ENVIRONMENTAL CAP INSPECTION REPORT

FORMER MURRAY PACIFIC NO. 2 LOG SORT YARD

Consent Decree No. 94-2-099227 (September 16, 1994)
Washington State Department of Ecology Facility ID # 1211
Inspection Dates: February 21 and March 1, 2017

April 17, 2017

Prepared by:

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Acronyms

Ecology	Washington state Department of Ecology
ISGP	industrial stormwater general permit
MOU	Memorandum of Understanding
Murray Pacific No. 2	Murray Pacific No. 2 log sort yard
O&M	operations and maintenance
Port	Port of Tacoma
RI/FS	remedial investigation/feasibility study
Windward	Windward Environmental LLC
WUT	Washington United Terminals

Certification

I hereby certify that I am familiar with the facilities addressed in this report and that the inspection was conducted in accordance with acceptable engineering practices.

Warren G. Hansen, PE

Expires 4-22-2019

1 Introduction

This report summarizes the field activities and results for the cap inspection conducted on behalf of the Port of Tacoma (Port) for the former Murray Pacific No. 2 log sort yard (Murray Pacific No. 2). Murray Pacific No. 2 is located on the southwest side of the Blair Waterway at 2407 Port of Tacoma Road in Tacoma, Washington (Ecology 2014) (Figure 1), and is within the larger shipping terminal owned by the Port and currently leased to Washington United Terminals (WUT). The surface at Murray Pacific No. 2 is covered with an environmental cap and has several stormwater drainage features, described herein.

Cap inspection activities were conducted in accordance with the requirements identified in the Consent Decree (No. 94-2-099227) dated September 16, 1994, issued to the Port by the Washington State Department of Ecology (Ecology) (Washington Superior Court 1994), as well as the conditions of the operations and maintenance (O&M) plan (HLA 1997). A Memorandum of Understanding (MOU) between Ecology and the Port issued on September 12, 2011, updated the cap inspection frequency to every 30 months, starting with an inspection in February 2012 (Ecology and Port of Tacoma 2011).

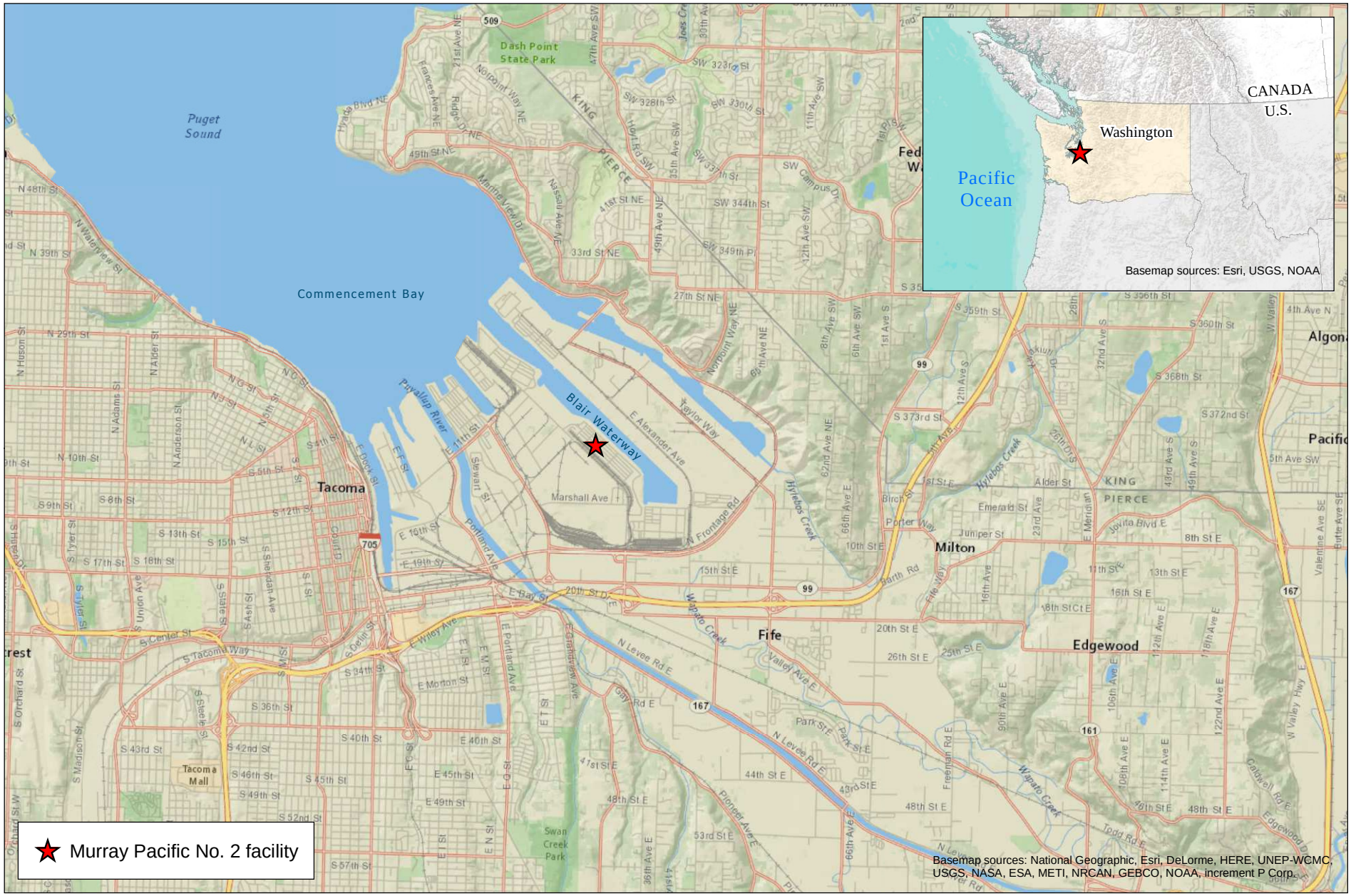

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Figure 1. Murray Pacific No. 2 vicinity map

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1.1 PURPOSE AND SCOPE

The purpose of this report is to present the findings of the 2017 environmental cap and stormwater drainage system inspection at Murray Pacific No. 2. The inspection was performed by Windward Environmental LLC (Windward) on February 21 and March 1, 2017, in accordance with the scope of work provided by the Port (Port of Tacoma 2016), which includes the following tasks:

- Inspection of the asphalt/concrete pavement for presence of cracks or other failures in the pavement that allow surface water runoff to infiltrate the bark/slag surficial fill (cracks greater than 1/8 in. wide, sub-base material exposed, pavement edge deterioration, and general appearance)
- Evaluation of the structural and functional condition of the cap and drainage systems (including catch basins, manholes, and oil/water separators)
- Evaluation of debris/sediment accumulation in the stormwater structures

The O&M plan states that cracks deeper than 2 in. shall be documented (HLA 1997). However, the criteria specified in the scope provided by the Port—that the cap shall be inspected for all cracks wider than 1/8 in.—is sufficiently protective. Therefore, crack depths were not measured during the inspection.

The purpose of the environmental cap is to prevent water infiltration, exposure of humans and the environment to underlying materials, and erosion. The stormwater drainage system is designed to convey stormwater off of the cap surfaces to prevent infiltration and erosion.

1.2 FACILITY BACKGROUND

Murray Pacific No. 2, situated on the southwest shore of the Blair Waterway in the Tacoma tideflats area, comprises 49.5 ac in the northwest portion of the larger 110-ac WUT facility. The Murray Pacific Corporation leased the property and operated it as a log sort yard from 1970 to 1994 (Ecology 2014). In order to stabilize Murray Pacific No. 2 for the heavy loads associated with log yard operations, approximately 68,000 tons of ASARCO slag, along with rock and gravel, were placed at the facility (Ecology 2014).

In 1983 and 1984, Ecology collected stormwater runoff samples from Murray Pacific No. 2 in which elevated levels of arsenic, copper, lead, and zinc were found to be present (Ecology 2014). Ecology concluded that the ASARCO slag was likely the source of the elevated metals concentrations.

A remedial investigation/feasibility study (RI/FS) involving soil, bark, sediment, surface water runoff, and groundwater sampling was completed in 1993 (Ecology 2014). In 1994, Ecology and the Port entered into a Consent Decree (No. 94-2-099227) in order to implement the remedy selected based on the findings of the FS (Ecology 2014; Washington Superior Court 1994). The selected remedy included excavation, installation of an asphalt cap, stormwater controls, groundwater monitoring, and

institutional controls (Ecology 2014). Remedial actions were completed from 1995 to 1998.

Pavement cap and stormwater inspections are currently performed at Murray Pacific No. 2 every 30 months (Ecology and Port of Tacoma 2011).[1] The last inspection was performed in August 2014 (Hart Crowser 2014).

Site groundwater is monitored every 18 months. It was most recently sampled in August 2016, and the results of that effort are documented in a separate report (Hart Crowser 2016).

During the most recent periodic review, Ecology determined that the remedial action at the site continues to be protective of human health and the environment (Ecology 2014).

[1] In addition to the stormwater system inspection described in this report, the stormwater system is monitored and maintained by WUT under its industrial stormwater general permit (ISGP).

2 Field Observations

Windward staff made field observations of the cap and stormwater system on February 21, 2017, and returned to Murray Pacific No. 2 on March 1, 2017, to observe additional stormwater structures not previously located or accessed. Use was made of existing repair and maintenance documentation provided by the Port.

2.1 ENVIRONMENTAL CAP

The environmental cap at Murray Pacific No. 2 covers approximately 49.5 ac (Figure 2). The cap was observed to be showing some signs of wear caused by the presence of containers and heavy equipment. Container divots (i.e., small depressions in the pavement surface caused by container corner fittings) were observed throughout portions of the cap used for container storage. The divots were generally shallow and did not appear to extend deeply into the cap cross section, or to impact the integrity of the cap. Loose gravel was often observed in the vicinity of the divots and may have been the result of raveling (i.e., dislodging of aggregate) (USACE 2009). Photos of representative divots are included as Figures 3 and 4.

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0 0.05 0.1 Miles

0 200 400 Feet

Figure 2. Murray Pacific No. 2 field observations

Prepared by mikey, 4/13/2017, W:\Projects\Landau-Port of Tacoma on-call\Data\GIS\Maps and Analyses\Cap Inspections 2017\Murray Pacific\6586 Murray Pacific cap inspection locations Feb 2017.mxd

Figure 3. Single representative divot

Figure 4. Multiple representative divots

Divots were also observed at locations within the wharf area (Figure 2). These divots were shallower and smaller than those observed in the container storage area, and did not appear to be impacting the integrity of the cap.

Slurry overlays were observed in multiple locations on the cap. The overlays were generally performing as intended, but some were observed to be degrading; in some areas, portions of the overlays were separating from the underlying pavement. Details regarding areas of slurry overlay degradation are included in Appendix A.

Deteriorated, broken, and relocated wheel stops were observed in multiple locations. Examples of such wheel stops are shown in Figure 5. In the previous inspection report (Hart Crowser 2014), 111 wheel stops were reported as damaged. Based on observations during the Windward inspection, it did not appear that the wheel stops had been repaired. However, the damaged wheel stops do not appear to be impacting the cap's integrity, as they are mounted on the cap surface with steel pins. Where the wheel stops were observed to be broken or dislodged, the pins remained intact.

Figure 5. Example of deteriorated wheel stops

Table 1 provides a summary of the cap condition observed during the Windward inspection.

Table 1. Environmental cap condition

Required Inspection Elements	Observed Condition	Required Actions
Presence of cracks wider than 1/8 in.	cracks wider than 1/8 in. present at multiple locations on the cap	see Figure 2 and Appendix A for crack locations recommended for repair
Sub-base material exposed	no sub-base material exposed	none
Pavement edge deterioration	no pavement edge deterioration	none
Degradation, subsidence, general appearance	divots observed in numerous locations; slurry overlay and pavement deteriorating; subsidence; excessive subsidence not observed	see Figure 2 and Appendix A for crack and gouge locations recommended for repair

Appendix A lists specific items observed on the environmental cap that require repair; these items are also shown on Figure 2.

2.2 STORMWATER DRAINAGE SYSTEM

The stormwater drainage system consists of 12 catch basins, 2 slot drains, and 5 oil/water separators. The slot drains, oil/water separators, and accessible catch basins were inspected for structural and functional condition and debris and sediment accumulation.

Appendix B summarizes the observations made at each accessible stormwater structure. Overall, the structures were in good condition and required only minor servicing (e.g., removal of accumulated debris from catch basin inserts), which can be accomplished during the next stormwater system servicing event. Some sediment was observed on the tops of the coalescing separator plates in the oil/water separators (Figure 6), possibly indicating the need for separator cleaning. The O&M plan states that the oil/water separators should be cleaned annually, by October of each year, and when the accumulated sediment depth reaches 10% of the chamber depth, or 8 in. (HLA 1997). The Port should verify that these maintenance events are occurring. It is also recommended that the plates of the oil/water separators be checked and cleaned, and that any accumulated oil be pumped out during the next servicing event in order to help ensure the efficiency of the separators.

Figure 6. Representative views of sediment accumulation on the coalescing plate oil/water separators

3 Status and Recommendations

3.1 MAINTENANCE AND REPAIR PERFORMED SINCE PREVIOUS INSPECTION

3.1.1 Environmental cap

Based on the results of the previous inspection, several recommendations for cap maintenance had been made, including sealing or resealing 8,712 ft of cracks and joints and repairing, replacing, or removing 111 concrete wheel stops (Hart Crowser 2014).

Although the exact locations of some of the cracks and joints recommended for sealing in the previous inspection report are unknown, sealed cracks were observed during Windward's inspection throughout the facility, including around the slot drain pavements. Some locations that had been recommended for sealing were located under containers at the time of this inspection.

In 2015, the Port repaired areas of pavement damage as recommended by Hart Crowser (2014). The Port is also currently implementing an incremental pavement repair plan to resurface the wearing course on the cap. The first resurfacing area was completed in 2016 (Smith 2016).

As discussed in Section 2.1, it does not appear that the concrete wheel stops have been repaired, replaced, or removed. However, the condition of the concrete wheel stops does not appear to be affecting the integrity of the environmental cap.

3.1.2 Stormwater drainage system

Based on the results of the previous inspection, it was recommended that the joint around catch basin CB6 be resealed (Hart Crowser 2014). During Windward's inspection, catch basin CB6 appeared to be in sound structural condition and functioning normally; the joint was observed to have been resealed.

3.2 RECOMMENDATIONS

3.2.1 Environmental cap

All cracks wider than 1/8 in. and areas of pavement deterioration (Figure 2) should be repaired as described in Appendix A.

3.2.2 Stormwater drainage system

It is recommended that the insert in catch basin CB6 be cleaned or replaced, and that the insert in catch basin CB13 be repositioned (Figure 2; Appendix B). It is also recommended that the coalescing separator plates in the oil/water separators be cleaned and/or serviced to remove accumulated sediment and oil from the plates (Figure 6).

3.3 LIMITATIONS

Observations contained in this report are limited to environmental cap areas that were visible to the field team. In some instances, portions of the cap surface may have been covered and not readily available for inspection. Inspection of stormwater structures was limited to observations made from the surface and by means of direct observation, probes (extendible poles to check for sediment), and photography. No confined space entry was performed. Observation of some stormwater structures was also limited by storm flow and/or the presence of damaged or sediment-laden catch basin inserts that could not be safely removed. No guarantee is made that all cap or stormwater deficiencies that could impact cap/drainage system performance were identified.

4 References

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APPENDIX A. ENVIRONMENTAL CAP FIELD OBSERVATIONS

ENVIRONMENTAL CAP FIELD OBSERVATIONS

Contents:

- Table A1. Environmental cap observations

Table A1 lists cracks in the environmental cap wider than 1/8 in. and other issues observed during the environmental cap inspection.

Table A1. Environmental cap observations

Location ID[a]	Observations	Recommended Actions	Photos
P1	pavement deterioration with cracks wider than 1/8 in.; area of damage approximately 25 by 5 ft; damage may extend under containers	Repair damaged pavement.	
P2	pavement deterioration with portions of slurry overlay broken out; standing water up to 2 in. deep	Repair slurry overlay.	

Location ID[a]	Observations	Recommended Actions	Photos
P3	pavement deterioration with portions of slurry overlay broken out; standing water 1–2 in. deep; three areas of damage in vicinity; loose gravel in vicinity	Repair pavement; remove loose gravel.	
P4	separation between slot drain pavement and asphalt wider than 1/8 in.; extends at least 50 ft	Repair separation.	

Location ID[a]	Observations	Recommended Actions	Photos
P5	pavement deterioration with portions of slurry overlay broken out; standing water up to 2 in. deep; numerous areas of damage in vicinity; loose pavement and gravel in vicinity; damage located adjacent to slot drain	Repair pavement; remove loose gravel.	 
P6	patches adjacent to slot drains performing adequately; loose gravel in vicinity	Remove loose gravel.	
P7	deterioration causing divot in pavement surface; 1–2 in. of standing water in area approximately 2 ft by 8 in.	Repair pavement.	

Location ID[a]	Observations	Recommended Actions	Photos
P8	divots in pavement caused by corners of containers; standing water up to 3 in. deep; loose gravel in vicinity	Repair pavement; remove loose gravel.	
P9	pavement deterioration; loose gravel in vicinity	Repair pavement; remove loose gravel.	
P10	area of gravel and mud accumulation and standing water	Remove accumulated mud and gravel; evaluate presence of underlying pavement and repair as necessary.	

Location ID[a]	Observations	Recommended Actions	Photos
P11	pavement deterioration with portions of slurry overlay broken out; multiple areas of damage in vicinity; standing water in damaged areas; damage adjacent to slot drain	Repair pavement.	
P12	pavement deterioration with portions of slurry overlay broken out; multiple areas of damage in vicinity and north along slot drain approximately 500 ft; standing water in damaged areas	Repair pavement.	
P13	crack wider than 1/8 in. extending several hundred feet	Repair pavement.	

Location ID[a]	Observations	Recommended Actions	Photos
P14	cracks wider than 1/8 in.; loose pavement between cracks	Repair pavement.	

[a] See Figure 2 in the main document.

P – pavement

APPENDIX B. STORMWATER STRUCTURE OBSERVATIONS

STORMWATER DRAINAGE SYSTEM FIELD OBSERVATIONS

Contents:

- Table B1. Stormwater structure observations

Table B1 provides details regarding the field observations and recommended actions for each stormwater drainage structure visited during the field inspection.

Table B1. Stormwater structure observations

Location IDa	Type of Structure	Observed Condition	Sediment Accumulation (inches)	Additional Observations	Recommended Actions	Photo
CB5	catch basin	functioning normally	< 1	insert in catch basin	none	
CB6	catch basin	functioning normally	4–5	insert in catch basin; moss growing on grate; did not open because of large volume of sediment in insert	Clean or replace insert as part of tenant's stormwater permit compliance program; remove vegetation from grate.	

Location IDa	Type of Structure	Observed Condition	Sediment Accumulation (inches)	Additional Observations	Recommended Actions	Photo
CB7	catch basin	did not open because of equipment parked on grate; functioning normally	nm	insert in catch basin; debris in insert; did not open because of trailers parked on grate	Remove accumulated debris from insert as part of tenant's stormwater permit compliance program; observe interior structure during next servicing.	
CB8	catch basin	functioning normally	5	insert in catch basin; did not remove because of large volume of sediment in insert	Clean or replace insert during next servicing under tenant's stormwater permit compliance program.	
CB9	catch basin	not observed	nm	inaccessible; located under containers	Observe during next inspection.	not observed
CB10	catch basin	not observed	nm	inaccessible; located under containers	Observe during next inspection.	not observed
CB11	catch basin	not observed	nm	inaccessible; located under containers	Observe during next inspection.	not observed
CB12	catch basin	not observed	nm	inaccessible; located under containers	Observe during next inspection.	not observed

Location IDa	Type of Structure	Observed Condition	Sediment Accumulation (inches)	Additional Observations	Recommended Actions	Photo
CB13	catch basin	functioning normally	1–2	insert in catch basin; insert partially falling into structure; did not open due to insert position	Reposition insert during next servicing under tenant's stormwater permit compliance program.	
CB14	catch basin	not observed	nm	inaccessible; located under containers	Observe during next inspection.	not observed
CB15	catch basin	not observed	nm	inaccessible; located under containers	Observe during next inspection.	not observed
CB16	catch basin	functioning normally	1	insert in catch basin	none	
OWS1	oil/water separator	functioning normally	slight accumulation on top of separator plates	concrete structure	Service oil/water separator during next servicing under tenant's stormwater permit compliance program to remove any accumulated sediment or debris in structure and on plates.	

Location IDa	Type of Structure	Observed Condition	Sediment Accumulation (inches)	Additional Observations	Recommended Actions	Photo
OWS2	oil/water separator	structurally sound, functioning normally	slight accumulation on top of separator plates	east lid paved over; concrete structure	Service oil/water separator during next servicing under tenant's stormwater permit compliance program to remove any accumulated sediment or debris in structure and on plates.	
OWS3	oil/water separator	functioning normally	slight accumulation on top of separator plates (see photo)	debris and sediment accumulation on plates; concrete structure	Service and clean structure during next servicing under tenant's stormwater permit compliance program to remove debris and sediment from plates.	

Location IDa	Type of Structure	Observed Condition	Sediment Accumulation (inches)	Additional Observations	Recommended Actions	Photo
OWS4	oil/water separator	functioning normally	slight accumulation on to of separator plates (see photo)	east vault inaccessible (located under equipment); sediment accumulated on plates in west vault; concrete structure	Service and clean structure during next servicing under tenant's stormwater permit compliance program to remove sediment from plates.	
OWS5	oil/water separator	structurally sound, functioning normally	slight accumulation on top of separator plates	concrete structure	Service oil/water separator during next servicing under tenant's stormwater permit compliance program to remove any accumulated sediment or debris in structure or on plates.	
East slot drain	slot drain	structurally sound, functioning normally	< 1	minimal sediment accumulation	none	

Location IDa	Type of Structure	Observed Condition	Sediment Accumulation (inches)	Additional Observations	Recommended Actions	Photo
West slot drain	slot drain	structurally sound, functioning normally	< 1	minimal sediment accumulation	none	

[a] See Figure 2 in report text.

O&M – operations and maintenance