SILTY CLAYEY GRAVEL - very dense, moist, dark yellowish brown (7.5YR-3/3), fine to coarse-grained, trace fine gravel (up to 3/8 inch in size)

SILTY SAND - medium dense, wet, dark yellowish brown, fine to coarse-grained, trace gravel

CLAYEY SAND - moist, dark olive gray (5Y 3/2), fine to coarse, trace coarse (up to 1 inch in size), some iron oxide

SILTY SAND - dense, moist, strong brown (7.5YR 5/8), fine to coarse-grained, some fine gravel, trace coarse (up to ½ inch in size)

SILTY CLAYEY SAND - dense, moist, dark brown (10YR 3/3), fine to medium grained, occasional coarse, layers of Silty Clay

Trace fine to coarse gravel

LEAN CLAY with SAND - hard, moist, dark brown, fine sand, trace medium, occasional gravel (up to 3/8 inch in size)
END OF BORING AT 122 FEET

NOTES:

Consistency description on this log is based on pocket penetrometer test results and/or visual observation of soil samples.

Hand augered upper 6 feet to avoid damage to utility.

Borehole grouted with cement-bentonite slurry and patched with asphalt concrete.

*Samples recovered below 67 feet (starting with Run #8) were placed in plastic tubing.
1 2½ inch thick Asphalt Concrete

QUATERNARY YOUNGER ALLUVIUM [Qal]

SILT - moist, brown, trace sand and gravel

Some clay

5-inch shale fragment

Layer of Sandy Silt with Gravel (up to 2 inches in size)

No core recovery from 6 to 9 feet

SILTY SAND with GRAVEL - medium dense, dry to slightly moist, dark greenish gray (10Y 4/1), fine to coarse grained, fine to coarse gravel (up to 2 inches in size)

Layers of Sandy Silt, moist, very dark grayish brown, fine to coarse sand, some fine to coarse gravel

No core recovery from 14 to 15 feet

WELL GRADED SAND with SILT and GRAVEL - dry to slightly moist, dark greenish gray (10Y 4/1), fine to coarse grained, fine to coarse gravel (up to 1½ inches in size)

SILTY CLAYEY SAND - medium dense, moist, dark grayish brown (2.5Y 3/2), fine grained, some medium to coarse, some fine gravel (up to ¾ inch in size), trace cobble (up to 4 inches in size), alternating layers of Sandy Silt

(continues on following figure)

Field Tech: RS/RH
Prepared/Date: YN/WL 9/30/2011
Checked/Date: HP/PE 10/2/2011

MTA Westside Subway Extension
Los Angeles, California

LOG OF BORING
Project No.: 4953-10-1561 Figure: A-3.13a
<table>
<thead>
<tr>
<th>ELEVATION (ft)</th>
<th>DEPTH (ft)</th>
<th>BOX #</th>
<th>RUN #</th>
<th>% RECOVERY</th>
<th>MOISTURE CONTENT (% of dry wt.)</th>
<th>PERCENT PASSING No. 200 SIEVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>285</td>
<td>25</td>
<td>2</td>
<td>3</td>
<td>100</td>
<td>15.7</td>
<td>47</td>
</tr>
<tr>
<td>280</td>
<td>30</td>
<td>3</td>
<td>4</td>
<td>55</td>
<td>4.0</td>
<td></td>
</tr>
<tr>
<td>275</td>
<td>35</td>
<td></td>
<td></td>
<td></td>
<td>6.1</td>
<td>25</td>
</tr>
</tbody>
</table>

**SILTY SAND with GRAVEL** - medium dense, moist, dark greenish gray (10Y 3/1), fine to coarse grained, fine to coarse gravel (up to 1½ inches in size)

Becomes yellowish-brown

No core recovery from 28 to 31 feet

**QUATERNARY OLDER ALLUVIUM [Qalo]**

SILTY SAND with GRAVEL - medium dense, moist, dark greenish gray (10Y 3/1)

Becomes brown (10YR 4/3)

SANDY SILT - very stiff to hard, moist, brown, fine sand, some fine gravel

**GROUND-WATER READINGS**

Ground-water level not measured.

**LOG OF BORING**

<table>
<thead>
<tr>
<th>BORING NO.</th>
<th>813+20, Rt 25 feet</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BORING COMPANY/DRILLING EQUIPMENT</strong></td>
<td>Boart Longyear / 600T Trusonic drill rig</td>
</tr>
<tr>
<td><strong>BORING METHOD</strong></td>
<td>Sonic Coring</td>
</tr>
<tr>
<td><strong>DATES DRILLED</strong></td>
<td>5/27/11 - 5/29/11</td>
</tr>
<tr>
<td><strong>HOLE DIAMETER</strong></td>
<td>6 inches</td>
</tr>
<tr>
<td><strong>GROUND EL.</strong></td>
<td>309 feet</td>
</tr>
</tbody>
</table>

**GINT LOG**

<table>
<thead>
<tr>
<th>RUN #</th>
<th>S-114</th>
</tr>
</thead>
<tbody>
<tr>
<td>HOLE DIAMETER</td>
<td>6 inches</td>
</tr>
<tr>
<td>GROUND EL.</td>
<td>309 feet</td>
</tr>
</tbody>
</table>

**GROUND-WATER READINGS**

Ground-water level not measured.
Alternating layers of Silty Sand, moist, brown, fine to coarse-grained, fine to coarse gravel

SANDY LEAN CLAY - moist, brown, fine to medium sand, trace coarse, occasional fine gravel (up to 3/8 inch in size)

Alternating Sandy Silt, trace fine to coarse gravel

SILT with SAND - moist, brown, fine sand, trace fine gravel

Becomes dark greenish gray with brown spots

SANDY LEAN CLAY - medium stiff, moist, dark greenish gray, brown and varying colors, fine sand, some medium to coarse, trace fine gravel (up to 3/4 inch in size)
<table>
<thead>
<tr>
<th>ELEVATION (ft)</th>
<th>BOX #</th>
<th>RUN #</th>
<th>% RECOVERY</th>
<th>MOISTURE CONTENT (of dry wt.)</th>
<th>PERCENT PASSING No. 200 SIEVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>66</td>
<td>6</td>
<td>7</td>
<td>100</td>
<td>18.8</td>
<td>CL-ML</td>
</tr>
<tr>
<td>70</td>
<td>7</td>
<td>8</td>
<td>100</td>
<td>18.2</td>
<td>ML</td>
</tr>
<tr>
<td>75</td>
<td>8</td>
<td>9</td>
<td>100</td>
<td>19.6</td>
<td>CL</td>
</tr>
<tr>
<td>80</td>
<td>9</td>
<td>10</td>
<td>100</td>
<td>20.0</td>
<td>ML</td>
</tr>
<tr>
<td>83</td>
<td>10</td>
<td>11</td>
<td>100</td>
<td>23.6</td>
<td>CH</td>
</tr>
</tbody>
</table>

**SILTY CLAY with SAND** - medium stiff, moist, brown and dark greenish gray, fine to coarse sand, trace gravel

Fine to coarse gravel

**SANDY SILT with GRAVEL** - stiff, moist, dark greenish gray, fine to coarse sand, fine to coarse gravel (up to 2 inches in size)

**LAKEWOOD FORMATION [Obs]**

**LEAN CLAY with SAND** - medium stiff to stiff, moist, brown, fine sand, trace medium and coarse, occasional gravel (up to 3/8 inch in size)

Becomes dark brown (10YR 3/3)

**FAT CLAY** - very stiff, moist, dark greenish gray with brown mottling, trace fine and medium sand, trace calcium carbonate nodules

---

**Ground-water level not measured.**

---

**DRILLING COMPANY/DRILLING EQUIPMENT**
Boart Longyear / 600T Trusonic drill rig

**DRILLING METHOD**
Sonic Coring

**DATES DRILLED**
5/27/11 - 5/29/11

**HOLE DIAMETER**
6 inches

**GROUNDBORE LOCATION**
813+20, Rt 25 feet

---

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

---

Field Tech: RS/RH
Prepared/Date: YN/WL 9/30/2011
Checked/Date: HP/PE 10/2/2011

MTA Westside Subway Extension
Los Angeles, California

LOG OF BORING
Project No.: 4953-10-1561 Figure: A-3.13d
### Ground-Water Readings

Ground-water level not measured.

### Subsurface Conditions

- **Trace fine gravel, abundant shell fragments, trace calcium carbonate nodules**
- **Occasional fine to medium gravel**
- **Occasional fine gravel**
- **Some fine to coarse sand**
- **SANDY SILT - hard, moist, olive (5Y 5/4), trace fine sand**
  - Alternating with layers of Silt and Clay, moist, olive gray to dark olive gray with brown mottling, trace fine sand
  - Some shell fragments
  - Some calcium carbonate nodules
- **FAT CLAY - hard, moist, olive gray with some brown mottling, trace fine to coarse sand, occasional fine gravel**
  - Some calcium carbonate nodules

### Log of Boring

<table>
<thead>
<tr>
<th>Elevation (ft)</th>
<th>Depth (ft)</th>
<th>BOX #</th>
<th>RUN #</th>
<th>% Recovery</th>
<th>Moisture Content (% of dry wt)</th>
<th>Percent Passing No. 200 Sieve</th>
</tr>
</thead>
<tbody>
<tr>
<td>225</td>
<td>8</td>
<td>9</td>
<td>100</td>
<td>24.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>220</td>
<td>9</td>
<td>10</td>
<td>100</td>
<td>28.1</td>
<td>92</td>
<td></td>
</tr>
<tr>
<td>215</td>
<td>9</td>
<td>10</td>
<td>100</td>
<td>28.2</td>
<td>95</td>
<td></td>
</tr>
<tr>
<td>210</td>
<td>100</td>
<td></td>
<td></td>
<td>24.5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Drilling Company/Drilling Equipment**
Boat Longyear / 600T Trusonic drill rig

**Drilling Method**
Sonic Coring

**Dates Drilled**
5/27/11 - 5/29/11

**Borehole Location**
813+20, Rt 25 feet

**Hole Diameter**
6 inches

**Ground EL.**
309 feet

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

Field Tech: RS/RH
Prepared/Date: YN/WL 9/30/2011
Checked/Date: HP/PE 10/2/2011

MTA Westside Subway Extension
Los Angeles, California

LOG OF BORING
Project No.: 4953-10-1561 Figure: A-3.13e
**FAT CLAY** - hard, moist, brown to grayish green, very few brown mottling, trace fine to coarse sand, trace fine gravel (up to 3/8 inch in size)

No brown mottling, few calcium carbonate nodules

**SANDY LEAN CLAY with GRAVEL** - stiff, moist, dark greenish gray, fine to coarse sand, fine to coarse gravel, some calcium carbonate nodules

**POORLY GRADED SAND** - medium dense to dense, moist to wet, yellowish brown (10YR 5/6), trace fine black slate gravel

**WELL GRADED SAND** - medium dense, moist, yellowish brown to dark yellowish brown, fine to coarse grained, trace fine gravel

**SILTY SAND with GRAVEL** - dense, moist, dark greenish gray, fine to coarse gravel

---

**GROUND-WATER READINGS**

Ground-water level not measured.

---

**LOG OF BORING**

**DRILLING COMPANY/DRILLING EQUIPMENT**
Boart Longyear / 600T Trusonic drill rig

**DRILLING METHOD**
Sonic Coring

**DATES DRILLED**
5/27/11 - 5/29/11

**BOREHOLE LOCATION**
813+20, Rt 25 feet

**GROUND EL.**
309 feet

---

**BORING NO.**
S-114

**RUN #**
S-114

**SAMPLE LOC.**
N

---

**HOLE DIAMETER**
6 inches

---

**S-114**

**HOLE DIAMETER**
6 inches

---

**PERCENT PASSING NO. 200 SIEVE**

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>% Recovery</th>
<th>Moisture Content (% of dry wt.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>105</td>
<td>23.2</td>
<td>N</td>
</tr>
<tr>
<td>110</td>
<td>24.8</td>
<td>ML</td>
</tr>
<tr>
<td>115</td>
<td>19.5</td>
<td>CL</td>
</tr>
<tr>
<td>120</td>
<td>20.5</td>
<td>SW</td>
</tr>
<tr>
<td>125</td>
<td>21.0</td>
<td>SM</td>
</tr>
<tr>
<td>130</td>
<td>20.3</td>
<td></td>
</tr>
<tr>
<td>135</td>
<td></td>
<td></td>
</tr>
<tr>
<td>140</td>
<td></td>
<td></td>
</tr>
<tr>
<td>145</td>
<td></td>
<td></td>
</tr>
<tr>
<td>150</td>
<td></td>
<td></td>
</tr>
<tr>
<td>155</td>
<td></td>
<td></td>
</tr>
<tr>
<td>160</td>
<td></td>
<td></td>
</tr>
<tr>
<td>165</td>
<td></td>
<td></td>
</tr>
<tr>
<td>170</td>
<td></td>
<td></td>
</tr>
<tr>
<td>175</td>
<td></td>
<td></td>
</tr>
<tr>
<td>180</td>
<td></td>
<td></td>
</tr>
<tr>
<td>185</td>
<td></td>
<td></td>
</tr>
<tr>
<td>190</td>
<td></td>
<td></td>
</tr>
<tr>
<td>195</td>
<td></td>
<td></td>
</tr>
<tr>
<td>200</td>
<td></td>
<td></td>
</tr>
<tr>
<td>205</td>
<td></td>
<td></td>
</tr>
<tr>
<td>210</td>
<td></td>
<td></td>
</tr>
<tr>
<td>215</td>
<td></td>
<td></td>
</tr>
<tr>
<td>220</td>
<td></td>
<td></td>
</tr>
<tr>
<td>225</td>
<td></td>
<td></td>
</tr>
<tr>
<td>230</td>
<td></td>
<td></td>
</tr>
<tr>
<td>235</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**FIELD TECH:** RS/RH
**PREPARED/DATE:** YN/WL 9/30/2011
**CHECKED/DATE:** HP/PE 10/2/2011

---

MTA Westside Subway Extension
Los Angeles, California

---

Project No.: 4953-10-1561
Figure: A-3.13f
**Consistency description on this log is based on pocket penetrometer test results and/or visual observation of soil samples.**

**Hand augered upper 7 feet to avoid damage to utilities.**

**Borehole grouted with cement-bentonite slurry and patched with asphalt concrete.**
**18 inch thick Asphalt Concrete over 12 inch thick Base Course**

**FILL [Af]**
SILT - moist, brown, trace sand, trace gravel, some sandy clay

**QUATERNARY OLDER ALLUVIUM (Qalo)**
SANDY SILTY CLAY - hard, moist, dark brown (10YR 3/3), fine to medium sand, trace fine, subrounded gravel (up to ¾ inch in size)

Fine to coarse gravel
More clay
Increasing fine to coarse gravel between 20.7 to 21.2 feet

Layer of silty sand, moist, dark brown, trace fine gravel
Some clay seams

More fine to coarse gravel

More sand
Becomes dark brown, trace fine to medium gravel, trace clay

LEAN CLAY with SAND - very stiff, moist, brown, fine sand, trace medium

SILTY SAND with GRAVEL - dense, moist, dark brown (10YR 4/3), dark brown (10YR 4/3), fine to coarse grained, fine gravel, trace coarse (up to 3 inches in size)
Becomes olive brown (2.5YR 4/3)

Becomes very dense

---

**GROUND WATER READINGS**

Ground-water level not measured.
### Ground-Water Readings

Ground-water level not measured.

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Elevation (ft)</th>
<th>Sample Location</th>
<th>Moisture Content (% of dry wt.)</th>
<th>Percent Passing No. 200 Sieve</th>
</tr>
</thead>
<tbody>
<tr>
<td>45</td>
<td>285</td>
<td>Westwood / VA Hospital Station</td>
<td>6.0 SM</td>
<td></td>
</tr>
<tr>
<td>45</td>
<td>280</td>
<td></td>
<td>4.9 ML</td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>275</td>
<td></td>
<td>4.5 GM</td>
<td></td>
</tr>
<tr>
<td>55</td>
<td>270</td>
<td></td>
<td>3.9 SM</td>
<td>17</td>
</tr>
<tr>
<td>60</td>
<td>265</td>
<td></td>
<td>4.0 GM</td>
<td>23</td>
</tr>
</tbody>
</table>

**SANDY SILT** - hard, moist, dark brown, fine sand, trace fine gravel

**Silty Sand with Gravel** - very dense, moist, varying colors, fine to coarse grained, fine gravel, trace coarse (up to 1 inch in size)

**Silty Gravel with Sand** - very dense, moist, varying colors, fine to coarse sand, fine to coarse gravel (up to 1½ inch in size)
**DRILLING COMPANY/DRILLING EQUIPMENT**
Boart Longyear / 600T Trusonic drill rig

**DRILLING METHOD**
Sonic Coring

**BOREHOLE LOCATION**
838+38, Lt 83 feet

**DATES DRILLED**
5/4/11

**HOLE DIAMETER**
6 inches

**GROUND EL.**
328 feet

---

<table>
<thead>
<tr>
<th>ELEVATION (ft)</th>
<th>DEPTH (ft)</th>
<th>BOX #</th>
<th>RUN #</th>
<th>% RECOVERY</th>
<th>MOISTURE CONTENT (% of dry wt.)</th>
<th>PERCENT PASSING No. 200 SIEVE</th>
<th>SAMPLE LOC.</th>
<th>PROJECT NO.: 4953-10-1561</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100</td>
<td></td>
<td>10</td>
<td>100</td>
<td>6.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>92</td>
<td></td>
<td>11</td>
<td>100</td>
<td>25.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>85</td>
<td></td>
<td>12</td>
<td>100</td>
<td>26.2</td>
<td>92</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>75</td>
<td></td>
<td>13</td>
<td>100</td>
<td>16.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>65</td>
<td></td>
<td>14</td>
<td>100</td>
<td>17.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**GROUND WATER READINGS**
Ground-water level not measured.

---

**SANDY SILT** - hard, moist, brown (10YR 4/3), fine to medium sand, trace clay, increasing plasticity with depth

**LEAN CLAY** - stiff, moist, brown (10YR 4/3), some fine sand, layers of Sandy Lean Clay

Trace fine gravel

Becomes dark brown (10YR 3/3)

**SANDY SILT** - medium stiff, wet, fine to coarse sand, trace fine to coarse gravel

Layer of Silty Sand with Gravel, very dense to dense, moist, dark brown, fine to coarse grained, fine to coarse gravel (up to 1 inch in size)

No Core Recovery between 77 to 78 feet

**SANDY LEAN CLAY** - stiff to very stiff, moist, dark brown, fine to coarse sand, some fine to coarse gravel (up to 2-inch in size), alternating Silty Clay layers

Less clay

---

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

---

**LOG OF BORING**

*Continued on following figure*
### LOG OF BORING

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

<table>
<thead>
<tr>
<th>ELEVATION (ft)</th>
<th>DEPTH (ft)</th>
<th>RUN #</th>
<th>% RECOVERY</th>
<th>MOISTURE CONTENT (% of dry wt)</th>
<th>PERCENT PASSING No. 200 SIEVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>245</td>
<td>100</td>
<td>7.2</td>
<td>22</td>
<td>CL</td>
<td>Silty Sand seams</td>
</tr>
<tr>
<td>245</td>
<td>14</td>
<td>8.5</td>
<td>12</td>
<td>ML</td>
<td>Silty Sand seams</td>
</tr>
<tr>
<td>240</td>
<td>15</td>
<td>7.6</td>
<td>16.3</td>
<td>SM</td>
<td>Silty Sand seams</td>
</tr>
</tbody>
</table>

**BORING NO.**  
S-115  
(Continued)

**DRILLING COMPANY/DRILLING EQUIPMENT**  
Boart Longyear / 600T Trusonic drill rig

**BORING LOCATION**  
838+38, Lt 83 feet

**HOLE DIAMETER**  
6 inches

**DATES DRILLED**  
5/4/11

**GROUND EL.**  
328 feet

**GROUND-WATER READINGS**  
Ground-water level not measured.

**CL**  
Silty Sand seams

**SM**  
Silty Sand seams

**ML**  
Sandy Silt - stiff to medium stiff, moist, dark brown (10YR 3/3), fine to coarse sand, trace fine to coarse gravel

Becomes wet, dark brown

**CL**  
Sandy Lean Clay - stiff to very stiff, moist, dark brown (10YR 3/3), trace fine grained, trace fine to medium gravel

**GP-GM**  
Poorly Graded Gravel with Silt and Sand - dense, moist, very dark gray (2.5Y 3/1), fine to coarse grained, fine gravel, trace coarse (up to 1 inch in size)

Becomes very dense, dark brown (10Y 3/3), breaks apart during sampling

**GP**  
Sandy Silt - hard, moist, brown (10YR 4/3), fine to coarse sand, medium gravel

Layer of silty gravel with sand

**SM**  
Silty Sand with Gravel - dense, moist, brown, fine to coarse sand, fine to coarse gravel

(Continued on following figure)
SANDY LEAN CLAY - stiff, moist, brown, fine sand, trace fine gravel

Silty Sand with GRAVEL - dense, moist, very dark greenish brown (2.5Y 3/2), fine to coarse grained, fine gravel, trace coarse (up to 1 inch in size)

No Core Recovery from 107 to 107.5 feet

SANDY SILT with GRAVEL - hard, moist, brown (10YR 4/3), fine to coarse sand, fine to coarse subrounded gravel (up to 1 inch in size)

Occasional fine gravel, layers of Silty Sand

More fine gravel

More sand layers from 119.5 to 120 feet
**LOG OF BORING**

**BORING NO.**

**S-115**

(Continued)

<table>
<thead>
<tr>
<th>ELEVATION (ft)</th>
<th>DEPTH (ft)</th>
<th>BOX #</th>
<th>RUN #</th>
<th>% RECOVERY</th>
<th>MOISTURE CONTENT (% of dry wt.)</th>
<th>PERCENT PASSING No. 200 SIEVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>140</td>
<td>135</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>135</td>
<td>130</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>130</td>
<td>125</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>125</td>
<td>205</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>200</td>
<td>205</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>205</td>
<td>325</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>325</td>
<td>328</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**DRILLING COMPANY/DRILLING EQUIPMENT**
Boart Longyear / 600T Trusonic drill rig

**DRILLING METHOD**
Sonic Coring

**BOREHOLE LOCATION**
838+38, Lt 83 feet

**DATES DRILLED**
5/4/11

**HOLE DIAMETER**
6 inches

**GROUND EL.**
328 feet

**GROUND-WATER READINGS**
Ground-water level not measured.

**NOTES:**

Consistency description on this log is based on pocket penetrometer test results and/or visual observation of soil samples.

Hand augered upper 7 feet to avoid damage to utilities.

Borehole grouted with cement-bentonite slurry and patched with asphalt concrete.

---

.END OF BORING AT 122 FEET

Field Tech: RH
Prepared/Date: PK/WL 10/1/2011
Checked/Date: HP/PE 10/2/2011

MTA Westside Subway Extension
Los Angeles, California
12-inch thick Asphalt Concrete over 4 inch thick Portland Cement Concrete, 2-inch thick Base Course

**FILL [Af]**
Silty Clay - moist, blueish-gray, trace black gravel, trace orange brick fragments (less than 4 inches in size)

No Core Recovery from 7 to 9 feet

**TAR IMPACTED SOILS**

**QUATERNARY OLDER ALLUVIUM [Qalo]**
Lean Clay with Sand - stiff to medium stiff, wet, dark greenish gray (5G 3/1) with black to dark brown tar spots, fine to coarse sand, trace fine to coarse gravel (up to 1 inch in size), some calcium carbonate nodules, tar content increases with depth, some Sandy Clay seams

**SAN PEDRO FORMATION [Qsp]**
San Pedro Clay - hard, moist, dark brown to black, trace fine gravel, slightly to moderately infused tar
Silt with Sand - hard, moist, dark brown to black, varying shades of dark greenish gray, fine to medium sand, slightly to moderately infused tar

Layers of Sandy Silt

No Core Recovery between 17 to 18 feet

**POORLY GRADED SAND with SILT** - dense, moist, fine to medium-grained, saturated with tar (19%)
<table>
<thead>
<tr>
<th>BOREHOLE LOCATION</th>
<th>512-50, Lt 17 feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>BORING NO.</td>
<td>S-116</td>
</tr>
<tr>
<td>(Continued)</td>
<td></td>
</tr>
<tr>
<td>DRILLING COMPANY/DRILLING EQUIPMENT</td>
<td>Boart Longyear / 600T Trusonic drill rig</td>
</tr>
<tr>
<td>DATES DRILLED</td>
<td>4/11/11 and 4/12/11</td>
</tr>
<tr>
<td>HOLE DIAMETER</td>
<td>6 inches</td>
</tr>
<tr>
<td>GROUND EL.</td>
<td>185 feet</td>
</tr>
<tr>
<td>ELEVATION (ft)</td>
<td></td>
</tr>
<tr>
<td>BOX #</td>
<td></td>
</tr>
<tr>
<td>RUN #</td>
<td></td>
</tr>
<tr>
<td>% MOISTURE CONTENT</td>
<td></td>
</tr>
<tr>
<td>PERCENT PASSING No. 200 SIEVE</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
<th>25</th>
<th>30</th>
<th>35</th>
<th>40</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAMPLE LOC.</td>
<td>M</td>
<td>ML</td>
<td>ML</td>
<td>ML</td>
</tr>
</tbody>
</table>

SANDY SILT - hard, moist, dark brown to black, shades of dark greenish gray, moist, slightly to moderately infused tar

Less sand, some clay

No Core Recovery between 27 to 29 feet

POORLY GRADED SAND with SILT - medium dense to dense, moist, dark greenish gray, fine to medium grained, saturated with tar

No Core Recovery between 37 to 38 feet

Becomes fine grained, some medium and coarse, saturated with tar (17%)
Trace fine slate gravel

Trace fine to coarse gravel (up to 1½ inches in size), subrounded

Layer of Silty Sand, fine grained, occasional medium and coarse, trace gravel (up to 3/8 inch in size), saturated with tar (18%)

Trace fine gravel

More fine to coarse gravel (up to 2½ inches in size), fine to coarse sand

No gravel, fine to medium sand

Fine to coarse sand, trace fine to coarse gravel

SILTY SAND with GRAVEL - moist, dark gray, fine to medium grained

SANDY SILT - wet, black, fine sand, saturated with tar

---

BORING NO. 116 (Continued)

**LOG OF BORING**

<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
<th>ELEVATION (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>45</td>
<td>140</td>
</tr>
<tr>
<td>50</td>
<td>135</td>
</tr>
<tr>
<td>55</td>
<td>130</td>
</tr>
<tr>
<td>60</td>
<td>125</td>
</tr>
<tr>
<td>65</td>
<td>120</td>
</tr>
<tr>
<td>70</td>
<td>115</td>
</tr>
<tr>
<td>75</td>
<td>110</td>
</tr>
</tbody>
</table>

**HOLE DIAMETER**

6 inches

**GROUND EL.**

BOX #

185 feet

**% RECOVERY**

100

**MOISTURE CONTENT** (% of dry wt.)

Ground-water level not measured.

**PERCENT PASSING**

No. 200 SIEVE

16

**SAMPLE LOC.**

512+50, Lt 17 feet

---

**BORING LOCATION**

Measurement Table:

<table>
<thead>
<tr>
<th>Run #</th>
<th>Ground-water level</th>
</tr>
</thead>
<tbody>
<tr>
<td>4/11/11</td>
<td>Measured</td>
</tr>
<tr>
<td>4/12/11</td>
<td>Measured</td>
</tr>
</tbody>
</table>

---

**DRILLING COMPANY/DRILLING EQUIPMENT**

Boart Longyear / 600T Trusonic drill rig

**DRILLING METHOD**

Sonic Coring

**DATES DRILLED**

4/11/11 and 4/12/11

Field Tech: RS/PH

Prepared/Date: YN/WL 9/29/2011

Checked/Date: LT/PE 9/29/2011

---

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.

---

MTA Westside Subway Extension
Los Angeles, California

Project No.: 4953-10-1561

Figure: A-3.15c

Los Angeles, California

---

Project: MTA Westside Subway Extension

Los Angeles, California

---

Note: The document contains a table with various measurements and a section on log interpretation. The table includes depth measurements, elevation, moisture content, and percent passing. The log interpretation describes the subsurface conditions encountered during drilling.
<table>
<thead>
<tr>
<th>ELEVATION (ft)</th>
<th>DEPTH (ft)</th>
<th>BOX #</th>
<th>RUN #</th>
<th>% RECOVERY</th>
<th>MOISTURE CONTENT (% of dry wt.)</th>
<th>PERCENT PASSING No. 200 SIEVE</th>
<th>SAMPLE LOC.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Trace fine gravel, saturated with tar (18%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Some shell fragments</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>FERNANDO FORMATION [TF]</td>
<td>SILTSTONE with Sand - hard, moist, dark brown, fine sand, fine to medium sands, slightly to moderately infused tar</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Saturated with tar (20%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No Core Recovery from 77.7 to 78.2 feet</td>
<td>Thin layer of Silty Sand, moist, black, medium to coarse grained, saturated with tar</td>
<td></td>
</tr>
</tbody>
</table>

**GROUND-WATER READINGS**
Ground-water level not measured.

**DRILLING COMPANY/DRILLING EQUIPMENT**
Boart Longyear / 600T Trusonic drill rig

**DRILLING METHOD**
Sonic Coring

**BOREHOLE LOCATION**
512+50, Lt 17 feet

**DATES DRILLED**
4/11/11 and 4/12/11

**HOLE DIAMETER**
6 inches

**GROUND EL.**
185 feet

---

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

---

**LOG OF BORING**

---

**Prepared/Date:** YN/WL 9/29/2011

---

**Checked/Date:** LT/PE 9/29/2011

---

**Figure:** A-3.15d

---

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

---

**Field Tech:** RS/RH

---

**Checked/Date:** LT/PE 9/29/2011

---

**Prepared/Date:** YN/WL 9/29/2011

---

**LOG OF BORING**

---

**Prepared/Date:** YN/WL 9/29/2011

---

**Checked/Date:** LT/PE 9/29/2011

---

**Field Tech:** RS/RH

---

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

---

**Figure:** A-3.15d

---

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

---

**LOG OF BORING**

---

**Prepared/Date:** YN/WL 9/29/2011

---

**Checked/Date:** LT/PE 9/29/2011

---

**Field Tech:** RS/RH

---

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

---

**Figure:** A-3.15d

---

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

---

**LOG OF BORING**

---

**Prepared/Date:** YN/WL 9/29/2011

---

**Checked/Date:** LT/PE 9/29/2011

---

**Field Tech:** RS/RH

---

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

---

**Figure:** A-3.15d

---

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

---

**LOG OF BORING**

---

**Prepared/Date:** YN/WL 9/29/2011

---

**Checked/Date:** LT/PE 9/29/2011

---

**Field Tech:** RS/RH

---

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

---

**Figure:** A-3.15d

---

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

---

**LOG OF BORING**

---

**Prepared/Date:** YN/WL 9/29/2011

---

**Checked/Date:** LT/PE 9/29/2011

---

**Field Tech:** RS/RH

---

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

---

**Figure:** A-3.15d

---

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

---

**LOG OF BORING**

---

**Prepared/Date:** YN/WL 9/29/2011

---

**Checked/Date:** LT/PE 9/29/2011

---

**Field Tech:** RS/RH

---

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

---

**Figure:** A-3.15d
<table>
<thead>
<tr>
<th>ELEVATION (ft)</th>
<th>DEPTH (ft)</th>
<th>BOX #</th>
<th>RUN #</th>
<th>% RECOVERY</th>
<th>MOISTURE-CONTENT (% of dry wt.)</th>
<th>PERCENT PASSING No. 200 SIEVE</th>
<th>SAMPLE LOC.</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>85</td>
<td>12</td>
<td>12</td>
<td>96</td>
<td>16.1</td>
<td>77</td>
<td></td>
</tr>
<tr>
<td>85</td>
<td>90</td>
<td>13</td>
<td>13</td>
<td>96</td>
<td>13.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>90</td>
<td>95</td>
<td>14</td>
<td>14</td>
<td>96</td>
<td>15.4</td>
<td>80</td>
<td></td>
</tr>
<tr>
<td>95</td>
<td>100</td>
<td>15</td>
<td>15</td>
<td>100</td>
<td>20.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>100</td>
<td>15</td>
<td>15</td>
<td>100</td>
<td>25.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>15</td>
<td>15</td>
<td>100</td>
<td>11.3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

No Core Recovery from 84 to 87 feet

No Core Recovery from 87.3 to 87.6 feet

No Core Recovery from 88.5 to 88.6 feet

Saturated with tar (18%)

No Core Recovery from 95.1 to 95.3 feet
No Core Recovery from 102.2 to 102.4 feet and from 102.5 to 102.7 feet

END OF BORING AT 107 FEET

CONSISTENCY DESCRIPTION ON THIS LOG IS BASED ON POCKET PENETROMETER TEST RESULTS AND/OR VISUAL OBSERVATION OF SOIL SAMPLES.

HAND AUGERED UPPER 7 FEET TO AVOID DAMAGE TO UTILITIES. BOREHOLE GROUTED WITH CEMENT-BENTONITE SLURRY AND PATCHED WITH ASPHALT CONCRETE.

This boring was originally planned as a rotary wash boring G-120, converted to sonic core boring.
<table>
<thead>
<tr>
<th>ELEVATION (ft)</th>
<th>DEPTH (ft)</th>
<th>BOX #</th>
<th>RUN #</th>
<th>% RECOVERY</th>
<th>MOISTURE CONTENT (% of dry wt.)</th>
<th>PERCENT PASSING No. 200 SIEVE</th>
<th>SAMPLE LOC.</th>
</tr>
</thead>
<tbody>
<tr>
<td>165</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>160</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>155</td>
<td>1</td>
<td>1</td>
<td>96</td>
<td>20.8</td>
<td>ML</td>
<td></td>
<td></td>
</tr>
<tr>
<td>150</td>
<td>15</td>
<td></td>
<td></td>
<td>14.5</td>
<td>SC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>20</td>
<td></td>
<td></td>
<td>6.8</td>
<td>SM</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **12 inch thick Asphalt Concrete over 6 inch thick Base Course**

- **LAKEWOOD FORMATION [Qlw]**
  - SILT - moist, dark brown, some clay
  - SILTY CLAY - moist, dark brown

- **TAR IMPACTED SOILS**
  - CLAYEY SAND - fine grained, tar content
    - Becomes brown
  - SANDY SILT - medium stiff, moist, olive (5Y 5/4), fine to medium sand, non-plastic
    - Pockets of tar sand, slightly infused tar, black, dark greenish gray (5G 4/1)
    - Slightly infused tar, black (5Y 25/1)
  - No Core Recovery between 17 to 18 feet
  - SILTY SAND - dense, moist, black, fine grained, some medium to coarse, moderately infused tar

**LOG OF BORING**

**BOREHOLE LOCATION**
- Sonic Coring
- 521+50, L1 18 feet

**DATES DRILLED**
- 4/14/11 - 4/18/11

**HOLE DIAMETER**
- 6 inches

**GROUND WATER READINGS**
- Ground-water level not measured.

**GROUND EL.**
- 167 feet

**BORING NO.**
- S-117

**DRILLING COMPANY/DRILLING EQUIPMENT**
- Boart Longyear / 600T Trusonic drill rig

**DRILLING METHOD**
- Sonic Coring

**PREPARED/DATE**
- YN/WL 9/28/2011

**CHECKED/DATE**
- LT/PE 9/28/2011

**PROJECT NO.:** 4953-10-1561

**Figure:** A-3.16a
<table>
<thead>
<tr>
<th>ELEVATION (ft)</th>
<th>DEPTH (ft)</th>
<th>BOX #</th>
<th>RUN #</th>
<th>% RECOVERY</th>
<th>MOISTURE CONTENT (% of dry wt)</th>
<th>PERCENT PASSING No. 200 SIEVE</th>
<th>SAMPLE LOC.</th>
</tr>
</thead>
<tbody>
<tr>
<td>145</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>90</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>140</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>90</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>135</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>80</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>
</tr>
<tr>
<td>125</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>120</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>115</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>110</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>105</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>95</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>90</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>85</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>80</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>75</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>70</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>65</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>60</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>55</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>45</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**SAN PEDRO FORMATION [Qsp]**

Becomes very dark brown, slightly infused tar

Fine grained, occasional medium to coarse, non-plastic

No Core Recovery from 27 to 29 feet

POORLY GRADED SAND with SILT- dense, moist, black, fine to medium grained, trace medium to fine gravel, saturated with tar

More gravel (up to 1 inch in size)

Becomes medium to coarse grained

Fine grained, some medium, trace coarse, occasional gravel (up to 3/8 inch in size)

Saturated with tar

Silty Sand - medium dense, moist, black, fine grained, occasional medium to coarse, fine subrounded slate gravel (up to 3/8 inch in size), saturated with tar, alternating layers of Clayey Sand

---

**LOG OF BORING**

**BOREHOLE LOCATION**

SAN PEDRO FORMATION

**HOLE DIAMETER**

50 ft

**DATES DRILLED**

4/14/11 - 4/18/11

**GROUND WATER READINGS**

Ground-water level not measured.

---

**MTA Westside Subway Extension**

Los Angeles, California

---

**DRILLING COMPANY/DRILLING EQUIPMENT**

Boart Longyear / 600T Trusonic drill rig

**DRILLING METHOD**

Sonic Coring

---

**GROUND EL.**

167 feet

---

**BORING NO.**

S-117

(Continued)
<table>
<thead>
<tr>
<th>ELEVATION (ft)</th>
<th>DEPTH (ft)</th>
<th>BOX #</th>
<th>RUN #</th>
<th>% RECOVERY</th>
<th>MOISTURE CONTENT (% of dry wt)</th>
<th>PERCENT PASSING No. 200 SIEVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>125</td>
<td></td>
<td></td>
<td></td>
<td>5</td>
<td>5</td>
<td>100</td>
</tr>
<tr>
<td>45</td>
<td></td>
<td></td>
<td>100</td>
<td>4.8</td>
<td>3.1</td>
<td>11</td>
</tr>
<tr>
<td>50</td>
<td></td>
<td></td>
<td>100</td>
<td>2.2</td>
<td>2.2</td>
<td>11</td>
</tr>
<tr>
<td>60</td>
<td></td>
<td></td>
<td>100</td>
<td>2.1</td>
<td>2.1</td>
<td>9</td>
</tr>
</tbody>
</table>

Gravel (up to 1 inch in size)

POORLY GRADED SAND with SILT - dense, moist, black, fine to coarse grained, saturated with tar
Becomes medium to coarse grained

Becomes fine to coarse grained, trace silt

Becomes coarse grained

Fine to coarse grained, trace gravel (up to ½ inch in size)

SILTY SAND - dense, moist, black, fine to medium grained, trace fine gravel, saturated with tar, small shell fragments, some clay

GRINDING COMPANY/DRILLING EQUIPMENT
Boart Longyear / 600T Trusonic drill rig

DRILLING METHOD
Sonic Coring

BOREHOLE LOCATION
521+50, Lt 18 feet

DATES DRILLED
4/14/11 - 4/18/11

HOLE DIAMETER
6 inches

GROUND WATER READINGS
Ground-water level not measured.

MTA Westside Subway Extension
Los Angeles, California
Fine grained, occasional medium; no gravel, non-plastic

POORLY GRADED SAND - dense, moist, black, medium to coarse grained, trace silt, trace fine to medium gravel, saturated with tar, shell fragments

FERNANDO FORMATION [Tf]
SILTSTONE - hard, moist, black and dark brown (10YR 2/2), trace fine sand, moderately infused tar, large shell fragments
Becomes very dark brown (10YR 2/2)

Less sand

Some shell fragments
<table>
<thead>
<tr>
<th>ELEVATION (ft)</th>
<th>DEPTH (ft)</th>
<th>BOX</th>
<th>RUN #</th>
<th>% RECOVERY</th>
<th>MOISTURE CONTENT (% of dry wt.)</th>
<th>PERCENT PASSING No. 200 SIEVE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>85</td>
<td></td>
<td>13</td>
<td>13</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>80</td>
<td></td>
<td>14</td>
<td>14</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>75</td>
<td></td>
<td>15</td>
<td>15</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>70</td>
<td></td>
<td>16</td>
<td>16</td>
<td>100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Layer of Sandstone, fine to medium sand, occasional gravel (up to 3/8 inch in size)**

**Trace fine sand**
### Notes:

- Consistency description on this log is based on pocket penetrometer test results and/or visual observation of soil samples.
- Hand augered upper 11 feet to avoid damage to utilities.
- Borehole grouted with cement-bentonite slurry and patched with asphalt concrete.
- This boring was originally planned as a rotary wash boring G-122, converted to sonic core boring.

### Ground-Water Readings

Ground-water level not measured.

---

**Log of Boring**

**Boring No.:** S-117

**Drilling Company/Drilling Equipment:**
- Boart Longyear / 600T Trusonic drill rig

**Drilling Method:**
- Sonic Coring

**Dates Drilled:**
- 4/14/11 - 4/18/11

**Borehole Location:**
- 521+50, Lt 18 feet

**Ground El.:**
- 167 feet

**Hole Diameter:**
- 6 inches

**Sample Loc.:**
- No. 200 Sieve

**Percent Passing:**
- ( % of dry wt.)

---

### Elevation (ft)

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Run #</th>
<th>Box #</th>
<th>Recovery</th>
<th>Moisture Content</th>
<th>Sample Loc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>65</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>105</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>110</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>115</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>120</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**Ground Water Readings:**

Ground-water level not measured.
### LOG OF BORING

**BORING NO.** S-118

**DRILLING COMPANY/DRILLING EQUIPMENT**
Boart Longyear / 600T Trusonic drill rig

**DRILLING METHOD**
Sonic Coring

**BOREHOLE LOCATION**
495-44, Lt 8 feet

**DATES DRILLED**
4/22/11 - 4/26/11

**HOLE DIAMETER**
6 inches

**GROUND-WATER READINGS**
Ground-water level not measured.

---

<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
<th>ELEVATION (ft)</th>
<th>RUN</th>
<th>BOX</th>
<th>% RECOVERY</th>
<th>MOISTURE CONTENT (% of dry wt.)</th>
<th>PERCENT PASSING No. 200 SIEVE</th>
<th>SAMPLE LOC.</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>195</td>
<td></td>
<td></td>
<td></td>
<td>CL-ML</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>185</td>
<td></td>
<td>1</td>
<td>22.6</td>
<td>ML</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>180</td>
<td></td>
<td></td>
<td>28.9</td>
<td>ML</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
<td></td>
<td></td>
<td>36.2</td>
<td>CL-ML</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**LAKEWOOD FORMATION [Qlw]**

- **Silty Clay** - moist, dark brown, with crushed rock
- **Silt** - trace sand, some clay, slightly infused tar
- **Sandy Silt** - medium stiff, moist, olive gray (5Y 4/3), fine to medium sand, some clay
- **Silty Sand** - medium dense, moist, olive gray, fine grained, occasional medium gravel (up to ½ inch in size)
- **Sandy Silt** - medium stiff, moist, olive gray, fine to medium sand
- **San Pedro Formation [Qsp]**
  - **Lean Clay** - stiff, moist, dark greenish gray (5G 4/1), trace fine sand, increased plasticity
  - **Sandy Silt** - stiff, moist, olive gray, fine to medium sand
  - **Fat Clay** - stiff, moist, olive gray, trace fine to coarse sand, trace fine gravel

---

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: RS/RH
Prepared/Date: YN/WL 9/28/2011
Checked/Date: LT/PE 9/28/2011

MTA Westside Subway Extension
Los Angeles, California
Increasing fine to coarse sand, fine to coarse gravel, calcium carbonate nodules

Becomes moist, abundant calcium carbonate nodules and interfingering grade to sandy clay, some fine to coarse gravel, dark greenish gray, calcium carbonate nodules easily breakable

SANDY LEAN CLAY - medium stiff, moist, olive gray, fine to medium sand, some silt

SILT with SAND and GRAVEL - stiff to hard, moist, dark greenish gray, abundant calcium carbonate nodules

FAT CLAY - medium stiff, moist, dark greenish gray, calcium carbonate nodules easily breakable, alternating with layers of Silt, some sand and gravel

Less sand and gravel

**LOG OF BORING**

**MTA Westside Subway Extension**

Los Angeles, California

---

**PROJECT NO.: 4953-10-1561  Figure: A-3.17b**

---

**GROUND WATER READINGS**

Ground-water level not measured.
<table>
<thead>
<tr>
<th>ELEVATION (ft)</th>
<th>BOX #</th>
<th>RUN #</th>
<th>% RECOVERY</th>
<th>% MOISTURE-CONTENT</th>
<th>% PERCENT PASSING No. 200 SIEVE</th>
<th>SAMPLE LOC.</th>
</tr>
</thead>
<tbody>
<tr>
<td>155</td>
<td>5 5</td>
<td>100</td>
<td>26.7</td>
<td>14.1</td>
<td>6.8</td>
<td>CH</td>
</tr>
<tr>
<td>45</td>
<td>6 6</td>
<td>100</td>
<td>3.5</td>
<td>13</td>
<td></td>
<td>ML</td>
</tr>
<tr>
<td>150</td>
<td>7 7</td>
<td>90</td>
<td>2.6</td>
<td>9.7</td>
<td></td>
<td>SM</td>
</tr>
<tr>
<td>145</td>
<td>8 8</td>
<td>95</td>
<td>2.6</td>
<td>6.8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**TAR IMPACTED SOILS**

- **SANDY SILT** - medium stiff, moist, very dark brown, fine sand, slightly infused tar (4%)
- **SILTY SAND** - moist, black (10YR 2/1), fine to medium grained
- Moderately infused tar (12%)
- Moderately infused tar (11%)
- Some fine to coarse gravel
- Less gravel

Ground-water level not measured.

---

**LOG OF BORING**

MTA Westside Subway Extension
Los Angeles, California

Field Tech: RS/RH
Prepared/Date: YN/WL 9/28/2011
Checked/Date: LT/PE 9/28/2011

---

**BORING COMPANY/DRILLING EQUIPMENT**
Boart Longyear / 600T Trusonic drill rig

**DRILLING METHOD**
Sonic Coring

**BOREHOLE LOCATION**
495+44, Lt 8 feet

**DATES DRILLED**
4/22/11 - 4/26/11

**HOLE DIAMETER**
6 inches

**GROUND EL.**
197 feet

**GROUND-WATER READINGS**
Ground-water level not measured.
### POOLY GRADED SAND with SILT - fine grained, some medium to coarse, trace gravel (up to 3/8 inch in size), saturated with tar (15%)

<table>
<thead>
<tr>
<th>Elevation (ft)</th>
<th>Box #</th>
<th>Run #</th>
<th>% Recovery</th>
<th>Moisture Content (% of dry wt.)</th>
<th>Percent Passing No. 200 Sieve</th>
</tr>
</thead>
<tbody>
<tr>
<td>65</td>
<td>9</td>
<td>9</td>
<td>100</td>
<td>2.3</td>
<td>9</td>
</tr>
</tbody>
</table>

**Ground-water level not measured.**

### More coarse sand, moderately infused tar (12%) More gravel (up to 1/2 inch in size) Saturated with tar (17%) Less gravel, fine to coarse gravel

**SILTY SAND - fine grained, trace medium to coarse, gravel (up to 3/8 inch in size), saturated with tar (18%)**

---

**MTA Westside Subway Extension**
**Los Angeles, California**
Some shell fragments

Wood fragments

**FERNANDO FORMATION [Tf]**

SILTSTONE - moist, brown (10YR 4/3) with shades of dark brown to light brown, trace fine sand, slightly infused tar

Becomes saturated with tar (19%)

Saturated with tar (30%)

Becomes dark brown
PROJECT NO.: 4953-10-1561  
MtA Westside Subway Extension  
Los Angeles, California

LOG OF BORING

S-118 (Continued)

BORING NO.

BOREHOLE LOCATION
495-44, Lt 8 feet

GROUND EL.
197 feet

DRILLING COMPANY/DRILLING EQUIPMENT
Boart Longyear / 600T Trusonic drill rig

DRILLING METHOD
Sonic Coring

DATES DRILLED
4/22/11 - 4/26/11

HOLE DIAMETER
6 inches

GROUND-WATER READINGS
Ground-water level not measured.

END OF BORING AT 102 FEET

NOTES:

Consistency description on this log is based on pocket penetrometer test results and/or visual observation of soil samples.

Hand augered upper 7 feet to avoid damage to utilities.

Borehole grouted with cement-bentonite slurry and patched with asphalt concrete.

This boring was originally planned as rotary wash boring G-117.
FIGURES A-4.1 THROUGH A-4.101
CPT LOGS (PE PHASE)
***Hand augered 8***

**CPT DATA**

<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
<th>TIP</th>
<th>FRICTION</th>
<th>PRESSURE U2</th>
<th>RATIO</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>TSF</td>
<td>TSF</td>
<td>10</td>
<td>30</td>
</tr>
<tr>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>60</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>80</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>120</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>140</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**SOIL BEHAVIOR TYPE**
- 1 - sensitive fine grained
- 2 - organic material
- 3 - clay
- 4 - silty clay to clay
- 5 - clayey silt to silty clay
- 6 - sandy silt to clayey silt
- 7 - silty sand to sandy silt
- 8 - sand to silty sand
- 9 - sand
- 10 - gravelly sand to sand
- 11 - very stiff fine grained (*)
- 12 - sand to clayey sand (*)

Robertson et al. 1986 * Overconsolidated or Cemented*
**CPT Data**

Job Number: 04.0911-0016  
CPT Number: C-102  
Location: W. Subway Ext. Los Angeles-CA

Operator: Daniel Garza  
Date and Time: 07-Jun-2011 13:08:20

Client: MACTEC

***Hand augered 6***

---

### CPT DATA

<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
<th>TIP TSF</th>
<th>FRICTION TSF</th>
<th>PRESSURE U2 TSF</th>
<th>RATIO %</th>
<th>SOIL BEHAVIOR TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>60</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>80</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>120</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>
</tr>
</tbody>
</table>

**SOIL BEHAVIOR TYPE**

- 1 - sensitive fine grained
- 2 - organic material
- 3 - clay
- 4 - silty clay to clay
- 5 - clayey silt to silty clay
- 6 - sandy silt to clayey silt
- 7 - silty sand to sandy silt
- 8 - sand to silty sand
- 9 - sand
- 10 - gravelly sand to sand
- 11 - very stiff fine grained (*)
- 12 - sand to clayey sand (*)

*Robertson et al. 1986 * Overconsolidated or Cemented

Figure A-4.2
***Hand augered 6***

CPT DATA

<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
<th>TIP TSF</th>
<th>FRICTION TSF</th>
<th>PRESSURE U2 TSF</th>
<th>RATIO %</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>60</td>
<td>60</td>
<td>60</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>80</td>
<td>80</td>
<td>80</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>120</td>
<td>120</td>
<td>120</td>
<td>120</td>
<td>120</td>
</tr>
<tr>
<td>140</td>
<td>140</td>
<td>140</td>
<td>140</td>
<td>140</td>
</tr>
</tbody>
</table>

SOIL BEHAVIOR TYPE:

1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

Robertson et al. 1986 * Overconsolidated or Cemented

Figure A-4.3
CPT Data

Job Number 04.0911-0016  CPT Number C-106  Location W. Subway Ext. Los Angeles-CA
Operator Daniel Garza  Date and Time 08-Jun-2011 11:35:30  Cone Number F7.5KE2HA3S1645
Client MACTEC

***Hand augered 10***

CPT DATA

<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
<th>TIP TSF</th>
<th>FRICTION TSF</th>
<th>PRESSURE U2 TSF</th>
<th>RATIO %</th>
<th>SOIL BEHAVIOR TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>60</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>80</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>120</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>
</tr>
</tbody>
</table>

1 - sensitive fine grained  4 - silty clay to clay  7 - silty sand to sandy silt  10 - gravelly sand to sand
2 - organic material  5 - clayey silt to silty clay  8 - sand to silty sand  11 - very stiff fine grained (*)
3 - clay  6 - sandy silt to clayey silt  9 - sand  12 - sand to clayey sand (*)

Robertson et al. 1986 * Overconsolidated or Cemented
### CPT Data

#### Job Number
04.0911-0016

#### CPT Number
C-107

#### Location
W. Subway Ext. Los Angeles-CA

#### Operator
Daniel Garza

#### Date and Time
14-Jun-2011 09:51:50

#### Cone Number
F7.5CKE2HA3S1645

#### Client
MACTEC

---

***Hand augered 5***

---

**CPT DATA**

<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
<th>TIP TSF</th>
<th>500</th>
<th>0</th>
<th>FRICTION TSF</th>
<th>10</th>
<th>30</th>
<th>PRESSURE U2 TSF</th>
<th>30</th>
<th>0</th>
<th>RATIO</th>
<th>%</th>
<th>10</th>
<th>0</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>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>60</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>80</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>120</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></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>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**SOIL BEHAVIOR TYPE**

- 1 - sensitive fine grained
- 2 - organic material
- 3 - clay
- 4 - silty clay to clay
- 5 - clayey silt to silty clay
- 6 - sandy silt to clayey silt
- 7 - silty sand to sandy silt
- 8 - sand to silty sand
- 9 - sand
- 10 - gravelly sand to sand
- 11 - very stiff fine grained (*)
- 12 - sand to clayey sand (*)

---

Robertson et al. 1986 * Overconsolidated or Cemented

---

Figure A-4.5
CPT Data

Job Number 04.0911-0016  CPT Number C-108  Location W. Subway Ext. Los Angeles-CA
Operator Daniel Garza  Date and Time 15-Jun-2011 09:34:39  Cone Number F7.5CKE2HA3S1645
Client MACTEC

---

***Hand augered 5"***

---

## CPT DATA

<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
<th>TIP TSF</th>
<th>500</th>
<th>FRICTION TSF</th>
<th>10 -30</th>
<th>PRESSURE U2 TSF</th>
<th>30</th>
<th>RATIO %</th>
<th>10</th>
<th>SOIL BEHAVIOR TYPE</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>20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>60</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>80</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>120</td>
<td></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>
<td></td>
</tr>
</tbody>
</table>

---

Robertson et al. 1986 * Overconsolidated or Cemented* Figure A-4.6

**SOIL BEHAVIOR TYPE**

1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)
Figure A-4.7

Robertson et al. 1986 * Overconsolidated or Cemented
CPT Data

Job Number 04.0911-0016  CPT Number C-110  Location W. Subway Ext. Los Angeles-CA
Operator Daniel Garza  Date and Time 03-Jun-2011 10:21:54  Cone Number F7.5CKE2HA3S1645
Client MACTEC

***Hand augered 6***

Robertson et al. 1986 * Overconsolidated or Cemented

Figure A-4.8
CPT Data

Job Number 04.0911-0016  CPT Number C-111  Location Subway Ext. Los Angeles-CA
Operator Daniel Garza  Date and Time 21-Jun-2011 10:19:53  Cone Number F7.5CKE2HA3S1645
Client MACTEC

***Hand augered 5***

---

CPT DATA

<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
<th>TIP TSF</th>
<th>500</th>
<th>0</th>
<th>FRICTION TSF</th>
<th>10</th>
<th>-30</th>
<th>PRESSURE U2 TSF</th>
<th>30</th>
<th>0</th>
<th>RATIO %</th>
<th>SOIL BEHAVIOR</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>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>60</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>80</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>120</td>
<td></td>
<td></td>
<td></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>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Robertson et al. 1986  * Overconsolidated or Cemented Figure A-4.9

1 - sensitive fine grained  4 - silty clay to clay  7 - silty sand to sandy silt  10 - gravelly sand to sand
2 - organic material  5 - clayey silt to silty clay  8 - sand to silty sand  11 - very stiff fine grained (*)
3 - clay  6 - sandy silt to clayey silt  9 - sand  12 - sand to clayey sand (*)

---
### CPT Data

**Job Number**: 04.0911-0016  
**CPT Number**: C-112  
**Location**: W. Subway Ext. Los Angeles-CA  
**Operator**: Rickey Norris  
**Date and Time**: 26-May-2011 11:37:59  
**Cone Number**: F7.5CKE2HA3S1645  
**Client**: MACTEC

***Hand augered 6"***

---

### CPT DATA

<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
<th>TIP TSF</th>
<th>FRICTION TSF</th>
<th>PRESSURE U2 TSF</th>
<th>RATIO %</th>
<th>SOIL BEHAVIOR TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>60</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>80</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>120</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>
</tr>
</tbody>
</table>

- **Soil Behavior Type**:
  - 1 - sensitive fine grained
  - 2 - organic material
  - 3 - clay
  - 4 - silty clay to clay
  - 5 - clayey silt to silty clay
  - 6 - sandy silt to clayey silt
  - 7 - silty sand to sandy silt
  - 8 - sand to silty sand
  - 9 - sand
  - 10 - gravelly sand to sand
  - 11 - very stiff fine grained (*)
  - 12 - sand to clayey sand (*)

---

*Robertson et al. 1986 * Overconsolidated or Cemented
CPT Data

Job Number 04.0911-0016  CPT Number C-113A  LocaW. Subway Ext. Los Angeles-CA
Operator Daniel Garza  Date and Tin 24-Jun-2011 09:55:03  Cone Number F7.5CKE2HA3S1645
Client MACTEC

***Hand augered 5***

Robertson et al. 1986 * Overconsolidated or Cemented

Figure A-4.11
### CPT Data

**Job Number**: 04.0911-0016  
**CPT Number**: C-114  
**Location**: W. Subway Ext. Los Angeles-CA  
**Operator**: Daniel Garza  
**Date and Time**: 31-May-2011 12:04:57  
**Cone Number**: F7.5CKE2HA3S1645  
**Client**: MACTEC

***Hand augered 6***

#### CPT DATA

<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
<th>TIP TSF</th>
<th>FRICTION TSF</th>
<th>PRESSURE U2 TSF</th>
<th>RATIO %</th>
<th>SOIL BEHAVIOR TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>60</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>80</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>120</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>
</tr>
</tbody>
</table>

- **1**: sensitive fine grained  
- **2**: organic material  
- **3**: clay  
- **4**: silty clay to clay  
- **5**: clayey silt to silty clay  
- **6**: sandy silt to clayey silt  
- **7**: silty sand to sandy silt  
- **8**: sand to silty sand  
- **9**: sand  
- **10**: gravelly sand to sand  
- **11**: very stiff fine grained (*)  
- **12**: sand to clayey sand (*)

Robertson et al. 1986 * Overconsolidated or Cemented

Figure A-4.12
Figure A-4.14

Max. Depth: 66.929 (ft)
Avg. Interval: 0.328 (ft)
CPT Data
30 ton rig

Customer: MACTEC
Job Site: Beverly Hills High School

Date: 05/Mar/2011
Test ID: C-117
Project: LosAngeles

Test ID: C-117
File: Z05M1102C.ECP

Figure A-4.18
CPT Data
30 ton rig

Customer: MACTEC
Job Site: Beverly Hills High School

Date: 05/Mar/2011
Test ID: C-117
Project: LosAngeles

Figure A-4.19
Kehoe Testing & Engineering
Office: (714) 901-7270
Fax: (714) 901-7289
rich@kehoetesting.com
www.kehoetesting.com

CPT Data
30 ton rig

Customer: MACTEC
Job Site: Beverly Hills High School

Date: 26/Feb/2011
Test ID: C-118
Project: LosAngeles

Tip Stress COR (tsf)
Sleeve Stress (tsf)
Pore Pressure (tsf)
Ratio COR (%)
SBT FR (Rob. 1986)

Hand Auger
VS Fine Gr
Clay
Sandy Silt
Silt Mix
Silty Clay
Clay
Silty Clay
Clay

Depth (ft)

Maximum depth: 76.08 (ft)
Page 1 of 2

Figure A-4.20
CPT Data
30 ton rig

Customer: MACTEC
Job Site: Beverly Hills High School

Date: 26/Feb/2011
Test ID: C-118
Project: LosAngeles

Figure A-4.21
CPT Data

30 ton rig

Date: 26/Feb/2011

Test ID: C-119A

Customer: MACTEC

Project: LosAngeles

Location: Beverly Hills High School

Test ID: C-119B

Figure A-4.22
CPT Data
30 ton rig
Customer: MACTEC
Job Site: Beverly Hills High School

Date: 26/Feb/2011
Test ID: C-119A
Project: Los Angeles

Tip Stress COR (tsf)
Sleeve Stress (tsf)
Pore Pressure (tsf)
Ratio COR (%)
SBT FR (Rob. 1986)

Depth (ft)

Figure A-4.23
Kehoe Testing & Engineering
Office: (714) 901-7270
Fax: (714) 901-7289
rich@kehoetesting.com
www.kehoetesting.com

CPT Data
30 ton rig

Date: 26/Feb/2011
Test ID: C-119B
Project: LosAngeles

Customer: MACTEC
Job Site: Beverly Hills High School

Tip Stress COR (tsf) 600
Sleeve Stress (tsf) 14
Pore Pressure (tsf) 14
Ratio COR (%) 8
SBT FR (Rob. 1986) 12

Depth (ft)

Maximum depth: 75.03 (ft)
Page 1 of 2

Figure A-4.24
CPT Data
30 ton rig

Date: 26/Feb/2011
Test ID: C-119B

Customer: MACTEC
Job Site: Beverly Hills High School

Tip Stress COR
(tsf)

Sleeve Stress
(tsf)

Pore Pressure
(tsf)

Ratio COR
(%)

SBT FR
(Rob. 1986)

Maximum depth: 75.03 (ft)
Page 2 of 2

Figure A-4.25
Kehoe Testing & Engineering  
Office: (714) 901-7270  
Fax: (714) 901-7289  
rich@kehoetesting.com  
www.kehoetesting.com  

CPT Data  
30 ton rig  
Test ID: C-120  
Date: 26/Feb/2011  
Project: LosAngeles  

Customer: MACTEC  
Job Site: Beverly Hills High School

Tip Stress COR (tsf)  
Sleeve Stress (tsf)  
Pore Pressure (tsf)  
Ratio COR (%)  
SBT FR (Rob. 1986)  

Depth (ft)  

Maximum depth: 70.01 (ft)  
Page 1 of 2

Figure A-4.26