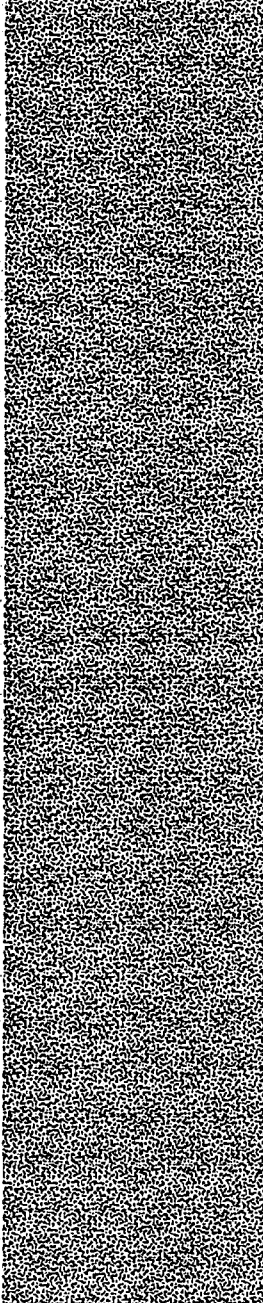




Contamination Assessment Plan



Prepared for

Citrus County Central Landfill

CITRUS COUNTY, FLORIDA

Prepared by

CHM HILL

April 14, 1995
FLE39450.18

RECEIVED
APR 21 1995

Department of Environmental Protection
SOUTHWEST DISTRICT

BY _____

Professional Geologist

I hereby state that I have reviewed the geological services required in preparation of this Contamination Assessment Plan for the Citrus County Central Landfill, and based upon my knowledge, information, and belief, this Plan has been prepared in accordance with commonly accepted procedures consistent with applicable standards and practice, and is not a guaranty or warranty, either expressed or implied.

Martin J. Clasen
Martin J. Clasen, P.G.



PG 000027

License No.

4-20-95

Date

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Section 1 Introduction

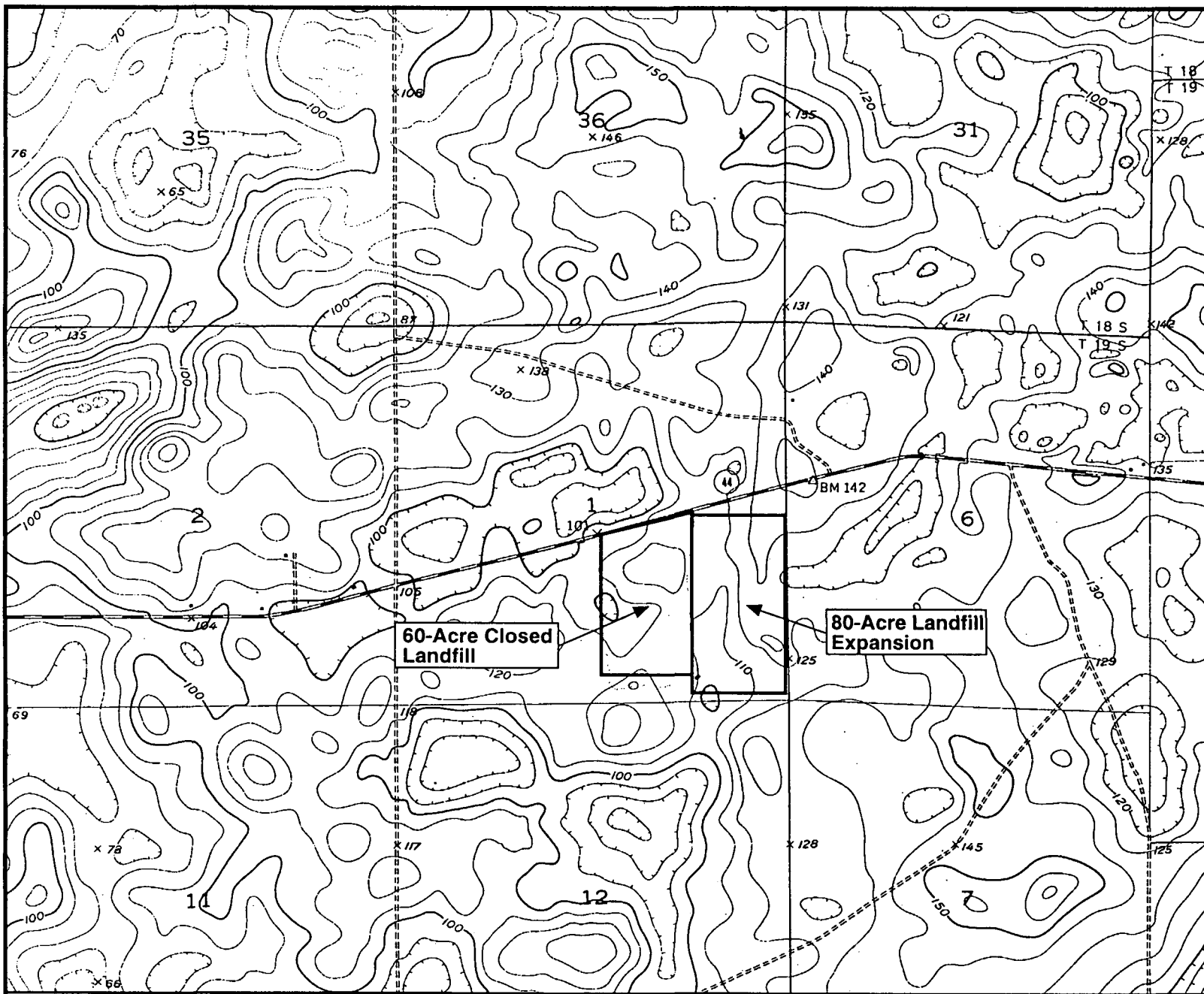
1.1 Location and Background

The Citrus County Central Landfill is located in Section 1 of Township 19 South and Range 18 East, approximately three miles east of Lecanto, Florida (Figure 1-1). The site consists of a closed 60-acre landfill and an active 80-acre landfill. The property is bordered on the west, south, and east by the Withlacoochee State Forest and on the north by State Road 44.

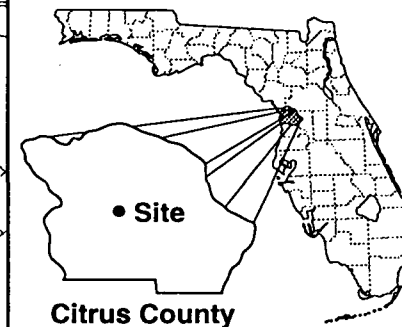
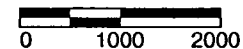
This Contamination Assessment Plan (CAP) is a result of requirements contained in the Groundwater Monitoring Permit No. SF09-11030 for the closed 60-acre landfill. Volatile organic compounds (VOCs) were detected in a downgradient monitoring well in a quarterly sampling event. Resampling on October 22, 1994 confirmed that VOCs were present and initiated assessment monitoring and a CAP to be submitted to the Florida Department of Environmental Protection (FDEP) in 180 days (April 22, 1995).

1.2 Purpose

The purpose of this CAP is to present the tasks required to complete a Contamination Assessment Report (CAR) for the Citrus County Closed 60-Acre Landfill. The tasks include evaluating existing data, hydrogeologic testing, and groundwater sampling to assess the groundwater contamination that was detected in the monitoring well.



Scale in Feet



U.S.G.S. Topographic Map
Lecanto, FL

FIGURE 1-1
Site Location Map



Section 2 Site Description

2.1 Topography

Predevelopment elevations range from 100 feet to 130 feet National Geodetic Vertical Datum (NGVD). The majority of the area is relatively flat. A closed depression exists along the west central boundary of the 60-acre site. Site topography is shown in Figure 1-1.

2.2 Description of the Facility and Operations

The active Citrus County Central Landfill 80-acre site is situated on property purchased from the State Division of Forestry and is operated by Citrus County and the Board of County Commissioners. The landfill operates under FDEP Permit No. SO09-187229 originally issued on November 12, 1975, with the most recent modification dated March 31, 1995. The landfill handles all of Citrus County's solid wastes resulting from domestic and commercial activities.

2.3 Site Features Pertinent to the Assessment

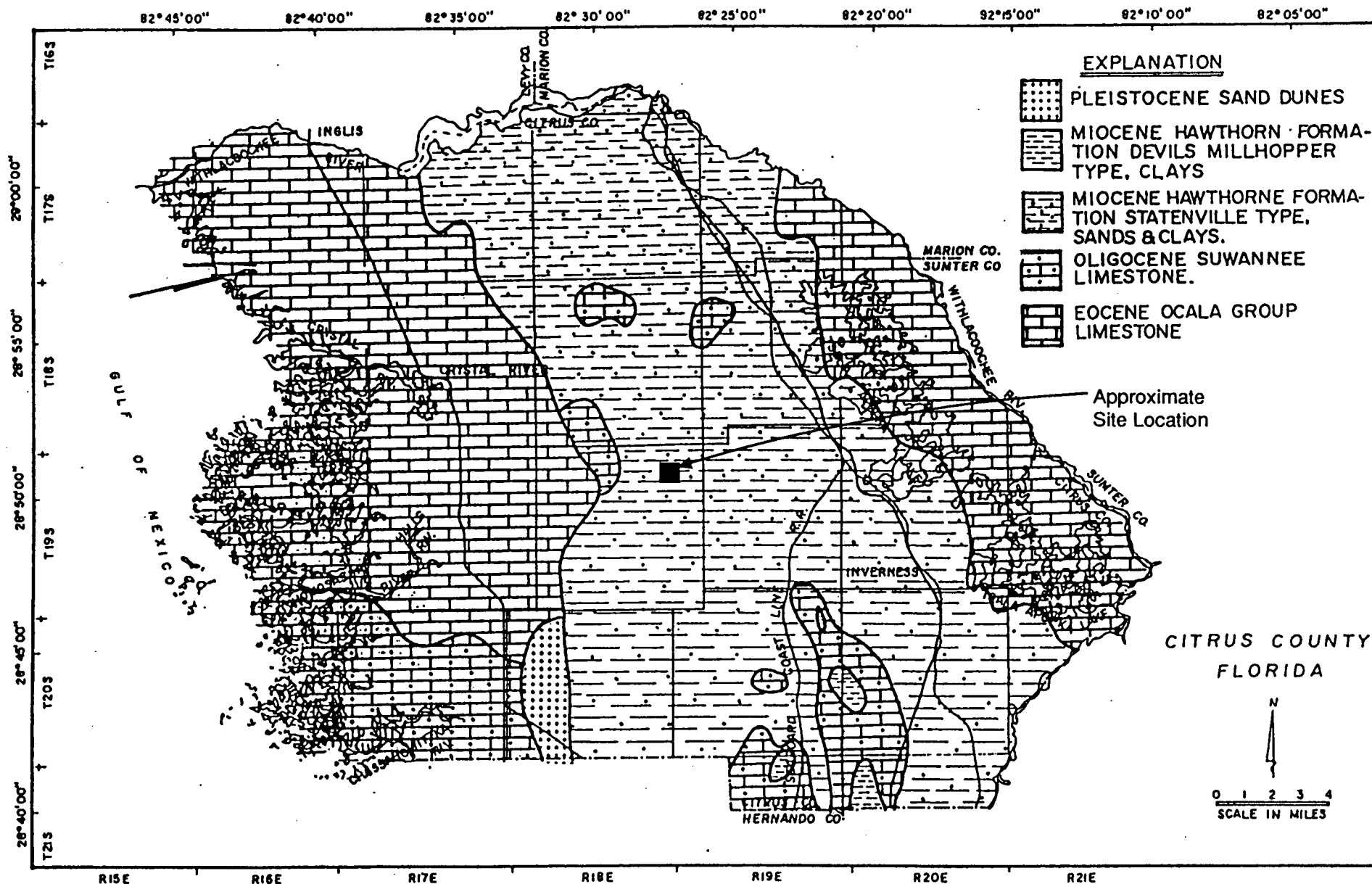
The closed 60-acre landfill is adjacent to the active 80-acre site. The closed 60-acre landfill has been capped, but was constructed without a liner. The new landfill has been constructed with a synthetic liner and a leachate collection system. Expansions will be constructed with a double liner system.

2.4 Regional Hydrogeology

The central ridge area of Citrus County is covered by undifferentiated sand and clay (Figure 2-1). A simplified stratigraphic sequence from top to bottom includes undifferentiated sands and clays of varying thicknesses overlying clays of the Hawthorn Formation, which overlie a thick sequence of limestones, including the Oligocene Suwannee Formation, Eocene Ocala Group, and Eocene Avon Park Formation. Clays of the Hawthorn Formation are not laterally continuous in the central ridge area. Geologic cross sections are shown in Figure 2-2.

Quaternary sediments consist of unconsolidated to poorly indurated clastic deposits composed mostly of quartz sand. These upper sediments were probably deposited by fluvial or eolian mechanisms. Portions of Citrus County have only a veneer of Quaternary sediments overlying the Eocene Ocala Group and Avon Park Limestone (Vernon, 1951).

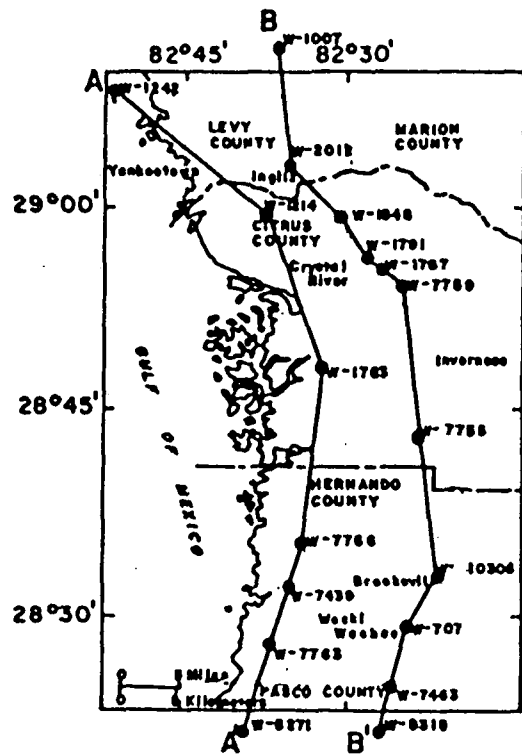
The Stratenville and Devils Millhopper facies of the Hawthorn Formation underlie the Quaternary sediments, and are Pliocene to Miocene in age. These sediments were deposited



Source: Groundwater Resource Availability Inventory, Citrus Co., Southwest Florida Water Management District

FIGURE 2-1
Regional Geology





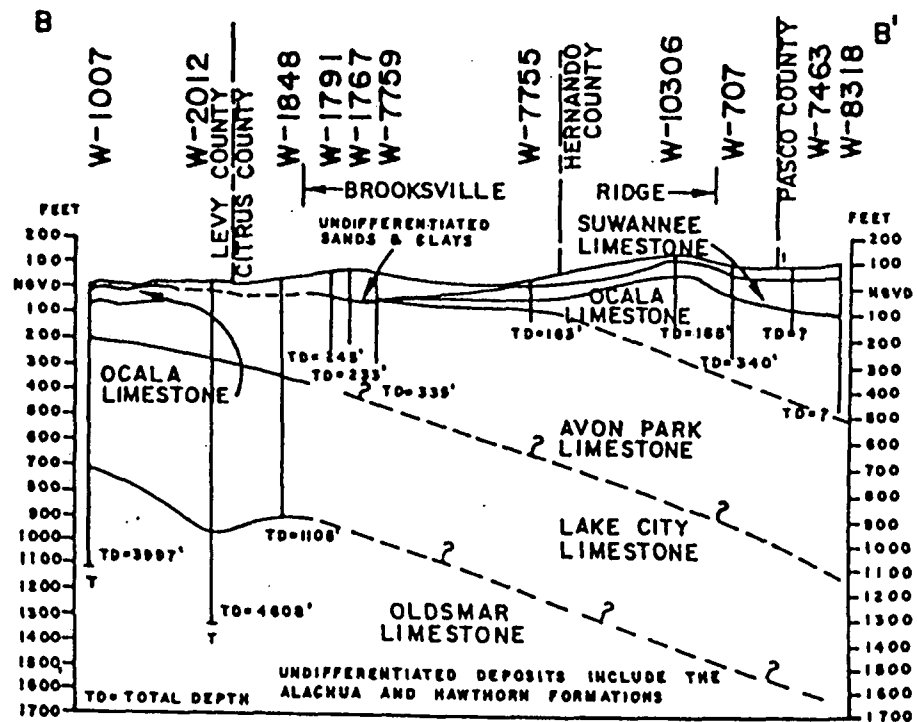
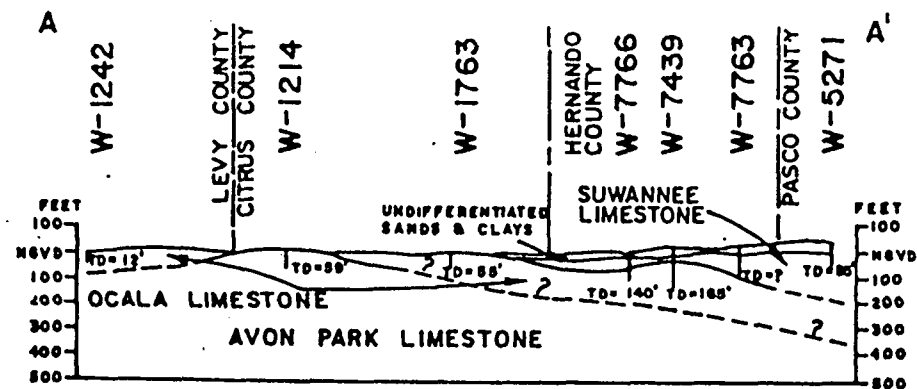
EXPLANATION

A — A'

LINE OF SECTION

● W-707

WELL AND FLORIDA BUREAU OF GEOLOGY REFERENCE NUMBER



VERTICAL SCALE GREATLY EXAGGERATED
NATIONAL GEODETIC VERTICAL DATUM
OF 1929.

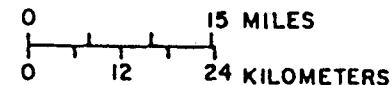


FIGURE 2-2
Regional Geologic Cross-Section



in a variety of environments, and consist of sand, silty sand, and waxy green clay. Phosphorite pebbles and oyster bars are common. The Hawthorn Formation may act as a partial confining unit to the Floridan aquifer in some parts of the county.

Below the surficial sands and clays lie a thick sequence of carbonate deposits consisting of Oligocene and Eocene limestones including the Suwannee, Ocala, and Avon Park formations. These chemically precipitated deposits contain shells and shell fragments of marine origin. The Oligocene Suwannee Limestone is exposed in the southwestern and northeastern parts of the county, and consists of a pure to slightly sandy limestone with secondary dolomitization. The Eocene Ocala Group consists of fossils in a silt to sand size matrix, and is usually soft, porous and friable (Brooks, 1981). The Avon Park Formation consists of finely crystalline dolomite with some fossiliferous limestone. It is very permeable in some areas, and is the deepest formation containing potable water (Seaburn and Robertson, 1985).

Groundwater in central Citrus County generally occurs under unconfined conditions. In the site vicinity, the Hawthorn Formation is not present, and the undifferentiated sands are hydraulically connected to the Floridan aquifer. The average water table elevation is approximately 8-10 feet NGVD, which is approximately 110 feet below ground level. Very little change occurs in the potentiometric surface between the wet and dry seasons because of little groundwater development (Fretwell, 1983). Regional groundwater flow in the Floridan aquifer beneath the site is generally westward toward the Gulf of Mexico. The site lies in a high recharge area estimated to receive between 10 and 20 inches of recharge per year (Stewart, 1980). Transmissivities of the Floridan aquifer in western Citrus County range from 90,000 to 2,000,000 square feet per day (Fretwell, 1983).

Section 3 Previous Investigations

3.1 Investigations Performed

No previous contamination assessment investigations have been performed at the Citrus County Central Landfill. Seaburn and Robertson, Inc. prepared a landfill renewal operation permit application for the old Citrus County Central Landfill in 1986 (60-acre site). As part of permitting Phase I of the new Citrus County Central Landfill (80-acre site), a hydrogeological investigation was performed by Post, Buckley, Schuch, and Jernigan (PBS&J), Inc. of Orlando, Florida, and a geotechnical investigation was performed by Universal Engineering Testing Company of Orlando, Florida. Both investigations were performed in 1988. The County has also conducted regular testing of wells at the site as part of the permit requirements.

3.2 Site Hydrogeology

PBS&J performed Standard Penetration Test (SPT) soil borings and developed several cross-sections at the site. A representative cross-section is shown in Figure 3-1. The upper 130 feet of sediments range from fine to medium sands to clayey, silty fine sands. Several 1 to 2-foot clay layers were encountered between 50 and 80 feet below land surface (bls). The shallow stratigraphy of the site can be generalized as a 10-foot thick surface layer of fine to medium-grained quartz sand; underlain by 120 feet of silty, clayey sand, and silty, fine-grained sand. These sediments form a low permeability unit above the Floridan aquifer with an average hydraulic conductivity of 0.024 feet per day.

Groundwater flow is essentially from east to west across the site. Water table maps for September, 1993 (wet season) and April, 1994 (dry season) are shown in Figures 3-2 and 3-3, respectively. The flow direction is more to the southwest in April, 1994 (Figure 3-3). Water table data are from the Citrus County Central Landfill Annual Groundwater Monitoring Report, October, 1994.

3.3 Groundwater Quality

Six monitoring wells, shown in Figure 3-4, are currently being sampled quarterly at the 60-acre closed landfill. Low levels of volatile organic compounds (VOCs) were previously detected in downgradient well MW-A in October, 1993, and January, 1994. Well MW-A had a damaged casing, and was plugged and abandoned and replaced with well MW-AA. Low levels of VOCs were detected in well MW-AA. A new well (MW-E) was installed further downgradient. The most recent groundwater sampling data (January 4, 1995) indicate no detected VOC contaminants in wells B, C, D, E, and R-1. Well MW-AA detected trace levels of VOCs (1 ppb benzene and 3 ppb vinyl chloride).

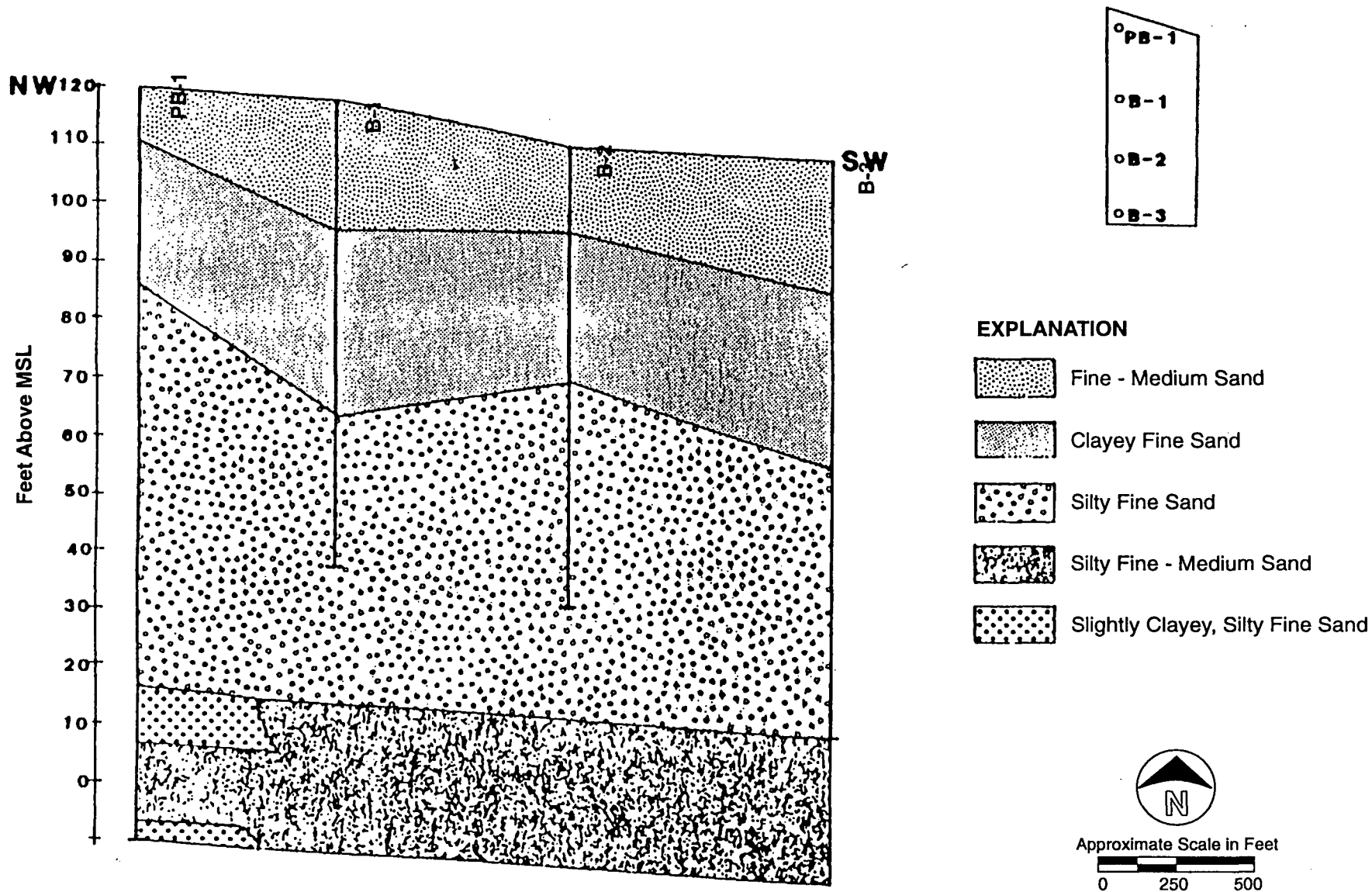
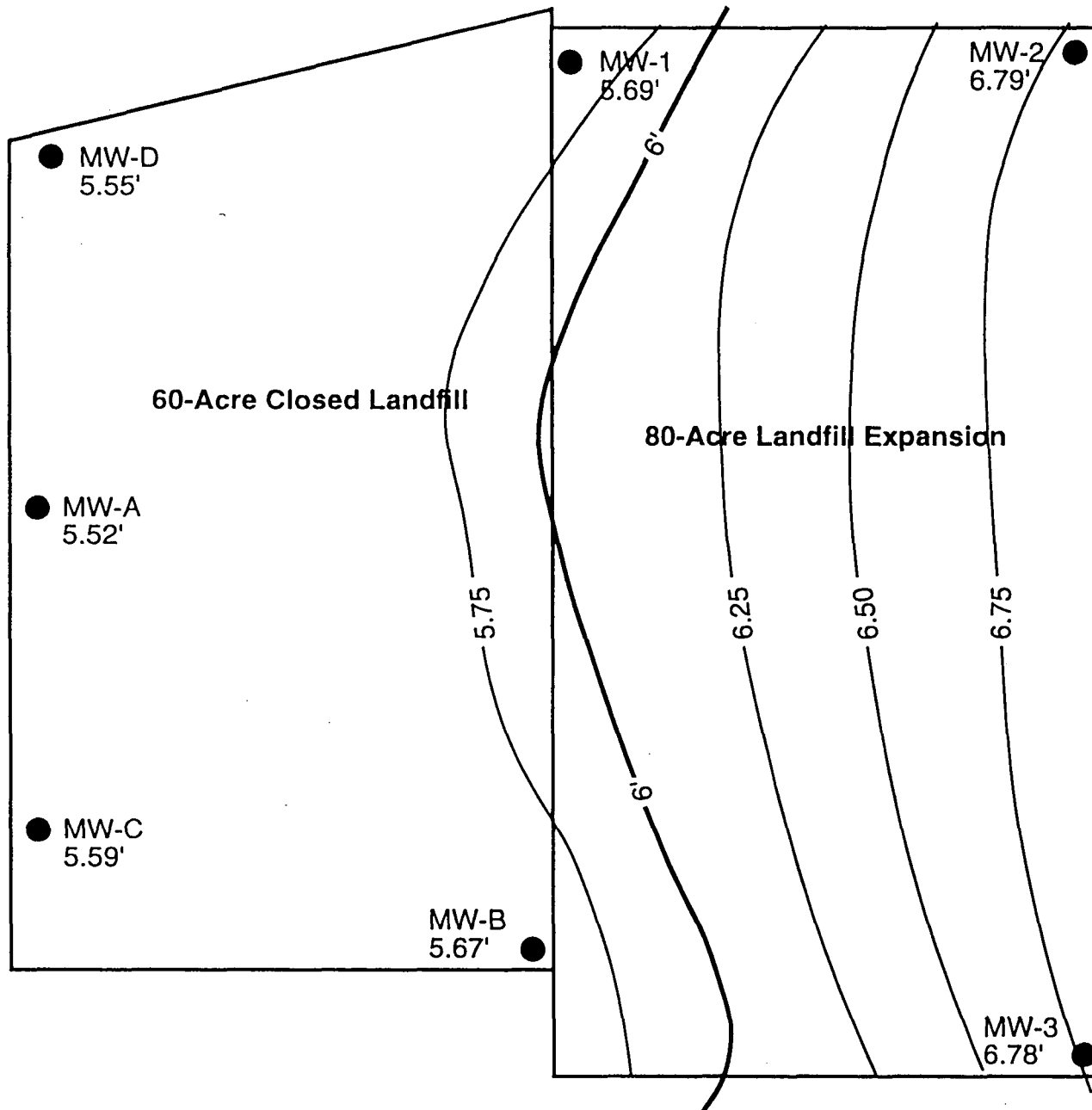


FIGURE 3-1
Local Geologic Cross-Section



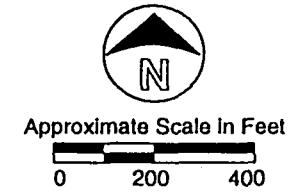
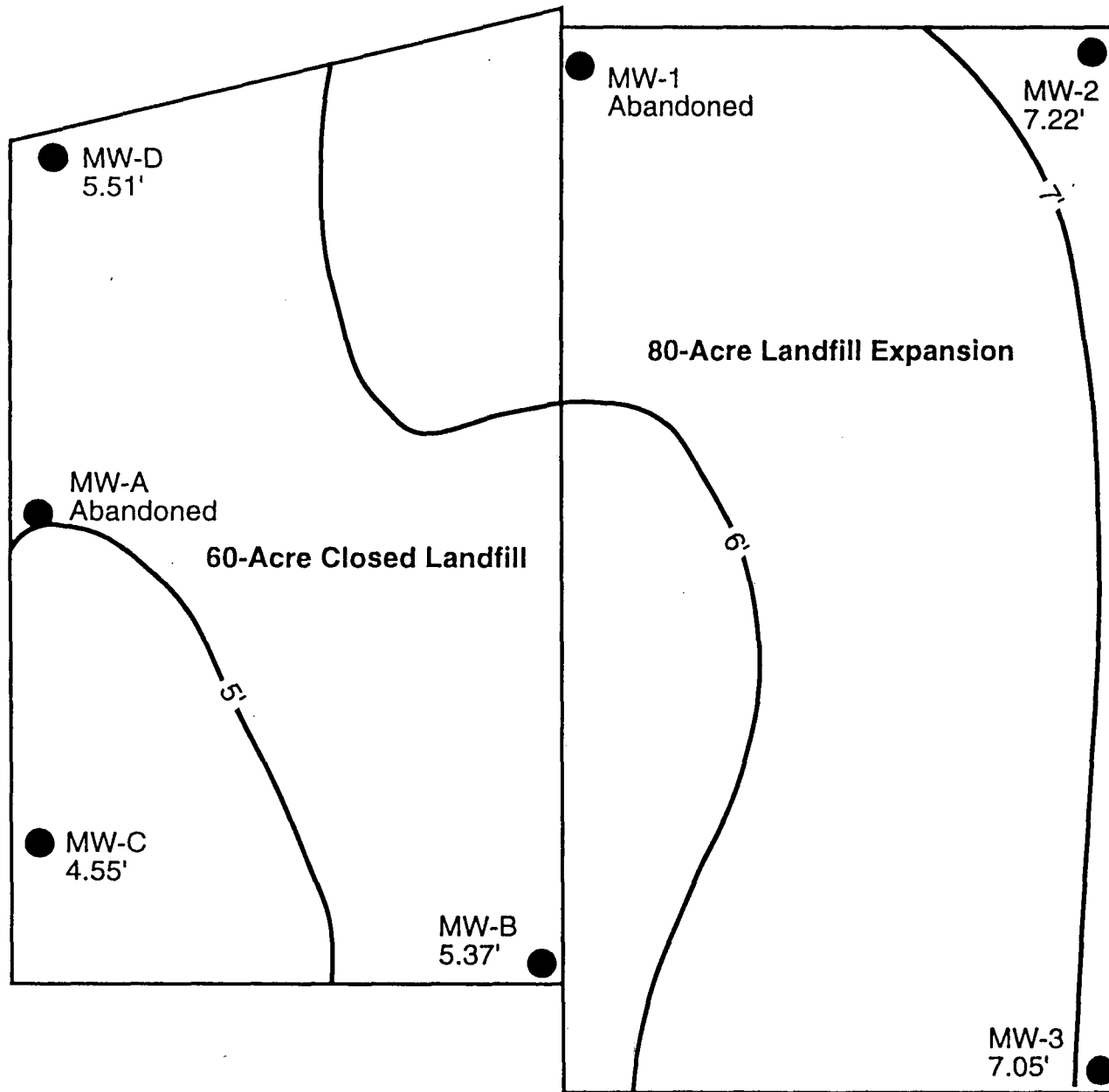


EXPLANATION

- MW-1 Well Locations and Identification
5.69' Water Level Elevation
- 6' — Contour Line and Elevation

FIGURE 3-2
Water Table Map for September 1993





- EXPLANATION**
- MW-1 Well Locations and Identification
 - 4.87' Water Level Elevation
 - 6' — Contour Line and Elevation

FIGURE 3-3
Water Table Map for April 1994



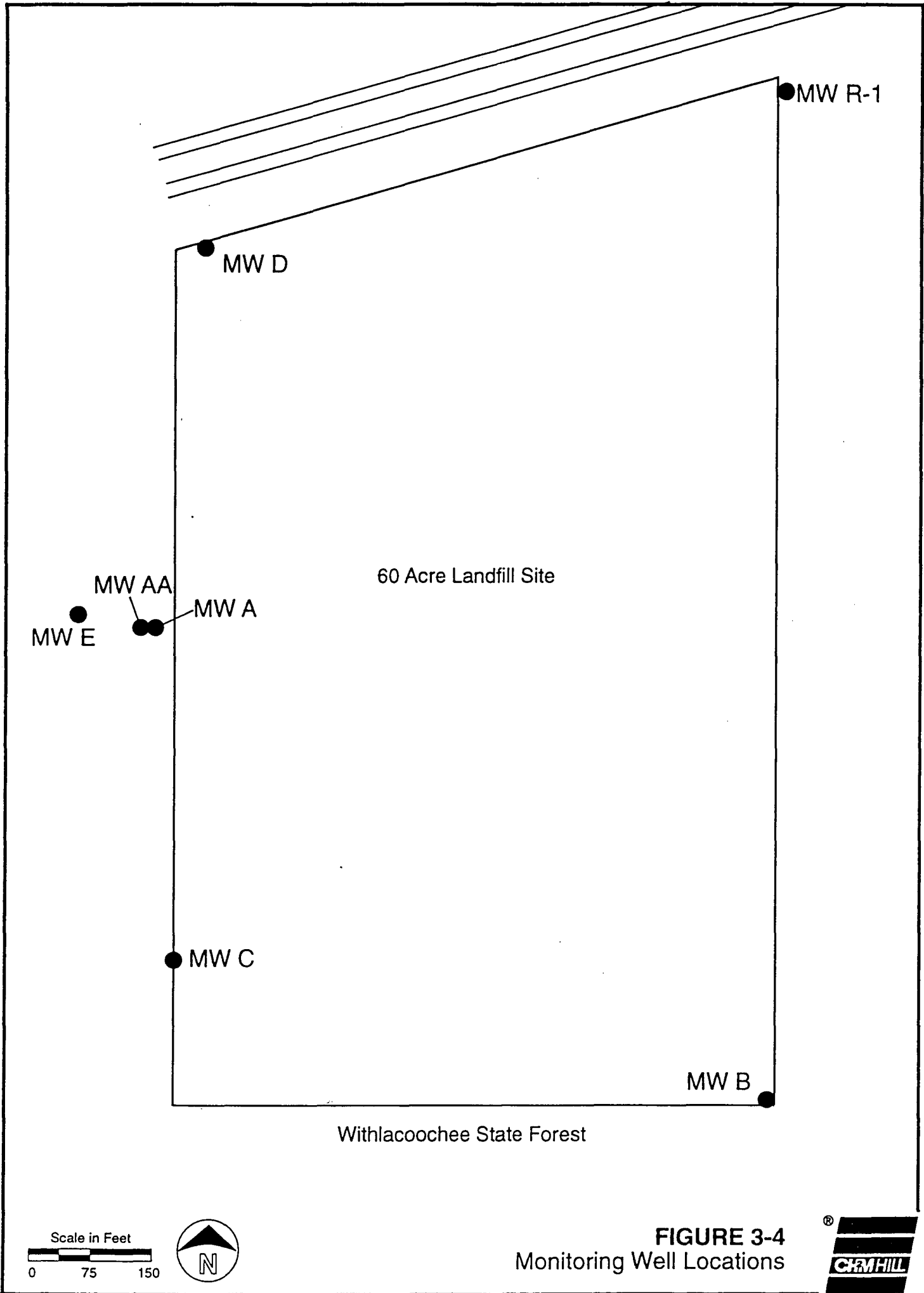


FIGURE 3-4
Monitoring Well Locations



Section 4

Contamination Assessment Tasks

This section describes the individual tasks that will be completed during the Contamination Assessment. All groundwater sampling activities and laboratory analyses will be performed by Orlando Laboratories, Inc., in accordance with its Comprehensive Quality Assurance Plan (#860106G) approved by the Florida Department of Environmental Protection (FDEP), or by CH2M HILL's Quality Analytical Laboratories, Inc., in accordance with its Comprehensive Quality Assurance Plan (#8705346), also approved by the FDEP. All other field activities will be performed by CH2M HILL in accordance with its FDEP-approved Field Comprehensive Quality Assurance Plan (#910036G).

4.1 Collection and Evaluation of Existing Data and Reports

Several hydrogeologic investigations have been conducted within the past ten years in the vicinity of the closed 60-acre landfill site. The information from these investigations will be compiled, and a comprehensive evaluation of the information will be performed to gain an understanding of site physical conditions, and the extent of groundwater contamination. This information will serve as the starting point for any expanded efforts to conduct a contamination assessment and prepare a Contamination Assessment Report (CAR).

4.2 Well Inventory

A well inventory will be performed for the area within a minimum two-mile radius of the site. Information regarding Consumptive Use Permits and Well Construction Permits will be obtained from files of the Southwest Florida Water Management District and Citrus County records for permitted water wells. The results of the well inventory will be included in the CAR.

4.3 Evaluation of Existing Monitor Wells

The six existing monitoring wells will be evaluated for acceptability for continued groundwater monitoring. This will involve a review of construction histories and a field inspection. All wells will be sounded to compare present depth with reported original depth. A table showing well construction details and other pertinent information will be prepared for the existing wells for inclusion in the CAR.

4.4 Hydrologic Testing and Groundwater Elevation Measurement

Aquifer hydrologic characteristics will be determined by conducting slug-tests on each of the six existing monitoring wells. Both rising-head and falling-head slug tests will be performed

in each well. The data obtained from the slug-tests will be used to determine groundwater flow velocity.

4.5 Groundwater Elevation Measurement

Water levels will be measured in the monitoring wells at the site on a single day. A steel tape and chalk will be used to measure depth to water in each well within 0.01 feet.

A water table contour map will be constructed and direction of groundwater flow will be determined. Hydraulic data obtained from the slug tests will be used to calculate the velocity of groundwater flow at the site. The direction and velocity of groundwater flow will be considered in terms of impact on the movement of contaminants.

4.6 Sampling and Analysis of Groundwater

Groundwater samples will be collected from the six (6) monitoring wells for USEPA Method 601/602 analyses. Groundwater samples will be collected on a quarterly basis for a period of one year. The first sampling event will be performed within thirty (30) days of FDEP approval of this CAP. The results of each sampling event will be submitted to FDEP within sixty (60) of sample collection.

Section 5
Data Evaluation and Contamination Assessment Report

After completion of the proposed tasks of the contamination assessment, a Contamination Assessment Report (CAR) will be prepared and submitted to the FDEP. The CAR will summarize and assess all tasks outlined in the CAP, and present the results of field analyses. The CAR will also include the results of the first round of quarterly sampling. The results of subsequent sampling events will be submitted to the Department under separate cover, sixty (60) days after completion of the respective sampling event.

Section 6 References

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- Fretwell, J.D., 1983, *Ground-Water Resources of Coastal Citrus, Hernando, and Southwestern Levy Counties, Florida*. USGS, WRI-Report 83-4079, 87p.
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