7-inch thick Asphalt Concrete over 5-inch thick Portland Cement Concrete, 4-inch thick Base Course

**QUATERNARY YOUNGER ALLUVIUM [Qal]**
SANDY SILT - moist, brown, fine sand

SILTY SAND - loose, moist, brown, fine to medium-grained, trace clay, trace fine gravel

**QUATERNARY OLDER ALLUVIUM [Qalo]**
SANDY LEAN CLAY - very stiff, moist, brown sand

SILTY SAND - medium dense, moist, orangish brown, fine to medium-grained, trace clay, trace fine gravel

WELL GRADED SAND with GRAVEL - medium dense, moist, brownish gray, fine to coarse-grained, coarse slate gravel

Becomes dark greenish gray, sandier seams

SILTY SAND with GRAVEL - dense, very moist, fine to coarse-grained, fine gravel (up to 1/2 inch in size)

POORLY GRADED SAND - medium dense, very moist, brown, fine to medium-grained, alternating Well Graded Sand, some fine gravel

SAN PEDRO FORMATION [Qsp]
LEAN CLAY with GRAVEL - moist, dark greenish gray

*Field Tech: JHD*
*Prepared/Date: WL 6/28/2011*
*Checked/Date: LT 10/6/2011*
**ELEVATION (ft)**
165 160 155 150 145 140 135

**DRILLING COMPANY/DRILLING EQUIPMENT**
Tri County Drilling / CME 75

**DRILLING METHOD**
Rotary Wash

**BOREHOLE LOCATION**
Sta 628+70, Lt 11 feet

**DATES DRILLED**

**HOLE DIAMETER**
4-¼ inches

**GROUND EL.**
209 feet

**GROUND-WATER READINGS**
Drilling mud bailed on 5/10/2011. Ground-water level measured at 32 feet below the ground surface on 5/11/2011.

**SAMPLE LOC.**
Sta 628+70, Lt 11 feet

**HOLE DIAMETER**
4-¼ inches

**DEPTH (ft)**
45 50 55 60 65 70 75 80

**% VALUE**
17 13 23 57

**MOISTURE CONTENT**
0.5 2.4 2.9 2.9

**OVA (ppm)**
29.9 26.9 19.2 19.2

**DRIED DENSITY (psf)**
- - - -

**BLOW COUNT (blows/ft)**
102 109 99 88 44 33 33 43

**MOISTURE CONTENT (% of dry wt.)**
26.3 18.7 25.2 19.2 19.2 14.8

**PERCENT PASSING No. 200 SIEVE**
- 21 99 44 43

**DOWHOLE TESTS**

**LOG OF BORING**

**LEAN CLAY - very stiff, very moist, dark bluish gray, trace gravel**

Less gravel

**ELASTIC SILT - stiff, moist, dark greenish gray, some fine to medium sand**

Becomes greenish gray to bluish gray

More fine gravel

**SILTY SAND with GRAVEL - medium dense, moist, dark greenish gray, fine to coarse-grained, fine gravel (up to 3/4 inch in size)**

Some clay, trace gravel

**LEAN CLAY with SAND - very stiff, moist, dark greenish gray to bluish gray, fine sand, trace medium**

LEAN CLAY with GRAVEL - hard, moist, dark gray, coarse gravel

Less gravel

Becomes very stiff, some gravel

Shale interbedded

Field Tech: JHD
Prepared/Date: WL 6/28/2011
Checked/Date: LT 10/6/2011

(Continued on following figure)
<table>
<thead>
<tr>
<th>ELEVATION (ft)</th>
<th>DEPTH (ft)</th>
<th>% N* Value Std Pen Test</th>
<th>OVA (ppm)**</th>
<th>MOISTURE CONTENT (% of dry wt.)</th>
<th>BLOW COUNT (blows/ft)</th>
<th>PERCENT PASSING No. 200 SIEVE</th>
<th>SAMPLE LOC.</th>
</tr>
</thead>
<tbody>
<tr>
<td>125</td>
<td></td>
<td>35</td>
<td>2.9</td>
<td>19.1</td>
<td>-</td>
<td>66</td>
<td>CL</td>
</tr>
<tr>
<td>120</td>
<td></td>
<td>85</td>
<td>2.3</td>
<td>6.0</td>
<td>122</td>
<td>51</td>
<td>ML</td>
</tr>
<tr>
<td>90</td>
<td></td>
<td>90</td>
<td>27</td>
<td>3.5</td>
<td>29.0</td>
<td>-</td>
<td>CL</td>
</tr>
<tr>
<td>95</td>
<td></td>
<td>95</td>
<td>2.9</td>
<td>24.5</td>
<td>-</td>
<td>46</td>
<td></td>
</tr>
</tbody>
</table>

**SANDY LEAN CLAY** - hard, moist, dark gray, fine to coarse sand, some shale interbedded, trace fine gravel (up to 3/4 inch in size)

**SANDY SILT with GRAVEL** - hard, moist, dark greenish gray, gravel (up to 1/4 inch in size), trace clay

**SANDY LEAN CLAY** - very stiff, moist, dark greenish gray

Trace coarse gravel

END OF BORING AT 96 FEET

NOTES:

Hand augered upper 5 feet to avoid damage to utilities. Borehole grouted with cement-bentonite slurry and patched with asphalt concrete.

"N" Value Standard Penetration Test: Number of blows required to drive the SPT sampler 18 inches using a 140 pound automatic hammer falling 30 inches

*Number of blows required to drive the Crandall Sampler 12 inches using a 140 pound automatic hammer falling 30 inches

**Photo Ionization Detector used for OVA readings

---

MTA Westside Subway Extension
Los Angeles, California

LOG OF BORING

Project No.: 4953-10-1561  Figure: A-2.38c
### MTA Westside Subway Extension
Los Angeles, California

**LOG OF BORING**

<table>
<thead>
<tr>
<th>BORING NO.</th>
<th>G-143</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOREHOLE LOCATION</td>
<td>Sta 635+40, Lt 16 feet</td>
</tr>
<tr>
<td>DRILLING COMPANY/DRILLING EQUIPMENT</td>
<td>Tri County Drilling / CME 75</td>
</tr>
<tr>
<td>DRILLING METHOD</td>
<td>Rotary Wash</td>
</tr>
<tr>
<td>HOLE DIAMETER</td>
<td>4-¼ inches</td>
</tr>
<tr>
<td>GROUND EL.</td>
<td>216 feet</td>
</tr>
</tbody>
</table>

**ELEVATION (ft)**

| ELEVATION (ft) | 215 | 210 | 205 | 200 | 195 | 190 | 185 | 180 | 175 | 170 | 165 | 160 | 155 | 150 | 145 | 140 | 135 | 130 | 125 | 120 | 115 | 110 | 105 | 100 | 95 | 90 | 85 | 80 | 75 | 70 | 65 | 60 | 55 | 50 | 45 | 40 |
|---------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| % VALUE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| STUDPENTEST | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| OVA (ppm)** | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| MOISTURE-CONTENT (% of dry wt.) | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| DRY DENSITY (pcf) | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| BLOW COUNT* (blows/ft) | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| PERCENT PASSING No. 200 SIEVE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| SAMPLE LOC. | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| DOWNHOLE TESTS | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Sample Location**

Sta 635+40, Lt 16 feet

**Hole Diameter**

4-¼ inches

**Downhole Tests**

- ML
- CH
- CL
- SC
- SM

**Quaternary Younger Alluvium**

- SANDY SILT - moist, brown, fine sand
- FAT CLAY - medium stiff, moist, brown
- LEAN CLAY - very stiff, moist, orangish brown, trace shale fragments
- CLAYEY SAND - medium dense, brown with greenish gray mottling, fine to medium-grained, abundant shale fragments, layers of Clayey Sand

**Quaternary Older Alluvium**

- LEAN CLAY with GRAVEL - hard, moist, brown, trace shale
- Silt (up to 1 inch in size)
- Becomes very dense, very moist, dark brown, medium-grained, abundant shale fragments
- SILTY SAND with GRAVEL - medium dense, moist, brownish gray, fine to coarse-grained, fine to coarse gravel (up to 1 inch in size)

---

**Notes:**

- This record is an interpretation of subsurface conditions at the exploration location. Latitude and longitude of boring location shown on logs are approximate.
- Subsurface conditions at other locations and at other times may differ. Transitions between strata may be gradual.***

**Prepared/Date:**

YN 6/9/2011

**Checked/Date:**

LT/PE 9/27/2011

**Field Tech:**

JHD

**Project No.:**

4953-10-1561

**Figure:**

A-2.39a

---

**Sample Location:***

- 10-inch thick Asphalt Concrete over 5-inch thick Portland Cement Concrete and 3-inch thick Base Course
- QUATERNARY YOUNGER ALLUVIUM [Qal]
  - SANDY SILT - moist, brown, fine sand
  - FAT CLAY - medium stiff, moist, brown
  - LEAN CLAY - very stiff, moist, orangish brown, trace shale fragments
  - CLAYEY SAND - medium dense, brown with greenish gray mottling, fine to medium-grained, abundant shale fragments, layers of Clayey Sand
- QUATERNARY OLDER ALLUVIUM [Qalo]
  - LEAN CLAY with GRAVEL - hard, moist, brown, trace shale
  - Silt (up to 1 inch in size)
  - Becomes very dense, very moist, dark brown, medium-grained, abundant shale fragments
  - SILTY SAND with GRAVEL - medium dense, moist, brownish gray, fine to coarse-grained, fine to coarse gravel (up to 1 inch in size)
<table>
<thead>
<tr>
<th>ELEVATION (ft)</th>
<th>DEPTH (ft)</th>
<th>%* VALUE STD PENTEST</th>
<th>OVA (ppm)**</th>
<th>MOISTURE CONTENT (% of dry wt.)</th>
<th>DRY DENSITY (pcf)</th>
<th>BLOW COUNT*</th>
<th>PERCENT PASSING No. 200 SIEVE</th>
<th>SAMPLE LOC.</th>
<th>BOREHOLE TESTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>175</td>
<td>41</td>
<td>5.6</td>
<td>13.1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>170</td>
<td>45</td>
<td>5.3</td>
<td>22.6</td>
<td>102</td>
<td>23</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>165</td>
<td>55</td>
<td>5.9</td>
<td>22.1</td>
<td>102</td>
<td>22</td>
<td>72</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>160</td>
<td>60</td>
<td>19</td>
<td>6.2</td>
<td>18.8</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>155</td>
<td>65</td>
<td>19</td>
<td>5.5</td>
<td>22.9</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>150</td>
<td>145</td>
<td>42</td>
<td>3.2</td>
<td>14.2</td>
<td>-</td>
<td>29</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>145</td>
<td>150</td>
<td>3.8</td>
<td>16.7</td>
<td>115</td>
<td>42</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>140</td>
<td>145</td>
<td>3.8</td>
<td>16.7</td>
<td>115</td>
<td>42</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>135</td>
<td>150</td>
<td>3.8</td>
<td>16.7</td>
<td>115</td>
<td>42</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>130</td>
<td>145</td>
<td>3.8</td>
<td>16.7</td>
<td>115</td>
<td>42</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>125</td>
<td>150</td>
<td>3.8</td>
<td>16.7</td>
<td>115</td>
<td>42</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>120</td>
<td>145</td>
<td>3.8</td>
<td>16.7</td>
<td>115</td>
<td>42</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>115</td>
<td>150</td>
<td>3.8</td>
<td>16.7</td>
<td>115</td>
<td>42</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>110</td>
<td>145</td>
<td>3.8</td>
<td>16.7</td>
<td>115</td>
<td>42</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>105</td>
<td>150</td>
<td>3.8</td>
<td>16.7</td>
<td>115</td>
<td>42</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>145</td>
<td>3.8</td>
<td>16.7</td>
<td>115</td>
<td>42</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>95</td>
<td>150</td>
<td>3.8</td>
<td>16.7</td>
<td>115</td>
<td>42</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>90</td>
<td>145</td>
<td>3.8</td>
<td>16.7</td>
<td>115</td>
<td>42</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>85</td>
<td>150</td>
<td>3.8</td>
<td>16.7</td>
<td>115</td>
<td>42</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>80</td>
<td>145</td>
<td>3.8</td>
<td>16.7</td>
<td>115</td>
<td>42</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

**Becomes dense, more shale fragments, layer of Well Graded Sand**

LEAN CLAY - stiff, moist, dark olive brown, trace coarse gravel

**Becomes very stiff, olive brown, trace shale fragments, thin layer of silt**

LEAN CLAY with SAND - stiff, moist, brown, some fine sand, occasional medium

**Becomes very stiff, dark brown, trace coarse shale fragments**

CLAYEY SAND with GRAVEL - medium dense, moist, dark brown, brown and olive brown mottling, fine to coarse-grained, fine gravel (up to 3/4 inch in size)

**Becomes dense, dark olive brown**

LEAN CLAY - very stiff, moist, dark brown, trace shale fragments

---

**DRILLING COMPANY/DRILLING EQUIPMENT**
Tri County Drilling / CME 75

**DRILLING METHOD**
Rotary Wash

**BOREHOLE LOCATION**
Sta 635+40, Lt 16 feet

**DATES DRILLED**

**HOLE DIAMETER**
4-1/4 inches

**GROUND EL.**
216 feet

**GROUND-WATER READINGS**
Drilling mud bailed on 5/12/2011. Ground-water level measured at 35 feet below the ground surface on 5/13/2011.

**Borehole Location**
Tri County Drilling / CME 75

**Drilling Method**
Rotary Wash

**Dates Drilled**

**Hole Diameter**
4-1/4 inches

**Ground El.**
216 feet

**Ground-Water Readings**
Drilling mud bailed on 5/12/2011. Ground-water level measured at 35 feet below the ground surface on 5/13/2011.
**GROUND WATER READINGS**

Drilling mud bailed on 5/12/2011. Ground-water level measured at 35 feet below the ground surface on 5/13/2011.

**DRILLING COMPANY/DRILLING EQUIPMENT**

*Tri County Drilling / CME 75*

**DRILLING METHOD**

*Rotary Wash*

**DATES DRILLED**


**BOREHOLE LOCATION**

*Sta 635+40, Lt 16 feet, 216 feet GROUND EL.*

**HOLE DIAMETER**

*4-¼ inches*

**SAMPLE LOC.**

*Sta 635+40, Lt 16 feet*

**LOG OF BORING**

***SAN PEDRO FORMATION [Qsp]***

**SANDY SILT** - very stiff, moist, olive brown, trace clay, trace shale fragments

**SILTY SAND** - very dense, dry, greenish gray, fine to coarse-grained, occasional fine gravel (up to 3/8 inch in size)

Becomes dark gray, thin layer of gravel

**END OF BORING AT 91½ FEET**

**NOTES:**

Hand augered upper 5½ feet to avoid damage to utilities. Borehole grouted with cement-bentonite slurry and patched with asphalt concrete.

"N" Value Standard Penetration Test: Number of blows required to drive the SPT sampler 18 inches using a 140 pound automatic hammer falling 30 inches

*Number of blows required to drive the Crandall Sampler 12 inches using a 140 pound automatic hammer falling 30 inches*

**Photo Ionization Detector used for OVA readings**

---

**MTA Westside Subway Extension**

Los Angeles, California
### Ground-water readings

Ground-water level measured at 53 feet below the ground surface on 6/2/2011.

<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
<th>MOISTURE CONTENT (% of dry wt.)</th>
<th>DRY DENSITY (pcf)</th>
<th>BLOW COUNT (blows/ft)</th>
<th>PERCENT PASSING No.200 SIEVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>21.2</td>
<td>99</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>13</td>
<td>26.8</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>17.0</td>
<td>113</td>
<td>20</td>
<td>85</td>
</tr>
<tr>
<td>20</td>
<td>17.9</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>8.7</td>
<td>123</td>
<td>42</td>
<td>12</td>
</tr>
<tr>
<td>30</td>
<td>15</td>
<td>22.1</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>8.4</td>
<td>130</td>
<td>45</td>
<td></td>
</tr>
</tbody>
</table>

#### Quaternary Younger Alluvium [Qal]

- **Sandy Silt** - moist, brown, very fine sand
  - Some clay
  - **Silty Sand** - medium dense, moist, light brown, fine-grained
  - **Lean Clay with Sand** - stiff, moist, light brown, fine sand

#### Quaternary Older Aluvium [Qalo]

- **Silty Sand** - medium dense, moist, brown, fine-grained
- **Fat Clay with Sand** - stiff, moist, brown, fine sand, trace medium to coarse sand
  - Trace gravel (up to 3/8 inch in size)
- **Silty Clay** - stiff, moist, olive brown, fine sand, some clay, trace gravel
- **Lean Clay with Sand** - very stiff, moist, light brown, fine to coarse sand, trace gravel (up to 3/4 inch in size)

(Continued on following figure)
MTA Westside Subway Extension
Los Angeles, California

**LOG OF BORING**

**BORING NO.**
G-144 (Continued)

**DEPT**
Sta 642+55, Lt 25 feet

**DATE DRILLED**

**DIA**
4-7/8 inches

**EL**
223 feet

**GROUND WATER READINGS**
Ground-water level measured at 53 feet below the ground surface on 6/2/2011.

**MATERIALS**

- *Silty Sand with Gravel*: very dense, moist, dark olive yellow, fine to coarse-grained, some gravel (up to 1/2 inch in size)

- *Silty Sand*: medium dense, moist, dark olive yellow to olive brown, fine to medium-grained, some coarse, trace fine gravel (up to 1/2 inch in size)

- *Lean Clay with Sand*: very stiff, moist, olive brown, fine to medium sand

- *More Sand*

- *Some Slate Gravel*

- *Fine Sand*, trace fine to coarse gravel (up to 3/8 inch in size)

**FIELD TECH**: AR

*Prepared/Date: YN 6/17/2011*

*Checked/Date: HP/PE 9/19/2011*

(CONTINUED ON FOLLOWING FIGURE)
### LOG OF BORING

**MTA Westside Subway Extension**  
Los Angeles, California

<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
<th>ELEVATION (ft)</th>
<th>%(^\circ) STP PENETTEST</th>
<th>MOISTURE CONTENT (% of dry wt.)</th>
<th>DRY DENSITY (pcf)</th>
<th>BLOW COUNT (blows/ft)</th>
<th>PERCENT PASSING No. 200 SIEVE</th>
<th>SAMPLE LOC.</th>
</tr>
</thead>
<tbody>
<tr>
<td>85</td>
<td>140</td>
<td>39</td>
<td>15.3</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>SC</td>
</tr>
<tr>
<td>90</td>
<td>135</td>
<td>12.1</td>
<td>117</td>
<td>46</td>
<td>33</td>
<td>-</td>
<td>SC</td>
</tr>
<tr>
<td>95</td>
<td>130</td>
<td>21.6</td>
<td>104</td>
<td>31</td>
<td>72</td>
<td>-</td>
<td>CL</td>
</tr>
<tr>
<td>100</td>
<td>125</td>
<td>13.7</td>
<td>110</td>
<td>41</td>
<td>29</td>
<td>-</td>
<td>SC</td>
</tr>
<tr>
<td>105</td>
<td>120</td>
<td>7.9</td>
<td>126</td>
<td>81</td>
<td>-</td>
<td>-</td>
<td>SC</td>
</tr>
<tr>
<td>110</td>
<td>115</td>
<td>51</td>
<td>17.6</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>SC</td>
</tr>
<tr>
<td>115</td>
<td>120</td>
<td>140</td>
<td>15.3</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>SM</td>
</tr>
</tbody>
</table>

**G-144**  
(Continued)

**DRILLING COMPANY/DRILLING EQUIPMENT**  
C & L Drilling / Mayhew 1000

**DRILLING METHOD**  
Rotary Wash

**BOREHOLE LOCATION**  
Sta 642+55, Lt 25 feet

**DATES DRILLED**  

**HOLE DIAMETER**  
4-7/8 inches

**GROUND EL.**  
223 feet

**GROUND-WATER READINGS**  
Ground-water level measured at 53 feet below the ground surface on 6/2/2011.

**GROUND-WATER LEVEL**  
53 feet below the ground surface on 6/2/2011.

**BECOMES HARD, YELLOWISH BROWN**

**CLAYEY SAND with GRAVEL** - dense, moist, dark olive yellow, fine to medium-grained, gravel (up to 1/2 inch in size)

**LEAN CLAY with SAND** - very stiff, moist, dark olive, fine sand, trace silt nodules

**Trace gravel**

**CLAYEY SAND** - dense, fine to medium-grained, trace fine gravel (up to 1/2 inch in size)

**CLAYEY SAND with GRAVEL** - medium dense, moist, brownish gray, fine to coarse-grained, gravel (up to 1/2 inch in size)

**SAN PEDRO FORMATION [Qsp]**

**CLAYEY SAND** - very dense, moist, greenish gray, fine to coarse-grained, trace fine gravel (up to 3/4 inch in size)

**SILTY SAND with GRAVEL** - very dense, moist, greenish gray, fine to coarse-grained

**FIELD TECH:** AR  
**PREPARED/DATE:** YN 6/17/2011  
**CHECKED/DATE:** HP/PE 9/19/2011

(Continued on following figure)
**LOG OF BORING**

<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
<th>ELEVATION (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>125</td>
<td>100</td>
</tr>
<tr>
<td>130</td>
<td>95</td>
</tr>
<tr>
<td>135</td>
<td>90</td>
</tr>
<tr>
<td>140</td>
<td>85</td>
</tr>
<tr>
<td>145</td>
<td>80</td>
</tr>
<tr>
<td>150</td>
<td>75</td>
</tr>
<tr>
<td>155</td>
<td>70</td>
</tr>
<tr>
<td>160</td>
<td>65</td>
</tr>
</tbody>
</table>

**NOTES:**
- Hand augered upper 5 feet due to utilities.
- Borehole grouted with cement-bentonite slurry and patched with quick set cement.
- "N" Value Standard Penetration Test:
  - Number of blows required to drive the SPT sampler 18 inches using a 140 pound automatic hammer falling 30 inches.
- "N" Value Crandall Sampler:
  - Number of blows required to drive the Crandall Sampler 12 inches using a 300 pound hammer falling 18 inches.
- Photo Ionization Detector used for OVA readings.

**Drilling Method:**
- Rotary Wash

**Dates Drilled:**

**Borehole Location:**
- Sta 642+55, Lt 25 feet
- Hole Diameter: 4-7/8 inches
- Borehole diameter: 223 feet

**Ground-Water Readings:**
- Ground-water level measured at 53 feet below the ground surface on 6/2/2011.

**Sample Loc.:**
- Sta 642+55, Lt 25 feet, 223 feet

**OTHER TESTS:**
- BLOW COUNT* (blows/ft)
- DRY DENSITY (pcf)
- PERCENT PASSING No. 200 SIEVE

**Ground and Soils:**
- Moisture Content (% of dry wt.)
- Percent Passing No. 200 Sieve

**Notes:**
- THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.
MTA Westside Subway Extension
Los Angeles, California

LOG OF BORING
Project No.: 4953-10-1561  Figure: A-2.41a

Field Tech: DW  Prepared/Date: YN 6/20/2011
Checked/Date: HP/PE 9/19/2011

ELEVATION (ft)
230 225 220 215 210 205 200 195 18.8 13.6 18.6 16.2 - 16.8 12.9 -

%* VALUE
0.5 0.4 0.0 10 22 10 - 7 - 7 - 16.8 -

STDPENTEST
18.8 13.6 - 16.2 - - - -

MOISTURE CONTENT (% of dry wt.)
104 Push 84 111 5 - - - -

DRY DENSITY (pcf)

BLOW COUNT* (blows/ft)

PERCENT PASSING No. 200 SIEVE

SAMPLE LOC.

FILL [Af]
SILTY SAND with GRAVEL - moist, brown

QUATERNARY YOUNGER ALLUVIUM [Qal]
LEAN CLAY with SAND - very soft, moist, olive grayish brown, fine to medium sand
Trace gravel (up to 3/8 inch in size)

FAT CLAY with SAND - stiff, moist, brown, fine to coarse sand, trace gravel (up to 1/2 inch in size)

POORLY GRADED GRAVEL - loose, moist, brown

POORLY GRADED GRAVEL with CLAY - loose, moist, brown, fine to coarse sand

QUATERNARY OLDER ALLUVIUM [Qalo]
SANDY LEAN CLAY - very stiff, moist, brown, fine to coarse sand
Trace gravel (up to 1/2 inch in size)

TRACE GRAVEL (up to 3/8 inch in size)

Becomes stiff, trace gravel

SILTY SAND - dense, moist, light olive brown, fine to medium-grained, some coarse, some fine gravel (up to 1/2 inch in size)
<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Moisture Content (% of dry wt)</th>
<th>Densities (pcf)</th>
<th>Blow Count (blows/ft)</th>
<th>Percent Passing No. 200 Sieve (v/v)</th>
<th>Sample Location</th>
<th>Downhole Tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>5.6</td>
<td>4</td>
<td>20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>16.0</td>
<td>4</td>
<td>73</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>19.5</td>
<td>4</td>
<td>73</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>17.4</td>
<td>16</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14.8</td>
<td>111</td>
<td>20</td>
<td>61</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>20.4</td>
<td>10</td>
<td>70</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **POORLY GRADED SAND** - loose, moist, brown, fine to coarse-grained, thin layers of Sandy Silt, trace fine gravel (up to 1/2 inch in size)
- **SANDY LEAN CLAY** - very stiff, moist, brown, some fine gravel
- **LEAN CLAY with SAND** - very stiff, moist, brown, some fine gravel (up to 3/4 inch in size)
- **Becomes stiff, with fine gravel**
- **SANDY LEAN CLAY** - very stiff, moist, brown, trace clay, trace gravel (up to 1/2 inch in size)

**GROUND-WATER READINGS**
Drilling mud bailed on 4/15/2011. Ground-water level measured at 71 feet below the ground surface on 4/18/2011.
ELEVATION (ft)
150
145
140
135
130
125
120
115
110
105
100
95
90
85
145
140
135
130
125
120
115
120

DEPTH (ft)

% "VALUE

STANDARD

TEST**

MOISTURE CONTENT
(% of dry wt.)

DENSITY
(pcf)

BLOW COUNT*
(No. 200 SIEVE)

PERCENT PASSING
No. 200 SIEVE

SM

SP

CL

SILTY SAND with GRAVEL - very dense, moist, brown, fine to coarse-grained, gravel (up to 1/2 inch in size)

SILTY SAND - very dense, moist, light brownish gray, fine to medium-grained, iron oxide stains, trace gravel (up to 3/4 inch in size), trace clay

POORLY GRADED SAND with SILT and GRAVEL - medium dense to dense, moist, light brownish gray, fine to coarse-grained, gravel (up to 1/4 inch in size)

SILTY SAND with GRAVEL - very dense, moist, olive yellow, fine to medium-grained, slate gravel (up to 1 1/2 inch in size)

SAN PEDRO FORMATION [Qsp]
SILTY SAND - medium dense, moist, olive, fine sand, trace gravel (up to 3/8 inch in size)

Thin layer of Sandy Silt

SILTY SAND - very dense, brown, fine-grained, iron oxide stains, trace gravel

POORLY GRADED SAND - very dense, moist, brown, fine to medium-grained

LEAN CLAY with SAND - very stiff, moist, gray to light brown, trace gravel (up to 3/8 inch in size)

SANDY LEAN CLAY - hard, moist, gray, fine sand, some medium

Log of Boring
MTA Westside Subway Extension
Los Angeles, California

Drilling Company/Drilling Equipment
C & L Drilling / Mayhew 1000

Borehole Location
Rotary Wash
Sta 648+40, Lt 50 feet

Dates Drilled

Hole Diameter
4-7/8 inches

Ground EL.
231 feet

Ground-Water Readings
Drilling mud bailed on 4/15/2011. Ground-water level measured at 71 feet below the ground surface on 4/18/2011.

This record is an interpretation of subsurface conditions at the exploration location. Latitude and longitude of boring location shown on logs are approximate. Subsurface conditions at other locations and at other times may differ. Interfaces between strata are approximate. Transitions between strata may be gradual.

Field Tech: DW
Prepared/Date: YN 6/20/2011
Checked/Date: HP/PE 9/19/2011

Project No.: 4953-10-1561
Figure: A-2.41c
### Elevation (ft)
- 110
- 105
- 100
- 95
- 90
- 85
- 80
- 75

### Depth (ft)
- 125
- 105
- 130
- 100
- 135
- 95
- 140
- 90
- 145
- 85
- 150
- 80
- 155
- 75
- 160

### Soil Description
- **SC** SANDY LEAN CLAY - very stiff, moist, gray, fine to medium sand, trace fine gravel

### Borehole Location
- End of boring at 121 feet

### Notes:
- Hand augered upper 8 feet to avoid damage to utilities.
- Borehole grouted with cement-bentonite slurry and patched with quick set cement.

### Ground-Water Readings
- Drilling mud bailed on 4/15/2011. Ground-water level measured at 71 feet below the ground surface on 4/18/2011.

### Downhole Tests
- OVA (ppm) **
- Blow Count *
- Dry Density (pcf)
- "N" Value: Number of blows required to drive the SPT sampler 18 inches using a 140 pound automatic hammer falling 30 inches
- *Number of blows required to drive the Crandall Sampler 12 inches using a 380 pound hammer falling 18 inches
- **Photo Ionization Detector used for OVA readings

### Downhole Test:
Downhole Test: NV = Noise/Vibration

---

**This record is an interpretation of subsurface conditions at the exploration locations. Latitude and longitude of boring location shown on logs are approximate. Interfaces between strata are approximate. Transitions between strata may be gradual.**

Field Tech: DW
Prepared/Date: YN 6/20/2011
Checked/Date: HP/PE 9/19/2011
## Log of Boring

**DRILLING COMPANY/DRILLING EQUIPMENT**
C & L Drilling / Mayhew 1000

**BOREHOLE LOCATION**
Drilling mud bailed on 4/21/2011. Ground-water level measured at 32 feet below the ground surface on 5/5/2011 (after two weeks).

**DRILLING METHOD**
Rotary Wash

**DATES DRILLED**

**HOLE DIAMETER**
4-7/8 inches

**GROUND EL.**
239 feet

**GROUND-WATER READINGS**
Drilling mud bailed on 4/21/2011. Ground-water level measured at 32 feet below the ground surface on 5/5/2011 (after two weeks).

<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
<th>ELEVATION (ft)</th>
<th>% VCF</th>
<th>OVA (ppm)**</th>
<th>MOIST CONTENT (% of dry wt.)</th>
<th>DRY DENSITY (pcf)</th>
<th>BLOW COUNT (blows/ft)</th>
<th>PERCENT PASSING No. 200 SIEVE</th>
<th>SAMPLE LOC.</th>
<th>SAMPLE DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>235</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>230</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>225</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>220</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>215</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>210</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>205</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>200</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**SANDY SILT - moist, light brown, fine sand**

**SANDY SAND - moist, light brown, fine to medium-grained, trace slate gravel**

**SANDY SILTY CLAY - medium stiff, moist, brown, fine sand, trace coarse, rootlets (up to 1/4 inch in size)**

**Trace gravel**

**QUATERNARY YOUNGER ALLUVIUM [Qal]**

**SANDY SILT - moist, light brown, fine sand**

**SANDY SILTY CLAY - medium stiff, moist, brown, fine sand, trace coarse, rootlets (up to 1/4 inch in size)**

**Trace gravel**

**QUATERNARY OLDER ALLUVIUM [Qalo]**

**SANDY LEAN CLAY - very stiff, moist, brown, fine sand, trace coarse, trace calcium carbonate nodules, trace magnesium nodules**

**Becomes hard. dark olive, fine to medium sand, trace gravel**

**SILTY SAND - medium dense, moist, brown to yellowish brown, fine to coarse-grained, fine to coarse gravel (up to 1 inch in size), trace clay, trace mica**

**POORLY GRADED SAND with SILT - medium dense, moist, brown to yellowish brown, fine to coarse-grained, trace gravel**

**Alternating with thin layers of Silt**

---

**LOG OF BORING**

MTA Westside Subway Extension
Los Angeles, California

Field Tech: AR
Prepared/Date: YN 9/21/2011
Checked/Date: LT/PE 9/26/2011

Figure: A-2.42a

Project No.: 4953-10-1561
<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
<th>ELEVATION (ft)</th>
<th>% V.</th>
<th>VMD</th>
<th>DRY DENSITY (pcf)</th>
<th>MOISTURE CONTENT (% of dry wt.)</th>
<th>BLOW COUNT* (blows/ft)</th>
<th>PERCENT PASSING No. 200 SIEVE</th>
<th>SAMPLE LOC.</th>
<th>DOWNHOLE TESTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>195</td>
<td>190</td>
<td>16</td>
<td>0.0</td>
<td>19.1</td>
<td>-</td>
<td>-</td>
<td>SM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>195</td>
<td>190</td>
<td>20</td>
<td>3.2</td>
<td>16.7</td>
<td>-</td>
<td>58</td>
<td>CL-ML</td>
<td></td>
<td></td>
</tr>
<tr>
<td>185</td>
<td>180</td>
<td>23</td>
<td>0.5</td>
<td>17.1</td>
<td>-</td>
<td>-</td>
<td>CL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>180</td>
<td>180</td>
<td>57</td>
<td>2.7</td>
<td>17.0</td>
<td>111</td>
<td>27</td>
<td>64</td>
<td></td>
<td></td>
</tr>
<tr>
<td>180</td>
<td>180</td>
<td>17</td>
<td>0.5</td>
<td>21.3</td>
<td>-</td>
<td>-</td>
<td>CL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>180</td>
<td>180</td>
<td>70</td>
<td>2.9</td>
<td>19.0</td>
<td>107</td>
<td>24</td>
<td>CL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>180</td>
<td>180</td>
<td>70</td>
<td>23</td>
<td>29.6</td>
<td>-</td>
<td>-</td>
<td>CL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>75</td>
<td>75</td>
<td>36</td>
<td>7.9</td>
<td>15.7</td>
<td>-</td>
<td>-</td>
<td>CL-ML</td>
<td></td>
<td></td>
</tr>
<tr>
<td>75</td>
<td>75</td>
<td>92</td>
<td>9.2</td>
<td>20.3</td>
<td>108</td>
<td>34</td>
<td>ML</td>
<td></td>
<td></td>
</tr>
<tr>
<td>70</td>
<td>70</td>
<td>25</td>
<td>7.9</td>
<td>16.7</td>
<td>-</td>
<td>-</td>
<td>ML</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Silty Sand** - medium dense, moist, brown, fine to medium-grained, trace coarse

**Sandy Silt** - very stiff, moist, dark olive, fine to coarse sand, trace fine gravel (up to 3/8 inch in size)

**Silty Clay** - stiff, moist, brown, some fine sand, trace medium to coarse, trace fine gravel (up to 1/4 inch in size)

**Sandy Lean Clay** - very stiff, moist, olive brown, fine sand, trace medium and coarse, trace fine gravel (up to 1/4 inch in size)

More sand, slate gravel (up to 1/2 inch in size)

Thin layer of Silty Sand, olive brown, fine to medium-grained

**Silt** - very stiff, wet, dark olive, trace fine sand, some clay

**Sandy Lean Clay** - very stiff, moist, brown to olive brown, fine sand

Thin layers of Silt and Sandy Silt

**Lean Clay** - very stiff, moist, olive brown, trace fine sand

**Sandy Silt** - hard, moist, dark olive, very fine to fine sand, trace fine gravel (up to 1/2 inch in size)

Becomes very stiff, trace fine to coarse gravel (up to 1/4 inch in size)

Becomes olive yellow to dark olive, some clay

---

MTA Westside Subway Extension
Los Angeles, California

---

LOG OF BORING

Field Tech: AR
Prepared/Date: YN 9/21/2011
Checked/Date: LT/PE 9/26/2011

Project No.: 4953-10-1561 Figure: A-2.42b
<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
<th>%N VALUE STD PENTEST</th>
<th>OVA (ppm)**</th>
<th>MOISTURE CONTENT (% of dry wt.)</th>
<th>DRY DENSITY (pcf)</th>
<th>BLOW COUNT* (blows/ft)</th>
<th>PERCENT PASSING No.200 SIEVE</th>
<th>SAMPLE LOC.</th>
<th>GROUND WATER READINGS</th>
</tr>
</thead>
<tbody>
<tr>
<td>120</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>125</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>130</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>135</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>140</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>145</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>150</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>155</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>160</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Sample Loc:** Sta 652+80, Lt 20 feet

**Hole Diameter:** 4-7/8 inches

**Ground El:** 239 feet

---

**Hand augered upper 5 feet due to utilities. Borehole grouted with cement bentonite slurry and patched with asphalt concrete.**

**"N" Value Standard Penetration Test:** Number of blows required to drive the SPT sampler 18 inches using a 140 pound automatic hammer falling 30 inches

**Number of blows required to drive the Crandall Sampler 12 inches using a 300 pound hammer falling 18 inches**

**Photo Ionization Detector used for OVA readings**
**ELEVATION (ft)**

<table>
<thead>
<tr>
<th>Elevation (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>245</td>
</tr>
<tr>
<td>240</td>
</tr>
<tr>
<td>235</td>
</tr>
<tr>
<td>230</td>
</tr>
<tr>
<td>225</td>
</tr>
<tr>
<td>220</td>
</tr>
<tr>
<td>215</td>
</tr>
<tr>
<td>210</td>
</tr>
<tr>
<td>205</td>
</tr>
<tr>
<td>200</td>
</tr>
<tr>
<td>195</td>
</tr>
</tbody>
</table>

**% Value Std Pen Test**

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>0.0</th>
<th>-</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>0.4</td>
<td>18.8</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>0.2</td>
<td>15.7</td>
<td>104</td>
</tr>
<tr>
<td>20</td>
<td>0.5</td>
<td>11.1</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>1.0</td>
<td>20.4</td>
<td>106</td>
</tr>
<tr>
<td>30</td>
<td>1.1</td>
<td>6.3</td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>1.4</td>
<td>20.4</td>
<td>100</td>
</tr>
<tr>
<td>40</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Moisture Content (% of dry wt.)**

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>0.0</th>
<th>-</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>0.4</td>
<td>18.8</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>0.2</td>
<td>15.7</td>
<td>104</td>
</tr>
<tr>
<td>20</td>
<td>0.5</td>
<td>11.1</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>1.0</td>
<td>20.4</td>
<td>106</td>
</tr>
<tr>
<td>30</td>
<td>1.1</td>
<td>6.3</td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>1.4</td>
<td>20.4</td>
<td>100</td>
</tr>
<tr>
<td>40</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Dry Density (pcf)**

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>0.0</th>
<th>-</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>0.4</td>
<td>18.8</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>0.2</td>
<td>15.7</td>
<td>104</td>
</tr>
<tr>
<td>20</td>
<td>0.5</td>
<td>11.1</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>1.0</td>
<td>20.4</td>
<td>106</td>
</tr>
<tr>
<td>30</td>
<td>1.1</td>
<td>6.3</td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>1.4</td>
<td>20.4</td>
<td>100</td>
</tr>
<tr>
<td>40</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Percent Passing No. 200 Sieve**

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>0.0</th>
<th>-</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>0.4</td>
<td>18.8</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>0.2</td>
<td>15.7</td>
<td>104</td>
</tr>
<tr>
<td>20</td>
<td>0.5</td>
<td>11.1</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>1.0</td>
<td>20.4</td>
<td>106</td>
</tr>
<tr>
<td>30</td>
<td>1.1</td>
<td>6.3</td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>1.4</td>
<td>20.4</td>
<td>100</td>
</tr>
<tr>
<td>40</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Downhole Tests**

- **SAMPLE LOC.:** Sta 659+52, Lt 45 feet
- **HOLE DIAMETER:** 4-¼ inches
- **GROUND EL.:** 246 feet

**Drilling Method:** Rotary Wash

**Dates Drilled:** 5/16/2011 - 5/18/2011


**Boring No.:** G-147

**Drilling Company/Drilling Equipment:** Tri Country Drilling / CME 75

**Ground-Water Readings**

- **6-inch thick Asphalt Concrete over 10-inch thick Portland Cement Concrete, No Base Course**

**Quaternary Younger Aluvium [Qal]**

- **Sandy Silt - moist, dark brown, fine sand**
  - Thin layers of Lean Clay
- **Silty Sand - loose, dark brown, fine to medium-grained, slightly porous**
  - LEAN CLAY - very stiff, moist, dark brown, trace gravel

**Quaternary Older Aluvium [Qalo]**

- **Silty Sand with Gravel - medium dense, moist, orange brown to brown, fine to medium-grained**
  - SANDY LEAN CLAY - very stiff, moist, dark orangeish brown, fine to medium sand
- **Silty Gravel with Sand - dense, moist, brownish gray, shale gravel, some quartz gravel, fine to coarse sand**
  - GRAVELLY LEAN CLAY - stiff, moist, dark brown, some coarse shale gravel

**Log of Boring**

MTA Westside Subway Extension
Los Angeles, California

Field Tech: JHD
Prepared/Date: YN 6/13/2011
Checked/Date: HP/LT 10/2/2011

(Continued on following figure)
MTA Westside Subway Extension
Los Angeles, California

**ELEVATION (ft)**
205
200
195
190
185
180
175
170
165
160
155
150
145
140
135
130
125
120
115
110
105
100
95
90
85
80

**DEPT (ft)**
45
50
55
60
65
70
75

**% Value Std. Penetration**
15
1.4
1.4
23.7
112
18.5
1.6
1.6
23

**Moisture Content (% of dry wt.)**
1.4
15.9
10.2
1.1
18.5
13.3
25.7
1.6
13.3

**Dry Density (pcf)**
-20
112
-108
23
94/8"
-112
-114
-113

**Percent Passing No. 200 Sieve**
-38
-32
-63
-50
-22
-23
-90
-59

**Sample Loc.**
CL-ML
SM
CL
SM
CL

**Downhole Tests**

**Silty Clay** - stiff to very stiff, moist, dark orangish brown

**Silty Sand with Gravel** - very dense, moist, orangish brown, some shale and quartz gravel

**Lean Clay with Gravel** - very stiff, moist, dark orangish brown, coarse gravel

**Becomes hard**

**Silty Sand** - very dense, moist, orangish brown, fine to coarse-grained, some fine gravel (up to 3/8 inch in size)

**Sandy Lean Clay** - hard, moist, dark orangish brown, fine to medium sand, trace coarse, trace fine gravel (up to 3/8 inch in size)

---

**Field Tech:** JHD
**Prepared/Date:** YN 6/13/2011
**Checked/Date:** HP/LT 10/2/2011

**Log of Boring**

**Drilling Company/Drilling Equipment**
Tri Country Drilling / CME 75
**Borehole Location**
Sta 659+52, Lt 45 feet

**Drilling Method**
Rotary Wash
**Dates Drilled**

**Hole Diameter**
4-¼ inches
**Ground El.**
246 feet

**Ground-Water Readings**
**LOG OF BORING**

MTA Westside Subway Extension  
Los Angeles, California

---

### Downhole Tests

- **Sample Loc.:** Sta 659+52, Lt 45 feet
- **Hole Diameter:** 4-¼ inches

### Ground-Water Readings


---

### Ground-El. (ft)

- 165
- 160
- 155
- 150
- 145
- 140
- 135
- 130
- 120

### Sample Loc.

- SM
- GW
- CL
- ML

### Downhole Tests

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>% Value Std Pen Test</th>
<th>Ova (ppm)**</th>
<th>Moisture-Content (% of dry wt.)</th>
<th>Dry Density (pcf)</th>
<th>Blow Count (blows/ft)</th>
<th>Percent Passing No.200 Sieve</th>
</tr>
</thead>
<tbody>
<tr>
<td>45</td>
<td>0.4</td>
<td>18.0</td>
<td>-</td>
<td>-</td>
<td>65</td>
<td>SM</td>
</tr>
<tr>
<td>85</td>
<td>0.5</td>
<td>18.0</td>
<td>113</td>
<td>65</td>
<td>25</td>
<td>SM</td>
</tr>
<tr>
<td>90</td>
<td>50/3&quot;</td>
<td>1.1</td>
<td>7.5</td>
<td>-</td>
<td>25</td>
<td>SM</td>
</tr>
<tr>
<td>95</td>
<td>0.6</td>
<td>14.1</td>
<td>119</td>
<td>42</td>
<td>19</td>
<td>SM</td>
</tr>
<tr>
<td>100</td>
<td>50/4&quot;</td>
<td>0.5</td>
<td>8.1</td>
<td>-</td>
<td>20</td>
<td>SM</td>
</tr>
<tr>
<td>105</td>
<td>0.2</td>
<td>17.6</td>
<td>114</td>
<td>78</td>
<td></td>
<td>GW</td>
</tr>
<tr>
<td>110</td>
<td>43</td>
<td>0.0</td>
<td>16.9</td>
<td>-</td>
<td></td>
<td>CL</td>
</tr>
<tr>
<td>115</td>
<td>26.0</td>
<td>99</td>
<td>55</td>
<td>81</td>
<td></td>
<td>ML</td>
</tr>
</tbody>
</table>

---

### Notes

- **Silty Sand** - dense, moist, orangish brown, fine to coarse-grained
- **Silty Sand with Gravel** - very dense, moist, dark gray, fine to coarse-grained, fine gravel (up to 1/2 inch in size)
- **Becomes medium dense, very moist, dark orangish brown**
- **Silty Sand** - very dense, moist, dark orangish brown, fine to coarse-grained, fine gravel (up to 1/2 inch in size)
- **Well Graded Gravel** - dense, moist, dark gray, coarse gravel
- **Sandy Lean Clay** - hard, moist, dark orangish brown, some coarse gravel
- **Trace gravel**
- **Silt with Sand** - hard, very moist, dark brown

---

**Drilling Company/Drilling Equipment**

Tri Country Drilling / CME 75

**Rotary Wash**

**Sta 659+52, Lt 45 feet**

**Dates Drilled**


**Hole Diameter**

4-¼ inches

**Ground El.**

246 feet

---

**Field Tech:** JHD  
**Prepared/Date:** YN 6/13/2011  
**Checked/Date:** HP/LT 10/2/2011  
**Project No.:** 4953-10-1561  
**Figure:** A-2.43c

(Continued on Following Figure)
**Log of Boring**

**Location:** MTA Westside Subway Extension, Los Angeles, California

**Boring No.:** G-147 (Continued)

<table>
<thead>
<tr>
<th>ELEVATION (ft)</th>
<th>DEPTH (ft)</th>
<th>N&quot; VALUE STD. PEN. TEST</th>
<th>OVA (ppm)**</th>
<th>MOISTURE CONTENT (% of dry wt.)</th>
<th>DRY DENSITY (pcf)</th>
<th>BLOW COUNT* (blows/ft)</th>
<th>PERCENT PASSING No. 200 SIEVE</th>
<th>SAMPLE LOC.</th>
</tr>
</thead>
<tbody>
<tr>
<td>160</td>
<td>0</td>
<td>45</td>
<td>18.0</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**End of Boring at 121½ Feet**

**Notes:**
- Hand augered upper 5½ feet to avoid damage to utilities. Borehole grouted with cement-bentonite slurry and patched with asphalt concrete.
- "N" Value Standard Penetration Test: Number of blows required to drive the SPT sampler 18 inches using a 140 pound automatic hammer falling 30 inches.
- *Number of blows required to drive the Crandall Sampler 12 inches using a 140 pound automatic hammer falling 30 inches.
- **Photo Ionization Detector used for OVA readings.

**Drilling Company/Drilling Equipment:**
Tri Country Drilling / CME 75

**Drilling Method:**
Rotary Wash

**Borehole Location:**
Sta 659+52, Lt 45 feet

**Dates Drilled:**

**Hole Diameter:**
4-¾ inches

**Ground El.:**
246 feet

**Ground-Water Readings:**

**Notes:**

Field Tech: JHD
Prepared/Date: YN 6/13/2011
Checked/Date: HP/LT 10/2/2011
<table>
<thead>
<tr>
<th>ELEVATION (ft)</th>
<th>DEPTH (ft)</th>
<th>% VOLUME STUTTERTEST</th>
<th>OVA (ppm)**</th>
<th>MOISTURE CONTENT (% of dry wt.)</th>
<th>DRY DENSITY (pcf)</th>
<th>BLOW COUNT (blows/ft)</th>
<th>PERCENT PASSING No.200 SIEVE</th>
<th>SAMPLE LOC.</th>
<th>DOWNHOLE TESTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>250</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>245</td>
<td></td>
<td></td>
<td>1.5</td>
<td>23.3</td>
<td>97</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>240</td>
<td></td>
<td>10/10&quot;</td>
<td>1.2</td>
<td>25.2</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>235</td>
<td></td>
<td></td>
<td>1.7</td>
<td>16.9</td>
<td>114</td>
<td>28</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>230</td>
<td></td>
<td></td>
<td>21</td>
<td>3.6</td>
<td>18.5</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>225</td>
<td></td>
<td></td>
<td>5.9</td>
<td>21.7</td>
<td>107</td>
<td>20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>220</td>
<td></td>
<td></td>
<td>25</td>
<td>4.7</td>
<td>12.8</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>215</td>
<td></td>
<td></td>
<td>4.1</td>
<td>6.5</td>
<td>124</td>
<td>24</td>
<td>62</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTES:**
- 6-inch Asphalt Concrete over 8-inch thick Portland Cement Concrete, 5-inch thick Base Course
- QUATERNARY YOUNGER ALLUVIUM [Qal] - SANDY SILT - medium stiff, moist, brown, fine sand, slightly porous
- Becomes dark brown, trace clay
- LEAN CLAY - stiff, moist, brown
- (Sample not recovered)
- QUATERNARY OLDER ALLUVIUM [Qalo] - LEAN CLAY with SAND - very stiff, moist, olive brown, fine to medium sand
- Trace slate gravel
- POORLY GRADED SAND with SILT and GRAVEL - medium dense, moist, brown, fine to medium-grained
- SANDY SILT - very stiff, moist, light brown, fine to medium sand, some coarse, some gravel
- Becomes stiff, brown, fine sand, some clay

MTA Westside Subway Extension
Los Angeles, California

LOG OF BORING
Project No.: 4953-10-1561   Figure: A-2.44a
<table>
<thead>
<tr>
<th>ELEVATION (ft)</th>
<th>MOISTURE CONTENT (% of dry wt.)</th>
<th>DRY DENSITY (pcf)</th>
<th>BLOW COUNT* (blows/ft)</th>
<th>SAMPLE LOC.</th>
</tr>
</thead>
<tbody>
<tr>
<td>210</td>
<td>5.2</td>
<td>20.8</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>205</td>
<td>5.9</td>
<td>15.6</td>
<td>119</td>
<td>SM</td>
</tr>
<tr>
<td>200</td>
<td>6.1</td>
<td>19.4</td>
<td>111</td>
<td>CL</td>
</tr>
<tr>
<td>195</td>
<td>6.9</td>
<td>14.9</td>
<td>117</td>
<td>SC</td>
</tr>
<tr>
<td>190</td>
<td>7.1</td>
<td>19.5</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>185</td>
<td>5.4</td>
<td>14.7</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>180</td>
<td>6.7</td>
<td>29.4</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

**GROUND-WATER READINGS**

Drilling mud bailed on 5/16/2011. Ground-water level measured at 41 feet below the ground surface on 5/17/2011.

- LEAN CLAY - stiff, very moist, brown
- SILTY SAND with GRAVEL - medium dense, moist, orangish brown, trace gravel
- Trace gravel
- LEAN CLAY - stiff, very moist, brown
- SANDY LEAN CLAY - very stiff, very moist, reddish brown
- FAT CLAY - very stiff, very moist, brown
- CLAYEY SAND - dense, moist, olive yellow to olive, fine to medium-grained, some coarse, some gravel (up to ½-inch in size)
- Alternating thin fine to medium-grained layers, very dense
- SANDY LEAN CLAY - hard, moist, brownish orange, fine to coarse sand, some gravel
- Becomes more sandy with trace silt

---

MTA Westside Subway Extension
Los Angeles, California
MTA Westside Subway Extension
Los Angeles, California

**LOG OF BORING**

**Boring No.** G-148

**Drilling Company/Drilling Equipment**
C & L Drilling / Mayhew 1000

**Drilling Method**
Rotary Wash

**Dates Drilled**

**Ground El.**
252 feet

**Ground-Water Readings**
Drilling mud bailed on 5/16/2011. Ground-water level measured at 41 feet below the ground surface on 5/17/2011.

**Borehole Location**
Sta 664+00, Lt 15 feet

**Hole Diameter**
4-7/8 inches

**Downhole Tests**

<table>
<thead>
<tr>
<th>Sample Loc.</th>
<th>Depth (ft)</th>
<th>N* Value</th>
<th>Ova (ppm)**</th>
<th>Moisture Content (% of dry wt.)</th>
<th>Dry Density (pcf)</th>
<th>Blow Count* (blows/ft)</th>
<th>Percent Passing No. 200 Sieve</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>120</td>
<td>5.1</td>
<td>19.4</td>
<td>108</td>
<td>34</td>
<td>63</td>
<td>SM</td>
</tr>
<tr>
<td></td>
<td>135</td>
<td>5.1</td>
<td>19.4</td>
<td>108</td>
<td>34</td>
<td>63</td>
<td>CL</td>
</tr>
<tr>
<td></td>
<td>140</td>
<td>5.7</td>
<td>23.6</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>CL</td>
</tr>
<tr>
<td></td>
<td>150</td>
<td>5.1</td>
<td>19.4</td>
<td>108</td>
<td>34</td>
<td>63</td>
<td>SM</td>
</tr>
<tr>
<td></td>
<td>160</td>
<td>5.1</td>
<td>19.4</td>
<td>108</td>
<td>34</td>
<td>63</td>
<td>SM</td>
</tr>
<tr>
<td></td>
<td>170</td>
<td>66</td>
<td>5.9</td>
<td>11.4</td>
<td>-</td>
<td>-</td>
<td>SM</td>
</tr>
<tr>
<td></td>
<td>85</td>
<td>4.3</td>
<td>13.1</td>
<td>113</td>
<td>57</td>
<td>28</td>
<td>SM</td>
</tr>
<tr>
<td></td>
<td>90</td>
<td>32</td>
<td>4.7</td>
<td>13.5</td>
<td>-</td>
<td>-</td>
<td>CL</td>
</tr>
<tr>
<td></td>
<td>95</td>
<td>31</td>
<td>4.4</td>
<td>19.5</td>
<td>-</td>
<td>-</td>
<td>CL</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>5.1</td>
<td>11.7</td>
<td>120</td>
<td>56</td>
<td>29</td>
<td>CL</td>
</tr>
<tr>
<td></td>
<td>105</td>
<td>5.1</td>
<td>11.7</td>
<td>120</td>
<td>56</td>
<td>29</td>
<td>CL</td>
</tr>
<tr>
<td></td>
<td>110</td>
<td>5.1</td>
<td>11.7</td>
<td>120</td>
<td>56</td>
<td>29</td>
<td>CL</td>
</tr>
<tr>
<td></td>
<td>115</td>
<td>5.1</td>
<td>11.7</td>
<td>120</td>
<td>56</td>
<td>29</td>
<td>CL</td>
</tr>
<tr>
<td></td>
<td>120</td>
<td>5.1</td>
<td>11.7</td>
<td>120</td>
<td>56</td>
<td>29</td>
<td>CL</td>
</tr>
</tbody>
</table>

**Notes:**
- Silty sand - very dense, moist, brown, fine-grained, trace clay
- Becomes dense, very moist to wet, orangish brown, fine to medium-grained, some coarse, trace clay and gravel
- Sandy lean clay - moist, brown, fine to coarse sand
- Silty sand - very moist to wet, fine to medium grained
- Sandy lean clay - hard, moist, brown, fine to coarse sand, trace gravel
- Silty sand - dense, moist, brown, fine to coarse-grained, some gravel
- Large slate gravel and small cobble
- Sandy lean clay - hard, moist, brown, fine to coarse sand
- Layers of clayey sand, fine to coarse
- Becomes very stiff

**Log of Boring (Continued on Following Figure)**

Field Tech: AR
Prepared/Date: YN 6/14/2011
Checked/Date: JAG/PE 9/26/2011

(Continued on following figure)
**ELEVATION (ft)**

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Moisture Content (% of dry wt.)</th>
<th>DRY Density (pcf)</th>
<th>BLOW COUNT (blows/ft)</th>
<th>PERCENT PASSING No. 200 SIEVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>160</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>155</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>150</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>145</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>140</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>135</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>130</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>125</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>120</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>115</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>110</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>105</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>56</td>
<td>5.4</td>
<td></td>
<td></td>
<td>54</td>
</tr>
<tr>
<td>54</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24.0</td>
<td>18.7</td>
<td>111</td>
<td>44</td>
<td></td>
</tr>
<tr>
<td>18.7</td>
<td>110</td>
<td>64</td>
<td>68</td>
<td></td>
</tr>
<tr>
<td>16.7</td>
<td>110</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.8</td>
<td>14.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.5</td>
<td>24.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.1</td>
<td>18.7</td>
<td>111</td>
<td>44</td>
<td></td>
</tr>
<tr>
<td>2.3</td>
<td>16.7</td>
<td>110</td>
<td>64</td>
<td></td>
</tr>
<tr>
<td>44</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>44</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>44</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**GROUND-WATER READINGS**

Drilling mud bailed on 5/16/2011. Ground-water level measured at 41 feet below the ground surface on 5/17/2011.

---

**NOTES:**

- Hand augered upper 5 feet to avoid damage to utilities.
- Borehole grouted with cement-bentonite slurry and patched with asphalt concrete.

*N* Value Standard Penetration Test: Number of blows required to drive the SPT sampler 18 inches using a 140 pound automatic hammer falling 30 inches

*Number of blows required to drive the Crandall Sampler 12 inches using a 300 pound hammer falling 18 inches

**Photo Ionization Detector used for OVA readings

---

**SANDY SILT** - hard, moist, brown, fine to coarse sand, some gravel

**SANDY LEAN CLAY** - hard, moist, light brown

Becomes more silty

Mottled brown and gray, some cemented clay layers

**END OF BORING AT 141½ FEET**
# Log of Boring

**MTA Westside Subway Extension**  
Los Angeles, California

**DRILLING COMPANY/DRILLING EQUIPMENT**  
C & L Drilling / Mayhew 1000

**DRILLING METHOD**  
Rotary Wash

**DATE DRILLED**  

**HOLE DIAMETER**  
4-7/8 inches

**GROUND EL.**  
258 feet

---

### Downhole Tests

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>% Value Std. Pen Test</th>
<th>MOISTURE CONTENT (% of dry wt.)</th>
<th>DRY DENSITY (g/cc)</th>
<th>BLOW COUNT (blows/ft)</th>
<th>PERCENT PASSING No. 200 SIEVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>1.9</td>
<td>14.8</td>
<td>108</td>
<td>19</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>21</td>
<td>1.2</td>
<td>12.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>1.7</td>
<td>18.7</td>
<td>97</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>12</td>
<td>4.3</td>
<td>18.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>1.4</td>
<td>9.4</td>
<td>106</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>37</td>
<td>3.2</td>
<td>17.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>2.1</td>
<td>27.4</td>
<td>93</td>
<td>14</td>
<td></td>
</tr>
</tbody>
</table>

**Ground-Water Readings**  

---

### Notes

10-inch thick Asphalt Concrete over 6-inch thick Portland Cement Concrete and 4-inch thick Base Course

**Fill [Af]**

SANDY SILT - moist, brown, trace gravel

**Quaternary Younger Alluvium [Qal]**

SILT with SAND - very stiff, moist, dark olive brown, fine to medium sand, some clay

SILTY SAND with GRAVEL - medium dense, moist, gray, fine to medium-grained, some coarse, slate gravel (up to 1 inch in size)

SILT with SAND - soft, moist, olive brown, very fine sand, trace gravel, some clay

SILTY SAND - medium dense, moist, light brown and gray, fine-grained, trace gravel (up to 1 inch in size)

Becomes brown, fine to medium-grained, with thin layers of Sandy Silt

**Quaternary Older Alluvium [Qalo]**

SANDY LEAN CLAY - hard, moist, brown to gray, fine to coarse sand, slate gravel (up to 3/4 inch in size)

SILT with SAND - stiff, moist, olive brown to gray, with thin layers of fine sand, some clay

---

Field Tech: AR  
Prepared/Date: JF 3/31/2011  
Checked/Date: LT/PE 9/19/2011

(Continued on following figure)
### GROUND WATER READINGS


### SAMPLE LOC.

Sta 670+60, Lt 5 feet

### HOLE DIAMETER

4-7/8 inches

### 258 feet

### BOREHOLE LOCATION

C & L Drilling / Mayhew 1000

### DRILLING METHOD

Rotary Wash

### DATES DRILLED


### GROUND EL.

215

### MOISTURE CONTENT

(\% of dry wt.)

### PERCENT PASSING

No. 200 SIEVE

### SAMPLING METHOD

Pot

### DOWNHOLE TESTS

OVA (ppm)**

### BLOW COUNT* (blows/ft)

### DRY DENSITY

(pcf)

### "N" VALUE

STD. PEN. TEST

### LOG OF BORING

**This record is an interpretation of subsurface conditions at the exploration location. Latitude and longitude of boring location shown on logs are approximate. Subsurface Conditions at other locations and at other times may differ. Interfaces between strata are approximate. Transitions between strata are gradual.**

---

**Field Tech:** AR  
**Prepared/Date:** JF 3/31/2011  
**Checked/Date:** LT/PE 9/19/2011

---

**MTA Westside Subway Extension**  
Los Angeles, California

---

**LOG OF BORING**

<table>
<thead>
<tr>
<th>BORING NO.</th>
<th>4953-10-1561</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure:</td>
<td>A-2.45b</td>
</tr>
</tbody>
</table>

---

**Sample not recovered**
<table>
<thead>
<tr>
<th>ELEVATION (ft)</th>
<th>DEPTH (ft)</th>
<th>% N* VALUE</th>
<th>STD PEN TEST</th>
<th>OVA (ppm)**</th>
<th>MOISTURE CONTENT (% of dry wt.)</th>
<th>DRY DENSITY (pcf)</th>
<th>BLOW COUNT (blows/ft)</th>
<th>PERCENT PASSING #200 SIEVE</th>
<th>SAMPLE LOC.</th>
<th>DOWNHOLE TESTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>175</td>
<td>85</td>
<td>43</td>
<td>1.9</td>
<td>15.4</td>
<td>17.6</td>
<td>110</td>
<td>43</td>
<td>52</td>
<td></td>
<td></td>
</tr>
<tr>
<td>170</td>
<td>90</td>
<td>88</td>
<td>2.9</td>
<td>13.5</td>
<td>-</td>
<td></td>
<td>43</td>
<td>56</td>
<td></td>
<td></td>
</tr>
<tr>
<td>165</td>
<td>95</td>
<td>32</td>
<td>2.7</td>
<td>28.0</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>160</td>
<td>100</td>
<td>14</td>
<td>1.4</td>
<td>19.3</td>
<td>100</td>
<td>46</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>155</td>
<td>105</td>
<td>34</td>
<td>1.7</td>
<td>31.4</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>150</td>
<td>110</td>
<td>62</td>
<td>1.5</td>
<td>17.9</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>145</td>
<td>115</td>
<td>0.9</td>
<td>24.0</td>
<td>101</td>
<td>73</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>140</td>
<td>120</td>
<td>28/10°</td>
<td>1.2</td>
<td>12.0</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Becomes Sandy Lean Clay, gravel (up to 3/8 inch in size)

CLAYEY SAND with GRAVEL - very dense, brown, gravel
(up to 1 inch in size)

Silty Sand - very dense, moist, brown, fine to coarse-grained, with gravel

Thin layers of Clay

Silt - hard, moist, brown to gray, with thin layers of sand, some clay

Thin layer of Silty Sand, brown, fine to medium-grained

Thin layer of Lean Clay, dark brown

Becomes dark brown

Silty Sand with GRAVEL - very dense, wet, brown, fine to coarse-grained, gravel (up to 1/4 inch in size)

Silty Sand - very dense, wet, brown, fine to medium-grained, trace gravel (up to 1 inch in size)

Becomes fine-grained

Coarse gravel layer

Becomes fine to coarse-grained, trace gravel
(up to 1/2 inch in size)

END OF BORING AT 111 1/2 FEET

NOTES:
Hand augered upper 5 feet due to utilities. Borehole grouted with cement-bentonite slurry and patched with asphalt concrete.

*N" Value Standard Penetration Test: Number of blows required to drive the SPT sampler 18 inches using a 140 pound automatic hammer falling 30 inches

*Number of blows required to drive the Crandall Sampler 12 inches using a 300 pound hammer falling 18 inches

**Photo Ionization Detector used for OVA readings
ELEVATION (ft)
260
255
250
245
240
235
230
225
220
215
210
205
200
195
190
185
180
175
170
165
160
155
150
145
140
135
130
125
120
115
110
105
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
15
10
5
0

% VALUE
0.0
7
19
26
35
40

STANDARD PENETRATION
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
This record is an interpretation of subsurface conditions at the exploration location. Latitude and longitude of boring location shown on logs are approximate. Subsurface conditions at other locations and at other times may differ. Interfaces between strata are approximate. Transitions between strata may be gradual.

Field Tech: DW
Prepared/Date: JF 3/31/2011
Checked/Date: LT/PE 9/19/2011

MTA Westside Subway Extension
Los Angeles, California

C & L Drilling / Mayhew 1000

DRILLING COMPANY/DRILLING EQUIPMENT

DRILLING METHOD
Rotary Wash

BOREHOLE LOCATION
Sta 674+70, Lt 15 feet

DATES DRILLED
1/31/2011 - 2/2/2011

HOLE DIAMETER
4-7/8 inches

GROUND WATER READINGS
Drilling mud bailed on 2/2/2011. Ground-water level measured at 22 feet below the ground surface 30 minutes after bailing of drilling mud.

GROUND-WATER CONDITIONS

CLAYEY SAND - medium dense, moist, brown to grayish brown, trace slate gravel (up to 1-1/2 inches in size)

SILTY SAND - very dense, moist, brown to coarse-grained, trace gravel (up to 3/8 inch in size)

LEAN CLAY - very stiff, moist, olive brown, trace sand, trace gravel (up to 1/4 inch in size)

SILTY SAND with GRAVEL - medium dense, moist, gray to brown, fine to coarse-grained

LEAN CLAY with SAND - very stiff, moist, gray

CLAYEY SAND - medium dense, moist, brown to grayish brown, trace slate gravel (up to 1-1/2 inches in size)

SILTY SAND - very dense, moist, brown to coarse-grained, some coarse, trace gravel

SANDY FAT CLAY - very stiff, moist, dark brown and gray

Trace gravel (up to 1/2 inch in size)

Trace gravel (up to 3/8 inch in size)
## LOG OF BORING

### MTA Westside Subway Extension
Los Angeles, California

<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
<th>ELEVATION (ft)</th>
<th>% N* VALUE STD PEN TEST</th>
<th>OVA (ppm)**</th>
<th>MOISTURE CONTENT (% of dry wt.)</th>
<th>DRY DENSITY (pcf)</th>
<th>BLOW COUNT* (blows/ft)</th>
<th>PERCENT PASSING No. 200 SIEVE</th>
<th>SAMPLE LOC.</th>
<th>DOWNHOLE TESTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>120</td>
<td>180</td>
<td>0.1</td>
<td>22.5</td>
<td>103</td>
<td>75</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>115</td>
<td>185</td>
<td>0.0</td>
<td>18.4</td>
<td>-</td>
<td>45</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>110</td>
<td>175</td>
<td>0.0</td>
<td>19.7</td>
<td>103</td>
<td>35</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>105</td>
<td>170</td>
<td>66</td>
<td>0.0</td>
<td>18.3</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>165</td>
<td>0.3</td>
<td>29.5</td>
<td>93</td>
<td>27</td>
<td>26</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>95</td>
<td>175</td>
<td>0.0</td>
<td>19.7</td>
<td>103</td>
<td>53</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>90</td>
<td>180</td>
<td>0.3</td>
<td>29.5</td>
<td>93</td>
<td>27</td>
<td>26</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>85</td>
<td>185</td>
<td>0.0</td>
<td>18.4</td>
<td>-</td>
<td>45</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>80</td>
<td>190</td>
<td>0.0</td>
<td>18.3</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
- Hand augered upper 5 feet to avoid damage to utilities.
- Borehole grouted with cement-bentonite slurry and patched with asphalt concrete.

*"N" Value Standard Penetration Test: Number of blows required to drive the SPT sampler 18 inches using a 140 pound automatic hammer falling 30 inches

**Photo Ionization Detector used for OVA readings

**End of boring at 111 feet

Drilling mud bailed on 2/2/2011. Ground-water level measured at 22 feet below the ground surface 30 minutes after bailing of drilling mud.
**Ground-water Readings**

Drilling mud bailed on 2/1/2011. Ground-water level measured at 37 feet below the ground surface 20 minutes after bailing of drilling mud.

**Quaternary Younger Alluvium**

- **Silty Sand**: moist, light brown to brown, fine to medium-grained, some coarse, trace slate gravel (up to 1/4 inch in size)

**Quaternary Older Alluvium**

- **Lean Clay**: medium stiff, olive brown
- **Silty Sand**: loose, moist, olive brown, fine to medium-grained, some coarse, some gravel
- **Silt**: moist, olive brown, some clay
- **Well-Graded Sand with Silt**: medium dense, moist, gray, fine to coarse-grained, some gravel (up to 1/2 inch in size)
- **Silty Sand**: medium dense, moist, olive brown, fine to medium-grained, some coarse
- **Sandy Silt**: medium stiff, moist, gray, with sand lenses
- **Silty Sand**: loose, moist, gray, fine to medium-grained, trace gravel

**Notes**

- This record is an interpretation of subsurface conditions at the exploration location. Latitude and longitude of boring location shown on logs are approximate. Subsurface conditions at other locations and at other times may differ. Interfaces between strata are approximate. Transitions between strata may be gradual.
<table>
<thead>
<tr>
<th>ELEVATION (ft)</th>
<th>DEPTH (ft)</th>
<th>N% VALUE ST Penet Test</th>
<th>OVA (ppm)</th>
<th>MOISTURE CONTENT (% of dry wt.)</th>
<th>DRY DENSITY (pcf)</th>
<th>BLOW COUNT (blows/ft)</th>
<th>PERCENT PASSING No. 200 SIEVE</th>
<th>SAMPLE LOC.</th>
<th>DOWNHOLE TESTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>230</td>
<td>-</td>
<td>3.0</td>
<td>15.6</td>
<td>107</td>
<td>57</td>
<td></td>
<td>SW</td>
<td></td>
<td></td>
</tr>
<tr>
<td>225</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>38</td>
<td>SW</td>
<td></td>
<td></td>
</tr>
<tr>
<td>220</td>
<td>45</td>
<td>44</td>
<td>8.5</td>
<td>8.3</td>
<td>-</td>
<td>10.8</td>
<td>116</td>
<td>55</td>
<td>SM</td>
</tr>
<tr>
<td></td>
<td>50/6&quot;</td>
<td>8.7</td>
<td>10.3</td>
<td>-</td>
<td>4.9</td>
<td>116</td>
<td>49</td>
<td>SM</td>
<td>ML</td>
</tr>
<tr>
<td></td>
<td>55</td>
<td>3.0</td>
<td>30.9</td>
<td>88</td>
<td>10</td>
<td>39</td>
<td>CL</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>60</td>
<td>28</td>
<td>9.6</td>
<td>19.2</td>
<td>-</td>
<td>5.1</td>
<td>18.8</td>
<td>99</td>
<td>CL</td>
</tr>
<tr>
<td></td>
<td>65</td>
<td>5.1</td>
<td>18.8</td>
<td>99</td>
<td>29</td>
<td>5.1</td>
<td>18.8</td>
<td>99</td>
<td>CL</td>
</tr>
<tr>
<td></td>
<td>70</td>
<td>4.5</td>
<td>23.9</td>
<td>97</td>
<td>54</td>
<td>82</td>
<td>CL</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>75</td>
<td>22</td>
<td>7.0</td>
<td>22.2</td>
<td>-</td>
<td>3.7</td>
<td>27.4</td>
<td>95</td>
<td>CH</td>
</tr>
<tr>
<td></td>
<td>80</td>
<td>3.7</td>
<td>15.3</td>
<td>112</td>
<td>57</td>
<td>3.7</td>
<td>15.3</td>
<td>112</td>
<td>CL</td>
</tr>
</tbody>
</table>

**Ground-Water Readings**

Drilling mud bailed on 2/1/2011. Ground-water level measured at 37 feet below the ground surface 20 minutes after bailing of drilling mud.

- **Silty Sand with Gravel** - very dense, very moist, brown, fine to coarse-grained, gravel (up to 3/4 inch in size)
- **Silt** - hard, moist, reddish brown
- **Silty Sand** - loose, wet, light to dark brown, fine to medium-grained, some coarse, trace gravel (up to 1/2 inch in size), with thin layers of Clayey Silt
- **Slate Gravel** (up to 1 inch in size)
- **Becomes medium dense, thin layer of Well Graded Sand with gravel (up to 1 inch in size)**
- **Sandy Lean Clay** - very stiff, moist, olive brown, trace gravel (up to 1/2 inch in size), with thin layers of Silty Sand
- **Becomes hard**

Field Tech: AR
Prepared/Date: JF 3/31/2011
Checked/Date: LT/PE 9/19/2011

MTA Westside Subway Extension
Los Angeles, California
<table>
<thead>
<tr>
<th>ELEVATION (ft)</th>
<th>DEPTH (ft)</th>
<th>% N* VALUE STD. PENTEST</th>
<th>OVA (ppm)**</th>
<th>MOISTURE CONTENT (% of dry wt.)</th>
<th>DRY DENSITY (pcf)</th>
<th>BLOW COUNT* (blows/ft)</th>
<th>PERCENT PASSING No.200 SIEVE</th>
<th>SAMPLE LOC.</th>
<th>GROUND-WATER READINGS</th>
</tr>
</thead>
<tbody>
<tr>
<td>190</td>
<td></td>
<td>55</td>
<td>1.4</td>
<td>14.0</td>
<td>-</td>
<td>26</td>
<td>SC</td>
<td>CLAYEY SAND with GRAVEL - very dense, wet, brown, fine to medium-grained, some coarse, gravel (up to 1 inch in size)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>85</td>
<td></td>
<td></td>
<td></td>
<td>11.1</td>
<td>123 75</td>
<td>X</td>
<td>SILOY SAND - very dense, very moist, brown, fine to coarse-grained, gravel (up to 1/4 inch in size)</td>
<td></td>
</tr>
<tr>
<td>185</td>
<td></td>
<td>50/5&quot;</td>
<td>6.5</td>
<td>13.3</td>
<td>-</td>
<td>45</td>
<td>SM</td>
<td>WELL GRADED SAND - very dense, wet, gray, fine to coarse-grained, with gravel (up to 3/4 inch in size)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>90</td>
<td></td>
<td></td>
<td></td>
<td>3.6</td>
<td>20.0 105 45</td>
<td>SW</td>
<td>ELASTIC SILT - hard, moist, olive gray to gray, trace sand, calcium carbonate nodules</td>
<td></td>
</tr>
<tr>
<td>180</td>
<td></td>
<td>41</td>
<td>5.8</td>
<td>19.5</td>
<td>-</td>
<td>52</td>
<td>CL</td>
<td>SANDY LEAN CLAY - hard, moist, brown, with gravel (up to 1/4 inch in size)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>175</td>
<td></td>
<td></td>
<td></td>
<td>4.3</td>
<td>15.0 115 52</td>
<td>ML</td>
<td>SANDY SILT - hard, moist, brown, some clay</td>
<td></td>
</tr>
<tr>
<td>170</td>
<td></td>
<td>42</td>
<td>4.9</td>
<td>17.1</td>
<td>-</td>
<td>42</td>
<td>SW</td>
<td>WELL GRADED SAND - wet, brown, fine to coarse-grained, with gravel (up to 1/4 inch in size)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>165</td>
<td></td>
<td></td>
<td></td>
<td>59</td>
<td>2.9 15.1</td>
<td>SP</td>
<td>POORLY GRADED SAND - very dense, moist, fine to coarse-grained, trace gravel (up to 1/4 inch in size)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>160</td>
<td></td>
<td></td>
<td></td>
<td>3.2</td>
<td>14.5 117 49</td>
<td>SM</td>
<td>SILTY SAND - dense, moist, reddish brown, fine to coarse-grained, trace gravel</td>
<td></td>
</tr>
<tr>
<td></td>
<td>155</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>END OF BORING AT 111 FEET</td>
<td></td>
</tr>
</tbody>
</table>

NOTES:
- Hand augered upper 9 feet to avoid damage to utilities.
- Borehole grouted with cement-bentonite slurry and patched with asphalt concrete.
- "N" Value Standard Penetration Test: Number of blows required to drive the SPT sampler 18 inches using a 140 pound automatic hammer falling 30 inches
- *Number of blows required to drive the Crandall Sampler 12 inches using a 300 pound hammer falling 18 inches
- **Photo Ionization Detector used for OVA readings
- Downhole Test: NV = Noise/Vibration

Field Tech: AR
Prepared/Date: JF 3/31/2011
Checked/Date: LT/PE 9/19/2011

MTA Westside Subway Extension
Los Angeles, California
<table>
<thead>
<tr>
<th>BORING NO.</th>
<th>4953-10-1561</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOG OF BORING</td>
<td></td>
</tr>
<tr>
<td>G-154</td>
<td></td>
</tr>
</tbody>
</table>

**MTA Westside Subway Extension**

**Los Angeles, California**

<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
<th>ELEVATION (ft)</th>
<th>%* VALUE</th>
<th>OVA (ppm)**</th>
<th>MOISTURE CONTENT (% of dry wt.)</th>
<th>DRY DENSITY (pcf)</th>
<th>BLOW COUNT (bops/ft)</th>
<th>PERCENT PASSING No.200 SIEVE</th>
<th>SAMPLE LOC.</th>
<th>DOWNHOLE TESTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>274</td>
<td>ML</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>270</td>
<td>CL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>265</td>
<td>ML</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>260</td>
<td>CL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>255</td>
<td>ML</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>250</td>
<td>CL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>245</td>
<td>ML</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>240</td>
<td>CL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>235</td>
<td>CL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**Grass Surface**

SANDY SILT - moist, brown to dark brown

**QUATERNARY YOUNGER/OLDER ALLUVIUM [Qalo]**

SILT with SAND - medium stiff, moist, dark brown, slightly porous, some clay

SANDY LEAN CLAY - very stiff, moist, dark brown

Becomes stiff, dark olive brown, trace sand

**QUATERNARY OLDER ALLUVIUM [Qalo]**

SILT with SAND - stiff, moist, gray, some clay

Becomes hard

LEAN CLAY with SAND - very stiff to hard, moist, brown and gray

Some thin layers of Silty Sand

Trace gravel (up to 3/8 inch in size), thin layer of Silty Sand

SILTY SAND - dense, moist, brown, fine to medium-grained, trace gravel

FAT CLAY - very stiff, moist, gray, trace sand

---

**Drilling mud bailed on 2/9/2011. Ground-water level measured at 50 feet below the ground surface on 2/10/2011.**

---

**Drilling Company/Drilling Equipment**

C & L Drilling / Mayhew 1000

**Drilling Method**

Rotary Wash

**Borehole Location**

Sta 696+10, Lt 10 feet

**Dates Drilled**


**Hole Diameter**

4-7/8 inches

**Ground EL.**

274 feet

---

**Field Tech:** AR

**Prepared/Date:** JF/WL 10/13/2011

**Checked/Date:** PE/RM 10/13/2011

---

**Sample Collection:**

Sta 696+10, Lt 10 feet

**Hole Diameter:** 4-7/8 inches

**Ground EL.:** 274 feet

---

**Logs:**

C & L Drilling / Mayhew 1000

**Rotary Wash**

**Dates Drilled:** 2/9/2011 - 2/10/2011

**Hole Diameter:** 4-7/8 inches

**Ground EL.:** 274 feet

---

**Notes:**

Ground-water readings: Drilling mud bailed on 2/9/2011. Ground-water level measured at 50 feet below the ground surface on 2/10/2011.

---

**Figure:** A-2.48a

---

**Project No.:** 4953-10-1561

**Figure:** A-2.48a
<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Value</th>
<th>OVA (pips)**</th>
<th>Moisture Content (% of dry wt.)</th>
<th>Blown Count* (Blows/ft)</th>
<th>Percent Passing No. 200 Sieve</th>
<th>Sample Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>26</td>
<td>10.0</td>
<td>16.9</td>
<td>-</td>
<td>2</td>
<td>68</td>
<td>ML</td>
</tr>
<tr>
<td>11.4</td>
<td>12.6</td>
<td>115</td>
<td>68</td>
<td>31</td>
<td>SC</td>
<td></td>
</tr>
<tr>
<td>37</td>
<td>7.2</td>
<td>17.3</td>
<td>-</td>
<td>85/8**</td>
<td>45</td>
<td>SM</td>
</tr>
<tr>
<td>12.0</td>
<td>11.1</td>
<td>118</td>
<td>24</td>
<td>85/8**</td>
<td>50</td>
<td>SM</td>
</tr>
<tr>
<td>58</td>
<td>10.2</td>
<td>9.1</td>
<td>-</td>
<td>14</td>
<td>GW</td>
<td></td>
</tr>
<tr>
<td>11.8</td>
<td>10.3</td>
<td>129</td>
<td>14</td>
<td>85/8**</td>
<td>55</td>
<td>SM</td>
</tr>
<tr>
<td>83</td>
<td>1.7</td>
<td>-</td>
<td>-</td>
<td>16</td>
<td>GW</td>
<td></td>
</tr>
<tr>
<td>8.5</td>
<td>10.3</td>
<td>119</td>
<td>16</td>
<td>85/8**</td>
<td>60</td>
<td>SM</td>
</tr>
<tr>
<td>23</td>
<td>10.2</td>
<td>30.1</td>
<td>-</td>
<td>36</td>
<td>ML</td>
<td></td>
</tr>
<tr>
<td>18.5</td>
<td>110</td>
<td>36</td>
<td>-</td>
<td>36</td>
<td>ML</td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>10.5</td>
<td>21.6</td>
<td>-</td>
<td>37</td>
<td>CL</td>
<td></td>
</tr>
<tr>
<td>10.1</td>
<td>26.3</td>
<td>99</td>
<td>37</td>
<td>37</td>
<td>SM</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>5.6</td>
<td>21.9</td>
<td>-</td>
<td>32</td>
<td>CL</td>
<td></td>
</tr>
<tr>
<td>9.8</td>
<td>24.0</td>
<td>93</td>
<td>32</td>
<td>32</td>
<td>CL</td>
<td></td>
</tr>
<tr>
<td>39</td>
<td>7.8</td>
<td>27.1</td>
<td>-</td>
<td>32</td>
<td>CL</td>
<td></td>
</tr>
<tr>
<td>9.2</td>
<td>33.7</td>
<td>87</td>
<td>32</td>
<td>32</td>
<td>CL</td>
<td></td>
</tr>
</tbody>
</table>

**SILT - very stiff, moist, brown and gray, trace sand, trace gravel (up to 1/4 inch in size), some clay

**CLAYEY SAND with GRAVEL - very dense, moist, brown and gray, fine-grained, gravel (up to 3/4 inch in size)

**LEAN CLAY with GRAVEL - hard, moist, brown and gray, gravel (up to 1/2 inch in size)

**Coarse gravel (6 inch layer)

**SILTY SAND with GRAVEL - very dense, moist, brown and gray, fine to coarse-grained, gravel (up to 1/2 inch in size)

**WELL GRADED GRAVEL - very dense, moist, gray, gravel (up to 3/4 inch in size)

**CLAYEY GRAVEL with SAND - very dense, wet, brown, fine to coarse-grained, gravel (up to 3/4 inch in size)

**WELL GRADED GRAVEL - very dense, brown, gravel (up to 1 inch in size), very little recovery

**SILTY SAND with GRAVEL - very dense, wet, brown and gray, fine to coarse-grained, gravel (up to 3/4 inch in size)

**SILT - very stiff, wet, olive brown, trace sand, trace iron oxide stains, some clay

**LEAN CLAY with SAND - very stiff to hard, moist, brown and gray

**Iron oxide stains

**SILTY SAND - dense, wet, olive brown, fine-grained

**SANDY SILT - very stiff, very moist, olive brown, some clay

**LEAN CLAY - very stiff, moist, olive brown

**SILT - hard, moist, brown and gray, some clay

**Thin layer of Silty Sand, fine-grained

**LEAN CLAY with SAND - very stiff, moist, olive gray
<table>
<thead>
<tr>
<th>ELEVATION (ft)</th>
<th>DEPTH (ft)</th>
<th>% N VALUE STD PENTEST</th>
<th>OVA (ppm)**</th>
<th>MOISTURE CONTENT (% of dry wt.)</th>
<th>DRY DENSITY (pcf)</th>
<th>BLOW COUNT (600 s)</th>
<th>PERCENT PASSING No. 200 SIEVE</th>
<th>SAMPLE LOC.</th>
</tr>
</thead>
<tbody>
<tr>
<td>190</td>
<td>2</td>
<td>43</td>
<td>8.0</td>
<td>21.4</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>SM</td>
</tr>
<tr>
<td>185</td>
<td>4</td>
<td>7.2</td>
<td>33.2</td>
<td>93</td>
<td>28</td>
<td>-</td>
<td>-</td>
<td>CL</td>
</tr>
<tr>
<td>180</td>
<td>6</td>
<td>36</td>
<td>8.1</td>
<td>17.4</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>175</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>170</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>165</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>160</td>
<td>14</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>155</td>
<td>16</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**SILTY SAND** - dense, wet, grayish brown, fine-grained

**LEAN CLAY** - very stiff, moist, dark gray, trace sand

Becomes hard, brown and gray, with sand, trace gravel (up to 1 inch in size), iron oxide stains

END OF BORING AT 86½ FEET

NOTES:

Hand augered upper 6 feet to avoid damage to utilities.

Borehole grouted with cement-bentonite slurry.

*"N" Value Standard Penetration Test: Number of blows required to drive the SPT sampler 18 inches using a 140 pound automatic hammer falling 30 inches

*Number of blows required to drive the Crandall Sampler 12 inches using a 300 pound hammer falling 18 inches

**Photo Ionization Detector used for OVA readings
## Log of Boring

**Location:** MTA Westside Subway Extension, Los Angeles, California

**Prepared/Date:** JF 3/29/2011
**Checked/Date:** LT/PE 9/20/2011
**Project No.:** 4953-10-1561

### Downhole Tests

<table>
<thead>
<tr>
<th>Sample Loc.</th>
<th>200 SHEEVE</th>
</tr>
</thead>
</table>

### Ground-Water Readings

Ground-water level measured at 27 feet and 45 feet below the ground surface in shallow and deep monitoring wells, respectively on 6/10/2011. See last page of this boring for details.

### Filling Material

8-inch thick Grass Surface, No Base Course

### Quaternary Younger Alluvium [Qal]

- **Silty Sand with gravel**
- **Sandy Lean Clay**
- **Clayey Sand**
- **Silty Clay**

### Quaternary Older Alluvium [Qalo]

- **Silt**
- **Silty Clay**
- **Silty Sand**
- **Fatty Clay**

### Sample 290

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Elevation (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>280</td>
</tr>
<tr>
<td>5</td>
<td>275</td>
</tr>
<tr>
<td>10</td>
<td>270</td>
</tr>
<tr>
<td>15</td>
<td>265</td>
</tr>
<tr>
<td>20</td>
<td>260</td>
</tr>
<tr>
<td>25</td>
<td>255</td>
</tr>
<tr>
<td>30</td>
<td>250</td>
</tr>
<tr>
<td>35</td>
<td>245</td>
</tr>
</tbody>
</table>

### Ground-Water readings

Ground-water level measured at 27 feet and 45 feet below the ground surface in shallow and deep monitoring wells, respectively on 6/10/2011. See last page of this boring for details.

### Borehole Location

- **Drill Rig:** G-156
- **Drilling Method:** Rotary Wash

### Dates Drilled

2/14/2011 - 2/15/2011
### G-R16 (Continued)

<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
<th>ELEVATION (ft)</th>
<th>% clay</th>
<th>% silt</th>
<th>M.V. Steadman Test</th>
<th>D.V.</th>
<th>BLOW COUNT</th>
<th># No.200 sieve</th>
<th>SAMPLE LOC.</th>
<th>BOREHOLE LOCATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>120</td>
<td>60</td>
<td>27</td>
<td>2.1</td>
<td>17.1</td>
<td>-</td>
<td>200</td>
<td>CL-ML</td>
<td>SILTY CLAY - very stiff, moist, gray, with layers of Silt</td>
<td></td>
</tr>
<tr>
<td>165</td>
<td>122</td>
<td>41</td>
<td>2.5</td>
<td>15.6</td>
<td>-</td>
<td>60</td>
<td>CL-ML</td>
<td>Becomes hard</td>
<td></td>
</tr>
<tr>
<td>170</td>
<td>125</td>
<td>50</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>SW</td>
<td>Trace gravel</td>
<td></td>
</tr>
<tr>
<td>175</td>
<td>128</td>
<td>41</td>
<td>1.9</td>
<td>21.7</td>
<td>-</td>
<td>200</td>
<td>CL-ML</td>
<td>SANDY LEAN CLAY - hard, moist, light brown, fine sand</td>
<td></td>
</tr>
<tr>
<td>180</td>
<td>131</td>
<td>1.0</td>
<td>23.5</td>
<td>100</td>
<td>50</td>
<td>ML</td>
<td>ML</td>
<td>(Sample not recovered)</td>
<td></td>
</tr>
<tr>
<td>185</td>
<td>134</td>
<td>28</td>
<td>1.5</td>
<td>8.9</td>
<td>-</td>
<td>-</td>
<td>SW</td>
<td>WELL GRADED SAND with GRAVEL - very dense, wet, dark gray, fine to coarse-grained</td>
<td></td>
</tr>
<tr>
<td>190</td>
<td>137</td>
<td>50</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>SW</td>
<td>SANDY SILT - moist, brown to gray, fine sand</td>
<td></td>
</tr>
<tr>
<td>195</td>
<td>140</td>
<td>41</td>
<td>2.5</td>
<td>15.6</td>
<td>-</td>
<td>60</td>
<td>CL-ML</td>
<td>SILTY CLAY - hard, moist, brown to gray</td>
<td></td>
</tr>
<tr>
<td>200</td>
<td>143</td>
<td>0.8</td>
<td>23.5</td>
<td>101</td>
<td>60</td>
<td>CL-ML</td>
<td>Alternating with clay layers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>205</td>
<td>146</td>
<td>2.5</td>
<td>15.6</td>
<td>-</td>
<td>60</td>
<td>CL-ML</td>
<td>Thin layer of Silty Sand, brown</td>
<td></td>
<td></td>
</tr>
<tr>
<td>210</td>
<td>149</td>
<td>1.0</td>
<td>23.5</td>
<td>100</td>
<td>50</td>
<td>CL</td>
<td>CL</td>
<td>SANDY LEAN CLAY - hard, moist, gray and brown, fine sand</td>
<td></td>
</tr>
</tbody>
</table>

**Ground-Water Readings**
- Ground-water level measured at 27 feet and 45 feet below the ground surface in shallow and deep monitoring wells, respectively on 6/10/2011. See last page of this boring for details.

**Log of Boring**

- **Tunnel:**
  - **Sample Loc.:** Sta 706+80, Lt 40 feet
  - **Hole Diameter:** 4-7/8 inches
  - **Ground El.:** 282 feet

- **Dates Drilled:** 2/14/2011 - 2/15/2011
- **Drilling Method:** Rotary Wash
- **Drilling Company/Drilling Equipment:** C & L Drilling / Mayhew 1000
- **Dates Drilled:** 2/14/2011 - 2/15/2011
- **Drilling Method:** Rotary Wash
- **Drilling Company/Drilling Equipment:** C & L Drilling / Mayhew 1000

---

**MTA Westside Subway Extension**

Los Angeles, California

---

**Field Tech:** AR

**Prepared/Date:** JF 3/29/2011

**Checked/Date:** LT/PE 9/20/2011

**Log of Boring**

Project No.: 4953-10-1561  Figure: A-2.49c
ELEVATION (ft)
160
155
150
145
140
135
130
125
120
115
110
105
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
15
10
5
0

FIELD TECH: AR
CHECKED/DATE: LT/PE 9/20/2011

GROUND-WATER READINGS
Ground-water level measured at 27 feet and 45 feet below the ground surface in shallow and deep monitoring wells, respectively on 6/10/2011. See last page of this boring for details.

NOTES:
Montoring well was installed on 2/15/2011. See well construction diagram for G-156.

"N" Value Standard Penetration Test: Number of blows required to drive the SPT sampler 18 inches using a 140 pound automatic hammer falling 30 inches

*Number of blows required to drive the Crandall Sampler 12 inches using a 300 pound hammer falling 18 inches

**Photo Ionization Detector used for OVA readings
Drilling mud bailed on 2/22/2011. Ground-water level measured at 15 feet below the ground surface 10 minutes after bailing of drilling mud.

**FILL [Af]**

12-inch thick Asphalt Concrete over 12-inch thick Portland Cement Concrete, No Base Course

**QUATERNARY OLDER ALLUVIUM [Qalo]**

SILT with SAND - medium stiff, moist, olive brown and gray

SANDY SILT - stiff, moist, brown and gray

SILTY SAND - loose, wet, brown, fine to medium-grained, trace gravel

SANDY LEAN CLAY - stiff, moist, gray and brown, trace gravel (up to 3/4 inch in size), scattered calcium carbonate nodules

Becomes very stiff, trace gravel (up to 1/4 inch in size)

Decrease in sand content, becomes olive gray, trace iron oxide stains

Becomes brown

(continued on following figure)
<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Elevation (ft)</th>
<th>% Value Std. Pen Test</th>
<th>OVA (ppm)**</th>
<th>Moisture-Content (% of dry wt.)</th>
<th>Dry Density (pcf)</th>
<th>Blown Count (blows/ft)</th>
<th>Percent Passing No. 200 Sieve</th>
<th>Sample Loc.</th>
<th>Downhole Tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>47</td>
<td>22</td>
<td>8.5</td>
<td>19.3</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>205</td>
<td>52</td>
<td>3.9</td>
<td>21.4</td>
<td>103</td>
<td>29</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>210</td>
<td>55</td>
<td>29</td>
<td>8.1</td>
<td>20.8</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>215</td>
<td>60</td>
<td>43</td>
<td>4.3</td>
<td>20.0</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>220</td>
<td>65</td>
<td>8.6</td>
<td>19.2</td>
<td>101</td>
<td>35</td>
<td>78</td>
<td>MH</td>
<td></td>
<td></td>
</tr>
<tr>
<td>225</td>
<td>70</td>
<td>43</td>
<td>4.3</td>
<td>20.0</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>230</td>
<td>75</td>
<td>52</td>
<td>7.6</td>
<td>19.4</td>
<td>-</td>
<td>39</td>
<td>SC, CL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>235</td>
<td>80</td>
<td>4.8</td>
<td>36.7</td>
<td>87</td>
<td>53</td>
<td>91</td>
<td>SM</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**OVA (ppm)**

- LEAN CLAY with SAND - hard, moist, brown and gray, trace gravel (up to 1/8 inch in size)
- ELLASTIC SILT with SAND - very stiff, moist, gray
- SILTY SAND - very dense, moist, brown, fine to medium-grained, trace gravel (up to 3/8 inch in size), with clay
- SANDY LEAN CLAY - hard, moist, brownish gray
- CLAYEY SAND - very dense, moist, brown, fine to coarse-grained, gravel (up to 3/8 inch in size)
- LEAN CLAY - hard, moist, brown, trace sand
- SILTY SAND - dense, wet, light brown, fine to medium-grained, trace gravel

---

**LOG OF BORING**

**BORING NO.** G-159 (Continued)

**DRILLING COMPANY/DRILLING EQUIPMENT** C & L Drilling / Mayhew 1000

**DRILLING METHOD** Rotary Wash

**BOREHOLE LOCATION** Sta 721+84, Lt 519 feet


**HOLE DIAMETER** 4-7/8 inches

**GROUND EL.** 276 feet

**GROUND-WATER READINGS**

Drilling mud bailed on 2/22/2011. Ground-water level measured at 15 feet below the ground surface 10 minutes after bailing of drilling mud.
MTA Westside Subway Extension
Los Angeles, California

(Continued on following figure)
| ELEVATION (ft) | 155 | 150 | 145 | 140 | 135 | 130 | 125 | 120 | 115 | 110 | 105 | 100 | 95 | 90 | 85 | 80 | 75 | 70 | 65 | 60 | 55 | 50 | 45 | 40 | 35 | 30 | 25 | 20 | 15 | 10 | 5 | 0 |
|---------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| % N VALUE     | 39  | 35  | 31  | 27  | 23  | 19  | 15  | 11  | 7   | 3   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   |
| OVA (ppm)**   | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 |
| DRY DENSITY (pcf) | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   |
| BLOW COUNT* (blows/ft) | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   |
| PERCENT PASSING No. 200 SIEVE | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   |
| SAMPLE LOC. | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   |

**NOTE:**
- Becomes light greenish gray, trace sand
- **END OF BORING AT 121½ FEET**

**NOTES:**
- Hand augered upper 6 feet to avoid damage to utilities.
- Borehole grouted with cement-bentonite slurry and patched with asphalt concrete.
- "N" Value Standard Penetration Test: Number of blows required to drive the SPT sampler 18 inches using a 140 pound automatic hammer falling 30 inches
- *Number of blows required to drive the Crandall Sampler 12 inches using a 300 pound hammer falling 18 inches
- **Photo Ionization Detector used for OVA readings

**GROUND-WATER READINGS**
- Drilling mud bailed on 2/22/2011. Ground-water level measured at 15 feet below the ground surface 10 minutes after bailing of drilling mud.
4-inch thick Asphalt Concrete over 12-inch thick Portland Cement Concrete and 2-inch thick Base Course

**FILL [Af]**
- CLAYEY SAND - moist, gray
- SANDY LEAN CLAY - moist, dark brown, trace brick fragments
- QUATERNARY YOUNGER ALLUVIUM [Qal]
  - LEAN CLAY - very soft, moist, gray
  - Becomes stiff, dark olive brown
- SILTY SAND with GRAVEL - medium dense, moist, olive brown, fine to medium-grained, gravel (up to 1/4 inch in size), some clay, sample disturbed
  - LEAN CLAY with SAND - soft, moist, olive brown
- SANDY SILT - stiff, moist to wet, olive gray
  - QUATERNARY OLDER ALLUVIUM [Qalo]
  - SILTY SAND - loose, wet, gray, fine-grained
  - Becomes medium dense, some gravel
  - Sample not recovered

---

**GROUND-WATER READINGS**
Drilling mud bailed on 2/4/2011. Ground-water level measured at 29 feet below the ground surface 30 minutes after bailing of drilling mud.
<table>
<thead>
<tr>
<th>ELEVATION (ft)</th>
<th>215</th>
<th>210</th>
<th>205</th>
<th>200</th>
<th>195</th>
<th>190</th>
<th>185</th>
<th>180</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depth (ft)</td>
<td>215</td>
<td>45</td>
<td>210</td>
<td>50</td>
<td>205</td>
<td>55</td>
<td>200</td>
<td>60</td>
</tr>
<tr>
<td>% Value STD PENETEST</td>
<td>25</td>
<td>0.0</td>
<td>-</td>
<td>-</td>
<td>62</td>
<td>0.2</td>
<td>-</td>
<td>50</td>
</tr>
<tr>
<td>OVA (ppm)**</td>
<td>0.0</td>
<td>18.0</td>
<td>-</td>
<td>-</td>
<td>0.0</td>
<td>28.0</td>
<td>93</td>
<td>16.9</td>
</tr>
<tr>
<td>Moisture-Content (% of dry wt)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.1</td>
<td>23.0</td>
<td>102</td>
<td>0.0</td>
</tr>
<tr>
<td>Dry Density (pcf)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Blow Count (blows/ft)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.1</td>
<td>23.0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Percent Passing No. 200 Sieve</td>
<td>19</td>
<td>30</td>
<td>17</td>
<td>11</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Sample Loc.</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Downhole Tests</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**G-161 (Continued)**

**Ground Water Readings**

Drilling mud bailed on 2/4/2011. Ground-water level measured at 29 feet below the ground surface 30 minutes after bailing of drilling mud.

- **Silty Sand** with **Gravel** - medium dense, moist to wet, grayish brown, fine to medium-grained, gravel (up to 1/4 inch in size), with layers of Poorly Graded Sand

- **(Sample not recovered)**

- Becomes very dense, dark gray, gravel (up to 1 inch in size)

- **Poorly Graded Sand** - medium dense, moist, brown, fine to medium-grained

- **Silt** - stiff, moist, brown, trace sand

- **Clayey Sand** - moist, olive brown, fine-grained

- **Silt** - hard, moist, olive brown to olive gray

- **Silty Sand** - wet, olive gray

- **Lean Clay** - very stiff, moist, olive gray, trace sand

- Becomes hard, gray, trace gravel (up to 1/4 inch in size)

- **Lean Clay with Sand** - very stiff, moist, gray, fine sand

---

MTA Westside Subway Extension  
Los Angeles, California

---

(Continued on following figure)