



Portland General Electric Company
121 SW Salmon Street • Portland, Oregon 97204

October 9, 2018

David Lacey
Northwest Region Cleanup/Site Assessment
Oregon Department of Environmental Quality
700 NE Multnomah St., Suite 600
Portland OR 97232

Subject: Willamette River Mile 13.1
Final Six-Month Post-Construction Survey
Isolation Cap Inspection Report
ESCI #5249

Per the River Mile (RM) 13.5 and 13.1 Cap Inspection Monitoring and Maintenance Plan, the Final six-month post-construction survey for RM 13.1 was performed including the required bathymetric survey.

In response to your letter dated July 11, 2018 and email dated September 17, 2018, Portland General Electric Company (PGE) has made the revisions as required and is resubmitting the report as final.

Please feel free to contact me at 503-464-7853 or Christopher.Bozzini@pge.com if you any questions or concerns.

Sincerely,

A handwritten signature in blue ink that reads "Christopher Bozzini". The signature is fluid and cursive, with a long horizontal stroke extending to the right.

Christopher Bozzini, P.E.
Manager, Cleanup & Terrestrial Group

Attachment

Portland General Electric Company
River Mile 13.1 Six-Month Post Construction Survey
Isolation Cap Inspection Report
ESCI #5249
October 2018



EXPIRES: 12/31/19

Project Background

The River Mile (RM) 13.1 Study Area is located on the eastern shore of the lower Willamette River in downtown Portland, Oregon (Figure 1). The RM 13.1 Study Area was one of nine focus areas identified by the Oregon Department of Environmental Quality (DEQ) during the 2008 Downtown Portland Sediment Study. The study indicated elevated concentrations of arsenic, lead, mercury, polychlorinated biphenyls (PCBs), dioxins/furans, pesticides, and polycyclic aromatic hydrocarbons (PAHs).

Based on the results of the 2011 Remedial Investigation (RI) Report, Portland General Electric Company (PGE) prepared a Feasibility Study (FS) to describe and evaluate suitable remedial alternatives for contaminated sediment above risk-based screening levels in 2014. The Final FS recommended the installation of an isolation cap over approximately 47,000 square feet, with an additional reactive amendment in two discrete areas (the amended cap areas) identified as “hot spots” to treat impacted sediment at RM 13.1.

In addition, PGE conducted an Emergency Action Project inside the RM 13.1 Study Area between February 23, 2016 and March 31, 2016. The action filled a scoured depression that was identified beneath four submerged electrical cables. The scoured depression was caused by a leak in the City of Portland’s (City’s) 30-inch-diameter pressurized water main; the leak was repaired by the City prior to implementation of the Emergency Action. During the Emergency Action, divers inspected, repaired, and removed debris from the submerged cables. Approximately 2,274 cubic yards of sand and gravel armor were placed to fill in the scour hole to support and cover the cables.

Record of Decision Requirements

In April 2005, DEQ issued the Record of Decision (ROD) Selected Remedy for the PGE Willamette River Sediment Sites (Environmental Cleanup Site Information (ECSI) Site ID: 5249). The ROD & Final River Mile 13.5 and 13.1 Cap Inspection, Monitoring, and Maintenance Plan, River Mile 13.5 and 13.1 Portland, Oregon, (PGE, June 22, 2018) (IMMP) required a six-month post construction survey be completed. Construction of the RM 13.1 Isolation Cap occurred between July and October 2017.

Following the completion of the required six-month post-construction survey during the seasonal high-water period (May 2018), long-term cap monitoring will commence and will be completed as follows:

Year 1	<i>April-May 2019</i>	Year 15	<i>April-May 2033</i>
Year 3	<i>April-May 2021</i>	Year 20	<i>April-May 2038</i>
Year 5	<i>April-May 2023</i>	Year 25	<i>April-May 2043</i>
Year 10	<i>April-May 2028</i>	Year 30	<i>April-May 2048</i>

At the request of DEQ, in 2017 PGE performed sediment sampling outside of the cap area, but within the study area. The driver of this sampling activity was the scour created by the City’s water main leak. The results of this sampling are summarized in the RM 13.1 Additional Surface Sediment Characterization Field Report, dated May 31, 2018. The next round of sediment sampling outside the cap footprint is

scheduled for the 5-year (2023) and 10-year (2028) monitoring events. PGE and DEQ will coordinate the need to extend monitoring events following review of the 10-year sample results.

Isolation cap inspection will also be required to be performed following the occurrence of a 100-year flood or significant seismic event. A 100-year flood event in the lower Willamette River is defined as a river stage of 32.2 feet NAVD88 or a river discharge of 375,000 cubic feet per second (cfs). A significant local seismic event is defined as an earthquake in excess of magnitude 6. If one of these events occurs, a bathymetric survey will be conducted when river levels recede, and surveying conditions are satisfactory and safe to complete within the river.

Appendix A shows the river flows from October 2017 through September 2018. No floods or high river flow event occurred since construction of the cap in 2017.

Specific objectives for the long-term IMMP include the following:

- Ensure cap stability and protectiveness over time by monitoring and maintaining (as needed) the as-built cap thickness and integrity of the armor layers.
- Monitor sediment concentrations outside of the RM 13.1 isolation cap to confirm that study area-wide surface sediment surface weighted area concentrations (SWACs) continue to decrease and eventually fall below mean upriver background concentrations (MUBCs) for indicator constituents of concern (COCs).

The physical integrity monitoring was conducted as part of the cap inspection to detect and evaluate changes in the cap stability and cap thickness over time. Cap monitoring includes the following as required:

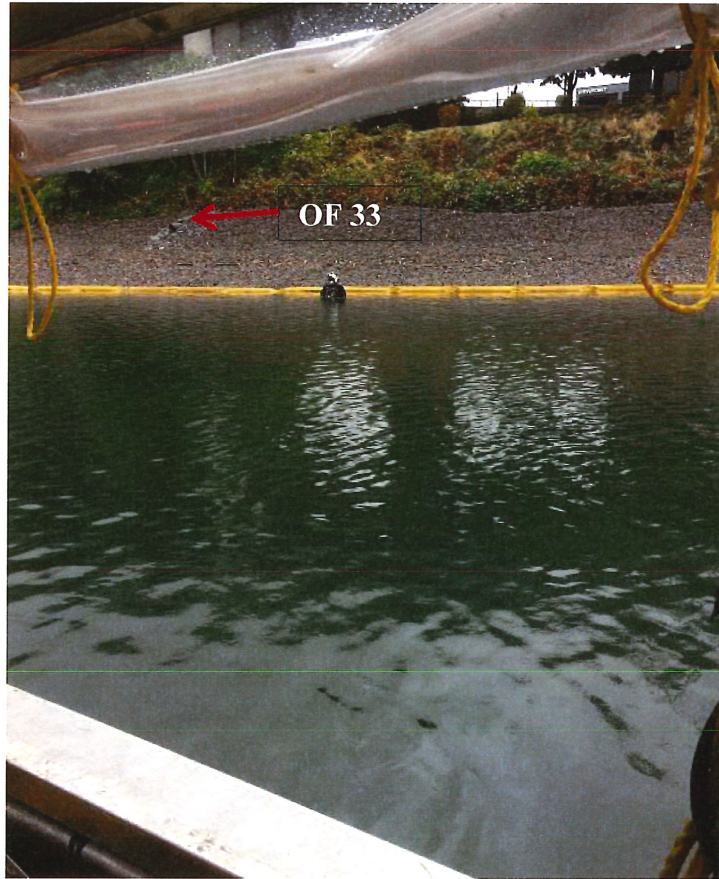
- Complete a high-resolutions multi-beam bathymetric survey to evaluate where the cap thickness and slopes are consistent with baseline conditions per the performance criteria.
- Visually inspect the shoreline cap area at low seasonal water level and low tide, if multi-beam bathymetric surveys cannot cover the full extent of the cap area. Visual inspections are intended to identify areas of eroded armor stone or damage to the armor layers from debris or human activities.
- If determined to be necessary by the Project Engineer, follow-up surveys and cap maintenance will be completed.

Six-Month Cap Inspection Results

1. Bathymetric Survey

The bathymetric survey field work was completed on April 9, 2018 by Solmar Hydro Inc. with the data being provided to PGE on May 4, 2018. The data and figures showed a potential low-spot of the cap on the shoreline near the Outfall (OF) 33 pipe. The following are photos showing OF 33 during the cap construction and OF 33 more recent on June 13, 2018. Per further evaluation, PGE found no

sluffing or low-spot adjacent to the OF 33 pipe. The potential low spot identified on the cut/fill analysis is believed to be an anomaly between survey data or interference from the outfall pipe.



Outfall (OF) 33 Pipe / RM 31.1 Cap Construction – Fall 2017



Outfall 33 Photo from Shoreline – June 13, 2018

The following figures from the May 9, 2018 bathymetric survey are included in of this report:

- Figure 2 *Willamette River RM 13.1 – Survey Area Basemap*
- Figure 3 *Willamette River RM 13.1 - Isolation Cap Volume Analysis*
- Figure 4 *Willamette River RM 13.1 – Sun-Illuminated Digital Terrain Model (1-ft contours)*

2. Visual Shoreline Monitoring and Inspection

Due to high water levels during the April 2018 bathymetric survey, the Visual Shoreline Inspection was completed by PGE on September 25, 2018. PGE scheduled the Visual Shoreline Inspection during the late-Summer and early Fall when the river is at its lowest level. During the inspection, the sediment cap appeared to be in very good condition, specifically the shoreline riprap and sediment cap armor stone.

The September 25, 2018 Visual Shoreline Inspection Notes/Observations are included in Appendix B of this report.

Evaluation of the Results

To complete the cut/fill analysis as part of the Isolation Cap Volume Analysis (Figure 3), on May 23, 2018 PGE's Survey Team used a boat on the river to identify the gap between the as-built bathymetric survey completed by HME Construction on February 15, 2018 during low water levels and the shore side of the cap. After review of the bathymetric survey data by PGE, the in-water portion of the cap is found to be in good condition with 98% of the cap greater than -0.5 feet of the original construction elevation. Roughly two percent of the cap is lower by half a foot or more, which is within the acceptable 10 percent criteria (Table 1). The RM 13.1 Isolation Cap remains intact and the integrity of the cap remains in place as required.

Follow-up Action

The evaluation of the results from the RM 13.1 Isolation Cap Six-Month Post-Construction Inspection indicates that no follow-up action will be required at this time.

The Year 1 RM 13.1 Isolation Cap Inspection will be completed in May 2019 as required under the ROD and IMMP.

References

DEQ. 2015. Record of Decision, Selected Remedy for PGE Willamette River Sediment Sites.
Prepared by Oregon Department of Environmental Quality, Northwest Regional Office,
April 2015.

AECOM. 2018. Additional Surface Sediment Characterization Field Report, River Mile 13.1.
Prepared for Portland General Electric Company, Portland, Oregon, May 31, 2018.

AECOM. 2018. River Mile 13.5 and 13.1 Cap Inspection, Monitoring, and Maintenance Plan.
Prepared for Portland General Electric Company, Portland, Oregon, June 22, 2018.

Table 1. Evaluation Criteria for Cap Integrity Monitoring

Monitoring Parameter	Data Evaluation of the Parameter	Decision Criteria	Decision	Follow-up Proposed Actions
Data	Review the QA/QC documentation provided by survey contractor.	Is the documentation missing any of the QA/QC requirements identified in Sections 3.2.2 and 4.1 of the IMMP or is the survey coverage less than 85 percent of the survey extents?	No	No additional action is necessary.
Cap Integrity	Prepare a sun-illuminated digital terrain model figure with surface elevation contour intervals. Identify the approximate length, width, and type of any surficial objects/large obstructions.	Do the surficial objects appear to be greater than an area 10 feet by 10 feet in size and/or is the object adversely impacting the cap?	No	No additional action is necessary.
	Prepare a backscatter figure with surface elevation contour intervals. Identify cap areas where the sediment density characteristics appear to be anomalous compared to final as-built survey.	Are there any anomalies greater than an area 10 feet by 10 feet in size and does area appear to be lower in elevation than the post-construction elevation?	No	No additional action is necessary.
Slope Stability	Calculate the slope across the extent of the isolation cap (top surface).	Has the grade across the isolation cap increased to greater than 3H:1V or changed substantially (greater than 50 percent) over an area larger than 50 feet by 50 feet in size? Is there any evidence of slope failure, such as stone accumulation at the bottom slopes?	No	No additional action is necessary.
Cap Thickness	Prepare ArcGIS bathymetry figure comparing the post-construction surface elevations and the current survey event surface elevations.	Is the change a neutral or positive change across 90 percent of the cap and are the negative areas less than 10 percent of the total isolation cap area?	2% of the cap has elevation difference >-0.5 ft	No additional action is necessary.

Note: QA/QC = quality assurance/quality control; H = horizontal; V = vertical

Figure 1
 RM 13.1 Site Location Map



Figure 1-1



- Final Cap Boundary
- Final Cap and Armor Extent
- Bathymetric Survey Extents

Portland General Electric
Portland, Oregon

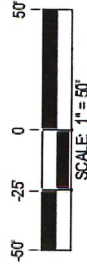
RM 13.1 Survey Area Basemap

Figure 2

Elevations Table

Number	Min. Elevation	Max. Elevation	Area SQ. FT.	Color	PERCENTAGE OF CAP
1	-2.50	-2.00	31.0	Red	0.06%
2	-2.00	-1.50	44.5	Red	0.08%
3	-1.50	-1.00	118.5	Red	0.20%
4	-1.00	-0.50	1060.7	Orange	1.92%
5	-0.50	0.00	32585.1	Yellow	59.14%
6	0.00	0.50	15144.5	Light Green	27.48%
7	0.50	1.00	3643.9	Green	6.61%
8	1.00	1.50	2034.9	Blue	3.69%
9	1.50	2.00	438.6	Dark Blue	0.82%

NOTE: ELEVATION DATUM = NAVD 1988, UNITS = FEET
 CUT/FILL ELEVATION BANDING BETWEEN AS-BUILT OF CAP AND APRIL 9, 2018
 BATHYMETRIC SURVEY. NEGATIVE VALUES ARE CUT AND POSITIVE VALUES ARE
 FILL



EXTENT OF 4-9-2018 SURVEY



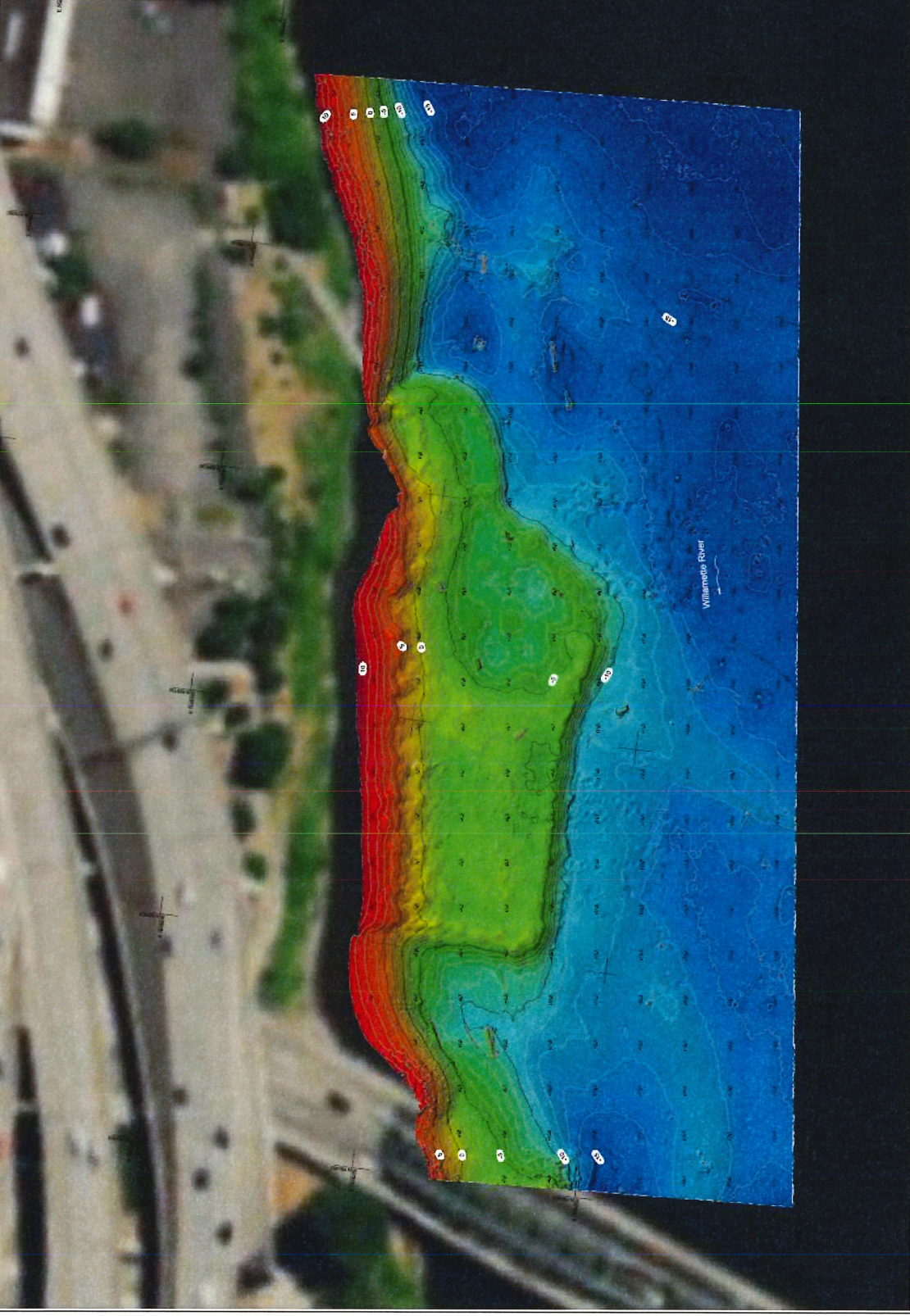
Public
 Access Not Limited

SHEET SIZE 11X17

FIGURE 3 - V1

REVISION

DATE	4/20/18	DESIGNER	UNSPECIFIED
DRAWN BY	FLI	CHECKED BY	UNSPECIFIED
SCALE	1"=50'	PROJECT NAME	WILLAMETTE RIVER RM 13.1 ISOLATION CAP
		CLIENT	PORTLAND GENERAL ELECTRIC CO.
		ADDRESS	121 SW SALMON ST., PORTLAND, OR 97204
		CITY	PORTLAND, OREGON
		STATE	OR
		COUNTY	CLATSOP
		PROJECT NO.	18-001
		SHEET NO.	3
		TOTAL SHEETS	3



- NOTES**
- The following information was derived from a multibeam bathymetric survey conducted by Solmar, Inc. on 10/10/2019.
 - Survey was conducted by J. Maguire.
 - The bathymetric chart was generated using the software of an electronic survey instrument.
 - Horizontal datum is NAD 83. Vertical datum is Mean Sea Level (MSL).
 - Vertical datum is Mean Sea Level (MSL).
 - Chart datum is MSL.
 - Water surface elevations were derived using RTK GPS (Real Time Kinematic) technology.
 - RTK GPS data was collected using a dual frequency GPS receiver (Trimble R10) and a dual frequency GPS antenna (Trimble SPS158).
 - Survey data is presented as a 10m grid resolution.
 - The bathymetric chart is a representation of the condition of the bottom at the time of the survey. The chart does not represent the condition of the bottom at any other time.
 - Vertical datum is Mean Sea Level (MSL).

SCALE

1" = 30'

0 30 60 90 120

Scale: 1" = 30'

Scale in Feet

PROJECT INFORMATION

PORTLAND GENERAL ELECTRIC RIVER MILE 13.1 CAP INSPECTION
 WILLAMETTE RIVER, PORTLAND OR
 MULTIBEAM BATHYMETRIC CONDITION SURVEY
 ONE FOOT CONTOURED CHART WITH SUN-ILLUMINATED
 DTM AND BACKSCATTER MOSAIC

Solmar hydro
 Marine Engineering & Surveying

Portland General Electric

APPROVED BY: J. Maguire

CHECKED BY: H. Shaw

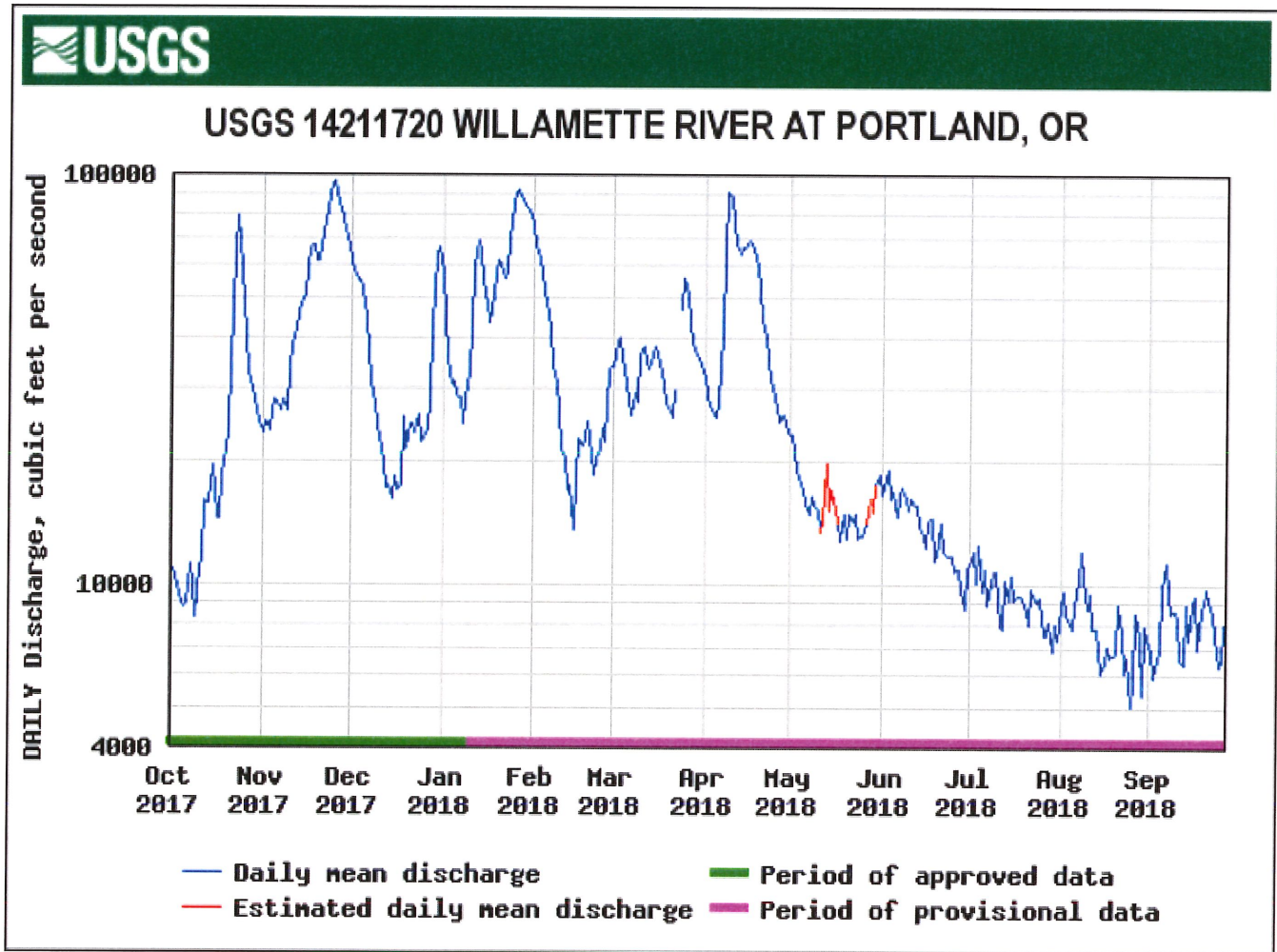
SCALE: 1" = 30'

DATE: 10/10/2019

Figure 4

Appendix A

USGS Water Discharge (Mean)
Willamette River at Portland, Oregon
October 2017 to September 2018
Graph



A 100-year flood event in the lower Willamette River is defined as a discharge of 375,000 cubic feet per second (cfs).

Appendix B

**Portland General Electric Company (PGE)
River Mile (RM) 13.1
Six-Month Sediment Cap Visual Shoreline Inspection
Field Notes & Observations**

September 25, 2018

(Low tide 2:31 am; High tide 7:12 am; Low tide 4:03 pm; high tide 7:38 pm)

Inspection performed by: Brandy Domina, PGE
Environmental Specialist

Field Notes

- Arrived at 9:40 am.

Location: South (downriver) from the RM 13.1 isolation cap location to begin visual shoreline inspection at the public dock.

- Weather was sunny and 62°F.
- Sediment cap and riprap in very good condition. River level is typically low in early Fall and much of the shoreline and armor stone was visible during the visual inspection.
- From shoreline, the armor stone and cap were observed in good condition with no low areas or sluffing observed.
- From shoreline/beach, the outfall 33 pipe was observed at approximately 20-23 ft above the current water level.

Difficult to walk on armor stone/riprap, but cap is observed in good condition with no contamination or oil sheen observed on the water or shoreline.

- Completed visual inspection at 10:10 a.m.

Location: North cap location (upriver) from RM 13.1 isolation cap.

Observations

1. *General coverage of armor stone and areas of inconsistent cover (slumping, mounding, loss).*

Comments: At the time of the visual inspection, the coverage of the armor stone looked intact with no inconsistencies in coverage observed.

2. *Areas of newly deposited sediment within the interstitial spaces of the armor stone or on top.*

Comments: At the time of the visual inspection, no visible areas of newly deposited sediment in the cap area was observed. Isolation cap appears to be in very good condition and is consistent with the bathymetric survey performed in April 9, 2018.

3. *Any apparent loss of sediment cap material (stone armor or sand).*

Comments: At the time of the visual inspection, there was no visible or apparent loss of sediment area. Isolation cap appears to be in good condition and is consistent with the previous bathymetric survey performed.

4. *Presence of significant debris that could undermine the physical integrity of the cap.*

Comments: No damage to the physical integrity of the cap was observed. The only debris observed was some minor trash and signs of camp fire rings toward the top of the riprap/shoreline area.

5. *Presence of vegetation.*

Comments: During the visual inspection of the shoreline, heavy vegetation along the river bank and shoreline was observed. The vegetation observed above the riprap near the bike trail mainly consisted of blackberry bushes. No vegetation was observed on the cap or armor stone.

6. *Visible signs or indicators of potential recontamination (i.e., sheen or staining) on the surface of the cap.*

Comments: No visual signs of contamination or oil sheens were observed on the shoreline or river water at the RM 13.1 Sediment Cap.

Photo Log



Photo 1

Looking south to north at the RM 13.1 Sediment Cap from the public dock.



Photo 2

Another view (south to north) at the riprap and shoreline from the public dock.



Photo 3

Another view at the riprap, shoreline and Outfall (OF) 33 pipe from the public dock.



Photo 4

Looking north to south from riprap and shoreline.



Looking south to north from riprap and shoreline.

Photo 5



View of OF 33 pipe looking up from river shoreline.

Photo 6