Smooth
3	Rough
SKETCH SYMBOLS	
	Joint
	Healed Joint
	Broken
	Part of Core Not Recovered
	Cavities or Vugs in Core
	Clay
	Sand
	Empty Space

SCALE: 1 division = 0.1 feet

NOTES Three grooves : S 43° E, One groove : N 43° W (project)
Fixing Arm : " , Screw : "

MUESER RUTLEDGE CONSULTING ENGINEERS
ROCK CORE SKETCH

BORING NO. B-101
 SHEET 7 OF 8
 FILE NO. 9560
 SURFACE ELEV. _____
 RES. ENGR. S-W Lee

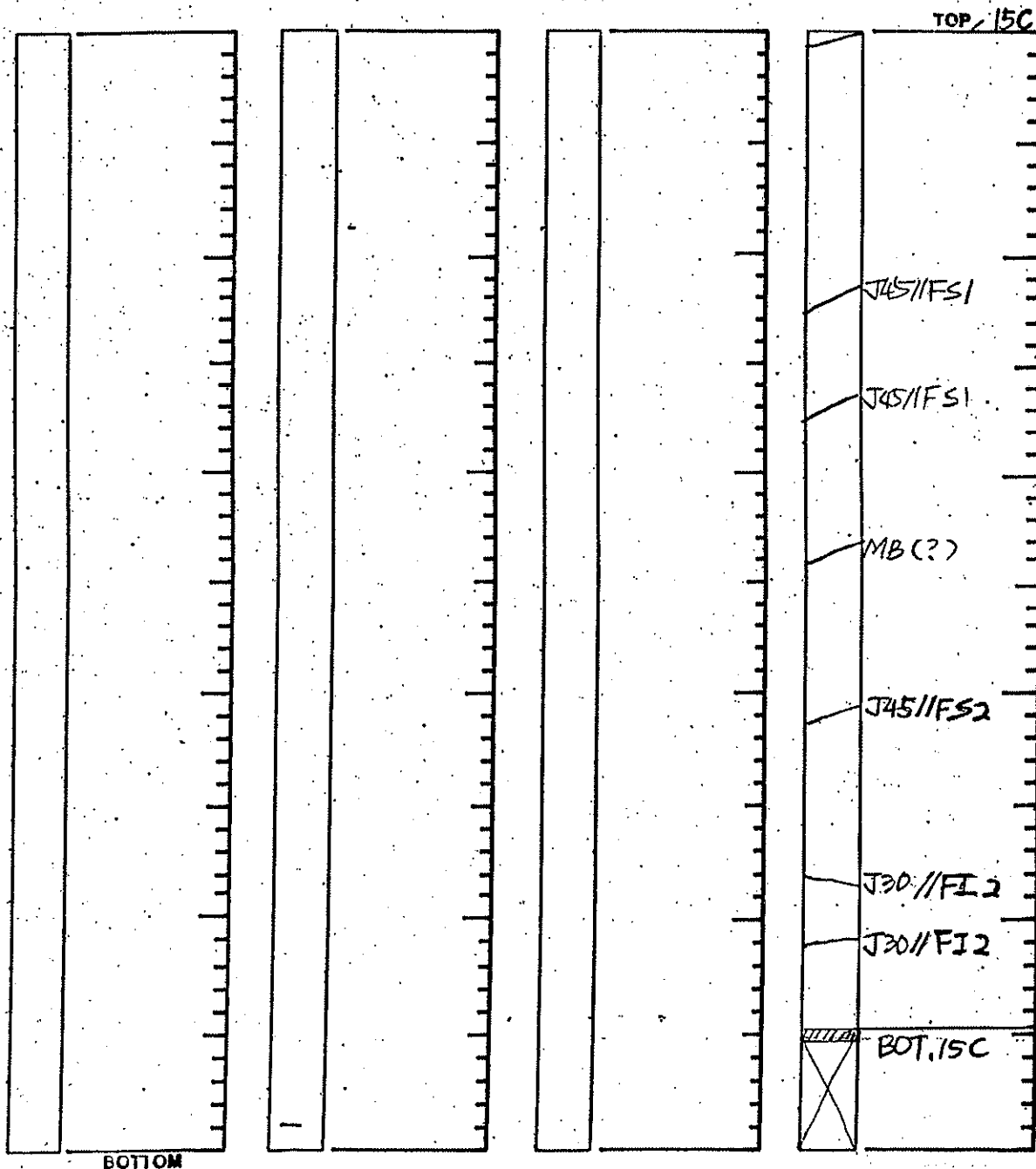
PROJECT Ninth Avenue Tower Project
 LOCATION New York, NY

Run No.	REC / RQD

Run No.	REC / RQD

Run No.	REC / RQD

Run No.	REC / RQD
15C	89/76



ROCK CORE SKETCH LEGEND	
JOINTING	
J	Joint
MB	Mechanical Break
K	Angle w/ Horizontal
//	Parallel
X	Crossing
F	Foliation
S	Stratification
U	Unfoliated or Unstratified
SURFACE	
C	Curved
I	Irregular
S	Straight
CONDITION	
1	Stick
2	Smooth
3	Rough
SKETCH SYMBOLS	
	Joint
	Healed Joint
	Broken
	Part of Core Not Recovered
	Cavities or Vugs in Core
	Clay
	Sand
	Empty Space

NOTES Three grooves : S43°E , One groove : N 43°W (project)
Fixing Arm : " , Screw : "

MUESER RUTLEDGE CONSULTING ENGINEERS

PROJECT NINTH AVENUE TOWER PROJECT	BORING NO. B-101
LOCATION NEW YORK, NEW YORK	SHEET 8 OF 8
BORING LOCATION SEE BORING LOCATION PLAN	FILE NO. 9560
	SURFACE ELEV. APPROX. +31
	DATUM

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG	TYPE OF FEED	CASING USED	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO	
TRUCK CME 75	DURING CORING				
	MECHANICAL	DIA., IN. 4			DEPTH, FT. FROM 0 TO 8.7
SKID	HYDRAULIC <input checked="" type="checkbox"/>	DIA., IN. 3			DEPTH, FT. FROM 0 TO 10.7
BARGE	OTHER	DIA., IN.			DEPTH, FT. FROM TO
OTHER					

TYPE AND SIZE OF:	DRILLING MUD USED <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
D-SAMPLER 2" O.D. SPLIT SPOON	DIAMETER OF ROTARY BIT, IN. 4-3/4, 3-7/8
U-SAMPLER	TYPE OF DRILLING MUD
S-SAMPLER	
CORE BARREL NX DOUBLE TUBE	AUGER USED <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
CORE BIT NX DIAMOND	TYPE AND DIAMETER, IN.
DRILL RODS	
	CASING HAMMER, LBS. 300 AVERAGE FALL, IN. 30
	SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
09-12-05	14:45	8.8	8.7	NO WATER	JUST AFTER SOIL BORING DOWN TO 8.8'
09-13-05	07:00	8.8	8.7	NO WATER	OVERNIGHT READING.
09-13-05	14:50	30.0	10.7	NO WATER	COULD NOT MEASURE DUE TO DRILLING EQUIPMENT.
09-14-05	07:00	30.0	10.7	NO WATER	COULD NOT MEASURE DUE TO DRILLING EQUIPMENT.
09-15-05	07:00	60.35	10.7	41.5	OVERNIGHT READING.
09-16-05	07:00	60.35	10.7	35.9	OVERNIGHT READING.

PIEZOMETER INSTALLED ☐ YES ☒ NO **SKETCH SHOWN ON**

STANDPIPE:	TYPE	ID, IN.	LENGTH, FT.	TOP ELEV.
INTAKE ELEMENT:	TYPE	OD, IN.	LENGTH, FT.	TIP ELEV.
FILTER:	MATERIAL	OD, IN.	LENGTH, FT.	BOT. ELEV.

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING	LIN. FT. 12.5	NO. OF 3" SHELBY TUBE SAMPLES
3.5" DIA. U-SAMPLE BORING	LIN. FT.	NO. OF 3" UNDISTURBED SAMPLES
CORE DRILLING IN ROCK	LIN. FT. 72.5	OTHER:

BORING CONTRACTOR	WARREN GEORGE INC.
DRILLER	GREG MARNEY HELPERS PAUL BARNETT
REMARKS	CEMENT GROUTED HOLE UPON COMPLETION.
RESIDENT ENGINEER	S.W. LEE DATE 09-15-05
CLASSIFICATION CHECK:	CHERYL MOSS TYPING CHECK:

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

PROJECT: NINTH AVENUE TOWER PROJECT
LOCATION: NEW YORK, NEW YORK

BORING NO. B-102
SHEET 1 OF 7
FILE NO. 9560
SURFACE ELEV. APPROX. +39
RES. ENGR. S.W. LEE

DAILY PROGRESS	SAMPLE			SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
12:20							4" 3"	3" Asphalt at surface.
09-07-05	1D	1.0	36-100/4"	Brown black coarse to fine sand, some silt, trace gravel, asphalt (Fill) (SM)	F1			Boring is at east end of parking lot.
Wednesday		1.8						
Sunny	2D	3.0	19-24	Brown red coarse to fine sand, some brick fragments, trace silt, concrete (Fill) (SP-SM)		5		
75°F	3D	5.0	5-6	Gray red coarse to fine sand, some gravel and concrete fragments, tr brick, silt (Fill) (SP-SM)				
	4D	7.0	8-5	Dark brown yellow fine to coarse sand, some rock fragments, trace gravel, brick fragment, 2" micaceous wthd rock at bot (Fill) (SP-SM)				
		9.0	19-39		DR	8.8		Light gray wash.
14:50	5D	10.0	100/4"	Dark brown yellow fine to medium sand, trace mica, silt (Decomposed Rock) (SP-SM)		10.6		
07:40		10.3			R		6*	*Coring time in minutes per foot.
09-08-05	1C	10.6	REC=100%	Medium hard slightly weathered gray gneissic schist, some pegmatite jointed, iron stained joints			5*	
Thursday		15.6	RQD=58%				6*	
Sunny	2C	15.6	REC=99%	Hard slightly weathered gray gneissic schist, trace pegmatite, moderately jointed, iron stained joints		15	6*	
75°F		20.6	RQD=88%				2*	
							2*	Around 24', hard drilling very slow. Gray wash.
							3*	
							3*	
						20	3*	
	3C	20.6	REC=81%	Medium hard slightly weathered gray gneissic schist, blocky, iron stained joints, weathered zone bottom 1'			14*	
		25.6	RQD=64%				13*	
							5*	
							24*	*Core barrel jammed up frequently.
	4C	25.6	REC=64%	Medium hard to intermediate slightly weathered to moderately weathered gray gneissic schist, trace pegmatite, moderately jointed, slightly weathered occasional clay filling joints, weathered zone bottom 2'		25	7*	
		30.6	RQD=39%				4*	
							8*	
							6*	
	5C	30.6	REC=88%	Medium hard slightly weathered to moderately weathered gray gneissic schist, jointed to broken, iron stained joints		30	16*	At 38' did not advance in 12 minutes.
		35.4	RQD=50%				9*	
							15*	
							12*	
							10*	
	6C	35.4	REC=96%	Intermediate moderately weathered gray gneissic schist, closely jointed to broken weathered joints		35	10*	
		38.0	RQD=35%				4*	
14:50							4*	
	7C	38.0	REC=97%	Medium hard slightly weathered gray gneissic schist moderately jointed, iron stained joints			12*	
09-09-05		41.7	RQD=85%			40	5*	
Friday							9*	
Sunny	8C	41.7	REC=95%	Medium hard slightly weathered gray gneissic schist moderately jointed, iron stained joints			8*	
75°F		45.7	RQD=74%				10*	
							12*	
							11*	
	9C	45.7	REC=99%	Hard unweathered gray gneissic schist, blocky, slight iron stained joints		45	15*	
		50.6	RQD=96%				3*	
							3*	
							4*	
						50	3*	

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

PROJECT: NINTH AVENUE TOWER PROJECT
LOCATION: NEW YORK, NEW YORK

BORING NO. B-102
SHEET 2 OF 7
FILE NO. 9560
SURFACE ELEV. APPROX. +39
RES. ENGR. S.W. LEE

DAILY PROGRESS	SAMPLE			SAMPLE DESCRIPTION	STRATA	CASING		REMARKS
	NO.	DEPTH	BLOWS/6"			DEPTH	BLOWS	
Cont'd 09-09-05	10C	50.6	REC=100%	Hard unweathered gray gneissic schist, blocky	R		3*	
		55.7	RQD=100%				3*	
							2*	
							3*	
						55	3*	
	11C	55.7	REC=100%	Do 10C			3*	
		60.7	RQD=100%				3*	
							3*	
							2*	
						60	3*	
12C	60.7	REC=100%	Hard unweathered gray hornblende gneiss, blocky, pyrite in joints			3*		
	65.8	RQD=99%				3*		
						3*		
						3*		
				65		3*		
11:50	13C	65.7	REC=100%	Do 12C			4*	
07:10		70.8	RQD=100%				3*	
09-12-05 Monday Sunny 75°F							4*	
							4*	
						70	4*	
	15C	75.8	REC=100%	Do 12C		4*		
		80.7	RQD=100%			3*		
						4*		
						4*		
					75	4*		
	16C	80.7	REC=100%	Do 12C		4*		
		85.0	RQD=100%			5*		
					5*			
					5*			
			80		5*			
11:30					5*			
					5*			
					4*			
					5*			
				85	3*			
								End of boring at 85'.
						90		
				95				

MUESER RUTLEDGE CONSULTING ENGINEERS
ROCK CORE SKETCH

BORING NO. B-102
SHEET 3 OF 7
FILE NO. 9560
SURFACE ELEV. _____
RES. ENGR. S-W Lee

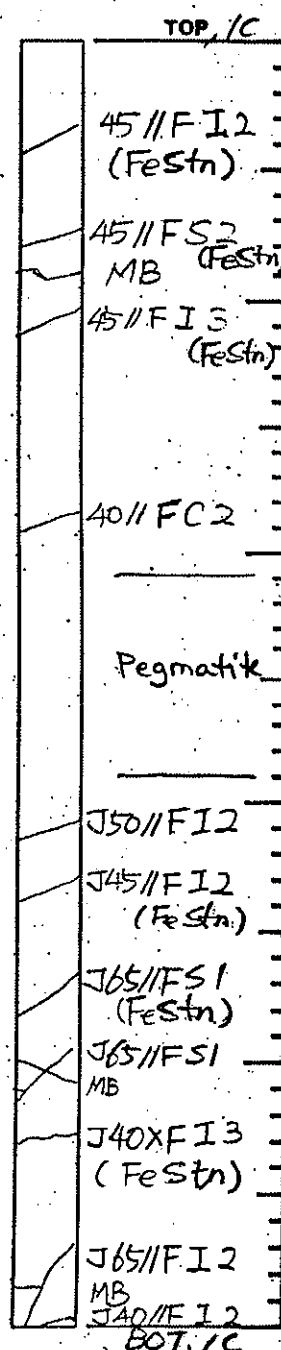
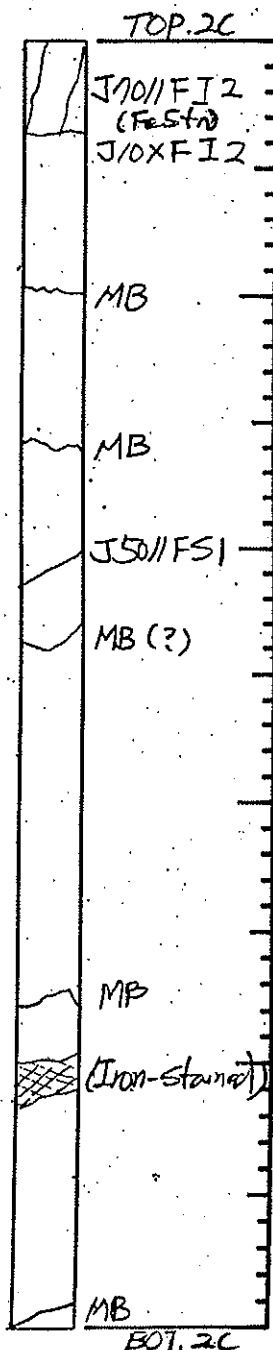
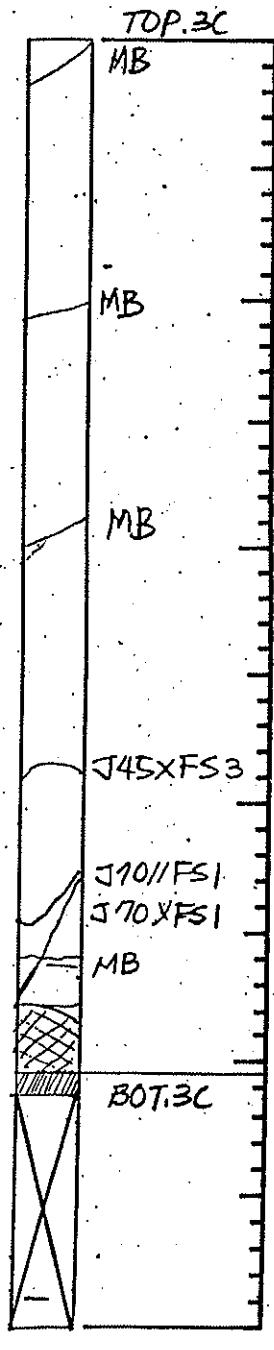
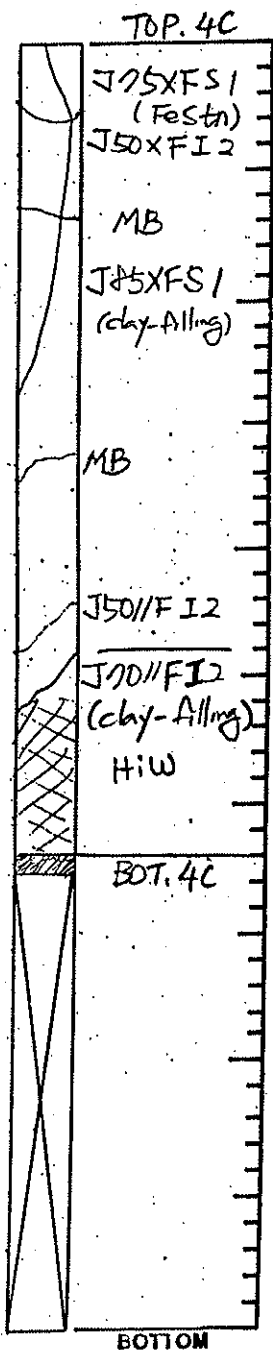
PROJECT Ninth Avenue Tower Project
LOCATION New York, NY

Run No.	REC / ROD
4C	64/ 39

Run No.	REC / ROD
3C	81/ 64

Run No.	REC / ROD
2C	99/ 88

Run No.	REC / ROD
1C	100/ 58



ROCK CORE SKETCH LEGEND	
JOINTING	
J	- Joint
MB	- Mechanical Break
*	- Angle w/ Horizontal
//	- Parallel
X	- Crossing
F	- Foliation
S	- Stratification
U	- Unfoliated or Unstratified
SURFACE	
C	- Curved
I	- Irregular
S	- Straight
CONDITION	
1	- Slick
2	- Smooth
3	- Rough
SKETCH SYMBOLS	
	Joint
	Healed Joint
	Broken
	Part of Core Not Recovered
	Cavities or Vugs in Core
	Clay
	Sand
	Empty Space

SCALE: 1 division = 0.1 feet

NOTES Three grooves (project West), One groove (project East)
Fixing Arm ("), Screw (")

MUESER RUTLEDGE CONSULTING ENGINEERS
ROCK CORE SKETCH

BORING NO. B-102

SHEET 4 OF 7

FILE NO. 9560

SURFACE ELEV. _____

RES. ENGR. S-W Lee

PROJECT Ninth Avenue Tower Project

LOCATION New York, NY

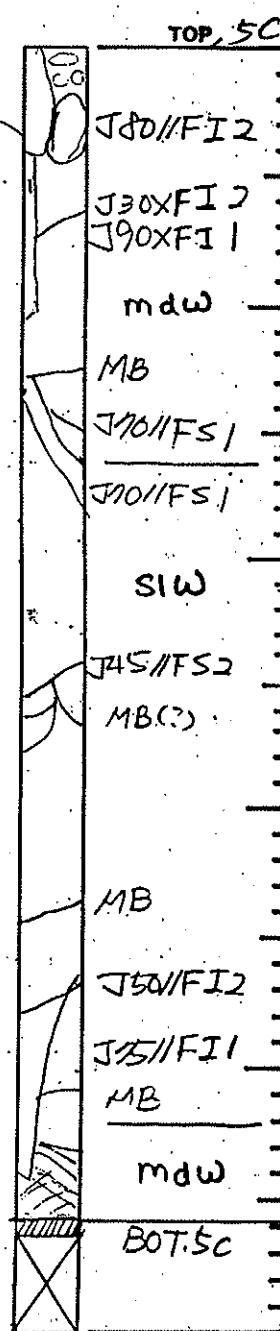
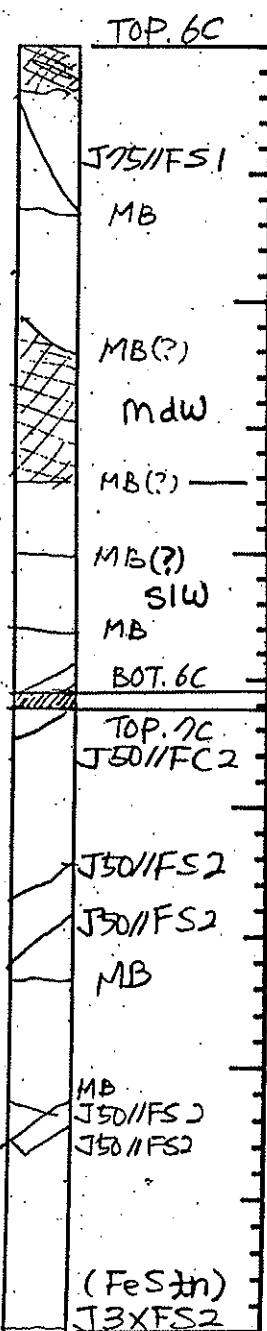
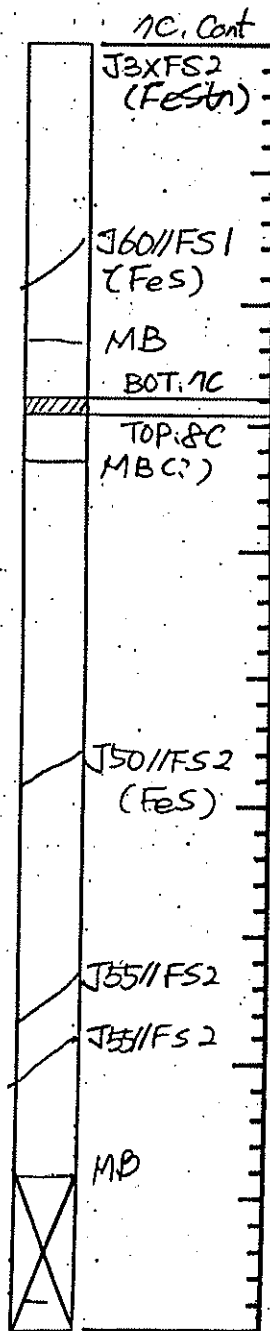
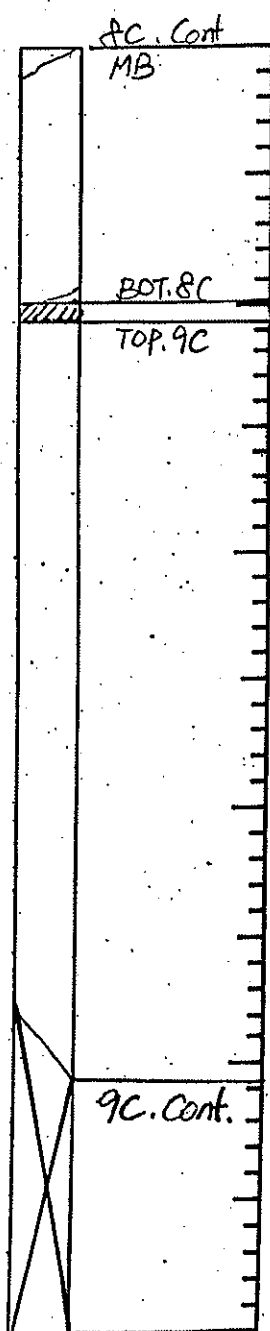
Run No.	REC / RQD
8C	95/74
9C	99/96

Run No.	REC / RQD
7C	97/85

Run No.	REC / RQD
6C	96/35

Run No.	REC / RQD
5C	88/50

5C to 9C very weakly foliated.



ROCK CORE SKETCH LEGEND

JOINTING

- J - Joint
- MB - Mechanical Break
- ∠ - Angle w/ Horizontal
- # - Parallel
- X - Crossing
- F - Foliation
- S - Stratification
- U - Unfoliated or Unstratified

SURFACE

- C - Curved
- I - Irregular
- S - Straight

CONDITION

- 1 - Slick
- 2 - Smooth
- 3 - Rough

SKETCH SYMBOLS

- Joint
- Healed Joint
- Broken
- Part of Core Not Recovered
- Cavities or Vugs in Core
- Clay
- Sand
- Empty Space

SCALE: 1 division = 0.1 feet

NOTES Three grooves (project West), One groove (project East)
Fixing Arm ("), Screw (")

MUESER RUTLEDGE CONSULTING ENGINEERS
ROCK CORE SKETCH

BORING NO. B-102
 SHEET 5 OF 7
 FILE NO. 9560
 SURFACE ELEV. _____
 RES. ENGR. S-W Lee

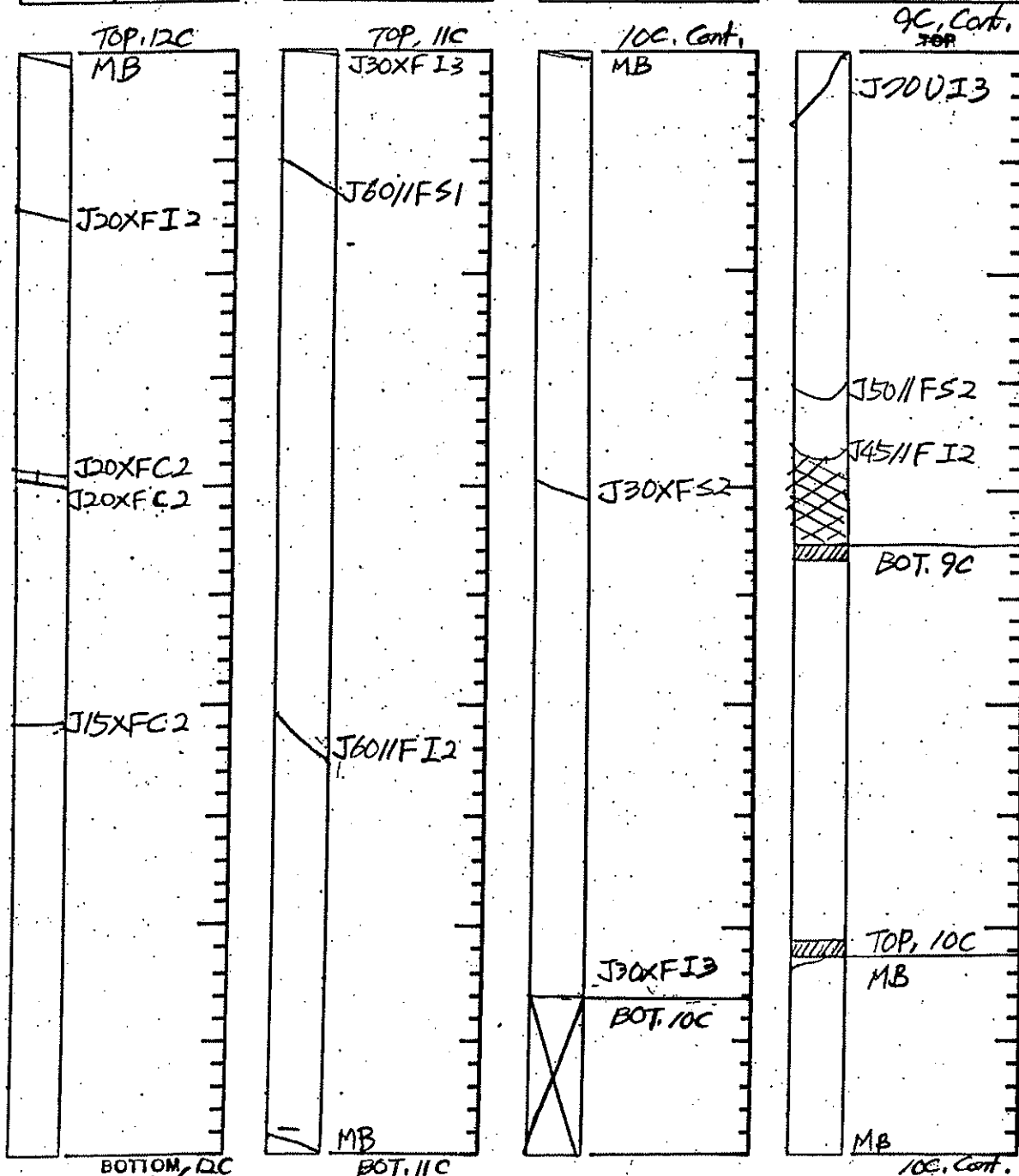
PROJECT Ninth Avenue Tower Project
 LOCATION New York, NY

Run No.	REC / RQD
12C	100/ 99

Run No.	REC / RQD
11C	100/ 100

Run No.	REC / RQD
10C	100/ 100

Run No.	REC / RQD
9C	99/ 96



ROCK CORE SKETCH LEGEND	
JOINTING	
J	- Joint
MB	- Mechanical Break
K	- Angle w/ Horizontal
//	- Parallel
X	- Crossing
F	- Foliation
S	- Stratification
U	- Unfoliated or Unstratified
SURFACE	
C	- Curved
I	- Irregular
S	- Straight
CONDITION	
1	- Slick
2	- Smooth
3	- Rough
SKETCH SYMBOLS	
	Joint
	Healed Joint
	Broken
	Part of Core Not Recovered
	Cavities or Vugs in Core
	Clay
	Sand
	Empty Space

NOTES Three grooves (project West), One groove (project East)
Fixing Arm ("), Screw (")

**MUESER RUTLEDGE CONSULTING ENGINEERS
ROCK CORE SKETCH**

BORING NO. B-102
SHEET 6 OF 7
FILE NO. 9560
SURFACE ELEV. _____
RES. ENGR. S-W Lee

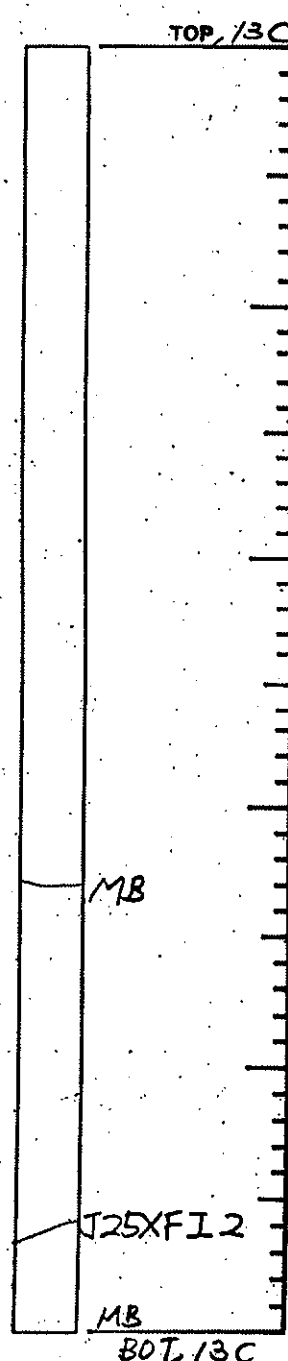
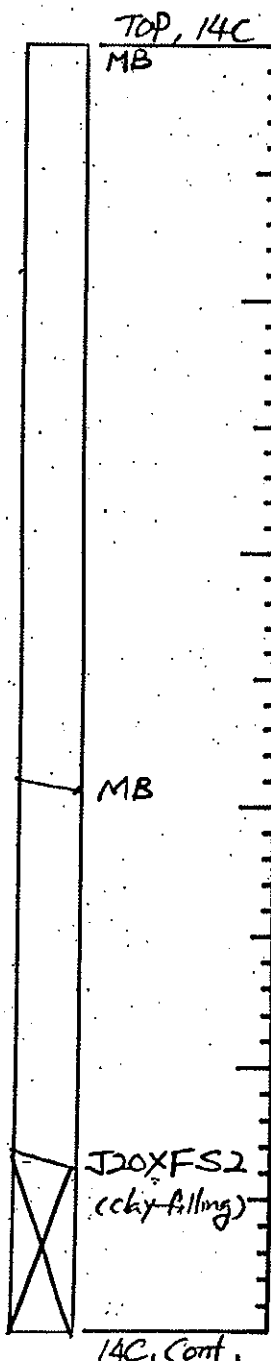
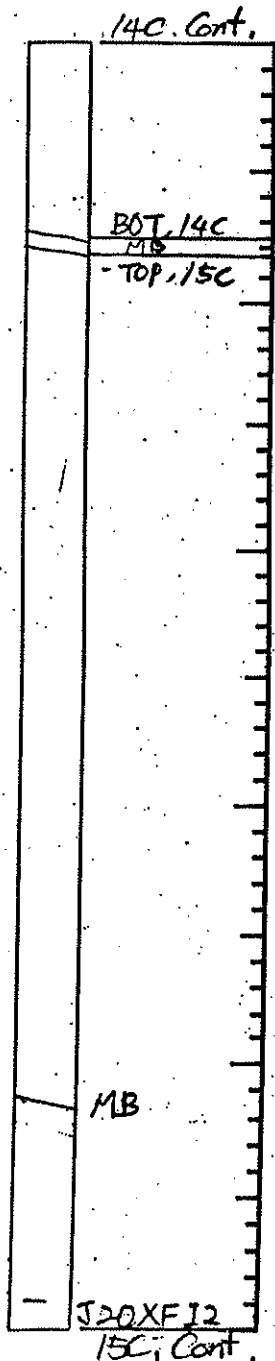
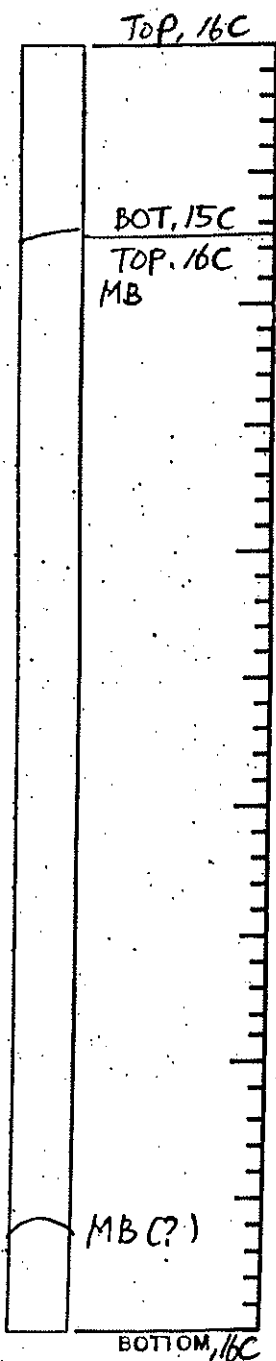
PROJECT Ninth Avenue Tower Project
LOCATION New York, NY

Run No.	REC / RQD
16C	100/ 100

Run No.	REC / RQD
14C 15C	100/ 100

Run No.	REC / RQD
14C	100/ 100

Run No.	REC / RQD
13C	100/ 100



ROCK CORE SKETCH LEGEND	
JOINTING	
J	- Joint
MB	- Mechanical Break
X	- Angle w/ Horizontal
//	- Parallel
X	- Crossing
F	- Foliation
S	- Stratification
U	- Unfoliated or Unstratified
SURFACE	
C	- Curved
I	- Irregular
S	- Straight
CONDITION	
1	- Stick
2	- Smooth
3	- Rough
SKETCH SYMBOLS	
	Joint
	Healed Joint
	Broken
	Part of Core Not Recovered
	Cavities or Vugs in Core
	Clay
	Sand
	Empty Space

SCALE: 1 division = 0.1 feet

NOTES _____

MUESER RUTLEDGE CONSULTING ENGINEERS

PROJECT <u>NINTH AVENUE TOWER PROJECT</u>	BORING NO. <u>B-102</u>
LOCATION <u>NEW YORK, NEW YORK</u>	SHEET <u>7</u> OF <u>7</u>
BORING LOCATION <u>SEE BORING LOCATION PLAN</u>	FILE NO. <u>9560</u>
	SURFACE ELEV. <u>APPROX. +39</u>
	DATUM _____

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG	TYPE OF FEED	CASING USED	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO	
TRUCK <u>CME 75</u>	DURING CORING	DIA., IN. <u>4</u>			DEPTH, FT. FROM <u>0</u> TO <u>86</u>
SKID _____	MECHANICAL _____	DIA., IN. <u>3</u>			DEPTH, FT. FROM <u>0</u> TO <u>10.5</u>
BARGE _____	HYDRAULIC <u>X</u>	DIA., IN. _____			DEPTH, FT. FROM _____ TO _____
OTHER _____	OTHER _____	DIA., IN. _____			DEPTH, FT. FROM _____ TO _____

TYPE AND SIZE OF:	DRILLING MUD USED <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
D-SAMPLER <u>2" O.D. SPLIT SPOON</u>	DIAMETER OF ROTARY BIT, IN. <u>4-3/4, 3-7/8</u>
U-SAMPLER _____	TYPE OF DRILLING MUD _____
S-SAMPLER _____	
CORE BARREL <u>NX DOUBLE TUBE</u>	AUGER USED <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
CORE BIT <u>NX DIAMOND</u>	TYPE AND DIAMETER, IN. _____
DRILL RODS _____	
	CASING HAMMER, LBS. <u>300</u> AVERAGE FALL, IN. <u>30</u>
	SAMPLER HAMMER, LBS. <u>140</u> AVERAGE FALL, IN. <u>30</u>

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
09-08-05	07:00	10.3	8.6	9.6	OVERNIGHT READING.
09-08-05	15:00	28	10.5	9.6	COULD NOT MEASURE DUE TO DRILLING EQUIPMENT.
09-09-05	07:00	38	10.5	9.6	COULD NOT MEASURE DUE TO DRILLING EQUIPMENT.
09-12-05	07:00	65.75	10.5	9.6	COULD NOT MEASURE DUE TO DRILLING EQUIPMENT.
09-12-05	11:30	84.95	10.5	5.3	JUST AFTER CORING DOWN TO 84.55
09-12-05	12:10	84.95		10.6	AFTER CORING.

PIEZOMETER INSTALLED ☐ YES ☒ NO **SKETCH SHOWN ON** _____

STANDPIPE:	TYPE _____	ID, IN. _____	LENGTH, FT. _____	TOP ELEV. _____
INTAKE ELEMENT:	TYPE _____	OD, IN. _____	LENGTH, FT. _____	TIP ELEV. _____
FILTER:	MATERIAL _____	OD, IN. _____	LENGTH, FT. _____	BOT. ELEV. _____

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING	LIN. FT. <u>10.5</u>	NO. OF 3" SHELBY TUBE SAMPLES _____
3.5" DIA. U-SAMPLE BORING	LIN. FT. _____	NO. OF 3" UNDISTURBED SAMPLES _____
CORE DRILLING IN ROCK	LIN. FT. <u>74.5</u>	OTHER: _____

BORING CONTRACTOR <u>WARREN GEORGE INC.</u>	DATE <u>09-12-05</u>
DRILLER <u>GREG MARNEY</u>	HELPERS <u>PAUL BARNETT</u>
REMARKS <u>CEMENT GROUTED HOLE UPON COMPLETION.</u>	
RESIDENT ENGINEER <u>S.W. LEE</u>	TYPING CHECK: _____
CLASSIFICATION CHECK: <u>CHERYL MOSS</u>	

APPENDIX B

LABORATORY DATA OF ROCK STRENGTH AND MODULUS

SOR TESTING LABORATORIES, INC.

Geotechnical Engineering - Materials Testing - Forensic Studies
98 Sand Park Rd., Cedar Grove, NJ 07009
(973) 239-6001 Fax (973) 239-8380

Branch Office:
New Brunswick, NJ
(732) 247-4481

Kamil Sor, Ph.D.
Orhun Sor, P.E.
Peter G. Micklus, P.E.
Yilmaz Arhan, Ph.D.
Kenneth Rowbotham, P.E.

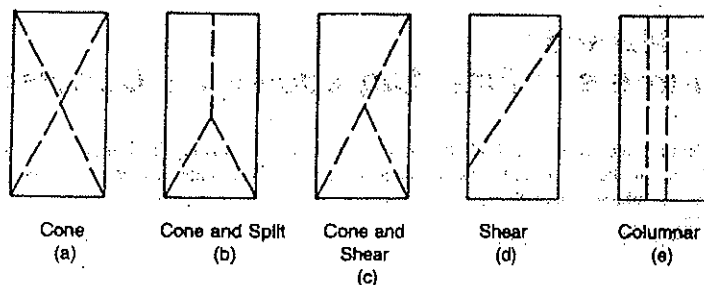
This report is the confidential property of the Client, and information contained may not be published or reproduced without our written permission.

Client:	Mueser Rutledge Consulting Engineers		
Project:	9 th Avenue Tower Development # 9560-01		
Subject:	Testing of Rock Cores		
Job No.:	08-71	Report No.:	08-692R
		Date:	2/29/2008

On February 26, 2008, the client delivered rock cores to our office for testing. At the request of the client, the unconfined compressive strength, modulus of elasticity and splitting tensile strength of the cores were determined in general conformance with ASTM D7012, Method C, ASTM D7012, Method D and Method D3967, respectively. The results of our tests are provided below. The stress-strain curves are attached.

Sample		Mechanical Property			
Number	ID (*)	Unconfined Compression (psi)	Type of Fracture	Modulus of Elasticity (psi)	Splitting Tensile Strength (psi)
1	B-201 2C	6050	Columnar	17.40×10^6	2080
2	B-201 3C	11,140	Shear	-	2530
3	B-201 4C	7610	Columnar	11.50×10^6	2170
4	B-219 1C	7320	Columnar	11.90×10^6	2720
5	B-219 3C	5090	Columnar	12.50×10^6	1340
6	B-202 4C	4710	Columnar	9.80×10^6	1800
7	B-203 2C	2040	Shear	-	1760
8	B-203 6C	5790	Columnar	9.10×10^6	1580
9	B-205 2C	6850	Columnar	9.45×10^6	2150
10	B-205 4C	6230	Columnar	9.10×10^6	1720

(*) By Client.

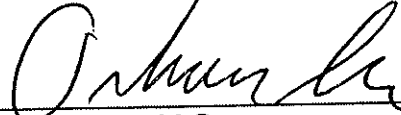


SOR TESTING LABORATORIES, INC.

Report No.08-692R
Page 2

Very truly yours,

SOR TESTING LABORATORIES, INC.

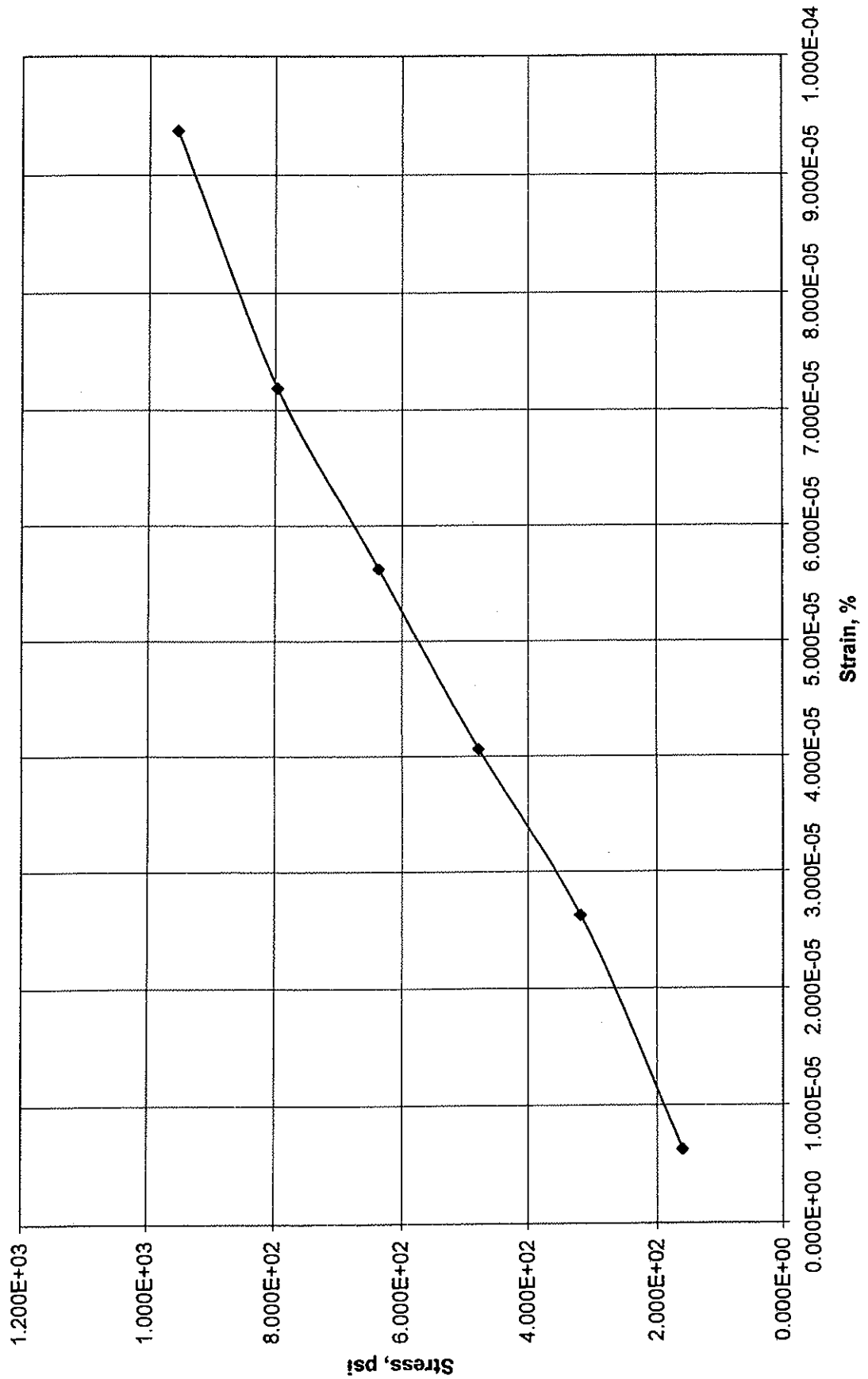
A handwritten signature in black ink, appearing to read 'Orhun Sor', is written over a horizontal line.

Orhun Sor, M.S.
Vice President

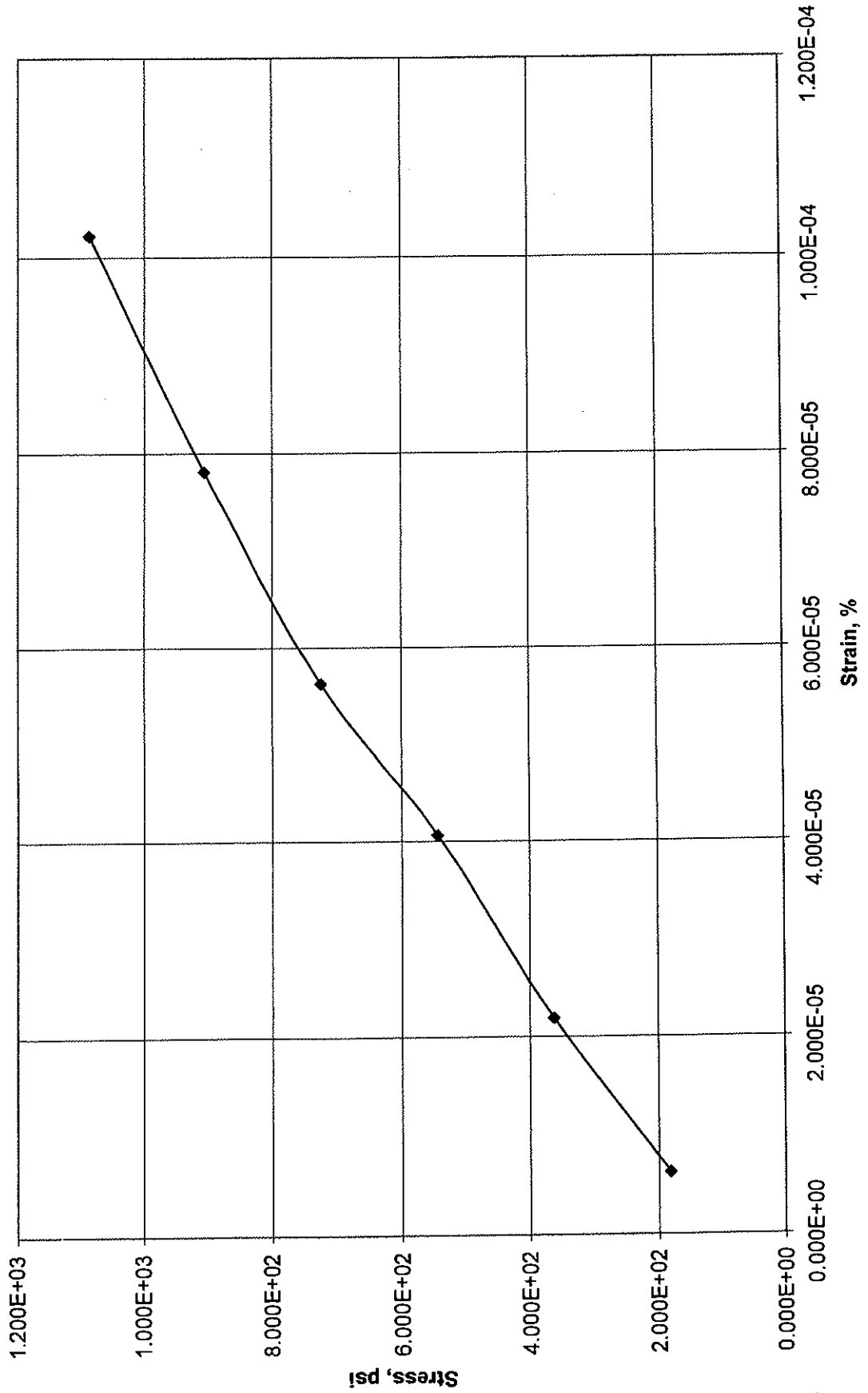
KS/ls

cc: (1) Client, Attn: Jim Tantella
Fax: 917-339-9400

Core B-205 4C



Core B-205 2C

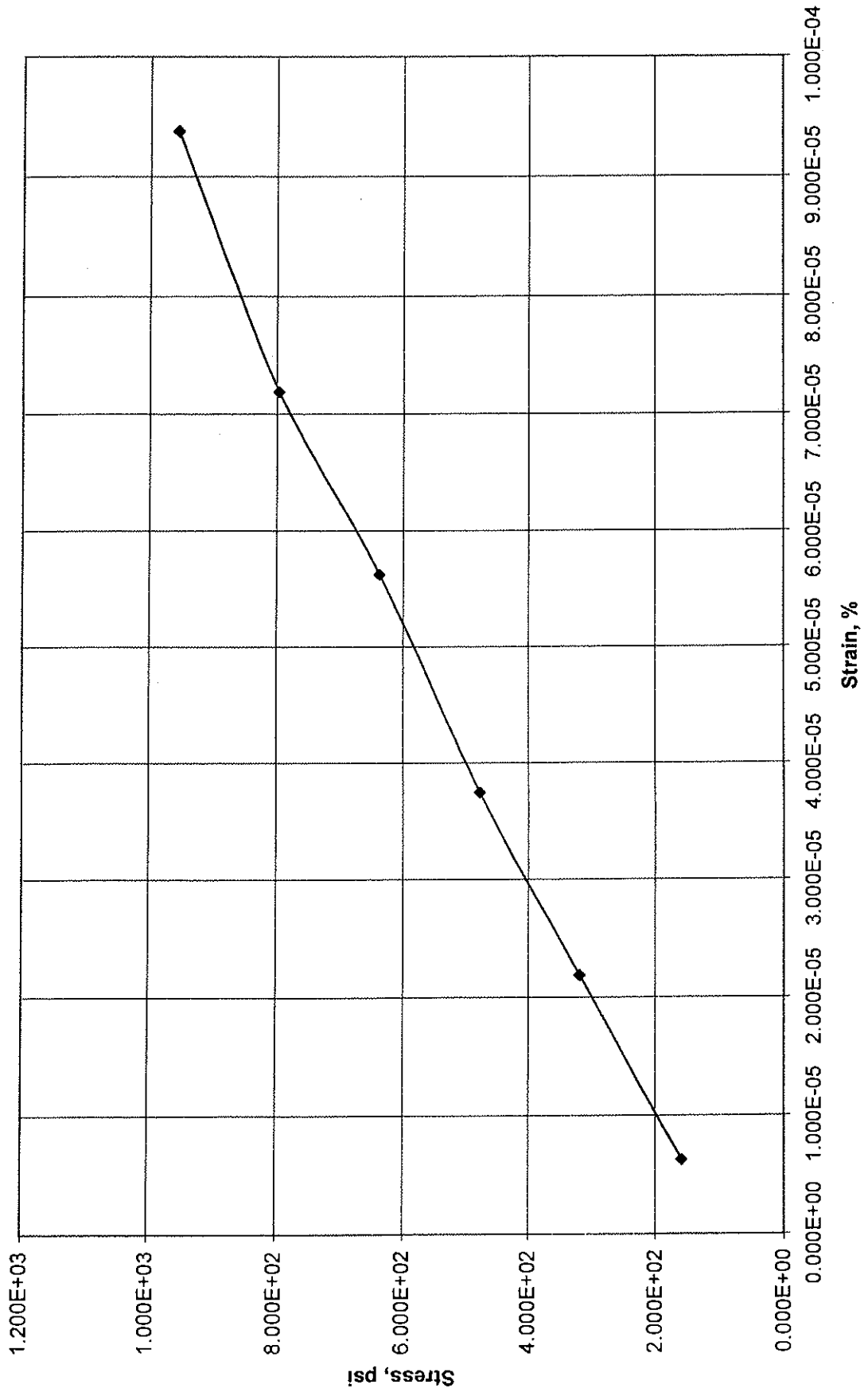


SOR TESTING LABORATORIES, INC.

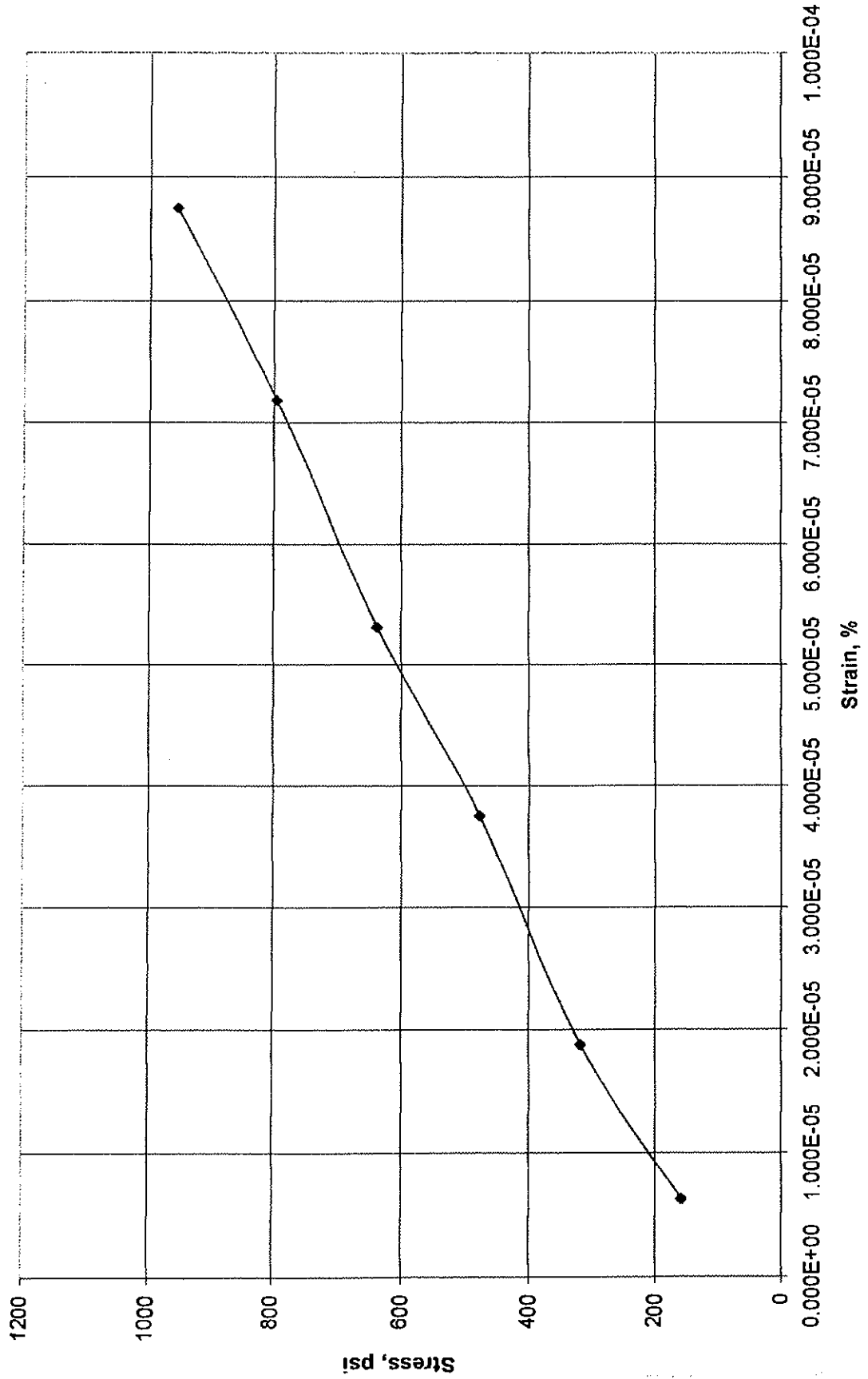
Report No.08-692

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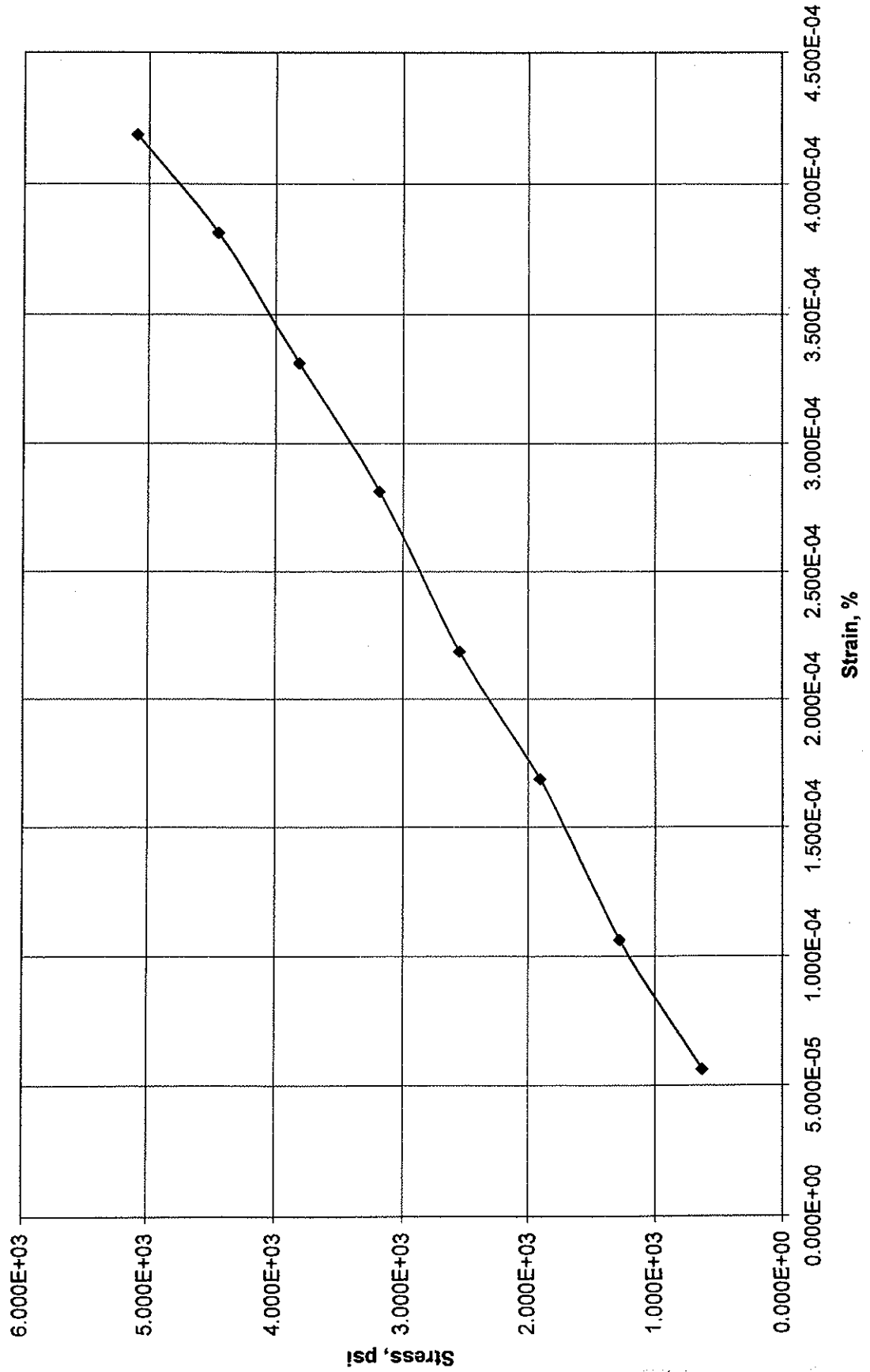
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Core B-202 4C



Core B-219 3C

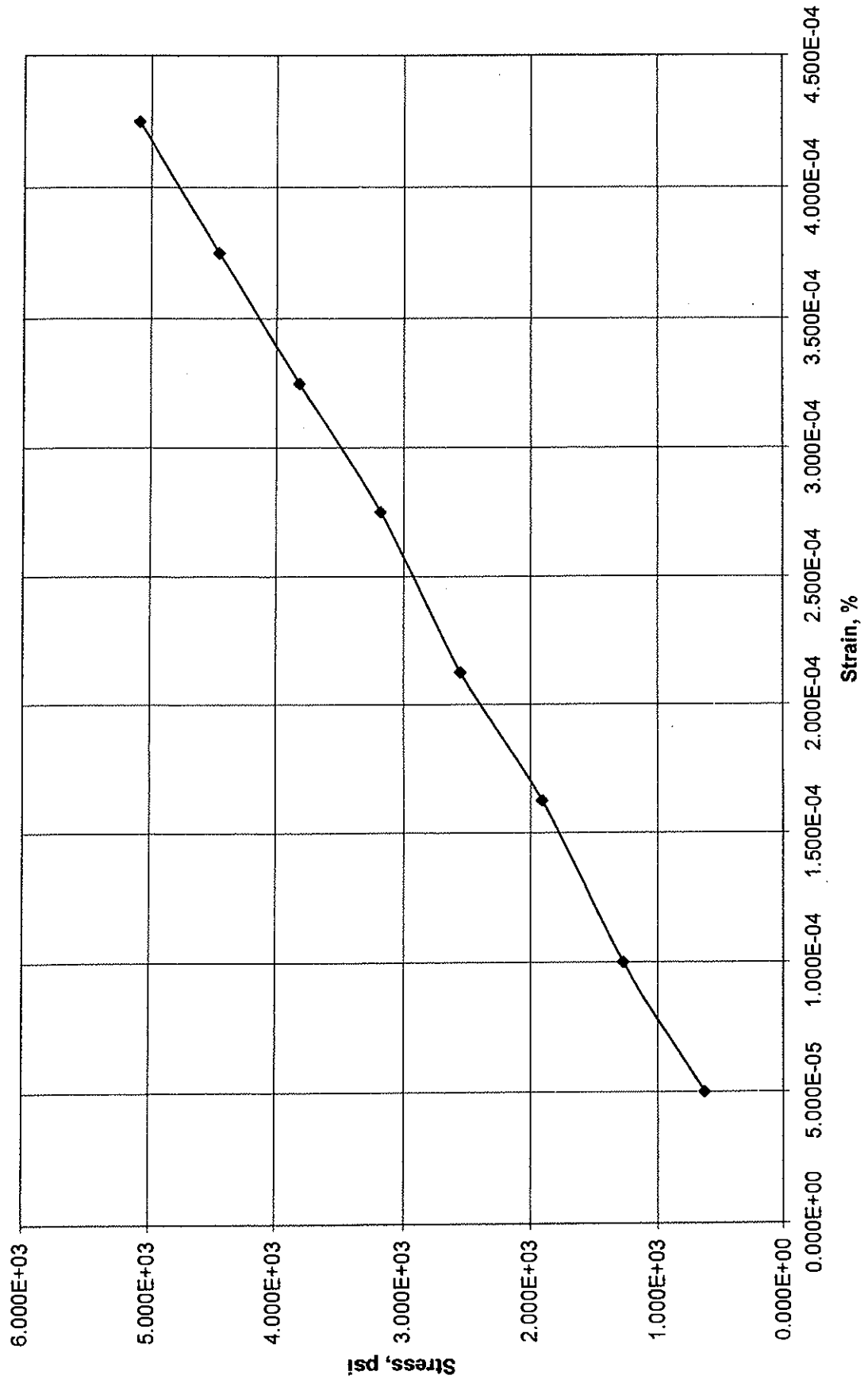


SOR TESTING LABORATORIES, INC.

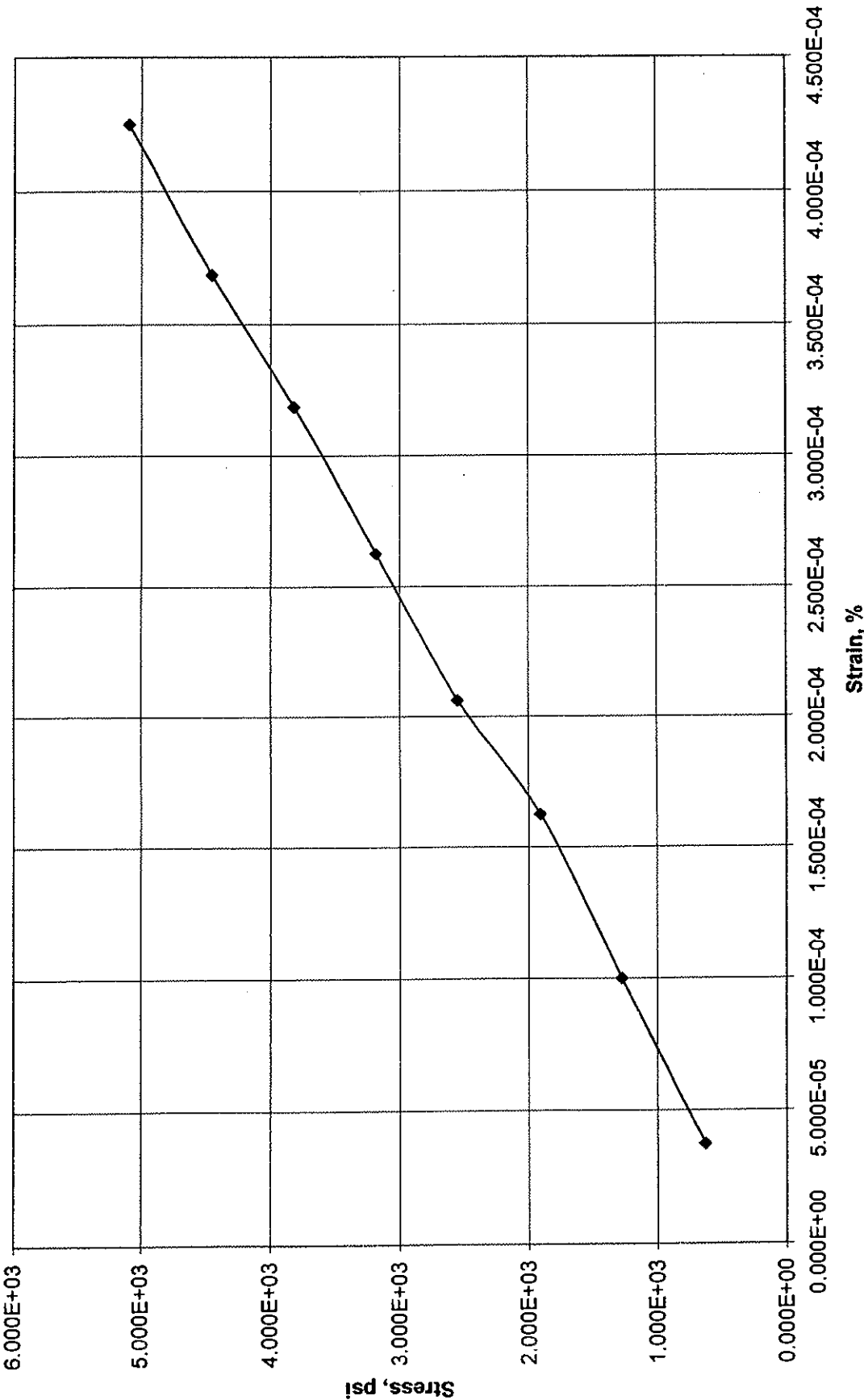
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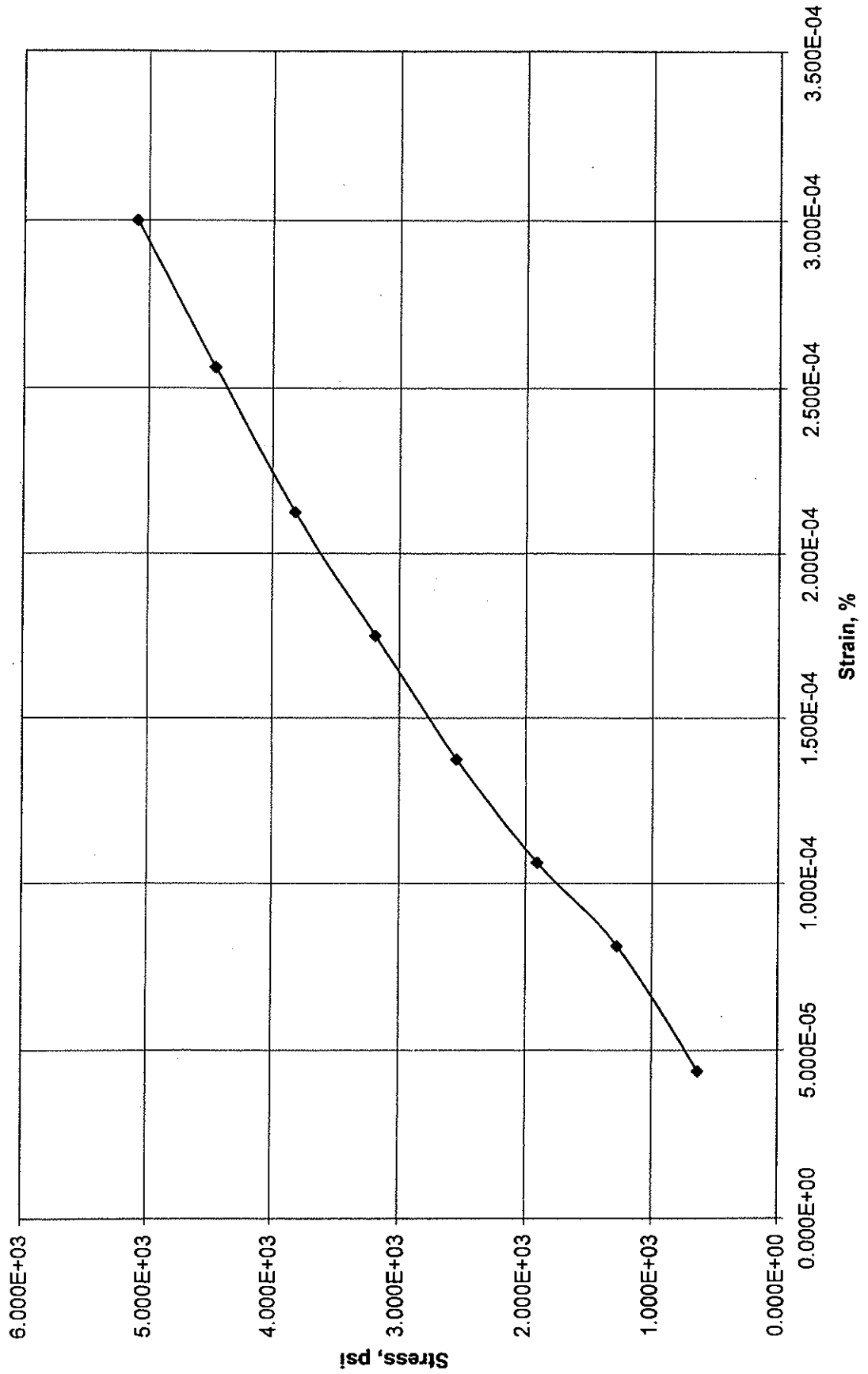
Core B-219 1C



Core B-201 4C



Core B-201 2C



APPENDIX C
SELECTED PHOTOGRAPHS OF ROCK CORE



Top of Box

Bottom of Box

<p>9TH AVENUE DEVELOPMENT NEW YORK NEW YORK</p>	<p>Boring No. GB-204A: Runs 8C to 11C</p>	<p>MUESER RUTLEDGE CONSULTING ENGINEERS 225 W. 34th Street, New York, NY 10122</p>
		<p>MRCE No. 9560</p>
		<p>Sheet 11 of 13</p>



Top of Box

Bottom of Box

NEW YORK NEW YORK	9 TH AVENUE DEVELOPMENT NEW YORK	Boring No. GB-205: Runs 5C to 8C		MUESER RUTLEDGE CONSULTING ENGINEERS 225 W. 34th Street, New York, NY 10122	
				MRCE No. 9560	Sheet 12 of 13



Top of Box

Bottom of Box

9 TH AVENUE DEVELOPMENT NEW YORK NEW YORK	Boring No. GB-206 : Runs 5C to 8C		MUESER RUTLEDGE CONSULTING ENGINEERS 225 W. 34th Street, New York, NY 10122	
			MRCE No. 9560	Sheet 13 of 13