



Air Force Civil Engineer Center

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# Semi-Annual Public Meeting



**Scott Clark**  
**Restoration Program**  
**Manager**  
**15 April 21**

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*Battle Ready ... Built Right!*



# Air Force Civil Engineer Center

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## **New Mexico – Arizona PBR**



**Steve Geiger, P.E., PhD  
AECOM Technical  
Services (URS Corp.)  
15 April 21**



# Semi-Annual Public Meeting

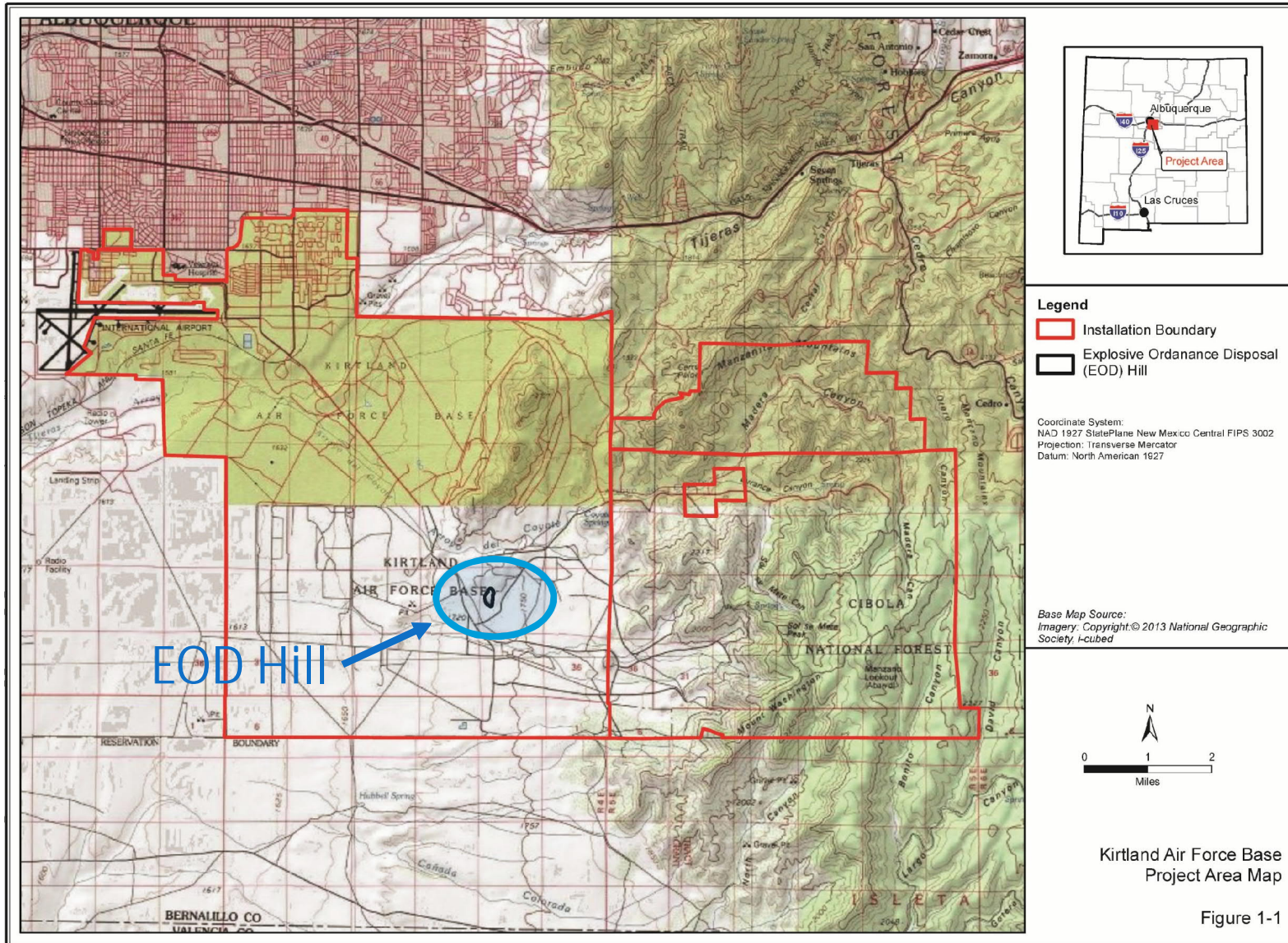


## Outline

- **Explosive Ordnance Disposal (EOD) Hill (CG-570) – Perchlorate Groundwater Contamination**
- **Manzano Base Groundwater (MBG) Site (CG-105)**
- **Oil/Water Separator, Bldgs. 481/482, ST-070E (SWMU ST-219)**



# Explosive Ordnance Disposal (EOD) Hill (CG-570)





# EOD Hill (CG-570)



## *Site Background*

- CG-570 is located on a 50 ft high limestone ridge approximately 1 mile west of Kirtland AFB's EOD Range
- The CG-570 well (also referred to as the EOD-borehole, or EOD-BH) a 214 ft borehole was installed by Sandia National Laboratory (SNL) in the early 1970s in support of down-hole geophysical measurements
- Additional small blast craters or mining prospect test pits (c1940s) present at CG-570
- There are no structures present at Site CG-570
- Perchlorate initially detected in groundwater sample from EOD-BH in 2001



# EOD Hill (CG-570)



## *Investigation History*

- Historical groundwater samples evaluated for Volatile Organic Compounds (VOCs), metals, radionuclides, cyanide, phenols, herbicides and pesticides, and general anion/alkalinity chemistry
- Perchlorate ( $\text{ClO}_4^-$ ) was established as the only Contaminant of Concern in groundwater
- Perchlorate is an oxidizing agent, primarily used in propellants for rockets or fireworks
- Colorless solid that is soluble in water
- Naturally occurring from certain geological source materials
- Source of perchlorate in groundwater from EOD-BH is uncertain



## EOD Hill (CG-570)



### *Sampling History - Groundwater*

- Ten groundwater samples collected (SNL, KAFB, and/or DOE) and analyzed for perchlorate between 2001 and 2011
- Results varied from Non Detect (at 0.94  $\mu\text{g/L}$  detection limit) in 2001 to 4,300  $\mu\text{g/L}$  in 2004, with a value of 22  $\mu\text{g/L}$  in 2011
- There is no established EPA MCL. Listed as a NMWQCC toxic pollutant.
- 2006 - EPA established a Drinking Water Exposure Limit of 24.5  $\mu\text{g/L}$
- 2008 - EPA updated with an Interim Drinking Water Health Advisory level of 15  $\mu\text{g/L}$
- 2012 - NMED published Tap Water screening value of 25.6  $\mu\text{g/L}$
- 2014 - NMED updated Tap Water screening value to 13.8  $\mu\text{g/L}$ , which remains the current value



# EOD Hill (CG-570)



## *Sampling History – Soils*

- Surficial soil samples collected (1 composite from each crater) from low points within each crater (12 samples total)
- Samples analyzed in approved laboratory for perchlorate and high explosives (nitroaromatics)
- Maximum detected perchlorate concentration was 4.43  $\mu\text{g}/\text{kg}$  (compared to NMED residential soil screening level of 54,800  $\mu\text{g}/\text{kg}$ )
- No other analytes were detected in the soil samples

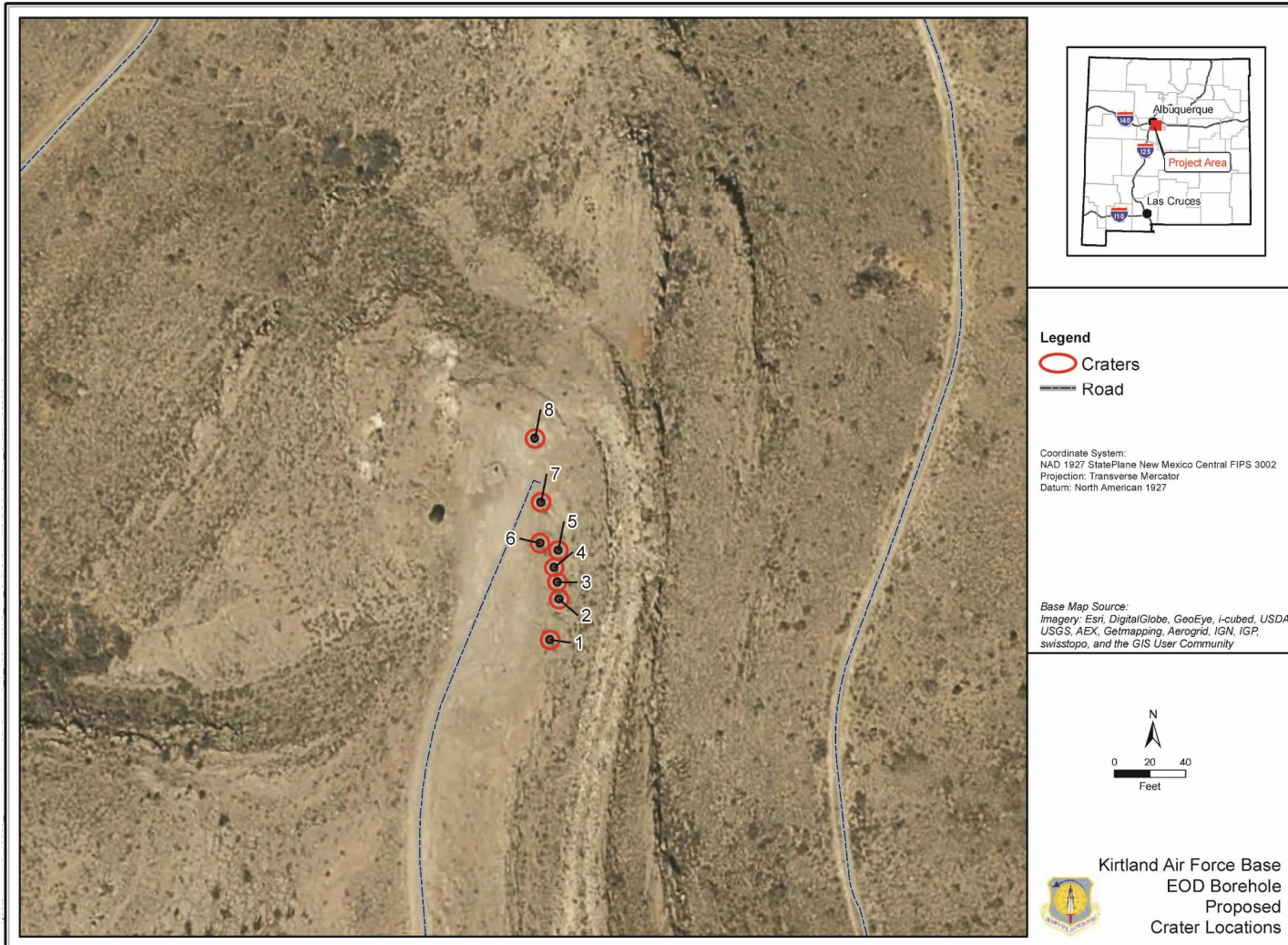




# EOD Hill (CG-570)



## Soil Sampling, 2016





## EOD Hill (CG-570)



### *Groundwater – Extended Purge Sampling (Dec 2014, Dec 2016)*

- Samples collected during purge cycles of borehole volumes
- Dec 2014 perchlorate declined from 27.4  $\mu\text{g/L}$  (initial sample) to 7.7  $\mu\text{g/L}$  after 8 borehole volumes purged
- Dec 2016 perchlorate levels were below the NMED screening value (13.8  $\mu\text{g/L}$ ) for all samples, ranging from 7.0 (initial sample) to 8.7  $\mu\text{g/L}$  in sample after 6 borehole volumes were purged



## EOD Hill (CG-570)



### *Final RCRA Facility Investigation (RFI) Report— September 2017*

- Reported that all soil concentrations were below NMED Residential Soil Screening Levels
- Reported on historical perchlorate concentrations and 'extended purge' testing results in 2014 through 2016
- Based on sampling results, formation groundwater is well below NMED Tap Water screening levels (13.8 µg/L) and EPA's 2008 Interim Drinking Water Health Advisory Level (15 µg/L)



# EOD Hill (CG-570)



## *Path Forward*

- Recommendation for Corrective Action Complete (CAC) approved by NMED, December 2017
- NMED approved discontinuation of groundwater sampling and that the borehole be plugged and abandoned for Site closure
- EOD Hill Borehole plugging/abandonment conducted in May 2019
- Kirtland AFB developing a Class 3 Permit Modification Request (PMR) to move Site CG-570 to Table K-1 "Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) for which Corrective Action is Complete Without Controls (Granted No Further Action Status)" of the Kirtland AFB RCRA Permit—Submittal of PMR to NMED planned for summer 2021 (to be combined with CG-105)
- The Class 3 Permit Modification will require an additional public meeting





# Manzano Base Groundwater (CG-105)



## *Site Background*

- CG-105 (Site) is located in the south-central portion of Kirtland AFB in the foothills of the Manzano Mountains at the Central Training Academy
- The Site was formerly part of the ST-105 TCE and Nitrate Contaminated Groundwater Site, listed in the original (1990) permit as a “Non-RCRA Unit”
- Kirtland AFB petitioned for NFA for SWMU 6-29 (Manzano Landfill [LF-20]) in 2004. NMED approved the NFA petition but required further evaluation of trichloroethylene (TCE) detected (below standards) in groundwater.
- Groundwater sampling initiated in 2006 Voluntary Corrective Measure Sampling Plan
- The Site is listed in the current (2010) RCRA Permit under “Section 6.4.1.3 Areas with Groundwater Contamination” as the “Manzano Base Groundwater – TCE”



# Manzano Base Groundwater (CG-105)

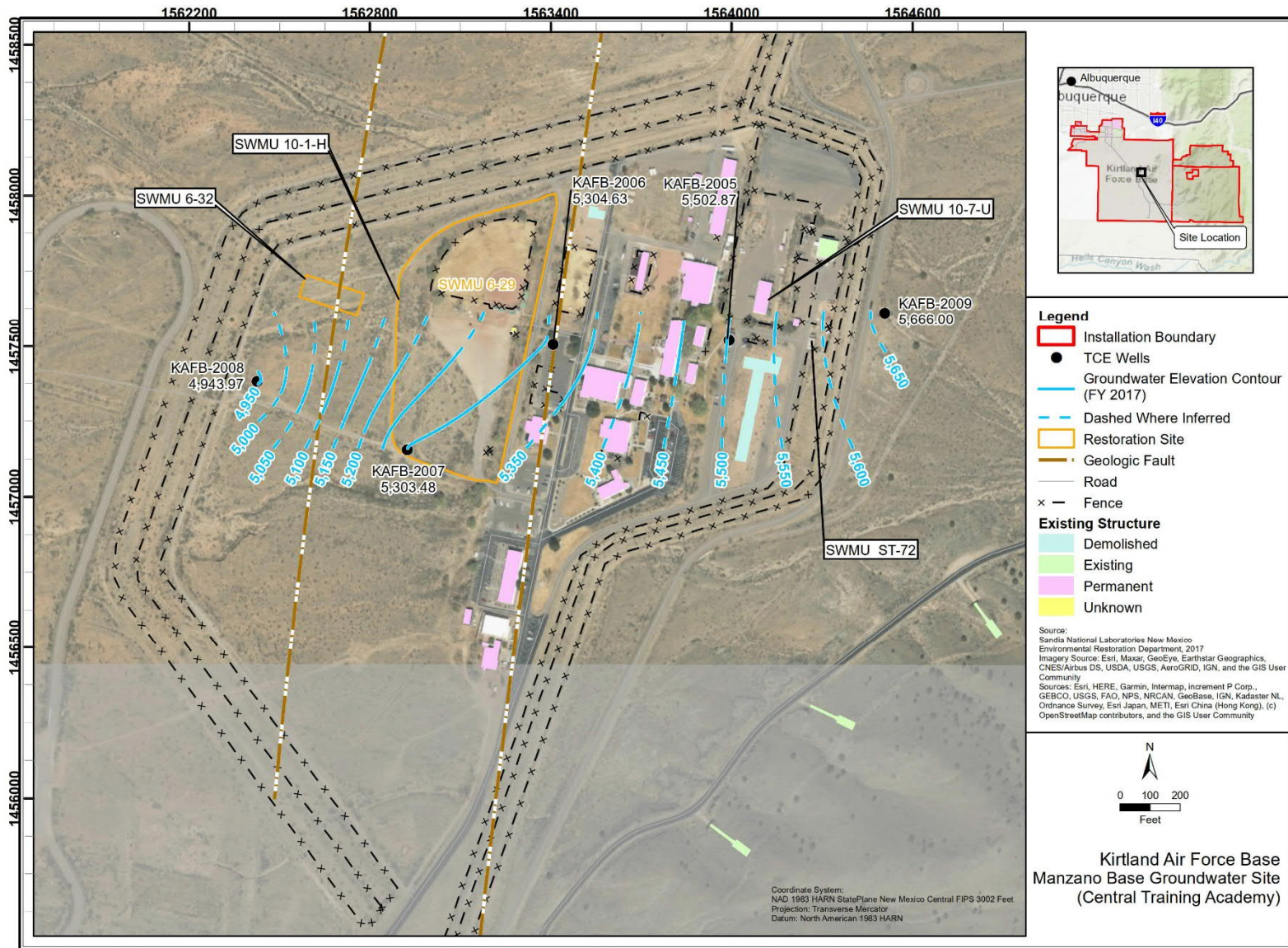


## *Site Background (cont.)*

- The Central Training Academy included five other SWMUs/AOCs (all were approved for CAC without Controls [Table K-1]):
  - SWMU ST-72 (Manzano Garage Oil/Water Separator),
  - SWMU 6-29 (Manzano Landfill-20),
  - SWMU 6-32 (former Manzano Fire Training Area [FT-14]),
  - SWMU 10-1-H (Manzano Sanitary Sewer [ST-327]), and
  - SWMU 10-7-U (Building 30142, Oil Water Separator [ST-264]) areas
- Groundwater occurs largely in fractured bedrock with a steep gradient across the site (flowing east to west)
- Five groundwater monitoring wells associated with the Site
- Depth to groundwater varies greatly at the Site: 74 feet in the eastern side to 597 feet on the western side
- There are no water supply wells located in the area



# Manzano Base Groundwater (CG-105)



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# Manzano Base Groundwater (CG-105)



## *Investigation History*

- Groundwater sampling at the Site included analysis for VOCs, anions and field parameters since 2006 (wells KAFB-2008 and -2009 installed in 2010)
- Source of TCE in groundwater likely originated from SWMU ST-72 (former garage oil-water separator)
- VOCs were present in soils at SWMU ST-72 and also detected in monitoring wells
- Contaminated soil at SWMU ST-72 was excavated during a 1999 Interim Corrective Measure, removing the source for future groundwater contamination



# Manzano Base Groundwater (CG-105)



## *Sampling History - Groundwater*

- TCE has been detected in three of the five monitoring wells (KAFB-2005, -2006, and -2007)
- NMWQCC standard and MCL for TCE is 5 µg/L
- Well KAFB-2005 has always been non-detect or low detections (below 1 µg/L)
- Well KAFB-2006 has been non-detect for TCE since 2012. Highest detected value was 1.3 µg/L in 2006
- Well KAFB-2007 has had TCE concentrations ranging from 2.5 µg/L to 1.7 µg/L. The most recent sample in 2017 had the lowest TCE concentration (1.7 µg/L) since sampling began in 2006
- Wells KAFB-2008 and -2009 installed in 2010. All results have been non-detect for TCE from both wells.



# Manzano Base Groundwater (CG-105)



## *Final ST-105 Fiscal Year 2017 Trichloroethylene Impacted Groundwater Monitoring Report (July 2017)*

- TCE was not detected in any wells at concentrations above NMWQCC standards or EPA MCLs since 2004 when NMED requested additional investigation of TCE in groundwater
- Recommended that groundwater monitoring of the MBG wells be discontinued and the Site be considered Corrective Action Complete without Controls, and moved to Permit Table K-1
- NMED issued letter (3 Nov 2017) approving the LTM report and discontinuation of groundwater monitoring



# Manzano Base Groundwater (CG-105)

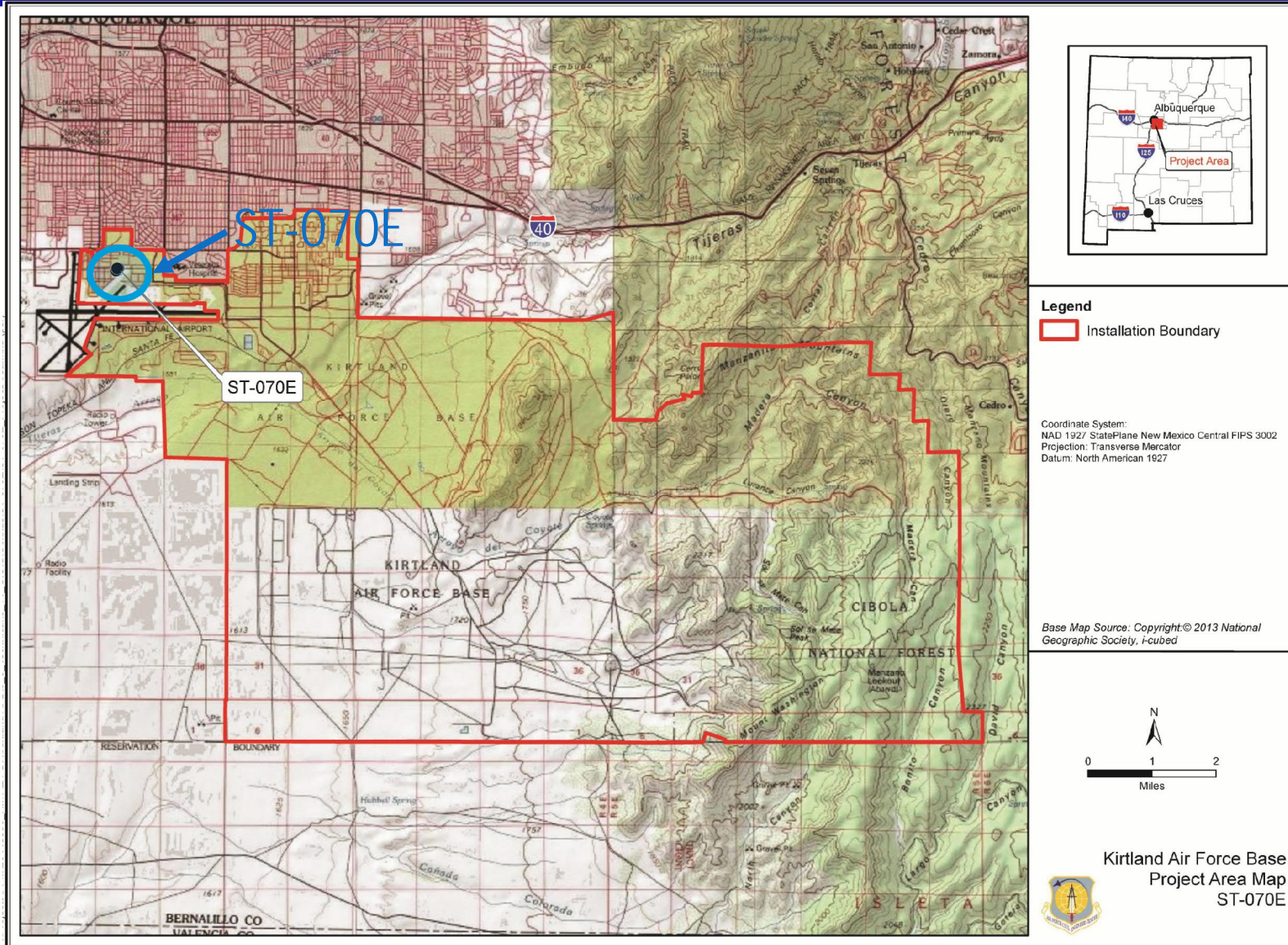


## *Path Forward*

- A Corrective Action Completion Proposal (CAC-P) is currently being developed for sites CG-105 and CG-570
- The CAC-P is currently under USAF review
- Once submitted to NMED (estimated summer 2021) the CAC process will be followed, including a public meeting and public comment period
- Following the Class 3 Permit Modification, the five monitoring wells will be plugged and abandoned



# Oil/Water Separator, ST-070E





# Oil/Water Separator, ST-070E



## *Site Background*

- Area used for aircraft movement and parking around hangar buildings 481 & 482
- Potential historic releases of fuels, lubricants and degreasers
- Former Oil Water Separator (OWS) identified as a contaminant release site based on inspections and sampling in 1990 & 1992
- Several RCRA Facility Investigation (RFI) phases conducted between 1993 & 1999
- 39 soil borings were advanced and sampled up to 150 feet depth below surface
- 7 soil vapor monitoring wells were installed



# Oil/Water Separator, ST-070E



## *Site Background (cont.)*

- Investigations determined that petroleum hydrocarbon contamination (Avgas, jet fuel, diesel and gasoline and limited mineral spirits and chlorinated solvents) impacted soils below the former OWS and drainage sump
- Groundwater characterization began in 2001 with installation of monitoring well KAFB-7001, a 480 ft deep well screened in the regional aquifer
- To date, no site-related contaminants have exceeded regulatory standards in well KAFB-7001, although trichloroethylene (TCE) has been detected at trace levels



# Oil/Water Separator, ST-070E



## *Remediation History*

- Bioventing was conducted between 1999 and 2001
  - Active subsurface ventilation with humidified air through a vapor well and extraction well
  - Soil samples collected to confirm presence of hydrocarbon degrading bacteria
  - Lower than anticipated degradation rates were achieved
- Soil Vapor Extraction (SVE) Pilot Tests conducted in 2003
  - Results of pilot testing indicated SVE would be an effective alternative for remediation of TPH and chlorinated solvents
  - Between 2007 and 2008 the SVE pilot-scale system was expanded to full-scale system by converting two vapor monitoring wells to SVE wells





# Oil/Water Separator, ST-070E



## *Remediation History (cont.)*

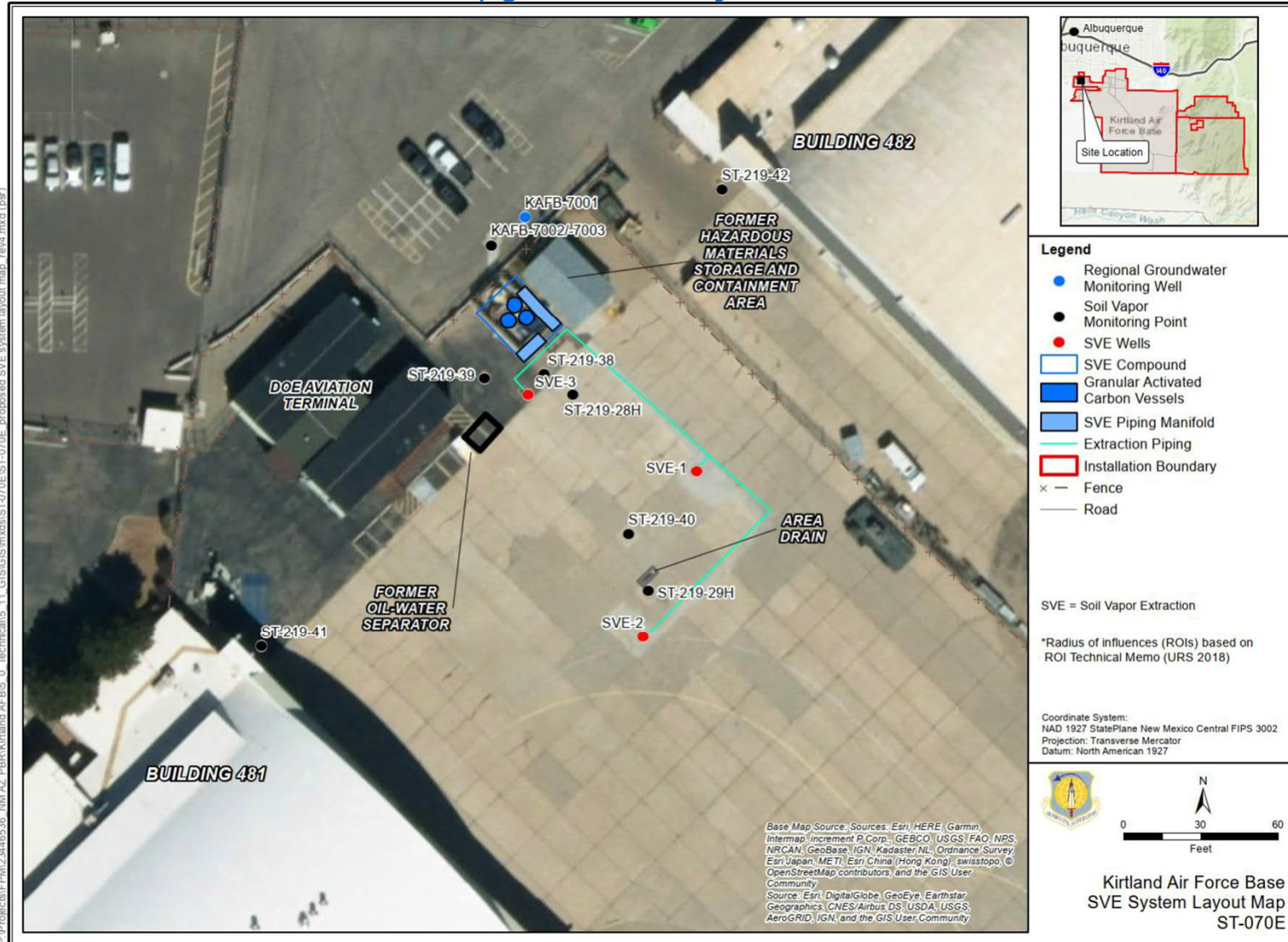
- SVE full scale system operation 2008—2016
  - The SVE treatment system was upgraded in 2008
  - Rebound study conducted in 2011 indicated that three month shutdowns would help operational efficiency
  - Full operation between June 2014 and June 2016
  - System operated at an air extraction rate of 80 to 85 standard cubic feet per minute (scfm)
- **Upgraded SVE System – Three New SVE Extraction Wells**
  - SVE-1 (nested well screens at 7-12 ft; 16-26 ft; and 31-36 ft)
  - SVE-2 (single well screen at 32-42 ft)
  - SVE-3 (nested well screens at 35-50 ft; 94-104 ft; 132-142 ft)



# Oil/Water Separator, ST-070E



## Upgraded SVE System



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# Oil/Water Separator, ST-070E



## *Remediation History (cont.)*

- New SVE Treatment System:
  - 20 HP SVE blower up to 250 scfm operating at vacuum of 90 inches of water column
  - Two 3,000 lb vapor phase granular activated carbon (GAC) treatment vessels with a third alternate on site for change-outs
- Mass Removal Since SVE Upgrade Restart (March 2018 - May 2019)
  - TPH (gasoline range) – 9,760 lbs
  - Tetrachloroethylene (PCE) – 5.2 lbs
  - Trichloroethylene (TCE) – 15.3 lbs
  - Benzene - 0.002 lbs



# Oil/Water Separator, ST-070E



## *Path Forward*

- Awaiting installation of two new groundwater monitoring wells
- Work plan was submitted to NMED – January 2021
- Work plan was approved by NMED (approval letter – March 12, 2021)
- Monitoring well installations – April/May 2021 (estimated)
- Minimum 2 years quarterly sampling (June 2021 – June 2023)
- Re-evaluation of site based on groundwater sampling results



# Questions



## Questions?

