



**Westinghouse Fuel Fabrication  
Facility  
July 25, 2019**

Hopkins, South Carolina



# Overview

- Site History
- Consent Agreement
- Current Investigations

## What Does Westinghouse Do?



- Operates a 550,000 square foot facility on 1,156 acres
- Began operations in 1969
- Manufactures Nuclear Fuel Rods
- Not a Nuclear Power Plant



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# Hydrogeology Setting and Overview

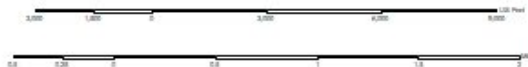
# Westinghouse, Hopkins

1/18/2010  
Buck Coates, LLC

2/10/2010, 2



Scale: 1/10,000

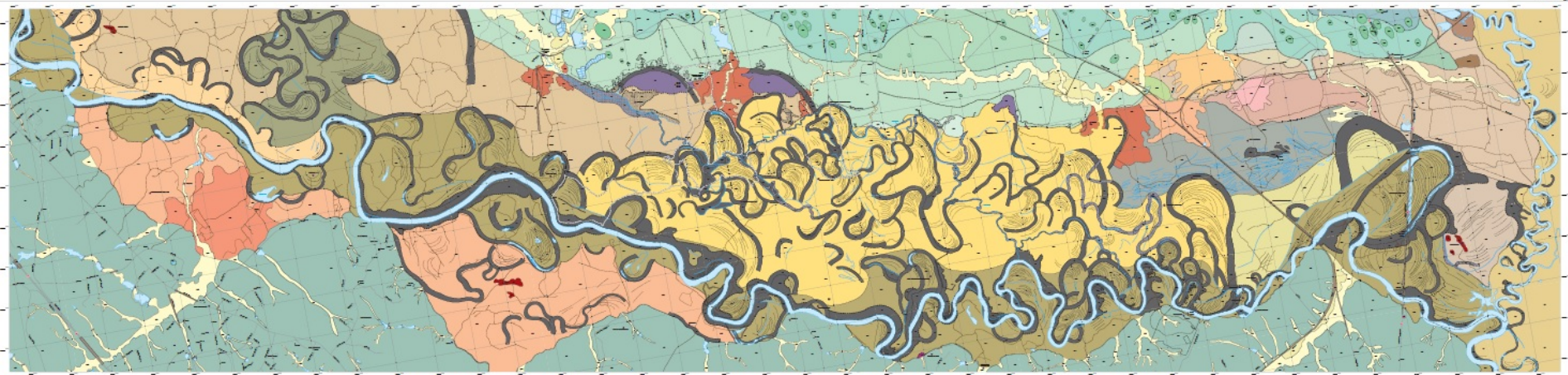




Plant location



Wateree  
River

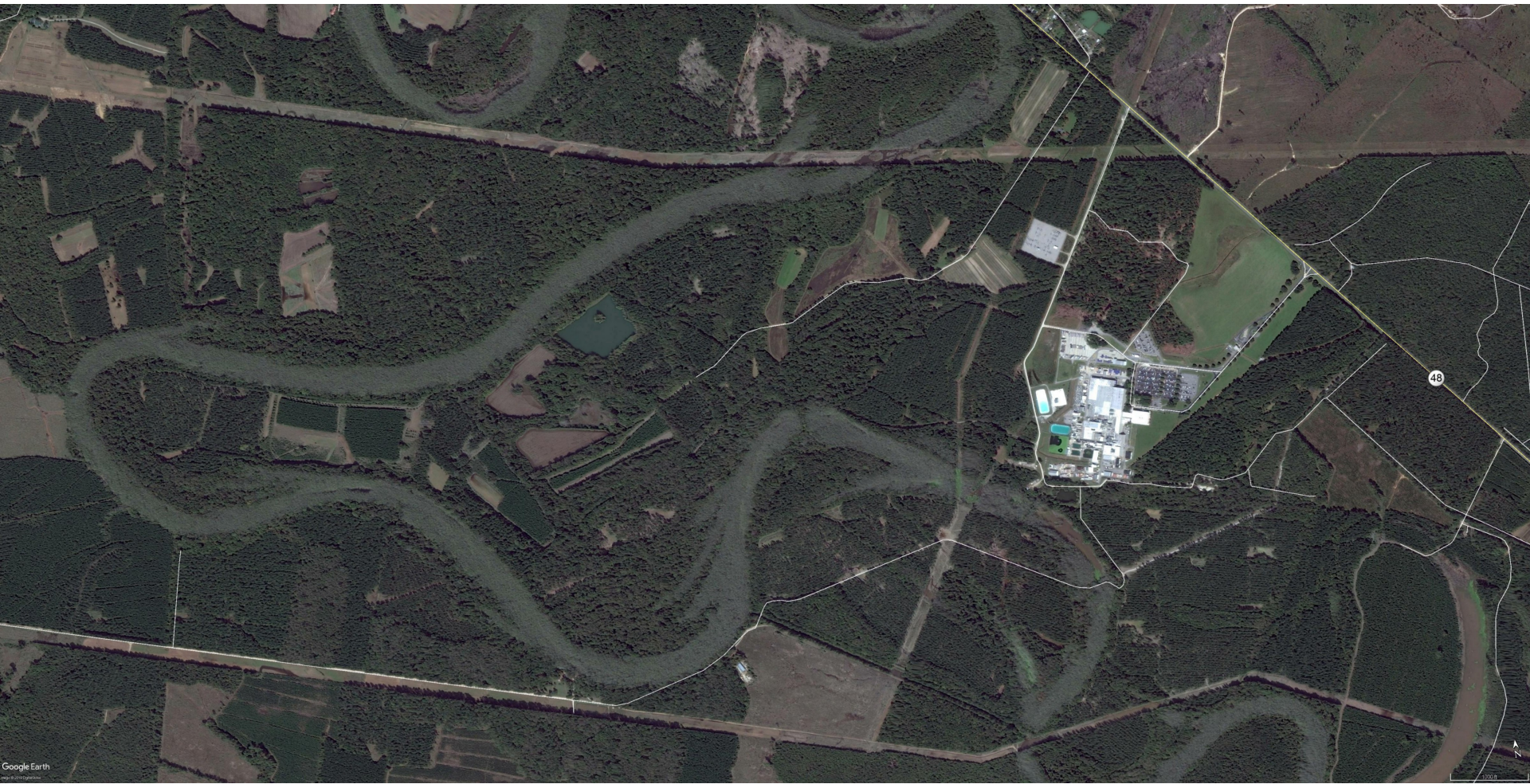


GEOLOGY AND GEOMORPHOLOGY OF THE LOWER CONGAREE RIVER FLOODPLAIN: PLATE 2

1:12,000

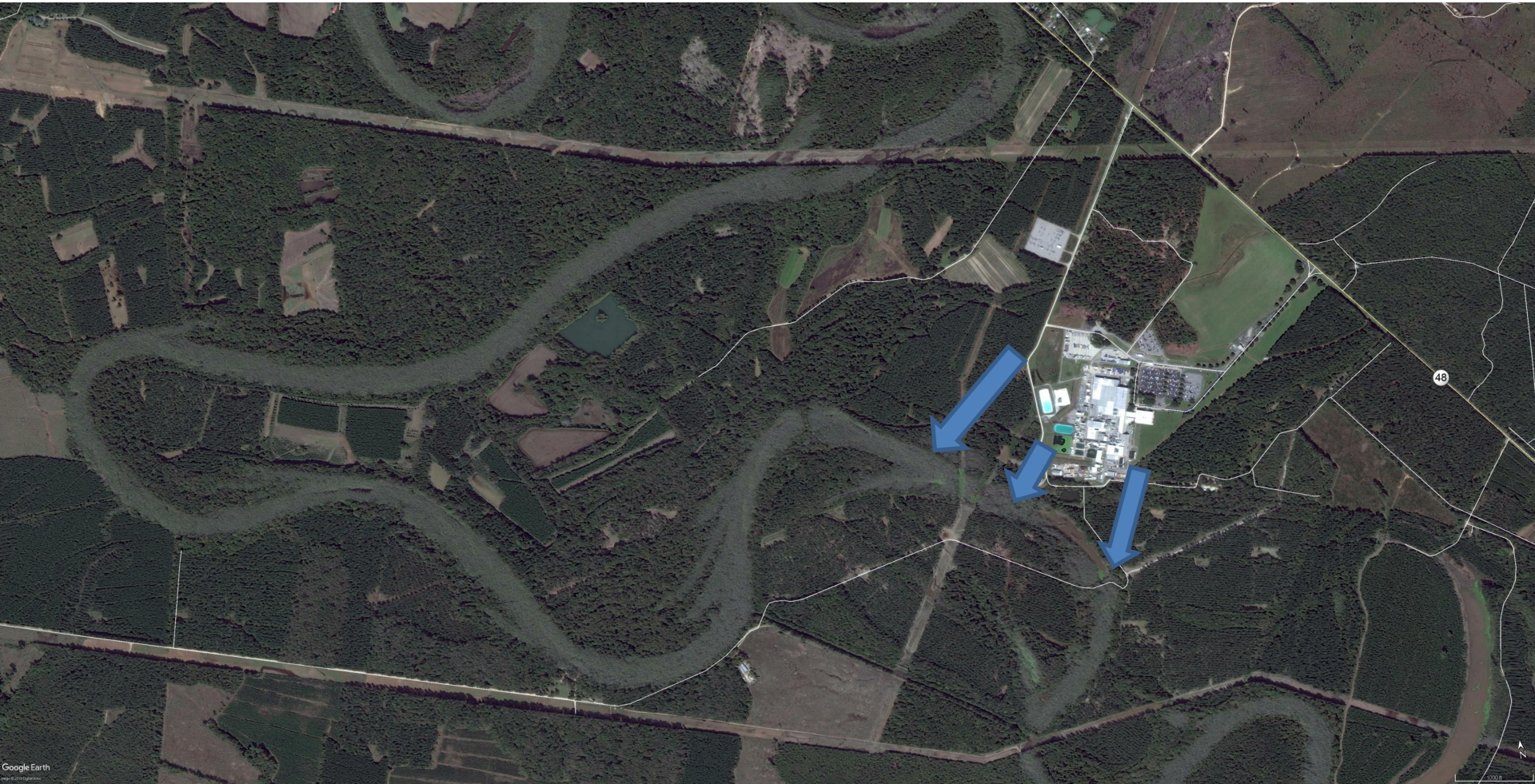
DAVID C. SHELLEY AND ARTHUR D. COHEN

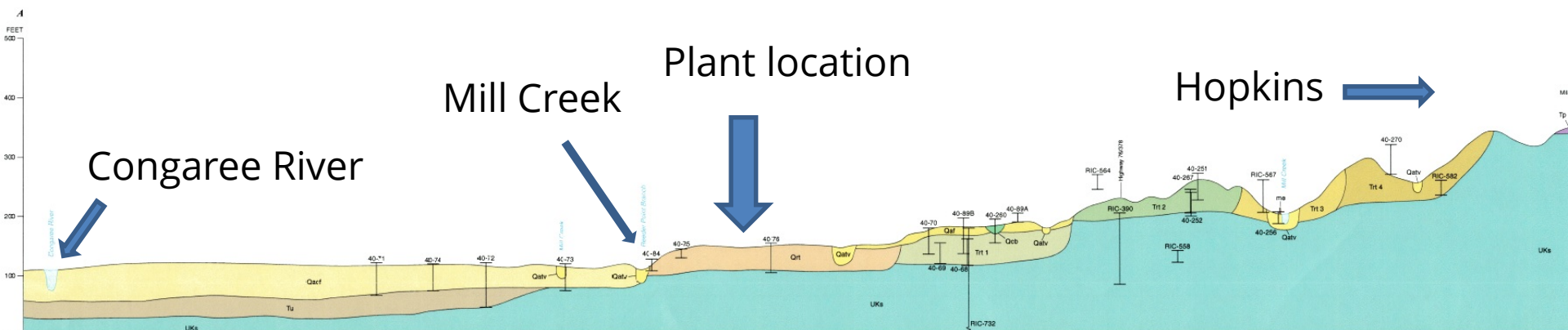






# Groundwater Flow Direction





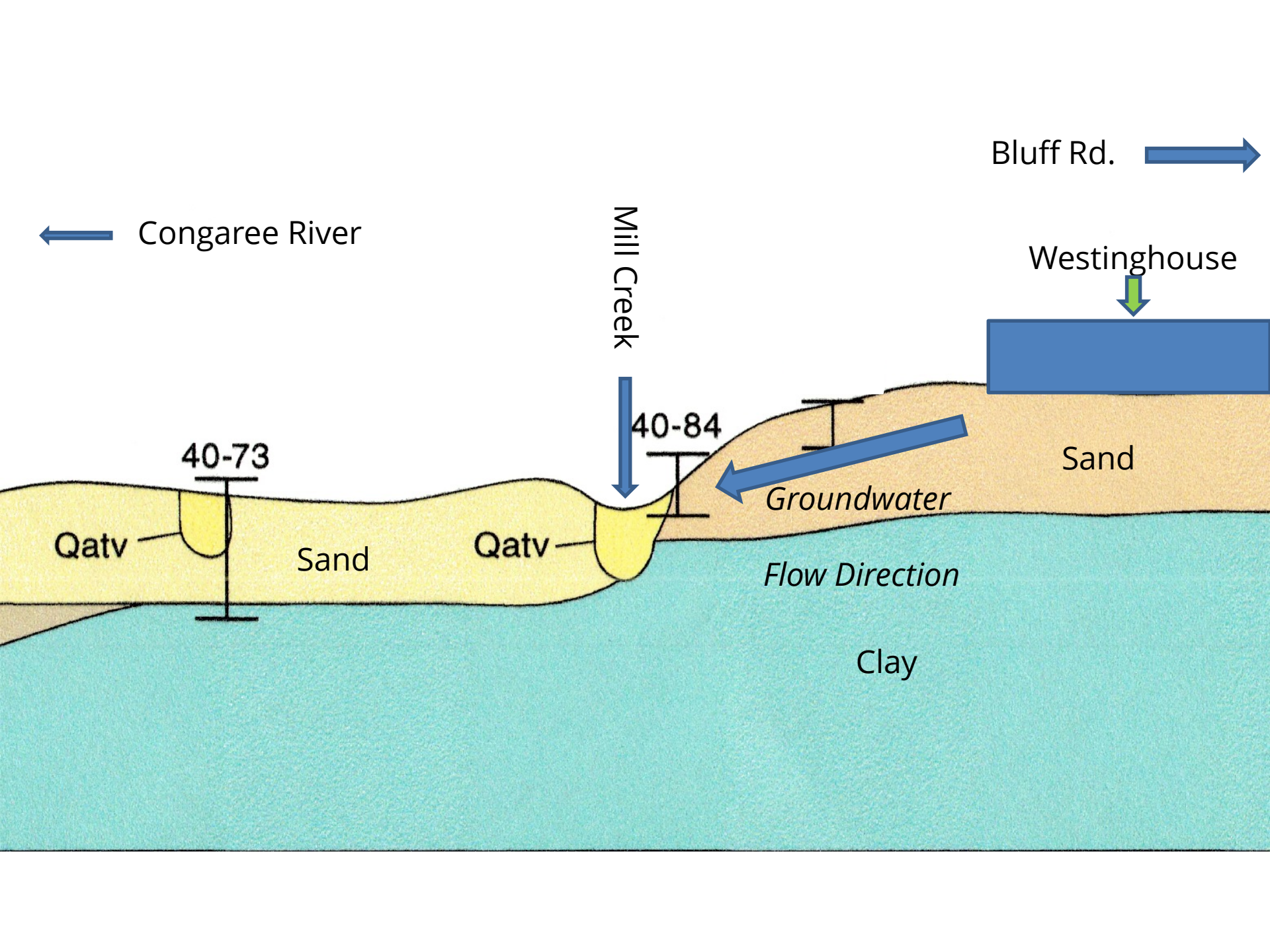
Congaree River

Mill Creek

Plant location

Hopkins





← Congaree River

Bluff Rd. →

Westinghouse

Mill Creek

40-73

40-84

Qatv

Sand

Qatv

Sand

Groundwater

Flow Direction

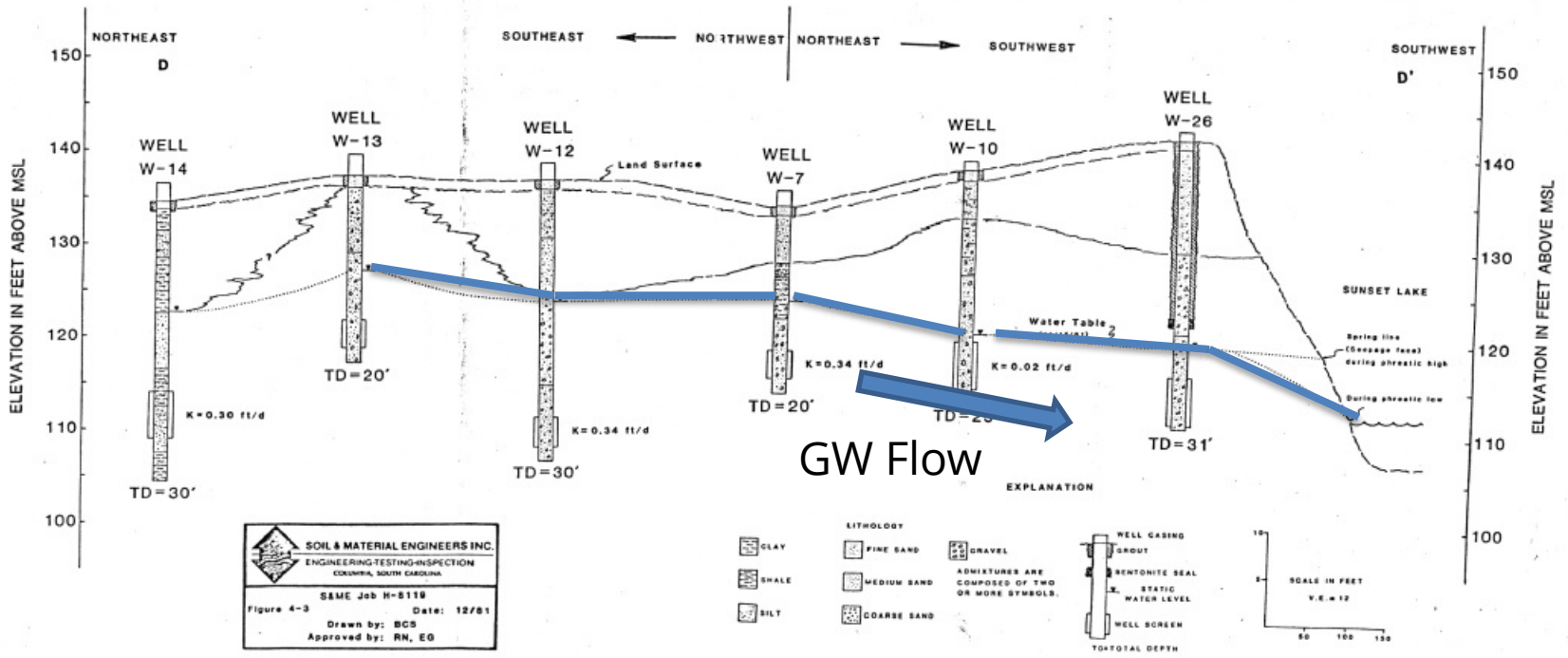
Clay


← Bluff Rd.

Westinghouse  
Plant

Congaree River →

FIGURE 4-3 EAST-WEST HYDROGEOLOGIC CROSS-SECTION D-D' OF THE TERRACE HYDROGEOLOGIC UNIT SOUTH OF THE PROCESS AREA




**SOIL & MATERIAL ENGINEERS INC.**  
 ENGINEERING-TESTING-INSPECTION  
 COLUMBIA, SOUTH CAROLINA  
 SAME Job H-5119  
 Figure 4-3 Date: 12/81  
 Drawn by: BCS  
 Approved by: RN, EG

GW Flow →



# Regulatory Roles

## US Nuclear Regulatory Commission (NRC)

- License and Regulate the use of radiologic materials
- Emergency Plans
- Conducts Inspections

## SC DHEC

- Assure proper investigation and cleanup of hazardous materials released into the environment under the Consent Agreement
- Air and Water Discharge Permits



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# Environmental History

- 1980s First Groundwater Assessment Due to Fish Kill in Gator Pond
- Monitoring Well Network Established
- Determined the Wastewater Lagoons were leaking Nitrates and Fluoride to the Groundwater
- Groundwater Monitoring has Continued Since the 1980s to the present



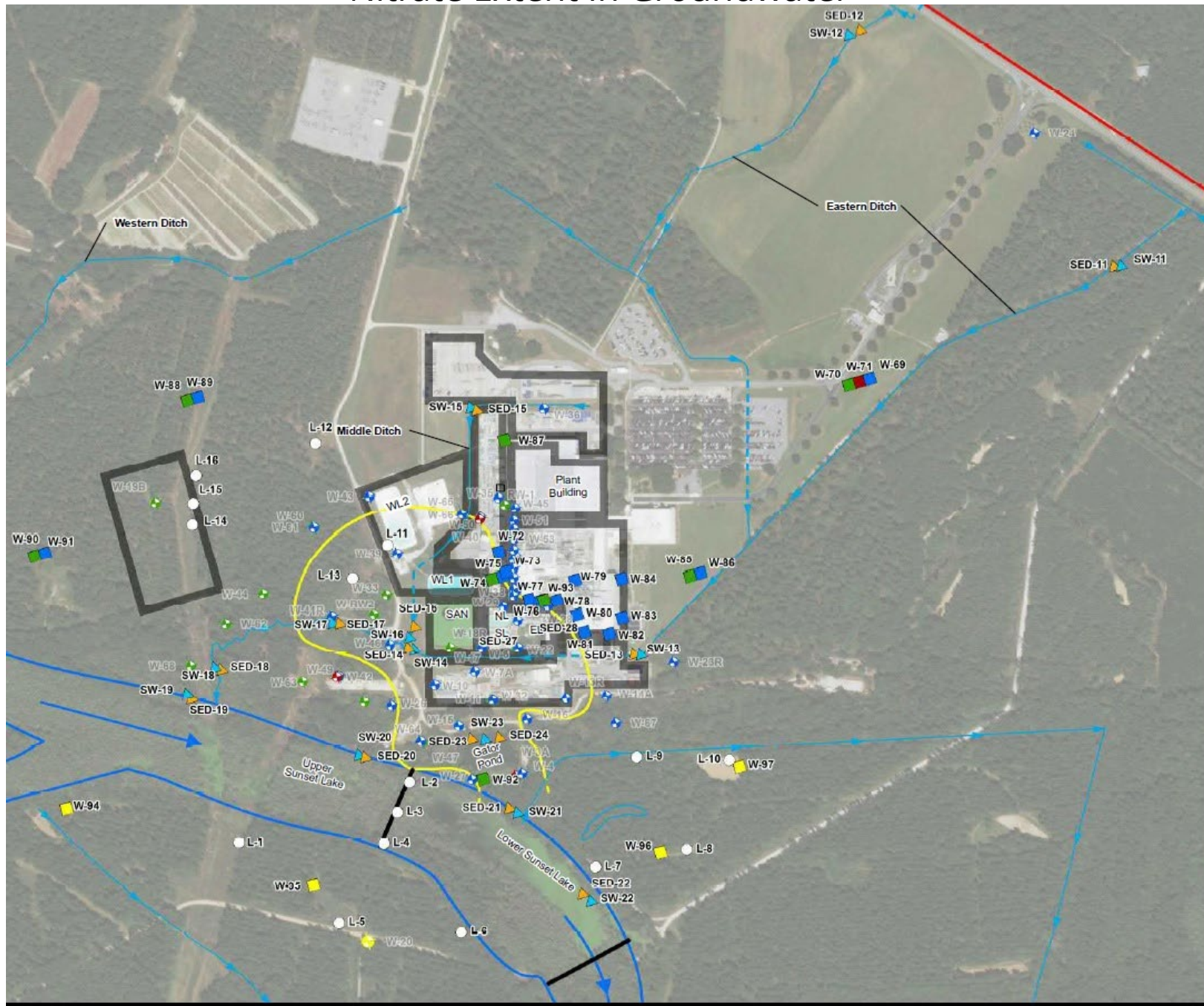


- In 1995 Solvent Chemical Contamination was Discovered in Groundwater
- Additional Investigation (more monitoring wells) Targeted the Solvent Contamination
- 1996-2011 Groundwater Treatment to Reduce the Solvents in Groundwater
- 2011 System Turned Off as Solvent Concentrations had Stopped Declining

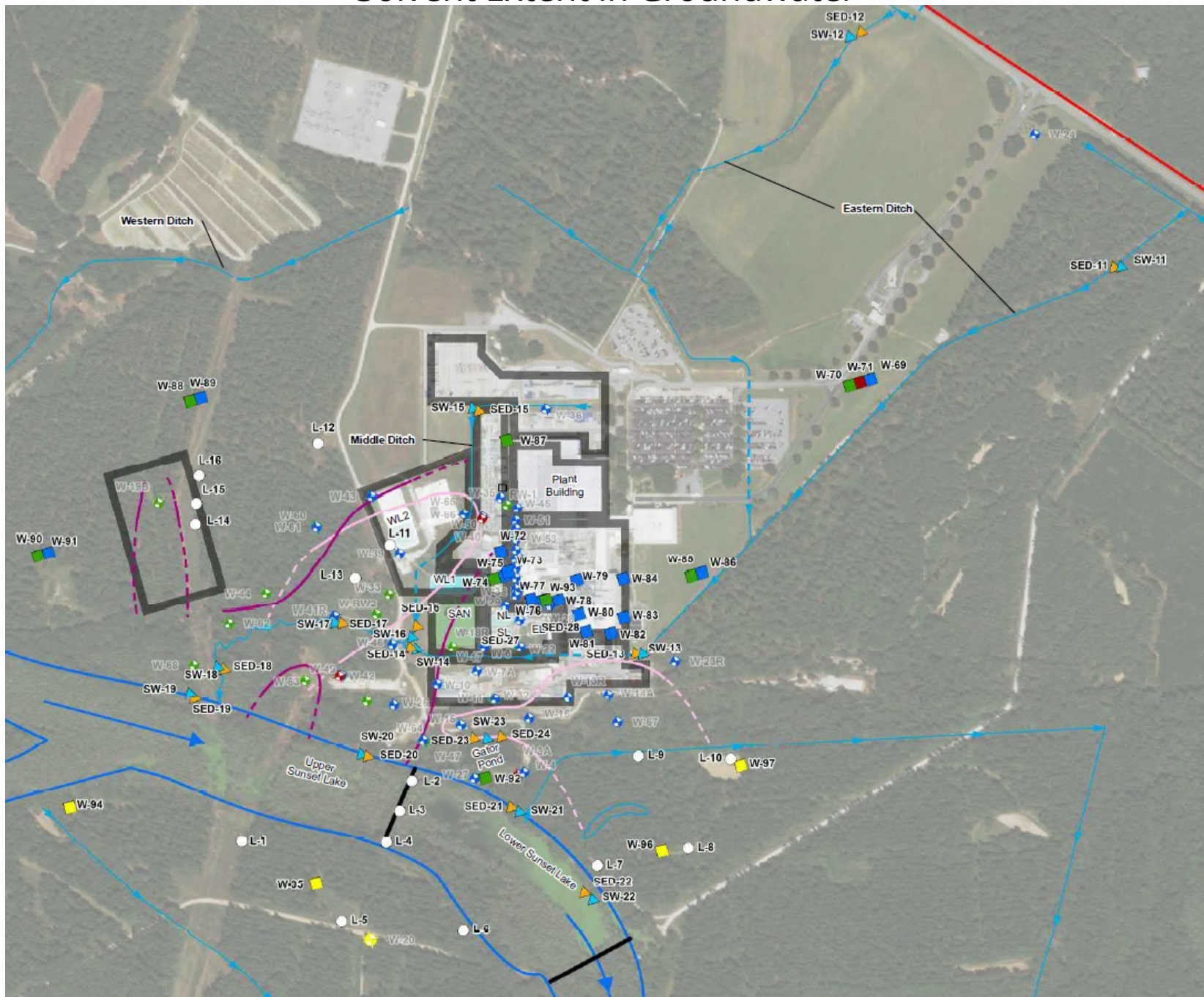
# Known Contaminants In Groundwater

- Nitrate
- Fluoride
- Ammonia
- Solvents-  
Tetrachloroethene (PCE)  
& Trichloroethene (TCE)
- Technetium-99
- Uranium

# Nitrate Extent In Groundwater



# Solvent Extent in Groundwater





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# Consent Agreement

## Executed February 26, 2019

- Establishes a Communication Protocol
- Integrates Investigation of all Past and Current Releases
- Response Mechanism for any Future Release
- Requires Evaluation of Cleanup Alternatives
- Remedial Design
- Remedial Action

# Consent Agreement

Why?

A need to coordinate the individual contaminant release incidents into one broad, comprehensive agreement.

## Consent Agreement

Over the past year, several issues have been reported needing investigation and a path to closure.

- Wastewater line leaks from 2008 and 2011 were reported in early 2018
- Hydrofluoric Acid Station leak through floor discovered and reported summer of 2018

No formal process was in place to investigate and resolve these issues...thus the need for the Consent Agreement





# Consent Agreement

Now there is a comprehensive and consistent process in place to deal with all current and future releases to the environment

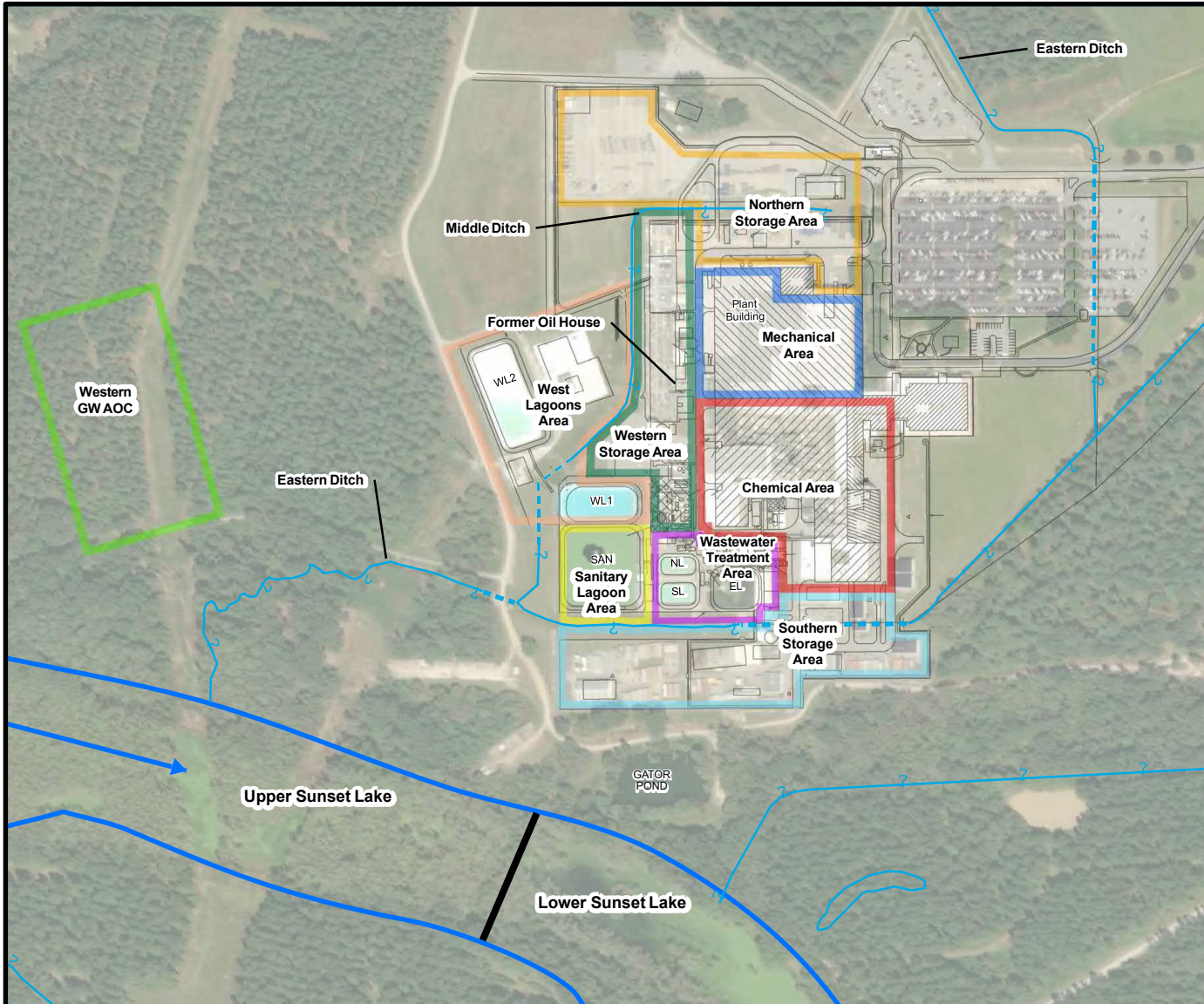


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# Current Investigation

# Remedial Investigation Work Plan – Approved June 19, 2019

- 29 new monitoring wells
- 56 Soil Samples
- 13 Surface Water Samples
- 18 Sediment Samples
- Sampling of all Groundwater Monitoring Wells

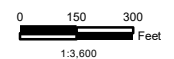


**Legend**

- Ditch
- Culvert
- Mill Creek Flow Direction
- EL East Lagoon
- NL North Lagoon
- SL South Lagoon
- SAN Sanitary Lagoon
- WL1 West Lagoon I
- WL2 West Lagoon II
- Mill Creek
- Dike Location

**Operable Units**

- Chemical Area
- Mechanical Area
- Northern Storage Area
- Sanitary Lagoon Area
- Southern Storage Area
- Wastewater Treatment Area
- West Lagoons Area
- Western Storage Area
- Western GW AOC



Map Projection: NAD 1983, South Carolina State Plane,  
FIPS 3900, Feet  
Datum: North American 1983



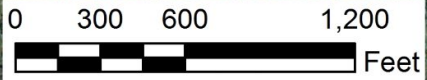
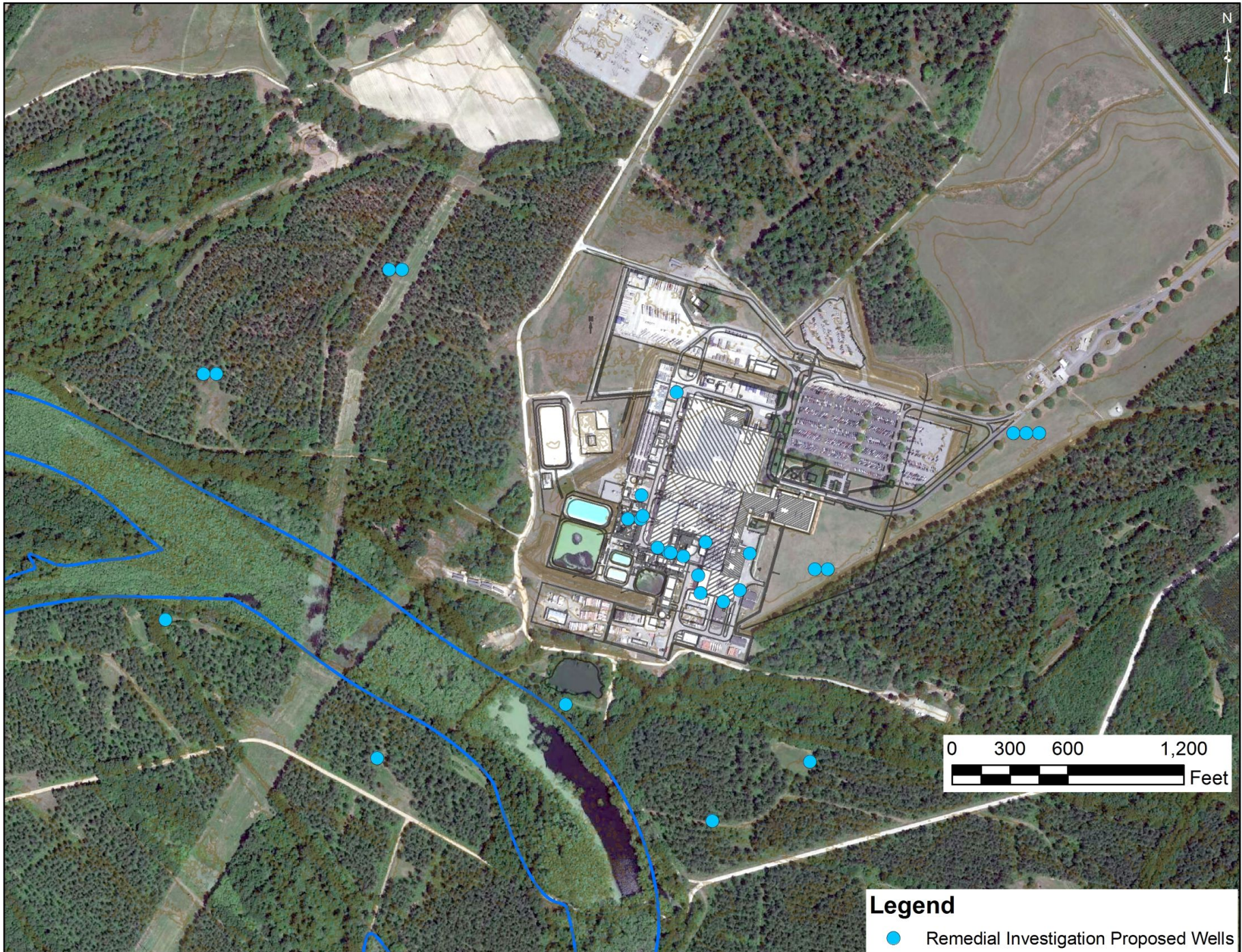
101 Research Drive  
Columbia, SC 29203  
T: (803) 254-4400 F: (803) 771-6676

**Operational Units Map**

WESTINGHOUSE COLUMBIA FUEL FABRICATION FACILITY  
HOPKINS, SOUTH CAROLINA

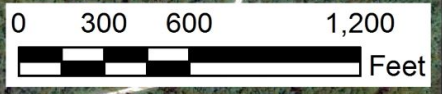
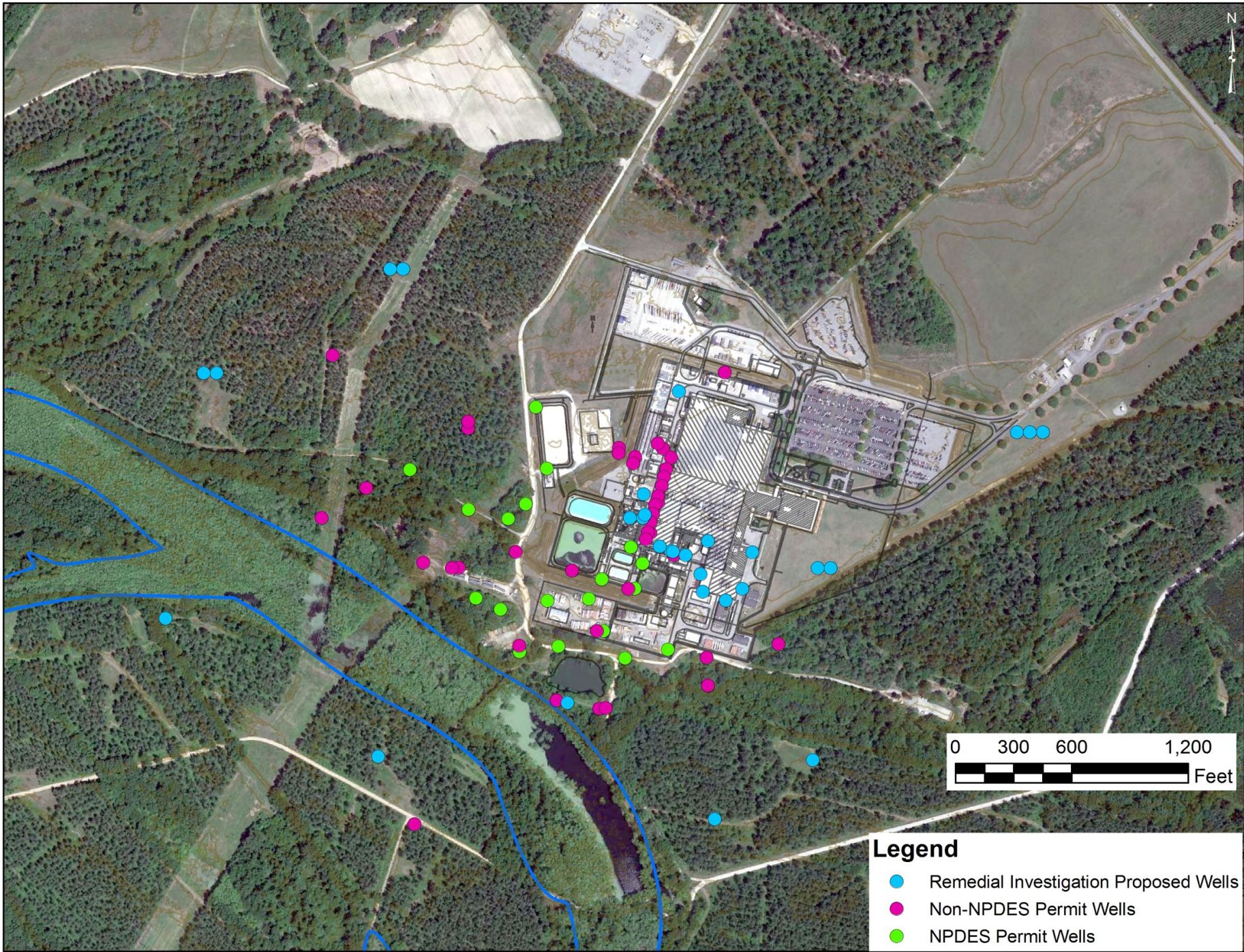
PROJECT NO. 60595649	PREPARED BY LJG	DATE February 2019	<b>FIGURE 4</b>
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Path: M:\EnvData\viz\Westinghouse\mxd\2019\_WCFFF\_RI\_Work\_Plan\OperationUnitsMap.mxd





**Legend**

● Remediation Investigation Proposed Wells



**Legend**

-  Remedial Investigation Proposed Wells
-  Non-NPDES Permit Wells
-  NPDES Permit Wells

# Update

- HF Spiking Station
- Private Well Sampling
- Sea Land Containers

# HF Spiking Station

- A 16 by 12 ft area inside the plant building
- All soil beneath the station has been removed to a depth of 12 feet and filled back in with concrete.
- No evidence that groundwater was effected
- Work is complete





**Legend**

- Shallow Aquifer Monitoring Well Location
- Intermediate Aquifer Monitoring Well Location
- Black Mingo Aquifer Monitoring Well Location
- Ditch
- EL East Lagoon
- NL North Lagoon
- SL South Lagoon
- SW Sanitary Lagoon
- WL1 West Lagoon1
- WL2 West Lagoon2



1:2,760  
 Map Projection NAD 83 South Carolina State Plane,  
 FIPS 3600, Feet  
 Datum North American 1983



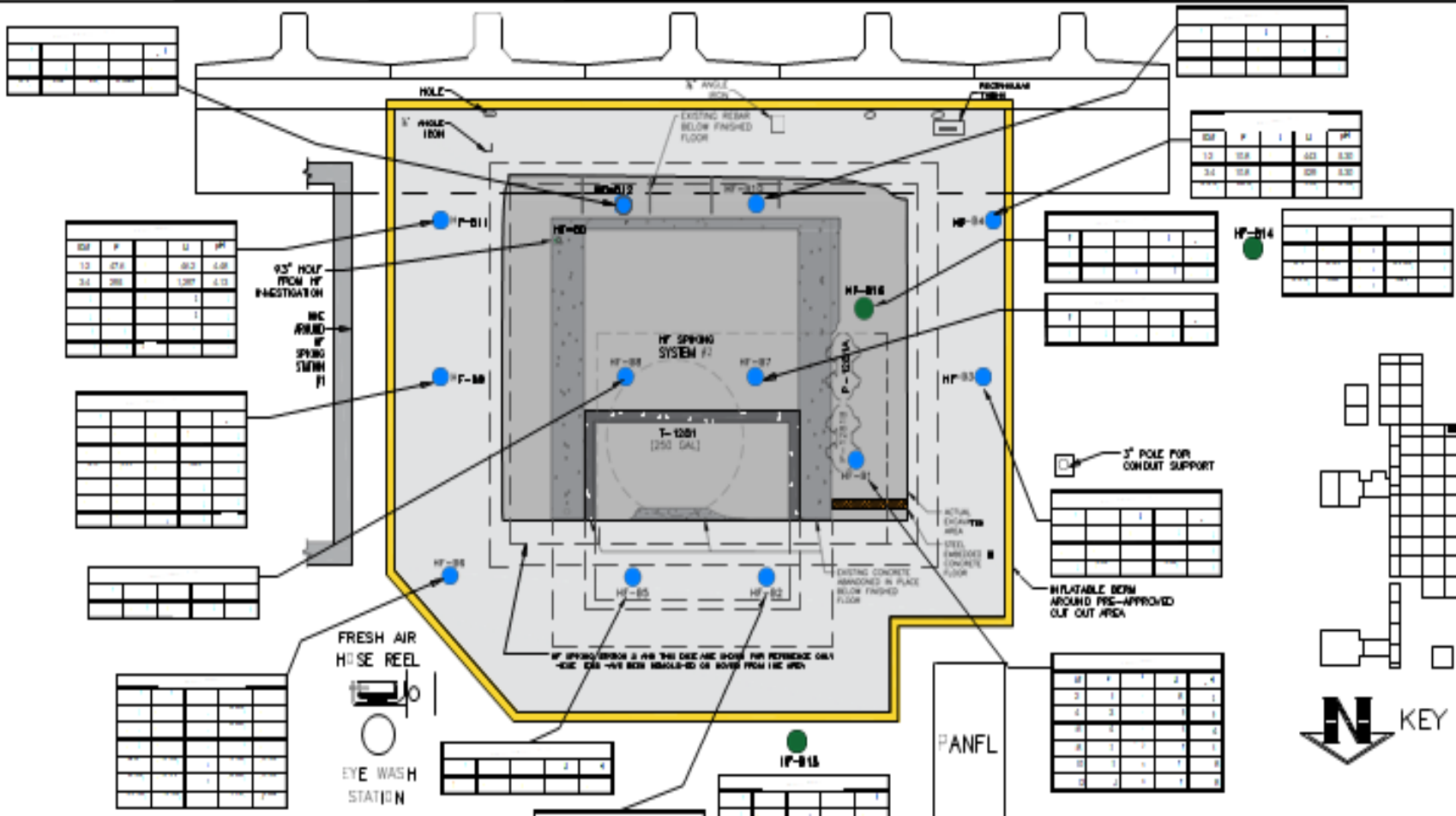
321 Research Drive  
 Columbia, SC 29203  
 1 803 284 4400 F 803 771 6000



**Site Map**

WESTINGHOUSE COLUMBIA FUEL FABRICATION FACILITY  
 HORNING, SOUTH CAROLINA

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

C:\WP5238 WESTINGHOUSE INDUSTRIAL USE ASSESSMENT\J100-0001\J100-0001-B1 (REVISED) SHEET 11.PDF 2/16/2016 1:28:02 PM



LEGEND	
SYMBOL	DESCRIPTION
	Soil sampling locations from DDEC work plan
	Additional soil sampling locations
y	Yield Concentration (mg/g)
w	Water Concentration (mg/g)
U	Uranium Concentration (mg/g)
NA	Not analyzed
J	Concentration is above the critical detection limit but below the reporting limit



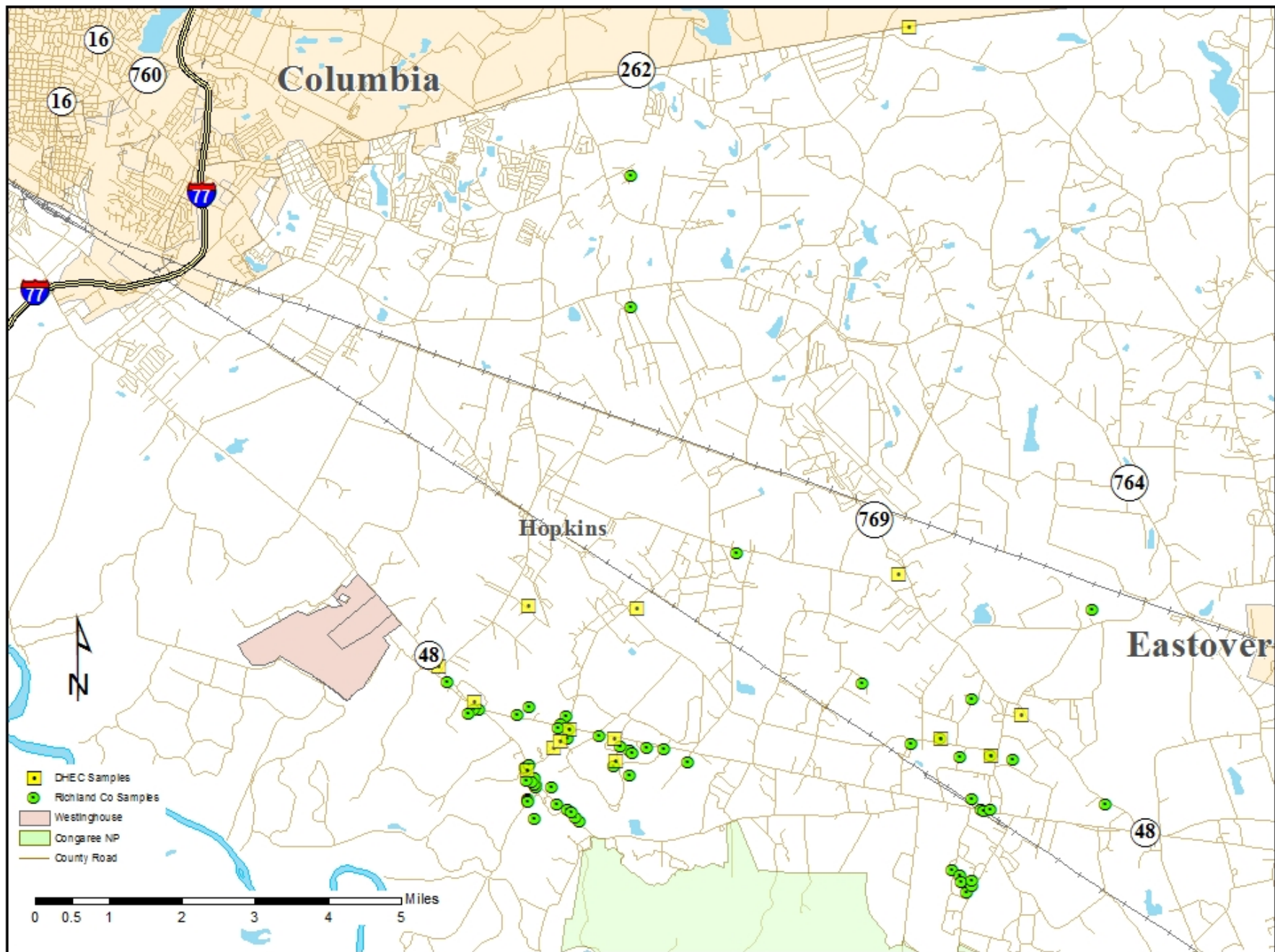
<b>AECOM</b>	101 Research Drive Columbia, South Carolina 29208 Telephone: (803) 251-6800 Fax: (803) 770-6676 <a href="http://www.aecom.com">www.aecom.com</a>		
	<b>Figure 3</b> HF Spiking Station #2 Soil CoC Map		
<b>WESTINGHOUSE COLUMBIA FUEL FABRICATION FACILITY HOPKINS, SOUTH CAROLINA</b>			
PROJECT NO. 407028	PREPARED BY: HSM	CHECKED BY: JG	APPROVED BY: JG
	DATE: NOVEMBER 6, 2016	DATE: NOVEMBER 6, 2016	SHEET 1 OF 1



# Private Well Sampling Summer 2018

- DHEC Sampled 14 Private Wells
- Richland County Sampled 62 Private Wells

None of the wells sampled showed any detection of any contaminant known in the groundwater at Westinghouse



# Sea Land Containers

- Inspection by Westinghouse on 5/31/19 found one with hole in its roof
- Some drums inside were in poor condition. They are filled with materials containing Uranium for recovery – rags mops, etc.
- Inspected all other containers



# Sea Land Containers

- As the Sea Land containers are emptied, the soil beneath them will be sampled.
- This Area is part of the Southern Storage Area included for investigation under the Consent Agreement.



# Drum Incident July 12, 2019



Pictured at left is the drum containing the items that self-ignited. Material on the floor was removed for inspection as part of the analysis of the incident.





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# CONTACT US

[www.scdhec.gov/Westinghouse](http://www.scdhec.gov/Westinghouse)

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