OVERVIEW:
The 14 story Draper Hall, located between Metropolitan Hospital and the East River, combines new construction with substantial rehab to an existing structure. The tower footprint was expanded to allow for double loaded corridors, 201 apartments, and a community center for the city’s underserved seniors.

CHALLENGE:
The project was originally spec’d with 12 3/4” micropiles using the traditional installation method and limited access was a concern. Also, the owner needed the piles to be installed quickly in order to stay within the schedule. Furthermore, contaminated soils were present and the cost of removing spoils was a significant concern.

SOLUTION:
IDEAL Group worked with Posillico to offer STELCOR Drilled-In Displacement Micropiles as a cost saving alternate solution on this project. Faster install time meant the project stayed within the schedule. No spoils are created when installing STELCOR piles. This resulted in a significant cost savings. Installation in the limited access area was simplified because because minimal equipment is needed to install STELCOR Drilled-In Displacement Micropiles.
August 6, 2015
GZA Project No. 41.0162028.20

Ms. Sydelle Knepper
Draper Hall Apartments, LLC
98 Cutter Mill Road, Suite 342S
Great Neck, NY 11021

Re: Pile Load Test Report
Draper Hall Addition
New York, NY

Dear Ms. Knepper:

GZA GeoEnvironmental of New York (GZA) is pleased to submit this report presenting the results of the Pile Load Test Program for the above referenced project.

The work described herein was performed in general accordance with our signed contract dated May 11, 2015. The contents for this report are subject to the limitations contained in Appendix A and the terms and conditions of engagement.

BACKGROUND

GZA was initially retained to conduct geotechnical subsurface exploration programs at the site. GZA provided the results of the subsurface explorations in a geotechnical report in 2014

Based on subsurface conditions and constructability issues, drilled micropiles were recommended to support the proposed structure. The micropiles were designed for an 85-ton allowable axial capacity and consisted of a 12.75-inch diameter ½-inch thick wall casing and one #9 grade 75 center bar. The micropiles were designed for a depth of 70 feet below street level (El. -58.5, NAVD88).

The site general contractor (Procida Construction Corporation) retained a piling subcontractor (Posillico Civil) who designed deep foundations consisting of Stelcor drilled-in displacement micropiles. The drilled-in displacement micropile consists of a Stelcor model SC1400-550-16149-8, which is comprised of a 16-inch diameter drive plate at the bottom of a 5.5-inch diameter by 0.475-inch wall steel shaft with 8-inch diameter exterior grout augers. A 14-inch deformation structure is connected immediately above the drive plate. The pile is drilled into the ground in 20-foot long sections that are bolted together. As the pile is drilled, the grout augers pull grout downward into the annulus generated by the deformation structure.

The drilled-in displacement micropiles were designed for an 85-ton allowable axial capacity at a final depth of 70 feet below existing site elevation. The drilled-in displacement micropile details are provided in Appendix B.

SCOPE OF WORK

The purpose of the pile load testing program is to confirm allowable axial capacity for the production piles at the site.

GZA provided the following services under the Pile Load Test Program:

- Observed the installation of two (2) test piles and eight (8) reaction piles;
- Observed two (2) compression load tests performed by Posillico in general conformance with ASTM Standards and the 2014 New York City Building Code (NYCBC);
- Analysis of load test results; and
- Preparation of this report.

PILE INSTALLATION

The test piles (TP-1 and TP-2) and the eight reaction piles were installed between June 19 and 25, 2015 by Posillico. A GZA field representative was on site to continuously observe the installation of the test and reaction piles. Grout cube sample testing of the test and reaction piles was performed by others. The location of the test and reaction piles are shown in Appendix B.

The test and reaction piles were all installed to a depth of 77-feet below existing elevation. The installed piles consisted of four 20-foot long sections (80-feet total) with 3-feet of stickup at each pile. The piles were grouted from the surface during installation. A 12-inch diameter by 5-foot long concrete-filled sonotube was installed at the top of each test pile to reduce eccentric loading between the jack and top of the pile. Vibrating wire strain gauges were installed within the center annulus of the test piles at depths of 2, 40, 60, 70, and 77 feet below ground surface.

STATIC LOAD TESTING

Two (2) static compression load tests were performed between July 16 and 24, 2015. The compression test reaction system consisted of a steel reaction frame that transferred the compression load to four (4) reaction piles and included a main beam and two reaction beams. The load frame system was designed by Posillico and was in general accordance with ASTM D1143 and is attached as Appendix C. Four dial gauges were used to measure movements of the pile. The dial gauges were placed on reference beams that extended at least eight feet from the test pile. A piano wire was also installed as a secondary measuring device. Optical level survey was performed on each reaction pile. Photographs of a typical test setup are provided in Appendix D.

A 300-ton capacity hydraulic jack was used to apply compression load to the test pile. Jack calibration records are provided in Appendix E. The strain gauge calibration records are also provided in Appendix E.
The compression load tests were performed to 170 tons (200% of the allowable design axial capacity). The compression load tests were performed using the maintained procedure (Procedure B) in accordance with ASTM D1143.

See Appendix F for the complete results from the compression load tests.

RESULTS AND RECOMMENDATIONS

The test results for the two compression load tests were evaluated based on the Davisson (1973) method\(^2\) and our general experience with pile load testing. The pile load test results showed that the maximum allowable axial compressive capacity of the test piles is 75 tons for a pile installed to a depth of 77-feet below grade. The allowable axial capacity can be increased by 33-percent for short term loads (wind or seismic).

If you should have any questions or comments, please contact the undersigned.

Very truly yours,

GZA GEOENVIRONMENTAL OF NEW YORK

Benjamin Cote, P.E
Assistant Project Manager

Alireza Ayoubian, P.E.
Project Manager

Cassandra A. Wetzel, P.E.
Associate Principal

Attachments:  
  Appendix A – Geotechnical Limitations  
  Appendix B – Pile Location Plan and Details  
  Appendix C – Test Pile Load Frame Plan  
  Appendix D – Typical Test Setup Photographs  
  Appendix E – Hydraulic Jack and Strain Gauge Calibration Records  
  Appendix F – Compression Load Test Results

APPENDIX A
LIMITATIONS
LIMITATIONS

Use of Report

1. GZA GeoEnvironmental, Inc. (GZA) prepared this report on behalf of, and for the exclusive use of our Client for the stated purpose(s) and location(s) identified in the Proposal for Services and/or Report. Use of this report, in whole or in part, at other locations, or for other purposes, may lead to inappropriate conclusions; and we do not accept any responsibility for the consequences of such use(s). Further, reliance by any party not expressly identified in the agreement, for any use, without our prior written permission, shall be at that party’s sole risk, and without any liability to GZA.

Standard of Care

2. GZA’s findings and conclusions are based on the work conducted as part of the Scope of Services set forth in Proposal for Services and/or Report, and reflect our professional judgment. These findings and conclusions must be considered not as scientific or engineering certainties, but rather as our professional opinions concerning the limited data gathered during the course of our work. If conditions other than those described in this report are found at the subject location(s), or the design has been altered in any way, GZA shall be so notified and afforded the opportunity to revise the report, as appropriate, to reflect the unanticipated changed conditions.

3. GZA’s services were performed using the degree of skill and care ordinarily exercised by qualified professionals performing the same type of services, at the same time, under similar conditions, at the same or a similar property. No warranty, expressed or implied, is made.

Subsurface Conditions

4. The generalized subsurface conditions provided in our Report are based on widely-spaced subsurface explorations and are intended only to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized, and were based on our assessment of subsurface conditions. The composition of strata, and the transitions between strata, may be more variable and more complex than indicated. For more specific information on soil conditions at a specific location refer to the exploration logs.

5. In preparing this report, GZA relied on certain information provided by the Client, state and local officials, and other parties referenced therein which were made available to GZA at the time of our evaluation. GZA did not attempt to independently verify the accuracy or completeness of all information reviewed or received during the course of this evaluation.

6. GZA’s services did not include an assessment of the presence of oil or hazardous materials at the property. Consequently, we did not consider the potential impacts (if any) that contaminants in soil or groundwater may have on construction activities, or the use of structures on the property.

Compliance with Codes and Regulations

7. We used reasonable care in identifying and interpreting applicable codes and regulations. These codes and regulations are subject to various, and possibly contradictory, interpretations. Compliance with codes and regulations by other parties is beyond our control.
APPENDIX B
PILE LOCATION PLAN AND DETAILS
1. Test and reaction piles shown.
2. Pile spacing addressed in the Drilled in Displacement Micropile Stelkor Shop Drawing Submittal dated June 1, 2015 page 6, design note #4.
Drilled-in Displacement Micropile 85 Tons

14" OUTER GROUT COLUMN

5.50" ø .476WT

SECTION A-A
SCALE N.T.S.

- 12x12x 1.25 SHEAR HEAD BOLTED TO TOP OF PILE
- 30'-0" FROM GROUND - NO FRICTION
- 0'-0"
- 10' MEDIUM DENSE GREY FINE SAND (SP)
- 20' STIFF GREY ORGANIC SILT SOME VEGETATION
- 30' MEDIUM DENSE, REDDISH BROWN, CLAYEY SILT, SOME SAND (ML)
- 40' MEDIUM DENSE, REDDISH BROWN, SAND (SP)
- 50' MEDIUM DENSE, REDDISH BROWN
- 60' HARD, REDDISH BROWN CLAYEY SILT, LITTLE SAND
- 70' MEDIUM DENSE, REDDISH BROWN, FINE TO MEDIUM SAND, CLAYEY SILT and CLAY (ML)
- 80' END OF BORINGS
5 1/2" BOLTED NEW CONSTRUCTION BRACKET
PART NO. 512NCB12X125

NOTES:

1. SHAFT TO EXCEED REQUIREMENTS TO MINIMUM YIELD STRENGTH OF 55 KSI AND MINIMUM TENSILE STRENGTH OF 75 KSI.

2. ALL WELDING TO BE PERFORMED BY SHOP QUALIFIED WELDER TO AWS D1.1 STRUCTURAL WELDING CODE - STEEL.

3. ULTIMATE STRUCTURAL CAPACITY OF THE UNIT IS DEPENDANT ON FINAL DESIGN

4. BOLT-ON OPTION AVAILABLE WHERE UPLIFT LOADS ARE PRESENT

5. BY IDEAL MANUFACTURING INC.
1-800-789-4810.
NOTES:

1. DISPLACEMENT DRILLED, FULL LENGTH STEEL CORE WITH SOLID GROUT FILL AND UNCASED OUTER GROUT COLUMN.
2. GROUT COLUMN DEFORMATION SHALL BE NOMINAL 14" O.D.
3. STEEL CORE SHALL BE 5.50" O.D. .476W 80 KSI MIN. YLD. - FULL LENGTH
4. LATERAL DISPLACEMENT DRILL HEAD SHALL BE FABRICATED OF ASTM A572 GR. 50 PARTS.
5. ALL WELDING TO BE PERFORMED BY CERTIFIED WELDER IN ACCORDANCE WITH AWS D1.1 - STRUCTURAL WELDING CODE- STEEL
6. OPTIONAL THREADBAR IN CENTER OF STEEL CORE
STELCOR
SC1400-550-16149-8
5.50" X .476w DRILLED-IN
DISPLACEMENT MICROPILE

NOTES:

1. DISPLACEMENT DRILLED, FULL LENGTH STEEL CORE WITH SOLID GROUT FILL AND UNCASED OUTER GROUT COLUMN.
2. GROUT COLUMN DEFORMATION SHALL BE NOMINAL 14" O.D.
3. STEEL CORE SHALL BE 5.50" O.D. .476W 80 KSI MIN. YLD. - FULL LENGTH
4. LATERAL DISPLACEMENT DRILL HEAD SHALL BE FABRICATED OF ASTM A572 GR. 50 PARTS.
5. ALL WELDING TO BE PERFORMED BY CERTIFIED WELDER IN ACCORDANCE WITH AWS D1.1 - STRUCTURAL WELDING CODE - STEEL
6. OPTIONAL THREADBAR IN CENTER OF STEEL CORE
APPENDIX C

TEST PILE LOAD FRAME PLAN
GENERAL:

1. CONTRACTOR SHALL COMPLETE STATIC AXIAL COMPRESSION LOAD TESTS ON 1/4" NOMINAL DIAMETER STELCO PILES.

   THE COMPRESSIVE LOAD FOR THE TEST PILES IS EIGHTY-FIVE (85) TONS.

2. THESE TESTS SHALL BE PERFORMED AT LOCATIONS APPROVED (SEE SHEET B PLAN).

3. CONTRACTOR SHALL INSTALL FOUR (4) 1/4" DIAMETER STELCO REACTION PLATES TO SUPPORT THE TEST FRAME BEAMS AS INDICATED.

4. INSTALL THE TEST FRAME AS SHOWN HERIN.

5. INSTALL STEEL PLATES, HYDRAULIC JACKS, DIAL GAGES. WIRE SCALE, ETC. AS SHOWN HERIN.

6. THE LOAD TEST LOADING PROCEDURE SHALL BE IN ACCORDANCE WITH ASTM SPECIFICATION D1143-07. PARAGRAPH B.3. "PROCEDURE B: MAINTAINED"

7. THE LOAD TEST READINGS SHALL BE TAKEN IN ACCORDANCE WITH ASTM SPECIFICATION D1143-07, PARAGRAPH A.2.3. "PROCEDURE B: MAINTAINED"

8. REFERENCE: "DRILLED IN DISPLACEMENT MICROPILE STELCO PILE SHOP DRAWING SUBMITTAL"

MATERIALS:

1. ALL LOAD AND REACTION BEAMS SHALL BE IN ACCORDANCE WITH ASTM A36 STEEL, AND SHALL BE OF THE MINIMUM SIZE AND SECTION INDICATED.

2. ALL STEEL PLATES SHALL BE IN ACCORDANCE WITH ASTM A36 AND SHALL BE OF THE MINIMUM SIZE INDICATED.

3. ALL WELDING SHALL BE IN ACCORDANCE WITH AWS "STRUCTURAL WELDING CODE-STEEL" D1.1, LATEST EDITION.

4. ELECTRODES USED SHALL BE IN ACCORDANCE WITH ASTM A5.6.

5. ALL LOAD AND REACTION PILES SHALL BE INSTALLED IN ACCORDANCE WITH APPROPRIATE DRAWINGS.

6. FABRICATION OF TEST FRAME BEAMS, TRANSFER BEAMS, STEFFENERS, ETC. SHALL BE IN ACCORDANCE WITH AISC SPECIFICATIONS.

7. HYDRAULIC JACKS SHALL BE EQUIPPED WITH THE NECESSARY GAGES AND ACCESSORIES TO TRANSFER CONSTANT LOAD TO THE TEST PILE.

8. THE HYDRAULIC JACK AND PRESSURE GAGE SHALL BE CALIBRATED AS A SET BY A CERTIFIED TESTING LABORATORY WITHIN ONE (1) MONTH PRIOR TO PERFORMING THE LOAD TEST. CONTRACTOR SHALL SUBMIT THE CALIBRATION REPORT TO THE ENGINEER PRIOR TO PERFORMING THE LOAD TEST.

9. ALL DIAL GAGES SHALL BE CALIBRABLE OF BEING READ ACCURATELY TO THE NEAREST 0.001 INCH, AND SHALL HAVE A MINIMUM OF THREE (3) INCHES OF TRAVEL.

LOAD TEST:

1. INSTALL THE TEST PILES FROM APPROXIMATE ELEVATION 7.50.

2. ALLOW THE TEST PILE AND REACTION PILES TO CURE UNTIL THE GROUT ACHIEVES A MINIMUM COMPRESSIVE STRENGTH OF 4,000 PSI, AS VERIFIED BY GROUT CURVE TEST PRIOR TO LOADING.

3. USE 12X12 TIMBERS, AS REQUIRED, TO TEMPORARILY SUPPORT THE TEST FRAME DURING ERECTION.

4. INSTALL STEEL PLATES, HYDRAULIC JACKS, REFERENCE BEAMS, DIAL GAGES, PIANO WIRE, AND SURVEY LEVEL SCALES.

5. PERFORM THE COMPRESSION LOAD TEST IN ACCORDANCE WITH THE COMPRESSION LOAD TEST SCHEDULE SHOWN.

6. THE MAXIMUM COMPRESSIVE LOAD TEST SHALL BE 170 TONS 2 X 15. (1) B-TONS MEASURE PILE SETTLEMENT WITH A MINIMUM OF THREE (3) DIAL GAUGES MOUNTED ON AN INDEPENDENT STEEL REFERENCE FRAME.

IN ADDITION, MEASURE SETTLEMENT USING A REFERENCE LATH AND SCALE, CAPABLE OF BEING READ ACCURATELY TO THE NEAREST 0.02 INCHES.

PROVIDE INDEPENDENT SURVEY LEVEL MEASUREMENT OF THE PILE AND REACTION PILES USING OPTICAL LEVEL SURVEY EQUIPMENT CAPABLE OF BEING READ ACCURATELY TO THE NEAREST 0.001 FEET.

---

**Revisions/Issues**

- **No Exceptions Taken**
- **Revise as Noted**
- **Rejected**
- **Revised as per GZA comments 5/28/15**
- **Revise and Resubmit**

---

**Procida Construction Corp.**

**Project Name:** Draper Hall

**Submit #:** 023010-02-2

**Item:** Pile Load Test

**Trade:** Piles

**This Review is Made Only for the General Conformance of this Document to the Contract Documents. Procida Does Not Assume Any Responsibility for Design Intent, Calculations or Code Compliance.**

---

**Posillico Civil**

131-36A 20th Avenue

College Point, New York 11356

(718) 555-9316
APPENDIX D
TYPICAL TEST SETUP PHOTOGRAPHS
Photo 1: Typical Load Test Setup

Photo 2: Typical Jack and Dial Gauge Measurement Setup
APPENDIX E

HYDRAULIC JACK AND STRAIN GAUGE CALIBRATION RECORDS
CALIBRATION REPORT

Date: 07/07/15

W.B. EQUIPMENT SERVICE CO. INC NO: ____________

CUSTOMER: POSILlico DRILLING  PO # ____________

CYLINDER: 300 TONS STROKE: 6 SERIAL NO. WB 1811

GAUGE: 6 INCH DIAMETER: 10000 PSI SERIAL NO.: WB 2136

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TEST PERFORMED BY: STEPHEN CIRECO

OUTPUT MEASURED BY LOADCELL SERIAL NUMBER D WITH STRAIN INDICATOR P3 SERIAL NUMBER 158559
TEST PERFORMED BY: STEPHEN CIRECO
OUTPUT MEASURED BY LOADCELL SERIAL NUMBER D WITH STRAIN INDICATOR P3 SERIAL NUMBER 158559
W. B. EQUIPMENT SERVICE CO. INC.
127 OAK STREET
WOOD RIDGE, NJ 07075
TEL: 201-438-7800  FAX: 201-438-7830

GAUGE CERTIFICATION

W. B. EQUIPMENT SERVICE CO NO:_____    DATE: 7/7/15

CUSTOMER: POSILICO DRILLING

ORDER NO: _____

GAUGE SERIAL NO:        CAPACITY

WB 2121        10000        PSI

_____        6 INCH        DIAL

WE CERTIFY THAT THE HYDRAULIC GAUGES LISTED ABOVE HAVE BEEN TESTED PRIOR TO SHIPMENT AND FOUND TO BE WITHIN STANDARD COMMERCIAL ACCURACY OF 2% PLUS-OR-MINUS OF FULL SCALE.

VERY TRULY YOURS,
W. B. EQUIPMENT SERVICE CO. INC.

STEPHEN CIRECO
CALIBRATION REPORT

Date: 07/07/15

W.B. EQUIPMENT SERVICE CO. INC NO: ___________

CUSTOMER: POSILICO DRILLING PO # ___________

CYLINDER: 300 TONS STROKE: 6 SERIAL NO. WB 1808

GAUGE: 6 INCH DIAMETER: 10000 PSI SERIAL NO: WB 2121

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TEST PERFORMED BY: STEPHEN CIRECO

OUTPUT MEASURED BY LOADCELL SERIAL NUMBER D WITH STRAIN INDICATOR P3 SERIAL NUMBER 158559
PRESSURE VS FORCE

TEST PERFORMED BY: STEPHEN CIRECO
OUTPUT MEASURED BY LOADCELL SERIAL NUMBER D WITH STRAIN INDICATOR P3 SERIAL NUMBER 158559
GAUGE CERTIFICATION

W. B. EQUIPMENT SERVICE CO NO: ____  DATE: 7/7/15

CUSTOMER: POSILICO DRILLING

ORDER NO: ____

GAUGE SERIAL NO:  CAPACITY

WB 2136  10000  PSI

____  6 INCH  DIAL

WE CERTIFY THAT THE HYDRAULIC GAUGES LISTED ABOVE HAVE BEEN TESTED PRIOR TO SHIPMENT AND FOUND TO BE WITHIN STANDARD COMMERCIAL ACCURACY OF 2% PLUS-OR-MINUS OF FULL SCALE.

VERY TRULY YOURS,
W. B. EQUIPMENT SERVICE CO. INC.

STEPHEN CIRECO
### Sister Bar Calibration Report

**Model Number:** 4911-4  
**Date of Calibration:** April 29, 2015  
**This calibration has been verified/validated as of 06/22/2015**  
**Serial Number:** 1512371  
**Cable Length:** 65 feet  
**Prestress:** 35,000 psi  
**Regression Zero:** 7140  
**Temperature:** 22.6 °C  
**Technician:** [Signature]  
**Calibration Instruction:** CI-VW Rebar

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*For conversion factor, load to strain, refer to table C-2 of the Installation Manual*

**Gage Factor:** **0.352** microstrain/ digit (GK-401 Pos. "B")

**Calculated Strain = Gage Factor(Current Reading - Zero Reading)**

Note: The above calibration uses the linear regression method.

**Users are advised to establish their own zero conditions.**

Linearity: **((Calculated Load - Applied Load)/Max. Applied Load) X 100 percent**

The above instrument was found to be in tolerance in all operating ranges.  
The above named instrument has been calibrated by comparison with standards traceable to the NIST, in compliance with ANSI Z540-1.

This report shall not be reproduced except in full without written permission of Geokon Inc.
Sister Bar Calibration Report

Model Number: 4911-4

Date of Calibration: April 29, 2015

This calibration has been verified/validated as of 06/22/2015

Serial Number: 1512370

Cable Length: 65 feet

Prestress: 35,000 psi

Regression Zero: 6877

Temperature: 22.6 °C

Technician: [Signature]

Calibration Instruction: CI-VW Rebar

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For conversion factor, load to strain, refer to table C-2 of the Installation Manual

Gage Factor: 0.346 microstrain/ digit (GK-401 Pos. "B")

Calculated Strain = Gage Factor(Current Reading - Zero Reading)

Note: The above calibration uses the linear regression method.

Users are advised to establish their own zero conditions.

Linearity: ((Calculated Load - Applied Load)/Max. Applied Load) X 100 percent

The above instrument was found to be in tolerance in all operating ranges.
The above named instrument has been calibrated by comparison with standards traceable to the NIST, in compliance with ANSI Z540-1.

This report shall not be reproduced except in full without written permission of Geokon Inc.
Sister Bar Calibration Report

Model Number: 4911-4
Serial Number: 1512422
Date of Calibration: April 29, 2015
This calibration has been verified/validated as of 06/22/2015
Cable Length: 20 feet
Prestress: 35,000 psi
Temperature: 23.1 °C
Regression Zero: 6642

Calibration Instruction: CI-VW Rebar

<table>
<thead>
<tr>
<th>Applied Load (pounds)</th>
<th>Readings</th>
<th>Linearity % Max. Load</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cycle #1</td>
<td>Cycle #2</td>
</tr>
<tr>
<td>100</td>
<td>6691</td>
<td>6690</td>
</tr>
<tr>
<td>1500</td>
<td>7372</td>
<td>7372</td>
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<tr>
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<td>8099</td>
</tr>
<tr>
<td>4500</td>
<td>8850</td>
<td>8839</td>
</tr>
<tr>
<td>6000</td>
<td>9563</td>
<td>9560</td>
</tr>
<tr>
<td>100</td>
<td>6690</td>
<td>6686</td>
</tr>
</tbody>
</table>

For conversion factor, load to strain, refer to table C-2 of the Installation Manual

Gage Factor: 0.346 microstrain/ digit (GK-401 Pos. "B")

Calculated Strain = Gage Factor(Current Reading - Zero Reading)

Note: The above calibration uses the linear regression method.

Users are advised to establish their own zero conditions.

Linearity: \( \frac{(\text{Calculated Load} - \text{Applied Load})}{\text{Max. Applied Load}} \times 100 \) percent

The above instrument was found to be in tolerance in all operating ranges.
The above named instrument has been calibrated by comparison with standards traceable to the NIST, in compliance with ANSI Z540-1.

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Sister Bar Calibration Report

Model Number: 4911-4
Serial Number: 1512389
Date of Calibration: April 29, 2015
This calibration has been verified/validated as of 06/22/2015
Cable Length: 20 feet

Prestress: 35,000 psi
Regression Zero: 6918

Temperature: 22.6 °C
Technician: [signature]

Calibration Instruction: CI-VW Rebar

<table>
<thead>
<tr>
<th>Applied Load (pounds)</th>
<th>Readings</th>
<th>Linearity % Max. Load</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
<tr>
<td>100</td>
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<td>8349</td>
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<tr>
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<td>9061</td>
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<td>9778</td>
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<tr>
<td>100</td>
<td>6966</td>
<td>6965</td>
</tr>
</tbody>
</table>

For conversion factor, load to strain, refer to table C-2 of the Installation Manual

Gage Factor: 0.352 microstrain/ digit (GK-401 Pos. "B")

Calculated Strain = Gage Factor(Current Reading - Zero Reading)

Note: The above calibration uses the linear regression method.

Users are advised to establish their own zero conditions.

Linearity: ((Calculated Load - Applied Load)/Max. Applied Load) X 100 percent

The above instrument was found to be in tolerance in all operating ranges.
The above named instrument has been calibrated by comparison with standards traceable to the NIST, in compliance with ANSI Z540-1.

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**Sister Bar Calibration Report**

Model Number: 4911-4  
Date of Calibration: April 29, 2015

This calibration has been verified/validated as of 06/22/2015

Serial Number: 1512380  
Cable Length: 30 feet

Prestress: 35,000 psi  
Regression Zero: 7106

Temperature: 22.6 °C  
Technician: [Signature]

Calibration Instruction: CI-VW Rebar

<table>
<thead>
<tr>
<th>Applied Load (pounds)</th>
<th>Readings</th>
<th>Linearity % Max. Load</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<tr>
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<td>8552</td>
</tr>
<tr>
<td>4500</td>
<td>9289</td>
<td>9284</td>
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<td>10014</td>
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<td>7156</td>
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</table>

*For conversion factor, load to strain, refer to table C-2 of the Installation Manual*

Gage Factor: 0.348 microstrain/ digit (GK-401 Pos. "B")

Calculated Strain = Gage Factor(Current Reading - Zero Reading)

Note: The above calibration uses the linear regression method.

Users are advised to establish their own zero conditions.

Linearity: ((Calculated Load - Applied Load)/Max. Applied Load) X 100 percent

The above instrument was found to be in tolerance in all operating ranges.
The above named instrument has been calibrated by comparison with standards traceable to the NIST, in compliance with ANSI Z540-1.

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**Sister Bar Calibration Report**

Model Number: 4911-4  
Serial Number: 1512379  
Date of Calibration: April 29, 2015

This calibration has been verified/validated as of 06/22/2015

Cable Length: 30 feet

Prestress: 35,000 psi

Regression Zero: 6858

Technician:

Temperature: 22.6 °C

 Calibration Instruction: **CI-VW Rebar**

<table>
<thead>
<tr>
<th>Applied Load (pounds)</th>
<th>Readings</th>
<th>Linearity % Max. Load</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td>9816</td>
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<tr>
<td>100</td>
<td>6914</td>
<td>6913</td>
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</tbody>
</table>

*For conversion factor, load to strain, refer to table C-2 of the Installation Manual*

**Gage Factor:** 0.343 microstrain/ digit (GK-401 Pos. "B")

**Calculated Strain = Gage Factor(Current Reading - Zero Reading)**

Note: The above calibration uses the linear regression method.

**Users are advised to establish their own zero conditions.**

Linearity: \((\text{Calculated Load - Applied Load)/Max. Applied Load}) \times 100 \text{ percent}\)

The above instrument was found to be in tolerance in all operating ranges.
The above named instrument has been calibrated by comparison with standards traceable to the NIST, in compliance with ANSI Z540-1.

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Sister Bar Calibration Report

Model Number: 4911-4  
Serial Number: 1511625  
Date of Calibration: April 27, 2015  
This calibration has been verified/validated as of 06/22/2015  
Cable Length: 80 feet  
Regression Zero: 7059

Prestress: 35,000 psi  
Temperature: 23.3 °C  
Technician: [Signature]

Calibration Instruction: CI-VW Rebar

<table>
<thead>
<tr>
<th>Applied Load (pounds)</th>
<th>Readings</th>
<th>Linearity % Max. Load</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<tr>
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<td>1500</td>
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</table>

For conversion factor, load to strain, refer to table C-2 of the Installation Manual

Gage Factor: 0.345 microstrain/ digit (GK-401 Pos. "B")

Calculated Strain = Gage Factor(Current Reading - Zero Reading)

Note: The above calibration uses the linear regression method.

Users are advised to establish their own zero conditions.

Linearity: ((Calculated Load - Applied Load)/Max. Applied Load) X 100 percent

The above instrument was found to be in tolerance in all operating ranges.  
The above named instrument has been calibrated by comparison with standards traceable to the NIST, in compliance with ANSI Z540-1.

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Sister Bar Calibration Report

Model Number: 4911-4  
Serial Number: 1512359  
Date of Calibration: April 29, 2015  
This calibration has been verified/validated as of 06/22/2015

Prestress: 35,000 psi  
Cable Length: 80 feet  
Regression Zero: 7188

Temperature: 22.6 °C  
Technician: [Signature]

Calibration Instruction: CI-VW Rebar

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<thead>
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<th>Applied Load (pounds)</th>
<th>Cycle #1</th>
<th>Cycle #2</th>
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<th>Change</th>
<th>Linearity % Max. Load</th>
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<td></td>
</tr>
<tr>
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<tr>
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<td>717</td>
<td>-0.21</td>
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<tr>
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</table>

For conversion factor, load to strain, refer to table C-2 of the Installation Manual

Gage Factor: 0.352 microstrain/ digit (GK-401 Pos. "B")

Calculated Strain = Gage Factor(Current Reading - Zero Reading)

Note: The above calibration uses the linear regression method.

Users are advised to establish their own zero conditions.

Linearity: ((Calculated Load - Applied Load)/Max. Applied Load) X 100 percent

The above instrument was found to be in tolerance in all operating ranges.
The above named instrument has been calibrated by comparison with standards traceable to the NIST, in compliance with ANSI Z540-1.

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## Sister Bar Calibration Report

**Model Number:** 4911-4  
**Date of Calibration:** April 27, 2015

This calibration has been verified/validated as of 06/22/2015

**Serial Number:** 1511611  
**Cable Length:** 90 feet

**Prestress:** 35,000 psi  
**Regression Zero:** 6935

**Temperature:** 23.3 °C  
**Technician:**

**Calibration Instruction:** CI-VW Rebar

<table>
<thead>
<tr>
<th>Applied Load (pounds)</th>
<th>Readings</th>
<th>Linearity % Max. Load</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cycle #1</td>
<td>Cycle #2</td>
</tr>
<tr>
<td>100</td>
<td>6987</td>
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<td>1500</td>
<td>7666</td>
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<tr>
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<td>8402</td>
<td>8410</td>
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<tr>
<td>4500</td>
<td>9156</td>
<td>9147</td>
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<tr>
<td>6000</td>
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<td>9878</td>
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<tr>
<td>100</td>
<td>6987</td>
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</table>

*For conversion factor, load to strain, refer to table C-2 of the Installation Manual*

**Gage Factor:** 0.345 microstrain/digit (GK-401 Pos. "B")

**Calculated Strain** = Gage Factor (Current Reading - Zero Reading)

*Note: The above calibration uses the linear regression method.*

**Users are advised to establish their own zero conditions.**

**Linearity:** ((Calculated Load - Applied Load)/Max. Applied Load) X 100 percent

The above instrument was found to be in tolerance in all operating ranges.
The above named instrument has been calibrated by comparison with standards traceable to the NIST, in compliance with ANSI Z540-1.

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Sister Bar Calibration Report

Model Number: 4911-4
Serial Number: 1511618
Date of Calibration: April 27, 2015
This calibration has been verified/validated as of 06/22/2015
Cable Length: 90 feet
Prestress: 35,000 psi
Regression Zero: 7041
Temperature: 23.3 °C
Technician: [Signature]

Calibration Instruction: CI-VW Rebar

<table>
<thead>
<tr>
<th>Applied Load (pounds)</th>
<th>Readings</th>
<th>Linearity % Max. Load</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cycle #1</td>
<td>Cycle #2</td>
</tr>
<tr>
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<td>7098</td>
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<tr>
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<tr>
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<td>10022</td>
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<tr>
<td>100</td>
<td>7096</td>
<td>7096</td>
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</tbody>
</table>

For conversion factor, load to strain, refer to table C-2 of the Installation Manual

Gage Factor: 0.342 microstrain/ digit (GK-401 Pos. "B")

Calculated Strain = Gage Factor(Current Reading - Zero Reading)

Note: The above calibration uses the linear regression method.

Users are advised to establish their own zero conditions.

Linearity: ((Calculated Load - Applied Load)/Max. Applied Load) X 100 percent

The above instrument was found to be in tolerance in all operating ranges.
The above named instrument has been calibrated by comparison with standards traceable to the NIST, in compliance with ANSI Z540-1.

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APPENDIX F

COMPRESSSION LOAD TEST RESULTS
<table>
<thead>
<tr>
<th>Date</th>
<th>Date Start</th>
<th>Date End</th>
<th>Load Test No.</th>
<th>Test File No.</th>
<th>TEST FILE DISPLACEMENT READINGS</th>
<th>TEST FILE RELATION READINGS</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/21/2015</td>
<td>1/21/2015</td>
<td>1/21/2015</td>
<td>125</td>
<td>125</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Load Test No.**

**Test File No.**

**Load**

**Test File DISPLACEMENT READINGS**

**TEST FILE RELATION READINGS**

**COMMENTS**

---

**PIERCING PILE LOAD TEST DATA**

---

**PROJECT:**

**LOCATION:**

**OWNER:**

**PILE CONTRACTOR:**

---

**Overview of Pile Test Results**

---

**Load Test Data**

---

**Data**

---

**Column**

---

**Comments**

---

**Notes**

---

**Table**

---

**Legend**

---

**Diagram**

---

**Graph**

---

**Report**

---

**Conclusion**

---

**Recommendations**

---
# Compression Pile Load Test Data

**PROJECT:** 104 West 29th Street, New York, NY 10001  
**LOCATION:** New York, New York  
**OWNER:** Museum of Modern Art  
**FILE CONTRACTOR:**  
**PROGRAM:** Geotechnical Engineering  

<table>
<thead>
<tr>
<th>File No.</th>
<th>Test Pile #1</th>
<th>Test Pile #2</th>
<th>Test Pile #3</th>
<th>Test Pile #4</th>
<th>Test Pile #5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load: 100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Reaction: 100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

**Load Test No.:** Test Pile #1  
**Date Start:** 4/17/2009  
**Date End:** 6/16/2010  

## Piecing Contraction

<table>
<thead>
<tr>
<th>Load (tons)</th>
<th>PLANNED PRESSURE</th>
<th>ACTUAL PRESSURE</th>
<th>REACTIONS</th>
<th>DEGREE DEP. (ft-bgs)</th>
<th>DEP. METER (digits)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
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<tr>
<td>150</td>
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<td>200</td>
<td>200</td>
<td>200</td>
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</tbody>
</table>

## Stress Strain

<table>
<thead>
<tr>
<th>GAUGE #</th>
<th>REACTIONS</th>
<th>DEP. METER (digits)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>100</td>
<td>100</td>
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<tr>
<td>150</td>
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<td>150</td>
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<tr>
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<td>200</td>
<td>200</td>
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</tbody>
</table>

## Reaction Pile Elevation Readings

<table>
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<th>REACTION</th>
<th>DISSP (IN)</th>
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</thead>
<tbody>
<tr>
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<td>100</td>
</tr>
<tr>
<td>2</td>
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<td>150</td>
</tr>
<tr>
<td>3</td>
<td>200</td>
<td>200</td>
</tr>
</tbody>
</table>

**Comments:**
- Increase pressure to 2000 psi.
<table>
<thead>
<tr>
<th>% DL</th>
<th>ACT TIME (min.)</th>
<th>HEAD TIME (min.)</th>
<th>PLANNED LOAD (kips)</th>
<th>ACTUAL LOAD (kips)</th>
<th>DIAL READ (kips)</th>
<th>AVG READ (kips)</th>
<th>AVG READ (kips)</th>
<th>AVG READ (kips)</th>
<th>AVG READ (kips)</th>
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</thead>
<tbody>
<tr>
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<td>840.0</td>
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<td>2.154</td>
<td>2.095</td>
<td>2.092</td>
<td>2.119</td>
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</table>

**COMPRESSION PILE LOAD TEST DATA**

**PROJECT:**
- Load Test No.: Test Plan #:
- File No.:
- Proj. Manager:
- Square: Average:
- Field Engineer:

**LOCATION:**
- New York, New York
- Hospital:
- Name:

**FILE SIZE:**
- 14 x 22 on 77 ft long

**Acceptable Load:**
- 30 ft

**Initial Readings:**
- Dial
- Avg

**Final Readings:**
- Dial
- Avg

** komment:**
- Increase from 30 ft to 40 ft

---

**ACTUAL TIME**
- (min.)
- **TIME - DIAL READING**
- **AVG READING**
- **COMMENTS**
- **LOAD**
- **AVAILABLE**
- **Metrosic strain**
- **Gauge 1**
- **Gauge 2**
- **Gauge 3**
- **Gauge 4**
- **Dial**
- **Strain**
- **Reactor pile 1**
- **Reactor pile 2**
- **Reactor pile 3**
- **Reactor pile 4**

---

**GZA Geoenvironment of New York**

104 West 29th Street, New York, NY 10010

---

**Load Test No:**
- Test Plan #:
- File No.:

---

**PILE NO.:**
- 760
- 128
- 126
- 120
- 127
- 128
- 129
- 130
- 131
- 132
- 133
- 134
- 135

---

**PILING CONTRACTOR:**
- Name:
- Address:

---

**PROJECT:**
- Name:
- Address:

---

**LOCATION:**
- New York, New York
- Hospital:
- Name:

---

**FILE SIZE:**
- 14 x 22 on 77 ft long

---

**Acceptable Load:**
- 30 ft

---

**Initial Readings:**
- Dial
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**komment:**
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**ACTUAL TIME**
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- **TIME - DIAL READING**
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- **Gauge 1**
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---

**GZA Geoenvironment of New York**

104 West 29th Street, New York, NY 10010

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**Load Test No:**
- Test Plan #:
- File No.:

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**PILE NO.:**
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**GZA Geoenvironment of New York**

104 West 29th Street, New York, NY 10010

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- Test Plan #:
- File No.:

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- Name:
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**PROJECT:**
- Name:
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**LOCATION:**
- New York, New York
- Hospital:
- Name:

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**FILE SIZE:**
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**komment:**
- Increase from 30 ft to 40 ft

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**ACTUAL TIME**
- (min.)
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**GZA Geoenvironment of New York**

104 West 29th Street, New York, NY 10010

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**Load Test No:**
- Test Plan #:
- File No.:

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**PILE NO.:**
- 760
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- 133
- 134
- 135

---

**PILING CONTRACTOR:**
- Name:
- Address:

---

**PROJECT:**
- Name:
- Address:

---

**LOCATION:**
- New York, New York
- Hospital:
- Name:
## COMPRESSION PILE LOAD TEST DATA

### PROJECT:  GeoEnvironmental of New York  
Location:  745 West 29th Street, New York, NY 10011  
Owner:  Mount Sinai Hospital  
Filing Contractor:  Field Engineering

### Load Test No.: Test Load #2  
Load No. 170  
Proj. Manager:  Direct Services  
Field Engineer:  Direct Services

---

### Load Information:
- **Load Date:** 2/26/2015  
- **Date Start:** 2/26/2015  
- **Date End:** 2/26/2015

### Load Details:
- **Load:** 2,641 kips  
- **Location:** 141 West 29th Street, New York, NY 10001

### Load Test Details:
- **Load Test No.:** Test Load #2  
- **Load No.:** 170

### Load Test Data:

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### Notes:
- Increase 2,600 to 2,600 psi at 20°F.
- MT pressure of 2,600 psi is less than the safety factor of 4.
- Load case in which the factor of safety drops below 2.0.
- Load case in which the factor of safety is greater than 2.0.

---

### Additional Information:
- **Site:** 141 West 29th Street, New York, NY 10001
- **Owner:** Mount Sinai Hospital
- **Filing Contractor:** Field Engineering

---

### Contact Information:
- **Project Manager:** Direct Services
- **Field Engineer:** Direct Services

---

### Site Information:
- **Address:** 141 West 29th Street, New York, NY 10001
- **City:** New York
- **State:** NY
- **Zip Code:** 10001

---

### Technical Details:
- **Load Test Type:** Compression Pile Load Test Data
- **Test Purpose:** Evaluation of pile capacity

### References:
- Geotechnical Engineering of New York
- Mount Sinai Hospital
- Field Engineering
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<th>Date End</th>
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<th>Date of Test Haul</th>
<th>Date of Test Clean Up</th>
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<th>Site Supervisor</th>
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<th>Test Plan No</th>
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**COMPRESSION PILE LOAD TEST DATA**

**PROJECT:**

**LOCATION:**

**FILNGS CONTRACTOR:**

**Fill:**

**Datum:**

**Compression Load:**

**Strain gage Locations:**

**Calibration Factors:**

**Strain gage Collection Factors:**

**Load Test No.:**

**Test Plan No.:**

**Test Plan Title:**

**Test Plan Notes:**

---

**GAGE #**

**Test Site Address:**

**Date Start:**

**Date End:**

**Date of Test:**

**Date of Test Load:**

**Date of Test Haul:**

**Date of Test Clean Up:**

**Field Engineer:**

**Site Supervisor:**

**Test Site Address:**

**Project Manager:**

**Test Plan No.:**

**Test Plan Title:**

**Test Plan Notes:**

---

**COMMENTS**

*Increased from 4400 to 4500 psi*
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<th>DIAL GUAGE READ (°)</th>
<th>DIAL GUAGE READ (°)</th>
<th>DIAL GUAGE READ (°)</th>
<th>AVG READ (°)</th>
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