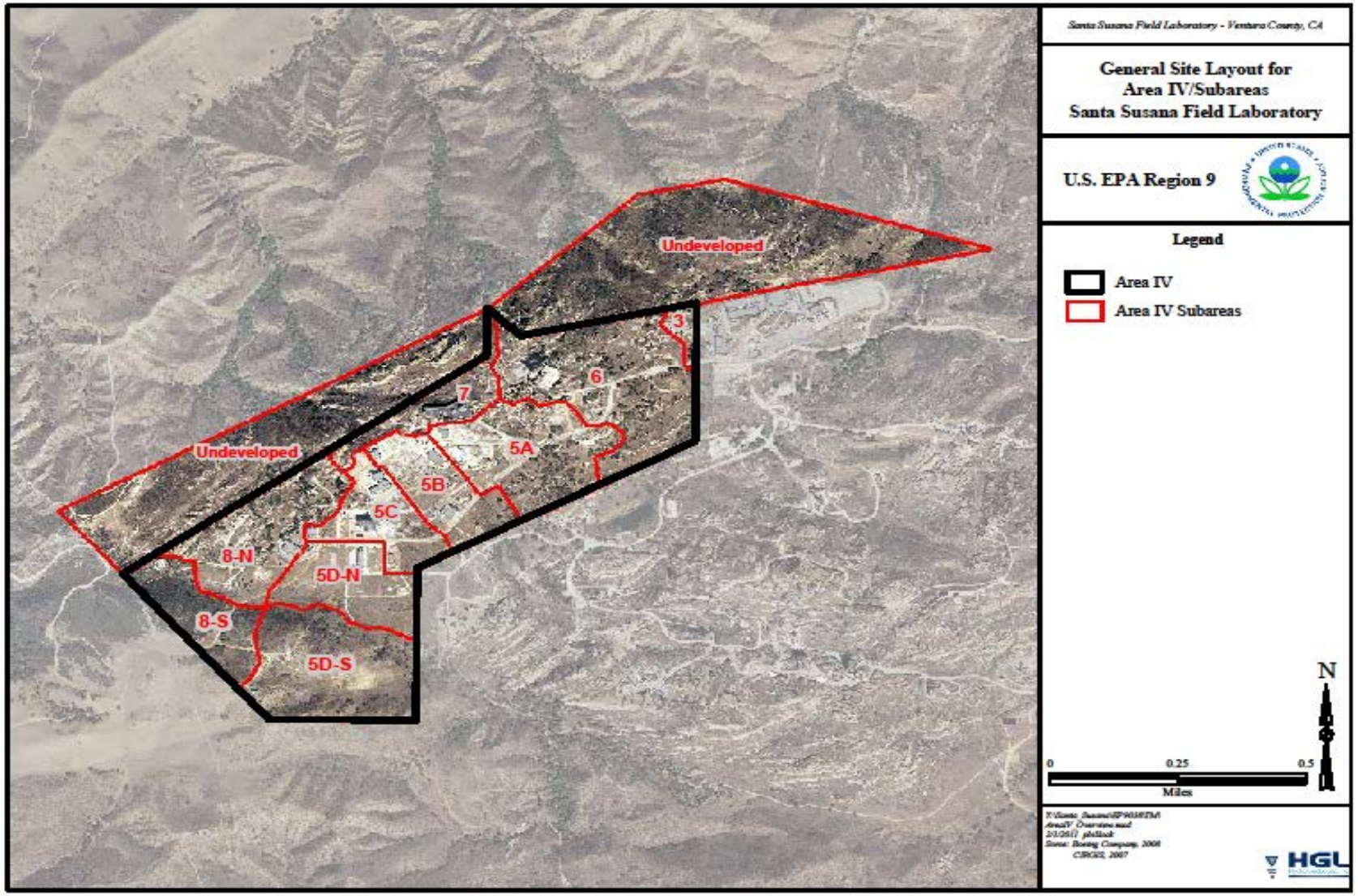
Overview of the Historical Site Assessment For Subarea 8

March 16, 2011

EPA Project Subareas



Subarea 8 Overview

- Approximately 108 acres
- Drainage is generally to the north toward NBZ
- Divided into 3 groups based on facility operation history
- Four key radiological use areas within Subarea 8

Four Key Radiological Use Areas

- ESADA
- Building 4009
- Former Sodium Disposal Facility
- Building 4056 Landfill

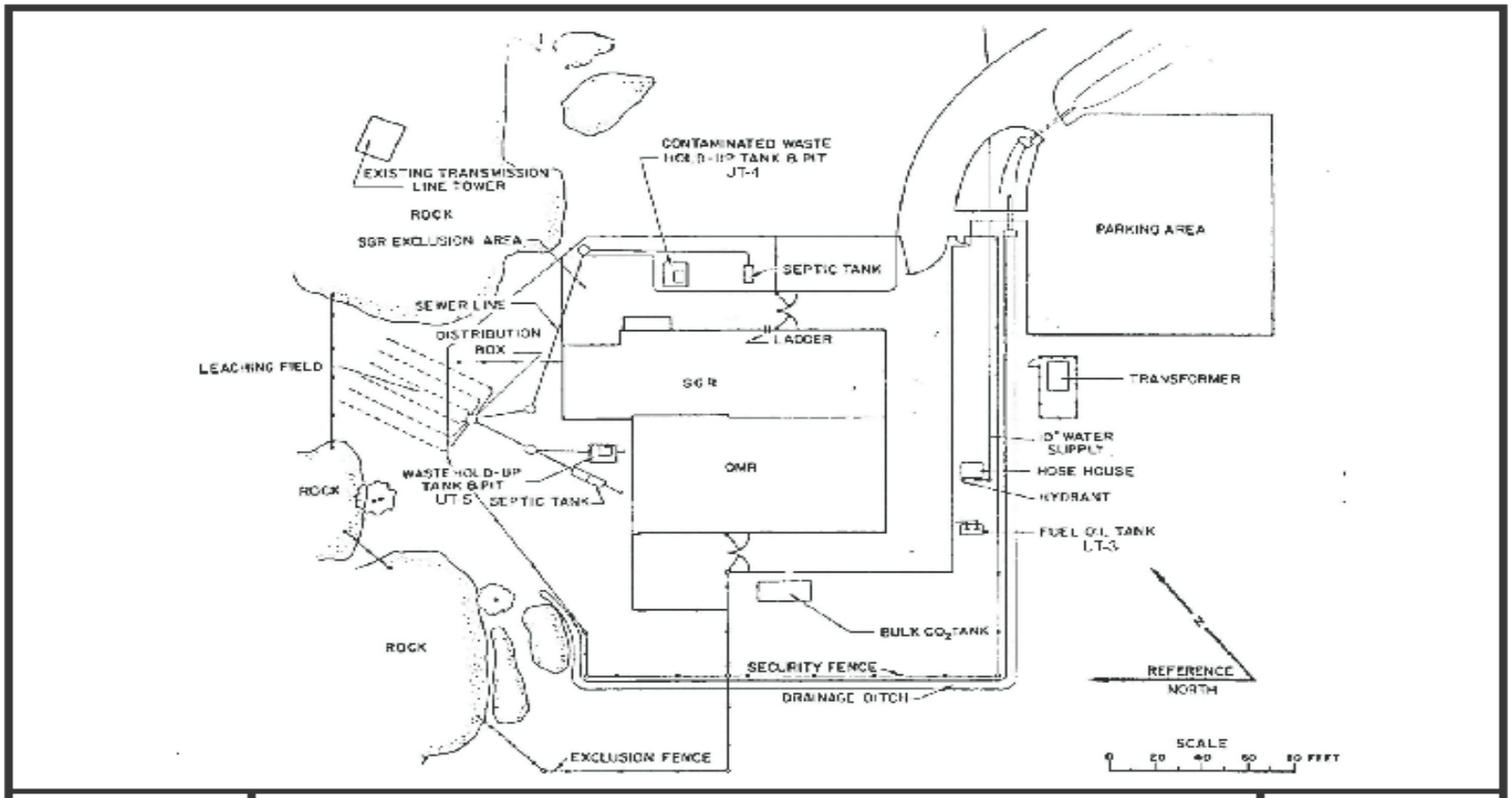
ESADA Area - 1991

ESADA Area

- Empire State Atomic Development Associates (ESADA)
- Approx. 1964 – 1968; ESADA tests
- Buildings 4730, 4820 used for ZrH_2 (10% natural uranium) Fuel pellet impact testing
- Site 4814 used for pipe bursting tests for sodium-water reactions
- Site 4814 connected to Sodium Disposal Facility via pipe
- Late 1970s - Site 4814 contained Large Leak Injector Device
- Approx. 1980 - pistol ranges 4317, 4318 constructed
- 3 incident reports requested from Boeing (not yet received)
- 1990s - demolished except for foundations and pavement

Building 4009

Bldg 4009 Site Layout



U.S. EPA Region 9

Figure 2.2.1d
Building 4009
Site Layout
Showing Leach Field
And Waste Tanks

Building 4009

- Built in 1958
- 1959 – 1965; Used for testing uranium fueled reactors moderated and cooled by organic liquids
- 1960 – 1967; Used for testing reactors cooled by sodium and moderated with graphite
- 1960-62; Van de Graaff accelerator in SGR graphite storage area
- 1970s; 800 pounds of depleted uranium stored in OMR high bay
- 1980s ; OMR high bay used for high energy rate forging
- 1980s; Storage and underwater testing of Rocketdyne's in-service inspection equipment

Sodium Disposal Facility - 1987

Concrete Pool -- 1985

Sodium Disposal Facility

- Built in 1956, expanded in 1967, operated until 1978
- The Sodium Burn Pit was used for cleaning components and disposal of excess sodium
- 1978-1980 – Some metal items removed
- 1991-1994 – radiologically contaminated soil removed
- 2002 - chemically contaminated soil removed
- 3 documented incidents (radioactive spill on ground, 1964; contaminated drums, 1968; contaminated scrap, 1978)

Typical Pond Debris - 1991

Bldg 4056 Landfill (1979)

Bldg 4056 Landfill

- Early 1960s – use of Building 4056 Landfill begins
- 1965 – pit dug for Building 4056
- Site 4056 used as a landfill for building construction materials, waste drums (containing oils, alcohols, sodium, sodium reaction products, grease, phosphoric acid, asbestos, rags, rope), sodium cold traps, vessels, old trucks, large system components, sheet metal
- No documented incidents
- Early 1980s – removed 89 drums and other items
- 1999 – pit drained and water and sediment sampled
- Debris currently remains on Site 4056

Summary of Findings

- HSA Aerial Photo Features
- Process Knowledge
- Soil Removals/Excavations

Gamma Radiation Scanning Update

Agenda

- Gamma Scanning Progress and Accomplishments
- Scanning Coverage by Subarea
- Subarea 8 North Potential GRAYs (Gamma Radiation Anomalies) and Initial Evaluation

Accomplishments in Subarea 8 North

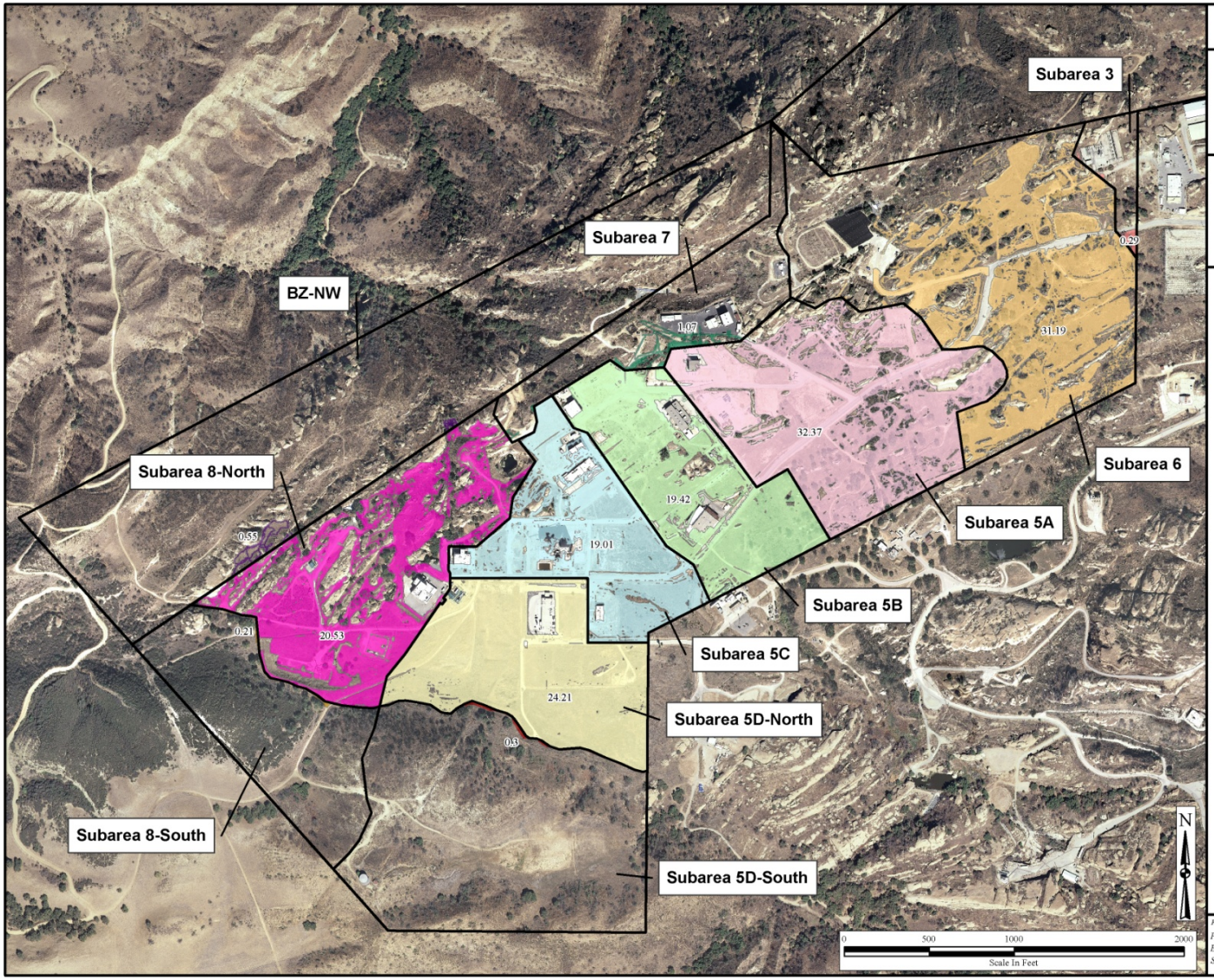
Scanned 82% of the accessible areas

Completed Subarea 8 North gamma data evaluation

Identified 32 potential Gamma Radiation Anomalies

Verified and evaluated 27 of 32 potential anomalies

Gamma Scanning Progress



HGL—Gamma Scanning, Santa Susana Field Laboratory Site Ventura County, California

Gamma Scanning Progress
Santa Susana Field Laboratory

U.S. EPA Region 9

Legend

Gamma Scanning Coverage

Subarea

- BZ-NW
- Subarea 3
- Subarea 5A
- Subarea 5B
- Subarea 5C
- Subarea 5D-North
- Subarea 5D-South
- Subarea 6
- Subarea 7
- Subarea 8-North
- Subarea 8-South

Type of Scanning Equipment	Week (18Feb11 thru 24Feb11)	Total To Date
ERGS	0.89	108.36
WMGS	0	23.28
MMGS	0	47.42

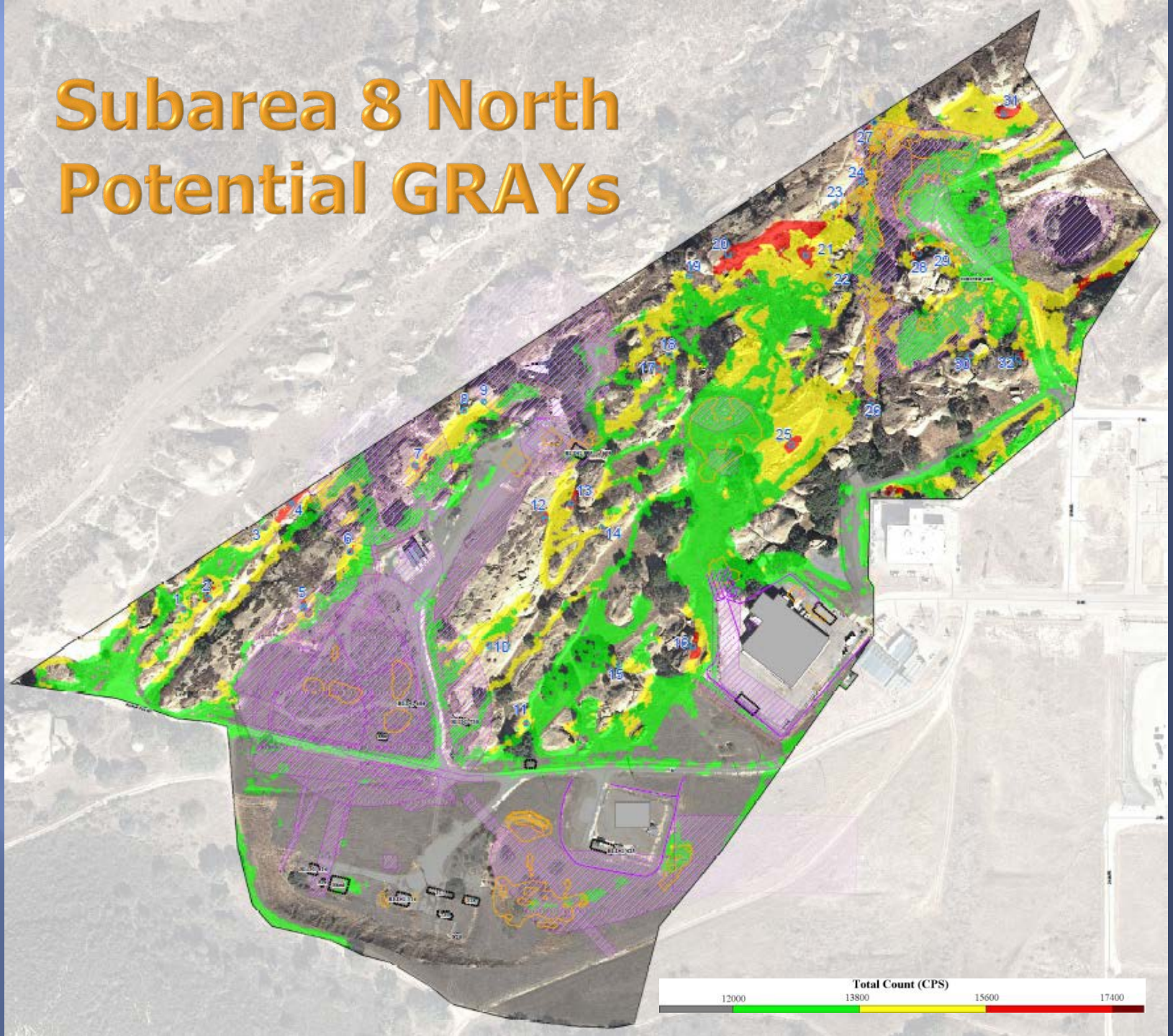
Acreage Totals
Including Overlaps: 179.06
Excluding Overlaps: 149.14

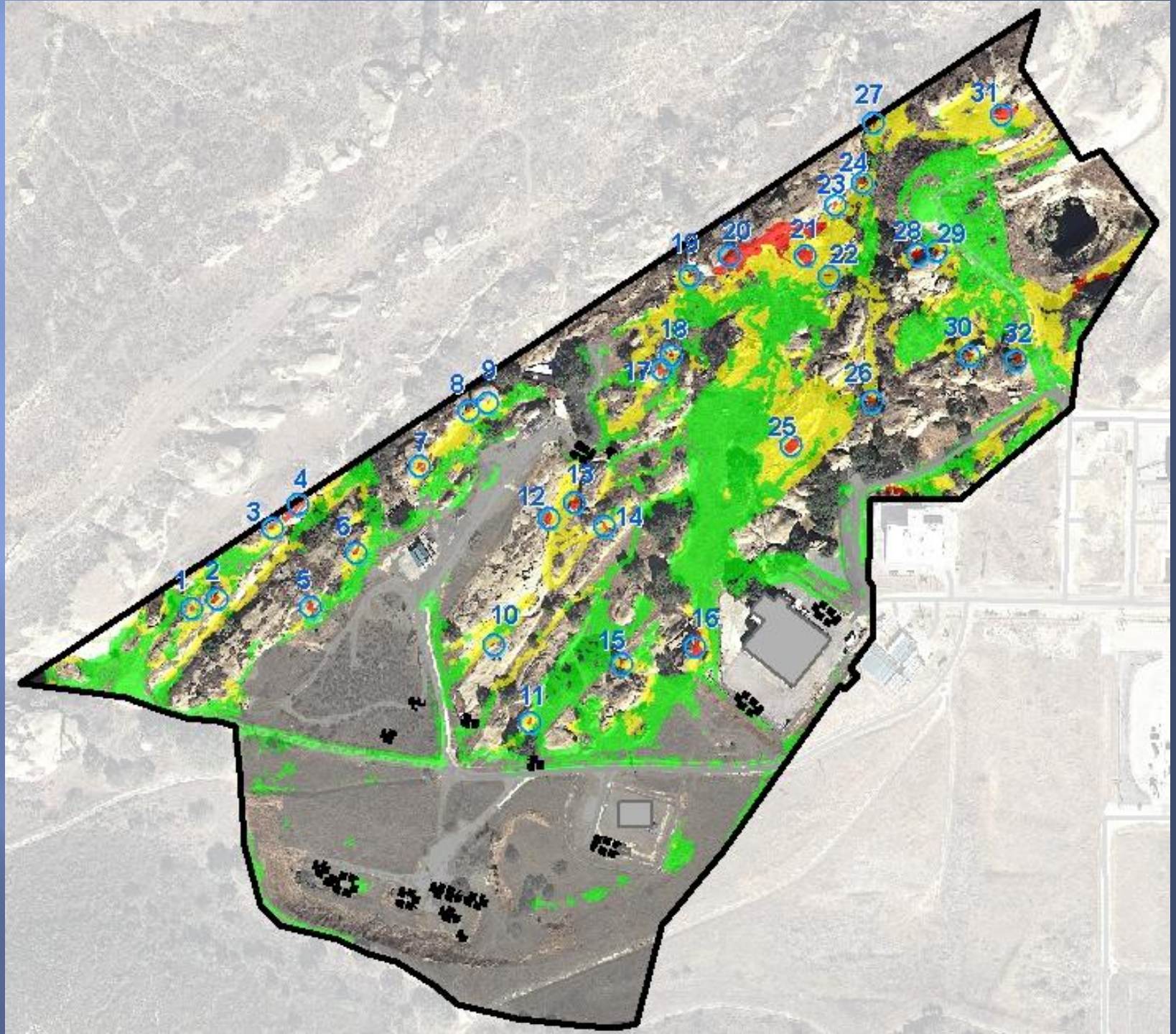
Notes:
- The totals listed in the table include overlap.
- The totals listed on the map exclude overlap.

Filepath: Y:\Santa_Susana\EP9038\GammaScanning\Coverage\GammaScanningProgress_11X17_20110224.mxd
Project: EP9038
Edited By: PL 20110224
Source: CIRGIS 2007, HGL 2010

HGL HydroGeoLogic, Inc

Subarea 8 North Potential GRAYs

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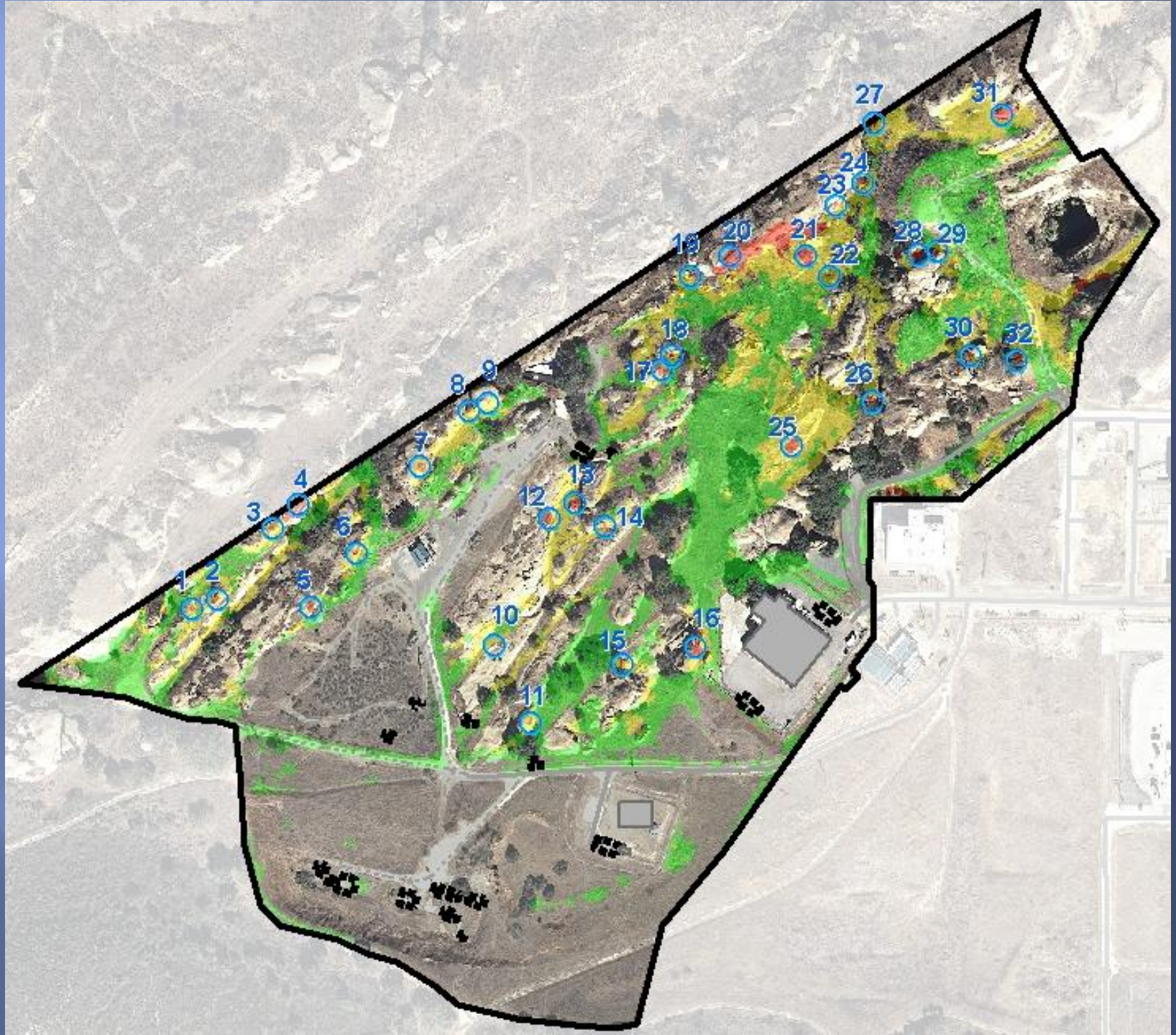
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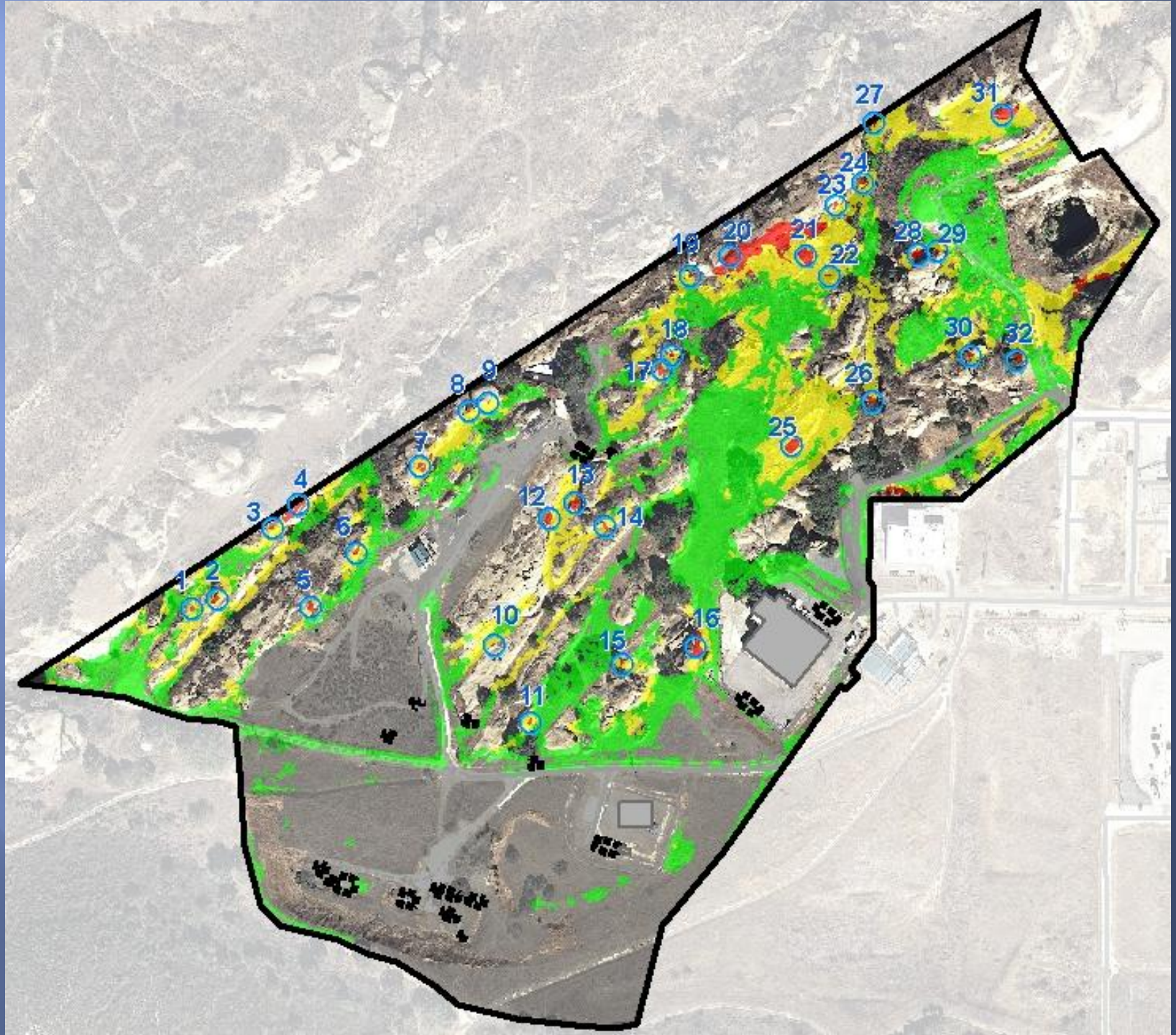
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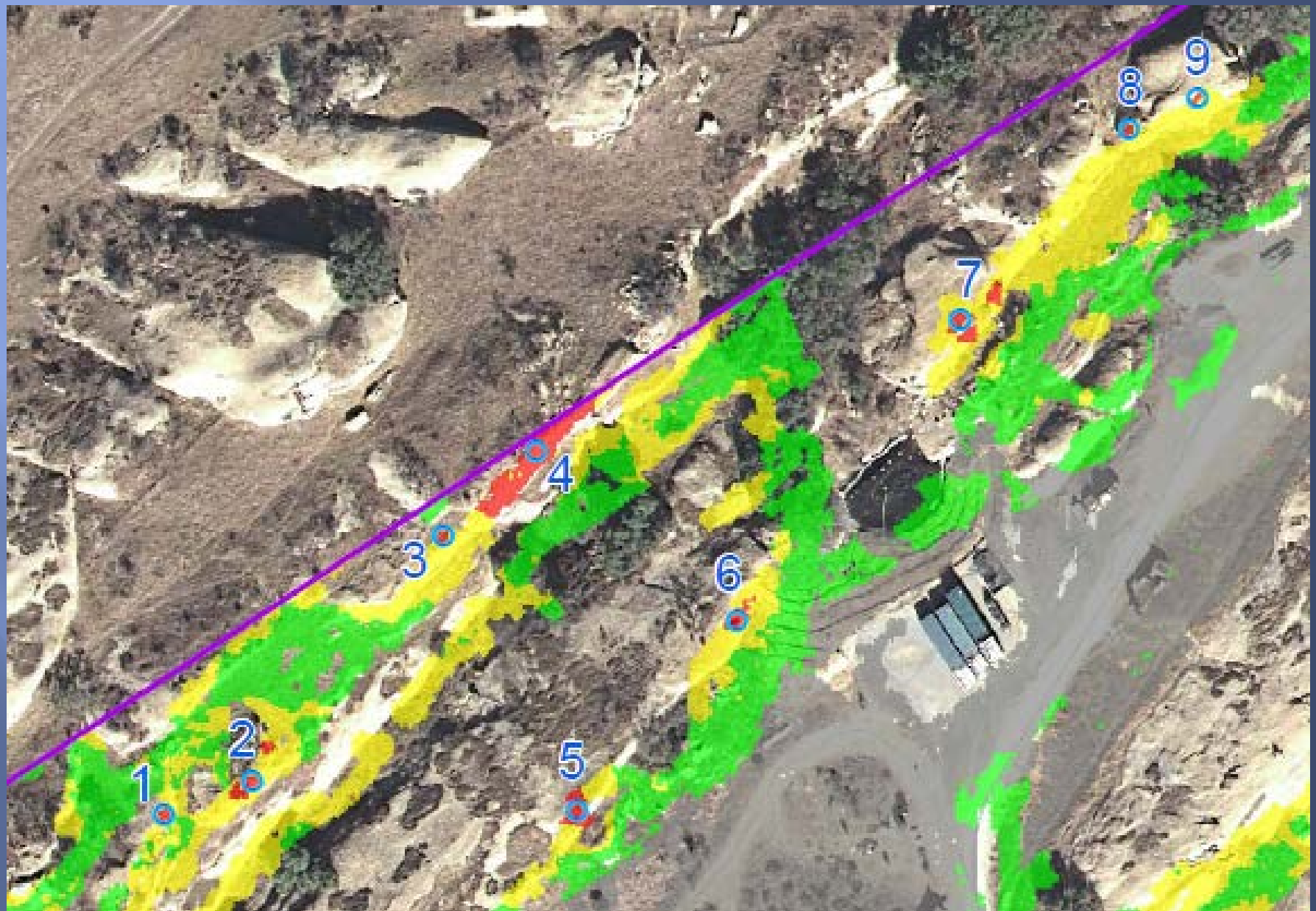
8 North Potential GRAYs 1-9

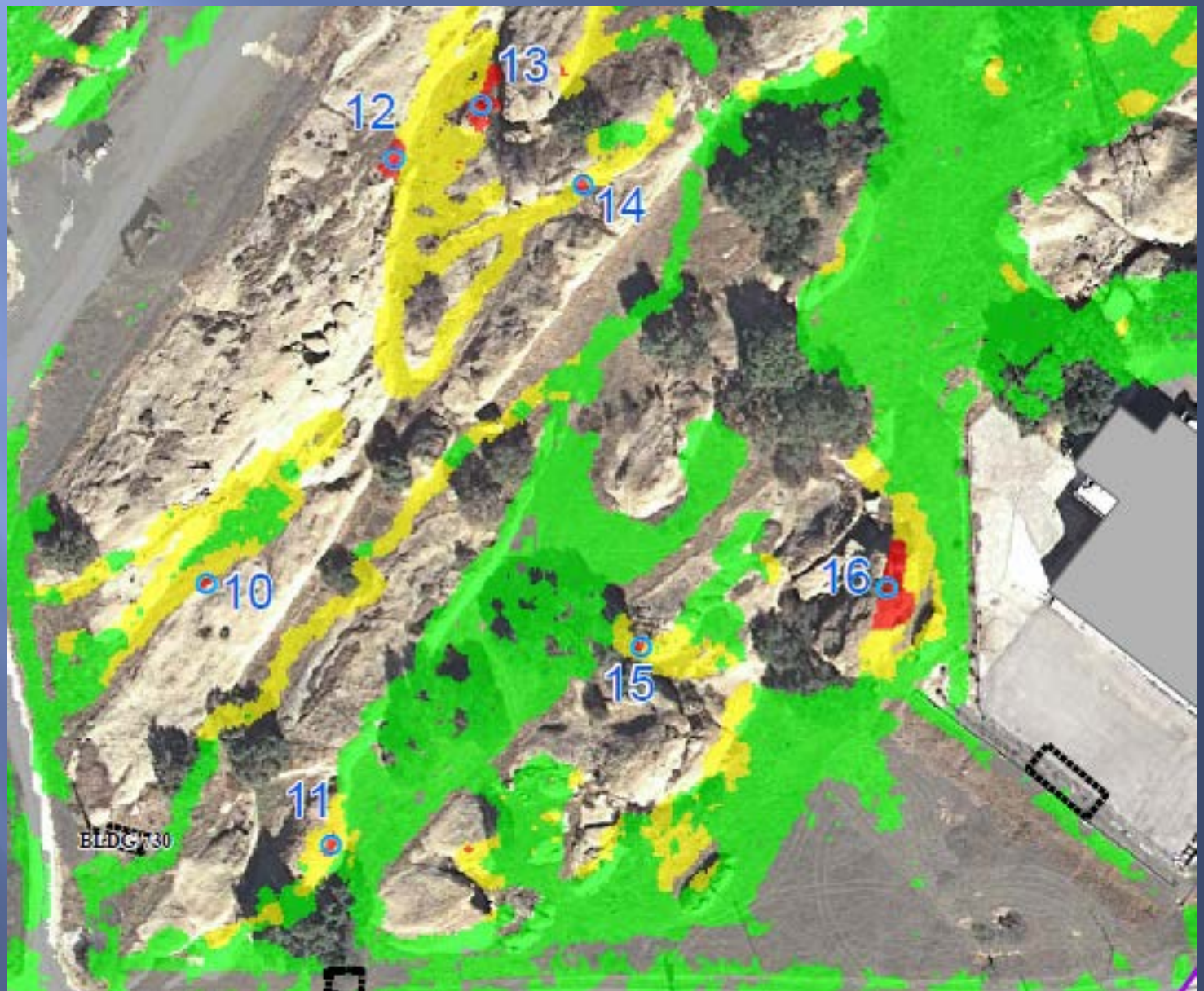


8 N PGRAYs 1 & 2

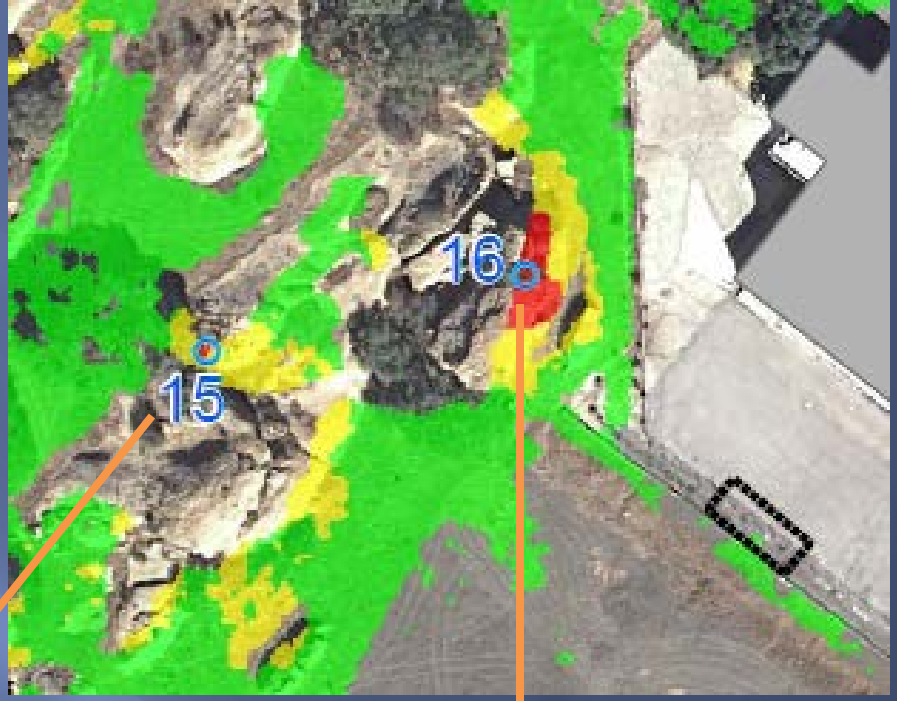
8 N PGRAYs 3-6

8 N PGRAYs 7-9

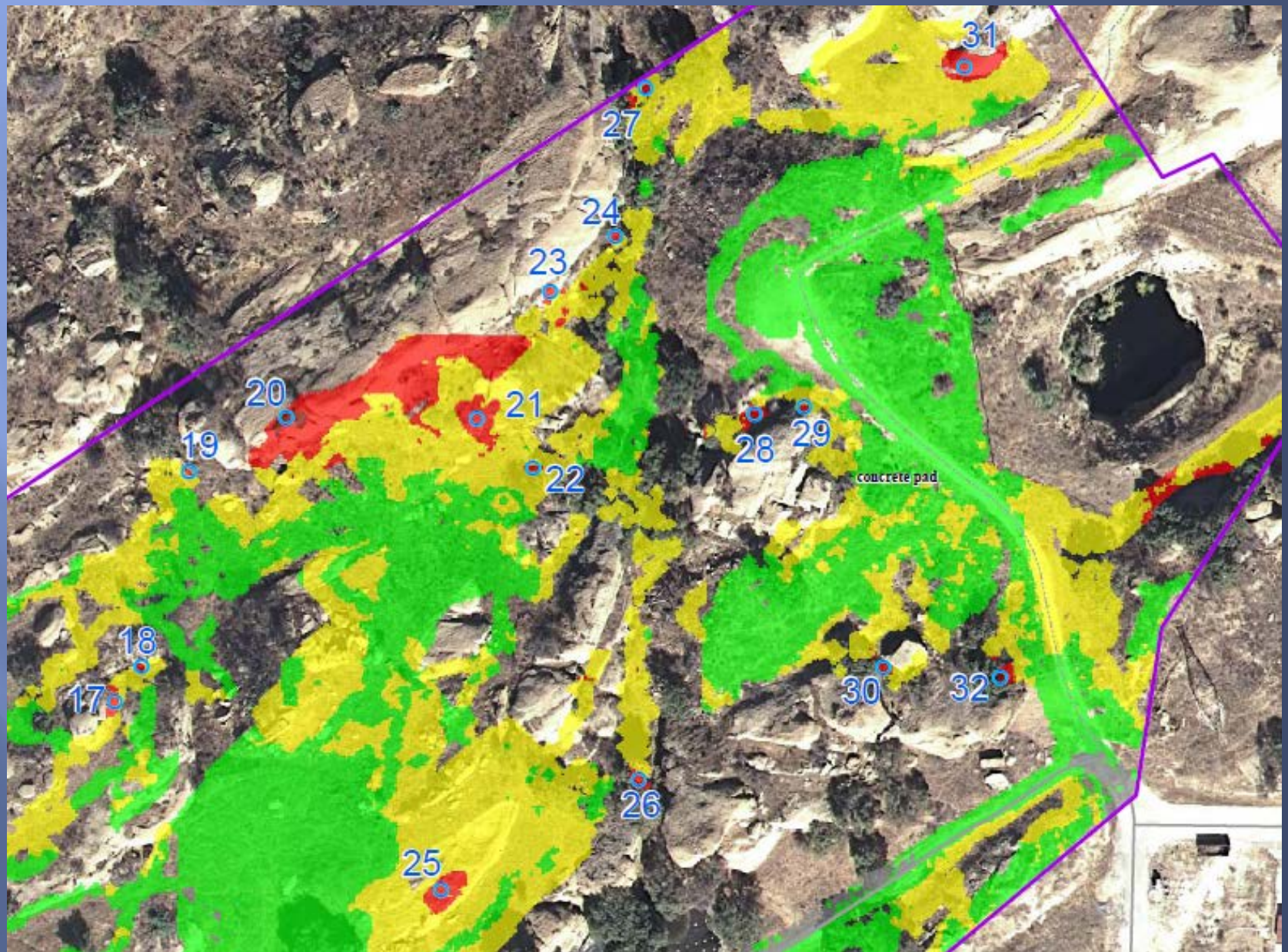
8 North Potential GRAYs 10-16



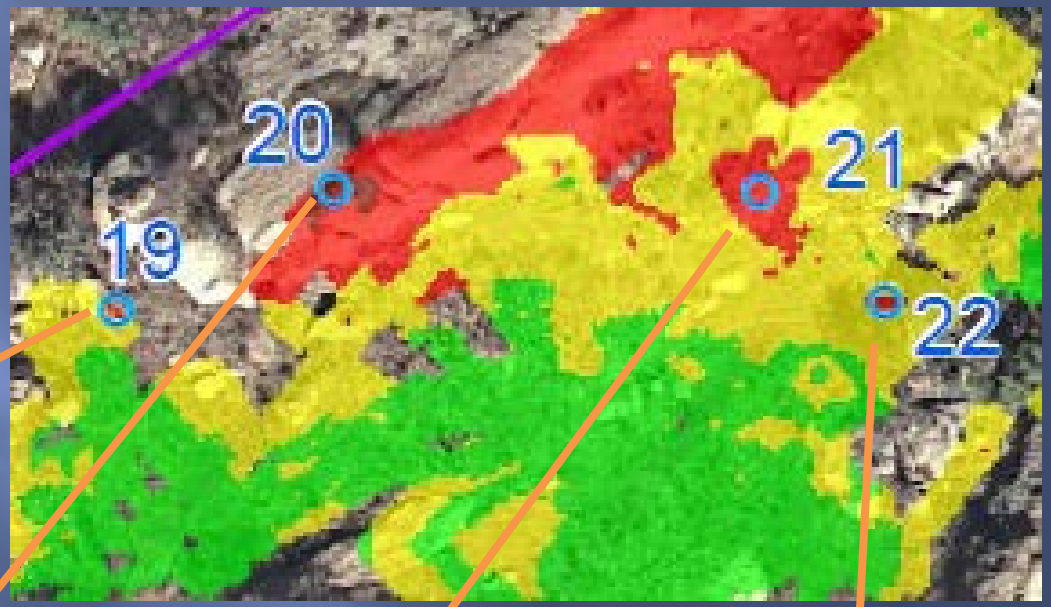
8 N PGRAYs 15 & 16



8 North Potential GRAYs 17-32



8 N PGRAYs 19-22

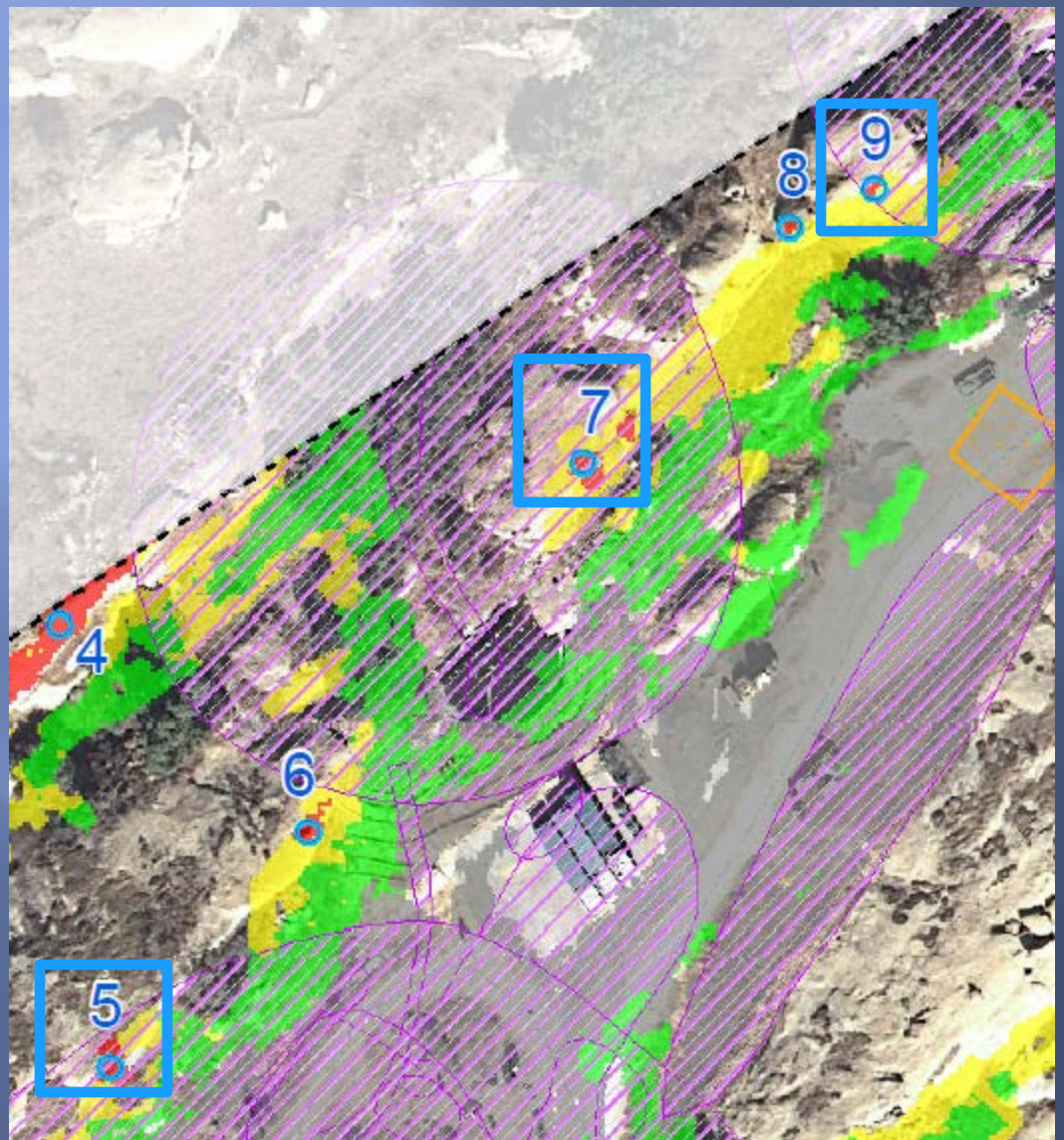


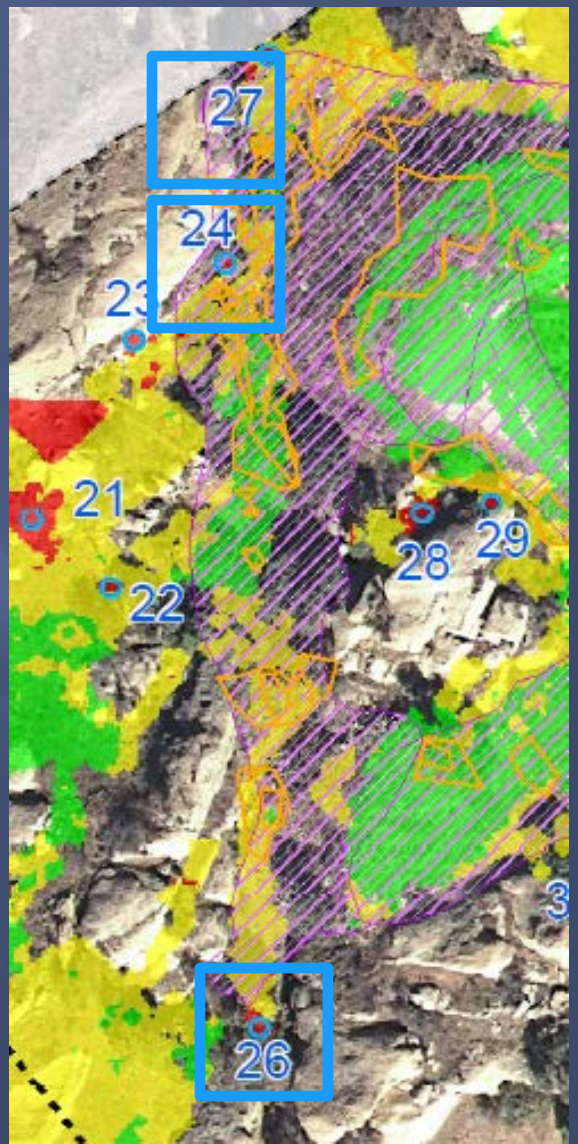
8 N PGRAYs
24, 26, & 27

Preliminary Evaluation
8 North Potential GRAYs

Potential GRAY	Evaluation
1-4, 6, 8-10, 12-14, 16, 17, 19-23, 25, 28, 29, 31	NORM
11, 15, 18, 26, 30	Sites too wet to verify
5, 7, 9, 24, 26, 27	Suspect due to another line of evidence at the location
NORM is Naturally Occurring Radioactive Materials (Uranium, Thorium, and Potassium-40)	

Suspect Due to Another Line of Evidence at the Location





Questions?

Geophysical Overview

March 16, 2011

Legend

Subarea 8 North Groups

Centerline Roads
- Primary Roads
- Secondary Roads
- Tertiary Roads

Buildings
- Demolished
- Existing

Geophysical Anomalies
- Terrain Conductivity
- Magnetometer
- Ground Penetrating Radar
- Cut and Fill Boundaries
- Magnetometer Anomaly Linear
- Terrain Conductivity Anomaly Linear

Surface Water
- Intermittent Stream
- Permanent Stream
- Surface Water
- Lined Channel

Surface Water Flow
- Surface Water Flow (From Boeing Database, 2008)

Surface Features
- Channel
- Drain
- Drain
- Drainage Divide
- Gutter
- Tank
- Tank
- Vault
- Well

Utilities
- Gas
- Storm Drain
- Sanitary Sewer
- Water
- Water (Removed)
- Water (Removed)
- Pipes (Unknown Type)
- Pipes (Unknown Type)

N

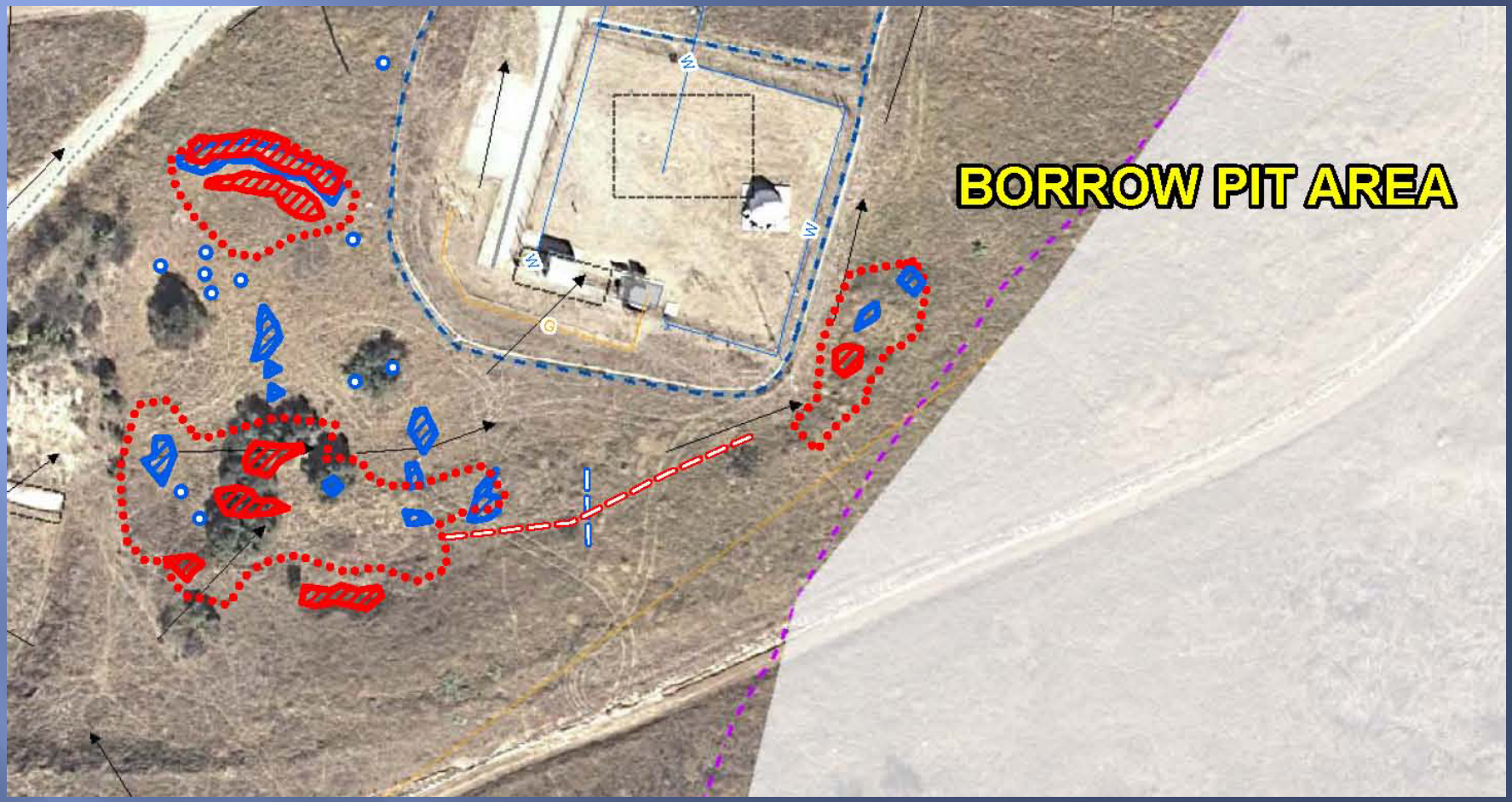
0 30 60 120
Scale In Feet

Geophysical Anomalies
Subarea 8
Santa Susana Field Laboratory

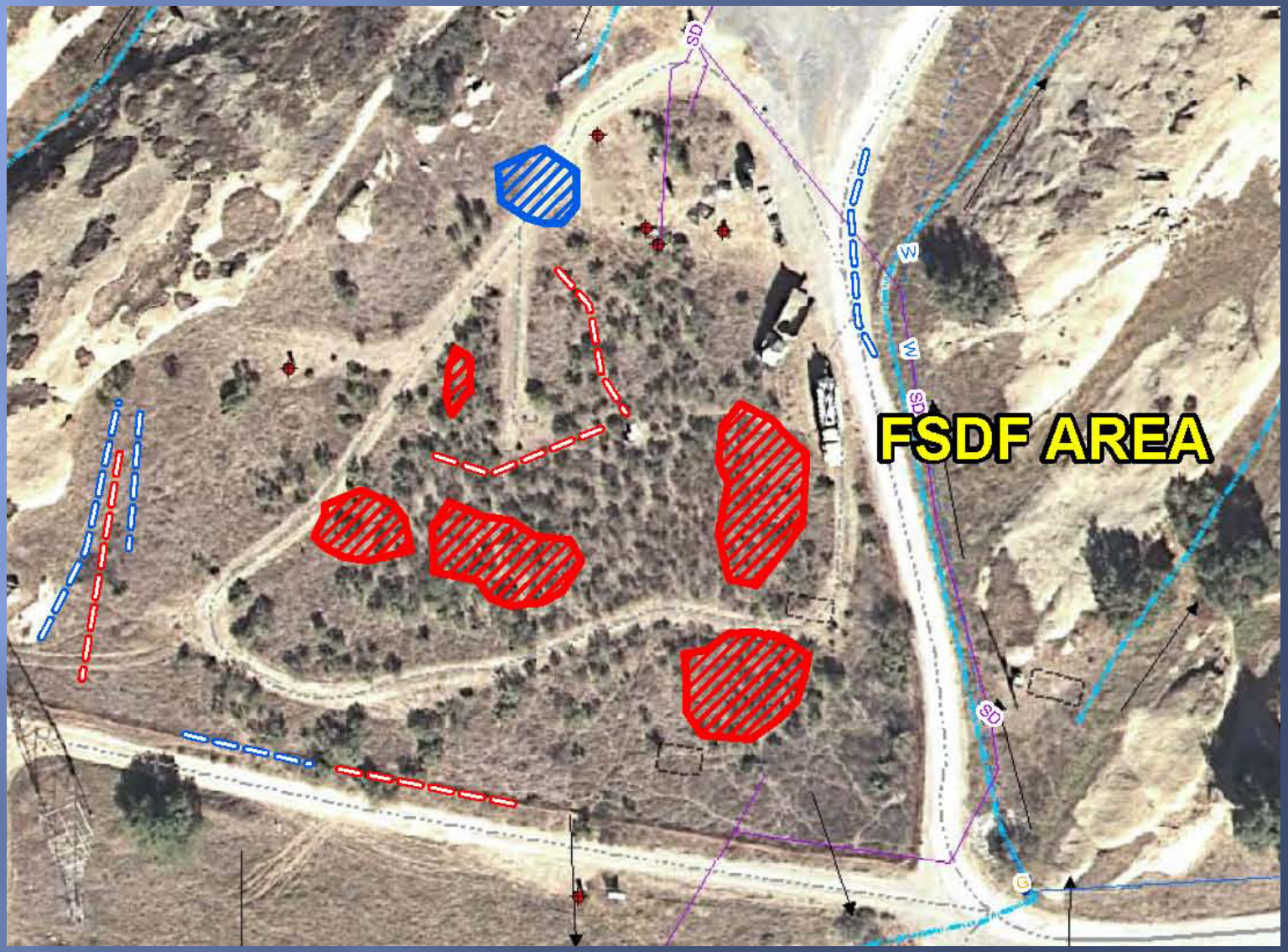
U.S. EPA Region 9

HGL

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY


BORROW PIT AREA

ESADA AREA
SD


FSDF AREA
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SD
SD
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FSDF AREA (North Portion)

BLDG 9 AREA
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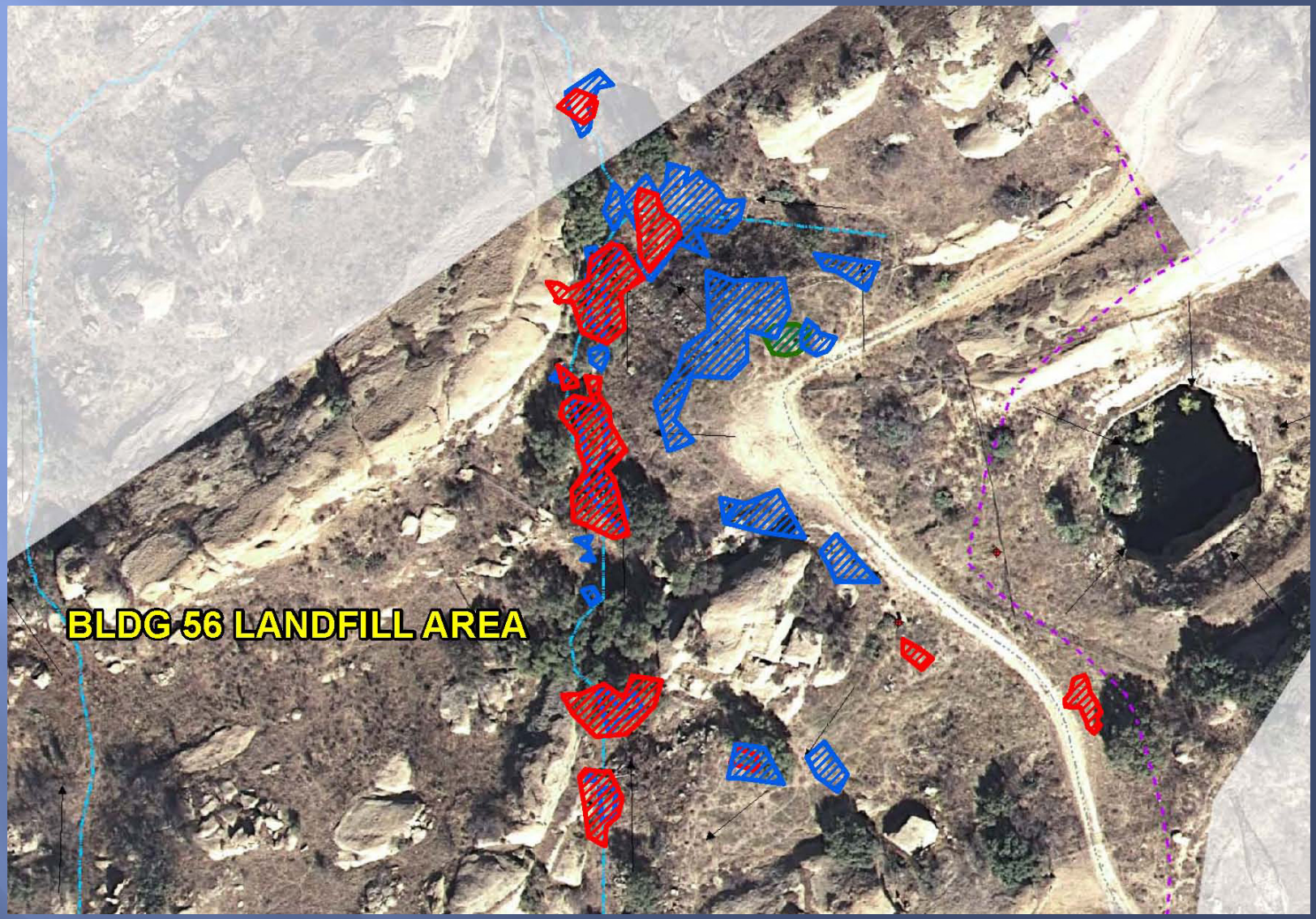
BLDG 56 LANDFILL AREA

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Sample Location Selection
Subarea 8N

March 16, 2011

Legend

Subarea 8 Groups

Centerline Roads

Type, narrative

PRIMARY, Area IV, NBZ Road Centerline

SECONDARY, Area IV, NBZ Road Centerline

TERTIARY, Area IV, NBZ Road Centerline

Buildings

Demolished

Existing

Proposed Sample Locations 5A

Drainage Sample

Subsurface Sample

Surface and Subsurface Sample

Likely Chemical Remediation Zones

Likely Structural Remediation Zones

N

0 50 100 200

Scale in Feet

Historical Site Assessment
Draft Technical Memorandum - HSA-8

Proposed Sample Locations
Subarea 8 North
Santa Susana Field Laboratory

U.S. EPA Region 9

HGL

Legend

Subarea 8 Groups
Centerline Roads
Type, narrative
PRIMARY, Area IV, NBZ Road Centerline
SECONDARY, Area IV, NBZ Road Centerline
TERTIARY, Area IV, NBZ Road Centerline
Buildings
Demolished
Existing

Proposed Sample Locations 5A
Drainage Sample
Subsurface Sample
Surface and Subsurface Sample
Likely Structual Remediation Zones
Likely Chemical Remediation Zones
Process Knowledge
Gamma Static Count

Geophysical Anomalies
Terrain Conductivity
Magnetometer
Ground Penetrating Radar
Cut and Fill Boundaries
Magnetometer Anomaly Linear
Terrian Conductivity Anomaly Linear
Buried Metals

Aerial Photography Data
Aerial Photography Features

0 50 100 200
Scale in Feet
N

Historical Site Assessment
Draft Technical Memorandum - HSA-8

Proposed Sample Locations
Subarea 8 North
Santa Susana Field Laboratory

U.S. EPA Region 9

HGL

Sample Tracking Table

HSA Subarea	Totals and Round Summary	Allocated Samples	CURRENT STATUS: Soil Samples Collected: Surface Soil Samples	Subsurface Soil Samples	Total Soil Samples
3	**Total**	**40**	**0**	**0**	**0**
	Round 1	*12*			*0*
	Round 2	*28*			*0*
5A	**Total**	**1482**	**143**	**222**	**365**
	Round 1	*444*	*143*	*222*	*365*
	Round 2	*1037*			*0*
5B	**Total**	**927**	**227**	**283**	**510**
	Round 1	*278*	*227*	*283*	*510*
	Round 2	*649*			*0*
5C	**Total**	**1207**	**83**	**122**	**205**
	Round 1	*362*	*83*	*122*	*205*
	Round 2	*845*			*0*
5D-North	**Total**	**1372**	**0**	**0**	**0**
	Round 1	*412*			*0*
	Round 2	*960*			*0*
5D-South	**Total**	**463**	**0**	**0**	**0**
	Round 1	*139*			*0*
	Round 2	*324*			*0*
6	**Total**	**1427**	**0**	**0**	**0**
	Round 1	*428*			*0*
	Round 2	*999*			*0*
7	**Total**	**985**	**0**	**0**	**0**
	Round 1	*295*			*0*
	Round 2	*689*			*0*
8-North	**Total**	**1088**	**110**	**119**	**229**
	Round 1	*326*	*110*	*119*	*229*
	Round 2	*762*			*0*
8-South	**Total**	**150**	**0**	**0**	**0**
	Round 1	*45*			*0*
	Round 2	*105*			*0*
NBZ-E	**Total**	**494**	**0**	**0**	**0**
	Round 1	*148*			*0*
	Round 2	*346*			*0*
NBZ-W	**Total**	**368**	**0**	**0**	**0**
	Round 1	*110*			*0*
	Round 2	*258*			*0*
All Subreas	**Total**	**10000**	**0**	**0**	**0**
	Round 1	*3000*			*1309*
	Round 2	*7000*			*0*

The number of soil samples ultimately necessary for EPA to complete its study may be higher or lower than 10,000 samples.

March 16, 2011

Round 1 Soil Sampling Status

- All soil samples planned for Subareas 5C and 5B have been collected
- Completion of Subarea 5A soil sampling anticipated on April 13
- Subarea 8-North soil sampling will begin on April 13
- Currently collected 873 soil samples

Laboratory Procurement

- A contract has been awarded to Test America Laboratories Saint Louis
- Sediment samples were shipped on March 15 and 16
- All soil samples from Subarea 5C will be shipped by the end of April
- All soil samples from Subareas 5A and 5B will be shipped by the end of June
- The first set of soil and sediment analytical data will be ready by summer

Co-Located Chemical Sampling Update

Mark Malinowski
Department of Toxic Substances Control
March 16, 2011

Co-Located Sampling Objectives

- Utilize opportunity to obtain additional chemical data for ultimate use in making cleanup decisions, per Administrative Order on Consent between DOE and DTSC, signed December 6, 2010.

- Take advantage of the additional information that EPA has obtained to target sampling (EPA Historical Site Assessments, Gamma Scanning Data, Geophysical logging, former worker interviews, aerial photography analysis)

Agency Coordination and Oversight

Collaborative effort between DOE and DTSC:

- Weekly coordination calls (DTSC's lab personnel and technical staff, DOE, CDM and contracted lab);
- DTSC's weekly field oversight of sampling activities;
- Ongoing DTSC site visits and coordination between DTSC, DOE and EPA;
- Ongoing feedback/review/approvals provided by DTSC lab and technical staff

Update on Field Work

- HSA 5C
  - All field work completed
  - All analytical data received being validated
  - HSA 5C Technical Memo being prepared to show results from chemical sample analysis
- HSA 5B:
  - Field work 95% complete
  - 75% analytical data received, data validation in progress
- HSA 5A
  - Currently in field with EPA
  - Surface samples collected
  - 25% soil borings completed

Co-Located Sampling Process

Discretionary Sampling Criteria for Chemicals:

1. Clearly Contaminated Areas

2. High-density radiological sampling areas due to elevated gamma survey results

3. High-density radiological sampling of features

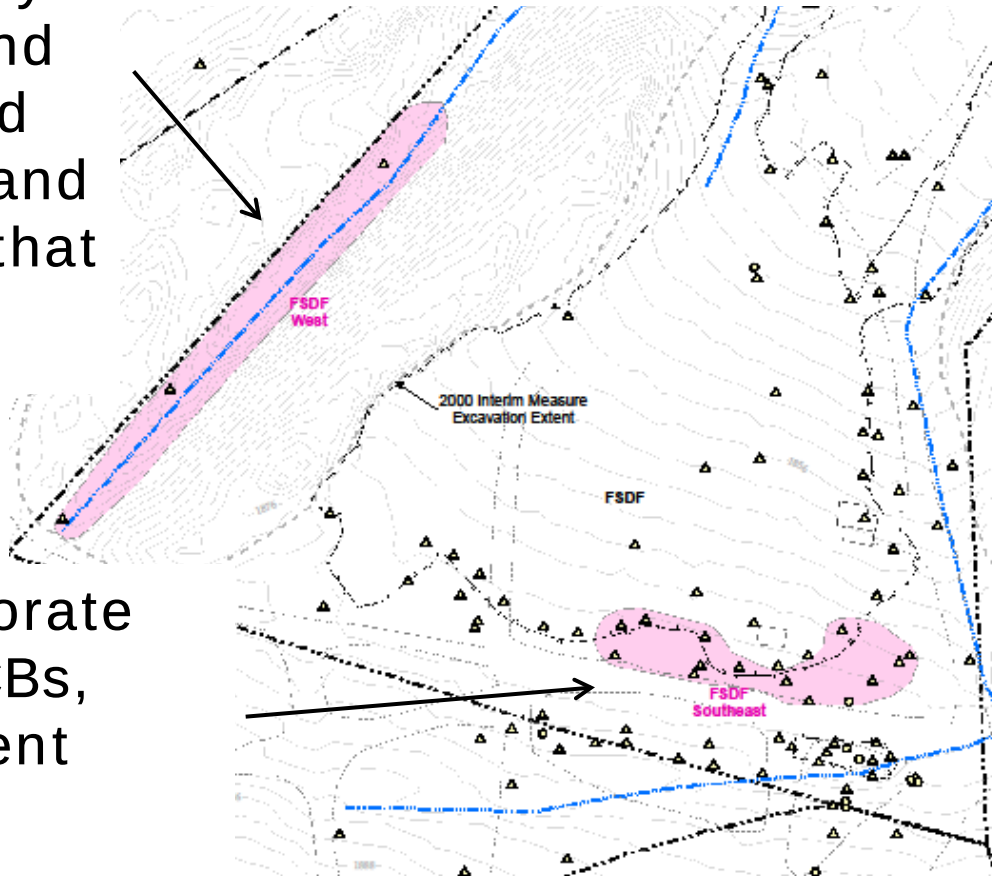
Clearly Contaminated Likely to Need Remediation--HSA 8 N

DTSC, DOE, and DOE's contractors reviewed previous RFI sampling results in relationship to site operations and historical aerial photographs, and identified six areas in HSA 8N that fall into this criteria

- Former Sodium Disposal Facility (FSDF) Southeast
- FSDF West
- FSDF Pistol Range
- Empire State Atomic Development Authority (ESADA) Pistol Range
- Building 56 Pit East Ramp
- Building 56 Landfill

Clearly Contaminated Likely to Need Remediation…FSDF Area

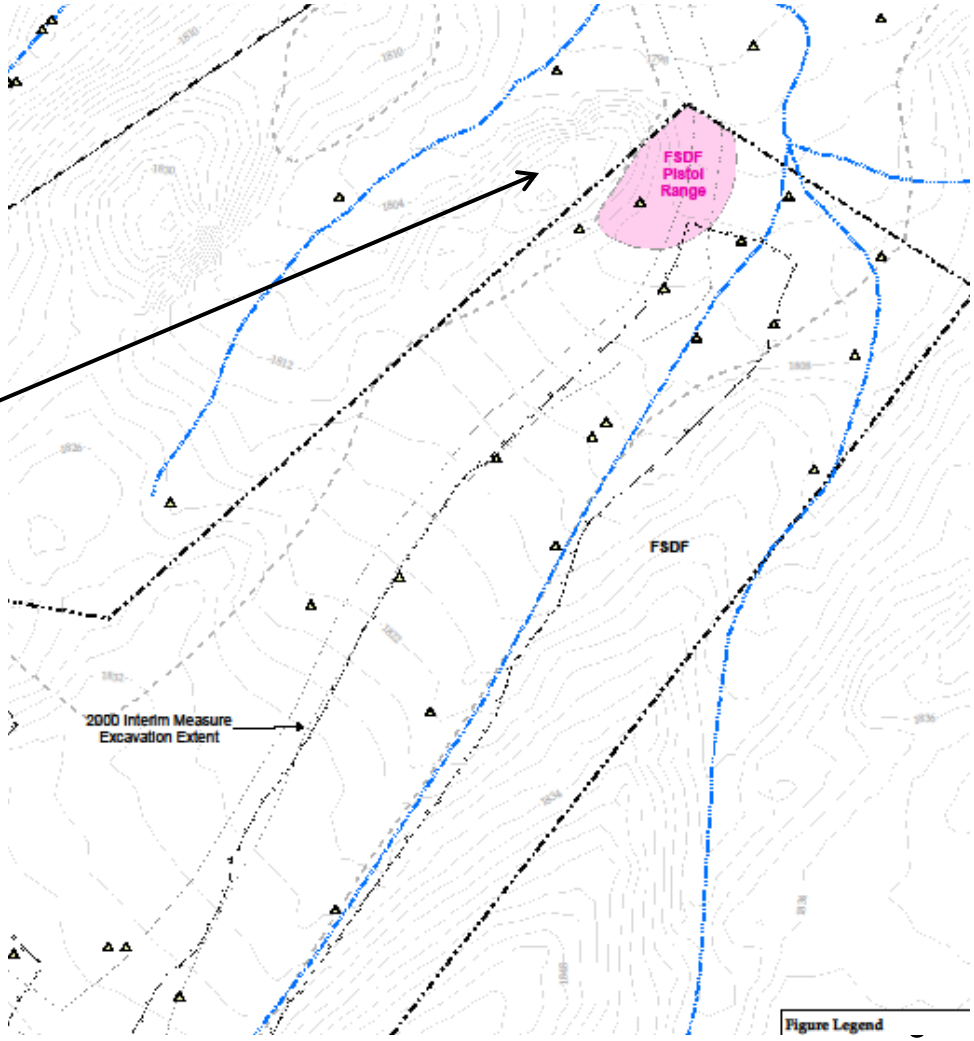
FSDF West - Mercury (up to 6.1 ppm) and PCBs; extent based on sampling data and bedrock outcrops that define the surface water drainage



FSDF Southeast – Perchlorate (up to 3.6 ppm), also PCBs, PAHs, and mercury; extent based on sampling data.

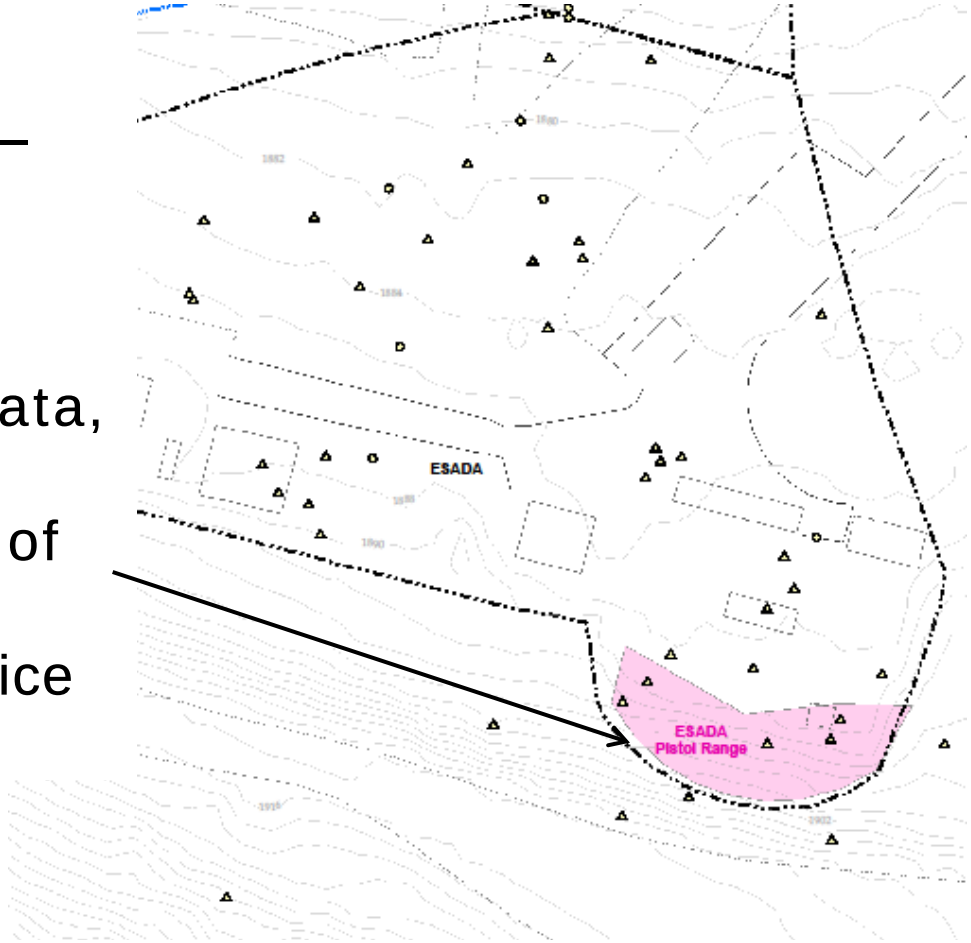
FSDF Pistol Range

FSDF Pistol Range - lead (up to 420 ppm) and mercury; extent based on visual lead shot and the extent of the hillside used for target practice



ESADA Pistol Range

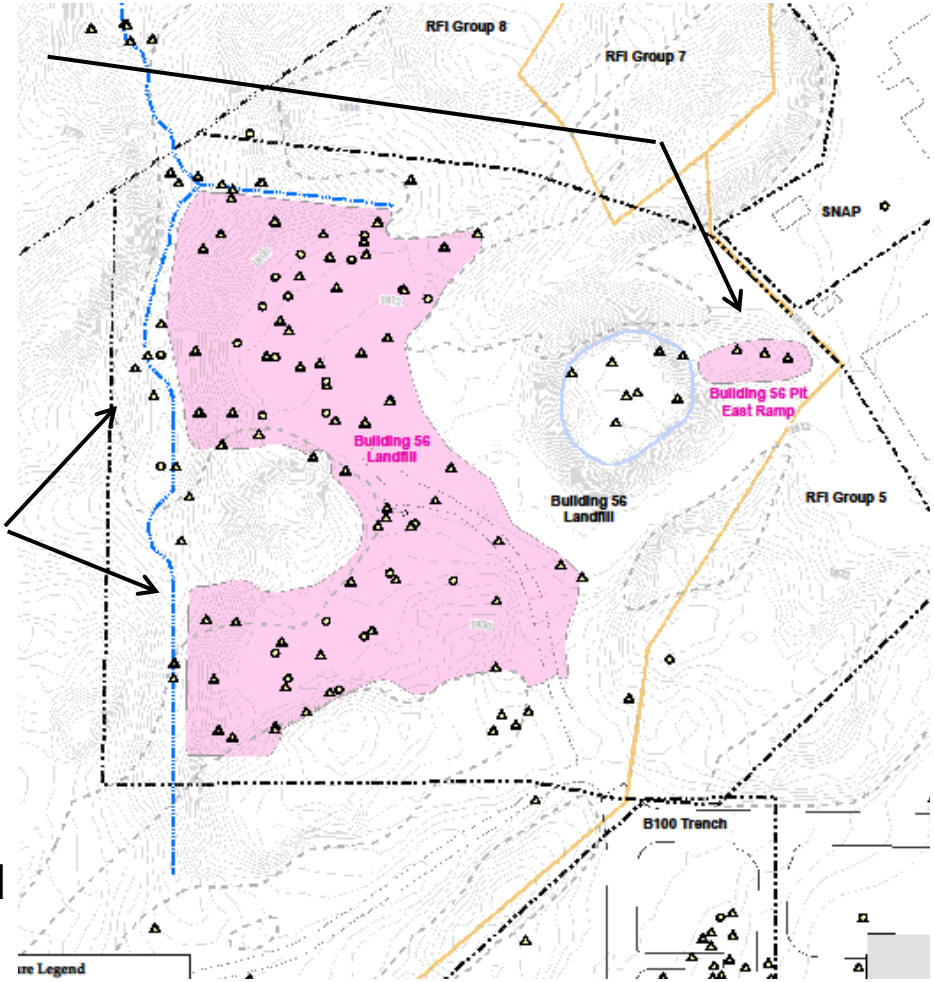
ESADA Pistol Range – lead (up to 27,000 ppm), also antimony and arsenic; extent based on sampling data, visual extent of lead shot, and the extent of the hillside that was used for target practice



Building 56

Building 56 Pit East Ramp - PCBs (up to 246 ppb) and petroleum hydrocarbons; extent based on sampling data and debris identified in area

Building 56 Landfill – PCBs (up to 1 ppm), also PAHs, metals (primarily lead, copper, selenium, and cadmium), and petroleum hydrocarbons; extent based on sampling data and the extent of landfill materials identified using field investigation techniques and review of historical aerial photographs



Reminder—Additional Potential Scenarios

The following additional scenarios will be evaluated using existing RFI data:

- Discretionary depth selection for certain analytes, based on known distribution (example: dioxins)
- Discretionary reduction of analyte list based on known historical chemical usage (example: hydrazine)

Reminder—Communication Process

- Identified scenarios for potential discretionary chemical sampling will be communicated to stakeholders in advance for discussion.
- As criteria are developed for each approved scenario, they will be applied to subsequent subareas for determination of discretionary sampling.
- Decisions made based on applied criteria for each scenario will be clearly described in each subarea technical memorandum.

DOE Proposal - Analytical Suites

- DOE proposes to limit wide application of a few analyses after public input and DTSC approval based on
  - How frequently the chemicals are detected
  - Refocusing where to perform analysis – for example, using expanded suite in waste disposal areas, or where needed based on observed soil conditions (staining)

Chemicals Under Consideration

- Formaldehyde (a breakdown product of hydrazine) – include only in waste area/disturbed soil samples since hydrazine was not widely used in Area IV
  - In HSA-5C, detected in 15 of 84 subsurface samples (~17%), detected in disturbed soil with max result of 10 ppm (similar to previous RFI data)

- Energetic Compounds (for example, TNT, C-4) - include only in waste area/disturbed soil samples since energetics not widely used in Area IV (*perchlorate will continue to be analyzed at all locations*)
  - In HSA-5C, not detected in 84 subsurface samples, including disturbed soil (only rare detections in previous RFI data at sites with energetic compound use)

Chemicals Under Consideration

- Terphenyls - include only in waste area/disturbed soil samples since rarely detected Area IV
  - In HSA 5C, not detected in 84 subsurface samples, including disturbed soil (rare detections in previous RFI data, ~5 in 400 samples)

- Alcohols/Glycols – include only in waste areas or known use locations since these chemicals are naturally occurring and break down very quickly in the environment
  - Ethanol detected in 33 of 84 subsurface samples (39%), max result 330 ppb; Methanol detected in 29 of 84 subsurface samples (35%), max result 640 ppb (ND in previous RFI data)
  - Glycols and 2-proponal not detected in 84 subsurface samples (rare glycol detections in previous RFI data, ~7 in 200 samples)

Chemicals Under Consideration

- Dioxins – recommendation still under evaluation pending disturbed soil association. Based on nature of release (burning), may recommend limiting to analysis only in surface soils and waste areas, and possibly including disturbed soils

- Chemical analysis revisions will be finalized only after public input and DTSC approval – will be further discussed at teleconference meeting March 24th /25th (currently being scheduled)

Revised Table of Analytes

Primary Analyses – performed on all soil samples	Secondary Analyses – performed on selected samples
Metals	Volatile Organic Compounds
Mercury	1,4-Dioxane
Chromium VI	Formaldehyde
Semivolatile Organic Compounds	N-Nitrosodimethylamine
Polycyclic Aromatic Hydrocarbons	Energetics
Perchlorate	Glycols
Polychlorinated Biphenyls	Alcohols
Fluoride	Terphenyls
Pesticides (surface samples only)	Nitrates
Herbicides (surface samples only)	Total petroleum hydrocarbons (gas/oil/diesel)
Dioxin/Furans (proposed for analysis in surface samples only unless there is an indication of use in the HSA)	Cyanide
pH	Methyl mercury
Percent Moisture	Organic Tin

Note: analytes highlighted in pink are proposed for samples collected at locations where HSA notes potential waste disposal or where visual evidence of waste is noted.

Where do we go from here...

- Analytical data for HSA 5C will soon be available
- Data validation is continuing
- Technical memorandums will be prepared for each subarea, starting with 5C in late spring
- Chemical co-located “selection/de-selection”
  - Will be documented in Tech Memos that will be distributed to Stakeholders and approved by DTSC
  - Convene electronic meeting to discuss de-selected sampling locations—March 24 or 25
  - Tech Memos are being posted on EPA’s Sharepoint web site, DTSC and DOE’s websites