### Sediment Core Processing Log

**Job:** LDWG coring  
**Core Location/Sample Number:** LDWG-SC-1  
**Date/Time:** 2/9/06 0825 - 09:30  
**Sample Logged by:** N. Bacher  
**Type/Diameter of Sample:** 4" sq. aluminium  
**Sample Quality:** Good  
**Avg. % Compaction:**  
**Notes:** Penet: 6.55' → R = 92%  
**On-deck: 6.05'**

<table>
<thead>
<tr>
<th>Recomended Length (m)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Sie X % G</th>
<th>Sie X % S</th>
<th>Pie</th>
<th>Description (grain size, color, moisture, alteration, biology, wood, other debris)</th>
<th>Height Actual Depth (m)</th>
<th>Sample Depth</th>
<th>Subsample No.</th>
<th>Sampling Stamps</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td></td>
<td>GLEY 2</td>
<td>90 15</td>
<td></td>
<td></td>
<td>WET, DARK BROWN, SANDY Silt, W/9/5# shell fragments, trace tufa and fish.</td>
<td>0.15</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>GLEY 2</td>
<td>15 85</td>
<td></td>
<td></td>
<td>WET, MUD, BLACK Silt, SANDY silt, trace roots, very slight H2S odor</td>
<td>0.15</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>black</td>
<td></td>
<td></td>
<td></td>
<td>True gray clay seams (x2)</td>
<td>0.15</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>GLEY 2</td>
<td>55 45</td>
<td></td>
<td></td>
<td>WET, MUD, DENSE, BROWN SAND, SANDY Silt, trace roots, fish, and pieces of</td>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>black</td>
<td></td>
<td></td>
<td></td>
<td>WET, MUD, Silt, BLACK Silt, clay, Silt, 10% wood shreds and roots, trace</td>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Scattered shells (x16)</td>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Moderate H2S odor throughout this interval</td>
<td>2.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Sand, 51% silt, clay, and trace roots</td>
<td>2.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Trace silt below 3.8 m</td>
<td>2.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Other wise SAA</td>
<td>2.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>@3.4' 1/2' round clay pocket in matrix.</td>
<td>2.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Below 4.9 SAA but no silt and sand is medium to coarse</td>
<td>5.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Core is slightly winnowed below 4.6', less than 5% lost from one corner edge</td>
<td>5.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>of core tube</td>
<td>6.0</td>
<td></td>
<td></td>
<td>END OF CORE</td>
</tr>
</tbody>
</table>
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-8-06  Recorder: 6SM

Project: 341185.001 Windward Lower Duwamish Coring

Station Name: 1 R2

Tube Length (ft): 16.05

Water Depth (ft): 25.3  Time: 1205

Est. Tide Height (ft) 8.1 (MLLW)

Est. Mudline: (MLLW)

Comments: 25 ft water depth

diver does not think any material was lost out of core

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft

Northing 211282

Easting 1266316

On Deck Top of Sediment 10.0

Penetration Tape Reading  Recovery Tape Reading  Comments

12.7
10.6
9.7
9.5

12.8
10.7
9.9
9.9

rate slowed down
refusal
Mudmole™ Bore Log

Project: LDWG Duwamish Coring
Project No: 341185.001
Collected by: GSM
Date: 2/8/2006
Water depth: 26.3 ft

Station: 1 R2
Position: NAD83
Time: 12:06
Easting: 1266316

Weather/Comments: N/A
Driven to refusal

Penetration interval
Distance from top of tube (ft)

Penetration 6.55 ft / On deck recovery 6.05 ft = 92% Recovery

Interval
recovery (ft)
Percent
recovery

0-3.35
3.25
97%

3.35-5.45
2.1
100%

5.45-6.35
0.799
89%

6.35-6.55
0.001
0%

Depth below
mudline (ft)

Distance from
top of tube (ft)

1
10.97

2
11.94

3
12.91

4
13.90

5
14.90

6
15.84

7
No sample

8
No sample

9
No sample

10
No sample

11
No sample

12
No sample

13
No sample

14
No sample

15
No sample

16
No sample

17
No sample

18
No sample

19
No sample

20
No sample

Mudline
10

Place Field ID Label Here

MCS Environmental, Inc.
6505 51st Ave SW, Suite 100
Mountlake Terrace, WA 98040

(425) 697-4340
tax (425) 697-4370

File name 1 R2
Bore Log (mudline)

F-2
3 of 490
Station Number: [Blank]
Attempt: [Blank]
Field Technician: [Blank]
Contractor: [Blank]
On-site Visitor: [Blank]
Latitude: 21.282
Longitude: 124.631
Left of target, offshore
Shoreline & surrounding area observations: [Blank]
Sediment surface & slope description: [Blank]
Water current: [Blank]

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, difficult, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.7</td>
<td>12.8</td>
<td>(Drive offset: [Blank]) easy drive</td>
</tr>
<tr>
<td>10.6</td>
<td>10.7</td>
<td>mod. drive</td>
</tr>
<tr>
<td>9.7</td>
<td>9.9</td>
<td>rate of penetration slowed</td>
</tr>
<tr>
<td>9.5</td>
<td>9.9</td>
<td>refusal</td>
</tr>
<tr>
<td>6.55</td>
<td>6.15</td>
<td></td>
</tr>
</tbody>
</table>

Estimated angle of drive: cannot see - seeped under water
Reason for ending drive: refusal

Drive Completion Time: 12:17
On Boat Recovery: 10

End of Core Tube Observations
Staining: some (moderate) - residual sed.
Tube Deformation: no
Loss of Sediment: screw plug inserted by diver in site
Sediment Description: grey sand - catcher full
Water in Tube: yes, siphoned off (~40 pps)

Need or Retry: [Blank] driver does not think any sediment was lost out of the core
catcher end
Core accepted:

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (lengths)
Station Number: 1  
Attempt: 2  
Field Technician: John M.  
Contractor:  
On-site Visitor:  
Latitude:  
Longitude:  

Date: 2/5/10  
Core Tube Length: 16.05  
Lead Line Water Depth: 25.3  
Diver Water Depth:  
Tip Probe Depth:  
Disk Probe Depth:  
Drive Initiation Time:  

Shoreline & surrounding area observations:  
Sediment surface & slope description:  
Water current:  

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, difficult, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>(Drive offset: )</td>
</tr>
</tbody>
</table>

Estimated angle of drive:  
Reason for ending drive:  

Drive Completion Time:  
On Boat Recovery:  

End of Core Tube Observations

Staining:  
Tube Deformation:  
Loss of Sediment:  
Sediment Description:  
Water in Tube:  

Keep or Retry:  

Notes:  
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
**MCS Environmental MudMole Bore Log**

**Collection Information**
- **Date:** 2-8-06
- **Recorder:** 634
- **Project:** 341185.001 Windward Lower Duwamish Coring

**Position Information**
- **Coordinate Datum:** WA State Plane N, NAD 83, Survey Ft
- **Northing:** 211310
- **Easting:** 1266321
- **On Deck Top of Sediment:** 10.4

**Station Name:** 1

<table>
<thead>
<tr>
<th>Tube Length (ft)</th>
<th>16.25</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depth (ft)</td>
<td>23.6</td>
</tr>
<tr>
<td>Water</td>
<td>15.85</td>
</tr>
<tr>
<td>Est. Tide Height</td>
<td>9.2</td>
</tr>
<tr>
<td>(ft)</td>
<td>(MLLW)</td>
</tr>
</tbody>
</table>

**Est. Mudline:** (MLLW)

**Comments:**
- Ebbing tide - silty sand with scattered cobble
- 22 ft depth, gentle slope & mild current
- 5 A visibility – lost some silty sand during plugging of air
- refusal - hit something hard
- 2/13 off station
- refusal
- dark medium sand against plug
- water depth 8 ft 23.7 @ 1155
- 8.2 tide

**Penetration Tape Reading**
- R25 16.3
- R23 14.3
- R22 12.5
- R21 11.0
- R20 10.0
- R19 9.6

**Recovery Tape Reading**
- 19.7
- 14.6
- 12.9
- 11.2
- 10.4
- 10.3

**Comments**

MCS Environmental, Inc.
5015 - 216th St SW, Suite 100
Mountlake Terrace, WA 98043
(425) 897-4340

duwamish boring format.
Mudmole™ Bore Log

Project: LDWG Duwamish Coring  Station: 1 R1
Project No: 341185.001  Position: NAD83  WAN
Collected by: GSM  Northing: 211310
Date: 2/8/2006  Time: 11:03  Easting: 1266321
Water depth: 23.6 ft  Mudline: -14.4 ft MLLW (estimated using tide tables)

Weather/Comments: N/A

<table>
<thead>
<tr>
<th>Penetration interval (ft)</th>
<th>Interval recovery (ft)</th>
<th>Percent recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-3.35</td>
<td>2.95</td>
<td>88%</td>
</tr>
<tr>
<td>3.35-4.85</td>
<td>1.7</td>
<td>113%</td>
</tr>
<tr>
<td>4.85-5.85</td>
<td>0.8</td>
<td>80%</td>
</tr>
<tr>
<td>5.85-6.25</td>
<td>0.1</td>
<td>25%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Depth below mudline (ft)</th>
<th>Distance from top of tube (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mudline 10.4</td>
</tr>
<tr>
<td>1</td>
<td>11.28</td>
</tr>
<tr>
<td>2</td>
<td>12.16</td>
</tr>
<tr>
<td>3</td>
<td>13.04</td>
</tr>
<tr>
<td>4</td>
<td>14.09</td>
</tr>
<tr>
<td>5</td>
<td>15.17</td>
</tr>
<tr>
<td>6</td>
<td>No sample</td>
</tr>
<tr>
<td>7</td>
<td>No sample</td>
</tr>
<tr>
<td>8</td>
<td>No sample</td>
</tr>
<tr>
<td>9</td>
<td>No sample</td>
</tr>
<tr>
<td>10</td>
<td>No sample</td>
</tr>
<tr>
<td>11</td>
<td>No sample</td>
</tr>
<tr>
<td>12</td>
<td>No sample</td>
</tr>
<tr>
<td>13</td>
<td>No sample</td>
</tr>
<tr>
<td>14</td>
<td>No sample</td>
</tr>
<tr>
<td>15</td>
<td>No sample</td>
</tr>
<tr>
<td>16</td>
<td>No sample</td>
</tr>
<tr>
<td>17</td>
<td>No sample</td>
</tr>
<tr>
<td>18</td>
<td>No sample</td>
</tr>
<tr>
<td>19</td>
<td>No sample</td>
</tr>
<tr>
<td>20</td>
<td>No sample</td>
</tr>
</tbody>
</table>

Penetration 6.25 ft  On deck recovery 5.45 ft = 87% Recovery
Station Number: 1
Attempt: 1A
Field Technician: JP/LL
Contractor: M/C/ES
On-site Visitor: JN (SFC)
Latitude: 211302
Longitude: N 47st target, offshore

Date: 08/09/01
Core Tube Length: 16.05
Lead Line Water Depth: 23.4
Diver Water Depth: 13
Tip Probe Depth: ---
Disk Probe Depth: ---
Drive Initiation Time: 1115

Shoreline & surrounding area observations: rip rap, gravel, iris and shrubs
Sediment surface & slope description: silt, w/scattered cobble, gentle slope
Water current: ebb tide, light winds from north, mild current 5 ft visibility

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, difficult, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.3</td>
<td>14.7</td>
<td>(Drive offset: ) - difficult drive</td>
</tr>
<tr>
<td>14.3</td>
<td>14.6</td>
<td>hit something hard</td>
</tr>
</tbody>
</table>

Estimated angle of drive: cannot see - engulfed underwater
Reason for ending drive: refusal - hit something hard

Drive Completion Time: 1119  On Boat Recovery: N/A

End of Core Tube Observations

Staining: 
Tube Deformation: N/A
Loss of Sediment: 
Sediment Description: 
Water in Tube: 

Keep or Retract: tube empty; will reuse for R 2 16 (reset tube) 14 off

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
Station Number: 1
Attempt: 8 1b
Field Technician: JF/EM
Contractor: JCS/RSS
On-site Visitor: JN (SMC)
Latitude: 2113 1D
Longitude: 126 6 32 "W 1.4", 44.444

Shoreline & surrounding area observations: 7 same as P1a
Sediment surface & slope description:
Water current:

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g., easy, difficult, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.5</td>
<td>12.9</td>
<td>(Drive offset: )  Moderate drive</td>
</tr>
<tr>
<td>11.0</td>
<td>11.2</td>
<td></td>
</tr>
<tr>
<td>10.0</td>
<td>10.4</td>
<td></td>
</tr>
<tr>
<td>9.6</td>
<td>10.7</td>
<td>Difficult drive</td>
</tr>
</tbody>
</table>

Total: 75 8.55

Estimated angle of drive: Cannot see - Egypt underwater
Reason for ending drive: Refusal

Drive Completion Time: 1135
On Boat Recovery: 10.4

End of Core Tube Observations
Staining: -
Tube Deformation: No
Loss of Sediment: Driver inserted screwplug in situ. Lost some silty sand during plugging
Sediment Description: Medium sand
Water in Tube: Yes, splashed out (w 45 pumps)

Keep or Retake: Will try for R2

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
Station Number:  
Attempt:  
Field Technician: LM  
Contractor: MCS  
On-site Visitor:  
Latitude:  
Longitude:  

Date: 2/8/06 15:05 8.0' 86 station  
Core Tube Length: 16.0' 
Lead Line Water Depth: 23.6'  
Diver Water Depth: 23.0'  
Tip Probe Depth:  
Disk Probe Depth:  
Drive Initiation Time: 1135-1140, mud mire brought out of sediment to check forward damage

Shoreline & surrounding area observations: marineat鲈ere bridge, RFS boat checked away from MCS boat
Sediment surface & slope description: sandy bottom w/ scattered cobbles, gentle slope
Water current: mild current, visibility = 5.0'

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, difficult, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.3</td>
<td>14.9</td>
<td>(Drive offset: —) easy</td>
</tr>
<tr>
<td>14.3</td>
<td>14.10</td>
<td>history, something stuck above the surface, no bottom penetration</td>
</tr>
<tr>
<td>12.5</td>
<td>12.9</td>
<td>moderate (had to diver to measure)</td>
</tr>
<tr>
<td>11.0</td>
<td>11.2</td>
<td>moderate - hand</td>
</tr>
<tr>
<td>10.0</td>
<td>10.1</td>
<td>moderate - hand</td>
</tr>
<tr>
<td>9.6</td>
<td>10.3</td>
<td>very slow penetration, hard drive</td>
</tr>
<tr>
<td>9.0</td>
<td>10.3</td>
<td>refusal</td>
</tr>
<tr>
<td>6.25</td>
<td>5.55</td>
<td></td>
</tr>
</tbody>
</table>

Estimated angle of drive: below water, unable to gauge angle
Reason for ending drive: refusal - extremely hard drive, aided by divers

Drive Completion Time: 135  
On Boat Recovery: 10.4

End of Core Tube Observations
| Staining: | Mott-uneven, residue black on core tube upon extraction |
| Tube Deformation: | None |
| Loss of Sediment: | Yes, disturbed loss during capping |
| Sediment Description: | Sand, medium grained, flat |
| Water in Tube: | Yes, siphoned 20' |

Keep or Retry:
M. Diver noted some material lost while plunging
Notes: using feedback box on RFS boat
Diver #1 more location toward shoal (70' from shore) for 2nd attempt
1130 am try at drilling
Core pushed up to sharp core at sediment-water interface by divers

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
## Sediment Core Processing Log

**Job:** Dungeness LDV  
**Sample Logged by:** V. Becker, A. Fitzpatrick

<table>
<thead>
<tr>
<th>Recomended Length (ft)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Size</th>
<th>Size</th>
<th>ROD</th>
<th>Description</th>
<th>Sample Depth</th>
<th>Sample Substrate</th>
</tr>
</thead>
</table>
| 25                     | 25           | Black | 50   | 50   | -   | little holes in sediment; two bags holes to confirm TIP | 10-10        | Silty sand w/ wind flap & contact (plastic)  
- Silty sand w/ wind flap & contact (plastic)  
- Grits up to 1 in. from 0.7 to 0.1 in.  
- Mixed white & black ± shell  
- Thin sheet of sheet in scale  
- Scattered clay particles  
- HS D in 12" bands  
- Black ± sand  
- Gradational end of sheet | 0.7-0.0  
- L1  
- 10-10  
- 10-10 | 0-30 |
| 25                     | 25           | Light gray | 50   | 50   | -   | little holes in sediment; two bags holes to confirm TIP | 10-10        | Silty sand w/ wind flap & contact (plastic)  
- Silty sand w/ wind flap & contact (plastic)  
- Grits up to 1 in. from 0.7 to 0.1 in.  
- Mixed white & black ± shell  
- Thin sheet of sheet in scale  
- Scattered clay particles  
- HS D in 12" bands  
- Black ± sand  
- Gradational end of sheet | 0.7-0.0  
- L1  
- 10-10  
- 10-10 | 0-30 |
| 25                     | 25           | Light gray | 50   | 50   | -   | little holes in sediment; two bags holes to confirm TIP | 10-10        | Silty sand w/ wind flap & contact (plastic)  
- Silty sand w/ wind flap & contact (plastic)  
- Grits up to 1 in. from 0.7 to 0.1 in.  
- Mixed white & black ± shell  
- Thin sheet of sheet in scale  
- Scattered clay particles  
- HS D in 12" bands  
- Black ± sand  
- Gradational end of sheet | 0.7-0.0  
- L1  
- 10-10  
- 10-10 | 0-30 |

**Notes:** 100% Sampled as Fluid
<table>
<thead>
<tr>
<th>Recov. Length (ft)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Size #. G</th>
<th>Size #. S</th>
<th>Size #. F</th>
<th>PO</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
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<tr>
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<td>100</td>
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</tr>
<tr>
<td>4.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>98</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Description**

(Grain size, color, moisture, shear/odor, biota, wood, other debris)

- Same as above
- Sharp moist/wet contact
- At 8.4' to 12' layer of blade silt + shell gravel
- Wedge catcher
- Same as above but damp with banding of soft, moist silt and hard chunks silt in softer layers
- 1-3" bands, dense

**Notes**

- Samples collected near Shell Island, Cricente Plant

**Sediment Core Processing Log**

| Core Location/Sample Number: | LDW - SC - 2 |
| Date/Time:                  | 07/09/01 |
| No. of Sections:            | 1 |
| Sample Logged by:           | NBR, ACE |
| Sample Length (from log):   | 500 |
| Avg. % Compaction:          | poor |
| Sample Quality:             | disturbed |

**Core Analysis**

- F-2
- 0.8
- 10.0
- 0.5
- 0.1
- 0.1
- 0.1
- 0.1
- 0.1
- 0.1
- 0.1
- 0.1
- 0.1
## Sediment Core Processing Log

**Job:** Duwamish LDW  
**Job Number:** BSS-18202  
**Core Location/Sample Number:** LDW-SC-2

**Sample Length (from log):** See  
**Avg. % Compaction:** Page 1

---

<table>
<thead>
<tr>
<th>Recovered Length (m)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Size % - G</th>
<th>Size % - S</th>
<th>Description (grain size, color, moisture, shear/sed, biota, wood, other debris)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>V. dark</td>
<td>48 4r</td>
<td></td>
<td>Pt 12.0 Ft. : damp, dark brown F-SAND w/ 1/2&quot; silt(brown) interbeds, distinct horiz. layers. Slight rootlets, few 1/2&quot; wood shreds. Raga layer. Baham is 1/6 ft. silky V.F. SAND in shale core.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Greenish gray</td>
<td>85 15</td>
<td></td>
<td>Bottom of core = 13.1</td>
</tr>
</tbody>
</table>

**Notes:**

- **Note:** interbed sand + silt interbeds & 1/2" just like units observed in core #1 and #4
- Wet Test @ 5.0 Ft = gray silt mats (always superfine) when wetted. Flow-like or ash-like; no integrity
- Jan shear Test @ 1.0 Ft = rainbow shear 50% corn, silt is w/ floccs 1/2" firms coming to surface
- PID baggy headspace 0.0 Ft = 0.0
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-9-06  Recorder: GSW

Project: 341185.001 Windward Lower Duwamish Coring

Station Name: 2 R 1

Tube Length (ft): 16.0 5
Water Depth (ft): 31.4
Est. Tide Height (ft): 7.4

Est. Mudline: (MLLW) Predicted
On Deck Top of Sediment 3.2

Comments: Sandy 51T - 31A - No slope

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Mountlake Terrace, WA 98043
(425) 697-4340

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft
Northing 21196
Easting 1267032

Penetration Tape Reading  Recovery Tape Reading  Comments
15.1  15.6
13.5  13.9
11.2  11.2
7.8  7.3
6.7  6.2
5.4  5.0
4.4  4.2
3.6  3.6
3.0  3.0

Silt, clay plug in bottom

Lines started coming out of tube at top of tube
Mudmole™ Bore Log

Project: LDWG Duwamish Coring
Project No: 341185.001
Collected by: GSM
Date: 2/9/2006
Water depth: 31.4 ft

Station: 2 R1
Position: NAD83

Time: 9:09
Easting: 1257032
Mudline: -24.0 ft MLLW

Weather/Comments: Sunny cold

Penetration
Interval
(ft) 0-0.95 0.95-1.0 1.0-1.6 1.6-2.1 2.1-2.5 2.5-2.7 2.7-3.9 3.9-4.3 4.3-4.7 4.7-5.6 5.6-8.6 8.6-10.6 10.6-11.6 11.6-12.4 12.4-13.0 13.0-13.5 13.5-14.0

Percent 
(recovery) 47% 106% 117% 115% 100% 92% 80% 75% 100% 81% 67% 100% 100% 100% 100% 100% 100% 100%

Depth below 
mudline 
(ft) 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

Distance from top of tube (ft) 0.0 2.0 4.0 6.0 8.0 10.0 12.0 14.0 16.0 18.0

Penetration 13.05 ft/ On deck recovery 12.85 ft = 98% Recovery
Station Number: 2
Attempt: 1
Field Technician: LM
Contractor: MCS
On-site Visitor: None
Latitude: 33.196
Longitude: 124.7632

Date: 1/9/06
Core Tube Length: 10.05
Lead Line Water Depth: 31.4
Diver Water Depth: 31.0
Tip Probe Depth: —
Disk Probe Depth: —
Drive Initiation Time: 09:15

5' off station

Shoreline & surrounding area observations: 100' from East Wharf, 50' from wharf pier, western ty
Sediment surface & slope description: silty clay
Water current: Ebb, no current, 400' visibility

Penetration | Recovery | Drive Notes (e.g. easy, difficult, etc.)
---|---|---
15.1 | 15.1 | (Drive offset: —) free fall
13.5 | 13.5 | easy– moderate
11.2 | 11.2 | moderate– hard drive, punctured through something
9.8 | 9.8 | slow drive, little moment
6.7 | 6.2 | moderate– hard, slow
5.4 | 5.0 | moderate– hard, slow
4.4 | 4.2 | moderate– hard, slow
3.6 | 3.6 | moderate– hard, slow
3.0 | 3.0 | end of core; exceeded goal = fines started coming out of tube

Total = 13.05

Estimated angle of drive: moderate– core below many psi, no observation; estimate 10° off vertical
Reason for ending drive: exceeded goal; ended in native silty clay

Drive Completion Time: 19:28
On Boat Recovery: 3.2

End of Core Tube Observations

Staining: Black organic silt (residual)
Tube Deformation: None
Loss of Sediment: Fines started coming out of tube = fines started coming out of tube
Sediment Description: Black fine silty sand
Water in Tube: Clear water splashed 70'

Keep or Retry: Keep

Diver observed. Core plug decay - core plug is not necessary due to natural plug from native material

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
Sediment Core Processing Log

Job: Duwamish LDW
Job Number: Por-55-18220
No. of Sections: 1
Sample Logged by: N. Becker, A. Fitzpatrick
Sample Quality: good, fair, poor, disturbed

Sample Length (from log): Drive = 10 ft
Avg. % Compaction: 100% on 10 ft
R = 850

Notes: Collected on 2/11/10, lab mudline matched.

<table>
<thead>
<tr>
<th>Depth</th>
<th>% Compaction</th>
<th>Color</th>
<th>Size % G</th>
<th>Size % S</th>
<th>Size % F</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td>10YR 3/1</td>
<td>45 15</td>
<td></td>
<td></td>
<td>moist, med. dense, brownish gray</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>very dk. gray</td>
<td>85 15</td>
<td></td>
<td></td>
<td>silt lenses</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>2.5Y 3/1</td>
<td></td>
<td></td>
<td></td>
<td>moist to wet, med. dense</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>v. dk. gray</td>
<td></td>
<td></td>
<td></td>
<td>silt lenses</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>greenish</td>
<td>65 15</td>
<td></td>
<td></td>
<td>2.7&quot; x 1&quot; thick wood</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>moderate H2S odor</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>slanting down to</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.2&quot; thick lens</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5.2&quot; thick lens</td>
</tr>
</tbody>
</table>

Core Location/Number: LDW-SC-3
Date/Time: 02/09/09, 14:30 - 15:40
Type/Diameter of Sample: 4" alum MCS
Tube is slightly bowed (hard driving)
Sediment Core Processing Log

Job: Duwamish
Job Number: P05-18280
No. of Sections: 
Sample Length (from log): see
Avg. % Compaction: 

Notes:

<table>
<thead>
<tr>
<th>Recoved Length (ft)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Site % - G</th>
<th>Site % - S</th>
<th>Site % - F</th>
<th>PID</th>
<th>Description (grain size, color, moisture, shell/odor, biota, wood, other debris)</th>
<th>Shelby Actual O Depth (ft)</th>
<th>Sample Depth</th>
<th>Subsample No.</th>
<th>Summary Sketch</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>@ 5.6 1/2&quot; thick lens</td>
<td></td>
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<tr>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>@ 5.8 2&quot; thick lens</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>@ 6.1 2&quot; thick lens</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>@ 6.4 1/2&quot; thick lens</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>@ 7.0: wood chunks, clays, silt.</td>
<td>1520</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>@ 7.2 1.5&quot; thick lens</td>
<td>7.0</td>
<td>2-1/2 in.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>@ 7.9: 1&quot; thick lens</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>@ 8.1: small wood chunk</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>End of core = 8.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: TV = 2.9

Page 2 of 2
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-9-06  Recorder: 63n

Project: 341185.001 Windward Lower Duwamish Coring

Station Name: 3 R1

Tube Length (ft): 16.0  Time: 10:18
Water Depth (ft): 57.0
Est. Tide Height (ft): 7.9 (MLLW)
Est. Mudline: (MLLW)

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft
Northing: 210 648
Easting: 126 643

On Deck Top of Sediment 7.4

Comments: incoming tide, fine sand & scattered cobble
57 dive depth
Wind pushed boat off station ~15'

Penetration Tape Reading  Recovery Tape Reading  Comments
14.6  14.7
13.6
12.9  13.9 refusal
10.7
9.1
8.1  9.0
7.1  8.2
5.9  7.2

hard, silty sand in tip

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Duwamish borelog form.xls 1-2 20 of 480
Mudmole™ Bore Log

Project: LDWG Duwamish Coring  
Station: 3 R1

Project No: 341185.001  
Position: NAD83  
Collected by: GSM  
Date: 2/9/2006  
Water depth: 57.0 ft

Time: 10:18  
Mudline: -49.1 ft MLLW (estimated using tide tables)

Weather/Comments: Sunny cold

Penetration interval  
Interval recovery  
Percent recovery

<table>
<thead>
<tr>
<th>Depth below mudline (ft)</th>
<th>Distance from top of tube (ft)</th>
<th>Penetration interval (ft)</th>
<th>Interval recovery (ft)</th>
<th>Percent recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>6.0</td>
<td>0-1.45</td>
<td>1.35</td>
<td>93%</td>
</tr>
<tr>
<td></td>
<td>8.0</td>
<td>1.45-2.45</td>
<td>1.3</td>
<td>130%</td>
</tr>
<tr>
<td></td>
<td>10.0</td>
<td>2.45-5.35</td>
<td>2.4</td>
<td>83%</td>
</tr>
<tr>
<td></td>
<td>12.0</td>
<td>5.35-6.95</td>
<td>1.3</td>
<td>81%</td>
</tr>
<tr>
<td></td>
<td>14.0</td>
<td>6.95-7.95</td>
<td>0.7</td>
<td>70%</td>
</tr>
<tr>
<td></td>
<td>16.0</td>
<td>7.95-8.95</td>
<td>0.8</td>
<td>80%</td>
</tr>
<tr>
<td></td>
<td>18.0</td>
<td>8.95-10.15</td>
<td>1</td>
<td>83%</td>
</tr>
</tbody>
</table>

Distance from top of tube (ft)

<table>
<thead>
<tr>
<th>Depth below mudline (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.4</td>
</tr>
<tr>
<td>8.33</td>
</tr>
<tr>
<td>9.47</td>
</tr>
<tr>
<td>10.51</td>
</tr>
<tr>
<td>11.33</td>
</tr>
<tr>
<td>12.16</td>
</tr>
<tr>
<td>12.88</td>
</tr>
<tr>
<td>13.79</td>
</tr>
<tr>
<td>14.49</td>
</tr>
<tr>
<td>15.29</td>
</tr>
<tr>
<td>No sample</td>
</tr>
<tr>
<td>No sample</td>
</tr>
<tr>
<td>No sample</td>
</tr>
<tr>
<td>No sample</td>
</tr>
<tr>
<td>No sample</td>
</tr>
<tr>
<td>No sample</td>
</tr>
<tr>
<td>No sample</td>
</tr>
<tr>
<td>No sample</td>
</tr>
</tbody>
</table>

Penetration 10.15 ft/ On deck recovery 8.65 ft = 85% Recovery
Station Number: 3
Attempt: 1
Field Technician: TD/LH/AB
Contractor: MCO/LBS
On-site Visitor: 
Latitude: 34.1048
Longitude: 122.6045

Date: 2/17/06
Core Tube Length: 16.05
Lead Line Water Depth: 57.0
Diver Water Depth: 57
Tip Probe Depth: 
Disk Probe Depth: 
Drive Initiation Time: 10:36

North off target, wind pushed boat 15 ft off station

Shoreline & surrounding area observations: mud/silt, rip rap and pilings to west, pier to east

Sediment surface & slope description: fine sand, scattered cobbles

Water current: ebbing tide (slack, from flood-tide), wind

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g., easy, difficult, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.6</td>
<td>14.7</td>
<td>(Driveoffset — ) easy-moderate drive; no free cells had to hammer or else core fell over.</td>
</tr>
<tr>
<td>12.4</td>
<td>12.4</td>
<td>easy-moderate drive</td>
</tr>
<tr>
<td>10.7</td>
<td>11.0</td>
<td>easy-moderate drive</td>
</tr>
<tr>
<td>9.1</td>
<td>9.7</td>
<td>moderate-hard drive</td>
</tr>
<tr>
<td>9.0</td>
<td>9.0</td>
<td>moderate-hard drive, drive slowed down to refusal; hard silt; Send In Tip</td>
</tr>
<tr>
<td>7.1</td>
<td>8.2</td>
<td>hard drive</td>
</tr>
<tr>
<td>5.9</td>
<td>7.2</td>
<td>moderate-hard drive, drive slowed down to refusal; hard silt; Send In Tip</td>
</tr>
<tr>
<td>10.15</td>
<td>8.85</td>
<td></td>
</tr>
</tbody>
</table>

87.2%

Estimated angle of drive: unable to see, equip. under water; shortestimated: 0.° off, 5° off during extraction

Reason for ending drive: refused

Drive Completion Time: 10:47
On Boat Recovery: 7.4

End of Core Tube Observations

Staining: resor, red on sides - washed off.
Tube Deformation: none
Loss of Sediment: 0.0 in.
Now inserted screw plug in tube at sed-water interface
Sediment Description: silty sand, hard, gray-turquoise
Water in Tube: yes, slightly turbid

Keep or Retry: Keep - listing "5° to starboard, le bow under water"
                    diffcult extraction
                    hard silty sand

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
### Sediment Core Processing Log

**Job:** LDWG combo  
**Job Number:** P055-18220  
**No. of Sections:** 1  
**Sample Length (from log):** 7.7'  
**Avg. % Compaction:**  
**Notes:** Denet: 9, R = 86%  

**Core Location/Sample Number:** LDWG-SC-4 R2  
**Date/ Time:** 2/9/06 0940  
**Sample Logged by:** N. Bacher  
**Type/Diameter of Sample:** 4" sq. Aluminium  
**Sample Quality:** good fair poor disturbed

<table>
<thead>
<tr>
<th>Recorded Length (ft)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Size s. G</th>
<th>Size s. S</th>
<th>Size s. F</th>
<th>Description (grain size, color, moisture, sheen/viscosity, blots, wood, other debris)</th>
<th>Test Actual Depth (ft)</th>
<th>Sample Depth</th>
<th>Subsample No.</th>
<th>Summary Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.25</td>
<td></td>
<td>GLEY2</td>
<td>5</td>
<td>0</td>
<td>15</td>
<td>Simply wet, loose, olive gray, silt, sand, trace of crystal, white, and minor gravel runded up to 5/8&quot;, trace of shells.</td>
<td>0.942</td>
<td>0.4</td>
<td>0.4</td>
<td>Trace HC sheen</td>
</tr>
<tr>
<td>0.942</td>
<td></td>
<td>GLEY2</td>
<td>5</td>
<td>0</td>
<td>15</td>
<td>Very wet, dark, black, sandy silt, gravel, angular and up to 1/2&quot;, trace of rocks and twigs.</td>
<td>0.952</td>
<td>0.4</td>
<td>0.4</td>
<td>Trace HC sheen</td>
</tr>
<tr>
<td>0.952</td>
<td></td>
<td>GLEY2</td>
<td>5</td>
<td>0</td>
<td>15</td>
<td>Very wet, loose, silt, sandy gravel, gravel, angular and up to 1/2&quot;, trace of calcite and shell, grayish gray.</td>
<td>0.958</td>
<td>0.4</td>
<td>0.4</td>
<td>Trace HC sheen</td>
</tr>
<tr>
<td>0.958</td>
<td></td>
<td>GLEY2</td>
<td>5</td>
<td>0</td>
<td>15</td>
<td>Very wet, dense, brownish gray, fine sand with irregular gray silt lenses and 10-15% wood shreds, twigs, roots, no apparent sheen. 1&quot; black clayey wood increases @ base. Silt lens @ 0.3.</td>
<td>1.0</td>
<td>0.4</td>
<td>0.4</td>
<td>Trace HC sheen</td>
</tr>
<tr>
<td>1.0</td>
<td></td>
<td>GLEY2</td>
<td>5</td>
<td>0</td>
<td>15</td>
<td>Unit grades to medium sand below 5.5&quot;, clay pocket @ 4.7, 0&quot;</td>
<td>5.0</td>
<td>1.0</td>
<td>0.4</td>
<td>Trace HC sheen</td>
</tr>
</tbody>
</table>

**Units:**
- 4.2" grey silt lens @ 5.4'
### Sediment Core Processing Log

**Core Location/Sample Number:** LDNG-SC-4 RZ

<table>
<thead>
<tr>
<th>Recovered Length (ft)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Size % - G</th>
<th>Size % - S</th>
<th>Size % - F</th>
<th>PDR</th>
<th>Description: (grain size, color, moisture, shells/lobor, biota, wood, other debris)</th>
<th>Initial Actual Depth (ft)</th>
<th>Sample Depth</th>
<th>Subsample No.</th>
<th>Summary Sketch</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>clay pocket @ 6.4' 1&quot; Ø</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unit, very dense, gray, fine sand w/ silt interbeds. From 6.4' - 7.2' interbeds are 1/8&quot; thick and spaced ~ 1/8&quot; apart. Then fine sand to 7.4' where another 1/8&quot; silt lens is found. Another silt lens @ 7.6'</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></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>End of core @ 7.7'</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**

- Sample Quality: good, fair, poor, disturbed

**Job:**

- **Job Number:**

**No. of Sections:**

- **Sample Length (from log):**

- **Avg. % Compaction:**

**Data/Time:**

- **Sample Logged by:**

**Type/Diameter of Sample:**

- **Sample Quality:**

**Summary Sketch:**

- TV = 3.0

(Handwritten notes: @ 7.2, big)
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-8-06  Recorder: 6SM
Project: 341185.001 Windward Lower Duwamish Coring

Station Name: 4 R2

Tube Length (ft): 16.00
Water Depth (ft): 41.9
Est. Tide Height (ft): 5.0 (MLLW)

Comments: gravelly silty sand

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft

Northing 210597
Easting 1266933
On Deck Top of Sediment 8.1

Penetration Tape Reading  Recovery Tape Reading  Comments
13.5  13.7
11.5  11.4
10.3  10.3
9.0  9.2
8.0  8.6
7.0  8.0

Sediment packed in end of core and hard
Mudmole™ Bore Log

Project: LDWG Duwamish Coring
Project No: 341185.001
Collected by: GSM
Date: 2/8/2006
Water depth: 41.9 ft

Station: 4 R2
Position: NAD83
Time: 14:55
Nothing
Easting

Water depth: 41.9 ft Mudline: -36.9 ft MLLW (estimated using tide tables)

Weather/Comments: N/A
Driven to refusal

Penetration interval:

<table>
<thead>
<tr>
<th>Depth below mudline (ft)</th>
<th>Distance from top of tube (ft)</th>
<th>Interval recovery (ft)</th>
<th>Percent recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-2.5</td>
<td>10.0</td>
<td>2.3</td>
<td>92%</td>
</tr>
<tr>
<td>2.5-4.5</td>
<td>12.0</td>
<td>2.3</td>
<td>115%</td>
</tr>
<tr>
<td>4.5-5.7</td>
<td>14.0</td>
<td>1.1</td>
<td>92%</td>
</tr>
<tr>
<td>5.7-7</td>
<td>16.0</td>
<td>1.1</td>
<td>85%</td>
</tr>
<tr>
<td>7-8</td>
<td>18.0</td>
<td>0.6</td>
<td>60%</td>
</tr>
<tr>
<td>8-9</td>
<td></td>
<td>0.6</td>
<td>60%</td>
</tr>
</tbody>
</table>

Distance from top of tube (ft):

<table>
<thead>
<tr>
<th>Depth below mudline (ft)</th>
<th>Distance from top of tube (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mudline</td>
<td>8.1</td>
</tr>
<tr>
<td>1</td>
<td>9.02</td>
</tr>
<tr>
<td>2</td>
<td>9.94</td>
</tr>
<tr>
<td>3</td>
<td>10.98</td>
</tr>
<tr>
<td>4</td>
<td>12.13</td>
</tr>
<tr>
<td>5</td>
<td>13.16</td>
</tr>
<tr>
<td>6</td>
<td>14.05</td>
</tr>
<tr>
<td>7</td>
<td>14.90</td>
</tr>
<tr>
<td>8</td>
<td>15.50</td>
</tr>
<tr>
<td>9</td>
<td>No sample</td>
</tr>
<tr>
<td>10</td>
<td>No sample</td>
</tr>
<tr>
<td>11</td>
<td>No sample</td>
</tr>
<tr>
<td>12</td>
<td>No sample</td>
</tr>
<tr>
<td>13</td>
<td>No sample</td>
</tr>
<tr>
<td>14</td>
<td>No sample</td>
</tr>
<tr>
<td>15</td>
<td>No sample</td>
</tr>
<tr>
<td>16</td>
<td>No sample</td>
</tr>
<tr>
<td>17</td>
<td>No sample</td>
</tr>
<tr>
<td>18</td>
<td>No sample</td>
</tr>
<tr>
<td>19</td>
<td>No sample</td>
</tr>
<tr>
<td>20</td>
<td>No sample</td>
</tr>
</tbody>
</table>

Penetration 9 ft/ On deck recovery 7.9 ft = 88% Recovery

MCS Environmental, Inc.
6503 216th Street SW, Suite 100
Mountlake Terrace, WA 98043
(425) 697-4340
fax (425) 697-4370

File name 4 R2
Bore Log (mudmole)
Station Number: 4  
Attempt: 2  
Field Technician: LM  
Contractor: MAS  
On-site Visitor: John V.  
Latitude:  
Longitude:  
Date: 2/8/06  
Core Tube Length: 16.00  
Lead Line Water Depth: 41.9  
Diver Water Depth: 42.0  
Tip Probe Depth:  
Disk Probe Depth:  
Drive Initiation Time: 15:02  

Shoreline & surrounding area observations: see R1  
Sediment surface & slope description: gravelly-silty sand  
Water current: see R1  

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g., easy, difficult, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.5</td>
<td>13.7</td>
<td>moderate-hard drive, diver measurements</td>
</tr>
<tr>
<td>11.5</td>
<td>11.4</td>
<td>moderate</td>
</tr>
<tr>
<td>10.3</td>
<td>10.3</td>
<td>moderate</td>
</tr>
<tr>
<td>9.0</td>
<td>9.2</td>
<td></td>
</tr>
<tr>
<td>8.0</td>
<td>8.0</td>
<td>hand-refusal</td>
</tr>
<tr>
<td>Totals</td>
<td>90.0</td>
<td>80.0</td>
</tr>
</tbody>
</table>

Estimated angle of drive: 10° off vertical  
Reason for ending drive: refusal; upon extraction, dive understood breaths to std.  

Drive Completion Time: 15:18  
On Boat Recovery: 8.1

89% recovery  

End of Core Tube Observations  
Staining: black, silty residue as core is extracted  
Tube Deformation: None  
Loss of Sediment: 0.1' on boat vs. 100.0 in situ  
Sediment Description:  
Water in Tube: water-saturated 2/4 ft.  

Keep or Retry:  
Diver caps core at sediment-water interface with plug, wrapped on deck  

Notes:  
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
Station Number: 4  
Attempt: 2  
Field Technician: JD/LM  
Contractor: NCSL/R  
On-site Visitor: JN (SHC)  
Latitude: 2105797  
Longitude: 1246933  

Shoreline & surrounding area observations:  N 18 ft off target  
Sediment surface & slope description:  gravelly silty sand  
Water current:  

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, difficult, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.5</td>
<td>13.7</td>
<td>moderate drive</td>
</tr>
<tr>
<td>11.5</td>
<td>11.4</td>
<td></td>
</tr>
<tr>
<td>10.3</td>
<td>10.3</td>
<td></td>
</tr>
<tr>
<td>9.0</td>
<td>9.2</td>
<td>difficult drive</td>
</tr>
<tr>
<td>8.0</td>
<td>8.6</td>
<td></td>
</tr>
<tr>
<td>7.0</td>
<td>8.0</td>
<td>refusal, hard, difficult drive</td>
</tr>
<tr>
<td>6.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.0</td>
<td>9.0</td>
<td></td>
</tr>
</tbody>
</table>

Estimated angle of drive: cannot see - equip underwater 10° off 90°  
Reason for ending drive: refusal  

Drive Completion Time: 1514  
On Boat Recovery: B.1  

End of Core Tube Observations  
Staining: light amount of sed. streaked on outside, washed off  
Tube Deformation: none  
Loss of Sediment: screw plug inserted by diver in site; packed hand tight at each end  
Sediment Description: fine, gray silty sand - packed in tight at plug  
Water in Tube: yes, pumped out (3.5 pumps)  

Keep or Retry: boat lists to starboard during extraction  
sed. packed in end of core - hand  

Notes:  
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
### Collection Information

- **Date:** 2-6-06
- **Recorder:** 659
- **Project:** 341185.001 Windward Lower Duwamish Coring

### Station Information

- **Station Name:** 4 R 1
- **Tube Length (ft):** 16.05
- **Water Depth (ft):** 42.7
- **Est. Tide Height:** 5.9 (MLLW)
- **Est. Mudline:** (MLLW)

### Position Information

- **Coordinate Datum:** WA State Plane N, NAD 83, Survey Ft
- **Northing:** 210 583
- **Easting:** 126 6940
- **On Deck Top of Sediment:** 10.4

### Comments

- Pile of gravel at station - moved offshore 26'4"
- Silt, gravel (crushed rock) / depth 42' / no slope
- TA visibility

### Penetration Tape

<table>
<thead>
<tr>
<th>Penetration Tape Reading</th>
<th>Recovery Tape Reading</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.7</td>
<td>14.0</td>
<td></td>
</tr>
<tr>
<td>12.2</td>
<td>12.8</td>
<td></td>
</tr>
<tr>
<td>11.2</td>
<td>12.2</td>
<td></td>
</tr>
<tr>
<td>10.5</td>
<td>11.6</td>
<td></td>
</tr>
<tr>
<td>9.8</td>
<td>10.9</td>
<td></td>
</tr>
<tr>
<td>8.7</td>
<td>9.9</td>
<td>refusal</td>
</tr>
</tbody>
</table>

- 5-10° angle on drive - $\$
- Had to use hammer to break core out of bottom
- Silt, sand in end of core tube
- No apparent loss of material
Mudmole™ Bore Log

Project: LDWG Duwamish Coring
Project No: 341185.001
Collected by: GSM
Date: 2/8/2003

Station: 4 R1
Position: NAD83
210583 Nathing
126940 Easting
Water depth: 42.2 ft
Mudline: -36.3 ft MLLW (estimated using tide tables)

Weather/Comments: N/A

Driven to refusal

Penetration interval (ft) | Interval recovery (ft) | Percent recovery | Depth below mudline (ft) | Distance from top of tube (ft)
--- | --- | --- | --- | ---
0-2.35 | 2.05 | 87% | Mudline | 10.4 |
2.35-3.85 | 1.2 | 80% |
3.85-4.85 | 0.6 | 60% |
4.65-5.55 | 0.6 | 60% |
5.55-6.25 | 0.7 | 100% |
6.25-7.35 | 1 | 91% |

8.0
9.0
10.0
11.0
12.0
13.0
14.0
15.0
16.0
17.0

Distance from top of tube (ft)

Top of sediment

On deck

In-situ

Penetration 7.35 ft/ On deck recovery 5.65 ft = 77% Recovery

MCS Environmental, Inc.
505 216th Street SW, Suite 100
Mountlake Terrace, WA 98043
(425) 697-4340
fax (425) 697-4370

File name 4 R1
Bore Log (Mudmole)
Station Number: 4
Attempt: 1
Field Technician: JMH
Contractor: MCS
On-site Visitor: John
Latitude: —
Longitude: —

Date: 1/8/06
Core Tube Length: 1105
Lead Line Water Depth: —
Diver Water Depth: 492
Tip Probe Depth: —
Disk Probe Depth: —
Drive Initiation Time: 1400/1420

Shoreline & surrounding area observations: 30 ft. from shoreline at gravel-dumping wharf (center wharf)
Sediment surface & slope description: Silt gravel, crushed rock
Water current: None, 1 ft. visibility

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g., easy, difficult, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.7</td>
<td>14.0</td>
<td>(Drive offset: —) easy - moderate penetration, diver measurements</td>
</tr>
<tr>
<td>13.2</td>
<td>12.8</td>
<td>mud - hard</td>
</tr>
<tr>
<td>11.2</td>
<td>12.3</td>
<td>mud - hard</td>
</tr>
<tr>
<td>10.5</td>
<td>11.1</td>
<td></td>
</tr>
<tr>
<td>9.8</td>
<td>9.9</td>
<td>refusal</td>
</tr>
<tr>
<td>8.7</td>
<td>9.9</td>
<td></td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>6.15</strong></td>
<td></td>
</tr>
</tbody>
</table>

Estimated angle of drive: 5/10' off vertical; mud/mold core below monopod
Reason for ending drive: refusal; core deeply embedded in mud; boat moved a lot

Drive Completion Time: 15/1423
On Boat Recovery: 45

84% recovery

End of Core Tube Observations:
Staining: None - light amt of residual black sediment
Tube Deformation: None
Loss of Sediment:
Sediment Description: Well packed black-gray sand = fill of plug
Water in Tube: Water-filled - lot

Keep or Retry: Keep

1532: Gravel around 1st location, Davis is investigating for better core ground.
1537: Maneuvered to toward channel.

Davis capped core with plug at sediment - water interface

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
Shoreline & surrounding area observations: Concrete pile cap, wood pilings/dolphins, @ cement/gravel loading site.

Sediment surface & slope description: 7/8 inch diameter, silty gravel (crushed rock), no slope

Water current:@s#. Winds from west, ebbing tide

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, difficult, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.7</td>
<td>14.0</td>
<td>(Drive offset: ) water due east</td>
</tr>
<tr>
<td>12.2</td>
<td>12.8</td>
<td></td>
</tr>
<tr>
<td>11.2</td>
<td>11.2</td>
<td></td>
</tr>
<tr>
<td>10.5</td>
<td>11.0</td>
<td></td>
</tr>
<tr>
<td>9.9</td>
<td>10.9</td>
<td>difficult drive</td>
</tr>
<tr>
<td>8.7</td>
<td>9.9</td>
<td>refusal, hard bottom</td>
</tr>
</tbody>
</table>

83.7\% 7.35 6.15

Estimated angle of drive: cannot see - equip under water 5°-10° degree angle off from 1

Reason for ending drive: refusal - hard bottom

Drive Completion Time: 11/13 On Boat Recovery: 10.4

End of Core Tube Observations

Staining:

Tube Deformation: none

Loss of Sediment: scraping by diver in site

Sediment Description: silty sand, de gray packed tight

Water in Tube: yes, spinout (30 pumps)

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)

Keep or retry: On boat recovery measurements indicate recovery is only 5.05 ft. May need to retry... will determine when core is processed or after consult with unit. tube stuck in sediment during retrieval, boat locked to port, used hammer to shake loose.
### Sediment Core Processing Log

**Job:** Duwamish  
**Job Number:** PWS55-1832D  
**No. of Sections:** 1

**Sample Length from log:** Driv = 3.4'  
**Avg. % Compaction:** In 2x4 = 14.2%

**Notes:** 
- <strike>Core collected 2/19/06, R1 opened + rejected core to be processed as Method A</strike>
- This core approved this Oversight.

<table>
<thead>
<tr>
<th>Recovered Length (ft)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Size % S-G</th>
<th>Size % S-F</th>
<th>P/C</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.54</td>
<td>25/1</td>
<td>black</td>
<td>15</td>
<td>85</td>
<td></td>
<td>moist, med. soft, olive gray, st. sandy silt, scattered roots, twigs, wetted appearance. 1 poly chaenid worm. 1 worm tube</td>
</tr>
<tr>
<td>2.54</td>
<td>4/1</td>
<td>dk. gray</td>
<td>95</td>
<td>5</td>
<td>9.1</td>
<td>moist, med. dense, grayish black lime to medium sand, trace shell frags, multi-colored grains are orange, red, white.</td>
</tr>
<tr>
<td>3/10y</td>
<td>95</td>
<td>gray</td>
<td>110</td>
<td>50</td>
<td></td>
<td>moist, soft, grayish, silty sand, multi abundant shell frags through sand.</td>
</tr>
</tbody>
</table>

*Gley*

<table>
<thead>
<tr>
<th>Recovered Length (ft)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Size % S-G</th>
<th>Size % S-F</th>
<th>P/C</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/10y</td>
<td></td>
<td></td>
<td>100</td>
<td></td>
<td></td>
<td>moist, medium dense, blackish gray medium sand, scattered very small shells slight this odor to 4.0'</td>
</tr>
</tbody>
</table>

**Sample Quality:** good  
**Sample Logged by:** Nik Beskar, A. Fitzpatrick  
**Type/Diameter of Sample:**  
**Sample Depth:** Initial depth 6.0', Subsample depth 3.1', Stated depth 4.0'

---

*End of core:* 6.2'
core slightly sloughed from 5, 9 - 6, 2. Material still present.
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-9-06  Recorder: 6557

Project: 341185.001 Windward Lower Duwamish Coring

Station Name: 5 R 2

Tube Length (ft): 16.05

Depth (ft): 19.7

Water Depth (ft): 7.7

Est. Tide Height (ft) (MLLW):

Est. Mudline (MLLW):

Comments: Sandy silt, very gentle slope

Visibility: 5-4

20-4 from planned station

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft

Northing: 210543

Easting: 1266048

On Deck Top of Sediment: 9.9

Penetration Tape Reading

<table>
<thead>
<tr>
<th>Recovery Tape Reading</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.5</td>
<td></td>
</tr>
<tr>
<td>13.1</td>
<td></td>
</tr>
<tr>
<td>11.0</td>
<td></td>
</tr>
<tr>
<td>9.7</td>
<td></td>
</tr>
<tr>
<td>8.7</td>
<td></td>
</tr>
<tr>
<td>15.6</td>
<td></td>
</tr>
<tr>
<td>13.3</td>
<td></td>
</tr>
<tr>
<td>11.3</td>
<td></td>
</tr>
<tr>
<td>10.3</td>
<td></td>
</tr>
<tr>
<td>9.7</td>
<td>penetration slowed natural</td>
</tr>
</tbody>
</table>

Lost some sand out of core tip when extracting

Coarse sand in end

No odor

MCS Environmental, Inc.
6505 – 210th St. SW, Suite 109
Mountlake Terrace, WA 98043
(425) 697-4340

Duwamish boring formibuz
35 of 490
Mudmole™ Bore Log

Project: LDWG Duwamish Coring
Project No: 341185.001
Collected by: GSM
Date: 2/9/2006
Water depth: 19.7 ft
Weather/Comments: Sunny

Station: 5 R2
Position: NAD83
Time: 14:15
Northing: 210543
Mudline: -12.0 ft MLLW (estimated using tide tables)
Easting: 1266048

Penetration interval (ft)
Interval recovery (ft)
Percent recovery

<table>
<thead>
<tr>
<th>Depth below mudline (ft)</th>
<th>Distance from top of tube (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td>Top of sediment</td>
</tr>
<tr>
<td>0.45</td>
<td>0-0.55</td>
</tr>
<tr>
<td>2.3</td>
<td>0.55-6.05</td>
</tr>
<tr>
<td>2</td>
<td>6.05-6.35</td>
</tr>
<tr>
<td>1</td>
<td>6.35-7.35</td>
</tr>
<tr>
<td>0.6</td>
<td>17.0</td>
</tr>
</tbody>
</table>

Penetration 7.35 ft / On deck recovery 6.15 ft = 84% Recovery

Depth below mudline (ft)
Distance from top of tube (ft)

<table>
<thead>
<tr>
<th>Depth below mudline (ft)</th>
<th>Distance from top of tube (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mudline</td>
<td>9.9</td>
</tr>
<tr>
<td>1</td>
<td>10.78</td>
</tr>
<tr>
<td>2</td>
<td>11.74</td>
</tr>
<tr>
<td>3</td>
<td>12.70</td>
</tr>
<tr>
<td>4</td>
<td>13.65</td>
</tr>
<tr>
<td>5</td>
<td>14.60</td>
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<td>6</td>
<td>15.38</td>
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<td>7</td>
<td>16.04</td>
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<td>8</td>
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<td>No sample</td>
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<td>No sample</td>
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<td>17</td>
<td>No sample</td>
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<td>18</td>
<td>No sample</td>
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<tr>
<td>19</td>
<td>No sample</td>
</tr>
<tr>
<td>20</td>
<td>No sample</td>
</tr>
</tbody>
</table>
Station Number: 5
Attempt: 2
Field Technician: TB/LM
Contractor: WES/RE3
On-site Visitor: 
Latitude: 2105443
Longitude: 1266048

Date: 1/9/06
Core Tube Length: 16.05
Lead Line Water Depth: 19.7
Diver Water Depth: 
Tip Probe Depth: 
Disk Probe Depth: 
Drive Initiation Time: 1421

Shoreline & surrounding area observations: Same as R1
Sediment surface & slope description: gentle slope, sandy/silt, visibility 5 ft.
Water current: Same as R1

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g., easy, difficult, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.0</td>
<td>13.3</td>
<td>(Drive offset: ) easy recovery</td>
</tr>
<tr>
<td>11.20</td>
<td>11.3</td>
<td>equipment underwater; easy drive</td>
</tr>
<tr>
<td>9.7</td>
<td>10.3</td>
<td>too deep; moderate drive</td>
</tr>
<tr>
<td>8.7</td>
<td>9.7</td>
<td>moderate drive/hard drive, penetration slow to refusal</td>
</tr>
</tbody>
</table>

86.4%
Estimated angle of drive: unable to see - mostly underwater. Est. 10° off
Reason for ending drive: refusal

Drive Completion Time: 1428
On Boat Recovery: 9.9

End of Core Tube Observations:
Staining: Back sitio side, washed off
Tube Deformation: No
Loss of Sediment: 0.2
Sediment Description: dark grey coarse sand, no odor no smell
Water in Tube: yes, clear

Keep or Retry: lost some sand out of tip during extraction
We suspect R1 may have hit a piling vs. no obstacle at this site.

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
Sediment Core Processing Log

**Job:** Dunxwash

**Core Location/Sample Number:** LDW-SC-5

**Data/Time:** Feb 16, 2004 collected 2/18/04 Stud 0830

**Sample Logged by:** N. Bacher A. Fitzpatrick

**Type/Diameter of Sample:** 4" glue MTS

**Sample Quality:** good fair poor disturbed

Notes:

- Suspect hit piling - refusal, deflection
- Oulds: 3.3

<table>
<thead>
<tr>
<th>Recovered Length (ft)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Size % - G</th>
<th>Size % - S</th>
<th>Size % - F</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>95</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td>moist, med. soft, blackish gray, sandy silt, mottled</td>
</tr>
</tbody>
</table>

- 50% wood frags and jetty sand, medium sheen, moderate crease line
- 1.0

5.95

- 5% wood, black fine to medium sand, trace silt, multi-colored grains are orange, red, white, trace to moderate. HC like sheen and moderate crease like color.
- 2.0

5

- 95% wet, soft, gray, silt w/trace sand, minor clay, trace crease like color, no sheen. 50% winnowed w/above sand
- 3.0

End of core: 3.3

The bottom silt unit appears to be a stand alone stratigraphic unit below the sand. However, it is hard to be certain due to core winnowing.
### Collection Information

**Date:** 2-9-06  
**Recorder:** GSV

**Project:** 341185.001 Windward Lower Duwamish Coring

#### Position Information

**Coordinate Datum:** WA State Plane N, NAD 83, Survey Ft

- **Northing:** 210531
- **Easting:** 1266043
- **On Deck Top of Sediment:** 12.8

#### Station Name: 5 R1

- **Tube Length (ft):** 16.05
- **Water Depth (ft):** 18.7
- **Est. Tide Height (ft):** 8.5 (MLLW)
- **Est. Mudline:** (MLLW)

**Comments:**
- Falling tide
- sandy silt
- wood & metal debris
- diver depth: 18
- gentle slope
- 10 ft visibility
- kit debris under surface - moved offshore slightly

#### Penetration Tape Reading

<table>
<thead>
<tr>
<th>Reading</th>
<th>Recovery Tape Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.6</td>
<td>15.6</td>
</tr>
<tr>
<td>13.4</td>
<td>13.7</td>
</tr>
<tr>
<td>12.9</td>
<td>13.2</td>
</tr>
<tr>
<td>11.3</td>
<td>11.6</td>
</tr>
<tr>
<td>9.9</td>
<td>9.8</td>
</tr>
<tr>
<td>9.2</td>
<td></td>
</tr>
</tbody>
</table>

**Comments:**
- penetration slowed
- refusal

- core stuck in bottom
- topped out with mudmole
- very hard to extract core
- oily medium sand in tip
- core tube tip damaged

**Many pylons in area may have hit end of bored pile.**
Mudmole™ Bore Log

Project: LDWG Duwamish Coring
Project No: 341185.001
Collector by: GSM
Date: 2/9/2006

Station: 5 R1
Position: NAD83

Water depth: 18.7 ft
Mudline: -10.2 ft MLLW (estimated using tide tables)

Weather/Comments: Sunny
Driven to refusal, core tapped out with Mudmole

Penetration 6.85 ft/ On deck recovery 3.25 ft = 47% Recovery
Station Number: 5
Attempt: 1
Field Technician: T/L
Contractor: MCB/RSS
On-site Visitor: 
Latitude: 21o53'1"
Longitude: 124°6'043"

Date: 2/4/06
Core Tube Length: 16.05
Lead Line Water Depth: 10.3
Diver Water Depth: 10
Tip Probe Depth: 
Disk Probe Depth: 
Drive Initiation Time: 13:18

Shoreline & surrounding area observations: Concrete rip rap and sandy beach 100' to west of wood pilings around.
Sediment surface & slope description: Sandy silt with wood & metal debris, gentle slope, left visibility.
Water current: light wind from north, ebbing tide.

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, difficult, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.19</td>
<td>15.19</td>
<td>Freefall</td>
</tr>
<tr>
<td>13.74</td>
<td>13.7</td>
<td>Easy - mod. drive</td>
</tr>
<tr>
<td>12.94</td>
<td>13.2</td>
<td>Moderate drive - hard drive - penetration - hard drive</td>
</tr>
<tr>
<td>11.23</td>
<td>11.6</td>
<td>Hammer below surface; moderate drive/hard drive</td>
</tr>
<tr>
<td>9.93</td>
<td>10.4</td>
<td>Moderate - hard drive</td>
</tr>
<tr>
<td>9.22</td>
<td>9.8</td>
<td>Hard drive, refusal</td>
</tr>
<tr>
<td>6.85</td>
<td>6.75</td>
<td>Core stuck in bottom; tapped out with 4&quot; driver</td>
</tr>
</tbody>
</table>

91.2% (see boat recovery)

Estimated angle of drive: 10° off upright until underwater's surface - cannot see after that.
Reason for ending drive: refusal?

Drive Completion Time: 13:26

On Boat Recovery: 12.8 = 3.25 ft total recovery = 47.4%

6.85 pounds

End of Core Tube Observations:
Staining: silt on sides; washed off.
Tube Deformation: tip of tube slightly deformed.
Loss of Sediment: 3 ft; screw plug used by diver at sediment surface.
Sediment Description: peatooch-like color, shear present; coarse/grained sand.
Water In Tube: yes, clear.

Keep on (Retry) stack on port anchor (left) given by of boat's underwater surface.
very difficult to extract core; boat bow lists to port (partially submerged)
Hammer used to shake core tube free (8x8-13"") horizontally. Mudline
line beginning to form under tension/strain of stuck core tube.
Collecting 6.25 ft; ensure if debris prevented further penetration and type of loss if 3 ft; during
extraction of stuck core tube (see boat's bottom)

Notes: Move station a few feet north by pilings present moving south.
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
### Sediment Core Processing Log

**Core Location/Sample Number:** LDW-SC-6

**Date/Time:** Feb 10, 2000, 0830

**Sample Logged by:** N. Bedke, A. Fieneichick

**Type/Diameter of Sample:** 4" Alum MC5

**Sample Quality:** Good, Fair, Poor, Disturbed, Very Good

---

**Notes:**
- Core collected 2/6/00
- Picked Without B (Sample #15) for this core w/ oversight approval
- In breach zone

---

<table>
<thead>
<tr>
<th>Recovered Length (ft)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Size % G</th>
<th>Size % S</th>
<th>Size % F</th>
<th>PIP</th>
<th>Description (grain size, color, motility, sheen/loose, etc., wood, other debris)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Just above sediment - NICE interstratified W/ twigs, shells, and wood chips</td>
</tr>
<tr>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td>Silt: Wet, agitated, stiff, blackish, brown Silt w/ scattered wood particles, light H2S odor, homogenous, no layering, mud, plasticity, increased shden w/ depth. Abrupt basal contact, mottled upper contact.</td>
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<tr>
<td>2.0</td>
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<td>In about 35 ft sand in upper 3 ft decreasing w/ depth.</td>
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<tr>
<td>3.0</td>
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<td></td>
<td>At 3.4' 2&quot; pocket of gray Silt &quot;soft&quot;, stiff, plastic (not a layer)</td>
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<tr>
<td>4.0</td>
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<td></td>
<td>0.35&quot; TV = 3.5 big</td>
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<tr>
<td>5.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.44&quot; TV = 3.0 big</td>
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<tr>
<td>6.0</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>0.65&quot; TV = 0.5 big</td>
</tr>
<tr>
<td>7.0</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>SAND: moist, dense, d. grain, brown</td>
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<tr>
<td>8.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SAND w/ gastroboid F-M-C</td>
</tr>
</tbody>
</table>
| 9.0                   |              |       |          |          |          |     | F

---

**Sharp Contact:** 4.5

**Sharp Contact:** 4.5

---

**12- U" intervals: 490 samples**
Low SC-6 (R4)

02/10/06

Matched "inert" 7.5' 8.5' 9.5' 10.5' INHIB 0.1°F

16:1 Direction

Slit winnowed

Full do tip but slightly winnowed

A drilled hole in sidewall to remove steadily 610.0
Started during this cuz of suspected fines loss
from previous core. However, does not appear to be
significant. On deck recovery has been matching lab
recovery (as depth to sediment from tip of hole).
### Sediment Core Processing Log

- **Job:** DUNAMISH
- **Core Location/Sample Number:** LDW - SC-6
- **Date/Time:** Feb 10, 2000, 08:31
- **Sample Logged by:** NPB, AVF
- **Sample Quality:** good, fair, poor, disturbed

#### Notes:

- See page 4

#### Table:

<table>
<thead>
<tr>
<th>Recommanded Length (m)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Granul% S</th>
<th>Size % S</th>
<th>Size % F</th>
<th>Description</th>
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<td></td>
<td>(grain size, color, moisture, sheen/odor, biota, wood, other debris)</td>
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</tbody>
</table>

- **Sheets Actual Depth (m):**
- **Sample Depth:**
- **Subsample No.:**

#### Observations:

- At 7.7', loose gravel with scattered small fragments (1"")
- Mixed with loose MIL SAND and scattered roots/leaves, possibly from one 1/2" skull (1"")
- Unit B, E, grain A/B 2" rounded around

#### Additional Notes:

- Bottom of cut 8.6'
- But lost 1.5' slightly winnowed
- Not sampled

- Note: Filled 3 debris bags from sand unit
- At 5.7', possible chunk
- At 7.0 to 8.0" = brick frag
- 1/2 skull from 8.5'
- At 6' = sand cast w/ odw
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-9-06  Recorder: 65m

Project: 341185.001 Windward Lower Duwamish Coring

Station Name: 6 81

Tube Length (ft): 16.1

Water Depth (ft): 8.6  Time: 12:00

Est. Tide Height (ft): 41.9  (MLLW)

Est. Mudline: (MLLW)

Comments: high slack tide sandy silt gentle slope

41 ft diver depth

---

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft

Northing 209,837

Easting 126,684

On Deck Top of Sediment 7.5

---

Penetration Tape Reading  Recovery Tape Reading  Comments

13.5  13.9

11.4  11.2

9.3  9.7

7.3  8.4

6.1  7.6

5.1  7.3

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Mudmole™ Bore Log

Project: LDWG Duwamish Coring
Project No: 341185.001
Collected by: GSM
Date: 2/9/2006

Weather/Comments: Sunny

Penetration: 0-2.6 ft
Interval: 2.7 ft
Percent recovery: 104%

Depth below mudline (ft):
- Mudline: 7.5
- 1: 8.54
- 2: 9.58
- 3: 10.62
- 4: 11.67
- 5: 12.61
- 6: 13.33
- 7: 14.03
- 8: 14.68
- 9: 15.33
- 10: 16.00
- 11: No sample
- 12: No sample
- 13: No sample
- 14: No sample
- 15: No sample
- 16: No sample
- 17: No sample
- 18: No sample
- 19: No sample
- 20: No sample

Distance from top of tube (ft):
- 0-2.6 ft
- 2.6-4.7 ft
- 4.7-6.6 ft
- 6.6-8.8 ft
- 8.8-10 ft
- 10-11 ft

Penetration 11 ft/ On deck recovery 8.6 ft = 78% Recovery

MCS Environmental, Inc.
5505 216th Street SW, Suite 100
Mountlake Terrace, WA 98043
(425) 697-4340
fax (425) 697-4370

Place Field ID Label Here
Station Number: 10  
Attempt: 1  
Date: 2/9/04  
Core Tube Length: 16.1
Lead Line Water Depth: 61.9
Diver Water Depth: 41
Tip Probe Depth:  
Disk Probe Depth:  
Drive Initiation Time: 12:33

Shoreline & surrounding area observations: Rip rap, causeway pier, stone abrasion 10 ft to west
Sediment surface & slope description: Sandy silt, gentle slope
Water current: Ebbing tide, winds from north 4 ft visibility

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, difficult, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.5</td>
<td>13.4</td>
<td>(Drive offset)  easy - moderate drive</td>
</tr>
<tr>
<td>11.4</td>
<td>11.2</td>
<td>moderate drive</td>
</tr>
<tr>
<td>9.3</td>
<td>9.7</td>
<td>moderate drive</td>
</tr>
<tr>
<td>7.3</td>
<td>8.4</td>
<td>moderate - hard drive</td>
</tr>
<tr>
<td>6.1</td>
<td>7.6</td>
<td>penetration - hard drive</td>
</tr>
<tr>
<td>5.1</td>
<td>7.3</td>
<td>refusal hard drive</td>
</tr>
<tr>
<td>11.0</td>
<td>8.8</td>
<td></td>
</tr>
</tbody>
</table>

80.0%
Estimated angle of drive: Unable to see, equip. underwater:
Reason for ending drive: refusal

Drive Completion Time: 12:39  
On Boat Recovery: 7.5

End of Core Tube Observations:
Staining: tangle of silt on sides
Tube Deformation: no
Loss of Sediment: 0.2, driver inserted screw cap in silt & wet-water interface
Sediment Description: Sandy silt - med. sand, gray in plug
Water in Tube: yes, slightly turbid

Keep or Retry: Screw plug inserted by diver - med. sand in plug end. Acceptable core

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
<table>
<thead>
<tr>
<th>Recov'd Length (ft)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Size, %</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core collected today</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2.0</td>
<td></td>
<td></td>
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<tr>
<td>3.0</td>
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<tr>
<td>4.0</td>
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<td>5.0</td>
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<tr>
<td>6.0</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

**Description**

- **Clay**: olive brown to black, soupy, very soft.
- **Silt**: dark gray, very sandy, silty, scattered wood fragments, roots, roots.

**Gravelly Sand**: moist, gray, dense, grey, fine to medium sand, well-rounded, light gray, scattered small 1/2" round silt clasts (light gray). Top appears "pebbled". Surface.

**End of Gavel**

**Sand**: same as above but no gravel. Most above, dense, gray, fine to medium sand with abundant scattered silt clasts | pockets | largest clasts seen yet. Coarse: light gray of gravel; 0.12" up to 0.14" 2 rocks. Well with multiple core, no layering. Pockets only surface appears "pebbled".
LDW - SC - 07

Feb 10, 2006
ACF

m.dck = 7.2'

7.2' 8.7' 0.2'

10.1'

to the corner

end of logging/sampling

slightly mined
50% sand loss

not sampled

empty shot

sand

residuals
## Sediment Core Processing Log

**Job:** Duwamish  
**Core Location/Sample Number:** LDW-SC-07  
**Date/Time:** Feb 10, 2002  
**Sample Logged by:** AF  
**Sample Quality:** Good  
**Notes:** See page 3

### Description

<table>
<thead>
<tr>
<th>Repercussion G. Length (m)</th>
<th>% Composition</th>
<th>Color</th>
<th>Size % G</th>
<th>Size % S</th>
<th>Size % F</th>
<th>PD</th>
<th>Grain size, color, moisture, shear/odor, biota, wood, other debris</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>GAY 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Same as above</td>
</tr>
<tr>
<td></td>
<td></td>
<td>41564</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>End of silt clasts. Transitional.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>None</td>
<td></td>
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<td></td>
<td>SAND; nicely layered/banded. Moist, dense, dark gray m-sand</td>
</tr>
<tr>
<td></td>
<td></td>
<td>None</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>W1 dark grayish-brown silt. Silty</td>
</tr>
<tr>
<td></td>
<td></td>
<td>None</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>F-sand interbeds (native-looking).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Depth Actual (m)</th>
<th>Sample Depth</th>
<th>Subsample No.</th>
<th>Summary String</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.6</td>
<td></td>
<td></td>
<td>SAND w/ CLAY</td>
</tr>
<tr>
<td>14.75</td>
<td></td>
<td></td>
<td>SAND</td>
</tr>
<tr>
<td>14.80</td>
<td>2-1602</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14.30</td>
<td>2-1602</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.84</td>
<td>8-8-9</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>9.7</td>
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<td></td>
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</tr>
</tbody>
</table>

**Bottom of Core = 8.7 m**

*Winnower from 8.7 to 8.9' is not shot 50% full. Same material as above.*

1 baggie = 5 l catls from 4'.
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-10-06  Recorder: 65

Project: 341185.001 Windward Lower Duwamish Coring

Station Name: 781

Tube Length (ft): 16.1

Water Depth (ft): 34.8

Est. Tide Height (ft): 6.7 (MLLW)

Est. Mudline: (MLLW)

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft

Northing: 209605

Easting: 1268850

On Deck Top of Sediment: 7.2

Comments: Ebbing tide - diver water depth 35 - sandy silt

Scattered cobble - gentle slope - 7 ft visibility

244 off station

Penetration Tape Reading

<table>
<thead>
<tr>
<th>Depth</th>
<th>Recovery Tape Reading</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.5</td>
<td>15.5</td>
<td></td>
</tr>
<tr>
<td>14.2</td>
<td>14.3</td>
<td></td>
</tr>
<tr>
<td>12.9</td>
<td>13.3</td>
<td></td>
</tr>
<tr>
<td>10.3</td>
<td>10.8</td>
<td></td>
</tr>
<tr>
<td>6.7</td>
<td>7.6</td>
<td></td>
</tr>
<tr>
<td>5.4</td>
<td>7.1</td>
<td></td>
</tr>
<tr>
<td>5.1</td>
<td>7.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>return</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sandy plug in tip of core
Mudmole™ Bore Log

Project: LDWG Duwamish Coring
Project No: 341186.001
Collected by: GSM
Date: 2/10/2006
Water depth: 34.8 ft

Station: 7 R1
Position: NAD83
Time: 9:07
Mudline: -28.1 ft MLLW

Weather/Comments: Sunny
Driven to refusal

Penetration interval (ft)
0.6 1.2 1.9 2.5 3.2 0.5 0.1
Interval recovery (ft) 0.6 1.2 1.9 2.5 3.2 0.5 0.1
Percent recovery 100% 92% 56% 119% 85% 38% 33%

Penetration 11 ft. On deck recovery 8.9 ft = 81% Recovery

Depth below mudline (ft)
Distance from top of tube (ft)
0.0 4.0 8.0 12.0 16.0 18.0
Top of sediment 4.0 8.0 12.0 16.0 18.0

Depth from top of tube (ft)
0.0 4.0 8.0 12.0 16.0 18.0

Penetration 11 ft. On deck recovery 8.9 ft = 81% Recovery

MCS Environmental, Inc.
6502 216th Street SW, Suite 106
Mountlake Terrace, WA 98043
(+1) 425 697-4340
fax (+1) 425 697-4370

File name 7 ft.
Bore Log (mudline)
**Station Number:** 7  
**Attempt:**    
**Field Technician:** LH  
**Contractor:** HCS  
**On-site Visitor:** Kathy Barritt

**Date:** 10/04/01  
**Core Tube Length:** 16.05 ft, 11.1"  
**Lead Line Water Depth:** 34.8'  
**Latitude:** 42°40'5"  
**Longitude:** 126°8'50"

**Shoreline & surrounding area:** 40' from eastern shore, eastern shore is flat. 10' container 40' off station  
**Sediment surface & slope:** Sandy silt, scattered cobbles. Gentle slope  
**Water current and visibility:** 7' visibility, ebbing tide  
**Diver Water Depth:** 38.0'  
**Tip Probe Depth:**    
**Disk Probe Depth:**

**Drive Details:**  
**Drive Initiation Time:** 0850  
**Drive Completion Time:** 0900  
**Drive Offset:**    
**Estimated angle of drive:** below anchor so not visible. ~10° off vertical estimate

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, moderate, difficult; measured by diver or deck)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.5</td>
<td>15.5</td>
<td>Freefall, diver measured</td>
</tr>
<tr>
<td>14.2</td>
<td>14.3</td>
<td>Moderate</td>
</tr>
<tr>
<td>13.9</td>
<td>13.3</td>
<td>Moderate</td>
</tr>
<tr>
<td>10.5</td>
<td>10.8</td>
<td>Moderate</td>
</tr>
<tr>
<td>6.7</td>
<td>7.4</td>
<td>Moderate</td>
</tr>
<tr>
<td>6.4</td>
<td>7.1</td>
<td>Hard</td>
</tr>
<tr>
<td>5.1</td>
<td>7.0</td>
<td>refusal</td>
</tr>
</tbody>
</table>

**TOTAL: 11.0'**  
**TOTAL: 9.1'**  
**Percent Recovered:**

**Reason for ending drive:** refusal  
**If refusal, reason for refusal:** bed of sand - diver observation

**Tension on line?:** ✓  
**Stability of vessel:** hard to port, bow above water  
**Overlying water in core (quantity and description):** Potentially loss of fines in sawing. ~200 mL of slightly turbid water  
**On Boat Recovery:** 7.2"  
**Loss of Sediment:**

**Extraction Observations:**

**On DECK Observations:**

**Staining:** Sandy silt layer  
**Tube Deformation:** None  
**Sediment Description (odor or sheen?):** Sandy, plugs, none

**Keep or Retry:** Diver plugged core at water-sediment interface; wrapped on deck

**Notes:**  
Penetration & Recovery measured from top of core tube to sediment surface in feet (meters)
Station Number: 7
Attempt: 1
Field Technician: TA/LM
Contractor: M.J.S. R55
On-site Visitor: KG&B (M.N.)

Shoreline & surrounding area: rip rap
Sediment surface & slope: sand, silt, scattered cobble, gentle slope
Water current and visibility: ebbing tide, 7 ft vis.
Diver Water Depth: 35
Tip Probe Depth: 
Disk Probe Depth: 

Drive Initiation Time: 0953
Drive Completion Time: 0901
Estimated angle of drive: easterly under water (cannot see) est. 110° right

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, moderate, difficult; measured by diver or deck)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.5</td>
<td>15.5</td>
<td>moderate, freefall - diver measured</td>
</tr>
<tr>
<td>14.2</td>
<td>14.3</td>
<td>moderate</td>
</tr>
<tr>
<td>12.5</td>
<td>13.3</td>
<td>moderate</td>
</tr>
<tr>
<td>10.3</td>
<td>10.8</td>
<td>easy - moderate</td>
</tr>
<tr>
<td>9.7</td>
<td>9.6</td>
<td>easy - moderate</td>
</tr>
<tr>
<td>5.4</td>
<td>7.1</td>
<td>moderate/hoard</td>
</tr>
<tr>
<td>5.1</td>
<td>7.0</td>
<td>moderate/hoard, refusal</td>
</tr>
</tbody>
</table>

TOTAL: 11
TOTAL: 9.1
Percent Recovered: 82.7

Reason for ending drive: refusal
If refusal, reason for refusal: sand (driver observation)

Extraction Observations:
Tension on line: yes
Stability of vessel: not low listing
Overlying water in core (quantity and description): yes, clear 4 ft
On Boat Recovery: 2.2
Loss of Sediment: (none) 0.2

Extraction Observations:
Staining: dark silt on sides, sprayed off
Tube Deformation: none
Sediment Description (odor or sheen?): sandy clay in tip of core, diver inserted screw plug at side-water interface; mid-course gray sand, no odor, no sheen.

Keep or Retry: Keep, good core.

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
### Sediment Core Processing Log

<table>
<thead>
<tr>
<th>Core Location/Sample Number:</th>
<th>LDW-SC-8 P1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date/Time:</td>
<td>Feb 10, 2006, Start 12:35</td>
</tr>
<tr>
<td>Sample Logged by:</td>
<td>A. Fitzpatrick, John N. Prescott</td>
</tr>
<tr>
<td>Type/Diameter of Sample:</td>
<td>4&quot;</td>
</tr>
<tr>
<td>Sample Quality:</td>
<td>Good, fair, poor, disturbed, except catchers below, but very good overall</td>
</tr>
</tbody>
</table>

#### Notes:
- Dr. R = 9.8% (lost 3' of sediment) core will only be 2'-10' of.

<table>
<thead>
<tr>
<th>Recovered Length (ft)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Grain Size, Color, Motility, Sheen, Color, Blot, Wood, Other Debris</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
</tbody>
</table>

#### Subsamples:
- Sample 1: 2'-10' of
- Sample 2: 2'-15' of
- Sample 3: 3'-10' of
- Sample 4: 3'-15' of

#### Summary Sketch:
- Lt. 15', TV=3.0 big
- Lt. 25', TV=1.7 big
- Lt. 30', TV=2.8 big
deck was 6.21

4.1' → 10.8' →

10.1' →

Shoe is full
w/ silt to very
tip catcher
inverted
**Sediment Core Processing Log**

**Job:** DWWR\[X\]  
**Core Location/Sample Number:** DW - SC-08  
**Date/Time:** Feb 10, 2001  
**Sample Logged by:** [Name]  
**Type/Diameter of Sample:**  
**Sample Quality:** Good  
**Avg. % Compaction:**  
**Notes:** See page 1

<table>
<thead>
<tr>
<th>Recovered Length (m)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Site S, O</th>
<th>Site S, F</th>
<th>PID</th>
<th>Description</th>
<th>Packed Conv. Density (g/cm³)</th>
<th>Sample Depth</th>
<th>Summary Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.84</td>
<td></td>
<td>black</td>
<td></td>
<td></td>
<td></td>
<td>Same as above, wet black, stiff SILT, no sand interbeds</td>
<td>1.320</td>
<td>6.4 (\times) 6.4 (\times) 6.4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>wet, greenish gray, stiff clay, interbeds 0.2&quot; thick &amp; moderate, H-15 odd</td>
<td>6.81</td>
<td>6.81</td>
<td></td>
</tr>
</tbody>
</table>
| 1.0                  |              |       |           |           |     | possible pH-like odor??  
|                      |              |       |           |           |     |  
| CLAYY1               | 1.2          | 1.0   |           |           |     | Clay: wet, greenish gray, stiff CLAY | 8.0 | 8.0 |  
|                      |              |       |           |           |     |  
|                      |              |       |           |           |     | Same unit as above, black stiff SILT | 10.0 | 10.0 |  
| Bottom of Cone C 10.0 ft |             |       |           |           |     | Bottom of Cone C 10.0 ft (plus fill shale 0.4 = 10.4 ft but not sampled) | 11.0 | 11.0 |  
| Baggie: At 4.8' = orange mudfat |             |       |           |           |     | Baggie: At 4.8' = orange mudfat  
| At 1.2' = black chink |             |       |           |           |     | At 1.2' = black chink  
| PID Baggie: At 5.8' = 0.0 |             |       |           |           |     | PID Baggie: At 5.8' = 0.0 |  

**Page 2 of 2**
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-10-06  Recorder: DSM

Project: 341185.001 Windward Lower Duwamish Coring

Station Name: 881

Tube Length (ft): 16.05

Water Depth (ft): 46.5

Est. Tide Height (ft) 7.3 (MLLW)

Est. Mudline: (MLLW) On Deck Top of Sediment 6.3

Comments: 
- Dredging tide - 46 ft diver depth - sunken silt -
- no debris - no slope - 74 vsr 74
- "4 ft offshore"

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft

Northing 209589

Easting 1266414

Penetration Tape Reading Recovery Tape Reading Comments

15.3 15.5
13.5 13.4
11.3 11.0
9.2 8.9
6.5 6.7
4.5 5.2
2.8 4.0
1.5 3.2

core catcher failed
Mudmole™ Bore Log

Project: LDWG Duwamish Coring
Project No: 341185.001
Collected by: GSM
Date: 2/10/2006

Station: 8 R1
Position: NAD83

Water depth: 46.5 ft
Mudline: -39.2 ft MLLW (estimated using tide tables)

Weather/Comments: Sunny
Core catcher failed

Penetration Interval 14.55 ft / On deck recovery 9.75 ft = 67% Recovery

Penetration
Interval
(ft)
0-0.75
0.75-2.55
2.55-4.75
4.75-6.65
6.65-9.55
9.55-11.65
11.65-13.25
13.25-14.55

Interval recovery
(ft)
0.55
2.1
2.4
2.1
2.2
1.5
1.2
0.8

Percent recovery
73%
117%
109%
100%
81%
75%
71%
62%

Depth below
mudline
(ft)
6.3
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20

Distance from
top of tube
(ft)
6.3
7.14
8.31
9.44
10.53
11.60
12.60
13.57
14.39
15.20
15.99
No sample
No sample
No sample
No sample
No sample
No sample
No sample
No sample
No sample
No sample
No sample
No sample

MCS Environmental, Inc.
6505 216th Street SE, Suite 100
Mountlake Terrace, WA 98043
(425) 697-4360
fax (425) 697-4370

File name 9821
Bore Log (mudmole)
Shoreline & surrounding area: Riprap to east, wood & metal pier (General Perley) to west, mid-way channel.

Sediment surface & slope: No debris, no slope, sandy silt.

Water current and visibility: Flow in, no current, great tide.

Diver Water Depth: 44.0

Tip Probe Depth

Disk Probe Depth

---

Drive Initiation Time: 10:54
Drive Completion Time: 11:00

Estimated angle of drive: Noprt downwards cannot see

---

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, moderate, difficult; measured by diver or deck)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.5</td>
<td>15.5</td>
<td>drive measured, free fall</td>
</tr>
<tr>
<td>13.5</td>
<td>13.4</td>
<td>moderate - easy drive</td>
</tr>
<tr>
<td>11.3</td>
<td>11.0</td>
<td>moderate - easy drive</td>
</tr>
<tr>
<td>9.2</td>
<td>9.9</td>
<td>easy drive</td>
</tr>
<tr>
<td>6.5</td>
<td>6.9</td>
<td>easy drive</td>
</tr>
<tr>
<td>4.5</td>
<td>5.2</td>
<td>moderate drive</td>
</tr>
<tr>
<td>2.8</td>
<td>4.0</td>
<td>moderate - different</td>
</tr>
<tr>
<td>1.5</td>
<td>3.2</td>
<td>continue drive to get plug, moderate</td>
</tr>
</tbody>
</table>

TOTAL: 14.85

---

Reason for ending drive: Penetration goal reached (not much tube length left).

If refusal, reason for refusal:

---

Extraction Observations:

Tension on line: yes
Stability of vessel: no problems

Overlying water in core (quantity and description): yes, clear ~150ml

On Boat Recovery: 90% Loss of Sediment: 0.3.3, y/e. Core catcher failed (lid lost during extraction)

Extraction Observations: Core tip wrapped in plastic

---

Sediment Description (odor or sheen): not seen, sandy silt w/cley - diver observation

---

Keep or Retry: Keep core b/c during the drive, penetration did not slow, no band
(sandy) material reached, and there is still ~10 ft of sediment recovered. (64%)

---

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Color</th>
<th>Description</th>
<th>Grain Size</th>
<th>% Compaction</th>
<th>Site % G</th>
<th>Site % S</th>
<th>Site % F</th>
<th>PD</th>
</tr>
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<tbody>
<tr>
<td>6.0</td>
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<td></td>
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<td>4.0</td>
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<td>3.0</td>
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</tr>
</tbody>
</table>

In breather zone TV hole
- Sandy, fine sand with occasional debris
- Sparse plant roots
- Some rootlets present
- Lenses of sandy material
- Transition to silty gyttja
- Trace of organic material
- Some wood fragments
- Slight H2S odor

Summary:
- Sandy
- Silty
- Organic
- Wood

Inferred depth:
- 17.0 ft
- 3.0
- 4.0
- 3.0
- 6.0
- 12.0 ft
- 18.38
- 2.5
- 2.0
- 0.4
LDW - SC - 09

Feb 13, 2004

- Trench = 7.7 ft

- 7.10 ft

- 8.5 ft

- Shoe

- 16 ft

- Full to beginning
- Tip of shoe
- No winnowing but
- Hard gray clay at
- Bottom: slightly broken
- Off, shoe empty
<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Color</th>
<th>Size % G</th>
<th>Size % S</th>
<th>Size % F</th>
<th>PID</th>
<th>Description (grain size, color, moisture, sheen/odor, biota, wood, other debris)</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.0</td>
<td>CLAY</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Contact sharp, moist, stiff, light gray (glacial color)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Silty, clayey, 1&quot; black-colored bands</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Uniformly spread (but no textural difference)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Convex bands, homogenous, highly</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Plastic (native-looking)</td>
</tr>
<tr>
<td>7.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**

- Bottom of core at 8.5′
- Shoe empty but material is intact

**Sampled from:**

- Sediment Core Processing Log
- Core Location/Sample Number: LDN-SC-9
- Date/Time: Feb 13, 2002
- Sample Logged by: N. Baker, A. Fitzgerald
- Type/Diameter of Sample: 1
- Sample Quality: good, fair, poor, disturbed
- No. of Sections: 1
- Sample Length (from log): 9.0 ft
- Avg. % Compaction: 100
- Job: Duwamish LDN
- Job Number: PWS5 - 1322.0
- Notes: See Page 1

**Adjunct Notes:**

- V. same as above
- At 6.5′ TV = 0.9
- Big

**Summary:**

- Sand
- Clay
- 1" black-colored bands
- Convex bands, homogenous, highly plastic (native-looking)
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-13-06  Recorder: GSM

Project: 341.185.001 Windward Lower Duwamish Coring

Station Name: 9R1

Tube Length (ft): 16.05

Water Depth (ft): 38 30 Time: 1031

Est. Tide Height (ft): 4.6 diver (MLLW)

Est. Mudline: ______ (MLLW)

Comments: Slack low tide - strong surface current

Diver depth 30 siltty sand - flat bottom - 5 ft vis, moderate current / lift off station

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft

Northing: 208919

Easting: 1266863

On Deck Top of Sediment 7.7

Penetration Tape

Reading  Recovery Tape Reading  Comments

14.2  14.6
12.5  12.1
10.5  10.7
8.2  10.0
6.1  9.4
4.2  8.3
3.2  7.5

silty dry plug in top & core

reached goal
Mudmole™ Bore Log

Project: LDWG Duwamish Coring  
Station: 9 R1  
Position: NAD83 W

Collected by: GSM  
208919 Northing

Date: 2/13/2006  
1266863 Easting

Penetration 12.85 ft/ On deck recovery 8.35 ft = 65% Recovery

Weather/Comments: Overcast  
Diver depth used, strong surface current

Depth below mudline (ft)  
Distance from top of tube (ft)  
Penetration interval (ft)  
Interval recovery (ft)  
Percent recovery

0-1.85  
1.85-3.55  
3.55-5.55  
5.55-7.85  
7.85-9.95  
9.95-11.85  
11.85-12.85

1.45  
2.5  
1.4  
0.7  
0.6  
1.1  
0.8

78%  
147%  
70%  
30%  
29%  
58%  
80%

Depth below mudline (ft)  
Distance from top of tube (ft)

Mudline  
1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20

7.7  
8.48  
9.37  
10.84  
11.97  
12.57  
13.19  
13.49  
13.79  
14.08  
14.38  
14.96  
15.57  
No sample  
No sample  
No sample  
No sample  
No sample  
No sample  
No sample

File name 9 R1  
Bore Log (mudline) 66 of 490

MCS Environmental, Inc.  
6001 31st Ave SW, Suite 100  
Moorpark Terrace, WA 98063  
(425) 697-4340  
Fax (425) 697-4370
Station Number: 9

Attempt: 1

Field Technician: ID

Contractor: M/S/SS

On-site Visitor: 

Pre-Drive and Diver Observations:
Shoreline & surrounding area: mid new channel, rip rap on east & west bank
Sediment surface & slope: 
Water current and visibility: strong current, slight wave, flat calm, good visibility
Diver Water Depth: 30

Drive Observations:
Drive Initiation Time: 1034
Drive Completion Time: 1042
Drive Offset: 
Estimated angle of drive: 

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, moderate, difficult; measured by diver or deck)</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.2</td>
<td>14.4</td>
<td>Diver recorded, fine fall, easy - moderate drive</td>
</tr>
<tr>
<td>12.5</td>
<td>12.1</td>
<td>easy drive</td>
</tr>
<tr>
<td>10.5</td>
<td>10.7</td>
<td>easy drive</td>
</tr>
<tr>
<td>8.2</td>
<td>10.0</td>
<td>easy - moderate drive</td>
</tr>
<tr>
<td>6.1</td>
<td>9.4</td>
<td>moderate drive</td>
</tr>
<tr>
<td>4.2</td>
<td>8.3</td>
<td>moderate drive</td>
</tr>
<tr>
<td>3.2</td>
<td>7.5</td>
<td>moderate drive</td>
</tr>
</tbody>
</table>

TOTAL: 12.85

Percent Recovered: 85.0%

Reason for ending drive: reached penetration goal, running out of core tube length.

If refusal, reason for refusal:

Extraction Observations:
Tension on line: ✓
Stability of vessel: bow list to port
Overlying water in core (quantity and description): yes, clear, 100 ml
On Boat Recovery: ✓
Loss of Sediment: 0.2

Extraction Notes: (i.e. winch or hammer, easy, hard) winch, easy

On/Deck Observations:
Staining: dark silt & sand, sprayed off
Tube Deformation: no
Sediment Description (odor or sheen?): dark sand silt, no odor or sheen, grey clay

Keep or Retype: saw plug inserted by diver at sed/bio interface

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
### Sediment Core Processing Log

**Job:** DUWAMISH  
**Job Number:** P1455 - 18220  
**No. of Sections:** 1  
**Sample Length (from log):** DIVE = 10.6'  
**Avg. % Compaction:** MD dust = 8.8%  

**Notes:** 08 Rec = 83.0%

**Core Collected = Same Day.**

<table>
<thead>
<tr>
<th>Recov Length (ft)</th>
<th>% Compaction</th>
<th>Size % G</th>
<th>Size % S</th>
<th>Size % P</th>
<th>PID</th>
<th>Description (grain size, color, matrix, structure, binders, wood, other debris)</th>
<th>Sediment/Soil Type</th>
<th>Sediment/Soil Depth</th>
<th>Sample Depth</th>
<th>Summary Sketch</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.66</td>
<td>10</td>
<td>90</td>
<td></td>
<td></td>
<td></td>
<td>2&quot; of olive brown sandy silt/very, thin, loose, dark gray, silty, sandy, gravel</td>
<td>Silt</td>
<td>0.66</td>
<td>0.75</td>
<td></td>
</tr>
<tr>
<td>1.0</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10 10</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cleay</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Silt; wet, red stiff, black, clayey, highly plastic, moderate H2S odor, trace sand, scattered nodules, hard, shell flake, no layering, uniform w/ depth, less water, w/ depth, slightly compressible texture</td>
<td>Clay</td>
<td>1.0</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>2.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5 95</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>At 3.4' mussel shell 1/2 fragment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Contact sharp</td>
<td></td>
<td></td>
<td>4.0</td>
<td></td>
</tr>
<tr>
<td>6.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Silt; moist to wet, stiff, dark brownish gray, clayey, silty w/ sand interbeds (1/4&quot; F sand) + abundant woody flake, plant material, + scattered soft clasts, pockets 1&quot; &amp; decreases w/ depth, clasts end at 6', then grading to unit below scattered woody matter.</td>
<td>Clay</td>
<td>6.0</td>
<td>6.0</td>
<td></td>
</tr>
</tbody>
</table>
on deck = 7.3'

7.2' 8.9' 16.1'

some slumping (from winnowing below)

\[ \text{8.9' from 7.7 ft 8.5' below, therefore, only sample 8.0'} \]

\( \text{make sure to tag sand} \)

↑

shoe 50% full

evidence of partial winnowing

50% full from 8.5 to 8.9'
F-2
70 of 490


MCS Environmental MudMole Bore Log

Collection Information

Date: 2-10-06  Recorder: 6SM

Project: 341185.001 Windward Lower Duwamish Coring

Station Name: 

Tube Length (ft): 16.05
Water Depth (ft): 24.6
Est. Tide Height (ft): 6.8 (MLLW)
Est. Mudline: (MLLW)

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft

Northing 208776
Easting 1267167
On Deck Top of Sediment 7.3

Comments: Flooding Tide

24 A diver depth - sandy silt - no slope - vis 5'
5' off station

Penetration Tape Reading  Recovery Tape Reading  Comments

15.5  15.6
14.4  14.4
12.3  12.2
10.3  10.1
8.3   8.5
6.3   7.6
5.5   7.2

Parent, some silty sand out at tip during extraction
### Mudmole™ Bore Log

**Project:** LDWG Duwamish Coring  
**Station:** 10 R1  
**Project No:** 341185.001  
**Collected by:** GSM  
**Position:** NAD83, WAN  
**Date:** 2/10/2006  
**Water depth:** 24.6 ft  
**Mudline:** -17.8 ft MLLW (estimated using tide tables)  

**Weather/Comments:** Sunny  

#### Penetration interval, interval recovery, percent recovery:

<table>
<thead>
<tr>
<th>Depth below mudline (ft)</th>
<th>Distance from top of tube (ft)</th>
<th>Penetration (ft)</th>
<th>Interval recovery (ft)</th>
<th>Percent recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-0.5500000000000000001-1</td>
<td>0-0.55000000000000000001</td>
<td>0.45</td>
<td>1.2</td>
<td>109%</td>
</tr>
<tr>
<td>1.65-3.75</td>
<td>1.65-3.75</td>
<td>2.2</td>
<td>2.1</td>
<td>105%</td>
</tr>
<tr>
<td>3.75-5.75</td>
<td>3.75-5.75</td>
<td>1.8</td>
<td>2.1</td>
<td>105%</td>
</tr>
<tr>
<td>5.75-7.75</td>
<td>5.75-7.75</td>
<td>1.8</td>
<td>1.5</td>
<td>80%</td>
</tr>
<tr>
<td>7.75-9.75</td>
<td>7.75-9.75</td>
<td>0.9</td>
<td>0.9</td>
<td>45%</td>
</tr>
<tr>
<td>9.75-10.55</td>
<td>9.75-10.55</td>
<td>0.4</td>
<td>0.4</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Depth below mudline & Distance from top of tube:

- Mudline: 7.3 ft  
- 1: 8.24 ft  
- 2: 9.32 ft  
- 3: 10.36 ft  
- 4: 11.41 ft  
- 5: 12.46 ft  
- 6: 13.45 ft  
- 7: 14.25 ft  
- 8: 14.96 ft  
- 9: 15.41 ft  
- 10: 15.88 ft  
- 11: No sample  
- 12: No sample  
- 13: No sample  
- 14: No sample  
- 15: No sample  
- 16: No sample  
- 17: No sample  
- 18: No sample  
- 19: No sample  
- 20: No sample  

---

MCS Environmental, Inc.  
6505 216th Street SW, Suite 100  
Mountlake Terrace, WA 98043  
(425) 697-4340  
Fax (425) 697-4370  

File name: 10 R1  
Bore Log (mudline)
Station Number: 10
Attempt: 1
Field Technician: ID/LM
Contractor: 
On-site Visitor: 

Shoreline & surrounding area: wood pier, rip rap
Sediment surface & slope: sandy silt, no slope
Water current and visibility: visibility S1: fixed tide
Diver Water Depth: 24'
Tip Probe Depth: 
Disk Probe Depth: 

Drive Initiation Time: 9:54
Drive Completion Time: 10:00
Drive Offset: 
Estimated angle of drive: equip water way, cannot see, est. 10°

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, moderate, difficult; measured by diver or deck)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.5</td>
<td>15.6</td>
<td>diver arrested, free fall</td>
</tr>
<tr>
<td>14.4</td>
<td>14.4</td>
<td>easy drive</td>
</tr>
<tr>
<td>12.3</td>
<td>12.2</td>
<td>easy</td>
</tr>
<tr>
<td>10.3</td>
<td>10.1</td>
<td>easy, moderate</td>
</tr>
<tr>
<td>0.3</td>
<td>0.5</td>
<td>easy</td>
</tr>
<tr>
<td>5.5</td>
<td>7.2</td>
<td>easy, moderate, penetration slightly</td>
</tr>
</tbody>
</table>

TOTAL: 10.55 TOTAL: 8.85 Percent Recovered: 83.9

Reason for ending drive: refuse
If refusal, reason for refusal: sand, diver observed.

Tension on line: yes
Stability of vessel: no listing
Overlying water in core (quantity and description): clear
On Boat Recovery: 3.3
Loss of Sediment: some silty sand upon extraction
Extraction Observations: 

Staining: residual silt on core, sprayed off
Tube Deformation: no
Sediment Description (odor or sheen?): no sheen, no odor, wet, dry grey sand

Keep or Retry: screw plug inserted by diver at sub/aer interface.

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
### Sediment Core Processing Log

**Job:** P-25 - 1220D  
**Core Location/Sample Number:** LDW - SC - II  
**Date/Time:** Feb 13, 2007 14:30 shop 15:10  
**Sample Logged by:** N. Reedy, A. Fitzpatrick  
**Type/Diameter of Sample:** 4" B. alum MCS  
**Sample Quality:** Good  
**Sample Collection:** 02/12/07

### Notes:
Kim observed core end appeared fair for processing. All units represented 2: hard clay in core.

### Description:
- **Silt:** Wet, soft, sl. grained, sandy silt, jumbled lumps w/ wood, wood fibers, black subsoil, clayey silt. 
- **Sand:** Medium, moist to wet, brownish gray, silky. F-Sand. No layers, homogeneous, no admixtures. 
- **Gravel:** Wet, loose, gray, silt, sandy gravel. 
- **Clay:** Damp, mottled, greenish gray, very dense, silty clay (silty). 
- **Bottom of Core:** E 5.0 ft.

### Core Characteristics:

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Depth (in)</th>
<th>Sample Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5</td>
<td>30</td>
<td>Silt: wet, soft, sl. grained, sandy silt, jumbled lumps w/ wood, wood fibers, black subsoil, clayey silt.</td>
</tr>
<tr>
<td>2.5</td>
<td>60</td>
<td>Sand: medium, moist to wet, brownish gray, silky. F-Sand. No layers, homogeneous, no admixtures.</td>
</tr>
<tr>
<td>3.0</td>
<td>1450</td>
<td>Gravel: wet, loose, gray, silt, sandy gravel.</td>
</tr>
<tr>
<td>3.0</td>
<td>1455</td>
<td>Clay: damp, mottled, greenish gray, very dense, silty clay (silty).</td>
</tr>
<tr>
<td>5.0</td>
<td>1460</td>
<td>Bottom of Core: E 5.0 ft.</td>
</tr>
</tbody>
</table>

### Core Holder:

1 baggie @ 0.7 ft = red chips, pc. debris.
LDN- SC-11

Feb 13, 2006

on deck = 11.4 ' 

11.2' | 4.9 |

16.1'

Shot is full v. stiff clay, sample to 5 ft.
Mudmole™ Bore Log

Project: LDWG Duwamish Coring
Project No: 341165.001
Collected by: GSM
Date: 2/13/2006
Weather/Comments: Overcast

Station: 11 R1
Position: NAD83
Date: 2/13/2006
Time: 9:34
Water depth: 2.6 ft
Mudline: 2.7 ft MLLW (estimated using tide tables)

Penetration interval (ft)
0-2.75
2.75-4.65
4.65-5.65
5.65-5.95

Interval recovery (ft)
2.35
1.5
1
0.2

Percent recovery
85%
79%
100%
67%

Penetration 5.95 ft / On deck recovery 4.95 ft = 83% Recovery

Depth below mudline (ft)
Distance from top of tube (ft)

Mudline
11.1
1
11.95
2
12.81
3
13.65
4
14.44
5
15.30
6
No sample
7
No sample
8
No sample
9
No sample
10
No sample
11
No sample
12
No sample
13
No sample
14
No sample
15
No sample
16
No sample
17
No sample
18
No sample
19
No sample
20
No sample

MCS Environmental, Inc.
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fax (425) 697-4370
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-13-08 Recorder: 65M

Project: 341185.001 Windward Lower Duwamish Coring

Station Name: 11 R1

Tube Length (ft): 16.95
Water Depth (ft): 2.6
Est. Tide Height (ft): 5.3 (MLLW)

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft
Northing: 208391
Easting: 1265908

Est. Mudline: (MLLW)
On Deck Top of Sediment: 11.1

Comments: scattered rip rap & bricks at site - moved 17A off station
to find soft area - no diver used
very hard to extract core from bottom

Penetration Tape Reading

<table>
<thead>
<tr>
<th>Reading</th>
<th>Recovery Tape Reading</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.3</td>
<td>13.7</td>
<td></td>
</tr>
<tr>
<td>11.4</td>
<td>12.2</td>
<td></td>
</tr>
<tr>
<td>10.4</td>
<td>11.2</td>
<td></td>
</tr>
<tr>
<td>10.1</td>
<td>11.0</td>
<td>returned</td>
</tr>
</tbody>
</table>

hard gray clay in tip of core tube
Station Number: 11
Attempt: 1
Field Technician: TD
Contractor: MGL/ES
On-site Visitor: 

Pre-Dive and Diver Observations:
Shoreline & surrounding area: rip rap, bricks, wood debris
Sediment surface & slope: silt, send, shallow to flat-slope (slick surface, no diver used)
Water current and visibility: 
Diver Water Depth 1/4
Tip Probe Depth 
Disk Probe Depth 

Drive Observations:
Drive Initiation Time: 0931
Drive Completion Time: 0943
Drive Offset: 
Estimated angle of drive: core box guide used, 84.10°-15°

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, moderate, difficult; measured by diver or deck)</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.3</td>
<td>13.7</td>
<td>drive measured, moderate drive</td>
</tr>
<tr>
<td>11.4</td>
<td>12.2</td>
<td>moderate drive</td>
</tr>
<tr>
<td>10.4</td>
<td>11.2</td>
<td>moderate-hard drive</td>
</tr>
<tr>
<td>10.1</td>
<td>11.0</td>
<td>off core tube guide, hard drive, refusal</td>
</tr>
</tbody>
</table>

TOTAL 50.5
TOTAL 50.5
Percent Recovered: 84.9

Reason for ending drive: refusal
If refusal, reason for refusal: hard material

Extraction Observations:
Tension on line: Y
Stability of vessel: difficult, bow dipped forward
Overlying water in core (quantity and description): just a little, clear
On Boat Recovery: 11.1
Loss of Sediment: none
Extraction Notes: (i.e. winch or hammer, easy, hard) winch, difficult

On-Dock Observations:
Staining: silt and sand, moderately, sprayed off
Tube Deformation: none
Sediment Description (odor or sheen): grey hard clay plug, no odor, no sheen

Keep or Retry: keep, hit hard clay

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in foot (tenths)
## Sediment Core Processing Log

**Job: LDNG Core Processing**

**Core Location/Sample Number:** X-12-R1

**Job Number:** PURS 1870-211

**Sample Length (from log):** 8.7

**Avg. % Compaction:**

**Notes:**

- **Top:** 9.6
- **Bottom:** 8.7

### Description

<table>
<thead>
<tr>
<th>Recovered Length (m)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Size % - G</th>
<th>Size % - S</th>
<th>Size % - F</th>
<th>Description (grain size, color, moisture, shear/stick, biota, wood, other debris)</th>
<th>Indent/Actual Depth (m)</th>
<th>Sample Depth</th>
<th>Subsample No.</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td></td>
<td>5.0 - 6.1 olive brown SILT</td>
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<td></td>
<td>6.1 - 2.1 (non) SILT</td>
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<td></td>
<td>well-mixed stiff, black, low plasticity clay, SILT (org)</td>
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<td></td>
<td>Skull fragments</td>
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<td></td>
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<td></td>
<td></td>
<td>abundant rootlets, wood fragments</td>
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<td></td>
<td>massive, blocky, uniform</td>
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<td></td>
<td>81. compressibility, low plasticity clay, organic matter, leaf matter</td>
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<td></td>
<td>@ 1.0: Woody fragments to 0.5'</td>
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<td></td>
<td>mod. HzS-like odor, metallic color</td>
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<td>+ the SILT</td>
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<td></td>
<td>@ 2.0 strong HzS-like odor</td>
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<td></td>
<td>@ 2.5 - 0.1 shell piece (25 shell)</td>
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<td></td>
<td>2.6 (SILT w/ clay)</td>
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<td></td>
<td></td>
<td>moist, dense, high stiffness gray clay, Silt interbedded with moistened clay,</td>
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<td>block at sandy Silt</td>
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<td></td>
<td></td>
<td>wood fragments</td>
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<td></td>
<td>strong HzS-like odor</td>
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<td></td>
<td></td>
<td></td>
<td>@ 5.0 3&quot; piecey wood (fragment)</td>
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<td></td>
<td></td>
<td>stiffening/composition with depth/color (organic A)</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

**Dive Page:** Next Page
Nudlem = 7.4

Core shoe is 5/6 full of multicolored gravelly bl. sand
### Sediment Core Processing Log

**Job:** GDW-6 Line Processing  
**Core Location/Sample Number:** SC-12-R1  
**Date/Time:** 21/6/01

**Sample Logged by:** [Signature]  
**Type/Diameter of Sample:** 4"  
**Sample Quality:** Good  
**Sample Length (from log):**  
**Avg. % Compaction:** CONT'D

#### Description (grain size, color, moisture, sheen/odor, blox, wood, other debris)

<table>
<thead>
<tr>
<th>Recov. Length (m)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Size % G</th>
<th>Size % S</th>
<th>Size % F</th>
<th>PID</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>End of Core @ 8.7′</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>98</td>
<td>SILT w/ SAND interbeds</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>90</td>
<td>moist, dark grey, black, SILT interbeds with 3′ layers of clayey debits to 0.2′L, sharp</td>
</tr>
<tr>
<td>6.9-8.7 SAND</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>78</td>
<td>moist, dark grey, clayey debits</td>
</tr>
<tr>
<td>5.45</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7</td>
<td>moist, clayey debits</td>
</tr>
<tr>
<td>5.05</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2.1b2</td>
<td>SAND</td>
</tr>
<tr>
<td>2.16</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2.16</td>
<td>SAND</td>
</tr>
<tr>
<td>0.88</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.88</td>
<td>SAND</td>
</tr>
</tbody>
</table>

- **Notes:** CONT'D
Mudmole™ Bore Log

Project: LDWG Duwamish Coring  
Station: 12 R1  
Project No: 341186.001  
Position: NAD83  
Collected by: GSM  
Date: 2/16/2006  
Time: 10:55  
Water depth: 13.7 ft  
Mudline: ft MLLW (estimated using tide tables)

Weather/Comments: N/A  
Driven to refusal

Penetration 9.55 ft/ On deck recovery 8.65 ft = 91% Recovery

<table>
<thead>
<tr>
<th>Depth below mudline (ft)</th>
<th>Distance from top of tube (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td>Top of sediment</td>
</tr>
<tr>
<td>0.0</td>
<td>On deck</td>
</tr>
<tr>
<td>0.0</td>
<td>In-situ</td>
</tr>
</tbody>
</table>

Penetration interval (ft) | Interval recovery (ft) | Percent recovery |
--------------------------|------------------------|------------------|
0-3.55                    | 3.55                   | 100%             |
3.55-5.45                 | 1.7                    | 89%              |
5.45-6.95                 | 1.4                    | 93%              |
6.95-7.55                 | 0.5                    | 83%              |
7.55-8.55                 | 0.7                    | 70%              |
8.55-9.55                 | 0.8                    | 80%              |

Mudline 7.4  
Distance from top of tube (ft)  
1  8.40  
2  9.40  
3  10.40  
4  11.35  
5  12.25  
6  13.16  
7  14.09  
8  14.87  
9  15.61  
10 No sample  
11 No sample  
12 No sample  
13 No sample  
14 No sample  
15 No sample  
16 No sample  
17 No sample  
18 No sample  
19 No sample  
20 No sample

MCS Environmental, Inc.  
695 210th Street SW, Suite 100  
Mountlake Terrace, WA 98043  
(425) 697-4340  
fax: (425) 697-4370

File name 12 R1  
Bore Log (mudline) 83 of 490  
F-2
Station Number: 12  Date: 24.10.06  Station Arrival Time: 10:40
Attempt: F  Core Tube Length: 16.05  Station Departure Time: 11:20
Field Technician: F.00, JMF  Lead Line Water Depth: 13.7  Dist. From Target Station: ≈ 2
Contractor: MOC, R33  Latitude: 208.217
On-site Visitor:  Longitude: 174.6577

Pre-Drive and Dive Observations:

Shoreline & surrounding area: Kellogg Island, wooded piling and dolphins, logs, gravel, peast/pea clay shelf
Sediment surface & slope: Gentle slope, gravelly silt, muddy bottom
Water current and visibility: Ebbing tide
Diver Water Depth: 13
Tip Probe Depth — Disk Probe Depth —

Drive Observations:

Drive Initiation Time: 11:00  Drive Completion Time: 11:05  Drive Offset: —
Estimated angle of drive: Underwater est 10°

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, moderate, difficult; measured by diver or deck)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.5</td>
<td>12.5</td>
<td>Easy drive, diver measured</td>
</tr>
<tr>
<td>10.4</td>
<td>10.8</td>
<td>Easy drive, diver measured</td>
</tr>
<tr>
<td>9.1</td>
<td>9.4</td>
<td>Easy drive, diver measured</td>
</tr>
<tr>
<td>8.5</td>
<td>8.9</td>
<td>Moderate drive, penetration slowed</td>
</tr>
<tr>
<td>7.5</td>
<td>8.2</td>
<td>Moderate to difficult, penetration very slow</td>
</tr>
<tr>
<td>6.5</td>
<td>7.4</td>
<td>Difficult drive, refusal</td>
</tr>
</tbody>
</table>

TOTAL 9.55  TOTAL 8.65  Percent Recovered: 90.5%  
Reason for ending drive: Refusal
If refusal, reason for refusal: Hard substrate

Extraction Observations:

Tension on line?  Y  Stability of vessel: No problem
Overlying water in core (quantity and description): Slightly turbid, ~ 2.5 L
On Boat Recovery: 7.4  Loss of Sediment: 62
Extraction Notes: (i.e. winch or hammer, easy, hard) Winch, easy

On Deck Observations:

Staining: Slightly sprayed off
Tube Deformation: None
Sediment Description (odor or sheen?): No odor, no sheen, dark brown mud to fine sand

Keep or Retry: Diver weber inserted screw plug at sed/H2O interface

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-16-06  Recorder: 85m

Project: 341185.001 Windward Lower Duwamish Coring

Station Name: [illegible]

Tube Length (ft): 16.05
Water Depth (ft): 13.7  Time: 10:55
Est. Tide Height (ft): 2.8  (MLLW)

Est. Mudline: [illegible]  (MLLW)

Comments: "calling tide - grainy silt - 13A depth - gentle"
"slope - no debris"
"224 off station"

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft

Northing 208,217
Easting 1266577
On Deck Top of Sediment 7.4

Penetration Tape Reading  Recovery Tape Reading  Comments

12.5  12.5
10.6  10.8
9.1  9.4
8.5  8.9
7.5  8.2
6.5  7.4

penetration rate slowed
refusal
# Sediment Core Processing Log

**Job:** Dunhamsh

**Job Number:** D05S5-1822D

**No. of Sections:**

**Sample Length (from log):** Anne = 12.5

**Avg. % Compaction:** Main = 9.4

**Notes:**

---

### Core Collected Today From Observed Core Processing

<table>
<thead>
<tr>
<th>Recovered Length (m)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Size % G</th>
<th>Size % S</th>
<th>Size % F</th>
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<tbody>
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<td>10</td>
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<td></td>
<td></td>
<td>Gley2</td>
<td>3/1</td>
<td>60/40</td>
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<td></td>
<td></td>
<td>v de</td>
<td>greenish gray</td>
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<td>10</td>
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<td>Gley1</td>
<td>3/1</td>
<td>60/40</td>
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<td>v de</td>
<td>greenish gray</td>
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<td>Gley1</td>
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<td>v de</td>
<td>greenish gray</td>
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<td>3/2</td>
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<td>v de</td>
<td>grayish brown</td>
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<td>15</td>
<td>5</td>
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<td></td>
<td>15</td>
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<td>85</td>
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</tbody>
</table>

### Description

- **(grain size, color, moisture, sheen/fodur, blots, wood, other debris)**

- **Wet, loose, gray, medium to coarse sand w/ small shell fragments trace silt, trace small gravel - Sharp.

- **Moist, medium, olive gray, silty sand w/ 25% wood, 5% roots, moderate to strong H2S odor.**

- **Moist, medium, stiff, olive gray silt w/mineral sand 25-30% wood, line above, H2S odor diminishes.**

- **Very trace H2S like odor 6m 7.5-3.0.**

- **Wet, medium, dense, brownish gray fine to medium sand w/mineral silt, HMB of silty layers/patches, scattered rootslets, multicolored grains reddening white.**

- **4.1-4.5 STN but silty sand w/ 30% wood fragments 3+ shredded, slight to moderate H2S odor.**

- **Moist, medium, brownish gray fine sand nodules embedded w/ moist, med stilt grayish brown 1-50 sand, stilt.**

- **30% wood from 5.5-6.0, shredded slight H2S odor in this layer very fibrous.**
LDW-SC-13  Feb 13, 2006

Unded = 6.2' to sediment.

Core slightly truncated from 9.5' to 16.1'.
Sediment Core Processing Log

Job: Dakota
Core Location/Sample Number: LDW - SC-13
Date/Time: Feb 13, 2006
Sample Logged by: N. Baday, A. Fitz
Sample Quality: good

<table>
<thead>
<tr>
<th>Recov Length (in)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Silt % - G</th>
<th>Silt % - S</th>
<th>Sand % - F</th>
<th>RP</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5</td>
<td></td>
<td>95</td>
<td>5</td>
<td></td>
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<td></td>
<td>minor wood shreds @ 6.1'</td>
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<td>6.0</td>
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<td>2-16c</td>
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<td>7.0</td>
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<td>2-16c</td>
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<td>8.0</td>
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<td>3.0</td>
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<td>2-16c</td>
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<td>9.0</td>
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<td>4.0</td>
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<td>2-16c</td>
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<td></td>
<td>10.0</td>
</tr>
</tbody>
</table>

END OF CORE: 9.9'

Core slightly winnowed from 9.5 to end.

Sample Depth

- 6.1'
- TV = 3.0' 

- 8.5'
- TV = 3.5' 

- 10.0'
- TV = 3.5' 

- 11.0'
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-13-06  Recorder: G55

Project: 341185.001 Windward Lower Duwamish Coring

Station Name: 13 R1

Tube Length (ft): 16.05

Water Depth (ft): 16.5  Time: 11:21

Est. Tide Height (ft): 4.8  (MLLW)

Est. Mudline:   (MLLW)

Comments: Flooded tide - diver depth 16 - silty clay sand

gentle slope - gentle current 5 A visibility
20 ft off station

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft

Northing: 207,096  Easting: 12675,85

On Deck Top of Sediment: 6.2

Penetration Tape Reading  Recovery Tape Reading  Comments

14.7  14.5

12.9  12.8

10.8  11.3

8.7   9.9

6.7   8.4

5.6   7.5  penetration rate slowed

4.6   6.7

3.6   6.0  reached goal

plug in tip at core
fine silty sand above

6.0   6.0  slow penetration
Mudmole™ Bore Log

Project: LDWG Duwamish Coring
Project No: 341185.001
Collected by: GSM
Date: 2/13/2006
Water depth: 16.5 ft

Station: 13 R1
Position: NAD83 WAN
207096 Northing
Time: 11:21
Easting 1267585

Weather/Comments: Overcast

Penetration interval (ft) | Interval recovery (ft) | Percent recovery
------------------------|------------------------|-------------------
0-1.35                  | 1.55                   | 115%
1.35-3.15               | 1.7                    | 94%
3.15-5.25               | 1.5                    | 71%
5.25-7.35               | 1.4                    | 67%
7.35-9.35               | 1.5                    | 75%
9.35-10.45              | 0.9                    | 82%
10.45-11.45             | 0.8                    | 60%
11.45-12.45             | 0.7                    | 70%

Depth below mudline (ft) | Distance from top of tube (ft)
-------------------------|-------------------------------
Mudline 6.2              | 1 7.35
2 8.36
3 9.31
4 10.06
5 10.77
6 11.45
7 12.12
8 12.84
9 13.59
10 14.38
11 15.19
12 15.94
13 No sample
14 No sample
15 No sample
16 No sample
17 No sample
18 No sample
19 No sample
20 No sample

Penetration 12.45 ft / On deck recovery 9.85 ft = 79% Recovery

MCS Environmental, Inc.
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Mountlake Terrace, WA 98043
(425) 677-4340
fax (425) 677-4370

File name 13R1
Bore Log (mudline) 90 of 490
Station Number: 13  
Attempt: 1  
Field Technician: TD  
Contractor: MCG/PWS  
On-site Visitor:  

Pre-Drive and Diver Observations:

- Shoreline & surrounding area: rip rap, wood debris
- Sediment surface & slope: silty coarse sand, gentle slope
- Water current and visibility: gentle current, 5 ft. vis., flotating tine
- Diver Water Depth: 16
- Tip Probe Depth: —  
- Disk Probe Depth: —  

Drive Observations:

- Drive Initiation Time: 11:24  
- Drive Completion Time: 11:31  
- Drive Offset: —  
- Estimated angle of drive: started out of water, ~10° est.

Drive Notes (e.g. easy, moderate, difficult; measured by diver or deck):

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.7</td>
<td>14.5</td>
<td>diver measured, easy - moderate drive</td>
</tr>
<tr>
<td>12.8</td>
<td>12.3</td>
<td>easy drive</td>
</tr>
<tr>
<td>10.8</td>
<td>11.3</td>
<td>easy - mod. drive</td>
</tr>
<tr>
<td>9.7</td>
<td>9.9</td>
<td>moderate drive, eqpt. under water, cannot see</td>
</tr>
<tr>
<td>6.7</td>
<td>6.4</td>
<td>easy - mod. drive</td>
</tr>
<tr>
<td>5.6</td>
<td>5.6</td>
<td>moderate - diff. drive, penetration rate slowed</td>
</tr>
<tr>
<td>4.6</td>
<td>6.0</td>
<td>moderate - diff. drive</td>
</tr>
<tr>
<td>3.6</td>
<td>6.0</td>
<td>difficult drive, reached penetration goal</td>
</tr>
</tbody>
</table>

TOTAL 12.45  
TOTAL 10.05  
Percent Recovered: 80.7%

Reason for ending drive: penetration goal reached, running out of tube length.
If refusal, reason for refusal:  

Extraction Observations:

- Tension on line?: Y  
- Stability of vessel: no problem
- Overlying water in core (quantity and description): yes, slightly turbid to clear, ~500m
- On Boat Recovery: 6.7
- Loss of Sediment: 0.2 ft.
- Extraction Notes: (i.e. winch or hammer, easy, hard) Winch, easy

On Deck Observations:

- Staining: very light, silty, sparsely off
- Tube Deformation: none
- Sediment Description (odor or sheen?): gray, fine-mud equal w/ silt, no odor, no sheen

Keep or Retry: screw plug inserted at sed/tube interface by diver.

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
### Sediment Core Processing Log

- **Job:** LDWG S-C coring
- **Core Location/Sample Number:** LDWG-S-C-14 R1
- **Date/Time:** 2/13/66, Spirit 1250 - 1400
- **Sample Logged by:** N. Busche
- **Type/Diameter of Sample:** 4" sq. aluminum
- **Sample Quality:** good

#### Notes:
- Penet 12.65, R-91%.
- On deck: 11.55.

#### Description

- **Grain Size, Color, Moisture, Sheen, Bioturbation, Wood, Other Debris:**
  - Loose, fine gr. silt, sand, shell fragments, most shells.
  - Loose, fine gr. silt, sand, shell fragments, most shells.
  - Loose, fine gr. silt, sand, shell fragments, most shells.
  - Loose, fine gr. silt, sand, shell fragments, most shells.

- **Sample Depth:**
  - 13.70
  - 3.1612
  - 1.0
  - 0.6

- **Comments:**
  - Silt but moist, none competent.
  - Silt but moist, none competent.
  - Silt but moist, none competent.
  - Silt but moist, none competent.

- **Summary Sheet:**
  - V. trace HC-like odor. and trace 1/16" sheen florets.
### Sediment Core Processing Log

**Job:** LDWG-SC coming

**Core Location/Sample Number:** LDWG-SC-14 R2

**Sample Logged by:** N. Bacher

**Sample Length (from log):** 11.6'

**Avg. % Compaction:**

**Notes:**

<table>
<thead>
<tr>
<th>Determined Length</th>
<th>% Compaction</th>
<th>Color</th>
<th>Size % - G</th>
<th>Size % - S</th>
<th>Size % - F</th>
<th>PDI</th>
<th>Description (grain size, color, moisture, shear/fall, bloat, wood, other debris)</th>
<th>Initial Actual Depth (ft)</th>
<th>Sample Depth</th>
<th>Substance No.</th>
<th>Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.54</td>
<td>3/2</td>
<td>gray</td>
<td>95</td>
<td>50</td>
<td></td>
<td></td>
<td>transition zone. Interbeds of fine brown sand &amp; grayish olive silt clayey silt, very motley appearance, trace to minor organic material, roots. @ 9.0' precede wood, wood, red clay, brown fine sand</td>
<td>13.02</td>
<td>13.20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.54</td>
<td>3/2</td>
<td>gray</td>
<td>95</td>
<td>50</td>
<td></td>
<td></td>
<td>below 8' no brown sand pockets, just black silt. @ 7.6' TV = 3.6 big</td>
<td>7.6</td>
<td>2-162</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.54</td>
<td>3/2</td>
<td>gray</td>
<td>95</td>
<td>50</td>
<td></td>
<td></td>
<td>slight warming from 10.5' to end of core.</td>
<td>7.0</td>
<td>13.25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>slight warming from 10.5' to end of core.</td>
<td>10.6</td>
<td>13.30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>slight warming from 10.5' to end of core.</td>
<td>11.6</td>
<td>13.62</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>End of core: 11.6'</td>
<td>12.0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Mudmole™ Bore Log

Project: LDWG Duwamish Coring
Project No: 341185.001
Collected by: GSM
Date: 2/13/2006
Water depth: 46.0 ft

Station: 14 R1
Position: NAD83
Northing: 207055
Easting: 1267397

Weather/Comments: Overcast

Penetration interval (ft) Interval recovery (ft) Percent recovery
0-1.85 2.15 116%
1.85-2.35 0.6 120%
2.35-4.35 2.2 110%
4.35-6.75 2.4 100%
6.75-8.95 1.8 82%
8.95-10.85 1.4 74%
10.85-12.65 1.2 07%

Penetration 12.65 ft/ On deck recovery 11.55 ft = 91% Recovery

Mudline

Distance from top of tube (ft)

Depth below mudline (ft)

Penetration 12.65 ft/ On deck recovery 11.55 ft = 91% Recovery

Distance from top of tube (ft)

Depth below mudline (ft)

Penetration 12.65 ft/ On deck recovery 11.55 ft = 91% Recovery

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File name: 14-148
Bore Log (mudline)
Station Number: 14
Attempt: 1
Field Technician: TD
Contractor: 
On-site Visitor: 

Core Tube Length: 16.05
Load Line Water Depth: 40.0
Latitude: 207055
Longitude: 1269397

Shoreline & surrounding area: mid nav. concave
Sediment surface & slope: flat bottom, silty sand, firm bottom
Water current and visibility: Strong surface current, ebullating tide, 5 ft vis, moderate current
Diver Water Depth: 45
Tip Probe Depth: 
Disk Probe Depth: 

Drive Initiation Time: 0840
Drive Completion Time: 0946
Estimated angle of drive: 

Drive Notes (e.g. easy, moderate, difficult; measured by diver or deck):

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.7</td>
<td>14.9</td>
<td>drive, measured, free fall</td>
</tr>
<tr>
<td>13.3</td>
<td>13.3</td>
<td>easy drive</td>
</tr>
<tr>
<td>11.7</td>
<td>11.1</td>
<td>easy drive</td>
</tr>
<tr>
<td>9.3</td>
<td>9.7</td>
<td>easy drive</td>
</tr>
<tr>
<td>7.1</td>
<td>6.9</td>
<td>easy drive</td>
</tr>
<tr>
<td>5.2</td>
<td>5.5</td>
<td>easy-moderate drive</td>
</tr>
<tr>
<td>3.4</td>
<td>4.3</td>
<td>moderate drive</td>
</tr>
</tbody>
</table>

TOTAL 12.05 TOTAL 11.75 Percent Recovered 92.9
Reason for ending drive: reached penetration goal
If refusal, reason for refusal: 

Extraction Observations:
Tension on line? Y
Stability of vessel: no problem
Overlying water in core (quantity and description): yes, clear, ~ 200nl
On Boat Recovery: 4.5
Loss of Sediment: 0.2 ft.
Extraction Notes: (i.e. winch or hammer, easy, hard) winch, easy

On-deck Observations:
Staining: light silt, sprayed off
Tube Deformation: none
Sediment Description (odor or sheen?): no odor, no sheen, silty sand, brown-gray

Keep or Retry: screw plug, inserted by diver at sed/so interface
Send silt plug (natural) in tip of core

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
**MCS Environmental MudMole Bore Log**

**Collection Information**

Date: 2-13-06  
Recorder: 65M  

Project: 341185.001 Windward Lower Duwamish Coring

<table>
<thead>
<tr>
<th>Station Name</th>
<th>14 R1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tube Length (ft):</td>
<td>16.05</td>
</tr>
</tbody>
</table>
| Water Depth (ft): | 46  
Time: 8:34 |
| Est. Tide Height (ft): | 6.7 (MLLW) |
| Est. Mudline: | (MLLW) |
| Comments: | Strong surface current, ebbing tide, bottom silty sand - flat bottom - 4.5 ft depth - Silt visibility, moderate current - firm bottom |

**Position Information**

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft  
Northing 207055  
Easting 1267397  
On Deck Top of Sediment: 45

**Penetration Tape Reading**

<table>
<thead>
<tr>
<th>Penetration Tape Reading</th>
<th>Recovery Tape Reading</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.2</td>
<td>14.9</td>
<td></td>
</tr>
<tr>
<td>13.9</td>
<td>13.3</td>
<td></td>
</tr>
<tr>
<td>11.7</td>
<td>11.1</td>
<td></td>
</tr>
<tr>
<td>9.3</td>
<td>8.7</td>
<td></td>
</tr>
<tr>
<td>7.1</td>
<td>6.9</td>
<td></td>
</tr>
<tr>
<td>5.2</td>
<td>5.5</td>
<td></td>
</tr>
<tr>
<td>3.4</td>
<td>4.3</td>
<td>Goal reached</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
### Sediment Core Processing Log

**Core Location/Sample Number:** SC-15-L1  
**Date/Time:** 2/17/06  
**Sample Logged by:** L. Kee  
**Type/Diameter of Sample:** 4" x 89.4"  
**Sample Quality:** Good  
**Avg. % Compaction:**  
**Notes:** Pen = 12.7;  
Deck Pen = 10.1

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Diameter (in)</th>
<th>Sample No.</th>
<th>Subsample No.</th>
<th>Summary Sketch</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1</td>
<td>0-1/25</td>
<td>0-1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-2</td>
<td>1-2/25</td>
<td>1-2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-3</td>
<td>2-3/25</td>
<td>2-3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-4</td>
<td>3-4/25</td>
<td>3-4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4-5</td>
<td>4-5/25</td>
<td>4-5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5-6</td>
<td>5-6/25</td>
<td>5-6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6-7</td>
<td>6-7/25</td>
<td>6-7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7-8</td>
<td>7-8/25</td>
<td>7-8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8-9</td>
<td>8-9/25</td>
<td>8-9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9-10</td>
<td>9-10/25</td>
<td>9-10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Description:**
- Silt (0-0.5 ft)
  - Wet, loose, dark olive brown silt sandy silt
  - Wood, rootlets, and wood debris
- Silt (0.5-1.0 ft)
  - Wet, mottled, gray, massive block
  - Silt (0.75 ft)
  - Worm (polychaete) (worm tube 0.2"
  - Scattered in top 0.5" in clayey silt
- Greenish gray clayey silt
- Mottled olive-gray clayey silt
- Pockets + layers within the block gray silt
- Layers are up to 0.1" thick
- Pockets are up to 0.1"
  - Moist, clayey silt, pay dirt-like, non-compressible, uniform texture
- @ 3-1/2 ft: Swindon zone to 5.0 ft
  - Clayey silt layer (blue-gray) described above
- @ 5.1 ft: Wood fragment

**Average Compaction:**  
**Notes:** Pen = 12.7; Deck Pen = 10.1
Mudline = 60

Core shoe is 1/3 full due to winnowing

Bl. fine med. grained sand (multicolored grains)
# Sediment Core Processing Log

**Core Location/Sample Number:** SC-15-R1  
**Date/Time:** 2/11/10

**Sample Logged by:** LM  
**Type/Diameter of Sample:**
- **Notes:** Pen = 12.7', Deck Rec = 10.1'

<table>
<thead>
<tr>
<th>Recovery Length (in)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Site % S</th>
<th>Site % S</th>
<th>Site % F</th>
<th>PHD</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>SAA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Remolding of materials blocks up to 6.7'</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Transition.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Layers of fine sand, 1&quot; thick</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Layers of clayey silt, 1&quot; thick</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Sharp</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Sediment, dark gray sand w/ some convex markings + multicolored grains (orange, red, white)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Green gray silt pockets up to 0.1&quot;, subrounded (lip up clasts?)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Worsening downward (medium sand)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>End of Core @ 10.1'</td>
</tr>
</tbody>
</table>

- **Sheen Test:** 1-2' = no sheen  
  4-6' = no sheen

- **Sample Quality:** good, fair, poor, disturbed

- **Insets:**
  - Subsample No.
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-16-26 Recorder: GSN

Project: 341185.001 Windward Lower Duwamish Coring

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft

Northing 306821
Easting 1267821

Est. Mudline: (MLLW)
On Deck Top of Sediment 6.0

Comments: Ebbing tide, diver depth 37 ft, flat bottom
5 ft vis, no debris, silty
27 ft off station

Penetration Tape

<table>
<thead>
<tr>
<th>Reading</th>
<th>Recovery Tape Reading</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.1</td>
<td>15.3</td>
<td></td>
</tr>
<tr>
<td>13.3</td>
<td>13.2</td>
<td></td>
</tr>
<tr>
<td>11.2</td>
<td>11.4</td>
<td></td>
</tr>
<tr>
<td>9.1</td>
<td>10.2</td>
<td></td>
</tr>
<tr>
<td>7.5</td>
<td>8.8</td>
<td></td>
</tr>
<tr>
<td>6.5</td>
<td>8.0</td>
<td>penetration rate slowed</td>
</tr>
<tr>
<td>5.5</td>
<td>7.3</td>
<td></td>
</tr>
<tr>
<td>4.5</td>
<td>6.7</td>
<td>goal reached</td>
</tr>
<tr>
<td>3.4</td>
<td>5.9</td>
<td></td>
</tr>
</tbody>
</table>
Station Number: 15
Attempt: 1
Field Technician: TD, JP
Contractor: NC/RS
On-site Visitor: 
Pre-Dive Observations:
Shoreline & surrounding area: 
Sediment surface & slope: 
Water current and visibility: 5 ft vis. ebb-tide
Diver Water Depth: 37

Drive Observations:
Drive Initiation Time: 09:12
Drive Completion Time: 09:22
Estimated angle of drive: 
est 10°
Penetration Recovery Drive Notes (e.g. easy, moderate, difficult; measured by diver or deck)

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.1</td>
<td>15.3</td>
<td>diver recorded, free fall</td>
</tr>
<tr>
<td>13.3</td>
<td>13.2</td>
<td>moderate drive</td>
</tr>
<tr>
<td>11.2</td>
<td>11.4</td>
<td>moderate drive</td>
</tr>
<tr>
<td>9.1</td>
<td>10.2</td>
<td>moderate drive</td>
</tr>
<tr>
<td>7.5</td>
<td>8.8</td>
<td>difficult drive, penetration note</td>
</tr>
<tr>
<td>6.5</td>
<td>8.0</td>
<td>difficult drive</td>
</tr>
<tr>
<td>5.5</td>
<td>7.3</td>
<td>difficult drive</td>
</tr>
<tr>
<td>3.4</td>
<td>5.9</td>
<td>difficult drive, refusal, penetration goal reached</td>
</tr>
<tr>
<td>TOTAL 12.7</td>
<td>TOTAL 10.2</td>
<td>Percent Recovered: 50.3%</td>
</tr>
</tbody>
</table>

Reason for ending drive: refusal and penetration goal reached
If refusal, reason for refusal: hard material

Extraction Observations:
Tension on line: yes
Stability of vessel: no problem
Overlying water in core (quantity and description): clear, slightly turbid
On Boat Recovery: 0.0
Loss of Sediment: 0.0 ft.
Extraction Notes: (I.e. winch or hammer, easy, hard) winch, moderately easy

On Deck Observations:
Staining: slight, salt, sprayed off
Tube Deformation: none
Sediment Description (odor or sheen?): mud, brown sand, no odor, no sheen

Keep or Retry: diver inserted screw play at sed/lo interface

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
### Sediment Core Processing Log

**Job:** 1DWG 5-31

**Core Location/Sample Number:** LW B - SC - 10

**Date/Time:** 21/14/66 07:50 - 11:20

**Sample Logged by:** N. Bacher, I. Meltz

**Type/Diameter of Sample:** 6" square aluminum

**Sample Quality:** good fair poor disturbed

**Notes:**
- Rn = 1.35; TV = 99
- 60; 40 = 10, 75

<table>
<thead>
<tr>
<th>Recovered Length (m)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Size % - G</th>
<th>Size % - S</th>
<th>Size % - F</th>
<th>PID</th>
</tr>
</thead>
<tbody>
<tr>
<td>GLEY2 2.75</td>
<td>3</td>
<td>10</td>
<td>90</td>
<td>0</td>
<td>sharp</td>
<td>moist, soft, gray silt, clayey to clayey silt. minor thin black horizontal streaks. no odor</td>
</tr>
<tr>
<td>GLEY2 2.5</td>
<td>2</td>
<td>0</td>
<td>90</td>
<td>0</td>
<td>trace</td>
<td>trace sand to 4.0, then trace sand below, scattered organics throughout, flakey, fibrous. trace ft, odor 3.0-4.0.</td>
</tr>
<tr>
<td>GLEY2 2.5/4</td>
<td>2</td>
<td>0</td>
<td>90</td>
<td>0</td>
<td>trace</td>
<td>trace gravel, blocky texture. 0.3-0.4</td>
</tr>
</tbody>
</table>

**Description**

- (grain size, color, moisture, sheen/odor, biota, wood, other debris)

<table>
<thead>
<tr>
<th>Interval/Actual Depth (m)</th>
<th>Sample Depth</th>
<th>Subsample No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.00</td>
<td>1040</td>
<td>1632</td>
</tr>
<tr>
<td>3.42</td>
<td>1047</td>
<td>1602</td>
</tr>
<tr>
<td>6.17</td>
<td>1052</td>
<td>1602</td>
</tr>
<tr>
<td>9.85</td>
<td>1057</td>
<td>1602</td>
</tr>
<tr>
<td>13.10</td>
<td>1061</td>
<td>1602</td>
</tr>
<tr>
<td>16.0</td>
<td>1067</td>
<td>1602</td>
</tr>
</tbody>
</table>

**Summary Sketch**

- @ 3.0 TV = 0.75
- @ 5.0 TV = 0.75

---

*Note: The diagram on the right appears to be a sketch of a core section or a similar visual representation, which is not transcribed in the text.*
<table>
<thead>
<tr>
<th>Recovered Length (ft)</th>
<th>Color</th>
<th>% Compaction</th>
<th>Size % - G</th>
<th>Size % - S</th>
<th>Size % - F</th>
<th>RD</th>
<th>Description (grain size, color, moisture, sheen/odor, biota, wood, other debris)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>@ 6.1' 2 1/4' pieces of wood</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Transitional</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>moist, medium dense, browny gray fine sand mottled by gray silt, pockets/inclusions</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8.4' locality red sand lens of 35% wood</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>@ 9.0' wood drifts</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>below 9.5 more defined interbeds 1/8-1/4' thickness of fine browny gray sand and gray silt</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Sand is multicolored, red, orange, white below 9.5', hard to tell above in unit</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>End of core: 10.8'</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-13-06  Recorder: 65VA

Project: 341185.001 Windward Lower Duwamish Coring

Station Name: 16 81

Tube Length (ft): 16.05

Water Depth (ft): 32.3  Time: 1431

Est. Tide Height (ft): 83  (MLLW)

Est. Mudline:  (MLLW)

Comments: incoming tide - soft silt 32 ft vis 1 ft
            gentle slope mild current
            2 10 ft off station

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft
Northing: 2066669
Easting: 1267959
On Deck Top of Sediment: 53

Penetration Tape Reading  Recovery Tape Reading  Comments

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>14.8</td>
<td>15.1</td>
<td></td>
</tr>
<tr>
<td>12.3</td>
<td>12.4</td>
<td></td>
</tr>
<tr>
<td>10.0</td>
<td>10.1</td>
<td></td>
</tr>
<tr>
<td>8.0</td>
<td>8.5</td>
<td></td>
</tr>
<tr>
<td>6.0</td>
<td>6.8</td>
<td></td>
</tr>
<tr>
<td>3.9</td>
<td>5.5</td>
<td></td>
</tr>
<tr>
<td>2.5</td>
<td>5.0</td>
<td></td>
</tr>
</tbody>
</table>
|       |       | goal reached -
       |       | still penetrating fast
|       |       | muddy clay plug in tip of core

MCS Environmental, Inc.
0503 - 216th St SW, Suite 100
Mountlake Terrace, WA 98043
(425) 697-4540

Duwamish borelog form.xls

107 of 490


**Mudmole™ Bore Log**

**Project:** LDWG Duwamish Coring  
**Project No:** 341185.001  
**Collected by:** GSM  
**Date:** 2/13/2006  
**Water depth:** 32.3 ft

**Station:** 16 R1  
**Position:** NAD83  
**Time:** 14:31  
**Northing:** 206669  
**Easting:** 1267959  
**Mudline:** -24.0 ft MLLW (estimated using tide tables)

**Weather/Comments:** Overcast and cold

---

<table>
<thead>
<tr>
<th>Depth below mudline (ft)</th>
<th>Distance from top of tube (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mudline</td>
<td>5.3</td>
</tr>
<tr>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>1</td>
<td>6.06</td>
</tr>
<tr>
<td>2</td>
<td>7.06</td>
</tr>
<tr>
<td>3</td>
<td>8.14</td>
</tr>
<tr>
<td>4</td>
<td>9.20</td>
</tr>
<tr>
<td>5</td>
<td>10.20</td>
</tr>
<tr>
<td>6</td>
<td>11.20</td>
</tr>
<tr>
<td>7</td>
<td>12.01</td>
</tr>
<tr>
<td>8</td>
<td>12.81</td>
</tr>
<tr>
<td>9</td>
<td>13.66</td>
</tr>
<tr>
<td>10</td>
<td>14.51</td>
</tr>
<tr>
<td>11</td>
<td>15.14</td>
</tr>
<tr>
<td>12</td>
<td>15.75</td>
</tr>
<tr>
<td>13</td>
<td>No sample</td>
</tr>
<tr>
<td>14</td>
<td>No sample</td>
</tr>
<tr>
<td>15</td>
<td>No sample</td>
</tr>
<tr>
<td>16</td>
<td>No sample</td>
</tr>
<tr>
<td>17</td>
<td>No sample</td>
</tr>
<tr>
<td>18</td>
<td>No sample</td>
</tr>
<tr>
<td>19</td>
<td>No sample</td>
</tr>
<tr>
<td>20</td>
<td>No sample</td>
</tr>
</tbody>
</table>

---

**Penetration interval** (ft) | **Interval recovery** (ft) | **Percent recovery**
---|---|---
0-1.25 | 0.95 | 75%
1.25-3.75 | 2.7 | 108%
3.75-6.05 | 2.3 | 100%
6.05-8.05 | 1.6 | 80%
8.05-10.05 | 1.7 | 85%
10.05-12.15 | 1.3 | 82%
12.15-13.55 | 0.5 | 36%

---

*Penetration 13.55 ft/ On deck recovery 10.75 ft = 79% Recovery*
Station Number: 10  
Date: 07/03/04  
Station Arrival Time: 14:18  
Core Tube Length: 16.05  
Station Departure Time: 14:52  
Lead Line Water Depth: 32.3  
Dist. From Target Station: 10  
Latitude: 20°06'49"  
Longitude: 120°17'59"

On-site Visitor: ________  
Pre-Drive and Diver Observations:

Shoreline & surrounding area:
- Wood piles/year to north and south, surrounded by barges
- Soft silt

Sediment surface & slope:
- Fleeting tide

Water current and visibility:

Diver Water Depth: 32

Tip Probe Depth: _______  
Disk Probe Depth: _______

Drive Observations:

Drive Initiation Time: 14:34  
Drive Completion Time: 14:37  
Drive Offset: _______

Estimated angle of drive:
- Core under water cannot see: east 10° off

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, moderate, difficult; measured by diver or deck)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.5</td>
<td>12.4</td>
<td>Over recorded; feet fall; most difficult.</td>
</tr>
<tr>
<td>10.0</td>
<td>10.1</td>
<td>Easy drive/moderate drive.</td>
</tr>
<tr>
<td>8.0</td>
<td>8.05</td>
<td>Easy drive.</td>
</tr>
<tr>
<td>6.0</td>
<td>6.0</td>
<td>Easy/moderate drive.</td>
</tr>
<tr>
<td>5.9</td>
<td>5.0</td>
<td>Easy/moderate drive; penetration goal reached.</td>
</tr>
<tr>
<td>2.5</td>
<td>5.0</td>
<td>Still penetrating at.</td>
</tr>
</tbody>
</table>

TOTAL: 12.55  TOTAL: 11.05  Percent Recovered: 81.5%

Reason for ending drive:
- Penetration goal reached; running out of tube length

If refusal, reason for refusal: ________

Extraction Observations:

Tension on line?: Yes  
Stability of vessel: No problem

Overlying water in core (quantity and description):
- Yes, clear - slightly turbid, no spoil

On Boat Recovery: 5.3  
Loss of Sediment: Silty clay plug in core tip

Extraction Notes: (i.e. winch or hammer, easy, hard) winch, easy

On Deck Observations:

Staining: Silty on sides, sprayed off

Tube Deformation: None

Sediment Description (odor or sheen?): Aperubrown - Silty fine sand, some clay?

Keep or Retry: Diver inserted screw plug at sed/hono interface

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
## Sediment Core Processing Log

**Job:** LDW6 Core Processing  
**Core Location/Sample Number:** SC-17-RS  
**Date/Time:** 2/24/06 9:45  
**Sample Logged by:** JB, CB  
**Type/Diameter of Sample:** 3" round  
**Sample Quality:** good  
**Notes:** Ren: 13.0'  

### Recovered Length (in) & % Compaction

<table>
<thead>
<tr>
<th>Recovered Length (in)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Size % G</th>
<th>Size % S</th>
<th>Pct</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Description (grain size, color, moisture, sheen/odor, bits, wood, other debris)

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Olive brown, sandy, soft sandy silty silt 0.6-0.4&quot; transition to black w/ color @ 0.3&quot;</td>
</tr>
<tr>
<td>Wet, deep black, medium dark silty sandy tilty silt w/ shell fragments, netlets 0.2&quot; long, wood fragments up to 0.2&quot; and submerged gravel 0.1&quot;</td>
</tr>
<tr>
<td>Silt is sl. commingled, low plasticity, bloated mottled, uniform, shell fragments, netlets, wood fragments up to 0.1&quot; mild this odor 1&quot; subrounded gravel 1/16&quot;</td>
</tr>
<tr>
<td>0.4&quot; piece of red ceramic - sandy gravel (sandwich)</td>
</tr>
<tr>
<td>0.7 petrolium-reek, weathered 1&quot;/1&quot;</td>
</tr>
<tr>
<td>0.2&quot; piece of polished multi-colored red glass</td>
</tr>
<tr>
<td>0.2&quot; wood fragment 3&quot;x1&quot;</td>
</tr>
<tr>
<td>0.3&quot; olive grey gravelly silty silt</td>
</tr>
<tr>
<td>0.38&quot; wood fragment 0.5&quot;x0.2&quot; milt pet - like odor with rainbow streaks + flecks up to 0.1&quot;</td>
</tr>
<tr>
<td>0.4&quot; 0.3&quot;x0.2&quot; wood fragment, strong petrolium-like odor, shear flutes up to 0.1&quot;</td>
</tr>
<tr>
<td>0.4&quot; 0.1&quot; piece of plastic (yellow) with strong HC-like odor</td>
</tr>
<tr>
<td>0.4&quot; 0.2&quot; clayey silty silt (olive gray)</td>
</tr>
<tr>
<td>0.5&quot; wood fragment 0.1&quot;x0.2&quot; mild HC-like odor</td>
</tr>
<tr>
<td>5.0 0.1&quot; pieces of canvas w/ mild HC-like odor</td>
</tr>
<tr>
<td>5.6 wood fragments w/ mild HC-like odor</td>
</tr>
<tr>
<td>5.1 2&quot; peat pocket + wood fragments w/ mild HC-like odor</td>
</tr>
<tr>
<td>5.4 olive grey clayey silty silt (sand) about 2&quot; thick</td>
</tr>
<tr>
<td>Baggie: 0.2.6&quot;</td>
</tr>
<tr>
<td>Baggie: 0.3.2&quot;</td>
</tr>
</tbody>
</table>

### Summary Search

<table>
<thead>
<tr>
<th>Summary Search</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.9&quot; TV: 0.1 BIG</td>
</tr>
</tbody>
</table>

---

**F-2**

110 of 490
50-17-25

4.4' - 8.6'

130'

93.0

8.6'

1:4' 

Notes:

Based on field notes, core catcher fullness was not noted in field. Sediment in core catcher included sandy silt, gravel, and wood fragments.

Core catcher is 1/4 full of black silty sand with olive grey silt layers.

Notes:

Upon opening top of core, water with rainbow sheen and strong petroleum-like odor (2-100 mL)

Upon opening bottom of core, rainbow sheen with smeared zone. Petroleum-like odor appears from 2'-10' 1

- LM

Top 0.3' of core are unwrapped, -70'.
### Sediment Core Processing Log

**Job:** LDWG Core Processing  
**Job Number:** DARS-18420-51U  
**Core Location/Sample Number:** X-17-25  
**Date/Time:** 2/24/16 0945  
**Sample Logged by:** LM, CB  
**Type/Diameter of Sample:** 3" Round  
**Sample Length (from log):** 8.6"  
**Sample Quality:** Good  
**Avg. % Compaction:**  
**Notes:** Cont'd

<table>
<thead>
<tr>
<th>Recovered Length (in)</th>
<th>Description of Material: (grain size, color, moisture, shear/odor, bits, wood, other debris)</th>
</tr>
</thead>
</table>
| 2.8 | **Medit HC-liked odor, sil. metallic sheen**  
| 2.3 | *Red paint chip with adhered PCP, 0.031L  
| 2.3 | Greenish-gray clayey silt, about 1% water*  
| 2.3 | O6.4: Wood fragments + med HC-like odor  
| 2.3 | O7.2: Wood fragment at L, mild HC-like odor  
| 2.3 | O7.2: Subrounded grain, 0.111L piece, mild HC-like odor  
| 2.3 | O7.0: Wood fragment, red HC-liked odor  
| 2.3 | O7.0: Red paint chip with adhered PCP, PcP, 0.031L  
| 2.3 | O7.0: Wood fragment, red HC-liked odor  
| 2.3 | O7.0: Wood fragment, red HC-liked odor  
| 2.3 | O7.0: Wood fragment, red HC-liked odor  
| 2.3 | O7.0: Wood fragment, red HC-liked odor  
| 2.3 | O7.0: Wood fragment, red HC-liked odor  
| **End of core @ 8.6** |

**Summary:**
- **Silt** (org)  
- **Silt**  
- **Silt**

---

*Note: The table contains detailed descriptions of the core samples collected during the processing, including grain size, color, moisture, odor, and other characteristics. The core is concluded at a length of 8.6 inches.*
**SEDIMENT CORE DRIVE LOG**

**Project:** UTW Subsurface Sd.  
**Project #:** 05 08 06 32  
**Field Crew:** TD  
**Contractor:** MSS  

**Core Location:** LCW-5617  
**Date:** 01-23-06  
**Time:** 1530  
**Attempt #:** 5  
**Sample Method:** Vibration  

---

<table>
<thead>
<tr>
<th>Proposed Coordinates</th>
<th>Actual Coordinates</th>
</tr>
</thead>
<tbody>
<tr>
<td>N: 20°0550</td>
<td>N: 47°33.376 W</td>
</tr>
<tr>
<td>E: 121°83449</td>
<td>E: 122°20.381 W</td>
</tr>
</tbody>
</table>

Mudline: Core Drive:  
Mudline: Core Drive:  

**DTS Boat:**  
**DTS Lead Line:** 20.0 ft  
**Mudline Elevation:**  

**Description:**

free fall, fingers inverted, vibration needed to  
drive/extract, estimation of density, debris encountered,  
slopes, refusal, mudline conditions, drive action, etc.)

0-7 ft free fall  
7-10 ft moderate drive  
10-13 ft. moderately easy drive

**Sheets on core tube:**  
Core top was empty (washed out) A  
Top of sed: brown surface, black silt w/ loads of silt.

**Total Drive:** 13 ft  
**Length Recovered:** 8.6 ft (66.1%)  

**Notes:**  
6 ft off target  
discarded core from RA on site.

**Measurement (to nearest 0.1 foot):**

| Avg. % Recovery | Avg. % Compaction | Description at Cuts |
|-----------------|------------------)|--|---|---|---|
|                 |                 | Section:  
|                 |                 | A =  
|                 |                 | B =  
|                 |                 | C =  
|                 |                 | D =  

**Core Tube Length:**

cut at catcher revealed black sandy silt, gravel, wood debris.
SEDIMENT CORE DRIVE LOG

Project: LDW Subsurface Silt        Core Location: LDW-SCF
Project #: 05-08.08.032              Date: 02.23.06       Time: 15:10
Field Crew: TD                      Attempt #: 4
Contractor: M.S.                     Accept/Reject: Pending

Sample Method: Vibracore

Proposed Coordinates
N: 206.550                           Actual Coordinates
Mudline:                                  N: 47 38.37575 E: 122 20.34900 W
Core Drive:                                Mudline:
                                            Core Drive:

DTS Boat: DTS Lead Line: 20.0 ft.
Mudline Elevation:

Description:
(free fall, fingers inverted, vibration needed to
drive/extract, estimation of density, debris encountered,
slopes, refusal, mudline conditions, drive action, etc.)

0-2 - did not record
2-A - moderate drive
A - 55 - difficult drive, refusal

Core tip had gravel, wood debris
black silt and sand.

Total Drive: 5.5 ft. Length Recovered: 5.2 ft.
98.1%

Notes: N/A off target.

Measurement (to nearest 0.1 foot):

Avg. % Recovery:

Avg. % Compaction:

Section: Length: Description at Cuts:
A =
B =
C =
D =
<table>
<thead>
<tr>
<th>Percentage Recovered</th>
<th>% Compaction</th>
<th>Color</th>
<th>Grain Size</th>
<th>Color</th>
<th>Moisture</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>10</td>
<td>80</td>
<td>0.1</td>
<td>Green</td>
<td>0.2</td>
<td>0.2&quot; gravel, 0.2&quot; fine sands, shell fragments, 0.2&quot; sandy silt, 0.2&quot; length</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>100</td>
<td>10</td>
<td>Black</td>
<td>0.4</td>
<td>0.4&quot; sandy silt, trace H2S-like odor, trace organic matter, trace sediments</td>
</tr>
<tr>
<td>20</td>
<td>20</td>
<td>20</td>
<td>0</td>
<td>Black</td>
<td>3&quot;</td>
<td>3&quot; pe clear plastic cap</td>
</tr>
</tbody>
</table>

End of Core 2.1
New Short core to mudline length = 124.2'
New 'MCS mudmole Bar Log' generated.

- LM
MCS Environmental MudMole Bore Log

Collection Information

Date: 2/13/06  Recorder: CSN

Project: 341185.001 Windward Lower Duwamish Coring

Station Name: 17 R1

Tube Length (ft): 163
Water Depth (ft): 192
Est. Tide Height (ft) (MLLW): 7.1
Est. Mudline: (MLLW)

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft
Northing: 206583 206546
Easting: 1268461 1268465
On Deck Top of Sediment: 14

Comments: incoming tide - 144 fertile bottom scattered wood
Initial behavior: gentle slope 3 ft visibility

Penetration Tape Reading  Recovery Tape Reading  Comments

15.1  155
13.8  14.3
13.2

R2 water depth 18.1
silt bottom w/scattered gravel
diver depth 17-A level bottom
14.2
13.3
13.0
13.3

12.3 attestation

hit something
time 1352 tide 7.7
hit something
Mudmole bouncing
Mudmole™ Bore Log

Project: LDWG Duwamish Coring  Station: 17 R2
Project No: 341185.001  Position: NAD83  WAN
Collected by: GSM  206546  Northing
Date: 2/13/2006  Time: 13:52  1268485  Easting
Water depth: 18.1 ft  Mudline: -10.4 ft MLLW (estimated using tide tables)

Weather/Comments: Rain
Rep 1 hit debris, tube rinsed clean and reused, Rep 2 hit debris

Penetration interval (ft)  Interval recovery (ft)  Percent recovery
0-2.1  2  95%
2.1-3  0.9  100%
3-3.3  0.1  33%

Depth below mudline (ft)  Distance from top of tube (ft)
Mudline  14.2
1  15.15
2  16.10
3  No sample
4  No sample
5  No sample
6  No sample
7  No sample
8  No sample
9  No sample
10  No sample
11  No sample
12  No sample
13  No sample
14  No sample
15  No sample
16  No sample
17  No sample
18  No sample
19  No sample
20  No sample

Penetration 3.3 ft/ On deck recovery 2.1 ft = 64% Recovery
Mudmole™ Bore Log

Project: LDWG Duwamish Coring
Station: 17 R2
Project No: 341185.001
Position: NAD83
Collected by: GSM
Date: 2/13/2006
Time: 13:52

Water depth: 18.1 ft
Mudline: -10.4 ft MLLW (estimated using tide tables)

Weather/Comments: Rain
Rep 1 hit debris, tube rinsed clean and reused, Rep 2 hit debris

Penetration interval
<table>
<thead>
<tr>
<th>Interval recovery</th>
<th>Percent recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-2.1</td>
<td>2</td>
</tr>
<tr>
<td>2.1-3</td>
<td>0.9</td>
</tr>
<tr>
<td>3-3.3</td>
<td>0.1</td>
</tr>
</tbody>
</table>

Depth below mudline (ft)

<table>
<thead>
<tr>
<th>Depth below mudline (ft)</th>
<th>Distance from top of tube (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mudline</td>
<td>14</td>
</tr>
<tr>
<td>1</td>
<td>14.95</td>
</tr>
<tr>
<td>2</td>
<td>15.90</td>
</tr>
<tr>
<td>3</td>
<td>No sample</td>
</tr>
<tr>
<td>4</td>
<td>No sample</td>
</tr>
<tr>
<td>5</td>
<td>No sample</td>
</tr>
<tr>
<td>6</td>
<td>No sample</td>
</tr>
<tr>
<td>7</td>
<td>No sample</td>
</tr>
<tr>
<td>8</td>
<td>No sample</td>
</tr>
<tr>
<td>9</td>
<td>No sample</td>
</tr>
<tr>
<td>10</td>
<td>No sample</td>
</tr>
<tr>
<td>11</td>
<td>No sample</td>
</tr>
<tr>
<td>12</td>
<td>No sample</td>
</tr>
<tr>
<td>13</td>
<td>No sample</td>
</tr>
<tr>
<td>14</td>
<td>No sample</td>
</tr>
<tr>
<td>15</td>
<td>No sample</td>
</tr>
<tr>
<td>16</td>
<td>No sample</td>
</tr>
<tr>
<td>17</td>
<td>No sample</td>
</tr>
<tr>
<td>18</td>
<td>No sample</td>
</tr>
<tr>
<td>19</td>
<td>No sample</td>
</tr>
<tr>
<td>20</td>
<td>No sample</td>
</tr>
</tbody>
</table>

Penetration 3.3 ft / On deck recovery 2.3 ft = 70% Recovery


Station Number: 1

Date: 02/05/20

Station Arrival Time: 10:50

Attempt: 3

Coro Tube Length: 16.7

Station Departure Time: 14:10

Field Technician: TD

Lead Line Water Depth: 18.1

Contractor: 12:38:46S

Latitude: 2065440

Longitude: 126840S

On-site Visitor: __________

Pre-Dive and Diver Observations

Shoreline & surrounding area: same as R1
Sediment surface & slope: silty bottom, scattered wood/metal debris, gentle slope, scattered gravel level bottom
Water current and visibility: incoming tide, 2 ft vis.
Diver Water Depth 10'4"
Tip Probe Depth
Disk Probe Depth

Drive Observations

Drive Initiation Time: 1352
Drive Completion Time: 355
Drive Offset: __________
Estimated angle of drive: equip mostly under water 4 10°

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, moderate, difficult; measured by diver or deck)</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.2</td>
<td>14.3</td>
<td>diver rounded, free fall; moderate dive</td>
</tr>
<tr>
<td>13.3</td>
<td>13.4</td>
<td>easy, moderate dive - hard drive</td>
</tr>
<tr>
<td>13.0</td>
<td>13.3</td>
<td>hard dive - refusal</td>
</tr>
</tbody>
</table>

TOTAL 3.3 TOTAL 3.0 Percent Recovered 90.1

Reason for ending drive: refused
If refusal, reason for refusal: equip bouncing around, hit something hard

Extraction Observations

Tension on line? yes
Stability of vessel: no problem
Overlying water in core (quantity and description): yes, clear, a lot (55L)
On Boat Recovery: 4
Loss of Sediment: 0.7 (?)
Extraction Notes: (i.e. winch or hammer, easy, hard) launch, easy

On Deck Observations

Staining: black oily sand - sprayed off
Tube Deformation: none
Sediment Description (odor or sheen?): black silt/sand, no odor/ sheen

Keep or Retry: equip, bouncing around;
driver inserted screw plug at sed/4.5 interface

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
Station Number: 17
Attempt: 1
Field Technician: TD
Contractor: MBS/RS
On-site Visitor: 

Pre-Drive and Dive Observations:
Shoreline & surrounding area: wood piles and debris, log pile, riprap, pier to north and south.
Sediment surface & slope: scattered wood/metal debris, silty gravel layer
Water current and visibility: 2 ft/15
Diver Water Depth 19
Tip Probe Depth
Disk Probe Depth

Drive Observations:
Drive Initiation Time: 13:41 Drive Completion Time: 13:43 Drive Offset: 
Estimated angle of drive: 10° off, equi. under-water

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, moderate, difficult; measured by diver or deck)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.1</td>
<td>15.5</td>
<td>diver recovered, few fall</td>
</tr>
<tr>
<td>15.8</td>
<td>14.3</td>
<td>easy drive - moderate drive</td>
</tr>
</tbody>
</table>

hit something hard, refusal
sample aborted

TOTAL

Reason for ending drive: refusal
If refusal, reason for refusal: hit something hard

Extraction Observations:
Tension on line: Yes
Stability of vessel: no prob.
Overlying water in core (quantity and description): yes - all water
On Boat Recovery: 0
Loss of Sediment: no sed.
Extraction Notes: (i.e. winch or hammer, easy, hard) winch, easy

On Deck Observations:
Staining: still, sprayed off
Tube Deformation: no
Sediment Description (odor or sheen?): no sed.

Keep or Retry: reset station, core hole inside clean (empty)

→ sample aborted →

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
## Sediment Core Processing Log

### Core Location/Sample Number: LDW6-SC-17, R3

**Date/Time:** 2/13/06 | **Shift:** OR4

**Sample Logged by:** P. Mckeever Fitzpatrick

**Type/Diameter of Sample:** 4" sq aluminum

**Sample Quality:** good | fair | poor | disturbed

**Notes:**
- On deck PAI = 9.7555
- Core color collected 2/14/05

### Description (grain size, color, moisture, structure, biota, wood, other debris)

<table>
<thead>
<tr>
<th>Recovery Length (m)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Grain Size</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.2</td>
<td></td>
<td></td>
<td>0-0.25</td>
<td>SILT, wet, brown to black, slaty, SLT + 0.0-0.25夸大</td>
</tr>
<tr>
<td>0.3</td>
<td></td>
<td></td>
<td>0.2-0.95</td>
<td>SAND, wet, black, loose, silty, gravel, gravel + sub wood free up to 3&quot;</td>
</tr>
<tr>
<td>1.0</td>
<td></td>
<td></td>
<td>0.95-5</td>
<td>Increasing size 2&quot; up to depth</td>
</tr>
<tr>
<td>2.0</td>
<td></td>
<td></td>
<td>2-5</td>
<td>Increasing silt below 1.5′ (transition to veed below)</td>
</tr>
<tr>
<td>3.0</td>
<td></td>
<td></td>
<td>5-10</td>
<td>GRAVEL, dense, black, poorly sorted (jumbled), silty, sandy, GRAVEL (poorly sorted, subrounded, up to 3″ D)</td>
</tr>
<tr>
<td>4.0</td>
<td></td>
<td></td>
<td>10-20</td>
<td>Below 3.4 ft = color change, less sheen and increasing gravel with depth, more rounded of depth (river-rock like) Silt, clay, silt, clay (CLAY)</td>
</tr>
</tbody>
</table>

**Bottom of Core 4.8′**

- Catcher in both sand grains = Qtz, Glaic, white

---

**Table Column Headers:**
- Recovery Length (m)
- % Compaction
- Color
- Grain Size
- Description

**Table Entries:**
- 0.2: SLT, wet, brown to black, slaty, SLT + 0.0-0.25
- 0.3: SAND, wet, black, loose, silty, gravel
- 1.0: Increasing size 2" up to depth
- 2.0: Increasing silt below 1.5′ (transition to veed below)
- 3.0: GRAVEL, dense, black, poorly sorted (jumbled), silty, sandy
- 4.0: Below 3.4 ft = color change, less sheen and increasing gravel with depth, more rounded of depth

---

**Diagram:**
- Sediment core with depth markers and description of sediment types.
on deck = 11.3 ft

sheer is empty
otherwise intact
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-14-06  Recorder: 6.5m

Project: 341185.001 Windward Lower Duwamish Coring

Station Name: 17 R3

Tube Length (ft): 16.05

Water Depth (ft): 21.4

Est. Tide Height (ft): 4.5 (MLLW)

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft

Northing 206538

Easting 1286436

On Deck Top of Sediment 11.3

Comments: incoming tide - diver depth 21 ft - vis 1 ft

silty sand - large holes from barge spud - debris - gentle slope

2 17 ft offshore of station

Penetration Tape Reading | Recovery Tape Reading | Comments

| 15.3 | 15.6 | |
| 13.3 | 13.8 | |
| 11.5 | 12.1 | |
| 9.4  | 11.3  | |
| 8.6  | 11.2  | no recovery

slow driving
Mudmole™ Bore Log

Project: LDWG Duwamish Coring
Project No: 341185.001
Collected by: GSM
Date: 2/14/2006
Water depth: 21.4 ft

Station: 17 R3
Position: NAD83 WAN
Time: 12:37
Nothing
Easting

Weather/Comments: N/A

Penetration interval | Interval recovery | Percent recovery | Depth below mudline | Distance from top of tube
(ft) | (ft) | recovery | (ft) | (ft)
0-0.75 | 0.45 | 60% | Mudline | 11.3
0.75-2.75 | 1.8 | 90% | 1 | 11.98
2.75-4.55 | 1.7 | 94% | 2 | 12.68
4.55-6.65 | 0.8 | 38% | 3 | 13.79
6.65-7.45 | 0.1 | 13% | 4 | 14.73

Penetration 7.45 ft/ On deck recovery 4.75 ft = 64% Recovery

MCS Environmental, Inc.
6905 216th Street SW, Suite 100
Mountlake Terrace, WA 98043
(425) 687-4345
fax (425) 687-4370

File name 17 R3
Bore Log (mudline)25 of 490
Station Number: 17  
Date: 07/14/06  
Station Arrival Time: 12:14
Attempt: 3  
Core Tube Length: 16.05  
Station Departure Time: 12:04
Field Technician: TD  
Lead Line Water Depth: 21.4  
Dist. From Target Station: 17
Contractor: WES, B&G  
Latitude: 206°53'8"  
Longitude: 126°8'36"
On-site Visitor:

Pre Drive and Diver Observations
Shoreline & surrounding area: same as R1 & R2 (07/13/06)
Sediment surface & slope: silty sand, gentle slope, no debris, large holes from heavy spuds
Water current and visibility: 1 ft.-vis.
Diver Water Depth: 21
Tip Probe Depth:  
Disk Probe Depth:  

Drive Observations
Drive Initiation Time: 12:43  
Drive Completion Time: 12:49  
Drive Offset:
Estimated angle of drive: unable to see - expect under water over 10°

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.3</td>
<td>15.0</td>
</tr>
<tr>
<td>13.3</td>
<td>13.8</td>
</tr>
<tr>
<td>11.5</td>
<td>12.1</td>
</tr>
<tr>
<td>9.4</td>
<td>11.3</td>
</tr>
<tr>
<td>8.1</td>
<td>11.2</td>
</tr>
</tbody>
</table>

TOTAL 745  TOTAL 485 Percent Recovered: 65.1%

Reason for ending drive: refusal, penetration slowed
If refusal, reason for refusal: hard material, no recovery

Extraction Observations
Tension on line? YES  
Stability of vessel: boat list to starboard
Overlying water in core (quantity and description): YES, clear
On Boat Recovery: 11.3  
Loss of Sediment: 0.1, breach sheared in tip, silty sediment
Extraction Notes: (i.e. winch or hammer, easy, hard) winch, mildly difficult

On Deck Observations
Staining:  
Tube Deformation: none, core tip battered up
Sediment Description (odor or sheen?): gravel/crushed rock & black silty sand, no odor, no sheen

Keep or Retry: diver inserted screw plug at sed/ho interface

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)

RETEC
206.624.9348 Phone  
206.624.1510 Fax  
www.retec.com
### Sediment Core Processing Log

**Core Location/Sample Number:** SC-18-R1  
**Date/Time:** 2/17/06  
**Sample Logged by:** LMH  
**Type/Diameter of Sample:** 4" sq aluminum  
**Sample Quality:** good  
**T:** 30 F

<table>
<thead>
<tr>
<th>Sample Length from log:</th>
<th>10.7'</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avg. % Compaction:</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:** Pen = 118' 2/91

#### Description

<table>
<thead>
<tr>
<th>Recovery Length (in)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Size % G</th>
<th>Size % S</th>
<th>Size % F</th>
<th>PIP</th>
<th>Indent Actual Depth (')</th>
<th>Sample Depth</th>
<th>Subsample No</th>
<th>Summary Log</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2.5Y</td>
<td>Black</td>
<td>90</td>
<td>90</td>
<td>0</td>
<td>0.1</td>
<td>0-1</td>
<td>0-1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>Gray</td>
<td>95</td>
<td>98</td>
<td>0</td>
<td>0.1</td>
<td>0-1</td>
<td>0-1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>2.5Y</td>
<td>Black</td>
<td>90</td>
<td>90</td>
<td>0</td>
<td>0.1</td>
<td>1-2</td>
<td>1-2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>2.5Y</td>
<td>Black</td>
<td>90</td>
<td>90</td>
<td>0</td>
<td>0.1</td>
<td>2-4</td>
<td>2-4</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td>90</td>
<td>90</td>
<td>0</td>
<td>3-6</td>
<td>3-6</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td>90</td>
<td>90</td>
<td>0</td>
<td>4-7</td>
<td>4-7</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

- **Silt:** wet, loamy, embryonic silt, clay silt
- **Sand:** 0.1-5.7 mm
- **Silt with black sand with multicolored grains and distinct silt units up to 0.2' thick (see below)**
- **0.8 oz L piece of glass**
- **1.1-12' olive grey, moist, semi, Silt with fine sand**
- **0.1 oz L piece of subangular rock**
- **19-21' moist, black, Silt w/ trace fine sand**
- **no odor or smell**
- **3.0-3.5' damp, olive grey, sandy Silt olive grey moll. H29 like odor**
- **3.5-5.7' (Interbeds) multicolored sand**
- **Silt with layers of 0.03' thick alternating with 0.5'-0.2' black Silt**
- **Silt is low compressibility/plasticity**
- **no odor or smell**
- **5.0 shell fragments**
- **9.7-9.0' massive, mixed, with layered units of very fine sand & clayey Silt (gray)**

---

*Images and data from RETEC Sediment Core Processing Log.*
Cae Catcher is 100% full in deformation to show fine to fine-bl. sand w/ multicolored grains
<table>
<thead>
<tr>
<th>Layer Description</th>
<th>Grain Size, Color, Moisture, Sheen/or, Biota, Wood, Other Debris</th>
</tr>
</thead>
<tbody>
<tr>
<td>SHA</td>
<td></td>
</tr>
<tr>
<td>8.6' woody layer of 1&quot; thick woody fragments up to ~ 2mm</td>
<td></td>
</tr>
<tr>
<td>2.5Y 2.511 black + 6GY 4/10Y 3 greenish gray</td>
<td></td>
</tr>
<tr>
<td>SAD</td>
<td></td>
</tr>
<tr>
<td>8' odor/shown</td>
<td></td>
</tr>
<tr>
<td>8.10/11</td>
<td></td>
</tr>
<tr>
<td>2.10/2</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
</tr>
<tr>
<td>0.8 H2/L glass</td>
<td></td>
</tr>
<tr>
<td>End of Core at 10.7'</td>
<td></td>
</tr>
</tbody>
</table>

Notes: CONT'D
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-16-06
Recorder: 65m

Project: 341185.001 Windward Lower Duwamish Coring

Station Name: 18 81

Tube Length (ft): 16.05

Water Depth (ft): 27.6
Time: 953

Est. Tide Height (ft): 4.6 (MLLW)

Est. Mudline: (MLLW)

Comments: 

Penetration Tape
Reading

Recovery Tape Reading

Comments

15.2
15.5

13.4
13.9

11.6
11.9

9.4
9.9

7.4
7.9

6.3
6.9

5.3
6.0

4.3
5.4

Nead day, plug in tip of core

Penetration suddenly slowed

Goal reached

Duwamish boring project

MCS Environmental, Inc.
6505 - 214th St SW, Suite 100
Mountlake Terrace, WA 98043
(425) 497-4540

131 of 490
Station Number: 10
Attempt: 1
Field Technician: TD SE
Contractor: MBS/BS
On-site Visitor: 

**Pre-Drive and Diver Observations**

Shoreline & surrounding area: rip-rap, trees, wood, dolphin, compounder, gravel barge
Sediment surface & slope: sand, silt, debris, level slope
Water current and visibility: Silt vis, ebbing tide
Diver Water Depth: 27
Tip Probe Depth: 
Disk Probe Depth: 

**Drive Observations**

Drive Initiation Time: 10:03
Drive Completion Time: 10:09
Drive Offset: 
Estimated angle of drive: Underwater, est 190° ± 10°

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, moderate, difficult; measured by diver or deck)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.2</td>
<td>15.5</td>
<td>Diver recorded freefall</td>
</tr>
<tr>
<td>13.4</td>
<td>13.9</td>
<td>moderate dive</td>
</tr>
<tr>
<td>11.6</td>
<td>11.9</td>
<td>moderate dive</td>
</tr>
<tr>
<td>9.4</td>
<td>9.9</td>
<td>moderate dive</td>
</tr>
<tr>
<td>7.4</td>
<td>7.9</td>
<td>moderate drive</td>
</tr>
<tr>
<td>6.3</td>
<td>6.9</td>
<td>moderate drive - penetration slowed</td>
</tr>
<tr>
<td>5.3</td>
<td>6.0</td>
<td>moderate - difficult drive</td>
</tr>
<tr>
<td>4.3</td>
<td>5.4</td>
<td>difficult drive - penetration goal reached</td>
</tr>
</tbody>
</table>

**TOTAL**

Penetration: 11.75
Recovery: 10.65
Percent Recovered: 90.89%

Reason for ending drive: penetration goal reached
If refusal, reason for refusal:

**Extraction Observations**

Tension on line? Yes
Stability of vessel: No problem
Overlying water in core (quantity and description): Clear, ~2 L
On Boat Recovery: 5.4
Loss of Sediment: 0
Extraction Notes: (i.e. winch or hammer, easy, hard) Winch, moderately easy

**On Deck Observations**

Staining: slight salt sprayed off
Tube Deformation: None
Sediment Description (odor or sheen): did not observe

Keep or Retry: Diver inserted screw plug at seafloor interface. SMF diver observed hard clay plug in tip of core

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
Sediment Core Processing Log

Job: LDWG Core Processing
Job Number: PERS-18939-S11
No. of Sections: 1
Sample Length (from log): 3.6'
Avg. % Compaction:

Notes: Pen: 50' 7'21' due to handle

Core Location/Sample Number: SC-19-R4
Date/Time: 2/25/06 1120
Sample Logged by: LM
Type/Diameter of Sample: 3' round
Sample Quality: good [ ] fair [X] poor [ ] disturbed [ ]

<table>
<thead>
<tr>
<th>Section</th>
<th>% Compaction</th>
<th>Color</th>
<th>Size % G</th>
<th>Size % S</th>
<th>PID</th>
<th>Description (grain size, color, moisture, sheen/odor, biota, wood, other debris)</th>
<th>Insitu Actual Depth (ft)</th>
<th>Sample Depth</th>
<th>Subsample No.</th>
<th>Summary Sketch</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2'-5' black + green gray 0'-0.7 mottled 0.7-3.8 massive 3.8-6.7 sand/silt</td>
<td>0-1</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1'-2 mottled 3.8-6.7 sand/silt 3.8-6.7 sand/silt 0'-0.7 mottled</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1'-2 light gray 2'-5' light gray</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2'-5' light gray 2'-5' light gray</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2'-5' light gray 2'-5' light gray</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

End of Core at 3.16'
SC: 19-R4

- 94 - 36
- 36

9.4
3.6
9.4

Core catcher = silty sand

Note: This core was stored vertically for
3 hours prior to processing (top-down).
May have caused soft sediments to shift.

- 5.0 mL of water came out of top of core when opened.
Water had 1 mm florets of rainbow sheen.

- No sheen observed in smear zone of proximal core was opened.
- 3.5-3.6 fell out of core while being cut open.
- Smear zone from 0.0-0.5 had 1 mm rainbow florets

LM
2/25/06
SEDIMENT CORE DRIVE LOG

Project: LDW Subsurface Sediment
Project #: 05-08-00-32
Field Crew: TD
Contractor: MSS

Core Location: LDW-SCL9
Date: 02.24.09
Time: 1340
Attempt #: 4
Accept/Reject: pending
Sample Method: Vibrocorer

Proposed Coordinates
N: 20°16'09"  E: 122°37'01"
Mudline: 5 ft
Core Drive: 5 ft

Actual Coordinates
N: 47°33'31.85"  E: 122°37'48"W
Mudline: 36 ft
Core Drive: 34 ft
Core Recovery: 34 ft (72%)

Tide Measurements (Datum: )
Time/Height:

DTS Boat:
DTS Lead Line:
29.8 ft
Mudline Elevation:

Description:
(free fall, fingers inverted, vibration needed to drive/extract, estimation of density, debris encountered, slopes, refusal, mudline conditions, drive action, etc.)

0-3.5 ft - free fall
3.5-5 ft - difficult drive refusal

Core catcher: semi-silty sand, mostly
Core error: empty, washed out

Total Drive: 5 ft
Length Recovered: 34 ft

Measurement (to nearest 0.1 foot):
Avg. % Recovery:
Avg. % Compaction:

Section: Length: Description at Cuts:
A =
B =
C =
D =

Notes: ~43 ft, off target, will try for E5
### Sediment Core Processing Log

**Job:** RWW Core Processing  
**Core Location/Sample Number:** GC 19-R5  
**Job Number:** RWS-18280-S4  
**Date/Time:** 2/24/06 1300  
**Sample Logged by:** LM, CB  
**Type/Diameter of Sample:** 3" round  
**Sample Quality:** good  
**Notes:** Phn ~ 13.0, 793%  
**On decker, ~12.1° F**

<table>
<thead>
<tr>
<th>Recuperated Length (ft)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Size %: G</th>
<th>Size %: S</th>
<th>Size %: F</th>
<th>PID</th>
<th>Description (grain size, color, moisture, sheen/odor, biota, wood, other debris)</th>
<th>Instal Actual Depth (ft)</th>
<th>Sample Depth</th>
<th>Subsample No.</th>
<th>Summary</th>
<th>Sketch</th>
</tr>
</thead>
</table>
|                         |              |       |           |           |           |     | most - damp, med. dense, black (org)  
SILT with spotting of blue- gray tuff & clayey SILT  
0.10 polycheat worm tubes  
rotte, shell fragments up to 2"L  
low plasticity, 31 compressible  | 0.1  
15.20  
2.1002 | 1           | 1.2  
15.20  
3.1002 | 0.9  
TV = 0.3  
BIG | 1 |  
SILT |  

|                         |              |       |           |           |           |     | 0.19 woody fragments up to 1/4"L  
+ Aket & rainbow sheen 74%  
- | 2           | 2.4  
15.25  
3.1002 | 0.9  
TV = 0.3  
BIG | 2 |  
  

|                         |              |       |           |           |           |     | mild H2S-odor  | 4       | 4.6  
15.50  
2.1002 | 3.7  
TV = 0.9  
BIG | 4 |  
  

|                         |              |       |           |           |           |     | 0.53" pellet of woody fragments  
+ | 5           | 5.3  
15.50  
2.1002 | 3.7  
TV = 0.9  
BIG | 5 |  
  

|                         |              |       |           |           |           |     | 0.59  
5"L piece of wood | 6           | 6.5  
15.50  
2.1002 | 3.7  
TV = 0.9  
BIG | 6 |  
  

[medioms/coreprocess]
SC-19-RS

137 of 490

That's due to being washed out.

Core catcher is empty.

Core catcher is full of black sandy silt.

0.8 - 7.0' sheen on stream zone.
### Sediment Core Processing Log

**Job:** LDV4 Core Proc  | **Core Location/Sample Number:** SC 19 - RS
**Job Number:** FER-18200-511  | **Date/Time:** 2/24/06 1500
**Sample Length (from log):**  | **Sample Logged by:** IM, CB
**Avg. % Compaction:**  | **Type/Diameter of Sample:** 3" round

**Sample Quality:**
- good
- fair
- poor
- disturbed

**Notes:**
- Pen = 13.01 393x
- On Deck Rec = 12.1

<table>
<thead>
<tr>
<th>Recovered Length (ft)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Size %: G</th>
<th>Size %: S</th>
<th>Size %: F</th>
<th>PID</th>
<th>Description (grain size, color, moisture, sheen/odor, biota, wood, other debris)</th>
<th>Actual Depth (ft)</th>
<th>Sample Depth</th>
<th>Subsample No.</th>
<th>Summary Sketch</th>
</tr>
</thead>
</table>
|                       |               |       |            |            |            | 7   | MUD, HS odor, transitional 
transition of gravel to rounded up to 1/2" and subangular up to D1.2 L, HS odor |
| 3                     | 25            | 75    | -          | 40         | 60         | 7   | 7.1 1540 2/102  
mix of very fine sand (gray-beige)  
soft, elastic Silt  |
| 8                     |               |       |            |            |            | 8   | 8.1 9119 1545 2/102  
very dense, gravelly sand  
with multicolored grains (gray, white)  
Gravel is subrounded and up to 1/4"  
shap |
| 10                    |               |       |            |            |            | 9   | 9.1 920 1545 2/102  
SAND  |
| 11                    |               |       |            |            |            | 10  | 10.1 919 1545 2/102  
SAND  |
| 12                    |               |       |            |            |            | 11  | 11.1 920 1545 2/102  
END OF CORE @ 11.9  |

**Well forms coreprocess**
## SEDIMENT CORE DRIVE LOG

**Project:** LVW Subsurface Std.  
**Project #:** 05-08-06-32  
**Field Crew:** ID  
**Contractor:** MSS  
**Core Location:** LVW-5419  
**Date:** 02-24-06  
**Time:** 1355  
**Attempt #:** 5  
**Sample Method:** Vibe Core

<table>
<thead>
<tr>
<th>Proposed Coordinates</th>
<th>Actual Coordinates</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Mudline:</th>
<th>Core Drive: 13 ft</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core Drive: 13 ft</td>
<td></td>
</tr>
</tbody>
</table>

Tide Measurements: (Datum: )  
Time/Height:  
Mudline Elevation:  
DTS Boat: DTS Lead Line: 34.6 ft

**Description:**  
Free fall, fingers inverted, vibration needed to drive/extract, estimation of density, debris encountered, slopes, refusal, mudline conditions, drive action, etc.

- 0-5.75 ft - freefall
- 5.75-6.5 ft - moderate drive
- 6.5-13 ft - very drive  
  - surface sed - soft-brown silt  
  - core catcher - brown sand/silt  
  - core cutter - sandy silt, washed out.

**Measurement (to nearest 0.1 foot):**  
Avg. % Recovery:  
Avg. % Compaction:  

<table>
<thead>
<tr>
<th>Section</th>
<th>Length</th>
<th>Description at Cuts:</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Core Tube Length:**

**Total Drive:** 13 ft  
**Length Recovered:** 12.1 
93.1%

**Notes:** 50 ft off target
SEDIMENT CORE DRIVE LOG

Project: LDD Subsurface Sediment
Project #: 05.08.10.02
Field Crew: TD
Contractor: M55

Core Location: LDD-SC19
Date: 02.28.06 Time: 1245
Attempt #: 3 Accept/Reject
Sample Method: Vibracore

Proposed Coordinates
N: 206,189
E: 126,701
Mudline: 8 ft.
Core Drive: 8 ft.

Actual Coordinates
N: 47 39.3133
E: 127 20.7443
Mudline: 8 ft.
Core Drive: 8 ft.
Core Recovery: 24 ft. (36.3%)

Tide Measurements (Datum: )
Time/Height:

DTS Boat: DTS Lead Line: 32.2 ft.
Mudline Elevation:

Description:
(free fall, fingers inverted, vibration needed to drive/extract, estimation of density, debris encountered, slopes, refusal, mudline conditions, drive action, etc.)

0-4 ft freefall
4 ft - 8 ft extremely difficult drive
~ 15 minute total core time

3/8" in rock in core cutter end.

Total Drive: 8 ft., Length Recovered: 2.9 ft.
36.3%

Notes: ~33 ft. off target, core discarded, will try E4
## Sediment Core Drive Log

**Project:** LDW Subsurface Sediment  
**Project #:** 05.08-06.32  
**Field Crew:** TD  
**Contractor:** M55  
**Core Location:** LDW-5019  
**Date:** 02.24.04  
**Time:** 22:5  
**Attempt #:** 2  
**Accept/Reject:**  
**Sample Method:** Vibracore  

### Proposed Coordinates
- **N:** 2061.89  
- **E:** 12607.011

### Actual Coordinates
- **N:** AF 33.31500  
- **E:** 127270.74200  

### Tide Measurements
- **(Datum):**  
- **Time/Height:**  
- **(Time/Height):**

### Description:
(free fall, fingers inverted, vibration needed to drive/extract, estimation of density, debris encountered, slopes, refusal, mudline conditions, drive action, etc.)

- 0-3.5 feet - free fall
- 3.5-4 feet - difficult drive
- 4-5 feet - free fall
- 5-6 feet - difficult drive - refusal

Core cutter and head gray silt silty fine sand.

### Measurement (to nearest 0.1 foot):

<table>
<thead>
<tr>
<th>Avg. % Recovery:</th>
<th>Avg. % Compaction:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Section</th>
<th>Length</th>
<th>Description at Cuts:</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Total Drive:
- **Left:** 6 ft.  
- **Length Recovered:** 24.5

### Notes:
- 27 feet off target, will discard, try for R3
**Sediment Core Drive Log**

**Project:** LDW Subsurface Sediment  
**Core Location:** LDW-SC19

**Project #:** 05-06-06:32  
**Field Crew:** TD

**Contractor:** MSS  
**Date:** 02-24-06  
**Time:** 11:55

**Attempt #:** 1  
**Sample Method:** Vibracore

<table>
<thead>
<tr>
<th>Proposed Coordinates</th>
<th>Actual Coordinates</th>
</tr>
</thead>
<tbody>
<tr>
<td>N: 2D61BA</td>
<td>N: 47° 33', 31.441W</td>
</tr>
<tr>
<td>E: 126° 7011</td>
<td>E: 122° 20.7444W</td>
</tr>
</tbody>
</table>

**Mudline:**  
**Core Drive:** left

**DTS Boat:**  
**DTS Lead Line:** 30 ft

**Mudline Elevation:**

**Description:**
(free fall, fingers inverted, vibration needed to drive/extract, estimation of density, debris encountered, slopes, refusal, mudline conditions, drive action, etc.)

- 0-4 ft. free fall
- 4-6 ft. difficult drive, hit refusal
- Soapy sandy silt

**Measurement (to nearest 0.1 foot):**

- **Core Tube Length:**
- **Total Drive:** left  
- **Length Recovered:** 2.7 ft  
- **45%**

**Notes:** N 30 ft. off target, will discard, try for R2

---

**Tide Measurements (Datum):**

**Time/Height:**

**Measurement (to nearest 0.1 foot):**

- **Avg. % Recovery:**

- **Avg. % Compaction:**

- **Section:**
  - A =
  - B =
  - C =
  - D =

- **Description at Cuts:**
  - A =
  - B =
  - C =
  - D =

---
## Sediment Core Processing Log

**Core Location/Sample Number:** LD W5 - 30 - 84

**Date/Time:** 2/15/04 1410

**Sample Logged by:** M. Lee, C. Brackett

**Type/Diameter of Sample:** 1/8" by aluminum

**Sample Quality:** good

---

<table>
<thead>
<tr>
<th>Recoved Length</th>
<th>% Compaction</th>
<th>Color</th>
<th>Size % G</th>
<th>Size % S</th>
<th>Size % F</th>
<th>PDI</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.50 0.30</td>
<td>10.90</td>
<td>Black</td>
<td>10.90</td>
<td>90.90</td>
<td>0.90</td>
<td>1</td>
<td>moist, rote, olive brown, sl. sandy silt.</td>
</tr>
<tr>
<td>2.51</td>
<td>10.90</td>
<td>Black</td>
<td>10.90</td>
<td>90.90</td>
<td>0.90</td>
<td>1</td>
<td>moist, dark black, silt with trace of charcoal.</td>
</tr>
<tr>
<td>2.51</td>
<td>10.90</td>
<td>Black</td>
<td>10.90</td>
<td>90.90</td>
<td>0.90</td>
<td>1</td>
<td>moist, dark, black silt with trace of charcoal.</td>
</tr>
<tr>
<td>2.51</td>
<td>10.90</td>
<td>Black</td>
<td>10.90</td>
<td>90.90</td>
<td>0.90</td>
<td>1</td>
<td>moist, dark black silt with trace of charcoal.</td>
</tr>
<tr>
<td>2.51</td>
<td>10.90</td>
<td>Black</td>
<td>10.90</td>
<td>90.90</td>
<td>0.90</td>
<td>1</td>
<td>moist, dark black silt with trace of charcoal.</td>
</tr>
<tr>
<td>2.51</td>
<td>10.90</td>
<td>Black</td>
<td>10.90</td>
<td>90.90</td>
<td>0.90</td>
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</tr>
<tr>
<td>2.51</td>
<td>10.90</td>
<td>Black</td>
<td>10.90</td>
<td>90.90</td>
<td>0.90</td>
<td>1</td>
<td>moist, dark black silt with trace of charcoal.</td>
</tr>
</tbody>
</table>

---

**Notes:**

- Pen = 12.6
- Rec = 98%
- Deck = 9.95

**Summary Sheet:**

- HC-like odor
- Slow in decomposition
- Wounding of Amm. black, no wood
- Silt

---

**Diagram:**

- Diagram showing sample locations and descriptions.
SC-20-R1

10.0

1.0

Shoe ½ full 16 bl. sl. sandy silt
# Sediment Core Processing Log

**Job Number:** LDWG 015 00-50-01  
**Core Location/Sample Number:** LDWG 015 SC 00  
**Date/Time:** 1/15/96  
**Sample Logged by:**  
**Type/Diameter of Sample:** 4" SC 91  
**Sample Quality:** good  
**Avg. % Compaction:**  
**Notes:** CONTINUED

<table>
<thead>
<tr>
<th>Layer</th>
<th>Description</th>
<th>Depth</th>
<th>Sample No.</th>
<th>Subsample No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>7.4-10.0 small small fragments - trace up to 0.05&quot;</td>
<td>1466</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>8-10 small fragment</td>
<td>1505</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>End of core at 10.0' core catcher shoe 1/2 full</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTES:** Sediment is coming out at core shoe  
Sample time determined by hammer.
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-15-06  Recorder: 65M

Project: 341185.001 Windward Lower Duwamish Coring

Station Name: 20 R1

Tube Length (ft): 16.05

Water Depth (ft): 93.5  Time: 0849

Est. Tide Height (ft): 7.4  (MLLW)

Est. Mudline: (MLLW)

Comments: Falling tide - strong surface current -

1 ft vis - mild current - Flat bottom - sandy silt -

4.3 ft diver depth

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft

Northing: 206177

Easting: 1267735

On Deck Top of Sediment: 62

Penetration Tape

Reading  Recovery Tape Reading  Comments

15.9  15.6  

12.1  11.8  

8.3  8.2  

5.8  6.4  

3.5  5.1  goal reached
Station Number: 20
Attempt: 1
Field Technician: TD
Contractor: MTI/RSI
On-Site Visitor: 

Pre-Dive and Diver Observations:
Shoreline & surrounding area: mid navigation channel, wooded bottom to east and west
Sediment surface & slope: sandy silt, flat bottom
Water current and visibility: strong tidal current at surface, mild current
Diver Water Depth: 43
Tip Probe Depth: 
Disk Probe Depth: 

Dive Observations:
Drive Initiation Time: 08:01
Drive Completion Time: 09:56
Estimated angle of drive: SE into water, counter to est 10-15° (against current)
Drive Notes (e.g. easy, moderate, difficult; measured by diver or deck):

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.9</td>
<td>15.2</td>
</tr>
<tr>
<td>12.1</td>
<td>11.6</td>
</tr>
<tr>
<td>8.3</td>
<td>8.2</td>
</tr>
<tr>
<td>5.8</td>
<td>6.4</td>
</tr>
<tr>
<td>3.5</td>
<td>5.1</td>
</tr>
</tbody>
</table>

TOTAL 12.55 TOTAL 10.95 Percent Recovered: 87.3

Reason for ending drive: penetration goal reached
If refusal, reason for refusal: 

Extraction Observations:
Tension on line: Yes
Stability of vessel: No problem
Overlying water in-core (quantity and description): clear, ~400 mL
On-Boat Recovery: 6.27
Loss of Sediment: 1.17
Extraction Notes: (i.e. winch or hammer, easy, hard) winch, moderately easy

On-Dock Observations:
Staining: silt washed off by diver under water 5/8 of current and spray hose from
Tube Deformation: none
Sediment Description (odor or sheen?): dark, silty sand, no odor, no sheen

Keep or Retry: diver inserted screw plug at sid/150 interface

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tanths)
# Sediment Core Processing Log

**Job:** Dumawsh  
**Job Number:** P0195-1922D  
**No. of Sections:** 1  
**Sample Length (from log):** 21.7  
**Avg. % Compaction:** Initial = 11.4%  
**Notes:**  
**Date/Time:** Feb 15, 2006, Start: 0445  
**Sample Logged by:** Fitzgerald, Leslie McKee  
**Type/Diameter of Sample:** 4.1 in. alum MCS  
**Sample Quality:** Good  
**Subsample No.:**  

<table>
<thead>
<tr>
<th>Depth (cm)</th>
<th>Description</th>
<th>Grain Size</th>
<th>Color</th>
<th>Sample Depth</th>
<th>Subsample No.</th>
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</thead>
<tbody>
<tr>
<td>0.0-1</td>
<td>0-1</td>
<td>0-1</td>
<td>0.0</td>
<td>0-1</td>
<td>1025</td>
</tr>
<tr>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1030</td>
</tr>
<tr>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
<td>1040</td>
</tr>
<tr>
<td>3.0</td>
<td>3.0</td>
<td>3.0</td>
<td>3.0</td>
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<td>1050</td>
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<tr>
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<tr>
<td>5.0</td>
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<td>1070</td>
</tr>
<tr>
<td>6.0</td>
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<td>6.0</td>
<td>6.0</td>
<td>6.0</td>
<td>1080</td>
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<tr>
<td>7.0</td>
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<td>7.0</td>
<td>7.0</td>
<td>7.0</td>
<td>1090</td>
</tr>
<tr>
<td>8.0</td>
<td>8.0</td>
<td>8.0</td>
<td>8.0</td>
<td>8.0</td>
<td>1100</td>
</tr>
<tr>
<td>9.0</td>
<td>9.0</td>
<td>9.0</td>
<td>9.0</td>
<td>9.0</td>
<td>1110</td>
</tr>
</tbody>
</table>

**Legend:**  
- **Silt:** 0-1  
- **Sand:** 1.0  
- **Organic Silt:** 2.0  
- **Mild HS-like odor:** 3.0  
- **xor H2S-like odor:** 4.0  
- **Strong HS-like odor:** 5.0  
- **Tran: 75 layers below:** 6.0  
- **Transition zone:** 8.0  
- **Clay:** 9.0  
- **Transition zone, noting below:** 10.0  
- **Organic Silt:** 11.0  

---

**Drawings and Descriptions:**  
- **Layer:** Turbid, medium dense  
- **Texture:** Silt  
- **Color:** Black  
- **Moisture:** Silt  
- **Sample Depth:** 3.0  
- **Subsample No.:** 1050  

---

**Notes:**  
- Dob Recovery: 89.6%  
- Core Collected: 02-14-DL
LDW-SC-21
Feb 15, 2006

\[
\text{on deck} = \frac{5.0'}{5.0'}
\]

\[
\begin{align*}
4.9' & \quad 11.4' & \quad L \\
1.8' & \quad 11.6' \\
16.3' & \quad 1
\end{align*}
\]

Lost 0.2'
out of coke
F-USAND
(nature-losing)

shoe is empty
(11.6 + 0.4')

no refusal
soil refusal

\[
\begin{align*}
5 & \\
12.3 & \\
11.4 & \\
4.9 &
\end{align*}
\]

water settled
over night.
### Sediment Core Processing Log

**Job:**  Duwamish  
**Job Number:**  PDI55 - 1822D  
**Core Location/Sample Number:**  LDW - SC - 21  
**Date/Time:**  Feb 15, 2023  
**Sample Logged by:**  L. Miller, A. Fitzgerald  
**Type/Diameter of Sample:**  
**Sample Quality:**  good fair poor disturbed  
**Avg. % Compaction:**  
**Notes:**  see pg. 4

<table>
<thead>
<tr>
<th>Tapped Total Length (in.)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Site % S</th>
<th>Site % T</th>
<th>Site % F</th>
<th>P&amp;ID</th>
<th>Description (grain size, color, moisture, sheen/factor, biota, wood, other debris)</th>
<th>Tritu. Actual Depth (in)</th>
<th>Sample Depth</th>
<th>Subsample No.</th>
<th>Summary/Seam</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6.1 - 6.11 meter thick black fine sand layer (61-62 Silt Silt)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.5</td>
<td>0</td>
<td>100</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>6.2</td>
<td>6.2 - 7.9, Must, black fine sand w/ interbedded silty sand (blackish) 340 Wood fragments (10%) 0.18mm Scattered woody layers ~2&quot; thick and interbedded silt layers ~2&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8.2 - 8.30, orange-br. woody layer (shredded) 20.85'</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0</td>
<td>10</td>
<td>20</td>
<td>10.6</td>
<td>8.9 - 11.4, Must, dense, black mud sand with multicolored grains (white, red, orange) 9.8 - 9.9, woody layer: orange-br. shredded pieces, well-sorted Transitional to unit below</td>
<td>11.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>11.4 - 13.4, Non-laminated, 0-1, wood piece (native-looking)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
|                          |              |       | 0        |          |          |      | End of core 13.4'  
Core catcher/sieve - empty                                          |                          |              |               |              |

**Summary/Seam:**  
**Notes:**  see pg. 4
## MCS Environmental MudMole Bore Log

### Collection Information
- **Date:** 2-14-06
- **Recorder:** GSG
- **Project:** 341185.001 Windward Lower Duwamish Coring

### Position Information
- **Coordinate Datum:** WA State Plane N, NAD 83, Survey Ft
- **Northing:** 206167
- **Easting:** 1267486
- **On Deck Top of Sediment:** 5.0
  - **Predicated Tide:** 1330
  - **Observed Tide:** 1330
  - **Divide depth:**
    - **Water Depth (ft):** 34.1
    - **Est. Tide Height (ft):** 5.9
  - **Mudline:**
    - **Est. Mudline:**
      - **Mudline (MLLW):**
- **Comments:**
  - Silty sand - no debray
  - 3' off station

### Penetration Tape Reading

<table>
<thead>
<tr>
<th>Penetration Tape Reading</th>
<th>Recovery Tape Reading</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.6</td>
<td>15.6</td>
<td></td>
</tr>
<tr>
<td>12.5</td>
<td>12.4</td>
<td></td>
</tr>
<tr>
<td>10.2</td>
<td>10.1</td>
<td></td>
</tr>
<tr>
<td>7.8</td>
<td>7.8</td>
<td></td>
</tr>
<tr>
<td>5.7</td>
<td>6.1</td>
<td></td>
</tr>
<tr>
<td>3.9</td>
<td>4.8</td>
<td>Goal reached</td>
</tr>
</tbody>
</table>
Station Number: 21
Date: 02/14/02
Core Tube Length: 28.16.05
Station Arrival Time: 1321
Core Tube Length: 28.16.05
Station Departure Time: 1358
Lead Line Water Depth: 28.1
Dist. From Target Station: 3

On-site Visitor:

**Pre-Drive and Diver Observations:**

Shoreline & surrounding area:
Concrete pier with wood piling.

Sediment surface & slope:
Silty sand, no deltas, flat bottom.

Water current & visibility:
4 ft. vs., fleeting (incoming tide).

Diver Water Depth: 33

Tip Probe Depth: ____
Disk Probe Depth: ____

**Drive Observations:**

Drive Initiation Time: 1324
Drive Completion Time: 1345
Drive Offset: ___

Estimated angle of drive: Unable to see – egg under water (est 10°)

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, moderate, difficult; measured by diver or deck)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.6</td>
<td>15.6</td>
<td>Diver measured; fair fall</td>
</tr>
<tr>
<td>12.5</td>
<td>12.4</td>
<td>Easy-moderate drive</td>
</tr>
<tr>
<td>10.2</td>
<td>10.1</td>
<td>Easy-moderate drive</td>
</tr>
<tr>
<td>7.8</td>
<td>7.8</td>
<td>Easy-moderate drive</td>
</tr>
<tr>
<td>5.7</td>
<td>6.1</td>
<td>Easy-moderate drive</td>
</tr>
<tr>
<td>3.9</td>
<td>4.8</td>
<td>Moderate-difficult drive</td>
</tr>
</tbody>
</table>

**TOTAL: 12.45 TOTAL: 11.25**

Percent Recovered: 92.6%

Reason for ending drive: penetration goal reached

If refusal, reason for refusal:

**Extraction Observations:**

Tension on line: Yes
Stability of vessel: No problem

Overlying water in core (quantity and description): Yes, clear – slightly turbid.

On Boat Recovery: 5.0
Loss of Sediment: 0.2

Extraction Notes: (i.e. winch or hammer, easy, hard) Winch, easy

**On Deck Observations:**

Staining: Some soil, sprayed off
Tube Deformation: None

Sediment Description (odor or sheen?): Brown, mud, sand; no odor or sheen (in plug)

Keep or Retry: Diver inserted screw plug at sed/lo interface

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (lengths)
## Sediment Core Processing Log

**Job:** LDWG SC convoy  
**Core Location/Sample Number:** LDWG - SC - 22 (R1)  
**Date/Time:** 2/14/06 0830 - 0920  
**Sample Logged by:** W. Baker, L. McKee  
**Type/Diameter of Sample:** 4 sq. aluminum  
**Sample Quality:** good fair poor disturbed

<table>
<thead>
<tr>
<th>Description</th>
<th>Height/Actual Depth (ft)</th>
<th>Sample Depth</th>
<th>Subsample No.</th>
<th>Sampling String</th>
</tr>
</thead>
</table>
| Wet, loose, dark gray, medium sand w/ minor silt, multiple brown, woody silt pockets  
1/4 brown, woody silt pocket/peat/wood fiber  
most med dense, black, medium sand w/ minor silt, 25% wood debris. Multicolored grains are orange, red, white.  
No creosote odor.  
0.7-1.2 moderate creosote-like odor and wood smell  
1.5" wood piece @ 1.0 w/ stringing  
multicolored grains are red/white  
No creosote-like odor or sheen below 1.6'  
*At 3.6 1x3" red bird fragment.*  
3.5-4.0 scattered 1/4" gray silt pockets.  
*At 4.2 4.4 silty woody sand layer, wood is elongate splinters  
1/2" and 1/2" log.*  
| 0.8 | 0.4 | 0.65 | 1.1 |
| Core is slightly to moderately weathered from 5.0-6.0'  
Good seal below.  
| 6.0 | 5.0 | 0.95 | 1.5 |

---

**Notes:** React. 9.3  
On-deck: 7.7'
core B winnowed from 5.7-6.9

5.7   6.9
<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.5</td>
<td>unit grades</td>
</tr>
<tr>
<td></td>
<td>to medium sand</td>
</tr>
<tr>
<td>6.9</td>
<td>1/2&quot; silty clay, peat pocket, brown</td>
</tr>
</tbody>
</table>

*END OF CORE: 7.7*
MCS Environmental MudMole Bore Log

Collection Information

Date: 13-06  
Recorder: SSM

Project: 341185.001 Windward Lower Duwamish Coring

Station Name: 22 R1

Tube Length (ft): 16.1
Water Depth (ft): 12.0  
Est. Tide Height (ft): 9.1  
(MLLW)
Est. Mudline: (MLLW)

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft
Northing: 205 908
Easting: 126 8174

On Deck Top of Sediment: 8.4

Comments:
core rubble at station - moved offshore 15' from station
diver 11 ft silty sandy with scattered gravel
& debris gentle slope

Penetration Tape Reading  
Recovery Tape Reading  
Comments

13.5  
9.6  
7.9  
6.8  
13.4  
9.7  
8.4  
8.2

rate slowed  
refusal

tine sand in tip - some loss of material
Mudmole™ Bore Log

Project: LDWG Duwamish Coring
Project No: 341185.001
Collected by: GSM
Date: 2/13/2006

Station: 22 R1
Position: NAD83 WAN
Northing: 205908
Easting: 1268174

Water depth: 12.0 ft
Mudline: -2.9 ft MLLW (estimated using tide tables)

Weather/Comments: Overcast
Driven to refusal

Penetration interval
(interval (ft))

Interval recovery
(recovery (ft))
Percent recovery

Depth below mudline

Distance from top of tube

0-2.6 2.7 104%
2.6-6.5 3.7 95%
6.5-8.2 1.3 76%
8.2-9.3 0.2 18%

Mudline: 8.4

1 9.44
2 10.46
3 11.48
4 12.43
5 13.38
6 14.33
7 15.18
8 15.95
9 No sample
10 No sample
11 No sample
12 No sample
13 No sample
14 No sample
15 No sample
16 No sample
17 No sample
18 No sample
19 No sample
20 No sample

Penetration 9.3 ft
On deck recovery 7.7 ft = 83% Recovery

MCS Environmental, Inc.
6505 216th Street SW, Suite 100
Mukilteo, WA 98275
(425) 697-4340
Fax (425) 697-4373

File name: 22 F-2
Bore Log (mudmole)
**Station Number:** 22  
**Date:** 0041/3/16  
**Station Arrival Time:** 1500  
**Station Departure Time:** 1540  
**Core Tube Length:** 16.1  
**Lead Line Water Depth:** 12.0  
**Dist. From Target Station:** 15  
**Latitude:** 205.108  
**Longitude:** 1268171  
**Contractor:** MW/86  
**On-site Visitor:** —

### Pre-Drive and Diver Observations
- **Shoreline & surrounding area:** Concrete slabs, rip rap and wood pilings and dolphins to east.
- **Sediment surface & slope:** Silty sand, scattered gravel, moderate slope.
- **Water current and visibility:** 4' vs. 10' flood tide.
- **Diver Water Depth:** 11  
- **Tip Probe Depth:** —  
- **Disk Probe Depth:** —

### Drive Observations
- **Drive Initiation Time:** 1525  
- **Drive Completion Time:** 1631  
- **Drive Offset:** —  
- **Estimated angle of drive:** 10-15° off during 1st drive, then underwater est. 10° af

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, moderate, difficult; measured by diver or deck)</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.5</td>
<td>13.4</td>
<td>Measured on deck, easy drive</td>
</tr>
<tr>
<td>9.6</td>
<td>9.3</td>
<td>Easy drive, diver measured from here on.</td>
</tr>
<tr>
<td>7.9</td>
<td>8.4</td>
<td>Deep, moderate drive, penetration rate slowed</td>
</tr>
<tr>
<td>6.8</td>
<td>6.2</td>
<td>Difficult drive, refused</td>
</tr>
</tbody>
</table>

**TOTAL:** 43.5

**Reason for ending drive:** Refusal  
**Percent Recovered:** 84.9%

### Extraction Observations
- **Tension on line:** Yes  
- **Stability of vessel:** No problem  
- **Overlying water in core (quantity and description):** Yes, clear to slightly turbid, N.W.

### On-Deck Observations
- **Staining:** Dark sandy sink, sprayed off  
- **Tube Deformation:** None  
- **Sediment Description (odor or sheen):** Brown mud-fine sand; no sheen no odor

**Keep or Retry:** Diver inserted screw plug or sed/HD interface
### Sediment Core Processing Log

**Job:** LDWG Sed Core Proc.  
**Core Location/Sample Number:** SC-23-R1  
**Job Number:** PORS 18220-S11  
**Date/Time:** 2/17/04 0830  
**Sample Logged by:** J. Millie  
**Type/Diameter of Sample:** 4" sq al.  
**Sample Quality:** good  
**Avg. % Compaction:**  
**Notes:** Pen = 12, Pen = 7  
**In Deck Dec. = 10.7, 5-8-1 Rec.**  

<table>
<thead>
<tr>
<th>Recovery Length (ft)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Site % G</th>
<th>Site % S</th>
<th>Site % F</th>
<th>PID</th>
<th>Description (grain size, color, moisture, sheen/odor, biota, wood, other debris)</th>
<th>Initial Actual Depth (ft)</th>
<th>Sample Depth</th>
<th>Subsample No.</th>
<th>Summary Sketch</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.51</td>
<td>10</td>
<td>90</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.0-0.5 Silt, with loose, olive brown clay 0.3&quot; concrete piece</td>
<td>1.0</td>
<td>0.25</td>
<td>0.56</td>
<td></td>
</tr>
<tr>
<td>4.13</td>
<td>10</td>
<td>90</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.5-2.3 Silt (org)</td>
<td>0.25</td>
<td>0.51</td>
<td>0.59</td>
<td></td>
</tr>
<tr>
<td>2.01</td>
<td>10</td>
<td>90</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2-3 Silt (org) moist, blocky, sand-peat black Silt (org)</td>
<td>0.25</td>
<td>0.51</td>
<td>0.59</td>
<td></td>
</tr>
<tr>
<td>2-3 Silt (org)</td>
<td>10</td>
<td>90</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Small fragments (scattered woody</td>
<td>0.25</td>
<td>0.51</td>
<td>0.59</td>
<td></td>
</tr>
<tr>
<td>3.0</td>
<td>10</td>
<td>90</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Shells fragments (scattered woody)</td>
<td>0.25</td>
<td>0.51</td>
<td>0.59</td>
<td></td>
</tr>
<tr>
<td>2.54</td>
<td>10</td>
<td>90</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2.5 Silt (org) layer of light (dark green-gray</td>
<td>2.54</td>
<td>0.51</td>
<td>0.59</td>
<td></td>
</tr>
<tr>
<td>2.5 Silt (org)</td>
<td>10</td>
<td>90</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>layer of dark clay, dark green-gray</td>
<td>2.54</td>
<td>0.51</td>
<td>0.59</td>
<td></td>
</tr>
<tr>
<td>2-3 Silt (org)</td>
<td>10</td>
<td>90</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Silt (org) as above unit 0.5 2.3</td>
<td>2.54</td>
<td>0.51</td>
<td>0.59</td>
<td></td>
</tr>
<tr>
<td>0.0-0.5 Silt</td>
<td>10</td>
<td>90</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.5 2.3 Silt (org)</td>
<td>2.54</td>
<td>0.51</td>
<td>0.59</td>
<td></td>
</tr>
<tr>
<td>2.5 Silt (org)</td>
<td>10</td>
<td>90</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Silt (org) as above unit 0.5 2.3</td>
<td>2.54</td>
<td>0.51</td>
<td>0.59</td>
<td></td>
</tr>
<tr>
<td>2-3 Silt (org)</td>
<td>10</td>
<td>90</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Silt (org) as above unit 0.5 2.3</td>
<td>2.54</td>
<td>0.51</td>
<td>0.59</td>
<td></td>
</tr>
<tr>
<td>2.5 Silt (org)</td>
<td>10</td>
<td>90</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Silt (org) as above unit 0.5 2.3</td>
<td>2.54</td>
<td>0.51</td>
<td>0.59</td>
<td></td>
</tr>
<tr>
<td>2.5 Silt (org)</td>
<td>10</td>
<td>90</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Silt (org) as above unit 0.5 2.3</td>
<td>2.54</td>
<td>0.51</td>
<td>0.59</td>
<td></td>
</tr>
</tbody>
</table>
core catcher is 1/5 full
grey-black Silt, trace fine sand

Mudline = 54 ft
**Sediment Core Processing Log**

**Job:** LDWO Sed Core Proc.  
**Job Number:** PBRS-18220-51

**Core Location/Sample Number:** SC-23-R1  
**Date/Time:** 2/17/19

**Sample Logged by:** LMcKee  
**Type/Diameter of Sample:** 4" sq. al.

**Sample Quality:** good, fair, poor, disturbed

**Avg. % Compaction:** CONT'D

**Notes:** CONT'D "3.5-10.1" grey Silt

<table>
<thead>
<tr>
<th>Recovered Length (ft)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Size % G</th>
<th>Size % S</th>
<th>Size % F</th>
<th>PID</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td></td>
<td>Black</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.5Y</td>
<td></td>
<td>SAA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.5V</td>
<td></td>
<td>grey</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>Initial Actual Depth</th>
<th>Sample Depth</th>
<th>Subsample No.</th>
<th>Summary Sched</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.95 ORG SILT</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SAA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>@ 7.7 1g. woody fragment = 1&quot; L</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H2S like odor</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HS-like odor</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.5-10.1 grey Silt</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MUST, med. dense, grey clayey Silt</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wood fragments up to 0.2&quot; L</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shell fragments up to 0.1&quot; L</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H2S-like odor</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>End of Core @ 10.7&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Torvance is frozen. After thawing had 81 restricted maneuverability.*

*Note: water at top end of core tube is frozen.

*Sheen test - 0-1 = No Sheen
   2-7 = No Sheen

163 of 490
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-16-06  Recorder: G5M

Project: 341185.001 Windward Lower Duwamish Coring

Station Name: 23 R1

Tube Length (ft): 16.05

Water Depth (ft): 23.2  Time: 1156

Est. Tide Height (ft): 2 x 1  (MLLW)

Est. Mudline: (MLLW)

Comments: Falling tide - strong surface current - Poor depth 23
Visibility < 1 ft  Silty bottom - stage unknown

Penetration Tape

<table>
<thead>
<tr>
<th>Penetration Tape Reading</th>
<th>Recovery Tape Reading</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.5</td>
<td>14.6</td>
<td></td>
</tr>
<tr>
<td>13.0</td>
<td>13.1</td>
<td></td>
</tr>
<tr>
<td>10.0</td>
<td>10.8</td>
<td></td>
</tr>
<tr>
<td>9.0</td>
<td>8.6</td>
<td></td>
</tr>
<tr>
<td>7.0</td>
<td>6.9</td>
<td></td>
</tr>
<tr>
<td>5.7</td>
<td>5.8</td>
<td>penetration slowed</td>
</tr>
<tr>
<td>3.7</td>
<td>4.5</td>
<td>goal reached</td>
</tr>
</tbody>
</table>

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft

Northing 205418

Easting 1268229

On Deck Top of Sediment 5.4
Penetration 12.35 ft / On deck recovery 10.65 ft = 86% Recovery
Pre-Drive and Diver Observations:

- Shoreline & surrounding area: Gypsum factory, riprap, concrete blocks, gisum, steel piling, dolphin
- Sediment surface & slope: Silty, slope unknown
- Water current and visibility: N/A, slight, cloudy, tide, strong current
- Diver Water Depth: 23

Drive Observations:

- Drive Initiation Time: 12:05
- Drive Completion Time: 12:11
- Drive Offset: —
- Estimated angle of drive: Underwater est 10°
- Percent Recovered: 93.5%
- Penetration: 12.03
- Total Penetration: 11.55

Drive Notes (e.g. easy, moderate, difficult; measured by diver or deck):
- 14.5 14.6 easy drive
- 13.0 13.1 easy drive
- 10.0 10.8 easy drive
- 9.0 8.6 easy drive
- 7.0 6.9 easy drive
- 5.7 5.8 easy drive, penetration slowed
- 3.7 4.5 moderate drive, penetration goal reached

Reason for ending drive: penetration goal reached
If refusal, reason for refusal: —

Extraction Observations:

- Tension on line?: Y
- Stability of vessel: no problem
- Overlying water in core (quantity and description): slightly turid, 11
- On Boat Recovery: 5.4
- Loss of Sediment: 0.9 ft
- Extraction Notes: (i.e. winch or hammer, easy, hard) Winch, easy

On Deck Observations:

- Staining: Silty, rinsed off
- Tube Deformation: None
- Sediment Description (odor or sheen?): Fine silt, trace gravel

Keep or Retry: Diver inserted screw plug at sed/H2o interface

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenth)
### Sediment Core Processing Log

**Core Location/Sample Number:** SC-124-R1  
**Date/Time:** 2/17/19 14:00  
**Sample Logged by:** LM

#### Sample Details
- **Type/Diameter of Sample:** 4"  
- **Sample Quality:** good  
- **Sample Length (from log):** 118'

#### Notes
- Pen = 12.8 %  
- On Deck = 11.8 %

<table>
<thead>
<tr>
<th>Recovered Length (ft)</th>
<th>Description of Sediment</th>
<th>Sample Depth</th>
<th>Subsample No.</th>
<th>Summary Sketch</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.0 - 1.0</td>
<td>41</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>wet, soft, black silty sand (SILT)</td>
<td>440</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.51 - 3.01</td>
<td>41.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>black</td>
<td>3/40</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3/100</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.0 - 10.0</td>
<td>42</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SAND interbedded w/ SILT</td>
<td>4.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>sand is fine grained, damp, black</td>
<td>445</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>multicolored grains of white, red, orange</td>
<td>3.100</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SILT is in layers &amp; pockets from</td>
<td>628</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>up to 1&quot; thick, wet, stiff</td>
<td>3.100</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>and is wet, soft-moist, olive-grey and silty sandy</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>100</td>
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<td>628</td>
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<tr>
<td></td>
<td></td>
<td>3.100</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td>445</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td>440</td>
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<td></td>
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<tr>
<td></td>
<td></td>
<td>3/100</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3/40</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>41</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>41.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3/40</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3/100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Summary
- **SAND:**  
  - TV = 1.25  
  - 1.5' deep
- **SILT:**  
  - TV = 1.25  
  - 1.5' deep
- **GRANITE:**  
  - TV = 3.8  
  - 2.5' deep

---

**Job:** LDWG Core Process  
**Job Number:** FORS-18220-SN  
**No. of Sections:** 1  
**Avg. % Compaction:**

---

**F-2**  
167 of 490
Mudline = 4.3'
core catcher is full with 0.1' GB
narrowing from tip upward.
Fine sand + silt interbeds.
<table>
<thead>
<tr>
<th>Recovered Length (ft)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Size % - G</th>
<th>Size % - S</th>
<th>Size % - F</th>
<th>RQD</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6-0 mild H2S-like odor; tree wood uniformly throughout</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6-1 0.2&quot; piece of wood</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7.0-8.0 layer olive-gray silt (see desc. above)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7-7 end of H2S-like odor</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>9.2-11.8 conversely shaped olive-gray silt layers &lt;0.05&quot; thick, 0.1&quot; apart to end of core</td>
</tr>
</tbody>
</table>

End of core @ 11.8'
Mudmole™ Bore Log

Project: LDWG Duwamish Coring
Project No: 341185.001
Collected by: GSM
Date: 2/17/2006
Water depth: 26.3 ft

Station: 24 R1
Position: NAD83
Northings: 205130
Easting: 1267860

Time: 11:19

Mudline: -20.2 ft MLLW (estimated using tide tables)

Weather/Comments: N/A

Penetration interval (ft)   Interval recovery (ft)   Percent recovery
---                     ---                      ---
0.0-0.850000000000000   0.55                     65%
0.850000000000001-2    2                        100%
2.85-4.65               1.9                      100%
4.65-7.15               2.9                      116%
7.15-9.05               2                        105%
9.05-10.05              0.9                      90%
10.05-11.15             1                        91%
11.15-12.15             0.8                      80%

Depth below
mudline (ft)
---
4.3
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20

Distance from top of tube (ft)
---
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0

Penetration 12.15 ft / On deck recovery 11.75 ft = 97% Recovery
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-17-06  Recorder: ESM

Project: 341185.001 Windward Lower Duwamish Coring

Station Name: 24 R1

Tube Length (ft): 16.05

Water Depth (ft): 26.3

Est. Tide Height (ft): 6.1 (MLLW)  Feb Tide Tables

Est. Mudline: (MLLW)

Comments: Falling tide - diver depth 26 visibility 4

Silt bottom - scattered metal debris

Barge over station - sampled 26 ft downrivers

Penetration Tape Reading  Recovery Tape Reading  Comments

15.2  15.5
13.2  13.5
11.4  11.6
 8.9  8.7
 7.0  6.7
 6.0  5.8
 4.9  4.8
 3.9  4.0

Hard clay plug in tip of core

Northing 205130
Easting 1267860

On Deck Top of Sediment 4.3

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft
**Pre-Drive and Dive Observations:**
- Shoreline & surrounding area: Concrete pier, water large "Take Provider".
- Sediment surface & slope: Moderate slope, clear, metal debris, silt bottom.
- Water current and visibility: vs. 4 ft, falling tide.
- Diver Water Depth: 26 ft.
- Tip Probe Depth: __________
- Disk Probe Depth: __________

**Drive Observations:**
- Drive Initiation Time: 11:27
- Drive Completion Time: 11:32
- Drive Offset: __________
- Estimated angle of drive: East under water, est. 10°

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, moderate, difficult; measured by diver or deck)</th>
</tr>
</thead>
<tbody>
<tr>
<td>16.2</td>
<td>15.5</td>
<td>Diver measured, fine fall</td>
</tr>
<tr>
<td>13.2</td>
<td>13.5</td>
<td>Easy drive</td>
</tr>
<tr>
<td>11.4</td>
<td>11.6</td>
<td>Easy dive</td>
</tr>
<tr>
<td>8.9</td>
<td>8.7</td>
<td>Easy drive</td>
</tr>
<tr>
<td>7.0</td>
<td>6.7</td>
<td>Moderate drive</td>
</tr>
<tr>
<td>6.0</td>
<td>5.6</td>
<td>Moderate drive</td>
</tr>
<tr>
<td>4.9</td>
<td>4.8</td>
<td>Moderate drive, penetration goal reached</td>
</tr>
<tr>
<td>3.9</td>
<td>4.0</td>
<td>Moderate drive, penetration goal reached</td>
</tr>
</tbody>
</table>

| TOTAL 12.15 | TOTAL 12.05 | Percent Recovered: 99.2% (96.7% on deck) |

Reason for ending drive: Penetration goal reached.

If refusal, reason for refusal: __________

**Extraction Observations:**
- Tension on line: Yes
- Stability of vessel: No problem
- Overlying water in core (quantity and description): Saline, turbid, 300 mL
- On Boat Recovery: 4.3
- Loss of Sediment: 0.3

**Extraction Notes:** (i.e. winch or hammer, easy, hard) Winch, moderate

**Additional Observations:**
- Staining: Silty clay, gray, sprayed off
- Tube Deformation: None
- Sediment Description (odor or sheen?): Silty clay, gray, no odor, no sheen

Keep or Retry: Hard clay plug in tip, no screw plug needed.

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in foot (tenths)
**Sediment Core Processing Log**

Job: **Duwamish LDN**

Job Number: **P055 - 1B2A1**

No. of Sections: 1

Sample Length (from log): Drive = 10' 3"

Avg. % Compaction: percent = 84%

Notes: %Rec = 86%

**Core Collected 2/12/01**

<table>
<thead>
<tr>
<th>Recovered Length (ft)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Size % F</th>
<th>Size % S</th>
<th>Size % G</th>
<th>PID</th>
<th>Description</th>
<th>Subsample No</th>
<th>Sample Depth</th>
<th>Summary Sketch</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.57/1</td>
<td>black</td>
<td>15</td>
<td>75</td>
<td></td>
<td></td>
<td></td>
<td>Silt: very soft, spongy, olive to black, silt scoured</td>
<td>142D</td>
<td>0-11</td>
<td></td>
</tr>
<tr>
<td>2.5y</td>
<td></td>
<td>5</td>
<td>45</td>
<td></td>
<td></td>
<td></td>
<td>1&quot; wood &amp; grass, black, 1&quot;+ grass, white, 0.4&quot;</td>
<td>143D</td>
<td>1-2</td>
<td></td>
</tr>
<tr>
<td>2.5L</td>
<td>black</td>
<td>5</td>
<td>45</td>
<td></td>
<td></td>
<td></td>
<td>Silt: black, soft to medium stiff, wet, organic</td>
<td>1425</td>
<td>3-11.8</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Subst. wood roots (0.3-1.2 ft)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Homogeneous, no layering, moderate</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Substantial layers of 1&quot; L shreded wood roots, slight horizon 2 ft, #0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>At 1.8' 1&quot; black clast, pe or clay glass, shred</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(does not roll but holds shape in bell)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>At 2.6' sub wood &amp; grass 4 L</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>At 3.6' legs wood clast 3' O</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Increasing woody material below 4 ft, and thin 1&quot; wood pockets</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>At 5.0' and below, scoured small, hard, dark gray, silt clast, 1/2&quot;, 4&quot; scoured roots, hair &amp; things (15&quot;) from 5.0'</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
LDW - SC - 25 (R2) Feb 18, 2006

\[ \text{ondeck to mudline} = 7.2' \]

\[ \text{Below 8.3'} \text{ slightly slumped 5-10\% sample less but mostly intact} \]

\[ \text{Shoe mostly full w/ M-SAND} \]
### Sediment Core Processing Log

**Job:** Dunamish  
**Job Number:** P0156-18220  
**Core Location/Sample Number:** LDW-SC-25 (R2)  
**Date/Time:** Feb 18, 2001  
**Sample Logged by:** A. Fitzpatrick, C. Bieckett  
**Type/Diameter of Sample:**  
**Sample Quality:** good, fair, poor, disturbed  
**Avg. % Compaction:** CONT'D

<table>
<thead>
<tr>
<th>Required Length (Ft)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Size % - G</th>
<th>Size % - S</th>
<th>Size % - F</th>
<th>PD</th>
<th>Description (grain size, color, moisture, sheen/odor, biota, wood, other debris)</th>
<th>Sample Depth</th>
<th>Subsamples No.</th>
<th>Summary Sketch</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>25</td>
<td></td>
<td>100</td>
<td></td>
<td>SAND: black, gradating to d. greenish gray, moist/wet, mud cake, M-SAND</td>
<td>14-10</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2.5/2</td>
<td>greenish</td>
<td>black</td>
<td></td>
<td>M-SAND with multicolored grains (red, white, orange) no layers, no silt, no silt pockets below 7.5 ft, well sorted, nodules (nativ-looking)</td>
<td>14-15</td>
<td>8-68</td>
<td></td>
</tr>
</tbody>
</table>
|                       |              |       |             |           |           |     | Bottom of Core @ 9.1 ft  
& no sand blast; not observed in core. SAND is san as observed in other alluvial units. | 9.0          |                |                 |
|                       |              |       |             |           |           |     | Baggie: At 1.8' blade check. | 11.0         |                |                 |

---

RTEC
Mudmole™ Bore Log

Project: LDWG Duwamish Coring
Project No: 341185.001
Collected by: GSM
Date: 2/17/2006
Water depth: 18.7 ft
Weather/Comments: N/A

Station: 25 R2
Position: NAD83
Numbering:
Date: 2/17/2006
Time: 12:45
Elevation:

Mudline:
-15.2 ft MLLW (estimated using tide tables)

Depth below mudline (ft)
Distance from top of tube (ft)
Penetration interval (ft)
Interval recovery (ft)
Percent recovery

Mudline 7.2
1 7.87
2 8.74
3 9.80
4 10.80
5 11.79
6 12.65
7 13.57
8 14.00
9 15.00
10 15.64
11 No sample
12 No sample
13 No sample
14 No sample
15 No sample
16 No sample
17 No sample
18 No sample
19 No sample
20 No sample

Penetration 10.3 ft/ On deck recovery 6.9 ft = 86% Recovery

MCS Environmental, Inc.
6905 216th Street SW, Suite G
Mountlake Terrace, WA 98043
(425) 857-4540
fax (425) 697-4073

File name 25 R2
Bore Log (mudline) 176 of 490
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-27-06  Recorder: GSU

Project: 341185.001 Windward Lower Duwamish Coring

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft
Northing 204751
Easting 1267980

Station Name: 25 R 2
Tube Length (ft): 16.1
Water Depth (ft): 18.7  Time: 1245
Est. Tide Height (ft) 3.5  Feb tide (MLLW) tables
Est. Mudline: (MLLW)

Comments: Filling tide  over depth 18 ft visibility 4-4
gentle slope - no debris - silty bottom
22 ft off shore at station

Penetration Tape Reading  Recovery Tape Reading  Comments

| 14.6 | 15.1 |
| 13.2 | 13.6 |
| 11.2 | 11.6 |
| 9.2  | 9.8  |
| 7.6  | 8.7  |
| 6.6  | 7.9  |
| 5.8  | 7.2  |

penetration slowed
refusal
**Pre-Drive Observations:**

- Shoreline & surrounding area: Same as R1
- Sediment surface & slope: No visible, silty bottom, gentle slope
- Water current and visibility: 4 ft. viz; falling tide
- Diver Water Depth: 13
- Tip Probe Depth: __
- Disk Probe Depth: __

**Drive Observations:**

- Drive Initiation Time: 7:51
- Drive Completion Time: 7:56
- Drive Offset: __
- Estimated angle of drive: East under water, est 10°

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, moderate, difficult; measured by diver or deck)</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.2</td>
<td>13.0</td>
<td>Easy drive</td>
</tr>
<tr>
<td>11.2</td>
<td>11.6</td>
<td>Easy-moderate drive</td>
</tr>
<tr>
<td>9.2</td>
<td>9.5</td>
<td>Easy-moderate drive</td>
</tr>
<tr>
<td>7.6</td>
<td>8.7</td>
<td>Moderate drive, penetration showed.</td>
</tr>
<tr>
<td>6.6</td>
<td>7.9</td>
<td>Moderate - difficult drive</td>
</tr>
<tr>
<td>5.8</td>
<td>7.2</td>
<td>Difficult drive, refused</td>
</tr>
</tbody>
</table>

- TOTAL 10.3
- Percent Recovered: 86.5%

**Reason for ending drive:** Refusal

**If refusal, reason for refusal:** Hard substrate

**Extraction Observations:**

- Tension on line? Yes
- Stability of vessel: No problem
- Overlying water in core (quantity and description): Clear, slightly turbid, 11 ft
- On Boat Recovery: 3.7
- Loss of Sediment: 0

**Extraction Notes:** (i.e. winch or hammer, easy, hard) Winch, easy

**On Deck Observations:**

- Staining: Dark, silty sand, sprayed off
- Tube Deformation: None
- Sediment Description (odor or sheen?): Dark mud, sand, no odor, no sheen

**Keep or Retry:** Diver inserted screw plug at sed/140 interface

---

**Notes:**

Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-17-06  Recorder: GSM

Project: 341185.001 Windward Lower Duwamish Coring

Station Name: 2581

Tube Length (ft): 15-6

Water Depth (ft): 14.8

Est. Tide Height (ft) 4.3 (MLLW)

Est. Mudline: ________ (MLLW)

Comments: 13 ft depth - silty bottom gentle slope - no debris

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft

Northing 204752

Easting 1867953

On Deck Top of Sediment 11.9

Penetration Tape Reading  Recovery Tape Reading  Comments

13.2  13.4  

12.3  12.7  slow penetration

11.3  12.3  

10.5  11.8  refusal

NOT PROCESSED
Mudmole™ Bore Log

Project: LDWG Duwamish Coring
Project No: 341185.001
Collected by: GSM
Date: 2/17/2006

Station: 25 R1
Position: NAD83
204752 Northing
1267953 Easting

Water depth: 14.8 ft Mudline: -10.5 ft MLLW (estimated using tide tables)

Weather/Comments: N/A

Penetration interval (ft) | Interval recovery (ft) | Percent recovery
--- | --- | ---
0-2.4 | 2.2 | 92%
2.4-3.3 | 0.7 | 78%
3.3-4.3 | 0.4 | 40%
4.3-5.1 | 0.5 | 62%

Depth below mudline (ft) | Distance from top of tube (ft)
--- | ---
Mudline | 11.9
1 | 12.82
2 | 13.73
3 | 14.57
4 | 15.08
5 | No sample
6 | No sample
7 | No sample
8 | No sample
9 | No sample
10 | No sample
11 | No sample
12 | No sample
13 | No sample
14 | No sample
15 | No sample
16 | No sample
17 | No sample
18 | No sample
19 | No sample
20 | No sample

Penetration 5.1 ft/ On deck recovery 3.7 ft = 73% Recovery
Station Number: 25
Attempt: 1
Field Technician: TD
Contractor: WES/RSS
On-site Visitor: 

Pre-Drive and Diver Observations:
Shoreline & surrounding area: rip rap, wood pilings, concrete pilings/por
Sediment surface & slope: gentle slope, silty bottom, no debris
Water current and visibility: Silt, vs., falling tide
Diver Water Depth: 13
Tip Probe Depth: 
Disk Probe Depth: 

Drive Observations:
Drive Initiation Time: 12:35
Drive Completion Time: 12:21
Drive Offset: __
Estimated angle of drive: Est. 10° - 15°

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, moderate, difficult; measured by diver or dock)</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.2</td>
<td>13.4</td>
<td>Free fall, easy drive, diver measured</td>
</tr>
<tr>
<td>12.3</td>
<td>12.7</td>
<td>Difficult drive, slow penetration</td>
</tr>
<tr>
<td>11.3</td>
<td>12.3</td>
<td>Difficult drive</td>
</tr>
<tr>
<td>10.5</td>
<td>11.0</td>
<td>Difficult drive, refusal</td>
</tr>
</tbody>
</table>

TOTAL 5.1
TOTAL 3.8
Percent Recovered: 74.5% (72.5% on deck)
Reason for ending drive: refusal
If refusal, reason for refusal: hard substrate

Tension on line? Yes
Stability of vessel: bow bow listing
Overlying water in core (quantity and description): clear, ~3 L
On Boat Recovery: 11.9
Loss of Sediment: 0, 1 ft.
Extraction Notes: (i.e. winch or hammer, easy, hard) winch, difficult(very)

On Deck Observations:
Staining: At silty sand, sprayed off
Tube Deformation: none
Sediment Description (odor or sheen): Dark med. sand, with no odor, no sheen

Keep on Retriever: Driver inserted screw plug at sed/1H2O interface
Deep observed silty sand in core tip
will retry for better penetration/recovery

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)

The RETEC Group, Inc.
111 East 4th Street, Suite 207
Seattle, WA 98104-1102
206.624.3379/1-800.206.7762
www.retec.com
<table>
<thead>
<tr>
<th>Section Length (m)</th>
<th>Color</th>
<th>% Compaction</th>
<th>Grain Size, Color, Moisture, Odor, Bioturbation, Wood, Other Debris</th>
<th>Initial Actual Depth (m)</th>
<th>Sample Depth (m)</th>
<th>Subsample No.</th>
<th>Summary Sheet</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.14</td>
<td>olive brown</td>
<td>10-90</td>
<td>wet, soft, olive brown, sandy silt</td>
<td>0-1</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.55</td>
<td>black</td>
<td>10-90</td>
<td>wet, soft, oval-dense silt</td>
<td>1</td>
<td>1.005</td>
<td>0.97</td>
<td></td>
</tr>
<tr>
<td>2.85</td>
<td>olive brown</td>
<td>10-90</td>
<td>wet, soft, oval-dense silt (organic), with olive-gray motting of clayey silt, frequent to occasionally spread throughout unit</td>
<td>1-2</td>
<td>1.005</td>
<td>0.97</td>
<td>Silt (org)</td>
</tr>
<tr>
<td>3.00</td>
<td>olive brown</td>
<td>0-90</td>
<td>wood fragment + rotlets, wood is up to 0.1 L</td>
<td>2-4</td>
<td>1.410</td>
<td>0.739</td>
<td></td>
</tr>
<tr>
<td>4.20</td>
<td>wood fragment</td>
<td>0-90</td>
<td>wood fragment (branch)</td>
<td>4-6</td>
<td>1.015</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.50</td>
<td>woody fragment</td>
<td>0-90</td>
<td>woody fragment, 0.11 w/ linn sheath, 0.76 rainbow sheen on screen zone</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.00</td>
<td>5.0-2.5</td>
<td>wet, medium-grained, black silty sand</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.60</td>
<td>5.6-4.5</td>
<td>wet, medium-grained, medium blocky silty sand</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Mudline = 3.8
16.1
3.8
19.3

Core shoe is 1/2 full (50%) at last 0.3'
Core catcher did not pierce
Sediment: silty sand (black, brown)

Sweat zone sheen from
3 - 12" with florets ~1" to 2" occasional
### Sediment Core Processing Log

**Core Location/Sample Number:** SC-26-R

**Sample Logged by:** LM

**Sample Quality:** Good

**Sample Description:**

<table>
<thead>
<tr>
<th>Recovery Length (in)</th>
<th>% Compaction</th>
<th>Grit</th>
<th>Size % - O</th>
<th>Size % - S</th>
<th>Size % - F</th>
<th>PCI</th>
<th>Description (grain size, color, moisture, sheen/odor, biota, wood, other debris)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.0 - 6.3</td>
<td>10</td>
<td>10</td>
<td>80</td>
<td>10</td>
<td></td>
<td></td>
<td>(gravely SAND) Gravel is subangular and black. Black SILT seam is interbedded on either side of SAND layer. Wood fragments + rootlets in SILT layer. Strong pet-lik e odor + sheen. Grains 1/16th to 1/32&quot;.</td>
</tr>
<tr>
<td>9.0 - 8.8</td>
<td>70</td>
<td>30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(gravely GRAVEL) Melanite color, moist, dense, very sandy GRAVEL. Most GRAVEL is a conglomerate of SAND, wood, and black GRAVEL is subangular. Biggie pieces have sheen running out of pore spaces. Bright orange specks on some GRAVEL pieces (non-native).</td>
</tr>
<tr>
<td>7.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Two Biggie Scraps at 1&quot; (punt chips ?)</td>
</tr>
<tr>
<td>2.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Corroded glass 1/16&quot;</td>
</tr>
<tr>
<td>8.10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Interbedded layers of wood, black SAND and BLACK SILT with occasional pockets of olive-gray BLANK SILT. 8.1 - 8.8</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Black SILT seam running longitudinally 2&quot; thick.</td>
</tr>
<tr>
<td>9.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>9.4 brass/bronze nut 3/8&quot;</td>
</tr>
<tr>
<td>10.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10.1 Black SILT layer 0.11&quot; thick</td>
</tr>
<tr>
<td>10.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10.1 Biggie: 6&quot; x 8&quot; plastic strips, metal shank odor = 1/40 &quot;rainbow sheen florets</td>
</tr>
<tr>
<td>11.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>11.2-11.3: Sand + valley of clay/silt. Mostly red, dense, fine black SAND w/multicolored grains. 11.2-11.3: 95% black and olive-gray SILT pockets.</td>
</tr>
<tr>
<td>11.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>11.1 Very coarse black SAND w/multicolored grains; H2S-like odor (strong)</td>
</tr>
<tr>
<td>12.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>12.0-12.5: clayey clay, silty sand, fine-fine gravel.</td>
</tr>
</tbody>
</table>

---

**End of Core @ 12.00' (0.3' winnowed)**
Mudmole™ Bore Log

Project: LDWG Duwamish Coring
Project No: 341185.001
Collected by: GSM
Date: 2/22/2006
Water depth: 35.4 ft
Weather/Comments: N/A

Station: 26 R1
Position: NAD83
Time: 11:26
204479
Nothing
Easting

Penetration 14.65 ft/ On deck recovery 12.25 ft = 84% Recovery

Penetration interval (ft)
Interval recovery (ft)
Percent recovery

Depth below mudline (ft)
Distance from top of tube (ft)

0-1.05
0.85
61%
Mudline 3.8

1.05-2.55
1.4
93%
1

2.55-4.65
2.3
110%
2

4.65-6.65
1.5
75%
3

6.65-8.65
1.8
90%
4

8.65-10.65
1.5
75%
5

10.65-12.65
1.5
75%
6

12.65-14.65
1.5
75%
7

15
No sample

16
No sample

17
No sample

18
No sample

19
No sample

20
No sample

Place Field ID Label Here

MCS Environmental, Inc.
6005 110th Street SW, Suite 100
Mountlake Terrace, WA 98043
(425) 697-4040
fax (425) 697-4373

File name 26 R1
Bore Log (mudline) 85 of 490

F-2
Date: 08/14/06 Station Arrival Time: 11:30
Core Tube Length: 16.05 Station Departure Time: 12:08
Lead Line Water Depth: 35.4 Dist. From Target Station: 50
Latitude: 204.47.9
Longitude: 12.815.7

Shoreline & surrounding area:
tied up adjacent to beach "Sew A" to mid-channel
gentle slope, silty bottom, no debris

Water current and visibility:
vis. 4 ft  gentle current

Diver Water Depth: 34
Tip Probe Depth
Disk Probe Depth

Drive Initiation Time: 11:47 Drive Completion Time: __________
Estimated angle of drive:
eye under water, est 10°

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, moderate, difficult; measured by diver or deck)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.0</td>
<td>15.2</td>
<td>over mud, free fall</td>
</tr>
<tr>
<td>13.5</td>
<td>13.8</td>
<td>easy drive</td>
</tr>
<tr>
<td>11.4</td>
<td>11.5</td>
<td>easy drive</td>
</tr>
<tr>
<td>9.4</td>
<td>10.0</td>
<td>moderate - easy drive</td>
</tr>
<tr>
<td>7.4</td>
<td>8.2</td>
<td>moderate - easy drive</td>
</tr>
<tr>
<td>5.4</td>
<td>6.7</td>
<td>moderate drive</td>
</tr>
<tr>
<td>3.4</td>
<td>5.2</td>
<td>moderate drive</td>
</tr>
<tr>
<td>1.4</td>
<td>3.7</td>
<td>moderate drive, penetration goal reached</td>
</tr>
</tbody>
</table>

TOTAL: 14.65 TOTAL: 12.35 Percent Recovered: 84.3% (82.6% on-deck)

Reason for ending drive: penetration goal reached
If refusal, reason for refusal:

Tension on line? Yes Stability of vessel: no problem
Overlying water in core (quantity and description): slightly turbid, ½ ft
On Boat Recovery: 38 Loss of Sediment: 0.4 ft
Extraction Notes: (i.e. winch or hammer, easy, hard) waving

Staining: brown, silty sediments, sprayed off
Tube Deformation: none
Sediment Description (odor or sheen?): gray/brown, silty sediments, no odor/sheen

Keep or Retry (diver inserted screw plug at sed/water interface)
silty sand plug (diver observed)

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (lengths)
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-22-06  Recorder: CSVM
Project: 341185.001 Windward Lower Duwamish Coring

Station Name: 26 R1
Tube Length (ft): 16.05
Water Depth (ft): 35.4  Time: 1128
Est. Tide Height (ft) 9.3 (MLLW)
Est. Mudline: (MLLW) On Deck Top of Sediment 3.8

Comments: diver depth 34 ft - 4 visibility
g gentle slope - no debris - silt bottom - gentle current
2 58 ft off station (barge on station)

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft
Northing 204479
Easting 1268157

Penetration Tape Reading Recovery Tape Reading Comments
15.0
13.5
11.4
9.4
7.4
5.4
3.4
1.4

goal reached
# Sediment Core Processing Log

**Job:** LDWG Sed coring  
**Core Location/Sample Number:** LDWG SC27 R1  
**Date/Time:** 2/14/10 12:45  
**Sample Logged by:** [Signature] N. Bachea  
**Type/Diameter of Sample:** 4" sq aluminum  
**Sample Quality:** good  
**Avg. % Compaction:**  
**Notes:** P.M. = 11.1' 2 85% Rec  

<table>
<thead>
<tr>
<th>Core</th>
<th>Sample</th>
<th>Description</th>
<th>Indent Actual Depth (ft)</th>
<th>Sample Depth</th>
<th>Subsample No.</th>
<th>Summary</th>
<th>Sketch</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>0-0.4' wet, soft, black sl. sandy silt H&lt;sub&gt;2&lt;/sub&gt;S-like odor</td>
<td>0-0.5</td>
<td>0-2</td>
<td></td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.4-1.8' wet, semi-firm, black, sl. sandy silt slight to moderate H&lt;sub&gt;2&lt;/sub&gt;S-like odor</td>
<td>1.0-1.7</td>
<td>1.0-3</td>
<td></td>
<td>1</td>
<td>[Sketch]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.8-2' wet, very firm, grey, sl. sandy silt</td>
<td>2-2.8</td>
<td>2-4.5</td>
<td></td>
<td>2</td>
<td>[Sketch]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.8-4.5' moist, dense, blocky grey-black silt with minor sand &amp; trace clay, 10% wood chunks, mottled</td>
<td>4.5-6.5</td>
<td>4.5-7.5</td>
<td>4.5-14</td>
<td>4</td>
<td>[Sketch]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4.5-7.8 moist, medium, dark brownish grey fine sand with minor silt, sand has red, yellow, orange multi-colored grains of wood</td>
<td>7.8-9.5</td>
<td>7.8-12</td>
<td>7.8-21</td>
<td>5</td>
<td>[Sketch]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9.5-11.5 sandstone with occasional silt grain</td>
<td>11.5-12.5</td>
<td>11.5-14.5</td>
<td>11.5-23</td>
<td>6</td>
<td>[Sketch]</td>
</tr>
</tbody>
</table>

**Recovered Length (ft):** 11.5' 2 85% Rec  
**% Compaction:**  

---

[Sketches and notes are present but not transcribed.]
# Sediment Core Processing Log

**Job:** LDWH Sed Core

**Job Number:** POAS-18220-311

**No. of Sections:** 1

**Sample Length (from log):** 9.5’

**Avg. % Compaction:**

**Notes:**

---

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Color</th>
<th>Grain Size %</th>
<th>Grainsize</th>
<th>Color</th>
<th>Description</th>
<th>Initial Depth (ft)</th>
<th>Sample Depth</th>
<th>Subsample No.</th>
<th>Summary Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td>O</td>
<td>50 50</td>
<td></td>
<td></td>
<td>65’ Onecatcher</td>
<td>6-78</td>
<td>13</td>
<td>365</td>
<td>2B9</td>
</tr>
<tr>
<td>0.31</td>
<td>O</td>
<td>50 50</td>
<td></td>
<td></td>
<td>6-7-7.8: 14-16” interbeds of brownish-grey fine sand &amp; grey silt; sandy silt w/ scattered wood shreds. Interbeds are convex in shape.</td>
<td>7</td>
<td>13</td>
<td>365</td>
<td>2B9</td>
</tr>
<tr>
<td>0.8</td>
<td>O</td>
<td>100 0</td>
<td></td>
<td></td>
<td>7.8-9.5: moist, dense, brownish-grey sand w/ wood debris (trace). Multicolored red, orange, white peats.</td>
<td>7.8-14</td>
<td>13</td>
<td>365</td>
<td>2B9</td>
</tr>
<tr>
<td>9.5</td>
<td>O</td>
<td>100 0</td>
<td></td>
<td></td>
<td>9.5 End of Core</td>
<td>9.5</td>
<td>13</td>
<td>365</td>
<td>2B9</td>
</tr>
</tbody>
</table>
Station Number: 2027
Attempt: 1
Field Technician: TD
Contractor: MCS/ESB
On-site Visitor: 

Pre-Drive and Diver Observations:
Shoreline & surrounding area: rip rap, metal debris
Sediment surface & slope: gentle slope, sandy silt
Water current and visibility: moderate - mild current, 8.4 ft vis., falling tide
Diver Water Depth: 19
Tip Probe Depth: 
Disk Probe Depth: 

Drive Observations:
Drive Initiation Time: OPEN
Drive Completion Time: 9:53
Drive Offset: 
Estimated angle of drive: East outer harbor, cannot see (est 10°)

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, moderate, difficult; measured by diver or deck)</th>
</tr>
</thead>
<tbody>
<tr>
<td>16.4</td>
<td>15.5</td>
<td>diver recorded, free fall</td>
</tr>
<tr>
<td>13.6</td>
<td>13.6</td>
<td>moderate drive</td>
</tr>
<tr>
<td>10.9</td>
<td>10.9</td>
<td>moderate drive</td>
</tr>
<tr>
<td>8.8</td>
<td>9.6</td>
<td>moderate - difficult drive</td>
</tr>
<tr>
<td>5.8</td>
<td>7.4</td>
<td>difficult drive, penetration rate 87 ft</td>
</tr>
<tr>
<td>4.9</td>
<td>6.4</td>
<td>difficult drive, refused</td>
</tr>
</tbody>
</table>

TOTAL 11.15  TOTAL 9.65  Percent Recovered: 86.5%

Reason for ending drive: refusal
If refusal, reason for refusal: hard material

Extraction Observations:
Tension on line: yes
Stability of vessel: no problem
Overlying water in core (quantity and description): yes, clear, ~ 400 mL
On Boat Recovery: 6.6
Loss of Sediment: 0.1
Extraction Notes: (i.e. winch or hammer, easy, hard) winch, easy

On Deck Observations:
Staining: a little bit of dark silt, sprayed off
Tube Deformation: no
Sediment Description (odor or sheen?): brown, fresh, sand, silt, no sheen, no odor

Keep or Retry: Keep - diver inserted successfully at sea/so interface

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)

The RETEC Group Inc.
1911 S 26th, Suite 200
Kent, WA 98032-1662

191 of 490
Mudmole™ Bore Log

Project: LDWG Duwamish Coring  
Station: 27 R1

Project No: 341185.001  
Position: NAD83

Collected by: GSM  
Northing: 204441

Date: 2/14/2006  
Time: 8:37

Water depth: 20.0 ft  
Mudline: -13.2 ft MLLW (estimated using tide tables)

Weather/Comments: Sunny

Driven to refusal

Penetration 11.15 ft  On deck recovery 9.45 ft = 85% Recovery

Penetration Interval  
Interval  
Percent  
Depth below  
Distance from  
(mudline)  
(mudline)  
recovery  
top of tube  
(top of tube)

0-0.65  0.55  85%
0.65-2.45  1.9  106%
2.45-5.15  2.6  96%
5.15-7.25  1.4  67%
7.25-10.25  2.2  73%
10.25-11.15  1  111%

Mudline  6.6
1  7.52
2  8.58
3  9.58
4  10.54
5  11.51
6  12.22
7  12.88
8  13.60
9  14.33
10  15.07
11  No sample
12  No sample
13  No sample
14  No sample
15  No sample
16  No sample
17  No sample
18  No sample
19  No sample
20  No sample
MCS Environmental MudMole Bore Log

Collection Information
Date: 2-14-06   Recorder: 6SM
Project: 341185.001 Windward Lower Duwamish Coring
Station Name: C7 R1

Tube Length (ft): 16.05
Water Depth (ft): 20.0   Time: 8:37
Est. Tide Height (ft): 6.8 (MLLW)
Est. Mudline:           (MLLW)
Comments:

Position Information
Coordinate Datum: WA State Plane N, NAD 83, Survey Ft
Northing: 204941
Easting: 1265 18
On Deck Top of Sediment: 6.6

Penetration Tape Reading
Recovery Tape Reading
Comments

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Tape Reading</th>
<th>Recovery Tape Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.4</td>
<td>15.5</td>
<td></td>
</tr>
<tr>
<td>13.6</td>
<td>13.6</td>
<td></td>
</tr>
<tr>
<td>10.9</td>
<td>11.0</td>
<td></td>
</tr>
<tr>
<td>8.8</td>
<td>9.6</td>
<td></td>
</tr>
<tr>
<td>5.8</td>
<td>7.4</td>
<td></td>
</tr>
<tr>
<td>4.9</td>
<td>6.4</td>
<td></td>
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</tr>
</tbody>
</table>

MCS Environmental, Inc.
8505 - 216th St SE, Suite 100
Monroe, WA 98272
(425) 697-4300

Duwamish boring forms 12
193 of 490
<table>
<thead>
<tr>
<th>Recomended Length (ft)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Size % s-s</th>
<th>Size % s-f</th>
<th>PD</th>
<th>Description (grain size, color, moisture, shell/odor, blite, wood, other debris)</th>
<th>Industry Actual Depth</th>
<th>Sample Depth</th>
<th>Subsample No.</th>
<th>Summary Sketch</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.54'</td>
<td>4.3</td>
<td>brown</td>
<td>10 90</td>
<td></td>
<td></td>
<td>wet, silt, brown sl. sandy silt</td>
<td>0-1</td>
<td>1000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>mottled block + olive grey, mast, red, shift,</td>
<td></td>
<td></td>
<td></td>
<td>Sl. sand: silt + some silt; occasional shells</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>mottled block, mottled, blocky</td>
<td></td>
<td></td>
<td></td>
<td>occasional fossils, polychaetes</td>
<td>1-2</td>
<td>60 105</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>mottled block, mottled, blocky</td>
<td></td>
<td></td>
<td></td>
<td>inversely stratified depth</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>mottled block, mottled, blocky</td>
<td></td>
<td></td>
<td></td>
<td>Sl. compressible, low plasticity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.1' 0.3' L piece of wood</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.9' full shell of h'k'</td>
<td></td>
<td></td>
<td>2-4</td>
<td>60 105</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>occasional fossils &lt; 1'</td>
<td></td>
<td></td>
<td>2-4</td>
<td>60 105</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.3-3.5 fossils</td>
<td></td>
<td></td>
<td>2-4</td>
<td>60 105</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4.2-4.5 fossils</td>
<td></td>
<td></td>
<td>2-4</td>
<td>60 105</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5.1' 15' L surrounded gravel</td>
<td></td>
<td></td>
<td>2-4</td>
<td>60 105</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.5' 2.5' block</td>
<td></td>
<td></td>
<td>2-4</td>
<td>60 105</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.5' 2.5' block</td>
<td></td>
<td></td>
<td>2-4</td>
<td>60 105</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>colored gravel + occasional</td>
<td></td>
<td></td>
<td>2-4</td>
<td>60 105</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>black silt pockets (bkg for above)</td>
<td></td>
<td></td>
<td>2-4</td>
<td>60 105</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Note: not accepted TLC
we tagged the gravel cap down

Core catcher was 1/2 full (50%)
of wet, silty sand, fine, grey (water overlying sediment on top of core catcher)

*Note: core was bowed, 5% from vertical

corecatcher is full of mid-gray sand

4.0 - 11.3: smeary zone sheen upon opening core

@6.5 shear test:
- intense blooming flowers, streaks up to 2°
- odor: H2-like odor
<table>
<thead>
<tr>
<th>Sample Length (from log):</th>
<th>Avg. % Compaction:</th>
</tr>
</thead>
</table>

### Sediment Core Processing Log

**Core Location/Sample Number:** SC-28-R4  
**Date/Time:** 2/24/06  
**Sample Logged by:** LM  
**Type/Diameter of Sample:** 3" round  
**Sample Quality:** good  
**Notes:** CONT’D

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Description</th>
<th>Water Content</th>
<th>Grains Size (in mm)</th>
<th>Grain Color</th>
<th>Grain Roundness</th>
<th>Grain Angularity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.25</td>
<td>25%; asphalt glistening to 0.3% L, non-SAND</td>
<td>0-3; black Silt</td>
<td>1:1</td>
<td>black Silt</td>
<td>Poor</td>
<td>Poor</td>
</tr>
<tr>
<td>1.25</td>
<td>25%; asphalt glistening to 0.3% L, non-SAND</td>
<td>0-3; black Silt</td>
<td>1:1</td>
<td>black Silt</td>
<td>Poor</td>
<td>Poor</td>
</tr>
<tr>
<td>1.25</td>
<td>25%; asphalt glistening to 0.3% L, non-SAND</td>
<td>0-3; black Silt</td>
<td>1:1</td>
<td>black Silt</td>
<td>Poor</td>
<td>Poor</td>
</tr>
<tr>
<td>1.25</td>
<td>25%; asphalt glistening to 0.3% L, non-SAND</td>
<td>0-3; black Silt</td>
<td>1:1</td>
<td>black Silt</td>
<td>Poor</td>
<td>Poor</td>
</tr>
</tbody>
</table>

### Summary

- **Layer 1:** 25% asphalt glistening to 0.3% L, non-SAND
- **Layer 2:** 25% asphalt glistening to 0.3% L, non-SAND
- **Layer 3:** 25% asphalt glistening to 0.3% L, non-SAND
- **Layer 4:** 25% asphalt glistening to 0.3% L, non-SAND

**Notes:**
- Layer 1: 25% asphalt glistening to 0.3% L, non-SAND
- Layer 2: 25% asphalt glistening to 0.3% L, non-SAND
- Layer 3: 25% asphalt glistening to 0.3% L, non-SAND
- Layer 4: 25% asphalt glistening to 0.3% L, non-SAND
## Sediment Core Processing Log

### Job:

### Core Location/Sample Number: JG 28-R5

### Date/Time:

### No. of Sections:

### Sample Length (from log):

### Avg. % Compaction:

### Sample Logged by:

### Type/Diameter of Sample:

### Sample Quality: good, fair, poor, disturbed

### Notes: CONTIA

<table>
<thead>
<tr>
<th>Recovered Length (m)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Size % - G</th>
<th>Size % - S</th>
<th>Description (grain size, color, moisture, sheen/odor, biota, wood, other debris)</th>
<th>In-situ Actual Depth (m)</th>
<th>Sample Depth</th>
<th>Subsample No.</th>
<th>Summary Sketch</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>GLEY</td>
<td>90</td>
<td>10</td>
<td>End of core at 12.2 m. Dark grey, grey, fine SAND w/ multicolored grains and some black sandy Silt (must, vis. str.) about 3&quot; thick. No odor or sheen.</td>
<td>12.1</td>
<td>12.0-12.6</td>
<td></td>
<td>SAND BLAST GRIT</td>
</tr>
</tbody>
</table>

End of core at 12.6 m.
# SEDIMENT CORE DRIVE LOG

**Project:** UTW Subsurface Sed.
**Project #:** 05.08.PH.32
**Field Crew:** TD
**Contractor:** LASS

<table>
<thead>
<tr>
<th>Proposed Coordinates</th>
<th>Actual Coordinates</th>
</tr>
</thead>
<tbody>
<tr>
<td>N: 20,4704</td>
<td>N: A7 32,99301</td>
</tr>
<tr>
<td>E: 12,68204</td>
<td>E: 122 20,4270W</td>
</tr>
<tr>
<td>Mudline:</td>
<td>Mudline:</td>
</tr>
<tr>
<td>Core Drive: 13 ft.</td>
<td>Core Drive:</td>
</tr>
</tbody>
</table>

- **Core Location:** UTW-5628
- **Date:** 02.27.06
- **Time:** 1500
- **Attempt #:** 5
- **Sample Method:** VibeCore

- **DTS Boat:**
- **DTS Lead Line:** 38.5 ft.
- **Mudline Elevation:**

**Description:**

- Free fall, fingers inverted, vibration needed to drive/extract, estimation of density, debris encountered, slopes, refusal, mudline conditions, drive action, etc.
- 0-5 ft. Free fall
- 5-6 ft. Easy drive
- 6-9 ft. Very easy drive
- 9-11 ft. Difficult (moderate)
- 11-13 ft. Easy drive

Materials bow list during extraction, cutter end: empty catcher: mud-free, sand/silt, all gray.

- **Total Drive:** 13 ft.
- **Length Recovered:** 12.4 ft.
- **Avg. % Recovery:** 95.4%

**Measurement (to nearest 0.1 foot):**

<table>
<thead>
<tr>
<th>Avg. % Recovery:</th>
<th>Avg. % Compaction:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Section:**

<table>
<thead>
<tr>
<th>A =</th>
<th>B =</th>
<th>C =</th>
<th>D =</th>
</tr>
</thead>
</table>

**Description at Cuts:**
SEDIMENT CORE DRIVE LOG

Project: LDW Subsurface Sed.
Project #: 05-08-06-32
Field Crew: JD
Contractor: M55

Core Location: LDW - SC2B
Date: 02-23-06
Time: 1415
Attempt #: A
Sample Method: Vibrocorer

Proposed Coordinates
N: 43,040
E: 126,3204
Mudline:
Core Drive:

Actual Coordinates
N: 47,32,9863 N
E: 122,20,4302W
Mudline:
Core Drive:
Core Recovery:

Tide Measurements (Datum: )
Time/Height:

Mudline Elevation:

Description:
(free fall, fingers inverted, vibration needed to
drive/extract, estimation of density, debris encountered,
slopes, refusal, mudline conditions, drive action, etc.)
0-1 ft - free fall
1-3.5 ft - easy moderate drive
3.5 - 6 - difficult drive
6-7 - moderate drive
7 - 13 - moderately easy drive

Core tube slightly bowed, difficult drive.
tube also scraped up from about on
down.

Total Drive: 13 ft. Length Recovered: 9.8 ft

Notes: 39 ft off target (25.4%)

Call Bill Ironside about content core tip contained gray fine sand w/some silt, shear

Measurement (to nearest 0.1 foot):

<table>
<thead>
<tr>
<th>Avg. % Recovery:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avg. % Compaction:</td>
</tr>
<tr>
<td>Description at Cuts:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Section</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td></td>
</tr>
</tbody>
</table>

Core Tube Length:

F-2
199 of 490
Sediment Core Drive Log

Project: LDW Subsurface Sediment
Project #: 05-08-06-32
Field Crew: TD
Contractor: MFS

Core Location: LDW-5628
Date: 02-23-04
Time: 13:35
Attempt #: 3
Accept/Reject: 
Sample Method: Vibrator

Proposed Coordinates
N: 204204
Mudline:
Core Drive: E: 1268204

Actual Coordinates
N: 47378544 N
Mudline:
Core Drive: E: 12220.4411 W
Core Recovery:

Tide Measurements (Datum: )
Time/Height:

DTS Boat: DTS Lead Line: 42 ft
Mudline Elevation: 

Description:
(free fall, fingers inverted, vibration needed to drive/extract, estimation of density, debris encountered, slopes, refusal, mudline conditions, drive action, etc.)
0-1 freefall
1 ft refusal. Difficult drive

Measurement (to nearest 0.1 foot):

Avg. % Recovery:

Avg. % Compaction:

Section: A = Length: 
B = C = D =

Total Drive: 10 ft
Length Recovered 50%

Notes: 75 ft off target, poor recovery, bit something hard, core cutter twisted up.
SEDIMENT CORE DRIVE LOG

Project: LDW Subsurface Sediment
Project #: 05-08 W-32
Field Crew: TD
Contractor: M5S

Core Location: LDW-5C28
Date: 02-23-06  Time: 1320
Attempt #: 2    Accept/Reject
Sample Method: Vibrator

<table>
<thead>
<tr>
<th>Proposed Coordinates</th>
<th>Actual Coordinates</th>
</tr>
</thead>
<tbody>
<tr>
<td>N: 20°42.04' E: 121°6.20'</td>
<td>N: 47°32.9854 NE: 122°20.4408 W</td>
</tr>
<tr>
<td>Mudline:</td>
<td>Mudline:</td>
</tr>
<tr>
<td>Core Drive:</td>
<td>Core Drive:</td>
</tr>
</tbody>
</table>

DTS Boat: DTS Lead Line: 41.9
Mudline Elevation:

Description:
(free fall, fingers inverted, vibration needed to drive/extract, estimation of density, debris encountered, slopes, refusal, mudline conditions, drive action, etc.)

free fall 1-2 ft.
difficult drive 2-3 refusal

Core Tube Length:

Measurement (to nearest 0.1 foot):

<table>
<thead>
<tr>
<th>Section</th>
<th>Length</th>
<th>Description at Cuts</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Avg. % Recovery:
Avg. % Compaction:

Total Drive: 30 ft. Length Recovered: 25 (83%)

Notes: 1/2 ft off target, hit refusal at 13 ft of penetration. Core tube was empty (washed out) will retry for R3
### Sediment Core Processing Log

**Core Location/Sample Number:** SC-28 R1

**Date/Time:** 21/4/10 10:55

**Sample Logged by:** M. Kee

**Type/Diameter of Sample:** 4" sq. diameter

**Sample Quality:** Good, fair, poor, disturbed

**Notes:**
- Rec = 7.25'
- On Deck, Rec = 2.85'
- 397, Rec

| Recovered Length (ft) | % Compaction | Color | Size % G | Size % S | Size % F | RP | Description (grain size, color, moisture, sheen/odor, biota, wood, other debris) | Initial Actual Depth ft | Sample Depth | Subsample No. | Analysis
|-----------------------|--------------|-------|----------|----------|----------|----|-----------------------------------------------------------------|------------------------|--------------|--------------|----------
|                       |              |       |          |          |          |    | 0.11 wet, soft, sandy silty clay, olive brown, slight sheen and petroleum-like odor | 0-1                   | 0-1          | 1            | 610-9    |
| 1                     |              |       |          |          |          |    | 1.1 - 2.1 wet, soft, medium to fine, sandy clayey silt, black, organic | 16.25                  | 16.25        | 1            | 1        |
| 2                     |              |       |          |          |          |    | 2.1 - 2.9 moist, firm, medium-grained, multi-colored sand, orange, red, white, no odor, no sheen | 16.20                  | 16.20        | 1            | 1.2      |
| 3                     |              |       |          |          |          |    | 2.1 - 2.91 diameter subangular gravel, well sorted | 16.30                  | 16.30        | 2            | 2-3      |

*End of Core at 2.91
no deformation on core tip*
# MCS Environmental MudMole Bore Log

## Collection Information

**Date:** 2-14-05  
**Recorder:** 6SM  
**Project:** 341165.001 Windward Lower Duwamish Coring

## Position Information

**Coordinate Datum:** WA State Plane N, NAD 83, Survey Ft  
**Northing:** 204181  
**Easting:** 1268195  
**On Deck Top of Sediment:** 13.2

## Comments
- **Siltty bottom, no debris, gentle slope**  
- **Dry hole over station - 22 off station**

## Penetration Tape Reading

<table>
<thead>
<tr>
<th>Penetration Tape</th>
<th>Recovery Tape Reading</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.7</td>
<td>15.7</td>
<td></td>
</tr>
<tr>
<td>12.6</td>
<td>14.2</td>
<td></td>
</tr>
<tr>
<td>10.3</td>
<td>13.3</td>
<td></td>
</tr>
<tr>
<td>8.8</td>
<td>12.7</td>
<td>no recovery</td>
</tr>
<tr>
<td>8.0</td>
<td>12.8</td>
<td>slow penetration</td>
</tr>
<tr>
<td></td>
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<tr>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
Mudmole™ Bore Log

Project: LDWG Duwamish Coring
Project No: 341185.001
Collected by: GSM
Date: 2/14/2006
Water depth: 40.0 ft

Station: 28 R1
Position: NAD83
204181
Northing

Date: 2/14/2006
Time: 9:32
1268195
Easting

Weather/Comments: Sunny

No recovery final interval

Penetration interval (ft)
Interval recovery (ft)
Percent recovery

Mudline
13.2

0-0.3500000000000000
0.35
100%

1
13.66

3.45-5.75
1.5
48%

2
14.35

5.75-7.25
0.9
39%

3
14.83

7
No sample

4
15.27

10
No sample

5
15.66

11
No sample

6
16.05

12
No sample

7
No sample

8
No sample

9
No sample

10
No sample

11
No sample

13
No sample

14
No sample

15
No sample

16
No sample

17
No sample

18
No sample

19
No sample

20
No sample

Penetration 7.25 ft/ On deck recovery 2.85 ft = 39% Recovery

MCS Environmental, Inc.
6505 216th Street SW, Suite 100
Mountlake Terrace, WA 98043
(425) 697-4360
Fax (425) 697-4370

File name 2006 28 R1 Bore Log (mudmole)
Station Number: 28  
Attempt: 1  
Field Technician: TD  
Contractor: USGS/ESS  
On-site Visitor:  

Pre-Drive and Diver Observations:
Shoreline & surrounding area: concrete pier, wood pilings and docks  
Sediment surface & slope: silty, gently sloping, hard base below surface, no visible adobs  
Water current and visibility: 3 ft/sec, feeling side  
Diver Water Depth: 40  
Tip Probe Depth:  
Disk Probe Depth:  

Drive Observations:
Drive Initiation Time: 0937  
Drive Completion Time: 0944  
Drive Offset:  
Estimated angle of drive: 90°, water, cannot see, (est. 10°)  

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, moderate, difficult; measured by diver or deck)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.7</td>
<td>15.7</td>
<td>Diver measured, 90° at full</td>
</tr>
<tr>
<td>12.1</td>
<td>12.2</td>
<td>70% moderate drive</td>
</tr>
<tr>
<td>10.3</td>
<td>13.3</td>
<td>moderate drive</td>
</tr>
<tr>
<td>8.8</td>
<td>12.7</td>
<td>moderate to difficult drive</td>
</tr>
<tr>
<td>8.0</td>
<td>12.8</td>
<td>difficult drive, refusal, no recovery, slow penetration</td>
</tr>
</tbody>
</table>

TOTAL 60.5  TOTAL 37.5  Percent Recovered: 40.1%  
Reason for ending drive: refusal  
If refusal, reason for refusal: hard material - no recovery  

Extraction Observations:
Tension on line? Yes  
Stability of vessel: vessel listing side to side  
Overlying water in core (quantity and description): yes, clear, ~300 mL  
On Boat Recovery: 13.7  
Loss of Sediment: 0.4, some gravel  
Extraction Notes: (i.e. winch or hammer, easy, hard) winch, hard to extract  

On Deck Observations:
Staining: some silt sprayed off  
Tube Deformation: none, tip slightly screwed up  
Sediment Description (odor or sheen?): coarse sand, no odor, no sheen  

Keep or Retry: diver inserted screw plug at sed/40 interface  
diver observed gravel that fell out of core tip  

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
# Sediment Core Processing Log

**Job**: ANG Core Processing  
**Job Number**: BORS-18220-SH  
**Core Location/Sample Number**: SC-29-R2  
**Date/Time**: 2/11/04 1540  
**Sample Logged by**: LM  
**Type/Diameter of Sample**: 4" sq. alum.  
**Sample Quality**: good  
**Notes**: Pre = 61.7%  

<table>
<thead>
<tr>
<th>Recovered Length (ft)</th>
<th>Compaction</th>
<th>Color</th>
<th>Size %: G</th>
<th>Size %: S</th>
<th>FO</th>
<th>Description</th>
<th>FO. Actual Depth (ft)</th>
<th>Sample Depth</th>
<th>Subsample No.</th>
<th>Summary Sketch</th>
</tr>
</thead>
</table>
| 0.54                  | -          | 2511  | -         | 0.90      | FO | 0-0.36  
Drier moist, soft motiled olive-brown  
Si, sandy SILT intermixed w/ smaller  
moist, soft, black, SILT  
@ 0.36-0.37, moist, @ dense, wet SAND  
@ 0.39 1" layer of moist, Si and SAND  
| 0-1 15950            | GT0.7      | 1      | SilT      | 1      | 1 |  |
| 2.31                  | -          | 2511  | 90.10     | -         | FO | @ 0.37  
Mix of black SILT from above  
with 2" thick layers of SAND  
And below  
| 1.18 15950            | GT1.4      | 2      | SAND      | 2      | 2 |  |
| 3.11                  | 3511       | black | -         | 0.90      | FO | 2.36-3.6  
Pocket of olive-grey clayey SILT  
and Silt  
| 2-3.6 19950           | GT1.4      | 3      | SAND      | 3      | 3 |  |
| 4.10                  | 3511       | black | -         | 0.90      | FO | End of core at 3.6"  

*Largely winnowed, see description on opposite side
SC-29-R2

1. 12.4' - 3.7'

11.1'

Mudline = 12.4'

Core catcher is full of dark black sand with multi-colored grains

Winnowing occurred from:

1.15 - 2.00' at 90%, winnowing

2.00 - 2.80' at 90%

2.80 - 3.30' at 10%
**MCS Environmental MudMole Bore Log**

### Collection Information

- **Date:** 2-21-06
- **Recorder:** G5M
- **Project:** 341185.001 Windward Lower Duwamish Coring

### Station Information

- **Station Name:** 29 R2
- **Tube Length (ft):** 16.05
- **Water Depth (ft):** 14.1
- **Time:** 0818
- **Est. Tide Height (ft):** 9.9 (MLLW)
- **Est. Mudline:** (MLLW)
- **Comments:** incoming tide – lower depth 14 – visibility 44
  - Gentle slope – sandy silt – no debris
  - 29 A offshore at station

### Position Information

- **Coordinate Datum:** WA State Plane N, NAD 83, Survey Ft
- **Northing:** 204 05 0
- **Easting:** 126 806 1
- **On Deck Top of Sediment:** 12.4

### Penetration Tape Reading

<table>
<thead>
<tr>
<th>Reading</th>
<th>Recovery Tape Reading</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>19.1</td>
<td>13.2</td>
<td></td>
</tr>
<tr>
<td>11.2</td>
<td>12.6</td>
<td></td>
</tr>
<tr>
<td>10.0</td>
<td>12.2</td>
<td></td>
</tr>
<tr>
<td>16.0</td>
<td>12.4</td>
<td></td>
</tr>
<tr>
<td>6.1</td>
<td>3.5</td>
<td></td>
</tr>
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</tr>
</tbody>
</table>
Mudmole™ Bore Log

Project: LDWG Duwamish Coring
Project No: 341185.001
Collected by: GSM
Date: 2/21/2006

Station: 29 R2
Position: NAD83
204054
260861
Water depth: 14.1 ft
Mudline: -4.2 ft MLLW (estimated using tide tables)

Weather/Comments: N/A
Driven to refusal

Depth below mudline (ft)

Distance from top of tube (ft)

Penetration interval (ft) | Interval recovery (ft) | Percent recovery |
------------------------|-----------------------|-----------------|
0-2.95                 | 2.85                  | 97%             |
2.95-4.85              | 0.6                   | 32%             |
4.85-6.05              | 0.6                   | 33%             |

Depth below mudline (ft) | Distance from top of tube (ft)
------------------------|-----------------------------|
Mudline                 | 12.4                        |
1                       | 13.37                       |
2                       | 14.33                       |
3                       | 15.27                       |
4                       | 15.58                       |
5                       | 15.90                       |
6                       | No sample                   |
7                       | No sample                   |
8                       | No sample                   |
9                       | No sample                   |
10                      | No sample                   |
11                      | No sample                   |
12                      | No sample                   |
13                      | No sample                   |
14                      | No sample                   |
15                      | No sample                   |
16                      | No sample                   |
17                      | No sample                   |
18                      | No sample                   |
19                      | No sample                   |
20                      | No sample                   |

Penetration 6.05 ft/ On deck recovery 3.65 ft = 60% Recovery
Station Number: 24  Date: 02/21/07  Station Arrival Time: 0805
Attempt: 2  Core Tubing Length: 16.85  Station Departure Time: 0855
Field Technician: TD  Lead Line Water Depth: 14.1  Dist. From Target Station: 29
Contractor: WISP/WS  Latitude: 204054  On-site Visitor: 

Shoreline & surrounding area:  rip rap, concrete debris, concrete pier, “beaver triangle”
Sediment surface & slope:  muddy, slope, sandy, sit, no restricting
Water current and visibility:  vs. 4 ft, flooding tide
Diver Water Depth: 14  Tip Probe Depth  

Drive Initiation Time: 0830  Drive Completion Time: 0842  Drive Offset: 10-15
Estimated angle of drive:  

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, moderate, difficult, measured by diver or deck)</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.1</td>
<td>12.7</td>
<td>difficult dive, diver recorded fire flow</td>
</tr>
<tr>
<td>1.2</td>
<td>12.6</td>
<td>difficult dive</td>
</tr>
<tr>
<td>10.0</td>
<td>12.2</td>
<td>difficult dive, refusal</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL 6.05</td>
<td>TOTAL 3.85</td>
<td>Percent Recovered: 163.7% (80.3% on deck)</td>
</tr>
</tbody>
</table>

Reason for ending drive: refusal
If refusal, reason for refusal: hard substrate

Tension on line? yes
Stability of vessel: no problem
Overlying water in core (quantity and description): yes, clear, ~ 3 ft
On Boat Recovery: 12.4
Loss of Sediment: 0.7

Extraction Notes: (i.e. winch or hammer, easy, hard) winch, easy

Staining: some salt/mud, spayed off
Tube Deformation: none
Sediment Description (odor or sheen?): no odor, no sheen, mud, sand, brown, clean

Keep of Retec: diver inserted screw pin at sed/bed interface

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in foot (tenths)
2/18/06
We will resample next week. RL was not processed.

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft

<table>
<thead>
<tr>
<th>Northing</th>
<th>20 40 05 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Easting</td>
<td>12 60 03 3</td>
</tr>
<tr>
<td>On Deck Top of Sediment</td>
<td>13.7</td>
</tr>
</tbody>
</table>

Est. Tide Height (ft) | 4.0 (MLLW)

Comments: Falling tide, diver depth 7', vis 11', flat bottom, sandy silt - no debris, 2 2 4 6 off station

Penetration Tape Reading | Recovery Tape Reading | Comments
---|---|---
13.9 | 14.3 | 
12.9 | 13.6 | 
10.9 | 12.3 | 
9.6 | 11.6 | refusal

Water leakage out of bottom of core tube
Mudmole™ Bore Log

Project: LDWG Duwamish Coring
Project No: 341185.001
Collected by: GSM
Date: 2/15/2006
Water depth: 8.0 ft
Weather/Comments: Sunny

Station: 29 R1
Position: NAD83
Time: 10:06
Mudline: -4.0 ft MLLW (estimated using tide tables)

Easting
WAN

Penetration Interval Interval Percent
Penetration (ft) recovery (ft) recovery

0-3.05 2.65 87%
3.05-4.05 0.7 70%
4.05-6.05 1.3 65%
6.05-7.35 0.7 54%

Depth below mudline (ft) Distance from top of tube (ft)

Mudline 13.7
1 14.57
2 15.44
3 16.31
4 No sample
5 No sample
6 No sample
7 No sample
8 No sample
9 No sample
10 No sample
11 No sample
12 No sample
13 No sample
14 No sample
15 No sample
16 No sample
17 No sample
18 No sample
19 No sample
20 No sample

Penetration 7.35 ft/ On deck recovery 3.25 ft = 44% Recovery
Station Number: 24
Attempt: 1
Field Technician: TD
Contractor: ALS/RESS
On-site Visitor: 

Pre-Drive and Diver Observations
Shoreline & surrounding area: rip rap, concrete piers
Sediment surface & slope: flat, very, sand, silt, mud, debris
Water current and visibility: 1 ft, 60%, mild current, ebbing tide
Diver Water Depth: 7
Tip Probe Depth: 
Disk Probe Depth: 

Drive Observations
Drive Initiation Time: 10:32
Drive Completion Time: 10:43
Drive Offset: 
Estimated angle of drive: East 10°

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, moderate, difficult; measured by diver or deck)</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.9</td>
<td>14.3</td>
<td>deck measured, free fall</td>
</tr>
<tr>
<td>12.8</td>
<td>13.6</td>
<td>easy, moderate, drive</td>
</tr>
<tr>
<td>10.9</td>
<td>12.3</td>
<td>moderate, drive</td>
</tr>
<tr>
<td>9.6</td>
<td>11.6</td>
<td>moderate, drive</td>
</tr>
</tbody>
</table>

TOTAL: 64.5
TOTAL: 44.5

Percent Recovered: 64.0%

Reason for ending drive: refusal
If refusal, reason for refusal: hard, weak, coarse sand

Extraction Observations
Tension on line: Yes
Stability of vessel: no problem
Overlying water in core (quantity and description): yes, clear, wilt
On Boat Recovery: 13.7
Loss of Sediment: some leakage during extraction 2.1 ft³
Extraction Notes: (i.e. winch or hammer, easy, hard) usually, easy

On Deck Observations
Staining:trace, light, sand, spread, easy
Tube Deformation: none
Sediment Description (odor or sheen): coarse, dark sand

Keep or Retry: river, inserted screw plug at 4.0/4.1 interface, Keep, pending decision to resample station.

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
# Sediment Core Processing Log

**Job:** LNW6 Core Processing  
**Job Number:** T05S-18280-S11  
**No. of Sections:** 1  
**Sample Length (from log):**  
**Avg. % Compaction:**  
**Notes:** $R_{tv} = 6.9$, $E_{90} = 5.9$

## Description

<table>
<thead>
<tr>
<th>Recovery Length (in.)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Site % - G</th>
<th>Site % - F</th>
<th>PO</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.1571</td>
<td>0</td>
<td>40</td>
<td>10</td>
<td>88</td>
<td>2</td>
<td>6.0-2 web, dense green-gray silt, silt, and no odor.</td>
</tr>
<tr>
<td>2.54</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td>0.2-1.2 must dense grey-black fine to medium sand with minor gravel.</td>
</tr>
<tr>
<td>2.52</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td>Substrate, 1/2&quot; to 0.3&quot; sand with bivalves.</td>
</tr>
<tr>
<td>2.5-3.2, transitional zone</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td>2.5-3.2, transition zone from sand transitioning to 3/4&quot; angular silt rippled, silt, and green-gray matrix of multi-colored material.</td>
</tr>
<tr>
<td>3.2-5.9, interbed of dark gray-black sand, very fine sand (moist, firm) and dark gray slightly sandy silt (moist, stiff) no odor; well sorted.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.7, Core Cather</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5</td>
<td>Silt, woody debris, trace small, &lt;3 cm.</td>
</tr>
</tbody>
</table>

End of Core at 5.9
MCS Environmental MudMole Bore Log

Collection Information
Date: 7-14-06  Recorder: G5V
Project: 541185.001 Windward Lower Duwamish Coring

Position Information
Coordinate Datum: WA State Plane N, NAD 83, Survey Ft
Northing: 203576
Easting: 1265785

Station Name: 30 R2
Tube Length (ft): 16.1
Water Depth (ft): 3.5
Est. Tide Height (ft): 18
Est. Mudline: (MLLW)

Comments: Low slack tide - diver depth 16
Bottom gentle slope - silty sand - no foils vis 4 ft
2 24' off shore of station

Penetration Tape
Reading | Recovery Tape Reading | Comments |
--- | --- | --- |
15.4 | 15.5 | |
12.5 | 12.7 | |
10.7 | 10.9 | |
9.6 | 10.3 | |
9.2 | 9.9 | Refusal

Silty Day in Tip of Core

MCS Environmental, Inc.
6105 - 216th St SW, Suite 100
Mountlake Terrace, WA 98040
(425) 867-6340

Duwamish bore log format
**Mudmole™ Bore Log**

**Project:** LDWG Duwamish Coring  
**Project No:** 341186.001  
**Collected by:** GSM  
**Date:** 2/14/2006  
**Water depth:** 18.0 ft  
**Weather/Comments:** Sunny  
**Driven to refusal**

<table>
<thead>
<tr>
<th>Depth below mudline (ft)</th>
<th>Distance from top of tube (ft)</th>
<th>Penetration interval (ft)</th>
<th>Interval recovery (ft)</th>
<th>Percent recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.0</td>
<td>0.6</td>
<td>86%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9.0</td>
<td>2.8</td>
<td>97%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10.0</td>
<td>3.6-5.4</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11.0</td>
<td>5.4-6.5</td>
<td>55%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>12.0</td>
<td>6.5-6.9</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

Penetration 6.9 ft / On deck recovery 5.9 ft = 86% Recovery

**Place Field ID Label Here**

**Depth below mudline:**
- Mudline: 10.2 ft
- 1 ft: 11.09 ft
- 2 ft: 12.06 ft
- 3 ft: 13.02 ft
- 4 ft: 14.00 ft
- 5 ft: 15.00 ft
- 6 ft: 15.73 ft
- 7 ft: No sample
- 8 ft: No sample
- 9 ft: No sample
- 10 ft: No sample
- 11 ft: No sample
- 12 ft: No sample
- 13 ft: No sample
- 14 ft: No sample
- 15 ft: No sample
- 16 ft: No sample
- 17 ft: No sample
- 18 ft: No sample
- 19 ft: No sample
- 20 ft: No sample
Station Number: 30
Date: 04/14/00
Station Arrival Time: 1012
Attempt: 2
Coro Tube Length: 16.0
Station Departure Time: 1127
Field Technician: TD
Lead Line Water Depth: 18.0
Contractor: NCS/RS
Tip Probe Depth: 
On-site Visitor: 
Disk Probe Depth: 

Shoreline and surrounding area: same as k-1
Sediment surface & slope: very soft, gentle slope
Water current and visibility: falling tide, 4 ft vis, low slack tide
Diver Water Depth: 16

Drive Observations:
Drive Initiation Time: 1104
Drive Completion Time: 
Estimated angle of drive: E4° 10'

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, moderate, difficult; measured by diver or deck)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.4</td>
<td>15.5</td>
<td>easy, moderate, fine 93%</td>
</tr>
<tr>
<td>12.5</td>
<td>12.7</td>
<td>easy to moderate drive</td>
</tr>
<tr>
<td>10.8</td>
<td>10.9</td>
<td>easy to moderate drive</td>
</tr>
<tr>
<td>9.6</td>
<td>10.3</td>
<td>moderate to difficult drive</td>
</tr>
<tr>
<td>9.2</td>
<td>9.9</td>
<td>difficult drive, refusal, penetration very slow</td>
</tr>
</tbody>
</table>

TOTAL 6.9    TOTAL 6.2    Percent Recovered: 94.96%

Reason for ending drive: refusal
If refusal, reason for refusal: hard material

Extraction Observations:
Tension on line?: YS
Stability of vessel: no problem
Overlying water in core (quantity and description): YS
On Boat Recovery: 0.2
Loss of Sediment: 0.3
Extraction Notes: (i.e. winch or hammer, easy, hard) winch, moderately difficult, a lot of tension on cable

On Deck Observations:
Staining: N/A, silty, squeezed off
Tube Deformation: none
Sediment Description (odor or sheen?): gray, silty, fine sand, no odor, no sheen

Keep or Retry: diver inserted screw plug at seafloor interface
Diver observed silty texture in tip.

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
### Sediment Core Processing Log

**Job:** LDNG Core Processing  
**Job Number:** P85-18222-511  
**Date/Time:** 2/14/06 1420  
**Sample Logged by:** Mike N. Backer  
**Sample Quality:** Good  
**Sample Length:** 41 in  
**Sample Diameter:** Diameter  

<table>
<thead>
<tr>
<th>Description</th>
<th>Initial Artifact Depth (ft)</th>
<th>Initial Sample Depth (ft)</th>
<th>Subsample No.</th>
<th>Sample Logs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entire core is winnowed.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Most grain black sand with</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>orange, red, white multi</td>
<td></td>
<td></td>
<td>No samples</td>
<td></td>
</tr>
<tr>
<td>colored grains</td>
<td></td>
<td></td>
<td>collected</td>
<td></td>
</tr>
<tr>
<td>30-35% winnowed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-14-06  Recorder: 6SM

Project: 341185.001 Windward Lower Duwamish Coring

Station Name: 30 R 1

Tube Length (ft): 16.1
Water Depth (ft): 11.4
Est. Tide Height (ft): 4.1
(MLLW)

Time: 10:20

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft
Northing 203593
Easting 1268797

On Deck Top of Sediment 13.1

Comments:
- Falling tide - diver depth 11.4 - slope < 30°
- Sandy silt - visible wood debris in area
- 26 ft off station

Penetration Tape
Reading  Recovery Tape Reading  Comments

13.6  13.6
11.9  12.9
11.7  12.9  refusal
Mudmole™ Bore Log

Project: LDWG Duwamish Coring
Project No: 341185.001
Collected by: GSM
Date: 2/14/2006

Station: 30 R1
Position: NAD83

Time: 10:20
Water depth: 11.4 ft

Weather/Comments: Sunny
Driven to refusal

Penetration 4.4 ft / On deck recovery 3 ft = 68% Recovery
Station Number: 30  
Attempt: 1  
Field Technician: TD  
Contractor: NES/ESS  
On-site Visitor:  
Station Arrival Time: 1012  
Date: 02/14/00  
Core Tube Length: 16.1  
Lead Line Water Depth: 11.4  
Latidue: 26° 35.79'  
Longitude: 126° 8.74'  
Dist. From Target Station: 6  

Pro-Drive and Diver Observations:
Shoreline & surrounding area: rip rap, reed, canary grass  
Sediment surface & slope: sandy silt, wood debris, rock debris, moderate slope to channel  
Water current & visibility: flowing, 5 ft vs  
Diver Water Depth: 11  
Tip Probe Depth:  
Disk Probe Depth:  

Drive Observations:
Drive Initiation Time: 1027  
Drive Completion Time: 1033  
Drive Offset:  
Estimated angle of drive: ENE 10-15° off  
Penetration | Recovery | Drive Notes (e.g. easy, moderate, difficult, measured by diver or deck)
---|---|---
13.6 | 13.6 | easy drive, deck measured  
11.9 | 12.4 | moderate to difficult drive, deck measured  
11.7 | 12.9 | difficult drive, refusal  

TOTAL 44  
TOTAL 32  
Percent Recovered: 74.7%  

Reason for ending drive: refusal  
If refusal, reason for refusal: hard material  

Extraction Observations:
Tension on line?: yes  
Stability of vessel: no problem  
Overlying water in core (quantity and description): yes, clear, ~500 ml  
On Boat Recovery: 13.1  
Loss of Sediment: 0.2  
Extraction Notes: (i.e. winch or hammer, easy, hard) winch, easy  

On Deck Observations:
Staining: a little bit of silt, spread out  
Tube Deformation: none, tip is bulleted  
Sediment Description (odor or sheen?): brown, mud, oily mud, no odor no sheen  

Keep or Retry: driver inserted screw plug at sed/in interface  
driver felt slump/cover in hole where core hole was  

Notes: 
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
## Sediment Core Processing Log

**Job:** Sediment Core Processing  
**Job Number:** PORS-18220-511  
**No. of Sections:** 1  
**Sample Length (from log):** 5.9'  
**Avg. % Compaction:**  
**Notes:** Pen = 7.5', 2'53',  
**on Deck Rec = 10.4', 7'85'.

---

### Core Log

<table>
<thead>
<tr>
<th>Rec. #</th>
<th>% Compaction</th>
<th>Color</th>
<th>Description</th>
</tr>
</thead>
</table>
|        |              |             | **SILT 0-0.5’**  
|        |              |             |     wet, loose, olive brown sl. sandy SILT                                             |
| 2.54   | 41.3         | olive brown |     segmented warm                                                                                                                              |
| 2.54   | 25/1         | black       | **SILT 0.5-2.8’**  
|        |              |             |     moist, soft, black sl. sandy SILT (org) with woody fragments                       |
| 6.23-6.7’ | 1-2.8      |             |     wood fragments, subangular 0.05’ gravel                                              |
| 6.78-5.0’ | 2.8-4       |             |     moist, dense, black SAND with multicolored grains (orange, white, red) medium-grained  
| 5.9’   | 4.59         |             |     transitioned                                                                                                                                  |

---

**Sample Length:** 15.1’

---

**Sample Quality:** Good, fair, poor, disturbed  
**Silver Core:** Core is 15.1’ in length.
SC-31-R1

2/17/06
2M

mudline = 9.2`

shoe
core catcher is empty from
tip of core tube to 0.6'
toward surface

9.2
5.9
15.1

core catcher did not close
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-16-06  Recorder: 651M

Project: 341185.001 Windward Lower Duwamish Coring

Station Name: 31R

Tube Length (ft): 15.6

Water Depth (ft): 35.3  Time: 13:45

Est. Tide Height (ft) (MLLW)

Est. Mudline: (MLLW)

Comments: Diver depth 35 visibility 3 A no debris

Not silly bottom - mild current

24 A from station

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey ft

Northing 203 092

Easting 126 8934

On Deck Top of Sediment 9.2

Penetration Tape Reading

Recovery Tape Reading

Comments

14.1
12.1
10.1
9.1
8.1

14.5
12.2
10.4
9.6
9.1

refusal

hard to extract core from bottom
Mudmole™ Bore Log

Project: LDWG Duwamish Coring
Station: 31 R1
Project No: 341185.001
Position: NAD83
Collected by: GSM
Date: 2/16/2006
Time: 13:45
Water depth: 36.3 ft
Mudline: #VALUE! ft MLLW (estimated using tide tables)

Weather/Comments: N/A
Driven to refusal

Penetration 7.5 ft On deck recovery 6.4 ft = 85% Recovery

Depth below mudline (ft)

Distance from top of tube (ft)

Penetration interval (ft) Interval recovery (ft) Percent recovery
0-1.5 1.1 73%
1.5-3.5 2.3 115%
3.5-5.5 1.8 90%
5.5-6.5 0.8 80%
6.5-7.5 0.5 50%

Depth below mudline (ft)
Distance from top of tube (ft)

Mudline 9.2
1 9.93
2 10.88
3 12.03
4 13.05
5 13.95
6 14.80
7 15.45
8 No sample
9 No sample
10 No sample
11 No sample
12 No sample
13 No sample
14 No sample
15 No sample
16 No sample
17 No sample
18 No sample
19 No sample
20 No sample

MCS Environmental, Inc.
6505 214th Street SW, Suite 100
Mountlake Terrace, WA 98043
(425) 697-4340
fax (425) 697-4370

File name 31.R1
Bore Log (mudmole)
Station Number: 31
Date: 2/14/06
Station Arrival Time: 1333
Attempt: 1
Core Tube Length: 15.6
Station Departure Time: 14
Field Technician: IND, INF
Lead Line Water Depth: 15.6
Contractor: MCS, RS
Dist. From Target Station: 4
On-site Visitor: 

Shoreline & surrounding area: Wood, dirt, cement, sand + gravel
Sediment surface & slope: Neurons, cut, broken, silty
Water current and visibility: Drifting, mild current
Diver Water Depth: 35
Tip Probe Depth: 
Disk Probe Depth: 

Drive Initiation Time: 1353
Drive Completion Time: 1358
Drive Offset: 
Estimated angle of drive: underwater est. 10°

Penetration Recovery Drive Notes (e.g. easy, moderate, difficult; measured by diver or deck)
14.1 14.5 Free fall measured by diver
12.1 12.2 Easy drive
10.1 10.4 Easy drive, penetration slowed
9.1 9.6 Moderate drive, penetration slowed
8.1 9.1 Be difficult, drive refusal

TOTAL 73.5 TOTAL 6.5 Percent Recovered: 86.7%
Reason for ending drive: refusal
If refusal, reason for refusal: hard substrate

Tension on line?: Y
Stability of vessel: list to starboard, dip to port
Overlying water in core (quantity and description): Clear ~ 3L
On Boat Recovery: 9.2
Loss of Sediment: 0.1 ft
Extraction Notes: (i.e. winch or hammer, easy, hard) Winch, moderate to hard

Staining: Some, silty, wet, rinsed off
Tube Deformation: None
Sediment Description (odor or sheen?): Gray, silty, sand

Keep or Retry: diver missed screw plug at H Zo/seed interface

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenth)
<table>
<thead>
<tr>
<th>Recovered Length (ft)</th>
<th>% Compaction</th>
<th>Fiber</th>
<th>Size % G</th>
<th>Size % S</th>
<th>Size % F</th>
<th>Purity</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5y</td>
<td>10 70</td>
<td>wet, loose, olive gray, silty sand, silt, organic matter, black, sandy silt, mottled black &amp; gray, trace muns, pumice, plant worm @ 0.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.5y</td>
<td>15 85</td>
<td>wet, loose, black, sandy silt, mottled black &amp; gray, trace muns, pumice, plant worm @ 0.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/4</td>
<td>10 70</td>
<td>wet, loose, olive gray, silt, trace muns, pumice, plant worm @ 0.6, sandy silt, mottled black &amp; gray, trace muns, pumice, plant worm @ 0.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.5y</td>
<td>80 20</td>
<td>slightly mottled throughout, base w/ thin black streaks</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.5y</td>
<td>2.5y</td>
<td>wet, loose, olive gray, silt, trace muns, pumice, plant worm @ 0.6, sandy silt, mottled black &amp; gray, trace muns, pumice, plant worm @ 0.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.5y</td>
<td>50 50</td>
<td>very loose, sandy silt, trace muns, pumice, plant worm @ 0.6, sandy silt, mottled black &amp; gray, trace muns, pumice, plant worm @ 0.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.5y</td>
<td>50 50</td>
<td>very loose, sandy silt, trace muns, pumice, plant worm @ 0.6, sandy silt, mottled black &amp; gray, trace muns, pumice, plant worm @ 0.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
- Pew. 12.65 7 + R = 95%
- On-deck rec. 12.65
### Sediment Core Processing Log

**Job:**

**Core Location/Sample Number:** LDWG-SC-32 RL

**Date/Time:**

**Sample Logged by:**

**Type/Diameter of Sample:**

**Sample Quality:** good fair poor disturbed

**Notes:**

<table>
<thead>
<tr>
<th>Description</th>
<th>Sample Depth</th>
<th>Subsample No.</th>
<th>Summary Sheets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moist, med. dense, grayish black, medium to coarse sand, sand is multicolored red, orange, white, silt clasts @ 7.3, 7.5, 8.1, 9.7, 10.4, 10.8 from 8.0 ft. Silty sand w/sand and silt interbeds</td>
<td>8.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wood (fresh) from 9.1-10.0 below 10, same w/sand as above w/silt clasts. 1/8&quot; quartz grains from 10 to base.</td>
<td>10.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>End of core: 11.2'</td>
<td>11.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>12.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Recovered Length (ft):** 11.2

**% Compaction:**

<table>
<thead>
<tr>
<th>Color</th>
<th>Size % S</th>
<th>Size % F</th>
<th>PID</th>
</tr>
</thead>
<tbody>
<tr>
<td>90</td>
<td>10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-10-06  Recorder: GSM

Project: 341185.001 Windward Lower Duwamish Coring

Station Name: 32 R1

Tube Length (ft): 16.05

Water Depth (ft): 25.6  Time: 12:43

Est. Tide Height (ft) 8.6

(MLLW)

Est. Mudline: _______ (MLLW)

Comments: high slack tide - 25' diver depth - silt bottom

no debris - no slope - flat bottom - 1-2 ft visibility

On Deck Top of Sediment 4.9

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft

Northing 202 959

Easting 1269344

Penetration Tape Recovery Tape Reading Comments
Reading

14.4 14.8
12.3 12.6
10.1 10.2
8.1 8.0
6.3 6.4
4.8 5.1
4.3 4.8

Penetration rate slowed
Refusal
Mudmole™ Bore Log

Project: LDWG Duwamish Coring
Station: 32 R1
Project No: 341185.001
Collected by: GSM
Position: NAD83 WAN
Date: 2/10/2006
Time: 12:43
Water depth: 25.6 ft
Mudline: -17.0 ft MLLW (estimated using tide tables)

Weather/Comments: Sunny

Driven to refusal

Penetration interval (ft) | Interval recovery (ft) | Percent recovery
-------------------------|------------------------|-------------------
0-2.55                   | 2.15                   | 84%
2.55-4.65                | 2.2                    | 105%
4.65-6.85                | 2.4                    | 109%
6.85-8.85                | 2.2                    | 110%
8.85-10.65               | 1.6                    | 89%
10.65-12.15              | 1.3                    | 87%
12.15-12.65              | 0.3                    | 60%

Depth below mudline (ft) | Distance from top of tube (ft)
-------------------------|-----------------------------
Mudline                  | 4.9
1                        | 5.74
2                        | 6.59
3                        | 7.52
4                        | 8.57
5                        | 9.83
6                        | 10.72
7                        | 11.82
8                        | 12.92
9                        | 13.98
10                       | 14.97
11                       | 15.75
12                       | 16.62
13                       | No sample
14                       | No sample
15                       | No sample
16                       | No sample
17                       | No sample
18                       | No sample
19                       | No sample
20                       | No sample

Penetration 12.65 ft/ On deck recovery 12.05 ft = 95% Recovery
Station Number: 32  
Attempt: 1  
Date: 2/10/04  
Field Technician: JD/LM  
Core Tube Length: 16.05  
Contractor: IN/JS/AJS  
Lead Line Water Depth: 25.6  
On-site Visitor:  
Latitude: 2029.59  
Longitude: 126.9344  
4.2 ft off station

Shoreline & surrounding area: strip 2, op cap, very muddy, (waste)
Sediment surface & slope: no slope, dirt, no debris, flat bottom
Water current and visibility: 12 ft vis., high slack tide
Diver Water Depth: 25
Tip Probe Depth:  
Disk Probe Depth:  

Notes: 

Drive Initiation Time: 17:51  
Drive Completion Time: 17:56  
Drive Offset: 
Estimated angle of drive: equal wind/water, cannot see

Penetration | Recovery | Drive Notes (e.g. easy, moderate, difficult; measured by diver or deck)
--- | --- | ---
14.4 | 14.8 | drive measured, free fall
12.3 | 12.6 | easy drive
10.1 | 10.4 | easy drive
8.1 | 8.0 | easy drive
6.3 | 6.4 | easy moderate drive
4.8 | 5.1 | difficult, penetration slow
4.3 | 4.8 | refusal, difficult drive

TOTAL 11.75  
TOLERINAL 11.79  
Percent Recovered: 95.4%

Reason for ending drive: refusal
If refusal, reason for refusal: Sand layer - drive obstruction

Staining: Light colored (gray) clay, silt, grayish  
Tube Deformation: none
Sediment Description (odor or sheen?): mud, sand, light petroleum-like odor, no sheen

Keep or Retry: diver inserted screw plug at sed/two interface

Notes: 
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
## Sediment Core Processing Log

### Core Location/Sample Number: LDWG - SC - 33 (R2)

### Date/Time: 2/11/86 Start 10:15 End 12:00

### Sample Logged by: N. Backer, A. Fitzpatrick

### Type/Diameter of Sample: 4" sq. aluminum

### Sample Quality: good fair poor disturbed

### Notes: Penet: 13.05' → R=79%

### Incised req: 10.03' Core Collected 2/10 DL. lab = 10.7' Sediment

### Description:

<table>
<thead>
<tr>
<th>Recovred Length (ft)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Size % G</th>
<th>Size % S</th>
<th>Size % F</th>
<th>PID</th>
<th>Description (grain size, color, matrix, sheen/odor, blote, wood, other debris)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.9</td>
<td>15.8</td>
<td>Gley 1</td>
<td>25/6</td>
<td>15/8</td>
<td>15/8</td>
<td>25%</td>
<td>moist, wet, silt, olive gray s1 sandy silt, trace clay, trace roots.</td>
</tr>
<tr>
<td>0.3</td>
<td>15.8</td>
<td>Gley 2</td>
<td>3/1</td>
<td>15/8</td>
<td>15/8</td>
<td>25%</td>
<td>moist, wet, loose, black, silt, very fine sand, trace gravel.</td>
</tr>
<tr>
<td>0.1</td>
<td>15.8</td>
<td>Gley 3</td>
<td>25/6</td>
<td>15/8</td>
<td>15/8</td>
<td>25%</td>
<td>1.4' light, 1.5' pale yellow, fibrous, 0.1' black, firm, tangy odor, dissemination when rolled by fingers, becomes clayey silt in 2.0 to base.</td>
</tr>
<tr>
<td>0.2</td>
<td>15.8</td>
<td>Gley 4</td>
<td>25/6</td>
<td>15/8</td>
<td>15/8</td>
<td>25%</td>
<td>moist, wet, silt, trace clay and sand, w/ scattered wood, twigs, shell fragments, slight H2S gas.</td>
</tr>
<tr>
<td>6.6</td>
<td>15.8</td>
<td>Gley 5</td>
<td>3/1</td>
<td>15/8</td>
<td>15/8</td>
<td>25%</td>
<td>3.6 to 4 ft - a gray s1 sandy silt layer, 5.4 to 6 ft - a gray s1 sandy silt layer</td>
</tr>
<tr>
<td>0.5</td>
<td>15.8</td>
<td>Gley 6</td>
<td>25/6</td>
<td>15/8</td>
<td>15/8</td>
<td>25%</td>
<td>4.0 '5.0', sandy wood layer, w/ 1/4 wood-like debris, slight creosote like odor, light brown, mussels, silver color, shiny, shell fragments, abundant.</td>
</tr>
<tr>
<td>0.1</td>
<td>15.8</td>
<td>Gley 7</td>
<td>25/6</td>
<td>15/8</td>
<td>15/8</td>
<td>25%</td>
<td>2.5' glass piece, top of soda bottle.</td>
</tr>
</tbody>
</table>

### Summary Sheet:

- Penet: 13.05' → R=79%
- Incised req: 10.03' Core Collected 2/10 DL. lab = 10.7' Sediment
- Moist, wet, silt, trace clay and sand, w/ scattered wood, twigs, shell fragments, slight H2S gas.
- 3.6 to 4 ft - a gray s1 sandy silt layer, 5.4 to 6 ft - a gray s1 sandy silt layer.
- 4.0 '5.0', sandy wood layer, w/ 1/4 wood-like debris, slight creosote like odor, light brown, mussels, silver color, shiny, shell fragments, abundant.
on deck: 6.0'

Water poured out
then (non-turbid) settled overnight

shoe empty
but sediment fell down to
coil catcher + measuring corner.
<table>
<thead>
<tr>
<th>Recorded Depth (ft)</th>
<th>Core</th>
<th>Size %: G</th>
<th>Size %: S</th>
<th>Size %: F</th>
<th>PID</th>
<th>Description (grain size, color, moisture, sheen/odor, biota, wood, other debris)</th>
<th>Instant Actual Depth (ft)</th>
<th>Sample Depth</th>
<th>Subsample No.</th>
<th>Access</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Some as above, dimiss, red stuff, blade organic? Silt with H2S scattered wood fragments (2%), Trih-sided odor from 4.4 - 7.7.</td>
<td>0.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>moist, wet, dense, silty sand, black and gray granite to silt, silty @ 9.15 well sorted. The sand grains are multicolored, orange, red, no odor scattered bottle caps.</td>
<td>3.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Bottom of core = 10.2'</td>
<td>10.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Bottle 2 Tell</td>
<td>11.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.9' yellow twine</td>
<td>11.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3.2' shell frag?</td>
<td>11.0</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5.5' unknown frags?</td>
<td>11.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5.6' silver nugget</td>
<td>11.0</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5.7' glass bottle frag</td>
<td>11.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-10-06  
 Recorder: 65R

Project: 341185.001 Windward Lower Duwamish Coring

Station Name: 33 R 2

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft
Northing 202,054  
Easting 126,9245

WATER

Depth (ft): 20.3  
Time: 1333

Est. Tide Height
(MLLW)

Est. Mudline: (MLLW)

Comments:
off station - high tide - wood debris & logs on
19 ft moderate slope - gravelly silt, scattered
metal debris - H A visibility

Penetration Tape Reading  
Recovery Tape Reading  
Comments

<table>
<thead>
<tr>
<th>Reading</th>
<th>Recovery Tape Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.7</td>
<td>15.5</td>
</tr>
</tbody>
</table>

Repe  
water depth  
time

24.1  
14.15

mored

ting tide - log

moderately slope bottom

| 15.5  | 15.3 |
| 13.0  | 12.4 |
| 10.7  | 10.4 |
| 8.6   | 8.8  |
| 7.0   | 7.5  |
| 5.0   | 6.1  |
| 3.0   | 5.2  |

Duwamish borelog formule

MCS Environmental, Inc.
6995 - 216th St SW, Suite 100
Mukilteo Terrace, WA 98275
(425) 697-4340
Mudmole™ Bore Log

Project: LDWG Duwamish Coring  
Project No: 341185.001  
Collected by: GSM  
Date: 2/10/2006  
Weather/Comments: Sunny

Station: 33 R2  
Position: NAD83 WAN  
Time: 14:15  
Place Field ID Label Here

Water depth: 24.1 ft  
Mudline: -15.7 ft MLLW (estimated using tide tables)

Penetration interval  
Interval recovery  
Percent recovery

Depth below mudline  
Distance from top of tube

0-0.5 0.75 136%
0.5-1.0 2.9 116%
1.0-1.5 3.05-5.35 2 87%
1.5-2.0 5.35-7.45 1.6 76%
2.0-2.5 7.45-9.05 1.3 81%
2.5-3.0 9.05-11.05 1.4 70%
3.0-3.5 11.05-13.05 0.9 45%

Mudline 6
1 7.27
2 8.43
3 9.59
4 10.48
5 11.35
6 12.15
7 12.91
8 13.70
9 14.51
10 15.22
11 15.92
12 No sample
13 No sample
14 No sample
15 No sample
16 No sample
17 No sample
18 No sample
19 No sample
20 No sample

Penetration 13.05 ft/ On deck recovery 10.05 ft = 77% Recovery
**Station Number:** 83  
**Attempt:** 2  
**Field Technician:** JAH/LUN  
**Contractor:** MWS/RSS  
**On-site Visitor:** —  
**Date:** 2/5/06  
**Core Tube Length:** 16.05  
**Lead Line Water Depth:** 24.1  
**Latitude:** 20°20'56"  
**Longitude:** 126°92.69'  
26'(off target 25'off)

**Shoreline & surrounding area:** Top cap, lag, pilings, spic, barge  
**Sediment surface & slope:** Mol-gale clays, gravel, silt, scattered elements inital & wind, layer down just under surface  
**Water current and visibility:**  4 ft visibility  
**Diver Water Depth:** —  
**Tip Probe Depth:** —  
**Disk Probe Depth:** —

**Drive Completion Time:** 1:42p  
**Drive Completion Time:** 1:42p  
**Drive Offset:** —  
**Estimated angle of drive:** 60°up, under water, cannot see much, w15°off (8ft)

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, moderate, difficult; measured by diver or deck)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.7</td>
<td>15.5</td>
<td>Driver recorded, fine, fast (station reset)</td>
</tr>
<tr>
<td>15.5</td>
<td>15.3</td>
<td>Driver recorded, fine, fast</td>
</tr>
<tr>
<td>13.0</td>
<td>12.4</td>
<td>Easy drive</td>
</tr>
<tr>
<td>10.7</td>
<td>10.4</td>
<td>Easy drive</td>
</tr>
<tr>
<td>8.6</td>
<td>8.89</td>
<td>Easy drive</td>
</tr>
<tr>
<td>7.0</td>
<td>7.5</td>
<td>Easy-medium drive</td>
</tr>
<tr>
<td>5.0</td>
<td>6.1</td>
<td>Easy-medium drive</td>
</tr>
<tr>
<td>3.0</td>
<td>5.2</td>
<td>Moderate</td>
</tr>
</tbody>
</table>

**Percent Recovered:** 83.1  
**Reason for ending drive:** Good quality  
**If refusal, reason for refusal:** —

**Tension on line:** Yes  
**Stability of vessel:** No problems  
**Overlying water in core (quantity and description):** Yes, clear, 1 L  
**On Boat Recovery:** 4.0  
**Loss of Sediment:** 8.8 ft  
**Extraction Observations:** —  
**Core Observation:** —

**Staining:** —  
**Tube Deformation:** None  
**Sediment Description (odor or sheen?):** Silt, dirty

**Keep or Retry:** Core did not penetrate, multiple violent attempts to penetrate, no success, will retry.  
**Scraped off shore to try again**  
**Core scraping instead by diver at sed/h2o interface**

**Notes:**  
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)  

---

**RETEC**  
The RETEC Group Inc.  
1511 SW McMinnville Rd, Suite 207  
Salem, OR 97304-1962  
503-581-5550  
www.retec.com
## Sediment Core Processing Log

**Core Location/Sample Number:** LDWG 6C-201 R1  
**Date/Time:** 2/11/06  
**Sample Logged by:** N. Bacher, A. Fitzpatrick  
**Type/Diameter of Sample:** 4" sq. aluminum  
**Sample Quality:** Good  
**Avg. % Compaction:** 90%  
**Notes:**  
- Density: 13.69 g/cc  
- % Water: 70%  
- % Solids: 30%  
- % Clay: 10%  
- % Silt: 30%  
- % Sand: 50%  
- **On deck:** N  
- **Collected:** 2/10/06

### Core Log

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Description</th>
<th>Sample</th>
<th>Sample Depth</th>
<th>Subsample No.</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td>2&quot; of very swampy, mucky, silty clay. Clayey, silty clay, wood fragments, No H2S odor, low per cent organic matter.</td>
<td>1245</td>
<td>1-1.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.5</td>
<td>- Transition</td>
<td>1310</td>
<td>1-1.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.0</td>
<td>Silt</td>
<td>05-2</td>
<td>1-1.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.5</td>
<td>Clay</td>
<td>1582</td>
<td>1-1.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.0</td>
<td>Transition</td>
<td>1259</td>
<td>1-1.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.0</td>
<td>Silt</td>
<td>2562</td>
<td>1-1.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.5</td>
<td>Silt</td>
<td>3-256</td>
<td>1-1.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.6</td>
<td>Silt</td>
<td>455</td>
<td>1-1.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.0</td>
<td>- Transition</td>
<td>655</td>
<td>1-1.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.5</td>
<td>- Transition</td>
<td>655</td>
<td>1-1.9</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **OL/ML:** Wet/moist, medium stiff, black, slightly fibrous.  
- **H2S:** Present.  
- **Texture:** Clayey, silty clay.  
- **Organic Matter:** Present.  
- **Sample Quality:** Good  
- **Sample Type:** 4" sq. aluminum  
- **Sample Diameter:** 4"  
- **Sample Location:** LDWG 6C-201 R1  
- **Sample Date:** 2/11/06  
- **Sample Logged by:** N. Bacher, A. Fitzpatrick  
- **Sample Notes:**  
- **Density:** 13.69 g/cc  
- **% Water:** 70%  
- **% Solids:** 30%  
- **% Clay:** 10%  
- **% Silt:** 30%  
- **% Sand:** 50%  

---

**Core Description:**
- At 5.6" = 2" layer of med. clayey, flocculent, uniform, no layers, low per cent organic matter; low per cent H2S odor, low per cent organic matter, low per cent clayey, fibrous.  
- At 6.0" = 2" layer of med. clayey, flocculent, uniform, no layers, low per cent organic matter; low per cent H2S odor, low per cent organic matter, low per cent clayey, fibrous.
LDW-SC-388 201 (Field rep of 33)

On deck = 4.5'

4.3' —— 11.8'

Full down to catcher's shoe empty
Thin shoe = Funky shiny
Orangeish silver film
Has settled over residual sediment possibly migrated down into debris along sidewalls
(anthropogenic-looking)

Water pooled out
Non-tribad
Settled overnight
## Sediment Core Processing Log

### Core Location/Sample Number: LDWG-SC-201 R221

### Date/Time: 2/11/86

**Sample Logged by:** N. Budech, A. Fitzpatrick

**Type/Diameter of Sample:** 4" Sq. aluminum

**Sample Quality:** good fair poor disturbed

### Notes:
- See page 1

---

<table>
<thead>
<tr>
<th>Recovered Length (ft)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Grain Size, Moisture, Odor</th>
<th>Description (grain size, color, moisture, sheen/odor, biots, wood, other debris)</th>
<th>Initial Actual Depth (ft)</th>
<th>Sample Depth</th>
<th>Subsample No.</th>
<th>Appearance</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td></td>
<td></td>
<td></td>
<td>ML, PL: Same unit as above but no described shelly fossils below; l.0', raw odor</td>
<td>3.00</td>
<td>2-4.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
<td>transition 3.1 - transition 8.0 - sandy to horizontal beds (native-looking)</td>
<td>13.05</td>
<td>2-19.0</td>
<td>7.0</td>
<td></td>
</tr>
<tr>
<td>4.0</td>
<td></td>
<td></td>
<td></td>
<td>silt silty silt w/ new shell frag, trace rootletts and interbeds of v.f. silty</td>
<td>8.0</td>
<td>10.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.0</td>
<td></td>
<td></td>
<td></td>
<td>Sandy: moist, well decayed material, dark grey, 2&quot; thick</td>
<td>28.0</td>
<td>11.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.0</td>
<td></td>
<td></td>
<td></td>
<td>transition zone w/ unit below</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.0</td>
<td></td>
<td></td>
<td></td>
<td>transition 13.10.0 - transition 10.62.0 - transition 12.05.0</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

---

1 baggie: brick frag E015
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-10-06  Recorder: GWM

Project: 341185.001 Windward Lower Duwamish Coring

Station Name: 2013  Position Information

Tube Length (ft): 16.05  Coordinate Datum: WA State Plane N, NAD 83, Survey Ft

Water

Depth (ft): 24  Northing: 202,052

Est. Tide Height

(ft)  8  Easting: 1269266  (MLLW)

Est. Mudline:  (MLLW)

Comments: Falling tide - diver depth

silt bottom - vicinity 1-A

26 ft offshore of station

Penetration Tape

Reading  Recovery Tape Reading  Comments

15.0  15.3

13.1  13.2

10.6  10.5

8.0  8.0

6.0  6.4

4.0  4.6

2.4  3.3

silty clay plug in end

________________________________________

________________________________________

________________________________________

________________________________________

________________________________________
**Mudmole™ Bore Log**

**Project:** LDWG Duwamish Coring  
**Station:** 201 R1  
**Project No:** 341185.001  
**Collected by:** GSM  
**Date:** 2/10/2006  
**Water depth:** 24.0 ft  
**Time:** 14:53  
**Position:** NAD83  
**Northing:** 202052  
**Easting:** 1269266  
**Mudline:** -16.0 ft MLLW (estimated using tide tables)

**Weather/Comments:** Sunny  
Mudline corrected to 4.3 ft from top of tube in field lab

---

**Penetration interval (ft)**  
**Interval recovery (ft)**  
**Percent recovery**  

<table>
<thead>
<tr>
<th>Interval</th>
<th>Recovery</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1.05</td>
<td>0.75</td>
<td>71%</td>
</tr>
<tr>
<td>1.05-2.95</td>
<td>2.1</td>
<td>111%</td>
</tr>
<tr>
<td>2.95-5.45</td>
<td>2.7</td>
<td>108%</td>
</tr>
<tr>
<td>5.45-8.05</td>
<td>2.5</td>
<td>96%</td>
</tr>
<tr>
<td>8.05-10.05</td>
<td>1.6</td>
<td>80%</td>
</tr>
<tr>
<td>10.05-12.05</td>
<td>1.8</td>
<td>50%</td>
</tr>
<tr>
<td>12.05-13.65</td>
<td>1.3</td>
<td>61%</td>
</tr>
</tbody>
</table>

**Depth below mudline (ft)**  
**Distance from top of tube (ft)**

<table>
<thead>
<tr>
<th>Depth below mudline (ft)</th>
<th>Distance from top of tube (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mudline</td>
<td>4.3</td>
</tr>
<tr>
<td>1</td>
<td>5.01</td>
</tr>
<tr>
<td>2</td>
<td>6.10</td>
</tr>
<tr>
<td>3</td>
<td>7.20</td>
</tr>
<tr>
<td>4</td>
<td>8.28</td>
</tr>
<tr>
<td>5</td>
<td>9.36</td>
</tr>
<tr>
<td>6</td>
<td>10.38</td>
</tr>
<tr>
<td>7</td>
<td>11.34</td>
</tr>
<tr>
<td>8</td>
<td>12.30</td>
</tr>
<tr>
<td>9</td>
<td>13.11</td>
</tr>
<tr>
<td>10</td>
<td>13.91</td>
</tr>
<tr>
<td>11</td>
<td>14.81</td>
</tr>
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<td>12</td>
<td>15.71</td>
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<td>No sample</td>
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<td>15</td>
<td>No sample</td>
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<td>16</td>
<td>No sample</td>
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<tr>
<td>17</td>
<td>No sample</td>
</tr>
<tr>
<td>18</td>
<td>No sample</td>
</tr>
<tr>
<td>19</td>
<td>No sample</td>
</tr>
<tr>
<td>20</td>
<td>No sample</td>
</tr>
</tbody>
</table>

---

Penetration 13.65 ft/ On deck recovery 11.75 ft = 86% Recovery
Station Number: 201 (Field Rep. of 33)
Date: 04/10/06
Core Tube Length: 16.05
Lead Line Water Depth: 24
Latitude: 202052
Longitude: 126096

Shoreline & surrounding area: Same as 33R1
Sediment surface & slope: Soft bottom, sand, moderate slope
Water current and visibility: Mild current, lift was falling tide
Diver Water Depth 24
Tip Probe Depth
Disk Probe Depth

Drive Initiation Time: 1456
Drive Completion Time: 1500
Drive Offset:
Estimated angle of drive: Unable to see, suspect underwater 10° off

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.0</td>
<td>15.7</td>
</tr>
<tr>
<td>13.1</td>
<td>13.7</td>
</tr>
<tr>
<td>10.1</td>
<td>10.5</td>
</tr>
<tr>
<td>8.0</td>
<td>8.0</td>
</tr>
<tr>
<td>6.0</td>
<td>6.4</td>
</tr>
<tr>
<td>4.0</td>
<td>4.0</td>
</tr>
<tr>
<td>2.4</td>
<td>3.3</td>
</tr>
</tbody>
</table>

TOTAL: 13.65 TOTAL: 12.75 Percent Recovered: 93.4

Reason for ending drive: Reached goal
If refusal, reason for refusal:

Tension on line? Yes
Stability of vessel: Very slow, slightly listing

Overlying water in core (quantity and description): Yes, clear, 1/4 full
On Boat Recovery: 4.5
Loss of Sediment: ~1.2 ft - New recovery = 11.56 ft (84.6%)
Extraction Observations:

Staining: Light air
Tube Deformation: None
Sediment Description (odor or sheen?): Not seen end of core wrapped underwater

Keep or Retry: Never wrapping end of core in plastic at sed/soil interface.
Salt ringed in core tip.

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
### Sediment Core Processing Log

**Core Location/Sample Number:** LDW - SC - 34 (2) Field Rep is 203

**Date/Time:** Feb 16, 2006 start 10:00 stop 11:30

**Sample Logged by:** T Fitzgerald Chg Bruckert

**Type/Diameter of Sample:** 4" X 2" Alum MCS

**Sample Quality:** Good, fair, poor, disturbed

**Notes:** sediments is frozen, no trowels, core was collected 2/16/06

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Recovery Length (ft)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Size % G</th>
<th>Size % F</th>
<th>PID</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td>2.8433</td>
<td>10</td>
<td>5</td>
<td>85</td>
<td>0.0</td>
<td>Silt: wet, med stiff, olive-brown, visually, sl. sandy Silt w/ sub. wood &amp; roots, NO H2S</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- at 5' warm</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Silt: med stiff, dark brown, moist,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Silt w/ sub. organic matter - twigs, leaves,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- shredded wood chips, pine needles, shedded wood - all small, fibers present, fibers throughout, fibers NO H2S, uniform, NO layers sl compressible - low plastic</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- at 1.3' plastic zip-tie - slightly gummy</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6 sedent present below 3.2' w/ shell + wood frags.</td>
</tr>
<tr>
<td>2.0</td>
<td>10</td>
<td>90</td>
<td>10</td>
<td>90</td>
<td>0.0</td>
<td>Silt (transition unit): 8' interbedded layers of dark brown Silt w/ org. matter</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- at 3.4' pic of glass shard</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>dark gray F-Sand w/ small modular shell Frag</td>
</tr>
<tr>
<td>3.0</td>
<td>10</td>
<td>90</td>
<td>10</td>
<td>90</td>
<td>0.0</td>
<td>Sand: 32' sand</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6 sedent present below 5' sand</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Silt is not compressible nor tacky</td>
</tr>
<tr>
<td>5.0</td>
<td>2.94</td>
<td>312</td>
<td>10</td>
<td>90</td>
<td>0.0</td>
<td>Silt: dark gray F-Sand w/ small modular shell Frag</td>
<td></td>
</tr>
</tbody>
</table>

**Field Form: Core Process**
LDN - SC - 34 (R2) Feb 18, 2006

Outside to sediment = 6.8'

Shoe is full packed.
<table>
<thead>
<tr>
<th>Recovered Length (m)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Silt % G</th>
<th>Sand % G</th>
<th>Gravel % G</th>
<th>Description (grain size, color, moisture, shear, odor, biota, wood, other debris)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.0</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.0</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.0</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.0</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.0</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.0</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.0</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.0</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.0</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.0</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
- See page 4
- See page 4

**Description:**
- Silt: humus, clayey, black
- Sand: damp, dense, dark gray, sl. silty, sl. gley (below 8 ft), M sand w. some dbm silt interbeds (1" to 2" long)
- Sand is multi-colored red, white, gray, light
- 1/2" red gray clay clasts, other
- At 7.5', small 1/2" oken brick fragment (pitted, Softer, slightly jumbled)
- At 8.1', small pc of amber glass
- Gravel: damp, dense, dark gray, sandy gravel (up to 2"), angular w. 1/2" gray, hard, 2" silt clasts, no layers, hard b-sample

**Bottom of 9.4':**
- Full size, sand/gavel, suspect it is not native (x gravel, no layers, not alluvium - debris)

**Two bags:**
- At 34' - glass shard
- At 7.4' - sm. brick frag
- 8.7' - amber glass shard
### Mudmole™ Bore Log

**Project:** LDWG Duwamish Coring  
**Station:** 34 R2  
**Project No:** 341185.001  
**Position:** NAD83 WAN  
**Collected by:** GSM  
**Date:** 2/17/2006  
**Time:** 9:36  
**Water depth:** 23.7 ft  
**Mudline:** -14.6 ft MLLW (estimated using tide tables)  

**Weather/Comments:** N/A

<table>
<thead>
<tr>
<th>Penetration interval (ft)</th>
<th>Interval recovery (ft)</th>
<th>Percent recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1.45</td>
<td>1.05</td>
<td>72%</td>
</tr>
<tr>
<td>1.45-4.95</td>
<td>3.2</td>
<td>91%</td>
</tr>
<tr>
<td>4.95-6.65</td>
<td>1.2</td>
<td>60%</td>
</tr>
<tr>
<td>6.65-8.65</td>
<td>1.1</td>
<td>70%</td>
</tr>
<tr>
<td>8.65-10.05</td>
<td>0.3</td>
<td>37%</td>
</tr>
<tr>
<td>10.05-10.85</td>
<td>0.7</td>
<td>54%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Depth below mudline (ft)</th>
<th>Distance from top of tube (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mudline</td>
<td>6.8</td>
</tr>
<tr>
<td>1</td>
<td>7.52</td>
</tr>
<tr>
<td>2</td>
<td>8.35</td>
</tr>
<tr>
<td>3</td>
<td>9.27</td>
</tr>
<tr>
<td>4</td>
<td>10.18</td>
</tr>
<tr>
<td>5</td>
<td>11.10</td>
</tr>
<tr>
<td>6</td>
<td>12.16</td>
</tr>
<tr>
<td>7</td>
<td>13.06</td>
</tr>
<tr>
<td>8</td>
<td>13.66</td>
</tr>
<tr>
<td>9</td>
<td>14.33</td>
</tr>
<tr>
<td>10</td>
<td>15.11</td>
</tr>
<tr>
<td>11</td>
<td>15.53</td>
</tr>
<tr>
<td>12</td>
<td>No sample</td>
</tr>
<tr>
<td>13</td>
<td>No sample</td>
</tr>
<tr>
<td>14</td>
<td>No sample</td>
</tr>
<tr>
<td>15</td>
<td>No sample</td>
</tr>
<tr>
<td>16</td>
<td>No sample</td>
</tr>
<tr>
<td>17</td>
<td>No sample</td>
</tr>
<tr>
<td>18</td>
<td>No sample</td>
</tr>
<tr>
<td>19</td>
<td>No sample</td>
</tr>
<tr>
<td>20</td>
<td>No sample</td>
</tr>
</tbody>
</table>

**Penetration 12.15 ft / On deck recovery 9.25 ft = 76% Recovery**

---

MCS Environmental, Inc.  
6505 210th Street SW, Suite 100  
Mountlake Terrace, WA 98043  
(425) 697-4340  
fax (425) 697-4370

File name 34 R2  
Bore Log (mudline)
MCS Environmental MudMole Bore Log

Collection Information

Date: 2/17/08  Recorder: 63 VM

Project: 341185.001 Windward Lower Duwamish Coring

Station Name: 34 R2

Tube Length (ft): 16.05

Water Depth (ft): 23.7  Time: 0936

Est. Tide Height (ft) 9.1 (MLLW)  Feb Tide Tube

Est. Mudline: (MLLW)

Comments: Falling tide - Diver depth 42 visibility 5

silty sand 10% cobble cover - 10% slope

28 ft station

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft

Northing: 202014

Easting: 1268831

On Deck Top of Sediment: 6.8

Penetration Tape Reading  Recovery Tape Reading  Comments

14.6  15.0
11.1  11.8
9.4  10.0
7.4  8.8
6.0  7.7
5.2  7.4  seal reached
3.9  6.7

MCS Environmental, Inc.
6005 - 215th St. SW; Suite 100
Mountlake Terrace, WA 98043
(425) 697-4346

252 of 490
Station Number: 34  
Attempt: 2  
Field Technician: TD  
Contractor: MCL/285  
On-site Visitor:  

Pre-Dive and Diver Observations:

Shoreline & surrounding area: Same as req.
Sediment surface & slope: Silty sand 10% cobble, 10% slope
Water current and visibility: Ebbing tide, <5 ft.
Diver Water Depth: 22
Tip Probe Depth:  
Disk Probe Depth:  

Drive Observations:

Drive Initiation Time: 0953  
Drive Completion Time: 0957  
Drive Offset:  
Estimated angle of drive: 90° under water, est 10°

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, moderate, difficult, measured by diver or deck)</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.6</td>
<td>15.0</td>
<td>Drive recorded, few fall</td>
</tr>
<tr>
<td>11.1</td>
<td>11.8</td>
<td>Easy drive</td>
</tr>
<tr>
<td>9.4</td>
<td>10.0</td>
<td>Easy drive</td>
</tr>
<tr>
<td>7.9</td>
<td>8.8</td>
<td>Easy drive</td>
</tr>
<tr>
<td>6.0</td>
<td>7.7</td>
<td>Easy drive</td>
</tr>
<tr>
<td>5.2</td>
<td>7.4</td>
<td>Easy drive</td>
</tr>
<tr>
<td>3.9</td>
<td>6.7</td>
<td>Easy drive, penetration goal reached, no core tube length</td>
</tr>
</tbody>
</table>

TOTAL 12.19 TOTAL 9.35  
Percent Recovered: 77.0% (76.1% on deck)

Reason for ending drive: Penetration goal reached.
If refusal, reason for refusal: No core tube length left.

Extraction Observations:

Tension on line: Yes  
Stability of vessel: No problem
Overlying water in core (quantity and description): Yes, clear, 1/5 L
On Boat Recovery: 6/0  
Loss of Sediment: 0.1 ft.
Extraction Notes: (i.e. winch or hammer, easy, hard) Winch, easy

On Deck Observations:

Staining: Oil, silt, trace, spread out
Tube Deformation: None
Sediment Description (odor or sheen?): Silty sand (dark), no odor, no sheen

Keep or Retry: Drive inserted screw plug at sed/110 interface

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-17-08
Recorder: 65M
Project: 341185.001 Windward Lower Duwamish Coring

Station Name: 34 R1

Tube Length (ft): 16.1
Water Depth (ft): 22.7
Est. Tide Height (ft): 10.4

Time: 841

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft
Northing: 201,999
Eastng: 126,808

Est Mudline: (MLLW)
On Deck Top of Sediment: 12.8

Est. Tide (MLLW)

Comments: Falling tide - driver depth 22 - visibility 5
Fine silt - no slope
Roll off station

Penetration Tape Reading

15.6
14.5
13.4
12.9
12.3

Not Processed

Recovery Tape Reading

15.5
14.5
14.1
13.2
12.1

Tool bouncing - hit something
End of core tube crushed

Comments

MCS Environmental, Inc.
6005 - 216th St SW, Suite 100
Mukilteo Terrace, WA 98273
(425) 697-4349

Dawerish borelog formulk
Mudmole™ Bore Log

Project: LDWG Duwamish Coring
Project No: 341185.001
Collected by: GSM
Date: 2/17/2006

Station: 34 R1
Position: NAD83

Water depth: 22.7 ft
Mudline: -12.3 ft MLLW (estimated using tide tables)

Date: 2/17/2006
Time: 8:41

Easting: 11268808
Northing: 201999

Penetration interval (ft)
Interval recovery (ft)
Percent recovery

Mudline 12.8
1 13.68
2 14.23
3 15.34
4 No sample
5 No sample
6 No sample
7 No sample
8 No sample
9 No sample
10 No sample
11 No sample
12 No sample
13 No sample
14 No sample
15 No sample
16 No sample
17 No sample
18 No sample
19 No sample
20 No sample

Weather/Comments: N/A

Driven to refusal, hit debris

Penetration 3.8 ft/ On deck recovery 3.3 ft = 87% Recovery
Station Number: 34  Date: 04/17/06  Station Arrival Time: 0830
Attempt: 1  Core Tube Length: 16.1  Station Departure Time: 1050
Field Technician: TD  Lead Line Water Depth: 22.7
Contractor: 20X/555  Dist. From Target Station: 02
On-site Visitor: 0214497  Latitude: 123456789
Shoreline & surrounding area: riprap/concrete debris, wood piles
Sediment surface & slope: steep slope
Water current and visibility: good
Diver Water Depth: 16  Tip Probe Depth 02
Disk Probe Depth 02
Drive Observations:
Drive Initiation Time: 0754  Drive Completion Time: 0802  Drive Offset: 02
Estimated angle of drive: 02
Penetration 15.6  Recovery 15.5  Drive Notes: easy, moderate, difficult
Penetration 13.8  Recovery 14.5  Drive Notes: moderate, difficult
Penetration 13.4  Recovery 14.1  Drive Notes: difficult
Penetration 12.7  Recovery 13.2  Drive Notes: difficult
Penetration 12.5  Recovery 12.1  Drive Notes: difficult
TOTAL 5.0  TOTAL 4.0  Percent Recovered: 105%
Reason for ending drive: refusal
If refusal, reason for refusal: hit rock or wood

Extraction Observations:
Tension on line? yes  Stability of vessel: no problem
Overlying water in core (quantity and description): clear
On Boat Recovery: 12.0  Loss of Sediment: 0.7 ft.
Extraction Notes: (i.e. winch or hammer, easy, hard) winch, easy

Tube Observations:
Staining: some 2 foot, spread off
Tube Deformation: tube tip warped/flushed
Sediment Description (odor or shear?): did not observe, core tip wrapped underwater, diver observed
silty sand
Keep or Retry: diviner wrapped tip of core, inside water, could not insert screwed plug
Keep or Retry: yes, tip was wrapped. diver suspects concrete. will retry after removing
further exploration.

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (months)
### Sediment Core Processing Log

**Job:** Dynamic LDN  
**Core Location/Sample Number:** LDN SC 003  
**Sample Logged by:** A. Fitzpatrick W. R. Braley  
**Sample Quality:** Good  
**Notes:** Core collected 2-1/2 mile, no minerals today.

<table>
<thead>
<tr>
<th>Ranged Length (m)</th>
<th>Color</th>
<th>Size % G</th>
<th>Size % S</th>
<th>Size % F</th>
<th>RD</th>
<th>Description (grain size, color, moisture, sheen/odor, biota, wood, other debris)</th>
<th>Grain Size</th>
<th>Sample Depth</th>
<th>Subsample No.</th>
<th>Summary Sketch</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Boulder of olive brown shaly Silt acc. Silt: wet, red shill, black grading to dark brown, organic Silt w/ moderate small wood + plant fraps, uniform, no layers, all compressible texture. Silt shg 1.25 below 2 ft., scattered small shell fragments, 1 pc. plastic 0.5 ft. non-porcic. Bhn-1 2 pcs plastic.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>At 2.1' Intact 1/2 mussel shell (two valves)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5 No H2S below 3 ft</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5 sand layers start below 4.0', interbedded</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Trace of brown Silt (interbedded w/ Silt): d. brownish gray, moist, dense. F. Sand w/ scattered gravel (below 0.5 ft.)- interbedded w/ 0.5' thick dark brown Silt w/ oily matter. Scattered small shell fragments, shredded wood, 2'' wood, twigs, leaves, slightly jumbled-likely layers, well sorted. Silt has multi-colored red, white, gray glaights. Trace small grain.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Core Information:**
- **Sample Length from log:** Depth of 1.25
- **Avg. % Compaction:** 6.9%
- **Joyo Rec:** 7.3%
LDW-SC-203 2/18/06

8.8

7.2

7.4

10.1

Contact

30% winnowed in sand

Sharp contact (pulled away from) silt + sand

Blw 7.4 to 8.8

But ok b sample appears relatively intact (no shifting downward)

Orderd to sediment = 7.2
<table>
<thead>
<tr>
<th>Recovered Length</th>
<th>% Compaction</th>
<th>Color</th>
<th>Size % - G</th>
<th>Size % - S</th>
<th>Size % - F</th>
<th>Description <em>(grain size, color, moisture, shear/odor, biota, wood, other debris)</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>25.0</td>
<td></td>
<td>30%</td>
<td>70%</td>
<td>10%</td>
<td></td>
<td>M-SAND + SILT</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GRYY1</td>
<td>v.d.</td>
<td>greenish</td>
<td>gray</td>
<td>Sand: damp, dark gray, gravelly grading to gravelly M-SAND, no layers</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Sand is angular up to 2&quot;, w/ small</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>gray, hard, rounded, 1/16&quot; clay clasts</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Bottom of Core = 8.8',</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>winnowed 30% below 7.4' was not sampled</td>
</tr>
</tbody>
</table>

Sample Quality: good
Mudmole™ Bore Log

Project: LDWG Duwamish Coring
Project No: 341186.001
Collected by: GSM
Date: 2/17/2006

Station: 203 R1
Position: NAD83
Time: 10:23

Water depth: 24.4 ft
Mudline: -16.6 ft MLLW (estimated using tide tables)

Penetration interval (ft) | Interval recovery (ft) | Percent recovery | Depth below mudline (ft) | Distance from top of tube (ft)
--- | --- | --- | --- | ---
0-1.35 | 0.65 | 48% | 1 | 7.2
1.35-2.25 | 1.3 | 144% | 2 | 7.68
2.25-3.85 | 1.8 | 113% | 3 | 8.79
3.85-6.05 | 2 | 91% | 4 | 9.99
6.05-8.05 | 1.6 | 80% | 5 | 11.09
8.05-9.85 | 1 | 56% | 6 | 12.00
9.85-11.35 | 0.4 | 27% | 7 | 12.90
11.35-12.05 | 0.3 | 43% | 8 | 13.71

Weather/Comments: N/A

Penetration 12.05 ft / On deck recovery 8.85 ft = 73% Recovery
# MCS Environmental MudMole Bore Log

## Collection Information

**Date:** 2-17-06  
**Recorder:** Gsu  
**Project:** 341185.001 Windward Lower Duwamish Coring

**Station Name:** 203  
**Tube Length (ft):** 16.05  
**Water Depth (ft):** 24.4  
**Est. Tide Height (ft):** 7.8 (MLLW)  
**Est. Mudline:** (MLLW)  
**Comments:** 24ft depth - gentle slope - sandy silt - 24 ft visibility

## Position Information

**Coordinate Datum:** WA State Plane N, NAD 83, Survey Ft  
**Northing:** 202013  
**Easting:** 1268832  
**On Deck Top of Sediment:** 7.2

## Penetration Tape

<table>
<thead>
<tr>
<th>Reading</th>
<th>Recovery Tape Reading</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.7</td>
<td>15.4</td>
<td></td>
</tr>
<tr>
<td>13.8</td>
<td>14.1</td>
<td></td>
</tr>
<tr>
<td>12.2</td>
<td>12.3</td>
<td></td>
</tr>
<tr>
<td>10.0</td>
<td>10.3</td>
<td></td>
</tr>
<tr>
<td>6.0</td>
<td>8.7</td>
<td></td>
</tr>
<tr>
<td>6.2</td>
<td>7.7</td>
<td>penetration slowed</td>
</tr>
<tr>
<td>4.7</td>
<td>7.3</td>
<td></td>
</tr>
<tr>
<td>4.0</td>
<td>7.0</td>
<td>goal reached</td>
</tr>
</tbody>
</table>

sand & crushed rock in tip of core
Station Number: 203  
Date: 01/01/06  
Station Arrival Time: 0830  
Field Technician: TD  
Core Tube Length: 16.05  
Lead Line Water Depth: 24A  
Core Number: KCS/KSS  
Station Departure Time: 1050  
On-site Visitor:  
Latitute:  
Longitude:  

**Pre-Drive and Diver Observations:**

- Shoreline & surrounding area:  same as Station 34 (R2)
- Sediment surface & slope: gentle slope, sandy silt, organic debris
- Water current and visibility: no current, 2 Pt. vis.
- Diver Water Depth: 24
- Tip Probe Depth:  
- Disk Probe Depth:  

**Drive Initiation Time:** 1032  
**Drive Completion Time:** 1037  
**Drive Offset:**  
**Estimated angle of drive:** east under water, est 10°

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, moderate, difficult; measured by diver or deck)</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.7</td>
<td>15.4</td>
<td>over recorded, free fall</td>
</tr>
<tr>
<td>13.8</td>
<td>14.1</td>
<td>easy drive</td>
</tr>
<tr>
<td>12.2</td>
<td>12.3</td>
<td>easy drive</td>
</tr>
<tr>
<td>10.0</td>
<td>10.3</td>
<td>easy drive</td>
</tr>
<tr>
<td>8.0</td>
<td>8.7</td>
<td>easy drive</td>
</tr>
<tr>
<td>6.7</td>
<td>7.7</td>
<td>moderate drive, penetration slowed</td>
</tr>
<tr>
<td>4.7</td>
<td>4.7</td>
<td>difficult drive</td>
</tr>
<tr>
<td>4.0</td>
<td>4.0</td>
<td>difficult drive, penetration good reached</td>
</tr>
<tr>
<td>TOTAL 12.05</td>
<td>TOTAL 9.05</td>
<td>Percent Recovered: 75.1% (73.4% on deck)</td>
</tr>
</tbody>
</table>

Reason for ending drive: penetration goal reached

If refusal, reason for refusal:  

**Tension on line?** Yes  
**Stability of vessel:** no problem

**Overlying water in core (quantity and description):** clear, slightly turbid

**On Boat Recovery:** 7.7  
**Loss of Sediment:** 0.2

**Extraction Notes:** (i.e. winch or hammer; easy, hard) Winch, easy

**On Core Observations:**

- Staining: dark, silty sand
- Tube Deformation: none
- Sediment Description (odor or sheen?): sand, very sand and silt, no odor, no sheen

Keep or Retry: diver inserted screw plugged sed/rsp interface

Diver observed sand and crushed rock in core tip

Notes: Penetration & Recovery measured from top of core tube to sediment surface in foot (teeth)
<table>
<thead>
<tr>
<th>Recov. Length (ft)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Silt % - G</th>
<th>Sand % - S</th>
<th>Clay % - F</th>
<th>Description (grain size, color, moisture, sheen/odor, Blake, wood, other debris)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.50</td>
<td></td>
<td>Gray</td>
<td>10</td>
<td>90</td>
<td>0.1</td>
<td>0.07 - 0.1 yellow, loose, brown, dark, fine sand, fine silt, no color</td>
</tr>
<tr>
<td>2.50</td>
<td></td>
<td>Black</td>
<td>10</td>
<td>90</td>
<td>0.1</td>
<td>0.07 - 0.1 yellow, loose, brown, dark, fine sand, fine silt, no color</td>
</tr>
<tr>
<td>3.00</td>
<td></td>
<td>Gray</td>
<td>12</td>
<td>96</td>
<td>0.1</td>
<td>3.00 - 4.2 yellow, brown, fine sand, fine silt, no color</td>
</tr>
<tr>
<td>3.00</td>
<td></td>
<td>Gray</td>
<td>15</td>
<td>85</td>
<td>0.1</td>
<td>3.00 - 4.2 yellow, brown, fine sand, fine silt, no color</td>
</tr>
</tbody>
</table>

Notes: Pen = 10.24, Perc = 31%
<table>
<thead>
<tr>
<th>Recovered Length (m)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Size % - G</th>
<th>Size % - S</th>
<th>Size % - F</th>
<th>PID</th>
<th>Description (grain size, color, moisture, shear/odor, biota, wood, other debris)</th>
<th>Initial Actual Depth (m)</th>
<th>Sample Depth</th>
<th>Subsample No</th>
<th>Summary Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>SAR</td>
<td></td>
<td></td>
<td></td>
<td>SAR</td>
<td>6-8, 1240, thick layer of olive-gray sand</td>
<td></td>
<td></td>
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<td></td>
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</tr>
</tbody>
</table>

End of Core 8.3 m
Core catcher full

NOTES: RI Examined

- Sed. is coming out of core shoe
- Core shoe is dented (rock?)
- Core is intact
- Core catcher is full

Sed. tagged:
- Sandy silt - olive brown
- Black silt (frag.)
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-14-06  Recorder: G. SM

Project: 341185.001 Windward Lower Duwamish Coring

Station Name: 35 R2

Tube Length (ft): 16.05

Water Depth (ft): 21.2  Time: 15:05

Est. Tide Height (ft): 6.7 (MLLW)

Est. Mudline: (MLLW)

Comments: 

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft

Northing 201602

Easting 1269260

On Deck Top of Sediment 8.0

Comments: 

29 ft off station

Penetration Tape

<table>
<thead>
<tr>
<th>Reading</th>
<th>Recovery Tape Reading</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.3</td>
<td>15.3</td>
<td></td>
</tr>
<tr>
<td>12.4</td>
<td>12.3</td>
<td></td>
</tr>
<tr>
<td>10.3</td>
<td>10.7</td>
<td></td>
</tr>
<tr>
<td>8.1</td>
<td>9.1</td>
<td></td>
</tr>
<tr>
<td>6.0</td>
<td>8.1</td>
<td>slowing refusal</td>
</tr>
<tr>
<td>5.9</td>
<td>7.9</td>
<td></td>
</tr>
</tbody>
</table>
Station Number: 35  
Date: 12/14/10  
Station Arrival Time: 14:14  
Attempt: 2  
Core Tube Length: 16.05  
Station Departure Time: 15:55  
Field Technician: TD  
Lead Line Water Depth: 21.2  
Contractor: WJS/ESSE  
Latitude: 20160  
On-site Visitor:  
Longitude: 126.926  

Pre-Drive and Diver Observations:

Shoreline & surrounding area: Same as E1
Sediment surface & slope: Gentle slope, no debris, silty sand
Water current and visibility: Field measuring tube: 1 ft vs. strong wind from north
Diver Water Depth: 20
Tip Probe Depth:  
Disk Probe Depth:  

Drive Observations:

Drive Initiation Time: 15:11  
Drive Completion Time: 15  
Estimated angle of drive: Unable to see, expect under water, est. 10° off
Drive Offset:  

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, moderate, difficult; measured by diver or deck)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.3</td>
<td>15.3</td>
<td>Diver measured, free flow</td>
</tr>
<tr>
<td>12.4</td>
<td>12.3</td>
<td>Easy to moderate drive</td>
</tr>
<tr>
<td>10.3</td>
<td>12.7</td>
<td>Moderate drive</td>
</tr>
<tr>
<td>8.1</td>
<td>9.1</td>
<td>Moderate to easy drive</td>
</tr>
<tr>
<td>5.9</td>
<td>7.9</td>
<td>Difficult to easy drive, recovery slowing</td>
</tr>
</tbody>
</table>

TOTAL: 30.15 TOTAL: 8.15 Percent Recovered: 80.3%

Reason for ending drive: refused
If refusal, reason for refusal: No penetration/recovery

Extraction Observations:

Tension on line: Yes  
Stability of vessel: No problem
Overlying water in core (quantity and description): Yes, slightly turbid, ~500 mL
On Boat Recovery: 8.0  
Loss of Sediment: 0.14
Extraction Notes: (i.e. winch or hammer, easy, hard) Winch, moderately easy

On Deck Observations:

Staining: Dark silty sand, spray on top
Tube Deformation: None
Sediment Description (odor or sheen?): Gray mud, sand, no odor, no sheen

Keep or Retry: Diver inserted, saw plug at sed/14.0 interface

Notes:  
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-14-06  Recorder: 65M

Project: 341185.001 Windward Lower Duwamish Coring

Station Name: 35 R1

Tube Length (ft): 15-85

Water Depth (ft): 16.8  Time: 1429

Est. Tide Height (ft) 7.5 (MLLW)

Est. Mudline: (MLLW)

Comments: moved 21 A along shore to avoid cable crossing area

incoming tide - diver depth 16 - gentle slope - silty sand - m debris

2 A visibility

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft

Northing 201391

Easting 1269253

On Deck Top of Sediment 13.9

Penetration Tape Reading  Recovery Tape Reading  Comments

15-6  15-1

14.1  13.9

13.0  13.4

12.8  13.2

refusal

Tip of core crushed

HIT rock

(beach is rip rap)
# Mudmole™ Bore Log

**Project:** LDWG Duwamish Coring  
**Station:** 35 R1  
**Project No:** 341185.001  
**Position:** NAD83  
**Collected by:** GSM  
**Date:** 2/14/2006  
**Time:** 14:29  
**Water depth:** 16.8 ft  
**Mudline:** -9.3 ft MLLW (estimated using tide tables)  

**Weather/Comments:** N/A  

**Driven to refusal**

<table>
<thead>
<tr>
<th>Distance from top of tube (ft)</th>
<th>Penetration interval (ft)</th>
<th>Interval recovery (ft)</th>
<th>Percent recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td>0-0.25</td>
<td>0.75</td>
<td>300%</td>
</tr>
<tr>
<td>12.0</td>
<td>0.25-1.75</td>
<td>1.2</td>
<td>60%</td>
</tr>
<tr>
<td>12.5</td>
<td>1.75-2.85</td>
<td>0.5</td>
<td>45%</td>
</tr>
<tr>
<td>13.0</td>
<td>2.85-3.05</td>
<td>0.2</td>
<td>100%</td>
</tr>
</tbody>
</table>

**Penetration 3.05 ft/ On deck recovery 1.95 ft = 64% Recovery**

**Depth below mudline (ft)**

<table>
<thead>
<tr>
<th>Depth below mudline (ft)</th>
<th>Distance from top of tube (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td>Mudline: 13.9</td>
</tr>
<tr>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>3.0</td>
<td>3.0</td>
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<td>4.0</td>
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<td>19.0</td>
<td>19.0</td>
</tr>
<tr>
<td>20.0</td>
<td>20.0</td>
</tr>
</tbody>
</table>

**File name:** 35 R1  
**Bore Log (mudline):** 217 of 490
Station Number: 35  
Attempt: 1  
Field Technician: TD  
Contractor: MV5/ESB  
On-site Visitor:  

Pre-Drive and Diver Observations:  
- Shoreline & surrounding area: wood debris, wood pilings and dolphins (fish offloading pier at SeaFreeze)  
- Sediment surface & slope: gentle slope, silty sand, no debris  
- Water current and visibility:  
- Diver Water Depth: 10  
  Tip Probe Depth  
  Disk Probe Depth  

Drive Observations:  
- Drive Initiation Time: 1435  
- Drive Completion Time: 1441  
- Drive Offset:  
- Estimated angle of drive:  

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, moderate, difficult; measured by diver or deck)</th>
</tr>
</thead>
</table>
| 15.6        | 15.1     | diver measured; fell foul  
| 14.1        | 13.9     | easy drive to mudflats  
| 12.6        | 13.2     | moderate to difficult drive, mudflats slightly angular  
| TOTAL 3.05  | TOTAL 2.65|  

Percent Recovered: 89.9%  

Reason for ending drive: refusal  
If refusal, reason for refusal: hit something hard  

Extraction Observations:  
- Tension on line: 44-5  
- Stability of vessel: no problem  
- Overlying water in core (quantity and description): yes, clear, ~11  
- On Boat Recovery: 13.9  
- Loss of Sediment: 4.7  
- Extraction Notes: (i.e. winch or hammer, easy, hard) winch, easy  

On-Deck Observations:  
- Staining: dark, silty sand, spread out  
- Tube Deformation: tip et hub very deformed  
- Sediment Description (odor or sheen): dark, silty sand, no odor, no sheen  

Keep or Retrain: diver inserted screw plug at sed/tho interface  

core hit something hard  

Notes:  
Penetration & Recovery measured from top of core tube to sediment surface in foot (tenths)
## Sediment Core Processing Log

**Job:** LDWG Processing

**Core Location/Sample Number:** SC-36-RI (FIELD REP 302)

**Date/Time:** 8/11/06, start 9:00 and 10:00

**Sample Logged by:** J. Melve, A. Friepadick

**Type/Diameter of Sample:** 4" sq aluminum, MCS

**Sample Quality:** good

### Notes
- Pen 2.3
- Deck Rec = 101

### Deck Rec = 101

<table>
<thead>
<tr>
<th>Recorded Length (m)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Site S-G</th>
<th>Site S-F</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.54</td>
<td>10</td>
<td>gray</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.54</td>
<td>10</td>
<td>gray</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.54</td>
<td>10</td>
<td>gray</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### in Breach Zone

- Description: (grain size, color, moisture, structure, odor, biota, wood, other debris)

- **Silt:** Ultermem, wet, soft, sl sandy silt w/ 1 worm
- **Silt mud:** black, wet, med stiff organic silt w/ scattered rootlets, bloody texture, massive, no layering, low plasticity, sl compressible, trace H2S odor, salt
- **At 0.6 ft:** small wood fragments, scattered shell fragments, max 2"L

- **At 2.0 ft:** 1/2" mud sand layer

- less organics w/ depth

- **Silt:** moist to wet, med stiff, dark greenish gray silt, sandy silt interbedded w/ black, organic silt from above, banded 3" layers, scattered rootlets, tons, no H2S odor, below 3.2 ft

- **At 4.4 ft:** whole clam shell 3"L

- **Silt:** moist to wet, mud stiff, dark grayish gray silt w/ scattered rootlets, no distinct layers
LDW-SC-36

Feb 16, 2006

\[\text{Drilled to sediment} = 6.0\,\text{ft}\]

\[\text{Slightly winnowed from 10 - 10.2'}\]

\[\text{Only sample to 10 ft}\]

\[\text{Shot 50% empty}\]

\[C\text{-m-SAN D to winnowed}\]
## Sediment Core Processing Log

**Core Location/Sample Number:** SC-36 - R1 (field rep 208)

**Date/Time:** 02/11/01 05

**Sample Logged by:** LMcKee, A Fitzpatrick

**Sample Quality:** good fair poor disturbed

### Notes:

- CONTINUED

### Description:

1. **Sediment Characteristics**
   - **Color:**
     - Unit 90: Dark gray
     - Beds 80-20: Greenish gray
   - **Texture:**
     - Unit 90: Moist to damp
     - Beds 80-20: Uniform bands/layer of alternating fine silty sand and silt (nuclace-look) bands = 1" thick and slightly convex. No silt below 9.5'
   - **Depth:**
     - At 9.5 ft, large wood log 3'x8'
     - Core end in sand with depth below 9.6'
   - **Bottom of Core:** 10.2
   - A sand has multicolored grains = white, red, orange

2. **Units:**
   - **Depth:**
     - Unit 100: 1.80
     - Unit 2.46: 2.46
     - Unit 6.8: 6.8
   - **Sample No.:**
     - Unit 100: 1.80
     - Unit 2.46: 2.46
     - Unit 6.8: 6.8

### Diagram:

- At 7.8' TV = 4.5' big
- At 4' TV = 4.5' big

---

*F-2 275 of 490*
Mudmole™ Bore Log

Project:  LDWG Duwamish Coring  
Project No:  341185.001  
Collected by:  GSM  
Date:  2/15/2006  
Water depth:  17.4 ft

Station:  36 R1  
Position:  NAD83  
Time:  11:31  
Mudline:  -14.5 ft MLLW (estimated using tide tables)

Date:  2/15/2006  
Water depth:  17.4 ft  
Mudline:  -14.5 ft MLLW (estimated using tide tables)

Weather/Comments:  Sunny
Driven to refusal

Penetration 12.3 ft/ On deck recovery 10.1 ft = 82% Recovery
**MCS Environmental MudMole Bore Log**

**Collection Information**

- **Date:** 2-15-06  
- **Recorder:** 6507  
- **Project:** 341185.001 Windward Lower Duwamish Coring

**Position Information**

- **Coordinate Datum:** WA State Plane N, NAD 83, Survey Ft  
  - **Northing:** 201 490  
  - **Easting:** 126 998

- **Est. Mudline:** (MLLW)  
- **On Deck Top of Sediment:** 6.0

**Comments:** slack low tide - diver depth 17-4 flat bottom  
- sandy silt - no debris - flat bottom - vis 2 ft  
- 3 ft from station

<table>
<thead>
<tr>
<th>Penetration Tape Reading</th>
<th>Recovery Tape Reading</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.7</td>
<td>15.6</td>
<td></td>
</tr>
<tr>
<td>13.1</td>
<td>13.4</td>
<td></td>
</tr>
<tr>
<td>10.6</td>
<td>11.3</td>
<td></td>
</tr>
<tr>
<td>8.3</td>
<td>9.4</td>
<td></td>
</tr>
<tr>
<td>6.3</td>
<td>7.7</td>
<td></td>
</tr>
<tr>
<td>5.0</td>
<td>6.8</td>
<td>penetration slowed refusal</td>
</tr>
<tr>
<td>3.8</td>
<td>5.9</td>
<td></td>
</tr>
</tbody>
</table>
Station Number: 36
Attempt: TD
Field Technician: TD
Contractor: 105/885
On-site Visitor: 

Pre-Drive and Diver Observations:
Shoreline & surrounding area: 2 ft. above s. boat ramp.
Sediment surface & slope: smooth, flat bottom, no debris
Water current and visibility: 17
Diver Water Depth:

Drive Observations:
Drive Initiation Time: 1135
Drive Completion Time: 1144
Drive Offset: 
Estimated angle of drive:

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, moderate, difficult; measured by diver or deck)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.7</td>
<td>15.6</td>
<td>diver recorded, sea fan</td>
</tr>
<tr>
<td>13.1</td>
<td>13.4</td>
<td>easy drive</td>
</tr>
<tr>
<td>10.6</td>
<td>11.3</td>
<td>easy-moderate drive</td>
</tr>
<tr>
<td>8.3</td>
<td>9.4</td>
<td>moderate drive</td>
</tr>
<tr>
<td>6.3</td>
<td>7.7</td>
<td>moderate drive</td>
</tr>
<tr>
<td>5.0</td>
<td>6.8</td>
<td>moderate-difficult drive, penetration slowed</td>
</tr>
<tr>
<td>3.8</td>
<td>5.9</td>
<td>difficult drive, refusal</td>
</tr>
</tbody>
</table>

TOTAL 12.3
TOTAL 10.2
Percent Recovered: 82.9%
Reason for ending drive: penetration goal reached
If refusal, reason for refusal:

Extraction Observations:
Tension on line? yes
Stability of vessel: no problem
Overlying water in core (quantity and description): yes, clear
On Boat Recovery: 6.0
Loss of Sediment: 0.1 ft.
Extraction Notes: (i.e. winch or hammer, easy, hard) winch, easy

On Deck Observations:
Staining: slightly, spayed off
Tube Deformation: none
Sediment Description (odor or sheen?): grey mud, sand; no odor, no sheen

Keep or Retry: diver inserted screw plug @ sed/plt interce

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
### Sediment Core Processing Log

**Job:** LAW6 Processing  
**Job Number:** F25S-1822C-511  
**No. of Sections:** 1  
**Sample Length (from log):** 10.1

**Notes:** Position = 7.8,  
**On Dock Dec. = 10/11/94**

#### Description

<table>
<thead>
<tr>
<th>Recorded Length (ft)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Size % G</th>
<th>Size % S</th>
<th>Size % F</th>
<th>PID</th>
<th>(grain size, color, moisture, shape/odor, bloating, wood, other debris)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.254</td>
<td>0</td>
<td>10</td>
<td>90</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0-0.0-0.4 Silt: dry, brown, wet, soft silty clayey silty</td>
</tr>
<tr>
<td>2.54</td>
<td>0</td>
<td>10</td>
<td>90</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>transition</td>
</tr>
<tr>
<td>2.51</td>
<td>0</td>
<td>10</td>
<td>90</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.4-0.6 Silt: dry, brown, wet, clayey silty</td>
</tr>
<tr>
<td>3.0</td>
<td>0</td>
<td>10</td>
<td>90</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>transition</td>
</tr>
<tr>
<td>3.0</td>
<td>0</td>
<td>10</td>
<td>90</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3.0-3.0-3.0 Silt: dry, brown, wet, clayey silty</td>
</tr>
<tr>
<td>4.1-8.0</td>
<td>0</td>
<td>10</td>
<td>90</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>transition</td>
</tr>
<tr>
<td>4.1-8.0</td>
<td>0</td>
<td>10</td>
<td>90</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4.1-8.0 Silt: dry, brown, wet, clayey silty</td>
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<tr>
<td>4.1-8.0</td>
<td>0</td>
<td>10</td>
<td>90</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>transition</td>
</tr>
<tr>
<td>4.1-8.0</td>
<td>0</td>
<td>10</td>
<td>90</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4.1-8.0 Silt: dry, brown, soft, clayey silty, blocky, massive</td>
</tr>
</tbody>
</table>

**Core Location/Sample Number:** SG 2025 R1 Chilnualna 36  
**Date/Time:** 02/11/94 08:20  
**Sample Logged by:** LMY  
**Type/Diameter of Sample:** 4 in diameter

**Sample Quality:** good, fair, poor, disturbed
LDW-SC-202 (Field rep of station 36)
Feb 16, 2004

6.0

10 1'

16.1

On deck to sediment = 4.0'
Shell is 3/4 full
Winnowing from 10.0 - 10.1'
Sediment Core Processing Log

Core Location/Sample Number: SC-A02-R1
Date/Time: 2/16/10 1020
Sample Logged by: L. See
Type/Diameter of Sample: 
Sample Quality: good, fair, poor, disturbed
Notes: CONTINUED

<table>
<thead>
<tr>
<th>Recorded Length (ft)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Size % G</th>
<th>Size % S</th>
<th>Size % F</th>
<th>PID</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>0.0</td>
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<tr>
<td>0.1</td>
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<td></td>
<td></td>
<td></td>
<td>80</td>
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<td>0.2</td>
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<td></td>
<td>20</td>
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<td>10</td>
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<td>0.4</td>
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<td></td>
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<td>10</td>
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<tr>
<td>0.6</td>
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<td></td>
<td>10</td>
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<tr>
<td>0.7</td>
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<td>10</td>
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<td>10</td>
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<tr>
<td>0.9</td>
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<td>10</td>
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<tr>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>

Description:
- SAND
  - moist, dark gray fine sand with multi-colored grains (white, red, orange)
  - uniform layers 0.2' thick of silt, fine sand and SILT
  - Woody fragments up to 0.1' L
  - SAND coarsens downward
  - 100 woody fragments, 0.2' L

Bottom of Core at 10.1'
Mudmole™ Bore Log

Project: LDWG Duwamish Coring
Project No: 341185.001
Collected by: GSM
Date: 2/15/2006

Station: 202 R1
Position: NAD83

Water depth: 16.5 ft Mudline: -12.7 ft MLLW (estimated using tide tables)

Weather/Comments: N/A

Penetration interval

Depth below mudline (ft)

Distance from top of tube (ft)

Penetration 12.5 ft/ On deck recovery 10.1 ft = 81% Recovery

Penetration

Interval recovery

Percent recovery

Distance from top of tube (ft)

Mudline

0.0 4.0 8.0 12.0 16.0

Top of sediment

On deck

m-situ
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-15-06  Recorder: GSR

Project: 341185.001 Windward Lower Duwamish Coring

Station Name: 202 R1

| Tube Length (ft): 16.1 |
| Water Depth (ft): 16.5 |
| Est. Tide Height (ft): 3.8 |

Est. Mudline: (MLLW) Predicted

Comments: 15 cm above - vis to A - sandy silt - flat bottom
- no debris

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft

Northing 201491

Easting 1269986

On Deck Top of Sediment 6.0

Penetration Tape Reading  Recovery Tape Reading  Comments

| 16.0 | 15.8 |
| 13.6 | 13.9 |
| 10.8 | 12.0 |
| 7.9  | 9.6  |
| 5.7  | 7.8  |
| 4.6  | 6.8  |
| 3.6  | 6.0  |

goal reached  refusal
Station Number: 202  
Date: 07/15/06  
Station Arrival Time: 1240

Attempt: 1  
Core Tube Length: 16.1  
Station Departure Time: 1320

Field Technician: TD  
Lead Line Water Depth: 16.5  
Dist. From Target Station: 50 ft

Contractor: NWS/ESS  
Latitude: 2014.91  
(50 ft. from station 36 east 131)

On-site Visitor:  
Longitude: 126.9986

Pre-Drive and Diver Observations:

Shoreline & surrounding area: rip rap, 1st Ass boat launch, wooden dock

Sediment surface & slope: sandy, slight, flat bottom, no ripple

Water current and visibility: 2 ft. vs. slack tide, flowing

Diver Water Depth 15

Drive Notes (e.g. easy, moderate, difficult; measured by diver or deck):

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>16.0</td>
<td>15.8</td>
<td>easy-moderate drive</td>
</tr>
<tr>
<td>13.0</td>
<td>13.9</td>
<td>easy-moderate drive</td>
</tr>
<tr>
<td>10.8</td>
<td>12.0</td>
<td>easy-moderate drive</td>
</tr>
<tr>
<td>9.0</td>
<td>9.0</td>
<td>moderate drive</td>
</tr>
<tr>
<td>7.9</td>
<td>7.8</td>
<td>moderate drive</td>
</tr>
<tr>
<td>5.7</td>
<td>6.8</td>
<td>moderate - difficult drive, penetration done</td>
</tr>
<tr>
<td>3.6</td>
<td>6.0</td>
<td>difficult drive, penetration refusal</td>
</tr>
</tbody>
</table>

TOTAL: 12.5 TOTAL: 10.1  
Percent Recovered: 80.8%

Reason for ending drive: penetration goal reached; refusal

If refusal, reason for refusal: sand layer

Extraction Observations:

Tension on line? Yes  
Stability of vessel: No problem

Overlying water in core (quantity and description): yes, clear, no storm

On Boat Recovery: 400  
Loss of Sediment: 0

Extraction Notes: (i.e. winch or hammer, easy, hard) Winch, easy to moderate

On Deck Observations:

Staining: slight amount of silty sand, sprayed off

Tube Deformation: None

Sediment Description (odor or sheen?): med. sand, brown, no odor, no sheen

Keep or Retry: over inserted screw plug at 16.0 foot interface

FIELD REPLICA OF LOW-SCALE

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (towards)
<table>
<thead>
<tr>
<th>Recovery Length (ft)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Size % G</th>
<th>Size % S</th>
<th>Size % F</th>
<th>PUD</th>
<th>Description (grain size, color, moisture, sheen/odor, biota, wood, other debris)</th>
<th>Individual Sample Depth (ft)</th>
<th>Sample Depth</th>
<th>Subsample No.</th>
<th>Summary Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.54</td>
<td>50</td>
<td>black</td>
<td>70-10</td>
<td>100-10</td>
<td>100-10</td>
<td>90</td>
<td>wet, soft, sappy, olive-brown silty sandy silt (transitional)</td>
<td>2</td>
<td>1-2</td>
<td>2</td>
<td>SILT</td>
</tr>
<tr>
<td>2.54</td>
<td>90</td>
<td>black</td>
<td>90-10</td>
<td>100-10</td>
<td>100-10</td>
<td>90</td>
<td>woody fragments, occasional woody fiber, olive grey clayey silt</td>
<td>1</td>
<td>1-2</td>
<td>2</td>
<td>SILT</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>@ 1.5, piece of copper wire</td>
<td>2</td>
<td>2-4</td>
<td>4</td>
<td>SILT</td>
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<tr>
<td>85</td>
<td>15</td>
<td>black</td>
<td>85-15</td>
<td>100-15</td>
<td>100-15</td>
<td>90</td>
<td>calcite large of silty sand, black, wet, to fine and graded</td>
<td>2</td>
<td>2-4</td>
<td>4</td>
<td>SILT</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>@ 2.6, large piece of copper wire</td>
<td>3</td>
<td>4-5</td>
<td>5</td>
<td>SILT</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.2% wood fragment w/BP pet-like odor</td>
<td>4</td>
<td>4-5</td>
<td>5</td>
<td>SILT</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>@ 3.5, large piece of copper wire</td>
<td>4</td>
<td>4-5</td>
<td>5</td>
<td>SILT</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.3' wood fragment w/BP pet-like odor</td>
<td>4</td>
<td>4-5</td>
<td>5</td>
<td>SILT</td>
</tr>
<tr>
<td>2.54</td>
<td>10</td>
<td>black</td>
<td>10-10</td>
<td>100-10</td>
<td>100-10</td>
<td>90</td>
<td>0.3' wood fragment w/BP pet-like odor</td>
<td>5</td>
<td>4-5</td>
<td>5</td>
<td>SAND</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>@ 4.7, silt pocket as described below embedded in black fine sand</td>
<td>5</td>
<td>4-5</td>
<td>5</td>
<td>SAND</td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>@ 4.9, silt pocket of grey green sand</td>
<td>5</td>
<td>4-5</td>
<td>5</td>
<td>SAND</td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>@ 5.3, silt pocket of grey green sand</td>
<td>5</td>
<td>4-5</td>
<td>5</td>
<td>SAND</td>
</tr>
</tbody>
</table>

Baggie @ 15'
Baggie @ 3.9'
### Sediment Core Processing Log

**Job:** Long Core Processing  
**Job Number:** P010-01030-59  
**No. of Sections:**  
**Sample Length (from log):**  
**Avg. % Compaction:**

**Notes:** Pen = 8.1%  
**Sample Quality:** good, fair, poor, disturbed

---

<table>
<thead>
<tr>
<th>Recovered Length (ft)</th>
<th>% Compaction</th>
<th>Grain Size</th>
<th>Grain Size</th>
<th>PnD</th>
<th>Description (grain size, color, moisture, sheen/odor, biota, wood, other debris)</th>
<th>Initial Actual Depth (ft)</th>
<th>Sample Depth</th>
<th>Subsample No.</th>
<th>Comments</th>
</tr>
</thead>
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<tr>
<td></td>
<td></td>
<td>SAA</td>
<td></td>
<td></td>
<td>SAA</td>
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<td></td>
<td></td>
<td>SAND</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>End of core @ 6.91</td>
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</tbody>
</table>
SC-37-R1

9.2' - 6.9' - 110.1'

Mudline = 9.2'

Core catcher is full w/ void space in top 1/6".
Black fine sand

Sheen florets: 0-5 = occasional, 1/2" &
@ 3.5 floret 0.11" &
@ 4.0 sheen streak 0.3" L

all m/sheen zone
Mudmole™ Bore Log

Project: LDWG Duwamish Coring

Station: 37 R1

Project No: 341185.001

Position: NAD83

Collected by: GSM

Date: 2/22/2006

Time: 12:28

Water depth: 19.8 ft

Mudline: -11.6 ft MLLW (estimated using tide tables)

Weather/Comments: N/A

Driven to refusal

Penetration interval (ft) | Interval recovery (ft) | Percent recovery
---|---|---
0-1.35 | 0.65 | 48%
1.35-3.35 | 2.1 | 105%
3.35-4.45 | 1.1 | 100%
4.45-6.45 | 1.6 | 80%
6.45-7.65 | 0.9 | 75%
7.65-8.65 | 0.7 | 76%

Depth below mudline (ft) | Distance from top of tube (ft)
---|---
Mudline | 9.2
1 | 9.68
2 | 10.53
3 | 11.58
4 | 12.60
5 | 13.49
6 | 14.29
7 | 15.06
8 | 15.82
9 | No sample
10 | No sample
11 | No sample
12 | No sample
13 | No sample
14 | No sample
15 | No sample
16 | No sample
17 | No sample
18 | No sample
19 | No sample
20 | No sample

Penetration 8.65 ft/ On deck recovery 6.85 ft = 80% Recovery
Station Number: 37  Date: 02/22/06  Station Arrival Time: 1300 (boat already anchored)
Attempt: 1  Core Tube Length: 16.09  Station Departure Time: 1300
Field Technician: TD  Lead Line Water Depth: 19.4  Dist. From Target Station: 110
Contractor: KCS/ESS  Latitude: 201435
On-site Visitor:  Longitude: 1270690

Pre-Drive and Dive Observations:
Shoreline & surrounding area:
rip rap & concrete debris, used pier (rock), wood pilings, buoys around us.
Sediment surface & slope:
sloping, silt bottom, pilings in area
Water current and visibility:
4 ft vis, mild current
Diver Water Depth: 19  Tip Probe Depth:  9
Diving Depth: 0  Disk Probe Depth: 9

Drive Initiation Time: 1743  Drive Completion Time: 1849  Drive Offset:  
Estimated angle of drive:  est 10° east under water

Penetration  Recovery  Drive Notes (e.g. easy, moderate, difficult; measured by diver or deck)
14.7  15.4  Over recorded, free fall
12.7  13.3  easy drive
11.6  12.2  moderate drive
9.6  10.4  moderate drive
8.4  9.7  moderate, difficult drive, penetration slowed
7.5  9.0  difficult drive, refusal

TOTAL 7.05  TOTAL 7.05  Percent Recovered 92.4% (80.1% on core)
Reason for ending drive: refusal
If refusal, reason for refusal: hard substrate

Extraordinary Conditions:
Tension on line? YES  Stability of vessel: no problem
Stability of vessel: no problem
Overlying water in core (quantity and description): yes, clear, nil
On Boat Recovery: 9.2  Loss of Sediment: 0.7

Extraction Notes: (i.e. winch or hammer, easy, hard) winch, moderate

On-boat Observations:
Staining: did not observe  Dry streaks of silky sand
Tube Deformation: none
Sediment Description (odor or sheen?): did not observe, red sand, no odor, no sheen

Keep or Retry:
Diver inserted screw plug at core/lid interface
Free sand on core tip (diver observed)

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-22-06  Recorder: EJ

Project: 341185.001 Windward Lower Duwamish Coring

| Station Name: | 37 (R) |
| Water Depth (ft): | 19.8 |
| Time: | 12:28 |
| Est. Tide Height (ft): | 8.2 (MLLW) |
| Est. Mudline: | (MLLW) |
| Comments: | Station is under pier - sampled close as possible |

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft

| Northing | 201435 |
| Easting | 1270690 |
| On Deck Top of Sediment | 9.2 |

16 ft off station - diver depth 18 ft - 4' visibility steep slope silt bottom - old pilings in area - mild current

Penetration Tape Reading Recovery Tape Reading Comments

| 14.7 |
| 13.3 |
| 12.2 |
| 10.6 |
| 9.7 |
| 9.0 |
| Penetration slowed |
| Refusal |
Sediment Core Processing Log

Core Location/Sample Number: SC-38 R2

Date/Time: Feb 21, 2002

Sample Logged by: [Signature]

Type/Diameter of Sample: 4"/8" diam

Sample Quality: Good, Fair, Poor, Disturbed

Notes: (Not collected 2/27/2002)

Job: LDWk Core Processing

Job Number: [Job Number]

No. of Sections: 1

Sample Length (from log): 56'

Avg. % Compaction: 62.5'

Notes: 62.5% is 62.5%
Sample interval is 10% downwind from 3.8 ft. 3.5 + 3.8 ft.

Grade line = 12.3 ft.

Sha is winnowed by 6070.

All M-SAND
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-20-06  Recorder: GSM

Project: 341185.001 Windward Lower Duwamish Coring

Station Name: 38 R2

Tube Length (ft): 16.05

Water Depth (ft): 42.66  Time: 955

Est. Tide Height (ft) 9.8  (MLLW)

Est. Mudline: 42.66  (MLLW)

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft

Northing 200959

Easting 1269745

On Deck Top of Sediment 123

Comments: Eel depth - scattered ballast rock - silty sand -

Not bottom - falling tide - 3 ft visibility

Penetration Tape Reading  Recovery Tape Reading  Comments

14.7  15.2

13.2  14.1

11.7  12.9

10.9  12.4

10.5  12.2  refusal

native sand in tip of core
Station Number: 38  
Attempt: 2  
Field Technician: JMF  
Contractor: MCS/BS5  
On-site Visitor:  

Date: 2/20/04  
Core Tube Length: 16.05  
Lead Line Water Depth: 6.6  
Latitude: 200959  
Longitude: 1209745  

Shoreline & surrounding area: riprap, concrete columns  
Sediment surface & slope: scattered rock, silty sand, flat bottom  
Water current and visibility: 3+ x 15  
Diver Water Depth: 6.4  
Tip Probe Depth:  
Disk Probe Depth:  

Drive Initiation Time: 0955  
Drive Completion Time: 1007  
Drive Offset:  
Estimated angle of drive:  

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, moderate, difficult; measured by diver or deck)</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.2</td>
<td>15.2</td>
<td></td>
</tr>
<tr>
<td>13.2</td>
<td>14.1</td>
<td></td>
</tr>
<tr>
<td>11.9</td>
<td>12.9</td>
<td></td>
</tr>
<tr>
<td>10.9</td>
<td>17.4</td>
<td></td>
</tr>
<tr>
<td>10.5</td>
<td>12.2</td>
<td>refusal, hit something</td>
</tr>
</tbody>
</table>

TOTAL 55.5  TOTAL 38.5  Percent Recovered: 69.4% (67.6% on deck)  
Reason for ending drive: refusal  
If refusal, reason for refusal: hit something  

Tension on line: Y  
Stability of vessel: no problem  
Overlying water in core (quantity and description): no  
On Boat Recovery: 12.3  
Loss of Sediment: 0.1  
Extraction Notes: (i.e. winch or hammer, easy, hard) winch, easy  

Staining: some silt, rinsed  
Tube Deformation: none  
Sediment Description (odor or sheen?): native mud, fine sand, dark brown  

Keep or Retry: pending. Diver could not insert screen plug due to top core tube crushed  

Notes:  
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)  

The RETEC Group, Inc.  
3521 NE 166th Way, Suite 207  
Seattle, WA 98134-1162  
206.624.3140 Phone  
206.624.2937 Fax  
www.retec.com
Sediment Core Processing Log

Job: LDW6 Sed Core Proc

Core Location/Sample Number: SC-38-R1

Date/Time: 27 Feb 2006  Shlf 1680  Shg 1730

No. of Sections: 1

Sample Logged by: JLM 1372-1373

Type/Diameter of Sample: 2.4" sq. Alum.

Avg. % Compaction:

Notes: Pen = 4.5'

On Deck Deck = 3.4' 76% Penetration 100% collected 2 20 2006

Description
(grain size, color, moisture, shear/odor, block, wood, other debris)

<table>
<thead>
<tr>
<th>Recovered</th>
<th>% Compaction</th>
<th>Core</th>
<th>Size % S</th>
<th>Size % F</th>
<th>PFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5y</td>
<td></td>
<td>5</td>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25/1 black</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3/2 grey</td>
<td></td>
<td>20</td>
<td>80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>dark brown</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.5y</td>
<td></td>
<td>30</td>
<td>70</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25/1 black</td>
<td></td>
<td>50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31/2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.5&quot; LT 1.5&quot; L</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Silt**: wet, thick, dull/greenish, shiny, no odor.
- **Sand**: brown, moderate TPA-like odor.
- **Shale**: dull, greenish, dull, fine, no odor.

**Summary**: 100% impacted. (Pen 2.6 to 3.5)

**Shale Test**: 2.3 Ft: 100% of surface has sheen. (mod to heavy) W/ long streaks.

**Bottom of Zone E 3.3'**

Shale: had silt w/sand; 100% of surface did not test sand in this hole but R2 collected 20 Ft off-site of this station was sand from 1 to 3.3. Sample bottom sand from R1.

**Summary**: 100% impacted. (Pen 2.6 to 3.5)
**SC-38-RI**

- Mudline = 12.7'
- Intact sediments to bottom of WC
- Slightly scoring on dip
- Sidewalls = hard material

2/8/06

LM
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-20-06  Recorder: 657

Project: 341185.001 Windward Lower Duwamish Coring

Station Name: 38 R1

Tube Length (ft): 16.1

Water Depth (ft): 6.1  Time: 0919

Est. Tide Height (ft): 10.3 (MLLW)

Est. Mudline: 12.7 (MLLW)

Comments: Silty sand bottom - broken concrete in vicinity
<1/2 ft off station - depth 5 ft that bottom 3 ft vis
Scattered wood debris

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft

Northing 200938

Easting 1269746

On Deck Top of Sediment 12.7

Penetration Tape Reading  Recovery Tape Reading  Comments

13.5    14.0
12.3    13.1
11.6    12.5  (refusal)

Tip of core crushed

MCS Environmental, Inc.
6105 - 210th St SW, Suite 100
Mountlake Terrace, WA 98043
(425) 697-4340

Duwamish bore log form.xls
**Mudmole™ Bore Log**

**Project:** LDWG Duwamish Coring  
**Station:** 38 R1  
**Project No.:** 341185.001  
**Position:** NAD83  
**Collected by:** GSM  
**Date:** 2/20/2006  
**Time:** 9:19  
**Water depth:** 6.1 ft  
**Mudline:** 4.2 ft MLLW  
(estimated using tide tables)

**Weather/Comments:** N/A

Driven to refusal, on-deck top of sediment measurement is 13 ft from top of tube at field lab.

---

<table>
<thead>
<tr>
<th>Depth below mudline (ft)</th>
<th>Distance from top of tube (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>1.0</td>
<td>2.0</td>
</tr>
<tr>
<td>2.0</td>
<td>3.0</td>
</tr>
<tr>
<td>3.0</td>
<td>4.0</td>
</tr>
<tr>
<td>4.0</td>
<td>5.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Penetration interval (ft)</th>
<th>Interval recovery (ft)</th>
<th>Percent recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-2.6</td>
<td>2.1</td>
<td>81%</td>
</tr>
<tr>
<td>2.6-3.6</td>
<td>0.9</td>
<td>75%</td>
</tr>
<tr>
<td>3.6-4.5</td>
<td>0.6</td>
<td>86%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Depth below mudline (ft)</th>
<th>Distance from top of tube (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mudline</td>
<td>13</td>
</tr>
<tr>
<td>1</td>
<td>13.81</td>
</tr>
<tr>
<td>2</td>
<td>14.62</td>
</tr>
<tr>
<td>3</td>
<td>15.40</td>
</tr>
<tr>
<td>4</td>
<td>No sample</td>
</tr>
<tr>
<td>5</td>
<td>No sample</td>
</tr>
<tr>
<td>6</td>
<td>No sample</td>
</tr>
<tr>
<td>7</td>
<td>No sample</td>
</tr>
<tr>
<td>8</td>
<td>No sample</td>
</tr>
<tr>
<td>9</td>
<td>No sample</td>
</tr>
<tr>
<td>10</td>
<td>No sample</td>
</tr>
<tr>
<td>11</td>
<td>No sample</td>
</tr>
<tr>
<td>12</td>
<td>No sample</td>
</tr>
<tr>
<td>13</td>
<td>No sample</td>
</tr>
<tr>
<td>14</td>
<td>No sample</td>
</tr>
<tr>
<td>15</td>
<td>No sample</td>
</tr>
<tr>
<td>16</td>
<td>No sample</td>
</tr>
<tr>
<td>17</td>
<td>No sample</td>
</tr>
<tr>
<td>18</td>
<td>No sample</td>
</tr>
<tr>
<td>19</td>
<td>No sample</td>
</tr>
<tr>
<td>20</td>
<td>No sample</td>
</tr>
</tbody>
</table>

Penetration 4.5 ft / On deck recovery 3.1 ft = 69% Recovery

Adjusted in the lab. Depth to mudline is different from processing.
Mudmole™ Bore Log

Project: LDWG Duwamish Coring
Station: 38 R1
Position: NAD83
Collecting No.: 341185.001
Collected by: GSM
Date: 2/20/2006
Time: 9:19
Water depth: 6.1 ft

Penetration interval (ft)
Interval recovery (ft)
Percent recovery

Depth below mudline (ft)
Distance from top of tube (ft)

Penetration 4.5 ft/ On deck recovery 3.4 ft = 76% Recovery

MCS Environmental, Inc.
6308 219th Street SW, Suite 100
Mountlake Terrace, WA 98043
(425) 667-4340
(425) 667-4370
File name 38 R1
Bore Log (mudline) 300 of 490

Penetration interval:
0-2.6
2.6-3.8
3.8-4.5

Depth below mudline:

Distance from top of tube:

Mucline:
12.7

1
13.51
2
14.32
3
15.10
4
15.87
5
No sample
6
No sample
7
No sample
8
No sample
9
No sample
10
No sample
11
No sample
12
No sample
13
No sample
14
No sample
15
No sample
16
No sample
17
No sample
18
No sample
19
No sample
20
No sample

N/A
Driven to refusal
### Drive Observations

**Station Number:** 1438  
**Date:** 3/20/00  
**Station Arrival Time:** 0850  
**Station Departure Time:** 1020  
**Core Tube Length:** 16.1  
**Lead Line Water Depth:** 6.1  
**Dist. From Target Station:** 17  
**Latitude:** 200928  
**Longitude:** 1249746

**On-site Visitor:**  
**Field Technician:** DMR  
**Contractor:** MGS15SS

**Shoreline & surrounding area:** rip rap, concrete columns  
**Sediment surface & slope:** flat bottom, silty, broken concrete, scattered wood debris  
**Water current and visibility:** 3 ft vis  
**Diver Water Depth:** 10.0  
**Tip Probe Depth:**  
**Disk Probe Depth:**

### Drive Initiation Time
**Drive Initiation Time:** 0919  
**Drive Completion Time:** 0925  
**Drive Offset:** __

**Estimated angle of drive:** __

**Penetration** | **Recovery** | **Drive Notes (e.g., easy, moderate, difficult, measured by diver or deck)** |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>13.5</td>
<td>14.0</td>
<td>easy, drive</td>
</tr>
<tr>
<td>12.3</td>
<td>13.1</td>
<td>moderate, drive, penetration slowed</td>
</tr>
<tr>
<td>11.6</td>
<td>12.5</td>
<td>refusal - hit something</td>
</tr>
</tbody>
</table>

**TOTAL:** 4.5  
**TOTAL:** 3.6  
**Percent Recovered:** 80%  
(75.6% on deck)

**Reason for ending drive:** refusal  
**If refusal, reason for refusal:** hit something, end of core tube crushed

### Extraction Observations

**Tension on line:** yes  
**Stability of vessel:** no problem  
**Overlying water in core (quantity and description):** no  
**On Boat Recovery:** 12.7  
**Loss of Sediment:** 0.2

**Extraction Notes:** (i.e., winch or hammer, easy, hard) easy, winch

### Observations

**Staining:** Some silt sprayed off  
**Tube Deformation:** none  
**Sediment Description (odor or sheen?):** silt, sand, black, slight hydrocarbon

**Keep or Retry:** diver inserted scrap plug, tube not crushed, suspect concrete

### Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
# Sediment Core Processing Log

**Job**: DWG Core Processing  
**Job Number**: PERS-18220-S11  
**No. of Sections**: 1  
**Sample Length (from log)**: 9.0  
**Avg. % Compaction**: 

**Core Location/Sample Number**: SC - 39 - R1  
**Date/Time**: 2/16/05 11:20  
**Sample Logged by**: McKee  
**Type/Diameter of Sample**: 4 in sq aluminum  
**Sample Quality**: Good  

**Notes**: Pen = 12.8% 2.74% Rec.

---

<table>
<thead>
<tr>
<th>Core Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0-0.4 Silt</td>
</tr>
<tr>
<td>0.4-2.5 Sand + gravel</td>
</tr>
<tr>
<td>1.3 Brick fragment 0.11 L</td>
</tr>
<tr>
<td>2.5-3.6 Sand + gravel with silty interbeds</td>
</tr>
<tr>
<td>3.6-6.4 Silt moist, firm, massive, blocky, silty, platy up to 0.3&quot;, woody, up to 0.4&quot;, silty, platy</td>
</tr>
</tbody>
</table>

---

| Unit:  
Bed: 2-6 |
|--------|---|

---

*Unable to get BT < 2.0 due to gravel*
Mudline = 6.9'

core catcher is full

winnowing from 9.2-9.3 (30%)
<table>
<thead>
<tr>
<th>Section</th>
<th>% Compaction</th>
<th>Color</th>
<th>Size % - G</th>
<th>Size % - S</th>
<th>Size % - F</th>
<th>PID</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
- Sample Depth: 8.92 ft
- Subsample No.: 7
- Summary Sketch: Final layer of sand marks the contact with underlying clay and sand.
### MCS Environmental MudMole Bore Log

**Collection Information**

Date: 2-15-08  
Recorder: GS

Project: 341185.001 Windward Lower Duwamish Coring

<table>
<thead>
<tr>
<th>Station Name</th>
<th>39 R1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tube Length (ft)</td>
<td>16.05</td>
</tr>
<tr>
<td>Water Depth (ft)</td>
<td>9.8</td>
</tr>
<tr>
<td>Est. Tide Height (ft)</td>
<td>5.3 (MLLW)</td>
</tr>
<tr>
<td>Est. Mudline</td>
<td>(MLLW)</td>
</tr>
</tbody>
</table>

**Position Information**

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft

Northing: 200657  
Easting: 1270056  
On Deck Top of Sediment: 6.9

**Comments:**

- incoming tile - broken core on beach - moved offshore
- diver depth 9 - visibility 1 - silty sand with small gravel - no debris - gentle slope - concrete nearby
- 24A off station

<table>
<thead>
<tr>
<th>Penetration Tape Reading</th>
<th>Recovery Tape Reading</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.0</td>
<td>14.9</td>
<td></td>
</tr>
<tr>
<td>13.3</td>
<td>13.5</td>
<td></td>
</tr>
<tr>
<td>10.6</td>
<td>11.0</td>
<td></td>
</tr>
<tr>
<td>7.4</td>
<td>8.7</td>
<td></td>
</tr>
<tr>
<td>6.0</td>
<td>7.7</td>
<td></td>
</tr>
<tr>
<td>3.7</td>
<td>6.0</td>
<td>goal reached slow penetration</td>
</tr>
<tr>
<td></td>
<td></td>
<td>very hard extraction from bottom</td>
</tr>
</tbody>
</table>

MCS Environmental, Inc.  
0005 - 210th St SW, Suite 100  
Mountlake Terrace, WA 98043  
(425) 697-4540
Station Number: 3A  
Date: 02  
Station Arrival Time: 1335  
Attempt: 1  
Core Tube Length: 16.05  
Station Departure Time: 1440  
Field Technician: TD  
Lead Line Water Depth: 9.6  
Contractor: KCS/ESS  
Latitude: 2002.5  
On-Site Visitor:  
Longitude: 127005.4  
Tip Probe Depth:  
Dist. From Target Station:  
Disk Probe Depth:  

Shoreline & surrounding area:  
- Rip rap, concrete debris, aspect, ground, wood dolphin barge to north and south  
- Silty sand, gravel, gentle slope to channel, no debris, concrete nearby  
- Flushing pipe, 1ft vis.  


<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, moderate, difficult; measured by diver or deck)</th>
</tr>
</thead>
<tbody>
<tr>
<td>19.0</td>
<td>14.9</td>
<td>Decks measured; easy drive &amp; 10% hammer used to secure mudline to core frame</td>
</tr>
<tr>
<td>13.3</td>
<td>13.5</td>
<td>Moderate drive</td>
</tr>
<tr>
<td>10.6</td>
<td>11.0</td>
<td>Moderate drive, driver measured</td>
</tr>
<tr>
<td>7.4</td>
<td>8.7</td>
<td>Moderate drive</td>
</tr>
<tr>
<td>6.0</td>
<td>7.7</td>
<td>Moderate - Difficult drive</td>
</tr>
<tr>
<td>3.7</td>
<td>6.0</td>
<td>Difficult drive, penetration slow, penetration good record</td>
</tr>
</tbody>
</table>

Total: 10.05  
Percent Recovered: 81.49%  
(74.1% from on-deck recovery)  

Reason for ending drive:  
Penetration goal reached  
If refusal, reason for refusal:  

Extraction Observations:  
- Tension on line? Yes  
- Stability of vessel: Not to starboard and port bow during extraction  
- Overlying water in core (quantity and description): Yes, clear, 75% water  
- On Boat Recovery: 6.9  
- Loss of Sediment: 0.9%  
- Extraction Notes: (i.e. winch or hammer, easy, hard) Winch difficult (very)  

On Deck Observations:  
- Staining: Dark, silty sand, sprayed off  
- Tube Deformation: None  
- Sediment Description (odor or shear?): Small gravel, silty gray, some clay, no over wash  

Keep or Retry:  
- Driver needed core plug at seafloor interface  
- Driver removed "pasty clay" in core tip  

Notes:  
Penetration & Recovery measured from top of core tube to sediment surface in feet (inches)
Mudmole™ Bore Log

Project: LDWG Duwamish Coring  
Station: 39 R1  
Position: NAD83  
Project No: 341185.001  
Collected by: GSM  
Date: 2/15/2006  
Weather/Comments: N/A

Penetration 12.35 ft/ On deck recovery 9.15 ft = 74% Recovery

Penetration, Interval recovery, Percent recovery

<table>
<thead>
<tr>
<th>Penetration interval (ft)</th>
<th>Interval recovery (ft)</th>
<th>Percent recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1.05</td>
<td>1.15</td>
<td>110%</td>
</tr>
<tr>
<td>1.05-2.75</td>
<td>1.4</td>
<td>82%</td>
</tr>
<tr>
<td>2.75-5.45</td>
<td>2.5</td>
<td>93%</td>
</tr>
<tr>
<td>5.45-8.65</td>
<td>2.3</td>
<td>72%</td>
</tr>
<tr>
<td>8.65-10.05</td>
<td>1</td>
<td>71%</td>
</tr>
<tr>
<td>10.05-12.35</td>
<td>1.7</td>
<td>74%</td>
</tr>
</tbody>
</table>

Depth below mudline (ft)  
Distance from top of tube (ft)

- Mudline: 6.9
- 1: 8.00
- 2: 8.83
- 3: 9.68
- 4: 10.81
- 5: 11.53
- 6: 12.35
- 7: 13.06
- 8: 13.78
- 9: 14.50
- 10: 15.21
- 11: 15.95
- 12: No sample
- 13: No sample
- 14: No sample
- 15: No sample
- 16: No sample
- 17: No sample
- 18: No sample
- 19: No sample
- 20: No sample
### Sediment Core Processing Log

**Job:** DNAO Core Processing  
**Core Location/Sample Number:** SC-40-R1  
**Sample Logged by:** J. McKee  
**Type/Diameter of Sample:** 4" Sq., 9" LUMINATION  
**Sample Quality:** good, fair, poor, disturbed

<table>
<thead>
<tr>
<th>Recovered Length (ft)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Size %: G</th>
<th>Size %: S</th>
<th>Size %: F</th>
<th>PID</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.0-1.4</td>
<td>SAND with SILT (avg.) Grains and layers of fine to coarse sand</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.0-1.4</td>
<td>SAND with SILT (avg.) Grains and layers of fine to coarse sand</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.0-1.4</td>
<td>SAND with SILT (avg.) Grains and layers of fine to coarse sand</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.0-1.4</td>
<td>SAND with SILT (avg.) Grains and layers of fine to coarse sand</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.4-2.7</td>
<td>SAND with multi-colored grains (red, orange, white)</td>
</tr>
<tr>
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<td></td>
<td></td>
<td>1.4-2.7</td>
<td>SAND with multi-colored grains (red, orange, white)</td>
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<td></td>
<td>1.4-2.7</td>
<td>SAND with multi-colored grains (red, orange, white)</td>
</tr>
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<td>2</td>
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<td></td>
<td></td>
<td></td>
<td>1.4-2.7</td>
<td>SAND with multi-colored grains (red, orange, white)</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td>1.4-2.7</td>
<td>SAND with multi-colored grains (red, orange, white)</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.4-2.7</td>
<td>SAND with multi-colored grains (red, orange, white)</td>
</tr>
</tbody>
</table>

End of core @ 2.7 ft

Additional physical/chemical collected for analysis.

---

*Note: The image contains a table with detailed descriptions of sediment core layers, including color, size distribution, and lithological characteristics. The core samples are marked with PID values, indicating various units and compositions. The core reaches a depth of 2.7 ft, with the last section noted as containing multi-colored grains.*
mudline = 13.4

>80% winnowing

core shoe is 3/4 full due to winnowing
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-15-06  Recorder: GS M
Project: 341185.001 Windward Lower Duwamish Coring

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft
Northing 200341
Easting 1270307

Station Name: 40 R1
Tube Length (ft): 16.1
Water Depth (ft): 8.0  Time: 1500
Est. Tide Height (ft) 7.1 (MLLW)
Est. Mudline: (MLLW)

On Deck Top of Sediment 13.9

Comments: Meaning tide - diver depth 8 ft - visibility 10
        Flat bottom - no visible debris - silt clay
        13 ft station

Penetration Tape Reading  Recovery Tape Reading  Comments
15.1 15.4
13.4 14.1
11.8 13.0
10.7 12.4
refusal
penetration suddenly stopped
Station Number: 40  Date: 04/15/04  Station Arrival Time: 1445
Attempt: 1  Core Tube Length: 16.1  Station Departure Time: 1457
Field Technician: JD  Lead Line Water Depth: 8.0  Dist. From Target Station: 10°
Contractor: MW/ESS  Latitude: 200341  °Trotty Site
On-site Visitor:  Longitute: 1270307

Pre-Drive and Diver Observations:
Shoreline & surrounding area: Rip rap, wood pilings and dolphins barrier to southeast, barge to northeast
Sediment surface & slope: Flat bottom, silky slopes, no visible debris
Water current and visibility: 1 ft. vs. flood tide
Diver Water Depth 8
Tip Probe Depth  0
Disk Probe Depth  0

Drive Observations:
Drive Initiation Time: 1503  Drive Completion Time: 1507  Drive Offset: 10°
Estimated angle of drive: West 10° right

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g., easy, moderate, difficult; measured by diver or deck)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.1</td>
<td>15.4</td>
<td>deck measured, fine sand</td>
</tr>
<tr>
<td>13.4</td>
<td>14.1</td>
<td>moderately easy drive</td>
</tr>
<tr>
<td>11.0</td>
<td>13.0</td>
<td>moderate drive</td>
</tr>
<tr>
<td>10.7</td>
<td>17.4</td>
<td>moderately difficult drive, hit something hard, refusal penetration</td>
</tr>
</tbody>
</table>

TOTAL 54  TOTAL 37  Percent Recovered: 68.5%

Reason for ending drive: refusal
If refusal, reason for refusal: hit something hard

Extraction Observations:
Tension on line? Yes  Stability of vessel: no problem
Overlying water in core (quantity and description): Yes, clear, 1.5 L
Extraction Notes: (i.e., winch or hammer, easy, hard) Winch, moderately easy

On Deck Observations:
Staining: trace, dry, sandy sand, stripped off
Tube Deformation: None
Sediment Description (odor or sheen?): Gray, mud, sand, no odor, no sheen

Keep or Retry? diver inserted screw plug at sed/bed interface will probably retry tomorrow or today

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
<table>
<thead>
<tr>
<th>No.</th>
<th>Sample Length (ft)</th>
<th>Description</th>
<th>Sediment Core Processing Log</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>SAND = very fine - fine, moist, olive brown</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>SILT = silt, sandy, black, moist, stiff, low compressibility, rootlets</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>SAND interbeds = coarse-mud, multi-fauna, # up to 1&quot; thick</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>O 1.9, piece of glass ~ 0.1&quot;</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>End of Core 2.11</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>No chemistry</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>No Physical</td>
<td></td>
</tr>
</tbody>
</table>
Mudline = 14

40% winnowing

Core shoe is 2/3 full due to winnowing
### Mudmole™ Bore Log

**Project:** LDWG Duwamish Coring  
**Station:** 40 R2  
**Position:** NAD83  
**Positioning:** 200337 Northing, 1270321 Easting  
**Date:** 2/15/2006  
**Time:** 15:38  
**Water depth:** 9.1 ft  
**Mudline:** -1.6 ft MLLW (estimated using tide tables)  

**Weather/Comments:** N/A

**Driven to refusal**

<table>
<thead>
<tr>
<th>Depth below mudline (ft)</th>
<th>Distance from top of tube (ft)</th>
<th>Penetration interval (ft)</th>
<th>Interval recovery (ft)</th>
<th>Percent recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-0.8500000000000000-2</td>
<td>0.75</td>
<td>0.75</td>
<td>88%</td>
<td></td>
</tr>
<tr>
<td>2.75-3.85</td>
<td>0.9</td>
<td>0.9</td>
<td>62%</td>
<td></td>
</tr>
<tr>
<td>3.85-5.95</td>
<td>1.2</td>
<td>1.2</td>
<td>57%</td>
<td></td>
</tr>
<tr>
<td>Mudline</td>
<td>14</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>14.84</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>15.42</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>No sample</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>4</td>
<td>No sample</td>
<td></td>
<td></td>
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<tr>
<td>5</td>
<td>No sample</td>
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<tr>
<td>6</td>
<td>No sample</td>
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<tr>
<td>7</td>
<td>No sample</td>
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<td>8</td>
<td>No sample</td>
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<td>9</td>
<td>No sample</td>
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<tr>
<td>10</td>
<td>No sample</td>
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<tr>
<td>11</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>12</td>
<td>No sample</td>
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<td></td>
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<td>14</td>
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<tr>
<td>15</td>
<td>No sample</td>
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<tr>
<td>16</td>
<td>No sample</td>
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<tr>
<td>17</td>
<td>No sample</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>18</td>
<td>No sample</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>No sample</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>No sample</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Penetration 5.95 ft/ On deck recovery 2.06 ft = 34% Recovery
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-15-06  Recorder: 6500

Project: 341186.001 Windward Lower Duwamish Coring

Station Name: 40 R2

Tube Length (ft): 16.05

Water Depth (ft): 9.1

Est. Tide Height (ft) (MLLW)

Est. Mudline: (MLLW)

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft

Northing 200337

Easting 1270321

On Deck Top of Sediment 14.0

Comments:

visibility 24 - silt, sandy

Penetration Tape Reading

Recovery Tape Reading

Comments

15.2  15.3
13.3  14.2
12.2  13.3
10.1  12.1

penetration suddenly slowed

refusal
Station Number: 40
Attempt: 2
Field Technician: TP
Contractor: W.S./P.S.
On-site Visitor:

**Pre-Drive and Diver Observations**

Shoreline & surrounding area: same as R1
Sediment surface & slope: flat bottom, silt-clay, no visible fines
Water current and visibility: 1@ vs. flow hole
Diver Water Depth: 9
Tip Probe Depth: — Disk Probe Depth: —

**Drive Observations**

Drive Initiation Time: 15:37
Drive Completion Time: 15:46
Drive Offset: —
Estimated angle of drive: 21° 10' 00" 70° off

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, moderate, difficult; measured by diver or deck)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.2</td>
<td>15.3</td>
<td>deck measured, free fall</td>
</tr>
<tr>
<td>13.7</td>
<td>14.2</td>
<td>easy-moderate drive</td>
</tr>
<tr>
<td>12.7</td>
<td>13.3</td>
<td>moderate drive</td>
</tr>
<tr>
<td>10.1</td>
<td>12.1</td>
<td>moderate drive - difficult, diver measured</td>
</tr>
<tr>
<td></td>
<td></td>
<td>moderate - difficult drive, refusal</td>
</tr>
</tbody>
</table>

TOTAL: 59.4
TOTAL: 59.4
Percent Recovered: 61.4
Reason for ending drive: refusal
If refusal, reason for refusal: hit hard material

**Extraction Observations**

Tension on line: yes
Stability of vessel: list to port
Overlying water in core (quantity and description): yes, clear, ~ 2"
On Boat Recovery: A.D. Loss of Sediment: ~ 3 ft
Extraction Notes: (i.e. winch or hammer, easy, hard) moderate, winch

**On Deck Observations**

Staining: raw, dirty sand, sprayed off
Tube Deformation: none
Sediment Description (odor or sheen?): mud, grey sand, no odor, no sheen

Keep or Retry: diver inserted screw plug at red/yellow interface
Core kept pending decision to resample

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
This may be a Bill Stalin
Tip not deformed.
Mid-sand - lost out bold.
## Sediment Core Processing Log

**Job:** LARGO Core Processing  
**Core Location/ Sample Number:** SC-40 4R3  
**Date/Time:** 11/24/08 08:39  
**Sample Logged by:** LM, LR  
**Type/Diameter of Sample:** 3" Round  
**Sample Quality:** Good  

### Notes
- Pen = 13.0'  
- Dec. Rec = 10.0'  
- 577' Rec

### Table

<table>
<thead>
<tr>
<th>Recovery Length (ft)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Size % S</th>
<th>Size % F</th>
<th>PID</th>
<th>Description (grain size, color, moisture, sheen/odor, biota, wood, other debris)</th>
<th>Subsample No</th>
<th>Summary Sketch</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>Brown</td>
<td>90</td>
<td>10</td>
<td></td>
<td>0-0.4: dark, medium dense mottled sand w/ multi-colored grains (red, orange, white)</td>
<td>2-1.2</td>
<td>SAND TV-0.0</td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>B1G</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>Brown</td>
<td>90</td>
<td>10</td>
<td></td>
<td>0.6-1.8 alternating layers of mottled, sand, silt (5&quot;) and medium dense sand (3&quot;)</td>
<td>1.2</td>
<td>Silt (5&quot;)</td>
</tr>
<tr>
<td></td>
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<td></td>
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<td></td>
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</tr>
<tr>
<td>3</td>
<td></td>
<td>Brown</td>
<td>78+</td>
<td></td>
<td></td>
<td>0.9: gravelly sand w/ wood fragment 1/2&quot; x 1/4&quot; thick with 1.5&quot; diameter sand grains</td>
<td>1.2</td>
<td>SAND TV-0.7</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>B1G</td>
</tr>
<tr>
<td>4</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>2-4: gravelly sand w/ 1/4&quot; wood fragment 1/2&quot; x 1/4&quot; thick with 1.5&quot; diameter sand grains</td>
<td>2-4</td>
<td>SAND TV-0.1</td>
</tr>
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<td>B1G</td>
</tr>
<tr>
<td>5</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>4-6: gravelly sand w/ 1/4&quot; wood fragment 1/2&quot; x 1/4&quot; thick with 1.5&quot; diameter sand grains</td>
<td>4-6</td>
<td>SAND TV-0.7</td>
</tr>
</tbody>
</table>

**Observed Changes**:  
- 4.4' change to gray sand  
- From 4.8' slight H2S like odor
Note: top 1.5' of core tube was erroneously cut off.
This section was opened with the rest of the core tube and logged as the top of the core.
(brown and sand)

LM
### Sediment Core Processing Log

**Core Location/Sample Number:** JC-40B3  
**Date/Time:** 2/24/06  
**Sample Logged by:** LM, CB  
**Type/Diameter of Sample:** 3" round  
**Sample Quality:** good, fair, poor, disturbed

<table>
<thead>
<tr>
<th>Recovered Length (ft)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Size % - G</th>
<th>Size % - S</th>
<th>Size % - F</th>
<th>PID</th>
<th>Description (grain size, color, moisture, shell/sand, biota, wood, other debris)</th>
<th>Initial Actual Depth (ft)</th>
<th>Sample Depth</th>
<th>Subsample No.</th>
<th>Summary Stencil</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7</td>
<td>From 6.0-10.0' SAND typically consists downward with same residual regions of medium-grained sand. Spread occasionally throughout.</td>
<td>7</td>
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<td>10</td>
<td></td>
<td>10</td>
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</tr>
</tbody>
</table>

**Notes:** CONT'D

End of core at 10.0'
**SEDIMENT CORE DRIVE LOG**

**Project:** LDW Subsurface Std.  
**Project #:** 05-09-06-32  
**Field Crew:** TD  
**Contractor:** MSS  
**Core Location:** LDW-5C40  
**Date:** 01-23-06  
**Time:** 1030  
**Attempt #:** 3  
**Sample Method:** Vibracore

<table>
<thead>
<tr>
<th>Proposed Coordinates</th>
<th>Actual Coordinates</th>
</tr>
</thead>
<tbody>
<tr>
<td>N: 200339 E: 1270298</td>
<td>N: E:</td>
</tr>
<tr>
<td>Mudline:</td>
<td>Mudline:</td>
</tr>
<tr>
<td>Core Drive:</td>
<td>Core Drive:</td>
</tr>
</tbody>
</table>

**DTS Boat:**  
**DTS Lead Line:** 10.4 ft.  
**Mudline Elevation:**

**Description:**  
(free fall, fingers inverted, vibration needed to drive/extract, estimation of density, debris encountered, slopes, refusal, mudline conditions, drive action, etc.)

- Easy drive all the way.
- No obstructions.
- No free fall.

**Measurement (to nearest 0.1 foot):**

<table>
<thead>
<tr>
<th>Avg. % Recovery:</th>
<th>Avg. % Compaction:</th>
<th>Description at Cuts:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Section</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>~ 0.3</td>
</tr>
<tr>
<td>B</td>
<td>10 ft.</td>
</tr>
<tr>
<td>C</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td></td>
</tr>
</tbody>
</table>

**Core Tube Length:**

- Total Drive: 13 ft.
- Length Recovered: 10 ft.

**Notes:**

- 13 ft penetration, 10 ft recovery = 76.9%.  
- Core catcher end: nothing b/c washed out.  
- Catcher end cut off 0.5 ft - not retained, b/c clean of sediment.

---

322 of 490
## Sediment Core Processing Log

**Job:** LDWB Core Processing  
**Job Number:** PORS-18220-S11  
**No. of Sections:** 7  
**Sample Length (from log):** 7.9  
**Avg. % Compaction:**  

### Core Location/Sample Number
- **Sample Number:** 41  
- **Date/Time:** 21:11 10/30  
- **Sample Logged by:** LM  
- **Type/Diameter of Sample:** 4"  
- **Sample Quality:** good  

### Description

<table>
<thead>
<tr>
<th>Recovered Length (m)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Size % - G</th>
<th>Size % - S</th>
<th>Size % - F</th>
<th>PNSD</th>
<th>Description</th>
<th>Ind Ald Depth (ft)</th>
<th>Sample Depth</th>
<th>Subsample No.</th>
</tr>
</thead>
</table>
|                      |              |       |            |            |            |      | 0.0 - 0.5 SILT, soupy, wet, brown, sand, clay, fine to very fine sand, low plasticity, low clay content transition 0.5 - 6.4 0.86  
|                      |              |       |            |            |            |      | mast, soft, und. dense, black, clay, clayey, Silt, with woody fragments and occasional mollusks spread throughout, 1.2 - 1.3 layer of soft, wet, olive-gray clay, clayey Silt interbedded in 0.6 Silt  
|                      |              |       |            |            |            |      | Silt is low plastic, fully compressible, 1/8" woody fragments, 2.0 - 3.2  
|                      |              |       |            |            |            |      | Silt is blocky, uniform, massive  
|                      |              |       |            |            |            |      | 2.5 woody fragments of 0.05" L  
|                      |              |       |            |            |            |      | 2.8 shell fragments of 2.1"  
|                      |              |       |            |            |            |      | 3.0 woody fragment of 0.3" L  
|                      |              |       |            |            |            |      |  
|                      |              |       |            |            |            |      |  
|                      |              |       |            |            |            |      |  
|                      |              |       |            |            |            |      |  

**Notes:** Pen = 1/2"  
**In Deck Sel = 7.9"**
Mudline - 7.91

Core catcher folded around sediment. Grey bl. silt sordly SILT
No sediment in last 0.2 m core shoe.

Winnowing from 3.9 - 4.2'

8.2
# Sediment Core Processing Log

**Job:** DNG Core Processing  
**Core Location/Sample Number:** SC-41 (R)

## Details
- **Job Number:** PDR19-18220-311
- **Date/Time:** 21/12/20
- **No. of Sections:** 1
- **Sample Length (from log):**
- **Avg. % Compaction:**
- **Sample Logged by:** LM
- **Type/Diameter of Sample:** 4" sq. Alum.
- **Sample Quality:** good

### Notes
- **Rev:** 2  
- **Comments:**

## Core Description

<table>
<thead>
<tr>
<th>Depth (m)</th>
<th>Sample Depth</th>
<th>Subsample No.</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.79</td>
<td>1050</td>
<td>2.19</td>
<td>SILT</td>
</tr>
<tr>
<td>6.99</td>
<td>G6.6</td>
<td>v=2.3</td>
<td>BiG</td>
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<td>7.79</td>
<td>1090</td>
<td>2.19</td>
<td>SILT</td>
</tr>
<tr>
<td>9.79</td>
<td>1130</td>
<td>2.19</td>
<td>SAND</td>
</tr>
</tbody>
</table>

**End of Core @ 7.9**

**Sheet test 0.0.5: No sheet.**
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-20-06  Recorder: 6547

Project: 341185.001 Windward Lower Duwamish Coring

Station Name: 41 R1

Tube Length (ft): 15-6

Water Depth (ft): 15-6  Time: 10:49

Est. Tide Height (ft): 8-9  (MLLW)

Est. Mudline:  (MLLW)

Comments: falling tide - diver depth 15 - silty bottom -> 5 ft visibility

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft

Northing 200394

Easting 1271170

On Deck Top of Sediment 7-9

Penetration Tape Reading

<table>
<thead>
<tr>
<th>Reading</th>
<th>Recovery Tape Reading</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.4</td>
<td>14.6</td>
<td></td>
</tr>
<tr>
<td>12.5</td>
<td>12.5</td>
<td></td>
</tr>
<tr>
<td>10.5</td>
<td>10.3</td>
<td></td>
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<tr>
<td>8.0</td>
<td>8.6</td>
<td></td>
</tr>
<tr>
<td>6.0</td>
<td>7.2</td>
<td></td>
</tr>
<tr>
<td>4.0</td>
<td>6.0</td>
<td>good reach</td>
</tr>
<tr>
<td></td>
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</tr>
</tbody>
</table>
Station Number: 41  
Attempt: 1  
Field Technician: JMF  
Contractor: MCS/ASS  
On-site Visitor:  

**Drilled Core Observations**

- Shoreline & surrounding area: rip rap, wood pier, dock + pilings
- Sediment surface & slope: silty bottom, no slope
- Water current and visibility: 5 ft + vis
- Diver Water Depth: 15
- Tip Probe Depth:  
- Disk Probe Depth:  

**Drive Observations**

- Drive Initiation Time: 6:48  
- Drive Completion Time: 10:54  
- Drive Offset:  

**Estimated angle of drive:** under water, e8 + 10°

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, moderate, difficult; measured by diver or deck)</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.4</td>
<td>14.6</td>
<td>diver recorded free fall</td>
</tr>
<tr>
<td>12.4</td>
<td>12.5</td>
<td>easy drive</td>
</tr>
<tr>
<td>10.5</td>
<td>10.3</td>
<td>easy, drive</td>
</tr>
<tr>
<td>8.0</td>
<td>8.6</td>
<td>easy, drive</td>
</tr>
<tr>
<td>6.0</td>
<td>7.2</td>
<td>easy, drive</td>
</tr>
<tr>
<td>4.0</td>
<td>6.0</td>
<td>easy, drive, reached penetration goal</td>
</tr>
</tbody>
</table>

**Percent Recovered:** 82.8% (68.4% on deck)

**Reason for ending drive:** reached penetration goal

**If refusal, reason for refusal:**  

**Extraction Observations**

- Tension on line? 7  
- Stability of vessel: no problem
- Overlying water in core (quantity and description): slightly turbid, ~1.5 L
- On Boat Recovery: 4.9  
- Loss of Sediment: 1.9  
- Extraction Notes: (i.e. winch or hammer, easy, hard) winch, easy

**Diver Observation**

- Staining: some silt, rinsed off
- Tube Deformation: no
- Sediment Description (odor or sheen?): damp gray, silt in trace fines sand

Keep or Retry: diver inserted screw plug at seal/h2o interface  
Since core catcher was bulging out

**Notes:**
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-21-06  Recorder: G5M

Project: 341185.001 Windward Lower Duwamish Coring

Station Name: 41 R2

Tube Length (ft): 15.6

Water Depth (ft): 9.7

Est. Tide Height (ft): 3.0 (MLLW)

Est. Mudline: (MLLW)

Position Information

Coordinate Datum: WA State Plane N. NAD 83, Survey Ft

Northing 200286

Easting 1271165

On Deck Top of Sediment 7.4

Comments: Talking tide - diver depth 8' - visibility 14 -

Silty bottom - no current - no slope

~ 9 A off station

Penetration Tape Reading | Recovery Tape Reading | Comments
---|---|---
12.9 | 13.4 | 
9.3 | 10.8 | 
7.5 | 9.5 | 
5.6 | 8.0 | 
3.5 | 6.5 | 
1.8 | 5.3 | 
0.2 | 4.3 | Full penetration
Mudmole™ Bore Log

Project: LDWG Duwamish Coring
Project No: 341185.001
Collected by: GSM
Date: 2/21/2006
Water depth: 9.7 ft

Station: 41 R2
Position: NAD83
200286 Northing
1271165 Easting

Weather/Comments: N/A

Penetration Interval Interval Percent
interval recovery recovery
(ft) (ft) recovery

0-2.7 2.2 81%
2.7-6.3 2.6 72%
6.3-8.1 1.3 72%
8.1-10 1.5 79%
10-12.1 1.5 71%
12.1-13.8 1.2 71%
13.8-15.4 1 62%

Depth below mudline Distance from top of tube
(ft) (ft)

Mudline 7.4
1 8.21
2 9.03
3 9.82
4 10.54
5 11.26
6 11.96
7 12.71
8 13.43
9 14.21
10 15.00
11 No sample
12 No sample
13 No sample
14 No sample
15 No sample
16 No sample
17 No sample
18 No sample
19 No sample
20 No sample

Penetration 15.4 ft On deck recovery 8.2 ft = 53% Recovery
Station Number: M  
Attempt:  
Field Technician: TD  
Contractor: NWS/95  
On-site Visitor: —

Pre-Drive and Diver Observations:
Shoreline & surrounding area: concrete cap over wood debris. Large "Rockport" in Myrtle st. embayment
Sediment surface & slope: silty bottom, no slope
Water current and visibility: falling tide, no current, 10-ft. visibility
Diver Water Depth: 8
Tip Probe Depth —  Disk Probe Depth —

Drive Observations:
Drive Initiation Time: 1451  Drive Completion Time: 1455  Drive Offset: —
Estimated angle of drive: 50°

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, moderate, difficult; measured by diver or deck)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.9</td>
<td>13.4</td>
<td>free fall, deck measured</td>
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<tr>
<td>9.3</td>
<td>10.8</td>
<td>easy drive, diver measured</td>
</tr>
<tr>
<td>7.5</td>
<td>9.5</td>
<td>easy drive</td>
</tr>
<tr>
<td>5.6</td>
<td>8.0</td>
<td>easy drive</td>
</tr>
<tr>
<td>3.5</td>
<td>6.5</td>
<td>easy-moderate drive</td>
</tr>
<tr>
<td>1.8</td>
<td>5.3</td>
<td>easy-moderate drive</td>
</tr>
<tr>
<td>0.7</td>
<td>4.3</td>
<td>moderate drive</td>
</tr>
</tbody>
</table>

TOTAL 15.4  TOTAL 11.3  Percent Recovered: 73.4% (53.7% on deck)

Reason for ending drive: Full penetration, no tube length left

If refusal, reason for refusal:

Extraction Observations:
Tension on line: yes  Stability of vessel: no problem
Overlying water in core (quantity and description): clear
On Boat Recovery: 3.4  Loss of Sediment: 3.1 ft.
Extraction Notes: (i.e. winch or hammer, easy, hard) winch, easy

On Deck Observations:
Staining: OK  Silty streaks, sprayed off
Tube Deformation: none
Sediment Description (odor or sheen?): black silt, fine sand, no sheen, slight petrol odor

Keep or Retry: diver inserted screw plug, 4/8" O-ring, dry wrapped with plastic by diver
soft rod, ship down tube during extraction, even though no make-up was lifted slowly.

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
Sediment Core Processing Log

Job: LOW6 Coring
Job Number: F055-16220

No. of Sections: 1
Sample Length (from log):
Avg. % Compaction:
Notes: Penet: 15.857 → R= 79%
On deck: 12.517

<table>
<thead>
<tr>
<th>Recov. Length (ft)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Size % G</th>
<th>Size % S</th>
<th>Size % F</th>
<th>PID</th>
</tr>
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<tbody>
<tr>
<td>1.0</td>
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<td>6.0</td>
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</tbody>
</table>

Description:
- Grain size, color, matrix, sheen, odor, roots, wood, other debris.

- Moist, wet, gray sl, sandy silt, trace to minor sand
- Sand decreases downward.
- Trace H2S odor
- Trace organic material
- Scattered, thin film (fibers, roots, wood shreds)
- Silt to minor clay
- Sediment is sticky

Sample Depth
- 1.0
- 1130
- 3-16b2
- 1.0
- 60
- 0.0
- 1.0
- 1135
- 3-16b2
- 2.0
- 60
- 2.2
- 1140
- 3.0
- 3-16b2
- 2.0
- 1145
- 2.0
- 3-16b2
- 4.0
- 5.0
- 2-16b2
- 6.0
- 0.0
- 0.0

Sample No.
- 1
- 0.7
- TV = 1.5
- big
- 1.3
- TV = 2.5
- big

Summary
- 0.7
- TV = 1.5
- big
- 4.3
- TV = 2.5
- big

Sample Logger: N. Bacher
Type/Diameter of Sample: 4" sq. aluminum
Sample Quality: good fair poor disturbed
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<th>2</th>
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<td>% Compaction</td>
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</tbody>
</table>

**Sediment Core Processing Log**

**Sample Length:**
- Sample: 20 cm
- Section: A
- Color: Yellow
- Size: Silt

**Sample Quality:**
- Good

**Sample Moisture:**
- Moist

**Sample Description:**
- Wet silt, medium to fine sand
- Grayish color

**Sample Location:**
- Core Location
- Sample Number

**Job Number:**
- 17006-56-102

**Date/Time:**
- Date
- Time

**Notes:**
- Results from grain size analysis
- Additional observations

**Summary Sketch:**
- Diagram of core sample

**Subsample No.:**
- 1-2

**In situ Actual Depth (ft):**
- 1150

**Sample Depth:**
- 1155

**Recover Length (ft):**
- 7.5
- 8.1
<table>
<thead>
<tr>
<th>Recovered Length (m)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Size % - G</th>
<th>Size % - S</th>
<th>Size % - F</th>
<th>PCD</th>
<th>Description</th>
<th>India Actual Depth (m)</th>
<th>Sample Depth</th>
<th>Subsample No.</th>
<th>Summary Sketch</th>
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<td></td>
<td>95</td>
<td>15</td>
<td></td>
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<td><img src="https://user-images.githubusercontent.com/75782668/119479126-6e173980-bd76-11eb-a046-2321b6f6a054.png" alt="" /></td>
<td>13.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>End of core: 12 8'</td>
<td></td>
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</tr>
</tbody>
</table>

Sample Quality: good  fair  poor  disturbed

Notes:
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-8-06  Recorder: 6SM

Project: 341185.001 Windward Lower Duwamish Coring

Station Name: 42 R2

Tube Length (ft): 16.05

Water Depth (ft): 10.4 20.2  Time: 942

Est. Tide Height (ft): 8.8 (MLLW)

Est. Mudline: (MLLW)

Comments: Rising tide - scattered debris - silty  on deck top of sediment 3.5  River depth 204

Penetration Tape Reading  Recovery Tape Reading  Comments

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Reading</th>
<th>Recovery Reading</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.9</td>
<td></td>
<td>15.6 15.7</td>
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</tr>
<tr>
<td>13.7</td>
<td></td>
<td>13.6</td>
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</tr>
<tr>
<td>10.6</td>
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<td>10.7</td>
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</tr>
<tr>
<td>8.0</td>
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</tr>
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<td>6.7</td>
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<td>4.7</td>
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<tr>
<td>0.2</td>
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<td>3.2</td>
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</tbody>
</table>

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft

Northing: 199898

Easting: 1271361

On Deck Top of Sediment: 3.5
# Mudmole™ Bore Log

**Project:** LDWG Duwamish Coring  
**Station:** 42 R2  
**Project No:** 341185.001  
**Position:** NAD83  
**Collected by:** GSM  
**Date:** 2/8/2006  
**Water depth:** 20.2 ft  
**Weather/Comments:** Overcast

## Penetration Interval

<table>
<thead>
<tr>
<th>Depth below mudline (ft)</th>
<th>Distance from top of tube (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>1.0</td>
<td>2.0</td>
</tr>
<tr>
<td>2.0</td>
<td>4.0</td>
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<tr>
<td>3.0</td>
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<td>8.0</td>
<td>16.0</td>
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<tr>
<td>9.0</td>
<td>18.0</td>
</tr>
</tbody>
</table>

Penetration 16.85 ft / On deck recovery 12.55 ft = 79% Recovery

## Depth below Mudline and Distance from Top of Tube

<table>
<thead>
<tr>
<th>Depth below mudline (ft)</th>
<th>Distance from top of tube (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
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</tbody>
</table>

## Penetration Interval

<table>
<thead>
<tr>
<th>Penetration interval (ft)</th>
<th>Interval recovery (ft)</th>
<th>Percent recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0-0.15</td>
<td>0.05</td>
<td>23%</td>
</tr>
<tr>
<td>0.15-2.35</td>
<td>2.1</td>
<td>95%</td>
</tr>
<tr>
<td>2.35-5.45</td>
<td>2.9</td>
<td>94%</td>
</tr>
<tr>
<td>5.45-8.05</td>
<td>2.2</td>
<td>85%</td>
</tr>
<tr>
<td>8.05-9.35</td>
<td>0.9</td>
<td>69%</td>
</tr>
<tr>
<td>9.35-11.35</td>
<td>1.4</td>
<td>70%</td>
</tr>
<tr>
<td>11.35-13.35</td>
<td>1.4</td>
<td>70%</td>
</tr>
<tr>
<td>13.35-14.35</td>
<td>0.6</td>
<td>60%</td>
</tr>
<tr>
<td>14.35-15.85</td>
<td>1</td>
<td>67%</td>
</tr>
</tbody>
</table>

MCS Environmental, Inc.  
6501 216th Street SW, Suite 103  
Mountlake Terrace, WA 98043

(425) 697-4440  
fax (425) 697-4570  

File name: 19-680  
Bore Log (mudmole)
Penetration 6.65 ft / On deck recovery 5.65 ft = 85% Recovery
Station Number: 42
Attempt: 2
Field Technician: TD, LH, AF
Contractor: MCL, KB, S
On-site Visitor: 
Latitude: 41.9468
Longitude: 127.7089

Date: 7/7/06
Core Tube Length: 16.05
Lead Line Water Depth: 20.2 ft
Diver Water Depth: 20 ft
Tip Probe Depth: 
Disk Probe Depth: 
Drive Initiation Time: 0745 0846

Shoreline & surrounding area observations: Ranger nearby (400 yards) - wood debris floating in water, rip rap along shore, wood debris and pilings, blackberry bushes
Sediment surface & slope description: gentle slope toward channel, scattered debris, silty
Water current: flooding tide

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.9</td>
<td>15.9</td>
</tr>
<tr>
<td>13.7</td>
<td>13.6</td>
</tr>
<tr>
<td>10.6</td>
<td>10.7</td>
</tr>
<tr>
<td>8.0</td>
<td>8.5</td>
</tr>
<tr>
<td>6.7</td>
<td>7.0</td>
</tr>
<tr>
<td>4.7</td>
<td>6.2</td>
</tr>
<tr>
<td>2.9</td>
<td>4.8</td>
</tr>
<tr>
<td>1.9</td>
<td>4.2</td>
</tr>
<tr>
<td>0.2</td>
<td>3.2</td>
</tr>
</tbody>
</table>

Drive Notes (e.g., easy, difficult, etc.): Cannot see, relayed by diver - easy

Estimated angle of drive: 90° ± 10°
Reason for ending drive: Out of tube length

Drive Completion Time: 0852
On Boat Recovery: 3.5 on deck top of sediment

End of Core Tube Observations
Staining:
Tube Deformation: No
Loss of Sediment: Screw plug, inserted by diver at bottom (sed. surface)
Sediment Description: Fin sand, gray-black
Water in Tube: Yes, pumped out 2x pumps

Keep or Retry: Good core, good natural plug - diver had to dig some out to insert screw plug

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
Station Number: 42
Attempt: 3
Field Technician: HM
Contractor: HEC
On-site Visitor: None
Latitude: ------
Longitude: ------

Date: 2/19/06
Core Tube Length: 16.35
Lead Line Water Depth: 19.50 & 20.21
Diver Water Depth: ------
Tip Probe Depth: ------
Disk Probe Depth: ------
Drive Initiation Time: 0946

Shoreline & surrounding area observations: See attempt 1 (R1) abounding delphini a banded

Sediment surface & slope description: scattered concrete debris, silty bottom

Water current: mild, visibility 1/2

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.9</td>
<td>15.6</td>
</tr>
<tr>
<td>13.7</td>
<td>13.6</td>
</tr>
<tr>
<td>10.6</td>
<td>10.7</td>
</tr>
<tr>
<td>8.0</td>
<td>8.5</td>
</tr>
<tr>
<td>7.0</td>
<td>7.6</td>
</tr>
<tr>
<td>4.7</td>
<td>4.2</td>
</tr>
<tr>
<td>1.7</td>
<td>1.85</td>
</tr>
<tr>
<td>Totals</td>
<td></td>
</tr>
</tbody>
</table>

Drive Notes (e.g. easy, difficult, etc.):
- easy drive
- drive

Estimated angle of drive: maximum core tube not visible; extraction angle = 85°-90°

Reason for ending drive: 

Drive Completion Time: 0956

On Boat Recovery: 3.5

End of Core Tube Observations:

Staining: None
Tube Deformation: None
Loss of Sediment: None, on deck
Sediment Description: sandy - fine sand, gray-black - fill
Water in Tube: Left water

Keep or Retry: Keep

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)

0933 - setting stern anchor for breakwater wind
Engine trouble light in gear due to wind + shallow area
sagged
No trouble holding position w/ y-anchors + stern anchor
Diver used screw plug at water - sed. surface; wrapped + tied on deck
(thermos plug)
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-7-06  
Recorder: 66V

Project: 341185.001 Windward Lower Duwamish Coring

Station Name: 42 84

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft

Water Depth (ft): 16.05

Time: 15:54

Northing: 199908

Easting: 1271361

Est. Mudline: 1.5 (MLLW)

On Deck Top of Sediment: 9.9

Comments: 0.4 penetration tape buried in bottom -

Penetration Tape Reading  | Recovery Tape Reading
-------------------------|------------------------
15.0                     | 15.1                   |
12.8                     | 13.1                   |
10.5                     | 11.1                   |
9.1                      | 10.1                   |
7.3                      | 8.5                    |
5.2                      | 6.8                    |
4.0                      | 5.9                    |
4.0                      | 5.8                    |

Penetration showed refusal
Mudmole™ Bore Log

Project: LDWG Duwamish Coring
Project No: 341185.001
Collected by: GSM
Date: 2/7/2006
Water depth: 15.0 ft

Weather/Comments: N/A
Penetration tape buried 0.4 ft field measurements offset, core catcher failed

Penetration 12.45 ft/ On deck recovery 6.15 ft = 49% Recovery

Penetration interval (ft)  | Interval recovery (ft)  | Percent recovery
0-1.45                   | 0.95                    | 66%
1.45-3.65                | 2                       | 91%
3.65-5.65                | 2                       | 87%
5.95-7.35                | 1                       | 71%
7.35-9.15                | 1.6                     | 89%
9.15-11.25               | 1.7                     | 81%
11.25-12.45              | 1                       | 83%

Mudline: -13.5 ft MLLW (estimated using tide tables)

Depth below mudline (ft)  | Distance from top of tube (ft)
Mudline: 9.9              |
1                        | 10.56
2                        | 11.35
3                        | 12.25
4                        | 13.15
5                        | 14.02
6                        | 14.89
7                        | 15.60
8                        | No sample
9                        | No sample
10                       | No sample
11                       | No sample
12                       | No sample
13                       | No sample
14                       | No sample
15                       | No sample
16                       | No sample
17                       | No sample
18                       | No sample
19                       | No sample
20                       | No sample
Station Number: 42
Attempt: 1
Field Technician: TD/CH/LM
Contractor: MCE/RSS
On-site Visitor: 

Latitude: 19°48.00' 
Longitude: 127°13.01'

Date: 06/07/05
Core Tube Length: 16.05
Lead Line Water Depth: 15.0
Diver Water Depth: 
Tip Probe Depth: 
Disk Probe Depth: 
Drive Initiation Time: 1600

Shoreline & surrounding area observations: Rip rap, Bang fixed up nearby
Sediment surface & slope description: Cannot see
Water current: Med strong ebb tide, light wind

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, difficult, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.0</td>
<td>15.1</td>
<td>(Drive offset: 0.4 pen. tape located in bottom)</td>
</tr>
<tr>
<td>12.8</td>
<td>13.1</td>
<td></td>
</tr>
<tr>
<td>10.5</td>
<td>11.1</td>
<td></td>
</tr>
<tr>
<td>9.1</td>
<td>10.1</td>
<td></td>
</tr>
<tr>
<td>7.3</td>
<td>8.5</td>
<td></td>
</tr>
<tr>
<td>5.2</td>
<td>6.8</td>
<td></td>
</tr>
<tr>
<td>4.0</td>
<td>5.9</td>
<td>Penetration slowed</td>
</tr>
<tr>
<td>4.0</td>
<td>5.9</td>
<td></td>
</tr>
</tbody>
</table>

Estimated angle of drive: 90° ± 10°
Reason for ending drive: Refuse

Drive Completion Time: 1613
On Boat Recovery: 9.9 on deck top of sediment

---

End of Core Tube Observations

Staining: 
Tube Deformation: No
Loss of Sediment: Core catcher end
Sediment Description: Cannot see
Water In Tube: Yes, shampooed off

---

Keep or Retry: Lost ~40% of core catcher failure

Notes: Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
Station Number: 42  
Attempt:  
Field Technician: MCJCB  
Contractor:  
On-site Visitor: NONE  
Latitude:  
Longitude:  
Date: 2/17/06  
Core Tube Length: 16.05  
Lead Line Water Depth: 13.0  
Diver Water Depth: 15.0  
Tip Probe Depth:  
Disk Probe Depth:  
Drive Initiation Time: 11:00  

Shoreline & surrounding area observations: riprap, concrete, plastic, wires/cable, scrapyard refuse  
Sediment surface & slope description: clayey silt, flat  
Water current: moderate  

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, difficult, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.0</td>
<td>15.1</td>
<td>Super easy, very fast drive</td>
</tr>
<tr>
<td>12.8</td>
<td>13.1</td>
<td>Super easy, very fast drive</td>
</tr>
<tr>
<td>10.5</td>
<td>11.1</td>
<td></td>
</tr>
<tr>
<td>9.1</td>
<td>10.1</td>
<td></td>
</tr>
<tr>
<td>7.3</td>
<td>8.5</td>
<td></td>
</tr>
<tr>
<td>5.2</td>
<td>6.8</td>
<td></td>
</tr>
<tr>
<td>4.0</td>
<td>5.8</td>
<td>and 4.0/5.9</td>
</tr>
<tr>
<td>12.05</td>
<td>14.25</td>
<td></td>
</tr>
</tbody>
</table>

Estimated angle of drive: 80° from initial push, 80-85° after pushes  
Reason for ending drive: refusal (2.0)  

Drive Completion Time: 11:45  
On Boat Recovery: 9.9 core catcher failed  

End of Core Tube Observations  

<table>
<thead>
<tr>
<th>Staining:</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tube Deformation:</td>
<td>None, water on surface</td>
</tr>
<tr>
<td>Loss of Sediment:</td>
<td>None at bottom, much at sed-water surface</td>
</tr>
<tr>
<td>Sediment Description:</td>
<td></td>
</tr>
<tr>
<td>Water in Tube:</td>
<td>Water siphoned off tube</td>
</tr>
</tbody>
</table>

Keep or Retry: Retry due to sediment loss  

Notes:  
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)  

Diver wrapped 90° core in water and estimated that core catcher may be missing. Confirmed that sediment is being held in.
### Sediment Core Processing Log

**Sample Location/Number:** SC-43 R2

**Date/Time:** 2/23/06 09:00

**Sample Logged by:** LM

**Type/Diameter of Sample:** 4" sq. core

**Sample Quality:** good, fair, poor, disturbed

---

<table>
<thead>
<tr>
<th>Recovery Length (ft)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Size % G</th>
<th>Size % S</th>
<th>Size % F</th>
<th>RD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Description (grain size, color, moisture, sheen, odor, biota, wood, other debris):**

1. **0.25-0.5" pocket of gray-brown clayey silt**
2. **Organic inter (leaves)**
3. **Silt**
4. **Silt**
5. **Silt**
6. **Silt**
7. **Silt**
8. **Silt**

**Notes:** Torvane was not taken at this station

(See RA Core log)
Sediment Core Processing Log

Job: #DWG core processing
Job Number: 467.220-311

Core Location/Sample Number: SC-413-R3

Date/Time: 2/23/10 06
Sample Logged by: LM

Type/Diameter of Sample: 4" S9 0.8m
Sample Quality: good

No. of Sections: 1
Sample Length (from log):
Avg. % Compaction:

Notes: On deck 06

<table>
<thead>
<tr>
<th>Recovered Length (ft)</th>
<th>Color</th>
<th>Size % G</th>
<th>Size % S</th>
<th>Size % F</th>
<th>RH</th>
<th>Description (grain size, color, moisture, sheen/odor, biota, wood, other debris)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SAA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.9 through 1&quot; seams of Silt alternating with Sand</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.8 Sand is coarse and a 1&quot; layer returning to medium-grained sand from 8.1-9.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Sand sharp, sharp, coarse block, multi-colored grained Sand</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>L coarsening downward</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>End of core @ 9.8'</td>
</tr>
</tbody>
</table>
**Mudmole™ Bore Log**

**Project:** LDWG Duwamish Coring  
**Station:** 43 R3  
**Project No:** 341185.001  
**Position:** NAD83  
**Collected by:** GSM  
**Date:** 2/22/6  
**Time:** 14:50  
**Water depth:** 11.1 ft  
**Mudline:** -7.2 ft MLLW (estimated using tide tables)

**Weather/Comments:** N/A

Full penetration, top of mud adjusted in field lab

<table>
<thead>
<tr>
<th>Penetration interval (ft)</th>
<th>Interval recovery (ft)</th>
<th>Percent recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td>0.55</td>
<td>157%</td>
</tr>
<tr>
<td>0.3500000000000000</td>
<td>1.6</td>
<td>69%</td>
</tr>
<tr>
<td>2.95-8.95</td>
<td>3.1</td>
<td>78%</td>
</tr>
<tr>
<td>6.95-8.95</td>
<td>1.6</td>
<td>80%</td>
</tr>
<tr>
<td>8.95-10.95</td>
<td>1.5</td>
<td>75%</td>
</tr>
<tr>
<td>10.95-13.15</td>
<td>1</td>
<td>45%</td>
</tr>
<tr>
<td>13.15-15.65</td>
<td>0.7</td>
<td>26%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Depth below mudline (ft)</th>
<th>Distance from top of tube (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mudline</td>
<td>6.2</td>
</tr>
<tr>
<td>1</td>
<td>7.20</td>
</tr>
<tr>
<td>2</td>
<td>7.89</td>
</tr>
<tr>
<td>3</td>
<td>8.69</td>
</tr>
<tr>
<td>4</td>
<td>9.36</td>
</tr>
<tr>
<td>5</td>
<td>10.14</td>
</tr>
<tr>
<td>6</td>
<td>10.91</td>
</tr>
<tr>
<td>7</td>
<td>11.69</td>
</tr>
<tr>
<td>8</td>
<td>12.49</td>
</tr>
<tr>
<td>9</td>
<td>13.28</td>
</tr>
<tr>
<td>10</td>
<td>14.04</td>
</tr>
<tr>
<td>11</td>
<td>14.77</td>
</tr>
<tr>
<td>12</td>
<td>15.23</td>
</tr>
<tr>
<td>13</td>
<td>15.68</td>
</tr>
<tr>
<td>14</td>
<td>15.97</td>
</tr>
<tr>
<td>15</td>
<td>No sample</td>
</tr>
<tr>
<td>16</td>
<td>No sample</td>
</tr>
<tr>
<td>17</td>
<td>No sample</td>
</tr>
<tr>
<td>18</td>
<td>No sample</td>
</tr>
<tr>
<td>19</td>
<td>No sample</td>
</tr>
<tr>
<td>20</td>
<td>No sample</td>
</tr>
</tbody>
</table>

Penetration 15.85 ft  On deck recovery 9.85 ft = 62% Recovery
Station Number: 43  Date: 02/22/06  Station Arrival Time: 1439
Attempt: 3  Core Tube Length: 16.05  Station Departure Time: 1520
Field Technician: TD  Lead Line Water Depth: 11.1  Dist. From Target Station: 20
Contractor: MWS/BB3  Latitude: 49.25  On-site Visitor: —
On-site Visitor: —  Longitude: 127.1846

**Shoreline & surrounding area:** rip rap, sea concrete, asphalt, wood debris

**Sediment surface & slope:** lightly sand, no visible debris

**Water current and visibility:** 1st VS., moderate current, falling tide (report)

**Diver Water Depth:** —  Tip Probe Depth: —  Disk Probe Depth: —

**Drive Initiation Time:** 1110  **Drive Completion Time:** 1508  **Drive Offset:** —

**Estimated angle of drive:** Est. 10°

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, moderate, difficult; measured by diver or deck)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.7</td>
<td>15.5</td>
<td>deep measured, free fall</td>
</tr>
<tr>
<td>13.1</td>
<td>13.7</td>
<td>easy drive</td>
</tr>
<tr>
<td>9.1</td>
<td>10.6</td>
<td>easy drive, diver measured</td>
</tr>
<tr>
<td>7.1</td>
<td>9.0</td>
<td>moderate drive</td>
</tr>
<tr>
<td>5.1</td>
<td>7.5</td>
<td>moderate drive</td>
</tr>
<tr>
<td>2.9</td>
<td>6.5</td>
<td>moderate - difficult drive, penetration good</td>
</tr>
<tr>
<td>0.2</td>
<td>5.8</td>
<td>difficult drive, penetration good</td>
</tr>
</tbody>
</table>

**TOTAL:** 15.85  **TOTAL:** 10.25  **Percent Recovered:** 64.7% (13.4% on deck)

**Reason for ending drive:** reached penetration goal

**If refusal, reason for refusal:**

**Penetration & Recovery measured from top of core tube to sediment surface in feet (tenth)**

**Tension on line:** Yes  **Stability of vessel:** no problem

**Overlying water in core (quantity and description):** slight, 1/2"

**On Boat Recovery:** 6"  **Loss of Sediment:** 0.2 ft.

**Extraction Notes:** (i.e. winch or hammer, easy, hard) winch, easy

**Optical Observations:**

**Staining:** mud-sand #18 strips, sprayed off

**Tube Deformation:** none

**Sediment Description (odor or sheen?):** mud-coarse sand, grey ground, no odor/sheen

**Keep or Retry:** Diver inserted screw plug at sea/unknown

Notes:

Penetration & Recovery measured from top of core tube to sediment surface in feet (tenth)
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-22-06  Recorder: 650

Project: 341185.001 Windward Lower Duwamish Coring

Station Name: 43 B3

Tube Length (ft): 16-05
Water Depth (ft): 11-1  Time: 1950
Est. Tide Height (ft): 3-9 (MLLW)
Est. Mudline:  (MLLW)

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft
Northing 199287
Easting 1271846
On Deck Top of Sediment 6.0

Comments: rapidly falling tide  diver depth 9 ft - flat bottom
        firm silty sand - visibility 1 ft - no debris - medium current
        26 ft offshore of station

Penetration Tape  Recovery Tape Reading  Comments
15.7  15.5
13.1  13.7
9.1  10.6
7.1  9.0
5.1  7.5
2.9  6.5
0.2  5.8  full penetration
### Sediment Core Processing Log

**Job:** DUG Core Processing  
**Core Location/Sample Number:** SC-43-R2  
**Date/Time:** 12/1/06 0400  
**Sample Logged by:** JH  
**Type/Diameter of Sample:** 4" sq alum  
**Sample Quality:** good  
**Notes:** Pin = 11.7", 7641 Rec  
**On Deck: 631 641 Rec**

<table>
<thead>
<tr>
<th>Sample Depth</th>
<th>Subsample No.</th>
<th>Summary Switch</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-2</td>
<td>0915</td>
<td>1-16</td>
</tr>
<tr>
<td>6T 26</td>
<td>13-00</td>
<td>1-16</td>
</tr>
<tr>
<td>3-3.5</td>
<td>0948</td>
<td>1-16</td>
</tr>
<tr>
<td>4-4.5</td>
<td>0948</td>
<td>1-16</td>
</tr>
<tr>
<td>5-5.5</td>
<td>1000</td>
<td>1-16</td>
</tr>
<tr>
<td>631</td>
<td>641</td>
<td>1-16</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>Initial Actual Depth</th>
<th>Sample Depth</th>
<th>Subsample No.</th>
<th>Summary Switch</th>
</tr>
</thead>
<tbody>
<tr>
<td>red-brown, wet, st. sandy Silt</td>
<td>0-0.5</td>
<td>0920</td>
<td>1-16</td>
<td>1-16</td>
</tr>
<tr>
<td>moist, med. stiff, black, implegt. st. sandy Silt (org)</td>
<td>0.5</td>
<td>0936</td>
<td>1-16</td>
<td>1-16</td>
</tr>
<tr>
<td>st. compressibility</td>
<td>0-2</td>
<td>0915</td>
<td>1-16</td>
<td>1-16</td>
</tr>
<tr>
<td>odor/silteness</td>
<td>6T 26</td>
<td>13-00</td>
<td>1-16</td>
<td>1-16</td>
</tr>
<tr>
<td>1.5-2.5</td>
<td>0948</td>
<td>1-16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-3.5</td>
<td>0948</td>
<td>1-16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4-4.5</td>
<td>0948</td>
<td>1-16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5-5.5</td>
<td>1000</td>
<td>1-16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>631</td>
<td>641</td>
<td>1-16</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Recovered Length (ft):** 6.3  
- **Avg. % Compaction:**

<table>
<thead>
<tr>
<th>Recorded Length (ft)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Size % G</th>
<th>Size % S</th>
<th>Size % F</th>
<th>PID</th>
<th>Description (grain size, color, moisture, sheen/odor, bits, wood, other debris)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.3</td>
<td></td>
<td>red-brown, wet, st. sandy Silt</td>
<td></td>
<td></td>
<td></td>
<td>20</td>
<td>transitional</td>
</tr>
<tr>
<td>2.5</td>
<td></td>
<td>moist, med. stiff, black, implegt. st. sandy Silt</td>
<td></td>
<td></td>
<td></td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>5.4</td>
<td></td>
<td>clayey silt about 1&quot; to 2&quot; wide</td>
<td></td>
<td></td>
<td></td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>2.5</td>
<td></td>
<td>increasing sand (dom. unit)</td>
<td></td>
<td></td>
<td></td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>2.5</td>
<td></td>
<td>sandy</td>
<td></td>
<td></td>
<td></td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>2.5</td>
<td></td>
<td>gray</td>
<td></td>
<td></td>
<td></td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>2.5</td>
<td></td>
<td>black</td>
<td></td>
<td></td>
<td></td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>2.5</td>
<td></td>
<td>black</td>
<td></td>
<td></td>
<td></td>
<td>20</td>
<td></td>
</tr>
</tbody>
</table>

**End of core @ 6.3'**

---

351 of 490
SG 43 - R2

2/21/06
LM

x-sectional view

observed mudline = 8.61'
actual = 9.8'

winnowing

0.8 - 1.0
1.5 - 2.0
2.3 - 2.8
4.5 - 5.0
5.0 - 6.0

SAA ~ 10%
SAA ~ 20%
SAA ~ 15%
top 3/4 of core is missing (see sec. above)

core catcher is 5/8 - 2/3 full at last 1.3' from bottom
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-20-06    Recorder: 630

Project: 341185.001 Windward Lower Duwamish Coring

Station Name: 43 R 2

Tube Length (ft): 16.05

Water Depth (ft): 7.5

Est. Tide Height (ft) 5.4 (MLLW)

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft

Northing 199291
Easting 1271871

Est. Mudline: (MLLW)

Comments: rapidly falling tide - strong surface current

5 ft visibility - silty sand - gentle slope

Penetration Tape Reading

<table>
<thead>
<tr>
<th>Reading</th>
<th>Recovery Tape Reading</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.9</td>
<td>14.0</td>
<td></td>
</tr>
<tr>
<td>11.6</td>
<td>12.9</td>
<td></td>
</tr>
<tr>
<td>10.3</td>
<td>11.8</td>
<td></td>
</tr>
<tr>
<td>7.2</td>
<td>9.4</td>
<td></td>
</tr>
<tr>
<td>6.4</td>
<td>9.0</td>
<td></td>
</tr>
<tr>
<td>5.4</td>
<td>8.7</td>
<td></td>
</tr>
<tr>
<td>4.4</td>
<td>8.5</td>
<td>refusal</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Mudmole™ Bore Log

Project: LDWG Duwamish Coring  
Project No: 341185.001  
Collected by: GSM  
Date: 2/20/2006  
Water depth: 7.5 ft  
Weather/Comments: N/A

Station: 43 R2  
Position: NAD83  
Time: 12:43  
Mudline: -2.1 ft MLLW (estimated using tide tables)

Driven to refusal, top of core measured as 9.8 ft from top of tube in field lab.

Penetration 11.65 ft/ On deck recovery 6.25 ft = 54% Recovery
Station Number: 43  Date: 2/20/04  Station Arrival Time: 1130
Attempt: 2  Coro Tube Length: 16.05  Station Departure Time: 1330
Field Technician: JMF  Lead Line Water Depth: 75
Contractor: MCF/RS  Dist. From Target Station: 14
On-site Visitor:  Latitude: 49.29.1
Store and surrounding area: rip rap, concrete slabs, wood pilings, dolphins
Sediment surface & slope: silty sand, gentle slope, wood debris
Water current and visibility: strong surface current
Diver Water Depth: 8.0  Tip Probe Depth:  —  Disk Probe Depth:  —

Drive Initiation Time: 1240  Drive Completion Time: 1305  Drive Offset:  —
Estimated angle of drive:  ~16°

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, moderate, difficult; measured by diver or deck)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.9</td>
<td>14.0</td>
<td>easy drive</td>
</tr>
<tr>
<td>11.6</td>
<td>12.9</td>
<td>easy drive, but penetration slowed</td>
</tr>
<tr>
<td>10.3</td>
<td>11.8</td>
<td>moderate drive</td>
</tr>
<tr>
<td>6.9</td>
<td>9.0</td>
<td>moderate drive</td>
</tr>
<tr>
<td>5.4</td>
<td>8.7</td>
<td>moderate drive</td>
</tr>
<tr>
<td>4.4</td>
<td>8.5</td>
<td>difficult drive - refusal</td>
</tr>
</tbody>
</table>

TOTAL 11.45  TOTAL 7.55  Percent Recovered: 64.8%
Reason for ending drive: refusal
If refusal, reason for refusal: hard substrate

Extraction observations:
Tension on line? Yes  Stability of vessel: no problem
Overlying water in core (quantity and description): clear ~1.5L
On Boat Recovery: 8.5  Loss of Sediment: 0.0
Extraction Notes: (i.e. winch or hammer, easy, hard) winch, easy

Surface Observations:
Staining: some silt, rinsed off
Tube Deformation: none
Sediment Description (odor or sheen?): dark grey to black, silt with finesand

Kept or Retype: diver inserted screw plug at sea/H2O interface

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-20-06  Recorder: G. C.
Project: 341185.001 Windward Lower Duwamish Coring

Station Name: 43 R1

| Tube Length (ft) | 16.05 |
| Water Depth (ft) | 8.4   |
| Est. Tide Height (ft) | 5.1   |

(MLLW)

Est. Mudline: ____________________

(MLLW)

Comments: Strong surface current - falling tide.

Diver depth & Visibility - 5 ft, silt, sand - gentle slope.

no debris

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft

Northing: 199298

Easting: 1271875

On Deck Top of Sediment: 11.3

Penetration Tape Reading

<table>
<thead>
<tr>
<th>Recovery Tape Reading</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.7</td>
<td>14.4</td>
</tr>
<tr>
<td>12.1</td>
<td>13.6</td>
</tr>
<tr>
<td>10.0</td>
<td>12.4</td>
</tr>
<tr>
<td>7.0</td>
<td>10.7</td>
</tr>
<tr>
<td>5.9</td>
<td>10.2</td>
</tr>
<tr>
<td>4.8</td>
<td>9.8</td>
</tr>
</tbody>
</table>
Mudmole™ Bore Log

Project: LDWG Duwamish Coring
Project No: 341185.001
Collected by: GSM
Date: 2/20/2006
Water depth: 8.4 ft

Station: 43 R1
Position: NAD83
199298
Nothing

Time: 11:46
1271875
Easting

Mudline: -3.3 ft MLLW (estimated using tide tables)

Weather/Comments: N/A
Driven to refusal

Penetration 11.25 ft/ On deck recovery 4.75 ft = 42% Recovery

Penetration interval
(0-2.35)
(2.35-3.95)
(3.95-6.05)
(6.05-9.05)
(9.05-10.15)
(10.15-11.25)

Interval
recovery
(1.65)
(0.8)
(1.2)
(1.7)
(0.5)
(0.4)

Percent
recovery
70%
50%
57%
57%
45%
36%

Depth below
mudline
(11.3)
(1)
(2)
(3)
(4)
(5)
(6)
(7)

Distance from top of tube
(11.3)
(12.00)
(12.70)
(13.28)
(13.76)
(14.35)
(14.92)
(15.49)

Distance below mudline (ft)

Penetration 11.25 ft/ On deck recovery 4.75 ft = 42% Recovery

Penetration 11.25 ft/ On deck recovery 4.75 ft = 42% Recovery

Penetration 11.25 ft/ On deck recovery 4.75 ft = 42% Recovery

Penetration 11.25 ft/ On deck recovery 4.75 ft = 42% Recovery

Penetration 11.25 ft/ On deck recovery 4.75 ft = 42% Recovery
**Station Number:** 43  
**Date:** 2/20/04  
**Core Tube Length:** 16.05  
**Station Arrival Time:** 1130  
**Lead Line Water Depth:** 8.9  
**Station Departure Time:** 1330  
**Latitude:** 49.248  
**Dist. From Target Station:** 12  
**Longitude:** 122°18'35"  

**Shoreline & surrounding area:** rip rap, concrete slabs, wood dolphins  
**Sediment surface & slope:** silt/sand, gentle slope no debris  
**Water current and visibility:** S+vis, strong surface current  
**Diver Water Depth:** 8.0  
**Tip Probe Depth:**  
**Disk Probe Depth:**  

**Drive Initiation Time:** 11:55  
**Drive Completion Time:** 12:20  
**Drive Offset:** —  
**Estimated angle of drive:** ~10°  

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, moderate, difficult; measured by diver or deck)</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.7</td>
<td>14.4</td>
<td>easy drive</td>
</tr>
<tr>
<td>12.1</td>
<td>13.6</td>
<td>easy drive</td>
</tr>
<tr>
<td>10.0</td>
<td>12.4</td>
<td>easy drive, current may have distorted data</td>
</tr>
<tr>
<td>7.0</td>
<td>10.7</td>
<td>moderate</td>
</tr>
<tr>
<td>5.9</td>
<td>10.2</td>
<td>moderate to difficult</td>
</tr>
<tr>
<td>4.8</td>
<td>9.8</td>
<td>difficult - refusal</td>
</tr>
</tbody>
</table>

**TOTAL 51.25**  
**Percent Recovered:** 55.60%  

**Reason for ending drive:** refusal  
**If refusal, reason for refusal:** hard substrate  

**Extraction Observations:**  
**Tension on line:** Y  
**Stability of vessel:** no problem  
**Overlying water in core (quantity and description):** slightly turbid ~1.5L  
**On Boat Recovery:** 11.3  
**Loss of Sediment:** 1.5ft; on boat recovery 42.2%  
**Extraction Notes:** (i.e. winch or hammer, easy, hard) winch, easy  

**Core Observation:**  
**Staining:**  
**Tube Deformation:** none  
**Sediment Description (odor of sheen?):** fine sand + silt grey to dark grey  

**Keep or Return:** diver inserted screw plug at H2O/sed interface will verify due to low recovery

**Notes:**  
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
## Sediment Core Processing Log

**Core Location/Sample Number:** LDN - 44 - R2 1430

**Sample Logged by:** L. Myer, A. Fitzpatrick

**Type/Diameter of Sample:** 4" 5.5" Ave. Alum IMCS

**Sample Quality:** good fair poor disturbed

### Description

<table>
<thead>
<tr>
<th>Required Length (ft.)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Size s.s.</th>
<th>Size s.s.</th>
<th>Size s.s.</th>
<th>Pud</th>
<th>Description (grain size, color, moisture, sheen/odor, biota, wood, other debris)</th>
<th>Delta Angle Core Entry</th>
<th>Sample Depth</th>
<th>Substrate An</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0 - 18.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Not to moist, soft, slurryy, Silt (black, gray)</td>
<td>0.25</td>
<td>150.2</td>
<td>150.2</td>
<td></td>
</tr>
<tr>
<td>2.5 Y</td>
<td>90</td>
<td>Black</td>
<td>10</td>
<td>90</td>
<td>90</td>
<td></td>
<td>0.5: 1.0 thick, clayey, multicolored grains</td>
<td>0.25</td>
<td>150.2</td>
<td>150.2</td>
<td></td>
</tr>
<tr>
<td>2.5 Y</td>
<td>90</td>
<td>Black</td>
<td>10</td>
<td>90</td>
<td>90</td>
<td></td>
<td>0.5: 1.0 thick, olive-grey clayey silt</td>
<td>0.25</td>
<td>150.2</td>
<td>150.2</td>
<td></td>
</tr>
<tr>
<td>2.5 Y</td>
<td>90</td>
<td>Brown</td>
<td>10</td>
<td>90</td>
<td>90</td>
<td></td>
<td>0.5: 1.0 thick, clayey, multicolored grains</td>
<td>0.25</td>
<td>150.2</td>
<td>150.2</td>
<td></td>
</tr>
<tr>
<td>2.5 Y</td>
<td>90</td>
<td>Brown</td>
<td>10</td>
<td>90</td>
<td>90</td>
<td></td>
<td>0.5: 1.0 thick, olive-grey clayey silt</td>
<td>0.25</td>
<td>150.2</td>
<td>150.2</td>
<td></td>
</tr>
<tr>
<td>2.5 Y</td>
<td>90</td>
<td>Grey</td>
<td>10</td>
<td>93</td>
<td>5</td>
<td></td>
<td>0.5: 1.0 thick, olive-grey clayey silt</td>
<td>0.25</td>
<td>150.2</td>
<td>150.2</td>
<td></td>
</tr>
</tbody>
</table>

### Notes

- **Avg. % Compaction:** 5.5%
- **Sample Quality:** good fair poor disturbed

---

**End of Core at 5.5 ft.**

Begins @ 3.5' Subangular Detrital Conglomerate
LDM-SC-44  R2  Feb 21, 2004

\[ \text{ondek madenê} = 10.3 \]

\[ \text{core catcher is } \frac{2}{3} \text{ full of bl. mid-course sand w/ multicolored grains} \]
**MCS Environmental MudMole Bore Log**

**Collection Information**
- Date: 2-27-06
- Recorder: GSV
- Project: 341185.001 Windward Lower Duwamish Coring

**Position Information**
- Coordinate Datum: WA State Plane N, NAD 83, Survey Ft
- Northing: 198925
- Easting: 1272230
- On Deck Top of Sediment: 10.3

**Station Name:** 44 R2

**Tube Length (ft):** 16.1

**Water Depth (ft):** 12.0
- Time: 10:04

**Est. Tide Height (ft):** 10.0 (MLLW)

**Est. Mudline:** (MLLW)

**Comments:** Moved offshore to avoid concrete debris. 28 ft. offshore. Diver depth 13. Visibility 4 ft. Mild current. Silty sand with rolling mounds. 1 1/2 ft. high. Sloping bottom

**Penetration Tape Reading**

<table>
<thead>
<tr>
<th>Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.4</td>
</tr>
<tr>
<td>11.1</td>
</tr>
<tr>
<td>9.4</td>
</tr>
<tr>
<td>7.6</td>
</tr>
<tr>
<td>5.4</td>
</tr>
<tr>
<td>4.4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Recovery Tape Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.2</td>
</tr>
<tr>
<td>12.8</td>
</tr>
<tr>
<td>12.1</td>
</tr>
<tr>
<td>11.1</td>
</tr>
<tr>
<td>10.6</td>
</tr>
<tr>
<td>10.2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>core penetrated at 10° angle</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

**MCS Environmental, Inc.**
6505 - 216th Dr SW, Suite 100
Mountlake Terrace, WA 98043
(425) 697-4346
Station Number: 44  
Date: 6/21/10  
Station Arrival Time: 9:22

Field Technician: TD  
Core Tube Length: 116.1  
Station Departure Time:

Contractor: MV5/RSS  
Lead Line Water Depth: 17.0  
Dist. From Target Station: 28

On-site Visitor:  
Latitude: 148925  
Longitude: 173220

**Pre-Drive and Drive Observations**

Shoreline & surrounding area: same as FI

Sediment surface & slope: gently slope down, silty sand, no visible features, sediment moves on bottom

Water current and visibility: 4 ft. vs., mild current

Diver Water Depth: 10

Tip Probe Depth:  
Disk Probe Depth:  

**Drive Observations**

Drive Initiation Time: 1018  
Drive Completion Time: 1025  
Drive Offset:  
Estimated angle of drive: 810

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, moderate, difficult; measured by diver or deck)</th>
</tr>
</thead>
<tbody>
<tr>
<td>17.4</td>
<td>14.2</td>
<td>deck measured; few, fine</td>
</tr>
<tr>
<td>11.1</td>
<td>12.8</td>
<td>dive measured, moderate wave</td>
</tr>
<tr>
<td>9.4</td>
<td>12.1</td>
<td>moderate-difficult wave</td>
</tr>
<tr>
<td>7.6</td>
<td>11.1</td>
<td>difficult dive</td>
</tr>
<tr>
<td>5.4</td>
<td>10.6</td>
<td>difficult dive</td>
</tr>
<tr>
<td>4.4</td>
<td>10.2</td>
<td>difficult dive</td>
</tr>
</tbody>
</table>

TOTAL: 11.7  TOTAL: 5.9  Percent Recovered: 50.4% (49.1% on-deck)

Reason for ending drive: refusal

If refusal, reason for refusal: hard substrate

**Extraction Observations**

Tension on line? Yes  
Stability of vessel: no problem

Overlying water in core (quantity and description): clear, slightly turbid

On Boat Recovery: 1.3  Loss of Sediment: 0.1 ft

Extraction Notes: (i.e. winch or hammer, easy, hard) winch, easy

**Core Observations**

Staining: slightly sand on cap, sprayed off

Tube Deformation: none, tube scratched up

Sediment Description (odor or sheen?): coarse sand, no odor, no sheen

Keep or Retry: drive inserted, screwing at sediment interface

- may come back with vibrator

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenth)

---

RETEC Group Inc.
1611 SW Market Rd. Suite 207
Seattle, WA 98144-1121

206.624.3189 Phone
206.624.3937 Fax
www.retec.com

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<table>
<thead>
<tr>
<th>Sample Depth</th>
<th>Sample No.</th>
<th>Sample Alkali</th>
<th>Sample Disposal</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-2.3</td>
<td>1000</td>
<td>SI   L T</td>
<td>SI   L T</td>
</tr>
<tr>
<td>2</td>
<td>23-4</td>
<td>1105</td>
<td>SI   L T</td>
</tr>
<tr>
<td>3</td>
<td>43-6</td>
<td>1105</td>
<td>SAND + GRAVEL</td>
</tr>
<tr>
<td>4</td>
<td>43-6</td>
<td>1105</td>
<td>SAND + GRAVEL</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td>GRAVEL</td>
</tr>
</tbody>
</table>

**Notes:**
- Pen = 10.62
- Im X Rec

**Description:**
- 0.2-
  - Well sorted, brown silt, sandy silt
  - Oat Silt (Silty Sand) + muckling
- 0.9
  - 0.1 layer of silt
  - 1.0
  - Oat silt + clayey silt

This core was not processed in R2 [R2] was determined to be better recovered with less winnowing & bottom sediments confirmed as some 2-1M sharp Sand + gravel

**Core Location/Sample Number:** SC-44-R3
**Type/Diameter of Sample:** 4.5" sq. clump
**Sample Quality:** Good, fair, poor, disturbed
Mudline = 9.6'

One bucket is 2/3 full from 9.9 - 6.5' (end zone)
black gravelly sand w/ wood debris
gravel is subangular & up to 1" Ø

longitudinal cross-sectional view of 4.9 - 6.5'
Mudmole™ Bore Log

Project: LDWG Duwamish Coring
Station: 44 R3
Project No: 341185.001
Position: NAD83, 198940, Nothing
Date: 2/22/2006
Time: 15:39, 1272209, Easting
Water depth: 5.6 ft, Mudline: -2.7 ft MLLW (estimated using tide tables)

Weather/Comments: N/A
Driven to refusal

Penetration interval (ft) | Interval recovery (ft) | Percent recovery |
---|---|---|
0-1.55 | 0.95 | 61% |
1.55-3.35 | 1.3 | 72% |
3.35-5.35 | 1.8 | 90% |
5.35-7.25 | 1.3 | 68% |
7.25-9.35 | 0.9 | 43% |
9.35-10.55 | 0.2 | 17% |

Depth below mudline (ft) | Distance from top of tube (ft)
---|---|
Mudline | 9.6 |
1 | 10.21 |
2 | 10.88 |
3 | 11.60 |
4 | 12.44 |
5 | 13.34 |
6 | 14.09 |
7 | 14.78 |
8 | 15.27 |
9 | 15.70 |
10 | 15.96 |
11 | No sample |
12 | No sample |
13 | No sample |
14 | No sample |
15 | No sample |
16 | No sample |
17 | No sample |
18 | No sample |
19 | No sample |
20 | No sample |

Penetration 10.55 ft/ On deck recovery 6.45 ft = 61% Recovery
Station Number: 44  
Date: 04/21/04  
Station Arrival Time: 1050  
Attempt: 3  
Core Tube Length: 16.05  
Station Departure Time: 1105  
Field Technician: TD  
Lead Line Water Depth: 5.6  
Dist. From Target Station: 27  
Contractor: MG/ESS  
Latitude: 195440  
On-site Visitor:  
Longitude: 1272209

Shoreline & surrounding area: rip rap, concrete debris, wood & metal debris, wood piling.  
Sediment surface & slope: sandy silt, flat bottom, no debris.  
Water current and visibility: very slow, marine current, falling tide (rapidly).  
Diver Water Depth: 5  
Tip Probe Depth:  
Disk Probe Depth:  

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, moderate, difficult; measured by diver or deck)</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.5</td>
<td>15.1</td>
<td>deck measured, free flow</td>
</tr>
<tr>
<td>12.7</td>
<td>12.8</td>
<td>moderately easy, normal drive</td>
</tr>
<tr>
<td>10.7</td>
<td>12.0</td>
<td>moderate drive</td>
</tr>
<tr>
<td>8.8</td>
<td>10.1</td>
<td>moderate drive</td>
</tr>
<tr>
<td>6.7</td>
<td>7.8</td>
<td>difficult drive, penetration slowed</td>
</tr>
<tr>
<td>5.5</td>
<td>9.0</td>
<td>difficult drive</td>
</tr>
</tbody>
</table>

TOTAL 112.65  TOTAL 6.45  Percent Recovered: 60.1% (60.1% on deck)

Reason for ending drive: refusal  
If refusal, reason for refusal: hard substrate

<table>
<thead>
<tr>
<th>Tension on line?</th>
<th>Stability of vessel:</th>
<th>Overlying water in core (quantity and description):</th>
<th>On Boat Recovery:</th>
<th>Loss of Sediment:</th>
</tr>
</thead>
<tbody>
<tr>
<td>YES</td>
<td>no problems</td>
<td>did not observe</td>
<td>9.6</td>
<td>0</td>
</tr>
</tbody>
</table>

Extraction Notes: (i.e. winch or hammer, easy, hard) winch, moderate

Staining: dark streaking of sandy silt, sprayed off  
Tube Deformation: none  
Sediment Description (odor or sheen?): coarse sand, brown, no odors/shell

Keep or Retry: diver inserted screw, play at sediment interface  
Core accepted

Notes: Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-22-08 Recorder: 6SM

Project: 341186.001 Windward Lower Duwamish Coring

Station Name: 44 R3

Tube Length (ft): 16.05

Water Depth (ft): 5-6 Time: 1539

Est. Tide Height (ft): 2.9 (MLLW)

Est. Mudline: (MLLW)

Comments: rapidly falling tide - 27 ft offshore of station
diver depth 54 ft - visibility 3 ft - medium current - flat bottom - sandy silt - no debris

Penetration Tape Reading

| 14.5 | 15.1 |
| 12.7 | 13.8 |
| 10.7 | 12.0 |
| 8.8  | 10.7 |
| 6.7  | 9.8  |
| 5.5  | 9.6  |

Recovery Tape Reading

Comments

- penetration slowed return
# MCS Environmental MudMole Bore Log

## Collection Information

- **Date:** 2-21-06
- **Recorder:** 6SM
- **Project:** 341185.001 Windward Lower Duwamish Coring

## Station Information

- **Station Name:** 44 Q1
- **Tube Length (ft):** 16.1
- **Water Depth (ft):** 10.4
- **Est. Tide Height (ft):** 10.1 (MLLW)
- **Est. Mudline:** (MLLW)

## Position Information

- **Coordinate Datum:** WA State Plane N, NAD 83, Survey Ft
- **Northing:** 198960
- **Easting:** 1272242
- **On Deck Top of Sediment:** 16.1
- **Comments:** Diver depth 10' visibility 4-6. Aft bottom scattered debris - silty sand concrete debris
  - 12' off station - falling tide - broken off piling near station moved away from 17.2 5 A

## Penetration Tape Reading

<table>
<thead>
<tr>
<th>Penetration Tape Reading</th>
<th>Recovery Tape Reading</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>16.0</td>
<td>15.6</td>
<td></td>
</tr>
<tr>
<td>15.1</td>
<td>15.3</td>
<td>refuse</td>
</tr>
</tbody>
</table>

- No recovery - tip of core tube crunched
Mudmole™ Bore Log

Project: LDWG Duwamish Coring
Project No: 341185.001
Collected by: GSM
Date: 2/21/2006

Station: 44 R1
Position: NAD83
Time: 9:35
198960 Northing
Water depth: 10.4 ft
Mudline: -0.3 ft MLLW (estimated using tide tables)

Place Field ID Label Here

Weather/Comments: N/A

Driven to refusal, no recovery, tip of core tube crushed

Penetration interval (ft) Interval recovery (ft) Percent recovery
0-0.100000000000000 0.5 500%
0.100000000000000- 0.3 35%

Depth below mudline (ft) Distance from top of tube (ft)
Mudline 16.1
1 No sample
2 No sample
3 No sample
4 No sample
5 No sample
6 No sample
7 No sample
8 No sample
9 No sample
10 No sample
11 No sample
12 No sample
13 No sample
14 No sample
15 No sample
16 No sample
17 No sample
18 No sample
19 No sample
20 No sample

Penetration 1 ft/ On deck recovery 0 ft = 0% Recovery
Station Number: 44  Date: 7/21/06  Station Arrival Time: 1922
Attempt: 1  Core Tube Length: 16.1
Field Technician: TD  Lead Line Water Depth: 10.1
Contractor: WSS/ESS  Dist. From Target Station: 12
On-site Visitor:  

Pre-Drive and Dive Observations:
Shoreline & surrounding area: Concrete brick, two cap, wood & metal cable debris
Sediment surface & slope: Scattered debris, flat bottom, silty sand, broken piling
Water current and visibility: W/S 4 ft.
Diver Water Depth: 10
Tip Probe Depth  ______  Disk Probe Depth  ______

Drive Initiation Time: 0844  Drive Completion Time: 0849  Drive Offset:  ______
Estimated angle of drive:  est 10°

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, moderate, difficult; measured by diver or deck)</th>
</tr>
</thead>
<tbody>
<tr>
<td>16.0</td>
<td>16.0</td>
<td>Deck measured, freefall</td>
</tr>
<tr>
<td>15.1</td>
<td>15.3</td>
<td>Difficult drive, refused</td>
</tr>
</tbody>
</table>

Percent Recovered: 80%  (0% on deck)

Reason for ending drive: refused
If refusal, reason for refusal: hard debris/substrate

Extraction Notes: 1.0  Tension on line:  yes  Stability of vessel: no prob.
Overlying water in core (quantity and description): yes
On Boat Recovery:  yes  Loss of Sediment:  ______
Extraction Notes: (i.e. winch or hammer, easy, hard) which, easy

Air-Driven Observation:
Staining: none
Tube Deformation: tube warped
Sediment Description (odor or sheen?): none

Keep or Retriev  [Hit something hard (coupling?) - core tip warped],
substrate washed out

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)

The RETEC Group, Inc.
6011 SW Samoa Way, Suite 260
Seattle, WA 98134-1162
Sediment Core Processing Log

Core Location/Sample Number: SC-43-R1

Date/Time: 1/21/06 11:25

Sample Logged by: LM, Act-

Type/Diameter of Sample: 4" sq. ALUM.

Sample Quality: good to fair

Avg. % Compaction: 53

Notes: Pen = 9.7 ² 5.7, Ret

Inch Actual Depth (ft) | Sample Depth | Subsample No. | Summary
--- | --- | --- | ---
| | | | SILT

Prepared Length (m) | % Compaction | Color | Silt % | Silt % | PDR | Description (grain size, color, moisture, sheen/odor, bitsa, wood, other debris)
--- | --- | --- | --- | --- | --- | ---

0.24 layers of black multicolored grains of floc, med. shards of 0.05; with layers interbedded with black SILT

0.3, 3 - black

0.3, 3 - brown spongy SILT

0.3, 3 - black, moist, med. denser, sandy

SILT (alg.)

rootlets, occasional

wood fragments, occasional

Note: closer to shore

End of Core @ 5.3'

Shell test @ 4' = none, @ 5.0' = yes

No Clam, No GeoTech

Note: AF is present for shear test +

1310 distillation

2.1462

1310 distillate

1310 distillate

1310 distillate

1310 distillate

1310 distillate

1310 distillate

1310 distillate
Mudline = 10.2

- Core shoe & tip are deformed due to driving impact.
- Core shoe is 1/6 full.
- Rainbow sheen on sediment & water.
- Cores tube from 3.8' to bottom of core.
- Petroleum-like odor.

**Sheen test @ 5.0'**

- High sheen, iridescent streaks, blubbs at jar sides, metallic/rainbow in color.
- No thickness observed, dissipates very slowly, none.
- Poor spacial coverage.
Mudmole™ Bore Log

Project: LDWG Duwamish Coring
Project No: 341185.001
Collected by: GSM
Date: 2/20/2006

Station: 45 R1
Position: NAD83
188628 Northing
Time: 14:56
1272645 Easting

Water depth: 9.0 ft
Mudline: -7.2 ft MLLW (estimated using tide tables)

Weather/Comments: N/A
Driven to refusal

Penetration interval (ft)
0-3.55
3.55-5.55
5.55-7.65
7.65-9.45

Interval recovery (ft)
3.25
1.4
1.5
0.7

Percent recovery
92%
58%
79%
44%

Depth below mudline (ft)
Mudline
10.2
1
11.12
2
12.03
3
12.95
4
13.71
5
14.30
6
14.89
7
15.68
8
16.42
9
16.85
10
No sample
11
No sample
12
No sample
13
No sample
14
No sample
15
No sample
16
No sample
17
No sample
18
No sample
19
No sample
20
No sample

Distance from top of tube (ft)

Penetration 9.45 ft / On deck recovery 6.75 ft = 71% Recovery
Station Number: 45  
Date: 2/20/06  
Station Arrival Time: 1450  
Attempt: 1  
Core Tube Length: 16.05  
Station Departure Time: 1600  
Field Technician: JMF  
Lead Line Water Depth: 9  
Contractor: MSHR  
Diver Water Depth: 8  
Dist. From Target Station: 10  
On-site Visitor:  

**Pre-Drive and Diver Observations:**
- Shoreline & surrounding area:
  - rip rap, steel, wood, dolphins, concrete piers
- Sediment surface & slope:
  - sandy, no slope, no detritus
- Water current and visibility:
- Diver Water Depth
  - Tip Probe Depth
  - Disk Probe Depth

**Drive Observations:**
- Drive Initiation Time: 1505  
- Drive Completion Time: 1530  
- Drive Offset: —  
- Estimated angle of drive: est 10°

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g., easy, moderate, difficult; measured by diver or deck)</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.4</td>
<td>13.7</td>
<td>drive moderate</td>
</tr>
<tr>
<td>11.0</td>
<td>13.3</td>
<td>drive moderate</td>
</tr>
<tr>
<td>9.1</td>
<td>10.8</td>
<td>drive moderate</td>
</tr>
<tr>
<td>7.8</td>
<td>10.0</td>
<td>drive moderate, difficult, penetration slowed</td>
</tr>
<tr>
<td>7.5</td>
<td>10.1</td>
<td>drive difficult</td>
</tr>
</tbody>
</table>

**TOTAL**: 8.55  
**TOTAL**: 5.45  
**Percent Recovered**: 89.6%  
(88.4% on deck)

**Reason for ending drive:** refusal
If refusal, reason for refusal: hard substrate

**Extraction Observations:**
- Tension on line?: yes
- Stability of vessel: no problem
- Overlying water in core (quantity and description): clean ~ 2L
- On Boat Recovery: 10.2
- Loss of Sediment: 0.18
- Extraction Notes: (i.e., winch or hammer, easy, hard) winch, easy

**Observations:**
- Staining: some soil, rinsed 076
- Tube Deformation: none, tip bent
- Sediment Description (odor or sheen?): green, silts, with fine sands, petroleum odor

**Keep or Return:** diver couldn't insert screw plug since core container was inserted, tip was bent very due to low recovery

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (feet)
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-20-06  Recorder: GSV

Project: 341185.001 Windward Lower Duwamish Coring

Station Name: 45 R1

Tube Length (ft): 16.05

Water Depth (ft): 9.0

Est. Tide Height (ft) 1.8 (MLLW)

Est. Mudline: (MLLW)

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft

Northing 198628

Easting 1272645

On Deck Top of Sediment 102

Comments: Falling tide - pilings on station - 13 ft north of station - diver depth 8 - visibility 2 ft - mud bottom - silty sand - no debris - no current - no slope

Penetration Tape Reading  Recovery Tape Reading  Comments

| 13.4   | 13.7   |                  |
| 11.0   | 12.3   |                  |
| 9.1    | 10.8   |                  |
| 7.8    | 10.0   | penetration slowed refusal |
| 7.5    | 10.1   |                  |

end of core tube crushed

oily  silty sand in tip
Mudmole™ Bore Log

Project: LDWG Duwamish Coring
Project No: 341186.001
Collected by: GSM
Date: 2/20/2006
Water depth: 9.5 ft

Station: 45 R2
Position: NAD83
'98622
Northing
Time: 15:35
1272635
Easting

Mudline: -8.2 ft MLLW (estimated using tide tables)

Weather/Comments: N/A
Driven to refusal

Penetration interval (ft)
Interval recovery (ft)
Percent recovery

Depth below
mudline (ft)
Distance from
top of tube (ft)

0-2.55
2.05
80%
1
10.4

2.55-3.75
0.8
67%
2
11.20

3.75-5.85
1.6
76%
3
12.01

5.85-7.75
1.1
58%
4
12.75

7.75-8.75
0.7
70%
5
13.44

6
14.20

7
14.94

8
15.52

9
No sample
10
No sample
11
No sample
12
No sample
13
No sample
14
No sample
15
No sample
16
No sample
17
No sample
18
No sample
19
No sample
20
No sample

Penetration 8.75 ft / On deck recovery 5.65 ft = 65% Recovery
Station Number: 45  Date: 2/10/06  Station Arrival Time: 14:50
Attempt: 2  Core Tube Length: 16.05
Field Technician: JMF  Lead Line Water Depth: 9.5
Contractor: MCS/RSK  Dist. From Target Station: 
On-site Visitor: —

Shoreline & surrounding area: rip rap, shell, wood andolphins, convect per
Sediment surface & slope: sandy, noslope, no debris
Water current and visibility: ~2+ VIS
Diver Water Depth 9.0  Tip Probe Depth —  Disk Probe Depth —

Drive Initiation Time: 15:20  Drive Completion Time: 15:45  Drive Offset: —
Estimated angle of drive:

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, moderate, difficult; measured by diver or deck)</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.5</td>
<td>14.0</td>
<td>easy drive</td>
</tr>
<tr>
<td>12.3</td>
<td>13.2</td>
<td>easy drive</td>
</tr>
<tr>
<td>10.2</td>
<td>11.6</td>
<td>easy drive</td>
</tr>
<tr>
<td>8.3</td>
<td>10.5</td>
<td>moderate drive, penetration slowed</td>
</tr>
<tr>
<td>4.3</td>
<td>9.8</td>
<td>difficult drive, refused</td>
</tr>
</tbody>
</table>

Met size cobble fed out of core tip + coarse gravel

TOTAL 6.75 TOTAL 6.75 Percent Recovered: 71.4%

Reason for ending drive: refusal
If refusal, reason for refusal: wind subaeral

Tension on line?: yes  Stability of vessel: no problem
Overlying water in core (quantity and description): slightly turbid ~1.5 in
On Boat Recovery: 10.4  Loss of Sediment: 0.64 ft
Extraction Notes: (i.e. winch or hammer, easy, hard) winch, easy

Staining: some suit rinsed off  Tube Deformation: none
Sediment Description (odor or sheen?): mid to fine sand (natural) dark brown

Keep or Retry: diver inserted screw plug at sed/h2o interface
2nd attempt, acceptability pending

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-20-06  Recorder: GSI

Project: 341185.001 Windward Lower Duwamish Coring

Station Name: 45 R2

| Tube Length (ft): | 16.05 |
| Water Depth (ft): | 9.5  |
| Est. Tide Height (ft): | 1.3 (MLLW) |

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft

| Northing | 198,622 |
| Easting  | 127,263 |

Est. Mudline: | 10.4 (MLLW) |

Comments:
- falling tide
- diver depth
- visibility
- mudline off station
- medium size cobble fell out of tip of core tube

Penetration Tape Reading

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Recovery Tape Reading</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.5</td>
<td>14.0</td>
<td></td>
</tr>
<tr>
<td>12.3</td>
<td>13.2</td>
<td></td>
</tr>
<tr>
<td>10.2</td>
<td>11.6</td>
<td></td>
</tr>
<tr>
<td>8.3</td>
<td>10.5</td>
<td></td>
</tr>
<tr>
<td>7.3</td>
<td>9.8</td>
<td></td>
</tr>
<tr>
<td>medium size cobble fell out of tip of core tube</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recovered Length (ft)</td>
<td>Color</td>
<td>% Compaction</td>
</tr>
<tr>
<td>----------------------</td>
<td>-------</td>
<td>--------------</td>
</tr>
<tr>
<td>2-5</td>
<td>yellow brown</td>
<td>-</td>
</tr>
<tr>
<td>2.5-1</td>
<td>black</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>2.5-1</td>
<td>grey</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-</td>
</tr>
</tbody>
</table>

**Sediment Core Processing Log**

**Core Location/Sample Number:** 3C-45-R3

**Date/Time:** 21/1/06 1230

**Sample Logged by:** M A

**Type/Diameter of Sample:** 4" sq. alum

**Sample Quality:** good

**Notes:** Pen + 7.26 8I Rec. Other from shore.

**Core Catcher begins at 6.0. Bore + 0.48. End of core @ 6.5.**
mudline = 9.6

6.5

core catcher is 1/2 full of black mud, grained sand
# Mudmole™ Bore Log

**Project:** LDWG Duwamish Coring  
**Station:** 45 R3  
**Project No:** 341185.001  
**Collected by:** GSM  
**Position:** NAD83, NAD83  
**Date:** 2/21/2006  
**Time:** 11:05  
**Water depth:** 22.7 ft  
**Mudline:** -13.5 ft MLLW (estimated using tide tables)  
**Weather/Comments:** N/A  
**Driven to refusal**

<table>
<thead>
<tr>
<th>Penetration interval (ft)</th>
<th>Interval recovery (ft)</th>
<th>Percent recovery</th>
<th>Depth below mudline (ft)</th>
<th>Distance from top of tube (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-0.8000000000000000</td>
<td>0.8</td>
<td>100%</td>
<td>Mudline</td>
<td>9.6</td>
</tr>
<tr>
<td>5.2-7.6</td>
<td>1.7</td>
<td>71%</td>
<td>1</td>
<td>10.58</td>
</tr>
<tr>
<td>7.6-7.7</td>
<td>0.2</td>
<td>200%</td>
<td>2</td>
<td>11.49</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td>12.40</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4</td>
<td>13.31</td>
</tr>
<tr>
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<td></td>
<td>5</td>
<td>14.22</td>
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<td>6</td>
<td>14.97</td>
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<td>7</td>
<td>15.68</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>8</td>
<td>No sample</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td>9</td>
<td>No sample</td>
</tr>
<tr>
<td></td>
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<td>10</td>
<td>No sample</td>
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<td>11</td>
<td>No sample</td>
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<td>12</td>
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<td>14</td>
<td>No sample</td>
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<td></td>
<td>15</td>
<td>No sample</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>16</td>
<td>No sample</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>17</td>
<td>No sample</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>18</td>
<td>No sample</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>19</td>
<td>No sample</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>20</td>
<td>No sample</td>
</tr>
</tbody>
</table>

Penetration 7.7 ft/ On deck recovery 6.5 ft = 84% Recovery

---

**MCS Environmental, Inc.**  
6505 31st Street SW, Suite 100  
Mountlake Terrace, WA 98043  
(425) 697-4340  
fax (425) 697-4370  

File name 46 R3  
Bore Log (mudline) 382 of 490
Station Number: 45  Date: 02/21/06  Station Arrival Time: 1052
Attempt: 3  Core Tube Length: 16.1  Station Departure Time: 1130
Field Technician: TD  Lead Line Water Depth: 22.7  Dist. From Target Station: 29
Contractor: ANS/RE  Latitude: 49°58.8
On-site Visitor:  Longitude: 127°24.17

Drive Observations:

Shoreline & surrounding area: rip rap, wood, holplines, pilings, concrete piers at slip 4
Sediment surface & slope: gentle slope, no visible debris, sandy silt<
Water current and visibility: mild current, 4 ft tide, falling tide
Diver Water Depth: 22
Tip Probe Depth
Disk Probe Depth

Drive Initiation Time: 1111  Drive Completion Time: 1111  Drive Offset: 10
Estimated angle of drive: 10°

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, moderate, difficult, measured by diver or deck)</th>
</tr>
</thead>
<tbody>
<tr>
<td>16.3</td>
<td>15.3</td>
<td>diver measured, free fall</td>
</tr>
<tr>
<td>10.9</td>
<td>11.3</td>
<td>easy drive</td>
</tr>
<tr>
<td>8.5</td>
<td>9.6</td>
<td>moderate, difficult drive, penetration droved considerably</td>
</tr>
<tr>
<td>8.4</td>
<td>9.4</td>
<td>difficult drive, refusal</td>
</tr>
</tbody>
</table>

TOTAL 37.7 TOTAL 31.7  Percent Recovered: 87.0% (64.4% on deck)

Reason for ending drive: refused
If refusal, reason for refusal: hard subsoil

Extraction Observations:

Tension on line: yes
Stability of vessel: no problem
Overlying water in core (quantity and description): yes
On Boat Recovery: 9.6
Loss of Sediment: 0.7
Extraction Notes: (i.e. winch or hammer, easy, hard) which, easy-moderate

Product Observations:

Staining: slightly sandy, silt, sprayed off
Tube Deformation: none
Sediment Description (odor or sheen?): medium sand, clear, no odor, no sheen

Keep or Retry: diver inserted screw plug at sed/ld interface

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-21-08
Recorder: G3M
Project: 341185.001 Windward Lower Duwamish Coring
Station Name: 45 R3

Water Depth (ft): 22.7
Est. Tide Height (ft): 9.2

Time: 1105

Est. Mudline: On Deck Top of Sediment 9.6

Comments: Falling tide 2 2844 south of station -
22 ft depth - 4 A vis - sandy soil - bottom - no debris

Penetration Tape

<table>
<thead>
<tr>
<th>Penetration Tape Reading</th>
<th>Recovery Tape Reading</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.3</td>
<td>15.3</td>
<td></td>
</tr>
<tr>
<td>10.9</td>
<td>11.3</td>
<td></td>
</tr>
<tr>
<td>8.5</td>
<td>9.6</td>
<td>penetration slowed</td>
</tr>
<tr>
<td>8.4</td>
<td>9.4</td>
<td>refusal</td>
</tr>
</tbody>
</table>

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft
Northing: 198588
Easting: 1272647

MCS Environmental, Inc.
6505 - 210th St. SW, Suite 100
Mountlake Terrace, WA 98043
(425) 697-4560

Duwamish bore log forms F-2 384 of 480
## Sediment Core Processing Log

**Job:** LDW6 Core Processing  
**Core Location/Sample Number:** 5G-48-R1  
**Date/Time:** 2/24/16  
**Sample Logged by:** JM, CB  
**Sample Length (from log):** 1  
**Sample Quality:** good, fair, poor, disturbed  
**Notes:** T-HD - 13°, 7° (*12°, 21°*)

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Description (grain size, color, moisture, sheen/odor, biota, wood, other debris)</th>
</tr>
</thead>
</table>
| 0.0 - 0.20 | Silt wet, dark, fine-grained, black (CO)  
| 0.2 - 0.30 | Silt, dark, fine-grained, black (CO)  
| 0.3 - 0.40 | Silt, fine-grained, black (CO)  
| 0.4 - 0.50 | Silt, fine-grained, black (CO)  
| 0.5 - 0.60 | Silt, fine-grained, black (CO)  
| 0.6 - 0.70 | Silt, fine-grained, black (CO)  
| 0.7 - 0.80 | Silt, fine-grained, black (CO)  
| 0.8 - 1.0 | Silt, fine-grained, black (CO)  
| 1.0 - 1.2 | Silt, fine-grained, black (CO)  
| 1.2 - 1.4 | Silt, fine-grained, black (CO)  
| 1.4 - 1.6 | Silt, fine-grained, black (CO)  
| 1.6 - 1.8 | Silt, fine-grained, black (CO)  
| 1.8 - 2.0 | Silt, fine-grained, black (CO)  
| 2.0 - 2.2 | Silt, fine-grained, black (CO)  
| 2.2 - 2.4 | Silt, fine-grained, black (CO)  
| 2.4 - 2.6 | Silt, fine-grained, black (CO)  
| 2.6 - 2.8 | Silt, fine-grained, black (CO)  
| 2.8 - 3.0 | Silt, fine-grained, black (CO)  
| 3.0 - 3.2 | Silt, fine-grained, black (CO)  
| 3.2 - 3.4 | Silt, fine-grained, black (CO)  

---

**Recovered Length:** 385 ft  
**% Compaction:** 90  
**Color:** brown  
**Size %:** 60  
**Size %:** 40  
**Size %:** 0  
**PID:** 10  
**In situ Actual Depth:** 16.20 ft  
**Sample Depth:** 24.00 ft  
**Subsample No.:** 1  
**Summary Sketch:** Silt, gravel, shells
Core catcher = empty

Bottom end of core = med. SAND
grey, multi-strand grasses
## Sediment Core Processing Log

**Job:** LWP2 Core Processing

**Core Location/Sample Number:** SC-46-R1

**Date/Time:** 2/24/96

**Sample Logged by:** LM, CB

**Type/Diameter of Sample:** 3" Round

**Sample Quality:** Good

### Notes:

CONT'D

<table>
<thead>
<tr>
<th>Recovered Length (in)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Size % G</th>
<th>Size % S</th>
<th>Size % F</th>
<th>PID</th>
<th>Description (grain size, color, moisture, sheen/color, biota, wood, other debris)</th>
<th>Instit. Actual Depth (in)</th>
<th>Sample Depth</th>
<th>Subsample No.</th>
<th>Summary Sketch</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SAA</td>
<td>7</td>
<td>18-8</td>
<td>L1</td>
<td>Silt</td>
</tr>
<tr>
<td>7.0</td>
<td>90</td>
<td>10</td>
<td>tr 98</td>
<td>tr 98</td>
<td>tr 98</td>
<td></td>
<td>2&quot; piece of plastic wood</td>
<td>8</td>
<td>10-11-2</td>
<td>1460</td>
<td>SAND</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Fragment 0.1' L x 0.2' W</td>
<td></td>
<td>1645</td>
<td>1600</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SAND dark grey, brown of weight</td>
<td></td>
<td>2.100</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2&quot; pocket of olive-grey clayey silt</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Occasional gravel, subrounded</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2&quot; L, equally spaced</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2&quot; pocket of olive-grey clayey silt</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.1' L</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**End of core @ 11.2'**
SEDIMENT CORE DRIVE LOG

Project: LDW Subsurface Sediment
Project #: 05-06-06-32
Field Crew: TD
Contractor: MSS

Core Location: LDW-SC-46

Date: 02-24-06  Time:

Proposed Coordinates
N: 46,529.0 E: 127,217
Mudline: 
Core Drive: 12"-

Actual Coordinates
N: 47,32,078.5 E: 122,19,41.09
Mudline: 
Core Drive: 12", Core Recovery: 10.2 ft (86%) -

Tide Measurements (Datum: )

Time/Height:

Measurement (to nearest 0.1 foot):

Avg. % Recovery:

Avg. % Compaction:

Description at Cuts:

Section: Length:
A =
B =
C =
D =

Core Tube Length:

Total Drive: 13 ft, Length Recovered: 10.2 ft (86.2%)

Notes: 10 ft, off target.
## Sediment Core Processing Log

**Job:** LDWS Core Processing  
**Core Location/Sample Number:** SC-47-R3  
**Date/Time:** 01/23/06 14:15  
**Sample Logged by:** LM, CB  
**Type/Diameter of Sample:** 3" round clam  
**Sample Quality:** Good  
**Notes:** Pen = 13, Pen Tec = 10.3, 79.4, 29.

### Description

<table>
<thead>
<tr>
<th>Depth</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td>SILT: wet, smooth, laminated</td>
</tr>
<tr>
<td>1</td>
<td>SAND: moist, medium, brown,</td>
</tr>
<tr>
<td>1.2</td>
<td>Sands with white, red, and</td>
</tr>
<tr>
<td>2.0</td>
<td>Medium, brown, sands with</td>
</tr>
<tr>
<td>2.5</td>
<td>Silt: with white, red, and</td>
</tr>
<tr>
<td>2.7</td>
<td>Brown, sands with white, red,</td>
</tr>
<tr>
<td>3.0</td>
<td>Medium, brown, sands with</td>
</tr>
<tr>
<td>3.1</td>
<td>Silt: with white, red, and</td>
</tr>
<tr>
<td>4.6</td>
<td>Brown, sands with white, red,</td>
</tr>
<tr>
<td>5</td>
<td>Brown, sands with white, red,</td>
</tr>
</tbody>
</table>

### Summary

- **SILT**
- **SAND**

---

### Table

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.6</td>
<td>SAND: moist, damp, brown, sands with white, red, orange</td>
</tr>
</tbody>
</table>
| 5         | **Uniform**
| 6         | **No Color Variation**

---

The table above lists the core processing details, including the core's physical characteristics, color, and other relevant descriptions. The summary indicates variations in sediment types and conditions throughout the core.
Mudline = 13.0
- 10.3
--- 2.7

core catcher is 50%. full 1/2
med brown/gray sand

opened R2: has 60% winnowing and 1/2 full core catcher.

total recovered length = 5.3'
<table>
<thead>
<tr>
<th>Recovery Length (ft)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Size % G</th>
<th>Size % S</th>
<th>Size % F</th>
<th>PFD</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>25.38</td>
<td>8.88</td>
<td>Light greenish grey</td>
<td>31</td>
<td>v. d.</td>
<td>2.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.512</td>
<td>4/12</td>
<td>(SAA)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.6.5 course sand, angular</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>@ 8.91 2&quot; o pocket of green grey very clayey</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CONEX. SHAPE: Silt</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>@ 9.2 5&quot; light grey sand with 1/2&quot; wood fragments, finegrained</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Fingy downwind</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>@ 9.9 wood fragments, round 1/2&quot; &amp; 2&quot; thick layer</td>
</tr>
</tbody>
</table>

End of core @ 10.3'
# SEDIMENT CORE DRIVE LOG

**Project:** UDW Subsurface Sed.

**Project #:** 05-08-06-32

**Field Crew:** TD

**Contractor:** MSS

**Core Location:** UDWSL64T

**Date:** 02-23-06

**Time:** 11:30

**Attempt #:** 3

**Sample Method:** Vibe core

<table>
<thead>
<tr>
<th>Proposed Coordinates</th>
<th>Actual Coordinates</th>
</tr>
</thead>
<tbody>
<tr>
<td>N: 47° 44.22' W: 127° 33.40'</td>
<td>N: 47° 31.69' W: 122° 19.15'</td>
</tr>
</tbody>
</table>

**DTS Boat:**

**DTS Lead Line:** 10.0 ft.

**Mudline Elevation:**

**Description:**

Instrument not ready correctly during early part of drive.

4-10 ft - moderate difficulty

10 ft on - difficult drive.

A lot of rip rap and debris in area.

Total Drive: 13 ft.

Length Recovered: 10.3 ft.

79.2%

**Notes:** 25 ft off target.

**Core catcher end = 50% medium brown, gray sand.**
Mudmole™ Bore Log

Project: LDWG Duwamish Coring
Project No: 341185.001
Collected by: GSM
Date: 2/22/2006
Water depth: 5.1 ft

Station: 47 R2
Position: NAD83
197448
Northing
Easting
1273341

Weather/Comments: N/A
Driven to refusal

Penetration 8.85 ft / On deck recovery 4.85 ft = 55% Recovery

Penetration Interval Interval Percent Depth below Distance from
(f) recovery recovery mudline top of tube
0-1.45 1.05 72% Mudline 11.2
1.45-2.65 0.7 58% 1 11.92
2.65-4.95 1.6 70% 2 12.57
4.95-6.75 1.3 72% 3 13.19
5.75-7.85 0.4 36% 4 13.89
7.85-8.85 0.5 60% 5 14.59
6 15.31
7 15.94
8 No sample
9 No sample
10 No sample
11 No sample
12 No sample
13 No sample
14 No sample
15 No sample
16 No sample
17 No sample
18 No sample
19 No sample
20 No sample
Station Number: 47
Attempt: 2
Field Technician: TD
Contractor: MIS/ESS
On-site Visitor: 

**Shoreline & surrounding area:** rip rap, concrete abutments, sandy beach, Dungeness Park

**Sediment surface & slope:** silty bottom, flat bottom, no visible obstructions

**Water current and visibility:** falling tide, PO VS

**Diver Water Depth:** 8.4

**Drive Initiation Time:** 1405

**Drive Completion Time:** 1415

**Drive Offset:** 

**Estimated angle of drive:** est. 117°-118°

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, moderate, difficult; measured by diver or deck)</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.6</td>
<td>15.0</td>
<td>deck measured, free fall</td>
</tr>
<tr>
<td>13.4</td>
<td>14.3</td>
<td>moderate move</td>
</tr>
<tr>
<td>11.1</td>
<td>12.3</td>
<td>moderate move</td>
</tr>
<tr>
<td>9.3</td>
<td>11.4</td>
<td>difficult move</td>
</tr>
<tr>
<td>8.2</td>
<td>11.0</td>
<td>difficult dive</td>
</tr>
<tr>
<td>7.2</td>
<td>10.5</td>
<td>difficult dive, refused</td>
</tr>
</tbody>
</table>

**TOTAL:** 88.55

**Percent Recovered:** 62.7% (54.8% on deck)

**Reason for ending drive:** refusal

**If refusal, reason for refusal:** hard substrate

**Tension on line?** yes

**Stability of vessel:** no problems

**Overlying water in core (quantity and description):** clear-slightly turbid, 1.5L

**On Boat Recovery:** 11.2

**Loss of Sediment:** 0.7 ft

**Extraction Notes:** (i.e. winch or hammer, easy, hard) winch, easy

**Staining:** hard, silty sand, sprayed off.

**Tube Deformation:** none.

**Sediment Description (odor or sheen):** brown mid-coarse sand, no odors/ sheen

**Keeper or Retry:** drive inserted screw plug at 114.0 interface

**Submit to pressing team pending analysis and decision to re sample.

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
# MCS Environmental MudMole Bore Log

## Collection Information

**Date:** 2-22-06  
**Recorder:** ES M

**Project:** 341185.001 Windward Lower Duwamish Coring

<table>
<thead>
<tr>
<th>Station Name</th>
<th>4.7 R2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tube Length (ft)</td>
<td>16.05</td>
</tr>
<tr>
<td>Water Depth (ft)</td>
<td>5.1</td>
</tr>
<tr>
<td>Est. Tide Height (ft)</td>
<td>5.7 (MLLW)</td>
</tr>
</tbody>
</table>

## Position Information

**Coordinate Datum:** WA State Plane N, NAD 83, Survey FI

| Northing | 197448 |
| Easting | 1273341 |

**On Deck Top of Sediment:** 11.2

**Comments:** Falling tide - silty bottom - visibility 0-4

- No debris felt
- 28A off station

## Penetration Tape Reading

<table>
<thead>
<tr>
<th>Depth</th>
<th>Recovery Tape Reading</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.6</td>
<td>15.0</td>
<td></td>
</tr>
<tr>
<td>13.4</td>
<td>14.3</td>
<td></td>
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<tr>
<td>11.1</td>
<td>12.7</td>
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<tr>
<td>9.3</td>
<td>11.4</td>
<td></td>
</tr>
<tr>
<td>8.2</td>
<td>11.0</td>
<td></td>
</tr>
<tr>
<td>7.2</td>
<td>10.5</td>
<td>Refusal</td>
</tr>
</tbody>
</table>

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MCS Environmental, Inc.  
6006 - 216th St SW, Suite 100  
Mountlake Terrace, WA 98043  
(425) 697-4340

Dowamish Bore log form
### Sediment Core Processing Log

**Job:** Duwamish  
**Core Location/Sample Number:** LDW-SC-47 (R)  
**Date/Time:** Feb 18, 2004 Start 0900 Stop 1400  
**Sample Logged by:** A. Fitzpatrick, C. Buxton  
**Type/Diameter of Sample:** 4 1/2 in., 11 3/4 in.  
**Sample Quality:** Good  
**Notes:** Frozen water coring is great, take photos. Core collected 02-11-04 near South Pole. Sed. acid in sun temp = high 30's processed 2 hours later.

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Material</th>
<th>Description</th>
<th>Grain size, color, moisture, sheen, odor, notes, weather, other debris</th>
<th>1st Contact Data</th>
<th>Subsample No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>SAND</td>
<td>Surface had abundant coarse gravel</td>
<td>(grain size, color, moisture, sheen, odor, notes, weather, other debris)</td>
<td>13S5</td>
<td>0-0</td>
</tr>
<tr>
<td>0.1</td>
<td>SILT</td>
<td>-</td>
<td>(grain size, color, moisture, sheen, odor, notes, weather, other debris)</td>
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<td>SILT</td>
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<td>(grain size, color, moisture, sheen, odor, notes, weather, other debris)</td>
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<tr>
<td>1.5</td>
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<td>(grain size, color, moisture, sheen, odor, notes, weather, other debris)</td>
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<tr>
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<td>4.1</td>
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<td>(grain size, color, moisture, sheen, odor, notes, weather, other debris)</td>
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<tr>
<td>4.9</td>
<td></td>
<td></td>
<td>(grain size, color, moisture, sheen, odor, notes, weather, other debris)</td>
<td>1340</td>
<td></td>
</tr>
<tr>
<td>5.0</td>
<td>Bottom of Core</td>
<td>4.8', but 50% winnowed/slampsed below 3.7'</td>
<td>Bottom of Core</td>
<td>4.8', but 50% winnowed/slampsed below 3.7'</td>
<td>5.0</td>
</tr>
</tbody>
</table>
LDW - SE - 47 (R1)

Feb 18, 2006

inlet
2.9 ft

\[ \text{\textbf{11.5'}}} \]

\[ \text{\textbf{4.8'}} \]

\[ \text{\textbf{11.3'}} \]

on deck to sediments = 11.5'

\[ \text{\textbf{\textit{50% winnowed from 2.9 ft to 4.8'}}} \]

\[ \text{\textbf{\textit{not sampled}}} \]

\[ \text{\textbf{\textit{sharp mudline contact}}} \]

\[ \text{\textbf{\textit{rode on top}}} \]

Shoe empty.
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-16-06  Recorder: 

Project: 341185.001 Windward Lower Duwamish Coring

Station Name: 47 R1

Tube Length (ft): 16.05

Water Depth (ft): 5.2  Time: 145.4

Est. Tide Height (ft) (MLLW)

Est. Mudline: (MLLW)

Comments:

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft

Northing 197443

Easting 1273361

On Deck Top of Sediment 11.5

Penetration Tape
Reading  Recovery Tape Reading  Comments

14.8  15.1  
13.2  13.6  
11.1  12.1  
9.7  11.6  
8.8  11.3  refund

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Mountlake Terrace, WA 98043
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Duwamish borelog format

F-2

380 of 490
Mudmole™ Bore Log

Project: LDWG Duwamish Coring            Station: 47 R1
Project No: 341186.001               Position: NAD83
Collected by: GSM                       Northing: 197443
Date: 2/16/2006                          Easting: 1273361
Water depth: 5.2 ft                     Mudline: #VALUE! ft MLLW (estimated using tide tables)
Weather/Comments: N/A

Penetration interval (ft) | Interval recovery (ft) | Percent recovery
--------------------------|------------------------|------------------
0-1.25                    | 0.95                   | 76%
1.25-2.85                 | 1.5                    | 94%
2.85-4.95                 | 1.5                    | 71%
4.95-6.35                 | 0.5                    | 36%
6.35-7.25                 | 0.3                    | 33%

Depth below mudline (ft) | Distance from top of tube (ft)
-------------------------|-----------------------------
Mudline                  | 11.5
1                        | 12.26
2                        | 13.15
3                        | 14.06
4                        | 14.77
5                        | 15.47
6                        | 15.83
7                        | No sample
8                        | No sample
9                        | No sample
10                       | No sample
11                       | No sample
12                       | No sample
13                       | No sample
14                       | No sample
15                       | No sample
16                       | No sample
17                       | No sample
18                       | No sample
19                       | No sample
20                       | No sample

Penetration 7.25 ft / On deck recovery 4.55 ft = 63% Recovery
Station Number: 47  Date: 2/14/06  Station Arrival Time: 14:25  15:25 JMF
Attempt: JND, JMF  Station Departure Time: 24:41 due to riprap
Field Technician: MCS/RS  Dist. From Target Station: 24:41 due to riprap
Contractor:  On-site Visitor: 
Pre-Drive and Diver Observations:
Shoreline & surrounding area: riprap, sand
Sediment surface & slope: unknown
Water current and visibility: unknown
Diver Water Depth —— Tip Probe Depth —— Disk Probe Depth ——

Drive Observations:
Drive Initiation Time: 14:59  Drive Completion Time: 15:10  Drive Offset: 
Estimated angle of drive: on deck est 10°

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, moderate, difficult; measured by diver or deck)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.8</td>
<td>5.1</td>
<td>easy, drive on deck</td>
</tr>
<tr>
<td>13.2</td>
<td>13.6</td>
<td>easy, drive on deck</td>
</tr>
<tr>
<td>11.1</td>
<td>12.1</td>
<td>easy, drive on deck</td>
</tr>
<tr>
<td>9.7</td>
<td>11.4</td>
<td>modified drive on deck, penetration signed</td>
</tr>
<tr>
<td>8.8</td>
<td>11.3</td>
<td>difficult, drive on deck</td>
</tr>
</tbody>
</table>

TOTAL 72.5  TOTAL 47.5  Percent Recovered: 65.5%
Reason for ending drive: refusal
If refusal, reason for refusal: hard substrate

Extraction Observations:
Tension on line? Yes  Stability of vessel: no problem
Overlying water in core (quantity and description): yes, but unsupparable
On Boat Recovery: 11.5  Loss of Sediment: 0.2 ft
Extraction Notes: (i.e. winch or hammer, easy, hard) easy, winch

On Deck Observations:
Staining: none
Tube Deformation: none
Sediment Description (odor or sheen?): dark brown fine to medium sand

Keep or Retry: diver inserted screw plug at sea/brine interface

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)

The RETEC Group, Inc. 1011 NW Market Pl, Suite 200  Seattle, WA 98119-1842
206-624-2315 Phone 206-624-2315 Fax  www.retec.com

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## Sediment Core Processing Log

**Job:** LDWG 647-1000

**Core Location/Sample Number:** LDWG SC-48 R2

**Date/Time:** 2/8/06 1310 - 1350

**Sample Logged by:** N. Becher

**Type/Diameter of Sample:** 4" sq. aluminium

**Sample Quality:** good

**Notes:**
- Note: 6.65 - R. 85%
- Measured length 5.6, missing 0.2" on bottom of core, core capillary partially full

<table>
<thead>
<tr>
<th>Recovered Length (ft)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Size % G</th>
<th>Size % S</th>
<th>Size % F</th>
<th>PID</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td></td>
<td></td>
<td>95 5</td>
<td>0</td>
<td>0</td>
<td>Ø</td>
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<td>1.0</td>
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<td>2.0</td>
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<td>95 45</td>
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<td>Ø</td>
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<td>3.0</td>
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<td>95 10</td>
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<td>Ø</td>
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<td>4.0</td>
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<td></td>
<td>95 15</td>
<td>0</td>
<td>0</td>
<td>Ø</td>
</tr>
</tbody>
</table>

**Description**
- Gassy wet, olive green, silty silt, wood grains, plant debris, base polychaeta present, moist, dense, greenish gray sand w/ trace of minor silt, silt decreasing downward below this point only trace silt otherwise SAA.
- Multi colored grains from top to bottom: orange, red, white
- Silty sand to sandy silt interbedded w/ 1/8" clayey silt lenses L= 38% fines
- Gray, silty clayey silt.
- Moist, brown, red, brown silty fine sand, still multi colored.

**Subsample No.:**
- 130
- 3.162
- 1335
- 3.162
- 1340
- 3.162
- 1345
- 2.162
- 3.162

**Summary Sheet:**
- GT shellfish taken in RI. See quick log on back.
- Thicker upper unit in RI, GT Helen Myers Unit.
SC-48 R2

0-1: soft, wet, to wet, olive-gray silty clayey silt, trace to minor wood pieces/shards.

1-5.0: multi-colored sand, 1/2 to fine, minor silt, red clay.

3.4-4.3 SAA, but w/ shredded wood pieces, natural color, not-blanche.

5.8-6.0: moist, stiff, silty clayey silt, gray w/ trace black horizontal strata.

GT @ 0.9 x 2.0

R1

10.1 x 6.6
**MCS Environmental MudMole Bore Log**

**Collection Information**

Date: 2-8-06  
Recorder: 6SM

Project: 341185.001 Windward Lower Duwamish Coring

Station Name: 48 R2

| Tube Length (ft): | 16.05 |
| Water Depth (ft): | 30.9  |
| Est. Tide Height (ft): | 9.4  |
| Est. Mudline (MLLW): | (MLLW) |

**Position Information**

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft

Northing: 196658  
Easting: 127453

On Deck Top of Sediment: 10.4

Comments: rising tide - bottom sandy silt - no debris

Diver 29.4, no log.

<table>
<thead>
<tr>
<th>Penetration Tape Reading</th>
<th>Recovery Tape Reading</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.9</td>
<td>15.6</td>
<td></td>
</tr>
<tr>
<td>14.3</td>
<td>14.5</td>
<td></td>
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<tr>
<td>12.0</td>
<td>12.2</td>
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<tr>
<td>10.0</td>
<td>10.5</td>
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</tr>
<tr>
<td>9.7</td>
<td>9.3</td>
<td>penetration slowed refusa</td>
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<td>9.4</td>
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</table>

MCS Environmental, Inc.  
6665 - 216th St SW, Suite 100  
Norblad Terrace, WA 98073  
(425) 697-4349

Duwamish borelog form.xls
Shoreline & surrounding area observations: mud channel, deeper depth to sediment bottom
Sediment surface & slope description: level ground, no slope
Water current: light current, visibility = 1-2'

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.9</td>
<td>15.10</td>
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<td>14.5</td>
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<td>12.0</td>
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<td>10.3</td>
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<tr>
<td>9.4</td>
<td>10.3</td>
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<tr>
<td><strong>Totals</strong></td>
<td><strong>57.5</strong></td>
</tr>
</tbody>
</table>

(Drive offset: 
Diver recorded)

Estimated angle of drive: core tube, mudmole not visible - angle not discernable
Reason for ending drive: refusal at very hard bottom

Drive Completion Time: 0830
On Boat Recovery: 10.4'

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
**Station Number:** 48  
**Date:** 08/16  
**Core Tube Length:** 16.05  
**Diver Depth:** 29 ft  
**Lead Line Water Depth:** 30.4  
**Diver Water Depth:** 29 ft  
**On-site Visitor:**  
**Latitude:** 19.6658  
**Longitude:** 127.453  
**5' off target**

**Shoreline & surrounding area observations:** rip rap, wood pilings (buoy) under S. Park Bridge.

**Bottom conditions:** Sediment surface & slope description: visibility: no slope, sandy silt, no debris, vis 1-2

**Water current:** flood tide, light current, countering outflow

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<tr>
<td>9.4</td>
<td>10.3</td>
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</tbody>
</table>

**Drive Notes (e.g. easy, difficult, etc.):**
- (Drive offset: ) core tube guide not used, easy
- cannot see (driver reached silt)

**Estimated angle of drive:** 90±10° est. - not visible

**Reason for ending drive:** refusal

**Drive Completion Time:** 08:48  
**On Boat Recovery:** 10.4 on deck top of sediment

**End of Core Tube Observations**

- **Staining:**  
- **Tube Deformation:** None
- **Loss of Sediment:** Catcher end plugged as it breaks surface (diver)
- **Sediment Description:** free gray sand
- **Water in Tube:** yes, siphoned out (473 pumps)

**Keep or Retry:**

**Notes:**
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
MCS Environmental MudMole Bore Log

Collection Information
Date: 2-6-06  Recorder: 65m
Project: 341185.001 Windward Lower Duwamish Coring
Station Name: 48 R1
Tube Length (ft): 16.05
Water Depth (ft): 25  Time: 14:25
Est. Tide Height (ft) 2.0  (MLLW)
Est. Mudline:  (MLLW)
Comments: very strong current - core tipped 15° from vertical

Position Information
Coordinate Datum: WA State Plane N, NAD 83, Survey Ft
Northing 196 657
Easting 1274517
On Deck Top of Sediment 10.2

Penetration Tape Reading  Recovery Tape Reading  Comments
13.4  12.5  probably should be 13.5
11.2  10.3
9.5  10.0
10.3

16.0  16  16
11.2  12.4  12.3
5.8  2.6  3.5

Dunaevis boshe baring form air  reject

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(425) 437-4440

F-2
407 of 490
Mudmole™ Bore Log

Project: LDWG Duwamish Coring
Project No: 341185.001
Collected by: GSM
Date: 2/6/2006

Station: 48 R1
Position: NAD83 WAN
Northing: 190657
Easting: 1274517

Water depth: 25.0 ft
Mudline: -23.0 ft MLLW (estimated using tide tables)

Weather/Comments: Sunny

Very strong current core tipped 15° from vertical

Penetration 5.75 ft/
On deck recovery 6.85 ft = 102% Recovery

Depth below mudline
Distance from top of tube

Penetration interval (ft) | Interval recovery (ft) | Percent recovery | Depth below mudline (ft) | Distance from top of tube (ft)
--- | --- | --- | --- | ---
0-2.65 | 2.55 | 96% | Mudline | 10.2
2.65-4.85 | 3.2 | 145% | 1 | 11.16
4.85-5.55 | 0.29 | 41% | 2 | 12.12
5.55-5.75 | 0.01 | 5% | 3 | 13.25

14.71
5
16.01
6
No sample
7
No sample
8
No sample
9
No sample
10
No sample
11
No sample
12
No sample
13
No sample
14
No sample
15
No sample
16
No sample
17
No sample
18
No sample
19
No sample
20
No sample

not processed bent tube
### Sediment Core Processing Log

**Job:** LDWG

**Job Number:** 90655-18220

**No. of Sections:** 1

**Sample Logged by:** N. Bader, Anne Fitz

**Date/Time:** 2/6/06 15:45 start

**Sample Location/Number:** LDN-H7 R1

**Sample Quality:** good

**Sample Size:** 1 ft

#### Description

- **Organic:** moist to wet, dark, soft, clayey, silty, decomposed wood fibers, silt, and organic matter.
- **Grain Size:** silt, clay, and organic matter.
- **Color:** dark brown, black, and gray.
- **Texture:** soft, mushy, and peaty.
- **Moisture:** high, 80%.

#### Notes
- **H2S Odor:** throughout core.
- **No Shen or THA- like odor throughout core.**

---

<table>
<thead>
<tr>
<th>Depth (in)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1</td>
<td>Wet clay, silt, organic matter, decomposed wood, silt, clay, organic matter.</td>
</tr>
<tr>
<td>1-2</td>
<td>Wet, clayey, silt, organic matter, decomposed wood, silt, clay, organic matter.</td>
</tr>
<tr>
<td>2-3</td>
<td>Wet, clayey, silt, organic matter, decomposed wood, silt, clay, organic matter.</td>
</tr>
<tr>
<td>3-4</td>
<td>Wet, clayey, silt, organic matter, decomposed wood, silt, clay, organic matter.</td>
</tr>
<tr>
<td>4-5</td>
<td>Wet, clayey, silt, organic matter, decomposed wood, silt, clay, organic matter.</td>
</tr>
<tr>
<td>5-6</td>
<td>Wet, clayey, silt, organic matter, decomposed wood, silt, clay, organic matter.</td>
</tr>
<tr>
<td>6-7</td>
<td>Wet, clayey, silt, organic matter, decomposed wood, silt, clay, organic matter.</td>
</tr>
<tr>
<td>7-8</td>
<td>Wet, clayey, silt, organic matter, decomposed wood, silt, clay, organic matter.</td>
</tr>
<tr>
<td>8-9</td>
<td>Wet, clayey, silt, organic matter, decomposed wood, silt, clay, organic matter.</td>
</tr>
<tr>
<td>9-10</td>
<td>Wet, clayey, silt, organic matter, decomposed wood, silt, clay, organic matter.</td>
</tr>
</tbody>
</table>

---

**Total Report:**

- **H2S Odor:** throughout core.
- **No Shen or THA-like odor throughout core.**

---

**Sample Log:**

- **Sample Number:** 1
- **Sample Size:** 1 ft
- **Sample Quality:** good
- **Sample Location:** LDN-H7 R1
- **Sample Date:** 2/6/06
- **Sample Time:** 15:45
- **Sample Desc.:** Wet, clayey, silt, organic matter, decomposed wood, silt, clay, organic matter.
- **Sample Notes:** H2S Odor throughout core.
### Sediment Core Processing Log

**Job:** LDW - Duvamish  
**Core Location/Sample Number:** LDW - 49  
**Date/Time:** 2/6/06  
**Sample Logged by:** N. Raczy, Ann Fitz  
**Avg. % Compaction:**  
**Sample Quality:** good, fair, poor, disturbed  

<table>
<thead>
<tr>
<th>Recorded Length (ft)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Site % G</th>
<th>Site % S</th>
<th>Site % F</th>
<th>PID</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>100</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.5 (N-1)</td>
<td></td>
<td>Gray</td>
<td>85</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td></td>
<td>Gray</td>
<td>80%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.4 (N-1)</td>
<td></td>
<td>Black</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.5 (N-1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- At 6.2', 2'pc of natural wood
- Same as above
- SF Sandy silt layer, more gray
- Increasing stiff wet with depth
- SF compostible, scattered things
- Strong H2S odor

- did a shear test cuz of PID. Only take shear, mostly organic, two tiny '1' shear by green inverte

- SF Damp, stiff, silt, dolm, sticky

- Bif (ns 1.1,41)

**PID = VX500 calibrated today**
Mudmole™ Bore Log

Project: LDWG Duwamish Coring
Project No: 341185.001
Collected by: GSM
Date: 2/6/2006

Station: 49 R1
Position: NAD83
Northing: 195851
Easting: 1275477
Water depth: 28.9 ft
Mudline: -23.4 ft MLLW (estimated using tide tables)

Weather/Comments: Sunny
Mudline is 0.4 ft on tape offset penetration readings

---

Distance from top of tube (ft)
0.0 2.0 4.0 6.0 8.0 10.0 12.0 14.0 16.0 18.0
Top of sediment

On deck
In-situ

Penetration 14.05 ft/ On deck recovery 11.45 ft = 81% Recovery

---

Penetration interval (ft)
0-1.05
1.05-3.85
3.85-5.95
5.85-8.35
8.35-10.05
10.05-12.05
12.05-14.05

Interval recovery (ft)
0.65
2.6
2
2.2
1.5
1.3
1.4

Percent recovery
62%
93%
95%
92%
88%
65%
70%

Depth below mudline (ft)
Distance from top of tube (ft)
Mudline
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20

No sample
No sample
No sample
No sample
No sample
No sample
No sample
No sample
No sample
No sample

Corrected 2/9/06
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-6-05  Recorder: 65W

Project: 341185.001 Windward Lower Duwamish Coring

Station Name: 49

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft

Northing: 195851
Easting: 1275477

Water Depth (ft): 28.9  Time: 1244

Est. Tide Height (ft): 5.5 (MLLW)

Est. Mudline: (MLLW)  On Deck Top of Sediment

Comments: Mudline is 0.4ft on tape - offset penetration

Penetration Tape

<table>
<thead>
<tr>
<th>Reading</th>
<th>Recovery Tape Reading</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.4</td>
<td>12.4</td>
<td></td>
</tr>
<tr>
<td>12.6</td>
<td>12.8</td>
<td></td>
</tr>
<tr>
<td>10.5</td>
<td>10.8</td>
<td></td>
</tr>
<tr>
<td>8.1</td>
<td>8.6</td>
<td></td>
</tr>
<tr>
<td>6.4</td>
<td>7.1</td>
<td></td>
</tr>
<tr>
<td>4.4</td>
<td>5.8</td>
<td></td>
</tr>
<tr>
<td>2.4</td>
<td>4.4</td>
<td></td>
</tr>
</tbody>
</table>
Mudmole™ Bore Log

Project: LDWG Duwamish Coring  
Station: 49 R1  
Project No: 341185.001  
Position: NAD83  
Collected by: GSM  
Date: 2/6/2006  
Time: 12:44  
Water depth: 28.9 ft  
Mudline: -23.4 ft MLLW (estimated using tide tables)

Weather/Comments: Sunny

Mudline is 0.4 ft on tapeoffset penetration readings - adjusted properly

Penetration 14.05 ft / On deck recovery 11.45 ft = 81% Recovery
### Sediment Core Processing Log

**Job:** LNUG Core Processing  
**Job Number:** PRR-2220-511 W  
**No. of Sections:** 1  
**Sample Length (from log):** 3 ft 12 in  
**Avg. % Compaction:**  
**Notes:** Pen = 13.4", 2.7%  
**On Deck Pen:** 11.8", 3.9%  

**Type/Diameter of Sample:** 4", sq. aluminum  
**Sample Quality:** good, fair, poor, disturbed  

<table>
<thead>
<tr>
<th>Description</th>
<th>Index</th>
<th>Sample Depth</th>
<th>Subsample No.</th>
<th>Summary Sketch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silty, soft, olive-brown and black mottled sl. sandy Silt</td>
<td>0.0-0.5</td>
<td>0.1-1.130</td>
<td>0-1</td>
<td>SILT (org)</td>
</tr>
<tr>
<td>Moist, soft, mild steel, black and sandy Silt</td>
<td>0.5-1</td>
<td>1</td>
<td>1-2</td>
<td>SILT (org)</td>
</tr>
<tr>
<td>Blocky, massive, sl. compresibility, low plasticity, occasional rootlets</td>
<td>1-1.135</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mottled black and olive-gray clayey Silt</td>
<td>1-1.140</td>
<td>2.3</td>
<td>2-4</td>
<td></td>
</tr>
<tr>
<td>2-3</td>
<td>1140</td>
<td>2</td>
<td>2-4</td>
<td></td>
</tr>
<tr>
<td>3-4</td>
<td>1145</td>
<td>3</td>
<td>3-4</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>1145</td>
<td>4</td>
<td>4-5</td>
<td></td>
</tr>
<tr>
<td>4-5</td>
<td>1145</td>
<td>5</td>
<td>4-5</td>
<td></td>
</tr>
<tr>
<td>5-6</td>
<td>1145</td>
<td>6</td>
<td>5-6</td>
<td></td>
</tr>
<tr>
<td>Recommed Length (ft)</td>
<td>% Consistency</td>
<td>Color</td>
<td>Site S.G.</td>
<td>Site S.s.</td>
</tr>
<tr>
<td>---------------------</td>
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</tr>
</tbody>
</table>

**Notes:**
- Layer 6.7: Layer of moist, mid-stiff olive-grey, clayey silty clay containing silt and clayey silt.
- Layer 7: Layer of alternating sand and clayey silt (as described above).
- Layer 8: Layer of metallic in color, with some sheen, see notes on opp page.
- Layer 8.9: Sheen test, see notes on opp page.
- Layer 9-10: Slight color change to metallic grey, occasional sheen.
- Layer 10.0 - 12.3:
  - 10.0: Sandy silt, silty clay with sheen.
  - 10.5: P10 = 341, 757 pH in a bag (cmil)
  - 11.0: 38, 357: P10 pH in a bag (cmil)
  - 12.0 - 12.3:
    - Note: Sheen on surface (green zone) from 2.0 to 3.0.

End of core @ 12.3'.
core shoe is 1/2 full of black sandy SILT

7.2' Skim test 4oz jar
- 15-20% iridescent sheen on water surface
- rainbow iridescent
- no foam on jar side
- on water surface: floats - 1cm +, 0.5" streaks strong
- odor upon opening jar lid

8.2' Skim test 4oz jar
- odor upon sample extraction
- moderate odor upon opening jar
- 10% floats + streaks (0.5") on water surface
- raw on jar side
Mudmole™ Bore Log

Project: LDWG Duwamish Coring
Project No: 341185.001
Station: 49 R2
Position: NAD83
Date: 2/22/2006
Water depth: 28.0 ft

Collected by: GSM
195852
Time: 10:21
Mudline: -18.1 ft MLLW (estimated using tide tables)

Weather/Comments: N/A

Full Penetration

Penetration 15.4 ft / On deck recovery 11.8 ft = 77% Recovery
Station Number: 49  Date: 07/32/04  Station Arrival Time: 10:05
Attempt: 2  Core Tube Length: 15.5  Station Departure Time: 10:42
Field Technician: 1D  Load Line Water Depth: 29.0  Dist. From Target Station: B
Contractor: 405/31.55  Latitude: 105.852
On-site Visitor: 417.549

Pre-Drive and Dive Observations:
Shoreline & surrounding area:
- mid-channel, rip rap to east and west, wood b Penguins, and 5 foot Marine Toward
Sediment surface & slope:
- Silty bottom, no slop, no clays
Water current and visibility:
- High slack tide, S. 4.0-5.0, no current
Diver Water Depth 30  Tip Probe Depth
Disk Probe Depth

Drive Observations:
Drive Initiation Time: 10:20  Drive Completion Time: 10:33  Drive Offset: —
Estimated angle of drive:
- 10° - easterly under water - cannot see

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, moderate, difficult; measured by diver or deck)</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.2</td>
<td>14.4</td>
<td>Over measured, fine fan</td>
</tr>
<tr>
<td>12.2</td>
<td>12.2</td>
<td>Moderate drive</td>
</tr>
<tr>
<td>9.5</td>
<td>9.5</td>
<td>Moderate drive</td>
</tr>
<tr>
<td>7.6</td>
<td>7.6</td>
<td>Moderate drive</td>
</tr>
<tr>
<td>5.5</td>
<td>6.0</td>
<td>Moderate drive</td>
</tr>
<tr>
<td>4.0</td>
<td>5.5</td>
<td>Moderate drive</td>
</tr>
<tr>
<td>3.0</td>
<td>4.0</td>
<td>Moderate drive -</td>
</tr>
<tr>
<td>1.5</td>
<td>3.8</td>
<td>Mixture of different -</td>
</tr>
<tr>
<td>0.2</td>
<td>2.8</td>
<td>Moderate drive</td>
</tr>
</tbody>
</table>

TOTAL 154  TOTAL 17.8  Percent Recovered: 83.1%  (76.6% on deck)
Reason for ending drive: end of core tube; full penetration
If refusal, reason for refusal:

On Deck Observations:
Tension on line: Yes  Stability of vessel: no problem
Overlying water in core (quantity and description): turbid, ~ 500 ml
Extraction Notes: (i.e. winch or hammer, easy, hard) Winch, Easy

Staining: streaks of the silt, sprayed off.
Tube Deformation: none
Sediment Description (odor or sheen): silt, fine sand, no odor

Keep or Retry: Determine side plug set and O-ring fitting

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-22-06  Recorder: GGM
Project: 341185.001 Windward Lower Duwamish Coring
Station Name: 49 R 2

| Tube Length (ft): | 15.6 |
| Water Depth (ft): | 28.0 |
| Est. Tide Height (ft): | 9.9 (MLLW) |
| Est. Mudline: | (MLLW) |

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft
Northing: 195 852
Easting: 127 549 8

On Deck Top of Sediment: 3-8

Comments:
- high slack tide - diver depth 27 ft, visibility 5-9
- silted bottom - no slope - no current - no debris
- 8 ft off station

Penetration Tape Reading  Recovery Tape Reading  Comments
14.2  14.4
12.2  12.2
9.5  9.5
7.5  7.7
5.5  6.0
4.7  5.5
3.0  4.7
1.5  3.8
0.2  2.8

MCS Environmental, Inc.
6606 - 216th St SW, Suite 160
Mountlake Terrace, WA 98043
(425) 697-4340

Duwamish borelog format F-2
### Sediment Core Processing Log

**Job:** LDWG Core Processing  
**Core Location/Sample Number:** SC-50-R2  
**Date/Time:** 2/12/10 08:10  
**Sample Logged by:** LM  
**Type/Diameter of Sample:** 4" sq. alum.  
**Sample Quality:** good ⓐ poor ⓑ disturbed  

**Notes:** Pen = 9.4  
Dr. Beck = 5.8' 5.27%  

<table>
<thead>
<tr>
<th>Recovered Length (ft)</th>
<th>% Compaction</th>
<th>Description (grain size, color, moisture, texture, blocks, wood, other debris)</th>
</tr>
</thead>
</table>
| 25.413, 25.412, 25.411 | 10, 90, 90 | 0.1-3.16 in. Moist, dense, soft sand, sandy sand, silt (org.)  
| 25.41-1, 25.41, 25.411, 25.412 | 90, 90, 90 | 1.25 in. Bed of olive-grey clayey silt extending to 31;  
| 25.42, 25.421, 25.422 | 90, 90, 90 | 0.1 in. Bed of fine-medi bl. sand about 0.1' in thickness  
| 25.421, 25.422, 25.423, 25.424 | 90, 90, 90 | Silt sand intermixed units of silt from above, both blocked by silt with gray clayey silt with  
| 25.423, 25.424 | 90, 90, 90 | Wood fragments up to 0.1'1, subrounded wood fragments 0.05  
| 2.5, 2.51, 2.52 | 90, 90, 90 | SAND moist, dry, dense, black fine-med. sand with multi-colored grains (red, orange, white)  
| 2.51, 2.52, 2.53 | 90, 90, 90 | Note: sand was not sampled due to excessive winnowing.  
| 3.8' End of Core | 6 |  

*Note: Salinity samples collected here up from 0-2 & 4.*
Mudline = 10.3'

\[
\begin{align*}
&5.8' \\
&10.3' \\
&16.1'
\end{align*}
\]

Core catcher is 1/2 full with dark red gravel sand

4.5' and 9' core is winnowed @ 80%, void up to 5.2'
when core catcher becomes 1/2 full from 5.2'-5.8' (end of core)

Note: R1 was opened. Core lithology mirrored R2.
Winnowing was greater in R1 so it was noted.
Sampled (3.5'-9' core was 76% winnowed)
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-21-06
Recorder: G3W

Project: 341185.001 Windward Lower Duwamish Coring

Station Name: 50 R2

Tube Length (ft): 16.1
Water Depth (ft): 15.0
Est. Tide Height (ft): 5.2 (MLLW)
Est. Mudline: (MLLW)

Time: 13:27

Position Information

Coordinate Datum: WA State Plane N, NAD83, Survey Ft
Northing: 194872
Easting: 1276017

On Deck Top of Sediment: 10.3

Comments:
Silty bottom - no debris - gentle slope
27 ft @ station 210° angle off vertical on core

Penetration Tape Reading

<table>
<thead>
<tr>
<th>Reading</th>
<th>Recovery Tape Reading</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.0</td>
<td>14.9</td>
<td></td>
</tr>
<tr>
<td>12.7</td>
<td>12.8</td>
<td></td>
</tr>
<tr>
<td>11.4</td>
<td>12.1</td>
<td></td>
</tr>
<tr>
<td>10.4</td>
<td>11.2</td>
<td></td>
</tr>
<tr>
<td>8.7</td>
<td>10.4</td>
<td>penetration slowed</td>
</tr>
<tr>
<td>7.7</td>
<td>10.0</td>
<td>refusal</td>
</tr>
<tr>
<td>6.7</td>
<td>9.6</td>
<td></td>
</tr>
</tbody>
</table>
# Mudmole™ Bore Log

**Project:** LDWG Duwamish Coring

**Station:** 50 R2

**Project No.:** 341185.001

**Position:** NAD83 (WAN)

**Collected by:** GSM

**Date:** 2/21/2006

**Time:** 13:27

**Easting:** 1276017

**Position:** Nothing

**Water depth:** 15.0 ft

**Mudline:** -9.8 ft MLLW (estimated using tide tables)

**Weather/Comments:** N/A

**Driven to refusal**

---

**Penetration**

<table>
<thead>
<tr>
<th>Interval (ft)</th>
<th>Recovery (ft)</th>
<th>Percent Recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1.1</td>
<td>1.2</td>
<td>109%</td>
</tr>
<tr>
<td>1.1-3.4</td>
<td>2.1</td>
<td>91%</td>
</tr>
<tr>
<td>3.4-4.7</td>
<td>0.7</td>
<td>54%</td>
</tr>
<tr>
<td>4.7-5.7</td>
<td>0.9</td>
<td>90%</td>
</tr>
<tr>
<td>5.7-7.4</td>
<td>0.8</td>
<td>47%</td>
</tr>
<tr>
<td>7.4-8.4</td>
<td>0.4</td>
<td>40%</td>
</tr>
<tr>
<td>8.4-9.4</td>
<td>0.4</td>
<td>40%</td>
</tr>
</tbody>
</table>

**Depth below mudline (ft):**

<table>
<thead>
<tr>
<th>Depth below mudline (ft)</th>
<th>Distance from top of tube (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.3</td>
<td>0</td>
</tr>
<tr>
<td>11.39</td>
<td>1</td>
</tr>
<tr>
<td>12.32</td>
<td>2</td>
</tr>
<tr>
<td>13.23</td>
<td>3</td>
</tr>
<tr>
<td>13.92</td>
<td>4</td>
</tr>
<tr>
<td>14.57</td>
<td>5</td>
</tr>
<tr>
<td>15.34</td>
<td>6</td>
</tr>
<tr>
<td>15.81</td>
<td>7</td>
</tr>
</tbody>
</table>

*Penetration 9.4 ft. On deck recovery 5.8 ft = 62% Recovery*

---

MCS Environmental, Inc.
6500 216th Street SW, Suite 100
Meadville Terrace, WA 98033
(425) 697-4340
fax (425) 697-4370

File name: 50 R2

Bore Log (mudline) F-2 of 490
Station Number: 50
Date: 07/01/00
Core Tube Length: 16.1
Steady Arrival Time: 1245
Field Technician: TD
Lead Line Water Depth: 15.0
Station Departure Time: 1400
Contractor: WSU/WSL
Dist. From Target Station: --
On-site Visitor: J.B. Wilson

Pre-Drive and Diver Observations
Shoreline & surrounding area: same as R-1
Sediment surface & slope: gentle slope, no debris, silty bottom
Water current and visibility: VR-4 ft, clear water
Diver Water Depth: 14
Tip Probe Depth: --
Disk Probe Depth: --

Drill Observations
Drive Initiation Time: 1335
Drive Completion Time: 1342
Drive Offset: --
Estimated angle of drive: --

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g., easy, moderate, difficult; measured by diver or deck)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.0</td>
<td>14.9</td>
<td>diver recorded, forced</td>
</tr>
<tr>
<td>12.7</td>
<td>12.9</td>
<td>easy drive</td>
</tr>
<tr>
<td>11.4</td>
<td>12.1</td>
<td>moderate drive</td>
</tr>
<tr>
<td>10.4</td>
<td>11.2</td>
<td>moderate - difficult drive</td>
</tr>
<tr>
<td>8.7</td>
<td>10.4</td>
<td>moderate - difficult drive</td>
</tr>
<tr>
<td>7.7</td>
<td>10.0</td>
<td>difficult drive</td>
</tr>
<tr>
<td>6.7</td>
<td>9.6</td>
<td>difficult drive refusal</td>
</tr>
</tbody>
</table>

TOTAL 9.4
TOTAL 6.5
Percent Recovered: 69.1% (69.7% on deck)

Reason for ending drive: refusal
If refusal, reason for refusal: hard substrate

Tension on line?: --
Stability of vessel: no problem
Overlying water in core (quantity and description): clear, ~3 ft
On Boat Recovery: 103
Loss of Sediment: 0.7 ft (5.8 ft on deck, creamy)
Extraction Notes: (i.e., winch or hammer, easy, hard)
winch, easy

On Deck Observations:
Staining: some sandy silt, sprayed off
Tube Deformation: none
Sediment Description (odor or sheen?): red sand, no odor/sheen

Keep or Retry: diver inserted sample into sed/land interface and wrapped
any evidence of vegetation?

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-21-06  Recorder: GSM

Project: 341185.001 Windward Lower Duwamish Coring

Station Name: 50 R1

Tube Length (ft): 16.05

Water Depth (ft): 8.9  Time: 1245

Est. Tide Height (ft): 6.6  (MLLW)

Est. Mudline: (MLLW)

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft

Northing 194878

Easting 1276048

On Deck Top of Sediment 10-8

Comments: Falling tide - 2.8 ft station - diver depth 7.4 ft

Visibility 5 - Silty bottom with scattered gravel and quarry spoil

Pental: 1.3

Penetration Tape Reading  Recovery Tape Reading  Comments

14.2  14.5

12.3  13.0

11.1  12.2

8.7  10.9

7.8  10.6

6.8  10.2

penetration slowed

refusal
### Mudmole™ Bore Log

**Project:** LDWG Duwamish Coring  
**Station:** 50 R1  
**Project No:** 341185.001  
**Position:** NAD83  
**Collected by:** GSM  
**Date:** 2/21/2006  
**Time:** 12:45  
**Water depth:** 8.9 ft  
**Mudline:** -2.3 ft MLLW (estimated using tide tables)  
**Weather/Comments:** N/A  
**Penetration interval (ft)** | **Interval recovery (ft)** | **Percent recovery** | **Depth below mudline (ft)** | **Distance from top of tube (ft)**  
--- | --- | --- | --- | ---  
0-1.85 | 1.55 | 84% | Mudline | 10.8  
1.85-3.75 | 1.5 | 79% | 1 | 11.64  
3.75-4.95 | 0.8 | 67% | 2 | 12.47  
4.95-7.35 | 1.3 | 54% | 3 | 13.26  
7.35-8.25 | 0.3 | 33% | 4 | 14.02  
8.25-9.25 | 0.4 | 40% | 5 | 14.66  
6 | 15.22  
7 | 15.76  
8 | No sample  
9 | No sample  
10 | No sample  
11 | No sample  
12 | No sample  
13 | No sample  
14 | No sample  
15 | No sample  
16 | No sample  
17 | No sample  
18 | No sample  
19 | No sample  
20 | No sample

Penetration 9.25 ft/ On deck recovery 5.25 ft = 57% Recovery

MCS Environmental, Inc.  
6003 216th Street SW, Suite 100  
Mountlake Terrace, WA 98043  
(425) 697-4340  
fax (425) 697-4970

File name 60 R1  
Bore Log (mudlog) 26 of 490
Station Number: 50  
Date: 04/11/00  
Station Arrival Time: 1245  
Event:  
Field Technician:  
Contractor:  
On-site Visitor:  
Core Tube Length: 60.05  
Load Line Water Depth: 6.9  
Dist. From Target Station:  
Latitude: 49.4378  
Longitude: 127.6048

**Shoreline & Surrounding Area:**
- Retaining wall
- Wood/creosoted pile
- Asphalt riprap & debris
- Dirty bottom, scattered gravel
- Forested rock/rocky, gentle slope

**Sediment Surface & Slope:**
- Visibility: 6 ft.
- Falling bed
- **Tip Probe Depth:**  
- **Disk Probe Depth:**

**Diver Observations:**
- Drive Initiation Time: 1255
- Drive Completion Time: 1305
- Drive Offset:  
- Estimated angle of drive: ~10°-15°

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, moderate, difficult; measured by diver or deck)</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.2</td>
<td>14.5</td>
<td>deck measured, free fall</td>
</tr>
<tr>
<td>12.3</td>
<td>13.0</td>
<td>easy drive</td>
</tr>
<tr>
<td>11.1</td>
<td>12.2</td>
<td>easy drive; moderate drive</td>
</tr>
<tr>
<td>8.7</td>
<td>10.9</td>
<td>moderate - difficult drive penetration; slow</td>
</tr>
<tr>
<td>7.8</td>
<td>10.6</td>
<td>drive measured; difficult drive</td>
</tr>
<tr>
<td>6.8</td>
<td>10.2</td>
<td>different drive, refusal</td>
</tr>
</tbody>
</table>

**TOTAL:** 9.25  
**TOTAL:** 5.85  
**Percent Recovered:** (63.2%) (51.6% on deck)

**Reason for Ending Drive:** refusal

**If refusal, reason for refusal:** hard substrate

**Extraction Observations:**
- Tension on line? Yes  
- Stability of vessel: no problem  
- Overlying water in core (quantity and description): clear, 2.5 ft
- On Boat Recovery: 10 ft  
- Loss of Sediment: 0.6 ft  
- Extraction Notes: (i.e. winch or hammer, easy, hard); winch, easy

**On Deck Observations:**
- Staining: Some sand, silt, spread off  
- Tube Deformation: none  
- Sediment Description (odor or color?): medium gray/brown sand, no odor/sheen

**Keep or Retry:**
- Diver notes screw plug at sediment/130 interface
- Keep or retry for R2

**Notes:**
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
### Sediment Core Processing Log

**Core Location/Sample Number:** SC-50-R3  
**Date/Time:** 2/14/10 12:17  
**Sample Logged by:** LM, CB  
**Type/Diameter of Sample:** 3" round  
**Sample Quality:** good  
**Notes:** Salinity collected from 2.8 - end of core, every 2".  
**On Deck Desc:** 2.8, 2.83, on hold at 3.0 ft. from SC-50-R2

<table>
<thead>
<tr>
<th>Recovered Length (ft)</th>
<th>% Comaption</th>
<th>Color</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.3</td>
<td>3</td>
<td>80</td>
<td>0.0-0.3: 2&quot; CLAY, 2&quot; SAND, 1&quot; Silt, 1&quot; Clay, 1&quot; Sand, 0.1&quot; Silt, 0.1&quot; Clay, 0.1&quot; Sand</td>
</tr>
<tr>
<td>8.8</td>
<td>50</td>
<td>90</td>
<td>0.8: 0.3&quot; Silt, 0.3&quot; Clay, 2&quot; Sand, 2&quot; Clay, 2&quot; Sand, 0.1&quot; Silt, 0.1&quot; Clay, 0.1&quot; Sand</td>
</tr>
<tr>
<td>8.4</td>
<td>20</td>
<td>98</td>
<td>0.4: 0.2&quot; Silt, 0.2&quot; Clay, 2&quot; Sand, 2&quot; Clay, 2&quot; Sand, 0.1&quot; Silt, 0.1&quot; Clay, 0.1&quot; Sand</td>
</tr>
<tr>
<td>2.1</td>
<td>20</td>
<td>90</td>
<td>2.2: 0.1&quot; Silt, 0.1&quot; Clay, 2&quot; Sand, 2&quot; Clay, 2&quot; Sand, 0.1&quot; Silt, 0.1&quot; Clay, 0.1&quot; Sand</td>
</tr>
<tr>
<td>0.8</td>
<td>20</td>
<td>90</td>
<td>0.8: 0.7&quot; Silt, 0.7&quot; Clay, 2&quot; Sand, 2&quot; Clay, 2&quot; Sand, 0.1&quot; Silt, 0.1&quot; Clay, 0.1&quot; Sand</td>
</tr>
<tr>
<td>0.8</td>
<td>20</td>
<td>90</td>
<td>0.8: 0.5&quot; Silt, 0.5&quot; Clay, 2&quot; Sand, 2&quot; Clay, 2&quot; Sand, 0.1&quot; Silt, 0.1&quot; Clay, 0.1&quot; Sand</td>
</tr>
<tr>
<td>0.8</td>
<td>20</td>
<td>90</td>
<td>0.8: 0.3&quot; Silt, 0.3&quot; Clay, 2&quot; Sand, 2&quot; Clay, 2&quot; Sand, 0.1&quot; Silt, 0.1&quot; Clay, 0.1&quot; Sand</td>
</tr>
</tbody>
</table>

**Sample Analysis:**

- **Depth:** 0-1.2 ft
- **Sample Depth:** 1-2.3 ft
- **Subsample No.:** 1-2
- **Analysis:** 0.8
tv=0.1
BIG
$\frac{21}{2}$
8.8
4.2

Core catcher is 100% full
Core catcher is full of gray red sand
Saw water (~200 mL) on surface

Note: Length recovered about = 8.8'
Length recovered at processing = 9.8'

2/24/06
LM
### Sediment Core Processing Log

**Job:** SEDIMENT CORE PROCESSING  
**Job Number:** P1052, 18300-511  
**No. of Sections:**  
**Sample Length (from log):** 8'  
**Avg. % Compaction:**  
**Notes:** CONT'D

**Core Location/Sample Number:** SC-50-R3  
**Date/Time:** 2/14/07  
**Sample Logged by:** LM, CB  
**Type/Diameter of Sample:** 3" round  
**Sample Quality:** good: fair: poor: disturbed

<table>
<thead>
<tr>
<th>Recovered Length (ft)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Size %: G</th>
<th>Size %: S</th>
<th>Size %: F</th>
<th>Description (grain size, color, moisture, sheen/odor, biota, wood, other debris)</th>
<th>Instal Actual Depth (ft)</th>
<th>Sample Depth</th>
<th>Subsample No.</th>
<th>Summary</th>
<th>Sketch</th>
</tr>
</thead>
<tbody>
<tr>
<td>6-8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6-9.8: medium SAND w/ occasional layers of coarse sand. Coarsening downward from 9.8</td>
<td>6-8</td>
<td>10.5</td>
<td>3305</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7:0 very coarse SAND ~ 10% in mud sand matrix</td>
<td>10.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7:8 3' - pocket of gray-green clay/silt</td>
<td>13.10</td>
<td>3.16x2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Coarsening downward</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>End of core @ 9.8'</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

End of core @ 9.8'

---

File: sediments/coreprocass

Page: 430 of 490
SEDIMENT CORE DRIVE LOG

Project: LDN Subsurface Ltd.
Project #: 05-CB-A-32
Field Crew: TP, NB
Contractor: MSS

Core Location: LDN-9CSD
Date: 02-24-06
Time: 08:28
Attempt #: 3
Sample Method: Vibration

Proposed Coordinates
N: 194871
E: 1276045
Mudline:
Core Drive: 13 ft.

Actual Coordinates
N: 4731.47684
E: 12210.44123
Mudline:
Core Drive: 13 ft.
Core Recovery 8.75 ft (67.3%)

Tide Measurements (Datum: )
Time/Height:

DTS Boat: DTS Lead Line:
11.6 / 12.8 ft on slope
Mudline Elevation:

Description:
(free fall, fingers inverted, vibration needed to drive/extract, estimation of density, debris encountered, slopes, refusal, mudline conditions, drive action, etc.)
0-4 ft free fall
4-10 ft easy drive
10-13 ft difficult drive

Core cut core fall of brown-gray medium sand, some fine sand
silt on surface (suspended in water)
bottom of it settled before excess core tube was cut off.

Total Drive: 13 ft.
Length Recovered: 8.75 ft
67.3%

Notes:
Left off target, meets amended GAPP acceptance criteria (>100 ft penetration and >60% recovery)

Measurement (to nearest 0.1 foot):
Avg. % Recovery:
Avg. % Compaction:
Section: Length: Description at Cuts:
A =
B =
C =
D =
<table>
<thead>
<tr>
<th>PID</th>
<th>Description</th>
<th>Color</th>
<th>Size % - G</th>
<th>Size % - S</th>
<th>Size % - F</th>
<th>Recovered Length (ft)</th>
<th>% Compaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.5</td>
<td>25 YR 6/8</td>
<td>35 %</td>
<td>15 %</td>
<td>0 %</td>
<td>15.3 %</td>
<td>2.0</td>
<td>0.3</td>
</tr>
<tr>
<td>2.5</td>
<td>25 YR 6/8</td>
<td>40 %</td>
<td>15 %</td>
<td>0 %</td>
<td>25.3 %</td>
<td>2.0</td>
<td>0.3</td>
</tr>
<tr>
<td>3.5</td>
<td>25 YR 6/8</td>
<td>40 %</td>
<td>15 %</td>
<td>0 %</td>
<td>33.5 %</td>
<td>2.0</td>
<td>0.3</td>
</tr>
<tr>
<td>4.5</td>
<td>25 YR 6/8</td>
<td>40 %</td>
<td>15 %</td>
<td>0 %</td>
<td>33.5 %</td>
<td>2.0</td>
<td>0.3</td>
</tr>
<tr>
<td>5.5</td>
<td>25 YR 6/8</td>
<td>40 %</td>
<td>15 %</td>
<td>0 %</td>
<td>33.5 %</td>
<td>2.0</td>
<td>0.3</td>
</tr>
</tbody>
</table>

Notes: R1 = 10.5, 7.571.

Job: TWT Core Processing Log
Core Location: 3-5-1-R1
Sample Number: 1330
Sample Quality: Good
Sample Description: Upper Unit from Horizonted Units

Summary Sketch
mudline = 10.0

core shoe is 1/2 full of fine-med bl. sand

57% winnowing@ $1.6

...surface sheen@1.63.2 - smear zone only...
**MCS Environmental MudMole Bore Log**

**Collection Information**

Date: 2-22-06  
Recorder: 65-17

Project: 341185.001 Windward Lower Duwamish Coring

<table>
<thead>
<tr>
<th>Station Name</th>
<th>51 R1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tube Length (ft)</td>
<td>16.05</td>
</tr>
<tr>
<td>Water Depth (ft)</td>
<td>8.5</td>
</tr>
<tr>
<td>Est. Tide Height (ft)</td>
<td>9.2 (MLLW)</td>
</tr>
<tr>
<td>Est. Mudline</td>
<td>(MLLW)</td>
</tr>
</tbody>
</table>

**Position Information**

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft

Northing: 194728  
Easting: 1276135  
On Deck Top of Sediment: 10.1

Comments: diver depth 9 ft - 2 visibility - silty sand with scattered cobble & crushed rock - moderate current - gentle slope

- 1 ft off station

**Penetration Tape Reading**

<table>
<thead>
<tr>
<th>Reading</th>
<th>Recovery Tape Reading</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.7</td>
<td>15.0</td>
<td></td>
</tr>
<tr>
<td>13.1</td>
<td>13.9</td>
<td></td>
</tr>
<tr>
<td>11.8</td>
<td>12.8</td>
<td></td>
</tr>
<tr>
<td>10.5</td>
<td>11.9</td>
<td></td>
</tr>
<tr>
<td>8.1</td>
<td>11.0</td>
<td>slow penetration</td>
</tr>
<tr>
<td>7.1</td>
<td>10.7</td>
<td>refusal</td>
</tr>
<tr>
<td>5.5</td>
<td>10.0</td>
<td></td>
</tr>
</tbody>
</table>

MCS Environmental Inc.  
6505 - 219th St SE, Suite 100  
Mountlake Terrace, WA 98043  
(425) 897-4340
Mudmole™ Bore Log

Project: LDWG Duwamish Coring
Project No: 341185.001
Collected by: GSM
Date: 2/22/2006
Water depth: 8.5 ft

Station: 51 R1
Position: NAD83
Time: 7:58
194728
Northing
1276135
Easting

Weather/Comments: N/A
Driven to refusal

Penetration

Distance from top of tube (ft)
0.0
8.0
2.0
4.0
6.0
8.0
10.0
12.0
14.0
16.0
18.0
Distance below mudline (ft)
8.0
10.0

Penetration 10.55 ft/ On deck recovery 6.05 ft = 57% Recovery

Penetration

Interval recovery
Percent recovery

0-1.35
1.05
78%
1.35-2.95
1.1
69%
2.95-4.25
1.1
85%
4.25-5.55
0.9
69%
5.55-7.95
0.9
38%
7.95-8.95
0.3
30%
8.95-10.65
0.7
44%

Depth below
mudline
Distance from
top of tube

Mudline
10
1
10.78
2
11.50
3
12.19
4
13.04
5
13.77
6
14.32
7
14.69
8
15.07
9
15.37
10
15.81
11
No sample
12
No sample
13
No sample
14
No sample
15
No sample
16
No sample
17
No sample
18
No sample
19
No sample
20
No sample

MCS Environmental, Inc.
6505 216th Street SW, Suite 100
Mountlake Terrace, WA 98043
(425) 697-4340
fax (425) 697-4370

File name: S-5
Bore Log (mudsol)
Station Number: 51  Date: 02/12/06  Station Arrival Time: 07:43
Attempt: 1  Core Tube Length: 11.05  Station Departure Time: 08:50
Field Technician: TD  Lead Line Water Depth: 8.5  Dist. From Target Station: 890
Contractor: M5/255  Latitude: 174.7720
On-site Visitor:  Longitude: 12.7.6615

**Pre-Drive and Dive Observations:**
- Shoreline & surrounding area: concrete, fall pipe, wood and steel retaining wall, slag pile, asphalt beams
- Sediment surface & slope: silty sand, scattered cobble & crushed rock, gentle slope
- Water current and visibility: moderate current, vis. 2 ft., floating debris
- Diver Water Depth: 9
- Tip Probe Depth: __________
- Disk Probe Depth: __________

**Drive Observations:**
- Drive Initiation Time: 08:39  Drive Completion Time: 08:54  Drive Offset: __________
- Estimated angle of drive: est 50°-10° off

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, moderate, difficult; measured by diver or deck)</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.7</td>
<td>15.0</td>
<td>deck measured, free fall, moderate drive</td>
</tr>
<tr>
<td>13.1</td>
<td>13.9</td>
<td>moderate drive</td>
</tr>
<tr>
<td>11.5</td>
<td>12.5</td>
<td>moderate drive</td>
</tr>
<tr>
<td>10.5</td>
<td>11.9</td>
<td>moderate - difficult drive, diver measured</td>
</tr>
<tr>
<td>8.1</td>
<td>11.0</td>
<td>moderate - difficult drive, slow penetration</td>
</tr>
<tr>
<td>6.1</td>
<td>10.3</td>
<td>difficult drive</td>
</tr>
<tr>
<td>5.5</td>
<td>10.0</td>
<td>difficult drive, refusal</td>
</tr>
</tbody>
</table>

**TOTAL: 10.05**  **TOTAL: 6.05**  **Percent Recovered: 57.2%**  (56.4% on deck)

Reason for ending drive: refusal
If refusal, reason for refusal: hard substrate

**Extraction Observations:**
- Tension on line: 250
- Stability of vessel: no problem
- Overlying water in core (quantity and description): clear, 2.5 L
- On Boat Recovery: 10.1
- Loss of Sediment: 0.1 ft.
- Extraction Notes: (i.e. winch or hammer, easy, hard) rachet, moderate pressure

**Post-drive Observations:**
- Staining: dark, oily sand, sprayed off
- Tube Deformation: none
- Sediment Description (odor or sheen?): brown fine sand w/ silt, no disturbance

Keep or Retry: screw plug inserted by diver at sed/bed interface

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-22-06
Recorder: 

Project: 341165.001 Windward Lower Duwamish Coring

Station Name: S1 R2

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft

Northing 194707

Easting 1276135

On Deck Top of Sediment 11.9

Comments: Rising tide - 11 ft diver depth - 10 ft visibility -

Moderate slope - Silty Bottom - Slight Current -

2.20 AM off station

Penetration Tape
Reading Recovery Tape Reading Comments

13.9 13.8 

11.3 12.6 very slow penetration refusal

10.3 12.3 

9.1 11.8 

MCS Environmental, Inc.
9505 - 219th St SW, Suite 100
Meadowdale Tower, WA 98045
(425) 897-4340

Duwamish bore log form.xls 437 of 490
Mudmole™ Bore Log

Project: LDWG Duwamish Coring
Project No: 341185.001
Collected by: GSM
Date: 2/22/2006
Water depth: 11.0 ft

Station: 51 R2
Position: NAD83
Time: 9:17
Mudline: -1.2 ft MLLW (estimated using tide tables)

Weather/Comments: N/A

Depth below
Interval Penetration mudline Percent
mudline (ft) recovery (ft) recovery (ft)

0-2.2 2.3 105%
2.2-4.8 1.2 46%
4.8-5.8 0.3 30%
5.8-7 0.5 42%

Distance from
top of tube

Penetration 7 ft/ On deck recovery 4.2 ft = 60% Recovery
Station Number: 51  Date: 04/24/07  Station Arrival Time: 0742
Attempt: 2  Core Tube Length: 16.1  Station Departure Time: 0950
Field Technician: TP  Lead Line Water Depth: 11.1  Dist. From Target Station: 20
Contractor: 1165/85  Latitude: 194.707
On-site Visitor: 1276.35  Longitude: 1276.35

Pre-Drive and Drive Observations:
Shoreline & surrounding area: Same as R1
Sediment surface & slope: Silty bottom, moderate slope.
Water current and visibility: Flowing tide, lift vs. slight current.
Diver Water Depth: 11  Tip Probe Depth: 12  Disk Probe Depth: 13

Drive Observations:
Drive Initiation Time: 0623  Drive Completion Time: 0933  Drive Offset: 1
Estimated angle of drive: 45°
Penetration Recovery Drive Notes (e.g. easy, moderate, difficult; measured by diver or dock)
11.3 13.9 12.0 13.8  Deck measured, easy-moderate drive.
11.3 12.0 12.6 13.8  Over measured, moderate drive.
10.3 12.3 12.6 13.8  Difficult drive, pen slow pen.
9.1 11.8 12.6 13.8  Difficult drive, refused

TOTAL 9.0  TOTAL 4.3  Percent Recovered: 61.4% (60.0% on deck)
Reason for ending drive: Refused
If refusal, reason for refusal: Hard substrate

Extraction Observations:
Tension on line: 4/5  Stability of vessel: No problem
Overlying water in core (quantity and description): Slight muddy water.
On Boat Recovery: 11.9  Loss of Sediment: 0.4 ft.
Extraction Notes: (i.e. winch or hammer, easy, hard) Winch, easy.

Unextracted Observations:
Staining: Brown, muddy sand, sprayed off
Tube Deformation: None
Sediment Description (odor or sheen?): Grey mud, sand, no odor/sheen

Keep or Retry: Drive inserted, screen ping at sed/tub interface

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenth).
### Sediment Core Processing Log

**Core Location/Sample Number:** LDWA-SC-52 R3

**Sample Logged by:** E. Bachor

**Type/Diameter of Sample:** 4" sq. tube

**Sample Quality:** good

**Notes:**
- P = 10.25
- Rec %: 57%
- 10/10 from 2.2 to 3.2. Logged as cautious.
- Top of tube to soil open core = 10.2'
- On deck R: 5.85

<table>
<thead>
<tr>
<th>Recovered Length (ft)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Size % G</th>
<th>Size % S</th>
<th>Size % F</th>
<th>PID</th>
<th>Description (grain size, color, moisture, sheen, odor, bio, wood, other debris)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.51 3/4</td>
<td>12</td>
<td>5</td>
<td>9%</td>
<td>95</td>
<td>0</td>
<td></td>
<td>Wet, grey to olive grey, sl. sandy, silt, minor: twigs and small shredded wood fronds</td>
</tr>
<tr>
<td>GLEY 2</td>
<td>4/100</td>
<td>3</td>
<td>100%</td>
<td>0%</td>
<td>0</td>
<td></td>
<td>Moist, med. straw, black, Silt w/moist, wood straights (small) and fringes slight, it's odor.</td>
</tr>
<tr>
<td>6/0.5U</td>
<td>2.5/586</td>
<td>10</td>
<td>90%</td>
<td>90%</td>
<td>0</td>
<td></td>
<td>1.3-1.4 small grey, sl. silty clay lens, high plasticity. Increasing stiffness downward as moisture content decreases.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Moist, med. loose, olive green sl. silty sand. Sand is fine and grades coarser downward. Trace wood shreds @ 2.6'. Multi colored grains are orange, red, white.</td>
</tr>
<tr>
<td>2.5/56V</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><em>STA but coarse and trace silt.</em></td>
</tr>
<tr>
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<td></td>
<td></td>
<td>End of core @ 4.9'</td>
</tr>
</tbody>
</table>

**NOTE:** 1' void between 2.2-3.2'. Based on an open tube measurement, loss is through bottom of core. For logging purposes void is omitted and sediments below void measured. Field true end of core was 5.9' and void.
R2 guide log

0-0.2': good intact surface layer, pale olive grey, polycheats tubes?

0.2-1.5: then black silt as 0.6-2.2 m R3.

1.5-3.5: fine to medium sand

Never gets into coarse sand as in R3 which was driven 3' further. 50% missing from 1.5-2.2'.
Mudmole™ Bore Log

Project: LDWG Duwamish Coring
Project No: 341185.001
Collected by: GSM
Date: 2/7/2006
Water depth: 7.1 ft

Station: 52 R1
Position: NAD83
194173 Northing
Easting 1276289

Weather/Comments: Sunny
medium fine sand in tip of core

Penetration interval (ft) | Interval recovery (ft) | Percent recovery
---|---|---
0-0.75 | 0.65 | 87%
0.75-1.55 | 0.8 | 100%
1.55-3.05 | 1.1 | 73%
3.05-4.25 | 0.7 | 58%
4.25-6.05 | 1 | 50%
6.05-7.25 | 0.4 | 33%

Penetration 7.25 ft/ On deck recovery 4.25 ft = 59% Recovery

Depth below mudline (ft) | Distance from top of tube (ft)
---|---
1 | 11.8
2 | 12.70
3 | 13.58
4 | 14.31
5 | 14.90
6 | 15.47
7 | 16.02
8 | No sample
9 | No sample
10 | No sample
11 | No sample
12 | No sample
13 | No sample
14 | No sample
15 | No sample
16 | No sample
17 | No sample
18 | No sample
19 | No sample
20 | No sample
Station Number: 52  
Attempt:  
Field Technician: LM 03  
Contractor: HCS  
On-site Visitor: Tim  
Latitude: 44.173  
Longitude: 127.089  
Date: 2/7/06  
Core Tube Length: 16.05  
Lead Line Water Depth: 7.1'  
Diver Water Depth: not taken  
Tip Probe Depth:  
Disk Probe Depth: 2.8'  
Drive Initiation Time: 13:19

Shoreline & surrounding area observations: Shore pile along shoreline, stay downstream from standing

Sediment surface & slope description: hard bottom, silty sand, depth not measured by diver

Water current: negligible

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g., easy, difficult, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.3</td>
<td>154</td>
<td>hard drive, slow start - boat</td>
</tr>
<tr>
<td>14.5</td>
<td>14.4%</td>
<td>hand drive - boat measurement</td>
</tr>
<tr>
<td>13.0</td>
<td>14.5</td>
<td>easier drive - boat measurement</td>
</tr>
<tr>
<td>11.8</td>
<td>12.8</td>
<td>easier drive - boat measurement, beginning to slow</td>
</tr>
<tr>
<td>10.8</td>
<td>11.4</td>
<td>medium hard drive, slow - boat measurement</td>
</tr>
<tr>
<td>8.8</td>
<td>11.4</td>
<td>very hard, slow</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>46.5</strong></td>
<td></td>
</tr>
</tbody>
</table>

Estimated angle of drive: 10' from vertical

Reason for ending drive: refusal

Drive Completion Time: 13:35  
On Boat Recovery: 4.8

End of Core Tube Observations
- Staining: petroleum odor, unseen evident
- Tube Deformation: not evident
- Loss of Sediment: 0.41 lost; slight compress of tube, bottom observed
- Sediment Description: dark, wet, muddy
- Water in Tube: water removed from top of core

Keep or Retry: Keep
- Air in wrapped underwater

Notes:
Penetration & Recovery measured from top of core to sediment surface in feet (tenths)
Station Number: 52  
Attempt: 1  
Date: 2/7/06  
Core Tube Length: 16.05  
Lead Line Water Depth: 4.4  
Diver Water Depth:  
Tip Probe Depth:  
Disk Probe Depth:  
Drive Initiation Time: 1319  

Shoreline & surrounding area observations: Retaining wall (sheet); piles of clay visible  
Sediment surface & slope description: cannot see  
Water current: light wind; low mid current  

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, difficult, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.3</td>
<td>15.4</td>
<td>(Drive offset: )</td>
</tr>
<tr>
<td>14.5</td>
<td>14.6</td>
<td></td>
</tr>
<tr>
<td>13.0</td>
<td>14.5</td>
<td></td>
</tr>
<tr>
<td>11.8</td>
<td>12.8</td>
<td></td>
</tr>
<tr>
<td>10.0</td>
<td>11.8</td>
<td></td>
</tr>
<tr>
<td>8.8</td>
<td>11.4</td>
<td></td>
</tr>
</tbody>
</table>

Estimated angle of drive: ±10°  
Reason for ending drive: refusal  

Drive Completion Time: 1324  
On Boat Recovery: on deck top of sediment  

End of Core Tube Observations  

<table>
<thead>
<tr>
<th>Observation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staining:</td>
</tr>
<tr>
<td>Tube Deformation:</td>
</tr>
<tr>
<td>Loss of Sediment:</td>
</tr>
<tr>
<td>Sediment Description:</td>
</tr>
<tr>
<td>Water in Tube:</td>
</tr>
</tbody>
</table>

Keep or Retry:

Notes:  
Penetration & Recovery measured from top of core tube to sediment surface in feet (lengths)
Station Number: 52
Attempt: 2
Field Technician: IMCB
Contractor: MCS
On-site Visitor: None
Latitude: 44.178
Longitude: 187.391

Date: 2/18/06
Core Tube Length: 16.05'
Lead Line Water Depth: 5.91
Diver Water Depth: _____
Tip Probe Depth: _____
Disk Probe Depth: _____
Drive Initiation Time: 14:02
off-site during initiation

Shoreline & surrounding area observations: same as attempt 1
Sediment surface & slope description: same as attempt 1
Water current: same as attempt 1

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Drive offset: )

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td>16.15</td>
<td>10.95</td>
</tr>
<tr>
<td>16.05</td>
<td>11.60</td>
</tr>
<tr>
<td>16.05</td>
<td>9.45</td>
</tr>
</tbody>
</table>

Estimated angle of drive: 15° from vertical
Reason for ending drive: refusal

Drive Completion Time: 14:10
On Boat Recovery: 11:49 on deck to top of sealed

End of Core Tube Observations

Staining: none
Tube Deformation: none
Loss of Sediment: none
Sediment Description: black, muddy, wet
Water in Tube: water GPLvd from top of tube

Keep or Retry: Retry

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
Station Number: 52
Attempt: 2
Field Technician: TBC
Contractor: LCA
On-site Visitor: TBC
Latitude: 44.167
Longitude: 161.296
Date: 4/16/06 10:05
Core Tube Length: 68.00
Lead Line Water Depth: 59
Diver Water Depth: ______
Tip Probe Depth: ______
Disk Probe Depth: ______
Drive Initiation Time: 1402

Shoreline & surrounding area observations: same as R1
Sediment surface & slope description:  
Water current:  

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, difficult, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.5</td>
<td>13.7</td>
<td>(Drive offset: )</td>
</tr>
<tr>
<td>12.3</td>
<td>12.7</td>
<td></td>
</tr>
<tr>
<td>11.2</td>
<td>12.1</td>
<td></td>
</tr>
<tr>
<td>10.1</td>
<td>11.6</td>
<td></td>
</tr>
</tbody>
</table>

Estimated angle of drive: 90° ±15°
Reason for ending drive: refused

Drive Completion Time: 1411
On Boat Recovery: 11.9 on deck top of sediment

---

End of Core Tube Observations
Staining: 
Tube Deformation: No
Loss of Sediment: core catcher and wrapped in silt
Sediment Description: cannot see
Water in Tube: yes, sieved off

Keep or Retry: will try for 3rd core

---

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (inches)
Station Number: 92
Date: 2/7/06
Core Tube Length: 11005
Field Technician: CB, LM
Lead Line Water Depth: 5.8'
Contractor: MCS
Diver Water Depth: 
On-site Visitor: None
Tip Probe Depth: 
Latitude: 144140
Disk Probe Depth: 
Longitude: 1374279
Drive Initiation Time: 144D

Shoreline & surrounding area observations: Same as Attempt 1
Sediment surface & slope description:
Water current: 1.0 foot-visibility

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, difficult, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.5</td>
<td>15.0</td>
<td>(Drive offset: )</td>
</tr>
<tr>
<td>13.3</td>
<td>14.2</td>
<td>moderate-hard drive</td>
</tr>
<tr>
<td>11.9</td>
<td>13.2</td>
<td>moderate-hard drive</td>
</tr>
<tr>
<td>9.8</td>
<td>12.0</td>
<td>moderate-hard drive</td>
</tr>
<tr>
<td>8.4</td>
<td>11.1</td>
<td>hard drive</td>
</tr>
<tr>
<td>7.1</td>
<td>10.5</td>
<td>hard drive</td>
</tr>
<tr>
<td>5.8</td>
<td>10.1</td>
<td>hard drive; refusal</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Estimated angle of drive: 40° - 55°, 80° - 85° in guide mechanism, 80° no guide
Reason for ending drive: refusal
Drive Completion Time: 1503
On Boat Recovery: 10.2

End of Core Tube Observations

| Staining: | none |
| Tube Deformation: | none |
| Loss of Sediment: | none |
| Sediment Description: | Wet, black, muddy - dots of residual tubules brought up |
| Water in Tube: | Spilled out |

Keep or Retry: 
Diver cores core and in water
wind picks up to 10 mph

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
Station Number: 52
Attempt: 3
Field Technician: T016674
Contractor: 100 LBS
On-site Visitor: 0
Latitude: 19.4160
Longitude: 127.6279

Date: 2/3/06
Core Tube Length: 16.05
Lead Line Water Depth: 5.8
Diver Water Depth: 
Tip Probe Depth: 
Disk Probe Depth: 
Drive Initiation Time: 1443

Shoreline & surrounding area observations: same as R1 & R2
Sediment surface & slope description: 
Water current: 

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.5</td>
<td>15.0</td>
</tr>
<tr>
<td>13.3</td>
<td>14.2</td>
</tr>
<tr>
<td>11.9</td>
<td>13.2</td>
</tr>
<tr>
<td>9.8</td>
<td>12.0</td>
</tr>
<tr>
<td>8.4</td>
<td>11.1</td>
</tr>
<tr>
<td>7.1</td>
<td>10.9</td>
</tr>
<tr>
<td>5.8</td>
<td>10.1</td>
</tr>
</tbody>
</table>

(Drive offset: )

Estimated angle of drive: °90 ± 5
Reason for ending drive: refusal

Drive Completion Time: 1503
On Boat Recovery: 10.2 on deck top of sediment

End of Core Tube Observations:

- Staining: 
- Tube Deformation: NO
- Loss of Sediment: core catcher end capped in situ
- Sediment Description: cannot see
- Water in Tube: yes, siphoned off

Keep or Retry: 

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
- Eric marks midpoint w/ knife after he has cut deck recovery material
- Drill drain hole 2" ft above midpoint on deck recovery

Changes
- third headset option
**Mudmole™ Bore Log**

**Project:** LDWG Duwamish Coring  
**Station:** 52 R2  
**Project No.:** 341185.001  
**Position:** NAD83  
**Collected by:** GSM  
**Date:** 2/7/2006  
**Time:** 13:59  
**Water depth:** 5.9 ft  
**Mudline:** -1.0 ft MLLW (estimated using tide tables)

**Weather/Comments:** Sunny

**Penetration**

<table>
<thead>
<tr>
<th>Penetration interval (ft)</th>
<th>Interval recovery (ft)</th>
<th>Percent recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-2.55</td>
<td>2.35</td>
<td>92%</td>
</tr>
<tr>
<td>2.55-3.75</td>
<td>1</td>
<td>83%</td>
</tr>
<tr>
<td>3.75-4.85</td>
<td>0.6</td>
<td>55%</td>
</tr>
<tr>
<td>4.85-5.95</td>
<td>0.5</td>
<td>45%</td>
</tr>
</tbody>
</table>

**Depth below mudline (ft)**

- 1: 12.82
- 2: 13.74
- 3: 14.63
- 4: 15.39
- 5: 16.92
- 6: No sample
- 7: No sample
- 8: No sample
- 9: No sample
- 10: No sample
- 11: No sample
- 12: No sample
- 13: No sample
- 14: No sample
- 15: No sample
- 16: No sample
- 17: No sample
- 18: No sample
- 19: No sample
- 20: No sample

**Penetration 5.95 ft; On deck recovery 4.15 ft = 70% Recovery**

---

**MCS Environmental, Inc.**

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Mukilteo, WA 98275

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Fax (425) 667-4370
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-7-08  Recorder: G5M

Project: 341185.001 Windward Lower Duwamish Coring

Station Name: 52 R1

Tube Length (ft): 16.05

Water Depth (ft): 7.1

Est. Tide Height (ft): 6.2 (MLLW)

Est. Mudline: (MLLW)

Comments: medium fine sand in tip of core

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft

Northing: 194173

Easting: 1276289

On Deck Top of Sediment: 1.8

Penetration Tape Reading

<table>
<thead>
<tr>
<th>Reading</th>
<th>Recovery Tape Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.3</td>
<td>15.4</td>
</tr>
<tr>
<td>14.5</td>
<td>14.6</td>
</tr>
<tr>
<td>13.0</td>
<td>14.5</td>
</tr>
<tr>
<td>11.8</td>
<td>12.8</td>
</tr>
<tr>
<td>10.8</td>
<td>11.8</td>
</tr>
<tr>
<td>8.8</td>
<td>11.4</td>
</tr>
</tbody>
</table>

Comments:

Duwamish boreid formuls F-2

451 of 490
### Collection Information

- **Date:** 2-7-06
- **Recorder:** 650
- **Project:** 341185.001 Windward Lower Duwamish Coring

- **Station Name:** 52 R2

### Position Information

- **Coordinate Datum:** WA State Plane N, NAD 83, Survey Ft
- **Northing:** 194 178
- **Easting:** 1276296
- **Easting:** 11.9

### Penetration Tape Reading

<table>
<thead>
<tr>
<th>Penetration Tape Reading</th>
<th>Recovery Tape Reading</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.5</td>
<td>13.7</td>
<td></td>
</tr>
<tr>
<td>12.3</td>
<td>12.7</td>
<td></td>
</tr>
<tr>
<td>11.2</td>
<td>12.1</td>
<td></td>
</tr>
<tr>
<td>10.1</td>
<td>11.6</td>
<td>refusal</td>
</tr>
<tr>
<td></td>
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</tbody>
</table>
## Mudmole™ Bore Log

**Project:** LDWG Duwamish Coring  
**Station:** 52 R3  
**Project No:** 341185.001  
**Collected by:** GSM  
**Date:** 2/7/2006  
**Time:** 14:35  
**Water depth:** 5.8 ft  
**Weather/Comments:** Sunny

Driven to refusal

<table>
<thead>
<tr>
<th>Distance from top of tube (ft)</th>
<th>Penetration interval (ft)</th>
<th>Interval recovery (ft)</th>
<th>Percent recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td>0-1.55</td>
<td>1.05</td>
<td>68%</td>
</tr>
<tr>
<td>2.0</td>
<td>1.55-2.75</td>
<td>0.8</td>
<td>67%</td>
</tr>
<tr>
<td>4.0</td>
<td>2.75-4.15</td>
<td>1</td>
<td>71%</td>
</tr>
<tr>
<td>6.0</td>
<td>4.15-6.25</td>
<td>1.2</td>
<td>57%</td>
</tr>
<tr>
<td>8.0</td>
<td>6.25-7.65</td>
<td>0.9</td>
<td>64%</td>
</tr>
<tr>
<td>10.0</td>
<td>7.65-8.95</td>
<td>0.6</td>
<td>48%</td>
</tr>
<tr>
<td>12.0</td>
<td>8.95-10.25</td>
<td>0.4</td>
<td>31%</td>
</tr>
</tbody>
</table>

Penetration 10.25 ft  
On deck recovery 5.85 ft  = 57% Recovery

<table>
<thead>
<tr>
<th>Depth below mudline (ft)</th>
<th>Distance from top of tube (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Mudline 10.2</td>
</tr>
<tr>
<td>1</td>
<td>10.88</td>
</tr>
<tr>
<td>2</td>
<td>11.55</td>
</tr>
<tr>
<td>3</td>
<td>12.23</td>
</tr>
<tr>
<td>4</td>
<td>12.94</td>
</tr>
<tr>
<td>5</td>
<td>13.54</td>
</tr>
<tr>
<td>6</td>
<td>14.11</td>
</tr>
<tr>
<td>7</td>
<td>14.73</td>
</tr>
<tr>
<td>8</td>
<td>15.31</td>
</tr>
<tr>
<td>9</td>
<td>15.77</td>
</tr>
<tr>
<td>10</td>
<td>No sample</td>
</tr>
<tr>
<td>11</td>
<td>No sample</td>
</tr>
<tr>
<td>12</td>
<td>No sample</td>
</tr>
<tr>
<td>13</td>
<td>No sample</td>
</tr>
<tr>
<td>14</td>
<td>No sample</td>
</tr>
<tr>
<td>15</td>
<td>No sample</td>
</tr>
<tr>
<td>16</td>
<td>No sample</td>
</tr>
<tr>
<td>17</td>
<td>No sample</td>
</tr>
<tr>
<td>18</td>
<td>No sample</td>
</tr>
<tr>
<td>19</td>
<td>No sample</td>
</tr>
<tr>
<td>20</td>
<td>No sample</td>
</tr>
</tbody>
</table>

MCS Environmental, Inc.  
6505 216th St SW, Suite 100  
Mountlake Terrace, WA 98043  
(425) 997-4340  
Fax (425) 997-4370

File name 50 R3  
Bore Log [msdh3]
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-7-06  Recorder: ESM

Project: 341185.001 Windward Lower Duwamish Coring

Station Name: S2 R3

Tube Length (ft): 16.05

Water Depth (ft): 5.8

Est. Tide Height (ft): 4.0 (MLLW)

Est. Mudline: _______ (MLLW)

Comments: ____________________________

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft

Northing 194160

Easting 1276279

On Deck Top of Sediment 19.2

Penetration Tape Reading

<table>
<thead>
<tr>
<th>Depth</th>
<th>Recovery Tape Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.5</td>
<td>15.0</td>
</tr>
<tr>
<td>13.3</td>
<td>14.2</td>
</tr>
<tr>
<td>11.9</td>
<td>13.2</td>
</tr>
<tr>
<td>9.8</td>
<td>12.0</td>
</tr>
<tr>
<td>8.4</td>
<td>11.1</td>
</tr>
<tr>
<td>7.1</td>
<td>10.5</td>
</tr>
<tr>
<td>5.8</td>
<td>10.1</td>
</tr>
</tbody>
</table>

Comments: Vertical
### Sediment Core Processing Log

**Job:** LDW DUNAMISH  
**Job Number:** PorS-R200-5/8  
**No. of Sections:** 1  
**Sample Length (from log):** 13,0"  
**Avg. % Compaction:** Recovered: 1,1%  
**Notes:** 16.1 %R = 82%, Too of tube to sed when opened 4.85"  
**Type/Diameter of Sample:** 4" N Aluminium MCS  
**Sample Quality:** good, fair, poor, disturbed  

#### Description

<table>
<thead>
<tr>
<th>Sample</th>
<th>Grain size, color, moisture, aeration, balsa, wood, other debris</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sandy, wet, tan, olive green, st sandy silt by trace organics (0.5%), mg. weed, woody grasses. Wet to moist, moderately soft, silt. Greenish gray (dark) slightly clayey. Trace rootlets, moderately H2S odor. Whole shell frag &lt; 0.1</td>
</tr>
<tr>
<td>2</td>
<td>Moist, moderately soft to stiff, silt, Silt, Silt just softer. Greenish gray (dark) slightly clayey. Trace rootlets, wood.</td>
</tr>
</tbody>
</table>

**Note:** This unit is very sticky, have to scrape spoons to get it to come off.

---

#### Core Location/Sample Number

**Core Location/Sample Number:** LDN-SC-53  
**Date/Time:** Day 4, 02-07-06, start 10:30  
**Sample Logged by:** N. Barkey, A. Fitzgerald  
**Type/Diameter of Sample:** 4" N Aluminium MCS  
**Sample Quality:** good, fair, poor, disturbed  

<table>
<thead>
<tr>
<th>Sample Location</th>
<th>Deposition Depth</th>
<th>Sample No.</th>
<th>Summary Sheet</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**F-2**

455 of 490
LDW- SC-53

- 4.9 → 11.1 → 16.1

Flap open

Shoe full of dirty sand; good plug
### Sediment Core Processing Log

**Job:** Duwamish LDWG  
**Job Number:** PDR 55-13220  
**No. of Sections:** 1  
**Sample Length (from log):** seepg  
**Avg. % Compaction:**  

<table>
<thead>
<tr>
<th>Required Length (ft)</th>
<th>% Compaction</th>
<th>Color</th>
<th>LGE % - C</th>
<th>LGE % - S</th>
<th>LGE % - F</th>
<th>PHD</th>
<th>Description (grain size, color, moisture, sheen/odor, biota, wood, other debris)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>at 6.3' thin 1&quot; fibers. Small shells. Foul odor.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>At Contact</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>moist, stiff, brownish gray, SILT, true sand, true to minor clay.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>true small wood frags @ base.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>moist, dense to med., dense, fine to medium sand, multi-colored grains,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>orange, white, clean, clean to sig dirt content.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>gray to brownish gray.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8.5 small shredded wood frags.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>moist, med. stiff, gray SILT to minor sand.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Fine sand w/ 1&quot; silt interbeds.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>brownish gray, med. dense to dense. clean sand appearance.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1&quot; silt beds @ 10.1' and 10.6'.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4&quot; silt bed/layer @ 10.8' extends into silt.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Bottom of Core: 11.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No TPH-like sheen/odor observed through core.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Jar shear test E 2F = None</td>
</tr>
</tbody>
</table>

**Notes:**
Mudmole™ Bore Log

Project: LDWG Duwamish Coring
Project No: 341185.001
Collected by: GSM
Date: 2/6/2006
Water depth: 16.3 ft

Weather/Comments: Overcast

Penetration interval

Depth below
mudline (ft)

Penetration 13.55 ft/ On deck recovery 11.05 ft = 82% Recovery

Percent
recovery

Distance from top of tube (ft)

Penetration interval (ft)

Interval recovery (ft)

16.0
15.0
14.0
13.0
12.0
11.0
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0

0.0

Top of sediment

On deck

In-situ

Distance from top of tube (ft)

0.0

1.0

2.0

3.0

4.0

5.0

6.0

7.0

8.0

9.0

10.0

11.0

12.0

13.0

14.0

15.0

16.0

0-2.25
2.25-4.25
4.25-6.15
6.15-8.15
8.15-9.25
9.25-10.25
10.25-11.25
11.25-12.25
12.25-13.55

1.45
1.9
1.5
1.7
0.9
0.8
1
0.8
1.1

64%
95%
79%
85%
82%
80%
100%
80%
85%

458 of 490
## MCS Environmental MudMole Bore Log

### Collection Information
- **Date:** 2-6-06  
- **Recorder:** GSM
- **Project:** 341185.001 Windward Lower Duwamish Coring

### Station Name:
- **Station Name:** 53 G1

### Position Information
- **Coordinate Datum:** WA State Plane N, NAD 83, Survey Ft
- **Northing:** 1929.27
- **Easting:** 1277458
- **On Deck Top of Sediment:** 5.0

### Tube Length (ft):
- **16.05**

### Water Depth (ft):
- **16.3**

### Est. Tide Height (ft):
- **0.8**

### Est. Mudline:
- **(MLLW) Predicted**

### Comments:

### Penetration Tape Reading

<table>
<thead>
<tr>
<th>Reading</th>
<th>Recovery Tape Reading</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.8</td>
<td>12.7</td>
<td></td>
</tr>
<tr>
<td>9.9</td>
<td>11.2</td>
<td></td>
</tr>
<tr>
<td>7.9</td>
<td>9.5</td>
<td></td>
</tr>
<tr>
<td>6.8</td>
<td>8.6</td>
<td></td>
</tr>
<tr>
<td>5.8</td>
<td>7.8</td>
<td></td>
</tr>
<tr>
<td>4.8</td>
<td>6.8</td>
<td></td>
</tr>
<tr>
<td>3.8</td>
<td>6.0</td>
<td></td>
</tr>
<tr>
<td>2.6</td>
<td>4.9</td>
<td>processed</td>
</tr>
</tbody>
</table>

---

MCS Environmental, Inc.
6105 - 218th St SW, Suite 100
Mukilteo Terrace, WA 98043
(425) 697-6346

Duwamish borelog form.xls 458 of 490
Mudmole™ Bore Log

Project: LDWG Duwamish Coring
Project No: 341185.001
Collected by: GSM
Date: 2/6/2006
Water depth: 16.3 ft

Station: 53 R1
Position: NAD83
192927 Northing
1277458 Easting

Mudline: -15.5 ft MLLW (estimated using tide tables)

Weather/Comments: Overcast
On-deck measurement revised to 4.9 ft from top of tube in lab

Penetration 13.55 ft / On deck recovery 11.15 ft = 82% Recovery
### Sediment Core Processing Log

**Core Location/Sample Number:** SC-541 (R3)

**Date/Time:** 2/12/2012

**Sample Logged by:** LM, NB

**Type/Diameter of Sample:** 4’

**Sample Quality:** Good

---

#### Description

<table>
<thead>
<tr>
<th>Description (grain size, color, moisture, sheen/odor, blaste, wood, other debris)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wet, moist, silt with slight black, gray, sandy silt mottled with olive, gray sandy silt. Black, massive, low plasticity, increasing competency with depth. Occasional mottlers. 31/4” wood fragments 3” x 1/4”</td>
</tr>
<tr>
<td>2.0 feet black, silt with distinct unit and mottlers is no longer present</td>
</tr>
<tr>
<td>2.4 feet, damp, gray clayey silt with mottling ends at 2.4’</td>
</tr>
<tr>
<td>3.0 feet thick mottlers</td>
</tr>
<tr>
<td>3.3’ wood fragments 1 x 2”</td>
</tr>
<tr>
<td>3.8’ sand increases to sandy silt</td>
</tr>
<tr>
<td>3.9 feet 0.5% wood, no odor</td>
</tr>
<tr>
<td>4.0 feet transition to silty clayey silt with sand</td>
</tr>
<tr>
<td>4.3 feet, sand, and wood fragments up to 1’ L</td>
</tr>
<tr>
<td>4.0-4.6’ transition seam of medium, multicolored sand</td>
</tr>
<tr>
<td>5.2-5.5’ transition, silty sand from above + sand from below</td>
</tr>
<tr>
<td>5.5-5.6’ sharp</td>
</tr>
<tr>
<td>5.5-6’ damp, dense, multicolored coarse sand</td>
</tr>
</tbody>
</table>

---

**Recommended Length (ft)**

<table>
<thead>
<tr>
<th>4.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.7</td>
</tr>
</tbody>
</table>

**% Compaction**

<table>
<thead>
<tr>
<th>4.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.7</td>
</tr>
</tbody>
</table>

**Color**

<table>
<thead>
<tr>
<th>4.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.7</td>
</tr>
</tbody>
</table>

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**Shoreline Data**

<table>
<thead>
<tr>
<th>Subsample No.</th>
<th>Subsample Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>SC-541</td>
<td>0.5-1</td>
</tr>
<tr>
<td>SC-541</td>
<td>1.0</td>
</tr>
<tr>
<td>SC-541</td>
<td>1.5-2</td>
</tr>
<tr>
<td>SC-541</td>
<td>2.5-3</td>
</tr>
<tr>
<td>SC-541</td>
<td>3.25</td>
</tr>
</tbody>
</table>

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**On Deck Rec.**

<table>
<thead>
<tr>
<th>10.8</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.3</td>
</tr>
</tbody>
</table>

---

**Notes**

- Wet, moist, silt with slight black, gray, sandy silt mottled with olive, gray sandy silt. Black, massive, low plasticity, increasing competency with depth. Occasional mottlers. 31/4” wood fragments 3” x 1/4”
- 2.0 feet black, silt with distinct unit and mottlers is no longer present
- 2.4 feet, damp, gray clayey silt with mottling ends at 2.4’
- 3.0 feet thick mottlers
- 3.3’ wood fragments 1 x 2”
- 3.8’ sand increases to sandy silt
- 3.9 feet 0.5% wood, no odor
- 4.0 feet transition to silty clayey silt with sand
- 4.3 feet, sand, and wood fragments up to 1’ L
- 4.0-4.6’ transition seam of medium, multicolored sand
- 5.2-5.5’ transition, silty sand from above + sand from below
- 5.5-6’ sharp
- 5.5-6’ damp, dense, multicolored coarse sand
- Fining downward at 6.0’
- 0.5-7’ course silt pocket 1’

---

**Sample Depth**

| 1240 | 0.5-1 |
| 0.0-12 |
| 2.5-3 |
| 4.0-4.6 |
| 5.5-8 |

---

**Length (ft)**

<table>
<thead>
<tr>
<th>4.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.7</td>
</tr>
</tbody>
</table>

---

**% Compaction**

<table>
<thead>
<tr>
<th>4.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.7</td>
</tr>
</tbody>
</table>

---

**Color**

<table>
<thead>
<tr>
<th>4.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.7</td>
</tr>
</tbody>
</table>

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**Shoreline Data**

<table>
<thead>
<tr>
<th>Subsample No.</th>
<th>Subsample Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>SC-541</td>
<td>0.5-1</td>
</tr>
<tr>
<td>SC-541</td>
<td>1.0</td>
</tr>
<tr>
<td>SC-541</td>
<td>1.5-2</td>
</tr>
<tr>
<td>SC-541</td>
<td>2.5-3</td>
</tr>
<tr>
<td>SC-541</td>
<td>3.25</td>
</tr>
</tbody>
</table>

---

**On Deck Rec.**

<table>
<thead>
<tr>
<th>10.8</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.3</td>
</tr>
</tbody>
</table>

---

**Notes**

- Wet, moist, silt with slight black, gray, sandy silt mottled with olive, gray sandy silt. Black, massive, low plasticity, increasing competency with depth. Occasional mottlers. 31/4” wood fragments 3” x 1/4”
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- 4.3 feet, sand, and wood fragments up to 1’ L
- 4.0-4.6’ transition seam of medium, multicolored sand
- 5.2-5.5’ transition, silty sand from above + sand from below
- 5.5-6’ sharp
- 5.5-6’ damp, dense, multicolored coarse sand
- Fining downward at 6.0’
- 0.5-7’ course silt pocket 1’
SC-54-R3

Mudline = 3.25

Cow catcher is 50% full of multicolored medium sand w/ clay pockets

2/23/06
LM
NB
## Sediment Core Processing Log

**Core Location/Sample Number:** SG-54-R3  
**Date/Time:** 2/123 AM  
**Sample Logged by:** LM, NB  

<table>
<thead>
<tr>
<th>Recorded Length (ft)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Size % - G</th>
<th>Size % - S</th>
<th>PND</th>
<th>Description (grain size, color, moisture, sheen/odor, biota, wood, other debris)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.54</td>
<td></td>
<td>Black</td>
<td>90%</td>
<td>10%</td>
<td></td>
<td>SAND (AA) (medium grain, very broken, damp)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4%</td>
<td>98%</td>
<td>8</td>
<td>2.54' deflated Wood piece with 3&quot; gray brown clayey SILT pocket</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>@ 2.0' 1&quot; &amp; clayey SILT pocket (gray-brown)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>@ 1.5' 1&quot; &amp; clayey SILT pocket (gray-brown)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>@ 0.5' 1&quot; &amp; clayey SILT pocket (gray-brown)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>@ 0.1' clay layer (gray-brown)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>End of core 10.2'</td>
</tr>
</tbody>
</table>

**Notes:**  
- PEN = 13.0'  
- On deck = 10.8'  

---

**Summary:**

- **Removals:**
  - 7
  - 8-10
  - 1300
  - 10

**Sample Dropped:**

- **Sample:** SAND
- **Subsample No.:**
  - 7
  - 8-10
  - 1300
  - 10

---

**Additional Information:**

- Type/Diameter of Sample:
  - Good, Fair, Poor, Disturbed

---

**Job:** LAW 5 Core Processing  
**Job Number:** 18220-228
SEDIMENT CORE DRIVE LOG

Project: UDW Subsurface Sed.
Project #: OS 08, 05-22
Field Crew: TD, NB
Contractor: BE, MSS

Core Location: UDW - 5654
Date: 02.23.04
Time: 09:20
Attempt #: 3
Sample Method: Vibracore

Proposed Coordinates
N: 192,179
E: 127,0342
Mudline:
Core Drive:

Actual Coordinates
N: 219,166
E: 127,0389
Mudline:
Core Drive:
Core Recovery:

Tide Measurements (Datum: )
Time/Height:

Description:
(free fall, fingers inverted, vibration needed to drive/extract, estimation of density, debris encountered, slopes, refusal, mudline conditions, drive action, etc.)

Measurement (to nearest 0.1 foot):

Avg. % Recovery:
Avg. % Compaction:

Section:
Length:
Description at Cuts:

Notes:
Core catcher cut off 10.25' - same material
Core tube length: 14'
Material in corecatcher is same as in cut above core catcher
Core tube length 14'
Rec. 10.25' in tube 10.25'
Core catcher cut off 0.5' core catcher on boat.
Delivered to lab 10.25'
## Sediment Core Processing Log

**Core Location/Sample Number:** LDW - SC-54

**Date/Time:** 02-03-74, Tuesday - 1445, 1630 end

**Sample Logged by:** N. Barlow, A. Fitzpatrick

**Type/Diameter of Sample:** 4" H

**Sample Quality:** good

### Notes:
- **Peramy = 5.81**
- **All terraces, w/ big wheel**
- **Hit rock, 74%**
- **Little hair on sediments**

---

| Recomended Length (ft) | % Compaction | Color | Grain Size / Color / Moisture / Textural / Sedimentary / Fossil / Trace Material |
|------------------------|--------------|-------|---------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| 10 yr                   | 3/2          | v. dark grey, brown               | 90 %                              | v. dark grey, brown | gray silt, sandy silt, trace sand, trace roots. | 1515 | 1545 |
| 3/4                    | v. dark grey, brown | 93 | 100 | v. dark grey, brown | gray silt, sandy silt, trace sand, trace roots. | 1520 | 1545 |
| 25/10                  | v. dark grey, brown | 85 | 95 | v. dark grey, brown | gray silt, sandy silt, trace sand, trace roots. | 1551 | 1591 |
| 31/30                  | v. dark grey, brown | 80 | 90 | v. dark grey, brown | gray silt, sandy silt, trace sand, trace roots. | 1602 | 1602 |
| 31 1/2                 | v. dark grey, brown | 80 | 20 | v. dark grey, brown | gray silt, sandy silt, trace sand, trace roots. | 1602 | 1602 |
| 31 1/2                 | v. dark grey, brown | 60 | 5 | v. dark grey, brown | gray silt, sandy silt, trace sand, trace roots. | 1602 | 1602 |
| 4 9/16                 | v. dark grey, brown | 100 | 5 | v. dark grey, brown | gray silt, sandy silt, trace sand, trace roots. | 1525 | 1525 |
| 4 9/16                 | v. dark grey, brown | 100 | 5 | v. dark grey, brown | gray silt, sandy silt, trace sand, trace roots. | 1602 | 1602 |

---

- **3.0-5.0 missing sample logged below probably slid down during core retrieval.**
- **Most med. dense, orange brown medium to coarse sand, very trace silt.**
- **No sheen odor throughout core; no shells**
R1

0-1.2: organic silt, black
1.2-3.6: interbedded silt & sand
3.6-4.0: clean fine sand, blade NOT reddish ox.

\[ \text{bottom of core, rest is winnowed.} \]
Mudmole™ Bore Log

Project: LDWG Duwamish Coring
Station: 54 R1
Project No: 341185.001
Collection by: GSM
Position: NAD83
Date: 2/7/2006
Time: 11:07
Position: 192181
Northing: 1276337
Easting: 8.8 ft
Mudline: -0.2 ft MLLW (estimated using tide tables)

Weather/Comments: Sunny
Sediment surface 10.3 ft from top of tube in field lab. Driven to refusal

Penetration interval (ft) | Interval recovery (ft) | Percent recovery
--- | --- | ---
0-1.35 | 1.25 | 93%
1.35-3.85 | 1.6 | 64%
3.85-6.25 | 1.8 | 75%
6.25-7.25 | 0.7 | 70%
7.25-7.75 | 0.3 | 60%

Depth below mudline (ft) | Distance from top of tube (ft)
--- | ---
Mudline: 10.3
1 | 11.23
2 | 11.97
3 | 12.61
4 | 13.26
5 | 14.01
6 | 14.76
7 | 15.48
8 | No sample
9 | No sample
10 | No sample
11 | No sample
12 | No sample
13 | No sample
14 | No sample
15 | No sample
16 | No sample
17 | No sample
18 | No sample
19 | No sample
20 | No sample

Penetration 7.75 ft/ On deck recovery 5.75 ft = 74% Recovery
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-7-06  Recorder: G5m

Project: 341185.001 Windward Lower Duwamish Coring

Station Name: 54 R1

Tube Length (ft): 16.05

Water Depth (ft): 8.8  Time: 1107

Est. Tide Height (ft) 8.6 (MLLW)

Est. Mudline:  (MLLW)

Comments:

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft

Northing 192181

Easting 1276337

On Deck Top of Sediment 10.5  10.3

Penetration Tape Reading  Recovery Tape Reading  Comments

14.7  14.8

12.2  13.2

9.8  11.4

8.8  10.7

8.3  10.4

Return
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-7-06
Recorder: DSSM

Project: 341185.001 Windward Lower Duwamish Coring

Station Name: 54 R2

Tube Length (ft): 16.05

Water Depth (ft): 8.4

Est. Tide Height (ft): 8.2 (MLLW)

Time: 1152

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft

Northing: 192154
Easting: 1276352

Est. Mudline: (MLLW)

On Deck Top of Sediment: 10.8

Comments: moved 25' upriver (upstream side of logs caught against pilings)

Penetration Tape Reading

Recovery Tape Reading

Comments

14.1 14.3
12.4 13.2
11.5 12.5
9.5 11.1
8.9 10.5 (refusal)
Station Number: 54
Attempt: 2nd
Field Technician: MCB
Contractor: MCS
On-site Visitor: Jim
Latitude: 19.1154
Longitude: 127.6352

Date: 2/17/06
Core Tube Length: 16.15
Diver Water Depth: 8.4
Tip Probe Depth: 
Disk Probe Depth: 
Drive Initiation Time: 11:51

3rd corner pile at south end N when facing
51.0' reading at waterline
30.0' off station

Shoreline & surrounding area observations: South D & E exist. 3rd end N & W.
Sediment surface & slope description: fine sand to medium level, minor debris, sand/silt surface.
Water current: negligible

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, difficult, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.1</td>
<td>14.3</td>
<td>easy drive, boat operated</td>
</tr>
<tr>
<td>12.4</td>
<td>13.2</td>
<td></td>
</tr>
<tr>
<td>11.3</td>
<td>12.5</td>
<td></td>
</tr>
<tr>
<td>9.5</td>
<td>11.1</td>
<td>hard drive, boat operated</td>
</tr>
<tr>
<td>8.9</td>
<td>10.5</td>
<td>divers, water</td>
</tr>
<tr>
<td></td>
<td></td>
<td>divers caps at 12:15</td>
</tr>
<tr>
<td>Totals</td>
<td>5.5</td>
<td></td>
</tr>
</tbody>
</table>

Estimated angle of drive: 10° from vertical - 15° to vertical as depth increased
Reason for ending drive: refusal before 10 feet

Drive Completion Time: 2:09
On Boat Recovery: 10.8
78% recovery

End of Core Tube Observations

| Staining:       | No Staining                |
| Tube Deformation: | None                       |
| Loss of Sediment: | Minimal                   |
| Sediment Description: | Dry, wet, soft, muddy   |
| Water in Tube:   | Pumped from top of tube at 12:11 |

Keep or Retry: Keep

Observe boat is tied to other side of debris ~10 feet away
and values for penetration/recovery forms are unnecessary. Dry dive, divers wrapped and underwater

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
Station Number: 54
Attempt: 1
Field Technician: CML
Contractor: MGS
On-site Visitor: TIM
Latitude: ________
Longitude: ________

Date: 2/27/06
Core Tube Length: 16.05
Lead Line Water Depth: 8.8
Diver Water Depth: ______
Tip Probe Depth: ______
Disk Probe Depth: ______
Drive Initiation Time: ______

Shoreline & surrounding area observations: Concrete piling

Sediment surface & slope description: LWD floating perpendicular to shore

Water current: __________

Penetration | Recovery | Drive Notes (e.g. easy, difficult, etc.)
---|---|---
14.7 | 14.8 | (Drive offset: )
12.3 | 13.2 |  
9.8 | 11.4 | Diver boat arrives
8.8 | 10.7 | Sags in water at operating core
8.3 | 10.4 | Difficult drive (Silt)

Totals: 71.85 56.5

Estimated angle of drive: 50% from vertical
Reason for ending drive: Refusal

Drive Completion Time: 11:27
On Boat Recovery: 10:5

End of Core Tube Observations

Staining: No Staining
Tube Deformation: No apparent deformation
Loss of Sediment: Slight turbid drip through wrap
Sediment Description: Dark, wet, muddy appearance
Water in Tube: Pumped from top of tube

Keep or Retry? 90% of sediment recovery goal (6') at
0% recovery goal (2.5')

Try again upstream of concrete pilings

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (feet react)
Station Number: 54
Attempt: 1
Field Technician: [Redacted]
Contractor: MCG, BSS
On-site Visitor: [Redacted]

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, difficult, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.7</td>
<td>14.8</td>
<td>(Drive offset: )</td>
</tr>
<tr>
<td>12.2</td>
<td>13.2</td>
<td></td>
</tr>
<tr>
<td>9.8</td>
<td>11.4</td>
<td></td>
</tr>
<tr>
<td>8.8</td>
<td>10.4</td>
<td></td>
</tr>
<tr>
<td>8.3</td>
<td>10.4</td>
<td></td>
</tr>
</tbody>
</table>

Estimated angle of drive: 90°
Reason for ending drive: refused

Drive Completion Time: 1128
On Boat Recovery: 10.5 (on deck, top of sediment)

End of Core Tube Observations

<table>
<thead>
<tr>
<th>Staining:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Tube Deformation:</td>
<td>NO</td>
</tr>
<tr>
<td>Loss of Sediment:</td>
<td>Carbonized and wrapped in situ</td>
</tr>
<tr>
<td>Sediment Description:</td>
<td></td>
</tr>
<tr>
<td>Water in Tube:</td>
<td>Yes, siphoned out</td>
</tr>
</tbody>
</table>

Keep or Retry: will try for 2nd core from other side of logs

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
Station Number: 54  
Attempt: 2  
Field Technician: [Redacted]  
Contractor: MCG, BMS  
On-site Visitor: [Redacted]  
Latitude: 34°21.54'  
Longitude: 127°03.52'  
Date: 7/14/06  
Core Tube Length: 16.05'  
Lead Line Water Depth: 8.4'  
Diver Water Depth:  
Tip Probe Depth:  
Disk Probe Depth:  
Drive Initiation Time: 1159  

Shoreline & surrounding area observations:  - some as R1  
Sediment surface & slope description:  
Water current:  

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g., easy, difficult, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.1</td>
<td>14.3</td>
<td>(Drive offset: )</td>
</tr>
<tr>
<td>12.4</td>
<td>13.2</td>
<td></td>
</tr>
<tr>
<td>11.3</td>
<td>12.5</td>
<td></td>
</tr>
<tr>
<td>9.3</td>
<td>11.1</td>
<td></td>
</tr>
<tr>
<td>8.9</td>
<td>10.5</td>
<td></td>
</tr>
</tbody>
</table>

Estimated angle of drive: ~90° ± 5°  
Reason for ending drive: Refusal  
Drive Completion Time: 12:07  
On Boat Recovery: 10$&$0 on deck top of sediment  

End of Core Tube Observations  
Staining:  
Tube Deformation:  
Loss of Sediment: core catcher end unwrapped in situ  
Sediment Description:  
Water in Tube: Yes, siphoned off  

For Retry: Similar penetration and recovery to R1  
R2 - Left off target 5' off relocation to south side of log/piling  

Notes:  
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
### Sediment Core Processing Log

**Job:** LDWG coring  
**Core Location/Sample Number:** 55 R1  
**Date/Time:** 7/6/06 1325 start 1510 stop  
**Sample Logged by:** N. Bachor, Amy Fiz  
**Type/Diameter of Sample:** 4" square column  
**Sample Quality:** good  
**Notes:** Penetration: 11.25'  
On deck: 6,95'  
R = 6.2  

<table>
<thead>
<tr>
<th>Recovered Length (ft)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Size % S</th>
<th>Size % F</th>
<th>PID</th>
<th>Description (grain size, color, moisture, shells, debris, wood, other debris)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>CLEV1</td>
<td>25%</td>
<td>75%</td>
<td>0</td>
<td>Clay, fine, gray, wet, trace black, organic streaks.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CLEV2</td>
<td>25%</td>
<td>75%</td>
<td>0</td>
<td>Fine sand, wet, homogenous, grey</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CLEV3</td>
<td>45%</td>
<td>55%</td>
<td>0</td>
<td>Organic sand</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CLEV4</td>
<td>45%</td>
<td>55%</td>
<td>0</td>
<td>Sand is interbedded with silt at bottom. Sand is fine and homogenous.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CLEV5</td>
<td>45%</td>
<td>55%</td>
<td>0</td>
<td>Coarse to medium sand, grading fines, multi-colored grains, trace gravel, medium dense.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CLEV6</td>
<td>45%</td>
<td>55%</td>
<td>0</td>
<td>Natural wood piece w/ red, white, orange, brown species, very clean sand.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CLEV7</td>
<td>45%</td>
<td>55%</td>
<td>0</td>
<td>4&quot; wood piece, shredded, waterlogged, pulls apart easily. Grates to mud. Sand at 4.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CLEV8</td>
<td>45%</td>
<td>55%</td>
<td>0</td>
<td>2x2 natural wood piece.</td>
</tr>
</tbody>
</table>

---

474 of 490
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-6-05  Recorder: 657

Project: 341185.001 Windward Lower Duwamish Coring

Station Name: 55 R2

Tube Length (ft): 16.05

Water Depth (ft): 9.2  Time: 10:10  Northing 190389

Est. Tide Height (ft) 9.8  (MLLW) (Predicted)

Easting 1278268  On Deck Top of Sediment 113

Est. Mudline: ____________  (MLLW)

Comments: wood in tip of core

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft

Penetration Tape Reading  Recovery Tape Reading  Comments

14.8  15.2
12.3  13.2
10.2  12.1
9.2  11.9
8.5  11.8
7.9  11.6  11.7
6.5  11.4
6.0  11.2  refusal

MCS Environmental, Inc.
6005 - 210th ESE, Suite 100
MudMole Technologies, WA 98643
(425) 697-6340

Duwamish borelog format
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-6-06  Recorder: 651

Project: 341186.001 Windward Lower Duwamish Coring

Station Name: 55  R3

Tube Length (ft): 16.05

Water Depth (ft): 13.8

Est. Tide Height (ft): 8.8 (MLLW)

Est. Mudline: 220' (MLLW)

Comments: moved offshore - logs in area
lost some sand out of bottom during recovery

Penetration Tape Reading  Recovery Tape Reading  Comments

14.1  15.2

11.3  13.2

10.8  12.5

7  12.3

9.3  12.2  refusal

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft

Northing 190372
Easting 1278253

On Deck Top of Sediment 12.4
### Collection Information

- **Date:** 2-6-06  
- **Recorder:** 5557  
- **Project:** 341185.001 Windward Lower Duwamish Coring

### Position Information

- **Coordinate Datum:** WA State Plane N, NAD 83, Survey Ft  
- **Northing:** 190389  
- **Easting:** 1278266  
- **On Deck Top of Sediment:** 9.1

### Comments:
- Auto tide phone not working - tide from chart for 8th Ave S / Divvy probe of bottom
- 0.4 ft SOA over firm material - scattered rip rag sample on steep clay slope

### Penetration Tape Reading

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Recovery Tape Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.4</td>
<td></td>
</tr>
<tr>
<td>12.5</td>
<td></td>
</tr>
<tr>
<td>+2.0</td>
<td></td>
</tr>
<tr>
<td>9.4</td>
<td>13.4</td>
</tr>
<tr>
<td>8.3</td>
<td>+0.4</td>
</tr>
<tr>
<td>7.3</td>
<td>10.8</td>
</tr>
<tr>
<td>6.3</td>
<td>10.3</td>
</tr>
<tr>
<td>5.3</td>
<td>9.8</td>
</tr>
<tr>
<td>4.8</td>
<td>9.4</td>
</tr>
</tbody>
</table>

- **Refusal**

### Recovery Tape Reading

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Recovery Tape Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>16.25</td>
<td></td>
</tr>
<tr>
<td>4.8</td>
<td></td>
</tr>
<tr>
<td>7.95</td>
<td></td>
</tr>
</tbody>
</table>

MCS Environmental, Inc.  
6505 - 218th St SIV, Suite 100  
Mountlake Terrace, WA 98043  
(425) 697-4940
Mudmole™ Bore Log

Project: LDWG Duwamish Coring
Project No: 341185.001
Collected by: GSM
Date: 2/6/2006

Station: 55 R1
Position: NAD83
Water depth: 8.5 ft

Collected depth: 190389
Time: 9:02
Mudline: 1.9 ft MLLW

Weather/Comments: Sunny

Penetration interval (ft) | Interval recovery (ft) | Percent recovery
---|---|---
0-0.65 | 0.55 | 85%
0.65-3.55 | 2.1 | 72%
3.55-6.65 | 2.1 | 68%
6.65-7.75 | 0.5 | 45%
7.75-8.75 | 0.5 | 50%
8.75-9.75 | 0.5 | 50%
9.75-10.75 | 0.4 | 40%
10.75-11.25 | 0.3 | 60%

Depth below mudline (ft) | Distance from top of tube (ft)
---|---
Mudline | 9.1
1 | 9.90
2 | 10.63
3 | 11.35
4 | 12.05
5 | 12.73
6 | 13.41
7 | 14.01
8 | 14.48
9 | 14.98
10 | 15.45
11 | 15.90
12 | No sample
13 | No sample
14 | No sample
15 | No sample
16 | No sample
17 | No sample
18 | No sample
19 | No sample
20 | No sample

Penetration 11.25 ft / On deck recovery 6.95 ft = 62% Recovery
Mudmole™ Bore Log

Project: LDWG Duwamish Coring
Project No: 341185.001
Collected by: GSM
Date: 2/6/2006
Water depth: 9.2 ft

Station: 55 R2
Position: NAD83
Time: 10:10
Mudline: 0.6 ft MLLW (estimated using tide tables)

Place Field ID Label Here

Weather/Comments: Sunny
Wood in tip of core, driven to refusal

Penetration interval

<table>
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<tr>
<th>Depth below mudline (ft)</th>
<th>Distance from top of tube (ft)</th>
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<tbody>
<tr>
<td>0-1.25</td>
<td>0.85</td>
</tr>
<tr>
<td>1.25-3.75</td>
<td>2</td>
</tr>
<tr>
<td>3.75-5.85</td>
<td>1.1</td>
</tr>
<tr>
<td>5.85-6.85</td>
<td>0.2</td>
</tr>
<tr>
<td>6.85-7.55</td>
<td>0.1</td>
</tr>
<tr>
<td>7.55-8.15</td>
<td>0.2</td>
</tr>
<tr>
<td>8.15-9.55</td>
<td>0.2</td>
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<tr>
<td>9.55-10.05</td>
<td>0.2</td>
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Percent recovery

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<th>Penetration interval (ft)</th>
<th>Interval recovery (ft)</th>
<th>Percent recovery</th>
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<tr>
<td>0-1.25</td>
<td>0.85</td>
<td>68%</td>
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<tr>
<td>1.25-3.75</td>
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<td>80%</td>
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<td>3.75-5.85</td>
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<td>6.85-7.55</td>
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<td>8.15-9.55</td>
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<td>14%</td>
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<tr>
<td>9.55-10.05</td>
<td>0.2</td>
<td>40%</td>
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Penetration 10.05 ft/ On deck recovery 4.75 ft = 47% Recovery

Depth below mudline (ft)

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<thead>
<tr>
<th>Depth from top of tube (ft)</th>
<th>Distance from top of tube (ft)</th>
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<td>11.98</td>
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<td>20 No sample</td>
<td>20 No sample</td>
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Mudmole™ Bore Log

Project: LDWG Duwamish Coring
Project No: 341185.001
Collected by: GSM
Date: 2/6/2006

Station: 55 R3
Position: NAD83
WAN

Water depth: 13.8 ft
Mudline: -5.0 ft MLLW (estimated using tide tables)

Weather/Comments: Sunny

Penetration interval (ft) | Interval recovery (ft) | Percent recovery
--- | --- | ---
0.0-1.95 | 0.85 | 44%
1.95-4.75 | 2 | 71%
4.75-5.25 | 0.7 | 140%
5.25-6.75 | 0.3 | 20%

Depth below mudline (ft) | Distance from top of tube (ft)
--- | ---
Mudline | 12.4
1 | 12.84
2 | 13.29
3 | 14.00
4 | 14.71
5 | 15.60
6 | No sample
7 | No sample
8 | No sample
9 | No sample
10 | No sample
11 | No sample
12 | No sample
13 | No sample
14 | No sample
15 | No sample
16 | No sample
17 | No sample
18 | No sample
19 | No sample
20 | No sample

Penetration 6.75 ft On deck recovery 3.85 ft = 54% Recovery
### Sediment Core Processing Log

**Job:** DUNIMISH  
**Job Number:** PSMA-18.325  
**No. of Sections:** 1  
**Sample Length (from log):**  
**Avg. % Compaction:**  
**Notes:** Recover = 7.2  
\[ \frac{9}{16} R = (6.7^{+/-}2) \]

#### Description
<table>
<thead>
<tr>
<th>Recovered Length (ft)</th>
<th>% Compaction</th>
<th>Color</th>
<th>Size %, G</th>
<th>Size %, S</th>
<th>Size %, F</th>
<th>P/O</th>
<th>Description (grain size, color, moisture, sheen/odor, blota, wood, other debris)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td></td>
<td>Dark</td>
<td>1/8</td>
<td>1/8</td>
<td>1/8</td>
<td></td>
<td>Brown Silt, red, dark brown, trace wood, trace silt, trace loam, trace sand.</td>
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<td>SAND: Loose, red, silty, sandy SAND.</td>
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<td>GRANEL: Black, wet, loose, silty, Sandy, GRANEL, fine silt, and clayey sand.</td>
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<td>BLACK CLAY, Silt, and clayey sand.</td>
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<td>2.0</td>
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<td>SAND: Wet, loose, F-M SAND w/ Electrified color, dark wood flake(s) grading coarser w/ depth.</td>
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<td>At 10&quot; embedded wood flake</td>
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<td>V. fine gray, slightly coarser SAND: Wet, loose, flocy, brown-gray grading to dark gray, trace silt M-C SAND grading.</td>
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<td>F-SAND w/ multi-colored grains, B-X2.</td>
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<td>White, green (no red), 4 1/2 wood flake (x2)</td>
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<td>Woody Flakes, Gray Silt, Sand.</td>
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<td>4 1/2 wood flake (x2)</td>
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<td>Silt, E-10.2, TV = 5.0</td>
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</tbody>
</table>

* Slight sheen + odor, run 0.6 to 0.95 ft (in gravid)  
  * Why I gotcha? This one. Twigs + wood flake. All fresh, not blackened; natural
Notes: Flooding | depositional sequences suspected. Typically fining upwards patterns

1. Silt-recent
   - Sand
   - Gravel
   - F
   - C
   - Sand w/ wood

2. Sand

Jar Sheen Test< 0.8 Ft = TPH-like odor + sheen, film over entire surface
iridescent, fluid-like sheen "like" oil. PID in bay: 10.7
### Mudmole™ Bore Log

**Project:** LDWG Duwamish Coring  
**Project No:** 341185.001  
**Collected by:** GSM  
**Date:** 2/7/2006  
**Water depth:** 8.5 ft  
**Weather/Comments:** Overcast and cold  

**Station:** 56 r3  
**Position:** NAD83  
**Time:** 9:58  
**Mudline:** 1.1 ft MLLW  

(estimated using tide tables)

<table>
<thead>
<tr>
<th>Penetration interval (ft)</th>
<th>Interval recovery (ft)</th>
<th>Percent recovery</th>
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<tr>
<td>0-0.4500000000000001</td>
<td>0.75</td>
<td>167%</td>
</tr>
<tr>
<td>0.4500000000000001-3</td>
<td>1.7</td>
<td>85%</td>
</tr>
<tr>
<td>3.05-5.35</td>
<td>1.3</td>
<td>57%</td>
</tr>
<tr>
<td>5.35-7.45</td>
<td>1.3</td>
<td>62%</td>
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<tr>
<td>7.45-8.65</td>
<td>0.7</td>
<td>58%</td>
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<td>8.65-9.85</td>
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<thead>
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<th>Depth below mudline (ft)</th>
<th>Distance from top of tube (ft)</th>
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<tr>
<td>Mudline</td>
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<td>3</td>
<td>11.42</td>
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<td>4</td>
<td>11.99</td>
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<td>5</td>
<td>12.55</td>
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<td>7</td>
<td>13.77</td>
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<td>14.37</td>
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<td>9</td>
<td>15.00</td>
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<tr>
<td>10</td>
<td>15.70</td>
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<tr>
<td>11</td>
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<td>No sample</td>
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<tr>
<td>14</td>
<td>No sample</td>
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<tr>
<td>15</td>
<td>No sample</td>
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<td>No sample</td>
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<tr>
<td>17</td>
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</tr>
<tr>
<td>19</td>
<td>No sample</td>
</tr>
<tr>
<td>20</td>
<td>No sample</td>
</tr>
</tbody>
</table>

Penetration 10.65 ft  
On deck recovery 7.05 ft = 66% Recovery

MCS Environmental, Inc.  
6505 16th Street SW, Suite 100  
Mountlake Terrace, WA 98043  
(425) 697-4540  
fax (425) 697-4370  

File name 56-1  
Bore Log (mudmole)
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-7-08  Recorder: 69

Project: 341185.001 Windward Lower Duwamish Coring

Station Name: S8 R1

Tube Length (ft): 16.05
Water Depth (ft): 7.5
Est. Tide Height (ft): 9.3 (MLLW) Predicted
Est. Mudline: (MLLW)

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft
Northing: 189987
Easting: 1277564
On Deck Top of Sediment: 15.3

Comments: core catcher gone - no recovery

Penetration Tape Reading  Recovery Tape Reading  Comments

15.25  15.25
14.2   14.6  
12.0   13.0  
10.3   12.5  
9.5    12.2  - removed

MCS Environmental, Inc.
6505 - 216th Ave SW, Suite 1CD
Mountlake Terrace, WA 98043
(425) 697-4340

Duwamish borelog form us
484 of 490
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-7-06  Recorder: 65M

Project: 341185.001 Windward Lower Duwamish Coring

Station Name: 56 82

Tube Length (ft): 16.05

Water Depth (ft): 7.8  Time: 9:25

Est. Tide Height (ft): 9.6 (MLLW)

Est. Mudline:  (MLLW)

Comments: lost gravel out of bottom during extraction

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft

Northing 190.000

Easting 1277577

On Deck Top of Sediment 12.6

Penetration Tape Reading  Recovery Tape Reading  Comments

15.0  15.2

13.2  13.7

12.1  12.0

10.6  12.3  refusal

---

MCS Environmental Inc.
6555 - 20th St SW, Suite 100
Mountlake Terrace, WA 98043
(425) 697-0340
MCS Environmental MudMole Bore Log

Collection Information

Date: 2-7-06  Recorder: 6SM

Project: 341185.001 Windward Lower Duwamish Coring

Station Name: 56 R 3

Tube Length (ft): 16.05

Water Depth (ft): 8.5

Est. Tide Height (ft): 9.6 (MLLW) predicted

Est. Mudline: On Deck Top of Sediment

Comments:

Position Information

Coordinate Datum: WA State Plane N, NAD 83, Survey Ft

Northing 190022

Easting 1277575

Penetration Tape Reading        Recovery Tape Reading        Comments

15.6        15.3
13.0        13.6
10.7        12.3
8.6         11.9
7.4         10.3
6.4         9.6
5.7         9.1
5.4         8.9

processed
Station Number: 56  
Attempt: 1  
Date: 2/6/96  
Core Tube Length: 16.05  
Lead Line Water Depth: 7.5  
Diver Water Depth:  
Tip Probe Depth:  
Disk Probe Depth:  
Drive Initiation Time: 0855  
Contractor: MCS  
On-site Visitor: Tim (Sale)  
Latitude:  
Longitude:  

Shoreline & surrounding area observations: Appearance of steep slopes  

Sediment surface & slope description:  

Water current: No apparent current in a protected cove  

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.25</td>
<td>15.25</td>
</tr>
<tr>
<td>4.2</td>
<td>4.6</td>
</tr>
<tr>
<td>12.0</td>
<td>13.0</td>
</tr>
<tr>
<td>10.3</td>
<td>10.5</td>
</tr>
<tr>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>6.55</td>
<td>-3.85</td>
</tr>
</tbody>
</table>

Drive Notes (e.g. easy, difficult, etc.):  

- Drive offset:  
- Easy drive  
- Medium bounced 2-3 times & then punched through  
- Drive slows down, but visual progress still evident  
- See cement  
- Drive slows considerably 1 inch per 15 seconds  

Estimated angle of drive: 40% off vertical  
Reason for ending drive: Refusal  

Drive Completion Time: 0910  
On Boat Recovery: Empty  

End of Core Tube Observations:  

- Staining:  
- Tube Deformation:  
- Loss of Sediment: All lost  
- Sediment Description:  
- Water in Tube:  

Keep or Retry: Must retry as tube is empty, core catcher is gone  

Notes:  
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
Station Number: 56
Attempt: 1
Field Technician: T. Do (UW)
Contractor: MCS, RSS
On-site Visitor: T.H. (UW)
Latitude: ____________
Longitude: ____________
Date: 4/2/10
Core Tube Length: 16.05
Lead Line Water Depth: 7.5
Diver Water Depth: ______
Tip Probe Depth: ______
Disk Probe Depth: ______
Drive Initiation Time: 0830

Shoreline & surrounding area observations: H. Blackberry, Reid aggy gras
Sediment surface & slope description: Shallow slope, intertidal station
Water current: not much

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g., easy, difficult, etc.)</th>
</tr>
</thead>
</table>

(Drive offset: )

Estimated angle of drive: 90°
Reason for ending drive: refusal, hit log

Drive Completion Time: ______
On Boat Recovery: ______

End of Core Tube Observations

| Staining: |
| Tube Deformation: |
| Loss of Sediment: no sediment |
| Sediment Description: |
| Water in Tube: |

Keep or (r) core catcher lost; hit log during drive

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
Station Number: 56  
Attempt: 2  
Field Technician: CB LM  
Contractor: MCS  
On-site Visitor: Tim  
Latitude:         
Longitude:         
Date: 2/5/06  
Core Tube Length:     
Lead Line Water Depth:      
Diver Water Depth:       
Tip Probe Depth:       
Disk Probe Depth:      
Drive Initiation Time: 9:12 AM

Shoreline & surrounding area observations:  
Apparent Steep slope: ~75' from shore

Sediment surface & slope description:  go down

Water current:  no current due to protected area

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, difficult, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.0</td>
<td>15.2</td>
<td>(Drive offset:</td>
</tr>
<tr>
<td>13.2</td>
<td>13.7</td>
<td>Easy drive</td>
</tr>
<tr>
<td>12.1</td>
<td>13.0</td>
<td>Easy drive</td>
</tr>
<tr>
<td>10.6</td>
<td>12.3</td>
<td>Out of drive guides - slow drive (difficult)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>measure water while probe still immersed</td>
</tr>
</tbody>
</table>

Estimated angle of drive: 109° off of vertical
Reason for ending drive: reduced

Drive Completion Time: 09:24  
On Boat Recovery: very limited

End of Core Tube Observations

<p>| |</p>
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Staining: none</td>
</tr>
<tr>
<td>Tube Deformation: good, no breaks</td>
</tr>
<tr>
<td>Loss of Sediment:</td>
</tr>
<tr>
<td>Sediment Description:</td>
</tr>
<tr>
<td>Water in Tube:</td>
</tr>
</tbody>
</table>

Keep or Retry:
09:24 - moderate descoupled from tube  
hand pumping water from tube (pump isn't very long, jumped as much clear water as possible in water into tube)  
04:44 - a small amount of gravel - most of sediment is lost, wrapping to package remnants in tube

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)
Station Number: 56  
Attempt: 3  
Field Technician: LM  
Contractor:  
On-site Visitor:  
Latitude:  
Longitude:  

Date: 2/8/2023  
Core Tube Length: 16.05  
Lead Line Water Depth: 8.5  
Diver Water Depth:  
Tip Probe Depth:  
Disk Probe Depth:  
Drive Initiation Time: 0859

Shoreline & surrounding area observations: Steepbanks, n 5 ft from shore
Sediment surface & slope description:  
Water current: No apparent current due to protected area

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Recovery</th>
<th>Drive Notes (e.g. easy, difficult, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.6</td>
<td>15.3</td>
<td>(Drive offset: )</td>
</tr>
<tr>
<td>13.0</td>
<td>13.6</td>
<td>Easy drive to begin</td>
</tr>
<tr>
<td>10.7</td>
<td>12.3</td>
<td>Easy drive, removing core tube from guide device</td>
</tr>
<tr>
<td>8.6</td>
<td>11.0</td>
<td>Slowly, still relatively</td>
</tr>
<tr>
<td>7.4</td>
<td>10.3</td>
<td>Slowly a 5th, but still good vertical progress</td>
</tr>
<tr>
<td>6.4</td>
<td>9.6</td>
<td>Very hard drive—slow</td>
</tr>
<tr>
<td>5.7</td>
<td>9.1</td>
<td></td>
</tr>
<tr>
<td>5.4</td>
<td>8.9</td>
<td></td>
</tr>
</tbody>
</table>

Estimated angle of drive: 0°37'6"  
Reason for ending drive: Radical

Drive Completion Time: 10:17  
On Boat Recovery: 

---

End of Core Tube Observations

| Staining: None |
| Tube Deformation: No apparent deformation |
| Loss of Sediment: 1 liter of turbid water from tip |
| Sediment Description: N/A wrapped by EP in water |
| Water in Tube: Ramped to some, will remain |

Keep or Retry: Recovery looks good, lab determination required to see if too much was lost

Notes:
Penetration & Recovery measured from top of core tube to sediment surface in feet (tenths)