

**Owner:** King County

**Project:** Lower Duwamish Waterway ENR/AC Pilot

**Dates:** November 29, 2016 to December 2, 2016

**Weekly Progress Meeting Summary:**

- The first weekly progress meeting is not scheduled to occur until Dec 6<sup>th</sup>.

**Construction Progress:**

- Schedule (updated weekly by contractor – Attached)
  - Note: Scour plot may move up the schedule dependent on Ash Grove maintenance dredging that is to occur in the next 60 days. Schedule for that work is currently unknown and it is anticipated that schedule will be firmed up by weeks end (Dec 9<sup>th</sup>, 2016).
- General progress with respect to schedule
  - The KP-2 barge was flooded to soak the Gravelly Sand + AC and Sand + AC for approximately 24 hours prior to the start of the test placements.
  - Test placement was completed for both the Gravelly Sand + AC and Sand + AC. A single pass pattern and a two pass with overlapping bucket pattern, as illustrated in the specifications, were tested. Based on the quantitative data and visual inspection of both test plots it was determined that the 2 pass with overlapping bucket pattern appeared to be better of the two patterns.
  - Work scheduled for this week:
    - Load the KP-3 with Gravelly Sand (12/5/16) at Cal-Portland facility. Soak Gravelly Sand at PPM yard (12/6 – 12/7).
    - Complete Gravelly Sand + AC placement in intertidal plot.
    - Daily hydrographic surveys at end of each shift.
    - Diver confirmation measurements of the Gravelly Sand + AC placement.
    - Start Gravelly Sand placement at intertidal plot.

**Problems Encountered (If Any) & Associated Action Items:**  None  See Comments below:

Problems Encountered	Date	Required Action	Date Completed
Turbidity plume while pumping out of the barge.	11/30/2016	Replace 25 micron filter in filters with 1 micron filters. Recycle water back into barge before discharging in the river.	12/1/2016

**Water Quality Monitoring:**

- Observed non-construction-related events that impacted water quality.
  - A stormwater located ~100 feet downstream of the work area was observed discharging highly turbid water while placement operations were occurring.
- Summary of water quality criteria violations and actions taken.

- Nov 29, 2016: Compliance point was 23.3 NTU above ambient during the 14:28 monitoring event. Placement had already stopped to relocate from the Sand + AC test plot to the Gravelly Sand + AC test plot when notification of exceedance was received.
- Nov 30, 2016: Compliance point was 8.0 NTU above ambient during the 13:37 monitoring event. Placement operations halted for ~28 minutes. Operations started again after WQM vessel verified that WQ was within allowable tolerances.
- Dec 1, 2016: Compliance point was 5.3 NTU above ambient during the 11:35 monitoring event. Placement operations halted for ~21 minutes. Operations started again after WQM vessel verified that WQ was within allowable tolerances.
- Dec 2, 2017: Compliance point was 10.0 NTU above ambient during the 13:33 monitoring event. Placement operations halted for ~68 minutes. Operations started again after WQM vessel verified that WQ was within allowable tolerances.

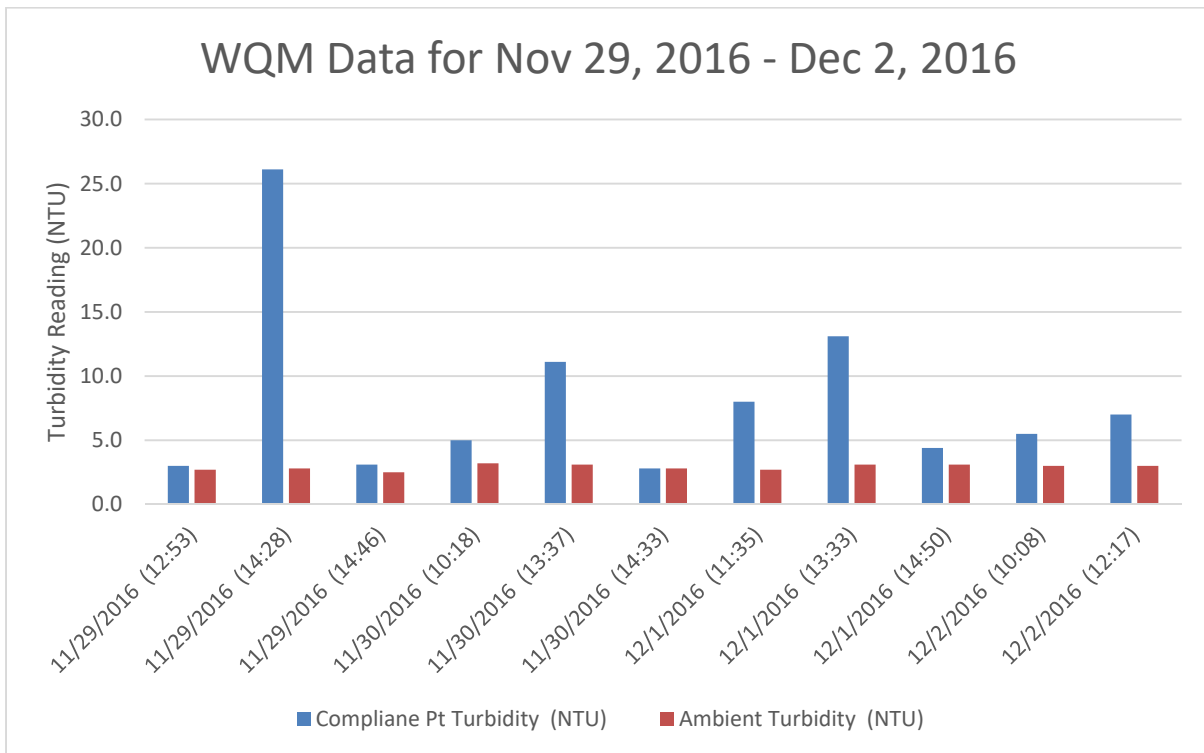


Figure 1: Water Quality Monitor Data Summary for Week Ending December 2, 2016

**QA Inspections:**

- Results:
  - QA Inspections
  - Surveying (Performed at the end of each shift. Attached is the Dec 2<sup>nd</sup>, 2016 survey)
  - Monitoring Activities:
    - Visual inspection and stake measurements performed at the end of each day during the low tide during the test plot placement. Field measurement summary for both test plots are attached.

- Out of Spec Conditions (if encountered) & Corrective Actions:  None  See  
Comments below:

Out of Spec condition	Date	Corrective Action	Date Completed
The Sand + AC test plot had 2 locations that had less than 4 inches of material after the completion of the test plot.	11/30/2016	No action at this time. It is believed that tidal action and river current will level the plot out so that no locations are less than 4 inches thick.	11/30/2016

## Weekly Photo Log – LDW ENR/AC Pilot



**Photo 1-A:** Example of a stake placed in the intertidal plot that will be used to measure the cap thickness. All stakes extended 18 inches above the mudline.

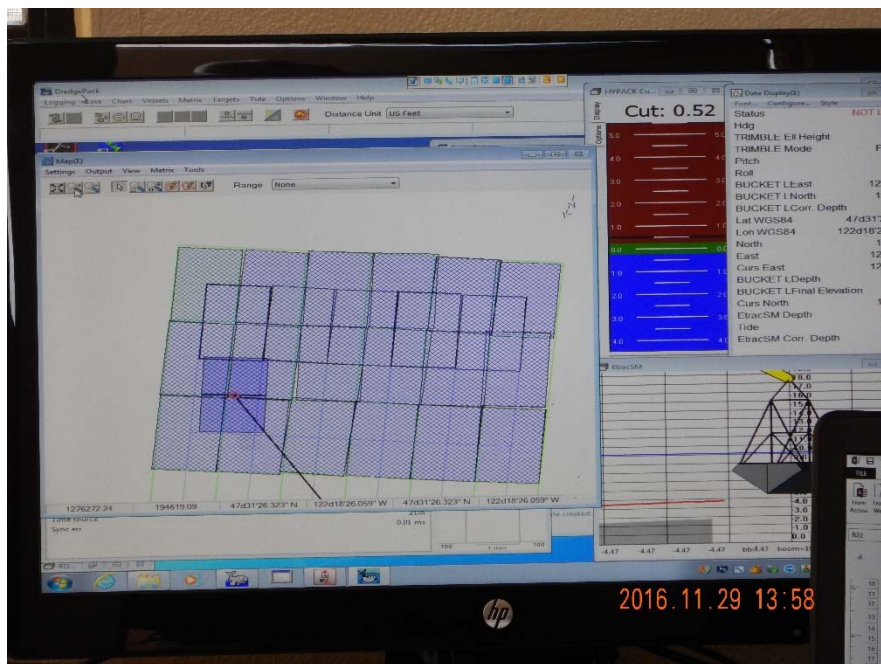


**Photo 1-B:** Activated carbon settled outside of the placement plot. This is approximately 15 feet outside of the placement area.

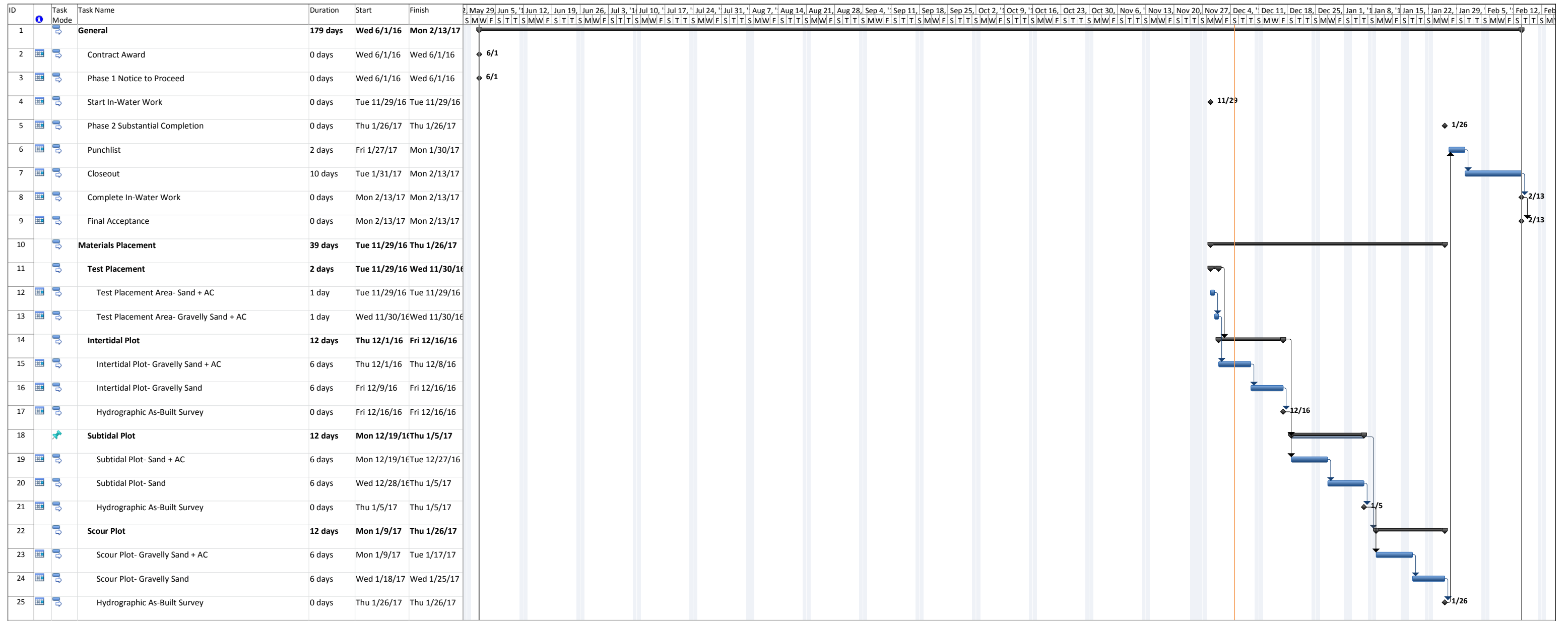
# Weekly Photo Log – LDW ENR/AC Pilot



**Photo 2-A:** The bag filter system used for barge water filtration. The four furthest filters had 25 micron bag filters initially but were replaced with 1 micron filters after a turbidity plume was observed during barge pumping.

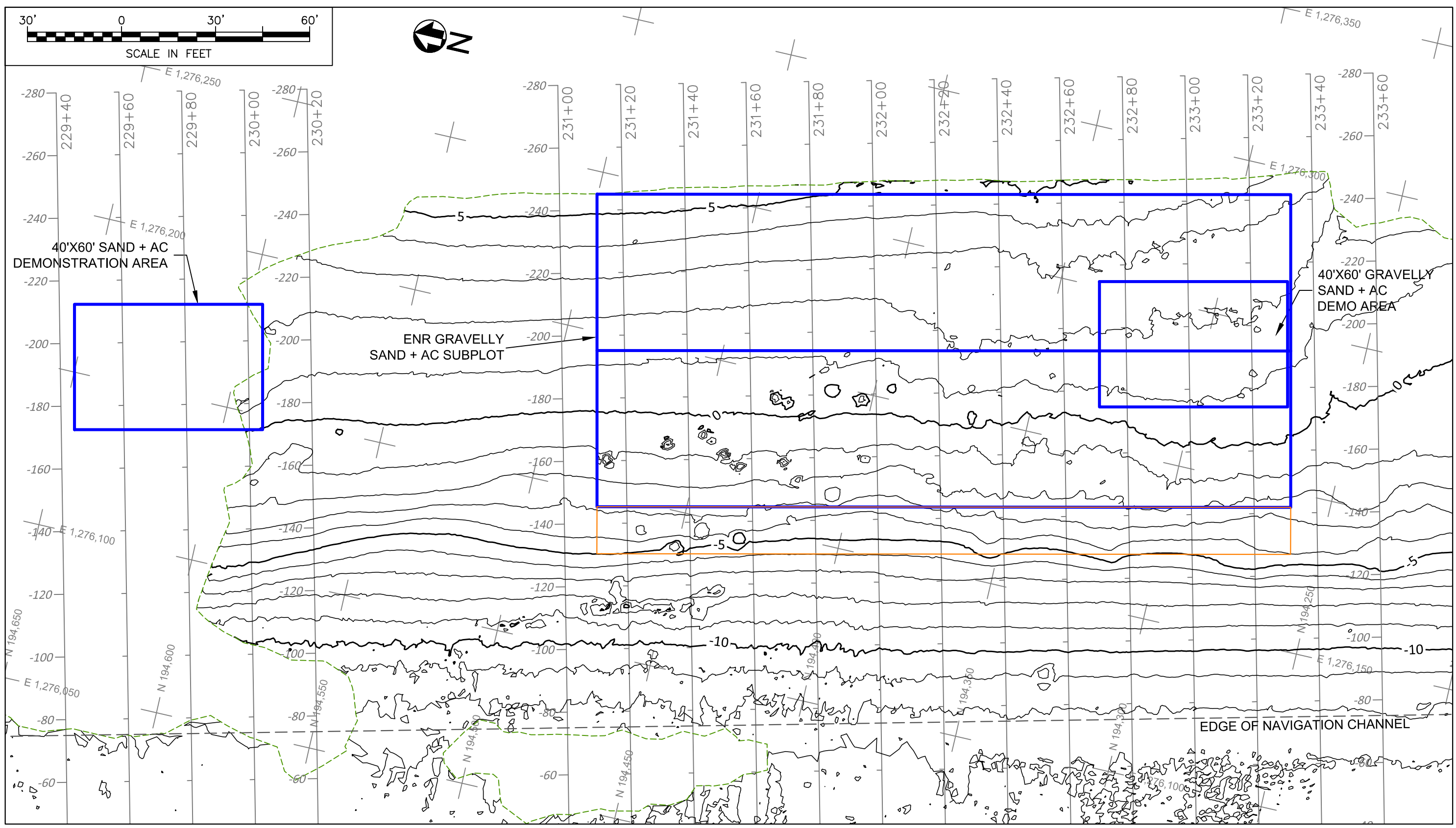


**Photo 2-B:** Operators DredgePack screen. The blue marks are tracked locations of bucket placements.



Project: Baseline Schedule (11-23) Task Milestone Project Summary External Milestone Inactive Milestone Manual Task Manual Summary Rollup Start-only Deadline

Date: Mon 12/5/16 Task Split Summary External Tasks Inactive Task Inactive Summary Duration-only Manual Summary Finish-only Progress



**DATUM INFORMATION**  
 Horizontal: WASHINGTON STATE PLANE NORTH, NAD83, U.S. FEET  
 Vertical: MEAN LOWER LOW WATER (MLLW) NOS SEATTLE EPOCH 1983-2001

- NOTES**
1. PROGRESS SURVEY FOR THE INTERTIDAL AREA WAS CONDUCTED BY TERRASOND LIMITED ON DECEMBER 02, 2016
  2. HYDROGRAPHIC DATA WAS COLLECTED USING A RESON 7125 400kHz MULTIBEAM, APPLIED WAVEMASTER INERTIAL NAVIGATION SYSTEM, AML CASE SOUND VELOCITY PROFILE, AND HYPACK HYSWEEP 2016
  3. REAL-TIME KINEMATIC (RTK) POSITIONING WAS BASED ON RECORD COORDINATES FOR POINT "SLAG 1"

- LEGEND**
- ▬ SUBPLOT / DEMONSTRATION LIMIT
  - ▬ OPTIONAL EXCESS MATERIAL PLACEMENT
  - - - CURRENT SURVEY LIMIT
  - ▬ SURVEY CONTOURS, 5 FEET INTERVAL
  - ▬ -5
  - ▬ -10

**SURVEY CONTROL**

SLAG 1	SLAG 2
N: 194,112.357	N: 194,112.026
E: 1,276,323.474	E: 1,276,325.646
Q: 10.905	Q: 10.195

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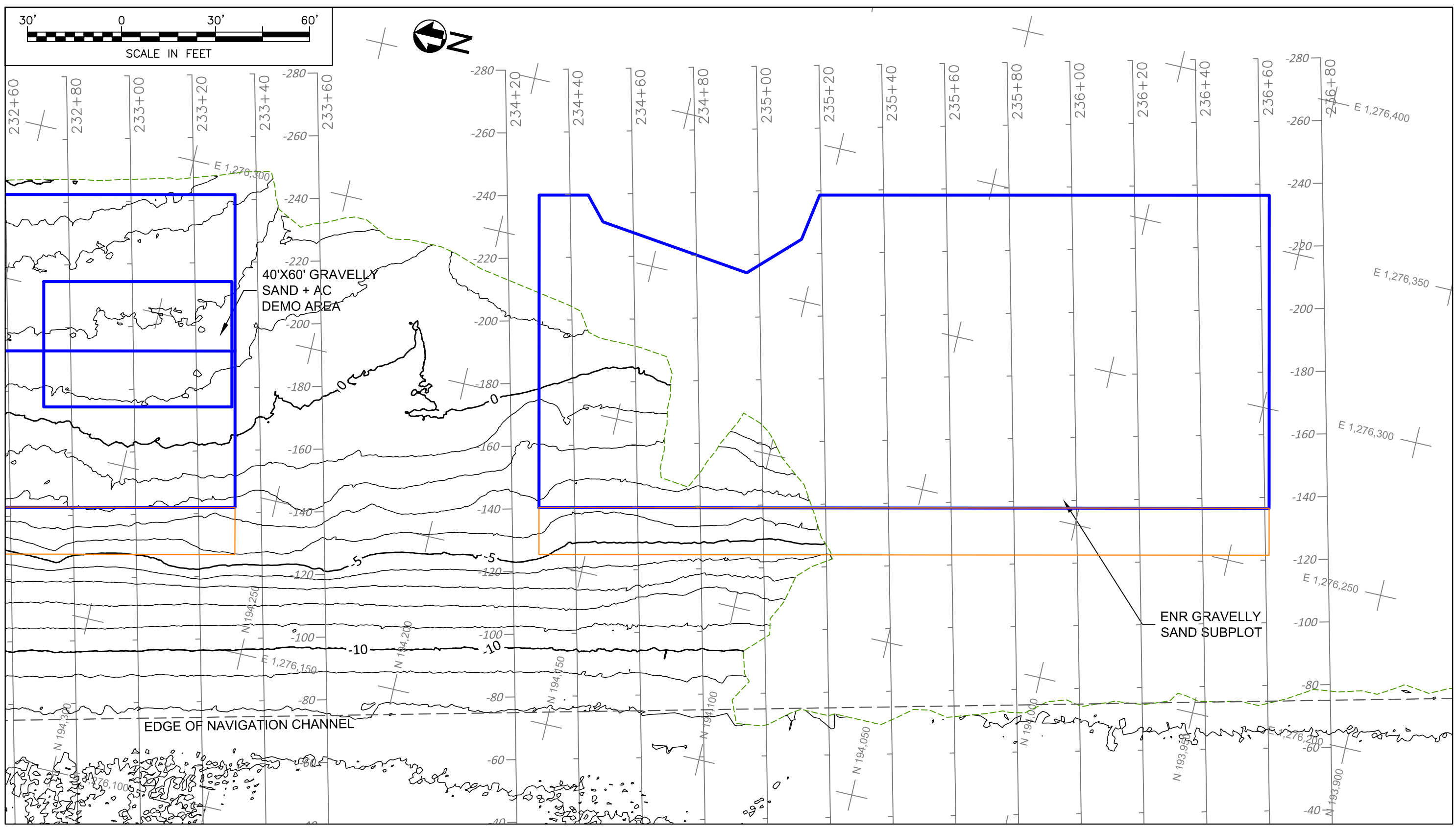
**ENHANCED NATURAL RECOVERY  
 ACTIVATED CARBON PILOT STUDY  
 MULTIBEAM HYDROGRAPHIC SURVEY**

**INTERTIDAL PROGRESS**

Revis. No.	Revision	Signed	Date

SHEET 1 OF 6

Drawn: MSK	Checked: LNL	Survey Date: DEC 02, 2016
Printer Size: ANSI	Project No.: 2016-000	Draw Date: DEC 05, 2016



**DATUM INFORMATION**  
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 Vertical: MEAN LOWER LOW WATER (MLLW) NOS SEATTLE EPOCH 1983-2001

- NOTES**
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  2. HYDROGRAPHIC DATA WAS COLLECTED USING A RESON 7125 400kHz MULTIBEAM, APPLIED WAVEMASTER INERTIAL NAVIGATION SYSTEM, AML CASE-SOUND VELOCITY PROFILE, AND HYPACK HYSWEEP 2016
  3. REAL-TIME KINEMATIC (RTK) POSITIONING WAS BASED ON RECORD COORDINATES FOR POINT "SLAG 1"

- LEGEND**
- SUBPLOT / DEMONSTRATION LIMIT
  - OPTIONAL EXCESS MATERIAL PLACEMENT
  - CURRENT SURVEY TENT
  - SURVEY CONTOURS, 5' INTERVAL
  - SURVEY CONTOURS, 10' INTERVAL

**SURVEY CONTROL**

SLAG 1	SLAG 2
N: 194,112.357	N: 194,112.026
E: 1,276,323.474	E: 1,276,325.646
Q: 10.905	Q: 10.195

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 ACTIVATED CARBON PILOT STUDY  
 MULTIBEAM HYDROGRAPHIC SURVEY**

INTERTIDAL PROGRESS

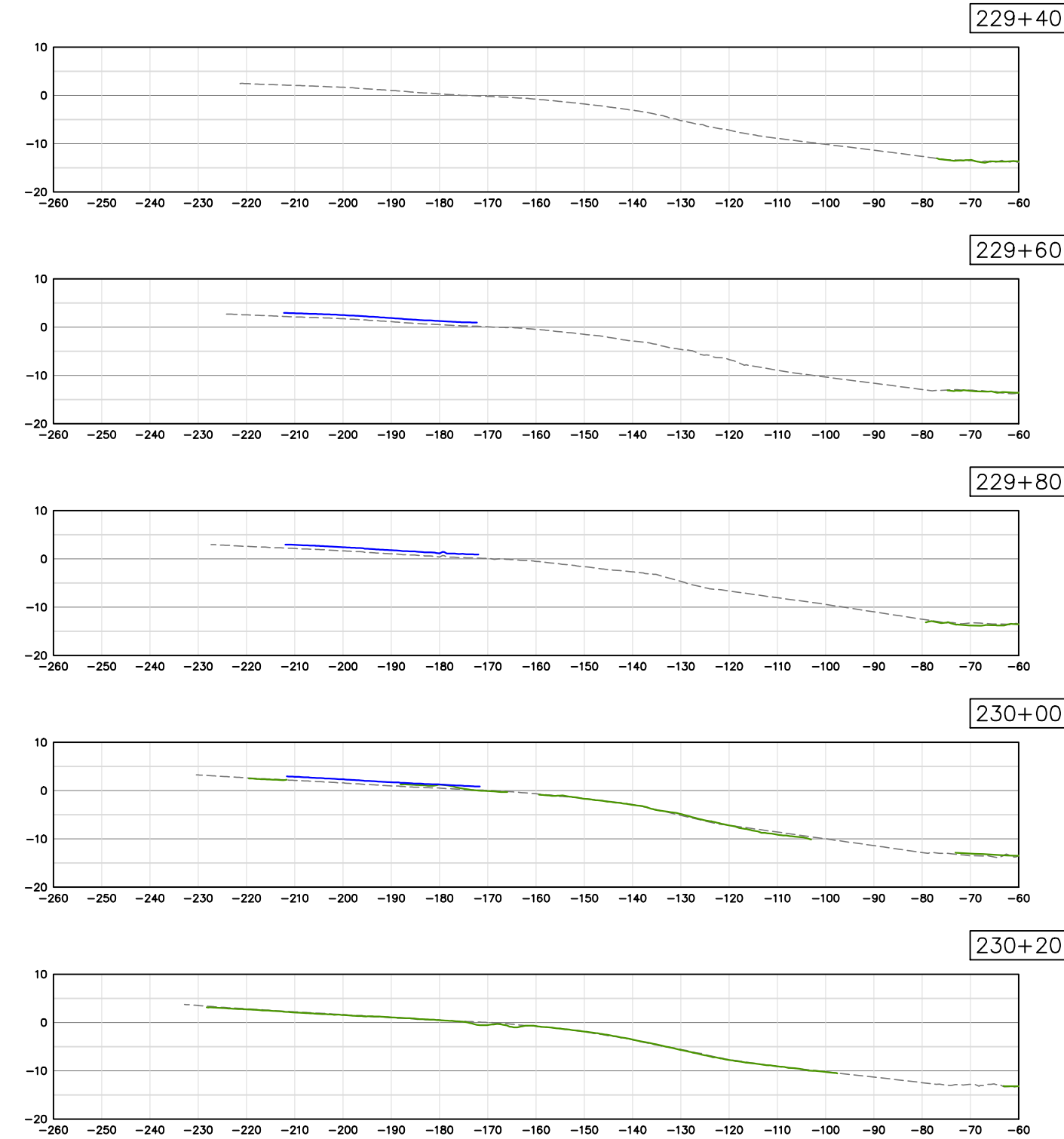
Revis. No.	Revision	Signed	Date

SHEET 2 OF 6

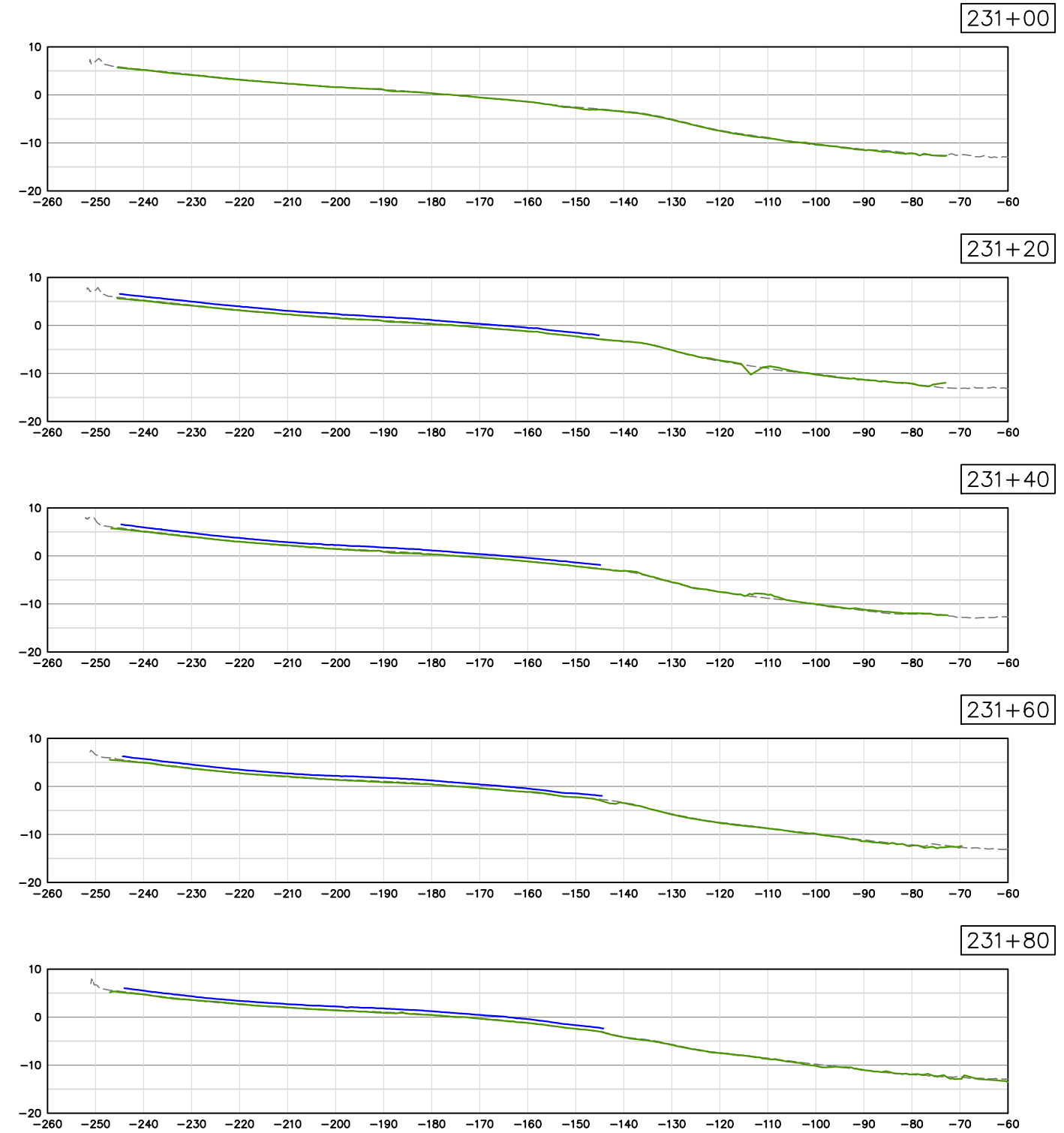
Drawn: MSK	Checked: LNL	Survey Date: DEC 02, 2016
Printer Size: ANSI	Project No.: 2016-000	Draw Date: DEC 05, 2016



### 40'X60' SAND + AC DEMONSTRATION AREA



### ENR GRAVELLY SAND + AC SUBPLOT



#### DATUM INFORMATION

Horizontal: WASHINGTON STATE PLANE NORTH, NAD83, U.S. FEET  
 Vertical: MEAN LOWER LOW WATER (MLLW) NOS SEATTLE EPOCH 1983-2001

#### NOTES

1. PRE-PLACEMENT SURVEY FOR THE INTERTIDAL AREA WAS CONDUCTED BY TERRASOND LIMITED ON DECEMBER 02, 2016
2. HYDROGRAPHIC DATA WAS COLLECTED USING A RESON 7125 400kHz MULTIBEAM, APPLANT WAVEMASTER INERTIAL NAVIGATION SYSTEM, AML BASE-SOUND VELOCITY PROFILE, AND HYPACK HYSWEEP 2016
3. REAL-TIME KINEMATIC (RTK) POSITIONING WAS BASED ON RECORD COORDINATES FOR POINT "SLAG 1"
4. PROFILE VERTICAL MAGNIFICATION IS 1.0

#### PROFILES LEGEND

- SUBPLOT EXTENT (39 INCHES)
- CURRENT SURVEY
- - - PRE-SURVEY (NOV 11, 2016)

#### SURVEY CONTROL

SLAG 1	SLAG 2
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E: 1,276,323.444	E: 1,276,325.646
Q: 10.905	Q: 10.195



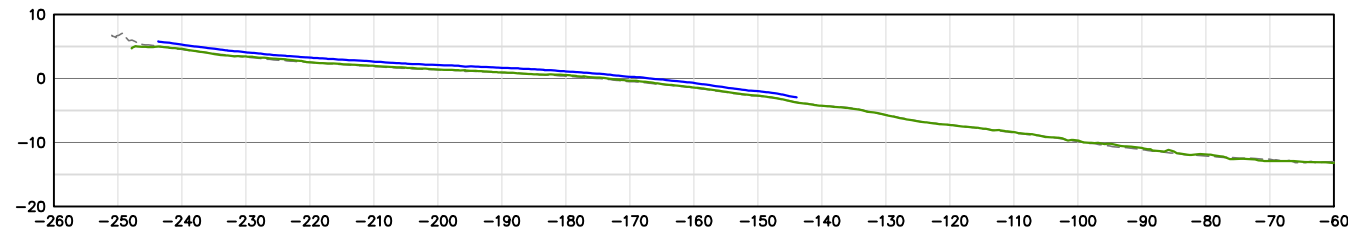
### ENHANCED NATURAL RECOVERY ACTIVATED CARBON PILOT STUDY MULTIBEAM HYDROGRAPHIC SURVEY

#### INTERTIDAL PROGRESS

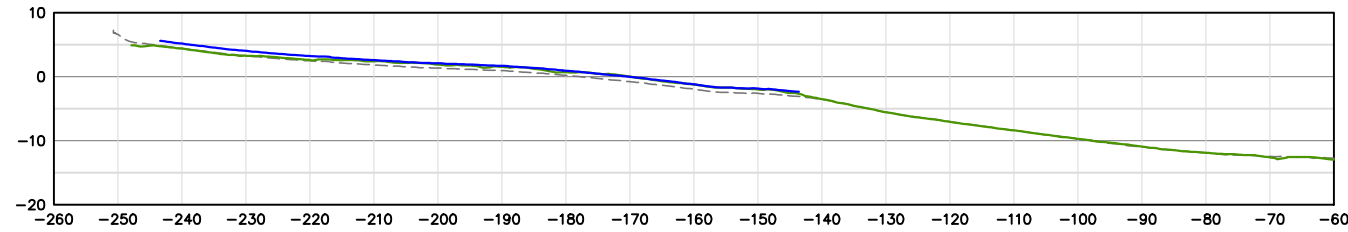
Revis. No.	Revision	Signed	Date
SHEET 3 OF 6			
Drawn: MSK	Checked: LNL	Survey Date: DEC 02, 2016	
Printer Size: ANSI	Project No.: 2016-000	Draw Date: DEC 05, 2016	

ENR GRAVELLY SAND + AC SUBPLOT

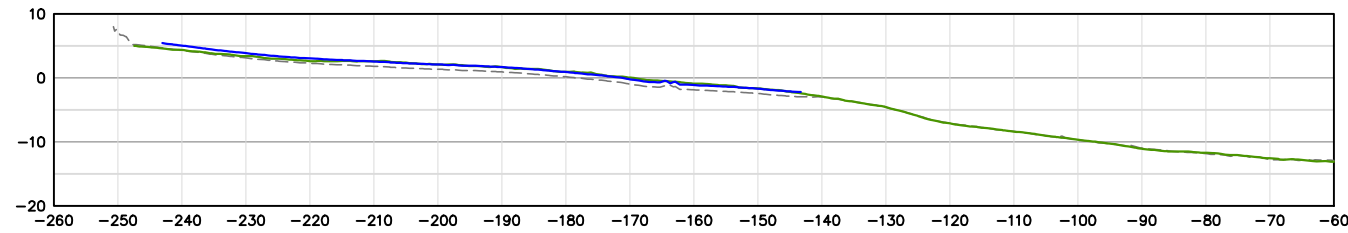
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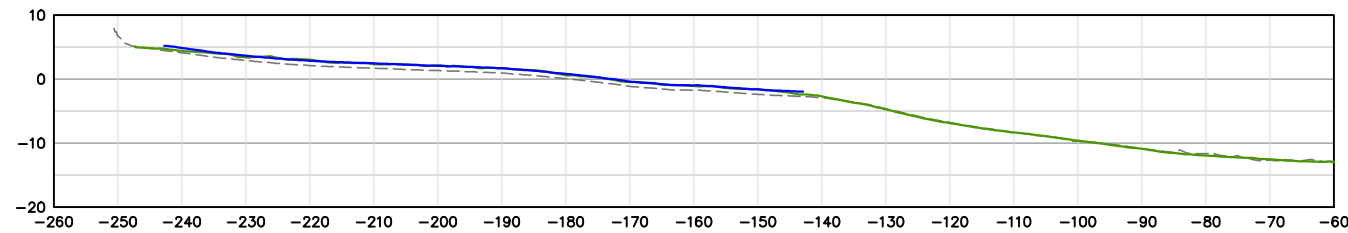
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232+40

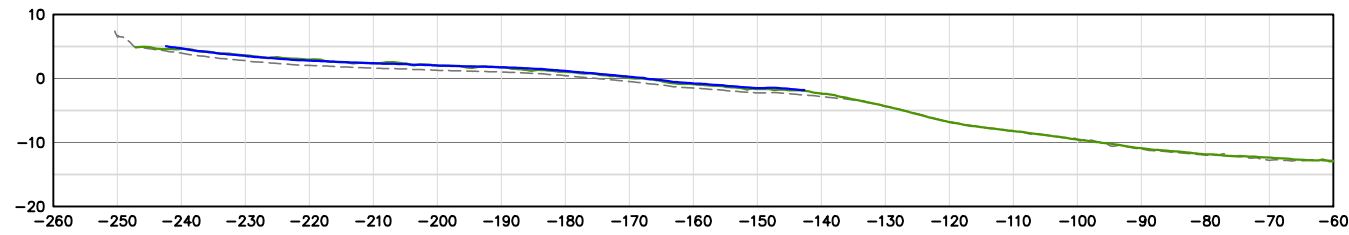


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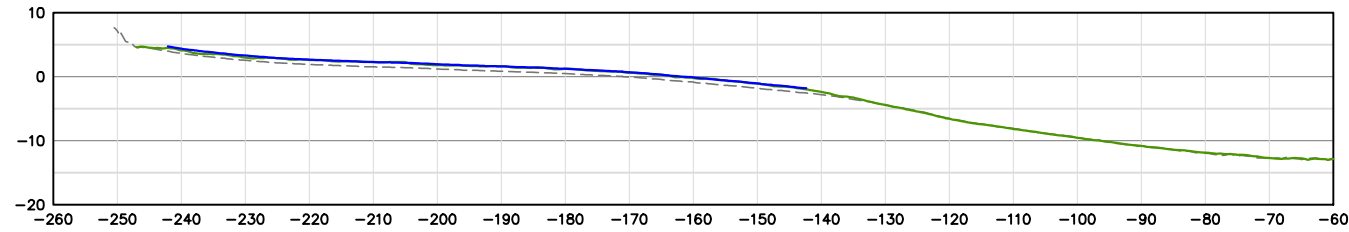


ENR GRAVELLY SAND + AC SUBPLOT

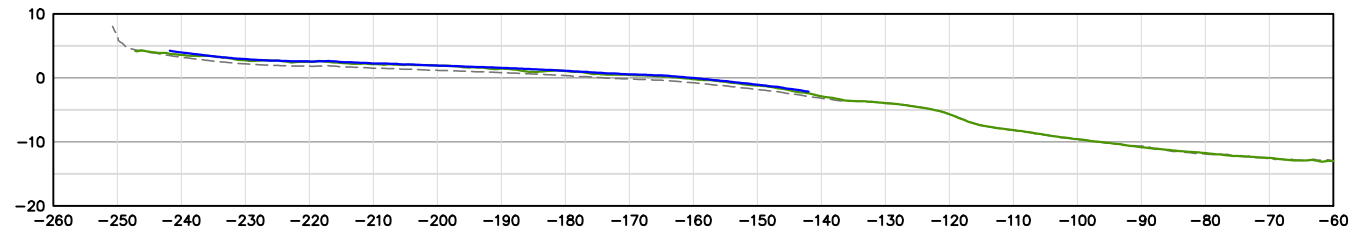
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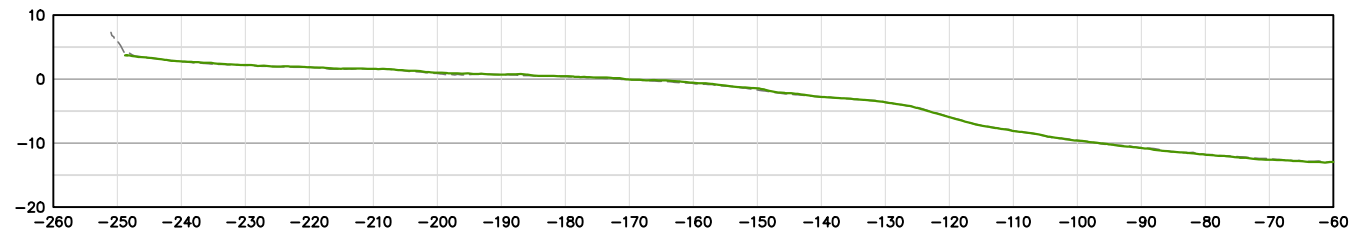
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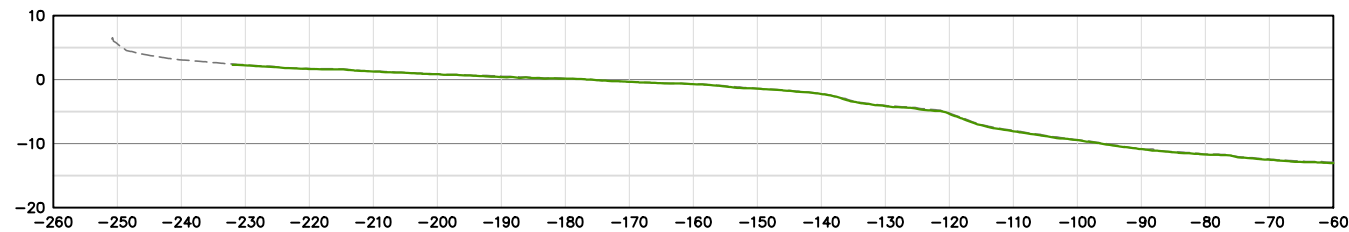
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233+40



233+60



DATUM INFORMATION

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Vertical: MEAN LOWER LOW WATER (MLLW) NOS SEATTLE EPOCH 1983-2001

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PROFILES LEGEND

- SUBPLOT ELEVATION (39 INCHES)
- CURRENT SURVEY
- PRE-SURVEY (NOV 11, 2016)

SURVEY CONTROL

SLAG 1  
N: 194,112.357  
E: 1,276,323.444  
Z: 10.905

SLAG 2  
N: 194,112.026  
E: 1,276,325.646  
Z: 10.095



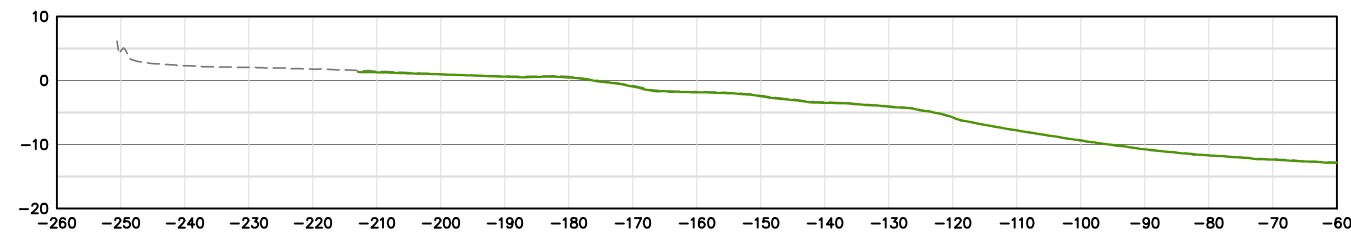
ENHANCED NATURAL RECOVERY  
ACTIVATED CARBON PILOT STUDY  
MULTIBEAM HYDROGRAPHIC SURVEY

INTERTIDAL PROGRESS

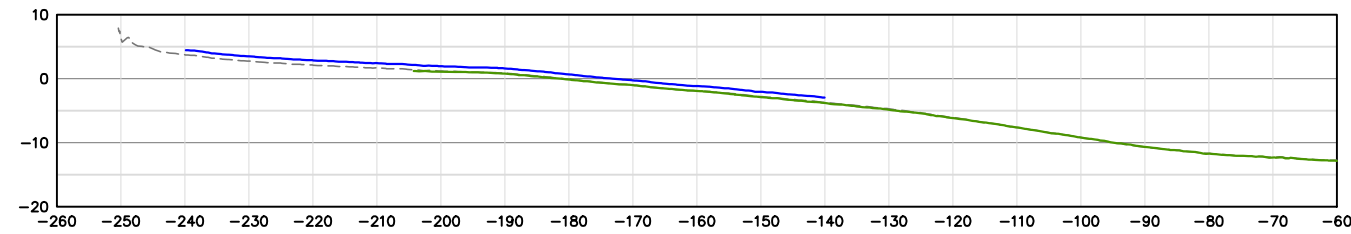
Revis. No.	Revision	Signed	Date
SHEET 4 OF 6			
Drawn: MSK	Checked: LNL	Survey Date: DEC 02, 2016	
Printer Size: ANSI	Project No.: 2016-000	Draw Date: DEC 05, 2016	

### ENR GRAVELLY SAND SUBPLOT

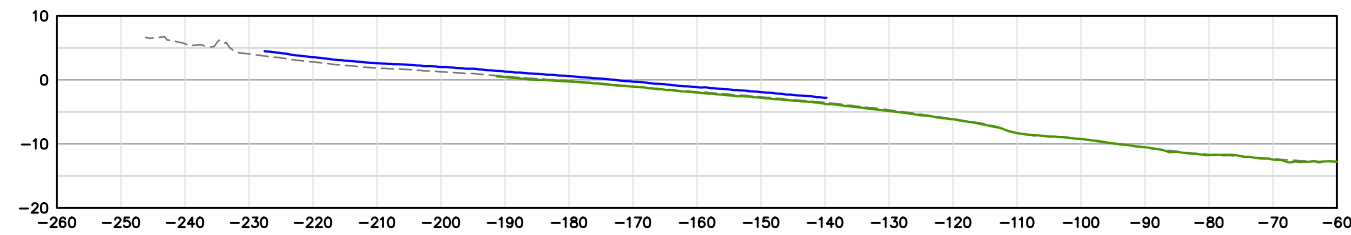
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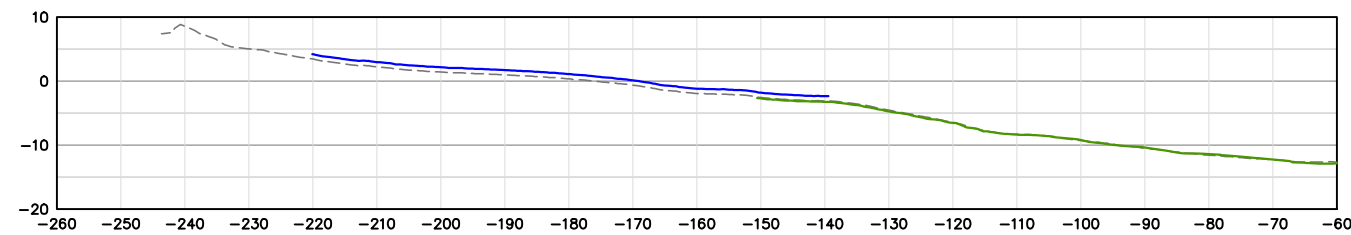
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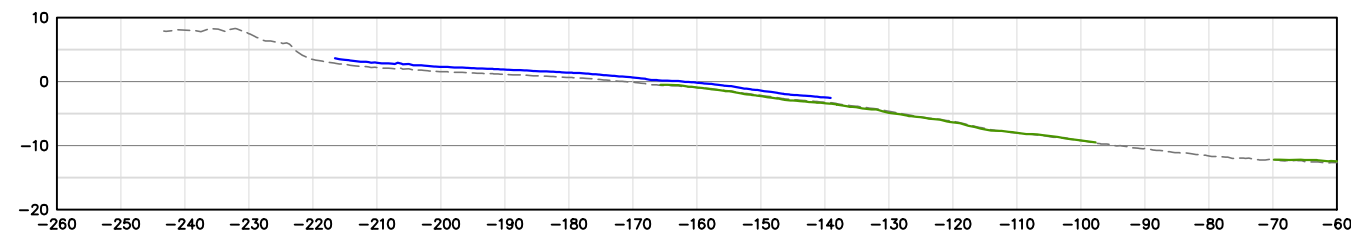
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234+80

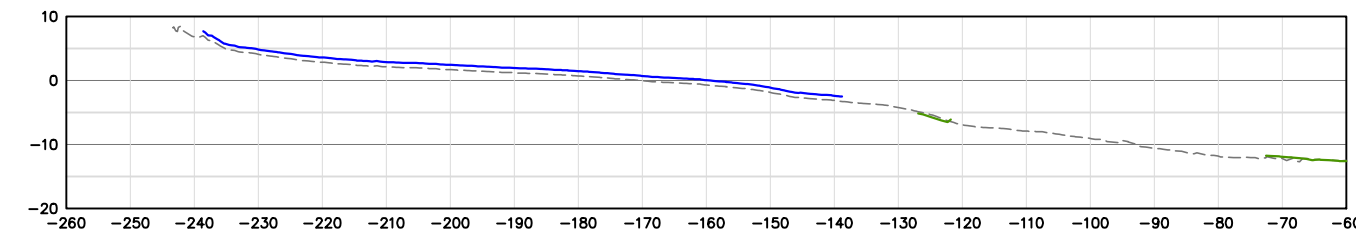


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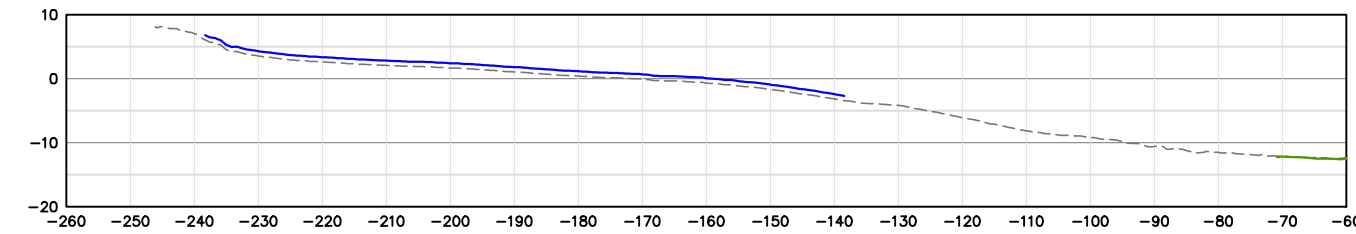


### ENR GRAVELLY SAND SUBPLOT

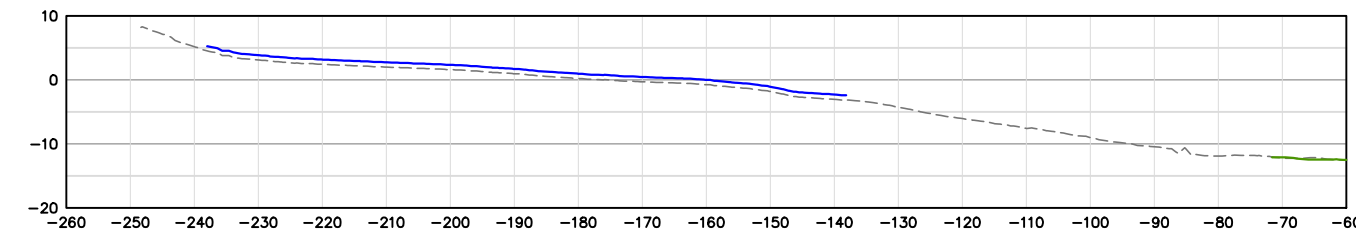
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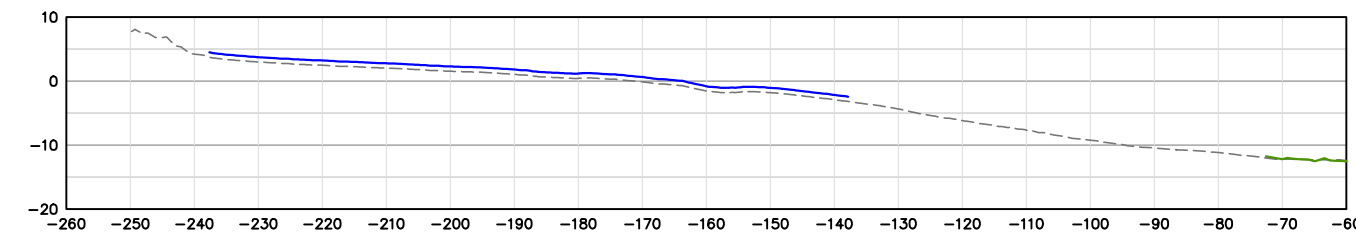
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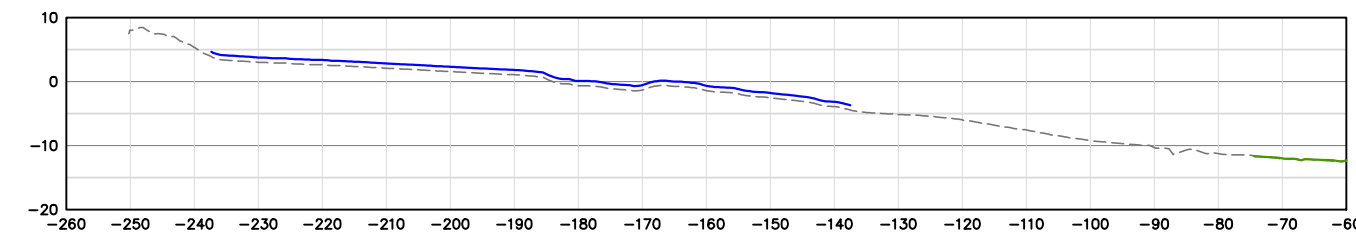
235+60



235+80



236+00



**DATUM INFORMATION**

Horizontal: WASHINGTON STATE PLANE NORTH, NAD83, U.S. FEET  
 Vertical: MEAN LOWER LOW WATER (MLLW) NOS SEATTLE EPOCH 1983-2001

**NOTES**

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2. HYDROGRAPHIC DATA WAS COLLECTED USING A RESON 7125 400KH MULTI-BEAM, APPLANT WAVEMASTER INERTIAL NAVIGATION SYSTEM, AML CASE-SOUND VELOCITY PROFILE, AND HYPACK HYSWEEP 2016
3. REAL-TIME KINEMATIC (RTK) POSITIONING WAS BASED ON RECORD COORDINATES FOR POINT "SLAG 1"
4. PROFILE VERTICAL EXAGGERATION IS 1.0

**PROFILES LEGEND**

- SUBPLOT ELEVANT (39 INCHES)
- CURRENT SURVEY
- - - PRE-SURVEY (NOV 11, 2016)

**SURVEY CONTROL**

SLAG 1	SLAG 2
N: 194,112.357	N: 194,112.026
E: 1,276,323.444	E: 1,276,325.646
Q: 10.905	Q: 10.095



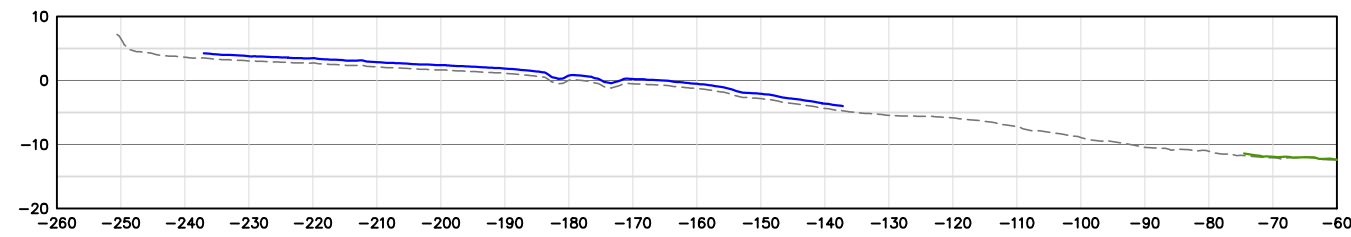
**ENHANCED NATURAL RECOVERY  
 ACTIVATED CARBON PILOT STUDY  
 MULTIBEAM HYDROGRAPHIC SURVEY**

**INTERTIDAL PROGRESS**

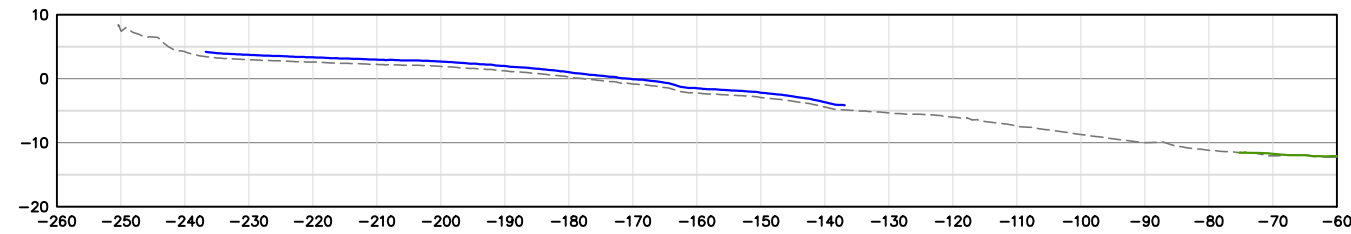
Revis. No.	Revision	Signed	Date
SHEET 5 OF 6			
Drawn: MSK	Checked: LNL	Survey Date: DEC 02, 2016	
Project No.: 2016-000	Draw Date: DEC 05, 2016		

# ENR GRAVELLY SAND SUBPLOT

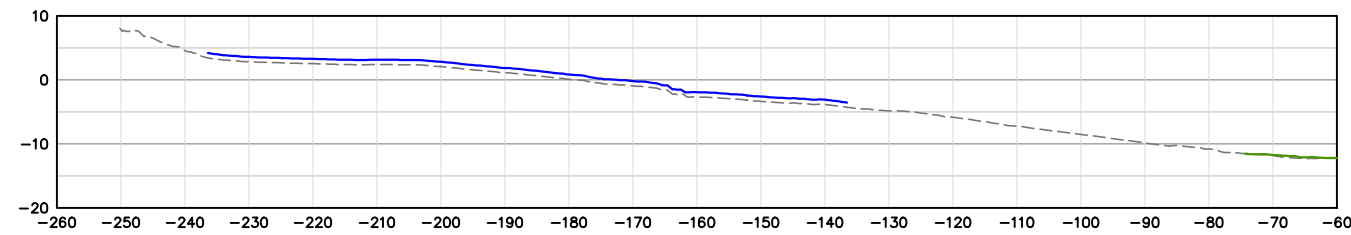
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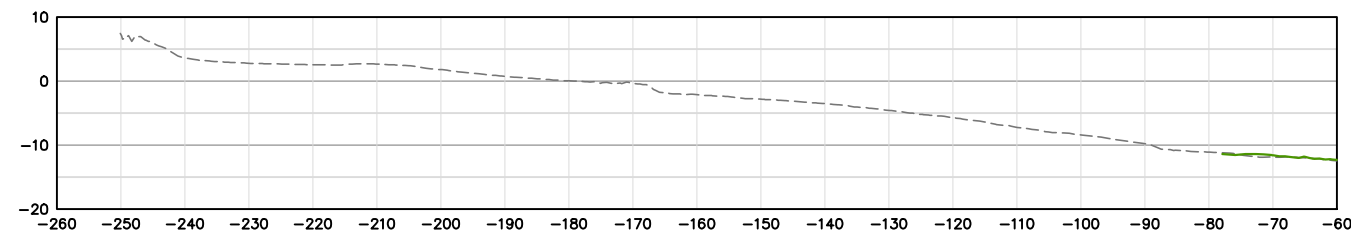
236+40



236+60



236+80



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**PROFILES LEGEND**

- SUBPLOT EXTENT (39 INCHES)
- CURRENT SURVEY
- PRE-SURVEY (NOV 1, 2016)

**SURVEY CONTROL**

SLAG 1	SLAG 2
N: 194,112.357	N: 194,112.026
E: 1,276,323.444	E: 1,276,325.646
Q: 10.905	Q: 10.095



**ENHANCED NATURAL RECOVERY  
 ACTIVATED CARBON PILOT STUDY  
 MULTIBEAM HYDROGRAPHIC SURVEY**

**INTERTIDAL PROGRESS**

Revis. No.	Revision	Signed	Date
SHEET 6 OF 6			
Drawn: MSK	Checked: LNL	Survey Date: DEC 02, 2016	
Printer Size: ANSI	Project No.: 2016-000	Draw Date: DEC 05, 2016	

**Owner:** King County

**Project:** Lower Duwamish Waterway ENR/AC Pilot

**Dates:** December 5, 2016 to December 9, 2016

**Weekly Progress Meeting Summary:**

Internal (KC, PPM, DOF) meeting occurred on Dec 6<sup>th</sup>.

- Schedule:
  - Intertidal Plot is scheduled to be completed on Dec 15, 2016.
  - Ash Grove maintenance dredging is not scheduled to occur until January or February. Based on PPM's Dec 2 updated schedule the Scour Plot placement was scheduled to occur in January. The new schedule attached has placement within this plot now scheduled to start on Dec 16<sup>th</sup> in order to avoid conflict with Ash Grove's schedule.
  - A visitor day will be scheduled to occur when work is being performed in the Scour Plot.
- Tribal Fishing:
  - There has been no nets or other fishing activities have been observed in the waterway between PPM's yard and the Intertidal Plot area.
  - No work will be performed if the work has the potential to impact Tribal fishing.
- 1<sup>st</sup> weekly meeting with Agency representatives is scheduled to occur on Dec 13<sup>th</sup>.

**Construction Progress:**

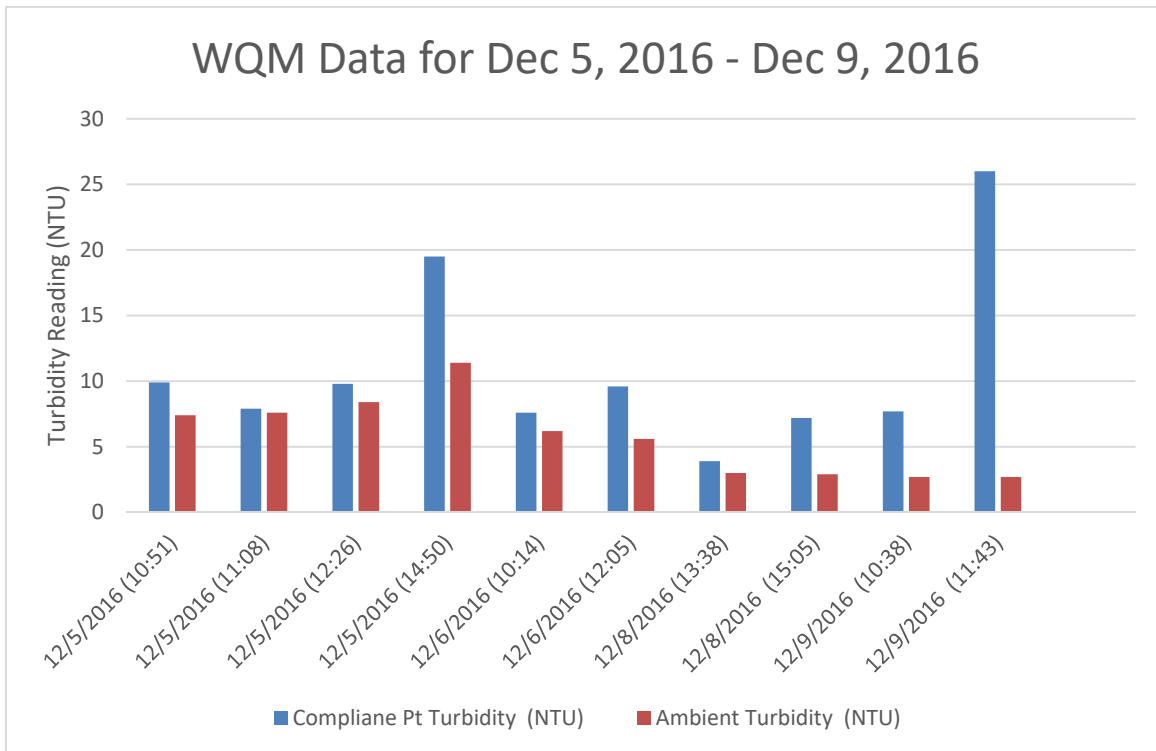
- Schedule (updated weekly by contractor – Attached)
  - Note that the scour plot was moved from early January 2017. It is now scheduled to be started on December 16, 2016.
- General progress with respect to schedule
  - The KP-3 barge was loaded on Dec 5, 2016 with Gravelly Sand ENR.
  - The KP-3 was flooded to soak the Gravelly Sand ENR on Dec 6<sup>th</sup>.
  - The last of the Gravelly Sand + AC in the KP-2 material barge was placed in the Intertidal Gravelly Sand + AC subplot Thursday morning, Dec 8<sup>th</sup>.
  - Placement within the Intertidal Gravelly Sand subplot was started on Thursday afternoon, Dec 8<sup>th</sup>.
  - Work scheduled for this week:
    - Load the KP-2 with Gravelly Sand + AC (12/13/16) at Cal-Portland facility. Soaking of Gravelly Sand + AC will occur either Wed, Dec 14, or Thur, Dec 15<sup>th</sup>, depending if completion Intertidal Gravelly Sand subplot on or ahead of schedule.
    - Complete Gravelly Sand + AC placement in intertidal plot.
    - Daily hydrographic surveys at end of each shift.
    - Confirmation measurements of the Gravelly Sand + AC placement.
    - Start Gravelly Sand+AC placement at scour plot.

**Problems Encountered (If Any) & Associated Action Items:**  None  See Comments below:

Problems Encountered	Date	Required Action	Date Completed

**Water Quality Monitoring:**

- Observed non-construction-related events that impacted water quality.
  - None
- Summary of water quality criteria violations and actions taken.
  - Dec 5, 2016: Compliance point was 8.1 NTU above ambient during the 14:50 monitoring event. Placement operations halted for ~14 minutes. Operations started again after WQM vessel verified that WQ was within allowable tolerances.
  - Dec 9, 2016: Compliance point was 5.0 NTU above ambient during the 10:38 monitoring event. Placement operations halted for ~13 minutes to move the barge and while waiting for waiting for other marine traffic to clear the area. Operations started again after WQM vessel verified that WQ was within allowable tolerances.
  - Dec 19, 2016: Compliance point was 5.3 NTU above ambient during the 11:43 monitoring event. Placement operations halted for ~48 minutes. Operations started again after WQM vessel verified that WQ was within allowable tolerances.



*Figure 1: Water Quality Monitor Data Summary for Week Ending December 9, 2016*

**QA Inspections:**

- Results:
  - QA Inspections
  - Surveying (Performed at the end of each shift. Attached is the Dec 9<sup>th</sup>, 2016 survey)
  - Monitoring Activities:
    - None.

- Out of Spec Conditions (if encountered) & Corrective Actions:  None  See  
Comments below:

Out of Spec condition	Date	Corrective Action	Date Completed
The Intertidal Gravelly Sand + AC subplot is ~90% complete. ~2000 sq ft of the plot area Still requires the planned 2 <sup>nd</sup> lift.	12/8/2016	A 2 <sup>nd</sup> lift will be placed on the remaining area after the 2 <sup>nd</sup> load of GS+AC is soaked and prior to moving to Scour Plot.	N/A

## Weekly Photo Log – LDW ENR/AC Pilot



**Photo 1-A:** KC Rep visually inspects remaining Gravelly Sand + AC in the KP-2 barge.



**Photo 1-B:** KP-2 material barge after all of the Gravelly Sand + AC was placed.



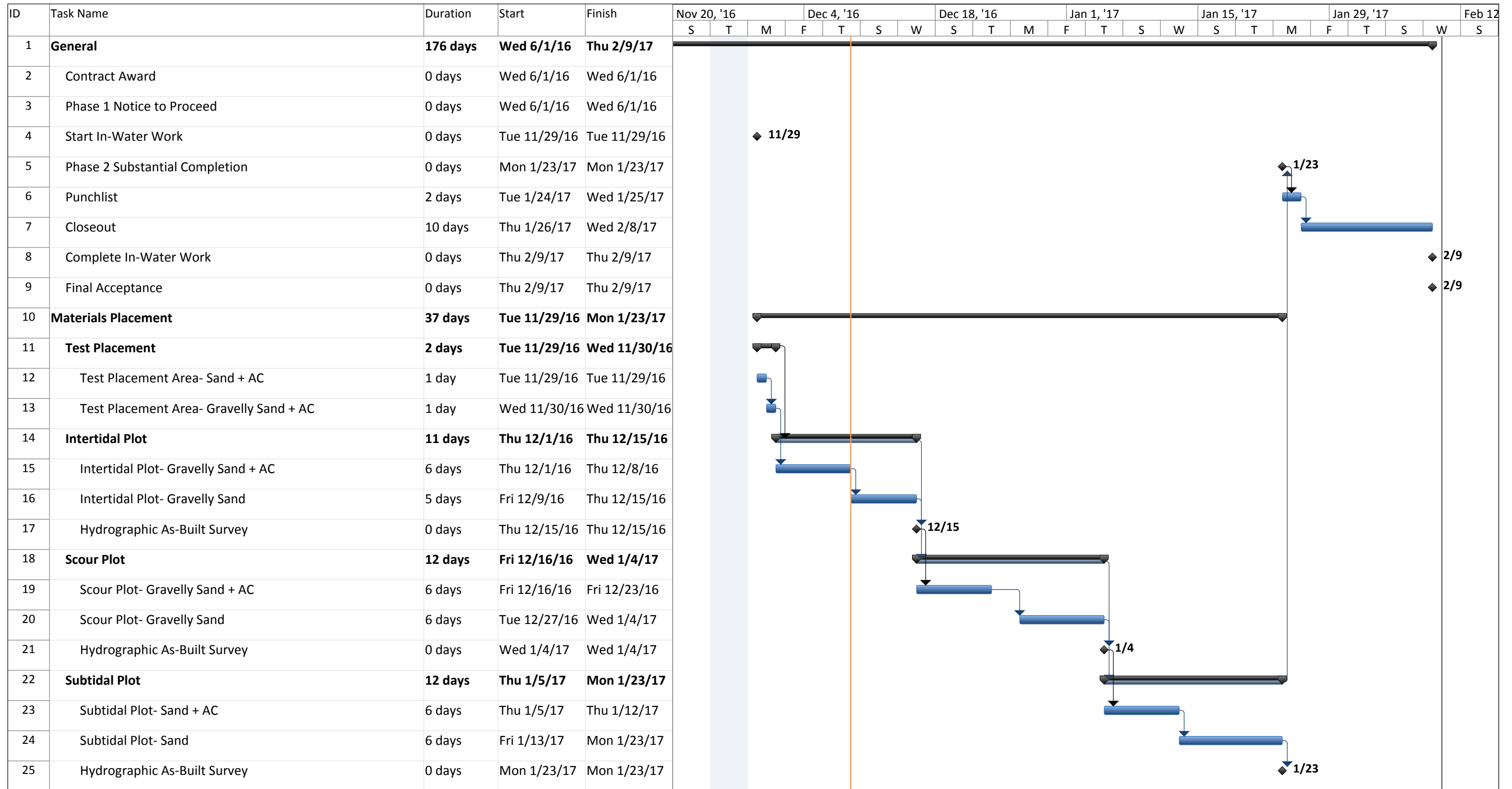
## Weekly Photo Log – LDW ENR/AC Pilot



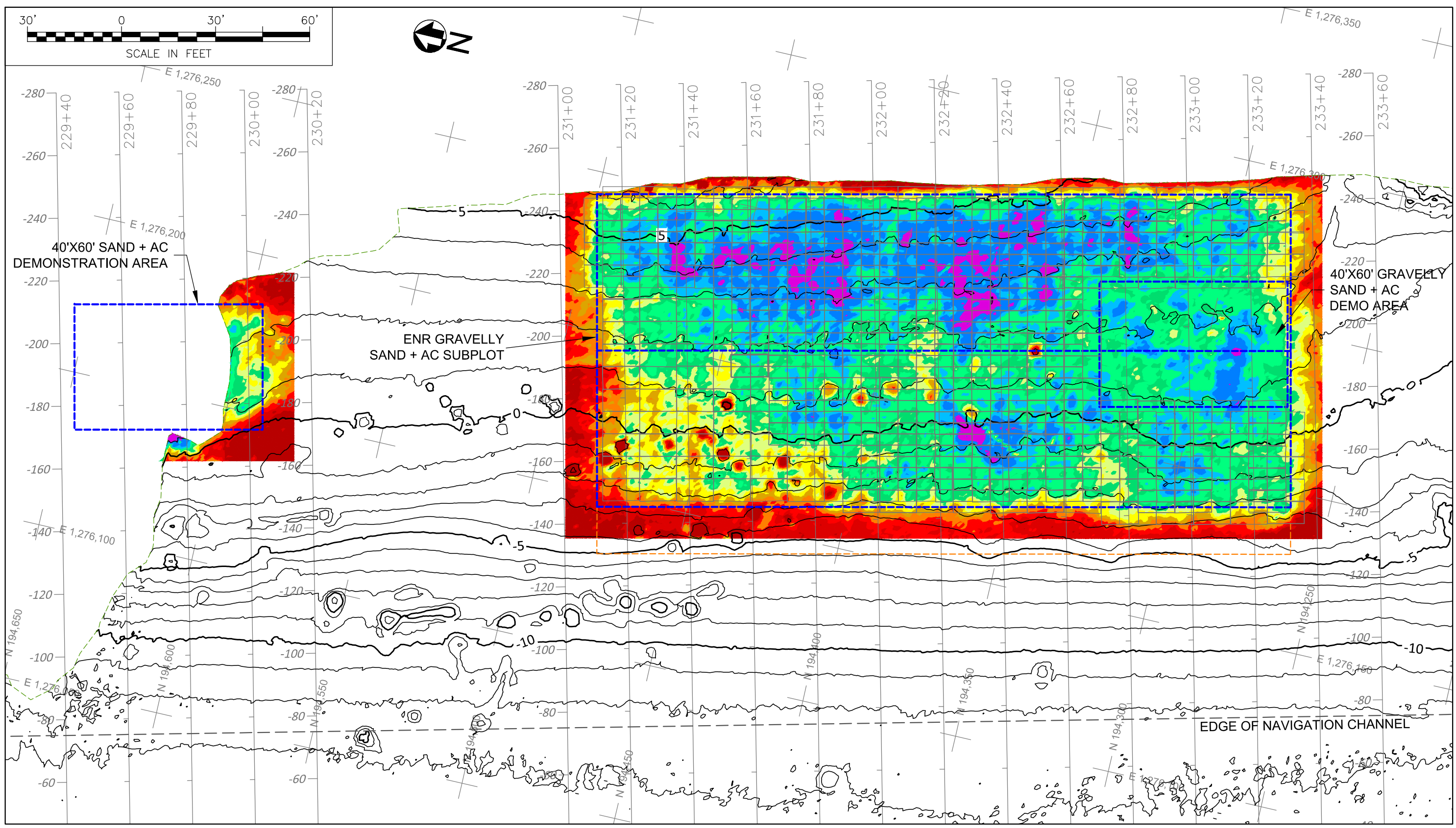
**Photo 2-A:** KP-3 material barge arrives on-site with Gravelly Sand. The excavator knocked down the wind rows prior to soaking.



**Photo 2-B:** Overnight snow covered the exposed gravelly sand in the KP-3 materials barge. Weather conditions did not impact operations.

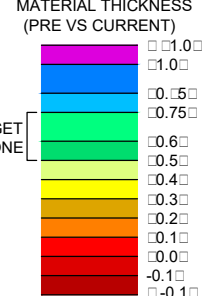


Project: Baseline Schedule-Update Date: Fri 12/9/16	Task		Project Summary		Inactive Milestone		Manual Summary Rollup		Deadline	
	Split		External Tasks		Inactive Summary		Manual Summary		Progress	
	Milestone		External Milestone		Manual Task		Start-only			
	Summary		Inactive Task		Duration-only		Finish-only			



**DATUM INFORMATION**  
 Horizontal: WASHINGTON STATE PLANE NORTH, NAD83, U.S. FEET  
 Vertical: MEAN LOWER LOW WATER (MLLW) NOS SEATTLE EPOCH 1983-2001

- NOTES**
1. SURVEY FOR THE INTERTIDAL AREA WAS CONDUCTED BY TERRASOND LIMITED ON DECEMBER 12, 2016
  2. HYDROGRAPHIC DATA WAS COLLECTED USING A RESON 7125 400kHz MULTIBeam, APPLIANCI WAVEMASTER INERTIAL NAVIGATION SYSTEM, AML CASE-SOUND VELOCITY PROFILE, AND HYPACK HYSWEEP 2016
  3. REAL-TIME KINEMATIC (RTK) POSITIONING WAS BASED ON RECORD COORDINATES FOR POINT "SLAG 1"



- LEGEND**
- SUBPLOT DEMONSTRATION LIMIT
  - OPTIONAL EXCESS MATERIAL PLACEMENT
  - CURRENT SURVEY
  - PREVIOUS SURVEY
  - SURVEY CONTOURS
  - 5' INDEX INTERVAL
  - BUCKET PLACEMENT MARK

**SURVEY CONTROL**

SLAG 1  
 N: 194,112.357  
 E: 1,276,323.474  
 U: 10.905

SLAG 2  
 N: 194,112.026  
 E: 1,276,325.646  
 U: 10.095

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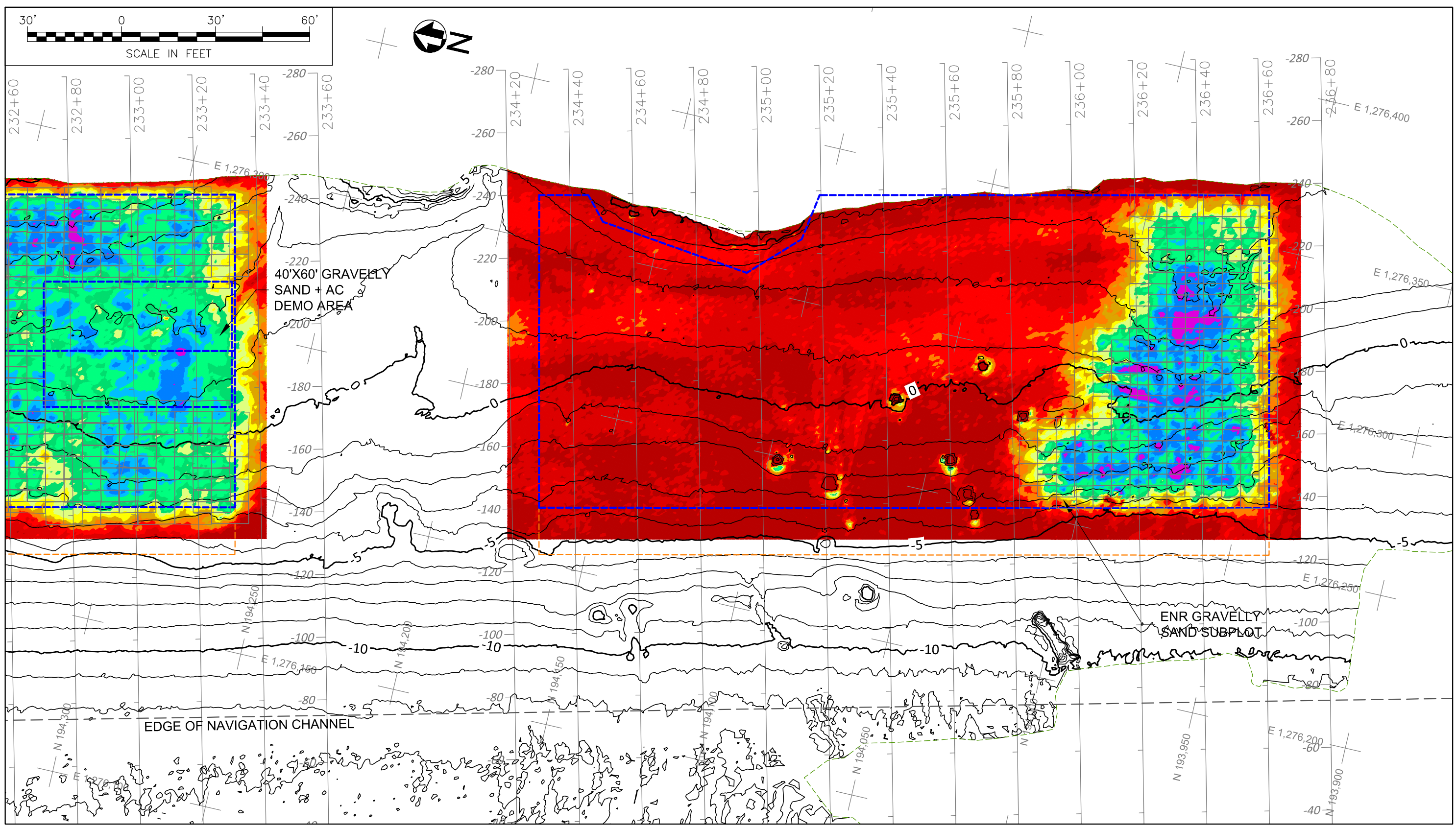
**ENHANCED NATURAL RECOVERY ACTIVATED CARBON PILOT STUDY MULTIBEAM HYDROGRAPHIC SURVEY**

**INTERTIDAL PROGRESS**

Revis. No.	Revision	Signed	Date

SHEET 1 OF 6

Drawn: MSK	Checked: LNL	Survey Date: DEC 09, 2016
Project No.: 2016-001	Draw Date: DEC 12, 2016	



**DATUM INFORMATION**  
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 Vertical: MEAN LOWER LOW WATER (MLLW) NOS SEATTLE EPOCH 1983-2001

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<b>MATERIAL THICKNESS (PRE VS CURRENT)</b> 	<b>LEGEND</b> 	<b>SURVEY CONTROL</b> SLAG 1 N: 194,112.357 E: 1,276,323.474 U: 10.905
		SLAG 2 N: 194,112.026 E: 1,276,325.646 U: 10.895

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**ENHANCED NATURAL RECOVERY  
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 MULTIBEAM HYDROGRAPHIC SURVEY**

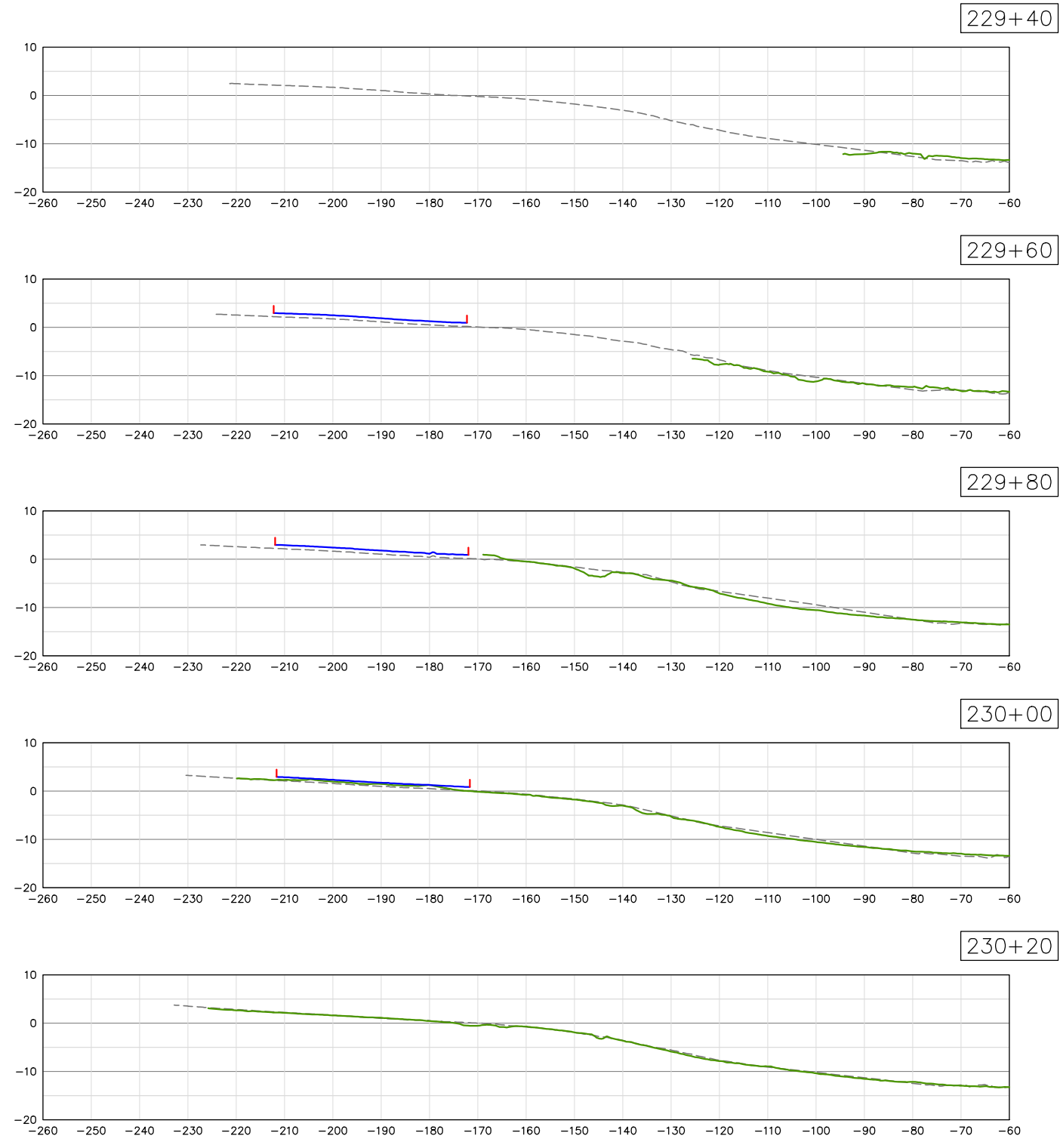
INTERTIDAL PROGRESS

Revis. No.	Revision	Signed	Date

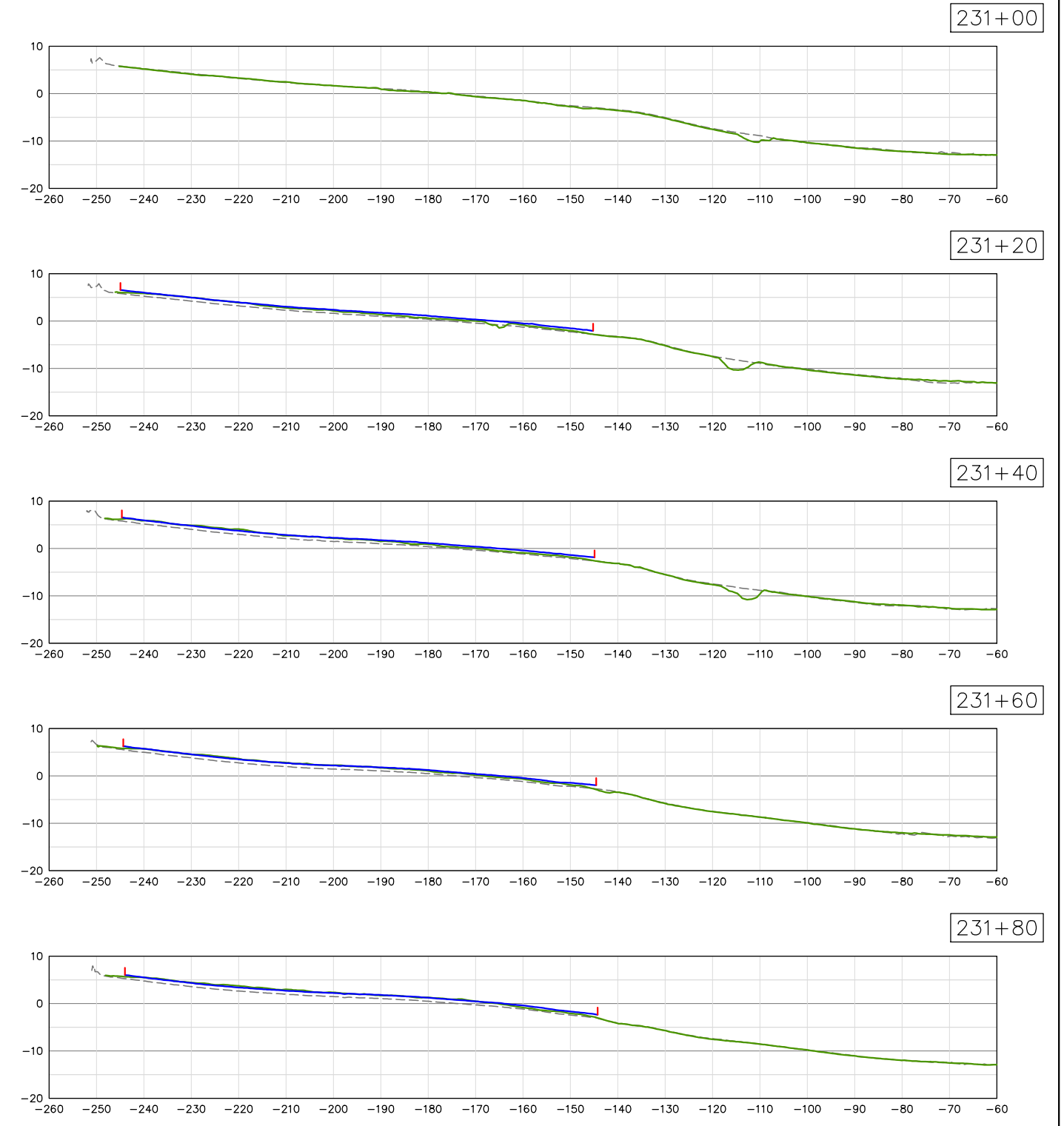
SHEET 2 OF 6

Drawn: MSK	Checked: LNL	Survey Date: DEC 09, 2016
Project No.: 2016-001	Draw Date: DEC 12, 2016	

### 40'X60' SAND + AC DEMONSTRATION AREA



### ENR GRAVELLY SAND + AC SUBPLOT



#### DATUM INFORMATION

Horizontal: WASHINGTON STATE PLANE NORTH, NAD83, U.S. FEET  
 Vertical: MEAN LOWER LOW WATER (MLLW) NOS SEATTLE EPOCH 1983-2001

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3. REAL-TIME KINEMATIC (RTK) POSITIONING WAS BASED ON RECORD COORDINATES FOR POINT "SLAG 1"
4. PROFILE VERTICAL MAGNIFICATION IS 1.0

#### PROFILES LEGEND

- SUBPLOT EXTENT (±9 INCHES)
- CURRENT SURVEY
- - - PRE-SURVEY (NOV 1, 2016)

#### SURVEY CONTROL

SLAG 1	SLAG 2
N: 194,112.357	N: 194,112.026
E: 1,276,323.444	E: 1,276,325.646
±: 10.905	±: 10.195



### ENHANCED NATURAL RECOVERY ACTIVATED CARBON PILOT STUDY MULTIBEAM HYDROGRAPHIC SURVEY

#### INTERTIDAL PROGRESS

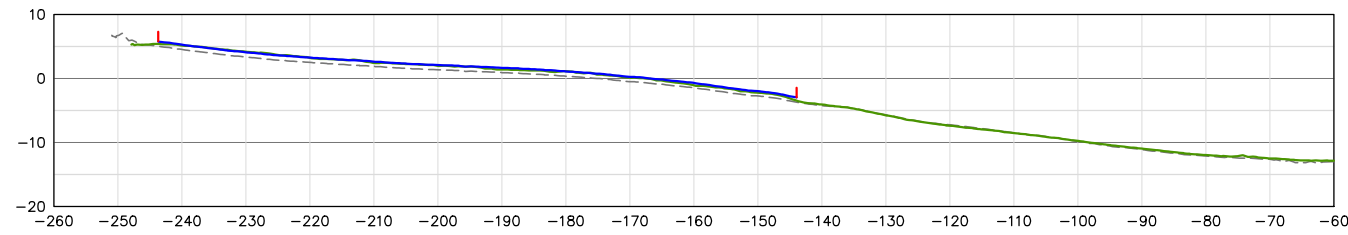
Revis. No.	Revision	Signed	Date

SHEET 3 OF 6

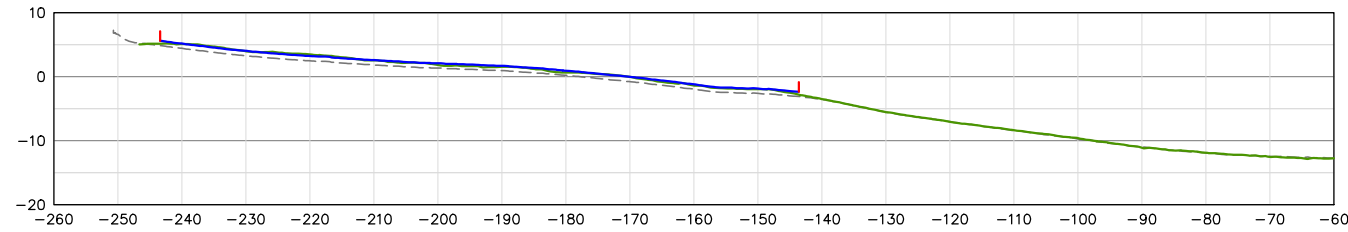
Drawn: MSK	Checked: LNL	Survey Date: DEC 09, 2016
Printer Size: ANSI	Project No.: 2016-000	Draw Date: DEC 12, 2016

### ENR GRAVELLY SAND + AC SUBPLOT

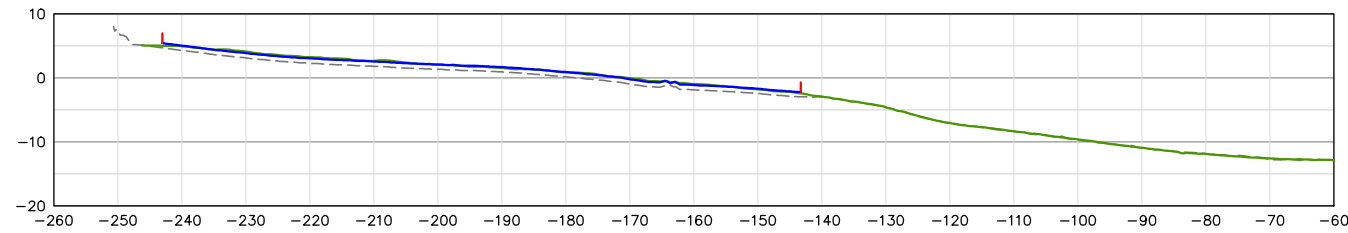
232+00



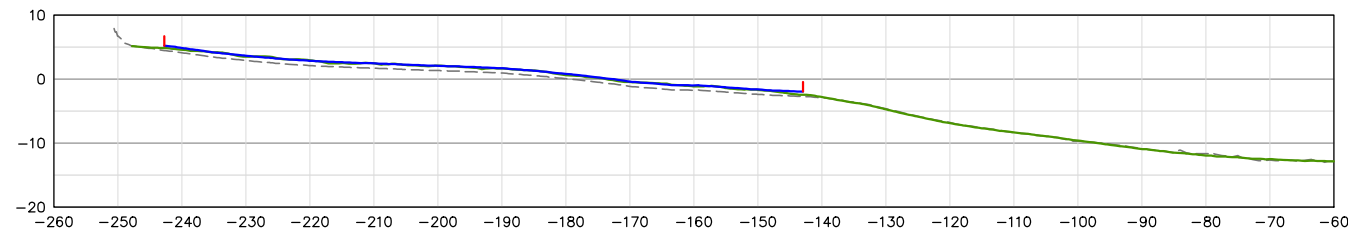
232+20



232+40

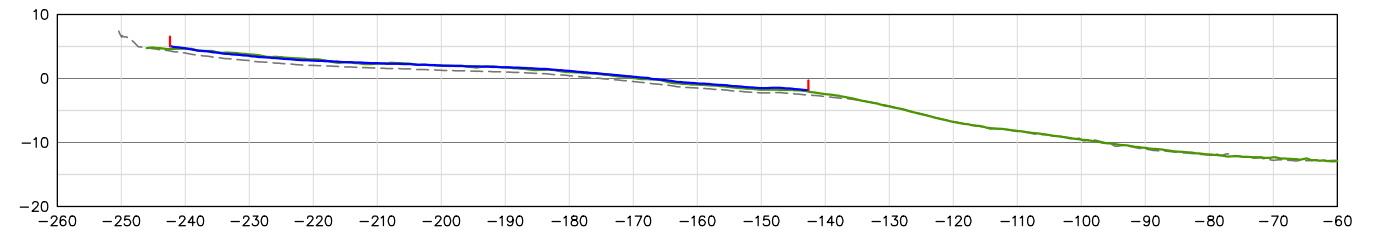


232+60

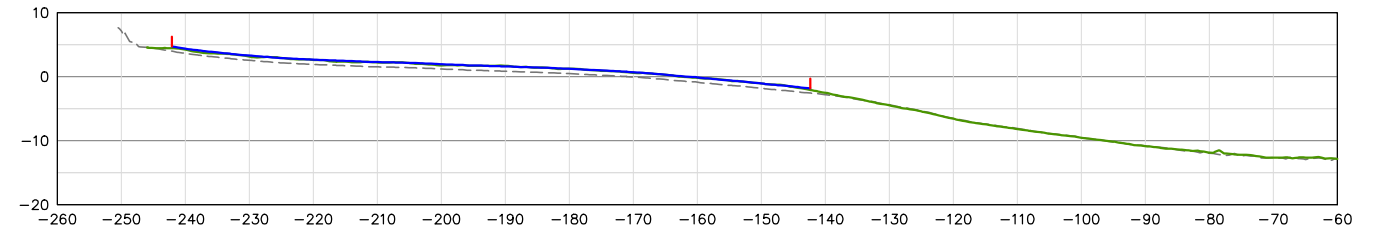


### ENR GRAVELLY SAND + AC SUBPLOT

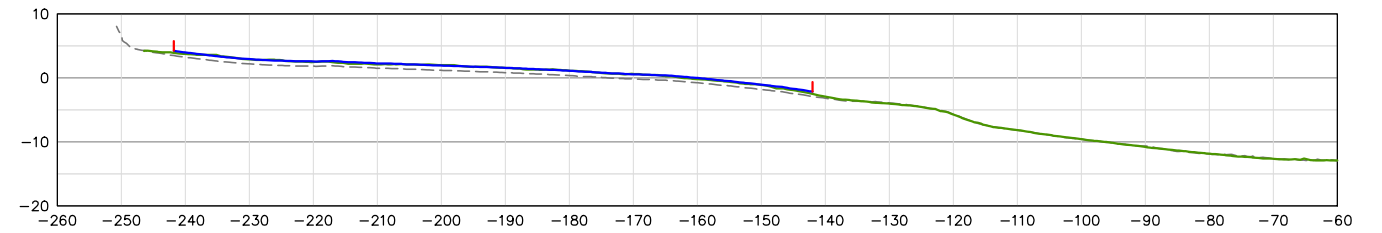
232+80



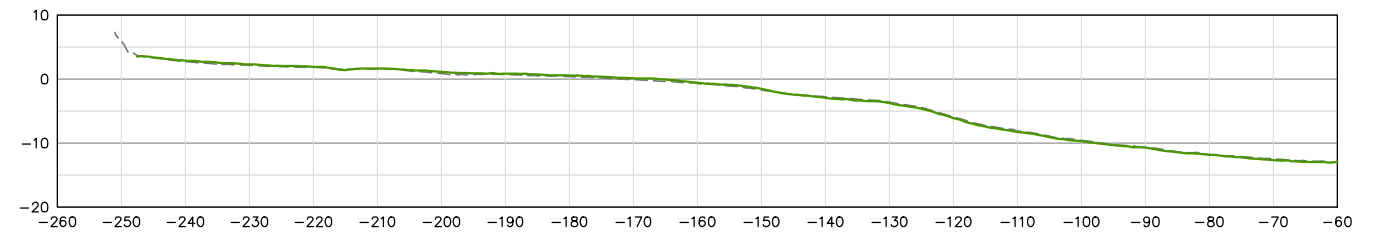
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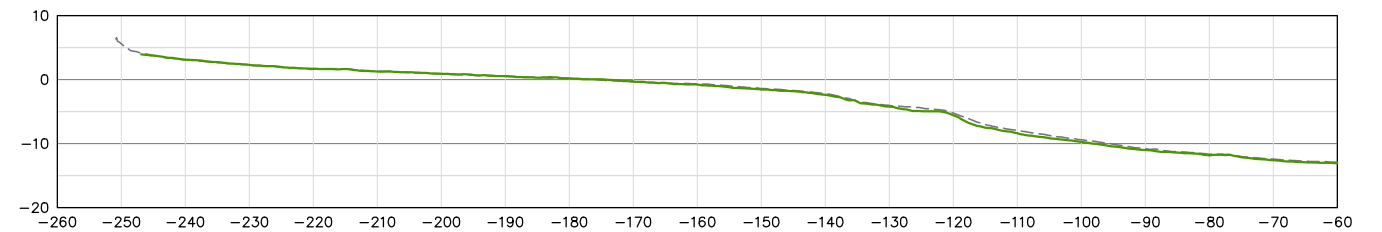
233+20



233+40



233+60



#### DATUM INFORMATION

Horizontal: WASHINGTON STATE PLANE NORTH, NAD83, U.S. FEET  
Vertical: MEAN LOWER LOW WATER (MLLW) NOS SEATTLE EPOCH 1983-2001

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4. PROFILE VERTICAL EXAGGERATION IS 1.0

#### PROFILES LEGEND

- SUBPLOT EXTENT (39 INCHES)
- CURRENT SURVEY
- - - PRE-SURVEY (NOV 13, 2016)

#### SURVEY CONTROL

SLAG 1	SLAG 2
N: 194,112.357	N: 194,112.026
E: 1,276,323.404	E: 1,276,325.646
Q: 10.905	Q: 10.095



### ENHANCED NATURAL RECOVERY ACTIVATED CARBON PILOT STUDY MULTIBEAM HYDROGRAPHIC SURVEY

#### INTERTIDAL PROGRESS

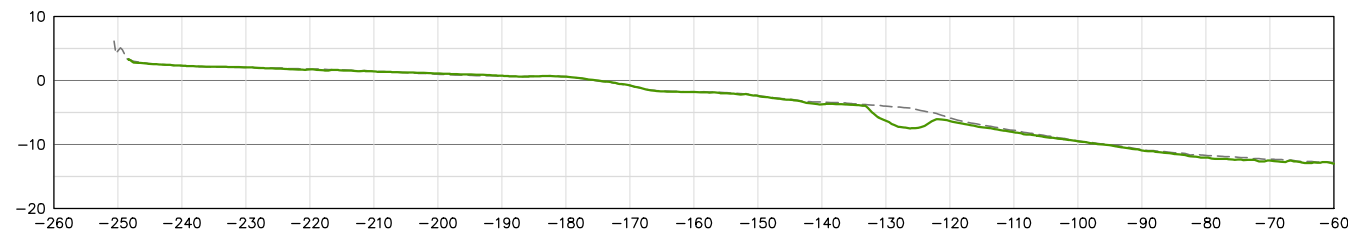
Revis. No.	Revision	Signed	Date

SHEET 4 OF 6

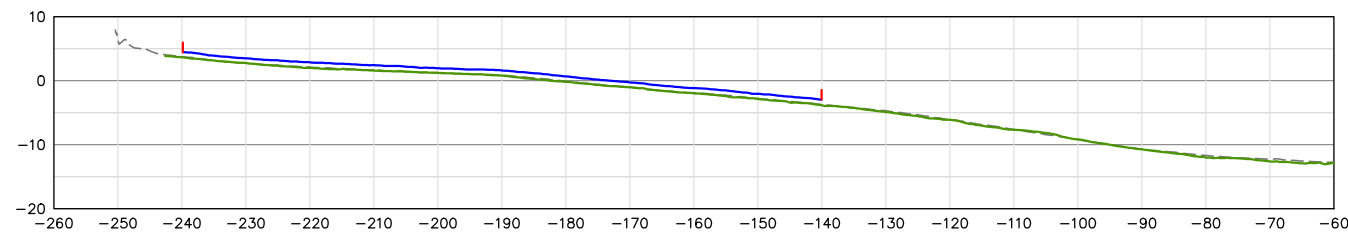
Drawn: MSK	Checked: LNL	Survey Date: DEC 09, 2016
Printer Size: ANSI	Project No.: 2016-000	Draw Date: DEC 12, 2016

### ENR GRAVELLY SAND SUBPLOT

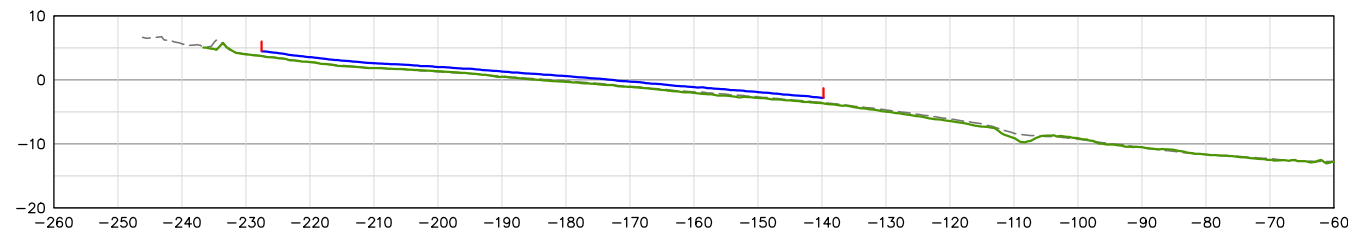
234+20



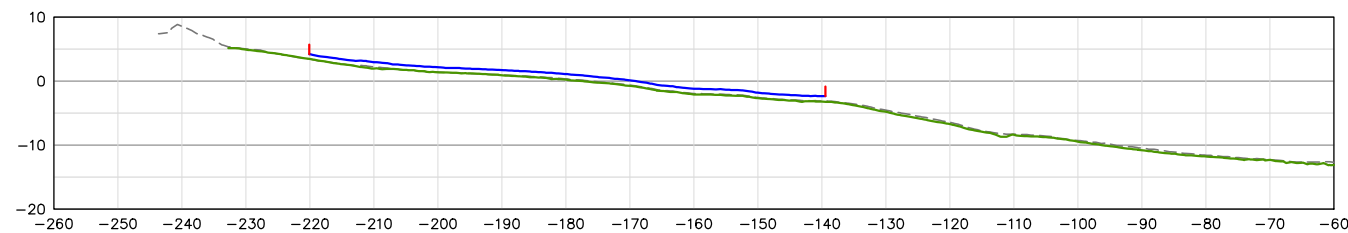
234+40



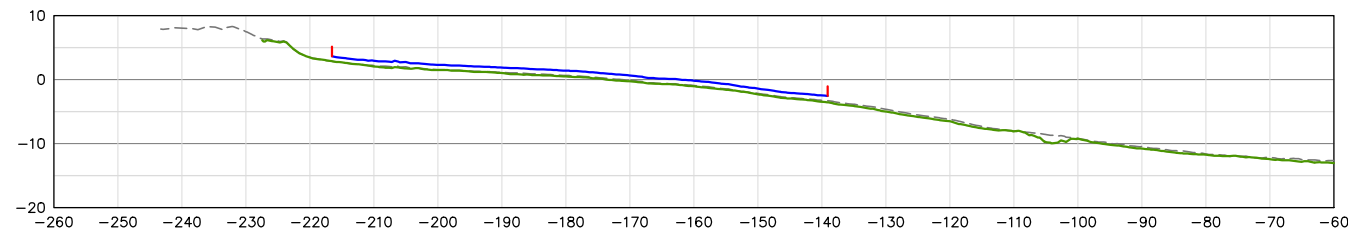
234+60



234+80

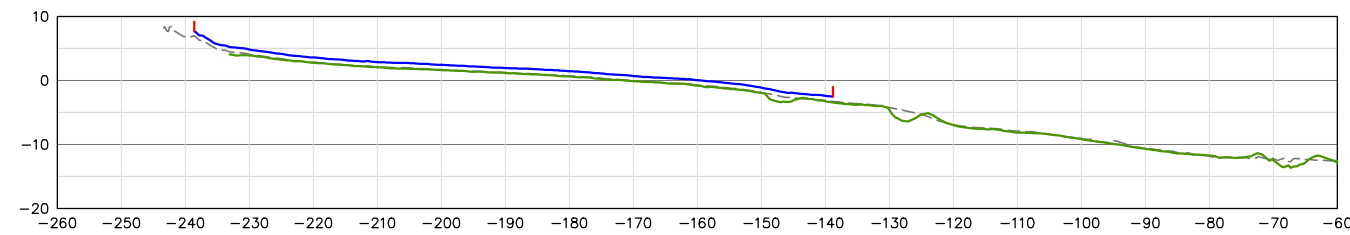


235+00

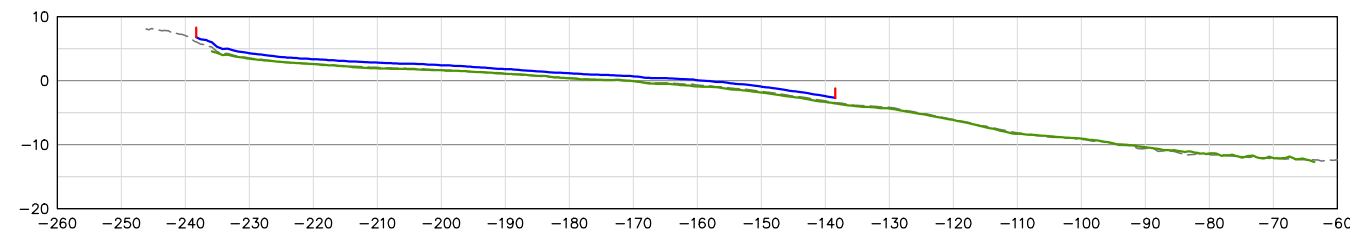


### ENR GRAVELLY SAND SUBPLOT

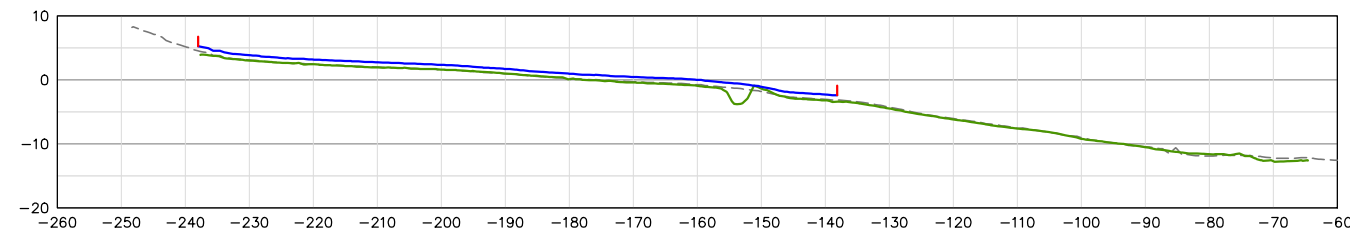
235+20



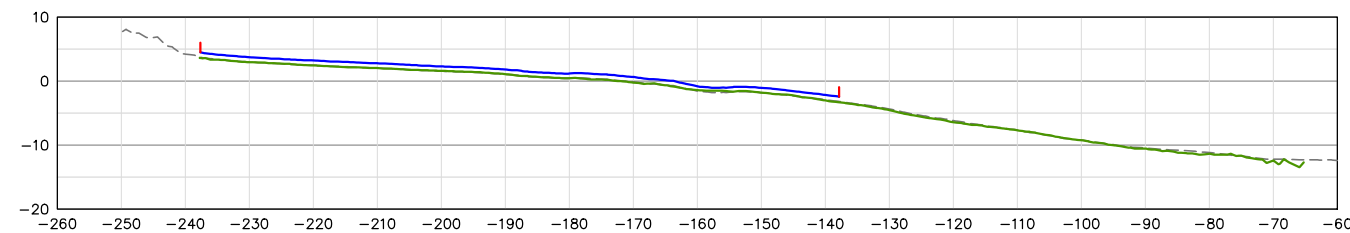
235+40



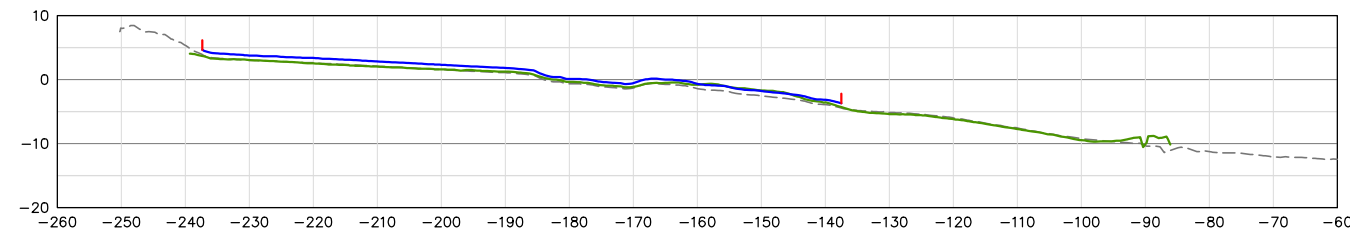
235+60



235+80



236+00



**DATUM INFORMATION**

Horizontal: WASHINGTON STATE PLANE NORTH, NAD83, U.S. FEET  
 Vertical: MEAN LOWER LOW WATER (MLLW) NOS SEATTLE EPOCH 1983-2001

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3. REAL-TIME KINEMATIC (RTK) POSITIONING WAS BASED ON RECORD COORDINATES FOR POINT "SLAG 1"
4. PROFILE VERTICAL MAGGGERATION IS 1.0

**PROFILES LEGEND**

- Subplot Elevation (±9 inches)
- Current Survey
- Pre-Survey (Nov 11, 2016)

**SURVEY CONTROL**

SLAG 1  
 N: 194,112.357  
 E: 1,276,323.444  
 Z: 10.905

SLAG 2  
 N: 194,112.026  
 E: 1,276,325.646  
 Z: 10.195



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**ENHANCED NATURAL RECOVERY  
 ACTIVATED CARBON PILOT STUDY  
 MULTIBEAM HYDROGRAPHIC SURVEY**

**INTERTIDAL PROGRESS**

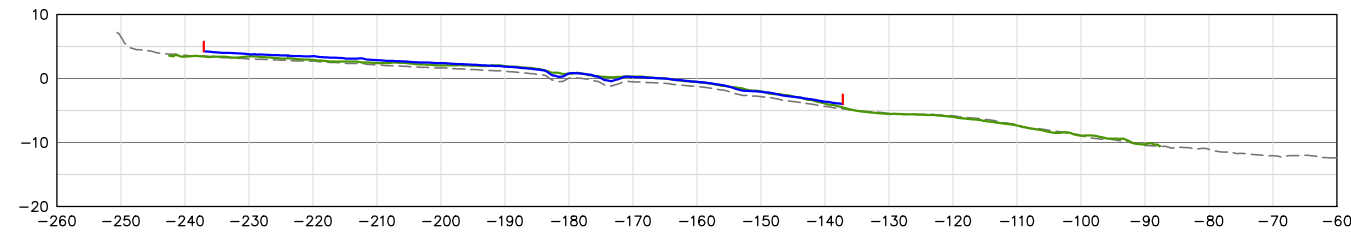
Revis. No.	Revision	Signed	Date

SHEET 5 OF 6

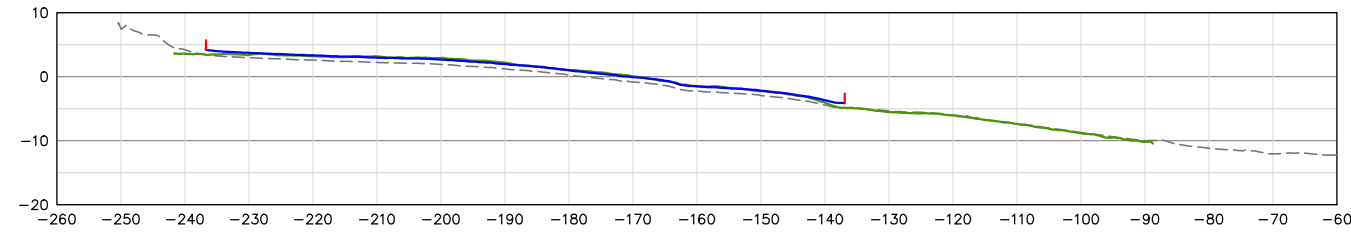
Drawn: MSK	Checked: LNL	Survey Date: DEC 09, 2016
Printer Size: ANSI	Project No.: 2016-000	Draw Date: DEC 12, 2016

# ENR GRAVELLY SAND SUBPLOT

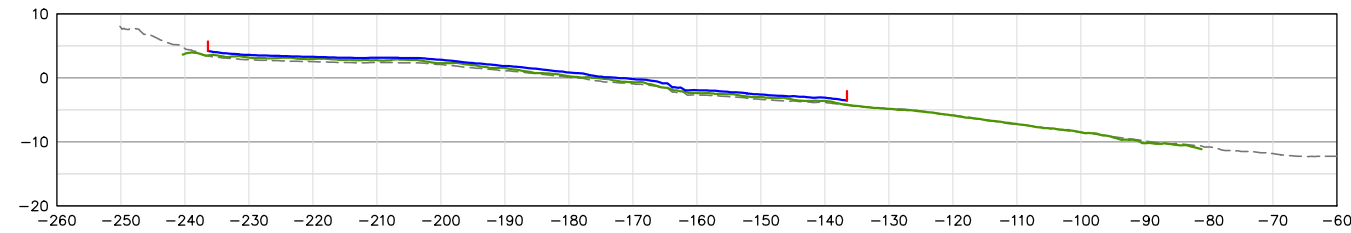
236+20



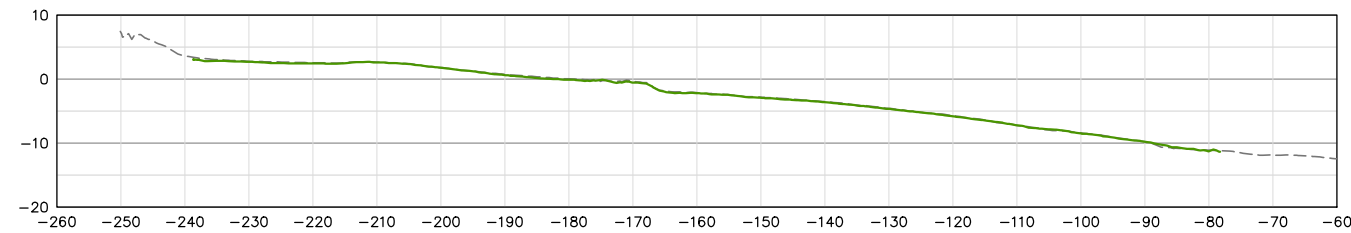
236+40



236+60



236+80



### DATUM INFORMATION

**Horizontal:** WASHINGTON STATE PLANE NORTH, NAD83, U.S. FEET  
**Vertical:** MEAN LOWER LOW WATER (MLLW) NOS SEATTLE EPOCH 1983-2001

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3. REAL-TIME KINEMATIC (RTK) POSITIONING WAS BASED ON RECORD COORDINATES FOR POINT "SLAG 1"
4. PROFILE VERTICAL MAGNIFICATION IS 1.0

### PROFILES LEGEND

- SUBPLOT EXTENT (39 INCHES)
- CURRENT SURVEY
- - - PRE-SURVEY (NOV 11, 2016)

### SURVEY CONTROL

SLAG 1	SLAG 2
N: 194,112.357	N: 194,112.026
E: 1,276,323.414	E: 1,276,325.646
Q: 10.905	Q: 10.195



## ENHANCED NATURAL RECOVERY ACTIVATED CARBON PILOT STUDY MULTIBEAM HYDROGRAPHIC SURVEY

### INTERTIDAL PROGRESS

Revis. No.	Revision	Signed	Date
SHEET 6 OF 6			
Drawn: MSK	Checked: LNL	Survey Date: DEC 09, 2016	
Printer Size: ANSI	Project No.: 2016-000	Draw Date: DEC 12, 2016	



**Owner:** King County

**Project:** Lower Duwamish Waterway ENR/AC Pilot

**Dates:** December 12, 2016 to December 16, 2016

### **Weekly Progress Meeting Summary:**

Weekly meeting occurred on Tuesday, Dec 13, 2016 at 08:30.

- Schedule (3 week look ahead):
  - Intertidal plot is scheduled to be completed by Dec 16, 2016
  - Mob to Scour Plot scheduled for Dec 16, 2016.
  - Gravelly Sand +AC (GS+AC) Scour subplot placement scheduled to start on Dec 19, 2016.
  - Both the Gravelly Sand (GS) and GS+AC subplots are scheduled to be completed the 1<sup>st</sup> week of Jan 2017.
  - Visitor day is scheduled for December 20, 2016 at Harbor Island near the marina where the placement operations in the Scour Plot can be observed.
- Tribal Fishing:
  - No fishing nets or other fishing activities were observed near the work area or downstream between the work area and Harbor Island.
- Issues & Challenges:
  - The excavator was down for approximately half a day when its alternator failed. A new alternator was installed without incident and the damaged alternator will be repaired on brought back onsite as a backup.
- Water Quality Monitoring:
  - It has been determined that there has been no significant difference in water quality when placing gravelly sand + AC and placing gravelly sand.

### **Construction Progress:**

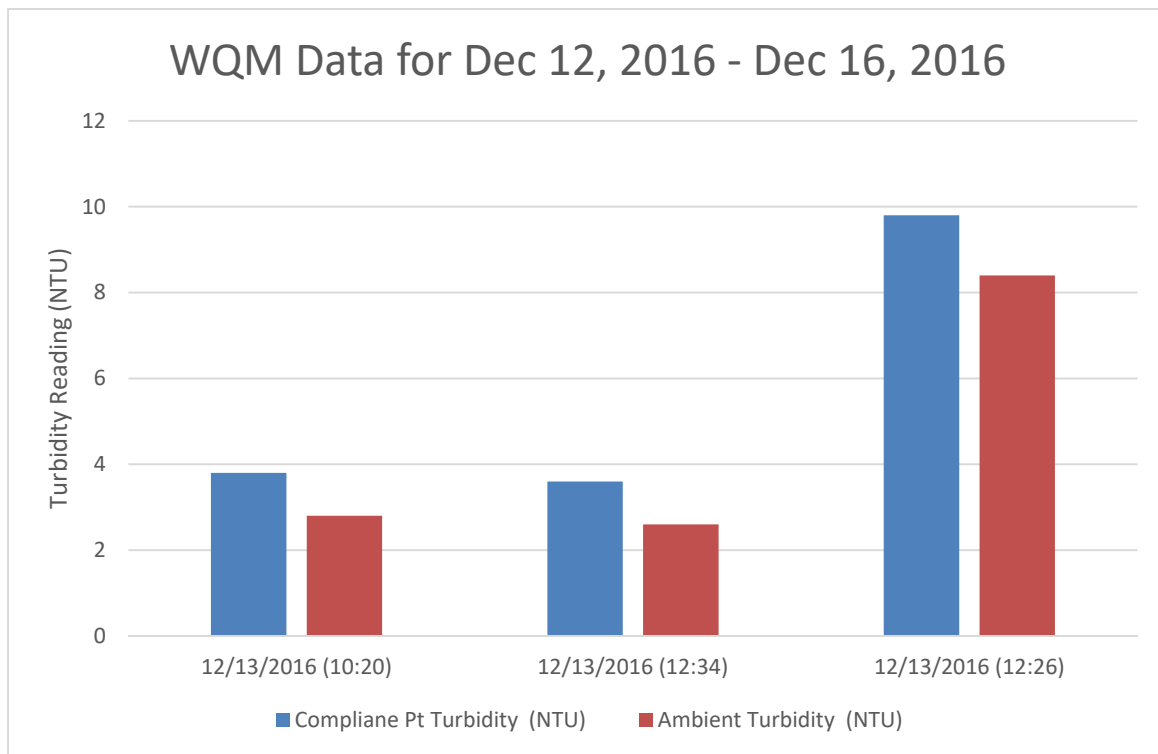
- Schedule (updated weekly by contractor – Attached)
  - Note that the scour plot mob was moved was pushed back to December 19, 2016.
- General progress with respect to schedule
  - The KP-2 barge was loaded on Dec 13, 2016 with Gravelly Sand +AC ENR.
  - KP-2 was flooded on Dec 14 to soak the GS+AC the minimum 12 hours prior to placement.
  - The KP-3 barge was loaded on Dec 16, 2016 with Gravelly Sand ENR.
  - All of the Gravelly Sand in the KP-3 that was loaded into the barge the previous week was placed in the Intertidal Gravelly Sand during the week. The subplot was not complete when the KP-3 was empty. See Problems Encountered below.
  - Placement within the Intertidal GS+AC subplot was completed on Thursday, Dec 15<sup>th</sup>.
  - No work was performed on Dec 16, 2016 due to not having enough GS to finish the GS subplot.
  - Work scheduled for this week:
    - Complete Gravelly Sand placement in intertidal plot.
    - Mob to Scour Plot.
    - Start GS+AC at Scour Plot on Dec 20, 2016 and continue to place GS+AC for the remainder of the week.
    - Daily hydrographic surveys at high tide during each shift.

**Problems Encountered (If Any) & Associated Action Items:**  None  See Comments below:

Problems Encountered	Date	Required Action	Date Completed
The excavators alternator failed and had to be replaced.	12/12/2016	Replaced alternator	12/12/2016
KP-3 barge leaking turbid water. Turbid leaks have only been observed after material at the base of the bin wall has been removed.	12/14/2016, 12/15/2016	PPM will continue to monitor for leaks. Leaks were and will continue to be plugged immediately after being observed.	12/14/2016, 12/15/2016
Ran out of GS before finishing subplot. This is related to the out of spec condition detailed below.	12/15/2016	Ordered additional 200 tons material loaded when scour plot GS was loaded.	12/15/2016

**Water Quality Monitoring:**

- Observed non-construction-related events that impacted water quality.
  - None
- Summary of water quality criteria violations and actions taken.
  - No exceedances observed.



*Figure 1: Water Quality Monitor Data Summary for Week Ending December 16, 2016*

**QA Inspections:**

- Results:
  - QA Inspections:
    - DOF representative was onsite for each to the barge loading events to ensure proper materials were being loaded and to verify the % AC for the GS+AC material. Samples of the GS+AC were collected from the conveyor belt that transported the material to the barge. This material was sent to the lab for analysis.
  - Surveying (Performed at the end of each shift. Attached is the Dec 15, 2016 survey)
  - Monitoring Activities:
    - DOF and AMECFW representatives performed a visual inspection and grade stake measurement during the evening low tides that occurred on Dec 13<sup>th</sup> and Dec 15<sup>th</sup>.  
During the visual inspection objects thought to be rocks greater than 2 inches in diameter up to approximately 6 inches in diameter were observed on and upstream of the GS+AC subplot. After further investigation it was determined that these objects were not rock but were comprised of blackish, soft, fine to medium grained material. These objects may be comprised of AC and fine silts. See Photos 2-A and 2-B showing observed objects.

Average placement thickness over the upstream half of the GS subplot was approximately 12 inches as measured on Dec 13<sup>th</sup>. The average thickness measurements at the stakes that had material placed after modifying the bucket fill factor was approximately 6 inches. The minimum thickness over all of the stakes in areas where material was by end of shift Dec 15 was 4 inches and the maximum was 14 inches. Attached is a figure with stake locations and measurements.

- Out of Spec Conditions (if encountered) & Corrective Actions:  None  See Comments below:

Out of Spec condition	Date	Corrective Action	Date Completed
Measured material thickness on the upstream portion of the GS sub-plot greater than 12 inches in several locations.	12/13/2016	Modified bucket fill factor to reduce placement thickness.	12/14/2016

## Weekly Photo Log – LDW ENR/AC Pilot



**Photo 1-A:** PPM field engineer performing bucket calibration check.



**Photo 1-B:** Leak observed mid-barge after the material at the base of the bin wall was removed.

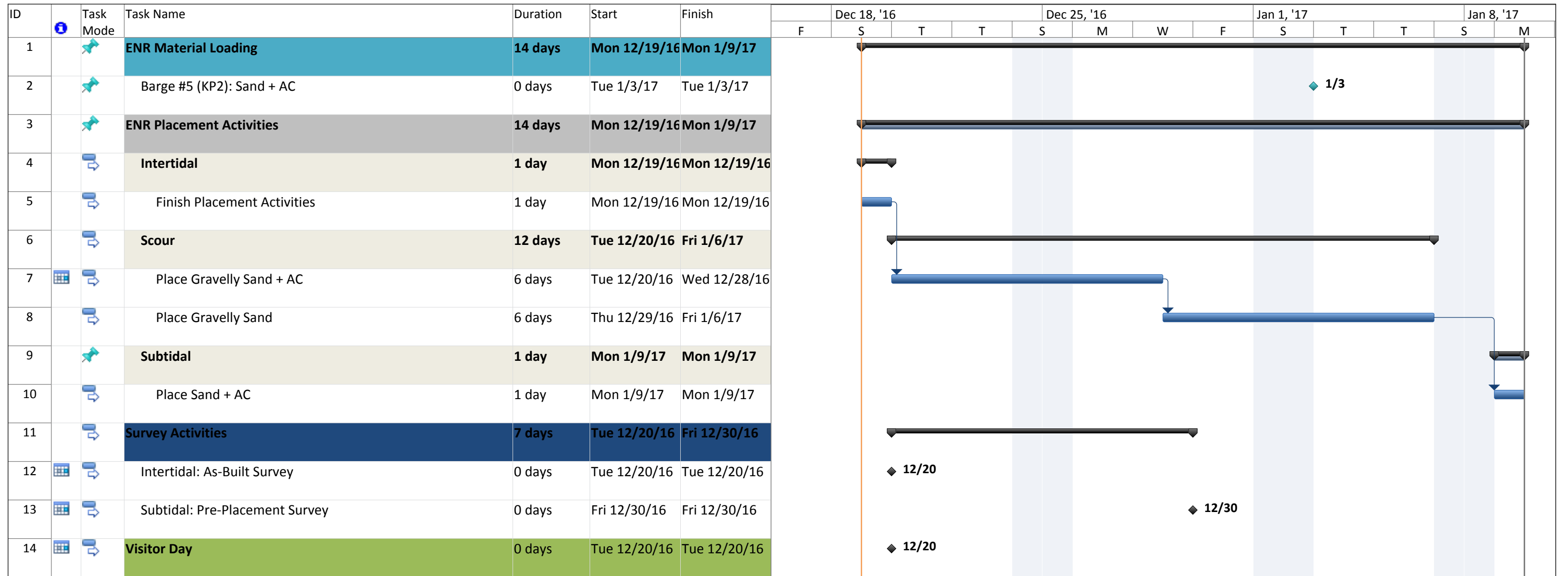
## Weekly Photo Log – LDW ENR/AC Pilot



**Photo 2-A:** Rock shaped object observed in the GS+AC subplot.



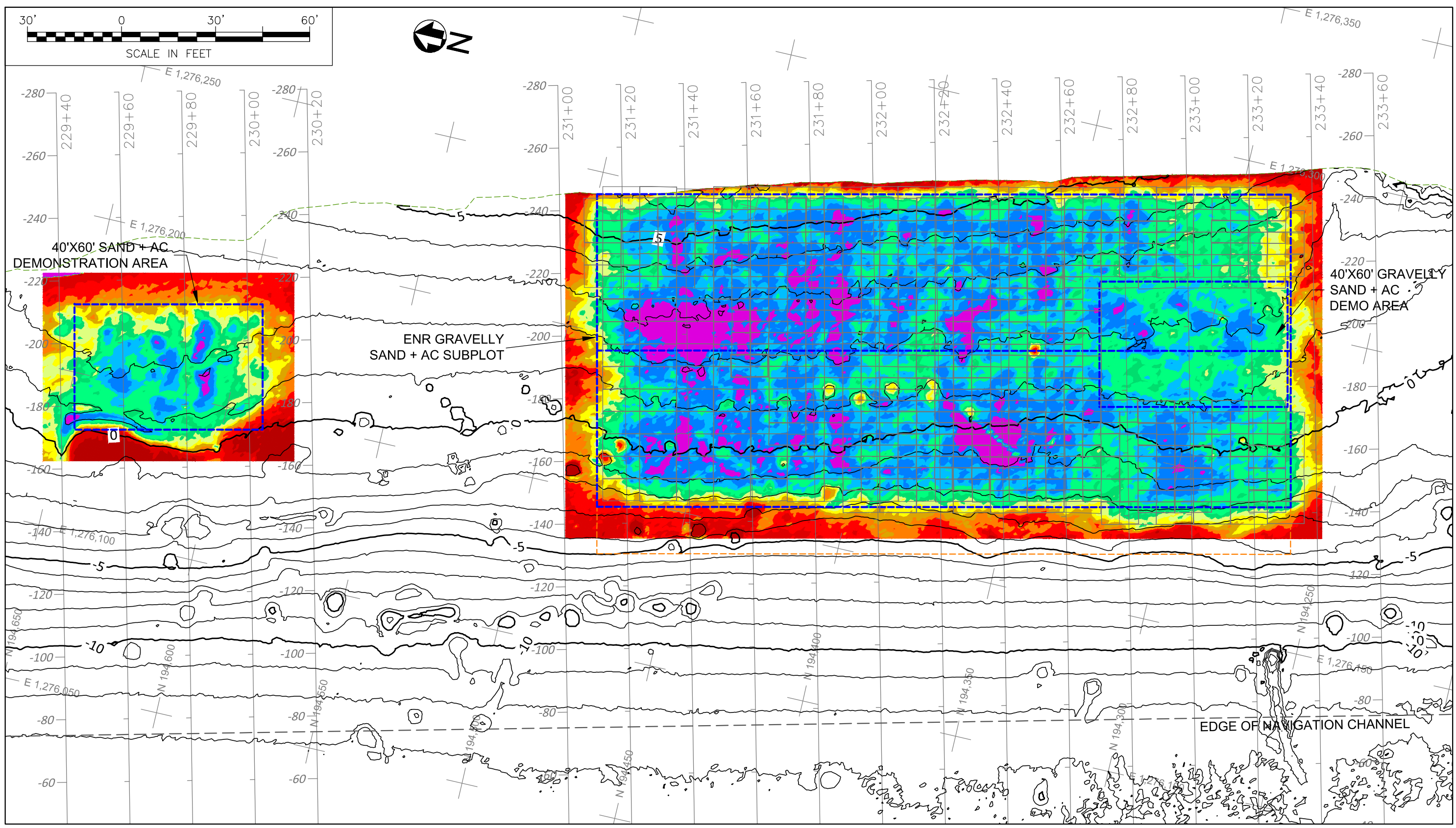
**Photo 2-B:** Rock shaped object split in half.



Project: 3-Week Look Ahead (12-1) Date: Mon 12/19/16	Task		Project Summary		Inactive Milestone	◆	Manual Summary Rollup		Deadline	↓
	Split		External Tasks		Inactive Summary		Manual Summary		Progress	
	Milestone	◆	External Milestone	◆	Manual Task		Start-only	☐		
	Summary		Inactive Task		Duration-only		Finish-only	☐		

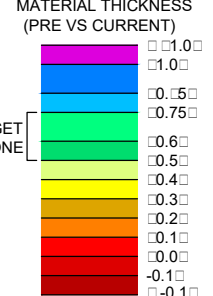
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						S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S				
1		<b>General</b>	<b>178 days</b>	<b>Wed 6/1/16</b>	<b>Fri 2/10/17</b>																										
2		Contract Award	0 days	Wed 6/1/16	Wed 6/1/16																										
3		Phase 1 Notice to Proceed	0 days	Wed 6/1/16	Wed 6/1/16																										
4		Start In-Water Work	0 days	Tue 11/29/16	Tue 11/29/16																										
5		Phase 2 Substantial Completion	0 days	Wed 1/25/17	Wed 1/25/17																										
6		Punchlist	2 days	Thu 1/26/17	Fri 1/27/17																										
7		Closeout	10 days	Mon 1/30/17	Fri 2/10/17																										
8		Complete In-Water Work	0 days	Thu 2/9/17	Thu 2/9/17																										
9		Final Acceptance	0 days	Thu 2/9/17	Thu 2/9/17																										
10		<b>Materials Placement</b>	<b>39 days</b>	<b>Tue 11/29/16</b>	<b>Wed 1/25/17</b>																										
11		<b>Test Placement</b>	<b>2 days</b>	<b>Tue 11/29/16</b>	<b>Wed 11/30/16</b>																										
12		Test Placement Area- Sand + AC	1 day	Tue 11/29/16	Tue 11/29/16																										
13		Test Placement Area- Gravelly Sand + AC	1 day	Wed 11/30/16	Wed 11/30/16																										
14		<b>Intertidal Plot</b>	<b>14 days</b>	<b>Thu 12/1/16</b>	<b>Tue 12/20/16</b>																										
15		Intertidal Plot- Gravelly Sand + AC	6 days	Thu 12/1/16	Thu 12/8/16																										
16		Intertidal Plot- Gravelly Sand	7 days	Fri 12/9/16	Mon 12/19/16																										
17		Hydrographic As-Built Survey	0 days	Tue 12/20/16	Tue 12/20/16																										
18		<b>Scour Plot</b>	<b>12 days</b>	<b>Tue 12/20/16</b>	<b>Fri 1/6/17</b>																										
19		Scour Plot- Gravelly Sand + AC	6 days	Tue 12/20/16	Wed 12/28/16																										
20		Scour Plot- Gravelly Sand	6 days	Thu 12/29/16	Fri 1/6/17																										
21		Hydrographic As-Built Survey	0 days	Fri 1/6/17	Fri 1/6/17																										
22		<b>Subtidal Plot</b>	<b>12 days</b>	<b>Mon 1/9/17</b>	<b>Wed 1/25/17</b>																										
23		Subtidal Plot- Sand + AC	6 days	Mon 1/9/17	Tue 1/17/17																										
24		Subtidal Plot- Sand	6 days	Wed 1/18/17	Wed 1/25/17																										
25		Hydrographic As-Built Survey	0 days	Wed 1/25/17	Wed 1/25/17																										

Project: Baseline Schedule-Update Date: Mon 12/19/16	Task		Project Summary		Inactive Milestone		Manual Summary Rollup		Deadline	
	Split		External Tasks		Inactive Summary		Manual Summary		Progress	
	Milestone		External Milestone		Manual Task		Start-only			
	Summary		Inactive Task		Duration-only		Finish-only			



**DATUM INFORMATION**  
 Horizontal: WASHINGTON STATE PLANE NORTH, NAD83, U.S. FEET  
 Vertical: MEAN LOWER LOW WATER (MLLW) NOS SEATTLE EPOCH 1983-2001

- NOTES**
1. SURVEY FOR THE INTERTIDAL AREA WAS CONDUCTED BY TERRASOND LIMITED ON DEC 15, 2016
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  3. REAL-TIME KINEMATIC (RTK) POSITIONING WAS BASED ON RECORD COORDINATES FOR POINT "SLAG 1"



- LEGEND**
- SUBPLOT
  - - - DEMONSTRATION LIMIT
  - - - OPTIONAL EXCESS MATERIAL PLACEMENT
  - - - CURRENT SURVEY
  - - - TARGET ONE
  - SURVEY CONTOURS
  - 5' INDEX INTERVAL
  - BUCKET PLACEMENT MARK

**SURVEY CONTROL**

SLAG 1  
 N: 194,112.357  
 E: 1,276,323.474  
 U: 10.905

SLAG 2  
 N: 194,112.026  
 E: 1,276,325.646  
 U: 10.95

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**ENHANCED NATURAL RECOVERY  
 ACTIVATED CARBON PILOT STUDY  
 MULTIBEAM HYDROGRAPHIC SURVEY**

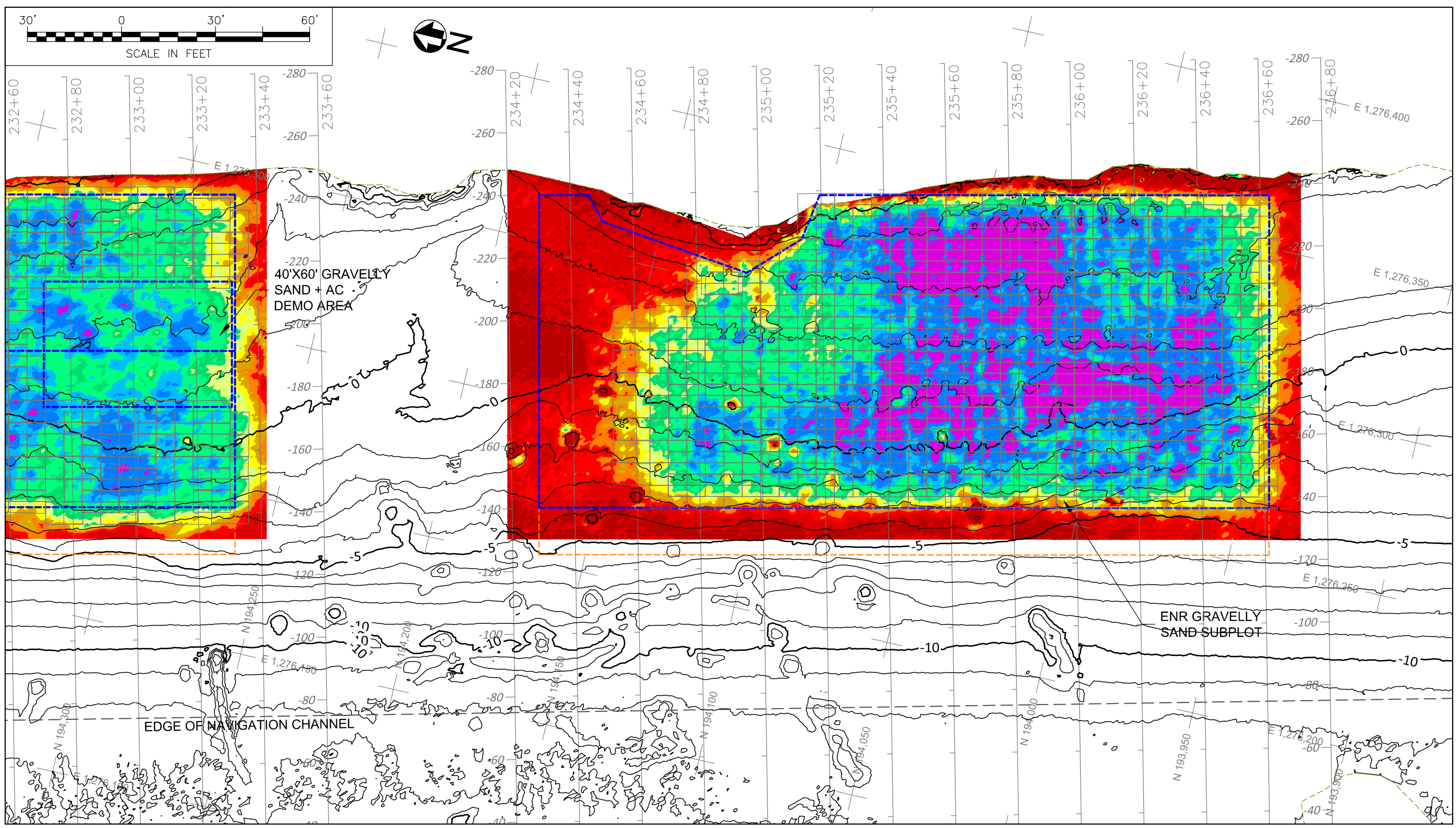
**INTERTIDAL PROGRESS**

Revised No.	Revision	Signed	Date

SHEET 1 OF 6

Drawn: MSK	Checked: LNL	Survey Date: DEC 15, 2016
Project No.: 2016-000	Draw Date: DEC 16, 2016	





**DATUM INFORMATION**  
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 Vertical: MEAN LOWER LOW WATER (MLLW) NOS SEATTLE EPOCH 1983-2001

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  3. REAL-TIME KINEMATIC (RTK) POSITIONING WAS BASED ON RECORD COORDINATES FOR POINT "SLAG 1"

<b>MATERIAL THICKNESS (PRE VS CURRENT)</b> 	<b>LEGEND</b> 	<b>SURVEY CONTROL</b> SLAG 1 N: 194,112.357 E: 1,276,323.474 U: 10.905
		SLAG 2 N: 194,112.026 E: 1,276,325.646 U: 10.995

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**ENHANCED NATURAL RECOVERY  
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 MULTIBEAM HYDROGRAPHIC SURVEY**

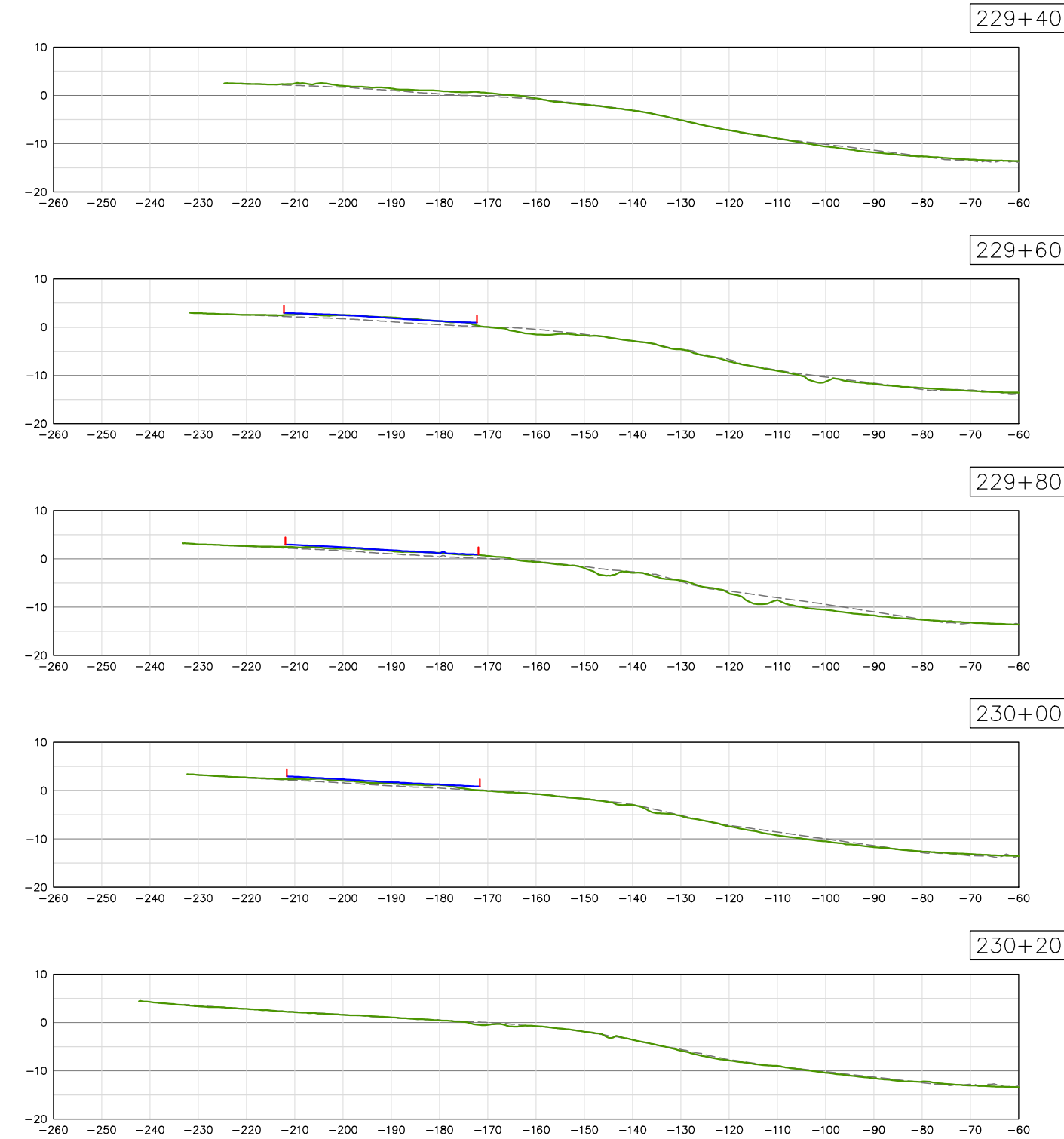
INTERTIDAL PROGRESS

Revis. No.	Revision	Signed	Date

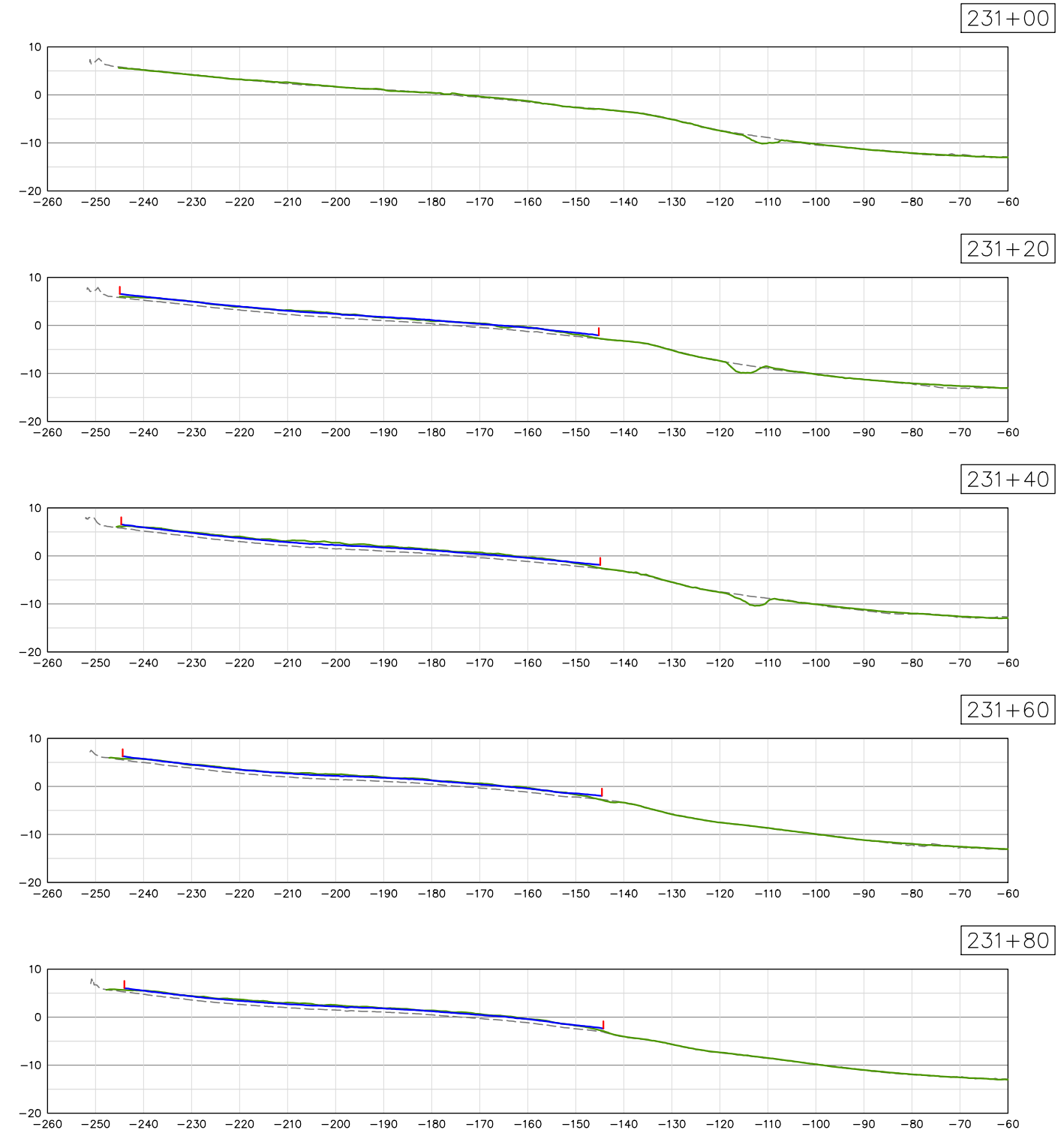
SHEET 2 OF 6

Drawn: MSK	Checked: LNL	Survey Date: DEC 15, 2016
Printer Size: ANSI	Project No.: 2016-000	Draw Date: DEC 16, 2016

### 40'X60' SAND + AC DEMONSTRATION AREA



### ENR GRAVELLY SAND + AC SUBPLOT



#### DATUM INFORMATION

Horizontal: WASHINGTON STATE PLANE NORTH, NAD83, U.S. FEET  
 Vertical: MEAN LOWER LOW WATER (MLLW) NOS SEATTLE EPOCH 1983-2001

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3. REAL-TIME KINEMATIC (RTK) POSITIONING WAS BASED ON RECORD COORDINATES FOR POINT "SLAG 1"
4. PROFILE VERTICAL MAGGERRATION IS 0.10

#### PROFILES LEGEND

- SUBPLOT EXTENT (39 INCHES)
- CURRENT SURVEY
- - - PRE-SURVEY (NOV 1, 2016)

#### SURVEY CONTROL

SLAG 1	SLAG 2
N: 194,112.357	N: 194,112.026
E: 1,276,323.444	E: 1,276,325.646
Q: 10.905	Q: 10.195



### ENHANCED NATURAL RECOVERY ACTIVATED CARBON PILOT STUDY MULTIBEAM HYDROGRAPHIC SURVEY

#### INTERTIDAL PROGRESS

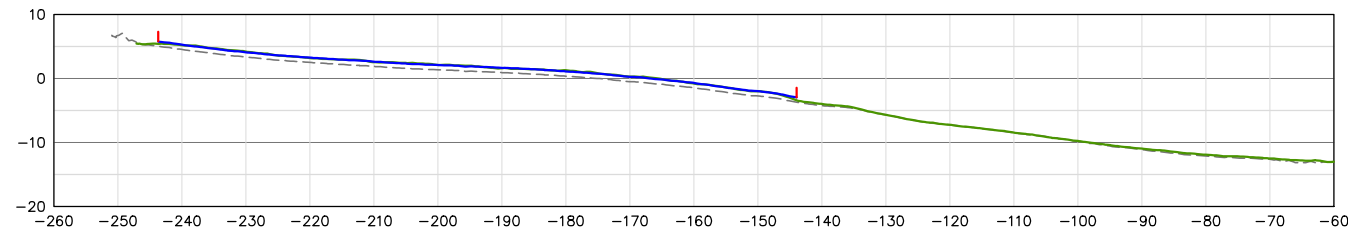
Revis. No.	Revision	Signed	Date

SHEET 3 OF 6

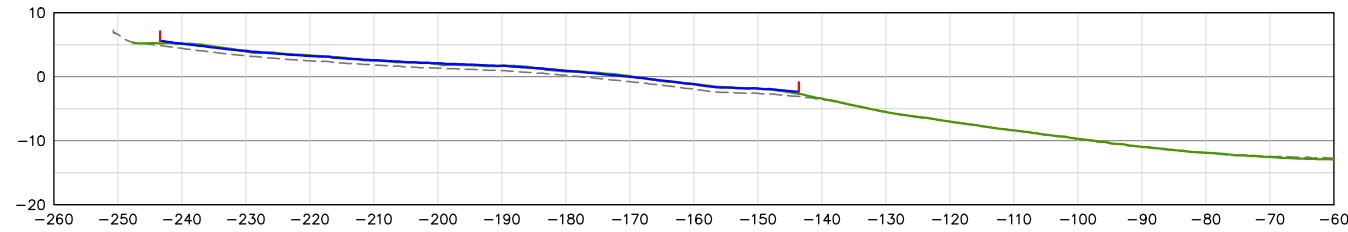
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Printer Size: ANSI	Project No.: 2016-000	Draw Date: DEC 16, 2016

### ENR GRAVELLY SAND + AC SUBPLOT

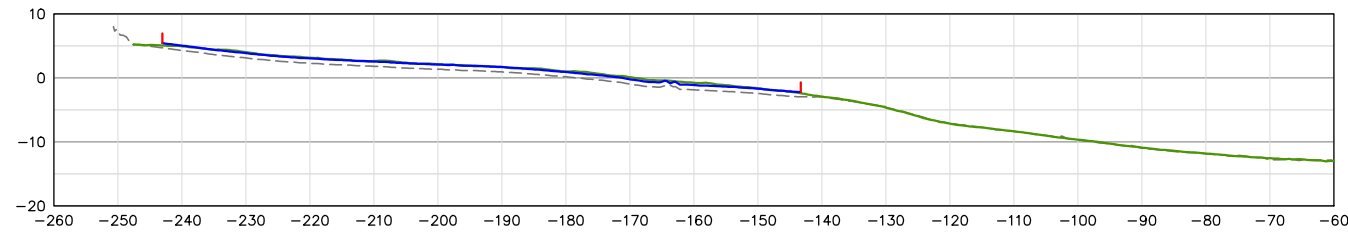
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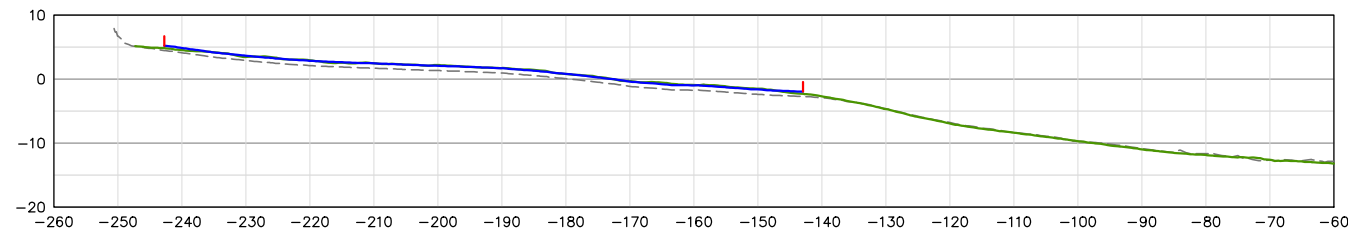
232+20



232+40

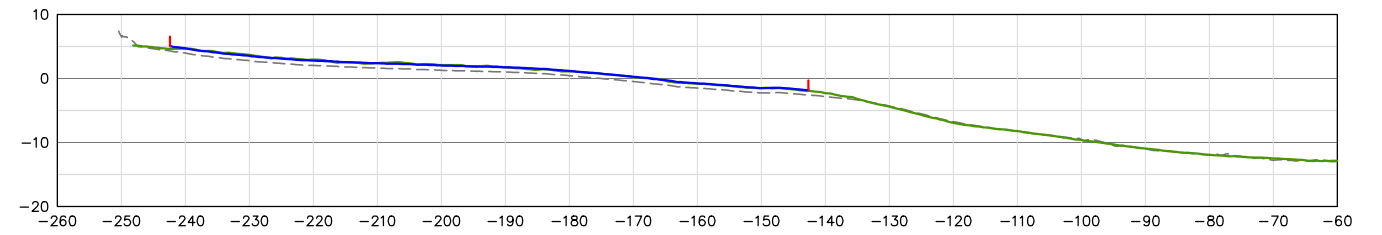


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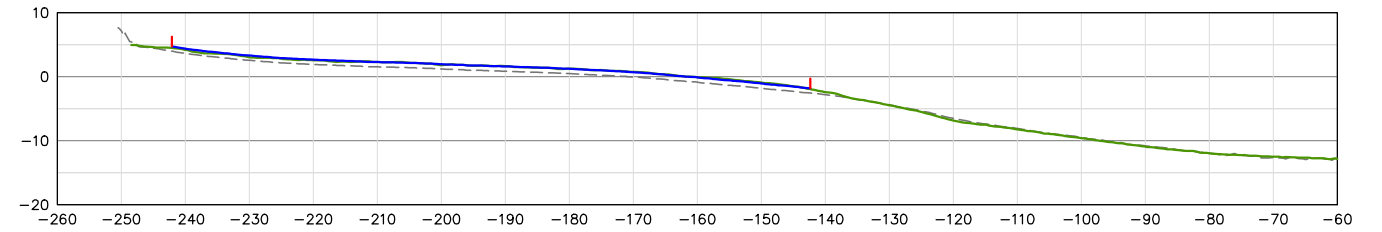


### ENR GRAVELLY SAND + AC SUBPLOT

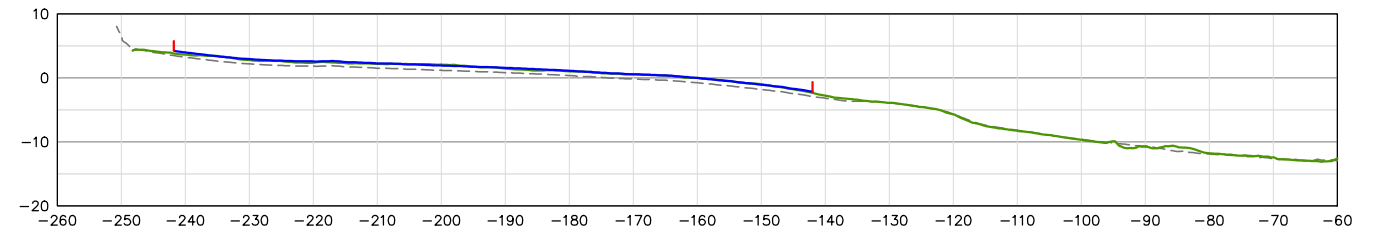
232+80



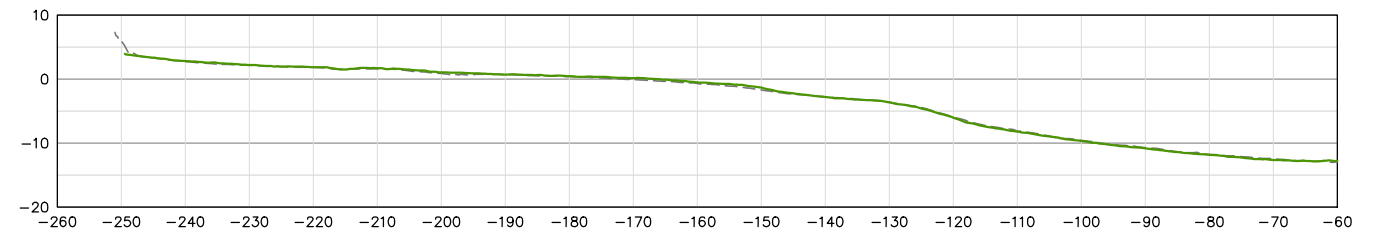
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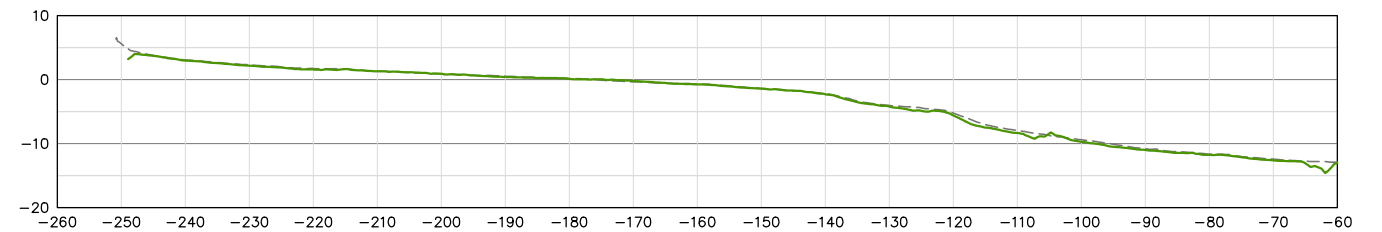
233+20



233+40



233+60



#### DATUM INFORMATION

Horizontal: WASHINGTON STATE PLANE NORTH, NAD83, U.S. FEET  
Vertical: MEAN LOWER LOW WATER (MLLW) NOS SEATTLE EPOCH 1983-2001

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3. REAL-TIME KINEMATIC (RTK) POSITIONING WAS BASED ON RECORD COORDINATES FOR POINT "SLAG 1"
4. PROFILE VERTICAL EXAGGERATION IS 1.0

#### PROFILES LEGEND

- SUBPLOT EXTENT (±9 INCHES)
- CURRENT SURVEY
- PRE-SURVEY (NOV 15, 2016)

#### SURVEY CONTROL

SLAG 1	SLAG 2
N: 194,112.357	N: 194,112.026
E: 1,276,323.444	E: 1,276,325.646
±: 10.905	±: 10.195



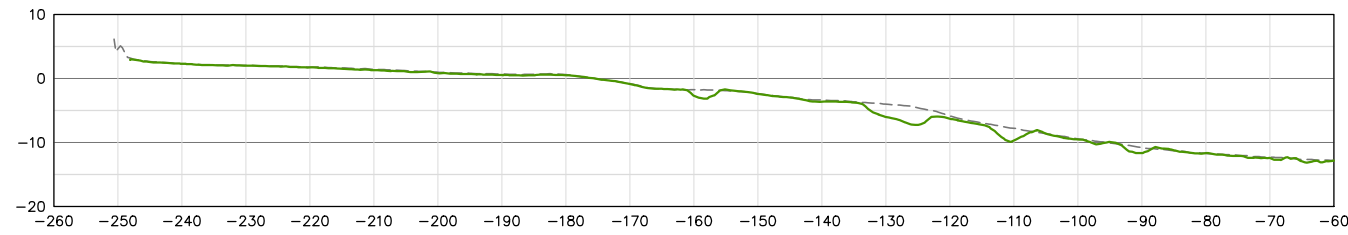
### ENHANCED NATURAL RECOVERY ACTIVATED CARBON PILOT STUDY MULTIBEAM HYDROGRAPHIC SURVEY

#### INTERTIDAL PROGRESS

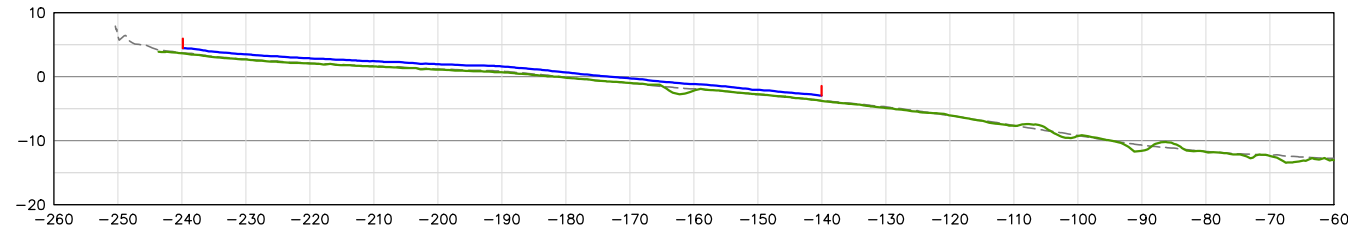
Revis. No.	Revision	Signed	Date
SHEET 4 OF 6			
Drawn: MSK	Checked: LNL	Survey Date: DEC 15, 2016	
Printer Size: ANSI	Project No.: 2016-000	Draw Date: DEC 16, 2016	

### ENR GRAVELLY SAND SUBPLOT

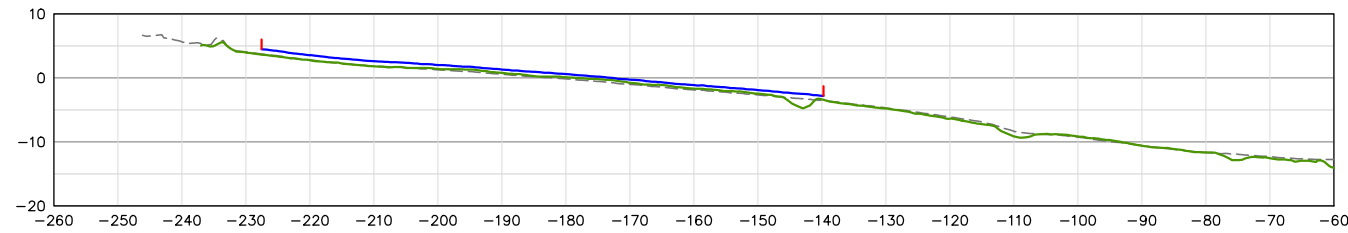
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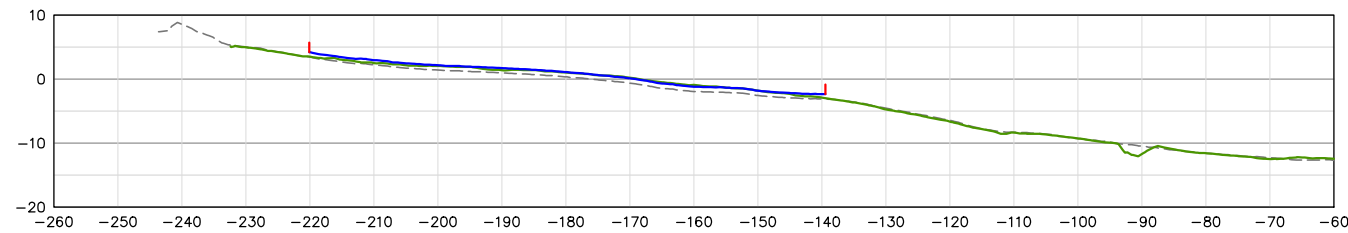
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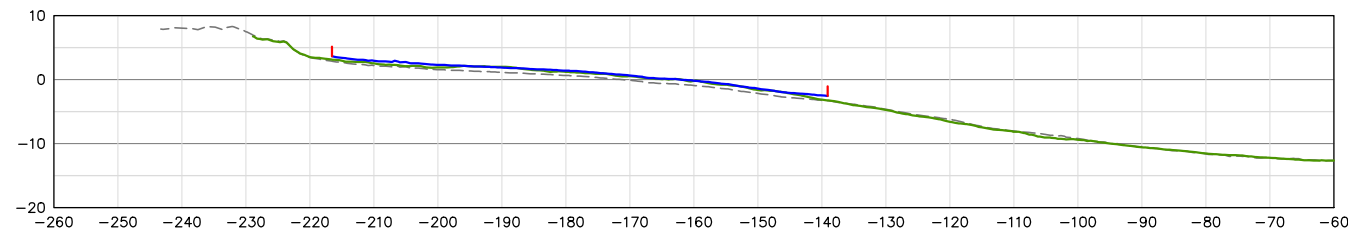
234+60



234+80

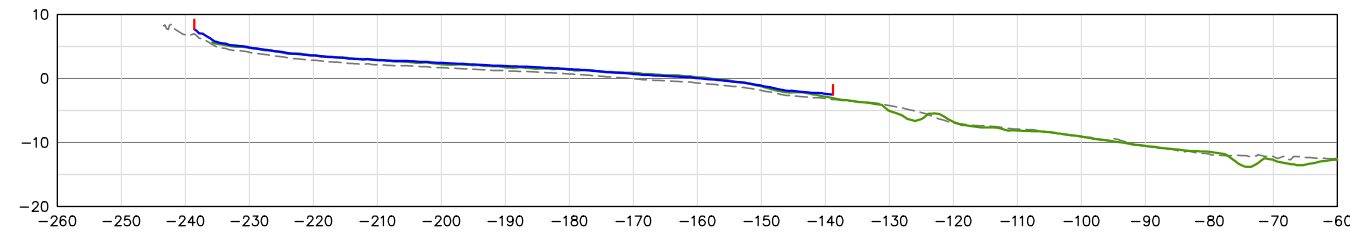


235+00

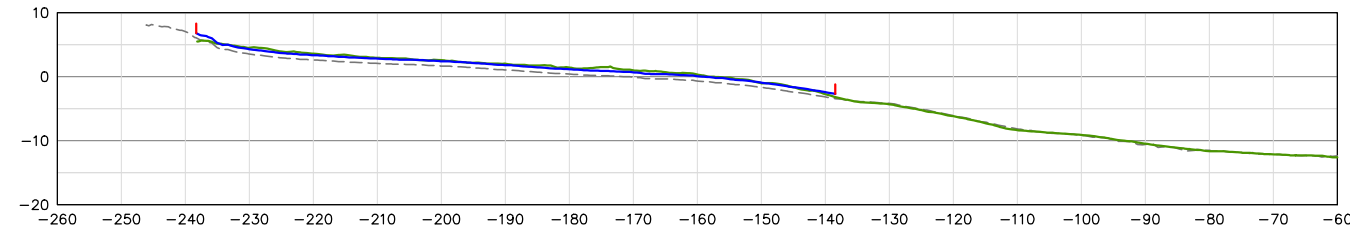


### ENR GRAVELLY SAND SUBPLOT

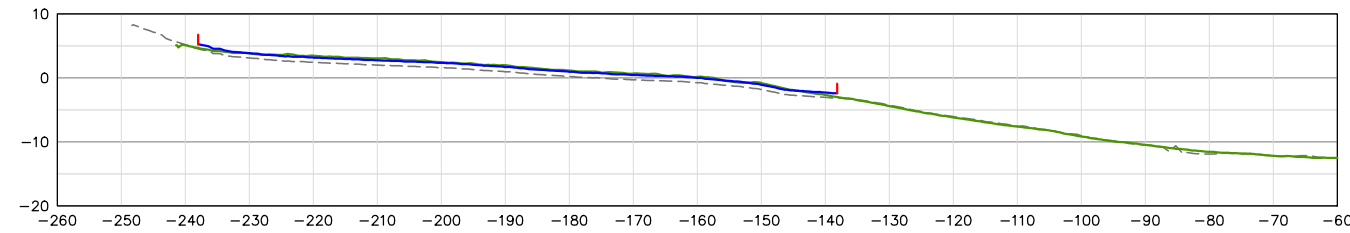
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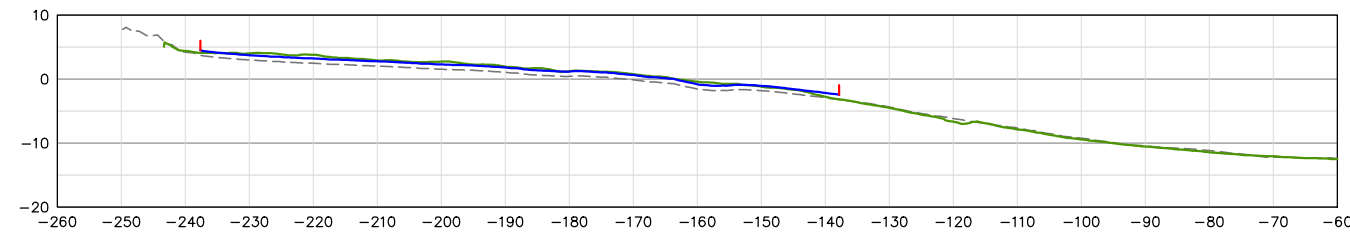
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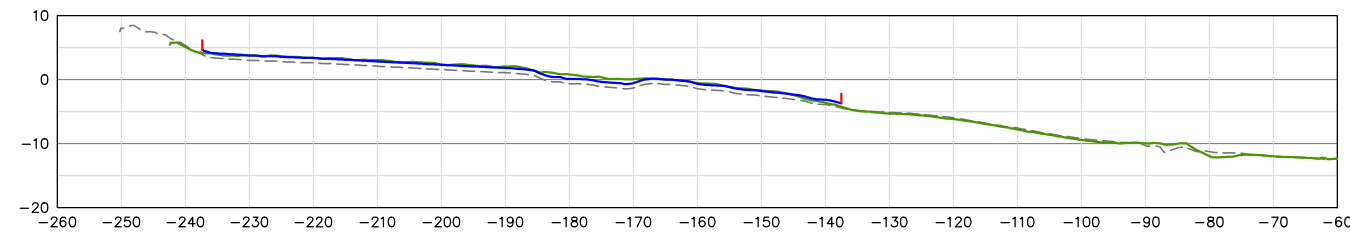
235+60



235+80



236+00



#### DATUM INFORMATION

Horizontal: WASHINGTON STATE PLANE NORTH, NAD83, U.S. FEET  
Vertical: MEAN LOWER LOW WATER (MLLW) NOS SEATTLE EPOCH 1983-2001

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3. REAL-TIME KINEMATIC (RTK) POSITIONING WAS BASED ON RECORD COORDINATES FOR POINT "SLAG 1"
4. PROFILE VERTICAL MAGNIFICATION IS 1.0

#### PROFILES LEGEND

- SUBPLOT EXTENT (39 INCHES)
- CURRENT SURVEY
- - - PRE-SURVEY (NOV 11, 2016)

#### SURVEY CONTROL

SLAG 1	SLAG 2
N: 194,112.357	N: 194,112.026
E: 1,276,323.444	E: 1,276,325.646
Q: 10.905	Q: 10.195



### ENHANCED NATURAL RECOVERY ACTIVATED CARBON PILOT STUDY MULTIBEAM HYDROGRAPHIC SURVEY

#### INTERTIDAL PROGRESS

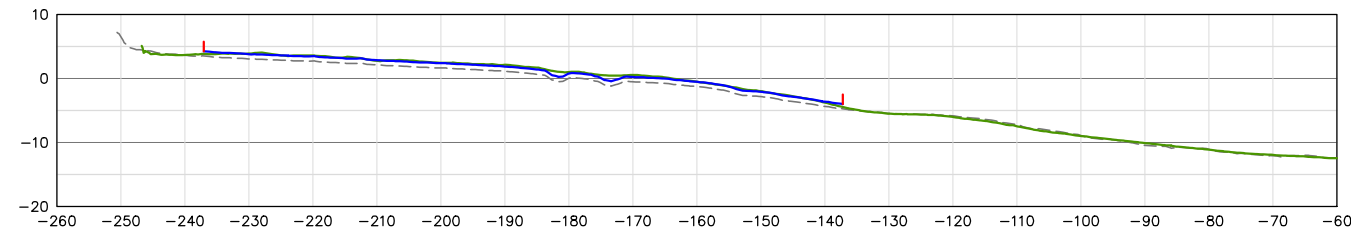
Revis. No.	Revision	Signed	Date

SHEET 5 OF 6

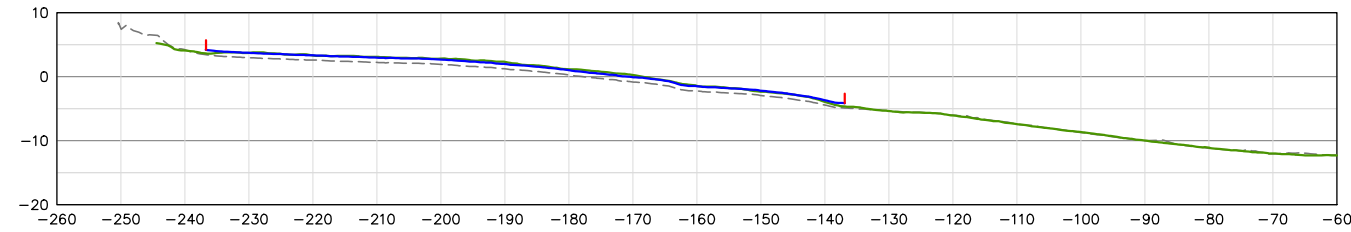
Drawn: MSK	Checked: LNL	Survey Date: DEC 15, 2016
Printer Size: ANSI	Project No.: 2016-000	Draw Date: DEC 16, 2016

# ENR GRAVELLY SAND SUBPLOT

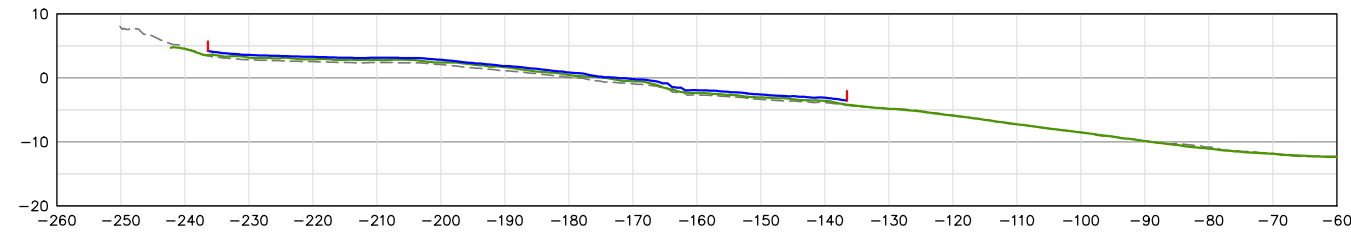
236+20



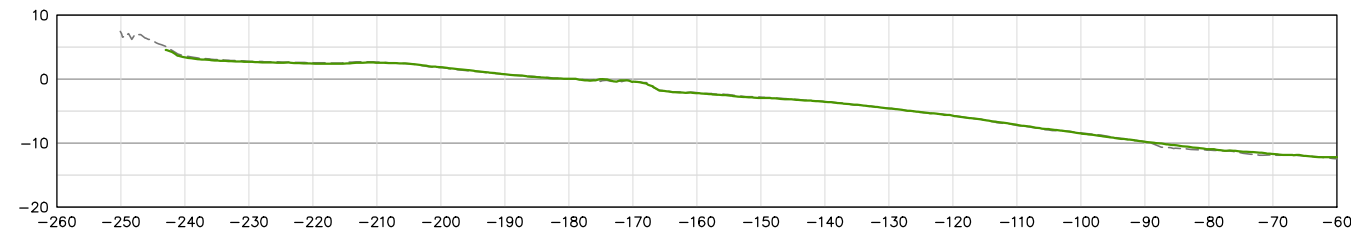
236+40



236+60



236+80



### DATUM INFORMATION

Horizontal: WASHINGTON STATE PLANE NORTH, NAD83, U.S. FEET

Vertical: MEAN LOWER LOW WATER (MLLW) NOS SEATTLE EPOCH 1983-2001

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### PROFILES LEGEND

- SUBPLOT EXTENT (39 INCHES)
- CURRENT SURVEY
- - - PRE-SURVEY (NOV 1, 2016)

### SURVEY CONTROL

SLAG 1	SLAG 2
N: 194,112.357	N: 194,112.026
E: 1,276,323.444	E: 1,276,325.646
Q: 10.905	Q: 10.195

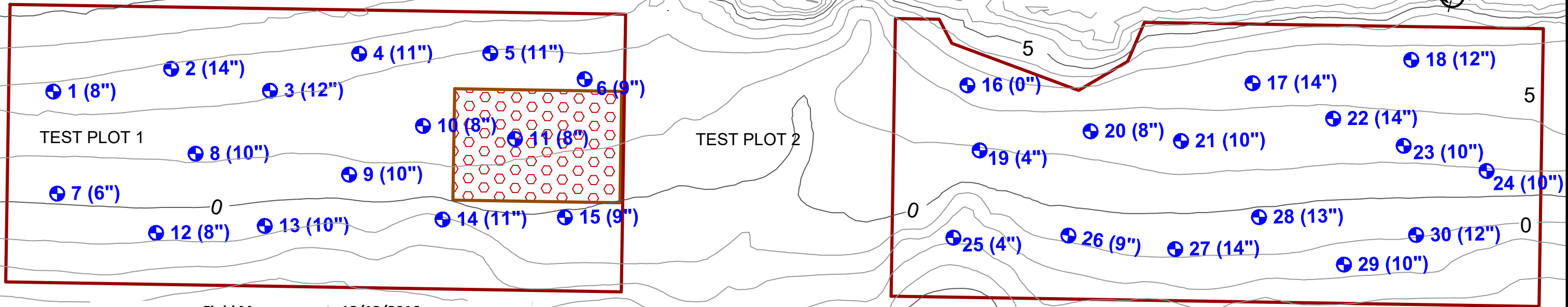


## ENHANCED NATURAL RECOVERY ACTIVATED CARBON PILOT STUDY MULTIBEAM HYDROGRAPHIC SURVEY

### INTERTIDAL PROGRESS

Revis. No.	Revision	Signed	Date
SHEET 6 OF 6			
Drawn: MSK	Checked: LNL	Survey Date: DEC 15, 2016	
Printer Size: ANSI	Project No.: 2016-000	Draw Date: DEC 16, 2016	

PLOT TIME: 12/19/2016 1:50 PM MOD TIME: 12/19/2016 1:05 PM USER: Dan Pickering DWG: D:\Projects\King County\ENR Plot\CAD\2016-12-19 04 KC-ENR Staking and Marmts.dwg



**Field Measurements 12/13/2016**  
Gravelly Sand + Activated Carbon Intertidal Subplot

Test Plot Location ID (IT-ENR-AC-xx)	Stake # (S-xx)	Stake Length above Plate (Inches)	Exposed Stake length (measured) Inches	Placed ENR Thickness (Inches)
IT-ENR-AC-01	S-31	18	10	8
IT-ENR-AC-02	S-61	18	4	14
IT-ENR-AC-03	S-41	18	6	12
IT-ENR-AC-04	S-37	18	7	11
IT-ENR-AC-05	S-70	18	7	11
IT-ENR-AC-06	S-69	18	9	9
IT-ENR-AC-07	S-29	18	12	6
IT-ENR-AC-08	S-56	18	8	10
IT-ENR-AC-09	S-100	18	8	10
IT-ENR-AC-10	S-57	18	10	8
IT-ENR-AC-11	S-76	18	10	8
IT-ENR-AC-12	S-35	18	10	8
IT-ENR-AC-13	S-45	18	8	10
IT-ENR-AC-14	S-44	18	7	11
IT-ENR-AC-15	S-34	18	9	9

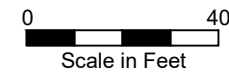
AVERAGE THICKNESS	10
MINIMUM THICKNESS	6
MAXIMUM THICKNESS	14

**Field Measurements 12/15/2016**  
Gravelly Sand Intertidal Subplot

Test Plot Location ID (IT-ENR-AC-xx)	Stake # (S-xx)	Stake Length above Plate (Inches)	Exposed Stake length (measured) Inches	Placed ENR Thickness (Inches)
IT-ENR-16*	S-10	18	18	0
IT-ENR-17	S-5	18	4	14
IT-ENR-18	S-11	18	6	12
IT-ENR-19	S-38	18	14	4
IT-ENR-20	S-19	18	10	8
IT-ENR-21	S-20	18	8	10
IT-ENR-22	S-16	18	4	14
IT-ENR-23	S-14	18	8	10
IT-ENR-24	S-7	18	8	10
IT-ENR-25	S-28	18	14	4
IT-ENR-26	S-14	18	9	9
IT-ENR-27	S-6	18	4	14
IT-ENR-28	S-33	18	5	13
IT-ENR-29	S-1	18	8	10
IT-ENR-30	S-18	18	6	12

\*No Material Placement at this location at time of measurement.

AVERAGE THICKNESS	10
MINIMUM THICKNESS	0
MAXIMUM THICKNESS	14



**Legend**

⊕ 13 (8) Stake Location (Thickness Measurement)

Test Plot

King County Department of Natural Resources & Parks  
Wastewater Treatment Division

Enhanced Natural Recovery-Active Carbon Study

**Staking Locations & Thickness Measurements**  
Intertidal Plot



**FIGURE**

December 19, 2016