ALTAMONT ENVIRONMENTAL, INC.
ENGINEERING & HYDROGEOLOGY
231 HAYWOOD STREET, ASHEVILLE, NC 28801
TEL.828.281.3350 FAC.828.281.3351
WWW.ALTAMONTENVIRONMENTAL.COM

RECEIVED
JUL 12 2010
SOLID WASTE SECTION

July 9, 2010

Jaclynne Drummond
Hydrogeologist
Division of Waste Management Solid Waste Section
North Carolina Department of Environment and Natural Resources
1646 Mail Service Center
Raleigh, North Carolina, 27699-1646

Subject: Groundwater and Additional Soil Assessment Work Plan
Jackson County, Scott Creek MSW and C&D Transfer Facility, Permit # 50-03T

Dear Ms. Drummond:

On behalf of Jackson County, Altamont Environmental, Inc. (Altamont) acknowledges receipt of your letter dated June 3, 2010 (DENR, 2010a). On the basis of the request contained within your letter, Altamont provides the following proposed scope of work for an assessment of groundwater and soil quality at the Scott Creek Transfer Facility (site).

Background

The site is located in the southern part of the township of Addie, North Carolina, a small community in a remote valley within rugged terrain of the Blue Ridge Mountains. The site is located southerly adjacent to Scott Creek, which flows southwesterly to the Tuckaseegee River. A smaller tributary, Ochre Hill Creek, flows northwesterly along the southern borders of the site. Its confluence with Scott Creek is located just northwest of the site (Figures 1 and 2).

The site is near a relatively well known dunite deposit, the Addie Deposit, which consists of olivine, talc, chlorite, and other secondary minerals (Hunter, 1941). A former olivine mine which was operated by Applied Industrial Materials Corporation, is located just south (upslope) of the site.

The following bullets describe our understanding of the recent events with regard to the leachate release.

- The North Carolina Department of Environment and Natural Resources (DENR) Division of Waste Management (DWM) Solid Waste Section (SWS) (referred to in the remainder of this letter as DENR) performed a Facility Compliance Audit at the Jackson County Scott Creek Transfer Facility on September 29, 2009 (Figure 1; DENR, 2009a).
- The DENR issued a Compliance Order with Administrative Penalty dated December 29, 2009 to Jackson County. The document states that Jackson County is in violation of Title 15A Subchapter 13B.0402 of the North Carolina Administrative Code (15A NCAC 13B .0402) because water that came in contact with solid waste was released and migrated into the nearest surface water body, Ochre Hill Creek (DENR, 2009b).
- Jackson County, on the basis of a work plan approved by DENR, collected soil and surface water samples (Municipal Engineering, 2010).
- DENR responded via a letter dated May 3, 2010 requesting additional work items, including the installation of a monitoring well cluster and a well and receptor survey (DENR, 2010a).

- Jackson County performed the well and receptor survey in June 2010 and has provided the results to DENR.
- Altamont, on behalf of Jackson County suggested that we collect additional soil samples and evaluate those results prior to installing the monitoring wells (Altamont, 2010).
- DENR, in a letter dated June 3, 2010, reiterated its request for installation of monitoring wells and collection of associated groundwater samples (DENR, 2010b).

Objectives of Assessment

The primary objective of the assessment described below is to determine whether the release identified in DENR's September 24, 2009 audit (DENR, 2009a), has affected the soil and groundwater quality. Specifically, has the release caused the concentrations of constituents to increase to levels above appropriate soil and groundwater quality standards?

Proposed Scope of Work

To comply with DENR's request, we propose the following tasks to assess the soil and groundwater quality with regard to effects of the release.

Task 1—Utility Clearance

Altamont will contact the "North Carolina One Call Center" to mark publicly owned utilities servicing the property.

Task 2—Monitoring Well Drilling and Installation

Three monitoring wells will be installed at the site. A well cluster, consisting of one shallow monitoring well (MW-01) screened in unconsolidated overburden, and one deeper bedrock well (MW-02), will be installed just outside of the fence on the northern side of the driveway (Figure 2). This location is based on the path of the leachate draining across the driveway and onto soils adjacent to the northern side of the driveway (as shown on DENR's third photograph in the September 2009 audit [DENR, 2009a]). This interpreted path is shown on Figure 2. The well cluster is intended to be located just downgradient from where the leachate percolated into the subsurface. A third monitoring well (MW-03) will be installed in the southeastern part of the facility upslope of MW-01 and MW-02. This location is considered to be in the upgradient part of the facility and as such is designed to evaluate metal background concentrations in the groundwater for the site.

The following paragraphs summarize the monitoring well drilling installation methodologies and construction. The standard methods for the design and installation of monitoring wellswill be followed (EPA, 2001). A boring log and a monitoring well construction log will be filled out for each monitoring well. During drilling Altamont will record the estimated soil origin, consistency, color, grain size, and other ancillary descriptions of the soil (e.g. moisture content) on soil boring logs. Soil sampling will be conducted and is described in Task 5. The drilling subcontractor will be certified in the state of North Carolina. Decontamination procedures are described in Task 6.

The saprolite monitoring well borings (MW-01 and MW-03) will be advanced using 4.25-inch hollow stem augers (HSAs) powered by a conventional drill rig. The borehole will be advanced approximately 10 feet below the first encountered water-bearing zone. The monitoring wells will be composed of two-inch nominal diameter Schedule 40 polyvinyl chloride (PVC). The screen shall be 10 feet in length and will be machine-slotted with 0.010-inch slots. Attempts will be made to construct these wells so that the screen straddles the water table (partially penetrating screen). The filter pack material will be a clean, washed, well-rounded silica sand sized to perform as a filter

between the formation material and the well screen. We anticipate using #2 (20-40 mesh) sand size.

The bentonite seal shall be composed of commercially manufactured sodium bentonite pellets, which do not exceed 0.25-inch in diameter. If the bentonite is installed above the water table, then clean, potable water will be used to hydrate the bentonite.

The cement grout will consist of a neat mixture of Portland Cement and water in the proportion of approximately six to seven gallons of approved water per 94-pound bag of cement. Water may be added to the mix in small amounts, at the discretion of Altamont, to achieve pumpability.

The third monitoring well (MW-02) will be clustered with MW-01 and will be installed into bedrock. The well will be constructed as follows:

- Advance 10-inch hollow stem augers to bedrock, which is estimated to be approximately 20 feet below ground surface (bgs; based on bedrock exposed in Ochre Hill Creek).
- Drill an approximately five-foot socket into the bedrock using six-inch diameter air hammer techniques.
- Install six-inch nominal diameter PVC surface casing to approximately five feet below the top of bedrock.
- Grout the annulus of the surface casing and allow at least 24 hours for the grout to cure.
- Advance a six-inch diameter borehole into the bedrock using air rotary drilling to the first major water-bearing fracture or 15 feet below the bottom of the surface casing, whichever is greater.
- Install two-inch nominal diameter PVC monitoring well with 10 feet of screen to the bottom of the bedrock borehole.

The casing/screen assembly for each of these three monitoring wells will be installed as follows:

- Prior to installation of the casing and screen, the lengths and diameters of all components (including the bottom plug or cap) will be measured (to the nearest tenth foot) and recorded in the field book. The casing riser and screen assembly will be installed round, plumb, and true to line.
- The filter pack will be placed in the annulus between the well material and borehole by pouring the material directly through the annular space between the well and the borehole/HSAs. A clean PVC pipe will be used as a tamping device to prevent bridging of the filter pack and to continuously tag its depth. For the saprolite monitoring wells, the HSAs will be raised incrementally during the installation of the filter pack, and attempts will be made to keep the bottom of the HSAs below the top of the filter pack during installation. The level of the top of the filter pack in the annulus will be verified by tag-line measurement during all phases of placement. The filter pack will extend at least two feet above the top of the screen. The volume of the installed filter pack will be compared with the annular volume to verify proper placement of the filter pack. This material accounting will be recorded in the field book.
- A bentonite seal at least two feet thick will be placed immediately above the filter pack. The method of bentonite seal placement shall be the same as for the filter pack. The bentonite pellet seal will be hydrated either by pouring water or utilizing the tremie pipe with an approximately equal volume of clean, potable water, and allowed to sufficiently hydrate. If water is used, its source and the volume used will be documented in the field book. The level of the top of the bentonite seal will be verified by tag-method measurement prior to grouting.
- To grout the remaining annular space, a side-discharging tremie pipe will be maintained three feet above the bentonite seal and will be used to slowly place the cement/bentonite

grout mixture. The HSAs will be pulled incrementally during the grouting procedures to limit borehole collapse. Grout will be pumped into the annulus through the tremie pipe until undiluted grout flows from the borehole at the ground surface. The grout will be allowed to cure for at least 24 hours prior to development.

Task 3—Well Development

After installation and a minimum 24-hour period for grout curing, each monitoring well will be developed using either surge-and-bail or swab-and-pump methods, depending on well depth and yield.

In most cases, the initial well development method will be by hand bailing to remove accumulated sediment in the well. The bailer will be allowed to fall freely through the well past the water surface until it strikes the bottom of the well. The bailer will be raised to the surface vigorously to create a high-action level of water movement. This free fall and rapid removal will provide some surging action to the filter pack and proximal formation material. To enhance the removal of sediment, the bailer should be intermittently agitated by rapid short upward strokes from the bottom of the well. Bailing should be continued until the water is free from suspended sand-sized sediment.

A surge block may be needed to create a stronger surging action than the bailer does. If this is the case, the surge block and the bailer will be used in conjunction with one another. After utilizing the surge block for a short period of time, the sediment that entered the well as a result of the surging will be removed with the bailer, as described in the previous paragraph. The surge block will be composed of inert material that will not affect the water quality in the well. Caution will be employed to ascertain that the block can move freely up and down the inside of the well without obstructions. The vertical action of the surge block will be accomplished manually. Care will be taken in the length of the strokes, the velocity of the up-and-down movement, and the duration of each surge block cycle. If the surging action is too vigorous for the well construction and formation characteristics, then the activity can be detrimental to the well integrity.

Water discharged from the monitoring well(s) during the development process will be wasted onto the ground surface near the monitoring well.

Development criteria will include the stabilization of standard field parameters. These criteria will be refined, based on the initial results at each site, with the objective being to achieve minimum turbidity in all wells.

During the pumping stage of development, pH, specific conductivity, dissolved oxygen (DO), oxidation-reduction potential (ORP), temperature, and turbidity will be measured generally once for every well volume removed. For each monitoring well, the well development and measurement of field parameters will be documented on a monitoring well development/sampling log (Appendix A).

Task 4—Monitoring Well Groundwater Sampling

Groundwater sampling will be conducted by personnel properly trained in procedures for collecting, labeling, packing, and shipping the samples. The collection of groundwater samples will be performed in accordance with EPA operating procedures (EPA, 2001). Groundwater samples will be placed in the appropriate pre-cleaned sample containers or vials, properly labeled, and packed in coolers for transfer to the laboratory. Sampling data will be recorded in the field logbook in indelible ink and transferred to the field data sheet on a daily basis. The chain-of-custody must be maintained on all samples collected.

Low-flow techniques will be used to purge and sample the monitoring wells. Before beginning the purging process, the water level of all the monitoring wells will be measured and recorded. This information, along with the documented total depth of each well will be used to calculate well volumes. Each well will be purged using a low-flow peristaltic or bladder pump. New polyethylene

tubing will be used to purge and sample each well. The evacuated water from the pump will be piped to a flow-through cell equipped with pH, temperature, DO, specific conductivity (SC), and ORP meters to monitor real-time variations in these parameters. Care will be taken to minimize agitation or aeration of the groundwater samples during purging and collection.

The well purging and field parameter stabilization requirements will be conducted in accordance with DENR's Solid Waste Section *Guidelines for Groundwater, Soil, and Surface Water Sampling* (DENR, 2008).

Groundwater samples will be collected from each monitoring well installed. Samples will be submitted to Pace Analytical Services in Asheville, North Carolina (Pace) for analyses of Appendix I VOCs using EPA Method 8260B and Appendix I Metals plus magnesium and iron using EPA Method 6010/7470.

Task 5—Soil Sampling

During advancement of MW-01 and MW-03, discrete soil samples will be collected at five-foot centers using properly decontaminated split-spoon samplers. In MW-01 and MW-03, soil samples from approximately 5, 10, and 15 feet bgs will be submitted to Pace for analyses of Appendix I VOCs using EPA Method 8260B and Appendix I Metals, plus magnesium and iron, using EPA Method 6010/7470. One QC duplicate sample will be collected during the advancement of the soil boring for MW-1.

The nomenclature for the soil samples associated with the monitoring well drilling will adhere to the structure: "MW01-5". "MW01" indicates that the sample is associated with the boring for MW-01 and "5" indicates the bottom depth of the sample below the original ground surface.

Task 6—Equipment Decontamination

Before and after each sampling point, all reusable sampling equipment that comes in contact with the sample will be properly decontaminated and cleaned to prevent cross-contamination. The equipment decontamination procedure will consist of a potable water rinse to remove visible dirt and debris followed by a Liquinox® wash, another potable water rinse, and a deionized water rinse. All decontamination efforts will be followed by air drying of the equipment. Nitrile phthalate-free gloves will be worn by sampling personnel during all sample and equipment handling activities.

The larger equipment, including drill rig rods and the rig itself, will be cleaned with a high-pressure, hot-water steam cleaner. The equipment will be rinsed once with the steam cleaner and then scrubbed to remove any remaining loose debris, washed again with the steam cleaner, and then air-dried. All of the large equipment decontamination rinsate will be wasted on the ground surface at the decontamination area. Water used in the decontamination processes, as well as during the drilling and well installation procedures, as described below, should be obtained from a source of known quality that does not contain constituents that could compromise the integrity of the monitoring well.

Task 7—Assessment Report

After the completion of the field work described here and receipt and evaluation of the laboratory analytical data, Altamont will generate and submit a report describing the field activities and results. The report will include an interpretation of the data as to whether water that had been in contact with the solid waste has impacted groundwater quality.

Thank you for your consideration of this work plan, and we appreciate your support on this project. Please feel free to call me at 828-771-0442 with any questions or if you need additional information.

Sincerely,

ALTAMONT ENVIRONMENTAL, INC.

Alec Macbeth

Alec Macbeth, PG

Enclosures:

References

Figure 1—Site Location Map

Figure 2—Proposed Monitoring Well Locations

cc: Ken Westmoreland, Jackson County Manager
Chad Parker, Jackson County Solid Waste Director

References

Altamont Environment, Inc. 2010. Letter to Jaclynne Drummond, DENR, Subject: Suggested Additional Scope of Work, May 20, 2010.

Hunter, C.E., 1941, *Forsterite Olivine Deposits of North Carolina and Georgia*, North Carolina Department of Conservation and Development, Division of Mineral resources, Bulletin No. 41.

Municipal Service Engineering Company. 2010. Letter to Jaclynne Drummond, DENR, *Re: Limited Soil and Surface Water Assessment Report*, March 15, 2010.

North Carolina Department of Environment and Natural Resources (DENR). 2008. *Solid Waste Section Guidelines for Groundwater, Soil, and Surface Water Sampling.*

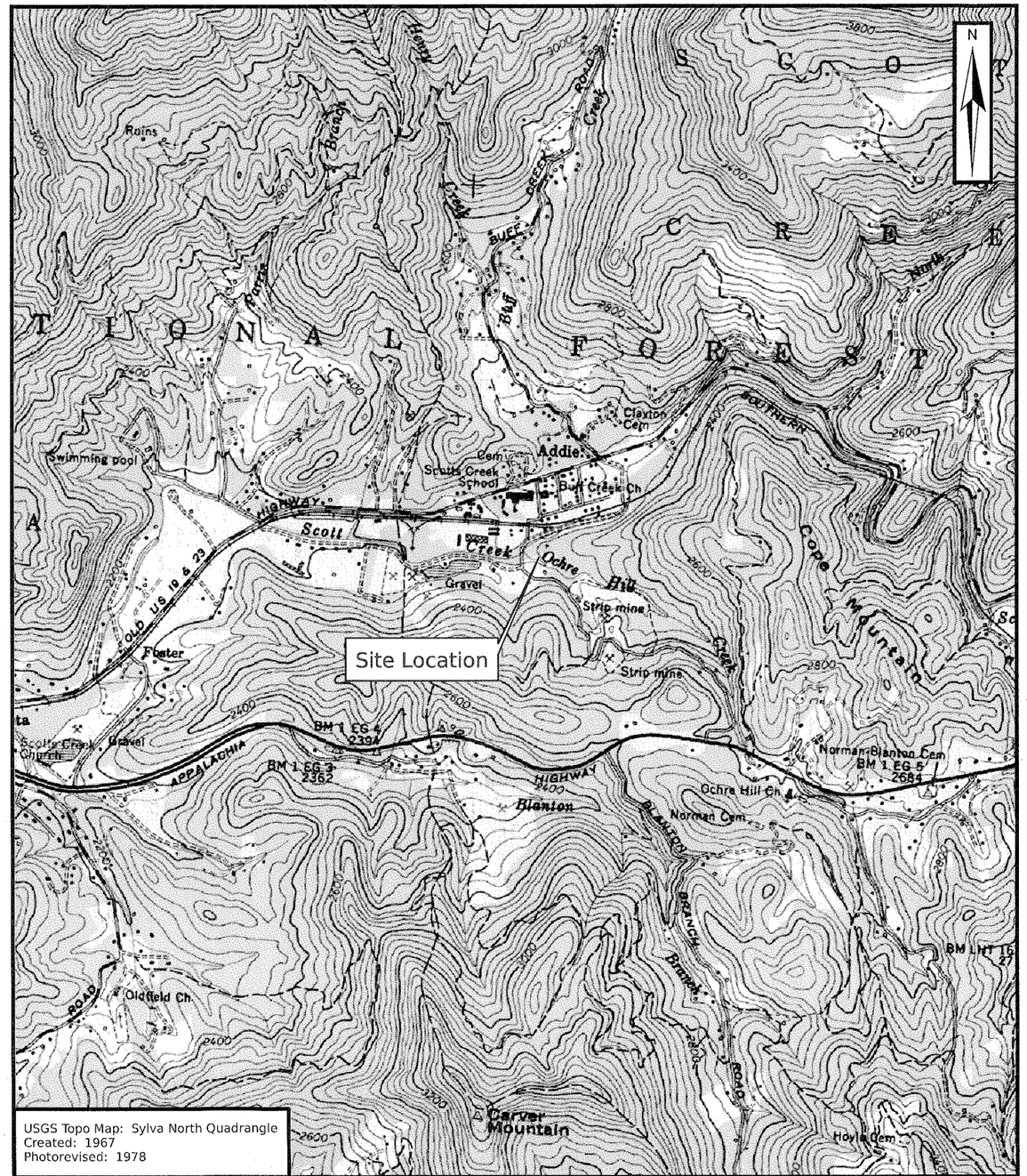
North Carolina Department of Environment and Natural Resources (DENR). 2009a. *Facility Compliance Audit Report, Scott Creek Transfer Station*, Jackson County, Permit No. 50-03T, September 24, 2009.

North Carolina Department of Environment and Natural Resources (DENR). 2009b. *Compliance Order With Administrative Penalty, Jackson County Scott Creek MSW & C&D Transfer Station, (Permit No. 50-03T)*, December 29, 2009.

North Carolina Department of Environment and Natural Resources (DENR). 2010a. Letter to Jackson County, *Re: Limited Soil and Surface Water Assessment Report*, May 3, 2010.

North Carolina Department of Environment and Natural Resources (DENR). 2010b. Letter to Jackson County, *Re: Suggested Additional Scope of Work*, June 3, 2010.

U.S. Environmental Protection Agency (EPA). 2001. *Environmental Investigation Standard Operating Procedures and Quality Assurance Manual (EISOPQAM).*



USGS Topo Map: Sylva North Quadrangle
Created: 1967
Photorevised: 1978

ALTAMONT ENVIRONMENTAL, INC.
ENGINEERING & HYDROGEOLOGY
231 HAYWOOD STREET, ASHEVILLE, NC 28801
TEL.828.281.3350 FAX.828.281.3351
WWW.ALTAMONTENVIRONMENTAL.COM

SITE LOCATION MAP

SCOTT CREEK TRANSFER STATION
JACKSON COUNTY, NORTH CAROLINA

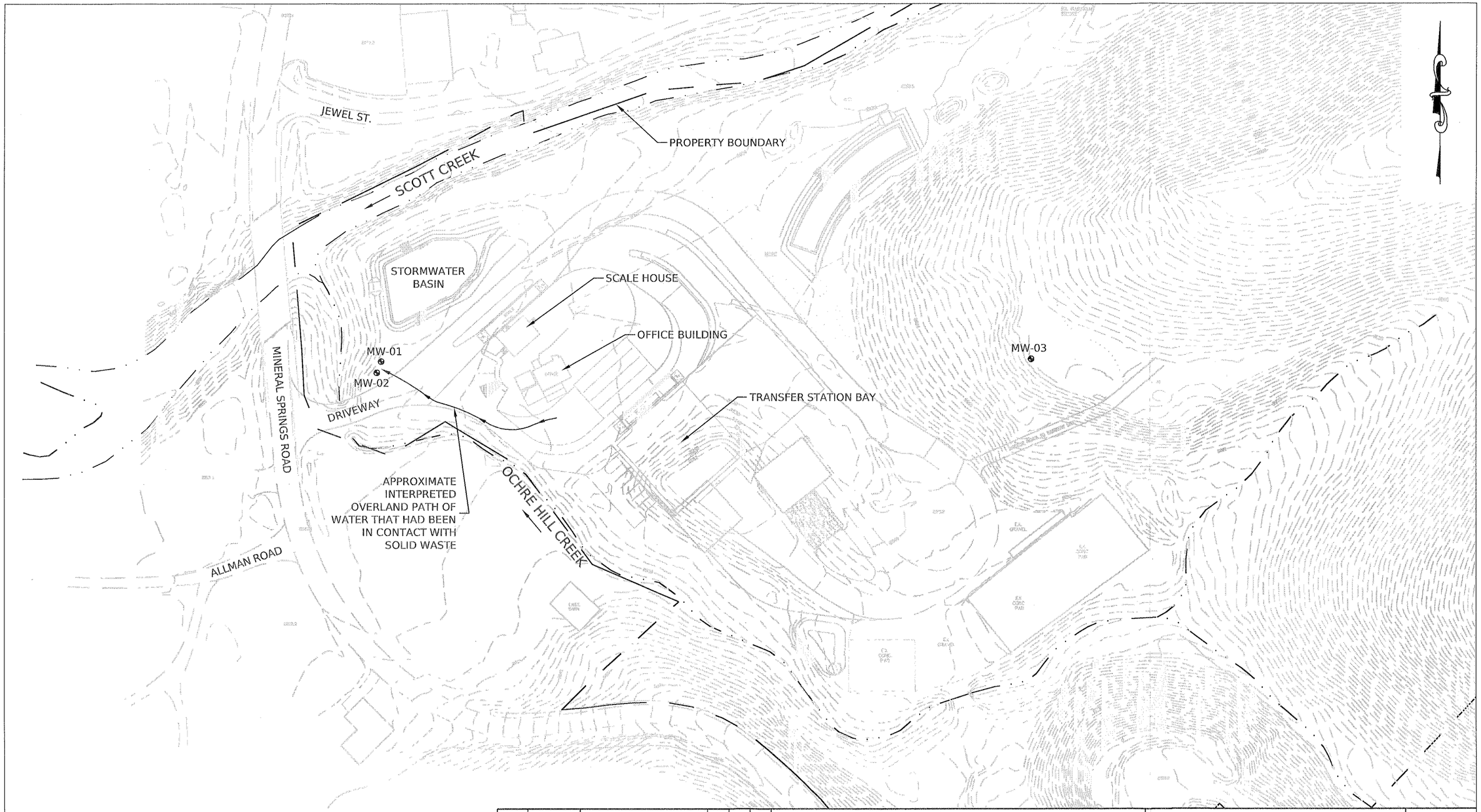
FIGURE

1

Drawn By: Chad Hearn
Project Manager: Alec Macbeth
Client: Jackson County
Date: 06/30/2010

Scale
0 500 1,000 2,000 Feet

P:\Jackson County\Scotts Creek\2010 Assessment\Figure 1 - Site Location Map.mxd



LEGEND:

LOCATION OF PROPOSED MONITORING WELL

SOURCE:

CAD DRAWING PROVIDED BY CHAD PARKER WITH JACKSON COUNTY.

REV.	DATE	DESCRIPTION	BY	CHK	APV

ALTAMONT ENVIRONMENTAL, INC.

ENGINEERING & HYDROGEOLOGY

231 HAYWOOD STREET, ASHEVILLE, NC 28801
TEL.828.281.3350 FAC.828.281.3351
WWW.ALTAMONTENVIRONMENTAL.COM

DRAWN BY: CHAD HEARN
PROJECT MANAGER: ALEC MACBETH
CLIENT: JACKSON COUNTY
DATE: 07/06/2010

SCALE (FEET)
50' 0 50' 100'
1" = 100'

PROPOSED MONITORING WELL LOCATIONS

SCOTT CREEK TRANSFER STATION
JACKSON COUNTY, NORTH CAROLINA

FIGURE 2

FILE PATH: P:\Jackson County\Scotts Creek\2010 Assessment\Figure 2 - Proposed MW Locations.dwg