Phase I Subsurface Characterization Work Plan
Third Creek Monofill
City of Statesville
Statesville, North Carolina
April 7, 1995

Prepared for
City of Statesville
Statesville, North Carolina

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HAZARDOUS WASTE

For submittal to
North Carolina Department of Environment,
Health, and Natural Resources
Division of Solid Waste Management
Hazardous Waste Section
Raleigh, North Carolina

Prepared by
Aquaterra, Inc.
Greensboro, North Carolina

aquaterra®
A GREAT LAKES CHEMICAL CORPORATION COMPANY
ENVIRONMENTAL CONSULTANTS:
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April 7, 1995

Mr. Joe Hudson
Water/Wastewater Treatment Department
The City of Statesville
Post Office Box 1111
Statesville, North Carolina 28677-1111

Reference: Phase I Subsurface Characterization Work Plan
Third Creek Monofill
City of Statesville
Statesville, North Carolina
Aquaterra Job No. 5302100

Dear Mr. Hudson:

Aquaterra, Inc. (Aquaterra) is pleased to submit this *Phase I Subsurface Characterization Work Plan* for subsurface characterization activities at the Third Creek Monofill site, located southeast of the City of Statesville, North Carolina. This work plan includes the tasks to characterize the subsurface conditions at the site as required in the Administrative Order on Consent (AOC) issued by the North Carolina Department of Environment, Health, and Natural Resources (DEHNR), Division of Solid Waste Management (DSWM) and signed on March 8, 1995 by the City of Statesville..

If you require any additional information or have any questions, please contact us at (910) 852-5003.

Sincerely,

AQUATERRA, INC.

Susan Kite

Susan Kite, P.G.
Senior Project Manager

Wendy Thomas for

Kirk B. Pollard, P.G.
Senior Project Manager

AQUATERRA, INC. REGISTERED C-103 GEOLOGICAL CORP. N. C.

cc: Mr. Douglas D. Vaughn, P.E.-Peirson & Whitman
Mr. George House-Brooks, Pierce, McLendon, Humphrey & Leonard, L.L.P.
Mr. Dan Bius, Acting Chief-NCDEHNR, DSWM

GR5041/SK/KBP/wlt

Phase I Subsurface Characterization Work Plan
Third Creek Monofill
City of Statesville
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1 Introduction

The City of Statesville operates a waste water treatment system at the Third Creek site located southeast of the city limits of Statesville, North Carolina (see Figure 1). The site operates under an NPDES permit (Permit No. 0020591) and a non-discharge permit (Permit No. WQ004040). Concerns of elevated concentrations of cadmium in the treatment system were raised in 1993. The non-dicharge permit was modified to allow the removal and landfilling of over 20 years of accumulated solids from Aeration Basin 1 and 2 and the Digestor in an effort to reduce the amount of cadmium released through the waste water treatment system. The sludge was placed in eight landfill trenches on property near the waste water treatment plant. Subsequent sampling of the landfilled sludge identified cadmium levels in excess of the regulatory limit for cadmium according to the toxicity leaching procedure (TCLP).

Based upon this investigation and the laboratory analytical results, the North Carolina Department of Environment, Health, and Natural Resources (NCDEHNR), Division of Solid Waste Management (DSWM) issued an Administrative Order on Consent (Order) that was signed by the City of Statesville on March 8, 1995. Based upon this Order, The City of Statesville was required to submit a *Phase I Subsurface Characterization Work Plan* to address the requirements of the Order.

2 Phase I Subsurface Characterization Work Activities

The primary objective of the *Phase I Subsurface Characterization Work Plan* is to present a plan to characterize the subsurface conditions at the site, including determining the ground water flow direction. The plan includes the installation of three borings in the surficial acquifer, and one boring advanced to auger refusal. In addition, three shallow ground water monitoring wells will be completed. Water levels collected from previously installed monitoring wells and topography will dictate the placement of the soil borings and monitoring wells.

2.1 Soil Boring/Monitoring Well Installation

Drilling

The drilling will be conducted with a rotary drill rig using 8-1/2 inch O.D. hollow stem augers. The hole will be drilled to a diameter of approximately 8-1/2 inches. Soil samples will be collected at five foot intervals according to the Standard Method for

Penetration Tests and Split Barrel Sampling of Soils (ASTM D 1586-84) and logged in the field by a geologist according to the Unified Soil Classification System (ASTM D 2488). The geologist will also record drilling rates, rod drops, etc., to help develop the geology of the boring.

Plastic will be placed around the boring locations with a hole for the augers to pass through. The plastic will collect the soil and ground water generated from the boring by the drilling process. A plastic-lined ditch will convey the soil and ground water to a small sump where it will be transferred into 55-gallon drums prior to proper disposal.

If a highly contaminated zone is encountered above the proposed screened internal, it may need to be cased to prevent the contamination from being carried down during the drilling process. A boring will then be drilled to a diameter of approximately 12 inches will be completed through the contaminated zone. Then an 8-inch inner diameter casing will be installed and grouted in place to seal the contaminated zone. The drilling will then proceed using the 7-7/8-inch bit until the desired screen depth is reached.

Well Construction

Following the completion of the drilling, the monitoring wells will be installed so that the shallow water table intersects the well screen. All screens will have centralizers installed at their base and top to ensure that the screen will be centered within the boring. A sandpack consisting of clean washed sand and gravel containing less than 5 percent deleterious material by weight will be trimmed around the screen and carried from 2 to 4 feet above the screen top. Deleterious materials are considered to be wood debris, other organic matter, heterogeneous material, and degradable materials.

Above the sandpack, volclay will be placed to form a seal between the annular space and the well. The volclay will be hydrated for a minimum of 1 hour. After the seal, a neat cement grout will be poured to the surface. The well will be capped with a water tight locking cap, and finished with a lockable protective steel casing installed around the well.

Well locations to the nearest foot and vertical elevations to the nearest 0.01 foot will be surveyed following well installation by a registered surveyor in the State of North Carolina.

Well Depth and Construction Materials

The shallow wells will be constructed of 2-inch schedule 40 PVC casing and screen. The PVC casing and screen will be connected by flush threaded end connections. No PVC solvent or glue will be used to connect the pipe. Screens will consist of a 10-foot length of slotted or wire wrapped screen with screen openings of 0.010 inches.

Construction Standards and Permitting

The ground water monitoring wells will be constructed to the standards discussed in 15 NCAC 2C.0108, *Standard of Construction, Wells Other Than Water Supply (c)* and

the *RCRA Ground Water Monitoring Technical Enforcement Guidance Document.* Upon completion of the monitoring wells, Aquaterra will submit Well Completion Form GW-1 for each well as required by North Carolina law. The originals will be submitted to the Division of Environmental Management (DEM) and copies will be submitted to the Division of Solid Waste Management, Hazardous Waste Section

Well Development

After the wells are installed, the wells will be cleaned of all clay, silt, or sand that may have accumulated in the well. The wells will be pumped or bailed for a sufficient length of time to settle the sandpack and remove any fines. The wells will be considered developed when the water removed from the well is reasonably free of sand, silt, and clay. All development water will be containerized for future disposal.

2.2 Ground Water Levels

Once the monitoring wells have been installed, a complete round of water level measurements will be collected. The water levels will be allowed to stabilize for a period of 72 hours prior to collecting the water level data.

The static water level will be determined by lowering the decontaminated sensing device and the electrical cable into the well until the sensing device lights or sounds. The cable is then raised slowly until the alarm goes off. The cable is then relowered slowly until the sensing device sounds and is marked with respect to a reference point at the top of the well casing. Using a measuring tape, the distance is measured from the top of the well casing cable mark to the nearest mark on the cable. This measurement is taken to the nearest 0.01 of a foot. This value is the either added to or subtracted from the nearest mark on the cable, depending on whether the mark is above or below the top of the well casing. The water level is then recorded on a field log sheet.

The water level will then be subtracted from the mean sea level elevation, and a ground water elevation will be computed. The data will be plotted on a map and a ground water direction determined.

2.3 Ground Water Sampling

The ground water samples will be collected at a later date according to the schedule and using the protocols specified in the *Sampling and Analysis Plan.* Ground water samples will be obtained and analyzed for the presence of arsenic, barium, cadmium, chromium, fluoride, lead, mercury, nitrate, selenium, silver, endrin, lindane, methoxychlor, toxaphene, 2,4-D,2,4,5-TP silvex, radium, gross alpha, gross beta, chloride, iron, manganese, phenols, sodium, sulfate, volatile and semi-volatile organic compounds, pH, and specific conductance.

3 Reporting

Aquaterra will prepare a report that addresses the project objectives. The report will summarize the findings from the proposed activities, including the site specific

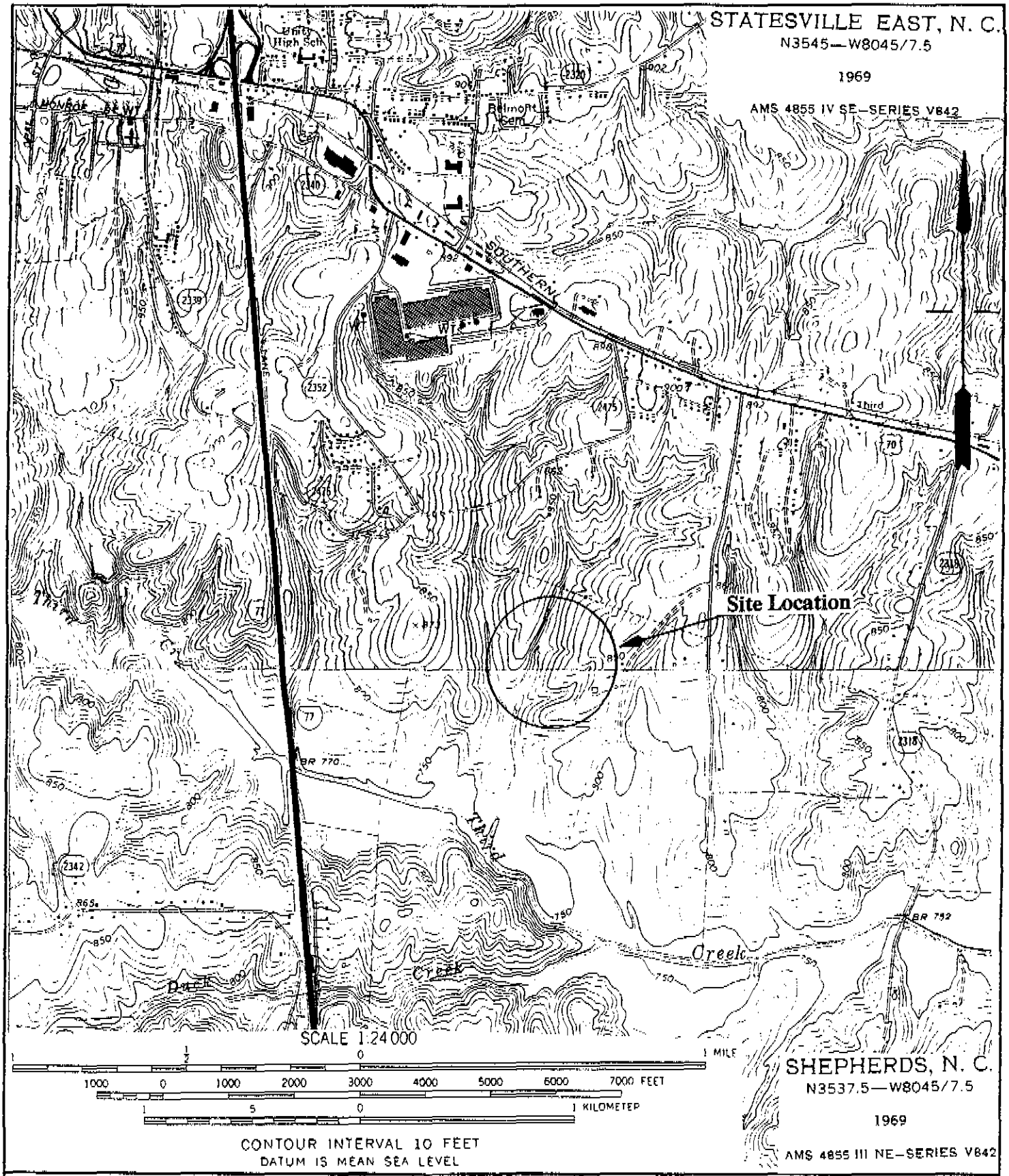
subsurface conditions and the ground water flow direction. The report will include the following:

- the boring logs and water levels from the initial borings/wells
- a description of the site, and the local and regional hydrogeologic conditions
- the location of the initial borings/wells on a site map
- well construction records and well schematics for each well
- a Sampling and Analysis Plan for the sample collection and analysis procedure including a schedule for the ground water sampling events

4 Project Schedule

Aquaterra anticipates beginning work on the assessment within 5 to 10 days after submittal of this plan.

Date	Tasks
April 17-21, 1995	Perform subsurface characterization
May 8, 1995	Submit subsurface characterization report and Sampling and Analysis Plan
June 7, 1995	Initiate ground water sampling
August 6, 1995	Submit closure plan



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Author	Drawing	Layers	Date	Title
sk			4-07-95	Site Location Map
Job No.	**Revision**	**Figure**	**Scale**	**Project**
5302100		1	1:24,000	Third Creek Monofill Statesville, North Carolina