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Information Technology Unit  
Regional Water Quality Control Board, Los Angeles Region  
320 West 4th Street, Suite 200  
Los Angeles, California 90013

Subject: First Quarter 2017 NPDES Discharge Monitoring Report  
Compliance File CI-6027 and NPDES No. CA0001309  
Santa Susana Field Laboratory  
Ventura County, California

The Boeing Company (Boeing) hereby submits this Discharge Monitoring Report (DMR) for the Santa Susana Field Laboratory (Santa Susana Site) for the period of 1 January through 31 March 2017 (First Quarter 2017). This DMR was prepared as required by and in accordance with National Pollutant Discharge Elimination System Permit No. CA0001309 (NPDES Permit) issued by the California Regional Water Quality Control Board, Los Angeles Region (Regional Board) in 2015 and under the regulatory oversight of the Regional Board.

Hard copies of this DMR are available to the public at California State University at Northridge Library; Simi Valley Library; and the Platt Branch of the Los Angeles Library. An electronic version of this DMR is located at:

<http://www.boeing.com/principles/environment/santa-susana/monitoring-reports.page>

#### FIRST QUARTER 2017 DMR CONTENTS

This DMR includes the following sections and appendices:

- **Discharge Summary:** This section describes the number of rain events, number of samples collected, sample dates, and sample locations during the First Quarter 2017. Table I summarizes the First Quarter 2017 sampling record by outfall, location, and sample type collected per the requirements of the NPDES Permit. Table II presents the First Quarter 2017 Arroyo Simi observations.
- **First Quarter 2017 Summary of Compliance:** This section summarizes the sample results that exceeded NPDES Permit limits, daily maximum benchmark limits, and receiving water limits in the First Quarter 2017.
- **Stormwater Treatment System (SWTS) at Outfall 018:** This section summarizes the activities at the SWTS at Outfall 018 in the First Quarter 2017.
- **First Quarter 2017 Santa Susana Site Stormwater Pollution Prevention Plan (SWPPP)/Best Management Practices (BMP) Activities:** This section presents the Santa Susana Site SWPPP activities and BMPs related to demolition, Interim Source Removal Actions (ISRA), the BMP Plan, the Northern Drainage, and other activities implemented in the First Quarter 2017. Table III summarizes specific BMP activities by outfall location.
- **Data Validation and Quality Control:** This section discusses data validation results and any laboratory or field corrective actions.

- **Figure 1** shows the stormwater collection conveyance system and Santa Susana Site features; **Figure 2** shows the Arroyo Simi – Frontier Park (RSW-002) sampling location.
- **Appendix A** summarizes the rainfall measured during the First Quarter 2017 at the Santa Susana Site.
- **Appendix B** tabulates waste shipment details.
- **Appendix C** presents chemical analytical results of the First Quarter 2017 stormwater and/or receiving water samples in tabular form by outfall location, constituents evaluated (analytes), sample dates, and data validation qualifiers.
- **Appendix D** summarizes the NPDES Permit limit exceedances.
- **Appendix E** contains copies of the laboratory analytical reports, chain of custody forms, and data validation reports.
- **Appendix F** tabulates the Reasonable Potential Analysis.
- **Appendix G** presents the First Quarter 2017 Bioassessment Sampling Report.
- **Appendix H** presents laboratory methods and State Water Resources Control Board Environmental and Laboratory Accreditation Program renewal certification.

**DISCHARGE SUMMARY**

The Santa Susana Site experienced six qualifying rain events that produced greater than 0.1 inch of rainfall within a 24-hour period and were preceded by at least 72 hours of dry weather during the First Quarter 2017 (Appendix A). Automated flow-weighted composite samplers (autosamplers) were set in preparation for all rain events. Five of the six qualifying rain events produced stormwater discharges. Santa Susana Site stormwater samples were collected at Outfalls 001, 002, 004, 006, 008, 009, 011, and 018.

The SWTS at Outfall 18 operated during the First Quarter 2017 and produced discharge at Outfalls 002 and 018.

One annual offsite receiving water sample was collected at the Arroyo Simi–Frontier Park location in Simi Valley (RSW 002; see Figure 2). Thirteen additional offsite receiving water grab samples were collected at the Arroyo Simi-Frontier Park location to calculate the geometric mean in compliance with Receiving Water Requirements in Attachment E of the NPDES Permit.

Table I summarizes the First Quarter 2017 sampling record by outfall/location, sample frequency, and sample type collected per NPDES Permit requirements.

**TABLE I: Sampling Record during the First Quarter 2017**

Date	Outfall/Location	Sample Frequency	Sample Type
01/09/2017	Arroyo Simi-Frontier Park (RSW-002)	Annual, Quarterly, Geometric Mean	Grab
01/09-01/10/2017	Outfall 009	Annual, Routine, Toxicity, Semi-Annual	Grab, Composite
01/16/2017	Arroyo Simi-Frontier Park (RSW-002)	Geometric Mean	Grab
01/17/2017	Arroyo Simi-Frontier Park (RSW-002)	Geometric Mean	Grab

<b>Date</b>	<b>Outfall/Location</b>	<b>Sample Frequency</b>	<b>Sample Type</b>
01/18/2017	Arroyo Simi-Frontier Park (RSW-002)	Geometric Mean	Grab
01/19/2017	Arroyo Simi-Frontier Park (RSW-002)	Geometric Mean	Grab
01/19-01/20/2017	Outfall 009	Routine, Toxicity	Grab, Composite
01/20/2017	Arroyo Simi-Frontier Park (RSW-002)	Geometric Mean	Grab
01/20-01/21/2017	Outfall 009	Quarterly, Routine, Toxicity	Grab, Composite
01/20-01/21/2017	Outfall 001	Annual, Quarterly, Routine, Toxicity	Grab, Composite
01/20-01/21/2017	Outfall 002	Quarterly, Routine, Toxicity	Grab, Composite
01/20-01/21/2017	Outfall 008	Annual, Routine, Toxicity	Grab, Composite
01/21/2017	Arroyo Simi-Frontier Park (RSW-002)	Geometric Mean	Grab
01/22/2017	Arroyo Simi-Frontier Park (RSW-002)	Geometric Mean	Grab
01/22-01/23/2017	Outfall 002	Annual, Quarterly, Routine, Toxicity	Grab, Composite
01/22-01/23/2017	Outfall 006	Annual, Routine, Semi-Annual, Toxicity	Grab, Composite
01/22-01/23/2017	Outfall 018	Annual, Quarterly, Routine, Toxicity	Grab, Composite
01/23/2017	Arroyo Simi-Frontier Park (RSW-002)	Geometric Mean	Grab
01/23-01/24/2017	Outfall 011	Annual, Quarterly, Routine, Toxicity	Grab, Composite
01/24/2017	Arroyo Simi-Frontier Park (RSW-002)	Geometric Mean	Grab
01/25/2017	Arroyo Simi-Frontier Park (RSW-002)	Geometric Mean	Grab
01/26/2017	Arroyo Simi-Frontier Park (RSW-002)	Geometric Mean	Grab
02/02/2017	Arroyo Simi-Frontier Park (RSW-002)	Geometric Mean	Grab
02/03-02/04/2017	Outfall 002	Routine, Toxicity	Grab, Composite
02/04-02/05/2017	Outfall 009	Routine	Grab, Composite

Date	Outfall/Location	Sample Frequency	Sample Type
02/06-02/07/2017	Outfall 008	Routine, Toxicity	Grab, Composite
02/07-02/08/2017	Outfall 001	Routine, Toxicity	Grab, Composite
02/07-02/08/2017	Outfall 018	Routine, Toxicity	Grab, Composite
02/08/2017	Arroyo Simi-Frontier Park (RSW-002)	Geometric Mean	Grab
02/10-02/12/2017	Outfall 018	Routine	Grab, Composite
02/11-02/12/2017	Outfall 002	Routine	Grab, Composite
02/11-02/12/2017	Outfall 009	Routine	Grab, Composite
02/17-02/18/2017	Outfall 001	Routine	Grab, Composite
02/17-02/18/2017	Outfall 002	Routine	Grab, Composite
02/17-02/18/2017	Outfall 004	Annual, Semi-Annual, Routine, Toxicity	Grab, Composite
02/17-02/18/2017	Outfall 006	Routine, Toxicity	Grab, Composite
02/17-02/18/2017	Outfall 008	Routine	Grab, Composite
02/17-02/18/2017	Outfall 009	Routine	Grab, Composite
02/17-02/18/2017	Outfall 011	Routine, Toxicity	Grab, Composite
02/17-02/18/2017	Outfall 018	Routine	Grab, Composite
02/26-02/27/2017	Outfall 002	Routine	Grab, Composite
02/26-02/27/2017	Outfall 009	Routine	Grab, Composite
02/26-02/27/2017	Outfall 018	Routine	Grab, Composite

**Notes:**

Routine = 1/discharge

Toxicity is required during the 1<sup>st</sup> and 2<sup>nd</sup> Rain or Flow Event

Geometric mean samples were collected in compliance with Receiving Water Requirements in Attachment E of the NPDES Permit

All samples were submitted to and analyzed by TestAmerica Laboratories, Inc., a California-certified analytical laboratory in Irvine, California per the NPDES Permit requirements.

#### FIRST QUARTER 2017 ARROYO SIMI OBSERVATIONS

The receiving water location at Arroyo Simi sample location RSW-002 in Simi Valley was observed in the First Quarter 2017 for the following:

**TABLE II: First Quarter 2017 Arroyo Simi Observations**

Arroyo Simi Observations	January 2017	February 2017	March 2017
Weather conditions	Cloudy, light drizzle, warm	Overcast, 56°F, slight breeze	NA
Color of water	Brown, opaque	Brown, opaque	NA
Appearance of oil films or grease, or floatable materials	Some foam	None	NA
Extent of visible turbidity or color patches	Uniform brown, turbid	Uniform Opaque	NA
Description of odor, if any	None	None	NA
Presence or activity of California Least Tern or California Brown Pelican	None	None	NA

**Notes:**

NA = not applicable. Since Outfall 009 did not flow during the month of March, a monthly inspection at Arroyo Simi was not required.

## FIRST QUARTER 2017 SUMMARY OF COMPLIANCE

As summarized in Appendix D, the First Quarter 2017 exceedances of Daily Maximum Benchmark Limits, Daily Maximum Permit Limits, or receiving water limits included:

- *Escherichia coli* (*E. coli*) at Arroyo Simi – Frontier Park (RSW-002);
- *Chronic Toxicity* at Outfall 002;
- *Iron* at Outfall 001, Outfall 002, and Outfall 011;
- *Lead* at Outfall 001 and Outfall 009;
- *Manganese* at Outfall 001;
- *Background dioxins (TCDD) toxic equivalent (TEQ)* at Outfall 001; and
- *pH* at Outfall 008.

Boeing is committed to fulfilling the requirements of the NPDES Permit. The actions taken during the First Quarter 2017 to control erosion and sediment transport and minimize the occurrence of future permit exceedances are described in Table III and the section on Outfall 008/009 ISRA and BMP Plan-Related Activities section of this report. Boeing will continue to work with the Stormwater Expert Panel (Expert Panel) to address exceedances at Outfalls.

### Arroyo Simi Frontier Park – (RSW-002)

#### Bacteria

In a sample collected offsite at the Frontier Park location on 9 January 2017, *E. coli* was detected at 8,000 most probable number per 100 milliliters (MPN/100mL) at the Arroyo Simi – Frontier Park (RSW-002), which is above the single sample maximum receiving water limit of 235 MPN/100mL. As stated in the NPDES Permit, *E. coli* is part of the water quality objectives for monitoring inland surface waters and includes a geometric mean calculation. Thirteen additional samples were collected at the Arroyo Simi – Frontier Park (RSW-002) on January 16 through 26 and February 2 and 8. All fourteen samples were used to calculate the geometric mean for *E. coli*. The calculated geometric mean for *E. coli* (1176 MPN/100mL) was above the geometric mean receiving water limit for *E. coli* (126 MPN/100mL).

On 9 January 2017, *E. coli* was detected in the stormwater sample collected from Outfall 009 at 200 MPN/100mL. The discharge from Outfall 009 was also analyzed for human-specific Bacteroides to determine whether bacteria present in this sample was from human sources. Results of the Bacteroides analysis demonstrated that human-specific markers were absent at Outfall 009; therefore, the bacteria therefore must have originated from non-human, natural sources (i.e., wildlife). Since discharge from Outfall 009 is the only Santa Susana Site Outfall contributing runoff to Arroyo Simi, it follows that the bacteria detected at Arroyo Simi – Frontier Park (RSW-002) do not include bacteria originating from human sources at the Santa Susana Site.

## Outfall 001

### Metals (Iron, Lead, and Manganese)

In a stormwater sample collected from Outfall 001 on 21 January 2017, iron was detected at 18 milligrams per liter (mg/L), above its Daily Maximum Benchmark Limit of 0.3 mg/L, lead was detected at 8.6 micrograms per liter ( $\mu\text{g/L}$ ), above its Daily Maximum Benchmark Limit of 5.2  $\mu\text{g/L}$ , and manganese was detected at 300  $\mu\text{g/L}$ , above its Daily Maximum Benchmark Limit of 50  $\mu\text{g/L}$ . Exceeding these Benchmark Limits requires a BMP Compliance Report, which Boeing will submit to the Regional Board.

The Expert Panel study, *SSFL Metals Background Report: Sources of Metals in SSFL Watersheds* (Ventura County Waterworks, 2011) noted that heavy metals in stormwater discharges from Outfalls 001, 002, 008, and 009 originate from various sources, including natural soil components, rainfall, and dry atmospheric deposition from local and regional sources. This report also explained that data show wet weather metals concentrations in creeks in regional natural watersheds, and that the Santa Susana Site's "outfall metal concentrations were comparable to the concentrations at these undeveloped watersheds."

Since total metals are commonly associated with sediment particles, Boeing believes that the metals concentrations observed in stormwater runoff in the Outfall 001 watershed were the result of erosion and total suspended solids (TSS) consisting of native sediments and soil. TSS loading varies based on rainfall intensity, duration, and erosion characteristics. The high rainfall intensity that occurred during the First Quarter 2017 likely caused the reported elevated metals concentrations (Appendix A). Thus, the elevated metals concentrations are most likely caused by the erosion of native soils and their subsequent migration into stormwater. In the Site-Wide Stormwater Plan and 2014/15 Annual Report, the Expert Panel recommended an erosion assessment of all unpaved roads in the watersheds upstream of Outfalls 001 and 002 in response to monitoring results with concentrations measured above the Benchmark Limits at these outfalls. As a result, Boeing completed a Road Erosion Assessment in August 2016 (Haley & Aldrich, Inc., 2017) and implemented corrective actions which will be reviewed and evaluated to determine their effectiveness.

### Background dioxins (TCDD) toxic equivalent (TEQ)

On 18 February 2017, TCDD TEQ was detected in a stormwater sample collected from Outfall 001 at 3.0E-08  $\mu\text{g/L}$ , above the Daily Max Permit Limit of 2.8E-08  $\mu\text{g/L}$ .

The Department of Toxic Substances Control's (DTSC) Chemical Soil Background Study found TCDD congeners in soil background conditions and concluded that they could have originated from wildfire combustion processes and atmospheric deposition (DTSC, 2012). Boeing believes that the dioxins detected in stormwater runoff in the Outfall 001 watershed resulted from the high intensity rain event that occurred the day before (17 February) which caused soil erosion and increased levels of total suspended solids (TSS). TSS loading varies based on rainfall intensity, duration, and erosion characteristics.

## Outfall 002

### Iron

On 23 January 2017, iron was detected in a stormwater sample collected from Outfall 002 at 0.48 mg/L, above the Daily Maximum Benchmark Limit of 0.3 mg/L. Exceeding this Benchmark Limit requires a BMP Compliance Report, which Boeing will submit to the Regional Board.

As discussed above for Outfall 001, Boeing believes that the metal concentration observed in stormwater runoff in the Outfall 002 watershed was the result of the high intensity rain events causing erosion and TSS consisting of

native sediments and soil. TSS loading varies based on rainfall intensity, duration, and erosion characteristics. In the Site-Wide Stormwater Plan and 2014/15 Annual Report, the Expert Panel recommended an erosion assessment of all unpaved roads in the watersheds upstream of Outfalls 001 and 002 in response to monitoring results with concentrations measured above the Benchmark Limits at these outfalls. As a result, Boeing implemented a corrective action which will be reviewed and evaluated to determine its effectiveness.

#### Chronic Toxicity

A chronic toxicity test conducted on stormwater collected from Outfall 002 on 21 January 2017 indicated a result of Fail with a % Effect of 55.46%, which is above the NPDES Permit daily maximum benchmark limit of Pass or % Effect <50.

Based on this sample result, the laboratory initiated the Toxicity Identification Evaluation (TIE) process as part of Boeing's Initial Toxicity Reduction Evaluation (TRE) Work Plan and reanalyzed the 21 January sample to establish a baseline for the TIE (Haley & Aldrich, 2015). The baseline toxicity was reported to be % Effect equal to 9.29%. Since the toxicity was reduced, the lab stopped the TIE process. Based on subsequent stormwater samples collected on 23 January 2017 and 03 February 2017 and which produced passing chronic toxicity results, this failed chronic toxicity test is viewed as episodic and the Toxicity Reduction Evaluation (TRE) process was ended.

#### **Outfall 008**

##### pH

A field measurement collected at Outfall 008 on 20 January 2017 indicated a pH of 6.2, which is slightly below the NPDES Permit limit range of 6.5 to 8.5. The reason for the decreased pH condition at this location has not been identified. Based on subsequent stormwater samples collected on 3 February 2017, 17 February 2017, and 26 February 2017 and which were within NPDES Permit limit range for pH, this low pH appears to be an episodic event.

#### **Outfall 009**

##### Lead

On 18 February 2017, lead was detected in a stormwater sample collected from Outfall 009 at 9.5 µg /L, above the Daily Maximum Permit Limit of 5.2 µg /L.

Since total metals are commonly associated with sediment particles, Boeing believes that the lead concentration observed in stormwater runoff in the Outfall 009 watershed was based on TSS consisting of native sediments and soil mobilized after the high intensity rainfall on 17 February. Through 16 February of the current rainy season, the Santa Susana Site received 16.74 inches of rainfall and received 4.6 inches of rainfall on 17 February, which produced almost four times the volume over the other discharge events in the First Quarter 2017 (Appendix C). Boeing constructed a biofilter in 2013, bioswales in 2015, and increased the settling time at culvert modification CM-1, which captures water from the road at the recommendation of the Stormwater Expert Panel. Boeing will continue to work with the Expert Panel to address exceedances at Outfalls.



## Outfall 011

### Iron

On 24 January 2017, iron was detected in a stormwater sample collected from Outfall 011 at 0.77 mg/L, above the Daily Maximum Benchmark Limit of 0.3 mg/L.

As discussed for Outfall 001, Boeing believes that the metals concentrations observed in stormwater runoff in the Outfall 011 watershed were the result of the high intensity rain events causing erosion and TSS consisting of native sediments and soil. TSS loading varies based on rainfall intensity, duration, and erosion characteristics. Boeing will continue to work with Expert Panel to address exceedances at Outfalls.

## STORMWATER TREATMENT SYSTEM AT OUTFALL 018 ACTIVITIES

The Stormwater Treatment System (SWTS), located at Silvernale Pond, and which discharges through Outfall 018, operated three times during the First Quarter 2017. Major maintenance items completed for its operation were as follows:

- Silica sand media were replaced at Sand Filter Banks 1 and 2;
- Granular activated carbon media were replaced in four of the eight carbon vessels;
- Communication between the ACTIFLO and Aluminum Sulfate chemical pump was repaired to facilitate control through the ACTIFLO Programmable Logic Controller;
- One of the sodium hydroxide chemical pumps was replaced with a digital peristaltic pump to improve the accuracy of the pump's output;
- The chemical dosing pumps controlled through the Human Machine Interface (HMI) screen on the ACTIFLO Programmable Logic Controller (PLC) were calibrated and verified to be accurate with the use of a 4-20 ma signal;
- A simulated flow function was installed on the Human Machine Interface HMI screen to allow testing and the calibration of the ACTIFLO chemical dosing pumps;
- Underground conveyance piping was installed to route wastewater from the SWTS to storage tanks in the adjacent gravel lot for additional storage capacity; and
- An upgraded electrical instant hot water heater and insulation were added to the polymer chemical skid and piping to limit the potential for chemical freezing.

### 1<sup>st</sup> Operational Event:

- The SWTS operated from 21 through 24 January 2017 and discharged for approximately 48 hours. Samples were collected on 22 and 23 January and all constituents met NPDES Permit effluent limits;
- All field measured parameters at the SWTS outlet were in compliance for the full discharge duration; and
- The total amount of water from Silvernale Pond treated and discharged was 3,241,400 gallons.

2<sup>nd</sup> Operational Event:

- The SWTS operated from February 8 through 17 2017 and discharged for approximately 150 hours. The SWTS operated and discharged water only during the day time shift on from 15 through 17 February. Samples were collected on 7 and 8, 10 through 12, and 17 and 18 February and all constituents met NPDES Permit effluent limits;
- All field measured parameters at the SWTS system outlet were in compliance for the full discharge duration; and
- The total amount of water discharged from Silvernale Pond was 10,005,600 gallons.

3<sup>rd</sup> Operational Event:

- The SWTS operated and discharged for approximately 120 hours between 23 through 28 February 2017. Samples were collected on 26 and 27 February and all constituents met NPDES Permit effluent limits;
- All field measured parameters at the SWTS outlet were in compliance for the full discharge duration;
- The total amount of water discharged from Silvernale Pond was 7,913,000 gallons; and
- The total amount of solids produced by the screw press during the three events was approximately 50 cubic yards.

**FIRST QUARTER 2017 SANTA SUSANA SITE SWPPP/BMP ACTIVITIES**

Boeing implemented significant SWPPP- and BMP-related activities to assist in improving stormwater quality and compliance at the Santa Susana Site. Table III summarizes the activities completed during the First Quarter 2017 by outfall. In addition to SWPPP-related activities, specific BMP projects included: Outfall 008/009 ISRA BMPs; BMP Plan-related BMPs; and Northern Drainage BMPs.

**TABLE III: Boeing's First Quarter 2017 BMP Activities**

OUTFALL (Location)	BMP ACTIVITIES DURING FIRST QUARTER 2017
001 (South Slope)	Conducted erosion, sediment control, and drainage stabilization inspections and performed maintenance around the perimeter of the outfall, the drainage/watershed, and areas of disturbance or sparse vegetation. Inspected the outfall and flume for sediment/debris. Checked the sample box and flow meter control box for the presence of debris and/or animals. Cleaned the sample box and the outfall area and performed weed abatement as needed. Reset the flow meter and replaced the tape monthly. Removed and cleaned large quantities of sediment and debris after each high intensity rain event in First Quarter 2017.
002 (South Slope)	Conducted erosion, sediment control, and drainage stabilization inspections and performed maintenance around the perimeter of the outfall, the drainage/watershed, and areas of disturbance or sparse vegetation. Inspected the outfall and flume for sediment/debris. Checked the sample box and flow meter control box for the presence of debris and/or animals. Cleaned the sample box and the outfall area and performed weed abatement as needed. Reset the flow meter and replaced the tape monthly. Repaired the Auto-Sampler/flow meter tubing. Removed and cleaned large quantities of sediment and debris after each high intensity rain event in First Quarter 2017.

OUTFALL (Location)	BMP ACTIVITIES DURING FIRST QUARTER 2017
<p>003 (Radioactive Material Handling Facility)</p>	<p>Conducted erosion and sediment control inspections and performed maintenance around the perimeter of the outfall, the drainage/watershed, and areas of disturbance or sparse vegetation. Inspected the outfall and flume for sediment/debris. Checked the sample box and flow meter control box for the presence of debris and/or animals. Cleaned the sample box and the outfall area and performed weed abatement as needed. Reset the flow meter and replaced the tape monthly. Conducted maintenance inspections of structural BMPs, including the flow-through structure and stormwater conveyance and retention systems.</p>
<p>004 (Sodium Reactor Experiment Area)</p>	<p>Conducted erosion and sediment control inspections and performed maintenance around the perimeter of the outfall, the drainage/watershed, and areas of disturbance or sparse vegetation. Inspected the outfall and flume for sediment/debris. Checked the sample box and flow meter control box for the presence of debris and/or animals. Cleaned the sample box and the outfall area and performed weed abatement as needed. Reset the flow meter and replaced the tape monthly. Conducted maintenance inspections of the structural BMPs, including the flow-through structure and stormwater conveyance system. Removed debris from inside the Charles King suction hose and the bottom of the storage tank near the suction inlet.</p>
<p>005 (Sodium Burn Pit 1)</p>	<p>Conducted erosion and sediment control inspections and performed maintenance around the perimeter of the outfall, the drainage/watershed, and areas of disturbance or sparse vegetation. Inspected the outfall for sediment/debris. Checked the sample box for the presence of debris and/or animals. Cleaned the sample box and the outfall area and performed weed abatement as needed. Conducted maintenance inspections of the stormwater conveyance and retention systems. Installed HDPE (felt) covers over catch basins to provide safe animal egress.</p>
<p>006 (Sodium Burn Pit 2)</p>	<p>Conducted erosion and sediment control inspections and performed maintenance around the perimeter of the outfall, the drainage/watershed, and areas of disturbance or sparse vegetation. Inspected the outfall and flume for sediment/debris. Checked sample box and flow meter control box for the presence of debris and/or animals. Cleaned sample box and the outfall area and performed weed abatement as needed. Reset flow meter and replaced the tape monthly. Conducted maintenance inspections of the structural BMPs, including the flow-through structure and stormwater conveyance system. Investigated and repaired the pumping discharge pipe by installing air bleed valve at the air-gap device.</p>
<p>007 (Building 100)</p>	<p>Conducted erosion and sediment control inspections and performed maintenance around the perimeter of the outfall, the drainage/watershed, and areas of disturbance or sparse vegetation. Inspected the outfall for sediment/debris. Checked the sample box for the presence of debris and/or animals. Cleaned the sample box and the outfall area and performed weed abatement as needed. Conducted maintenance inspections of the stormwater conveyance and retention systems. Installed HDPE (felt) covers over catch basins to provide safe animal egress.</p>

OUTFALL (Location)	BMP ACTIVITIES DURING FIRST QUARTER 2017
<p>008 (Happy Valley)</p>	<p>Conducted erosion and sediment control inspections and performed maintenance around the perimeter of the outfall, the drainage/watershed, and areas of disturbance or sparse vegetation. Inspected the outfall and flume for sediment/debris. Checked the sample box and flow meter control box for the presence of debris and/or animals. Cleaned the sample box and the outfall area and performed weed abatement as needed. Reset the flow meter and replaced the tape monthly. Removed and cleaned large quantities of sediment and debris after each high intensity rain event in First Quarter 2017.</p>
<p>009 (WS-13 Drainage)</p>	<p>Outfall BMPs: Conducted erosion and sediment control inspections and performed maintenance around the perimeter of the outfall, the drainage/watershed, and areas of disturbance or sparse vegetation. Inspected the outfall and flume for sediment/debris. Checked the sample box and flow meter control box for the presence of debris and/or animals. Cleaned the sample box and the outfall area and performed weed abatement as needed. Reset the flow meter and replaced the tape monthly. Removed and cleaned large quantities of sediment and debris after each high intensity rain event in First Quarter 2017.</p> <p>Restoration, Monitoring and Mitigation Plan BMPs: Performed a quarterly biological monitoring inspection on 22 March 2017 and a quarterly geomorphic monitoring inspection on March 20.</p> <p>Lower Lot BMP: Inspected the Sedimentation Basin, Biofilter, and Cistern areas. Cleaned the sediment area near the wooden retaining wall and installed gravel to prevent the migration of sediment into the parking lot. Cleared the overflow channel of leaves and debris and installed BMPs to direct the water into the channel along the fence to prevent possible overflow and erosion of the Northern Drainage slope.</p> <p>Front Gate: removed debris and sediment and cleaned the area.</p> <p>Former Building 1436 (B1436) Detention Bioswales: Performed maintenance inspection of bioswale surface area, including hydroseeded area and fiber rolls. Replaced the straw wattles and removed sediment buildup from the inlets.</p> <p>B-1 Area: Performed maintenance inspection of BMPs along the slope and within drainage.</p> <p>Helipad: Added seven additional Adler tanks to assist in moving stormwater to Silvernale Pond.</p> <p>Culvert Modifications: Performed maintenance inspection of BMPs. Inspected the culvert inlets and rip rap check dams of debris prior to and after rain events. Installed wattles where new BMP discharges and completed installation of BMP modification at CM-3 to divert additional service area road runoff towards this location. Replaced the damaged straw wattle and assessed the upstream drainage channel to determine if additional BMPs were required at CM-4.</p>

OUTFALL (Location)	BMP ACTIVITIES DURING FIRST QUARTER 2017
<p>010 (Building 203)</p>	<p>Conducted erosion and sediment control inspections and performed maintenance around the perimeter of the outfall, the drainage/watershed, and areas of disturbance or sparse vegetation. Inspected the outfall and flume for sediment/debris. Checked the sample box and flow meter control box for the presence of debris and/or animals. Cleaned the sample box and the outfall area and performed weed abatement as needed. Reset the flow meter and replaced the tape monthly. Conducted maintenance inspections of structural BMPs, including the flow-through structure and stormwater conveyance and retention systems.</p>
<p>011 (Perimeter Pond)</p>	<p>Conducted erosion and sediment control inspections and performed maintenance around the perimeter of the outfall, the drainage/watershed, and areas of disturbance or sparse vegetation. Inspected the outfall and weir for sediment/debris. Checked the sample box and flow meter control box for the presence of debris and/or animals. Cleaned the sample box and the outfall area and performed weed abatement as needed. Reset the flow meter and replaced tape monthly. Conducted maintenance inspections of structural BMPs, including the flow-through structure and stormwater conveyance system. Cleaned the mechanical totalizer of sediment/debris. Tested the pumps to verify they are pumping at capacity. Installed a new totalizer. Removed and cleaned large quantities of sediment and debris after each high intensity rain event in First Quarter 2017.</p> <p>Perimeter Pond: Conducted maintenance on a faulty pump seal.</p> <p>R-1 Pond: Installed 6-inch diameter HDPE suction pipe in the pond and 6-inch flat discharge hose into the Bowl.</p>
<p>018 (R-2 Pond Spillway)</p>	<p>Conducted erosion and sediment control inspections and performed maintenance around the perimeter of the outfall, the drainage/watershed, and areas of disturbance or sparse vegetation. Inspected the outfall and flume for sediment/debris. Checked the sample box and flow meter control box for the presence of debris and/or animals. Cleaned the sample box and the outfall area and performed weed abatement as needed. Reset the flow meter and replaced the tape monthly. Conducted maintenance inspections of the structural BMPs, including the flow-through structure and conveyance system. Removed and cleaned large quantities of sediment and debris after each high intensity rain event in First Quarter 2017.</p> <p>R-2A Pond: Added seven Adler tanks to assist in moving stormwater to Silvernale Pond.</p>
<p>019 (Area I Groundwater Extraction and Treatment [GET] System)</p>	<p>The GET system has not operated since April 2013 and no pumping or discharge has occurred; therefore, no NPDES Permit sampling was performed at the Area I GET System in the First Quarter 2017. Conducted maintenance inspections of the structural BMPs.</p>
<p>RSW-002 (Arroyo Simi – Frontier Park)</p>	<p>Collected the annual and quarterly rain event receiving water sample at the Arroyo Simi – Frontier Park location. In addition, thirteen receiving water grab samples were collected to calculate the geometric mean. Conducted receiving water inspections.</p>

## **OTHER BMP ACTIVITIES**

BMP observations and maintenance inspections were conducted in conformance with the Site-Wide SWPPP (Haley & Aldrich, 2016) at and around the former active test stands Alfa and Bravo and former Advanced Propulsion Test Facility.

## **NASA-RELATED ACTIVITIES**

Demolition activities covered by National Aeronautics and Space Administration's (NASA) Construction SWPPP (dated 16 March 2016) are inspected in accordance with the Construction General Permit (CGP). During the First Quarter 2017, NASA performed planned demolition activities in the Skyline and Liquid Oxygen Plant (LOX) areas. NASA placed wattles as linear sediment controls, installed silt fencing, and placed rip rap as an erosion control measure, where needed, and hydroseeded areas within these sites where construction activities had been completed.

NASA also inspected temporary BMPs (sand bags and wattles) at Liquid Oxygen Plant (LOX) ISRA areas and discharge points to Northern Drainage and inspected ELV BMP storage tanks in preparation for the rainy season during the First Quarter 2017.

## **DOE-RELATED ACTIVITIES**

The Department of Energy (DOE) performed stormwater runoff maintenance during the First Quarter 2017 by removing silt buildup from behind silt fences and wattles. Extra sediment fencing was installed in the vicinity of well DD-141 to prevent sediment from entering the drainage north of the Building 56 Landfill Area and in the vicinity of well DD-143 to prevent sediment from entering the drainage upgradient from Outfall 003. BMPs are currently being monitored to make sure they are effective at preventing soil erosion.

## **SITE-WIDE WORKPLAN AND ANNUAL REPORT**

The Expert Panel submitted a Site-Wide Stormwater Work Plan and 2014/15 Annual Report (2015 Work Plan) in September 2015 (Geosyntec and the Expert Panel, 2015a) on behalf of Boeing to meet the requirements of the NPDES Permit (Order No. R4-2015-0033)<sup>1</sup>. The 2015 Work Plan is applicable to all outfalls and presents the NPDES Permit monitoring results and BMP-related activities to be performed and reported on a yearly basis. The 2015 Work Plan also carried over the maintenance and monitoring of BMPs originally recommended in the 2010 BMP Plan for the Outfall 008 and 009 Watersheds (MWH *et al.*, 2010) and BMP Plan Addenda (Geosyntec and the Expert Panel, 2011; Geosyntec and the Expert Panel, 2012; Geosyntec and the Expert Panel, 2013; and Geosyntec and the Expert Panel, 2014), as well as those reported in the ISRA Performance Monitoring and BMP Monitoring Reports for Outfalls 008 and 009 Watersheds submitted to the Regional Board for each rainy season from 2010 through 2015 (MWH, 2010; MWH *et al.*, 2011; MWH *et al.*, 2012; MWH *et al.*, 2013; MWH *et al.*, 2014, and MWH *et al.*, 2015).

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<sup>1</sup> Available at: <http://www.boeing.com/principles/environment/santa-susana/permits.page>

The 2015 Work Plan is designed to assess the effectiveness of BMPs/treatment control implementation measures based on surface water samples collected at outfalls and supplemented by monitoring data. A memorandum developed by Geosyntec Consultants for Boeing and the Expert Panel was incorporated into the 2015 Work Plan to summarize the evaluation of stormwater BMP opportunities along the Service Area Road. Subsequent to Geosyntec's memorandum, Boeing conducted surveys along the Service Area Road and completed additional design iterations to support diverting surface flow from the roadway to existing culvert modifications and maximize the capture area. BMP implementation was planned for and was initiated in early 2017 (Geosyntec and the Expert Panel, 2015b). The 2015 Work Plan also includes recommended non-industrial sources special studies intended to help identify sources of lead and dioxins within the Outfall 009 watershed. The special studies involve vacuum sampling pavement solids, pan sampling atmospheric deposition solids, soil sampling around treated wood poles, and sediment and stormwater sampling at multiple locations along the Northern Drainage. A subset of sampling for the various studies was conducted in the First Quarter 2017 as described below. As outlined in the 2015 Work Plan, the 2015/2016 Annual Report was submitted to the Regional Board in October 2016 (Geosyntec and the Expert Panel, 2016).

#### **OUTFALL 008/009 ISRA AND BMP PLAN-RELATED ACTIVITIES**

The BMP activities discussed below were performed, commenced, or completed during the First Quarter 2017 in coordination with the Expert Panel.

##### *Public Meeting*

The Expert Panel hosted a public meeting and tour on March 21, 2017. The bus tour visited the following site areas/BMPs: Detention Bioswales, new upper lot media filter, sedimentation basin and biofilter, Happy Valley, and the Helipad.

##### *Former Building 1436 Detention Bioswales*

Two detention bioswales were constructed at the former Building 1436 following its removal in Third Quarter 2014. The graded surface was hydroseeded and more than 2,900 native plantings were installed in December 2014. The bioswales were designed to capture, pretreat, and detain runoff from the adjacent parking lot and from approximately 13.9 acres of drainage area east and upgradient prior to releasing the stormwater to the former Instrument and Equipment Laboratories (IEL) storm drain, where flow is diverted to the lower lot biofilter for treatment. The First Quarter 2017 activities included inspections of the bioswales and hydroseeded areas.

##### *Lower Lot Biofilter*

The lower lot biofilter is a stormwater treatment BMP designed and built to capture, convey, and treat stormwater runoff from the lower parking lot and former IEL watershed. The lower lot biofilter consists of a 30,000-gallon cistern, a stormwater conveyance line, a sedimentation basin, and a media biofilter. Construction activities were completed on March 15, 2013; a Regional Board and public tour of the completed biofilter was conducted on March 20, 2013.

The First Quarter 2017 activities included inspections to verify that the sedimentation basin and biofilter were free of sediment and debris, checks of the Cistern area and pump, and inspections of surrounding BMPs. Approximately 2,577,200 gallons of stormwater was pumped from the Cistern to the sedimentation basin during the First Quarter 2017 rain events.

#### *NASA Expendable Launch Vehicle (ELV) Area BMPs*

BMPs and drainage improvements were installed between June and October 2013 at the NASA ELV to improve the quality of stormwater from the ELV area. Stormwater is gravity-driven through the tank system, starting with the settling tanks, then through the filter media tank, before discharging to a tributary that flows to Outfall 009. In the Second Quarter 2016, a sand bag berm was placed across the ELV asphalt swale, to divert runoff from directly discharging to the Northern Drainage to instead flow toward CM-1 for treatment. The First Quarter 2017 activities included inspections of the BMPs.

The existing culvert inlet on the north side of the upper parking lot was converted in March and April 2017 to a media filter similar in design to the media filter at the B-1 area. Runoff from the upper parking lot and the main entrance road is detained and treated with a site-specific media mix before sending treated flow to the Northern Drainage.

#### *Administration Area Inlet Filters*

Four storm drain inlets were modified with either drop inlet filters or weighted wattles filled with media mixtures during the First Quarter 2017. A sandbag berm was also placed upstream of the inlet closest to the lower lot to increase the settling of solids.

#### *Road Runoff Diversion to CM-3*

The construction of a new Service Area road runoff diversion to CM-3 was completed during the First Quarter 2017. This BMP included a new curb installed on the north side of the road meant to convey flow to a new drop inlet and trench under the road, which then directs the collected runoff to CM-3 for treatment before entering the Northern Drainage.

#### *LOX Area*

Sandbags were placed along both sides of the paved entrance drive to detain additional runoff and lengthen the flow paths prior to entering the Northern Drainage. The sandbag placement started during the Fourth Quarter 2016 and was completed during the First Quarter 2017.

#### *NASA and Boeing BMP Monitoring-Related Maintenance Activities*

In addition to activities performed in coordination with the Expert Panel described above, the BMP monitoring-related activities performed for Outfalls 008/009 during the First Quarter 2017 included the following:

- Collected BMP performance monitoring samples at the following locations; these samples will be reported by the Expert Panel in the 2016/17 Annual Report.
  - Area II Road area;
  - B-1 area;
  - Lower Parking Lot area;
  - Area I Landfill area;
  - IEL area;
  - ELV area;
  - Helipad area;
  - CM-1 area;
  - CM-10 area; and



- Well 13 Road area.
- Collected Expert Panel Special Monitoring Studies (Santa Susana Surface Water Expert Panel and Geosyntec Consultants, 2016) samples at the following locations in or near the Northern Drainage:
  - Along the Northern Drainage above the confluence with Area II drainage (stormwater);
  - Along the Area II drainage above the confluence with the Northern Drainage (stormwater);
  - Along the Northern Drainage west of the LOX Area and near the Well 52B/52C cluster (stormwater);
  - Along the Northern Drainage east of the LOX Area and downstream of the box culvert (stormwater);
  - Along the Northern Drainage east of the LOX area and near CM-5 (stormwater);
  - Along the Northern Drainage downstream of a 24-inch storm drain outlet discharge (stormwater); and
  - Along the Northern Drainage north of the Santa Susana Site entrance and west of the Facility Road and Woolsey Canyon Road intersection (stormwater).
- Collected special studies atmospheric deposition samples from sampling pans on the Boeing-owned stormwater tank near the Helipad and the Boeing Fire Station;
- Collected special studies pavement solids samples from the following locations:
  - LOX entrance road;
  - Area II Road near CM-9;
  - Lower parking lot;
  - Upper parking lot, two locations (south end and east side); and
- Area I Road near entrance to the upper parking lot
- Inspected BMPs at BMP monitoring locations and surrounding areas;
- At the Lower Lot, next to the wooden retaining wall, removed sediment and installed gravel to prevent migration of sediment into the parking lot;
- At the Lower Lot BMP (Biofilter), cleared the overflow channel of leaves and debris and installed BMPs to direct water into the channel along the fence to prevent possible overflow and erosion of the Northern Drainage slope;
- At the front gate, removed debris and sediment and cleaned the area;
- At CM-2, cleared the inlet of sediment and debris and installed fiber roll and rip rap to dissipate the flow to prevent erosion of the bank just south of the CM;
- At CM-3, removed debris and sediment and cleaned the area;
- At CM-4, replaced damaged straw wattle, removed debris and sediment, and cleaned the area;
- At CM-5 at Sage Ranch, removed debris and sediment, and cleaned the area;
- At CM-9, removed debris and sediment at the culvert area, at the check dam along culvert pipe, from the clogged grated inlet along Area II Road, and cleaned all areas; and
- At CM-10, removed debris and sediment, and cleaned the area.

## **NORTHERN DRAINAGE BMPS**

Boeing has actively worked to restore the Northern Drainage following cleanup activities performed under the oversight of the Department of Toxic Substances Control (DTSC) and in accordance with the requirements of Regional Board's Cleanup and Abatement Order No. R4-2007-0054 (Regional Board, 2007). The restoration and mitigation activities proposed in the Northern Drainage Restoration, Mitigation, and Monitoring Plan (RMMP)<sup>2</sup> were implemented in 2012. In accordance with the RMMP, regular maintenance, monitoring, and reporting have been implemented in the Northern Drainage since 2012 for the stream's plant biology and geomorphology. Biological activities include botanical and California Rapid Assessment Method surveys, plant watering only during periods of excessive heat, and weeding non-native species. Geomorphic activities include stabilization measure inspections, physical surveying, facies mapping, photographic surveying, annual stream walks, as-needed maintenance, and annual geomorphic monitoring reports.

Biological activities performed in the First Quarter 2017 included periodic weeding and a quarterly monitoring inspection on 22 March 2017.

Geomorphic activities performed in the First Quarter 2017 included inspection of stabilization measures on January 6, 2017 and March 20, 2017.

## **REASONABLE POTENTIAL ANALYSIS**

Stormwater discharges from the Santa Susana Site occurred at Outfall 001, 002, 004, 006, 008, 009, 011, and 018 during the First Quarter 2017. Analytical results from this quarter were added to the Reasonable Potential Analysis dataset following the MWH and Flow Science Reasonable Potential Analysis procedures (MWH and Flow Science, 2006). As shown in Appendix F, the analytical results for the First Quarter 2017 did not trigger a reasonable potential for any other constituent not already regulated under the current NPDES Permit.

### Bacteria

On 20 January 2017, *E. coli* was detected in stormwater samples collected from Outfall 001 at 810 MPN/100mL. On 22 January 2017, *E. coli* was detected in stormwater samples collected from Outfall 018 at 600 MPN/100mL. Outfalls 001 and 018 were also analyzed for human-specific Bacteroides to confirm that the bacteria present in these samples were not from human sources. The results of the Bacteroides analysis demonstrated that human-specific markers were present at Outfall 001 and absent from 018. Since Bacteroides were found to be present at Outfalls 001, Boeing collected samples on 17 February 2017 under wet conditions at Outfall 001 and three upstream locations: Outfall 011, R-1 Pond, and Perimeter Pond. Laboratory analysis reported human-specific markers were present at all four locations. Boeing collected additional water samples for human-specific Bacteroides analysis on 27 March 2017 under dry conditions at R-1 Pond and Perimeter Pond. Laboratory analysis reported that human-specific markers were absent. Based on these subsequent samples, the present human bacteria results are viewed as episodic. Boeing therefore believes that no reasonable potential has been demonstrated for bacteria at Outfall 001 and Outfall 018. Boeing collects all sanitary waste generated at the Santa Susana Site and transports it to an offsite facility for treatment and disposal. Boeing will review their sanitary waste collection procedures.

## **DATA VALIDATION AND QUALITY CONTROL**

In accordance with current federal and state Environmental Protection Agency guidelines and procedures, or as specified in the NPDES Monitoring and Reporting Program, samples were analyzed at a State of California-certified

<sup>2</sup> Available at: <http://www.boeing.com/principles/environment/santa-susana/technical-reports.page>

laboratory. Data validation was performed on the analytical results and quality control elements were found to be within acceptable limits for the analytical methods reported, except as noted on the analytical summary tables. Measures were implemented by the analytical laboratory to monitor and/or evaluate low level detections, analyze for interferences, and ensure that cross-contamination did not occur. Laboratory analytical reports, including validation reports and notes, are included in Appendix E.

Attachment H of the NPDES Permit presents the State Board's minimum levels laboratories are expected to achieve for reporting and determining compliance with NPDES Permit limits. The analytical laboratory achieved these minimum levels in the First Quarter 2017 except when reporting limits were above the minimum levels (generally due to matrix). In cases where the NPDES Permit limit was less than the reporting limit and minimum level, the reporting limit was used to determine compliance.

### **BIOASSESSMENT MONITORING**

A bioassessment review was conducted at the Santa Susana Site on 30 March 2017 to evaluate water quality conditions in the tributary to Arroyo Simi downstream of Outfall 006 and the tributary to the Los Angeles River downstream of Outfall 001 in accordance with NPDES Permit requirements. The methods, procedures, and results of the bioassessment are reported in the Bioassessment Monitoring Report included in Appendix G. Note that there was insufficient water flow to conduct the bioassessment monitoring in 2017.

### **CONCLUSIONS**

Boeing continues to improve water quality at stormwater discharge locations at the Santa Susana Site through methods designed to preserve the natural conditions in the watershed to the maximum extent feasible by implementing sustainable erosion control/restoration measures and continuing our collaboration with the Expert Panel.

### **FACILITY CONTACT**

If there are any questions regarding this report or its enclosures, you may contact Mr. Paul Costa of Boeing at (818) 466-8778.

**CERTIFICATION**

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted.

Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Executed on the 15th of May 2017.

Sincerely,



Steven Shestak  
Director, Environment  
The Boeing Company

**Enclosures:**

## References

Figure 1 – Site Map with Stormwater Collection and Conveyance System and Site Features

Figure 2 – Arroyo Simi – Frontier Park (RSW-002) Sampling Location

Appendix A – First Quarter 2017 Rainfall Data Summary

Appendix B – First Quarter 2017 Waste Shipment Summary Table

Appendix C – First Quarter 2017 Discharge Monitoring Data Summary Tables

Appendix D – First Quarter 2017 NPDES Permit Limit Exceedances

Appendix E – (on CD) First Quarter 2017 Analytical Laboratory Report, Chain of Custody Forms, and Validation Reports

Appendix F – First Quarter 2017 Reasonable Potential Analysis Tables

Appendix G – First Quarter 2017 Bioassessment Sampling Report

Appendix H – (on CD) First Quarter 2017 Analytical Laboratory Methods, Method Detection Limits, Reporting Limits, QA/QC Procedures, and ELAP Certifications

cc: Ms. Cassandra Owens, RWQCB  
Mr. Mark Malinowski, DTSC  
California State University – Northridge, Library  
Simi Valley Library  
Los Angeles Library, Platt Branch

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