

Site-Wide Stormwater Work Plan and 2014/15 Annual Report

Santa Susana Field Laboratory Ventura County, CA

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1. INTRODUCTION

The Santa Susana Field Laboratory (SSFL) occupies approximately 2,850 acres and is located at the top of Woolsey Canyon Road in the Simi Hills, Ventura County, California. The SSFL has the potential to discharge stormwater runoff impacted by constituents from the facility. As such, discharges from SSFL are currently regulated by the Los Angeles Regional Water Quality Control Board (LARWQCB) under *National Pollutant Discharge Elimination System (NPDES) Permit No. CA0001309 for the Boeing Company, SSFL, Canoga Park, CA, Order No. R4-2015-0033* (“2015 Permit”). The 2015 Permit¹ became effective on April 1, 2015 and states the following:

“The Discharger has agreed to maintain the Surface Water Expert Panel. With input from the Surface Water Expert Panel, the Discharger shall submit annual reports that describe the previous year’s monitoring results, evaluation of existing BMP performance, and submit a workplan that includes recommendations for modified and/or new storm water controls and monitoring that will address exceedances from any outfall addressed by this permit. The Discharger shall also support the Surface Water Expert Panel in organizing periodic public interaction events and encouraging public communication involvement. The first annual report shall be due within 6 months of the effective date of this permit [October 1, 2015].”

This Site-Wide Stormwater Work Plan and 2014/15 Annual Report (2015 Work Plan) is intended to meet the aforementioned requirements, including a summary of historical SSFL NPDES outfall monitoring results through the 2014/2015 rainy season (October 1 – September 30).

1.1 Site Background

The SSFL is jointly owned by the Boeing Company (Boeing) and the federal government. The National Aeronautics and Space Administration (NASA) administers the portion of the property owned by the federal government. The site is divided into four administrative areas (Areas I, II, III, and IV, Figure 1) and undeveloped land areas to both the north and south. Administrative Areas I and III are operated by Boeing, which owns the majority of Area I and all of Area III. A portion of Area I (40 acres) and all of Area II are owned by the federal government, and were formerly administered by NASA and operated by Boeing. The land within Area IV is owned by Boeing, was formerly operated by Boeing for DOE. DOE owns specific facilities located on approximately 90 acres of Area IV. Industrial operations at the SSFL have ceased; current activities at the site include environmental monitoring and sampling, and remediation planning. The site also provides exceptional wildlife habitat and undeveloped land (open space),

Stormwater discharges² from the SSFL are typically captured and treated at the outfalls, up to a design storm. An exception to this outfall-based treatment approach is at Outfalls 001 and 002 in the southern undeveloped land, where stormwater runoff is generated from undeveloped areas with no or minimal history of industrial activity or known surface soil contamination and is discharged without

¹ Prior to April 1, 2015 this site was regulated since 2010 the under *National Pollutant Discharge Elimination System (NPDES) Permit No. CA0001309 for the Boeing Company, SSFL, Canoga Park, CA, Order No. R4-2010-0090* (“2010 Permit”)

² Treated groundwater discharges are also covered in the 2015 Permit however these discharges are not addressed in this Work Plan.

treatment. Another exception to this is at Outfalls 008 and 009, where the stormwater quality management strategy instead leverages distributed source controls and natural treatment systems due to the challenge of treating stormwater at these canyon outfalls (i.e., outfall-based treatment would require construction of large dams with substantial associated environmental impact and potential risk to the public downstream). At Outfalls 008 and 009, Interim Source Removal Action (ISRA) and Best Management Practices (BMP) programs were implemented beginning in 2010 with oversight and participation of the LARWQCB to improve compliance with the 2010 Permit limits through the dual approach of remediation of surface soils that are above defined thresholds for NPDES constituents of concern, and through distributed control and/or treatment of stormwater runoff from prioritized subareas, respectively. The BMP Plan for the Outfall 008 and 009 Watersheds (MWH et al, 2010) (“2010 BMP Plan”) was developed under the oversight of the Surface Water Expert Panel (Expert Panel). A new Expert Panel Work Plan is now required to replace the 2010 BMP Plan and provide an overall strategy for improving NPDES compliance for stormwater discharges site-wide, and to continue the important process of public outreach and engagement on stormwater issues.

1.2 Expert Panel Background

The Expert Panel was formed in late 2007 in response to Cease and Desist Order (CDO) No. R4-2007-0056. The CDO required Boeing to submit a work plan to evaluate, select and implement natural treatment BMPs to address stormwater discharges in the Outfall 008 and 009 watersheds. To ensure that the proposed BMPs incorporate the current state of the art for stormwater treatment and control, Boeing proposed a panel of stormwater hydrology and BMP design experts. An Expert Panel Work Plan (Expert Panel, 2007) was submitted to the LARWQCB in December 2007. Panel members were selected in consultation with Geosyntec Consultants, LARWQCB staff, and local environmental organizations.

The Expert Panel continues to oversee stormwater planning and design work at the SSFL, as well as provide input on monitoring, source removal activities and other NPDES Permit issues. The Expert Panel also oversees scientific studies related to SSFL stormwater quality issues and BMP design, supports the ongoing stormwater Human Health Risk Assessment (HHRA), and interfaces with the public on SSFL stormwater activities and health risk communication. Their original mission, to improve stormwater at NPDES Outfalls 008 and 009, is now expanded to include all NPDES outfalls as required through the 2015 Permit. The Expert Panel is composed of the following members:

- Robert Gearheart, PhD, PE, Humboldt State University
- Jonathan Jones, PE, DWRE, Wright Water Engineers, Inc.
- Michael Josselyn, PhD, PWS WRA Environmental Consultants
- Robert Pitt, PhD, PE, BCEE, DWRE, University of Alabama
- Michael K. Stenstrom, PhD, PE, BCEE, University of California, Los Angeles

The Expert Panel has hosted multiple public outreach meetings and tours of SSFL, with recent examples summarized in Table 1 below:

Table 1. Recent Expert Panel Public Involvement Activities

Date	Topic
November 19, 2014	Community Action Group meeting
March 20, 2013	Public meeting and tour
October 6, 2013	Public meeting and tour
August 25, 2011	Public meeting
January 22, 2011	Public meeting and tour

2. WATERSHED OVERVIEW

2.1 NPDES Outfalls

Approximately 60% of the annual stormwater discharge from SSFL exits the property via two southerly discharge points (Outfalls 001 and 002) to Bell Creek, a tributary to the Los Angeles River. Upstream outfalls that contribute to the discharge at Outfalls 001 and 002 include Outfalls 011 and 018. Outfalls 019 and 020 discharge treated groundwater downstream of Outfalls 001 and 002, respectively. The Surface Water Expert Panel's scope does not include groundwater; a separate Groundwater Expert Panel is available to oversee Boeing related tasks.

The stormwater from the northern boundary of the site is discharged via Outfalls 003 through 007 and 010, or it is transferred to Silvernale Pond for treatment prior to discharge at Outfall 018. At Outfalls 011 and 018, active treatment systems have been in place since 2012 for advanced treatment of stormwater which is modulated using storage ponds. Because of the location, size and terrain of the Outfall 008 and 009 watersheds, flows from these areas are not captured and treated by the active treatment systems³, and instead a distributed stormwater treatment and iterative (or adaptive management-based) approach is employed in both the Outfall 008 and 009 watersheds, as described in the 2010 BMP Plan. Thus, Outfall 009 naturally flows to Arroyo Simi and stormwater runoff from Happy Valley (Outfall 008) naturally flows via Dayton Canyon Creek to Chatsworth Creek. Chatsworth Creek flows south to Bell Creek southwest of the intersection of Shoup Avenue and Sherman Way. Bell Creek subsequently flows southeast to the Los Angeles River.

³ An exception to this is at the helipad, located in Area II in the 009 watershed, where some runoff is captured and piped to Silvernale Pond for treatment in the 018 active treatment system.

Table 2. NPDES outfall descriptions (outfalls in grey are not regulated under the 2015 Permit*)

Outfall	Status/Discharge Description
001	Downstream of Outfall 011; discharge to Bell Creek
002	Downstream of Outfall 018; discharge to Bell Creek
003	Runoff transferred to Silvernale for treatment prior to discharge at Outfall 018
004	Runoff transferred to Silvernale for treatment prior to discharge at Outfall 018
005	Runoff transferred to Silvernale for treatment prior to discharge at Outfall 018
006	Runoff transferred to Silvernale for treatment prior to discharge at Outfall 018
007	Runoff transferred to Silvernale for treatment prior to discharge at Outfall 018
008	Stormwater from Happy Valley; discharge to Dayton Creek
009	Stormwater from Northern Drainage; discharge to Arroyo Simi
010	Runoff transferred to Silvernale for treatment prior to discharge at Outfall 018
011	Stormwater and perimeter pond (treated at SWTS); discharge to Outfall 001
012	Stormwater from Alfa Test Stand
013	Stormwater from Bravo Test Stand
014	Stormwater from Advanced Propulsion Test Facility
015	Stormwater retained on-site and trucked for off-site POTW disposal
016	Stormwater retained on-site and trucked for off-site POTW disposal
017	Stormwater retained on-site and trucked for off-site POTW disposal
018	Stormwater and R-2 pond (treated at SWTS); discharge to Outfall 002
019	Treated groundwater (GET System)
020	Treated groundwater (GET System); new outfall location

*Outfalls 012 through 017 were excluded from the 2015 Permit

2.2 Existing Stormwater Treatment

BMPs have been implemented throughout the site to treat stormwater prior to discharge. The major structural treatment BMPs (i.e., excluding site-wide erosion controls, dirt road control measures, and demolition of buildings and paved areas) are summarized in the *ISRA Performance Monitoring and BMP Monitoring for the Outfalls 008 and 009 Watersheds, 2014/2015 Rainy Season* (“2015 Annual Report for Outfalls 008 and 009”) (MWH *et al.*, 2015) and the 2015 BMP Plan (Haley & Aldrich, 2015) and include:

- Outfall 009 Culvert Modifications (CM), completed in 2009
- Outfall 011 Stormwater Conveyance and Treatment System, completed in 2011
- Outfall 018 Stormwater Conveyance and Treatment System, completed in 2011
- Outfall 009 B-1 Sedimentation Basin and Media Filter, completed in 2011
- Outfall 009 Northern Drainage Restoration Measures, completed in 2012
- Outfall 009 Lower Parking Lot Biofilter, completed in 2013
- Outfall 008 and 009 ISRA Excavations, completed in 2013
- Outfall 009 ELV Stormwater Treatment System, completed in 2013
- Outfall 009 B1436 Detention Bioswale, Completed in 2014

Stormwater from Outfall 011 is pumped to a storage pond and, when volumes exceed the pond storage capacity, treated using an advanced treatment system. The treated stormwater is then discharged to

Outfall 001. All stormwater (up to a certain size design storm event that varies by outfall based on site-specific pumping and storage capacities) from Outfalls 003, 004, 005, 006, 007, 009⁴, 010 and 018 is pumped to another storage pond and treated using an advanced treatment system. This treated stormwater is then discharged to Outfall 002. Since the implementation of these Stormwater Treatment Systems (SWTSs) in 2012, the discharge from these outfalls (excluding 009) has effectively been reduced to zero because of the drought combined with the significant storage capacity available in the onsite ponds. Therefore no or very few recent effluent monitoring results are available for these outfalls⁵.

The various BMPs in Outfall 009 have also been effective at reducing the concentrations of the constituents of concern (COCs) in the watershed. In general, the statistical evaluation of influent versus effluent BMP performance sample results included in the 2015 Annual Report for Outfalls 008 and 009 indicated that significant COC removal is occurring in these watersheds, particularly for BMP influent samples that exceed the 2010 Permit limits. This annual data analysis has been submitted to the Regional Board as part of each year's annual report, and has demonstrated consistent pollutant removal for the primary COCs for Outfall 009 (i.e., dioxins and lead) for each of the BMPs evaluated. The performance monitoring results demonstrate the benefits of the sedimentation and media filtration unit processes employed by the Outfall 009 structural treatment controls.

Limited runoff has occurred at Outfall 008 since the completion of ISRA activities and installation of the new erosion and sediment controls in 2012, with only two results with concentrations above the 2015 Permit limits during this period, suggesting positive performance of the ISRA soil removal activities, revegetation/restoration, and erosion controls, combined with effects of the ongoing drought which has resulted in below average rainfall at the SSFL.

2.3 Future Activities / Site Closure Considerations

During the upcoming 2015 Permit term (i.e., 2015 – 2020), it is expected that site activities will transition from remediation planning to the implementation of significant remediation activities in preparation for the closure of the site. The remediation activities will likely include vegetation and topsoil removal, excavation and removal of contaminated soil, on-site soil stockpiling and management, in-situ remediation projects, increased vehicular traffic, demolition of building and other infrastructure, creek-side construction and slope stabilization, and restoration. Collectively, many of these activities have the potential to increase sediment loads (that are derived from erosion of newly-exposed clean natural soils) to the NPDES outfalls, presenting new and enhanced NPDES compliance challenges, particularly at outfalls that are without downstream active treatment systems and where substantial creekside excavation or other construction is anticipated (i.e., Outfall 009). Therefore the Expert Panel recommends cautious planning to mitigate the potential movement of exposed soils by stormwater during and following this active remediation period. Robust restoration planning will be needed to quickly rehabilitate the site with native vegetation to stabilize the soils. In general, when large amounts of soil are being excavation, stockpiled, and moved in steep terrain subject to periodic

⁴ Stormwater runoff from a small area within the Outfall 009 watershed (helipad area) is pumped to the storage pond for treatment prior to being discharged from Outfall 018, while stormwater runoff from the remaining, vast majority of the watershed flows to Outfall 009.

⁵ With the one exception of a pump-related power failure at Outfall 010 on 2/28/2014 that resulted in discharge from the outfall and the concentrations of two parameters being measured above the 2015 Permit limits.

intense rainfalls, site planning, design, implementation and maintenance/monitoring must be based on conservative, multilayered strategies that are regularly adjusted in response to field observations. This next Permit term will therefore require a new phase and paradigm of BMPs for stormwater management until natural vegetation is re-established. Once a final cleanup plan is adopted and the phasing of that plan is understood, it will be necessary to institute a stormwater management plan involving BMPs and to develop a restoration plan to restore natural habitats as quickly as possible.

3. SUMMARY OF MONITORING RESULTS

In order to frame the tasks described in the following Work Plan (Section 4), an analysis of historical monitoring results at each of the NPDES outfalls was completed and the 2014/2015 subarea monitoring results for Outfalls 008 and 009 are summarized. Based on these findings a summary of recommended outfall-COC combinations is included.

3.1 Historic NPDES Outfall Monitoring

A comparison between historic water quality data and the 2015 Permit limits and benchmarks has been performed to anticipate future NPDES exceedance risks and identify the priority outfall-COC combinations (i.e., those pollutants for each outfall that are of primary concern for this report). These results can be found for two analysis periods in Table 3 and Table 4. Although the NPDES effluent limit and benchmark values have varied between NPDES Permits, the historical outfall monitoring data have been compared only with the 2015 Permit limits and benchmarks because these are expected to provide a best estimate of future NPDES exceedance risks.

- **1998 – 2015.** This analysis period represents the full historical record of NPDES compliance, beginning with the first NPDES Permit.
- **2012 – 2015.** This analysis period represents the monitoring results after the active treatment systems were completed at Outfalls 011 and 018 and most distributed source control and natural treatment systems were implemented upstream of Outfalls 008 and 009.

During the 2012-2015 analysis period relatively few outfalls had concentrations above the 2015 Permit limits and benchmarks. Most of these high concentrations (i.e., 12 of the 21, excluding Outfall 019 which is a non-stormwater discharge) occur at Outfall 009, where an ongoing plan is in place to annually monitor upland subareas (as well as continue to monitor and evaluate the performance of the existing distributed BMPs), apply a statistical analysis procedure to prioritize subareas, and identify new BMPs or enhancements to existing BMPs. The Expert Panel proposes to continue to utilize this iterative approach for stormwater quality management in this watershed, and to further investigate sources of NPDES exceedances here. The Expert Panel also proposes new special monitoring studies for the 2015/16 season to evaluate water quality impacts from paved roads, as described in the 2015 Annual Report for Outfalls 008 and 009.

The quarterly and annual NPDES discharge monitoring reports are also incorporated by reference here. For more information on recent NPDES monitoring results and explanations for exceedances, refer to the most recent discharge monitoring report (Boeing, 2015a, 2015b, 2015c), which can be found here: <http://www.boeing.com/principles/environment/santa-susana/monitoring-reports.page>.

Table 3. Number of NPDES outfall monitoring results that have concentrations above the 2015 Permit's daily concentration limits and benchmarks, based on 1998-2015 data

Parameter	NPDES Outfalls													Total
	001	002	003	004	005	006	007	008	009	010	011	018	019 [†]	
Discharge Days	74	151	70	81	90	92	49	38	84	42	27	42	37	877
TCDD TEQ_NoDNQ	8*	10*	2	17	5	4	4	1	24	8	5	7		95
Antimony, Total			1		3		4							8
Arsenic, Total		1*												1
Barium, Total		1*												1
Beryllium, Total		1*												1
Biochemical Oxygen Demand (BOD)		1*												1
bis(2-Ethylhexyl)phthalate		1*												1
Cadmium, Total		1*												1
Chloride					1	3							2	6
Chlorine	1*	1*									1	1		4
Chromium, Total	1*	1*												2
Chronic Toxicity		1*		2										3
Copper, Total	2*	1*	1	1	2	2	2	1	1					13
Cyanide, Total		2*												2
Fluoride						1								1
Gross Alpha Analytes	1*	1*						2						4
Gross Beta Analytes		1*	1			1								3
Iron, Total	21*	14*									6	6		47
Lead, Total	7*	5*					1	7	15	1	2	1		39
Manganese, Total	11*	5*									5	3		24
MBAS (foaming agents)	2*	1*												3
Mercury, Total	1*	3*		3	1	1								10
Nickel, Total		1*												1
Nitrite/Nitrate Nitrogen		1*			7	1								9
Oil and Grease (HEM), Total									1					1
pH, Field			4	1	1	5			2	2		1		16
Radium-226 & 228		1*												1
Strontium-90			1											1
Sulfate		5*												5
Thallium, Total		1*			1									2
Total Dissolved Solids (TDS)		1*			1								1	3
Zinc, Total		1*												1
Total	54*	63*	10	24	22	19	11	11	43	11	19	19	3	310

*2015 Permit uses benchmarks at Outfalls 001 and 002

†Outfall 019 discharges only treated groundwater and is therefore not addressed in this Work Plan.

Table 4. Number of NPDES outfall monitoring results that have concentrations above the 2015 Permit's daily concentration limits and benchmarks, based on 2012-2015 data

Parameter	NPDES Outfalls													Total
	001	002	003	004	005	006	007	008	009	010	011	018	019 [†]	
Discharge Days	1	5	0	0	0	0	0	2	22	1	0	2	26	50
TCDD TEQ_NoDNQ									6	1**				7
Antimony, Total														-
Arsenic, Total														-
Barium, Total														-
Beryllium, Total														-
Biochemical Oxygen Demand (BOD)														-
bis(2-Ethylhexyl)phthalate														-
Cadmium, Total														-
Chloride													1	1
Chlorine														-
Chromium, Total														-
Chronic Toxicity														-
Copper, Total								1						1
Cyanide, Total														-
Gross Alpha Analytes	1*													1
Gross Beta Analytes														-
Iron, Total	1*	1*												2
Lead, Total	1*							1	5	1**				8
Manganese, Total	1*													1
MBAS (foaming agents)														-
Mercury, Total														-
Nickel, Total														-
Nitrite/Nitrate Nitrogen														-
Oil and Grease (HEM), Total														-
pH, Field									1***					1
Radium-226 & 228														-
Strontium-90														-
Sulfate														-
Thallium, Total														-
Total Dissolved Solids (TDS)													1	1
Zinc, Total														-
Total	4*	1*	-	-	-	-	-	2	11	2**	-	-	2	23

*2015 Permit uses benchmarks at Outfalls 001 and 002

**Concentrations above the 2015 Permit limits at Outfall 010 on 2/28/2014 were the result of a pump-related power failure

***pH was determined with a field instrument and was noted as such. This exceedance was not corroborated by the corresponding lab result.

†Outfall 019 discharges only treated groundwater and is therefore not addressed in this Work Plan

3.2 2014/2015 Outfall 008 and 009 Monitoring Results

The 2015 Annual Report for Outfalls 008 and 009 provides a detailed evaluation of 2014/15 NPDES, BMP subarea, and BMP performance monitoring results. The following narrative is taken from that Annual Report for the purpose of including a brief summary here.

NPDES monitoring and sampling of Outfalls 008 and 009 conducted during the 2014/2015 rainy season was performed in accordance with the 2010 Permit. During the 2014/2015 rainy season, one sample was collected at Outfall 008 and five samples were collected at Outfall 009. The dates and associated rain event information for these samples are presented in the 2015 Annual Report for Outfalls 008 and 009. The concentrations of the outfall-specific COCs and field measurements for Outfall 008 and Outfall 009 are presented in the 2015 Annual Report for Outfalls 008 and 009.

BMP monitoring analytical results, including field measurements and rainfall event measurements from the 2014/2015 rainy season are presented in the 2015 Annual Report for Outfalls 008 and 009; Table 3-3 for potential BMP subarea monitoring and in Tables 3-4a through 3-4g for treatment BMP performance monitoring.

BMP monitoring results for NPDES COCs were compared to NPDES outfall results to assess whether there is a general pattern of water quality changes as runoff travels down the watersheds and to provide a context for evaluating possible contributions to NPDES samples at the outfalls. To support this evaluation, time-series charts comparing BMP monitoring results and NPDES monitoring results, and correlation charts comparing COC results to TSS are provided in Appendices C and D of the 2015 Annual Report for Outfalls 008 and 009.

Below is a summary and discussion of the 2014/15 potential BMP subarea and BMP performance monitoring results, with an emphasis on the Permit limit-exceeding pollutants, lead and dioxins.

- **Potential BMP Subarea Monitoring Results:** Lead, copper and/or dioxins were detected above the 2010 Permit limit in six samples collected from two potential BMP monitoring locations (AP/STP and IEL) during five rain events. The list of the highest ranked subareas based on the results of the Expert Panel's BMP site ranking analysis is presented in Section 3.4 of the 2015 Annual Report for Outfalls 008 and 009. In general, the subarea monitoring sites that receive runoff from primarily paved surfaces had the highest COC concentrations, a finding that supports the benefits of the ongoing asphalt removal/demolition projects and BMPs that are sited to treat runoff from paved areas.
- **BMP Performance Monitoring Results:** Lead, copper, mercury, and/or dioxins were detected above 2010 Permit limits in 29 samples collected from 12 BMP performance monitoring locations during 5 rain events, including at the B-1 Media Filter (up- and downstream), Lower Parking Lot BMP (up-, intermediate, and downstream), CM-9 (up- and downstream), CM-1 (up-stream), and ELV stormwater treatment BMP (up-stream). Of the 29 samples with exceedances of the 2010 Permit limits, 16 samples were collected from up-stream monitoring locations, 5 samples were collected from intermediate monitoring locations, and 8 samples were collected from downstream locations. Refer to Section 3.3 of the 2015 Annual Report

for Outfalls 008 and 009 for the evaluation of upstream versus downstream BMP performance monitoring samples.

Based on data analyses shown in the Expert Panel's 2015 BMP Ranking Memo (Appendix F of the 2015 Annual Report for Outfalls 008 and 009), lead concentrations and particulate strengths at Outfall 009 were found to be close to those of stormwater background sites, indicating that lead sources in this watershed may be predominantly from natural background soils. However, for dioxins, concentrations and particulate strengths at Outfall 009 were found to be above those of background sites, indicating that anthropogenic sources are contributing to the outfall, such as weathered pavement, pavement resurfacing, vehicles, treated wood power poles, and atmospheric deposition (which is more efficiently conveyed by impervious area in developed watersheds than pervious area in undeveloped watersheds). While it is infeasible to control the atmosphere deposition (i.e., dry fall or precipitation, including from wildfires) and subsequent washoff of solids and pollutants onto/from land surfaces at the site, existing treatment controls may be currently functioning to treat pollutants from such sources .

3.3 Priority Outfall – COC Combinations

The following NPDES outfall-COC combinations have been identified as priorities based on the outfall analysis for 2012 to 2015 presented in the previous Section 3.1. The NPDES outfall-COC combinations were based solely on the 2012 to 2015 analysis of NPDES outfall monitoring data (relative to 2015 Permit limits and benchmarks), since BMP implementation since 2012 has improved water quality of all outfall locations. The Work Plan (Section 4) will focus on these priority combinations:

- Outfall 001: Iron, lead, manganese, and gross alpha
- Outfall 002: Iron
- Outfall 008: Copper and lead
- Outfall 009: Dioxins and lead

4. EXPERT PANEL WORK PLAN

This 2015 Work Plan is intended to be applicable to the following NPDES watersheds, per the results of the data analysis presented in Section 3 above, for the extent of the 2015 Permit term: Watershed 001, 002, 008, and 009. This 2015 Work Plan is composed of the following studies/actions, which are explained in further detail below:

1. Continuation of NPDES monitoring site-wide, and potential BMP subarea and BMP performance monitoring in Watersheds 008 and 009;
2. Continuation of the subarea prioritization and BMP performance evaluation process in Watersheds 008 and 009
3. Evaluate implementation needs in Watersheds 001 and 002 (e.g., exposed soil erosion controls, and in-channel sediment/stabilization controls);
4. Recommendations for modified and/or new stormwater controls as needed to address NPDES outfall exceedances;
5. Identification and recommendation of special studies in the watersheds with persistent exceedances;
6. Review of construction erosion and sediment control plans and implementation, and review of post-construction restoration plans for remediation projects, with particular emphasis on creekside projects in Watersheds 008 and 009 which are without downstream treatment systems (includes review of the design, construction, and operation/maintenance of such restoration measures); and
7. Continued Panel support of public outreach and informational activities.

4.1 NPDES Outfall and Outfall 008 and 009 Potential BMP Subarea and BMP Performance Monitoring

In addition to the outfall monitoring requirements described in the Attachment E of the 2015 Permit, monitoring will continue to include the subarea monitoring and BMP performance monitoring in the Outfall 008 and 009 watersheds (Section 3 of the 2015 Annual Report for Outfalls 008 and 009). Potential BMP subarea monitoring involves the collection of stormwater samples at locations receiving runoff from potential source areas and other infrastructure (e.g., roads, buildings, parking areas) to assess the potential for contribution of COCs from the potential source areas and to identify locations for new BMPs and/or treatment controls. Potential BMP monitoring locations are performed at the “potential”⁶ BMP sites. BMP performance monitoring involves the collection of stormwater samples at locations up- and downstream of completed BMPs to evaluate the treatment performance of the BMPs. The continued subarea and BMP performance monitoring includes any changes that are described in the 2015 Annual Report for Outfalls 008 and 009.

⁶ “Potential” treatment BMPs include those that will be considered for new BMP placement based on comparison of subarea monitoring results with onsite stormwater background concentrations and the 2015 Permit limits.

4.2 008/009 Subarea Prioritization and BMP Performance Evaluation Process

As part of the 2010 BMP monitoring program, an approach was developed by the Expert Panel for ranking the potential BMP sites to prioritize the locations based on water quality considerations. A letter summarizing the BMP site ranking analysis approach was submitted to the RWQCB on June 22, 2011 (Expert Panel, 2011). The BMP site ranking and selection process described in the letter has occurred on a yearly basis through 2015, the end of the BMP Plan coverage period. This 2015 Work Plan proposes to continue the annual subarea prioritization (or “BMP ranking”) and BMP performance evaluations as described in the 2010 BMP Plan.

4.3 Evaluate Implementation Needs in Watersheds 001 and 002

To address the monitoring results with concentrations measured above the 2015 Permit benchmarks in Outfalls 001 and 002, an unsurfaced road erosion control assessment should be performed by a qualified erosion and sediment control specialist to control unsurfaced roads as sources of sediment in these undeveloped watersheds. In addition, a drainage stabilization assessment should be performed along the drainages above Outfall 001 and 002 by a qualified fluvial geomorphologist, to assess the need for instream geomorphic control features to control instream sources of sediment to Outfalls 001 and 002.

4.4 Recommendations for Modified and/or New Stormwater Controls

To ensure reliable treatment of stormwater at the Outfalls 003, 004, 005, 006, 007, 010, 011 and 018, backup power supplies and other operational procedures should be considered for incorporation into the SWTS.

For Outfalls 008 and 009, the 2015 Annual Report for Outfalls 008 and 009 (specifically the ranking memo) describes in detail the Expert Panel’s 2015 recommendations for continued BMP maintenance, new BMPs (such as along Service Area Road, which are described in a September 2015 memo from Geosyntec and the Expert Panel to Boeing), and special monitoring studies (which are further described in the next section). The Expert Panel believes that the new and planned activities, taken together, will improve NPDES compliance at Outfalls 008 and 009 during events up to the Panel’s proposed site-specific design storm (1-year, 24-hour storm), at least based on existing site conditions and activities (i.e., NPDES compliance with current Permit limits at these outfalls may be negatively impacted during periods of massive remediation activity).

4.5 Identification and Recommendation of Special Studies

The Expert Panel proposes to further investigate the causes and sources dioxins and lead in stormwater at Outfall 009, and has identified the following study questions as the basis for new sampling studies that are recommended for the 2015/16 rainy season (Expert Panel, 2015):

1. **Question:** Where (spatially) within Watershed 009 are dioxins and lead in stormwater predominantly coming from?

Suggested approach to answer question: Conduct grab sampling of stormwater along the Northern Drainage at key locations. These locations are being identified based on accessibility and to bracket key areas of stormwater discharge.

2. **Question:** What are the predominant pollutant sources to these paved subareas -- e.g., pavement material itself (whether weathered or newly resurfaced), vehicles, treated wood poles, and/or atmospheric deposition (which is efficiently transported to the outfall by paved surfaces)?

Suggested approach to answer question: Conduct stormwater sampling from representative areas with newly resurfaced asphalt (e.g., north end of upper parking lot near site entrance), medium traffic (e.g., helipad, lower parking lot), and high traffic (e.g., upper parking lot near former Building 1436, and the top of Woolsey Canyon Road near site entrance). This can be done using existing, active subarea monitoring efforts, therefore no new subarea monitoring is needed.

Also collect samples of atmospheric deposition solids (via pail collectors) and road solids (via hand vacuum sampling) from these areas. This will enable the distinction of solids concentration differences between vehicle-traveled areas and pure atmospheric deposition areas. Similarly, with respect to treated wood poles as a potential source, collect soil samples near poles and analyze for lead and dioxin TEQ.

4.6 Construction and Post-Construction Planning and Implementation at Demolition and Remediation Sites

Remediation activities, such as the demolition of buildings and other infrastructure and the excavation and removal of contaminated soils, are expected to substantially increase in the 2015 Permit term. While these activities are directed towards the removal of contaminated and uncontaminated materials, and have the potential to reduce sources of stormwater pollutants, they also pose a temporary threat to stormwater quality and the natural drainages as disturbed soils may be mobilized en masse during storm events into the drainage network. In order to protect stormwater quality and the natural drainages, very robust stormwater management practices will need to be instituted during the construction period, and similarly, very robust restoration practices will need to be instituted during the post-construction period. The Expert Panel can play an important role in the planning, design, and development of rigorous, multilayered water quality control procedures related to future construction activities (e.g., review of construction Stormwater Pollution Prevention Plans [SWPPPs]) and post-construction restoration planning. At a minimum, the Expert Panel will review post-construction restoration plans for remediation projects, especially those for creekside projects in Watersheds 008 and 009 which are without downstream treatment systems; this will include review of the design, construction, and operation/maintenance of such restoration measures. The Expert Panel's extensive experience related to planning, permitting, designing, and long term monitoring/maintenance of large scale earth-moving projects will be very valuable during these activities.

4.7 Communication and Public Involvement Plan

Numerous stakeholder groups and members of the general public have expressed interest in the stormwater issues at the SSFL at past public involvement activities and Regional Board hearings. In an effort to keep these groups and others apprised of progress, and provide an opportunity for public

input, periodic (i.e., a minimum of annual) public forum meetings or site tours will be held with the Expert Panel. Additionally, project status reports and submittal documents will also be posted on the Boeing project website after major project milestones and prior to public outreach meetings.

4.8 Milestones Schedule

As described previously in this section, following BMPs/treatment control implementation, effectiveness of these measures will be evaluated primarily by the results of surface water samples collected at outfalls, supplemented by any subarea data to be collected as part of this 2015 Work Plan. These sampling results will be reviewed annually to determine whether additional upgrades may be warranted. If required, a Work Plan Addendum will be submitted for RWQCB review and approval.

2015:

October 2015	Submit Site-wide Stormwater Work Plan and 2014/15 Annual Report pursuant to the 2015 Permit.
2015/2016 Rainy Season	Perform monitoring as described in the 2015 Work Plan.
October – December 2015	Implement Work Plan BMP, maintenance, and special study recommendations following approval by RWQCB, approval of necessary permits, contractor selection and completion of required surveys. Work may be phased based on the scope of work identified in the Work Plan, and some projects (such as special monitoring studies) may cover extended and non-rainy season periods.

2016:

October 2016	Submit Site-wide Stormwater 2015/16 Annual Report.
2016/2017 Rainy Season	Perform monitoring as described in the 2015 Work Plan and any modifications identified in the 2015/16 Annual Report.
Summer – Fall 2016	Implement Work Plan BMP, maintenance, and special study recommendations following approval by RWQCB, approval of necessary permits, contractor selection and completion of required surveys. Work may be phased based on the scope of work identified in the Work Plan.

2017:

October 2017	Submit Site-wide Stormwater 2016/17 Annual Report.
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2017/2018 Rainy Season

Perform monitoring as described in the 2015 Work Plan and any modifications identified in the 2016/17 Annual Report.

Summer – Fall 2017

Implement Work Plan BMP, maintenance, and special study recommendations following approval by RWQCB, approval of necessary permits, contractor selection and completion of required surveys. Work may be phased based on the scope of work identified in the Work Plan.

2018:

October 2018

Submit Site-wide Stormwater 2017/18 Annual Report.

2018/2019 Rainy Season

Perform monitoring as described in the 2015 Work Plan and any modifications identified in the 2017/18 Annual Report.

Summer – Fall 2018

Implement Work Plan BMP, maintenance, and special study recommendations following approval by RWQCB, approval of necessary permits, contractor selection and completion of required surveys. Work may be phased based on the scope of work identified in the Work Plan.

2019:

October 2019

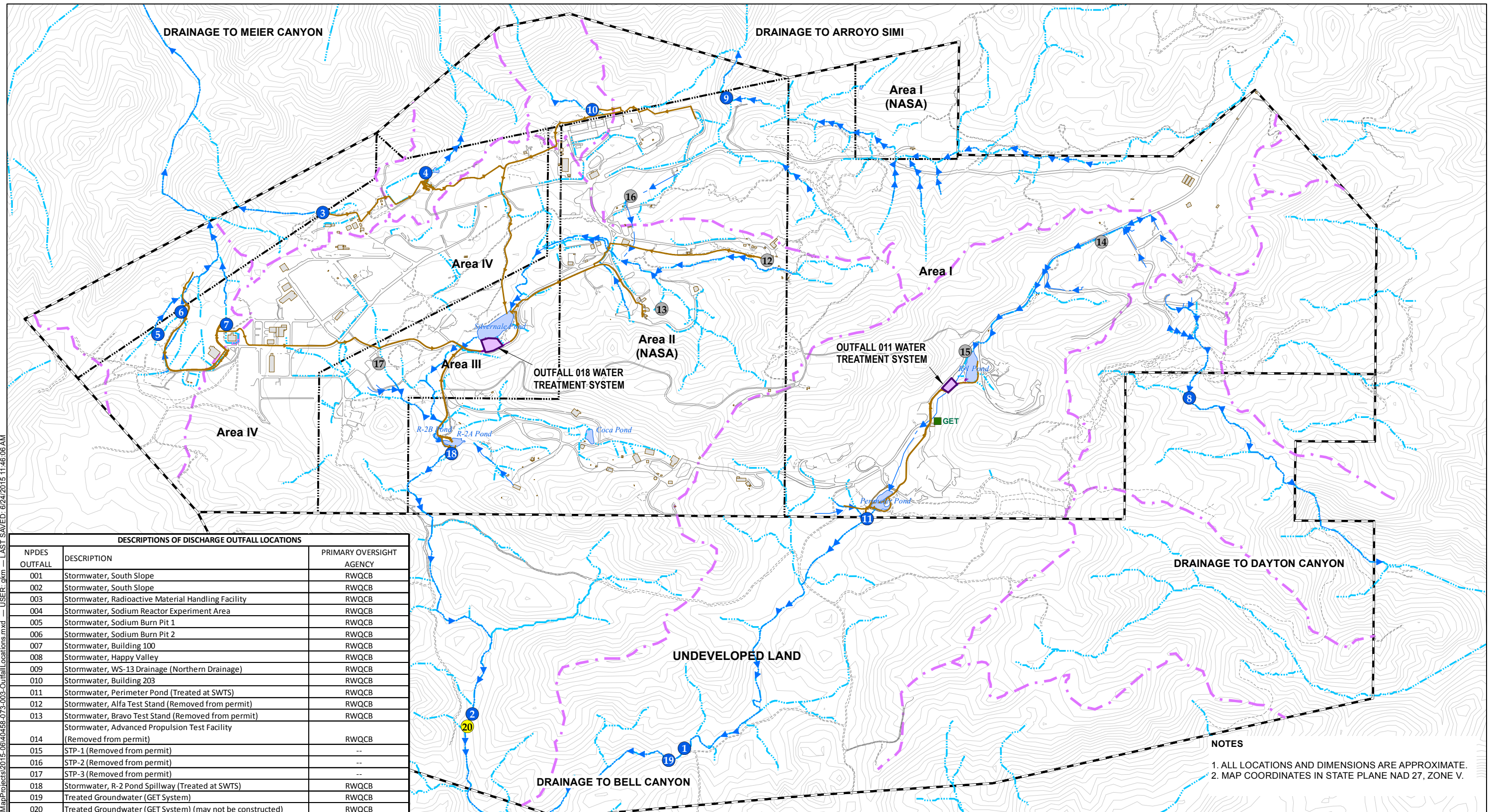
Submit Site-wide Stormwater 2018/19 Annual Report.

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FIGURE

GIS FILE PATH: G:\40458_SSEFL\GIS\MapProjects\2015-06\40458-073-003-OutfallLocations.mxd - USER: ckrn - LAST SAVED: 6/24/2015 11:46:06 AM

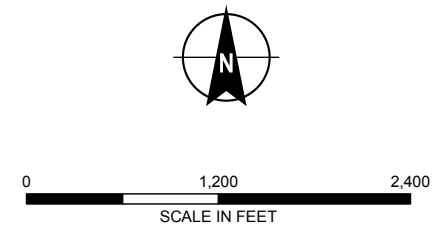


DESCRIPTIONS OF DISCHARGE OUTFALL LOCATIONS		
NPDES OUTFALL	DESCRIPTION	PRIMARY OVERSIGHT AGENCY
001	Stormwater, South Slope	RWQCB
002	Stormwater, South Slope	RWQCB
003	Stormwater, Radioactive Material Handling Facility	RWQCB
004	Stormwater, Sodium Reactor Experiment Area	RWQCB
005	Stormwater, Sodium Burn Pit 1	RWQCB
006	Stormwater, Sodium Burn Pit 2	RWQCB
007	Stormwater, Building 100	RWQCB
008	Stormwater, Happy Valley	RWQCB
009	Stormwater, WS-13 Drainage (Northern Drainage)	RWQCB
010	Stormwater, Building 203	RWQCB
011	Stormwater, Perimeter Pond (Treated at SWTS)	RWQCB
012	Stormwater, Alfa Test Stand (Removed from permit)	RWQCB
013	Stormwater, Bravo Test Stand (Removed from permit)	RWQCB
014	Stormwater, Advanced Propulsion Test Facility (Removed from permit)	RWQCB
015	STP-1 (Removed from permit)	--
016	STP-2 (Removed from permit)	--
017	STP-3 (Removed from permit)	--
018	Stormwater, R-2 Pond Spillway (Treated at SWTS)	RWQCB
019	Treated Groundwater (GET System)	RWQCB
020	Treated Groundwater (GET System) (may not be constructed)	RWQCB

NOTES
 1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
 2. MAP COORDINATES IN STATE PLANE NAD 27, ZONE V.

LEGEND

FORMER NPDES OUTFALL LOCATION	SSFL PROPERTY BOUNDARY	STORMWATER CONVEYANCE PIPELINE WITH FLOW DIRECTION	NATURAL DRAINAGE
NPDES OUTFALL LOCATION	ADMINISTRATIVE AREA BOUNDARY	DIRT ROAD	EFFLUENT PATHWAY
POSSIBLE FUTURE NPDES OUTFALL LOCATION	EXISTING BUILDING/STRUCTURE	25' ELEVATION CONTOUR	SURFACE WATER POND
GROUNDWATER EXTRACTION TREATMENT (GET) SYSTEM	STORMWATER TREATMENT SYSTEM	SURFACE WATER DIVIDE	



HALEY ALDRICH STORMWATER POLLUTION PREVENTION PLAN
 SANTA SUSANA FIELD LABORATORY
 VENTURA COUNTY, CALIFORNIA

SITE MAP WITH DRAINAGES, DRAINAGE AREAS, OUTFALL LOCATIONS, AND SURFACE WATER BODIES

JUNE 2015 FIGURE 3