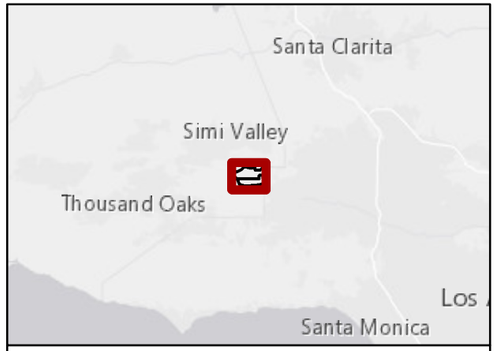


Legend

- NPDES Outfall
- Drainage
- NPDES Drainage Area
- Administrative Boundary
- Property Boundary
- Treatment BMPs

Treated Drainage Areas

- Active SWTS
- Distributed Flow-Through Media BMP

0 750 1,500 3,000 Feet

Site-wide Stormwater Best Management Practices (BMPs)

Santa Susana Field Laboratory
Ventura County, CA

November 2023

Geosyntec consultants

N

BUFFER
NASA
BUFFER
AREA IV (BOEING/DOE)
AREA II (NASA)
AREA I (BOEING)
AREA III (BOEING)
BUFFER

1 2 3 4 5 6 7 8 9 10 11 18

Service Layer Credits: Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community
Source: Esri, Maxar, Earthstar Geographics,

SWTS Treatment & Pond Infiltration

Santa Susana Field Laboratory

Advanced Stormwater Treatment System Factsheet

Year Constructed
2011

Drainage Area
927 acres total

Target Constituents
Dioxins, lead, manganese, and others

Treatment Processes
Filtration, coagulation, sedimentation

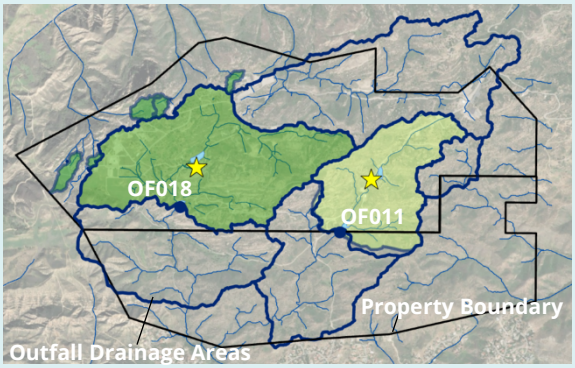
Stormwater Treatment Systems (SWTS)

- **Implementation (2011)**: Stormwater Treatment Systems (SWTSs) were established at Outfalls 011 and 018.
- **Advanced Treatment**: SWTSs employ coagulation and filtration systems for advanced stormwater treatment.
- **Upstream Management**: Existing ponds were strategically used to facilitate flow equalization and pretreatment sedimentation.
- **Stormwater Treatment**: When the pond volumes approach their storage capacity, advanced SWTSs are utilized to treat stormwater prior to discharge.

Pond Infiltration Study

- **Investigating Migration Pathway**: Concerns about stormwater infiltration in the ponds impacting groundwater quality prompted an infiltration study.
- **Assessment Method**: Utilizing water level measurements, rainfall, and evapotranspiration records, infiltration rates were assessed through mass balance analysis in ponds upstream of Outfalls 011 and 018 over a six-month period.
- **Low Infiltration Risk**: Modeling analyses and field estimates both confirm that stormwater infiltration in onsite ponds is very low. The average infiltration rates at Silvernale and R-1, and were 0.0006 and 0.03 inches per hour, respectively. COPCs in stormwater (e.g., metals and dioxins) are predominately in particulate form, which minimizes their downward migration as they are filtered and sorbed by sediment in the pond and underlying soils. Additionally, the four samples of untreated stormwater from the ponds met primary drinking water standards at R-1 or Silvernale ponds. Increased sample frequency will start in 2024.

LOCATION



- The SWTSs (stars) treat stormwater from R-1 and Silvernale ponds before discharging at Outfalls 011 and 018 (blue circles).
- The treated drainage areas (shaded green) includes most former operational areas.

SWTS PERFORMANCE

SWTSs are performing well as evidenced by near 100% compliance at Outfalls 011 and 018. Concentrations decreased from the influent to the effluent, for lead, dioxins, and other COPCs, at SWTS 011 and 018.

The table below summarizes the number of influent samples above a drinking water MCL or permit limit out of the total number of samples collected to date. Of the 918 NPDES constituents analyzed, only the five constituents listed below exceeded a water quality objective.

	Silvernale (018) SWTS Influent		R-1 (011) SWTS Influent	
Constituent	Above MCL	Above Permit Limit	Above MCL	Above Permit Limit
Iron*	0/2	2/2	0/2	2/2
TCDD TEQ (no DNQ)	0/2	2/2	0/2	1/2
Manganese*	2/2	2/2	0/2	0/2
Mercury	0/2	1/2	0/2	1/2
Oil & Grease	N/A	0/2	N/A	1/2

*Iron and manganese secondary MCL is based on aesthetics (taste/color), neither has a primary MCL.
There is no drinking water standard for oil & grease.

Geosyntec consultants
engineers | scientists | innovators

COCA RD.

EXISTING DRAINAGE BOUNDARIES

WATERSHED BOUNDARY

SANDBAG BERM

DRAINAGE AREA 011

PERIMETER POND

PIPE RAMP PROTECTOR

GRAVITY PIPE

LOW POINT

STA 12+00.90

1
C02

CAPTURE AREA

CATCH BASIN BOX

OUTFALL 011

HIGH POINT

STA 0+00.00

1751.86' BOTTOM OF SUMP
>25 GPM AT 31' TDH

ROCA AVE.

PROPOSED SUMP PUMP WITH
GRATE INLET AND TRASH SCREEN
AT LOW POINT

PROPOSED 3" FORCE MAIN

DRAINAGE AREA 001

PIPE RAMP PROTECTOR

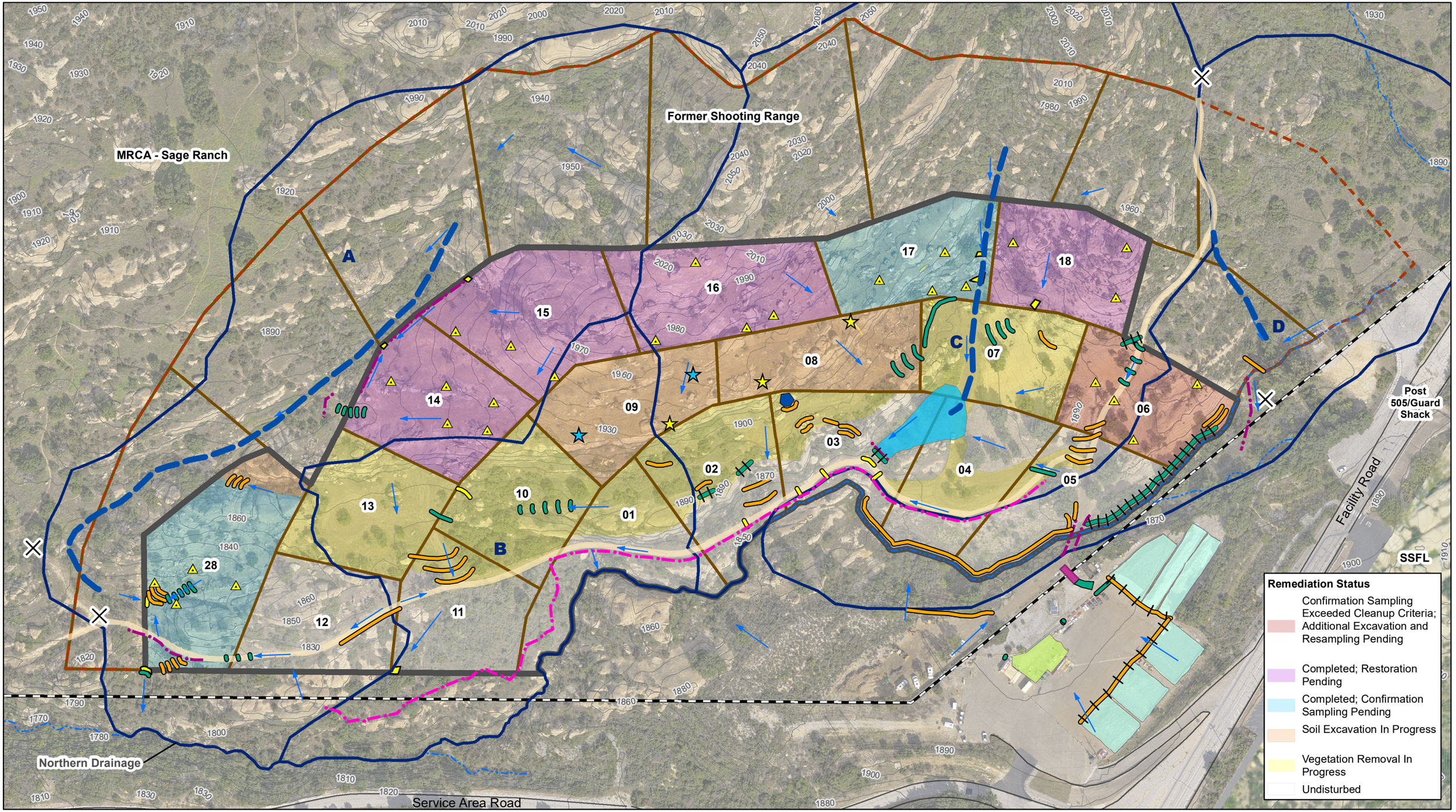
LEGEND:

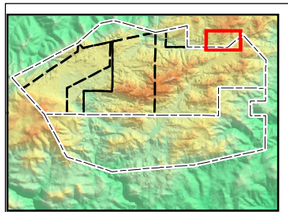
- PROPOSED SANDBAG BERM
- DRAINAGE AREA
- PROPOSED GRAVITY PIPE
- PROPOSED 3" FORCE MAIN
- EXISTING CHANNEL
- EXISTING CONTOUR
- WATERSHED BOUNDARY
- PIPE RAMP PROTECTOR
- PERIMETER POND
- FLOW ARROW

N

0 25' 50' 100'

Area 1 Burn Pit Stormwater Capture and Conveyance Conceptual Design
Santa Susana Field Laboratory





- SSFL Property Boundary
- Decision Unit (DU) Boundary
- Removal Action
- Sage Ranch Main Trail
- Current Hiking Trial Closure Points (to be opened following completion of Removal Action)
- Chute
- Water Buffalo
- Drainage
- Surface Water Flow Direction
- Path of Concentrated Flow
- Sub-Watershed
- XRF Hot Spot; Additional Soil Removed
- Existing Silt Fence
- Gravel Bag Berm
- Gravel Bag Berm, 3 High
- Rip Rap Dam
- Silt Fence
- Straw Wattle
- Straw Wattle Under Edge of HDPE Liner
- Covered Containment Cell
- Detention Pond
- Lower Lot Cistern
- Gravel
- Rip Rap Dam
- Rumble Plates
- Plastic Tarp

Former Shooting Range
BMP Plan - Remedial Action Areas

SAGE RANCH PARK

Path: C:\Working\Boeing\Rocketdyne\Shooting_Range_Order\MXD\Fig_E_B3_SWPPP_BMP_2023Nov.mxd

Date: 11/27/2023

1 inch = 140 feet

0 70 140 210 280 Feet

Stantec

Figure B-3