



# **REMEDIAL INVESTIGATION WORK PLAN ADDENDUM FOR OFF-SITE GROUNDWATER**

**Ardee Translite**

**Shelby, Cleveland County  
North Carolina**

**NCDENR Site ID # NONCD0002881**

*Prepared for:*

Genlyte Thomas Group LLC  
3 Burlington Woods Drive  
Burlington, MA 01803

*Prepared by:*

AECOM North Carolina, Inc.  
701 Corporate Center Drive, Suite 475  
Raleigh, SC 27607

March 2015

REC PROGRAM DOCUMENT CERTIFICATION FORM - PAGE 1 OF 2

IHSB SITE NAME Ardee Translite, 639 Washburn Switch Road, Shelby, NC

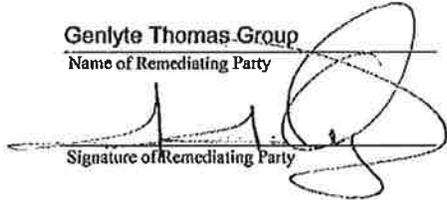
DATE & NAME OF DOCUMENT March 2015/RIWP Addendum & Quarterly Progress Rpt

TYPE OF SUBMITTAL (circle all that apply): Report, Work plan, Work Phase Comp. Statement, Schedule Change

**REMEDIATING PARTY DOCUMENT CERTIFICATION STATEMENT (.0306(B)(2))**

"I certify under penalty of law that I have personally examined and am familiar with the information contained in this submittal, including any and all documents accompanying this certification, and that, based on my inquiry of those individuals immediately responsible for obtaining the information, the material and information contained herein is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for willfully submitting false, inaccurate or incomplete information."

Genlyte Thomas Group  
Name of Remediating Party

  
Signature of Remediating Party

11 MARCH 2015  
Date

**NOTARIZATION**

Pennsylvania (Enter State)

Clinton COUNTY

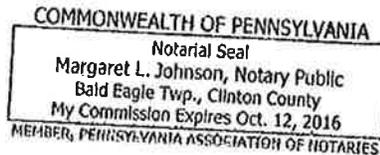
I, Margaret L Johnson, a Notary Public of said County and State, do hereby certify that JESSE J OVERGARD did personally appear and sign before me this day, produced proper identification in the form of PA DL, was duly sworn or affirmed, and declared that, to the best of his or her knowledge and belief, after thorough investigation, the information contained in the above certification is true and accurate, and he or she then signed this Certification in my presence.

WITNESS my hand and official seal this 11 day of MARCH, 2015.

Margaret L Johnson  
Notary Public (signature)

(OFFICIAL SEAL)

My commission expires: 10/12/2016



## Genlyte Thomas Group LLC

---

### POWER OF ATTORNEY

The undersigned, Genlyte Thomas Group LLC, a Delaware limited liability company, having an address at 3000 Minuteman Road, Building One, MS 109, Andover, Massachusetts 01810 ("the Company"), hereby appoints: Jesse Overgard

as attorney-in-fact with authority to do the following in the name of and on behalf of the Company:

- 1) To execute any and all reports, filings, documents, waste manifests, certifications and other documents required to be made by the Company to any third party, including but not limited to, governmental agencies, waste disposal companies, remediation services companies and others, in regard to environmental activities pursuant to the governing laws, rules, regulations, consent orders, and any related permits, for environmental projects conducted by or on behalf of the Company.
- 2) To take any other action of any type whatsoever in connection with the foregoing which, in the opinion of such attorney-in-fact, may be of benefit to, in the best interest of, or legally required on behalf of the undersigned, it being understood that the documents executed by such attorney-in-fact on behalf of the undersigned pursuant to this Power of Attorney shall be in such form and shall contain such terms and conditions as such attorney-in-fact may approve in such attorney-in-fact's discretion.

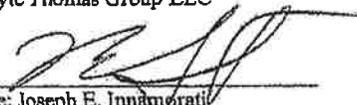
The undersigned hereby grants to such attorney-in-fact full power and authority to do and perform any and every act and thing whatsoever necessary or proper to be done in the exercise of any of the rights and powers herein granted, as fully as the undersigned might or could do if personally present, hereby ratifying and confirming all that such attorney-in-fact, shall lawfully do or cause to be done by virtue of this Power of Attorney and the rights and powers herein granted.

Local, State and Federal agencies and other third parties are authorized to rely on a photocopy or facsimile of this Power of Attorney to the same extent as the original.

This Power of Attorney shall remain in full force and effect until revoked in writing.

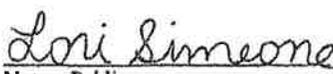
IN WITNESS WHEREOF, the undersigned has caused this Power of Attorney to be executed on September 12, 2013.

Genlyte Thomas Group LLC

By:   
Name: Joseph E. Innamorati  
Title: Vice President

LOUI SIMONE  
NOTARY PUBLIC  
CONNECTICUT  
MY COMMISSION EXPIRES  
03/31/2018

Sworn to and Subscribed Before Me  
On this 12th day of September, 2013.

  
Lori Simone  
Notary Public



3000 Minuteman Road, Building One  
Andover, MA 01810

978-659-4836  
joseph.innamorati@philips.com



**REGISTERED SITE MANAGER CERTIFICATION OF SIGNATURES**

As the Registered Environmental Consultant for the Site for which this filing is made, I certify that the signatures included herewith are genuine and authentic original handwritten signatures and/or true, accurate, and complete copies of the genuine and authentic original handwritten signatures of the persons who purport to sign for this filing. I further certify that I have collected through reliable means the originals and/or copies of said signatures from the persons authorized to sign for this filing who, in fact, signed the originals thereof. Those persons and I understand and agree that any copies of signatures have the same legally binding effect as original handwritten signatures, and I certify that any person for whom I am submitting a copy of their signature has provided me with their express consent to submit said copy. Additionally, I certify that I am authorized to attest to the genuineness and authenticity of the signatures, both originals and any copies, being submitted herewith and that by signing below, I do in fact attest to the genuineness and authenticity of all the signatures, both originals and copies, being submitted for this filing.

David R. Oliphant

Name of Registered Site Manager

*David R. Oliphant*

Signature of Registered Site Manager

3-11-15

Date

**REGISTERED SITE MANAGER DOCUMENT CERTIFICATION STATEMENT (.0306(b)(1))**

"I certify under penalty of law that I am personally familiar with the information contained in this submittal, including any and all supporting documents accompanying this certification, and that the material and information contained herein is, to the best of my knowledge and belief, true, accurate and complete and complies with the Inactive Hazardous Sites Response Act G.S. 130A-310, et seq, and the remedial action program Rules 15A NCAC 13C .0300. I am aware that there are significant penalties for willfully submitting false, inaccurate or incomplete information."

David R. Oliphant

Name of Registered Site Manager

*David R. Oliphant*

Signature of Registered Site Manager

3-11-15

Date

**NOTARIZATION**

South Carolina (Enter State)

Greenville COUNTY

I, Catherine R Greer, a Notary Public of said County and State, do hereby certify that David R Oliphant did personally appear and sign before me this day, produced proper identification in the form of SC Driver license, was duly sworn or affirmed, and declared that, he or she is the duly authorized environmental consultant of the remediating party of the property referenced above and that, to the best of his or her knowledge and belief, after thorough investigation, the information contained in the above certifications is true and accurate, and he or she then signed these Certifications in my presence.

WITNESS my hand and official seal this 11<sup>th</sup> day of March, 2015.

*Catherine R Greer*  
Notary Public (signature)

My commission expires: 9/29/16.



# REMEDIAL INVESTIGATION WORK PLAN ADDENDUM FOR OFF-SITE GROUNDWATER

March 2015

*David R Oliphant*

Prepared By Dave Oliphant, CHMM/RSM

*Mark Hartford*

Reviewed By Mark Hartford, PG



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## **1.0 INTRODUCTION**

### **1.1 Background and Overview**

A (combined) Phase I (and Phase II) Remedial Investigation Work Plan (RIWP) was completed in September 2013 by AECOM North Carolina, Inc. (AECOM), on behalf of the Genlyte Thomas Group (Genlyte Thomas), for the Ardee Translite facility, located at 639 Washburn Switch Road, Shelby, Cleveland County, North Carolina (the "Site"). The RIWP was prepared in accordance with the requirements of the North Carolina Inactive Hazardous Waste Site rules (15A NCAC 13C) and follows the procedures provided in the most recent guidance documents available at that time (NCDENR, 2012). This guidance document was developed by the North Carolina Department of Environment and Natural Resources (NCDENR), Division of Waste Management (DWM) Superfund Section, Inactive Hazardous Sites Branch (IHSB).

The combined document (RIWP) of September 2013 contains the following:

- Investigation Objectives (Section 1.2 of RIWP)
- Summary of Data Gaps from Previous Investigations (Section 1.3 of RIWP)
- Site Description and Background Information (Sections 2.1 through 2.13 of RIWP)
- Summary of partial Phase I Remedial Investigation (RI) Results and Delineation to Date (Section 2.14 of RIWP)
- Sampling Rationale and Locations (Section 3.1 of RIWP)
- Sample Collection Procedures and Methods (Section 3.2 of RIWP)
- Field and Laboratory Procedures (Section 3.3 of RIWP)

The RIWP was implemented during field activities performed in October and November 2013. Resampling of several of the existing wells and some of the wells installed in October/November 2013, along with some additional soil sampling, was performed on December 16, 2013.

As a result of those investigations, a few data gaps were identified with respect to delineation of the groundwater impact at the facility. A second work plan, denoted as the RI Work Plan Addendum, was developed in April 2014 and submitted to the NCDENR IHSB. Field work was performed from May through September 2014. The data gaps on site were addressed. However, it was determined that the groundwater plume containing 1,1-dichloroethene (DCE)

and 1,4-dioxane had migrated off site. Therefore, this RI Work Plan (RIWP) Addendum for Off-Site Groundwater was developed.

## **1.2 Purpose of this RIWP Addendum for Off-Site Groundwater**

This RIWP Addendum for Off-Site Groundwater addresses the following identified data gaps regarding delineation of the groundwater plume:

- Further delineate the horizontal extent of constituent exceedences of the North Carolina 2L groundwater standards for the groundwater plume off site, further downgradient of wells MW-17 and MW-17D.
- Further delineate in saprolite, transition zone, and bedrock (if needed) the vertical extent of constituent exceedences of the North Carolina 2L groundwater standards for the groundwater plume, further downgradient of wells MW-17 and MW-17D.

## **1.3 Document Organization**

This RIWP Addendum for Off-Site Groundwater has been organized as follows:

- Section 1 – Introduction
- Section 2 – Summary of Groundwater Plume Data from Former Aboveground Tank Area
- Section 3 – Methods of Additional Investigation

## **2.0 SUMMARY OF GROUNDWATER PLUME DATA FROM FORMER ABOVEGROUND TANK AREA**

In this section, the site description and background information are briefly summarized. Groundwater data to date are discussed.

### **2.1 Site Description**

The Ardee Translite Site is located at 639 Washburn Switch Road, Shelby, Cleveland County, North Carolina at the location shown in Figure 2-1. The property is currently owned by Genlyte Thomas and occupied by Ardee Translite. It previously was used for assembly of lighting fixtures, sheet metal fabrication, warehousing, and administrative functions, but operations were shut down and the building vacated in June 2014. The Site is developed with one 126,000 square foot building, of which approximately 23,200 square feet is office space, on an approximately 37-acre tract. Approximately 5.4 acres of the tract are developed. The current facility was constructed in 1960.

### **2.2 Background Information**

Historical records indicate that an aboveground storage tank (AST) for storing 1,1,1-trichloroethane (TCA) was installed in 1986 just outside the south side of the building on the edge of the paved parking lot (Figure 2-2). This solvent reportedly was used from 1986 to 1993 as a degreaser. In about 1993, TCE replaced 1,1,1-TCA as the degreaser solvent. An in-line vapor degreaser was situated just inside the building inside a concrete sump area. As part of the facility's lighting manufacturing process at that time, steel or aluminum was received in rolls, uncoiled, and then stamped, pressed, and formed into required shapes for decorative lighting. These fabricated metal parts were hung on steel hooks on a conveyor line and were transported through the on-line vapor degreaser and then through a paint dip tank. Then, the parts were spray painted if necessary and passed through two electric drying ovens. The degreaser reportedly had a 55-gallon solvent capacity with a 55-gallon reserve tank. This process, using TCE as the degreaser, was operating at the time of a June 1996 environmental assessment site visit. Vapor degreasing operations reportedly were discontinued by 2001, and painting operations ceased by 2003, although a small paint booth was still present in December 2004 for small touch up painting. Current Ardee Translite facility personnel stated in July 2003 that no degreasing operations have been conducted since the early 2000s, and no painting operations other than touch up with an aerosol paint can have been performed on site since the mid-2000s.

### **2.3 Adjacent Property Owners**

Table 2-1 shows the names and addresses of adjacent property owners and additional owners further downgradient between Washburn Switch Road and the point where Artee Road crosses

the unnamed creek. As indicated, many but not all of the downgradient parcels are owned by the North Carolina Department of Transportation (NCDOT), who is constructing the Highway 74 bypass downgradient of the Ardee Translite site.

## **2.4 Summary of Phase I RI Groundwater Data and Delineation to Date**

Well construction details from past assessment events are shown in Table 2-2. Vertical gradients on site are shown in Table 2-3. Field parameters are summarized in Table 2-4.

### **2.4.1 Constituents of Concern for the Site**

The constituents of concern in groundwater present at the site include the following:

- Volatile Organic Compounds (VOCs): Chlorinated solvent VOCs, consisting of 1,1,1-TCA, trichloroethene (TCE), and tetrachloroethene (PCE) and their degradation products or con-constituents (particularly degradation product 1,1-DCE or co-constituent 1,4-dioxane). The two main constituents detected off site to date exceeding the NC 2L Standards are 1,1-DCE and 1,4-dioxane. Two other constituents (1,2-dichloroethane [DCA] and tetrachloroethene [PCE]), slightly exceeded the 2L standard. The only off-site exceedences occurred at well MW-17D, a deep saprolite well screened from 65 to 70 below ground surface (bgs).

### **2.4.2 Groundwater Flow Direction at the Site**

The latest site-wide water level monitoring was performed on September 8, 2014. The potentiometric map for that date for the shallow aquifer is shown in Figures 2-2. Groundwater flow from the Site is to the southwest toward Artee Road and the unnamed creek that borders the western side of the Site. Artee Road crosses this unnamed creek downstream of existing well MW-13. Based on the topography of the site, there could be a groundwater divide to the east of the Site along Washburn Switch Road. See further discussion in Section 2.4.3 below.

### **2.4.3 Horizontal and Vertical Extent of Hazardous Substance Releases**

Figures 2-3 and 2-4 show the concentrations and groundwater plumes for 1,1-DCE and 1,4-dioxane, respectively. As indicated in those two figures, a groundwater plume has migrated on site from the area of the former 1,1,1-TCA AST to the south-southwest to well MW-11, located at the southern property boundary (edge of parking lot next to the wooded area). The plume then has migrated horizontally and vertically off site, where it is not detected above the 2L standards in groundwater at shallow saprolite wells MW-14, MW-15, or MW-17; these wells are screened from 25 to 35 feet bgs. However, exceedences of the 2 L standards have occurred at deep saprolite well MW-17D (65 to 70 feet bgs), as follows:

- 1,1-DCE at 400 ug/L (2L standard is 350 ug/L and federal standard is 7 ug/L)
- 1,4-dioxane at 313 ug/L (2L standard is 3 ug/L; no federal standard)
- 1,2-DCA at 2.3 ug/L (2L standard is 0.4 ug/L)
- PCE at 1.8 ug/L (2L standard is 0.7 ug/L and federal standard is 5 ug/L)

As shown in Table 2-3, there is a slightly downward vertical gradient at the well MW-17 cluster. All of the five clustered wells on site show a downward gradient.

As shown in Figures 2-3 and 2-4, the plume has not migrated laterally in the shallow saprolite (to the west or the east) from the former 1,1,1-TCA tank area next to the building, as evidenced by non-detections at well MW-8, and only slight detections at wells MW-3, MW-4, and MW-8 for 1,1-DCE. It appears to be a narrow plume heading to the MW-17 area, and data indicate that the plume has not crossed the divide and migrated toward Washburn Switch Road. The plume likely follows the topographic surface contours toward the area where Ardee Road crosses Town Creek to the southwest of the Site.

## **2.5 Remaining Area of Concern and Data Gaps**

Based on the analytical data, the following area of concern and data gaps at the Site still remain:

- Further horizontal delineation of the off-site groundwater plume beyond the well MW-17/MW-17D area
- Further vertical delineation of the off-site plume in the deep saprolite, transition zone, and/or bedrock (as necessary) downgradient of the well MW-17/MW-17D area.

The proposed additional off-site investigation for this area is discussed in Section 3.0.

### **3.0 METHODS OF ADDITIONAL INVESTIGATION**

Section 3.1 provides the rationale for delineation of the off-site horizontal and vertical extent of VOCs in groundwater. Sections 3.2 through 3.6 reference the RI Work Plan for standard procedures to be followed during future sampling and monitoring events. A preliminary schedule is discussed in Section 3.7.

#### **3.1 Sampling Rationale and Locations [.0306(g)(14) and (15)]**

Approximate locations for additional off-site groundwater sampling in relation to the various property tracts are shown in Figure 3-1. Some of these are contingent samples and will only be installed if needed to define the horizontal and/or vertical extent of contamination. Table 3-1 shows the sample nomenclature and parameters which will be analyzed. Three separate areas are targeted as shown in Figure 3-2. Also, Figure 3-1 shows the location of a paired transition zone or bedrock well with well MW-8.

(a) Area Between Power Lines and Woods: Approximately 7 locations, some with two depths, are indicated at locations shown in Figure 3-1. The nomenclature is TW/MW, depending on whether or not a permanent well is installed. Locations are points 18 through 22, about 200 feet apart and downgradient of MW-17-MW-17D. A contingent location 23, to the north of either point 22 or point 23, could be installed, depending on whether any 2L exceedences are detected. All samples will be either on NCDOT property or on the easement for the parcel owned by Mr. George Doggett. Genlyte Thomas has a signed easement access approval with NCDOT and a signed access agreement with Mr. Doggett.

(b) Area Along or Adjacent to Artee Road: These locations will only be temporary wells, with groundwater sampled either through 1" slotted PVC screen or with a screen point sampler. Location 24 could have up to two discrete depth; location 25 would be as close to the creek as safely possible with only one depth. Points 26, 27, 28, and 29 are contingent locations for a later mobilization if 2L exceedences are found at either point 24 or 25.

(c) Unnamed Creek Where Artee Road Crosses: Surface water and sediment sampling will occur, if these points can be accessed safely, a one location upstream of the point where Artee Road crosses the creek and at one location downstream of the crossing. Samples will be collected from NCDOT property and not from land privately owned.

In addition, one on-site location is targeted for the follow up phase for a deep saprolite/transition zone well:

(d) Paired Well near Clean Saprolite Well MW-8: The purpose of this well is to confirm that deep saprolite or transition zone groundwater is not impacted in this area, from the groundwater divide that likely is occurring at the site. This well will be denoted as MW-8D.

## **3.2 Sample Collection Procedures and Methods**

### **3.2.1 Monitoring Well Installation Methods**

Shallow groundwater monitoring wells will be installed using Geoprobe or hollow stem auger drilling methods with possible supplemental air rotary drill out if the well enters the PWR zone. Each saprolite or PWR well will be constructed as a Type II well with 2-inch diameter PVC casings and 10-foot long PVC screens. Shallow wells will be used to monitor the shallow or intermediate saprolite zone. The maximum depth of the shallow wells will be approximately 40 feet bgs. For the locations along Artee Road, only temporary wells will be installed. Borings will be abandoned by grouting to the ground surface on the same day as the sampling is performed.

Deep monitoring wells in the bedrock or transition zone will be constructed as Type III wells with inner and outer casings. A combination of hollow stem auger and air rotary drilling methods will be used to install a 6-inch diameter outer casing grouted at least five feet into competent bedrock. The borehole will then be advanced into competent rock below the outer casing using air rotary drilling methods. Drilling will continue until one or more water-bearing fracture zones are encountered. The inner well casings will consist of PVC materials and a 5-foot or 10-foot PVC screen will be used. Total depths of the deeper wells are estimated to range from 55 feet to 80 feet bgs, depending on depths to top of bedrock and fracture depths. Bedrock could be more shallow near the creek.

After well construction is completed, most likely with a surface completion and well vault, each new well will be developed by pumping and/or surge block methods to remove sediment and develop the well sand pack around the screens. Purge water will be contained in metal DOT-rated drums pending analysis and off-site disposal. The top each well and adjacent ground surface will be surveyed for elevation and location by a professional land surveyor.

### **3.2.2 Groundwater Sampling Procedures**

After the wells are completed, they will be gauged for water levels and sampled. The groundwater samples will be collected using low-flow purging and sampling technique in accordance with the EPA standard operation procedures (SOPs). Prior to sampling, static groundwater elevation measurements will be recorded from each monitoring well. Field water quality parameters of pH, dissolved oxygen, specific conductance, temperature, and oxidation reduction potential (ORP) will be measured during purging and sampling. .

## **3.3 Field and Laboratory Procedures [.0306(g)(16)]**

In order to preserve sample integrity, samples will be collected in the appropriate containers, preserved when required and stored at the appropriate temperature. Samples will be carefully packed in coolers, chain of custody documents will be maintained, and samples will be properly

shipped or transported to the laboratory using the procedures outlined in this section. These procedures are compliant with the technical requirements outlined in appropriate EPA Region IV *Field Branches Quality System and Technical Procedure* documents.

### **3.4 Analytical Parameters and Methods [.0306(g)(17)]**

Groundwater samples will be analyzed by the following methods as summarized in Table 3-1:

- VOCs using EPA SW846 Method 8260;
- 1,4-dioxane using EPA Method 8260 SIM will be analyzed in groundwater samples.

### **3.5 Decontamination Procedures**

Equipment used during the investigation will be appropriately decontaminated using an Alconox™ and water solution in general accordance with appropriate EPA Region IV *Field Branches Quality System and Technical Procedure* documents (EPA, 2012). Decontamination water will be containerized in 55-gallon drums and secured onsite pending laboratory analysis. Personnel protective equipment (PPE) will be disposed of along with the investigation-derived waste (IDW) at a permitted facility for non-hazardous waste, unless VOCs or other constituents are detected at concentrations indicating the presence of hazardous waste. Any rinse water decontamination of PPE, such as rubber boots, will be contained and disposed off site with other IDW.

### **3.6 Community Health and Safety Plan [.0306(g)(19)]**

A copy of the Site-specific Health and Safety Plan (HASP) is included as Appendix M of the RIWP. This HASP has been written to comply with the requirements of Section .0306 (d) of the Technical Standards for RECs for the State of North Carolina. It includes protocols for protecting the community.

### **3.7 Anticipated Schedule of RI Work Plan Addendum Activities**

A tentative schedule for this work appears below. The schedule is contingent on the findings of each remaining stage of the RI.

<b>RI Work Task/Milestone</b>	<b>Estimated Time Period to Complete <u>after Previous Milestone</u></b>
Submit This RI Work Plan Addendum to NCDENR	
Well Installations/Soil and Groundwater Sampling	30 to 60 days
Laboratory Analysis and Data Review and Validation	21 to 28 days
Additional RI Field Work (if required)	45 to 120 days
Prepare and Submit Final Draft and RI Report (assuming field activities are completed)	60 to 180 days

#### **4.0 REFERENCES**

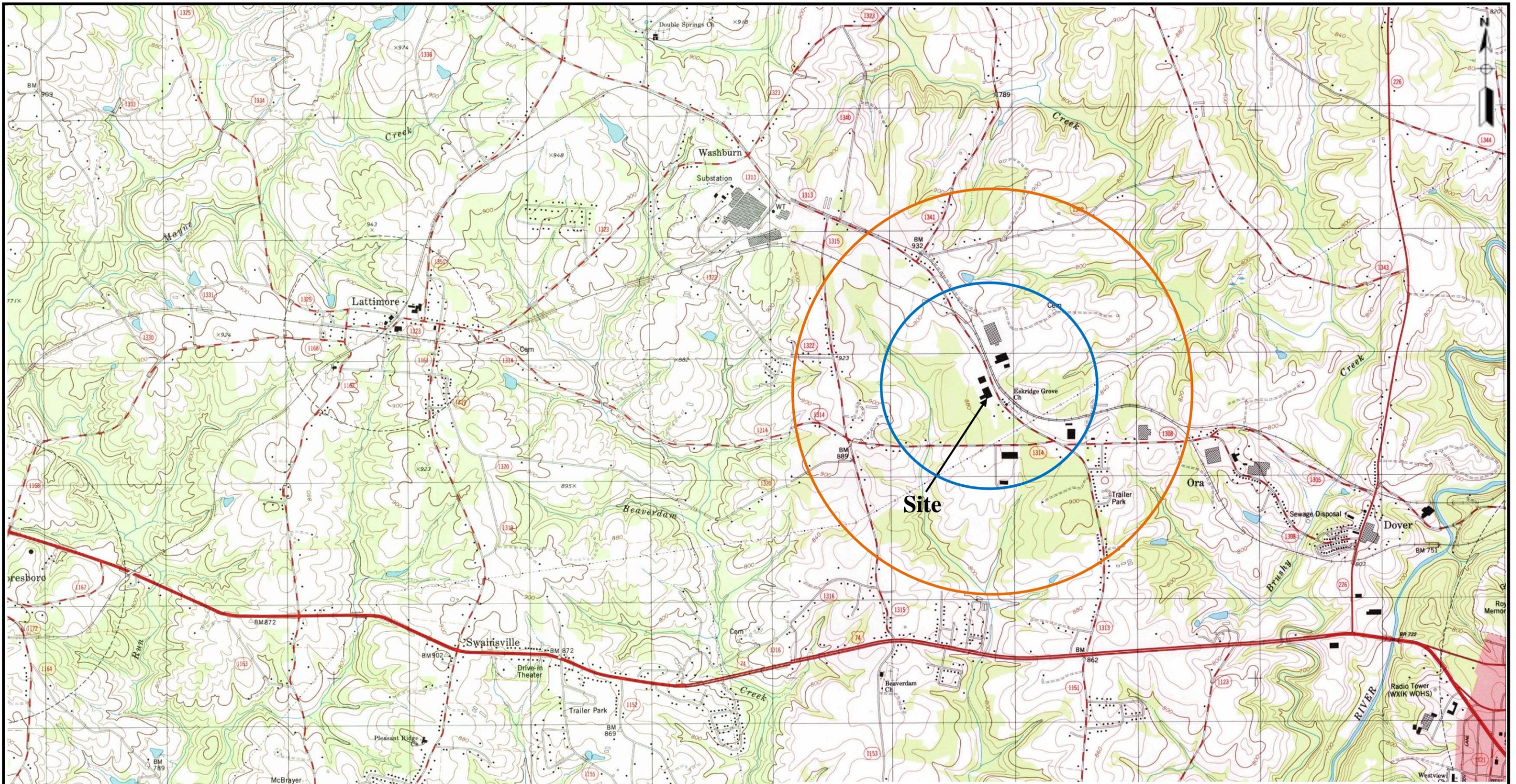
AECOM, 2013. *Combined Phase I and II Remedial Investigation Work Plan, Ardee Translite, Shelby, NC*, September 2013.

AECOM, 2014, *Remedial Investigation Work Plan Addendum, Ardee Translite, Shelby, NC*, April 2014.

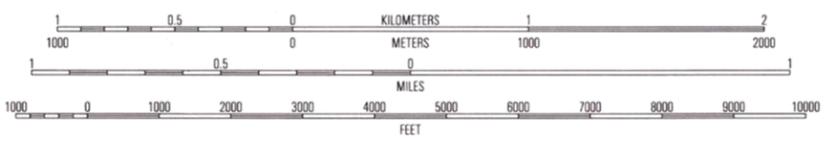
NCDENR, 2012. *Registered Environmental Consultant (REC) Program Implementation Guidance – November 2012* (document used to prepare RIWP in 2013).

NCDENR, 2013. *Registered Environmental Consultant (REC) Program Implementation Guidance – December 2013* (document used to prepare the RIWP Addendum in April 2014).

**FIGURES**



SCALE 1:24 000

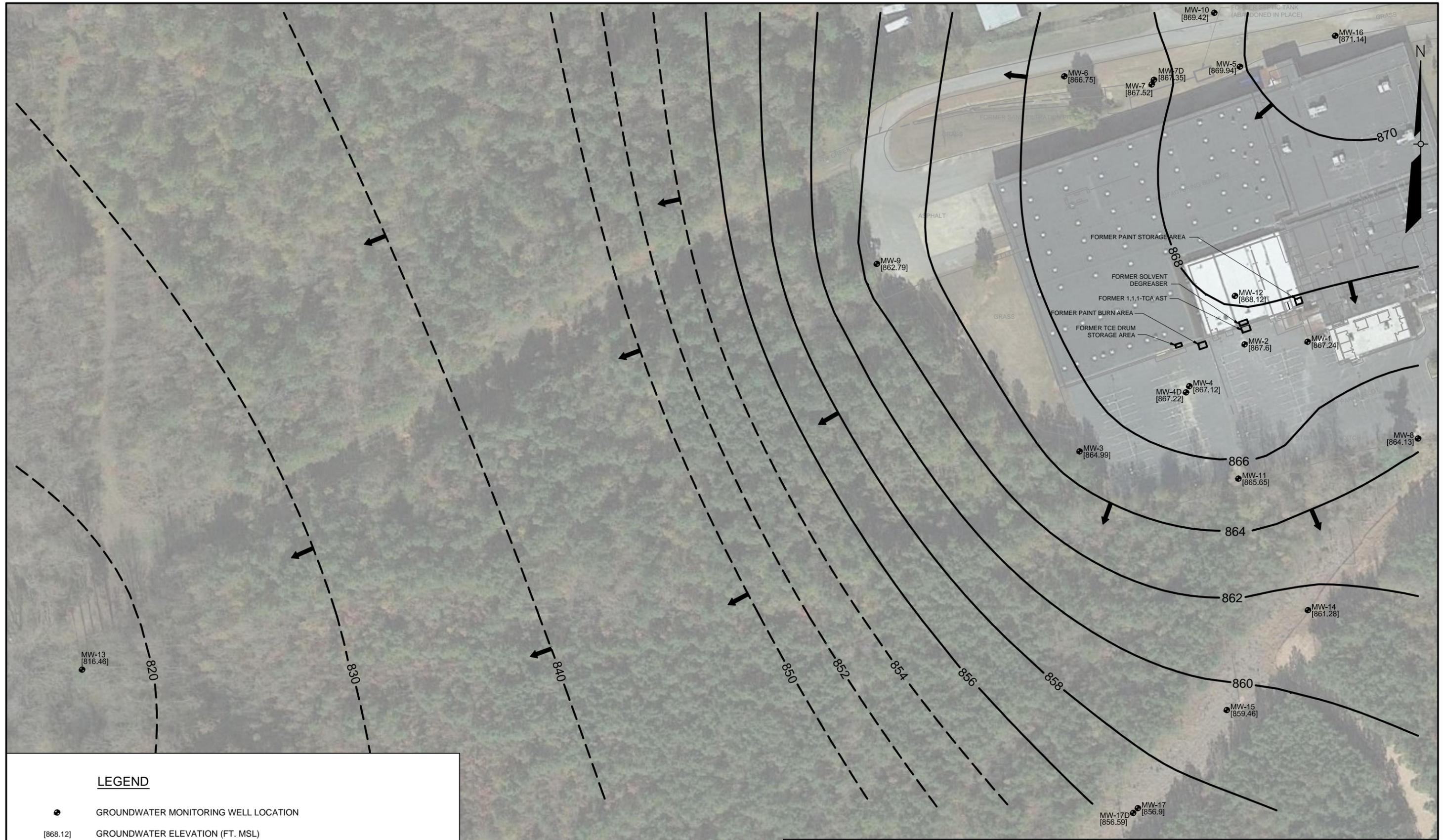


- - 1/2 Mile Radius
- - 1 Mile Radius

Source: USGS 7.5 Minute (Topographic) Series:  
Shelby, North Carolina Quadrangle  
USGS 7.5 Minute (Topographic) Series: Boiling  
Springs, North Carolina Quadrangle

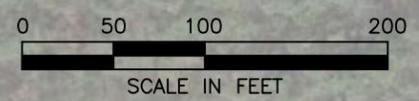


FIGURE 2-1  
SITE LOCATION MAP  
ARDEE TRANSLITE  
RI WORK PLAN  
SHELBY, NORTH CAROLINA  
JULY 2013

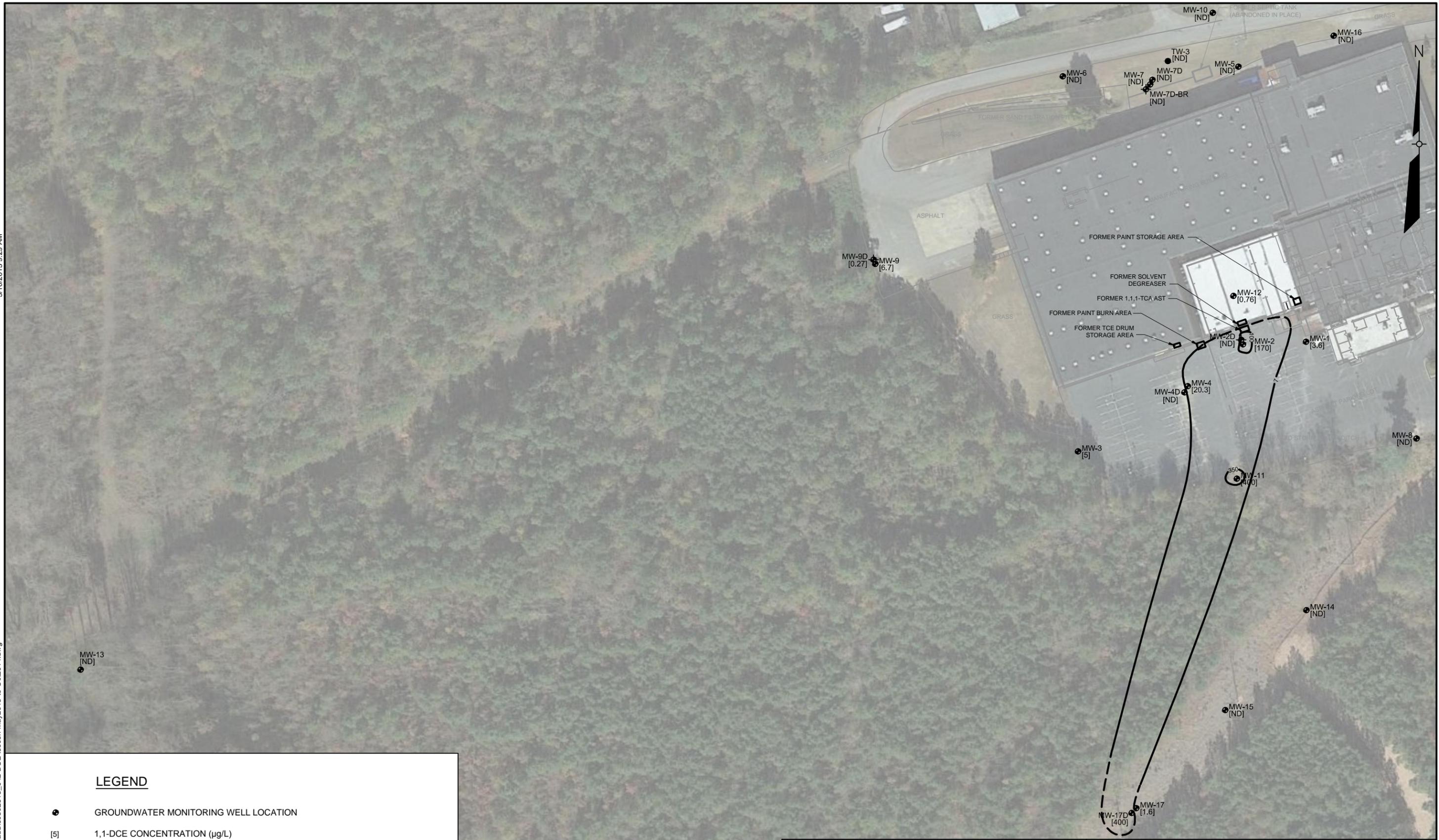


**LEGEND**

- GROUNDWATER MONITORING WELL LOCATION
- [868.12] GROUNDWATER ELEVATION (FT. MSL)
- POTENTIOMETRIC SURFACE CONTOUR (DASHED WHERE INFERRED) (FT. MSL)
- ➔ GROUNDWATER FLOW DIRECTION
- POTENTIAL AREA OF CONCERN

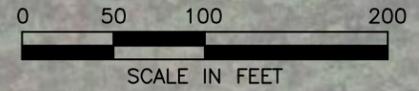


**FIGURE 2-2**  
**POTENTIOMETRIC CONTOUR MAP**  
**IN THE SHALLOW AQUIFER**  
**SEPTEMBER 8, 2014**  
 ARDEE TRANSLITE  
 SHELBY, NORTH CAROLINA



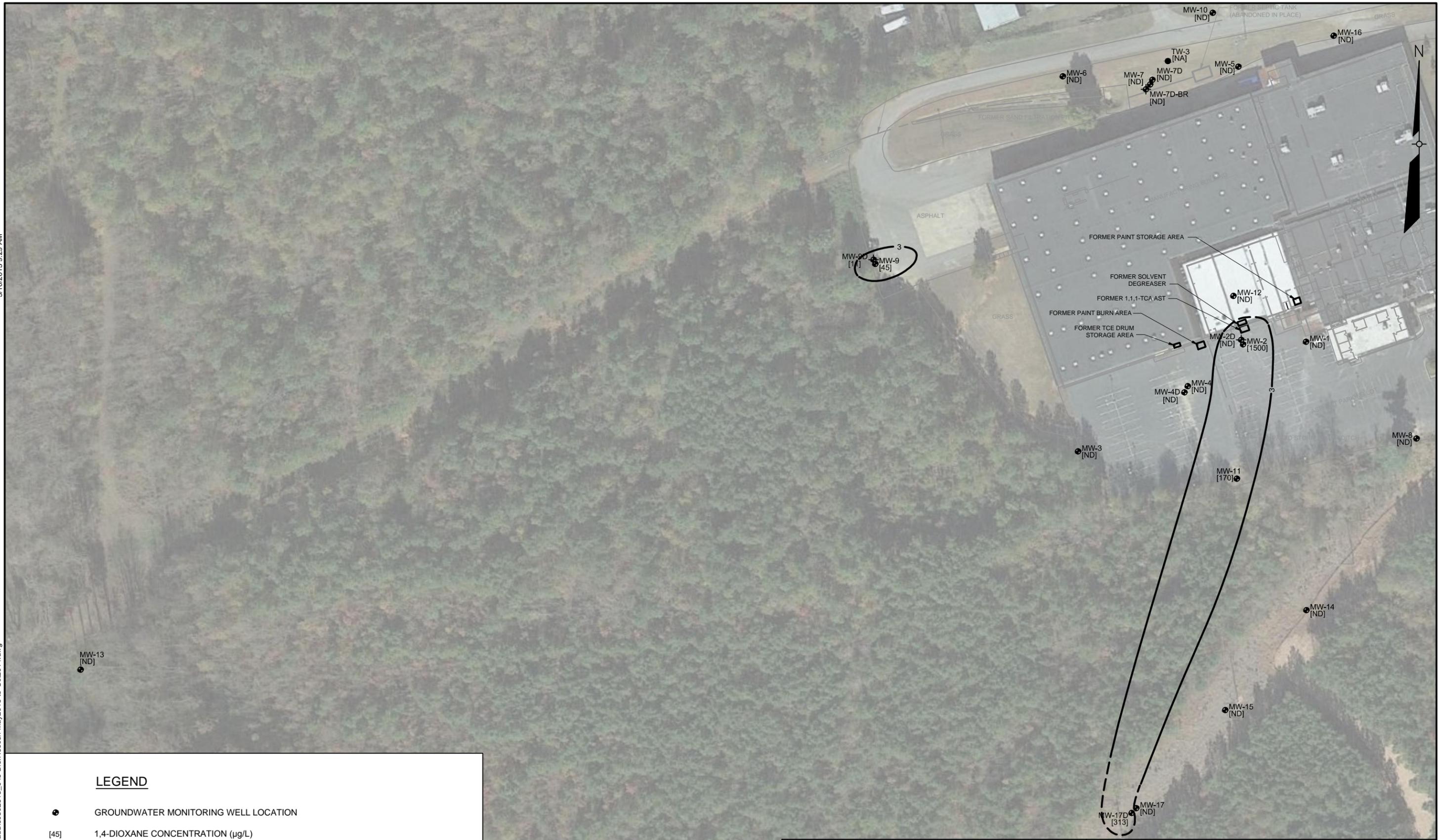
**LEGEND**

- GROUNDWATER MONITORING WELL LOCATION
- [5] 1,1-DCE CONCENTRATION (µg/L)
- 1,1-DCE ISOCONCENTRATION CONTOUR (DASHED WHERE INFERRED) (µg/L)
- POTENTIAL AREA OF CONCERN



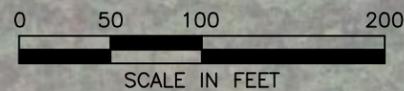
**FIGURE 2-3**  
**1,1-DICHLOROETHENE (1,1-DCE)**  
**IN THE SHALLOW AQUIFER: 2014**

ARDEE TRANSLITE  
 SHELBY, NORTH CAROLINA



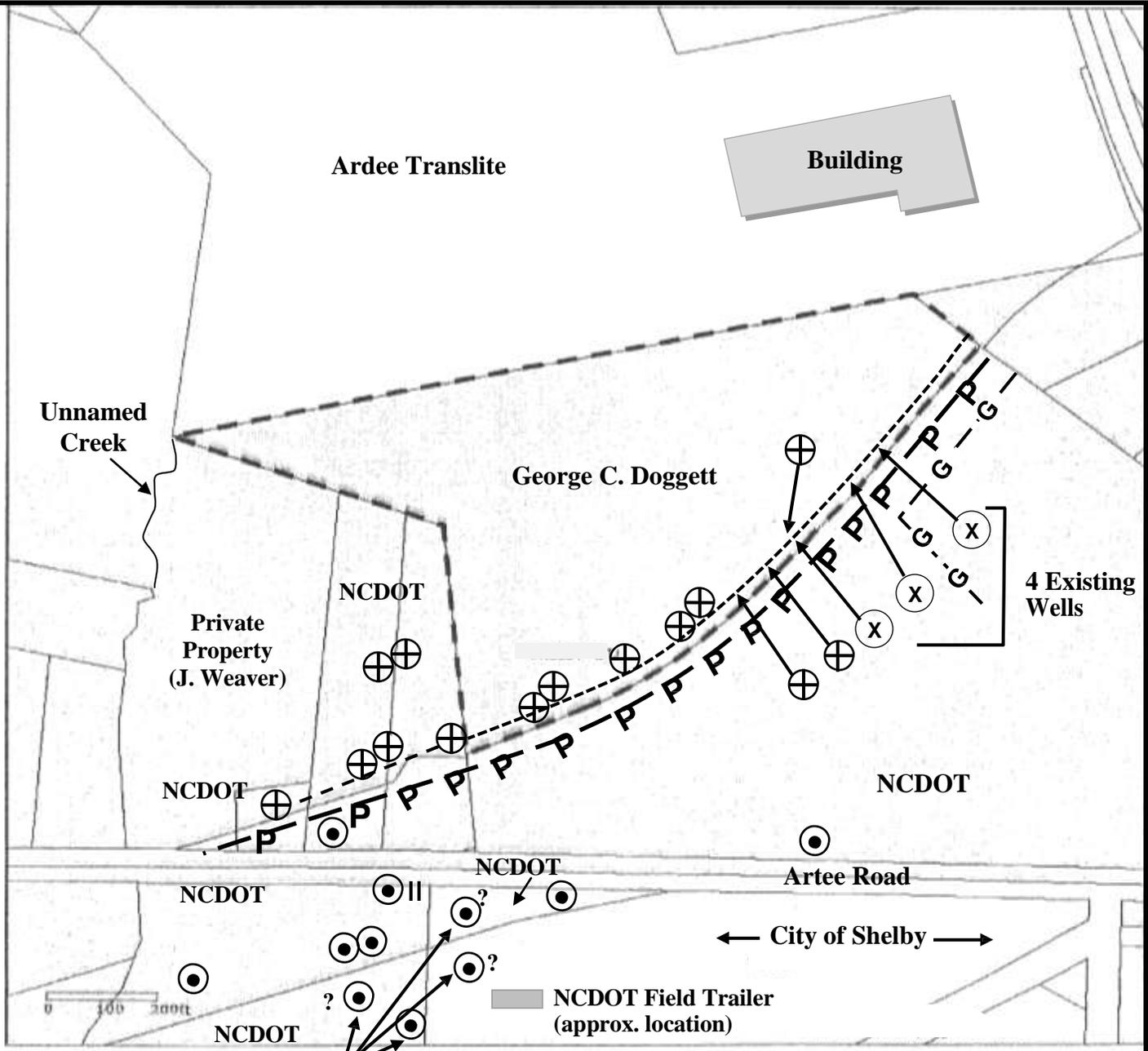
**LEGEND**

- GROUNDWATER MONITORING WELL LOCATION
- [45] 1,4-DIOXANE CONCENTRATION (µg/L)
- 1,4 DIOXANE ISOCONCENTRATION CONTOUR (DASHED WHERE INFERRED) (µg/L)
- ▭ POTENTIAL AREA OF CONCERN



**FIGURE 2-4**  
**1,4-DIOXANE ISOCONCENTRATION CONTOUR MAP**  
**IN THE SHALLOW AQUIFER: 2014**

ARDEE TRANSLITE  
 SHELBY, NORTH CAROLINA



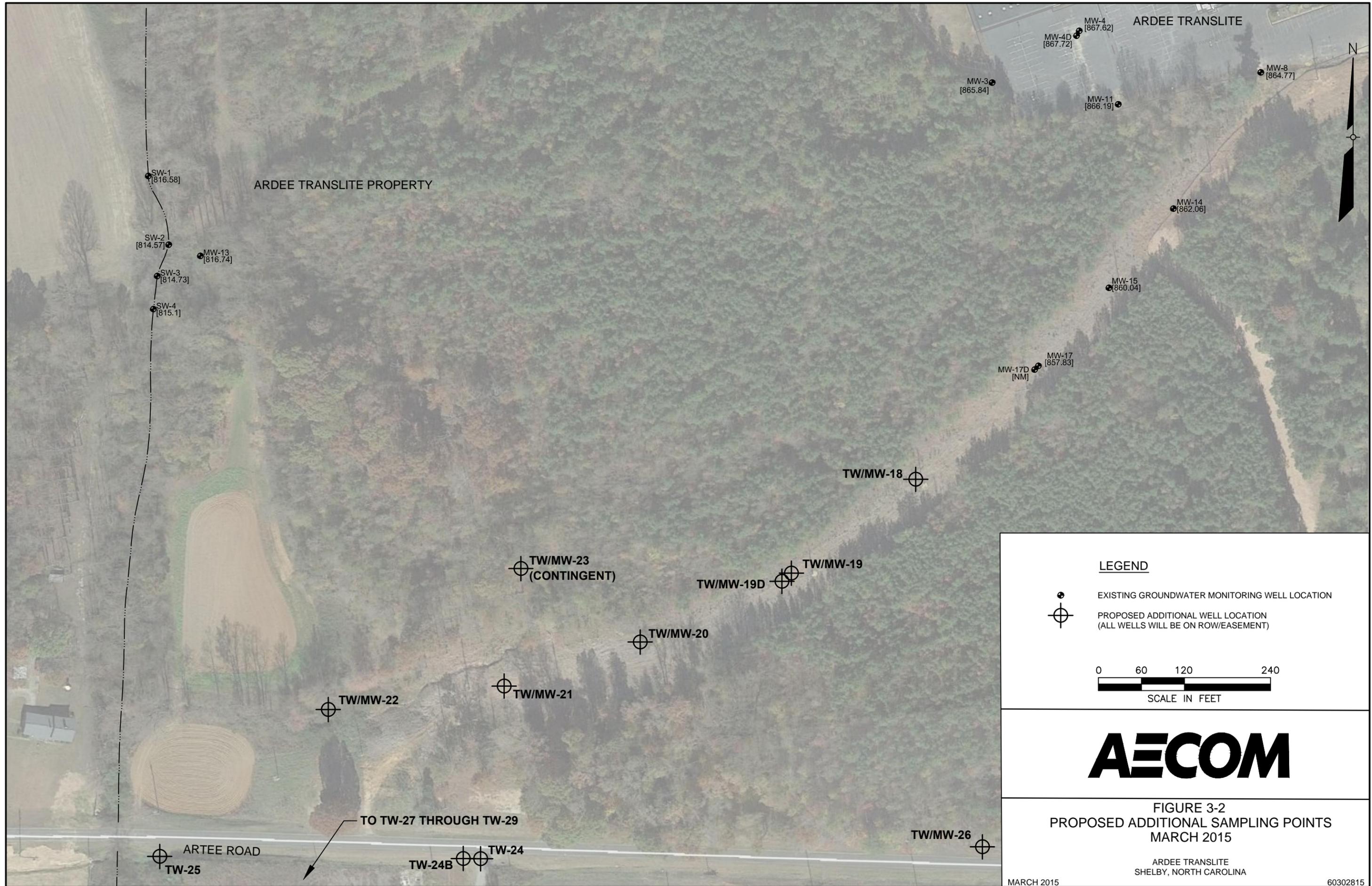
**LEGEND**

- (X) - Monitoring Well on Easement
- - 25-ft Wide Utility Easement
- P- - Overhead Power Line
- G- - Buried Gas Line
- (⊕) - Proposed Additional Sampling Point or Well (only some to be installed)
- (⊙) - Proposed Sampling Point (to be abandoned same day) (only some of these anticipated to be installed)
- ? - Maximum of two of these points sampled

(Late April or May if needed)

**FIGURE 3-1  
PROPOSED LOCATIONS OF MONITORING WELLS  
AND SURROUNDING PARCELS**

Map Source: <http://arcgis.webgis.net/nc/Cleveland>



ARDEE TRANSLITE PROPERTY

ARDEE TRANSLITE

MW-4 [867.62]  
 MW-4D [867.72]  
 MW-3 [865.84]  
 MW-11 [866.19]  
 MW-8 [864.77]  
 MW-14 [862.06]  
 MW-15 [860.04]  
 MW-17 [857.83]  
 MW-17D [NM]

SW-1 [816.58]  
 SW-2 [814.57]  
 MW-13 [816.74]  
 SW-3 [814.73]  
 SW-4 [815.1]

TW/MW-18

TW/MW-23 (CONTINGENT)

TW/MW-19D TW/MW-19

TW/MW-20

TW/MW-22

TW/MW-21

TW/MW-26

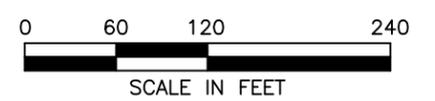
ARTEE ROAD  
 TW-25

TW-24B TW-24

TO TW-27 THROUGH TW-29

**LEGEND**

-  EXISTING GROUNDWATER MONITORING WELL LOCATION
-  PROPOSED ADDITIONAL WELL LOCATION (ALL WELLS WILL BE ON ROW/EASEMENT)



**AECOM**

**FIGURE 3-2  
 PROPOSED ADDITIONAL SAMPLING POINTS  
 MARCH 2015**

ARDEE TRANSLITE  
 SHELBY, NORTH CAROLINA

**TABLES**

**TABLE 2-1  
SURROUNDING PROPERTY OWNERS AND LAND USES  
ARDEE TRANSLITE, 639 WASHBURN SWITCH ROAD, SHELBY, NC**

Figure 2-3 Map ID	Parcel ID Number	Parcel Address	Owner Name	Owner Address	Owner City	Owner State	Owner Zip	Direction from Site and Land Use
1	32699	639 Washburn Switch Road	JJI Lighting Group	639 Washburn Switch Road	Shelby	NC		Ardee Translite Site - Industrial
2A, 2B, 2C	28695	635 Washburn Switch Road	NC Dept of Transportation	1546 Mail Service CE	Raleigh	NC	27611	Tracts to Southeast - Vacant (Recent demolition of homes) - Future Road Construction
3	28692	515 Washburn Switch Road	George C. Doggett	515 Washburn Switch Road	Shelby	NC	28150	Tract to South - Vacant Farmland
4	32696	Artee Road (no street number)	John Weaver and Grace Weaver	2221 Albert Blanton	Shelby	NC	28152	Tract to West - Vacant Farmland
5	32700	649 Washburn Switch Road	Capitol Funds, Inc.	P.O. Box 146	Shelby	NC	28151	Tract to North - Industrial Wood Truss Mfg. Facility, Operated by Piedmont Components
6	32622 & 61568	667 and 671 Washburn Switch Road	Clearwater Paper Corp.	601 West Riverside Avenue	Spokane	WA	99201	Tract to North - Industrial and One Residence
7	40584	Washburn Switch Road (no street number)	Coleman A. Doggett and Nancy Doggett	217 Rosecommon Lane	Cary	NC	27511	Tract to East - Vacant Land
8	32698	Washburn Switch Road (no street number)	City of Shelby	300 S. Washington Street	Shelby	NC	28150	Tract to Southeast - Vacant with Structure
9	28699	636 Washburn Switch Road	House assoc. w/Eskridge Grove Baptist Church	636 Washburn Switch Road	Shelby	NC	28150	Tract to Southeast - Residential on City Water
10	28690	634 Washburn Switch Road	Eskridge Grove Baptist Church	634 Washburn Switch Road	Shelby	NC	28150	Tract to Southeast - Church on City Water, with Cemetery and Vacant Farmland
11	28698	624 Washburn Switch Road	Eskridge Grove Baptist Church	634 Washburn Switch Road	Shelby	NC	28150	Tract to Southeast - Vacant Farmland
12	32642 & 32650	656 and 658 Washburn Switch Road	Seal Wire Company	656 and 658 Washburn Switch Road	Shelby	NC	28150	Tracts to East and Northeast - Some Vacant and Some Active Industrial
13	32630 & 59222	658 Washburn Switch Road	John or Susan Haskell	112 Harvest Lane	Boiling Springs	SC	29316	Tracts to Northeast - Some Active Light Industrial or Warehouse
14	32623	662 Washburn Switch Road	Container Corp. of America	c/o Industrial Valuation	Austin	TX	78709	Tract to Northeast - Vacant Industrial
15	62100	Artee Road (no street number)	NC Dept of Transportation	1546 Mail Service CE	Raleigh	NC	27611	Tract to Southwest - Vacant - Future Road Construction
16	62166	Artee Road (no street number)	NC Dept of Transportation	1546 Mail Service CE	Raleigh	NC	27611	Tract to Southwest - Vacant - Future Road Construction
17	62165	Artee Road (no street number)	NC Dept of Transportation	1546 Mail Service CE	Raleigh	NC	27611	Tract to Southwest - Vacant - Future Road Construction
18	60391	3500 Artee Road	Malcolm and Kathy Beaver	3500 Artee Road	Shelby	NC	28150	Tract to Southwest Across Unnamed Creek - Rural Residential
19	32703	3504 Artee Road	Kathy Hipps	3607 Artee Road	Shelby	NC	28150	Tract to Southwest Across Unnamed Creek - Rural Residential

Source: Cleveland County, NC, 2013 and 2015

**Table 2-2  
Summary of Permanent Monitoring Well Construction Details  
Ardee Translite  
Shelby, North Carolina**

Well Number	Installation Date	Northing SC SPC (ft NAD 83)	Easting SC SPC (ft NAD 83)	Top of Casing Elevation (ft NAVD 88)	Ground Elevation (ft NAVD 88)	Casing Stickup [from Survey] (ft)	Well Depth (ft bgs)	Well Depth (ft btoc)	Top of Screen Depth (ft bgs)	Bottom of Screen Depth (ft bgs)	Top of Screen Elevation (ft NAVD 88)	Bottom of Screen Elevation (ft NAVD 88)	Screen Length	Well Diameter (inches)	Borehole Diameter (inches)
<b>Saprolite Monitoring Wells</b>															
MW-1	1/16/2012	578746.039	1222245.131	889.59	890.14	-0.55	35.0	34.4	25	34.7	865.14	855.44	9.7	2	8
MW-2	1/16/2012	578743.166	1222175.469	890.28	890.68	-0.40	35.0	34.6	25	34.7	865.68	855.98	9.7	2	8
MW-3	1/17/2012	578624.965	1221992.745	887.81	888.14	-0.34	30.0	29.7	20	29.7	868.14	858.44	9.7	2	8
MW-4	1/17/2012	578696.973	1222114.158	888.62	888.84	-0.22	35.0	34.8	25	34.7	863.84	854.14	9.7	2	8
MW-5	1/11/2012	579049.849	1222170.293	888.28	888.75	-0.47	35.0	34.5	25	34.7	863.75	854.05	9.7	2	8
MW-6	1/12/2012	579039.234	1221975.911	882.00	882.31	-0.32	35.0	34.7	25	34.7	857.31	847.61	9.7	2	8
MW-7	1/12/2012	579030.189	1222072.589	887.15	887.44	-0.28	35.0	34.7	25	34.7	862.44	852.74	9.7	2	8
MW-8	10/23/2013	578639.227	1222367.396	889.28	889.67	-0.39	35.0	34.6	25.1	34.6	864.57	855.07	9.5	2	6
MW-9	10/23/2013	578831.974	1221768.397	882.35	882.73	-0.38	35.0	34.6	25.1	34.6	857.63	848.13	9.5	2	6
MW-10	10/23/2013	579109.317	1222141.853	891.09	891.36	-0.28	35.0	34.7	25.1	34.6	866.26	856.76	9.5	2	6
MW-11	10/22/2013	578594.788	1222168.566	886.77	887.08	-0.31	35.0	34.7	25.1	34.6	861.98	852.48	9.5	2	6
MW-12	5/5/2014	578796.697	1222164.761	890.79	891.02	-0.23	35.0	34.8	25.0	34.7	866.02	856.32	9.7	2	8
MW-13	5/6/2014	578383.981	1220888.754	826.92	824.29	2.64	20.0	22.6	10.0	19.7	814.29	804.59	9.7	2	8
MW-14	7/29/2014	578449.705	1222245.536	884.46	884.48	-0.03	35.0	36.12	25.00	34.7	859.5	849.78	9.7	2	8
MW-15	7/29/2014	578339.408	1222155.677	882.40	882.45	-0.06	35.0	35.35	25.0	34.7	857.45	847.75	9.7	2	8
MW-16	5/6/2014	579084.060	1222275.735	890.71	890.94	-0.23	35.0	34.8	25.0	34.7	865.94	856.24	9.7	2	8
MW-17	7/28/2014	578230.985	1222057.278	878.00	878.29	-0.29	35.0	35.3	25.00	34.7	853.3	843.59	9.7	2	8
<b>Deep Saprolite/PWR Monitoring Wells</b>															
MW-4D	10/24/2013	578690.188	1222110.488	888.42	888.71	-0.29	70.0	69.7	60.1	69.6	828.61	819.11	9.5	2	6
MW-7D	1/13/2012	579035.299	1222075.013	887.06	887.28	-0.22	55.0	54.8	45.0	54.7	842.28	832.58	9.7	2	6
MW-17D	9/3/2014	578225.720	1222051.992	878.22	878.16	0.06	70.5	70.6	65.5	70.2	812.66	807.96	4.7	2	11
<b>Bedrock Monitoring Wells</b>															
MW-2D	1/13/2012	578748.247	1222173.363	890.51	890.78	-0.27	60.0	59.7	50.0	59.7	840.78	831.08	9.7	2	6
MW-7D-BR	10/24/2013	579024.905	1222067.927	887.00	887.33	-0.32	75.0	74.7	65.1	74.6	822.23	812.73	9.5	2	6
MW-9D	9/3/2014	578836.649	1221766.399	882.35	882.65	-0.30	67.5	67.2	57.5	67.2	825.15	815.45	9.7	2	6

**Table 2-3**  
**Summary of Vertical Hydraulic Gradients**  
**Ardee Translite**  
**Shelby, North Carolina**

Well Number	Screened Interval Top (ft bgs)	Screened Interval Bottom (ft bgs)	Water Surface Elevation 9/8/14 (ft NAVD 88)	Screen midpoint (ft)	Distance Between Screens (ft)	Gradient	Direction
<b>Saprolite / PWR Bedrock Monitoring Wells</b>							
MW-4	25	34.7	867.12	29.9	35.0	0.003	upward
MW-4D	60.1	69.6	867.22	64.9			
MW-7	25	34.7	867.52	29.9	20.0	-0.008	downward
MW-7D	45	54.7	867.35	49.9			
MW-17	25	34.7	856.90	29.9	38.0	-0.008	downward
MW-17D	65.5	70.2	856.59	67.9			
<b>Saprolite / Upper Bedrock Monitoring Wells</b>							
MW-2	25	34.7	867.70	29.9	25.0	-0.004	downward
MW-2D	50	59.7	867.60	54.9			
MW-7	25.0	34.7	867.52	29.9	40.0	-0.006	downward
MW-7D-BR	65.1	74.6	867.30	69.9			
MW-9	25.1	34.6	862.79	29.9	32.5	-0.134	downward
MW-9D	57.5	67.2	858.44	62.4			
<b>PWR Bedrock / Upper Bedrock Monitoring Wells</b>							
MW-7D	45	54.7	867.35	49.9	20.0	-0.003	downward
MW-7D-BR	65.1	74.6	867.30	69.9			

**Notes:**

ft bgs - feet below ground surface.

ft - feet.

NAVD 88 - North American Vertical Datum of 1988.

**Table 2-4**  
**Summary of Groundwater and Surface Water Field Indicator Parameter Results**  
**Ardee Translite**  
**Shelby, North Carolina**

Sample ID	Measurement Date	pH	Specific Conductance (mS/cm)	Water Temp (°C)	Turbidity (NTUs)	Dissolved Oxygen (mg/L)	ORP (mV)
<b>Saprolite Monitoring Wells</b>							
MW-1	5/9/2013	4.50	0.055	23.41	6.87	4.29	228.5
MW-2	12/16/2013	4.72	0.028	18.15	30.13	5.28	269.7
MW-3	10/29/2013	5.17	0.193	19.12	1.83	0.88	34.7
MW-4	10/29/2013	4.52	0.061	22.88	1.16	4.80	243.6
MW-5	5/9/2013	6.01	0.113	20.40	8.53	6.87	168.6
MW-6	5/9/2013	4.13	0.049	18.90	5.42	3.94	241.8
MW-7	5/9/2013	4.61	0.062	20.38	30.24	7.07	240.0
MW-8	10/29/2013	4.60	0.065	19.81	1.43	5.10	260.7
MW-9	12/16/2013	4.73	0.060	18.62	2.30	3.87	279.7
MW-10	8/4/2014	4.81	0.060	19.35	6.30	8.59	364.2
MW-11	12/16/2013	4.75	0.046	16.35	0.77	4.87	285.4
MW-12	5/8/2014	4.17	0.061	20.11	3.99	5.07	115.3
MW-13	5/8/2014	4.70	0.050	15.84	11.02	6.25	44.5
MW-14	8/4/2014	4.83	0.040	19.80	13.83	8.62	328.4
MW-15	8/4/2014	4.61	0.039	19.26	6.88	8.55	369.7
MW-16	5/8/2014	5.93	0.061	23.44	6.37	8.33	53.9
MW-17	10/8/2014	4.32	0.033	20.58	2.16	8.15	353.4
<b>PWR Monitoring Wells</b>							
MW-4D	10/29/2013	10.69	0.632	24.43	1.99	3.77	65.1
MW-7D	10/29/2013	6.81	0.166	18.28	4.06	2.47	140.5
MW-17D	10/8/2014	4.98	0.050	16.24	1.67	3.26	275.5
<b>Bedrock Monitoring Wells</b>							
MW-2D	5/9/2013	5.78	0.153	24.37	13.72	0.86	178.8
MW-7D-BR	10/29/2013	7.62	0.184	20.85	8.40	5.18	119.7
MW-9D	10/8/2014	6.15	0.094	20.52	1.81	0.42	-6.8

**Notes:**

mS/cm - millisiemens per centimeter.

°C - Celsius.

NTU - Nephelometric Turbidity Unit

mg/L - milligram per liter.

mV - millivolt.

NS - Not Sampled

NM - Not Measured

**TABLE 3-1  
PROPOSED ADDITIONAL RI GROUNDWATER SAMPLES AND ANALYTICAL PARAMETERS  
ARDEE TRANSLITE OFF SITE LOCATIONS  
SHELBY, NORTH CAROLINA**

Location/Area of Concern	New Well or New Location ID	General Location of New Well	NC Certified Laboratory Analyses					Field Screening and Analysis		Comments
			VOCs Plus TICs (Method 8260)	SVOCs Plus TICs (Method 8270)	TAL Metals (Method 6010/7471)	Hexavalent Chromium (Method 3500)	1,4-Dioxane (Method 8260 SIM)	Field Screening and Geochemistry	Field Parameters and Indicators	
Off Site Between Power Line and Woods	TW-18/MW-18	150 feet downgradient of MW-17	X				X		X	We have access agreement with owner, G. Doggett.
	TW-19/MW-19	150 feet downgradient of MW-18	X				X		X	We have access agreement with owner, G. Doggett.
	MW-19D	Contingent deep well paired with MW-19	X				X		X	We have access agreement with owner, G. Doggett.
	TW-20/MW-20	150 feet downgradient of MW-19	X				X		X	We have access agreement with owner, G. Doggett.
	TW-21/MW-21	150 feet downgradient of MW-20	X				X		X	We have access agreement with owner, G. Doggett.
	MW-21D	Contingent deep well paired with MW-21	X				X		X	We have access agreement with owner, G. Doggett.
	TW-22/MW-22	150 feet downgradient of MW-21	X				X		X	Make sure this well is on NCDOT property
	TW-23/MW-23	150 feet north and sidegradient of MW-21	X				X		X	Make sure this well is on NCDOT property
Along or Adjacent to Artee Road	TW-24	South Side of Artee Road along gravel entrance to lay down yard (first water bearing zone)	X				X		X	This is contingent of NCDOT and their contractor allowing us to access.
	TW-24B	South Side of Artee Road along gravel entrance to lay down yard (at the depth of geoprobe refusal)	X				X		X	This is contingent of NCDOT and their contractor allowing us to access. Also contingent on Geoprobe being able to penetrate deep enough to collect a second meaningful sample.
	TW-25	Further downgradient accessible point nearest the creek, south side of Artee Road	X				X		X	This is contingent of NCDOT and their contractor allowing us to access.
	TW-26/MW-26	Along Artee Road and east of TW-24.	X				X		X	Purpose of this well
	TW-27	Contingent boring on NCDOT property, only if find VOCs in TW-24 or TW-25	X				X		X	Make sure this is on NCDOT and not City of Shelby property.
	TW-28	Contingent boring on NCDOT property, only if find VOCs in TW-24 or TW-25	X				X		X	Make sure this is on NCDOT and not City of Shelby property.
	TW-29	Contingent boring on NCDOT property, only if find VOCs in TW-24 or TW-25	X				X		X	Make sure this is on NCDOT and not City of Shelby property.
Unnamed Creek	SW-5	Upstream of point where Artee Road crosses the creek	X				X		X	Only collect if can access safely
	SW-6	Downstream of the point where Artee Road crosses the creek	X				X		X	Only collect if can access safely
	SED-5	Upstream of point where Artee Road crosses the creek	X							Only collect if can access safely
	SED-6	Downstream of the point where Artee Road crosses the creek	X							Only collect if can access safely
On-Site	MW-8D	Transition zone or bedrock well paired with MW-8, to confirm no deep migration across gw divide	X				X		X	
<b>Total No. of Primary Samples</b>			13-20	0	0	0	11-18			
QA/QC Samples	Duplicate		1				1			
	Equipment Blank		1							
	Trip Blank		1							
	MS/MSD		0							
<b>Total No. of Samples + QA/QC</b>			3	0	0	0	1			

VOCs - Volatile Organic Compounds

SVOCs - Semivolatile Organic Compounds

TAL - Target Analyte -List <(Metals)

TICs - Tentatively Identified Compounds