DEPT OF BLDGS 121324290 Job Number

ES513872614 Scan Code

NYC BUILDINGS

# TR4: Technical Report
## Soil Investigation

*Must be typewritten.*

Orient and affix BIS job number label here

**1 Location Information** *Required for all applications.*

House No(s) 501 Street Name West 30th Street

Borough Manhattan Block 702 Lot 50 BIN 1012456 CB No. 104

Work on Floor(s) cel Apt/Condo No(s)

**2 Applicant Information** *Required for all applications.*

Last Name Gallagher First Name Marc Middle Initial J

Business Name Langan Engineering &Environmental Business Telephone (212) 479-5400

Business Address 21 Penn Plaza Business Fax (212) 479-5444

City New York State NY Zip 10001 Mobile Telephone

E-Mail MGallagher@langan.com License Number 081664

☑ P.E. ☐ R.A.

**3 Required Borings / Test Pits** *Required for all applications.*

Number of Test Pits as Required as per NYC Construction Codes: 29

**4 Plot Diagram** *Required for all applications.*

Draw in ink to indicate scale. Show building outline or extension and location of all borings and/or test pits by dimensions. Borings and/or test pits shall be distributed according to the NYC Construction Codes.

SEE DOCUMENTS ATTACHED

## 5 Test Report *Required for all applications.*

| Date | Boring/ Test Pit # | Feet Below Curb | Soil Description | Class Number | Remarks |
|---|---|---|---|---|---|
| | | | SEE DOCUMENTS ATTACHED | | |
| | | | | | |
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## 6 Statements and Signatures *Required for all applications.*

I hereby state that the above information is correct and complete to the best of my knowledge and that the above tests were performed in accordance with all Administrative Code Provisions and Departmental Rules, Regulations and Directives.

Falsification of any statement is a misdemeanor and is punishable by a fine or imprisonment, or both.

It is unlawful to give to a city employee, or for a city employee to accept, any benefit, monetary or otherwise, either as a gratuity for properly performing the job or in exchange for special consideration. Violation is punishable by imprisonment or fine or both.

Name (please print)

Marc J Gallagher

Signature

Date

11/7/12

STATE OF NEW YORK · MARC J. GALLAGHER · 081664-1 · LICENSED PROFESSIONAL ENGINEER

P.E. / R.A. Seal *(apply seal, then sign and date over seal)*

## Approvals - Internal Use Only

| | | | |
|---|---|---|---|
| Examined and Recommended for Approval | | Approved | |
| Examiner Name | | Borough Commissioner Signature | Date |
| Signature | Date | | |

# Geotechnical Engineering Study

## Hudson Yards – Terra Firma
## Manhattan, New York

***Prepared For:***

**Related Companies**
**60 Columbus Circle**
**New York, New York 10023**

***Prepared By:***


**Langan Engineering & Environmental Services, P.C.**
**21 Penn Plaza**
**360 West 31st Street, 8th Floor**
**New York, New York 10001**
**NJ Certificate of Authorization No: 24GA27996400**

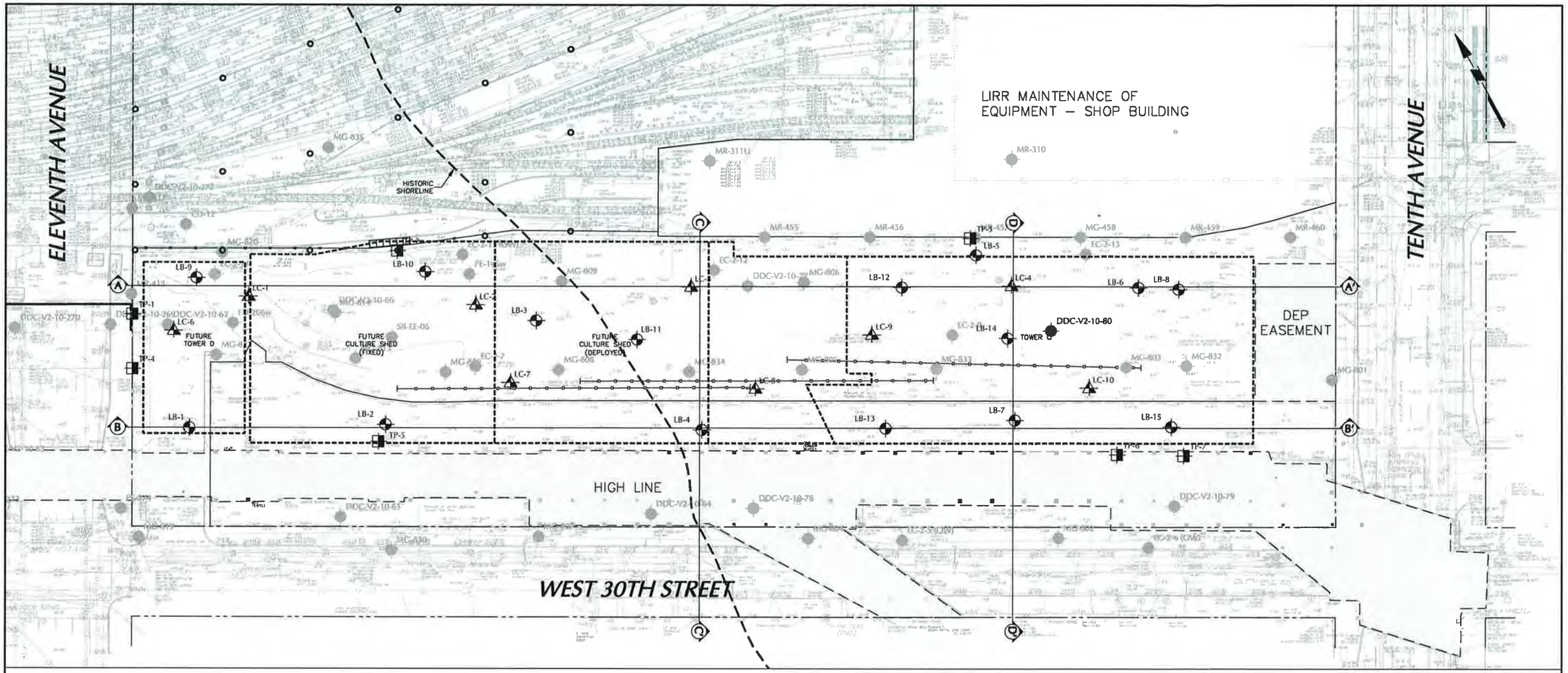
**Michael Paquette, P.E.**
**Professional Engineer License No. 086956**

11/7/12

**Marc Gallagher, P.E., LEED AP**
**Professional Engineer License No. 081664-1**


**17 May 2012**
**170019112**

LANGAN




GENERAL NOTES:

1. EXISTING CONDITIONS INFORMATION TAKEN FROM TOPOGRAPHIC & BOUNDARY SURVEY PREPARED BY LANGAN ENGINEERING & ENVIRONMENTAL SERVICES, P.C. TITLED "HUDSON YARDS FINAL TOPO SURVEY," DATED 5 NOVEMBER 2010.
2. PROPOSED CONSTRUCTION INFORMATION TAKEN FROM DRAWINGS G1-0100 AND A1-B100 PREPARED BY KOHN PEDERSEN FOX ASSOCIATES PC ARCHITECTS & PLANNING CONSULTANTS, TITLED "SITE PLAN, HYE MASTERPLAN" AND "COMPOSITE PLAN, FLOOR B1-00," DATED 22 DECEMBER 2011.
3. ALL ELEVATIONS CONTAINED WITHIN THIS DRAWING REFERENCE THE BOROUGH PRESIDENT OF MANHATTAN DATUM (BPMD) WHICH IS 2.75 FT ABOVE MEAN SEA LEVEL AT SANDY HOOK, NJ AS DEFINED BY THE UNITED STATES GEOLOGIC SURVEY (USGS NGVD 1929).

   DATUM CONVERSIONS:
   USGS = BPMD+2.75'
   PENN = BPMD+300.025'
4. LANGAN BORING, SCPT, AND TEST PIT LOCATIONS WERE SURVEYED BY LANGAN ENGINEERING AND ENVIRONMENTAL SERVICES.
5. ALL HISTORIC BORING LOCATIONS SHOULD BE CONSIDERED APPROXIMATE.
6. LANGAN BORINGS, CONE PENETRATION TESTING, AND TEST PITS WERE PERFORMED UNDER THE FULL-TIME INSPECTION OF REPRESENTATIVES OF LANGAN ENGINEERING AND ENVIRONMENTAL SERVICES.
7. DRILLING OF BORINGS LB-1 THROUGH LB-15 WAS PERFORMED BY WARREN GEORGE INC. OF JERSEY CITY, NEW JERSEY BETWEEN 29 DECEMBER 2011 AND 18 JANUARY 2012.
8. CONE PENETRATION TESTING AT LC-1 THROUGH LC-10 (EXCLUDING LC-5) WAS PERFORMED BY CONETEC, INC OF WEST BERLIN, NEW JERSEY ON 18 JANUARY 2012.
9. TEST PITS TP-1 THROUGH TP-7 WERE EXCAVATED BY WARREN GEORGE INC. OF JERSEY CITY, NEW JERSEY BETWEEN 3 JANUARY AND 13 JANUARY 2012.
10. A SHEAR WAVE VELOCITY SURVEY WAS PERFORMED BY HAGER RICHTER GEOSCIENCE OF FORDS, NEW JERSEY ON 23 JANUARY 2012.
11. ALL DRILLING WAS PERFORMED USING MUD ROTARY DRILLING TECHNIQUES.
12. DISTURBED SOIL SAMPLES WERE OBTAINED UTILIZING A STANDARD 2-INCH OUTER DIAMETER SPLIT-SPOON SAMPLER, FREE FALLING A HEIGHT OF 30-INCHES.
13. ROCK CORING WAS PERFORMED USING A NQ DOUBLE WALL, WIRE LINE CORE BARRELS.
14. EXISTING MONITORING WELLS IN BORINGS EC-2-5, EC-2-6, AND EC-2-11 WERE USED TO MEASURE GROUNDWATER ELEVATION.
15. REFER TO FIGURES 11 AND 12 FOR SUBSURFACE CROSS-SECTIONS.
16. MABSTOA CAISSON LOCATIONS APPROXIMATED FROM A DRAWING TITLED "DRILLED CAISSON DETAILS – 1" FROM THE LIRR MABSTOA BUS GARAGE FOUNDATIONS CONTRACT NO. 1-02-21064-0-0, DATED FEBRUARY 15, 1962, SHEET 199 OF 204, DRAWING NO. BG-2.

LEGEND:

- LB-1 — LANGAN BORING LOCATION (2012)
- LC-1 — LANGAN SEISMIC CONE PENETRATION TEST LOCATION (2012)
- TP-1 — LANGAN TEST PIT LOCATION (2012)
- BORINGS BY OTHERS (SEE LIST BELOW)
- LANGAN SHEAR WAVE VELOCITY SURVEY LINES (2012)
- APPROXIMATE EXCAVATION LIMITS OF PROPOSED TOWER C, TOWER D AND CULTURAL SHED

BORING SERIES INFORMATION:

| | |
|---|---|
| EC | HUDSON YARDS, LANGAN 2006 |
| CD | NO. 7 SUBWAY EXTENSION, PB TEAM 2003 |
| SB | NO. 7 SUBWAY EXTENSION, PB TEAM 2004 |
| FD | NO. 7 SUBWAY EXTENSION, PB TEAM 2005 |
| PE | NO. 7 SUBWAY EXTENSION, PB TEAM 2007 |
| V2-10 | VARIOUS PROJECTS COMPILED BY NYCDOC |
| MR | VARIOUS, WESTSIDE YARDS, MRCE 1980 |
| MG | MABSTOA GARAGE AREA, MRCE 1982 |

WHERE INDICATED, (OW) REFERS TO MONITORING WELL

STATE OF NEW YORK · MARCO S. GALLAGHER · 066666 · LICENSED PROFESSIONAL ENGINEER
11/7/12

30 0 15 30
SCALE IN FEET

**Warning:** It is a violation of the NYS Education Law Article 145 for any person, unless he is acting under the direction of a licensed Professional Engineer, to alter this item in any way.


LANGAN
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NJ Certificate of Authorization No 24GA27996400


Project
HUDSON YARDS
TERRA FIRMA

MANHATTAN NEW YORK

Drawing Title
SUBSURFACE INVESTIGATION PLAN

| | |
|---|---|
| Project No. 170019112 | Drawing No. |
| Date 2/24/12 | 9 |
| Scale 1" = 30' | |
| Drn. By SMG | |
| Last Revised | Of |

© 2010 Langan Engineering and Environmental Services Inc.

Filename: \\langan.com\data\NY\ylabs1\170019112\Cadd Data – 170019112\Geotechnical Report\Subsurface Investigation Plan\HTTF_B_Subsurface Investigation Plan.dwg Date: 2/8/2012 Time: 10:53 User: mamong Style Table: Langan.stb Layout: D Size Sheet (Side)

# APPENDIX B
# 2012 Langan Boring Logs

STATE OF NEW YORK
MARC J. GALLAGHER
PROFESSIONAL ENGINEER

11/7/12

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Log of Boring **LB-1** Sheet 1 of 3

| | |
|---|---|
| Project: Hudson Yards - Terra Firma | Project No.: 170019112 |
| Location: West 30th St. from 10th to 11th Ave., Manhattan, NY | Elevation and Datum: Approx. 13.25 ft BPMD |
| Drilling Company: Warren George, Inc. | Date Started: 1/6/12 / Date Finished: 1/6/12 |
| Drilling Equipment: Truck-mounted Mobile 58 | Completion Depth: 65 ft / Rock Depth: 40 ft |
| Size and Type of Bit: 3 7/8" Tricone Roller Bit | Number of Samples: Disturbed 10, Undisturbed 0, Core 5 |
| Casing Diameter (in): 3" and 4" Flush Joint Steel Pipe / Casing Depth (ft): 14 | Water Level (ft.): First ▽ -, Completion ▼ -, 24 HR. ▼ - |
| Casing Hammer: Automatic / Weight (lbs): 300 / Drop (in): 30 | Drilling Foreman: Caesar |
| Sampler: 2" O.D. Split Spoon/NX Core Barrel | Inspecting Engineer: Pragnesh Shah |
| Sampler Hammer: Automatic / Weight (lbs): 140 / Drop (in): 30 | |

| Elev. (ft) | Building Code | Sample Description | Coring min/ft | Depth Scale | Sample Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|---|---|
| +13.3 | | 8 in. concrete slab | | 0 | | | | | | 12/30/11: Cleared of utilities to a depth of 4 ft via air knife and probing with a 0.5 inch diameter rod. No obstructions were encountered. |
| +12.6 | | | | 1 | | | | | | |
| | | | | 2 | | HA | | | | 1/6/12: Cleared of utilities to a depth of 8 ft using water rotary drilling with no down pressure. No obstructions were encountered. |
| | | | PUSH | 3 | | | | | | |
| | | | | 4 | | | | | | Advanced 4 in. casing to 6 ft. |
| | | | | 5 | | WATERROTARY | | | | |
| | | | | 6 | | | | | | |
| | | | PUSH | 7 | | | | | | |
| | | Brown silty m-f SAND, trace gravel [FILL] (moist) | | 8 | | | | | | Sampled S-1 at 10:00 AM. Advanced 4 in. casing to 9 ft. |
| | | | | 9 | S-1 | SS | 7 | 16 4 3 4 | 7 | |
| | Class 7 | Greenish black silty fine SAND, trace gravel [FILL] (moist) | | 10 | | | | | | Sampled S-2 at 10:22 AM. Advanced 4 in. casing to 9 ft. |
| | | | PUSH | 11 | S-2 | SS | 14 | 12 4 8 9 | 12 | |
| | | Greenish black silty fine SAND, trace gravel [FILL] (moist) | | 12 | | | | | | Sampled S-3. Advanced 4 in. casing to 14 ft. |
| | | | | 13 | S-3 | SS | 11 | 2 1 1 1 | 2 | |
| | | | | 14 | | | | | | |
| | | Greenish black fine SAND, some silt, trace gravel [FILL] (wet) | | 15 | | | | | | Sampled S-4 at 10:40 AM. |
| | | | | 16 | S-4 | SS | 17 | 3 3 3 3 | 6 | |
| | | Greenish black fine SAND, trace silt, trace gravel [FILL] (wet) | | 17 | | | | | | Sampled S-5 at 10:43 AM. Black wash. |
| | | | | 18 | S-5 | SS | 3 | 1 1 1 1 | 2 | |
| | | | | 19 | | | | | | |
| | | | | 20 | | | | | | |

\\LANGAN.COM\DATA\NY\DATA1\170019112\ENGINEERING DATA\GEOTECHNICAL\GINTLOGS\170019112_HYTF_2011-2012 BORINGS.GPJ ... 2/14/2012 11:05:19 AM ... Report: Log - LANGAN ... Template TEMPLATE.GDT

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ENGINEERING & ENVIRONMENTAL SERVICES

Log of Boring **LB-1** Sheet 2 of 3

| Project | Project No. |
|---|---|
| Hudson Yards - Terra Firma | 170019112 |
| **Location** | **Elevation and Datum** |
| West 30th St. from 10th to 11th Ave., Manhattan, NY | Approx. 13.25 ft BPMD |

| Elev. (ft) | Building Code | Sample Description | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|
| | Class 7 | Black clayey SILT, trace fine SAND [FILL] (wet) | Sampled S-6 at 11:00 AM. |
| | Class 7 | Black clayey SILT, trace fine SAND [FILL] (wet) | Sampled S-7 at 11:07 AM. Black wash. |
| -11.3 | | | Brown wash. |
| | Class 3b | Brown silty fine SAND, trace gravel, trace mica [SM] medium dense (moist) | Sampled S-8 at 11:18 AM. |
| | Class 3b | Brown silty fine SAND, trace mica [SM] medium dense (moist) | Sampled S-9 at 11:27 AM. |
| -20.3 | | | |
| | Class 3a | Brown silty c-f SAND, trace gravel, trace quartz, trace mica [SM] dense (moist) | Sampled S-10 at 11:43 AM. |
| | Class 3a | | Advanced 3 in. casing to 40 ft. |
| -26.8 | | | Began coring R-1 at 1:05 PM. |
| | Class 1b | Dark gray-black-white quartzofeldspathic, muscovite-biotite-garnet SCHIST, m-f grained, fresh, close to wide fracture spacing, fractures 45° from horizontal<br>Good quality | |
| -31.8 | | | |

Sample Data

| Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) |
|---|---|---|---|---|
| S-6 | SS | 4 | 2 3 3 3 | 6 |
| S-7 | SS | 16 | 3 2 2 4 | 4 |
| S-8 | SS | 20 | 4 5 5 7 | 10 |
| S-9 | SS | 17 | 5 9 8 9 | 17 |
| S-10 | SS | 7 | 21 15 29 30 | 44 |
| R-1 | NX | REC=56"/60" =93% | RQD=48"/60" =80% | |

Coring min/ft: 3, 3, 3, 3, 3

Depth Scale: 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45

N-Value scale: 10 20 30 40

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Log of Boring **LB-1** Sheet 3 of 3

| Project | Project No. |
|---|---|
| Hudson Yards - Terra Firma | 170019112 |
| **Location** | **Elevation and Datum** |
| West 30th St. from 10th to 11th Ave., Manhattan, NY | Approx. 13.25 ft BPMD |

| Elev. (ft) | Building Code | Sample Description | Coring min/ft | Depth Scale | Sample Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|---|---|
| | Class 1a | Dark gray-black-white quartzofeldspathic, muscovite-biotite-garnet SCHIST, m-f grained, fresh, close to wide fracture spacing, fractures 45° from horizontal<br>Good quality | 2, 3, 3, 4, 3 | 45–50 | R-2 | NX | REC=58"/60" =97% | RQD=53"/60" =88% | | Began coring R-2 at 1:32 PM. |
| | Class 1a | Dark gray-black-white quartzofeldspathic, muscovite-biotite-garnet SCHIST, m-f grained, fresh, close to wide fracture spacing, fractures 45° from horizontal<br>Excellent quality | 5, 4, 3, 3, 4 | 50–55 | R-3 | NX | REC=59"/60" =98% | RQD=55"/60" =92% | | Began coring R-3 at 2:00 PM. |
| -41.8 | Class 1a | 55-59 ft: White-pink-green biotite-muscovite-microcline-quartz megacrystalline PEGMATITE, very coarse grained, fresh, moderate to wide fracture spacing, fractures 30° to 45° from horizontal<br>Excellent quality | 3, 4.5, 5.5, 5 | 55–59 | R-4 | NX | REC=60"/60" =100% | RQD=60"/60" =100% | | Began coring R-4 at 2:31 PM. |
| -45.8 | Class 1b | 59-60 ft: Dark gray-black-white quartzofeldspathic, muscovite-biotite-garnet SCHIST, m-f grained, slightly weathered, close to moderate fracture spacing, fractures 45° from horizontal<br>Dark gray-black-white quartzofeldspathic, muscovite-biotite-garnet SCHIST, m-f grained, slightly weathered, close to moderate fracture spacing, fractures 45° from horizontal, several PEGMATITE intrusions<br>Good quality | 6, 3, 3, 4, 3, 3 | 59–65 | R-5 | NX | REC=58"/60" =97% | RQD=49"/60" =82% | | Began coring R-5 at 3:07 PM. |
| -51.8 | | END OF BORING @ 65 FT | | 65–70 | | | | | | |

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Log of Boring **LB-10** Sheet 1 of 3

| | |
|---|---|
| Project: Hudson Yards - Terra Firma | Project No.: 170019112 |
| Location: West 30th St. from 10th to 11th Ave., Manhattan, NY | Elevation and Datum: Approx. 9.06 ft BPMD |
| Drilling Company: Warren George, Inc. | Date Started: 1/5/12 / Date Finished: 1/5/12 |
| Drilling Equipment: Truck-mounted Acker Soil Max | Completion Depth: 46 ft / Rock Depth: 21 ft |
| Size and Type of Bit: 3 7/8" Tricone Roller Bit | Number of Samples: Disturbed 6, Undisturbed 0, Core 5 |
| Casing Diameter (in): 3" and 4" Flush Joint Steel Pipe / Casing Depth (ft): 14 | Water Level (ft.): First ▽ -, Completion ▼ -, 24 HR. ▼ - |
| Casing Hammer: Donut / Weight (lbs): 300 / Drop (in): 30 | Drilling Foreman: Jacob Harris |
| Sampler: 2" O.D. Split Spoon/NX Core Barrel | Inspecting Engineer: Scott Garfield |
| Sampler Hammer: Donut / Weight (lbs): 140 / Drop (in): 30 | |

| Elev. (ft) | Building Code | Sample Description | Coring min/ft | Depth Scale | Sample Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|---|---|
| +9.1 | | 8 in. concrete slab | | 0 | | | | | | 1/3/12: Cleared of utilities to a depth of 6 ft via air knife and probing with a 0.5 inch diameter rod. No obstructions were encountered. |
| +8.4 | | | | 1 | | | | | | |
| | | | | 2 | | | | | | |
| | | | PUSH | 3 | | HA | | | | Advanced 4 in. casing to 6 ft. |
| | | | | 4 | | | | | | |
| | | | | 5 | | | | | | |
| | Class 7 | Black m-f SAND, trace gravel, trace brick, trace concrete [FILL] (wet) | | 6 | | | | | | Sampled S-1 at 9:46 AM. |
| | | | PUSH | 7 | S-1 | SS | 4 | 3 5 7 5 | 12 | |
| | | Dark brown fine SAND, trace silt, trace gravel, trace brick [FILL] (wet) | | 8 | | | | | | Sampled S-2 at 9:55 AM. Advanced 4 in. casing to 9 ft. |
| | | | | 9 | S-2 | SS | 8 | 2 7 4 15 | 11 | |
| | | Dark brown m-f SAND, trace silt, trace gravel, trace brick, trace glass [FILL] (wet) | | 10 | | | | | | Sampled S-3 at 10:07 AM. |
| | | | PUSH | 11 | S-3 | SS | 5 | 3 6 22 10 | 28 | |
| -2.9 | | | | 12 | | | | | | Sampled S-4 at 10:09 AM. Advanced 4 in. casing to 14 ft. |
| | | Reddish brown sandy non-plastic SILT, trace gravel [ML] very stiff (wet) | | 13 | S-4 | SS | 12 | 8 9 11 10 | 20 | |
| | | | | 14 | | | | | | |
| | | Reddish brown sandy non-plastic SILT [ML] very stiff (wet) | | 15 | | | | | | Sampled S-5 at 10:23 AM. Hard drilling from 18 ft to 18.5 ft. |
| | Class 5b | | | 16 | S-5 | SS | 14 | 12 7 11 10 | 18 | |
| | | | | 17 | | | | | | |
| | | | | 18 | | | | | | |
| | | | | 19 | | | | | | |
| | | | | 20 | | | | | | |

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Log of Boring **LB-10** Sheet 2 of 3

| Project | Project No. |
|---|---|
| Hudson Yards - Terra Firma | 170019112 |
| **Location** | **Elevation and Datum** |
| West 30th St. from 10th to 11th Ave., Manhattan, NY | Approx. 9.06 ft BPMD |

| Elev. (ft) | Building Code | Sample Description | Coring min/ft | Depth Scale | Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|---|---|
| | Class 5b | Reddish brown sandy non-plastic SILT, some gravel [ML] very stiff (wet) | | 20 | S-6 | SS | 2 | 10 100/5" | Refusal | Sampled S-6 at 10:38 AM. Advanced 3 in. casing to 21 ft. |
| -11.9 | | | | 21 | | | | | | Began coring R-1 at 11:17 AM. |
| | Class 1a | Gray quartz-feldspar GRANULITE, fine grained, fresh, moderate fracture spacing, fractures near horizontal<br>Excellent quality | 7, 8, 5, 4, 7 | 22–25 | R-1 | NX | REC=55"/60" =92% | RQD=55"/60" =92% | | |
| | | Gray quartz-feldspar GRANULITE, fine grained, fresh, moderate fracture spacing, fractures near horizontal<br>Excellent quality | 5, 4, 4, 4, 3 | 26–30 | R-2 | NX | REC=58"/60" =97% | RQD=58"/60" =97% | | Began coring R-2 at 11:56 AM. |
| | | Gray quartz-feldspar GRANULITE, fine grained, fresh, moderate fracture spacing, fractures near horizontal<br>Good quality | 4, 4, 6, 6, 6 | 31–35 | R-3 | NX | REC=60"/60" =100% | RQD=51"/60" =85% | | Began coring R-3 at 12:24 PM. |
| | | 36-38 ft: Gray quartz-feldspar GRANULITE, fine grained, fresh, moderate fracture spacing, fractures near horizontal | 6, 3 | 36–37 | R-4 | NX | REC=60"/60" =100% | RQD=37"/60" =62% | | Began coring R-4 at 12:56 PM. |
| -28.9 | | | | | | | | | | |
| | Class 1b | 38-41 ft: Dark gray-black-white quartzofeldspathic, muscovite-biotite-garnet SCHIST, m-f grained, fresh to slightly weathered, close to moderate fracture spacing, fractures 0 to 45° from horizontal<br>Fair quality | 3, 3, 3 | 38–40 | | | | | | |
| | | Dark gray-black-white quartzofeldspathic, muscovite-biotite-garnet SCHIST, m-f grained, fresh to slightly weathered, close to moderate fracture spacing, fractures 0 to 45° from horizontal<br>Fair quality | 3, 3, 4, 4 | 41–44 | R-5 | NX | REC=57"/60" =95% | RQD=31"/60" =52% | | Began coring R-5 at 1:21 PM. |
| | | | | 45 | | | | | | |

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ENGINEERING & ENVIRONMENTAL SERVICES

Log of Boring **LB-10** Sheet 3 of 3

| Project | Project No. |
|---|---|
| Hudson Yards - Terra Firma | 170019112 |
| **Location** | **Elevation and Datum** |
| West 30th St. from 10th to 11th Ave., Manhattan, NY | Approx. 9.06 ft BPMD |

| Material Symbol | Elev. (ft) | Building Code | Sample Description | Coring min/ft | Depth Scale | Sample Data: Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) 10 20 30 40 | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | -36.9 | Class 1b | | 4 | 45 | R-5 | NX | | | | |
| | | | END OF BORING @ 46 FT | | 46 | | | | | | |
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Log of Boring **LB-11** Sheet 1 of 3

| | |
|---|---|
| Project: Hudson Yards - Terra Firma | Project No.: 170019112 |
| Location: West 30th St. from 10th to 11th Ave., Manhattan, NY | Elevation and Datum: Approx. 10.74 ft BPMD |
| Drilling Company: Warren George, Inc. | Date Started: 1/10/12 / Date Finished: 1/10/12 |
| Drilling Equipment: Truck-mounted Acker Soil Max | Completion Depth: 46 ft / Rock Depth: 36 ft |
| Size and Type of Bit: 3 7/8" Tricone Roller Bit | Number of Samples: Disturbed 10, Undisturbed 0, Core 2 |
| Casing Diameter (in): 3" and 4" Flush Joint Steel Pipe / Casing Depth (ft): 19 | Water Level (ft.): First ▽ -, Completion ▼ -, 24 HR. ▼ - |
| Casing Hammer: Donut / Weight (lbs): 300 / Drop (in): 30 | Drilling Foreman: Caesar |
| Sampler: 2" O.D. Split Spoon/NX Core Barrel | Inspecting Engineer: Eddy Phelps |
| Sampler Hammer: Donut / Weight (lbs): 140 / Drop (in): 30 | |

| Elev. (ft) | Building Code | Sample Description | Coring min/ft | Depth Scale | Sample Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|---|---|
| +10.7 | | 8 in. concrete slab | | 0 | | | | | | 1/5/12: Cleared of utilities to a depth of 3.5 ft via air knife and probing with a 0.5 inch diameter rod. No obstructions were encountered. |
| +10.1 | | | DRIVE | 1–3 | | HA | | | | 1/10/12: Cleared of utilities to a depth of 6 ft using water rotary drilling with no down pressure. No obstructions were encountered. |
| | | | | 4–5 | | WATERROTARY | | | | Advanced 4 in. casing to 3.5 ft. |
| | Class 7 | Black and dark gray GRAVEL, some sand, trace silt, trace brick, trace concrete [FILL] (moist) | PUSH | 6–7 | S-1 | SS | 6 | 1, 2, 1, 1 | 3 | Sampled S-1. |
| | | Black to dark gray m-f SAND, some silt, trace wood [FILL] (moist) | | 8–9 | S-2 | SS | 8 | 2, 2, 2, 2 | 4 | Sampled S-2. Advanced casing to 9 ft. |
| | | Gray c-f SAND, some silt, trace wood [FILL] (wet) | | 10–11 | S-3 | SS | 7 | 1, 1, 5, 6 | 6 | Sampled S-3. |
| -1.3 | | | | 12–13 | S-4 | SS | 10 | 5, 7, 8, 12 | 15 | Sampled S-4. |
| | Class 5b | Reddish brown sandy non-plastic SILT [ML] very stiff (wet) | DRIVE | 14–15 | S-5 | SS | 10 | 10, 7, 8, 10 | 15 | Sampled S-5. |
| | Class 6 | Reddish brown sandy non-plastic SILT, trace gravel [ML] very stiff (wet) | | 16–17 | S-6 | SS | 20 | 3, 3, 4, 5 | 7 | Sampled S-6. Advanced 4 in. casing to 19 ft. |
| | Class 5b | Reddish brown sandy non-plastic SILT [ML] firm (wet) | | 18–19 | | | | | | |

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Log of Boring **LB-11** Sheet 2 of 3

| Project | Project No. |
|---|---|
| Hudson Yards - Terra Firma | 170019112 |
| **Location** | **Elevation and Datum** |
| West 30th St. from 10th to 11th Ave., Manhattan, NY | Approx. 10.74 ft BPMD |

| Elev. (ft) | Building Code | Sample Description | Coring min/ft | Depth Scale | Sample Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|---|---|
| | Class 5b | Reddish brown sandy non-plastic SILT [ML] very stiff (wet) | | 20–23 | S-7 | SS | 22 | 8, 12, 11, 12 | 23 | Sampled S-7. |
| -12.8 | | | | 24 | | | | | | |
| | Class 6 | Reddish brown silty fine SAND, trace mica [SM] loose (wet) | | 25–27 | S-8 | SS | 22 | 4, 3, 5, 5 | 8 | Sampled S-8. |
| | Class 6 | Reddish brown silty fine SAND, trace mica [SM] very loose (wet) | | 28–32 | S-9 | SS | 6 | 5, 2, 2, 6 | 4 | Sampled S-9. |
| | Class 3a | Reddish brown silty fine SAND, trace mica [SM] dense (wet) | | 33–35 | S-10 | SS | 10 | 7, 9, 100/2" | Refusal | Sampled S-10. Advanced 3 in. casing to 36 ft. Began coring R-1 at 1:47 PM. |
| -25.3 | Class 1b | Dark gray-black-white quartzofeldspathic, muscovite-biotite-garnet SCHIST, m-f grained, fresh to slightly weathered, close to moderate fracture spacing, fractures 15° from horizontal Good quality | 7, 12, 4, 4, 4 | 36–40 | R-1 | NX | REC=50"/60" =83% | RQD=50"/60" =83% | | |
| -30.3 | Class 1a | White-pink-green biotite-muscovite-microcline-quartz GRANITE and megacrystalline PEGMATITE, very coarse to medium grained, fresh, wide fracture spacing Excellent quality | 6, 7, 5, 8 | 41–45 | R-2 | NX | REC=55"/60" =92% | RQD=55"/60" =92% | | Began coring R-2 at 2:34 PM. |

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Log of Boring **LB-11** Sheet 3 of 3

| Project | Project No. |
|---|---|
| Hudson Yards - Terra Firma | 170019112 |
| **Location** | **Elevation and Datum** |
| West 30th St. from 10th to 11th Ave., Manhattan, NY | Approx. 10.74 ft BPMD |

| MATERIAL SYMBOL | Elev. (ft) | Building Code | Sample Description | Coring min/ ft | Depth Scale | Sample Data: Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) 10 20 30 40 | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | -35.3 | Class 1a | | 6 | 45 | R-2 | NX | | | | |
| | | | END OF BORING @ 46 FT | | 46 | | | | | | |
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Log of Boring **LB-12** Sheet 1 of 2

| | |
|---|---|
| Project: Hudson Yards - Terra Firma | Project No.: 170019112 |
| Location: West 30th St. from 10th to 11th Ave., Manhattan, NY | Elevation and Datum: Approx. 12.76 ft BPMD |
| Drilling Company: Warren George, Inc. | Date Started: 1/12/12 — Date Finished: 1/13/12 |
| Drilling Equipment: Truck-mounted Acker Soil Max | Completion Depth: 43 ft — Rock Depth: 33 ft |
| Size and Type of Bit: 2 7/8" Tricone Roller Bit | Number of Samples: Disturbed 7, Undisturbed 0, Core 2 |
| Casing Diameter (in): 3" and 4" Flush Joint Steel Pipe — Casing Depth (ft): 4 | Water Level (ft.): First -, Completion -, 24 HR. - |
| Casing Hammer: Donut — Weight (lbs): 300 — Drop (in): 30 | Drilling Foreman: Angel |
| Sampler: 2" O.D. Split Spoon/NX Core Barrel | Inspecting Engineer: Scott Garfield |
| Sampler Hammer: Donut — Weight (lbs): 140 — Drop (in): 30 | |

| Elev. (ft) | Building Code | Sample Description | Coring min/ft | Depth Scale | Sample Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|---|---|
| +12.8 | | 8 in. concrete slab | | 0 | | | | | | 1/5/12: Cleared of utilities to a depth of 7 ft via air knife and probing with a 0.5 inch diameter rod. No obstructions were encountered. |
| +12.1 | Class 7 | | PUSH | 1–4 | | HA | | | | Advanced 4 in. casing to 4 ft. |
| | | Dark brown/gray fine SAND, some silt, trace gravel [FILL] (wet) | | 8–9 | S-1 | SS | 15 | 3 2 2 1 | 4 | Sampled S-1 at 12:48 PM. |
| | | Dark brown/gray fine SAND, some silt, trace gravel [FILL] (wet) | | 10–11 | S-2 | SS | 8 | 1 2 2 2 | 4 | Sampled S-2 at 12:55 PM. |
| | | Dark brown/gray fine SAND, some silt, trace gravel [FILL] (wet) | | 12–13 | S-3 | SS | 7 | 2 1 3 5 | 4 | Sampled S-3 at 1:03 PM. -#200 = 37% |
| -1.2 | Class 5b | Reddish brown sandy non-plastic SILT [ML] very stiff (wet) | | 14–15 | S-4 | SS | 10 | 8 13 10 11 | 23 | Sampled S-4 at 1:07 PM. Brown wash. |

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Log of Boring **LB-12** Sheet 2 of 2

| Project | Project No. |
|---|---|
| Hudson Yards - Terra Firma | 170019112 |
| **Location** | **Elevation and Datum** |
| West 30th St. from 10th to 11th Ave., Manhattan, NY | Approx. 12.76 ft BPMD |

| Elev. (ft) | Building Code | Sample Description | Coring min/ft | Depth Scale | Sample Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|---|---|
| | Class 5b | Reddish brown sandy non-plastic SILT [ML] very stiff (wet) | | 20–23 | S-5 | SS | 14 | 9, 9, 14, 17 | 23 | Sampled S-5 at 1:18 PM. |
| -10.7 | | | | | | | | | | |
| | Class 3a | Reddish brown m-f SAND, some silt, trace gravel [SP] very dense (wet) | | 25–27 | S-6 | SS | 6 | 20, 32, 44, 28 | 76 | Sampled S-6 at 1:30 PM. -#200 = 22% |
| -17.2 | | | | | | | | | | |
| | Class 1d | Decomposed SCHIST | | 30–31 | S-7 | SS | 3 | 34, 100/4" | Refusal | Sampled S-7 at 1:44 PM. |
| | | | | 32 | | | | | | Advanced 3 in. casing to 33 ft. |
| -20.2 | | | | | | | | | | |
| | Class 1b | Dark gray-black-white quartzofeldspathic, muscovite-biotite-garnet SCHIST, m-f grained, fresh, close to moderate fracture spacing, fractures near horizontal fair quality | 4, 5, 5, 4 | 33–37 | R-1 | NX | REC=56"/60" =93% | RQD=35"/60" =58% | | Began coring R-1 at 8:17 AM on 1/13/12. |
| -24.2 | | | | | | | | | | |
| -24.5 | | 37-37.3 ft: silt seam | 5 | | | | | | | |
| | Class 1b | Dark gray-black-white quartzofeldspathic, muscovite-biotite-garnet SCHIST, m-f grained, fresh, close to moderate fracture spacing, fractures near horizontal Good quality | | 38–43 | R-2 | NX | REC=60"/60" =100% | RQD=47"/60" =78% | | Began coring R-2 at 9:03 AM. |
| -30.2 | | END OF BORING @ 43 FT | | 44–45 | | | | | | |

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Log of Boring **LB-13** Sheet 1 of 3

| | |
|---|---|
| Project: Hudson Yards - Terra Firma | Project No.: 170019112 |
| Location: West 30th St. from 10th to 11th Ave., Manhattan, NY | Elevation and Datum: Approx. 15.26 ft BPMD |
| Drilling Company: Warren George, Inc. | Date Started: 1/4/12 / Date Finished: 1/4/12 |
| Drilling Equipment: Truck-mounted Acker Soil Max | Completion Depth: 49 ft / Rock Depth: 39 ft |
| Size and Type of Bit: 3 7/8" Tricone Roller Bit | Number of Samples: Disturbed 9, Undisturbed 0, Core 2 |
| Casing Diameter (in): 3" and 4" Flush Joint Steel Pipe / Casing Depth (ft): 19 | Water Level (ft.): First ▽ -, Completion ▼ -, 24 HR. ▼ - |
| Casing Hammer: Donut / Weight (lbs): 300 / Drop (in): 30 | Drilling Foreman: Jacob Harris |
| Sampler: 2" O.D. Split Spoon/NX Core Barrel | Inspecting Engineer: Scott Garfield |
| Sampler Hammer: Donut / Weight (lbs): 140 / Drop (in): 30 | |

| Material Symbol | Elev. (ft) +15.3 | Building Code | Sample Description | Coring min/ft | Depth Scale | Sample Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | PUSH | 0–6 | HA | | | | | 1/4/12: Cleared of utilities to a depth of 6 ft via air knife and probing with a 0.5 inch diameter rod. No obstructions were encountered. Advanced 4 in. casing to 6 ft. |
| | | | Dark brown/gray silty SAND [FILL] (moist) | PUSH | 6–8 | S-1 | SS | 13 | 14, 6, 4, 7 | 10 | Sampled S-1 at 10:45 AM. Advanced 4 in. casing to 8 ft. |
| | | | Dark brown/gray silty SAND, trace gravel [FILL] (moist) | PUSH | 8–10 | S-2 | SS | 12 | 3, 4, 3, 3 | 7 | Sampled S-2 at 10:55 AM. Advanced 4 in. casing to 9 ft. |
| | | Class 7 | Gray silty SAND, trace gravel [FILL] (moist) | PUSH | 10–12 | S-3 | SS | 6 | 3, 2, 2, 2 | 4 | Sampled S-3 at 11:05 AM. |
| | | | Gray silty SAND [FILL] (moist) | PUSH | 12–14 | S-4 | SS | 18 | 4, 5, 6, 7 | 11 | Sampled S-4 at 11:15 AM. Advanced 4 in. casing to 14 ft. |
| | | | Brown/gray/black m-f SAND, trace silt [FILL] (moist) | PUSH | 14–17 | S-5 | SS | 12 | 4, 19, 8, 5 | 27 | Sampled S-5 at 11:18 AM. |

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Log of Boring **LB-13** Sheet 2 of 3

| Project | Project No. |
|---|---|
| Hudson Yards - Terra Firma | 170019112 |
| **Location** | **Elevation and Datum** |
| West 30th St. from 10th to 11th Ave., Manhattan, NY | Approx. 15.26 ft BPMD |

| Elev. (ft) | Building Code | Sample Description | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|
| | Class 7 | Brown fine SAND, some silt, trace gravel [FILL] (wet) | Sampled S-6 at 11:28 AM. Advanced 4 in. casing to 19 ft. |
| | | | Brown wash. |
| -8.2 | | | |
| | Class 3b | No recovery | Sampled S-7 at 11:45 AM. No recovery. Pushed additional split spoon, no recovery. |
| | | Reddish brown m-f SAND, some silt [SP] medium dense (wet) | Sampled S-8 at 12:29 PM. -#200 = 30% |
| -18.2 | | | |
| | Class 5b | Reddish brown SILT, trace sand [ML] very stiff (wet) | Sampled S-9 at 12:30 PM. -#200 = 95% Hard drilling from 38 ft to 39 ft. |
| | | | Installed 3 in. casing to 39 ft. |
| -23.7 | | | |
| | Class 1b | 39-42.5 ft: Grayish white biotite-muscovite-microcline-quartz GRANITE and megacrystalline PEGMATITE, very coarse to medium grained, fresh, close to moderate fracture spacing, fractures near horizontal | Began coring R-1 at 1:28 PM. |
| -27.2 | | | |
| | Class 1a | 42.5-44 ft: White QUARTZITE, m-f grained, fresh, close to moderate fracture spacing, fractures near horizontal Good quality | Began coring R-2 at 2:07 PM. |

Sample Data

| Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) |
|---|---|---|---|---|
| S-6 | SS | 2 | 11 13 12 10 | 25 |
| S-7 | SS | 0 | 18 18 23 24 | 41 |
| S-8 | SS | 14 | 6 12 15 14 | 27 |
| S-9 | SS | 18 | 6 8 10 8 | 18 |
| R-1 | NX | REC=52"/60" =87% | RQD=49"/60" =82% | |
| R-2 | NX | | | |

Coring min/ft: 7, 6, 5, 5, 5, 6

Depth Scale: 20–45 ft

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Log of Boring **LB-13** Sheet 3 of 3

| Project | Project No. |
|---|---|
| Hudson Yards - Terra Firma | 170019112 |
| **Location** | **Elevation and Datum** |
| West 30th St. from 10th to 11th Ave., Manhattan, NY | Approx. 15.26 ft BPMD |

| Material Symbol | Elev. (ft) | Building Code | Sample Description | Coring min/ft | Depth Scale | Sample Data: Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) 10 20 30 40 | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Class 1a | White QUARTZITE, m-f grained, fresh, close to moderate fracture spacing, fractures near horizontal<br>Excellent quality | 6<br>6<br>6<br>4 | 45<br>46<br>47<br>48 | R-2 | NX | REC=60"/60" =100% | RQD=58"/60" =97% | | |
| | -33.7 | | END OF BORING @ 49 FT | | 49<br>50<br>51<br>52<br>53<br>54<br>55<br>56<br>57<br>58<br>59<br>60<br>61<br>62<br>63<br>64<br>65<br>66<br>67<br>68<br>69<br>70 | | | | | | |

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Log of Boring **LB-14** Sheet 1 of 3

| | |
|---|---|
| Project: Hudson Yards - Terra Firma | Project No.: 170019112 |
| Location: West 30th St. from 10th to 11th Ave., Manhattan, NY | Elevation and Datum: Approx. 13.76 ft BPMD |
| Drilling Company: Warren George, Inc. | Date Started: 1/12/12 / Date Finished: 1/13/12 |
| Drilling Equipment: Truck-mounted Mobile 58 | Completion Depth: 68 ft / Rock Depth: 43 ft |
| Size and Type of Bit: 2 7/8" and 3 7/8" Tricone Roller Bit | Number of Samples: Disturbed 10, Undisturbed 0, Core 5 |
| Casing Diameter (in): 3" and 4" Flush Joint Steel Pipe / Casing Depth (ft): 19 | Water Level (ft.): First ▽ -, Completion ▼ -, 24 HR. ▼ - |
| Casing Hammer: Automatic / Weight (lbs): 300 / Drop (in): 30 | Drilling Foreman: Caesar |
| Sampler: 2" O.D. Split Spoon/NX Core Barrel | Inspecting Engineer: Pragnesh Shah |
| Sampler Hammer: Automatic / Weight (lbs): 140 / Drop (in): 30 | |

| Elev. (ft) | Building Code | Sample Description | Coring min/ft | Depth Scale | Sample Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|---|---|
| +13.8 | | 8 in. concrete slab | | 0 | | | | | | 1/6/12: Cleared of utilities to a depth of 3.5 ft via air knife and probing with a 0.5 inch diameter rod. No obstructions were encountered. |
| +13.1 | Class 7 | | PUSH | 1–3 | | HA | | | | 1/12/12: Cleared of utilities to a depth of 8 ft using water rotary drilling with no down pressure. No obstructions were encountered. |
| | | | PUSH | 4–8 | | WATERROTARY | | | | Advanced 4 in. casing to 4 ft. |
| | | Brown and black silty m-f SAND, trace clay, trace gravel [FILL] (moist) | | 8–9 | S-1 | SS | 5 | WOH, WOH, WOH, 3 (0) | | Sampled S-1 at 12:05 PM. Advanced 4 in. casing to 9 ft. -#200 = 41% |
| | | Brown and black silty m-f SAND, trace clay, trace gravel [FILL] (moist) | PUSH | 10–11 | S-2 | SS | 12 | 2, 5, 4, 3 (9) | | Sampled S-2 at 12:12 PM. |
| +1.8 | Class 3b | Brown silty m-f SAND, trace gravel [SM] medium dense (moist) | | 12–13 | S-3 | SS | 10 | 2, 12, 13, 8 (25) | | Sampled S-3 at 12:25 PM. Advanced 4 in. casing to 14 ft. |
| | | Brown silty m-f SAND, trace gravel [SM] medium dense (moist) | PUSH | 15–16 | S-4 | SS | 2 | 15, 16, 5, 8 (21) | | Sampled S-4 at 1:11 PM. |
| -3.2 | Class 5b | Reddish brown sandy non-plastic SILT, trace gravel [ML] very stiff (moist) | | 17–18 | S-5 | SS | 13 | 10, 12, 10, 10 (22) | | Sampled S-5 at 1:17 PM. Advanced 4 in. casing to 19 ft. |
| -5.7 | Class | | | 19–20 | | | | | | |

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Log of Boring **LB-14** Sheet 2 of 3

| Project | Project No. |
|---|---|
| Hudson Yards - Terra Firma | 170019112 |
| **Location** | **Elevation and Datum** |
| West 30th St. from 10th to 11th Ave., Manhattan, NY | Approx. 13.76 ft BPMD |

| Elev. (ft) | Building Code | Sample Description | Coring min/ft | Sample Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|---|
| | 3a<br>Class 3a | Reddish brown silty m-f SAND, trace gravel [SM] dense (wet) | | S-6 | SS | 5 | 8, 15, 16, 18 | 31 | Sampled S-6 at 2:03 PM. |
| -9.7 | Class 2a | Red and whit GRAVEL, some m-f sand, some silt [GP] very dense (wet) | | S-7 | SS | 2 | 29, 100/2" | Refusal | Sampled S-7 at 2:17 PM. Heavy rig chatter from 24 ft to 26 ft. |
| -14.7 | Class 5b | Brown sandy non-plastic SILT, trace mica [ML] stiff (wet) | | S-8 | SS | 17 | 7, 7, 8, 9 | 15 | Sampled S-8 at 2:31 PM. |
| -19.7 | Class 3b | Reddish brown m-f SAND, some silt, trace gravel [SM] medium dense (wet) | | S-9 | SS | 15 | 6, 3, 14, 9 | 17 | Sampled S-9 at 2:47 PM. -#200 = 23% Black wash at 38 ft. |
| -24.7 | Class 1d | Decomposed SCHIST | | S-10 | SS | 10 | 37, 69, 100/3" | Refusal | Sampled S-10 at 3:03 PM. Very slow drilling from 38 ft to 43 ft. |
| -29.2 | Class 1d | Dark gray-black-white quartzofeldspathic, muscovite-biotite-garnet SCHIST, m-f grained, fresh to completely weathered, close to moderate fracture spacing, fractures 15° from | 2<br>1 | R-1 | NX | | | | |

Depth Scale: 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45

N-Value scale: 10 20 30 40

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Log of Boring **LB-14** Sheet 3 of 3

| Project | Project No. |
|---|---|
| Hudson Yards - Terra Firma | 170019112 |
| **Location** | **Elevation and Datum** |
| West 30th St. from 10th to 11th Ave., Manhattan, NY | Approx. 13.76 ft BPMD |

| Elev. (ft) | Building Code | Sample Description | Coring min/ft | Depth Scale | Sample Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | horizontal<br>Very poor quality | 1, 2, 1 | 45–48 | R-1 | NX | REC=20"/60" =33% | RQD=12"/60" =20% | | |
| | Class 1d | Dark gray-black-white quartzofeldspathic, muscovite-biotite-garnet SCHIST, m-f grained, fresh to completely weathered, very close to close fracture spacing, fractures 15° from horizontal<br>Very poor quality | 2, 2, 2, 2, 3 | 48–53 | R-2 | NX | REC=14"/60" =23% | RQD=4"/60" =7% | | |
| -39.2 | | | | | | | | | | |
| | Class 1c | 53-57 ft: Grayish white biotite-muscovite-microcline-quartz GRANITE, c-m grained, fresh, close to moderate fracture spacing, fractures near horizontal<br>Poor quality | 3, 4, 3, 3 | 53–57 | R-3 | NX | REC=42"/60" =70% | RQD=28"/60" =47% | | |
| -43.2 | | | | | | | | | | |
| | Class 1b | 57-58 ft: Dark gray-black-white quartzofeldspathic, muscovite-biotite-garnet SCHIST, m-f grained, fresh to completely weathered, close to moderate fracture spacing, fractures 15° from horizontal<br><br>Interbedded white QUARTZITE and dark gray-black-white quartzofeldspathic, muscovite-biotite-garnet SCHIST, m-f grained, fresh, close to moderate fracture spacing, fractures 0 to 30° from horizontal<br>Fair quality | 3, 4, 5, 5, 4, 4 | 57–63 | R-4 | NX | REC=59"/60" =98% | RQD=35"/60" =58% | | |
| | | Interbedded white QUARTZITE and dark gray-black-white quartzofeldspathic, muscovite-biotite-garnet SCHIST, m-f grained, fresh, close to moderate fracture spacing, fractures 0 to 30° from horizontal<br>Fair quality | 5, 5, 5, 4, 4 | 63–68 | R-5 | NX | REC=56"/60" =93% | RQD=45"/60" =75% | | |
| -54.2 | | END OF BORING @ 68 FT. | | 68–70 | | | | | | |

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Log of Boring **LB-15** Sheet 1 of 4

| | |
|---|---|
| Project: Hudson Yards - Terra Firma | Project No.: 170019112 |
| Location: West 30th St. from 10th to 11th Ave., Manhattan, NY | Elevation and Datum: Approx. 15.83 ft BPMD |
| Drilling Company: Warren George, Inc. | Date Started: 12/29/11 — Date Finished: 1/3/12 |
| Drilling Equipment: Truck-mounted Mobile 58 | Completion Depth: 79.5 ft — Rock Depth: 52.5 ft |
| Size and Type of Bit: 3 7/8" Tricone Roller Bit | Number of Samples: Disturbed 10, Undisturbed 0, Core 5 |
| Casing Diameter (in): 3" and 4" Flush Joint Steel Pipe — Casing Depth (ft): 29 | Water Level (ft.): First ▽ -, Completion ▼ -, 24 HR. ▼ - |
| Casing Hammer: Automatic — Weight (lbs): 300 — Drop (in): 30 | Drilling Foreman: Caesar |
| Sampler: 2" O.D. Split Spoon/NX Core Barrel | Inspecting Engineer: Pragnesh Shah |
| Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30 | |

| Elev. (ft) | Building Code | Sample Description | Coring min/ft | Depth Scale | Sample Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|---|---|
| +15.8 | | | | 0 | | | | | | 12/28/11: Cleared of utilities to a depth of 8 ft via air knife and probing with a 0.5 inch diameter rod. No obstructions were encountered. |
| | Class 7 | | PUSH | 4–8 | HA | HA | | | | |
| | | | | 8 | | | | | | Advanced 4 in. casing to 9 ft. |
| | | | PUSH | 9–12 | | | | | | |
| | | Brown fine SAND, some silt, trace gravel [FILL] (wet) | | 10–11 | S-1 | SS | 10 | 2, 1, 2, 3 | 3 | Sampled S-1 at 11:45 AM. -#200 = 18% |
| | | Brown fine SAND, some silt, trace gravel [FILL] (wet) | | 12–13 | S-2 | SS | 13 | 5, 6, 11, 12 | 17 | Sampled S-2 at 11:52 AM. -#200 = 19% Advanced 4 in. casing to 14 ft. |
| | | | PUSH | 14–17 | | | | | | |
| +0.8 | | | | 15–16 | S-3 | SS | 9 | 2, 2, 4, 5 | 6 | Sampled S-3 at 1:10 PM. Advanced 4 in. casing to 19 ft. |
| | Class 6 | Brown m-f SAND, some silt, trace gravel [SM] loose (wet) | | | | | | | | |
| | Class 3b | | | 19–20 | | | | | | |

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Log of Boring **LB-15** Sheet 2 of 4

| Project | Project No. |
|---|---|
| Hudson Yards - Terra Firma | 170019112 |
| **Location** | **Elevation and Datum** |
| West 30th St. from 10th to 11th Ave., Manhattan, NY | Approx. 15.83 ft BPMD |

| Elev. (ft) | Building Code | Sample Description | Coring min/ft | Depth Scale | Sample Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|---|---|
| | Class 3b | Reddish brown m-f SAND, some silt, trace gravel [SP-SM] medium dense (wet) | PUSH | 20–22 | S-4 | SS | 10 | 4 6 5 5 | 11 | Sampled S-4 at 1:20 PM. -#200 = 32% Advanced 4 in. casing to 24 ft. |
| | | Reddish brown m-f SAND, trace silt, trace gravel [SP-SM] medium dense (wet) | PUSH | 25–27 | S-5 | SS | 14 | 5 5 5 5 | 10 | Sampled S-5 at 1:28 PM. Advanced 4 in. casing to 29 ft. |
| -12.7 | Class 5b | Brown sandy non-plastic SILT [ML] stiff (wet) | | 30–32 | S-6 | SS | 18 | 6 6 7 7 | 13 | Sampled S-6 at 1:37 PM. |
| | | Brown sandy non-plastic SILT [ML] very stiff (wet) | | 35–37 | S-7 | SS | 17 | 6 7 9 12 | 16 | Sampled S-7 at 1:43 PM. |
| -22.7 | Class 3a | Brown m-f SAND, some silt, trace gravel [SM] dense (moist) | | 40–42 | S-8 | SS | 10 | 27 20 13 19 | 33 | Sampled S-8 at 1:51 PM. |
| | | | | 43–45 | | | | | | Slight rig chatter. |

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Log of Boring **LB-15** Sheet 3 of 4

| Project | Project No. |
|---|---|
| Hudson Yards - Terra Firma | 170019112 |
| **Location** | **Elevation and Datum** |
| West 30th St. from 10th to 11th Ave., Manhattan, NY | Approx. 15.83 ft BPMD |

| Elev. (ft) | Building Code | Sample Description | Coring min/ft | Depth Scale | Sample Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|---|---|
| | Class 3a | Brown SAND with gravel, trace silt [SP] very dense (wet) | | 45 | | | | | | Sampled S-9 at 2:02 PM. |
| | | | | 46 | S-9 | SS | 8 | 28 26 32 14 | 58 | Heavy rig chatter from 46 ft to 47 ft. Wash changed from brown to black. |
| | | | | 47 | | | | | | |
| | | | | 48 | | | | | | |
| | | | | 49 | | | | | | |
| -33.7 | | | | | | | | | | |
| | Class 1d | Decomposed SCHIST | | 50 | S-10 | SS | 2 | 100/5" | Refusal | Sampled S-10. Very hard drilling at 52.5 ft. |
| | | | | 51 | | | | | | |
| | | | | 52 | | | | | | 12/30/11: Advanced 3 in. casing to 52.5 ft. Began coring R-1 at 10:21 AM. |
| -36.7 | Class 1d | Dark gray-black-white quartzofeldspathic, muscovite-biotite-garnet SCHIST, m-f grained, moderately to highly weathered, very close to close fracture spacing Very poor quality | 3 | 53 | R-1 | NX | REC=42"/60" =70% | RQD=6"/60" =10% | | |
| | | | 2 | 54 | | | | | | |
| | | | 4 | 55 | | | | | | |
| | | | 2 | 56 | | | | | | |
| | | | 3 | 57 | | | | | | |
| | Class 1d | Dark gray-black-white quartzofeldspathic, muscovite-biotite-garnet SCHIST, m-f grained, moderately to highly weathered, very close to close fracture spacing Very poor quality | 1 | 58 | R-2 | NX | REC=36"/60" =60% | RQD=11"/60" =18% | | Began coring R-2 at 10:57 AM. |
| | | | 2 | 59 | | | | | | |
| | | | 3 | 60 | | | | | | |
| | | | 1 | 61 | | | | | | |
| | | | 1 | 62 | | | | | | |
| | | | | 63 | | | | | | |
| | | | | 64 | | | | | | |
| -48.7 | Class 1a | Dark gray-black-white quartzofeldspathic, muscovite-biotite-garnet SCHIST, m-f grained, fresh, moderate to wide fracture spacing, fractures 30 to 45° from horizontal Excellent quality | 4 | 65 | R-3 | NX | REC=59"/60" =98% | RQD=59"/60" =98% | | Began coring R-3 at 2:03 PM. |
| | | | 5 | 66 | | | | | | |
| | | | 4 | 67 | | | | | | |
| | | | 4 | 68 | | | | | | |
| | | | 5 | 69 | | | | | | |
| | | | | 70 | | NX | | | | Began coring R-4 at 8:00 AM |

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Log of Boring **LB-15** Sheet 4 of 4

| Project | Project No. |
|---|---|
| Hudson Yards - Terra Firma | 170019112 |
| **Location** | **Elevation and Datum** |
| West 30th St. from 10th to 11th Ave., Manhattan, NY | Approx. 15.83 ft BPMD |

| Elev. (ft) | Building Code | Sample Description | Coring min/ft | Depth Scale | Sample Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|---|---|
| | Class 1a | Dark gray-black-white quartzofeldspathic, muscovite-biotite-garnet SCHIST, m-f grained, fresh, moderate to wide fracture spacing, fractures 30 to 45° from horizontal<br>Excellent quality | 5<br>4<br>4<br>6<br>6 | 70<br>71<br>72<br>73<br>74 | R-4 | NX | REC=60"/60" =100% | RQD=60"/60" =100% | | on 1/3/12. |
| | | Dark gray-black-white quartzofeldspathic, muscovite-biotite-garnet SCHIST, m-f grained, fresh, close to wide fracture spacing, fractures 30 to 45° from horizontal<br>Excellent quality | 5<br>5<br>6<br>5<br>5 | 75<br>76<br>77<br>78<br>79 | R-5 | NX | REC=60"/60" =100% | RQD=56"/60" =93% | | Began coring R-5 at 9:12 AM. |
| -63.7 | | END OF BORING @ 79.5 FT | | 80<br>81<br>82<br>83<br>84<br>85<br>86<br>87<br>88<br>89<br>90<br>91<br>92<br>93<br>94<br>95 | | | | | | |

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Log of Boring **LB-2** Sheet 1 of 2

| | |
|---|---|
| Project: Hudson Yards - Terra Firma | Project No.: 170019112 |
| Location: West 30th St. from 10th to 11th Ave., Manhattan, NY | Elevation and Datum: Approx. 13.13 ft BPMD |
| Drilling Company: Warren George, Inc. | Date Started: 1/5/12 — Date Finished: 1/5/12 |
| Drilling Equipment: Truck-mounted Mobile 58 | Completion Depth: 45 ft — Rock Depth: 20 ft |
| Size and Type of Bit: 3 7/8" Tricone Roller Bit | Number of Samples: Disturbed 6, Undisturbed 0, Core 5 |
| Casing Diameter (in): 3" and 4" Flush Joint Steel Pipe — Casing Depth (ft): 14 | Water Level (ft.): First ▽ -, Completion ▼ -, 24 HR. ▼ - |
| Casing Hammer: Automatic — Weight (lbs): 300 — Drop (in): 30 | Drilling Foreman: Caesar |
| Sampler: 2" O.D. Split Spoon/NX Core Barrel | Inspecting Engineer: Pragnesh Shah |
| Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30 | |

| Elev. (ft) | Building Code | Sample Description | Coring min/ft | Depth Scale | Sample Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|---|---|
| +13.1 | | | | 0 | | | | | | 12/30/11: Cleared of utilities to a depth of 7.5 ft via air knife and probing with a 0.5 inch diameter rod. No obstructions were encountered. |
| | | | | 1 | | | | | | |
| | | | | 2 | | | | | | |
| | | | | 3 | | | | | | |
| | | | | 4 | HA | | | | | |
| | | | PUSH | 5 | | | | | | |
| | | | | 6 | | | | | | |
| | | | | 7 | | | | | | |
| | | | | 8 | | | | | | |
| | Class 7 | Green m-f SAND, some silt, trace gravel [FILL] (wet) | | 9 | S-1 | SS | 7 | 9, 9, 3, 7 | 12 | Sampled S-1 at 11:25 AM. |
| | | Green fine SAND, some silt, trace gravel, trace wood [FILL] (wet) | | 10 | S-2 | SS | 16 | 8, 9, 7, 8 | 16 | Sampled S-2 at 11:28 AM. Advanced 4 in. casing to 9 ft. |
| | | | PUSH | 11 | | | | | | |
| | | Green fine SAND, some silt, trace grave, trace wood, trace roots [FILL] (wet) | | 12 | S-3 | SS | 18 | 1, 1, 1, 1 | 2 | Sampled S-3 at 11:37 AM. Advanced 4 in. casing to 14 ft. |
| | | | | 13 | | | | | | |
| | | | | 14 | | | | | | |
| | | Green fine SAND, trace silt [FILL] (wet) | | 15 | S-4 | SS | 13 | 1, WOH, WOH, WOH | 0 | Sampled S-4 at 11:43 AM. |
| | | | | 16 | | | | | | |
| | | Green fine SAND, trace silt, trace gravel [FILL] (moist) | | 17 | S-5 | SS | 15 | WOH, WOH, WOH, WOH | 0 | Sampled S-5 at 11:47 AM. |
| | | | | 18 | | | | | | |
| -5.9 | Class 1d | Decomposed SCHIST | | 19 | S-6 | SS | 1 | 100/2" | Refusal | Sampled S-6 Hard drilling at 20 ft. |
| -6.9 | | | | 20 | | | | | | |

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Log of Boring **LB-2** Sheet 2 of 2

| Project | Project No. |
|---|---|
| Hudson Yards - Terra Firma | 170019112 |
| **Location** | **Elevation and Datum** |
| West 30th St. from 10th to 11th Ave., Manhattan, NY | Approx. 13.13 ft BPMD |

| Elev. (ft) | Building Code | Sample Description | Coring min/ft | Depth Scale | Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 20 | | | | | | Advance 3 in. casing to 20 ft. Began coring R-1 at 12:51 PM. |
| | Class 1a | White-pink-green biotite-muscovite-microcline-quartz megacrystalline PEGMATITE, very coarse grained, fresh, moderate fracture spacing, fractures near horizontal Good quality | 4, 5, 5, 4, 4 | 21, 22, 23, 24 | R-1 | NX | REC=58"/60" =97% | RQD=53"/60" =88% | | |
| -11.9 | | | | 25 | | | | | | Began coring R-2 at 1:31 PM. |
| | Class 1b | Dark greenish black quartz-biotite-hornblende AMPHIBOLITE, fine grained, fresh to slightly weathered, close to moderate fracture spacing, fractures near horizontal Good quality | 3.5, 4, 4, 3.5, 4 | 26, 27, 28, 29 | R-2 | NX | REC=54"/60" =90% | RQD=48"/60" =80% | | |
| -16.9 | | | | 30 | | | | | | Began coring R-3 at 2:03 PM. |
| | Class 1a | Dark gray-black-white quartzofeldspathic, muscovite-biotite-garnet SCHIST, m-f grained, fresh, close to wide fracture spacing, fractures 15° from horizontal Excellent quality | 4, 4, 5, 5, 4 | 31, 32, 33, 34 | R-3 | NX | REC=60"/60" =100% | RQD=54"/60" =90% | | |
| -18.4 | | | | | | | | | | |
| -19.9 | | 31.5-33 ft: Gray quartz-feldspar GRANULITE, fine grained, fresh, close to moderate fracture spacing | | | | | | | | |
| | Class 1a | Dark gray-black-white quartzofeldspathic, muscovite-biotite-garnet SCHIST, m-f grained, fresh, close to wide fracture spacing, fractures 15° from horizontal NYCBC Class 1a | 3, 4, 4, 5, 5 | 35, 36, 37, 38, 39 | R-4 | NX | REC=56"/60" =93% | RQD=56"/60" =93% | | Began coring R-4 at 2:37 PM. |
| | | Dark gray-black-white quartzofeldspathic, muscovite-biotite-garnet SCHIST, m-f grained, fresh, close to wide fracture spacing, fractures 45° from horizontal NYCBC Class 1a | 4, 4, 5, 4, 5 | 40, 41, 42, 43, 44 | R-5 | NX | REC=60"/60" =100% | RQD=54"/60" =90% | | Began coring R-5 at 3:07 PM. |
| | | END OF BORING @ 45 FT | | 45 | | | | | | |
| -31.9 | | | | | | | | | | |

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Log of Boring **LB-3** Sheet 1 of 3

| | |
|---|---|
| Project: Hudson Yards - Terra Firma | Project No.: 170019112 |
| Location: West 30th St. from 10th to 11th Ave., Manhattan, NY | Elevation and Datum: Approx. 9.68 ft BPMD |
| Drilling Company: Warren George, Inc. | Date Started: 1/6/12 / Date Finished: 1/6/12 |
| Drilling Equipment: Truck-mounted Acker Soil Max | Completion Depth: 49 ft / Rock Depth: 34 ft |
| Size and Type of Bit: 3 7/8" Tricone Roller Bit | Number of Samples: Disturbed 8, Undisturbed 0, Core 3 |
| Casing Diameter (in): 3" and 4" Flush Joint Steel Pipe / Casing Depth (ft): 14 | Water Level (ft.): First ▽ -, Completion ▼ -, 24 HR. ▼ - |
| Casing Hammer: Donut / Weight (lbs): 300 / Drop (in): 30 | Drilling Foreman: Jacob Harris |
| Sampler: 2" O.D. Split Spoon/NX Core Barrel | Inspecting Engineer: Scott Garfield |
| Sampler Hammer: Donut / Weight (lbs): 140 / Drop (in): 30 | |

| Elev. (ft) | Building Code | Sample Description | Coring min/ft | Depth Scale | Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|---|---|
| +9.7 | | 8 in. concrete slab | | 0 | | | | | | 1/4/12: Cleared of utilities to a depth of 6 ft via air knife and probing with a 0.5 inch diameter rod. No obstructions were encountered. |
| +9.0 | Class 7 | Black fine SAND, trace silt, trace brick [FILL] (moist) | PUSH | 1–5 | HA | | | | | Advanced 4 in. casing to 6 ft. |
| | | | PUSH | 6–7 | S-1 | SS | 8 | 5 4 34 31 | 38 | Sampled S-1 at 8:53 AM. Advanced 4 in. casing to 8 ft. |
| | | Black m-f SAND, trace silt, trace brick [FILL] (moist) | PUSH | 8–9 | S-2 | SS | 3 | 6 8 5 13 | 13 | Sampled S-2 at 9:02 AM. Advanced 4 in. casing to 9 ft. |
| | | Brown m-f SAND, trace gravel, trace brick [FILL] (moist) | PUSH | 10–11 | S-3 | SS | 13 | 3 5 7 9 | 12 | Sampled S-3 at 9:10 AM. |
| -2.3 | Class 3b | Reddish brown fine SAND, some silt [SM] medium dense (moist) | | 12–13 | S-4 | SS | 11 | 9 8 12 9 | 20 | Sampled S-4 at 9:13 AM. Advanced 4 in. casing to 14 ft. |
| | Class 3a | Reddish brown c-f SAND, trace silt, trace mica, trace quartz [SP-SM] very dense (moist) | | 15–16 | S-5 | SS | 12 | 15 65 100/3" | Refusal | Sampled S-5 at 9:30 AM. |
| -8.8 | Class 3b | | | 17–20 | | | | | | |

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Log of Boring **LB-3** Sheet 2 of 3

| Project | Project No. |
|---|---|
| Hudson Yards - Terra Firma | 170019112 |
| **Location** | **Elevation and Datum** |
| West 30th St. from 10th to 11th Ave., Manhattan, NY | Approx. 9.68 ft BPMD |

| Elev. (ft) | Building Code | Sample Description | Coring min/ft | Depth Scale | Sample Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|---|---|
| | Class 3b | Reddish brown silty fine SAND, trace mica [SM] medium dense (wet) | | 20–22 | S-6 | SS | 12 | 5, 5, 8, 10 | 13 | Sampled S-6 at 9:47 AM. -#200 = 34% |
| | Class 3b | Reddish brown silty fine SAND, trace mica [SM] medium dense (wet) | | 25–27 | S-7 | SS | 10 | 7, 16, 11, 10 | 27 | Sampled S-7 at 9:55 AM. |
| -20.3 | Class 1d | Decomposed SCHIST | | 30–31 | S-8 | SS | 6 | 8, 7, 100/5" | Refusal | Sampled S-8 at 10:09 AM. Hard drilling from 30 ft to 34 ft. |
| -24.3 | Class 1c | Dark gray-black-white quartzofeldspathic, muscovite-biotite-garnet SCHIST, m-f grained, slightly to highly weathered, very close to close fracture spacing, fractures 45° from horizontal Poor quality | 5, 5, 3, 3, 3 | 34–38 | R-1 | NX | REC=33"/60" =55% | RQD=22"/60" =37% | | Advanced 3 in. casing to 34 ft. Began coring R-1 at 11:07 AM. |
| -29.3 | Class 1c | 39-41 ft: Gray quartz-feldspar GRANULITE, fine grained, slightly weathered, close fracture spacing, fractures near horizontal | 3, 4 | 39–41 | R-2 | NX | REC=48"/60" =80% | RQD=28"/60" =47% | | Began coring R-2 at 12:04 PM. |
| -31.3 | Class 1c | 41-44 ft: Dark gray-black-white quartzofeldspathic, muscovite-biotite-garnet SCHIST, m-f grained, slightly to moderately weathered, close to moderate fracture spacing, fractures 45° from horizontal Poor quality | 5, 4, 4 | 41–44 | | | | | | |
| -34.3 | Class 1b | | 4 | 44–45 | R-3 | NX | | | | |

Sample Data

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Log of Boring **LB-3** Sheet 3 of 3

| Project | Project No. |
|---|---|
| Hudson Yards - Terra Firma | 170019112 |
| **Location** | **Elevation and Datum** |
| West 30th St. from 10th to 11th Ave., Manhattan, NY | Approx. 9.68 ft BPMD |

| Material Symbol | Elev. (ft) | Building Code | Sample Description | Coring min/ft | Depth Scale | Sample Data: Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) 10 20 30 40 | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Class 1b | Dark gray-black-white quartzofeldspathic, muscovite-biotite-garnet SCHIST, m-f grained, slightly to moderately weathered, close to moderate fracture spacing, fractures 45° from horizontal<br>Fair quality<br>47-47.5 ft: highly weathered | 5<br>2<br>3<br>3 | 45<br>46<br>47<br>48 | R-3 | NX | REC=60"/60" =100% | RQD=33"/60" =55% | | |
| | -39.3 | | END OF BORING @ 49 FT | | 49<br>50<br>51<br>52<br>53<br>54<br>55<br>56<br>57<br>58<br>59<br>60<br>61<br>62<br>63<br>64<br>65<br>66<br>67<br>68<br>69<br>70 | | | | | | |

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Log of Boring **LB-4** Sheet 1 of 2

| | |
|---|---|
| Project: Hudson Yards - Terra Firma | Project No.: 170019112 |
| Location: West 30th St. from 10th to 11th Ave., Manhattan, NY | Elevation and Datum: Approx. 14.53 ft BPMD |
| Drilling Company: Warren George, Inc. | Date Started: 1/3/12 / Date Finished: 1/3/12 |
| Drilling Equipment: Truck-mounted Acker Soil Max | Completion Depth: 44 ft / Rock Depth: 34 ft |
| Size and Type of Bit: 3 7/8" and 4 7/8" Tricone Roller Bit | Number of Samples: Disturbed 8, Undisturbed 0, Core 2 |
| Casing Diameter (in): 3" and 5" Flush Joint Steel Pipe / Casing Depth (ft): 9.5 | Water Level (ft.): First ▽ -, Completion ▼ -, 24 HR. ▼ - |
| Casing Hammer: Donut / Weight (lbs): 300 / Drop (in): 30 | Drilling Foreman: Jacob Harris |
| Sampler: 2" O.D. Split Spoon/NX Core Barrel | Inspecting Engineer: Scott Garfield |
| Sampler Hammer: Donut / Weight (lbs): 140 / Drop (in): 30 | |

| Elev. (ft) | Building Code | Sample Description | Casng blws/ ft Coring min/ ft | Depth Scale | Sample Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|---|---|
| +14.5 | | | | 0 | | | | | | 12/29/11: Cleared of utilities to a depth of 6 ft via air knife and probing with a 0.5 inch diameter rod. No obstructions were encountered. |
| | | | PUSH | 1–2 | | | | | | |
| | | | | 3 | | HA | | | | Advanced 5 in. casing to 6 ft. |
| | | | 12 | 4 | | | | | | |
| | | | PUSH | 5 | | | | | | |
| | | Brown m-f SAND, trace silt, trace gravel, trace brick, trace concrete [FILL] (moist) | | 6 | | | | | | Sampled S-1 at 10:30 AM. |
| | | | | 7 | S-1 | SS | 14 | 14, 21, 9, 6 | 30 | |
| | | | PUSH | 8 | | | | | | |
| | | Brown silty SAND, trace gravel, trace brick [FILL] (moist) | | | | | | | | Sampled S-2 at 10:40 AM. Advanced 5 in. casing to 9.5 ft. |
| | Class 7 | | | 9 | S-2 | SS | 5 | 8, 24, 30, 18 | 54 | |
| | | Brown m-f SAND, trace silt, trace gravel, trace brick [FILL] (moist) | | 10 | | | | | | Sampled S-3 at 10:55 AM. |
| | | | | 11 | S-3 | SS | 2 | 9, 5, 6, 4 | 11 | |
| | | Brown fine SAND, some silt, trace gravel [FILL] (wet) | | 12 | | | | | | Sampled S-4 at 11:00 AM. |
| | | | | 13 | S-4 | SS | 6 | 6, 10, 9, 10 | 19 | |
| | | | | 14 | | | | | | |
| | | Dark brown c-f SAND, some silt, trace gravel, trace brick [FILL] (wet) | | 15 | | | | | | Sampled S-5 at 11:15 AM. -#200 = 15% |
| | | | | 16 | S-5 | SS | 12 | 25, 40, 18, 10 | 58 | |
| | | | | 17 | | | | | | |
| | | | | 18 | | | | | | Brown wash. |
| -4.0 | | | | 19 | | | | | | |
| | Class 3b | | | 20 | | | | | | |

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Log of Boring **LB-4** Sheet 2 of 2

| Project | Project No. |
|---|---|
| Hudson Yards - Terra Firma | 170019112 |
| **Location** | **Elevation and Datum** |
| West 30th St. from 10th to 11th Ave., Manhattan, NY | Approx. 14.53 ft BPMD |

| Elev. (ft) | Building Code | Sample Description | Depth Scale | Sample Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|---|
| | Class 3b | Reddish brown m-f SAND, some silt [SP-SM] medium dense (wet) | 20–22 | S-6 | SS | 14 | 6, 7, 10, 15 | 17 | Sampled S-6 at 11:25 AM. |
| -9.0 | | | | | | | | | |
| | Class 5b | Reddish brown sandy non-plastic SILT [SM] very stiff (wet) | 25–27 | S-7 | SS | 13 | 6, 8, 9, 14 | 17 | Sampled S-7 at 11:35 AM. |
| -15.5 | Class 1d | Decomposed SCHIST | 30–33 | S-8 | SS | 1 | 100/1" | Refusal | Sampled S-8 at 11:45 AM. |
| | | | | | | | | | Advanced 3 in. casing to 34 ft. |
| -19.5 | Class 1a | 34-37.5 ft: Dark gray-black-white quartzofeldspathic, muscovite-biotite-garnet SCHIST, m-f grained, fresh to slightly weathered, close to moderate fracture spacing, fractures 30° from horizontal<br>Excellent quality | 34–37 | R-1 | NX | REC=60"/60" =100% | RQD=60"/60" =100% | | Began coring R-1 at 1:27 PM. |
| -23.0 | Class 1a | 37.5-39.5 ft: White QUARTZITE, c-m grained, fresh, close to moderate fracture spacing, fractures near horizontal<br>Excellent quality | 38–39 | | | | | | |
| -25.0 | Class 1a | 39.5-44 ft: Interbedded SCHIST and QUARTZITE<br>Excellent quality | 40–43 | R-2 | NX | REC=60"/60" =100% | RQD=60"/60" =100% | | Began coring R-2 at 2:10 PM. |
| -29.5 | | END OF BORING @ 44 FT | 44–45 | | | | | | |

Casing blws/ ft: 6, 7, 3, 7, 5, 5, 7, 4, 4, 4

Coring min/ ft

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Log of Boring **LB-5** Sheet 1 of 3

| | |
|---|---|
| Project: Hudson Yards - Terra Firma | Project No.: 170019112 |
| Location: West 30th St. from 10th to 11th Ave., Manhattan, NY | Elevation and Datum: Approx. 13.21 ft BPMD |
| Drilling Company: Warren George, Inc. | Date Started: 1/11/12 / Date Finished: 1/12/12 |
| Drilling Equipment: Truck-mounted Mobile 58 | Completion Depth: 57 ft / Rock Depth: 32 ft |
| Size and Type of Bit: 3 7/8" Tricone Roller Bit | Number of Samples: Disturbed 7, Undisturbed 0, Core 5 |
| Casing Diameter (in): 3" and 4" Flush Joint Steel Pipe / Casing Depth (ft): 19 | Water Level (ft.): First -, Completion -, 24 HR. - |
| Casing Hammer: Automatic / Weight (lbs): 300 / Drop (in): 30 | Drilling Foreman: Caesar |
| Sampler: 2" O.D. Split Spoon/NX Core Barrel | Inspecting Engineer: Pragnesh Shah |
| Sampler Hammer: Automatic / Weight (lbs): 140 / Drop (in): 30 | |

| Elev. (ft) | Building Code | Sample Description | Coring min/ft | Depth Scale | Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|---|---|
| +13.2 | | 8 in. concrete slab | | 0 | | | | | | 1/9/12: Cleared of utilities to a depth of 4 ft via air knife and probing with a 0.5 inch diameter rod. No obstructions were encountered. |
| +12.5 | Class 7 | | | 1, 2, 3 | | HA | | | | 1/11/12: Cleared of utilities to a depth of 10 ft using water rotary drilling with no down pressure. No obstructions were encountered. |
| | | | | 4, 5, 6, 7, 8, 9 | | WATERROTARY | | | | |
| | | Black and reddish brown c-f SAND, some silt, trace gravel [FILL] (wet) | | 10, 11 | S-1 | SS | 10 | 14, 21, 14, 9 | 35 | Sampled S-1. |
| | | Gray c-f SAND, trace silt, trace gravel [FILL] (wet) | | 12, 13 | S-2 | SS | 12 | 9, 2, 4, 4 | 6 | Sampled S-2. |
| | | Gray c-f SAND, trace silt, trace gravel [FILL] (wet) | DRIVE | 14, 15 | S-3 | SS | 10 | 8, 10, 12, 9 | 22 | Sampled S-3. Advanced 4 in. casing to 14 ft. |
| -1.8 | Class 5b | Reddish brown sandy non-plastic SILT [ML] very stiff (wet) | | | | | | | | |
| | | Reddish brown sandy non-plastic SILT, trace gravel [ML] stiff (wet) | DRIVE | 16, 17 | S-4 | SS | 20 | 2, 4, 5, 6 | 9 | Sampled S-4. Advanced 4 in. casing to 19 ft. |
| | Class 6 | | | 18 | | | | | | |
| | Class 5b | | | 19, 20 | | | | | | |

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Log of Boring **LB-5** Sheet 2 of 3

| Project | Project No. |
|---|---|
| Hudson Yards - Terra Firma | 170019112 |
| **Location** | **Elevation and Datum** |
| West 30th St. from 10th to 11th Ave., Manhattan, NY | Approx. 13.21 ft BPMD |

| Elev. (ft) | Building Code | Sample Description | Coring min/ft | Depth Scale | Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|---|---|
| | Class 5b | Reddish brown sandy non-plastic SILT [ML] very stiff (wet) | | 20–22 | S-5 | SS | 12 | 7, 8, 9, 12 | 17 | Sampled S-5. |
| -10.3 | | | | 23–24 | | | | | | |
| | Class 3a | Reddish brown silty m-f SAND, trace gravel [SP-SM] dense (wet) | | 25–27 | S-6 | SS | 10 | 28, 14, 16, 15 | 30 | Sampled S-6. -#200 = 48% |
| | | | | 28–29 | | | | | | |
| -16.8 | Class 1d | Decomposed SCHIST | | 30–31 | S-7 | SS | 7 | 68, 100/1" | Refusal | Sampled S-7. Hard drilling at 30.5 ft. Advanced 3 in. casing to 32 ft. |
| -18.8 | Class 1a | Dark gray-black-white quartzofeldspathic, muscovite-biotite-garnet SCHIST, m-f grained, slightly to moderately weathered, close to moderate fracture spacing, fractures 0 to 15° from horizontal Excellent quality | 3, 2, 2, 2, 2 | 32–37 | R-1 | NX | REC=60"/60" =100% | RQD=54"/60" =90% | | Began coring R-1 at 1:25 PM. |
| | | Dark gray-black-white quartzofeldspathic, muscovite-biotite-garnet SCHIST, m-f grained, fresh to slightly weathered, close to moderate fracture spacing, fractures 0 to 15° from horizontal Excellent quality | 6, 3, 4, 5, 5 | 37–42 | R-2 | NX | REC=57"/60" =95% | RQD=54"/60" =90% | | Began coring R-2 at 1:46 PM. |
| | | Dark gray-black-white quartzofeldspathic, muscovite-biotite-garnet SCHIST, m-f grained, fresh to slightly weathered, close to moderate fracture spacing, fractures 0 to 15° from horizontal Excellent quality | 6, 3, 2 | 42–45 | R-3 | NX | REC=60"/60" =100% | RQD=60"/60" =100% | | Began coring R-3 at 2:20 PM. |

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Log of Boring **LB-5** Sheet 3 of 3

| Project | Project No. |
|---|---|
| Hudson Yards - Terra Firma | 170019112 |
| **Location** | **Elevation and Datum** |
| West 30th St. from 10th to 11th Ave., Manhattan, NY | Approx. 13.21 ft BPMD |

| Elev. (ft) | Building Code | Sample Description | Coring min/ft | Depth Scale | Sample Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | 3 | 45 | | | | | | |
| | | | 3 | 46 | R-3 | NX | | | | |
| | | | 3 | 47 | | | | | | Began coring R-4 at 9:47 AM on 1/12/12. |
| | | Dark gray-black-white quartzofeldspathic, muscovite-biotite-garnet SCHIST, m-f grained, fresh to slightly weathered, close to moderate fracture spacing, fractures 0 to 15° from horizontal<br>Good quality | 3 | 48 | | | | | | |
| | | | 3 | 49 | R-4 | NX | REC=56"/60" =93% | RQD=53"/60" =88% | | |
| | | | 4 | 50 | | | | | | |
| | Class 1a | | 3 | 51 | | | | | | |
| | | | 4 | 52 | | | | | | Began coring R-5 at 10:16 AM. |
| | | | 4 | 53 | | | | | | |
| | | Dark gray-black-white quartzofeldspathic, muscovite-biotite-garnet SCHIST, m-f grained, fresh to slightly weathered, close to moderate fracture spacing, fractures 0 to 15° from horizontal<br>Good quality | 4 | 54 | R-5 | NX | REC=59"/60" =98% | RQD=53"/60" =88% | | |
| | | | 4 | 55 | | | | | | |
| | | | 3 | 56 | | | | | | |
| -43.8 | | | 3 | 57 | | | | | | |
| | | END OF BORING @ 57 FT | | 58 | | | | | | |
| | | | | 59 | | | | | | |
| | | | | 60 | | | | | | |
| | | | | 61 | | | | | | |
| | | | | 62 | | | | | | |
| | | | | 63 | | | | | | |
| | | | | 64 | | | | | | |
| | | | | 65 | | | | | | |
| | | | | 66 | | | | | | |
| | | | | 67 | | | | | | |
| | | | | 68 | | | | | | |
| | | | | 69 | | | | | | |
| | | | | 70 | | | | | | |

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Log of Boring **LB-6** Sheet 1 of 3

| | |
|---|---|
| Project: Hudson Yards - Terra Firma | Project No.: 170019112 |
| Location: West 30th St. from 10th to 11th Ave., Manhattan, NY | Elevation and Datum: Approx. 14.47 ft BPMD |
| Drilling Company: Warren George, Inc. | Date Started: 1/13/12 / Date Finished: 1/18/12 |
| Drilling Equipment: Truck-mounted Acker Soil Max | Completion Depth: 69 ft / Rock Depth: 44 ft |
| Size and Type of Bit: 3 7/8" and 4 7/8" Tricone Roller Bit | Number of Samples: Disturbed 7, Undisturbed 0, Core 5 |
| Casing Diameter (in): 3", 4", and 5" Flush Joint Steel Pipe / Casing Depth (ft): 19 | Water Level (ft.): First ▽ -, Completion ▼ -, 24 HR. ▼ - |
| Casing Hammer: Donut / Weight (lbs): 300 / Drop (in): 30 | Drilling Foreman: Angel |
| Sampler: 2" O.D. Split Spoon/NX Core Barrel | Inspecting Engineer: Scott Garfield |
| Sampler Hammer: Donut / Weight (lbs): 140 / Drop (in): 30 | |

| Elev. (ft) | Building Code | Sample Description | Sample Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| +14.5 | | 8 in. concrete slab | | | | | | 1/6/12: Cleared of utilities to a depth of 5 ft via air knife and probing with a 0.5 inch diameter rod. No obstructions were encountered. |
| +13.8 | Class 7 | Boulder from 7 ft to 10.5 ft | HA | | | | | 1/13/12: Cleared of utilities to a depth of 12 ft using water rotary drilling with no down pressure. Boulder was encountered from about 7 ft to 10.5 ft. The boulder was cored using an NX core barrel. No other obstructions were encountered. |
| | | | WATERROTARY | | | | | Advanced 4 in. casing to 8 ft. |
| +2.5 | Class 3a | Reddish brown m-f SAND, trace silt, trace gravel [SP] very dense (moist) | S-1 | SS | 14 | 9, 23, 30, 16 | 53 | Sampled S-1 at 2:13 PM. |
| | | Reddish brown m-f SAND, trace silt, trace gravel [SP] medium dense (moist) NYCBC | S-2 | SS | 18 | 12, 10, 15, 12 | 25 | Sampled S-2 at 2:20 PM. Advanced 4 in. casing to 12 ft. |
| | Class 3b | | | | | | | |

Depth Scale: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20

Coring min/ft

N-Value scale: 10 20 30 40

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Log of Boring **LB-6** Sheet 2 of 3

| Project | Project No. |
|---|---|
| Hudson Yards - Terra Firma | 170019112 |
| **Location** | **Elevation and Datum** |
| West 30th St. from 10th to 11th Ave., Manhattan, NY | Approx. 14.47 ft BPMD |

| Elev. (ft) | Building Code | Sample Description | Coring min/ft | Sample Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|---|
| | Class 3b | Reddish brown m-f SAND, trace silt, trace gravel [SP] medium dense (wet) | | S-3 | SS | 5 | 13 13 14 15 | 27 | Sampled S-3 at 2:46 PM. Advanced 4 in. casing to 19 ft |
| -9.0 | Class 5b | Brown sandy non-plastic SILT, trace gravel [ML] stiff (wet) | | S-4 | SS | 13 | 7 5 6 6 | 11 | Sampled S-4 at 9:10 AM on 1/18/12. |
| | Class 6 | Brown sandy non-plastic SILT [ML] firm (wet) | | S-5 | SS | 18 | 3 4 3 7 | 7 | Sampled S-5 at 9:18 AM. |
| | | Brown sandy non-plastic SILT [ML] firm (wet) | | S-6 | SS | 16 | WOH 2 5 6 | 7 | Sampled S-6 at 9:26 AM. -#200 = 90% |
| -24.0 | Class 3a | Brown m-f SAND, some silt, trace gravel [SP] dense (wet) | | S-7 | SS | 18 | 8 26 20 31 | 46 | Sampled S-7 at 9:39 AM. -#200 = 25% |
| -29.5 | Class 1b | | 7 | R-1 | NX | | | | Advanced 3 in. casing to 44 ft. Began coring R-1 at 11:16 AM. |

Depth Scale: 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45

N-Value scale: 10 20 30 40

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Log of Boring **LB-6** Sheet 3 of 3

| Project | Project No. |
|---|---|
| Hudson Yards - Terra Firma | 170019112 |
| **Location** | **Elevation and Datum** |
| West 30th St. from 10th to 11th Ave., Manhattan, NY | Approx. 14.47 ft BPMD |

| Elev. (ft) | Building Code | Sample Description | Coring min/ft | Depth Scale | Sample Data: Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|---|---|
| | Class 1b | Grayish shite biotite-muscovite-microcline-quartz GRANITE, c-m grained, fresh, close to moderate fracture spacing, fracture near horizontal<br>Fair quality | 6, 6, 5, 5 | 45, 46, 47, 48 | R-1 | NX | REC=46"/60" =77% | RQD=33"/60" =55% | | |
| -34.5 | | | | 49 | | | | | | Began coring R-2 at 11:55 AM. |
| | | Dark gray-black-white quartzofeldspathic, muscovite-biotite-garnet SCHIST, m-f grained, fresh to slightly weathered, close to moderate fracture spacing, fractures 0 to 15° from horizontal<br>Fair quality | 6, 5, 6, 5, 6 | 50, 51, 52, 53 | R-2 | NX | REC=60"/60" =100% | RQD=44"/60" =73% | | |
| | | | | 54 | | | | | | Began coring R-3 at 12:45 PM. |
| | | Dark gray-black-white quartzofeldspathic, muscovite-biotite-garnet SCHIST, m-f grained, fresh to slightly weathered, close to moderate fracture spacing, fractures 0 to 15° from horizontal<br>Good quality | 3, 4, 4, 3, 2 | 55, 56, 57, 58 | R-3 | NX | REC=55"/60" =92% | RQD=47"/60" =78% | | |
| | Class 1b | | | 59 | | | | | | Began coring R-4 at 1:15 PM. |
| | | Dark gray-black-white quartzofeldspathic, muscovite-biotite-garnet SCHIST, m-f grained, slightly to moderately weathered, close to moderate fracture spacing, fractures 0 to 15° from horizontal<br>Fair quality | 3, 3, 3, 3, 3 | 60, 61, 62, 63 | R-4 | NX | REC=51"/60" =85% | RQD=36"/60" =60% | | |
| | | | | 64 | | | | | | Began coring R-5 at 1:40 PM. |
| | | Dark gray-black-white quartzofeldspathic, muscovite-biotite-garnet SCHIST, m-f grained, fresh to slightly weathered, close to moderate fracture spacing, fractures 0 to 15° from horizontal<br>Fair quality<br>68-69 ft: quartz intrusion | 5, 6, 5, 6, 6 | 65, 66, 67, 68 | R-5 | NX | REC=60"/60" =100% | RQD=39"/60" =65% | | |
| -54.5 | | | | 69 | | | | | | |
| | | END OF BORING @ 69 FT | | 70 | | | | | | |

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Log of Boring **LB-7** Sheet 1 of 4

| | |
|---|---|
| Project: Hudson Yards - Terra Firma | Project No.: 170019112 |
| Location: West 30th St. from 10th to 11th Ave., Manhattan, NY | Elevation and Datum: Approx. 14.95 ft BPMD |
| Drilling Company: Warren George, Inc. | Date Started: 1/3/12 / Date Finished: 1/4/12 |
| Drilling Equipment: Truck-mounted Mobile 58 | Completion Depth: 76 ft / Rock Depth: 51 ft |
| Size and Type of Bit: 2 7/8" and 3 7/8" Tricone Roller Bit | Number of Samples: Disturbed 11, Undisturbed 0, Core 5 |
| Casing Diameter (in): 3" and 4" Flush Joint Steel Pipe / Casing Depth (ft): 29 | Water Level (ft.): First ▽ -, Completion ▼ -, 24 HR. ▼ - |
| Casing Hammer: Automatic / Weight (lbs): 300 / Drop (in): 30 | Drilling Foreman: Caesar |
| Sampler: 2" O.D. Split Spoon/NX Core Barrel | Inspecting Engineer: Pragnesh Shah |
| Sampler Hammer: Automatic / Weight (lbs): 140 / Drop (in): 30 | |

| Elev. (ft) | Building Code | Sample Description | Coring min/ft | Depth Scale | Sample Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|---|---|
| +15.0 | | | | 0 | | | | | | 12/28/11: Cleared of utilities to a depth of 9 ft via air knife and probing with a 0.5 inch diameter rod. No obstructions were encountered. |
| | | | PUSH | 1–4 | | HA | | | | |
| | Class 7 | | | 5–8 | | | | | | Advanced 4 in. casing to 9 ft. |
| | | | | 9 | | | | | | |
| | | Greenish brown silty m-f SAND, some mica [FILL] (moist) | PUSH | 10–11 | S-1 | SS | 17 | 2 1 1 3 | 2 | Sampled S-1 at 11:08 AM. -#200 = 34% |
| | | Greenish brown m-f SAND, some silt [FILL] (moist) | | 12–13 | S-2 | SS | 18 | 2 3 4 5 | 7 | Sampled S-2 at 11:17 AM. Advanced 4 in. casing to 14 ft. |
| | | | | 14 | | | | | | |
| | | Greenish brown silty SAND, trace gravel [FILL] (moist) | PUSH | 15–16 | S-3 | SS | 10 | 2 5 6 4 | 11 | Sampled S-3 at 12:03 PM. |
| -2.1 | | | | 17 | | | | | | |
| | Class 5b | Brown sandy non-plastic SILT, trace gravel [ML] stiff (wet) | | 18 | S-4 | SS | 2 | 3 5 8 8 | 13 | Sampled S-4 at 12:17 PM. Advanced 4 in. casing to 19 ft. Brown wash at 17 ft. |
| | Class 6 | | | 19–20 | | | | | | |

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Log of Boring **LB-7** Sheet 2 of 4

| Project | Project No. |
|---|---|
| Hudson Yards - Terra Firma | 170019112 |
| **Location** | **Elevation and Datum** |
| West 30th St. from 10th to 11th Ave., Manhattan, NY | Approx. 14.95 ft BPMD |

| Elev. (ft) | Building Code | Sample Description | Coring min/ft | Depth Scale | Sample Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|---|---|
| | Class 6 | Brown sandy non-plastic SILT, trace clay, trace gravel [ML] stiff (wet) | PUSH | 20–22 | S-5 | SS | 11 | 4 4 5 6 | 9 | Sampled S-5 at 12:43 PM. Advanced 4 in. casing to 24 ft. |
| -8.6 | | | | | | | | | | |
| | Class 3b | Brown silty SAND, trace gravel [SM] medium dense (moist) NYCBC | PUSH | 24–27 | S-6 | SS | 18 | 5 7 8 9 | 15 | Sampled S-6 at 1:13 PM. Advanced 4 in. casing to 29 ft. |
| -13.6 | | | | | | | | | | |
| | Class 3a | Reddish brown gravelly m-f SAND, some silt [SP] dense (wet) | | 29–32 | S-7 | SS | 11 | 17 15 22 17 | 37 | Sampled S-7 at 1:41 PM. Heavy rig chatter from 30 ft to 33 ft. |
| -18.6 | | | | | | | | | | |
| | Class 5b | Brown sandy non-plastic SILT, trace mica [ML] very stiff (moist) | | 34–37 | S-8 | SS | 20 | 10 13 18 17 | 31 | Sampled S-8 at 2:17 PM. Slight rig chatter from 38 ft to 39 ft. |
| | | Brown sandy non-plastic SILT, trace mica [ML] very stiff (moist) | | 39–42 | S-9 | SS | 6 | 12 14 13 15 | 27 | Sampled S-9 at 2:45 PM. |
| -28.6 | Class 3a | | | 43–45 | | | | | | |

Depth Scale: 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45

N-Value (Blows/ft): 10 20 30 40

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Log of Boring **LB-7** Sheet 3 of 4

| Project | Project No. |
|---|---|
| Hudson Yards - Terra Firma | 170019112 |
| **Location** | **Elevation and Datum** |
| West 30th St. from 10th to 11th Ave., Manhattan, NY | Approx. 14.95 ft BPMD |

| Elev. (ft) | Building Code | Sample Description | Coring min/ft | Depth Scale | Sample Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|---|---|
| | Class 3a | Reddish brown m-f SAND, some silt, trace gravel [SP] dense (wet) | | 45–47 | S-10 | SS | 3 | 23, 29, 19, 21 | 48 | 1/4/12: Sampled S-10 |
| -34.1 | | | | 49 | | | | | | Black wash, weathered rock fragments |
| | Class 1d | Decomposed SCHIST | | 50 | S-11 | SS | 1 | 100/3" | Refusal | Sampled S-11. Very hard drilling at 51 ft. Advanced 3 in. casing to 51 ft. |
| -36.1 | | | | 51 | | | | | | |
| -36.8 | Class 1a | Dark gray-black-white quartzofeldspathic, muscovite-biotite-garnet SCHIST, m-f grained, fresh to slightly weathered, close to wide fracture spacing, fractures near horizontal Excellent quality | 3, 2, 2, 3, 5 | 52–55 | R-1 | NX | REC=58"/60" =97% | RQD=55"/60" =92% | | |
| -37.8 | | | | | | | | | | |
| -38.7 | Class 1a | 51.7-52.7 ft: Gray quartz-feldspar GRANULITE, fine grained, fresh | | | | | | | | |
| -39.5 | | 53.6-54.4 ft: Gray quartz-feldspar GRANULITE, fine grained, fresh | | | | | | | | |
| | | Dark gray-black-white quartzofeldspathic, muscovite-biotite-garnet SCHIST, m-f grained, fresh to slightly weathered, close to wide fracture spacing, fractures near horizontal Good quality | 6, 5, 4, 4, 5 | 56–60 | R-2 | NX | REC=55"/60" =92% | RQD=52"/60" =87% | | |
| | Class 1a | Dark gray-black-white quartzofeldspathic, muscovite-biotite-garnet SCHIST, m-f grained, fresh to slightly weathered, close to wide fracture spacing, fractures near horizontal Excellent quality | 5, 6, 5, 4, 5 | 61–65 | R-3 | NX | REC=54"/60" =90% | RQD=54"/60" =90% | | |
| | | Dark gray-black-white quartzofeldspathic, muscovite-biotite-garnet SCHIST, m-f grained, fresh to slightly weathered, close to wide fracture spacing, fractures near horizontal Excellent quality | 5, 4, 4, 5 | 66–70 | R-4 | NX | REC=59"/60" =98% | RQD=54"/60" =90% | | |

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Log of Boring **LB-7** Sheet 4 of 4

| Project | Project No. |
|---|---|
| Hudson Yards - Terra Firma | 170019112 |
| **Location** | **Elevation and Datum** |
| West 30th St. from 10th to 11th Ave., Manhattan, NY | Approx. 14.95 ft BPMD |

| Material Symbol | Elev. (ft) | Building Code | Sample Description | Coring min/ft | Depth Scale | Sample Data: Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) 10 20 30 40 | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Class 1a | Dark gray-black-white quartzofeldspathic, muscovite-biotite-garnet SCHIST, m-f grained, slightly to highly weathered, close to wide fracture spacing, fractures near horizontal Excellent quality | 5 | 70 | R-4 | NX | | | | |
| | | | | 4 | 71 | R-5 | NX | REC=57"/60" =95% | RQD=55"/60" =92% | | |
| | | | | 4 | 72 | | | | | | |
| | | | | 5 | 73 | | | | | | |
| | | | | 4 | 74 | | | | | | |
| | | | | 4 | 75 | | | | | | |
| | -61.1 | | END OF BORING @ 76 FT. | | 76 | | | | | | |
| | | | | | 77 | | | | | | |
| | | | | | 78 | | | | | | |
| | | | | | 79 | | | | | | |
| | | | | | 80 | | | | | | |
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| | | | | | 93 | | | | | | |
| | | | | | 94 | | | | | | |
| | | | | | 95 | | | | | | |

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Log of Boring **LB-8** Sheet 1 of 3

| | |
|---|---|
| Project: Hudson Yards - Terra Firma | Project No.: 170019112 |
| Location: West 30th St. from 10th to 11th Ave., Manhattan, NY | Elevation and Datum: Approx. 14.75 ft BPMD |
| Drilling Company: Warren George, Inc. | Date Started: 1/9/12 / Date Finished: 1/10/12 |
| Drilling Equipment: Truck-mounted Acker Soil Max | Completion Depth: 63 ft / Rock Depth: 39 ft |
| Size and Type of Bit: 3 7/8" Tricone Roller Bit | Number of Samples: Disturbed 8, Undisturbed 0, Core 5 |
| Casing Diameter (in): 3" and 4" Flush Joint Steel Pipe / Casing Depth (ft): 14 | Water Level (ft.): First - , Completion - , 24 HR. - |
| Casing Hammer: Donut / Weight (lbs): 300 / Drop (in): 30 | Drilling Foreman: Jacob Harris |
| Sampler: 2" O.D. Split Spoon/NX Core Barrel | Inspecting Engineer: Scott Garfield |
| Sampler Hammer: Donut / Weight (lbs): 140 / Drop (in): 30 | |

| Elev. (ft) | Building Code | Sample Description | Casng blws/ ft Coring min/ ft | Depth Scale | Sample Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|---|---|
| +14.8 | | 8 in. concrete slab | | 0 | | | | | | 1/6/12: Cleared of utilities to a depth of 4.5 ft via air knife and probing with a 0.5 in. diameter rod. No obstructions were encountered. |
| +14.1 | Class 7 | | PUSH | 1–4 | | HA | | | | 1/9/12: Cleared of utilities to a depth of 8 ft using water rotary drilling with no down pressure. No obstructions were encountered. |
| | | | | 5–7 | | WATERROTARY | | | | Advanced 4 in. casing to 8 ft. |
| | | | +100 | 7 | | | | | | |
| | | | 25 | 8 | | | | | | |
| | | Black and white GRAVEL [FILL] (moist) | | 9–10 | S-1 | SS | 3 | 30, 3, 2, 2 | 5 | Sampled S-1 at 11:08 AM. Advanced 4 in. casing to 9 ft. |
| | | Brown fine SAND, trace silt, trace gravel [FILL] (moist) | +100 | 11–12 | S-2 | SS | 17 | 2, 2, 3, 6 | 5 | Sampled S-2 at 11:37 AM. |
| +1.8 | Class 3a | Reddish brown m-f SAND, trace silt, trace gravel [SP] dense (moist) | | 13–14 | S-3 | SS | 16 | 21, 18, 16, 12 | 34 | Sampled S-3 at 11:41 AM. Advanced 4 in. casing to 14 ft. |
| | | Reddish brown silty SAND, trace gravel [SM] medium dense (moist) | | 15–16 | S-4 | SS | 11 | 6, 8, 8, 11 | 16 | Sampled S-4. |
| | Class 3b | | | 17–20 | | | | | | |

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Log of Boring **LB-8** Sheet 2 of 3

| Project | Project No. |
|---|---|
| Hudson Yards - Terra Firma | 170019112 |
| **Location** | **Elevation and Datum** |
| West 30th St. from 10th to 11th Ave., Manhattan, NY | Approx. 14.75 ft BPMD |

| Elev. (ft) | Building Code | Sample Description | Casng blws/ ft Coring min/ ft | Depth Scale | Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|---|---|
| | Class 3b | Reddish brown medium SAND, trace silt, trace gravel [SP] medium dense (wet) | | 20–22 | S-5 | SS | 12 | 7, 7, 10, 11 | 17 | Sampled S-5. -#200 = 5% |
| -8.8 | | | | | | | | | | |
| | Class 5b | Brown sandy non-plastic SILT [ML] stiff (wet) | | 25–27 | S-6 | SS | 8 | 7, 5, 6, 9 | 11 | Sampled S-6. |
| | | Brown sandy non-plastic SILT [ML] very stiff (wet) | | 30–32 | S-7 | SS | 18 | 4, 7, 9, 11 | 16 | Sampled S-7. |
| -18.8 | | | | | | | | | | |
| | Class 3b | Reddish brown m-f SAND, some silt [SP] medium dense (wet) | | 35–37 | S-8 | SS | 24 | 5, 6, 18, 19 | 24 | Sampled S-8. -#200 = 25% Hard drilling from 37.5 ft to 39 ft. |
| | | | | 38 | | | | | | Advanced 3 in. casing to 39 ft. |
| -24.3 | Class 1b | Dark gray-black-white quartzofeldspathic, muscovite-biotite-garnet SCHIST, m-f grained, slightly to highly weathered, very close to moderate fracture spacing, fractures 0 to 15° from horizontal Fair quality | 4, 4, 4, 4, 4 | 39–43 | R-1 | NX | REC=50"/60" =83% | RQD=32"/60" =53% | | Sampled S-9 at 1:09 PM. Refusal with the split spoon sampler at 39 ft. Began coring R-1 at 1:55 PM. |
| -29.3 | Class 1d | Dark gray-black-white quartzofeldspathic, | 3 | 44–45 | R-2 | NX | | | | Began coring R-2 at 2:29 PM. |

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Log of Boring **LB-8** Sheet 3 of 3

| Project | Project No. |
|---|---|
| Hudson Yards - Terra Firma | 170019112 |
| **Location** | **Elevation and Datum** |
| West 30th St. from 10th to 11th Ave., Manhattan, NY | Approx. 14.75 ft BPMD |

| Elev. (ft) | Building Code | Sample Description | Casng blws/ ft Coring min/ ft | Depth Scale | Sample Data: Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|---|---|
| | Class 1d | muscovite-biotite-garnet SCHIST, m-f grained, slightly to highly weathered, very close to moderate fracture spacing, fractures 0 to 15° from horizontal<br>Very poor quality | 4, 6, 18 | 45–48 | R-2 | NX | REC=39"/60" =65% | RQD=8"/60" =13% | | |
| -34.3 | Class 1b | Dark gray-black-white quartzofeldspathic, muscovite-biotite-garnet SCHIST, m-f grained, slightly to highly weathered, very close to moderate fracture spacing, fractures 0 to 15° from horizontal<br>Fair quality | | 49–52 | R-3 | NX | REC=36"/48" =75% | RQD=29"/48" =60% | | Began coring R-3 at 10:00 AM on 1/10/12. |
| -38.3 | Class 1d | Dark gray-black-white quartzofeldspathic, muscovite-biotite-garnet SCHIST, m-f grained, slightly to highly weathered, very close to moderate fracture spacing, fractures 0 to 15° from horizontal<br>Poor quality | 5, 6, 5, 19, 15 | 53–57 | R-4 | NX | REC=42"/60" =70% | RQD=18"/60" =30% | | Began coring R-4 at 10:55 AM. |
| -43.3 | Class 1a | Dark gray-black-white quartzofeldspathic, muscovite-biotite-garnet SCHIST, m-f grained, slightly to highly weathered, very close to moderate fracture spacing, fractures 0 to 15° from horizontal<br>Excellent quality | 7, 5, 5, 4, 3 | 58–63 | R-5 | NX | REC=60"/60" =100% | RQD=60"/60" =100% | | Began coring R-5 at 12:00 PM. |
| -48.3 | | END OF BORING @ 63 FT | | 63–70 | | | | | | |

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Log of Boring **LB-9** Sheet 1 of 3

| | |
|---|---|
| Project: Hudson Yards - Terra Firma | Project No.: 170019112 |
| Location: West 30th St. from 10th to 11th Ave., Manhattan, NY | Elevation and Datum: Approx. 8.69 ft BPMD |
| Drilling Company: Warren George, Inc. | Date Started: 1/9/12 / Date Finished: 1/9/12 |
| Drilling Equipment: Truck-mounted Mobile 58 | Completion Depth: 49 ft / Rock Depth: 24 ft |
| Size and Type of Bit: 3 7/8" Tricone Roller Bit | Number of Samples: Disturbed 6, Undisturbed 0, Core 5 |
| Casing Diameter (in): 3" and 4" Flush Joint Steel Pipe / Casing Depth (ft): 19 | Water Level (ft.): First ▽ -, Completion ▼ -, 24 HR. ▼ - |
| Casing Hammer: Automatic / Weight (lbs): 300 / Drop (in): 30 | Drilling Foreman: Caesar |
| Sampler: 2" O.D. Split Spoon/NX Core Barrel | Inspecting Engineer: Pragnesh Shah |
| Sampler Hammer: Automatic / Weight (lbs): 140 / Drop (in): 30 | |

| Elev. (ft) | Building Code | Sample Description | Coring min/ft | Depth Scale | Sample Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|---|---|
| +8.7 | | | | 0 | | | | | | 12/30/11: Cleared of utilities to a depth of 5 ft via air knife and probing with a 0.5 inch diameter rod. No obstructions were encountered. |
| | | | | 1 | | | | | | |
| | | | | 2 | | | | | | |
| | | | PUSH | 3 | | HA | | | | 1/9/12: Cleared of utilities to a depth of 8 ft using water rotary drilling with no down pressure. No obstructions were encountered. |
| | | | | 4 | | | | | | |
| | | | | 5 | | | | | | Advanced 4 in. casing to 6 ft. |
| | | | | 6 | | | | | | |
| | | | PUSH | 7 | | WATERROTARY | | | | |
| | | Greenish black sandy SILT, trace gravel, trace wood [FILL] (wet) | | 8 | | | | | | Sampled S-1 at 10:41 AM. Advanced 4 in. casing to 9 ft. |
| | Class 7 | | | 9 | S-1 | SS | 7 | 3 4 2 1 | 6 | |
| | | Greenish black silty m-f SAND, trace gravel, some wood [FILL] (wet) | | 10 | | | | | | Sampled S-2 at 11:00 AM. |
| | | | PUSH | 11 | S-2 | SS | 16 | 3 5 5 5 | 10 | |
| | | Black silty m-f SAND, trace gravel, trace brick, trace wood [FILL] (wet) | | 12 | | | | | | Sampled S-3 at 11:04 AM. Advanced 4 in. casing to 14 ft. |
| | | | | 13 | S-3 | SS | 9 | 3 9 8 4 | 17 | |
| | | | | 14 | | | | | | |
| | | Black silty fine SAND, some wood [FILL] (wet) | | 15 | | | | | | Sampled S-4 at 11:30 AM. |
| | | | DRIVE | 16 | S-4 | SS | 4 | 2 1 1 1 | 2 | |
| | | Black silty SAND, trace gravel, some wood [FILL] (wet) | | 17 | | | | | | Sampled S-5 at 11:34 AM. -#200 = 48% |
| | | | | 18 | S-5 | SS | 12 | 8 7 7 7 | 14 | Advanced 4 in. casing to 19 ft. Difficult to drive. Wash contains timber fragments. |
| -9.8 | | | | | | | | | | |
| | Class 3b | Reddish brown silty fine SAND, trace gravel [SM] medium dense (moist) | | 19 | | | | | | Brown wash. |
| -11.1 | | | | 20 | | | | | | |

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Log of Boring **LB-9** Sheet 2 of 3

| Project | Project No. |
|---|---|
| Hudson Yards - Terra Firma | 170019112 |
| **Location** | **Elevation and Datum** |
| West 30th St. from 10th to 11th Ave., Manhattan, NY | Approx. 8.69 ft BPMD |

| Elev. (ft) | Building Code | Sample Description | Coring min/ft | Depth Scale | Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|---|---|
| | Class 5b | Reddish brown sandy non-plastic SILT, trace gravel [ML] stiff (moist) | | 20–22 | S-6 | SS | 10 | 5, 6, 6, 6 | 12 | Sampled S-6 at 12:23 PM. -#200 = 64% |
| | | | | 23 | | | | | | Hard drilling at 23 ft. Advanced 3 in. casing to 24 ft. |
| -15.3 | | | | 24 | | | | | | Began coring R-1 at 12:59 PM. |
| | Class 1a | Dark gray-black-white quartzofeldspathic, muscovite-biotite-garnet SCHIST, m-f grained, slightly weathered, moderate to wide fracture spacing, fractures 30° from horizontal Excellent quality | 3, 4, 4, 3, 3 | 25–29 | R-1 | NX | REC=59"/60" =98% | RQD=59"/60" =98% | | |
| | | Dark gray-black-white quartzofeldspathic, muscovite-biotite-garnet SCHIST, m-f grained, fresh, moderate to wide fracture spacing, fractures near horizontal Excellent quality | 3, 3, 4, 4, 4 | 29–34 | R-2 | NX | REC=57"/60" =95% | RQD=55"/60" =92% | | Began coring R-2 at 1:34 PM. |
| | | Dark gray-black-white quartzofeldspathic, muscovite-biotite-garnet SCHIST, m-f grained, fresh, moderate to wide fracture spacing, fractures near horizontal Excellent quality | 3, 4, 4, 5, 5 | 34–39 | R-3 | NX | REC=58"/60" =97% | RQD=56"/60" =93% | | Began coring R-3 at 2:07 PM. |
| | | Dark gray-black-white quartzofeldspathic, muscovite-biotite-garnet SCHIST, m-f grained, fresh, moderate to wide fracture spacing, fractures near horizontal Excellent quality | 5, 4, 4, 5, 5 | 39–44 | R-4 | NX | REC=60"/60" =100% | RQD=60"/60" =100% | | Began coring R-4 at 2:37 PM. |
| -35.3 | | 44-46 ft: White QUARTZITE, coarse grained, | 3 | 44–45 | R-5 | NX | | | | Began coring R-5 at 3:08 PM. |

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Log of Boring **LB-9** Sheet 3 of 3

| Project | Project No. |
|---|---|
| Hudson Yards - Terra Firma | 170019112 |
| **Location** | **Elevation and Datum** |
| West 30th St. from 10th to 11th Ave., Manhattan, NY | Approx. 8.69 ft BPMD |

| Material Symbol | Elev. (ft) | Building Code | Sample Description | Coring min/ft | Depth Scale | Sample Data: Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) 10 20 30 40 | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | fresh, moderate to wide fracture spacing, fractures 45° from horizontal | 3 | 45 | R-5 | NX | REC=56"/60" =93% | RQD=54"/60" =90% | | |
| | -37.3 | | | 4 | 46 | | | | | | |
| | | Class 1a | 46-49 ft: Dark gray-black-white quartzofeldspathic, muscovite-biotite-garnet SCHIST, m-f grained, fresh, moderate to wide fracture spacing, fractures 45° from horizontal Excellent quality | 3 | 47 | | | | | | |
| | | | | 3 | 48 | | | | | | |
| | -40.3 | | | | 49 | | | | | | |
| | | | END OF BORING AT 49 FT | | 50 | | | | | | |
| | | | | | 51 | | | | | | |
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| | | | | | 70 | | | | | | |

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# APPENDIX G
# 2008 Langan Boring Logs and Lab Testing

STATE OF NEW YORK
MARC G. GALLAGHER
081664-1
LICENSED PROFESSIONAL ENGINEER

11/7/12

# Boring Logs

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Log of Boring **EC-2-1** Sheet 1 of 2

| | | | |
|---|---|---|---|
| Project: Hudson Yards East Rail Yard (ERY) | | Project No.: 170019110 | |
| Location: Manhattan, N.Y. | | Elevation and Datum: Approx. 14.33 ft | |
| Drilling Agency: Aquifer Drilling & Testing, Inc. (ADT) | | Date Started: 8/4/08 | Date Finished: 8/5/08 |
| Drilling Equipment: CME-55 Track Mounted Drill Rig | | Completion Depth: 25 ft | Rock Depth: N/E |
| Size and Type of Bit: 6" I.D. Hollow Stem Auger | | Number of Samples: Disturbed 8 | Undisturbed - / Core - |
| Casing Diameter (in): N/A | Casing Depth (ft): N/A | Water Level (ft.): First ▽ 17 | Completion ▼ / 24 HR. ▼ |
| Casing Hammer: N/A | Weight (lbs): N/A / Drop (in): N/A | Drilling Foreman: Chris Stratton | |
| Sampler: 2" O.D. Split Spoon | | Inspecting Engineer: Steve Nascimento | |
| Sampler Hammer: Automatic | Weight (lbs): 140 / Drop (in): 30 | | |

| Elev. (ft) | Sample Description | Depth Scale | Sample Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|
| +14.3 | | 0 | | | | | | |
| +13.8 | CONCRETE (sidewalk) | | | | | | | Utility clearance, soft dig to 10' depth on 7/28-7/29/08 |
| | Soil sample collected at 3.0'-4.0'<br>FILL (dry)<br>Dark brown m-c SAND, trace fine sand, trace fine gravel | 1<br>2<br>3<br>4<br>5<br>6 | | | | | | Traces of brick and concrete fragments<br>Environmental soil sample EC-2-1-3.0-4.0 |
| +7.3 | | 7 | | | | | | |
| | FILL (dry)<br>Dark brown f-c SAND, trace fine sand | 8<br>9 | | | | | | |
| +4.3 | | 10 | | | | | | |
| | FILL (moist)<br>Brown m-c SAND, trace fine gravel, trace silt | 11<br>12 | S-1 | SS | 14.4 | 3 4 4 5 | 8 | Traces of brick fragments |
| | FILL (moist)<br>Brown m-c SAND, trace silt, trace fine gravel | 13 | S-2 | SS | 3.6 | 20 3 2 2 | 5 | Traces of brick fragments |
| +0.3 | | 14 | | | | | | Environmental soil sample EC-2-1-14.0-16.0 |
| | FILL (moist)<br>Brown m-c SAND, some f-c gravel, trace silt | 15<br>16 | S-3 | SS | 3.6 | 3 1 0 1 | 1 | Traces of brick fragments |
| | FILL (wet)<br>Brown m-c SAND, trace to some f-c gravel, occasional small cobbles | 17<br>18 | S-4 | SS | 2.4 | 1 2 4 7 | 6 | Traces of brick fragments |
| | FILL (wet)<br>Brown f-m SAND, some fine gravel, trace silt | 19<br>20 | S-5 | SS | 7.2 | 1 1 1 1 | 2 | Traces of brick fragments |
| -5.7 | | | | | | | | |

PID Reading (ppm): 0

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Log of Boring **EC-2-1** Sheet 2 of 2

| Project | Project No. |
|---|---|
| Hudson Yards East Rail Yard (ERY) | 170019110 |
| **Location** | **Elevation and Datum** |
| Manhattan, N.Y. | Approx. 14.33 ft |

| Elev. (ft) | Sample Description | PID Reading (ppm) | Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|
| | FILL (wet)<br>Brown m-c SAND, trace fine sand<br>FILL (wet)<br>Brown f-m SAND, some coarse sand, trace silt | 0<br>0<br>0 | S-6 | SS | 24 | 3<br>3<br>2<br>3 | 5 | Traces of brick fragments |
| -8.2<br>-8.7 | Brown fine SAND, trace silt, trace medium sand (wet) | 0 | S-7 | SS | 24 | 1<br>1<br>1<br>1 | 2 | Environmental soil sample EC-2-1-23.0-24.0 |
| -9.7 | Brownish gray silty fine SAND, trace clay (wet) | | | | | | | |
| -10.7 | Gray CLAY, trace silt (wet) | 0 | S-8 | SS | 12 | 1<br>1 | | Traces of wood fragments |
| | End of boring at 25' | 0 | | | | | | Monitoring well constructed, screen between 15 and 25 ft bgs |

Depth Scale: 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45

N-Value scale: 10 20 30 40

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Log of Boring **EC2-10** Sheet 1 of 1

| | | | |
|---|---|---|---|
| Project: Hudson Yards East Rail Yard (ERY) | | Project No.: 170019110 | |
| Location: Manhattan, N.Y. | | Elevation and Datum: Approx. 15.5 ft | |
| Drilling Agency: Aquifer Drilling & Testing, Inc. (ADT) | | Date Started: 8/13/08 | Date Finished: 8/15/08 |
| Drilling Equipment: Vactron Soft Dig Excavation Equipment | | Completion Depth: 5 ft | Rock Depth: N/E |
| Size and Type of Bit: N/A | | Number of Samples: Disturbed 1 | Undisturbed - / Core - |
| Casing Diameter (in): N/A | Casing Depth (ft): N/A | Water Level (ft.): First N/E | Completion / 24 HR. |
| Casing Hammer: N/A | Weight (lbs): N/A / Drop (in): N/A | Drilling Foreman: Chris Iodice | |
| Sampler: Stainless Steel Auger | | Inspecting Engineer: Ed Zofchak | |
| Sampler Hammer: N/A | Weight (lbs): N/A / Drop (in): N/A | | |

| Elev. (ft) | Sample Description | PID Reading (ppm) | Depth Scale | Sample Data: Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|---|
| +15.5 | | | 0 | | | | | | |
| | FILL (dry to moist)<br>Dark brown f-m SAND, trace to some silt, trace f-m gravel | 0 | 1 | S-1 | HAND AUGER | | | | Two-electric cables in black PVC conduit at 1' to 1.5' depth |
| | | 0 | 2 | | | | | | Occasional small cobbles |
| | | 0 | 3 | | | | | | |
| | | 0 | 4 | | | | | | Environmental sample EC-2-10-4.0-5.0 |
| +10.5 | Concrete slab obstruction | 0 | 5 | | | | | | |
| +10.0 | ? ? ? ? | | | | | | | | Multiple attempts to complete utility soft dig in area free of dangerous obstructions was unsuccessful.<br>Large concrete slab encountered at all soft dig locations. Concrete was poured over several 13 KV electric cables lying between main transformer and water tunnel shaft to operate hoists, pumps and other electrically powered equipment |
| | | | 6 | | | | | | |
| | | | 7 | | | | | | |
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| | | | 20 | | | | | | |

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| | | | |
|---|---|---|---|
| Project | Hudson Yards East Rail Yard (ERY) | Project No. | 170019110 |
| Location | Manhattan, N.Y. | Elevation and Datum | Approx. 9.33 ft |
| Drilling Agency | Aquifer Drilling & Testing, Inc. (ADT) | Date Started / Date Finished | 8/12/08 / 8/14/08 |
| Drilling Equipment | CME-55 Track Mounted Drill Rig | Completion Depth / Rock Depth | 43 ft / 22.9 ft |
| Size and Type of Bit | 6" I.D. Hollow Stem Auger | Number of Samples | Disturbed 8; Undisturbed -; Core 5 |
| Casing Diameter (in) | 4" Steel Casing; Casing Depth (ft) 22.9 | Water Level (ft.) | First ∇ 8; Completion; 24 HR. |
| Casing Hammer | Automatic; Weight (lbs) 140; Drop (in) 30 | Drilling Foreman | Chris Stratton |
| Sampler | 2" O.D. Split Spoon | Inspecting Engineer | Steve Nascimento/Guru Ranganathan |
| Sampler Hammer | Automatic; Weight (lbs) 140; Drop (in) 30 | | |

| Elev. (ft) | Sample Description | Depth (ft) |
|---|---|---|
| +9.3 to +8.5 | CONCRETE PAVEMENT | 0 – 0.8 |
| +8.5 to +6.3 | FILL (dry to moist) Dark brown gray f-c SAND, trace to some silt, trace to some f-c gravel | 0.8 – 3 |
| +6.3 to -2.7 | FILL (moist to wet) Yellow brown m-f SAND, trace silt with occasional brick and stone fragments | 3 – 12 |
| | ∇ FILL (wet) Dark brown silty fine SAND with occasional brick fragments and cobbles | |
| -2.7 to -4.7 | Brown silty fine SAND, some clay (wet) | 12 – 14 |
| -4.7 to -8.7 | Brown sandy SILT (wet) | 14 – 18 |
| | Brown sandy SILT (wet) | |
| -8.7 | Brown f-m SAND, trace coarse sand, trace silt (wet) | 18 – 20 |

PID Reading (ppm): 0 at each foot from 1 to 19 ft.

| Depth (ft) | Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) |
|---|---|---|---|---|---|
| 8 – 10 | S-1 | SS | 4.8 | 4, 2, 1, 1 | 3 |
| 10 – 12 | S-2 | SS | 4.8 | 9, 11, 8, 4 | 19 |
| 12 – 14 | S-3 | SS | 14.4 | 6, 6, 6, 5 | 12 |
| 14 – 16 | S-4 | SS | 12 | 2, 1, 2, 3 | 3 |
| 16 – 18 | S-5 | SS | 24 | 6, 4, 6, 4 | 10 |
| 18 – 20 | S-6 | SS | 21.6 | 2, 4, 2, 3 | 6 |

**Remarks** (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)

- Utility clearance, soft dig to 8' depth completed on 8/ 6 /08
- 8" to 10" thick aggregate and wire mesh reinforced concrete
- Occasional bits of coal and slag, brick, wood, stone fragments
- Environmental sample EC-2-11-4.5-5.5
- Begin augering at 8' bgs on 8/12/08 at 0930 hrs.
- Environmental sample EC-2-11-8.0-10.0
- Traces of brick fragments observed between 8' and 12' bgs.
- Environmental sample EC-2-11-14.0-16.0

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Log of Boring **EC-2-11** Sheet 2 of 2

| Project | Project No. |
|---|---|
| Hudson Yards East Rail Yard (ERY) | 170019110 |
| **Location** | **Elevation and Datum** |
| Manhattan, N.Y. | Approx. 9.33 ft |

| Elev. (ft) | Sample Description | PID Reading (ppm) | Depth Scale | Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|---|
| | Brown Silty f. SAND (Wet) | 0 | 20 | | | | | | |
| | Brown silty fine SAND (wet) | 0 | 21 | S-7 | SS | 24 | 2, 3, 4, 6 | 7 | |
| | | 0 | 22 | S-8 | SS | 10.8 | 2, 100/0" | Refusal | |
| -13.6 | MICA SCHIST-Silver gray fine to medium grained moderate to poorly foliated, hard to medium hard, fresh to slightly weathered moderate fractured (.66' to 2') between 22.9' and 24.6', becoming closely fractured (.21'-.66'). Top .25' GNEISSIC SCHIST with moderate foliation (black) becoming light silver gray with muscovite the predominant mica mineral | | 23 | RUN 1 | NX CORE | REC=31"/49" =63% | RQD=28"/49" =57% | | Split spoon refusal at 22.9' bgs, decomposed mica schist bedrock encountered at 1110 hrs. |
| | MICA SCHIST-Gray silver fine grained moderate to locally poorly foliated, medium hard, slightly weathered and fresh, closely (.21' to .66') to locally very close (.06'-.21') fracturing becoming light gray fine grained quartz feldspar granofels between 28.2' and 30.5' (top of next run) with occasional schistose layers | | 27 | RUN 2 | NX CORE | REC=29"/42" =69% | RQD=14"/42" =33% | | Drive/spin 4" casing down to 23' depth and switched to NX core barrel |
| | MICA SCHIST-Dark gray/black and light gray, fine to medium grained, medium hard, moderate to well foliated; slight to occasional moderate weathering along fractures between 31' and 31.9' depth, other wise fresh fracture surfaces; closely (.21 to .66') fractured with localized very close (.06' to .21') and moderate (.66' to 2') fracturing, frequent thin discontinuous quartz feldspar lenses and stringers, often folded, thin bands at 30.5' to 30.7', 31.7' to 31.8' | | 31 | RUN 3 | NX CORE | REC=42"/44" =95% | RQD=28"/44" =63% | | |
| | MICA SCHIST-Dark gray/black and light gray/white, well foliated with locally poorly developed foliation where transitioning in orientation or gneissic composition; fine to medium grained, closely (.21' to .66') to moderate (.66 to 2') fractured, hard to moderately hard,continued discontiguous thin quartz feldspar lenses/layers frequently folded, thin granofels band between 36.3' and 36.6', 38.3' and 39' depth (vertical lithology extending into top of next run | | 35 | RUN 4 | NX CORE | REC=57"/60" =95% | RQD=54"/60" =90% | | |
| | MICA SCHIST-Black, silver blue gray fine to medium grained, moderate to well foliated, fresh to occasionally slight weathering along fractures, close (.21' to .60') to moderately (.66' to 2' ) fractured, hard to moderately hard, continued frequent quartz feldspar bands/stringers to 39.9', increasing muscovite foliation at 40.5' | | 40 | RUN 5 | NX CORE | REC=41"/46" =90% | RQD=34"/46" =75% | | |
| -33.7 | End of boring at 43' | | 43 | | | | | | Monitoring well constructed, screen 6' to 16' bgs |
| | | | 45 | | | | | | |

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Log of Boring **EC-2-12** Sheet 1 of 2

| | | | |
|---|---|---|---|
| Project: Hudson Yards East Rail Yard (ERY) | | Project No.: 170019110 | |
| Location: Manhattan, N.Y. | | Elevation and Datum: Approx. 11.22 ft | |
| Drilling Agency: Aquifer Drilling & Testing, Inc. (ADT) | | Date Started: 8/18/08 | Date Finished: 8/19/08 |
| Drilling Equipment: CME-55 Track Mounted Drill Rig | | Completion Depth: 39.2 ft | Rock Depth: 26.3 ft |
| Size and Type of Bit: 6" I.D. Hollow Stem Auger | | Number of Samples: Disturbed 11 | Undisturbed - / Core - |
| Casing Diameter (in): 4" Steel Casing | Casing Depth (ft): 26 | Water Level (ft.): First ▽ 10 | Completion ▼ / 24 HR. ▼ |
| Casing Hammer: Automatic | Weight (lbs): 140 / Drop (in): 30 | Drilling Foreman: Chris Stratton | |
| Sampler: 2" O.D. Split Spoon | | Inspecting Engineer: Steve Nascimento/Guru Ranganathan | |
| Sampler Hammer: Automatic | Weight (lbs): 140 / Drop (in): 30 | | |

| Elev. (ft) | Sample Description | PID Reading (ppm) | Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|
| +11.2 | CONCRETE PAVEMENT | | | | | | | Utility clearance, soft dig to 5' depth completed on 8/11/08<br>8" to 10" of aggregate and wire mesh reinforced concrete |
| +10.4 | FILL (dry)<br>Gray brown f-c SAND, trace silt, trace fine gravel with occasional cobbles and brick becoming | 0 | | | | | | |
| | FILL (dry to moist)<br>Brown f-c SAND, trace silt and gravel/small cobbles | 0 | | | | | | |
| | FILL (moist)<br>Brown m-c SAND, trace silt | 0 | S-1 | SS | 9.6 | 35 11 9 6 | 20 | Begin drilling at 5' bgs on 8/18/08 at 1235 hrs.<br>Environmental sample EC-2-12-4.5-5.0 |
| | FILL (moist)<br>Brown c-f SAND, trace to some f-c gravel, trace silt | 0 | S-2 | SS | 9.6 | 10 18 18 11 | 36 | Environmental sample EC-2-12-7.0-9.0<br>Possible cobbles and gravel |
| | FILL (wet)<br>Brown c-f SAND | 0 | S-3 | SS | 4.8 | 5 5 4 2 | 9 | |
| +0.2 | Brown sandy SILT (wet) | 0 | S-4 | SS | 12 | 4 3 3 3 | 6 | Trace brick fragments (possible fall in) |
| | Brown sandy SILT (moist) | 0 | S-5 | SS | 19.2 | 3 5 5 6 | 10 | Environmental sample EC-2-12-13.0-15.0 |
| | | 0 | S-6 | SS | 0 | 2 3 4 5 | 7 | No recovery from 15' to 17' |
| | Brown sandy SILT (wet) | 0 | S-7 | SS | 13.2 | 10 8 8 10 | 16 | |
| -7.2 | Brown silty fine SAND (wet) | 0 | S-8 | SS | 9.6 | 4 4 | 9 | |

Depth Scale: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20

N-Value scale: 10 20 30 40

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Log of Boring **EC-2-12** Sheet 2 of 2

| Project | Project No. |
|---|---|
| Hudson Yards East Rail Yard (ERY) | 170019110 |
| **Location** | **Elevation and Datum** |
| Manhattan, N.Y. | Approx. 11.22 ft |

| Elev. (ft) | Sample Description | PID Reading (ppm) | Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|
| | Brown silty fine SAND (wet) | 0 | S-8 | SS | 9.6 | 5 8 | 3 | |
| | Brown silty fine SAND becoming reddish brown m-c SAND, trace fine sand, trace silt (wet) | 0 0 0 | S-9 | SS | 12 | 4 10 17 13 | 27 | |
| -13.3 | Reddish brown silty m-f SAND, trace coarse sand becoming | 0 0 | S-10 | SS | 12 | 8 5 7 7 | 12 | |
| -15.1 | Red brown CLAY, trace silt (moist) | 0 0 | S-11 | SS | 8.4 | 5 8 100/4" | Refusal | Stop drilling for the day at1440 hours at 25' bgs. |
| | GRANOFELS-Light silver gray fine to medium grained. poorly foliated;fresh to slight weathering along fracture surfaces (light iron staining and weathered feldspar); close (.21 to .66 ft) to moderate (.66 to 2 ft) fractured; hard to medium hard | | RUN #1 | NX CORE | REC=51.6"/52" =100% | RQD=41.28"/52" =80% | | Start drilling at 0800, encountered bedrock at 26' bgs at 0815 hrs. Split spoon refusal at 26.3' depth Drive/spin 4" casing down to 26' depth and switch to NX core barrel |
| | GRANOFELS/GRANITIC GNEISS-Light gray white medium to fine grained; quartz-feldspar-with minor mica minerals; poorly foliated with occasional thin muscovite bands/layers; fresh to slight weathering (light spotty iron staining); close to moderate fracturing with high angle/vertical fractures between approx. 32.5 and 33.5 ft; hard to medium hard | | RUN #2 | NX CORE | REC=38.76"/43" =90% | RQD=27.84"/43" =64% | | |
| | GRANOFELS-Light gray white with black specks (biotite)-quartz-feldspar biotite (increasing in volume; fresh to slight weathering (light iron staining) along fracture surfaces; very close (.06 to .21 ft) to close (.21 to .66 ft) fracturing becoming MICA SCHIST at 36' depth, silver, blue gray; fine to medium grained; poor to well foliated closely (.21 to .66 ft) to moderately (.66 to 2 ft) fractured; fresh to occasional slight weathering along fracture surfaces, medium hard-quartz pegmatite at 39' depth | | RUN #3 | NX CORE | REC=60"/60" =100% | RQD=37.32"/60" =62% | | |
| -28.0 | End of boring at 39.2' | | | | | | | Monitoring well constructed, screen between 8 and 18 ft bgs |

Depth Scale: 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45

N-Value scale: 10 20 30 40

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Log of Boring **EC-2-13** Sheet 1 of 4

| | | | |
|---|---|---|---|
| Project | Hudson Yards East Rail Yard (ERY) | Project No. | 170019110 |
| Location | Manhattan, N.Y. | Elevation and Datum | Approx. 14.21 ft |
| Drilling Agency | Aquifer Drilling & Testing, Inc. (ADT) | Date Started / Date Finished | 8/26/08 / 8/29/08 |
| Drilling Equipment | CME-55 Track Mounted Drill Rig | Completion Depth / Rock Depth | 76.5 ft / 59.6 ft |
| Size and Type of Bit | 6" I.D. Hollow Stem Auger | Number of Samples: Disturbed / Undisturbed / Core | 20 / - / |
| Casing Diameter (in) / Casing Depth (ft) | 4" Steel Casing / 59.5 | Water Level (ft.): First / Completion / 24 HR. | 13 |
| Casing Hammer / Weight (lbs) / Drop (in) | Automatic / 140 / 30 | Drilling Foreman | Chris Stratton |
| Sampler | 2" O.D. Split Spoon | Inspecting Engineer | Steve Nascimento/Guru Ranganathan |
| Sampler Hammer / Weight (lbs) / Drop (in) | Automatic / 140 / 30 | | |

| Elev. (ft) | Sample Description | Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|
| +14.2 | | | | | | | |
| +13.7 | CONCRETE PAVEMENT | | | | | | Utility clearance, soft dig to 8' depth completed on 8/12/08 |
| +13.2 | F-m GRAVEL SUB BASE | | | | | | cobbles at bottom of soft dig excavation |
| | FILL (dry to moist)<br>Brown to gray f-c SAND, trace to some silt, trace to some f-c gravel, trace clay | | | | | | 6" thick concrete pavement. Occasional to frequent cobbles, brick. Occasional concrete, cinder bits or metals.<br>Environmental sample EC-2-13-4.0-5.0 |
| +6.2 | Brown SILT, trace f-c sand with small cobbles (dry) | S-1 | SS | 9 | 7 7 100/3" | | |
| +5.2 | Small BOULDER | | | | | Refusal | Refusal at 9.25 ' bgs, broken/fragmented pieces of rock in the sample<br>Heavy to moderate grinding |
| +4.2 | Sandy SILT with frequent cobbles | | | | | | |
| +2.2 | Brown sandy SILT | S-2 | SS | 24 | 5 5 4 3 | 9 | |
| +1.2 | | | | | | | |
| +0.7 | Gray black f-m SAND (moist to wet) | | | | | | |
| +0.2 | Brown SILT (moist) (stiff) | | | | | | |
| -0.3 | Gray black to brown sandy SILT (moist to wet) | S-3 | SS | 24 | 3 4 5 6 | 9 | Environmental sample EC-2-13-14.0-16.0 |
| | Brown SILT (moist) (stiff) | | | | | | |
| -1.8 | Brown sandy SILT (wet) (soft) | S-4 | SS | 12 | 5 5 5 7 | 10 | |
| | | S-5 | SS | 0 | 8 7 6 6 | 13 | No sample recovered from 18 to 20 ft depth |

PID Reading (ppm): 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, -, -

Depth Scale: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20

N-Value scale: 10 20 30 40

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Log of Boring **EC-2-13** Sheet 2 of 4

| Project | Project No. |
|---|---|
| Hudson Yards East Rail Yard (ERY) | 170019110 |
| **Location** | **Elevation and Datum** |
| Manhattan, N.Y. | Approx. 14.21 ft |

| Elev. (ft) | Sample Description | PID Reading (ppm) | Depth Scale | Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|---|
| -6.3 | Grayish brown sandy SILT (wet) | 0 | 20 | | | | | | |
| | Brown silty fine SAND (wet) | 0 | 21 | S-6 | SS | 12 | 1 1 1 1 | 2 | |
| -8.3 | | 0 | 22 | | | | | | |
| | Brown SILT, trace fine sand (wet) | 0 | 23 | S-7 | SS | 24 | 2 2 1 3 | 3 | |
| | | 0 | 24 | | | | | | |
| | | 0 | 25 | S-8 | SS | 24 | 2 2 2 2 | 4 | |
| -11.4 | | | | | | | | | |
| -11.8 | Reddish brown CLAY (moist) | 0 | 26 | | | | | | |
| | Reddish brown SILT, trace fine sand (moist to wet) | 0 | 27 | S-9 | SS | 24 | 4 4 5 4 | 9 | |
| | | 0 | 28 | | | | | | |
| | | 0 | 29 | S-10 | SS | 18 | 2 4 4 6 | 8 | |
| | | 0 | 30 | | | | | | |
| | Reddish brown SILT, some f-m sand (wet) | 0 | 31 | S-11 | SS | 21.6 | 2 2 3 3 | 5 | |
| | | 0 | 32 | | | | | | |
| | | 0 | 33 | S-12 | SS | 24 | 5 7 6 6 | 13 | |
| -19.3 | Reddish brown f-m sandy CLAY (wet) | | | | | | | | |
| | Reddish brown clayey f-c SAND (wet) | 0 | 34 | | | | | | |
| -20.8 | Reddish brown silty CLAY (moist to wet) | 0 | 35 | S-13 | SS | 24 | 7 7 9 8 | 16 | |
| | | 0 | 36 | | | | | | |
| | | 0 | 37 | S-14 | SS | 24 | 12 15 16 20 | 31 | |
| | | 0 | 38 | | | | | | |
| | | 0 | 39 | S-15 | SS | 24 | 7 8 14 13 | 22 | |
| | Sandy CLAY, some f-m gravel | 0 | 40 | | | | | | Pieces of rock/stone 1"-2" at 40' bgs |
| | | 0 | 41 | S-16 | SS | 18 | 8 12 13 22 | 25 | |
| -27.3 | | | | | | | | | |
| -27.8 | Reddish brown clayey m-c SAND (moist) | 0 | 42 | | | | | | |
| | Reddish brown silty f-c SAND, trace f-m gravel (wet) | | | | | | | | Pieces of rock/stone 1"-2" at 41.5' to 42' bgs |
| | | 0 | 43 | S-17 | SS | 18 | 10 10 12 13 | 22 | |
| -29.3 | | | | | | | | | |
| -29.8 | Reddish brown clayey m-c SAND, trace silt | 0 | 44 | | | | | | |
| | Reddish brown sandy CLAY (wet) | | | S-18 | SS | 12 | 4 4 | 11 | Pieces of rock/stone 1"-2" at 43.5' and 44.5' bgs |
| -30.8 | | | 45 | | | | | | |

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Log of Boring **EC-2-13** Sheet 3 of 4

| Project | Project No. |
|---|---|
| Hudson Yards East Rail Yard (ERY) | 170019110 |
| **Location** | **Elevation and Datum** |
| Manhattan, N.Y. | Approx. 14.21 ft |

| Elev. (ft) | Sample Description | PID Reading (ppm) | Depth Scale | Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|---|
| | Reddish brown silty f-m SAND, trace clay, trace coarse sand to fine gravel | 0 | 45 | S-18 | SS | 12 | 7 10 | 11 | |
| | Reddish brown silty f-c SAND, trace fine gravel (wet) | 0 | 46 | | | | 12 | | |
| | | 0 | 47 | S-19 | SS | 24 | 11 12 10 | 23 | Pieces of rock/stone 1/2" to 2" encountered intermittently throughout the interval between 44' and 53.5' bgs |
| | | 0 | 48 | | | | 7 | | |
| | Reddish brown f-c SAND, trace silt, trace fine gravel (wet) | 0 | 49 | S-20 | SS | 24 | 12 13 15 | 25 | |
| | | 0 | 50 | | | | | | |
| | | | 51 | | | | | | |
| | | | 52 | | | | | | |
| | | | 53 | | | | | | |
| -39.3 | | | 54 | | | | | | Auger refusal at 53.5' depth Drive/spin 4" casing down to 53.5' depth and switch to NX core barrel. Very poor recovery in decomposed bedrock with competent layers |
| | DECOMPOSED BEDROCK Black and white micaceous f-m SAND, trace to some c-f gravel with occasional small cobbles | | 55 | | | | | | |
| | | | 56 | | | | | | |
| | | | 57 | | | | | | |
| | | | 58 | | | | | | |
| | | | 59 | | | | | | |
| -45.4 | | | 60 | | | | | | Switch to 3 7/8" roller bit and drill down to 59.5' depth; competent bedrock encountered; advance casing to 59.5' depth and resume coring |
| | MICA SCHIST-Silver gray, black fine to medium grained; moderately well to well foliated; fresh to slight weathering along majority of fracture surfaces with thin isolated,moderate to deep weather layer between 62.4' and 62.5' depth; patchy iron staining and mineral alteration on fracture surfaces; close (.21' to .66') to moderate (.66' to 2') fracturing; moderately hard. GRANOFELS layers (quartz-feldspar with minor mica minerals) between 62.3' and 62.7' | | 61 | RUN #1 | NX CORE | REC=49.92"/66" =76% | RQD=43.44"/66" =66% | | |
| | | | 62 | | | | | | |
| | | | 63 | | | | | | |
| | | | 64 | | | | | | |
| | | | 65 | | | | | | |
| | MICA SCHIST-Gray black fine to medium grained, well fractured schist interlayered with .1' to .4' thick layers of quartz-feldspar (biotite) granitic gneiss/granofels; fractures predominantly mechanical occurring along/through schist/mica mineral layers/lenses; moderate (.66' to 2') to close (.21' to .66') fractures; fracture surfaces fresh with minor mineral alteration (feldspar to clay) moderately hard to hard | | 66 | | | | | | |
| | | | 67 | RUN #2 | NX CORE | REC=42.24"/54" =78% | RQD=41.88"/54" =78% | | |
| | | | 68 | | | | | | |
| | | | 69 | | | | | | |
| | | | 70 | | | | | | |

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Log of Boring **EC-2-13** Sheet 4 of 4

| Project | Project No. |
|---|---|
| Hudson Yards East Rail Yard (ERY) | 170019110 |
| **Location** | **Elevation and Datum** |
| Manhattan, N.Y. | Approx. 14.21 ft |

| MATERIAL SYMBOL | Elev. (ft) | Sample Description | PID Reading (ppm) | Depth Scale | Sample Data: Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) 10 20 30 40 | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | MICA SCHIST-Gray/white black fine to medium grained well to locally poorly foliated; very close (.06' to .21") to closely (.21' to .66") fractured, with soft crumbly rubble zones at 69.7', 70.1' to 70.3' and 71.9' occuring along mica rich/concentrated layers, fresh to slightly weathered along fracture surfaces; including rubble zones, except at 71.9' where upper .06' is brown gray in color, medium to moderately hard | | 70 71 72 73 74 75 76 | RUN #3 | NX CORE | REC=29.52"/83" =36% | RQD=23.76"/83" =29% | | |
| | -62.3 | End of boring at 76.5' | | 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 | | | | | | Monitoring well constructed, screen between 11 and 21 ft bgs |

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Log of Boring **EC-2-14** Sheet 1 of 1

| | | | |
|---|---|---|---|
| Project: Hudson Yards East Rail Yard (ERY) | | Project No.: 170019110 | |
| Location: Manhattan, N.Y. | | Elevation and Datum: Approx. 9.18 ft | |
| Drilling Agency: Aquifer Drilling & Testing, Inc. (ADT) | | Date Started: 8/11/08 | Date Finished: 8/11/08 |
| Drilling Equipment: CME-55 Track Mounted Drill Rig | | Completion Depth: 21.5 ft | Rock Depth: 21.5 ft |
| Size and Type of Bit: 6" I.D. Hollow Stem Auger | | Number of Samples: Disturbed 7 | Undisturbed - / Core - |
| Casing Diameter (in): N/A | Casing Depth (ft): N/A | Water Level (ft.): First ▽ 12 | Completion ▼ / 24 HR. ▼ |
| Casing Hammer: N/A | Weight (lbs): N/A / Drop (in): N/A | Drilling Foreman: Chris Stratton | |
| Sampler: 2" O.D. Split Spoon | | Inspecting Engineer: Steve Nascimento | |
| Sampler Hammer: Automatic | Weight (lbs): 140 / Drop (in): 30 | | |

| Elev. (ft) | Sample Description | Depth Scale | Sample Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|
| +9.2 | | 0 | | | | | | |
| +8.7 | BROKEN ASPHALT PAVEMENT (3"-4") | | | | | | | Utility clearance, soft dig 10' depth completed on 8/4/08 |
| +8.2 | GRAVEL BASE (4"-6") | 1 | | | | | | |
| | FILL (dry)<br>Gray m-f SAND with m-c gravel, occasional brick, large cobbles and small boulders | 2, 3, 4, 5, 6, 7 | | | | | | Environmental sample EC-2-14-4.0-5.0<br>Less cobbles and boulders below 4.5' to 5' depth |
| | FILL (moist)<br>Brown f-m SAND with occasional cobbles, trace silt | 8, 9 | S-1 | SS | 9.6 | 8 3 3 3 | 6 | Begin augering on 8/11/08 at 0900 hrs from 8' bgs.<br>Traces of brick fragments observed between 8' and 10' bgs. |
| -0.8 | FILL (moist to wet)<br>Greenish grey silty fine SAND, trace medium sand, trace brick, occasional cobbles | 10, 11 | S-2 | SS | 24 | 3 3 2 3 | 5 | Environmental sample EC-2-14-10.0-12.0 |
| -2.8 | FILL (wet)<br>Brown silty fine SAND, some clay (wet) | 12, 13 | S-3 | SS | 21.6 | 2 1 2 2 | 3 | |
| -4.8 | FILL (wet)<br>Dark gray fine SAND, some silt, trace medium sand, trace brick fragments | 14, 15 | S-4 | SS | 9.6 | 1 6 5 5 | 11 | Traces of brick fragments observed between 14' and 16' bgs. |
| | FILL (wet)<br>Black silty f-m SAND, some cinders, trace glass and brick | 16, 17 | S-5 | SS | 12 | 8 7 7 9 | 14 | Traces of glass, brick fragments and some cinders were observed between 16' and 18' bgs. |
| | | 18, 19 | S-6 | SS | 15.6 | 10 10 12 7 | 22 | Environmental sample EC-2-14-19.0-21.0<br>Split spoon refusal encountered at 21.5' at 1010 hrs. Bedrock appeared to be mica schist formation. |
| -10.8 | Brown silty fine SAND with occasional cobbles (wet) | 20, 21 | S-7 | SS | 14.4 | 5 7 50 100/0" | 57 | Monitoring well constructed, screen between 9 and 19 ft bgs |
| -12.3 | End of boring at 21.5' | 22 | | | | | | |

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Log of Boring **EC-2-2** Sheet 1 of 2

| | | | |
|---|---|---|---|
| Project: Hudson Yards East Rail Yard (ERY) | | Project No.: 170019110 | |
| Location: Manhattan, N.Y. | | Elevation and Datum: Approx. 11.31 ft | |
| Drilling Agency: Aquifer Drilling & Testing, Inc. (ADT) | | Date Started: 8/5/08 | Date Finished: 8/6/08 |
| Drilling Equipment: CME-55 Track Mounted Drill Rig | | Completion Depth: 22 ft | Rock Depth: N/E |
| Size and Type of Bit: 6" I.D. Hollow Stem Auger | | Number of Samples: Disturbed 7 | Undisturbed / Core |
| Casing Diameter (in): N/A | Casing Depth (ft): N/A | Water Level (ft.): First ▽ 13 | Completion ▼ / 24 HR. ▼ |
| Casing Hammer: N/A | Weight (lbs): N/A / Drop (in): N/A | Drilling Foreman: Chris Stratton | |
| Sampler: 2" O.D. Split Spoon | | Inspecting Engineer: Steve Nascimento | |
| Sampler Hammer: Automatic | Weight (lbs): 140 / Drop (in): 30 | | |

| Elev. (ft) | Sample Description | Depth Scale | Sample Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|
| +11.3 | | 0 | | | | | | |
| +10.8 | CONCRETE (sidewalk) | | | | | | | |
| | FILL (dry to moist)<br>Dark brown to black m-c SAND, m-c gravel, with occasional cobbles, boulders, trace bricks, trace concrete fragments, trace metal pieces | 1<br>2<br>3<br>4<br>5<br>6<br>7 | | | | | | Begin jackhammering concrete sidewalk at 1945 hours on 7/29/08.<br>Utility clearance, soft dig to 8' depth completed on 7/29/08<br>Environmental soil sample EC-2-2-2.0-3.0 |
| +3.3 | FILL (moist)<br>Dark gray m-c SAND, brick fragments, trace concrete fragments, trace cinders | 8<br>9<br>10 | S-1 | SS | 4.8 | 4 4 5 2 | 9 | Soft dig<br>Refusal at 8.0' bgs.<br>Begin augering on 8/5/08 at 2135 hrs.<br>Environmental soil sample EC-2-2-10.0-12.0 |
| | | 11 | S-2 | SS | 4.8 | 3 2 2 4 | 4 | |
| -0.7 | Brown medium SAND, some fine sand, trace coarse sand and fine gravel (wet) ▽ | 12<br>13 | S-3 | SS | 12 | 4 5 4 3 | 9 | |
| | Brown f-m SAND, trace coarse sand, trace silt (wet) | 14<br>15 | S-4 | SS | 15.6 | 1 2 2 3 | 4 | |
| -4.7 | Dark gray CLAY, trace fine sand (wet) | 16<br>17 | S-5 | SS | 19.2 | 2 2 2 2 | 4 | Environmental soil sample EC-2-2-17.0-18.0 |
| | | 18<br>19<br>20 | S-6 | SS | 24 | 4 4 3 4 | 7 | |

PID Reading (ppm): 0

N-Value scale: 10 20 30 40

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Log of Boring **EC-2-2** Sheet 2 of 2

| Project | Project No. |
|---|---|
| Hudson Yards East Rail Yard (ERY) | 170019110 |
| **Location** | **Elevation and Datum** |
| Manhattan, N.Y. | Approx. 11.31 ft |

| Material Symbol | Elev. (ft) | Sample Description | PID Reading (ppm) | Depth Scale | Sample Data: Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Dark gray CLAY, trace fine sand (wet) | 0 | 20 | S-7 | SS | 21.6 | 2 | | |
| | | | 0 | 21 | | | | 9 10 | 19 | |
| | -10.2 | Brown silty fine SAND (wet) | | | | | | 9 | | |
| | -10.7 | End of boring at 22' | 0 | 22 | | | | | | |
| | | | | 23 | | | | | | Monitoring well constructed, screen between 11 and 21 ft bgs |
| | | | | 24 | | | | | | |
| | | | | 25 | | | | | | |
| | | | | 26 | | | | | | |
| | | | | 27 | | | | | | |
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| | | | | 30 | | | | | | |
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Log of Boring **EC-2-3** Sheet 1 of 2

| | | | |
|---|---|---|---|
| Project: Hudson Yards East Rail Yard (ERY) | | Project No.: 170019110 | |
| Location: Manhattan, N.Y. | | Elevation and Datum: Approx. 11.32 ft | |
| Drilling Agency: Aquifer Drilling & Testing, Inc. (ADT) | | Date Started: 8/6/08 | Date Finished: 8/7/08 |
| Drilling Equipment: CME-55 Track Mounted Drill Rig | | Completion Depth: 22 ft | Rock Depth: N/E |
| Size and Type of Bit: 6" I.D. Hollow Stem Auger | | Number of Samples: Disturbed 6 | Undisturbed / Core |
| Casing Diameter (in): N/A | Casing Depth (ft): N/A | Water Level (ft.): First ▽ 12 | Completion ▼ / 24 HR. ▼ |
| Casing Hammer: N/A | Weight (lbs): N/A / Drop (in): N/A | Drilling Foreman: Chris Stratton | |
| Sampler: 2" O.D. Split Spoon | | Inspecting Engineer: Steve Nascimento | |
| Sampler Hammer: Automatic | Weight (lbs): 140 / Drop (in): 30 | | |

| Elev. (ft) | Sample Description | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|
| +11.3 | | |
| +10.8 | CONCRETE (sidewalk) | Utility clearance, soft dig to 10' depth completed on 7/30/08 |
| | FILL (moist)<br>Brown clayey f-m SAND, trace t some f-c gravel, trace silt, frequent small to large cobbles, occasional small boulders | Begin jackhammering on concrete at 1940 hrs on 07/30/08.<br><br>Environmental sample EC-2-3-4.0-5.0 |
| +2.3 | FILL (moist)<br>Gray silty fine SAND<br><br>FILL (wet)<br>Brown f-m SAND, trace silt, trace cinders | Environmental sample EC-2-3-10.0-12.0<br>Begin augering at 2135 hrs on 8/6/08. |
| | FILL (wet)<br>Brown f-m SAND, trace silt, trace cinders | |
| -2.7 | Brown f-m SAND, some silt, occasional cobbles | |
| -4.7 | Brown medium SAND, some fine sand, trace silt (wet) | |
| | Brown fine silty SAND, trace medium sand (wet) | |
| -7.7 | Brown CLAY, trace silt (wet) | |

Sample Data

| Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) |
|---|---|---|---|---|
| S-1 | SS | 4.8 | 2 2 2 1 | 4 |
| S-2 | SS | 4.8 | 2 2 2 4 | 4 |
| S-3 | SS | 12 | 2 3 4 2 | 7 |
| S-4 | SS | 14.4 | 5 3 5 9 | 8 |
| S-5 | SS | 7.2 | 8 9 6 6 | 15 |

PID Reading (ppm): 0

Depth Scale: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20

N-Value (Blows/ft): 10 20 30 40

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Log of Boring **EC-2-3** Sheet 2 of 2

| Project | Project No. |
|---|---|
| Hudson Yards East Rail Yard (ERY) | 170019110 |
| **Location** | **Elevation and Datum** |
| Manhattan, N.Y. | Approx. 11.32 ft |

| MATERIAL SYMBOL | Elev. (ft) | Sample Description | PID Reading (ppm) | Depth Scale | Sample Data: Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) 10 20 30 40 | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Brown CLAY, trace silt (wet) | 0 | 20 | | | | 6 | | Environmental sample EC-2-3-20.0-22.0 |
| | | | 0 | 21 | S-6 | SS | 4.8 | 3 4 | 7 | |
| | -10.7 | | 0 | 22 | | | | 5 | | |
| | | End of boring at 22' | | 23 | | | | | | Monitoring well constructed, screen between 10 and 20 ft bgs |
| | | | | 24 | | | | | | |
| | | | | 25 | | | | | | |
| | | | | 26 | | | | | | |
| | | | | 27 | | | | | | |
| | | | | 28 | | | | | | |
| | | | | 29 | | | | | | |
| | | | | 30 | | | | | | |
| | | | | 31 | | | | | | |
| | | | | 32 | | | | | | |
| | | | | 33 | | | | | | |
| | | | | 34 | | | | | | |
| | | | | 35 | | | | | | |
| | | | | 36 | | | | | | |
| | | | | 37 | | | | | | |
| | | | | 38 | | | | | | |
| | | | | 39 | | | | | | |
| | | | | 40 | | | | | | |
| | | | | 41 | | | | | | |
| | | | | 42 | | | | | | |
| | | | | 43 | | | | | | |
| | | | | 44 | | | | | | |
| | | | | 45 | | | | | | |

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Log of Boring **EC-2-4** Sheet 1 of 1

| | | | |
|---|---|---|---|
| Project | Hudson Yards East Rail Yard (ERY) | Project No. | 170019110 |
| Location | Manhattan, N.Y. | Elevation and Datum | Approx. 12.13 ft |
| Drilling Agency | Aquifer Drilling & Testing, Inc. (ADT) | Date Started / Date Finished | 8/7/08 / 8/7/08 |
| Drilling Equipment | CME-55 Track Mounted Drill Rig | Completion Depth / Rock Depth | 18 ft / N/E |
| Size and Type of Bit | 6" I.D. Hollow Stem Auger | Number of Samples: Disturbed / Undisturbed / Core | 4 / / |
| Casing Diameter (in) / Casing Depth (ft) | N/A / N/A | Water Level (ft.): First / Completion / 24 HR. | 11 / / |
| Casing Hammer / Weight (lbs) / Drop (in) | N/A / N/A / N/A | Drilling Foreman | Chris Stratton |
| Sampler | 2" O.D. Split Spoon | Inspecting Engineer | Steve Nascimento |
| Sampler Hammer / Weight (lbs) / Drop (in) | Automatic / 140 / 30 | | |

| Elev. (ft) | Sample Description | PID Reading (ppm) | Depth Scale | Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|---|
| +12.1 | | | 0 | | | | | | |
| +11.6 | CONCRETE (sidewalk) | | | | | | | | Utility clearance, soft dig to 10' depth completed on 7/30/08 |
| | FILL (moist)<br>Brown fine SAND, some silt, some medium sand, some coarse gravel with frequent cobbles | 0 | 1 | | | | | | |
| | | 0 | 2 | | | | | | Cobbles composed mica schist |
| | | 0 | 3 | | | | | | |
| | | 0 | 4 | | | | | | Environmental sample EC-2-4-4.0-5.0 |
| | | 0 | 5 | | | | | | |
| | | 0 | 6 | | | | | | |
| | | 0 | 7 | | | | | | |
| | | 0 | 8 | | | | | | |
| | | 0 | 9 | | | | | | |
| +2.1 | | 0 | 10 | | | | | | Begin augering 2100 hrs on 8/7/08. |
| | FILL (moist to wet)<br>Brown silty fine SAND, trace medium sand, trace m-c gravel | 0 | 11 | S-1 | SS | 21.6 | 1 1 2 2 | 3 | Environmental sample EC-2-4-10.0-12.0 |
| | | 0 | 12 | | | | | | |
| | FILL (wet)<br>Brown f-c SAND, some silt, some cinders | 0 | 13 | S-2 | SS | 6 | 2 1 2 3 | 3 | |
| -2.4 | | 0 | 14 | | | | | | |
| | Gray silty CLAY, trace fine sand, trace peat (wet) | 0 | 15 | S-3 | SS | 18 | 1 1 1 1 | 2 | Environmental sample EC-2-4-15.0-16.0 |
| -4.3 | | 0 | 16 | | | | | | Slight organic odor from 15'-18' bgs. |
| | Gray brown silty fine SAND, trace clay, trace peat (wet) | 0 | 17 | S-4 | SS | 20.4 | 6 7 6 8 | 13 | Monitoring well constructed, screen between 8 and 18 ft bgs |
| -5.9 | | 0 | 18 | | | | | | |
| | End of boring at 18' | | 19 | | | | | | |
| | | | 20 | | | | | | |

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Log of Boring **EC-2-5** Sheet 1 of 1

| | | | |
|---|---|---|---|
| Project: Hudson Yards East Rail Yard (ERY) | | Project No.: 170019110 | |
| Location: Manhattan, N.Y. | | Elevation and Datum: Approx. 12.8 ft | |
| Drilling Agency: Aquifer Drilling & Testing, Inc. (ADT) | | Date Started: 8/7/08 | Date Finished: 8/8/08 |
| Drilling Equipment: CME-55 Track Mounted Drill Rig | | Completion Depth: 20 ft | Rock Depth: N/E |
| Size and Type of Bit: 6" I.D. Hollow Stem Auger | | Number of Samples: Disturbed 5 | Undisturbed / Core |
| Casing Diameter (in): N/A | Casing Depth (ft): N/A | Water Level (ft.): First ▽ 12 | Completion ▼ / 24 HR. ▼ |
| Casing Hammer: N/A | Weight (lbs): N/A / Drop (in): N/A | Drilling Foreman: Chris Stratton | |
| Sampler: 2" O.D. Split Spoon | | Inspecting Engineer: Steve Nascimento | |
| Sampler Hammer: Automatic | Weight (lbs): 140 / Drop (in): 30 | | |

| Elev. (ft) | Sample Description | Sample Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|
| +12.8 | | | | | | | |
| +12.3 | CONCRETE (sidewalk) | | | | | | Utility clearance, soft dig to 10 ' depth completed on 7/31/08 |
| | FILL (dry)<br>Brown fine SAND, trace to some silt, trace f-c gravel with occasional cobbles and small boulders | | | | | | Begin jackhammering a 2'x2' square on the sidewalk concrete on 7/31/08 at 2030 hrs.<br>Cobbles/boulders comprised of mica schist<br>Environmental sample EC-2-5-3.0-4.0 |
| | FILL (moist)<br>Brown f-m SAND, some silt, trace cinders with occasional cobbles | S-1 | SS | 9.6 | 10 14 8 8 | 22 | Environmental sample EC-2-5-10.0-12.0 |
| +0.8 | ▽ | | | | | | |
| | Brown silty fine SAND, some medium sand (wet) | S-2 | SS | 24 | 2 2 2 3 | 4 | |
| | Dark brown f-m SAND, some silt, trace fine gravel (wet) | S-3 | SS | 3.6 | 3 3 4 3 | 7 | |
| | Brown silty fine SAND, some medium sand, trace peat (wet) | S-4 | SS | 24 | 4 3 4 2 | 7 | Environmental sample EC-2-5-16.0-18.0 |
| -4.2 | Brown SILT, some fine sand (wet) | | | | | | |
| | Brown SILT, some fine sand (wet) | S-5 | SS | 21.6 | 3 3 3 4 | 6 | Slight organic odor between 18' and 20' depth |
| | Brown SILT, some fine sand (moist) | | | | | | Monitoring well constructed between 10 and 20 ft bgs |
| -7.2 | End of boring at 20' | | | | | | |

PID Reading (ppm): 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

Depth Scale: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22

N-Value (Blows/ft) scale: 10 20 30 40

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Log of Boring **EC-2-6** Sheet 1 of 1

| | | | |
|---|---|---|---|
| Project: Hudson Yards East Rail Yard (ERY) | | Project No.: 170019110 | |
| Location: Manhattan, N.Y. | | Elevation and Datum: Approx. 14.19 ft | |
| Drilling Agency: Aquifer Drilling & Testing, Inc. (ADT) | | Date Started: 8/8/08 | Date Finished: 8/8/08 |
| Drilling Equipment: CME-55 Track Mounted Drill Rig | | Completion Depth: 20 ft | Rock Depth: N/E |
| Size and Type of Bit: 6" I.D. Hollow Stem Auger | | Number of Samples: Disturbed 5 | Undisturbed / Core |
| Casing Diameter (in): N/A | Casing Depth (ft): N/A | Water Level (ft.): First ▽ 14 | Completion ▼ / 24 HR. ▼ |
| Casing Hammer: N/A | Weight (lbs): N/A / Drop (in): N/A | Drilling Foreman: Chris Stratton | |
| Sampler: 2" O.D. Split Spoon | | Inspecting Engineer: Steve Nascimento | |
| Sampler Hammer: Automatic | Weight (lbs): 140 / Drop (in): 30 | | |

| Elev. (ft) | Sample Description | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|
| +14.2 | | |
| +13.7 | CONCRETE (sidewalk) | Utility clearance, soft dig to 10' depth completed on 8/1/08 |
| | FILL (dry)<br>Brown f-m SAND with frequent cobbles and small boulders, trace brick fragments | Begin jackhammering concrete sidewalk at 2000 hrs on 8/1/08<br>Cobbles and boulders comprised of mica schist<br>Environmental sample EC-2-6-5.0-6.0 |
| +8.2 | Brown f-m SAND with frequent cobbles and small boulders (dry) | Cobbles and boulders comprised of mica schist |
| | Brown f-m SAND with frequent cobbles (dry) | |
| +4.2 | Brown f-m SAND, trace silt, trace coarse gravel, occasional cobbles (moist) | Begin augering at 0845 hrs on 8/8/08. |
| +2.2 | Brown clayey f-m SAND, trace peat (moist to wet) | Environmental sample EC-2-6-12.0-14.0 |
| +0.2 | Brown f-m SAND, trace silt, trace fine gravel (wet) | |
| -0.8 | Brown SILT, some fine sand (wet) | |
| | Brown SILT, some fine sand (moist to wet) | Monitoring well constructed, screen between 12 and 20 ft bgs |
| -5.8 | End of boring at 20' | |

| Sample Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) |
|---|---|---|---|---|
| S-1 | SS | 14.4 | 13 10 9 7 | 19 |
| S-2 | SS | 24 | 2 2 2 3 | 4 |
| S-3 | SS | 19.2 | 4 6 6 4 | 12 |
| S-4 | SS | 24 | 8 8 7 3 | 15 |
| S-5 | SS | 24 | 3 3 3 3 | 6 |

PID Reading (ppm): 0

Depth Scale: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22

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Log of Boring **EC-2-7** Sheet 1 of 2

| | | | |
|---|---|---|---|
| Project: Hudson Yards East Rail Yard (ERY) | | Project No.: 170019110 | |
| Location: Manhattan, N.Y. | | Elevation and Datum: Approx. 9.42 ft | |
| Drilling Agency: Aquifer Drilling & Testing, Inc. (ADT) | | Date Started: 8/14/08 | Date Finished: 8/15/08 |
| Drilling Equipment: CME-55 Track Mounted Drill Rig | | Completion Depth: 37.8 ft | Rock Depth: 23.5 ft |
| Size and Type of Bit: 6" I.D. Hollow Stem Auger | | Number of Samples: Disturbed 9; Undisturbed -; Core 3 | |
| Casing Diameter (in): 4" Steel Casing | Casing Depth (ft): 23.5 | Water Level (ft.): First ▽ 10; Completion ▼; 24 HR. ▼ | |
| Casing Hammer: Automatic; Weight (lbs): 140; Drop (in): 30 | | Drilling Foreman: Chris Stratton | |
| Sampler: 2" O.D. Split Spoon | | | |
| Sampler Hammer: Automatic; Weight (lbs): 140; Drop (in): 30 | | Inspecting Engineer: Steve Nascimento/Guru Ranganathan | |

| Elev. (ft) | Sample Description | PID Reading (ppm) | Depth Scale | Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|---|
| +9.4 | | | 0 | | | | | | |
| +9.1 | ASPHALT PAVEMENT (2"-3") | | | | | | | | Utility clearance, soft dig to 5' depth completed on 8/7/08. Occasional slag and cinders mixed with soil |
| +8.6 | GRAVEL BASE (4"-6") | | | | | | | | |
| | Brown gray/black c-f SAND, trace to some silt, trace to some fine gravel, occasional flat schist cobbles and brick | 0 | 1 | | | | | | |
| | | 0 | 2 | | | | | | |
| | | 0 | 3 | | | | | | |
| | Large piece of flat BLUESTONE CURBING | 0 | 4 | | | | | | Diabase curbing 6" to 8" thick. Jack hammer bouncing. Environmental sample EC-2-7-4.0-5.0. Begin augering on 8/14/2008 at 1405 hrs. |
| +4.4 | FILL (dry to moist) Black f-c SAND, trace fine gravel, some cinders, trace brick fragments | 0 | 5 | | | | | | |
| +3.4 | FILL (moist) Brown f-m SAND, trace fine gravel, trace brick fragments with frequent wood pieces/fragments | 0 | 6 | S-1 | SS | 12 | 6 / 10 / 3 / 2 | 13 | |
| | | 0 | 7 | S-2 | SS | 7.2 | 3 / 2 / 2 / 11 | 4 | Environmental sample EC-2-7-7.0-9.0 |
| | | 0 | 8 | | | | | | |
| | FILL f-m SAND, trace coarse sand to fine gravel, trace silt, trace brick and wood becoming f-m gravelly f-m SAND, trace silt ▽ | 0 | 9 | S-3 | SS | 2.4 | 2 / 20 / 12 / 4 | 32 | |
| | | 0 | 10 | | | | | | |
| -1.6 | Black organic silty fine sand, trace brick and wood fragments (wet) | 0 | 11 | S-4 | SS | 14.4 | 2 / 2 / 1 / 1 | 3 | Slight organic odor between 11' and 13' bgs. |
| | | 0 | 12 | | | | | | |
| | | - | 13 | S-5 | SS | 0 | 1 / 4 / 3 / 3 | 7 | No recovery between 13' and 15' bgs. |
| | | - | 14 | | | | | | |
| -5.6 | Brown sandy SILT (wet) | 0 | 15 | S-6 | SS | 15.6 | 3 / 2 / 3 / 4 | 5 | Environmental sample EC-2-7-15.0-17.0 |
| -6.6 | Dark gray medium SAND, trace to some m-c gravel, trace wood (wet) | 0 | 16 | | | | | | |
| -7.6 | Brown sandy SILT (Wet) | 0 | 17 | S-7 | SS | 24 | 5 / 5 / 5 / 6 | 10 | Brick fragment in spoon tip at 17' |
| | | 0 | 18 | | | | | | |
| -9.6 | Brown silty f-m SAND (wet) | 0 | 19 | S-8 | SS | 7.2 | 2 / 2 | 3 | |
| | | | 20 | | | | | | |

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Log of Boring **EC-2-7** Sheet 2 of 2

| Project | Project No. |
|---|---|
| Hudson Yards East Rail Yard (ERY) | 170019110 |
| **Location** | **Elevation and Datum** |
| Manhattan, N.Y. | Approx. 9.42 ft |

| Elev. (ft) | Sample Description | PID Reading (ppm) | Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|
| | Brown silty f-m SAND (wet) | 0 | S-8 | SS | 7.2 | 1, 2 | 3 | |
| -11.6 | | 0 | S-9 | SS | 14.4 | 3, 3, 4, 3 | 7 | Stop augering for the day at 1455 hrs. Begin augering for the day at 0815 hrs on 8/15/2008. |
| | Brown sandy SILT (wet) | 0 | | | | | | |
| -14.1 | | 0 | | | | | | Auger refusal on bedrock at 23.5'. Drive/spin 4" casing to 23.5' depth and switch to NX core barrel |
| | MICA SCHIST-Black and blue gray fine to medium grained; well to locally poorly foliated, fresh to slightly weathered with isolated moderate weathering; closely fractured (.21' to .66'); medium hard. Upper 1' to 1 1/2' of core is light tan, brown gray in color. Fractures following foliation. Narrow confined soft zone along isolated fractures; crushed rock at end of recovered core run | | RUN 1 | NX CORE | REC=39"/54" =72% | RQD=28"/54" =52% | | |
| | MICA SCHIST-Light gray and black (salt & pepper) fine to medium grained, poorly developed foliation. at 29.5' becoming SCHISTOSE GNEISS GRANOFELS. Light gray to silver gray, fine to medium grained, poorly developed foliation, hard to medium hard, fresh to slight weathering along fracture, closely (.21' to .66') to locally moderately (.66' to 2') fractured-light staining, brown discoloration along fractures. | | RUN 2 | NX CORE | REC=48"/58" =83% | RQD=40"/58" =69% | | |
| | MICA SCHIST-Dark gray/black and white, silver gray, fine to medium grained, well to locally poorly foliated, fresh to locally slightly weathered, hard to medium hard; moderate (.66' to 2') to closely fractured (.21' to .66') | | RUN 3 | NX CORE | REC=53"/60" =88% | RQD=50.5"/60" =84% | | |
| -28.4 | | | | | | | | |
| | End of boring at 37.8' | | | | | | | Monitoring well constructed, screen between 8 and 18 ft bgs |

Depth Scale: 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45

N-Value scale: 10 20 30 40

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Log of Boring **EC-2-8** Sheet 1 of 1

| | | | |
|---|---|---|---|
| Project: Hudson Yards East Rail Yard (ERY) | | Project No.: 170019110 | |
| Location: Manhattan, N.Y. | | Elevation and Datum: Approx. 10.98 ft | |
| Drilling Agency: Aquifer Drilling & Testing, Inc. (ADT) | | Date Started: 8/20/08 | Date Finished: 8/20/08 |
| Drilling Equipment: CME-55 Track Mounted Drill Rig | | Completion Depth: 18 ft | Rock Depth: N/E |
| Size and Type of Bit: 6" I.D. Hollow Stem Auger | | Number of Samples: Disturbed 7 | Undisturbed - / Core - |
| Casing Diameter (in): N/A | Casing Depth (ft): N/A | Water Level (ft.): First ▽ 10 | Completion ▼ / 24 HR. ▼ |
| Casing Hammer: N/A | Weight (lbs): N/A / Drop (in): N/A | Drilling Foreman: Chris Stratton | |
| Sampler: 2" O.D. Split Spoon | | Inspecting Engineer: Steve Nascimento/Guru Ranganathan | |
| Sampler Hammer: Automatic | Weight (lbs): 140 / Drop (in): 30 | | |

| Elev. (ft) | Sample Description | PID Reading (ppm) | Depth Scale | Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|---|
| +11.0 | | | 0 | | | | | | |
| +10.2 | CONCRETE PAVEMENT | | | | | | | | Utility clearance, soft dig to 5' depth completed on 8/8/08 |
| | FILL (dry to moist)<br>Brown gray f-c SAND, trace to some silt, trace to some f-c gravel mixed with concrete, brick ,wood, roofing material | 0 | 1 | | | | | | 8" to 10" of aggregate and wire mesh reinforced concrete |
| | | 0 | 2 | | | | | | Environmental sample EC-2-8-2.0-3.0 |
| | | 0 | 3 | | | | | | |
| | | 0 | 4 | | | | | | Concrete footing and brick foundation between 3' and 5' depth |
| | FILL (moist)<br>m-c SAND mixed with pieces/fragments of brick | 0 | 5 | S-1 | SS | 8.4 | 5 100 | | Begin augering on 8/20/08 at 0915 hrs. |
| +5.0 | | 0 | 6 | | | | | | Debris consists of crushed cinders and brick fragments up to 6' bgs and brick fragments between 6' and 12' bgs. |
| | DEMOLITION DEBRIS FILL (dry to moist0<br>Pieces and fragments of brick mixed with fine sand | 0 | 7 | | | | | | |
| | | 0 | 8 | S-2 | SS | 6 | 100 | | |
| | | 0 | 9 | S-3 | SS | 3.6 | 100 | | Split spoon refusal encountered throughout the interval between 5.5' and 12' bgs. |
| | ▽ | 0 | 10 | S-4 | SS | 4.8 | 9 100 | | Heavy grinding as augers advanced |
| | | 0 | 11 | | | | | | |
| -1.0 | FILL (wet)<br>Brown f-c SAND and brick fragment pieces, trace fine gravel | 0 | 12 | | | | | | Debris between 12' and 15' bgs consists predominantly of brick |
| | | 0 | 13 | S-5 | SS | 12 | 4 4 4 5 | 8 | |
| -3.0 | FILL (wet)<br>Brown m-c SAND and brick fragment pieces | 0 | 14 | | | | | | |
| -4.0 | Brown f-m silty SAND, trace weathered rock and sand to fine gravel (wet) | 0 | 15 | S-6 | SS | 16.8 | 4 6 5 6 | 11 | |
| -5.0 | Brown silty CLAY, trace fine sand (wet) | 0 | 16 | | | | | | Environmental sample EC-2-8-16.0-17.0 |
| | | 0 | 17 | S-7 | SS | 15 | 3 4 4 3 | 8 | |
| -7.0 | End of boring at 18' | 0 | 18 | | | | | | Monitoring well constructed, screen between 7.5 and 17.5 ft bgs |
| | | | 19 | | | | | | |
| | | | 20 | | | | | | |

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ENGINEERING & ENVIRONMENTAL SERVICES

Log of Boring **EC2-9** Sheet 1 of 3

| | | | |
|---|---|---|---|
| Project: Hudson Yards East Rail Yard (ERY) | | Project No.: 170019110 | |
| Location: Manhattan, N.Y. | | Elevation and Datum: Approx. 13.36 ft | |
| Drilling Agency: Aquifer Drilling & Testing, Inc. (ADT) | | Date Started: 8/22/08 | Date Finished: 8/23/08 |
| Drilling Equipment: CME-55 Track Mounted Drill Rig | | Completion Depth: 49.5 ft | Rock Depth: 33.7 ft |
| Size and Type of Bit: 6" I.D. Hollow Stem Auger | | Number of Samples: Disturbed 12 | Undisturbed - / Core 3 |
| Casing Diameter (in): 4" Steel Casing | Casing Depth (ft): 33.5 | Water Level (ft.): First ▽ 12 | Completion ▼ / 24 HR. ▼ |
| Casing Hammer: Automatic | Weight (lbs): 140 / Drop (in): 30 | Drilling Foreman: Chris Stratton | |
| Sampler: 2" O.D. Split Spoon | | Inspecting Engineer: Steve Nascimento/Guru Ranganathan | |
| Sampler Hammer: Automatic | Weight (lbs): 140 / Drop (in): 30 | | |

| Elev. (ft) | Sample Description | PID Reading (ppm) | Depth Scale | Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|---|
| +13.4 | | | 0 | | | | | | |
| +12.6 | CONCRETE PAVEMENT | | | | | | | | Utility clearance, soft dig to 10' depth completed on 8/11/08<br>8" to 10" of aggregate and wire mesh reinforced concrete |
| | FILL (dry to moist)<br>Dark brown fine SAND, trace to some silt with occasional brick fragments | 0 | 1 | | | | | | |
| | | 0 | 2 | | | | | | |
| | | 0 | 3 | | | | | | |
| | FILL (dry to moist)<br>Gray brown f-m SAND, trace silt | 0 | 4 | | | | | | Environmental sample EC-2-9-4.0-5.0 |
| | | 0 | 5 | | | | | | |
| | | 0 | 6 | | | | | | |
| | | 0 | 7 | | | | | | |
| | FILL (dry to moist)<br>orange yellow m-f SAND, trace silt | 0 | 8 | | | | | | Occasional oyster shells/shell fragments |
| | | 0 | 9 | | | | | | |
| | | 0 | 10 | | | | | | Begin augering from 10' bgs on 8/22/08 at 0820 hrs. |
| +2.4 | | 0 | 11 | S-1 | SS | 6 | 2 2 3 16 | 5 | Environmental sample EC-2-9-10.0-12.0 |
| +1.4 | Dark gray organic silty SAND, trace clay, some coarse gravel (moist) ▽ | | | | | | | | |
| | Dark brown sandy SILT, trace fine gravel (wet) | 0 | 12 | | | | | | |
| | | 0 | 13 | S-2 | SS | 4.8 | 3 5 2 1 | 7 | |
| -0.6 | | 0 | 14 | | | | | | |
| | Dark brown silty SAND, trace fine gravel (moist to wet) | 0 | 15 | S-3 | SS | 6 | 6 4 4 5 | 8 | |
| | Grayish brown silty SAND, trace fine gravel (wet) | 0 | 16 | | | | | | Environmental sample EC-2-9-16.0-18.0 |
| | Brown silty SAND, trace fine gravel (moist) | 0 | 17 | S-4 | SS | 24 | 5 5 7 6 | 12 | |
| -4.6 | | 0 | 18 | | | | | | |
| | Brown SILT (moist) | 0 | 19 | S-5 | SS | 19.2 | 3 3 4 4 | 7 | |
| | | | 20 | | | | | | |

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Log of Boring **EC2-9** Sheet 2 of 3

| Project | Project No. |
|---|---|
| Hudson Yards East Rail Yard (ERY) | 170019110 |
| **Location** | **Elevation and Datum** |
| Manhattan, N.Y. | Approx. 13.36 ft |

| Elev. (ft) | Sample Description | PID Reading (ppm) | Depth Scale | Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|---|
| | Brown SILT (moist) | 0, 0 | 20, 21 | S-6 | SS | 19.2 | 3, 3, 5, 7 | 8 | |
| | Brown SILT (wet) | 0, 0 | 22, 23 | S-7 | SS | 24 | 12, 14, 14, 12 | 28 | |
| | Grayish brown SILT (wet) | 0 | 24 | | | | | | |
| | Brown SILT (moist to wet) | 0 | 25 | S-8 | SS | 14.4 | 10, 9, 9, 8 | 18 | |
| | Grayish brown SILT (wet) | 0 | 26 | | | | | | Rock fragments of size 0.5" to 1" observed between 25' and 27.2' bgs. |
| -13.1 | | | | | | | | | |
| -13.6 | Brown sandy GRAVEL (wet) | | | | | | | | |
| | Grayish brown SILT (wet) | 0 | 27 | S-9 | SS | 14.4 | 10, 10, 7, 7 | 17 | |
| | | 0, 0 | 28, 29 | S-10 | SS | 12 | 5, 5, 4, 3 | 9 | |
| | Brown SILT, trace m-c sand (wet) | 0, 0 | 30, 31 | S-11 | SS | 14.4 | 7, 7, 8, 9 | 15 | Pebbles and rock fragments of size 0.25" to 2" observed between 30' and 32' bgs. |
| | Grayish brown SILT, trace f-m sand (wet) | 0, 0 | 32, 33 | S-12 | SS | 21 | 4, 4, 5 | 9 | |
| -20.3 | | | | | | | 100 | | Split spoon and auger refusal at 33.75' |
| | MICA SCHIST-Silver blue gray fine to medium grained well foliated, fresh to unweathered, closely fractured (.21 to .66) with very close fracturing (.06 to .21) between 35.3' and 35.5', hard to medium hard | | 34, 35, 36 | RUN 1 | NX CORE | REC=58"/66" =88% | RQD=53.5"/66" =81% | | |
| | GRANOFELS-Light gray/white fine to medium grained, poorly foliated between 38' and 39' depth | | 37, 38, 39 | | | | | | Drive/spin 4" casing down to 33.5' depth and switch to NX core barrel |
| | MICA SCHIST-Silver blue gray fine to medium grained, well foliated, hard to medium hard, moderate (.66' to 2') to widely (2' to 6') fractured with thin slightly weathered soft layers at approx. 42', 43', 43.5' depth | | 40, 41, 42, 43, 44, 45 | RUN 2 | NX CORE | REC=58"/60" =97% | RQD=54"/60" =90% | | |

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Log of Boring **EC2-9** Sheet 3 of 3

| Project | Project No. |
|---|---|
| Hudson Yards East Rail Yard (ERY) | 170019110 |
| **Location** | **Elevation and Datum** |
| Manhattan, N.Y. | Approx. 13.36 ft |

| MATERIAL SYMBOL | Elev. (ft) | Sample Description | PID Reading (ppm) | Depth Scale | Sample Data: Number | Type | Recov. (in) | Penetr. resist BL/6in | N-Value (Blows/ft) 10 20 30 40 | Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | MICA SCHIST-silver blue gray fine to medium grained, well foliated, hard to medium hard moderate (.66' to 2') to closely fractured<br>Picking up thin folded discontinuous quartz feldspar layers between 45.4'-47.7', thin slightly weathered soft zones at 44.5', 45.4', 47.8' depth | | 45 46 47 48 49 | RUN 3 | NX CORE | REC=57"/64" =90% | RQD=51"/64" =80% | | |
| | -36.1 | End of boring at 49.5' | | 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 | | | | | | Monitoring well constructed, screen between 10.5 and 20.5 ft bgs |

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# APPENDIX H
# Historic Borings by Others

STATE OF NEW YORK
MARC J. GALLAGHER
LICENSED PROFESSIONAL ENGINEER

11/7/12

Parsons Brinckerhoff Quade & Douglas, Inc.

# BORING LOG

BORING NUMBER: **CD-12**
SHEET NUMBER: **1** of **1**
PROJECT NUMBER: **26553A**

PROJECT: **No 7 Subway line Extension**
LOCATION: **Manhattan**
CLIENT: **MTA**
CONTRACTOR: **Jersey Boring & Drilling**
DRILLER: **M. Blejuwas**
INSPECTOR: **A. Zabala**
DRILLING METHOD: **Rotary Wash**
RIG TYPE: **CME 75**

LOCATION: **LIRR (West Side Yard)**
COORD. **N: 213,877.0** **E: 983,374.0**
STN. NO.: OFFSET:
SURFACE ELEV.: **108.0 feet**
DATUM:
START DATE: **5/27/03** TIME: **8:00 am**
FINISH DATE: **6/1/03** TIME: **4:00 pm**

| | Casing | Split Spoon | Shelby Tube | Piston | Grab | Core Barrel |
|---|---|---|---|---|---|---|
| Type/Symbol | HW | S | U | P | G | C |
| I.D. | 4" | 1.375" | 2.938" | 2.938" | | 2" |
| O.D. | 4.5" | 2" | 3" | 3" | | 3" |
| Length | | 24" | 24" | 24" | | |
| Hammer Wt. | 300 lbs | 140 lbs | Drill Rod Size | | NWJ | |
| Hammer Fall | 24" | 30" | I.D. (O.D.) | | 2.937" (2.938") | |

GROUNDWATER DATA

| Date | Time | Water Depth (ft) | Casing Depth (ft) | Hole Depth (ft) |
|---|---|---|---|---|
| 6/2/03 | 11:30 am | 5.4 | 25.0 | 120.0 |

| DEPTH (feet) | GRAPHIC LOG | CASING (Blows/ft) CORING (Min./ft) | SAMPLE TYPE | SAMPLE NUMBER | SAMPLE SYMBOL | SAMPLE DEPTH (feet) | SOIL (Blows/6 in.) 0/6 | 6/12 | 12/18 | 18/24 | REC. (in.) | CORING RUN (in.) | REC. (in.) | REC. % | L>4" (in.) | RQD % | Depth Elev. | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 0.0 - 6.0 | | Hand | | Auger | | | | | | | | Hand Augered Material:<br>0-0.5' - Concrete from street<br>0.5' to 2' - Dark brown, coarse to fine SAND, c-f Gravel, some organics, occasional cobbles<br>2' to 4.5' - Same as above<br>4.5' to 6' - Light brown, yellowish SAND (possibly from LIRR drain pipe trench) |
| 5 | | | S | 1 | | 6.0 - 8.0 | 2 | 5 | 3 | 2 | 14 | | | | | | | Light Brown, c-f SAND, some m-f Gravel, moist, loose. |
| 10 | | | S | 2 | | 10.0 - 12.0 | 2 | 1 | 1 | 2 | 10 | | | | | | | (a) 3" light brown c-f SAND, some m-f Gravel, moist loose.<br>(b) 7" Black, Clayey SILT, some m-f Sand, trace f gravel, soft organics. |
| 15 | | | S | 3 | | 15.0 - 17.0 | 8 | 11 | 6 | 7 | 13 | | | | | | | Light Brown, Clayey SILT, little m-f Sand, medium dense, moist. |
| 20 | | | S | 4 | | 20.0 - 22.0 | 9 | 11 | 16 | 14 | 14 | | | | | | | Brown, c-f SAND, little c-f gravel, trace clayey silt, medium dense, moist. |
| | | | | | | | | | | | | | | | | | 25.0 | Roller bit refusal and begin coring at 25'. |

BORING LOG NO_7NE.GPJ MAINLI-1.GLB 8/18/06

Parsons Brinckerhoff Quade & Douglas, Inc.

# CORING LOG

BORING NUMBER: **CD-12**
SHEET NUMBER: **1** of **4**
PROJECT NUMBER: **26553A**

PROJECT: **No 7 Subway line Extension**
LOCATION: **Manhattan**
CLIENT: **MTA**
CONTRACTOR: **Jersey Boring & Drilling**
DRILLER: **M. Blejuwas**
INSPECTOR: **A. Zabala**
DRILLING METHOD: **Diamond drilling with double core barrel**
RIG TYPE: **CME 75**

LOCATION: **LIRR (West Side Yard)**
COORD. **N: 213,877.0** **E: 983,374.0**
STN. NO.: OFFSET:
SURFACE ELEV.: **108.0 feet**
DATUM:
START DATE: **5/27/03** TIME: **8:00 am**
FINISH DATE: **6/1/03** TIME: **4:00 pm**

**CORE BARREL DATA:**
TYPE: NX
CORE SIZE: 2"
O.D.: 3"
I.D.: 2"
CASING SIZE: 4" (4.5")

**NOTES:**

GROUNDWATER DATA

| Date | Time | Water Depth (ft) | Casing Depth (ft) | Hole Depth (ft) |
|---|---|---|---|---|
| 6/2/03 | 11:30 am | 5.4 | 25.0 | 120.0 |

| DEPTH (feet) | CORING RATE (ft/min) | CORE RUN NO. AND DEPTH (ft) | RECOVERY (in) | RECOVERY (%) | RQD (%) | DESCRIPTION AND REMARKS (Lithology, Structure, Weathering, Continuity, Strength, Color, Grain Size)<br>* - Denotes discontinuity along foliation<br>MB - Denotes mechanical break | WEATHERING | STRENGTH | DISCONTINUITY DATA ANGLE (deg) | Jr | Ja | DEPTH (feet) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | C-1<br>25.0 - 29.5 | 54 | 100 | 87 | Gray Quartz, Feldspar, Biotite SCHIST, slightly weathered, sound to slightly fractured, moderate fracture spacing, strong rock, coarse to fine grained.<br>- Garnets 1/8" up to 3/16" throughout run<br>-Yellow rusted joints at 26.5' and 27.9'<br>-Decomposed rock at 27.9'<br>-Faster drilling rate at 26' to 27' | II | R4 | 30 | 1.5 | 2 | 25.2 |
| | | | | | | | | | 20 | 1.5 | 1.0 | 26.2 |
| | | | | | | | | | 0 | 1.5 | 1.0 | 26.25 |
| | | | | | | | | | 0 | 1.5 | 1.0 | 26.3 |
| | | | | | | | | | 30 | 1.5 | 1.0 | 26.5 |
| | | | | | | | | | $35_{MB}$ | - | - | 27.1 |
| 30 | | C-2<br>29.5 - 34.6 | 61 | 100 | 100 | Gray Quartz, Feldspar, Biotite SCHIST, slightly weathered, sound, wide fracture spacing, strong rock, c-f grained.<br>-Garnets 1/8" up to 3/16" present throughout the run.<br>-Yellowish rusted joint @ 34.1' and 33.2' | II | R4 | $*40_{MB}$ | - | - | 27.5 |
| | | | | | | | | | $35_{MB}$ | - | - | 27.8 |
| | | | | | | | | | *40 | 1.5 | 2 | 27.9 |
| | | | | | | | | | 35 | 1.5 | 2 | 27.95 |
| | | | | | | | | | $*40_{MB}$ | - | - | 28.4 |
| | | | | | | | | | $*40_{MB}$ | - | - | 28.9 |
| | | | | | | | | | $*45_{MB}$ | - | - | 29.1 |
| | | | | | | | | | $40_{MB}$ | - | - | 29.5 |
| | | | | | | | | | $40_{MB}$ | - | - | 31.8 |
| 35 | | C-3<br>34.6 - 44.2 | 115 | 100 | 100 | Gray Quartz, Feldspar, Biotite SCHIST, slightly weathered, sound moderate to fine fracture spacing, strong rock, coarse to fine grained.<br>-Wavy foliation at high angles<br>-Red-yellow stains at 37.6' and 38.3'<br>-Garnets up to 1/4" size<br>-High angle incipient hairline fracture, slightly weathered, cutting across joint at 40.4'<br>-Hornblende Biotite SCHIST from 44' to 44.2' | II | R4 | $30_{MB}$ | 1.5 | 1 | 33.2 |
| | | | | | | | | | 10 | 3 | 1 | 34.1 |
| | | | | | | | | | $30_{MB}$ | - | - | 34.6 |
| | | | | | | | | | $25_{MB}$ | - | - | 36.1 |
| | | | | | | | | | $35_{MB}$ | - | - | 36.4 |
| | | | | | | | | | 10 | 1.5 | 1.0 | 37.6 |
| | | | | | | | | | 5 | 1.5 | 1 | 38.3 |
| 40 | | | | | | | | | $15_{MB}$ | - | - | 39 |
| | | | | | | | | | 20 | 3 | 1 | 40.4 |
| | | | | | | | | | $0_{MB}$ | - | - | 41.5 |
| | | | | | | | | | 60 | 1.5 | 2 | 43.8 |
| 45 | | C-4<br>44.2 - 54.2 | 118 | 98 | 98 | 44.2'-48.1 light gray-white GRANITE, unweathered, sound, wide fracture spacing, very strong, medium to fine grained<br>-Some core lost near 44.2' (Hornblende Biotite Schist and top of Granite) | I | R5 | $30_{MB}$ | - | - | 44.2 |
| | | | | | | | | | $20_{MB}$ | - | - | 46 |
| | | | | | | | | | $35_{MB}$ | - | - | 47.3 |
| | | | | | | 48.1'-54.2' - Gray Quartz, Feldspar, Biotite SCHIST, wavy foliation, slightly weathered, slightly to sound fracture, moderate fracture spacing, strong rock, | II | R4 | $0_{MB}$ | - | - | 48.1 |
| | | | | | | | | | 10 | 1.5 | 1 | 49.4 |



NO. 7 CORING LOG NO_7NE.GPJ MAINLI~1.GLB 8/21/06

Parsons Brinckerhoff Quade & Douglas, Inc.

# CORING LOG
(continued)

BORING NUMBER: **CD-12**
SHEET NUMBER: **2** of **4**
PROJECT NUMBER: **26553A**

PROJECT: **No 7 Subway line Extension**
LOCATION: **Manhattan**
CLIENT: **MTA**

CONTRACTOR: **Jersey Boring & Drilling**
DRILLER: **M. Blejuwas**
INSPECTOR: **A. Zabala**

| DEPTH (feet) | CORING RATE (ft/min) | CORE RUN NO. AND DEPTH (ft) | RECOVERY (in) | RECOVERY (%) | RQD (%) | DESCRIPTION AND REMARKS (Lithology, Structure, Weathering, Continuity, Strength, Color, Grain Size) * - Denotes discontinuity along foliation MB - Denotes mechanical break | WEATHERING | STRENGTH | DISCONTINUITY DATA ANGLE (deg) | Jr | Ja | DEPTH (feet) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | coarse to fine grained<br>-At 54' light gray-white PEGMATITE<br>-High angle incipient fracture, slightly weathered cuts across joint 53.9' | | | 30MB<br>35MB<br>30MB<br>40MB | -<br>-<br>-<br>- | -<br>-<br>-<br>- | 49.6<br>49.9<br>51.8<br>52.5 |
| 55 | | C-5 54.2 - 63.9 | 116 | 100 | 100 | 54.2'-59.5' and 62.4'-63.2', light Gray-White GRANITE unweathered, sound, wide fracture spacing, very strong, medium to fine grained. | I | R5 | 50MB<br>45MB<br>0MB<br>0MB | 3<br>-<br>-<br>- | 1.0<br>-<br>-<br>- | 53.9<br>54.2<br>55.7<br>57.3 |
| 60 | | | | | | 59.5' to 62.4' - SCHIST intercalated with Granitic material<br>63.2' to 63.9' - Dark gray SCHISTOSE GNEISS<br>63.9' to 63.9 - Dark gray Hornblende Biotite SCHIST Unweathered, sound, wide fracture spacing, strong rock, coarse to fine grained, wavy foliation<br>-From 61.2' to 61.7' - High angle to vertical incipient fracture, slightly weathered and vuggy<br>-Trace Garnet (1/16" to 1/8") at 61.6' to 62.1' | I | R4 | 60MB<br>30MB<br>40MB<br>30MB<br>30MB<br>0<br>*50 | 3<br>-<br>-<br>-<br>-<br>-<br>3<br>1.5 | 1<br>-<br>-<br>-<br>-<br>-<br>1<br>2 | 58.8<br>59.1<br>59.7<br>61<br>62.1<br>62.6<br>63.4 |
| 65 | | C-6 63.9 - 73.9 | 120 | 100 | 100 | 63.9' to 68.3' - Dark gray Hornblende Biotite SCHIST, unweathered, sound, moderate to wide fracture, strong rock, coarse to fine grained | I | R4 | 35MB<br>20MB<br>25 | -<br>-<br>1.5 | -<br>-<br>2 | 63.9<br>64<br>67 |
| 70 | | | | | | 68.3' to 70' and 71.2' to 73.9' - Light gray GRANITE, slightly weathered, sound, wide fracture spacing, very strong rock, medium to fine grained<br>70' to 71.2' - Gray Mica SCHIST<br>-Rusted Joint @ 69.8' and 73.5'<br>-Occasional high angle to vertical healed hairline fractures | II | R5 | 40<br>20MB<br>20<br>30MB<br>0MB<br>40MB | 3<br>-<br>1.5<br>-<br>-<br>- | 2<br>-<br>1.0<br>-<br>-<br>- | 68.3<br>69<br>69.8<br>71.1<br>71.8<br>72.9 |
| 75 | | C-7 73.9 - 83.8 | 119 | 100 | 100 | 73.8' to 78.0' - Light gray-white GRANITE, unweathered, sound, wide fracture spacing, very strong, medium to fine grained. | I | R5 | 10<br>0MB<br>55MB<br>35MB | 1.5<br>-<br>-<br>- | 1<br>-<br>-<br>- | 73.5<br>73.9<br>74.8<br>75.5 |
| 80 | | | | | | 78.0' to 83.8' - Gray Mica SCHIST, slightly weathered, moderate fracture spacing, slightly fractured, strong rock, coarse to fine grained<br>-Some Garnets (1/32" to 3/16") | II | R4 | 30MB<br>20MB<br>25MB<br>*40MB<br>*45<br>10MB<br>25MB<br>*40<br>*40MB | -<br>-<br>-<br>-<br>3<br>-<br>-<br>1.5<br>- | -<br>-<br>-<br>-<br>2<br>-<br>-<br>2<br>- | 78.2<br>78.6<br>78.7<br>78.8<br>78.9<br>79.2<br>79.8<br>80.8<br>81.1 |
| | | | | | | Gray Mica SCHIST, (40 degree foliation), slightly weathered, slightly to sound fractures, moderate | II | R4 | 65<br>*40MB | 3.0<br>- | 1.0<br>- | 81.4<br>81.9 |



NO. 7 CORING LOG NO_7NE.GPJ MAINLI~1.GLB 8/21/06

Parsons Brinckerhoff Quade & Douglas, Inc.

# CORING LOG
(continued)

BORING NUMBER: **CD-12**

SHEET NUMBER: **3** of **4**

PROJECT NUMBER: **26553A**

PROJECT: **No 7 Subway line Extension**

LOCATION: **Manhattan**

CLIENT: **MTA**

CONTRACTOR: **Jersey Boring & Drilling**

DRILLER: **M. Blejuwas**

INSPECTOR: **A. Zabala**

| DEPTH (feet) | CORING RATE (ft/min) | CORE RUN NO. AND DEPTH (ft) | RECOVERY (in) | RECOVERY (%) | RQD (%) | DESCRIPTION AND REMARKS (Lithology, Structure, Weathering, Continuity, Strength, Color, Grain Size)<br>* - Denotes discontinuity along foliation<br>MB - Denotes mechanical break | WEATHERING | STRENGTH | DISCONTINUITY DATA ANGLE (deg) | Jr | Ja | DEPTH (feet) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | C-8 83.8 - 90.0 | 74 | 100 | 100 | fracture spacing, coarse to fine grained<br>-From 89.6' to 90' - Dark gray Hornblende Biotite SCHIST<br>-Red Garnets (1/16" to 3/16") along run | | | *35$_{MB}$ | - | - | 82.2 |
| | | | | | | | | | *40$_{MB}$ | - | - | 82.5 |
| | | | | | | | | | *40 | 1.5 | 1 | 83.1 |
| | | | | | | | | | *35$_{MB}$ | - | - | 83.6 |
| | | | | | | | | | *40$_{MB}$ | - | - | 83.8 |
| | | | | | | | | | *40$_{MB}$ | - | - | 85.5 |
| | | | | | | | | | *40$_{MB}$ | - | - | 85.9 |
| | | | | | | | | | *40$_{MB}$ | - | - | 86.2 |
| 90 | | | | | | | | | *40$_{MB}$ | - | - | 86.9 |
| | | C-9 90.0 - 99.0 | 108 | 100 | 87 | Gray SCHIST, wavy foliation, slightly weathered, slightly fractured, moderate fracture spacing, coarse to fine grained<br>-Friable from 93.1' to 93.3'<br>-Slickensides at 94.1'<br>-Garnets up to 7/16"<br>-From 96.7' to 98.2' and 98.6' to 98.8' rock appears to be sheared along foliation planes | II | R4 | *40 | 1 | 1 | 87.4 |
| | | | | | | | | | *40 | 1.5 | 1 | 87.9 |
| | | | | | | | | | *40$_{MB}$ | - | - | 88.2 |
| | | | | | | | | | *40 | 1.5 | 2 | 88.3 |
| | | | | | | | III | R1 | *40$_{MB}$ | - | - | 88.4 |
| | | | | | | | | | *40 | 1.5 | 1 | 89 |
| | | | | | | | | | *50 | 1 | 1 | 89.2 |
| 95 | | | | | | | | | *50$_{MB}$ | - | - | 89.6 |
| | | | | | | | | | *50$_{MB}$ | - | - | 89.7 |
| | | | | | | | | | *40$_{MB}$ | - | - | 90 |
| | | | | | | Extremely fractured, extremely close to close fracture spacing along foliations planes from 97.4' to 97.9' | | R3 | 0$_{MB}$ | - | - | 90.1 |
| | | | | | | | | | 0$_{MB}$ | - | - | 90.15 |
| | | | | | | | | | *25$_{MB}$ | - | - | 90.2 |
| | | | | | | | | | 0 | 1.5 | 1 | 90.7 |
| | | C-10 99.0 - 109.0 | 120 | 100 | 100 | Gray Mica SCHIST, slightly weathered, sound, wide fracture spacing, strong rock, coarse to fine grained<br>-Garnets within Schist up to 1/4" size | II | R4 | 0 | 1.5 | 1 | 90.8 |
| | | | | | | | | | *40$_{MB}$ | - | - | 91 |
| 100 | | | | | | | | | *40 | 1.5 | 1 | 91.2 |
| | | | | | | | | | 20$_{MB}$ | - | - | 92.1 |
| | | | | | | | | | *40 | 1.5 | 2 | 93.2 |
| | | | | | | EXCEPT 102' to 102.9', 104.7' to 106.7', and 108.3' to 109' - Light gray-white GRANITE, sound, slightly weathered, medium to fine grained<br><br>103.8' to 105' and 106.7' to 107.5' - Dark gray Hornblende Biotite GNEISS | II | R5 | *40 | 1.5 | 2 | 93.8 |
| | | | | | | | | | *40 | 1.5 | 4 | 93.9 |
| | | | | | | | | | *40 | 0.5 | 2 | 94.1 |
| | | | | | | | | | 10 | 3 | 2 | 94.4 |
| | | | | | | | | | 50 | 3 | 2 | 94.9 |
| 105 | | | | | | | | | 10$_{MB}$ | - | - | 95.5 |
| | | | | | | | | | 10$_{MB}$ | - | - | 95.6 |
| | | | | | | | | | 0$_{MB}$ | - | - | 95.7 |
| | | | | | | | | | 30$_{MB}$ | - | - | 96 |
| | | | | | | | | | 60$_{MB}$ | - | - | 96.1 |
| | | | | | | | | | 35$_{MB}$ | - | - | 96.2 |
| | | | | | | | | | 0 | 1.5 | 2 | 96.6 |
| | | C-11 109.0 - 119.0 | 120 | 100 | 97 | Light gray-white GRANITE, slightly weathered, sound, very strong, moderate to wide fracture spacing, medium to fine grained.<br>Except 109' to 109.4' and 112.8' to 114' - Gray Mica SCHIST | II | R5 | 40$_{MB}$ | - | - | 97.1 |
| 110 | | | | | | | | | 50 | 1.5 | 2 | 97.3 |
| | | | | | | | | | 75$_{MB}$ | - | - | 97.4 |
| | | | | | | | | | *45 | 1.5 | 4 | 97.5 |
| | | | | | | | | | *45 | 1.5 | 4 | 97.6 |
| | | | | | | | | | *45 | 1.5 | 4 | 97.7 |
| | | | | | | | | | *45 | 1.5 | 4 | 97.8 |
| | | | | | | | | | 50 | 1.5 | 4 | 97.9 |
| | | | | | | | | | 40 | 1.5 | 4 | 98.1 |
| 115 | | | | | | | | | 45 | 1.5 | 1 | 98.3 |
| | | | | | | | | | 40 | 1.5 | 4 | 98.6 |
| | | | | | | | | | 40 | 1.5 | 4 | 98.7 |
| | | | | | | | | | 0$_{MB}$ | - | - | 99 |
| | | | | | | | | | *45$_{MB}$ | - | - | 99.5 |
| | | | | | | | | | *40$_{MB}$ | - | - | 99.8 |
| | | | | | | | | | *40 | 1.5 | 1 | 100.1 |
| | | | | | | | | | *45 | 1.5 | 1 | 100.2 |
| | | | | | | Light gray-white GRANITE, slightly weathered, wide | II | R5 | 30 | 1.5 | 1 | 101.4 |



NO. 7 CORING LOG NO_7NE.GPJ MAINLI~1.GLB 8/21/06

Parsons Brinckerhoff Quade & Douglas, Inc.

# CORING LOG
(continued)

BORING NUMBER: **CD-12**

SHEET NUMBER: **4** of **4**

PROJECT NUMBER: **26553A**

PROJECT: **No 7 Subway line Extension**

LOCATION: **Manhattan**

CLIENT: **MTA**

CONTRACTOR: **Jersey Boring & Drilling**

DRILLER: **M. Blejuwas**

INSPECTOR: **A. Zabala**

| DEPTH (feet) | CORING RATE (ft/min) | CORE RUN NO. AND DEPTH (ft) | RECOVERY (in) | RECOVERY (%) | RQD (%) | DESCRIPTION AND REMARKS (Lithology, Structure, Weathering, Continuity, Strength, Color, Grain Size) * - Denotes discontinuity along foliation MB - Denotes mechanical break | WEATHERING | STRENGTH | DISCONTINUITY DATA ANGLE (deg) | Jr | Ja | DEPTH (feet) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | C-12 119.0 - 123.9 | 59 | 100 | 100 | fracture spacing, sound, very strong, medium to fine grained<br>Except 120.5' to 121.3' - Gray Mica SCHIST<br>-From 120.7' to 121' - possible micro-shears along foliation, extremely thin, extremely close to very close spacing | | | $55_{MB}$ | - | - | 102.1 |
| | | | | | | | | | $30_{MB}$ | - | - | 102.8 |
| | | | | | | | | | $20_{MB}$ | - | - | 102.9 |
| | | | | | | | | | $*35_{MB}$ | - | - | 103.1 |
| | | | | | | | | | $30_{MB}$ | - | - | 103.4 |
| | | | | | | | | | $*35_{MB}$ | - | - | 103.9 |
| | | | | | | E.O.B. at 123.9'. | | | $0_{MB}$ | - | - | 105.2 |
| | | | | | | | | | $0_{MB}$ | - | - | 106.5 |
| 125 | | | | | | | | | $0_{MB}$ | - | - | 108.1 |
| | | | | | | | | | $35_{MB}$ | - | - | 108.3 |
| | | | | | | | | | $50_{MB}$ | - | - | 108.9 |
| | | | | | | | | | $50_{MB}$ | - | - | 109 |
| | | | | | | | | | *40 | 3 | 1 | 109.1 |
| | | | | | | | | | *40 | 3 | 1 | 109.3 |
| | | | | | | | | | $15_{MB}$ | - | - | 109.8 |
| | | | | | | | | | 45 | 1.5 | 1 | 110.5 |
| 130 | | | | | | | | | $10_{MB}$ | - | - | 110.9 |
| | | | | | | | | | $0_{MB}$ | - | - | 111.2 |
| | | | | | | | | | $0\text{-}30_{MB}$ | - | - | 111.3 |
| | | | | | | | | | $25_{MB}$ | - | - | 111.5 |
| | | | | | | | | | $*45_{MB}$ | - | - | 112.9 |
| | | | | | | | | | $0_{MB}$ | - | - | 113.3 |
| | | | | | | | | | *50 | 1.5 | 1 | 114 |
| | | | | | | | | | $10_{MB}$ | - | - | 115.1 |
| 135 | | | | | | | | | $0\text{-}30_{MB}$ | - | - | 115.6 |
| | | | | | | | | | $10_{MB}$ | - | - | 115.9 |
| | | | | | | | | | $15_{MB}$ | - | - | 116.1 |
| | | | | | | | | | $0_{MB}$ | - | - | 117.5 |
| | | | | | | | | | $10_{MB}$ | - | - | 118.1 |
| | | | | | | | | | $40_{MB}$ | - | - | 118.9 |
| | | | | | | | | | $35_{MB}$ | - | - | 119 |
| | | | | | | | | | $50_{MB}$ | - | - | 119.5 |
| | | | | | | | | | $0_{MB}$ | - | - | 120.4 |
| 140 | | | | | | | | | *45 | 1.5 | 4 | 120.9 |
| | | | | | | | | | $*45_{MB}$ | - | - | 121 |
| | | | | | | | | | $35_{MB}$ | - | - | 121.3 |
| | | | | | | | | | $30_{MB}$ | - | - | 123 |
| | | | | | | | | | $30_{MB}$ | - | - | 123.6 |
| | | | | | | | | | $20_{MB}$ | - | - | 123.8 |
| | | | | | | | | | $20_{MB}$ | - | - | 123.9 |
| 145 | | | | | | | | | | | | |
| 150 | | | | | | | | | | | | |

Parsons Brinckerhoff Quade & Douglas, Inc.

# BORING LOG

BORING NUMBER: **FD-206w**

SHEET NUMBER: **1** of **1**

PROJECT NUMBER:

PROJECT: **No 7 Subway line Extension**
LOCATION: **Manhattan**
CLIENT: **MTA**
CONTRACTOR: **Jersey Boring & Drilling**

DRILLER: **C. Deighart**
INSPECTOR: **C. Burzynski**

DRILLING METHOD: **Rotary Wash**
RIG TYPE: **CME-55**

LOCATION: **DEP Tunnel-30th & 11th Ave**
COORD. **N: 213,804.1** **E: 983,369.3**
STN. NO.: OFFSET:
SURFACE ELEV.: **110.0 feet**
DATUM:

START DATE: **6/20/05** TIME: **6:00 am**
FINISH DATE: **6/29/05** TIME: **3:00 pm**

| | Casing | Split Spoon | Shelby Tube | Piston | Grab | Core Barrel |
|---|---|---|---|---|---|---|
| Type/Symbol | HW | S | U | P | G | C |
| I.D. | 4" | 1.375" | 2.938" | 2.938" | | 2" |
| O.D. | 4.5" | 2" | 3" | 3" | | 3" |
| Length | | 24" | 24" | 24" | | |
| Hammer Wt. | 300 lbs | 140 lbs | Drill Rod Size | | NWJ | |
| Hammer Fall | 24" | 30" | I.D. (O.D.) | | (2.938") | |

GROUNDWATER DATA

| Date | Time | Water Depth (ft) | Casing Depth (ft) | Hole Depth (ft) |
|---|---|---|---|---|
| 6/27/05 | 6:00 am | 12.0 | 24.5 | 113.9 |

| DEPTH (feet) | GRAPHIC LOG | CASING (Blows/ft) CORING (Min./ft) | SAMPLE TYPE | NUMBER | SYMBOL | DEPTH (feet) | SOIL (Blows/6 in.) 0/6 | 6/12 | 12/18 | 18/24 | REC. (in.) | CORING RUN (in.) | REC. (in.) | REC. % | L>4" (in.) | RQD % | Depth Elev. | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | G | 1 | | 0.0 - 6.0 | | Hand | | Auger | | | | | | | | Hand Augered 0' to 6'.<br>Brown c-f SAND, some Clayey Silt, some c-f Gravel, ( stone and brick), trace of debris(plastic)(FILL), dry.<br>NOTE:<br>Installed a 4" diameter casing 0' to 4'. |
| 5 | | | S | 1 | | 6.0 - 8.0 | 10 | 21 | 76 | 53 | 14 | | | | | | | Gray c-f GRAVEL ( stone and brick), some c-f Sand, little Clayey Silt, (FILL), moist. |
| | | | S | 2 | | 8.0 - 10.0 | 15 | 7 | 6 | 9 | 6 | | | | | | | Same as above, moist.<br>NOTE:<br>Installed 4" casing from 4' to 9'. |
| 10 | | | S | 3 | | 10.0 - 12.0 | 4 | 6 | 16 | 9 | 9 | | | | | | | Gray and brown c-f SAND, some Silt, little m-f Gravel (stone and brick fragments) (FILL), moist.<br>NOTE:<br>Installed 4" casing 9' to 14'. |
| 15 | | | S | 4 | | 15.0 - 17.0 | 18 | 11 | WOH | WOH | 20 | | | | | | | S-4A 15.0 to 17.0':<br>(Top 8") (FILL), wet.<br>S-4B- Bottom 12": Black elastic Silty CLAY, little m-f Sand, little roots and wood, wet, slightly organic (MH)<br>Notes:<br>1) Black wash 16' to 19'<br>2) Installed 4"casing 14 to 19'. |
| 20 | | | S | 5 | | 20.0 - 22.0 | 20 | 23 | 16 | 14 | 12 | | | | | | | S-5A :( top 6") Dark Gray c-f Gravel, little m-f Sand, little Clay & Silt.<br>S-5B:( bottom 6") Red brown f SAND, little Silt & Clay<br>NOTE:<br>Installed 4" casing 19' to 24'. |
| | | | S | 6 | | 24.0 - 24.0 | 100-0 | | | | | | | | | | 24.8 | No Recovery. |

BORING LOG NO_7NE.GPJ MAINLI-1.GLB 8/23/06

Parsons Brinckerhoff Quade & Douglas, Inc.

# CORING LOG

BORING NUMBER: **FD-206w**

SHEET NUMBER: **1** of **4**

PROJECT NUMBER:

PROJECT: **No 7 Subway line Extension**
LOCATION: **Manhattan**
CLIENT: **MTA**
CONTRACTOR: **Jersey Boring & Drilling**
DRILLER: **C. Deighart**
INSPECTOR: **C. Burzynski**
DRILLING METHOD: **Diamond drilling with double core barrel**
RIG TYPE: **CME-55**

LOCATION: **DEP Tunnel-30th & 11th Ave**
COORD. **N: 213,804.1** **E: 983,369.3**
STN. NO.: OFFSET:
SURFACE ELEV.: **110.0 feet**
DATUM:
START DATE: **6/20/05** TIME: **6:00 am**
FINISH DATE: **6/29/05** TIME: **3:00 pm**

**CORE BARREL DATA:**
TYPE: NX
CORE SIZE: 2"
O.D.: 3"
I.D.: 2"
CASING SIZE: 4" (4.5")

**NOTES:**

GROUNDWATER DATA

| Date | Time | Water Depth (ft) | Casing Depth (ft) | Hole Depth (ft) |
|---|---|---|---|---|
| 6/27/05 | 6:00 am | 12.0 | 24.5 | 113.9 |

| DEPTH (feet) | CORING RATE (ft/min) | CORE RUN NO. AND DEPTH (ft) | RECOVERY (in) | RECOVERY (%) | RQD (%) | DESCRIPTION AND REMARKS (Lithology, Structure, Weathering, Continuity, Strength, Color, Grain Size) * - Denotes discontinuity along foliation MB - Denotes mechanical break | WEATHERING | STRENGTH | DISCONTINUITY DATA ANGLE (deg) | Jr | Ja | DEPTH (feet) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | C-1 24.8 - 30.0 | 62 | 100 | 97 | Dark gray to black SCHIST; c-f grains of biotite, quartz, feldspar, muscovite; close to moderate fracture spacing; medium strong to strong; slightly weathered; foliation defined by distinct, wavy schistosity and contorted bands of quartz; foliation dips 40° to 70°; granite/pegmatite with irregular contacts with biotite concentrations from 27.7' to 28.7', near vertical; wavy core sides in schist. | II | R3/R4 | 30$_{MB}$ | - | - | 25.9 |
| | | | | | | | | | *80 | 1.5 | 2.0 | 27.7 |
| | | | | | | | | | *70 | 2.0 | 2.0 | 28.2 |
| | | | | | | | | | *45 | 1.5 | 1.0 | 28.7 |
| 30 | | | | | | | | | 15 | 1.5 | 1.0 | 28.8 |
| | | C-2 30.0 - 35.4 | 65 | 100 | 100 | C-2: 30.0' to 31.4' Dark gray to black SCHIST, as above. | II | R3/R4 | 5 | 1.5 | 1.0 | 28.9 |
| | | | | | | | | | 20 | 1.5 | 1.0 | 29.4 |
| | | | | | | 31.4 to 35.4': Light to medium gray GRANITE; fine to medium grains of feldspar, quartz, muscovite, sparse black mafic minerals; wide fracture spacing; slightly weathered to unweathered; strong to very strong; contacts with overlying schist is intact, dipping 80° with concentrations of quartz and mica. | I/II | R4/R5 | 10$_{MB}$ | - | - | 30 |
| | | | | | | | | | 10 | 1.5 | 1.0 | 30.8 |
| | | | | | | | | | 20 | 2.0 | 1.0 | 31.4 |
| | | | | | | | | | 30 | 3.0 | 1.0 | 32.1 |
| 35 | | | | | | | | | | | | |
| | | C-3 35.4 - 45.5 | 121 | 100 | 87 | C-3: 35.4' to 40.5' Medium gray GRANITE; m-f grains of feldspar, quartz, muscovite, sparse black mafic minerals; becoming coarse grained from 39.7' to 40.5'; wide fracture spacing; slightly weathered; strong; faint banding dipping ~80°; | II/I | R4 | 40 | 2.0 | 1.0 | 35.3 |
| | | | | | | | | | 0$_{MB}$ | - | - | 35.4 |
| | | | | | | 40.5' to 45.5: Dark gray to black SCHIST; fine to medium grains of biotite, quartz, feldspar, other black mafic minerals; close to very close fracture spacing, with gravel size pieces at 41.7'; slightly weathered; medium strong to strong; contact with overlying granite is intact but weathered, dips 50° parallel to foliation; foliation defined by distinct schistosity dipping 20° to 50°; core side wavy. | II | R3 | 5 | 3.0 | 1.0 | 39 |
| 40 | | | | | | | | | 25 | 2.0 | 1.0 | 39.9 |
| | | | | | | | | | 25$_{MB}$ | - | - | 40.3 |
| | | | | | | | | | *40 | 1.5 | 2.0 | 40.6 |
| | | | | | | | | | *45 | 1.0 | 2.0 | 40.8 |
| | | | | | | | | | *40 | 1.5 | 1.0 | 41.1 |
| | | | | | | | | | *30 | 1.5 | 1.0 | 41.4 |
| | | | | | | | | | 20 | 1.5 | 1.0 | 41.6 |
| | | | | | | | | | 20 | 1.5 | 2.0 | 41.7 |
| 45 | | | | | | | | | 0/20 | 1.5 | 1.0 | 42.4 |
| | | | | | | C-4: Dark gray to black SCHIST; c-f grains of biotite, quartz, feldspar, other mafic minerals, sparse garnet up to 0.1" across; close to moderate fracture spacing; slightly weathered; medium strong to strong; foliation defined by wavy schistosity dipping 30° to 50°; pegmatite breccia in black, fine grained matrix at 54.2'-54.6'; wavy core sides throughout, especially | II | R3/R4 | *35 | 1.5 | 1.0 | 43.4 |
| | | | | | | | | | 30$_{MB}$ | - | - | 43.8 |
| | | | | | | | | | 10$_{MB}$ | - | - | 44.3 |
| | | | | | | | | | *40 | 1.5 | 1.0 | 45.15 |
| | | | | | | | | | *30 | 1.5 | 1.0 | 45.4 |
| | | | | | | | | | 20 | 1.5 | 1.0 | 45.5 |
| | | | | | | | | | 5 | 1.5 | 1.0 | 47.3 |

Parsons Brinckerhoff Quade & Douglas, Inc.

# CORING LOG
(continued)

BORING NUMBER: **FD-206w**

SHEET NUMBER: **2** of **4**

PROJECT NUMBER:

PROJECT: **No 7 Subway line Extension**

LOCATION: **Manhattan**

CLIENT: **MTA**

CONTRACTOR: **Jersey Boring & Drilling**

DRILLER: **C. Deighart**

INSPECTOR: **C. Burzynski**

| DEPTH (feet) | CORING RATE (ft/min) | CORE RUN NO. AND DEPTH (ft) | RECOVERY (in) | RECOVERY (%) | RQD (%) | DESCRIPTION AND REMARKS (Lithology, Structure, Weathering, Continuity, Strength, Color, Grain Size) * - Denotes discontinuity along foliation MB - Denotes mechanical break | WEATHERING | STRENGTH | DISCONTINUITY DATA ANGLE (deg) | Jr | Ja | DEPTH (feet) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | C-4 45.5 - 55.2 | 115 | 99 | 97 | noticeable 48.0' to 49.0'. | | | $5_{MB}$ | - | - | 47.5 |
| | | | | | | | | | $20_{MB}$ | - | - | 48.8 |
| | | | | | | | | | $0_{MB}$ | - | - | 49.2 |
| | | | | | | | | | $0_{MB}$ | - | - | 50 |
| | | | | | | | | | 5 | 2.0 | 1.0 | 51 |
| | | | | | | | | | *50 | 1.5 | 1.0 | 51.6 |
| | | | | | | | | | *50 | 2.0 | 1.0 | 51.7 |
| | | | | | | | | | $30_{MB}$ | - | - | 52.8 |
| 55 | | | | | | | | | $20_{MB}$ | - | - | 53.8 |
| | | C-5 55.2 - 65.2 | 120 | 100 | 98 | C-5: Dark gray to blue gray SCHIST; c-f grains of biotite, quartz, feldspar, cyanite (?) a few garnets, up to 0.2" across; becoming fine grained below 61.5'; moderate to wide fracture spacing; slightly weathered; strong; very dense; foliation defined by faint schistosity, becoming distinct below 61.5'; foliation dips 60° to 90°; 0.5"-thick band of quartz-garnet, dipping 60° at 64.8'. 65.0' to 65.2': Light gray, fine grained GRANITE, contact dips 60°, parallel to foliation in overlying schist. | II | R4 | *45/5 | 1.5 | 1.0 | 54.3 |
| | | | | | | | | | 40 | 1.5 | 4.0 | 54.8 |
| | | | | | | | | | *60 | 1.5 | 4.0 | 55.2 |
| | | | | | | | | | 0/30 | 3.0 | 1.0 | 55.9 |
| | | | | | | | | | $30_{MB}$ | - | - | 57.5 |
| | | | | | | | | | 25 | 2.0 | 1.0 | 58.9 |
| 60 | | | | | | | | | $20_{MB}$ | - | - | 60.2 |
| | | | | | | | | | 40 | 1.5 | 2.0 | 61.1 |
| | | | | | | | | | $10_{MB}$ | - | - | 61.3 |
| | | | | | | | | | 5 | 2.0 | 1.0 | 62.4 |
| | | | | | | | | | *60 | 1.0 | 1.0 | 63 |
| | | | | | | | | | $30_{MB}$ | - | - | 64.2 |
| 65 | | | | | | | | | 20 | 1.5 | 1.0 | 64.5 |
| | | C-6 65.2 - 75.3 | 121 | 100 | 80 | C-6: 65.2' to 66.7' Medium gray GRANITE/PEGMATITE;c-f grains of quartz, feldspar, muscovite; healed breccia in places, with gray quartz matrix; very close fracture spacing; slightly weathered; strong; upper and lower contacts with schist are intact and parallel to foliation; red iron staining at 66.1'. 66.7' to 74.8': Dark gray to blue-gray to black SCHIST; fine to medium grains of biotite, quartz, feldspar; close to moderate fracture spacing; slightly weathered; strong; foliation defined by wavy schistosity and contorted bands of quartz-feldspar; foliation dips 40° to 70°. 74.8' to 75.3': Light gray GRANITE; fine to medium grains of quartz, muscovite, feldspar; moderate fracture spacing; slightly weathered; very strong; coarse grained pegmatite, same composition below 75.0'; | II | R4 | *40 | 1.0 | 2.0 | 65 |
| | | | | | | | | | $0_{MB}$ | - | - | 65.2 |
| | | | | | | | | | 0 | 3.0 | 1.0 | 65.8 |
| | | | | | | | | | 35 | 3.0 | 1.0 | 66.1 |
| | | | | | | | | | 10 | 2.0 | 1.0 | 66.3 |
| | | | | | | | | | 10 | 2.0 | 1.0 | 66.4 |
| | | | | | | | | | 10 | 2.0 | 1.0 | 66.5 |
| 70 | | | | | | | | | *40 | 2.0 | 1.0 | 67.5 |
| | | | | | | | | | 30 | 2.0 | 1.0 | 68.2 |
| | | | | | | | | | *50 | 1.5 | 1.0 | 68.6 |
| | | | | | | | | | 10 | 3.0 | 1.0 | 68.9 |
| | | | | | | | | | $0_{MB}$ | - | - | 69.5 |
| | | | | | | | | | 50 | 1.5 | 1.0 | 69.8 |
| | | | | | | | | | 30 | 1.5 | 1.0 | 70.2 |
| | | | | | | | | | 40 | 1.5 | 1.0 | 70.4 |
| | | | | | | | | | *40 | 1.5 | 1.0 | 71.2 |
| 75 | | | | | | | II | R5 | *50 | 2.0 | 1.0 | 72.2 |
| | | C-7 75.3 - 79.3 | 48 | 100 | 100 | C-7: Salmon-pink to medium gray PEGMATITE; coarse grains of pink feldspar, quartz, sparse muscovite; pink feldspars up to 3" across; moderate fracture spacing; unweathered to slightly weathered; medium strong; red iron staining at 77.4'. | I/II | R3 | *60 | 1.5 | 2.0 | 73.3 |
| | | | | | | | | | *40 | 1.5 | 1.0 | 73.7 |
| | | | | | | | | | *40 | 2.0 | 2.0 | 74 |
| | | | | | | | | | *50 | 1.5 | 1.0 | 74.1 |
| | | | | | | | | | $40_{MB}$ | - | - | 74.2 |
| | | | | | | | | | $40_{MB}$ | - | - | 74.8 |
| 80 | | | | | | | II | R1 | $40/0_{MB}$ | - | - | 76.3 |
| | | C-8 79.3 - 83.6 | 51 | 100 | 53 | C-8: Medium gray to salmon-pink PEGMATITE; coarse grains of pink and white feldspar, quartz, biotite, muscovite, soft green mineral; feldspar and quartz up to 1" across; books of biotite up to 2" across; close to moderate fracture spacing, except extremely close spacing from 79.6' to 79.9'; medium strong, except very weak from 79.3' to 80.0'; slightly weathered, with sand coatings at some fractures; mica phenocrystals in fine grained black matrix from | II | R3 | $10_{MB}$ | - | - | 76.9 |
| | | | | | | | | | 30 | 1.5 | 1.0 | 77 |
| | | | | | | | | | 30 | 2.0 | 1.0 | 77.4 |
| | | | | | | | | | 0 | 1.5 | 1.0 | 78.3 |
| | | | | | | | | | 10 | 3.0 | 2.0 | 78.4 |
| | | | | | | | | | 10 | 3.0 | 1.0 | 79 |
| | | | | | | | II | R4 | $40_{MB}$ | - | - | 79.3 |
| | | | | | | | | | 0 | 3.0 | 1.0 | 79.6 |

Parsons Brinckerhoff Quade & Douglas, Inc.

# CORING LOG
(continued)

BORING NUMBER: **FD-206w**

SHEET NUMBER: **3** of **4**

PROJECT NUMBER:

PROJECT: **No 7 Subway line Extension**

LOCATION: **Manhattan**

CLIENT: **MTA**

CONTRACTOR: **Jersey Boring & Drilling**

DRILLER: **C. Deighart**

INSPECTOR: **C. Burzynski**

| DEPTH (feet) | CORING RATE (ft/min) | CORE RUN NO. AND DEPTH (ft) | RECOVERY (in) | RECOVERY (%) | RQD (%) | DESCRIPTION AND REMARKS (Lithology, Structure, Weathering, Continuity, Strength, Color, Grain Size) * - Denotes discontinuity along foliation MB - Denotes mechanical break | WEATHERING | STRENGTH |
|---|---|---|---|---|---|---|---|---|
| 90 | | C-9 83.6 - 91.6 | 96 | 100 | 91 | 81.3' to 82.0'; no contact, poor rock fit at 80.5' and 83.0'; C-9: Medium gray to tan GRANITE; fine to medium grains of white feldspar, quartz, muscovite, with black mafic minerals below 87.0'; moderate fracture spacing, except very close spacing at 87.4' to 87.8'; slightly weathered; strong; parallel alignment of conspicuous muscovite produces foliation from 83.6' to 87.0'; dipping 50° to 60°; red and orange iron staining on fractures from 87.2' to 89.2'; 1" quartz band dipping 60° across foliation at 84.1'; no contact, poor crack fit at 25° fracture at 84.4' (in pure dark gray quartz). | II | R5 |
| 95 | | C-10 91.6 - 95.9 | 51 | 100 | 94 | C-10: Medium gray GRANITE; fine to medium grains of white and pink feldspar, quartz, muscovite, biotite, and other mafic minerals; close to moderate fracture spacing; slightly weathered; strong; faint fabric defined by parallel alignment of platy minerals, dipping 50° to 60°; healed hairline fractures parallel to fabric, dipping 50° to 60°, red staining on fracture surfaces at 93.6'. Core bit NQ-6 Series in satisfactory condition. Loosing water throughout run. | II | R4/R5 |
| 100 | | C-11 95.9 - 105.9 | 119 | 99 | 97 | C-11: Medium to tan GRANITE; fine to coarse grains of feldspar, quartz, muscovite, biotite, other mafic minerals; moderate to wide fracture spacing, except two extremely close low angle fractures at 103.0' to 103.1'; slightly weathered, except moderately weathered at 103.0 to 103.1'; strong to very strong, except very weak at 103.0' to 103.1'; color change from gray to tan at 102.7' to 103.7'; fine grained from 101.5' to 102.5'; 1-inch wide pegmatite dipping 50° at 103.6'; iron staining on fracture surfaces from 100.6' to 103.6'; thin (<0.1") bands of mica dipping 60° to 70° | III | R1 |
| 105 | | C-12 105.9 - 115.7 | 118 | 100 | 97 | from 98.6' to 99.5'; no contact, poor crack fit at low angle fracture at 103.0'. Loosing water throughout run. Rimmed borehole from 95.9' changed bit from #6 Series to to #8 series. C-12: Medium gray to tan GRANITE; fine to medium grains of feldspar, quartz, muscovite, black mafic minerals; moderate fracture spacing; slightly weathered, with tan discoloration from 112.0' to 113.5'; strong to very strong; faint foliation from parallel alignment micas dip 30° to 50°; red staining on 40° fractures at 106.4' and 112.8'; coarse grained, gray pegmatite 111.7' to 112.2'; core sides are markedly non-parallel, wavy; 1-inch thick gray quartz band dipping 70° at 106.6'. | II | R4/R5 |
| 110 | | | | | | | | |
| 115 | | | | | | C-13: 115.7' to 116.5' Medium gray GRANITE; as above, except fine grained. 116.5' to 125.7': Dark gray to black SCHIST; fine to medium grains of biotite, quartz, feldspar, mafic minerals; a few sparse garnets up to 0.1" across; close to moderate fracture spacing, except very close | II<br>II | R4/R5<br>R3/R4 |

DISCONTINUITY DATA

| ANGLE (deg) | Jr | Ja | DEPTH (feet) |
|---|---|---|---|
| 20 | 3.0 | 3.0 | 79.7 |
| 20 | 3.0 | 1.0 | 79.9 |
| 20 | 3.0 | 3.0 | 80.1 |
| 20/0 | 2.0 | 6.0 | 80.5 |
| 40 | 2.0 | 3.0 | 80.7 |
| 20 | 2.0 | 3.0 | 81.1 |
| $30_{MB}$ | - | - | 81.5 |
| $85_{MB}$ | - | - | 81.6 |
| $20_{MB}$ | - | - | 81.7 |
| 20 | 2.0 | 2.0 | 83 |
| 30 | 2.0 | 1.0 | 83.6 |
| 20 | 1.5 | 1.0 | 84.3 |
| 25 | 3.0 | 6.0 | 84.4 |
| 20 | 2.0 | 1.0 | 86 |
| *60 | 2.0 | 1.0 | 87.1 |
| 40 | 2.0 | 1.0 | 87.4 |
| 40 | 2.0 | 1.0 | 87.6 |
| 20 | 1.5 | 3.0 | 87.7 |
| 40 | 1.5 | 1.0 | 88.5 |
| *50 | 1.5 | 1.0 | 89 |
| 40 | 1.5 | 1.0 | 89.2 |
| *60 | 1.5 | 1.0 | 90.6 |
| 35 | 2.0 | 1.0 | 91.3 |
| $30_{MB}$ | - | - | 91.4 |
| $30_{MB}$ | - | - | 91.5 |
| $0_{MB}$ | - | - | 91.6 |
| 40 | 1.5 | 1.0 | 93.1 |
| $30_{MB}$ | - | - | 93.2 |
| 40 | 1.5 | 2.0 | 93.3 |
| 40 | 1.5 | 2.0 | 93.6 |
| 10 | 1.5 | 1.0 | 93.7 |
| *40 | 2.0 | 1.0 | 94 |
| *40 | 2.0 | 2.0 | 95.3 |
| $*40_{MB}$ | - | - | 95.5 |
| $10_{MB}$ | - | - | 95.8 |
| $5_{MB}$ | - | - | 95.9 |
| $10_{MB}$ | - | - | 96.5 |
| $10_{MB}$ | - | - | 96.8 |
| 10 | 2.0 | 1.0 | 99.3 |
| 40 | 1.5 | 1.0 | 100.5 |
| 20 | 1.5 | 1.0 | 100.6 |
| $60_{MB}$ | - | - | 101 |
| 30 | 2.0 | 1.0 | 101.8 |
| 30 | 2.0 | 2.0 | 101.9 |
| 30 | 1.0 | 1.0 | 102 |
| 20 | 2.0 | 6.0 | 103 |
| 20 | 1.5 | 2.0 | 103.1 |
| 50 | 2.0 | 2.0 | 103.6 |
| 40 | 2.0 | 1.0 | 105.4 |
| 40 | 1.5 | 1.0 | 105.9 |
| 40 | 1.5 | 1.0 | 106.4 |
| 45 | 1.5 | 1.0 | 106.6 |
| 40 | 1.5 | 1.0 | 108.5 |
| 25 | 1.5 | 1.0 | 108.8 |
| *50 | 1.5 | 1.0 | 109.6 |
| $10/05_{MB}$ | - | - | 110.75 |
| $10_{MB}$ | - | - | 111.5 |
| 10 | 2.0 | 1.0 | 111.7 |

Parsons Brinckerhoff Quade & Douglas, Inc.

# CORING LOG
(continued)

BORING NUMBER: **FD-206w**

SHEET NUMBER: **4** of **4**

PROJECT NUMBER:

PROJECT: **No 7 Subway line Extension**

LOCATION: **Manhattan**

CLIENT: **MTA**

CONTRACTOR: **Jersey Boring & Drilling**

DRILLER: **C. Deighart**

INSPECTOR: **C. Burzynski**

| DEPTH (feet) | CORING RATE (ft/min) | CORE RUN NO. AND DEPTH (ft) | RECOVERY (in) | RECOVERY (%) | RQD (%) | DESCRIPTION AND REMARKS (Lithology, Structure, Weathering, Continuity, Strength, Color, Grain Size) * - Denotes discontinuity along foliation MB - Denotes mechanical break | WEATHERING | STRENGTH |
|---|---|---|---|---|---|---|---|---|
| | | C-13 115.7 - 125.7 | 120 | 100 | 97 | spacing from 123.9' to 124.2'; medium strong to strong; slightly weathered; foliation defined by distinct, planar schistosity, dipping 40° to 60°, most fractures along foliation; some fractures have softened mica and clay on surfaces. A few 1/4" to 1" quartz-feldspar bands parallel to foliation; slightly wavy core sides. | | |
| 125 | | | | | | | | |
| | | C-14 125.7 - 135.7 | 120 | 100 | 99 | C-14: Dark gray to black SCHIST; fine to medium grains of biotite and muscovite, quartz, feldspar, black mafic minerals (amphibole?); numerous garnets up to 0.4" across; moderate fracture spacing; slightly weathered to unweathered; strong; foliation defined by distinct schistosity, undulating only around garnets; foliation dips 40° to 60°; all fractures along foliation; some fracture surfaces have softened mica coatings; slightly wavy core sides 127.5' to 129.0'. | I/II | R4 |
| 130 | | | | | | | | |
| 135 | | | | | | | | |
| | | C-15 135.7 - 141.0 | 63 | 100 | 95 | C-15: 135.7' to 138.7': Dark gray SCHIST, as above. 138.7' to 141.0': Medium gray GRANITE, with interlayered SCHIST; alternating layers 1" to 6" thick each; granite is fine to medium grained; muscovite, feldspar, quartz, medium grained garnet; schist is as above; becoming more granitic with depth. | I | R4 |
| 140 | | | | | | | | |
| | | | | | | E.O.B at 141.0'. | | |
| 145 | | | | | | | | |
| 150 | | | | | | | | |

DISCONTINUITY DATA

| ANGLE (deg) | Jr | Ja | DEPTH (feet) |
|---|---|---|---|
| 10 | 1.5 | 1.0 | 112.4 |
| 40 | 2.0 | 3.0 | 112.8 |
| *85 | 3.0 | 1.0 | 114.6 |
| 30 | 2.0 | 2.0 | 114.7 |
| 15 | 2.0 | 2.0 | 115.7 |
| *10 | 2.0 | 2.0 | 117 |
| *50 | 1.5 | 4.0 | 117.8 |
| 50 | 2.0 | 2.0 | 118.2 |
| *50 | 1.0 | 2.0 | 119.2 |
| *55 | 1.5 | 2.0 | 119.8 |
| *40 | 1.5 | 1.0 | 120.4 |
| 40MB | - | - | 120.55 |
| 65 | 2.0 | 1.0 | 120.65 |
| *45 | 1.0 | 1.0 | 121.5 |
| *55 | 1.5 | 4.0 | 122 |
| *40 | 1.0 | 2.0 | 122.4 |
| *40 | 1.5 | 4.0 | 122.8 |
| *40 | 1.0 | 4.0 | 122.9 |
| *40 | 1.5 | 4.0 | 123 |
| *45 | 1.0 | 1.0 | 124.5 |
| *40 | 1.0 | 1.0 | 125 |
| 45 | 3.0 | 2.0 | 125.1 |
| *50 | 1.5 | 1.0 | 125.2 |
| *50 | 1.5 | 1.0 | 125.4 |
| *50 | 1.0 | 1.0 | 125.6 |
| 45 | 2.0 | 1.0 | 125.65 |
| *50 | 1.5 | 1.0 | 125.7 |
| *45 | 1.0 | 1.0 | 126.6 |
| *45 | 1.5 | 1.0 | 127.5 |
| *45 | 1.5 | 2.0 | 128.2 |
| *50 | 1.0 | 1.0 | 129 |
| *50 | 1.5 | 1.0 | 130 |
| *60MB | - | - | 130.8 |
| *5 | 1.5 | 2.0 | 131.8 |
| *45 | 1.5 | 4.0 | 132.2 |
| *45 | 1.5 | 2.0 | 133.3 |
| *40 | 1.5 | 4.0 | 133.6 |
| *45 | 1.5 | 2.0 | 134.7 |
| *45 | 1.5 | 4.0 | 135.1 |
| 10 | 2.0 | 2.0 | 135.6 |
| *50MB | - | - | 135.7 |
| *50 | 1.5 | 4.0 | 136.9 |
| *45 | 1.5 | 1.0 | 138.3 |
| *45 | 1.5 | 4.0 | 138.7 |
| *45 | 1.0 | 4.0 | 139.2 |
| *45 | 1.5 | 4.0 | 139.5 |
| *40 | 1.5 | 4.0 | 139.65 |
| 20MB | - | - | 141 |

# BORING LOG

BORING NUMBER: **PE-273**
SHEET NUMBER: **1** of **2**
PROJECT NUMBER: **19499B**

PROJECT: **Trans-Hudson Express (THE) Project**
LOCATION: **New York, New York**
CLIENT: **NJ Transit**
CONTRACTOR: **Jersey Boring & Drilling**
DRILLER: **J. Kurzynowski**
INSPECTOR: **R. Sidorski/M. Tekin**
DRILLING METHOD: **Rotary Wash; Diamond Coring**
RIG TYPE: **CME-75, Truck-mounted, Automatic Safety Hammer**

LOCATION: **11th Ave at 30th St, NW corner**
COORD.: **N: 699,757.3 E: 629,565.0**
SURFACE ELEV.: **318.5 feet**
DATUM: **Horizontal: NJ State Plane**
**Vertical: NYCT datum-200 ft**
START DATE: **4/15/08** TIME: **7:00 am**
FINISH DATE: **4/18/08** TIME: **11:00 am**

| | Casing | Split Spoon | Shelby Tube | Piston | Grab | Core Barrel |
|---|---|---|---|---|---|---|
| Type/Symbol | HW | S | U | P | G | C |
| I.D. | 4" | 1.375" | 2.938" | 2.938" | | 1.875" |
| O.D. | 4.5" | 2" | 3" | 3" | | 3" |
| Length | 60" | 24" | 24" | 24" | | 120" |
| Hammer Wt. | 300 lbs. | 140 lbs. | Drill Rod Size | | NWJ | |
| Hammer Fall | 24" | 30" | I.D. (O.D.) | | 2.25" (2.625") | |

GROUNDWATER DATA

| Date | Time | Water Depth (ft) | Casing Depth (ft) | Hole Depth (ft) |
|---|---|---|---|---|
| | | | | |

| DEPTH (feet) | GRAPHIC LOG | CASING (Blows/ft) | SAMPLE TYPE | SAMPLE NUMBER | SAMPLE SYMBOL | SAMPLE DEPTH (feet) | SOIL (Blows/6 in.) 0/6 | 6/12 | 12/18 | 18/24 | REC. (in.) | CORING RUN (in.) | REC. (in.) | REC. % | L>4" (in.) | RQD % | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | G | 1 | | 0.0 - 0.5<br>0.5 - 6.0 | | | | | | | | | | | Hand augered from 0.0' to 6.0'.<br>0-0.5': Asphalt<br>0.5-6.0': Brown, c-f SAND, trace m-f Gravel, trace Silt, brick & concrete pieces. (FILL) |
| 5 | | | S | 2 | | 6.0 - 8.0 | 7 | 7 | 5 | 2 | 12 | | | | | | Brown, c-f SAND, trace (+) m-f Gravel, trace Silt, concrete. (FILL) |
| | | | S | 3 | | 8.0 - 10.0 | 3 | 5 | 5 | 4 | 6 | | | | | | Brown, c-f SAND, little m-f Gravel, trace Silt. (FILL) |
| 10 | | | S | 4 | | 10.0 - 12.0 | 2 | 4 | 29 | 71 | 5 | | | | | | Black and white, c-f GRAVEL, some c-f Sand, trace Silt with mica. (GP) |
| 15 | | | S | 5 | | 15.0 - 17.0 | 2 | 2 | 6 | 3 | 8 | | | | | | Brown, SILT, some f Sand, trace c-f Gravel. (ML) |

PARTNERSHIP BORING GDR (FINAL) 00 EPE ALL PACKAGES 4-30-08.GPJ THE PARTNERSHIP EPE LAND (FINAL) 11-07-08.GLB 11/11/08

# BORING LOG
(continued)

BORING NUMBER: **PE-273**
SHEET NUMBER: **2** of **2**
PROJECT NUMBER: **19499B**

PROJECT: **Trans-Hudson Express (THE) Project**
LOCATION: **11th Ave at 30th St, NW corner**
CLIENT: **NJ Transit**

CONTRACTOR: **Jersey Boring & Drilling**
DRILLER: **J. Kurzynowski**
INSPECTOR: **R. Sidorski/M. Tekin**

| DEPTH (feet) | GRAPHIC LOG | CASING (Blows/ft) | SAMPLE TYPE | SAMPLE NUMBER | SAMPLE SYMBOL | SAMPLE DEPTH (feet) | SOIL (Blows/6 in.) 0/6 | 6/12 | 12/18 | 18/24 | REC. (in.) | CORING RUN (in.) | CORING REC. (in.) | CORING REC. % | CORING L>4" (in.) | CORING RQD % | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | S | 6 | | 20.0 - 22.0 | 1 | WOH | WOH | 20 | 4 | | | | | | Red & gray, c-f SAND, some c-f Gravel, trace (+) Silt. (SP) |
| 25 | | | S | 7 | | 25.0 - 27.0 | 24 | 9 | 11 | 15 | 11 | | | | | | Red brown, c-f SAND, some m-f Gravel, trace Silt. (SP) |
| 30 | | | S | 8 | | 30.0 - 32.0 | 2 | 1 | 1 | 2 | 18 | | | | | | Dark gray, CLAY & SILT, trace f Sand with marine shells. (CL) |
| 35 | | | S | 9 | | 35.0 - 37.0 | WOH | 1 | 2 | 9 | 4 | | | | | | Dark gray, c-f GRAVEL, trace Silt . (GP)<br>Note: Gravel is stuck in tip.<br>Hard drilling at 39.0'. |
| 40 | | | S | 10 | | 40.0 - 40.3 | 100/3" | | | | 3 | | | | | | Dark gray, m-f SAND, little m-f Gravel, trace Silt with mica. (SM) (Decomposed Rock) |
| | | | | | | | | | | | | | | | | | 41.5' Roller-bit to 41.5' depth and start rock coring. |



PARTNERSHIP BORING GDR (FINAL) 00 EPE ALL PACKAGES 4-30-08.GPJ THE PARTNERSHIP EPE LAND (FINAL) 11-07-08.GLB 11/11/08

# THE PARTNERSHIP CORING LOG

BORING NUMBER: **PE-273**
SHEET NUMBER: **1** of **9**
PROJECT NUMBER: **19499B**

PROJECT: **Trans-Hudson Express (THE) Project**
LOCATION: **New York, New York**
CLIENT: **NJ Transit**
CONTRACTOR: **Jersey Boring & Drilling**
DRILLER: **J. Kurzynowski**
INSPECTOR: **R. Sidorski/M. Tekin**
DRILLING METHOD: **Rotary Wash; Diamond Coring**
RIG TYPE: **CME-75, Truck-mounted, Automatic Safety Hammer**

LOCATION: **11th Ave at 30th St, NW corner**
COORD.: **N: 699,757.3 E: 629,565.0**
SURFACE ELEV.:**318.5 feet**
DATUM: **Horizontal: NJ State Plane Vertical: NYCT datum-200 ft**
START DATE: **4/15/08** TIME: **7:00 am**
FINISH DATE: **4/18/08** TIME: **11:00 am**

**CORE BARREL DATA:**
TYPE: Double Barrel, solid inner barrel with wireline
CORE SIZE: NQ
O.D.: 3"
I.D.: 1.875"
CASING SIZE: 4" (4.5")

**NOTES:**

GROUNDWATER DATA

| Date | Time | Water Depth (ft) | Casing Depth (ft) | Hole Depth (ft) |
|---|---|---|---|---|
| | | | | |

| DEPTH (feet) | CORING RATE (min/ft) | CORE RUN NO. AND DEPTH (ft) | RECOVERY (in) | RECOVERY (%) | RQD (%) | DESCRIPTION AND REMARKS | WEATHERING | STRENGTH | DISCONTINUITY DATA ANGLE (deg) | Jr | Ja | DEPTH (feet) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 4 | C-1 41.5 - 46.6 | 61 | 100 | 70 | C-1: 41.5-45.8': Dark gray SCHIST; f-c grains of biotite, quartz, muscovite, feldspar, and sparse garnet; close to moderate fracture spacing, except extremely close at 42.3-42.4'; slightly weathered; medium strong to strong; distinct wavy and crenulated schistosity dips 50-80 deg; orange iron staining on some fracture surfaces; no rock wall contact at horizontal fracture at 44.1'; 1/2-inch thick quartz-feldspar pegmatites; parallel to schistosity at 43.6', 44.4', and 44.6'. | II | R3/R4 | *70 | 2.0 | 2.0 | 41.5 |
| | | | | | | | | | 30 | 2.0 | 2.0 | 42.3 |
| | | | | | | | | | 30 | 2.0 | 2.0 | 42.4 |
| | | | | | | | | | *60 | 2.0 | 2.0 | 42.8 |
| | | | | | | | | | *80 | 1.5 | 1.0 | 43.4 |
| | | | | | | | | | *50 | 2.0 | 1.0 | 43.6 |
| | | | | | | | | | 0 | 1.0 | 6.0 | 44.1 |
| 45 | | | | | | | | | 5 | 2.0 | 2.0 | 44.6 |
| | | | | | | | | | *70 | 1.5 | 1.0 | 44.8 |
| | | | | | | 45.8-46.3': Medium gray GRANITE; medium grains of mostly quartz, with some muscovite and white feldspar; moderate fracture spacing; unweathered; strong; upper contact is parallel to foliation in schist. | | | 15 | 3.0 | 2.0 | 45.4 |
| | | | | | | | I | R4 | 10 | 3.0 | 2.0 | 45.6 |
| | | | | | | | | | *70 | 1.5 | 1.0 | 46.3 |
| | 5 | C-2 46.6 - 56.1 | 114 | 100 | 95 | C-2: Dark gray SCHIST, with interlayered medium to light gray to light red GRANITE; alternating schist and granite bands are 1/4" to 8" thick; schist has f-c grains of biotite, quartz, muscovite, feldspar, and sparse garnet; granite has f-m grains of quartz, feldspar, and muscovite, with hematite at 53.8-54.3' and 55.7-56.1'; moderate to wide fracture spacing, except close at 55.6-56.1'; unweathered to slightly weathered; strong; schist has distinct planar schistosity dipping 50-70 deg; schist-granite contacts are intact and parallel to schistosity; pure QUARTZ at 55.5-55.6'; pink PEGMATITE at 51.0-51.1'. | I/II | R4 | *70 | 1.5 | 1.0 | 47 |
| 50 | | | | | | | | | 25 | 3.0 | 1.0 | 49.7 |
| | | | | | | | | | *70 | 2.0 | 1.0 | 51.2 |
| | | | | | | | | | *50 | 1.5 | 1.0 | 53.3 |
| 55 | | | | | | | | | *50 | 1.0 | 1.0 | 54.6 |
| | | | | | | | | | 30 | 1.0 | 6.0 | 54.8 |
| | | | | | | | | | 30 | 3.0 | 1.0 | 55.5 |
| | | | | | | C-3: 56.1-61.0': Light red to light gray GRANITE | I | R4 | *50 | 2.0 | 1.0 | 55.6 |



PARTNERSHIP CORING GDR (FINAL) 00 EPE ALL PACKAGES 4-30-08.GPJ THE PARTNERSHIP EPE (FINAL) 10-24-08.GLB 10/24/08

# CORING LOG
(continued)

BORING NUMBER: **PE-273**
SHEET NUMBER: **2** of **9**
PROJECT NUMBER: **19499B**

PROJECT: **Trans-Hudson Express (THE) Project**
LOCATION: **11th Ave at 30th St, NW corner**
CLIENT: **NJ Transit**

CONTRACTOR: **Jersey Boring & Drilling**
DRILLER: **J. Kurzynowski**
INSPECTOR: **R. Sidorski/M. Tekin**

| DEPTH (feet) | CORING RATE (min/ft) | CORE RUN NO. AND DEPTH (ft) | RECOVERY (in) | RECOVERY (%) | RQD (%) | DESCRIPTION AND REMARKS | WEATHERING | STRENGTH | DISCONTINUITY DATA ANGLE (deg) | Jr | Ja | DEPTH (feet) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | with interlayered dark gray SCHIST; alternating granite and schist bands are 1/4" to 10" thick; granite has f-m grains of quartz, feldspar, muscovite, and sparse garnet, with hematite at 56.1-59.0'; schist has f-c grains of biotite, quartz, muscovite, and feldspar; moderate to wide fracture spacing; unweathered; strong; distinct planar schistosity in schist dips 50-60 deg; granite-schist contacts are intact and parallel to schistosity. | | | 20 | 1.0 | 6.0 | 56 |
| | | | | | | | | | 25 | 1.5 | 1.0 | 56.1 |
| | | | | | | | | | 0 | MB | MB | 59.4 |
| 60 | | | | | | | | | 20 | 2.0 | 2.0 | 60 |
| | 5 | C-3 56.1 - 66.0 | 119 | 100 | 97 | 61.0-66.0': Dark gray SCHIST; f-c grains of biotite, quartz, muscovite, and feldspar; moderate fracture spacing; slightly weathered; strong; distinct wavy and crenulated schistosity dips 60-80 deg; no rock wall contact at 60 deg foliation fracture at 62.0', with smooth, polished surfaces and thin coating of brown clay; light gray granite intrusion along foliation at 63.3-63.8'; black, f-grained, and biotite-rich at 65.4-66.0'. | II | R4 | *50 | 1.5 | 2.0 | 61.3 |
| | | | | | | | | | 60 | 1.0 | 6.0 | 62 |
| | | | | | | | | | 40 | MB | MB | 63.4 |
| | | | | | | | | | 10 | MB | MB | 64.4 |
| 65 | | | | | | | | | *60 | 1.5 | 1.0 | 65 |
| | | | | | | | | | 60 | 1.0 | 1.0 | 65.6 |
| | | | | | | C-4: Dark to medium gray SCHIST; f-c grains of quartz, biotite, muscovite, feldspar, and scattered garnets, up to 1/8" across; close to wide fracture spacing, except extremely close at 70.6-71.0'; slightly weathered; strong; wavy to crenulated schistosity dips 60-80 deg; strike-slip slickensides on 70 deg foliation fracture at 70.9', with thin (<0.1") coating of brown clay; near-vertical cross foliation fracture at 70.0-70.8' has thin coating of gray clay; thin brown clay coating also on smooth 70 deg foliation fracture at 71.0'; calcite coatings on fractures at 72.4-74.3'; orange iron staining on fractures at 75.3-76.0'; white near-vertical hairline veins of calcite, partly weathered out, at 72.4-76.0'; medium gray GRANITE at 71.0-72.4', with medium grains of quartz, feldspar, and muscovite and faint near-vertical banding; upper and lower granite contacts are along smooth foliation fractures. | II | R4 | *60 | MB | MB | 66 |
| | | | | | | | | | 5 | 2.0 | 1.0 | 66.5 |
| | | | | | | | | | 20 | 2.0 | 1.0 | 66.8 |
| | | | | | | | | | 35 | 2.0 | 1.0 | 67.3 |
| 70 | | | | | | | | | 80 | 1.5 | 4.0 | 70 |
| | | | | | | | | | 90 | 1.5 | 4.0 | 70.2 |
| | 5 | C-4 66.0 - 76.0 | 118 | 98 | 86 | | | | 85 | 1.5 | 4.0 | 70.8 |
| | | | | | | | | | *70 | 0.5 | 4.0 | 70.9 |
| | | | | | | | | | *70 | 1.0 | 4.0 | 71 |
| | | | | | | | | | *60 | 2.0 | 1.0 | 72.4 |
| | | | | | | | | | *60 | 1.0 | 1.0 | 73 |
| | | | | | | | | | 90 | 3.0 | 2.0 | 74.3 |
| 75 | | | | | | | | | 60 | 3.0 | 1.0 | 74.35 |



PARTNERSHIP CORING GDR (FINAL) 00 EPE ALL PACKAGES 4-30-08.GPJ THE PARTNERSHIP EPE (FINAL) 10-24-08.GLB 10/24/08

# CORING LOG
(continued)

BORING NUMBER: **PE-273**
SHEET NUMBER: **3** of **9**
PROJECT NUMBER: **19499B**

PROJECT: **Trans-Hudson Express (THE) Project**
LOCATION: **11th Ave at 30th St, NW corner**
CLIENT: **NJ Transit**

CONTRACTOR: **Jersey Boring & Drilling**
DRILLER: **J. Kurzynowski**
INSPECTOR: **R. Sidorski/M. Tekin**

| DEPTH (feet) | CORING RATE (min/ft) | CORE RUN NO. AND DEPTH (ft) | RECOVERY (in) | RECOVERY (%) | RQD (%) | DESCRIPTION AND REMARKS | WEATHERING | STRENGTH | DISCONTINUITY DATA ANGLE (deg) | Jr | Ja | DEPTH (feet) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | 10 | 3.0 | 2.0 | 74.4 |
| | | | | | | | | | 20 | 3.0 | 2.0 | 75.3 |
| | 5 | C-5 76.0 - 86.1 | 121 | 100 | 100 | C-5: Medium to dark gray SCHIST; f-m grains of biotite, muscovite, quartz, feldspar, calcite, and garnets up to 1/4" across; moderate to wide fracture spacing; slightly weathered; strong; crenulated schistosity dips 50-70 deg; enriched in biotite at 82.1-82.3'; pure QUARTZ at 80.6-80.8'; scattered hairline calcite veins parallel to foliation; all fractures are along foliation, most with thin (<(0.1") calcite coatings. | II | R4 | 80 | 1.5 | 1.0 | 76 |
| | | | | | | | | | *60 | 1.5 | 1.0 | 78.4 |
| | | | | | | | | | 30 | 2.0 | 2.0 | 79.3 |
| 80 | | | | | | | | | | | | |
| | | | | | | | | | *50 | 1.5 | 2.0 | 80.5 |
| | | | | | | | | | *50 | MB | MB | 80.8 |
| | | | | | | | | | 20 | 3.0 | 1.0 | 81.6 |
| | | | | | | | | | *50 | 1.0 | 1.0 | 82.2 |
| | | | | | | | | | *50 | 1.5 | 1.0 | 84.5 |
| 85 | | | | | | | | | | | | |
| | | | | | | | | | *50 | 2.0 | 2.0 | 85.3 |
| | | | | | | | | | *70 | 2.0 | 1.0 | 85.7 |
| | 5 | C-6 86.1 - 96.1 | 120 | 100 | 100 | C-6: Medium to dark gray SCHIST; f-m grains of biotite, quartz, muscovite, feldspar, calcite, and scattered garnets, up to 1/4" across; rock is f-c grained below 90.7'; moderate fracture spacing; unweathered; strong; planar to crenulated schistosity dips 50-80 deg, becoming near-vertical below 93.6'; contorted quartz-feldspar band, 1/2" thick, at 89.2'; thin (<0.1") calcite coatings on most fractures; scattered hairline veins of white calcite parallel to schistosity; core sides are slightly bulging at 92.0-93.5'. | I | R4 | 30 | 2.0 | 1.0 | 86.9 |
| | | | | | | | | | *60 | 1.0 | 1.0 | 88.6 |
| 90 | | | | | | | | | | | | |
| | | | | | | | | | *50 | 1.0 | 1.0 | 90.2 |
| | | | | | | | | | 10 | 3.0 | 1.0 | 91.9 |
| | | | | | | | | | *60 | 1.5 | 2.0 | 93.6 |



PARTNERSHIP CORING GDR (FINAL) 00 EPE ALL PACKAGES 4-30-08.GPJ THE PARTNERSHIP EPE (FINAL) 10-24-08.GLB 10/24/08

# CORING LOG
(continued)

BORING NUMBER: **PE-273**
SHEET NUMBER: **4** of **9**
PROJECT NUMBER: **19499B**

PROJECT: **Trans-Hudson Express (THE) Project**
LOCATION: **11th Ave at 30th St, NW corner**
CLIENT: **NJ Transit**

CONTRACTOR: **Jersey Boring & Drilling**
DRILLER: **J. Kurzynowski**
INSPECTOR: **R. Sidorski/M. Tekin**

| DEPTH (feet) | CORING RATE (min/ft) | CORE RUN NO. AND DEPTH (ft) | RECOVERY (in) | RECOVERY (%) | RQD (%) | DESCRIPTION AND REMARKS | WEATHERING | STRENGTH | DISCONTINUITY DATA ANGLE (deg) | Jr | Ja | DEPTH (feet) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 95 | | | | | | | | | 15 | MB | MB | 95.1 |
| | | | | | | | | | 20 | 3.0 | 1.0 | 95.6 |
| | | | | | | C-7: Dark gray SCHIST; f-c grains of biotite, muscovite, quartz, feldspar, calcite, and many garnets, up to 1/4" across; moderate to wide fracture spacing, except close at 105.1-105.8'; unweathered; strong; crenulated schistosity dips 50-80 deg, near-vertical at 96.1-97.2'; thin (<0.1") calcite coatings on some foliation fractures; no rock wall contact at near-horizontal fractures at 100.9', with rough, unweathered fracture surfaces. | I | R4 | 50 | MB | MB | 96.1 |
| | | | | | | | | | 30 | 3.0 | 1.0 | 98.1 |
| 100 | | | | | | | | | 40 | MB | MB | 99.7 |
| | | | | | | | | | *60 | 1.0 | 1.0 | 100.2 |
| | 5 | C-7 96.1 - 105.8 | 116 | 100 | 95 | | | | 10 | 1.0 | 6.0 | 100.9 |
| | | | | | | | | | *60 | 1.5 | 1.0 | 103.6 |
| 105 | | | | | | | | | 0 | 2.0 | 1.0 | 104.7 |
| | | | | | | | | | *60 | 1.5 | 1.0 | 105.1 |
| | | | | | | | | | *50 | 2.0 | 1.0 | 105.4 |
| | | | | | | C-8: Dark to medium gray SCHIST; f-m grains of muscovite, biotite, quartz, feldspar, calcite, and scattered garnets, up to 1/4" across; close to moderate fracture spacing; unweathered; strong; planar to crenulated schistosity dips 50-70 deg; thin (0.1") calcite coatings on many fractures; medium gray, pure QUARTZ at 112.9-114.1'. | I | R4 | 40 | 2.0 | 1.0 | 105.8 |
| | | | | | | | | | *60 | 1.0 | 1.0 | 107.2 |
| | | | | | | | | | *60 | 2.0 | 1.0 | 107.7 |
| | | | | | | | | | 40 | 2.0 | 1.0 | 108.6 |
| | | | | | | | | | *70 | 1.5 | 1.0 | 109.2 |
| 110 | | | | | | | | | *70 | 2.0 | 1.0 | 109.3 |
| | | | | | | | | | 35 | 2.0 | 1.0 | 109.9 |
| | 5 | C-8 105.8 - 115.4 | 115 | 100 | 93 | | | | *50 | 1.5 | 1.0 | 110.1 |
| | | | | | | | | | 15 | 3.0 | 1.0 | 111.3 |
| | | | | | | | | | 0 | 2.0 | 1.0 | 112.1 |



PARTNERSHIP CORING GDR (FINAL) 00 EPE ALL PACKAGES 4-30-08.GPJ THE PARTNERSHIP EPE (FINAL) 10-24-08.GLB 10/24/08

# CORING LOG
(continued)

BORING NUMBER: **PE-273**
SHEET NUMBER: **5** of **9**
PROJECT NUMBER: **19499B**

PROJECT: **Trans-Hudson Express (THE) Project**
LOCATION: **11th Ave at 30th St, NW corner**
CLIENT: **NJ Transit**

CONTRACTOR: **Jersey Boring & Drilling**
DRILLER: **J. Kurzynowski**
INSPECTOR: **R. Sidorski/M. Tekin**

| DEPTH (feet) | CORING RATE (min/ft) | CORE RUN NO. AND DEPTH (ft) | RECOVERY (in) | RECOVERY (%) | RQD (%) | DESCRIPTION AND REMARKS | WEATHERING | STRENGTH | DISCONTINUITY DATA ANGLE (deg) | Jr | Ja | DEPTH (feet) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | *50 | 1.0 | 1.0 | 112.2 |
| | | | | | | | | | *60 | 1.5 | 1.0 | 112.8 |
| | | | | | | | | | 10 | 3.0 | 1.0 | 114.1 |
| | | | | | | | | | *40 | 1.5 | 1.0 | 114.2 |
| 115 | | | | | | | | | | | | |
| | | | | | | C-9: 115.4-121.3' and 124.0-125.4': Medium to dark gray SCHIST; f--m grains of quartz, biotite, muscovite, feldspar, calcite, and sparse garnet; close to moderate fracture spacing, except two very close foliation fractures at 121.1-121.3'; unweathered; strong; indistinct schistosity is wavy to crenulated, dips 60-80 deg; calcite coatings on many fracture surfaces; QUARTZ band parallel to schistosity at 124.9-125.35'; core sides bulging at 119.5-120.4'. | I | R4 | 30 | 3.0 | 1.0 | 115.4 |
| | | | | | | | | | 40 | 2.0 | 1.0 | 116.1 |
| | | | | | | | | | 30 | 3.0 | 1.0 | 116.6 |
| | | | | | | | | | 0 | MB | MB | 117 |
| | | | | | | | | | *70 | 1.5 | 1.0 | 117.3 |
| | | | | | | | | | 5 | 3.0 | 1.0 | 118.4 |
| 120 | 5 | C-9 115.4 - 125.4 | 120 | 100 | 94 | 121.3-124.0': Light gray GRANITE; indistinct f-m grains of quartz, feldspar, and muscovite, with some pink orthoclase; moderate fracture spacing; unweathered; strong; faint near-vertical banding; near-vertical inclusion of dark gray schist at 122.5-123.0'. | | | *60 | 1.5 | 1.0 | 120.5 |
| | | | | | | | | | *70 | 1.5 | 1.0 | 121.1 |
| | | | | | | | | | *80 | 1.0 | 1.0 | 121.3 |
| | | | | | | | | | 90 | 2.0 | 1.0 | 122.5 |
| | | | | | | | | | 50 | 1.5 | 1.0 | 122.55 |
| | | | | | | | | | *65 | 1.0 | 1.0 | 122.7 |
| 125 | | | | | | | | | | | | |
| | | | | | | C-10: 125.4-132.4': Black and white pinstriped SCHIST; f-m grains of biotite, amphibole (?), quartz, feldspar, and calcite; close to moderate fracture spacing; slightly weathered; strong; distinct planar schistosity and wavy banding dip 70-90 deg; planar bands of white calcite and quartz parallel to schistosity are hairline to 1/2" thick; some contorted bands of quartz-feldspar; thin (<0.1") coating of gray clay on 80 deg foliation fracture at 128.4'; calcite on most fracture surfaces. | II | R4 | 40 | 2.0 | 1.0 | 125.4 |
| | | | | | | | | | 10 | MB | MB | 126.1 |
| | | | | | | | | | 50 | 2.0 | 1.0 | 126.5 |
| | | | | | | | | | 30 | 3.0 | 1.0 | 127 |
| | | | | | | | | | 20 | 3.0 | 2.0 | 127.5 |
| | | | | | | | | | *80 | 1.5 | 4.0 | 128.4 |
| | | | | | | | | | 5 | 3.0 | 2.0 | 128.6 |
| 130 | | | | | | 132.4-135.7': Light gray GRANITE; m grains of feldspar, quartz, muscovite, and sparse garnet; close to moderate fracture spacing, except extremely close at 135.0-135.6' (may be mechanical); unweathered; very strong; calcite on some fracture surfaces inclusion of dark gray schist at 133.1-133.4' | | | 30 | 3.0 | 2.0 | 129.7 |
| | | | | | | | | | 30 | 3.0 | 1.0 | 130.3 |
| | 5 | C-10 125.4 - 135.7 | 124 | 100 | 81 | | | | 10 | 3.0 | 1.0 | 130.7 |



PARTNERSHIP CORING GDR (FINAL) 00 EPE ALL PACKAGES 4-30-08.GPJ THE PARTNERSHIP EPE (FINAL) 10-24-08.GLB 10/24/08

# THE PARTNERSHIP CORING LOG (continued)

BORING NUMBER: **PE-273**
SHEET NUMBER: **6** of **9**
PROJECT NUMBER: **19499B**

PROJECT: **Trans-Hudson Express (THE) Project**
LOCATION: **11th Ave at 30th St, NW corner**
CLIENT: **NJ Transit**

CONTRACTOR: **Jersey Boring & Drilling**
DRILLER: **J. Kurzynowski**
INSPECTOR: **R. Sidorski/M. Tekin**

| DEPTH (feet) | CORING RATE (min/ft) | CORE RUN NO. AND DEPTH (ft) | RECOVERY (in) | RECOVERY (%) | RQD (%) | DESCRIPTION AND REMARKS | WEATHERING | STRENGTH | DISCONTINUITY DATA ANGLE (deg) | Jr | Ja | DEPTH (feet) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | I | R5 | *80 | 1.5 | 4.0 | 131.2 |
| | | | | | | | | | 10 | 3.0 | 1.0 | 131.3 |
| | | | | | | | | | 5 | 2.0 | 2.0 | 131.4 |
| | | | | | | | | | *90 | 2.0 | 2.0 | 131.6 |
| | | | | | | | | | 50 | 2.0 | 2.0 | 131.8 |
| | | | | | | | | | 80 | 1.5 | 2.0 | 132 |
| | | | | | | | | | 60 | 1.0 | 1.0 | 133.1 |
| | | | | | | | | | 40 | 2.0 | 1.0 | 133.9 |
| | | | | | | | | | 40 | 2.0 | 1.0 | 134.4 |
| 135 | | | | | | | | | 20 | 2.0 | 1.0 | 134.8 |
| | | | | | | | | | 30 | 2.0 | 1.0 | 135.1 |
| | | | | | | C-11: 135.7-141.5': Light gray GRANITE; f-m grains of feldspar, quartz, muscovite, and garnet; close to moderate fracture spacing, except very close low-angle fractures at 139.5-139.9'; unweathered to slightly weathered; very strong; becoming f-grained below 139.9', with faint banding dipping 50 deg; slight iron stains on fracture surfaces at 139.5-139.7' and at lower contact at 141.5'; calcite on some fracture surfaces; black schist inclusion at 136.3-136.9'. | I/II | R5 | 60 | 3.0 | 1.0 | 135.3 |
| | | | | | | | | | 90 | 3.0 | 1.0 | 135.5 |
| | | | | | | | | | 10 | 2.0 | 1.0 | 135.7 |
| | | | | | | | | | 50 | 2.0 | 1.0 | 135.8 |
| | | | | | | | | | 30 | 1.5 | 1.0 | 137.2 |
| | | | | | | | | | 10 | 1.5 | 1.0 | 137.6 |
| | | | | | | | | | 5 | 2.0 | 1.0 | 138.3 |
| 140 | 4 | C-11 135.7 - 145.6 | 119 | 100 | 94 | 141.5-145.6': Black to dark gray SCHIST; f-m grains of biotite, quartz, feldspar, and muscovite; close to moderate fracture spacing; unweathered to slightly weathered; strong; planar schistosity dip 50 deg; calcite on all fracture surfaces; no rock wall contact and softened biotite on horizontal fracture at upper contact with granite; pure QUARTZ at 142.7-143.2'. | | | 10 | 1.5 | 1.0 | 139.5 |
| | | | | | | | | | 5 | 1.5 | 1.0 | 139.6 |
| | | | | | | | | | 10 | 1.5 | 1.0 | 139.7 |
| | | | | | | | | | 15 | 2.0 | 1.0 | 139.9 |
| | | | | | | | | | 50 | MB | MB | 140.5 |
| | | | | | | | I/II | R4 | 0 | 1.0 | 6.0 | 141.5 |
| | | | | | | | | | *50 | 1.0 | 1.0 | 142.4 |
| | | | | | | | | | *40 | MB | MB | 143.9 |
| 145 | | | | | | | | | *50 | 1.5 | 1.0 | 144.6 |
| | | | | | | | | | *50 | MB | MB | 144.9 |
| | | | | | | C-12: Medium to dark gray SCHIST; f-m grains of quartz, biotite, feldspar, muscovite, calcite, and scattered garnets, up to 1/8" across; moderate fracture spacing, except very close foliation fractures at 150.1-150.7'; unweathered; strong; planar schistosity dips 50-60 deg; calcite on most fracture surfaces; pure QUARTZ at 149.0-149.7' and 155.1-155.5', light gray APLITE at 149.8-149.9', 150.1-150.3', and 148.1-148.5, with some orange potassium feldspar. | I | R4 | *50 | 1.0 | 1.0 | 145.7 |
| | | | | | | | | | 55 | 1.5 | 1.0 | 146.4 |
| | | | | | | | | | *50 | 1.0 | 1.0 | 147.8 |
| | | | | | | | | | *60 | 1.5 | 1.0 | 148.5 |
| 150 | | | | | | | | | *40 | 1.0 | 1.0 | 149.8 |



PARTNERSHIP CORING GDR (FINAL) 00 EPE ALL PACKAGES 4-30-08.GPJ THE PARTNERSHIP EPE (FINAL) 10-24-08.GLB 10/24/08

# CORING LOG
(continued)

BORING NUMBER: **PE-273**
SHEET NUMBER: 7 of 9
PROJECT NUMBER: **19499B**

PROJECT: **Trans-Hudson Express (THE) Project**
LOCATION: **11th Ave at 30th St, NW corner**
CLIENT: **NJ Transit**

CONTRACTOR: **Jersey Boring & Drilling**
DRILLER: **J. Kurzynowski**
INSPECTOR: **R. Sidorski/M. Tekin**

| DEPTH (feet) | CORING RATE (min/ft) | CORE RUN NO. AND DEPTH (ft) | RECOVERY (in) | RECOVERY (%) | RQD (%) | DESCRIPTION AND REMARKS | WEATHERING | STRENGTH | DISCONTINUITY DATA ANGLE (deg) | Jr | Ja | DEPTH (feet) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | C-12 145.6 - 155.6 | 120 | 100 | 94 | | | | *50 | 1.5 | 1.0 | 150.1 |
| | | | | | | | | | *50 | 1.5 | 1.0 | 150.3 |
| | | | | | | | | | *50 | 1.5 | 1.0 | 150.5 |
| | | | | | | | | | *50 | 1.0 | 1.0 | 150.7 |
| | | | | | | | | | *60 | 1.0 | 1.0 | 152.3 |
| | | | | | | | | | 0 | 3.0 | 1.0 | 152.9 |
| | | | | | | | | | *60 | 1.0 | 1.0 | 154 |
| 155 | | | | | | | | | *50 | 1.5 | 1.0 | 155.1 |
| | | | | | | C-13: Medium to dark gray SCHIST; f-c grains of quartz, biotite, muscovite, feldspar, calcite, and scattered garnets, up to 1/4" across; moderate fracture spacing, except for two extremely close foliation fractures at 165.4-165.45'; unweathered; strong; planar to slightly crenulated schistosity dips 50-60 deg; most fractures are along schistosity; calcite on most fracture surfaces; irregular white granitic intrusions, 1" thick and near-vertical, at 160.0', 161.3', and 162.1'; 1/2" of adjacent schist is enriched in biotite. | I | R4 | 45 | 2.0 | 1.0 | 155.2 |
| | | | | | | | | | 15 | 2.0 | 1.0 | 155.6 |
| | | | | | | | | | 30 | 2.0 | 1.0 | 157.5 |
| | | | | | | | | | *70 | 1.0 | 1.0 | 159.1 |
| 160 | | C-13 155.6 - 165.6 | 120 | 100 | 97 | | | | *50 | 1.5 | 1.0 | 160.6 |
| | 5 | | | | | | | | *60 | 1.5 | 1.0 | 161.4 |
| | | | | | | | | | *50 | 1.0 | 1.0 | 163.3 |
| | | | | | | | | | *50 | 1.0 | 1.0 | 164.2 |
| 165 | | | | | | | | | *50 | 1.0 | 1.0 | 165.4 |
| | | | | | | C-14: Medium gray SCHIST; f-m grains of muscovite, biotite, quartz, feldspar, and scattered garnets, up to 1/8" across; very close to moderate fracture spacing, except extremely close at 172.8-172.9' and 175.2-175.6'; slightly weathered; medium strong to strong; distinct wavy to planar schistosity dips 50-70 deg; clay and softened mica on fractures at 167.9', 172.9' and 173.1'. | II | R3/R4 | *50 | 1.0 | 1.0 | 165.45 |
| | | | | | | | | | *50 | 1.5 | 1.0 | 165.6 |
| | | | | | | | | | *60 | 1.0 | 1.0 | 166.4 |
| | | | | | | | | | *50 | 1.0 | 1.0 | 167 |
| | | | | | | | | | *60 | 1.0 | MB | 167.05 |
| | | | | | | | | | 15 | 3.0 | 1.0 | 167.5 |
| | | | | | | | | | *50 | 1.0 | 4.0 | 167.9 |
| | | | | | | | | | *70 | 1.0 | 4.0 | 168.2 |



PARTNERSHIP CORING GDR (FINAL) 00 EPE ALL PACKAGES 4-30-08.GPJ THE PARTNERSHIP EPE (FINAL) 10-24-08.GLB 10/24/08

# THE PARTNERSHIP CORING LOG (continued)

BORING NUMBER: **PE-273**
SHEET NUMBER: **8** of **9**
PROJECT NUMBER: **19499B**

PROJECT: **Trans-Hudson Express (THE) Project**
LOCATION: **11th Ave at 30th St, NW corner**
CLIENT: **NJ Transit**

CONTRACTOR: **Jersey Boring & Drilling**
DRILLER: **J. Kurzynowski**
INSPECTOR: **R. Sidorski/M. Tekin**

| DEPTH (feet) | CORING RATE (min/ft) | CORE RUN NO. AND DEPTH (ft) | RECOVERY (in) | RECOVERY (%) | RQD (%) | DESCRIPTION AND REMARKS | WEATHERING | STRENGTH | DISCONTINUITY DATA ANGLE (deg) | Jr | Ja | DEPTH (feet) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 170 | | C-14 165.6 - 175.6 | 120 | 100 | 72 | 169.9-172.6': Rock is gneissic, with irregular bands of quartz and orange potassium-feldspar; core surfaces is pitted; no rock wall contact at 170.8'; hard, green epidote (?) on weathered fracture surfaces at 170.8' and 171.6'. | | | *70 | 1.5 | 1.0 | 169.1 |
| | | | | | | | | | *60 | 1.5 | 4.0 | 169.3 |
| | | | | | | | | | *50 | 1.0 | 1.0 | 169.5 |
| | | | | | | | | | 30 | 2.0 | 2.0 | 170.05 |
| | | | | | | | | | 15 | 3.0 | 1.0 | 170.2 |
| | | | | | | | | | 10 | 1.0 | 6.0 | 170.8 |
| | | | | | | | | | 15 | 3.0 | 1.0 | 171 |
| | | | | | | | | | *60 | 2.0 | 2.0 | 171.5 |
| | | | | | | | | | 20 | 3.0 | 2.0 | 171.6 |
| | | | | | | | | | *40 | 1.5 | 1.0 | 172 |
| | | | | | | | | | *50 | 1.5 | 2.0 | 172.8 |
| | | | | | | | | | 80 | 2.0 | 4.0 | 172.9 |
| | | | | | | | | | *50 | 1.5 | 1.0 | 173 |
| | | | | | | | | | 80 | 3.0 | 4.0 | 173.1 |
| | | | | | | | | | 10 | 3.0 | 1.0 | 173.4 |
| 175 | | | | | | | | | 0 | MB | MB | 174.6 |
| | | | | | | C-15: 175.6-181.6': Dark gray SCHIST; f-m grains of biotite, muscovite, quartz, feldspar, and garnet; close to moderate fracture spacing, except for 2 extremely close intersecting high-angle fractures at 179.8-180.0'; slightly weathered; strong; planar to crenulated schistosity dips 50-70 deg; high angle cross-foliation fractures at 178.9-179.8 have orange and red iron staining, softened mica, and sandy clay coatings; softened mica on some foliation fractures; calcite on fracture surfaces at 176.8-178.1'. | | | *50 | 1.5 | 1.0 | 175.2 |
| | | | | | | | II | R4 | *50 | 1.0 | 1.0 | 175.3 |
| | | | | | | | | | *50 | 1.5 | 1.0 | 175.35 |
| | | | | | | | | | *40 | 2.0 | 1.0 | 175.5 |
| | | | | | | | | | *50 | 1.5 | 1.0 | 175.6 |
| | | | | | | | | | 20 | 3.0 | 2.0 | 175.7 |
| | | | | | | | | | *50 | 1.5 | 1.0 | 176.8 |
| | | | | | | | | | *30 | 1.0 | 1.0 | 177.9 |
| | | | | | | | | | *60 | 1.0 | 1.0 | 178.3 |
| | | | | | | | | | 25 | 3.0 | 2.0 | 178.6 |
| | | | | | | | | | 90 | 2.0 | 4.0 | 178.9 |
| | | | | | | | | | 40 | 3.0 | 1.0 | 179.2 |
| 180 | | C-15 175.6 - 185.3 | 116 | 100 | 89 | 181.6-183.4': Light gray GRANITE; f-c grains of white and pink feldspar, quartz, and muscovite; moderate fracture spacing; unweathered; very strong; healed hairline fracture dips 70 deg. | | | 80 | 2.0 | 4.0 | 179.8 |
| | | | | | | | | | *70 | 1.5 | 1.0 | 180 |
| | | | | | | | | | 60 | 2.0 | 4.0 | 180.3 |
| | | | | | | | | | 15 | 3.0 | 2.0 | 180.9 |
| | | | | | | 183.4-185.3': Medium gray, pure QUARTZ; close to moderate fracture spacing; unweathered; very strong; few small (<0.1") inclusions of white feldspar. | II | R5 | 20 | 2.0 | 1.0 | 181.6 |
| | | | | | | | I | R5 | | | | |
| | | | | | | | | | 20 | 1.5 | 1.0 | 183.8 |
| | | | | | | | | | 20 | 3.0 | 1.0 | 184.6 |
| 185 | | | | | | | | | 10 | 1.5 | 1.0 | 185.1 |
| | | | | | | C-16: 185.3-185.5': Medium gray QUARTZ, as above. | II | R4 | 40 | 3.0 | 1.0 | 185.3 |
| | | | | | | | | | *40 | 3.0 | 2.0 | 185.6 |
| | | | | | | 185.5-188.0': Light gray GRANITE; f-c grains of feldspar, quartz, and muscovite; close to moderate fracture spacing; slightly weathered; strong; coarse | | | 80 | 2.0 | 1.0 | 185.9 |
| | | | | | | | | | 30 | 1.5 | 1.0 | 186 |
| | | | | | | | | | 90 | 3.0 | 2.0 | 186.5 |
| | | | | | | | | | 70 | 3.0 | 1.0 | 186.9 |



PARTNERSHIP CORING GDR (FINAL) 00 EPE ALL PACKAGES 4-30-08.GPJ THE PARTNERSHIP EPE (FINAL) 10-24-08.GLB 10/24/08

# CORING LOG
(continued)

BORING NUMBER: **PE-273**
SHEET NUMBER: **9** of **9**
PROJECT NUMBER: **19499B**

PROJECT: **Trans-Hudson Express (THE) Project**
LOCATION: **11th Ave at 30th St, NW corner**
CLIENT: **NJ Transit**

CONTRACTOR: **Jersey Boring & Drilling**
DRILLER: **J. Kurzynowski**
INSPECTOR: **R. Sidorski/M. Tekin**

| DEPTH (feet) | CORING RATE (min/ft) | CORE RUN NO. AND DEPTH (ft) | RECOVERY (in) | RECOVERY (%) | RQD (%) | DESCRIPTION AND REMARKS | WEATHERING | STRENGTH | DISCONTINUITY DATA ANGLE (deg) | Jr | Ja | DEPTH (feet) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | grained at 186.1-187.4', with muscovite seams dipping 30 deg spaced 1/8" to 1/2" apart; vertical fracture at 186.5' has rough, orange iron-stained surface. | I/II | R4 | *60 | 1.5 | 1.0 | 188 |
| | | | | | | | | | *50 | 1.0 | 1.0 | 188.7 |
| | | | | | | | | | *45 | 1.5 | 1.0 | 189 |
| 190 | | C-16 185.3 - 195.2 | 119 | 100 | 82 | 188.0-195.2': Dark gray SCHIST; f-m grains of biotite, muscovite, quartz, feldspar, calcite, and sparse garnet; close to moderate fracture spacing, except very close at 194.6-195.2'; unweathered to slightly weathered; strong; planar to wavy schistosity dips 50-60 deg; most fractures along foliation, many with calcite on surface; light gray granitic intrusions at 189.5-190.0', 190.5-190.8', 191.2-191.5', and 192.3-192.9'; schistosity is contorted around granite contacts. | | | 50 | 3.0 | 1.0 | 189.8 |
| | | | | | | | | | *60 | 1.0 | 2.0 | 191.7 |
| | | | | | | | | | *60 | 1.0 | 1.0 | 192.4 |
| | | | | | | | | | *50 | 1.0 | 1.0 | 193.5 |
| | | | | | | | | | *50 | 1.0 | 1.0 | 194.2 |
| | | | | | | | | | *50 | 1.0 | 1.0 | 194.6 |
| 195 | | | | | | | | | 30 | 3.0 | 1.0 | 194.7 |
| | | | | | | End of Boring at 195.2' | | | 40 | 3.0 | 1.0 | 195 |
| | | | | | | | | | 40 | 2.0 | 1.0 | 195.2 |
| 200 | | | | | | | | | | | | |
| 205 | | | | | | | | | | | | |



PARTNERSHIP CORING GDR (FINAL) 00 EPE ALL PACKAGES 4-30-08.GPJ THE PARTNERSHIP EPE (FINAL) 10-24-08.GLB 10/24/08

# BORING LOG

BORING NUMBER: **PE-274**
SHEET NUMBER: **1** of **2**
PROJECT NUMBER: **19499B**

PROJECT: **Trans-Hudson Express (THE) Project**
LOCATION: **New York, New York**
CLIENT: **NJ Transit**
CONTRACTOR: **Jersey Boring & Drilling**
DRILLER: **J. Kurzynowski**
INSPECTOR: **M. Tekin**
DRILLING METHOD: **Rotary Wash; Diamond Coring**
RIG TYPE: **CME-75, Truck-mounted, Automatic Safety Hammer**

LOCATION: **11th Ave at 30th St, NE corner**
COORD.: **N: 699,717.1 E: 629,641.9**
SURFACE ELEV.: **318.6 feet**
DATUM: **Horizontal: NJ State Plane Vertical: NYCT datum-200 ft**
START DATE: **4/15/08** TIME: **10:00 am**
FINISH DATE: **4/24/08** TIME: **11:30 am**

| | Casing | Split Spoon | Shelby Tube | Piston | Grab | Core Barrel |
|---|---|---|---|---|---|---|
| Type/Symbol | HW | S | U | P | G | C |
| I.D. | 4" | 1.375" | 2.938" | 2.938" | | 1.875" |
| O.D. | 4.5" | 2" | 3" | 3" | | 3" |
| Length | 60" | 24" | 24" | 24" | | 120" |
| Hammer Wt. | 300 lbs. | 140 lbs. | Drill Rod Size | | NWJ | |
| Hammer Fall | 24" | 30" | I.D. (O.D.) | | 2.25" (2.625") | |

GROUNDWATER DATA

| Date | Time | Water Depth (ft) | Casing Depth (ft) | Hole Depth (ft) |
|---|---|---|---|---|
| 4/22/08 | 7:00 am | 19.5 | 35.0 | 115.1 |
| 4/24/08 | 7:00 am | 19.0 | 35.0 | 166.1 |

| DEPTH (feet) | GRAPHIC LOG | CASING (Blows/ft) | SAMPLE TYPE | SAMPLE NUMBER | SAMPLE SYMBOL | SAMPLE DEPTH (feet) | SOIL (Blows/6 in.) 0/6 | 6/12 | 12/18 | 18/24 | REC. (in.) | CORING RUN (in.) | REC. (in.) | REC. % | L>4" (in.) | RQD % | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 0.0 - 6.0 | | | | | | | | | | | Hand-augered from 0.0' to 6.0'. 0-0.5': Concrete 0.5-6.0': Brown, c-f SAND, little c-f Gravel, little Silt, occasional black pebble. (FILL) |
| 5 | | | S | 1 | | 6.0 - 8.0 | 3 | 3 | 4 | 4 | 3 | | | | | | Black brown, c-f SAND, little m-f Gravel, little (-) organic silt. (FILL) |
| | | | S | 2 | | 8.0 - 10.0 | 7 | 9 | 14 | 12 | 4 | | | | | | Black brown, c-f SAND, little m-f Gravel, little (-) organic silt, with brick fragments. (FILL) |
| 10 | | | S | 3 | | 10.0 - 12.0 | 9 | 13 | 16 | 17 | 4 | | | | | | Dark brown, c-f SAND, and c-f Gravel, little Silt, with brick fragments. (FILL) |
| 15 | | | S | 4 | | 15.0 - 17.0 | 3 | 3 | 3 | 3 | 6 | | | | | | Gray brown, c-f SAND, and Silt, trace (+) m-f Gravel, micaceous. (SM) |



PARTNERSHIP BORING GDR (FINAL) 00 EPE ALL PACKAGES 4-30-08.GPJ THE PARTNERSHIP EPE LAND (FINAL) 11-07-08.GLB 11/11/08

# BORING LOG
(continued)

BORING NUMBER: **PE-274**
SHEET NUMBER: **2** of **2**
PROJECT NUMBER: **19499B**

PROJECT: **Trans-Hudson Express (THE) Project**
LOCATION: **11th Ave at 30th St, NE corner**
CLIENT: **NJ Transit**

CONTRACTOR: **Jersey Boring & Drilling**
DRILLER: **J. Kurzynowski**
INSPECTOR: **M. Tekin**

| DEPTH (feet) | GRAPHIC LOG | CASING (Blows/ft) | SAMPLE TYPE | SAMPLE NUMBER | SAMPLE SYMBOL | SAMPLE DEPTH (feet) | SOIL (Blows/6 in.) 0/6 | 6/12 | 12/18 | 18/24 | REC. (in.) | CORING RUN (in.) | REC. (in.) | REC. % | L>4" (in.) | RQD % | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | S | 5 | | 20.0 - 22.0 | 4 | 29 | 16 | 22 | 6 | | | | | | Gray, c-f SAND, some (+) m-f Gravel, some Silt, micaceous. (SM) |
| 25 | | | S | 6 | | 25.0 - 27.0 | 14 | 10 | 6 | 8 | 6 | | | | | | Gray brown, c-f SAND, some (+) c-f Gravel, trace (+) Silt, wet. (SP) |
| 30 | | | S | 7 | | 30.0 - 32.0 | 5 | 4 | 6 | 8 | 22 | | | | | | Gray, SILT & CLAY, trace (+) f Sand. (ML) |
| 35 | | | S | 8 | | 35.0 - 35.3 | 100/4" | | | | 4 | | | | | | 35.9' Gray, c-f SAND, trace Silt . (Decomposed Schist) |
| | | | | | | | | | | | | | | | | | Note: Start rock coring at 35.9' depth. |
| 40 | | | | | | | | | | | | | | | | | |



PARTNERSHIP BORING GDR (FINAL) 00 EPE ALL PACKAGES 4-30-08.GPJ THE PARTNERSHIP EPE LAND (FINAL) 11-07-08.GLB 11/11/08

# THE PARTNERSHIP CORING LOG

BORING NUMBER: **PE-274**
SHEET NUMBER: **1** of **9**
PROJECT NUMBER: **19499B**

PROJECT: **Trans-Hudson Express (THE) Project**
LOCATION: **New York, New York**
CLIENT: **NJ Transit**
CONTRACTOR: **Jersey Boring & Drilling**
DRILLER: **J. Kurzynowski**
INSPECTOR: **M. Tekin**
DRILLING METHOD: **Rotary Wash; Diamond Coring**
RIG TYPE: **CME-75, Truck-mounted, Automatic Safety Hammer**

LOCATION: **11th Ave at 30th St, NE corner**
COORD.: **N: 699,717.1 E: 629,641.9**
SURFACE ELEV.: **318.6 feet**
DATUM: **Horizontal: NJ State Plane Vertical: NYCT datum-200 ft**
START DATE: **4/15/08** TIME: **10:00 am**
FINISH DATE: **4/24/08** TIME: **11:30 am**

**CORE BARREL DATA:**
TYPE: Double Barrel, solid inner barrel with wireline
CORE SIZE: NQ
O.D.: 3"
I.D.: 1.875"
CASING SIZE: 4" (4.5")

**NOTES:**

GROUNDWATER DATA

| Date | Time | Water Depth (ft) | Casing Depth (ft) | Hole Depth (ft) |
|---|---|---|---|---|
| 4/22/08 | 7:00 am | 19.5 | 35.0 | 115.1 |
| 4/24/08 | 7:00 am | 19.0 | 35.0 | 166.1 |

| DEPTH (feet) | CORING RATE (min/ft) | CORE RUN NO. AND DEPTH (ft) | RECOVERY (in) | RECOVERY (%) | RQD (%) | DESCRIPTION AND REMARKS | WEATHERING | STRENGTH | DISCONTINUITY DATA ANGLE (deg) | Jr | Ja | DEPTH (feet) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 40 | 4 | C-1 35.9 - 43.4 | 90 | 100 | 59 | C-1, 35.9-37.6' and 38.5-40.7': Light gray to medium gray PEGMATITE; medium to coarse grains of quartz, white feldspar, muscovite, and biotite; close to moderate fracture spacing; slightly weathered; medium strong; irregular seams of mica throughout; orange iron-staining above 37.6'; schist inclusion at 36.8-37.0'. 37.6-38.5' and 40.7-43.5': Dark gray to brown SCHIST; fine to medium grains of biotite, muscovite, quartz, feldspar, and scattered garnets, up to 1/8" across; very close to moderate fracture spacing, except extremely close at 43.1-43.5'; slightly weathered, except moderately weathered at 41.8-42.5'; medium strong, except weak at 41.8-42.5'; distinct wavy to laminated schistosity dips 50-75 degrees; orange iron staining at 41.8-43.0', with thin (<0.1") coatings of softened mica and gray clay on fracture surfaces. | II | R3 | *45 | 2.0 | 2.0 | 36.1 |
| | | | | | | | | | 70 | 3.0 | 2.0 | 36.5 |
| | | | | | | | | | *20 | 1.5 | 2.0 | 36.7 |
| | | | | | | | | | *60 | 1.5 | 1.0 | 37 |
| | | | | | | | | | 20 | 3.0 | 2.0 | 37.2 |
| | | | | | | | | | *40 | 2.0 | 2.0 | 37.5 |
| | | | | | | | | | *70 | 2.0 | 4.0 | 37.8 |
| | | | | | | | | | *50 | 1.5 | 2.0 | 38.4 |
| | | | | | | | | | *5 | 2.0 | 1.0 | 38.7 |
| | | | | | | | | | *40 | 1.5 | 1.0 | 39.5 |
| | | | | | | | | | 15 | 2.0 | 1.0 | 40 |
| | | | | | | | | | *60 | MB | MB | 40.7 |
| | | | | | | | | | 15 | 1.5 | 1.0 | 41 |
| | | | | | | | III | R2 | *50 | 1.0 | 4.0 | 41.8 |
| | | | | | | | | | *60 | 1.0 | 4.0 | 41.9 |
| | | | | | | | II | R3 | *60 | 1.5 | 4.0 | 42.2 |
| | | | | | | | | | *70 | 2.0 | 2.0 | 42.5 |
| 45 | 4 | C-2 43.5 - 45.3 | 21 | 100 | 57 | C-2: 43.5-44.4': Tan to light gray PEGMATITE; coarse grains of quartz, white feldspar, and muscovite, with gray schist inclusions; close fracture spacing; slightly weathered; medium strong; orange iron staining throughout, with healed hairline fractures. | II | R3 | 30 | 2.0 | 2.0 | 42.55 |
| | | | | | | | | | *75 | 1.5 | 4.0 | 42.6 |
| | | | | | | | | | 5 | 3.0 | 2.0 | 42.9 |
| | | | | | | | | | *60 | 2.0 | 1.0 | 43.2 |
| | | | | | | | | | *60 | 1.5 | 1.0 | 43.5 |
| 50 | 5 | C-3 45.2 - 55.1 | 118 | 99 | 91 | 44.4-45.2': Dark gray SCHIST; fine to coarse grains of biotite, muscovite, quartz, feldspar, scattered garnets, up to 1/8" across; close fracture spacing; slightly weathered; medium strong; distinct wavy to crenulated schistosity dips 60-75 degrees. C-3: Dark gray to medium gray SCHIST; fine to coarse grains of muscovite, biotite, quartz, feldspar, and scattered garnets, up to 1/8" across; close to moderate fracture spacing; slightly weathered; medium strong to strong; distinct crenulated schistosity dips 50-80 degrees; medium gray to tan PEGMATITE; with muscovite seams, at 47.5-48.8'; no rock wall contact, with increased weathering at fractures at 48.7' and 48.8'; clay and softened mica | II | R3/R4 | *60 | 2.0 | 2.0 | 43.8 |
| | | | | | | | | | 80 | 1.5 | 2.0 | 43.9 |
| | | | | | | | | | 50 | 2.0 | 2.0 | 44 |
| | | | | | | | | | 85 | 3.0 | 1.0 | 44.3 |
| | | | | | | | | | *60 | 1.5 | 1.0 | 44.7 |
| | | | | | | | | | 85 | 3.0 | 1.0 | 45 |
| | | | | | | | | | 30 | 3.0 | 1.0 | 45.1 |
| | | | | | | | | | 45 | 3.0 | 1.0 | 45.2 |
| | | | | | | | | | 50 | 3.0 | 1.0 | 45.8 |
| | | | | | | | | | *60 | 1.5 | 1.0 | 45.9 |
| | | | | | | | | | 30 | 2.0 | 2.0 | 47.2 |
| | | | | | | | | | 30 | 3.0 | 2.0 | 47.9 |
| | | | | | | | | | *50 | 1.5 | 2.0 | 48.3 |
| | | | | | | | | | 10 | 1.0 | 6.0 | 48.4 |
| | | | | | | | | | 10 | 3.0 | 3.0 | 48.5 |
| | | | | | | | | | 40 | 2.0 | 2.0 | 48.6 |



PARTNERSHIP CORING GDR (FINAL) 00 EPE ALL PACKAGES 4-30-08.GPJ THE PARTNERSHIP EPE (FINAL) 10-24-08.GLB 10/24/08

# CORING LOG (continued)

BORING NUMBER: **PE-274**
SHEET NUMBER: **2** of **9**
PROJECT NUMBER: **19499B**

PROJECT: **Trans-Hudson Express (THE) Project**
LOCATION: **11th Ave at 30th St, NE corner**
CLIENT: **NJ Transit**

CONTRACTOR: **Jersey Boring & Drilling**
DRILLER: **J. Kurzynowski**
INSPECTOR: **M. Tekin**

| DEPTH (feet) | CORING RATE (min/ft) | CORE RUN NO. AND DEPTH (ft) | RECOVERY (in) | RECOVERY (%) | RQD (%) | DESCRIPTION AND REMARKS | WEATHERING | STRENGTH | DISCONTINUITY DATA ANGLE (deg) | Jr | Ja | DEPTH (feet) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | on 50 degree fractures at 51.3' and 51.8'; quartz vein along schistosity at 50.1-50.2'. | | | 0 | MB | MB | 48.7 |
| | | | | | | | | | 30 | 1.0 | 6.0 | 48.8 |
| | | | | | | | | | *60 | 1.5 | 4.0 | 49.3 |
| | | | | | | | | | *60 | 1.5 | 2.0 | 49.7 |
| | | | | | | | | | *50 | 1.0 | 3.0 | 50.1 |
| | | | | | | | | | 50 | 2.0 | 4.0 | 51.3 |
| | | | | | | | | | *60 | 1.5 | 4.0 | 51.8 |
| | | | | | | | | | *60 | 2.0 | 1.0 | 53.8 |
| 55 | | | | | | | | | *60 | 1.5 | 2.0 | 54.6 |
| | | | | | | C-4: Dark gray SCHIST; fine to coarse grains of biotite, muscovite, quartz, feldspar, and many garnets, up to 1/4" across; close to moderate fracture spacing; unweathered to slightly weathered; strong; crenulated to wavy schistosity dips 40-80 degrees; no rock wall contact at near horizontal fracture at 55.5'; softened mica along foliation fractures at 62.6' and 64.7'; ptygmatically folded bands of quartz-feldspar ~1/2" thick, at 60.1-60.5'; slightly bulging core sides throughout; pure QUARTZ at 57.7-58.2' and 62.6-64.6'; lower quartz has 1/8" seams of black mafic minerals and adjacent yellow metallic mineral (gold?). | I/II | R4 | 60 | 2.0 | 1.0 | 55.1 |
| | | | | | | | | | *70 | 2.0 | 1.0 | 55.4 |
| | | | | | | | | | 10 | 1.0 | 6.0 | 55.5 |
| | | | | | | | | | 30 | 3.0 | 1.0 | 56.6 |
| | | | | | | | | | 15 | 2.0 | 2.0 | 57.8 |
| | | | | | | | | | *40 | 1.0 | 2.0 | 58.2 |
| | | | | | | | | | *60 | 1.5 | 1.0 | 58.8 |
| 60 | 5 | C-4 55.1 - 65.1 | 120 | 100 | 97 | | | | *60 | 2.0 | 1.0 | 59.7 |
| | | | | | | | | | *60 | 1.5 | 1.0 | 60.2 |
| | | | | | | | | | *50 | 1.5 | 2.0 | 61.3 |
| | | | | | | | | | *55 | 1.0 | 2.0 | 62.2 |
| | | | | | | | | | 20 | 3.0 | 1.0 | 62.3 |
| | | | | | | | | | *50 | 1.0 | 4.0 | 62.6 |
| | | | | | | | | | 0 | 2.0 | 1.0 | 63.1 |
| 65 | | | | | | | | | *50 | 1.0 | 4.0 | 64.7 |
| | | | | | | C-5: Dark gray SCHIST; fine to coarse grains of muscovite, biotite, quartz, feldspar, and scattered garnets, up to 1/8" across; close to moderate fracture spacing, except very close at 69.7-69.8' and 71.6-71.7'; unweathered to slightly weathered; strong; distinct crenulated to wavy schistosity dips 50-80 degrees; softened mica on foliation fractures at 69.7' and 69.8'; thin (<0.1") calcite coatings on foliation fractures at 73.1', 73.6' and 75.1'. | I/II | R4 | 0 | 3.0 | 2.0 | 65.1 |
| | | | | | | | | | 20 | 2.0 | 1.0 | 65.5 |
| | | | | | | | | | 20 | 1.0 | 6.0 | 65.6 |
| | | | | | | | | | *60 | 2.0 | 1.0 | 66 |
| | | | | | | | | | 15 | 3.0 | 1.0 | 67.3 |
| | | | | | | | | | 20 | 3.0 | 2.0 | 67.9 |
| | | | | | | | | | 30 | 3.0 | 1.0 | 68.4 |



PARTNERSHIP CORING GDR (FINAL) 00 EPE ALL PACKAGES 4-30-08.GPJ THE PARTNERSHIP EPE (FINAL) 10-24-08.GLB 10/24/08

# CORING LOG
(continued)

BORING NUMBER: **PE-274**
SHEET NUMBER: **3** of **9**
PROJECT NUMBER: **19499B**

PROJECT: **Trans-Hudson Express (THE) Project**
LOCATION: **11th Ave at 30th St, NE corner**
CLIENT: **NJ Transit**

CONTRACTOR: **Jersey Boring & Drilling**
DRILLER: **J. Kurzynowski**
INSPECTOR: **M. Tekin**

| DEPTH (feet) | CORING RATE (min/ft) | CORE RUN NO. AND DEPTH (ft) | RECOVERY (in) | RECOVERY (%) | RQD (%) | DESCRIPTION AND REMARKS | WEATHERING | STRENGTH | DISCONTINUITY DATA ANGLE (deg) | Jr | Ja | DEPTH (feet) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 70 | 4 | C-5 65.1 - 75.5 | 120 | 96 | 90 | | | | *60 | 1.5 | 4.0 | 69.7 |
| | | | | | | | | | *60 | 1.5 | 4.0 | 69.8 |
| | | | | | | | | | *50 | 1.5 | 2.0 | 70.8 |
| | | | | | | | | | 40 | 3.0 | 1.0 | 71.6 |
| | | | | | | | | | 40 | 3.0 | 2.0 | 71.7 |
| | | | | | | | | | *60 | 1.5 | 2.0 | 73.1 |
| 75 | | | | | | | | | *60 | 1.0 | 2.0 | 74.6 |
| | | | | | | | | | *60 | 1.0 | 2.0 | 75.1 |
| | 4 | C-6 75.5 - 85.5 | 120 | 100 | 100 | C-6: Dark gray to medium gray SCHIST; fine to coarse grains of biotite, muscovite, quartz, feldspar, and scattered garnets, up to 1/4" across; moderate to wide fracture spacing; unweathered, except slightly weathered at 81.0-81.2'; strong; foliation defined by distinct crenulated schistosity and few 1/2" thick contorted bands of quartz-feldspar; orange iron staining at 81.0'; calcite coatings on all foliation fractures; core sides slightly bulging at 77.0-80.5'. | I/II | R4 | *60 | 1.5 | 1.0 | 78 |
| | | | | | | | | | *60 | 1.5 | 1.0 | 79 |
| 80 | | | | | | | | | 50 | 2.0 | 1.0 | 79.7 |
| | | | | | | | | | 60 | MB | MB | 80.5 |
| | | | | | | | | | 50 | MB | MB | 80.7 |
| | | | | | | | | | 30 | 3.0 | 2.0 | 81 |
| | | | | | | | | | *50 | 2.0 | 1.0 | 83.5 |
| 85 | | | | | | | | | | | | |
| | | | | | | C-7: Dark gray SCHIST; fine to coarse grains of biotite, muscovite, quartz, feldspar and many garnets, up to 1/4" across; moderate to wide fracture spacing, except very close at 91.7-92.0', 94.0- 94.2' and 94.8-95.6'; unweathered, except slightly weathered at 94.8-95.5'; strong; wavy to crenulated schistosity and scattered contorted quartz bands dip 60-75 degrees; thin (<0.1") calcite coatings on | I | R4 | *60 | 2.0 | 2.0 | 85.5 |
| | | | | | | | | | 40 | 2.0 | 1.0 | 85.9 |
| | | | | | | | | | 50 | 3.0 | 1.0 | 87 |



PARTNERSHIP CORING GDR (FINAL) 00 EPE ALL PACKAGES 4-30-08.GPJ THE PARTNERSHIP EPE (FINAL) 10-24-08.GLB 10/24/08

# CORING LOG
(continued)

BORING NUMBER: **PE-274**
SHEET NUMBER: **4** of **9**
PROJECT NUMBER: **19499B**

PROJECT: **Trans-Hudson Express (THE) Project**
LOCATION: **11th Ave at 30th St, NE corner**
CLIENT: **NJ Transit**

CONTRACTOR: **Jersey Boring & Drilling**
DRILLER: **J. Kurzynowski**
INSPECTOR: **M. Tekin**

| DEPTH (feet) | CORING RATE (min/ft) | CORE RUN NO. AND DEPTH (ft) | RECOVERY (in) | RECOVERY (%) | RQD (%) | DESCRIPTION AND REMARKS | WEATHERING | STRENGTH | DISCONTINUITY DATA ANGLE (deg) | Jr | Ja | DEPTH (feet) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | foliation fractures at 89.0', 90.5', and 91.8'; no rock wall contact at weathered low-angle fracture at 95.2'. | | | *50 | 1.0 | 1.0 | 89 |
| 90 | 4 | C-7 85.5 - 95.5 | 120 | 100 | 93 | | | | *55 | 1.0 | 1.0 | 89.9 |
| | | | | | | | | | 0 | 3.0 | 1.0 | 90 |
| | | | | | | | | | *60 | 1.0 | 1.0 | 90.5 |
| | | | | | | | | | *60 | 1.5 | 1.0 | 91.8 |
| | | | | | | | | | *60 | 2.0 | 1.0 | 93.8 |
| 95 | | | | | | | II | R4 | *60 | 2.0 | 1.0 | 94.8 |
| | | | | | | | | | *70 | 1.5 | 2.0 | 95.1 |
| | | | | | | C-8: 95.5-99.1': Dark gray SCHIST; fine to medium grains of biotite, muscovite, quartz, feldspar; moderate to wide fracture spacing; unweathered; strong; wavy to crenulated schistosity dips 60-80 degrees; calcite coating on foliation fracture at 96.1'; pure QUARTZ at 98.8-99.0'. | I | R4 | *70 | 2.0 | 1.0 | 95.15 |
| | | | | | | | | | 10 | 1.0 | 6.0 | 95.2 |
| | | | | | | | | | *60 | 2.0 | 2.0 | 95.5 |
| | | | | | | | | | *80 | 2.0 | 1.0 | 96.1 |
| | | | | | | 99.1-104.7': Medium gray to light gray GRANITE; fine to medium grains of feldspar, quartz, and muscovite; wide fracture spacing; unweathered, except slightly weathered at horizontal fractures at 101.6' and 101.9'; very strong; faint near vertical banding; trace QUARTZ at 101.6-101.9', with no contact at horizontal fractures at upper and lower contacts. | | | *60 | 1.5 | 2.0 | 98.4 |
| | | | | | | | I/II | R5 | *60 | 1.5 | 1.0 | 99.1 |
| 100 | 4 | C-8 95.5 - 104.7 | 110 | 100 | 96 | | | | | | | |
| | | | | | | | | | 0 | 1.0 | 6.0 | 101.6 |
| | | | | | | | | | 0 | 1.0 | 6.0 | 101.9 |
| | | | | | | | | | 15 | MB | MB | 103.9 |
| 105 | | | | | | C-9: 104.7-111.5': Light gray GRANITE; medium grains of feldspar, quartz, and muscovite; moderate to wide fracture spacing; unweathered, except slightly weathered at 40 degree fracture at 107.0'; strong to very strong; faint banding and thin (<0.1") muscovite seams at 107.8-109.6' are near vertical; | I/II | R4/R5 | 40 | 2.0 | 1.0 | 104.7 |



PARTNERSHIP CORING GDR (FINAL) 00 EPE ALL PACKAGES 4-30-08.GPJ THE PARTNERSHIP EPE (FINAL) 10-24-08.GLB 10/24/08

# CORING LOG
(continued)

BORING NUMBER: **PE-274**
SHEET NUMBER: **5** of **9**
PROJECT NUMBER: **19499B**

PROJECT: **Trans-Hudson Express (THE) Project**
LOCATION: **11th Ave at 30th St, NE corner**
CLIENT: **NJ Transit**

CONTRACTOR: **Jersey Boring & Drilling**
DRILLER: **J. Kurzynowski**
INSPECTOR: **M. Tekin**

| DEPTH (feet) | CORING RATE (min/ft) | CORE RUN NO. AND DEPTH (ft) | RECOVERY (in) | RECOVERY (%) | RQD (%) | DESCRIPTION AND REMARKS | WEATHERING | STRENGTH | DISCONTINUITY DATA ANGLE (deg) | Jr | Ja | DEPTH (feet) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 4 | C-9 104.7 - 111.5 | 81 | 100 | 100 | pure QUARTZ at 107.0-107.5', 108.1-108.4', and 110.9-111.5'; dark gray SCHIST inclusion at 110.2-110.9', with medium grains of biotite, other mafic minerals, muscovite, quartz, and feldspar; iron staining at horizontal fracture at 110.3'. | | | 40 | 3.0 | 2.0 | 107 |
| | | | | | | | | | 0 | MB | MB | 108.3 |
| | | | | | | | | | *80 | 1.0 | 4.0 | 108.9 |
| | | | | | | | | | 20 | MB | MB | 109 |
| 110 | | | | | | | | | | | | |
| | | | | | | | | | 0 | 3.0 | 2.0 | 110.3 |
| | | | | | | | | | 20 | 3.0 | 1.0 | 110.9 |
| | 4 | C-10 111.5 - 115.5 | 48 | 100 | 100 | C-10: 111.5-112.9': Medium gray QUARTZ, with biotite schist and feldspar pegmatite inclusions; moderate fracture spacing; unweathered; strong. 112.9-115.5': Dark gray to black SCHIST; fine to medium grains of biotite, muscovite, quartz, and feldspar; moderate fracture spacing, unweathered; strong; planar schistosity dips 60 degrees; all fractures have thin (<0.1") calcite coatings. | I | R4 | *50 | 1.5 | 1.0 | 111.5 |
| | | | | | | | | | *50 | 3.0 | 1.0 | 112.9 |
| | | | | | | | | | *60 | 1.0 | 1.0 | 114 |
| 115 | | | | | | | | | *50 | 1.5 | 1.0 | 114.7 |
| | 4 | C-11 115.5 - 125.3 | 117 | 100 | 100 | C-11: Dark gray SCHIST; fine to medium grains of biotite, muscovite, quartz, and feldspar; wide fracture spacing; unweathered, except slightly weathered at near vertical fracture at 122.0'; strong; faint wavy schistosity dips 60-90 degrees; orange iron staining on rough, near vertical cross-foliation fracture at 122.0'; contorted intrusions of light gray GRANITE at 116.5-117.0', 119.3-120.7' and 123.1-124.2'; schistosity parallels contorted contacts. | I/II | R4 | *60 | 1.5 | 1.0 | 115.5 |
| | | | | | | | | | 30 | MB | MB | 117 |
| 120 | | | | | | | | | | | | |
| | | | | | | | | | 20 | 2.0 | 1.0 | 120.6 |
| | | | | | | | | | 85 | 2.0 | 2.0 | 122 |
| 125 | | | | | | | | | *60 | 1.5 | 1.0 | 124.6 |
| | | | | | | C-12: Dark gay to black SCHIST; fine to medium | I | R4 | 20 | 3.0 | 1.0 | 125.3 |



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# CORING LOG
(continued)

BORING NUMBER: **PE-274**
SHEET NUMBER: **6** of **9**
PROJECT NUMBER: **19499B**

PROJECT: **Trans-Hudson Express (THE) Project**
LOCATION: **11th Ave at 30th St, NE corner**
CLIENT: **NJ Transit**

CONTRACTOR: **Jersey Boring & Drilling**
DRILLER: **J. Kurzynowski**
INSPECTOR: **M. Tekin**

| DEPTH (feet) | CORING RATE (min/ft) | CORE RUN NO. AND DEPTH (ft) | RECOVERY (in) | RECOVERY (%) | RQD (%) | DESCRIPTION AND REMARKS | WEATHERING | STRENGTH | DISCONTINUITY DATA ANGLE (deg) | Jr | Ja | DEPTH (feet) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | grains of biotite, muscovite, quartz, feldspar, and sparse garnets, up to 1/8" across; wide fracture spacing; unweathered; strong; faint, wavy schistosity dips 60-90 degrees; pure QUARTZ, with vertical contacts at 125.3-126.0'; light gray GRANITE, with near-vertical muscovite seams, with vertical contacts along schistosity at 126.5-129.0'. | | | *60 | 1.5 | 1.0 | 126.5 |
| 130 | 5 | C-12 125.3 - 135.3 | 120 | 100 | 100 | | | | 45 | 3.0 | 1.0 | 130.2 |
| 135 | | | | | | | | | *80 | 2.0 | 2.0 | 134.6 |
| | | | | | | C-13: Dark gray SCHIST; fine to medium grains of biotite, muscovite, quartz, feldspar, and sparse medium grained garnet; close to moderate fracture spacing; unweathered to slightly weathered; strong; indistinct schistosity dips 60-90 degrees; contorted 1/2" band of quartz-feldspar at 142.4-142.6', parallel to schistosity; no rock wall contact and orange iron staining at low-angle fracture at 136.6'; thin (<0.1") calcite coating on foliation fracture at 142.8'; softened mica on smooth foliation fracture at 143.9'. | I/II | R4 | 0 | 2.0 | 1.0 | 135.3 |
| | | | | | | | | | 30 | 3.0 | 1.0 | 135.6 |
| | | | | | | | | | 20 | 1.0 | 6.0 | 136.6 |
| | | | | | | | | | 10 | 1.0 | 6.0 | 137.5 |
| | | | | | | | | | 40 | MB | MB | 138.9 |
| 140 | 4 | C-13 135.3 - 145.4 | 121 | 100 | 93 | | | | 30 | 3.0 | 1.0 | 139.9 |
| | | | | | | | | | *50 | 2.0 | 1.0 | 141 |
| | | | | | | | | | *60 | 2.0 | 1.0 | 142.8 |
| | | | | | | | | | 40 | 3.0 | 1.0 | 143.1 |
| | | | | | | | | | *50 | 1.5 | 2.0 | 143.7 |
| | | | | | | | | | *70 | 1.0 | 4.0 | 143.9 |



PARTNERSHIP CORING GDR (FINAL) 00 EPE ALL PACKAGES 4-30-08.GPJ THE PARTNERSHIP EPE (FINAL) 10-24-08.GLB 10/24/08

# CORING LOG
(continued)

BORING NUMBER: **PE-274**
SHEET NUMBER: 7 of 9
PROJECT NUMBER: **19499B**

PROJECT: **Trans-Hudson Express (THE) Project**
LOCATION: **11th Ave at 30th St, NE corner**
CLIENT: **NJ Transit**

CONTRACTOR: **Jersey Boring & Drilling**
DRILLER: **J. Kurzynowski**
INSPECTOR: **M. Tekin**

| DEPTH (feet) | CORING RATE (min/ft) | CORE RUN NO. AND DEPTH (ft) | RECOVERY (in) | RECOVERY (%) | RQD (%) | DESCRIPTION AND REMARKS | WEATHERING | STRENGTH | DISCONTINUITY DATA ANGLE (deg) | Jr | Ja | DEPTH (feet) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 145 | | | | | | | | | *60 | 1.0 | 1.0 | 144.2 |
| | | | | | | | | | 60 | 1.0 | 2.0 | 144.7 |
| | 6 | C-14 145.4 - 146.9 | 17 | 94 | 22 | C-14: 145.4-146.0': Light gray GRANITE; medium grains of quartz, feldspar, and muscovite; closely fractured; slightly weathered; strong; healed hairline fractures dip 70 degrees. | II/III | R2/R3 | *40 | 1.5 | 1.0 | 145.3 |
| | | | | | | | | | 40 | 2.0 | 1.0 | 145.4 |
| | | | | | | | | | *70 | 2.0 | 1.0 | 145.8 |
| | | | | | | | | | *60 | 1.0 | 4.0 | 146.1 |
| | 6 | C-15 146.9 - 150.4 | 35 | 83 | 60 | 146.0-146.9': Dark gray SCHIST; fine to medium grains of biotite and other mafic minerals, quartz, muscovite and feldspar; very close to extremely close fracture spacing; slightly weathered at 146.0-146.9'; moderately weathered at 146.2-146.9'; weak to medium strong; softened mica on foliation fractures below 146.0'; irregular, broken pieces are pitted and weathered. | III | R2/R3 | *60 | 1.0 | 4.0 | 146.2 |
| | | | | | | | | | 10 | 3.0 | 2.0 | 146.3 |
| | | | | | | | | | 80 | 1.5 | 2.0 | 146.4 |
| | | | | | | | II | R4 | 0 | 1.5 | 3.0 | 146.5 |
| | | | | | | | | | *50 | 1.0 | 2.0 | 146.55 |
| | | | | | | | | | 75 | 1.5 | 2.0 | 146.6 |
| | | | | | | | | | 15 | 2.0 | 2.0 | 146.65 |
| | | | | | | | | | 10 | 3.0 | 2.0 | 146.7 |
| 150 | | | | | | | | | *60 | 1.0 | 2.0 | 146.8 |
| | | | | | | C-15: 146.9-147.8': Dark gray SCHIST; as above, except extremely close fracture spacing throughout; moderately weathered; some overdrilled pieces; recovery loss likely at 146.9-147.6'; | | | 20 | 2.0 | 2.0 | 147.6 |
| | | | | | | | II | R4 | 75 | 2.0 | 2.0 | 147.65 |
| | | | | | | | | | 15 | 2.0 | 2.0 | 147.68 |
| | | | | | | 147.8-150.4': Dark gray SCHIST; fine to coarse grains of biotite, muscovite, quartz, feldspar; many garnets, up to 1/2" across; close to moderate fracture spacing; slightly weathered; strong; crenulated schistosity dips 60-80 degrees. | | | *60 | 1.5 | 1.0 | 147.7 |
| | | | | | | | | | 10 | 2.0 | 2.0 | 147.72 |
| | | | | | | | | | *70 | 2.0 | 4.0 | 148.1 |
| | | | | | | | | | 15 | 2.0 | 2.0 | 148.15 |
| | | | | | | | | | 20 | 3.0 | 2.0 | 149.9 |
| | 4 | C-16 150.4 - 156.1 | 68 | 100 | 100 | C-16: Dark gray to medium gray SCHIST; fine to coarse grains of biotite, muscovite, quartz, feldspar, sparse calcite, and many garnets, up to 3/8" across; moderate fracture spacing; slightly weathered; strong; distinct crenulated schistosity dips 60-70 degrees; calcite coating on foliation fracture at 153.0'. | | | *60 | 1.5 | 1.0 | 150.1 |
| | | | | | | | | | *70 | 2.0 | 4.0 | 150.4 |
| | | | | | | | | | *65 | MB | MB | 151.4 |
| | | | | | | | | | *65 | 1.5 | 1.0 | 151.7 |
| 155 | | | | | | | | | *60 | 1.5 | 2.0 | 153 |
| | | | | | | C-17: 156.1-158.6': Dark to medium gray SCHIST; as above, except close fracture spacing and extremely close foliation fractures at 157.6-157.8'. | II | R4 | 30 | 3.0 | 1.0 | 156.1 |
| | | | | | | | | | *60 | 1.5 | 1.0 | 156.8 |
| | | | | | | 158.6-164.2': Black to dark green AMPHIBOLITE; fine to medium grains of hornblende, quartz, biotite, and sparse calcite; close to wide fracture spacing; unweathered to slightly weathered; very strong; faint schistosity and quartz bands dip ~ 50 degrees; biotite-rich at 160.2-160.7', where core sides are slightly bulging; calcite on most fracture surfaces; extremely dense. | | | 20 | 3.0 | 2.0 | 157.4 |
| | | | | | | | | | 45 | 2.0 | 2.0 | 157.6 |
| | | | | | | | | | *50 | 1.5 | 4.0 | 157.65 |
| | | | | | | | I/II | R5 | *60 | 1.5 | 1.0 | 157.8 |
| | | | | | | | | | *50 | 1.0 | 2.0 | 158.2 |
| | | | | | | | | | *30 | 1.5 | 1.0 | 158.7 |
| 160 | | | | | | | | | 40 | 1.5 | 1.0 | 159 |
| | | | | | | | | | 30 | 2.0 | 1.0 | 160 |
| | | | | | | | | | *50 | 1.5 | 1.0 | 160.3 |
| | 4 | C-17 156.1 - 166.1 | 120 | 100 | 91 | 164.2-166.1': Dark to medium gray SCHIST; fine to medium grains of biotite, muscovite, quartz, and feldspar; moderate fracture spacing; unweathered; strong; distinct crenulated schistosity dips 60 degrees. | | | 20 | 2.0 | 1.0 | 160.7 |



PARTNERSHIP CORING GDR (FINAL) 00 EPE ALL PACKAGES 4-30-08.GPJ THE PARTNERSHIP EPE (FINAL) 10-24-08.GLB 10/24/08

# CORING LOG
(continued)

BORING NUMBER: **PE-274**
SHEET NUMBER: **8** of **9**
PROJECT NUMBER: **19499B**

PROJECT: **Trans-Hudson Express (THE) Project**
LOCATION: **11th Ave at 30th St, NE corner**
CLIENT: **NJ Transit**

CONTRACTOR: **Jersey Boring & Drilling**
DRILLER: **J. Kurzynowski**
INSPECTOR: **M. Tekin**

| DEPTH (feet) | CORING RATE (min/ft) | CORE RUN NO. AND DEPTH (ft) | RECOVERY (in) | RECOVERY (%) | RQD (%) | DESCRIPTION AND REMARKS | WEATHERING | STRENGTH | DISCONTINUITY DATA ANGLE (deg) | Jr | Ja | DEPTH (feet) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | I | R4 | 0 | 2.0 | 1.0 | 164.2 |
| 165 | | | | | | | | | *50 | 1.5 | 2.0 | 164.7 |
| | | | | | | | | | *50 | 1.5 | 1.0 | 165.3 |
| | | | | | | | | | *50 | 2.0 | 1.0 | 165.9 |
| | | | | | | C-18: 166.1-170.8': Dark gray SCHIST; as above; near vertical healed hairline fractures have orange, weathered calcite fillings. | I | R4 | 50 | 2.0 | 2.0 | 166.1 |
| | | | | | | | | | *60 | 1.5 | 4.0 | 166.8 |
| | | | | | | | | | *60 | 1.0 | 2.0 | 167.2 |
| | | | | | | 170.8-172.0': Black and white pinstriped HORNBLENDE-BIOTITE-SCHIST; fine to medium grains of hornblende, biotite, quartz, and thin (<0.1" bands of calcite; moderate fracture spacing; unweathered; very strong; distinct planar schistosity and banding dip 60-70 degrees; very dense. | | | *70 | 1.5 | 2.0 | 168.2 |
| 170 | | | | | | | | | 20 | MB | MB | 169.8 |
| | 4 | C-18 166.1 - 175.4 | 112 | 100 | 89 | 172.0 ft to 175.4 ft: Dark to medium gray SCHIST; fine to medium grains of biotite, muscovite, quartz, feldspar, and sparse garnets, up to 1/4" across; moderate fracture spacing; unweathered to slightly weathered; strong; wavy schistosity dips 70-80 degrees; calcite coatings on most fracture surfaces; pure, medium gray QUARTZ at 174.2-175.0', with yellow metallic flakes (pyrite ?) on fracture surface at 174.9'. | I | R5 | *70 | 1.5 | 1.0 | 170.6 |
| | | | | | | | | | *70 | 1.5 | 1.0 | 170.8 |
| | | | | | | | I/II | R4 | | | | |
| | | | | | | | | | *70 | 2.0 | 2.0 | 172.7 |
| | | | | | | | | | *50 | 2.0 | 1.0 | 174.1 |
| | | | | | | | | | *40 | 1.5 | 1.0 | 174.3 |
| 175 | | | | | | | | | 5 | 3.0 | 1.0 | 174.9 |
| | | | | | | | | | *70 | 2.0 | 1.0 | 175.2 |
| | | | | | | C-19, Dark gray SCHIST; fine to coarse grains of biotite, quartz, muscovite, feldspar, and medium grained garnet; close to moderate fracture spacing, except very close to extremely close at 175.7-179.1'; slightly weathered, except moderately weathered along fractures at 175.7-179.1'; strong, except weak to medium strong at 175.7-179.1'; foliation defined by distinct wavy schistosity and wavy bands and nodules of quartz; strike-slip slickensides on 80 degree foliation fracture at 177.1'; thick (>0.1") coatings of gray clay and calcite on all fractures at 177.1-179.1', most of which are along foliation. | II | R4 | *70 | 1.0 | 1.0 | 175.3 |
| | | | | | | | III | R2/R3 | 20 | 4.0 | 1.0 | 175.4 |
| | | | | | | | | | *50 | 4.0 | 4.0 | 176.3 |
| | | | | | | | | | *70 | 1.0 | 2.0 | 176.8 |
| | | | | | | | | | *80 | 0.5 | 4.0 | 177.1 |
| | 6 | C-19 175.4 - 179.1 | 44 | 100 | 23 | | | | 30 | 3.0 | 4.0 | 177.5 |
| | | | | | | | | | *70 | 1.0 | 4.0 | 177.6 |
| | | | | | | | | | *70 | 1.5 | 4.0 | 177.7 |
| | | | | | | | | | *70 | 1.0 | 4.0 | 177.9 |
| | | | | | | | II | R3/R4 | *60 | 1.0 | 4.0 | 178 |
| | | | | | | | | | *70 | 1.5 | 4.0 | 178.3 |
| 180 | | | | | | C-20: Dark to medium gray SCHIST; fine to medium grains of muscovite, biotite, quartz, feldspar, and calcite; close to moderate fracture spacing, except very close foliation fractures at 185.0-185.1'; slightly weathered; medium strong to strong; distinct planar schistosity dips 60-70 degrees; calcite coatings on | | | 50 | 2.0 | 2.0 | 178.6 |
| | | | | | | | | | *70 | 1.0 | 4.0 | 179 |
| | | | | | | | | | *70 | 1.0 | 4.0 | 179.05 |
| | 5 | | | | | | | | 30 | 2.0 | 3.0 | 179.1 |
| | | | | | | | | | *70 | 1.0 | 4.0 | 179.9 |
| | | | | | | | | | 0 | 3.0 | 2.0 | 180.5 |



PARTNERSHIP CORING GDR (FINAL) 00 EPE ALL PACKAGES 4-30-08.GPJ THE PARTNERSHIP EPE (FINAL) 10-24-08.GLB 10/24/08

# CORING LOG
(continued)

BORING NUMBER: **PE-274**
SHEET NUMBER: **9** of **9**
PROJECT NUMBER: **19499B**

PROJECT: **Trans-Hudson Express (THE) Project**
LOCATION: **11th Ave at 30th St, NE corner**
CLIENT: **NJ Transit**

CONTRACTOR: **Jersey Boring & Drilling**
DRILLER: **J. Kurzynowski**
INSPECTOR: **M. Tekin**

| DEPTH (feet) | CORING RATE (min/ft) | CORE RUN NO. AND DEPTH (ft) | RECOVERY (in) | RECOVERY (%) | RQD (%) | DESCRIPTION AND REMARKS | WEATHERING | STRENGTH | DISCONTINUITY DATA ANGLE (deg) | Jr | Ja | DEPTH (feet) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 4 | C-20 179.1 - 185.7 | 79 | 100 | 89 | almost all fractures; silt coatings on horizontal fractures at 180.5' and 184.3'; pitted horizontal healed hairline fracture at 184.35'. | | | *70 | 1.0 | 2.0 | 180.7 |
| | | | | | | | | | 15 | 1.5 | 2.0 | 181 |
| | | | | | | | | | 20 | MB | MB | 182.8 |
| | | | | | | | | | 0 | 2.0 | 3.0 | 184.3 |
| 185 | | | | | | | | | *70 | 1.0 | 4.0 | 185 |
| | | | | | | | | | *70 | 2.0 | 4.0 | 185.1 |
| | 5 | C-21 185.7 - 195.8 | 121 | 100 | 94 | C-21: 185.7-186.4': Dark gray SCHIST, as above. | II | R3/R4 | *60 | 1.0 | 2.0 | 185.5 |
| | | | | | | | | | *60 | 1.0 | 1.0 | 185.7 |
| | | | | | | 186.4-191.2': Light to medium gray GRANITE; fine to medium grains of quartz, feldspar, muscovite, and sparse medium grained garnet; moderate fracture spacing; unweathered; very strong; faint banding dips 50 degrees; quartz-feldspar PEGMATITE at 187.4 ft, 187.8 ft, 190.0-190.3', and 190.7-191.1';; dark gray schist at 188.1-188.6'. | I | R5 | *60 | 1.0 | 1.0 | 185.8 |
| | | | | | | | | | *60 | 1.0 | 4.0 | 185.9 |
| | | | | | | | | | *50 | 1.0 | 1.0 | 186.4 |
| | | | | | | | | | 10 | MB | MB | 186.7 |
| | | | | | | | | | *50 | 1.0 | 1.0 | 188.1 |
| 190 | | | | | | 191.2-194.0': Dark to medium gray SCHIST; fine to medium grains of biotite, muscovite, quartz, and feldspar; wide fracture spacing; slightly weathered; strong; distinct planar schistosity dips 50 degrees. | | | | | | |
| | | | | | | 194.1-195.8': Light gray GRANITE, as above except close to moderate fracture spacing; slightly weathered; strong; schist inclusion at 195.3-195.6'; very close horizontal fractures at 194.8-194.9' have orange iron staining and silt coatings. | II | R4 | *50 | 1.0 | 1.0 | 191.4 |
| | | | | | | | | | 45 | 3.0 | 1.0 | 194.1 |
| 195 | | | | | | | | | 0 | 1.5 | 3.0 | 194.8 |
| | | | | | | | | | 5 | 1.5 | 3.0 | 194.9 |
| | | | | | | | | | 0 | 2.0 | 1.0 | 195.4 |
| | | | | | | End of Boring at 195.8' | | | 10 | 2.0 | 1.0 | 195.5 |
| | | | | | | | | | 80 | 3.0 | 1.0 | 195.7 |
| | | | | | | | | | 15 | 2.0 | 1.0 | 195.8 |
| 200 | | | | | | | | | | | | |



PARTNERSHIP CORING.GDR (FINAL) 00 EPE ALL PACKAGES 4-30-08.GPJ THE PARTNERSHIP EPE (FINAL) 10-24-08.GLB 10/24/08

BORING LOGS - MG SERIES - MABSTOA GARAGE AREA

MUESER, RUTLEDGE, JOHNSTON & DESIMONE
WOODWARD–CLYDE CONSULTANTS, INC.

# BORING LOG

SHEET 1 of 2
BORING NO. MG-801
FILE NO. 4840

| | | | |
|---|---|---|---|
| PROJECT: WEST SIDE HIGHWAY | DOT. CONTR. NO.: D 250002 | ELEVATION: + 16.1 | |
| COORDINATES: N 191932.3 | E 1999628.3 | DATUM: Manhattan | |
| BORING LOCATION: MTA Yard, MABSTOA Garage | | DATE STARTED: 03/26/82 | |
| INSPECTOR: B. Mukherjee (MRJD) | | DATE COMP.: 03/29/82 | |
| CONTRACTOR: Warren George, Inc. | | | |
| DRILLER: J. Stevenson | HELPER: J. Bowen | | |
| TYPE OF RIG: TRUCK ☒ SKID ☐ BARGE MOUNTED ☐ TRIPOD ☐ OTHER ☐ | | | |
| CASING: DIA. 4 IN. FROM 0.0 TO 43.0 FT.; DIA. 3 IN. FROM 0.0 TO 45.0 FT. | | | |
| DRILLING MUD UTILIZED: MUD TYPE | | ROTARY BIT DIA. 3 3/4, 2 15/16 IN | |
| SAMPLING EQUIPMENT, (TYPE & SIZE) | D–SAMPLER: Split Spoon, 2" O.D. | DRILL ROD BW | |
| | U–SAMPLER: DIA. IN.: TYPE | | |
| | CORE BIT Diamond, BX | CORE BARREL Double Barrel | |
| FEED DURING CORING: MECHANICAL ☐ HYDRAULIC ☒ OTHER ☐ | | | |
| SAMPLER HAMMER: WEIGHT (LBS) 140 | AVG. FALL 30 IN. | | |
| CASING HAMMER: WEIGHT (LBS) 300 | AVG. FALL 18 IN. | | |
| NO. OF U–TUBES – NO. OF VANE TESTS – | DEPTH TO ROCK 45.0 FT. | DEPTH TO COMP. 60.0 FT. | |

WATER LEVEL OBSERVATIONS

| DATE | TIME | DEPTH OF HOLE | DEPTH OF CASING | DEPTH TO WATER | ELEVATION OF TIDE | CONDITIONS OF OBSERVATION |
|---|---|---|---|---|---|---|
| 03/29/82 | 0800 | 42.0 | 43.0 | 7.5 | | After weekend |
| 03/29/82 | 1345 | 60.0 | 43.0 | 14.5 | | After 20 minutes of completion of drilling |
| 03/29/82 | 1405 | 60.0 | 43.0 | 11.9 | | |
| 03/29/82 | 1430 | 40.0 | 0.0 | 11.5 | | |

| DAILY PROGRESS | CASING BLOWS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH (FT) | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 0800 | – | | | | | | | |
| | 2 | 1D | 0.7 | 10-10 | Brown f-c sand, sm silt, trace Cinders (Fill)(SM) | * 0.3 Loose to medium compact, brn, f-c sand & gravel, some silt, trace cinders (Fill) | 0 | *Concrete |
| | 16 | | 2.7 | 11-4 | | | | |
| | 16 | | | | | | | |
| | 25 | | | | | | | |
| | 39 | 2D | 5.0 | 5-10 | Graveland some decomposed mica schist, silt (Fill) (GM) | | 5 | |
| | 43 | | 7.0 | 11-35 | | | | |
| | 29 | | | | | | | |
| | 26 | | | | | | | |
| | 21 | | | | | | | |
| | 15 | 3D | 10.0 | 6-2 | Red-brown silty fine sand (Fill)(SM) | | 10 | |
| | 13 | | 12.0 | 1-2 | | | | |
| | 11 | | | | | | | |
| | 30 | | | | | | | |
| | 52 | | | | | | | |
| | 29 | 4D | 15.0 | 12-12 | Top: Yellow-brown m-f sand, sm silt (Fill)(SM) | | 15 | |
| | 31 | | 17.0 | 9-10 | | 16.0 | | |
| | 37 | | | | Bot: Brown silty fine sand, tr gravel (SM) | Medium compact, brn & red-brn f-m sand, sm silt, tr clay, gravel, mica | | |
| | 41 | | | | | | | |
| | 53 | | | | | | | |
| | 42 | 5D | 20.0 | 12-11 | Brown f-m sand, tr mica (SP) | | 20 | |
| | 46 | | 22.0 | 10-11 | | | | |
| | 48 | | | | | | | |
| | 43 | | | | | | | |
| | 45 | | | | | | | |
| | 30 | 6D | 25.0 | 10-9 | Brown fine sand, some silt, tr m-c sand, gvl, mica (SM) | | 25 | |
| | 40 | | 27.0 | 10-15 | | | | |
| | 50 | | | | | | | |
| | 62 | | | | | | | |
| | 58 | | | | | | | |

Cloudy, Rain 03/28/82

BORING NO. MG-801

MUESER, RUTLEDGE, JOHNSTON & DESIMONE
WOODWARD–CLYDE CONSULTANTS, INC.

# BORING LOG

SHEET 2 of 2
BORING NO. MG-801
FILE NO. 4840

| DAILY PROGRESS | CASING BLOWS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH (FT) | REMARKS |
|---|---|---|---|---|---|---|---|---|
| Same as above | 49 | 7D | 30.0 | 7-9 | Red-brown silty fine sand, sm mica, trace clay layers (SM) | same as above | 30 | |
| | 54 | | 32.0 | 12-12 | | | | |
| | 63 | | | | | | | |
| | 70 | | | | | | | |
| | 75 | | | | | | | |
| | 57 | 8D | 35.0 | 8-8 | Red-brown silty fine sand, tr mica (SM) | | 35 | |
| | 66 | | 37.0' | 9-14 | | | | |
| | 75 | | | | | | | |
| | 89 | | | | | | | |
| | 84 | | | | | | | |
| | 132 | 9D | 40.0 | 14-29 | Red-brown gravelly c-f sand, some silt (SM) | 40.0 9D Very Compact | 40 | |
| 1500 | 104 | | 42.0 | 37-23 | | | | |
| 0700 | 250 | | | | | | | **44.0'-45.0' Drilled |
| | ** | | | | | 43.0 *** | | ***Dec. rock. 43.5'-45.0' Decomposed mica schist was observed in cuttings. |
| | | 1C | 45.0 | Rec= 94% | Light gray mica schist, trace quartz inclusions, cljtd, UnWExJts | 45.0 Light gray mica schist cljtd-jtd UnWExJts | 45 | |
| | | | 50.0 | RQD= 60% | | | | |
| Sunny 03/29/82 | | 2C | 50.0 | Rec= 98% | Do 1C | | 50 | |
| | | | 55.0 | RQD= 66% | | | | |
| | | 3C | 55.0 | Rec= 86% | Light gray mica schist, jtd, UnWExJts | | 55 | |
| | | | 60.0 | RQD= 78% | | | | |
| 1430 | | | | | | 60.0 | 60 | |
| | | | | | | | 65 | |
| | | | | | | | 70 | |
| | | | | | | | 75 | |
| | | | | | | | 80 | |
| | | | | | | | 85 | |

BORING NO. MG-801

MUESER, RUTLEDGE, JOHNSTON & DESIMONE
WOODWARD–CLYDE CONSULTANTS, INC.

SHEET 1 of 3
BORING NO. MG-802P
FILE NO. 4840

# BORING LOG

| | |
|---|---|
| PROJECT: WEST SIDE HIGHWAY | DOT. CONTR. NO.: D 250002 |
| COORDINATES: N 191930.5 E 1999414.1 | ELEVATION: +13.6 |
| | DATUM: Manhattan |
| BORING LOCATION: MTA Yard, MABSTOA Garage | DATE STARTED: 03/30/82 |
| INSPECTOR: B. Mukherjee (MRJD) | DATE COMP.: 03/31/82 |
| CONTRACTOR: Warren George, Inc. | |
| DRILLER: J. Stevenson | HELPER: C. Soto |

TYPE OF RIG: TRUCK ☒ SKID ☐ BARGE MOUNTED ☐ TRIPOD ☐ OTHER ☐

CASING: DIA. 3 IN. FRDM 0.0 TO 39.5 FT.; DIA. IN. FRDM TD FT.

DRILLING MUD UTILIZED: MUD TYPE

ROTARY BIT DIA. 2 15/16 IN

SAMPLING EQUIPMENT, (TYPE & SIZE): D-SAMPLER: Split Spoon, 2" O.D. DRILL ROD BW; U-SAMPLER: DIA. IN.: TYPE; CORE BIT Diamond, BX CORE BARREL Double Barrel

FEED DURING CORING: MECHANICAL ☐ HYDRAULIC ☑ OTHER ☐

SAMPLER HAMMER: WEIGHT (LBS) 140 AVG. FALL 30 IN.

CASING HAMMER: WEIGHT (LBS) 300 AVG. FALL 18 IN.

NO. OF U-TUBES – NO. OF VANE TESTS – DEPTH TO ROCK 39.5 FT. DEPTH TO COMP. 63.0 FT.

WATER LEVEL OBSERVATIONS

| DATE | TIME | DEPTH OF HOLE | DEPTH OF CASING | DEPTH TO WATER | ELEVATION OF TIDE | CONDITIONS OF OBSERVATION |
|---|---|---|---|---|---|---|
| 03/31/82 | 0830 | 63.0 | 34.0 | 8.9 | | Overnight |
| 04/01/82 | 1300 | 20.0 | 20.0 | 9.0 | | Inside Piezometer |

| DAILY PROGRESS | CASING BLOWS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH (FT) | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 0800 | 1 | | | | | * | 0 | *Sidewalk Concrete |
| | 11 | 1D | 1.0 | 8-14 | Dark brn f-m sand, sm silt, tr gvl, cinders (Fill) (SM) | 0.3 | | |
| | 19 | | 3.0 | 20-10 | | | | W = Water content in % |
| | 23 | | | | | | | |
| | 16 | | | | | | | |
| | 5 | 2D | 5.0 | 4-2 | Brn silty f-m sand, tr cinders, gravel (Fill) (SM) | Loose brown silty fine to medium sand, sm silt, tr gvl, cndrs (Fill) | 5 | |
| | 4 | | 7.0 | 3-2 | | | | |
| | 12 | | | | | | | |
| | 11 | | | | | | | |
| | 8 | | | | | | | |
| | 7 | 3D | 10.0 | 6-5 | Brn silty f-m sand, tr gvl (Fill) (SM) | | 10 | Recovered in second attempt. |
| | 6 | | 12.0 | 3-1 | | | | |
| | 7 | | | | | | | |
| | 8 | | | | | | | |
| | 8 | | | | | | | |
| | 12 | 4D | 15.0 | 4-2 | Brn silty f-m sand, tr gvl (Fill) (SM) | | 15 | |
| | 10 | | 17.0 | 2-8 | | | | |
| | 20 | | | | | | | |
| | 29 | | | | | | | |
| | 28 | | | | | | | |
| | 21 | 5D | 20.0 | 3-4 | Brown silt, trace fine sand (ML) | 20.0 | 20 | W = 18 |
| | 29 | | 22.0 | 5-7 | | Loose brn silt, tr fine sand | | |
| | 32 | | | | | | | |
| | 36 | | | | | | | |
| | 40 | | | | | | | |
| | 36 | 6D | 25.0 | 3-5 | Do 5D (ML) | | 25 | W = 38 |
| | 35 | | 27.0 | 6-7 | | | | |
| | 47 | | | | | | | |
| | 54 | | | | | | | |
| | 55 | | | | | | 30 | |

Sunny 03/30/82

BORING NO. MG-802P

MUESER, RUTLEDGE, JOHNSTON & DESIMONE
WOODWARD–CLYDE CONSULTANTS, INC.

SHEET 2 of 3
BORING NO. MG-802P
FILE NO. 4840

# BORING LOG

| DAILY PROGRESS | CASING BLOWS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH (FT) | REMARKS |
|---|---|---|---|---|---|---|---|---|
| | 34 | *7D | 30.0 | 5-6 | Brown m-f sand, tr coarse sand, silt (SP) | Med cpt. brown m-f sand, sm silt, mica trace coarse sand | 30 | *Sample probably wash |
| | 43 | | 32.0 | 7-8 | | | | |
| | 51 | | | | | | | |
| | 60 | | | | | | | |
| | 72 | | | | | | | |
| | 45 | 8D | 35.0 | 3-6 | Brown m-f sand, sm silt, mica (SM) | | 35 | |
| | 41 | | 37.0 | 9-11 | | | | |
| | 57 | | | | | | | |
| | 92 | | | | | | | |
| | 150/6" | | | | | | | |
| | | 1C | 40.0 | Rec=96% | Light gray mica schist & qtz veins, broken UnWExJts | 40.0 | 40 | Jnts mostly parallel to foliation. |
| | | | 45.0 | RQD=30% | | | | |
| Sunny | | | | | | | | |
| | | 2C | 45.0 | Rec=88% | Light gray qtz garnet mica schist, broken, UnWExJts to HiW | Lt gray quartz garnet mica sch broken, UnWExJts to HiW | 45 | |
| | | | 47.0 | RQD=14% | | | | |
| 03/30/82 | | 3C | 50.0 | Rec=60% | Do 2C | | 50 | |
| | | | 55.0 | RQD= 0% | | | | |
| | | 4C | 55.0 | Rec=46% | Light gray mica schist, bkn HiW to SlW | | 55 | Decomposed rock washed out. Between 56.9'-60.0' |
| | | | 57.6 | RQD= 0% | | 56.9 4C | | |
| | | 5C | 60.0 | Rec=73% | White and light gray micaceous quartzite & mica schist, bkn, UnWExJts | 60.0 5C | 60 | Core barrel blocked at 63.0' |
| 1530 | | | 63.0 | RQD=16% | | 63.0 | | |
| | | | | | | | 65 | |
| | | | | | | | 70 | |
| | | | | | | | 75 | |
| | | | | | | | 80 | |
| | | | | | | | 85 | |

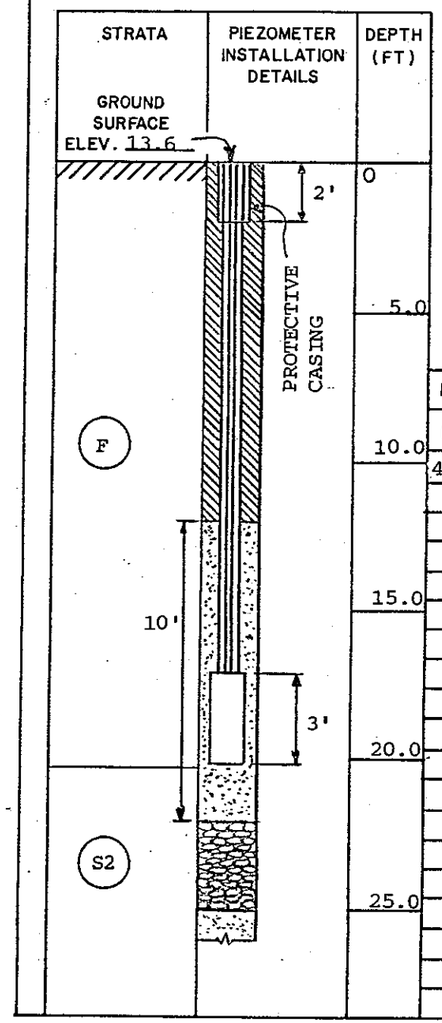
BORING NO. MG-802P

SHEET 3 OF 3
FILE NO. 4840
SUBCODE SMBST

# MUESER, RUTLEDGE, JOHNSTON & DESIMONE
CONSULTING ENGINEERS

## PIEZOMETER RECORD

PROJECT WEST SIDE HIGHWAY-CONTRACT 5 PIEZOMETER NO. MG-802P
LOCATION MABSTOA GARAGE
PIEZOMETER LOCATION 10th AVE & W 30th STREET DATE OF INSTALLATION 3-30-82
☐ SEE SKETCH ON BACK RES. ENG. B. Mukherjee




PIEZOMETER TYPE DOUBLE TUBE POROUS PLASTIC

**INTAKE POINT**

depth to bottom, ft= 20.0
depth to top, ft= 17.0
length, ft= 3' =L
diameter, in= 1.5, ft= 0.125 =2R

**STANDPIPE/RISER** (DOUBLE TUBE)

elevation of rim, ft= 13.6
diameter, in= 3/8, ft= 0.031 =2r

| READING TIME DATE | CLOCK | DEPTH - RIM TO WATER | ELEVATION OF WATER | REMARKS |
|---|---|---|---|---|
| 4-1-82 | 1300 | 9.0 | 4.0 | 1/2" Rainfall on 3-31-82 |

Sand, Gravel, Bentonite, Grout

GROUND SURFACE ELEV. 13.6

PIEZOMETER NO. MG-802P

# MUESER, RUTLEDGE, JOHNSTON & DESIMONE
WOODWARD-CLYDE CONSULTANTS, INC.

SHEET 1 of 2
BORING NO. MG-803
FILE NO. 4840

## BORING LOG

PROJECT: WEST SIDE HIGHWAY | DOT. CONTR. NO.: D 250002 | ELEVATION: + 14.1
COORDINATES: N 192031.4 E 1999465.7 | DATUM: Manhattan
BORING LOCATION: MTA Yard, MABSTOA Garage | DATE STARTED: 03/25/82
INSPECTOR: Y.K. Chan (MRJD) | DATE COMP.: 03/26/82
CONTRACTOR: Warren George, Inc.
DRILLER: B. Nicolosi | HELPER: W. Myrick
TYPE OF RIG: TRUCK ☒ SKID ☐ BARGE MOUNTED ☐ TRIPOD ☐ OTHER ☐
CASING: DIA. 4 IN. FROM 0.0 TO 24.0 FT.; DIA. 3 IN. FROM 0.0 TO 45.0 FT.
DRILLING MUD UTILIZED: MUD TYPE | ROTARY BIT DIA. 4 IN.
SAMPLING EQUIPMENT (TYPE & SIZE): D-SAMPLER: Split Spoon, 2" O.D. | DRILL ROD NW
U-SAMPLER: DIA. IN.: TYPE
CORE BIT Diamond, NX | CORE BARREL Double Barrel
FEED DURING CORING: MECHANICAL ☐ HYDRAULIC ☒ OTHER ☐
SAMPLER HAMMER: WEIGHT (LBS) 140 AVG. FALL 30 IN.
CASING HAMMER: WEIGHT (LBS) 360 AVG. FALL 18-24 IN.
NO. OF U-TUBES – NO. OF VANE TESTS – DEPTH TO ROCK 44.0 FT. DEPTH TO COMP. 72.8 FT.

WATER LEVEL OBSERVATIONS

| DATE | TIME | DEPTH OF HOLE | DEPTH OF CASING | DEPTH TO WATER | ELEVATION OF TIDE | CONDITIONS OF OBSERVATION |
|---|---|---|---|---|---|---|
| 03/26/82 | 0800 | 50.0 | 45.0 | 9.3 | | Overnight. Rain in the morning |
| 03/26/82 | 1313 | 72.8 | 45.0 | 9.8 | | At completion of boring |
| 03/26/82 | 1353 | 72.8 | 0.0 | 7.3 | | 40 Minutes after completion of boring |

| DAILY PROGRESS | CASING BLOWS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH (FT) | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 0830 | *** | | | | | * | 0 | *Asphalt |
| | | 1D | 1.0 | 5-6 | Dk brn f-c sand, sm silt, tr gvl, brk, cinders (Fill)(SM) | 0.3 | | ***Drilled |
| | W | | 3.0 | 4-30 | | | | W = Water content in % |
| | 5 | | | | | | | |
| | 12 | | | | | | | |
| | 9 | NR | 5.0 | 1-2 | | | 5 | |
| | 8 | | 7.0 | 2-3 | | | | |
| | 10 | 2D | 7.0 | 2-2 | Dk brn f-c sand, sm silt, tr gvl (Fill)(SM) | | | |
| | 8 | | 9.0 | 4-7 | | | | |
| | 14 | | | | | | | |
| | 16 | 3D | 10.0 | 4-1 | Brown silty fine to medium sand (Fill)(SM) | | 10 | |
| | 11 | | 12.0 | 1-4 | | | | |
| | 13 | | | | | | | |
| | 16 | | | | | | | |
| | 19 | | | | | | | |
| Cloudy | 21 | 4D | 15.0 | 17-23 | Brown fine to coarse sand, some silt, gravel (SM) | Loose brn f-c sand, sm silt, tr gravel, brick, cinders (Fill) | 15 | |
| | 34 | | 17.0 | 19-31 | | | | |
| | 58 | | | | | | | |
| | 54 | | | | | 18.0 | | |
| | 29 | | | | | | | |
| | 33 | 5D | 20.0 | 31-11 | Red-brown silt, trace fine sand (ML) | Compact brn silt, sm to trace fine sand Layers | 20 | W = 26 |
| | 46 | | 22.0 | 9-11 | | | | |
| | 49 | | | | | | | |
| | 44 | | | | | | | |
| | D | | | | | | | |
| | R | NR | 25.0 | 16-12 | | | 25 | |
| | I | | 27.0 | 15-16 | | | | |
| | L | 6D | 27.0 | 9-13 | Red-brn silt, sm fine sand layers (ML) | | | W = 26 |
| | L | | 29.0 | 14-23 | | | | |
| | R | | | | | | 30 | |
| 03/25/82 | | | | | | | | |

BORING NO. MG-803

MUESER, RUTLEDGE, JOHNSTON & DESIMONE
WOODWARD–CLYDE CONSULTANTS, INC.

## BORING LOG

SHEET 2 of 2
BORING NO. MG-803
FILE NO. 4840

| DAILY PROGRESS | CASING BLOWS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH (FT) | REMARKS |
|---|---|---|---|---|---|---|---|---|
| | D | 7D | 30.0 | 6-10 | Top: Red-brn silt, sm fine sand layers (ML) | **** | 30 | ****/D Top: |
| | E | | 32.0 | 15-16 | Bot: Red-brn m-f sand, some silt (SM) | 30.8 | | |
| | L | | | | | | | |
| | L | | | | | | | |
| | I | | | | | | | |
| | R | 8D | 35.0 | 7-11 | Red-brown silt, some fine to medium sand (ML) | | 35 | W = 26 |
| | D | | 37.0 | 14-15 | | | | |
| Sunny | | | | | | | | |
| | | 9D | 40.0 | 21-16 | Red-brown f-c sand, some gravel silt (SM) | Med cpt red-brown f-c sand some silt, trace gravel | 40 | |
| | | | 42.0 | 13-20 | | | | |
| 03/25/82 | | | | | | | | |
| | | 1C | 45.0 | Rec=77% | Gray mica schist, trace pegmatite, bkn, HiW to UnWExJts | 45.0 | 45 | |
| | | | 50.0 | RQD=25% | | | | |
| 1530 | | | | | | | | |
| 0800 | | 2C | 50.0 | Rec=82% | Gray mica schist, trace quartzite veins, bkn, HiW to UnWExJts | Gray mica schist, tr quartzite veins, bkn, HiW to UnWExJts | 50 | |
| | | | 55.0 | RQD=26% | | | | |
| Rain | | | | | | | | |
| | | 3C | 55.0 | Rec=86% | Top: Do 2C | | 55 | |
| | | | 60.0 | RQD=43% | Bot: White micaceous quartzite, jointed, UnWExJts | 57.0 | | |
| | | 4C | 60.0 | Rec=90% | White micaceous quartzite, tr mica schist, cljtd, UnWExJts to SlW | White mic quartzite to granitic gneiss tr mica schist pkts,cljtd,UnWExJts to SlW | 60 | |
| | | | 65.0 | RQD=52% | | | | |
| Cloudy, Occa. | | | | | | | | |
| 03/26/82 | | 5C | 65.0 | Rec=80% | White micaceous quartzite to granitic gneiss, tr mica schist pkts,cljtd, UnW to SlW | | 65 | Core barrel blocked off at 65.0'. |
| | | | 67.8 | RQD=28% | | | | |
| | | 6C | 67.8 | Rec=90% | Do 5C, UnWExJts | | | |
| | | | 72.8 | RQD=45% | | | | |
| 1313 | | | | | | 72.8 | 70 | |
| | | | | | | | 75 | |
| | | | | | | | 80 | |
| | | | | | | | 85 | |

BORING NO. MG-803

MUESER, RUTLEDGE, JOHNSTON & DESIMONE
WOODWARD–CLYDE CONSULTANTS, INC.

## BORING LOG

SHEET 1 of 2
BORING NO. MG-804
FILE NO. 4840

| | | | |
|---|---|---|---|
| PROJECT: WEST SIDE HIGHWAY | DOT. CONTR. NO.: D 250002 | | ELEVATION: + 12.5 |
| COORDINATES: N 192012.9 | E 1999268.0 | | DATUM: Manhattan |
| BORING LOCATION: MTA Yard, MABSTOA Garage | | | DATE STARTED: 04/12/82 |
| INSPECTOR: Y.K. Chan (MRJD) | | | DATE COMP.: 04/12/82 |
| CONTRACTOR: Warren George, Inc. | | | |
| DRILLER: V. Gandolfo | HELPER: J. Loconte | | |
| TYPE OF RIG: TRUCK ☒ SKID ☐ BARGE MOUNTED ☐ TRIPOD ☐ OTHER ☒ CME-75 | | | |
| CASING: DIA. 3 IN. FROM 0.0 TO 30.5 FT.; DIA. IN. FROM TO FT. | | | |
| DRILLING MUD UTILIZED: MUD TYPE | | | ROTARY BIT DIA. 2 15/16 IN. |
| SAMPLING EQUIPMENT, (TYPE & SIZE) | D-SAMPLER: Split Spoon, 2" O.D. | | DRILL ROD N |
| | U-SAMPLER: DIA. IN.: TYPE | | |
| | CORE BIT Diamond, NX | | CORE BARREL Double Barrel |
| FEED DURING CORING: MECHANICAL ☐ HYDRAULIC ☒ OTHER ☐ | | | |
| SAMPLER HAMMER: WEIGHT (LBS) 140 | AVG. FALL 30 IN. | | |
| CASING HAMMER: WEIGHT (LBS) 300 | AVG. FALL 18 IN. | | |
| NO. OF U-TUBES – NO. OF VANE TESTS – | DEPTH TO ROCK 30.3 FT. | DEPTH TO COMP. 40.5 FT. | |

WATER LEVEL OBSERVATIONS

| DATE | TIME | DEPTH OF HOLE | DEPTH OF CASING | DEPTH TO WATER | ELEVATION OF TIDE | CONDITIONS OF OBSERVATION |
|---|---|---|---|---|---|---|
| 04/12/82 | 1516 | 40.5 | 30.5 | 13.8 | | At Completion |
| 04/12/82 | 1645 | 40.5 | 0.0 | 9.2 | | |

| DAILY PROGRESS | CASING BLOWS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH (FT) | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 0900 | 2 | | | | | * | 0 | * Concrete |
| | 8 | 1D | 0.5 | 10-8 | Dark brown m-f sand, sm silt, tr gravel, cinders (Fill)(SM) | 0.5 | | |
| | 13 | | 2.5 | 6-7 | | | | |
| | 13 | | | | | | | |
| | 9 | | | | | | | |
| | 10 | 2D | 5.0 | 3-8 | Do 1D (Fill)(SM) | Medium compact to loose brown c-f sand, sm silt, tr gravel, cinders, clay (Fill) | 5 | |
| | 20 | | 7.0 | 13-10 | | | | |
| | 16 | | | | | | | |
| | 12 | | | | | | | |
| | 10 | | | | | | | |
| | 4 | ‡3D | 10.0 | 3-1 | Brown c-f sand, tr silt, gravel (Fill) (SP-SM) | | 10 | ** Washed sample |
| Sunny | 5 | | 12.0 | 1-2 | | | | |
| | 10 | | | | | | | |
| | 7 | | | | | | | |
| | 10 | | | | | | | |
| | 18 | 4D | 15.0 | 6-11 | Brown medium to fine sand, sm silt, tr clay (Fill)(SM) | | 15 | |
| | 23 | | 17.0 | 13-13 | | | | |
| | 31 | | | | | | | |
| | 37 | | | | | 18.0 | | |
| | 44 | | | | | | | |
| 04/12/82 | 33 | 5D | 20.0 | 11-10 | Brown silty fine sand, tr m-c sand, gravel, mica (SM) | Med cpt, brn silty fine sand | 20 | Attempted twice for 6" recovery |
| | 37 | | 22.0 | 15-15 | | | | |
| | 40 | | | | | | | |
| | 49 | | | | | | | |
| | 47 | | | | | | | |
| | 40 | 6D | 25.0 | 13-8 | Red-brown silty m-f sand, tr gravel, and clay (SM-SC) | 25.0 | 25 | |
| | 45 | | 27.0 | 10-7 | | 6D Med Cpt. | | |
| | 45 | | | | | | | |
| | 57 | | | | | | | |
| | 61 | | | | | | 30 | |

BORING NO. MG-804

MUESER, RUTLEDGE, JOHNSTON & DESIMONE
WOODWARD–CLYDE CONSULTANTS, INC.

BORING LOG

SHEET 2 of 2
BORING NO. MG-804
FILE NO. 4840

| DAILY PROGRESS | CASING BLOWS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH (FT) | REMARKS |
|---|---|---|---|---|---|---|---|---|
| | | 7D | 30.0 | 100/4" | Red-brown silt, sm fine sand, and rock fgmts (ML) | 7D | 30 | |
| | | | 30.3 | | | 30.3 | | |
| | | 1C | 30.5 | Rec=96% | Gray garnet mica schist, cljtd UnWExJts | | | |
| | | | 35.5 | RQD=52% | | | | |
| same as above | | | | | | | 35 | |
| | | 2C | 35.5 | Rec=100% | Gray garnet mica schist, trace quartz inclusions, jtd to Mdjt, UnWExJts | 2C | | |
| | | | 40.5 | RQD=82% | | | | |
| 1530 | | | | | | | 40 | |
| | | | | | | 40.5 | | |
| | | | | | | | 45 | |
| | | | | | | | 50 | |
| | | | | | | | 55 | |
| | | | | | | | 60 | |
| | | | | | | | 65 | |
| | | | | | | | 70 | |
| | | | | | | | 75 | |
| | | | | | | | 80 | |
| | | | | | | | 80 | |

BORING NO. MG-804

MUESER, RUTLEDGE, JOHNSTON & DESIMONE
WOODWARD–CLYDE CONSULTANTS, INC.

BORING LOG

SHEET 1 of 2
BORING NO. MG-805
FILE NO. 4840

PROJECT: WEST SIDE HIGHWAY | DOT. CONTR. NO.: D 250002 | ELEVATION: +12.0
COORDINATES: N 192111.7 E 1999322.6 | DATUM: Manhattan
BORING LOCATION: MTA Yard, MABSTOA Garage | DATE STARTED: 03/23/82
INSPECTOR: B. Mukherjee (MRJD) | DATE COMP.: 03/24/82
CONTRACTOR: Warren George, Inc.
DRILLER: J. Stevenson | HELPER: J. Bowen
TYPE OF RIG: TRUCK ☒ SKID ☐ BARGE MOUNTED ☐ TRIPOD ☐ OTHER ☐
CASING: DIA. 4 IN. FROM 0.0 TO 30.0 FT.; DIA. 3 IN. FROM 0.0 TO 32.0 FT.
DRILLING MUD UTILIZED: MUD TYPE | ROTARY BIT DIA. 3 3/4 IN.
SAMPLING EQUIPMENT, (TYPE & SIZE): D-SAMPLER: Split Spoon, 2" O.D. | DRILL ROD
U-SAMPLER: DIA. IN.: TYPE
CORE BIT Diamond, BX | CORE BARREL Double Barrel
FEED DURING CORING: MECHANICAL ☐ HYDRAULIC ☒ OTHER ☐
SAMPLER HAMMER: WEIGHT (LBS) 140 AVG. FALL 30 IN.
CASING HAMMER: WEIGHT (LBS) 300 AVG. FALL 18 IN.
NO. OF U-TUBES -- NO. OF VANE TESTS -- DEPTH TO ROCK 32.3 FT. DEPTH TO COMP. 52.3 FT.

WATER LEVEL OBSERVATIONS

| DATE | TIME | DEPTH OF HOLE | DEPTH OF CASING | DEPTH TO WATER | ELEVATION OF TIDE | CONDITIONS OF OBSERVATION |
|---|---|---|---|---|---|---|
| 03/24/82 | 0730 | 42.3 | 32.0 | 8.0 | | Overnight |
| 03/24/82 | 1130 | 52.3 | 30.0 | 7.5 | | While withdrawing 3" casing |
| 03/24/82 | 1140 | 52.3 | 25.0 | 7.8 | | " " " " " |
| 03/24/82 | 1145 | 52.3 | 10.0 | 8.0 | | " " " " " |
| 03/24/82 | 1200 | - | 0.0 | 8.4 | | After withdrawing all 3" casing |

| DAILY PROGRESS | CASING BLOWS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH (FT) | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 0700 | - | | | | | * | 0 | *Asphalt |
| | 31 | | | | | 0.5 | | |
| | 35 | 1D | 2.3 | 12-10 | Dark gray c-f sand, sm silt, cinders (Fill)(SM) | Med cpt cinders, c-f sand (Fill) | | W = Water content in % |
| | 79 | | 4.3 | 7-25 | | | | |
| | 50 | | | | | | | |
| | 17 | 2D | 5.0 | 22-7 | Gray silty fine sand, tr gvl, silt (Fill)(SM) | 5.0 | 5 | |
| | 24 | | 7.0 | 3-3 | | | | |
| | 19 | | | | | Loose gray m-f sand, trace gravel (Fill) | | |
| | 7 | | | | | | | |
| | 5 | | | | | | | |
| | 8 | 3D | 10.0 | 2-3 | Gray medium to fine sand, sm silt, tr gravel (Fill)(SM) | | 10 | |
| | 9 | | 12.0 | 2-4 | | | | |
| Tuesday | 10 | | | | | | | |
| | 15 | | | | | | | |
| | 24 | | | | | | | |
| | 29 | 4D | 15.0 | 12-10 | Red-brn silt, sm fine sand, tr gravel (ML) | 15.0 | 15 | W = 18 |
| | 36 | | 17.0 | 9-8 | | | | |
| | 44 | | | | | | | |
| | 46 | | | | | | | |
| | 53 | | | | | | | |
| | 50 | 5D | 20.0 | 9-12 | Red-brown silt, sm fine sand, tr mica, gravel (ML) | Med cpt red-brn, silt sm fine sand, tr mica, gravel | 20 | ▲25.0'-29.0' Drilled ahead of casing. |
| | 76 | | 22.0 | 16-16 | | | | |
| | 124 | | | | | | | |
| | 134 | | | | | | | |
| | 137 | | | | | | | |
| 03/24/82 | ▲83 | *6D | 25.0 | 10-16 | Do 5D (ML) | | 25 | *Recovered 6D in second attempt. W = 26 |
| | 75 | | 27.0 | 17-20 | | | | |
| | 263 | | | | | 27.0 *** | | ***Hard drilling at 27.0'. Possible till. |
| | 95 | | | | | | | |
| | 79 | | | | | | 30 | |

BORING NO. MG - 805

MUESER, RUTLEDGE, JOHNSTON & DESIMONE
WOODWARD–CLYDE CONSULTANTS, INC.

## BORING LOG

SHEET 2 of 2
BORING NO. MG-805
FILE NO. 4840

| DAILY PROGRESS | CASING BLOWS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH (FT) | REMARKS |
|---|---|---|---|---|---|---|---|---|
| | **** | NR | 30.0 | 52/1" | | * | 30 | ****Drilled |
| | | | 30.1 | | | 30.2 | | *Hard drilling. Possible till. |
| | | 7D | 32.0 | 100/4" | Gray micaceous f-m sand, trace silt (Decomposed rock) (SP) | 7D 32.3 | | |
| | | | 32.3 | | | 1C Top | | |
| | | 1C | 32.3 | Rec=84% | Top: Gry mica schist, tr qtz | | 35 | |
| | | | 37.3 | RQD=48% | veins, cljtd, SlW | | | **Buff white micaceous quartzite, jtd to cljtd, UnWExJtd |
| | | | | | Bot:Buff white quartzite, jtd, UnW | ** | | |
| | | 2C | 37.3 | Rec=90% | Top: Buff white micaceous | 38.3 | | |
| | | | 42.3 | RQD=36% | quartzite, cljtd, UnW | | 40 | |
| | | | | | Bot: Gry mica schist, bkn SlW | Gray mica schist, bkn to jointed, SlW to UnWExJts | | |
| 03/23/82 Sunny 1530 | | | | | | | | |
| 0700 | | 3C | 42.3 | Rec=90% | Gray mica schist, cljtd to jtd | | | |
| | | | 47.3 | RQD=70% | UnWExJts | | 45 | |
| 03/24/82 Sunny | | | | | | | | |
| | | 4C | 47.3 | Rec=98% | Gray mica schist, jtd to | | | |
| | | | 52.3 | RQD=78% | cljtd, UnWExJts | | 50 | |
| 1200 | | | | | | | | |
| | | | | | | 52.3 | | |
| | | | | | | | 55 | |
| | | | | | | | 60 | |
| | | | | | | | 65 | |
| | | | | | | | 70 | |
| | | | | | | | 75 | |
| | | | | | | | 80 | |
| | | | | | | | 85 | |

BORING NO. MG-805

MUESER, RUTLEDGE, JOHNSTON & DESIMONE
WOODWARD–CLYDE CONSULTANTS, INC.

## BORING LOG

SHEET 1 of 2
BORING NO. MG-806
FILE NO. 4840

| | | | |
|---|---|---|---|
| PROJECT: WEST SIDE HIGHWAY | DOT. CONTR. NO.: D 250002 | | ELEVATION: +12.0 |
| COORDINATES: N 192163.2 | E 1999353.2 | | DATUM: Manhattan |
| BORING LOCATION: MTA Yard, MABSTOA Garage | | | DATE STARTED: 03/24/82 |
| INSPECTOR: B. Mukherjee (MRJD) | | | DATE COMP.: 03/25/82 |
| CONTRACTOR: Warren George, Inc. | | | |
| DRILLER: J. Stevenson | HELPER: J. Bowen | | |
| TYPE OF RIG: TRUCK ☒ SKID ☐ BARGE MOUNTED ☐ TRIPOD ☐ OTHER ☐ | | | |
| CASING: DIA. 4 IN. FROM 0.0 TO 27.3 FT.; DIA. 3 IN. FROM 30.0 TO FT. | | | |
| DRILLING MUD UTILIZED: MUD TYPE | | | ROTARY BIT DIA. 3 3/4 IN. |
| SAMPLING EQUIPMENT, (TYPE & SIZE) | O-SAMPLER: Split Spoon, 2" O.D. | | DRILL ROD BX |
| | U-SAMPLER: DIA. IN.: TYPE | | |
| | CORE BIT Diamond, BX | | CORE BARREL Double Barrel |
| FEED DURING CORING: MECHANICAL ☐ | HYDRAULIC ☒ | OTHER ☐ | |
| SAMPLER HAMMER: WEIGHT (LBS) 140 | | AVG. FALL 30 IN. | |
| CASING HAMMER: WEIGHT (LBS) 300 | | AVG. FALL 18 IN. | |
| NO. OF U-TUBES – | NO. OF VANE TESTS – | DEPTH TO ROCK 29.0 FT. | DEPTH TO COMP. 40.0 FT. |

WATER LEVEL OBSERVATIONS

| DATE | TIME | DEPTH OF HOLE | DEPTH OF CASING | DEPTH TO WATER | ELEVATION OF TIDE | CONDITIONS OF OBSERVATION |
|---|---|---|---|---|---|---|
| 03/25/82 | 0730 | 17.0 | 15.0 | 2.0 | | |
| 03/25/82 | 1330 | 40.0 | 27.3 | 8.0 | | At completion of drilling |
| 03/25/82 | 1340 | 40.0 | 15.0 | 5.5 | | |
| 03/25/82 | 1350 | – | 0.0 | 6.2 | | |

| DAILY PROGRESS | CASING BLOWS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH (FT) | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 1300 | – | | | | | * | 0 | *Concrete |
| | 27 | 1D | 1.0 | 8-12 | Gray-brn silty f-m sand, cndrs | 0.5 | | W = Water content in % |
| | 32 | | 3.0 | 11-13 | (Fill) (SM) | Loose to med cpt, gry to gry-brn f-c sand, cinders (Fill) | | |
| | 24 | | | | | | | |
| | 18 | | | | | | 5 | |
| 03/24/82 Sunny | 8 | 2D | 5.0 | 3-3 | Gray f-c sand, sm silt, dec | | | |
| | 39 | | 7.0 | 9-17 | mica schist (Fill)(SM) | | | |
| | 35 | | | | | | | |
| | 32 | | | | | | | |
| | 29 | | | | | | | |
| | 24 | 3D | 10.0 | 1-2 | Gry-brn m-f sand, sm silt, tr | | 10 | |
| | 33 | | 12.0 | 7-4 | organic, bricks, cndrs, shells | | | |
| | 49 | | | | (Fill)(SM) | | | |
| | 55 | | | | | | | |
| | 51 | | | | | 13.5 | | |
| | *34 | 4D | 15.0 | 3-3 | Red-brn silt, sm fine sand, tr | | 15 | *15.0'-25.0' drilled ahead of casing. W = 21 |
| 1500 | 31 | | 17.0 | 4-6 | gravel (ML) | | | |
| 0700 | 26 | | | | | | | |
| | 24 | | | | | | | |
| | 24 | | | | | | | |
| | 24 | 5D | 20.0 | 7-9 | Red-brown silty fine sand | Med compact red-brown fine sand and silt | 20 | |
| | 21 | | 22.0 | 10-12 | (SM) | | | |
| 03/25/82 Sunny | 24 | | | | | | | |
| | 26 | | | | | | | |
| | 27 | | | | | | | |
| | 29 | 6D | 25.0 | 9-11 | Gray-brown silt, trace fine | | 25 | Till at spoon tip in sample 6D |
| | 65 | | 27.0 | 12-12 | sand, gravel (ML) | 26.0 | | |
| | 60/4" | | | | | 6D | | |
| | * | | | | | | | *Drilled |
| | | | | | | 29.0 | 30 | 1C Top ** |

BORING NO. MG-806

MUESER, RUTLEDGE, JOHNSTON & DESIMONE
WOODWARD–CLYDE CONSULTANTS, INC.

BORING LOG

SHEET 2 of 2
BORING NO. MG-806
FILE NO. 4840

| DAILY PROGRESS | CASING BLOWS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH (FT) | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 03/25/82 Sunny | | 1C | 30.0 | Rec=96% | Top: Light gray mica schist, cljtd,UnWExJts | | 30 | |
| | | | 35.0 | RQD=70% | Bot: White micaceous quartzite, cljtd, UnWExJts | 1C Top | | |
| | | | | | | 33.5 | | |
| | | 2C | 35.0 | Rec=100% | Top: White micaceous quartzite, & granitic gneiss,jtd,UnWExJts | 2C Top | 35 | |
| | | | 40.0 | RQD=90% | Bot: Gray mica schist, jointed, UnWExJts | | | |
| 1330 | | | | | | 39.2* | 40 | *2C, Bottom |
| | | | | | | 40.0 | | |
| | | | | | | | 45 | |
| | | | | | | | 50 | |
| | | | | | | | 55 | |
| | | | | | | | 60 | |
| | | | | | | | 65 | |
| | | | | | | | 70 | |
| | | | | | | | 75 | |
| | | | | | | | 80 | |
| | | | | | | | 85 | |

BORING NO. MG-806

MUESER, RUTLEDGE, JOHNSTON & DESIMONE
WOODWARD–CLYDE CONSULTANTS, INC.

BORING LOG

SHEET 1 of 2
BORING NO. MG-807
FILE NO. 4840

| | | | |
|---|---|---|---|
| PROJECT WEST SIDE HIGHWAY | DOT. CONTR. NO.: D 250002 | | ELEVATION: +11.5 |
| COORDINATES: N 192101.8 | E 1999110.6 | | DATUM: Manhattan |
| BORING LOCATION: MTA Yard, MABSTOA Garage | | | DATE STARTED: 03/30/82 |
| INSPECTOR: Y.K. Chan (MRJD) | | | DATE COMP.: 03/31/82 |
| CONTRACTOR: Warren George, Inc. | | | |
| DRILLER: J. Farrell | HELPER: G. McCartar | | |
| TYPE OF RIG: TRUCK ☒ SKID ☐ BARGE MOUNTED ☐ TRIPOD ☐ OTHER ☒ CME-75 | | | |
| CASING: DIA. 4 IN. FROM 0.0 TO 26.3 FT.; DIA. IN. FROM TO FT. | | | |
| DRILLING MUD UTILIZED: MUD TYPE | | | ROTARY BIT DIA. 3 7/8 IN. |
| SAMPLING EQUIPMENT, (TYPE & SIZE) | D-SAMPLER: Split Spoon, 2" O.D. | | DRILL ROD NW |
| | U-SAMPLER: DIA. IN.: TYPE | | |
| | CORE BIT Diamond, NX | | CORE BARREL Double Barrel |
| FEED DURING CORING: MECHANICAL ☐ | HYDRAULIC ☒ | OTHER ☐ | |
| SAMPLER HAMMER: WEIGHT (LBS) 140 | | AVG. FALL 30 IN. | |
| CASING HAMMER: WEIGHT (LBS) 300 | | AVG. FALL 18 IN. | |
| NO. OF U-TUBES – | NO. OF VANE TESTS – | DEPTH TO ROCK 26.3 FT. | DEPTH TO COMP. 36.5 FT. |

WATER LEVEL OBSERVATIONS

| DATE | TIME | DEPTH OF HOLE | DEPTH OF CASING | DEPTH TO WATER | ELEVATION OF TIDE | CONDITIONS OF OBSERVATION |
|---|---|---|---|---|---|---|
| 03/31/82 | 0730 | 26.3 | 26.3 | 4.5 | | Overnight at start of drilling |
| 03/31/82 | o940 | 36.5 | 26.3 | 6.2 | | At completion |
| 03/31/82 | 1010 | 36.5 | 0 | 8.2 | | 30 minutes after completion |

| DAILY PROGRESS | CASING BLOWS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH (FT) | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 1100 | – | | | | | 0.3 | 0 | *Concrete |
| 03/30/82 Sunny | 7 | 1D | 1.0 | 8-10 | Brown f-m sand, sm silt tr gvl brick, cindrs, (Fill)(SM) | Loose to medium cpt brown f-c sand, sm silt, tr gravel, brick cinders (Fill) | | |
| | 12 | | 3.0 | 7-8 | | | | |
| | 13 | | | | | | | |
| | 4 | | | | | | | |
| | 8 | 2D | 5.0 | 3-3 | Brown f-c sand, sm silt, tr gravel (Fill)(SM) | | 5 | |
| | 14 | | 7.0 | 2-7 | | | | |
| | 15 | | | | | | | |
| | 13 | | | | | | | |
| | 3 | | | | | | | |
| | 4 | NR | 10.0 | 1-2/18" | | | 10 | |
| | 10 | | 12.0 | | | | | |
| | 15 | 3D | 12.0 | 4-3 | Brown c-f sand, tr silt, gvl (Fill) (SP-SM) | | | |
| | 17 | | 14.0 | 9-7 | | | | |
| | 4 | | | | | | | |
| | 9 | NR | 15.0 | 3-4 | | | 15 | |
| | 11 | | 17.0 | 3-3 | Top: Brn silty f-m sand, tr gvl (Fill) (SM) | | | |
| | 18 | 4D | 17.0 | 9-8 | | | | |
| | 25 | | 19.0 | 13-18 | Bot: Red-brn silty f sa,tr mica (SM) | 18.0 | | |
| | 29 | | | | | | | |
| | 40 | 5D | 20.0 | 7-9 | Red-brn silty f-c sand, tr gvl (SM) | Red-brn f-c sand sm silt, trace gravel | 20 | |
| | 73 | | 22.0 | 17-26 | | | | |
| | 165 | | | | | | | |
| | *68 | | | | | | | *24.0'-26.0' Drilled ahead of casing. |
| | 42 | | | | | | | |
| 1530 | | | | | | | | |
| 0700 | 30 | 6D | 25.0 | 23-20 | Red-brown m-f sand, sm silt,tr gvl, c sand (SM) | | 25 | |
| Same as below | | | 26.3 | 100/4" | | | | |
| | | 1C | 26.3 | Rec=98% | Gray garnet mica schist, cljtd to bkn, UnWExJts | 26.3 1C | | |
| | | | 31.5 | RQD=64% | | | 30 | |

BORING NO. MG-807

MUESER, RUTLEDGE, JOHNSTON & DESIMONE
WOODWARD–CLYDE CONSULTANTS, INC.

BORING LOG

SHEET 2 of 2
BORING NO. MG-807
FILE NO. 4840

| DAILY PROGRESS | CASING BLOWS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH (FT) | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 03/31/82 Cloudy, Rain 1100 | | 2C | 31.5 | Rec=98% | Gray garnet mica schist, sm white granite pegmatite, jtd, UnWExJts | 2C | 30 | |
| | | | 36.5 | RQD=82% | | 36.5 | 35 | |
| | | | | | | | 40 | |
| | | | | | | | 45 | |
| | | | | | | | 50 | |
| | | | | | | | 55 | |
| | | | | | | | 60 | |
| | | | | | | | 65 | |
| | | | | | | | 70 | |
| | | | | | | | 75 | |
| | | | | | | | 80 | |
| | | | | | | | 85 | |

BORING NO. MG-807

MUESER, RUTLEDGE, JOHNSTON & DESIMONE
WOODWARD–CLYDE CONSULTANTS, INC.

BORING LOG

SHEET 1 of 2
BORING NO. MG-808
FILE NO. 4840

PROJECT: WEST SIDE HIGHWAY | DOT. CONTR. NO.: D 250002 | ELEVATION: +10.1
COORDINATES: N 192191.2 E 1999178.9 | DATUM: Manhattan
BORING LOCATION: MTA Yard, MABSTOA Garage | DATE STARTED: 03/19/82
INSPECTOR: Y.K. Chan (MRJD) | DATE COMP.: 03/22/82
CONTRACTOR: Warren George, Inc.
DRILLER: B. Nicolosi | HELPER: W. Myrick
TYPE OF RIG: TRUCK ☒ SKID ☐ BARGE MOUNTED ☐ TRIPOD ☐ OTHER ☐
CASING: DIA. 4 IN. FROM 0.0 TO 35.0 FT.; DIA. IN. FROM TO FT.
DRILLING MUD UTILIZED: MUD TYPE | ROTARY BIT DIA. 4 IN.
SAMPLING EQUIPMENT, (TYPE & SIZE): D-SAMPLER: Split Spoon, 2" O.D. | DRILL ROD NW
U-SAMPLER: DIA. IN.: TYPE
CORE BIT Diamond, NX | CORE BARREL Double Barrel
FEED DURING CORING: MECHANICAL ☐ HYDRAULIC ☒ OTHER ☐
SAMPLER HAMMER: WEIGHT (LBS) 140 AVG. FALL 30 IN.
CASING HAMMER: WEIGHT (LBS) 300 AVG. FALL 24 IN.
NO. OF U-TUBES – NO. OF VANE TESTS – DEPTH TO ROCK 34.5 FT. DEPTH TO COMP. 58.0 FT.

WATER LEVEL OBSERVATIONS

| DATE | TIME | DEPTH OF HOLE | DEPTH OF CASING | DEPTH TO WATER | ELEVATION OF TIDE | CONDITIONS OF OBSERVATION |
|---|---|---|---|---|---|---|
| 03/22/82 | 0745 | 31.5 | 29.0 | 8.0 | | Over the weekend |
| 03/22/82 | 1300 | 58.0 | 35.0 | 6.0 | | At completion. Rods still in hole. |
| 03/22.82 | 1336 | 58.0 | 0.0 | 5.3 | | 36 min. after completion |

| DAILY PROGRESS | CASING BLOWS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH (FT) | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 1100 | – | | | | | | 0 | *Asphalt Roller bit to 1.0' ahead of casing |
| | 25 | 1D | 1.0 | 11-13 | Black c-f sand, sm cndrs, silt, trace gravel (Fill)(SM) | 0 Loose to med cpt brn to dk brn silty f-c sand, sm* bricks, cinders (Fill) | | |
| | 29 | | 3.0 | 11-11 | | | | |
| | 21 | | | | | | | |
| | 4 | | | | | | | |
| | 14 | 2D | 5.0 | 4-3 | Brick and wood, some m-f sand, cinders (Fill)(SP) | | 5 | W = Water content in % |
| | 9 | | 7.0 | 21-20 | | | | |
| | 14 | | | | | | | |
| | 10 | | | | | | | Lost water at 7.0' |
| | 6 | | | | | | | |
| | 25 | 3D | 10.0 | 10-5 | Dark brn silty m-f sand, sm dec rock, tr coarse sand, wood (Fill)(SM) | | 10 | |
| | 25 | | 12.0 | 8-4 | | | | |
| | 27 | | | | | | | |
| | 20 | | | | | 13.0 | | |
| | 20 | | | | | | | |
| Cloudy | 27 | 4D | 15.0 | 5-6 | Red-brn silt, tr fine sand, mica (ML) | Med cpt red-brn silt, tr fine sand, mica | 15 | W = 30 |
| | 35 | | 17.0 | 6-11 | | | | |
| | 66 | | | | | | | |
| | 95 | | | | | | | |
| | 50 | | | | | | | |
| 03/19/82 | 46 | 5D | 20.0 | 8-11 | Top: Do 4D (ML) | | 20 | W = 26 |
| | 65 | | 22.0 | 12-17 | Bot: Red-brn f sand, sm silt, tr mica (SM) | | | |
| | 70 | | | | | 20.2 | | |
| | 55 | | | | | Med cpt brn f-c sand, sm silt, tr gravel | | |
| | 53 | | | | | | | |
| | 46 | 6D | 25.0 | 8-11 | Top: Do 5D, bottom (SM) | | 25 | W = 17 |
| | 38 | | 27.0 | 16-20 | Bot: Red-brn silty f-c sand, sm gravel (SM) | | | |
| | 17 | | | | | | | |
| | 18 | | | | | | | |
| 1530 | 37 | | | | | | 30 | |

BORING NO. MG-808

MUESER, RUTLEDGE, JOHNSTON & DESIMONE
WOODWARD–CLYDE CONSULTANTS, INC.

## BORING LOG

SHEET 2 of 2
BORING NO. MG 808
FILE NO. 4840

| DAILY PROGRESS | CASING BLOWS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH (FT) | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 0700 | 34 | 7D | 30.0 | 30-45 | Brn c-f sand, sm gvl, tr mica, silt (SP-SM) | 7D | | |
| | 45 | | 31.5 | 100/5" | | | | |
| | 44 | | | | | | | |
| | 74 | | | | | | | |
| | 85 | | | | | | | |
| | | 1C | 35.0 | Rec=82% | Gray garnet mica schist, tr qtz inclusions, cljtd to bkn, UnWExJts to S1W | 34.5 Light gray garnet mica schist, tr quartz veins, cljtd to jtd, UnWExJts | 35 | |
| | | | 39.5 | RQD=26% | | | | |
| Sunny & Windy | | | | | | | | |
| | | 2C | 39.5 | Rec=100% | Gray garnet mica schist, tr qtz inclusions, cljtd to bkn, UnWExJts | | 40 | |
| | | | 43.0 | RQD=42% | | | | |
| | | 3C | 43.0 | Rec=96% | Light gray garnet mica schist tr qtz veins, cljtd, UnWExJts | | | |
| | | | 48.0 | RQD=64% | | | 45 | |
| 03/22/82 | | 4C | 48.0 | Rec=100% | Light gray qtz garnet mica schist, tr qtz veins, cljtd, UnWExJts | | 50 | Drilling rod bend while drilling at 46.0'. Rod was changed at 50.6'. |
| | | | 53.0 | RQD=54% | | | | |
| | | 5C | 53.0 | Rec=94% | Light gray garnet mica schist, jtd, UnWExJts | | 55 | |
| | | | 58.0 | RQD=80% | | | | |
| 1330 | | | | | | 58.0 | 60 | |
| | | | | | | | 65 | |
| | | | | | | | 70 | |
| | | | | | | | 75 | |
| | | | | | | | 80 | |
| | | | | | | | 85 | |

BORING NO. MG-808

MUESER, RUTLEDGE, JOHNSTON & DESIMONE
WOODWARD–CLYDE CONSULTANTS, INC.

## BORING LOG

SHEET 1 of 2
BORING NO. MG-809
FILE NO. 4840

PROJECT: WEST SIDE HIGHWAY | DOT. CONTR. NO.: D 250002 | ELEVATION: +10.2
COORDINATES: N 192243.0 E 1999210.9 | DATUM: Manhattan
BORING LOCATION: MTA Yard, MABSTOA Garage | DATE STARTED: 03/22/82
INSPECTOR: Y.K. Chan (MRJD) | DATE COMP.: 03/24/82
CONTRACTOR: Warren George, Inc.
DRILLER: B. Nicolosi | HELPER: W. Myrick
TYPE OF RIG: TRUCK ☒ SKID ☐ BARGE MOUNTED ☐ TRIPOD ☐ OTHER ☐
CASING: DIA. 4 IN. FROM 0.0 TO 40.0 FT.; DIA. 3 IN. FROM 0.0 TO 52.0 FT.
DRILLING MUD UTILIZED: MUD TYPE | ROTARY BIT DIA. 4 IN.
SAMPLING EQUIPMENT (TYPE & SIZE): D-SAMPLER: Split Spoon, 2" O.D. | DRILL ROD NW
U-SAMPLER: DIA. IN.: TYPE
CORE BIT Diamond, NX | CORE BARREL Double Barrel
FEED DURING CORING: MECHANICAL ☐ HYDRAULIC ☒ OTHER ☐
SAMPLER HAMMER: WEIGHT (LBS) 140 AVG. FALL 30 IN.
CASING HAMMER: WEIGHT (LBS) 300 AVG. FALL 18-24 IN.
NO. OF U-TUBES – NO. OF VANE TESTS – DEPTH TO ROCK 40.0 FT. DEPTH TO COMP. 61.2 FT.

WATER LEVEL OBSERVATIONS

| DATE | TIME | DEPTH OF HOLE | DEPTH OF CASING | DEPTH TO WATER | ELEVATION OF TIDE | CONDITIONS OF OBSERVATION |
|---|---|---|---|---|---|---|
| 03/23/82 | 0730 | 10.0 | 9.0 | 5.2 | | Overnight |
| 03/24/82 | 1417 | 61.2 | 40.0 | 8.2 | | At completion 3" casing completely pulled out |

| DAILY PROGRESS | CASING BLOWS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH (FT) | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 1400 | – | | | | | * | 0 | *Concrete |
| | 14 | 1D | 1.0 | 11-24 | Brn-blk m-f sand, sm silt, cndrs tr brick (Fill) (SM) | 0.7 Cpt to loose brn-blk m-f sand, sm silt, cndr gvl, frag of concrete (Fill) | | W = Water content in % |
| | 20 | | 3.0 | 20-23 | | | | W = 15 |
| Windy & | 14 | | | | | | | |
| | 6 | | | | | | | |
| | 10 | 2D | 5.0 | 5-4 | Brn m-f sand & brick, tr silt, gvl (Fill) (SP) | | 5 | |
| | 9 | | 7.0 | 4-5 | | | | |
| 03/22/82 Sunny | 7 | | | | | | | |
| | 22 | | | | | | | |
| 1530 | 7 | | | | | | | |
| 0700 | 81 | 3D | 10.0 | 7 1/2" | Brn m-f sand, sm silt, gvl, tr brick (Fill) (SM) | | 10 | Boulders or concrete encountered from 10.2' to 11.5' W = 17 |
| | 160 | | 10.2 | | | | | |
| | 114 | 4D | 12.0 | 5-7 | Brn silt, tr mica, fine sand (ML) | 11.5 Med cpt silty f-m sand, tr gvl, mica | | |
| | 106 | | 14.0 | 13-16 | | | | |
| | 71 | | | | | | | |
| | 70 | 5D | 15.0 | 14-9 | Brn silty f-m sand, tr gvl, mica (SM) | | 15 | |
| | 108 | | 17.0 | 12-7 | | | | |
| | 111 | | | | | | | |
| | 98 | | | | | | | |
| | 75 | | | | | | | |
| | 45 | NR | 20.0 | 12-12 | | 20.0 Cpt red-brn silty fine to medium sand | 20 | |
| | 45 | | 22.0 | 11-14 | | | | |
| | 61 | 6D | 22.0 | 10-8 | Red-brn silty f-m sand (SM) | | | |
| | 72 | | 24.0 | 9-9 | | | | |
| Sunny | 42 | | | | | | | |
| | 38 | *NR | 25.0 | 7-8 | | | 25 | Attempted sample twice. No recovery. Red-brn material in wash water. |
| | 46 | * | 27.0 | 8-13 | | | | |
| 03/23/82 | 58 | NR | 27.0 | 1-3 | | | | |
| | 62 | | 29.0 | 8-7 | | | | |
| | 53 | | | | | | 30 | |

BORING NO. MG-809

MUESER, RUTLEDGE, JOHNSTON & DESIMONE
WOODWARD–CLYDE CONSULTANTS, INC.

BORING LOG

SHEET 2 of 2
BORING NO. MG-809
FILE NO. 4840

| DAILY PROGRESS | CASING BLOWS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH (FT) | REMARKS |
|---|---|---|---|---|---|---|---|---|
| | 77 | 7D | 30.0 | 14-17 | Brown c-f sand, sm silt, gvl (SM) | Cpt light brn c-f sand, tr to sm silt gravel | 30 | |
| | 81 | | 32.0 | 32-35 | | | | |
| | 100 | | | | | | | |
| | 90 | | | | | | | |
| Sunny | *14 | | | | | | | 34.0'-40.0' Casing drilled ahead |
| | 24 | 8D | 35.0 | 42-17 | Light brown c-f sand, tr silt, gravel (SP) | | 35 | |
| | 31 | | 37.0 | 14-63 | | | | |
| | 91 | | | | | | | |
| 03/25/82 | 62 | | | | | | | |
| | 46 | | | | | | | |
| | | 1C | 40.0 | Rec=90% | Top:Light gray garnet mica schist, cljtd, SlW | | 40 | |
| | | | 45.0 | RQD=68% | Bot: White granitic gneiss,jtd UnWExJts | 40.0 1C TOP | | Core barrel blocked off by sand recirculating in drilling fluid. |
| 1530 | | | | | | 42.5 | | |
| 0700 | | 2C | 45.0 | Rec=97% | White granitic gneiss, cljtd, UnWExJts | Wht granitic gns jtd to cljtd UnWExJts | 45 | |
| | | | 48.5 | RQD=60% | | | | |
| | | | | | | | | |
| | | 3C | 48.5 | Rec=80% | Top:Green-gry mica schist, bkn, HiW | 48.5 3C TOP | 50 | 3" casing telescoped inside 4" casing to 52.0' to seal off HiW rock 48.5' - 50.0'. |
| | | | 53.5 | RQD=36% | Bot: Gry mica schist, tr qtz veins & wthd pegmatite, cljtd to bkn, UnWExJts to HiW | | | |
| Sunny | | | | | | | | |
| | | 4C | 53.5 | Rec=100% | Gry garnet mica schist, tr qtz pkts, cljtd,UnWExJts | Gry mica schist & pegmatite,tr qtz veins jtd to bkn, UnWExJts | 55 | |
| 03/24/82 | | | 56.2 | RQD=78% | | | | |
| | | 5C | 56.2 | Rec=100% | Gray mica schist and white granitic pegmatite, jtd, UnWExJts. | | | |
| | | | 61.2 | RQD=74% | | | | |
| 1530 | | | | | | | 60 | |
| | | | | | | 61.2 | | |
| | | | | | | | 65 | |
| | | | | | | | 70 | |
| | | | | | | | 75 | |
| | | | | | | | 80 | |
| | | | | | | | 85 | |

BORING NO. MG-809

MUESER, RUTLEDGE, JOHNSTON & DESIMONE
WOODWARD–CLYDE CONSULTANTS, INC.

BORING LOG

SHEET 1 of 2
BORING NO. MG-813
FILE NO. 4840

| | | | |
|---|---|---|---|
| PROJECT: WEST SIDE HIGHWAY | DOT. CONTR. NO.: D 250002 | | ELEVATION: +9.3 |
| COORDINATES: N 192265.1 | E 1999064.0 | | DATUM: Manhattan |
| BORING LOCATION: MTA Yard, MABSTOA Garage | | | DATE STARTED: 03/18/82 |
| INSPECTOR: B. Mukherjee (MRJD) | | | DATE COMP.: 03/19/82 |
| CONTRACTOR: Warren George, Inc. | | | |
| DRILLER: J. Stevenson | HELPER: J. Bowen | | |
| TYPE OF RIG: TRUCK ☒ SKID ☐ BARGE MOUNTED ☐ TRIPOD ☐ OTHER ☐ | | | |
| CASING: DIA. 4 IN. FROM 0.0 TO 13.5 FT.; DIA. IN. FROM TO FT. | | | |
| DRILLING MUD UTILIZED: MUD TYPE | | | ROTARY BIT DIA. 3 3/4,2 5/16 IN |
| SAMPLING EQUIPMENT, (TYPE & SIZE) | D-SAMPLER: Split Spoon, 2" O.D. | | DRILL ROD BW |
| | U-SAMPLER: DIA. IN.: TYPE | | |
| | CORE BIT Diamond, BX | | CORE BARREL Double Barrel |
| FEED DURING CORING: MECHANICAL ☐ HYDRAULIC ☒ OTHER ☐ | | | |
| SAMPLER HAMMER: WEIGHT (LBS) 140 | AVG. FALL 30 IN. | | |
| CASING HAMMER: WEIGHT (LBS) 300 | AVG. FALL 18 IN. | | |
| NO. OF U-TUBES – NO. OF VANE TESTS – | DEPTH TO ROCK 14.0 FT. | DEPTH TO COMP. 41.0 FT. | |

WATER LEVEL OBSERVATIONS

| DATE | TIME | DEPTH OF HOLE | DEPTH OF CASING | DEPTH TO WATER | ELEVATION OF TIDE | CONDITIONS OF OBSERVATION |
|---|---|---|---|---|---|---|
| 03/19/82 | 1400 | 41.0 | 13.5 | 4.0 | | At completion of rock coring |
| 03/19/82 | 1415 | 41.0 | 5.0 | 4.7 | | |
| 03/19/82 | 1420 | – | 0.0 | 4.5 | | |

| DAILY PROGRESS | CASING BLOWS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH (FT) | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 1145 | 10 | 1D | 0.5 | 19-20 | Gray c-f sand, sm gravel, silt, cinders (Fill)(SM) | 0.3* Cpt to loose gray,brn c-f sand, sm gvl, silt,tr cinders (Fill) | 0 | * Asphalt |
| | 43 | | 2.5 | 18-14 | | | | |
| | 46 | | | | | | | |
| | 51 | | | | | | | |
| | 45 | | | | | | | |
| | 25 | 2D | 5.0 | 9-7 | Gray & brn c-f sand, sm gvl, silt (Fill)(SM) | | 5 | |
| | 31 | | 7.0 | 11-11 | | | | |
| | 24 | | | | | | | |
| Sunny | 32 | | | | | | | |
| | 23 | | | | | | | |
| | 18 | 3D | 10.0 | 13-5 | Gray-brown m-f sand, sm gravel, silt (Fill)(SM) | | 10 | |
| | 15 | | 12.0 | 4-2 | | | | **Decomposed rock Decomposed mica schist in cuttings at 13.5' |
| | 20 | | | | | | | |
| 03/18/82 | 23/6" | | | | | 13.5 | | |
| | | 1C | 14.0 | Rec=98% | Light gray mica schist, broken to cljtd, UnWExJts | ** | 15 | |
| | | | 19.0 | RQD=34% | | | | |
| | | | | | | | | |
| | | | | | | | | |
| 1530 | | 2C | 19.0 | Rec=65% | Gray garnet mica schist, tr qtz pkts,bkn,UnWExJts to MdW | Gray garnet mica schist, sm quartzite, cljtd, UnWExJts | 20 | |
| 0700 | | | 21.0 | RQD= 0% | | | | |
| | | 3C | 21.0 | Rec=84% | Gray garnet mica schist, some micaceous quartzite, cljtd, UnWExJts | | | Run #3 change to new drilling bit. Soil filling at 23.0' wash water color brown. Core barrel blocked in run #2. |
| | | | 26.0 | RQD=38% | | | | |
| Sunny | | | | | | | | |
| | | | | | | | 25 | |
| 03/19/82 | | 4C | 26.0 | Rec=100% | Gray garnet mica schist, tr quartz inclusions, jtd, UnWExJts | | | |
| | | | 31.0 | RQD=90% | | | | |
| | | | | | | | 30 | |

BORING NO. MG-813

MUESER, RUTLEDGE, JOHNSTON & DESIMONE
WOODWARD–CLYDE CONSULTANTS, INC.

## BORING LOG

SHEET 2 of 2
BORING NO. MG-813
FILE NO. 4840

| DAILY PROGRESS | CASING BLOWS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH (FT) | REMARKS |
|---|---|---|---|---|---|---|---|---|
| Sunny 03/19/82 | | 5C | 31.0 | Rec=100% | Gray garnet mica schist, jtd UnW | Gray garnet mica sch, sm to tr quartzite, cljtd, UnWExJts | 30 | |
| | | | 36.0 | RQD=85% | | | | |
| | | 6C | 36.0 | Rec=100% | Gray garnet mica schist, tr quartz inclusions, Mdjtd, cljtd, UnW | | 35 | |
| | | | 41.0 | RQD=80% | | | | |
| 1530 | | | | | | 41.0 | 40 | |
| | | | | | | | 45 | |
| | | | | | | | 50 | |
| | | | | | | | 55 | |
| | | | | | | | 60 | |
| | | | | | | | 65 | |
| | | | | | | | 70 | |
| | | | | | | | 75 | |
| | | | | | | | 80 | |
| | | | | | | | 85 | |

BORING NO. MG-813

MUESER, RUTLEDGE, JOHNSTON & DESIMONE
WOODWARD–CLYDE CONSULTANTS, INC.

## BORING LOG

SHEET 1 of 1
BORING NO. MG-814
FILE NO. 4840

PROJECT: WEST SIDE HIGHWAY | DOT. CONTR. NO.: D 250002 | ELEVATION: +9.0
COORDINATES: N 192299.9 E 1999067.7 | DATUM: Manhattan
BORING LOCATION: MTA Yard, MABSTOA Garage | DATE STARTED: 03/29/82
INSPECTOR: Y.K. Chan (MRJD) | DATE COMP.: 03/29/82
CONTRACTOR: Warren George, Inc.
DRILLER: B. Nicolosi | HELPER: W. Myrik
TYPE OF RIG: TRUCK ☒ SKID ☐ BARGE MOUNTED ☐ TRIPOD ☐ OTHER ☐
CASING: DIA. 4.0 IN. FROM 0.0 TO 18.0 FT.; DIA. IN. FROM TO FT.
DRILLING MUD UTILIZED: MUD TYPE | ROTARY BIT DIA. IN.
SAMPLING EQUIPMENT (TYPE & SIZE): D–SAMPLER: Split Spoon, 2" O.D. | DRILL ROD NW
U–SAMPLER: DIA. IN.: TYPE
CORE BIT Diamond, NX | CORE BARREL Double Barrel
FEED DURING CORING: MECHANICAL ☐ HYDRAULIC ☒ OTHER ☐
SAMPLER HAMMER: WEIGHT (LBS) 140 AVG. FALL 30 IN.
CASING HAMMER: WEIGHT (LBS) 300 AVG. FALL 18 IN.
NO. OF U–TUBES – NO. OF VANE TESTS – DEPTH TO ROCK 18.0 FT. DEPTH TO COMP. 29.0 FT.

WATER LEVEL OBSERVATIONS

| DATE | TIME | DEPTH OF HOLE | DEPTH OF CASING | DEPTH TO WATER | ELEVATION OF TIDE | CONDITIONS OF OBSERVATION |
|---|---|---|---|---|---|---|
| 03/29/82 | 1345 | 29.0 | 18.0 | 3.6 | | At completion |
| 03/29/82 | 1415 | 29.0 | 0 | 5.2 | | 30 minutes after completion |

| DAILY PROGRESS | CASING BLOWS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH (FT) | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 0700 | – | | | | | * | | *Concrete |
| Sunny 03/29/82 | 13 | 1D | 1.0 | 10-15 | Dark brown fine to coarse sand, some silt, gravel, cinders (Fill)(SM) | Med cpt to cpt dk brn f-c sand, tr-sm silt,gvl, brick mica shells (Fill) 0.8 | | |
| | 44 | | 3.0 | 43-69 | | | | |
| | 22 | | | | | | | |
| | 6 | | | | | | 5 | |
| | 8 | 2D | 5.0 | 3-3 | Dark brown fine to medium sand, some silt, trace brick, mica (Fill)(SM) | | | |
| | 19 | | 7.0 | 8-10 | | | | |
| | 49 | | | | | | | |
| | 48 | | | | | | | |
| | 17 | | | | | | 10 | |
| | 33 | NR | 10.0 | 9-6 | | | | |
| | 31 | | 12.0 | 6-6 | | | | |
| | 18 | 3D | 12.0 | 1-2 | Dark brown fine to coarse sand, trace silt, gravel, shells (Fill)(SP-SM) | | | |
| | 23 | | 14.0 | 18-14 | | | | |
| | 21 | | | | | | | |
| | 30 | 4D | 15.0 | 14-13 | Top: Brown mic silty f-m sand ** (SM) | | 15 | **Decomposed rock (Fill) |
| | 40 | | 17.0 | 14-15 | | 16.0 4D | | |
| | 61 | | | | Bot: Red-brn silty f sand (SM) | Bot. | | |
| | | | | | | 18.0 Wht quartzite & grt gneiss, tr gry mica schist, jtd,UnWExJts | | |
| | | 1C | 19.0 | Rec=92% | White quartzite & granite gneiss, cljtd,UnWExJts | | 20 | |
| | | | 24.0 | RQD=66% | | | | |
| | | 2C | 24.0 | Rec=100% | White quartzite & granitic gneiss, tr gray mica schist, jtd, UnWExJts | | 25 | |
| | | | 29.0 | RQD=78% | | | | |
| 1415 | | | | | | 29.0 | 30 | |

BORING NO. MG-814

MUESER, RUTLEDGE, JOHNSTON & DESIMONE
WOODWARD–CLYDE CONSULTANTS, INC.

# BORING LOG

SHEET 1 of 2
BORING NO. MG-819
FILE NO. 4840

| | |
|---|---|
| PROJECT: WEST SIDE HIGHWAY | DOT. CONTR. NO.: D 250002 |
| COORDINATES: N 192230.6 | E 1998879.2 |
| BORING LOCATION: MTA Yard, MABSTOA Garage | |
| INSPECTOR: B. Mukherjee (MRJD) | |
| CONTRACTOR: Warren George, Inc. | |
| DRILLER: J. Stevenson | HELPER: C. Soto |
| TYPE OF RIG: TRUCK ☒ SKID ☐ BARGE MOUNTED ☐ TRIPOD ☐ OTHER ☐ | |
| CASING: DIA. 4 IN. FROM 0.0 TO 34.5 FT.; DIA. IN. FROM TO FT. | |
| DRILLING MUD UTILIZED: MUD TYPE | ROTARY BIT DIA. 3 3/4 IN. |
| SAMPLING EQUIPMENT, (TYPE & SIZE) — D-SAMPLER: Split Spoon, 2" O.D. | DRILL ROD BW |
| U-SAMPLER: DIA. IN.: TYPE | |
| CORE BIT Diamond, NX | CORE BARREL Double Barrel |
| FEED DURING CORING: MECHANICAL ☐ HYDRAULIC ☒ OTHER ☐ | |
| SAMPLER HAMMER: WEIGHT (LBS) 140 | AVG. FALL 30 IN. |
| CASING HAMMER: WEIGHT (LBS) 300 | AVG. FALL 18 IN. |
| NO. OF U-TUBES – NO. OF VANE TESTS – | DEPTH TO ROCK 33.0 FT. DEPTH TO COMP. 47.2 FT. |

| ELEVATION: +16.3 |
|---|
| DATUM: Manhattan |
| DATE STARTED: 04/01/82 |
| DATE COMP.: 04/01/82 |

WATER LEVEL OBSERVATIONS

| DATE | TIME | DEPTH OF HOLE | DEPTH OF CASING | DEPTH TO WATER | ELEVATION OF TIDE | CONDITIONS OF OBSERVATION |
|---|---|---|---|---|---|---|
| 04/01/82 | 1400 | 47.2 | 34.5 | 11.7 | | At completion of rock drilling. |
| 04/01/82 | 1410 | 47.2 | 29.5 | 12.9 | | |
| 04/01/82 | 1420 | – | 0.0 | 12.9 | | |

| DAILY PROGRESS | CASING BLOWS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH (FT) | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 0715 | – | | | | | * | 0 | *Concrete |
| | 5 | 1D | 1.5 | 4-3 | Dk gray c-f sand, sm gvl, cndrs silt (Fill)(SM) | 0.7 Loose to med cpt brn c-f sand, sm silt tr-sm gvl, trace brick (Fill) | | W = Water content in % |
| | 9 | | 3.5 | 5-4 | | | | |
| | 8 | | | | | | | |
| | 11 | | | | | | | |
| | 13 | 2D | 5.0 | 3-5 | Do 1D, tr brick (Fill)(SM) | | 5 | |
| | 14 | | 7.0 | 3-3 | | | | |
| | 34 | | | | | | | |
| | 25 | | | | | | | |
| | 12 | | | | | | | |
| | 4 | NR | 10.0 | 6-4 | | | 10 | |
| | 6 | | 12.0 | 4-4 | | | | |
| | 8 | 3D | 12.0 | 3-2 | Brn silty m-f sand, trace gvl (Fill)(SM) | | | |
| | 7 | | 14.0 | 2-2 | | | | |
| Sunny | 25 | | | | | | | |
| | 10 | 4D | 15.0 | 6-3 | Brn f-c sand, sm silt, tr gvl (Fill)(SM) | | 15 | |
| | 6 | | 17.0 | 1-1 | | | | |
| | 5 | | | | | | | |
| | 4 | | | | | | | |
| | 20 | | | | | | | |
| | 27 | 5D | 20.0 | 17-13 | Top: Do 4D (Fill)(SM) | | 20 | |
| | 19 | | 22.0 | 7-5 | Bot: Lt brn m-f sand, sm silt (SM) | 21.0 Med cpt, brn m-f sa, sm silt tr org silt (Fill) | | |
| 04/01/82 | 17 | | | | | | | |
| | 13 | | | | | | | |
| | 12 | | | | | | | |
| | 22 | 6D | 25.0 | 11-13 | Brown m-f sand, sm organic silt, trace gravel (SM) | | 25 | 26.0'-27.0' Organic silt, mixture. |
| | 22 | | 27.0 | 2-3 | | | | |
| | 24 | | | | | 27.0 *** | | ***Med cpt red-brn silt, sm fine sand |
| | 25 | | | | | | | |
| | 24 | | | | | | 30 | |

BORING NO. MG-819

MUESER, RUTLEDGE, JOHNSTON & DESIMONE
WOODWARD–CLYDE CONSULTANTS, INC.

# BORING LOG

SHEET 2 of 2
BORING NO. MG-819
FILE NO. 4840

| DAILY PROGRESS | CASING BLOWS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH (FT) | REMARKS |
|---|---|---|---|---|---|---|---|---|
| | 44 | 7D | 30.0 | 3-10 | Top: Red-brn silt, sm mic fine sand (ML) | 7D Top 31.5* | 30 | W = 24 (Top) |
| | 46 | | 32.0 | 7-11 | | | | *Decomposed mica schist |
| | 131 | | | | Bot: Lt gray micaceous f-m sand (SP) | | | 34.5 |
| | 125 | | | | | | | |
| | 125/6" | | | | | | | |
| Sunny | | 1C | 34.5 | Rec=100% | Lt gray garnite mica schist, tr quartz inclusions, mdjtd, UnWIncJts | Lt gry grt mica schist, sm qtz veins, tr qtz inclusions, mdjtd to jtd, UnWIncJts to UnWExJts | 35 | |
| | | | 39.5 | RQD=92% | | | | |
| 04/01/82 | | 2C | 39.5 | Rec=100% | Light gray mica schist, sm quartz veins, jtd, UnWExJts | | 40 | Core barrel blocked in run 2C. |
| | | | 43.5 | RQD=80% | | | | |
| | | 3C | 43.5 | Rec=100% | Do 1C | | 45 | |
| | | | 47.2 | RQD=100% | | | | |
| 1500 | | | | | | 47.2 | | |
| | | | | | | | 50 | |
| | | | | | | | 55 | |
| | | | | | | | 60 | |
| | | | | | | | 65 | |
| | | | | | | | 70 | |
| | | | | | | | 75 | |
| | | | | | | | 80 | |
| | | | | | | | 85 | |

BORING NO. MG-819

MUESER, RUTLEDGE, JOHNSTON & DESIMONE
WOODWARD–CLYDE CONSULTANTS, INC.

# BORING LOG

SHEET 1 of 2
BORING NO. MG-820
FILE NO. 4840

| | | | |
|---|---|---|---|
| PROJECT: | WEST SIDE HIGHWAY | DOT. CONTR. NO.: D 250002 | ELEVATION: +9.1 |
| COORDINATES: N | 192373.6 | E 1999022.8 | DATUM: Manhattan |
| BORING LOCATION: | MTA Yard, MABSTOA Garage | | DATE STARTED: 03/16/82 |
| INSPECTOR: | B. Mukherjee (MRJD) | | DATE COMP.: 03/18/82 |
| CONTRACTOR: | Warren George, Inc. | | |
| DRILLER: | J. Stevenson | HELPER: J. Bowen | |

TYPE OF RIG: TRUCK ☒ SKID ☐ BARGE MOUNTED ☐ TRIPOD ☐ OTHER ☐

CASING: DIA. 4 IN. FROM 0.0 TO 10.0 FT.; DIA. 3 IN. FROM 0.0 TO 23.2 FT.

DRILLING MUD UTILIZED: MUD TYPE

ROTARY BIT DIA. 3 3/4 IN.

SAMPLING EQUIPMENT, (TYPE & SIZE): D–SAMPLER: Split Spoon, 2" O.D.; U–SAMPLER: DIA. IN.: TYPE; CORE BIT Diamond, NX; DRILL ROD BW; CORE BARREL Double Barrel

FEED DURING CORING: MECHANICAL ☐ HYDRAULIC ☒ OTHER ☐

SAMPLER HAMMER: WEIGHT (LBS) 140 AVG. FALL 30 IN.

CASING HAMMER: WEIGHT (LBS) 300 AVG. FALL 18 IN.

NO. OF U–TUBES – NO. OF VANE TESTS – DEPTH TO ROCK 23.5 FT. DEPTH TO COMP. 33.7 FT.

WATER LEVEL OBSERVATIONS

| DATE | TIME | DEPTH OF HOLE | DEPTH OF CASING | DEPTH TO WATER | ELEVATION OF TIDE | CONDITIONS OF OBSERVATION |
|---|---|---|---|---|---|---|
| 03/18/82 | 0730 | 22.0 | 20.0 | 4.1 | | Overnight. Drill rods in hole. |
| 03/18/82 | 1030 | 33.7 | 23.2 | 9.0 | | At completion of rock coring. |
| 03/18/82 | 1045 | 33.7 | 10.0 | 6.9 | | After 3" dia casing completely withdrawn |
| 03/18/82 | 1100 | – | 0.0 | 6.5 | | After all casing completely withdrawn |

| DAILY PROGRESS | CASING BLOWS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH (FT) | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 03/16/82 Cloudy 1300 | – | | | | | | | |
| | 18 | 1D | 1.5 | 3-10 | Gray c-f sand, sm cndrs,gvl, brk, silt (Fill) (SM) | * 0.3 | 0 | *Asphalt |
| | 23 | | 3.2 | 12-62/3" | | | | |
| | 64 | | | | | | | |
| 1500 | 12 | | | | | | | |
| 0700 03/17/82 Light Rain | 43 | 2D | 5.0 | 7-20 | Gray gvl, sm c-f sand, tr silt (Fill)(GP) | Med cpt to v cpt, gry gvl,sm c-f sand, tr silt, cndrs,wood, bricks, (Fill) | 5 | |
| | 77 | | 6.0 | | | | | |
| | 69 | | | | | | | |
| | 83 | | | | | | | |
| | 95 | | | | | | | |
| | DRILLED | 3D | 10.0 | 46-76 | Pieces of gravel, trace coarse to fine sand (Fill)(GP) | | 10 | Drilled ahead of casing 15.0'-23.0'. Wash water color red-brown at 18.0' Telescoped 3" casing in 4" casing at 10.0'. |
| | | | 12.0 | 29-18 | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | 14 | 4D | 15.0 | 15-38 | Pieces of wood (Fill) | | 15 | |
| | 26 | | 17.0 | 18-25 | | | | |
| | 20 | | | | | | | |
| | 28 | | | | | | | |
| | 60 | | | | | | | |
| | 44 | 5D | 20.0 | 53-41 | Top: Red-brn m-f sand,sm gvl silt (SM) | 18.0 | 20 | |
| 1300 | 49 | | 22.0 | 48-81 | Bot: Brn gravelly f-c sand,tr silt (SP-SM) | V cpt,red-brn to brn c-f sand,sm gvl silt | | Piece of diabase gravel in wash at 23.0'. |
| 0700 03/18/82 Sunny | 107 | | | | | | | |
| | 45/2" | | | | | | | |
| | | 1C | 23.7 | Rec=96% | Top: Lt gry garnet mica schist cljtd, UnWExJts | | | |
| | | | 28.7 | RQD=80% | | 23.5 | 25 | |
| | | | | | Bot: Lt gry garnet mica schist blky,UnW | | | |
| | | 2C | 28.7 | Rec=100% | Lt gry garnet mica schist, mdjtd, UnWExJts | 1C Top cljtd-blky UnWExJts | 30 | |

BORING NO. MG-820

MUESER, RUTLEDGE, JOHNSTON & DESIMONE
WOODWARD–CLYDE CONSULTANTS, INC.

# BORING LOG

SHEET 2 of 2
BORING NO. MG-820
FILE NO. 4840

| DAILY PROGRESS | CASING BLOWS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH (FT) | REMARKS |
|---|---|---|---|---|---|---|---|---|
| Same as Above 1100 | | | | | | 1C Bottom cljtd to blky UnWExJts 33.7 | 30 | |
| | | | | | | | 35 | |
| | | | | | | | 40 | |
| | | | | | | | 45 | |
| | | | | | | | 50 | |
| | | | | | | | 55 | |
| | | | | | | | 60 | |
| | | | | | | | 65 | |
| | | | | | | | 70 | |
| | | | | | | | 75 | |
| | | | | | | | 80 | |
| | | | | | | | 85 | |

BORING NO. MG-820

MUESER, RUTLEDGE, JOHNSTON & DESIMONE
WOODWARD–CLYDE CONSULTANTS, INC.

# BORING LOG

SHEET 1 of 2
BORING NO. MG-829
FILE NO. 4840

| | | | |
|---|---|---|---|
| PROJECT: WEST SIDE HIGHWAY | DOT. CONTR. NO.: D 250002 | | ELEVATION: + 9.2 |
| COORDINATES: N 192227.9 | E 1999114.6 | | DATUM: Manhattan |
| BORING LOCATION: MTA Yard, MABSTOA Garage | | | DATE STARTED: 04/08/82 |
| INSPECTOR: Y. K. Chan (MRJD) | | | DATE COMP.: 04/09/92 |
| CONTRACTOR: Warren George, Inc. | | | |
| DRILLER: J. Farrell | HELPER: G. McCartar | | |

TYPE OF RIG: TRUCK ☒ SKID ☐ BARGE MOUNTED ☐ TRIPOD ☐ OTHER ☐

CASING: DIA. 4 IN. FROM 0.0 TO 5.0 FT.; DIA. 3 IN. FROM 0.0 TO 22.5 FT.

DRILLING MUD UTILIZED: MUD TYPE Quick - Gel ROTARY BIT DIA. 3 7/8 IN.

SAMPLING EQUIPMENT (TYPE & SIZE): D-SAMPLER: Split Spoon, 2" O.D. DRILL ROD NW; U-SAMPLER: DIA. IN.: TYPE; CORE BIT Diamond, NX CORE BARREL Double Barrel

FEED DURING CORING: MECHANICAL ☐ HYDRAULIC ☒ OTHER ☐

SAMPLER HAMMER: WEIGHT (LBS) 140 AVG. FALL 30 IN.

CASING HAMMER: WEIGHT (LBS) 300 AVG. FALL 18 IN.

NO. OF U-TUBES – NO. OF VANE TESTS – DEPTH TO ROCK 20.5 FT. DEPTH TO COMP. 33.0 FT.

WATER LEVEL OBSERVATIONS

| DATE | TIME | DEPTH OF HOLE | DEPTH OF CASING | DEPTH TO WATER | ELEVATION OF TIDE | CONDITIONS OF OBSERVATION |
|---|---|---|---|---|---|---|
| 04/09/82 | 0730 | 17.0 | 5.0 | 3.1 | | Over night. Drilling mud in hole. |
| 04/09/82 | 1040 | 33.0 | 5.0 | 5.1 | | At completion. Water in hole. |

| DAILY PROGRESS | CASING BLOWS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH (FT) | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 1300 | – | | | | | * | 0 | * Asphalt |
| | 10 | 1D | 1.0 | 6-6 | Dark brown f-c sand, sm cinders, silt, tr gravel (Fill)(SM) | 0.8 | | W = Water content in % |
| | 14 | | 3.0 | 7-7 | | | | |
| | 15 | | | | | | | |
| | 18 | | | | | | | |
| Sunny | DRIVE | 2D | 5.0 | 10-16 | Dark brn m-f sand, sm silt, tr brick, gravel (Fill) (SM) | Med cpt to loose dk brn f-c sand, sm cndrs, tr brick, gvl (Fill) | 5 | |
| | | | 7.0 | 8-5 | | | | |
| 04/08/82 | 3" | | | | | | | |
| | | NR | 10.0 | 7-6 | | | 10 | |
| | | | 12.0 | 3-2 | | | | |
| | | 3D | 12.0 | 3-3 | Top: Dk brn m-f sand, sm silt, tr gravel (Fill)(SM) | | | |
| | | | 14.0 | 3-6 | | | | |
| | | | | | Bot: Brn clayey silt, tr fine sand, mica (ML) | 13.9 | | |
| | | 4D | 15.0 | 4-9 | | Med-Stiff red-brn cl sl, sm m-f sand | 15 | |
| 1530 | | | 17.0 | 8-11 | Red-brown clayey silt, sm m-f sand layers (ML) | | | W = 19 |
| 0700 | | | | | | 18.0 | | |
| | | | | | | 5D | | |
| | | 5D | 20.0 | 10-100/4" | Top: Red-brn f-c sand, sm silt, tr gravel (SM) | Top 20.5 | 20 | 5D Bottom is decomposed rock. |
| | | | 20.8 | | Bot: Gry mic silty f-m sand, tr rock fragments (SM) | | | |
| Cloudy | | 1C | 23.0 | Rec=96% | | 5D Bot 23.0 | | |
| | | | 28.0 | RQD=80% | Top: White granite pegmatite, jtd, UnW | | 25 | |
| 04/09/82 | | | | | Bot: Lt gry mica schist, tr qtz veins, jtd, UnWExJts | 1C | | |
| | | | | | | | 30 | |

BORING NO. MG-829

MUESER, RUTLEDGE, JOHNSTON & DESIMONE
WOODWARD–CLYDE CONSULTANTS, INC.

# BORING LOG

SHEET 2 of 2
BORING NO. MG-829
FILE NO. 4840

| DAILY PROGRESS | CASING BLOWS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH (FT) | REMARKS |
|---|---|---|---|---|---|---|---|---|
| Same as above | | 2C | 28.0 | Rec=97% | Lt gry mica schist, tr quartzite veins, jtd, UnWExJts | 2C | 30 | |
| | | | 33.0 | RQD=80% | | 33.0 | | |
| | | | | | | | 35 | |
| | | | | | | | 40 | |
| | | | | | | | 45 | |
| | | | | | | | 50 | |
| | | | | | | | 55 | |
| | | | | | | | 60 | |
| | | | | | | | 65 | |
| | | | | | | | 70 | |
| | | | | | | | 75 | |
| | | | | | | | 80 | |
| | | | | | | | 85 | |

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BORING NO. MG-829

MUESER, RUTLEDGE, JOHNSTON & DESIMONE
WOODWARD–CLYDE CONSULTANTS, INC.

# BORING LOG

SHEET 1 of 2
BORING NO. MG-830
FILE NO. 4840

| | | | |
|---|---|---|---|
| PROJECT: WEST SIDE HIGHWAY | DOT. CONTR. NO.: D 250008 | ELEVATION: + 11.1 | |
| COORDINATES: N 192151.5 | E 1999020.8 | DATUM: Manhattan | |
| BORING LOCATION: MTA Yard, MABSTOA Garage | | DATE STARTED: 04/12/82 | |
| INSPECTOR: B. Mukherjee (MRJD) / Y. K. Chan (MRJD) | | DATE COMP.: 04/13/82 | |
| CONTRACTOR: Warren George, Inc. | | | |
| DRILLER: J. Stevenson | HELPER: C. Soto | | |
| TYPE OF RIG: TRUCK ☒ SKID ☐ BARGE MOUNTED ☐ TRIPOD ☐ OTHER ☐ | | | |
| CASING: DIA. 4 IN. FROM 0.0 TO 26.5 FT.: DIA. IN. FROM TO FT. | | | |
| DRILLING MUD UTILIZED: MUD TYPE | | ROTARY BIT DIA. 3 3/4 IN. | |
| SAMPLING EQUIPMENT, (TYPE & SIZE) | D-SAMPLER: Split Spoon, 2" O.D. | DRILL ROD BW | |
| | U-SAMPLER: DIA. IN.: TYPE | | |
| | CORE BIT Diamond, NX | CORE BARREL Double Barrel | |
| FEED DURING CORING: MECHANICAL ☐ HYDRAULIC ☒ OTHER ☐ | | | |
| SAMPLER HAMMER: WEIGHT (LBS) 140 | AVG. FALL 30 IN. | | |
| CASING HAMMER: WEIGHT (LBS) 300 | AVG. FALL 18 IN. | | |
| NO. OF U-TUBES – NO. OF VANE TESTS – | DEPTH TO ROCK 26.5 FT. | DEPTH TO COMP. 37.0 FT. | |

WATER LEVEL OBSERVATIONS

| DATE | TIME | DEPTH OF HOLE | DEPTH OF CASING | DEPTH TO WATER | ELEVATION OF TIDE | CONDITIONS OF OBSERVATION |
|---|---|---|---|---|---|---|
| 04/13/82 | 1036 | 37.0 | 26.5 | 5.5 | | At completion |
| 04/13/82 | 1048 | 37.0 | 15.0 | 8.6 | | |
| 04/13/82 | 1058 | 37.0 | 0.0 | 8.8 | | |

| DAILY PROGRESS | CASING BLOWS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH (FT) | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 1400 | 2 | 1D | 0.5 | 5-8 | Brown silty f-m sand, tr gravel (Fill)(SM) | * 0.4 | 0 | * Concrete |
| | 10 | | 2.5 | 5-6 | | | | W = Water |
| | 12 | | | | | | | content in % |
| | 15 | | | | | | | |
| | 26 | | | | | | | |
| 04/12/82 Partly Sunny | 10 | 2D | 5.0 | 3-4 | Do 1D, tr glass (Fill)(SM) | Loose brown silty fine to medium sand, tr gravel, glass (Fill) | 5 | |
| | 36 | | 7.0 | 3-10 | | | | |
| | 8 | | | | | | | |
| | 4 | | | | | | | |
| | 3 | | | | | | | |
| | 16 | 3D | 10.0 | 11-6 | Brown f-c sand, sm silt, tr gvl (Fill)(SM) | | 10 | |
| | 28 | | 12.0 | 10-7 | | | | |
| | 37 | | | | | | | |
| | 15 | | | | | | | |
| | 10 | | | | | | | |
| | 3 | 4W | 15.0 | 10-5 | Brown c-f sand, tr silt (Fill)(SP) | | 15 | |
| 1530 | 5 | | 17.0 | 3-3 | | | | |
| 0700 | 17 | | | | | 17.7 | | |
| | 24 | | | | | 5D, | | |
| | 26 | | | | | Med | | |
| 04/13/82 Cloudy | 38 | 5D | 20.0 | 8-12 | Top: Med dk gry org silty clay, sm fine sand, tr sls, gvl (OH) | | 20 | |
| | 35 | | 22.0 | 12-11 | | 20.5 | | |
| | 44 | | | | Bot:Brn silt,sm f sand, tr mica (ML) | 6D | | |
| | 55 | | | | | Loose | | |
| | 61 | | | | | | | |
| | 56 | 6D | 25.0 | 3-4 | Brown silt, sm fine sand, tr gravel, clay, mica (ML) | 26.0 | 25 | W = 28 (Top) |
| | | | 26.5 | 5-100/0" | | ** | | |
| | | 1C | 27.0 | Rec=98% | White granitic gneiss cljtd,SlW, to gray mica schist, tr qtz inclusions, jtd, UnWExjts | 26.5 | | **Decomposed rock |
| | | | 32.0 | RQD=76% | | 1C | 30 | |



MUESER, RUTLEDGE, JOHNSTON & DESIMONE
WOODWARD–CLYDE CONSULTANTS, INC.

BORING LOG

SHEET 2 of 2
BORING NO. MG-830
FILE NO. 4840

| DAILY PROGRESS | CASING BLOWS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH (FT) | REMARKS |
|---|---|---|---|---|---|---|---|---|
| Same as above | | 2C | 32.0 | Rec=100% | Gray mica schist, some quartz veins, jtd, UnWExJts | 2C | 30 | |
| | | | 37.0 | RQD=88% | | | | |
| 1200 | | | | | | | 35 | |
| | | | | | | 37.0 | | |
| | | | | | | | 40 | |
| | | | | | | | 45 | |
| | | | | | | | 50 | |
| | | | | | | | 55 | |
| | | | | | | | 60 | |
| | | | | | | | 65 | |
| | | | | | | | 70 | |
| | | | | | | | 75 | |
| | | | | | | | 80 | |
| | | | | | | | 85 | |

MUESER, RUTLEDGE, JOHNSTON & DESIMONE
WOODWARD–CLYDE CONSULTANTS, INC.

# BORING LOG

SHEET 1 of 2
BORING NO. MG-831
FILE NO. 4840

| | |
|---|---|
| PROJECT: WEST SIDE HIGHWAY | DOT. CONTR. NO.: D 250002 |
| COORDINATES: N 192313.3 | E 1998985.3 |
| BORING LOCATION: MTA Yard, MABSTOA Garage | ELEVATION: +10.8 |
| INSPECTOR: Y.K. Chan (MRJD) | DATUM: Manhattan |
| CONTRACTOR: Warren George, Inc. | DATE STARTED: 04/09/82 |
| DRILLER: J. Farrell | DATE COMP.: 04/12/82 |
| HELPER: G McCartar | |

TYPE OF RIG: TRUCK ☒ SKID ☐ BARGE MOUNTED ☐ TRIPOD ☐ OTHER ☐

CASING: DIA. 4 IN. FROM 0.0 TO 5.0 FT.; DIA. 3 IN. FROM 0.0 TO 33.5 FT.

DRILLING MUD UTILIZED: MUD TYPE Quick-Gel ROTARY BIT DIA. 3 7/8 IN.

SAMPLING EQUIPMENT, (TYPE & SIZE): D-SAMPLER: Split Spoon, 2" O.D. DRILL ROD NW
U-SAMPLER: DIA. IN.: TYPE
CORE BIT Diamond, NX CORE BARREL Double Barrel

FEED DURING CORING: MECHANICAL ☐ HYDRAULIC ☒ OTHER ☐

SAMPLER HAMMER: WEIGHT (LBS) 140 AVG. FALL 30 IN.

CASING HAMMER: WEIGHT (LBS) 300 AVG. FALL 18 IN.

NO. OF U-TUBES – NO. OF VANE TESTS – DEPTH TO ROCK 33.0 FT. DEPTH TO COMP. 44.0 FT.

WATER LEVEL OBSERVATIONS

| DATE | TIME | DEPTH OF HOLE | DEPTH OF CASING | DEPTH TO WATER | ELEVATION OF TIDE | CONDITIONS OF OBSERVATION |
|---|---|---|---|---|---|---|
| 04/12/82 | 0800 | 27.0 | 5.0 | 5.8 | | Over weekend. Drilling mud in hole |
| 04/12/82 | 1410 | 44.0 | 5.0 | 11.5 | | At completion Water in hole |
| 04/12/82 | 1445 | 44.0 | 0.0 | 7.5 | | |

| DAILY PROGRESS | CASING BLOWS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH (FT) | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 1215 | | 1D | 0.5 | 12-11 | Dark brown f-c sand, sm silt, gravel, cinders (Fill) (SM) | 0.* | 0 | *Concrete W = Water content in % |
| | 4 | | 2.5 | 6-4 | | | | |
| | 8 | | | | | | | |
| | 7 | | | | | | | |
| | 6 | | | | | | | |
| | | 2D | 5.0 | 4-3 | Gray-brown f-m sand, sm silt, tr decomposed wood (Fill)(SM) | Med cpt to loose dark brn f-c sand, sm silt, tr gvl, cndrs, decomposed wood (Fill) | 5 | |
| | D | | 7.0 | 3-3 | | | | |
| | E | | | | | | | |
| | R | | | | | | | |
| | E | | | | | | | |
| | W | 3D | 10.0 | 7-1 | Gray-brown f-m sand, sm silt, tr gravel (Fill)(SM) | | 10 | |
| | O | | 12.0 | 12-15 | | | | |
| Snow | L | | | | | | | |
| | | 4D | 15.0 | 4-4 | Top: Do 3D (Fill)(SM) | | 15 | 4D Bot: W = 58 |
| 04/09/82 | | | 17.0 | 4-2 | Bot: Soft black organic silty clay, tr fine sand (OH) | 16.5 4D Bottom | | |
| | | NR | 20.0 | 7-14 | | | 20 | |
| | | | 22.0 | 17-23 | | 20.0 | | |
| | | 5D | 22.0 | 29-29 | Brown silty f-m sand, tr gravel (SM) | Cpt red-brn f-c sand, sm silt, gravel | | |
| | | | 24.0 | 38-44 | | | | |
| | | 6D | 25.0 | 28-36 | Red-brown f-c sand, sm silt, gravel (SM) | | 25 | |
| | | | 27.0 | 32-41 | | | | |
| | | | | | | | 30 | |

BORING NO. MG-831

MUESER, RUTLEDGE, JOHNSTON & DESIMONE
WOODWARD–CLYDE CONSULTANTS, INC.

# BORING LOG

SHEET 2 of 2
BORING NO. MG-831
FILE NO. 4840

| DAILY PROGRESS | CASING BLOWS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH (FT) | REMARKS |
|---|---|---|---|---|---|---|---|---|
| | | 7D | 30.0 | 24-36 | Brown f-c sand, sm silt, gravel (SM) | 7D | 30 | |
| | | | 32.0 | 62-37 | | V cpt 33.0 | | |
| | | | | | | * | | *Decomposed rock |
| | | 1C | 34.0 | Rec=98% | Light gray-white micaceous quartzite blocky, UnW | 34.0 | 35 | |
| | | | 39.0 | RQD=98% | | Lt gry mica schist quartzite mass, UnW | | Core barrel was blocked at 35.5. |
| Sunny | | | | | | | | |
| 04/12/82 | | 2C | 39.0 | Rec=100% | Do 1C | | 40 | |
| | | | 44.0 | RQD=96% | | | | |
| 1530 | | | | | | 44.0 | 45 | |
| | | | | | | | 50 | |
| | | | | | | | 55 | |
| | | | | | | | 60 | |
| | | | | | | | 65 | |
| | | | | | | | 70 | |
| | | | | | | | 75 | |
| | | | | | | | 80 | |
| | | | | | | | 85 | |

BORING NO. MG-831

# MUESER, RUTLEDGE, JOHNSTON & DESIMONE
## WOODWARD–CLYDE CONSULTANTS, INC.
## BORING LOG

SHEET 1 of 2
BORING NO. MG-832
FILE NO. 4840

| | | | |
|---|---|---|---|
| PROJECT: WEST SIDE HIGHWAY | DOT. CONTR. NO.: D 250002 | ELEVATION: +15.2 | |
| COORDINATES: N 191987.5 | E 1999546.6 | DATUM: Manhattan | |
| BORING LOCATION: MTA Yard, MABSTOA Garage | | DATE STARTED: 04/14/82 | |
| INSPECTOR: Y.K. Chan (MRJD) | | DATE COMP.: 04/15/82 | |
| CONTRACTOR: Warren George, Inc. | | | |
| DRILLER: J. Stevenson | HELPER: C. Soto | | |

TYPE OF RIG: TRUCK ☒ SKID ☐ BARGE MOUNTED ☐ TRIPOD ☐ OTHER ☐

CASING: DIA. 4 IN. FROM 0.0 TO 15.0 FT.; DIA. 3 IN. FROM 0.0 TO 48.5 FT.

DRILLING MUD UTILIZED: MUD TYPE — ROTARY BIT DIA. 3 3/4, 2 7/8 IN

SAMPLING EQUIPMENT, (TYPE & SIZE): D-SAMPLER: Split Spoon, 2" O.D. — DRILL ROD BW
U-SAMPLER: DIA. IN.: TYPE
CORE BIT Diamond, NX — CORE BARREL Double Barrel

FEED DURING CORING: MECHANICAL ☐ HYDRAULIC ☒ OTHER ☐

SAMPLER HAMMER: WEIGHT (LBS) 140 AVG. FALL 30 IN.

CASING HAMMER: WEIGHT (LBS) 300 AVG. FALL 18 IN.

NO. OF U-TUBES – NO. OF VANE TESTS – DEPTH TO ROCK 46.0 FT. DEPTH TO COMP. 59.0 FT.

WATER LEVEL OBSERVATIONS

| DATE | TIME | DEPTH OF HOLE | DEPTH OF CASING | DEPTH TO WATER | ELEVATION OF TIDE | CONDITIONS OF OBSERVATION |
|---|---|---|---|---|---|---|
| 04/15/82 | 0725 | 59.0 | 48.5 | 11.1 | | Overnight |
| 04/15/82 | 0810 | 59.0 | 15.0 | 13.0 | | |
| 04/15/82 | 0820 | 59.0 | 0.0 | 10.0 | | |

| DAILY PROGRESS | CASING BLOWS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH (FT) | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 0700 | – | 1D | 0.8 | 20-20 | Dark brown silty fine to medium sand, tr gravel (Fill)(SM) | 0.8* | 0 | *Asphalt |
| | 36 | | 2.8 | 19-12 | | | | |
| | 49 | | | | | | | |
| | 80 | | | | | | | |
| | 150 | | | | | | | |
| | 45 | 2D | 5.0 | 14-11 | Gray gravelly mic fine to medium sand (Fill)(SP) | Med cpt to cpt, brn silty f-m sand, sm gravel, tr mica (Fill) | 5 | |
| | 86 | | 7.0 | 20-20 | | | | |
| | 79 | | | | | | | |
| | 59 | | | | | | | |
| | 28 | | | | | | | |
| | 10 | 3D | 10.0 | 9-1 | Brown silty fine to medium sand, trace mica (Fill)(SM) | | 10 | |
| | 6 | | 12.0 | 2-1 | | | | |
| | 8 | | | | | | | |
| | 14 | | | | | 12.5 | | |
| | 21 | | | | | | | |
| Sunny 04/14/82 | D | 4D | 15.0 | 5-9 | Brown silty medium to fine sand (SM) | Med cpt brown c-f sand, sm silt, trace gravel | 15 | Note: Drilled ahead of the casing. 15.0'-45.0'. |
| | E | | 17.0 | 12-16 | | | | |
| | R | | | | | | | |
| | E | | | | | | | |
| | W | | | | | | | |
| | O | 5D | 20.0 | 9-12 | Brown coarse to fine sand, sm silt, tr gravel (SM) | | 20 | |
| | L | | 22.0 | 13-12 | | | | |
| | | 6D | 25.0 | 7-8 | Brown coarse to fine sand, tr silt, gravel (SP-SM) | | 25 | **Medium compact brown silt, tr fine sand. |
| | | | 27.0 | 10-9 | | | | |
| | | | | | | 28.0 ** | 30 | |



MUESER, RUTLEDGE, JOHNSTON & DESIMONE
WOODWARD–CLYDE CONSULTANTS, INC.
BORING LOG

SHEET 2 of 2
BORING NO. MG-832
FILE NO. 4840

| DAILY PROGRESS | CASING BLOWS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH (FT) | REMARKS |
|---|---|---|---|---|---|---|---|---|
| | | 7D | 30.0 | 3-6 | Brown silt, trace fine to medium sand (ML) | Med cpt brown silt, trace fine sand | 30 | |
| | | | 32.0 | 7-7 | | | | |
| | | 8D | 35.0 | 5-7 | Do 7D (ML) | | 35 | |
| | | | 37.0 | 8-15 | | | | |
| | | 9D | 40.0 | 4-11 | Red-brown m-f sand, sm silt, tr gravel (SM) | 40.0 | 40 | |
| | | | 42.0 | 15-16 | | | | |
| Sunny 04/14/82 | 38 | 10D | 45.5 | 10-14 | Brown mic m-f sand, sm silt (SM) | Medium compact 9D, Dec Rock | 45 | Sample 10D is Decomposed rock. |
| | 55 | | 47.5 | 19-28 | | 46.0 | | |
| | 55 | | | | | | | |
| | 150/6" | | | | | | | |
| | | 1C | 49.0 | Rec=98% | Light gray garnet mica schist, trace quartz veins, jtd, UnWExJts | Lt gry, jtd-blky garnet, mica schist, tr qtz veins, UnWExJts | 50 | |
| | | | 54.0 | RQD=88% | | | | |
| | | 2C | 54.0 | Rec=100% | Do 1C, blocky, UnWExJts | | | |
| | | | 59.0 | RQD=100% | | | | |
| 1530 | | | | | | 59.0 | 55 | |
| | | | | | | | 60 | |
| | | | | | | | 65 | |
| | | | | | | | 70 | |
| | | | | | | | 75 | |
| | | | | | | | 80 | |
| | | | | | | | 85 | |

MUESER, RUTLEDGE, JOHNSTON & DESIMONE
WOODWARD–CLYDE CONSULTANTS, INC.

# BORING LOG

SHEET 1 of 2
BORING NO. MG-833U
FILE NO. 4840

| | | | |
|---|---|---|---|
| PROJECT: WEST SIDE HIGHWAY | DOT. CONTR. NO.: D 250002 | ELEVATION: +13.2 | |
| COORDINATES: N 192068.9 | E 1999398.6 | DATUM: Manhattan | |
| BORING LOCATION: MTA Yard, MABSTOA Garage | | DATE STARTED: 04/19/82 | |
| INSPECTOR: Y.K. Chan (MRJD) | | DATE COMP.: 04/21/82 | |
| CONTRACTOR: Warren George, Inc. | | | |
| DRILLER: J. Stevenson | HELPER: C. Soto | | |

TYPE OF RIG: TRUCK ☒ SKID ☐ BARGE MOUNTED ☐ TRIPOD ☐ OTHER ☐

CASING: DIA. 4 IN. FROM 0.0 TO 25.5 FT.; DIA. 3 IN. FROM 0.0 TO 35.0 FT.

DRILLING MUD UTILIZED: MUD TYPE

ROTARY BIT DIA. 3 3/4, 2 15/16 IN

SAMPLING EQUIPMENT, (TYPE & SIZE)
D-SAMPLER: Split Spoon, 2" & 3" O.D.
U-SAMPLER: DIA. 3 IN.: TYPE Osterberg & Shelby
CORE BIT Diamond, NX
DRILL ROD BW
CORE BARREL Double Barrel

FEED DURING CORING: MECHANICAL ☐ HYDRAULIC ☒ OTHER ☐

SAMPLER HAMMER: WEIGHT (LBS) 140 AVG. FALL 30 IN.

CASING HAMMER: WEIGHT (LBS) 300 AVG. FALL 18 IN.

NO. OF U-TUBES 4 NO. OF VANE TESTS – DEPTH TO ROCK 35.5 FT. DEPTH TO COMP. 45.5 FT.

WATER LEVEL OBSERVATIONS

| DATE | TIME | DEPTH OF HOLE | DEPTH OF CASING | DEPTH TO WATER | ELEVATION OF TIDE | CONDITIONS OF OBSERVATION |
|---|---|---|---|---|---|---|
| 04/20/82 | 0800 | 18.5 | 18.5 | 4.0 | | Overnight |
| 04/21/82 | 0705 | 35.0 | 25.5 | 2.0 | | Overnight |
| 04/21/82 | 0906 | 45.5 | 18.5 | 10.7 | | At completion of hole 3" casing withdrawn |
| 04/21/82 | 0915 | 45.5 | 12.0 | 10.5 | | |
| 04/21/82 | 0925 | 45.5 | 0.0 | 7.1 | | |

| DAILY PROGRESS | CASING BLOWS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH (FT) | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 1040 | – | 1D | 0.5 | 12-10 | Black c-f cinders, sm sand, silt (Fill) ( SM) | * 0.3 | 0 | *Asphalt W = Water content in % |
| | 10 | | 2.5 | 6-7 | | | | |
| | 21 | | | | | | | |
| | 15 | | | | | | | |
| | 16 | | | | | | | |
| | 26 | 2D | 5.0 | 7-5 | Gray fine to medium sand, some silt (Fill)(SM) | | 5 | |
| | 11 | | 7.0 | 3-3 | | | | |
| | 10 | | | | | | | |
| | 12 | | | | | | | |
| | 17 | | | | | | | |
| Sunny 04/19/82 | 19 | 3D | 10.0 | 3-2 | Top: Gry org si f sand (Fill)(SM) Bot: Gry peat, tr f sand (PT) | | 10 | |
| | 16 | | 12.0 | 2-3 | | | | |
| | 21 | 4U | 12.0 | P=24" | Top: Gry f-c sa, sm si (Fill)(SM) | | | Sample No. 4U void in tube. Sample moved inside the tube. |
| | 26 | | 14.0 | R=24" | Bot: Gry f-c sa, sm si, tr rts (Fill)(SM) | | | |
| | 25 | 5U | 14.0 | P=24" | Top Gry-brn m-f sa, sm si, tr gvl (Fill)(SM) | | | |
| | 24 | | 16.0 | R=19" | | | 15 | |
| | 23 | 6U | 16.0 | P=6" | Bot: Brn f-c sa, sm si (SM) | 15.0 * | | *Med cpt brn to red-brn c-f sa, sm silt, tr cl, gvl 16.5'-18.5' First attempt was made |
| | 27 | | 16.5 | R=6" | Brn c-f sa, sm silt (SM) | 16.5 | | |
| | 28 | 7D | 16.5 | 3-7 | Top: Red-brn silt f-c sand, tr cl gvl (SM-SC) | | | |
| 1530 | 25 | | 18.5 | 9-9 | | | | |
| 0700 | 23 | 8U | 18.5 | P-24" | Bot: Red-brn silt, tr cl (ML) | | 20 | |
| | 38 | | 20.5 | R=19" | Red-brn silt, tr clay (ML) | | | |
| | *23 | 9UD | 20.5 | P=24" | Red silt, tr f sand, mica (ML) | | | without any recovery. Second attempt was made by 3"dia spoon 8U W = 25 |
| Sunny 04/20/82 | 27 | | 22.5 | R=5" | | | | |
| | 31 | 10UD | 22.5 | P=24" | Do 9UD, tr gravel (ML) | | 25 | |
| | 40 | | 24.5 | R=4" | | | | |
| | 46 | 11UD | 24.5 | P=24" | | | | Sample 9UD thru 12UD-3" dia. split spoon sampler driven 18"after |
| | 25/6" | | 26.5 | R=2" | Red-brn silt, tr cl, gvl, f-m sand layers (ML) | | | |
| | | 12UD | 26.5 | P=24" | Do 11UD (ML) | | | |
| | | | 28.5 | R=3" | | | 30 | |

Medium compact to loose, black to gray fine to coarse sand, some silt, trace roots, peat (Fill)

Cpt to v cpt red-brn silt, tr clay, gravel fine to medium & fine sand layers

Note: Sample identification typed out of scale because of space restriction.

BORING NO. MG-833U

MUESER, RUTLEDGE, JOHNSTON & DESIMONE
WOODWARD–CLYDE CONSULTANTS, INC.

# BORING LOG

SHEET 2 of 2
BORING NO. MG-833U
FILE NO. 4840

| DAILY PROGRESS | CASING BLOWS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH (FT) | REMARKS |
|---|---|---|---|---|---|---|---|---|
| Same as above | D | 13D | 28.5 | 10-14 | Red-brn silt, tr gvl, c-f sand layers (ML) | Same as above | 30 | attempting each undisturbed sample. to recover sufficient amount of material. |
| | E | | 30.5 | 34-40 | | | | |
| | R | △14D | 30.5 | 29-46 | Red-brn silt, tr fine sand layers, gvl (ML) | | | |
| | E | | 32.5 | 34-37 | | | | |
| | W | | | | | | | |
| 1530 | O | | | | | 35.0 ** | 35 | Blows per 6" for each sample are as follows: |
| 0700 | L | 1C | 35.5 | Rec=90% | Light gray garnet mica schist, sm quartzite, jtd, UnWExJts | 35.5 | | |
| | | | 40.5 | RQD=80% | | | | |
| 04/21/82 Cloudy | | 2C | 40.5 | Rec=100% | Light gray mica schist, tr quartzite, quartz veins, mdjtd, UnWExJts | 1C & 2C | 40 | 9UD=31,31,40 10UD=17,17,23 11UD= 9,24,31 12UD=18,25,33 |
| | | | 45.5 | RQD=100% | | | | |
| 1000 | | | | | | 45.5 | 45 | *21.0'-25.0' casing drilled ahead |
| | | | | | | | | △Used 3" dia split spoon |
| | | | | | | | 50 | **Decomposed rock Strata reflected in wash water. |
| | | | | | | | 55 | |
| | | | | | | | 60 | |
| | | | | | | | 65 | |
| | | | | | | | 70 | |
| | | | | | | | 75 | |
| | | | | | | | 80 | |
| | | | | | | | 85 | |

BORING NO. MG-833U

# MUESER, RUTLEDGE, JOHNSTON & DESIMONE
## WOODWARD–CLYDE CONSULTANTS, INC.
## BORING LOG

SHEET 1 of 2
BORING NO. MG-834
FILE NO. 4840

| | | | |
|---|---|---|---|
| PROJECT: WEST SIDE HIGHWAY | DOT. CONTR. NO.: D 250002 | ELEVATION: +11.2 | |
| COORDINATES: N 192147.3 | E 1999254.6 | DATUM: Manhattan | |
| BORING LOCATION: MTA Yard, MABSTOA Garage | | DATE STARTED: 04/15/82 | |
| INSPECTOR: Y.K. Chan (MRJD) | | DATE COMP.: 04/16/82 | |
| CONTRACTOR: Warren George, Inc | | | |
| DRILLER: J. Stevenson | HELPER: C. Soto | | |

TYPE OF RIG: TRUCK ☒ SKID ☐ BARGE MOUNTED ☐ TRIPDD ☐ OTHER ☐

CASING: DIA. 4 IN. FROM 0.0 TO 22.0 FT.; DIA. 3 IN. FROM 0.0 TO 23.0 FT.

DRILLING MUD UTILIZED: MUD TYPE

ROTARY BIT DIA 3 3/4 IN.

SAMPLING EQUIPMENT, (TYPE & SIZE): D-SAMPLER: Split Spoon, 2" O.D. — DRILL ROD BW
U-SAMPLER: DIA. IN.: TYPE
CORE BIT Diamond, NX — CORE BARREL Double Barrel

FEED DURING CORING: MECHANICAL ☐ HYDRAULIC ☒ OTHER ☐

SAMPLER HAMMER: WEIGHT (LBS) 140 AVG. FALL 30 IN.

CASING HAMMER: WEIGHT (LBS) 300 AVG. FALL 18 IN.

NO. OF U-TUBES -- NO. OF VANE TESTS - DEPTH TO ROCK 21.8 FT. DEPTH TO COMP. 33.0 FT.

WATER LEVEL OBSERVATIONS

| DATE | TIME | DEPTH OF HOLE | DEPTH OF CASING | DEPTH TO WATER | ELEVATION OF TIDE | CONDITIONS OF OBSERVATION |
|---|---|---|---|---|---|---|
| 04/16/82 | 0727 | 22.0 | 22.0 | 7.3 | | Overnight |
| 04/16/82 | 1000 | 33.0 | 23.0 | 7.0 | | At completion |
| 04/16/82 | 1030 | 33.0 | 15.0 | 6.6 | | |
| 04/16/82 | 1046 | 33.0 | 0.0 | 5.0 | | |

| DAILY PROGRESS | CASING BLOWS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH (FT) | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 0900 | 10 | 1D | 0.3 | 19-17 | Black fine to coarse sand, sm silt, cinders (Fill)(SM) | * 0.3 | 0 | *Aphalt. |
| | 33 | | 2.3 | 11-11 | | | | |
| | 23 | | | | | | | |
| | 19 | | | | | | | |
| | 15 | | | | | | | |
| | 5 | 2D | 5.0 | 2-1 | Brown m-f sand, sm silt, tr brick, cinders (Fill)(SM) | Med cpt to loose, blk &brn m-f sand, sm cndrs, silt, tr brick, mica (Fill) | 5 | |
| | 19 | | 7.0 | 1-10 | | | | |
| | 37 | | | | | | | |
| | 21 | | | | | | | |
| | 20 | | | | | | | |
| Sunny | 184 | 3D | 10.0 | 90-13 | Gray-brown m-f sand, sm silt, tr mica, gravel (Fill)(SM) | | 10 | Cobbles encountered from 10.0'-10.5' |
| | 36 | | 12.0 | 9-8 | | | | |
| | 36 | | | | | | | |
| | 41 | | | | | | | |
| | 55 | | | | | 14.0 | | |
| 04/15/82 | *28 | 4D | 15.0 | 6-11 | Red-brown micaceous silty fine sand (SM) | Medium compact 4D | 15 | *15.0'-20.0' Casing drilled ahead |
| | 27 | | 17.0 | 10-10 | | | | |
| | 20 | | | | | | | |
| | 21 | | | | | | | |
| | 17 | | | | | | | |
| | 126 | 5D | 20.0 | 10-11 | Brown c-f sand, sm silt, gravel (SM) | | 20 | 20.0'-20.5' Washed ahead with roller bit. |
| 1500 | 93 | | 21.8 | 59-100/3" | | 21.0 Dec Rock | | |
| 0700 | | | | | | | | |
| Sunny | | 1C | 23.0 | Rec=94% | White micaceous quartzite, mdjtd, UnWIncJts | 23.0 | | |
| | | | 28.0 | RQD=92% | | | | |
| 04/16/82 | | | | | | 1C | 25 | |
| | | | | | | | 30 | |

BORING NO. MG-834

# MUESER, RUTLEDGE, JOHNSTON & DESIMONE
## WOODWARD–CLYDE CONSULTANTS, INC.
## BORING LOG

SHEET 2 of 2
BORING NO. MG-834
FILE NO. 4840

| DAILY PROGRESS | CASING BLOWS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH (FT) | REMARKS |
|---|---|---|---|---|---|---|---|---|
| Same as above 1100 | | 2C | 28.0 | Rec=100% | White micaceous quartzite & dark gray mica schist, jtd, UnWExJts | Same as above 33.0 | 30 | |
| | | | 33.0 | RQD=80% | | | | |
| | | | | | | | 35 | |
| | | | | | | | 40 | |
| | | | | | | | 45 | |
| | | | | | | | 50 | |
| | | | | | | | 55 | |
| | | | | | | | 60 | |
| | | | | | | | 65 | |
| | | | | | | | 70 | |
| | | | | | | | 75 | |
| | | | | | | | 80 | |
| | | | | | | | 85 | |

BORING NO. MG-834

MUESER, RUTLEDGE, JOHNSTON & DESIMONE
WOODWARD–CLYDE CONSULTANTS, INC.

# BORING LOG

SHEET 1 of 2
BORING NO. MG-835
FILE NO. 4840

| | | | |
|---|---|---|---|
| PROJECT: WEST SIDE HIGHWAY | DOT. CONTR. NO.: D 250002 | ELEVATION: +8.4 | |
| COORDINATES: N 192399.1 | E 199911.0 | DATUM: Manhattan | |
| BORING LOCATION: MTA Yard Ramp | | DATE STARTED: 04/16/82 | |
| INSPECTOR: Y.K. Chan (MRJD) | | DATE COMP.: 04/19/82 | |
| CONTRACTOR: Warren George, Inc. | | | |
| DRILLER: John Stevenson | HELPER: Cecil Soto | | |
| TYPE OF RIG: TRUCK ☒ SKID ☐ BARGE MOUNTED ☐ TRIPOD ☐ OTHER ☐ | | | |
| CASING: DIA. 4 IN. FROM 0.0 TO 24.0 FT.; DIA. IN. FROM TO FT. | | | |
| DRILLING MUD UTILIZED: MUD TYPE | | ROTARY BIT DIA. 3/3/4 IN. | |
| SAMPLING EQUIPMENT, (TYPE & SIZE) | D-SAMPLER: Split Spoon, 2" O.D. | DRILL ROD BW | |
| | U-SAMPLER: DIA. IN.: TYPE | | |
| | CORE BIT Diamond NX | CORE BARREL Double Barrel | |
| FEED DURING CORING: MECHANICAL ☐ HYDRAULIC ☒ OTHER ☐ | | | |
| SAMPLER HAMMER: WEIGHT (LBS) 140 | AVG. FALL 30 IN. | | |
| CASING HAMMER: WEIGHT (LBS) 300 | AVG. FALL 18 IN. | | |
| NO. OF U-TUBES – NO. OF VANE TESTS – | DEPTH TO ROCK 24.5 FT. | DEPTH TO COMP. 34.5 FT. | |

WATER LEVEL OBSERVATIONS

| DATE | TIME | DEPTH OF HOLE | DEPTH OF CASING | DEPTH TO WATER | ELEVATION OF TIDE | CONDITIONS OF OBSERVATION |
|---|---|---|---|---|---|---|
| 04/19/82 | 0705 | 24.5 | 24.0 | 2.0 | | Over weekend at start of drilling. |
| 04/19/82 | 0836 | 34.5 | 20.0 | 6.0 | | At completion |
| 04/19/82 | 0848 | 34.5 | 10.0 | 4.9 | | |
| 04/19/82 | 0900 | 34.5 | 0.0 | 3.2 | | |

| DAILY PROGRESS | CASING BLOWS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH (FT) | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 1130 | 13 | 1D | 0.5 | 15-15 | Dark gray m-f sand, sm silt trace gravel (Fill) (SM) | * | 0 | *Aphalt |
| | 26 | | 2.5 | 10-22 | | 0.5 Med cpt dark brn f-c sand some silt, tr gravel cinders (Fill) | | |
| | 45 | | | | | | | |
| | 50 | | | | | | | |
| | 52 | | | | | | | |
| | 27 | 2D | 5.0 | 6-8 | Brown f-m sand, sm silt, trace cinders (Fill) (SM) | | 5 | |
| | 25 | | 7.0 | 6-4 | | | | |
| | 23 | | | | | | | |
| | 25 | | | | | | | |
| | 38 | | | | | | | |
| Sunny | 35 | 3D | 10.0 | 5-3 | Dark brown c-f sand, tr silt, cinders (Fill) (SP-SM) | | 10 | |
| | 50 | | 12.0 | 9-12 | | | | |
| | 45 | | | | | | | |
| | 48 | | | | | | | Red-brown color of washed at 14.0' |
| | 56 | | | | | | | |
| | 42 * | NR | 15.0 | 8-9 | | 14.0 Med cpt red-brn c-f sand, sm silt tr gravel | 15 | |
| 04/16/82 | 46 * | | 17.0 | 10-9 | | | | |
| | 47 * | 4D | 17.0 | 2-9 | Red-brown silty fine to medium sand (SM) | | | |
| | 46 * | | 19.0 | 10-8 | | | | * Washed ahead |
| | 42 * | | | | | | | |
| | 49 * | 5D | 20.0 | 7-12 | Red-brown fine to coarse sand, some silt, tr gravel (SM) | | 20 | |
| | 43 * | | 22.0 | 12-14 | | | | |
| | 66 * | | | | | | | |
| 1530 | 58/4"* | | | | | 22.5 ** | | |
| 1700 | | 1C | 24.5 | Rec=98% | Gray mica schist, some granitic gneiss, cljtd to jtd, UnWExJts | | | **Decomposed rock Decomposed mica schist in cuttings between 22.5'-24.5'. |
| | | | 29.5 | RQD=64% | | 24.5 | 25 | |
| 04/19/82 Sunny | | | | | | 1C | 30 | |

BORING NO. MG-835

MUESER, RUTLEDGE, JOHNSTON & DESIMONE
WOODWARD–CLYDE CONSULTANTS, INC.

# BORING LOG

SHEET 2 of 2
BORING NO. MG-835
FILE NO. 4840

| DAILY PROGRESS | CASING BLOWS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH (FT) | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 04/19/82 Sunny | | 2C | 29.5 | Rec=100% | White to gray granitic gneiss, some mica schist, jtd, UnWExJts | | 30 | |
| | | | 34.5 | RQD=84% | | | | |
| | | | | | | 2C | | |
| 0930 | | | | | | 34.5 | 35 | |
| | | | | | | | 40 | |
| | | | | | | | 45 | |
| | | | | | | | 50 | |
| | | | | | | | 55 | |
| | | | | | | | 60 | |
| | | | | | | | 65 | |
| | | | | | | | 70 | |
| | | | | | | | 75 | |
| | | | | | | | 80 | |
| | | | | | | | 85 | |

BORING NO. MG-835

MUESER, RUTLEDGE, JOHNSTON & DESIMONE
WOODWARD–CLYDE CONSULTANTS, INC.

# BORING LOG

SHEET 1 of 2
BORING NO. MG-824
FILE NO. 4840

PROJECT: WEST SIDE HIGHWAY | DOT. CONTR. NO.: D 250002 | ELEVATION: +5.7
COORDINATES: N 192491.8 E 1998852.4 | DATUM: Manhattan
BORING LOCATION: MTA Yard, Ramps | DATE STARTED: 04/07/82
INSPECTOR: Y.K. Chan (MRJD) | DATE COMP.: 04/08/82
CONTRACTOR: Warren George, Inc.
DRILLER: J. Farrell | HELPER: G. Mccartar
TYPE OF RIG: TRUCK ☒ SKID ☐ BARGE MOUNTED ☐ TRIPOD ☐ OTHER ☐
CASING: DIA. 4 IN. FROM 0.0 TO 5.0 FT.; DIA. 3 IN. FROM 0.0 TO 29.5 FT.
DRILLING MUD UTILIZED: MUD TYPE Quick-Gel | ROTARY BIT DIA. 3 7/8 IN.
SAMPLING EQUIPMENT (TYPE & SIZE): D-SAMPLER: Split Spoon, 2" O.D. | DRILL ROD NW
U-SAMPLER: DIA. IN.: TYPE
CORE BIT Diamond, NX | CORE BARREL Double Barrel
FEED DURING CORING: MECHANICAL ☐ HYDRAULIC ☒ OTHER ☐
SAMPLER HAMMER: WEIGHT (LBS) 140 AVG. FALL 30 IN.
CASING HAMMER: WEIGHT (LBS) 300 AVG. FALL 18 IN.
NO. OF U-TUBES – NO. OF VANE TESTS – DEPTH TO ROCK 27.7 FT. DEPTH TO COMP. 39.5 FT.

WATER LEVEL OBSERVATIONS

| DATE | TIME | DEPTH OF HOLE | DEPTH OF CASING | DEPTH TO WATER | ELEVATION OF TIDE | CONDITIONS OF OBSERVATION |
|---|---|---|---|---|---|---|
| 04/08/82 | 0730 | 20.0 | 5.0 | 0.0 | | Overnight – mud in hole. |
| 04/08/82 | 1120 | 39.5 | 29.5 | 5.0 | | At completion. Water in hole. |

| DAILY PROGRESS | CASING BLOWS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH (FT) | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 1300 | 10 | 1D | 0.0 | 6-8 | Dark brown f-c sandy gravel, some silt, trace glass (Fill) (GM) | Med cpt dk brn, f-c sand & gvl, sm silt, tr brick, glass (Fill) | 0 | W = Water content in % |
| | 15 | | 2.0 | 9-8 | | | | |
| | 17 | | | | | | | |
| | 31 | | | | | | | |
| | 17 | | | | | | | |
| | D | | | | | | 5 | |
| | E | NR | 5.5 | 6-8 | | | | |
| | R | | 7.5 | 5-6 | | | | |
| | E | 2D | 7.5 | 9-9 | Dark brown f-c sand, sm silt, trace brick (Fill) (SM) | | | |
| | | | 9.5 | 16-13 | | | | |
| | O | NR | 10.0 | 3-3 | | | 10 | |
| | W | | 12.0 | 3-4 | | | | |
| | | 3D | 12.0 | 5-3 | Black organic clayey m-f sand (Fill) (SC) | Loose 3D (Fill) | 12.0 | |
| | | | 14.0 | 4-6 | | | | |
| | | 4D | 15.0 | 1-1 | Medium dark gray organic silty clay, tr fine sand, decomposed wood (OH) | 4D, trace vegetation | 15.0 | W = 72 |
| 1530 | | | 17.0 | 1-1 | | | 15 | |
| 0700 | | | | | | | | |
| | | 5D | 20.0 | 1/12" | Do 4D, trace vegetation (OH) | | 20 | W = 57 |
| | | | 22.0 | 2-2 | | | | |
| | | 6D | 25.0 | 6-5 | Red-brn silty f-m sand, sm silty clay layers, tr gravel, mica (SM) | 24.0 6D Med cpt | 25 | |
| | | | 27.0 | 5-6 | | 27.5 Dec. Rock | | Decomposed rock fgmts, in wash at 27.5'. |
| | | | | | | | 30 | |

04/07/82 Sunny, Windy
04/08/82 Sunny

BORING NO. MG-824

MUESER, RUTLEDGE, JOHNSTON & DESIMONE
WOODWARD–CLYDE CONSULTANTS, INC.

# BORING LOG

SHEET 2 of 2
BORING NO. MG-824
FILE NO. 4840

| DAILY PROGRESS | CASING BLOWS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH (FT) | REMARKS |
|---|---|---|---|---|---|---|---|---|
| | | 1C | 29.5 | Rec=98% | Green to light gray hornblende mica schist, tr quartz veins & mica schist, jtd, UnWExJts. | 1C | 30 | |
| | | | 34.5 | RQD=84% | | | | |
| | | | | | | 34.5 | 35 | |
| | | 2C | 34.5 | Rec=96% | Light gray mica schist, trace quartz inclusions, mdjtd, UnWExJts | 2C | | |
| | | | 39.5 | RQD=84% | | | | |
| 1200 | | | | | | 39.5 | 40 | |
| | | | | | | | 45 | |
| | | | | | | | 50 | |
| | | | | | | | 55 | |
| | | | | | | | 60 | |
| | | | | | | | 65 | |
| | | | | | | | 70 | |
| | | | | | | | 75 | |
| | | | | | | | 80 | |
| | | | | | | | 85 | |

04/08/82 Sunny

BORING NO. MG-824

MUESER, RUTLEDGE, JOHNSTON & DESIMONE
WOODWARD–CLYDE CONSULTANTS, INC.

SHEET 1 of 2
BORING NO. MG-825
FILE NO. 4840

# BORING LOG

| | |
|---|---|
| PROJECT: WEST SIDE HIGHWAY | DOT. CONTR. NO.: D 250002 |
| COORDINATES: N 192600.2 | E 1998598.9 |
| BORING LOCATION: MTA Yard, MABSTOA Garage | ELEVATION: +6.2 |
| INSPECTOR: B. Mukherjee | DATUM: Manhattan |
| CONTRACTOR: Warren George, Inc. | DATE STARTED: 04/02/82 |
| DRILLER: J. Stevenson | DATE COMP.: 04/05/82 |
| HELPER: C. Soto | |

TYPE OF RIG: TRUCK ☒ SKID ☐ BARGE MOUNTED ☐ TRIPOD ☐ OTHER ☐

CASING: DIA. 4 IN. FROM 0.0 TO 35.0 FT.; DIA. 3 IN. FROM 0.0 TO 49.5 FT.

DRILLING MUD UTILIZED: MUD TYPE Zeogel

SAMPLING EQUIPMENT, (TYPE & SIZE): D-SAMPLER: Split Spoon, 2" O.D.; U-SAMPLER: DIA. IN.: TYPE; CORE BIT Diamond, BX

ROTARY BIT DIA. 3 3/4, 2 15/16 IN; DRILL ROD BW; CORE BARREL Double Barrel

FEED DURING CORING: MECHANICAL ☐ HYDRAULIC ☒ OTHER ☐

SAMPLER HAMMER: WEIGHT (LBS) 140 AVG. FALL 30 IN.

CASING HAMMER: WEIGHT (LBS) 300 AVG. FALL 18 IN.

NO. OF U-TUBES -- NO. OF VANE TESTS - DEPTH TO ROCK 49.5 FT. DEPTH TO COMP. 68.0 FT.

WATER LEVEL OBSERVATIONS

| DATE | TIME | DEPTH OF HOLE | DEPTH OF CASING | DEPTH TO WATER | ELEVATION OF TIDE | CONDITIONS OF OBSERVATION |
|---|---|---|---|---|---|---|
| 04/05/82 | 0715 | 60.0 | 49.5 | 3.0 | | Over weekend |
| 04/05/82 | 1430 | 68.0 | 49.5 | 4.9 | | At completion of rock coring |
| 04/05/82 | 1440 | 68.0 | 35.0 | 9.0 | | |
| 04/05/82 | 1500 | 68.0 | 20.0 | 4.5 | | |
| 04/05/82 | 1510 | - | 0.0 | 5.2 | | |

| DAILY PROGRESS | CASING BLOWS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH (FT) | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 0700 | - | 1D | 0.5 | 12-12 | Dk gry c-f cinders, sm silt (Fill) (SM) | * | 0 | *Asphalt |
| | 16 | | 2.5 | 8-9 | | 0.3 | | W = Water content in % |
| | 14 | | | | | | | |
| | 31 | | | | | | | |
| | 32 | | | | | | | |
| | 14 | 2D | 5.0 | 7-4 | Dk gray c-f cinders, some organic silt (Fill) (SM) | | 5 | |
| | 11 | | 7.0 | 4-5 | | | | |
| | 14 | | | | | | | |
| | 13 | | | | | | | |
| | 18 | | | | | | | |
| | 11 | 3D | 10.0 | 2-1 | Gray fine sand, sm organic silt (Fill) (SM) | | 10 | Lost all drilling water at 12.0'. |
| | 16 | | 12.0 | 1-2 | | | | |
| | 82 | | | | | | | |
| | 87 | | | | | | | |
| | 45 | | | | | | | |
| | 28 | 4D | 15.0 | 12-11 | Dk gray c-f sand, sm silt, gvl (Fill) (SM) | | 15 | |
| | 30 | | 17.0 | 30-32 | | | | |
| | 62 | | | | | | | |
| | 45 | | | | | | | |
| | 46 | | | | | | | |
| | 30 | NR | 20.0 | 15-21 | | | 20 | |
| | 56 | | 22.0 | 6-3 | | | | |
| | 42 | 5D | 22.0 | 5-12 | Gry mic silty f-c sand, some rock fragments (Fill) (SM) | | | |
| | 44 | | 24.0 | 17-20 | | | | |
| | 48 | | | | | | | |
| | 26 | 6D | 25.0 | 14-1.9 | Gray mic f-c sand, sm silt (Fill) (SM) | | 25 | |
| | 51 | | 27.0 | 3-21 | | | | |
| | 113 | | | | | | | |
| | 276 | | | | | | | |
| | 82 | | | | | | 30 | |

04/02/82 Sunny

Loose to compact, dark gray fine to coarse sand, some cinders, silt, trace gravel, rock fragments. (Fill)

BORING NO. MG-825

MUESER, RUTLEDGE, JOHNSTON & DESIMONE
WOODWARD–CLYDE CONSULTANTS, INC.

SHEET 2 of 2
BORING NO. MG-825
FILE NO. 4840

# BORING LOG

| DAILY PROGRESS | CASING BLOWS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH (FT) | REMARKS |
|---|---|---|---|---|---|---|---|---|
| | 46 | 7D | 30.0 | WR/12" | Top: Soft blk org silty clay, tr mica (OH) | * | 30* | *7D Top |
| | 30 | | 32.0 | 4-4 | Bot: Med gry org silty clay, sm shells, fine sand (OH) | 31.0 | | Top: W = 52 |
| | 39 | | | | | | | Bot: W =55 |
| | 36 | | | | | | | |
| | 39 | | | | | | | |
| | | 8D | 35.0 | 1-1 | Medium gray organic silty clay, some shells, trace fine sand (OH) | | 35 | W = 48 |
| | M | | 37.0 | 2-2 | | | | |
| | U | | | | | | | |
| | D | | | | | | | |
| | | | | | | | | |
| | U | 9D | 40.0 | 1/12" | Med gry org silty clay, tr fine sand partings, veg (OH) | | 40 | W = 53 |
| | S | | 42.0 | 2-2 | | | | |
| | E | | | | | | | |
| | D | | | | | | | |
| | | | | | | | | |
| | | 10D | 45.0 | WH-1 | Top: Do 9D (OH) | | 45 | Top: W = 34 |
| | | | 47.0 | 1-2 | Bot: Gray f-m sand, sm organic silt, trace peat, shells (SM) | 46.0 | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | 1C | 50.0 | Rec=94% | Lt gry to white granitic pegmatite, cljtd, UnW to SlW | 10D Bottom 49.5 | 50 | |
| | | | 55.0 | RQD=46% | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | 2C | 55.0 | Rec=98% | Do 1C | | 55 | New diamond bit at 55.0'. |
| | | | 60.0 | RQD=26% | | | | |
| | | | | | | | | |
| | | | | | | | | |
| 1530 | | | | | | | | |
| 0700 | | 3C | 60.0 | Rec=93% | Do 2C, trace quartzite | | 60 | Core barrel blocked at 63.0' |
| | | | 63.0 | RQD=50% | | | | |
| | | 4C | 63.0 | Rec=98% | Lt gray to white quartzite and granitic gneiss, jtd, UnW | | | |
| | | | 68.0 | RQD=84% | | | | |
| | | | | | | | 65 | |
| 1530 | | | | | | | | |
| | | | | | | 68.0 | | |
| | | | | | | | 70 | |
| | | | | | | | 75 | |
| | | | | | | | 80 | |
| | | | | | | | 85 | |

04/05/82 Sunny

Light gray to white granitic pegmatite, trace quartzite, jtd, UnW to SlW

BORING NO. MG-825

MUESER, RUTLEDGE, JOHNSTON & DESIMONE
WOODWARD–CLYDE CONSULTANTS, INC.

# BORING LOG

SHEET 1 of 2
BORING NO. MG-826
FILE NO. 4840

| | | | |
|---|---|---|---|
| PROJECT: WEST SIDE HIGHWAY | DOT. CONTR. NO.: D 250002 | ELEVATION: +5.7 | |
| COORDINATES: N 192690.5 | E 1998436.2 | DATUM: Manhattan | |
| BORING LOCATION: MTA Yard, MABSTOA Garage | | DATE STARTED: 04/01/82 | |
| INSPECTOR: Y. K. Chan | | DATE COMP.: 04/02/82 | |
| CONTRACTOR: Warren George, Inc. | | | |
| DRILLER: J. Farrell | HELPER: G. McCartar | | |

TYPE OF RIG: TRUCK ☒ SKID ☐ BARGE MOUNTED ☐ TRIPOD ☐ OTHER ☐

CASING: DIA. 4 IN. FROM 0.0 TO 11.0 FT.; DIA. 3 IN. FROM 0.0 TO 71.0 FT.

DRILLING MUD UTILIZED: MUD TYPE Quick Gel — ROTARY BIT DIA. 3 7/8 IN.

SAMPLING EQUIPMENT, (TYPE & SIZE): D-SAMPLER: Split Spoon, 2" O.D. — DRILL ROD NW
U-SAMPLER: DIA. IN.: TYPE
CORE BIT Diamond, NX — CORE BARREL Double Barrel

FEED DURING CORING: MECHANICAL ☐ HYDRAULIC ☒ OTHER ☐

SAMPLER HAMMER: WEIGHT (LBS) 140 AVG. FALL 30 IN.

CASING HAMMER: WEIGHT (LBS) 300 AVG. FALL 18 IN.

NO. OF U-TUBES -- NO. OF VANE TESTS --- DEPTH TO ROCK 69.0 FT. DEPTH TO COMP. 82.0 FT.

WATER LEVEL OBSERVATIONS

| DATE | TIME | DEPTH OF HOLE | DEPTH OF CASING | DEPTH TO WATER | ELEVATION OF TIDE | CONDITIONS OF OBSERVATION |
|---|---|---|---|---|---|---|
| 04/02/82 | 0710 | 82.0 | 71.0 | 6.2 | | Overnight |
| 04/02/82 | 0815 | 82.0 | 0.0 | 6.9 | | |

| DAILY PROGRESS | CASING BLOWS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH (FT) | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 0700 | - | | | | | | | |
| | | 1D | 1.0 | 23-16 | Gray c-f sand, sm gravel, trace silt (Fill)(SP) | * 0.3 Loose to compact gry to blk f-c sand, sm silt, tr gvl, sls, dec wood (Fill) | 0 | *Asphalt W = Water content in % |
| | | | 3.0 | 14-11 | | | | |
| | | 2D | 5.0 | 6-8 | Gray silty fine to medium sand (Fill)(SM) | | 5 | |
| | | | 7.0 | 7-7 | | | | |
| | | *NR | 10.0 | 7-5 | | | 10 | **Tried for sample twice. No recovery. |
| | | | 12.0 | 3-3 | | | | |
| | | 3D | 12.0 | 3-3 | Black c-f sand, sm silt, tr gravel (Fill)(SM) | | | |
| | | | 14.0 | 13-17 | | | | |
| | | 4D | 15.0 | 3-3 | Blk f-c sand, sm silt, tr gvl decomposed wood, sls(Fill) (SM) | | 15 | |
| | | | 17.0 | 3-3 | | | | |
| | | 5D | 20.0 | 6-3 | Gray-brn clayey fine to medium sand, trace gravel (Fill)(SC) | | 20 | |
| | | | 22.0 | 3-4 | | | | Color of mud was black at 23.0'. |
| | | | | | | 23.0 | | |
| | | 6D | 25.0 | 2-2 | Soft black organic silty clay, trace fine sand (OH) | 6D | 25 | W = 72 |
| | | | 27.0 | 3-3 | | | | *Soft-med,dk gry org silty clay, tr f sa, f sa seams,sls, veg. |
| | | | | | | 28.0 * | 30 | |

Sunny

04/01/82

BORING NO. MG-826

MUESER, RUTLEDGE, JOHNSTON & DESIMONE
WOODWARD–CLYDE CONSULTANTS, INC.

# BORING LOG

SHEET 2 of 2
BORING NO. MG-826
FILE NO. 4840

| DAILY PROGRESS | CASING BLOWS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH (FT) | REMARKS |
|---|---|---|---|---|---|---|---|---|
| | | 7D | 30.0 | WH/12" | Soft dark gray organic silty clay, tr fine sand seams (OH) | Soft to medium dark gray organic silty clay, tr fine sand seams, shells, vegetation. | 30 | W = 69 |
| | M | | 32.0 | 2-3 | | | | |
| | U | | | | | | | |
| | D | | | | | | | |
| | U | 8D | 35.0 | WH-1 | Do 7D, trace shells, veg (OH) | | 35 | W = 46 |
| | S | | 37.0 | 1-2 | | | | |
| | E | | | | | | | |
| | D | | | | | | | |
| | | 9D | 40.0 | 1/12" | Do 8D (OH) | | 40 | W = 52 |
| | | | 42.0 | WH/12" | | | | |
| | | 10D | 45.0 | 2-2 | Do 8D (OH) | | 45 | W = 52 |
| | | | 47.0 | 2-2 | | | | |
| | | 11D | 50.0 | 1-2 | Medium dark gray organic silty clay, trace fine sand (OH) | | 50 | W = 57 |
| | | | 52.0 | 2-3 | | | | |
| | | 12D | 55.0 | WR/24" | Do 11D, some fine sand, trace shells (OH) | | 55 | W = 35 |
| | | | 57.0 | | | | | |
| | | 13D | 60.0 | WH/12" | Medium dark gray organic silty clay, tr fine sand, shells, veg (OH) | | 60 | W = 41 |
| | | | 62.0 | 3-3 | | | | |
| | | 14D | 65.0 | WH/18" | Medium dark gray organic silty clay, tr fine sand, veg (OH) | | 65 | W = 33 |
| | | | 67.0 | 3 | | | | |
| | | | | | | 69.0 * | 70 | Telescoped 3" casing inside 4" casing to 72.0' *Possible decomposed rock |
| | | 1C | 72.0 | Rec=98% | Top: Gray garnet mica schist, jtd, UnWExJts Bot: White quartzite, mdjtd. UnW. | 72.0 Gry grt mica schist to wht quartzite, jtd to mdjtd, UnWExJts | 75 | Mica schist is very micaceous. |
| | | | 77.0 | RQD=88% | | | | |
| | | 2C | 77.0 | Rec=98% | Top: White quartzite, mdjtd, UnW Bottom: Gray garnet mica schist, mdjtd, UnWExJts | | 80 | |
| | | | 82.0 | RQD=96% | | 82.0 | | |
| 1530 | | | | | | | 85 | |

04/01/82

BORING NO. MG-826

MUESER, RUTLEDGE, JOHNSTON & DESIMONE
WOODWARD–CLYDE CONSULTANTS, INC.

SHEET 1 of 3
BORING NO. MG-827
FILE NO. 4840

# BORING LOG

| | | | |
|---|---|---|---|
| PROJECT: WEST SIDE HIGHWAY | DOT. CONTR. NO.: D 250002 | ELEVATION: +5.5 | |
| COORDINATES: N 192663.3 | E 1998186.4 | DATUM: Manhattan | |
| BORING LOCATION: MTA Yard, Ramps | | DATE STARTED: 04/07/82 | |
| INSPECTOR: B. Mukherjee (MRJD) | | DATE COMP.: 04/09/82 | |
| CONTRACTOR: Warren George, Inc. | | | |
| DRILLER: J Stevenson | HELPER: C. Soto | | |

TYPE OF RIG: TRUCK ☒ SKID ☐ BARGE MOUNTED ☐ TRIPOD ☐ OTHER ☐

CASING: DIA. 4 IN. FROM 0.0 TO 40.0 FT.; DIA. 3 IN. FROM 0.0 TO 115.3 FT.

DRILLING MUD UTILIZED: MUD TYPE

SAMPLING EQUIPMENT (TYPE & SIZE): D-SAMPLER: Split Spoon, 2" O.D. — ROTARY BIT DIA. 3 3/4 IN. — DRILL ROD BW
U-SAMPLER: DIA. IN.: TYPE
CORE BIT Diamond, NX — CORE BARREL Double Barrel

FEED DURING CORING: MECHANICAL ☐ HYDRAULIC ☒ OTHER ☐

SAMPLER HAMMER: WEIGHT (LBS) 140 AVG. FALL 30 IN.

CASING HAMMER: WEIGHT (LBS) 300 AVG. FALL 18 IN.

NO. OF U-TUBES – NO. OF VANE TESTS – DEPTH TO ROCK 115.3 FT. DEPTH TO COMP. 135.0 FT.

WATER LEVEL OBSERVATIONS

| DATE | TIME | DEPTH OF HOLE | DEPTH OF CASING | DEPTH TO WATER | ELEVATION OF TIDE | CONDITIONS OF OBSERVATION |
|---|---|---|---|---|---|---|
| 04/08/82 | 0730 | 62.0 | 40.0 | 4.6 | | Overnight |
| 04/09/82 | 0715 | 115.3 | 115.3 | 6.0 | | |
| 04/09/82 | 1430 | 135.0 | 115.3 | 2.0 | | At completion at rock coring |
| 04/12/82 | 0730 | – | 15.0 | 5.7 | | Over the weekend |
| 04/12/82 | 0800 | – | 0.0 | 5.0 | | |

| DAILY PROGRESS | CASING BLOWS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH (FT) | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 0830 | — | 1D | 0.75 | 32-19 | Brown cinders, sm c-f sand, silt, tr gravel (Fill) (SM) | * 0.2 | 0 | *Asphalt W = Water content in % |
| | 28 | | 2.75 | 10-30 | | | | |
| | 48 | | | | | | | |
| | 37 | | | | | | | |
| | 56 | | | | | | | |
| | 31 | 2D | 5.0 | 9-16 | Gry-brn silty f-m sand, tr gvl cndrs, brick, mica (Fill) (SM) | Medium compact to loose gray-brown silty fine to coarse sand, trace gravel, cinders, brick, mica (Fill) | 5 | |
| | 27 | | 7.0 | 9-10 | | | | |
| | 34 | | | | | | | |
| | 21 | | | | | | | |
| | 13 | | | | | | | |
| | 29 | 3D | 10.0 | 11-17 | Top: 18" Do 2D (Fill) (SM) Bot: 6" Red-brn silt, sm fine sand (Fill) (ML) | | 10 | |
| | 25 | | 12.0 | 12-8 | | | | |
| | 38 | | | | | | | |
| | 29 | | | | | | | |
| | 17 | | | | | | | |
| | 15 | 4D | 15.0 | 1-3 | Dark gray c-f sand, sm gravel, silt, tr cndrs, mica (Fill)(SM) | | 15 | |
| | 15 | | 17.0 | 3-5 | | | | |
| | 16 | | | | | | | |
| | 18 | | | | | | | |
| | 16 | | | | | | | |
| | *19 | 5D | 20.0 | WR-13 | Med black organic silty clay, tr fine sand, wood, bricks (OH) | 20.0 | 20 | W = 58 *20.0'-25.0' drilled ahead of casing. |
| | 18 | | 22.0 | 9-6 | | 5D Medium | | |
| | 12 | | | | | | | |
| | 26 | | | | | | | |
| | 27 | | | | | | | |
| | 28 | 6D | 25.0 | 30-19 | Gray-brn mic silty f-m sand, sm rock fragments (SM) | 25.0 6D Med compact (Fill) | 25 | 6D rock fgmts are decomposed mica schist. (Fill) |
| | 43 | | 27.0 | 12-13 | | | | |
| | 80 | | | | | | | |
| | 69 | | | | | | | |
| | 90 | | | | | | | |

04/07/82 Partly Cloudy, Cold

BORING NO. MG-827

MUESER, RUTLEDGE, JOHNSTON & DESIMONE
WOODWARD–CLYDE CONSULTANTS, INC.

SHEET 2 of 3
BORING NO. MG-827
FILE NO. 4840

# BORING LOG

| DAILY PROGRESS | CASING BLOWS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH (FT) | REMARKS |
|---|---|---|---|---|---|---|---|---|
| | 44 | NR | 30.0 | 100/4" | | Same as above | 30 | |
| | 22 | | 30.3 | | | | | |
| | 32 | | | | | | | |
| | 34 | | | | | | | |
| | 35 | | | | | | | |
| | * 42 | 7D | 35.0 | 10-14 | Stiff black organic clay, trace vegetation (OH) | 35.0 Stiff blk org clay | 35 | W = 64 *35.0'-40.0' drilled ahead of casing. |
| | 26 | | 37.0 | 8-9 | | | | |
| | 26 | | | | | | | |
| | 25 | | | | | | | |
| | 25 | | | | | | | |
| | | 8D | 40.0 | 1-1 | Medium gray organic silty clay, trace shells (OH) | 40.0 | 40 | W = 69 |
| | | | 42.0 | 2-4 | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | 9D | 45.0 | 1-1 | Medium gray organic silty clay, trace shells (OH) | | 45 | W = 53 |
| | | | 47.0 | 1-1 | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | 10D | 50.0 | 1-1 | Do 9D, some fine sand (OH) | | 50 | W = 47 |
| | | | 52.0 | 1-1 | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | 11D | 55.0 | 1-1 | Medium gray organic silty clay, trace shells (OH) | | 55 | W = 47 |
| | | | 57.0 | 2-2 | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | 12D | 60.0 | 2-2 | Do 11D (OH) | | 60 | W = 53 |
| 1530 | | | 62.0 | 3-4 | | | | |
| 0700 | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | 13D | 65.0 | 1-WH | Medium gray organic silty clay, tr shells, fine sand partings (OH) | | 65 | W = 57 |
| | | | 67.0 | WH-1 | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | 14D | 70.0 | WH-1 | Do 13D (OH) | | 70 | W = 34 |
| | | | 72.0 | 1-2 | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | 15D | 75.0 | 1-1 | Do 13D (OH) | | 75 | W = 50 |
| | | | 77.0 | 2-2 | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | 16D | 80.0 | 2-3 | Do 13D (OH) | | 80 | W = 39 |
| | | | 82.0 | 4-2 | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | 85 | |

04/07/82 Partly Cloudy, Cold
04/08/82 Sunny

BORING NO. MG-827

MUESER, RUTLEDGE, JOHNSTON & DESIMONE
WOODWARD–CLYDE CONSULTANTS, INC.

## BORING LOG

SHEET 3 of 3
BORING NO. MG-827
FILE NO. 4840

| DAILY PROGRESS | CASING BLOWS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH (FT) | REMARKS |
|---|---|---|---|---|---|---|---|---|
| | | 17D | 85.0 | 2-2 | Medium gray organic silty clay, | Medium gray organic silty clay, tr to sm fine sand, tr peat partings | 85 | W = 59 |
| | | | 87.0 | 6-5 | some fine sand (OH) | | | |
| | | 18D | 90.0 | WH-6 | Medium gray organic silty clay, | | 90 | W = 39 |
| | | | 92.0 | 3-2 | trace fine sand partings (OH) | | | |
| Sunny | | 19D | 95.0 | WH-1 | Medium gray organic silty clay, | | 95 | W = 40 |
| | | | 97.0 | 5-9 | some fine sand (OH) | | | |
| | | 20D | 100.0 | WR-2 | Medium gray organic silty clay, | | 100 | W = 45 |
| | | | 102.0 | 2-11 | trace fine sand partings, peat (OH) | | | |
| 04/08/82 | | 21D | 105.0 | 5-11 | Medium gray organic silt, sm | | 105 | W = 32 |
| | | | 107.0 | 16-16 | fine sand and clay (OL) | | | |
| | | 22D | 110.0 | 2-5 | Stiff gray organic clay, some | | 110 | W = 52 |
| | | | 112.0 | 7-10 | peat, trace decomposed wood (OH) | | | W = 73 (Peat portion of the sample) |
| 1500 | | | | | | | | |
| 0700 | | 23D | 115.0 | 100/4" | Light gray micaceous f-m sand, | 115.0 | 115 | * Decomposed mica schist. |
| | | | 115.3 | | tr c sand, silt (SP)* | Dec Rock 118.0 | | |
| | | 1C | 116.0 | Rec=88% | Light gray garnet mica schist, | | | |
| | | | 121.0 | RQD=12% | broken, SlW to HiW | | | |
| Cloudy | | 2C | 121.0 | Rec=82% | Light gray garnet mica schist, | Lt gry mica schist & grt mica schist, mic quartzite, tr qtz veins, bkn to mdit, UnWExJts | 120 | Run #2C Core barrel blocked. |
| | | | 125.0 | RQD=25% | trace quartz veins, cljtd, UnWExJts. | | | |
| 04/09/82 | | 3C | 125.0 | Rec=92% | Top: Light gray mica schist, tr | | 125 | |
| | | | 130.0 | RQD=30% | quartz veins, broken, UnWExJts Bot: White mic quartzite, cljtd, UnWExJts | | | |
| | | 4C | 130.0 | Rec=100% | Light gray mica schist & mic | | 130 | |
| | | | 135.0 | RQD=88% | quartzite, mdjtd, UnWExJts | | | |
| 1430 | | | | | | 135.0 | 135 | |
| | | | | | | | 140 | |

BORING NO. MG-827

MUESER, RUTLEDGE, JOHNSTON & DESIMONE
WOODWARD–CLYDE CONSULTANTS, INC.

## BORING LOG

SHEET 1 of 2
BORING NO. MG-827P
FILE NO. 4840

| | | | |
|---|---|---|---|
| PROJECT: WEST SIDE HIGHWAY | DOT. CONTR. NO.: D 250002 | | ELEVATION: +5.5 |
| COORDINATES: N 192674 | E 1998158. | | DATUM: Manhattan |
| BORING LOCATION: MTA Yard, MABSTOA Garage | | | DATE STARTED: 04/12/82 |
| INSPECTOR: B. Mukherjee (MRJD) | | | DATE COMP.: 04/12/82 |
| CONTRACTOR: Warren George, Inc. | | | |
| DRILLER: J. Stevenson | HELPER: C. Soto | | |
| TYPE OF RIG: TRUCK ☒ SKID ☐ BARGE MOUNTED ☐ TRIPOD ☐ OTHER ☐ | | | |
| CASING: DIA. 4 IN. FROM 0.0 TO 20.0 FT.; DIA. IN. FROM TO FT. | | | |
| DRILLING MUD UTILIZED: MUD TYPE | | | ROTARY BIT DIA. 3 3/4 IN. |
| SAMPLING EQUIPMENT, (TYPE & SIZE) | D–SAMPLER: Split Spoon, 2" O.D. | | DRILL ROD BW |
| | U–SAMPLER: DIA. IN.: TYPE | | |
| | CORE BIT | | CORE BARREL |
| FEED DURING CORING: MECHANICAL ☐ | HYDRAULIC ☐ | OTHER ☐ | |
| SAMPLER HAMMER: WEIGHT (LBS) | 140 | AVG. FALL 30 IN. | |
| CASING HAMMER: WEIGHT (LBS) | 300 | AVG. FALL 18 IN. | |
| NO. OF U–TUBES – | NO. OF VANE TESTS – | DEPTH TO ROCK – FT. | DEPTH TO COMP. – FT. |

WATER LEVEL OBSERVATIONS

| DATE | TIME | DEPTH OF HOLE | DEPTH OF CASING | DEPTH TO WATER | ELEVATION OF TIDE | CONDITIONS OF OBSERVATION |
|---|---|---|---|---|---|---|
| 04/12/82 | 1000 | 20.0 | 20.0 | 2.0 | | |
| 04/12/82 | 1300 | 15.5 | 15.0 | 3.9 | | Inside piezometer |

| DAILY PROGRESS | CASING BLOWS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH (FT) | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 0700 | 13 | | | | | | 0 | |
| | 18 | | | | | | | |
| | 16 | | | | | | | |
| | 34 | | | | | | | |
| | 12 | | | | | | | |
| | 20 | | | | | | 5 | |
| | 110 | | | | | | | |
| | 88 | | | | | | | |
| | 19 | | | | | | | |
| | 10 | | | | | | | |
| | 25 | | | | | | 10 | |
| | 20 | | | | | | | |
| | 20 | | | | | | | |
| | 18 | | | | | | | |
| | 12 | | | | | | | |
| 04/12/82 Partly Sunny | 11 | 1D | 15.0 | 3-3 | Gray-brown medium to fine | (Fill) | 15 | |
| | 11 | | 17.0 | 4-5 | sand, trace gravel (Fill)(SP) | | | |
| | 13 | | | | | | | |
| | 12 | | | | | | | |
| 1300 | 12 | | | | | | 20 | |
| | | | | | | 20.0 | | |
| | | | | | | | 25 | |
| | | | | | | | 30 | |

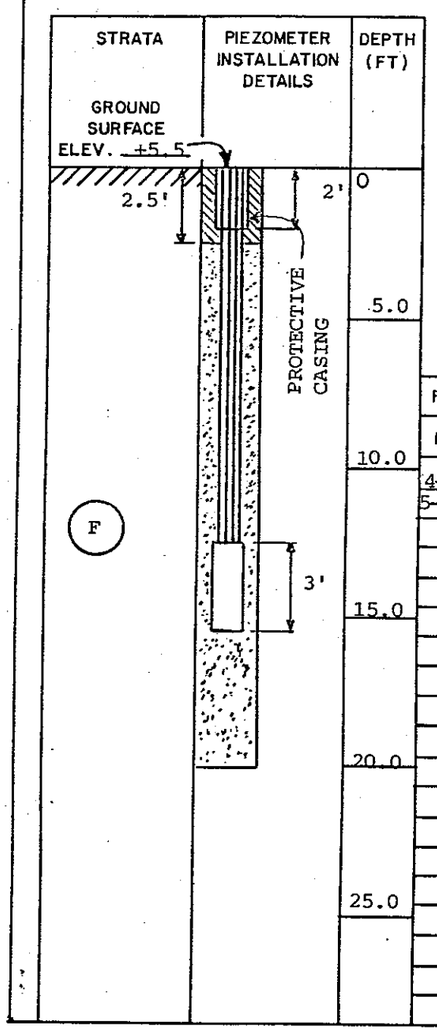
BORING NO. MG-827P

SHEET 2 OF 2
FILE NO. 4840
SUBCODE SMBST

# MUESER, RUTLEDGE, JOHNSTON & DESIMONE
CONSULTING ENGINEERS

## PIEZOMETER RECORD

PROJECT WEST SIDE HIGHWAY - CONTRACT 5 PIEZOMETER NO. MG-827 P
LOCATION MABSTOA GARAGE
PIEZOMETER LOCATION 12th AVE & W 30th STREET DATE OF INSTALLATION 4-12-82
☐ SEE SKETCH ON BACK RES. ENG. B. Mukherjee




PIEZOMETER TYPE DOUBLE TUBE POROUS PLASTIC

**INTAKE POINT**

depth to bottom, ft= 15.5
depth to top, ft= 12.5
length, ft= 3' =L
diameter, in= 1.5, ft= 0.125 =2R

**STANDPIPE/RISER** (DOUBLE TUBE)

elevation of rim, ft= +5.5
diameter, in= 3/8, ft= 0.031 =2r

| READING TIME DATE | CLOCK | DEPTH - RIM TO WATER | ELEVATION OF WATER | REMARKS |
|---|---|---|---|---|
| 4-12-82 | 1300 | 3.9 | 1.6 | High Tide 1220 |
| 5-10-82 | 1503 | 4.7 | 0.8 | High Tide 1115 |

Sand, Bentonite, Gravel, Grout

GROUND SURFACE ELEV. +5.5

PIEZOMETER NO. MG-827P

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MUESER, RUTLEDGE, JOHNSTON & DESIMONE
WOODWARD–CLYDE CONSULTANTS, INC.

SHEET 1 of 3
BORING NO. MG-828
FILE NO. 4840

## BORING LOG

PROJECT: WEST SIDE HIGHWAY | DOT. CONTR. NO.: D 250002 | ELEVATION: +5.3
COORDINATES: N 192784.1 E 1998289.0 | DATUM: Manhattan
BORING LOCATION: MTA Yard, Ramp | DATE STARTED: 04/02/82
INSPECTOR: Y. K. Chan (MRJD) | DATE COMP.: 04/07/82
CONTRACTOR: Warren George, Inc.
DRILLER: J Farrell | HELPER: Mr. G. McCartar
TYPE OF RIG: TRUCK ☒ SKID ☐ BARGE MOUNTED ☐ TRIPOD ☐ OTHER ☐
CASING: DIA. 4 IN. FROM 0.0 TO 10.0 FT.; DIA. 3 IN. FROM 0.0 TO 105.0 FT.
DRILLING MUD UTILIZED: MUD TYPE Quick Gel | ROTARY BIT DIA. 3 7/8 IN.
SAMPLING EQUIPMENT, (TYPE & SIZE): D-SAMPLER: Split Spoon, 2" O.D. | DRILL ROD NW
U-SAMPLER: DIA. IN.: TYPE
CORE BIT Diamond, NX | CORE BARREL Double Barrel
FEED DURING CORING: MECHANICAL ☐ HYDRAULIC ☒ OTHER ☐
SAMPLER HAMMER: WEIGHT (LBS) 140 AVG. FALL 30 IN.
CASING HAMMER: WEIGHT (LBS) 300 AVG. FALL 18 IN.
NO. OF U-TUBES – NO. OF VANE TESTS – DEPTH TO ROCK 103.0 FT. DEPTH TO COMP. 115.0 FT.

WATER LEVEL OBSERVATIONS

| DATE | TIME | DEPTH OF HOLE | DEPTH OF CASING | DEPTH TO WATER | ELEVATION OF TIDE | CONDITIONS OF OBSERVATION |
|---|---|---|---|---|---|---|
| 04/05/82 | 0750 | 57.0 | 10.0 | 4.4 | | Over weekend with drilling mud inside the hole |
| 04/07/82 | 0800 | 105.0 | 105.0 | 4.5 | | At start of drilling w/water inside the hole |
| 04/07/82 | 1045 | 115.0 | 10.0 | 4.5 | | |

| DAILY PROGRESS | CASING BLOWS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH (FT) | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 0830 | – | | | | | * | 0 | *Asphalt |
| | 21 | 1D | 0.5 | 10-8 | Dark gray c-f sand, sm cinders, | 0.3 | | W = Water |
| | 17 | | 2.5 | 6-5 | silt, tr gvl (Fill)(SM) | | | content in % |
| | 22 | | | | | | | |
| | 13 | | | | | | 5 | |
| | 21 | 2D | 5.0 | 22-17 | Black c-f sandy gravel, trace | | | |
| | 30 | | 7.0 | 6-13 | silt (Fill)(GP) | | | |
| | 26 | | | | | | | |
| | 30 | | | | | | | |
| | 28 | | | | | | | |
| | | 3D | 10.0 | 17-13 | Dark brown c-f sand, some | | 10 | |
| Windy | | | 12.0 | 9-5 | cinders, trace gvl (Fill)(SP) | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| Sunny, | | **NR | 15.0 | 5-3 | | | 15 | **Attempted sample twice. No recovery. Sample 4D is probably wash. |
| | | | 17.0 | 1-3 | | | | |
| | | 4D | 17.0 | 5-5 | Black c-f sand, sm cndrs, tr | | | |
| | | | 19.0 | 8-9 | silt, gvl (Fill)(SP) | | | |
| | | | | | | | | |
| 04/02/82 | | 5D | 20.0 | 4-1 | Black c-f sand, sm cndrs, tr | | 20 | |
| | | | 22.0 | 2-4 | organic silty clay, gravel (Fill)(SP) | | | |
| | | | | | | | | |
| | | | | | | 23.0 | | |
| | | | | | | | 25 | |
| | | 6D | 25.0 | 2-1 | Medium black organic silty clay, | | | W = 71 |
| | | | 27.0 | 1-2 | trace fine sand, veg, wood (OH) | | | |
| | | | | | | | | |
| | | | | | | | 30 | |

Medium compact dark gray to brown coarse to fine sand, some cinders, gravel, trace silt (Fill)

Med blk org silty clay, tr fsa, wood, veg

BORING NO. MG-828

MUESER, RUTLEDGE, JOHNSTON & DESIMONE
WOODWARD–CLYDE CONSULTANTS, INC.

BORING LOG

SHEET 2 of 3
BORING NO. MG 828
FILE NO. 4840

| DAILY PROGRESS | CASING BLOWS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH (FT) | REMARKS |
|---|---|---|---|---|---|---|---|---|
| | | 7D | 30.0 | 1-WH | Med dark gray organic silty clay, tr fine sand, sls (OH) | Medium dark gray organic silty clay, trace fine sand, fine sand partings, shells | 30 | W = 62 |
| | | | 32.0 | 2-2 | | | | |
| | | 8D | 35.0 | 1-WH | Do 7D, trace veg. (OH) | | 35 | W = 69 |
| | | | 37.0 | 1-2 | | | | |
| | | 9D | 40.0 | 5-4 | Do 7D (OH) | | 40 | |
| | | | 42.0 | 1-1 | | | | |
| Sunny 04/02/82 | | 10D | 45.0 | 1-WH | Do 7D, tr fine sand partings (OH) | | 45 | W = 53 |
| | | | 47.0 | 3-4 | | | | |
| | | 11D | 50.0 | 1-WH | Do 7D, tr fine sand partings (OH) | | 50 | W = 54 |
| | | | 52.0 | 5-4 | | | | |
| 1500 0700 | | 12D | 55.0 | WR - WH | Do 7D, tr fine sand partings (OH) | | 55 | W = 53 |
| | | | 57.0 | 2-4 | | | | |
| | | 13D | 60.0 | 2-3 | Do 7D, tr fine sand partings (OH) | | 60 | |
| | | | 62.0 | 5-7 | | | | |
| | | NR | 65.0 | 9-7 | | | 65 | |
| | | | 67.0 | 7-10 | | | | |
| Windy | | 14D | 67.0 | 7-2 | Med dk org silty clay, sm fine sand, tr sls, gvl, veg (OH) | | | W = 36 |
| | | | 69.0 | 5-4 | | | | |
| | | 15D | 70.0 | WR/24" | Med dk gray org silty clay, tr fine sand, sls (OH) | | 70 | W = 39 |
| Sunny, | | | 72.0 | | | | | |
| | | 16D | 75.0 | WR/24" | Do 15D, tr fine sand partings (OH) | | 75 | W = 34 |
| 04/05/82 | | | 77.0 | | | | | |
| | | 17D | 80.0 | WR - 1 | Med dk gray org silty clay, tr m-f sand, fine sand partings, shells (OH) | | 80 | W = 41 |
| | | | 82.0 | 6-9 | | | | |
| | | | | | | | 85 | |



MUESER, RUTLEDGE, JOHNSTON & DESIMONE
WOODWARD–CLYDE CONSULTANTS, INC.

BORING LOG

SHEET 3 of 3
BORING NO. MG-828
FILE NO. 4840

| DAILY PROGRESS | CASING BLOWS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH (FT) | REMARKS |
|---|---|---|---|---|---|---|---|---|
| | | NR | 85.0 | 5-12 | | Med dk gry org si cl, sm m-f sa tr shells | 85 | |
| | | | 87.0 | 11-14 | | | | |
| | | 18D | 87.0 | 9-6 | Med dark gray organic silty clay, sm m-f sand, tr shells (OH) | | | |
| | | | 89.0 | 11-14 | | | | |
| Windy | | 19D | 90.0 | WR - 6 | Med dark gray organic silty clay, some m-f sandy silt lyrs (OH) | | 90 | W = 43 |
| | | | 92.0 | 6-9 | | | | |
| Sunny, | | | | | | | | |
| | | | | | | Cpt dk gry si f-m sa tr mica | 93.0 | |
| | | 20D | 95.0 | 11-18 | Dark gray silty fine to medium sand, tr mica (SM) | | 95 | |
| | | | 97.0 | 22-25 | | | | 3" dia casing was placed inside hole. |
| 04/05/82 | | | | | | | | |
| | | | | | | 21D | 99.0 | |
| | | 21D | 100.0 | 2-6 | Stiff dark gray organic silty clay, tr f-m sand, veg (OH) | | 100 | W = 53 |
| | | | 102.0 | 8-11 | | | | |
| | | | | | | | 103.0 * | |
| 1530 0700 | | 1C | 105.0 | Rec=100% | Light gray garnet mica schist, jtd, UnWExJts | Light gry garnet mica schist, jtd UnWExJts | 105.0 | *Possible decomposed rock. |
| | | | 110.0 | RQD=84% | | | | |
| Windy | | | | | | | | |
| | | 2C | 110.0 | Rec=96% | Do 1C | | 110 | Highly micaceous rock. |
| 04/07/82 | | | 115.0 | RQD=80% | | | | |
| 1130 | | | | | | | 115.0 | 115 |
| | | | | | | | 120 | |
| | | | | | | | 125 | |
| | | | | | | | 130 | |
| | | | | | | | 135 | |
| | | | | | | | 140 | |

Metropolitan Transportation Authority
10th Avenue Bridge, 11th Avenue Viaduct,
Evacuation Tunnel, North Access Tunnel,
Catenary Removal, Mabstoa Bus Garage
Foundations at the
West Side Storage Yard Complex
Contract No. 1-02-21064-0-0
Stick Logs

LEGEND

- CARTWAY 4' WIDE
- CARTWAY 8' WIDE
- PLATFORM
- ROADWAY
- ENDS OF TRAINS AT MIN. DISTANCE FROM CLEARANCE POINT
- 12 ENDS OF TRAINS AT STANDARD DESIGN POSITION WITH NUMBER OF CARS
- BUILDING LIMITS
- 2300 N / 10000 W ARBITRARY COORDINATE SYSTEM
- 15000 W / 19400 N NEW YORK CITY COORDINATE SYSTEM (BPM)

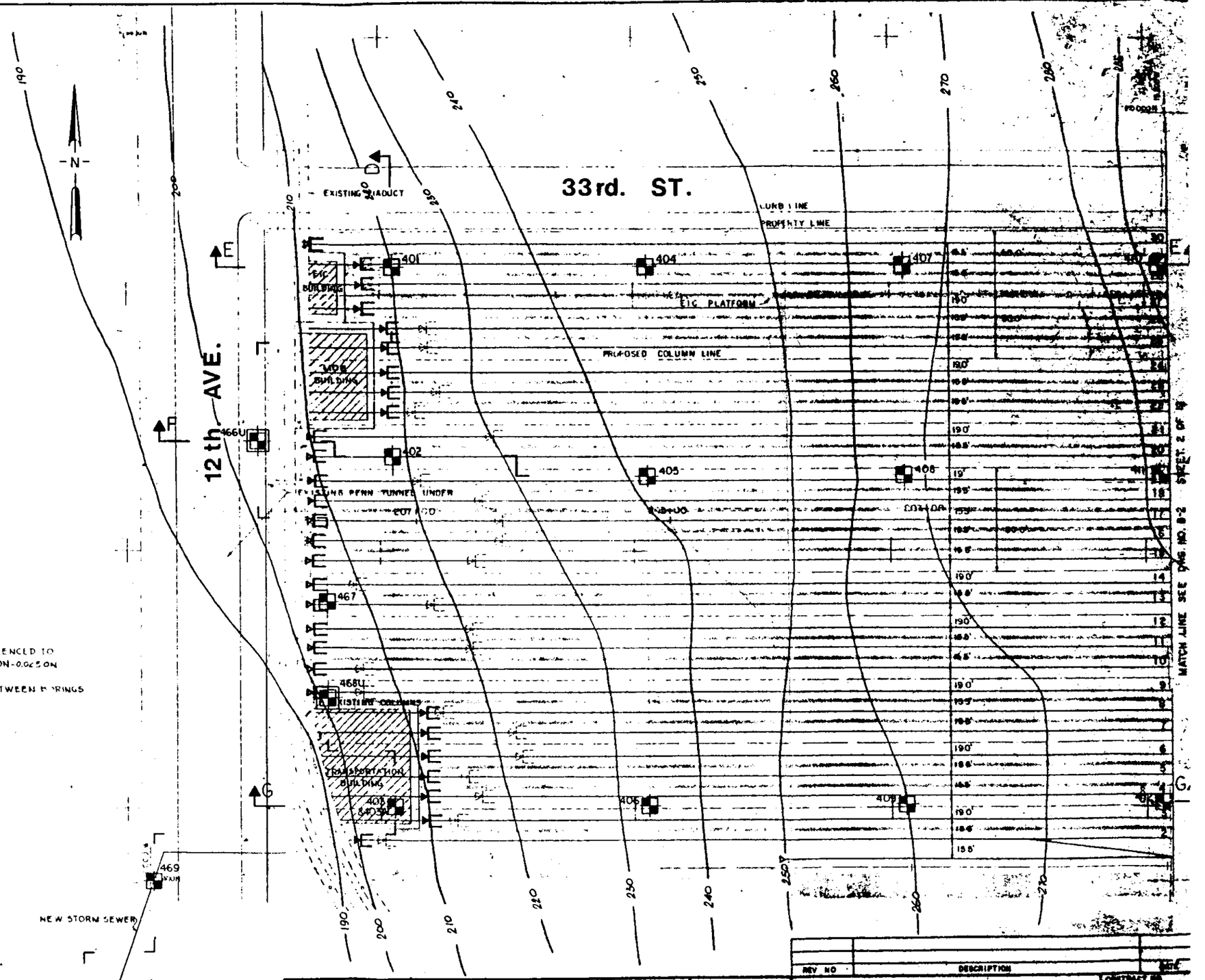
BORING LEGEND

300 SERIES
- DRY SAMPLE BORING MADE IN 1980
- UNDISTURBED SAMPLE BORING MADE IN 1980

400 SERIES
- DRY SAMPLE BORING MADE IN 1981
- UNDISTURBED SAMPLE BORING MADE IN 1981

NOTES

1. CONTOURS REPRESENT ELEVATION OF TOP OF ROCK REFERENCED TO L.I.R.R. DATUM, ON WHICH ELEVATION 300 = ELEVATION -0.025 ON BOROUGH OF MANHATTAN DATUM
2. CONTOURS SHOWN ARE NECESSARY INTERPOLATIONS BETWEEN BORINGS
3. BORINGS 463 AND 465 WERE DELETED




GRAPHIC SCALE

0' 20' 40' 80' 120'

| REV NO | DESCRIPTION | DATE |
|---|---|---|
| | | |

SEELYE STEVENSON VALUE & KNECHT, INC.
ENGINEERS & PLANNERS
99 PARK AVENUE NEW YORK, N.Y. 10016
MUESER·RUTLEDGE·JOHNSTON & DESIMONE
CONSULTING ENGINEERS

L.I.R.R.
LONG ISLAND RAIL ROAD

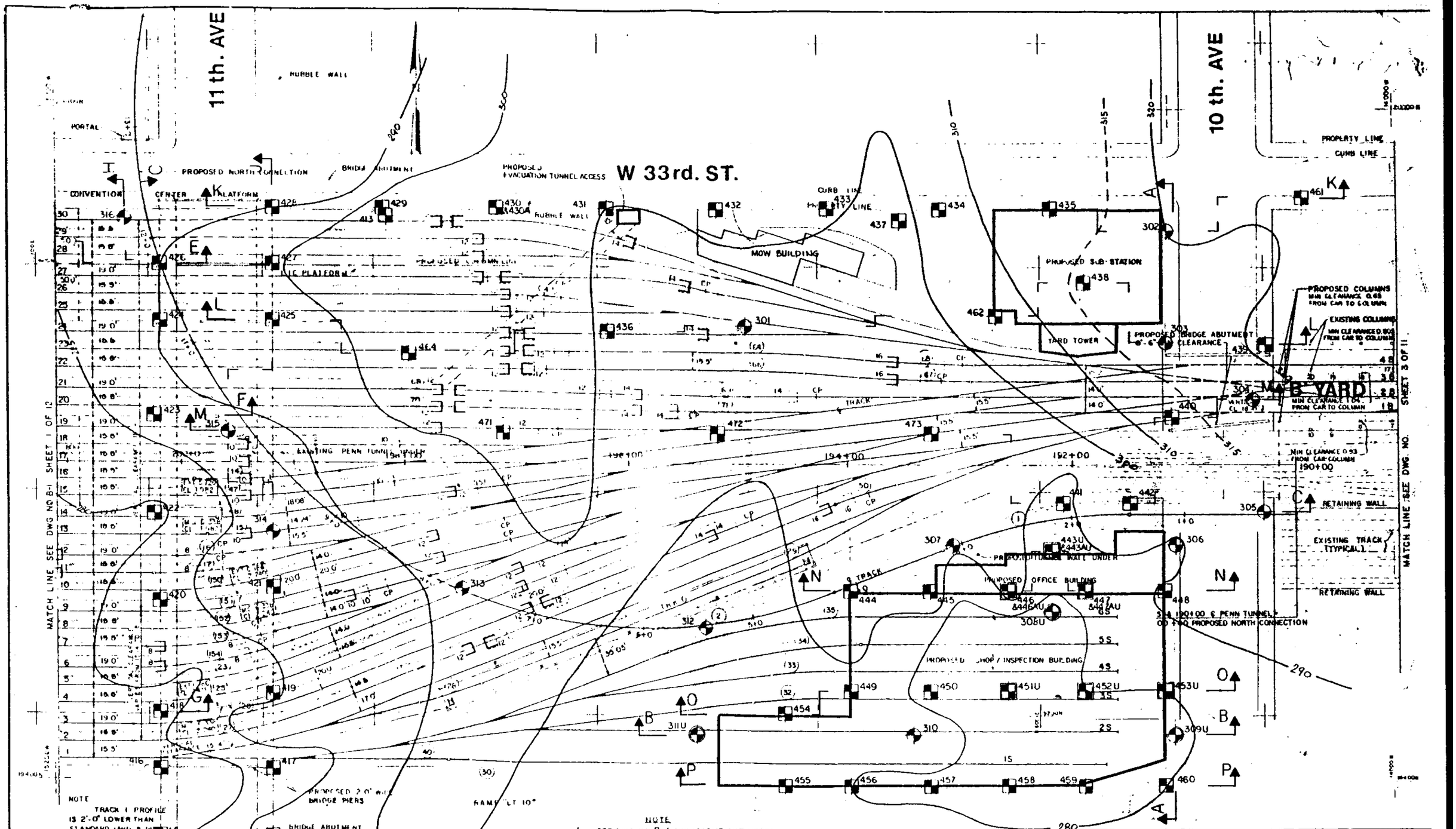
Metropolitan Transportation Authority

WEST SIDE STORAGE YARD COMPLEX

BORING LOCATION PLAN
& CONTOURS OF TOP OF ROCK

CONTRACT NO. 5385
DATE JULY 19, 1981
SCALE 1" = 40'
DRAWING NO. B-1
SHEET 1 OF 12

MATCH LINE SEE DWG. NO. B-2 SHEET 2 OF 12




| REV NO | DESCRIPTION | DATE |
|---|---|---|
| | | |

SEELYE STEVENSON VALUE & KNECHT, INC.
ENGINEERS & PLANNERS
99 PARK AVENUE NEW YORK, N.Y. 10016
MUESER-RUTLEDGE-JOHNSTON & DESIMONE
CONSULTING ENGINEERS

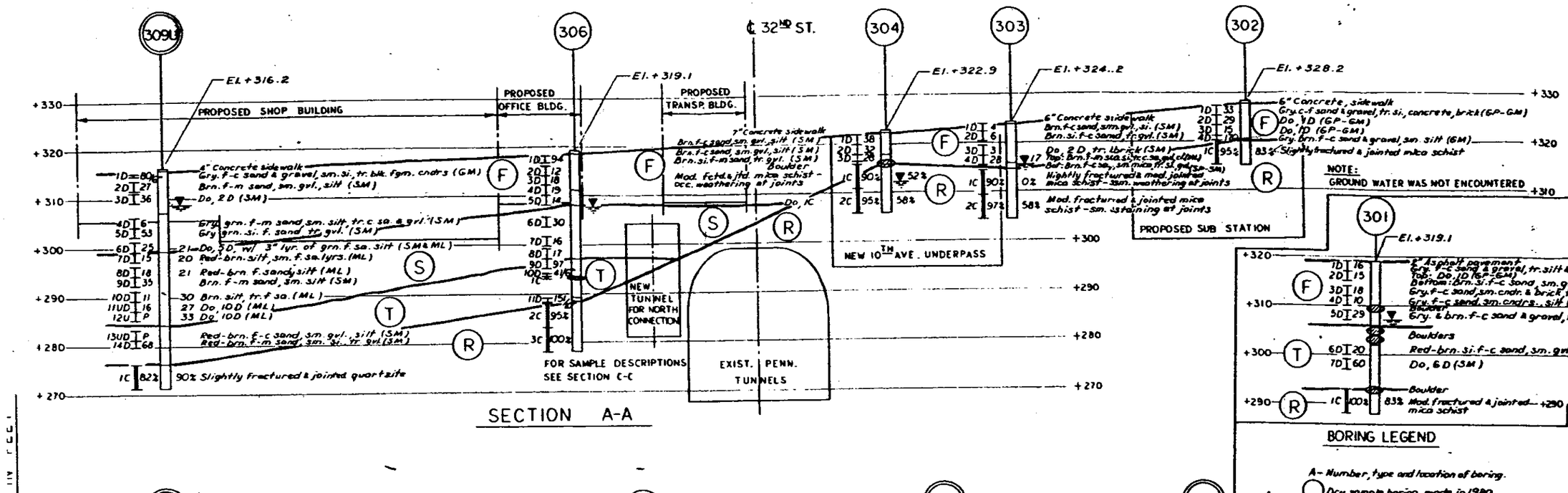
L.I.R.R.
LONG ISLAND RAIL ROAD

Metropolitan Transportation Authority

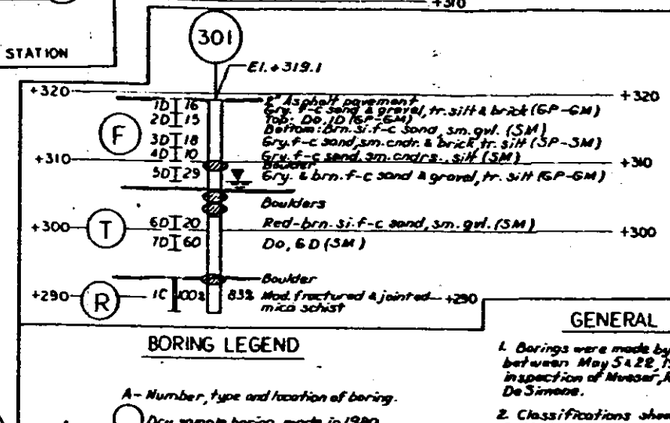
# WEST SIDE STORAGE YARD COMPLEX

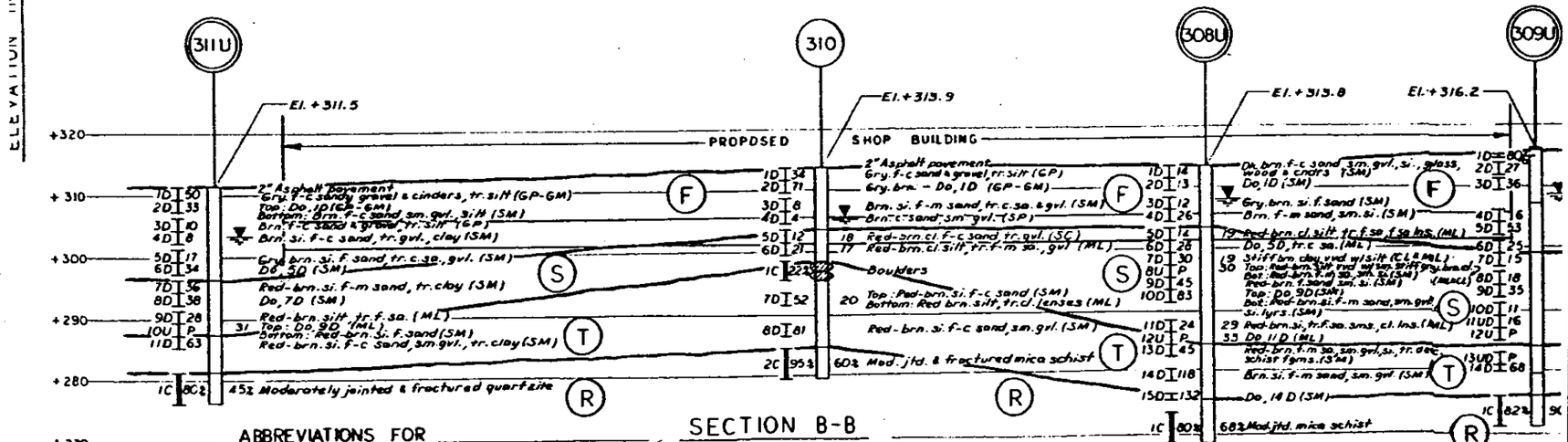
BORING LOCATION PLAN & CONTOURS OF TOP OF ROCK

CONTRACT NO. 5585
DATE JULY 16, 1981
SCALE 1" = 40'
DRAWING NO. B-2




SECTION A-A




SECTION B-B

NOTE: BORING 308U PROJECTED TO SECTION

## ABBREVIATIONS FOR SOIL SAMPLE DESCRIPTIONS

| Word | Abbrev. | Word | Abbrev. | Word | Abbrev. |
|---|---|---|---|---|---|
| And | - & | Fine to medium | - f-m | Seams | - sms |
| Black | - blk | Fragment | - fgmt | Silt or silty | - si |
| Brown | - brn | Fractured | - fctd | Some | - sm |
| Bottom | - bot | Gray | - gry | Slightly | - sl |
| Cinder | - cndr | Green | - grn | Trace | - tr |
| Clay or clayey | - cl | Gravel or gravely | - gvl | Varved | - vvd |
| Coarse | - c | Jointed | - jtd | With | - wl |
| Coarse to Fine | - c-f | Layer | - lyr | Relatively | - rel |
| Dark | - dk | Light | - lt | | |
| Decomposed | - dec | Lenses | - lns | | |
| Ditto | - do | Moderately | - mod | | |
| Fine | - f | Occasional | - occ | | |

## GENERAL STRATA DESCRIPTIONS

(F) - Fill: Loose to compact gray-brown fine to coarse sand and gravel, some silt with cinders, brick and concrete.

(S) - Sand & Silt: Medium compact to compact red-brown silt or clayey silt with layers of silty fine sand to silty fine to coarse sand, some gravel.

(T) - Glacial Till: Very compact red-brown silty fine to coarse sand, some gravel with boulders.

## SAMPLE CONSTITUENT PERCENTAGES

Trace — Less than 11 %

Some — 11 % to 30 %

## BORING LEGEND

A - Number, type and location of boring.

○ Dry sample boring, made in 1980.

● Undisturbed sample boring, made in 1980.

EL - Elevation of ground surface.

B - Number and type of sample.

D - Dry sample taken with 2" O.D. split spoon.

U - Undisturbed sample taken with 3" O.D. piston type sampler.

UD - Undisturbed sample extruded in field and placed in the jar due to poor recovery.

I - Location and length of sample attempt.

N - Standard Penetration Resistance - Number of blows from 140lb. hammer free falling 30" required to drive 2" O.D. split spoon sampler one foot unless a specific penetration is indicated.

P - Pressed or pushed sample.

▨ Boulder.

E - Average natural water content of sample in percent of dry weight.

▼ Ground water level observed in hand boringe. (immediately after compretion of boring)

C - Rock or boulder core.

I - Length of core run.

F - Length of core recovered expressed as a percent of the length of core run.

R - Rock quality designation - length of recovered core consisting of pieces 4" or more in length expressed as a percent of the length of core run.

Letters shown in parenthesis after the soil sample description represent the Unified Soil Classification Symbol.

## GENERAL NOTES

1. Borings were made by Warren George, Inc between May 5 & 22, 1980 under the contin. inspection of Mueser, Rutledge, Johnston & De Simone.

2. Classifications shown were made by Mu Rutledge, Johnston & De Simone and may agree with the drillers' classifications,

3. Stratifications shown are necessary inter lations between borings and may or may n represent actual subsurface conditions

4. Elevations refer to LIRR datum, which Elevation 300 is equal to Elevatio as on the Borough of Manhattan datum.

5. Locations and ground surface elevations borings were determined by Seelye, Ste Valve & Knecht, Inc.

GRAPHIC SCALE

HORIZONTAL 0' 20' 40' 60'

VERTICAL

METROPOLITAN TRANSPORTATION AUTHO
west side storage yo

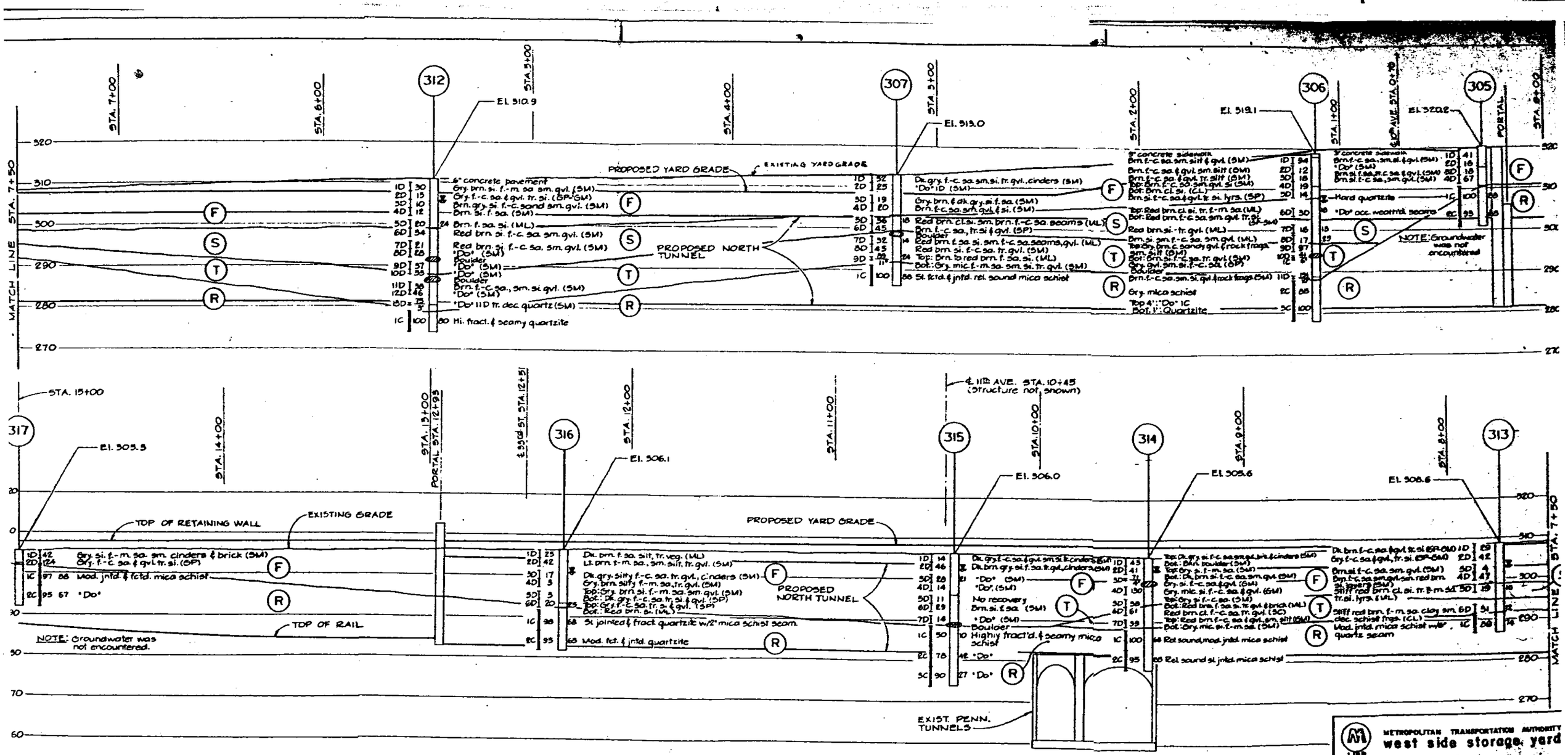
SEELYE STEVENSON VALUE & KNECHT
NEW YORK, N.Y.

MUESER · RUTLEDGE · JOHNSTON & DESIM
CONSULTING ENGINEERS
415 MADISON AVE., NEW YORK N. Y. 10017

| | | | |
|---|---|---|---|
| SCALE GRAPHIC | DRAWN BY S.S.S. | DATE 6-10-80 | |
| | DESIGN BY J.F.Q. | DATE 6-11-80 | 51 |

GEOLOGIC SECTIONS
A-A, B-B

G




## GENERAL STRATA DESCRIPTIONS

(F) - Fill: Loose to compact gray-brown fine to coarse sand and gravel, some silt with cinders, brick and concrete.

(S) - Sand & Silt: Medium Compact to compact red-brown silt or clayey silt with layers of silty fine sand to silty fine to coarse sand, some gravel.

(T) - Glacial Till: Very compact red-brown silty fine to coarse sand, some gravel with boulders.

(R) - Bedrock: Moderately jointed and fractured

## SECTION C-C

NOTE: For Boring Legend, General Notes and Soil Sample Abbreviations see Drawing No. 05-1.
Tunnel and existing structure profiles were taken from 55V & K's Drawing titled North-Connection Plan.

GRAPHIC SCALE
HORIZONTAL 0 20' 40' 60'

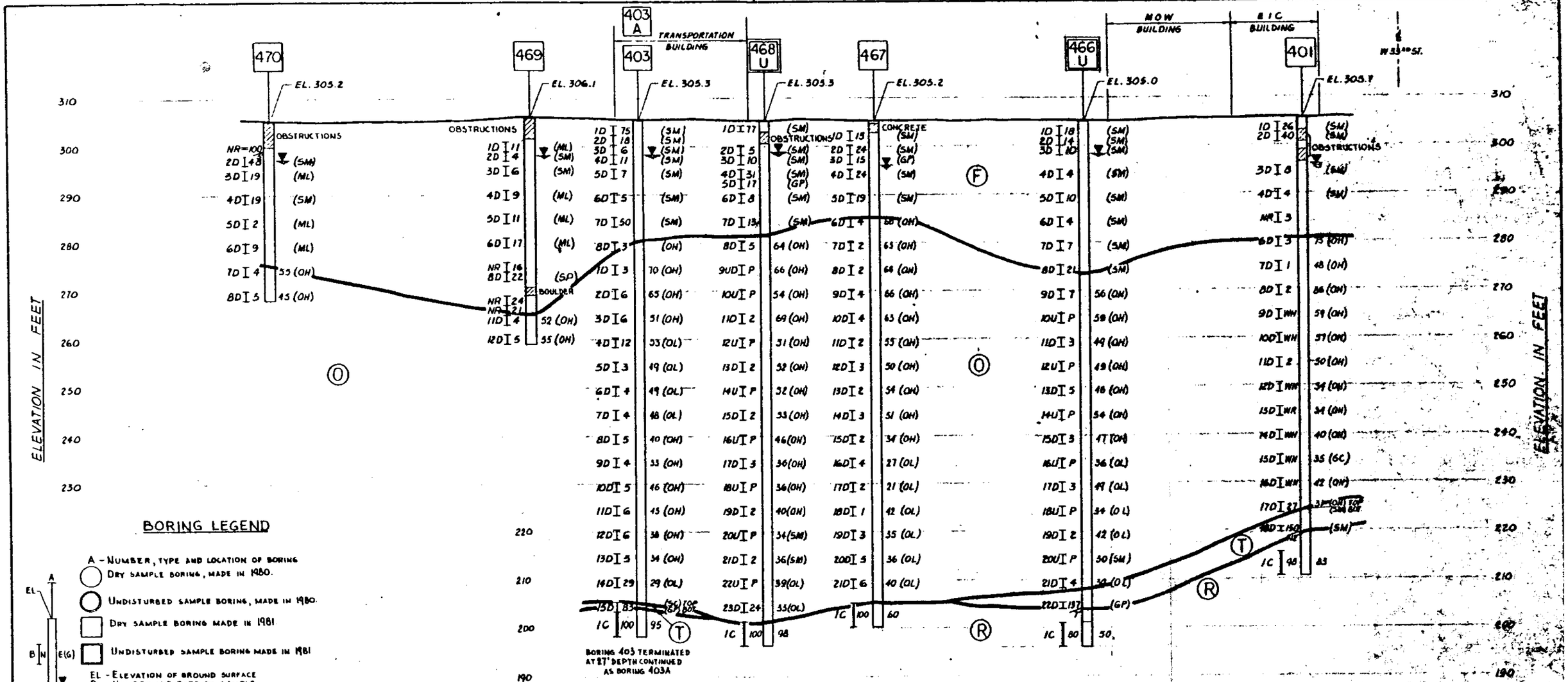
METROPOLITAN TRANSPORTATION AUTHORITY
LIRR
west side storage yard

SEELYE STEVENSON VALUE & KNECHT INC.
NEW YORK, N.Y.

MUESER - RUTLEDGE - JOHNSTON & DESHROSIERS
CONSULTING ENGINEERS
415 MADISON AVE., NEW YORK N.Y. 10017

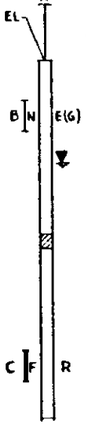
SCALE | DRAWN J.V. | DATE 6-11-80
CHECKED J.F.G. | DATE 6-11-80

PROFILE SECTION C-C




## SECTION D-D

## BORING LEGEND




A - Number, type and location of boring
- Dry sample boring, made in 1980.
- Undisturbed sample boring, made in 1980.
- Dry sample boring made in 1981
- Undisturbed sample boring made in 1981

EL - Elevation of ground surface
B - Number and type of sample
- D - Dry sample taken with 2" O.D. split spoon
- U - Undisturbed sample taken with 3" O.D. piston type sampler.
- UD - Undisturbed sample extruded in field and placed in jar due to poor recovery.
- NR - No recovery

I - Location and length of sample
N - Standard penetration resistance - number of blows from 140lb. hammer free falling 30" required to drive 2" O.D. split spoon sampler one foot unless a specific penetration is indicated
- P - Pressed or pushed sample
- WR - Sampler advanced under weight of rods
- WH - Sampler advanced under weight of rods and hammer

Boulder or obstruction
E - Average natural water content of sample in percent of dry weight.
Ground water level observed in land borings. (immediately after completion of boring)
C - Rock core
II - Length of core run.
F - Length of core recovered expressed as a percent of the length of core run
R - Rock quality designation - length of recovered core consisting of pieces 4" or more in length expressed as a percent of the length of core run
G - Unified soil classification symbol

## GENERAL NOTES

1. 400 series borings were made by Warren George, Inc between April 13 and June 8, 1981 under the continuous inspection of Mueser, Rutledge, Johnston and De Simone
2. 300 series borings were made by Warren George, Inc between May 5 and 22, 1980 under the continuous inspection of Mueser, Rutledge, Johnston and De Simone.
3. Classifications shown were made by Mueser, Rutledge, Johnston and De Simone and may not agree with the drillers' classifications.
4. Stratifications shown are necessary interpolations between borings and may or may not represent actual subsurface conditions
5. Elevations refer to L.I.R.R. datum, on which elevation 300 is equal to elevation -0.025 on the Borough of Manhattan Datum.
6. Locations and ground surface elevations of borings were determined by Seelye, Stevenson, Value and Knecht, Inc.

## GENERAL STRATA DESCRIPTIONS

(F) - Fill: Loose to compact gray - brown fine to coarse sand and gravel, some silt with cinders, brick and concrete.

(O) - Organic: Soft to medium dark gray organic silty clay to clayey silt with fine sand seams.

(S) - Sand and Silt: Medium compact to compact red - brown silt or clayey silt with layers of silty fine sand to silty fine to coarse sand, some gravel.

(T) - Glacial Till: Very compact red-brown silty fine to coarse sand, some gravel with boulders.

(R) - Bedrock: Moderately jointed and fractured mica schist with quartzite seams.

## GRAPHIC SCALES

Horizontal: 0' 15' 30' 60' 120'

Vertical: 0' 10' 20' 40'

| REV. NO. | DESCRIPTION | DATE |
|---|---|---|
| | | |

SEELYE STEVENSON VALUE & KNECHT, INC.
ENGINEERS & PLANNERS
90 PARK AVENUE NEW YORK, N.Y. 10016

MUESER · RUTLEDGE · JOHNSTON & DESIMONE
CONSULTING ENGINEERS
415 MADISON AVE., NEW YORK, N.Y. 10017

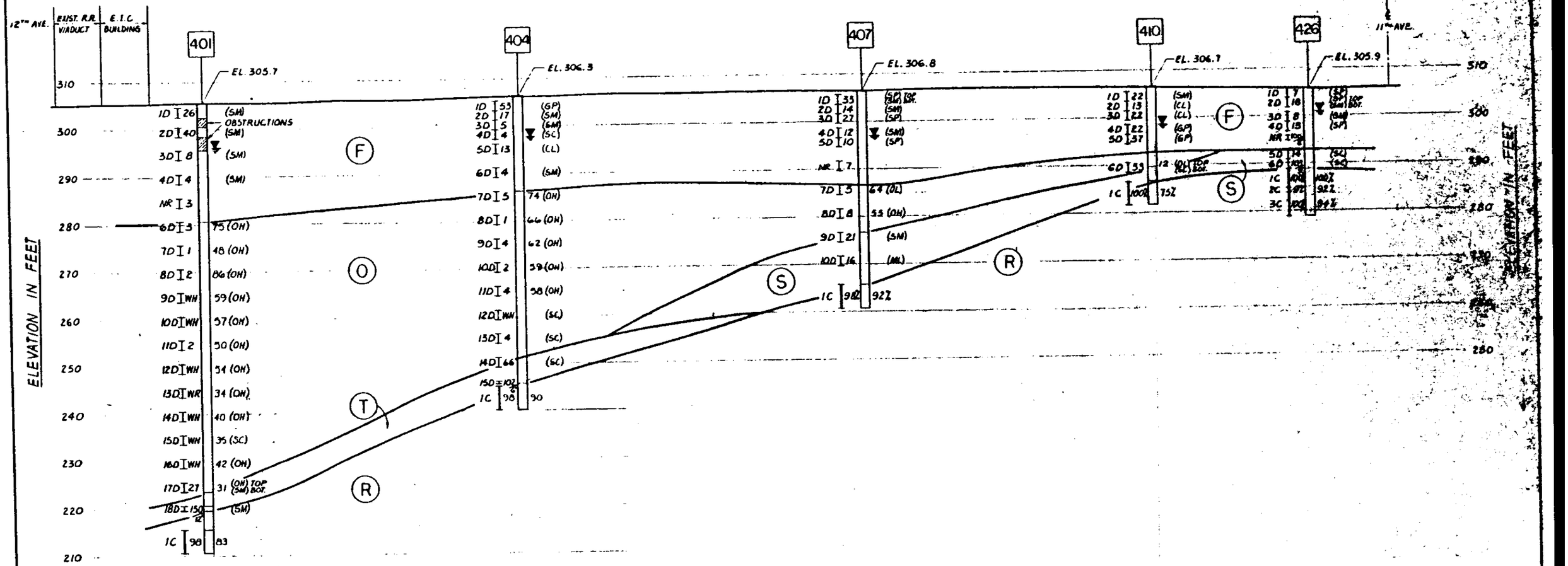
L.I.R.R.
LONG ISLAND RAIL ROAD

Metropolitan Transportation Authority

WEST SIDE STORAGE YARD COMPLEX

GEOLOGIC SECTION D-D

CONTRACT NO. 5386
DATE JULY 16, 1981
SCALE GRAPHIC
DRAWING NO. GS-3
SHEET 3 OF 10




## SECTION E-E

### GENERAL STRATA DESCRIPTIONS

(F) – FILL: LOOSE TO COMPACT GRAY - BROWN FINE TO COARSE SAND AND GRAVEL, SOME SILT WITH CINDERS, BRICK AND CONCRETE.

(O) – ORGANIC: SOFT TO MEDIUM DARK GRAY ORGANIC SILTY CLAY TO CLAYEY SILT WITH FINE SAND SEAMS.

(S) – SAND AND SILT: MEDIUM COMPACT TO COMPACT RED-BROWN SILT OR CLAYEY SILT WITH LAYERS OF SILTY FINE SAND TO SILTY FINE TO COARSE SAND, SOME GRAVEL.

(T) – GLACIAL TILL: VERY COMPACT RED-BROWN SILTY FINE TO COARSE SAND, SOME GRAVEL WITH BOULDERS.

(R) – BEDROCK: MODERATELY JOINTED AND FRACTURED MICA SCHIST WITH QUARTZITE SEAMS.

GRAPHIC SCALES

Horizontal: 0' 15' 30' 40' 120'

Vertical: 0' 10' 20' 40'

SEELYE STEVENSON VALUE & KNECHT, INC.
ENGINEERS & PLANNERS
90 PARK AVENUE NEW YORK, N.Y. 10016

MUESER-RUTLEDGE-JOHNSTON & DESIMONE
CONSULTING ENGINEERS
415 MADISON AVE., NEW YORK, N.Y. 10017

L.I.R.R.
LONG ISLAND RAIL ROAD

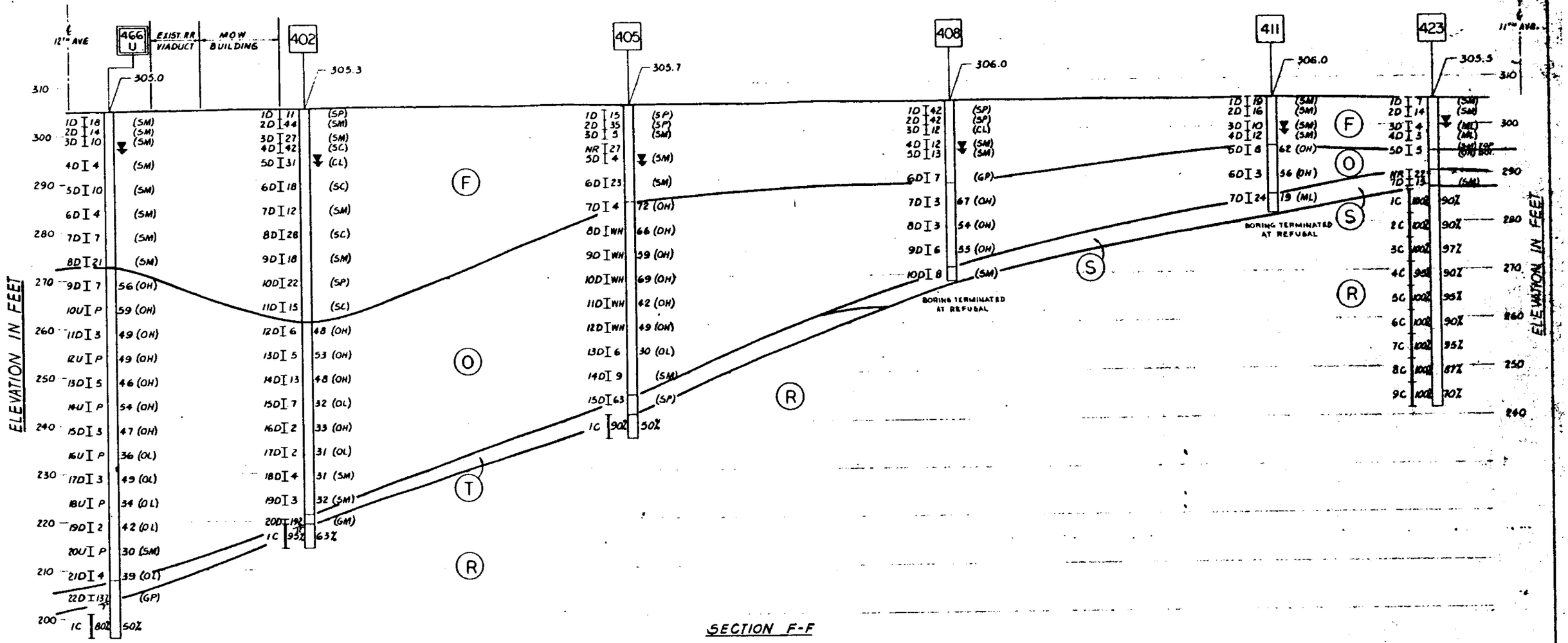
Metropolitan Transportation Authority

| REV NO | DESCRIPTION | DATE |
|---|---|---|
| | | |

WEST SIDE STORAGE YARD COMPLEX

GEOLOGIC SECTION E-E

CONTRACT NO. 5188
DATE JULY 16, 1981
SCALE GRAPHIC
DRAWING NO. GS-4
SHEET 6 OF




SECTION F-F

## GENERAL STRATA DESCRIPTIONS

(F) – FILL: LOOSE TO COMPACT GRAY - BROWN FINE TO COARSE SAND AND GRAVEL, SOME SILT WITH CINDERS, BRICK AND CONCRETE.

(O) – ORGANIC: SOFT TO MEDIUM DARK GRAY ORGANIC SILTY CLAY TO CLAYEY SILT WITH FINE SAND SEAMS.

(S) – SAND AND SILT: MEDIUM COMPACT TO COMPACT RED-BROWN SILT OR CLAYEY SILT WITH LAYERS OF SILTY FINE SAND TO SILTY FINE TO COARSE SAND, SOME GRAVEL.

(T) – GLACIAL TILL: VERY COMPACT RED-BROWN SILTY FINE TO COARSE SAND, SOME GRAVEL WITH BOULDERS.

(R) – BEDROCK: MODERATELY JOINTED AND FRACTURED MICA SCHIST WITH QUARTZITE SEAMS.

RECORD SET

GRAPHIC SCALES

HORIZONTAL : 0' 30' 60' 120'

VERTICAL : 0' 10' 20' 40'

| REV NO | DESCRIPTION | DATE |
|---|---|---|
| | | |

SEELYE STEVENSON VALUE & KNECHT, INC.
ENGINEERS & PLANNERS
99 PARK AVENUE NEW YORK, N.Y. 10016

MUESER-RUTLEDGE-JOHNSTON & DESIMONE
CONSULTING ENGINEERS
415 MADISON AVE., NEW YORK, N.Y. 10017

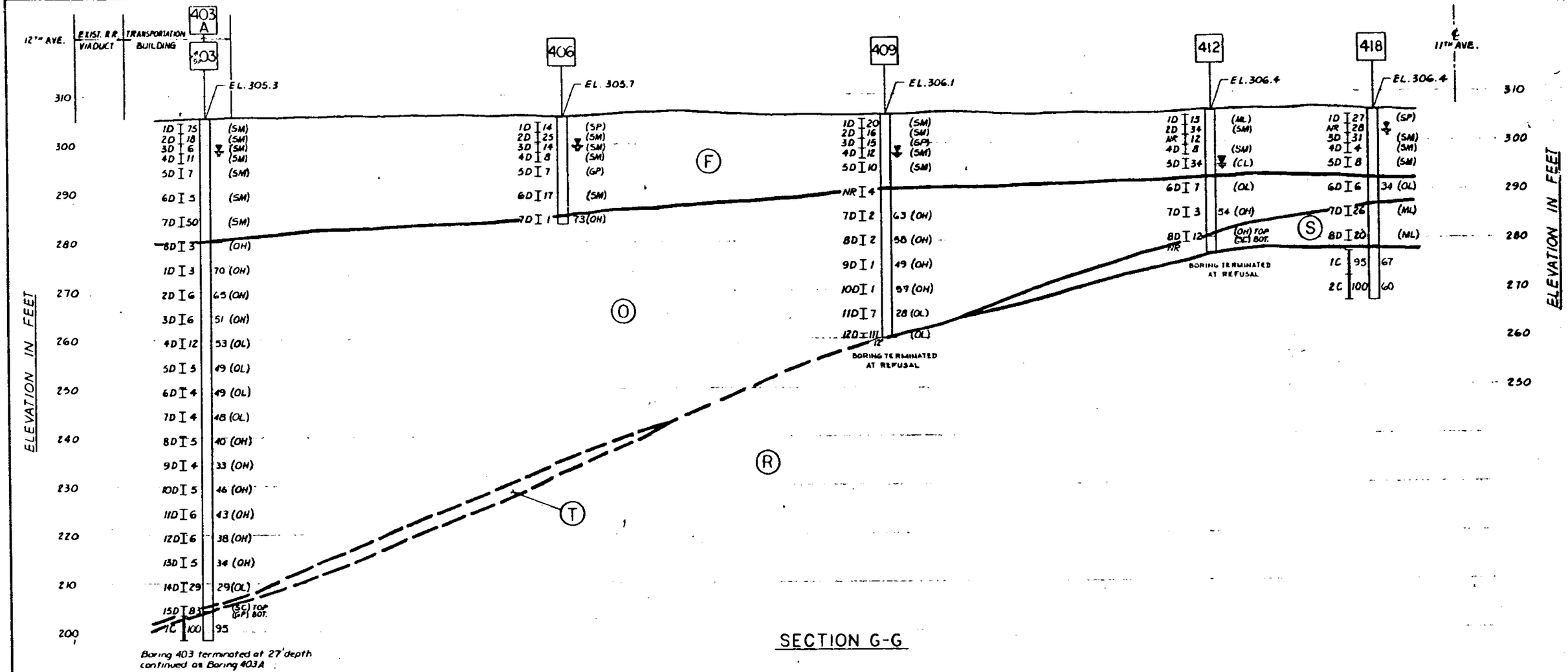
L.I.R.R.
LONG ISLAND RAIL ROAD

Metropolitan Transportation Authority

WEST SIDE STORAGE YARD COMPLEX

GEOLOGIC SECTION F-F

CONTRACT NO. 5385
DATE JULY, 16, 1981
SCALE GRAPHIC
DRAWING NO. GS-5
SHEET 7 OF 12




SECTION G-G

## GENERAL STRATA DESCRIPTIONS

(F) – FILL: LOOSE TO COMPACT GRAY-BROWN FINE TO COARSE SAND AND GRAVEL, SOME SILT WITH CINDERS, BRICK AND CONCRETE.

(O) – ORGANIC: SOFT TO MEDIUM DARK GRAY ORGANIC SILTY CLAY TO CLAYEY SILT WITH FINE SAND SEAMS.

(S) – SAND AND SILT: MEDIUM COMPACT TO COMPACT RED-BROWN SILT OR CLAYEY SILT WITH LAYERS OF SILTY FINE SAND TO SILTY FINE TO COARSE SAND, SOME GRAVEL.

(T) – GLACIAL TILL: VERY COMPACT RED-BROWN SILTY FINE TO COARSE SAND, SOME GRAVEL WITH BOULDERS.

(R) – BEDROCK: MODERATELY JOINTED AND FRACTURED MICA SCHIST WITH QUARTZITE SEAMS.

GRAPHIC SCALES

Horizontal: 0' 15' 30' 60' 180'

Vertical: 0' 10' 20' 40'

| REV NO | DESCRIPTION | DATE |
|---|---|---|
| | | |

SEELYE STEVENSON VALUE & KNECHT, INC.
ENGINEERS & PLANNERS
99 PARK AVENUE NEW YORK, N.Y. 10016

MUESER·RUTLEDGE·JOHNSTON & DESIMONE
CONSULTING ENGINEERS
415 MADISON AVE., NEW YORK, N.Y. 10017

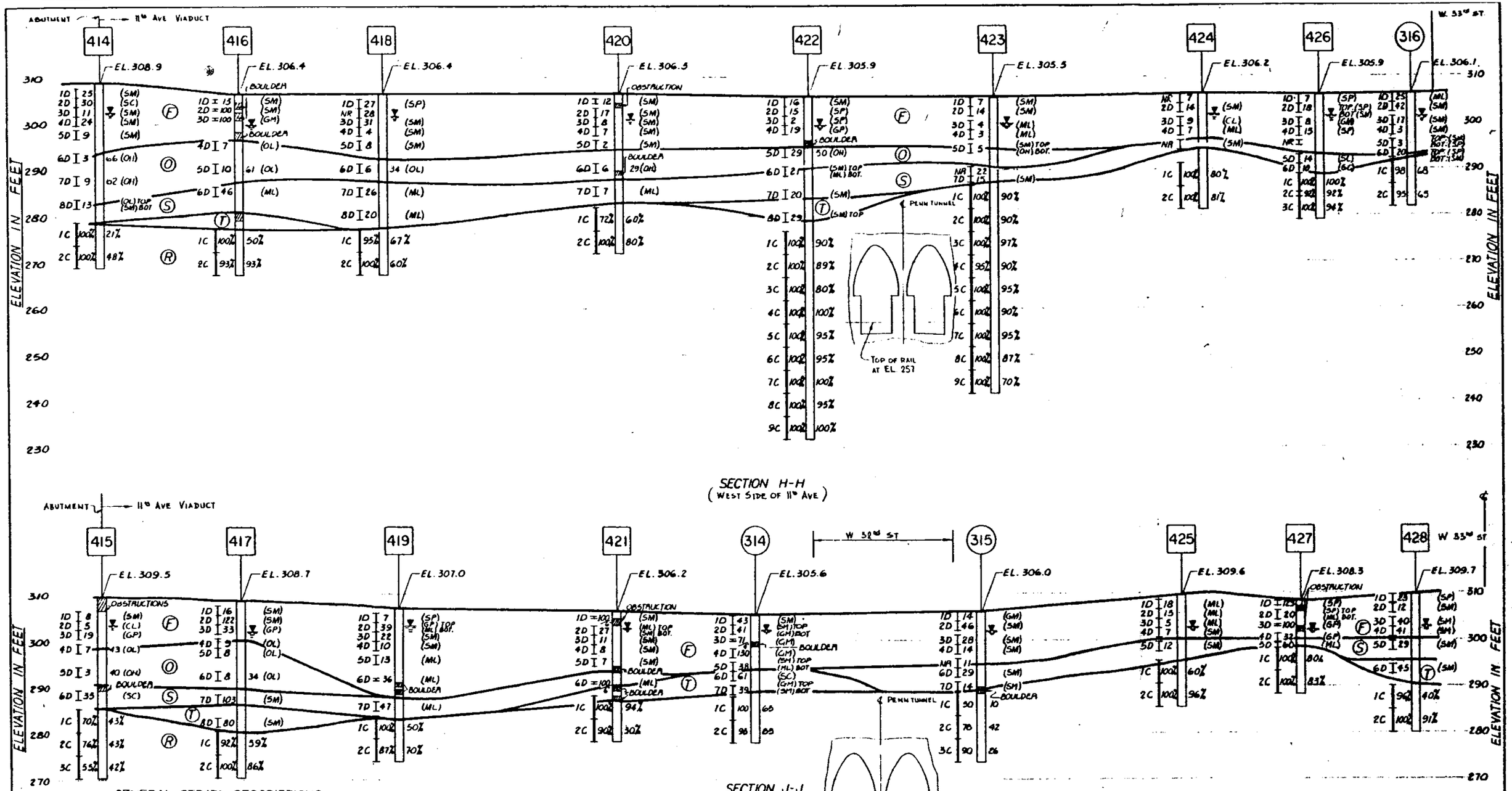
L.I.R.R.
LONG ISLAND RAIL ROAD

M
Metropolitan Transportation Authority

WEST SIDE STORAGE YARD COMPLEX

GEOLOGIC SECTION G-G

CONTRACT NO 5385
DATE JULY, 16, 1981
SCALE GRAPHIC
DRAWING NO. GS-6
SHEET 8 OF 12




## GENERAL STRATA DESCRIPTIONS

(F) – FILL: LOOSE TO COMPACT GRAY-BROWN FINE TO COARSE SAND AND GRAVEL, SOME SILT WITH CINDERS, BRICK AND CONCRETE.

(O) – ORGANIC: SOFT TO MEDIUM DARK GRAY ORGANIC SILTY CLAY TO CLAYEY SILT WITH FINE SAND SEAMS.

(S) – SAND AND SILT: MEDIUM COMPACT TO COMPACT RED-BROWN SILT OR CLAYEY SILT WITH LAYERS OF SILTY FINE SAND TO SILTY FINE TO COARSE SAND, SOME GRAVEL.

(T) – GLACIAL TILL: VERY COMPACT RED-BROWN SILTY FINE TO COARSE SAND, SOME GRAVEL WITH BOULDERS.

(R) – BEDROCK: MODERATELY JOINTED AND FRACTURED MICA SCHIST WITH QUARTZITE SEAMS.

HORIZONTAL 0' 20' 40'

VERTICAL 0' 10' 20'

SEELYE STEVENSON VALUE & KNECHT, INC.
ENGINEERS & PLANNERS
90 PARK AVENUE, NEW YORK, N.Y. 10016

MUESER-RUTLEDGE-JOHNSTON & DESIMONE
CONSULTING ENGINEERS
415 MADISON AVE., NEW YORK, N.Y. 10017

L.I.R.R.
LONG ISLAND RAIL ROAD

Metropolitan Transportation Authority

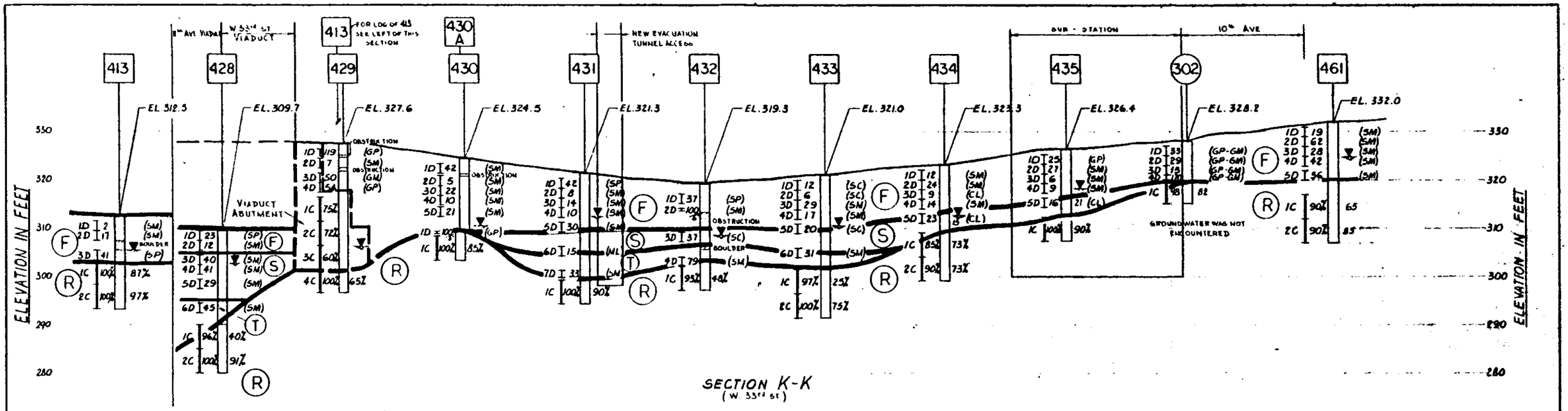
| REV NO | DESCRIPTION | DATE |
|---|---|---|

WEST SIDE STORAGE YARD COMPLEX

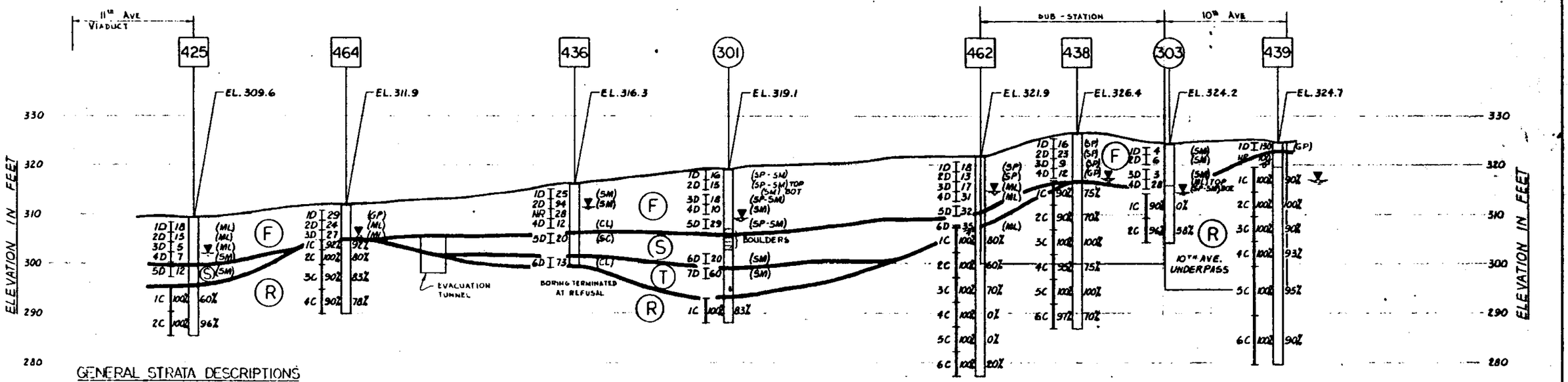
11TH AVENUE VIADUCT
SUBSURFACE PROFILES

GEOLOGIC SECTION H-H & J-J

CONTRACT NO 5385
DATE JULY, 16, 1981
SCALE GRAPHIC
DRAWING NO GS-7
SHEET 9 OF 12




SECTION K-K
(W. 33rd St)




SECTION L-L

## GENERAL STRATA DESCRIPTIONS

(F) - FILL: LOOSE TO COMPACT GRAY - BROWN FINE TO COARSE SAND AND GRAVEL, SOME SILT WITH CINDERS, BRICK AND CONCRETE.

(O) - ORGANIC: SOFT TO MEDIUM DARK GRAY ORGANIC SILTY CLAY TO CLAYEY SILT WITH FINE SAND SEAMS.

(S) - SAND AND SILT: MEDIUM COMPACT TO COMPACT RED - BROWN SILT OR CLAYEY SILT WITH LAYERS OF SILTY FINE SAND TO SILTY FINE TO COARSE SAND, SOME GRAVEL.

(T) - GLACIAL TILL: VERY COMPACT RED-BROWN SILTY FINE TO COARSE SAND, SOME GRAVEL WITH BOULDERS.

(R) - BEDROCK: MODERATELY JOINTED AND FRACTURED MICA SCHIST WITH QUARTZITE SEAMS.

GRAPHIC SCALES

HORIZONTAL: 0' 20' 40' 80' 100'

VERTICAL: 0' 10' 20' 40'

SEELYE STEVENSON VALUE & KNECHT, INC.
ENGINEERS & PLANNERS
99 PARK AVENUE NEW YORK, N.Y. 10016

MUESER-RUTLEDGE-JOHNSTON & DESIMONE
CONSULTING ENGINEERS
415 MADISON AVE., NEW YORK, N.Y. 10017

L.I.R.R.
LONG ISLAND RAIL ROAD

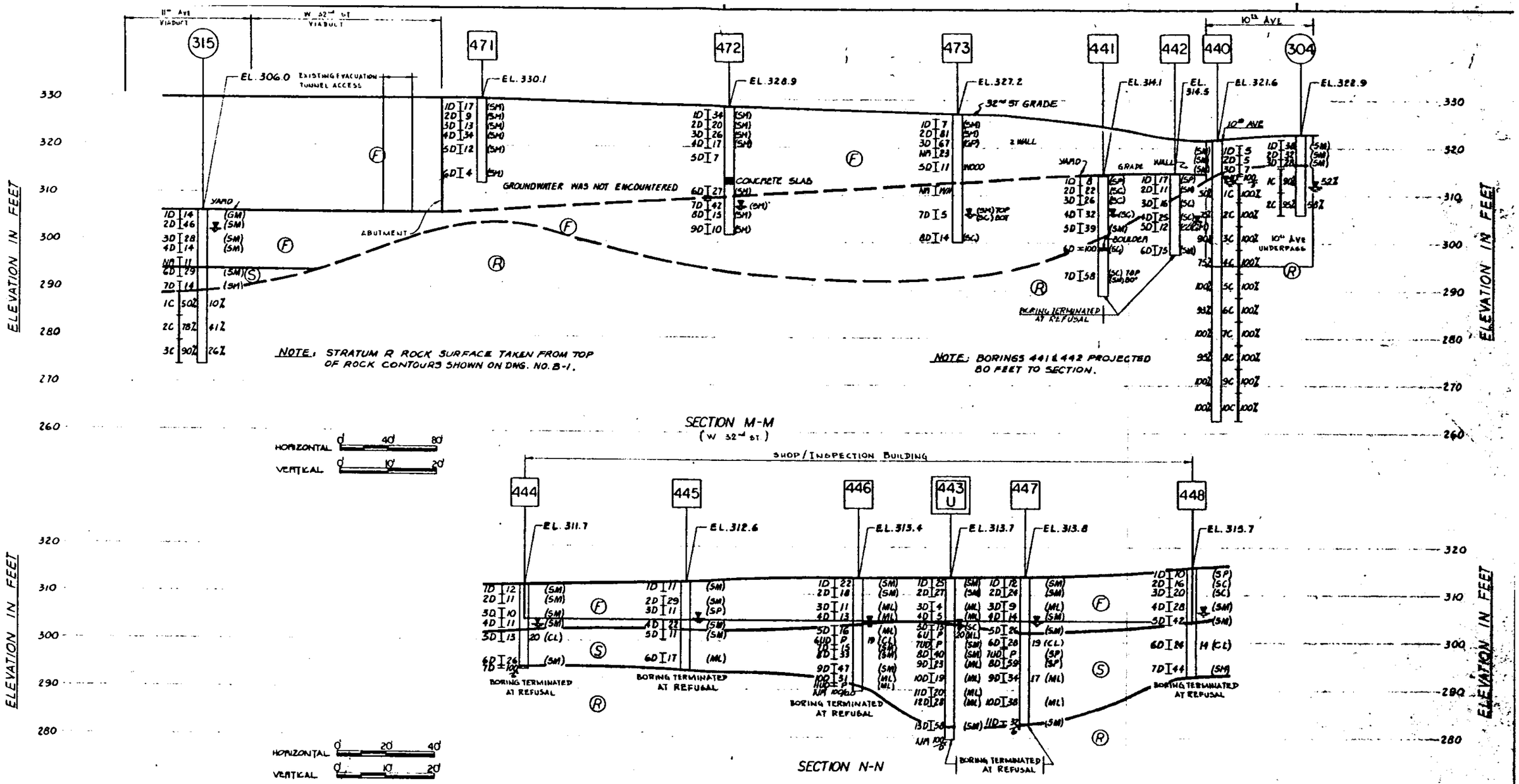
Metropolitan Transportation Authority

| REV NO | DESCRIPTION | DATE |
|---|---|---|
| | | |

WEST SIDE STORAGE YARD COMPLEX

GEOLOGIC SECTION K-K & L-L

CONTRACT NO 5385
DATE JULY, 16, 1981
SCALE GRAPHIC
DRAWING NO GS-8
SHEET 10 OF 12




SECTION M-M
(W 32nd St)




SECTION N-N

## GENERAL STRATA DESCRIPTIONS

(F) – Fill: Loose to compact gray-brown fine to coarse sand and gravel, some silt with cinders, brick and concrete.

(O) – Organic: Soft to medium dark gray organic silty clay to clayey silt with fine sand seams.

(S) – Sand and Silt: Medium compact to compact red-brown silt or clayey silt with layers of silty fine sand to silty fine to coarse sand, some gravel.

(T) – Glacial Till: Very compact red-brown silty fine to coarse sand, some gravel with boulders.

(R) – Bedrock: Moderately jointed and fractured mica schist with quartzite seams.

| REV NO | DESCRIPTION | DATE |
|---|---|---|
| 1 | REVISED ROCK SURFACE-SECTION M-M | 1-19-81 |

SEELYE STEVENSON VALUE & KNECHT, INC.
ENGINEERS & PLANNERS
99 PARK AVENUE NEW YORK, N.Y. 10016

MUESER·RUTLEDGE·JOHNSTON & DESIMONE
CONSULTING ENGINEERS
415 MADISON AVE., NEW YORK, N.Y. 10017

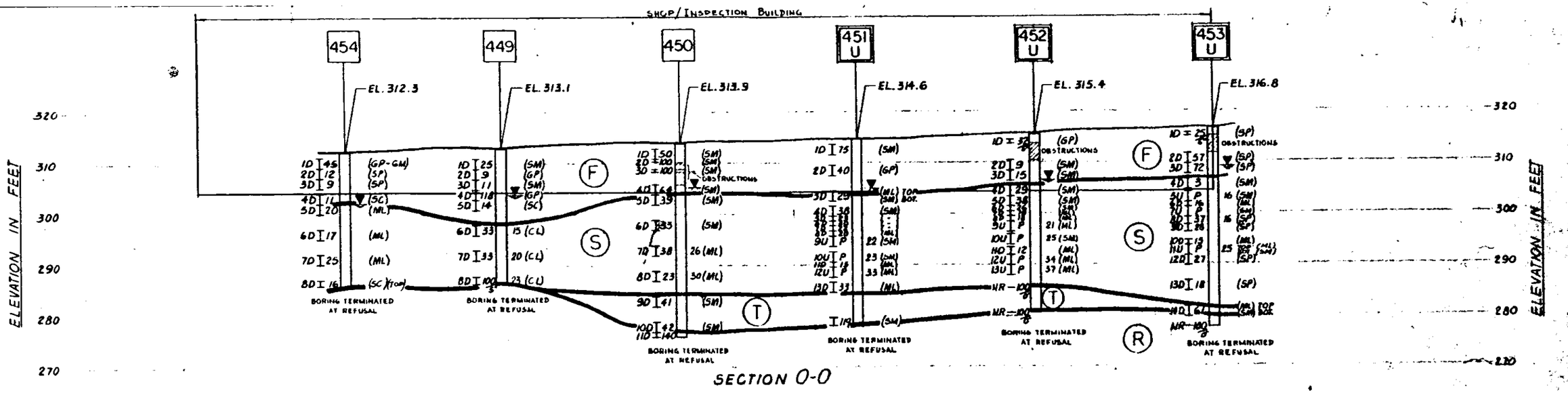
L.I.R.R.
LONG ISLAND RAIL ROAD

Metropolitan Transportation Authority

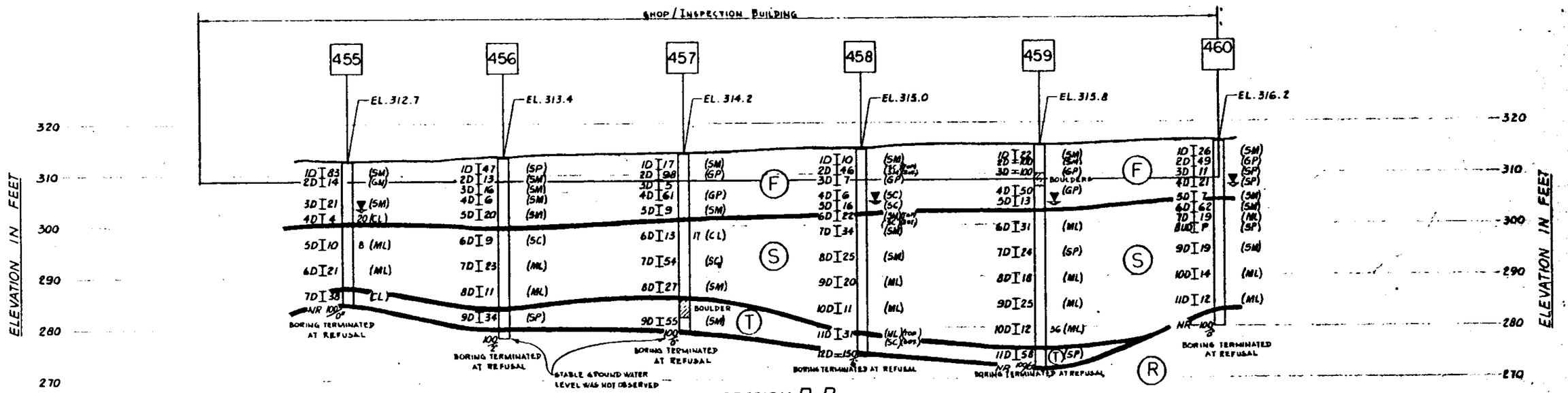
# WEST SIDE STORAGE YARD COMPLEX

GEOLOGIC SECTION M-M & N-N

CONTRACT NO. 5385
DATE JULY, 16, 1981
SCALE GRAPHIC
DRAWING NO. GS-9
SHEET 11 OF 12




SECTION O-O




SECTION P-P

## GENERAL STRATA DESCRIPTIONS

(F) – FILL: LOOSE TO COMPACT GRAY-BROWN FINE TO COARSE SAND AND GRAVEL, SOME SILT WITH CINDERS, BRICK AND CONCRETE.

(O) – ORGANIC: SOFT TO MEDIUM DARK GRAY ORGANIC SILTY CLAY TO CLAYEY SILT WITH FINE SAND SEAMS.

(S) – SAND AND SILT: MEDIUM COMPACT TO COMPACT RED-BROWN SILT OR CLAYEY SILT WITH LAYERS OF SILTY FINE SAND TO SILTY FINE TO COARSE SAND, SOME GRAVEL.

(T) – GLACIAL TILL: VERY COMPACT RED-BROWN SILTY FINE TO COARSE SAND, SOME GRAVEL WITH BOULDERS.

(R) – BEDROCK: MODERATELY JOINTED AND FRACTURED MICA SCHIST WITH QUARTZITE BEAMS.

## GRAPHIC SCALES

HORIZONTAL: 0' 10' 20' 40' 80'

VERTICAL: 0' 10' 20' 40'

SEELYE STEVENSON VALUE & KNECHT, INC.
ENGINEERS & PLANNERS
90 PARK AVENUE NEW YORK, N.Y. 10016

MUESER·RUTLEDGE·JOHNSTON & DESIMONE
CONSULTING ENGINEERS
415 MADISON AVE., NEW YORK, N.Y. 10017

L.I.R.R.
LONG ISLAND RAIL ROAD

M
Metropolitan Transportation Authority

| REV. NO. | DESCRIPTION | DATE |
|---|---|---|
| | | |

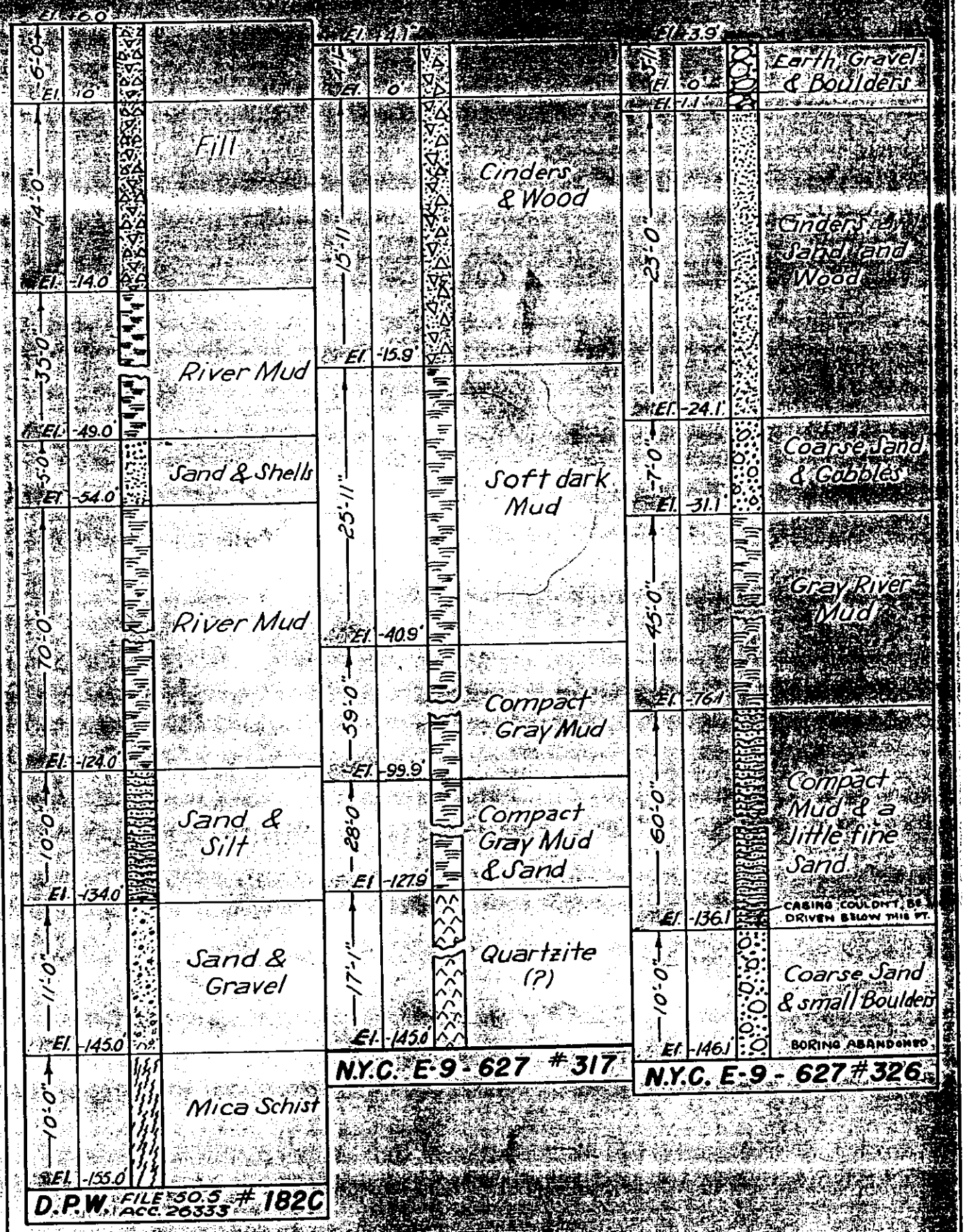
WEST SIDE STORAGE YARD COMPLEX

GEOLOGIC SECTION O-O & P-P

CONTRACT NO. [illegible]
DATE JULY 16, 1981
SCALE GRAPHIC
DRAWING NO. 66-10
SHEET [illegible] OF [illegible]

New York City
Department of Design and Construction

Borings Per Location Plan
Volume 2, Sheet 10

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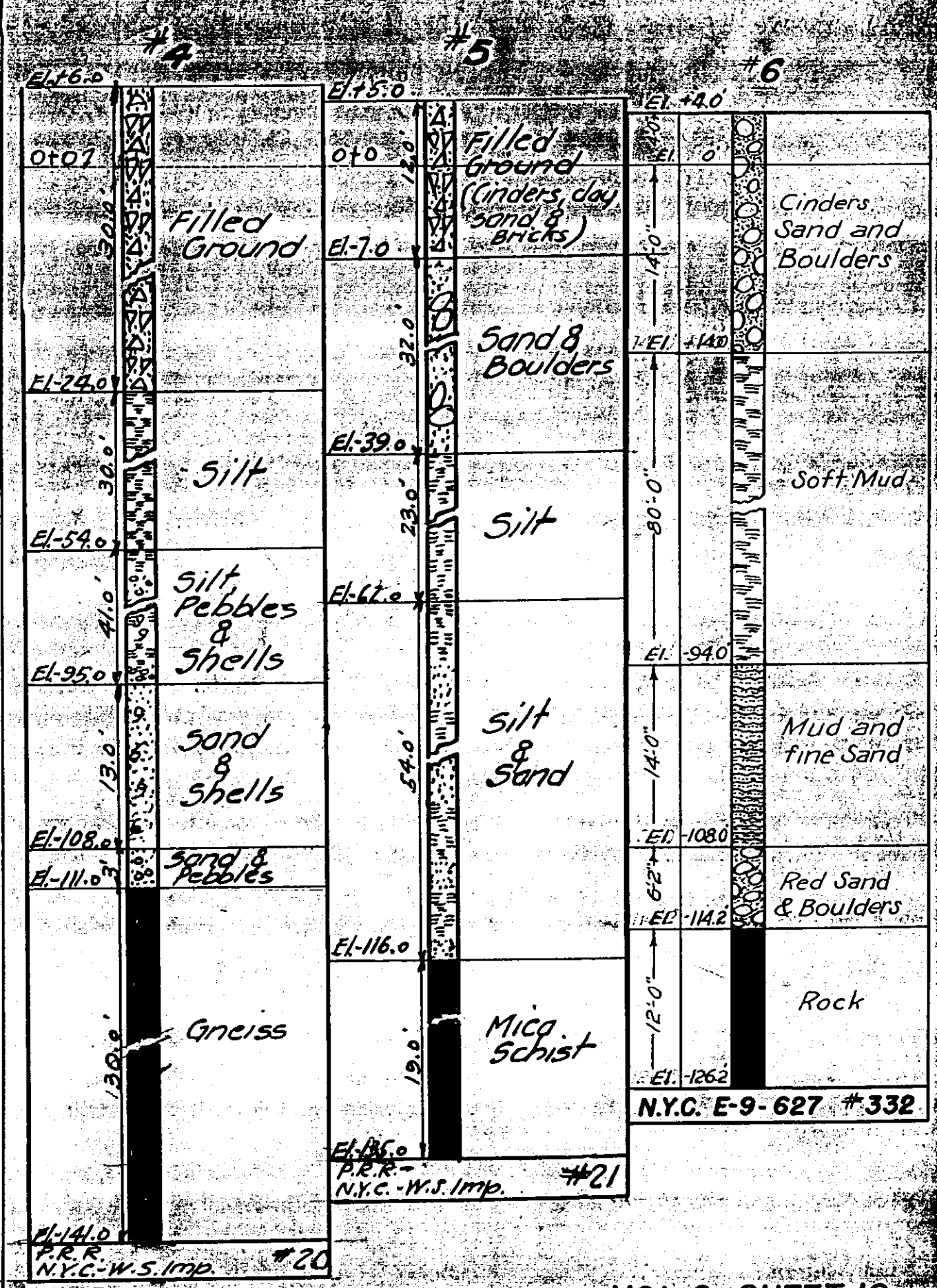
VOL. 2 SHEET 10

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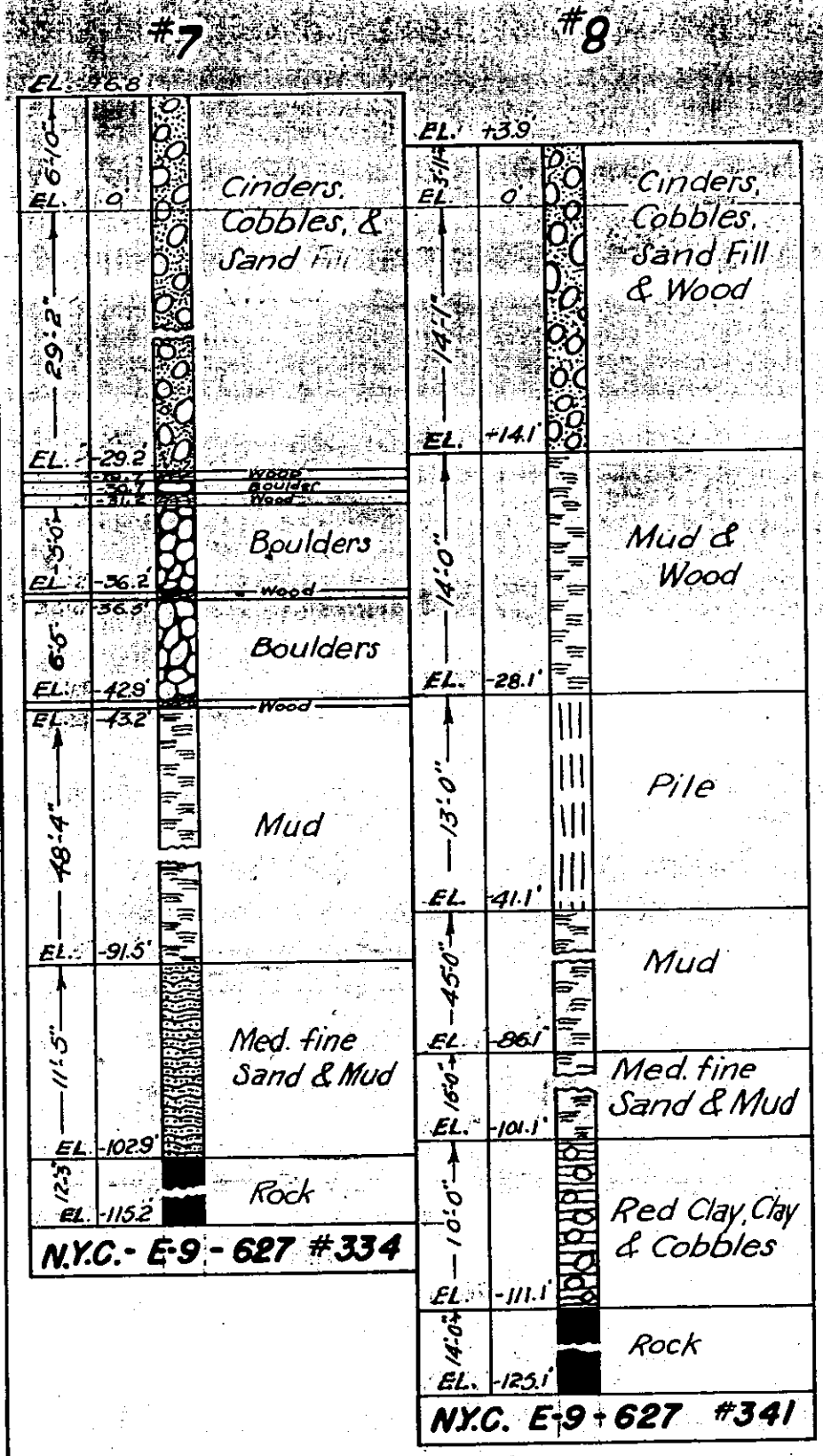


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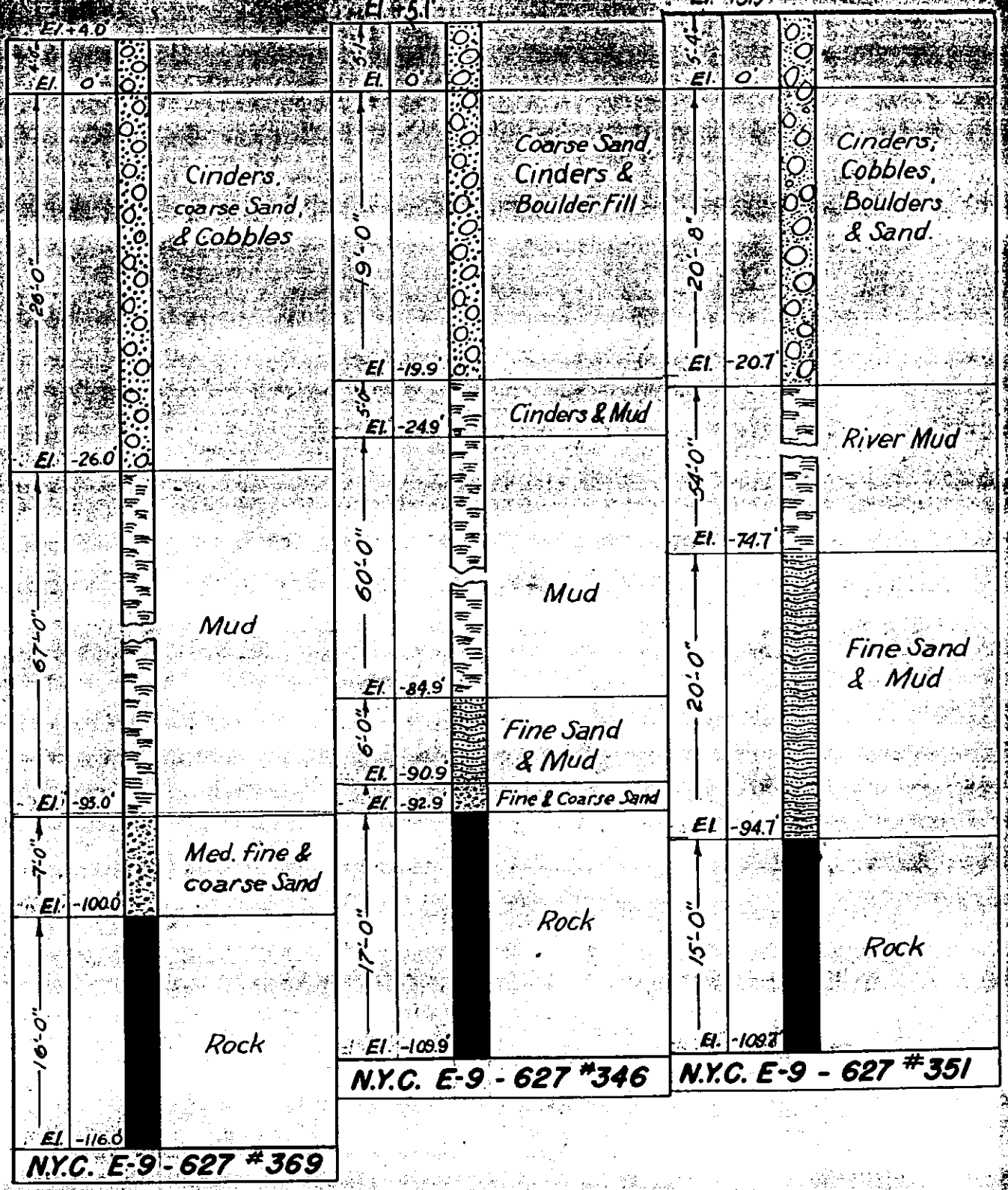


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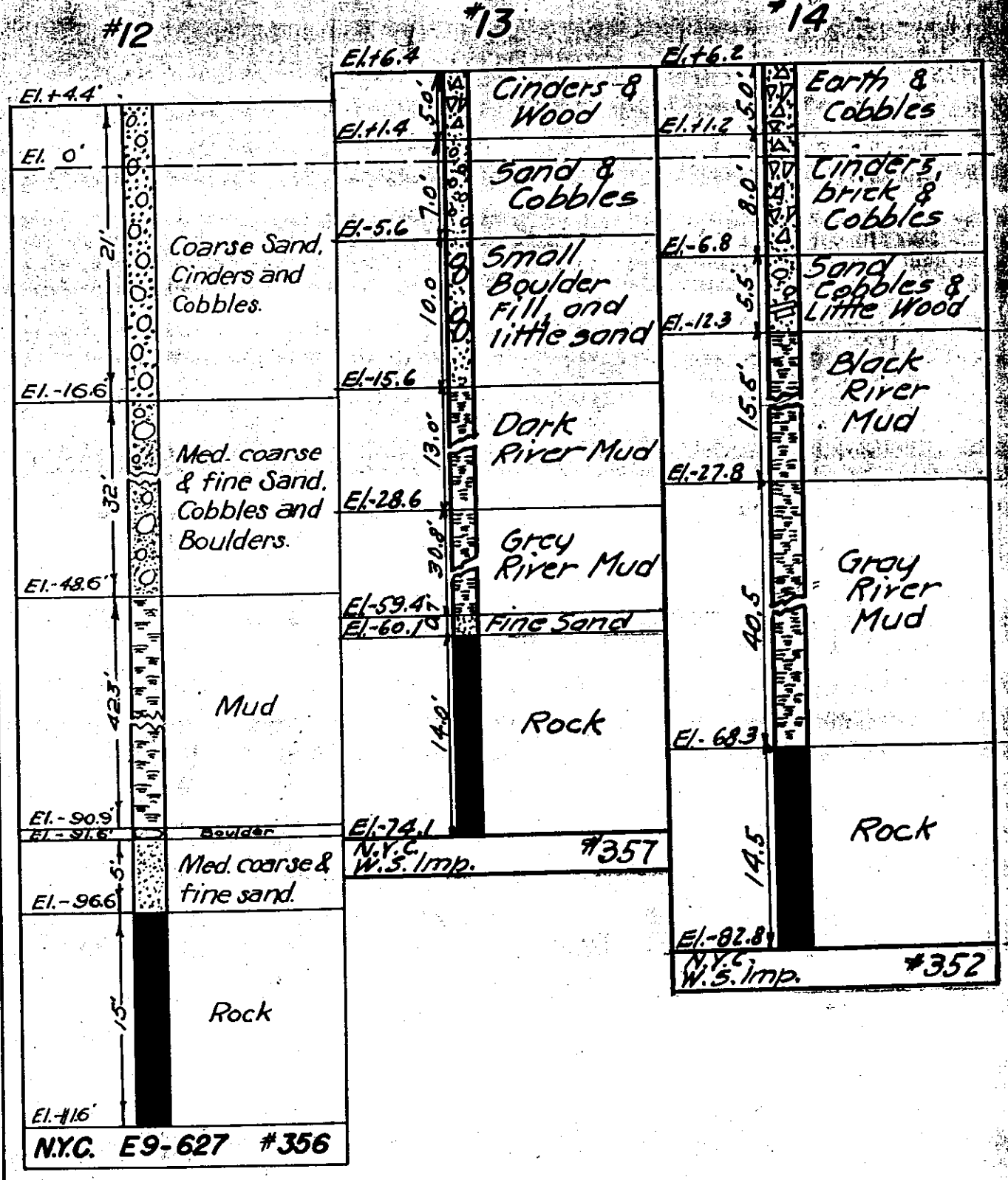
VOL. 2 - SHEET 10

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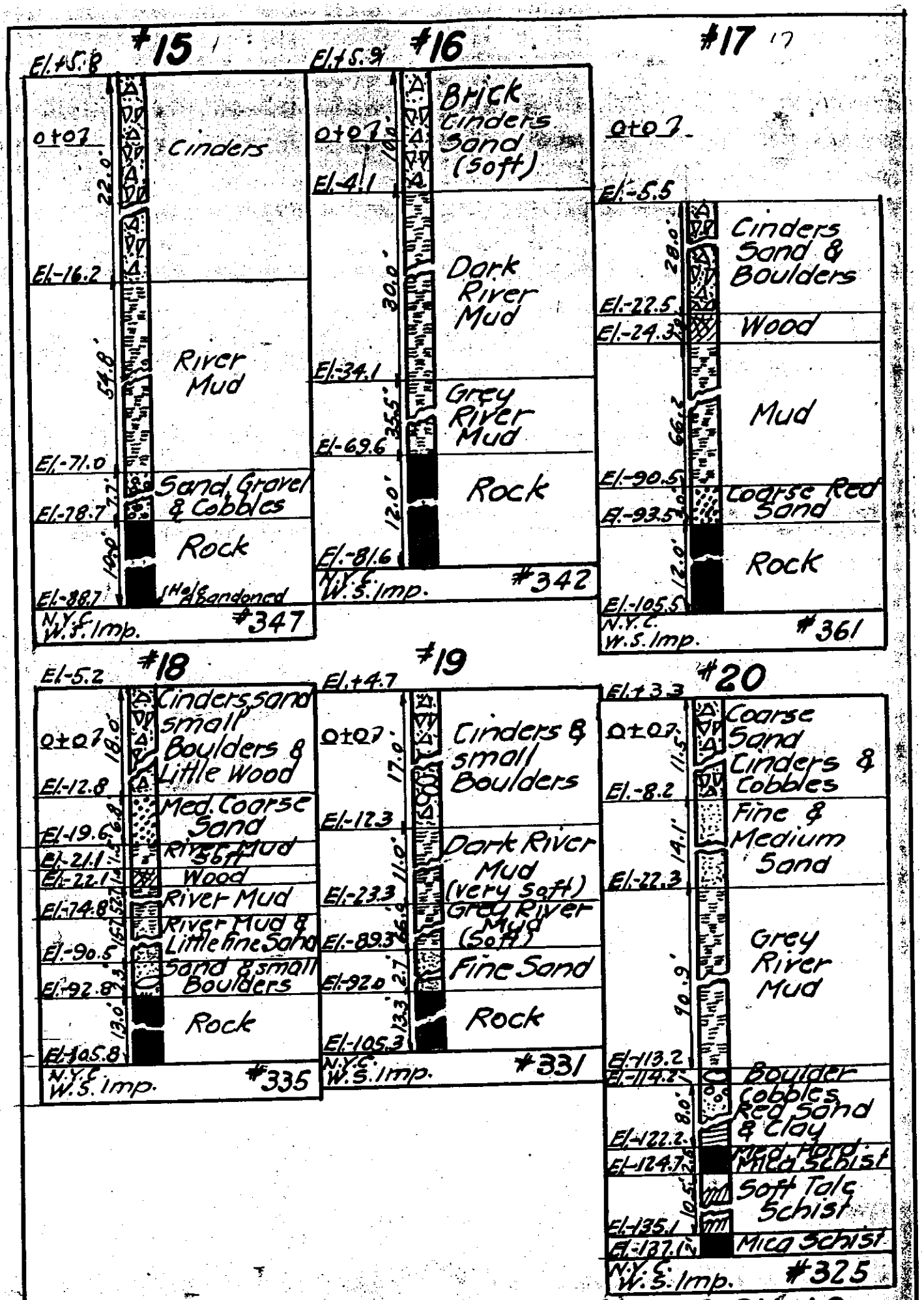


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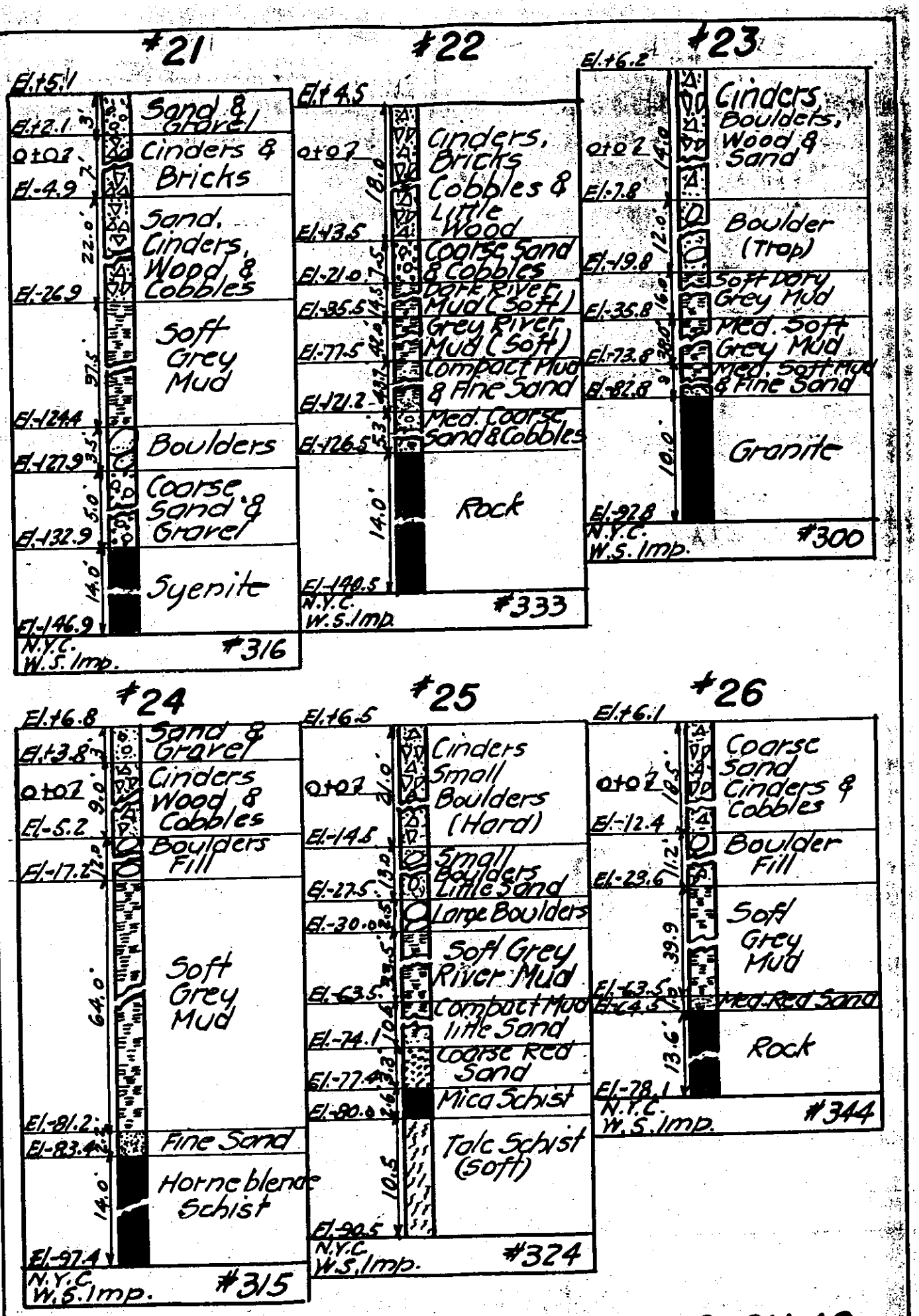
VOL. 2 SH. 10

Ch. B. 11-19-34

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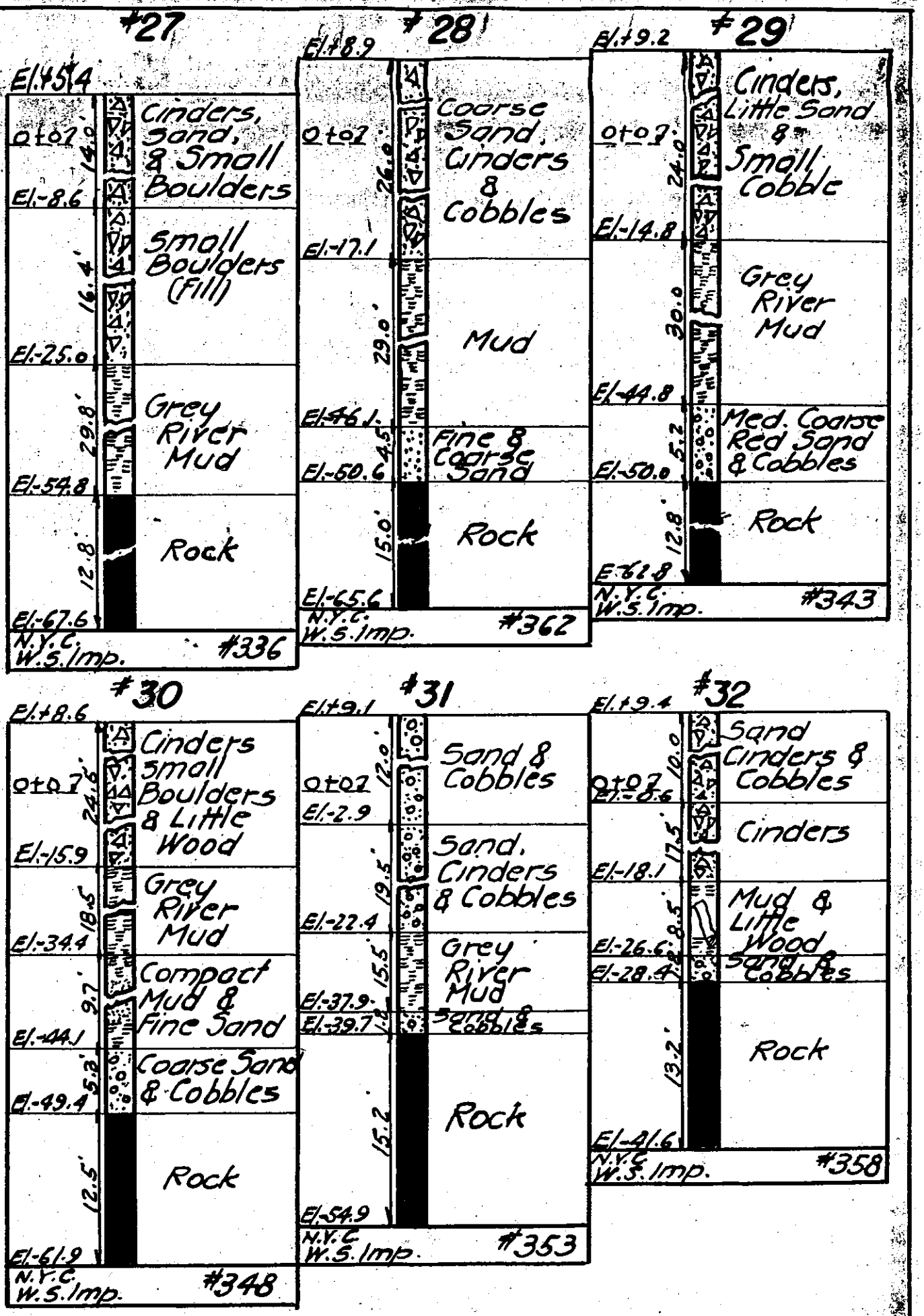


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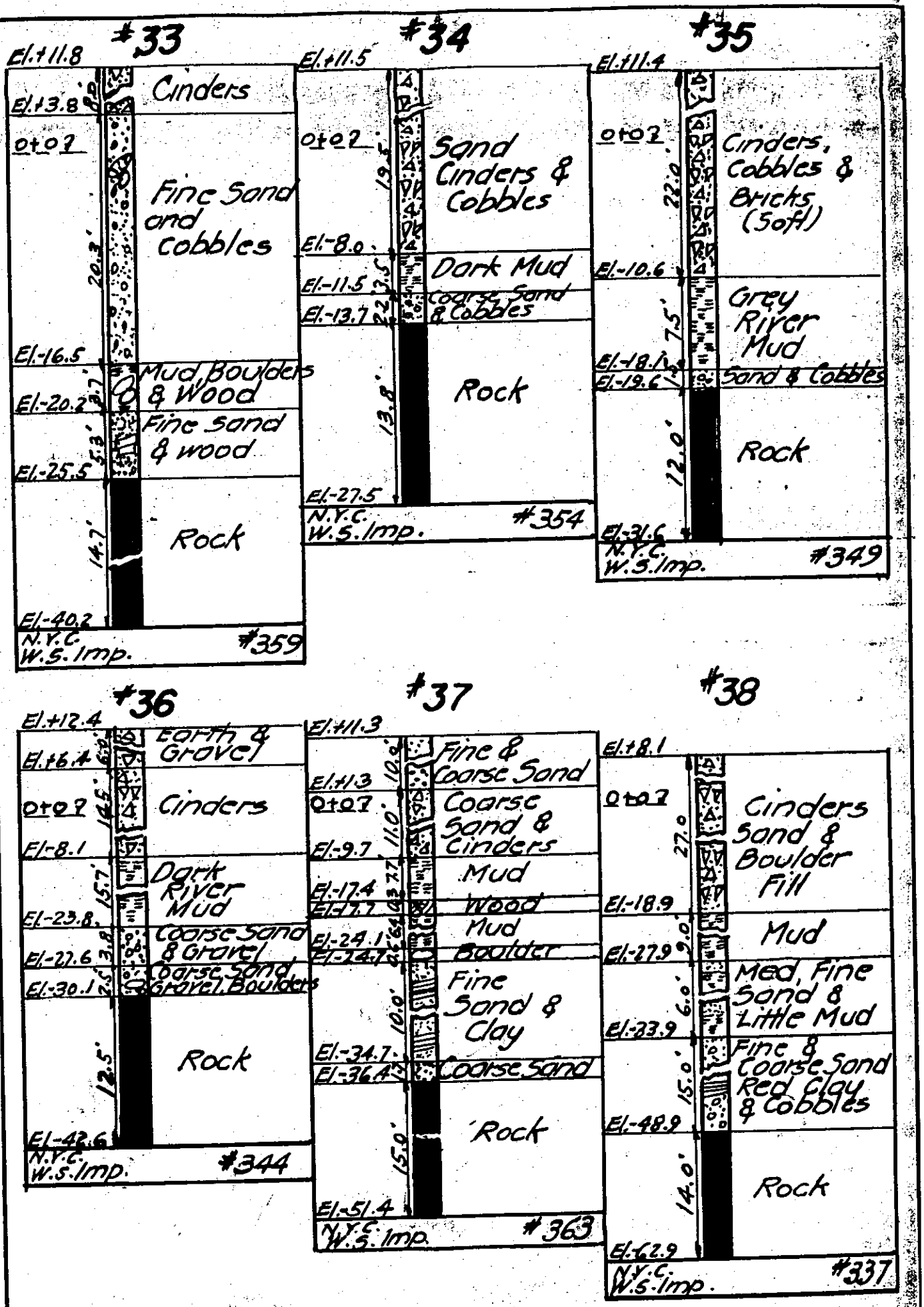


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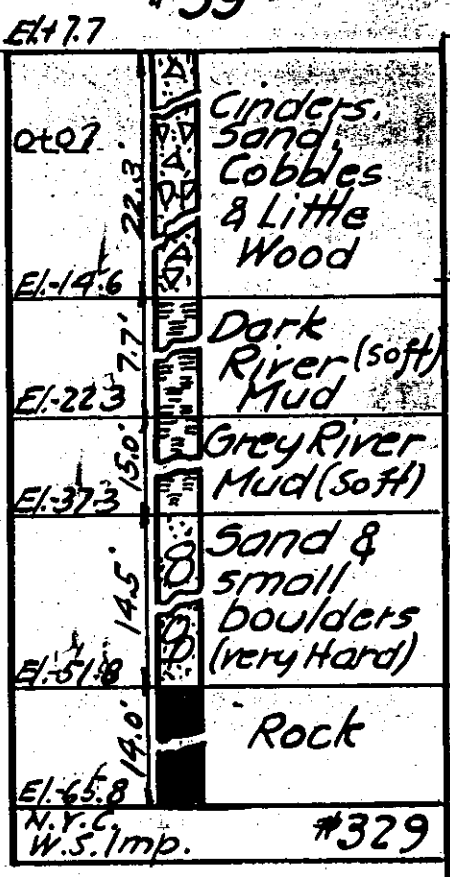


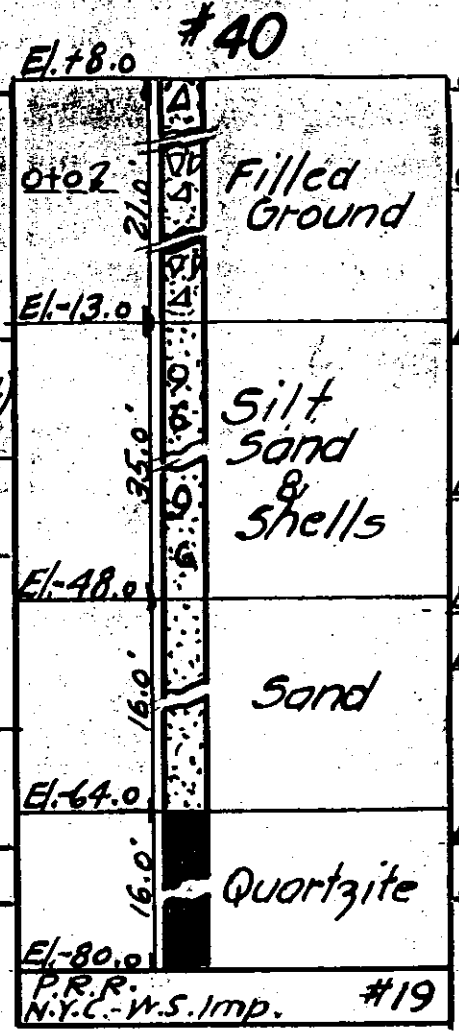


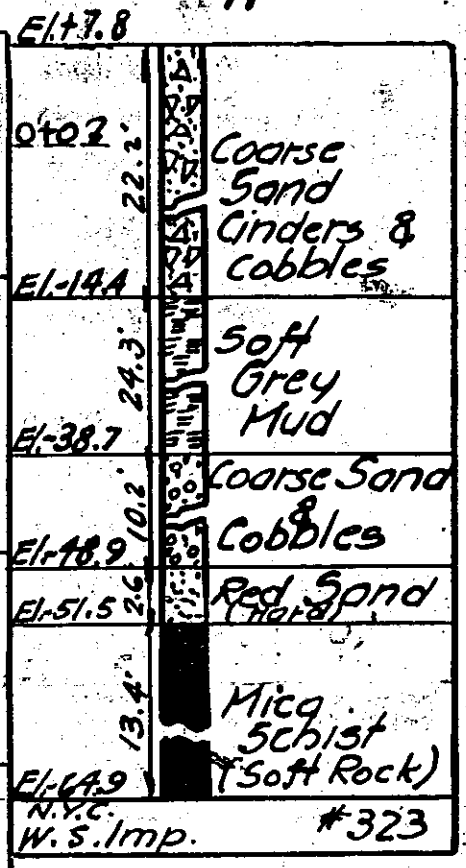


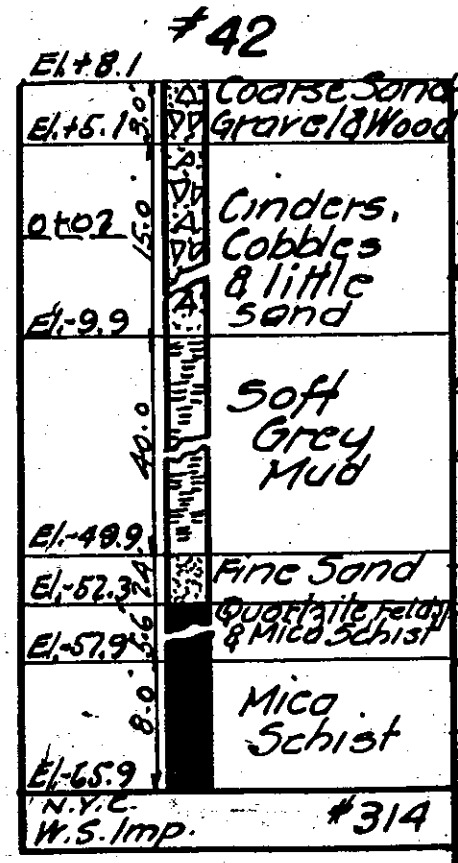


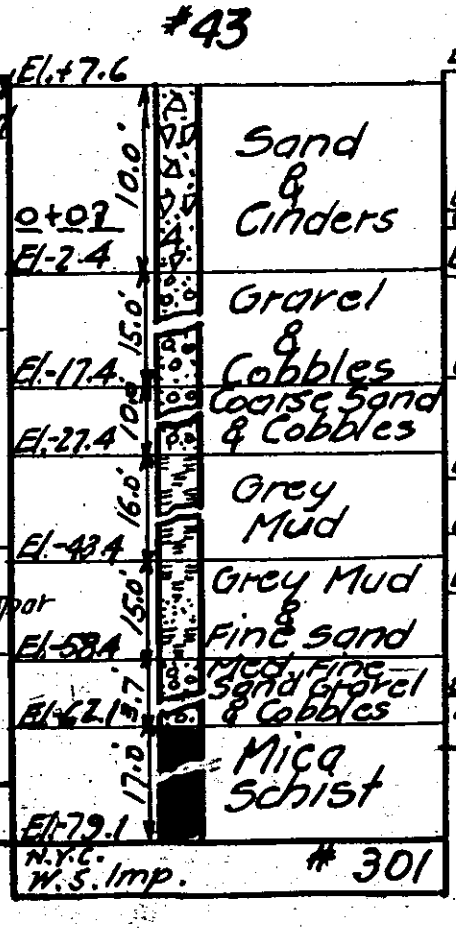


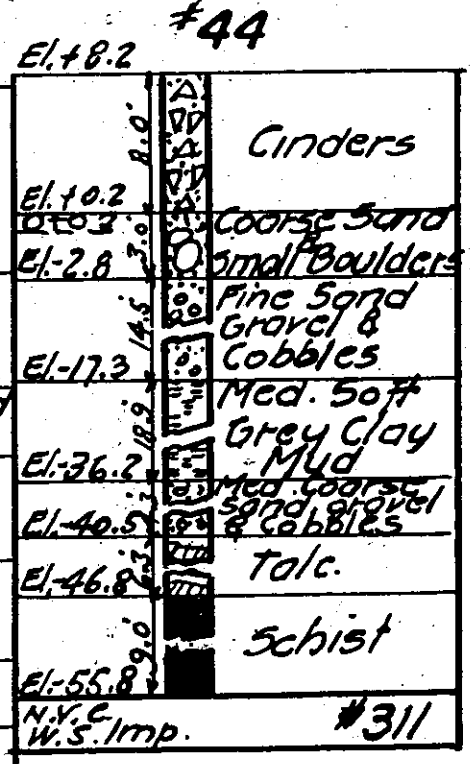


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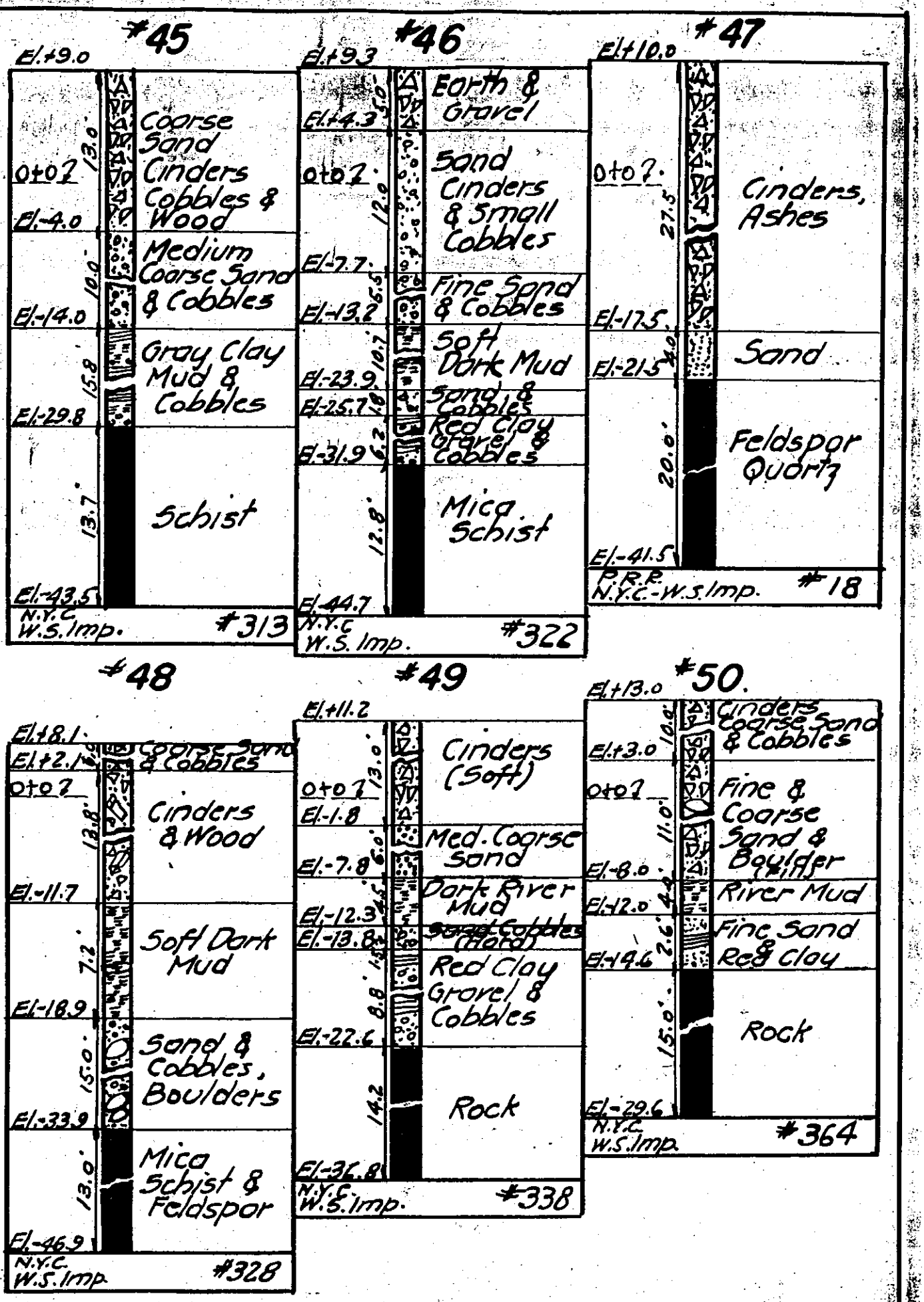


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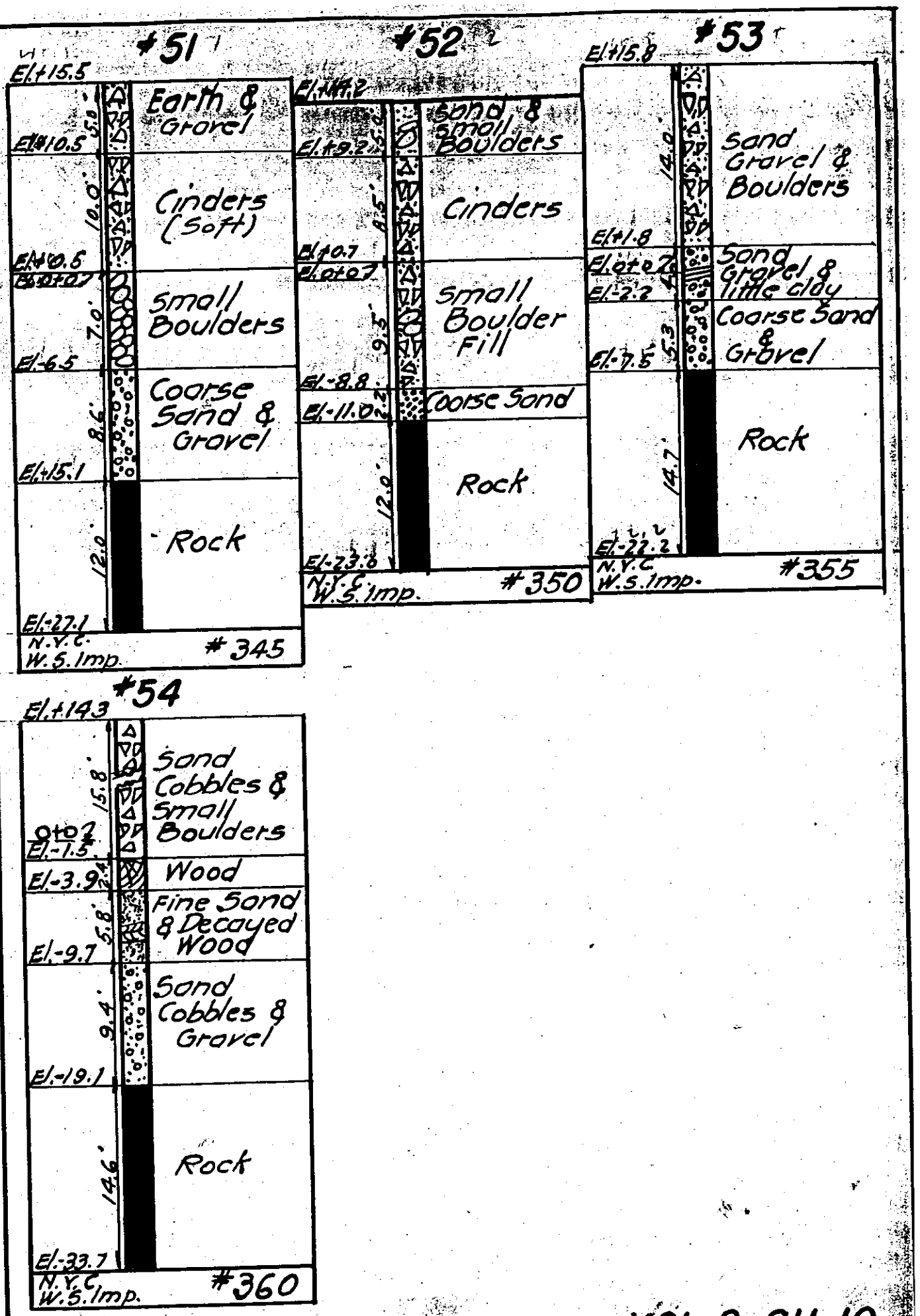
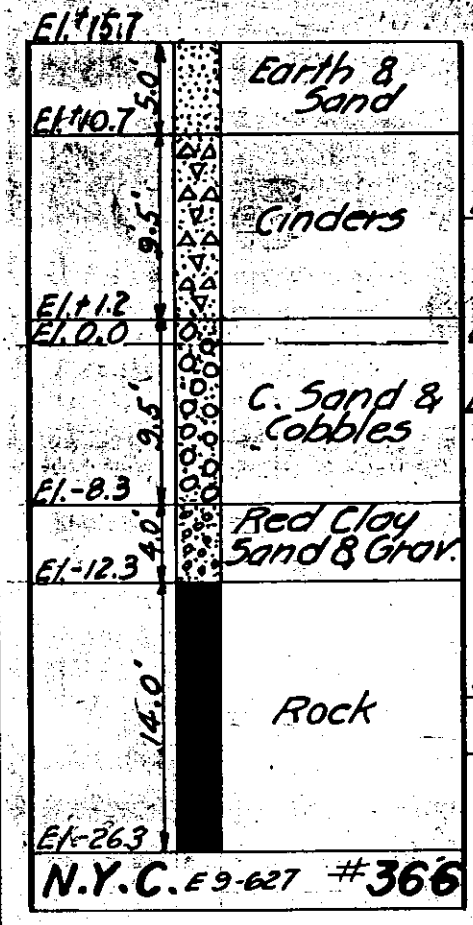
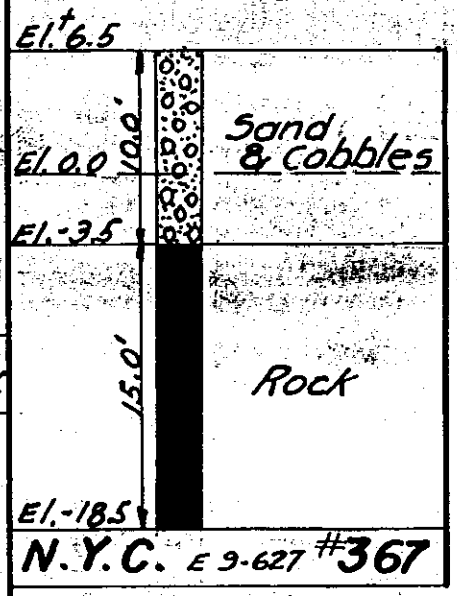



ROCK · DATA

VOL. 2 SH. 10

Ch. B 1-24-34


#55
El.+15.7
Earth & Sand
5.0'
El.+10.7
Cinders
9.5'
El.+1.2
El.0.0
C. Sand & Cobbles
9.5'
El.-8.3
Red Clay Sand & Grav.
4.0'
El.-12.3
Rock
14.0'
El.-26.3
N.Y.C. E 9-627 #366


#56
El.+6.5
Sand & Cobbles
10.0'
El.0.0
El.-3.5
Rock
15.0'
El.-18.5
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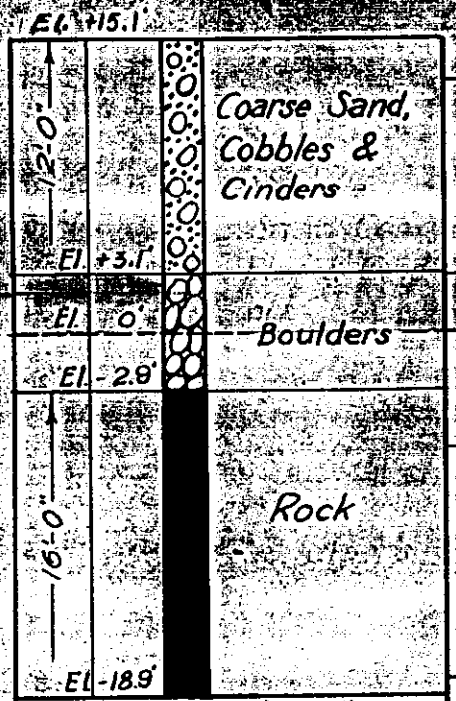


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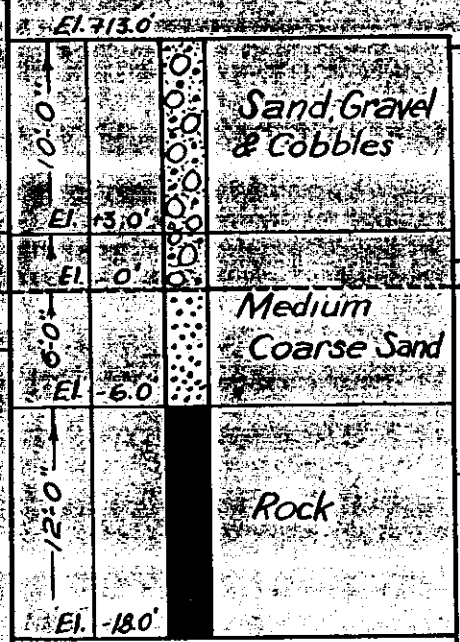


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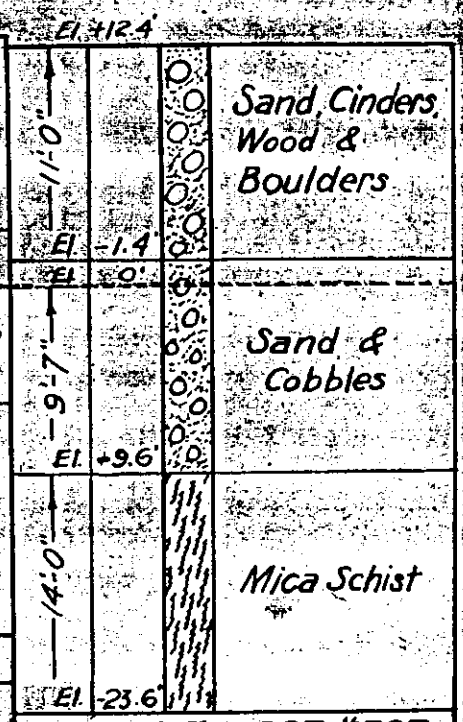


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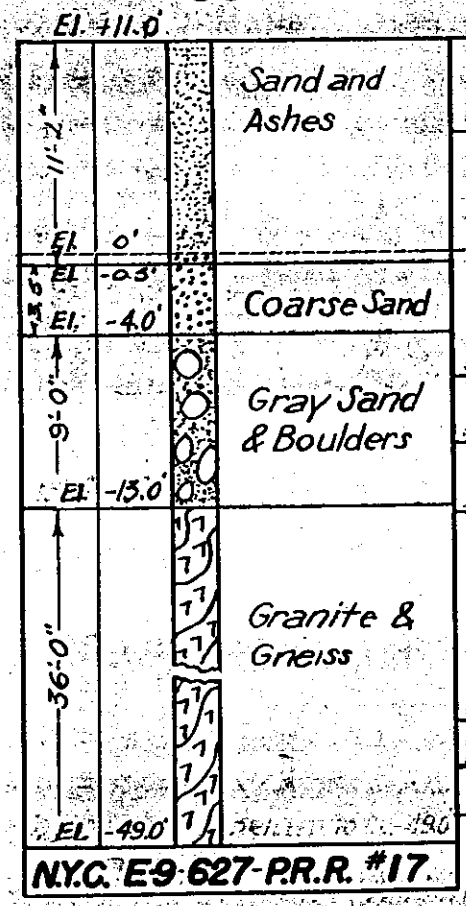


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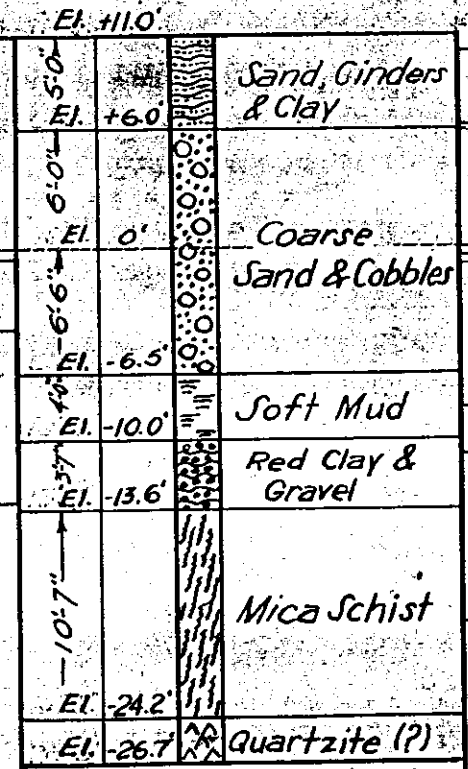


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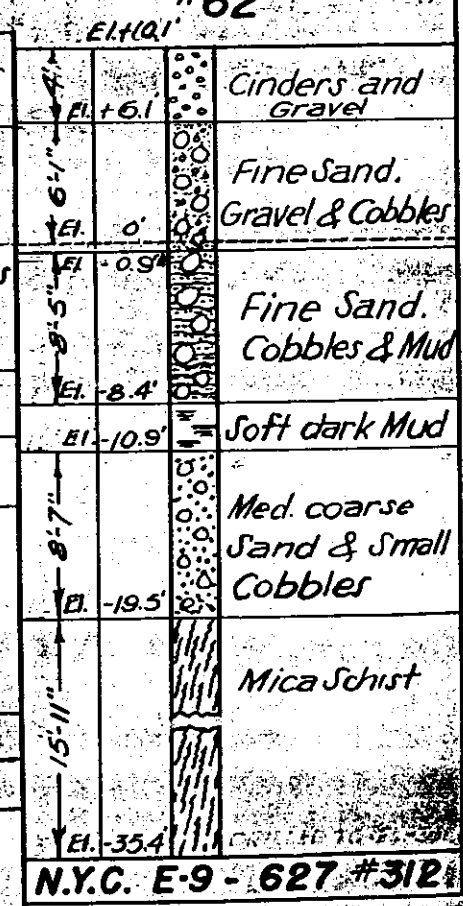


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ROCK DATA

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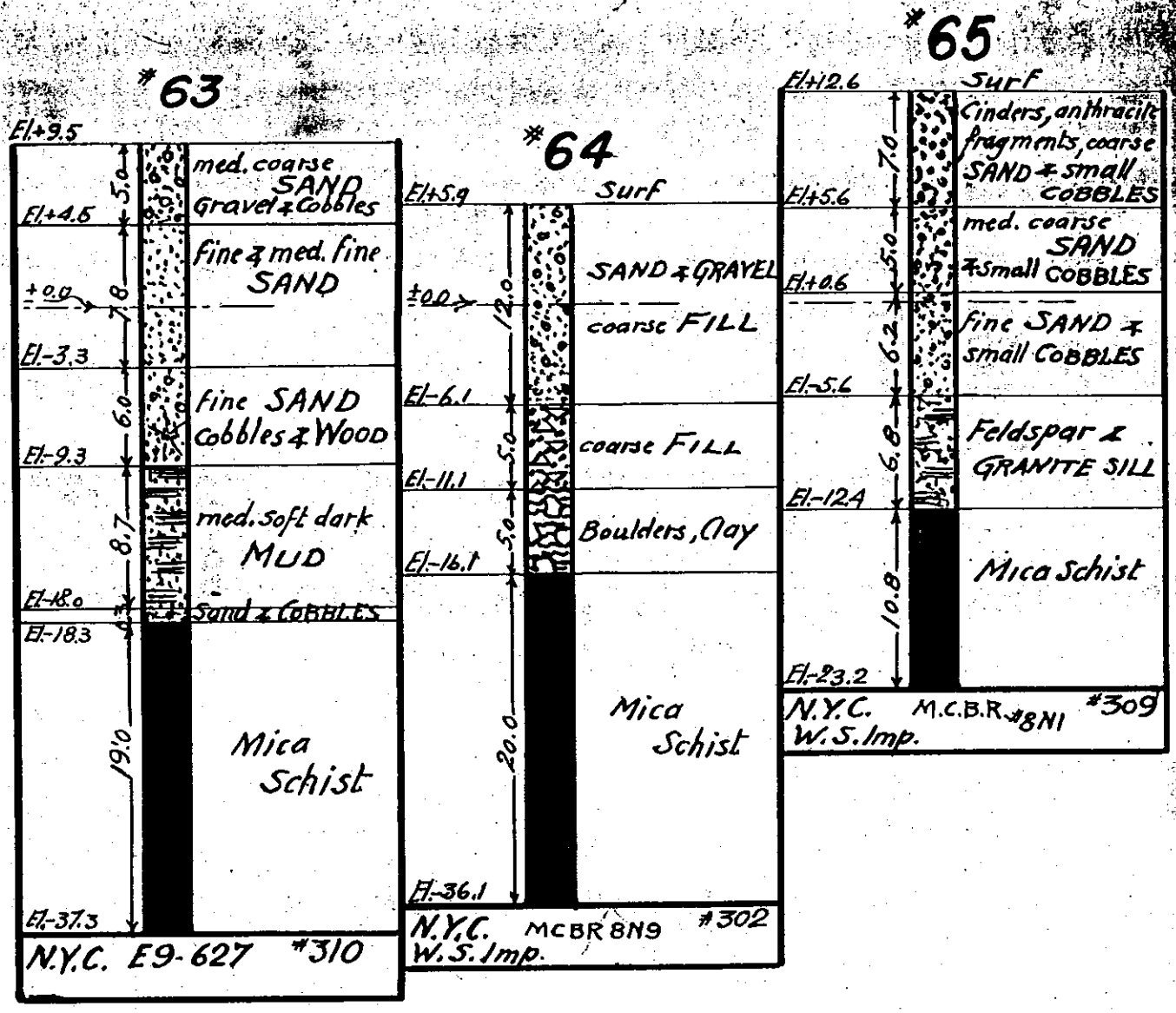


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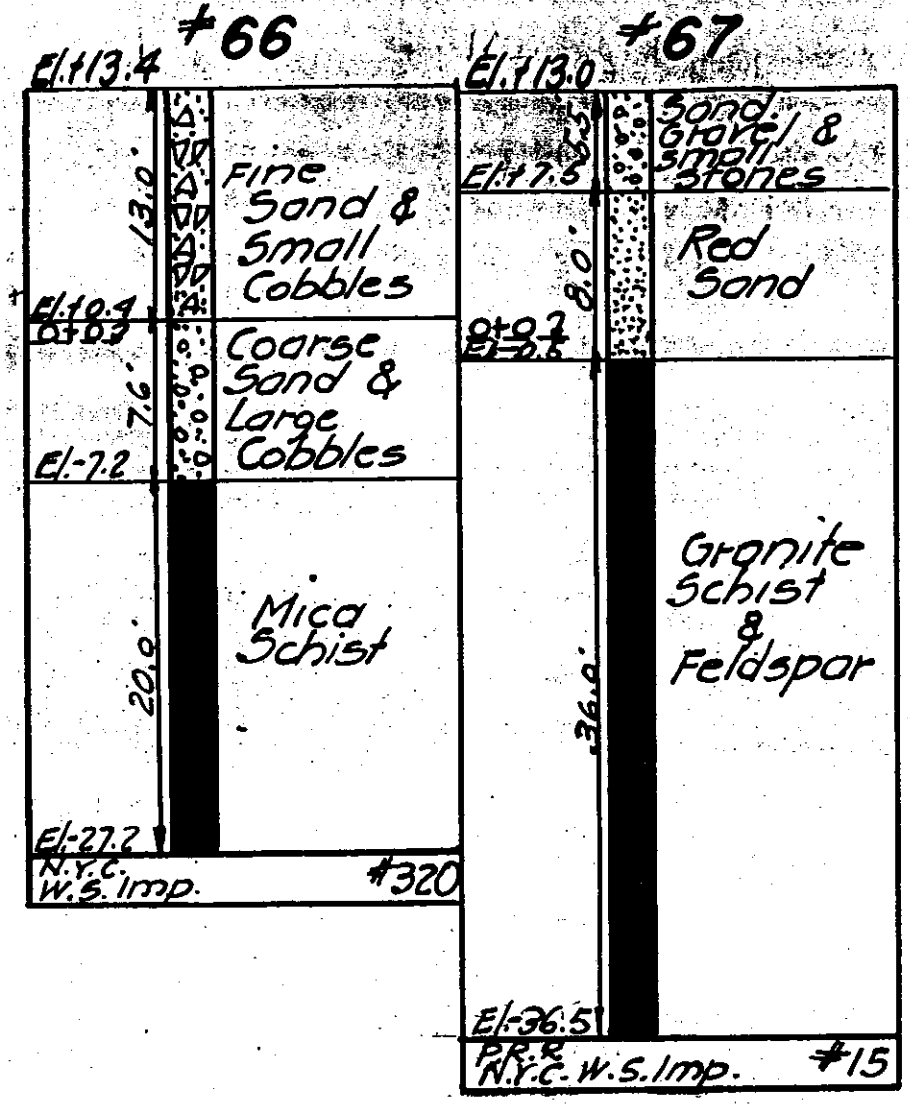


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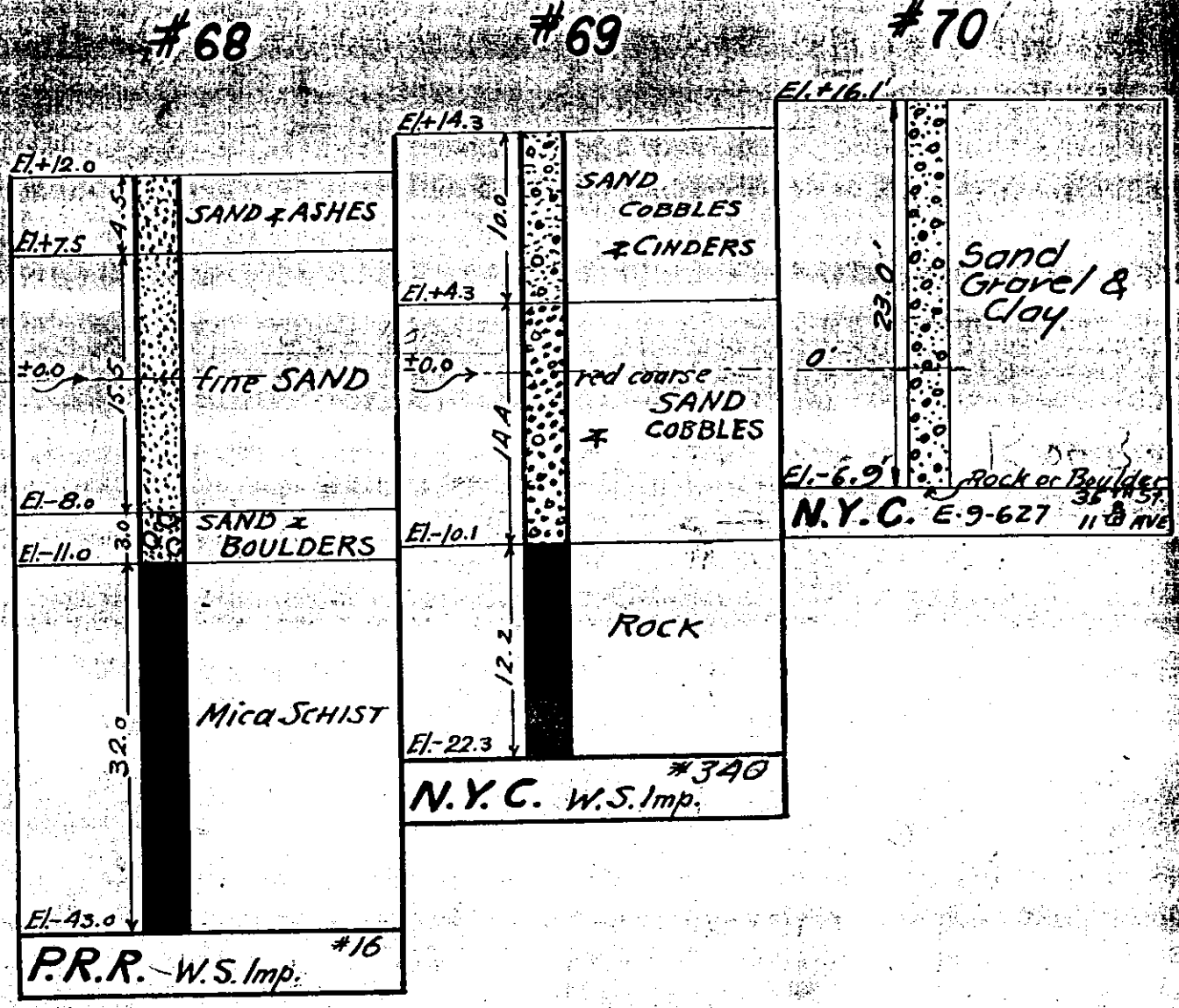


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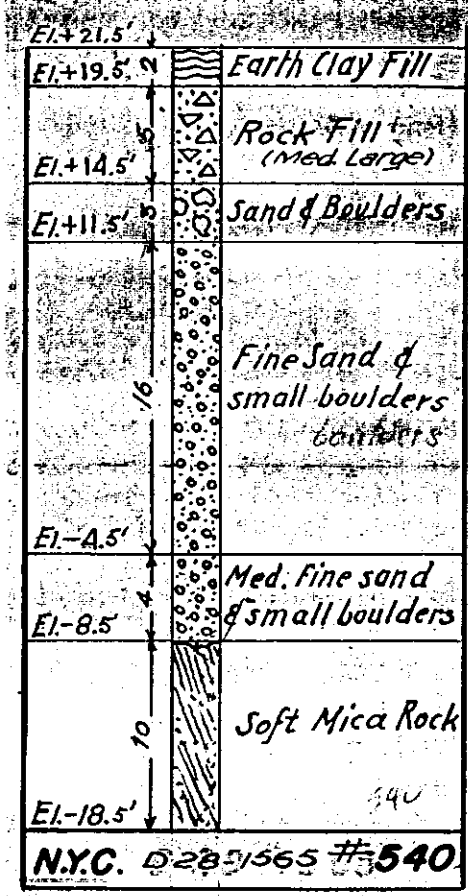
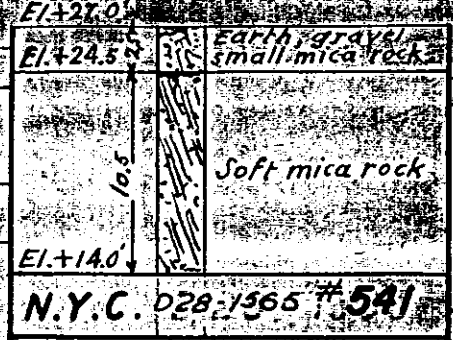
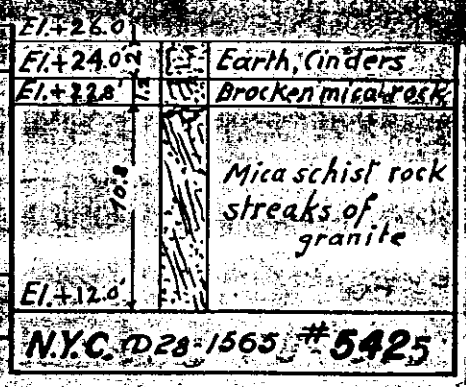
VOL. 2 SH. 10

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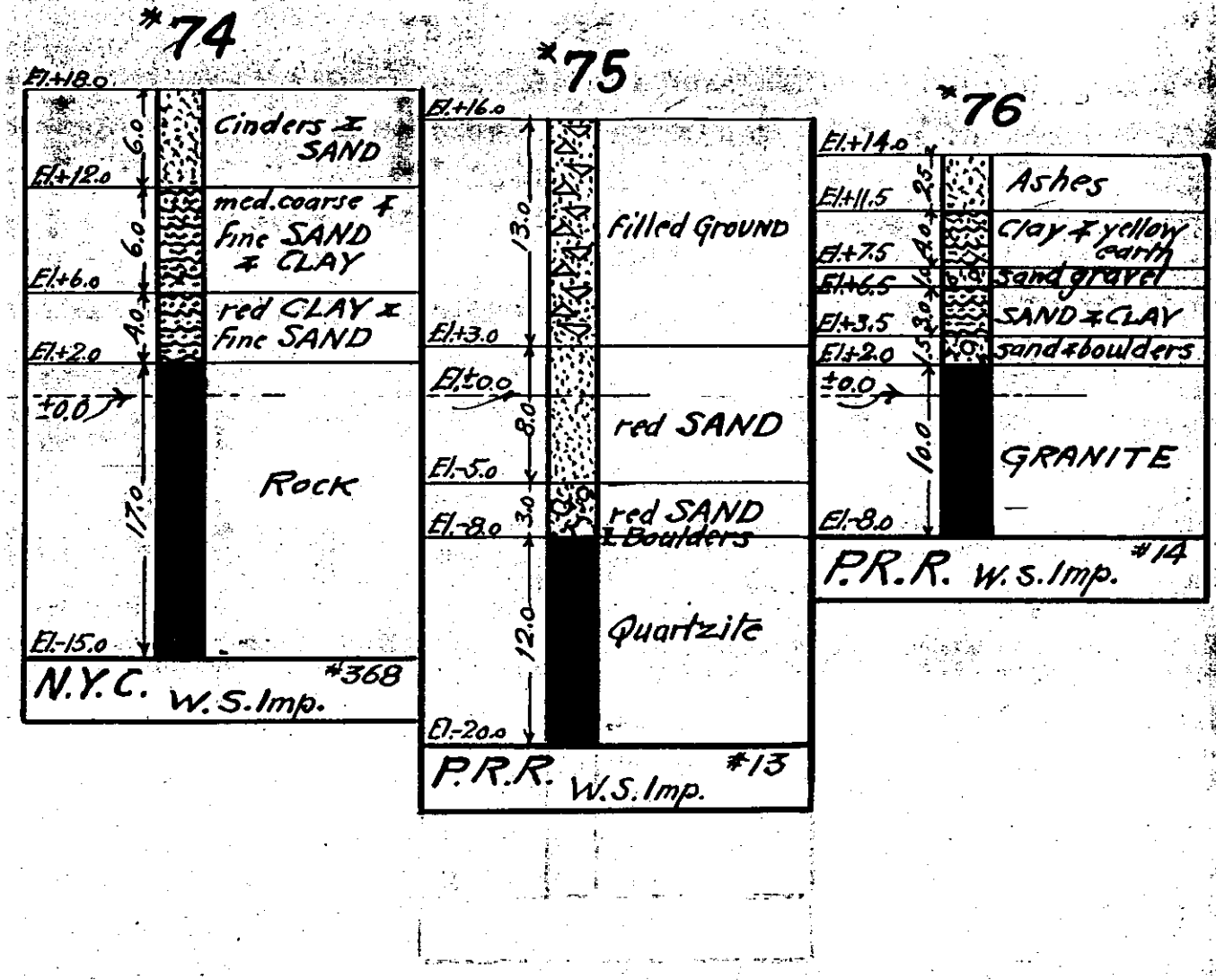
VOL.2 SHEET 10

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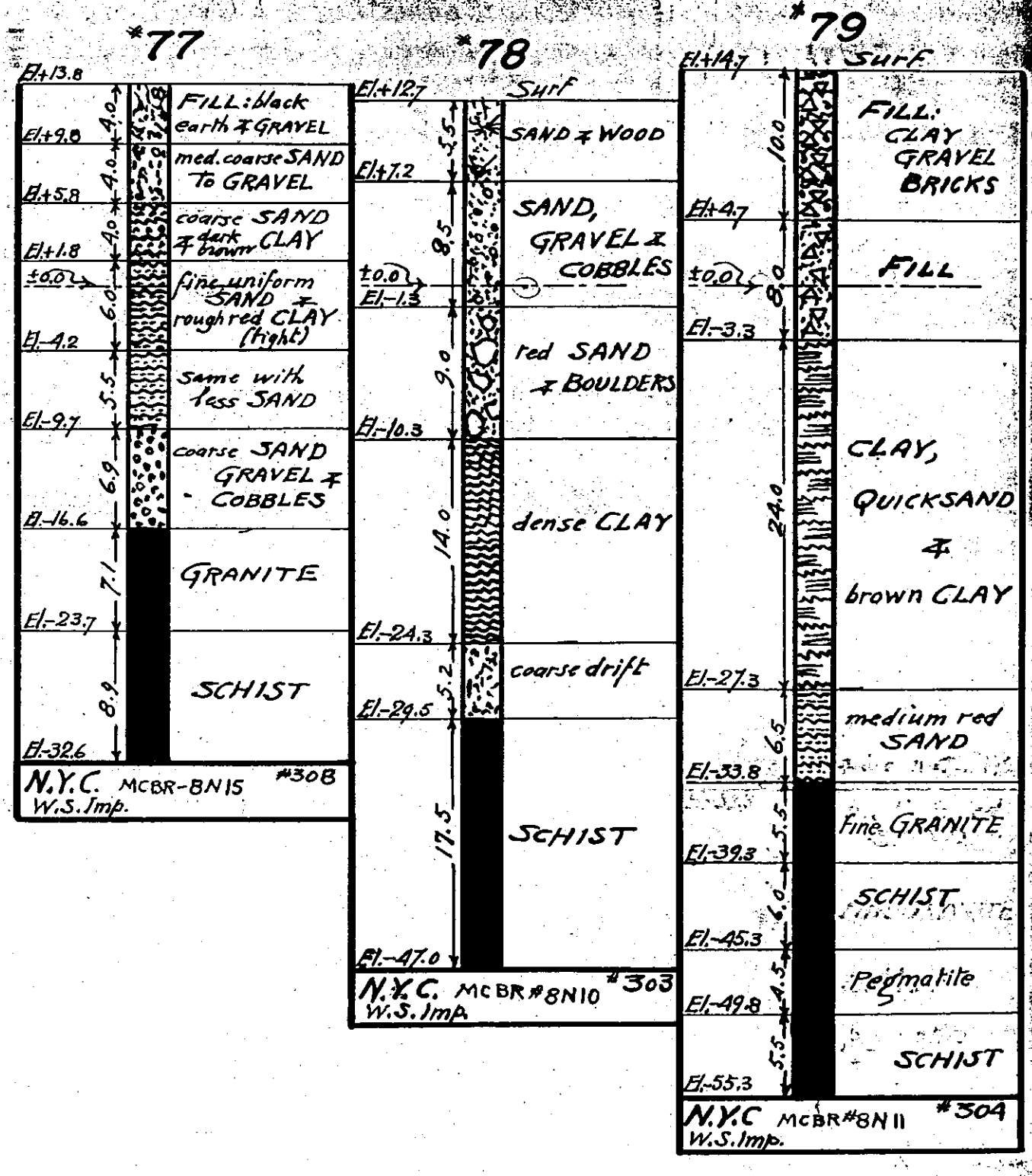


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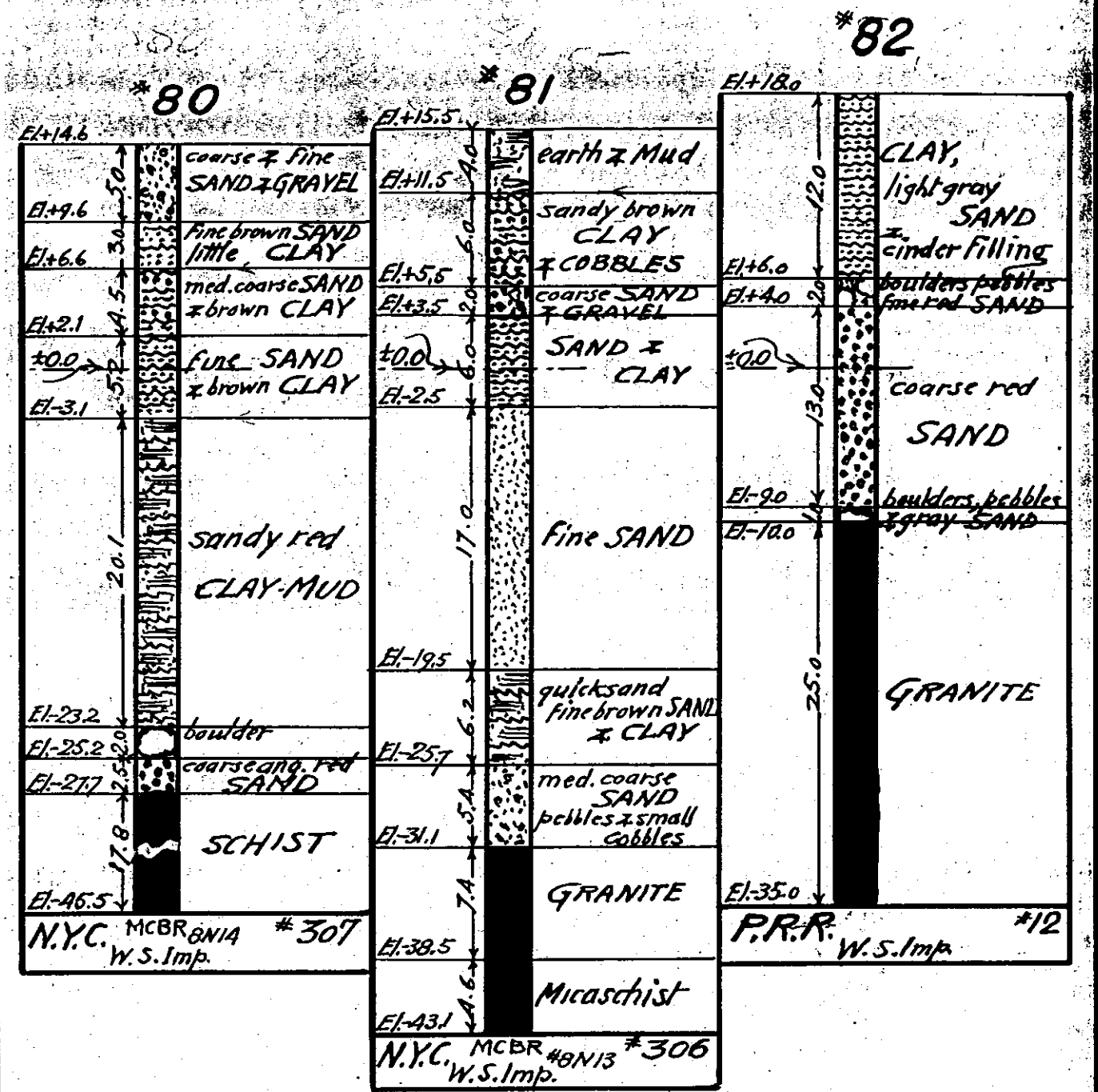


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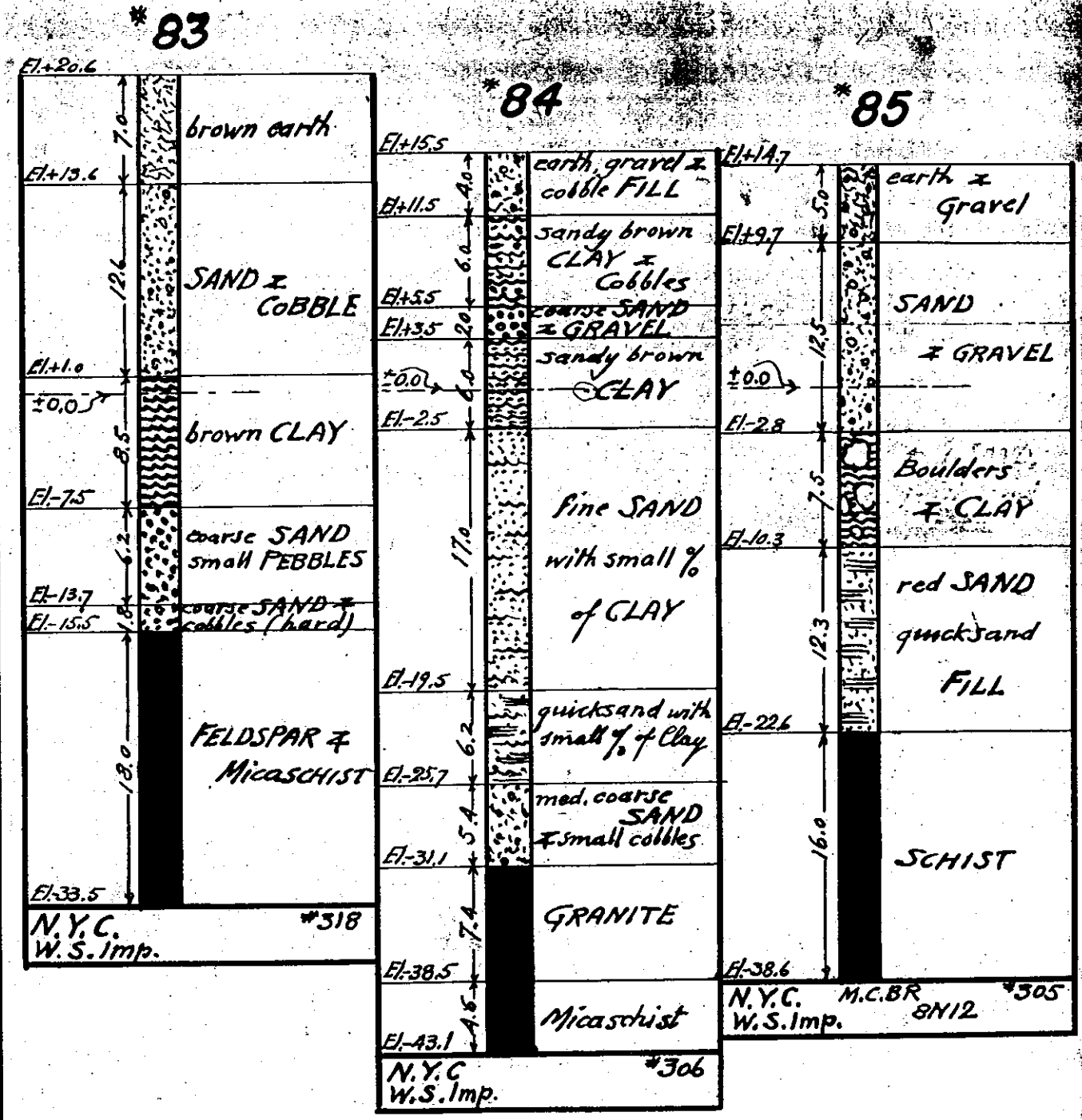


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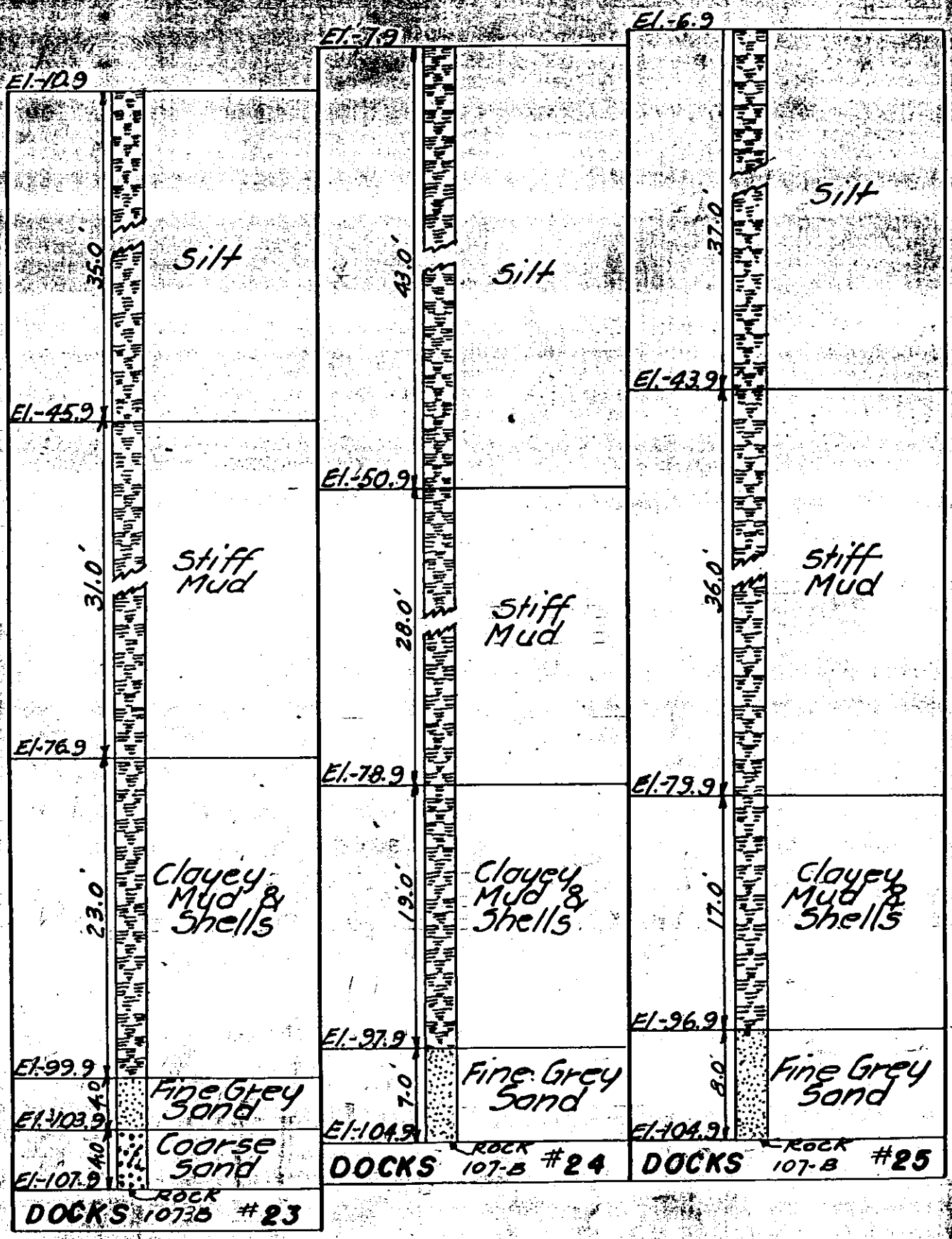


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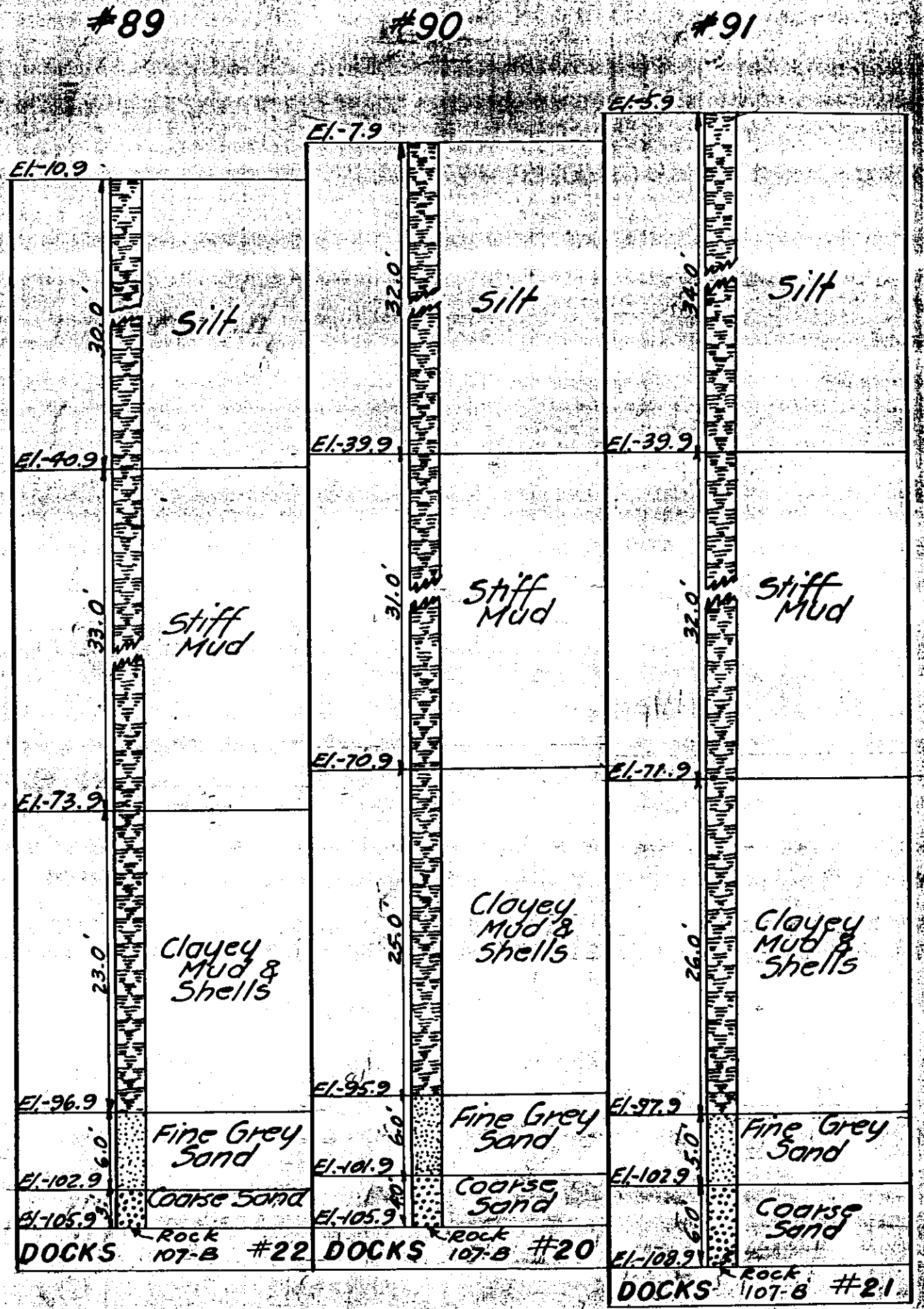


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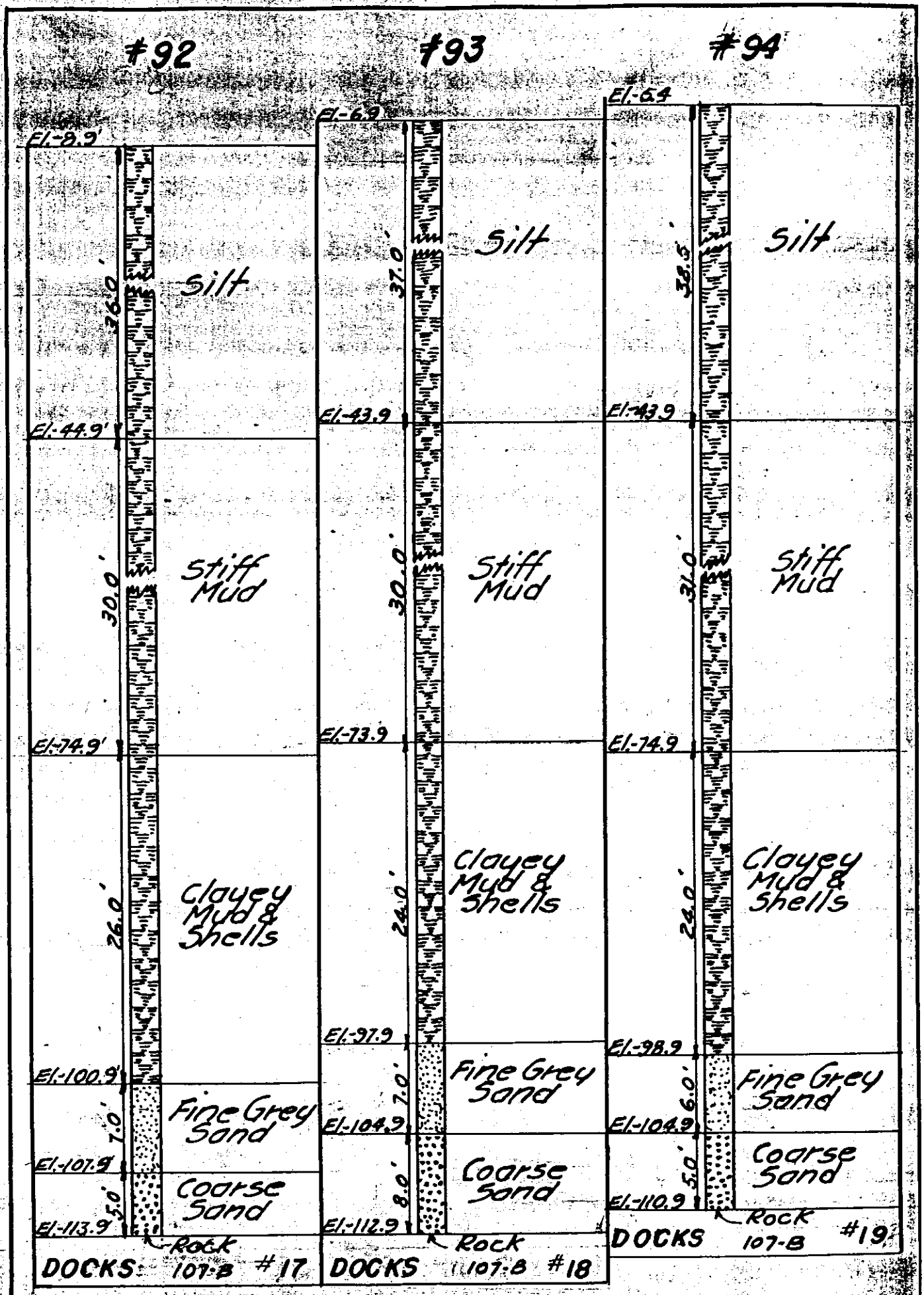


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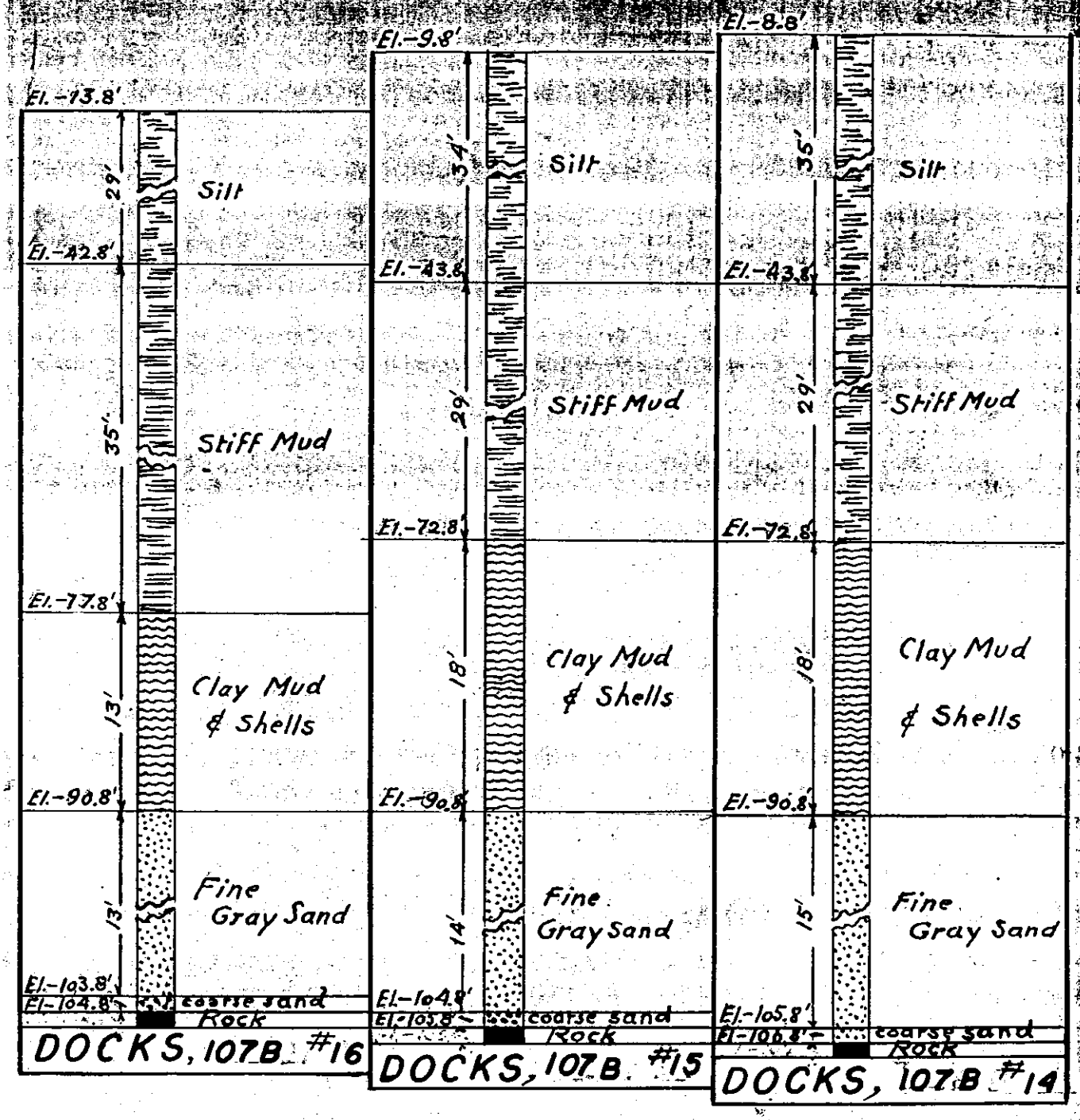


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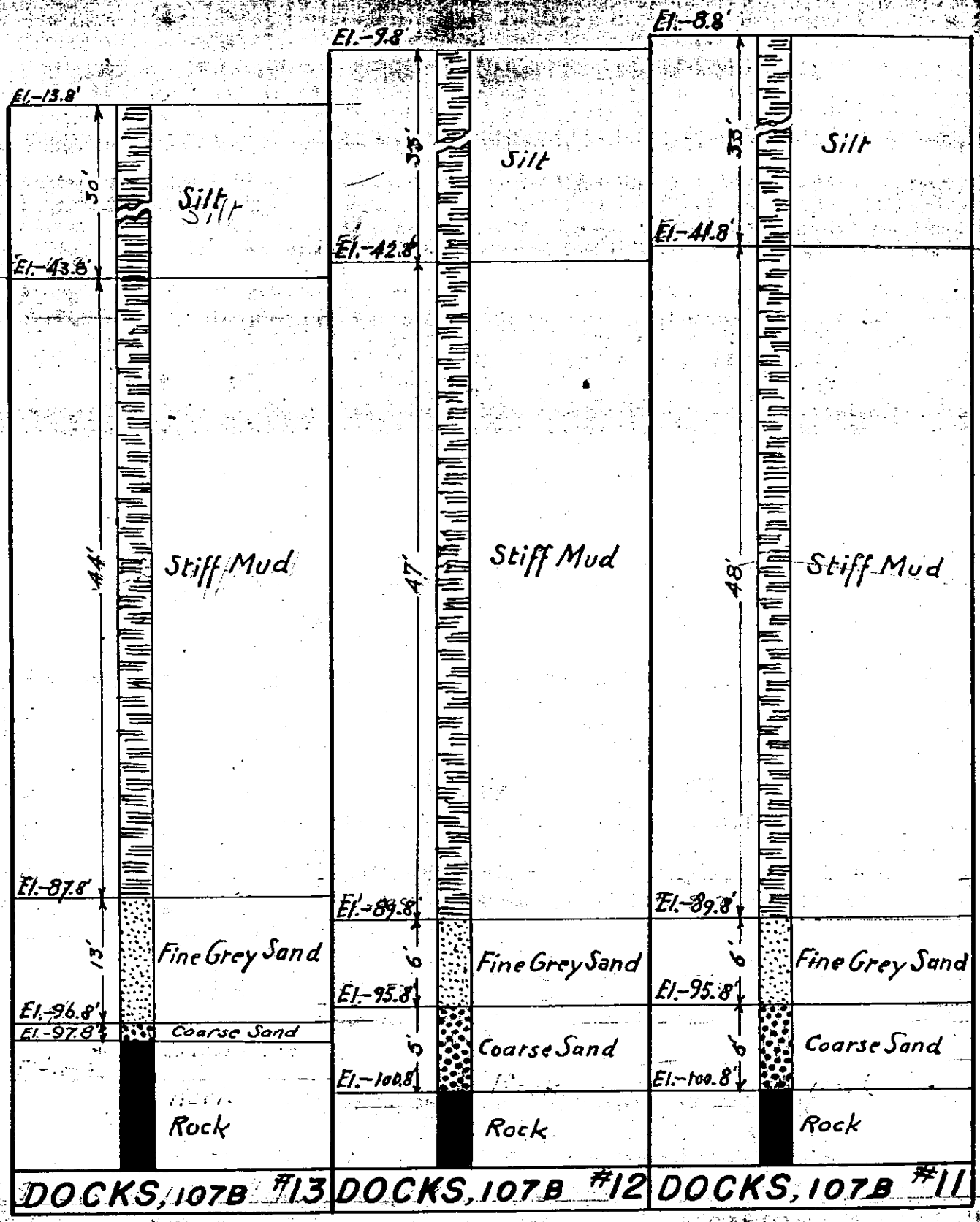


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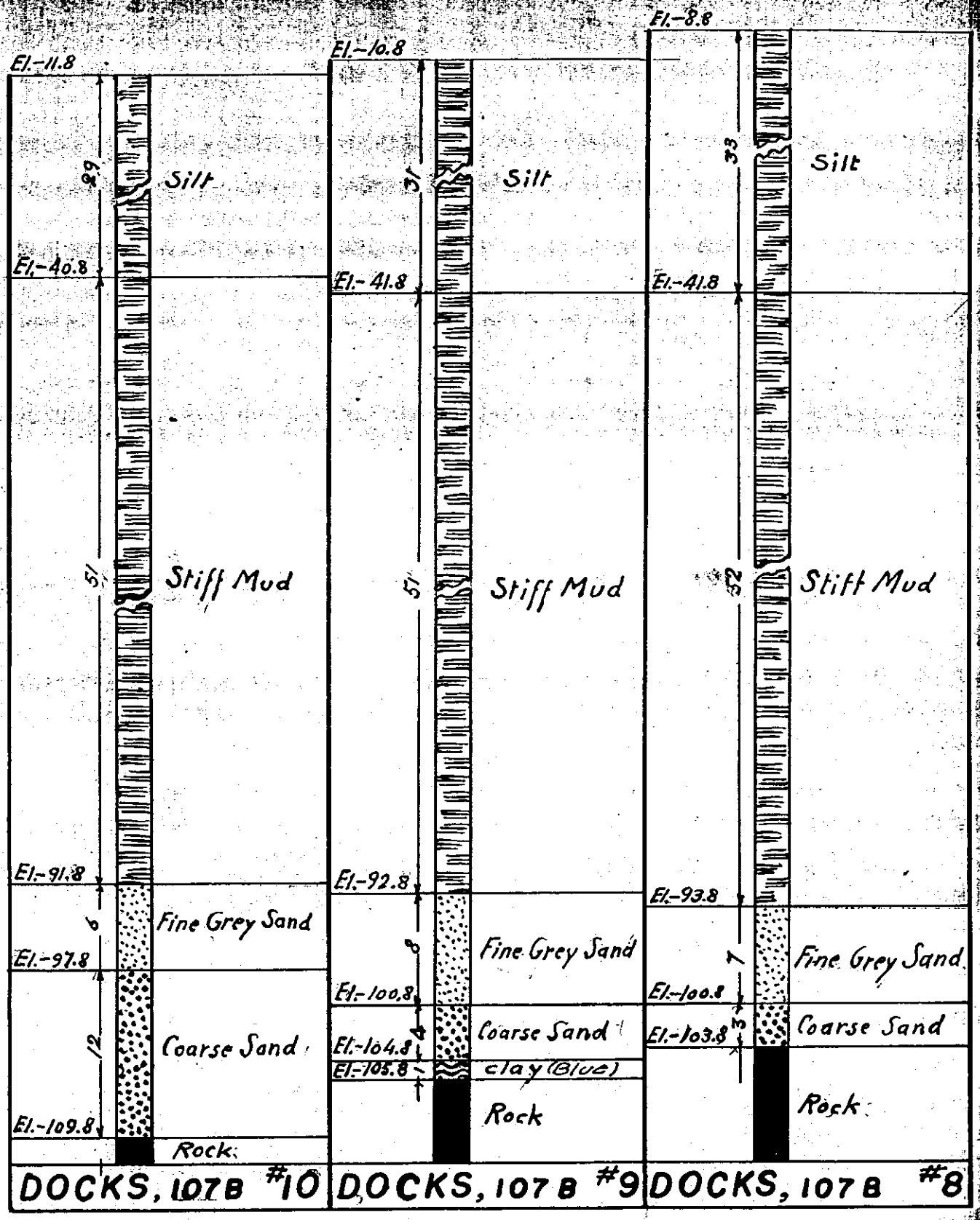


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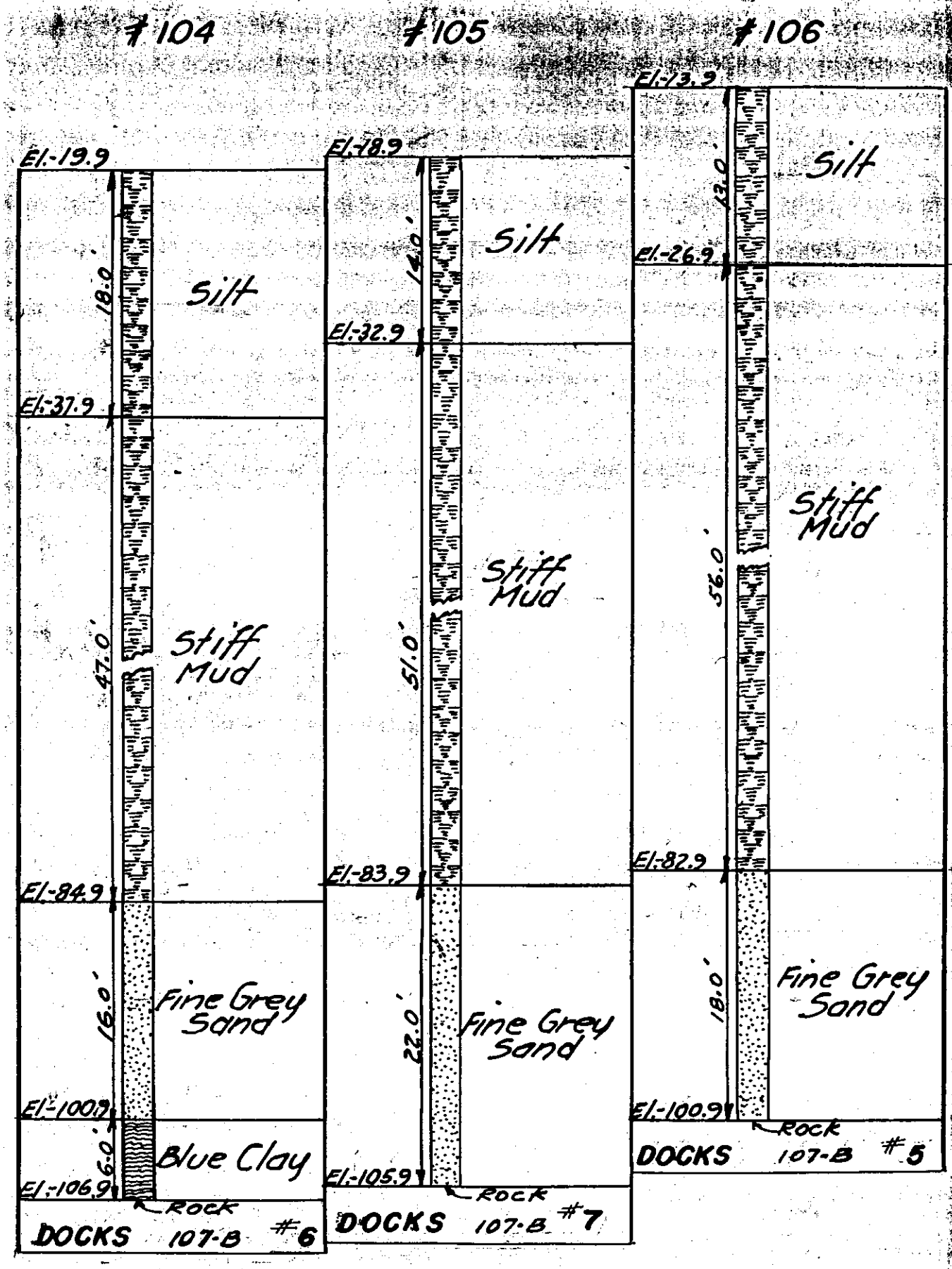


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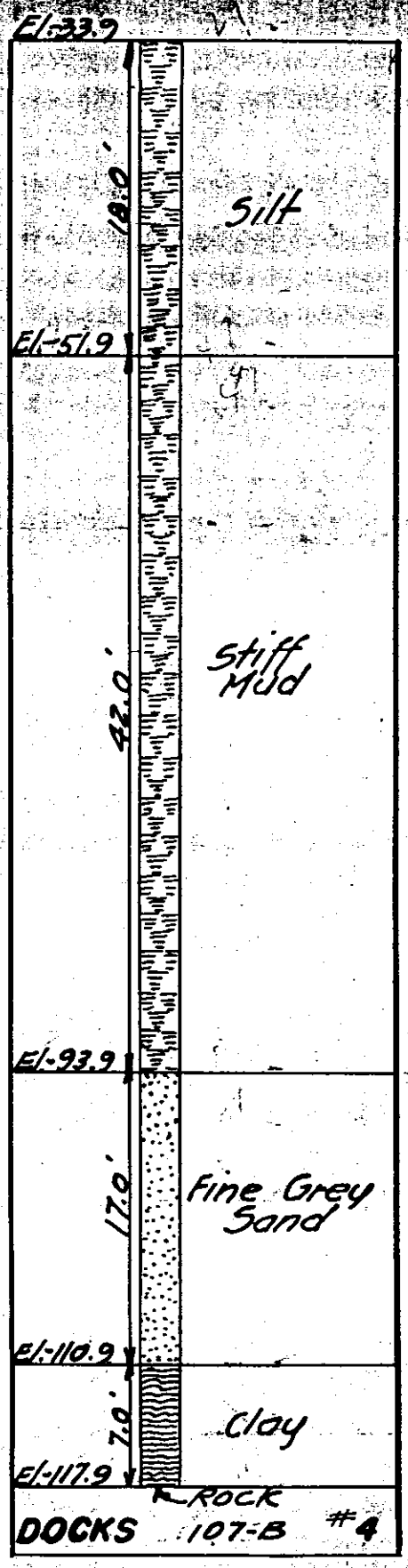
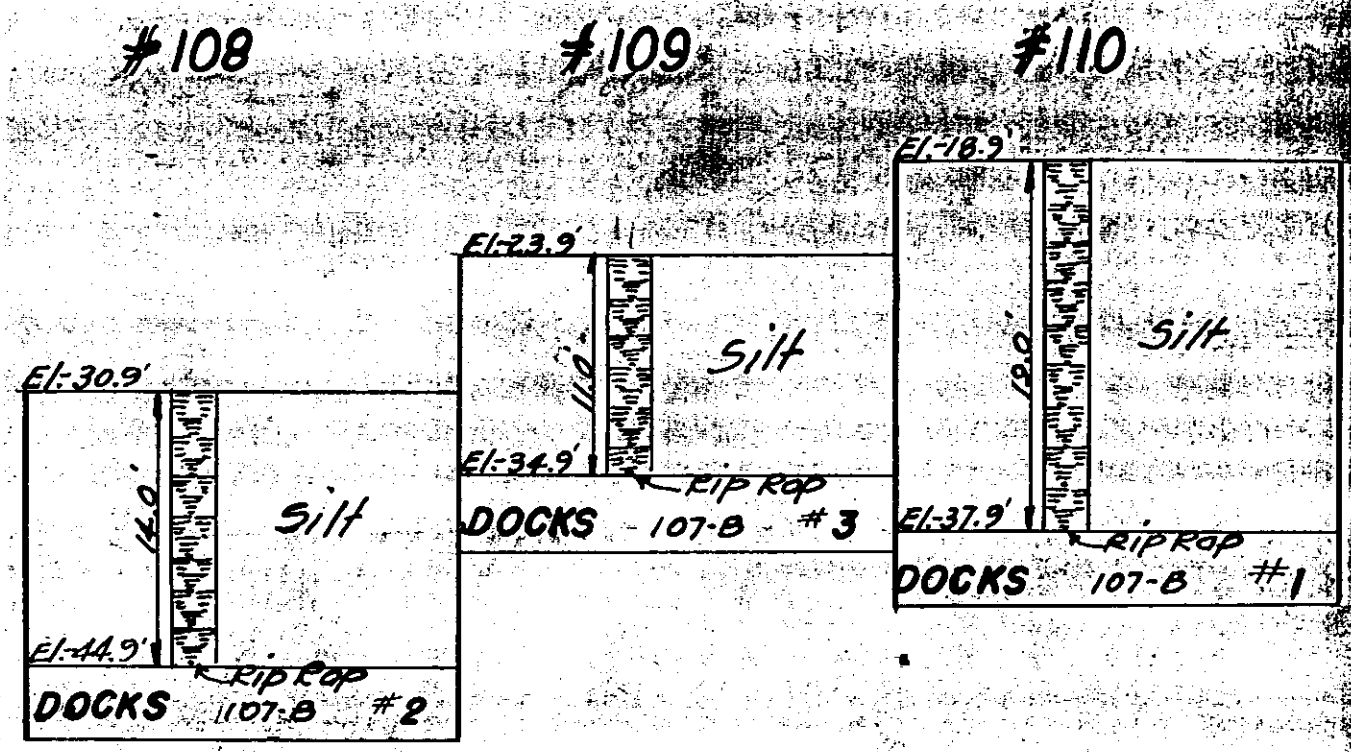
VOL. 2 SH. 10

# #107




ROCK DATA

VOL 2 SH 10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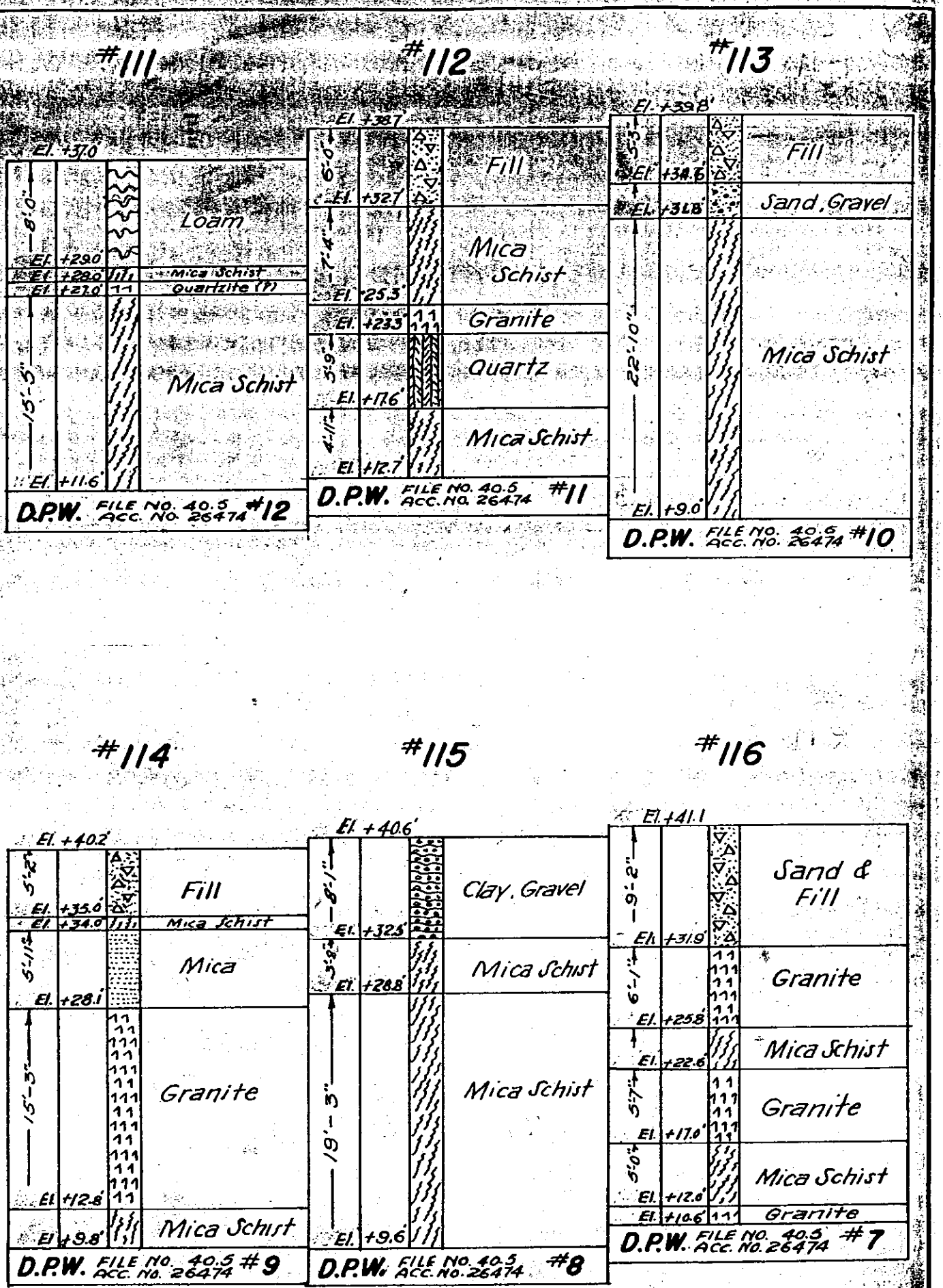
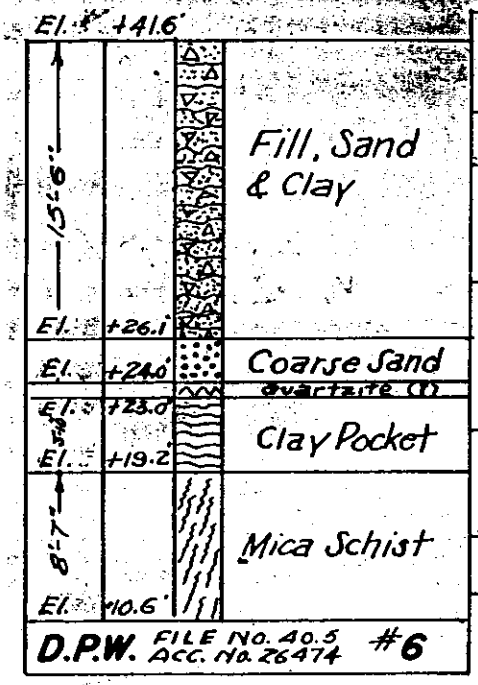
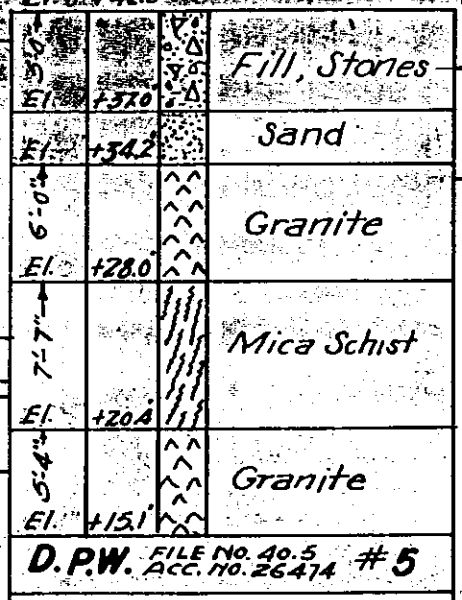
#109
#110
El.-18.9'
El.-23.9'
El.-30.9'
Silt
Silt
Silt
14.0'
11.0'
19.0'
El.-34.9'
El.-37.9'
El.-44.9'
Rip Rap
Rip Rap
Rip Rap
DOCKS 107-B #3
DOCKS 107-B #1
DOCKS 107-B #2

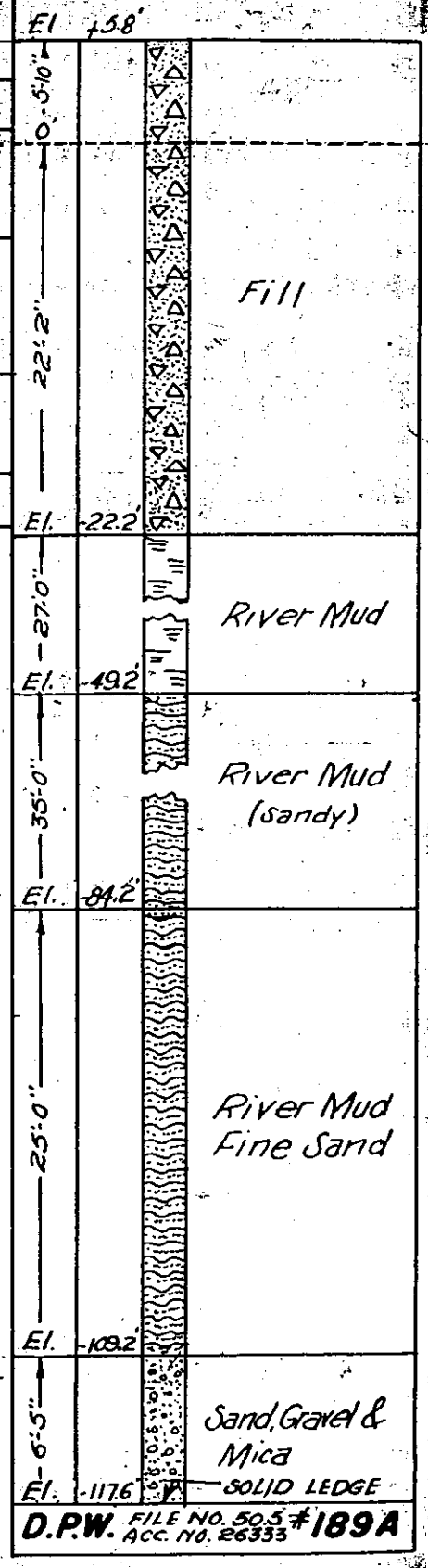


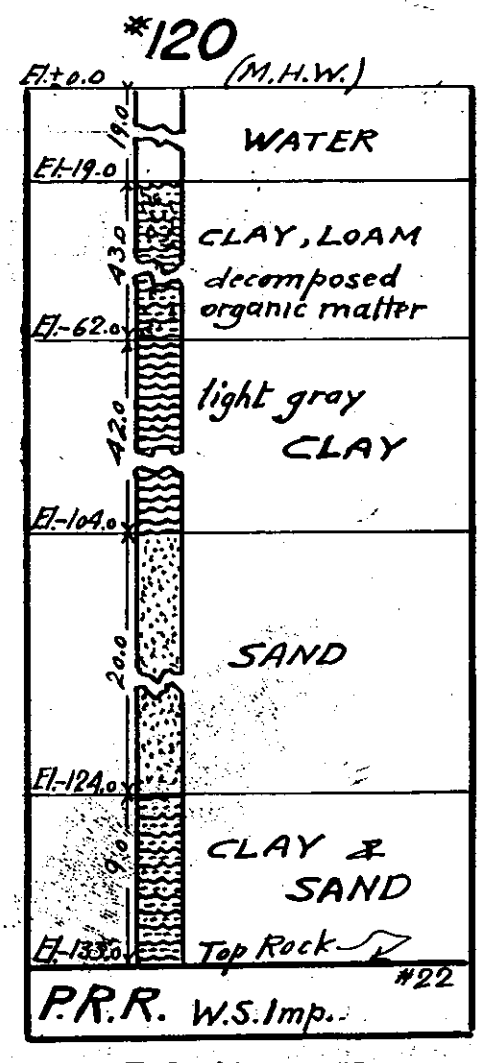

ROCK DATA

VOL. 2 SHEET 10



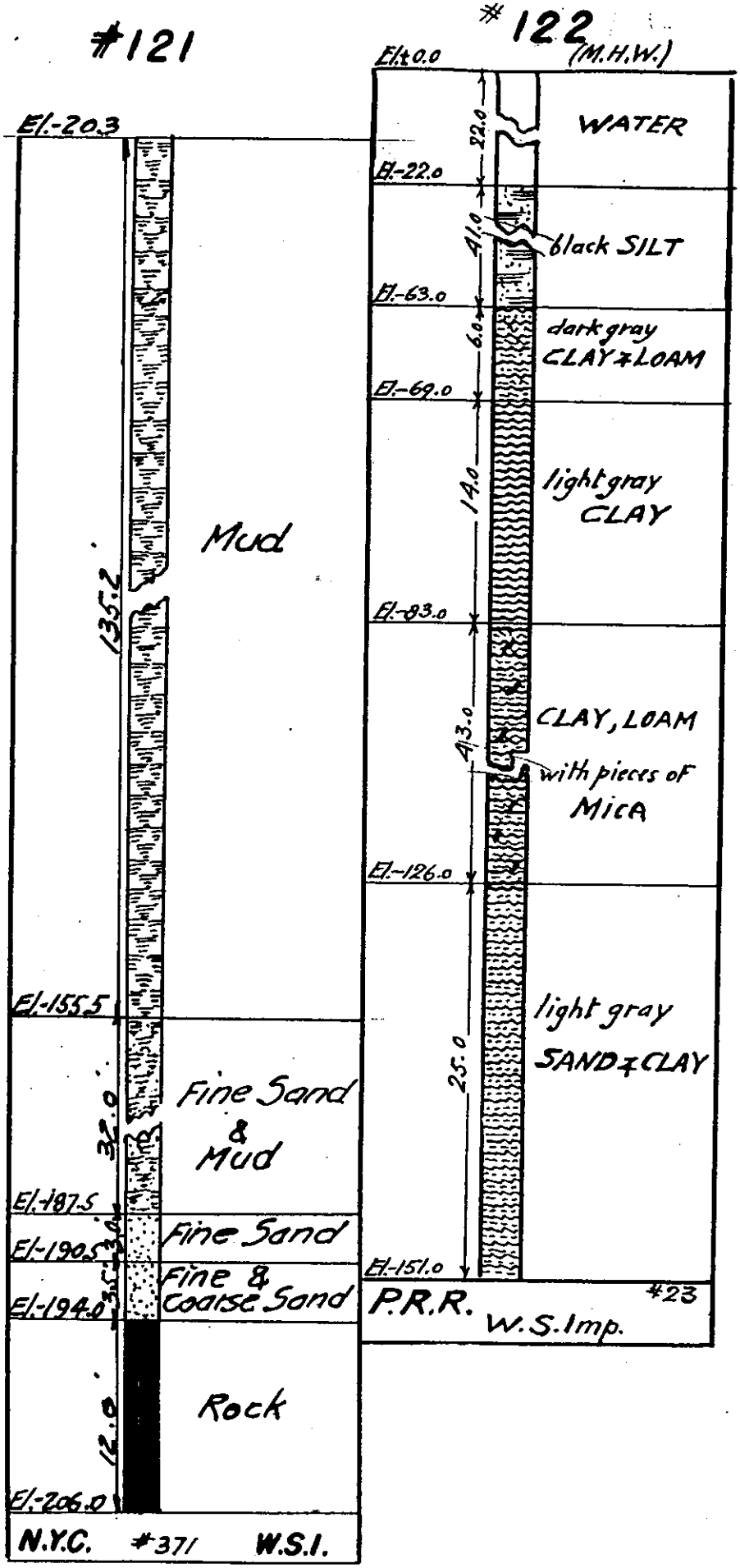



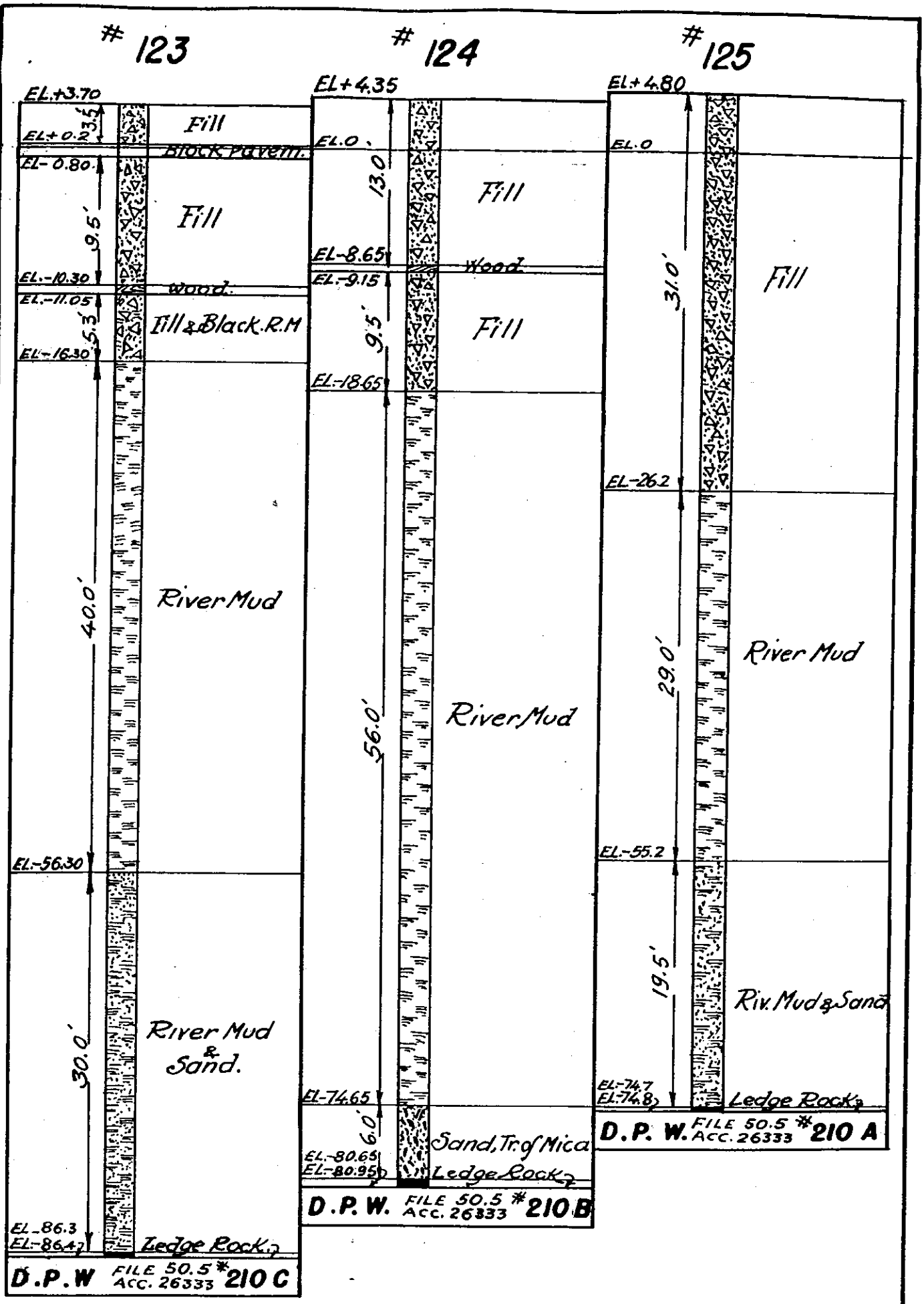

ROCK DATA

VOL. 2 SHEET 10



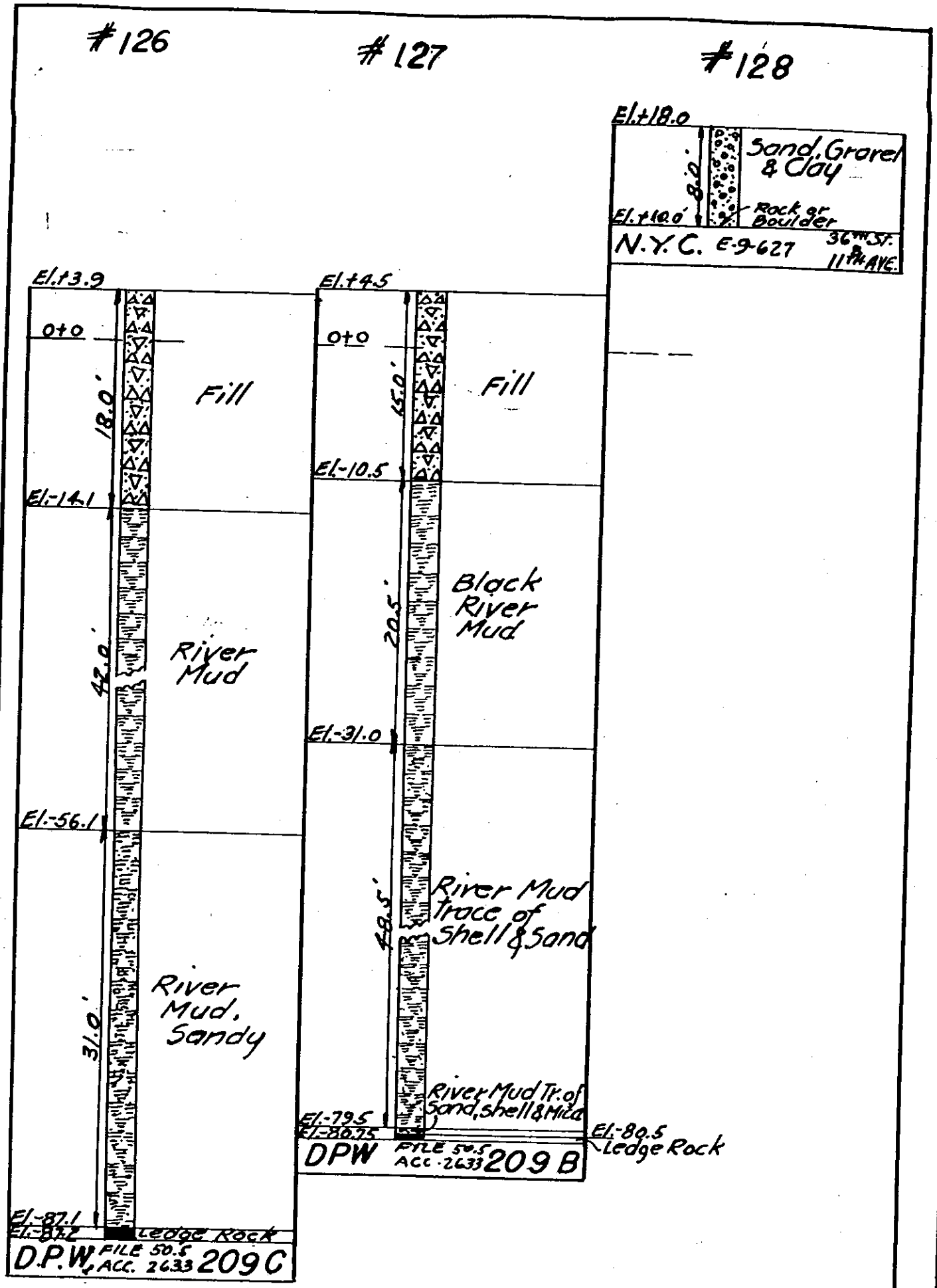

ROCK DATA

VOL. 2 SH 10

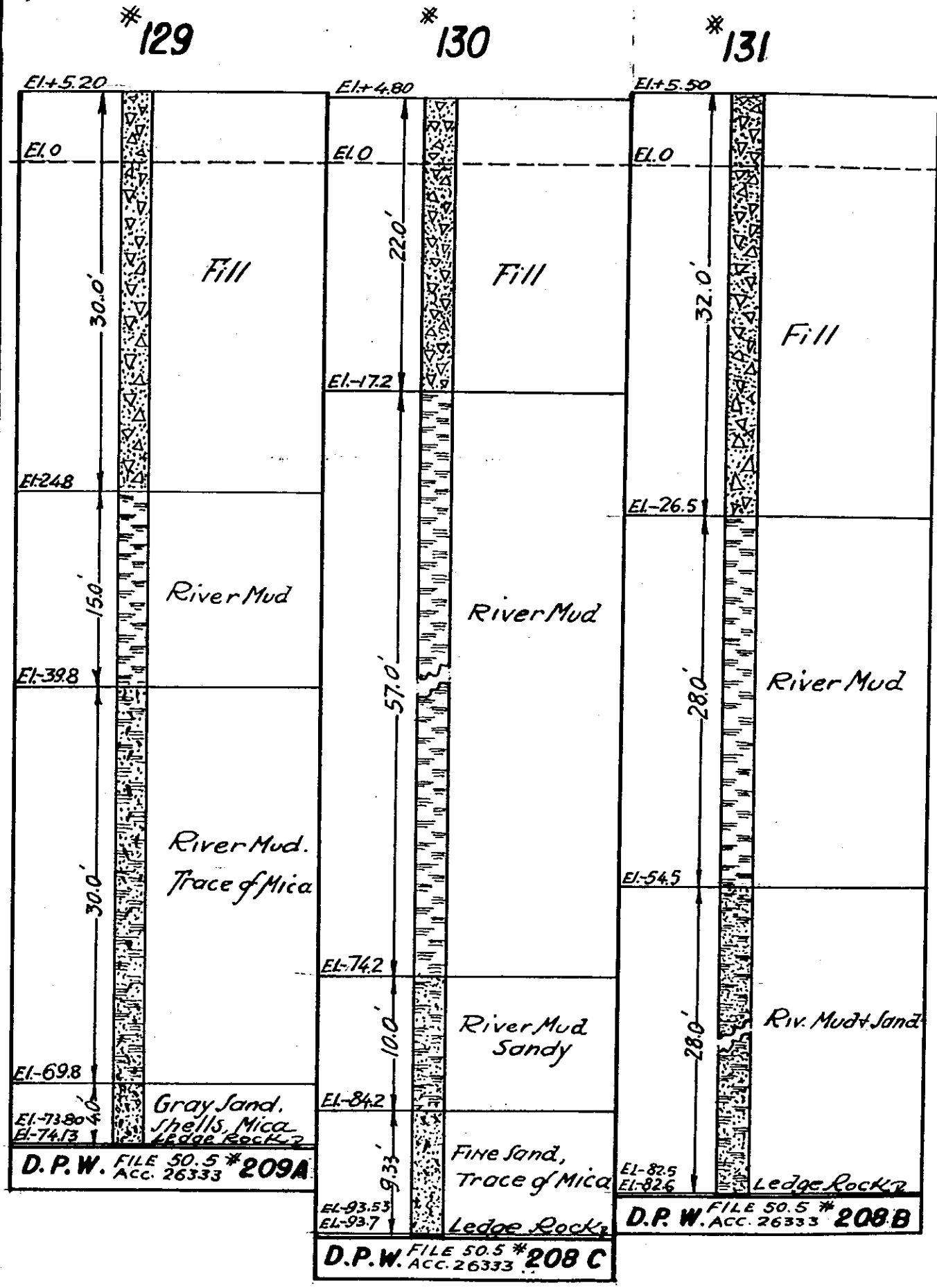



ROCK DATA

VOL. 2 SHEET 10

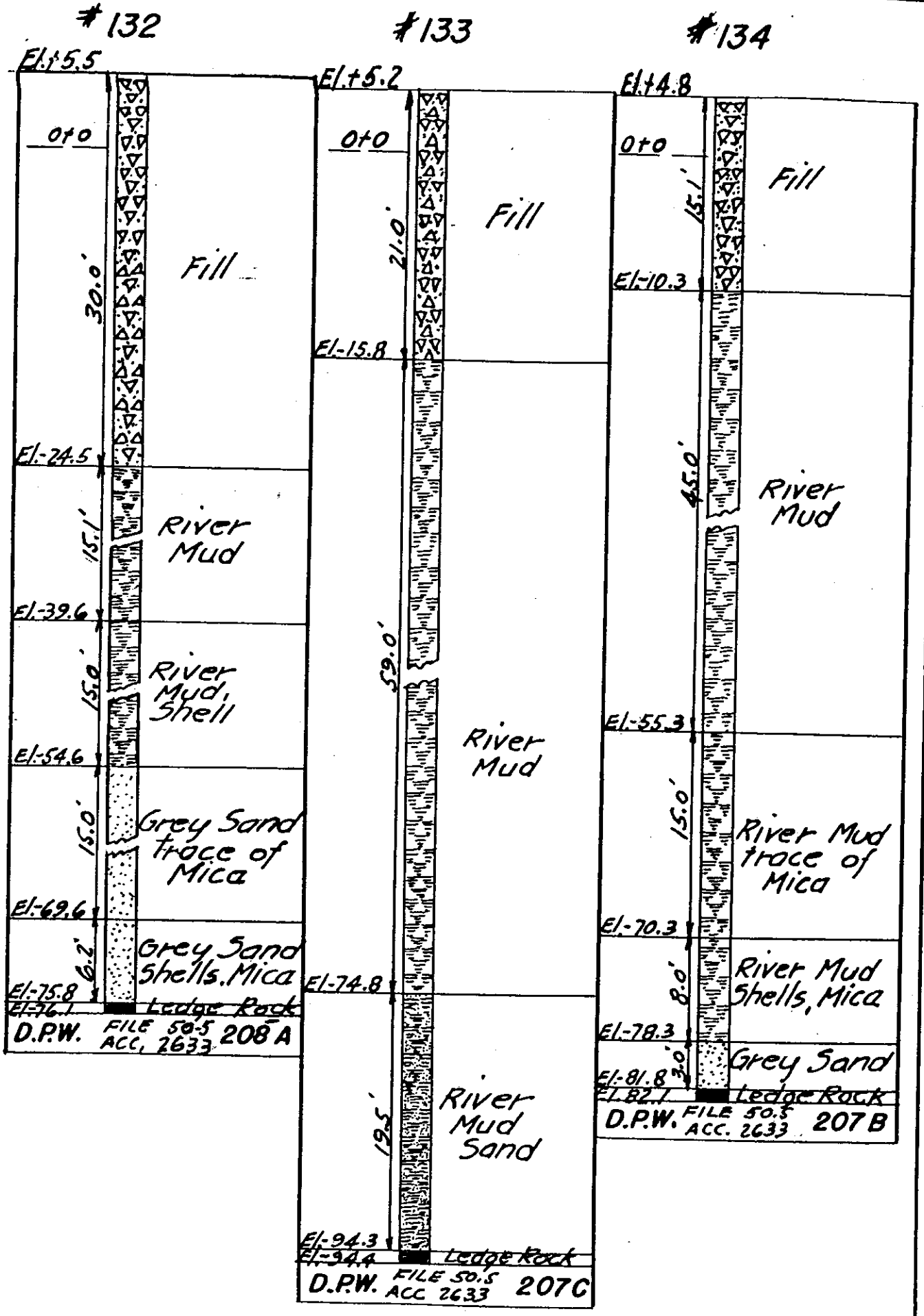

#126
#127
#128
El.+18.0
Sand, Gravel & Clay
8.0'
El.+10.0'
Rock or Boulder
N.Y.C. E-9-627
36th St. & 11th Ave.
El.+3.9
0+0
18.0'
Fill
El.-14.1
42.0'
River Mud
El.-56.1
31.0'
River Mud, Sandy
El.-87.1
El.-87.2
Ledge Rock
D.P.W. FILE 50.5 ACC. 2633 209C
El.+4.5
0+0
15.0'
Fill
El.-10.5
20.5'
Black River Mud
El.-31.0
49.5'
River Mud Trace of Shell & Sand
River Mud Tr. of Sand, Shell & Mica
El.-79.5
El.-80.75
El.-80.5
Ledge Rock
DPW FILE 50.5 ACC. 2633 209 B
ROCK DATA
VOL. 2 SH. 10

Ch. Levin



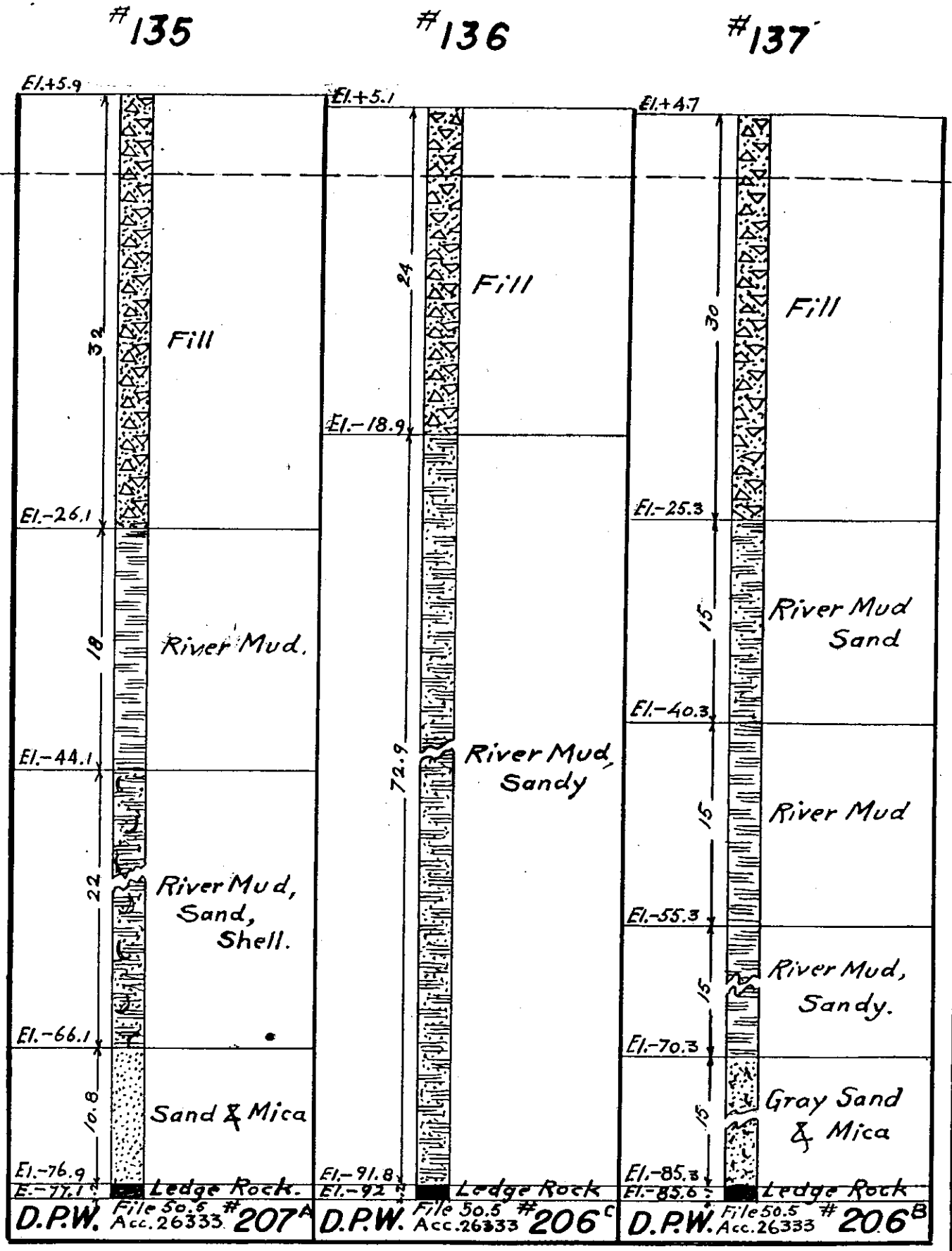

ROCK DATA

VOL. 2 SHEET 10




ROCK DATA

VOL. 2 SH. 10

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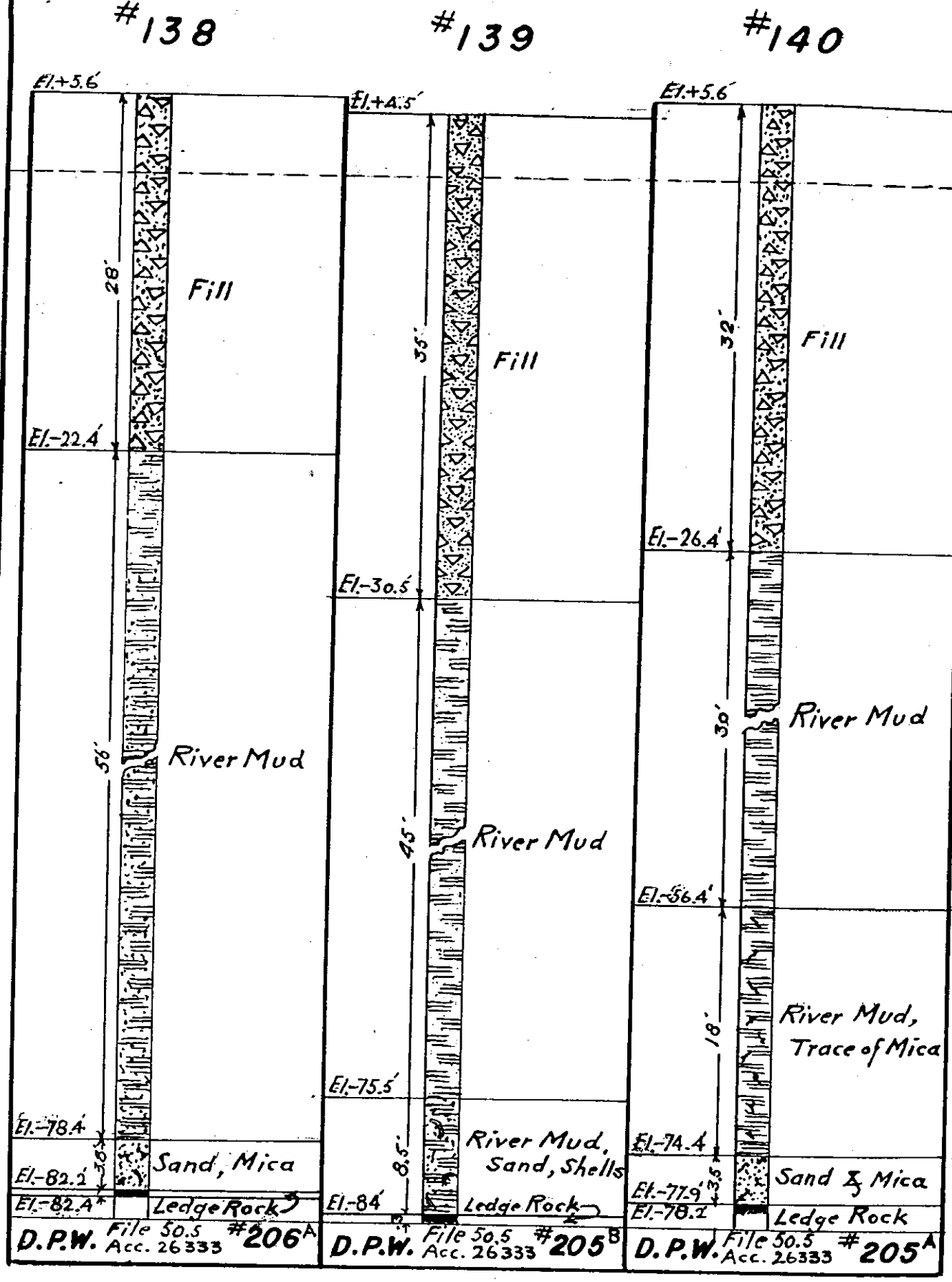
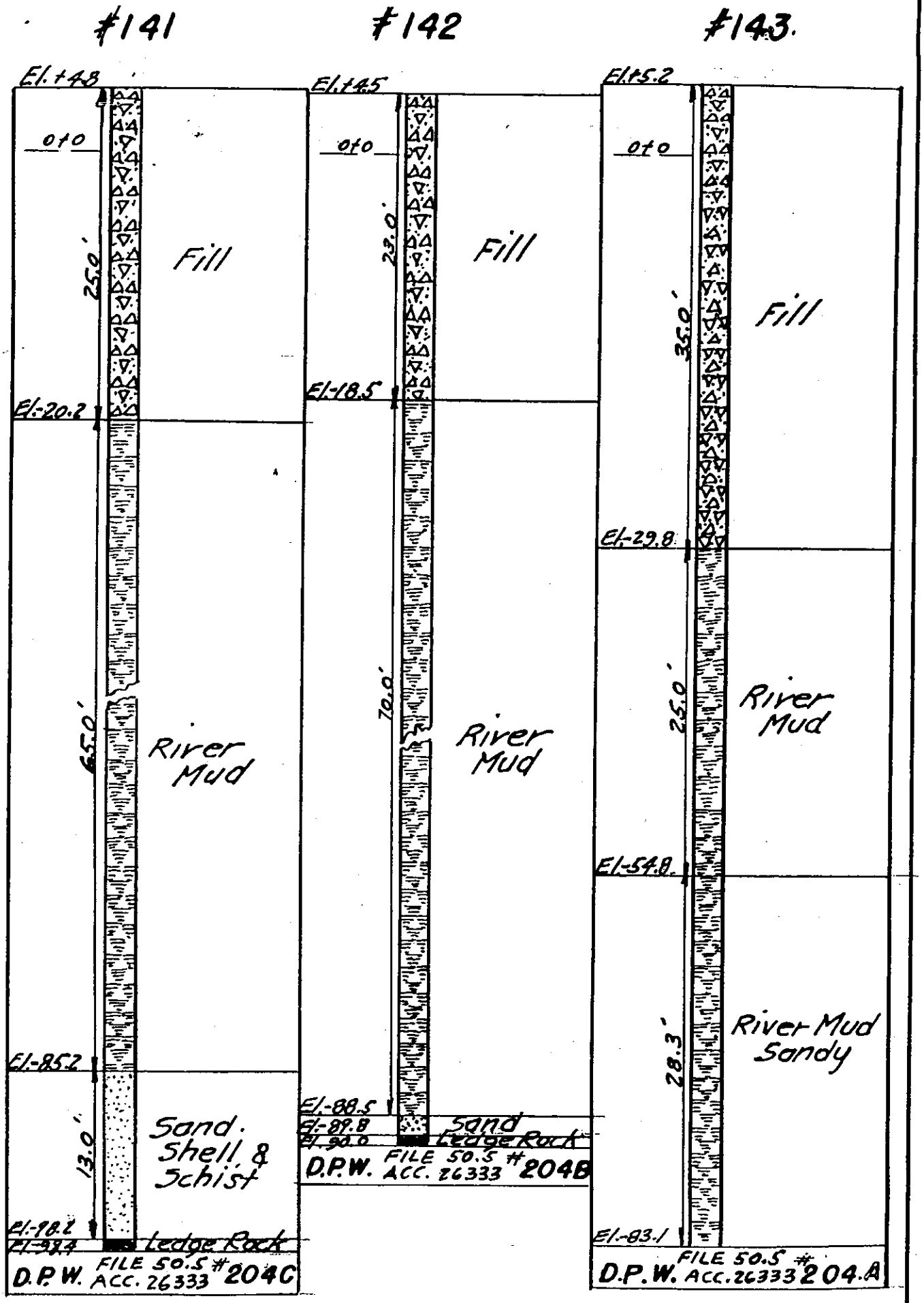
VOL. 2 SHEET #10



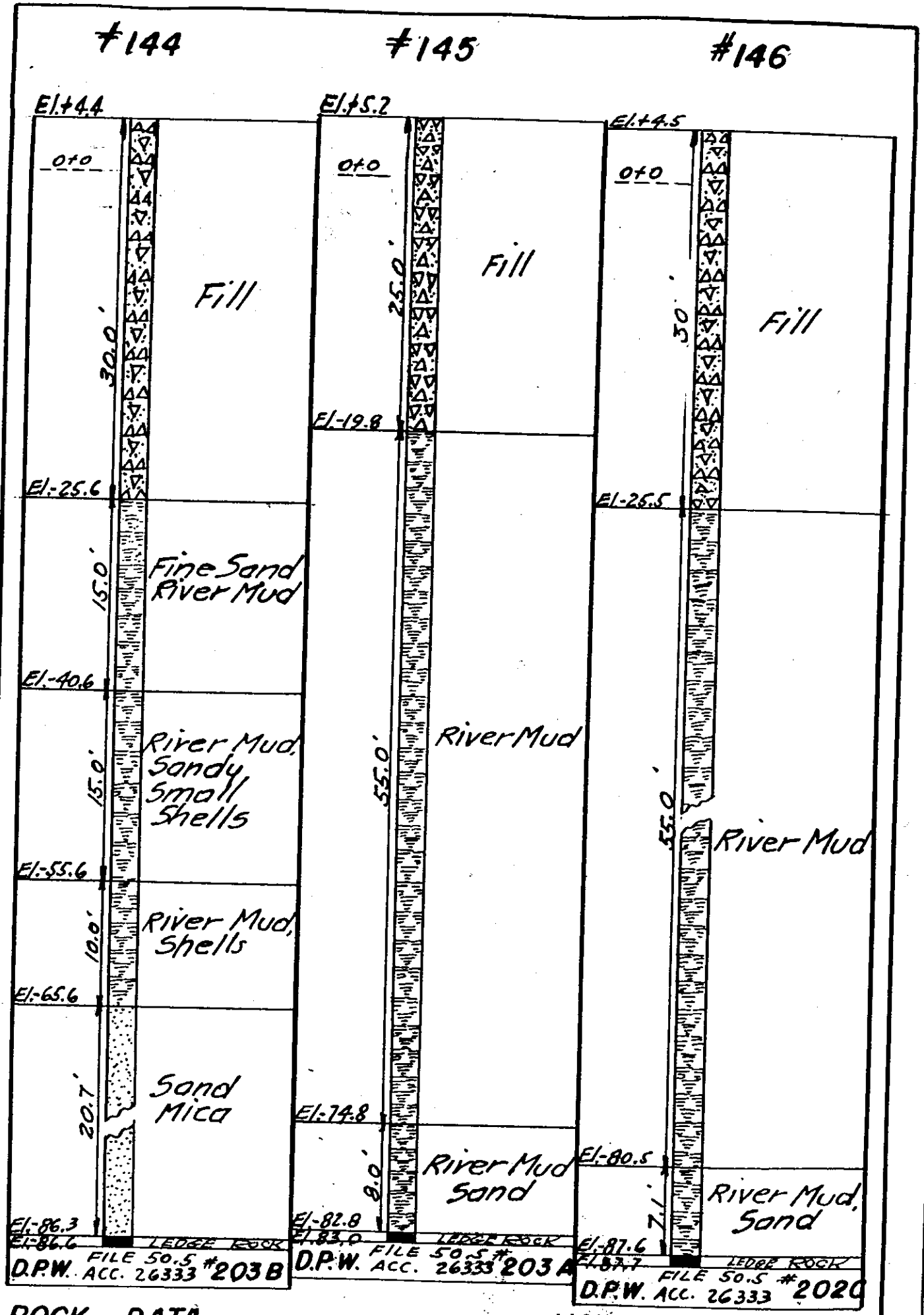

ROCK DATA

VOL. 2 SHEET 10



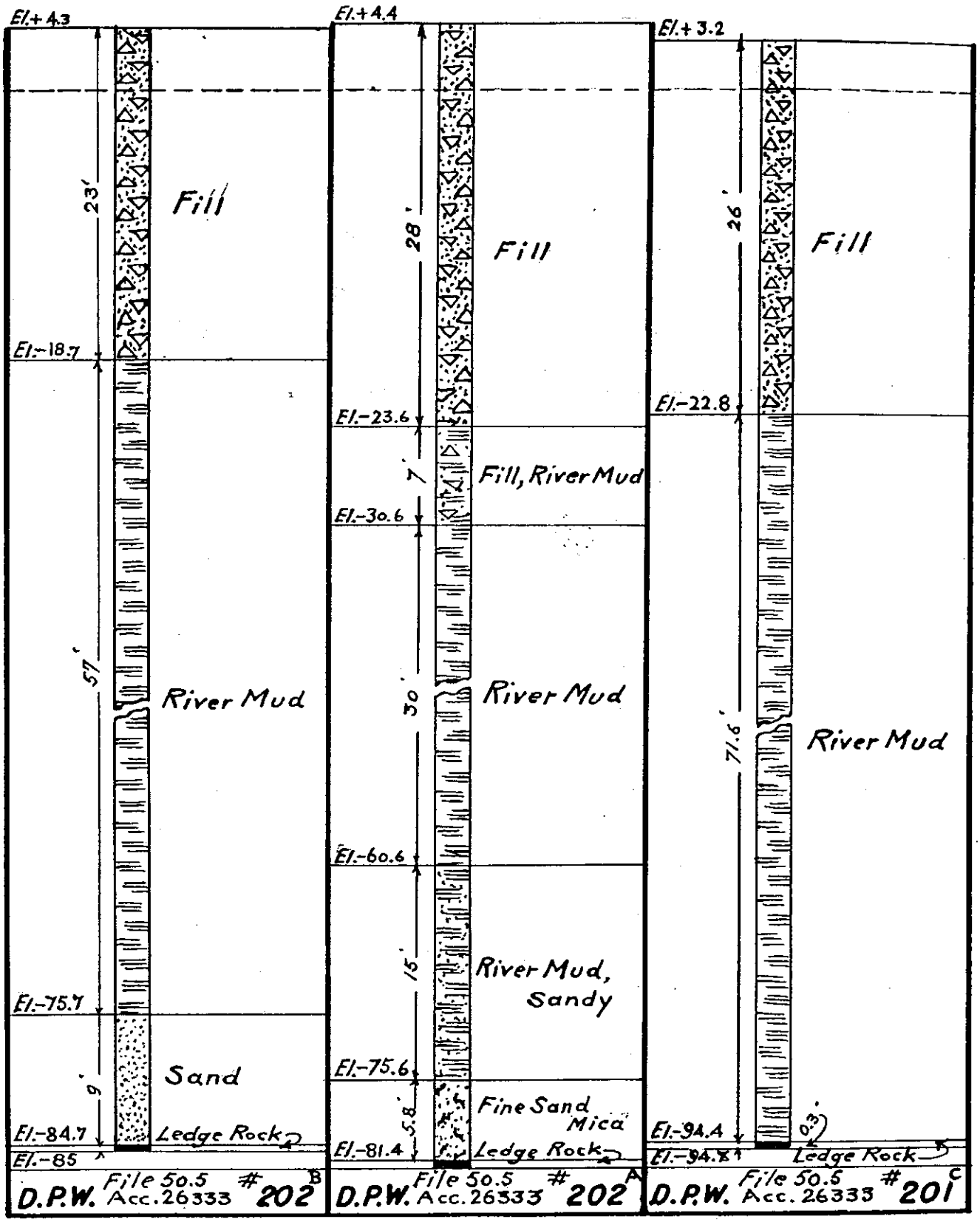

ROCK DATA

VOL. 2 SH. 10



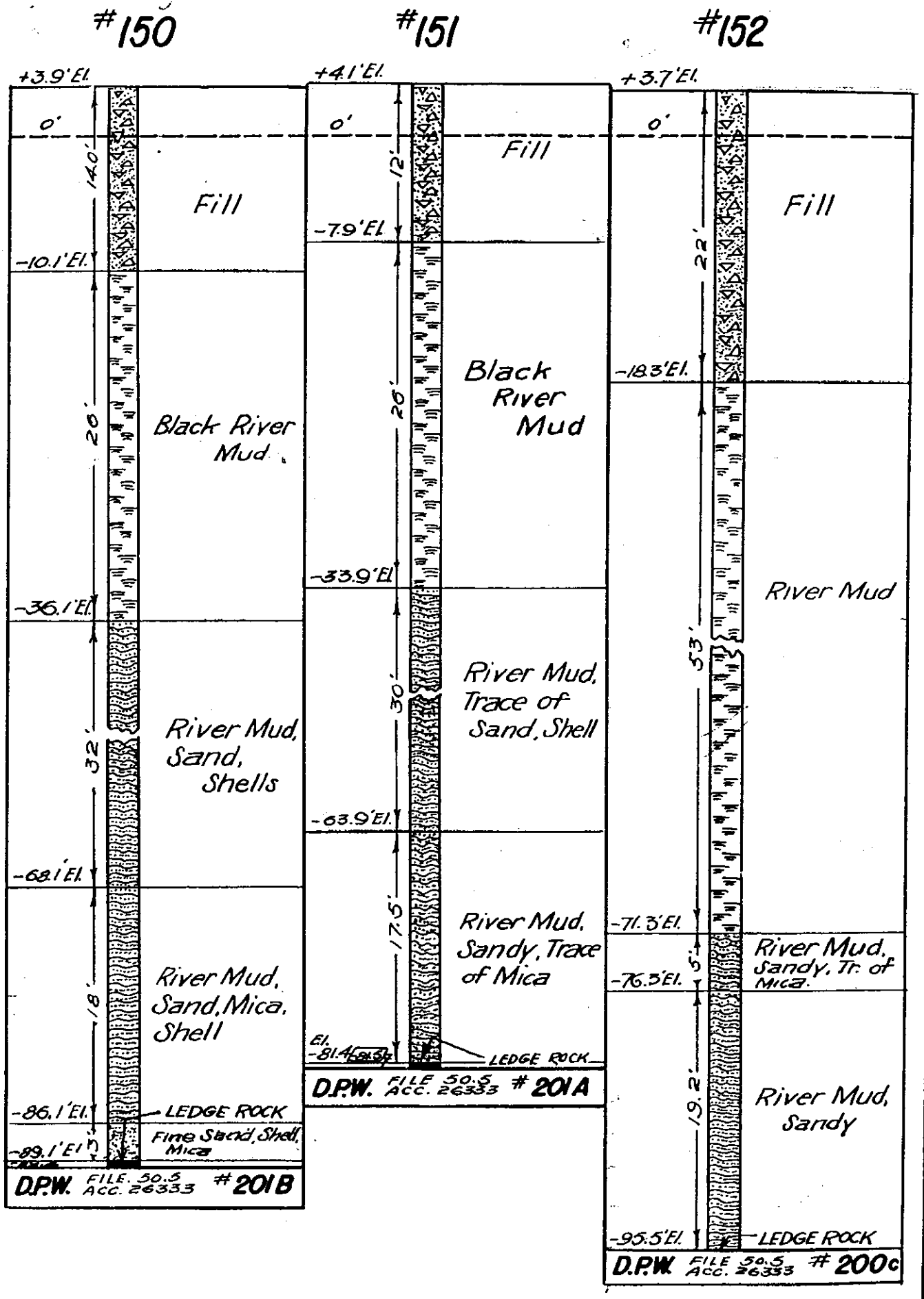

ROCK DATA

VOL. 2 SH. 10



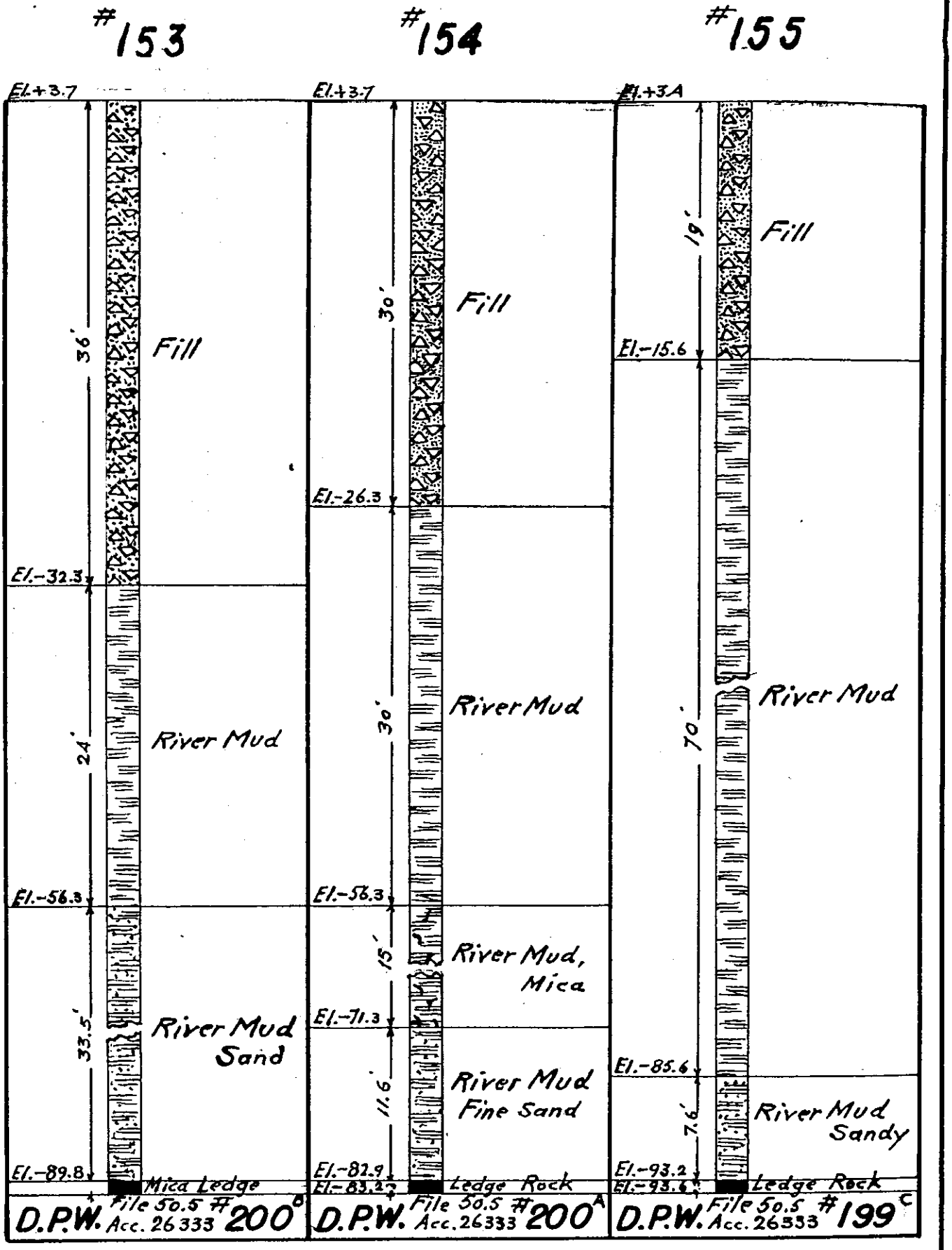

ROCK DATA

VOL. 2 SHEET #10




ROCK DATA

VOL. 2 SHEET 10

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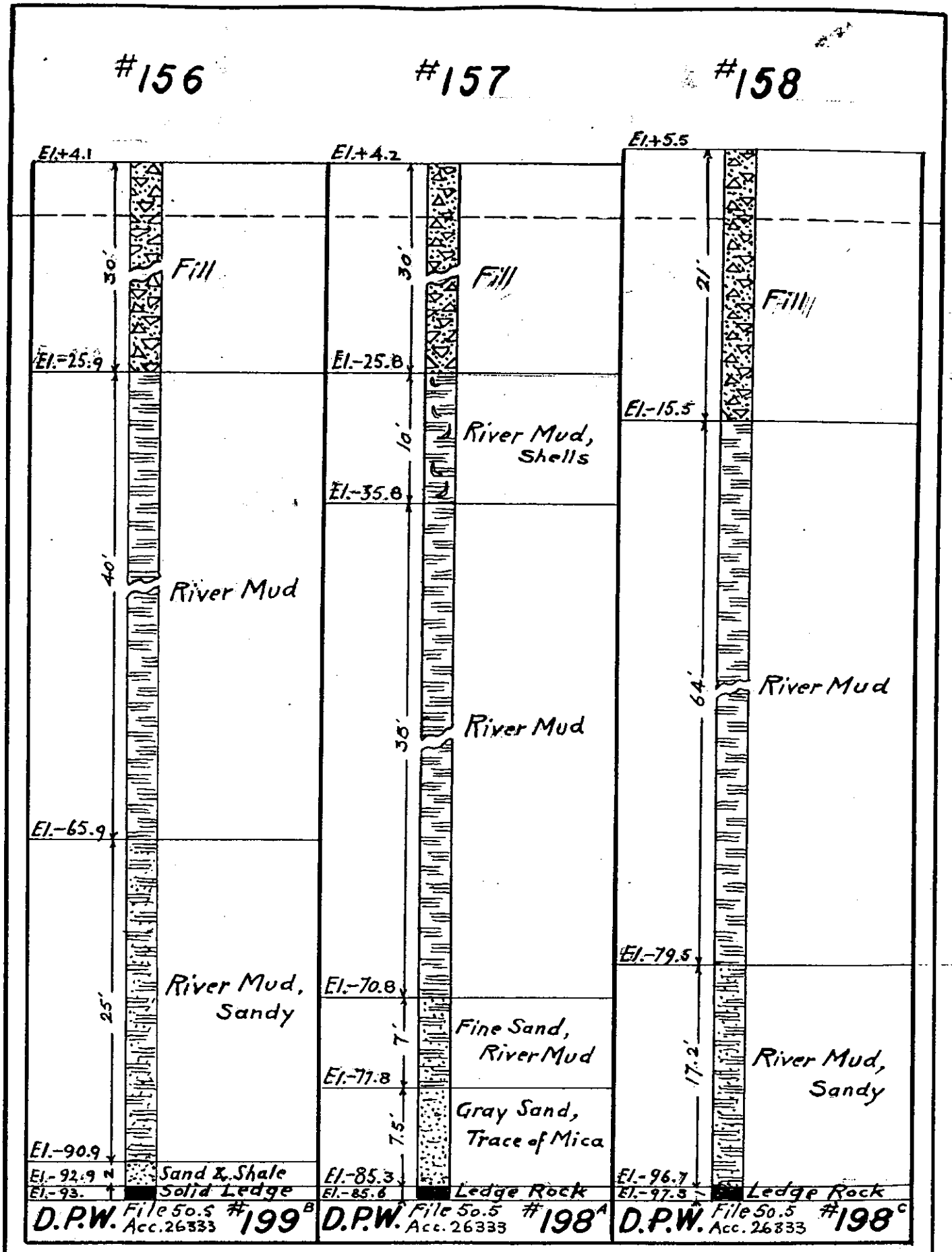
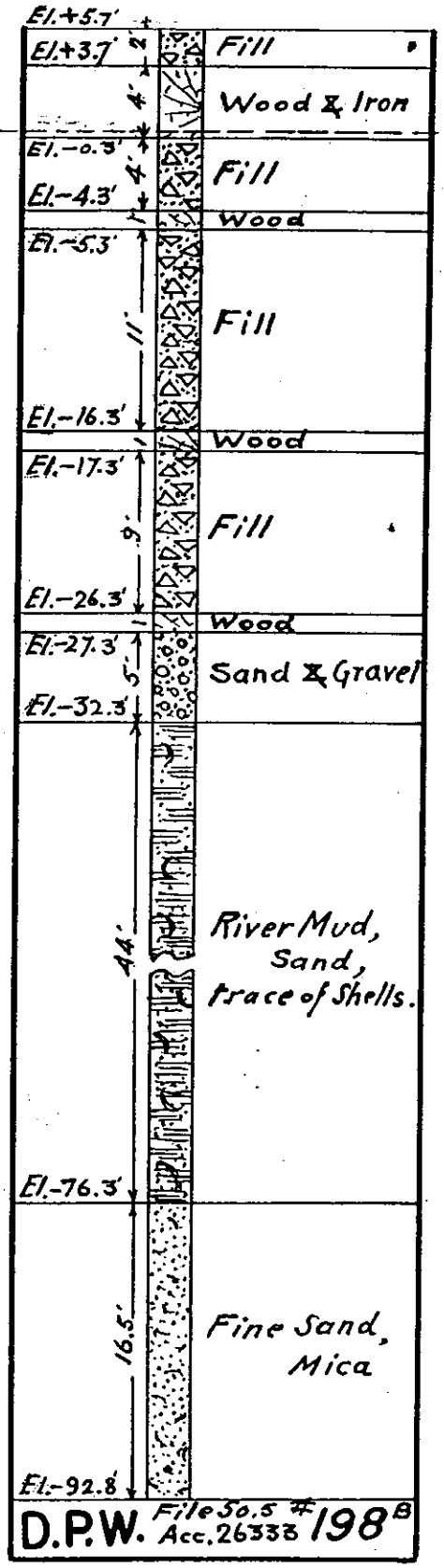
VOL. 2 SHEET 10




ROCK DATA

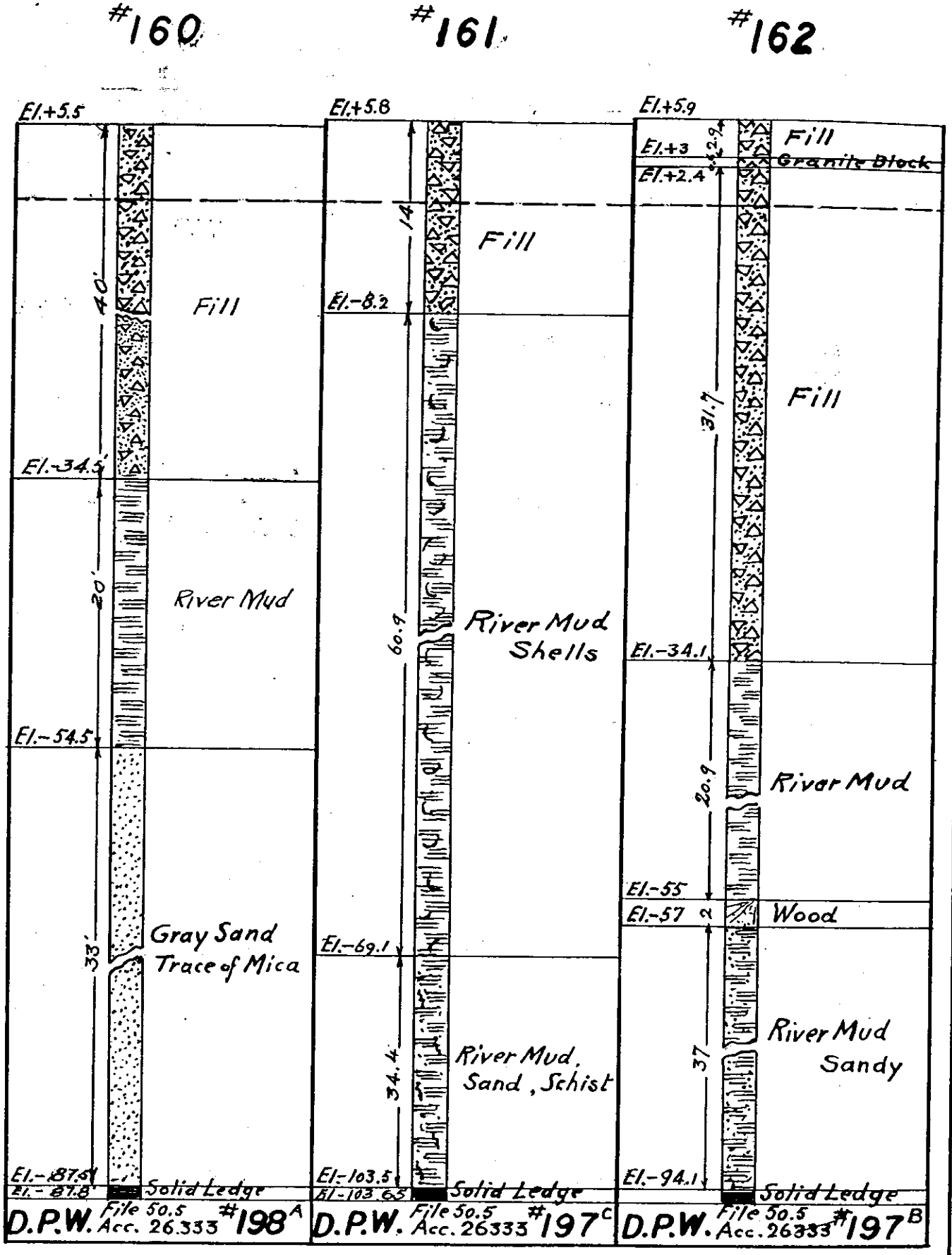
VOL. 2 SHEET #10

#159

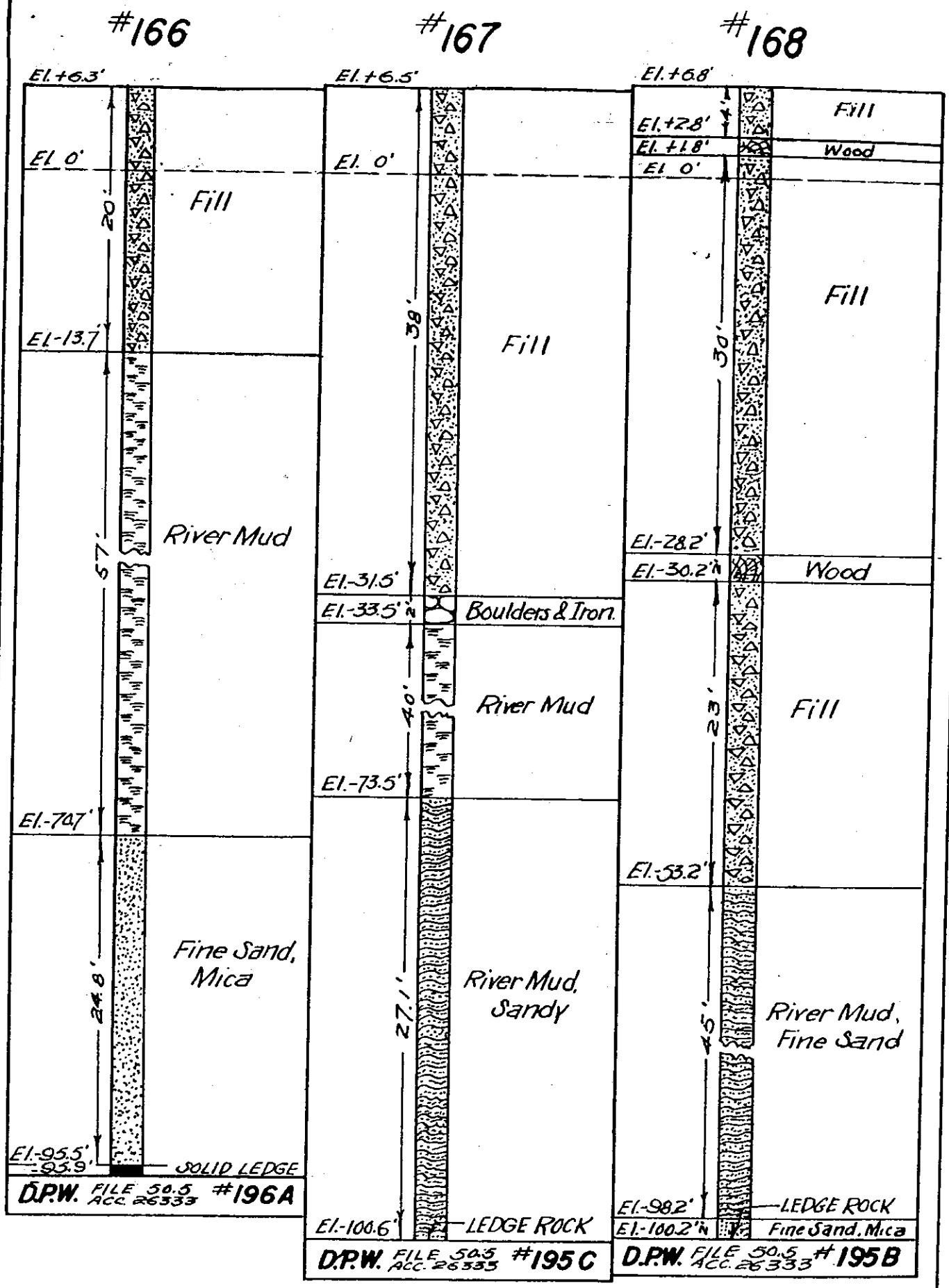



ROCK DATA

VOL. 2 SHEET #10




ROCK DATA VOL. 2 SHEET 10

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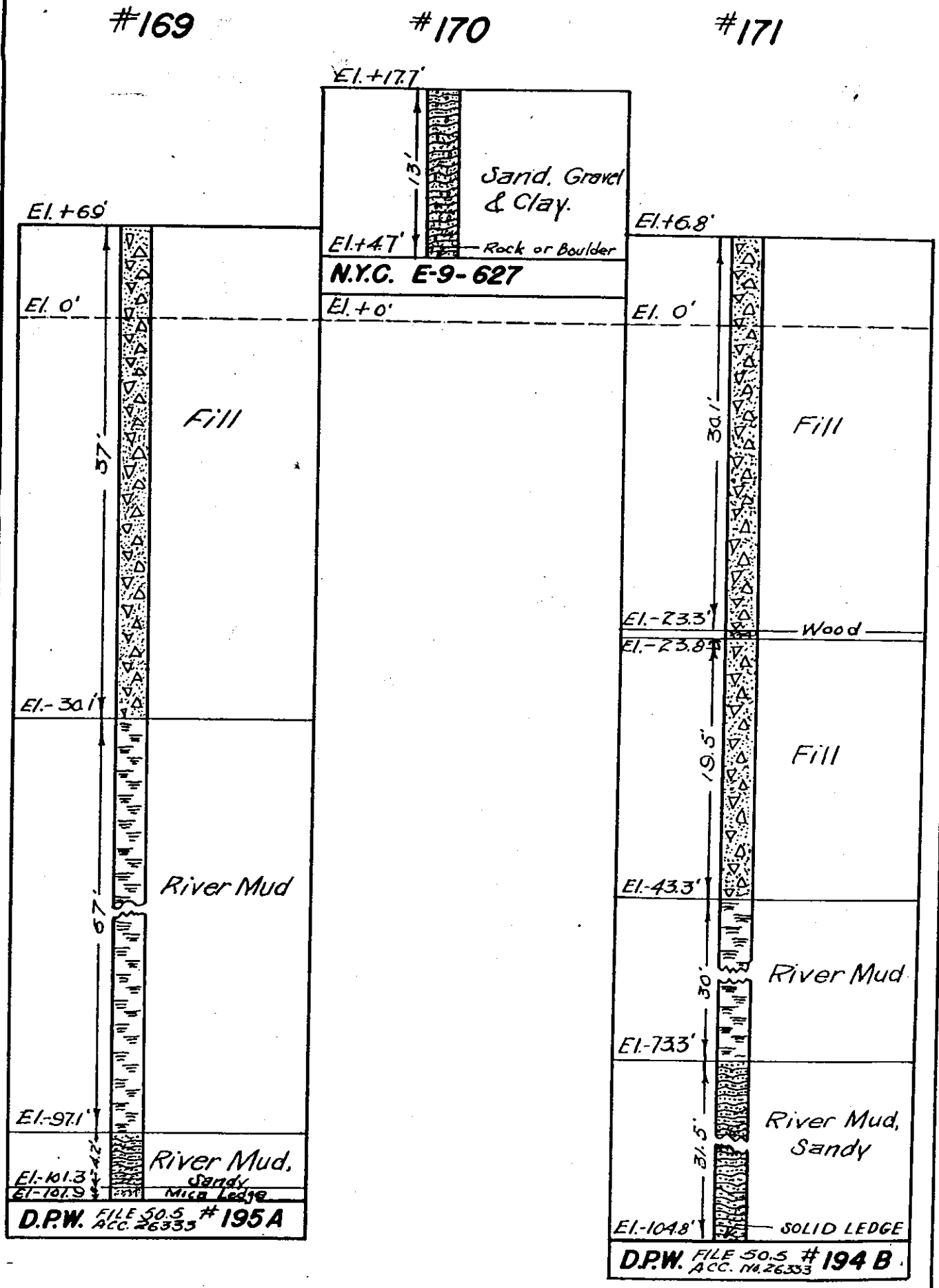
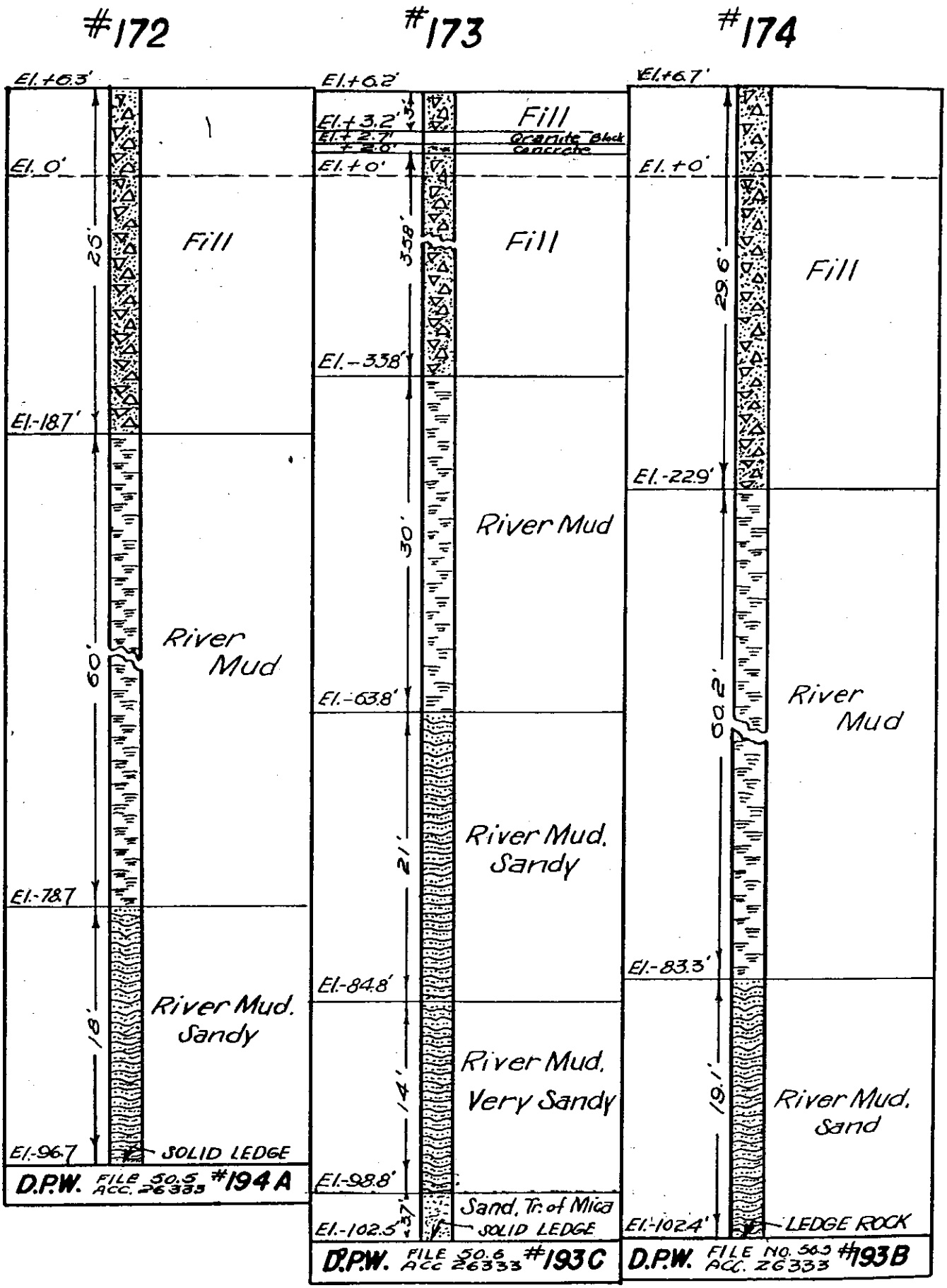
VOL. 2 SHEET 10



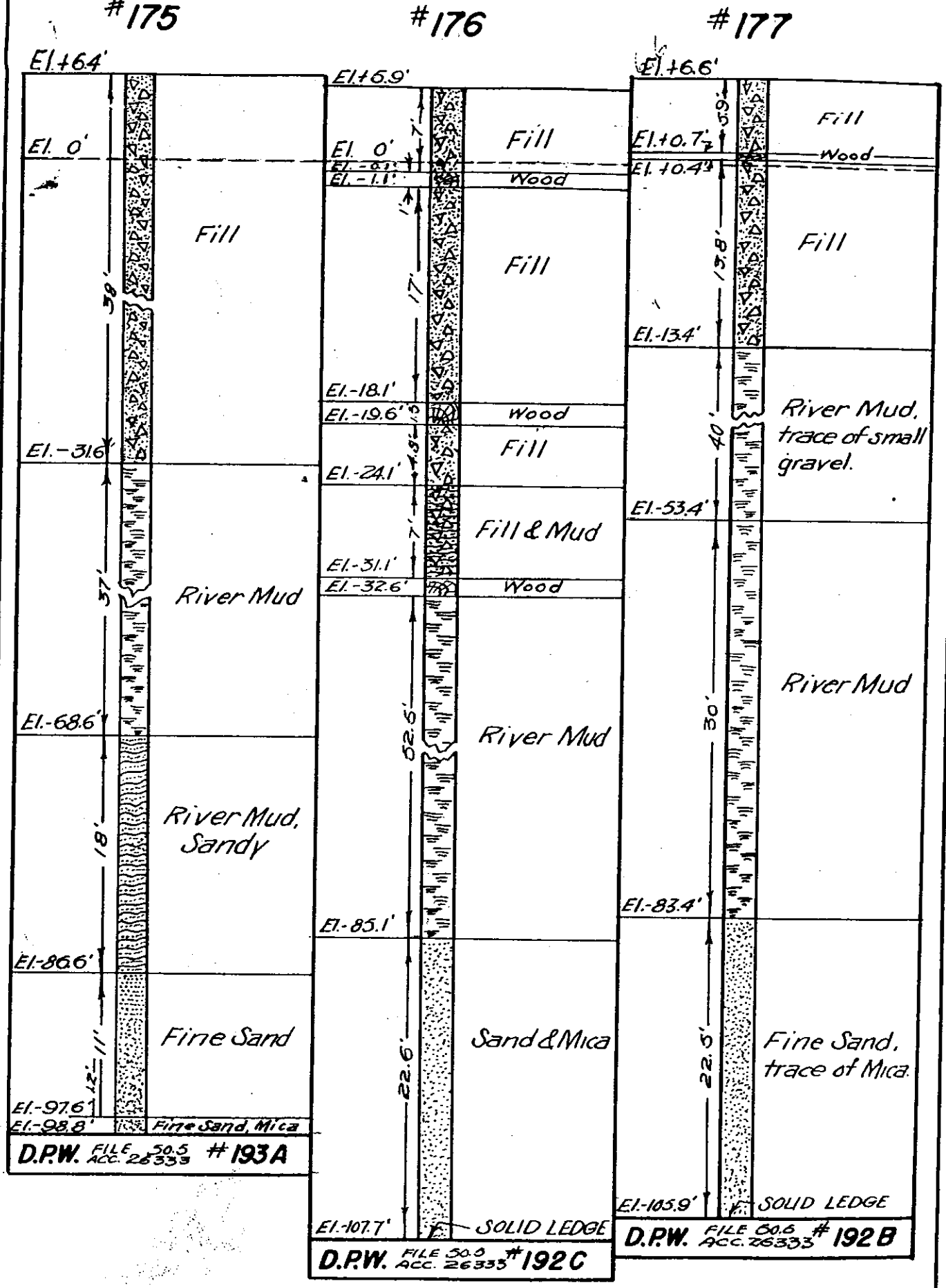

ROCK DATA

VOL. 2 SHEET 10



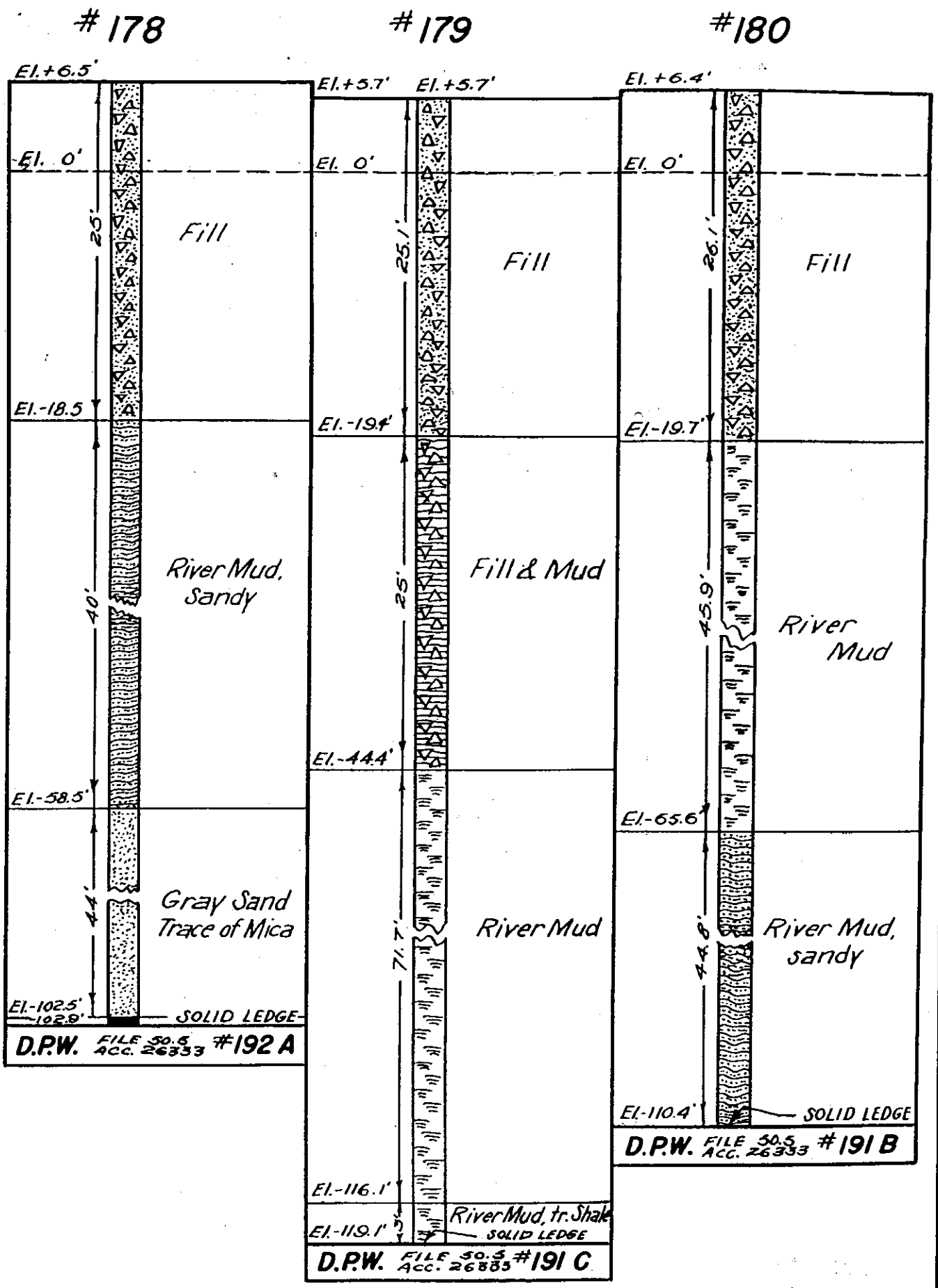

ROCK DATA

VOL. 2 SHEET 10



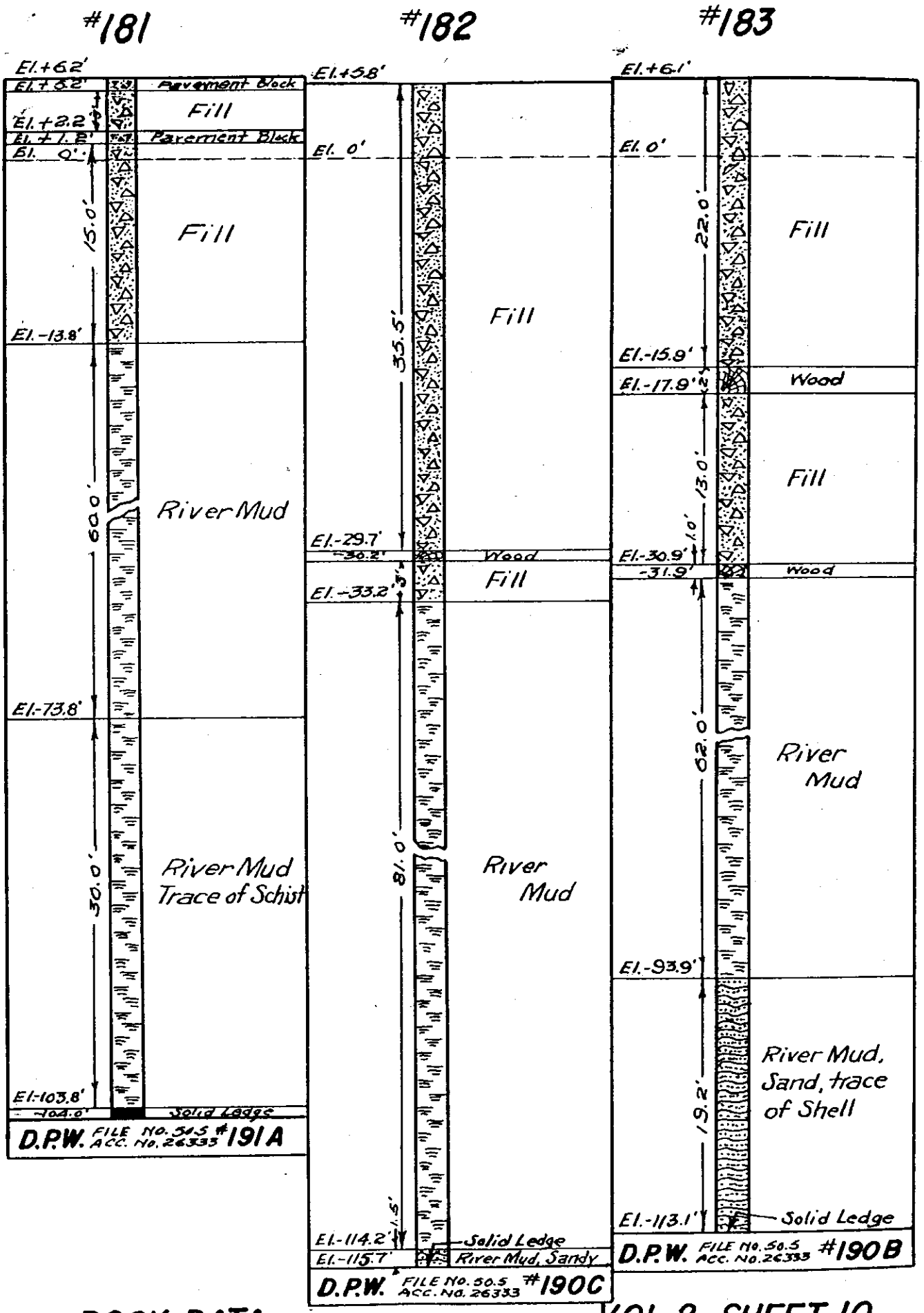

ROCK DATA

VOL.2 SHEET 10



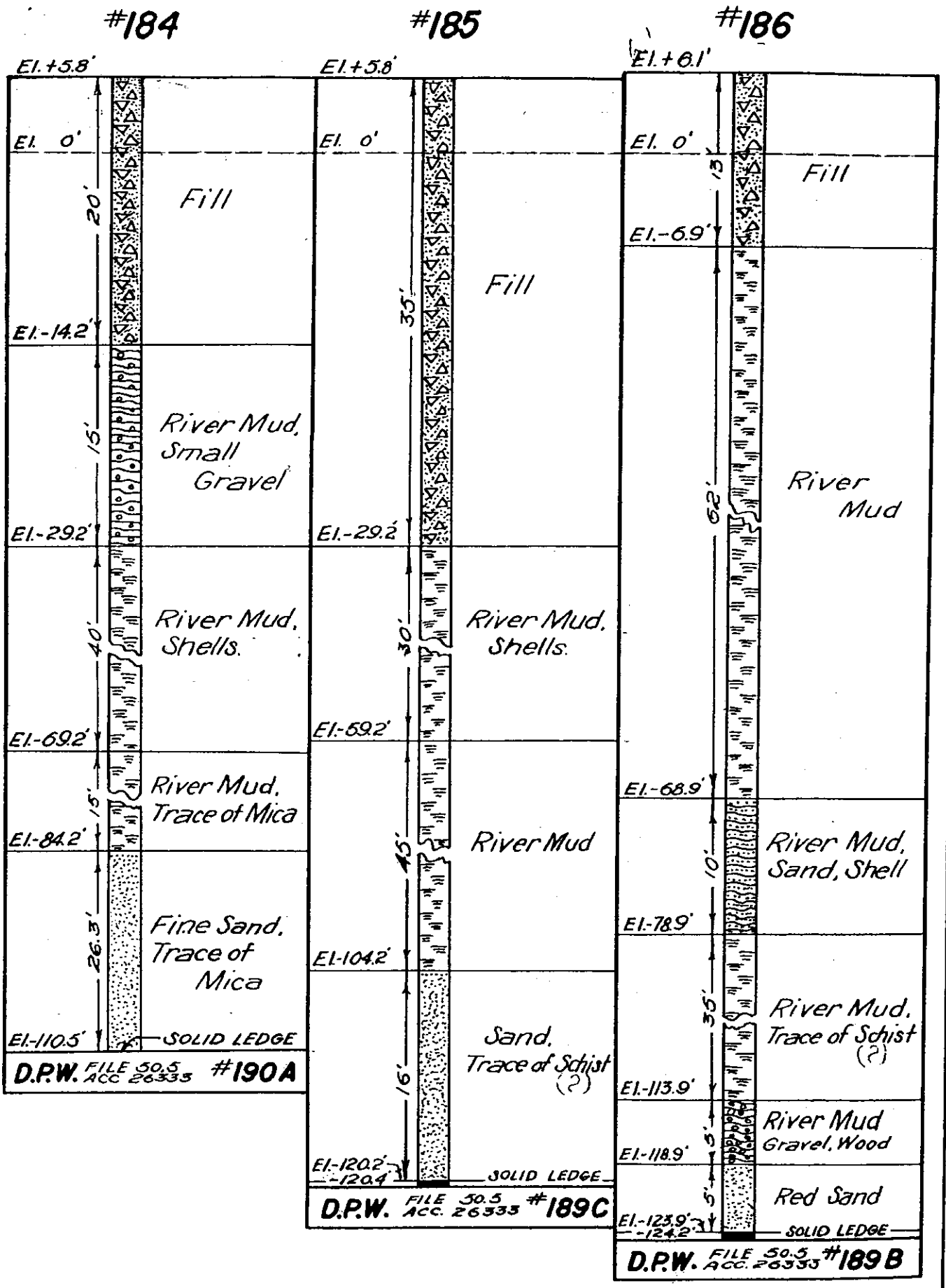

ROCK DATA

VOL.2 SHEET 10



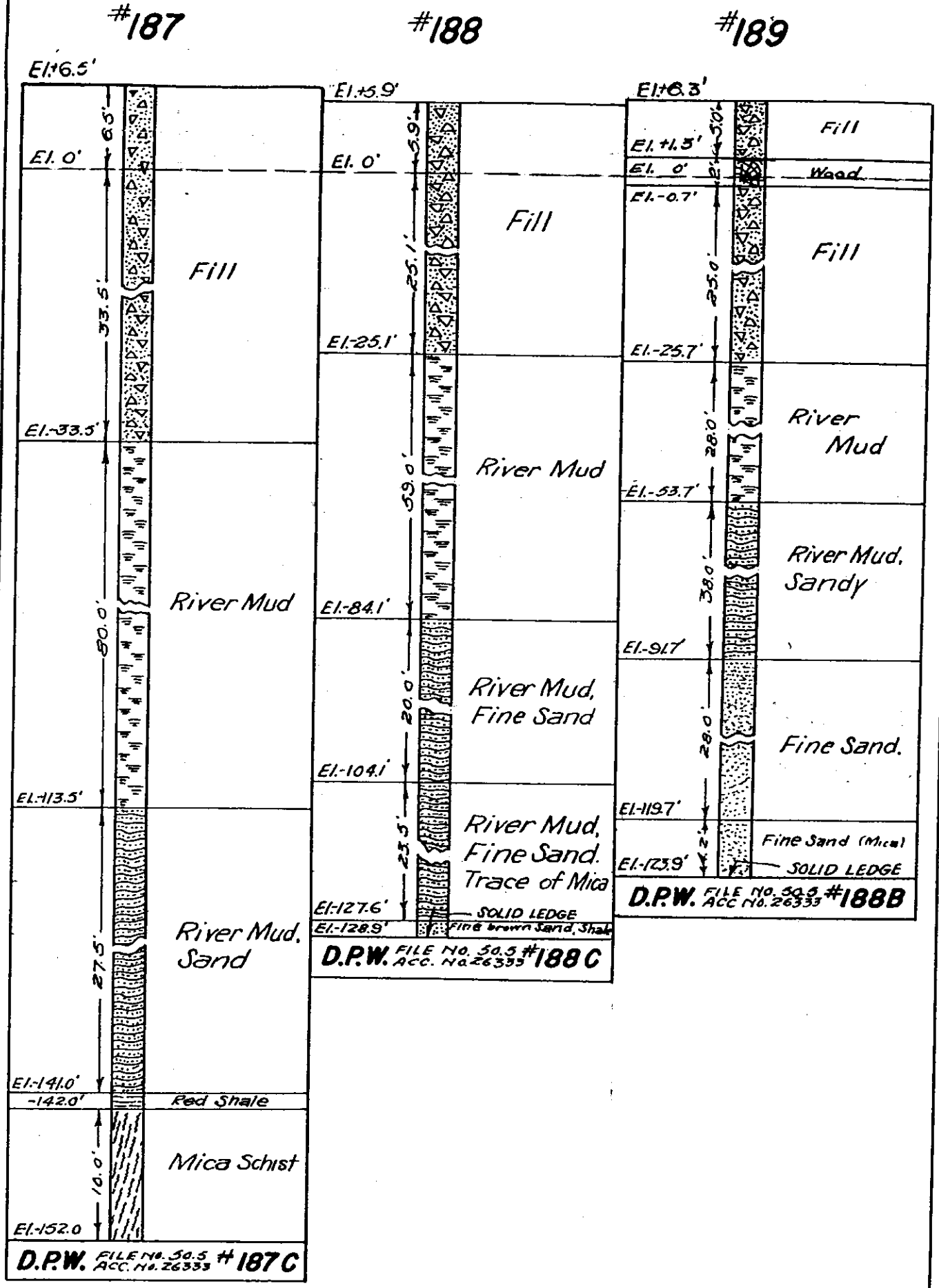

ROCK DATA

VOL. 2 SHEET 10




ROCK DATA

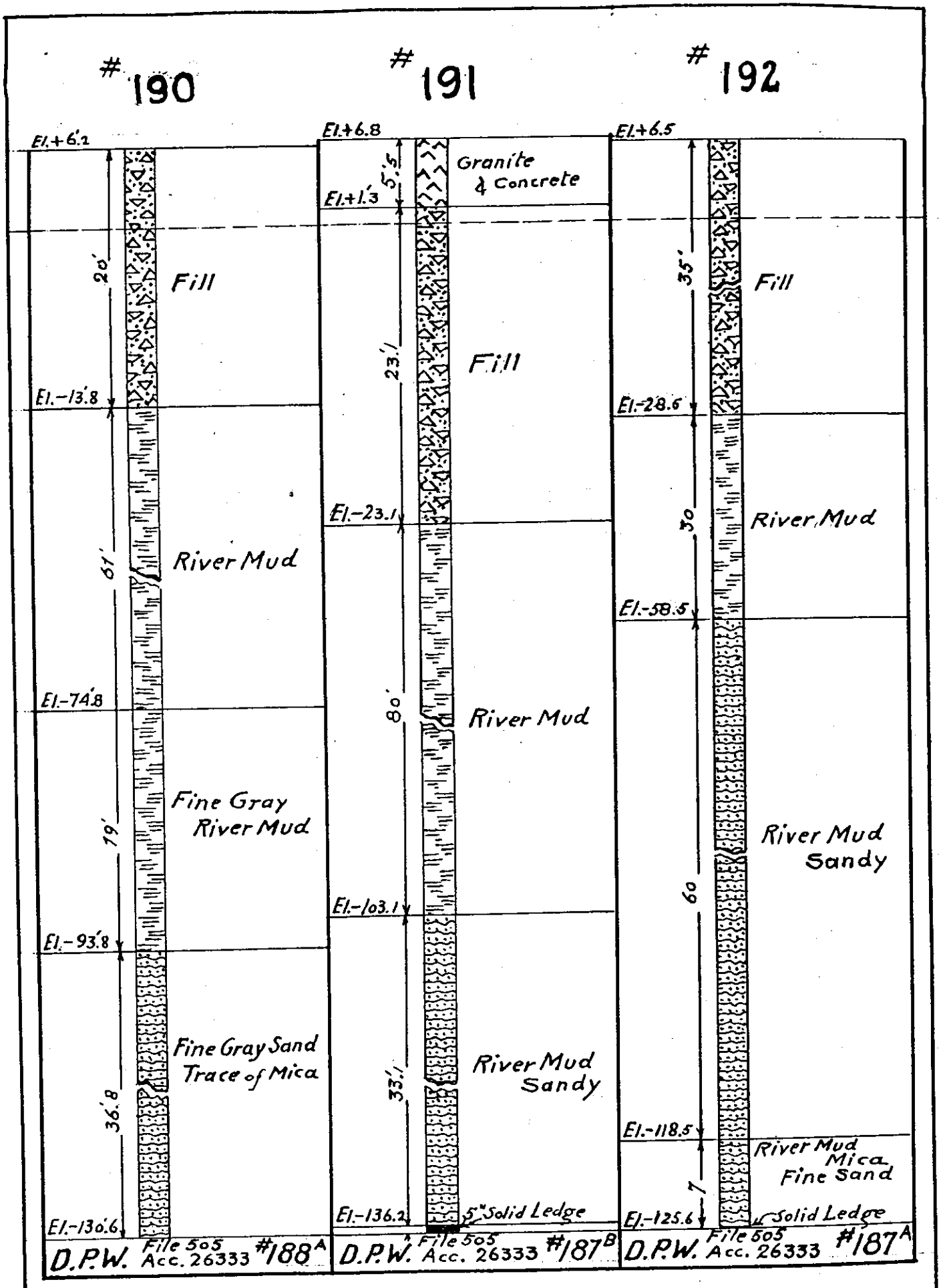
VOL.2 SHEET 10




ROCK DATA

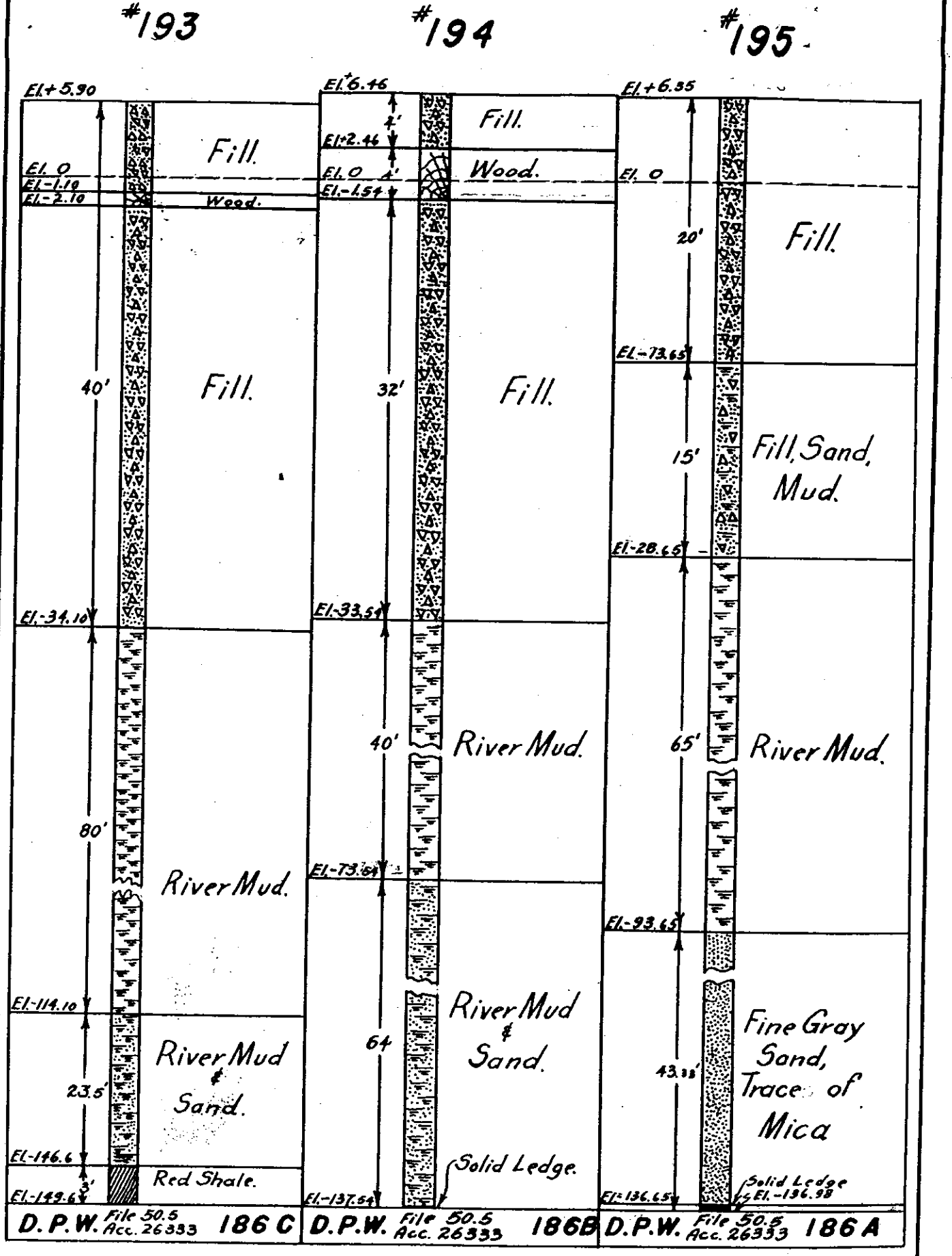
VOL. 2 SHEET 10

Transcribed by [illegible] 2-27-34.



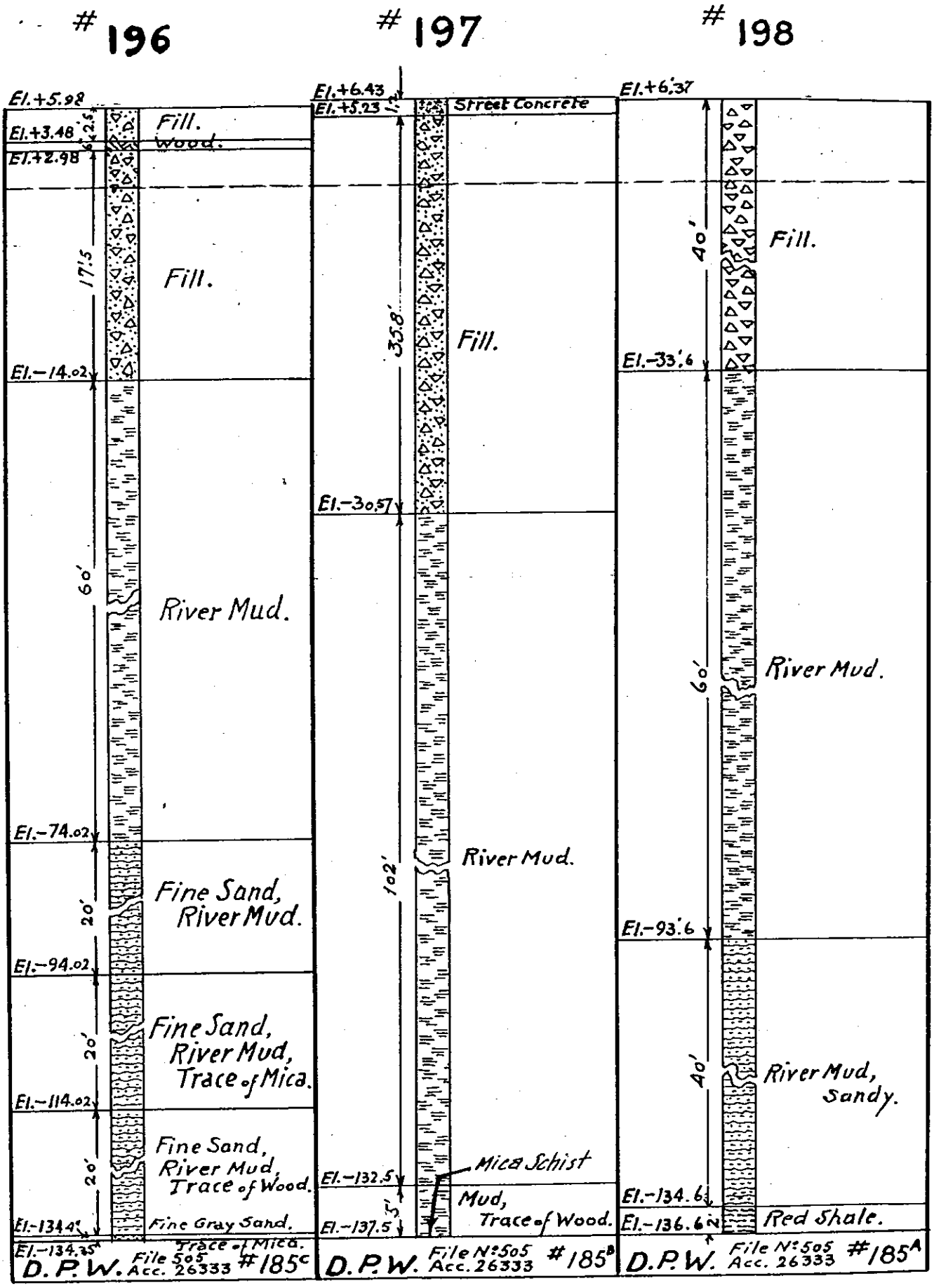

ROCK DATA

VOL. 2 SHEET 10.




ROCK DATA

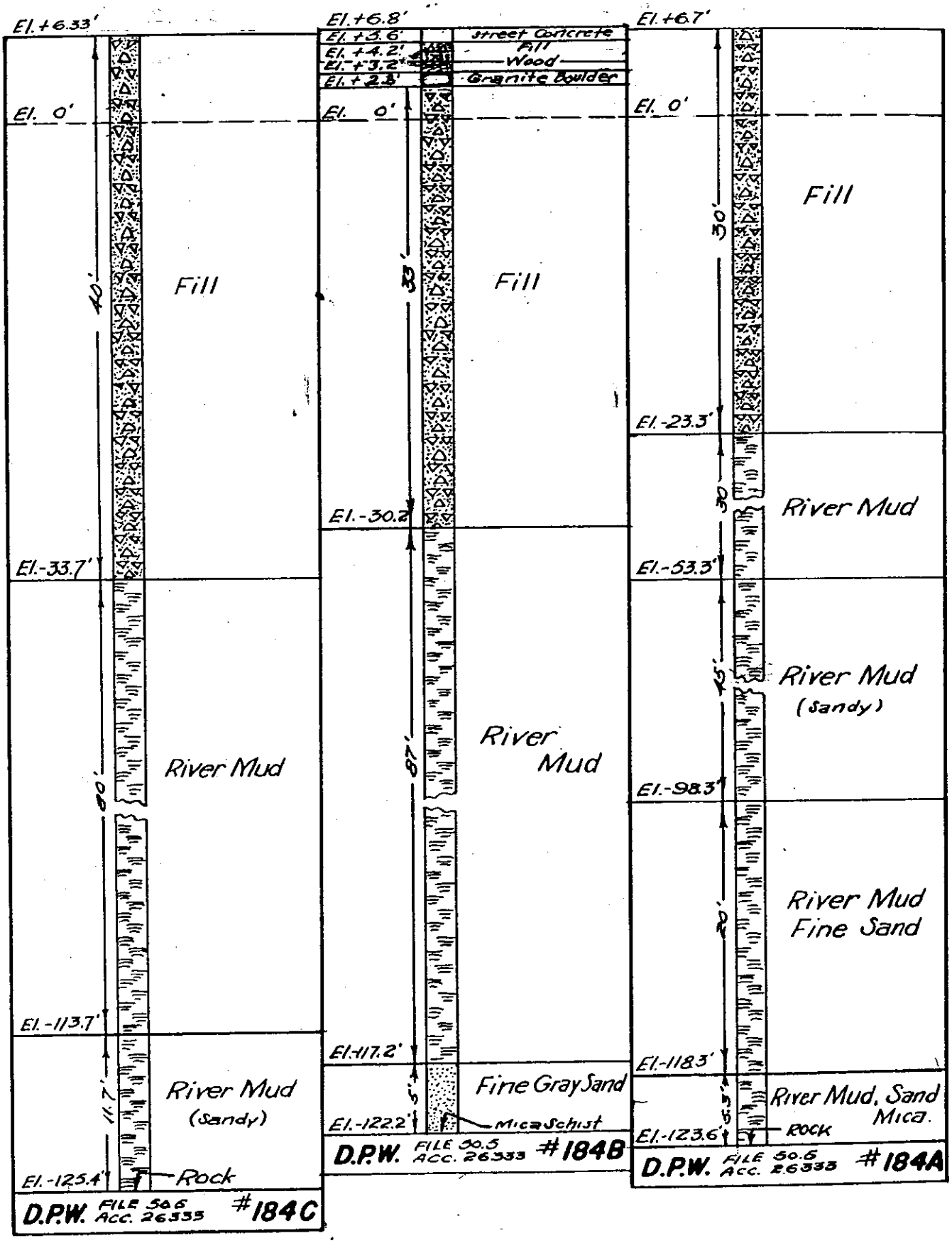
VOL.2 SHEET 10




ROCK DATA

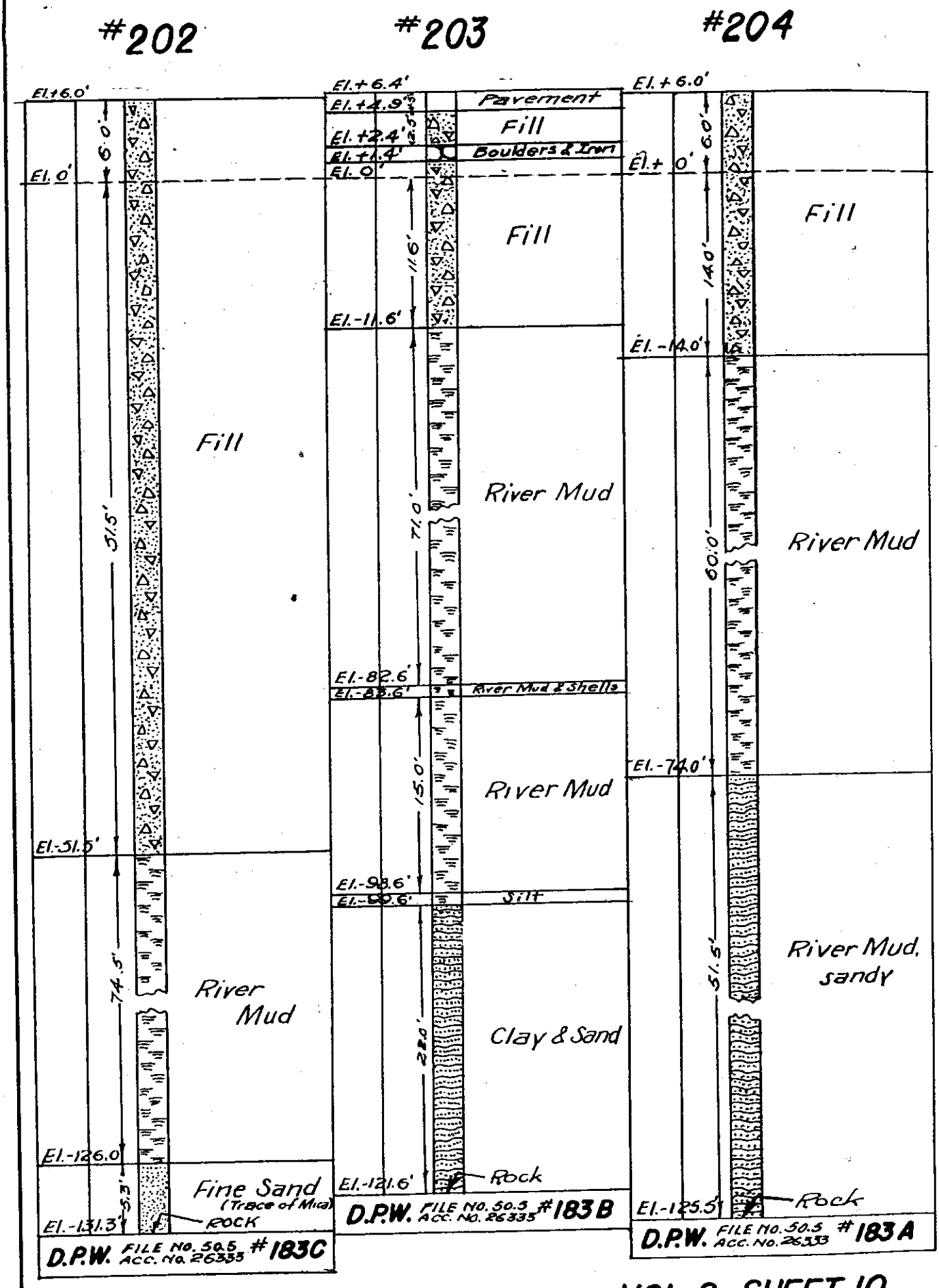
VOL.2 SHEET 10

L. D. Ludlitti N. M.B.L. 2-27-34



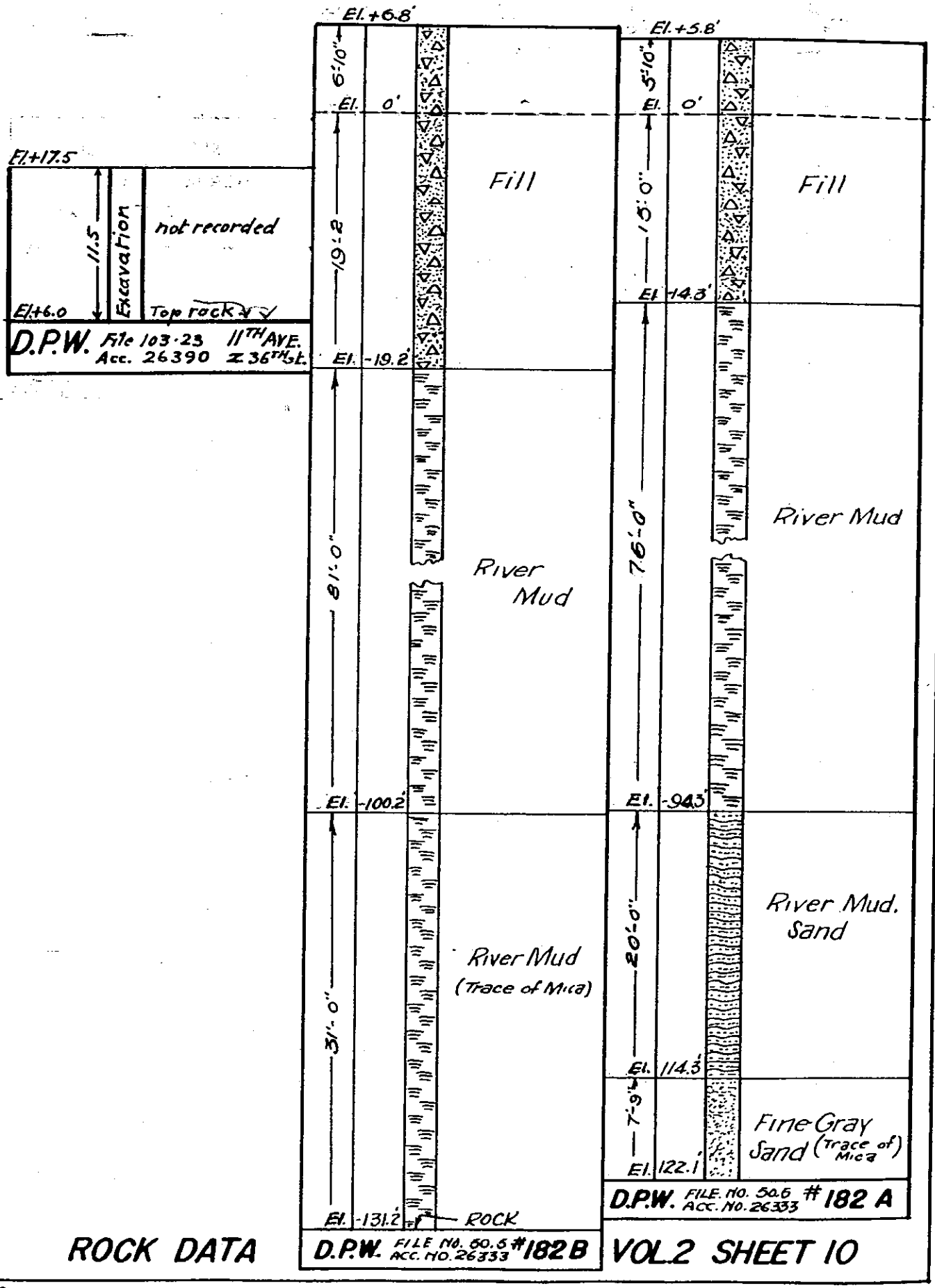

ROCK DATA

VOL.2 SHEET 10




ROCK DATA

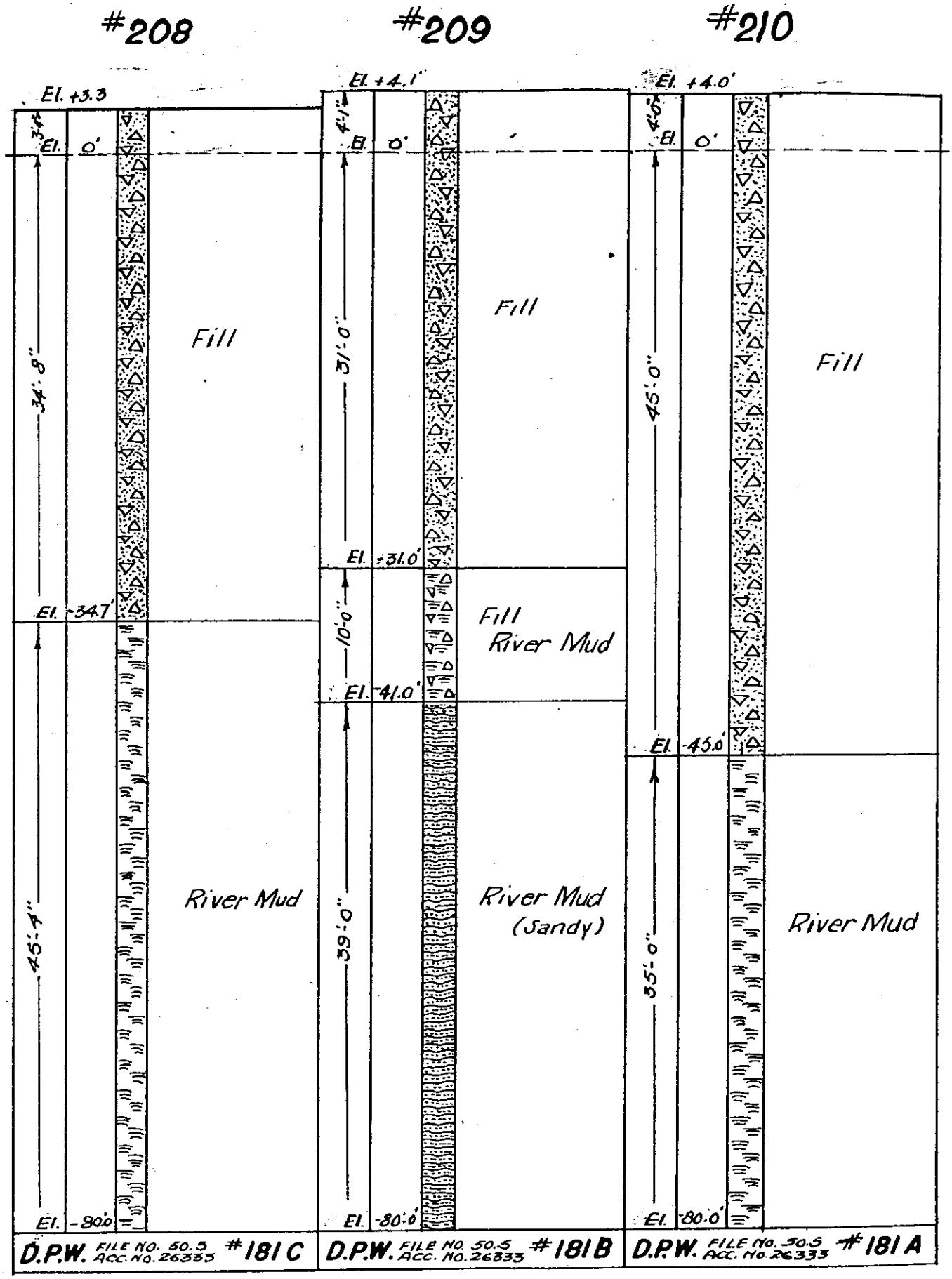
VOL. 2 SHEET 10




ROCK DATA

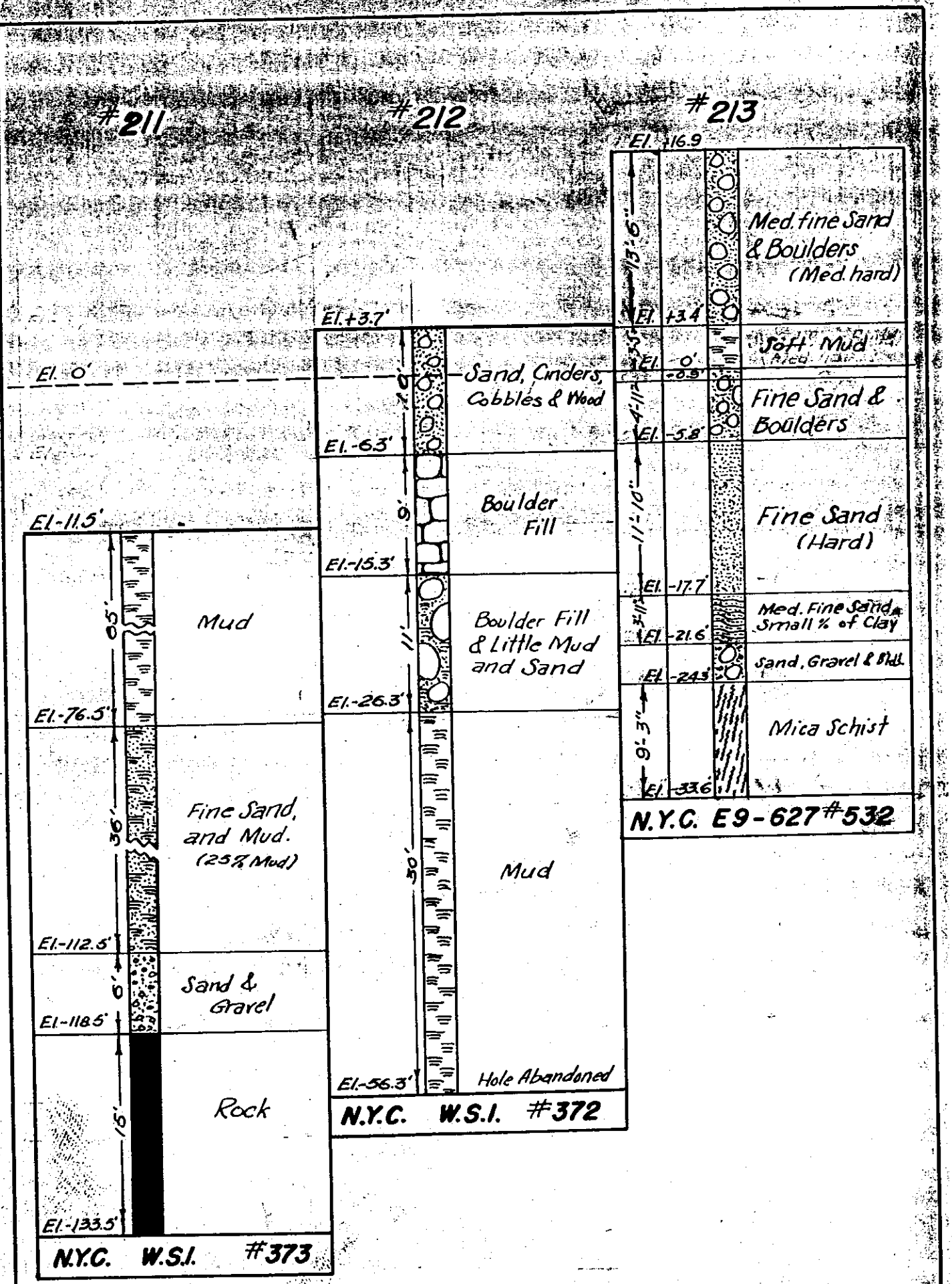
VOL.2 SHEET 10

In Orig: Ch. by SBT. 2-27-34



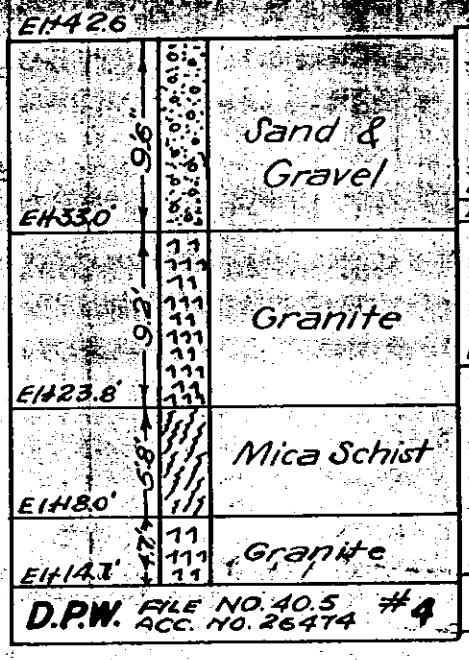

ROCK DATA

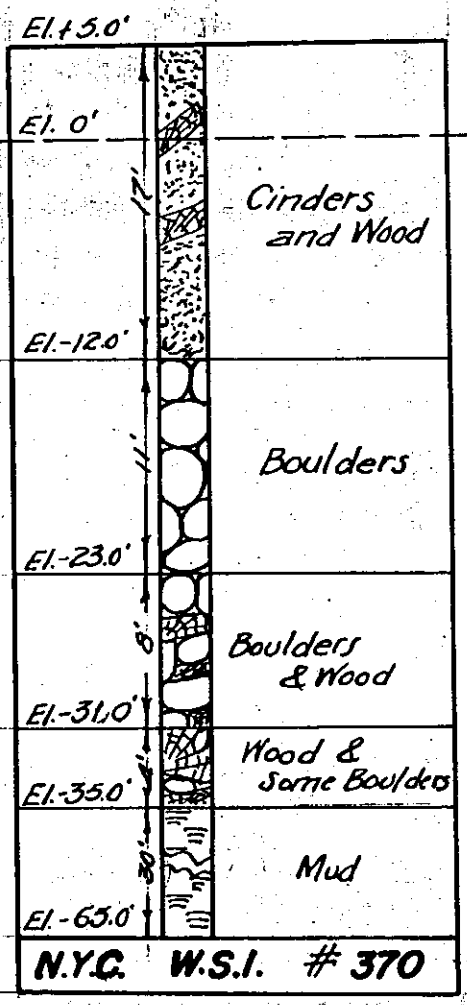
VOL. 2 SHEET 10




ROCK DATA

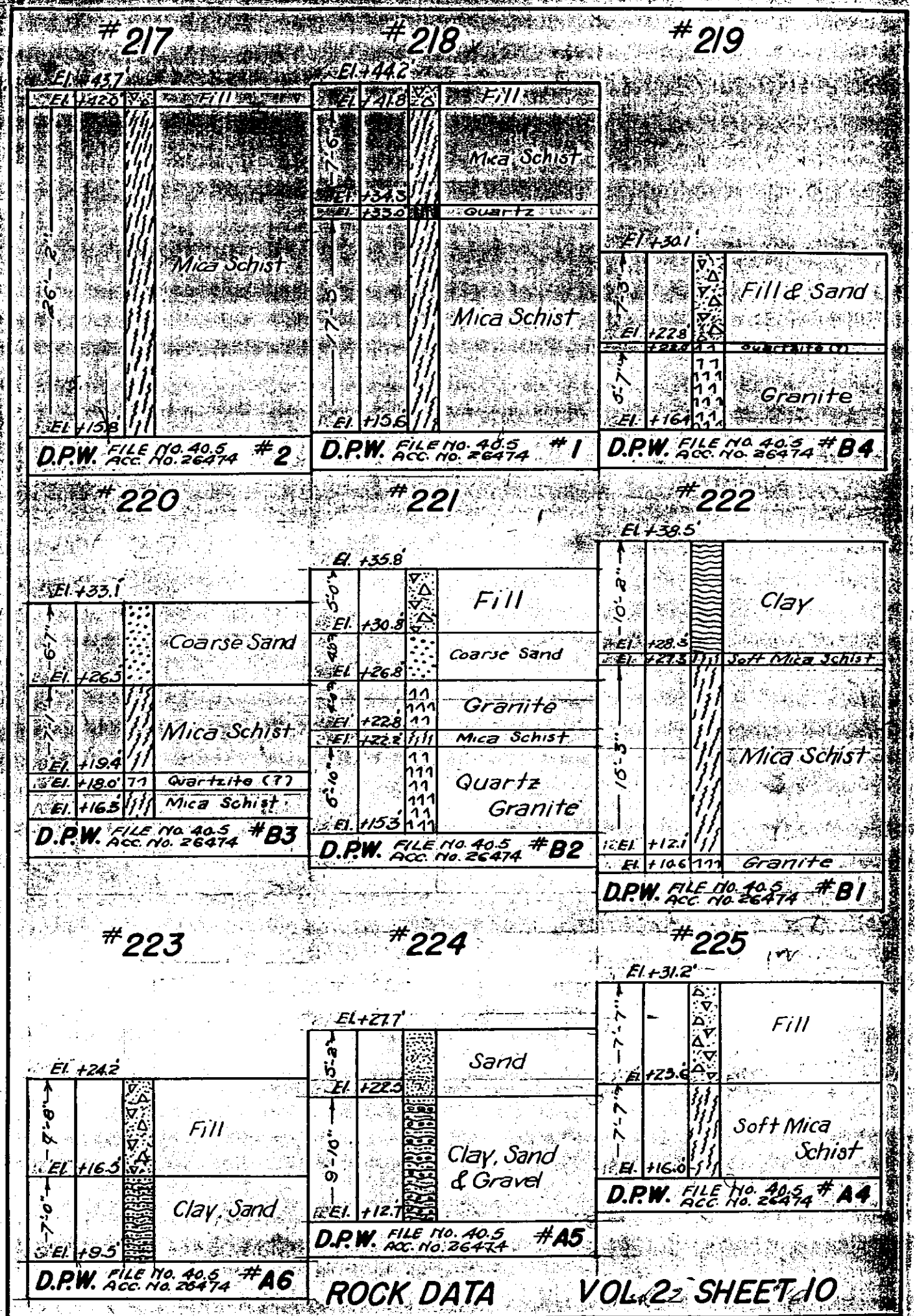
VOL. 2 SHEET 10

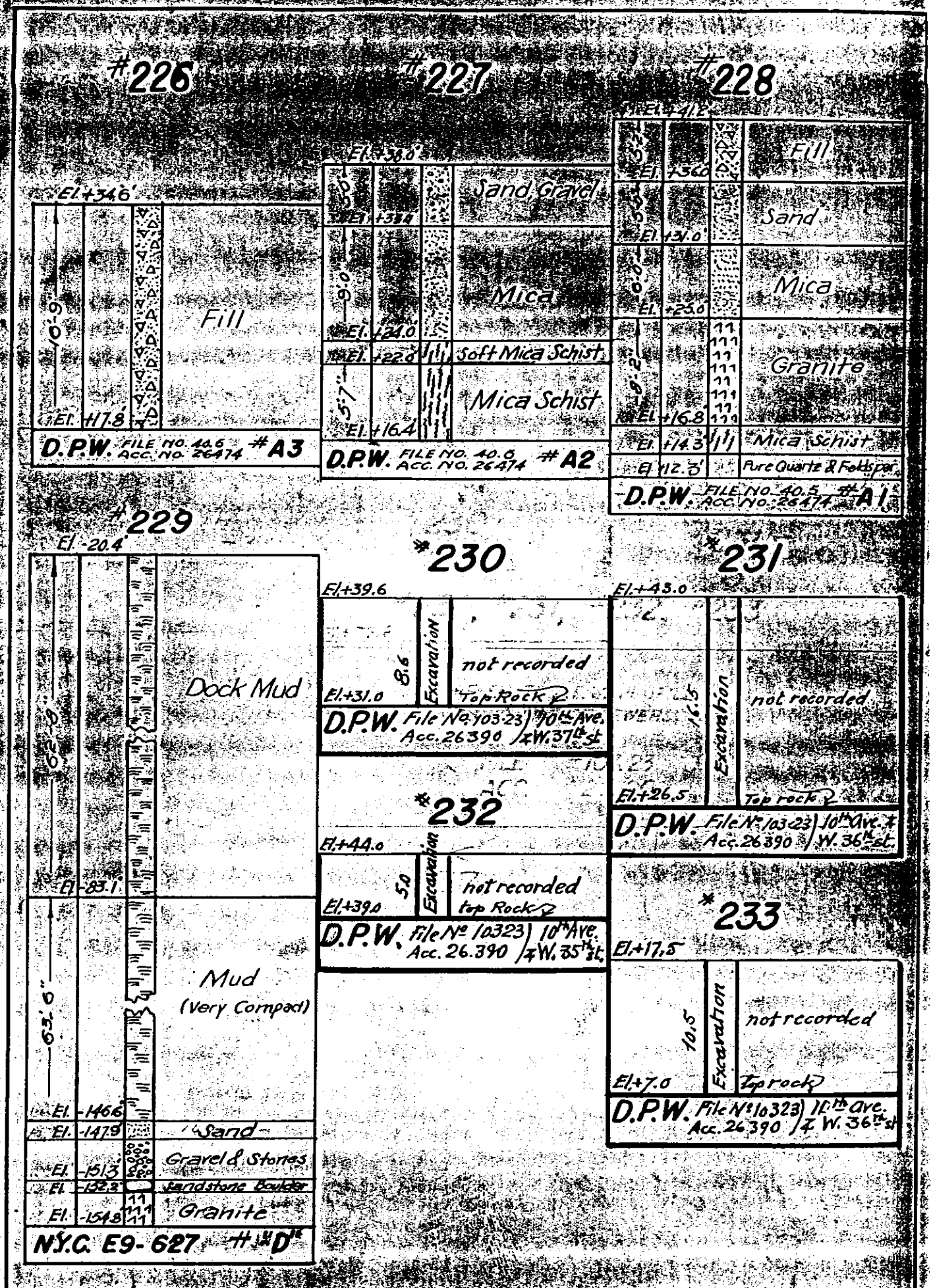



ROCK DATA

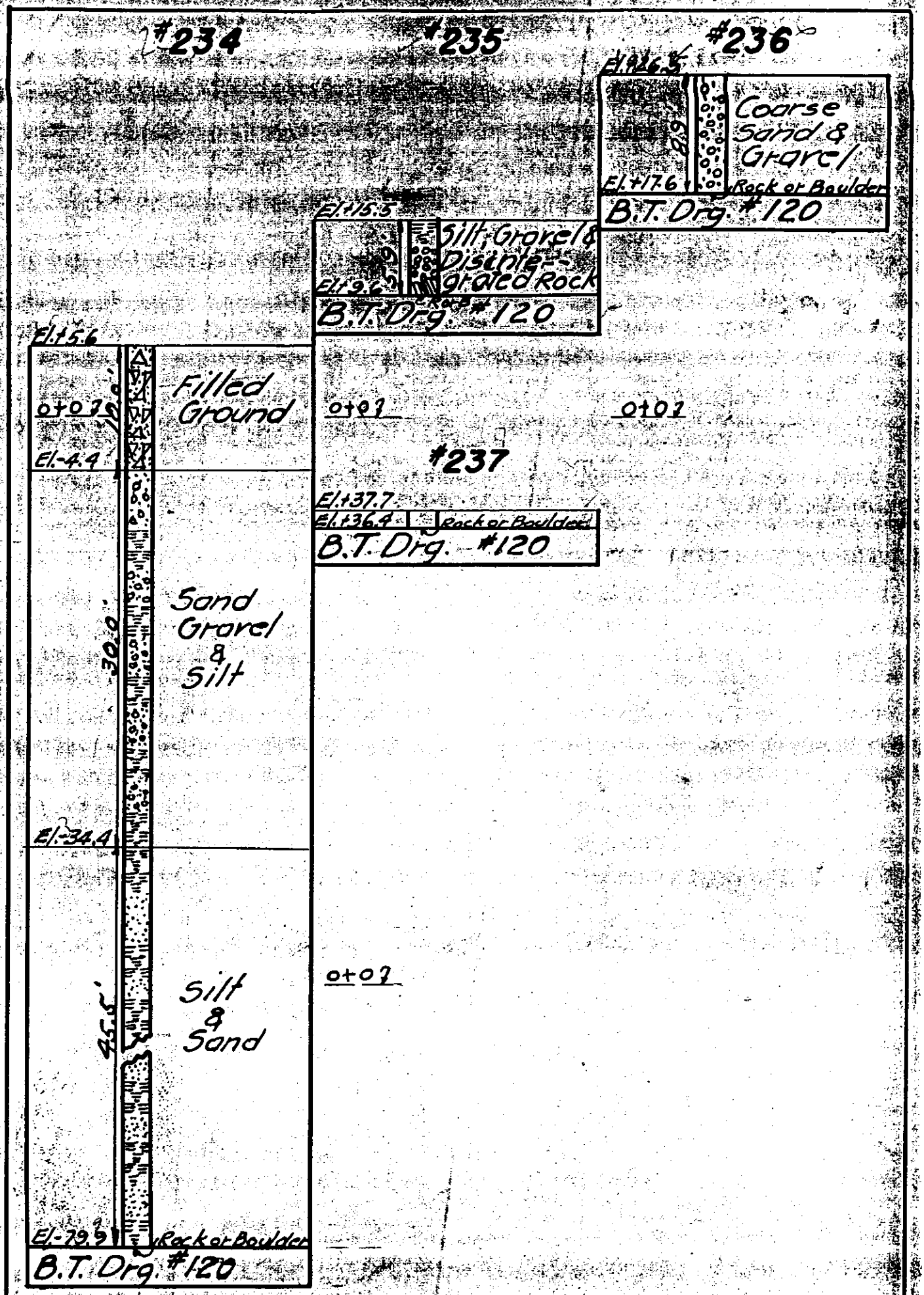
VOL. 2 SHEET 10


#217
El. +43.7
El. +42.0
Fill
26'-2"
Mica Schist
El. +15.8
D.P.W. FILE NO. 40.5 ACC. NO. 26474 #2
#218
El. +44.2
El. +41.8
Fill
7'-6"
Mica Schist
El. +34.3
El. +35.0
Quartz
17'-3"
Mica Schist
El. +15.6
D.P.W. FILE NO. 40.5 ACC. NO. 26474 #1
#219
El. +30.1
7'-3"
Fill & Sand
El. +22.8
Quartzite (?)
5'-7"
Granite
El. +16.4
D.P.W. FILE NO. 40.5 ACC. NO. 26474 #B4
#220
El. +33.1
6'-7"
Coarse Sand
El. +26.5
7'-11"
Mica Schist
El. +19.4
El. +18.0
Quartzite (?)
El. +16.5
Mica Schist
D.P.W. FILE NO. 40.5 ACC. NO. 26474 #B3
#221
El. +35.8
5'-7"
Fill
El. +30.8
48'-9"
Coarse Sand
El. +26.8
Granite
El. +22.8
El. +22.2
Mica Schist
6'-10"
Quartz Granite
El. +15.3
D.P.W. FILE NO. 40.5 ACC. NO. 26474 #B2
#222
El. +38.5
10'-8"
Clay
El. +28.3
El. +27.3
Soft Mica Schist
19'-3"
Mica Schist
El. +12.1
El. +10.6
Granite
D.P.W. FILE NO. 40.5 ACC. NO. 26474 #B1
#223
El. +24.2
7'-8"
Fill
El. +16.5
7'-0"
Clay, Sand
El. +9.5
D.P.W. FILE NO. 40.5 ACC. NO. 26474 #A6
#224
El. +27.7
5'-2"
Sand
El. +22.5
9'-10"
Clay, Sand & Gravel
El. +12.7
D.P.W. FILE NO. 40.5 ACC. NO. 26474 #A5
#225
El. +31.2'
7'-7"
Fill
El. +23.6
7'-7"
Soft Mica Schist
El. +16.0
D.P.W. FILE NO. 40.5 ACC. NO. 26474 #A4
ROCK DATA
VOL. 2 SHEET 10




ROCK DATA

VOL. 2 SHEET 10




ROCK DATA

VOL. 2 SH. 10

## #238

El.+21.0

10.3

not recorded

El.+10.7 Rock Top

Godwin Construction Co., #A
P.O. Garage, W. 33d st.

## #239

El.+21.0

9.3

not recorded

El.+11.7 Rock Top

Godwin Construction Co., #B
P.O. Garage, W. 33d st.

## #240

El.+21.0

12.9

not recorded

El.+8.1 Rock Top

Godwin Construction Co., #C
P.O. Garage, W. 33d st.

## #241

El.+21.0

18.4

not recorded

El.+2.6 Rock Top

Godwin Construction Co., #D
P.O. Garage, W. 33d st.

## #242

El.+21.0

14.5

not recorded

El.+6.5 Rock Top

Godwin Construction Co., #E
P.O. Garage, W. 33d st.

## #243

El.+21.0

14.1

not recorded

El.+6.9 Rock Top

Goldwin Construction Co., #F
P.O. Garage, W. 33d st.

## #244

El.+21.0

10.7

not recorded

El.+10.3 Rock Top

Godwin Construction Co., #G
P.O. Garage, W. 33d st.

## #245

El.+21.0

10.3

not recorded

El.+10.7 Rock Top

Godwin Construction Co. #H
P.O. Garage, W. 33d st.

## #246

El.+21.0

11.7

not recorded

El.+9.3 Rock Top

Godwin Construction Co., #I
P.O. Garage, W. 33d st.

## #247

El.+21.0

15.7

not recorded

El.+5.3 Rock Top

Godwin Construction Co., #L
P.O. Garage, W. 33d st.

## #248

El.+21.0

20.0

not recorded

El.+1.0 Rock Top

Godwin Construction Co., #M
P.O. Garage, W. 33d st.

## #249

El.+21.0

14.8

not recorded

El.+6.2 Rock Top

Godwin Construction Co., #N
P.O. Garage, W. 33d st.

# ROCK DATA VOL. 2, SHEET 10

## #250

El.+21.0

13.1

not recorded

El.+7.9 Rock Top

Godwin Construction Co., #O
P.O. Garage, W. 33d st.

## #251

El.+21.0

14.1

not recorded

El.+6.9 Rock Top

Godwin Construction Co., #P
P.O. Garage, W. 33d st.

## #252

El.+21.0

14.6

not recorded

El.+6.4 Rock Top

Godwin Construction Co., #Q
P.O. Garage, W. 33d st.

## #253

El.+21.0

18.1

not recorded

El.+2.9 Rock Top

Godwin Construction Co., #R
P.O. Garage, W. 33d st.

## #254

El.+21.0

18.3

not recorded

El.+2.7 Rock Top

Godwin Construction Co., #S
P.O. Garage, W. 33d st.

## #255

El.+21.0

14.3

not recorded

El.+6.7 Rock Top

Godwin Construction Co., #T
P.O. Garage, W. 33d st.

## #256

El.+21.0

15.4

not recorded

El.+5.6 Rock Top

Godwin Construction Co., #U
P.O. Garage, W. 33d st.

## #257

El.+21.0

18.7

not recorded

El.+2.3 Rock Top

Godwin Construction Co., #V
P.O. Garage, W. 33d st.

## #258

El.+21.0

18.8

not recorded

El.+2.2 Rock Top

Godwin Construction Co., #Z
P.O. Garage, W. 33d st.

# ROCK DATA

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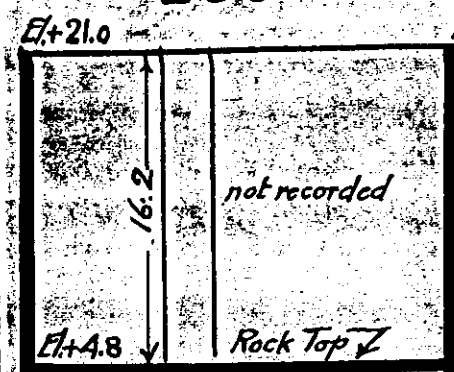


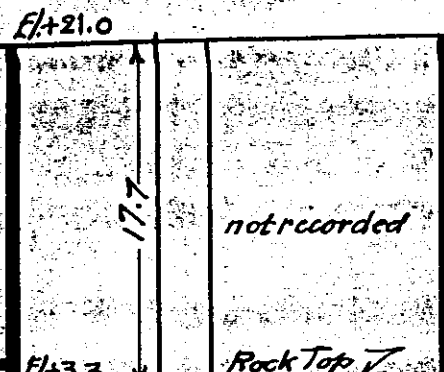


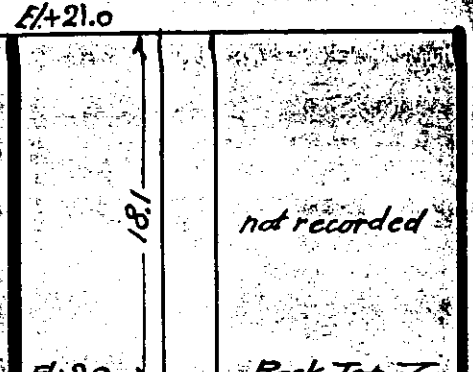


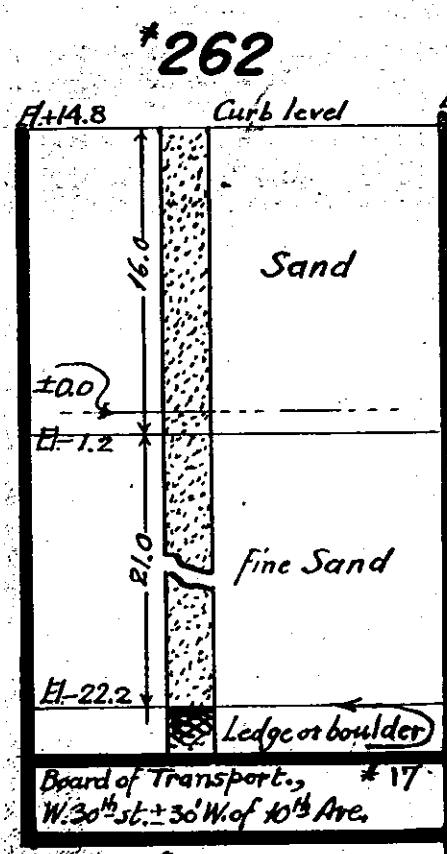


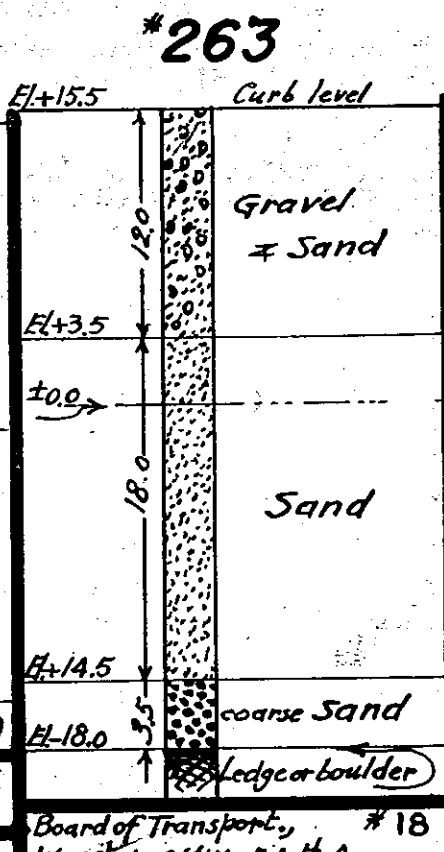


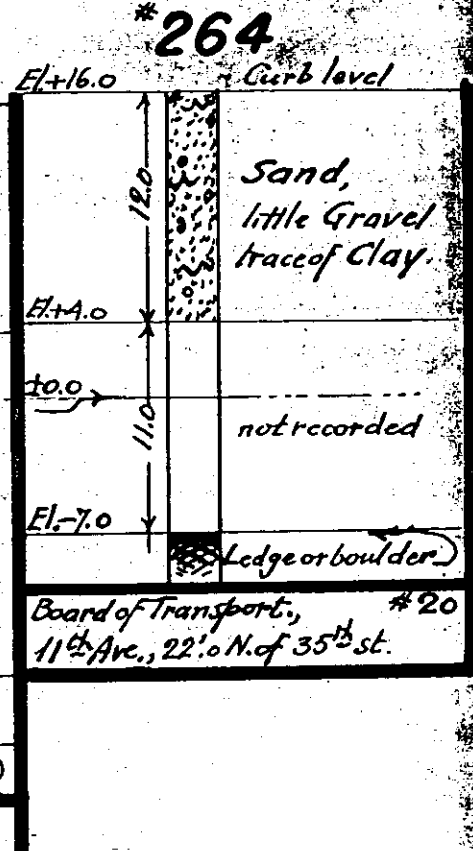


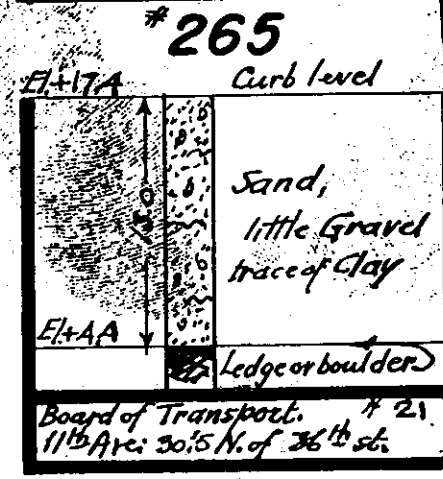


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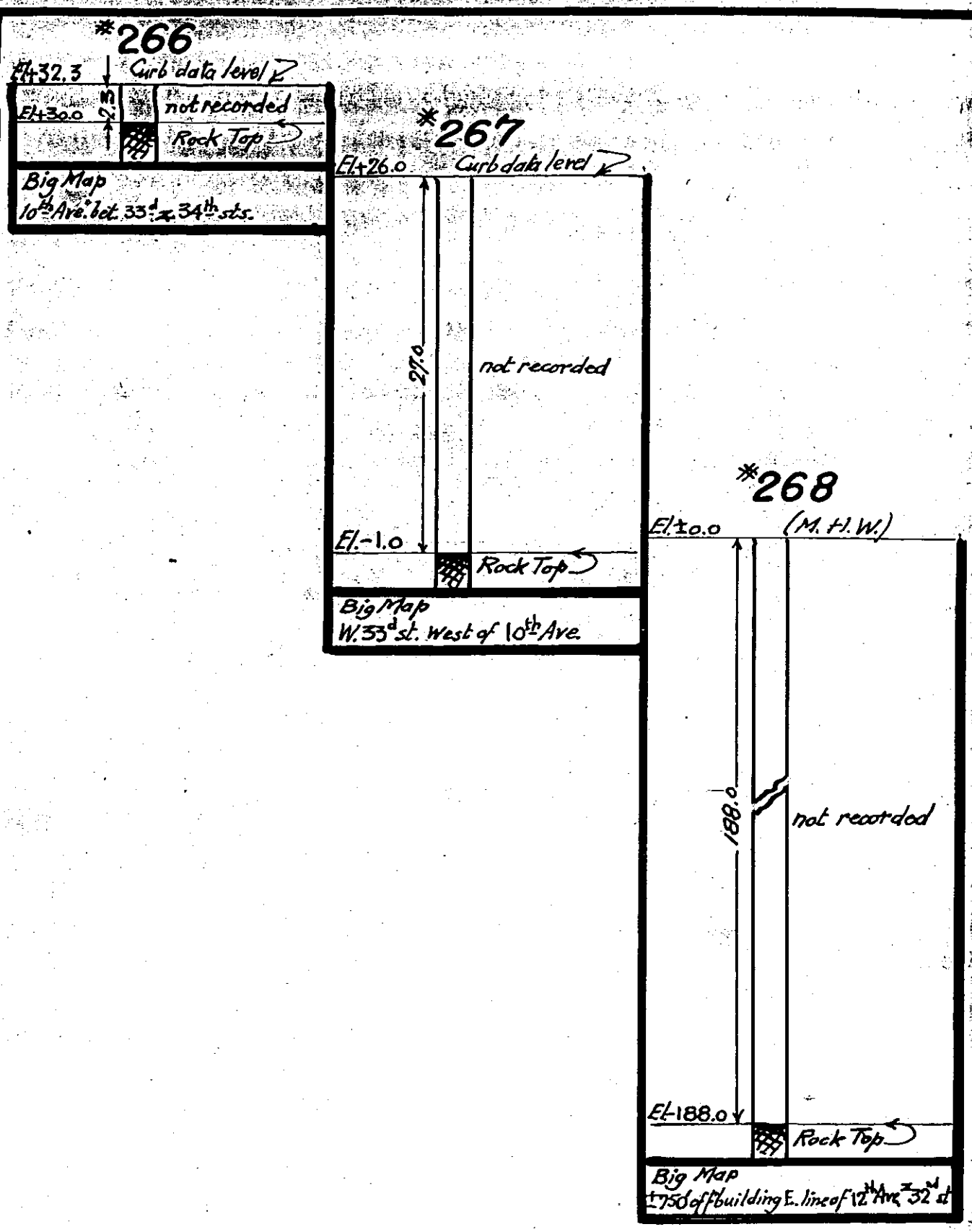
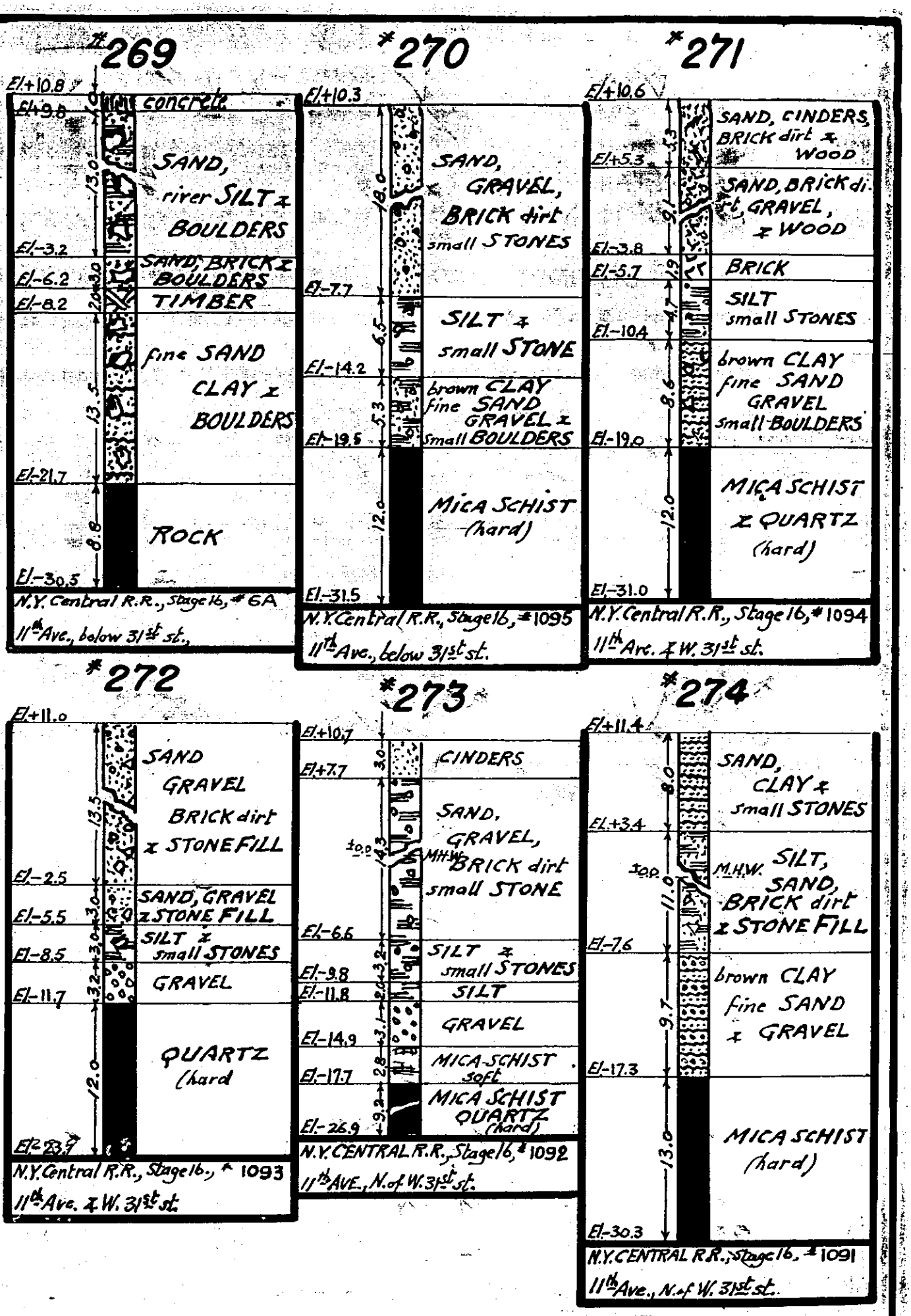
7-23-36




ROCK DATA VOL. 2, SHEET 10

Dorfman 2.5.31 OLL 4-17-71

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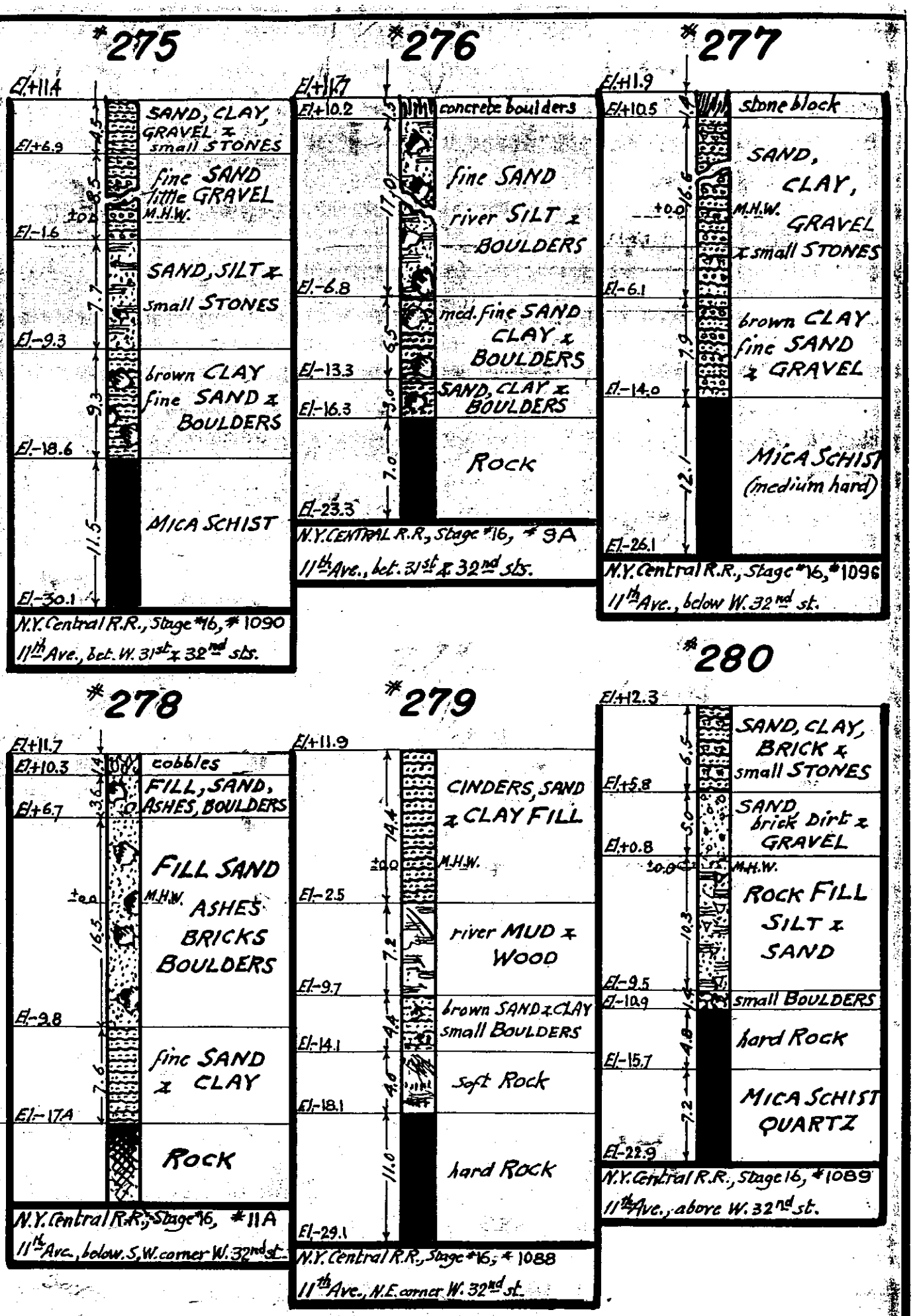


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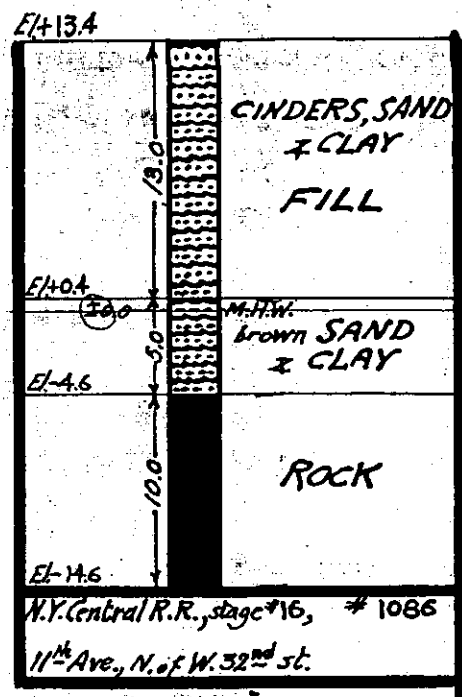


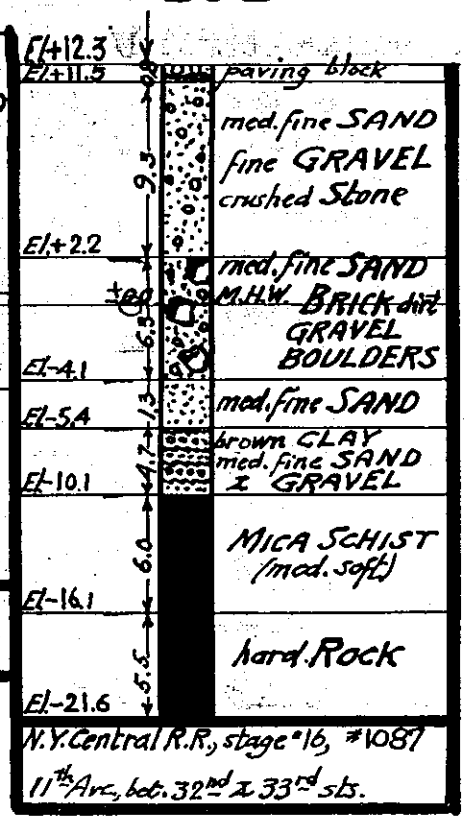


ROCK DATA

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