

Cantonment Digester Incident

Preliminary Air and Environmental Monitoring and Sampling Summary

Prepared On Behalf Of:

Unified Command

Prepared By:

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**All Data is Considered Preliminary and Subject to Additional Review*

Introduction

On January 23, 2017, the Center for Toxicology and Environmental Health, LLC (CTEH®) was contacted to initiate personal property assessment, real-time air monitoring, and environmental sampling and monitoring in support of response activities for the Cantonment Digester Incident. All methods and preliminary data summarized here were collected and managed under the direction of the Cantonment Digester Incident Unified Command, composed of representatives of the US Environmental Protection Agency, Florida Department of Environmental Protection, Florida Department of Health, Escambia County, and International Paper. This preliminary data report summarizes samples collected from January 23, 2017 through February 5, 2017.

Real-time Air Monitoring¹

Real-time air monitoring was initiated as a precaution on January 23 in the community to document and quantify levels of sulfur compounds, primarily hydrogen sulfide (H₂S), emanating from the mill digester wood pulp material. All instrumentation was calibrated at least once per day, or per manufacturer’s recommendations. Target analytes were measured as H₂S, dimethyl sulfide (DMS), dimethyl disulfide (DMDS), and methanethiol (methyl mercaptan) using handheld instruments such as RAESystems MultiRAE Pro and Gastec colorimetric detection tubes. **Appendix I** contains real-time air monitoring locations and analytical air sampling locations.

During this monitoring period, no detections of target analytes occurred using hand-held air monitoring equipment. Table 1, presented below, summarizes data for hand-held instruments.

*Table 1: Hand-held Real-time Air Monitoring Summary¹
January 24, 2017 to February 5, 2017*

Analyte	Instrument	No of Readings	Range of Detections ²	Action Level ³
DMDS	Gastec #53	35	< 0.3 ppm	0.5 ppm
DMS	Gastec #53	35	< 0.5 ppm	10 ppm
H ₂ S	MultiRAE Pro	811	< 0.1 ppm	0.2 ppm
H ₂ S	MultiRAE Plus	92	< 1 ppm	5 ppm ⁴
Methanethiol	Gastec #71	16	< 0.1 ppm	0.5 ppm

¹Please Note: The data displayed in the above table has not undergone complete QC analysis and is presented in preliminary format.

²Maximum detections preceded by the “<” symbol are considered non-detections at the limit of detection (LoD) value to the right.

³Action levels represent sustained concentrations for more than 5 minutes that require further investigation. For H₂S, the action level of 0.2 ppm for the community must be sustained for more than one hour to be actionable (per FDOH Health Advisory for H₂S).

⁴A separate action level for workers of 5 ppm H₂S sustained for 5 minutes was employed at ½ of the OSHA Permissible Exposure Limit.

Analytical Air Sampling

Analytical air sampling began on January 25, 2017 to assess concentrations of H₂S and DMS in ambient air in the community. All samples were sent to American Industrial Hygiene Associate (AIHA) accredited laboratories for analysis of H₂S and DMS using laboratory derived analytical methods. Results to date are presented below in Table 2.

¹ Real-time air monitoring provides near instantaneous measurements for concentrations in air without the need for laboratory analysis.

*Table 2: Preliminary Analytical Air Sampling Results Summary¹
January 25, 2017 to January 29, 2017*

Analyte	Location	No of Samples	Max Detection (ppm) ²	Screening Level (ppm) ³
DMS	AS001	3	ND	0.5
	AS002	3	ND	0.5
	AS003	3	ND	0.5
H ₂ S	AS001	4	0.011	0.07
	AS002	4	0.011	0.07
	AS003	4	0.013	0.07

¹Please Note: The data displayed in the above table has not undergone complete QC analysis and is presented in preliminary format

²ND = Analyte was not detected above the method detection limit

³Agency for Toxic Substances Acute Minimal Risk Level for H₂S (1-14 days); Emergency Response Planning Guideline-1 for DMS (1 hour)

Environmental Sampling and Monitoring

- Surface water, sediment, soil, and municipal drinking water sampling as well as surface water quality monitoring were conducted to assess and delineate potential environmental impacts from the Cantonment Digester Incident.
- Two municipal drinking water samples were collected directly from indoor water taps in accordance with standard drinking water sample collection protocols. One sample was collected from a residence in the Cantonment Heights neighborhood, and one sample was collected from the Escambia County Fire and Rescue Station #4 in Cantonment, FL.
- Beta Testing was conducted on two residences in the Cantonment Heights neighborhood to evaluate residential cleaning methods. Rinse water (rinsate) samples were collected for analysis and field testing of pH. An additional water sample was collected for analysis from an outdoors water hose during the residential cleanup Beta Test.
- Soil results include samples collected from the shoulder and median of Highway 29 that were considered in the joint decision from Florida DOT and Florida DEP to leave any residual pulp material in place along the highway without further action.

Samples were submitted to Pace Analytical Laboratories, a NELAC certified laboratory for analysis for pH, sulfide, sulfate, sodium, total organic carbon (TOC) (surface water only), and biological oxygen demand (BOD) (surface water only). Surface water quality parameters (pH, conductivity, dissolved oxygen, turbidity, temperature, oxygen reduction potential, salinity, total dissolved solids) were recorded with each surface water sample using a Horiba U-52 multi-parameter water quality meter.

Analytical and sampling methods are outlined in the Environmental Sampling and Analysis Plan, and residential cleanup confirmation sampling protocols are outlined in the Remedial Action Plan. Table 3 contains a summary of all sample counts collected to date. Table 4 contains a summary of all analytical results to date. **Appendix II** contains a map of environmental surface water, soil, and sediment monitoring locations.

Residential Cleaning Confirmation Sampling

Soil samples were collected from the yards of residential properties to determine the levels of pH, sodium, sulfate, and sulfide remaining in the soil following property cleaning and grass mowing. To date, nine yard soil samples have been analyzed. Results show pH consistent with normal background soil pH and non-detect for sodium, sulfate, and sulfide in six yards, indicating no significant residual impacts from the digester incident in those yards. Confirmatory sampling will be conducted in yards where compounds were detected in excess of action levels. Residential cleaning confirmation sample results are presented below in Table 4.

Non-porous surface wipe samples were collected offsite and from cleaned residential properties to determine the levels of residual sodium, sulfate, and sulfide. Wipe sample results are presented below in Table 4. A map of wipe sampling locations is provided in **Appendix II**.

Post-cleaning residential rinsate water samples were collected from cleaned residential properties to determine the levels of pH, residual sodium, sulfate, and sulfide prior to rinsate disposal in accordance with the Waste Management Plan. Rinsate water sample results are presented below in Table 4. A map of rinsate water sample locations is provided in **Appendix II**.

Residual Pulp Material and Source Material Sampling

A sample of residual pulp material was collected from a rain gutter at [REDACTED] Woodbury Place during washing of the residence. The material was wet and visibly discolored indicating that the material had not undergone complete washing. The sample was analyzed for pH, sodium, sulfate, and sulfide. The results of the analysis showed a pH of 8.5 S.U., a sodium level of 5,570 mg/kg, and no detections of sulfate or sulfide. These results led to rooftops being washed multiple times to ensure that any residual pulp material remaining on rooftops did not contain residual sodium or elevated pH above safe levels.

An additional sample of residual pulp material was collected from five roof tops at [REDACTED] Woodbury Place, [REDACTED] Woodbury Place, [REDACTED] Woodbury Drive, [REDACTED] Woodbury Place, and [REDACTED] Woodbury Circle. The sample was analyzed for pH, sodium, sulfate, and sulfide. The results of the analysis showed a pH of 6.4 S.U., a sodium level of 4,760 mg/kg, and no detections of sulfate or sulfide.

A sample of source material was collected near the digester on the mill site. The sample was analyzed for pH, sodium, sulfate, and sulfide based on the safety data sheet for the material. The results indicated a pH of 9.9, a sodium level of 12,700 mg/L, and no detections of sulfate or sulfide. Despite the absence of sulfate or sulfide detections in the source material, these compounds were included in ongoing analyses in accordance with the Unified Command approved sampling and analysis plans.

Property Impact Assessment

Visual impacts of residual pulp material on properties were assessed to determine the geographical extent of the potential impact offsite from the mill. Approximately 347 properties/parcels have been assessed to date, with 143 properties confirmed as impacted. A map of the assessed locations indicating impact or no impact is provided in **Appendix III**.

Summary of Activities and Results

- To date, the Cantonment Digester Incident response has identified the characteristics of the source material and the residual pulp material potentially impacting properties in the areas near the Pensacola Mill.
- Air monitoring and sampling continues to be performed during cleanup operations to ensure the safety of workers and the community. No concentrations of the target chemicals have been detected above health-based action levels.
- A delineation of potentially impacted properties to be cleaned was completed through visual inspection. Approximately 347 properties were assessed, and 140 residences and 3 businesses have been confirmed as impacted.
- Potential impacts of the indicators of the source material: pH, sodium, sulfate, and sulfide, have been delineated through sampling of background soils, sediments, and surface water in the Cantonment area and compared with the results for samples collected in the areas of potential impact.
- Cleaning procedures were evaluated for their efficacy in eliminating residual pulp material from impacted properties.
- Cleanup is currently in progress on 94 properties with cleaning anticipated to be completed on approximately 12 homes per day. Confirmation soil sampling will be completed on 100% of the cleaned properties.

*Table 3: Environmental Result Count Summary
January 25, 2017 to February 4, 2017*

Sample Type	Matrix	Samples with Results
Beta Test Property Contamination Assessment	Rinsate	3
Property Contamination Assessment	Municipal	1
	Residual Pulp (roof)	1
	Rinsate	15
	Soil	26
	Surface	30
Soil, Source, and Water Sampling	Drinking Water	2
	Residual Pulp	1
	Sediment	94
	Soil	54
	Source Material	1
	Surface Water	96

*Table 4: Environmental Sample Result Summary
January 25, 2017 to February 4, 2017*

Location Type	Matrix	Analyte	Samples with Results	Range of Detections
Beta Test Property Contamination Assessment	Rinsate Water (Beta Test)	BOD, 5 day	3	31.1 - 2,270 mg/L
		pH at 25 °C	3	4.9 - 10 S.U.
		Sodium	3	23.8 - 3,840 mg/L
		Sulfate	3	23.9 - 2,150 mg/L
		Sulfide, Total	3	ND
		Total Organic Carbon	3	84 - 5,740 mg/L
Property Contamination Assessment	Municipal Water	BOD, 5 day	1	76.8 mg/L
		pH (Field)	1	6.00 S.U.
		Sodium	1	2.63 mg/L
		Sulfate	1	ND
		Sulfide, Total	1	ND
		Total Organic Carbon	1	1.4 mg/L
	Residual Pulp (roof)	pH at 25 °C	1	6.4 S.U.
		Sodium	1	4,760 mg/kg
		Sulfate	1	ND
		Sulfide	1	ND
	Rinsate Water	BOD, 5 day	7	13.7 - 84 mg/L
		pH (Field)	15	6.20 - 8.50 S.U.
		Sodium	15	3.38 - 45.1 mg/L
		Sulfate	15	1.8 - 7.1 mg/L
		Sulfide, Total	15	ND
		Total Organic Carbon	15	2.7 - 45.5 mg/L
	Soil	pH at 25 °C	26	4.8 - 8.4 S.U.
		Sodium	26	91.9 - 555 mg/kg
		Sulfate	26	1,080 mg/kg
		Sulfide	26	93.4 mg/kg
	Wipe	pH at 25 °C	30	5.8 - 7.3 S.U.
Sodium		30	185 - 478 Total ug	
Sulfate		30	1 Total mg	
Sulfide, Total		30	ND	
Drinking Water	BOD, 5 day	2	ND	


Location Type	Matrix	Analyte	Samples with Results	Range of Detections
Soil, Source, and Water Sampling		pH (Field)	2	6.50 S.U.
		Sodium	2	3.13 - 3.28 mg/L
		Sulfate	2	ND
		Sulfide	2	0.4 mg/L
		Total Organic Carbon	2	ND
	Residual Pulp	pH at 25 °C	1	8.5 S.U.
		Sodium	1	5,570 mg/kg
		Sulfate	1	ND
		Sulfide	1	ND
	Sediment	pH at 25 °C	94	5.4 - 8.2 S.U.
		Sodium	94	90.2 - 667 mg/kg
		Sulfate	94	684 - 2,960 mg/kg
		Sulfide	94	203 - 2,790 mg/kg
	Soil	pH at 25 °C	54	4.4 - 9 S.U.
		Sodium	54	103 - 2,280 mg/kg
		Sulfate	54	54.7 - 3,400 mg/kg
		Sulfide	54	90 - 134 mg/kg
	Source Material	pH at 25 °C	1	9.9 S.U.
		Sodium	1	12,700 mg/L
		Sulfate	1	ND
Sulfide, Total		1	ND	
Surface Water	BOD, 5 day	44	ND	
	pH (Field)	96	4.03 - 9.11 S.U.	
	Sodium	96	2.74 - 38.4 mg/L	
	Sulfate	96	2 - 61 mg/L	
	Sulfide, Total	96	0.024 mg/L	
	Total Organic Carbon	92	1 - 9.7 mg/L	

ND = Analyte was not detected above the instrument method detection limit.

Appendix I:

Real-Time Air Monitoring and Analytical Air Sampling Locations



 Approximate Incident Location



- Approximate Incident Location
- Analytical Air Sampling Stations

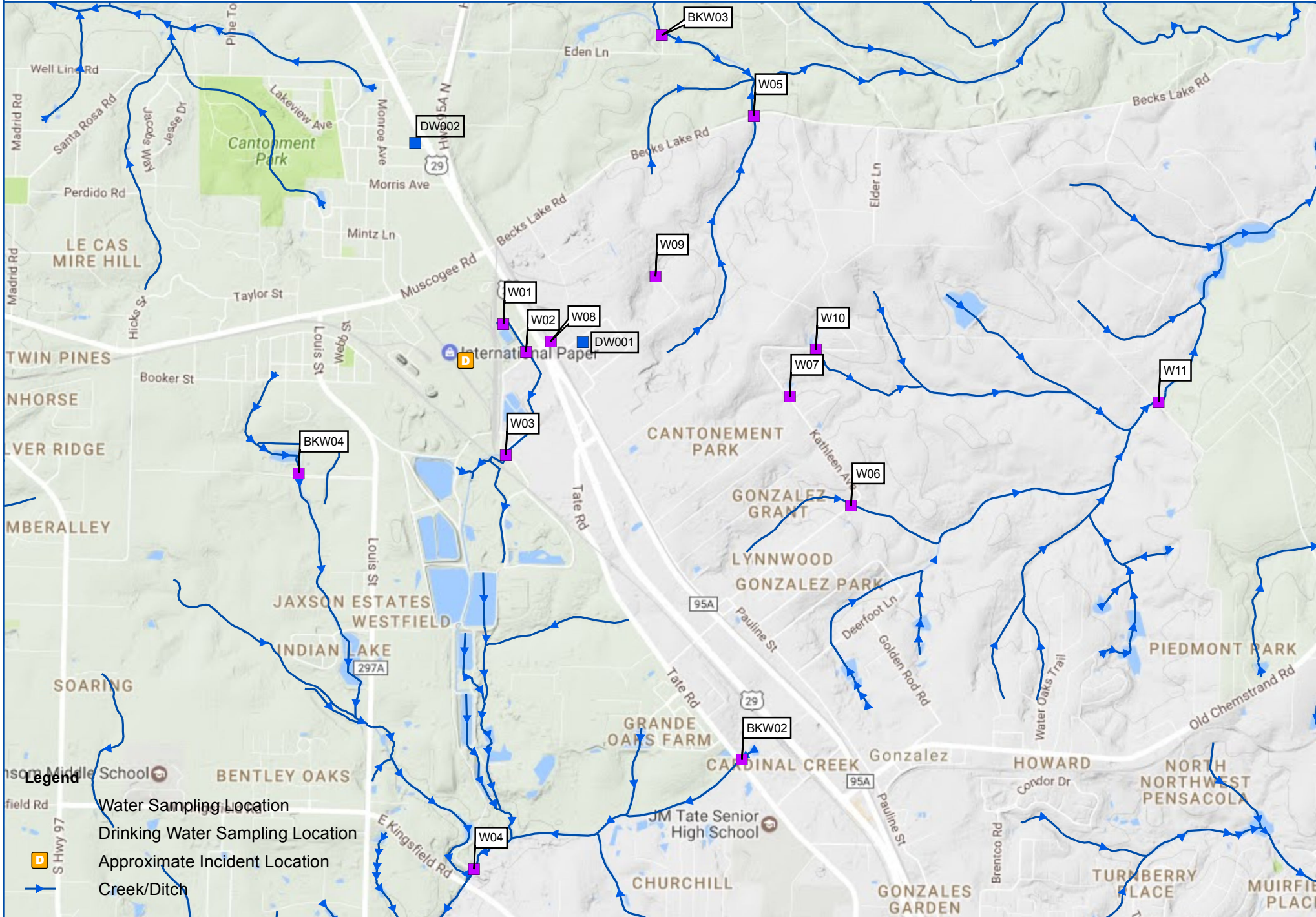


Real-Time Air Monitoring Locations

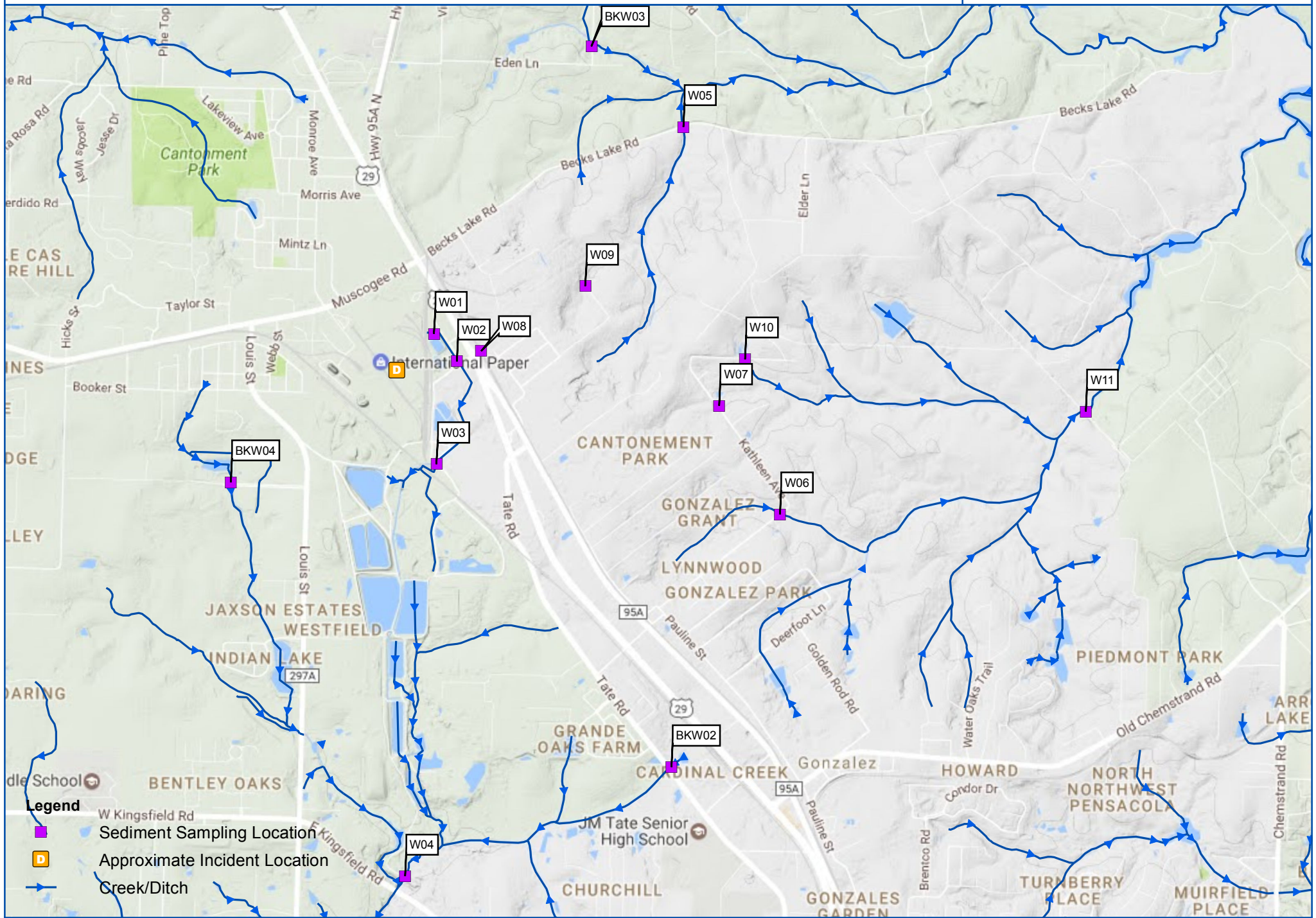
● Non Detection

Appendix II:

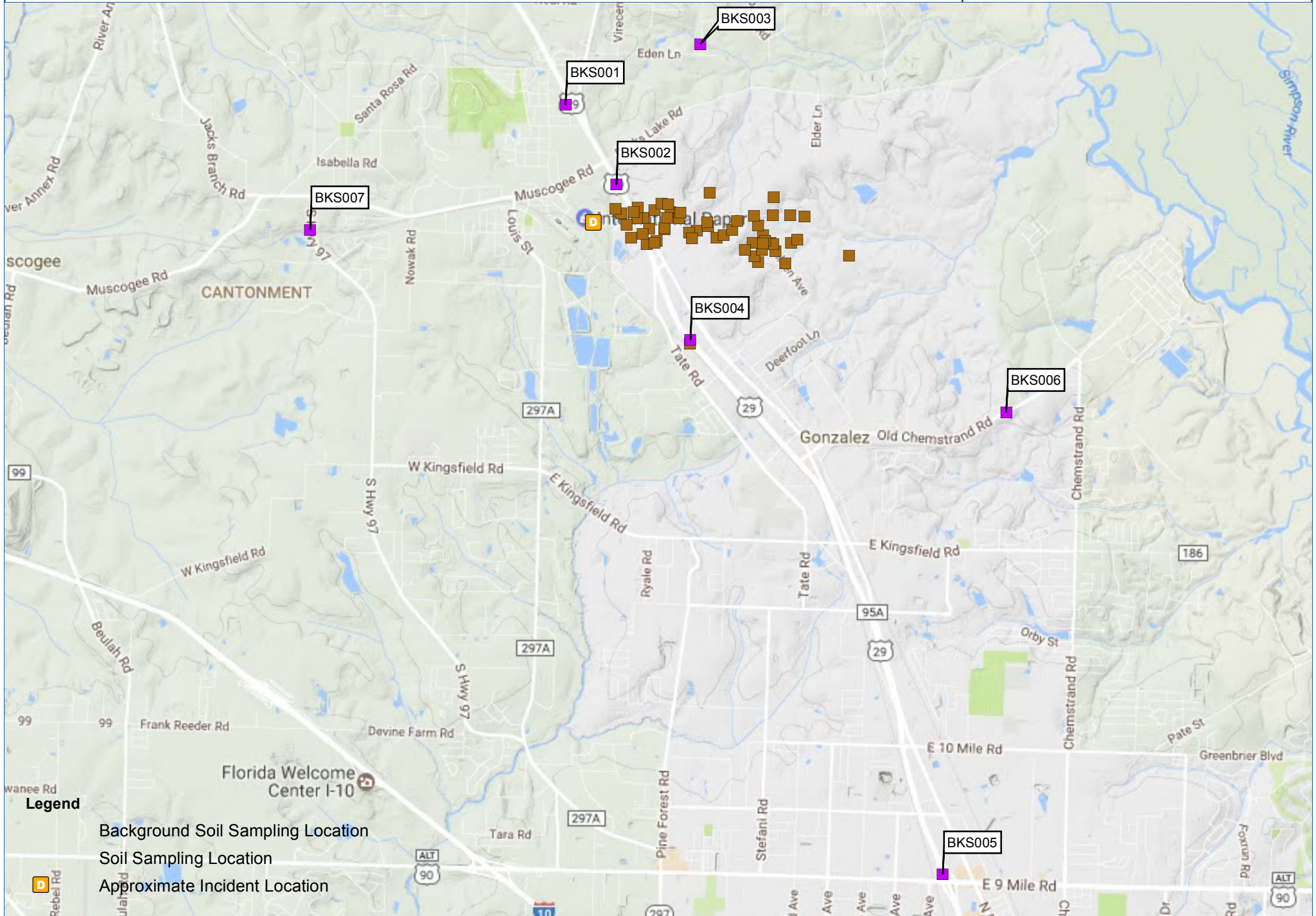
Environmental Monitoring Locations



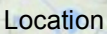

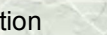
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- Water Sampling Location
 - Drinking Water Sampling Location
 - D Approximate Incident Location
 - Creek/Ditch

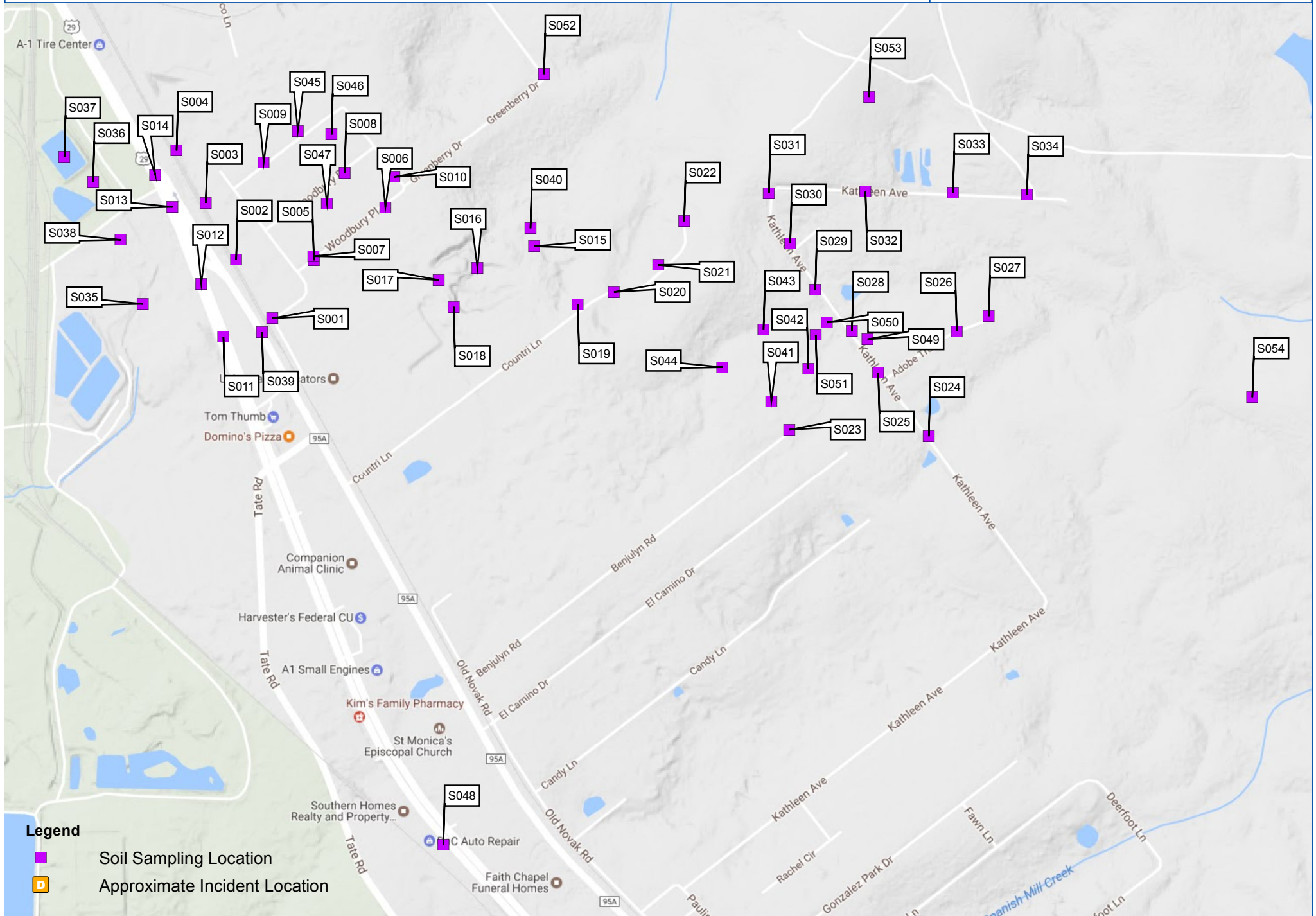


- Legend**
- Sediment Sampling Location
 - Approximate Incident Location
 - Creek/Ditch

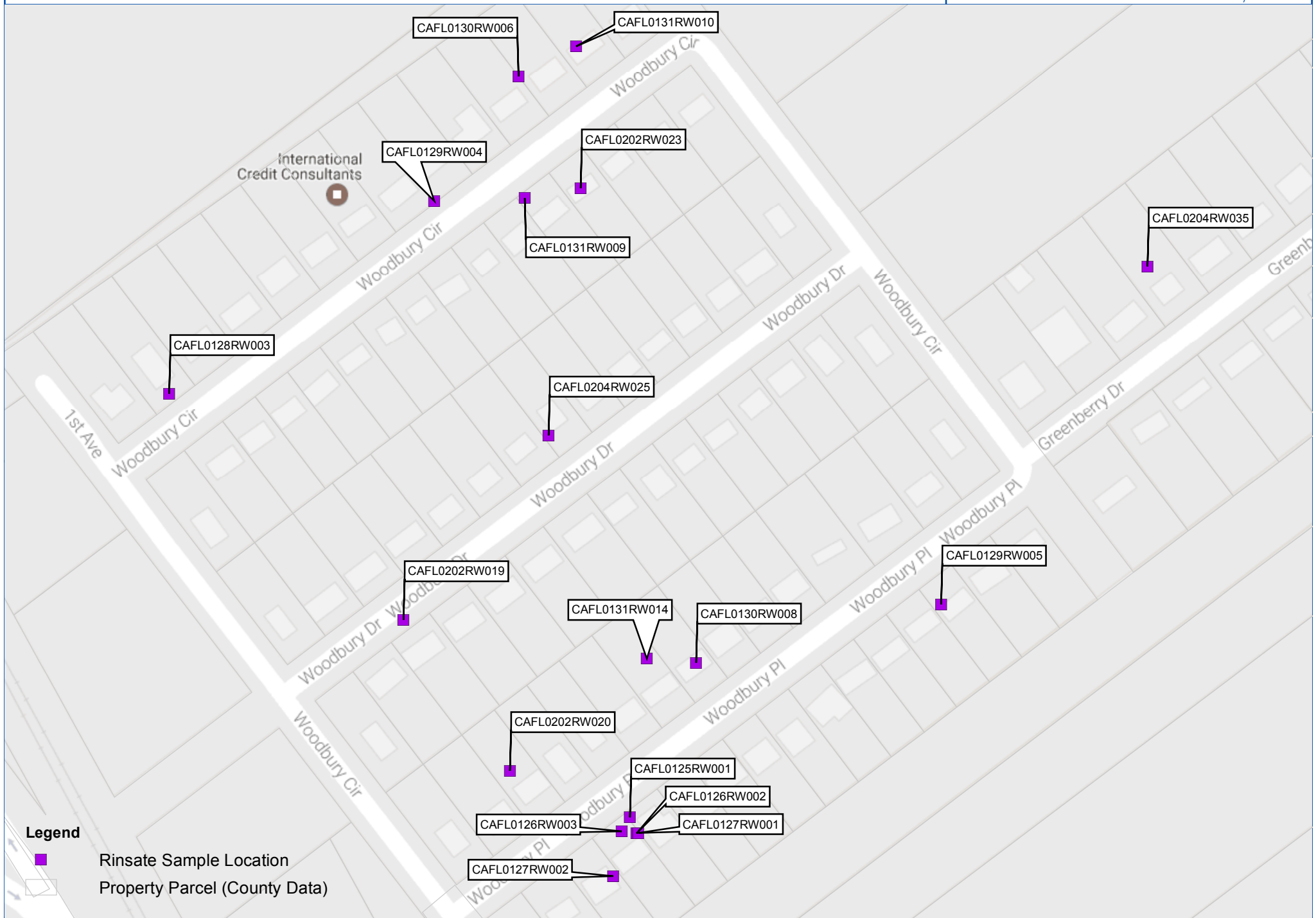


Legend

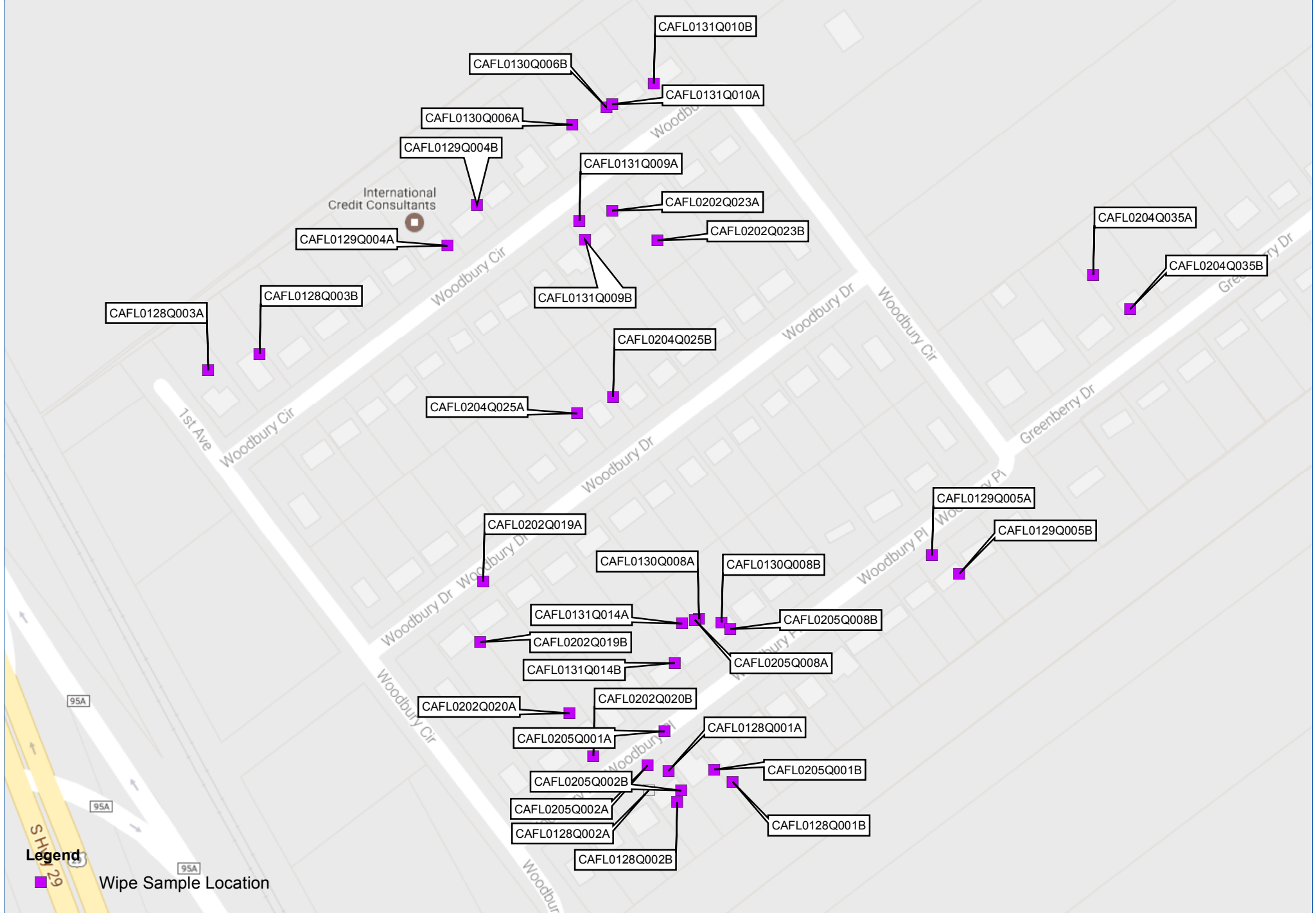
-  Background Soil Sampling Location
-  Soil Sampling Location
-  Approximate Incident Location



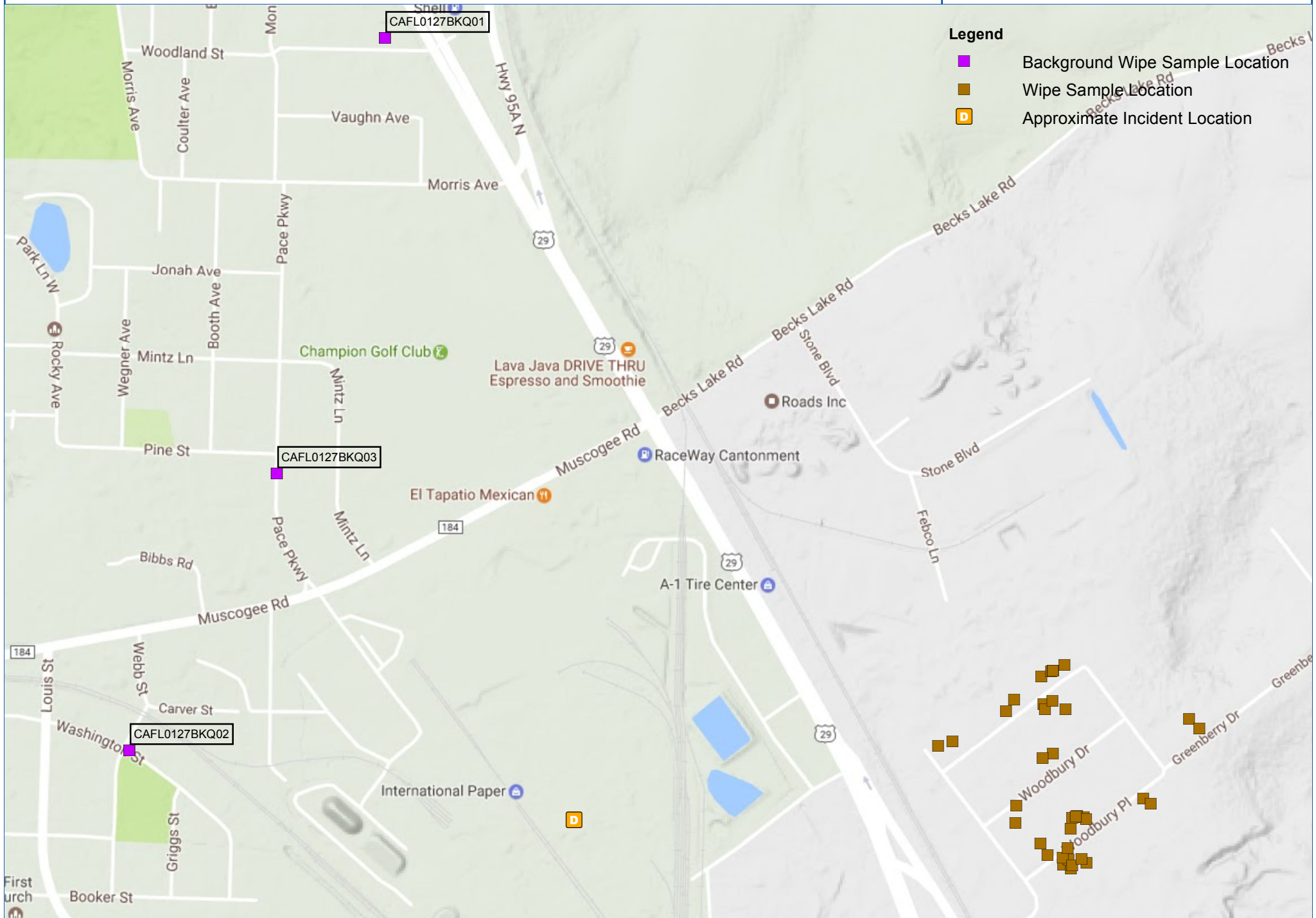
- Legend**
- Soil Sampling Location
 - Approximate Incident Location



- Legend**
- Rinsate Sample Location
 - Property Parcel (County Data)

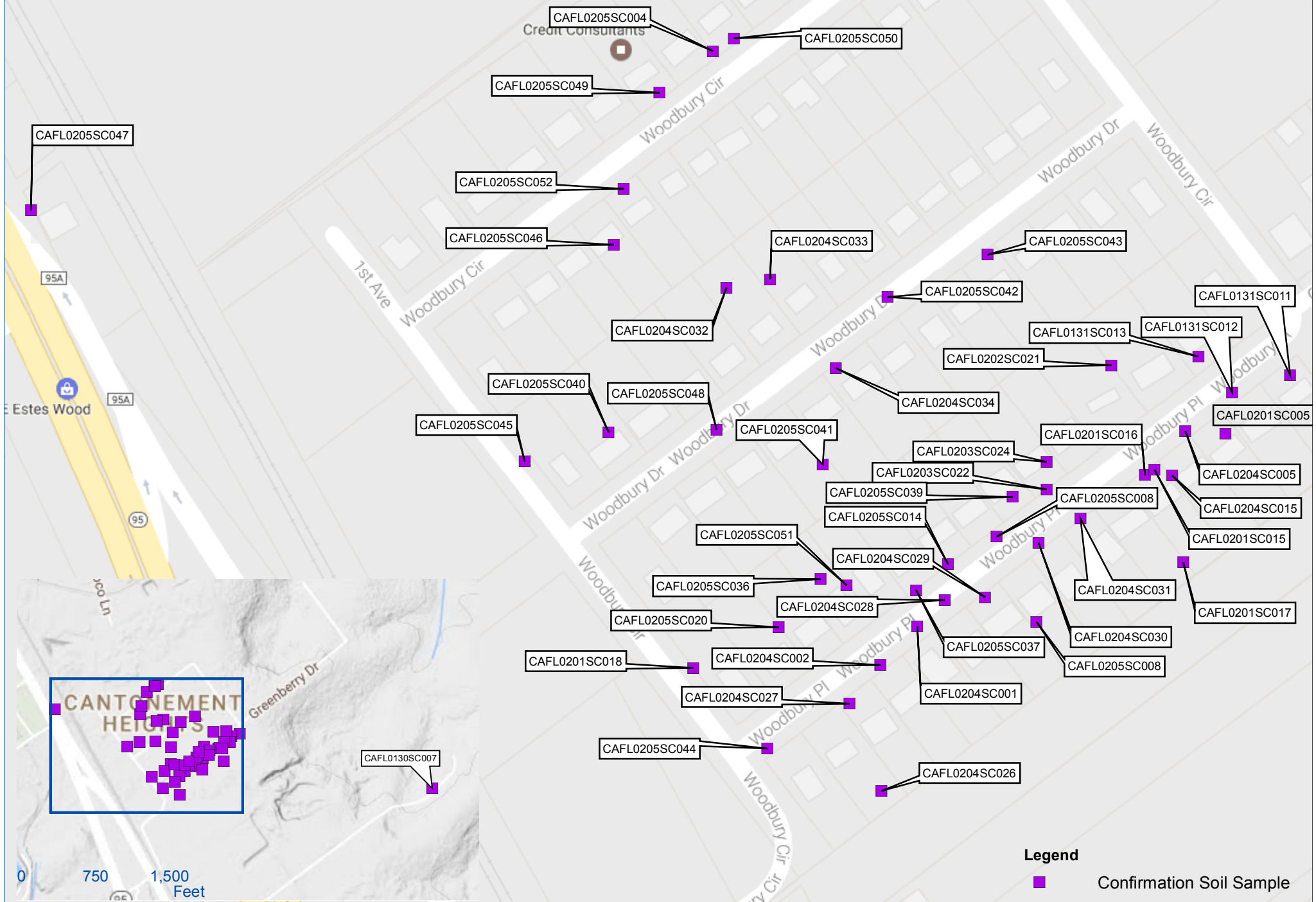


Legend
■ Wipe Sample Location



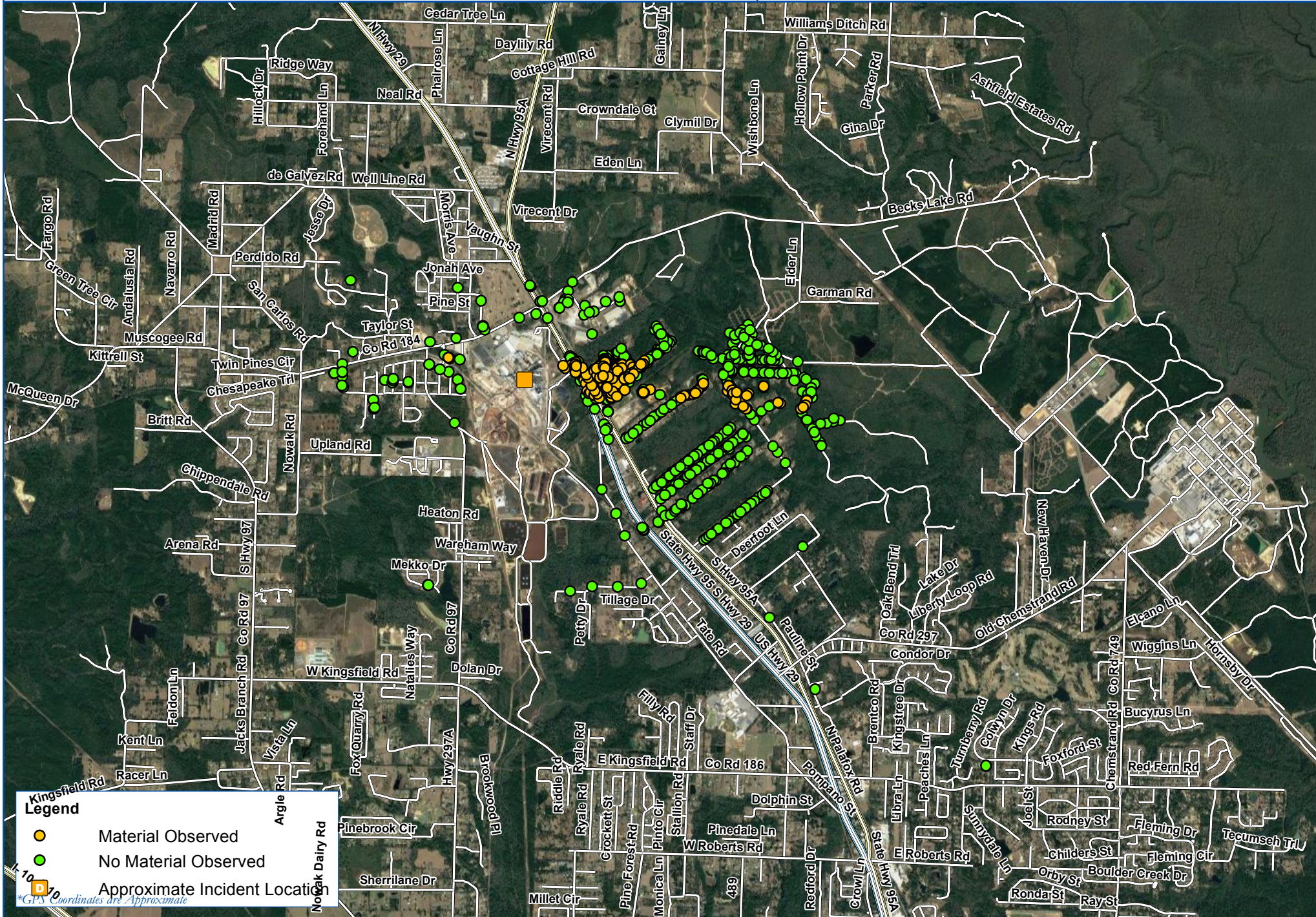
Legend

- Background Wipe Sample Location
- Wipe Sample Location
- Approximate Incident Location



Appendix III:

Property Impact Assessment Map



Legend

- Material Observed
- No Material Observed
- Approximate Incident Location

*GPS Coordinates are Approximate