APPENDIX C: CPT LOGS

As part of the field investigations, 26 Piezo-Cone Penetrometer Tests (CPTU) were performed at the sites of interest, as listed in Table C.1. These CPT probes were performed by Soil Testing Engineers Inc. between 1/30/06 and 2/22/06. All fieldwork activities were conducted by members of the Independent Levee Investigation Team (ILIT) under the direct supervision of senior members of the team.

The CPTs were performed according to the ASTM D 5778, using an electric piezo-cone conforming to the ASTM standards. The pore pressure measurements were obtained at the base of the cone sleeve, immediately above the conical cone “tip”, as illustrated in Figure C-1. The sleeve friction was re-zeroed at the start of each probe, and the porous stone was saturated before each test.

The Figures that follow present a series of plan views showing the locations of the CPTU probes performed by our investigation team, followed by the logs of these CPTU probes. Each CPTU log also has local GPS coordinates (x, y, and z) to help to locate these.

Figure C-1: Typical piezo-cone used by STE Inc. showing the location of the porous filter element
<table>
<thead>
<tr>
<th>CPT NUMBER</th>
<th>Latitude (N)</th>
<th>Longitude (W)</th>
<th>Elevation (MSL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>17-CPT-1</td>
<td>30.01716</td>
<td>90.12109</td>
<td>-1.9</td>
</tr>
<tr>
<td>17-CPT-2</td>
<td>30.01793</td>
<td>90.1207</td>
<td>-6.5</td>
</tr>
<tr>
<td>17-CPT-3</td>
<td>30.01804</td>
<td>90.12125</td>
<td>3.8</td>
</tr>
<tr>
<td>17-CPT-3 A</td>
<td>30.01805</td>
<td>90.12125</td>
<td>3.8</td>
</tr>
<tr>
<td>17-CPT-4</td>
<td>30.01626</td>
<td>90.1215</td>
<td>4</td>
</tr>
<tr>
<td>17-CPT-4 A</td>
<td>30.0162</td>
<td>90.12155</td>
<td>4</td>
</tr>
<tr>
<td>17-CPT-5</td>
<td>30.01718</td>
<td>90.12108</td>
<td>-2</td>
</tr>
<tr>
<td>17-CPT-6</td>
<td>30.01711</td>
<td>90.12109</td>
<td>-1.8</td>
</tr>
<tr>
<td>17-CPT-7</td>
<td>30.01736</td>
<td>90.12116</td>
<td>0.5</td>
</tr>
<tr>
<td>17-CPT-9 A</td>
<td>30.01636</td>
<td>90.12077</td>
<td>-6.6</td>
</tr>
<tr>
<td>17-CPT-10</td>
<td>30.01731</td>
<td>90.12202</td>
<td>4.31</td>
</tr>
<tr>
<td>17-CPT-11</td>
<td>30.01641</td>
<td>90.12212</td>
<td>4.31</td>
</tr>
<tr>
<td>17-CPT-12</td>
<td>30.01824</td>
<td>90.12057</td>
<td>-6.6</td>
</tr>
</tbody>
</table>

**LONDON AVENUE CANAL NORTH, EAST BANK**

<table>
<thead>
<tr>
<th>CPT NUMBER</th>
<th>Latitude (N)</th>
<th>Longitude (W)</th>
<th>Elevation (MSL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAC-CPT-1</td>
<td>30.02097</td>
<td>90.07027</td>
<td>-7.7</td>
</tr>
<tr>
<td>LAC-CPT-2</td>
<td>30.02062</td>
<td>90.07026</td>
<td>-8</td>
</tr>
<tr>
<td>LAC-CPT-3</td>
<td>30.02135</td>
<td>90.07053</td>
<td>-8.2</td>
</tr>
<tr>
<td>LAC-CPT-4</td>
<td>30.01998</td>
<td>90.07032</td>
<td>-8.5</td>
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</table>

**LONDON AVENUE CANAL NORTH, WEST BANK**

<table>
<thead>
<tr>
<th>CPT NUMBER</th>
<th>Latitude (N)</th>
<th>Longitude (W)</th>
<th>Elevation (MSL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LACW-CPT-1</td>
<td>30.02044</td>
<td>90.07136</td>
<td>-5.6</td>
</tr>
<tr>
<td>LACW-CPT-2</td>
<td>30.02048</td>
<td>90.07104</td>
<td>2.8</td>
</tr>
<tr>
<td>LACW-CPT-3</td>
<td>30.02131</td>
<td>90.07094</td>
<td>3.1</td>
</tr>
<tr>
<td>LACW-CPT-4</td>
<td>30.01953</td>
<td>90.07082</td>
<td>2.6</td>
</tr>
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</table>

Note: Geographic coordinates are based on WGS84 datum.
### LONDON AVENUE CANAL SOUTH, EAST BANK

<table>
<thead>
<tr>
<th>CPT NUMBER</th>
<th>Latitude (N)</th>
<th>Longitude (W)</th>
<th>Elevation (MSL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LACS-CPT-1</td>
<td>30.00908</td>
<td>90.0694</td>
<td>-0.15</td>
</tr>
<tr>
<td>LACS-CPT-2</td>
<td>30.00797</td>
<td>90.06931</td>
<td>4.6</td>
</tr>
<tr>
<td>LACS-CPT-3</td>
<td>30.0085</td>
<td>90.06907</td>
<td>-2.3</td>
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</table>

### INNER HARBOR NAVIGATION CANAL, EAST BANK

<table>
<thead>
<tr>
<th>CPT NUMBER</th>
<th>Latitude (N)</th>
<th>Longitude (W)</th>
<th>Elevation (MSL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IHNC-N-CPT-1</td>
<td>29.9787</td>
<td>90.02049</td>
<td>-3.38</td>
</tr>
<tr>
<td>IHNC-S-CPT-1</td>
<td>29.97035</td>
<td>90.02314</td>
<td>0.93</td>
</tr>
<tr>
<td>IHNC-S-CPT-2</td>
<td>29.97126</td>
<td>90.02292</td>
<td>-2.7</td>
</tr>
<tr>
<td>IHNC-S-CPT-3</td>
<td>29.97248</td>
<td>90.02257</td>
<td>-2.3</td>
</tr>
</tbody>
</table>

Note: Geographic coordinates are based on WGS84 datum.
fs  --> Sleeve Friction
q_c  --> Cone Resistance
Um  --> Pore pressure measured
RF  --> Friction Ratio = fs/qc
State Project: 17th Street Canal- East Bank
Performed By: Geo Engineering UCB and STE
Sounding No.: 17-CPT-3
Ground Elevation: 3.8

Location: N30.01804 W90.12125
30’ north of breach, levee crest

Location: Logger: A. Athanasopoulos
Logger: D. Cobos
Date Completed: 2/02/06

Cone #

Log Developer: Juan Gabriel Vera-Grunauer
CVA Consulting Group

fs → Sleeve Friction
qc → Cone Resistance
Um → Pore pressure measured
RF → Friction Ratio = fs/qc
Location
N30.01805 W90.12125
30' north of breach, levee crest

State Project
<table>
<thead>
<tr>
<th>Site Name</th>
<th>Performed By</th>
<th>Sounding No.</th>
<th>Ground Elevation</th>
</tr>
</thead>
<tbody>
<tr>
<td>17th Street Canal- East Bank</td>
<td>Geo Engineering UCB and STE</td>
<td>17-CPT-3A</td>
<td>3.8</td>
</tr>
</tbody>
</table>

Logger: A. Athanasopoulos
Logger: D. Cobos
Cone #

Date Completed: 2/02/06

Log Developer:
Juan Gabriel Vera-Grunauer
CVA Consulting Group

fs --> Sleeve Friction
qc --> Cone Resistance
Um --> Pore pressure measured
RF --> Friction Ratio = fs/qc
Location
N30.01718 W90.12108
next to displaced block, 5' north of 17-CPT-1

State Project  Site Name  Performed By  Sounding No.  Ground Elevation
17th Street Canal- East Bank  17-CPT-5  -2.0

Logger: A. Athanasopoulos  SHEET 1 of 1
Logger: D. Cobos
Date Completed  2/03/06

Cone #

fs  --> Sleeve Friction
qc  --> Cone Resistance
Um  --> Pore pressure measured
Rf  --> Friction Ratio = fs/qc

Log Developer:
Juan Gabriel Vera-Grunauer
CVA Consulting Group
Location
N30.01736 W90.12116
north of displaced block, next to USACE fence

<table>
<thead>
<tr>
<th>q_c (tsf)</th>
<th>fs (tsf)</th>
<th>Um (tsf)</th>
<th>Rf (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 5 10 15 20</td>
<td>0 0.5 1.0 1.5 2.0</td>
<td>-0.5 0.5 1.5 2.5 3.5 4.5</td>
<td>0 5 10 15 20</td>
</tr>
</tbody>
</table>

fs --> Sleeve Friction
qc --> Cone Resistance
Um --> Pore pressure measured
Rf --> Friction Ratio = fs/qc

Log Developer:
Juan Gabriel Vera-Grunauer
CVA Consulting Group
Location
N30.01636 W90.12077
south of breach, between 6810 and 6814 Belaire Dr.

<table>
<thead>
<tr>
<th>State Project</th>
<th>Site Name</th>
<th>Performed By</th>
<th>Sounding No.</th>
<th>Ground Elevation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>17th Street Canal- East Bank</td>
<td>Geo Engineering UCB and STE</td>
<td>17-CPT-9A</td>
<td>-6.6</td>
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</table>

<table>
<thead>
<tr>
<th>Location</th>
<th>Logger: A. Athanasopoulos</th>
<th>SHEET 1 of 1</th>
</tr>
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<tbody>
<tr>
<td>fs (tsf)</td>
<td>0 0.5 1.0 1.5 2.0</td>
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<tr>
<td>qc (tsf)</td>
<td>0 5 10 15 20</td>
<td></td>
</tr>
<tr>
<td>Um (tsf)</td>
<td>-0.5 0.5 1.5 2.5 3.5 4.5</td>
<td></td>
</tr>
<tr>
<td>Rf (%)</td>
<td>0 5 10 15 20</td>
<td></td>
</tr>
</tbody>
</table>

fs --> Sleeve Friction
qc --> Cone Resistance
Um --> Pore pressure measured
Rf --> Friction Ratio = fs/qc

Log Developer:
Juan Gabriel Vera-Grunauer
CVA Consulting Group
Location
N30.01731 W90.12202
Orpheum Ave., north of Ash St., levee crest

Log Developer:
Juan Gabriel Vera-Grunauer
CVA Consulting Group

fs -> Sleeve Friction
qc -> Cone Resistance
Um -> Pore pressure measured
RF -> Friction Ratio = fs/qc
<table>
<thead>
<tr>
<th>Location</th>
<th>Log Developer</th>
</tr>
</thead>
<tbody>
<tr>
<td>N30.01641 W90.12212</td>
<td>Juan Gabriel Vera-Grunauer</td>
</tr>
<tr>
<td></td>
<td>CVA Consulting Group</td>
</tr>
<tr>
<td>Orpheum Ave., between Ash St., and Poplar St.</td>
<td></td>
</tr>
<tr>
<td>south of 17-CPT-10, levee crest</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>State Project</th>
<th>Site Name</th>
<th>Performed By</th>
<th>Sounding No.</th>
<th>Ground Elevation</th>
</tr>
</thead>
<tbody>
<tr>
<td>17th Street Canal- West Bank</td>
<td>Geo Engineering UCB and STE</td>
<td>17-CPT-11</td>
<td>4.31</td>
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<table>
<thead>
<tr>
<th>Location</th>
<th>Logger: A. Athanasopoulos</th>
<th>SHEET 1 of 1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Logger: C. Watkins</td>
<td>Date Completed</td>
</tr>
<tr>
<td></td>
<td>Cone #</td>
<td>2/07/06</td>
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</table>

<table>
<thead>
<tr>
<th>Location</th>
<th>Log Developer</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Juan Gabriel Vera-Grunauer</td>
</tr>
<tr>
<td></td>
<td>CVA Consulting Group</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cone #</th>
<th>fs (tsf)</th>
<th>Um (tsf)</th>
<th>Rf (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>-0.5</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>0.5</td>
<td>0.5</td>
<td>5</td>
</tr>
<tr>
<td>10</td>
<td>1.0</td>
<td>1.5</td>
<td>10</td>
</tr>
<tr>
<td>15</td>
<td>1.5</td>
<td>2.0</td>
<td>15</td>
</tr>
<tr>
<td>20</td>
<td>2.0</td>
<td>2.5</td>
<td>20</td>
</tr>
</tbody>
</table>

qC (tsf) -- Cone Resistance
fs (tsf) -- Sleeve Friction
Um (tsf) -- Pore pressure measured
Rf (%) -- Friction Ratio = fs/qc
Location

N30.02044 W90.07136
middle of breach, frontyard of 6109 Pratt Drive

fs --> Sleeve Friction
qc --> Cone Resistance
Um --> Pore pressure measured
RF --> Friction Ratio = fs/qc
Location
N30.02048 W90.07104
middle of breach, pre-Katrina levee toe

State Project | Site Name | Performed By | Sounding No. | Ground Elevation
----------------|-----------|--------------|--------------|------------------
London Ave. Canal North | Geo Engineering UCB and STE | LACW-cpt2 | 2.8

Logger: D. Karadeniz
CPT Operator
Cone #
Date Completed 2/07/06

Log Developer:
Juan Gabriel Vera-Grunauer
CVA Consulting Group
<table>
<thead>
<tr>
<th>State Project</th>
<th>Site Name</th>
<th>Performed By</th>
<th>Sounding No.</th>
<th>Ground Elevation</th>
</tr>
</thead>
<tbody>
<tr>
<td>London Ave. Canal North West Bank</td>
<td>Geo Engineering UCB and STE</td>
<td>LACW-cpt3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Location

N30.02131 W90.07094

north of breach, on the levee, next to Robert E. Lee bridge

Logger: D. Karadeniz
CPT Operator
Cone #

date completed: 2/07/06

<table>
<thead>
<tr>
<th>Elevation (ft)</th>
<th>qc (tsf)</th>
<th>fs (tsf)</th>
<th>Um (tsf)</th>
<th>RF (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>0</td>
<td>0.5</td>
<td>1.0</td>
</tr>
<tr>
<td>25</td>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>50</td>
<td></td>
<td></td>
<td></td>
<td>-0.5</td>
</tr>
<tr>
<td>75</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

fs --> Sleeve Friction
qc --> Cone Resistance
Um --> Pore pressure measured
RF --> Friction Ratio = fs/qc

Log Developer:
Juan Gabriel Vera-Grunauer
CVA Consulting Group
Location
N30.01953 W90.07082
30’ south end of breach, levee crest

<table>
<thead>
<tr>
<th>State Project</th>
<th>Site Name</th>
<th>Performed By</th>
<th>Sounding No.</th>
<th>Ground Elevation</th>
</tr>
</thead>
<tbody>
<tr>
<td>London Ave. Canal North West Bank</td>
<td>Geo Engineering UCB and STE</td>
<td>LACW-cpt4</td>
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</table>

<table>
<thead>
<tr>
<th>Location</th>
<th>Logger: D. Karadeniz</th>
<th>CPT Operator</th>
<th>Date Completed</th>
</tr>
</thead>
<tbody>
<tr>
<td>30’ south end of breach, levee crest</td>
<td>SHEET 1 of 1</td>
<td>2/07/06</td>
<td></td>
</tr>
</tbody>
</table>

fs --> Sleeve Friction
q_c --> Cone Resistance
Um --> Pore pressure measured
RF --> Friction Ratio = fs/qc

Log Developer:
Juan Gabriel Vera-Grunauer
CVA Consulting Group

Geo Engineering UCB and STE

CVA Consulting Group
State Project: Geo Engineering UCB and STE
Site Name: London Ave. Canal North East Bank
Performed By: Geo Engineering UCB and STE
Sounding No.: LAC-cpt1
Ground Elevation: -7.7

Location:
N30.02097 W90.07027
back yard of 6076 Warrington Drive

Logger: A. Athanasopoulos
Date Completed: 2/10/06

Cone #:

Log Developer:
Juan Gabriel Vera-Grunauer
CVA Consulting Group

fs --> Sleeve Friction
qc --> Cone Resistance
Um --> Pore pressure measured
RF --> Friction Ratio = fs/qc
Location
N30.02062 W90.07026
120' South of LAC-CPT-1

fs -> Sleeve Friction
qc -> Cone Resistance
Um -> Pore pressure measured
RF -> Friction Ratio = fs/qc

Logger: A. Athanasopoulos
Date Completed: 2/09/06

Log Developer:
Juan Gabriel Vera-Grunauer
CVA Consulting Group
Location
N30.01998 W90.07032
280' south of LAC-CPT-1

Logger: A. Athanasopoulos
Date Completed 2/09/06

Log Developer:
Juan Gabriel Vera-Grunauer
CVA Consulting Group

fs --> Sleeve Friction
qc --> Cone Resistance
Um --> Pore pressure measured
RF --> Friction Ratio = fs/qc

State Project  | Site Name  | Performed By  | Sounding No.  | Ground Elevation
---|---|---|---|---
London Ave. Canal North East Bank  |  | Geo Engineering UCB and STE  | LAC-cpt4  |  

<table>
<thead>
<tr>
<th>Cone #</th>
<th>fs (tsf)</th>
<th>Um (tsf)</th>
<th>RF (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0 0.5 1.0 1.5 2.0</td>
<td>-0.5 0 0.5 1.0 1.5</td>
<td>0 2.5 5.0 7.5 10</td>
</tr>
</tbody>
</table>

Elevation (ft)

-40 -35 -30 -25 -20 -15 -10 -5 0 5

25 50 75 100
Location
N30.00908 W90.0694
40' north of breach, levee slope

State | Project | Site Name | Performed By | Sounding No. | Ground Elevation | Logger | Date Completed
--- | --- | --- | --- | --- | --- | --- | ---
| London Ave. Canal South | Geo Engineering UCB and STE | LACS-1 | -0.15 | A. Athanopoulos | SHEET 1 of 1 | D. Cobos | 2/16/06

$q_c$ (tsf) | $fs$ (tsf) | $Um$ (tsf) | $Rf$ (%)
--- | --- | --- | ---
0 | 0 | -0.5 | 0
50 | 0.5 | 0.5 | 2.5
100 | 1.0 | 1.5 | 5.0
150 | 1.5 | 2.0 | 7.5
200 | 2.0 | 1.5 | 10

$q_c$ --> Cone Resistance
$fs$ --> Sleeve Friction
$Um$ --> Pore pressure measured
$Rf$ --> Friction Ratio = $fs/q_c$

Log Developer:
Juan Gabriel Vera-Grunauer
CVA Consulting Group
Location
N30.00797 W90.06931
30' south of breach, on emergency repair fill

State Project
London Ave. Canal- South
Performed By
Geo Engineering UCB and STE
Sounding No.
LACS-2
Ground Elevation
4.6

Logger: A. Athanasopoulos
Logger: D. Cobos
Cone #

Date Completed
2/16/06

fs  --> Sleeve Friction
q_c --> Cone Resistance
Um --> Pore pressure measured
Rf  --> Friction Ratio = fs/qc
Location
N30.0085 W90.06907
middle of breach, backyard of house
on Warrington Dr. and Wilton Dr.

State Project
London Ave. Canal - South

Performed By
Geo Engineering UCB and STE

Sounding No.
LACS-3

Ground Elevation
4.6

Logger: A. Athanasopoulos
Date Completed
2/16/06

Logger: D. Cobos

Cone #

--- Graphs and Data ---

fs (tsf) vs. qc (tsf)
fs (tsf) vs. Um (tsf)
Rf (%) vs. Elevation ft

fs --> Sleeve Friction
qc --> Cone Resistance
Um --> Pore pressure measured
Rf --> Friction Ratio = fs/qc

Log Developer:
Juan Gabriel Vera-Grunauer
CVA Consulting Group
Location
N29.97035 W90.02314
south of south breach, ~600' north of Claiborne bridge

State Project
Site Name
IHNC South-East Bank
Performed By
Geo Engineering UCB and STE
Sounding No.
IHNC-5-1
Ground Elevation
0.93

Location
Log: A. Athansopoulos
Logger: D. Cobos
Cone #

Date Completed
2/17/06

fs --> Sleeve Friction
qc --> Cone Resistance
Um --> Pore pressure measured
RF --> Friction Ratio = fs/qc
Location:

N29.97126 W90.02292
middle of south breach, ~1050' north of Claiborne bridge

State Project: IHNC South-East Bank
Performed By: Geo Engineering UCB and STE
Sounding No.: IHNC-S-2
Ground Elevation: -2.7

Logger: A. Athanasopoulos
Logger D. Cobos
Cone #

Date Completed: 2/16/06
Location

N29.97248 W90.02257

north of south breach, ∼1500' north of Claiborne bridge

fs --> Sleeve Friction
qc --> Cone Resistance
Um --> Pore pressure measured
RF --> Friction Ratio = fs/qc

Logger: A. Athanasopoulos
Date Completed
2/21/06