

# Report

Hackensack Meadowlands Development  
Commission

Preliminary Environmental and  
Health Impact Statement for  
the Materials Handling  
Complex at the Former  
Keegan Landfill

Kearny, New Jersey

May 1995

16

# Contents

# Contents

List of Tables

List of Figures

Executive Summary

<b>Section 1</b>	Site History and Site Design .....	1-1
1.1	Site History .....	1-1
1.2	Ownership .....	1-4
1.3	Site Design .....	1-4
<b>Section 2</b>	Environmental Inventory .....	2-1
2.1	Physical/Chemical Environment .....	2-4
2.1.1	Geology .....	2-4
2.1.2	Soils .....	2-5
2.1.3	Hazardous Wastes .....	2-7
2.1.4	Groundwater Resources .....	2-10
2.1.4.1	On-Site Subsurface Hydrology .....	2-10
2.1.5	Surface Water Resources .....	2-11
2.1.5.1	On-Site Water Bodies .....	2-11
2.1.5.2	Upstream and Downstream Tributaries .....	2-14
2.1.6	Topography .....	2-17
2.1.7	Climatological Data .....	2-19
2.1.8	Ambient Air Quality .....	2-21
2.1.8.1	Applicable Regulations .....	2-21
2.1.8.2	Study Area Ambient Air Quality .....	2-22
2.1.8.3	Regional Ambient Air Quality .....	2-26
2.1.9	Ambient Acoustical Conditions .....	2-27
2.1.9.1	Noise Measurements .....	2-27
2.1.9.2	Relevant Noise Regulations and Guidelines .....	2-30
2.1.9.3	Environmental Noise Monitoring Program .....	2-35

2.2	Biological/Ecological Environment .....	2-38
2.2.1	Plant Associations (Flora) .....	2-38
2.2.1.1	Inactive Waste Disposal Site .....	2-38
2.2.1.2	Freshwater Marsh .....	2-39
2.2.2	Animal Associations (Fauna) .....	2-39
2.2.2.1	Game and Non-Game Mammals .....	2-39
2.2.2.2	Game and Non-Game Birds .....	2-39
2.2.2.3	Reptiles and Amphibians .....	2-40
2.2.2.4	Fish .....	2-40
2.2.3	Threatened and Endangered Species (Vegetation Fish and Wildlife), Including Unique Habitats .....	2-40
2.2.3.1	Threatened or Endangered Species .....	2-41
2.2.3.2	Remnant or Unique Habitat .....	2-48
2.3	Cultural Environment .....	2-48
2.3.1	Recreational Resources .....	2-48
2.3.2	Aesthetic (Visual) Resources .....	2-48
2.3.3	Historical/Archeological Resources .....	2-50
2.4	Socioeconomic Environment .....	2-53
2.4.1	Transportation Facilities .....	2-53
2.4.1.1	Proposed Facility Network .....	2-53
2.4.1.2	Regional Conditions .....	2-55
2.4.2	Public Utilities .....	2-56
2.4.2.1	Sewage Facilities .....	2-56
2.4.2.2	Stormwater Management .....	2-56
2.4.2.3	Water Supply .....	2-57
2.4.2.4	Energy Supply .....	2-58
2.4.3	Public Services .....	2-58
2.4.4	Community Facilities .....	2-58
2.4.5	Population and Housing .....	2-59
2.4.5.1	Population .....	2-62
2.4.5.2	Housing .....	2-63

<i>Section 3</i>	Environmental Assessment and Mitigation .....	3-1
	3.1 Physical/Chemical Environment .....	3-1
	3.1.1 Geology, Topography and Soils .....	3-1
	3.1.2 Hazardous Wastes .....	3-3
	3.1.3 Groundwater Resources .....	3-4
	3.1.4 Surface Water Resources .....	3-6
	3.1.5 Air Quality and Climate .....	3-8
	3.1.6 Odors/Landfill Gases .....	3-11
	3.1.7 Noise .....	3-13
	3.2 Biological/Ecological Environment .....	3-20
	3.2.1 Terrestrial and Aquatic Environment .....	3-20
	3.3 Cultural Environment .....	3-21
	3.3.1 Visual Resources .....	3-21
	3.3.2 Historical/Archeological Resources .....	3-22
	3.4 Socioeconomic Environment .....	3-22
	3.4.1 Transportation and Traffic .....	3-22
	3.4.2 Public Utilities .....	3-23
	3.4.3 Public and Community Services .....	3-25
	3.4.4 Population .....	3-27
	3.4.5 Land Use and Zoning .....	3-28
<i>Section 4</i>	Facility Relationship to Federal State County and Local Land Use or Environmental Plans, Policies, Controls or Regulations .....	4-1
<i>Section 5</i>	Unavoidable Adverse Environmental Effects .....	5-1
<i>Section 6</i>	Project Alternatives .....	6-1
	6.1 Introduction .....	6-1
	6.2 Continued Transportation and Disposal Out-of-State .....	6-1
	6.3 Alternative Sites .....	6-1
	6.4 Alternative Design .....	6-2
<i>Section 7</i>	Short Term Use of the Environment .....	7-1
	7.1 Short Term Use of the Environment .....	7-1
	7.2 Maintenance and Enhancement of Long-term Productivity .....	7-1
<i>Section 8</i>	Irreversible or Irretrievable Commitments .....	8-1
<i>Section 9</i>	References .....	9-1

# List of Tables

*Table*

2-1	Soil Series in the Hackensack Meadowlands District .....	2-6
2-2	Summary of Sediment and Surface Water Samples Taken at the Former Keegan Landfill .....	2-8
2-3	Groundwater Usage .....	2-12
2-4	New Jersey Water Quality Criteria .....	2-16
2-5	Climatological Values for Area Surrounding Proposed Keegan Landfill ..	2-20
2-6	Comparison of State and Federal Ambient Air Quality Standards .....	2-22
2-7	Keegan Landfill Study Area - Existing Air Quality .....	2-25
2-8	Hackensack Meadowlands District - Existing Air Quality .....	2-28
2-9	Maximum Energy - Equivalent and Day-Night Equivalent Sound Levels of Study Area Noise Monitoring Locations .....	2-37
2-10	Location A Octave Band Center Frequency .....	2-37
2-11	Threatened and Endangered Species Observed in the Hackensack Meadowlands .....	2-42
2-12	Existing Parks and Recreational Facilities .....	2-49
2-13	Harrison Avenue and Schuyler Avenue NJDOT 1995 Traffic Study .....	2-53
2-14	PVSC Sewerage Treatment Facility .....	2-56
2-15	North Jersey District Water Supply Commission Water Supply System ..	2-57
2-16	Project Study Area Educational Facilities .....	2-60
2-17	Demographics and Employment Data for Bergen and Hudson Counties and the Hackensack Meadowlands District .....	2-61
2-18	Demographic and Employment Data for Kearny and Harrison .....	2-62
2-19	Real Property Valuation and Housing Units .....	2-63

3-1	Comparison of Exhaust Emissions for Heavy-Duty Gasoline and Diesel Powered Construction Equipment and Vehicles and Light-Duty Vehicles . . . . .	3-9
3-2	Typical Construction Equipment Noise Levels . . . . .	3-14
3-3	Predicted Maximum Construction Leq Sound Levels . . . . .	3-15
3-4	Predicted Maximum Facility Operations . . . . . Daytime Leq Sound Levels	3-18

(w:\docs\hmdc\keegan\tab)

# List of Figures

## Figure

1-1	Site Location Map	1-2
1-2	Facility Block and Lots	1-3
1-3	Preliminary Facility Design	1-5
2-1	Project Study Area	2-2
2-2	Site Location within HMDC Boundary	2-3
2-3	USEPA Site Inspection Sample Locations	2-9
2-4	On-Site Surface Water Quality Samples Location and Results	2-13
2-5	Surface Water Features	2-15
2-6	Existing Site Topography	2-18
2-7	State of New Jersey Monitoring Network	2-23
2-8	A-Weighted Sound Pressure Levels Associated with Common Sounds	2-29
2-9	Example of Outdoor Day-Night Energy Equivalent Noise Levels	2-31
2-10	Study Area Noise Monitoring Locations	2-36
2-11	Existing Threatened/Endangered and Remnant/Unique Habitats	2-43
2-12	Peregrine Falcon Feeding Habitat Quality	2-46
2-13	Cultural Resources in or around the Hackensack Meadowlands District	2-51
2-14	Facility Transportation Network	2-54
3-1	Study Area Noise Monitoring Locations and Sensitive Receptors	3-16
6-1	Alternative Design	6-3

[w:\docs\hmdc\keegan\fig]

# Executive Summary

# Executive Summary

The Hackensack Meadowlands Development Commission (HMDC) proposes to construct and operate a Materials Handling Complex in Kearny, Hudson County, New Jersey. This facility will consist of a non-processible materials landfill and a construction/demolition recycling facility on the site of the former Keegan Landfill. The former Keegan Landfill is located on land which is primarily owned by the Town of Kearny. This Preliminary Environmental and Health Impact Statement (PEHIS) addresses the landfill portion of the project.

Key to the development of this non-processible landfill is the long-term environmental remediation of the former landfill operation on the site. Therefore, background information about the former landfill operation is an important component of this PEHIS.

HMDC has designated certain blocks and lots for this facility which cover a total of 421 acres. HMDC solid waste landfilling operations, however, will be limited to the approximately 110 acre former Keegan Landfill tract. The remainder of the site includes the Kearny Freshwater Marsh. The Kearny Freshwater Marsh will benefit directly by the remediation of the former landfill through construction of a perimeter leachate collection system, a confining cutoff wall and wetlands mitigation. Leachate will be prevented from discharging to the surrounding area by the perimeter collection system. Controlling existing leachate discharges to surrounding marshes will positively impact the local environment by improving water quality and wildlife habitat. In addition, excess revenues from the proposed facility will be used to close the currently inactive MSLA 1-D Landfill. Similar environmental benefits will be realized as a result of the closure of MSLA 1-D.

The Town of Kearny, as the majority property owner of the Keegan site, will experience positive economic and fiscal effects as a result of benefits from both the remediation and operation of the proposed landfill. Specifically, HMDC will assume all closure and post-closure liability for the site. These costs have been estimated by HMDC to exceed \$60 million. In addition, the Town will realize a minimum of \$2 million per year in host community benefits. Further, the financial liability that HMDC would assume for the closure and post-closure at the abandoned MSLA 1-D landfill will be approximately the same as that for the Keegan site.

The marsh will also be part of the reuse plan for the landfill at post-closure. The landfill will be vegetated at post-closure to provide habitat compatible with uplands adjacent to the wetlands.

The Keegan Landfill operated from the late 1940s until 1972. During that time, the site accepted a variety of wastes including municipal, industrial, construction, and demolition debris. These operations predated environmental regulations, and thus there were no measures taken to control the spread of pollutants into the environment. Soon after HMDC was created by the New Jersey Legislature in 1969, it began to limit the expansion of all landfills in the Hackensack Meadowlands District. This included the expansion of the Keegan Landfill farther into the surrounding Kearny Freshwater Marsh.

A 1989 study for the United States Environmental Protection Agency by the NUS Superfund Division indicated that the Keegan site was ranked medium priority for cleanup. NUS recommended that the site be fenced to prevent access and that at least two feet of soil be placed over the entire site. To date, none of these recommendations have been implemented. The site has had numerous underground fires over the years (one fire resulted in the closure of a nearby New Jersey Turnpike toll plaza), and significant efforts were required of the Town Fire Department and contractors hired by the Town to extinguish these fires.

In the twenty years since the landfill ceased operating virtually no remedial work has been performed primarily because of the prohibitive cost involved. In order to raise the money to perform the environmental improvements, HMDC is proposing that a non-processible materials landfill be operated on top of the former Keegan Landfill, an arrangement commonly referred to as a "piggy back" landfill. In conjunction with the landfill operations, HMDC will undertake a massive remediation of the site. The remediation will include extensive on-site geotechnical data collection. This will form the basis for the design of a perimeter cutoff wall and leachate collection system. The key features of the design will be a soil-bentonite (clay) cutoff wall that will encircle the site and be "keyed" into the existing underlying clay soils. The leachate collection system, which consists of a perforated pipe and gravel trench (essentially a french drain), will be located inside the cutoff wall and a minimum of two feet below the level of the Kearny Marsh. This design insures that the head of water is always higher outside of the cutoff wall than the inside. The state-of-the-art design is known as an "in-flow landfill". This design has been widely used in landfills throughout the world, including three sites in the Meadowlands. A new force main will be built to convey leachate from the facility to the 1-A Landfill east of the site. Another new force main from the 1-A Landfill to the Kearny South Pump Station will permit the leachate to be sent to the Passaic Valley Sewerage Commissioners (PVSC) facility for treatment through the Kearny Municipal Utility Authority (KMUA) sewerage system.

Additional perimeter improvements will be constructed that include runoff control, sedimentation basins to prevent the discharge of stormwater-borne sediments into the Kearny Freshwater Marsh, and controlled outfalls at strategic locations around the site.

The non-processible materials that are proposed to be accepted at the landfill are wastes that are now mostly being transferred out of state. It is anticipated that this facility would be available to 5 or 6 counties in Northern New Jersey. The non-processible wastes are not recyclable, and cannot be burned at a resource recovery facility. Included in this waste category are sheetrock, non-recyclable plastics, industrial and commercial residuals, treated lumber, asbestos, etc. No putrescible (household) wastes will be accepted.

Based on current regulations, the site will accept waste only from New Jersey sources. All wastes would be covered on an interim basis in accordance with applicable regulations, and a final cover will be spread over the entire site at closure.

In 1995, HMDC, in conjunction with CDM, conducted an environmental data collection program at the former Keegan Landfill site. This included noise and water quality sampling. Based on data collected at the site for this PEHIS, the assessment characterized the significant beneficial and adverse impacts to the following environments: physical/chemical, biological/ecological,

cultural and socioeconomic. This analysis identified potential groundwater, surface water quality, wetlands, traffic, visual and recreational impacts both positive and negative. Beneficial impacts are expected for the site and surrounding environment, including the Kearny Marsh, due to remedial measures designed to improve water quality. Traffic impacts will be minimized by the use of Harrison Avenue for site access. The 100 foot elevation of the landfill at completion will have a minor adverse impact on the visual aesthetics of the area. Because of the large buffer areas and physical distance of separation, adjacent recreational facilities will receive only minor impacts from noise and fugitive dust emissions.

[w:\docs\hmdc\keegan\execsum]

1

Section  
One

# Section 1

## Site Description and Site Design

The proposed non-processible landfill consists of 110 acres of a 421-acre tract located on Bergen Avenue in the Town of Kearny in Hudson County, New Jersey (Figure 1-1). The landfill is proposed for Block 205, Lots 18, 19, 24, 27, 28, 29, 30, 31, 32, and 33. The current site conditions are shown on Figure 1-2 in relation to these block and lots. In addition to the landfill, HMDC also proposes to include a construction/demolition debris recycling operation on a portion of the site adjacent to Bergen Avenue.

On December 2, 1992, the New Jersey Department of Environmental Protection (NJDEP) certified the amendment to the Hackensack Meadowlands Development Commission (HMDC) Solid Waste Management Plan that provides for the siting of this facility. At that time, NJDEP stated that "This proposed facility represents a significant initiative in reducing the state's dependence on out-of-state landfills and in remediating previously closed landfills."

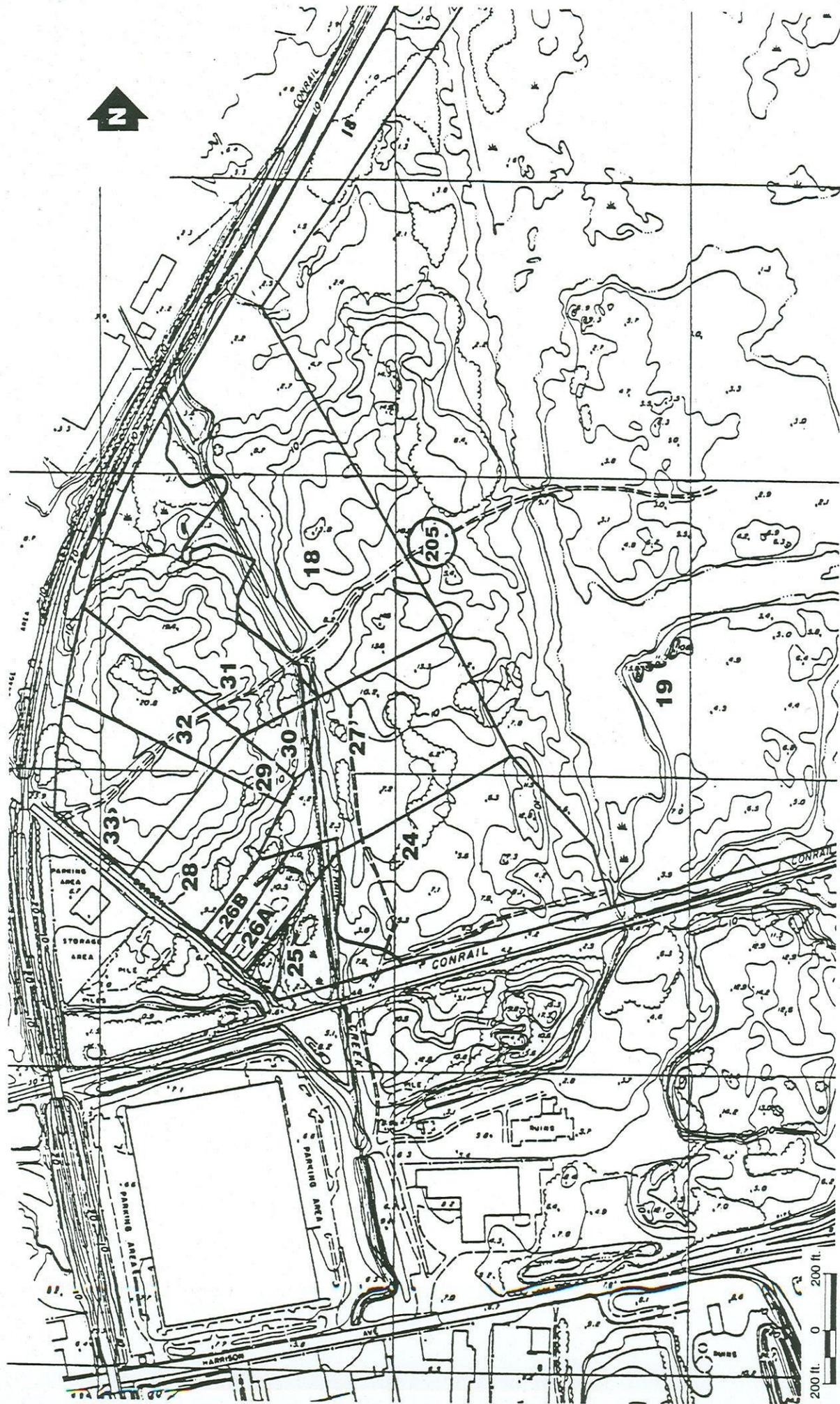
On October 30, 1993, NJDEP approved a subsequent certification to HMDC's Solid Waste Management Plan that addressed then Governor Florio's Task Force Recommendations on solid waste. This required that HMDC specifically address efforts towards regionalization. The cornerstone of these regionalization efforts is HMDC Materials Handling Complex, which consists of the non-processible landfill and the construction/demolition debris recycling facility at the former Keegan Landfill. The NJDEP further stated that "...HMDC can and should play an active role in addressing the regional solid waste management needs of the northeastern counties of the State."

### 1.1 Site History

It is believed that the first landfill operations on the Keegan site were in the 1940's. However, the majority of the landfilling activities occurred in the 1960's and until 1972 when the site was closed to operations. The site was operated by the Municipal Sanitary Landfill Authority (a private company) as the MSLA 1-B Landfill, under a lease agreement with the Town of Kearny. This lease agreement basically permitted MSLA to landfill all of the Meadowlands area under the control of the Town with no environmental improvements and no financial assurances.

Because the landfill ceased operations prior to the State Solid Waste Management Act, the operator/owner was not required to construct environmental improvements. Consequently, leachate is being discharged from the site at an estimated rate of 65 million gallons per year based on rainfall data, site acreage, etc. This leachate enters either Kearny Freshwater Marsh, or Frank's Creek which bisects the site and flows south to Newark Bay. Frank's Creek has often been described as an open sewer that varies in color and odor. Earlier reports by the NUS Corporation indicated chromium contamination of the Creek, which would account for a yellow staining of the water. Leachate seeps are also evident along the banks of the Creek and the perimeter of the site.





Block 205, Lots 18, 19, 24, 27, 28, 29, 30, 31, 32 and 33

**Figure 1-2**  
**Facility Block and Lots**  
 HMDC Materials Handling Complex - PEHIS

Further, the site has been plagued with underground fires several times a year since the site ceased operations. This resulted in the closure of a nearby turnpike toll plaza during one event. More recently, the Town spent a considerable amount of money covering a large area with soil to stop an underground fire.

A September 29, 1989 report prepared by the NUS Corporation/Superfund Division for the United State Environmental Protection Agency indicated the presence of mercury, lead, chromium, polychlorinated biphenols (PCB's) and several semi-volatile compounds in various sediment samples. Mercury, lead, and chromium were also detected in surface water samples collected in Frank's Creek at that time.

Also noted in the NUS report was that a member of the Kearny Police Department had worked as a truck driver for DuPont Chemical in Newark in the 1960's. He reported that every morning, at least one truck with approximately forty 30-gallon drums went to the Keegan Landfill. These wastes included chromate and bichromate slurry, pigment wastes, and other organic wastes. However, during follow-up site investigations by NUS, no drums were found.

The NUS summary report concluded that the site poses a potential threat of contamination to surface waters. Even 20 years after the waste disposal occurred, downstream water and sediment samples indicate concentrations of chromium significantly greater than upstream samples. NUS also indicated that there was potential for direct contact with hazardous substances on the site, and they recommended that the site be fenced and covered. However, no site controls were put in place by the Town. At many times of the year, people are seen either hunting or fishing on the site. Further, there is significant evidence of illegal dumping throughout the site.

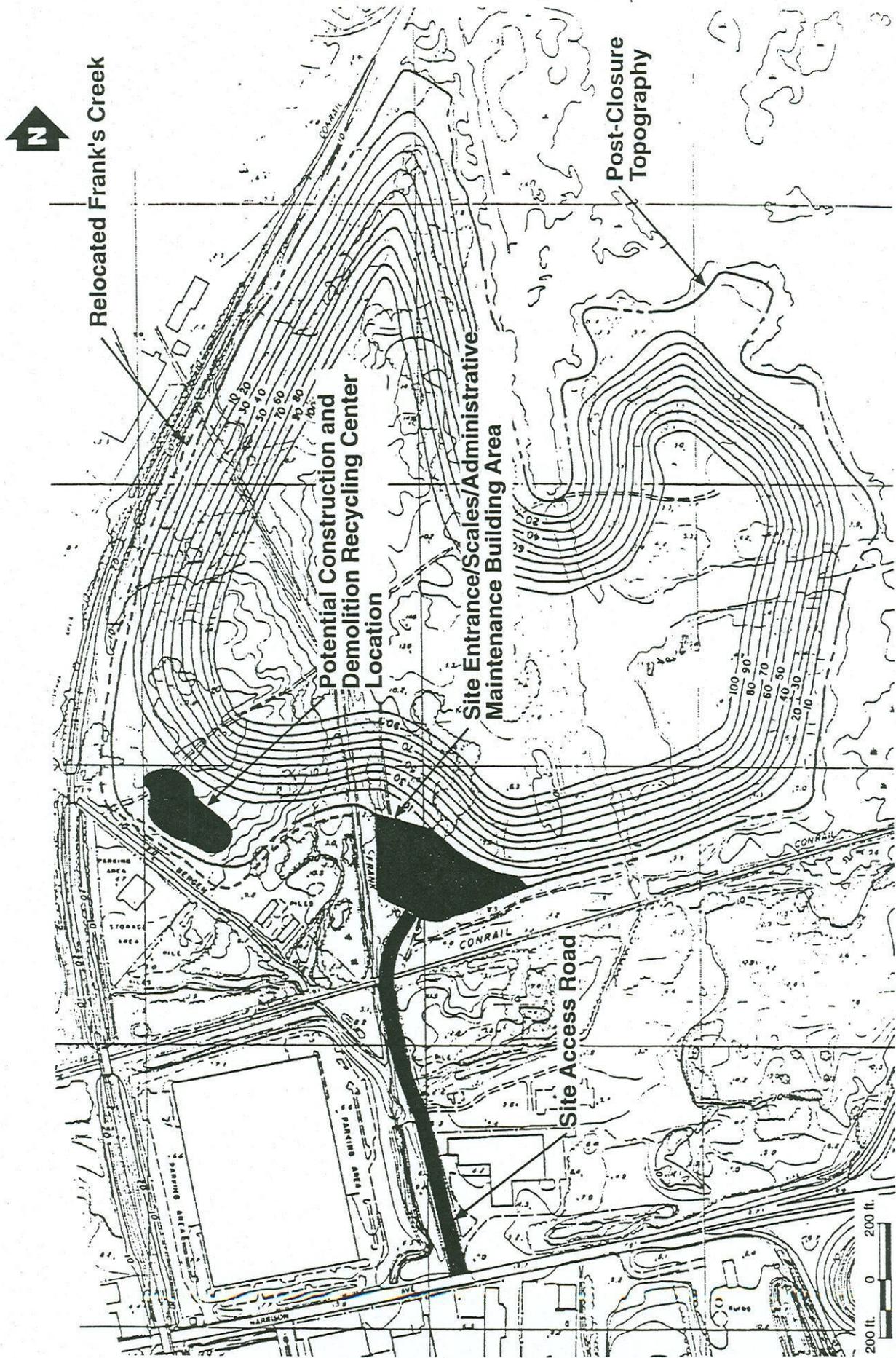
A July 2, 1987 letter from NJDEP to the Town of Kearny required the preparation of a landfill closure plan. At a minimum, this plan was to include the application of 24 inches of final cover, proper grading, slope stabilization, and seeding, and development of provisions for groundwater monitoring. Fire access roads were also to be constructed. Periodic patrols and/or fences were also to be put in place. None of these requirements have been implemented.

## 1.2 Ownership

The majority of the site is owned by the Town of Kearny (384 acres), with the remainder of the site in private ownership. Hudson Meadows Urban Development Corporation also has a leasehold interest on all of the Kearny-owned land, as well as having direct ownership of about 34 acres. The total area that HMDC has previously designated by Block and Lot is 421 acres. Of that amount, 110 acres are proposed for landfilling. The remaining acreage is the Freshwater Marsh, which will ultimately be incorporated into the reuse of the site as a passive wildlife refuge.

## 1.3 Site Design

The proposed landfill would be created above the existing Keegan Landfill. The preliminary site plan shown on Figure 1-3 shows post closure topography, the proposed access route and the location of on site facilities. The goal is to remediate the old landfill, thereby containing and controlling the existing pollutants from the site, while providing a much needed non-processible



**Figure 1-3**  
**Preliminary Facility Design**  
 HMDC Materials Handling Complex - PEHIS

materials landfill for the region. The funds for closure and post-closure will be generated through the tipping fees collected during the operation of the landfill. In addition, HMDC has proposed that surplus funds collected from the tipping fees be used to provide for the closure of the MSLA 1-D Landfill (See Figure 2-1). The MSLA 1-D site, also owned by the Town of Kearny, generates a significant amount of leachate. Within the limits of the MSLA 1-D site, there is an encapsulation (clay-lined "vault") that contains solid waste saturated with waste oil from the former Diamond Head Oil cleanup for New Jersey Route 280. This material was placed by the NJDOT in the site in the late-1970's. This site poses a serious environmental threat to the area and a major economic impact to the Town of Kearny if the Town were required to fund the remediation.

The former Keegan landfill operation occurred on approximately 110 acres along the western boundary of the Kearny Freshwater Marsh. The remediation of the site, and preparation for the proposed landfill operations will include a perimeter soil-bentonite cutoff wall that will hydraulically isolate the landfill from the Marsh. As with the other cutoff walls constructed by HMDC in the District, it is expected that the wall will be about 3 feet thick, have a permeability of less than  $1 \times 10^{-7}$  cm/sec, and extend into a confining in-situ clay layer beneath the landfill. A new force main will convey leachate to the 1-A Landfill east of the site. A second force main to be built from the 1-A Landfill to the South Kearny Pump Station will permit leachate flow to the PVSC Wastewater treatment plant.

Perimeter stormwater runoff controls would include retention/siltation basins, controlled outfalls with tide gates, piezometers to monitor the hydraulic gradient on either side of the cutoff wall, and a maintenance access road.

Access to the site will be from an improved paved road south of the landfill to Harrison Avenue. Currently, access to the site is from unimproved portions of Bergen Avenue. Access to the landfill from the west along the Bergen Avenue entrance will be closed. The portion of Bergen Avenue, from Harrison Avenue to the landfill, will be improved to Town specifications. This newly paved road will provide the only access to the site. Once on the property, vehicles will be directed to a scale house where the waste will be weighed and screened to determine waste origin and waste type. From there, waste will be directed onto the landfill according to the waste type.

For example, asbestos-containing waste will be directed from the scale house to a separate disposal location. A separate asbestos disposal area will be identified because there are specific operational requirements for asbestos disposal, including more aggressive cover operations than regular landfilling. All asbestos waste deliveries are scheduled at least 10 days in advance and are approved by the site engineer. Copies of the paperwork are forwarded by the generator to federal and state offices.

The remainder of the acceptable wastes will be directed to the main working face for disposal. Bulky materials will be limited in size to allow for better compaction. Any unacceptable wastes that are dumped at the working face will be segregated and removed by the hauler, or through controlled measures. No liquid wastes will be accepted. Permitted waste types, per NJDEP definitions, will include:

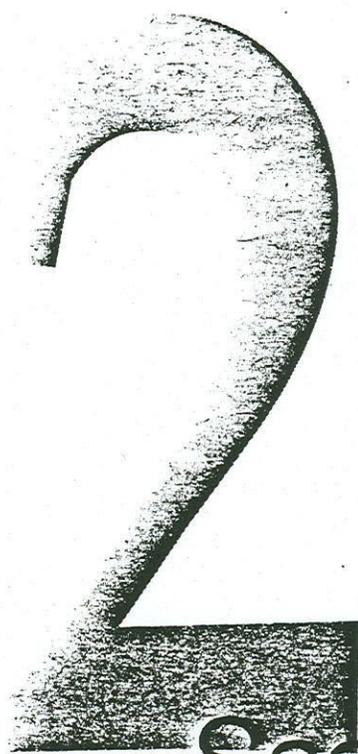
- Type 13 - Bulky Wastes;
- Type 27 - Non-Hazardous Industrial Wastes (non-recyclable wastes including contaminated soils).

These materials will be covered in accordance with the regulations at the end of the day. Areas that will not have additional fill for more than 24 hours will be covered by one (1) foot of cover material. Further, areas that will not receive additional solid waste for more than six (6) months will have 24 inches of cover material applied.

Site security will include guards during non-operational hours, as well as fencing and control points, such as gates, where needed. The landfill will operate six days per week, holidays and Sundays excluded. Hours will be from 6:00 a.m. to 4:30 p.m. Monday through Friday, and 6:00 a.m. to 3:00 p.m. on Saturdays.

The closure of the site will include additional soil placed above areas that have reached final elevation. Sufficient soil will be applied to establish a vegetative cover to control erosion and improve site aesthetics. Because this landfill will not accept putrescible waste, it is not anticipated that a landfill gas recovery program will be required.

[w:\docs\hmdg\keegan\sec1]



Section  
Two

## Section 2 Environmental Inventory

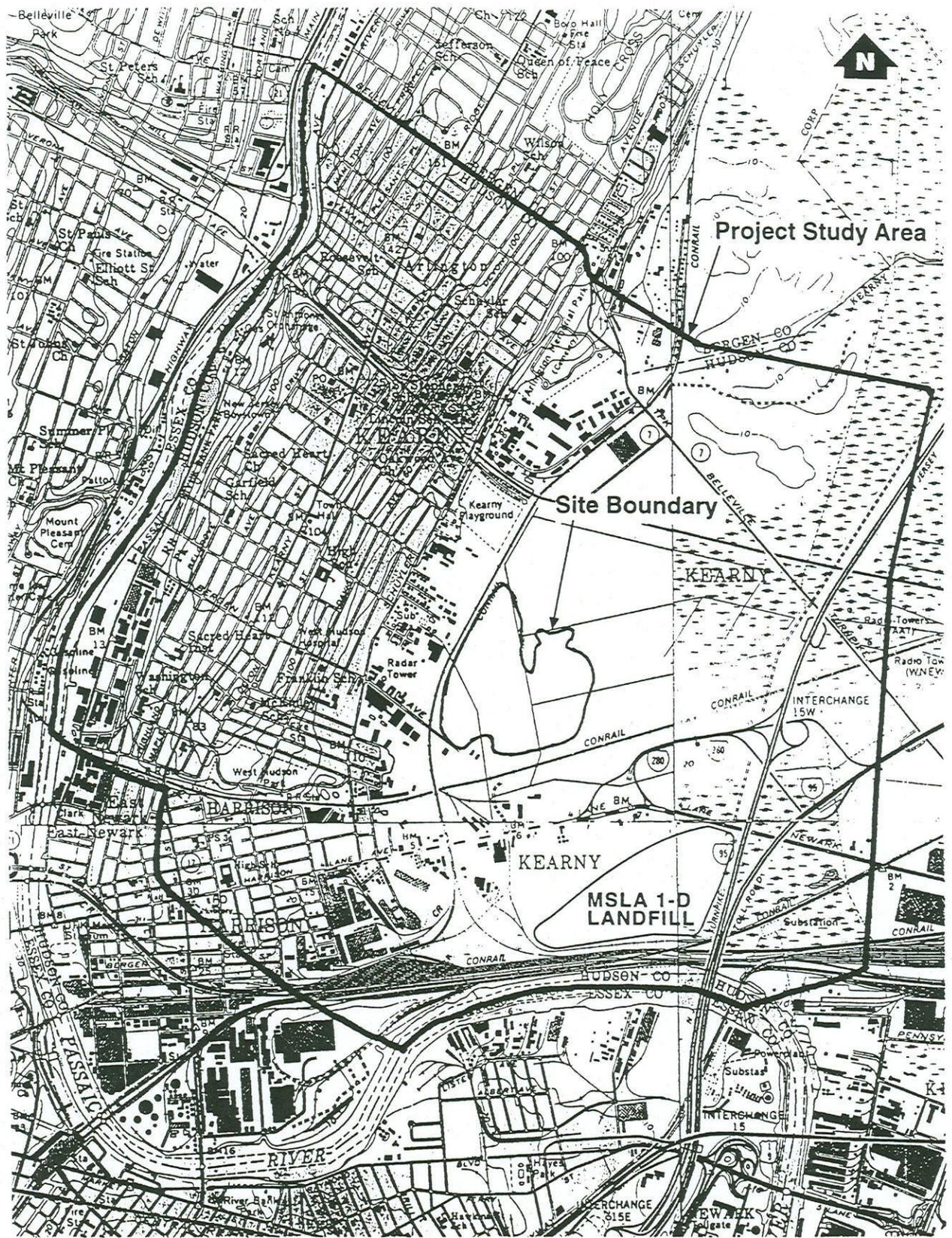
In Section 2, environmental data is presented for the proposed landfill site and for the general area one mile from the site boundary. The environmental inventory serves as a point of reference from which to evaluate the environmental impact of the proposed facility. The information is based on site visits, previous studies conducted for the subject property and the Hackensack Meadowlands District (District), data provided by government agencies and results from field sampling.

This PEHIS focuses on both localized site specific issues and more generalized regional environmental impacts. The environmental inventory consists of the following four categories and their respective parameters:

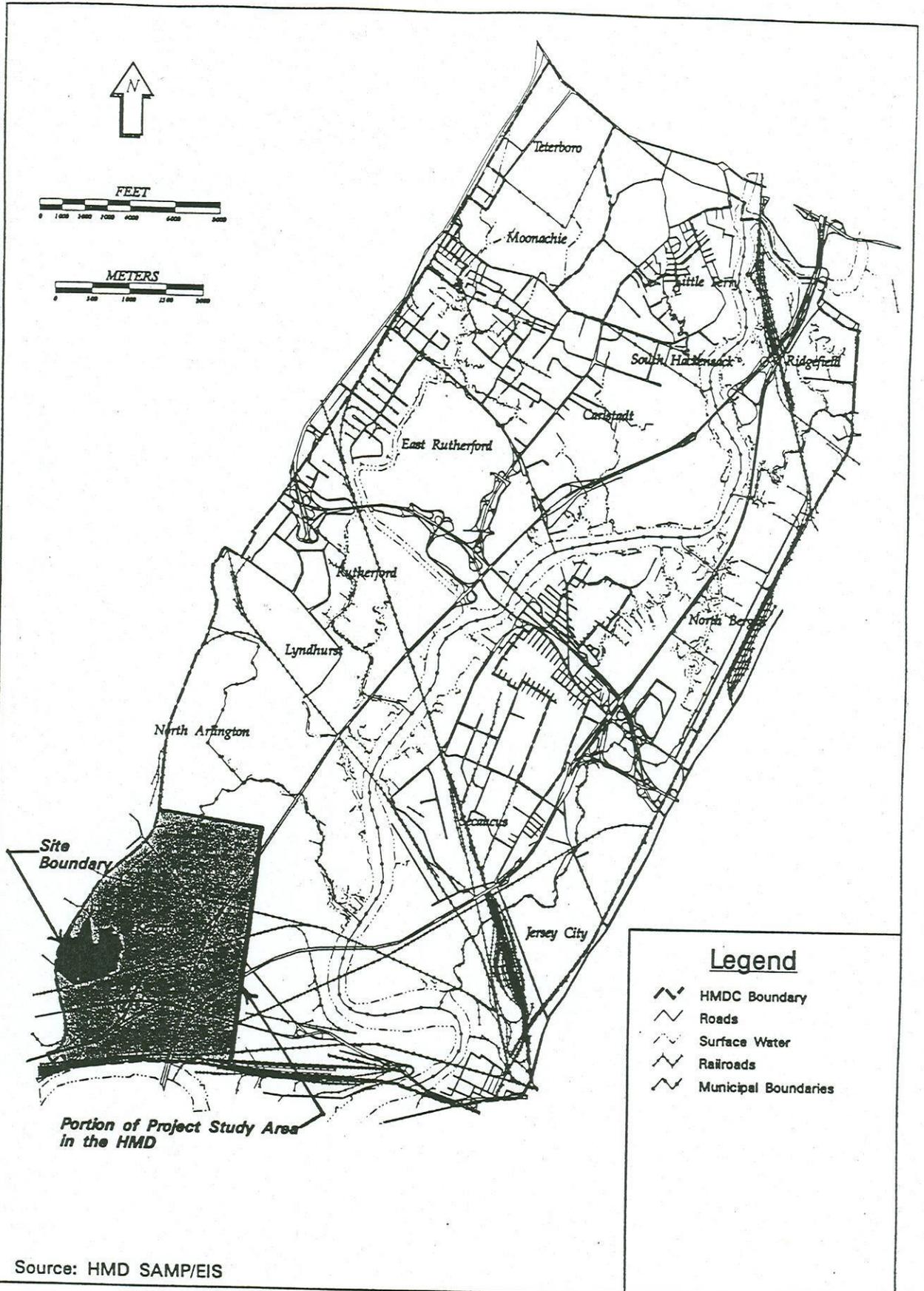
- I. Physical/Chemical: geology, soils, subsurface hydrology, water bodies, tributaries, additional water bodies, topography, climate, ambient air quality, and ambient acoustical conditions
- II. Biological/Ecological: plants, mammals, birds, reptiles and amphibians, fish, endangered, threatened or rare plant or animal species, unique, critical, or unusual habitat, site visit description, and ecosystem evaluation methodologies
- III. Cultural: recreational activities, aesthetics, areas of historical and archeological importance
- IV. Socioeconomic: transportation facilities, sewage facilities, stormwater management systems, water supply, energy supply, demography, property values, public services, community and residential dwellings

A primary project study area has been defined in order to guide the description of the existing conditions and the investigation of impacts resulting from the proposed project. The study area encompasses the region in which significant environmental impacts occur for most parameters; however, its borders have been adjusted slightly to correspond to well-established physical boundaries. These boundaries enclose the area within approximately a one mile radius of the boundaries of the proposed project site. HMDC has identified the location of the facility as the site of the former Keegan Landfill, comprising a total of 421 acres. The project study area and project site boundary is shown in Figure 2-1. Figure 2-2 locates the project study area and the site within the District.

The analysis of the environmental impacts of the preferred alternative is presented in Section 3 of the Preliminary Environmental and Health Impact Statement.



Source: USGS 7.5 minute Quadrangle maps:  
 Orange, Weehawken, Elizabeth and Jersey City



Source: HMD SAMP/EIS

Figure 2-2  
 Site Location within  
 Hackensack Meadowlands District

## 2.1 Physical/Chemical Environment

### 2.1.1 Geology

The site of the proposed facility is situated in a glacially eroded trough formed during the late Wisconsinian glaciation (Agron, 1980). The Hackensack Valley is part of the Newark Basin of the Newark Supergroup. The part of the Newark Basin in the Meadowlands, formerly considered part of the Brunswick Formation, has been redefined by Olsen as the Passaic Formation. The Passaic Formation consists chiefly of red siltstones and sandstones and conglomerates, and dates from the Carnian Sinemurian (Late Triassic) age (Olsen, 1980). The Passaic Formation reaches a maximum thickness of 6,000 meters. The Newark Basin trends from southwest to northeast across New Jersey from Mercer County to Bergen County at a width of 20 to 30 miles.

The results of a recent study of the subsurface conditions within the site boundary done by Melick-Tully and Associates, Inc. are presented below (Melick, 1987).

**"Subsurface Conditions:** The subsurface conditions encountered in the explorations performed for this preliminary study were relatively uniform, and consisted of the following generalized strata in order of increasing depth:

- 1) Fill consisting primarily of trash containing wood, glass, newspapers, rags, organic materials and other refuse was encountered at each of the sites. However, several of the test pits performed also encountered fill materials consisting of silty sands and sandy silts containing varying amounts of wood, concrete fragments, bricks and other demolition debris. The fill materials encountered in the explorations were found to vary from 8 to more than 17 feet in thickness.
- 2) Dark brown peat was encountered beneath the surficial fill materials in the majority of the explorations. This material was soft and compressible and varied from approximately 1 to 4 feet in thickness, where encountered.

Dark gray and black organic silt was encountered in the previously performed test borings and in several of the test pits. This material was soft in consistency and reportedly extended to depths of up to 23 feet below the ground surface in the test borings previously performed by others.

- 3) Gray sandy silt and silty sand was generally encountered beneath the organic soils and ranged from 7.5 to 36 feet in thickness. This material was generally firm in consistency.
- 4) Gray and red-brown varved silt and clay with occasional layers of fine sand and silt was encountered below the silty/sandy soils of Stratum 3. The varved soils varied from very soft to stiff in consistency and ranged from 34 to 100 feet in thickness.
- 5) Dense to very dense clayey silt containing varying amounts of sand and gravel was encountered underlying the varved silts and clays. This material is locally referred to as "Glacial Till" and varied from 7 to 25 feet in thickness.

- 6) Red-brown shale bedrock was encountered beneath the glacial till soils. The surface of the shale was encountered in the borings performed for this preliminary study at depths ranging from approximately 90 to 150 feet below the existing surface grades. The available geologic mapping, and boring information from several other nearby projects, suggest that a subsurface valley may transect the site. As a result, depths to bedrock may be erratic over relatively short horizontal distances and may be as great as 200 to 250 feet below the ground surface in portions of the property."

### *2.1.2 Soils*

Soil associations, as defined by the Soil Conservation Service (SCS), are landscapes that have distinctive proportional patterns of soils. SCS classifies the entire HMDC District as a single soil association—a tidal marsh having "low-lying organic and sometimes flooded soils along waterways." These soils are the result of 10,000 years or more of glacial action and the resultant erosion and deposition.

Soil series are soils that share substantially the same profile: the major soil horizons are similar in thickness, arrangement, and other important characteristics. Soil series are divided into "phases," which vary as to slope, surface layer texture, and other characteristics that affect the prospective use of the land. Soil phases are usually, but not always, equivalent to the mapping units, which are the soil areas shown on soil survey maps.

#### Kearny Marsh

The characteristic soil series in the Kearny Marsh include Udorthents Ub, Uc and Ud, which are all found on low-lying marine and estuarine deposits. Individual soil units are irregular in shape. Included in mapped areas are poorly draining mineral soils: sulfaquents and sulfihemists. Slopes for the soil types listed in Table 2-1 range from 0 to 5 feet.

The soil descriptions in Table 2-1 are drawn from the SCS Soil Survey of Bergen County (SCS 1989). The companion soils maps are the basis for the soil distribution analysis. The Hudson County section of the District was not surveyed by the SCS, but judging from aerial photography, the distribution of the predominant udorthent, urban land and tidal marsh soils in the Hudson County portion of the District is comparable to that of the Bergen County portion.

#### Former Keegan Landfill

The SCS issued a General Soils Map for Essex and Hudson Counties in June 1993 based on the statewide mapping. The characteristic soil series for this site include Urban Land; Boonton and Weathersfield. These soils are described as gently sloping to very steep, well drained and moderately well drained, very deep and deep gravelly loams formed in acid, reddish sandstone, shale, basalt and conglomerate glacial till over shale and basalt bedrock. These soils occur on upland glacial till plains and ridges. The discussion of the subsurface conditions in Section 2.1.1 provides additional information on the site soil conditions.

Table 2-1

Soil Series in the Hackensack Meadowlands District

Series Name	Size of Units	Composition	Current Use	Location in District
U <sub>b</sub> - Udorthents, Organic Substratum	5 - 195 acres	Filled and smoothed or otherwise extensively distributed to a depth of 3 feet or more. Fill material consists of relatively clean stone boulders and soil.	Supports railroads and unpaved service roads.	Small number of areas found along river banks and in drainage areas along roadways subject to daily tidal flooding
U <sub>c</sub> - Udorthents, (U <sub>d</sub> ) - Urban Land Complex	5 - 310 acres	50% U <sub>b</sub> , 36% Urban Land, 15% other soils. Clean fill to variable depths, smoothed and partially paved. Also included are very poorly drained Carlisle and Adrian units. Subject to daily flooding	Uses have been for residential, commercial and low-load paved surfaces	Largest areas are in the Turnpike meadow south of the Meadowlands Sports Complex. Other smaller sites found along the banks of Berry's Creek Canal.
U <sub>d</sub> - Udorthents, Refuse Substratum	5 - 410 acres	Has been, or is being filled to a depth of 3 feet or more. Fill material generally consists of solid waste, refuse, and other non-soils. Limited amounts of soil material may have been added or incorporated with the dominant fill. Presumed to have been deep, poorly drained soils in low-lying areas.	Used for refuse disposal sites.	Many large tracts located in the southwest portion of the District. Comprises approximately 15 percent of the District.
U <sub>e</sub> - Udorthents, Wet Substratum	5 - 180 acres	Extensively disturbed or filled areas to a depth of 3 feet. Fill material is generally clean fill of soil material with variable amounts of stone.	--	Occurs on upland estuarine deposits and flood plains. Buffer area around Teterboro Airport and other scattered recreational sites in the northern portion of the District
U <sub>f</sub> - Udorthents, (U <sub>e</sub> ) - Urban Land Complex	5 - 20 acres	Shares characteristics of the other udorthents	--	Only appears on the runway at Teterboro Airport
U <sub>r</sub> - Urban Land	5 - 750 acres	Nearly level or gently sloping. Typically cut or filled and covered with impervious surfaces (e.g., buildings, pavement) for over 85 percent of area. Identification of soils is not feasible because of the degree of alteration or obstruction by urban works.	Urban uses.	Covers roughly 35 percent of the District. Tracts around Carlstadt, with relatively recent construction, comprise the largest single U <sub>r</sub> concentration. Remaining U <sub>r</sub> is distributed along major roadway corridors and along the rim of wetland areas.
Tidal Marsh	--	Very poorly drained, having silty or mucky flats that are associated with estuarine systems, bays and coastal rivers. Low river velocity limits sediment-bearing capacity to predominantly fine-grained alluvial materials (clay and silt), which is trapped in dense marsh water during slack water. Together with detritus from marsh vegetation, captured material presently covers the tidal marshes to thicknesses ranging from 4 to 20 feet. Associated with microtopography, (0 to 2 percent slope and elevations of 0 to 5 feet mean sea level). Soils are almost continuously saturated and generally high in organic content.	--	From northern extent on the west bank and Losen Slote to the large Kearny marshes, the tidal marsh soil series dominates the District landscape. Covers almost half of the District. Much of the Hackensack shore forms an almost uninterrupted swath across the District. Only isolated areas are small tracts that surround Teterboro Airport.

Source: SCS Soil Survey of Bergen County

(tab2-1)

### 2.1.3 Hazardous Wastes

During the time the landfill operated from the 1940s to 1972, State and Federal regulations did not prohibit the disposal of hazardous wastes at a municipal landfill. Additionally, because the former Keegan Landfill ceased operations in 1972 prior to the State Solid Waste Management Act, the operator/owner was not required to construct environmental improvements to limit leachate production. Based on rainfall data, site acreage, depth of waste, type and depth of soil cover, etc. it is estimated that 65 million gallons per year of leachate is being discharged from the site and enters either Kearny Freshwater Marsh, or Frank's Creek which bisects the site and flows south to Newark Bay. For these reasons the United States Environmental Protection Agency (EPA) believed that not only was the subsurface soil contaminated by hazardous wastes but also surface water bodies were impacted by the leachate produced by the landfill. Consequently in 1989 the EPA contracted NUS Corporation (Superfund Division) to prepare a site inspection report on the former Keegan Landfill (NUS, 1989). The following narrative summarizes the results of this investigation:

On April 25, 1989, NUS Corporation Region 2 FIT personnel collected seven surface water samples, six sediment samples at the Keegan Landfill Site. These samples were collected to detect the presence or absence of Target Compound List (TCL) substances, and the potential for these compounds to migrate off site. Results of this sampling indicate the presence of mercury, lead, chromium polychlorinated biphenyls (PCBs), and several semivolatile compounds in various sediment samples. Several inorganic compounds, including mercury, lead, and chromium, were detected in water samples collected in Frank Creek.

Sample results for the surface water and sediment samples are listed below in Table 2-2. Figure 2-3 shows the location of each sample.

The report's waste source description included chromate and bichromate slurry, pigment wastes, and other organic wastes, abandoned automobiles, appliances, and furniture, municipal putrescible waste and construction debris (still being disposed at the site).

Also noted in the NUS report was that a member of the Kearny Police Department had worked as a truck driver for DuPont Chemical in Newark in the 1960s. He reported that every morning, at least one truck with approximately forty 30-gallon drums went to the Keegan Landfill. These wastes included chromate and bichromate slurry, pigment wastes, and other organic wastes.

The NUS summary report concluded that the site poses a potential threat of contamination to surface waters. Downstream water samples indicated concentrations of chromium significantly greater than upstream samples. The same could be said for the sediment samples taken along the creek. NUS also indicated that there was the potential for direct contact with hazardous substances on the site, and they recommended that the site be fenced and covered. However, no site controls were put in place. A July 2, 1987 letter from NJDEP to the Town of Kearny required the preparation of a landfill closure plan. At a minimum, this plan was to include the application of 24 inches of final cover, proper grading, slope

**Table 2-2**  
**Summary of Analyses for Sediment Samples and Surface Water**  
**Samples Taken at the Former Keegan Landfill (April 25, 1989)**

Parameter/Unit	Sediment Sample			
	Sed 1	Sed 4	Sed 5	Sed 6
Phenanthrene ug/kg			5,300	4,800
Fluoranthene ug/kg			15,000	4,700
Pyrene ug/kg			9,600	3,500
Benzo (a) anthracene ug/kg			6,900	2,000
Chrysene ug/kg			7,300	2,400
Benzo(b)fluoranthene ug/kg			5,800	2,300
Benzo(k)fluoranthene ug/kg			3,700	1,100
Indeno (1,2,3-cd) pyrene ug/kg			3,200	1,600
Benzo(a)pyrene ug/kg			4,400	2,000
Benzo(g,h,i)perylene ug/kg			2,700	2,000
Aroclor - 1254 ug/kg	2,600 E		1,400E	4,200 E
Aroclor - 1260 ug/kg	2,400 E		1,600 E	
Mercury mg/kg	0.7	2.6	8.7	2.3
Lead mg/kg	305	1,020	1,180	479
Chromium mg/kg	13.3	93.6	114	116
	<i>Surface Water Sample</i>			
Parameter/Unit	SW-5	SW-6, SW-7		
Aluminum ug/L	2170 E	444 E, 467 E		
Barium ug/L	445	211, 212		
Chromium ug/L	21.6 E	4.6*, 4.2*		
Copper ug/L	95.2 E			
Iron ug/L	11,900	2550, 2630		
Lead ug/L	159	43.9, 42.8		
Manganese ug/L	484	224,220		
Mercury ug/L	1.2			
Zinc ug/L	339	45.4, 47.7		

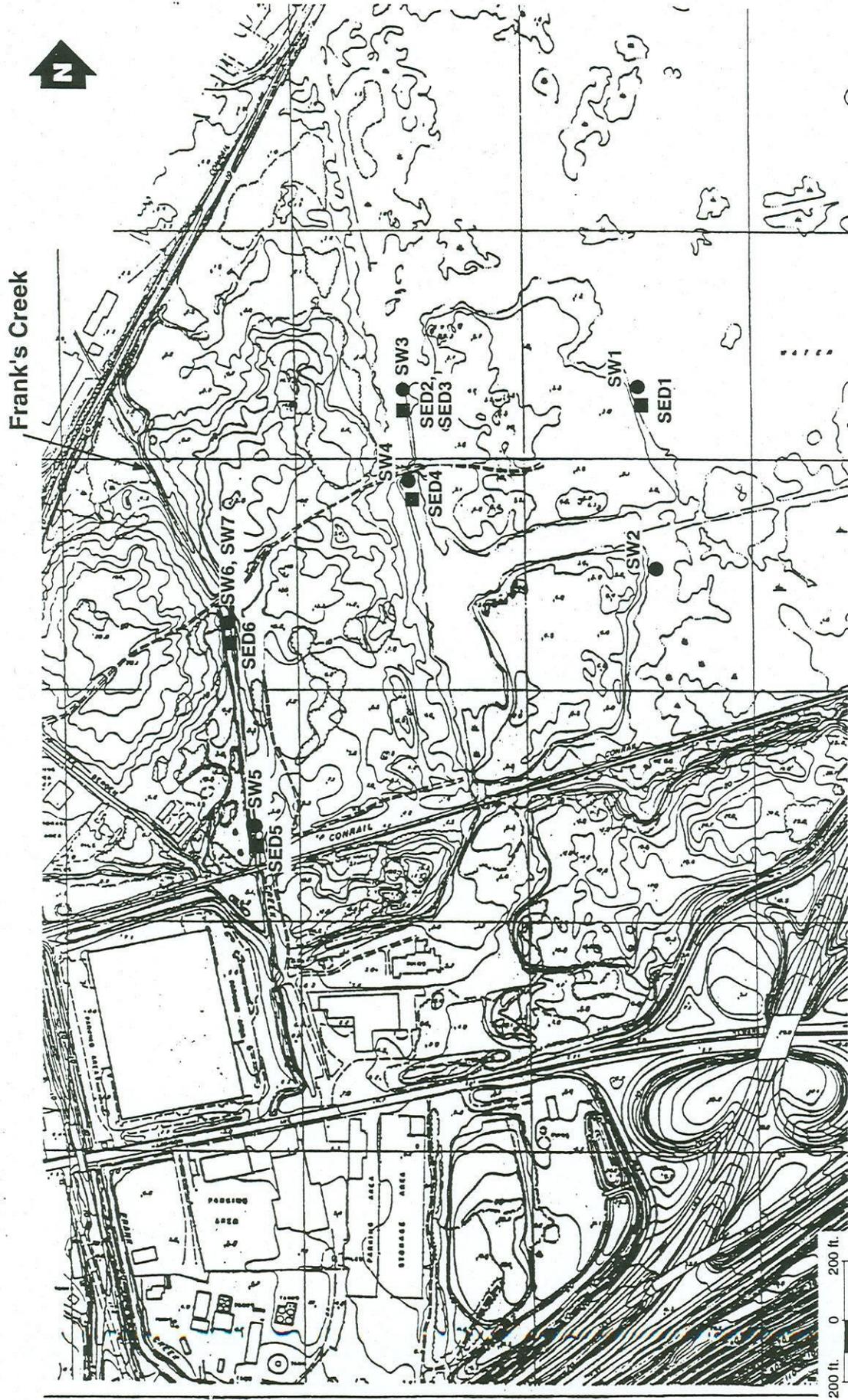
Source: (NUS, 1989)

\* - estimated value, compound present below CRDL, but above IDL.

E - estimated value

blank space - compound analyzed for but not detected

[w:\docs\hmdc\keegan\table]



Source: Revised from (NUS, 1989)

**Figure 2-3**  
**USEPA Site Inspection Sample Locations**  
 HMDC Materials Handling Complex - PEHIS

stabilization, and seeding, and development of provisions for groundwater monitoring. Fire access roads were also to be constructed. Periodic patrols and/or fences were also to be put in place. None of these requirements have been implemented.

## 2.1.4 Groundwater Resources

### 2.1.4.1 Subsurface Hydrology

Groundwater quantity and quality data is presented in this section for the aquifers located beneath the site. Information on the aquifers includes depth to groundwater, flow direction existing uses and future supply capabilities.

A site inspection report of the former Keegan Landfill was prepared by NUS Corporation under contract with the U.S. Environmental Protection Agency (NUS, 1989). Their investigation included the following discussion of the subsurface hydrology at the site.

"The Passaic Formation is the most important bedrock aquifer in the basin. The water table in this area is assumed to be at or near the ground surface. Groundwater in the Passaic Formation occurs in a network of interconnected openings formed along joints fractures, and solution channels. Groundwater flow in the area is likely to be southeast toward the Hackensack River. Unconsolidated deposits overlying the Passaic Formation consists of till, varved silt and clay, alluvium, sand, and gravel. Small quantities of groundwater are stored in the till which overlies the bedrock.

Groundwater from the Passaic Formation in the lower part of the basin is hard to very hard and highly mineralized. In the vicinity of the site the water quality in both the Brunswick and unconsolidated deposits is influenced by the water quality of the Hackensack River and Newark Bay. The surface groundwater quality in the lower area is influenced by the disposal of large quantities of sewage and industrial wastes in the Hackensack Meadows. Pollution from local industry, sewage, and urban area runoff prevents wellhead groundwater recharge and reduces water quality. In addition to the summer brackish flow up from Newark Bay, it is believed that highly influential hydraulic subsurface connections exist between the Brunswick Formation and Newark Bay. As a consequence of heavy pumping, high chloride water has been induced deep into the aquifer along the strike of the beds. High concentrations of chloride make the water in the lower Hackensack River unsuitable for municipal and industrial processes, although it is usable for cooling purposes.

Well drilling in the Hackensack Meadowlands is limited by the above constraints and yields only small to moderate supplies of groundwater. The District is primarily in a groundwater discharge area (groundwater is generally discharging to the Hackensack River and the Atlantic Ocean). In discharge areas, groundwater travels for longer periods and greater distances, is higher in dissolved solids, and tends to be in chemical equilibrium with adjacent rocks. In the Meadowlands, the groundwater in the Passaic Formation is highly mineralized. Chemical quality is affected by induced recharge of poor quality surface water from the Hackensack River and Newark Bay.

Acute groundwater problems exist in the District. The Oradell Dam has effectively cut off the headwaters and source of the Hackensack from its lower reaches thus limiting the fresh water in the lower reaches. Weakened flow rate in the lower valley has exposed the groundwater system to salt water intrusions from Newark Bay. Dredging of canals has further exposed permeable materials, which can lead to additional leaching of the brackish river water into the groundwater.

There is no potable water collected from groundwater in the area. The town of Kearny and Harrison draw their drinking water from the Wanaque Reservoir, located in northern Passaic County. There are 10 industrial wells and one recreational well within 3 miles of the site, the nearest being approximately 0.7 mile southwest of the site. This well and nine others withdraw water from the Passaic Formation. One well located 1.5 miles southeast of the site withdraws water from the stratified glacial drift. The recreational well is operated by the Essex County Parks Department, which is used to replenish water in a pond in Branch Brook Park located approximately 2.7 miles northwest of the site. This well information is summarized in Table 2-3.

## 2.1.5 Surface Water Resources

### 2.1.5.1 On-Site Water Bodies

This section provides detailed water quality and quantity data for water bodies which abut the site, exist on site, or drain onto or off the site. These include: Frank's Creek, unnamed creek, and Kearny Marsh. In addition, it identifies all existing classifications, designated uses and limitations of the water bodies. Frank's Creek, with a length of 1.25 miles, covers a 400-acre area across the former Keegan Landfill. Frank's Creek flows south of the site into the Passaic River, approximately 1 stream mile from the site. Since the creeks flow into the Newark portion of the Passaic River, (confluence with Second River to mouth), they receive the same water classification as SE3. According to the Water Quality Standards NJAC 7:9B, SE3 water body has the following designated uses:

1. Secondary contact recreation;
2. Maintenance and migration of fish populations;
3. Migration of diadromous fish;
4. Maintenance of wildlife; and
5. Any other reasonable uses

Water quality samples for the Kearny Marsh and the upstream and downstream portion of Frank's Creek and the unnamed creek were taken on March 7 and March 15, 1995 by HMDC personnel.

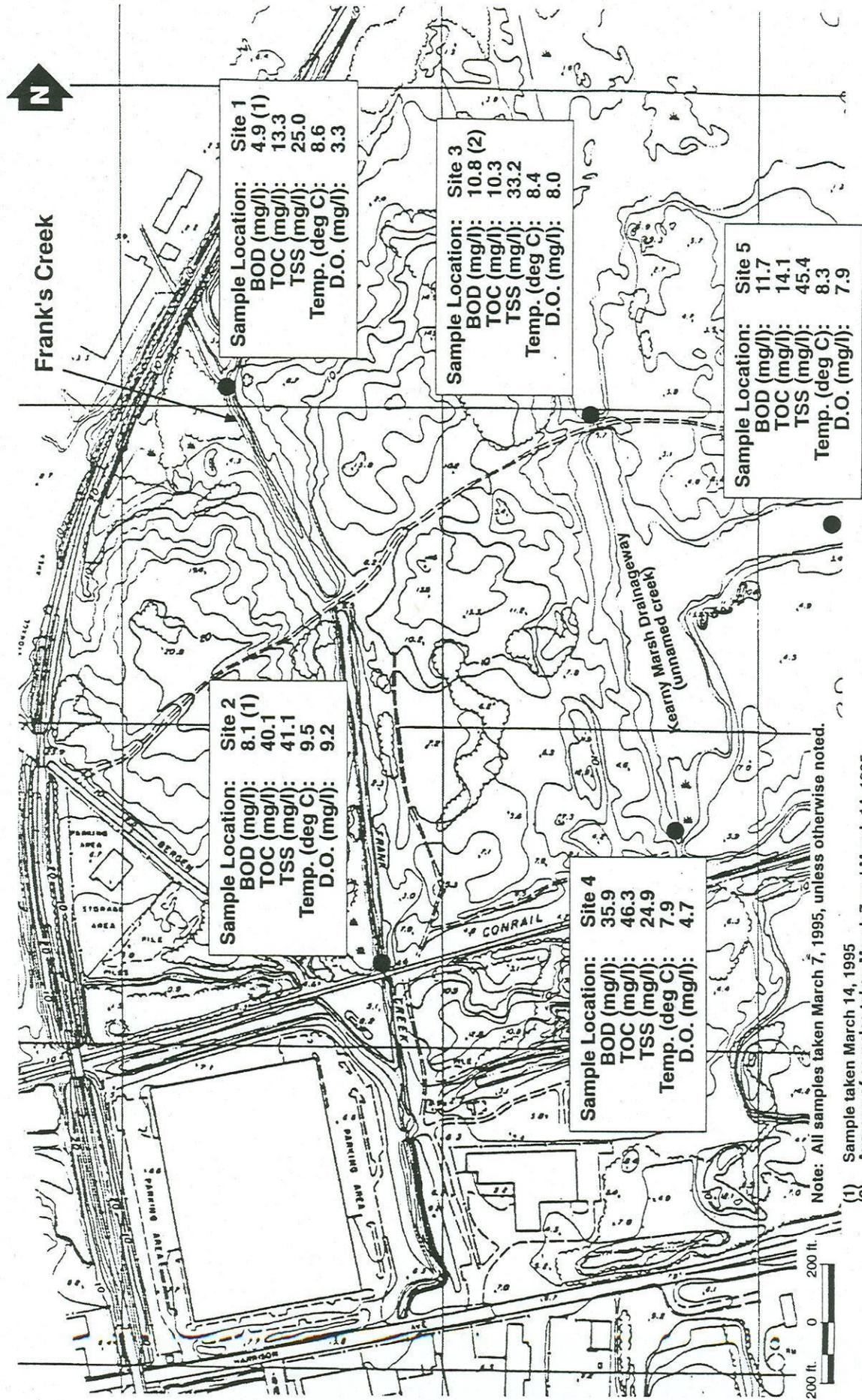
Samples were analyzed for dissolved oxygen (DO) biochemical oxygen demand (BOD), total organic carbon (TOC), total suspended solids (TSS) and temperature. Figure 2-4 shows the location of the samples and the analytical results in relation to the on site surface water bodies.

**Table 2-3**  
**Groundwater Usage Within 3 Miles of Keegan Landfill**  
**Kearny, New Jersey**

<i>Name</i>	<i>Distance from Site (Miles)</i>	<i>Direction from Site</i>	<i>Well Depth (ft)</i>	<i>Aquifer</i>	<i>Use</i>
American Ref. Company	1.5	SE	35	Stratified drift	Industrial
V.H. Swenson Co., Inc.	0.75	N	400	Passaic Formation	Industrial
Ronson Metals Corp.	1.75	S	300	Passaic Formation	Industrial
Ronson Metals Corp.	2.0	S	165	Passaic Formation	Industrial
Public Service Electric	2.0	SW	216	Passaic Formation	Industrial
New Jersey Bell Telephone	2.25	SW	215	Passaic Formation	Industrial
Grand Union Company	2.7	N	300	Passaic Formation	Industrial
International Minerals and Chemicals	2.0	NNW	400	Passaic Formation	Industrial
Honeycomb Plastics Corp.	0.7	SW	500	Passaic Formation	Industrial
Honeycomb Plastics Corp.	0.7	SW	700	Passaic Formation	Industrial
Essex County Parks	2.7	NW	450	Passaic Formation	Recreation

Source - Site Inspection Report, NUS Corporation

[w:\docs\hmdc\keegan\tab2-3]



**Figure 2-4**  
**On-Site Water Quality Sample Locations and Results**  
 HMDC Materials Handling Complex - PEHIS

#### 2.1.5.2 Upstream and Downstream Tributaries

This section identifies existing classifications, designated uses and limitations for upstream tributaries which flow onto the site, and downstream tributaries which flow from the site. It also provides a narrative description of the factors affecting water quality. In addition, this section lists the major permitted discharges into these tributaries and other tributaries or confluences with other water bodies. Regional surface water features are shown on Figure 2-5.

#### Hackensack River

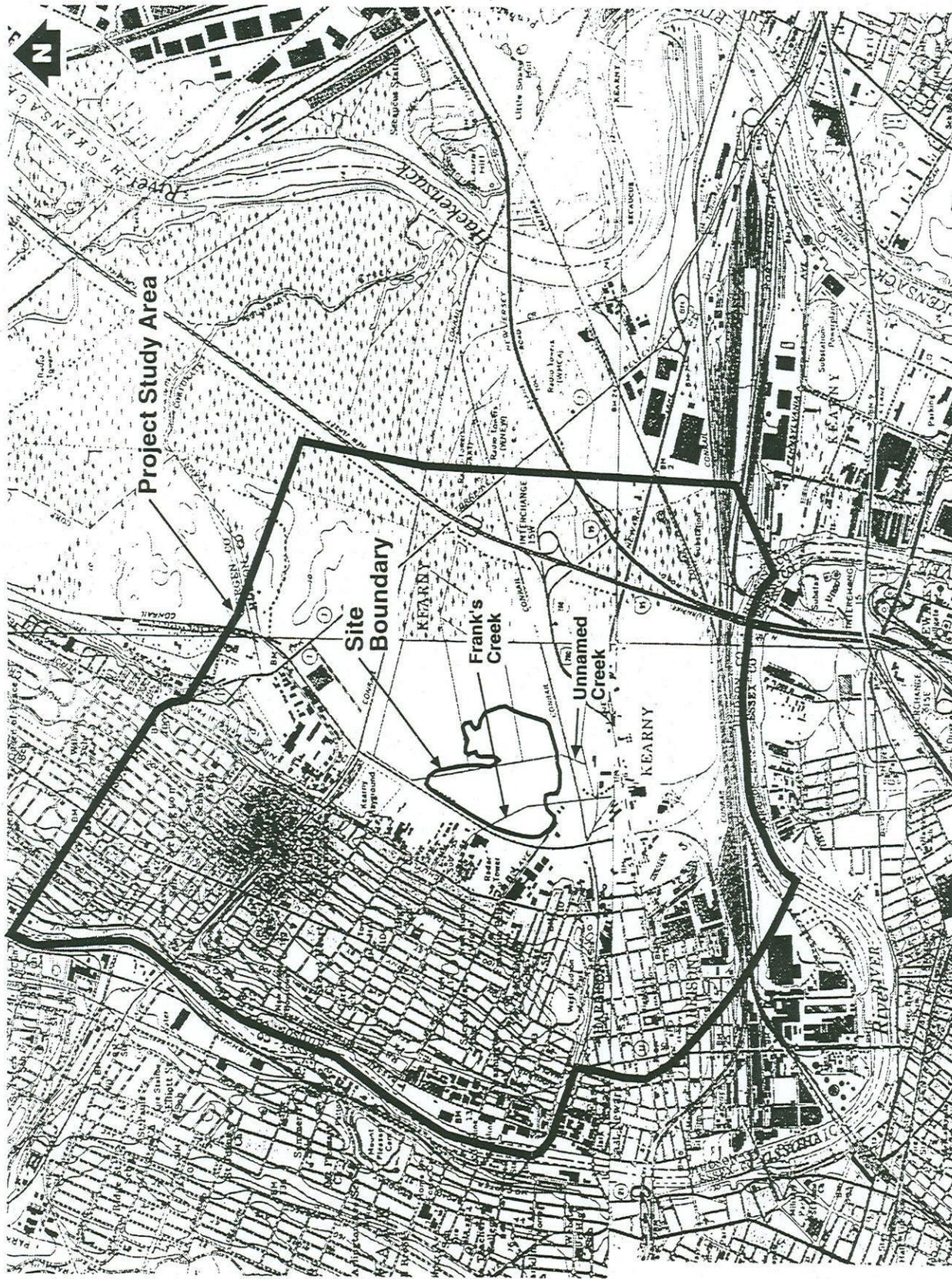
The Hackensack River, the primary fresh water source for the Meadowlands, originates in Rockland County, New York, drawing its water from streams in the north Palisades. The 50 mile southward course of the Hackensack River parallels that of the nearby Hudson River to the east. The river drains a watershed 34 miles in length with a width ranging from 4 to 7 miles. The area of the Hackensack watershed is approximately 197 square miles, two thirds of which is located in Bergen and Hudson counties.

The Hackensack Meadowlands District lies within the lower Hackensack River Basin. Water quality in this region has been influenced significantly by the urbanization and industrialization that has occurred within the watershed and by tidal exchange with adjacent coastal waterways (Mattson & Vallario, 1976). Due to its limited freshwater inflow (controlled by the Oradell Dam upstream of the District boundary) and indirect communication with the open sea, the lower Hackensack River is not as well flushed as many estuaries (CBA, 1990). As a result, the water quality is inherently susceptible to pollutants introduced into the watershed.

The sources of pollution within the District include 50-60 industrial discharges, three power generating plants (Hudson, Bergen and Kearny), three major sewage treatment plants (Bergen County Utilities Authority, Secaucus MUA, and North Bergen MUA), 12 combined sewer overflows (CSO's), 12 emergency overflows, and 1,200 acres of uncontrolled and undeveloped landfills. The collective inputs from point sources as well as non-point sources have adversely affected the water quality within the Meadowlands. This conclusion is based on assessing several water quality parameters which are described below.

The NJDEP has classified the Route 1 and 9 Bridge to Kearny Point reach of the Hackensack River as an SE-3 water body. The water quality criteria that need to be maintained to achieve this standard are summarized in Table 2-4.

The water quality monitoring that has taken place to date indicates that, during the summer, the water quality classifications for the District are not being met. Oxygen, fecal coliform bacteria, temperature and pH values are outside acceptable ranges. In general, the water quality in the river and its tributaries, based on these parameters, has remained fairly constant every summer between 1983 and 1988 (HMDC, 1990). Other parameters that cause



2000 ft. 0 2000 ft.

Source: USGS Quads, Orange, Weehawken, Elizabeth and Jersey City

**Figure 2-5**  
**Surface Water Features**  
 HMDC Materials Handling Complex - PEHIS

Table 2-4

**New Jersey Water Quality Criteria That Are Important in the Hackensack and Passaic River and their Tributaries**

CRITERION	WATER QUALITY CLASSIFICATION			
	SE1	SE2	SE3	FW2-NT
Fecal Coliform	<200/100ml	<770/100ml	<1500/100ml	<200/100ml
Dissolved Oxygen	24 hr. Average $\geq 5.0$ mg/l but not $< 4.0$ mg/l any time	$\geq 4.0$ mg/l all the time	$\geq 3.0$ mg/l all the time	24 hr. average $\geq 5.0$ mg/l but not $< 4.0$ mg/l any time
pH	6.5-8.5	6.5-8.5	6.5-8.5	6.5-8.5
Suspended Solids	None which would render the water unsuitable for the designated uses.			$< 40$ mg/l
Temperature	No thermal deviations which would cause $\Delta T > 2.2^\circ\text{C}$ ( $4^\circ\text{F}$ ) from Sept.-May or $\Delta T > 0.8^\circ\text{C}$ ( $1.5^\circ\text{F}$ ) from June to August; $T \leq 29.4^\circ\text{C}$ ( $85^\circ\text{F}$ )			$\Delta T \leq 2.8^\circ\text{C}$ ( $5^\circ\text{F}$ ); $T \leq 27.8^\circ\text{C}$ ( $82^\circ\text{F}$ ) for small-mouth bass or yellow perch waters, or $T \leq 30^\circ\text{C}$ ( $86^\circ\text{F}$ ) for other non-trout waters.
Toxic Substances	<ul style="list-style-type: none"> <li>i. None, either alone or in combination with other substances, in such concentrations as to affect humans or be detrimental to the natural aquatic biota, produce undesirable aquatic life, or which would render the waters unsuitable for the designated uses.</li> <li>ii. Toxic substances shall not be present in concentrations that cause acute or chronic toxicity to aquatic biota, or bioaccumulate within an organism to concentrations that exert a toxic effect on the organism or render it unfit for consumption.</li> <li>iii. The concentration of nonpersistent toxic substances in the State's waters shall not exceed one-twentieth (0.05) of the acute definitive <math>LC_{50}</math> or <math>EC_{50}</math> value, as determined by appropriate bioassays conducted in accordance with N.J.A.C. 7:18.</li> <li>iv. The concentration of persistent toxic substances in the State's waters shall not exceed one-hundredth (0.01) of the acute definitive <math>LC_{50}</math> or <math>EC_{50}</math> value, as determined by appropriate bioassays conducted in accordance with N.J.A.C. 7:18.</li> </ul>			
Ammonia, un-ionized (24-hr avg)				$< 50$ $\mu\text{g/l}$
Lead (total recoverable)				$5$ $\mu\text{g/l}$
Nitrate (as N)				$10$ $\mu\text{g/l}$

degradation of water quality in the District include excess nutrients (which can affect dissolved oxygen) and toxic compounds.

### Passaic River

Frank's Creek flows into the Newark segment of the Passaic River. The Passaic River drains into the Hackensack River which flows into Newark Bay, and eventually connects with the Atlantic Ocean. The Passaic River is used for navigational purposes and is tidal in nature. The 1-year 24-hour rainfall in the area is approximately 2.75 inches. There are no surface water intakes on the Passaic River, the Hackensack River or Newark Bay within 3 miles downstream of the site (NUS, 1989).

The Newark segment of the Passaic River from Second River to its mouth is classified as an SE-3 water body with the following designated uses:

1. Secondary contact recreation;
2. Maintenance and migration of fish populations;
3. Migration of diadromous fish;
4. Maintenance of wildlife; and
5. Any other reasonable uses

The New Jersey Administrative Code (NJAC) Section 7:9-4 defines standards for surface water quality, and the criteria required to meet these standards (Table 2-4).

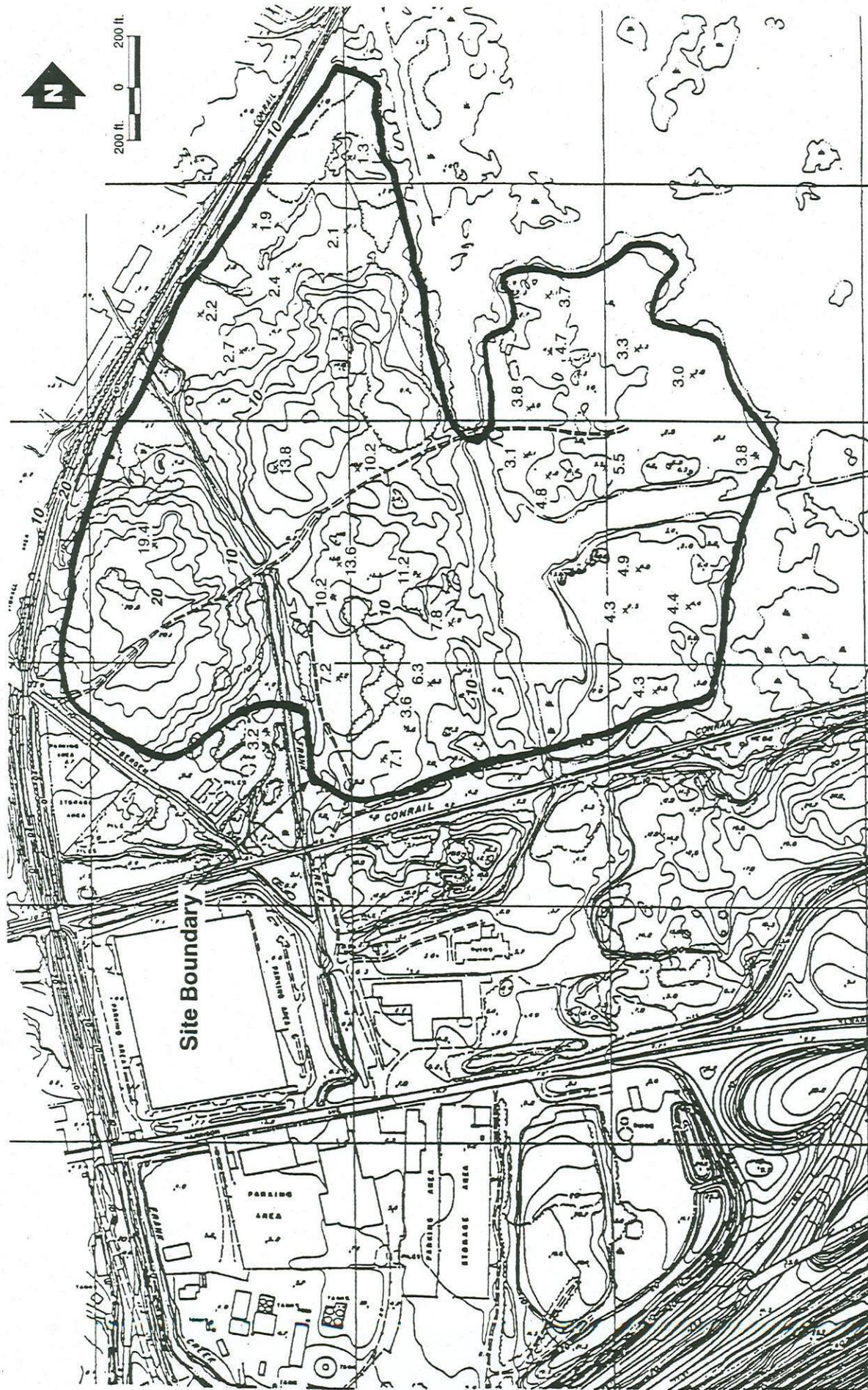
### *2.1.6 Topography*

The topography of the site and its surroundings is described in this section. Contour data, drainage patterns, 100-year floodway and flood hazard delineations are discussed as part of this narrative.

Contour elevation varies markedly across the site study area. Contour of the proposed site are characterized by an irregular surface, caused by previous dumping at the site. The existing site elevation ranges in elevation from 3 feet above mean sea level (AMSL) to approximately 15 feet AMSL. Existing contours are shown on Figure 2-6.

HMDC has delineated the in-District Hackensack River watershed into 27 sub drainage basins. The proposed study area falls within the Kearny Marsh Drainage Way. The Kearny Marsh Drainage Way is the largest single sub-basin in the District (2,669 acres), and is also the most constrained by man-made features. Numerous highway and railroad embankments transect the marsh at many angles. There is no central stream; much of the complicated water flow is directed through culverts connecting subareas.

Man-made dikes and tidegates prevent any tidal influence and thereby maintain a large freshwater marsh. Point sources of freshwater from industrial discharge contribute to the local freshwater regime. Kearny Marsh has been experiencing rising water levels resulting in large water cells and ponding action.



**Figure 2-6**  
**Existing Site Topography**  
 HMDC Materials Handling Complex - PEHIS

Also part of the site hydrology is Frank Creek's with a length of 1.25 miles. Its headwaters cover a 400 acre area in the southwestern corner of the District. The flow from the Frank Creek discharges into the Passaic River. The site is entirely within the 100-year floodplain, but is essentially filled above the 5 foot 100-year flood level.

### *2.1.7 Climatological Data*

Descriptions of the existing climatological features of the area surrounding the proposed facility site are based upon long-term (30 years or more) historical data recorded at the National Weather Service (NWS) monitoring station at Newark International Airport located approximately 20,000 feet south of the proposed facility. Specific climatological averages based on the Newark NWS data are shown in Table 2-5.

#### *Climate*

The following description of the local climate is adapted from the National Oceanic and Atmospheric Administration's (NOAA, 1994), 1994 Climatological Data Summary of Newark in 1994. The Town of Kearny is located in western Hudson County, New Jersey directly north of Newark. The climate is dominated by continental weather patterns with prevailing westerly winds. However, easterly winds, particularly southeasterly, moderate the climate because of the influence of the Atlantic Ocean. The slow change in the ocean water temperature tends to retard the spring and fall seasons by imparting a warming effect in the fall and a cooling effect in the spring.

Daily temperature falls of 5 to 15 degrees, depending on the season, are not uncommon when the wind backs from southwesterly to southeasterly. Periods of very hot weather, lasting as long as a week, are associated with a west-southwest air flow which has a long trajectory over the land. Extremes of cold are related to rapidly moving outbreaks of cold air traveling southeastward from the Hudson Bay region.

#### *Temperature*

The temperature patterns for the area surrounding the proposed site are greatly influenced by the Atlantic Ocean.

Data from the Newark NWS monitoring station indicate that the annual average temperature of the area surrounding the proposed facility site in the period of record (1964 to 1993) was 54.1°F. Average monthly temperatures range from a low of 31.6°F in January to a high of 76.8° in July. The highest temperature recorded at the Newark NWS station was 105° in July 1993 and the lowest recorded was -8° in January 1985.

#### *Precipitation*

A considerable amount of precipitation is realized from the Northeasters of the Atlantic coast. These storms, more typical of the fall and winter, generally last for a period of two days and commonly produce between 1 and 2 inches of precipitation. Storms producing 4 inches or more of snow occur from one to five times a winter. The frequency and intensity of snowstorms and the duration of the snow cover increase dramatically a few miles to the west of the proposed facility site.

**Table 2-5**

***Climatological Values for the Area Surrounding the Proposed Keegan Landfill***

<i>Month</i>	<i>Average Temperature (°F)</i>	<i>Average Total Precipitation<sup>b</sup> (in.)</i>	<i>Average Wind Speed/ Direction (mph)</i>	<i>Average Snowfall (in.)</i>
January	31.6	3.34	11.2 NE	7.5
February	32.9	2.88	11.5 NW	7.9
March	41.1	4.04	11.9 NW	4.9
April	51.7	3.66	11.2 WNW	0.7
May	62.5	3.86	10.9 SW	trace
June	71.6	3.31	9.5 SW	0.0
July	76.8	4.08	8.9 SW	0.0
August	75.1	4.16	8.7 SW	0.0
September	67.8	3.73	9.0 SW	0.0
October	56.9	3.03	9.4 SW	trace
November	46.3	3.61	10.2 SW	0.5
December	35.4	3.38	10.8 SW	5.5
ANNUAL	54.1	43.08	10.2 SW	26.9

<sup>a</sup>Newark NWS Data. Period of record is January 1964 to December 1993.

<sup>b</sup>Total precipitation includes rains, snow and ice, reported as rain.

Annual average precipitation (including rain, snow and ice) over the period of record (1964 to 1993) was 43.08 inches. Monthly precipitation extremes range from a high of 11.84 inches in August 1955 to a low of 0.07 inches in June 1949. The annual average snowfall over the period of record (1964 to 1993) was 26.9 inches. The highest monthly snowfall experienced in the area surrounding the facility site was 29.1 inches in December 1947.

### *Wind*

General air movement in the area surrounding the proposed facility site is dominated by the prevailing westerly winds. The summer months most often experience warm southwesterly winds. The winter months generally experience westerly and northwesterly winds. The proposed facility site is located sufficiently inland from the bays so that it is not significantly affected by a sea breeze. Wind speeds during the winter months (November to April) are normally higher than summer months.

The annual average wind speed over the period of record (1964 to 1993) is 10.2 miles per hour (mph). The highest monthly average wind speed is in March at 11.9 mph and the lowest monthly average is in August at 8.7 mph.

## **2.1.8 Ambient Air Quality**

### **2.1.8.1 Applicable Regulations**

The proposed facility is regulated under Federal and State law. The NJDEP has developed a number of regulations and guidelines that are stricter than those developed by the United States Environmental Protection Agency (EPA) under the Clean Air Act (CAA) of 1970. Present regulations are described below.

#### National Ambient Air Quality Standards (NAAQS)

Pollutants with legal air quality standards are called criteria pollutants. The criteria pollutants include sulfur dioxide (SO<sub>2</sub>), carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), ozone (O<sub>3</sub>), total suspended particulates (TSP), inhalable particulates (PM<sub>10</sub>) and lead (Pb). Air quality standards are concentrations over a period of time, such as a year or a day, which have been shown to be safe for sensitive persons, such as the elderly, children, or people with respiratory or heart disease.

Primary air quality standards are based upon public health needs. Secondary standards are levels deemed necessary to prevent deterioration of visibility or damage to materials or vegetation—effects that occur at lower concentrations rather than effects on people. Therefore, comparisons are made to both primary and secondary standards and are used as guideline values for assessing impact.

Air basins or regions are classified as attainment or nonattainment areas for the criteria pollutants depending upon whether the NAAQS have been exceeded. Ozone attainment areas are further classified as marginal, moderate, serious, severe or extreme depending upon the degree of exceedance of the ozone standard. Particulate (PM<sub>10</sub>) and carbon monoxide nonattainment areas may be designated as either moderate or serious. Table 2-6 shows the

**Table 2-6**  
**Comparison of State and Federal Ambient Air Quality Standards**

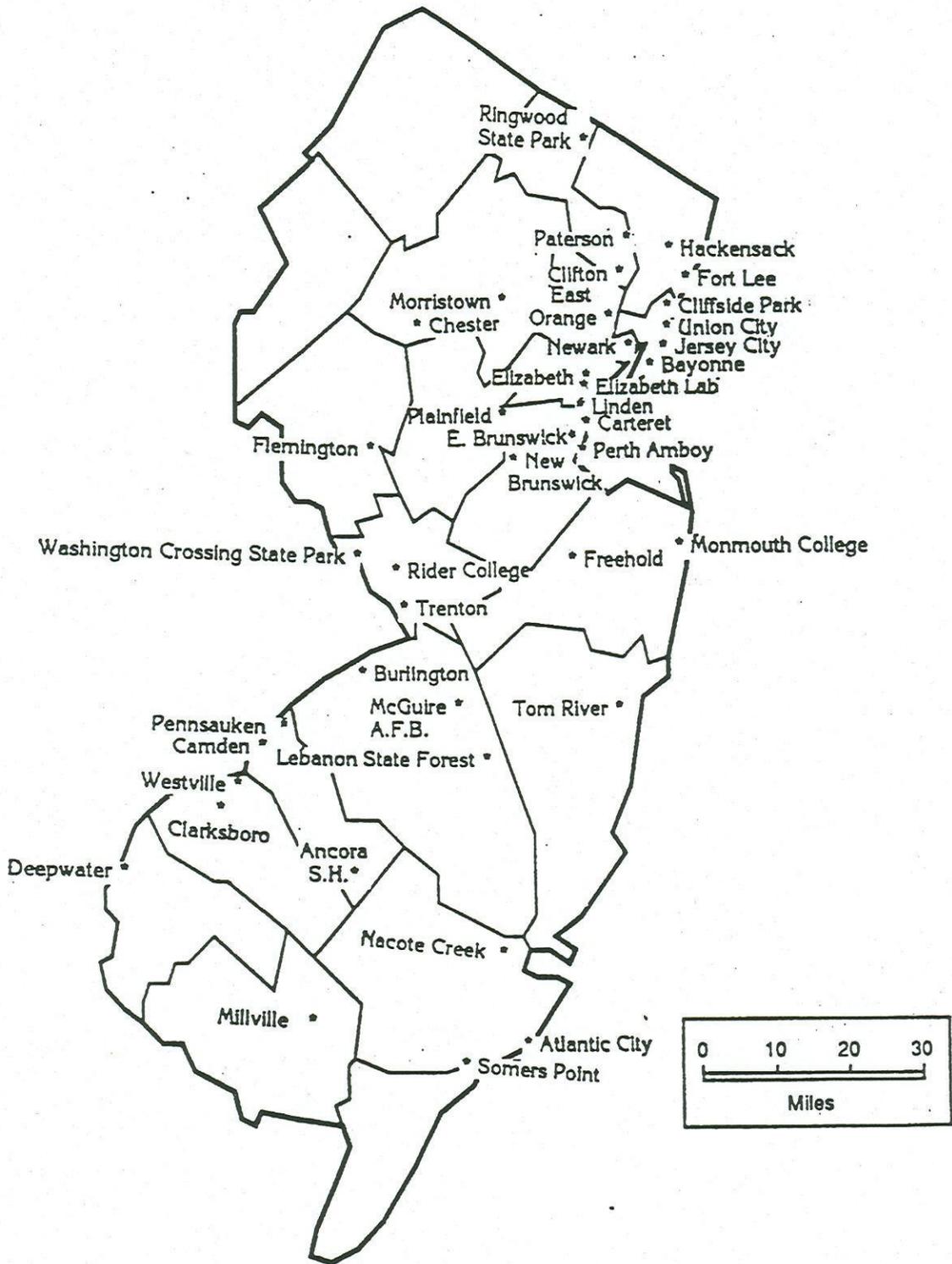
Pollutant	Averaging Time	New Jersey		Federal	
		Primary (ug/m3)/(ppm)	Secondary (ug/m3)/(ppm)	Primary (ug/m3)/(ppm)	Secondary (ug/m3)/(ppm)
Carbon monoxide	1 hour 8 hours	40,000/35 10,000/9	40,000/35 10,000/9	40,000/35 10,000/9	NA NA
Sulfur dioxide	3 hours 24 hours Annual (arithmetic mean)	N/A 365/.14 80/.03	1,300/.5 260/.10 60/.02	NA 365/.14 80/.03	1,300/.5 NA NA
Inhalable particulates (PM 10)	24-hour Annual (arithmetic mean)	NA NA	NA NA	150 50	150 50
Ozone	1-hour Max daily 1-hour	NA 235/.12	160/.08 NA	NA 235/.12	235/.12 NA
Nitrogen dioxide	Annual (arithmetic mean)	100/.05	100/.05	100/.05	100/.05
Total suspended particulates	24 hours Annual (geometric mean)	260 75	150 60	NA NA	NA NA
Lead	3-month avg. quarterly mean	1.5 NA	1.5 NA	NA 1.5	NA 1.5

existing State and Federal (NAAQS and NJAAQS) ambient air quality standards (NJDEP May 1994).

#### 2.1.8.2 Study Area Ambient Air Quality

New Jersey monitors and forecasts ambient air quality and reports this information to health organizations and wire services. This report is known as the New Jersey Pollutant Standards Index (PSI). This index indicates that in 1993 primary ambient air quality standards were exceeded during 4 days of the year. The PSI divides the state into nine reporting regions. The region potentially affected by the proposed facility is the southern metropolitan region that consists of Hudson, Essex and Union Counties.

A discussion of each of the pollutants regulated by NAAQS is presented below. The quantitative description of existing air quality conditions is based on the 1993 Air Quality Report published by the NJDEP, Division of Environmental Quality dated May 1994. The report is a summary of New Jersey air quality data compiled for 1993 from the statewide monitoring station network. Figure 2-7 shows the monitoring locations throughout



New Jersey. NJDEP maintains continuous monitoring stations throughout the state. Five Newark monitoring stations provide the best representation of air quality in Project Study Area:

Table 2-7 lists the pollutant concentrations at the Newark monitoring stations and compares them with the NAAQS.

#### *Carbon Monoxide (CO)*

Emissions of carbon monoxide occur when incomplete combustion takes place (CO is an intermediate product before CO<sub>2</sub> is formed). The primary source of CO is the automobile, which emits excessive CO when operated with an incorrect fuel/air mixture. Thus, high CO concentrations tend to be found primarily in downtown urban areas. Table 2-7 shows CO concentrations for the Newark Monitoring Station for 1-hour and 8-hour averages (NJDEP 1993). Values are within NAAQS. Although this is the closest location, it does not properly represent site conditions because of the highly localized nature of CO.

#### *Sulfur Dioxide*

Sulfur dioxide results from the burning of fossil fuel. Therefore, sources of SO<sub>2</sub> typically include coal or oil burning facilities such as space heaters, industrial boilers, and power plants. SO<sub>2</sub> in the atmosphere combines with other gases to form acids. This, combined with precipitation, yields acid rain, which is a major environmental concern affecting soils, vegetation, and man-made structures.

Table 2-7 list the annual arithmetic mean levels, and the 3-hour running averages for SO<sub>2</sub> (NJDEP 1993) at the Newark Monitoring Station. Standards for the year 1993 were not exceeded.

#### *Inhalable Particulates (PM10)*

Inhalable particulates are emitted from stationary sources and area sources. Further particulate contribution comes in the form of fugitive dust emissions from industrial complexes, regional landfills, natural erosion, and long-range air pollutant transfer (area sources). They are differentiated from total suspended particulates (TSP) by their aerodynamic diameter which must be 10 micrometers or less. Table 2-7 shows the annual average and maximum 24 hour average at multiple Newark monitoring stations. Standards for 1993 were not exceeded.

#### *Ozone (O<sub>3</sub>)*

Ozone and other oxidates are formed by the reaction of volatile organic substances, such as hydrocarbons, with oxides of nitrogen in the presence of sunlight. Thus, ozone is only a potential problem when sunlight is at its maximum strength, which occurs from late spring to early fall. Because of the high nitrogen oxide concentrations resulting from heavy automobile traffic in this densely populated region, in addition to hydrocarbons from nearby industry, the whole region is designated as an area of severe nonattainment. Table 2-7 shows the 1-hour maximum readings of ozone. (NJDEP 1993).

### *Nitrogen Dioxide (NO<sub>2</sub>)*

Nitrogen dioxide and nitric oxide (NO) result from high-temperature combustion. The primary source of this form of air pollution is the automobile, as well as other mobile sources. Additional sources of NO<sub>2</sub> are refineries and fuel combustion.

With the reduction of emissions from automobiles resulting from the use of catalytic converters, the ambient levels of NO<sub>2</sub> should decline. Table 2-7 shows the annual arithmetic mean of NO<sub>2</sub> (NJDEP 1993) at the Newark monitoring station.

### *Total Suspended Particulates (TSP)*

The sources of total suspended particulates are the same as inhalable particulates. Table 2-7 lists the average particulate levels from 1993 for monitoring stations within close proximity to the site. Standards for the year 1993 were not exceeded.

### *Lead (Pb)*

Lead as an air pollutant comes principally from automobiles, with lesser amounts from industries such as smelting. Ambient levels have decreased in recent years with the increased use of unleaded gasoline and pollution control devices on automobiles. Levels are within NAAQS. Table 2-7 illustrates the maximum quarterly values (NJDEP 1993).

In summary all indicators of air quality are in compliance with federal and state health based standards, except for ozone. Ozone has been identified as a regional problem.

#### *2.1.8.3 Regional Air Quality*

A description of the existing air quality within the District has been prepared to characterize existing air quality. The existing major point, area, and transportation sources that contribute to air quality within the District have been identified.

#### *Existing Air Quality*

The Hackensack Meadowlands District is located in an air basin (the NY, NJ, CT Consolidated Metropolitan Statistical Area) classified as moderate for carbon monoxide nonattainment. The air basin, as a whole, must demonstrate attainment with air quality standards by December 31, 2000. The New Jersey State Implementation Plan (SIP) revisions, which are intended to plan for the achievement of the NAAQS, were due to be submitted to EPA November 15, 1992, in accordance with the timetable established in Title I of the Clean Air Act of 1990. Some of the tools NJDEP may use in achieving attainment throughout New Jersey include having the SIP contain provisions for reducing vehicle miles traveled (VMT), supplying oxygenated gasoline, and producing economic incentives to reduce stationary source carbon monoxide emissions by 5% per year until attainment occurs.

Similarly, the air basin containing the District is classified as severe for ozone nonattainment and must demonstrate attainment by November 15, 2007. Two primary precursors exist for ozone formation, volatile organic compounds and nitrogen oxides, whose emission reductions throughout all of New Jersey will have to be addressed in the SIP revisions. A reduction of emissions from both transportation and stationary sources is likely to be

required for ozone in the air basin. Transportation-related reduction techniques may include motor vehicle inspection and maintenance programs, Stage II vapor recovery at gasoline dispensing facilities, "clean" fuels, vehicle based vapor recovery, mandatory car pooling, and enforceable transportation control measures to reduce VMT.

The District, and surrounding areas, are classified as attainment for particulates (PM<sub>10</sub>), nitrogen dioxide, sulfur dioxide and lead.

Existing air quality conditions for the Hackensack Meadowlands District are characterized using existing NJDEP Monitoring stations. The 1993 air quality report for monitoring stations near the District indicates that several criteria pollutants are approaching or have exceeded the NAAQS. Table 2-8 lists the pollutant concentrations measured at each monitoring station within and near the District in 1993. Measured data is also compared with the NAAQS. When comparing the 1993 maximum pollutant concentrations to the NAAQS, all the pollutants except ozone are below their respective health standard. (1993 Air Quality Report, May 1994.) While carbon monoxide concentrations within the District are within NAAQS limits, the air basin encompassing the District contains other areas which do not meet the NAAQS; therefore, the air basin as a whole is considered to be nonattainment.

Since the air basin's baseline air quality exceeded the NAAQS for ozone and carbon monoxide, proposed development alternatives within the District, as well as those throughout the remainder of New Jersey, will have to demonstrate a reduction in air quality impacts for these pollutants. Proposed transportation alternatives will have to result in lower VMT, vehicle hours traveled and congestion. Proposed stationary and area source alternatives will have to demonstrate a net reduction in carbon monoxide and ozone precursors, volatile organic compounds and nitrogen oxides emissions.

### *2.1.9 Ambient Acoustical Conditions*

This section presents information on current environmental noise levels in the vicinity of the proposed project site. The section first presents an explanation of how noise is measured, followed by relevant noise regulations and guidelines and a discussion of the results of the environmental noise monitoring program conducted by CDM on March 7, 1995 at the proposed facility site. Finally, the background environmental sound levels for the District are assessed.

#### *2.1.9.1 Noise Measurements*

Noise is often and most simply defined as unwanted sound. The magnitude of air pressure fluctuations produced by sound is referred to as the sound level and is measured in decibels (dB). The decibel scale using a logarithmic function compresses the very large range of audible pressures into a meaningful scale: 0 dB corresponds to the faintest audible sound; levels in excess of 130 dB produce pain in humans. Because human hearing sensitivity varies with the frequency of sound, a filter, called the A-weighting filter, which simulates this frequency sensitivity in human hearing, is used in measuring and reporting environmental sound levels. A-weighted sound levels are abbreviated as "dBA." Figure 2-8 shows typical sound pressure levels of various sounds in dBA. Since the decibel scale is logarithmic, changes in sound energy are not proportional. A 26 percent change in the energy level

**Table 2-7  
Keegan Landfill Study Area  
Existing Air Quality**

<i>Pollutant</i>	<i>Monitoring* Station</i>	<i>Site Code**</i>	<i>Averaging Period</i>	<i>1993 Max Concentration</i>	<i>NAAQS</i>
Carbon Monoxide	Newark	S	1-hour 8-hour	5.6 ppm 4.8 ppm	35 ppm 9 ppm
Sulfur Dioxide	Newark	S	3-hour Annual	0.52 ppm .008 ppm	0.5 ppm 0.03 ppm
Inhalable Particulates (PM10)	Newark	S	24-hour Annual	79 ug/m <sup>3</sup> 32.7 ug/m <sup>3</sup>	150 ug/m <sup>3</sup> 50 ug/m <sup>3</sup>
	Newark- Woolworth Bldg	SPM	24-hour Annual	72 ug/m <sup>3</sup> 28.6 ug/m <sup>3</sup>	150 ug/m <sup>3</sup> 50 ug/m <sup>3</sup>
	Newark Police Booth	S	24-hour Annual	81 ug/m <sup>3</sup> ***	150 ug/m <sup>3</sup> 50 ug/m <sup>3</sup>
Ozone	Newark	S	1-hour	0.113 ppm	0.12 ppm
Nitrogen Dioxide	Newark	S	Annual	0.035 ppm	.053 ppm
Total Suspended Particulates	Newark-Ave. C <sup>1</sup>	S-PB	24-hour Annual	128 ug/m <sup>3</sup> 61.3 ug/m <sup>3</sup>	260 ug/m <sup>3</sup> 75 ug/m <sup>3</sup>
	Newark-Ave. C <sup>2</sup>	SPM-PB	24-hour Annual	126 ug/m <sup>3</sup> 63.0 ug/m <sup>3</sup>	260 ug/m <sup>3</sup> 75 ug/m <sup>3</sup>
Lead	Newark-Ave C <sup>1</sup>	S	3-month	.317 ug/m <sup>3</sup>	1.5 ug/m <sup>3</sup>
	Newark-Ave C <sup>2</sup>	SPM	3-month	.336 ug/m <sup>3</sup>	1.5 ug/m <sup>3</sup>

\* Newark - St. Charles and Berlin Streets  
 Newark - Woolworth Bldg - 165 Market Street  
 Newark Police Booth - Broad and Market Streets  
 Newark - Avenue C<sup>1</sup> - Avenue C and Wright Street - 060 - Cookson Pigments  
 Newark - Avenue C<sup>2</sup> - Avenue C and Wright Street - 069 - Cookson Pigments  
 PB - Lead Monitoring Site

\*\* Site Code: S - State and Local Air Monitoring Sites (SLAMS), these sites fulfill the federal monitoring requirements for the state.

SPM - Special Purpose Monitoring, these sites fulfill a specific need or purpose and are not federally required.

N - National Air Monitoring Sites (NAMS), these sites are a subset of the SLAMS which must comply with stricter siting criteria and reporting requirements.

PB - Lead Monitoring Site

\*\*\* Insufficient Data for Valid Arithmetic Mean

**Table 2-8  
Hackensack Meadowlands District  
Existing Air Quality**

<i>Pollutant</i>	<i>Monitoring* Station</i>	<i>Site Code**</i>	<i>Averaging Period</i>	<i>1993 Max Concentration</i>	<i>NAAQS</i>
Carbon Monoxide	Hackensack	N	1-hour 8-hour	7.9 ppm 6.9 ppm	35 ppm 9 ppm
	Jersey City <sup>1</sup>	N	1-hour 8-hour	8.2 ppm 5.9 ppm	35 ppm 9 ppm
Sulfur Dioxide	Hackensack	S	3-hour Annual	0.43 ppm .008 ppm	.5 ppm <sup>**</sup> .03 ppm
	Jersey City <sup>1</sup>	N	3-hour Annual	.071 ppm .012 ppm	.5 ppm <sup>**</sup> .03 ppm
Inhalable Particulates (PM10)	Fort Lee	N	24-hour Annual	91 mg/m <sup>3+</sup> 36.6 ug/m <sup>3</sup>	150 ug/m <sup>3</sup> 50 ug/m <sup>3</sup>
	Jersey City <sup>2</sup>	N	24-hour Annual	93 ug/m <sup>3+</sup> 34.4 ug/m <sup>3</sup>	150 ug/m <sup>3</sup> 50 ug/m <sup>3</sup>
Ozone	Cliffside Park	S	1-hour	.115 ppm	.12 ppm
Nitrogen Dioxide	Cliffside Park	S	Annual	.029 ppm	.053 ppm
Total Suspended Particulates	Union City	SPM	24-hour Annual	129 mg/m <sup>3</sup> 50.5 ug/m <sup>3</sup>	260 ug/m <sup>3</sup> 75 ug/m <sup>3</sup>
	Jersey City <sup>2</sup>	SPM	24-hour Annual	144 ug/m <sup>3</sup> 55.4 ug/m <sup>3</sup>	260 ug/m <sup>3</sup> 75 ug/m <sup>3</sup>
Lead	Union City	S	3-month	.035 ug/m <sup>3</sup>	1.5 ug/m <sup>3++</sup>
	Jersey City <sup>2</sup>	N	3-month	.053 ug/m <sup>3</sup>	1.5 ug/m <sup>3++</sup>

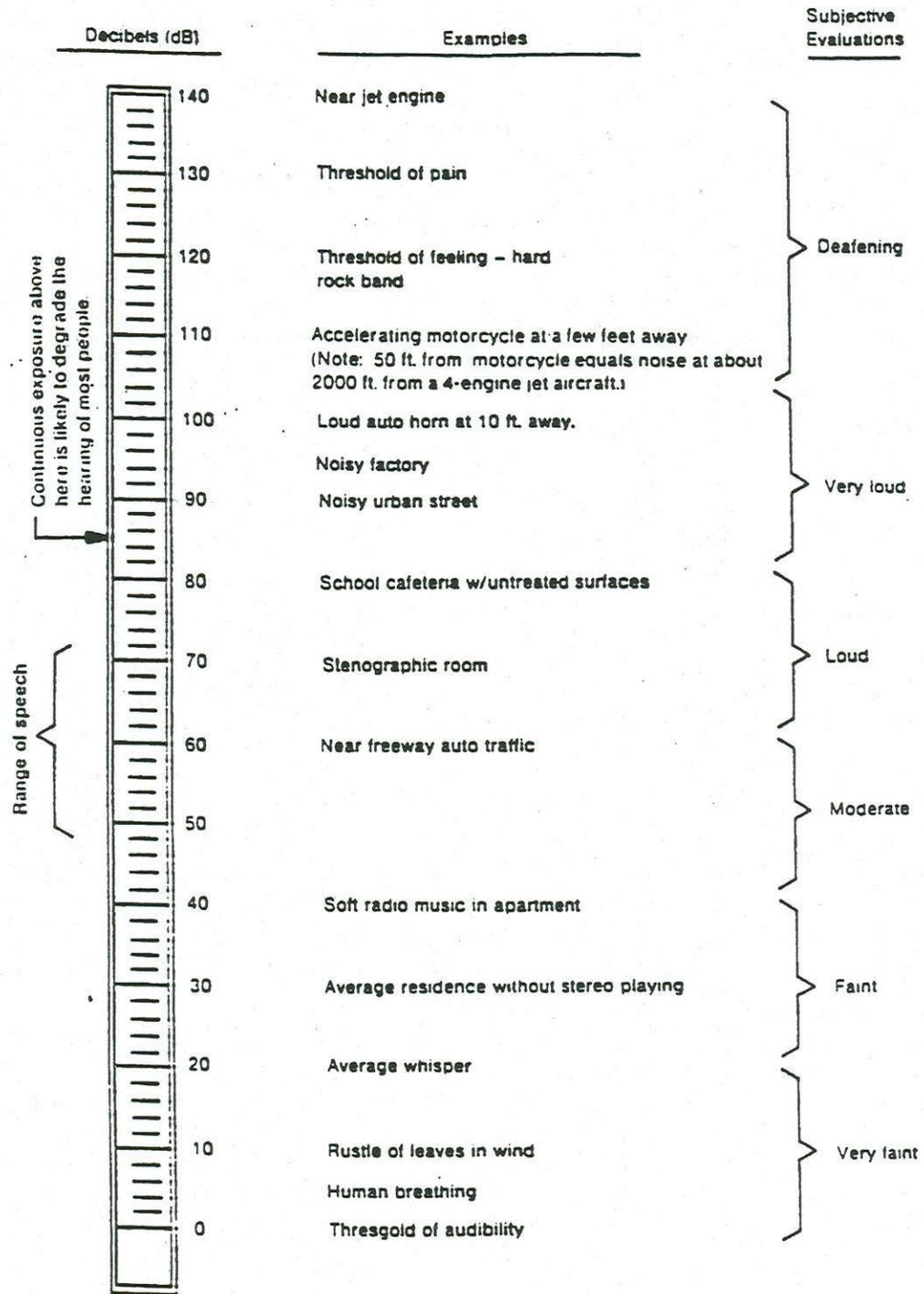
\* Hackensack, 133 River Street  
Fort Lee, Lemoine Avenue Overpass  
Cliffside Park, Accomando Place and Cedar Street  
Union City, 714 31st Street  
Jersey City<sup>1</sup>, 2828 Kennedy Boulevard  
Jersey City<sup>2</sup>, 355 Newark Avenue

\*\* Site Code: S - State and Local Air Monitoring Sites (SLAMS), these sites fulfill the federal monitoring requirements for the state.

SPM - Special Purpose Monitoring, these sites fulfill a specific need or purpose and are not federally required.

N - National Air Monitoring Sites (NAMS), these sites are a subset of the SLAMS which must comply with stricter siting criteria and reporting requirements.

Some common, easily recognized sounds are listed below in order of increasing sound intensity levels in decibels. The sound levels shown for occupied rooms are typical general activity levels only and do not represent criteria for design.



Source: Egan, M. David. Concepts In Architectural Accoustics. McGraw-Hill Book Co., New York, 1972

changes the sound level by just one decibel. The most sensitive human ear would not detect this change, except in an acoustical laboratory. A doubling of the energy level would result in a 3 dB increase, which would be barely perceptible to most people. A tripling in energy level would result in a clearly noticeable change of 5 dB in the sound level. A change of ten times in the energy level would result in a 10 dB change in the sound level. For most people a 10 dB increase in sound level is perceived as a doubling of the apparent loudness.

The noise descriptors used in this analysis are the energy equivalent sound level ( $L_{eq}$ ) and the day-night energy equivalent sound level ( $L_{dn}$ ). The  $L_{eq}$  is a single value average of the energy content of a time-varying sound level for any time period. Human perception of sound is such that a total ambient sound level increase in the  $L_{eq}$  of 0 to 3 dBA would be perceived as "negligible" noise impact, an increase of 5 dBA would be perceived as a "minor" noise impact, an increase of 5 dBA to 10 dBA would be perceived as a "moderate" noise impact, and an increase of 10 dBA or more would be perceived as a "significant" noise impact (Figure 2-8).

A problem can occur when assessing noise exposure over a 24-hour period with a single-valued descriptor such as  $L_{eq}$ . Sound levels occurring at night generally produce greater annoyance than do the same levels occurring during the day. It is generally agreed that community perception of nighttime sound levels is 10 dBA higher than daytime levels. That is, a given level of environmental noise during the day would appear to be approximately 10 dBA louder at night, at least in terms of community annoyance. This is largely because nighttime environmental ambient sound levels in most areas are approximately 10 dBA lower than daytime sound levels.

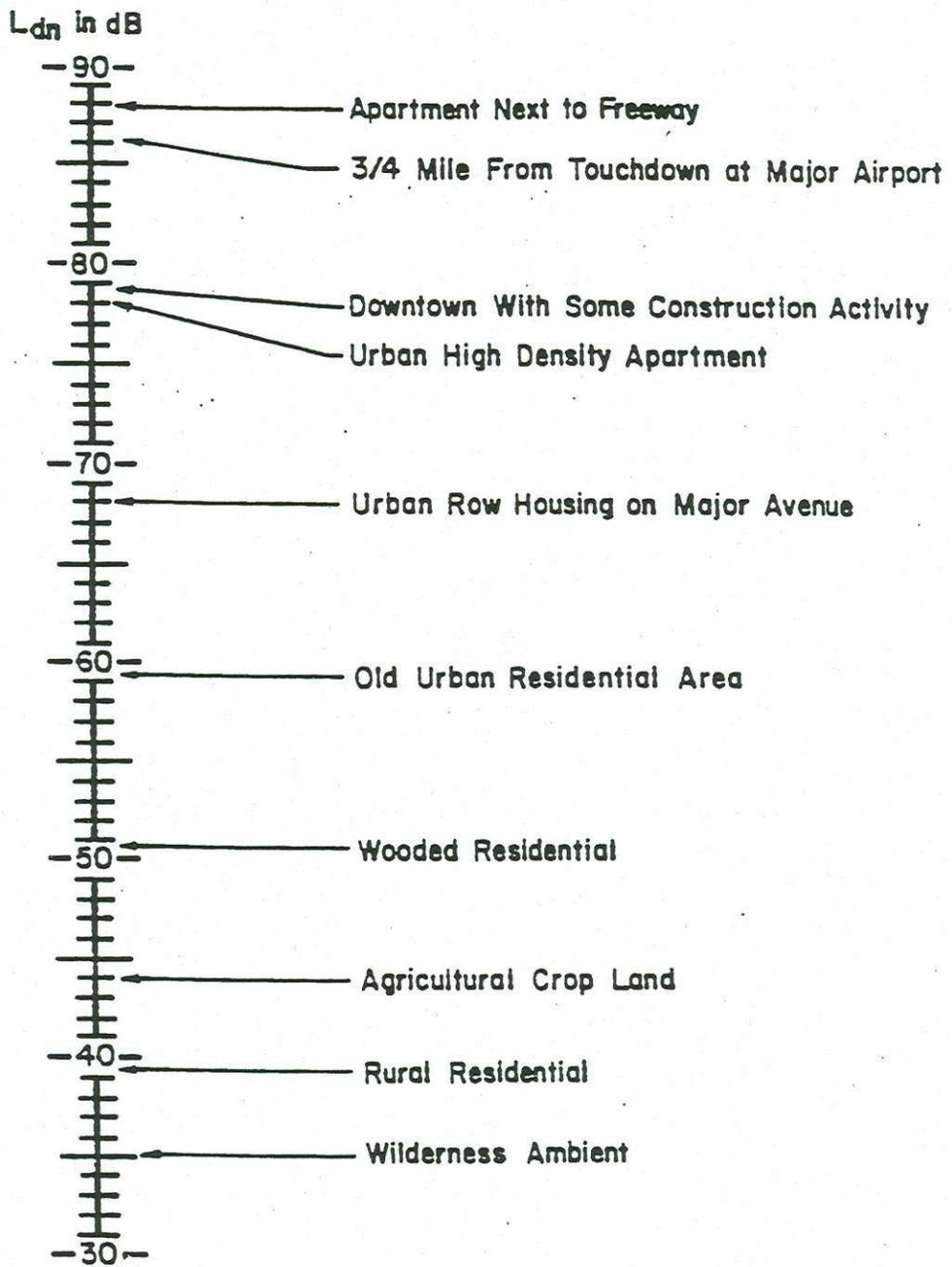
To account for nighttime community reaction to sound, a day-night noise descriptor has been defined using the energy equivalent sound level. This descriptor, referred to as the day-night average sound level, ( $L_{dn}$ ), adds 10 dBA to sound levels occurring between 10:00 pm and 7:00 am.  $L_{dn}$  accounts for increased community sensitivity to nighttime sound levels. As a result, both the  $L_{eq}$  and the  $L_{dn}$  have become widely accepted for use in environmental noise regulations and criteria. However, because the landfill will not operate at night, the concern with nighttime noise impacts does not exist with the project.

To put the  $L_{dn}$  in clearer perspective, Figure 2-9 contains a day-night average sound level scale of  $L_{dn}$  showing corresponding values for various types of outdoor locations.

#### 2.1.9.2 Relevant Noise Regulations and Guidelines

##### *HMDC Regulations*

The District zoning regulations (at NJAC 19:4-6.1) set forth the noise regulations in the District. The regulations are expressed in terms of performance standards by category. Noise shall not exceed the maximum sound levels specified for each performance category as follows:



Source: Egan, M. David, Concepts in Architectural Acoustics, McGraw-Hill Book Co., New York, 1972

<b>HMDC Noise Level Restrictions</b>		
<i>Performance Standard Category</i>	<i>Maximum Permitted Sound Level</i>	<i>Where Measured</i>
A	65 dBA	On or beyond subject property boundary line.
B	70 dBA	On or beyond subject property boundary line.
C	76 dBA	On or beyond the zone boundaries.

**NJDEP Regulations**

New Jersey regulations require that noise levels generated by industrial, commercial, public service, or community service facilities not exceed the standards set forth in the New Jersey Noise Control Regulations under NJAC 7:29-1.2. These regulations state that sound from any such facility and its related premises, property, or equipment used to provide governmental services to the public including, but not limited to water and sewage facilities, when measured at any residential property line, shall not exceed the following:

1. From 7:00 a.m. to 10:00 p.m.:
  - i. Continuous airborne sound which has a sound level in excess of 65 dBA; or
  - ii. Continuous airborne sound which has an octave band sound pressure level in decibels which exceeds the values listed below in one or more octave bands.

<b>Octave Band Center Frequency (Hz)</b>	<b>Octave Band Sound Pressure Level (dB)</b>
31.5	96
63	82
125	74
250	67
500	63
1,000	60
2,000	57
4,000	55
8,000	53

or,

iii. Impulsive sound in air which has a peak sound pressure level in excess of 80 decibels.

2. From 10:00 p.m. to 7:00 a.m.:

i. Continuous airborne sound which has a sound level in excess of 50 dBA; or

ii. Continuous airborne sound which has an octave band sound pressure level in decibels which exceeds the values listed below in one or more octave bands:

<i>Octave Band Center Frequency (Hz)</i>	<i>Octave Band Sound Pressure Level (dB)</i>
31.5	86
63	71
125	61
250	53
500	48
1,000	45
2,000	42
4,000	40
8,000	38

or,

iii. Impulsive sound in air which has a peak sound pressure level in excess of 80 decibels.

Similar, but less restrictive, limitations exist for sound measured at any commercial property line. There are no regulations limiting noise levels as measured at industrial property lines.

*Federal Guidelines and Standards*

The U.S. Department of Housing and Urban Development (HUD) has been the lead federal agency setting standards for interior and exterior sound levels for housing. HUD noise standards are outlined in 24 CFR Part 51. This regulation establishes site acceptability standards based on  $L_{dn}$  (day-night energy equivalent noise level) noise exposure levels. These standards were developed for urban environments, and are useful as general guidelines in planning for residential uses in the District.

The table below shows HUD site acceptability in terms of ranges of  $L_{dn}$ . "Acceptable" sites are those where noise levels do not exceed an  $L_{dn}$  of 65 dB. Housing on acceptable sites does not require noise attenuation other than that provided in customary building techniques in the District.

<b>U.S. Department of Housing and Urban Development Site Acceptability Criteria<sup>a</sup></b>	
	<i>Day-Night Energy Equivalent Level (in decibels)</i>
Acceptable	Not exceeding 65 dB
Normally unacceptable	Above 65 dB but not exceeding 75 dB
Unacceptable	Above 75 dB

<sup>a</sup> Taken from 24 CFR Para. 51.103, Criteria and Standards

"Normally unacceptable" sites are those where the  $L_{dn}$  is above 65 dB but does not exceed 75 dB. Housing on normally unacceptable sites requires some means of noise abatement, either at the property line or in the building exterior construction, to assure that building interior noise levels are acceptable. From a practical standpoint, this usually means that buildings must be air conditioned so that windows can be closed to reduce exterior sound transmission into interior spaces.

"Unacceptable" sites are those where the  $L_{dn}$  is 75 dB or higher. The term "unacceptable" does not mean that housing cannot be built on these sites, but rather, that more sophisticated building sound attenuation is likely to be needed and that there must exist some benefits which outweigh the disadvantages posed by high environmental noise levels. Housing on unacceptable sites generally requires sound-attenuating double glazing and air conditioning.

### 2.1.9.3 Environmental Noise Monitoring Program

To characterize ambient sound levels in the vicinity of the proposed project, weekday environmental noise monitoring was conducted at the following four locations on March 7, 1995 by CDM personnel:

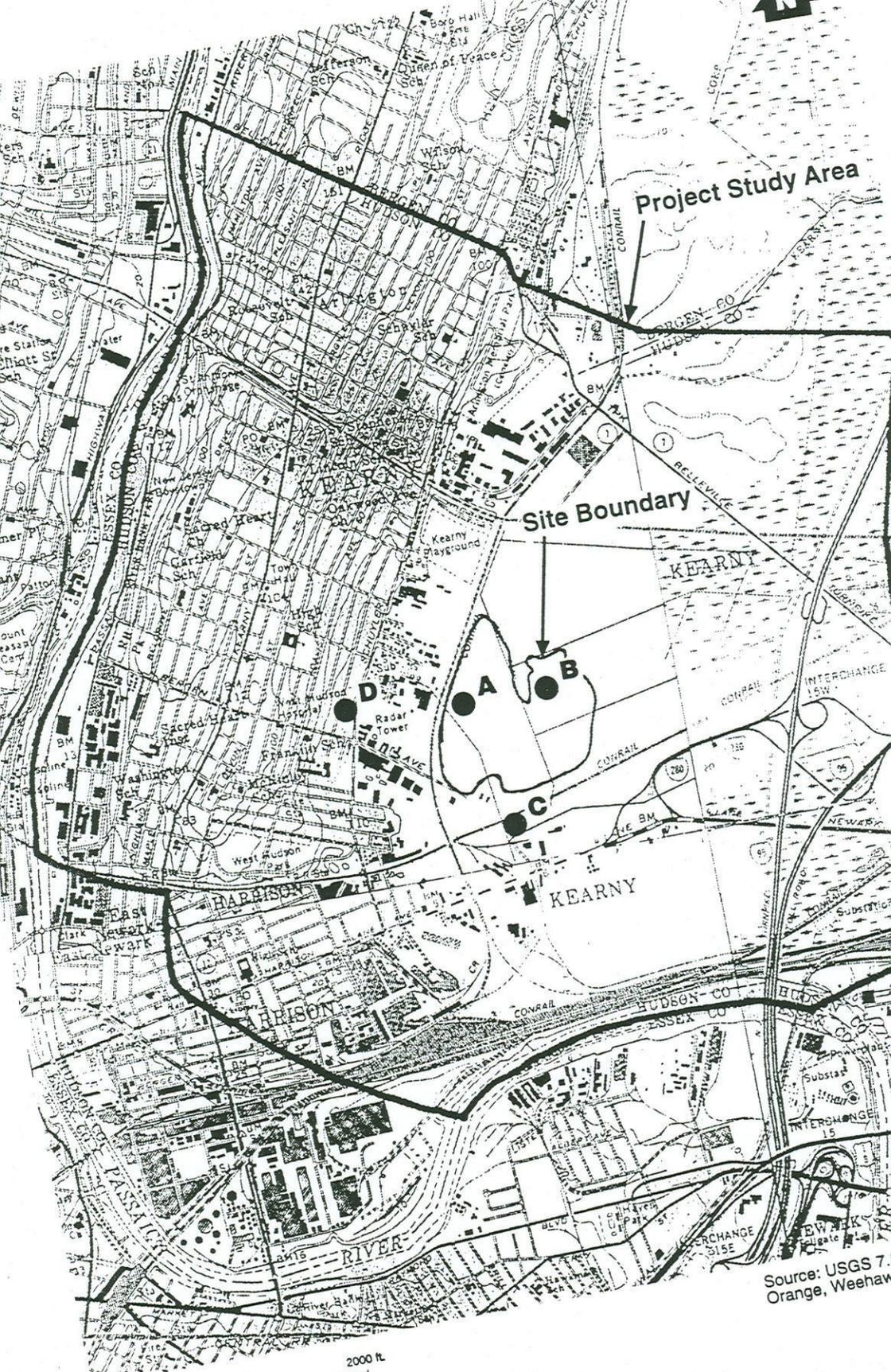
- Location A: At the western boundary of the proposed facility site, adjacent to commercial/industrial and residential area
- Location B: At the eastern boundary adjacent to the Kearny Marsh
- Location C: At the southern boundary of the proposed site, north of Harrison Avenue.
- Location D: 80 Ivy Street in Kearny, off Bergen Avenue in a residential area.

Survey locations, shown on Figure 2-10, were chosen to monitor noise levels at the boundaries of the proposed facility (3 locations) and adjacent to sensitive receptors. A major daytime continuous noise source in the area is auto and truck traffic on major area roads (Harrison Ave., Schuyler Ave., New Jersey Turnpike, Route 280). Intermittent noise sources in the area include overhead aircraft, typical urban sounds (horns, sirens, radios, etc.), and birds and insects.

The noise monitoring covered twelve distinct 20-minute periods between 8:30 a.m. March 7, 1995 and 12:30 a.m., March 8, 1995 at each of the three boundary (A, B & C) locations in order to define representative existing ambient sound levels throughout the day and night. Between 7:30 a.m. and 8:00 a.m. residential location D was monitored to determine off-site conditions. In addition, at location A octave band center frequency sound levels were measured from 10:00 - 10:30 and 12:30 - 1 p.m. Noise measurements were made using a Gen Rad Model 1988 precision (type 1) integrating sound-level meter conforming to the requirements of NJAC 7:29-2.6. The monitoring program followed New Jersey regulations and sound-level meter manufacturer recommendations.

Table 2-9 shows the existing minimum and maximum daytime and nighttime  $L_{eq}$  sound levels measured at each location. As shown in the table, measured existing noise levels at all locations are in compliance with both the 65 dBA daytime NJAC regulation for continuous sound but exceed the 50 dBA nighttime NJAC regulation. Table 2-9 also shows that existing  $L_{dn}$  sound levels in the vicinity of the site are within the "normally unacceptable" range as defined by HUD for residential uses.

Table 2-10 presents the lowest and highest measured 1-minute  $L_{eq}$  sound levels by octave band center frequency at location A. These octave band center frequency levels are in compliance with the daytime NJAC regulations for octave band sound levels. The lowest A-weighted ambient sound levels will be used in the noise impact analysis for comparison with predicted construction sound levels to provide a conservative assessment of project construction noise impact. Noise impact will be assessed in the environmental impact section in



Source: USGS 7.5  
Orange, Weehawken

**Study Area Noise**  
HMDC Material

S. McKee

**Table 2-9**  
**Existing Energy-Equivalent and Day-Night Energy Equivalent**  
**Sound Levels at Study Area Noise Monitoring Locations**  
**(March 7 and 8, 1995)**

<i>Energy-Equivalent Levels (L<sub>eq</sub>)</i>				
<i>Measured</i>				<i>Day-Night Energy (L<sub>dn</sub>)</i> <i>Equivalent Sound</i> <i>Levels</i>
<i>Monitoring</i> <i>Location</i>	<i>Daytime</i> <i>Minimum</i> <i>(dBA)</i>	<i>Daytime</i> <i>Maximum</i> <i>(dBA)</i>	<i>Nighttime</i> <i>(dBA)</i>	<i>Measured</i> <i>(dBA)</i>
A	58	61	59	66
B	58	62	60	66
C	59	62	61	67
D	60	60	NA	NA

NA - No measurement taken.

**Table 2-10**  
**Location A**  
**Octave Band Center Frequency**  
**Energy-Equivalent Levels**  
**(March 7, 1995)**

<i>Hz</i>	<i>Lowest Daytime</i> <i>(10:00 - 10:30 a.m.)</i> <i>(dBA)</i>	<i>Highest Daytime</i> <i>(12:30 - 1:00 p.m.)</i> <i>(dBA)</i>
31.5	69	75
63	68	70
125	64	63
250	53	57
500	53	55
1000	50	56
2000	47	45
4000	42	36
8000	28	27

terms of the project impact criteria discussed above by computing the magnitude of predicted change from the  $L_{eq}$  noise levels measured at the monitoring locations.

The nearest sensitive noise receptors in the project study area are the residences west of the proposed facility.

With regard to other potential sensitive receptors, the nearest schools are as follows: an elementary school (Mt. Carmel Guild School) about 0.4 miles west of the proposed landfill; Franklin Elementary School about 0.5 mile west from the proposed facility; Kearny High School approximately 0.6 miles northwest of the proposed facility; and West Hudson Handicapped Center .4 miles, northwest of the proposed site. The nearest hospital West Hudson Hospital is about 0.5 mile from the facility. Harvey Field is the closest park to project activity approximately 0.1 miles west. In addition, Gunnel Oval(Kearny) Park 0.5 miles northwest and West Hudson Park 0.7 miles southwest exist within the study area. For more detail on these sensitive receptors, see section 2.3 Cultural Environment and 2.4 Socioeconomic Environment.

## 2.2 Biological/Ecological Environment

The proposed facility is bordered on the north and east by the Kearny Marsh, classified as a Freshwater Marsh biozone within HMDC's region. Because the land south and west of the site is zoned for manufacturing, light industrial and residential use, impacts to these areas are not considered. The description of the biological/ecological environment is based on the Draft Environmental Impact Statement on the Special Area Management Plan for the Hackensack Meadowlands District, NJ (HMDC, 1995).

### 2.2.1 Plant Associations (Flora)

Little undeveloped open space remains in the Meadowlands District that is not a wetland, an aquatic habitat, or a filled and contaminated upland. The terrestrial habitats have been significantly modified since the arrival of the first settlers; first for farming and later for residential and industrial development. The major terrestrial open spaces that have become re-established in the District are on the closed solid waste disposal areas. The site of the proposed facility is one such area.

#### 2.2.1.1 Inactive Waste Disposal Sites

Outside of the small areas that are still used for active waste disposal, most of the historic waste disposal sites have become revegetated and provide habitat for numerous species. These open areas are concentrated in undeveloped former landfill areas in the District (approximately 1,200 acres).

The plant communities on the inactive landfills can be characterized as early to middle successional. The fills were abandoned only recently (circa 1970-1980) and the dominant species are herbaceous plants, forbs (herbs other than grasses), and small shrubs. The climax local forests have not yet had time to become re-established; that process can take 200 years. As a result the waste-filled land remains open and the terrestrial wildlife that dominate there are those most closely associated with the transitional "old-field" community of the Atlantic

seaboard. This community is an association of plants and animals that develops in agricultural areas that have been left undisturbed for several years. Both the plant and animal species in these open areas are considered opportunistic in that they can reproduce quickly and in large numbers to colonize disturbed areas. The populations, however, are continually changing as these opportunistic species are displaced by the local climax species (assuming no further human disturbances).

#### 2.2.1.2 Freshwater Marsh

The freshwater marshes north and east of the proposed facility in the Meadowlands consist of wetlands that are not directly connected to tidal waters. These marshes are influenced by freshwaters coming from upland runoff or groundwater. In the Meadowlands District, freshwater marshes of various size can be found in:

- the Kearny Marsh lying south of the New Jersey Transit Boonton Line
- the Penhorn Creek basin
- in North Bergen, in areas isolated from the tides by roads and dikes
- Losen Slote Creek
- areas near Teterboro Airport
- in small pockets throughout the lower Hackensack River floodplain

Historically, these freshwater meadows contained a mix of grasses such as those of the *Panicum* and *Andropogon* genera. However, most of the freshwater marshes in the District are currently dominated by *Phragmites*. Several areas do persist as remnant (non-reed) habitats, in the vicinity of Losen Slote and Moonachie Creek, the westerly portion of Sawmill Creek WMA, and areas in Kearny Marsh. In addition, naturally wooded areas make up some of the freshwater marshes.

#### 2.2.2 Animal Associations (Fauna)

A variety of invertebrates, amphibians, reptiles, fish, birds, and mammals are found in the Hackensack Meadowlands. A list of species found in the District was compiled by HMDC (1987) from a review of 33 references and from their own surveys.

In summary, 23 species of invertebrates have been identified, and 31 species of fish. USEPA (1989) reports that over 250 species of birds have been seen in the Meadowlands, and over 60 nest there. The marshes in the region are used by waterfowl, including over 20 species of ducks.

##### 2.2.2.1 Game and Non-Game Mammals

Mammals in the region include opossum, shrews, mice, moles, raccoon, weasel, skunk, foxes, chipmunk, squirrel, muskrat, rat, cottontail, and feral dogs and cats.

##### 2.2.2.2 Game and Non-Game Birds

Birds breeding in freshwater marsh zone (adjacent to the proposed facility) include red-winged blackbirds, long-billed marsh wrens, and green-backed herons.

### 2.2.2.3 Reptiles and Amphibians

The freshwater habitat contributes a high biological diversity to the Meadowlands. Within the zone are found freshwater species such as the leopard frog, snapping, painted, and spotted turtles, and many aquatic insects and invertebrates.

### 2.2.2.4 Fish

Based on the data collected during 1987 and 1988 (HMDC 1989), several observations can be made regarding the fish species found in the District as follows:

- The lower Hackensack River can be divided into three general biological zones, based on the salinity of the water. These zones are not specific and the boundaries can vary depending on the tides and seasonal runoff. In the reach furthest downstream the average annual salinity was 9.4 parts per thousand (ppt). Of the 22 species of fish caught at this location, 7 were marine species, 6 were diadromous (migrating between ocean and freshwater), 5 were estuarine, and 4 were freshwater. In the middle zone the average annual salinity was 5.6 ppt. Of the 21 species of fish caught at this location, 6 were marine, 7 were diadromous, 4 estuarine, and 4 freshwater. In the upstream reach, the average annual salinity was 3.4 ppt. Of the 14 species caught, none were marine, 3 were diadromous, 4 were estuarine, and 7 were freshwater.
- The fish population is dominated (numerically) by the mummichog (*Fundulus heteroclitus*). This species represents approximately 90% of the individuals caught.
- Other abundant fishes were the Atlantic silverside, inland silverside, white perch, blueback herring, Atlantic tomcod, brown bullhead, pumpkinseed, American eel, and bay anchovy.
- The composition of the fish community seems to vary seasonally, with two peaks in species diversity. The first peak occurs in the spring and the second in the fall. The peaks correspond to periods of seasonal use such as the spring and fall migrations. Fish using the estuary as a refuge from predators and/or as a nursery area also contributed to these peaks.

### 2.2.3 Rare, Threatened and Endangered Species (Vegetation, Fish, and Wildlife), Including Unique Habitats

Several species among the state and federally listed endangered or threatened species have been reported to use open space locations within the site Project Area. State and federal laws seek to preserve the habitats of the threatened and endangered species. Existing remnant or unique habitats are discussed in Section 2.2.3.2. Remnant habitats are those which were more common in the past but which have since dwindled to remnants of their former areal range. Unique habitats are those that developed under unusual circumstances and now provide valuable habitat. Remnant habitats provide scientists with an opportunity to study and understand the mechanisms that led to the reduction of these habitats. Remnant and unique habitats in the Meadowlands provide a local diversity of plants and animals which may supply the stock to recolonize other areas of the Meadowlands at some future time.

### 2.2.3.1 Threatened or Endangered Species Habitats

Table 2-11 lists the various rare, threatened or endangered (T/E) species, as collected from several data sources (USEPA/Maguire Group, 1989; NJDEP Natural Heritage Program, written communications, 1992; NJDEP Division of Fish Game and Wildlife, written communications, 1992). Habitat areas as identified from federal, state, and HMDC sources generally cover broad expanses of territory, in which some localized use, or uses, have been observed. In addition, a federal biological assessment has been conducted in the District to identify potential impacts to the Peregrine Falcon. The results of this study are discussed below (under "Peregrine Falcon"). Several of the species of birds listed in Table 2-11 are indicated as being threatened or endangered only for the breeding populations. These species are either known to breed in the District, or the District is considered to be a suitable breeding habitat for these species.

Additionally, the NJ Audubon Society (NJAS) reports that two birds on NJ's threatened and endangered species list—short-eared owls (*Asio flammeus*, a former nester in the District) and long-eared owls (*Asio otus*, a possible nester in the District)—use the Meadowlands every year. The short-eared owl is classified as threatened in NJ, and the breeding population of long-eared owl is classified as endangered. However, no information on specific probable habitats within the District is available.

Figure 2-11 presents the habitat areas identified from these sources, and distinguishes between wetland and vacant upland areas. The habitats identified in the SAMP EIS include the Kearny Marsh, Belleville Turnpike and the Saw Mill Creek Wildlife Management Area. Each species listed in Table 2-11 is described in more detail below, followed by a description of each general habitat location noted on Figure 2-11.

#### *Description of T/E Species*

This section, taken from the preliminary Draft Environmental Impact Statement (EIS) on the Special Area Management Plan for the Hackensack Meadowlands District (1995), describes the threatened or endangered species in the Project Study Area.

Peregrine Falcon. The peregrine falcon (*Falco peregrinus*) is listed as an endangered bird species in both federal and state regulations. Although peregrine falcons historically inhabited remote, unpopulated areas, today they are found nesting and feeding in close proximity to human activity. Although the peregrine falcon is not yet known to breed in the Meadowlands District, in 1994 12 pairs of peregrines occupied nest sites within 15 miles of the District. Four were on buildings in New York City and six others were on bridges, including the George Washington Bridge, Goethals Bridge, and Outerbridge Crossing connecting New York and New Jersey (Chris Nadeski, pers. comm.). One formerly unreported breeding pair was discovered (through interviews conducted for the SAMP) to be utilizing a nest site at a power plant in Kearny about three-quarters of a mile south of the District boundary (James Schissias and Sheldon Kay, pers. comms.); this pair apparently produced at least two fledglings in 1993, but none were observed in 1994 (John Lung, pers. comm.). Also, NJDEP reports a breeding pair on the I-280 bridge over the Passaic River in Harrison, about 1.6 miles west of the District (Kathleen Clark, pers. comm.). The breeding

Table 2-11

*Threatened and Endangered  
Species Observed in the Hackensack Meadowlands<sup>1</sup>*

Scientific Name	Common Name	State Status <sup>2</sup>	Federal Status <sup>2</sup>
<i>Botaurus lentiginosus</i>	American Bittern	T <sup>3</sup>	X
<i>Rynchops niger</i>	Black Skimmer	E	X
<i>Dolichonyx oryzivorus</i>	Bobolink	T	X
<i>Sterna antillarum</i>	Least Tern	E	X
<i>Circus cyaneus</i>	Northern Harrier	E <sup>3</sup>	X
<i>Pandion haliaetus</i>	Osprey	T	X
<i>Falco peregrinus</i>	Peregrine Falcon	E	E <sup>3</sup>
<i>Podilymbus podiceps</i>	Pied-Billed Grebe	E <sup>2</sup>	X
<i>Passerculus sandwichensis</i>	Savannah Sparrow	T	X
<i>Nycticurax violaceus</i>	Yellow-Crowned Night Heron	T	X
<i>Ammodramus savannarum</i>	Grasshopper Sparrow	T	X
<i>Cistothorus platensis</i>	Sedge Wren	E	X
<i>Alosa sapidissima</i>	American Shad	X <sup>4</sup>	X <sup>4</sup>
<i>Microgadus tomcod</i>	Atlantic Tomcod	X <sup>4</sup>	X <sup>4</sup>
<i>Eupatorium capillifolium</i>	Dog Fennel	E	X
<i>Carex pseudocyperus</i>	Sedge	E	X
<i>Hieracium Kalmii</i>	Canada hawkweed	E	X
<i>Prenanthes racemosa</i>	Smooth rattle-snake root	E	X
<i>Salix lucida</i>	Shining Willow	E	X
<i>Scirpus maritimus</i>	Salt Marsh Bullrush	E	X
<i>Triglochin maritimum</i>	Sea-side arrowgrass	E	X

<sup>1</sup> Preliminary list pending further information from the NJ Natural Heritage Program

<sup>2</sup> T = Threatened; E = Endangered; X = Not Listed

<sup>3</sup> Breeding population only

<sup>4</sup> Listed for similarity of appearance to T/E species

<sup>5</sup> Listed as a T/E species in AVID report (USEPA, 1989)

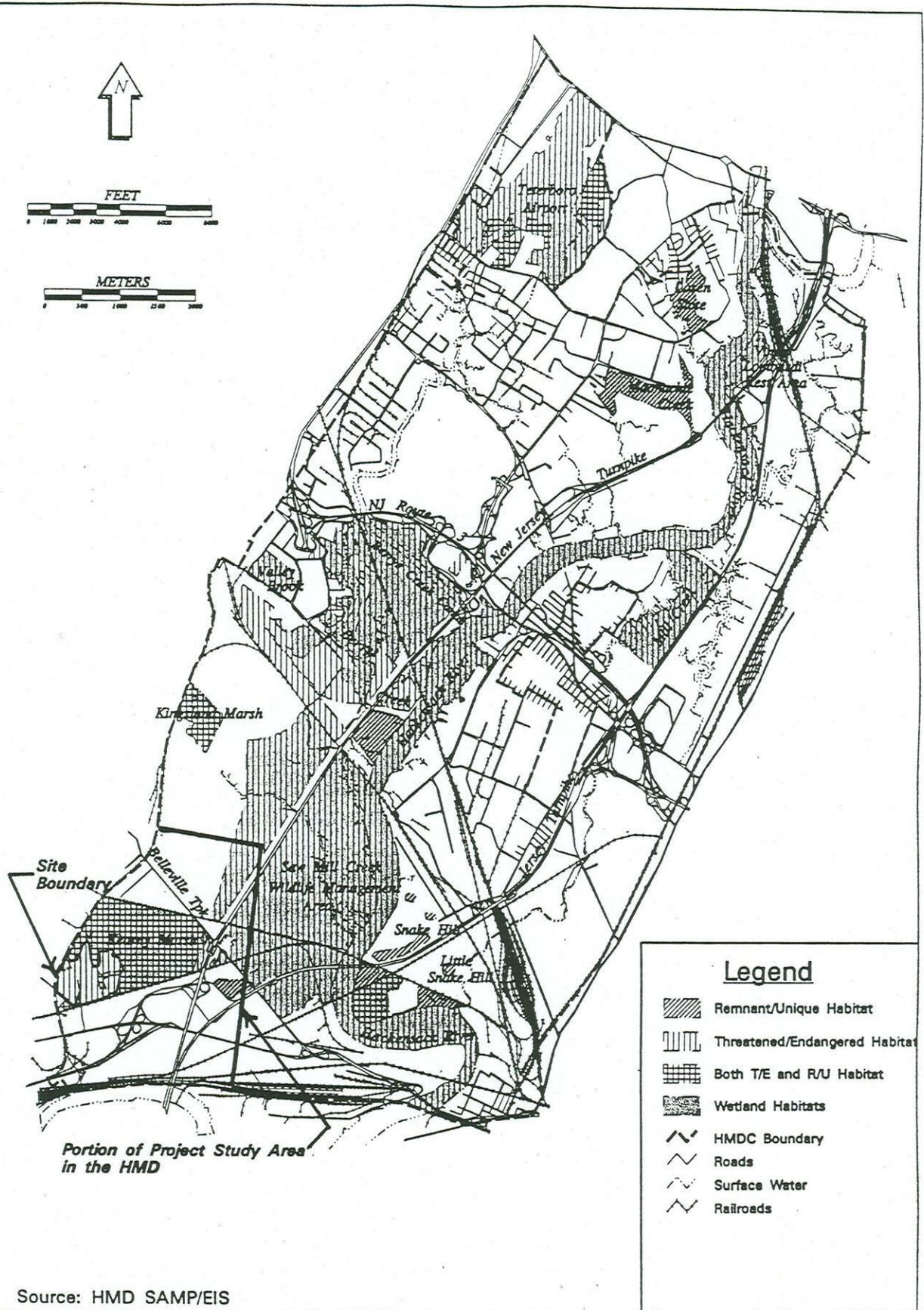


Figure 2-11  
Existing Threatened/Endangered  
and Remnant/Unique Habitats

peregrines in New York City and New Jersey are apparently nonmigratory (Chris Nadareski and Kathleen Clark, pers. comms., and Frier 1982).

In the Meadowlands, peregrines have been sighted in the Sawmill Wildlife Management Area; in Kearny Marsh and Kingsland Marsh; and in the wetlands and upland landfills near lower Berrys Creek (around the Hackensack Meadowlands Environment Center). These habitats include approximately 2,260 acres of wetlands and 520 acres of vacant uplands. A Biological Assessment (BA) was conducted for the HMD SAMP/EIS to determine the potential impacts of the SAMP on peregrine falcon habitats. The research conducted for the BA found that a total of 67 observations of peregrine falcon in the Meadowlands have been reported in the literature and the sightings logbook maintained by the Hackensack Meadowlands Environmental Center, including one observation (of two birds) in May 1994. Entries in the logbook are made by birders and other visitors to the Center and vicinity, who represent a wide range of proficiencies at bird identification. However, most of the peregrine entries are by reputable observers and are considered to be reliable. After scattered reports from 1963, 1966, 1977, 1978, and 1980, this species has been reported every year since 1982 with the exception of 1989. The peak numbers of observations in that period were 9 in 1987, 10 in 1991, and 9 in 1992. The months with the greatest number of observations are August (10 seen), September (11 seen), and October (10 seen), whereas those with the lowest number are June, July, and November (with 2 observations each). It is highly likely that the reported sightings constitute only a small fraction of the actual occurrences of Peregrine Falcon in the Meadowlands District.

Of the 67 observations, 73% are from the Lyndhurst/North Arlington area (i.e., HMDC and Sawmill Creek WMA, and immediate surroundings, including landfills). This is an area of excellent waterbird habitat, including extensive tidal flats and marshes, with excellent public access. It is well known to regional birding enthusiasts and is frequently visited by experienced observers. Another 16% of the observations are from Kearny, either at Kearny Marsh or adjacent landfills. Although public access to Kearny Marsh, owned by the town of Kearny is relatively limited, observation points are known to area birders, and because the site is well known for its waterbirds it would be included on any birding trip to the area. The paucity of reports from other areas of the District can be attributed at least in part to a lack of public access to potential peregrine habitat elsewhere, but (owing to the presence of extensive open water and tidal flats) the Lyndhurst/North Arlington/Kearny area does encompass the best waterbird habitat, and consequently the best hunting habitat for Peregrine Falcon, in the District. The regular use of landfills by peregrines should also be noted—their activities are not restricted to wetlands.

Although Peregrine Falcon has been observed in the Meadowlands District in every month, the pattern of occurrence (highest during the migration months of September-October and in the winter months of January-February, lowest in June-July) suggests that the greatest use is by migrating and wintering birds rather than breeders from the surrounding region. An independent investigator who has conducted more than 2,500 hours of observation of the New York City peregrines, believes that adult peregrines in the city do all their hunting in or near the nesting territory, and considers it highly improbable that these birds travel to the Meadowlands to hunt (Sol Frank, pers. comm.). Even the breeding pair at Kearny is reported

to concentrate their breeding-season hunting on Rock Doves that roost and nest on the nearby Pulaski Skyway (John Lung, pers. comm.).

Egg dates for peregrine in New York state are generally March 26 to May 31 (Bull 1974), and as incubation lasts 28-29 days and fledgling occurs 35-42 days after hatching (Brown and Amadon 1989), adults could be hunting to feed nestlings from late April into early August. However, other than the August peak there is no increase in sightings during these months, as might be expected if one or more of the nearby pairs were hunting frequently in the District to feed themselves and their young. It seems unlikely that the regional population has uniformly late egg dates that would result in an August peak in hunting activity by breeders. This peak may, however, represent dispersal into the Meadowlands by at least one local breeding pair and possibly their young, since the peregrines breeding at the PSE&G Kearny Generating Station are reported to disappear from that site each year in August (John Lung, pers. comm.). Fledged young from other regional breeding sites may also utilize the concentrations of shorebirds that occur during August on tidal flats such as Sawmill Creek. According to Sol Frank (pers. comm.), banding results have shown that New York City peregrine fledglings do disperse widely from their natal territories. The results of a habitat classification conducted as part of the SAMP/EIS are presented on Figure 2-12.

Black Skimmer. The black skimmer (*rynchops niger*) is a state endangered bird in New Jersey. Black skimmers are known to be somewhat sensitive to human activity, especially in their selection of nesting sites. Within the District, the black skimmer's habitats include the wetlands along Belleville Turnpike, Kingsland Marsh, and Sawmill Creek Wildlife Management Area, and encompasses approximately 1,420 acres of wetlands and ten acres of uplands.

Least Tern. The least tern (*Sterna albifrons*) is a state endangered bird in New Jersey. The least tern is quite sensitive to human activity. Within the District, identified least tern's habitats include Kingsland Marsh, Mill Creek, Sawmill Creek Wildlife Management Area, and the wetlands around the NJ Turnpike Vince Lombardi service area. The identified habitat for the least tern included approximately 1,415 acres of wetlands and ten acres of uplands. According to the NJDEP Department of Fish, Game and Wildlife, the least tern has probably been lost in the District due to plant succession. However, information from the NJ Audubon Society (NJAS) indicates that while there appears to be a loss of nesting habitats in the District from natural causes, least terns still use the District for feeding.

Dog Fennel. The dog fennel (*Eupatorium capillifolium*) is a wetland plant included on New Jersey's endangered species list. Within the District, it has been found in approximately 260 acres of wetlands along Belleville Turnpike.

Pied-billed Grebe. The breeding population of the pied-billed grebe (*Podilymbus podiceps*) is listed as endangered in New Jersey. Within the District, habitat for this bird has been identified as including approximately 705 acres of wetlands—along Belleville Turnpike, in Kearny Marsh, and in Kingsland Marsh.

Osprey. The osprey (*Pandion haliaetus*) is listed as a threatened bird in New Jersey. Osprey are not especially sensitive to human activity, but the decline in population has been partly



Figure 2-12  
 Peregrine Falcon  
 Feeding Habitat Quality

attributed to man's encroachment on the osprey's estuarine and seacoast nesting habitats. Within the District, Kearny Marsh and Kingsland Marsh (which total approximately 440 acres of wetlands) have been identified as potential habitat areas for the osprey.

Savannah Sparrow. The savannah sparrow (*Passerculus sandwichensis*) is included on New Jersey's list of threatened birds. Within the District, approximately 1,820 acres of wetlands and 415 acres of uplands around lower Berrys Creek and the Sawmill Creek Wildlife Management Area have been identified as habitats for the savannah sparrow.

Yellow-crowned Night Heron. The yellow-crowned night heron (*Nyctanassa violacea*) is listed as a threatened bird in New Jersey. The yellow-crowned night heron is somewhat sensitive to human activity, and may nest in the District. Within the Meadowlands District, identified habitats for the heron include Kearny Marsh, Kingsland Marsh, Sawmill Creek Wildlife Management Area, and wetlands along Belleville Turnpike. Approximately 1,460 acres of wetlands and 115 acres of uplands have been identified as habitats for the yellow-crowned night heron.

American Bittern. The breeding population of the American bittern (*Botaurus lentiginosus*) is listed as threatened in New Jersey. The American bittern is usually found hidden deep in a wetland amongst emergent plants. It also may nest in the Meadowlands. Within the District, the identified habitat for this bird includes approximately 2,715 acres of wetlands and 520 acres of uplands, including: wetlands along Belleville Turnpike, Mill Creek, and the "high salt marsh" near the Hackensack River south of Route 3; and wetlands and uplands near lower Berrys Creek, Kearny Marsh, and Sawmill Creek Wildlife Management Area.

American Coot. The American coot (*Fulica americana*) was listed in the NJ National Heritage Program report of T/E species, but is not officially listed as a threatened or endangered bird in New Jersey. The American coot is not overly sensitive to human disturbances, and utilizes only open water areas. In the District, the identified habitat for the American coot includes approximately 440 acres of wetlands in Kearny and Kingsland Marshes.

American Shad. The American shad (*Alosa sapidissima*) was listed as a T/E species in the AVID (USEPA, 1989), but is not officially listed as a threatened or endangered fish in New Jersey. Within the District, the entire length of the Hackensack River has been identified as habitat for the American shad.

Atlantic Tomcod. The Atlantic tomcod (*Microgadus tomcod*) was listed as a T/E species in the AVID (USEPA, 1989), but is not officially listed as a threatened or endangered fish in New Jersey. Within the District, the Hackensack River south of Route 3 and the deeper channels in the Sawmill Creek Wildlife Management Area have been identified as habitat for the Atlantic tomcod.

#### Description of Habitat Locations

Hackensack River. The entire length of the Hackensack River is identified as a habitat for American shad, while the Hackensack River from Mill Creek south is identified as a habitat for Atlantic tomcod.

Kearny Marsh. The wetlands in this area have been identified as a habitat for peregrine falcon, pied-billed grebe, American bittern, osprey, yellow-crowned night heron, and American coot. The vacant upland areas south-west of Kearny Marsh, along with the wetlands have been identified as a coastal heron rookery.

Sawmill Creek Wildlife Management Area. This area has been identified as a habitat for many wetland species, including least tern, peregrine falcon, American bittern, black skimmer, yellow-crowned night heron, savannah sparrow, and Atlantic tomcod.

### *2.2.3.2 Remnant or Unique Habitats*

Remnant habitats are those which were more common in the past but which have since dwindled to remnants of their former range. Unique habitats are those which have developed under unusual circumstances and now provide valuable habitat. Remnant habitats provide scientists with an opportunity to study and understand the mechanisms which led to the reduction of these habitats. Remnant and unique habitats provide a local diversity of plants and animals which may supply the stock to recolonize other areas of the Meadowlands at some future time. Remnant and unique habitats have been identified by USEPA in the 1989 "Functional Assessment of Wetlands in New Jersey's Hackensack Meadowlands", and are shown in Figure 2-11. In the project Study Area remnant and unique habitats include:

- Freshwater Meadows near Losen Slote and Moonachie Creek, Kingsland Marsh, and Kearny Marsh (approximately 605 acres)

## 2.3 Cultural Environment

### *2.3.1 Recreational Resources*

The primary recreational resources within the project study area are county and municipal parks of Kearny and Harrison (west and southwest of the proposed facility) and the Kearny Marsh (north and east of the proposed facility). Table 2-12 lists the county and municipal parks, and provides the size and facilities offered. The Kearny Marsh is currently utilized for a variety of recreational activities including hunting, fishing, native photography, bird watching boating and swimming. Access to the Marsh however is prohibited by law.

### *2.3.2 Aesthetic (Visual) Resources*

The proposed landfill site is bounded on the south and west by industrial/commercial properties of limited aesthetic value. The Kearny Marsh provides the greatest aesthetic value. Gunnell Oval Park offers the best publicly accessible vantage point for viewing the Marsh. Public access and the topography in the project study area limit the ability to view the Marsh from other locations. Visibility from Harvey Park, directly west of the proposed landfill, is currently blocked by topography and the Bedrock Stone Company which operates between the park from the proposed landfill.

**Table 2-12**  
**Existing Parks and Recreational Facilities**

<i>Name &amp; Location</i>	<i>Acres</i>	<i>Facilities</i>
<u>Hudson County - County</u>		
West Hudson - Kearny/Harrison (Duke St./Schuyler Ave.)	5	Football, soccer, base/softball, basketball, bocci, tennis
<u>Hudson County - Municipal - Kearny</u>		
Fairlawn Manor - Jefferson & Bennet Aves.	2	Football, base/softball, basketball, playground
Gunnel Oval - Schuyler/Oakwood Aves.	23	Football, soccer, base/softball, basketball, handball, playground, tennis
Harvey Field - Schuyler, Berg & Garfield Aves.	7	Soccer
Kearny H.S. - King St./Garfield/Devon St.	3	Football, track
Riverbank Park - Passaic Ave. & River	16	Ice skating, playground, tennis
Veteran's Memorial Field - Belgrove Dr./ Bergen Ave.	13	Football, soccer, base/softball, basketball
Veteran's Playground - Hickory/Oakway/Spruce Street	2	Street hockey, basketball, playground
Twelve parks less than 2 acres		
<u>Hudson County Municipal - Harrison</u>		
John F. Kennedy Stadium - 1st Str.	ND	Football, track, tennis, etc.
Little League Field - Harrison Ave.	ND	Base/soft ball
Library Park	ND	Basketball

Sources: HMDC Master Plan, Environmental Operations, Engineering Staffs, 1991. Open Space Plan Report  
ND - Not determined

### 2.3.3 Historical/Archeological Resources

Historical and archaeological resources in the project study area have been identified by reviewing the State and National Register of History Places, utilizing the Stage 1A Archaeological and Historical Sensitivity Evaluation of the Hackensack Meadowlands, New Jersey report prepared by Grossman and Associates, Inc. The Highland Hose Company #4 on Halstead Avenue in Kearny is the only State and National Register Historic Place within the project study area. Based on the historical review of the History of Kearny and Harrison, the West Hudson Park located in both towns was selected as an additional area of historical significance. The Grossman report included the Schuyler Copper Mines, Belleville Turnpike, and the Cedar Swamps as areas of historical or archaeological significance within the project study area. These areas are shown on Figure 2-13. Each of these resources are described below.

#### *Highland Hose Company #4*

Kearny's oldest fire house was built in 1894 for the Highland Hose Company. It is no longer in active service but does contain a Fireman's Museum. The site is on both the State and National Register of Historic Places.

#### *West Hudson Park*

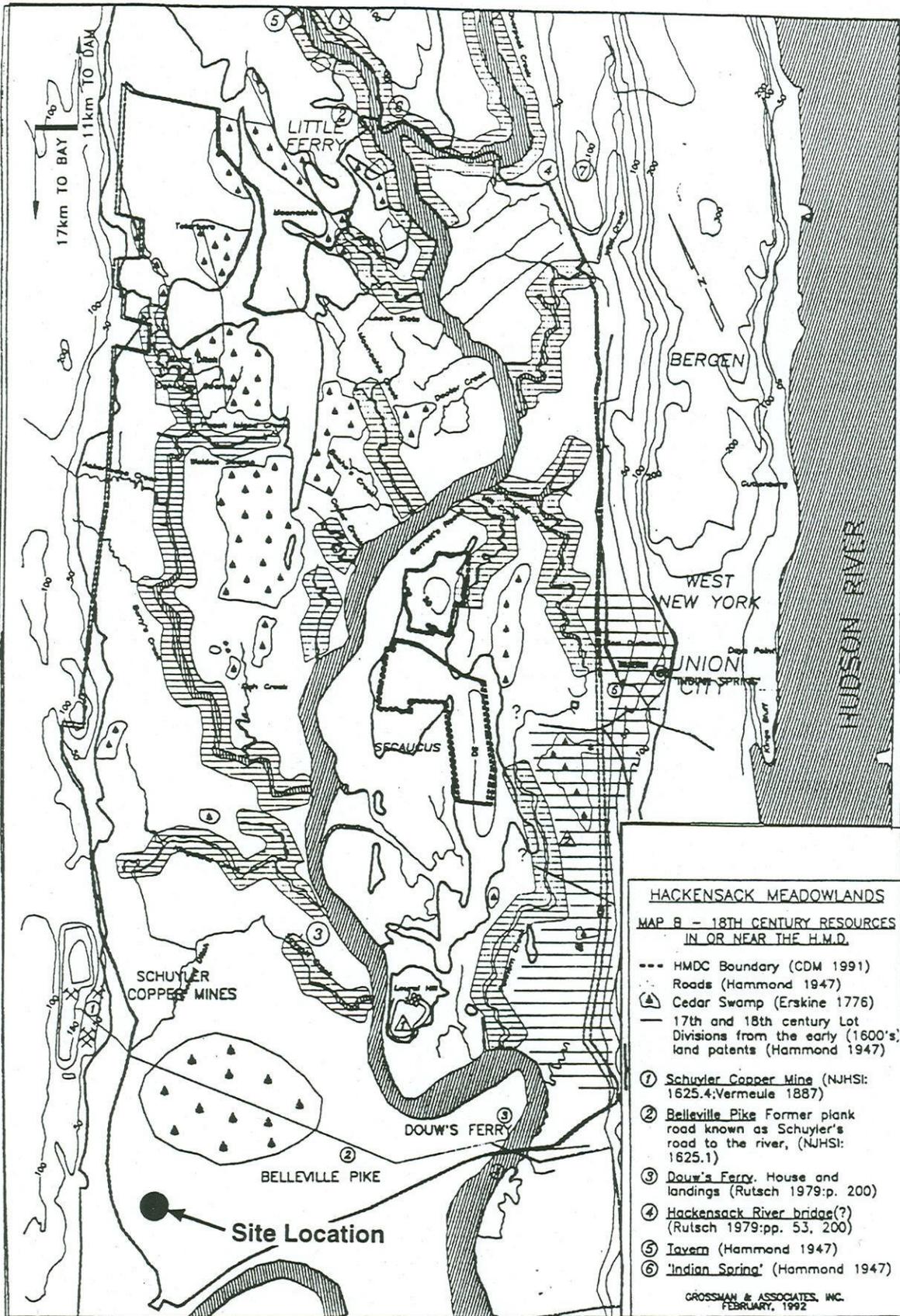
Planned and constructed in 1913, the West Hudson Park covers forty-three and one-half acres. The park, which extends from Schuyler Avenue to North 5th Street in Harrison, is bordered on the north by Dukes Street and on the south by Conrail rail lines. The following description originally appeared in Kearny's local newspaper, *The Observer*, on June 9, 1933.

"A trip through the park shows one all the pleasure seeker or picnicker desires. There is a swimming pool and a large sports field where on summer evenings crowds gather to play basketball, to bowl, to run and engage in similar sports. For the nature lover there are secluded walks, a winding lake and beautiful shrubs and foliage. The park, while it is Kearny's only one of any pretensions or size, is a worthy one. It ranks with any of the other county parks as far as go completeness, variety and beauty."

#### Schuyler Copper Mine (Figure 2-13, No. 1)

In North Arlington, on the bluffs to the west of the Hackensack Meadowlands and just outside of HMDC's project area, eighteenth century economic activity was centered around Arent Schuyler's Copper Mine. Schuyler's Mine, which is shown on Robert Erskine's Revolutionary War era map of the area, was reported to have been discovered prior to 1719 "by a Negro slave on the Schuyler plantation."

As of the writing of *The WPA Guide to 1930's New Jersey*, the ruins of these mines were reportedly in the face of a cliff along Schuyler Ave. 0.2 miles north of Belleville Pike. Much loose earth had reportedly fallen into the mine's two entrances, and exploration was considered dangerous. Below the mines, and also on the cliff, were the remains of a pump house that had been used to work the mine.



### Belleville Pike (Figure 2-13, No.2)

The first roads in the area were also laid out in the eighteenth century to transport the people and resources from the towns in the interior of New Jersey, across the marsh and meadows, to the ports along the Hudson River which provided ferry service to the port of New York. In 1768, John Schuyler built a cedar log road along the route of the current Belleville Pike, from his copper mine in North Arlington, to Bergen. Other sources suggest that the turnpike, which was originally called Schuyler Rd., "was built by sailors from the British fleet anchored in New York harbor during the Revolution in order to furnish an outlet for the copper needed in the manufacture of munitions." However, aside from two skirmishes between British troops and patriots at Secaucus in 1780, most sources suggest that Revolutionary War era activity in the Hackensack Meadowlands was limited primarily to the use of the roads and the raiding of farms by both sides.

The early road network crossing and bordering the Hackensack Meadowlands is shown on Robert Erskine's 1776 map of the area. This included a road from Powles (Paulus) Hook on the Hudson River to Bergen (Jersey City), which then continued in three directions. One road extended north from Bergen through the "Bergen Woods" to "3 Pidgeons", where it connected with another road from "Hobuck Ferry" and "Wharsk Ferry" and then continued north along the eastern edge of the marsh. The road running north from Bergen is in the general alignment of the later historic Hackensack or Bergen Road, and US Route 1 and 9. A "Tavern" is indicated on the east side of the road to Hackensack, at "Three Pidgeons", on Hammond's 1947 map of historic Bergen property lines (see Figure 2-13). Another unnamed road, presumably Schuyler's Road (now Belleville Tpke.), headed slightly northwest across the Hackensack River, through the "Salt Meadows" and the "Cedar Swamp", past Schuyler's copper mine, and then turned north along the Passaic River.

### Cedar Swamps (Figure 2-13)

Approximately 800 years ago, the first cedar trees are believed to have appeared in the Meadowlands. The cedar bogs predominated for some three to five centuries, and began to dwindle beginning about 500 years ago. According to late 19th century maps, the then surviving cedar stands were limited to only a few scattered areas, surrounded by common reed (*Phragmites australis*). The apparent island pattern of isolated survival is consistent with ecological models of the takeover of one plant community by another. The pattern of survival also suggests that the former extent of cedar bogs in the Meadowlands was much larger than was found in the late 19th century.

Recent changes in the Meadowlands have been more abrupt, and more drastic. The first cause of change was the attempt to "reclaim" the Meadowlands as arable land, and beginning in the 1930's, to control mosquito breeding. The diking and ditching undertaken to drain the Meadowlands probably aided in the decline of the cedar bogs. In 1867, the Iron Dike Land Reconstruction Company constructed a dike along the northern bank of the lower Passaic River, around Kearny Point, along the western bank of the Hackensack River, and finally up Sawmill Creek. The section of land that this dike isolated contained a large cedar swamp, which was shown as a "former" cedar swamp on a 1896 map. Because diking prevents the influx of tidal water, and also dries out the marsh, this dike probably contributed to the loss of cedar in the Sawmill Creek area. (However, as was stated above, evidence suggests that

the cedar swamps started declining approximately 500 years ago, thus some of the reasons for the decline are probably "natural.") A further human factor in the decline of the cedar in the Meadowlands may have been the harvesting for use in ship building, to make plank roads to traverse the Meadowlands, and for lumber and shingles.

## 2.4 Socioeconomic Environment

The socioeconomic environment section includes a baseline description of the transportation facilities, utilities and public services which will serve the facility. An inventory of community and educational facilities within the study area and a description of housing and population are also provided. The potential for impact to these facilities and services is examined in Section 3.

### 2.4.1 Transportation Facilities

#### 2.4.1.1 Proposed Facility Network

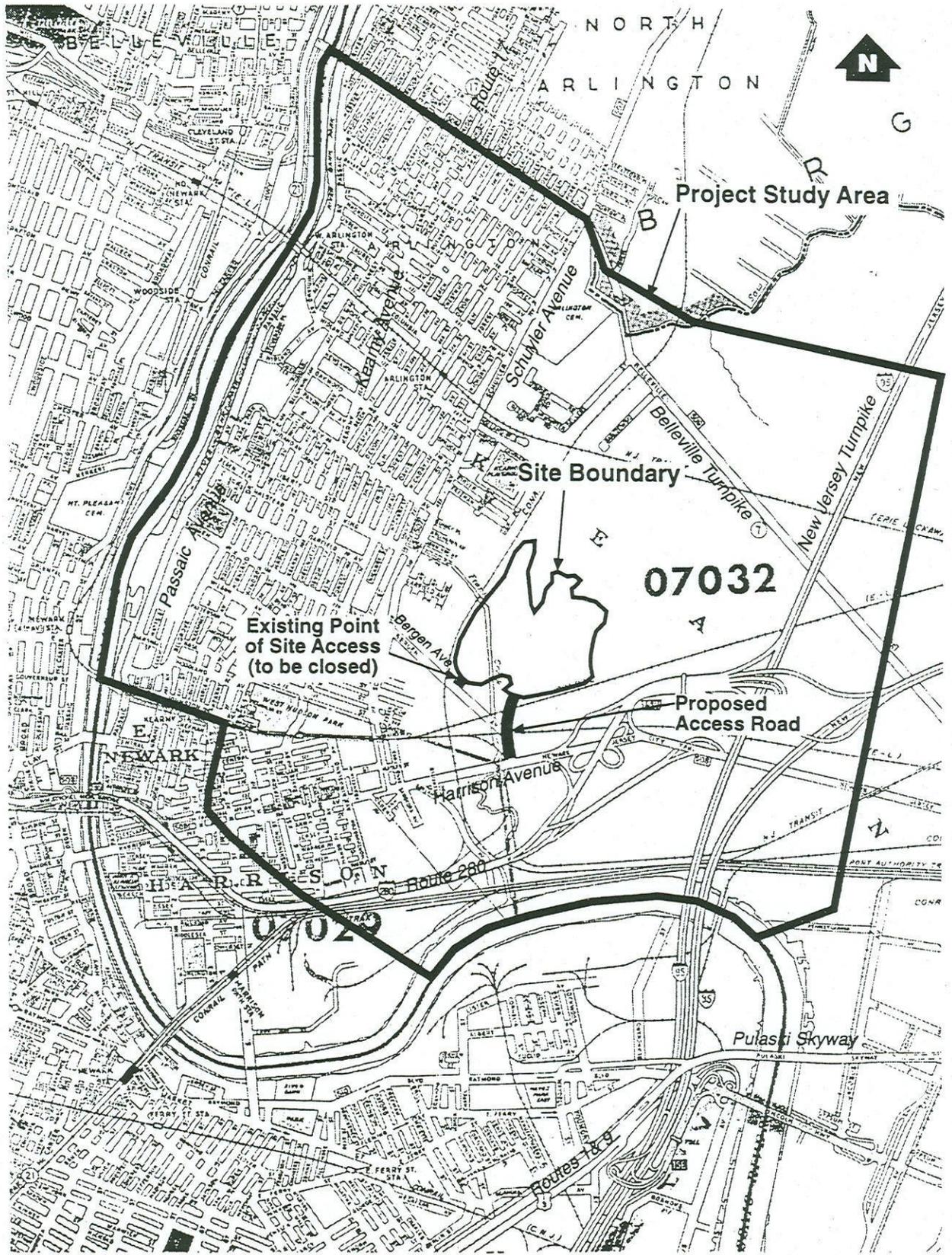
The transportation route to the proposed facility will utilize Harrison Avenue. A currently unimproved portion of Bergen Avenue which intersects with Harrison Avenue and travels north to the landfill will be improved and used as the access road to the landfill. Traffic will be directed from Harrison Avenue north on an improved road to a scale house on-site. No access to or from the facility will be permitted from the western end of Bergen Avenue (i.e., from Passaic Avenue, Kearny Avenue, Schuyler Avenue, etc.).

Harrison Avenue is accessible from Route 280 and from the New Jersey Turnpike and from Routes 1 and 9. The facility transportation network is shown on Figure 2-14. It currently serves residential traffic in Harrison and Kearny and high volume truck traffic to industrial facilities.

A 1995 traffic study performed by the New Jersey Department of Transportation, (NJDOT) measured average daily traffic (ADT), peak design and AM/PM peak hour volumes for Harrison Avenue and Schuyler Avenue. The study also identified the percentage of heavy truck traffic and total truck traffic for Harrison Avenue. The results of this study are presented below in Table 2-13.

**Table 2-13**  
**Schuyler Avenue and Harrison Avenue**  
**NJDOT Traffic Study**

Street Name and Location	ADT Two Way	AM Peak Hour	PM Peak Hour	% Heavy Truck in 24 Hours	% Total Truck in 24 Hours
Harrison Avenue (from Schuyler Ave. Intersection to Interstate 280)	16,140	1,210	1,355	17% (2591)	35% (5334)
Schuyler Avenue (At Harrison Avenue Intersection)	12,345	910	1,050	Not measured	Not measured



Source: Hagstrom Map of Hudson County

### 2.4.1.2 Regional Conditions

The District is located in the middle of one of the most densely populated and heavily traveled areas in the United States. Not only is the District surrounded by New Jersey's most populous cities, it also serves as a gateway to New York City. Highways—including the eastern and western spurs of the New Jersey Turnpike, U.S. Route 1 and 9, State Route 3, State Route 17 and U.S. Route 46—crisscross the District, bringing cars and trucks to and from New York City. Trucking companies have used the concentration of highways, and the proximity of markets, to locate major terminal facilities within the District, increasing the amount of truck traffic experienced on local roadways.

### Existing Highway System

The District is served by a variety of major roadways including limited access facilities such as the New Jersey Turnpike, major state highways such as U.S. Routes 1 and 9, and other local distributor and collector facilities (see Figure 2-14). The following sections briefly describe the physical characteristics of important highway facilities in and around the District.

New Jersey Turnpike/Interstate Route 95. The New Jersey Turnpike is a north-south limited access toll road with a posted speed limit of 55 miles per hour (mph). The Turnpike passes through the center of the District, and serves both through traffic and Meadowlands-related traffic. Just to the south of the District, it consists of a twelve lane roadway, with three lanes each way dedicated to cars only. Between Interchanges 14 and 15E (still to the south of the District), it divides into two separate roadways. Within the District, the eastern spur is a six-lane roadway with two interchanges in the Secaucus area (16E and 17E), which serve State Route 3, U.S. Route 1 and 9, and Interstate Route 495, with access to Manhattan via the Lincoln Tunnel. The western spur consists of a six-lane roadway from interchange 15E through interchanges 15W (I-280), 16W (S.R. 3), and 18W (Meadowlands Sports Complex). North of interchange 18W, the western spur becomes a four-lane roadway in western alignments of the Turnpike then merge together to form a ten-lane roadway in Ridgefield, just south of interchange 18E. North of interchange 18E (serving U.S. Route 46), the roadway reduces to six lanes and becomes Interstate Route 95, which merges with Interstate Route 80, and crosses the George Washington Bridge into Manhattan.

State Route 17. Route 17 is a north-south roadway which parallels the western boundary of the District. Most of the roadway north of Route 3 is a six-lane facility with a 50 mph speed limit and commercial developments along both sides of the roadway. The segment of Route 17 south of Route 3, also known as Ridge Road, is a two-lane facility passing through a mixed commercial/residential area and having a posted speed limit of 30 mph. The southern terminus of Route 17 is at State Route 7 in North Arlington. Ridge Road turns into Kearny Avenue at the North Arlington Kearny border. Route 17 primarily serves through traffic between the major highways that it crosses, but also serves as a collector and distributor roadway for local trips.

U.S. Route 1 & 9. Route 1 and 9 is a north-south roadway that parallels much of the eastern boundary of the District. At the southeastern corner of the District, at the Tonelle Avenue circle, the roadway divides into Route 1 and 9 (Tonelle Avenue), which parallels the

District boundary, and Route 1 and 9 Business, which connects with the Holland Tunnel. The posted speed limit on the mostly four-lane Tonnelle Avenue ranges from 40 to 45 mph.

Interstate Route 280. The eastern terminus of Route I-280 is located in the southwestern corner of the District at Turnpike interchange 15W. The roadway is mostly a six-lane limited access facility with a posted speed limit of 50 mph. It serves the regional traffic between Hudson County and Morris County through Essex County, and provides access for Meadowlands traffic to Essex County and other regional facilities such as Routes I-287 and I-80. It also provides a connecting route for traffic headed to and from the Holland Tunnel and downtown Manhattan.

## 2.4.2 Utilities

### 2.4.2.1 Sewage Facilities

Until very recently, in-District portions of Kearny provided their own sewage treatment. Kearny now pumps their wastewater to the treatment facility operated in Newark by the Passaic Valley Sewerage Commissioners (PVSC). The Kearny Municipal Utilities Authority (KMUA) provides sewer service to industrial users in South Kearny. Residential sewer service is provided by the Town of Kearny. A twelve inch main collects sanitary wastewater along Bergen Avenue which flows by gravity to the South Kearny Pump Station where it is pumped to the PVSC WWTP. Table 2-14 identifies pertinent characteristics of the PVSC facility.

<b>Table 2-14 PVSC Treatment Plant System Characteristics</b>	
<b>Facility Name:</b>	PVSC Plant
<b>Location:</b>	Intersection of Wilson and Dormus Avenue, Newark
<b>Existing Treatment Capacity:</b>	Avg.: 330 mgd
<b>Peak Dry Capacity:</b>	400 mgd
<b>Peak Wet Capacity:</b>	720 mgd

Unsewered areas are characterized by absence of development or have uses that do not produce substantial quantities of wastewater. Specific areas that meet this description include the Kearny Marsh and vacant land uses in the southwest sections of the District.

### 2.4.2.2 Stormwater Management

Stormwater in the vicinity of the proposed landfill is conveyed over land to the Kearny Marsh and to catch basins which direct the water to the Kearny storm sewer infrastructure. A 4' x 4'-3" box culvert on Bergen Avenue adjacent to the proposed property directs stormwater from portions of Kearny to the Kearny Marsh.

**2.4.2.3 Water Supply**

Water supply in Kearny is provided by the Town of Kearny. Kearny is a participating municipality in the North Jersey District Water Supply Commission (NJDWSC) which was formed by the state in the 1930s. The NJDWSC water treatment plant in Wanaque, New Jersey allocates water to participating municipalities. The treatment process includes prechlorination, chemical addition (potassium permanganate, alum and polymer), sedimentation, filtration, post chlorination and pH adjustment (lime). Table 2-15 lists pertinent information for the North Jersey District water supply system, and for the Kearny system.

The NJDWSC water system is entirely surface water fed, receiving primary contribution from the Wanaque Reservoir. In addition, water is available from the Monksville Reservoir and the Ramapo and Pompton Rivers. Current allocation to Kearny MUA is 12.06 mgd. Average demand is 6.955 mgd and peak demand is 11.0 mgd. The water system has excess capacity of 5.1 mgd during non-peak periods and 1.0 mgd during peak demand periods. An 8-inch and a 12-inch water main runs from Schuyler Avenue along Bergen Avenue (including paper street) to Harrison Avenue. The proposed facility will obtain water from either of the Bergen Avenue mains.

<b>Table 2-15 Town of Kearny Water Supply</b>	
<b>NJDWSC Water Source:</b>	Wanaque Reservoir (29.6 billion gal)
<b>NJDWSC Availability of Additional Supply:</b>	Monksville Reservoir (7 billion gal.), Pompton River (250 mgd) Ramapo River (150 mgd)
<b>NJDWSC Treatment Plant Average Capacity:</b>	140 mgd
<b>NJDWSC Treatment Plant Peak Capacity:</b>	210 mgd
<b>NJDWSC Treatment Plant Average Demand (1994):</b>	121.1 mgd
<b>NJDWSC Treatment Plant Peak Demand (1994):</b>	142 mgd (annual), 161 mgd (daily), 175 mgd (hourly)
<b>Kearny Distribution System Capacity:</b>	18.9 mgd
<b>Kearny Current Commitment of Capacity:</b>	12.06 mgd
<b>Kearny Peak Demand (1994):</b>	11.0 mgd
<b>Kearny Average Demand:</b>	6.955 mgd

#### 2.4.2.4 Energy Supply

##### *Electric Power*

Electrical energy needs in the Hackensack Meadowlands District are met, for the most part, by PSE&G's one in-District facility and two powerplants and associated substations that are just south of the District. These facilities transmit electricity over 138 KV lines.

The Kearny generating station on the lower Passaic provides service to Kearny. Overhead powerlines run along the south side of Bergen Avenue and intersect at railroad tracks south of the proposed facility. Power lines continue south toward Harrison Avenue and east and west along the rail lines.

##### *Natural Gas*

The Transcontinental Pipeline Corporation has two major pipelines in HMDC's District that run from north to south along the western spur of the NJ Turnpike, from the gas storage facility site on the Hackensack River to points west and outside of the District. These lines are part of a larger network that spans the Atlantic seaboard (linking petroleum reserves in the Gulf of Mexico with the New England area). Natural gas is available to the proposed facility via a pipeline along Bergen Avenue.

#### 2.4.3 Public Safety

This section describes existing public services for Kearny and Harrison, including local law enforcement, fire protection and health protection.

Although information is included herein on available Harrison municipal services, they are included for reference purposes only due to their location within the project study area. It should be emphasized that the proposed facility will be located entirely within the Town of Kearny, and will rely on Kearny municipal services. Host community benefits to the Town of Kearney, which are expected to exceed \$2 million per year, will offset additional municipal service costs.

##### *Police Protection*

Local law enforcement is provided by the Kearny Police Department and the Harrison Police Department. Two stations in Kearny, the headquarters on Laurel Avenue and Second Precinct on Route 1 and 9, house 109 sworn officers and 45 vehicles. Harrison Police Department Headquarters is located in Harrison and contains 58 sworn officers and 12 vehicles.

##### *Fire Protection*

The Kearny Fire Department protects the citizens and properties of Kearny. The department has four stations located on Kearny Ave., Midland Ave., corner of Deven Terrace and Davis Ave. and Route 1 and 9. The force is made up of 100 paid employees and vehicles (three trucks and four engines). The fire fighters have received full fire training, emergency medical training (EMT), and hazardous materials training (HazMat).

- **Benches and Berms.** These are terraces constructed across open sloped land whose purpose is to reduce the length and grade of a slope or slopes. Benches and berms reduce runoff and erosion by reducing the velocity of the water and by facilitating infiltration into the soil.
- **Diversions.** Diversions are structures that intercept surface runoff before it may gain sufficient velocity to cause erosion damage. These may be temporary or permanent structures.
- **Sedimentation Basins.** Sedimentation basins are used to trap runoff and sediment. In such basins, the runoff is temporarily detained and the sediment is trapped and settles out. Sedimentation basins are usually situated in either natural drainage ways or at the low corner of the site. Like diversion structures, they may be either temporary or permanent. The size of the particular sedimentation basin will depend upon the location, size of drainage area, soil type, and precipitation pattern.

### 3.1.2 Hazardous Wastes

#### *Environmental Impact*

##### *Construction, Operation and Post Closure*

Although the former Keegan Landfill has been classified as a medium priority site on the USEPA National Priority List (NPL) due to the presence of hazardous chemicals, no remedial action has been taken to date. It is estimated that 65 million gallons per year of leachate contaminated by these wastes discharge to surrounding groundwaters and surface waters. The proposed facility will be designed to prevent this discharge from continuing.

The landfill's in-flow design creates a hydraulic relationship between the groundwater level inside the landfill and the level outside the landfill that assures that local groundwater flows toward the landfill. The perimeter cutoff wall and leachate collection system will prevent contaminated leachate from the former Keegan Landfill from degrading groundwater resources. The state-of-the-art in-flow landfill design will create a lower hydraulic head within the perimeter cutoff wall, thereby creating a flow gradient from outside the landfill toward the leachate collection system inside the landfill perimeter. The perimeter soil-bentonite cutoff wall and leachate collection system will be used to hydraulically isolate the landfill from the Kearny marsh.

As the rainfall percolates through the site it collects contaminants. The contaminated rainfall (leachate) is then removed via the leachate collection system. By withdrawing the leachate from the system (which includes the period of operation and post closure), the site is remediated. By eliminating the discharge of millions of gallons of leachate per year to surrounding groundwaters and surface waters, the water quality in the adjacent Kearny Marsh will be improved. In addition, the MSLA 1-D Landfill will be closed with surplus revenues generated by the landfill operations. Discharge of leachate from this inactive landfill will be controlled and the quality of its receiving water will be improved.

In summary, because leachate will be collected on-site and will be treated off-site at the PVSC wastewater treatment plant, the project will prevent 65 million gallons per year of leachate from discharging to the environment.

### *Mitigation*

No mitigation measures are required because this activity will benefit the site and its surrounding environment.

### *3.1.3 Groundwater Resources*

#### *Environmental Impacts*

Groundwater quality in the aquifer beneath the landfill is currently being degraded by contaminated leachate from waste formerly dumped in the Keegan Landfill. There is evidence that chromate and bichromate slurries were disposed of at the Keegan Landfill when the landfill was open (from the 1940s to 1972) (NUS, 1989).

#### *Construction*

During project construction, limited quantities of the following materials may be kept on site:

- Fuels and lubricating oils,
- Hydraulic fluids,
- Metal cleaning agents (organic solvents and inorganic acids),
- Caustic solids and liquids (lime, bleach),
- Road salt,
- Glues and adhesives, and
- Paints and paint thinners.

Because these materials will be on-site only in limited quantities, and the potential for contamination will be minimized by procedures governing their use and storage, the potential of accidental groundwater quality deterioration during construction is negligible.

#### *Operation and Post-Closure*

The following four possible sources of groundwater contamination will exist during operation and post-closure of the landfill.

- Solid waste landfilling
- Leachate storage
- Sanitary wastewater
- Surface water runoff (operations only)

Each of these potential impacts is discussed below in relation to the current conceptual design.

#### Solid Waste Landfilling

Leachate that is produced when rain percolates through the landfill will be intercepted by the leachate collection system. The landfill design, described in Section 3.1.2, and site conditions will preclude off-site aquifer impacts.

Impacts to drinking water within the project study area are expected to be minimal for the following reasons:

- The Kearny Marsh adjacent to the facility is a ground water discharge area.
- There are no municipal water wells within three miles of the site.
- Drinking water is supplied to the area from the Wanaque Reservoir located in northern New Jersey.
- The leachate collection system will discharge leachate to the Passaic Valley Sewerage Commission (PVSC) treatment plant.

#### Impact of Leachate Collection, Treatment, and Disposal

Landfill leachate and in-flow from the surrounding aquifer will be conveyed via force main to the Passaic Valley Sewerage Commission (PVSC) wastewater treatment plant. Because of PVSC's ability to properly treat and dispose (off-site) of the leachate, the impact is expected to be minimal.

#### Impact of Sanitary Wastewater

Sanitary wastewater from personal and domestic uses will also be directed to PVSC. Because sanitary wastes will be conveyed and treated off-site, they will not affect groundwater quality or quantity.

#### Impact of Surface Water Runoff

The uncontrolled discharge of surface water runoff from the active areas of the landfill would have the potential to pollute adjacent surface waters. Several elements of the landfill design will substantially reduce the discharge of contaminated runoff and thereby protect against groundwater contamination from this source. These design features include: (1) diverting surface water runoff from adjacent tributary areas around the areas being filled; (2) grading the landfill surface thereby avoiding pockets of standing water; and 3) implementation of in-flow design to direct leachate flow into the landfill leachate collection system.

#### *Groundwater Recharge*

Groundwater that supplies the industrial wells in the area is replenished by groundwater recharge. Interfering with recharge can cause the water table to drop.

The installation of the leachate collection system will interfere with direct groundwater recharge over the landfill area. Rain water percolating through the landfill will be collected by the leachate collection system and treated at an off-site treatment plant. Because the area covered by the landfill is a very small percentage of the total area available for recharge to the local aquifer system, the net change in groundwater recharge to the local aquifer system will be negligible. Additionally, the leachate collection system will protect the aquifer and industrial wells from being impacted by contaminated leachate from the former Keegan Landfill.

## *Mitigation*

### *Construction*

Careful use and proper storage of any fuels and construction chemicals during construction at the facility site will minimize the risk of ground water contamination. Any accidental spills or leaks would be cleaned up and the affected soils removed before the contaminants are transported to the groundwater table, eliminating any possible degradation of existing groundwater quality. Strict compliance with use, storage, containment, and spill cleanup procedures typical for any construction site will be practiced to ensure that groundwater quality is not impacted by construction activities.

### *Operation and Post-Closure*

Landfill Design. The key features of the design will be a soil-bentonite (clay) cutoff wall that will encircle the site and be "keyed" into the existing underlying clay soils. The leachate collection system, which consists of a perforated pipe and gravel trench (essentially a french drain), will be located inside the cutoff wall and a minimum of two feet below the level of the Kearny Marsh.

Groundwater Monitoring. To protect against off-site groundwater impact, groundwater quality will be periodically evaluated by groundwater monitoring. Additionally, piezometers may be placed inside and outside the cutoff wall in order to measure the hydraulic gradient across the cutoff wall. Groundwater monitoring will be conducted during the operational, closure, and post-closure stages of the project. The sampling program, as required by NJDEP, consists of quarterly sampling runs and a more comprehensive annual sampling event.

## *3.1.4 Surface Water Resources*

### *Environmental Impact*

The potential for impact to the surface water resources in the study area as a result of the implementation of the proposed project is discussed below.

### *Construction*

A short-term issue of concern is the potential for contaminated surface water runoff to be generated during construction activities. This impact could include siltation of the stormwater runoff from cleared or excavated areas or from stockpiles of excavated materials. Other potential short-term impact can occur if oil, gasoline, or other hydrocarbons from construction equipment accidentally spill and are transported in local runoff.

### *Operation and Post-Closure*

The inflow design consisting of a leachate collection system and a soil bentonite perimeter cutoff wall will have a beneficial impact on surface water during operation and post closure. Currently, contaminated leachate from the former Keegan Landfill impacts the groundwater. Because the groundwater discharges to the Kearny Marsh, Frank's Creek and the unnamed creek, the contaminants are transported to these surface water bodies. The in-flow design will prevent this contaminated leachate from impacting the groundwater. This will, in effect,

improve the surface water quality. Operation of the landfill in this manner will prevent additional leachate from the former Keegan Landfill from impacting the surface water bodies.

Soils at the site are classified as well-drained, according to SCS. Although soils may be well-drained, it does not necessarily follow that they are highly permeable, and would permit rapid in-flow or movement of potential pollutants. This is especially true at the Keegan Site where soil is mixed with refuse from previous dumping. The drainage characteristics of a given site are also dependent on the slope of the ground surface and the depth of the groundwater table. The soil permeability is dependent on the properties of the soil itself (including grain size and plasticity). Therefore, contaminants will not necessarily move rapidly to groundwater in well-drained soils. Groundwater discharges to the surface water. Therefore, if groundwater becomes contaminated, surface waters may also become contaminated.

The potential for surface water impacts via contamination of groundwater fed streams will be reduced by the leachate containment and collection system installed around the perimeter of the landfill. In addition, once the landfill receives final cover, the potential for impacts to nearby surface waters should be further reduced. The purpose of the final cover is to reduce the possibility of water percolation through buried waste; this reduces the generation of leachate but increases the volume of surface runoff. The stormwater collection system will control this increased runoff.

## *Mitigation*

### *Construction*

During construction there is some potential for minor adverse impacts from surface water runoff. Several mitigation measures are available that effectively reduce the potential for surface water quality impact from construction. For example, the placement of silt fences along drainage channels running from the area of active construction is recommended to serve as check dams to slow runoff velocity (thus reducing sediment transport). The silt fences will also act as filters in removing the sediment load from the runoff. Proper grading and mulching of exposed slopes should minimize any excessive runoff and resulting erosion. Silt fences, hay bales or mulch at the base of the fill area are recommended. In addition, sedimentation basins are recommended to collect and settle sediment (and potential contaminants) in runoff. A soil erosion and sedimentation control plan will be implemented to reduce adverse impacts from surface runoff.

### *Operation and Post-Closure*

At this preliminary stage in design, specific stormwater controls have not been determined. The following description describes the controls typically employed at landfill sites. Stormwater detention basins and collection systems may be incorporated into the landfill design to control the discharge of runoff-borne contaminants. A drainage channel will be constructed along the base of the side slope to direct runoff to the stormwater basins. Other methods of erosion and sediment runoff control include prompt revegetation and reseedling of exposed slopes, the use of brush and straw dikes, filter cloth fences, and hay bales. A Soil Erosion and Sediment Control Plan will be developed for the proposed project incorporating good engineering and landscaping practices to control runoff. The soil erosion and sediment control plan will be maintained during the operation and post-closure of the site.