Remedial Action Plan

DuPont Brevard Site

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Executive Summary

This Remedial Action Plan (RAP) presents a plan for completing the final remedial actions at the E.I. du Pont de Nemours and Company (DuPont) Brevard site (site). At this site, DuPont produced high purity silicon from 1957 to 1962, and DuPont and subsequent property owners produced X-ray films from 1962 to 2002. DuPont and other property owners have been investigating and remediating the site since the 1980s under the Resource Conservation Recovery Act (RCRA) Corrective Action Program, with oversight by the North Carolina Department of Environmental Quality (NCDEQ). Approximately 1,100 remedial investigation samples have been collected at the site, and DuPont submitted the Remedial Investigation Report (RIR) to NCDEQ in 2015, which marked the completion of the site's investigation phase (Parsons 2015b). A number of remedial actions were completed during the investigation phase. Key completed remedial actions included demolition and removal activities of the former plant, removal and recycling/relocation of X-ray film waste, installation of cap/covers over former landfills/disposal areas and similar areas, and installation of a groundwater treatment system for the DuPont State Recreational Forest (DSRF) Visitor Center water supply well.

In order to accelerate the cleanup process in North Carolina, the General Assembly of North Carolina passed a law referred to as the Risk Bill, which allows risk-based remediation based on the submittal of an RIR and RAP to the NCDEQ. Specifically, the purpose of the Risk Bill is "to authorize the Department to approve the remediation of contaminated sites based on site-specific remediation standards in circumstances where site-specific remediation standards are adequate to protect public health, safety, and welfare and the environment and are consistent with protection of current and anticipated future use of groundwater and surface water affected or potentially affected by the contamination." This RAP was prepared in accordance with the Risk Bill. The purpose of this RAP is to identify site-specific remediation standards, propose and justify remedial actions that comply with the remediation standards, and describe the implementation of the remedial actions in accordance with the Risk Bill.

To put the property back into productive use, site-specific remediation standards (i.e., remediation levels and points of compliance) were developed based on the current and planned future land use for the site. Although current use of the site is minimal, future land use will change once DuPont transfers the entire site to the State of North Carolina (State) in the near future. The State's planned future land uses for the site include DSRF recreational and administrative uses, and North Carolina National Guard (NCNG) low impact military training and administrative uses. Based on the current and planned future land use, the remedial action objectives (RAOs) for the RAP are to protect public health, safety, and welfare and the environment by:

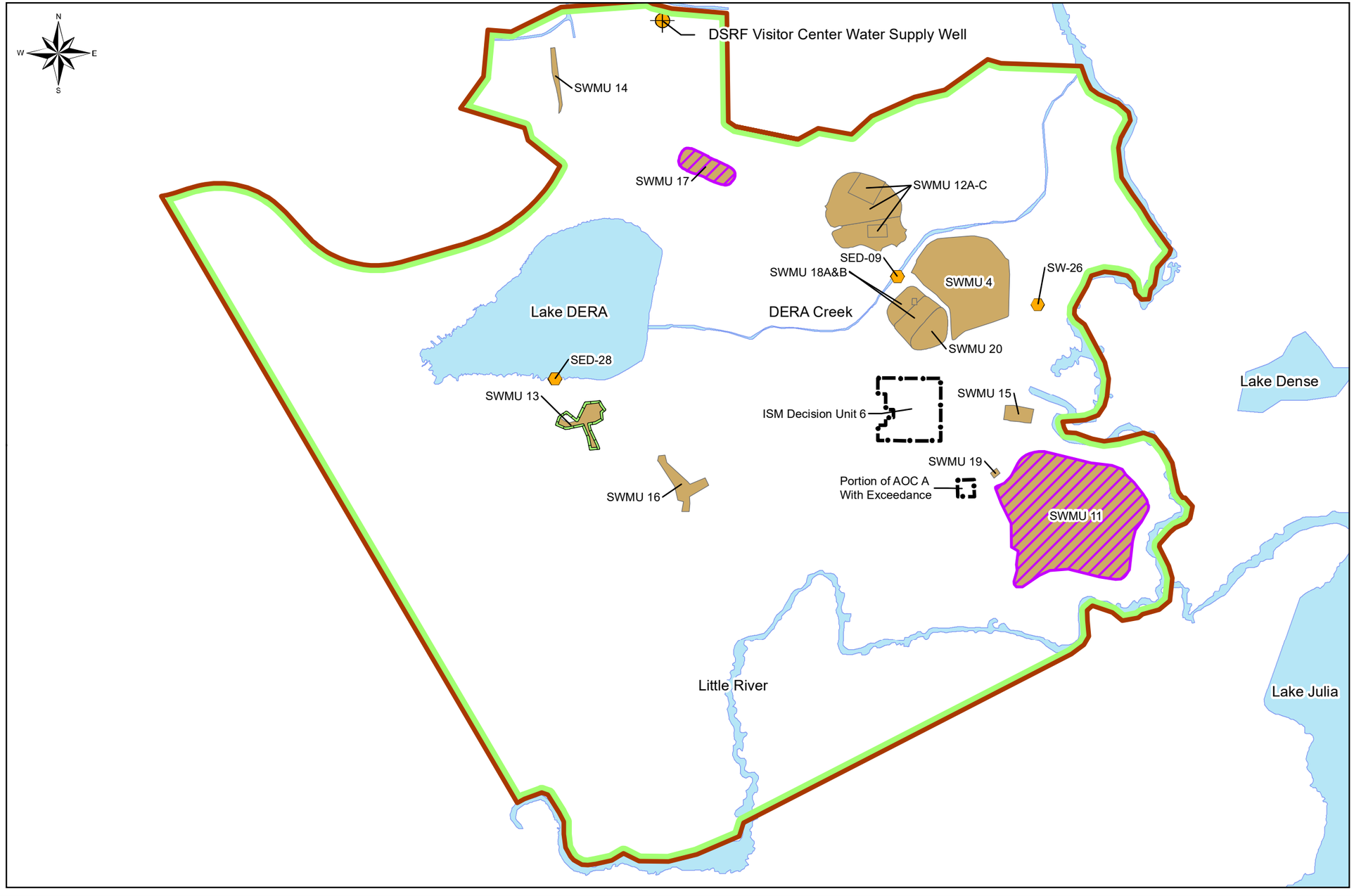
- Completing the existing DuPont remedial action commitments;
- Eliminating unacceptable exposures associated with site-specific remediation standard exceedances; and
- Implementing institutional controls/engineering controls (ICs/ECs) to further ensure potential exposures do not occur.

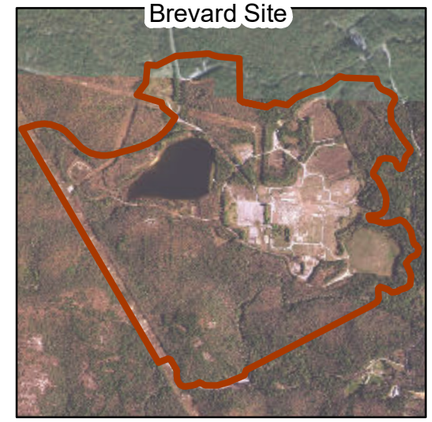
Few exceedances of the site-specific remediation standards remain at the site. Thus, minimal additional remedial actions (e.g., long-term operation and maintenance [O&M] activities and long-term ICs/ECs) are needed in order to protect public health, safety, and welfare and the environment. As a result, the following remedial actions are proposed to satisfy the RAOs (see Figure ES-1):

- Perform active remediation at Solid Waste Management Unit (SWMU) 11 and SWMU 17:
  - Design and install a vegetative cap for final closure of SWMU 11.
  - Design and perform in-situ solidification/stabilization (S/S) for soil and waste within SWMU 17.
- Perform O&M activities for cap/covers at SWMUs 4, 11, 12A-C, 13, 16, 17, 18A&B, and 20 (e.g., annual inspections of the cap/covers and repair/replacement of the cap/covers as necessary).
- Perform O&M activities for the treatment system at the DSRF Visitor Center water supply well (e.g., periodic repair/replacement of the treatment system, sampling of groundwater).
- Install and maintain access-control fencing around two areas referred to as Incremental Sampling Methodology (ISM) Decision Unit 6 and a portion of Area of Concern (AOC) A.
- Install wooden bollards and/or other physical deterrents/barriers at SWMU 13 as an extra precaution to prohibit vehicles from disturbing the existing cover.
- Implement long-term ICs/ECs for future excavation activities, future land use, future groundwater use, and future building construction.
- Install and sample a shallow groundwater monitoring well in the Surficial Aquifer between SWMU 17 and the DSRF Visitor Center. The analytical results from this well will be included as an additional line of evidence for the evaluation of the potential for vapor intrusion at the DSRF Visitor Center.
- Collect additional sediment and surface water samples from Lake DERA, DERA Creek, and the SW-26 seep to evaluate whether or not further action is needed for polycyclic aromatic hydrocarbons.

The proposed remedial actions listed above are recommended as the final site remedy because they adequately address short- and long-term risks, they reduce the toxicity, mobility, and/or volume of constituents and waste material, they will be effective over the short- and long-term, and they are easy to implement.

This RAP includes details about how the proposed remedial actions will be implemented. A key long-term component of implementation will be placing a deed restriction on the site to ensure the required O&M activities and ICs/ECs are implemented and maintained over the long-term and the site remains protective of public health, safety, and welfare and the environment. The DuPont-owned property will be transferred to the State concurrent with RAP implementation. Thus, a Property Control Plan is being developed to establish specific procedures for the State's long-term implementation of the required O&M activities and ICs/ECs. The Property Control Plan is consistent with the State's planned use for the site and is being prepared in collaboration with the State.





Legend

- Site Boundary
- Lake or Stream

Remedial Actions

- Planned Active Remedial Action
- Perform O&M of Cap/Covers
- Perform O&M of the Groundwater Treatment System
- Install and Maintain Access-Control Fencing
- Install Physical Deterrent/Barrier to Prohibit Vehicle Access
- Implement Long-term ICs/ECs
- Areas Where Additional Sediment and Surface Water Samples will be Collected to Evaluate Whether or Not Remedial Action is Needed

0 250 500 1,000 1,500 Feet

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Summary of the Remedial Actions
Remedial Action Plan
Brevard Site
Cedar Mountain, North Carolina

Figure ES-1

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List of Acronyms

Acronym	Explanation
§	Section
AFB	Alternate Fuel Boiler
AGFA	AGFA Corporation
AOC	Area of Concern
BGS	Below ground surface
CA	Corrective Action
CAMU	Corrective Action Management Unit
COC	Constituent of Concern
COPC	Constituent of Potential Concern
CRG	Corporate Remediation Group
CSEM	Conceptual Site Exposure Model
DERA	DuPont Employees Recreation Association
DERS	DuPont Environmental Remediation Services
DSRF	DuPont State Recreational Forest
DuPont	E.I. du Pont de Nemours and Company
EC	Engineering Control
EcoCommunities	Ecological Communities
°F	Degrees Fahrenheit
Ft	Feet
GAC	Granular Activated Carbon
GMP	Groundwater Monitoring Plan
HASP	Health and Safety Plan
HI	Hazard Index
HRE	Health Risk Evaluation
HSWA	Hazardous and Solid Waste Amendments
IC	Institutional Control
IM	Interim Measure
ISM	Incremental Sampling Methodology
LUR	Land Use Restriction
MSL	Mean Sea Level
NC	North Carolina
NC2B	15A North Carolina Administrative Code 02B
NC2L	15A North Carolina Administrative Code 02L
NCAC	North Carolina Administrative Code

Acronym	Explanation
NCDA&CS	North Carolina Department of Agriculture and Consumer Services
NCDENR	North Carolina Department of Environment and Natural Resources
NCDEQ	North Carolina Department of Environmental Quality
NCNG	North Carolina National Guard
NCGS	North Carolina General Statutes
Notice	Notice of Intent to Remediate
NPDES	National Pollutant Discharge Elimination System
O&M	Operation and Maintenance
PAH	Polycyclic Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
PET	Polyethylene Terephthalate
POC	Point of Compliance
Property	DuPont-Owned Portion of the Property
RAO	Remedial Action Objective
RAP	Remedial Action Plan
RCRA	Resource Conservation Recovery Act
RFI	RCRA Facility Investigation
RIR	Remedial Investigation Report
Risk Bill	Risk-Based Environmental Remediation of Industrial Sites Law
RL	Remediation Level
RWM	Remediation Waste Material
Site	Brevard Site
SL	Screening Level
S/S	Solidification/Stabilization
State	State of North Carolina
Sterling	Sterling Diagnostic Imaging Inc.
SWMU	Solid Waste Management Unit
TCE	Trichloroethylene
TR	Trout Waters
VI	Vapor Intrusion
VOCs	Volatile Organic Compounds
WSW	Water Supply Well
WSW-VISIT	DuPont Visitor Center Water Supply Well
WWTP	Wastewater Treatment Plant

SECTION 1: INTRODUCTION

E.I. du Pont de Nemours and Company (DuPont) has been performing remediation activities at the Brevard Site (site) since the 1980s as part of the Resource Conservation Recovery Act (RCRA) Corrective Action (CA) Program in accordance with Hazardous Waste Management Permit No. NCD003152329-R2. The permit was issued by the North Carolina (NC) Department of Environment and Natural Resources (NCDENR), which officially became the NC Department of Environmental Quality (NCDEQ) on September 18, 2015.[1,2] Remediation activities are being performed at the site to satisfy RCRA CA requirements, as well as to facilitate the transfer of the property ownership from DuPont to the State of North Carolina (State).

In 2011, the General Assembly of NC passed a law entitled Risk-Based Environmental Remediation of Industrial Sites (referred to as the Risk Bill) which allows risk-based remediation at sites to accelerate the cleanup process (General Assembly NC 2011).[3] To put the property back into productive use, DuPont and the State (including the NCDEQ, NC Department of Agriculture and Consumer Services [NCDA&CS], the NC Forest Service [DSRF] and the NC National Guard [NCNG]) have agreed that it is appropriate to conduct future remediation activities in accordance with the Risk Bill. The purpose of the Risk Bill is "to authorize the Department to approve the remediation of contaminated sites based on site-specific remediation standards in circumstances where site-specific remediation standards are adequate to protect public health, safety, and welfare and the environment and are consistent with protection of current and anticipated future use of groundwater and surface water affected or potentially affected by the contamination." This Remedial Action Plan (RAP) was prepared to satisfy NCGS § 130A-310.69 of the Risk Bill, which states, "A person who proposes to conduct remediation pursuant to this Part shall develop and submit a proposed remedial action plan to the Department."

1.1 RAP Purpose

The purpose of this RAP is to identify site-specific remediation standards, propose and justify remedial actions to comply with the remediation standards, and describe the implementation of the remedial actions in accordance with the Risk Bill. The proposed remedial actions presented in this RAP were based on current and future land use to protect public health, safety, and welfare and the environment.

1.2 Site Location

The site is located in Cedar Mountain, in Transylvania County, North Carolina, approximately six miles southeast of the town of Brevard and three miles north of the South Carolina border (see Figure 1-1). The

[1] http://portal.ncdenr.org/web/guest/denr-blog/-/blogs/denr-has-a-new-name-n-c-dept-of-environmental-quality?_33_redirect=%2Fweb%2Fguest%2Fdenr-blog

[2] NCDENR will henceforth be referred to as NCDEQ in this RAP.

[3] This law was enacted as Part 8 of Article 9 of Chapter 130A of the North Carolina General Statutes (NCGS § 130A) which has been revised over time (General Assembly NC 2015).

site is located off of Staton Road and is bordered by the heavily-wooded mountains of the DSRF to the north, south, east, and west and by the Little River to the south and east (see Figure 1-1). Other site water bodies include Lake DERA (a man-made lake) and DERA Creek (a channelized drainage way that flows from west to east [from Lake DERA to Little River] through the site).

1.3 DuPont Property Transfer Goals

DuPont owns approximately 475 of the 491-acre site (see Figure 1-1). The DuPont-owned portion of the site (property) will be transferred from DuPont to the State concurrent with the implementation of this RAP. The property transfer goals are to:

- Ensure the ongoing protection of people and the environment following the transfer of the property;
- Identify remedial actions for the site that are consistent with the State's desired future land use; and
- Meet regulatory obligations and public expectations.

1.4 RAP Organization

The RAP is organized as follows.

- Section 1: Introduction
- Section 2: Site Overview
- Section 3: Remediation Standards
- Section 4: Identification of Areas Needing Further Action
- Section 5: Conceptual Overview of the Remedial Actions
- Section 6: Evaluation of the Remedial Actions
- Section 7: Implementation of the Remedial Actions
- Section 8: References

SECTION 2: SITE OVERVIEW

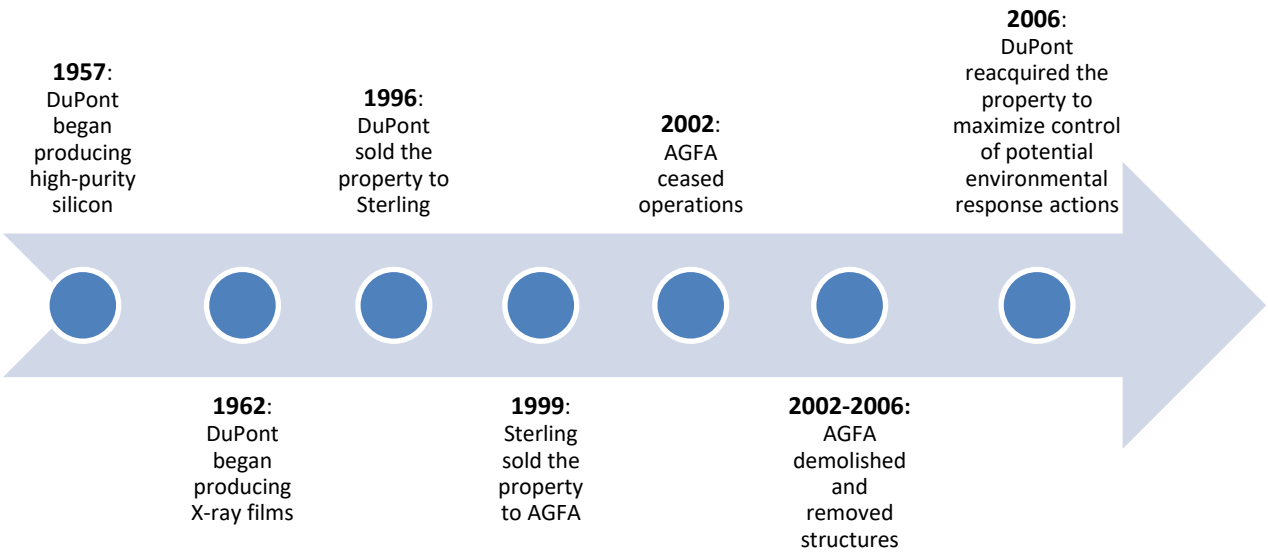
Details regarding the history and current conditions of the site were presented in the RIR (Parsons 2015b). For the purposes of the RAP, the following topics are summarized in this section.

- Operational History
- Regulatory Setting
- Site Setting
- RCRA Facility Investigation Summary
- Releases from Historical Operations
- Completed Remedial Actions
- Existing DuPont Remedial Action Commitments
- Current Status of SWMUs and AOCs
- Current and Future Land Use
- RIR Screening Conceptual Site Exposure Model (CSEM)
- Screening Levels (SLs) and Constituents of Potential Concern (COPCs)
- RAP CSEM

2.1 Operational History

DuPont began manufacturing operations in Brevard in 1957 becoming the first commercial producer of silicon, the raw material used to make transistors and other solid state electronic devices. Brevard was chosen as the manufacturing location to guarantee isolation from other industries and agricultural areas, which were possible sources of impurities. DuPont's Chemicals and Pigments Department produced high purity silicon until approximately 1962 when the property was transferred to the Imaging Department to start production of medical imaging (X-ray) films. During this time, DuPont also operated a powerhouse, a wastewater treatment facility, a silver recovery unit (Save-All System), the Alternate Fuel Boiler (AFB), and solid waste landfills to support manufacturing activities (see Figure 2-1). Areas outside of the former manufacturing area were used for recreational purposes that were managed by the DuPont Employees Recreation Association (DERA).

DuPont produced medical imaging films until Sterling Diagnostic Imaging Inc. (Sterling) purchased the Facility in 1996 and sold it to AGFA Corporation (AGFA) in 1999. Both Sterling and AGFA conducted the same operations as DuPont. AGFA discontinued operations in December 2002. DuPont reacquired the divested property in 2006 to maximize control of future potential environmental response actions. As part of the reacquisition agreement between DuPont and AGFA, AGFA demolished and removed major structures. Demolition and removal activities were completed in May 2006 and DuPont reacquired the property in July 2006. The graphic on the following page presents an operational history time line for the property.



2.2 Regulatory Setting

Site investigation and remediation activities have been conducted at the site under RCRA since 1980. An initial RCRA Part A Permit Application was submitted for the former Brevard facility in November 1980. An amended Part A Application was submitted in November 1992 for the storage of hazardous wastes in containers. DuPont submitted a RCRA Part B Permit Application for a Hazardous Waste Container Storage Area to the NCDEQ in May 1983. The State issued a Part B Permit for the Brevard facility on January 25, 1984 (Permit No. NCD003152329). The expiration date of the permit was January 25, 1994. The RCRA Part B Permit was renewed and became effective on August 8, 1996 and named DuPont and Sterling as co-owners of the permit. This permit identified CA activities to be completed as part of the permit guidelines along with schedules for the activities. DuPont submitted a RCRA Part B permit re-application for a Hazardous and Solid Waste Amendments (HSWA)-only permit on July 20, 2007. This permit became effective on August 31, 2008, was reissued on April 21, 2011, and will remain in effect until August 31, 2018 (NCDENR 2008a, 2011). Detailed descriptions of the Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) identified in the permit are presented in the RIR (Parsons 2015b). Thirty-seven SWMUs and/or AOCs were identified at the site: SWMUs 1 through 20 and AOCs A through K. Locations of SWMUs and AOCs are presented on Figure 2-2.

2.3 Site Setting

2.3.1 Climate

The site is located in Transylvania County. Transylvania County has a moderate climate with a relatively-high average annual precipitation (64 inches). The warmest and coolest months of the year are July and

December, respectively. The average high and low temperatures during these months are 83 degrees Fahrenheit (°F) in July and 24 °F in December. The highest average precipitation amounts per month (6.4 inches) are in January and December.

2.3.2 Topography

The site is located on top of a granitic plateau, which generally slopes downward from northwest to southeast. Land elevations are higher along the northwest portion of the site near Lake DERA (over 2,600 feet above mean sea level [MSL]) than in other portions of the site. Elevations decrease to less than 2,525 feet above MSL eastward along Little River. Land along the river is reasonably-flat outwash with slopes significantly increasing on the land outside of the site boundary, south and east of the river.

2.3.3 Geology

Four northeast-trending geologic zones are in Transylvania County, each containing rocks of differing lithologies. The site is located in the most southeastern zone, where Whiteside Granite is the predominant rock type. In general, near surface site geology is overburden, residuum (saprolite and partially-weather rock), and bedrock (see Figure 2-3; Parsons 2009).

The site soil interval is from the ground surface to the top of the residuum unit. Overall, material across the site consists of silty sands and sandy silts with colors ranging from black or hydric in appearance, to tan, grayish, yellow-orange, and brown with intermixing and noted gradations. Overburden material on the site ranges from 0.25 feet thick to approximately 20 feet thick. Thick overbank deposits were found proximate to Little River and thin overbank deposits were found along topographic high regions of the site (Parsons 2009).

Saprolite (considered part of the residuum at the site) is weathered bedrock that is in-situ and maintains the mineral fabric of its parent material. Partially-weather rock is the same as unconsolidated saprolite, but contains more competent material (e.g., rock fragments). The thickness of the saprolite ranges from 4.5 feet to 26 feet across the site, with the greatest thickness being below the former manufacturing area.

The bedrock beneath the site is made up of phaneritic and aphanitic gneiss in the northern and southern portions of the site, respectively. Bedrock material near the northeast site boundary has higher quartz content and is very hard and competent. The minerals near the northeast site boundary are larger than those along the eastern and southern site boundaries, and there are several pockets of large potassium feldspar.

2.3.4 Hydrogeology

Groundwater in the Western Piedmont and Blue Ridge provinces occurs predominately in fractured bedrock. The crystalline nature of the granite and gneiss result in very low primary porosity. Groundwater flow direction and rate are governed by the orientation and size of fractures, faults, and foliation planes within the bedrock. Fracture openings are generally less than one percent of the rock volume and water-bearing fractures are uncommon at depths greater than 300 feet below surface (Parsons 2009).

Two aquifers have been identified and characterized at the site: Surficial and Bedrock. Generally, the Surficial Aquifer consists of subsurface overburden materials (soil) and residuum materials (unconsolidated saprolite and partially weathered rock) that overlay crystalline bedrock composed of granite and gneiss. The thickness of the Surficial Aquifer (overburden combined with the residuum) can be correlated to the relief of the underlying bedrock outcrop (Parsons 2009).

The only aquifer used or expected to be used as a source for drinking water at the site is the Bedrock Aquifer. The only active Bedrock Aquifer water supply wells (WSWs) are the DSRF Visitor Center WSW (WSW-DSF3) and the DSRF Visitor Center WSW (WSW-VISIT). Four other existing Bedrock Aquifer WSWs are inactive. The Surficial Aquifer is not currently used for drinking water purposes, nor is it expected to be used for drinking water purposes in the future (Parsons 2015b).

The overall flow direction across the site within the Surficial Aquifer is east/southeast toward the Little River and also appears to be radial from the bedrock mound beneath the SWMU 17 area. The overall flow direction across the site within the Bedrock Aquifer is toward the east/southeast (see Figure 2-4). Groundwater gradients generally follow bedrock topography. Horizontal gradients are the steepest in the areas where bedrock topography is the greatest, and are the lowest in areas where the topography begins to level off near Little River (Parsons 2009).

2.3.5 Surface Water

Lake DERA (elevation approximately 2,566 feet above MSL) is an approximately 19-acre man-made lake located in the northwest portion of the site (see Figure 2-1). The lake is fed by small creeks along its northwest corner, surface water runoff, and possibly by shallow groundwater flowing in from the north. Overflow from Lake DERA is channeled through DERA Creek and drains into the Little River, approximately 3,500 feet to the east-northeast. Lake DERA and DERA Creek are not used for water supply purposes (Parsons 2015b).

The Little River originates south of the site and flows northward along the south and east site boundary (see Figure 1-1). The river receives overflow from Lake Julia located southeast of the site boundary and runoff from surrounding highlands from the south. The Little River continues its northern run for six miles where it drains into the French Broad River (Parsons 2009).[4] The Little River is classified by NCDEQ as Class C fresh surface water (aquatic propagation and survival, fishing, wildlife, secondary recreation, and agricultural use). In addition, the Little River has a supplemental classification of Class TR (Trout Waters [intended to protect freshwaters for natural trout propagation and survival of stocked trout]; Parsons 2015b). The Little River is not used for water supply purposes (Parsons 2015b).

2.3.6 Site Ecological Setting

An ecological assessment was performed for the site in 2006 to identify significant natural environmental features. The key features identified in the report included the Lake DERA marsh, the Little River/Cedar

[4] Based on visual observations of aerial images of the site using Google Earth in 2012, as referenced in the RIR.

Mountains, and two wetland communities (URS 2006). A second ecological assessment was performed for the site in 2011 to identify, evaluate, and document the presence of unique features and/or significant ecological resources (URS 2011). The conclusions from the assessments were that, aside from the former manufacturing area, the overall site resources, when considered collectively, represent a significant natural area that encompasses approximately 316 acres and supports high quality environments and diverse species. As identified by the NC Natural Heritage Program, rare and unique resources at the site are valuable as linkages with similar communities in the adjacent DSRF (Acidic Cove Forest) or represent unique patches of regionally- and nationally-rare habitats (e.g., Low Elevation Granitic Domes). These resources provide common and unique habitats for resident and migrant wildlife, including documented threatened and endangered species. Notable species and significant ecological communities (EcoCommunities) are presented in Figure 2-5.

Lake DERA features a silty bottom with limited submerged aquatic vegetation along its shallowest reaches. An assessment of Lake DERA was conducted by the NC Wildlife Resources Commission on August 10, 2010. The assessment consisted of a snorkel survey and use of an YSI® Pro20 to develop a temperature and dissolved oxygen profile of the lake. The snorkel survey revealed that the northern portion of the lake is shallow and contains some emergent vegetation which serves as habitat for young-of-the-year and adult littoral fish species. Overall, fish density and diversity were low; three fish species were observed: largemouth bass (Micropterus salmoides), bluegill (Lepomis macrochirus), and redbreast sunfish (Lepomis auritus). YSI® measurements confirmed that the relatively-shallow lake is fully mixed by wind and has adequate dissolved oxygen levels throughout the water column. Consequently, the ecological quality of Lake DERA is considered moderate due to limited aquatic vegetation and a low diversity of aquatic life (URS 2011).

DERA Creek flows from west to east (from Lake DERA to Little River) through the site, and has year-round flow. During the 2011 ecological assessment of the site, bluegill and bass were observed in the outfall pool, just east of the Lake DERA dam; however, sediments in this area were notably marked by iron flocculant (URS 2011). Swamp Forest-Bog and Acidic Cove Forest were found along the creek, limiting access.

2.4 RCRA Facility Investigation Summary

DuPont conducted the RCRA Facility Investigation (RFI) for the site in phases (see the in-text table below).

Year	Phase	Purpose	References
2003	I	▪ Characterize constituent concentrations in groundwater and surface water; ▪ Gain a better understanding of the geologic and hydrogeologic conditions at the site; and ▪ Address other objectives that were identified in the Current Conditions Report.	DuPont Corporate Remediation Group (CRG) 2002, 2003
2004	II	▪ Investigate regulated units and former manufacturing areas; and ▪ Address site-wide groundwater monitoring data gaps.	DuPont CRG 2004
2008 -2009	III	▪ Gain a better understanding of physical and chemical conditions at the site; and ▪ Determine if potential impacts to human health and the environment required remedial actions.	DuPont CRG 2008; Parsons 2009
2015	RIR[5]	▪ Resolve any remaining data gaps after the Phase III evaluation.	Parsons 2015b

The RIR marked the completion of the investigation phase of CAs. Information from the three phases and the RIR provided adequate information to support the RAP (Parsons 2015b). Approximately 1,100 samples were evaluated in the RIR and the locations of the samples are presented on Figure 2-6. The NCDEQ reviewed the RIR and provided comments regarding minor data gaps, which will be addressed during RAP implementation.

Other site investigation reports of note included:

- RCRA Facility Assessment (DuPont Environmental Remediation Services [DERS] 1996)
- Confirmatory Sampling Work Plan (DERS 1998)
- DuPont State Forest Service Visitor Center Interim Measures (DuPont CRG 2009)
- Environmental Indicator for corrective action “current human exposures under control” (Parsons 2012c)
- Environmental Indicator for “migration of contaminated groundwater under control" (Parsons 2012a)
- DuPont Brevard Ecological Inventory Summary Report (URS 2011)
- DuPont Facility Property: Significant Natural Features (DuPont 2006)

2.5 Releases from Historical Operations

Areas where constituents were potentially released to the environment from SWMUs and AOCs were investigated during the RFI process. In general, the SWMUs and AOCs with confirmed or potential releases included former landfills/disposal areas and other locations within the former manufacturing area.

2.6 Completed Remedial Actions

Several remedial actions have been completed at the site and are summarized in the following subsections.

[5] To be consistent with Risk Bill terms, Phase IV results were documented in the RIR (rather than a Phase IV Soil RFI Report).

2.6.1 Plant Demolition and Removal Activities

Remedial actions were performed within the former manufacturing area during the demolition and removal of buildings and other infrastructure from 2002 to 2006, reducing potential future releases from these areas. Approximately 32,370 tons (75,530 cubic yards) of debris and other materials were removed from the site. Erosion and sediment controls were established at the beginning of the demolition effort and areas that were disturbed during demolition and removal activities were stabilized by hydro-seeding and broadcast seeding. Parking lots, concrete slabs, grass areas, and all gravel areas were graded to achieve positive drainage of surface water. Any disturbed or borrow areas used during demolition and removal activities were stabilized before the end of the project. The demolition and removal activities were performed by AGFA and overseen by DuPont, and were documented in maps, analytical data, before and after photographs, videos, and field notes, all of which are available at the site (DuPont CRG 2006). The major demolition and removal activities are summarized in this section and the former manufacturing area is presented on Figure 2-7.

2.6.1.1 Waste Removal

Special waste and other materials (including asbestos, lead-based paint, mercury switches, light ballasts [polychlorinated biphenyl (PCB) and non-PCB]), residual material in vessels, hydraulic fluids, gearbox oils, halon materials used for fire suppression, and batteries were removed from the site. All debris was segregated by material type (e.g., concrete, aluminum, copper, carbon steel, and stainless steel). Sorted metal debris was removed from the site and transported to a reclamation center. Other demolition debris was disposed off-site at a permitted facility (DuPont CRG 2006).

2.6.1.2 Sub-Structure Cleaning

To address potential future hazards during demolition and removal activities at sub-structures left on site (e.g., slabs). The slabs that were left in place were pressure washed at 3,000 pounds per square inch and scraped using hand tools, followed by a clean water rinse. Wash and rinse waters were collected and containerized and samples were collected and analyzed for constituents based on the type of former operation in the area. If sample results were within site-specific National Pollutant Discharge Elimination System (NPDES) limits, the water was discharged to the wastewater treatment plant (WWTP). If the sample results were above the NPDES limits, the water was transported off-site for disposal. Wash water sample results were compared to applicable screening criteria (e.g., drinking water and surface water regulatory standards) to determine if the cleaning operations had removed residual constituents from the slab. Slabs where the cleaning had generated wash and rinse water concentrations that exceeded regulatory requirements were washed and rinsed a second time and sampled/analyzed again. This process was repeated until the regulatory criteria were met or until it was decided that the slab should be properly removed and disposed. Approximately 16 slabs, pads, or foundations were completely removed from the site during these activities (DuPont CRG 2006). The foundations that remain in place are shown in Figure 2-7.

2.6.1.3 Site Sewer Cleaning and Closure

All site sewers were cleaned and closed during demolition and removal activities (see Figure 2-7; Parsons 2015b). The cleaning effort involved either washing using a 3,000-pound per square inch pressure washer or gravity flushing using a large volume of water. The resulting water, which was discharged to the WWTP, was sampled and analyzed for constituents based on the type of former operation in the area and all results were within site-specific NPDES limitations. Remote inspection was performed where possible on 30% of the total length of sewer pipe using an electric remote-control robot equipped with a camera. In all, 3,500 linear feet of sewer pipe, 1,500 linear feet of process sewer, and 2,000 linear feet of storm sewer were inspected and videotaped. None of the inspection reviews indicated significant accumulation of debris or stained pipes, which led to the approval of closure activities. Sewer and manhole closure involved either removing or abandoning the sewer pipe, or filling the pipe and manholes with an inert material. All other underground piping (e.g., water, gas, fire protection) was capped at grade and abandoned.

2.6.2 Closure of SWMU 11 and SWMU 12A-C

DuPont operated two permitted industrial solid waste landfills on site (SWMU 11 and 12A-C), both operating under NC Solid Waste Permit No. 88-06. The permit allowed for the disposal of production scrap (e.g., polyester film base), scrap metal, shop grindings and shavings, solid resin, and office refuse in the area designated as the North Landfill (SWMU 12A-C). Demolition waste was disposed of in the East Landfill (SWMU 11). DuPont closed the SWMU 12A-C in 1993 and received official approval of closure from NCDEQ on August 22, 1996 (DuPont CRG 2002). DuPont completed closure activities at SWMU 11 in late 1996 and received official closure notification from the NCDEQ on May 18, 2001. A cap/cover was installed on both SWMU 11 and SWMU 12A-C.

2.6.3 SWMU 11 CAMU and SWMU 14 Interim Measures

DuPont established a Corrective Action Management Unit (CAMU) at SWMU 11 subsequent to closure of SWMU 11 in the 1990s to act as the consolidation location for X-ray film (i.e., polyethylene terephthalate [PET]) that could not be recycled from SWMU 14. Nonhazardous, off-specification and process startup-waste PET film was deposited into SWMU 11 (the former East Landfill) and SWMU 14 (the Former West Landfill; see Figure 2-2). The SWMU 14 area was reclaimed and used as a ball field during DuPont ownership. The ball field had not been used since DuPont reacquired the site in 2006. DuPont submitted the SWMU 11 CAMU Application on April 20, 2010, and a revised application on October 29, 2010. NCDEQ approved the establishment of the CAMU in a modification to the RCRA Part B permit on April 21, 2011. The SWMU 11 CAMU (the Former East Landfill) is a 13.5-acre unlined unit located on the southeast portion of the site (Figure 2-2). The SWMU 11 CAMU is currently covered by an approximately 1-2 foot thick soil cover. To meet the CAMU requirement for groundwater monitoring, an Interim CAMU Groundwater Monitoring Plan (GMP) was developed by Parsons in August 2010 and submitted as Attachment 6 to the CAMU Application (DuPont CRG 2010); this GMP plan will remain in effect until final closure of the unit.

An interim measures (IM) removal/consolidation effort at SWMU 14 and the SWMU 11 CAMU was performed from June 2011 to July 2012 in accordance with the Interim Measures Work Plan, which was approved in April 2011 (WRScompass 2011). Plastic materials from SWMUs 11 and 14 were removed, and where possible, the waste PET material was recycled. The remaining acceptable remediation waste material (RWM) from SWMU 14 was placed into the SWMU 11 CAMU. During the effort, approximately 9,771 in-place cubic yards of PET material from SWMU 11 and 6,140 in-place cubic yards of PET material from SWMU 14 were shipped off the site for recycling. Approximately 80,665 in-place cubic yards of acceptable RWM was removed from SWMU 14 and placed into the SWMU 11 CAMU. RWM was periodically sampled to document that the material being moved from SWMU 14 to SWMU 11 was non-hazardous. After excavation and hauling at SWMU 14, the disturbed areas were graded to match the surrounding contours and promote positive drainage using the remaining overburden, cover soil, and topsoil. Grading incorporated the existing installed downstream drainage features, rock check dams, and sediment traps. The area was final graded, hydro-seeded and mulched (WRScompass 2011). A small portion of SWMU 14 waste material remains near Staton Road as shown on Figure 2-2.

Excavation performed during the plastics removal provided an understanding of the contents and extent (lateral and vertical) of SWMU 11. Materials remaining in SWMU 11 have the visual and chemical waste characteristics indicative of solid, non-hazardous waste. An interim landfill cap was constructed over the SWMU 11 CAMU by the end of July 2012 according to the specifications detailed in the CAMU plan (Parsons 2012c).

2.6.4 Closure of SWMU 4

The 25-acre WWTP (SWMU 4) was closed during demolition and removal activities, and over 2,563 tons of biosolids were removed from the WWTP emergency spill, aeration, and settling basins using a barge-mounted diesel dredge. In addition, 1,085 tons of biosolids were removed from the diversion basin. All removed solids were filtered and disposed of off-site in a permitted landfill. Testing of residual solids and underlying soil did not indicate any potential future environmental concerns (DuPont CRG 2006). Approximately 60,000 cubic yards of soil was used to grade and cap the area to create proper drainage. Based on pre-closure sampling analysis, AGFA and DuPont determined that the biosolids in the Polishing Pond could remain in place. The Polishing Pond was drained and the sludge was dewatered and solidified. A non-woven, needle-punched geotextile fabric was installed over the solidified sludge. Three feet of cover soil was placed and compacted over the geotextile fabric and the area was reseeded to create a vegetative cover. The final grade of the polishing pond was constructed at a 1.2% slope to minimize accumulation of surface water (DuPont CRG 2006).

2.6.5 Installation of DSRF Visitor Center Water Treatment System

DuPont sampled the DSRF Visitor Center WSW in January 2007 upon receiving a notification for intended future use of the WSW by DSRF personnel. Only one constituent (trichloroethylene [TCE]) was detected at a concentration that exceeded the 15A NC Administrative Code (NCAC) 02L (NC2L) value. This exceedance led to the initiation and completion of additional investigation and remediation activities.

DuPont voluntarily designed a granular activated carbon (GAC) treatment system for the DSRF Visitor Center WSW as an IM to ensure a safe water supply to DSRF Visitor Center workers and users. The system was installed in January 2009 and treatment system confirmation water samples were collected on a monthly basis for four months after the restrooms were opened to the public. The sampling frequency was reevaluated and adjusted accordingly. The current sampling program consists of changing the GAC filter annually and sampling treatment system water semiannually. The IM report was submitted to NCDEQ in June 2009 (DuPont CRG 2009). Results of the ongoing semiannual monitoring program indicate that the GAC system is effectively removing volatile organic compounds (VOCs) in the groundwater used as a water supply for the DSRF Visitor Center. No VOCs were detected in any of the samples collected from the post-filtration (treated water) sampling locations (Parsons 2015a). In addition, no VOCs were detected in soil gas around the building indicating that there was no potential for VOCs in indoor or ambient air (Parsons 2009).

2.6.6 Installation of Historical Cap/Covers

As part of historical operations, cap/covers were also installed over the following former landfills/disposal areas when the areas were no longer used:

- SWMU 13
- SWMU 16
- SWMU 17
- SWMU 18A&B
- SWMU 20

The locations of these former SWMUs and AOCs with existing cap/covers are shown in Figure 2-8.

2.6.7 SWMUs and AOCs with No Further Action Needed

No further action is needed at the following SWMUs and AOCs in accordance with the 2011 NCDEQ Hazardous Waste Management Permit No. NCD003152329-R2 and SWMU/AOC-specific documentation (see Figure 2-9):

- SWMU 1
- SWMU 2A
- SWMU 2B
- SWMU 2C
- SWMU 3A
- SWMU 3B
- SWMU 3C
- SWMU 3D
- SWMU 3E
- SWMU 5
- SWMU 6
- SWMU 7

- SWMU 8
- SWMU 9
- SWMU 10
- SWMU 14
- SWMU 15
- SWMU 19
- AOC C
- AOC F

In addition, no further action is needed for the following AOCs based on the results of the RIR (Parsons 2015b):

- AOC B
- AOC D
- AOC E
- AOC G
- AOC H
- AOC I
- AOC J
- AOC K

2.7 Existing DuPont Remedial Action Commitments

2.7.1 Final Closure of SWMU 11

DuPont is committed to designing and installing a vegetative cap for SWMU 11 to complete SWMU 11 closure activities. SWMU 11 received a cap/cover when it was initially closed in 1996 (see Section 2.6.2). SWMU 11 subsequently received an interim CAMU cap/cover in 2012 (see Section 2.6.3). DuPont and NCDEQ have had numerous discussions regarding the establishment, operation, and final closure requirements for SWMU 11. Based on the nature of the waste in SWMU 11, NCDEQ has agreed that a low permeability cap is not required. Therefore, to perform the closure requirements, SWMU 11 will be covered with an alternative vegetative cap. In addition, soil cover and sideslope grading will be performed to address waste materials protruding from the edge of the landfill (and to provide for long-term maintenance and additional protection from flood scour).

The goals for the SWMU 11 vegetative cap are to:

- Cover visible waste materials protruding from the edge of the landfill;
- Minimize long-term maintenance needs and expenses; and
- Provide adequate stormwater management and 100-year flood protection.

Additionally, the soil cover and sideslope regrading will:

- Eliminate the potential for exposure to unit wastes;

- Incorporate the existing soil cover and make use of on-property borrow soil, minimizing soil import needs;
- Provide slope stability and mitigate soil erosion; and
- Decrease infiltration to the waste.

The SWMU 11 design and implementation activities are discussed further in Section 7.

2.7.2 SWMU 17 IM

DuPont is in the process of designing an in-situ solidification/stabilization (S/S) treatment action for soil and waste within SWMU 17. SWMU 17 (also known as the Former Power Hill Disposal Area) consists of five disposal areas that reportedly received the neutralized waste hydrofluoric acid used in the Silicon® product manufacturing process, along with other miscellaneous wastes. Records indicate that the unit was in operation from 1958 to 1977 (DuPont CRG 2003). Although it remains protective of public health, safety, and welfare and the environment, SWMU 17 has been identified for additional remedial action because of uncertainties about the nature and extent of the waste materials in the SWMU and because the unit appears to be impacting an off-property drinking water source (the DSRF Visitor Center where a GAC water treatment system was installed and is being monitored). In addition, completion of IM activities will support anticipated future land use. An in-situ S/S treatability study will be conducted to evaluate the effectiveness of this technology to meet the following IM goals and objectives.

2.7.2.1 SWMU 17 IM Goals

The SWMU 17 IM goals are as follows:

1. Remove and/or treat toxic or mobile materials with in-situ S/S by:
   a. Removing and disposing of waste materials that can be visually identified (e.g., sludges) and/or that could hinder the effectiveness of in-situ S/S (e.g., waste containers, rugs, other solid debris);
   b. Stabilizing the remaining waste material to reduce mobility; and
   c. Solidifying the remaining waste material to (1) create a physical barrier intended to prevent human and ecological contact with the material and (2) lowering the permeability to limit infiltration and leaching.
2. Reduce SWMU-related constituent concentrations in downgradient groundwater and reduce the operational time frame for the GAC treatment system at the DSRF Visitor Center WSW.

To meet the SWMU 17 IM goals, DuPont will conduct the IM in two stages; the activities of the second stage will build upon the results of the first stage. The activities that will be performed in the two IM stages are listed below.

2.7.2.2 SWMU 17 IM Stage 1 Goals

The Stage 1 investigation activities, which will be described in the work plan for the SWMU 17 IM, were developed to meet the following goals:

1. Gather additional information about the SWMU contents, locations, and characteristics via test trenching. Gathering additional information will minimize uncertainties about the nature and

extent of the SWMU including the location and volume of former waste trenches and SWMU materials, the physical nature of the materials (e.g., unbroken containers, rolled up carpet), and the migration potential of constituents from the SWMU due to the complex hydrogeology of the area.

2. Remove waste materials accessed during test trenching efforts. During test trenching, waste materials that can be visually identified and/or that could hinder potential in-situ activities will be removed to prepare the area for additional remedial actions, if necessary.
3. Determine the best approach for additional treatment of the SWMU, if any. Samples will be collected from the test trenching areas for baseline analysis and treatability studies.

2.7.2.3 SWMU 17 IM Stage 2 Goals

Stage 2 implementation activities will build upon the results of the Stage 1 investigations. Implementation activities will be summarized in a work plan that will be developed once the results from the Stage 1 activities have been evaluated. The following preliminary goals have been developed for the Stage 2 of the IM:

1. Conduct additional remediation (e.g., removal, in-situ S/S), as necessary; and
2. Continue to treat impacted groundwater at the DSRF Visitor Center with the GAC treatment system.

2.7.3 Cap/Covers, O&Ms, and Institutional Controls for Former Landfills/Disposal Areas

DuPont is committed to conducting the following long-term actions associated with former landfills/disposal areas:

- Perform O&M activities (e.g., annual inspections of the cap/covers and repair/replacement of the cap/covers as necessary) for the cap/covers at SWMUs 4, 11, 12A-C, 13, 16, 17, 18A&B, and 20;
- Implement institutional controls (ICs) to prohibit excavation at SWMUs 4, 11, 12A-C, 13, 14, 16, 17, 18A&B, and 20;[6]
- Install wooden bollards and/or other physical deterrent/barriers at SWMU 13 as an extra precaution to prohibit vehicles from disturbing the existing cover since SWMU 13 is located immediately adjacent to Lake DERA and may be subject to more frequent use; and
- Implement ICs to require that NCDEQ is notified and soil is sampled prior to any excavation activities within the former manufacturing area (which includes SWMU 15 and SWMU 19).[7]

[6] Even though no further action is necessary for SWMU 14, DuPont has decided to implement this IC since waste material remains in this area.

[7] Even though no further action is necessary for SWMU 15, SWMU 19, and the former manufacturing area, DuPont has decided to implement this IC across the entire former manufacturing area (which encompasses the estimated locations of SWMU 15 and SWMU 19) since former process features and/or wastes could be present in this area.

2.8 Current Status of SWMUs and AOCs

Based on the completed remedial actions (see Section 2.6) and the existing DuPont remedial action commitments (see Section 2.7), further action is needed as summarized in the table below and Figure 2-9.

No Further Action Needed[1]	Active Remediation	Perform O&M of Existing Cap/Cover	Implement ICs to Prohibit Excavation	Implement ICs to Require That NCDEQ is Notified and Soil is Sampled Prior to Any Excavation Activities	Further Action Needed
SWMU 1 SWMU 2A SWMU 2B SWMU 2C SWMU 3A SWMU 3B SWMU 3C SWMU 3D SWMU 3E SWMU 5 SWMU 6 SWMU 7 SWMU 8 SWMU 9 SWMU 10 SWMU 14 SWMU 15 SWMU 19 AOC B AOC C AOC D AOC E AOC F AOC G AOC H AOC I AOC J AOC K	SWMU 11 SWMU 17	SWMU 4 SWMU 11 SWMU 12A-C SWMU 13[2] SWMU 16 SWMU 17 SWMU 18A&B SWMU 20	SWMU 4 SWMU 11 SWMU 12A-C SWMU 13 SWMU 14 SWMU 16 SWMU 17 SWMU 18A&B SWMU 20	SWMU 1 SWMU 2A SWMU 2B SWMU 2C SWMU 3A SWMU 3B SWMU 3C SWMU 3D SWMU 3E SWMU 5 SWMU 6 SWMU 7 SWMU 8 SWMU 10 SWMU 15 SWMU 19 AOC B AOC C AOC D AOC E AOC F AOC G AOC H AOC I AOC J AOC K	AOC A (i.e., address the soil exceedance discussed in Section 4.1.1)

Notes:
[1] No Further Action in the context of RCRA CA.
[2] A physical deterrent/barrier will be installed at SWMU 13 to prohibit vehicles from disturbing existing cover.

2.9 Current and Future Land Uses

The site is no longer used for manufacturing operations and the manufacturing infrastructure was dismantled during demolition and removal activities. Current use of the site is minimal. The only current site users are DSRF Visitor Center workers and visitors, security guards, and military personnel who use the site periodically for military training (e.g., flight landing practice). According to information provided by the State, the planned future land uses for the property after it is transferred to the State include recreational uses consistent with NCDA&CS, NCNG, and DSRF staff land use plans, and NCNG military training (Parsons 2015b). Specifically, potential future uses at the site include:

- Forest trail use by DSRF users (e.g., hikers)
- Water recreational activities in Little River, Lake DERA, and DERA Creek by DSRF users
- Administrative facilities for DSRF staff
- Low impact military training by the NCNG
- Administrative facilities for NCNG staff
- Multiple uses (e.g., a driving course, large training exercises, equipment staging, and helibase functions) for the large parking lot near the former manufacturing area (see Figure 2-7)
- A managed recreation center at Lake DERA for Wounded Warrior REHAB (including primitive camping, water recreation, and designated fishing areas)

Based on the current and planned future land use for the site, the following potential receptors were identified to be representative of reasonable maximum exposure scenarios in the RIR:

- Current and Future DSRF User[8]
- Current and Future DSRF Visitor Center Worker (Indoor Worker)
- Future DSRF Worker
- Future NCNG Worker (Military Exercises and Training)
- Future Utility/Excavation Worker
- Current and Future Ecological Receptors

2.10 RIR Screening CSEM

A CSEM is a visual representation of how exposure to constituents at a site could occur. It is used to integrate all available site information and identify how receptors may be exposed to constituents under current and plausible future land uses. A CSEM is a tool used to communicate potential exposures to constituents at a site based on sources of contamination, release mechanisms, exposure pathways, and receptors.

The CSEM for the site was presented in the RIR (Parsons 2015b). The RIR Screening CSEM was used to identify potentially-complete and complete exposure pathways for the site based on current and potential future land uses (see Figure 2-10). Since the RIR Screening CSEM was used for screening purposes (i.e., to identify conservative SLs and COPCs as summarized in section 2.11), it included future residents and future industrial workers even though these hypothetical receptors are not realistic receptors given the planned future land use. All complete and potentially-complete exposure pathways presented in the RIR Screening CSEM were considered in the identification of SLs and COPCs (Parsons 2015b).

2.11 SLs and COPCs

Conservative, pathway- and medium-specific SLs based on the potentially-complete and complete pathways were identified in the RIR Screening CSEM using the approach outlined in the following in-text table (Parsons 2015b).

[8] DSRF user includes forest trail users and water recreational users at Little River, Lake DERA, and DERA Creek. The only current DSRF user is a Little River recreational user since there is no current recreational use within the property boundary.

Pathway	Media	Receptors Used to Develop SLs [1]
Surface and subsurface soil direct contact (via incidental ingestion, dermal contact, and inhalation of particulates) [2]	Soil	Future resident and future industrial worker
Soil-to-groundwater	Soil	Future resident
Vapor intrusion (VI)	Groundwater	Future resident and future industrial worker
Surficial Aquifer used as drinking water	Groundwater	Future resident
Bedrock Aquifer used as drinking water	Groundwater	Future resident
Surface water exposures (via incidental ingestion, dermal contact, and fish consumption)	Surface water	Current and future DSRF user and current and future ecological receptors
Sediment exposures (via incidental ingestion, dermal contact, and fish consumption)	Sediment	Future resident and current and future ecological receptors

Notes:
[1] These receptors were used for screening purposes since the exposure assumptions for these receptors are more conservative than the exposure assumptions for other potential receptors (e.g., the exposure assumptions for a default industrial worker are more conservative than exposure assumptions for other site-specific workers).
[2] Surface soil direct contact and subsurface soil direct contact pathways were combined in the development of SLs.

The pathway- and medium-specific SLs were used to identify pathway- and medium-specific COPCs in the RIR (Parsons 2015b). A constituent with a maximum concentration greater than the applicable SL was identified as a COPC for that pathway and medium. Table 2-1 lists the COPCs identified in the RIR by pathway and medium.

Appendix A provides additional details about the basis used to identify pathway- and medium-specific SLs in the RIR. Appendix A also summarizes the magnitude of constituent concentrations compared to pathway- and medium-specific SLs for all applicable COPCs.

The SLs and COPCs were used in this RAP to define areas where ICs and/or engineering controls (ECs) are needed in order to prevent unacceptable exposures for potentially-complete pathways.

2.12 RAP CSEM

Complete exposure pathways for the site based on current and planned future land uses were identified in the RAP CSEM (see Figure 2-11). In accordance with the Risk Bill, site-specific remediation standards can be based on current and planned future use of the site (i.e., site-specific remediation standards do not have to be based on exposure scenarios that are not applicable to a site). Therefore, the following complete exposure pathways identified in the RAP CSEM were used to identify the remediation standards for the site in accordance with the Risk Bill:

- Surface soil direct contact (via incidental ingestion, dermal contact, and inhalation) by a current and future DSRF user, future DSRF worker, future NCNG worker, and future utility/excavation worker.
- Subsurface soil direct contact (via incidental ingestion, dermal contact, and inhalation) by a future utility/excavation worker.
- Bedrock Aquifer used as drinking water by a current and future DSRF Visitor Center worker.
- Surface water exposures (via incidental ingestion, dermal contact, and fish consumption) by a current and future DSRF user and current and future ecological receptors.

- Sediment exposures (via incidental ingestion, dermal contact, and fish consumption) by a current and future DSRF user and current and future ecological receptors.

In addition, the following potentially-complete exposure pathways identified in the RAP CSEM were used to identify additional IC/EC needs for the site in accordance with the Risk Bill:

- Surface and subsurface soil direct contact (via incidental ingestion, dermal contact, and inhalation) by a future resident and future industrial worker. This is not a complete exposure pathway because these hypothetical receptors are not realistic given the planned future land use.
- VI exposures (via inhalation of indoor air) by a current and future DSRF Visitor Center worker, future DSRF worker, future NCNG worker, future resident, and future industrial worker. This is not a complete exposure pathway because no VOCs have been detected in soil gas around the building indicating that there was no potential for VOCs in indoor or ambient air and because ICs/ECs will be implemented to characterize and mitigate the potential VI pathway as necessary within the portion of the site where VOCs in the Surficial Aquifer could be present.
- Surficial Aquifer used as drinking water by a current and future DSRF user, current and future DSRF Visitor Center worker, future DSRF worker, future NCNG worker, future utility/excavation worker, future resident, and future industrial worker. This is not a complete exposure pathway because it is not currently used for drinking water purposes and because ICs will be implemented to preclude future use for drinking water purposes.
- Bedrock Aquifer used as drinking water by a current and future DSRF user, future DSRF worker, future NCNG worker, future utility/excavation worker, future resident, and future industrial worker. This is not a complete exposure pathway because ICs will be implemented to require that all new or existing Bedrock Aquifer WSWs are sampled prior to being put into service in order to address the potential exposures associated with Bedrock Aquifer used as drinking water.

SECTION 3: REMEDIATION STANDARDS

The remedial action objectives and remediation standards for the RAP are presented in this section. The remediation standards were based on site-specific RLs and other standards that were presented in the RIR and points of compliance (POCs) that were developed based on the five complete exposure pathways identified in the RAP CSEM.

3.1 Remedial Action Objectives

Based on the complete and potentially-complete exposure pathways identified in the RAP CSEM, the remedial action objectives (RAOs) for the RAP are to protect public health, safety, and welfare and the environment by:

- Completing the existing DuPont remedial action commitments outlined in Section 2.7.
- Eliminating unacceptable exposures associated with the following complete exposure pathways:
  - Surface soil direct contact by a current and future DSRF user, future DSRF worker, future NCNG worker, and future utility/excavation worker
  - Subsurface soil direct contact by a future utility/excavation worker
  - Bedrock Aquifer used as drinking water by a current and future DSRF Visitor Center worker
  - Surface water exposures by a current and future DSRF user and current and future ecological receptors
  - Sediment exposures by a current and future DSRF user and current and future ecological receptors
- Implementing ICs/ECs to ensure potential exposures associated with following potentially-complete pathways do not occur:
  - Surface and subsurface soil direct contact by a future resident and future industrial worker
  - VI exposures by a current and future DSRF Visitor Center worker, future DSRF worker, future NCNG worker, future resident, and future industrial worker
  - Surficial Aquifer used as drinking water by a current and future DSRF user, current and future DSRF Visitor Center worker, future DSRF worker, future NCNG worker, future utility/excavation worker, future resident, and future industrial worker
  - Bedrock Aquifer used as drinking water by a current and future DSRF user, future DSRF worker, future NCNG worker, future utility/excavation worker, future resident, and future industrial worker

3.2 Remediation Standards

Remediation standards were identified for the complete exposure pathways presented in the RAP CSEM (see Figure 2-11 and Section 2.12 of this RAP). The remediation standards were based on the NCDA&CS's, DSRF's, and NCNG's proposed future uses for the site and the document *Establishing Remediation Goals*

for the DuPont Brevard Facility (URS 2014) and NCDEQ's *Guidelines for Establishing Remediation Goals at RCRA Hazardous Waste Sites* (NCDENR 2013).

NCDEQ's methodology for risk assessment was used to identify the remediation standards for the site; however, the actual planned future uses for the site, as proposed by the DSRF and the NCNG, were also used (Parsons 2015b).[9] Remediation standards were identified for the following five complete exposure pathways:

- Surface soil direct contact by a current and future DSRF user, future DSRF worker, future NCNG worker, and future utility/excavation worker
- Subsurface soil direct contact by a future utility/excavation worker
- Bedrock aquifer used as drinking water by a current and future DSRF Visitor Center worker
- Surface water exposures by a current and future DSRF user and current and future ecological receptors
- Sediment exposures by a current and future DSRF user and current and future ecological receptors

Consistent with the NCGS § 130A-310.68 (a)(3), pathway- and medium-specific standards were identified based on the complete exposure pathways using the approach outlined in the following table.

Pathway	Media	Receptors	Basis for Remediation Standard
Surface soil direct contact	Soil	Current and future DSRF user, future DSRF worker, future NCNG worker, and future utility/excavation worker[10]	Most stringent of RLs calculated for DSRF user, DSRF worker, NCNG worker, and utility/excavation worker. In addition, the cumulative cancer risk cannot exceed 1E-04 consistent with NCGS § 130A-310.68 (b)(9) and the cumulative noncancer hazard index (HI) for each endpoint cannot exceed 1 consistent with NCGS § 130A-310.68 (b)(10).
Subsurface soil direct contact	Soil	Future utility/excavation worker[10]	RLs calculated for utility/excavation worker. In addition, the cumulative cancer risk cannot exceed 1E-04 consistent with NCGS § 130A-310.68 (b)(9) and the cumulative noncancer HI for each endpoint cannot exceed 1 consistent with NCGS § 130A-310.68 (b)(10).
Bedrock Aquifer used as drinking water	Groundwater	Current and future DSRF Visitor Center Worker	Most stringent of NC2L values and NC Interim Maximum Allowable Concentrations.
Surface water exposures	Surface water	Current and future DSRF user and current and future ecological receptors	Most stringent of 15A NCAC 02B (NC2B) values for freshwater organisms (chronic), trout waters (organism only), and human health (fish consumption). If NC2B values were not available for a COPC, the National Recommended Water Quality Criterion was used (USEPA 2014).
Sediment exposures	Sediment	Current and future DSRF user and current and future ecological receptors	Most stringent of RLs for DSRF user and DSRF worker and ecological screening values including

[9] Risk assessment is a process that is used to characterize the nature and magnitude of health risks to humans and ecological receptors from constituents that may be present in the environment. NCDEQ has used risk assessment methodologies to identify acceptable constituent concentrations in soil and groundwater for either future residential or industrial land use exposure scenarios.

[10] Current soil concentrations are protective of groundwater. The soil-to-groundwater-to-surface water pathway was not included in the RL determination because it was eliminated from further consideration in the RIR based on site-specific soil-to-groundwater-to-surface water criteria as well as groundwater, pore water and surface water sampling results.

Pathway	Media	Receptors	Basis for Remediation Standard
			ecological sediment benchmarks from the USEPA and other sources (Parsons 2015b).

3.3 Points of Compliance

The POCs associated with the pathway- and medium-specific RLs are defined in the following table:

Pathway	Media	POC Location(s)
Surface soil direct contact	Soil	0 – 2 feet below ground surface (ft bgs)
Subsurface soil direct contact	Soil	2 – 15 ft bgs
Bedrock Aquifer used as drinking water	Groundwater	Existing and future Bedrock Aquifer WSWs
Surface water exposures	Surface water	Little River, Lake DERA, DERA Creek, and site surface waters that flow into Little River, Lake DERA, and DERA Creek
Sediment exposures	Sediment	Sediment in the biologically-active zone of Little River, Lake DERA, DERA Creek, and site surface waters that flow into Little River, Lake DERA, and DERA Creek

These POCs are based on the locations where potential receptors associated with complete pathway could be exposed based on current and planned future land use. Empirical surface water and sediment data will be used to evaluate whether or not remedial actions are necessary to address constituents in site soil and groundwater.

SECTION 4: IDENTIFICATION OF AREAS NEEDING FURTHER ACTION

The purpose of this section is to:

- Identify areas that may need remedial action based on site-specific remediation standard exceedances; and
- Identify ICs/ECs required by the Risk Bill for potentially-complete exposure pathways.

4.1 Summary of Site-Specific Remediation Standard Exceedances

To determine if any additional site areas need remedial actions, COPC concentrations were compared to the site-specific remediation standards (i.e., RLs and POCs) for the five complete exposure pathways for the site (see Section 3). The complete exposure pathways were presented in the RAP CSEM (see Figure 2-11) and the RIR (Parsons 2015b).

4.1.1 Surface Soil Direct Contact Pathway

Maximum detected surface soil[11] COPC concentrations were compared to the most stringent RLs for the surface soil direct contact pathway. COPC concentrations were above the RLs at only five sample locations (see Figure 4-1).[12] The RL exceedances at these five locations were due to 3-methylcholanthrene and the following polycyclic aromatic hydrocarbon (PAHs): 7,12-dimethylbenz(a)anthracene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, and dibenz(a,h)anthracene (see Table 4-1). The two highest cumulative exceedances at the five sample locations were in the Incremental Sampling Methodology (ISM) sample at Decision Unit 6 (DU-6ISM) and AOC A (AOCA-SS-6).

If remedial actions are taken to address the exceedances in ISM Decision Unit 6 and AOC A, the potential risks associated with site surface soil will be significantly reduced. Since it is unlikely that potential receptors would spend all of their time at one location on the site, the average[13] surface soil concentrations for 3-methylcholanthrene and the PAHs were calculated after eliminating the DU-6ISM and AOCA-SS-6 samples to determine if the three other samples with RL exceedances posed an unacceptable risk at the site. This approach (averaging the concentrations at locations across the site) is appropriate since potential receptors will be exposed to soil across the entire site. The average site surface soil concentrations, when samples DU-6ISM and AOCA-SS-6 were excluded from the data set, were less than the RLs. Therefore, remedial action will be conducted to address RL exceedances in ISM Decision Unit 6 and AOC A only. The surface soil direct contact pathway may need to be re-evaluated if additional surface soil samples are collected in the future.

[11] For the purpose of this report, soil refers to soil and waste samples.

[12] Although all PCB concentrations were below RLs, an additional soil investigation will be conducted to resolve USEPA and NCDEQ questions regarding the nature and extent of PCBs in potentially-affected media at the facility.

[13] See Appendix B.

4.1.2 Subsurface Soil Direct Contact Pathway

Maximum detected subsurface soil COPC concentrations were compared to the most stringent RLs for the subsurface soil direct contact pathway. COPC concentrations were below the RLs at all sample locations (see Figure 4-2). Therefore, no additional remedial action is required as long as ICs and ECs preventing or restricting exposure are instituted and maintained. The subsurface soil direct contact pathway may need to be re-evaluated if additional subsurface soil samples are collected in the future (e.g., samples collected during the SWMU 17 IM).

4.1.3 Bedrock Aquifer Used as Drinking Water Pathway

Maximum detected groundwater COPC concentrations in existing Bedrock Aquifer WSWs were compared to the most stringent RLs for the Bedrock Aquifer used as drinking water pathway (see Figure 4-3). COPC concentrations at the majority of the POC sample locations (i.e., existing WSWs) were less than the RLs. DSRF Visitor Center WSW (WSW-DSF3) is the only WSW that had a site-related COPC concentration (TCE) greater than an RL (see Figure 4-3 and Table 4-1). Although iron and/or manganese exceeded RLs in WSW-CMPGND, WSW-GUARD, and WSW-WWT, and vanadium exceeded the RL in WSW-CMPGND, these constituents are not site related. Iron, manganese, and vanadium are naturally-occurring constituents that are not associated with any former manufacturing process. In addition, WSW-CMPGND (where the vanadium RL exceedance was detected) is located upgradient of the former manufacturing areas and former landfills/disposal areas (see Figure 2-4). As a result, remedial action to address a DuPont release is not necessary for the iron, manganese, and vanadium RL exceedances. However, the State will still need to comply with NC's implementation of Safe Drinking Water Act requirements as appropriate (e.g., comply with NC2L values).[14]

Due to the TCE RL exceedance in the DSRF Visitor Center WSW, ongoing O&M of the DSRF Visitor Center WSW existing treatment system is needed to ensure ongoing protection of DSRF Visitor Center workers and users. Even though no other site-related RL exceedances were identified, DuPont will also implement ICs to require that all new or existing Bedrock Aquifer WSWs are sampled prior to being put into service.

4.1.4 Surface Water Exposures Pathway

Maximum detected surface water COPC concentrations at the surface water POCs were compared to the most stringent RLs for the surface water exposures pathway (see Figure 4-4). COPC concentrations at the majority of the POC sample locations were less than the RLs. The only POC location that had a site-related COPC concentration (vinyl chloride) greater than an RL was a seep (SW-26) that flows into the Little River (see Figure 4-4 and Table 4-1). However, the vinyl chloride RL was based on fish consumption and the

[14] For example, the WSW-Campground will be sampled before it is used, due to the presence of iron, manganese, and vanadium above the NC 2L. If these results also indicate constituents are present in groundwater above NC 2L standards, a health risk evaluation (HRE) will need to be performed. The results of the HRE will determine the risk associated with potential uses (drinking, toilets, showering, etc.) of the water from the well and what steps are necessary to reduce these risks. As an alternative, the well may be abandoned.

vinyl chloride concentration in SW-26 was less than the most stringent ecological criterion. It is unlikely that this seep would ever be used for recreational fishing purposes because it does not have the habitat to support fish. Therefore, the assumptions upon which the RLs are based (i.e., DSRF users will routinely consume fish containing vinyl chloride) are not valid for this seep. Since the vinyl chloride RL exceedance in SW-26 will not cause an unacceptable exposure for ecological or human receptors (and the downstream Little River is not impacted by vinyl chloride), remedial action is not necessary at this location. However, per NCDEQ's request, DuPont will collect sediment and surface water samples from the SW-26 seep to further characterize vinyl chloride concentrations. The only other COPC concentrations that exceeded RLs were iron and/or manganese, which are not site-related COPCs (see Figure 4-4 and Table 4-1). Iron and manganese are naturally-occurring constituents that are not associated with any former manufacturing process. As a result, remedial action is not necessary for the iron and manganese RL exceedances.

4.1.5 Sediment Exposures Pathway

Maximum detected sediment COPC concentrations at the sediment POCs were compared to the most stringent RLs for the sediment exposures pathway (see Figure 4-5). COPC concentrations at the majority of the POC sample locations were less than the RLs. A Lake DERA sample (SED-28) and a DERA Creek sample (SED-09) were the only sample locations with potentially site-related COPC concentrations (PAHs) greater than RLs (see Figure 4-5). The RL exceedances at these two locations were due to 12 PAHs (see Table 4-1). In response to an NCDEQ comment on the RIR, DuPont has agreed to collect additional Lake DERA and DERA Creek sediment samples to further evaluate these PAH RL exceedances and determine whether or not remedial action is needed.[15]

Although iron and/or manganese concentrations exceeded RLs in sample locations SED-10 and SED-26, and lead and selenium concentrations exceeded RLs in sample location SED-33 (see Figure 4-5 and Table 4-1), these detections are not site related. Iron, manganese, lead, and selenium are naturally-occurring constituents that are not associated with any former manufacturing process. In addition, sample location SED-33 (where the lead and selenium RL exceedances were detected) is located upgradient of the former manufacturing areas and former landfills/disposal areas (see Figure 2-4). As a result, remedial action to address a DuPont release is not necessary for iron, manganese, lead, and selenium RL exceedances.

4.1.6 Constituents of Concern

The pathway- and medium-specific COPCs identified in the RIR were identified as constituents of concern (COCs) for a pathway/medium if all of the following criteria were met:

- The COPC was associated with a complete exposure pathway (i.e., surface soil direct contact, subsurface soil direct contact, Bedrock Aquifer used as drinking water, surface water exposures, and/or sediment exposures)
- The maximum COPC concentration at a POC location exceeded an RL

[15] DuPont will also collect co-located surface water samples as part of the sediment sampling. In addition, DuPont will collect sediment and surface water samples from the SW-26 seep per NCDEQ's request.

- The COPC was site-related (i.e., some metals are not site-related)

Based on these three criteria, the following COPCs were identified as COCs (see Table 4-2):

Pathway	Media	COCs
Surface soil direct contact	Soil	3-Methylcholanthrene 7,12-Dimethylbenz(a)anthracene Benzo(a)anthracene Benzo(b)fluoranthene Benzo(a)pyrene Dibenz(a,h)anthracene
Subsurface soil direct contact	Soil	None
Bedrock Aquifer used as drinking water	Groundwater	TCE
Surface water exposures	Surface water	Vinyl chloride
Sediment exposures	Sediment	To be determined after additional sediment sampling [(1)]

Notes:

[(1)] Potential COCs based on existing data are anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(g,h,i)perylene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene.

4.2 ICs/ECs Needed for Potentially-Complete Exposure Pathways

In accordance with the Risk Bill, ICs/ECs need to be implemented for potentially-complete exposure pathways to prevent unacceptable exposures that could occur if the site land use was to drastically change in the future (which is not expected for this site). The potentially-complete exposure pathways for the site include:

- Surface and subsurface soil direct contact by a future resident and future industrial worker
- VI exposures by a current and future DSRF Visitor Center worker, future DSRF worker, future NCNG worker, future resident, and future industrial worker
- Surficial Aquifer used as drinking water by a current and future DSRF user, current and future DSRF Visitor Center worker, future DSRF worker, future NCNG worker, future utility/excavation worker, future resident, and future industrial worker
- Bedrock Aquifer used as drinking water by a current and future DSRF user, future DSRF worker, future NCNG worker, future utility/excavation worker, future resident, and future industrial worker

Thus, the following ICs/ECs will need to be implemented to address the potentially-complete exposure pathways that were not already addressed by actions presented in Section 4.1:

- ICs to prohibit residential land use
- ICs to prohibit industrial land use
- ICs/ECs to characterize and mitigate the potential VI pathway as necessary
- ICs to prohibit extraction of Surficial Aquifer groundwater for use as drinking water[16]

[16] As discussed in Section 4.1.3, DuPont will implement ICs to require that all new or existing Bedrock Aquifer WSWs are sampled prior to being put into service in order to address potential exposures associated with Bedrock Aquifer used as drinking water by a current and future DSRF user, future DSRF worker, future NCNG worker, future utility/excavation worker, future resident, and future industrial worker.

SECTION 5: CONCEPTUAL OVERVIEW OF THE REMEDIAL ACTIONS

The purpose of this section is to provide a conceptual overview of the proposed remedial actions so that they can be evaluated against Risk Bill criteria in Section 6 to ensure the proposed remedial actions are appropriate. Details about how the proposed remedial actions will be implemented are presented in Section 7.

The following remedial actions are proposed to meet the existing DuPont remedial action commitments presented in Section 2.7, satisfy the RAOs presented in Section 3.1, and address the areas needing further action identified in Section 4:

- Complete active remediation at SWMU 11 and SWMU 17 (see Figure 5-1).
  - Design and install a vegetative cap for final closure of SWMU 11; and
  - Design and perform in-situ S/S for soil and waste within SWMU 17, as appropriate. An auger system or injection/mixing head on an excavator will likely be used to apply an S/S agent (e.g., Portland cement) to the soil/waste. A treatability study is being conducted to evaluate the need for, effectiveness, and implementability of in-situ S/S for SWMU 17.
- Perform O&M of existing cap/covers at SWMUs 4, 11, 12A-C, 13, 16, 17, 18A&B, and 20 (see Figure 5-2). O&M activities will include annual inspections of the cap/covers and repair/replacement of the cap/covers as necessary if the cap/covers are damaged or disturbed.
- Implement ICs to prohibit excavation at SWMUs 4, 11, 12A-C, 13, 14, 16, 17, 18A&B, and 20 (see Figure 5-3). The purpose of the ICs is to ensure the cap/covers are not disturbed in the future. Signs or other permanent markings will be established to identify areas where this IC applies.
- Implement ICs to require that NCDEQ is notified and soil is sampled prior to any excavation activities within the former manufacturing area (see Figure 5-3). The notice to NCDEQ should summarize the work that is going to be conducted and the plan for testing soil. The purpose of the ICs is to ensure that appropriate measures are taken to manage the excavated material based on results of the pre-excavation sampling. Signs or other permanent markings will be established to identify areas where this IC applies.
- Install and maintain wooden bollards and/or other physical deterrents/barriers at SWMU 13 to prohibit vehicles from disturbing the existing cover (see Figure 5-4).
- Install and maintain access-control fencing and signs around ISM Decision Unit 6 and the portion of AOC A with the exceedance. The purpose of fencing these areas is to prevent surface soil direct contact exposures associated with RL exceedances (see Figure 5-4). Installation of a gravel cover is also an acceptable exposure barrier.
- Perform O&M of the existing GAC treatment system on the DSRF Visitor Center WSW until TCE and any degradation byproducts are less than RLs (see Figure 5-5). O&M activities will include periodic replacement of the GAC (in accordance with the manufacturer's design criteria and actual flow), annual collection of samples from the WSW, and repair/replacement of the GAC treatment system as necessary.

- Implement ICs to require that any new or existing Bedrock Aquifer WSW is sampled prior to putting the WSW into service (see Figure 5-5). The purpose of the ICs is to ensure that the water quality in the WSW is acceptable for the intended use in accordance with NC's implementation of Safe Drinking Water Act requirements.
- Collect additional sediment and surface water samples in Lake DERA, DERA Creek, and the SW-26 seep to further evaluate whether or not remedial action is needed to address PAHs (see Figure 5-6). In addition, sediment and surface water samples will be collected from the SW-26 seep to further characterize vinyl chloride concentrations, and samples collected in DERA Creek and the SW-26 seep will also be analyzed for diphenyl ether and 1,1-biphenyl.
- Collect and analyze additional soil, sediment, and surface water samples for PCBs to further characterize PCB concentrations and resolve USEPA and NCDEQ questions regarding low-level PCB detections identified during previous surface soil sampling.
- Install and sample a shallow groundwater monitoring well in the Surficial Aquifer between SWMU 17 and the DSRF Visitor Center. The analytical results from this well will be included as an additional line of evidence for the evaluation of the potential for vapor intrusion at the DSRF Visitor Center.
- Conduct post-remedial-action groundwater monitoring at SWMU 11 and SWMU 17 to confirm that the remedial activities did not make existing groundwater conditions worse and that the remedy remains protective of human health and the environment. Sampling events will be conducted one, five, and 10 years after the remedial activities are completed. In the event that contaminant concentrations are not stable or decreasing for three consecutive sampling events, monitoring shall continue every five years thereafter until such conditions are met, or for 30 years, whichever comes first.
- Implement ICs within the site boundary to prohibit (1) residential land use, (2) industrial land use, and (3) extraction of Surficial Aquifer groundwater to use as drinking water (see Figure 5-7). The purpose of the ICs is to prevent unacceptable exposures if land use or groundwater use were to drastically change in the future (which is not expected). These ICs will address the potentially-complete exposure pathways discussed in Section 2.12.
- Implement ICs/ECs to characterize and mitigate the potential VI pathway as necessary within the portion of the site where VOCs in the Surficial Aquifer could be present (see Figure 5-7). The purpose of the ICs/ECs is to ensure that there are no unacceptable VI exposures for routinely occupied buildings constructed in the future. These ICs will address the potentially-complete exposure pathways discussed in Section 2.12.
- Submit a RCRA Part B Permit Renewal Application as required by 40CFR 270.30 unless the RAP Completion Report has been approved by NCDEQ prior to August 31, 2018.

The proposed remedial actions can be implemented in a relatively short time frame (e.g., two to three years following RAP approval). ECs and health and safety measures will be utilized to minimize potential risks to workers, the surrounding community, and ecological receptors as appropriate during implementation of the remedial actions.

SECTION 6: EVALUATION OF THE REMEDIAL ACTIONS

In accordance with NCGS § 130A-310.69(c), the remedial actions identified in Section 5 were evaluated based on the following factors:

- Long-Term Risks and Effectiveness;
- Toxicity, Mobility, and Volume of Contaminants;
- Short-Term Risks and Effectiveness; and
- The Ease/Difficulty of Implementing the RAP.

6.1 Long-Term Risks and Effectiveness

The long-term risks and effectiveness associated with the proposed remedial actions were evaluated and summarized in the following table using the five sub-factors listed in NCGS § 130A-310.69(c)(1).

Factor	Evaluation
The magnitude of risks remaining after completion of the remediation	The magnitude of potential risks remaining after implementation of the proposed remedial actions is minimal. As discussed in Section 4.1, there are few exceedances of site-specific remediation standards prior to implementation of the proposed remedial actions. The few exceedances that will remain will be controlled with long-term actions including cap/covers, O&M activities, and ICs/ECs.
The type, degree, frequency, and duration of any post-remediation activity that may be required, including, but not limited to, O&M, monitoring, inspection, reports, and other activities necessary to protect public health, safety, and welfare and the environment	Long-term activities such as O&M, inspections, potential repair/replacement, ICs/ECs, and reporting are anticipated. However, the degree of the long-term activities is not expected to be onerous. The few long-term activities are not complicated and can be easily implemented. Even if there was a temporary failure with one or more of the long-term activities, there would be minimal impact on the potential risk posed by the site or the effectiveness of the proposed remedial actions given the limited potential risk posed by the site.
The potential for exposure of human and environmental receptors to constituents remaining at the site	The potential for exposure of human and ecological receptors to COCs that will remain at the site is minimal. As discussed in Section 4.1, there are few exceedances of site-specific remediation standards prior to implementation of the proposed remedial actions. The few exceedances that will remain will be controlled with a variety of long-term actions including cap/covers, O&M activities, and ICs/ECs.
The long-term reliability of any ECs and voluntary ICs, including repair, maintenance, or replacement of components	Long-term activities such as O&M, inspections, potential repair/replacement, ICs/ECs, and reporting are anticipated to occur. These activities rely on relatively simple and easy to implement technologies that have been proven to be reliable at other sites.
The time required to achieve remediation standards	Site-specific remediation standards can be achieved in a relatively short time frame (e.g., two to three years following RAP approval).

6.2 Reduction in Toxicity, Mobility, and Volume of Contaminants

The reduction in toxicity, mobility, and volume of contaminants associated with the proposed remedial actions was evaluated and summarized in the following table using the three sub-factors listed in NCGS § 130A-310.69(c)(2).

Factor	Evaluation
The amount of contaminants that will be removed, contained, treated, or destroyed	A significant amount of contaminants and waste material have been and/or will be removed, contained, and treated. For instance, approximately 75,000 cubic yards of debris and other waste materials were removed and disposed of off-site during the plant demolition and removal activities. Approximately 15,000 cubic yards of PET was removed and recycled off-site during the 2011 to 2012 SWMU 14 IM and Interim Closure of the SWMU 11 CAMU. Cap/covers have been installed over SWMUs 4, 11, 12A-C, 13, 16, 17, 18A&B, and 20. Treatment of VOCs (e.g., TCE) with the GAC system at the DSRF Visitor Center WSW is ongoing. SWMU 11 will receive additional containment (i.e., vegetative cap) and SWMU 17 will be treated with in-situ S/S during implementation of the proposed remedial actions.
The degree of the expected reduction in toxicity, mobility, and volume	The completed and/or proposed removal, containment, and treatment actions described above have significantly reduced and/or will significantly reduce the mobility and volume of COCs and waste material.
The type, quantity, toxicity, and mobility of contaminants that will remain after implementation of the RAP	COCs and waste material will remain after implementation of the proposed remedial actions. However, further reduction of the toxicity, mobility, and/or volume of COCs and waste material beyond the proposed remedial actions is not warranted given (1) the degree of completed and/or proposed removal, containment, and treatment actions described above, (2) the waste materials from former landfills/disposal areas that were generally inert and non-toxic, (3) the few remaining COCs at the site, and (4) the limited impacts associated with the remaining COCs. Materials remaining on-site are either below site-specific RLs or are not located where human or ecological receptors can contact the materials.

6.3 Short-Term Risks and Effectiveness

The short-term risks and effectiveness associated with the proposed remedial actions were evaluated and summarized in the following table using the two sub-factors listed in NCGS § 130A-310.69(c)(3).

Factor	Evaluation
Short-term risks that may be posed to the community, workers, or the environment during implementation of the RAP	Short-term risks that may be posed to the community, workers, and the environment during implementation of the RAP are minimal. As discussed in Section 4.1, there were few exceedances of site-specific remediation standards prior to implementation of the proposed remedial actions. In other words, the potential risks associated with COCs and waste material remaining at the site is minimal. Nonetheless, ECs and health and safety measures will be utilized during the implementation of the proposed remedial actions to further reduce potential short-term risks.
The effectiveness and reliability of protective measures to address short-term risks	ECs and health and safety measures are relatively simple and easy-to-implement technologies have been proven to be reliable at other sites.

6.4 Ease or Difficulty of Implementation

The ease or difficulty of implementation associated with the proposed remedial actions was evaluated and summarized in the following table using the five sub-factors listed in NCGS § 130A-310.69(c)(4).

Factor	Evaluation
Commercially-available remedial measures	The proposed remedial actions rely upon relatively small amounts equipment, materials, and supplies. The equipment, materials, and supplies that will be needed are readily available.
The expected operational reliability	The expected operational reliability is high because the proposed remedial actions rely upon relatively simple and easy-to-implement technologies that have been proven to be reliable at other sites.
Available capacity and location of needed treatment, storage, and disposal services for wastes	Little to no waste will be generated by the proposed remedial actions. If waste is generated, DuPont-approved disposal facilities have availability to accept the waste.
The time to initiate remediation	All of the proposed remedial actions will likely be initiated within one year of RAP approval, if not sooner.
The approvals necessary to implement the remediation	Following RAP approval, permits (e.g., local grading permit, coverage under a general NPDES stormwater permit) will likely be required for some of the proposed remedial actions (e.g., work at SWMU 11 and SWMU 17). Obtaining these permits is expected to be relatively easy.

6.5 NCDEQ Approval Criteria

NCGS § 130A-310.71(a) identifies 10 approval criteria that must be met for NCDEQ to approve the RAP. The RIR and RAP address all 10 criteria as summarized in the following table.

NCDEQ Approval Criteria	Content in RIR and RAP
Determine whether site-specific remediation standards are appropriate for a particular contaminated site. In making this determination, the Department shall consider proximity of the contamination to water supply wells or other receptors; current and probable future reliance on the groundwater as a water supply; current and anticipated future land use; environmental impacts; and the feasibility of remediation to unrestricted use standards.	Future land uses for the site are clear and future property owners have been engaged in the RAP process. Site-specific remediation standards were developed based on input from the NCDA&CS, DSRF, and NCNG in collaboration with NCDEQ and site impacts are minimal (see Section 4.1). The only WSW with a COC RL exceedance has a GAC treatment system to remove the COC. Other on-site WSWs are not currently being used and COCs were not identified at these WSWs.
Determine whether the party conducting the remediation has adequately demonstrated through modeling or other scientific means acceptable to the Department that no contamination will migrate to adjacent property at levels above unrestricted use standards, except as may remain pursuant to a cleanup conducted pursuant to G.S. 130A-310.73A(a)(2).	Once the remaining DuPont-owned property is transferred to the State, the State will own a contiguous area of land that is significantly larger than the site boundary depicted in this RAP. Although there are groundwater impacts relatively near the site boundary depicted in this RAP (e.g., TCE impacts in the DSRF Visitor Center WSW), these impacts will not affect adjacent properties once the remaining DuPont-owned property becomes integrated with the surrounding State land.
Determine whether the proposed remedial action plan meets the requirements of G.S. 130A-310.69.	An RIR was submitted to NCDEQ pursuant to NCGS § 130A-310.69(a). This RAP includes all of the components listed in NCGS § 130A-310.69(b). Sections 6.1 through 6.4 of this plan provide an evaluation of the factors in NCGS § 130A-310.69(c).
Determine whether the proposed remedial action plan meets the requirements of any other applicable remediation program except those pertaining to remediation standards.	Implementation of the RAP will result in conditions at the site that are protective and will fulfill the RCRA CA requirements for the site.
Establish the acceptable level or range of levels of risk to public health, safety, and welfare and to the environment.	Site-specific RLs were established in this RAP consistent with NCGS § 130A-310.68(b).
Establish, for each contaminant, the maximum allowable quantity, concentration, range, or other measures of contamination that will remain at the contaminated Site at the conclusion of the contaminant-reduction phase of the remediation.	Table 4-2 of this RAP presents the typical COPC concentrations that exceed RLs and the concentrations expected to remain at the site following implementation of the proposed remedial actions. To the extent practicable, the RAP Completion Report will document residual COC concentrations remaining after the proposed remedial actions are implemented.
Consider the technical performance, effectiveness, and reliability of the proposed remedial action plan in attaining and maintaining compliance with applicable remediation standards.	A summary of the technical performance, effectiveness, and reliability evaluation for the proposed remedial actions is presented in Sections 6.1 through 6.4 of this RAP.
Consider the ability of the person who proposes to remediate the Site to implement the proposed remedial action plan within a reasonable time and without jeopardizing public health, safety, or welfare or the environment.	DuPont can implement the proposed remedial actions within a reasonable time frame (e.g., two to three years following RAP approval) while protecting public health, safety, and welfare and the environment.
Determine whether the proposed remedial action plan adequately provides for the imposition and maintenance of ECs and ICs and for sampling, monitoring, and reporting requirements necessary to protect public health, safety, and welfare and the environment. In making this determination, the Department may consider, in lieu of land-use restrictions authorized under G.S. 130A-310.69, reliance on other State or local land-use controls. Any land-use controls implemented shall adequately protect public health, safety, and welfare and the environment, and provide adequate notice to current and future property owners of any residual contamination and the land-use controls in place.	This RAP provides for the implementation and maintenance of ICs and ECs, sampling, and monitoring as summarized in Section 7. The ICs and ECS were designed to protect public health, safety, and welfare and the environment. Proposed land use controls are based on future land use. Current (DuPont) and future (State) property owners have been actively engaged in developing the ICs and ECs.
Approve the circumstances under which no further remediation is required.	A no further action determination is not anticipated for this site given the nature and duration of long-term activities (e.g., O&M and ICs/ECs).

6.6 Conclusions

As summarized in Sections 6.1 through 6.4, the proposed remedial actions are expected to:

- Adequately address long-term risks;
- Be effective over the long-term;
- Adequately reduce the toxicity, mobility, and/or volume of COCs and waste material;
- Adequately address short-term risks;
- Be effective over the short-term; and
- Be relatively easy to implement.

As summarized in Section 6.5, the RIR and RAP satisfy the 10 NCDEQ approval criteria. Therefore, it is recommended that the proposed remedial actions be implemented as the final site remedy.

SECTION 7: IMPLEMENTATION OF THE REMEDIAL ACTIONS

7.1 Public Participation Procedures

In accordance with NCGS § 130A-310.70, the public and other stakeholders have been involved in the RAP process. Future landowners and NCDEQ previewed the Conceptual RAP and a Notice of Intent to Remediate (Notice) was issued for the public. In the Notice, a brief site history, planned remedial actions, and contact information for the DuPont project manager were provided. In addition, information regarding the public meeting, and information on how to access other site reports pertinent to the RAP in an information repository at the Transylvania Public Library or via NCDEQ's and DuPont's websites were provided. A 60-day public comment period was initiated on May 26, 2016 when the Notice was advertised in the Transylvania County Times. The Notice was also advertised via mail, radio, and print:

- The Notice was mailed on May 26, 2016 to NCDEQ, all local governments with taxing or land-use jurisdiction over the site, and the facility's mailing list.
- The Notice was read in a 60-second radio advertisement, which was placed on local radio station 720 AM WGCR the week of May 30, 2016 (after the Notice was mailed) and the week of June 20, 2016 (the week of the public meeting); and
- The Notice was professionally printed on a large (2' x 4') yellow weatherproof board that was placed along Staton Road adjacent to the site.

In addition, DuPont hosted two meetings to present and communicate the components of the RAP with the public. DuPont met with the Friends of the Forest on May 3, 2016 and the public on June 23, 2016. The public meeting, which was advertised in the Notice via newspaper, radio, and print, was held at the Transylvania County Library on June 23, 2016 and comments were received from local and interested stakeholders.

The comments that were received for the RIR and the draft RAP are presented in Appendix C. In addition, a responsiveness summary (including the public's comments, DuPont's responses, and how the RAP was modified, as appropriate, based on those comments) is included in Appendix C.

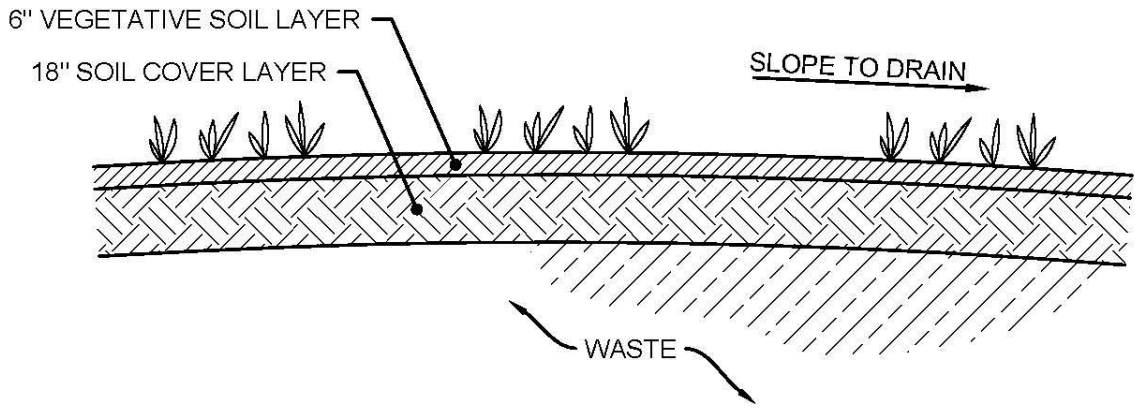
The RAP was modified to incorporate NCDEQ's comments on the RIR and RAP (e.g., identification of minor data gaps). The RAP was not modified based on the public's comments due to the nature of the comments received.

7.2 Remaining Remedial Design Activities

In accordance with NCGS § 130A-310.69(b)(13), the remaining remedial design activities, including treatability studies and additional sampling, needed to support the remedial actions are presented in this section. Future work plans and Land Use Restrictions (LURs) will be subject to approval by the NCDEQ prior to implementation.

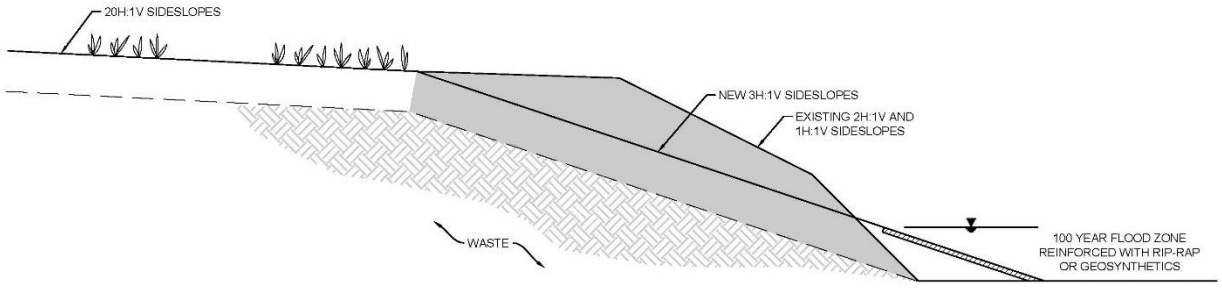
7.2.1 SWMU 11 Vegetative Cap Design

DuPont and NCDEQ have reached agreement on a conceptual closure approach for the SWMU 11 vegetative cap. The currently-proposed conceptual design includes installing a six- inch thick vegetative soil cover layer that overlays an 18-inch thick soil cover layer, as shown below. Remedial design activities will begin once the RAP is approved.



The soil cover layer will cover SWMU 11 waste and reduce infiltration into the waste. The vegetative soil layer will promote the establishment of vegetation and stabilization of the cover system to reduce erosion. The final surface of the soil cover will be seeded to establish trees and other native vegetation on the unit, consistent with the surrounding ground cover, habitat, and stakeholder input. The conceptual design assumes that the vegetative soil layer and the soil cover layer will be constructed using on-site or equivalent borrow soil.

Portions of the sideslopes that are currently steeper than three horizontal to one vertical (3H:1V) will be regraded to 3H:1V. Grading will improve stability and promote positive drainage from the SWMU 11 cover system. Additionally, rip-rap will be placed along the toe of the slopes within the 100-year flood plain in accordance with Army Corps of Engineers guidance for bank-slope protection. A conceptual view of the 3H:1V sideslope regrading and consolidation of waste is shown below.



3H:1V Graded Sideslopes

(Grey-shaded area represents waste to be relocated)

Implementation of the soil cover system at SWMU 11 is anticipated to be as follows:

- Clearing and grubbing the existing surface and sideslopes;
- Relocating waste on the sideslopes and re-grading the sideslopes to (3H:1V) while maintaining the existing toe of slope;
- Placing the soil cover layer;
- Placing and seeding the vegetative cover layer; and,
- Placing rip-rap along the sideslopes in the floodplain to the 100-year flood elevation.

During the design of the final cover, static and seismic slope stability analyses will be performed to verify that the closed unit will be stable. Additionally, during the design phase, the soil cover layer thickness may be adjusted where the existing soil cover is in good condition and will not be disturbed by grading and waste consolidation efforts (i.e. portions of the top deck). DuPont will work with local stakeholders to determine the best approach for developing a sustainable vegetative cover system that will likely include native grasses. The refined plan and design will be presented in an upcoming RAP Implementation Work Plan.

7.2.2 SWMU 17 In-Situ S/S Design

Remedial design work and remedial actions at SWMU 17 are ongoing as an IM. Prior to full-scale implementation, an additional investigation will be performed, including a geophysical survey, test trenches, and a bench-scale treatability study. A SWMU 17 IM work plan was developed and describes the additional investigation in detail (Parsons 2016). The work plan includes the following elements:

- An updated geophysical investigation will be conducted to locate potential buried waste material.
- Test trenches will be excavated to visually identify and remove waste materials (e.g., sludges) or other materials that could hinder potential in-situ S/S activities (e.g., waste containers, rugs, and other solid debris). The waste materials will be segregated and placed in lined, roll-off containers for characterization and off-site disposal. Segregating these materials will reduce the potential for impacts to public health, safety, and welfare and the environment and improve the ability to apply and mix the binding agent.
- Soil samples will be collected during test trenching activities to support bench-scale S/S studies and to characterize the material for disposal.
- Excavated soil from the test trenching activities will be used to backfill the trenches.
- A treatability study will be performed for SWMU 17 to verify the effectiveness of the proposed in-situ S/S as well as to develop design parameters for the treatment.
- Final remedial design of the in-situ S/S will be conducted following the treatability study.

Fieldwork is targeted for the week of September 26 and is anticipated to take three weeks. In accordance with the approved work plan, the treatability study is anticipated to take eight months with a final report to be submitted three months following the treatability study.

7.2.3 Additional Sampling

The following additional sampling will be conducted to support the RAP:

- **Additional Characterization of PAHs in Sediment and Surface Water**: Additional Lake DERA, DERA Creek sediment and surface water samples will be collected and analyzed for PAHs in order to further evaluate whether or not remedial action is needed to address PAHs. Additional sediment and surface water samples will be collected from the SW-26 seep to further characterize vinyl chloride concentrations. Per NCDEQ's request, the samples collected in DERA Creek and the SW-26 seep will also be analyzed for diphenyl ether and 1,1-biphenyl. A sampling plan will be provided to NCDEQ for review and approval.
- **Additional Characterization of Potential VOCs in Surficial Aquifer at the DSRF:** A shallow groundwater monitoring well will be installed in the Surficial Aquifer between SWMU 17 and the DSRF Visitor Center. The well will be sampled and the analytical results will be included as an additional line of evidence in the evaluation of the potential for vapor intrusion at the DSRF Visitor Center. Depending on sampling results from the new monitoring well, additional monitoring may be necessary.
- **Additional Characterization of PCBs in Soil, Sediment, and Surface Water**: DuPont is working with USEPA and NCDEQ to resolve questions regarding PCBs in soil. Additional soil, sediment, and surface water samples will be collected and analyzed for PCBs to further characterize PCB concentrations and resolve USEPA and NCDEQ questions regarding low-level PCB detections identified during previous surface soil sampling.

The results of these additional sampling activities will be documented in reports that will be submitted to NCDEQ for review. Depending on the sampling results, additional assessment and/or remediation may be necessary.

7.3 Compliance with Other Regulations during Implementation

In accordance with NCGS § 130A-310.69(b)(7), measures will be implemented for applicable construction activities (e.g., SWMU 11 and SWMU 17 earthwork activities) in order to prevent discharge into surface waters that violate applicable surface water quality standards. These measures will likely include:

- Obtaining a local gradient permit:
- Obtaining coverage under the State's general stormwater NPDES permit;
- Implementing applicable provisions of the local grading permit and the State's general stormwater NPDES permit; and
- Preparing and implementing a temporary erosion and sediment control plan and stormwater pollution prevention plan.

In accordance with NCGS § 130A-310.69(b)(8), measures will be implemented for applicable construction activities (e.g., SWMU 11 and SWMU 17 earthwork activities) to prevent air emissions that could violate applicable air quality standards. These measures will likely include:

- Dust control best management practices to prevent fugitive dust emissions; and
- Dust monitoring to evaluate fugitive dust emissions and ensure worker safety.

In accordance with 40 CFR 270.30, a RCRA Part B Permit Renewal Application will be prepared and submitted as required unless the RAP Completion Report has been approved by NCDEQ prior to the due date of the Permit Renewal Application. In addition, DuPont will comply with other applicable regulations as appropriate (e.g., RCRA regulations for waste generation, storage, transportation, and disposal, and

Occupational Safety and Health Act regulations for protection of workers). Prior to any construction or excavation activities, DuPont will also identify sensitive ecological areas, conduct ecological assessments as necessary, and implement mitigation measures as necessary.

7.4 Confirmatory Sampling

In accordance with NCGS § 130A-310.69(b)(9), (10), and (13), it is expected that confirmatory sampling activities will be conducted to evaluate the concentrations of COCs after the remedial actions are completed. Post-remedial action groundwater monitoring will be conducted at SWMU 11 and SWMU 17. The purpose of this monitoring will be to confirm that the remedial activities did not make existing groundwater conditions worse and that the remedy remains protective of human health and the environment. Sampling events will be conducted one, five, and 10 years after the remedial activities are completed. If contaminant concentrations are not stable or decreasing for three consecutive sampling events, monitoring shall continue every five years thereafter until such conditions are met, or for 30 years, whichever comes first. Groundwater samples will be collected from four wells for each SWMU. The existing site Sampling and Analysis Plan/Quality Assurance Project Plan will be updated as necessary for these activities (URS 2009; Parsons 2010, 2014).

7.5 Health and Safety for Workers and Other Potential Receptors

In accordance with NCGS § 130A-310.69(b)(14), health and safety measures will be implemented for all field construction activities in order to ensure that workers, visitors, and people in the vicinity of the site are not adversely affected by field construction activities. These measures will be implemented in accordance with the project Health and Safety Plan (HASP), which will be updated as needed for the field construction activities. The HASP will address provisions including, but not limited to:

- Conducting pre-construction process hazard analyses;
- Using trained and experienced workers;
- Implementing health and safety procedures;
- Implementing ECs;
- Performing air monitoring;
- Implementing dust controls;
- Implementing noise controls; and
- Controlling work-area access.

7.6 Deed Restriction and Property Control Plan

In accordance with NCGS § 130A-310.69(b)(11), a deed restriction will be used to ensure the required O&M activities and ICs/ECs are implemented over the long-term. The following information will be included in the deed restriction:

- The areas where restrictions are being imposed will be identified on plat maps in accordance with NCGS 47-30 and 143B-279.10;
- LUR language will be developed and included on plats; and

- The plats and LURs will be recorded in the Register of Deeds office.

A Property Control Plan will be developed to establish specific procedures for long-term implementation of the required O&M activities and ICs/ECs. The Property Control Plan will include:

- A Long-term O&M Plan;
- An Excavation and Land Use Management Plan;
- A Groundwater Use Management Plan; and
- A VI Characterization and Mitigation Plan.

The Property Control Plan will be referenced or attached to the deed restriction. Associated plans and LURs will be subject to approval by the NDDEQ prior to implementation. Additional details about the four plans that will support the Property Control Plan are discussed below.

7.6.1 Long-Term O&M Plan

In accordance with NCGS § 130A-310.69(b)(9), a Long-term O&M Plan will be developed to provide specific details for the long-term implementation of required O&M activities.

O&M Activities	Area	Objective	Summary of O&M Components
Long-term O&M of existing cap/covers	SWMUs 4, 11, 12A-C, 13, 16, 17, 18A&B, and 20 (see Figure 5-2)	Ensure the existing cap/covers remain in place to prevent exposure to subsurface waste materials	▪ Inspect cap/covers annually ▪ Report inspections annually ▪ Repair/replace the cap/covers as necessary (e.g., maintain seeded vegetative cover layer, reinforce rip-rap on sideslopes) ▪ Report repair/replace activities
Maintain access control fencing and install warning signs on fencing	ISM Decision Unit 6 and AOC A (see Figure 5-4)	Ensure the fencing is maintained to prevent exposure to surface soil RL exceedances. The fencing should be high enough to strongly discourage trespassers from entering the area. Warning signs attached to the fencing will also be maintained.	▪ Inspect fencing annually ▪ Report inspections annually ▪ Maintain and replace fencing as necessary ▪ Maintain and replace warning signs as necessary
Long-term O&M of the existing GAC treatment system at the DSRF Visitor Center WSW	DSRF Visitor Center WSW (see Figure 5-5)	Ensure the existing GAC treatment system continues to operate as intended and adequately treats TCE and any degradation byproducts in the DSRF Visitor Center WSW	▪ Replace the pre-GAC canisters semiannually ▪ Replace two of the four GAC units annually ▪ Sample the GAC effluent semiannually ▪ Report sampling activities to NCDEQ and DSRF semiannually
Maintain vehicle access deterrent/barrier	SWMU 13	Ensure the deterrent/barrier is maintained to prevent vehicles from disturbing the existing cover	Install and maintain wooden bollards and/or other physical deterrents/barriers to prevent vehicles from disturbing the existing cover (see Figure 5-4).

7.6.2 Excavation and Land Use Management Plan

An Excavation and Land Use Management Plan will be developed to provide specific details for the long-term implementation of required ICs/ECs related to excavation activities and land use.

IC/EC	Area	Objective	Summary of IC/EC Components
Prohibit excavation (i.e., "No Dig Areas")	SWMUs 4, 11, 12A-C, 13, 16, 17, 18A&B, and 20 (see Figure 5-3)	Ensure the existing cap/covers are not disturbed by excavation activities	▪ Install signs or permanent markings to identify areas with "no dig" ICs ▪ Inspect cap/covers annually ▪ Report inspections annually
Require that NCDEQ is notified and soil is sampled prior to any excavation activities (i.e., "Test Before Dig")	Former manufacturing area (see Figure 5-3)	Ensure that appropriate measures are performed to manage excavated material as necessary based on an evaluation of the pre-excavation sample results	▪ Install signs or permanent markings to identify areas with "test before dig" ICs ▪ Notify NCDEQ if soil will be excavated ▪ Collect soil samples prior to excavation and analyze for applicable constituents ▪ Evaluate sampling results to ensure excavated material is handled and managed appropriately ▪ Report soil sampling results, evaluation results, and any recommended actions/controls associated with the excavation activity ▪ Conduct action if a site-related constituent concentration exceeds an RL
Prohibit residential land use	Entire site (see Figure 5-7)	Ensure there is no residential land use	▪ Inspect land use and deed restrictions annually ▪ Submit an annual certification to NCDEQ that land use continues to comply with LURs and the deed restriction is still properly recorded as required by NCGS § 130A-310.69(b)(12)
Prohibit industrial land use	Entire site (see Figure 5-7)	Ensure there is no industrial land use	▪ Inspect land use and deed restrictions annually ▪ Submit an annual certification to NCDEQ that land use continues to comply with LURs and the deed restriction is still properly recorded as required by NCGS § 130A-310.69(b)(12)

7.6.3 Groundwater Use Management Plan

A Groundwater Use Management Plan will be developed to provide specific details for the long-term implementation of required ICs/ECs related to groundwater use.

IC/EC	Area	Objective	Summary of IC/EC Components
Require that any new or existing Bedrock Aquifer WSW is sampled prior to putting the WSW into service	Bedrock Aquifer across entire site (see Figure 5-5)	Ensure that the water quality in the WSW is acceptable for the intended use in accordance with NC's implementation of Safe Drinking Water Act requirements	▪ Collect and analyze groundwater samples from the WSW prior to use and during use in accordance with NC's implementation of Safe Drinking Water Act requirements[17] ▪ Evaluate and report sampling results in accordance with NC's implementation of Safe Drinking Water Act requirements ▪ Conduct action as necessary if a site-related constituent concentration exceeds an RL
Prohibit the extraction of Surficial Aquifer groundwater for use as drinking water	Surficial Aquifer across entire site (see Figure 5-7)	Ensure that future potential receptors do not use the Surficial Aquifer for drinking water	▪ Submit a report to confirm that no on-site Surficial Aquifer WSWs are being used for drinking water purposes
Abandon wells that are no longer used	Entire site (see Figure 5-7)	Eliminate the potential for a groundwater well to act as a conduit for contamination or a source of drinking water	▪ Maintain monitoring wells in the vicinity of DSRF Visitor Center ▪ Maintain four monitoring wells in vicinity of SWMU 11 and SWMU 17 ▪ Maintain all WSWs (WSW-YMCA, WSW-CMPGND, WSW-GUARD, WSW-VISIT, and WSW-WWT) ▪ Abandon all other monitoring wells

7.6.4 VI Characterization and Mitigation Plan

A VI Characterization and Mitigation Plan will be developed to provide specific details for the long-term implementation of required ICs/ECs related to the potential VI pathway.

IC/EC	Area	Objective	Summary of IC/EC Components
VI Characterization	Portion of the site where VOCs may be present (see Figure 5-7)	Characterize the potential for VI in any new building that will be routinely occupied	▪ Collect groundwater, soil gas, and/or indoor samples as appropriate and analyze for VOCs ▪ Evaluate sampling results to determine whether or not mitigation is needed ▪ Report sampling results, evaluation results, and any recommendations based on the results
VI Mitigation (if necessary)	Portion of the site where VOCs may be present (see Figure 5-7)	Ensure that the potential VI pathway is mitigated for each occupied building as appropriate based on the design and location of the building	▪ Install a mitigation system (e.g., vapor barrier or passive convertible ventilation system) ▪ Test the mitigation system installation ▪ Perform post-construction baseline multimedia sampling (groundwater, soil gas, indoor air, ambient air) ▪ Submit a report documenting the installation and testing of the mitigation system and post-construction baseline sampling results

[17] As an example, due to the presence of metals above the NC 2L, the WSW-Campground supply well will be sampled before it is used. If these results also indicate constituents are present in groundwater above NC 2L standards, a health risk evaluation (HRE) will be performed. The results of the HRE will determine the risk associated with potential uses (drinking, toilets, showering, etc.) of the water from the well and what steps are necessary to reduce these risks. As an alternative, the well can be abandoned.

IC/EC	Area	Objective	Summary of IC/EC Components
VI O&M (if necessary)	Portion of the site where VOCs may be present (see Figure 5-7)	Ensure that the potential VI pathway is mitigated for each occupied building as appropriate based on the design and location of the building	▪ Develop a building- or area-specific VI O&M Plan ▪ Inspect VI mitigation system periodically ▪ Perform multimedia sampling periodically to demonstrate mitigation is effective ▪ Submit report

7.7 RAP Completion Report

In accordance with NCGA § 130A-310.73, a RAP Completion Report will be submitted to NCDEQ when the RAP has been fully implemented. The RAP Completion Report will document that the RAP has been fully implemented and remediation standards have been achieved. In addition, all local governments with taxing and land-use jurisdiction over the site will be notified when the RAP Completion Report is submitted to NCDEQ.

7.8 Implementation Schedule

RAP implementation schedule milestones include:

- A RAP Implementation Plan will be submitted 120 days after RAP approval.
- Design and implementation of the SWMU 11 vegetative cap will take approximately three years.
- Design and implementation of the SWMU 17 in-situ S/S project will take approximately two years.
- The RAP Completion Report (per Risk Bill Section 130A-310.73) will document that the RAP has been fully implemented and remediation standards have been achieved. The report will be completed within 120 days after all remedial actions are implemented.

7.9 Remedial Action Cost Estimate and Financial Assurances

7.9.1 Cost Estimate

In accordance with NCGS § 130A-310.69(b)(15), an estimate was developed of the probable cost of the remedial actions described in the RAP. The cost estimate is summarized below and is presented in more detail in Appendix D.

RAP Cost Estimate – Summary

Component	Task	Estimated Cost
SWMU 17	Remediation: Work Plans, Health and Safety, Subcontractors, Field Work, Reporting	$717,430
	Post Remediation Monitoring: Assumes a four-well sampling event occurs Year 1, Year 5, and Year 10 after remediation is complete	$45,000
	DSRF Visitor Center GAC System Costs: Assumes carbon change-out and annual monitoring for 30 years	$310,000
SWMU 11	Cover and Slope Design, Work Plan, Health and Safety, Subcontractors, Field Work, Reporting	$2,230,750
	Post Remediation Monitoring: Assumes a four-well sampling event occurs Year 1, Year 5, and Year 10 after remediation is complete	$45,000
Additional Investigation	Sediment and Surface Water: Work Plan, Field Work, Laboratory & Analytical Data Quality Management, Reporting	$77,500
	Installing/Sampling Well at DSRF: Work Plan, Field Work, Lab & ADQM, Reporting	$18,010
RAP Implementation	RAP Implementation Plan	$25,000
	Deed Restrictions	$10,000
	Implementation of Remedial Actions	$10,000
	RAP Property Control Plan: Long-Term O&M Plan, Excavation and Land Use Plan, Groundwater Use Management Plan, VI Characterization and Mitigation Plan	$35,000
	Well Abandonment	$94,800
	Implementation of Plans, Periodic Repairs, and Annual Certification of LURs	$150,000
	Remedial Action Completion Report	$30,000
RCRA Part B Permit	Permit Renewal Application	$10,000
	TOTAL	$3,808,490

7.9.2 Financial Assurances

In accordance with NCGS § 130A-310.69(b)(16), DuPont will provide the appropriate financial assurance for the costs estimated in Section 7.9.1 once the RAP is approved.

SECTION 8: REFERENCES

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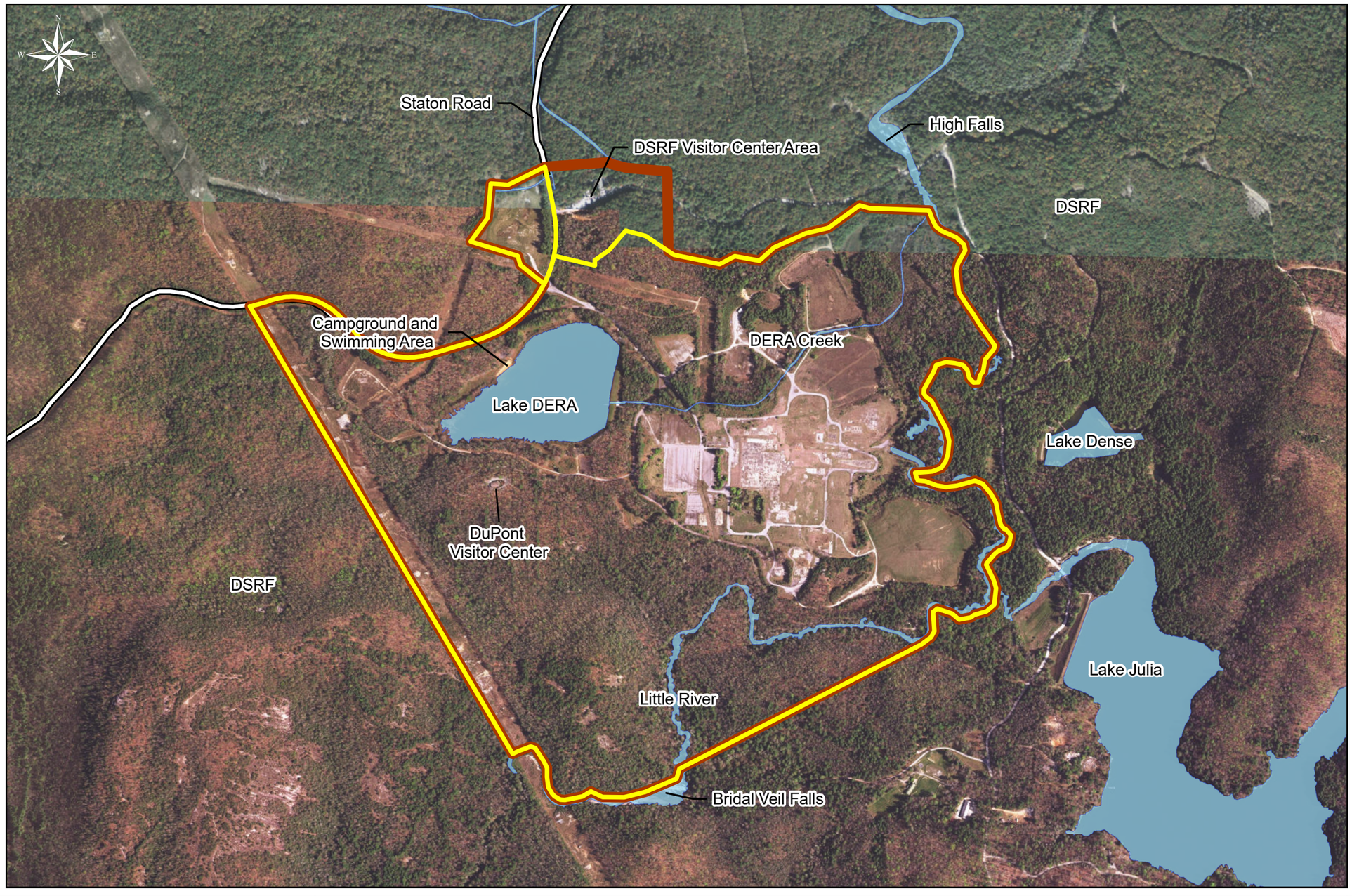
Figures



Legend

- Property Boundary
- Site Boundary
- Lake or Stream
- Staton Road

Notes:
Discoloration in base layer is due to GIS imagery.

0 500 1,000 1,500 Feet

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Site Location
Remedial Action Plan
Brevard Site
Cedar Mountain, North Carolina

Figure 1-1

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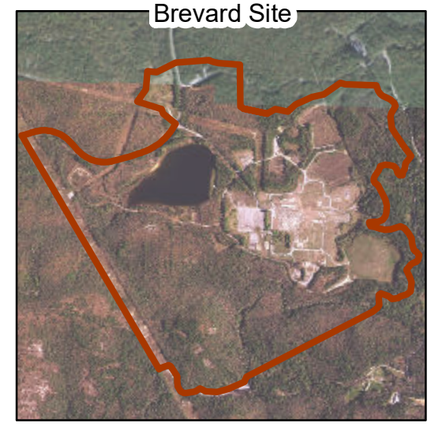

Legend

- Site Boundary
- Lake or Stream
- Historical Manufacturing-Related Features

Notes:
Discoloration in base layer is due to GIS imagery.

0 250 500 1,000 1,500
Feet

PIONEER TECHNOLOGIES CORPORATION

Historical Manufacturing-Related Features
Remedial Action Plan
Brevard Site
Cedar Mountain, North Carolina

Figure 2-1

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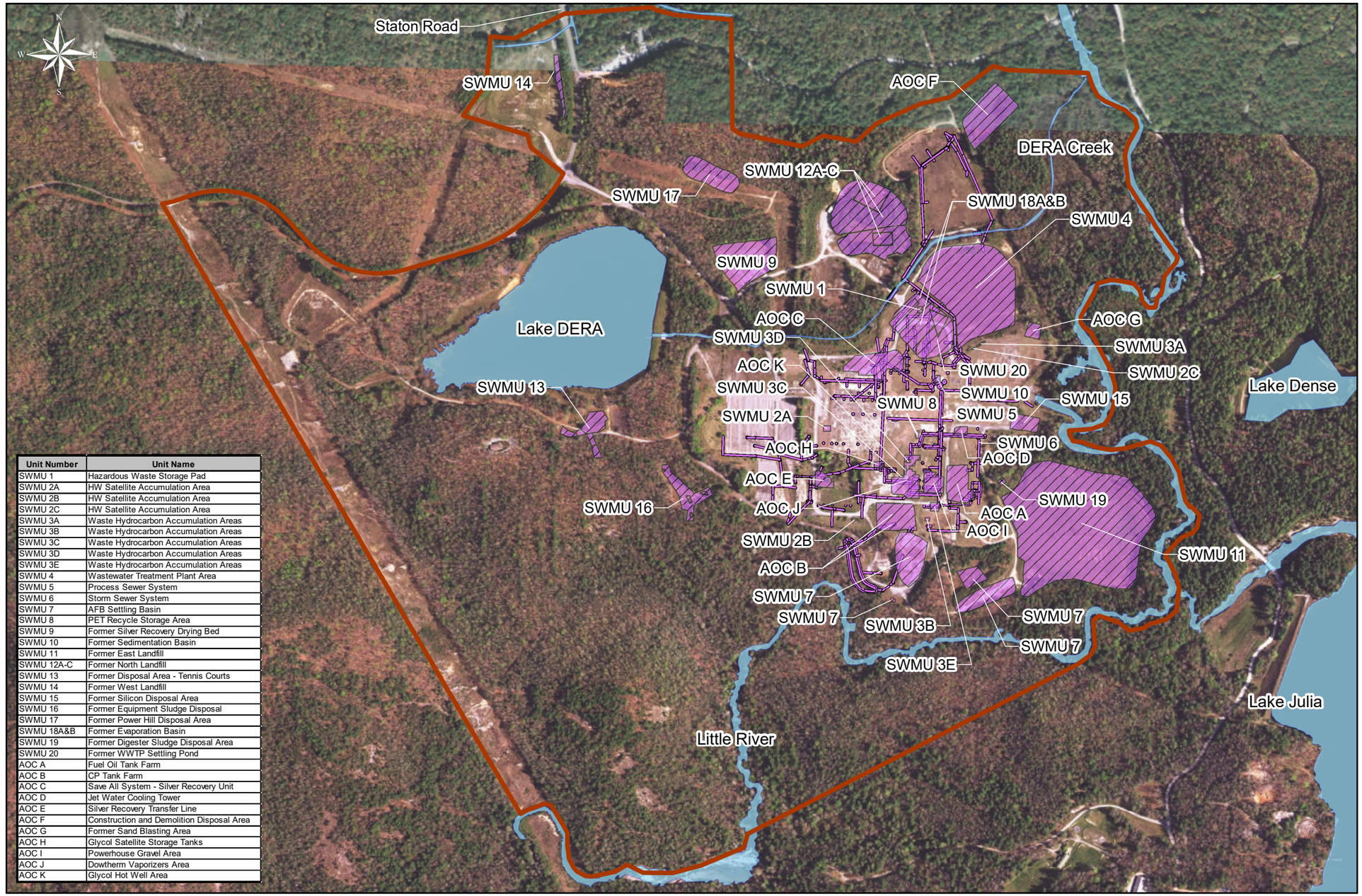
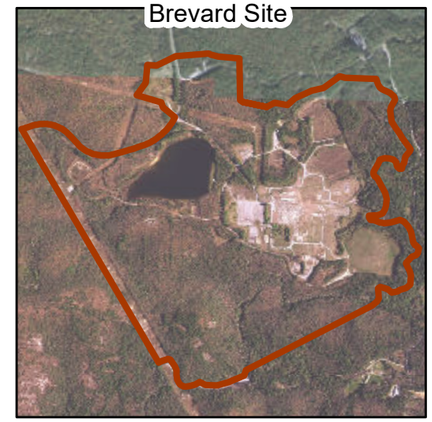


Unit Number	Unit Name
SWMU 1	Hazardous Waste Storage Pad
SWMU 2A	HW Satellite Accumulation Area
SWMU 2B	HW Satellite Accumulation Area
SWMU 2C	HW Satellite Accumulation Area
SWMU 3A	Waste Hydrocarbon Accumulation Areas
SWMU 3B	Waste Hydrocarbon Accumulation Areas
SWMU 3C	Waste Hydrocarbon Accumulation Areas
SWMU 3D	Waste Hydrocarbon Accumulation Areas
SWMU 3E	Waste Hydrocarbon Accumulation Areas
SWMU 4	Wastewater Treatment Plant Area
SWMU 5	Process Sewer System
SWMU 6	Storm Sewer System
SWMU 7	AFB Settling Basin
SWMU 8	PET Recycle Storage Area
SWMU 9	Former Silver Recovery Drying Bed
SWMU 10	Former Sedimentation Basin
SWMU 11	Former East Landfill
SWMU 12A-C	Former North Landfill
SWMU 13	Former Disposal Area - Tennis Courts
SWMU 14	Former West Landfill
SWMU 15	Former Silicon Disposal Area
SWMU 16	Former Equipment Sludge Disposal
SWMU 17	Former Power Hill Disposal Area
SWMU 18A&B	Former Evaporation Basin
SWMU 19	Former Digester Sludge Disposal Area
SWMU 20	Former WWTP Settling Pond
AOC A	Fuel Oil Tank Farm
AOC B	CP Tank Farm
AOC C	Save All System - Silver Recovery Unit
AOC D	Jet Water Cooling Tower
AOC E	Silver Recovery Transfer Line
AOC F	Construction and Demolition Disposal Area
AOC G	Former Sand Blasting Area
AOC H	Glycol Satellite Storage Tanks
AOC I	Powerhouse Gravel Area
AOC J	Dowtherm Vaporizers Area
AOC K	Glycol Hot Well Area



Legend

- Site Boundary
- Lake or Stream
- SWMUs and AOCs

Notes:
Discoloration in base layer is due to GIS imagery.

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PIONEER TECHNOLOGIES CORPORATION

SWMUs and AOCs
Remedial Action Plan
Brevard Site
Cedar Mountain, North Carolina

Figure 2-2

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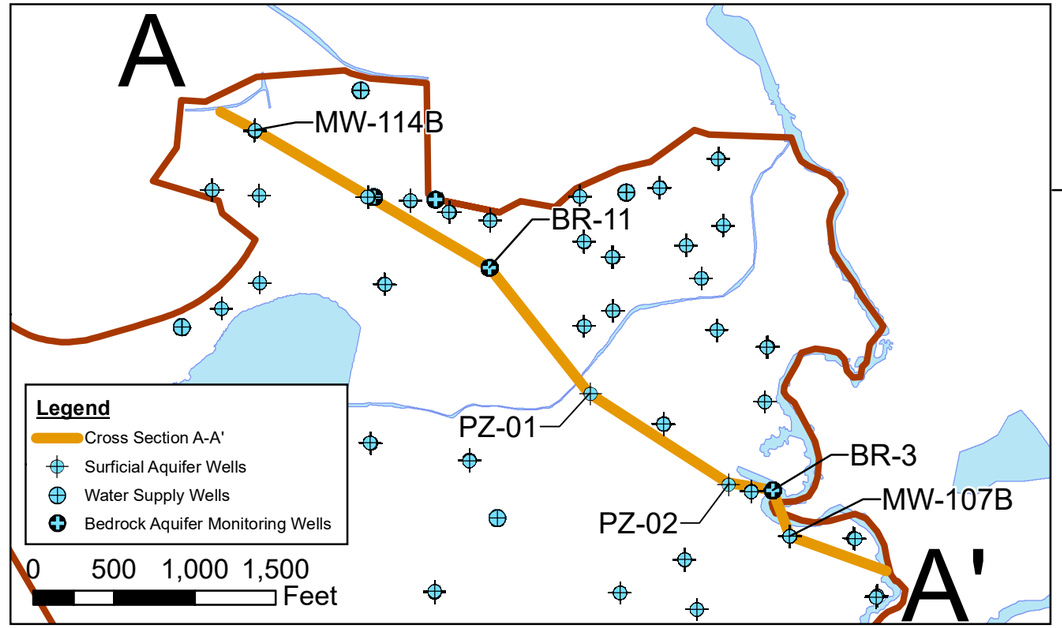
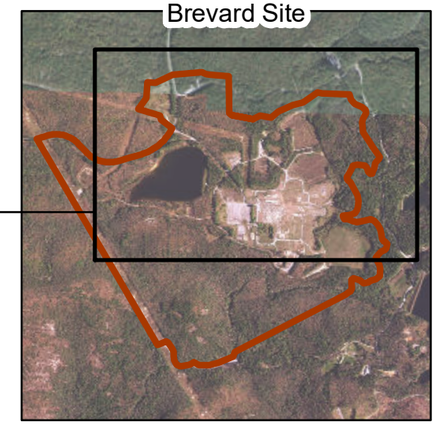
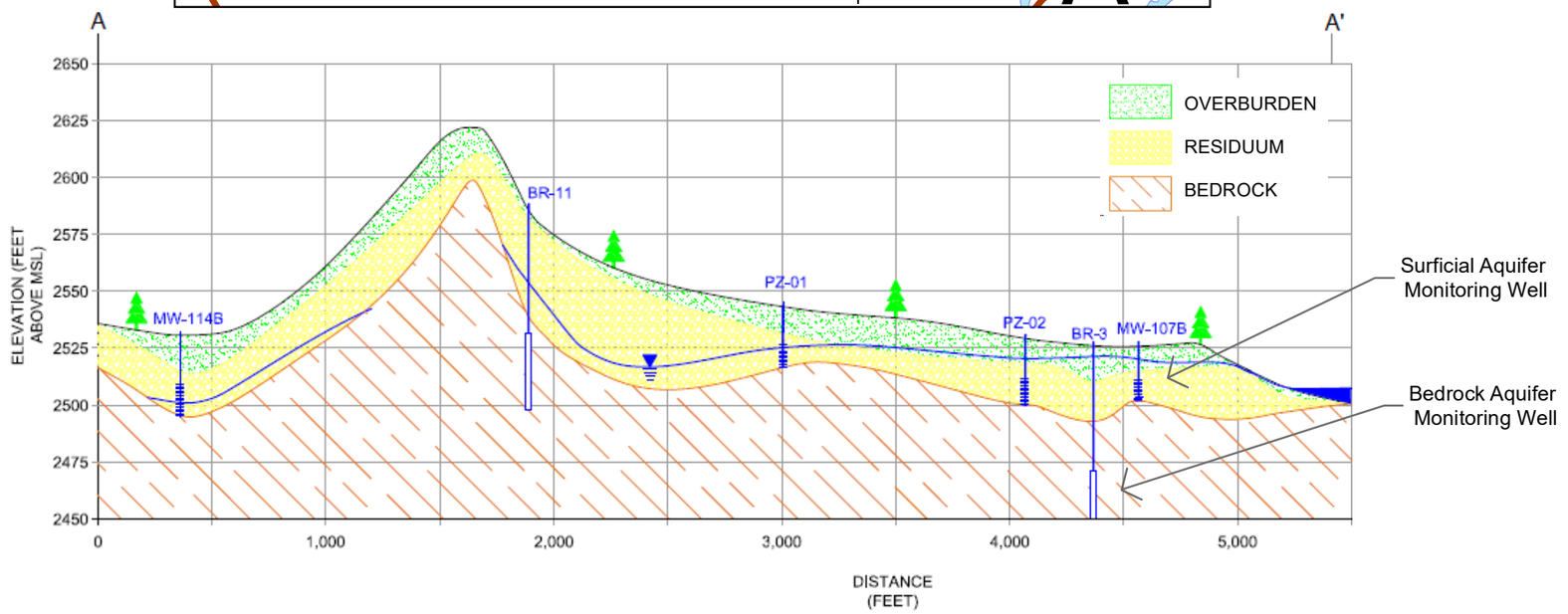






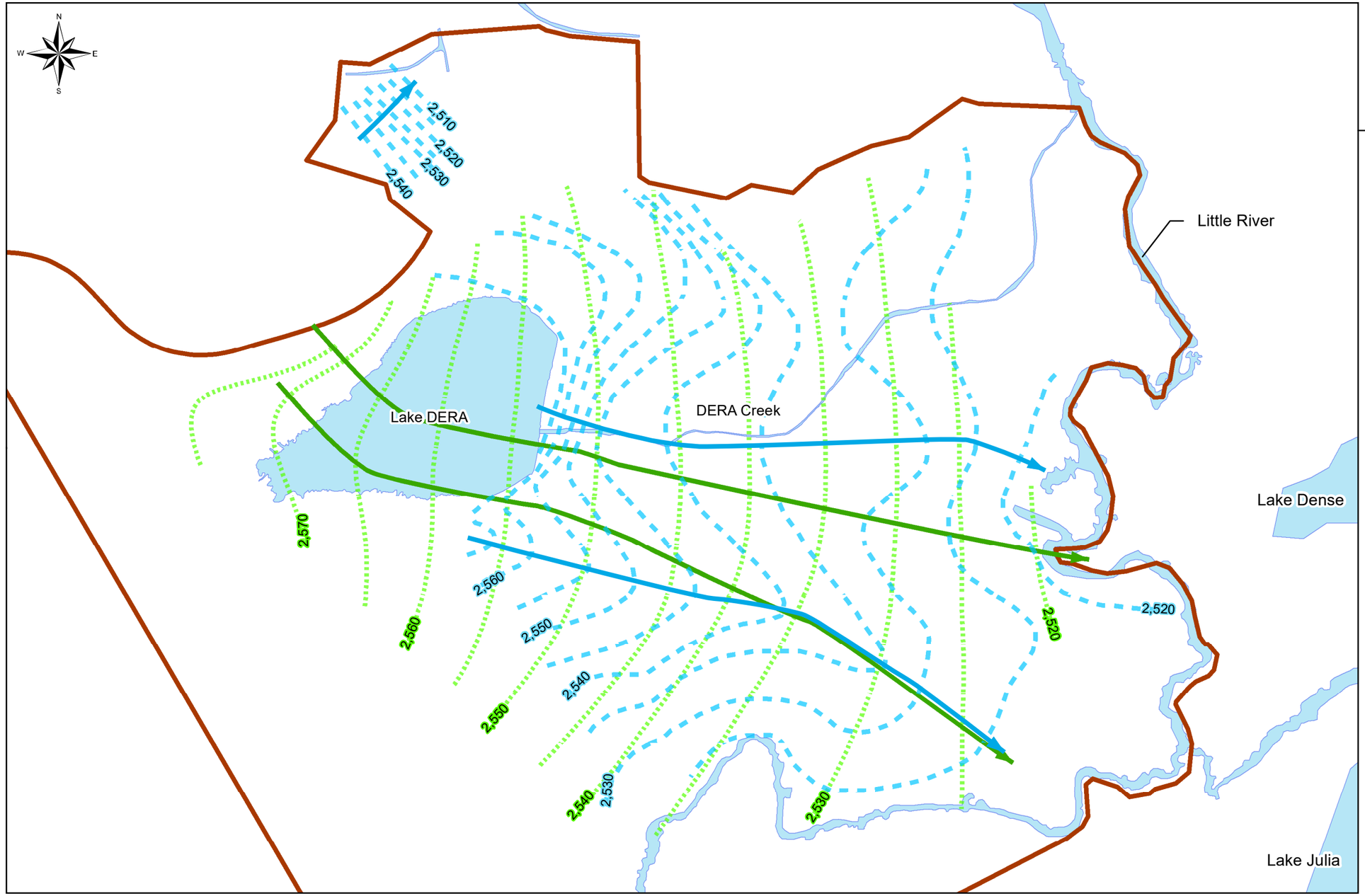
-Cross-Section Source: Parsons

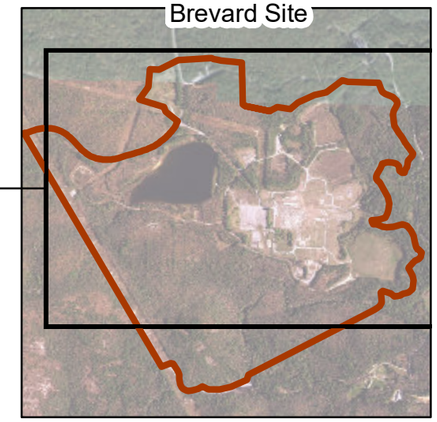
PIONEER TECHNOLOGIES CORPORATION

Geological Cross-Section
Remedial Action Plan
Brevard Site
Cedar Mountain, North Carolina

Figure 2-3

Document Path: G:\Projects\Brevard\Maps\2016\RAP\Fig_2-3-Geological Cross-Section.mxd; Author: ; Date Saved: 2/4/2016





Legend

- Site Boundary
- Lake or Stream

Surficial Aquifer

- Surficial Aquifer Elevation Contour (feet above MSL)
- Generalized Surficial Aquifer Flow Line

Bedrock Aquifer

- Bedrock Aquifer Elevation Contour (feet above MSL)
- Generalized Bedrock Aquifer Flow Line

Notes:
-Elevation contours from April 2009 groundwater monitoring event.

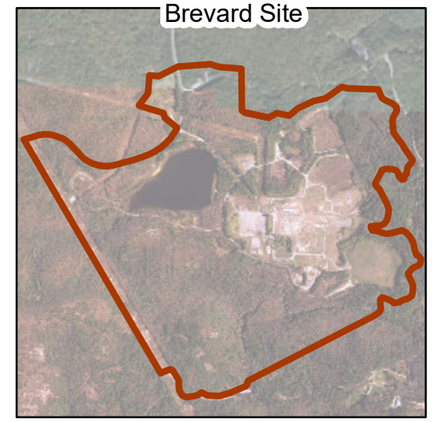
0 200 400 800 1,200 Feet

PIONEER TECHNOLOGIES CORPORATION

Groundwater Elevation Contours
Remedial Action Plan
Brevard Site
Cedar Mountain, North Carolina

Figure 2-4

Document Path: G:\Projects\BrevardMaps\2016\RAP\Fig_2-4_Groundwater Elevation Contours.mxd; Author: SM; Date Saved: 8/11/2016



Legend

- Site Boundary
- Lake or Stream
- Rare Plant Species

Green Salamander

- Known Location
- Potential Location

EcoCommunities

- Acidic Cove Forest
- Floodplain Pool
- Low Elevation Granitic Dome
- Montane Alluvial Forest
- Montane Oak-Hickory Forest
- None
- Pine Oak/Heath Forest
- Southern Appalachian Fen
- Swamp Forest-Bog
- Vernal Pool
- White Pine Forest

Notes:
Only rare plant species are labeled.
Source: URS 2011

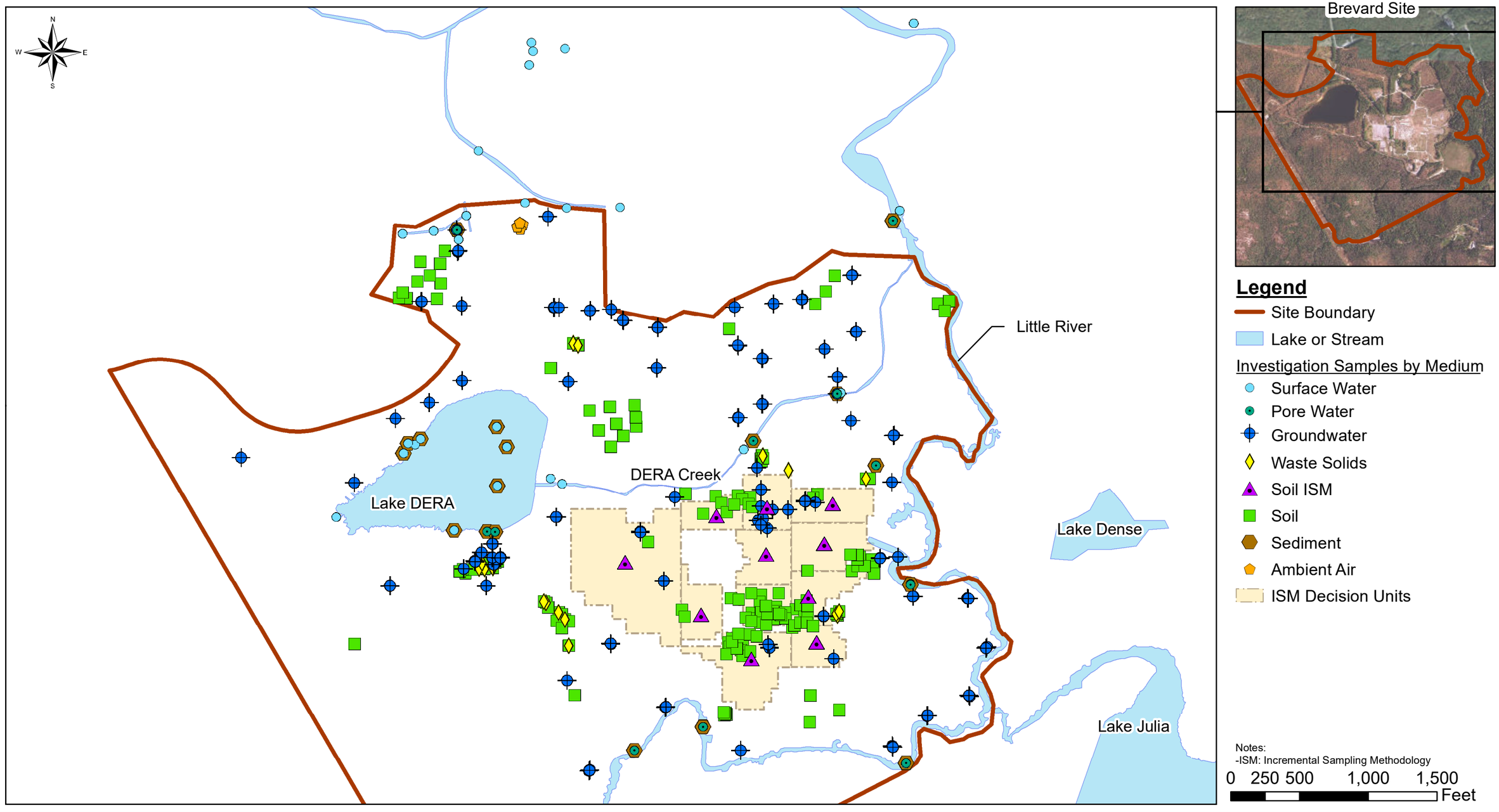
0 500 1,000 1,500 Feet

PIONEER TECHNOLOGIES CORPORATION

Significant Ecological Communities
Remedial Action Plan
Brevard Site
Cedar Mountain, North Carolina

Figure 2-5

Document Path: G:\Projects\Brevard\Maps\2016\RAP\Fig_2-5-Significant Ecological Communities Figure.mxd; Author: SM; Date Saved: 8/11/2016

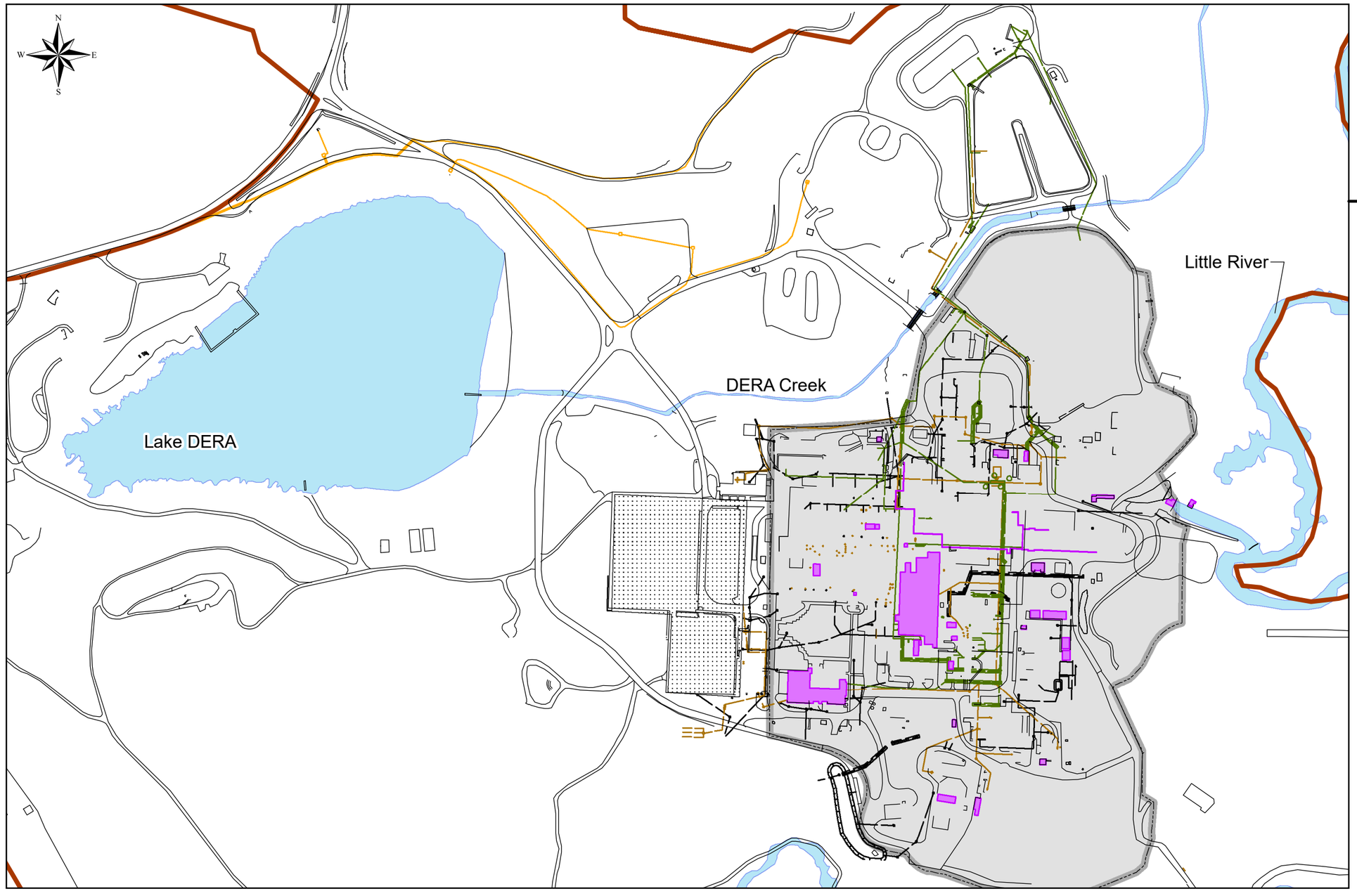


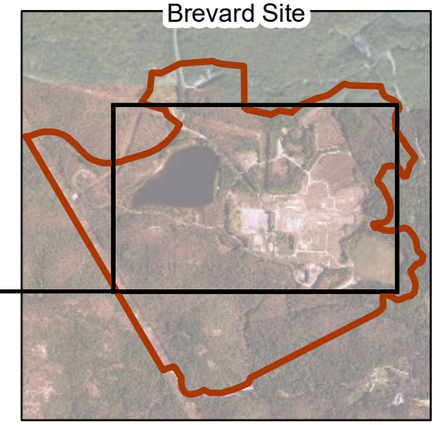
PIONEER TECHNOLOGIES CORPORATION

Remedial Investigation Sample Summary
Remedial Action Plan
Brevard Site
Cedar Mountain, North Carolina

Figure 2-6

Document Path: G:\Projects\Brevard\Maps\2016\RAP\Fig_2-6_Remedial Investigation Sample Summary.mxd; Author: DB; Date Saved: 8/11/2016





Legend

- Site Boundary
- Plant Demolition and Removal Area Within Former Manufacturing Area
- Lake or Stream
- Remaining Foundations
- Large Parking Lot
- Roads and Other Features

Remaining Utilities

- Underground Power Lines
- Process Sewer
- Sanitary Sewer
- Storm Sewer

Notes:
-Not all in-place infrastructure are presented on this figure.

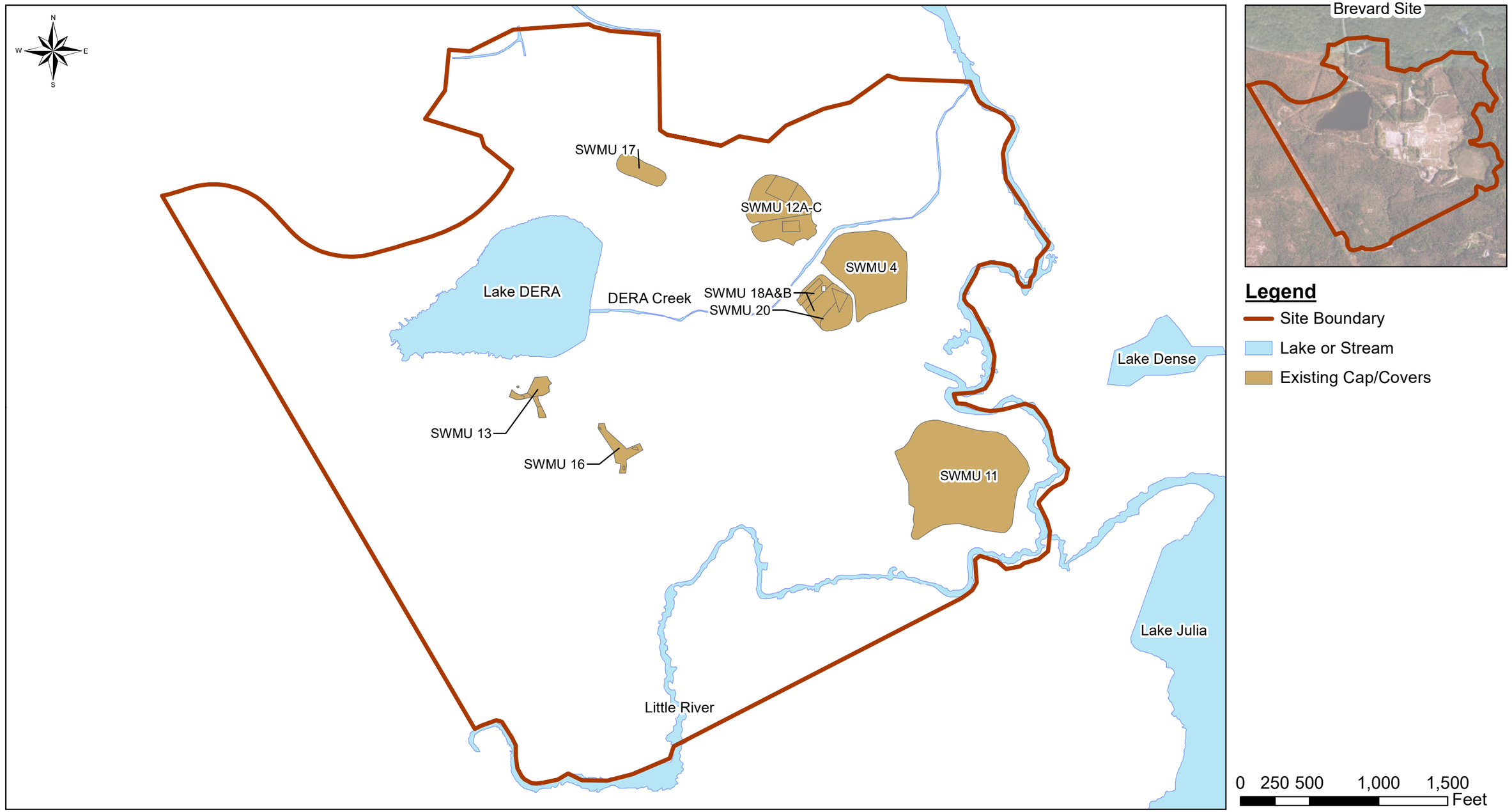
0 250 500 750 Feet

PIONEER TECHNOLOGIES CORPORATION

Plant Demolition and Removal Area and Remaining Infrastructure
Remedial Action Plan
Brevard Site
Cedar Mountain, North Carolina

Figure 2-7

Document Path: G:\Projects\Brevard\Maps\2016\RAP\Fig_2-7-Plant Demo and Removal Area and Remaining Infrastructure.mxd; Author: DB; Date Saved: 8/11/2016



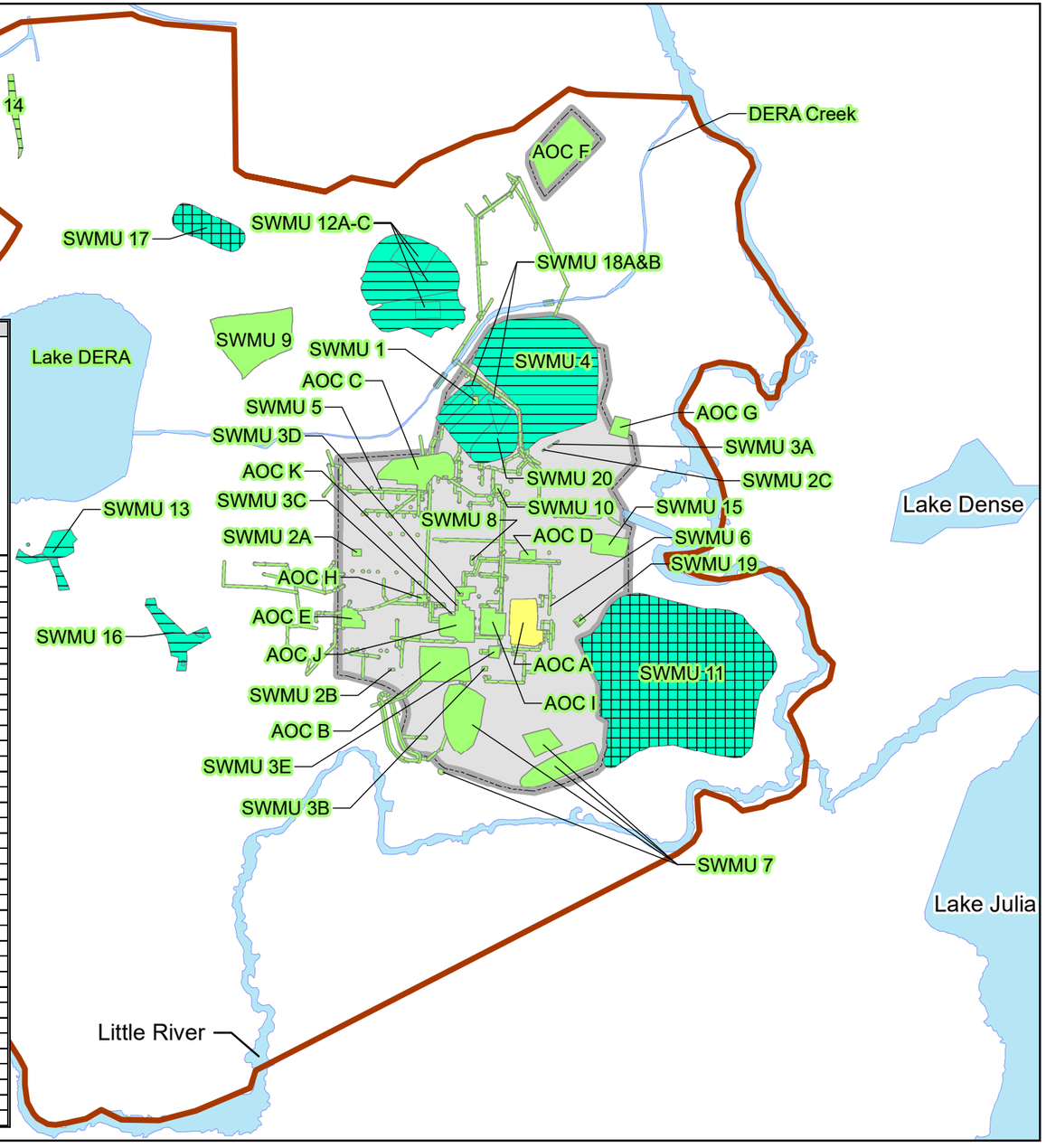
PIONEER TECHNOLOGIES CORPORATION

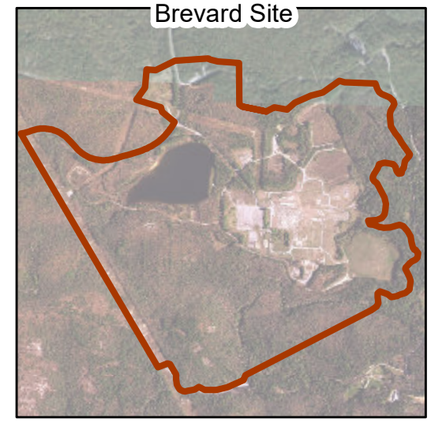
Existing Cap/Covers
Remedial Action Plan
Brevard Site
Cedar Mountain, North Carolina

Figure 2-8

Document Path: G:\Projects\Brevard\Maps\2016\RAP\Fig_2-8_Existing_Cap_Covers.mxd; Author: SM; Date Saved: 8/11/2016

Unit	Unit Name	Current Status of Unit					
		No Further Action Needed (RCRA)	Active Remediation	Perform O&M of Existing Cap/Cover	Implement ICs to Prohibit Excavation	Implement ICs to Require That NCDEQ Is Notified and Soil is Sampled Prior to Any Excavation Activities	Further Action Needed
SWMU 1	Hazardous Waste Storage Pad	X				X	
SWMU 2A	HW Satellite Accumulation Area	X				X	
SWMU 2B	HW Satellite Accumulation Area	X				X	
SWMU 2C	HW Satellite Accumulation Area	X				X	
SWMU 3A	Waste Hydrocarbon Accumulation Areas	X				X	
SWMU 3B	Waste Hydrocarbon Accumulation Areas	X				X	
SWMU 3C	Waste Hydrocarbon Accumulation Areas	X				X	
SWMU 3D	Waste Hydrocarbon Accumulation Areas	X				X	
SWMU 3E	Waste Hydrocarbon Accumulation Areas	X				X	
SWMU 4	Wastewater Treatment Plant Area			X	X		
SWMU 5	Process Sewer System	X				X	
SWMU 6	Storm Sewer System	X				X	
SWMU 7	AFB Settling Basin	X				X	
SWMU 8	PET Recycle Storage Area	X					
SWMU 9	Former Silver Recovery Drying Bed	X					
SWMU 10	Former Sedimentation Basin	X				X	
SWMU 11	Former East Landfill		X	X	X		
SWMU 12A-C	Former North Landfill			X	X		
SWMU 13	Former Disposal Area - Tennis Courts			X	X		
SWMU 14	Former West Landfill	X			X		
SWMU 15	Former Silicon Disposal Area	X				X	
SWMU 16	Former Equipment Sludge Disposal			X	X		
SWMU 17	Former Power Hill Disposal Area		X	X	X		
SWMU 18A&B	Former Evaporation Basin			X	X		
SWMU 19	Former Digester Sludge Disposal Area	X				X	
SWMU 20	Former WWTP Settling Pond			X	X		
AOC A	Fuel Oil Tank Farm						X
AOC B	CP Tank Farm	X				X	
AOC C	Save All System - Silver Recovery Unit	X				X	
AOC D	Jet Water Cooling Tower	X				X	
AOC E	Silver Recovery Transfer Line	X				X	
AOC F	Construction and Demolition Disposal Area	X				X	
AOC G	Former Sand Blasting Area	X				X	
AOC H	Glycol Satellite Storage Tanks	X				X	
AOC I	Powerhouse Gravel Area	X				X	
AOC J	Dowtherm Vaporizers Area	X				X	
AOC K	Glycol Hot Well Area	X				X	





Legend

- Site Boundary
- Lake or Stream

SWMU and AOC Status

- Perform O&M of Existing Cap/Cover
- Active Remediation
- Further Action Needed
- No Further Action Needed
- Implement ICs to Prohibit Excavation
- Implement ICs to Require that NCDEQ is Notified and Soil is Sampled Prior to Any Excavation Activities

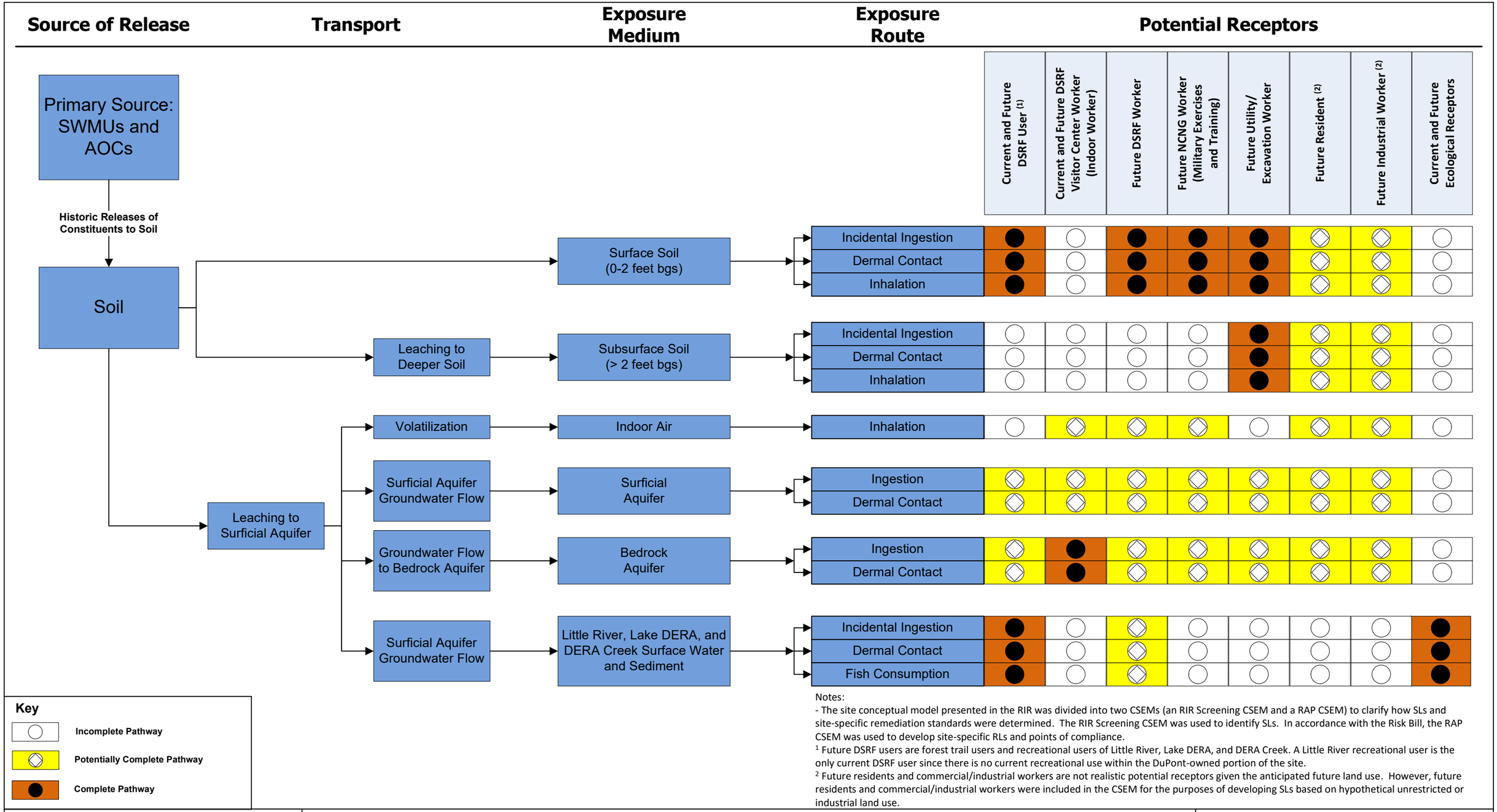
0 250 500 1,000 1,500 Feet

PIONEER TECHNOLOGIES CORPORATION

Current Status of SWMUs and AOCs
Remedial Action Plan
Brevard Site
Cedar Mountain, North Carolina

Figure 2-9

Document Path: G:\Projects\BrevardMaps\2016\RAP\Fig_2-9_Current Status of SWMUs and AOCs.mxd; Author: VN; Date Saved: 8/12/2016

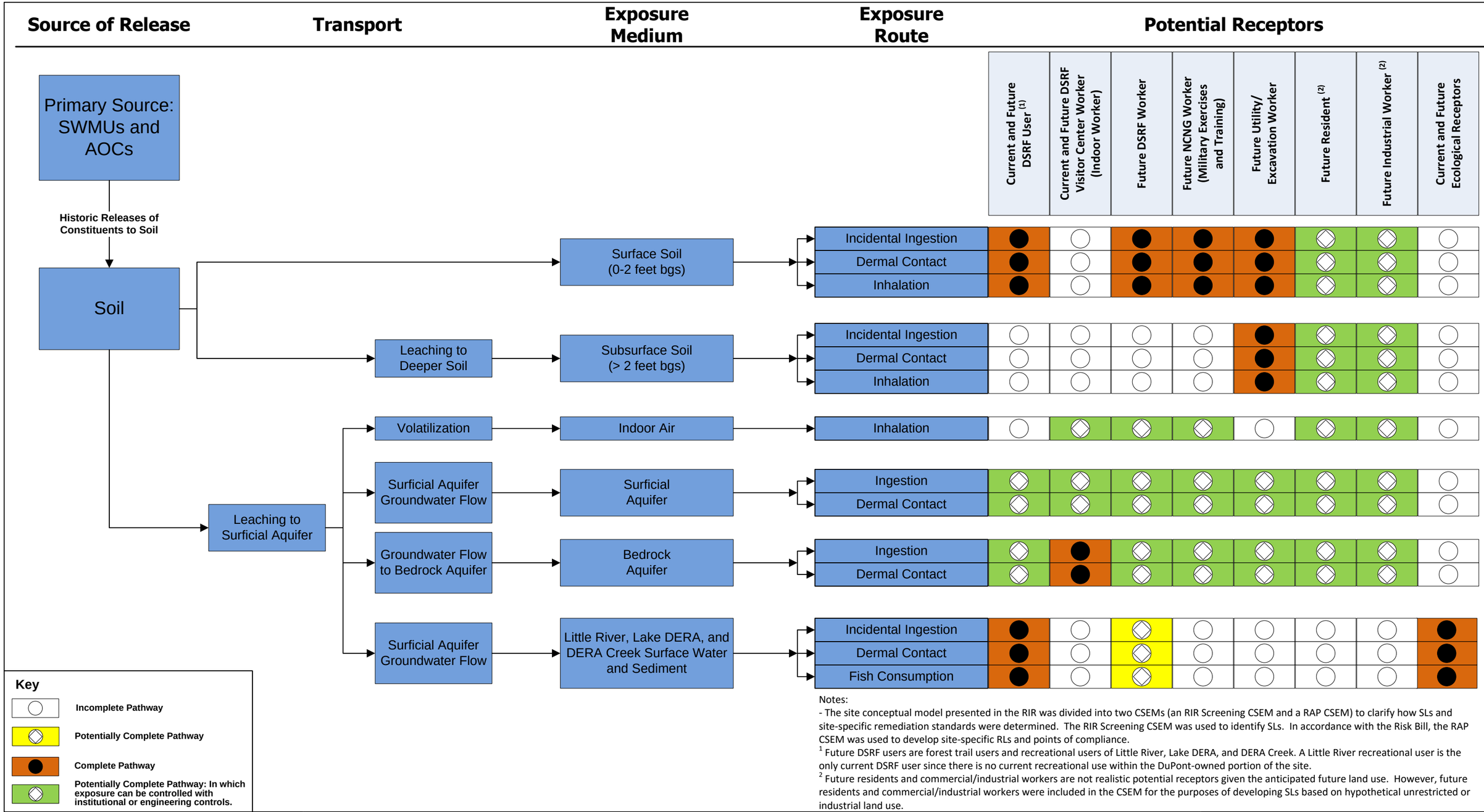


Notes:
- The site conceptual model presented in the RIR was divided into two CSEMs (an RIR Screening CSEM and a RAP CSEM) to clarify how SLs and site-specific remediation standards were determined. The RIR Screening CSEM was used to identify SLs. In accordance with the Risk Bill, the RAP CSEM was used to develop site-specific RLs and points of compliance.
[1] Future DSRF users are forest trail users and recreational users of Little River, Lake DERA, and DERA Creek. A Little River recreational user is the only current DSRF user since there is no current recreational use within the DuPont-owned portion of the site.
[2] Future residents and commercial/industrial workers are not realistic potential receptors given the anticipated future land use. However, future residents and commercial/industrial workers were included in the CSEM for the purposes of developing SLs based on hypothetical unrestricted or industrial land use.

PIONEER TECHNOLOGIES CORPORATION

RIR Screening CSEM
Remedial Action Plan
Brevard Site
Cedar Mountain, North Carolina

Figure 2-10

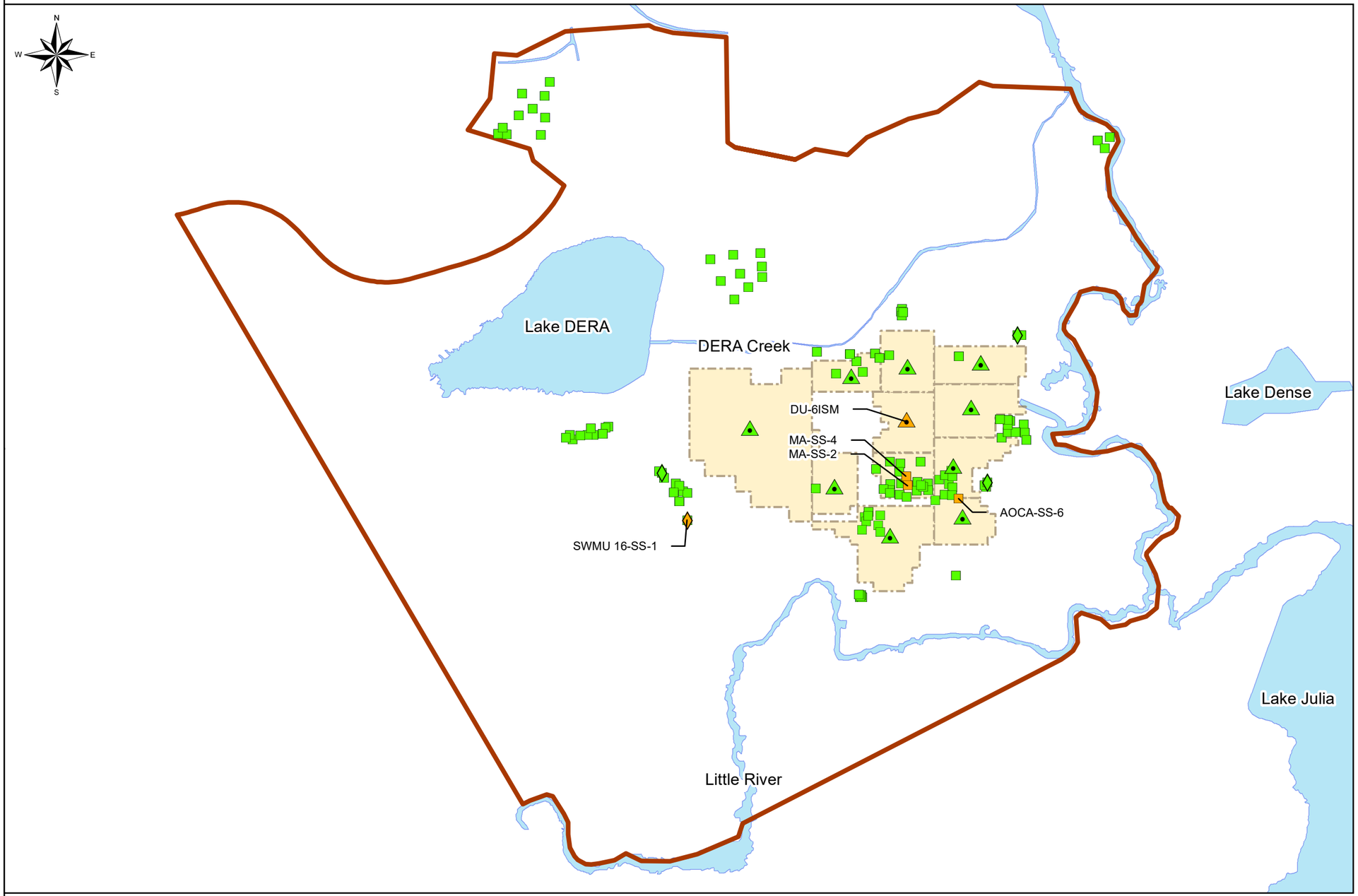


Notes:
- The site conceptual model presented in the RIR was divided into two CSEMs (an RIR Screening CSEM and a RAP CSEM) to clarify how SLs and site-specific remediation standards were determined. The RIR Screening CSEM was used to identify SLs. In accordance with the Risk Bill, the RAP CSEM was used to develop site-specific RLs and points of compliance.
[1] Future DSRF users are forest trail users and recreational users of Little River, Lake DERA, and DERA Creek. A Little River recreational user is the only current DSRF user since there is no current recreational use within the DuPont-owned portion of the site.
[2] Future residents and commercial/industrial workers are not realistic potential receptors given the anticipated future land use. However, future residents and commercial/industrial workers were included in the CSEM for the purposes of developing SLs based on hypothetical unrestricted or industrial land use.

PIONEER TECHNOLOGIES CORPORATION

RAP CSEM
Remedial Action Plan
Brevard Site
Cedar Mountain, North Carolina

Figure 2-11



Legend

- Site Boundary
- Lake or Stream

Sample Category

- Soil Sample 0-2 ft bgs
- ISM Decision Units
- ISM Sample
- Waste Sample 0-2 ft bgs

Maximum COPC Concentrations

- COPC Concentrations ≤ RL, Cumulative Risk ≤ 1E-04, and Cumulative HI ≤ 1
- A COPC Concentration > RL, Cumulative Risk > 1E-04, or Cumulative HI > 1

Notes:
-ISM: Incremental Sampling Methodology

0 250 500 1,000 1,500 Feet

PIONEER TECHNOLOGIES CORPORATION

RL Exceedances at POC for Surface Soil Direct Contact Pathway
Remedial Action Plan
Brevard Site
Cedar Mountain, North Carolina

Figure 4-1

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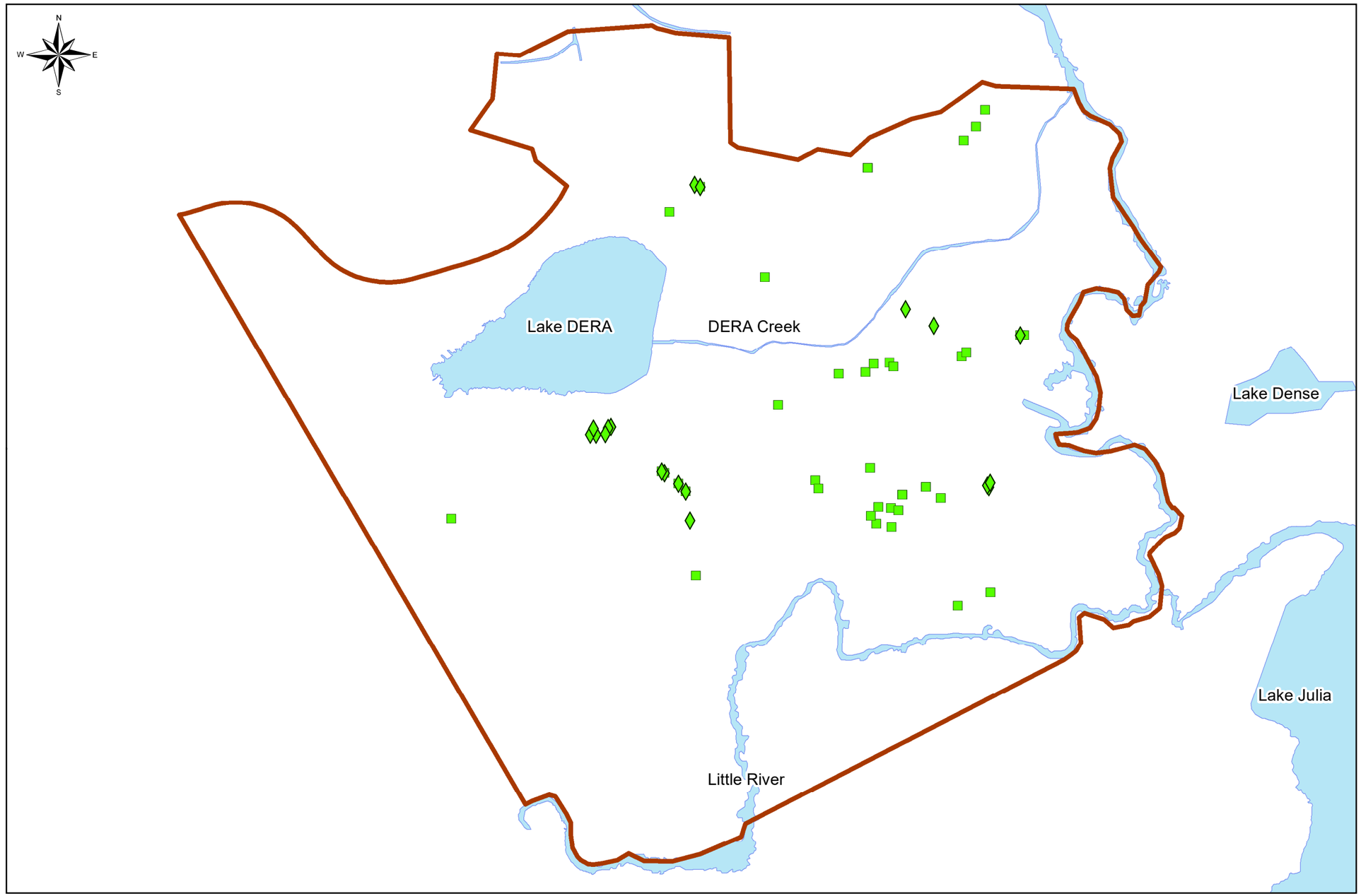


Legend

- Site Boundary
- Lake or Stream

Sample Category

- Soil Sample 2-15 ft bgs
- Waste Sample 2-15 ft bgs

Maximum COPC Concentrations

- COPC Concentrations ≤ RL, Cumulative Risk ≤ 1E-04, and Cumulative HI ≤ 1
- A COPC Concentration > RL, Cumulative Risk > 1E-04, or Cumulative HI >1

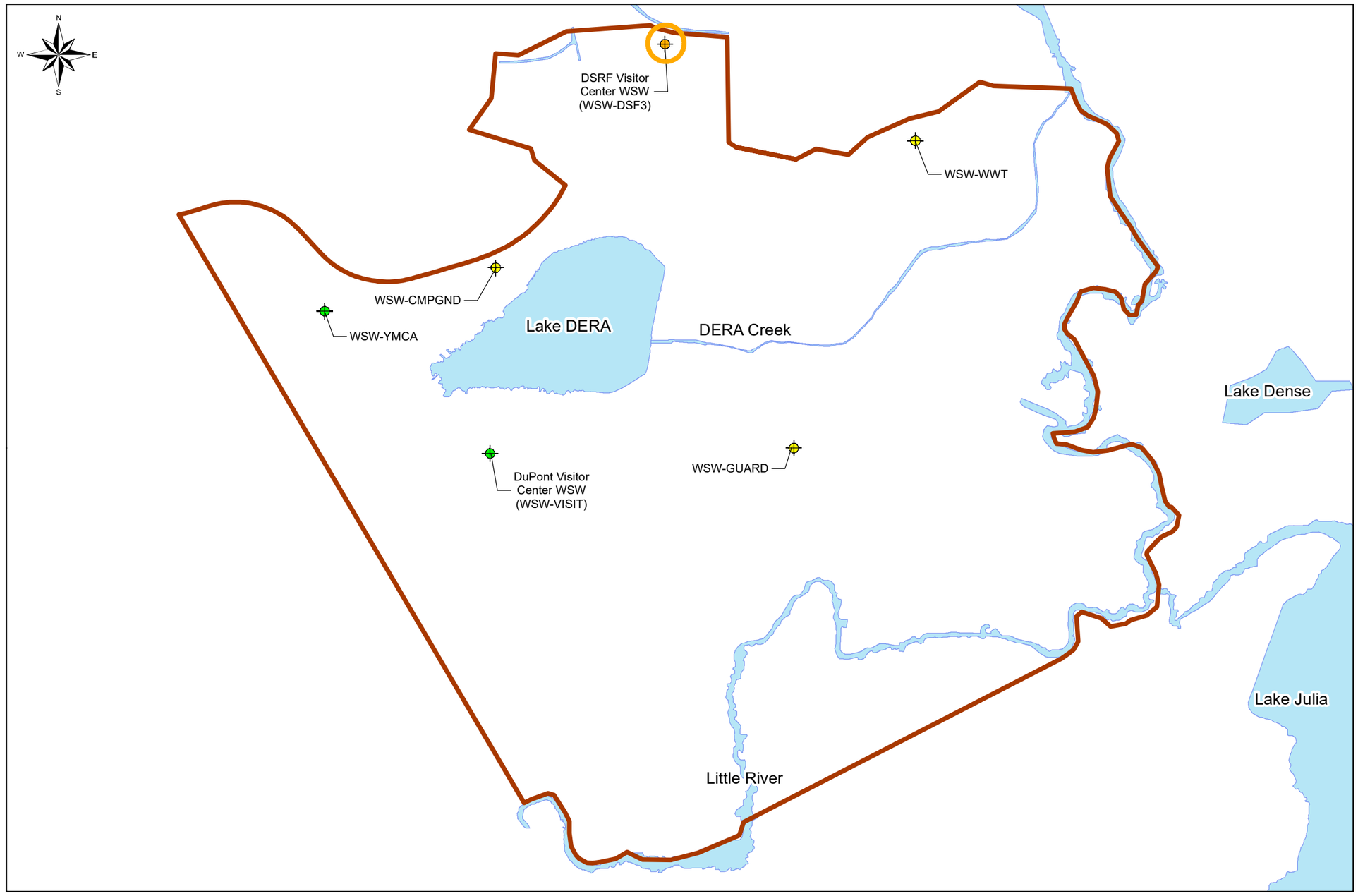
0 250 500 1,000 1,500 Feet

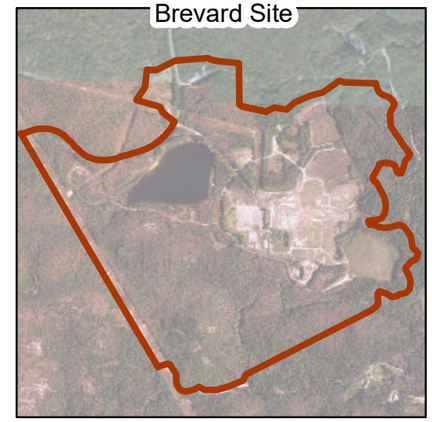
PIONEER TECHNOLOGIES CORPORATION

RL Exceedances at POC for Subsurface Soil Direct Contact Pathway
Remedial Action Plan
Brevard Site
Cedar Mountain, North Carolina

Figure 4-2

Document Path: G:\Projects\Brevard\Maps\2016\RAP\Fig_4-2_SubsurfaceSoil-DirectContact.mxd; Author: DB; Date Saved: 8/11/2016





Legend

- Site Boundary
- Lake or Stream
- Existing Bedrock Aquifer Water Supply Well

Maximum COPC Concentrations

- COPC Concentrations ≤ RL
- Non-Site-Related COPC Concentrations ≤ RL
- A Site-Related COPC Concentration > RL
- Active WSW

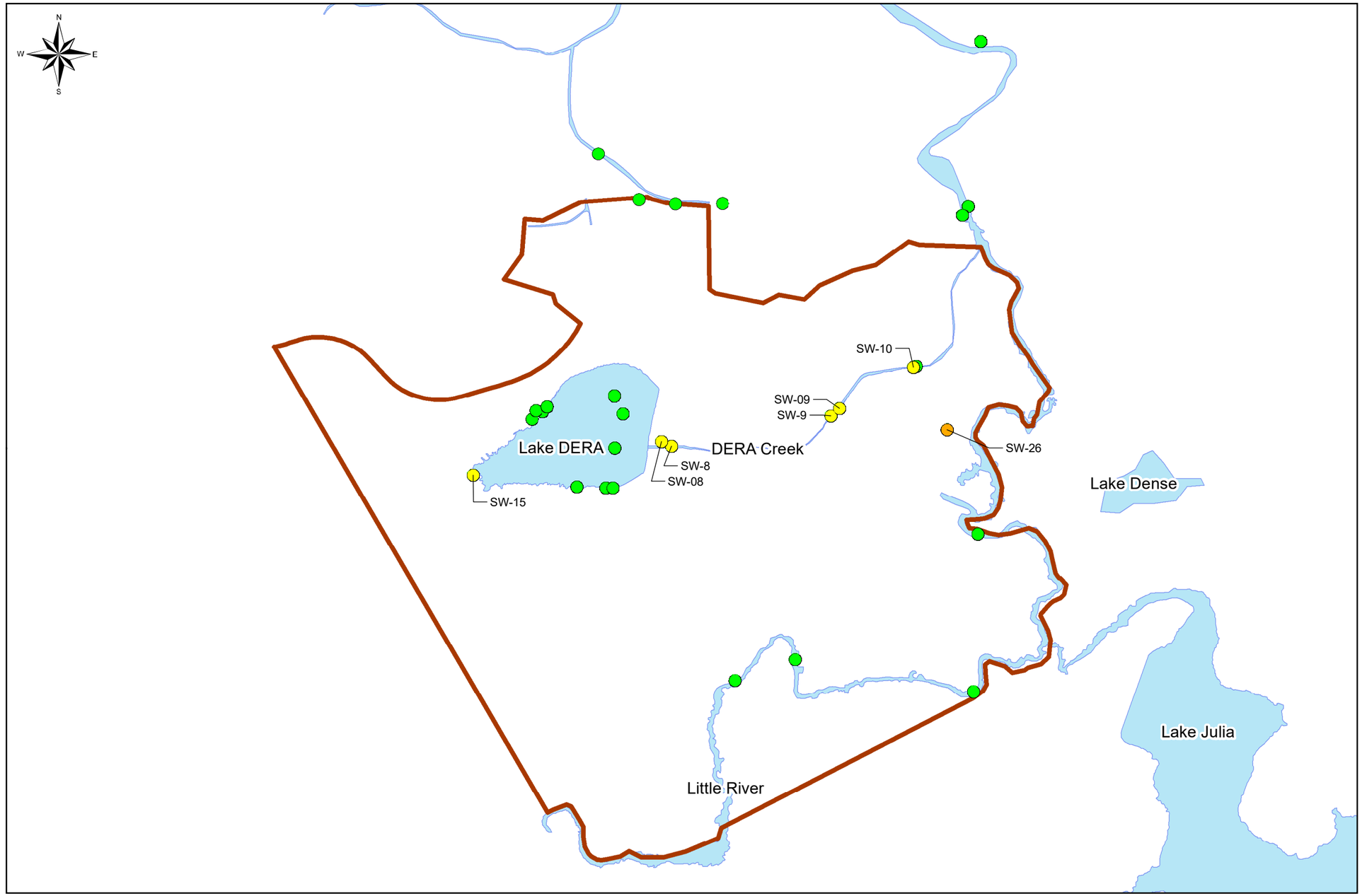
0 250 500 1,000 1,500 Feet

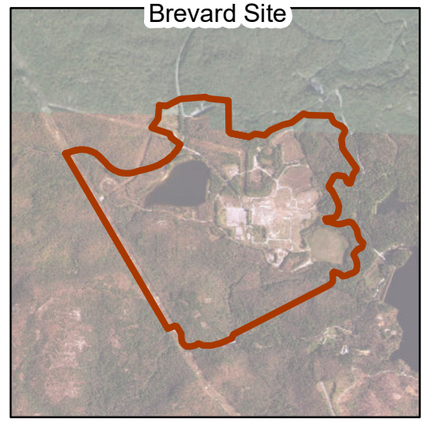
PIONEER TECHNOLOGIES CORPORATION

RL Exceedances at POC for Bedrock Aquifer Used as Drinking Water Pathway
Remedial Action Plan
Brevard Site
Cedar Mountain, North Carolina

Figure 4-3

Document Path: G:\Projects\Brevard\Maps\2016\RAP\Fig_4-3_Bedrock Aquifer_Water Supply Wells.mxd; Author: DB; Date Saved: 8/11/2016





Legend

- Site Boundary
- Lake or Stream
- Relevant Surface Water Sample Location

Maximum COPC Concentrations

- All COPC Concentrations ≤ RL
- All Non-Site-Related COPC Concentrations ≤ RL
- A Site-Related COPC Concentration > RL

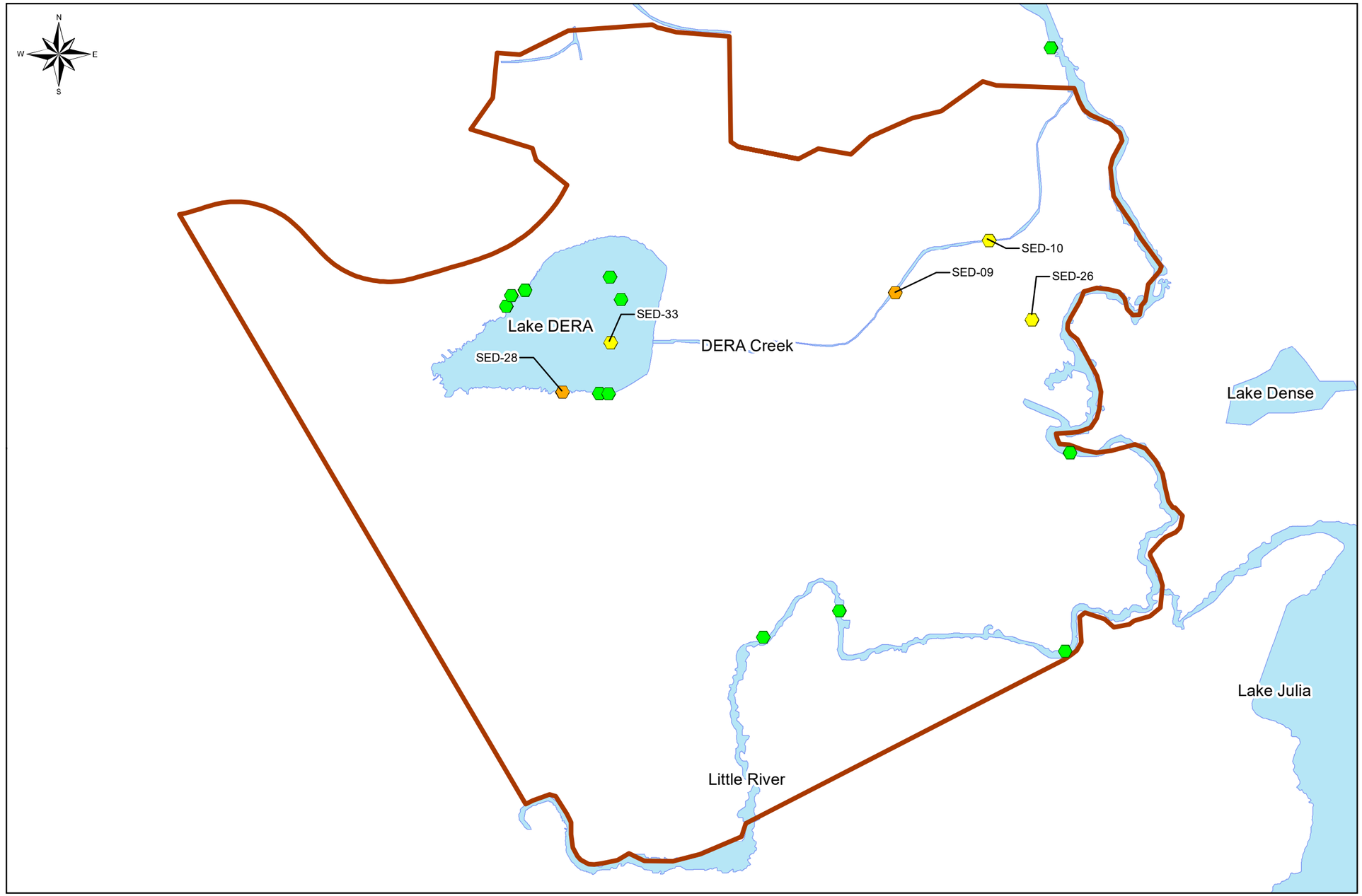
0 500 1,000 1,500 Feet

PIONEER TECHNOLOGIES CORPORATION

RL Exceedances at POC for Surface Water Exposures Pathway
Remedial Action Plan
Brevard Site
Cedar Mountain, North Carolina

Figure 4-4

Document Path: G:\Projects\Brevard\Maps\2016\RAP\Fig_4-4_SW-RL-Exceedances.mxd; Author: SM; Date Saved: 8/11/2016



Legend

- Site Boundary
- Lake or Stream
- Relevant Sediment Sample Location

Maximum COPC Concentration

- All COPC Concentrations ≤ RL
- All Non-Site-Related COPC Concentrations ≤ RL
- A Site-Related COPC Concentration > RL

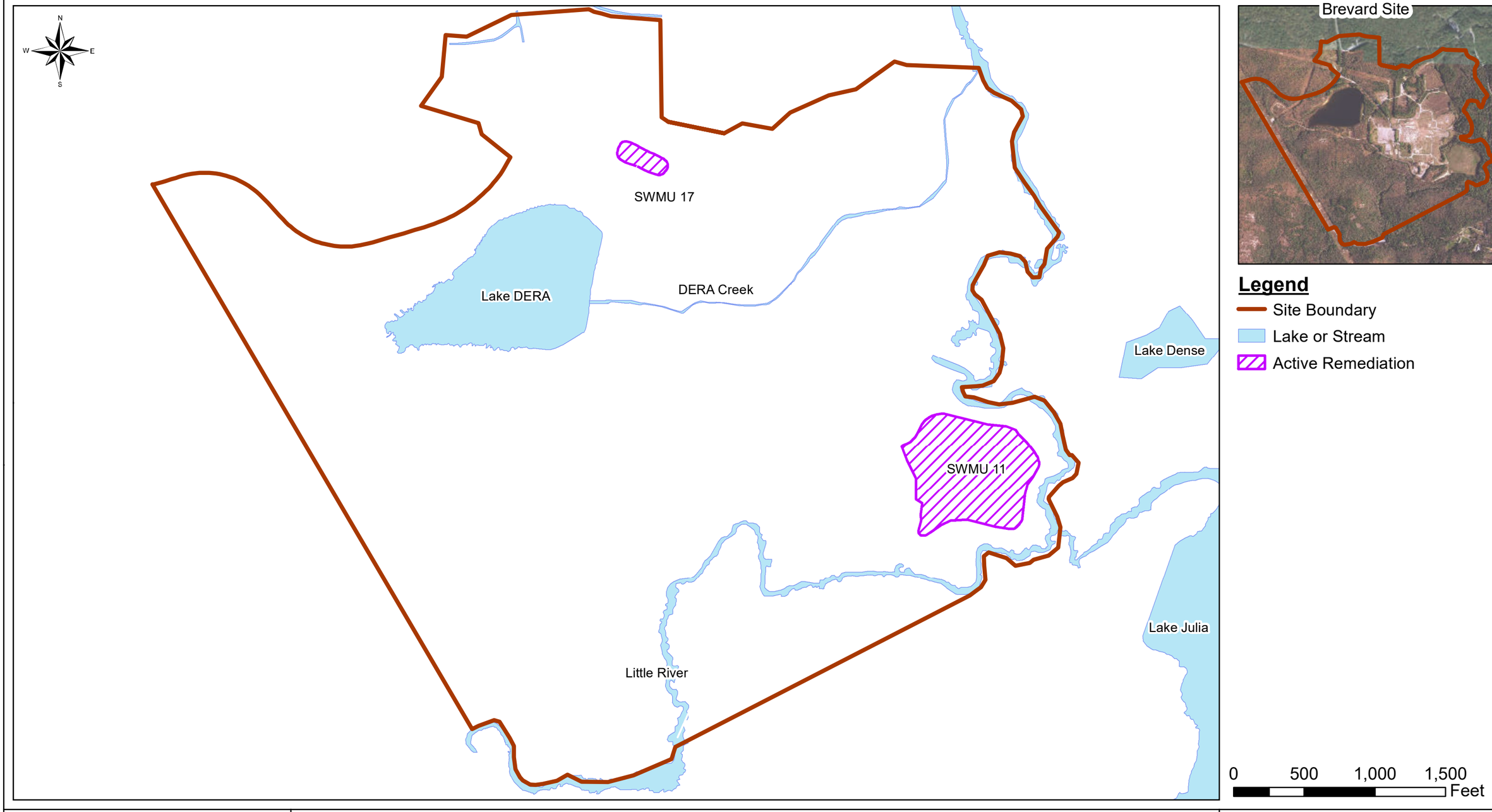
0 250 500 1,000 1,500 Feet

PIONEER TECHNOLOGIES CORPORATION

RL Exceedances at POC for Sediment Exposures Pathway
Remedial Action Plan
Brevard Site
Cedar Mountain, North Carolina

Figure 4-5

Document Path: G:\Projects\Brevard\Maps\2016\RAP\Fig_4-5_Sediment Concentrations compared to Site Specific Trail User.mxd; Author: DB; Date Saved: 8/11/2016

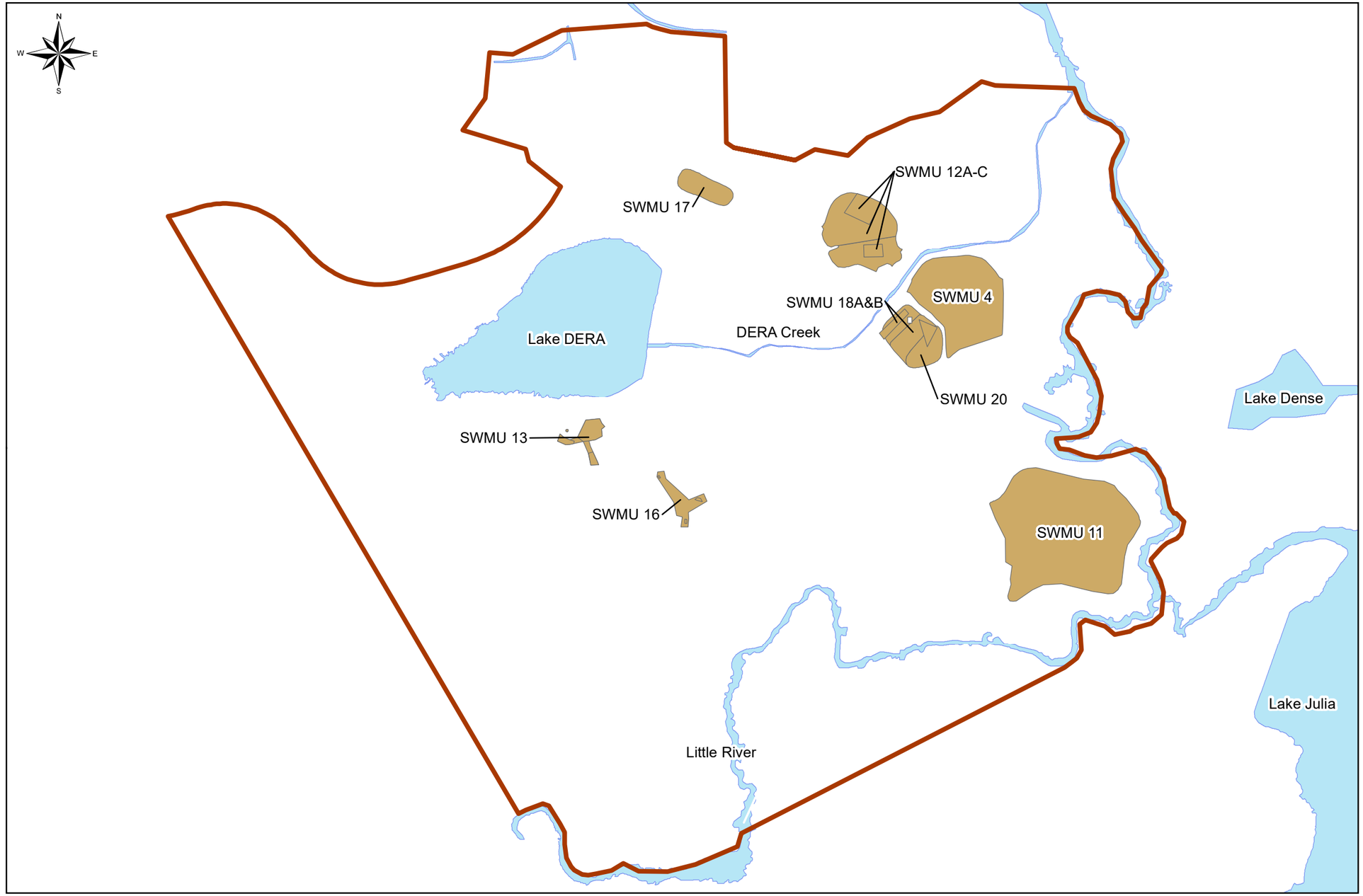


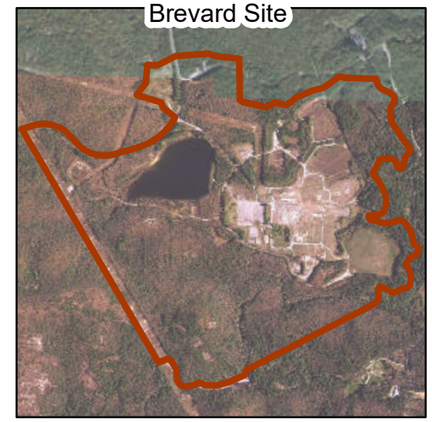
PIONEER TECHNOLOGIES CORPORATION

Active Remediation Locations (SWMU 11 and SWMU 17)
Remedial Action Plan
Brevard Site
Cedar Mountain, North Carolina

Figure 5-1

Document Path: G:\Projects\Brevard\Maps\2016\RAP\Fig_5-1_Ongoing Remedial Action at SWMUs 11 and 17.mxd; Author: SM; Date Saved: 8/11/2016





Legend

- Site Boundary
- Lake or Stream
- Perform O&M of Existing Cap/Covers and Implement ICs to Prohibit Excavation

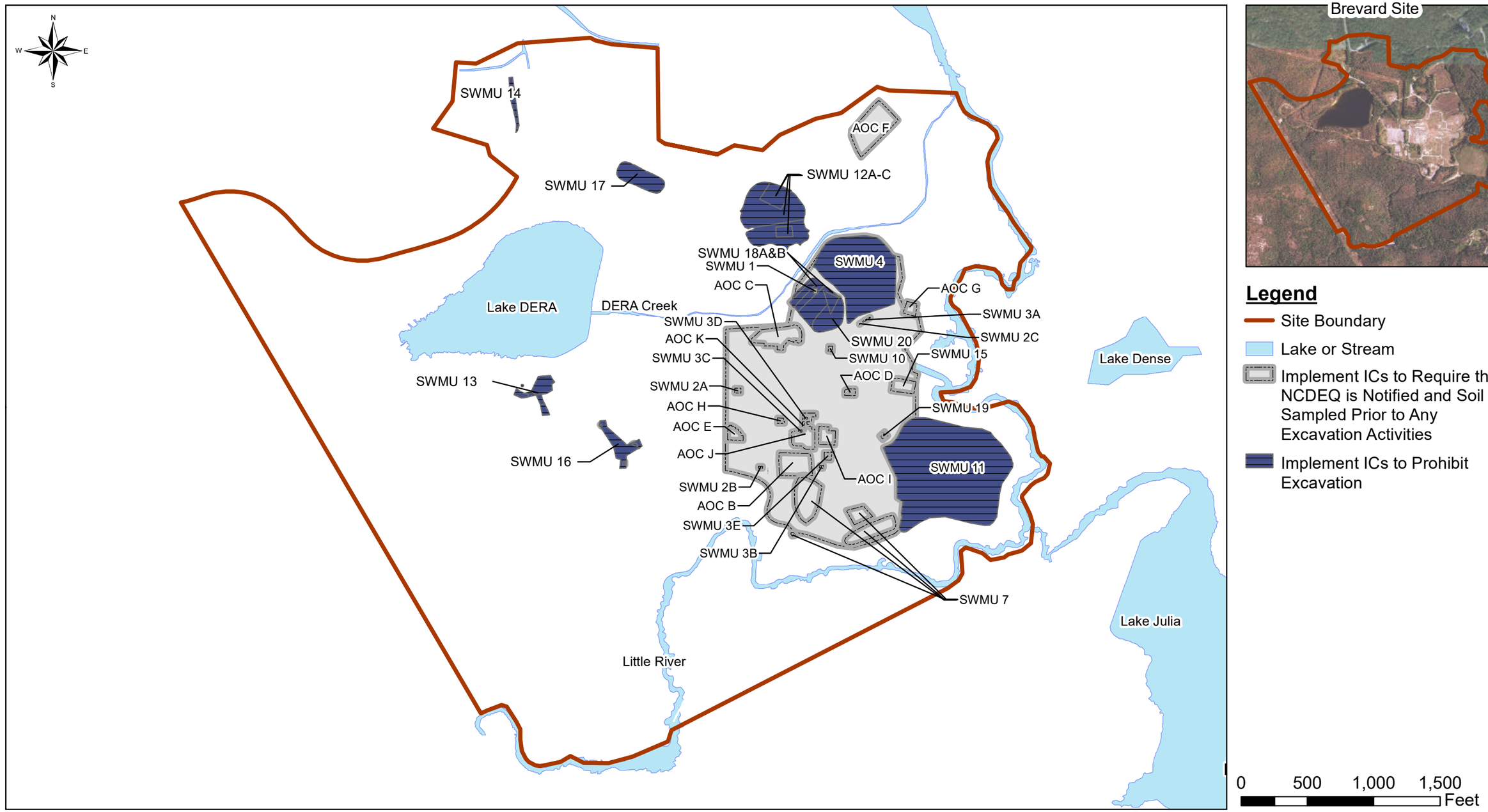
0 500 1,000 1,500 Feet

PIONEER TECHNOLOGIES CORPORATION

Perform O&M of Existing Cap/Covers
Remedial Action Plan
Brevard Site
Cedar Mountain, North Carolina

Figure 5-2

Document Path: G:\Projects\Brevard\Maps\2016\RAP\Fig_5-2_O&M and ICs for CAPs.mxd; Author: DB; Date Saved: 8/12/2016



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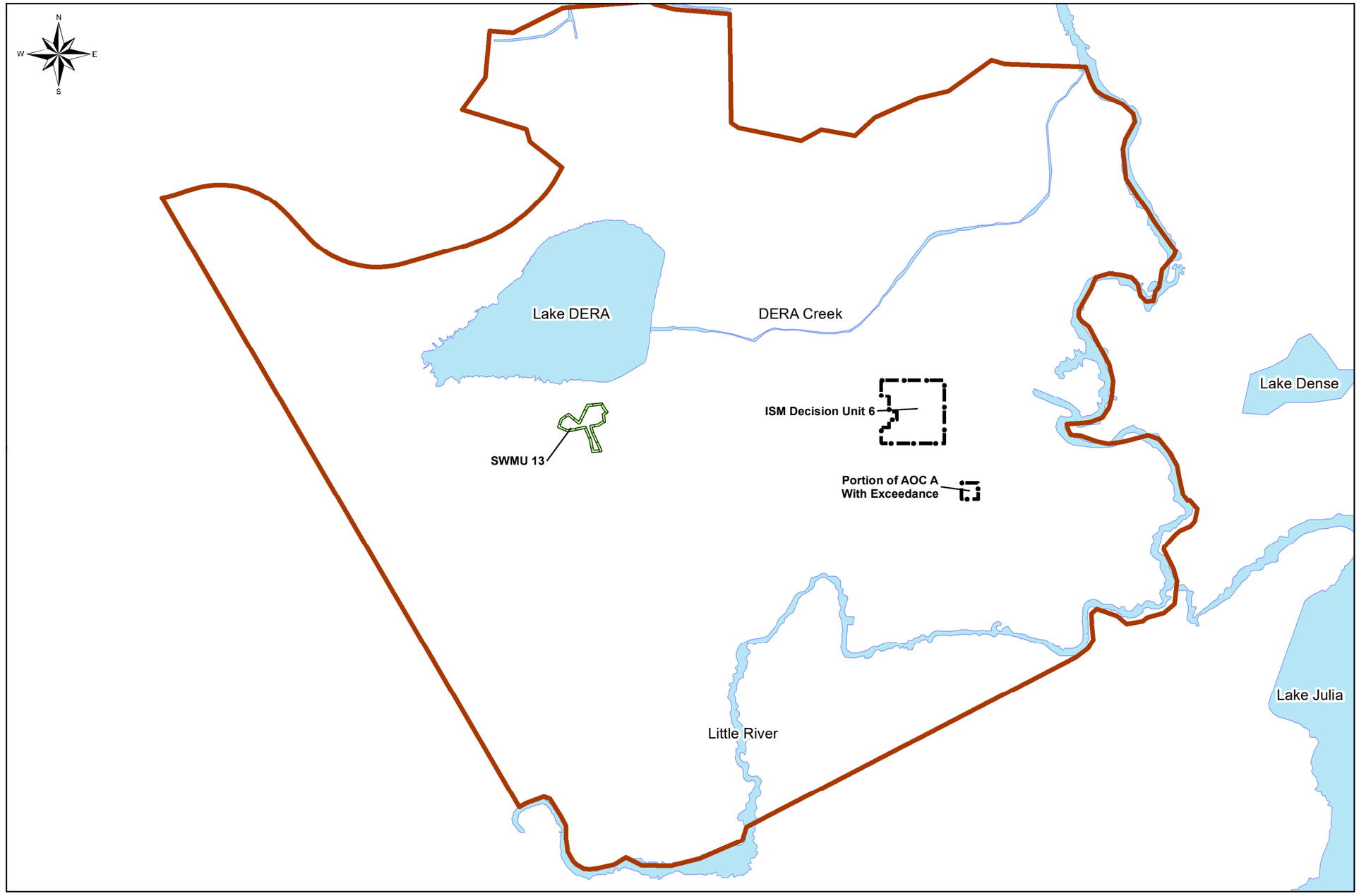
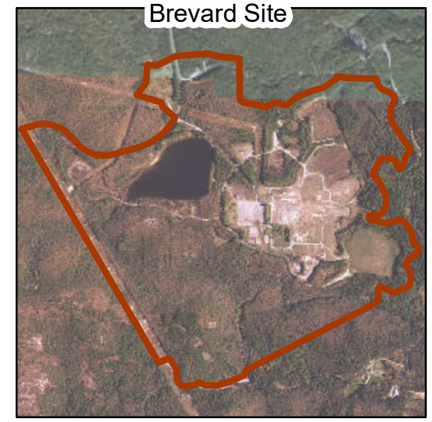
PIONEER TECHNOLOGIES CORPORATION

Implement Excavation-Related ICs
Remedial Action Plan
Brevard Site
Cedar Mountain, North Carolina

Figure 5-3





Legend

- Site Boundary
- Lake or Stream
- Install and Maintain Access-Control Fencing
- Install Physical Deterrent/Barrier to Prohibit Vehicle Access

Notes:
- Surface soil is from 0-2 feet bgs.

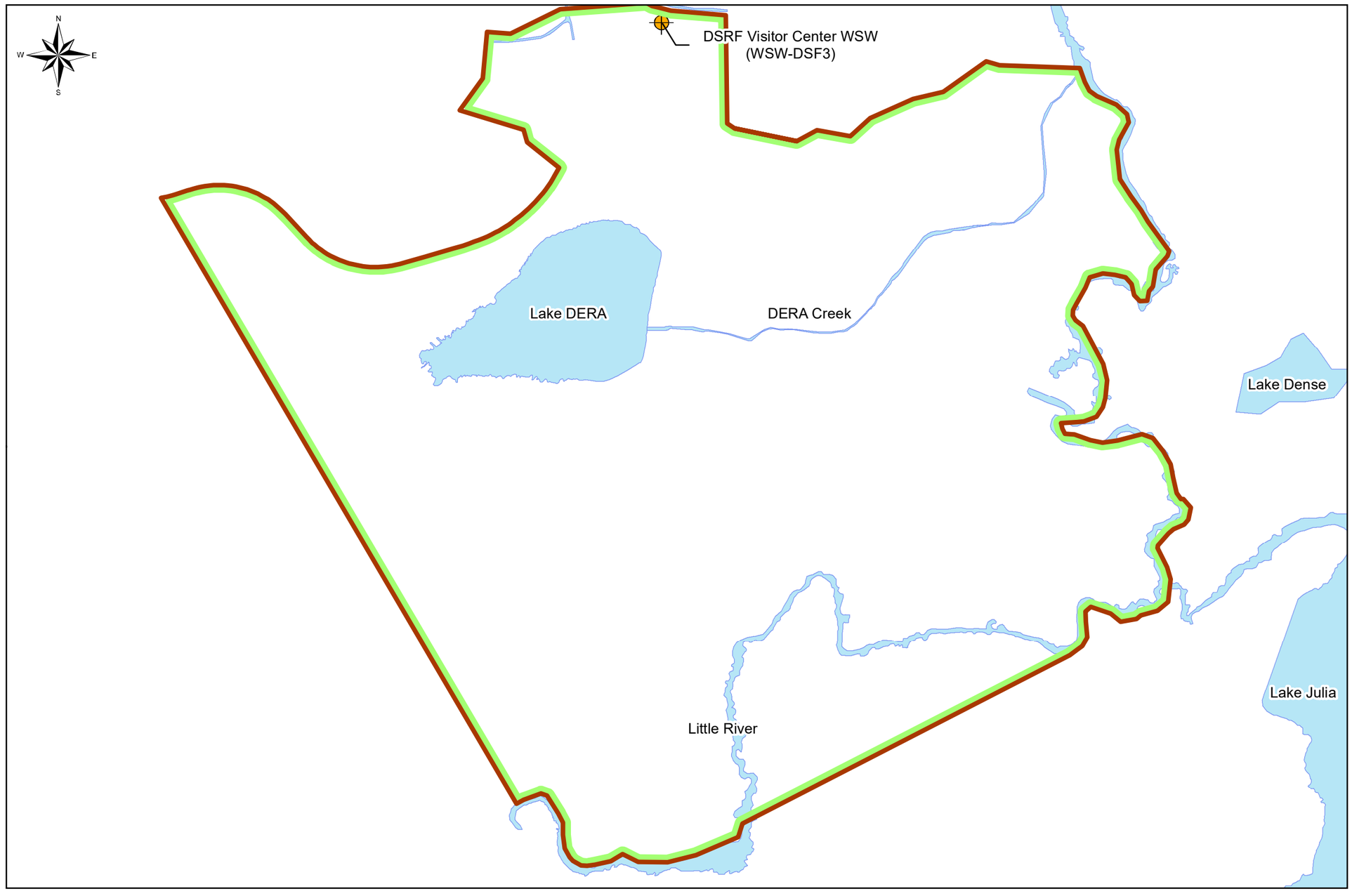
0 500 1,000 1,500 Feet

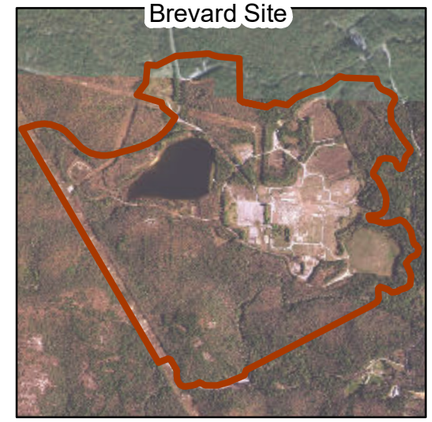
PIONEER TECHNOLOGIES CORPORATION

Actions to Address Surface Soil Direct Contact Pathway
Remedial Action Plan
Brevard Site
Cedar Mountain, North Carolina

Figure 5-4

Document Path: G:\Projects\Brevard\Maps\2016\RAP\Fig_5-4_Actions to Address Surface Soil.mxd; Author: SM; Date Saved: 8/11/2016





Legend

- Site Boundary
- Lake or Stream
- Perform O&M of Existing Treatment System
- Implement ICs to Require that Any New or Existing Bedrock Aquifer WSW is Sampled Prior to Putting the WSW into Service

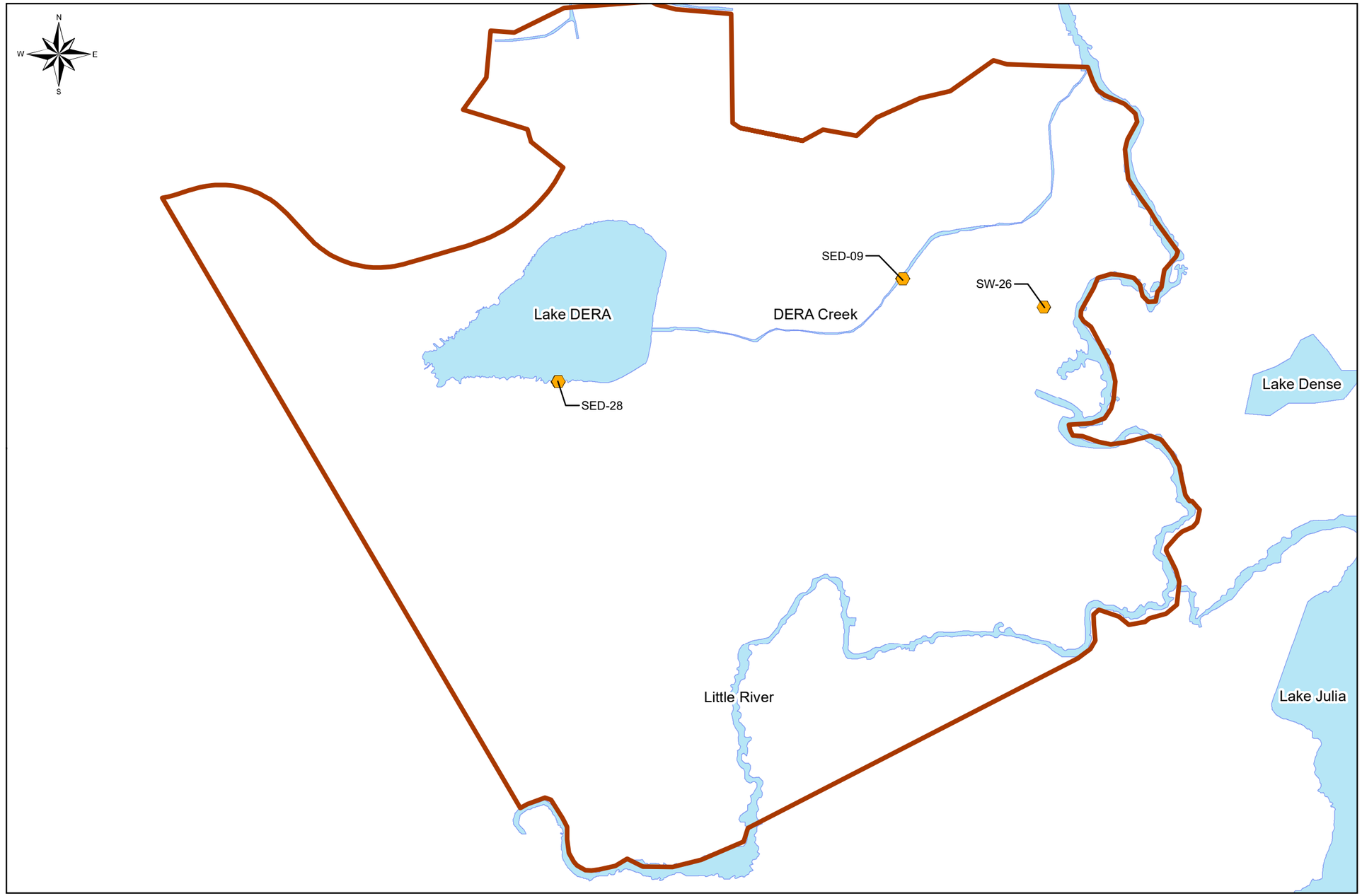
0 250 500 1,000 1,500 Feet

PIONEER TECHNOLOGIES CORPORATION

Actions to Address Bedrock Aquifer Used as Drinking Water Pathway Exceedances
Remedial Action Plan
Brevard Site
Cedar Mountain, North Carolina

Figure 5-5

Document Path: G:\Projects\Brevard\Maps\2016\RAP\Fig_5-5_Actions to Address Bedrock Aquifer.mxd; Author: SM; Date Saved: 8/11/2016



Legend

- Site Boundary
- Lake or Stream
- Areas Where Additional Sediment and Surface Water Samples will be Collected to Evaluate Whether or Not Remedial Action is Needed

0 250 500 1,000 1,500 Feet

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Additional Sediment and Surface Water Sampling
Remedial Action Plan
Brevard Site
Cedar Mountain, North Carolina

Figure 5-6

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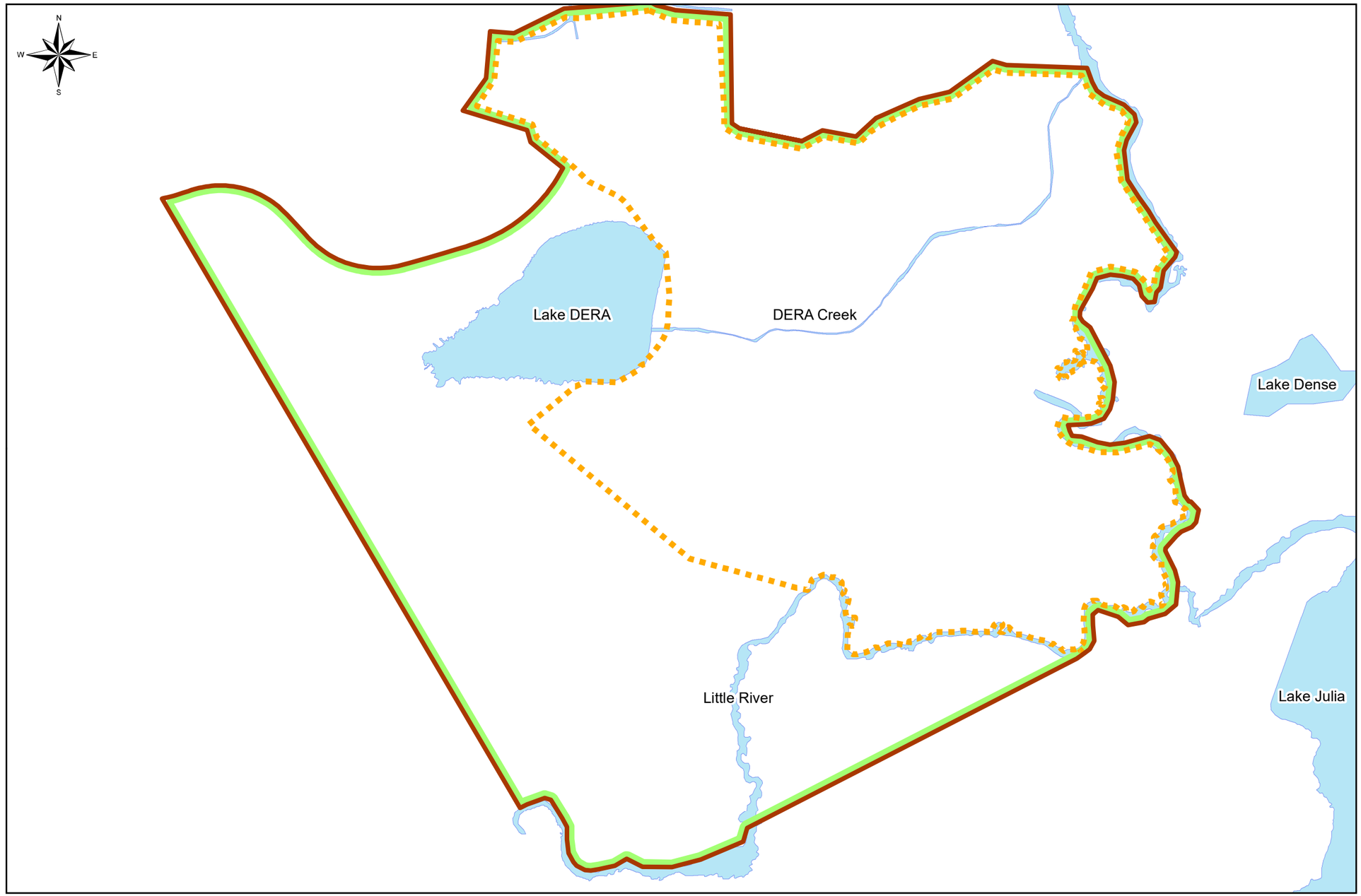

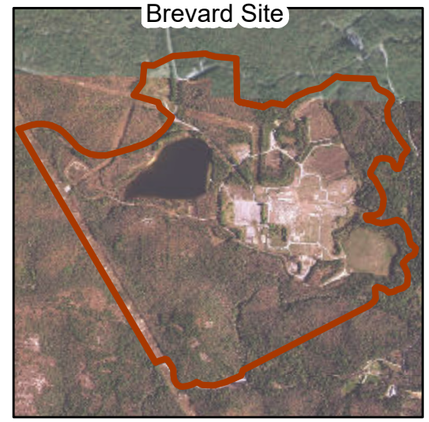

Legend

- Site Boundary
- Lake or Stream
- Implement ICs to:
  1) Prohibit Residential Land Use
  2) Prohibit Industrial Land Use
  3) Prohibit Extraction of Shallow Aquifer Groundwater for Use as Drinking Water
- Implement ICs/ECs to Characterize and Mitigate the Potential Vapor Intrusion Pathway as Necessary

0 250 500 1,000 1,500 Feet

PIONEER TECHNOLOGIES CORPORATION

ICs/ECs to Address Potentially Complete Pathways
Remedial Action Plan
Brevard Site
Cedar Mountain, North Carolina

Figure 5-7

Document Path: G:\Projects\Brevard\Maps\2016\RAP\Fig_5-7_ICs-ECs to Address Potentially Complete Pathways.mxd; Author: SM; Date Saved: 8/12/2016

Tables

Table 2-1: COPCs Identified in the RIR

COPCs	Complete and Potentially-Complete Exposure Pathways / Media						
	Surface and Subsurface Soil Direct Contact [1]	Soil-to-Groundwater	Vapor Intrusion	Surficial Aquifer Used as Drinking Water	Bedrock Aquifer Used as Drinking Water	Surface Water Exposure[2]	Sediment Exposure[3]
	Soil (0-15 feet bgs)	Soil (0-15 ft bgs)	Surficial Aquifer Groundwater	Surficial Aquifer Groundwater	Bedrock Aquifer Groundwater	Little River, Lake DERA, DERA Creek Surface Water	Little River, Lake DERA, DERA Creek Sediment
Inorganics							
Ammonia				X			
Antimony	X	X		X			
Arsenic	X	X		X			
Beryllium and compounds				X			
Cadmium		X		X			
Chromium, Total				X	X		
Cobalt	X	X		X			
Iron				X	X	X	X
Lead and Compounds	X			X			X
Manganese				X	X	X	
Mercury (elemental)	X	X					
Nickel Soluble Salts	X	X					
Selenium							X
Silver	X	X					X
Thallium (Soluble Salts)	X	X		X			
Vanadium	X	X		X	X		
Zinc and Compounds	X	X					
SVOCs							
1-Methylnaphthalene	X	X					
2-Methylnaphthalene	X	X					
7,12-Dimethylbenz(a)anthracene	X						
Acenaphthene		X					
Anthracene							X
Aroclor 1242	X	X					
Aroclor 1248	X	X					

Table 2-1: COPCs Identified in the RIR

COPCs	Complete and Potentially-Complete Exposure Pathways / Media						
	Surface and Subsurface Soil Direct Contact [1]	Soil-to-Groundwater	Vapor Intrusion	Surficial Aquifer Used as Drinking Water	Bedrock Aquifer Used as Drinking Water	Surface Water Exposure[2]	Sediment Exposure[3]
	Soil (0-15 feet bgs)	Soil (0-15 ft bgs)	Surficial Aquifer Groundwater	Surficial Aquifer Groundwater	Bedrock Aquifer Groundwater	Little River, Lake DERA, DERA Creek Surface Water	Little River, Lake DERA, DERA Creek Sediment
Aroclor 1254	X	X					
Aroclor 1260		X					
Benz[a]anthracene	X	X					X
Benzo(g,h,i)perylene							X
Benzo[a]pyrene	X	X		X			X
Benzo[b]fluoranthene	X	X					
Benzo[k]fluoranthene	X	X					X
Chrysene	X	X					X
Dibenz[a,h]anthracene	X	X		X	X		X
Fluoranthene							X
Fluorene							X
Indeno[1,2,3-cd]pyrene	X	X					X
Naphthalene	X	X					
Phenanthrene		X					X
Pyrene							X
DOWTHERM							
1,1'-Biphenyl	X	X	X	X			
Diphenyl Ether		X		X	X		
VOCs							
1,1,2,2-Tetrachloroethane	X	X	X	X			
1,1,2-Trichloroethane	X	X	X	X			
1,1-Dichloroethylene		X		X			
1,2-cis-Dichloroethylene	X	X		X			
1,2-Dichloroethane	X	X		X			
1,2-Diphenylhydrazine	X						
1,2-trans-Dichloroethylene		X					

Table 2-1: COPCs Identified in the RIR

COPCs	Complete and Potentially-Complete Exposure Pathways / Media						
	Surface and Subsurface Soil Direct Contact [1]	Soil-to-Groundwater	Vapor Intrusion	Surficial Aquifer Used as Drinking Water	Bedrock Aquifer Used as Drinking Water	Surface Water Exposure[2]	Sediment Exposure[3]
	Soil (0-15 feet bgs)	Soil (0-15 ft bgs)	Surficial Aquifer Groundwater	Surficial Aquifer Groundwater	Bedrock Aquifer Groundwater	Little River, Lake DERA, DERA Creek Surface Water	Little River, Lake DERA, DERA Creek Sediment
1,4-Dioxane				X	X		
3-Methylcholanthrene	X						
Benzaldehyde		X					
Benzene	X	X		X			
Bis(2-ethylhexyl)phthalate				X			
Carbazole		X					
Carbon Tetrachloride			X	X			
Chloroform			X				
Dibenzofuran	X	X					
Ethylbenzene	X						
Ethylene Glycol		X					
Methylene Chloride		X					
N-Nitrosodimethylamine	X	X					
p-Cresol		X					
Phenol		X					
Tetrachloroethylene	X	X	X	X	X		
Trichloroethylene	X	X	X	X	X		
Trichlorofluoromethane			X				
Vinyl Chloride		X	X	X	X	X	
Xylenes		X					

Notes:

[1] Direct contact via incidental ingestion, dermal contact, and inhalation

[2] Surface water exposures via incidental ingestion, dermal contact, and fish consumption

[3] Sediment exposures via incidental ingestion, dermal contact, and fish consumption

Table 4-1: Summary of Remediation Level Exceedances

Pathway		Sample ID	COPC	Result	Qualifier	RL	EF
Surface Soil Direct Contact [1],[2] (mg/kg)	Soil (0-2 feet bgs)	BRE-S-AOCA-SS-6(0-2)_8/2/2004	7,12-Dimethylbenz(a)anthracene	5.7		0.60	9.5
			Benzo[a]pyrene	4.4		20	0.22
		BRE-V-SWMU16-SS-1(1-5)_7/12/2004	3-Methylcholanthrene	1.3	J	7.0	0.19
			Benz[a]anthracene	48		198	0.24
			Benzo[a]pyrene	41		20	2.1
			Benzo[b]fluoranthene	51		198	0.26
			Dibenz[a,h]anthracene	4.2		20	0.21
		SSP14-ISM-DU-6ISM_12/11/2014	Benz[a]anthracene	26		198	0.13
			Benzo[a]pyrene	21		20	1.1
			Benzo[b]fluoranthene	29		198	0.15
			Dibenz[a,h]anthracene	3.2		20	0.16
		SSP14-MA-SS-2_12/2/2014	Benz[a]anthracene	22		198	0.11
			Benzo[a]pyrene	17		20	0.86
			Benzo[b]fluoranthene	22		198	0.11
			Dibenz[a,h]anthracene	3.1	J	20	0.16
		SSP14-MA-SS-2-D_12/2/2014	Benz[a]anthracene	32		198	0.16
			Benzo[a]pyrene	18		20	0.91
			Benzo[b]fluoranthene	32		198	0.16
			Dibenz[a,h]anthracene	3.5		20	0.18
		SSP14-MA-SS-4_12/2/2014	Benzo[a]pyrene	14		20	0.71
			Benzo[b]fluoranthene	20		198	0.10
			Dibenz[a,h]anthracene	3.0		20	0.15
Subsurface Soil Direct Contact (mg/kg)	Soil (2-15 feet bgs)	None	None	N/A	N/A	N/A	N/A
Bedrock Aquifer as Drinking Water (ug/L)	Groundwater	SSP14-GW-WSW-CMPGND_12/19/2014	Iron	24,400		300	81
			Vanadium	2.1	J	0.30	7.0
		SSP14-GW-WSW-DSF3_12/16/2014	Trichloroethylene	13		3.0	4.3
		SSP14-GW-WSW-GUARD_12/19/2014	Iron	6,770		300	23
			Manganese	76		50	1.5
		SSP14-GW-WSW-WWT_12/18/2014	Iron	86,500		300	288
			Manganese	438		50	8.8

Table 4-1: Summary of Remediation Level Exceedances

Pathway		Sample ID	COPC	Result	Qualifier	RL	EF
Surface Water Exposures (ug/L)	Little River, Lake DERA, DERA Creek Surface Water	BRE-W-SW-10_2/4/2009	Manganese	332		120	2.8
		BRE-W-SW-10-DUP_2/4/2009	Manganese	347		120	2.9
		BRE-W-SW-15_2/4/2009	Iron	1,190		1,000	1.2
		BRE-W-SW-8_2/4/2009	Manganese	178		120	1.5
		BRE-W-SW-9_2/4/2009	Manganese	274		120	2.3
		PPS14-SW-10_10/21/2014	Manganese	510		120	4.3
		PPS14-SW-10-Z_10/21/2014	Manganese	498		120	4.2
		SSP14-SW-08_10/28/2014	Iron	1,520		1,000	1.5
			Manganese	371		120	3.1
		SSP14-SW-08-Z_10/28/2014	Iron	1,460		1,000	1.5
			Manganese	374		120	3.1
		SSP14-SW-09_10/28/2014	Manganese	416		120	3.5
		SSP14-SW-09-Z_10/28/2014	Manganese	402		120	3.4
		SSP14-SW-26_10/22/2014	Vinyl Chloride	5.0		2.4	2.1
Sediment Exposure (mg/kg)	Little River, Lake DERA, DERA Creek Sediment	SSP14-SED-09_10/21/2014	Anthracene	1.6		0.33	4.8
			Benz[a]anthracene	3.7		0.33	11
			Benzo(g,h,i)perylene	1.7		0.17	10.0
			Benzo[a]pyrene	2.8		0.33	8.5
			Benzo[k]fluoranthene	1.6		0.24	6.7
			Chrysene	3.6		0.33	11
			Dibenz[a,h]anthracene	0.39		0.033	12
			Fluoranthene	7.1		0.33	22
			Fluorene	0.49		0.33	1.5
			Indeno[1,2,3-cd]pyrene	1.6		0.20	8.0
			Manganese	5,760	J	460	13
			Phenanthrene	5.2		0.33	16
			Pyrene	5.0		0.20	26
		SSP14-SED-10_10/21/2014	Manganese	1,270	J	460	2.8
		SSP14-SED-26_10/22/2014	Iron	72,700	J	20,000	3.6
			Manganese	1,350	J	460	2.9
		SSP14-SED-28_10/23/2014	Anthracene	0.75		0.33	2.3
			Benz[a]anthracene	2.2		0.33	6.7
			Benzo(g,h,i)perylene	1.3		0.17	7.6
			Benzo[a]pyrene	1.9		0.33	5.8
			Benzo[k]fluoranthene	1.0		0.24	4.2
			Chrysene	2.0		0.33	6.1
			Dibenz[a,h]anthracene	0.37		0.033	11
			Fluoranthene	4.5		0.33	14
			Indeno[1,2,3-cd]pyrene	1.2		0.20	6.0
			Phenanthrene	2.9		0.33	8.8
			Pyrene	3.5		0.20	18

Table 4-1: Summary of Remediation Level Exceedances

Pathway		Sample ID	COPC	Result	Qualifier	RL	EF
		SSP14-SED-33_10/22/2014	Lead and Compounds	50	J	36	1.4
			Selenium	2.3	J	2.0	1.1

Notes:

J: Estimated value

U: Non-detected value

(1) For surface soil, some COPCs that have an exceedance factor (EF) < 1 are included on this table because the COPC contributes to a cumulative risk > 1E-04.

Table 4-2: Identification of COCs

COPCs	Complete Exposure Pathways					COC?	Rationale
	Surface Soil Direct Contact	Subsurface Soil Direct Contact	Bedrock Aquifer Used as Drinking Water	Surface Water Exposures	Sediment Exposures		
Inorganics							
Ammonia						No	Not applicable to complete exposure pathways
Antimony	X	X				No	No RL exceedance
Arsenic	X	X				No	No RL exceedance
Beryllium and compounds						No	Not applicable to complete exposure pathways
Cadmium						No	Not applicable to complete exposure pathways
Chromium, Total			X			No	No RL exceedance
Cobalt	X	X				No	No RL exceedance
Iron			X	X	X	No	Not a site-related constituent
Lead and Compounds	X	X			X	No	No RL exceedances for surface and subsurface soil; not site-related for sediment
Manganese			X	X		No	Not a site-related constituent
Mercury (elemental)	X	X				No	No RL exceedance
Nickel Soluble Salts	X	X				No	No RL exceedance
Selenium					X	No	Not a site-related constituent
Silver	X	X			X	No	No RL exceedance
Thallium (Soluble Salts)	X	X				No	No RL exceedance
Vanadium	X	X	X			No	No RL exceedance for surface and subsurface soil; not a site-related constituent for Bedrock Aquifer groundwater
Zinc and Compounds	X	X				No	No RL exceedance
SVOCs							
1-Methylnaphthalene	X	X				No	No RL exceedance
2-Methylnaphthalene	X	X				No	No RL exceedance
7,12-Dimethylbenz(a)anthracene	X	X				Yes	Exceeds RL in surface soil; no RL exceedance in subsurface soil
Acenaphthene						No	Not applicable to complete exposure pathways
Anthracene					X	TBD	To be determined based on additional sediment sampling
Aroclor 1242	X	X				No	No RL exceedance

Table 4-2: Identification of COCs

COPCs	Complete Exposure Pathways					COC?	Rationale
	Surface Soil Direct Contact	Subsurface Soil Direct Contact	Bedrock Aquifer Used as Drinking Water	Surface Water Exposures	Sediment Exposures		
Aroclor 1248	X	X				No	No RL exceedance
Aroclor 1254	X	X				No	No RL exceedance
Aroclor 1260						No	Not applicable to complete exposure pathways
Benz[a]anthracene	X	X			X	Yes	Exceeds RL in surface soil; no RL exceedance for subsurface soil; to be determined based on additional sediment sampling
Benzo(g,h,i)perylene					X	TBD	To be determined based on additional sediment sampling
Benzo[a]pyrene	X	X			X	Yes	Exceeds RL in surface soil; no RL exceedance in subsurface soil; to be determined based on additional sediment sampling
Benzo[b]fluoranthene	X	X				Yes	Exceeds RL in surface soil; no RL exceedance in subsurface soil
Benzo[k]fluoranthene	X	X			X	TBD	No RL exceedances in surface and subsurface soil; to be determined based on additional sediment sampling
Chrysene	X	X			X	TBD	No RL exceedances in surface and subsurface soil; to be determined based on additional sediment sampling
Dibenz[a,h]anthracene	X	X	X		X	Yes	Exceeds RL in surface soil; no RL exceedance in subsurface soil and Bedrock Aquifer groundwater; to be determined based on additional sediment sampling
Fluoranthene					X	TBD	To be determined based on additional sediment sampling
Fluorene					X	No	No RL exceedance
Indeno[1,2,3-cd]pyrene	X	X			X	TBD	No RL exceedances in surface and subsurface soil; to be determined based on additional sediment sampling
Naphthalene	X	X				No	No RL exceedance
Phenanthrene					X	TBD	To be determined based on additional sediment sampling
Pyrene					X	TBD	To be determined based on additional sediment sampling

Table 4-2: Identification of COCs

COPCs	Complete Exposure Pathways					COC?	Rationale
	Surface Soil Direct Contact	Subsurface Soil Direct Contact	Bedrock Aquifer Used as Drinking Water	Surface Water Exposures	Sediment Exposures		
DOWTHERM							
1,1'-Biphenyl	X	X				No	No RL exceedance
Diphenyl Ether			X			No	No RL exceedance
VOCs							
1,1,2,2-Tetrachloroethane	X	X				No	No RL exceedance
1,1,2-Trichloroethane	X	X				No	No RL exceedance
1,1-Dichloroethylene						No	Not applicable to complete exposure pathways
1,2-cis-Dichloroethylene	X	X				No	No RL exceedance
1,2-Dichloroethane	X	X				No	No RL exceedance
1,2-Diphenylhydrazine	X	X				No	No RL exceedance
1,2-trans-Dichloroethylene						No	Not applicable to complete exposure pathways
1,4-Dioxane			X			No	No RL exceedance
3-Methylcholanthrene	X	X				Yes	Exceeds RL in surface soil; no RL exceedance in subsurface soil
Benzaldehyde						No	Not applicable to complete exposure pathways
Benzene	X	X				No	No RL exceedance
Bis(2-ethylhexyl)phthalate						No	Not applicable to complete exposure pathways
Carbazole						No	Not applicable to complete exposure pathways
Carbon Tetrachloride						No	Not applicable to complete exposure pathways
Chloroform						No	Not applicable to complete exposure pathways
Dibenzofuran	X	X				No	No RL exceedance
Ethylbenzene	X	X				No	No RL exceedance
Ethylene Glycol						No	Not applicable to complete exposure pathways
Methylene Chloride						No	Not applicable to complete exposure pathways
N-Nitrosodimethylamine	X	X				No	No RL exceedance
p-Cresol						No	Not applicable to complete exposure pathways
Phenol						No	Not applicable to complete exposure pathways
Tetrachloroethylene	X	X	X			No	No RL exceedance
Trichloroethylene	X	X	X			Yes	No RL exceedances in surface and subsurface soil; exceeds RL in Bedrock Aquifer groundwater

Table 4-2: Identification of COCs

COPCs	Complete Exposure Pathways					COC?	Rationale
	Surface Soil Direct Contact	Subsurface Soil Direct Contact	Bedrock Aquifer Used as Drinking Water	Surface Water Exposures	Sediment Exposures		
Trichlorofluoromethane						No	Not applicable to complete exposure pathways
Vinyl Chloride			X	X		Yes	Exceeds RL in surface water; no RL exceedances in Bedrock Aquifer groundwater
Xylenes						No	Not applicable to complete exposure pathways

Appendix A

Screening Level Exceedance Locations

Prepared for:

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Table of Contents

Figures

List of Acronyms

Acronym	Explanation
CCEFs	Cumulative Cancer Exceedance Factors
CEFs	Cancer Exceedance Factors
DEQ	Department of Environment Quality
DERA	DuPont Employee Recreational Area
ECs	Engineering Controls
EF	Exceedance Factor
DuPont	E.I. DuPont de Nemours and Company
HI	Hazard index (noncancer)
ICs	Institutional Controls
IHSB	Inactive Hazardous Site Branch
IMAC	Interim Maximum Allowable Concentrations
NC	North Carolina
NC2L	North Carolina 2L drinking water criteria
NC2B	North Carolina 2B surface water criteria
NCDEQ	North Carolina Department of Environmental Quality
NCDWM	North Carolina Division of Waste Management
NCEFs	Noncancer Exceedance Factors
PSRG	Preliminary Soil Remediation Goals
RAP	Remedial Action Plan
RIR	Remedial Investigation Report
Site	Brevard Site
USEPA	United States Environmental Protection Agency
VI	Vapor Intrusion
SL	Screening Levels

SECTION 1: SCREENING LEVEL EXCEEDANCES

The generic screening levels (SLs) presented in the Remedial Investigation Report (RIR) for the E.I. du Pont de Nemours and Company (DuPont) Brevard Site (site) were used in the Remedial Action Plan (RAP) to identify areas where institutional controls (ICs) and engineering controls (ECs) may be needed after site-specific remedial actions are complete. To identify areas at the site where constituent concentrations in soil, groundwater, surface water, and sediment exceeded SLs, maximum constituent concentrations were compared to SLs based on the potentially-complete exposure pathways identified in the RIR (Parsons 2015). The purpose of this appendix is to present the sample locations where maximum constituent concentrations exceeded SLs for each potentially-complete and complete exposure pathway identified in the RIR and define the magnitude of the SL exceedances using exceedance factors (EFs).

1.1 Screening Levels

The following default North Carolina (NC) Department of Environment Quality (NCDEQ), NC Division of Waste Management (NCDWM), or United States Environmental Protection Agency (USEPA) criteria were used as the SLs in the RIR (Parsons 2015).

Soil	•Inactive Hazardous Site Branch (IHSB) Residential Preliminary Soil Remediation Goals (PSRGs) •IHSB Industrial PSRGs •IHSB Protection of Groundwater PSRGs
Groundwater	•15A NCAC4 2L.0200 (NC2L) drinking water criteria •NC Interim Maximum Allowable Concentrations (IMAC) •NCDW Residential Vapor Intrusion (VI) SLs •NCDWM Industrial VI SLs
Sediment (Little River, Lake DERA, and DERA Creek)	•Ecological Sediment Quality Benchmarks
Surface Water (Little River, Lake DERA, and DERA Creek Surface Water)	•15A NCAC 2B (NC2B) surface water critera (protection of freshwater organisms (chronic), trout waters (organism only), and human health (fish consumption) •National Recommended Water Quality Criteria (if NC2B standards were not available)

1.2 Calculation of Exceedance Factors

Exceedance factors (EFs) were calculated for all detected constituents by dividing the maximum constituent concentrations in soil, groundwater, surface water, and sediment by the most conservative potentially-complete exposure pathway SLs to determine where (and by how much) constituent concentrations exceeded the SLs. Noncancer exceedance factors (NCEFs) and cancer exceedance factors (CEFs) were calculated for each sample location by dividing the maximum constituent concentration at a sample location by the noncancer or cancer SL for each potentially-complete exposure pathway.

Potentially-Complete Exposure Pathway	Media	Receptor
Surface and subsurface soil direct contact (via incidental ingestion, dermal contact, and inhalation of particulates)	Soil	Future resident and future industrial worker
Soil-to-groundwater	Soil	Future resident
Vapor intrusion	Groundwater	Future resident and future industrial worker
Surficial Aquifer used as drinking water	Groundwater	Future resident
Bedrock Aquifer used as drinking water	Groundwater	Future resident
Surface water exposures (via incidental ingestion, dermal contact, and consumption of seafood)	Surface Water	Current and future DSRF user and current and future ecological receptors
Sediment exposures (via incidental ingestion, dermal contact, and consumption of seafood)	Sediment	Current and future ecological receptors

NCEFs were based on noncancer endpoints with a hazard index of 0.2 or a combination of cancer and noncancer endpoints. An NCEF greater than 1 indicates that at least one constituent concentration at a sample location was greater than the SL. An NCEF of 10 indicates that at least one constituent concentration at a sample location is greater than 10 times the SL. The highest NCEF for each sample location is presented on the applicable figures.

Cancer risks are presented as cumulative risks (i.e., cumulative CEFs [CCEFs]). To determine the CCEFs for each sample location, the CEFs for all constituents detected at a sample location were summed. A CCEF of 1 indicates that the cumulative cancer risk at a sample location is 1E-06. A CCEF of 10 indicates that the cumulative cancer risk at a sample location is 1E-05. The highest CCEF for each sample location is presented on the applicable figures.

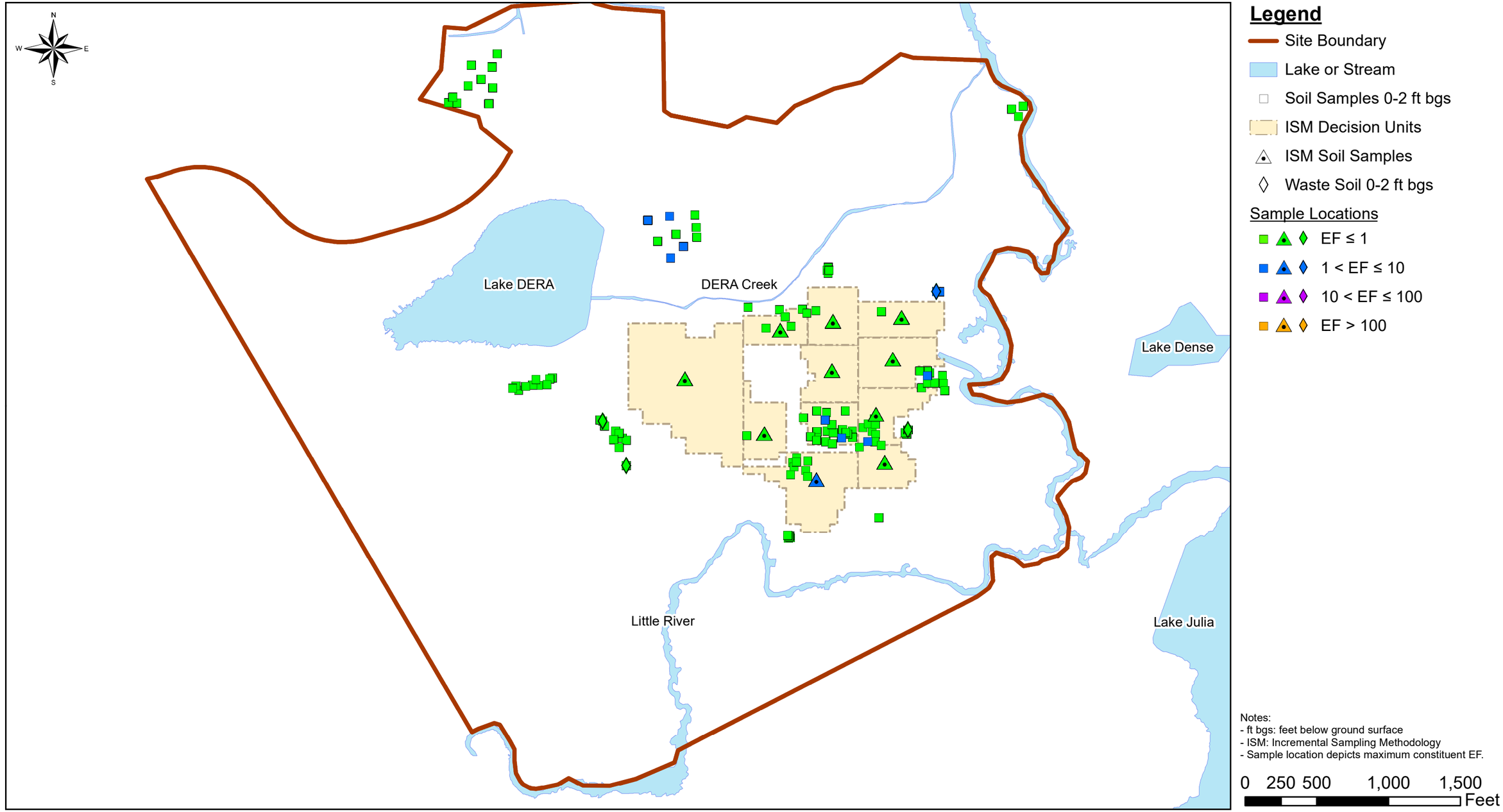
1.3 Exceedance Locations

Figures A-1 through A-15 present the locations where constituent concentrations exceeded SLs. The following table identifies the pathway and SL used in each EF figure.

Figure	Pathway	Calculation	Criteria	EF Type
A-1	Surface soil direct contact	The maximum surface soil concentration was divided by the residential noncancer SLs	North Carolina residential noncancer PSRG (Hazard Index [HI] = 0.2)	NCEF
A-2	Surface soil direct contact	The maximum surface soil concentration was divided by the residential cancer SL	North Carolina residential cancer PSRG (cancer risk [CR] = 1E-06)	CCEF
A-3	Surface soil direct	The maximum surface soil	North Carolina industrial	NCEF

Figure	Pathway	Calculation	Criteria	EF Type
	contact	concentration was divided by the industrial noncancer SL	noncancer PSRG (HI = 0.2)	
A-4	Surface soil direct contact	The maximum surface soil concentration was divided by the industrial cancer SL	North Carolina industrial cancer PSRG (CR = 1E-06)	CCEF
A-5	Subsurface soil direct contact	The maximum subsurface soil concentration was divided by the residential noncancer SL	North Carolina residential noncancer PSRG (HI = 0.2)	NCEF
A-6	Subsurface soil direct contact	The maximum subsurface soil direct contact concentration was divided by residential cancer SL	North Carolina Residential cancer PSRG (CR = 1E-06)	CCEF
A-7	Subsurface soil direct contact	The maximum subsurface soil concentration was divided by industrial noncancer SL	North Carolina Industrial noncancer PSRG (HI = 0.2)	NCEF
A-8	Subsurface soil direct contact	The maximum subsurface soil concentration was divided by industrial cancer SLs	North Carolina industrial cancer PSRG (CR = 1E-06)	CCEF
A-9	Soil-to-groundwater	The maximum soil concentration was divided by the protection of groundwater SLs	North Carolina protection of groundwater PSRG	EFs are based on either noncancer or cancer criteria.
A-10	Vapor intrusion	The maximum Surficial Aquifer concentration was divided by the residential VI SL	North Carolina Division of Waste Management Residential VI SLs	EFs are based on either noncancer or cancer criteria.
A-11	Vapor intrusion	The maximum Surficial Aquifer concentration was divided by industrial VI SLs	North Carolina Division of Waste Management Industrial vapor intrusion (VI) SLs	EFs are based on either noncancer or cancer criteria.
A-12	Surficial Aquifer used as drinking water	The maximum Surficial Aquifer constituent concentration was divided by drinking water SLs	NC2L	EFs are based on either noncancer or cancer criteria.
A-13	Bedrock Aquifer used as drinking water	The maximum Bedrock Aquifer constituent concentration was divided by drinking water SLs	NC2L	EFs are based on either noncancer or cancer criteria.
A-14	Surface water exposures	The maximum surface water constituent concentration was divided ecological and human health SLs	NC2B	EFs are based on either noncancer or cancer criteria.
A-15	Sediment exposures	The maximum sediment constituent concentration was divided by ecological SLs	Ecological SLs	EFs are based on either noncancer or cancer criteria.

Figures

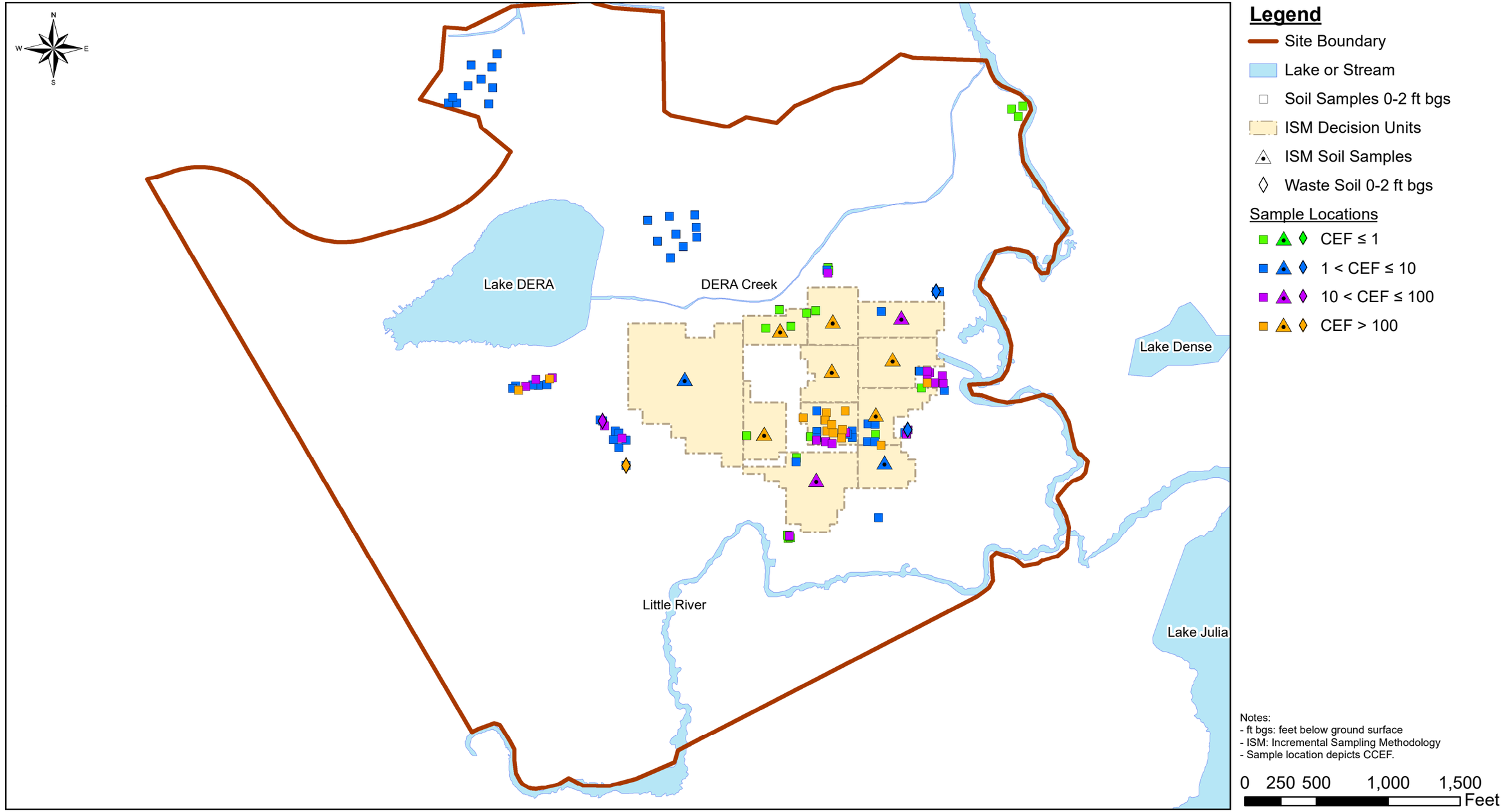


PIONEER TECHNOLOGIES CORPORATION

Surface Soil Concentrations Compared to Residential Noncancer SLs
Remedial Action Plan
Brevard Site
Cedar Mountain, North Carolina

Figure A-1

Document Path: G:\Projects\Brevard\Maps\2016\RAP\Appendix A\Fig_A-1-Soil compared to NC Res Non-Can.mxd; Author: SM; Date Saved: 8/11/2016



PIONEER TECHNOLOGIES CORPORATION

Surface Soil Concentrations Compared to Residential Cancer SLs
Remedial Action Plan
Brevard Site
Cedar Mountain, North Carolina

Figure A-2

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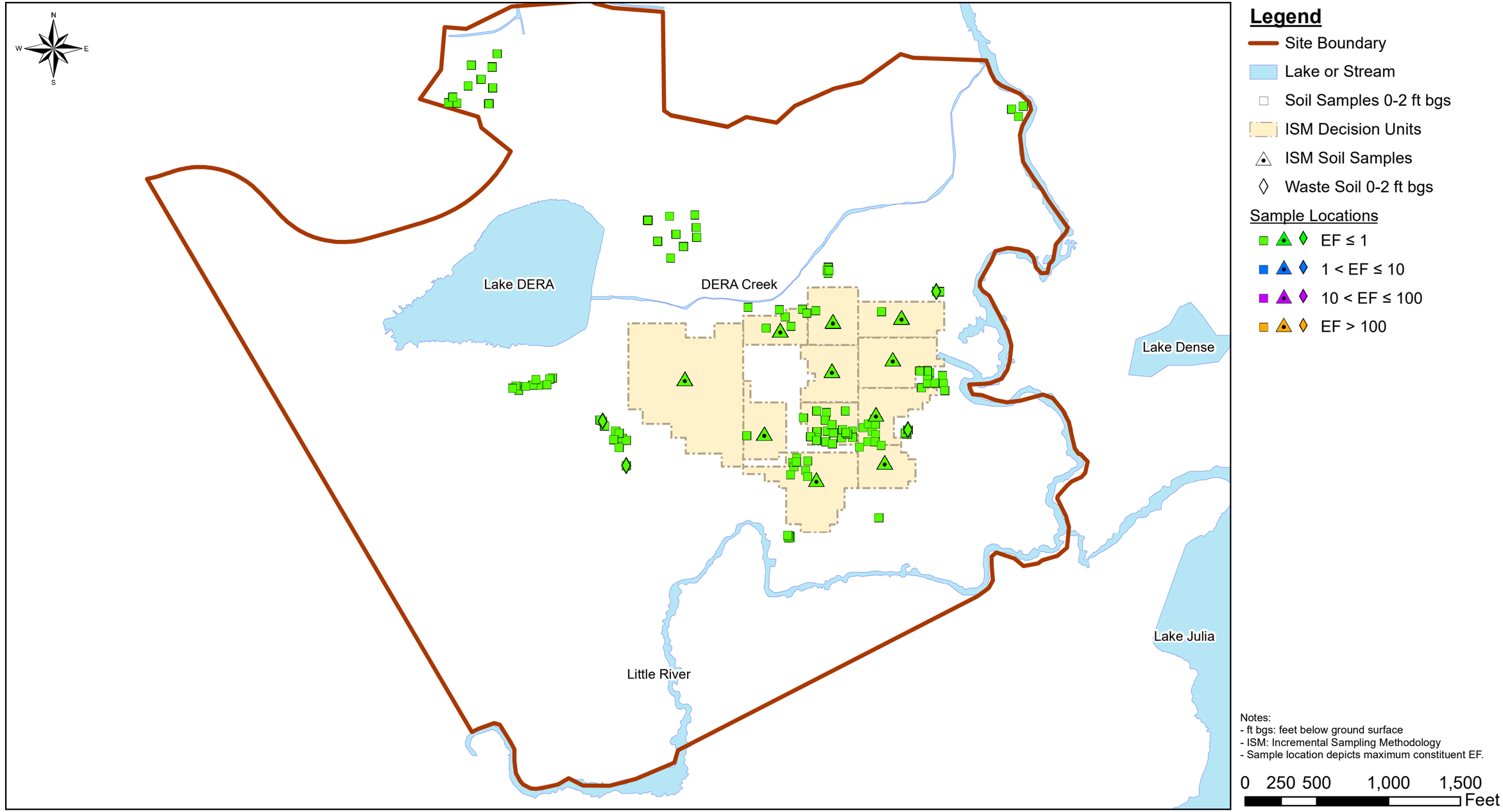

PIONEER TECHNOLOGIES CORPORATION

Surface Soil Concentrations Compared to Industrial Noncancer SLs
Remedial Action Plan
Brevard Site
Cedar Mountain, North Carolina

Figure A-3

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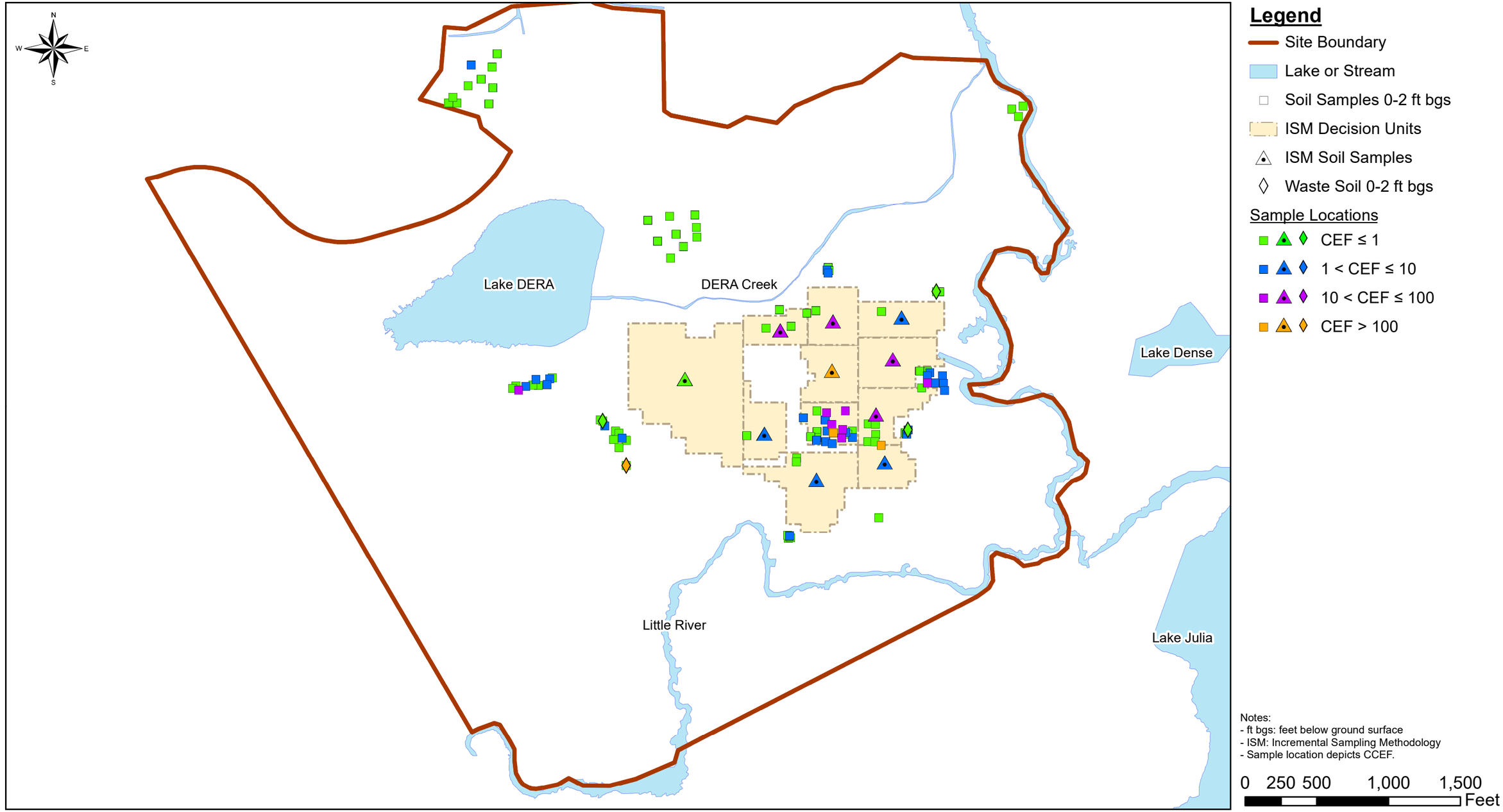

PIONEER TECHNOLOGIES CORPORATION

Surface Soil Concentrations Compared to Industrial Cancer SLs
Remedial Action Plan
Brevard Site
Cedar Mountain, North Carolina

Figure A-4

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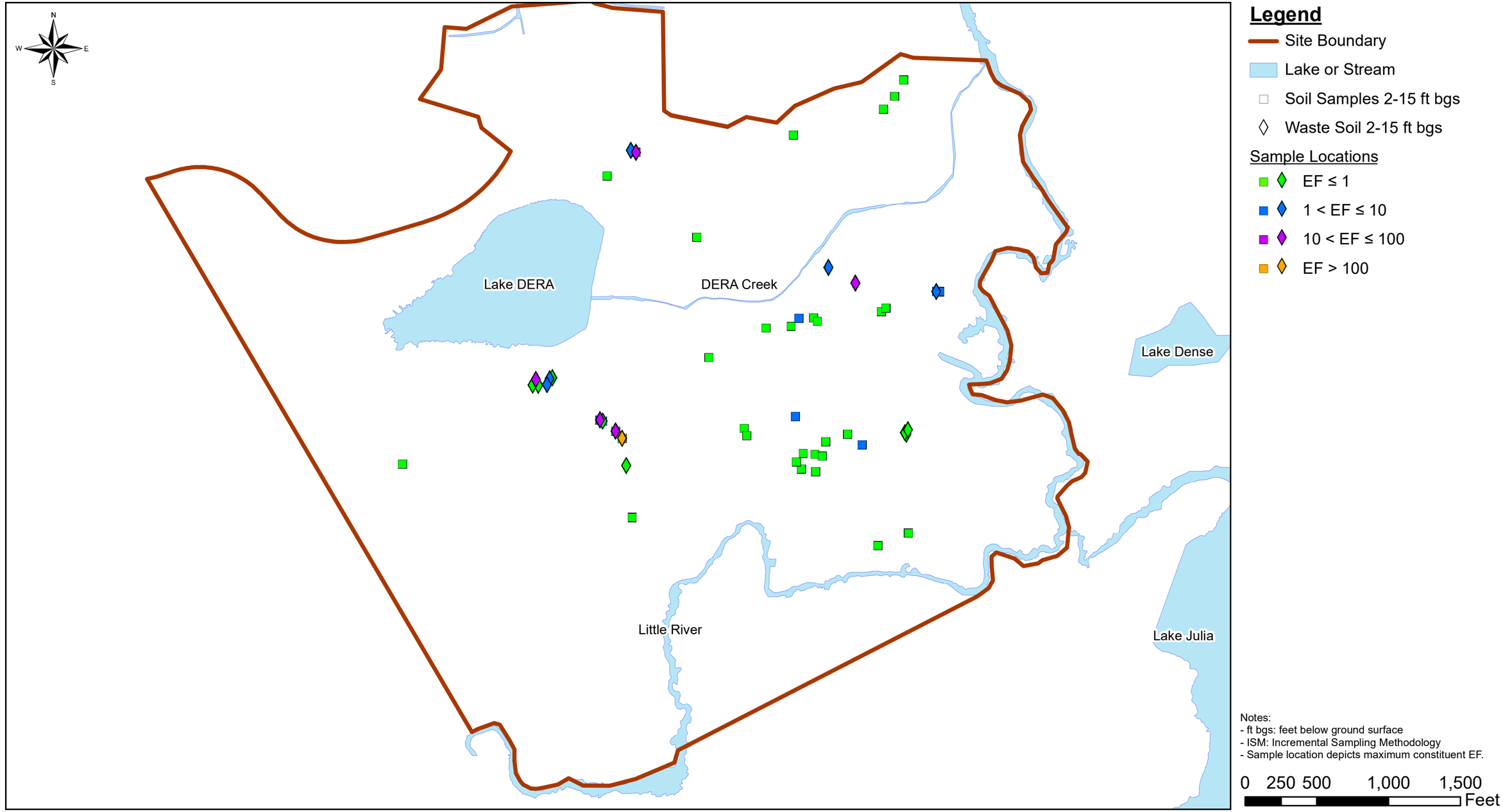

PIONEER TECHNOLOGIES CORPORATION

Subsurface Soil Concentrations Compared to Residential Noncancer SLs
Remedial Action Plan
Brevard Site
Cedar Mountain, North Carolina

Figure A-5

Document Path: G:\Projects\Brevard\Maps\2016\RAP\Appendix A\Fig_A-5-Soil 2-15 compared to NC Res Non-Can.mxd; Author: SM; Date Saved: 8/11/2016

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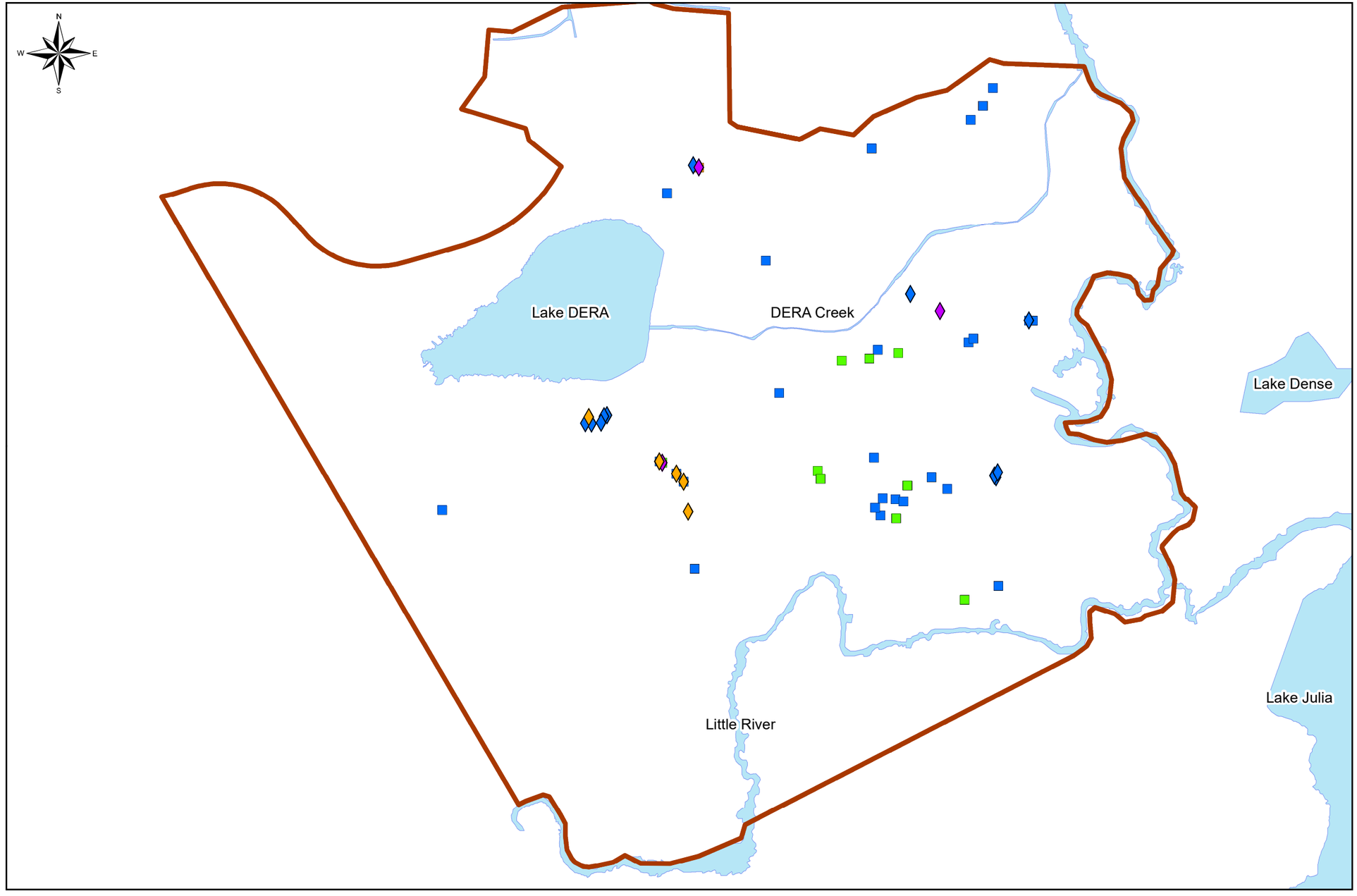


Legend

- Site Boundary
- Lake or Stream
- Soil Samples 2-15 ft bgs
- Waste Soil 2-15 ft bgs

Sample Locations

- CEF ≤ 1
- 1 < CEF ≤ 10
- 10 < CEF ≤ 100
- CEF > 100

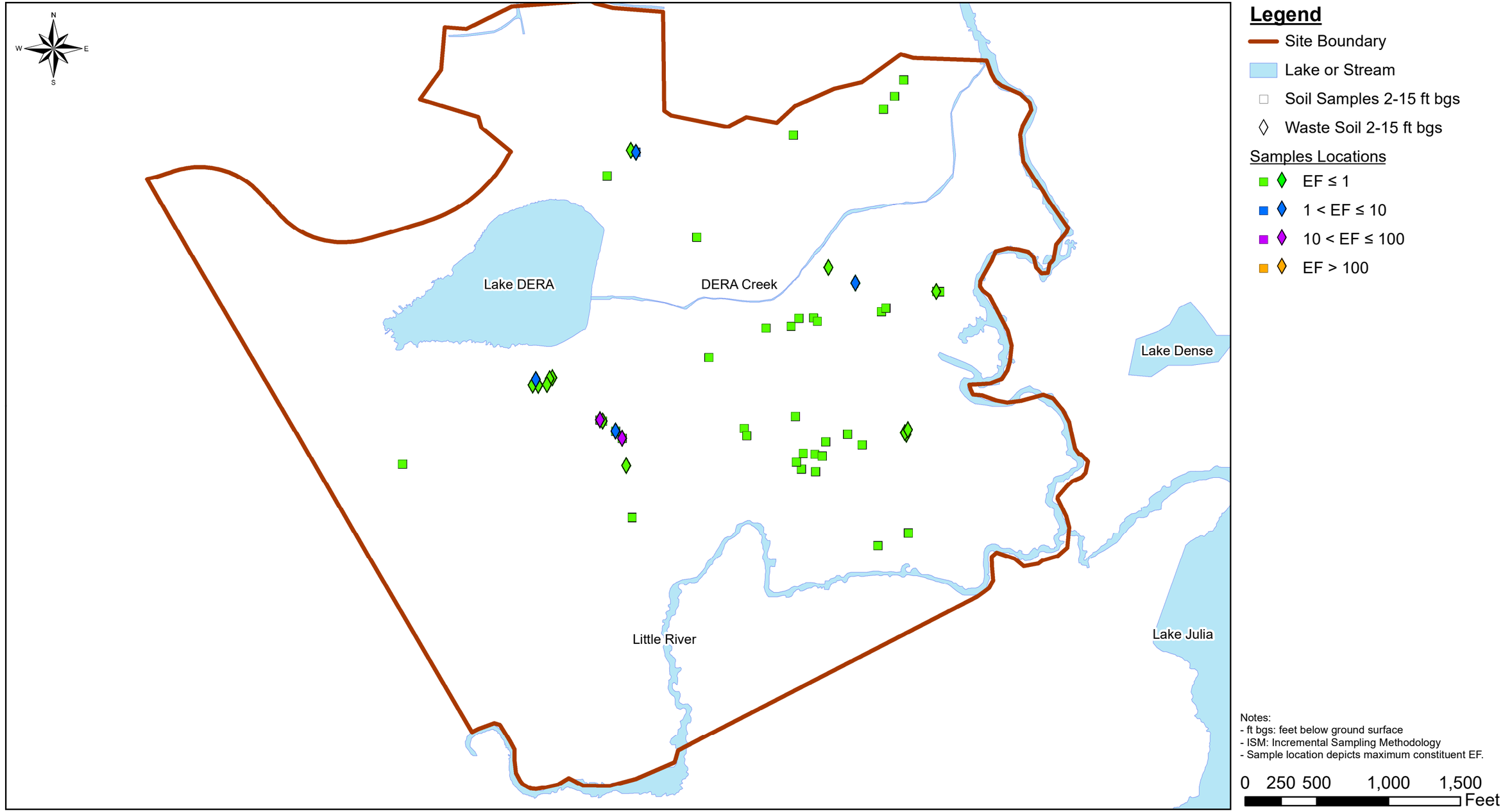
Notes:
- ft bgs: feet below ground surface
- ISM: Incremental Sampling Methodology
- Sample location depicts CCEF.

0 250 500 1,000 1,500 Feet

PIONEER TECHNOLOGIES CORPORATION

Subsurface Soil Concentrations Compared to Residential Cancer SLs
Remedial Action Plan
Brevard Site
Cedar Mountain, North Carolina

Figure A-6

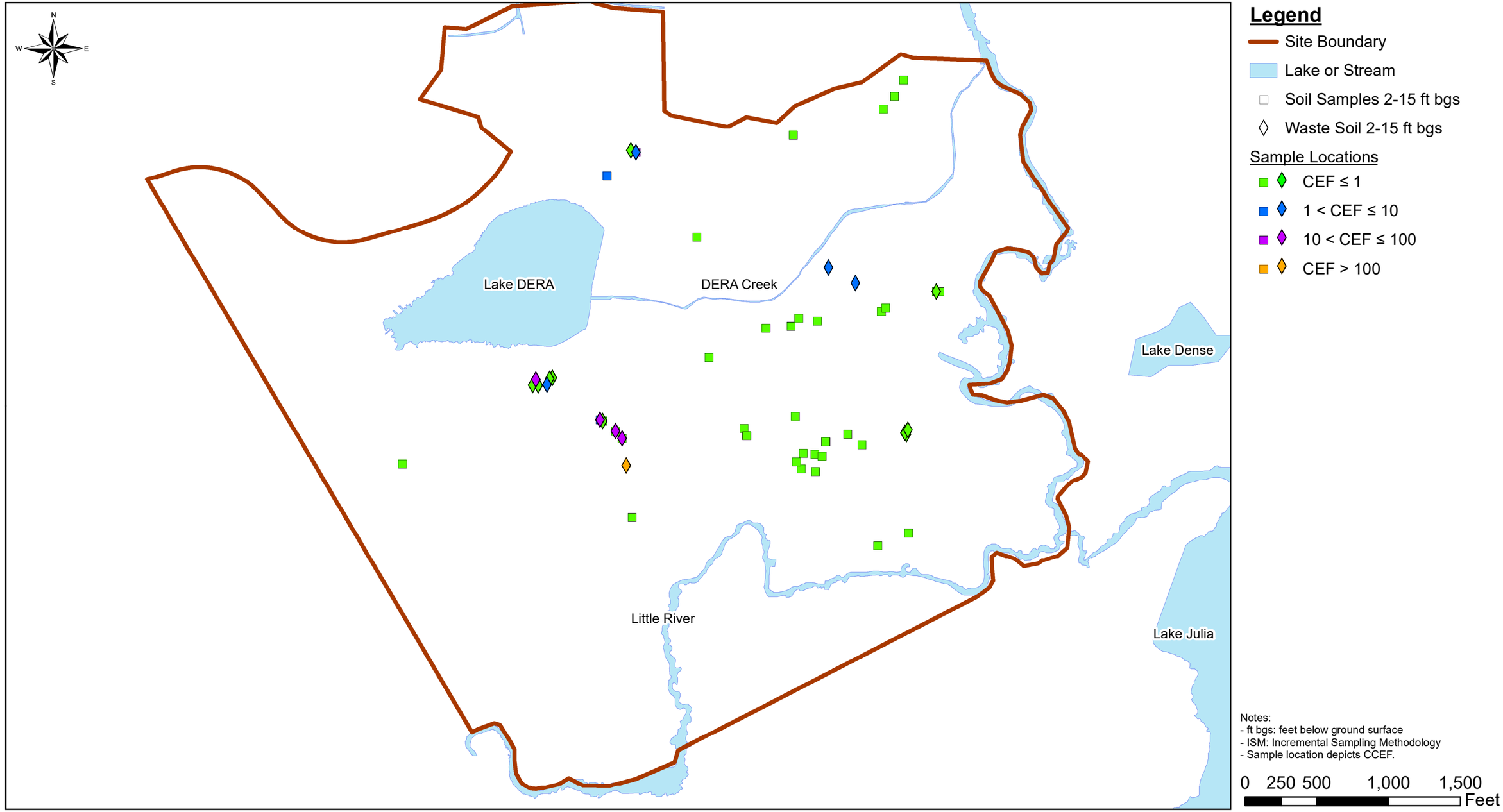


PIONEER TECHNOLOGIES CORPORATION

Subsurface Soil Concentrations Compared to Industrial Noncancer SLs
Remedial Action Plan
Brevard Site
Cedar Mountain, North Carolina

Figure A-7

Document Path: G:\Projects\Brevard\Maps\2016\RAP\Appendix A\Fig_A-7-Soil 2-15 compared to NC Ind Non-Can.mxd; Author: SM; Date Saved: 8/11/2016



PIONEER TECHNOLOGIES CORPORATION

Subsurface Soil Concentrations Compared to Industrial Cancer SLs
Remedial Action Plan
Brevard Site
Cedar Mountain, North Carolina

Figure A-8

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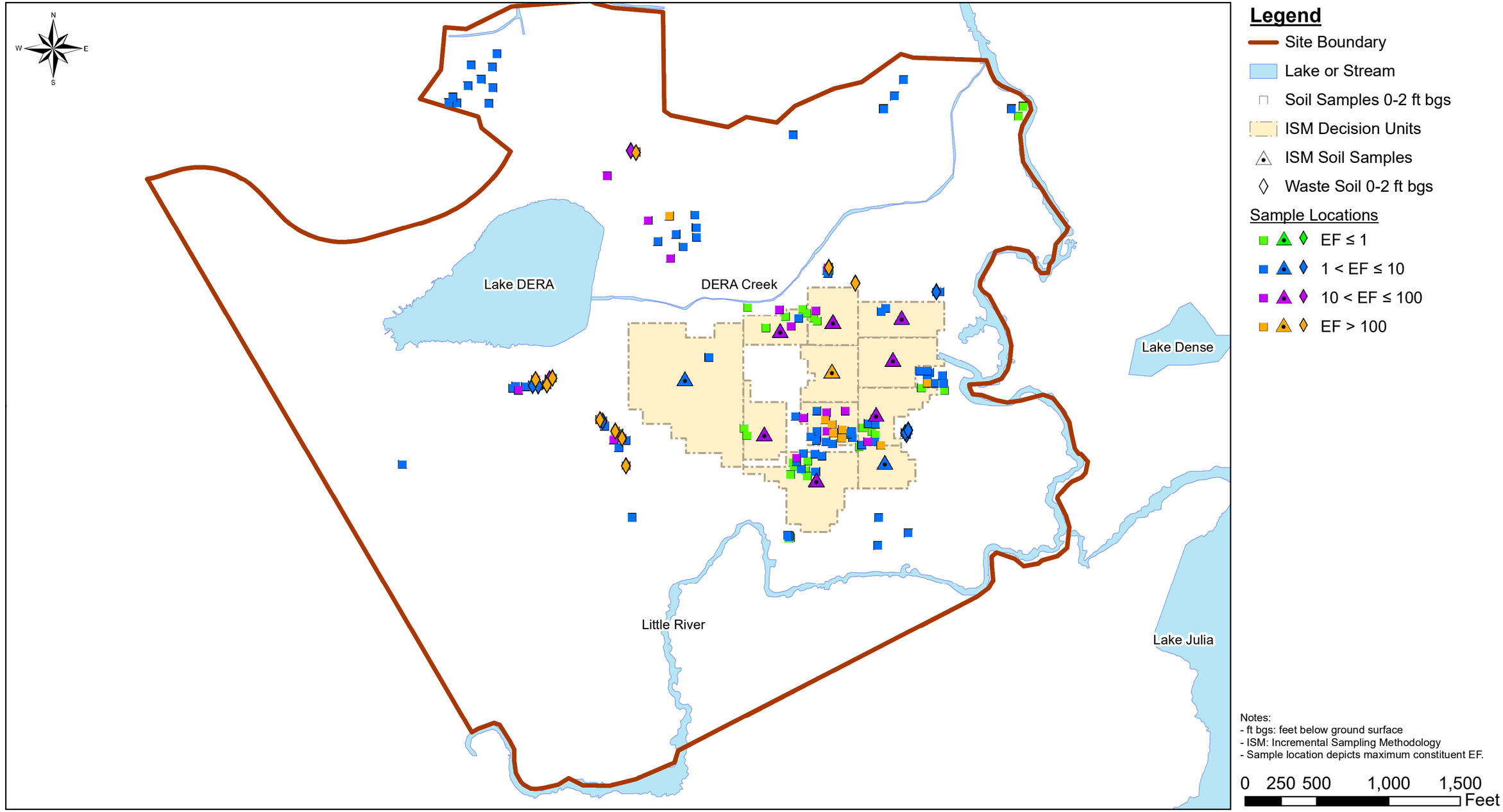

PIONEER TECHNOLOGIES CORPORATION

Soil Concentrations Compared to Protection of Groundwater SLs
Remedial Action Plan
Brevard Site
Cedar Mountain, North Carolina

Figure A-9

Document Path: G:\Projects\Brevard\Maps\2016\RAP\Appendix A\Fig_A-9-Soil compared to NC Migration to Groundwater.mxd; Author: SM; Date Saved: 8/11/2016

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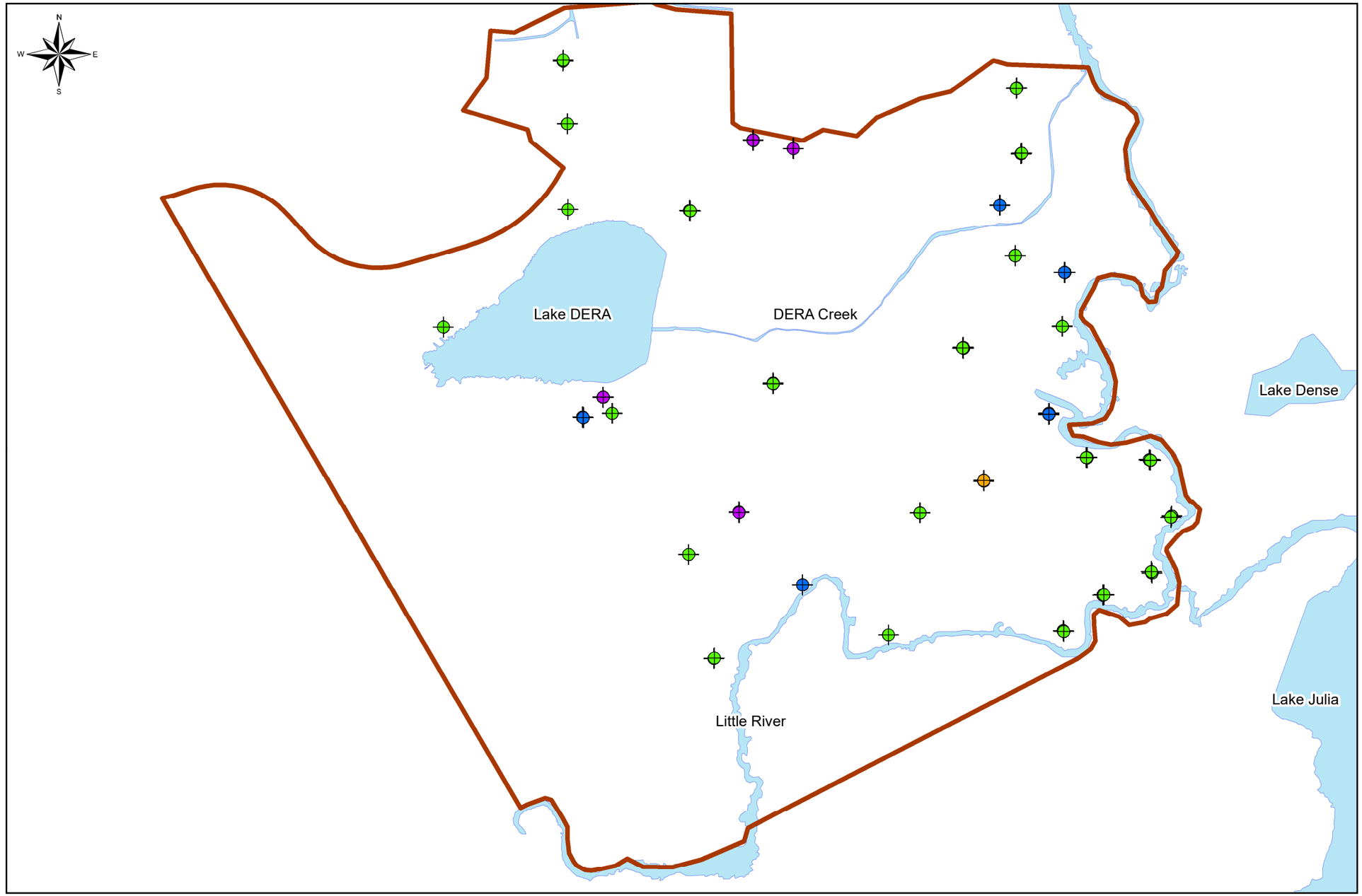
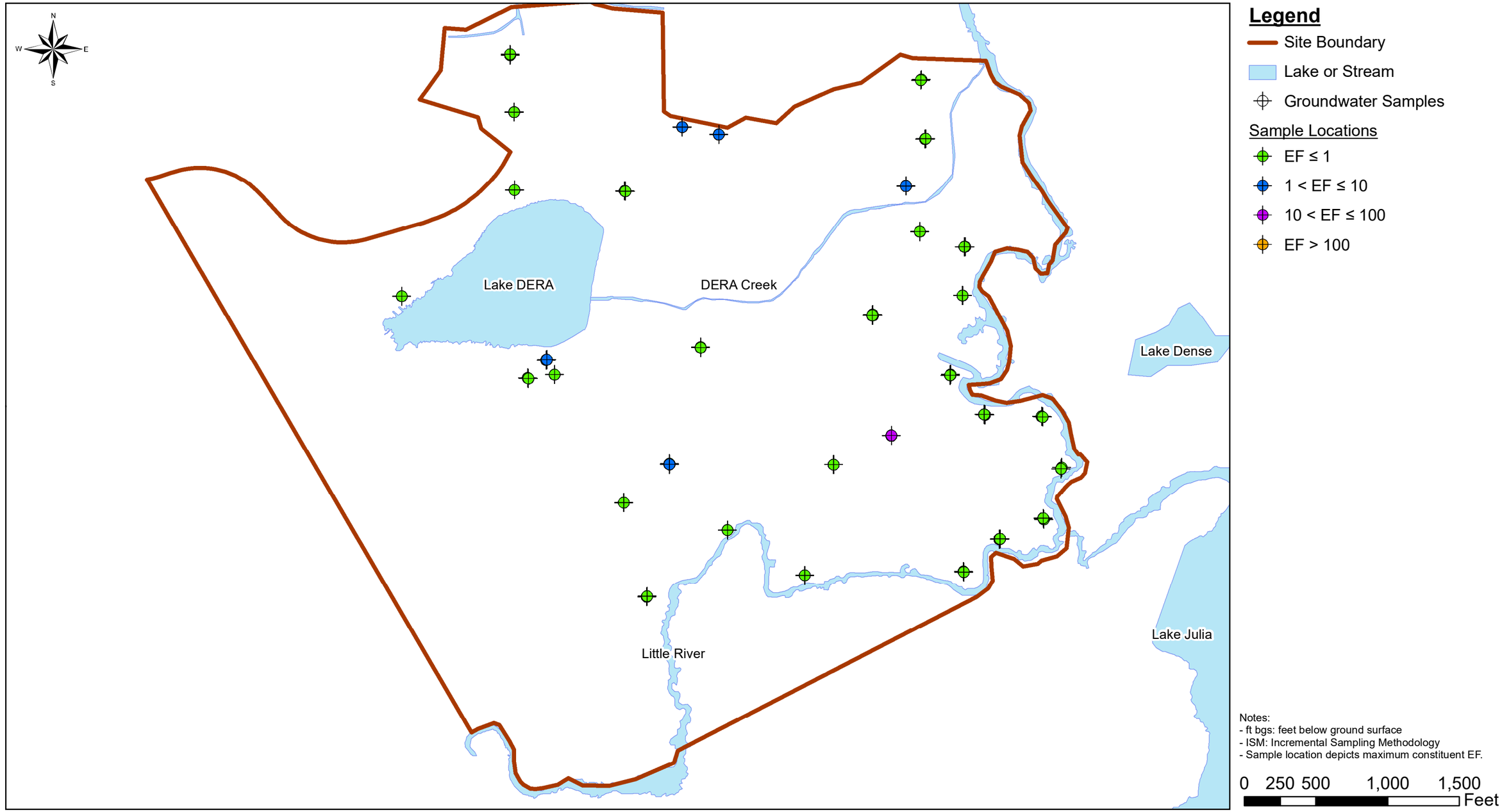


PIONEER TECHNOLOGIES CORPORATION

Surficial Aquifer Concentrations Compared to Residential Vapor Intrusion SLs
Remedial Action Plan
Brevard Site
Cedar Mountain, North Carolina

Figure A-10



PIONEER TECHNOLOGIES CORPORATION

Surficial Aquifer Concentrations Compared to Industrial Vapor Intrusion SLs
Remedial Action Plan
Brevard Site
Cedar Mountain, North Carolina

Figure A-11

Document Path: G:\Projects\Brevard\Maps\2016\RAP\Appendix A\Fig_A-11- Surficial GW compared to IV.mxd; Author: SM; Date Saved: 8/11/2016

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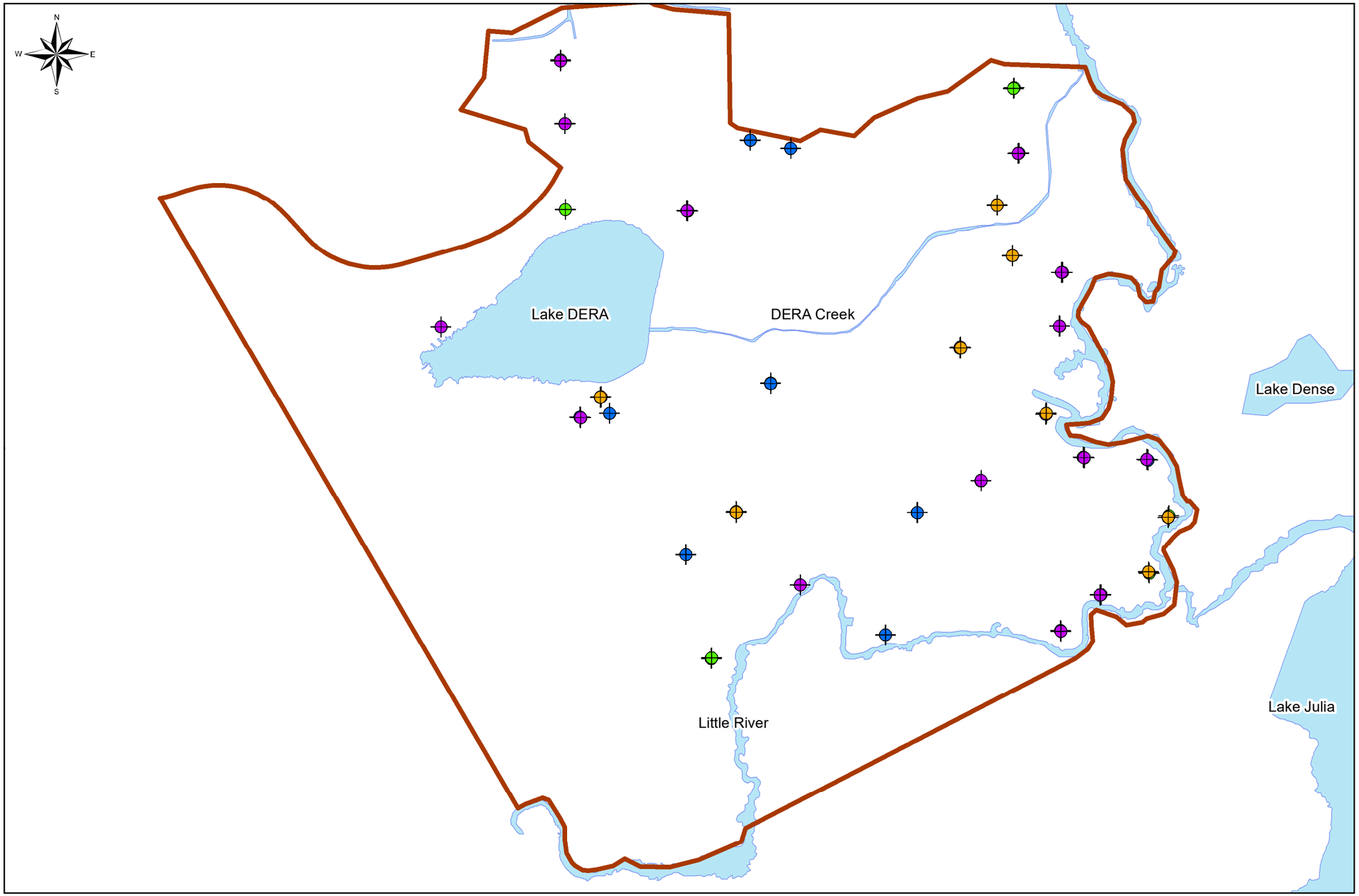


Legend

- Site Boundary
- Lake or Stream
- Groundwater Samples

Sample Locations

- EF ≤ 1
- 1 < EF ≤ 10
- 10 < EF ≤ 100
- EF > 100

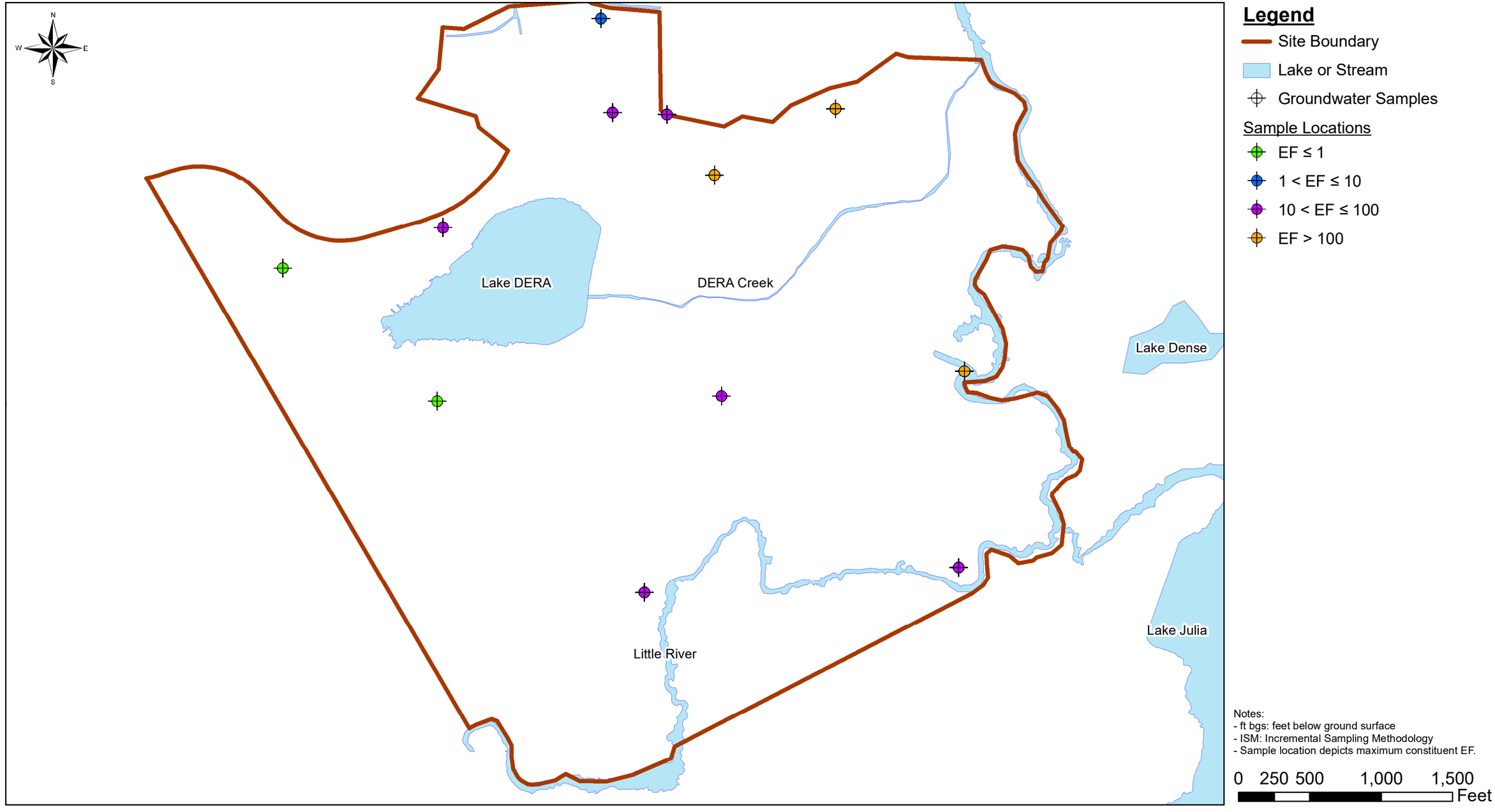
Notes:
- ft bgs: feet below ground surface
- ISM: Incremental Sampling Methodology
- Sample location depicts maximum constituent EF.

0 250 500 1,000 1,500 Feet

PIONEER TECHNOLOGIES CORPORATION

Surficial Aquifer Concentrations Compared to Drinking Water SLs
Remedial Action Plan
Brevard Site
Cedar Mountain, North Carolina

Figure A-12

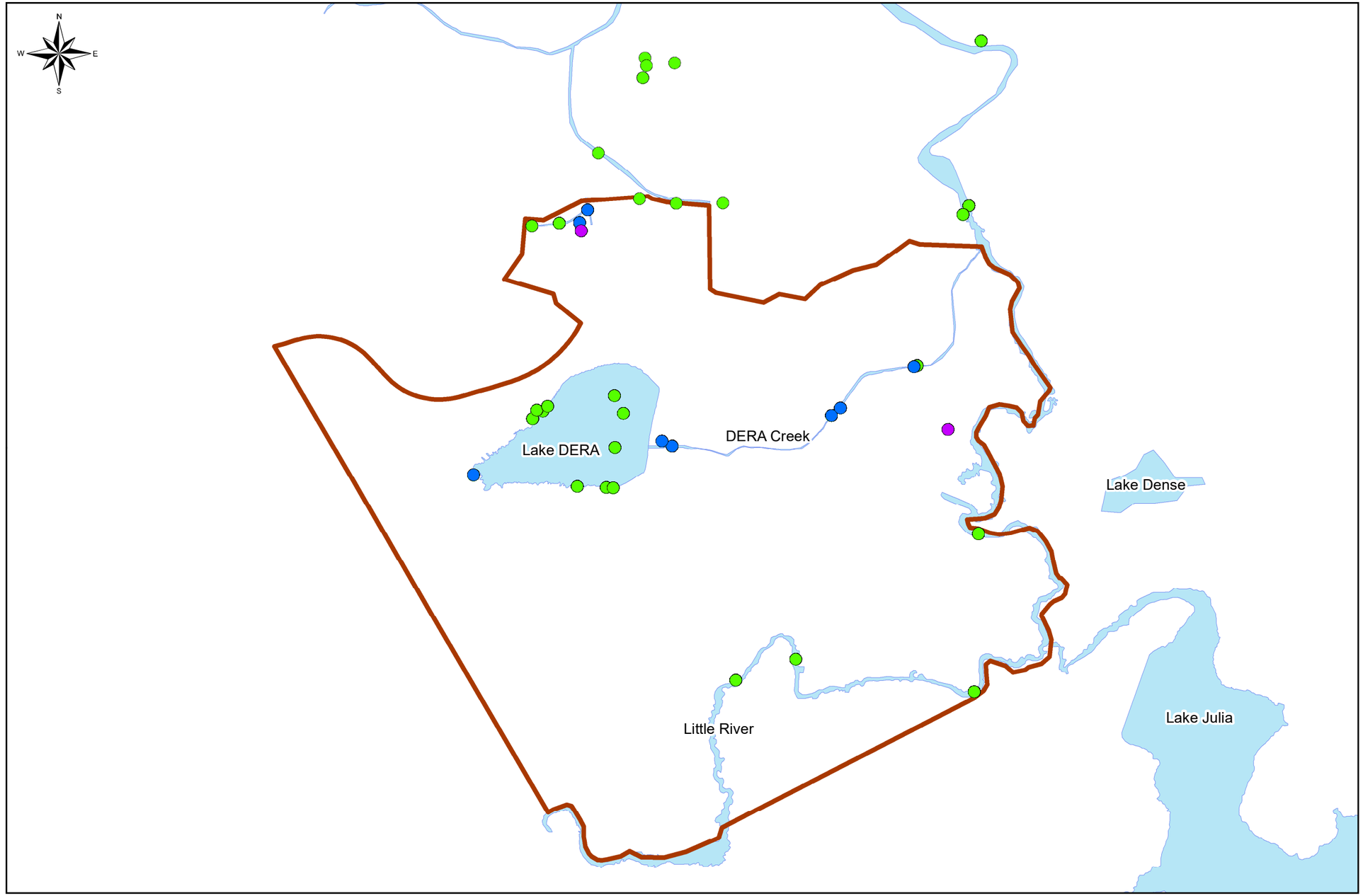


PIONEER TECHNOLOGIES CORPORATION

Bedrock Aquifer Concentrations Compared to Drinking Water SLs
Remedial Action Plan
Brevard Site
Cedar Mountain, North Carolina

Figure A-13

Document Path: G:\Projects\Brevard\Maps\2016\RAP\Appendix A\Fig_A-13- Deep GW compared to drinking water criteria.mxd; Author: SM; Date Saved: 8/11/2016



Legend

- Site Boundary
- Lake or Stream
- Surface Water Samples

Sample Locations

- EF ≤ 1
- 1 < EF ≤ 10
- 10 < EF ≤ 100
- EF > 100

Notes:
- ft bgs: feet below ground surface
- ISM: Incremental Sampling Methodology
- Sample location depicts maximum constituent EF.

0 500 1,000 1,500 Feet

PIONEER TECHNOLOGIES CORPORATION

Surface Water Concentrations Compared to Ecological and Human Health SLs
Remedial Action Plan
Brevard Site
Cedar Mountain, North Carolina

Figure A-14

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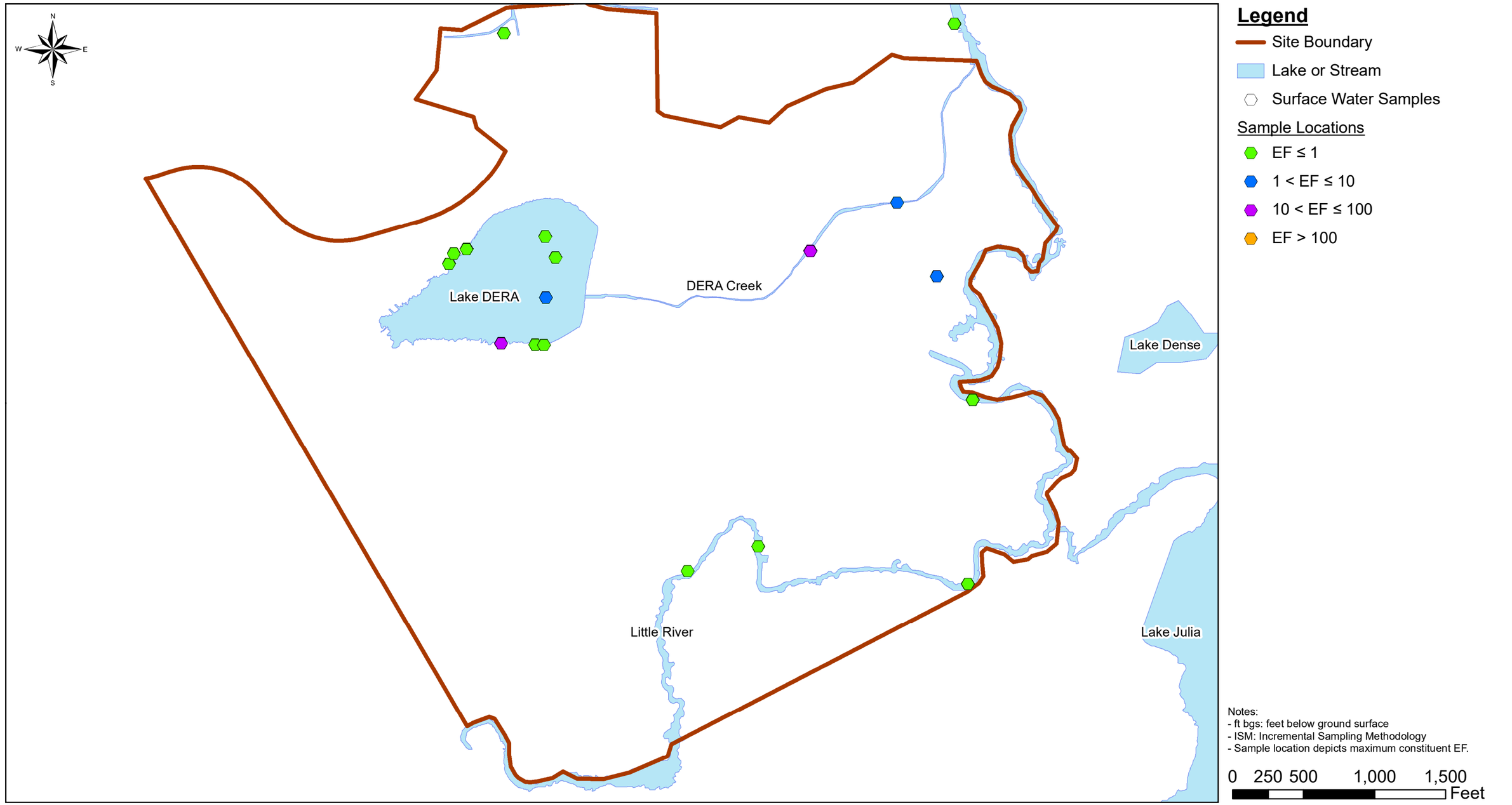

PIONEER TECHNOLOGIES CORPORATION

Sediment Concentrations Compared to Ecological SLs
Remedial Action Plan
Brevard Site
Cedar Mountain, North Carolina

Figure A-15

Document Path: G:\Projects\Brevard\Maps\2016\RAP\Appendix A\Fig_A-15- Sediment compared to ECO.mxd; Author: SM; Date Saved: 8/11/2016

Appendix B

Approach for Averaging Surface Soil Exceedances

Prepared for:

E.I. DU PONT DE NEMOURS AND COMPANY
Corporate Remediation Group
6324 Fairview Road
Charlotte, North Carolina 28209

Prepared by:

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September 2016

Surface Soil Exceedance Averaging

If remedial actions are taken to address the exceedances in ISM Decision Unit 6 and AOC A, the potential risks associated with site surface soil will be significantly reduced. Since it is unlikely that potential receptors will spend all of their time at one location on the site, the average site surface soil concentrations for 3-methylcholanthrene and the PAHs were calculated after eliminating the DU-6ISM and AOCA-SS-6 samples to determine if the three other samples with RL exceedances posed an unacceptable risk at the site.

All site surface soil data, excluding the ISM samples, were combined to determine a representative reasonable maximum exposure (RME) point concentration. The RME represents a conservative (i.e., health protective) concentration that typically consists of the upper confidence limit (UCL) on the mean or the logarithmic mean. The RME was determined using the following decision rules:

1. The 95% UCL was used if the distribution type was normal;
2. The 95% log UCL was used if the distribution type was lognormal, normal/lognormal, or unknown;
3. The maximum detected concentration was used if it was less than the 95% UCL or the 95% log UCL were collected in the area; and
4. The maximum detected concentration was used if less than 10 samples were present.

The RME and the associated cancer exceedance factors (EFs) were calculated first for all of the surface soil data except the ISM samples. As shown in the Table B-1, the cumulative cancer EFs for a DSRF user and worker are greater than 100 indicating that the cumulative cancer risks for these receptors are greater than 1E-04. The same calculation was performed for all surface soil data except the ISM samples (specifically DU-6ISM) and the AOCA-SS-6(0-2) sample. The cumulative cancer EFs for a DSRF user and worker when the ISM samples and AOCA-SS-6(0-2) are excluded are less than 100, indicating that the cumulative cancer risks for these receptors are below the RL criteria.

This approach (determining an average concentration across the site) is appropriate since potential receptors will be exposed to soil across the entire site (not just at one location). The average site surface soil concentrations when samples DU-6ISM and AOCA-SS-6 were excluded from the data set were less than the RLs.

Tables

Table B-1: Average Surface Soil Concentrations

COC	Units	Number of Samples	Maximum Detection	95% UCL	95% Log UCL	Distribution Type	RME	DSRF User Cancer EF	DSRF Worker Cancer EF	NCNG Worker Cancer EF	Utility/ Excavation Worker Cancer EF
All Surface Soil Data (0-2') Excluding ISM Samples											
3-Methylcholanthrene	mg/kg	7	0.32	0.27	0.98	Normal/Lognormal	0.32	4.6	1.1	0.26	0.37
7,12-Dimethylbenz(a)anthracene	mg/kg	2	5.7	21	1.3E+153	Unknown	5.7	950	242	62	81
Benzo[a]anthracene	mg/kg	58	32	3.3	14	Lognormal	14	7.0	1.7	0.44	0.57
Benzo[a]pyrene	mg/kg	62	18	2.3	7.5	Lognormal	7.5	38	9.3	2.4	3.1
Benzo[b]fluoranthene	mg/kg	62	32	3.3	10	Lognormal	10	5.2	1.3	0.33	0.43
Dibenz[a,h]anthracene	mg/kg	46	3.5	0.59	1.6	Unknown	1.6	8.1	2.0	0.51	0.66
						Cumulative Cancer EF		**1,013**	**257**	**66**	**86**
All Surface Soil Data (0-2') Excluding ISM Samples and AOCA-SS-6(0-2)											
3-Methylcholanthrene	mg/kg	7	0.32	0.27	0.98	Normal/Lognormal	0.32	4.6	1.1	0.26	0.37
7,12-Dimethylbenz(a)anthracene	mg/kg	1	0.039	NA	NA	Unknown	0.039	6.5	1.7	0.42	0.55
Benzo[a]anthracene	mg/kg	57	32	3.3	13	Lognormal	13	6.4	1.6	0.41	0.53
Benzo[a]pyrene	mg/kg	61	18	2.3	6.6	Lognormal	6.6	33	8.2	2.1	2.7
Benzo[b]fluoranthene	mg/kg	61	32	3.3	9.7	Lognormal	9.7	4.9	1.2	0.31	0.40
Dibenz[a,h]anthracene	mg/kg	45	3.5	0.58	1.4	Unknown	1.4	7.2	1.8	0.45	0.59
						Cumulative Cancer EF		**63**	**15**	**3.9**	**5.2**

Notes:

RME: Reasonable maximum exposure

EF: Exceedance Factor

95% UCL: 95 percent upper confidence limit on the mean.

Reasonable Maximum Exposure concentration was determined using the following decision rules:

(1) The 95% UCL was used if the distribution type was normal;

(2) The 95% log UCL was used if the distribution type was lognormal, normal/lognormal, or unknown;

(3) The maximum detected concentration was used if it was less than the 95% UCL or the 95% log UCL .were collected in the area; and

(4) The maximum detected concentration was used if less than 10 samples were present.

Exceedance factors were calculated for all detected constituents by dividing the constituent concentrations in soil by the most conservative potentially-complete exposure pathway RLs to determine by how much constituent concentrations exceeded the RLs. Cancer RLs were lower than noncancer RLs in all cases.

Cancer risks are presented as cumulative risks (i.e., cumulative CEFs [CCEFs]). To determine the CCEFs for each sample location, the CEFs for all constituents detected at a sample location were summed. A CCEF of 1 indicates that the cumulative cancer risk at a sample location is 1E-06. A CCEF of 10 indicates that the cumulative cancer risk at a sample location is 1E-05.

Appendix C

Responsiveness Summary

Prepared for:

E.I. DU PONT DE NEMOURS AND COMPANY
Corporate Remediation Group
6324 Fairview Road
Charlotte, North Carolina 28209

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www.uspioneer.com

September 2016

RESPONSIVENESS SUMMARY

To ensure that the Brevard community had an opportunity to review and comment on the proposed Remedial Action Plan (RAP) for the Brevard site (site), E. I. du Pont de Nemours and Company (DuPont) issued a Notice of Intent to Remediate (Notice). The Notice was issued in accordance with the public participation requirements prescribed in Resource Conservation and Recovery Act (RCRA) Class III Modifications, the North Carolina House Bill 639 (Risk Bill), and the RCRA Public Participation Manual,[1] as recommended by North Carolina Department of Environmental Quality (NCDEQ) project managers. The public participation tasks DuPont performed to support the Notice process are summarized in this appendix. In addition, the Notice, copies of all supporting information, and an updated North Carolina National Guard future use brochure for the site are included as attachments to this appendix.

The Remedial Investigation Report (RIR) and the RAP were submitted to NCDEQ for review. The submittal of the RIR to NCDEQ in 2015 marked the completion of the site's investigation phase. NCDEQ issued comments and DuPont provided responses on April 1, 2016. An initial draft version of the RAP (Conceptual RAP) was submitted to NCDEQ on February 5, 2016 for review. NCDEQ issued comments on March 17, 2016 and DuPont provided responses on April 26, 2016. In an email from NCDEQ project manager Mark Wilkins to DuPont, dated May 10, 2016, NCDEQ acknowledged that DuPont's responses to comments on the RIR and RAP were adequate and provided two additional comments for consideration. NCDEQ and DuPont agreed that the proposed modifications would be incorporated in the RAP following the completion of the 60-day public comment period, which began on May 26, 2016 and ended on July 25, 2016.

The 60-day public comment period was initiated on May 26, 2016 when the Notice was advertised in the Transylvania County Times. In the Notice, a brief site history, planned remedial actions, and contact information for the DuPont project manager were provided. In addition, information regarding the public meeting, and information on how to access other site reports pertinent to the RAP in an information repository at the Transylvania Public Library or via NCDEQ's and DuPont's websites were provided.[2] The following tasks were also conducted to make sure the community was informed about the RAP and the public meeting:

- The Notice was mailed on May 26, 2016 to NCDEQ, all local governments having taxing or land-use jurisdiction over the site, and the facility's mailing list.

[1] United States Environmental Protection Agency. 1996. RCRA Public Participation Manual. 1996 Edition.

[2] The Remedial Investigation Report (RIR), the RAP, NCDEQ comments and DuPont responses on the RIR and RAP, and an ecological assessment were available for review in the information repository at the Transylvania County Public Library in Brevard, North Carolina and online at a NCDEQ-hosted website and a DuPont-hosted website: NCDEQ: https://deq.nc.gov/about/divisions/waste-management/hazardous-waste-section/dupont-facility-brevard-nc and DuPont: http://www.uspioneer.com/projects/FormerDupontBrevardFacility/download.htm.

- A 60-second radio advertisement was placed on local radio station (720 AM WGCR); the spot ran the week of May 30, 2016 (after the Notice was mailed) and the week of June 20, 2016 (the week of the public meeting); and
- The Notice was professionally printed on a large (2' x 4') yellow weatherproof board that was placed along Staton Road adjacent to the site.

The Notice, the mailing list, and all supporting documentation for the advertising (e.g., radio script, pictures) are provided in Attachment C-1.

The public meeting was held in the Rogow Room of the Transylvania County Public Library in Brevard, North Carolina on June 23, 2016 from 6:00pm to 8:00pm. The DuPont project director of the site presented a slide show and explained the plan for the site. After the presentation, the DuPont project director and DuPont consultants specializing in site evaluation and remediation were available to answer questions and receive any comments. Posters with additional information about the site were also available for viewing. Meeting notes, comments, and responses from the public meeting are included in Attachment C-2.

The purpose of the Notice and public meeting was to provide an opportunity for community members to review and comment on the plans for the site so their comments could be incorporated in the final draft of the RAP before it is submitted to NCDEQ. All comments received by July 25, 2016 (the last day of the public comment period) were reviewed. The mailing addresses for the community members who provided comments were added to the facility mailing list; the updated mailing list is provided in Attachment C-3.

All comments received from the State of North Carolina (e.g., NCDEQ) and the public were considered during the development of the RAP. The RAP was modified to incorporate NCDEQ's comments on the RIR and RAP (e.g., identification of minor data gaps). The RAP was not modified based on the public's comments received due to the nature of the comments. The comments are provided in Attachment C-4 along with the responses and appropriate modifications to the RAP.

In addition, the North Carolina National Guard provided DuPont with an updated brochure in which their planned future activities for the site are documented (see Attachment C-5). The planned future uses presented in the brochure are consistent with the land uses (i.e., low impact military training and administrative uses) identified in the RAP.

Attachments

C-1	Notice of Intent to Remediate Documentation
C-2	Public Meeting Documentation
C-3	Updated Mailing List
C-4	Responsiveness Summary – Comments, Responses, and Updates
C-5	North Carolina National Guard Land Use Brochure

Attachment C-1

Notice of Intent to Remediate Documentation

Attachment C-1: Notice of Intent to Remediate Documentation

Table of Contents

NOTICE OF INTENT TO REMEDIATE

Risk-Based Remediation
Pursuant to Part 8 of Article 9 of Chapter 130A of the General Statutes

Former DuPont Brevard Site
1300 Staton Road
Cedar Mountain, Transylvania County, North Carolina
EPA ID No. NCD 003 152 329

This is a notice to the public of a request by E.I. du Pont de Nemours and Company (DuPont) to pursue remediation of the contamination at the Former DuPont Brevard Facility (site) using site-specific remediation standards as opposed to unrestricted use standards. Contaminated site media include groundwater, soil, sediment and surface water. Information about the nature and extent of the contamination at the site is presented in the Remedial Investigation Report which is available electronically for review at: https://deq.nc.gov/about/divisions/waste-management/hazardous-waste-section/dupont-facility-brevard-nc.

DuPont has been performing investigation and remediation activities at the site since the 1990s. The site was used to produce high purity silicon from 1957 to 1962 and medical imaging (X-ray films) from 1962 to 2002. Approximately 1,100 samples were collected at the site during four comprehensive investigations and numerous remedial actions have been completed. Key remedial actions include demolition and removal activities of the former plant, removal and recycling/relocation of X-ray film waste, installation of cap/covers over former landfill/disposal areas, and installation of a groundwater treatment system for the DuPont State Recreational Forest (DSRF) Visitor Center water supply well. To satisfy additional remedial action objectives for the site, active remediation is proposed at two evaluation units (Solid Waste Management Unit [SWMU] 11 and SWMU 17. A vegetative cap will be designed and installed for final closure of SWMU 11 and in-situ solidification/stabilization for soil and waste will be designed and installed within SWMU 17. Institutional controls and engineering controls (e.g., fencing) will also be implemented throughout the site. Site investigations and proposed additional remedial actions are documented in reports that are available for review at the Transylvania County Library in Brevard, North Carolina and online at:
http://www.uspioneer.com/projects/FormerDupontBrevardFacility/download.htm.

DuPont is preparing a remedial action plan in accordance with N.C.G.S. 130A-310.65 through 310.77 which allows use of site-specific remediation standards that are expected to pose no unacceptable risk to human health and the environment. Once the North Carolina Department of Environmental Quality (NC DEQ) approves the proposed remedial action plan, a second Public Notice will be issued providing for a 45-day public comment period.

In addition, a public meeting will be held on Thursday June 23rd from 6:00 pm to 8:00 pm in the Rogow Room at the Transylvania Public Library. Information about the proposed remediation action plan will be presented during the meeting. DuPont representatives will be available to answer questions and receive comments from the public. Comments received on or before July 25, 2016 will be incorporated, as appropriate, in the remedial action plan.

For more information or if you would like to submit a comment, please contact:

Mr. Jamie VanBuskirk
DuPont Corporate Remediation Group
6324 Fairview Road
Charlotte, NC 28210
704.362.6626
Jamie.A.Vanbuskirk@dupont.com

MAILING LIST
FORMER DUPONT BREVARD FACILITY
NCD 003 152 329
May 26, 2016

Mr. Jamie VanBuskirk DuPont Corporate Remediation Group 6324 Fairview Road Charlotte, NC 28210	Ms. Julie Woosley, Chief NC Hazardous Waste Section Department of Environmental Quality 217 W. Jones Street 1646 MSC Raleigh, NC 27699-1646
Mr. Jon E. Johnston, Chief RCRA Corrective Action and Permitting Section RCRA Cleanup and Brownfields Branch Resource Conservation and Restoration Division US EPA, Region 4 61 Forsyth Street SW Atlanta, Georgia 30303	Ms. Jaime Laughter, Manager Transylvania County 101 South Broad Street Brevard, NC 28712
Ms. Elaine Russell, Director Transylvania County Public Health 98 East Morgan Street Brevard, NC 28712	Mr. David McNeill, Director Transylvania County Emergency Services 155 Public Safety Way Brevard, NC 28712
Mr. Steve Wyatt, Manager Henderson County 1 Historic Courthouse Square, Suite2 Hendersonville, NC 28792	Mr. Steven Smith, Director Henderson County Public Health 1200 Spartanburg Highway, Suite 100 Hendersonville, NC 28792
Mr. Rocky Hyder, Director Henderson County Emergency Management 211 First Avenue East Hendersonville, NC 28792	Ms. Bev Parlier President Friends of DuPont Forest P. O. Box 2107 Brevard, NC 28712
Mr. Jeff Jennings DSRF Advisory Committee 29 Thistle Wood Lane Hendersonville, NC 28791	Mr. Jason Guidry, Forest Supervisor DuPont State Recreational Forest PO Box 300 Cedar Mountain, NC 28718-0300
Mr. David Smith Chief Deputy Commissioner NC DA&CS 1001 Mail Service Center Raleigh, NC 27699-1001	

May 25, 2016

Mark Wilkins
Hazardous Waste Section
North Carolina Department of Environmental Quality
1646 Mail Service Center
Raleigh, NC 27699

Dear Mr. Wilkins:

This purpose of this letter is to certify that the Notice of Intent to Remediate (Public Notice) for the Former DuPont Brevard Facility (site) was sent via first class mail on May 25, 2016 to the 13 recipients on the site mailing list. A copy of the Public Notice is included as an attachment to this letter. The mailing list included the following recipients:

Mr. Jamie VanBuskirk	DuPont Corporate Remediation Group
Ms. Julie Woosley	North Carolina Department of Environmental Quality
Mr. Jon Johnston	US EPA, Region 4
Ms. Jaime Laughter	Transylvania County
Ms. Elain Russell	Transylvania County Public Health
Mr. David McNeill	Transylvania County Emergency Services
Mr. Steve Wyatt	Henderson County
Mr. Steven Smith	Henderson County Public Health
Mr. Rocky Hyder	Henderson County Emergency Management
Ms. Ben Parlier	Friends of DuPont Forest
Mr. Jeff Jennings	DSRF Advisory Committee
Mr. Jason Guidry	DuPont State Recreational Forest
Mr. David Smith	NC DA&CS

Sincerely,

Barb Roloff
PIONEER Technologies Corporation

cc: Jamie VanBuskirk

Enclosure: Public Notice for the Former DuPont Brevard Facility

Photographic Log of Notices Mailed

Photo No. 1: Photo of Addressed Letters (1-8)	
Date: 6/25/16	
Direction Photo Taken: N/A	
Description: Documentation of Recipients of Notice of Intent to Remediate	

Photo No. 2: Photo of Addressed Letters (9-13)	
Date: 6/25/16	
Direction Photo Taken: N/A	
Description: Documentation of Recipients of Notice of Intent to Remediate	

DuPont Brevard - Radio Script - 1 minute:

DuPont is holding a public meeting on June 23, 2016 from 6:00 pm to 8:00 pm in the Rogow Room of the Transylvania Public Library.

Company representatives will discuss a request they will be making to the North Carolina Department of Environmental Quality to pursue remediation of the DuPont Brevard site at 1300 Staton Road.

The property was home to manufacturing operations where X-ray films were produced for diagnostic use by doctors and hospitals around the world.

Using site-specific remediation standards, DuPont proposes to implement environmental safeguards to protect groundwater, surface water, soil and sediment in the area.

Detailed information about the proposed remedial action plan will be presented during the June 23rd meeting and DuPont representatives will be available to answer questions and record comments from the public.

Specific elements of the company's plan are available at the Transylvania County library in Brevard and may also be viewed online at the North Carolina Department of Environmental Quality web site by searching the term "Brevard."

All public comments received on or before July 25, 2016 will be included in the remedial action plan that will be submitted to the state.

From: Vanessa Nygren
To: Kevin Gallagher
Subject: Brevard Public Notice radio ad
Date: Friday, June 3, 2016 9:54:00 AM

The Brevard Public Notice radio ad was broadcast on WGCR – 720 AM on May 31st, 2016 at 10:45AM PST. I heard the reading of the ad on WGCR's live stream.

Vanessa Nygren

-Thank you,

-Vanessa

_____

Vanessa Nygren :: nygrenv@uspioneer.com

PIONEER Technologies Corporation

360.570.1700

http://www.uspioneer.com

This electronic mail transmission and any accompanying documents contain information belonging to the sender which may be confidential and legally privileged. This information is intended only for the use of the individual or entity to whom this electronic mail transmission was sent as indicated above. If you are not the intended recipient, any disclosure, copying, distribution, or action taken in reliance on the contents of the information contained in this transmission is strictly prohibited. If you have received this transmission in error, please notify the sender by return e-mail and delete the message. Thank you.

AFFIDAVIT OF PUBLICATION

CLIPPING OF LEGAL ADVERTISING ATTACHED HERE

NOTICE OF INTENT TO REMEDIATE
Risk-Based Remediation Pursuant to Part 8 of Article 9 of Chapter 130A of the General Statutes

Former DuPont Brevard Site
1300 Staton Road
Cedar Mountain,
Transylvania County,
North Carolina
EPA ID No. NCD 003 152 329

This is a notice to the public of a request by E.I. du Pont de Nemours and Company (DuPont) to pursue remediation of the contamination at the Former DuPont Brevard Facility (site) using site-specific remediation standards as opposed to unrestricted use standards. Contaminated site media include groundwater, soil, sediment and surface water. Information about the nature and extent of the contamination at the site is presented in the Remedial Investigation Report which is available electronically for review at: https://deq.nc.gov/about/divisions/waste-management/hazardous-waste-section/dupont-facility-brevard-nc.

DuPont has been performing investigation and remediation activities at the site since the 1990s. The site was used to produce high purity silicon from 1957 to 1962 and medical imaging (X-ray films) from 1962 to 2002. Approximately 1,100 samples were collected at the site during four comprehensive investigations and numerous remedial actions have been completed. Key remedial action activities included demolition and removal activities of the former

DuPont is preparing a remedial action plan in accordance with N.C.G.S. 130A-310.65 through 310.77 which allows use of site-specific remediation standards that are expected to pose no unacceptable risk to human health and the environment. Once the North Carolina Department of Environmental Quality (NC DEQ) approves the proposed remedial action plan, a second Public Notice will be issued providing for a 45-day public comment period.

In addition, a public meeting will be held on Thursday June [illegible] from 6:00 pm to 8:00 pm in the Rogow Room at the Transylvania Public Library. Information about the proposed remediation action plan will be presented during the meeting. DuPont representatives will be available to answer questions and receive comments from the public. Comments received on or before July 25, 2016 will be incorporated, as appropriate, in the remedial action plan.

For more information or if you would like to submit a comment, please contact:

Mr. Jamie VanBuskirk
DuPont Corporate Remediation Group
6324 Fairview Road
Charlotte, NC 28210
704.362.6626
Jamie.A.Vanbuskirk@dupont.com

T/5/26/1TP-62332

NORTH CAROLINA
TRANSYLVANIA COUNTY

Before the undersigned, a Notary Public of said County and State, duly commissioned, qualified, and authorized by law to administer oaths, personally appeared Sean A. Trapp, who being first duly sworn, deposes and says: that he is Operations Manager (Owner, partner, publisher, or other officer or employee authorized to make this affidavit) of The Transylvania Times, published, issued, and entered as second class mail in the Town of Brevard in said County and State; that he is authorized to make this affidavit and sworn statement; that the notice or other legal advertisement, a true copy of which is attached hereto, was published in The Transylvania Times on the following dates:

May 26, 2016

And that the said newspaper in which such notice, paper, document, or legal advertisement was published was, at the time of each and every such publication, a newspaper meeting all of the requirements and qualifications of Section I-597 of the General Statutes of North Carolina and was qualified newspaper within the meaning of Section I-597 of the General Statutes of North Carolina.

This 26th day of May, 2016

Sean A Trapp
(Signature of person making affidavit)

Sworn to and subscribed before me, this 26th day of May, 2016.

Linda M. McCants
Notary Public

LINDA M. MCCANTS
NOTARY PUBLIC
Transylvania County, NC
My Commission Expires 4/27/2018

Pursuant to Part 8 of Article 9 of Chapter 130A of the General Statutes

Former DuPont Brevard Site

1300 Staton Road

Cedar Mountain, Transylvania County, North Carolina

EPA ID No. NCD 003 152 329

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For more information or if you would like to submit a comment, please contact:

Mr. Jamie VanBuskirk

DuPont Corporate Remediation Group

6324 Fairview Road

Charlotte, NC 28210

704.362.6626

Jamie.A.Vanbuskirk@dupont.com

T/5/26/1TP-62332

Photographic Log of Signs Posted on Site

Photo No. 1: Photo of Sign Posted on Site	
Date: 6/25/16	
Direction Photo Taken: N/A	
Description: Documentation of Intent to Remediate Notice Posted at the Site (Close Up).	

Photo No. 2: Photo of Sign Posted on Site	
Date: 6/25/16	
Direction Photo Taken: N/A	
Description: Documentation of Intent to Remediate Notice Posted at the Site (Taken at a Distance).	

Former DuPont Brevard Facility: File Download Page

File Name	Description	Upload Date	Size (mb)	File Type
1. Remedial Investigation Report	This is the May 6, 2015 Remedial Investigation Report for the DuPont Brevard Facility. Cedar Mountain, North Carolina. Note: This is a large document and may take some time to download, depending on your connection speed.	05/26/16	113.2	PDF
2. NCDEQ's Comments on the Remedial Investigation Report with DuPont's Responses	Brevard Final Remedial Investigation Report (RIR) North Carolina Department of Environmental Quality (DEQ) Comments and DuPont Responses Contents: 1. DEQ Comments on RIR letter dated July 30, 2015 2. DuPont Response to DEQ Comments on the RIR letter dated August 31, 2015 3. DuPont Response to DEQ Comments on the RIR letter dated April 1, 2016 4. DEQ Final Comments on RIR email dated May 10, 2016	05/26/16	3.9	PDF
3. Draft Remedial Action Plan	This is the May 2016 Draft Remedial Action Plan for the DuPont Brevard Site. Note: This document is formatted for double-sided printing and contains blank pages.	05/26/16	27.1	PDF
4. NCDEQ's Comments on the Draft Remedial Action Plan with DuPont's Responses	Brevard Conceptual Remedial Action Plan (RAP) North Carolina Department of Environmental Quality (DEQ) Comments and DuPont Responses Contents: 1. DEQ Comments on Conceptual RAP letter dated March 17, 2016 2. DuPont Responses to DEQ Comments on the Conceptual RAP letter dated April 26, 2016 3. DEQ Final Comments on Conceptual RAP email dated May 10, 2016	05/26/16	4.2	PDF
5. DuPont Brevard Ecological Inventory Summary Report	An ecological assessment of the DuPont Brevard, North Carolina site (Site).	06/20/16	6.6	PDF

PIONEER Technologies Corporation
Date: May 26, 2016

Attachment C-2

Public Meeting Documentation

Attachment C-2: Public Meeting Documentation

Location: Transylvania County Library
212 South Gaston Street
Brevard, North Carolina 28712

Meeting began at 6:00pm

Total number of people in attendance: 30

NCDEQ employees in attendance: Mark Wilkens, Sandy Mort, and two others = 4

Department of Agriculture employees in attendance: Bill Yarborough, Jason Guidry = 2

National Guard in attendance: Colonel Todd Hunt, and 2 others = 3

DuPont Representative and Team members in attendance: Jamie VanBuskirk, Brad Grimsted, Tracy Ovbey, Chet Menzer, and one other = 5

General Audience in attendance: = 17

Meeting concluded at 7:06pm

Comment	Public Question/Comment	Summary of Response
1.	Where will the DEQ Public meeting be held?	Mark Wilkens (NCDEQ) responded that the NCDEQ public meeting will probably be at the Transylvania County Library.
2.	Are there more meetings scheduled [about the remedial action plan] at the library?	DuPont does not have any more public meetings planned at this time.
3.	The dump site at the tennis courts near Lake DERA, what is in it [SWMU 13]? Do you think it might be leaking into the lake? It is still going into the river, isn't it?	Solid Waste Management Unit (SWMU) 13 contains waste and garbage. Groundwater in vicinity of SWMU 13 does not flow toward Lake DERA. Rather, groundwater flows from the SWMU 13 area toward the Little River.
4.	Are contaminants going from SWMU 13 into the Little River?	Contaminant levels are below levels of concern in Little River. This has been demonstrated by groundwater monitoring at wells located between the former manufacturing area and the Little River. In addition, this has been confirmed by Little River surface water monitoring results.
5.	Why is Little River campground not being utilized, etc.? A campground is good for the local economy.	The DuPont-owned property will be transferred to the State concurrent with RAP

Attachment C-2: Public Meeting Documentation

		implementation. The State will then determine how the property will be used in the future.
6.	Regarding the carbon treatment system, does the system cover the bathrooms that are adjacent to the Visitor Center?	Yes, the carbon treatment system does supply the water that is used for the bathrooms that are adjacent to the Visitor's Center.
7.	What are PAHs?	PAHs or polycyclic aromatic hydrocarbons, are used for asphalt roads, creosote, and other purposes, and is a common contaminant.
8.	What compounds are located in the proposed fenced in areas?	Polycyclic aromatic hydrocarbons (PAHs) are present within the proposed fenced area. In the shallow soils, low levels of PAHs exist at two locations in the former manufacturing area that exceed the site action levels. A fence will be installed around the locations and other measures will be used to control access to ensure the public's safety. In addition, Polychlorinated biphenyls (PCBs) were detected at concentrations greater than 1 milligram per kilogram (mg/kg) but less than 5 mg/kg. DuPont is working with the United States Environmental Protection Agency (USEPA) and NCDEQ to develop a sampling plan to more fully characterize PCB concentrations and demonstrate that PCBs are not a concern.
9.	Who pays for everything that is being done?	DuPont pays for all of the work that is being done to characterize and cleanup the property.
10.	Will state have access to property during remediation?	Once the property is transferred, the State will control the property and give DuPont access.
11.	Will state have security?	That will be up to the State to decide.

Attachment C-3

Updated Mailing List

Brevard Responsiveness Summary – Updated Mailing List

MAILING LIST
FORMER DUPONT BREVARD FACILITY
NCD 003 152 329
August 5, 2016

Mr. Jamie VanBuskirk DuPont Corporate Remediation Group 6324 Fairview Road Charlotte, NC 28210	Ms. Julie Woosley, Chief NC Hazardous Waste Section Department of Environmental Quality 217 W. Jones Street 1646 MSC Raleigh, NC 27699-1646
Mr. Jon E. Johnston, Chief RCRA Corrective Action and Permitting Section RCRA Cleanup and Brownfields Branch Resource Conservation and Restoration Division US EPA, Region 4 61 Forsyth Street SW Atlanta, Georgia 30303	Ms. Jaime Laughter, Manager Transylvania County 101 South Broad Street Brevard, NC 28712
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Mr. Jeff Jennings DSRF Advisory Committee 29 Thistle Wood Lane Hendersonville, NC 28791	Mr. Jason Guidry, Forest Supervisor DuPont State Recreational Forest PO Box 300 Cedar Mountain, NC 28718-0300

Brevard Responsiveness Summary – Updated Mailing List

Mr. David Smith Chief Deputy Commissioner NC DA&CS 1001 Mail Service Center Raleigh, NC 27699-1001	Mark Wilkins Hydrogeologist NC Hazardous Waste Section/Division of Waste Management NC Department of Environmental Quality 217 W. Jones Center Raleigh, NC 27699-1646
Jason R Chappell Transylvania County Board of County Commissioners 101 South Broad St Brevard, NC 28712	Jeremy M. Whitesides Email: richlandcreektimber@gmail.com No address provided
Wayne Hennie Email: waynehennie@gmail.com No address provided	Jim Meyer Email: Jim@ConservativeWriters.org No address provided
James Humphrey III Email: jimhumphreyiii@hotmail.com No address provided	John Dorner III Email: johndorner@thedorners.com No address provided
Sandy Watson Email: sbwatsonnc@comporium.net No address provided	Patricia Danz 105 Haven Drive Flat Rock, NC 28731
Chuck McGrady Email: chuck.mcgrady@ncleg.net No address provided	Thomas Anderson Mechanical Contractor, Lic SCM1269-5, unl. Email: mailto:Tanderso@bju.edu No address provided
Joseph Hudyncia Environmental Programs N.C. Department of Agriculture & Consumer Services 1001 Mail Service Center Raleigh, NC 27699-1001	Bill O'Conner Email: billoc@fastmail.us No address provided

Attachment C-4

Responsiveness Summary

Comments, Responses, and Updates

Responsiveness Summary – Comments, Responses, and Updates

#	Comment	DuPont Response	RAP Update
***NCDEQ Comments on the Remedial Investigation Report* (NCDENR 2015), (DuPont 2015), (DuPont 2016a), (NCDEQ 2016a)**			
1.	DuPont should install a minimum of two (2) monitoring wells just east of the DuPont State Forest (DSF) Visitor Center. One of the wells should be screened across the water table. Another well should be screened at the top of bedrock. If bedrock is encountered prior to encountering the water table, DuPont should attempt to screen a well(s) at the first water bearing fracture encountered in bedrock. The purpose of these wells is to help determine the extent of groundwater contamination north of Solid Waste Management Unit (SWMU) 17.	DuPont does not believe conducting additional groundwater monitoring east of the DuPont State Recreational Forest (DSRF) Visitor Center is warranted. Based on the future land use plans provided by the State of North Carolina (State), surficial aquifer (shallow) groundwater (i.e., 13 to 78 feet below ground surface [bgs]) will not be used in the future. The only structures in this area (a public restroom and the Aleen Steinberg Center) are serviced with potable water from a nearby bedrock aquifer "deep well". Impacts to groundwater identified in the deep well are removed prior to use by a granulated activated carbon treatment system installed and maintained by DuPont at the Aleen Steinberg Center. Surface water samples collected from seeps located downgradient of the Aleen Steinberg Center and the deep well did not indicate any adverse impacts (Parsons 2009). During DuPont's discussions with NCDEQ during a December 2, 2015 meeting, it became apparent that NCDEQ is concerned with the potential for vapor intrusion into the Aleen Steinberg Center. Although vapor intrusion was not of concern from potentially contaminated shallow groundwater based on the results of soil gas samples collected around the Aleen Steinberg Center, and future land use plans provided by the State indicate that no new buildings will be constructed in this area, DuPont understands this concern and will work with NCDEQ to create a scope of work (SOW) to address this issue including the installation of a sentinel well near the visitors center. In addition, DuPont is proposing to address the suspected contaminant source area at SWMU 17 through in-situ treatment remedial actions.	Section 7.2.3 was updated to include the installation and sampling of a monitoring well.

#	Comment	DuPont Response	RAP Update
2.	Due to occasional detections of contaminants in samples collected from DERA Creek during historical surface water monitoring, DuPont should develop a surface water monitoring plan to collect samples quarterly for a one year period from DERA Creek. Due to the detection of contaminants above NC 2B standards, the monitoring plan should include sample collection from the seep area downgradient of the former WWTP polishing pond. The monitoring plan should include at least one sampling event during a period when surface water flow is typically at lower flow conditions based on historical information. In addition, as stated in Comment 12 of the September 25, 2014 letter from the HWS to DuPont, if Polycyclic Aromatic Hydrocarbons (PAHs) were detected in sediment samples collected during the RI, analysis of surface water for the presence of PAHs may be required. Since PAHs were detected in DERA Creek sediment, PAHs should be added to the list of analytes for surface water samples collected during these quarterly monitoring events.	Surface water sample concentrations collected during the Remedial Investigation were less than NC 2B standards (human health or aquatic life) and Ecological Screening Values (ESVs) with the following exceptions (see RIR, Section 5.3). ▪ Iron concentrations in DERA Creek exceeded the NC 2B standard (aquatic life) in one location (SW-8); however, no exceedances were observed in locations sampled further downstream prior to DERA Creek's confluence with Little River. ▪ Manganese concentrations were above the ESV in all locations in DERA Creek. Iron concentrations exceeded the NC 2B standard (aquatic life) in the SWMU 14 drainage ditch (ball field sample). ▪ Vinyl chloride and iron concentrations exceeded the NC 2B standard and manganese exceeded the ESV in seep location SW-26. Based on these results, the potential for adverse ecological effects from site surface water is limited. In addition, surface water flow in DERA Creek originates from Lake DERA and is controlled by a weir. Therefore, the flow is not seasonal in nature. To confirm that the potential for adverse ecological effects from site surface water is limited, DuPont will collect one round of surface water and co-located sediment samples to complete the characterization of surface water and sediment. The samples will be analyzed as follows: ▪ The Lake DERA samples will be analyzed for metals and PAHs[1] ▪ The DERA Creek samples will be analyzed for metals, PAHs, and PCBs. All PCB samples will be analyzed for Aroclors and 10% of samples will be analyzed for congeners. The samples that will undergo congener analysis will be determined once the Aroclor analyses are complete. ▪ The seep sample will be analyzed for metals, PAHs, PCBs (Aroclors), and VOCs	Section 7.2.3 already had text indicating that additional sediment and surface water sampling will be conducted.

[1] No PCB sampling is proposed for Lake DERA since no manufacturing related activities occurred in the vicinity. In addition, it is hydraulically upgradient of any potential source areas.

#	Comment	DuPont Response	RAP Update
3.	To provide a visual representation of areas of the site that are contaminated DuPont should develop figures that show: ▪ location and extent of soil contamination found in samples collected at the 0 - 1 foot and 0-2 foot intervals that are above residential (unrestricted) remediation goals as listed in the Inactive Hazardous Sites Branch (IHSB) Preliminary Soil Remediation Goals (PSRG) Table; ▪ location and extent of soil contamination found in samples collected at the 0 - 1 foot and 0 -2 foot intervals that are above industrial remediation goals as listed in the IHSB PSRG Table; ▪ location and extent of soil contamination found in samples collected more than 2 feet below land surface that are above industrial remediation goals as listed in the IHSB PSRG Table; ▪ location and extent of areas that must be remediated or must have restricted uses based on the calculated most restrictive proposed use of the site; ▪ location and extent of areas that must have restricted uses due to potential vapor intrusion issues; ▪ location and extent of areas of surface water contamination above NC 2B standards; ▪ location and extent of sediment contamination where the recalculated Hazard Quotient (HQ) for ecological effects due to any constituent detected in the sediment is greater than 1; and, ▪ the location and extent of groundwater contamination above NC 2L standards in the surficial and bedrock aquifers. **This information is not only necessary to identify contaminated areas and their extent but will be critical in development of any Land Use Restrictions (LURs) established at the site.	These figures were included in the RAP (Appendix A and B).	Visual representation of contaminated areas at the site were included in the RAP (Appendix A).

#	Comment	DuPont Response	RAP Update
4.	In Sections 5.1.2. and 7.5.2., DuPont indicates that a two-foot soil cover is not present over all areas of contamination at the site. DuPont should provide a figure that locates any areas at the site where surface covers are insufficient.	During the final field investigation at the site, soil cores were collected from SWMU 13, SWMU 16, and SWMU 19 as well as SWMUs 4, 12, 15, and 18/20 (see RIR, Section 5.1.2). The results of the final field investigation indicated that, despite the presence of some miscellaneous debris, two-foot soil covers were intact at these SWMUs. The miscellaneous debris observed in the soil cores were from the following three SWMUs: SWMU 12 B (Former North Landfill): Green turquoise plastic was found in one of six soil cores (SWMU-12B/C-CB-3). SWMU 15 (Former Silicon Disposal Area): Plastic, high purity silicone fragments, and/or other materials were found in three of 10 soil cores (SWMU-15-SS-1, SWMU-15-SS-2, SWMU-15-SBS-1). SWMU 18 (Former Disposal Area 8 for evaporation basin wastewater containing zinc chloride): PVC pipe, a soda can, pipe jacket with Tedlar coating, and a small piece of metal were found in one of three soil cores (SWMU-18B-CB-1). Subsequent discussions with NCDEQ regarding SWMU 13 resulted in a commitment to install wooden bollards and/or other physical deterrent/barriers at SWMU 13 as an extra precaution to prohibit vehicles from disturbing the existing cover since SWMU 13 is located immediately adjacent to Lake DERA and may be subject to more frequent use than other SWMUs.	Additional information was provided to NCDEQ documenting that the cover was adequate at these SWMUs. In addition, Sections 5 and 7.6.1 were updated to include the additional protective measure for SWMU 13.
5.	In Section 7.5.1. and 7.5.2. of the RIR, DuPont states "Potentially complete exposure pathways for this receptor may include ... inhalation of soil-derived particulates." When considering these potential pathways, DuPont should include inhalation of volatile constituents present in the soil along with inhalation of soil particulates.	The inhalation of volatile constituents was included in the RIR. As shown in Table 12 of Appendix C of the RIR, the inhalation pathway was evaluated for both particulates and volatiles.	None
6.	In Section 7.7.2. of the RIR, DuPont compares the concentration of metals in sediment samples collected at the Facility to the concentration ranges of metals in sediments from across the United States. DuPont should determine the natural background levels of these metals in sediments collected from or as close as possible to the Facility and compare these concentrations to those in sediment samples from impacted areas at the Site.	While determining site-specific background concentrations in rivers/streams would be helpful for evaluating whether or not detected metal concentrations are consistent with what is present naturally, there is no reason to develop site-specific background concentrations for metals at this time since they are not of concern at the site. Metal concentrations (iron, lead, and manganese) exceeded the screening criteria at only four sediment sample locations (SSP14-SED-09, SSP14-SED-10, SSP14-SED-26, and SSP14-SED-33 [see RIR, Table 25]). Iron and manganese are naturally-occurring constituents that are not associated with any former manufacturing processes. The sample where the lead concentration that exceeded the criterion (SSP14-SED-33) was collected in Lake DERA; it was the only sample (out of 18 samples) from Lake DERA with a concentration that exceeded the ESV and the concentration was only 40% higher than the ESV.	None

#	Comment	DuPont Response	RAP Update
7.	In Section 7.7. and Table 25, DuPont summed the concentration of individual PAHs and then used this total number when determining the Hazard Quotient (HQ) for PAHs in sediment. DuPont should determine the HQ for each individual PAH separately. In addition, as part of the ecological evaluation process, DuPont used averages of constituent concentrations in sediment sampled from Lake DERA, DERA Creek, and the Little River to screen contaminants. Due to the distance between sampling locations and differences in sample environments, DuPont should not use the average value from all of these areas in the screening process. Reevaluating the data using individual PAHs and not using the averaged values indicates additional sediment sampling is necessary to fully evaluate the ecological risk in DERA Creek and Lake DERA. DuPont should develop a sediment sampling plan to fully evaluate the ecological risk from contaminated sediments. In addition, Polychlorinated Biphenyls (PCBs) were detected during soil sampling at the Facility. Although EPA Region 4 is overseeing Corrective Action related to the PCB contamination, comment 12 of the September 24, 2014 letter from the HWS to DuPont states that analysis of sediment samples for the presence of PCBs may be required if PCBs were detected in soil samples collected during the RI. DuPont may want to include PCB analysis in the next round of sediment sampling to prevent having to return to the site for additional sediment sample collection potentially requested by EPA.	DuPont will collect one round of surface water and co-located sediment samples to complete the characterization of surface water and sediment. The proposed sample locations are located at Lake DERA, DERA Creek, and the seep. The samples will be analyzed as follows: ▪ The Lake DERA samples will be analyzed for metals and PAHs[2] ▪ The DERA Creek samples will be analyzed for metals, PAHs, and PCBs. All PCB samples will be analyzed for Aroclors and 10% of samples will be analyzed for congeners. The samples that will undergo congener analysis will be determined once the Aroclor analyses are complete. ▪ The seep sample will be analyzed for metals, PAHs, PCBs, and VOCs	Section 7.2.3 already had text indicating that additional sediment and surface water sampling will occur.
8.	The RIR indicates surface water samples were collected at or just below the surface of Lake DERA. The RIR also indicates contamination was detected above residential standards in several sediment samples and above industrial standards in one sediment sample collected from Lake DERA. Although the likelihood of an individual corning into significant contact with sediment is minimal, DuPont should collect surface water samples from the water column just above the bottom of Lake DERA in the area(s) of sediment contamination and should collect additional sediment samples from Lake DERA to fully evaluate the ecological risk in Lake DERA. DuPont should also consider the potential effect sediment contamination would have on fish populations in Lake DERA and whether tissue samples are appropriate to fully evaluate risk to potential receptors.	The potential risks for fish[3] and recreators exposed to Lake DERA sediment were evaluated by comparing average sediment constituent concentrations in Lake DERA to ecological screening values (ESVs) or background concentrations and trail user human health screening levels. Only three PAH constituent concentrations exceeded ESV or background criteria and the maximum exceedance was only two times the criterion. Thus, the potential risk to fish in Lake DERA is low and does not warrant further evaluation (tissue sampling). In addition, the average sediment constituent concentrations were all less than the Trail User remedial levels (RL) indicating that the potential risk to future recreators is low.[4] However, additional sediment and co-located surface water samples are proposed in Lake DERA to characterize metal and PAH concentrations. Surface water samples will be collected just above the bottom of Lake DERA.	Section 7.2.3 already had text indicating that additional sediment and surface water sampling will occur.

[2] No PCB sampling is proposed for Lake DERA since no manufacturing related activities occurred in the vicinity. In addition, it is hydraulically upgradient of any potential source areas.
[3] Lake DERA is shallow and contains some emergent vegetation which serves as habitat for young-of-the-year and adult littoral fish species. Overall, fish density and diversity are low (see Section 7.4.1 of the RIR).
[4] The trail user exposure scenario is protective of future use scenarios. Applying this scenario to sediment assumes that a trail user spends all of their time in the lake in contact with sediment, which is unlikely.

#	Comment	DuPont Response	RAP Update
a.	In Section 4.2. of the Remedial Investigation Report (RIR), DuPont states Remedial Levels (RLs) were developed so soil concentrations are"... protective of potential groundwater receptors (Little River)... " As indicated in previous correspondence (see August 21,2014 NCDENR comments to DuPont, for example) the HWS considers DERA Creek a receptor for discharge of contaminated groundwater at the Facility. DuPont must include DERA Creek and not the Little River as the receptor when calculating site specific groundwater RLs (and therefore site specific soil RLs) for the site.	DERA Creek was used as a receptor for evaluating groundwater data in the vicinity of DERA Creek. Maximum detected concentrations in groundwater monitoring wells adjacent to DERA Creek were compared to adjusted groundwater-to-surface water screening criteria (i.e., surface water screening criteria with an applied conservative dilution factor of 10 to account for groundwater-to-DERA Creek surface water interaction).[5] Only one constituent (barium) had a maximum detected groundwater concentration that exceeded the adjusted groundwater-to-surface water screening criteria. However, the average barium concentration was less than the adjusted groundwater-to-surface water screening criteria. In addition, barium was not detected in any DERA Creek surface water sample. Therefore, the potential for constituents in groundwater to discharge into DERA Creek is not a concern. In addition, soil constituent concentrations protective of groundwater (RLs) were calculated based on the ACLs protective of DERA Creek. Soil concentrations near DERA Creek were compared to these criteria. Based on this evaluation, it is unlikely that constituent concentrations in soil will affect DERA Creek, as the soil concentrations were less than RLs protective of DERA Creek. Soil constituent concentrations at two sample locations were above the RLs; however, they are located hydraulically downgradient of DERA Creek.	None
b.	Based on figures provided in the RIR and in previous discussions about potential future site uses, areas near the former manufacturing area may be utilized for vehicle and motorcycle training. If areas to be utilized for this and other training do not have a permanent cover of asphalt, concrete or other similar surface, DuPont should revise the soil ingestion rate up from 100 mg/day to 330 mg/day when calculating site specific RLs due to the amount of soil that will be suspended in air due to disturbance by vehicles.	The parking lot and the looping roads that will be used for the motorcycle and driving course have permanent covers in that they are paved. In addition, the current National Guard exposure scenario incorporates a particulate emission factor (PEF) which accounts for wind-borne dust.	None
c.	Benzo(a)anthracene is considered a volatile compound. DuPont should consider a volatilization factor when calculating a site specific RL for this constituent.	The RLs for the scenarios were recalculated using the current USEPA recommended VF. The effect of incorporating the VF into the exposure calculation to determine RLs was minimal in that the RL decreased by less than one percent. For example, the National Guard RL changed from 31.6 (value in RIR [Appendix C, Table 13]) to 31.3 mg/kg.	None
d.	In Table 12 of the RIR, DuPont uses a contact fraction of 0.25 as an assumption when calculating the remediation goals for trail users. DuPont should provide details as to how this contact fraction number was established.	For the trail user scenario it was assumed that a receptor will be using trails in the DSRF frequently in the summer months (5 days per week) and infrequently in the spring and fall months (2 days per week) for a total of 108 days/year for 26 years. The contact fraction of 0.25 reflects the amount of time that an individual is assumed to be at the site and in contact with COPCs in surface soil. This is a conservative assumption since the site is only a small portion of the DSRF and it is likely that trail users will visit and spend time in more noteworthy attractions of the DSRF such as High Falls.	None

[5] Alternate concentration limits (ACLs) for groundwater concentrations protective of DERA Creek were presented in the RIR in Appendix C as part of the Response to NC DENR Comments dated August 21, 2014.

#	Comment	DuPont Response	RAP Update
e.	Based on data and calculations provided, trail user is the most restrictive standard that would be applied throughout the site. Any area of the site where contaminants are above the RL that was calculated based on trail user exposure should be clearly identified and either remediated or restricted by a mechanism that can be demonstrated to be adequate to protect against any use that could cause exposure above the calculated acceptable risk concentration.	Areas of the site where soil concentrations are greater than the trail user RLs were identified and addressed in the RAP.	Visual representation of areas of the site that are contaminated were included in the RAP (Appendix A).
f.	Calculate RLs based on no greater than a 1X10-5 increased risk (and HI = 1) due to the additivity effect of multiple carcinogens.	Cumulative risks at individual sample locations were evaluated and are presented in the RAP.	None
NCDEQ Comments on the Conceptual RAP (DuPont 2016b), (NCDEQ 2016a, 2016b)			
1.	Section 2.6.6 – As indicated in HWS comments on the Remedial Investigation Workplan (RIW) and the Remedial Investigation Report (RIR), data from boring logs advanced during the Phase II RFI and during implementation of the RIW indicate there may not be sufficient cap/cover at some of the SWMUs where waste remains in place. During a December 2015 meeting, DuPont personnel indicated they would consider installation of additional cover materials (e.g. gravel at SWMU 13 of sufficient quantity to use as a potential parking area) at some site SWMUs. If DuPont is still considering this plan, it should be indicated in the RAP	DuPont is not considering installing additional cover materials at any SWMUs on the site. During the final site field investigation, soil cores were collected from the following SWMUs: SWMUs 4, 12A, 12B, 12C, 13, 15, 16, 18A&B, 19, and 20 (see RIR, Section 5.1.2). The results of the final field investigation indicated that, despite the presence of some miscellaneous debris, adequate soil covers were intact at these SWMUs. The miscellaneous debris observed in the soil cores were from three of the SWMUs: ▪ SWMU 12B (Former North Landfill): Green turquoise plastic was found in one of six soil cores (SWMU-12B/C-CB-3). ▪ SWMU 15 (Former Silicon Disposal Area): Plastic, high purity silicone fragments, and/or other materials were found in three of 10 soil cores (SWMU-15-SS-1, SWMU-15-SS-2, SWMU-15-SBS-1). ▪ SWMU 18B (Former Disposal Area 8 for evaporation basin wastewater containing zinc chloride): PVC pipe, a soda can, pipe jacket with Tedlar coating, and a small piece of metal were found in one of three soil cores (SWMU-18B-CB-1). This topic was discussed further at a meeting on April 7, 2016 in Raleigh with NCDEQ and NCDA&CS. NCDEQ indicated that they would consider this response further and provide a recommendation in future if applicable.	Additional information was provided to NCDEQ documenting that cover was adequate at these SWMUs. In addition, Sections 5 and 7.6.1 were updated to include the additional protective measure for SWMU 13.

#	Comment	DuPont Response	RAP Update
2.	Section 2.6.7 and 2.7.3 - SWMU 2C is listed as requiring No Further Action (NFA). In comments on the Phase II RFI Report, the HWS requested DuPont collect additional samples at SWMU 2C. Additional analysis was requested due to the presence of additional potential contamination identified in the bore log for SB-1. The additional contamination was identified below the sample interval that was submitted to the laboratory for analysis indicating potential higher concentration of contamination further below the surface. SWMU 2C is within the former manufacturing area proposed for restricted use (notification and sampling required) so that any future users will know that potentially contaminated soil could be encountered during excavation. However, it could be important to future owners of the site to realize there may be underlying contamination in this area that, if disturbed, will need to be managed properly, up to and including excavation and offsite disposal.	To make sure that future users know that potentially-contaminated soil could be encountered during excavation activities in the former manufacturing area, all SWMUs and AOCs located in the former manufacturing area will be identified as Test Before Dig Areas in the future. In Test Before Dig Areas, sampling must be performed before any invasive work (e.g., excavations) can be conducted. Before the RAP is submitted to NCDEQ, the in-text table in Section 2.8 and Figure 2-9 will be revised to clarify that, in the future, all of the SWMUs and AOCs in the former manufacturing area will be subject to sampling prior to any excavation activities being conducted. In addition, historical data, including reports and analytical data with location coordinates will be provided to future property owners, so that they can evaluate existing data when considering intrusive activities at the site.	Section 2.8 and Figure 2-9 were updated to clarify that all SWMUs and AOCs located in the former manufacturing area, including AOC 2C, are considered Test Before Dig Areas and must be sampled prior to any excavation activities.
3.	Section 2.6.7 - This Section of the RAP lists AOCs I and J as requiring No Further Action. AOC I is the former Powerhouse Area while AOC J is the Dowtherm Vaporizer Area. Both these AOCs are in the vicinity of DU-6 and DU-11, where additional work is proposed (additional PCB soil sampling, fence installation, etc.). The status of these AOCs should be clarified.	The NFA determinations for AOC I and AOC J were based on historical data. Before the RAP is submitted to NCDEQ, the in-text table in Section 2.8 and Figure 2-9 will be revised to clarify that these AOCs will be subject to sampling prior to any future excavation activities. In addition, DU-6 and DU-11 will be identified in Section 7.2.3 as areas where additional soil sampling will be conducted to further characterize PCB concentrations.	Revised the in-text table in Section 2.8 and Figure 2-9 to clarify that AOC I and AOC J will be subject to sampling prior to any future excavation activities. Section 5 and Section 7.2.3 were updated to indicate that additional soil sampling will be conducted to further characterize PCB concentrations in DU-6 and around soil sample SS-5.
4.	Section 2.7.3 – The Land Management Plan creates an area where the owner must notify DEQ and conduct confirmatory sampling prior to beginning excavation. It will be important to future owners of the site to realize there may be underlying contamination in this area that, if disturbed, will need to be managed, up to and including excavation and offsite disposal.	DuPont agrees that soil and other materials in the former manufacturing area must be sampled and managed appropriately if any invasive activities are going to occur in this area in the future. To address this issue, the following text will be added to Section 5 of the RAP before it is submitted to NCDEQ, “Implement an IC to require that soil is sampled prior to any excavation activities within the former manufacturing area. The purpose of this IC is to ensure that appropriate measures are taken to manage excavated material, as necessary, based on an evaluation of the pre-excavation sample results.” Before the RAP is submitted to NCDEQ, the Property Control Plan presented in Section 7.6 will be updated to require that a notification be submitted to NCDEQ prior to any future excavation activities in the former manufacturing area. This notification should include a summary of the excavation, sampling, and analytical plans. In addition, the future deed restriction will also require that a pre-excavation notification be submitted to NCDEQ.	Section 2.7.3, Section 5, Figure 5-3, and Section 7.6.2 were updated to include the requirement that a notification be submitted to NCDEQ prior to any future excavation activities in the former manufacturing area.

#	Comment	DuPont Response	RAP Update
5.	Section 2.8 – AOC 2C should be moved from NFA to the category that requires notification and sampling prior to excavation.	Before the RAP is submitted to NCDEQ, Section 2.8 and Figure 2-9 will be revised to clarify that all SWMUs and AOCs located in the former manufacturing area, including AOC 2C, are considered Test Before Dig Areas and must be sampled prior to any excavation activities.	Section 2.8 and Figure 2-9 were updated to clarify that all SWMUs and AOCs located in the former manufacturing area, including AOC 2C, are considered Test Before Dig Areas and must be sampled prior to any excavation activities.
6.	Section 2.8 - AOC F is listed as NFA in the Permit but is listed in the RAP as an area where excavation is prohibited. The status of AOC F should be clarified.	Before the RAP is submitted to NCDEQ, AOC F will be reassigned from a No Dig Area to a Test Before Dig Area (i.e., Implement ICs to Require that Soil is Sampled Prior to Any Excavation Activities Area), based on discussions with NCDEQ and NCDA&CS.	Section 2.8 and Figure 2-9 were updated to clarify that all SWMUs and AOCs located in the former manufacturing area, including AOC 2C, are considered Test Before Dig Areas and must be sampled prior to any excavation activities.
7.	Section 2.8 – See comment 3.	Before the RAP is submitted to NCDEQ, Section 2.8 and Figure 2-9 will be revised to clarify that all of the SWMUs and AOCs located in the former manufacturing area are considered Test Before Dig Areas and must be sampled prior to any excavation activities.	Section 2.8 and Figure 2-9 were updated to clarify that all SWMUs and AOCs located in the former manufacturing area, including AOC 2C, are considered Test Before Dig Areas and must be sampled prior to any excavation activities.
8.	Section 2.8 - AOC A is listed as Further Action Needed in this Section. The status of this AOC should be clarified.	Before the RAP is submitted to NCDEQ, Section 2.8 and Figure 2-9 will be revised to clarify that all of the SWMUs and AOCs located in the former manufacturing area are considered Test Before Dig Areas and must be sampled prior to any excavation activities.	Section 2.8 and Figure 2-9 were updated to clarify that all SWMUs and AOCs located in the former manufacturing area, including AOC 2C, are considered Test Before Dig Areas and must be sampled prior to any excavation activities.
9.	Section 2.12 - In August 2015, EPA revised Ecological Screening Values (ESVs) used for evaluating ecological systems. DuPont should use the 2015 EPA ESVs document to develop Remedial Levels based on ESVs for the site. https://www.epa.gov/risk/region-4-ecological-risk-assessment-supplemental-guidance	Additional sediment sampling is recommended in Section 7.2.3 of the RAP. The sediment screening values in the August 2015 EPA guidance will be considered when sediment data are screened in the future.	None

#	Comment	DuPont Response	RAP Update
10.	Section 2.12 – 130A-310.68 states site-specific remediation standards for surface waters shall be the water quality standards adopted by the Commission. Therefore the surface water standards will be those listed in NC 2B. If hazardous constituents related to the site are detected above NC 2B standards in surface water, steps must be taken to reduce these constituents in surface water.	DuPont agrees that the NC 2B surface water standards are the applicable cleanup standards for site-related constituents. Before the RAP is submitted to NCDEQ, the text will be updated to clarify that 2B values, not site-specific RLs, are appropriate for evaluating surface water concentrations. The only site-related constituent concentration that exceeded a 2B value was vinyl chloride. The concentration that exceeded the 2B value was at the polishing pond seep and DuPont is planning to collect additional surface water samples at this location. The only other constituent concentrations that exceeded 2B values were not site-related constituents (iron and manganese).	Section 3.2 was updated to clarify that NC 2B surface water standards are the appropriate remediation standards for surface water.
11.	Section 4.1 and 4.2 – DuPont should clarify that no additional remedial action is required for the surface and subsurface soil, so long as Institutional and or Engineering Controls preventing or restricting exposure are instituted and maintained. For example, if the cover at SWMU 13 is not maintained to prevent erosion or excavation is allowed at this SWMU, then users could be exposed to surface or subsurface soil at levels above site specific remedial levels.	DuPont agrees that as long as the remedial actions and ICs/ECs are implemented and maintained, the site will remain protective. Before the RAP is submitted to NCDEQ, the sentence "No additional remedial action is required" will be revised to "No additional remedial action is required as long as ICs/ECs preventing or restricting exposure are instituted and maintained."	Section 4.1.2 was updated to clarify that no additional remedial action is required as long as ICs/ECs are implemented and maintained.
12.	Section 4.2 – As part of Institutional Controls (ICs) for the Facility, the RAP should propose methods for future users of the site to identify that an area is restricted (e.g. signs with "Contact DEQ prior to excavation" or similar wording, etc.).	Before the RAP is submitted to NCDEQ, Section 4.2 will be updated to include a sentence stating that sign(s) or other permanent markings will be required to identify areas at the site with ICs or ECs. It was agreed during the April 7, 2017 meeting that NCDEQ, NCDAG&CS, and the DuPont State Recreational Forest (DSRF) will work together to determine the content of the sign(s) assuming that NCDAG&CS is indeed the future property owner. In addition, these areas will also be surveyed and identified in figures in the Property Control Plan.	Section 5 and Section 7.6.2 were updated to indicate that sign(s) or other permanent markings will be required to identify areas with ICs so that future users do not dig in these areas or if they intend to dig, they will notify NCDEQ and test before digging.
13.	Section 5 – The RAP should include statements that additional samples are to be collected in order to complete assessment of the nature and extent of PCB contamination in all potentially impacted media at the Facility. The RAP should state that assessment and potential cleanup of PCBs at the site will comply with: EPA rules for PCB remediation; follow the February 28, 2013 guidance on PCB characterization referenced in the U.S. EPA Region 4 Issue Paper for PCB Characterization at Region 4 Superfund and RCRA Sites available at https://www.epa.gov/risk/region-4-issue-paper-pcb-characterization; and, will be protective of human health and the environment.	Before the RAP is submitted to NCDEQ, Section 5 will be revised to reflect that DuPont is working with the EPA and NCDEQ to address PCBs in site soil in a manner that is protective of human health and the environment. Based on a conference call on April 14th with NCDEQ and EPA, the following text will be added to the RAP: "A proposed soil sampling plan for DU-6 and DU-11 will be included in a work plan that will be submitted to NCDEQ and EPA. The soil samples will be extracted using a TSCA extraction method and analyzed for Aroclors. A subset of the samples will also be analyzed for 209 PCB congeners. The sampling will be conducted as soon as the work plan is approved." After the final RAP is approved, a separate work plan will also be drafted in which the approach for further characterizing constituents (e.g., PAHs, PCBs, metals) in Lake DERA, DERA Creek, and the polishing pond seep surface water and sediment will be presented. The PCB data collected from these two future sampling efforts will be evaluated to ensure protection of people and the environment as well as to comply with appropriate guidance and regulations.	Section 5 and Section 7.2.3 were updated to indicate that additional soil sampling will be conducted to further characterize PCB concentrations in DU-6 and around soil sample SS-5.

#	Comment	DuPont Response	RAP Update
14.	Section 5 – The RAP should include a statement that a RCRA Part B Permit Renewal Application will be prepared and submitted as required in 40CFR 270.30 unless the RAP Completion Report has been approved by DEQ prior to the due date of the Renewal Permit.	Before the RAP is submitted to NCDEQ, Section 5 will be updated to include the recommended statement. During the April 7, 2016 meeting, NCDEQ indicated that they would clarify which properties (i.e., DuPont property, DSRF Visitors Center, or the whole DSRF) would be included in the permit, and provide that information to DuPont.	Section 5 and Section 7.3 were updated to indicate that the RCRA Permit Renewal will be required unless the RAP Completion report is approved prior to the renewal due date.
15.	Section 5 – The RAP should include plans for: surveying the areas where Land Use Restrictions (LURs) will be implemented; development of plat maps that meet the requirements of NCGS 47-30 and 143B-279.10; development of LUR language to be included on plats; and, the recordation of the LURs and plats in the register of deeds office.	Before the RAP is submitted to NCDEQ, Section 7.6 will be updated to include a plan for surveying LUR areas, developing plat maps with LUR language, and recording the LURs and plats.	Section 7.6 was updated to include a requirement to survey LUR areas, develop plat maps with LUR language, and record the LURs and plats with the county.
16.	Section 5 – The RAP should include a plan to abandon site monitoring wells to comply with NCAC 2C requirements. The plan should address near term abandonment of wells that will no longer be utilized for monitoring purposes and for abandonment of additional monitoring wells once it is determined they are no longer needed.	Before the RAP is submitted to NCDEQ, Section 5 will be updated to include a site monitoring well abandonment plan. In addition, Section 7.3 will be updated to include text about abandoning monitoring wells in accordance with NCAC 2C requirements.	Section 5 and Section 7.6.3 were updated to include well abandonment requirements.
17.	Section 7.2.3 – In order to further define the extent of contaminated groundwater and as part of the investigation process to determine the potential for vapor intrusion at the DuPont State Forest Visitor Center, the RAP should include a plan for installation of a monitoring well near the Visitor Center. The well should be installed to monitor the uppermost aquifer (i.e. screened across the top of the water table).	Before the RAP is submitted to NCDEQ, Section 7.2.3 will be updated to include a plan for installing a monitoring well near the Visitor Center. During DuPont's discussions with NCDEQ on December 2, 2015, it became apparent that NCDEQ is concerned with the potential for vapor intrusion into the Aleen Steinberg Center. Although vapor intrusion was not of concern from potentially-contaminated shallow groundwater based on the results of soil gas samples collected around the Aleen Steinberg Center, and future land use plans provided by the State that indicated that no new buildings will be constructed in this area, DuPont understands NCDEQ's concern and will work with NCDEQ to create a scope of work (SOW) to address this issue. During the April 7, 2016 meeting, it was discussed further that this monitoring well would be installed in a location near the Visitor Center, and initially sampled by DuPont to better characterize potential shallow groundwater impacts related to SWMU 17. The need for and scope of additional monitoring or other actions necessary to ensure vapor intrusion will not be a concern in the Visitor Center will be worked out between NCDEQ and the NCDAG&CS.	Section 7.2.3 was updated to include the installation of a monitoring well near the DSRF Visitor Center.
18.	Section 7.6.2 – see comment 6.	Before the RAP is submitted to NCDEQ, the in-text table in Section 7.6.2 will be updated to change the designation for AOC F from a No Dig Area to a Test Before Dig Area (Require that soil is sampled prior to any excavation activities). Figure 5-3 will also be updated to reflect the change.	Section 7.6.2 and Figure 5-3 were updated to change the designation for AOC F from a No Dig Area to a Test Before Dig Area.

#	Comment	DuPont Response	RAP Update
19.	Section 7.6.2 – the RAP should indicate potential methods for future users of the site to identify that an area is restricted (e.g. signs with "Contact NCDEQ or NCDA&CS prior to excavation" or similar wording). Related to this, consideration should be given to establishment and maintenance of on-site and electronic repositories for the Property Control Plan for future owners/operators of the site.	Before the RAP is submitted to NCDEQ, the Property Control Plan presented in Section 7.6 will be updated to indicate that signs will be posted near restricted use areas notifying potential users of the site that a notification is to be submitted to NCDEQ prior to any future excavation activities in the former manufacturing area. In addition, the submitted RAP will include a statement that future users of the site will maintain an on-site repository of all pertinent information, including the site Control Plan. DuPont recommends discussions with NCDEQ and NCDA&CS to more clearly define how this will be accomplished.	Section 5 and Section 7.6.2 were updated to indicate that sign(s) or other permanent markings will be required to identify areas where ICs are present so that future users do not dig, or notify NCDEQ and test before digging.
20.	Diphenyl Ether and Biphenyl were both detected in sediment samples from DERA Creek and Diphenyl Ether was detected in surface water collected from DERA Creek. The RAP should propose additional sediment sampling and analysis for these constituents in addition to the analysis proposed for PAHs.	The diphenyl ether and 1,1-biphenyl sediment and surface water concentrations are less than screening values. However, additional sampling is proposed and laboratory analyses will include diphenyl ether and 1,1-biphenyl for DERA Creek and the polishing pond seep sediment and surface water samples.	None
21.	An additional comment was received via email on May 10, 2016 from NCDEQ and is presented below: You asked the HWS to let you know if there were any additional comments on the RIR or the RAP, the HWS comments on the RIR or the RAP, DuPont's response to comments for the RIR or the RAP, or any subsequent discussions that were had. Below are our comments. Let me know if there needs to be further discussion to clarify either of these issues. a. HWS Comment 1 to the Conceptual RAP dealt with caps/covers at SWMUs, particularly SWMU 13. In addition, a subsequent meeting between DA&CS and the HWS identified potential issues with the cover at SWMU 12. We believe both of these issues have been resolved in subsequent conversations between the HWS and DuPont. Evidence of adequate existing cover at SWMU 12 was provided. For SWMU 13, DuPont has asked the DA&CS to indicate what type of addition "protective measure" they would prefer in the SWMU 13 area. b. HWS Comment 16 dealt with requirements for well abandonment at the Facility. In subsequent discussions between the HWS, DA&CS, DuPont, and NCNG it was agreed to not abandon 4 monitoring wells each at SWMU 11 and SWMU 17, the water supply wells at the Facility, and the wells at the DSRF property.	a. DuPont agrees that the cover at SWMU 12 is adequate. Subsequent discussions with NCDEQ regarding SWMU 13 resulted a commitment to install wooden bollards and/or other physical deterrents/barriers at SWMU 13 as an extra precaution to prohibit vehicles from disturbing the existing cover since SWMU 13 is located immediately adjacent to Lake DERA and may be subject to more frequent use than other SWMUs. b. Wells will be abandoned that are not needed in the future for post remediation monitoring. Wells that will be needed in the future for post remediation monitoring include: ▪ monitoring wells in the vicinity of DSRF Visitors Center ▪ four monitoring wells in vicinity of SWMU 11 and SWMU 17 In addition, all WSWs (WSW-YMCA, WSW-CMPGND, WSW-GUARD, WSW-VISIT, WSW-WWT, and WSW-DSF3) will be kept at the request of the Department of Agriculture.	Sections 5 and 7.6.1 were updated to include the additional protective measure for SWMU 13. Section 7.6.3 was updated to address well abandonment and ensure that select wells will not be abandoned so groundwater monitoring can be conducted at SWMU 11, SWMU 17, and the DSRF property.

#	Comment	DuPont Response	RAP Update
Public Comments Received During June 23, 2016 Public Meeting			
1.	Where will the DEQ meeting be held?	Mark Wilkens (NCDEQ) responded that the NCDEQ public meeting will probably be at the Transylvania County Library.	None
2.	Are there more meetings scheduled [about the remedial action plan] at the library?	DuPont does not have any more public meetings planned at this time.	None
3.	The dumpsite at the tennis courts near Lake DERA, what is in it [SWMU 13]? Do you think it might be leaking into the lake? It is still going into the river, isn't it?	Solid Waste Management Unit (SWMU) 13 contains waste and garbage. Groundwater in vicinity of SWMU 13 does not flow toward Lake DERA. Rather, groundwater flows from the SWMU 13 area toward the Little River.	None
4.	Are contaminants going from SWMU 13 into the Little River?	Contaminant levels are below levels of concern in Little River. This has been demonstrated by groundwater monitoring at wells located between the former manufacturing area and the Little River. In addition, this has been confirmed by Little River surface water monitoring results.	None
5.	Why is Little River campground not being utilized, etc.? A campground is good for the local economy.	The DuPont-owned property will be transferred to the State concurrent with RAP implementation. The State will then determine how the property will be used in the future.	None
6.	Regarding the carbon treatment system, does the system cover the bathrooms that are adjacent to the Visitor Center?	Yes, the carbon treatment system does supply the water that is used for the bathrooms that are adjacent to the Visitor's Center.	None
7.	What are PAHs?	PAHs or polycyclic aromatic hydrocarbons, are used for asphalt roads, creosote, and other purposes, and is a common contaminant.	None
8.	What compounds are located in the proposed fenced in areas?	Polycyclic aromatic hydrocarbons (PAHs) are present within the proposed fenced area. In the shallow soils, low levels of PAHs exist at two locations in the former manufacturing area that exceed the site action levels. A fence will be installed around the locations and other measures will be used to control access to ensure the public's safety. In addition, Polychlorinated biphenyls (PCBs) were detected at concentrations greater than 1 milligram per kilogram (mg/kg) but less than 5 mg/kg. DuPont is working with the United States Environmental Protection Agency (USEPA) and NCDEQ to develop a sampling plan to more fully characterize PCB concentrations and demonstrate that PCBs are not a concern.	None
9.	Who pays for everything that is being done.?	DuPont pays for all of the work that is being done to characterize and cleanup the property.	None
10.	Will the state have access to the property during remediation?	Once the property is transferred, the State will control the property and give DuPont access.	None
11.	Will state have security?	That will be up to the State to decide.	None

#	Comment	DuPont Response	RAP Update
12.	What is the small piece of land that the company held onto, which is located on the other side of the forest?	The small piece of land is 2 acres in size and was intended to be a location for future clean borrow soil that could then be used as backfill. However, the property that DuPont actually retained was a location where previous borrow soil was obtained. That is why the 2 acre area consists of property that has a large hole in the ground.	None
Public Comments Received via Email/Letter			
1.	Mr. Wilkins, I would like to voice my official support for the effort to create the DuPont First Responder Training Center. As a long time elected official in Transylvania County I have witnessed the changes our community has faced. I believe this is a opportunity to could have major impacts on Transylvania County and Western NC in general. From a potential in job creation, to helping resolve emergency response issues, I believe this would be a win win for NC. Please support this idea and help turn this into a reality. If you have any questions, please feel free to contact. Jason R Chappell Transylvania County Board of County Commissioners 101 South Broad St Brevard, NC 28712 (828)884-3271 Commissioner Office (828)553-0958 Cell Jason.Chappell@transylvaniacounty.org	Comment acknowledged	None
2.	The "donut hole" project us something that I would like to express my encouragement for. On behalf of Chris Whitmire I would like to say that I am for this project, sincerely Jeremy M Whitesides	Comment acknowledged	None
3.	Dear Mr. Wilkins, I have looked at the proposed use of the Donut Hole in DuPont State Forest for 1st Responder training and it makes complete sense to utilize that site for this purpose.. Not only will it help in a small way, Transylvania County but in the bigger picture the entire state of North Carolina... plus have the added benefit of helping relieve the parking issues at peak usage times of the surrounding DuPont Forest... (which currently is not a good thing). I completely support this proposal and hope it moves forward expeditiously. Wayne Hennie	Comment noted	None

#	Comment	DuPont Response	RAP Update
4.	Jim, I wonder if another publicly funded operation that takes 420 acres out of the profit making economy is a long term benefit to the county and it's people. I wonder how much effort might be expended through state and county officials to, through regulatory, tax, and public/private interests to prepare the property for private profit making, job generation use. It would be a wonder, wouldn't it, to see Transylvania County contribute, again, something to the world economy in a substantial way, with assets that many would covet if organized and administered in a way to be privately attractive. On Wed, Jun 1, 2016, at 02:37 PM, Jim Meyer wrote: Conservative Writers: Our N.C. House State Representative, Mr. Chris Whitmire, is asking for some help. Chris has been working tirelessly for more than three years to get something worthwhile going on the site of the former DuPont Medical X-Ray Film Plant that once employed 1,500 people. This area is 420 acres in size and commonly known as the DuPont Donut Hole. Chris worked with multiple state agencies and DuPont to clean up the site so it can once again bring jobs and functional use to the area by serving emergency response and recreational needs of the public. One of the primary intended purposes for the Donut Hole is first responder training run by the North Carolina National Guard. In addition to jobs, this will resolve rescue capability gaps for Western North Carolina. The public comment period is underway and concludes on June 23rd. I encourage you to submit positive, supportive comments to the North Carolina Department of Environmental Quality via Mr. Mark Wilkins at mark.wilkins@ncdenr.gov. This is a great project, with multiple beneficial outcomes for our county as well as our state. Please share your support with comments to Mr. Wilkins at the above email. Any other specific questions about this can be addressed directly to Chris. I left his original email attached for your reference. Thank you for considering this, Wayne Hennie	Comment acknowledged	None

#	Comment	DuPont Response	RAP Update
5.	Dear Mr. Wilkins; I request your support for a cooperative effort between the Department of Agriculture and the NC National Guard. To be able to provide this area both Forestry Service together with enhanced first response training and capability seems wise and efficient use of resources and dollars. Our residents will have the security of better response to flood, fire, and storm emergencies. Additional recreation facilities for veteran families and an educational Challenge Academy will also boost the economies of Transylvania and neighboring counties. I request you support Representative Whitmire's proposal. Respectfully, James Humphrey III jimhumphreyiii@hotmail.com	Comment acknowledged	None
6.	Wanted you to know that my family and I are in favor of creating additional jobs, enhancing public safety and open our natural attractions for public enjoyment to the land mass know as The Headwaters Track and the DuPont "Donut Hole". We are also in favor of the partnership between the Department of Agriculture and he NC National Guard concept that would focus on areas that would include emergency response needs of NC,such as, swift water rescue, forest fires suppression, flooding and hurricane responses among other natural disasters. Thanks for understanding our interest, John Dorner III 828 489 2601	Comment acknowledged	None
7.	As a resident who retired to Brevard with my husband eight years ago, I am very aware of the issues that make economic development in our county extremely challenging. I also have knowledge of the EMS shortcomings here: old equipment, staff shortages, and only two vehicles for this vast, mountainous county. I am excited about the possibility of a Dept. of Agriculture and North Carolina National Guard partnership that would produce jobs, improve safety for outdoor enthusiasts, improve the effectiveness and efficiency of multiple state agencies, and fill EMS deficiencies in my county. Thank you for the opportunity to express my opinion. Sincerely, Sandy Watson Transylvania County	Comment acknowledged	None

#	Comment	DuPont Response	RAP Update
8.	Dear Mr. Wilkins, I am increasingly uncomfortable with the amount of private property shifting into government ownership. Usually this shift results in lower tax revenues and a difficult-to-measure loss of economic growth and jobs when private property is no longer used as a part of the market economy. As a member of the Henderson County Environmental Advisory Board in Henderson County I have noticed that when the Committee is considering whether or not to ask the County Commissioners to support a particular project which entails the repurposing of private land to community park use we are only presented with information from those who are in favor of the change. This one-sided approach may lead us over the tipping point from the position of having plenty of public-use greenspace to a situation where we suffer the lack of revenue-producing and job-producing land. It is with this in mind that I write to you to solicit your support for using the The Headwaters Tract and the nearby DuPont "Donut Hole" to allow a partnership between the Department of Agriculture and the North Carolina National Guard where traditional state forestry missions would coexist with the state's Guard facilitating first responder civil support training and associated missions. Using public property for the public good seems like a very good idea to me. Man does not live by greenspace alone even though it is very desirable. Sincerely, Patricia Danz 105 Haven Drive Flat Rock, NC 28731	Comment acknowledged	None

#	Comment	DuPont Response	RAP Update
9.	Chuck: I mostly disagree with your perspective on this, particularly with respect to DuPont. The Department and the Forest Service are trying to complete the acquisition of the so-called "Donut Hole" at DuPont. That tract is the old plant site, and it looks like there will be some partnership between the Forest Service and the National Guard on that tract. Similarly, the Headwaters tract is likely to end up being used, in part, for National Guard training purposes. I'm guessing this partnership will inure to the benefit of our area. As we've learned consistently over the past few years, the availability of public lands for recreational uses is a magnet for other plant sitings. For example, Sierra Nevada identified that as one of the reasons it moved to western North Carolina. In the case of DuPont and Headwaters, the proposed acquisitions are done between private landowners and the state. The current landowners are willing to sell or give their property to the State for inclusion in the State's state forests. I don't have any problem with that. As for how things work at the Environmental Advisory Board, that is Henderson County's bailiwick, and I'm not going to get into that.	Comment acknowledged	None

#	Comment	DuPont Response	RAP Update
10.	Mr. Wilkins, Good Afternoon! In reference to the "DuPont Remedial Action Plan" , I would like to first express my utmost gratitude for your work in giving the American public such a beautiful and viable State park here at DuPont State Park! Some quick comments on "The Plan...": 1.) Considering your plan in lowering ground slope/ grades from 2:1 to 3:1, perhaps terracing utilizing rock retaining walls would have less impact on disturbing the existing soil or in conjunction with re-grading. 3:1 is a 15-degree slope, which is still very prone to erosion. 2.) In the "Drap Remedial Action Plan" book, p. 7-3, para.7.2.1, Last sentence, it stated there was no plan for "sustainable vegetative cover system" at that time. Have you come up with that plan yet? 3.) A small consideration to be given to Transylvania Library at the beginning of the 6/23/2016 meeting in gratitude for their participation in these matters would be 'ground breaking'! (Pun intended) 4.) We would be remiss to not give Ms. Kris Blair with "Resources" at the Trans. Library a public Thank You for the pro-active services she is rendering for assisting in disseminating all your plans to the public. She has operated as an admirable liaison for all parties of interest. I am sure you would agree that she is doing an outstanding job and should be remembered for future public relations. Since I am only a stranger, a personal invitation to Thurs, meeting from you would be very appropriate. Thanks again for all your and staff's conscientious work! Thomas Anderson, Mechanical Contractor, lic SCM1269-5, unl.	1.) and 2.) The final design for the closure of SWMU 11 has not been completed. The RAP proposes the general approach to be followed during the design process; including the use of a vegetative final cover and a 3:1 slide slope regrading. These general approach criteria are consistent with current regulatory and engineering practices. 3.) and 4.) Comment acknowledged	None

#	Comment	DuPont Response	RAP Update
Other Comments			
1.	Jamie, The NCDA&CS with input from the National Guard have decided that it is in our interest to retain all six water supply wells at the DuPont Brevard site. Wells include the existing well serving the DSRF Visitor's Center, plus the five additional water supply wells: 1. WSW-YMCA, 2. WSW-CMPGND, 3. WSW-GUARD, 4. WSW-VISIT (Chet's Office), 5. WSW-WWT. Please include retention of these water supply wells in the DuPont actions going forward. Thank you for your consideration, Joe Joseph Hudyncia Environmental Programs N.C. Department of Agriculture & Consumer Services 1001 Mail Service Center Raleigh, NC 27699-1001 (919) 707-3070 *office* (919) 264-9895 *cell* http://www.ncagr.gov/	Comment acknowledged.	Section 7.6.3 of the RAP was updated to indicate that these wells should not be abandoned.
NCDEQ Comments on the August 16 Draft RAP (NCDEQ 2016c)			
1.	Executive Summary – DuPont and the HWS agreed a shallow monitoring well would be installed in the vicinity of the DuPont State Recreational Forest Visitor Center (DSRFVC). The proposed well will be screened across the water table. Installation and monitoring details for this proposed well are provided in Section 7.2.3 of the RAP.	Text was added to the Executive Summary describing the installation and sampling of this groundwater monitoring well.	Executive Summary

#	Comment	DuPont Response	RAP Update
2.	Section 4.1.3 – DuPont should revise the RAP to account for the following statements: Manganese, iron, and vanadium have been detected above NC 2L standards in groundwater samples collected in a well formerly used to supply water to the campground at Lake DERA (WSW-Campground). As there is a potential health risk associated with elevated levels of these constituents, prior to the supply well being used, additional sampling will need to be performed on WSW-Campground. If these results also indicate constituents are present in groundwater above NC 2L standards, a health risk evaluation (HRE) will need to be performed. The results of the HRE will determine the risk associated with potential uses (drinking, toilets, showering, etc.) of the water from the well and what steps are necessary to reduce these risks. As an alternative, the well may be abandoned.	This concept is already in RAP Section 4.1.3 and Section 7.6.3. The more explicit language suggested by NCDEQ will be added as a footnote to RAP Section 4.1.3.	Sections 4.1.3 & 7.6.3
3.	Section 4.1.6. - Biphenyl and Diphenyl Ether should be added as constituents of concern for Sediment Exposures.	Screening was performed during the RIR and these constituents were not identified as COPCs. Table 21A of the RIR documents that the maximum biphenyl and diphenyl ether concentrations do not exceed human health (resident). Table 22 documents that the maximum concentrations are well below the ecological screening values. Therefore, as shown in Table 23 they are not COPCs and were not evaluated further in the RIR. Therefore, they are not included in Table 4-2 as COCs. DuPont previously responded to NCDEQ comments on the Conceptual RAP with the following: *"The diphenyl ether and 1,1-biphenyl sediment and surface water concentrations are less than screening values. However, additional sampling is proposed and laboratory analyses will include diphenyl ether and 1,1-biphenyl for DERA Creek and the polishing pond seep sediment and surface water samples."* Text was added to Sections 5 and 7.2.3 regarding additional analyses for diphenyl ether and 1,1-biphenyl.	Sections 5 & 7.2.3
4.	Section 5 – Section 5 of the RAP provides an overview of remaining remedial activities. There is no mention of installation of the new monitoring well near the DSRFVC or sampling of monitoring wells downgradient of SWMUs 11 and 17 as agreed to by the HWS and DuPont. The well should be installed as detailed in Section 7.2.3. and the sampling should be conducted at SWMUs 11 and 17 as detailed in Section 7.4. of the RAP.	Text was added to Section 5 describing these activities.	Section 5
5.	Section 6.2 – The HWS recommends adding the following to the Table in this Section under "Evaluation" for the 3rd factor ("…The type, quantity, toxicity…): "Materials remaining on-site are either below site-specific RLs or are not located where human or ecological receptors can contact the materials".	The suggested text was added to Section 6.2.	Section 6.2

#	Comment	DuPont Response	RAP Update
6.	Section 7.2.1. – The HWS recommends that rip-rap to be placed at SWMU 11 be constructed to a level above the 100-year flood elevation.	The following text is already in the RAP (Section 7.2.1, Page 7-2 & 7-3): *"Additionally, riprap will be placed along the toe of the slopes within the 100-year flood plain in accordance with Army Corps of Engineers guidance for bank-slope protection."* This is a conceptual plan and it is premature to add additional details in the RAP before the design has been finalized. Implementation details will be included in a future plan that will be submitted to the NCDEQ for review and approval.	None proposed.
7.	Section 7.2.3 – Language should be added to state "Depending on results of sampling of the new monitoring well installed in the surficial aquifer near the DSRFVC, additional monitoring may be necessary."	The suggested text was added to Section 7.2.3. This text also addresses Comment 13.	Section 7.2.3 – Language should be added to state "Depending on results of sampling of the new monitoring well installed in the surficial aquifer near the DSRFVC, additional monitoring may be necessary."
8.	Section 7.4 – In the RAP, DuPont has indicated they will conduct sampling of four (4) wells at SWMU 11 and four (4) monitoring wells at SWMU 17. The RAP states sampling will be conducted at years 1, 5, and 10 after recapping of SWMUs 11 and 17. However, as mentioned in previous discussions, in order to verify the effectiveness of the selected remedies and to ensure remedial actions do not result in an increase in constituent concentrations in groundwater, sampling of the monitoring wells may be required beyond this ten-year time frame. DuPont should revise the RAP to indicate sampling of wells at SWMUs 11 and 17 will be required every five years for the lesser of either thirty (30) years or when analysis of sample results from three (3) successive sampling events indicate contaminant concentrations are reducing or are stable.	The Section 7.4 text was revised to incorporate this concept.	Section 7.4
9.	Section 7.6. – In several locations within the RAP, DuPont indicates workplans will be developed that detail all work required to complete remedial activities at the Facility. Workplans to be developed in the future include: Long-Term O&M, Excavation and Land Use Management Plan, Groundwater Use Management Plan, VI Characterization and Mitigation Plan, Additional Remediation Activities at SWMU 17 Plan, Additional Remediation Activities at SWMU 11 Plan, PCB Sampling and Remediation Plan, and Property Management Plan. DuPont should revise the RAP to indicate the HWS shall approve all future workplans, LURs, etc. prior to implementation of the work.	Text was added to Sections 7.2 and 7.6 stating that all future work plans and LURs will be submitted to NCDEQ for approval prior to implementation of the work.	Sections 7.2 and 7.6.
10.	Section 7.6.1. – DuPont should revise the RAP to specify that warning signs will be installed on the fencing at DU-6/AOC A area. In addition, DuPont should ensure the fencing is high enough to strongly discourage trespassers entering the area.	The Section 7.6.1 text was revised to incorporate this concept.	Section 7.6.1.

#	Comment	DuPont Response	RAP Update
11.	Figure 2-10 and 2-11 – It appears the Future DSRF Worker was not considered when evaluating receptor pathways at Lake DERA or DERA Creek. DuPont should explain why this pathway was not considered. DuPont may need to consider the Future DSRF Worker when evaluating risk using data from the proposed sediment sampling at DERA Creek and Lake DERA.	1) Appendix G of RIR documents an evaluation that was performed for an adult and child in Lake DERA and DERA Creek (i.e., recreators). The exposure frequency for children/adults was 108 days per year versus 90 days per year for a Future DSRF Worker. Although potential exposures to surface water and sediment by Future DSRF Workers were not specifically evaluated in Appendix G due to being incomplete, the aforementioned scenario is protective. 2) The Conceptual Site Exposure Model (CSEM) presented in figures 2-10 and 2-11 is consistent with RIR. A Future DSRF Worker includes workers that may be hired to assume daily operations of managed recreation at Lake DERA and/or staff a ranger station. Potential exposures to Lake DERA/ DERA Creek surface water and sediment by Future DSRF Workers were not considered a complete exposure pathway since these workers are not expected to have appreciable contact with sediment and surface water. 3) Figures 2-10 and 2-11 were updated to reflect that potential surface water and sediment exposure for a Future DSRF Worker was considered. In addition, this potential exposure scenario will be considered in future sediment and surface water data evaluations.	Update Figure 2-10 and 2-11.
12.	Table D-1 – DuPont should revise this table to include the estimate cost for annual certification of LURs.	These costs are already captured in Table D-1 under RAP Implementation as “Implementation of Plans and Periodic Repairs”. The title will be updated to clarify that it includes the cost for annual certification of LURs.	None
13.	General – DuPont has proposed additional assessment activities in the RAP. This sampling may indicate additional assessment is needed. DuPont should include language that additional assessment and/or remediation may be required dependent on sampling results.	The Section 7.2.3 text was revised to incorporate this concept.	Section 7.2.3

References:

DuPont. 2015. Response to NCDENR Comments on the Remedial Investigation Report, Former DuPont Brevard Facility Cedar Mountain, North Carolina NCDENR RCA Permit No. NCD 003 152 329. August 31.

DuPont. 2016a. Response to NCDEQ Comments on the Remedial Investigation Report, Former DuPont Brevard Facility Cedar Mountain, North Carolina NCDENR RCA Permit No. NCD 003 152 329. April 1.

DuPont. 2016b. Response to NCDEQ Comments on the Conceptual Remedial Action Plan, Former DuPont Brevard Facility Cedar Mountain, North Carolina NCDENR RCA Permit No. NCD 003 152 329. April 26.

NCDEQ. 2016a. Email from Mark Wilkens to Jamie VanBuskirk Regarding RIR and RAP. May 10.

NCDEQ. 2016b. Comments on Conceptual Remedial Action Plan, Former DuPont Brevard Facility. March 17.

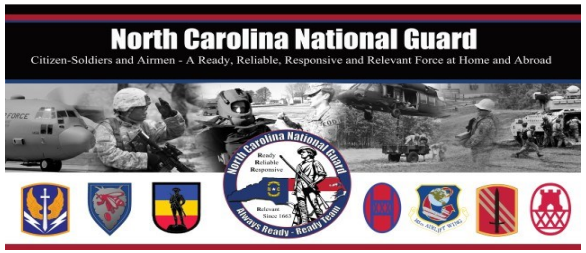
NCDEQ. 2016c. Comments on August 2016 Draft Remedial Action Plan, Former DuPont Brevard Facility. September 8.

NCDENR. 2015. Comments on Remedial Investigation Report, Former DuPont Brevard Facility EPA ID No. 003 152 329. July 30.

Parsons. 2009. Phase II RCRA Facility Investigation Report. Former DuPont Brevard Facility. Cedar Mountain, North Carolina. HSWA Permit NCD003152329-R2. September 30.

Attachment C-5

North Carolina National Guard Land Use Brochure



Opportunities in DuPont Region

Mission Statement :

On order, the North Carolina National Guard's Always Ready-Ready Team deploys military capabilities, in support of State and/or National authorities, in order to protect the lives and properties of fellow Citizens, defend the State and Nation, and secure our American way of life.

NCNG could use the DuPont site to facilitate the training for Military and Civilian Support.

Proposed timeline and activities

Within six months

- Dismounted Military Training
- Military Vehicle Training
- Motor Cycle Operators Course
- Land Navigation Course
- Bivouac Training
- Engineers Training
- Leaders Reaction Course
- Helicopter Aquatic Rescue Training
- Mountain Operations

Within one Year :

Military Usage

- Obstacle Course
- Short-term stays with lodging

Morale and Recreation site

- Primitive Camping
- Water Recreation on the DuPont Lake
- Designated Fishing Areas

Two Years and Beyond:

- Partner with Veterans Groups and Air Guard , establishing permanent camp sites,
- Wounded Warrior REHAB site
- NG Mobile Training Team, National Site
- NG Civil Support Center of Excellent
- Permanent Lodging/ Admin facilities to support training

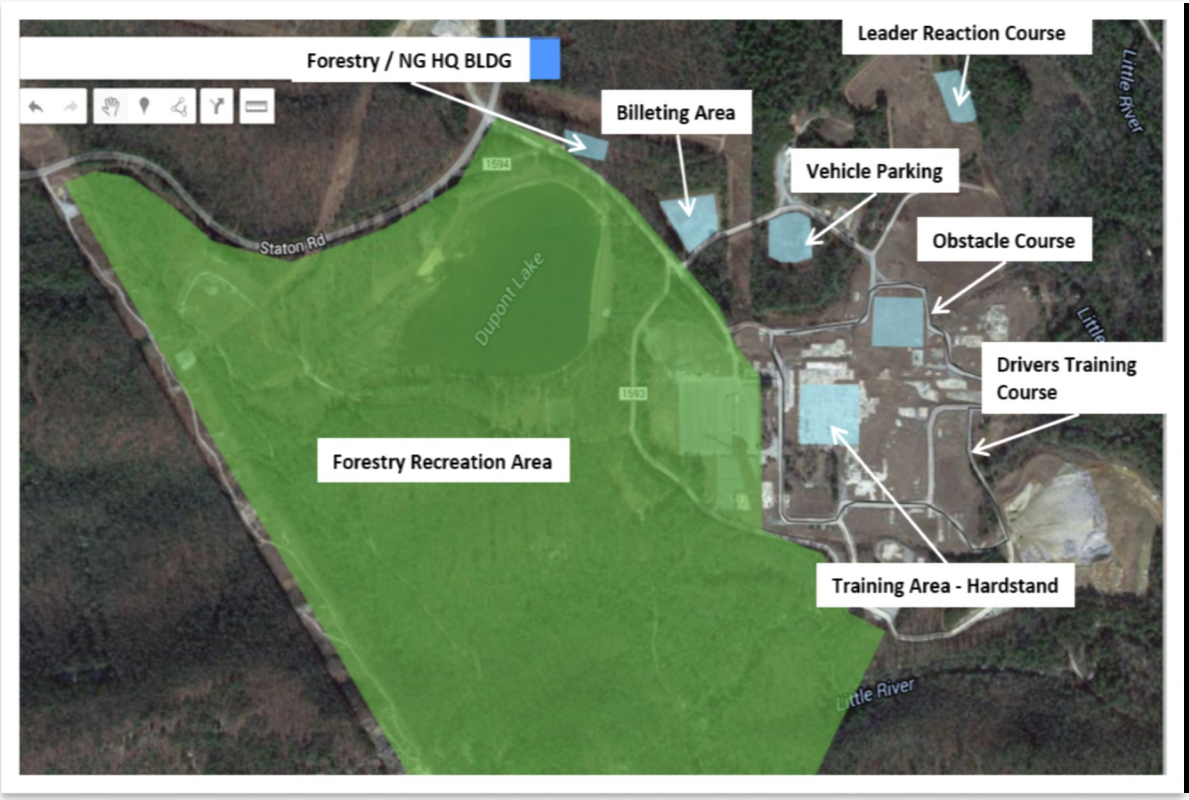
NCNG

The NCNG is able to utilize the DuPont "doughnut hole" beginning within 6 months, and has a vision to expand both training and recreational opportunities well into the future. In order for the area to be fully utilized, the NCNG along with other State Agencies must partner and develop dual use facilities to foster efficiency.

Potential State and Federal Partners Utilizing DuPont and the Headwaters

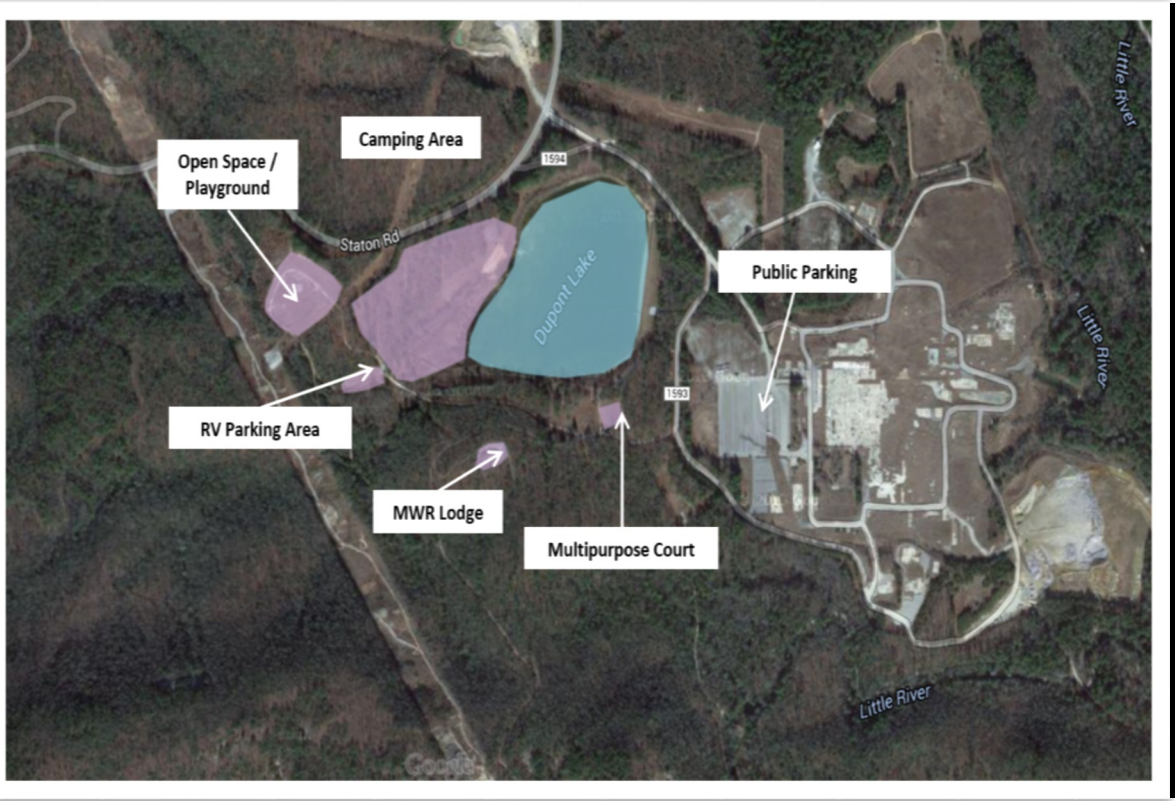
- **North Carolina National Guard**
- **NC Emergency Management**
- **NC Highway Patrol**
- **NC Department of Public Safety**
- **NC Forest Service**
- **U.S .Special forces Command**
- **U.S. Army ROTC**

ARMY ROTC



Proposed National Guard Facilities

Solid Waste Management Unit



Proposed Morale Recreation and Welfare (MWR)

Appendix D

Remedial Action Cost Estimate

Prepared for:

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Corporate Remediation Group
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Prepared by:

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September 2016

REMEDIAL ACTION COST ESTIMATE

The Remedial Action Plan (RAP) proposes remedial actions to comply with remediation standards at the Brevard Site. The purpose of this appendix is to provide an estimate of the probable cost of the remedial actions described in the RAP in order to satisfy NCGS § 130A-310.69(b)(15) of the Risk Bill. Estimated costs for the remedial actions described in the RAP are provided in Table D-1 (see attached).

Table D-1: Remedial Action Cost Estimate

	2017	2018	2019	2020	2021	2022	2023 - 2027	2028 - 2037	2038 - 2047	Grand Total
TOTAL	$ 1,802,700	$ 778,045	$ 717,745	$ 45,000	$ 15,000	$ 45,000	$ 105,000	$ 150,000	$ 150,000	$ 3,808,490
SWMU 17[1]	**$ 697,130**	**$ 55,300**	**$ 10,000**	**$ 10,000**	**$ 10,000**	**$ 25,000**	**$ 65,000**	**$ 100,000**	**$ 100,000**	$ 1,072,430
Remediation										
Work Plans, H&S, Subs	$ 120,500	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
Field Work Implementation[2,3]	$ 566,630	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
Reporting	$ -	$ 30,300	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
Post Remediation Monitoring (Year 1, Year 5, Year 10 Four Well Sampling Event)	$ -	$ 15,000	$ -	$ -	$ -	$ 15,000	$ 15,000	$ -	$ -	
DSRF Visitors Center GAC System Costs: carbon changeout and annual monitoring	$ 10,000	$ 10,000	$ 10,000	$ 10,000	$ 10,000	$ 10,000	$ 50,000	$ 100,000	$ 100,000	
SWMU 11	**$ 825,260**	**$ 717,745**	**$ 702,745**	**$ -**	**$ -**	**$ 15,000**	**$ 15,000**	**$ -**	**$ -**	$ 2,275,750
Cover Design and Installation[3]	$ 702,745	$ 702,745	$ 702,745	$ -	$ -	$ -	$ -	$ -	$ -	
Side Slope Design and Installation[3]	$ 122,515	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
Post Remediation Monitoring (Year 1, Year 5, Year 10 Four Well Sampling Event)	$ -	$ 15,000	$ -	$ -	$ -	$ 15,000	$ 15,000	$ -	$ -	
Additional Investigation	**$ 95,510**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	$ 95,510
Sediment and Surface Water										
Work Plan	$ 13,500	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
Field Work	$ 19,950	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
Lab & ADQM	$ 24,050	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
Reporting	$ 20,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
Installing/Sampling Well at DSRF										
Work Plan	$ 2,830	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
Field Work	$ 6,800	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
Lab & ADQM	$ 3,380	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
Reporting	$ 5,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
RAP Implementation	**$ 174,800**	**$ 5,000**	**$ 5,000**	**$ 35,000**	**$ 5,000**	**$ 5,000**	**$ 25,000**	**$ 50,000**	**$ 50,000**	$ 354,800
RAP Implementation Plan										
Develop Plan	$ 20,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
DEQ Review	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
Respond to Comments	$ 2,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
Finalize Plan	$ 3,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
Deed Restrictions	$ 10,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
Implementation of Remedial Actions	$ 10,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
RAP Property Control Plan										
Long Term O&M Plan	$ 8,750	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
Excavation and Land Use Plan	$ 8,750	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
Groundwater Use Management Plan	$ 8,750	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
VI Characterization and Mitigation Plan	$ 8,750	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
Well Abandonment	$ 94,800	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
Implementation of Plans and Periodic Repairs and Annual Certification of LURs	$ -	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 25,000	$ 50,000	$ 50,000	
Remedial Action Completion Report	$ -	$ -	$ -	$ 30,000	$ -	$ -	$ -	$ -	$ -	
RCRA Part B Permit Renewal Application Process	**$ 10,000**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	$ 10,000

Notes:

[1] Assumes SWMU 17 investigation work will be completed prior to RAP approval.

[2] The remedial action is assumed to be Large Diameter Auger soil mixing with introduction of portland cement to reduce permeability and immobilize contaminants in combination with ZVI treatment to promote contaminant degradation.

[3] The cost estimate was provided by an outside consultant (Geosyntec).