

Addendum No. 4 to

Master Work Plan/Field Sampling and Analysis  
Plan, Co-Located Chemical Sampling at Area IV  
Santa Susana Field Laboratory, Ventura County,  
California

EPA Subarea 5D North Soil Sampling

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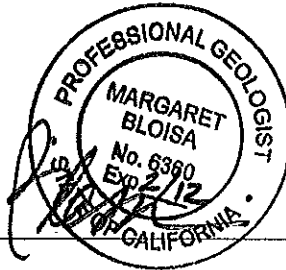
May 2011

Addendum No. 4 to Master Work Plan/Field  
Sampling and Analysis Plan, Co-Located Chemical  
Sampling at Area IV Santa Susana Field Laboratory,  
Ventura County, California

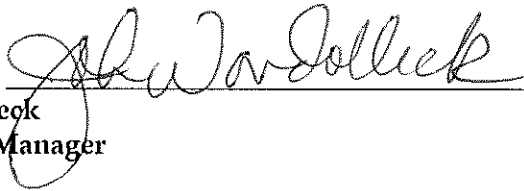
EPA Subarea 5D North Soil Sampling

Contract DE-AM09-05SR22404  
CDM Task Order DE-AT30-08CC60021/ET17

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5/10/11  
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## Introduction

This document supports the field implementation of the soil sampling program addressed in the *Master Work Plan (WP)/Field Sampling and Analysis Plan (FSAP), Co-Located Chemical Sampling at Area IV, Santa Susana Field Laboratory* (Master WP/FSAP, CDM 2011). The Master WP/FSAP dictates the field sampling, analytical, quality control, and data review procedures for the collection and chemical analysis of soil samples within Area IV of the Santa Susana Field Laboratory (SSFL) and the Northern Buffer Zone (NBZ), collectively termed the Area IV study area. As part of a radiological characterization study, the United States Environmental Protection Agency (EPA) is collecting surface and subsurface soil samples throughout Area IV of SSFL and the NBZ for the presence of radioactive elements (radionuclides). The California Department of Toxic Substances Control (DTSC) and Department of Energy (DOE) requested that soil collected by EPA also be analyzed for chemical analytes. DTSC and DOE agreed that the chemical sampling be done by DOE's contractor, CDM Federal Programs Corporation (CDM).

## Purpose of Addendum

This addendum documents the rationale for the location of surface and subsurface chemical soil samples to be collected during Phase I of soil sampling within Subarea 5D North as presented in EPA's *Subarea 5D North FSP Addendum, Santa Susana Field Laboratory Site, Area IV Radiological Study*, (HGL 2011). Phase I soil sampling is based on EPA's Historical Site Assessment (HSA) of Subarea 5D North (that also included a gamma survey, geophysical survey, and review of prior data) with sample locations selected by EPA to address concerns identified in the HSA. Phase II chemical sampling, which is not covered by this Addendum, will involve further chemical and radionuclide characterization "step-out" samples. The need for chemical "step-out" samples will be determined on a case-by-case basis following a review of all chemical data collected for Area IV.

Under the co-located soil sampling program, EPA and its consultant HydroGeoLogic, Inc. (HGL) will physically collect the soil material. CDM personnel will be responsible for the sample container preparation, sample handling and documentation, sample shipment, laboratory procurement, chemical analyses of the samples, and chemical data review. Co-located soil samples collected by CDM will be analyzed for chemical analytes as stipulated in Table 4-1 (Data Quality Objectives) and Table 6-1 (Analytical Methods, Containers, Preservatives, and Holding Times) of the Master WP/FSAP (CDM 2011).

Figure 1 is a layout of EPA's Subarea 5D North. The proposed sample locations are shown on Figures 2 through 4, which were taken from EPA's Subarea 5D-North FSP Addendum (HGL 2011). EPA's description and rationale for the soil sample locations in Subarea 5D North are summarized in Table 1.

## De-Selection of Locations for Chemical Sampling

EPA's identified sample locations are based on radiological sampling needs as determined by EPA, and not on chemical sampling needs. The sampling protocol for targeting the depths of soil samples for chemical analyses are illustrated in Figures 5-1 and 5-2 of the Master WP/FSAP.

Soil samples for chemical analyses will not be collected from all locations identified in Subarea 5D North by EPA for radionuclide analyses. Portions of the Subarea 5D North study area that have been subject to prior investigations under the RFI include the:

- Rockwell International Hot Lab (Building 4020)
- Southern Portion of DOE Leach Field 3 site (includes Buildings 4055, 4373, 4363, 4353, and surrounding areas)
- Pond Dredge Area.

A few locations have adequate data for use in determining the need for a soil cleanup action. Locations with adequate data were discussed with DTSC personnel on April 25, 2011 and DOE and DTSC jointly de-selected HGL sample locations for chemical sample collection using the following three "Sample/No Sample" decision criteria.

### **SCENARIO 1. "CLEARLY CONTAMINATED" AREA THAT WILL REQUIRE CLEANUP DISCRETIONARY SAMPLING CRITERIA**

The potential discretionary decision is to not collect chemical samples at some EPA locations where sufficient chemical data already exist to define the area as one that is clearly contaminated and will likely be remediated. Co-located sampling will still be conducted near the areas, as needed, to adequately define extent of contamination.

- a. "Clearly contaminated" are those areas that have been previously sampled and sampling results show detected chemical concentrations that obviously exceed current background and/or Method Reporting Limits (MRLs)
- b. There are a high frequency and number of chemical constituents that exceed background and MRLs
- c. DOE agrees to cleanup of contaminated area.

### **SCENARIO 2. HIGH DENSITY RADIOLOGICAL SAMPLING AREA DUE TO ELEVATED GAMMA SURVEY RESULTS DISCRETIONARY SAMPLING CRITERIA**

Potential discretionary decision: do not collect chemical samples at some EPA locations so that sample spacing is consistent with the RFI approach (approximately 50 to 100 feet).

- a. No known and/or identified chemical operations and/or releases (subject to field observations)
- b. Non-point source, no preferential pathways identified, open/flat area
- c. Site is sufficiently distant from known potential chemical sources.

### **SCENARIO 3. HIGH DENSITY RADIOLOGIC SAMPLING OF HISTORIC FEATURES DISCRETIONARY SAMPLING CRITERIA**

Potential discretionary decision: using professional judgment, do not collect chemical samples at some EPA locations so that sample spacing is consistent with the RFI approach.

- a. Feature has known chemical and/or radiologic impacts, and/or identified data gaps
- b. Targeted sampling density should be based on feature characteristics and historical use (e.g., holdup tanks, septic tanks, sumps, test areas, etc.).

The logic and rationale for discretionary de-selection of co-located sample locations for Subarea 5D North was discussed with the community stakeholders on May 5, 2011. The criterion for each agreed-upon de-selected co-located sampling location is also noted in Table 1.

## **Reduction of Analytes for Chemical Sampling**

During the March 9, 2011 Technical Work Group meeting, DOE discussed with the stakeholders a proposal to modify the secondary analytical suite (i.e., those analyses performed on soil samples collected from areas with a process history of specific chemical usage, elevated field instrument readings, visually contaminated materials, or at locations of waste or fill) at locations where there is sufficient chemical analytical information known to warrant such a reduction. Inputs to reduction of the secondary analytical suite include:

- recent HSA sampling results indicate that many chemicals on the secondary analyte list have been rarely detected
- previous RFI sampling results, and
- DTSC comments and public input on RFI and EPA documents

Rationale for reduction of the secondary analyte list was developed taking into consideration historic operations at the site, proximity of the operation to the sample location, EPA rationale and targeted feature(s), and likelihood of multiple sources or pathways that may have contributed to contamination in the area.

All chemical co-located samples collected within Subarea 5D North will be analyzed for the primary suite. Locations where secondary analyses will be reduced are:

Within the southern portion of DOE Leach Field 3 site:

- Samples collected from locations 74, 77 through 85 and 88, and 206 will be analyzed for all primary analytes and energetics only from the secondary analyte list, since use and storage of energetics at Buildings 4373 and 4374 have been documented.
- Samples collected from locations 100, 114, and 115 will be analyzed for primary analytes and NMDA only from the secondary analyte list, based on elevated detections in previous RFI sampling results.

These reductions in the secondary suite of analyses are also noted in Table 1. All secondary analytes will be included if field conditions are indicative of potential impacts (e.g., odor, staining, or elevated measurement of volatile organic vapors).

## Schedule

EPA is scheduled to initiate soil sampling within Subarea 5D North mid-May 2011 with the collection of surface soil samples identified in Table 1. Collection of subsurface samples is scheduled to begin the last week of May 2011 following completion of soil boring sampling within Subarea 8N.

## References

CDM Federal Programs Corporation (CDM). 2011. *Master Work Plan/Field Sampling and Analysis Plan Co-Located Chemical Sampling at Area IV, Santa Susana Field Laboratory, Ventura County, California*. February 16.

HydroGeoLogic, Inc. 2011. *Subarea 5D North FSP Addendum, Santa Susana Field Laboratory Site, Area IV Radiological Study, Santa Susana Field Laboratory*. May 5.

# FIGURES

**Figure 1**  
**Subarea 5D North Base Map**  
**Santa Susana Field Laboratory**

U.S. EPA Region 9

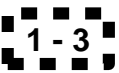


**Legend**

Buildings:

 Demolished

 Existing

 1-3 Subarea 5D North Groups





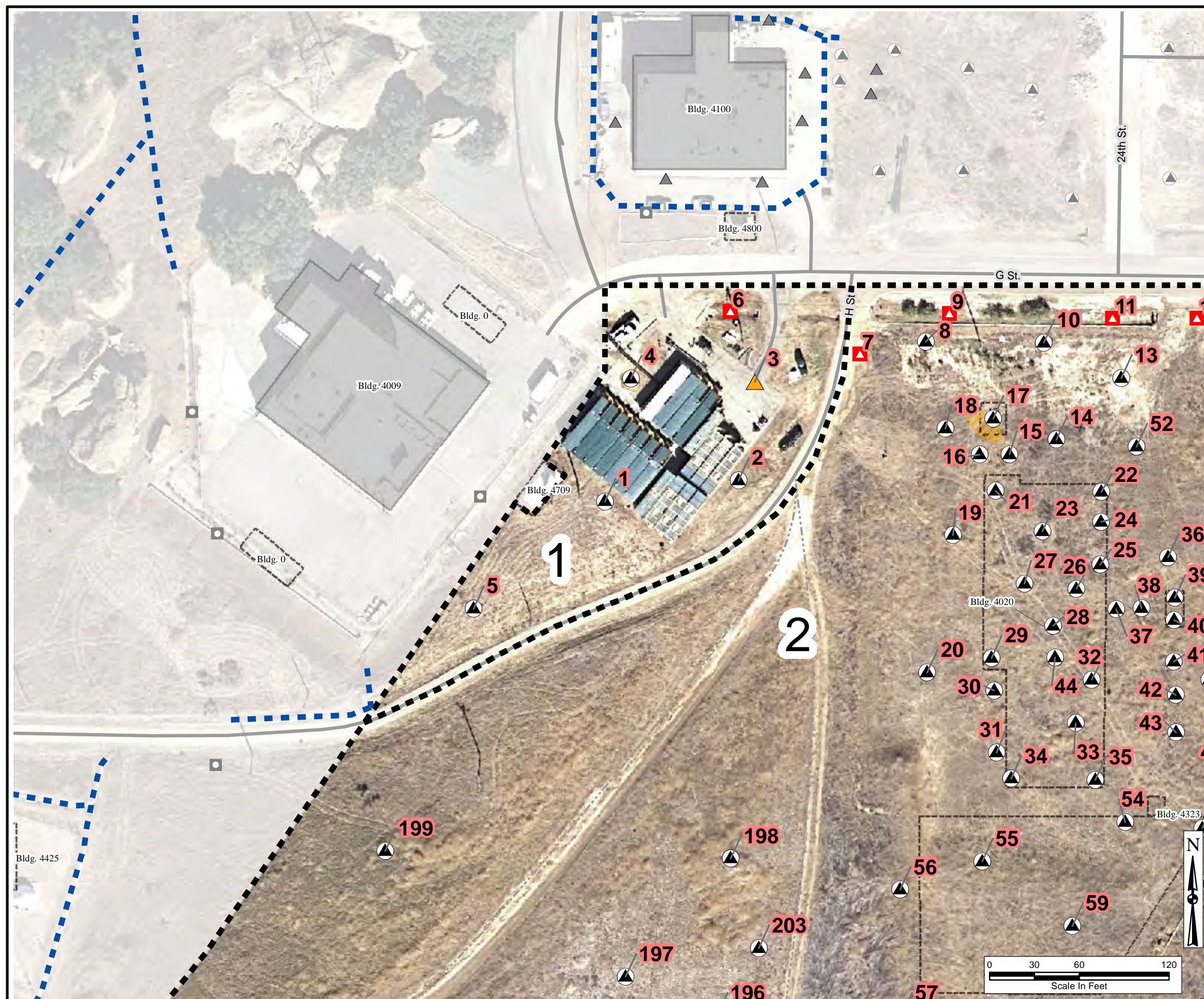
**Figure 2**  
**Subarea 5D North Group 1 Sample Locations**  
**Santa Susana Field Laboratory**

U.S. EPA Region 9



**Legend**

- Demolished Buildings
- Existing Buildings
- Subarea 5D North Groups
- Drainage and Subsurface Sample
- Subsurface Sample
- Surface and Subsurface Sample  
(Grayed Symbols Represent Soil Samples from Previous Subareas)
- Likely Remediation Areas**
  - Chemical



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(2)Group1ProposedSampleLocations\_11x17\_5DN.mxd  
5/4/2011 sdrallos-kopecky  
Source:HGL 2010, CIRGIS 2007



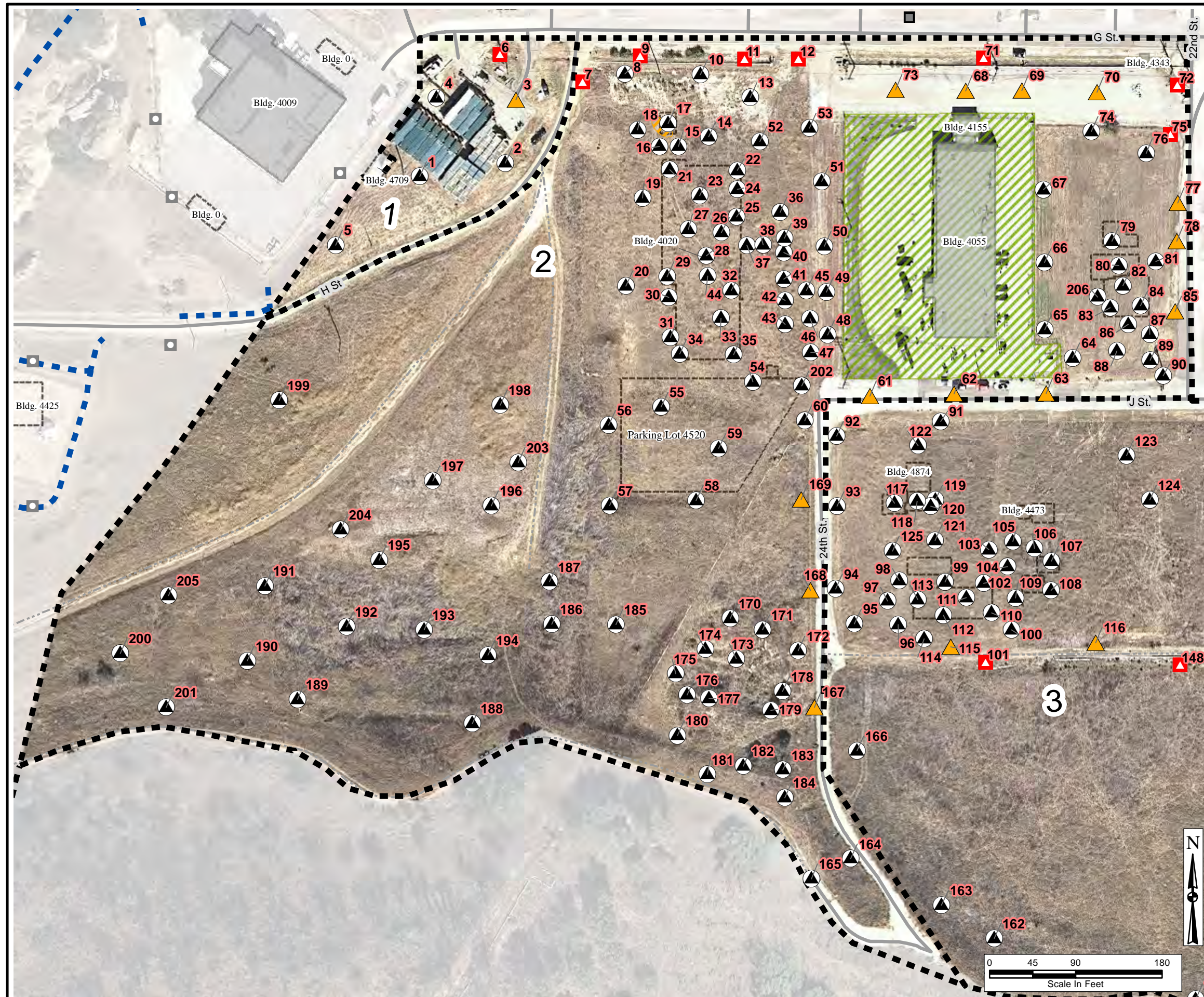
**Figure 3**  
**Subarea 5D North Group 2 Sample Locations**  
**Santa Susana Field Laboratory**

U.S. EPA Region 9



**Legend**

- Demolished Buildings
- Existing Buildings
- Subarea 5D North Groups
- Drainage and Subsurface Sample
- Subsurface Sample
- Surface and Subsurface Sample  
(Grayed Symbols Represent Soil Samples from Previous Subareas)
- Likely Remediation Areas**
- Chemical
- Decontamination & Decommissioning









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 (3)Group2ProposedSampleLocations\_11x17\_5DN.mxd  
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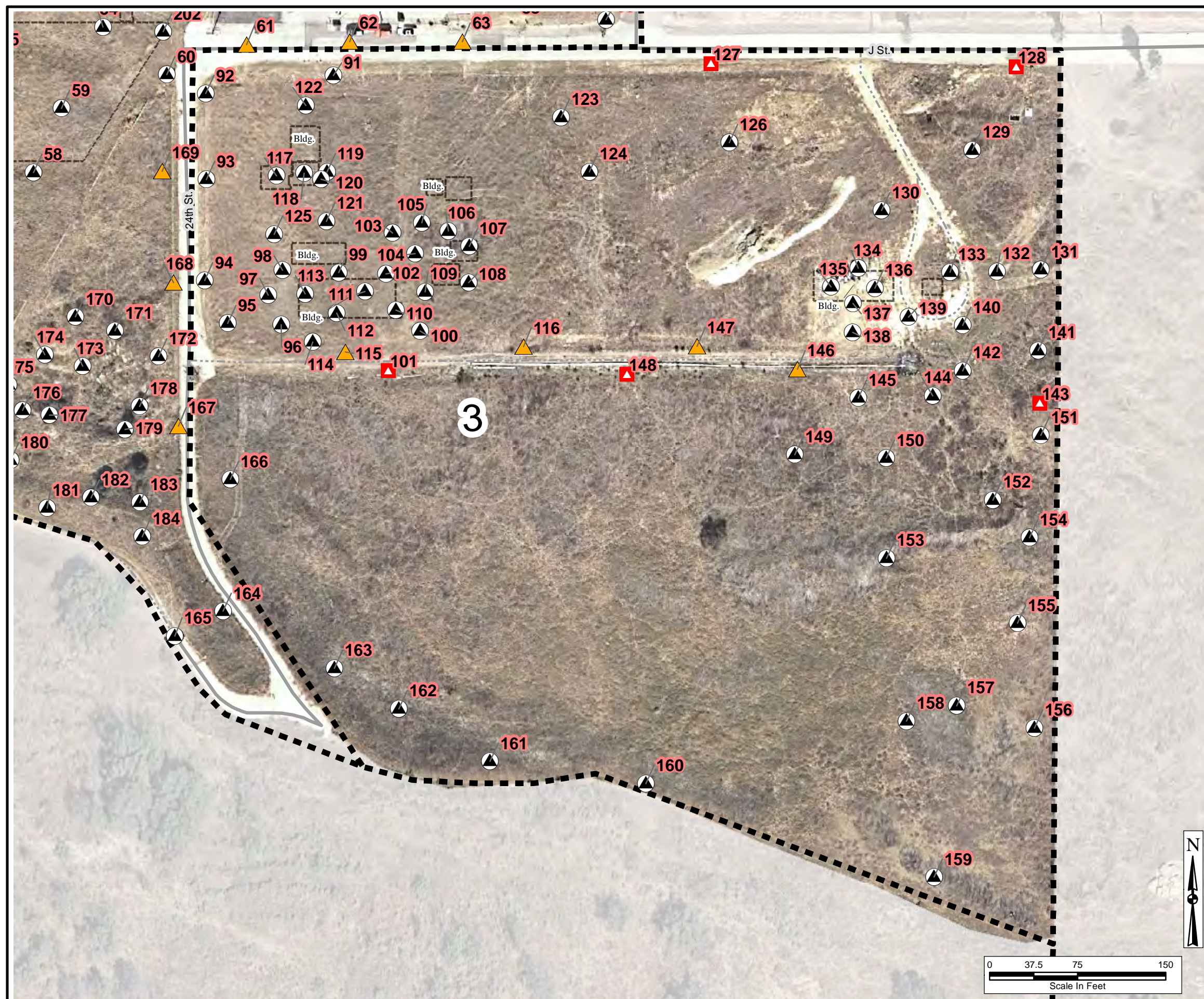
**Figure 4**  
**Subarea 5D North Group 3 Sample Locations**  
**Santa Susana Field Laboratory**

U.S. EPA Region 9



**Legend**

-  Demolished Buildings
-  Existing Buildings
-  Subarea 5D North Groups
-  Drainage and Subsurface Sample
-  Subsurface Sample
-  Surface and Subsurface Sample  
(Grayed Symbols Represent Soil Samples from Previous Subareas)



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(4)Group3ProposedSampleLocations\_11x17\_5DN.mxd  
5/4/2011 sdrallos-kopecky  
Source:HGL 2010, CIRGIS 2007



# TABLE















**Table 1**  
**Summary of Soil Sample Locations in Subarea 5D North**

Grouping	Sample Type	Location ID	Location Description	Technical Justification	Analytes	Co-located Chemical Sample Rationale
Group 2	Surface	192	Pond Dredge Area - South central portion of Fill Area 14.	Historical Data	Primary & Secondary	Secondary suite added due to potential waste disposal in the Pond Dredge Area.
Group 2	Subsurface	192	Pond Dredge Area - South central portion of Fill Area 14.	Historical Data	Primary & Secondary	Secondary suite added due to potential waste disposal in the Pond Dredge Area.
Group 2	Surface	193	Pond Dredge Area - South central portion of Fill Area 14.	Geophysical Anomaly, "Conductivity and Magnetometer". Aerial Photo Feature, "Fill".	Primary	Primary suite only due to high sample density in Pond Dredge Area.
Group 2	Subsurface	193	Pond Dredge Area - South central portion of Fill Area 14.	Geophysical Anomaly, "Conductivity and Magnetometer". Aerial Photo Feature, "Fill".	Primary	Primary suite only due to high sample density in Pond Dredge Area.
Group 2	Surface	194	Pond Dredge Area - Southeast portion of Fill Area 14.	Geophysical Anomaly, "Conductivity and Magnetometer". Aerial Photo Feature, "Fill".	Primary	Primary suite only due to high sample density in Pond Dredge Area.
Group 2	Subsurface	194	Pond Dredge Area - Southeast portion of Fill Area 14.	Geophysical Anomaly, "Conductivity and Magnetometer". Aerial Photo Feature, "Fill".	Primary	Primary suite only due to high sample density in Pond Dredge Area.
Group 2	Surface	195	Pond Dredge Area - South central portion of Fill Area 14.	Geophysical Anomaly, "Conductivity and Magnetometer". Aerial Photo Feature, "Fill".	Primary	Primary suite only due to high sample density in Pond Dredge Area.
Group 2	Subsurface	195	Pond Dredge Area - South central portion of Fill Area 14.	Geophysical Anomaly, "Conductivity and Magnetometer". Aerial Photo Feature, "Fill".	Primary	Primary suite only due to high sample density in Pond Dredge Area.
Group 2	Surface	196	Pond Dredge Area - Central portion of Fill Area 14.	Geophysical Anomaly, "Conductivity". Aerial Photo Feature, "Fill".	Primary	Primary suite only due to high sample density in Pond Dredge Area.
Group 2	Subsurface	196	Pond Dredge Area - Central portion of Fill Area 14.	Geophysical Anomaly, "Conductivity". Aerial Photo Feature, "Fill".	Primary	Primary suite only due to high sample density in Pond Dredge Area.
Group 2	Surface	197	Pond Dredge Area - Central portion of Fill Area 14.	Geophysical Anomaly, "Conductivity and Magnetometer". Aerial Photo Feature, "Fill".	Primary & Secondary	Secondary suite added due to potential waste disposal in the Pond Dredge Area.
Group 2	Subsurface	197	Pond Dredge Area - Central portion of Fill Area 14.	Geophysical Anomaly, "Conductivity and Magnetometer". Aerial Photo Feature, "Fill".	Primary & Secondary	Secondary suite added due to potential waste disposal in the Pond Dredge Area.
Group 2	Surface	198	Pond Dredge Area - North portion of Fill Area 14.	Geophysical Anomaly, "Conductivity and Magnetometer". Aerial Photo Feature, "Fill".	Primary & Secondary	Secondary suite added due to multiple lines of evidence indicating potential for contamination.
Group 2	Subsurface	198	Pond Dredge Area - North portion of Fill Area 14.	Geophysical Anomaly, "Conductivity and Magnetometer". Aerial Photo Feature, "Fill".	Primary & Secondary	Secondary suite added due to multiple lines of evidence indicating potential for contamination.
Group 2	Surface	199	Pond Dredge Area - West portion of Fill Area 14.	Slightly elevated gamma survey readings.	Primary	Primary suite only since outside of operational area.
Group 2	Subsurface	199	Pond Dredge Area - West portion of Fill Area 14.	Slightly elevated gamma survey readings.	Primary	Primary suite only since outside of operational area.
Group 2	Surface	200	Southwest corner of Subarea 5DN.	Geophysical Anomaly, "Conductivity".	Primary	Primary suite only due to high sample density in Pond Dredge Area.
Group 2	Subsurface	200	Southwest corner of Subarea 5DN.	Geophysical Anomaly, "Conductivity".	Primary	Primary suite only due to high sample density in Pond Dredge Area.
Group 2	Surface	201	Southwest corner of Subarea 5DN.	Aerial Photo Feature, "Trench".	Primary	Primary suite only due to high sample density in Pond Dredge Area.
Group 2	Subsurface	201	Southwest corner of Subarea 5DN.	Aerial Photo Feature, "Trench".	Primary	Primary suite only due to high sample density in Pond Dredge Area.
Group 2	Surface	202	Northeast corner of former Parking Lot 4520	Stakeholder Request - Staging area for the D&D of former Building 4020.	Primary	Primary suite only since outside of operational area.
Group 2	Subsurface	202	Northeast corner of former Parking Lot 4521	Stakeholder Request - Staging area for the D&D of former Building 4020.	Primary	Primary suite only since outside of operational area.
Group 2	Surface	203	Pond Dredge Area - East portion of Fill Area 14.	Aerial Photo Feature, "Fill Area".	Primary	Primary suite only since outside of operational area.
Group 2	Subsurface	203	Pond Dredge Area - East portion of Fill Area 14.	Aerial Photo Feature, "Fill Area".	Primary	Primary suite only since outside of operational area.
Group 2	Surface	204	Pond Dredge - West portion of Fill Area 14.	Geophysical Anomaly, "Conductivity and Magnetometer". Aerial Photo Feature, "Fill". - Stakeholder Request	Primary	Primary suite only due to high sample density in Pond Dredge Area.
Group 2	Subsurface	204	Pond Dredge - West portion of Fill Area 14.	Geophysical Anomaly, "Conductivity and Magnetometer". Aerial Photo Feature, "Fill". - Stakeholder Request	Primary	Primary suite only due to high sample density in Pond Dredge Area.
Group 2	Surface	205	Southwest corner of Subarea 5DN.	Possible open storage - Stakeholder Request	Primary	Primary suite only due to high sample density in Pond Dredge Area.
Group 2	Subsurface	205	Southwest corner of Subarea 5DN.	Possible open storage - Stakeholder Request	Primary	Primary suite only due to high sample density in Pond Dredge Area.
Group 2	Surface	206	West side of former Building 4373.	Entry way to former Building 4373 - Stakeholder Request	Primary & Energetics	Energetics added due to documented use/storage in historical operations.
Group 2	Subsurface	206	West side of former Building 4373.	Entry way to former Building 4373 - Stakeholder Request	Primary & Energetics	Energetics added due to documented use/storage in historical operations.

**NOTES:**

**Subsurface locations 21 through 29, 32 through 35, and 44 will be sampled by HGL as follows:**

During D&D activities at former Building 4020 a 1 foot sand layer was placed in the bottom of the building excavation. A targeted subsurface sample of native soil will be collected below the 1 foot sand layer, at the soil/bedrock interface, if possible.

If refusal is encountered before bedrock is reached, a soil sample will be collected just above the depth refusal was encountered. In addition to this subsurface sample, soil samples will be collected based on the results of the borehole gamma logging in accordance with the Master Soil Sampling Field Sampling Plan (FSP).

If borehole gamma logging results show no elevated gamma reading then a composite soil sample will be collected from the 1-5 foot interval. A minimum of two subsurface soil samples will be collected from each subsurface boring location.

**Subsurface locations 38, 47 through 51 and 53 will be sampled by HGL as follows:**

A targeted subsurface sample of native soil will be collected at the soil/bedrock interface, if possible. If refusal is encountered before bedrock is reached, a soil sample will be collected just above the depth refusal was encountered.

Only one subsurface soil sample will be collected unless the borehole gamma logging results show elevated gamma readings, then subsurface soil samples will be collected at each contaminated zone in accordance with the Master Soil Sampling FSP.

D&D = decontamination and decommissioning

PGRAY = potential gamma ray anomaly