

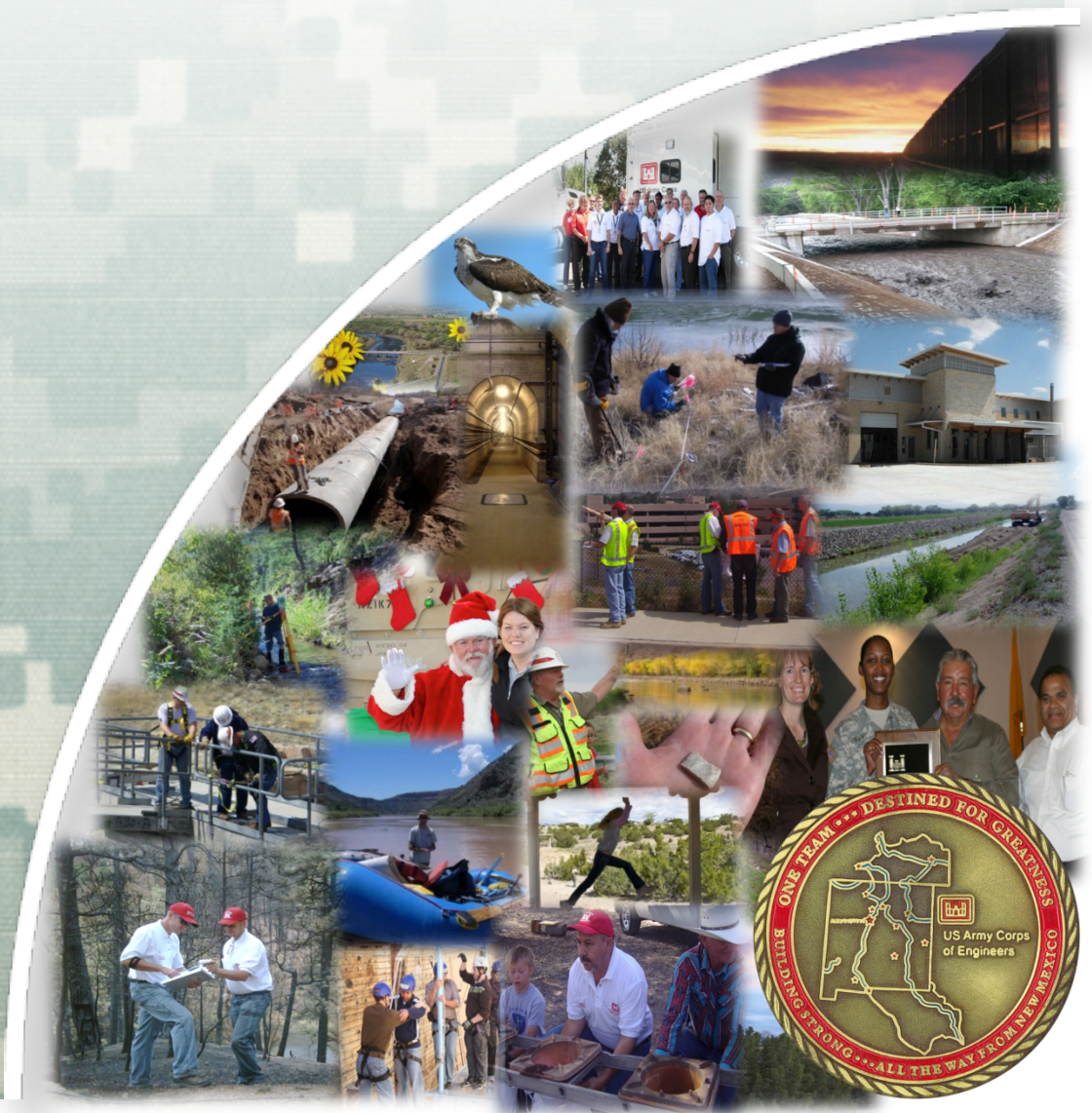
Former Kirtland Air Force Base Precision Bombing Ranges (N-2 & NDA) FUDS ID K06NM0445

M2S2 Webinar 4 February 2014

Trent Simpler, PE
Mark Phaneuf, PG
Albuquerque District



US Army Corps of Engineers
BUILDING STRONG®
One Team ★ ★ ★ Destined For Greatness



Project Team

- **USACE Project Team**

- ▶ Project Manager – Trent Simpler (SPA)
- ▶ Technical Lead – Mark Phaneuf (SPA)
- ▶ Geophysicist – Eric Kirwan (SWF)
- ▶ Geophysicist – John Jackson (SPK)
- ▶ Geophysicist – Andrew Schwartz (EMCX)
- ▶ Ordnance and Explosive Safety Specialist – Steve Carpenter (SPA)
- ▶ Risk Assessor – Neal Navarro (SPK)
- ▶ Archeologist – Jeremy Decker (SPA)
- ▶ Many others.....

- **Regulators**

- ▶ Greg Lyssy (US EPA Region 6 Dallas)
- ▶ Julie Jacobs (NMED Santa Fe)



Coordination

- EMCX
- Local Law Enforcement
- EPA & NMED
- Property Owners (Private, State, City, and Fed.)
- Property Users
 - ▶ CABQ
 - ▶ DEll Airport (FAA)
 - ▶ National Park Service



Historical Site Use & Activities



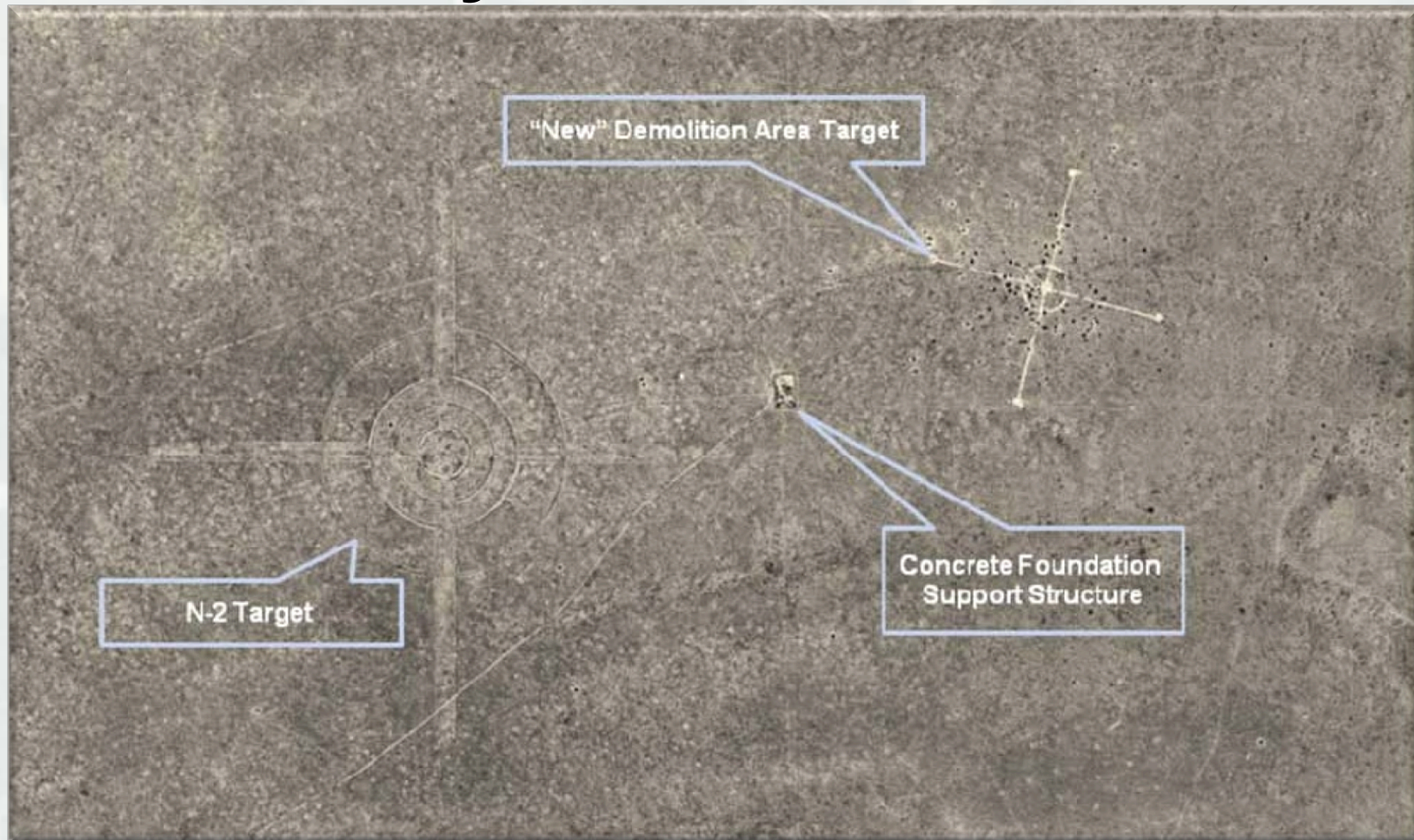
- 1942: 15,135 acres leased for use as precision bombing ranges for Kirtland Field
 - ▶ Students attending the bombardier training school at Kirtland Field used these ranges
 - ▶ Documentation and munitions related items found include 100 lb practice bombs, 100lb HE general purpose bombs, M1A1 spotting charges, aircraft flares, M100 series fuzes
 - ▶ There are 8 targets within the 15K acres; we are focused on the two adjacent targets N-2 and NDA
- 1947: All acreages were declared surplus and leases were cancelled
- 1952: 9800 Training Support Unit conducted various surface clearance activities within the property



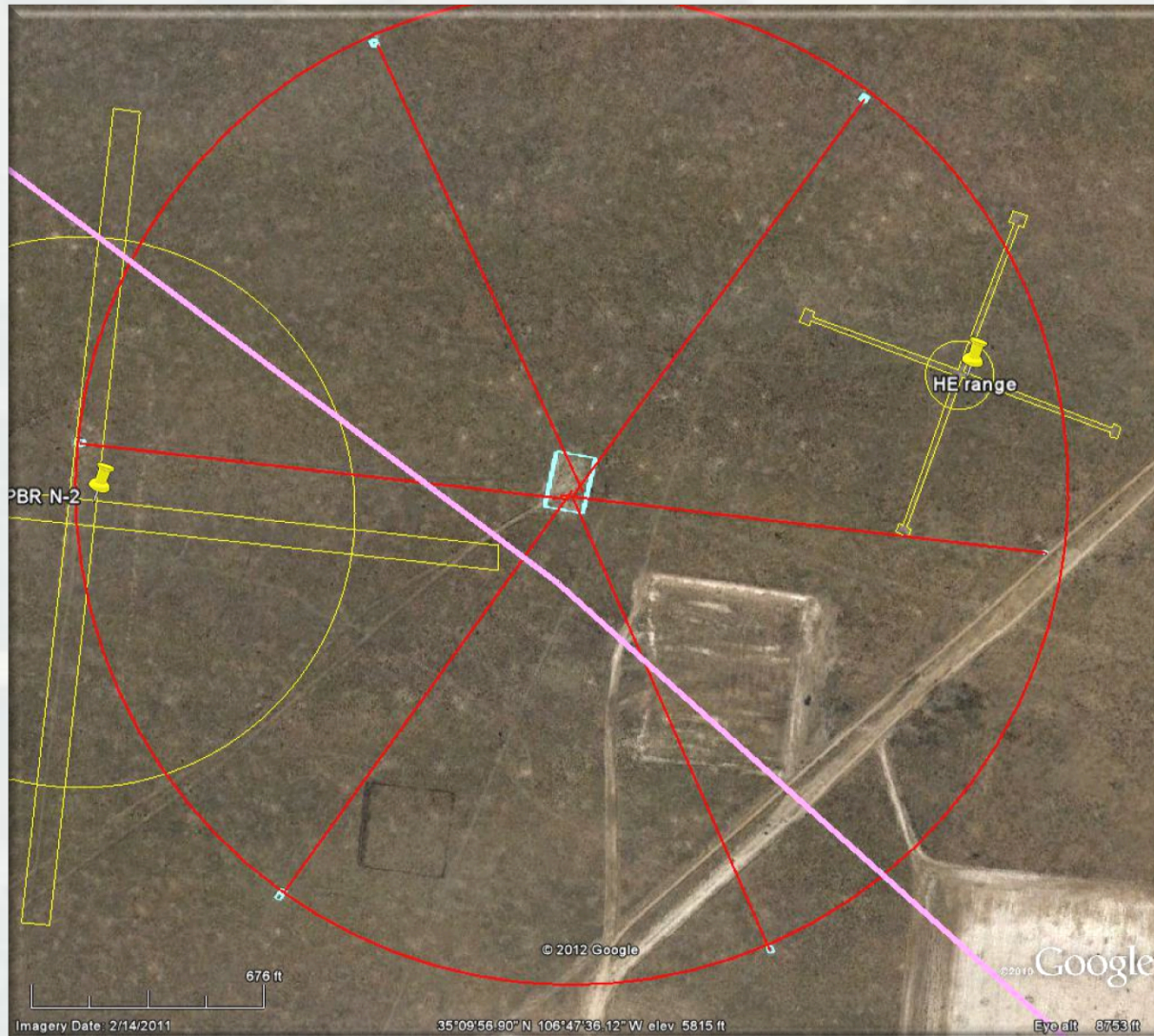
Other Mysterious Site Uses?



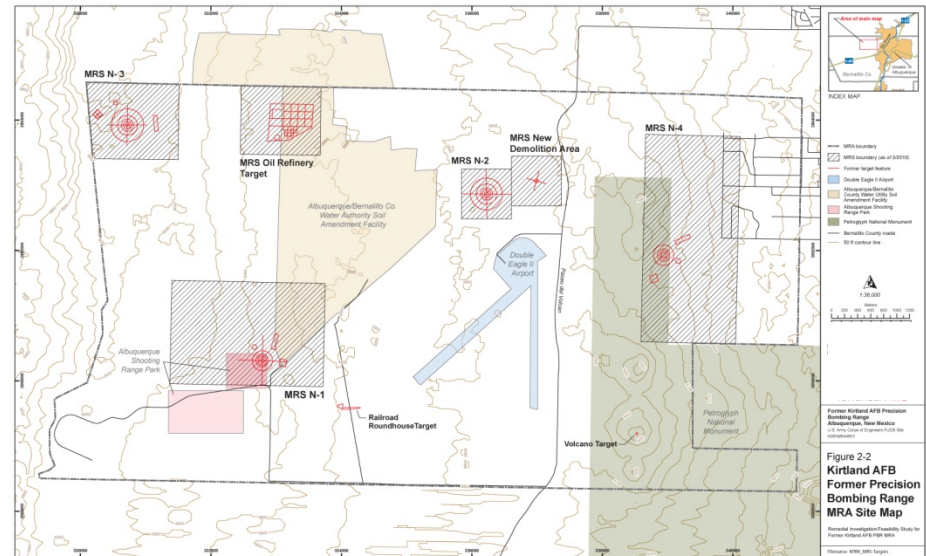
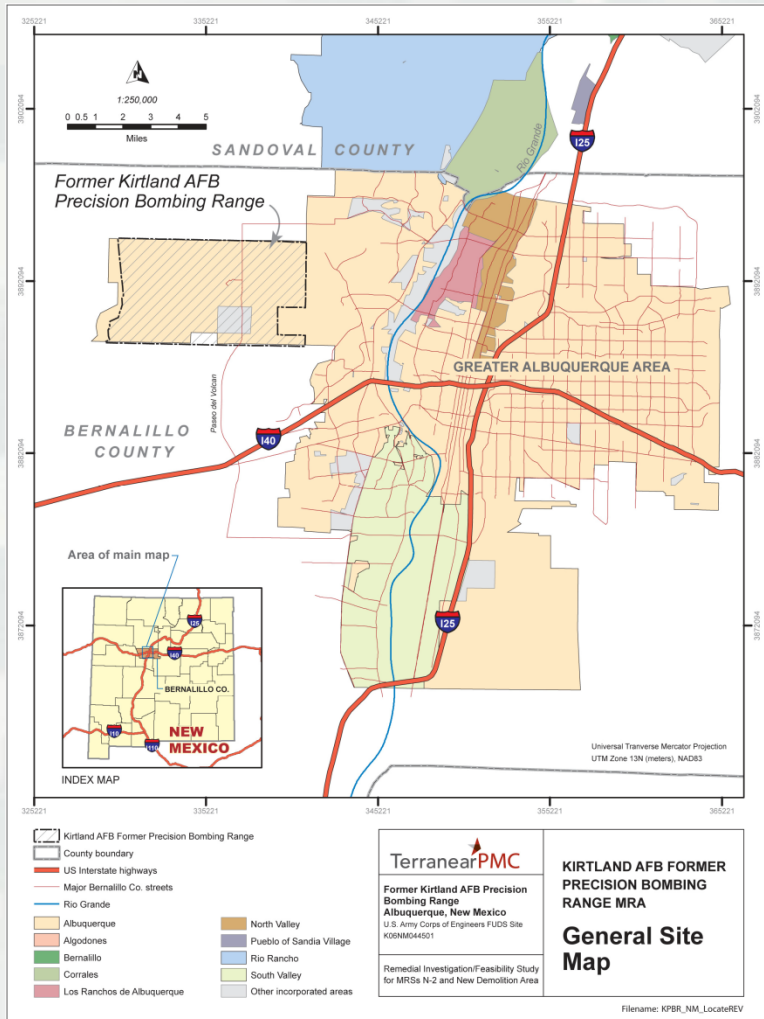
Other Mysterious Site Uses?

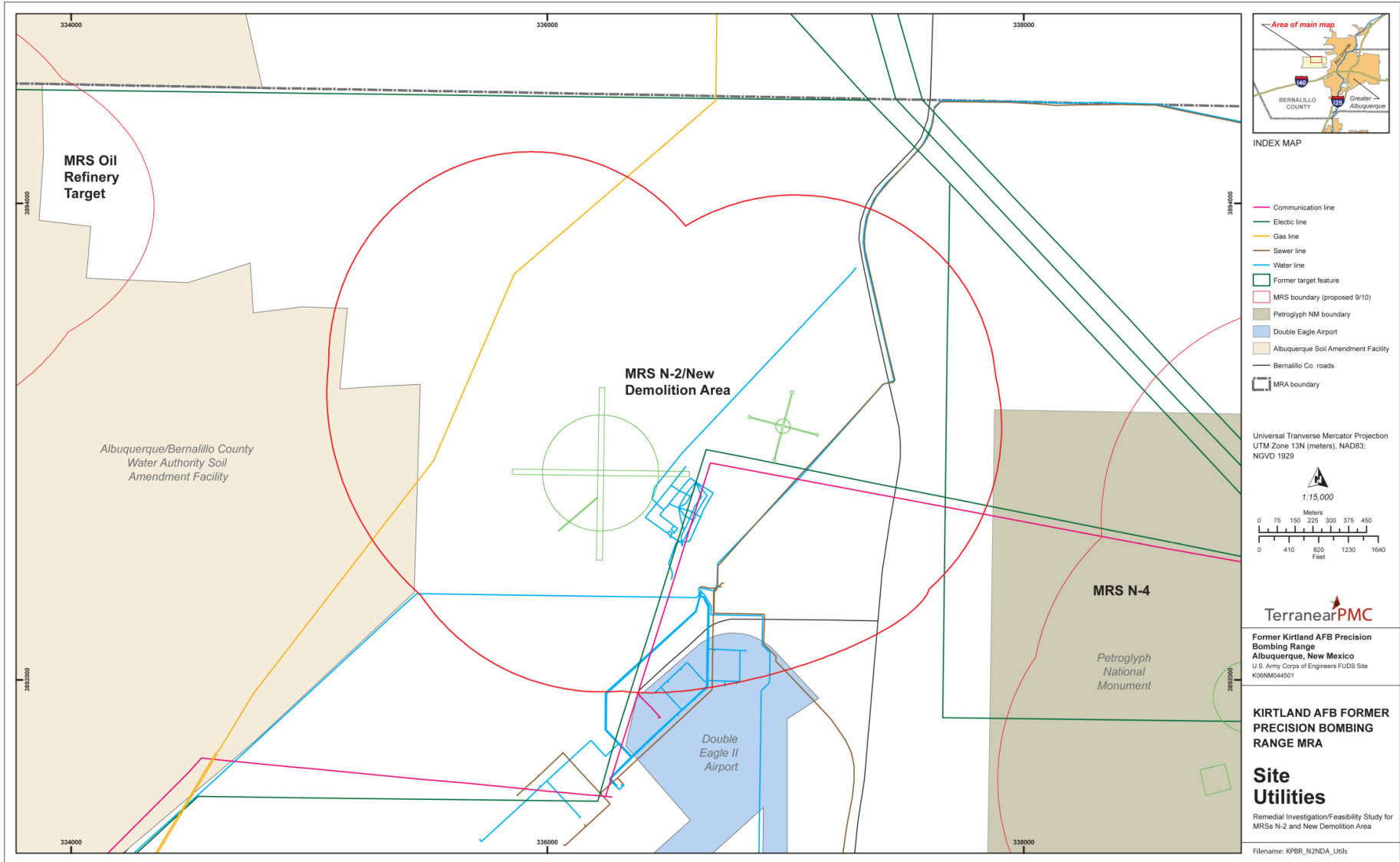


Other Mysterious Site Uses?



A Drill Down of Where We Are in 2014





Typical Ordnance Items



Site Conditions



- Western edge of the Rio Grande Rift
- Volcanic activity as recently as 100,000 yr ago
 - ▶ Several volcanic cones on the eastern edge of the site
 - ▶ Exposed lava flows on eastern portions of the site
 - ▶ Santa Fe Group alluvial deposits of sand, silt, caliche, and clay
- High desert environment ~5,800 ft amsl
 - ▶ Grasses and scrub brush (<10 in./yr precipitation)
- Groundwater ~ approximately 900 ft bgs
- Current regional airport on property with expansion plans
- Plans for large solar facility adjacent to the site



USACE Site Investigation History

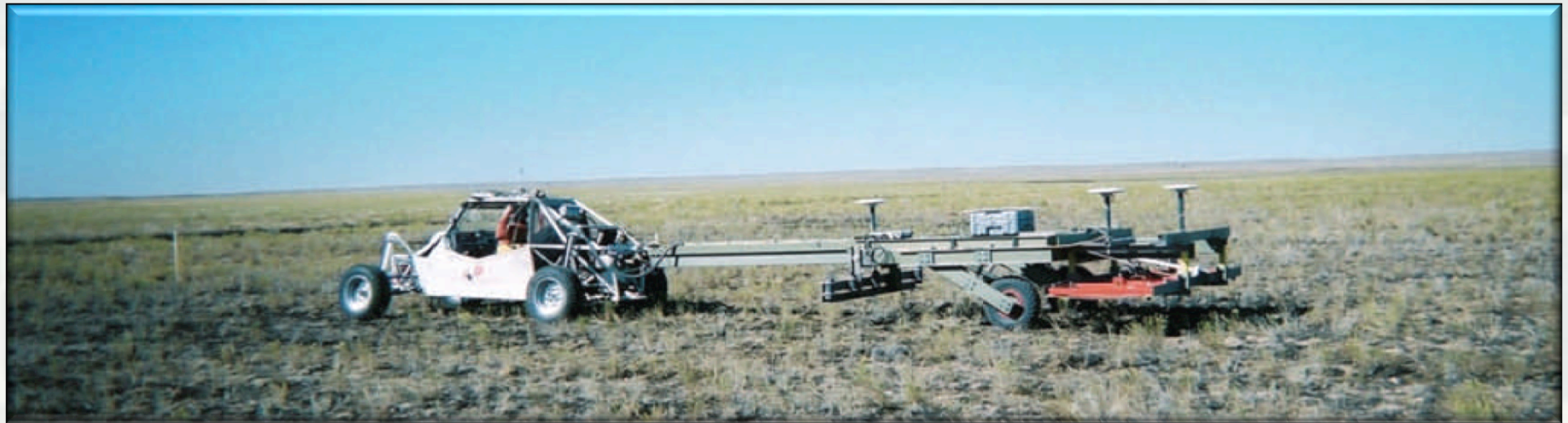
- 1992 Preliminary Assessment of Eligibility
- 1994 Archive Search Report
- 2007 Engineering Evaluation Cost Analysis (EE/CA)
 - ▶ Ground based geophysics over the N-2/NDA MRS
 - ▶ 2,260+ anomalies dug and no MEC recovered
 - ▶ Surface soil sampling for MC and metals (no elevated detections over NM SSLs)
- 2008 Environmental Technology Security Certification Program (ESTCP) Wide Area Assessment Program
 - ▶ Covered over 5,042 acres over N-2/NDA and other targets
 - ▶ LiDAR and Orthophotography
 - ▶ Helicopter based magnetometry
 - ▶ Towed ground based magnetometry
- 2009 RIFS (no proper exit strategy at the end of the RI)
 - ▶ Historical document reviews as well as historical and more current orthophotography reviews
 - ▶ Biased MC Sampling (No detections above NM SSLs)
 - ▶ 896 anomalies were prioritized in 3 categories; top 100 of priority 1 were selected for intrusive investigation
 - ▶ No MEC recovered



USACE Site Investigation History (Cont.)

- 2012 DD and PP
 - ▶ Built library for TOIs using museum pieces with the Metal Mapper team coordination at 2 Florida museums
 - ▶ Surface clearance of all metallic debris at N-2/NDA MRS; preparation for Metal Mapper
- 2013 Metal Mapper 10 Acre Calibration Study
 - ▶ IVS
 - ▶ Blind seeding efforts
 - ▶ EM-61 and MM implementation
- 2014 Implement Metal Mapper within entire MRS
 - ▶ Coming Soon





Data?

- Terabytes of data collected over the years using many methods and numerous technologies; so what have we done with it and what can we do?



Develop a Focused Approach

- Focus on the only area where HE ordnance was documented to be used and evidence of HE ordnance was discovered
- Develop an exit strategy/ TOI reduction
- Coordination with CABQ and planners



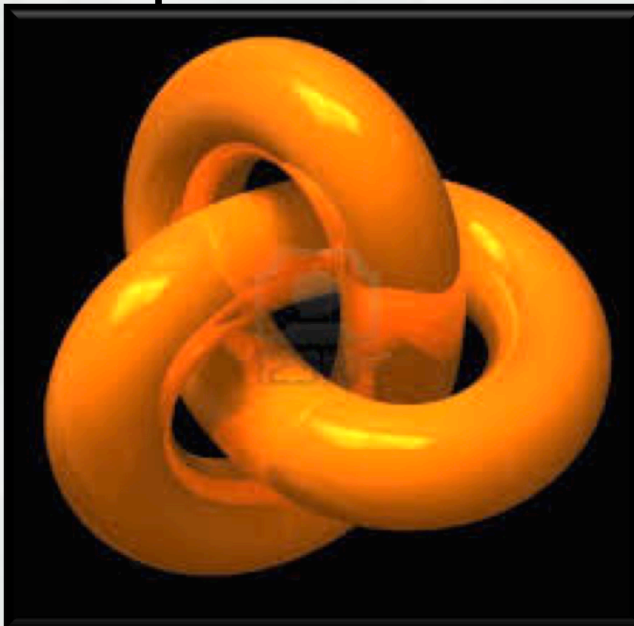
Pre DD Coordination with Regulators

- 100% DGM on all High Density Areas
- 100% DGM on Random Grids for Med and Low Density
- Idea of 10 Acre Calibration Study using Metal Mapper
 - ▶ Looking for all targets of interests
 - ▶ Depending upon results – Focus only on 100lb intact practice bombs and GP bombs



Decision Document Pitfalls

- More up front involvement in the RI stage with the EMCX and regulators, face to face or a webinar, in an effort to avoid the endless loop of comments and responses to comments



DQOs

Table 2-9
DQOs for MRS N-2/NDA

Statement of the Problem:

Determine if past DoD activities have resulted in the presence/absence of HE MC that may have impacted human health and environment.

Decision Questions	Decision Inputs	Resolution of Decision Questions
MRS boundaries for Former MRS N-2 and Former MRS NDA		
<p>Boundaries that existed for MRSs N-1, N-2, N-3, N-4, and NDA were based on old range maps presented in the ASR. To ensure the MRS boundaries and MRA boundary encompass areas of potential MEC and HE MC contamination, the TPP Team developed the following questions:</p> <ol style="list-style-type: none"> 1. What is the aerial extent of each MRS? 2. Do the current MRS and MRA boundaries adequately encompass the all areas where hazards from Historical PBR activities exist? 	<ul style="list-style-type: none"> • Soil samples were collected from SUs within the MRSs and analyzed for HE MC to determine the presence, and if present, the extent of HE MC contamination. • No HE MC contamination was detected above NMED residential SSLs or USEPA residential RSLs; therefore, MRS boundaries will be based solely on the presence of MD from practice bombs and fragments from HE bombs. • Helicopter magnetometer and ground-based geophysics data and dig results were used to statistically delineate MRS boundaries based on geophysical anomalies associated with practice bomb MD and HE bomb fragmentation. 	<p>Based on the evaluation of data from the EE/CA, WAA and this RI the answers to the decision questions are:</p> <ol style="list-style-type: none"> 1. The MRS boundaries and the MRA boundary are delineated based on presence of metallic anomalies associated with practice bomb MD and HE bomb fragmentation identified in the EE/CA, WAA, and this RI. 2. No, the previously delineated boundaries did not accurately encompass the area of potential hazard associated with MRS N-2/NDA. <p>There is adequate data to answer the decision questions, and to support the RIFVS.</p>
Is HE MC contamination present within Former MRS N-2 and Former MRS NDA		
<p>To ensure HE MC contamination associated with 100-lb HE bombs was not present at any of the MRS targets the TPP Team developed the following questions:</p> <ol style="list-style-type: none"> 1. Are HE MCs present at concentrations that may cause adverse effects to human health and the environment? <ol style="list-style-type: none"> 1a. Is there HE MC contamination present at the MRS target center areas resulting from PBR operations? 1b. Was there any aerial distribution of HE MC in areas immediately surrounding the target areas during PBR operations from low order detonations of 100-lb HE Bombs? 	<ul style="list-style-type: none"> • Historical background and current site information. This includes site-specific operational layouts and locations of current and past use areas and facilities. • Geophysical data from published sources, previous investigations, and field observations. • Analytical results from discrete surface soil samples collected at target centers. • CDRCs were identified as HE MC in surface soil. • Relevant residential risk-based soil screening levels are the NMED 2006 SSLs or EPA Residential RSLs for Chemical Contaminants at Superfund Sites (1991), if not contained in the NMED SSLs list. • Binned 0.25-acre IS SUs were placed in target centers or areas of high metallic debris concentrations, as indicated by geophysical data. • 2-acre SUs were distributed over MRS using a systematic-random statistical approach developed in VSP. • Surface soil was investigated to a depth of 0 to 4 in bgs. • Surface soil samples were collected in a designated grid pattern at the MRS. • Soil analytical results were compared to the most conservative or appropriate standard established for a particular analyte. 	<p>Based on the data collected during the EE/CA and this RI, the answer to the decision questions are:</p> <ol style="list-style-type: none"> 1. No HE MCs, attributable to former DoD activities, were detected at concentrations that may cause adverse effects to human health and the environment. 1a. No HE MC contamination was detected at the MRS target centers. 1b. No contamination was detected in soil samples from areas immediately surrounding the targets, where aerial distribution of HE MCs resulting from low order detonations of 100-lb HE bombs may have occurred. <p>There is adequate data to answer the decision questions and to support the RIFVS.</p>
Determine if 100-lb HE bombs are present in the vicinity of Former MRS NDA and potential overlap areas of Former MRS N-2		
<p>No intrusive investigations have been performed at the NDA Target. An intrusive investigation was designed to answer the following questions:</p> <ol style="list-style-type: none"> 1. Are 100-lb HE bombs present in subsurface soils in the vicinity of Former MRS NDA? 2. 100-lb bombs represent the greatest hazard within the MRA. Can the MRS boundary of Former MRS NDA be determined from existing data? 	<ul style="list-style-type: none"> • Anomalies from existing WAA geophysical data sets were intrusively investigated to determine the nature and extent of munitions contamination within the MRS N-2/NDA. • 100 geophysical anomalies with the highest likelihood of being a 100-lb bomb were excavated. • Solution of the 100 "most likely" anomalies was managed with Geosoft Oasis montaj software. • The results from anomaly excavation were used in combination with geophysical data and dig results from the WAA and EE/CA to statistically determine lateral extent of MRS N-2/NDA. 	<ol style="list-style-type: none"> 1. Undetermined - 236 geophysical anomalies were selected from a list of 896 and ranked in order of most to least likely to be a 100-lb bomb. The first 100 were excavated. Of the 100 anomalies excavated no intact 100-lb HE bombs were found. It is still undetermined if 100-lb HE bombs exist within the MRS. Multiple lines of evidence indicate the likelihood of encountering HE bomb MEC items at MRS N-2/NDA is considerably lower than originally thought. 2. Yes, fragmentation from HE bomb was observed only within the Former MRS NDA boundary. However, statistical evaluation of the RI intrusive investigation results and geophysical data collected for the EE/CA and WAA suggest there is potential overlap. Additionally, and U.S. Army technical papers indicate there is overlap between the two target areas (see Section-10).
Determine the impact of physical processes on transport of MEC		
<ol style="list-style-type: none"> 1. What is the impact of wind erosion on potential MEC at the West Mesa MRA? 2. What is the impact of water erosion on MEC on the eastern third of the West Mesa MRA? 3. What is the impact of frost heave on MEC on the West Mesa MRA? 	<ul style="list-style-type: none"> • Research was conducted on the topics of wind and water erosion, and frost heave in the West Mesa MRA. • Drainage patterns on the eastern slopes of the volcanoes in the eastern third of the MRA were evaluated. 	<ol style="list-style-type: none"> 1. There is a net increase of sediment deposition on the West Mesa. 2. West of the Volcanoes the West Mesa is relatively flat and water will not play a role in MEC transport. 3. Frost heave is an unlikely MD or MEC transport mechanism at MRS N-2/NDA.
Determine future land use within the MRA		
<p>Will land use within the MRA change in the foreseeable future?</p>	<ul style="list-style-type: none"> • Discussions were held with Albuquerque Planning department representatives along with review of the planning documents 	<p>Airport and commercial development is planned for the area in and around MRS N-2/NDA.</p>



DQOs

- Statement of the problem: Determine if past DoD activities have resulted in the presence/absence of MC and MEC that may impact human health and the environment
 - ▶ A. Define MRS boundaries
 - Soil sampling
 - WAA magnetometer (air and ground based)
 - Evaluation of all former investigation work, extents based on presence of metallic anomalies



DQOs (cont.)

- ▶ B. Is MC contamination present within MRS N-2/NDA
 - Use of historical sampling data
 - Biased 0.25 acre SUs over target centers
 - 2 acre SUs placed throughout MRS using VSP
 - All samples collected in 0-4 inch intervals
 - Results compared to most conservative and appropriate standard established for a particular analyte



DQOs (cont.)

- ▶ C. Determine if 100lb HE bombs present in vicinity of N-2/NDA
 - Use of historical data
 - Selection of top 100 anomalies expected to be 100lb HE bombs
- ▶ D. Determine impact of physical processes on potential transport of MEC
 - Impacts from wind erosion
 - Impacts from water erosion
 - Impacts from frost heave
 - Topography and climate data research show no frost heave; net increase of sediments; and area is too flat with little drainage patterns to suggest there is water role in MEC transportation



DQOs (cont.)

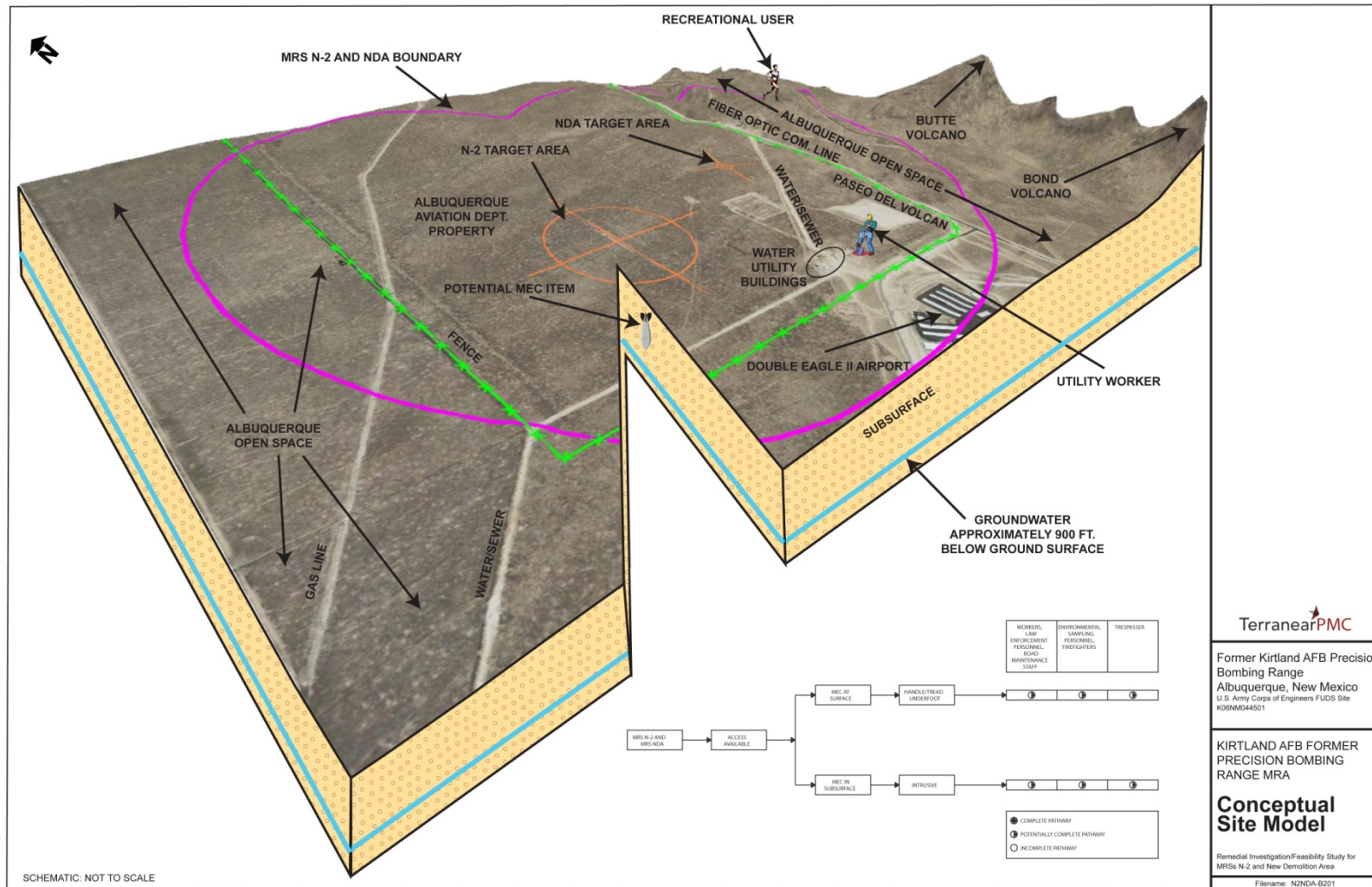
- ▶ E. Determine potential future land use within the MRA
 - Will current land use change in the foreseeable future
 - Discussions held with CABQ planning resulting in likelihood of airport expansions and commercial development in the area
 - Working with CABQ to institute LUCs into their 20yr master plan



RAOs

- Based on RI results, RAO focuses on MEC related explosive safety hazards associated with site TOIs
- Reduce the potential for receptors to come in direct contact with MEC items potentially remaining in MRS N-2/NDA



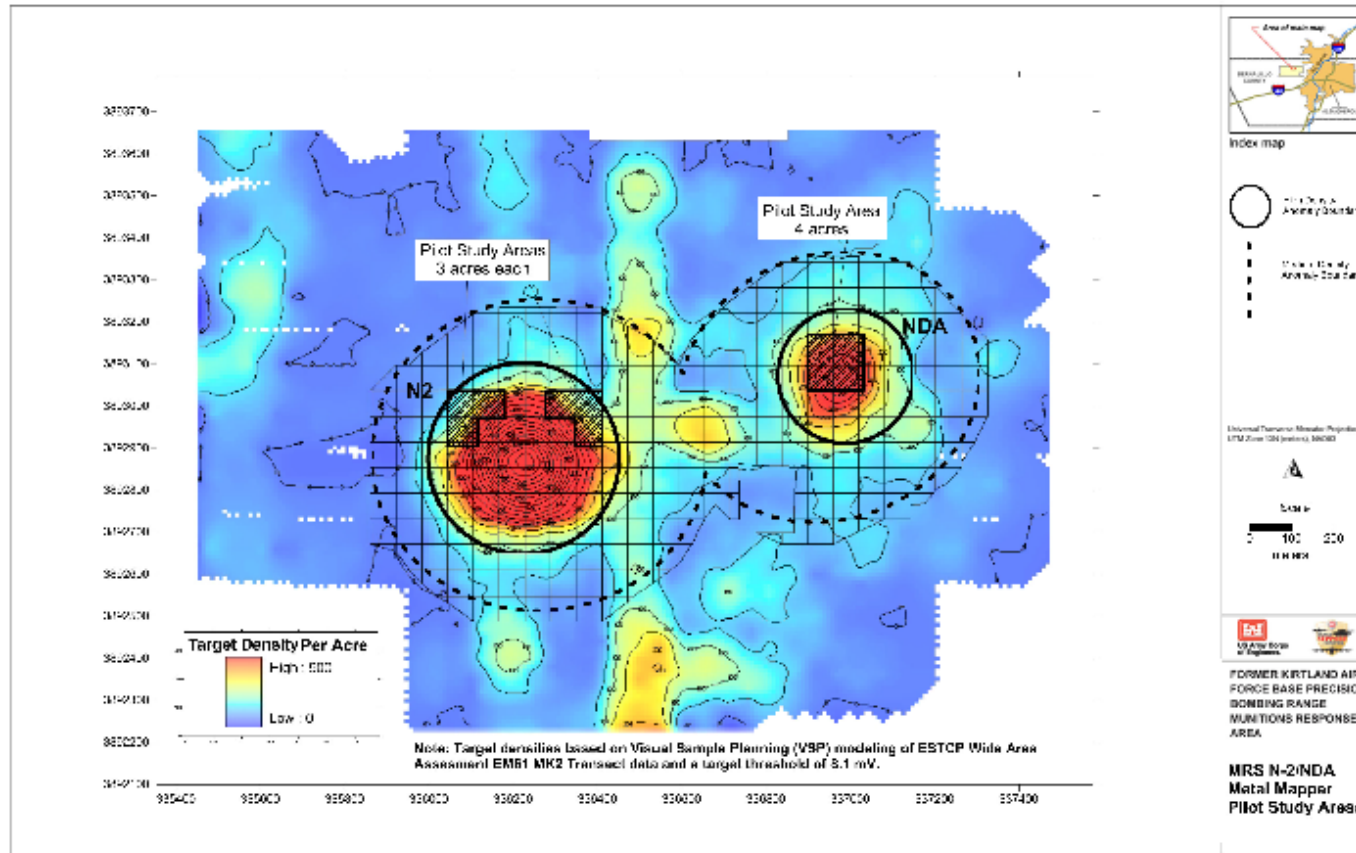


Current Site Description

- Anomaly density
- Break down of this MRS
- 10 acre calibration study



Figure 4
 Pilot Study Areas



TammarPMC, LLC
 Contract No.: W912PP-13-C-004

17

3/28/2013
 Final



Figure A-11 MRS N-2/NDA Anomaly Densities

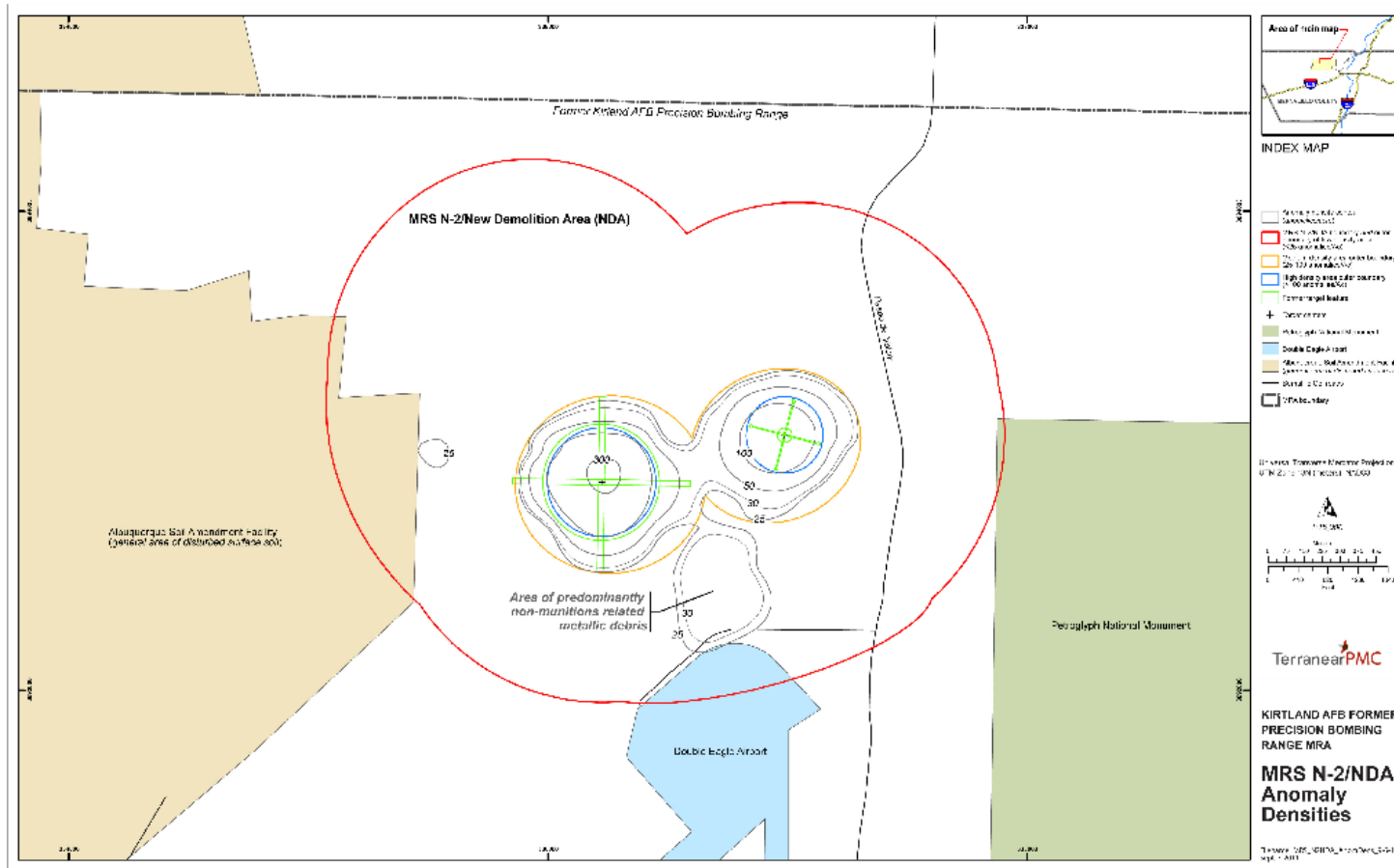
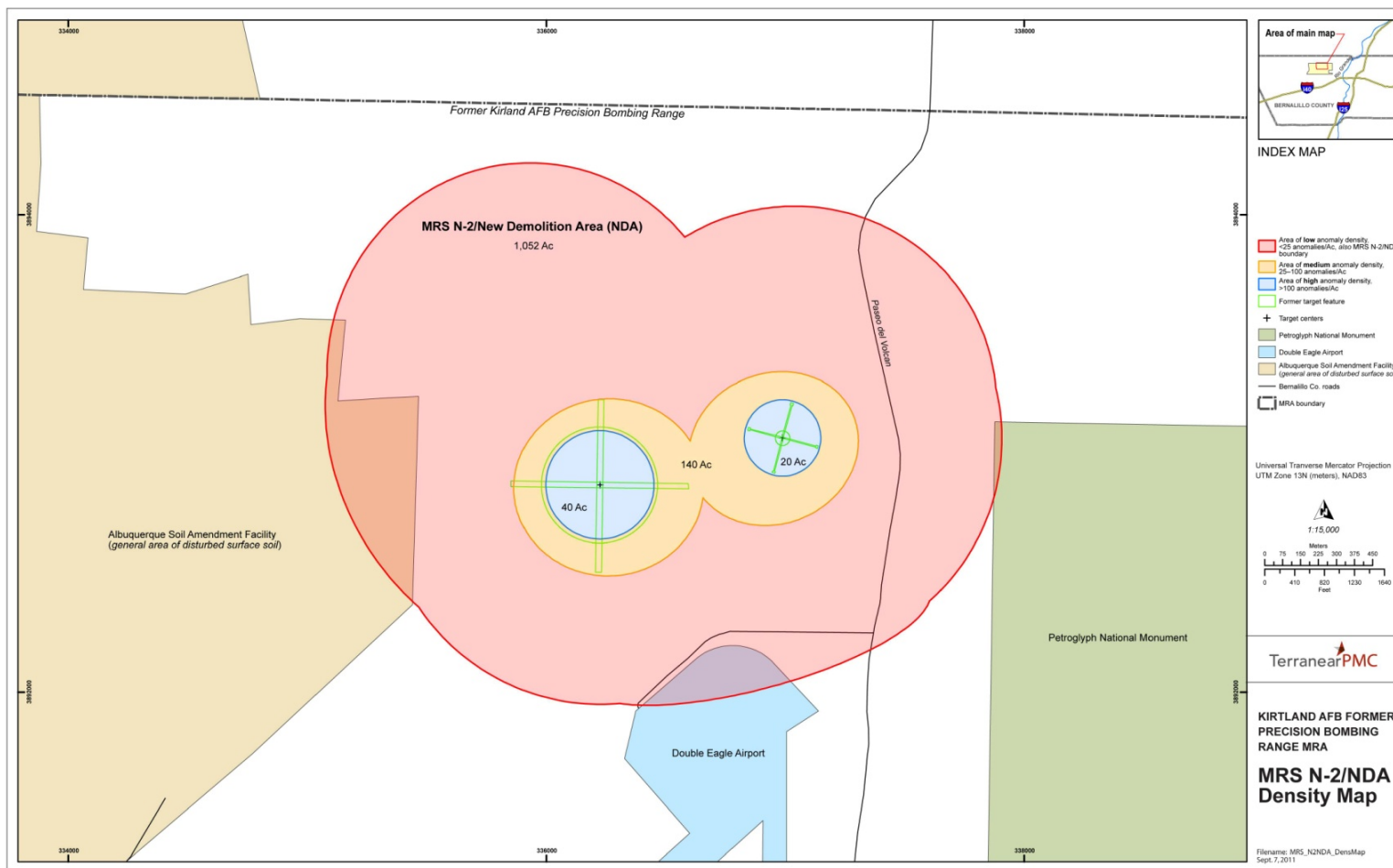


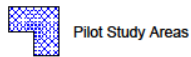
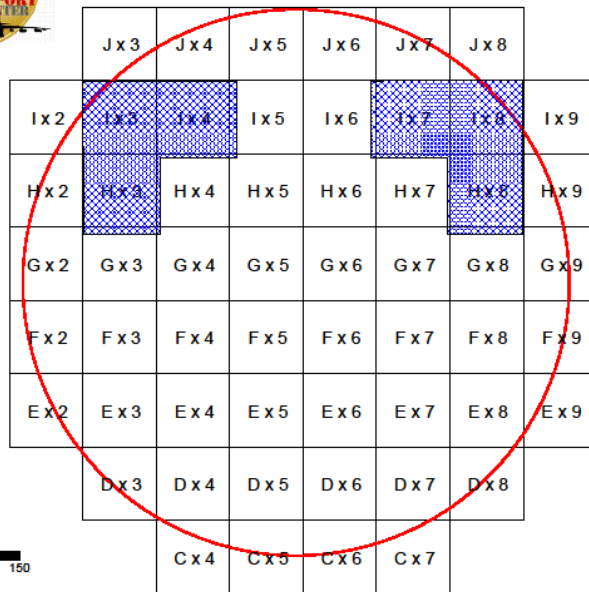
Figure A-12 MRS N-2/NDA Density Map



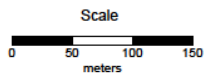


N-2 High Density Area

Grid Index Map

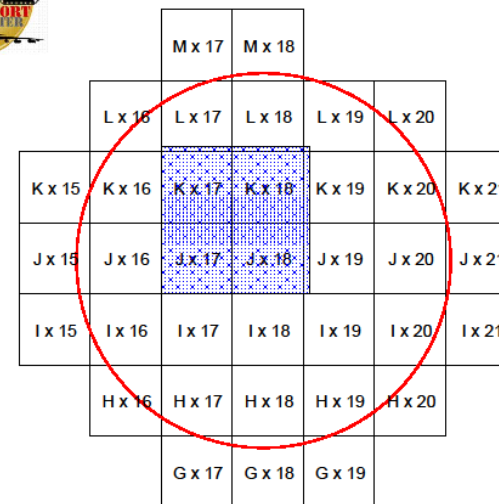


Pilot Study Areas

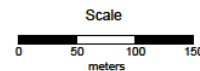


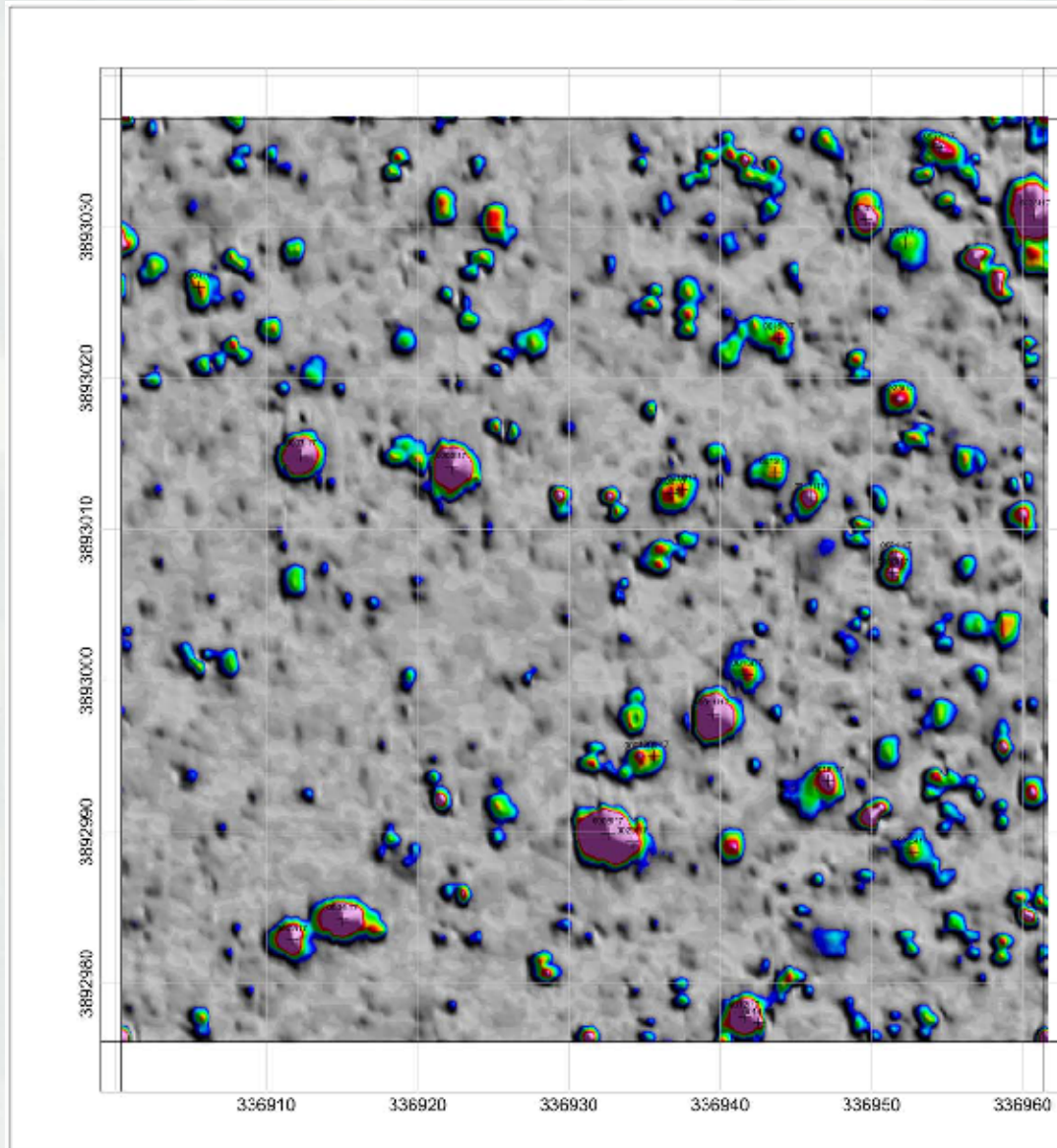
NDA High Density Area

Grid Index Map



Pilot Study Areas





MAP NDA Grid I17

LEGEND

Target Location and Identifier



Client: USACE Albuquerque	
Project: N-2/NDA RDIRA Project	
Contractor: Terracon/PMC	
Created by: E. Atkins	Verified by: L. Brode
Date: 2014/10/09	File: NDA_I17
Page number: 1	Approved: J. Leberfinger



10 Acre Calibration Study

- Why did we do this study?
- When should this study have been done?
- What was revealed about geology, depth of penetration and depth of detection?
- What was found in this this study?





Could This Be All?



10 Acre Calibration Study Results

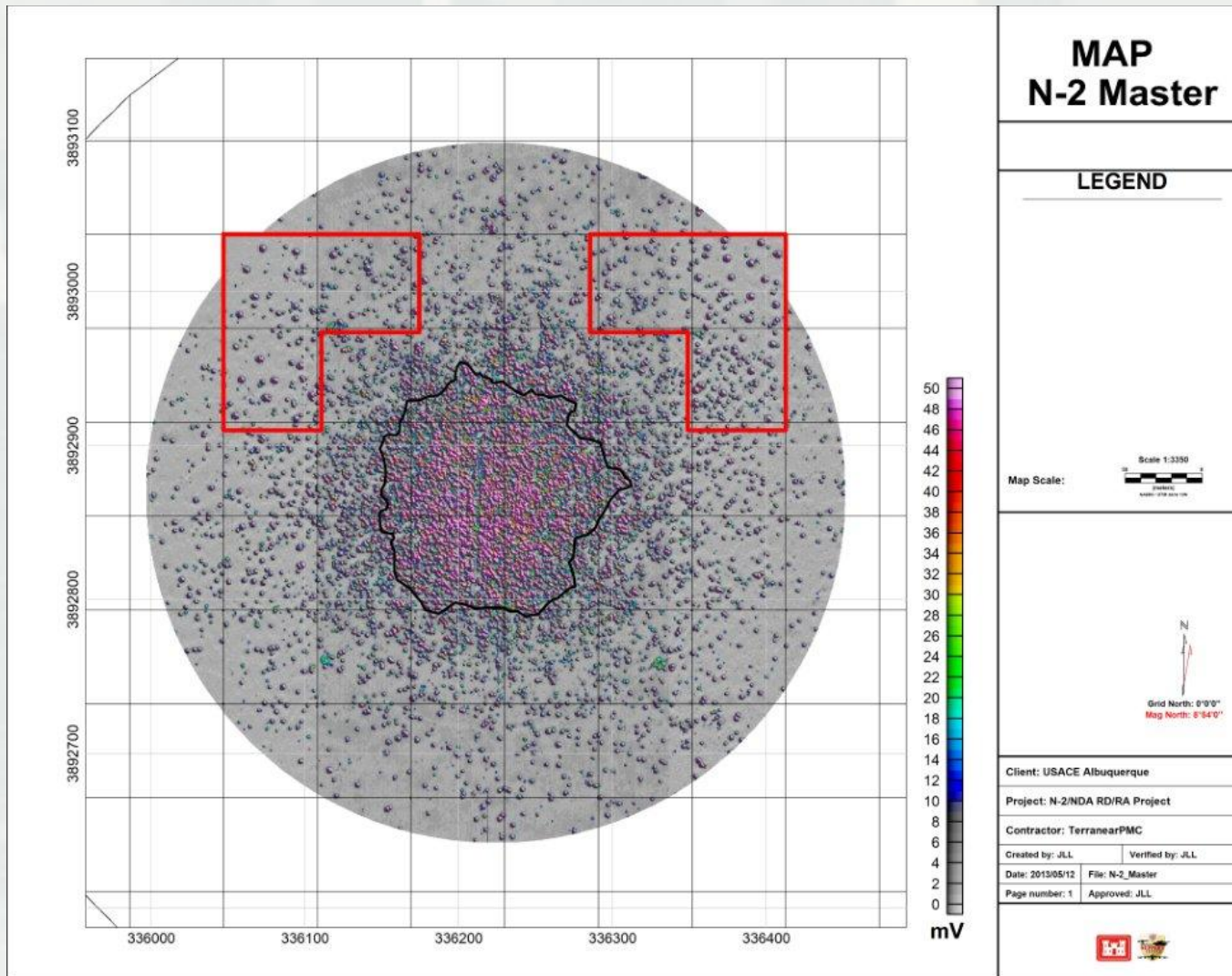
- 2013 1,600+ anomalies were detected in the grids at N-2/NDA
 - ▶ 28 of the 1,600 anomalies were classified as 100 lb general purpose bombs
 - ▶ All 1,600 anomalies were dug and cataloged
 - ▶ Discovered a total of 4 live unexploded 100 lb general purpose bombs at NDA



BIP Video



Dynamic Mode Metal Mapper??????



Project Website

Project documents, meeting schedules, meeting minutes, maps, and other information is available on the West Mesa Project Website:

<http://westmesaproject.com/>



SAFETY REMINDER



Remember the 3Rs of Military Munitions Safety:

Recognize:

you may have encountered a munitions item.

Retreat:

from munitions item. Do not touch or disturb it; instead move away carefully, walking out the same way you entered the area. Do not use two-way radios or cell phones within 100 feet of the item.

Report:

what you saw and where you saw it by calling 911.



Questions



Where could the next one be?



