01.04-09/30/96-01727

SITE INVESTIGATION
SAMPLE STRATEGY PLAN
SITE 10
ORIGINAL BASE LANDFILL

MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA

CONTRACT TASK ORDER 0369

SEPTEMBER 30, 1996

Prepared for:

DEPARTMENT OF THE NAVY
ATLANTIC DIVISION
NAVAL FACILITIES
ENGINEERING COMMAND
Norfolk, Virginia

Under:

LANTDIV CLEAN Program
Contract N62470-89-D-4814

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LIST OF ACRONYMS AND ABBREVIATIONS

Baker	Baker Environmental, Inc.
bgs	Below Ground Surface
DoN	Department of the Navy
LANTDIV	Atlantic Division, Naval Facilities Engineering Command
MCB	Marine Corps Base
MCL	Maximum Contaminant Level
NC DEHNR	North Carolina Department of the Environment, Health, and Natural Resources
NCWQS	North Carolina Water Quality Standard
PCB	Polychlorinated Biphenyl
RA	Risk Assessment
RI	Remedial Investigation
SI	Site Investigation
SSP	Sample Strategy Plan
TAL	Target Analyte List
TCL	Target Compound List
USEPA	United States Environmental Protection Agency

1.0 INTRODUCTION

This Sample Strategy Plan (SSP) presents an overview of the Site Investigation (SI) scope of work for Site 10, Marine Corps Base (MCB), Camp Lejeune, North Carolina (Figure 1-1). The purpose of the SSP is to provide the United States Environmental Protection Agency (USEPA) Region IV, and the North Carolina Department of the Environment, Health, and Natural Resources (NC DEHNR) with a summary of the proposed field investigations that will be presented by the Department of the Navy (DoN), Atlantic Division, Naval Facilities Engineering Command (LANTDIV) during an upcoming project scoping conference call. This document is meant to be used as a supplement to the scoping call, therefore, questions and/or comments will be addressed during a future call.

A brief description of the site history, and summaries of previous investigations and the site visit are provided. The proposed field investigations are described, including be objectives and sampling rationale.

1.1 Site Description and History

Site 10, Original Base Landfill is located on the western side of Holcomb Boulevard approximately 1,600 feet south of Wallace Creek and 1,750 feet north of Bearhead Creek (Figure 1-2). Both creeks flow east to west and eventually drain into the New River. This study area is fairly clear of trees with a thick underbrush. The site is a topographical high sloping north, west and south. Surface water that does not infiltrate, will travel in the direction of slope to the swamps surrounding the site.

The landfill covers approximately 5 to 10 acres and was operated prior to 1950 for the disposal of construction debris and as a burn dump. Records documenting the type of debris and/or wastes disposed at the site are unavailable at this time. Construction debris (i.e., concrete, bricks, scrap metal and asphalt) were observed during the site visit. The site was recently added to the IR Program when it was reported that two marines obtained skin rashes by contacting a heavy oily material at the site.

1.2 Previous Investigations

Baker Environmental, Inc. (Baker) conducted an expedited site characterization and evaluation of Site 10 during the week of September 26, 1995. A single surface and two subsurface soil samples were collected from each of five locations (10-SB01 through 10-SB05) using a Geoprobe. Surface soil samples were collected from 0 to 6 inches below ground surface (bgs). The subsurface samples were collected from just above the water table and from a depth midway between the surface and the water table. Three temporary groundwater monitoring wells (10-TW01, 10-TW02 and 10-TW03) were installed at the site and sampled.

All soil samples were analyzed for full Target Compound List (TCL) Organics and Target Analyte List (TAL) Inorganics. The three groundwater samples were analyzed for full TCL Organics and TAL Inorganics (total and dissolved fractions).

Results of the surface and subsurface soils were compared to Region III Risk Based Concentrations (RBCs) for residential and industrial soil. No volatiles were detected in excess of these criteria in the surface soil samples, however, the following semivolatiles exceeded residential and/or industrial criteria: benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, and dibenzo(a,h)anthracene. No pesticides or PCBs were detected in excess of the above mentioned criteria.

The inorganic compounds detected in the surface soils were compared to the previously mentioned criteria as well as base background results. The following compounds were detected at concentrations which exceed the one or more of the criteria: arsenic, barium, beryllium, potassium, manganese, lead, and zinc.

The only compound which exceeded the residential criteria in the subsurface soil samples was benzo(a)pyrene and no compounds were detected above the industrial criteria. Arsenic, barium, calcium, copper, manganese, lead and zinc were detected at concentrations exceeding the residential, industrial and/or base background concentrations.

Groundwater results indicated that organics were present but at levels well below the Federal Maximum Contaminant Levels (MCLs) and the North Carolina Water Quality Standards (NCWQS).

The following inorganics were detected at levels above the Federal MCLs and/or NCWQS: aluminum, arsenic, chromium, iron, manganese, nickel, lead and vanadium.

1.3 Site Visit

The following provides a brief description of Site 10 field observations which were noted during the site visit conducted by Baker on September 18, 1996. Photographs 1-1 through 1-6 were taken during the site visit and depict site conditions and some of the items noted during the site visit.

- The suspected location of the site is approximately 150 feet west of Holcomb Boulevard in an area which contains few trees and heavy underbrush. The trees that do exist in the area appear to be less than 10 years in age.

- The suspected location is a topographical high with the elevation sloping to the north, west and south.

- Some metal debris was discovered protruding through the ground surface on the western portion of the suspected site. The types of debris include 3-inch steel piping, miscellaneous vehicle parts and rebar, but no evidence of drums or storage containers of any kind were observed.

- The surrounding area is wooded with trees varying in age from saplings to 30 - 40 years in age. Many swamps exist south, west and north of the suspected site location. It is not certain if the swamps presently exist due to the recent amount of rain, or if these areas remain marsh during most of the year.

- Miscellaneous metal, concrete and asphalt debris was discovered west of the suspected site location. Some of the material may have been discarded at the surface, however some were protruding through the ground surface.

2.0 PROPOSED SAMPLE STRATEGY

The following sampling strategy is proposed for the additional sampling activities at Site 10. The expedited sampling (September, 1995) was not conducted in the area presently suspected to be Site 10. In fact, it was conducted in an area located approximately 900 feet west of the suspected site area. Due to the discrepancy as to the actual location of Site 10, aerial photographs dating back to the early 1940s have been requested by Baker to help delineate the area in which the dumping occurred. The photos have been ordered from the Cartographic Branch of the National Archive and the USDA-FSA Aerial Photography Field Office, however they were not be available prior to the submittal of the SSP. Therefore, the sampling activities are centered around an area suspected to be the original base landfill but may need to be modified if the historical photographs indicate the location of the landfill is elsewhere.

The focus of this Site Investigation (SI) is to determine if contamination is present at the site, to collect data to determine if additional work is warranted in the form of a Remedial Investigation (RI), to establish the direction of groundwater flow in the shallow aquifer, to provide a limited quantitative Risk Assessment (RA) using conservative receptors, and to qualitatively assess all data against applicable criteria. It is not the focus of the SI to determine the extent (if any) of contamination detected at the site, therefore the number of samples collected at the site are based on the dimensions of the site and observations made during the site visit.

Soil samples will be collected across the site using Geoprobe direct push technology, therefore eliminating any need for soil investigative derived waste characterization and disposal. In addition, seven temporary monitoring wells will be installed at the site and sampled. Figure 2-1 identifies the soil boring/temporary well locations. The number of sampling locations are subject to change based on the actual location and dimensions of the original based landfill once determined by the historical aerial photographs. Additionally, any observations during the investigation eluding to additional areas of disposal not depicted in the photographs may affect the number of sample locations.

2.1 Soil Investigation

The proposed soil investigation was developed to determine whether debris disposed at the site have contaminated the adjacent soils and potentially the groundwater. A 200 x 200 foot grid will be

established to determine the soil sample locations. Soil samples will be collected from two additional locations in the areas where additional debris was observed beyond the suspected limits of the site.

Surface soil samples will be collected from 0 - 1 feet below ground surface (bgs) at each of the locations providing analytical data to support the RA. To determine whether soil is a possible source of groundwater contamination, one subsurface soil sample will be collected from each of the locations from just above the water table. A second sample may be collected at each boring if evidence of contamination (i.e., visible or by monitoring equipment) is noted or if the depth to groundwater is greater than 10 feet bgs. The samples will be analyzed for TCL organics and TAL inorganics.

2.2 Groundwater Investigation

The proposed groundwater investigation was developed to determine whether the debris disposed at the site has contaminated the groundwater in the vicinity of the site, to determine the direction of groundwater flow in the surficial aquifer, and to provide data for the RA. Groundwater in the vicinity of the site may flow either to the north toward Wallace Creek; to the south toward Bearhead Creek; or in both directions. It is necessary to determine groundwater flow direction in order to assure proper placement of monitoring wells during an RI (if necessary) and to assure sample collection downgradient of the site.

A total of seven temporary wells are proposed for installation across the site. Three wells are to be installed within the boundaries of the site and four will be installed just beyond the perimeter of the landfill area. A magnetometer will be utilized in conjunction with the historic aerial photographs to determine the boundary of the landfill. The wells will be constructed allowing the screen portion of the well to intercept the water table. Each well will be developed and sampled for TCL organics and TAL metals. In addition, the wells will be surveyed and two rounds of water levels will be collected. Upon completion of the SI, the wells will be removed and the locations marked for future use.

2.3 Investigation Derived Waste

A single sample of the development water will be obtained and analyzed for full TCL organics, TAL metals, Total Dissolved Solids (TDS) and Total Suspended Solids (TSS) in order to assess disposal options.

2.4 Surveying

A site survey will be conducted at the site near the conclusion of the field activities. Site features such as the tree line, the boundary of the landfill, surface water features and any areas where dumping had occurred outside of the landfill boundaries will be surveyed as well as all sample locations.

FIGURES

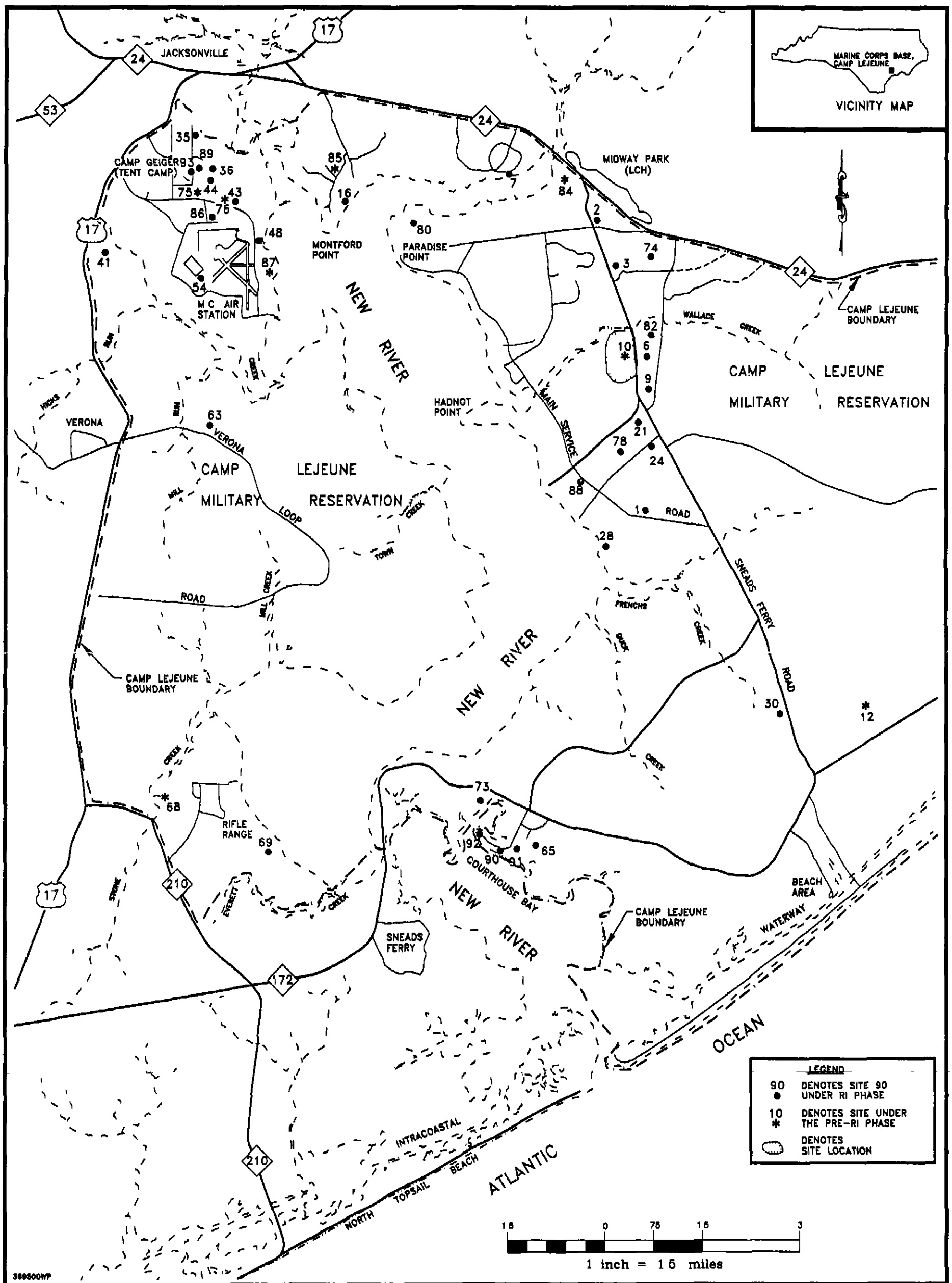

FIGURE 1-1
OPERABLE UNITS AND SITE LOCATIONS AT
MARINE CORPS BASE CAMP LEJEUNE
SAMPLE STRATEGY PLAN CTO-0369

MARINE CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA

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Baker
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FIGURE 1-2
SITES 10, ORIGINAL BASE LANDFILL LOCATION MAP
SAMPLE STRATEGY PLAN CTO-369
MARINE CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA

SOURCE: U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE: AERIAL PHOTOGRAPH FIELD OFFICE

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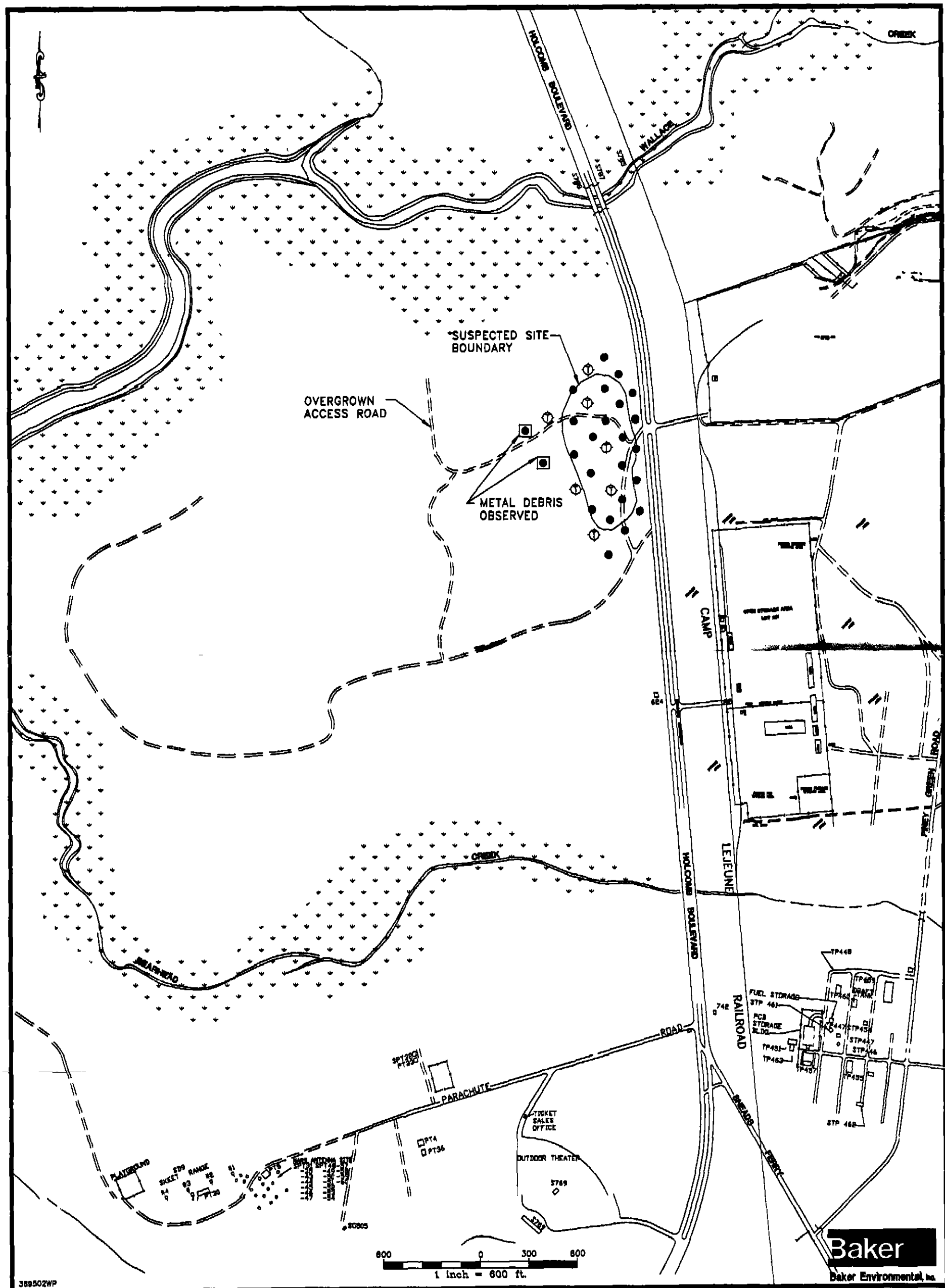

LEGEND

⊕ – TEMPORARY WELL LOCATION WITH SURFACE AND SUBSURFACE SOIL SAMPLES

● – SURFACE AND SUBSURFACE SOIL LOCATION

FIGURE 2-1
SITE 10, ORIGINAL BASE LANDFILL
PROPOSED SAMPLING LOCATIONS
SAMPLE STRATEGY PLAN, CTO-0369

MARINE CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA

01727E032

PHOTOGRAPHS

Photograph 1-1: Photograph of a portion of the "cleared area". Note the treeline in the background which indicates the beginning of the wooded area surrounding the suspected site location.

Photograph 1-2: Photograph illustrating the thick underbrush present in the southern portion of the "cleared area".

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Photograph 1-3: This photograph depicts the density of the wooded area. As one can see, there are areas where the trees are younger or not present.

Photograph 1-4: Photograph depicting one of the marshy areas surrounding the site. This particular marsh area exists south of the suspected location of the landfill.

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Photograph 1-5: Photograph of the partially buried 3" metal piping observed west of the suspected site location.

Photograph 1-6: Photograph of buried metal and concrete debris located west of the site.

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