ENVIRONMENTAL IMPACT ANALYSIS REPORT

Cuyahoga County Resource Recovery Facility

Ohio, Dept of Energy

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ENVIRONMENTAL IMPACT ASSESSMENT REPORT

FOR A

RESOURCE RECOVERY FACILITY

CUYAHOGA COUNTY, OHIO

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U.S. DEPARTMENT OF COMMERCE NOAA
COASTAL SERVICES CENTER
2234 SOUTH HOBSON AVENUE
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REGIONAL PLANNING COMMISSION

Prepared by:
REGIONAL PLANNING COMMISSION
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ENVIRONMENTAL IMPACT ASSESSMENT REPORT
FOR A PROPOSED
RESOURCE RECOVERY FACILITY

prepared for the
Ohio Department of Energy

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I.A. Purpose of the Project

Cuyahoga County, as the most populous county in the State of Ohio, is facing a critical solid waste disposal problem. This can be generally attributed to three factors:

1) The increase in the number of households and consumption, and the decrease in vacant land due to urban and suburban development;
2) Strict enforcement of pollution abatement measures, which have resulted in substantial benefits to the environment. These measures included the banning of open dumping and burning, shutting down municipal and private incinerators which did not meet air pollution control standards, and imposing strict guidelines for the purpose of regulating sanitary landfills.
3) The decrease in the available capacity of existing landfills, the closing of completed landfills, and the difficulty in locating new landfills.

In order to alleviate this solid waste disposal problem, the County is taking steps to implement a resource recovery system. This alternative means of disposal has been utilized in France, Germany, Japan and other countries for many years. Several cities in the United States have recently developed resource recovery systems based on this European technology.

I.B. Project Description

The resource recovery facility will be centrally located in Cuyahoga County, and will incinerate solid waste to produce energy in the form of steam and/or electricity. The municipal solid waste (MSW) will be brought to the facility in either collection or transfer vehicles. The facility is expected to combust waste continuously seven days a week and 24 hours per day.

To date, a total of 37 communities in Cuyahoga County have expressed an interest in participating in the County's resource recovery program. The combined solid waste from these communities is expected to exceed 2500 tons per day by 1985. However, the size of the facility, expressed in terms of solid waste processing capacity, will be designed to handle less than 2000 tons per

day due to the risks involved in oversizing the facility. The total amount of solid waste to be processed at the plant depends on the final number of communities which participate and the possibility of including commercial and industrial solid wastes. The exact size of the plant will not be known until these commitments are made.

waste from a refuse pit. The technology for the plant is summarized in the following paragraphs, which were written by Bechtel, Incorporated, the County's technical consultant for the project.[1]

The resource recovery facility will use "mass burn" technology. This decision was made by the Board of County Commissioners on May 12, 1980 based on the recommendation of the Resource Recovery Advisory Committee. Mass burn technology is used by several hundred existing, operating facilities world wide, including eight in the United States. A schematic of a typical mass burn facility is shown in Figure 1.1. Numbers on the figure correspond to the following descriptive paragraphs.

1. MSW Receiving Area

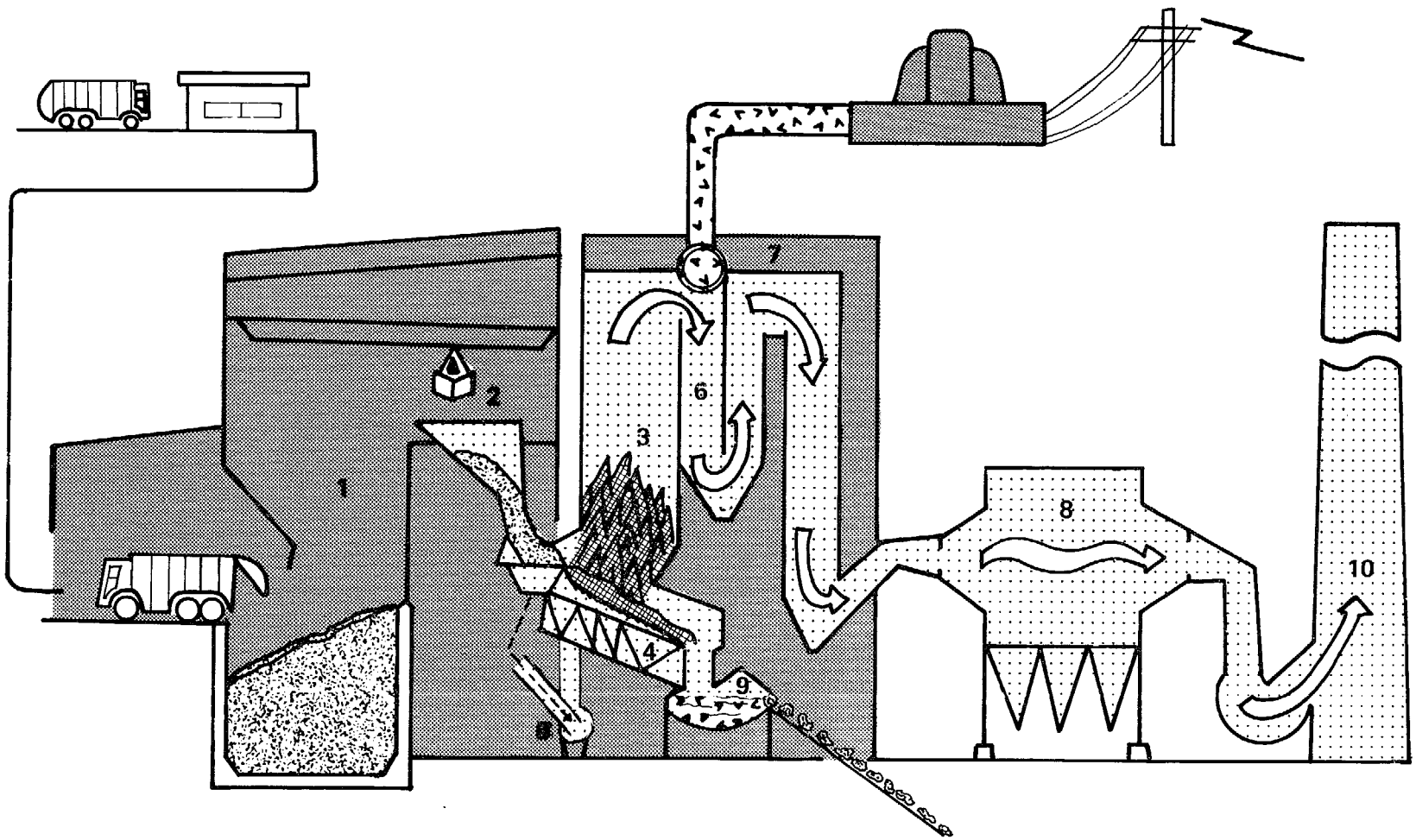
   The MSW transported to the resource recovery facility is dumped into an enclosed receiving pit. The pit provides MSW storage to permit facility operation seven days per week, even though MSW collection and transportation occurs only five days per week. An attempt is made to contain odors and noise by enclosing the receiving area. Combustion air is taken from above the pit to assist in controlling odors.

2. Furnace Charging

   One or more overhead cranes are provided to lift the MSW from the pit and put it in the furnace feed chute. The crane operator attempts to

1. Bechtel, Inc., Solid Waste Resource Recovery Facility, Phase II, June, 1980, pp. II-2 to II-6.

FIGURE 1.1



MASS BURN ENERGY RECOVERY FACILITY SCHEMATIC

SOURCE: "Universal Oil Products"

keep the MSW in the pit mixed to avoid wide swings in "fuel" composition. The feed chute is kept filled to block furnace heat from the pit area. The feed chute provides gravity flow of material into the furnace. A ram feeder at the bottom of the feed chute may be used to provide positive movement of material into the furnace.

3. Furnace

Combustion of the MSW occurs in the furnace. It is anticipated that the furnace will burn MSW continuously, 24 hours per day, seven days per week. Combustion of most MSW is self-sustained, and usually does not require auxiliary fuel, except, possibly, for startup. The MSW moves gradually through the furnace on grates from the feed chute to the residue handling system. Two types of furnace walls include refractory walls and "water walls," which are actually part of the boiler.

4. Grates

Grates support the burning MSW and move it through the furnace. The grates also agitate the material to increase the portion burned. Air forced upward through the grates provides combustion air for the MSW as well as keeping the grates cool. Different grate systems being considered include reciprocating, roller, and reciprocating plus rotary kiln. The grate speed can be varied to help control the combustion process.

5. Combustion Air

Air for combustion is generally supplied partly from below the grates, "underfire air," and partly from above the grates, "overfire air." Air is supplied in quantities required to combust the material, termed theoretical air, plus additional air, or "excess air," to ensure complete combustion. Separate overfire and underfire air fans are generally provided, and the fans can be controlled to provide the necessary

air depending on the particular mix of material being burned.

6. Boiler

The boiler converts the thermal energy from the furnace into steam. It consists of a system of connected tubes containing water. Heat is transferred from the furnace into the water, vaporizing it to form steam. Steam pressure and temperature from the boiler will be established based on market requirements. An attempt to control erosion and corrosion of boiler tubes will include limiting boiler tube temperatures and controlling the excess air in the furnace.

7. Turbine-Generator

Steam from the boiler can be sold directly to an energy customer, used to generate electricity in a steam turbine-generator, or used in an automatic extraction steam turbine-generator to produce both steam and electricity. The latter arrangement is most advantageous to the project if the steam energy market is available. All steam generated enters the turbine. Some of it is extracted for use by steam customers, while the remainder goes completely through the turbine, produces electricity and is condensed. The split between the sale of steam and the sale of electricity is determined by market demand.

8. Air Pollution Equipment (to be discussed later).
9. Residue and Ash Handling (to be discussed later).
10. Stack (to be discussed later).

I.C. Existing Disposal Facilities

At the present time, approximately 97% of the municipal solid waste generated in Cuyahoga County is disposed of at landfills. Most of the remaining 3% is incinerated, while a small fraction is recycled. It is hoped that recycling and conservation will have more of an impact in the future.

Table 1.1

CUYAHOGA COUNTY SANITARY LANDFILL FACILITIES

LICENSED - 1979

MAP KEY	FACILITY NAME	LOCATION	MAILING ADDRESS	OWNERSHIP
1	Cleveland Land Development Co.	1329 E. Shaaf, Brooklyn Heights	4900 Woodland Ave., Cleveland 44104	P
2	Cleveland Land Development Co.	7720 Harvard Ave.,Cuyahoga Hgts	4900 Woodland Ave., Cleveland 44104	P
3	Cleveland Land Development Co. and Harry Rock & Co.	7720 Harvard Ave., Cleveland	4900 Woodland Ave., Cleveland 44104	P
4	Glenwillow Works(Austin Powder)	30300 Pettibone Rd.,Glenwillow	3735 Green Rd., Cleveland 44101	P
5	Inland Reclamation, aka Glenwillow Landfill	6705 Richmond Rd., Glenwillow	6705 Richmond Rd., Glenwillow 44126	P
6	Nicky Boulevard Landfill	6700 Grant Ave.,Cuyahoga Hgts.	4100 Brookpark Rd.,Cleveland 44134	P
7	*Rockside Reclamation Co.	5661 Canal Rd., Garfield Heights	4100 Brookpark Rd.,Cleveland 44134	P
8	Royalton Rd. Sanitary Landfill	3401 E.Royalton Rd.,BroadviewHts	7500 Exchange St., ValleyView 44125	P
9	*Warner Hill Improvement Co.	4720 Warner Rd.,Garfield Heights	4720 Warner Rd.,Garfield Hts.	P
10	Bedford Landfill	Krick Rd.,Walton Hills	65 Columbus Rd.,Bedford 44146	G
11	Brooklyn Landfill	9400 Memphis Ave., Brooklyn	7619 Memphis Ave., Brooklyn 44144	G
12	Ridgewood Sanitary Landfill	2221 W. Ridgewood, Parma	6611 Ridge Rd., Parma 44134	G
13	Shaker Heights Landfill	Bartlett & Columbus Rds.Bedford	3400 Lee Rd.,Shaker Heights 44120	G
14	Solon Sanitary Landfill	6600 Cochran Rd., Solon	6315 S.O.M. Cntr. Rd., Solon 44139	G
15	Strongsville Landfill	Mill Hollow Rd., Strongsville	18688 Royalton Rd.Strongsville44136	G
16	Westlake Landfill	741 Bassett Rd., Westlake	27216 Hilliard Rd., Westlake 44145	G
OUT - OF - COUNTY FACILITIES				
17	Lake County Landfill	Brooklane & County Line Rds, Kirtland Twp.	P.O. Box 228, Chardon 44024	P
18	Lorain County Landfill(Brotherton)	3 mi. w. of S.R. 20 on S.R. 10	8515 Butternut Ridge Elyria 44035	P
19	Weibush Landfill	St. Rt. 225, Atwater Twp.	127 E. Main St., Alliance 44601	P

*Closed

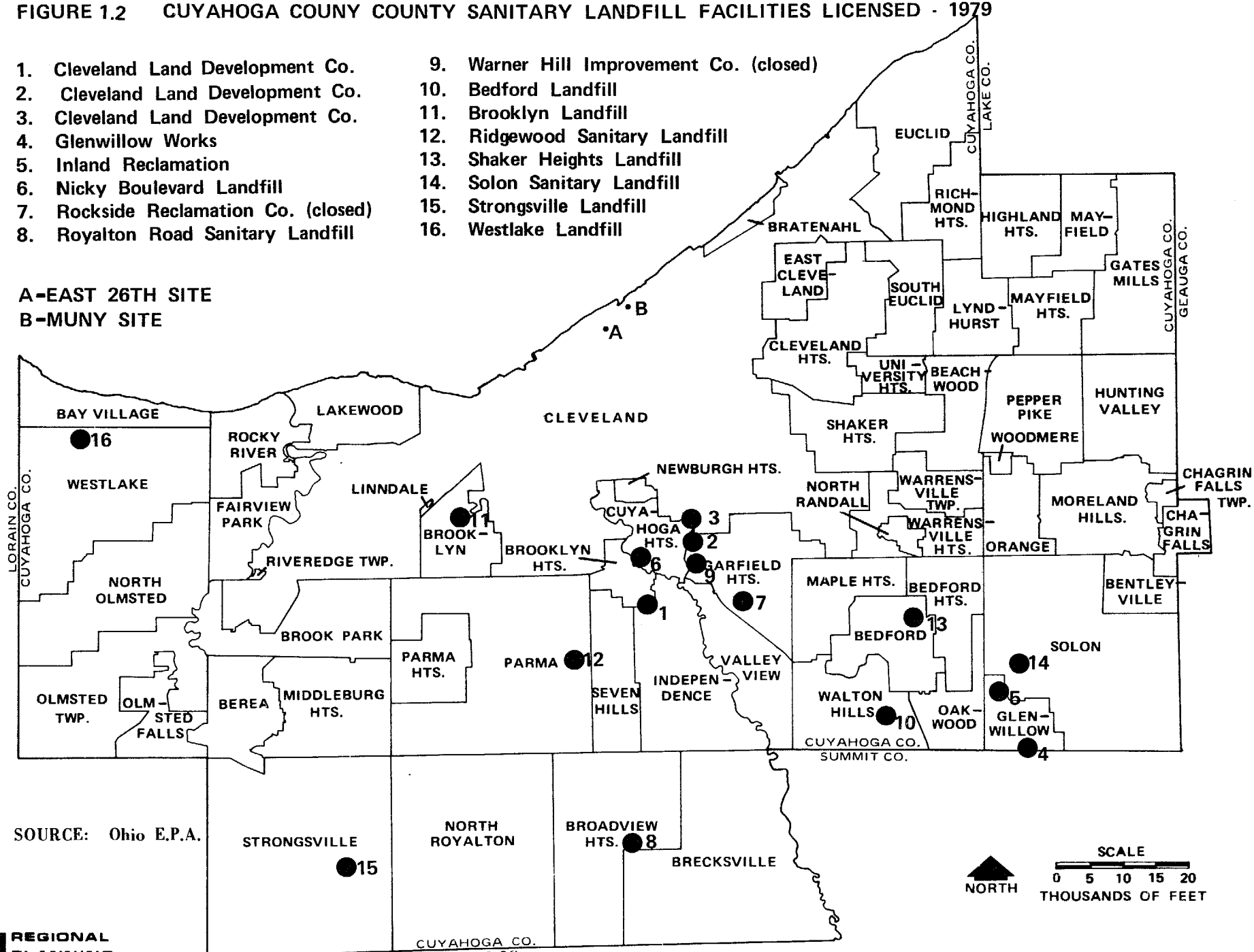
P Private
G Government

SOURCE: Ohio EPA

FIGURE 1.2 CUYAHOGA COUNY COUNTY SANITARY LANDFILL FACILITIES LICENSED - 1979

1. Cleveland Land Development Co.
2. Cleveland Land Development Co.
3. Cleveland Land Development Co.
4. Glenwillow Works
5. Inland Reclamation
6. Nicky Boulevard Landfill
7. Rockside Reclamation Co. (closed)
8. Royalton Road Sanitary Landfill
9. Warner Hill Improvement Co. (closed)
10. Bedford Landfill
11. Brooklyn Landfill
12. Ridgewood Sanitary Landfill
13. Shaker Heights Landfill
14. Solon Sanitary Landfill
15. Strongsville Landfill
16. Westlake Landfill

A-EAST 26TH SITE
B-MUNY SITE



SOURCE: Ohio E.P.A.

REGIONAL PLANNING COMMISSION

CUYAHOGA COUNTY, OHIO FEB. 1979

There are currently 14 licensed sanitary landfills in Cuyahoga County (see Table 1.1). However, most municipalities in the County utilize only three of these landfills, along with two landfills in adjoining counties for municipal solid waste disposal. A map indicating these facilities appears on the following page (Figure 1.2).

The three landfills in Cuyahoga County which are most heavily utilized are Inland Reclamation and the Glenwillow Works in Glenwillow, and Royalton Road Sanitary Landfill in Broadview Heights. The two landfills outside the County which are used by County municipalities are Lake County Land Development in Lake County, and Brotherton Landfill in Lorain County.

The only two communities in the County which do not utilize landfills for primary waste disposal are the cities of Lakewood and Euclid. Both communities burn their waste in their own incinerators. However, Lakewood has no long-range plans for upkeep of its facility for this purpose and intends to convert the incinerator to a waste transfer station, or abandon the facility altogether.

I.D. Deficiencies in the Existing System

Prior to the utilization of sanitary landfills in recent years, most municipalities in Cuyahoga County disposed of their wastes by one of two methods. The first consisted of open dumping, whereby the waste was dumped in an open area and often burned. The second method involved the use of municipal incinerators for the burning of the waste, although these often emitted pollutants which adversely affected air quality. Both methods of disposal had severe impacts on the environment. During the past decade, the federal government has enacted such legislative acts as the Clean Air and Water Act and the Resource Recovery and Conservation Act, which have banned open dumping and placed severe restrictions on air emissions from municipal incinerators. As a result, most communities in the County are utilizing sanitary landfills as a prime disposal

site, while the two that operate incinerators have invested substantial sums of capital in air pollution control equipment.

The potential for new or expanded landfills in Cuyahoga County is extremely limited. The possibility of refurbishing old municipal incinerators or building new incinerators is very doubtful due to the high cost of pollution control equipment. The potential for materials conservation in Cuyahoga County is good, although the number of source separation programs is limited at the present time. An increase in participation in these programs hinges on changing the attitudes of the public from "throw-away disposal tendencies" to that of recycling.

In essence, the resource recovery facility appears to be the best alternative means of solid waste disposal in the future. In addition to the incineration of waste, this alternative has the advantage of recovering energy in the form of steam and/or electricity. However, some landfilling would still be necessary as residue and other forms of unburnable waste would require permanent disposal.

I.E. Implementation Schedule

Planning for a resource recovery facility in Cuyahoga County has been in effect for several years. At the present time, the third and final phase of planning has just begun, with scheduled completion in December of 1982. Construction of the facility itself is scheduled for 1983 and operation will most likely begin in late 1985 or early 1986.

The Executive Review Board, a ten-member solid waste decision-making body made up of top County and municipal officials, has adopted the position that the proposed facility would be owned by the County and that it would be privately operated. It was also recommended that the full service system of procurement be implemented, with one firm responsible for design, construction and operation of the facility. The Ohio Water Development Authority has agreed to participate as the bond issuing authority.

Several major steps for procurement must be undertaken, including the following items:

- Requests for Proposals (RFP). The preparation of an RFP for an energy production facility requires that numerous decisions be made prior to issuance of the RFP. Otherwise, selection of the most cost effective facility, between several different technologies, will be difficult or impossible. Whenever final decisions cannot be made, assumptions must be listed so that each proposer responds using comparable data. The RFP's are scheduled to be issued in September of 1981.
- Site Data. Prior to RFP issuance site soil borings, topographic maps, and existing utilities are desirable for inclusion with the RFP.
- Solid Waste Supply. A guaranteed solid waste supply (signed contracts) is necessary prior to issuing bonds. Letters of intent should be received from each municipality in the service area prior to RFP issuance.

Figure 1.3 indicates the implementation schedule for the Resource Recovery Facility.

I.F. Related Projects

As mentioned previously, there are currently eight other resource recovery facilities using "mass burn" technology in the United States, and many more world-wide. A mass burn facility which is similar in size to the proposed County resource recovery plant is located in Saugus, Massachusetts, just outside of Boston (see Figure 1.4). Other resource recovery projects which utilize substantially different types of technology are also located throughout the nation, the closest of these being located in Akron, Ohio, approximately 35 miles from the proposed site in Cuyahoga County.

At this time, it is anticipated that there will be no recovery of materials at the Cuyahoga County resource recovery facility prior to incineration. However, markets for incinerated ferrous metals are being explored. Materials recovery will depend on local source separation programs done prior to pick-up involving substantial citizen participation.

CUYAHOGA COUNTY RESOURCE RECOVERY FACILITY

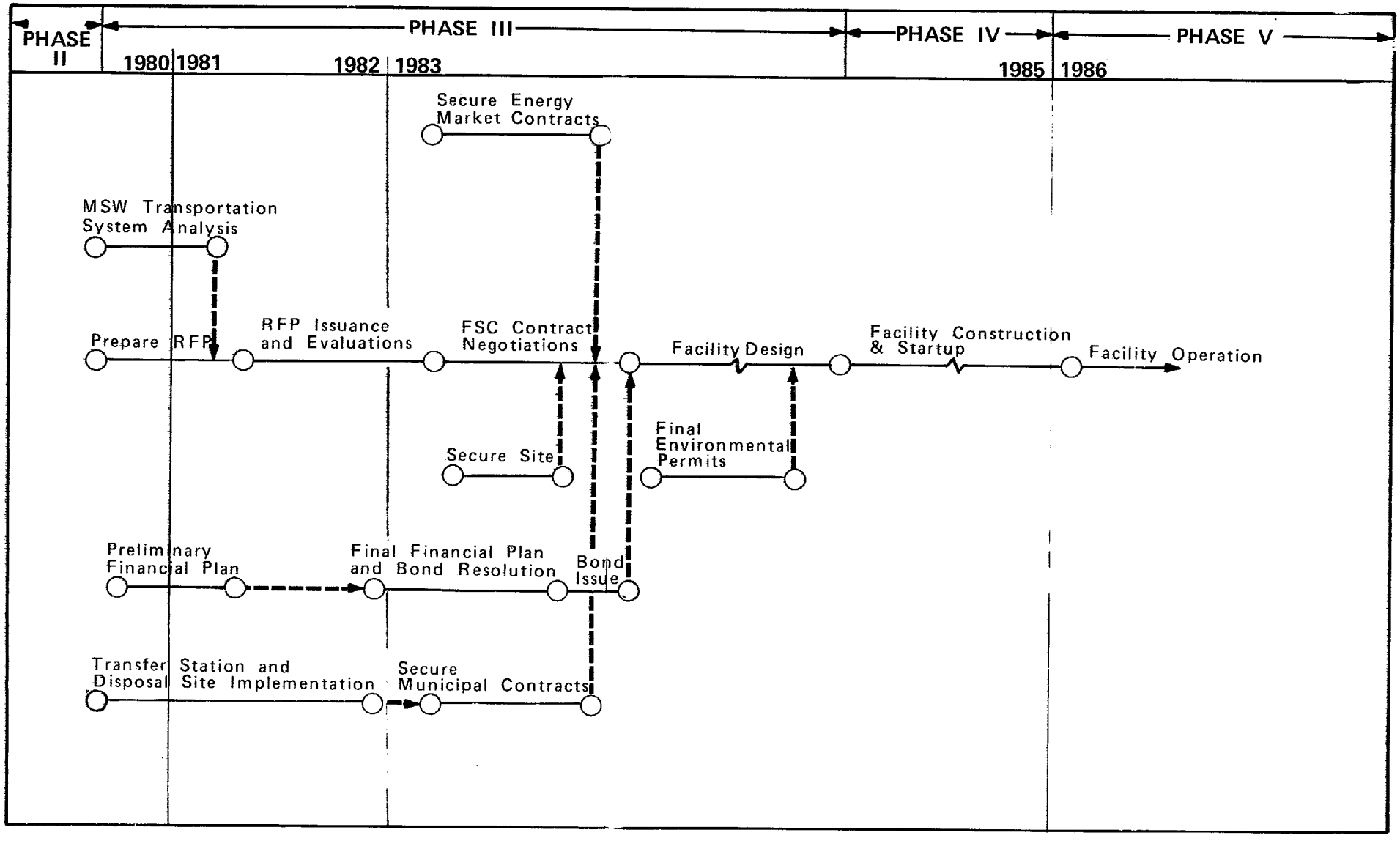
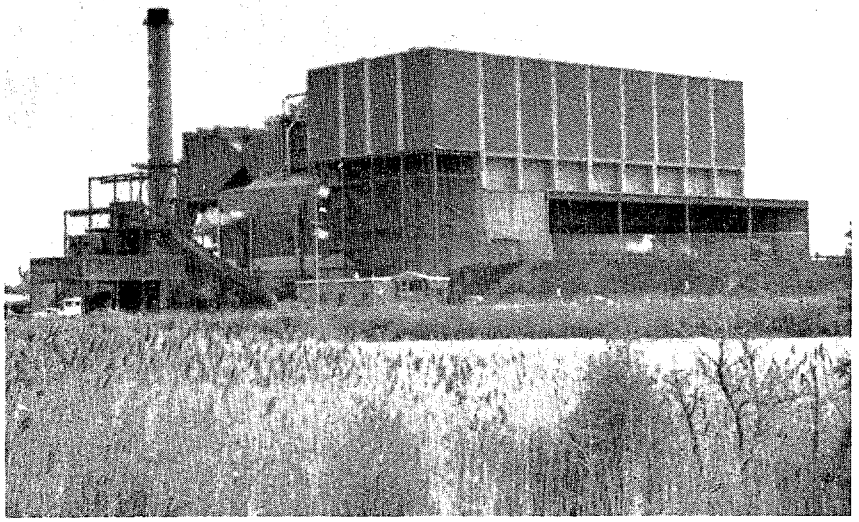


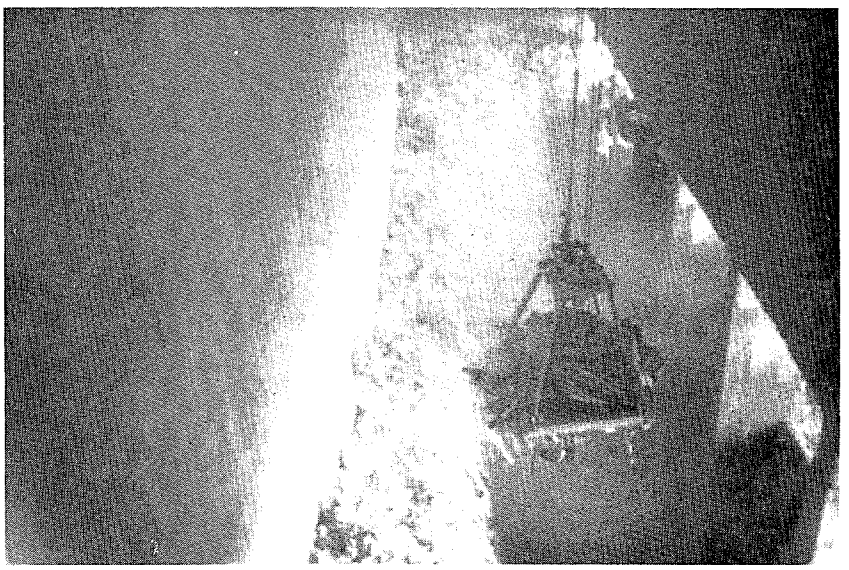
FIGURE 1.3 PROJECT SCHEDULE

FIGURE 1.4 EXAMPLE OF MASS-BURN FACILITY SAUGUS,MASS.

TRUCKS HAUL WASTE TO THE FACILITY JUST OUTSIDE OF BOSTON.



THE FACILITY PROCESSES ABOUT 1500 TONS OF SOLID WASTE EACH DAY.



A CRANE TRANSFERS THE WASTE FROM THE RECEIVING PIT TO THE FURNACE.

II. Site Criteria

II.A. Site Identification

The specific location for the proposed resource recovery plant has yet to be determined. The site originally proposed for the facility was located north of Harvard Avenue and west of East 26th Street in the Village of Newburgh Heights, at the southern edge of the County's coastal zone. The site was one of several alternatives located in the industrial valley of the Cuyahoga River.

The selection of this site was based primarily on its proximity to a potentially large steam market, as steam cannot be transported for too long a distance before it condenses. Initially, seven major firms expressed an interest in purchasing steam from the County's plant. These potential customers included Harshaw Chemical, McGean Chemical, U.S. Steel, Republic Steel, Jones and Laughlin Steel, Alcoa, and Metropolitan General Hospital. All seven of these potential customers were located within two miles of the proposed site on Harvard Road.

In spite of the obvious advantages which this site afforded, three factors have arisen which have resulted in the termination of negotiations between the County and the owners of the site. First, the demand for steam by these seven firms is not as substantial as was originally thought. Secondly, there has been some reluctance on the part of the firms to commit themselves to long-term contracts for the purchase of steam. And thirdly, a recent ruling by the Federal Energy Regulatory Commission made the sale of electricity more economically feasible.

As a result of these factors, other sites are now being considered. Obviously, if the sole form of energy produced by the plant is electricity, the location of the site is not as restrictive as it would be if steam is produced. The major energy markets are now the steam and electric utility companies which serve the County: the Cleveland Electric Illuminating Company (CEI) and the

City of Cleveland's Division of Light and Power (Muny). Each utility has a major power plant located near downtown Cleveland. Consequently, alternative sites which are now being evaluated are closer to these markets. Although no specific site has been chosen, two sites are currently being given serious consideration. These are indicated in Figure 2.1.

For the purposes of this report, both sites will be analyzed with regard to their impact on the surrounding area. The two sites are located in or immediately adjacent to the Cuyahoga County Coastal Zone, and are located approximately 1.5 miles apart. The selection of a final site is dependent on several factors, as well as a number of decisions which have yet to be made. The two sites can be analyzed as follows.

East 26th/Lakeside Site

This site was determined by the Regional Planning Commission to be one of the most desirable of a number of sites for a steam generating plant in the downtown area. The site is approximately 12 acres and has a number of advantages.

The area which surrounds the site is comprised primarily of industry, railroads and related uses. The nearest residential area is over 1400 feet away. Accessibility to all interstates in the County is excellent, since the site is immediately adjacent to the Innerbelt Freeway. Exit and entrance ramps to the Innerbelt in both directions are located within one quarter of a mile of the site.

If the resource recovery plant is constructed on the East 26th Street site, it is likely that the form of energy which would be produced would be steam and electricity during the winter and electricity during the summer. Since CEI's East 20th Street steam plant is located within 2000 feet of the site, the steam can be economically transported from the resource recovery plant to supplement the electric company's downtown steam loop. All utilities, except possibly water lines, are located near the site.

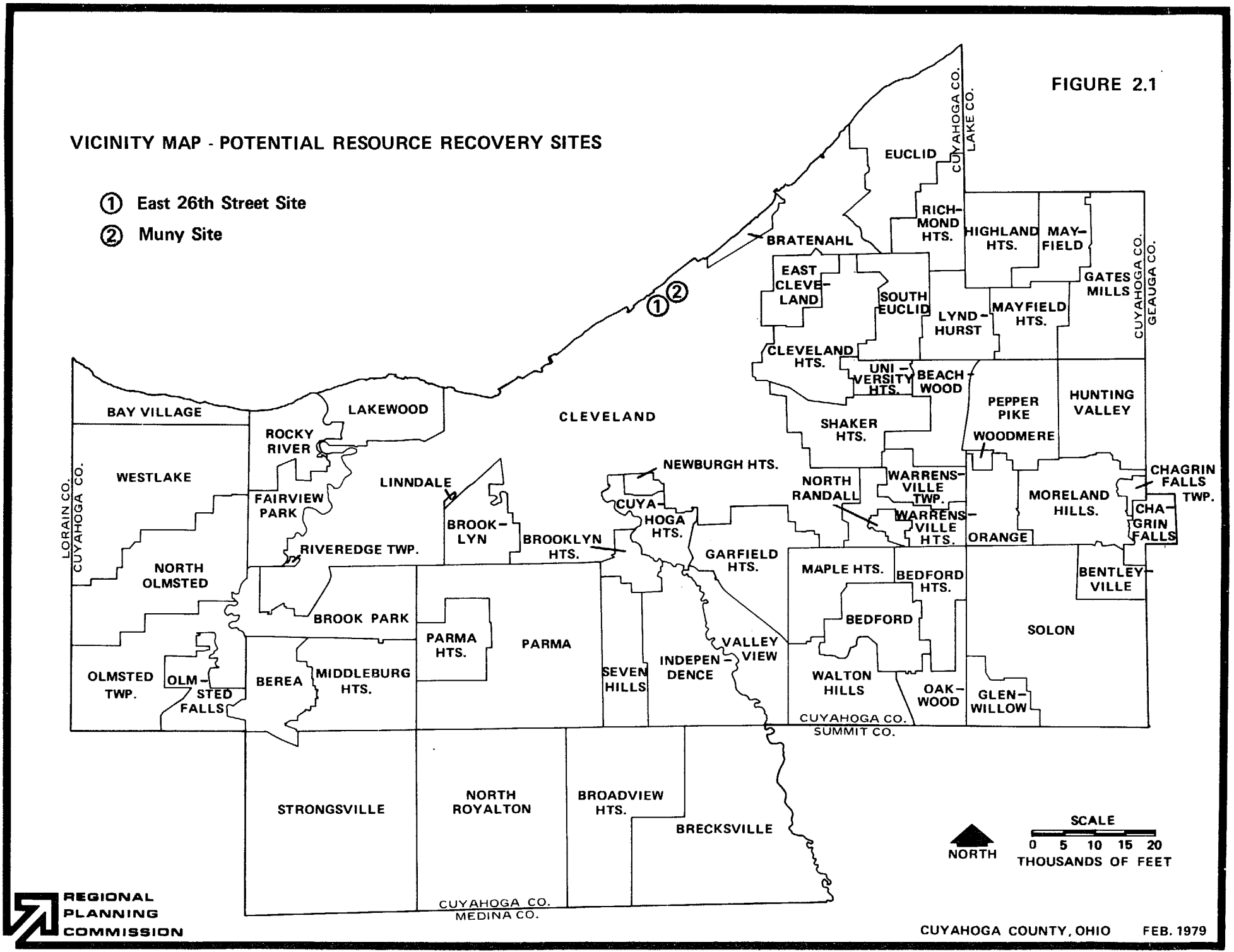


FIGURE 2.1
VICINITY MAP - POTENTIAL RESOURCE RECOVERY SITES
① East 26th Street Site
② Muny Site
EUCLID
CUYAHOGA CO.
LAKE CO.
RICH-MOND HTS.
HIGHLAND HTS.
MAY-FIELD
GATES MILLS
CUYAHOGA CO.
GEAUGA CO.
BRATENAHL
EAST CLEVE-LAND
SOUTH EUCLID
LYND-HURST
MAYFIELD HTS.
CLEVELAND HTS.
UNI-VERSITY HTS.
BEACH-WOOD
PEPPER PIKE
HUNTING VALLEY
WOODMERE
SHAKER HTS.
BAY VILLAGE
LAKEWOOD
CLEVELAND
ROCKY RIVER
WESTLAKE
LORAIN CO.
CUYAHOGA CO.
FAIRVIEW PARK
LINNDALE
NEWBURGH HTS.
NORTH RANDALL
WARRENS-VILLE TWP.
WARRENS-VILLE HTS.
MORELAND HILLS.
CHAGRIN FALLS TWP.
CHA-GRIN FALLS
ORANGE
CUYA-HOGA HTS.
BROOK-LYN
BROOKLYN HTS.
RIVEREDGE TWP.
GARFIELD HTS.
NORTH OLMSTED
MAPLE HTS.
BEDFORD HTS.
BENTLEY-VILLE
BROOK PARK
BEDFORD
SOLON
PARMA HTS.
PARMA
VALLEY VIEW
OLMSTED TWP.
OLM-STED FALLS
BEREA
MIDDLEBURG HTS.
SEVEN HILLS
INDEPEN-DENCE
WALTON HILLS
OAK-WOOD
GLEN-WILLOW
CUYAHOGA CO.
SUMMIT CO.
STRONGSVILLE
NORTH ROYALTON
BROADVIEW HTS.
BRECKSVILLE
CUYAHOGA CO.
MEDINA CO.
NORTH
SCALE
0 5 10 15 20
THOUSANDS OF FEET
REGIONAL PLANNING COMMISSION
CUYAHOGA COUNTY, OHIO
FEB. 1979

East 53rd/South Marginal Site

This site is approximately 18 acres and is located south of the Memorial Shoreway (Interstate 90). The site is owned by the City of Cleveland, and the recipient of the steam and/or electricity which would be produced by the resource recovery plant would be the City's Municipal Light Plant. The Light Plant is connected to the site via a tunnel which runs under the Shoreway which would allow for relatively inexpensive transmission lines.

The surrounding land is predominantly industrial and accessibility is good to the Memorial Shoreway. More detailed information on these sites will be discussed later in this chapter.

II.B. Climatology

Located on the southern shore of Lake Erie, Cleveland has a climate which is mainly continental in character with a modifying influence due to the lake. The surrounding terrain has an average level of 575 feet above mean sea level with higher ground in the southeast suburbs rising to twelve hundred and thirteen hundred feet above mean sea level.

Official weather records have been maintained since 1941 by the National Weather Service at Cleveland Hopkins International Airport, 10 miles southwest of downtown Cleveland and 5 miles south of the lake shoreline. Records from 1871 to 1941 were kept in downtown Cleveland. In comparison, daytime temperatures at the airport average 2° to 4° F. higher except during the winter months. Nighttime temperatures average from 2° to 4° F. lower at the airport for all seasons. Differences as much as 12° F. have occurred on some individual days. Temperature extremes at Cleveland Hopkins International Airport show an all-time high of 103° F. and a record low of -19° F. Precipitation differences between the two locations are slight. Average monthly temperatures are indicated in Figure 2.2.

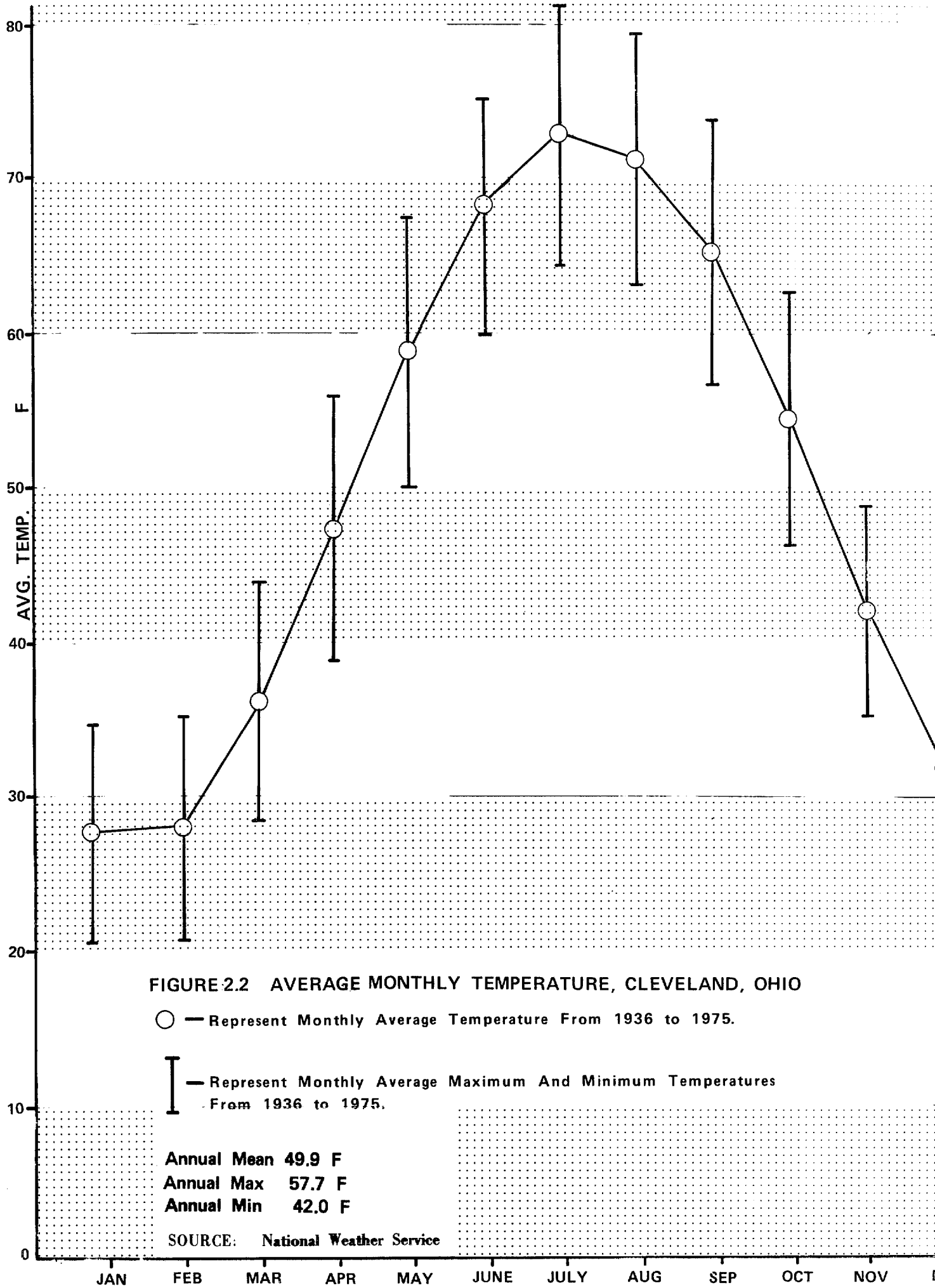


FIGURE 2.2 AVERAGE MONTHLY TEMPERATURE, CLEVELAND, OHIO

Burke Lakefront Airport is less than one half mile from both possible sites for the Resource Recovery Plant. Unfortunately, the available records for Burke Lakefront Airport do not date back far enough to be of any value. Therefore, weather records maintained by the National Weather Service at Cleveland Hopkins International Airport, and in downtown Cleveland from 1871 to 1941 are the primary sources of weather data.

Cold winter air masses moving southeastward from Canada pass through Cleveland. The accompanying low temperatures are moderated by the heat and moisture accumulated while passing over the warm open waters of Lake Erie. When these moisture-laden air masses rise up over the land, the air is cooled by expansion and condensation occurs in the form of fog, clouds, and/or precipitation. This situation quite frequently causes snow and snow squalls along the south shore of Lake Erie and some distance inland.

During the spring and early summer, the lake acts to cool the land. The heavier cooler air over the lake moves inland, displacing the warmer air over land which causes a cool lake breeze. This situation often delays the change of seasons along the lake.

Precipitation is moderate and evenly distributed throughout most of the Cleveland area. Heavier precipitation is common in the eastern suburbs because of their higher elevations. The largest twenty-four hour snowfall of 17.4 inches occurred in November 1913. The maximum precipitation in summer thunderstorms has been 1.20 inches in ten minutes, 2.21 inches in one hour, 3.02 inches in two hours and 4.97 inches in twenty-four hours.

Only four tornadoes have occurred within the Cleveland city limits since the beginning of records in 1870. Most damaging winds occur during severe summer thunderstorms.

Annually, the prevailing winds are from the south-southwest and west-southwest approximately 47.2% of the time. The largest percentage (15.0%)

FIGURE 2.3

PERCENT FREQUENCY OF WIND DIRECTION FOR VARIOUS AVERAGING TIMES.

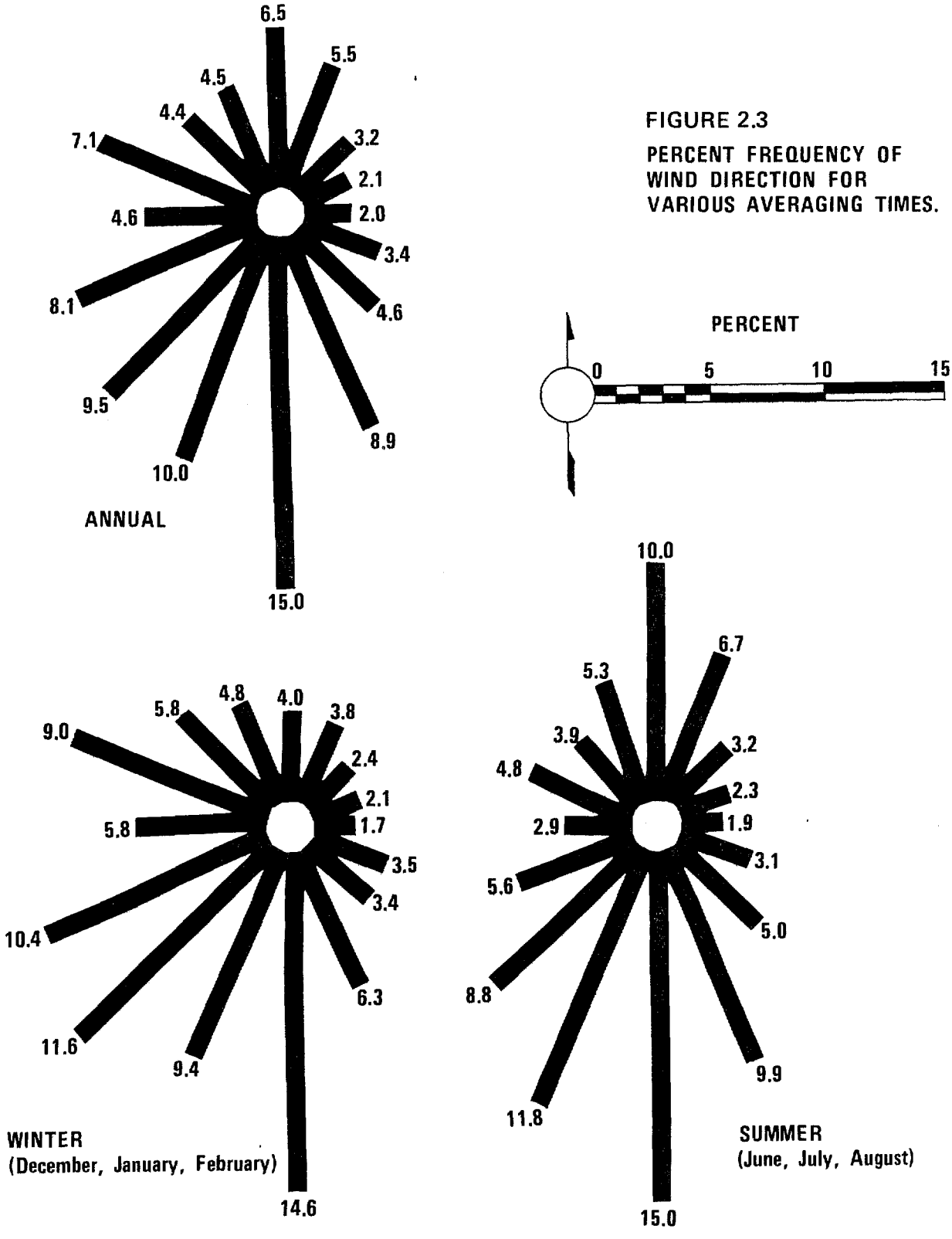


TABLE 2.1

AVERAGE EXPECTANCY OF WEATHER PATTERNS AT
CLEVELAND HOPKINS INTERNATIONAL AIRPORT (DEGREES IN FAHRENHEIT)

TYPE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
Days with Thunderstorm	*	*	2	4	5	8	7	5	3	2	1	*	37
Percent of Possible Sunshine	26	33	45	51	57	84	88	66	61	55	33	29	49%
Precipitation													
Monthly precipitation	2.38	2.28	2.89	2.73	2.73	3.05	3.04	2.64	3.13	2.42	2.66	2.29	32.24
Greatest in One Day	2.33	2.33	2.76	1.92	2.73	2.79	2.73	3.07	1.85	3.44	2.23	1.26	3.73
Monthly Snowfall	10.0	9.8	11.2	2.6	T	0	0	0	T	0.5	6.5	10.9	51.5
Days with Precipitation .01	16	14	16	15	14	11	10	9	9	10	15	15	164
Temperature													
Average For Month	28.5	28.6	36.8	47.3	59.1	69.4	73.7	71.9	65.5	54.4	41.7	30.9	50.9
Average Daily Maximum	36.0	36.4	45.2	57.1	69.9	80.4	84.7	82.7	76.8	64.3	49.2	37.5	
Average Daily Minimum	20.9	20.8	28.3	37.5	48.2	58.3	62.6	61.1	55.1	44.5	34.2	24.3	
Highest Ever Recorded	73	69	83	88	92	101	103	102	101	90	82	69	103
Lowest Ever Recorded	- 19	- 15	- 5	10	25	31	41	41	32	22	3	- 11	- 19
Number Days Below 32 For High	12	9	5	*	0	0	0	0	0	0	2	11	39
Number Days Below 32 For Low	27	24	21	8	*	0	0	0	*	1	13	25	119
Winds													
Prevailing Wind	S	S	W	S	S	S	S	S	S	S	S	S	S
Average Windspeed (mph)	12.5	12.2	12.4	11.8	10.3	9.4	8.7	8.4	9.1	10.1	12.0	12.4	10.8
Direction -- Extreme Winds	SW	W	W	W	SW	SW	W	W	S	W	W	SW	W
Velocity - Extreme Winds (mph)	68	65	74	65	68	57	65	61	45	43	59	49	74

*Less than one day in an average year

Sources: United Airlines, Cleveland Metropolitan Area Master Plan Report, March 28, 1967
Extreme winds from National Climatic Center Summaries.

National Climatic Center, Asheville, North Carolina, May 1977.

of all winds are from the south (see Figure 2.3). These percentages fluctuate slightly with the change in seasons. The average windspeed of the prevailing winds varies from 12.5 m.p.h. in January to 8.4 m.p.h. in August. These prevailing winds are strongest during the winter months and weakest during the summer months (see Table 2.1). The maximum wind recorded was 74 m.p.h. from the west in March 1948.

The existing flow pattern of Lake Erie is a result of the prevailing winds and the topography of the Great Lakes Basin. Surface water flow in the lake is extremely slow. The predominant flow is generally from west to east; from the northwest shore to the southcentral shore and then northeast to the eastern basin. Bottom flow is predominantly southwesterly as a result of the surface flow; however, the flow is easterly at all depths along the south shore (see Figure 2.4).

The flow of water in the Cleveland Harbor is from east to west with 80% of the flow from the Cuyahoga River passing through the harbor (see Figure 2.5).

Ice cover on Lake Erie plays a major role in determining Cleveland weather. With little ice coverage, cold air masses from the north readily pick up heat and moisture from the lake. This produces convective clouds, fog, snow, and other forms of precipitation. As the ice coverage increases, the ice acts as a barrier to the transfer of heat and moisture to the atmosphere and, therefore, less precipitation occurs. When the ice breaks up, moisture and heat can again be transferred to the atmosphere.

In early December, the lake is usually free of ice with the exception of a small amount of ice possibly forming in the extreme west basin. Ice tends to form first at the western end of the lake and gradually spreads eastward. The probability of finding ice covering any portion of the lake increases from early December to March 1st. On March 1, the probability of finding

ice on any part of the lake is highest. Only during extreme winters does the entire lake freeze over. Winds and storms often disturb the formation of ice.

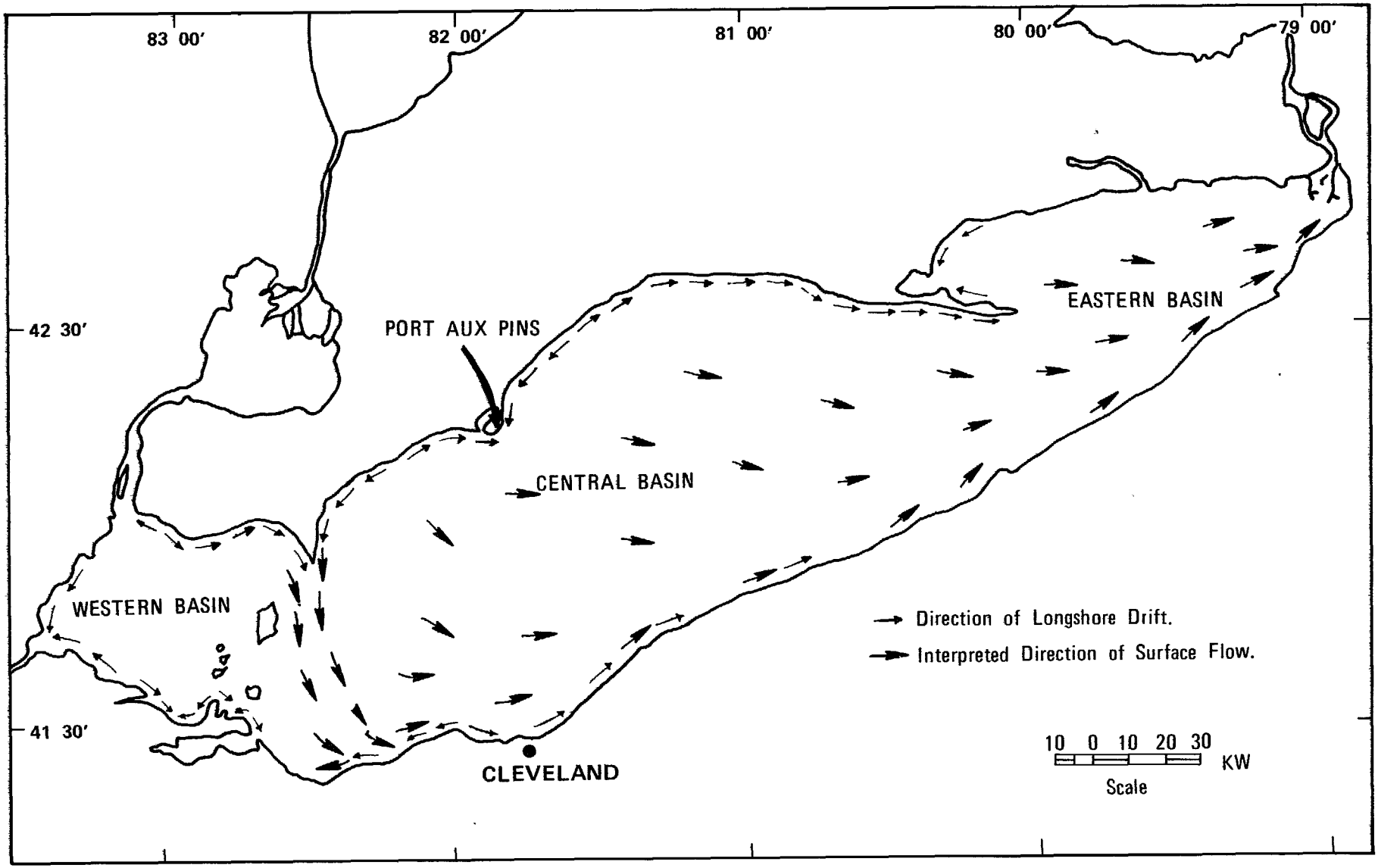
From March 1 to the end of April, the probability of ice coverage for all parts of the lake continues to decrease. The eastern basin of the lake is usually the last place where ice can be found in the springtime. The amount of snow generated by any particular air mass passing over the lake depends upon the amount of open ice-free surface water. A traveling distance of at least fifty miles over the open waters of the lake is considered necessary to produce snow.

The "worst weather" for Cleveland occurs when the wind travels either one hundred fifty miles over Lake Erie from Buffalo, or three hundred miles over Lake Huron and Lake Erie northwest of Cleveland. Given these conditions, annual snowfall is 51.5 inches at the airport.

Winds out of the east-southeast tend to reduce the probability of precipitation. This phenomenon can be explained by the fact that air from the southeast descends from higher ground. This downslope motion heats up the air and dries it out. The likelihood for precipitation is then reduced.

Occasionally, fog forms along the Lake Erie shoreline, but only rarely does it hinder visibility. Burke Lakefront Airport operates with little interruption due to fog. Table 2.2 shows that temperature differences between land and water surfaces encourage the formation of fog. Fortunately, fog does not normally form densely enough along the lakefront to be a problem.

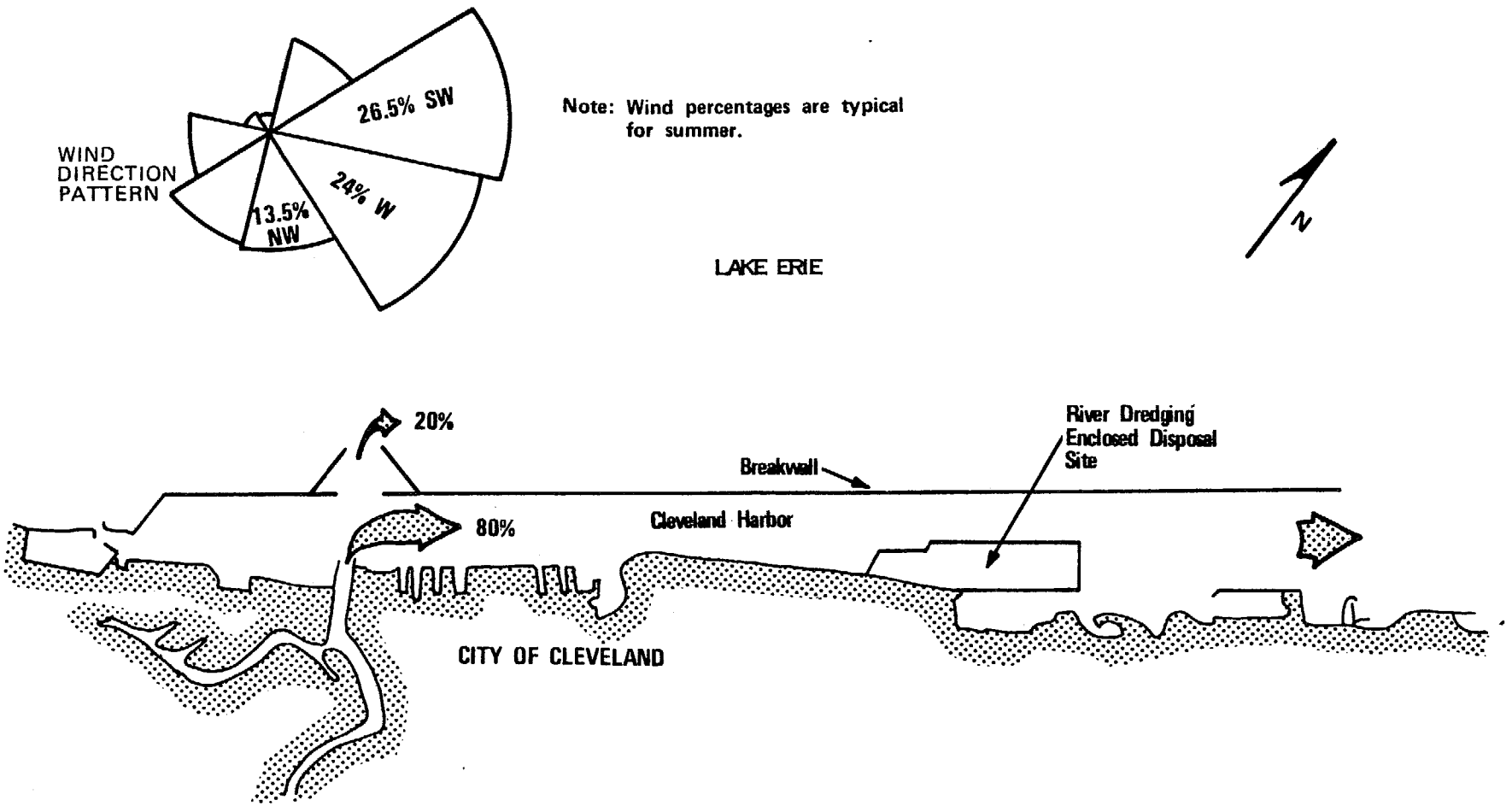
FIGURE 2.4 LAKE ERIE CURRENTS



The permanent surface circulation of the central and eastern basins of Lake Erie.

SOURCE: "Final Environmental Statement, Cleveland Harbor Operations and Maintenance, Cuyahoga County, Ohio", U.S. Army Engineer District, Buffalo, N.Y., April 1974

FIGURE 2.5 LAKE ERIE DIRECTIONAL CURRENT: CLEVELAND AREA



Typical flow pattern of the Cuyahoga River with the dominant southwest, west, and northwest wind directions (Havens and Emerson, 1968).

SOURCE: "Water Quality Baseline Assessment for Cleveland Area-Lake Erie, Volume I - Synthesis", Garlauskas, A.B. and Hanok, M., EPA 905/9-74-005, May 1974.

TABLE 2.2

AIR - WATER TEMPERATURE DIFFERENCES
LAKE ERIE

		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Mean Air	°F	29	29	34	45	55	68	71	71	65	55	41	31
Mean Water	°F	34	33	33	38	49	63	70	72	67	59	49	39
Temperature Difference	°F	-5	-4	1	7 1/	6 1/	5	1	-1	-2	-4	-8 1/	-8 1/

1/ Good Fog Generating Conditions.

II.C. Geology

1. Introduction

The development of land for almost any type of use requires consideration of geologic information in the development process. Engineers require knowledge of the type of bedrock underlying the site and its depth from the surface (Bedrock Geology) to establish its usefulness as a building foundation. The types and consistency of unconsolidated materials found above bedrock (Glacial Geology) must also be studied not only in relation to their suitability for building a foundation base, but also how these unconsolidated materials were formed. Their composition will indicate such information as: 1) site drainage; 2) its resistance to erosion or subsidence; and 3) suitability for use in the construction process.

Geological information is invaluable in judging site suitability for a structure, particularly a large structure such as the proposed Resource Recovery Facility. This section will discuss glacial and bedrock geology, soils and topography as they relate to the East 26th Street Site and the Muny Site and how these factors would affect locating the proposed Facility at either of these sites.

2. Glacial Geology

The Northern United States has been covered four times during the Pleistocene or Glacial Era by ice sheets. The ice of the fourth glacial stage, the Wisconsin, advanced over Cuyahoga County at least three times. The last time was approximately 14,000 years ago.[1] Figure 2.6 shows the drift borders of these four glacial periods.

These massive glaciers altered the land surface by smoothing plains, rounding sharp hilltops, and pulverizing the earth and rocks beneath them in bulldozerlike action. As these glaciers advanced and receded they would carry unconsolidated material along with them and this material would be laid down in thin layers in other areas as the ice melted. "Almost all of the mantle of unconsolidated material that overlies bedrock in Cuyahoga County is of glacial origin, having been deposited either directly by ice sheets, or by meltwater streams flowing from the ice, or in glacial lakes that were the predecessors of Lake Erie."[2] The material that was laid down directly by the ice sheets as they melted is called glacial till. This dense till consists mostly of stiff clays, with some gravel and probably black shale fragments.

Overlying the glacial till are lake deposits which consist of clays, sands, and silts which were deposited or formed during the early high stages of Lake Erie.[3] As Figure 2.7 indicates, the Lake Erie shoreline from Avon Lake eastward has been covered with lake deposits.

By analyzing a map of the Surficial Geology of the Cleveland Lakefront area (Figure 2.8), it is apparent that both the East 26th St. Site and the Muny Site are located on Lake Deposited Soils which have an underlying

1. Earl Webber, George White, and John Winslow, The Water Resources of Cuyahoga County, Ohio. (Columbus: Ohio Department of Natural Resources, 1953), p. 36.
2. Webber, White, and Winslow, p. 36.
3. Shore Erosion in Ohio, (Columbus: Ohio Dept. of Natural Resources, 1961), p.3.

FIGURE 2.6 DRIFT BORDERS OF THE PLEISTOCENE GLACIER IN THE UNITED STATES

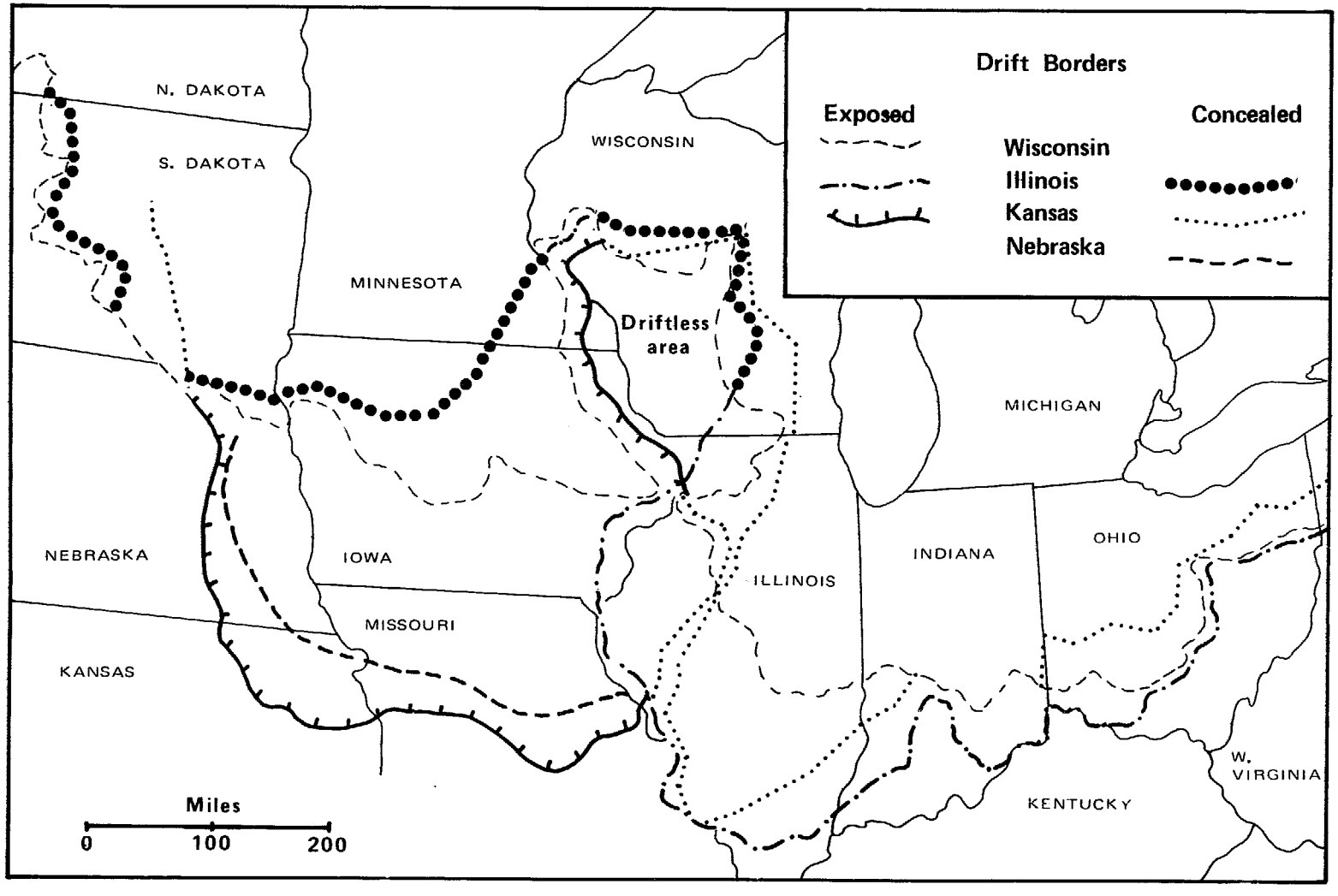
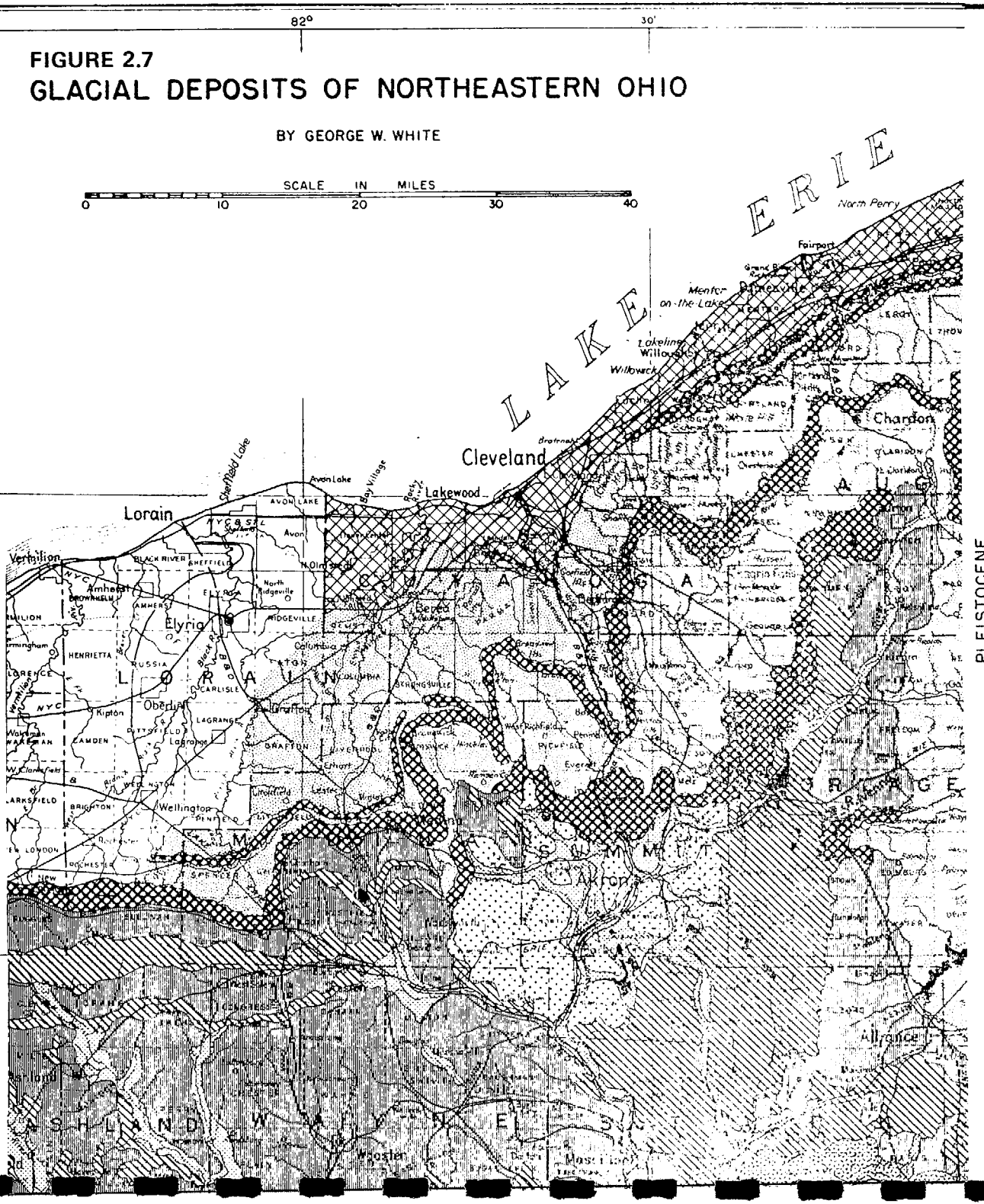


FIGURE 2.7
GLACIAL DEPOSITS OF NORTHEASTERN OHIO

BY GEORGE W. WHITE



EXPLANATION

PLEISTOCENE

WISCONSIN

LATE WISCONSIN

LAKE DEPOSITS

Deposits of glacial lakes in Erie Basin. Sand, silt, and clay, usually thin and underlain by till.

CARY

Late Cary

END MORAINE

Hummocky and undulating topography; tight, compact, clayey till; sand or gravel very minor. Underlying earlier drift in Summit and northwest Portage Counties generally more coarse and permeable.

GROUND MORAINE

Flat to gently undulating topography; tight, compact, clayey till; at many places less than 20 feet thick.

Early Cary

END MORAINE

Hummocky to very hummocky topography. Gravel, or silty to sandy till with much sand and gravel intermixed. (Areas in southern Wayne, Holmes, southern Ashland and parts of Columbiana and Mahoning Counties not true end moraine but hummocky areas of thicker drift related to valleys and lowlands.)

GROUND MORAINE

Flat or gently undulating topography to hilly, bedrock-controlled topography. Silty to sandy till.

TAZEWELL

GROUND MORAINE

Gently undulating to hilly, bedrock-controlled topography. Coarse, stony, sandy till. Includes small areas of hummocky topography in which drift is more gravelly.

ILLINOIAN

GROUND MORAINE

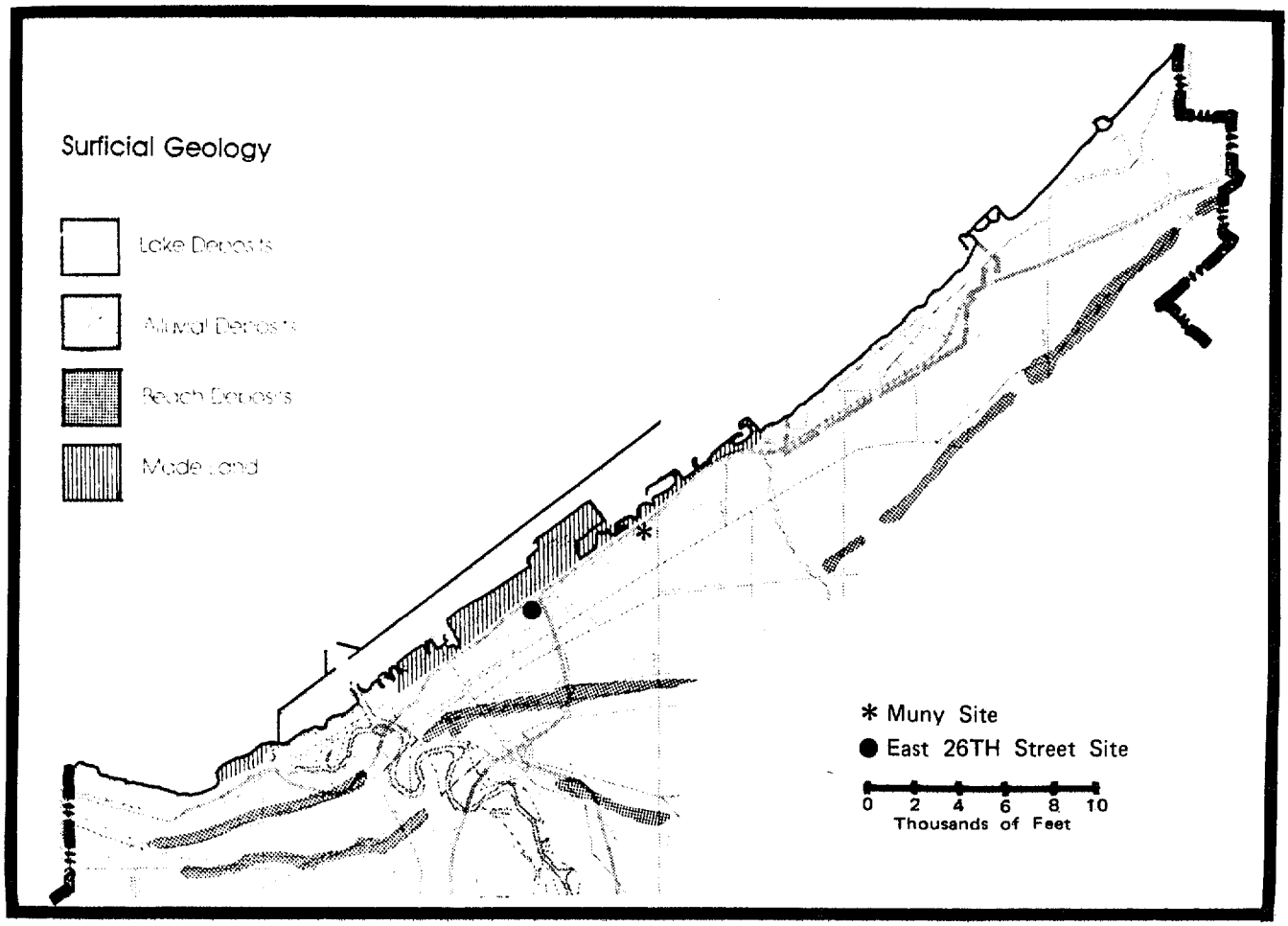
Thin drift over bedrock. Mainly coarse till, in part discontinuous. A few very small areas of thicker, coarser, drift with somewhat hummocky topography.

GLACIAL OUTWASH, UNDIFFERENTIATED

Mainly valley trains, but includes kame terraces, especially in Ashland and Holmes Counties. Alluvium of flood plains of central part of many valleys included. Mainly sand and gravel, but some silt included, especially in southern Summit County.

FIGURE 2.8

SURFICIAL GEOLOGY



SOURCE: Cleveland Lakefront State Park, by Behnke, Dickson and Trach for the Ohio Dept. of Natural Resources, 1979, p.24.

glacial till with characteristics as previously described. This glacial till "generally possesses greater strengths than the lake deposit soils and is not as compressible as the upper lake deposits."[4]

The clayey nature of the lake deposited soils and underlying till would probably cause infiltration of surface water to be slow at both the East 26th Street Site and the Muny Site.

The total thickness of the glacial till and lake deposited soils (glacial drift) overlying the bedrock is approximately 150 feet at the Muny Site, and 250 feet at the East 26th Street Site as indicated on Figure 2.9.

Since the drift thickness map is not site specific, onsite test borings may need to be done to determine the drift thickness and for engineering purposes.

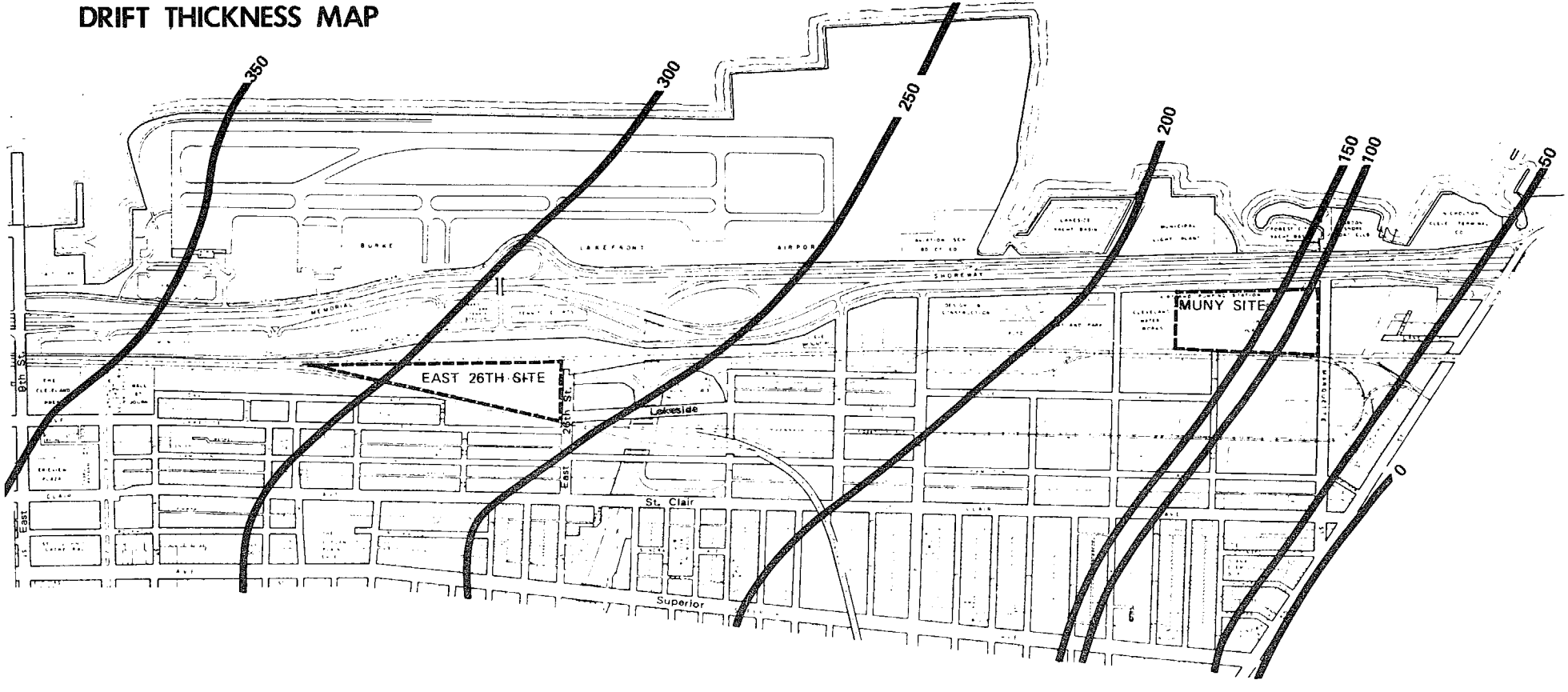
3. Bedrock Geology

The bedrock geology, or type of bedrock which underlies the glacial drift, is particularly important to know since not all types of bedrock are suitable as foundations for large structures. The best bedrock for a foundation is sandstone. Limestone or dolomite would also be suitable foundation material as long as they have not been weakened by the acids of groundwater which can travel through and collect in small crevices of these two types of bedrock.[5]

The type of bedrock that is the least suitable for use as a foundation for large structures is shale. Since Shale is composed of compacted and consolidated mud, and is non-crystalline in nature, it is a weak

4. Behnke, Dickson, and Tkach, The Cleveland Lakefront State Park, (Columbus: Ohio Dept. of Natural Resources, 1979) p. 22.
5. Gaybrielle Gordon, Users Guide to the Ohio Capability Analysis Program, (Columbus: Ohio Dept. of Natural Resources, Dec. 1978), p. 69.

CUYAHOGA COUNTY RESOURCE RECOVERY PROJECT
ENVIRONMENTAL IMPACT ASSESSMENT REPORT
DRIFT THICKNESS MAP



SOURCE: Ohio Geological Survey, 1981, Preliminary Map.

FIGURE 2.9

Contour Interval = 50 Feet

0 1100 2200

NORTH

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The preparation of this map was financed in part through a Coastal Energy Impact Program grant from the Ohio Department of Energy.

building foundation. Its weakness as a foundation is not only becuase of shale's consistency, but shale also has small natural cracks which run parallel to the bedding plane.[6]

Determining the types of bedrock and their depth from the surface can be accomplished by studying road cuts, rock sequences in quarries, or anywhere where rock has been exposed. Bedrock type can also be determined from examining water, oil, and gas well logs and records of the cores brought up to the surface. These methods have been used in Cuyahoga County to determine the depth to bedrock and type.

The type of bedrock underlying both the Muny Site and the East 26th Street Site is a shale formation of the Mississippian and Devonian Systems Figure 2.10 shows the general geographic distribution of these systems in the Lake Erie Region.

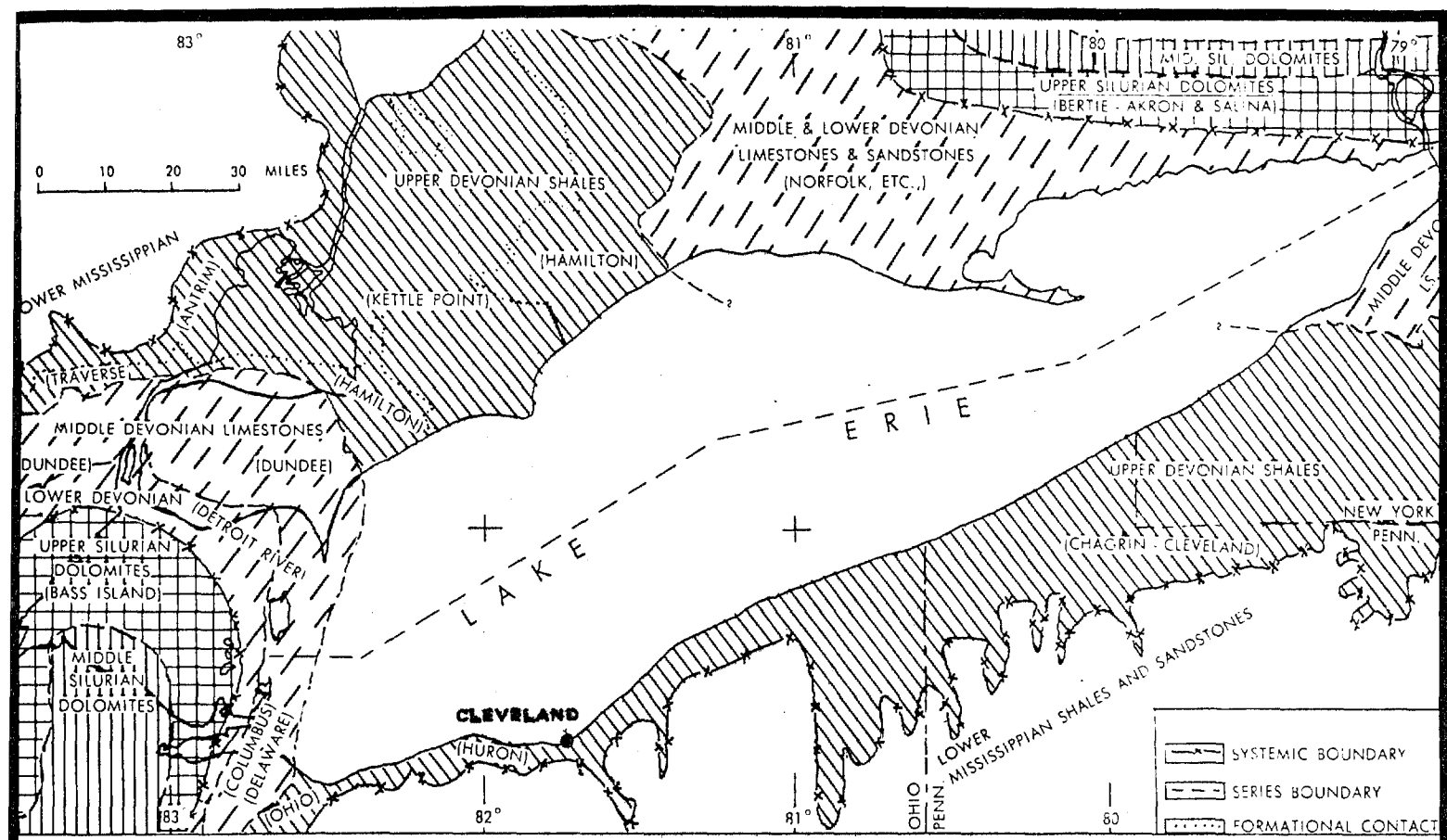
Specific evidence of bedrock type in the vicinity of the two proposed Resource Recovery Facility Sites is found in the few well logs recorded in the area. When Well #386 on Figure 2.11 was drilled, shale was encountered at a depth of 132 feet below the surface. Well #387 also had shale encountered at a depth of 91 feet. The shale at both wells is from the three shale formations of Bedford Shale, Ohio Shale, and Chagrin Shale.[7] Well #386 is the closest to the two alternative Resource Recovery Facility Sites.

From this well log information and other tests and observations of area bedrock, the bedrock sequence as bedrock would be encountered in descending order is: Bedford Shale of the Mississippian System, Ohio Shale-Cleveland Member of the Devonian System, and Chagrin Shale of the Devonian System. (Figure 2.12).

Bedford Shale is a soft, blue-gray shale with thin calcareous (limestone or calciumlike) sandstone lenses in places. It averages 75 feet in

6. Gordon, p. 69.
7. Webber, White and Winslow, p. 56.

FIGURE;2.10 GEOLOGIC MAP LAKE ERIE REGION



GEOLOGIC MAP LEGEND AND GENERALIZED TABLE OF FORMATIONS

UNDERLYING OR EXPOSED ALONG THE OHIO LAKE FRONT

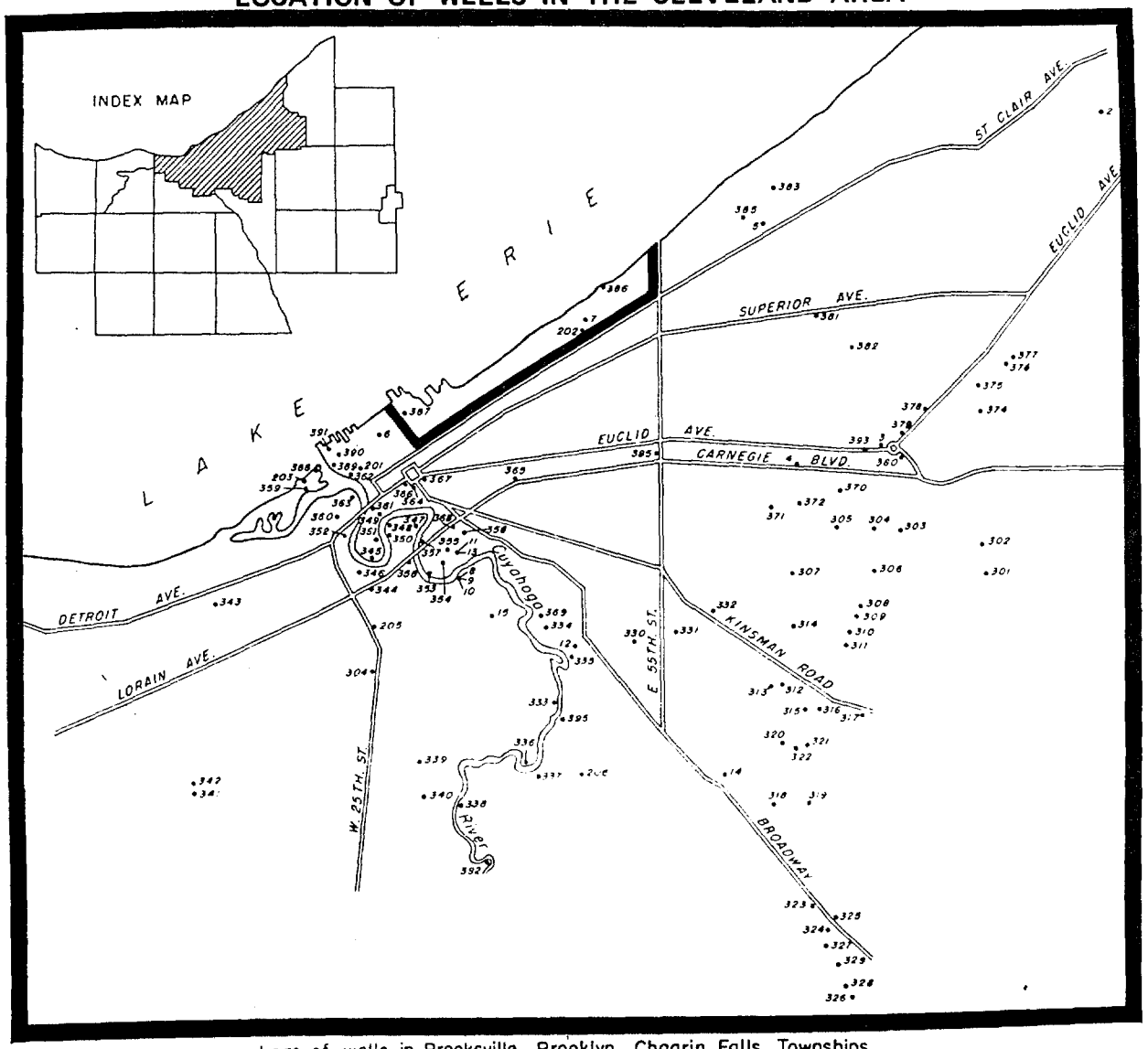
PLEISTOCENE DEPOSITS; UNCONSOLIDATED, 0-600 FEET THICK; GLACIAL TILL (BOULDER CLAY), LAKE CLAYS, SILTS AND SANDS, AND ALLUVIAL DEPOSITS. (NOT SHOWN IN FIG. V)

LOWER MISSISSIPPIAN SHALES AND SANDSTONES.	BEREA SANDSTONE BEDFORD SHALE
UPPER DEVONIAN SHALES	OHIO SHALE { CLEVELAND SHALE; HURON SHALE (WEST); CHAGRIN SHALE (EAST) }
	OLENTANGY SHALE — PROUT LIMESTONE
MIDDLE AND LOWER DEVONIAN LIMESTONES, DOLOMITES AND SANDSTONES.	DELAWARE LIMESTONE COLUMBUS LIMESTONE DETROIT RIVER GROUP { LUCAS DOLOMITE; AMHERSTBERG DOLOMITE } SYLVANIA SANDSTONE
UPPER SILURIAN DOLOMITES.	BASS ISLAND GROUP { RAISIN RIVER DOLOMITE; PUT-IN-BAY DOLOMITE; TYMOCHTEE DOLOMITE; GREENFIELD DOLOMITE }
MIDDLE SILURIAN DOLOMITES	GUELPH DOLOMITE, ETC.

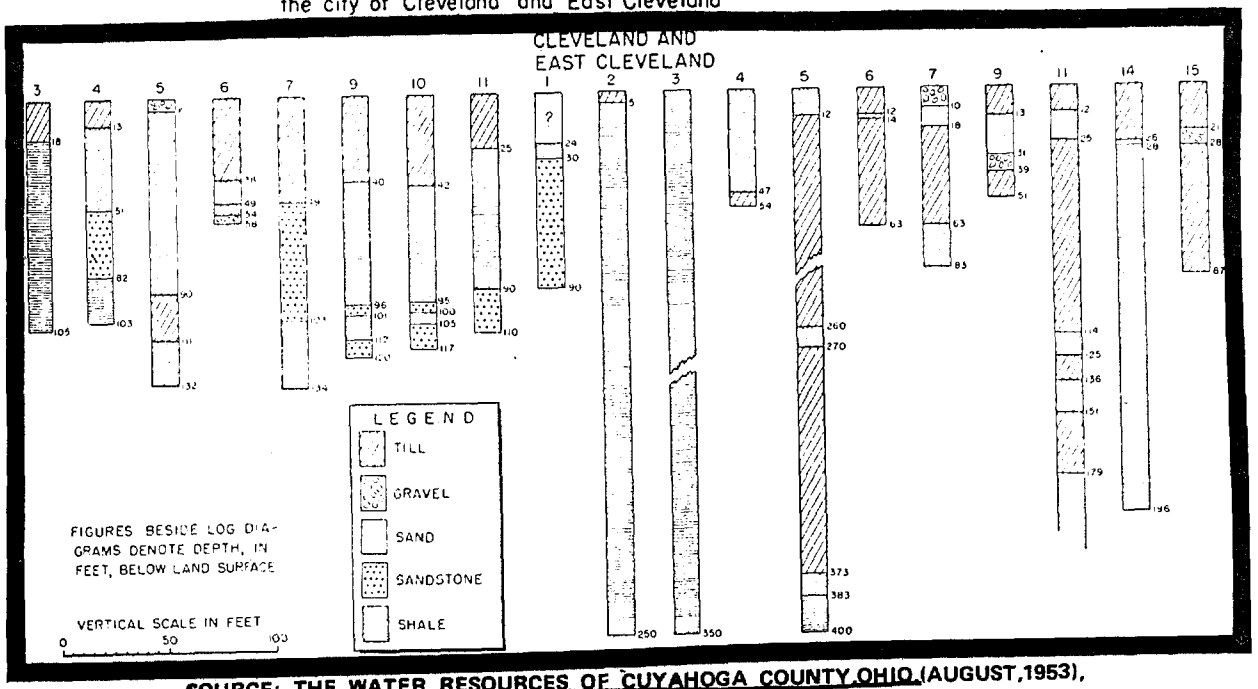
CREDITS (MAP AND TABLE): 1) CALEY, J. F. (1941, 1943, 1946); 2) CARMAN, J. E. (1946); 3) EHLERS, G. M., STUMM, E. B., & KESLING, R. V. (1951); 4) KINDLE, E. M. (1912); 5) SANFORD, B. V., & BRADY, W. B. (1955); 6) STOUT, W. (1941); 7) WINSLOW, J. D., WHITE, G. W., & WEBBER, E. E. (1953).

SOURCE: Engineering Geology of the Ohio Shore Line of Lake Erie (1960), Howard J. Pincus.

FIGURE 2.11
LOCATION OF WELLS IN THE CLEVELAND AREA



Logs of wells in Brecksville, Brooklyn, Chagrin Falls Townships, the city of Cleveland and East Cleveland



SOURCE: THE WATER RESOURCES OF CUYAHOGA COUNTY,OHIO,(AUGUST,1953), WINSLOW,WHITE,&WEBBER, pp. 64,65.

thickness but may range as much as 40 feet from the average because of the nonconformance between Bedford Shale and overlying Berea Sandstone.[8]

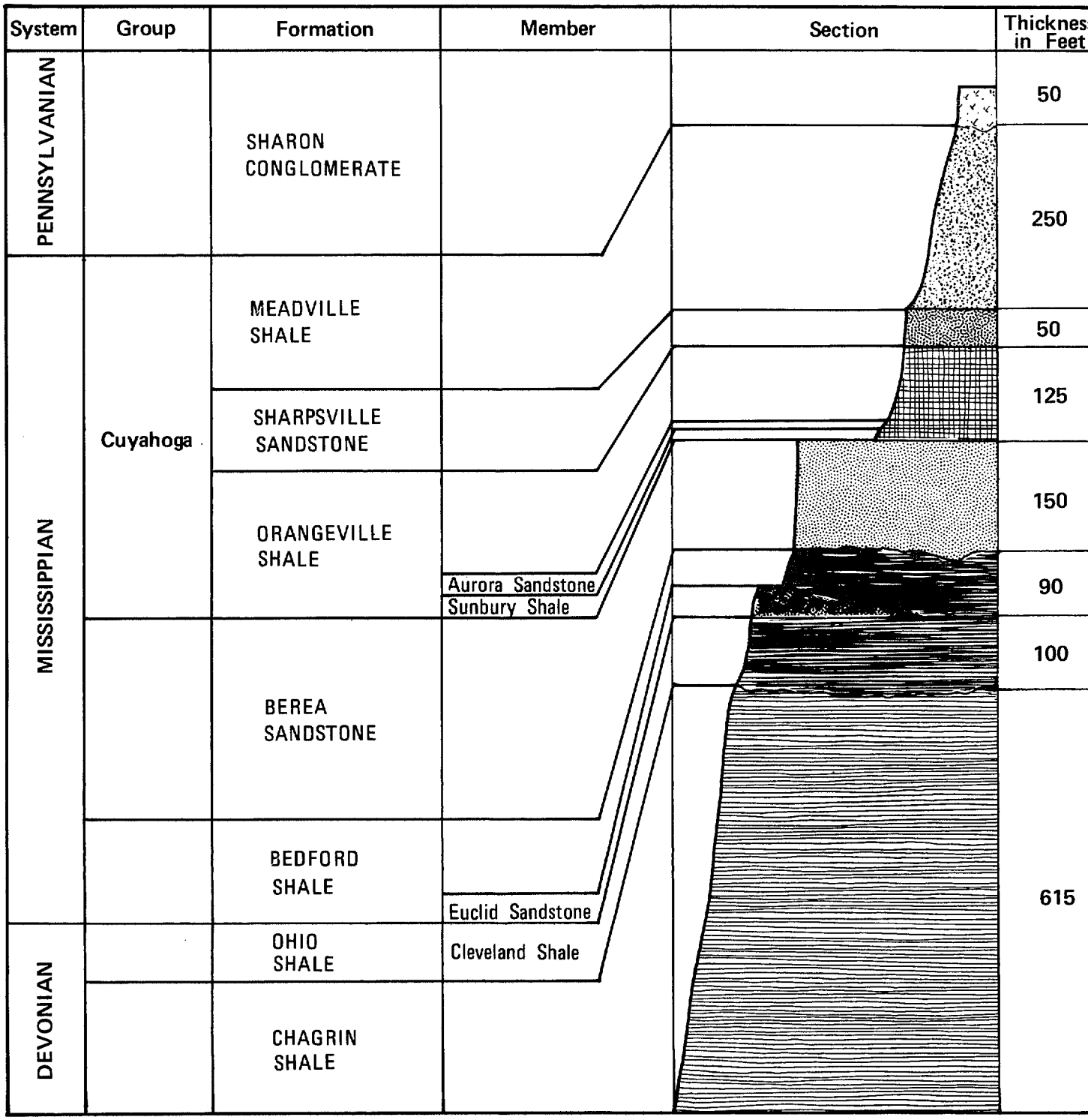
Ohio Shale averages 50 feet in thickness. This shale breaks into thin flat plates and chips. It consists of very small quartz grains, mica, clay minerals, and a very large amount of fine-grained, coal-like matter. This dark organic matter is the remains of plants which lived on the land, were washed into the late Devonian Sea, and were then carbonized about 350 million years ago.[9]

Chagrin Shale is the oldest formation known in Cuyahoga County and does not occur at the surface anywhere in Ohio. In this county, only the upper 200 feet of the total thickness of 500 feet is exposed above Lake Erie. Chagrin Shale is blue-gray to dark gray, silty shale, containing light blue-gray solidified iron carbonate and thin, hard, light gray, calcareous sandstone beds.[10]

The Drift Thickness Map referred to previously (Figure 2.9) indicates the depth to bedrock as well as the thickness of glacial cover. Accordingly, bedrock may be encountered at the Muny Site at a depth of 100-150 feet from the surface. Bedrock may be reached at a depth of 250 feet from the surface at the East 26th Street Site. Since bedrock must be shallower than 40-50 feet to be used for foundation support, it is unlikely that the bedrock at both sites can be used for foundation base. Driving pilings to the depth of bedrock at either site is probably not economically feasible. Even if it were feasible, the characteristics of Shale make it unsuitable as a foundation base as discussed previously. Consequently, construction of the Resource Recovery Facility at either site will require contending with the unconsolidated material above the bedrock for foundation support.

8. Webber, White and Winslow, p. 61.
9. Michael Lafferty, ed., Ohio's Natural Heritage, Columbus: The Ohio Academy of Science, 1979, p. 25.
10. Webber, White, and Winslow, p. 51.

FIGURE 2.12 GENERALIZED GEOLOGIC SECTION OF THE CONSOLIDATED ROCKS EXPOSED IN CUYAHOGA COUNTY, OHIO



SOURCE: State of Ohio, Ohio Dept. of Natural Resources Division of Water, U.S.G.S., Map of the Consolidated Rock Formations in Cuyahoga County, (October, 1952).

4. Soils and Topography

While glaciers have for the most part determined topography, the soil, or uppermost layer of the earth's crust (usually at least several feet thick), is the result of a combination of the factors of climatic action, organisms (plant and animal decay), parent materials from which the soil was formed, topography, and time.[11]

The parent material of the East 26th Street and Muny Sites are most likely glacial till (from Wisconsin Glaciers), lake deposits, and materials from bedrock. The till is low lime, clay loam, and clayey till. There are also clayey or silty lacustrine (lake deposited) materials in the study area.[12]

The U.S. Soil Survey classifies the soils of the two alternate sites as "Urban Land" (Figure 2.13). Urban Land is defined as soils in which at least 80% of the land surface is covered by manmade surfaces.[13] Indeed, much of the study area has been covered by asphalt, buildings, etc. In addition, as Figure 2.14 indicates, a portion of both of the proposed sites has been covered with fill material used to extend the Lake Erie shoreline over 1,000 feet.

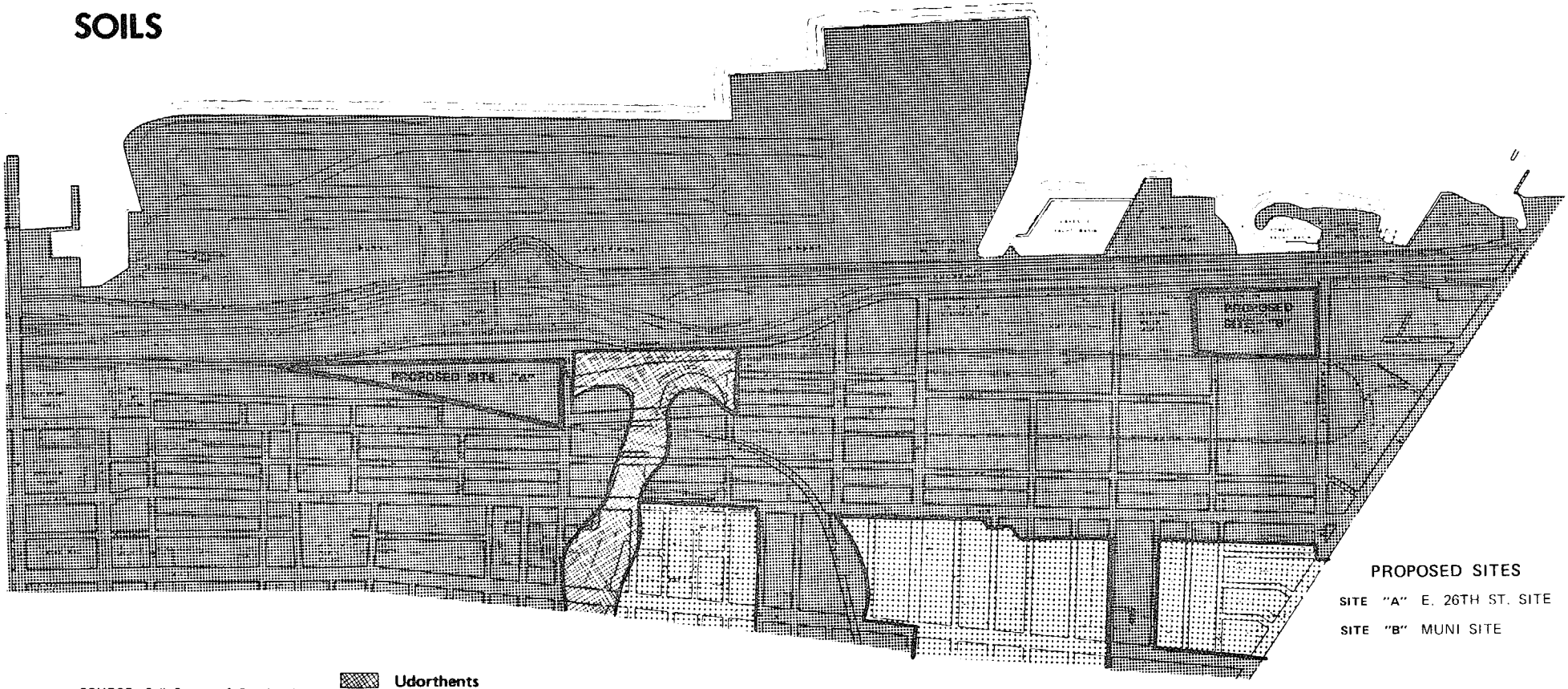
However, since soils are formed from their parent materials to a large extent, it is likely that the predominant soils of the sites are somewhat clayey, silty clay, and/or gravelly clay. Soils with any large amount of clay present characterstically have slow permeability.

The general slope of the study area averages 6%, which is generally moderately suitable for large-scale type development (Figure 2.15).

More site specifically, the average slope of the East 26th Street Site is 8% (Figure 2.16) and the average slope of the Muny Site is 10%

11. Lafferty, p. 71.
12. Lafferty, p. 77.
13. U. S. Dept. of Agriculture, Soil Conservation Service, Soil Survey of Cuyahoga County, Dec., 1980, p. 46.

CUYAHOGA COUNTY RESOURCE RECOVERY PROJECT
ENVIRONMENTAL IMPACT ASSESSMENT REPORT
SOILS



SOURCE: Soil Survey of Cuyahoga County, National Co-operative Soil Survey

- Udorthents
- Urban Land
- Urban Land - Elnora complex, nearly level

0 1100 2200

NORTH

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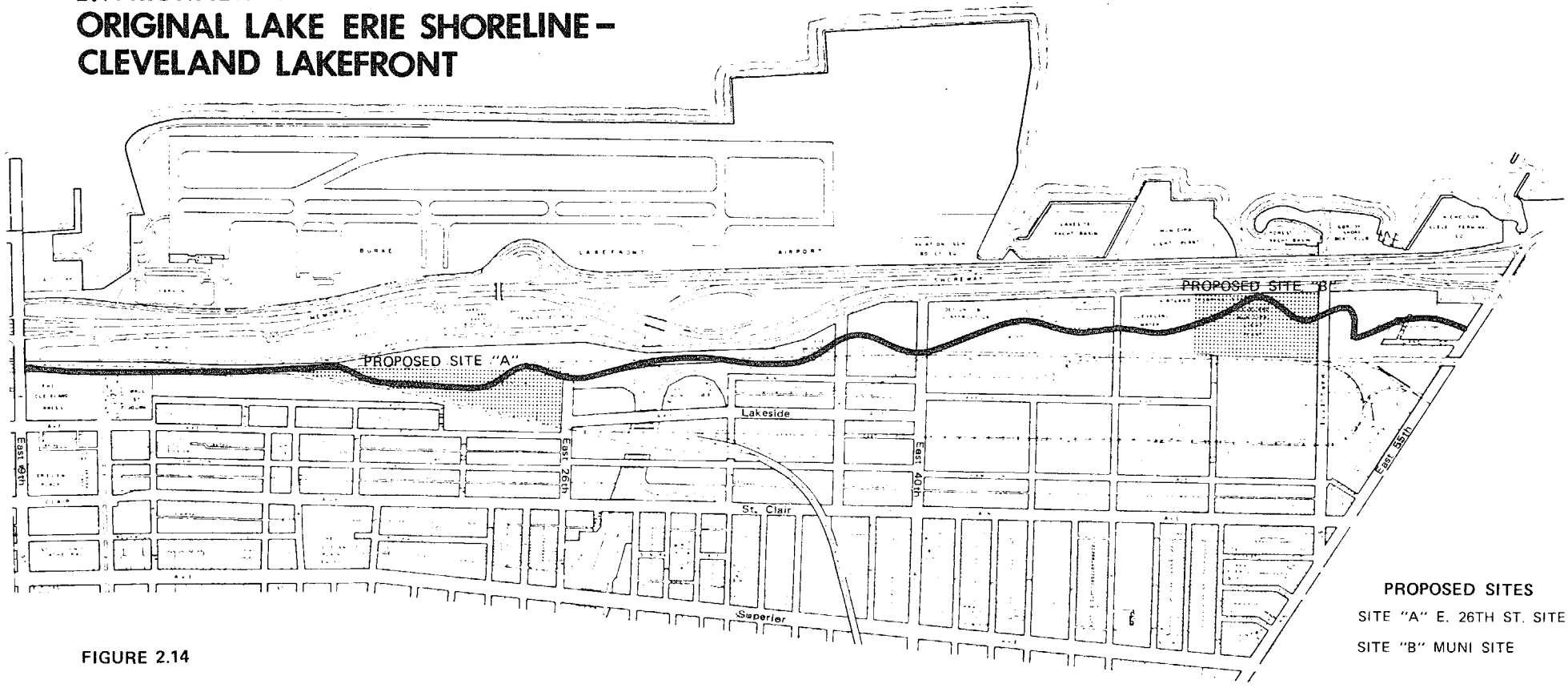
FIGURE 2.13

The preparation of this map was financed in part through a Coastal Energy Impact Program grant from the Ohio Department of Energy.

CUYAHOGA COUNTY RESOURCE RECOVERY PROJECT

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

ORIGINAL LAKE ERIE SHORELINE – CLEVELAND LAKEFRONT



PROPOSED SITES

SITE "A" E. 26TH ST. SITE

SITE "B" MUNI SITE

FIGURE 2.14

SOURCE: Ohio Division of Land and Soil 1977

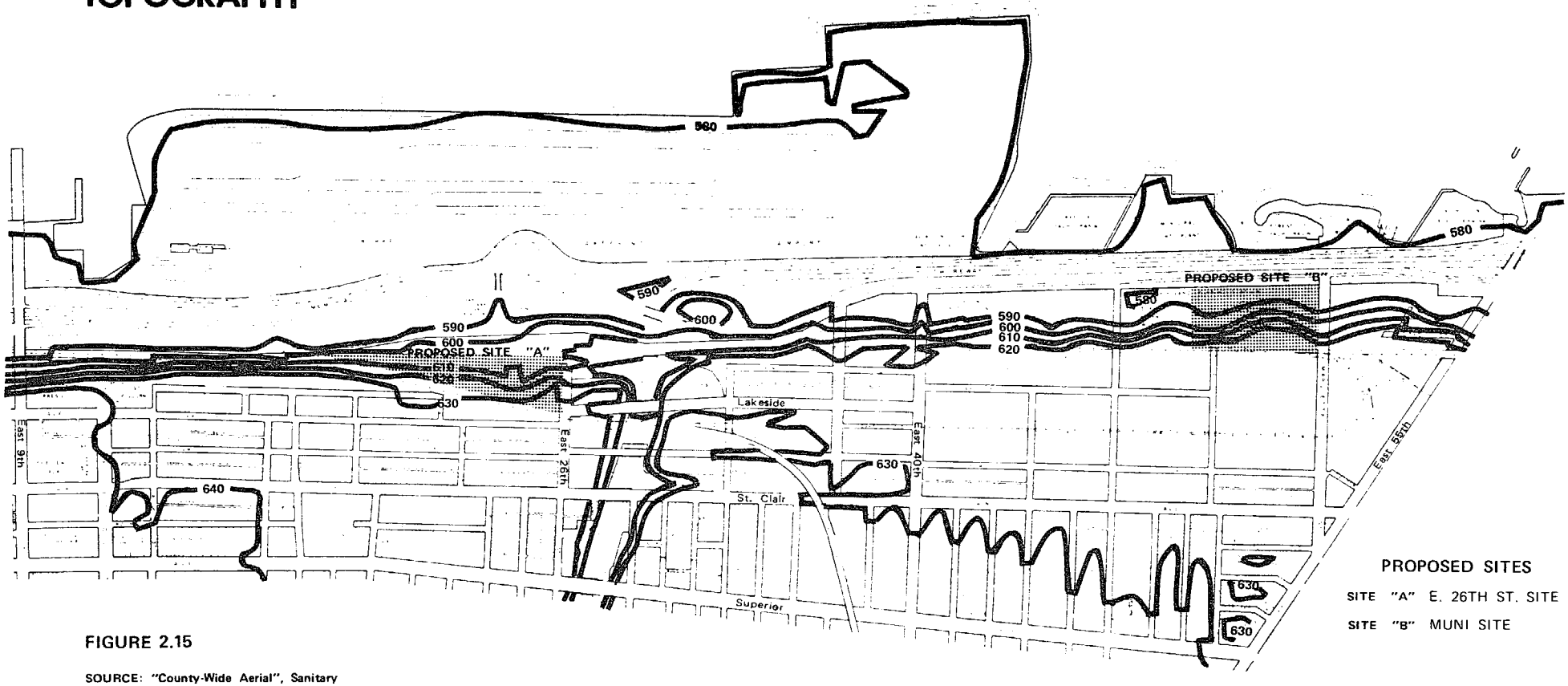
0 1100 2200

NORTH

REGIONAL PLANNING COMMISSION

The preparation of this map was financed in part through a Coastal Energy Impact Program grant from the Ohio Department of Energy.

CUYAHOGA COUNTY RESOURCE RECOVERY PROJECT
ENVIRONMENTAL IMPACT ASSESSMENT REPORT
TOPOGRAPHY



PROPOSED SITES

SITE "A" E. 26TH ST. SITE

SITE "B" MUNI SITE

FIGURE 2.15

SOURCE: "County-Wide Aerial", Sanitary Engineering Department 1978

CONTOUR INTERVAL 10 FEET

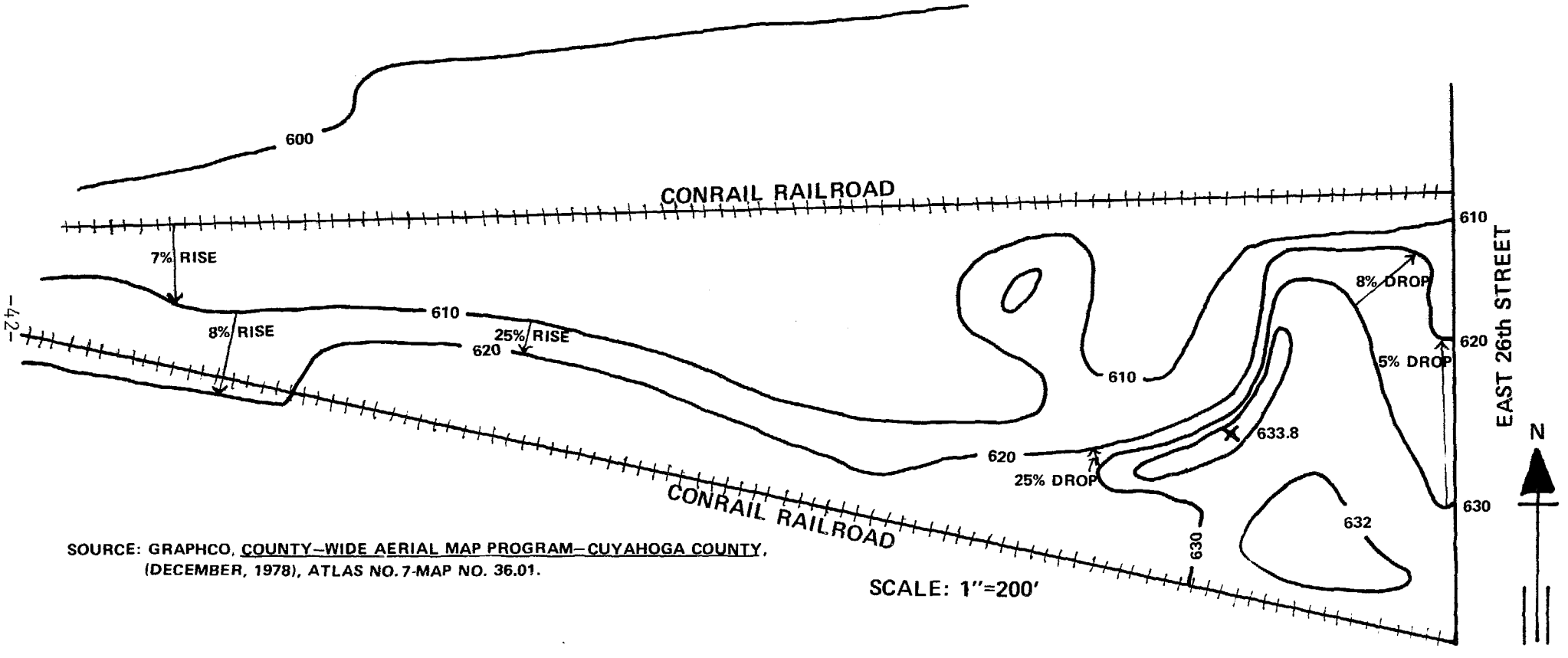
0 1100 2200

NORTH

REGIONAL PLANNING COMMISSION

The preparation of this map was financed in part through a Coastal Energy Impact Program grant from the Ohio Department of Energy.

FIGURE 2.16
TOPOGRAPHY: EAST 26th STREET SITE

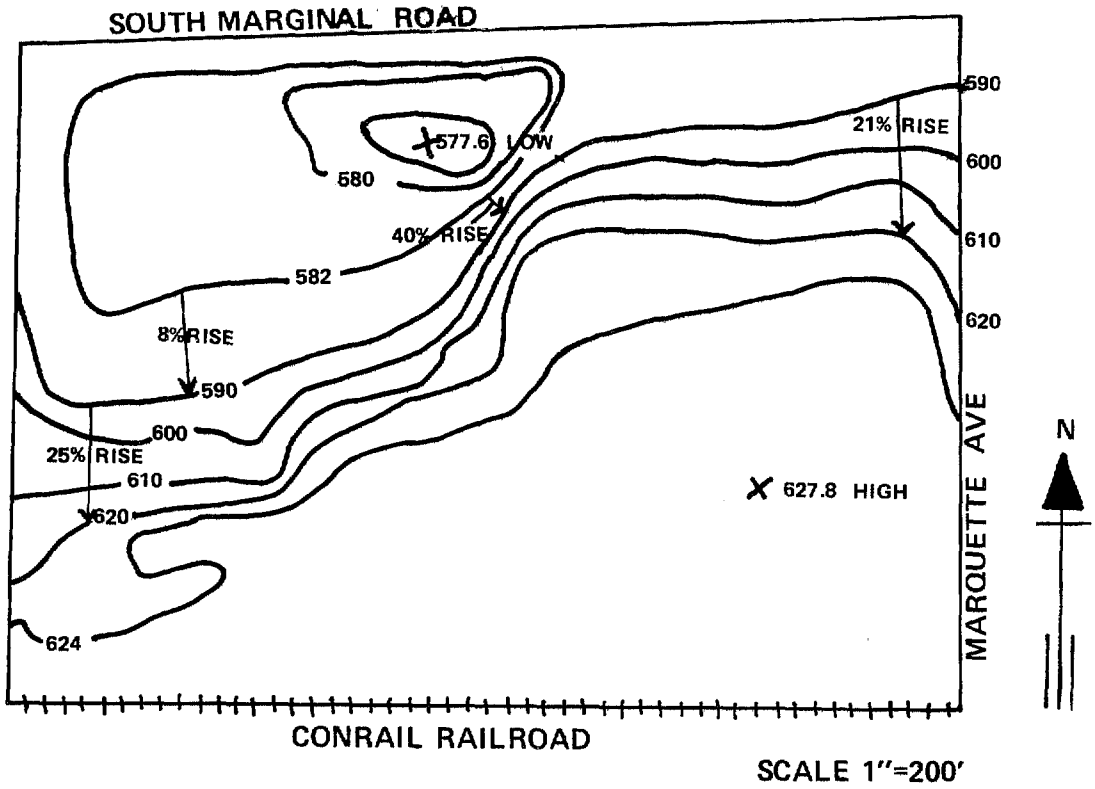


SOURCE: GRAPHCO, COUNTY-WIDE AERIAL MAP PROGRAM-CUYAHOGA COUNTY, (DECEMBER, 1978), ATLAS NO. 7-MAP NO. 36.01.

SCALE: 1"=200'

FIGURE 2.17

TOPOGRAPHY: MUNICIPAL LIGHT PLANT SITE



SOURCE: GRAPHCO COUNTY-WIDE AERIAL MAP PROGRAM-CUYAHOGA COUNTY, (DECEMBER ,1978),ATLAS NO. 7 MAP NO. 23.04.

Figure 2.17).

While both sites have variations in elevations through the center of the sites, they both have more level, developable areas in the southeastern and northwestern sections of the sites.

If the soils are indeed somewhat clayey, then there may be runoff problems due to the slope downward towards the lake at both sites.

5. Summary

Both proposed sites have bedrock underlying them composed of a shale formation. The depth to bedrock and characteristics of shale may prevent the use of bedrock for a foundation base.

The glacial till overlying the bedrock consists of clays with some gravel and shale fragments.

The lake deposits above the till consist of clays, sands, and silts.

The soils formed from lake deposits, glacial till and bedrock are likely to be somewhat clayey with slow permeability.

The slope of both sites make them moderately suitable for large-scale construction.

Onsite test borings and corings will have to be conducted to determine the exact composition of the soils, till and bedrock and their suitability to support a Resource Recovery Facility.

Generally, the sites would seem to exhibit no serious limitations for large-scale construction based on the geologic information available.

II.D. Existing Land Use: CEIP Study Area

During the period between November, 1980, through January, 1981, the staff of the Cuyahoga County Regional Planning Commission conducted a land use survey in the area around the two alternative sites proposed for the construction of the resource recovery facility. The purpose of this land use survey was to

identify land uses in the area surrounding the two alternative sites which might be impacted by the construction of the facility. This area, referred to as the CEIP Study Area in the remainder of this section, includes a total of just over 1,065 acres and includes the area bounded by East 9th Street from Superior Avenue north to the Shoreway on the west, East 55th Street from Superior Avenue north to the Shoreway on the east, Superior Avenue from East 9th Street to East 55th Street on the south, and the Shoreway from East 9th Street east to East 55th Street on the north. Figure 2.18 on page 57 shows the area examined during the land use survey and the various land uses within the Study Area.

As indicated in Table 2.3, almost 75% of the land in the CEIP Study Area is devoted to industrial or transportation related uses. Similarly, both proposed sites are immediately adjacent to utilities, transportation facilities or industrial firms. Consequently, compatability with surrounding land use should not be a major problem in locating the resource recovery facility at either site. The following section details each land use type in the study area.

Residential - One- and Two-Family

One and two-family residential development within the CEIP Study Area comprises just over 41 acres or just under 4% of the total acreage within the CEIP Study Area. One and two-family residential development in the Study Area is situated mainly in the area between Superior and St. Clair Avenues from East 24th Street east to East 55th Street. While this residential development consists mainly of two-family detached structures in fair to good condition, it was apparent that a substantial number of the one and two-family structures were delapidated and in need of repair. The majority of the one and two-family structures within the Study Area were constructed around the turn of the century.[14]

14. RPC, The Housing Stock - Housing Cuyahoga County, February 1972, p. 19.

TABLE 2.3

CEIP STUDY AREA: LAND USE BY ACRES AND PERCENT OF TOTAL

Land Use Category	Acres	Percent
Residential: One and Two Family	41.4	3.9
Transportation and Utilities	502.0	47.1
Commercial, Office and Hotel	56.8	5.3
Governmental, Institutional, Parks and Recreation	82.9	7.8
Industrial	209.7	19.7
Schools and Churches	21.8	2.1
Wholesale, Warehouse, Truck Terminals	77.9	7.3
Parking, Vacant Buildings, Vacant Land and Vacant Under Construction	72.7	6.8
TOTAL ACRES	1,065.2	100.0

Note: Excludes streets other than interstate highway.

There are no one and two-family residential structures in the areas immediately surrounding either of the proposed sites for the County's resource recovery facility. The closest residential development to the proposed Municipal Light Plant site is approximately one-third of a mile to the southeast near the Marquette Avenue/Hamilton Avenue intersection, while the closest residential development to the proposed East 26th Street site is about a fourth of a mile to the south at East 26th and St. Clair Avenue. Therefore, the facility should have little impact on residential development.

Collection vehicles and transfer station rigs hauling wastes to either of the proposed sites will use the Insterstate system within the County and will not travel through residential areas within the CEIP Study Area. In addition, each site is located within an area already zoned for industrial use and each site is separated from residential development by existing industrial development.

It should be noted that several two-family residential units within the CEIP Study Area were attached to or had been built over commercial structures. For the purposes of determining the amount of acreage represented by these and other "mixed uses," the acreage determined for the entire lot was allocated to the predominant land use's category.

Transportation and Utilities

Land used for transportation related uses and for utilities within the CEIP Study Area comprises 502 acres or just over 47% of the total acreage within the Study Area. Land used for transportation and utilities constitutes the largest use of land within the Study Area. Acreage represented by streets other than the interstate highway system was excluded in determining total acreage within the Study Area.

The major transportation uses within the CEIP Study Area include the interstate highway system, railroads, Burke Lakefront Airport and the Port of Cleveland. The interstate highway system, which extends through the Study Area, allows for convenient access to and from the two alternative proposed sites for the County's resource recovery facility. Access to the two alternative sites and to the Study Area in general can be gained via I-77 and I-71 through the Innerbelt from the south, and via I-90 from the east and west.

The Conrail railroad tracks extend in an east-west direction through the CEIP Study Area. Both of the alternative sites are located immediately adjacent to railroad tracks. These railroads have historically been used for long distance transportation of raw materials and finished products to and from industrial and manufacturing firms. While many firms may still use railroads, particularly for bulk products, there is generally an increasing reliance upon trucks for freight hauling.

Industrial and other uses within the Study Area have excellent access to Burke Lakefront Airport and container shipping facilities situated immediately north of the Study Area. The proposed East 26th Street Site is within one mile of Burke Lakefront Airport and within two miles of the Port of Cleveland, while the Municipal Light Plant Site is within two miles of the airport and within three miles of the Port. The Port of Cleveland's 1979 waterborne commerce, including public and private operations, totalled 19,131,777 short tons and consisted of 516,678 short tons of overseas tonnage and 18,615,099 short tons of domestic and Canadian tonnage.[15]

The major utility related uses within the CEIP Study Area include the Municipal Electric Light Plant and facilities operated by the Cleveland Electric Illuminating Company (CEI) and the Ohio Bell Telephone Company. The Municipal Electric Light

15. Great Lakes Basin Commission, Great Lakes Communicator, Vol. II, No. 4, (January, 1981), p. 4.

Plant is located immediately northeast of the proposed Muny Site and occupies just under eleven (11) acres. The Muny Site, while categorized for the purposes of this report as a utility related use, is actually currently occupied by vacant, delapidated buildings, and measures approximately 18 acres.

The Cleveland Electric Illuminating Company (CEI) operates a substation on Hamilton Avenue at East 17th Street, a steam plant on Hamilton Avenue at East 18th Street and an additional facility just west of the St. Clair Avenue/ Marquette Street intersection. Ohio Bell Telephone Company has facilities on Hamilton Avenue at East 12th Street, on Hamilton Avenue near East 23rd Street and an additional facility between East 21st and East 24th and Superior Avenue.

It is not anticipated that the construction of the County's resource recovery facility on either of the proposed sites will have a significantly adverse environmental impact on transportation or utility uses in the Study Area. It should be noted, however, that vehicles attempting to gain access to the Municipal Light Plant site going north on Marquette Avenue and those attempting to gain access to the East 26th Street site going north on East 26th Street may experience short delays, possibly 5-10 minutes, at the Conrail crossings on Marquette Avenue and on East 26th due to passing trains.

Commercial/Office/Hotel

Commercial, office and hotel uses comprise approximately 57 acres or just over 5% of the total acreage of the CEIP Study Area. Commercial and office uses are generally scattered throughout the entire CEIP Study Area, but are mainly situated along Superior and St. Clair Avenues between East 14th Street east to East 55th Street. Only two hotels, the Holiday Inn on Lakeside Avenue at East 12th Street and a hotel on St. Clair Avenue at East 20th Street, are located in the CEIP Study Area. Commercial uses ranged from establishments offering convenience goods and services, such as restaurants, banks, bars, small

food stores and barber shops, to those offering shopping goods and services such as furniture stores, automobile repair, sales and service establishments and small printing shops. Although there is scattered office use throughout the entire CEIP Study Area, most of this development is concentrated in the western portion of the Study Area in association with Cleveland's Central Business District activities.

There is no commercial, office or hotel use in the immediate vicinity of the proposed Municipal Light Plant site. Although there is no office or hotel use in the immediate vicinity of the proposed East 26th Street site, there is scattered commercial use just under one-half mile directly south.

Governmental/Institutional/Parks and Recreation

Governmental, institutional and parks and recreation uses comprise 83 acres or just under 8% of the total acreage in the CEIP Study Area. Although there are cases of governmental and institutional use located in other sections of the CEIP Study Area, these uses are mainly situated in the western portion of the Study Area in the area between East 12th Street and East 26th Street between Superior and the Shoreway. Examples of governmental and institutional uses within the Study Area include the City of Cleveland Fire Station Headquarters (Fire Station No. 1), located on Superior Avenue at East 17th Street, the City of Cleveland's Department of Housing, Taxation and Community Development and their Public Utilities Department located on Lakeside Avenue between East 16th and East 20th Streets, the City of Cleveland Fire Station No. 5 located on Lakeside Avenue between the Innerbelt and East 33rd Street and the Cleveland Mounted Police Headquarters on East 38th Street at South Marginal Road.

Park and recreational development is limited within the CEIP Study Area. Only three public park and recreational uses were identified within the Study

Area, two of which are located in the immediate vicinity of the two alternative proposed sites for the County's resource recovery facility. These three facilities are Kirtland Park Playground and Playfield located immediately west of the proposed Municipal Light Plant Site on East 49th Street just south of South Marginal Road, and the Harold T. Clark Tennis Stadium and Tennis Courts located less than one-half mile to the north of the proposed East 26th Street Site. The remaining major park and recreation use in the area is the Sterling Recreational Center and Playground located on East 32nd Street between Superior and St. Clair Avenues. In addition to these public facilities, three private yacht clubs are located near the Muny Site. Any possible adverse environmental impact on park and recreational uses within the CEIP Study Area are discussed in a later section of this report.

Industrial

Although there are numerous scattered industries throughout Cuyahoga County, industrial development in Cuyahoga County can generally be found in five geographic areas - the Cuyahoga Valley area, the remainder of the City of Cleveland, the Brook Park - Hopkins Airport area, the southeast and the northeast.[16] The industrial uses examined during the land use survey are located in the "remainder of the City of Cleveland."

Industrial development is distributed throughout the entire CEIP Study Area, occupying approximately 210 acres or just under 20% of the total acreage within the Study Area. Industrial use constituted the second largest use of land within the CEIP Study Area.

Although there is a mixture of industrial enterprises engaged in both light and heavy industrial operations, the industries in the CEIP Study Area were mainly

16. RPC, The Manufacturing Industries, (1974), p. 9.

engaged in light industrial operations. The heaviest concentration of industrial uses in the Study Area is situated in the area surrounding the proposed Municipal Light Plant site (see Figure 2.18). These industrial uses were also the larger of the industrial uses examined during the land use survey. The industrial firms immediately adjacent to the proposed Municipal Light Plant site are Ryerson Steel, Inc., Cleveland Twist Drill and Republic Structural Steel to the immediate south, and Ohio Medical Products to the east.

In contrast to the larger industrial enterprises in the vicinity of the proposed Municipal Light Plant site, the firms in the vicinity of the proposed East 26th Street site are relatively smaller in scale. The firms immediately south of the proposed East 26th Street site are Norris Brothers Movers and Erectors, Buckeye Insulation and Chip Industries.

It is not anticipated that construction of the County's resource recovery facility on either of the proposed sites will result in a significant adverse environmental impact on industrial development within the CEIP Study Area. The alternative sites are located in areas already zoned for industrial use and are thus compatible with the existing industrial land use patterns in these areas.

Schools/Churches

Land use devoted to schools and churches in the CEIP Study Area comprises just under 22 acres or about 2% of the total acreage within the area. There are few schools and churches in the Study Area. For the most part, schools and churches are located between Superior and St. Clair Avenues in the area between East 40th Street and East 55th Street. These include Ohio Diesel Technical Institute on East 49th Street and Immaculate Conception Church and School on Superior Avenue at East 41st Street. Other major schools and churches within the Study Area include St. John's Cathedral, located on Superior Avenue at East 9th Street, the Cleveland Public Schools' Supplemental Education Center located on Lakeside Avenue at East 14th Street, the City of Cleveland Fire

Training Academy on Lakeside Avenue at East 33rd Street and the Cleveland Public Schools' Aviation High School on North Marginal Road at East 41st Street.

There are no schools or churches immediately adjacent to either proposed site. The closest school or church to the proposed Muny Site, Aviation High School, is situated about a third of a mile to the northwest, while the closest school or church to the proposed East 26th Street Site, the City of Cleveland's Fire Training Academy, is just under a third of a mile directly east. Neither of these facilities, nor any of the remaining schools and churches in the CEIP Study Area, are expected to be adversely impacted by the proposed facility on either site. The proposed Municipal Light Plant Site is separated from the Aviation High School by the Shoreway and the North and South Marginal Roads, while the East 26th Street Site is separated from the City of Cleveland Fire Training Academy by a container trucking service and the northern end of the Innerbelt.

Wholesale, Warehouse, Truck Terminals

Land within the CEIP Study Area being utilized for wholesale, warehouse or truck terminal operations comprise 78 acres or just over 7% of the total acreage within the Study Area. These uses for the most part are situated in the area north of Hamilton Avenue within the Study Area. The proposed East 26th Street site occupies just over 14 acres and represents the largest amount of land devoted to wholesale, warehouse or truck terminal use within the Study Area. Due to the triangular shape of this site, however, the usable acreage of this site is about 12 acres. The proposed East 26th Street Site is currently being used for storage of truck trailers.

Although there are no wholesale, warehouse or truck terminal operations in the immediate vicinity of the proposed Municipal Light Plant site, the proposed East 26th Street site is located directly north of Leaseway Trucking Company

and directly west of Ohio Container Service, Incorporated. The construction of a resource recovery facility on either of the alternatively proposed sites will not result in a significantly adverse impact on wholesale, warehouse or truck terminal uses within the area.

Parking/Vacant Buildings/Vacant Land/Under Construction

Land devoted to parking, vacant buildings and vacant land totalled 73 acres and represented just under 7% of the total acreage within the CEIP Study Area. Land currently being used for parking purposes is located almost exclusively between East 9th Street and East 18th from Superior Avenue to the Shoreway. Much of the area around East 9th Street is part of the Erieview Development Project. As a result, much of the land that is yet undeveloped as part of this project is currently being used for parking lots until construction can begin. The largest amount of land devoted to parking use is the Municipal Parking Lot which measures just under 20 acres and extends from East 9th Street to East 22nd Street north of South Marginal Road.

Vacant buildings are scattered throughout the entire CEIP Study Area. The largest amount of land currently occupied by a vacant building, just over 2 acres, is the site of the Stanard Elementary School and Playground located at East 53rd Street and Stanard Avenue. This school was recently closed by the Cleveland Board of Education.

Most of the vacant land parcels within the Study Area are less than an acre in size and are mainly located in the area between St. Clair and Superior Avenues. The largest vacant parcels within the Study Area are located immediately east of the proposed East 26th Street site and on Davenport Avenue just south of the Municipal Parking Lot. These sites measure just over two acres and just over four acres respectively.

Two projects are under construction within the Study Area. These parcels, located on East 9th Street at Rockwell Avenue, E. 12th and Superior, and on East 21st and Rockwell Avenue, are expected to be utilized for office use.

II.E. Zoning

The purpose of this section is to identify those portions of the City of Cleveland's zoning ordinance that enhance or limit the potential of the two sites as locations for a resource recovery facility. The purpose of the ordinance is to control the use and reuse of land within the City. It specifically outlines the types of uses that are allowable within each district and the form these uses may take. Specific regulations govern building height, setbacks, parking, screening and access.

The analysis will be divided into two parts. The first part will look at the project area in general and describe the requirements of the zoning ordinance. The second part will look at the two sites individually and summarize the limits that current regulations place on their use. Approaches to dealing with these limitations will also be presented.

Project Area Analysis

Within the project area shown on Figure 2.19, there are six different zoning districts based on use. The percentage of land in each of the zoning classifications is presented in Table 2.4.

TABLE 2.4

Project Area Zoning Summary

Classification	Acres	Percent
Two-Family	2,058	1.6%
Multi-Family	2,417	1.9%
General Retail	723	.6%
Institutional	43,981	33.6%
Semi-Industrial	19,457	14.9%
General Industry	30,679	23.4%
Roads and Right-of-Way	31,541	24.1%
TOTAL	130,856	100.0%

The project area is dominated by institutional uses and two zoning classifications; Semi-Industrial and General Industry. The largest of the institutional uses is Burke Lakefront Airport.

In addition to these use zones, there are several large overlay zones with special requirements. These include the Euclid-Cleveland State Land Protective District, the General Business District, a Motor Freight Limitation District, four area districts and five Building Height Districts. Of these, the General Business District and the Building Height Districts are relevant to the sites in question. Both place additional requirements on uses within their boundaries in terms of allowable uses, building height and parking.

Use - Both the East 26th Street site and the Muni site are zoned for General Industry. According to Section 345.04 (General Industry District) of the Zoning Ordinance:

> ... no building or premises shall be hereafter erected, altered, used, arranged or designed to be used, in whole or in part for any of the following uses:
> (1) Incineration or reduction of dead animals, garbage or offal or refuse, except in a private incinerator or operated as required by Section 337.23.

CUYAHOGA COUNTY RESOURCE RECOVERY PROJECT

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

EXISTING LAND USE

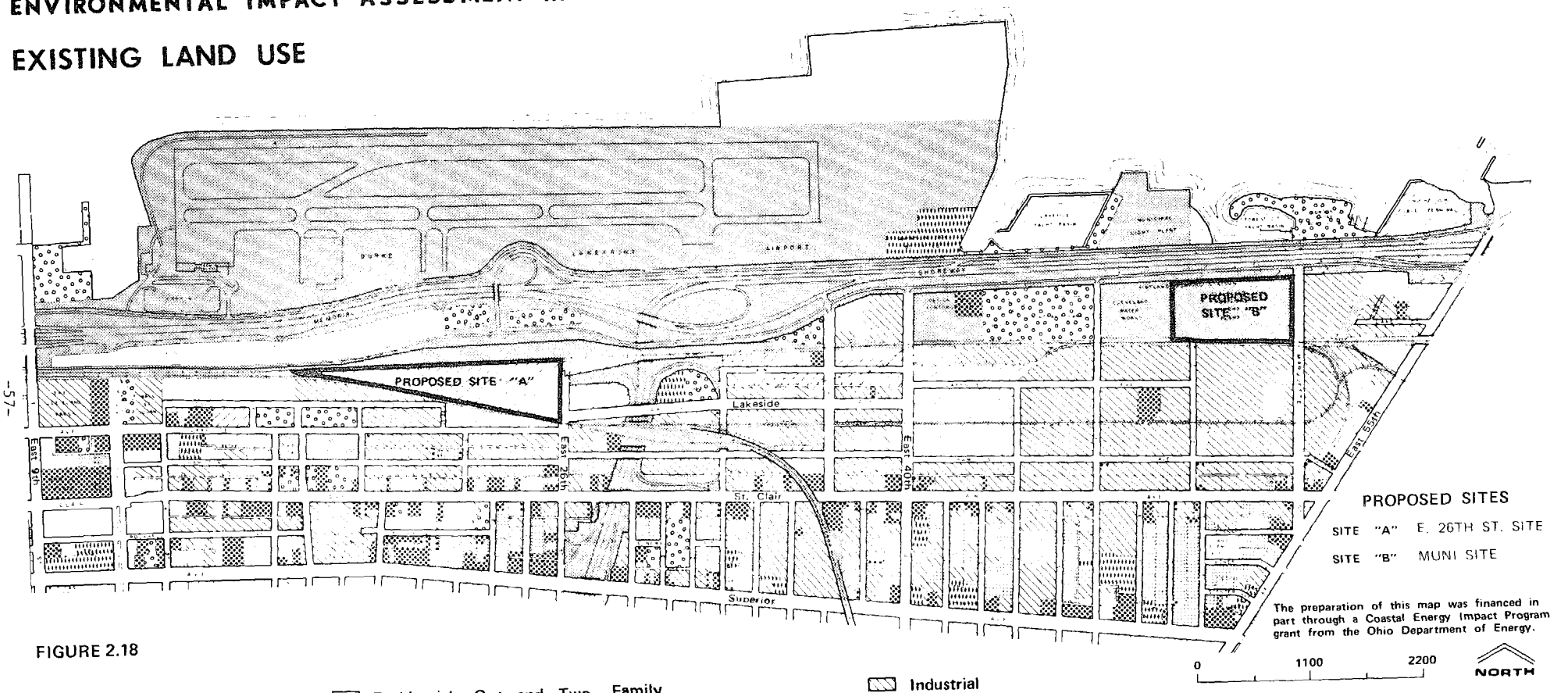


FIGURE 2.18

SOURCE: RPC Land Use Survey, November, 1980 – January, 1981

- Residential: One and Two Family
- Transportation Facilities and Utilities
- Commercial, Office and Hotel
- Governmental, Institutional, Parks and Recreation
- Industrial
- Schools and Churches
- Wholesale, Warehouse, Terminals and Storage
- Parking, Vacant Buildings, Vacant Land, Vacant Under Development

REGIONAL PLANNING COMMISSION

CUYAHOGA COUNTY RESOURCE RECOVERY PROJECT
ENVIRONMENTAL IMPACT ASSESSMENT REPORT

EXISTING ZONING

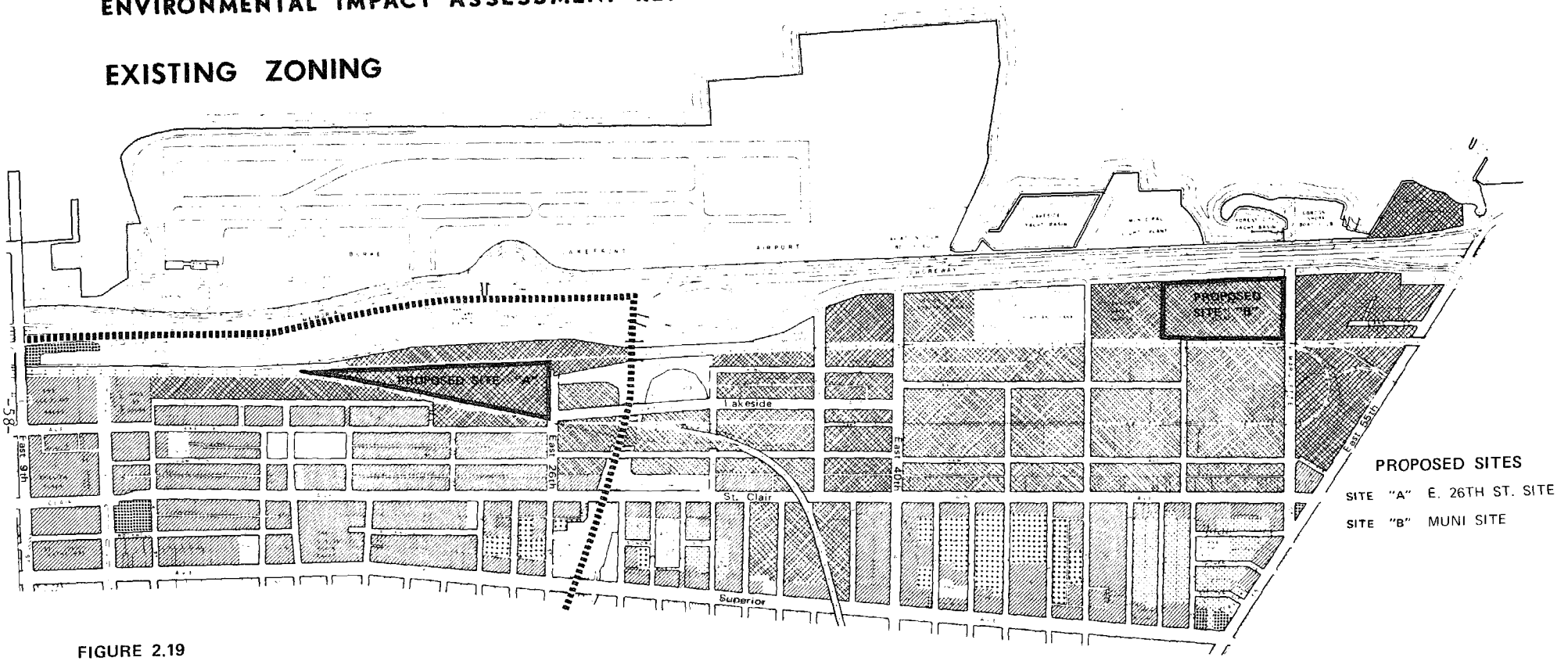


FIGURE 2.19

SOURCE: City of Cleveland
City Planning Commission

One and Two Family
Multi - Family
General Retail Business
Semi - Industry
General Industry

CBD Boundary

0 1100 2200

NORTH

REGIONAL PLANNING COMMISSION

The preparation of this map was financed in part through a Coastal Energy Impact Program grant from the Ohio Department of Energy.

Section 337.23 states:

(5) Private incinerators for the burning of refuse and garbage produced on the same premises provided that construction is such as to assure immediate and complete combustion and freedom from offensive smoke ash, unburned particles and odors and a permit is granted by the Commissioner of Air Pollution Control.

Based on these sections of the Zoning Ordinance, it would appear that a resource recovery facility is not an allowable use on the two sites in question. Therefore, it will be necessary for the Cleveland City Council to change the zoning of the sites to the next highest classification--Unrestricted Industry--or vary from the zoning as applied to these sites. If a change in zoning is required, then this change must be based upon a recommendation of the City Planning Commission.

Building Height - Both sites are controlled in their use by building height regulations contained in the Zoning Ordinance (see Figure 2.20). The relevant portions of the Ordinance are Sections 353.01, 353.02, and 353.06.

Both the East 26th Street site and the Muny site are located in Height District 3. According to Section 353.01, the height limit in District 3 for a building erected on the building line or yard line without a setback is three times the distance from the centerline of the street not to exceed 115 feet above grade level. Grade level is defined as mean elevation at the ground adjoining the building on all sides, where all the walls of the main building are more than five feet back from the street line. However, Section 353.02 provides that any portion of the building may be erected to exceed the height limit specified in 353.01 if it is set back an appropriate distance from the building line.

For every foot of setback from the building line or yard line, the structure is allowed an additional number of feet in height. For Height District 3,

CUYAHOGA COUNTY RESOURCE RECOVERY PROJECT
ENVIRONMENTAL IMPACT ASSESSMENT REPORT

HEIGHT REGULATIONS

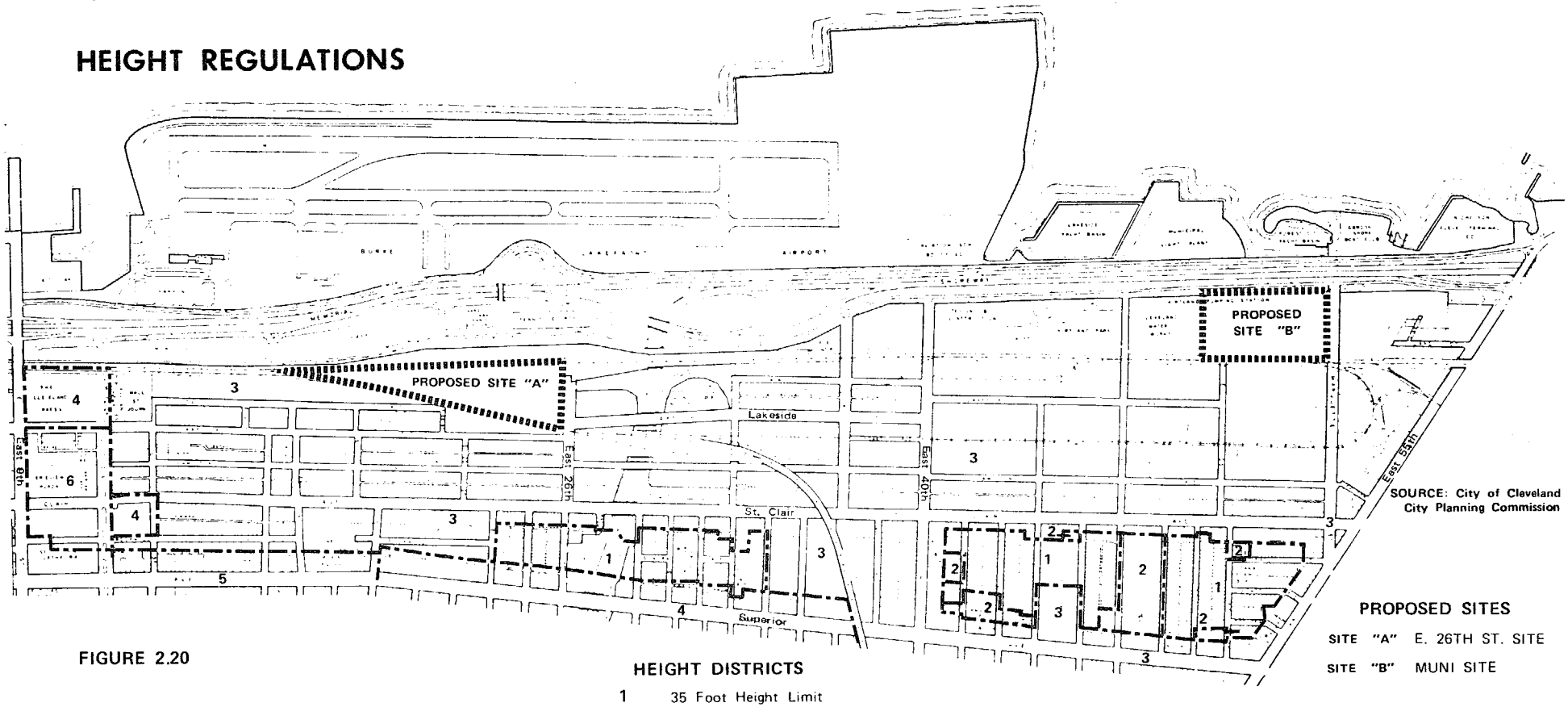


FIGURE 2.20

HEIGHT DISTRICTS

1	35 Foot Height Limit
2	60 Foot Height Limit
3	115 Foot Height Limit
4	175 Foot Height Limit
5	250 Foot Height Limit
6	600 Foot Height Limit

REGIONAL PLANNING COMMISSION

The preparation of this map was financed in part through a Coastal Energy Impact Program grant from the Ohio Department of Energy.

one foot of setback is required for every three feet of additional height not to exceed a maximum of 175 feet above grade level.

The only exception to Sections 353.01 and 353.02 is contained in Section 353.06 and pertains to roof structures. This section is applicable to both the resource recovery facility and the sites in question. Section 353.06 states:

> (b) Roof Structures. In any height district, stairway and elevator or ventilating equipment penthouses, and penthouses for similar purposes, water tanks, cooling towers, ...chimneys or other necessary appurtenances, when erected upon and as an integral part of the building, may be erected or extended above the maximum height specified in Section 353.02 if such building is more than one mile from a public airport or landing field or if closer proximity to such airport or landing field is specifically permitted by the Board.

The potential problem for a resource recovery facility located at either site is that unless it can be built within the 175-foot limit above grade level, a special permit will have to be obtained from the Zoning Board of Appeals due to the proximity of both sites (less than one mile) to Burke Lakefront Airport.

The use and height requirements present potential problems both in the use of the two sites and in the design of the facility. The ordinance also contains some additional requirements that must be incorporated into the design, but which are not as critical as the use and height regulations. These specifications include parking and off-street loading.

Parking - The requirements for the inclusion of parking facilities in projects in industrial districts are contained in Section 349.04, 349.05 and 349.07. The required number of accessory off-street parking spaces in industrial zones is either equal to a ratio of one space for each three employees expected to be on the premises during the largest work shift

period or equivalent to 25% of the structure's gross floor area, whichever is less.

The location of these spaces is spelled out in Section 349.05. Accessory parking must either be provided on the same lot as the use, on a lot within 400 feet of the nearest boundary on a straight line, or in a municipal or private parking facility. In the case of the latter, the Off-Street Parking Committee must determine that the municipal or private facility will adequately serve the proposed use. In addition, no parking space should be located within ten feet of a structure if that wall contains a ground floor opening designed to provide light or ventilation for that structure.

Section 349.07 contains requirements regarding the layout and materials to be used in the construction of accessory off-street parking.

The East 26th Street site is within the boundary of the Central Business District (CBD). Section 349.11 states that within the CBD, Section 349.04 does not apply. It also requires that a parking plan be submitted to the Off-Street Parking Committee for every proposed development within the CBD. In addition to indicating that the parking facilities substantially meet the minimum standards contained in the Ordinance, this plan must contain a description of:

1) the project area
2) existing and proposed uses
3) construction schedules
4) any duplication of off-street parking requirements
5) a proposal for joint use and sharing of off-street parking.

Off-Street Loading - Section 349.17 provides that adequate loading and unloading docks or platforms be provided in or on all non-residential buildings which contain a gross floor area of 25,000 square feet or abut an alley or have a frontage of 100 feet or more. It requires that:

> Such docks or platforms shall be not less than fifty feet back from the building line along the street or alley on which they face and not less than eighty feet from the center line of the street. Any truck entrance or exit doorway or gateway less than five feet from the street line shall be at least twelve feet wide and twelve feet high and the curb cut shall extend for at least fifteen feet on either side of the driveway.

Site Analysis

The following summarizes by site, the limitations current zoning regulations place on each and alternative approaches to dealing with those limitations.

East 26th Street

Use - This site is presently zoned General Industry. A solid waste facility is not listed as an allowable use. Zoning would have to be changed to Unrestricted Industry classification, or permission granted by other means. City Council would possibly have to pass an amendment to the Zoning Map.

Building Height - Current height regulations limit the height of the proposed facility to 115 feet with no setback and 175 feet with 20 feet of setback. Roof structures may extend above this limit if they are an integral part of the building and if the building is more than one mile from a public airport. The site is within one mile of Burke Lakefront. If the height of the facility and its integral roof structures must exceed 175 feet, a special permit will have to be obtained from the Zoning Board of Appeals.

Parking - Requirements for accessory parking do not limit the use of this site but must be satisfied in the design of the facility. Due to the fact

that the site is within the Central Business District, a parking plan will have to be prepared and presented to the Off-Street Parking Committee.

Off-Street Loading - Off-street loading requirements do not limit the use of this site, but must be satisfied in the design of the facility.

Muny Site

Use - This site is presently zoned General Industry. A solid waste facility is not an allowable use. Zoning would have to be changed to Unrestricted Industry classification. City Council would have to pass an amendment to the Zoning Map.

Building Height - Current height regulations limit the height of the proposed facility to 115 feet with no setback and 175 feet with 20 feet of setback. Roof structures may extend above this limit if they are an integral part of the building and if the building is more than one mile from a public airport.

The site is within one mile of Burke Lakefront. If the height of the facility and its integral roof structures must exceed 175 feet, a special permit will have to be obtained from the Zoning Board of Appeals.

Parking - Requirements for accessory parking do not limit the use of this site but must be satisfied in the design of the facility.

Off-Street Loading - Off-street loading requirements do not limit the use of this site but must be satisfied in the design of the facility.

F. Access

Since the two proposed sites for the resource recovery facility (RRF) are located near interstate highways, accessibility from the participating municipalities should not be a significant problem. Much of the haul route to the proposed sites would be over interstate highways. The following section will investigate potential access routes between the interstate highways and the proposed sites.

From the Shoreway trucks would most likely travel south on East 55th to South Marginal Road, west on South Marginal Road to Marquette Street, and south on Marquette Street to the Muny site entrance. As the vehicles return to their origins, they would retrace their path back to the Shoreway. Maximum traveling distance between the Shoreway and Muny site would be approximately 4000 feet (Figure 2.21).

Trucks exiting at East 55th Street from the eastbound Shoreway may find turning from this exit ramp to South Marginal Road to be a potential problem. The turn from this exit ramp to South Marginal Road requires a 180° turn in a distance of approximately 40 feet. Larger trucks could experience some difficulty in negotiating the severe turning radius. A possible solution would be the construction of an exit ramp that would take trucks directly to South Marginal Road near the Muny site (see Figure 2.22).

The East 26th Street site is readily accessible to the Inner Belt. Incoming trucks from the Inner Belt would follow two separate potential routes depending on their origin. Northbound Inner Belt trucks would travel south on East 33rd Street to Lakeside Avenue, west on Lakeside Avenue to East 26th Street, and enter the site on East 26th Street. Southbound Inner Belt trucks would exit on to East 26th Street and proceed north across the Conrail tracks to the site.

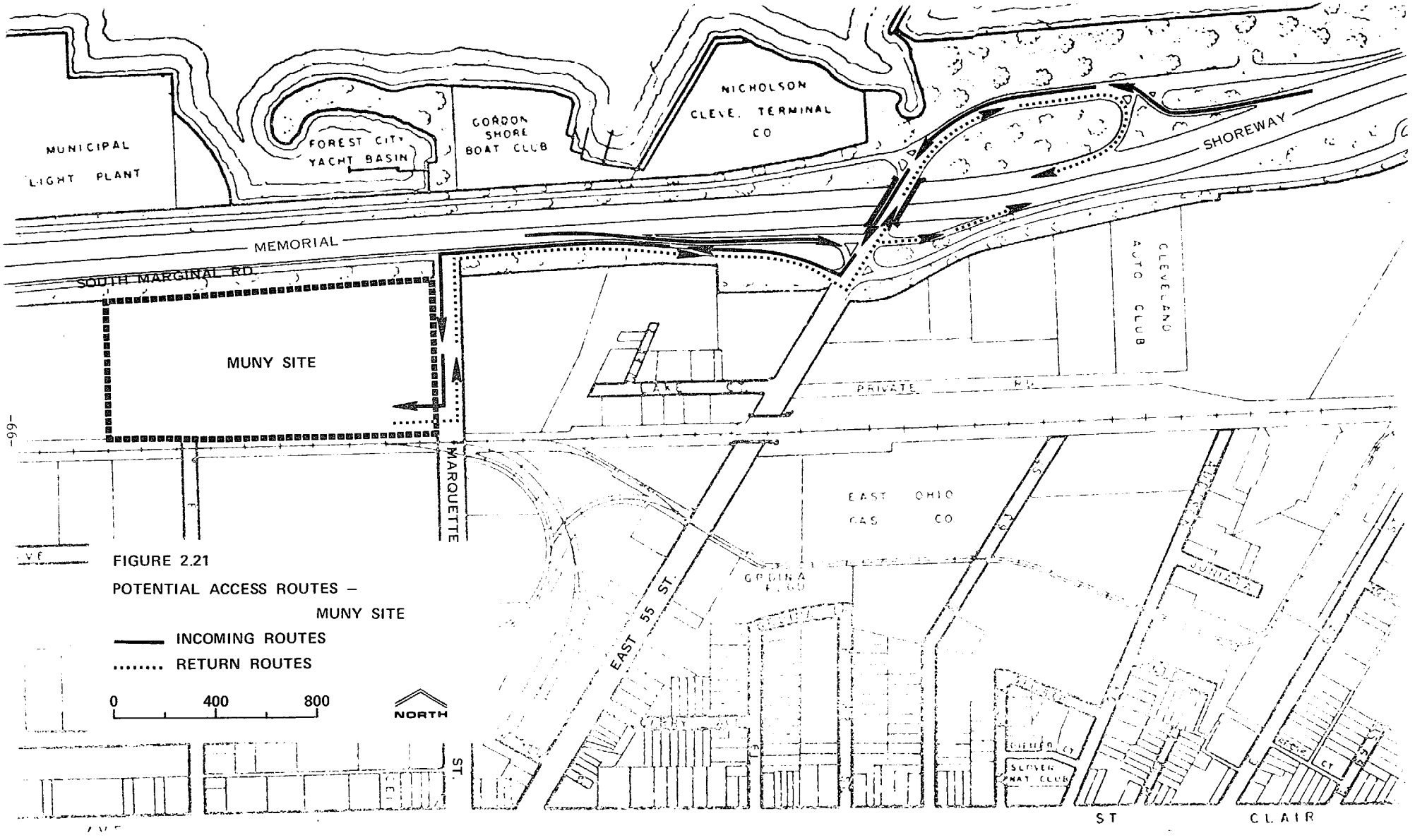


FIGURE 2.21

POTENTIAL ACCESS ROUTES –
MUNY SITE

——— INCOMING ROUTES

..... RETURN ROUTES

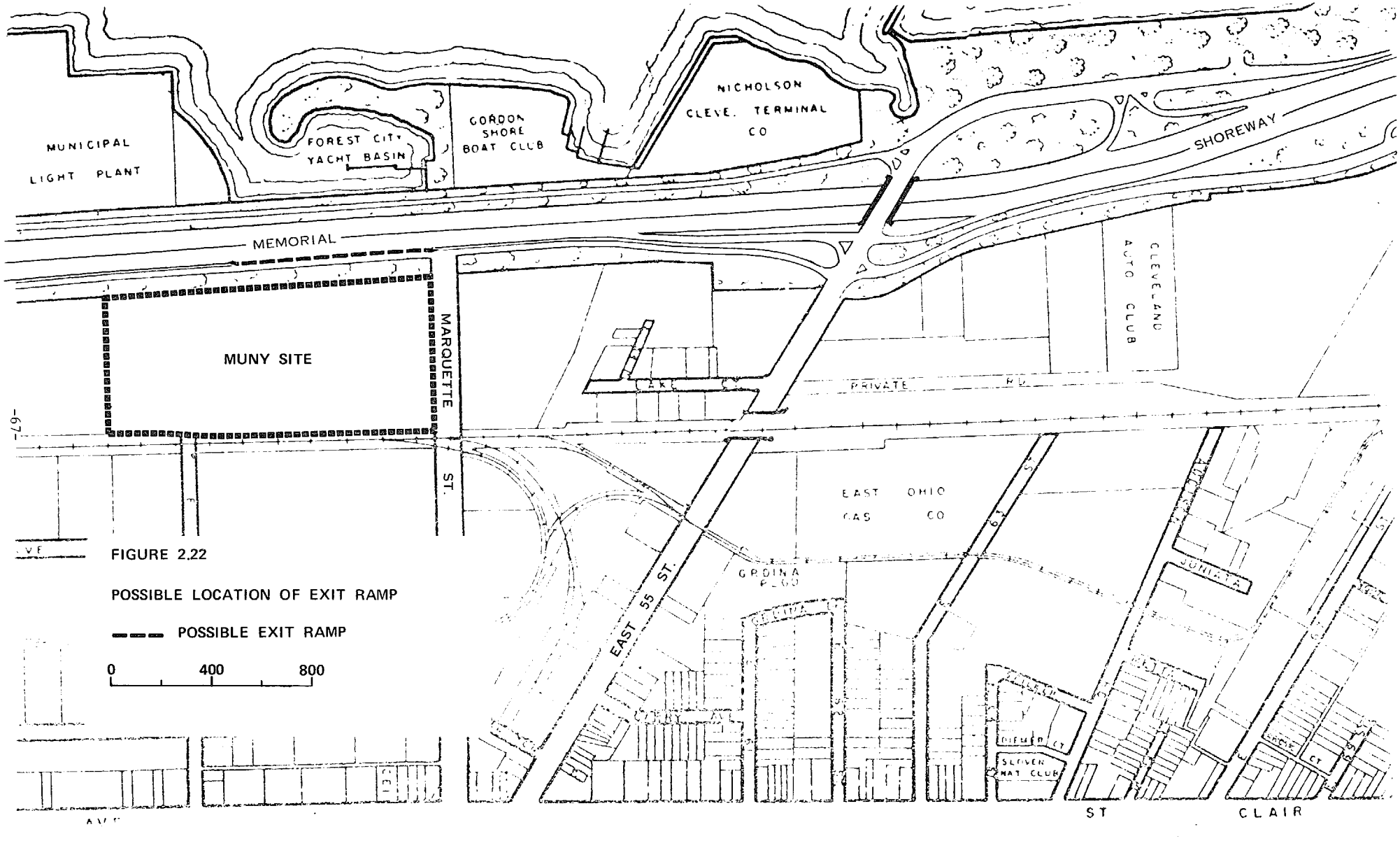


FIGURE 2.22

POSSIBLE LOCATION OF EXIT RAMP

POSSIBLE EXIT RAMP

0 400 800

On their return trip, southbound trucks would probably enter the Inner Belt near the north end of East 26th Street. Northbound trucks would likely travel south on East 26th Street to Hamilton Avenue, east on Hamilton Avenue to East 33rd Street, and then south on East 33rd Street to the Inner Belt entrance ramp (Figure 2.23). Maximum traveling distance between the East 26th Street site and the Inner Belt is approximately 2200 feet.

Two alternatives were used in determining traffic generated by the proposed RRF. The alternatives include modified transfer and full transfer.

Modified Transfer

This alternative introduces the use of transfer stations. A transfer station would serve as a central collection point for waste collection vehicles, where the waste would be further compacted and then transported by larger vehicles to the RRF. The use of transfer stations may significantly reduce hauling costs. Under the modified transfer alternative, eleven communities would haul their solid wastes to one of five transfer stations. The remaining participating communities would haul directly to the RRF.

Full Transfer

This alternative would have seven transfer stations serving forty-three communities. The remaining participating communities would direct haul to the RRF.

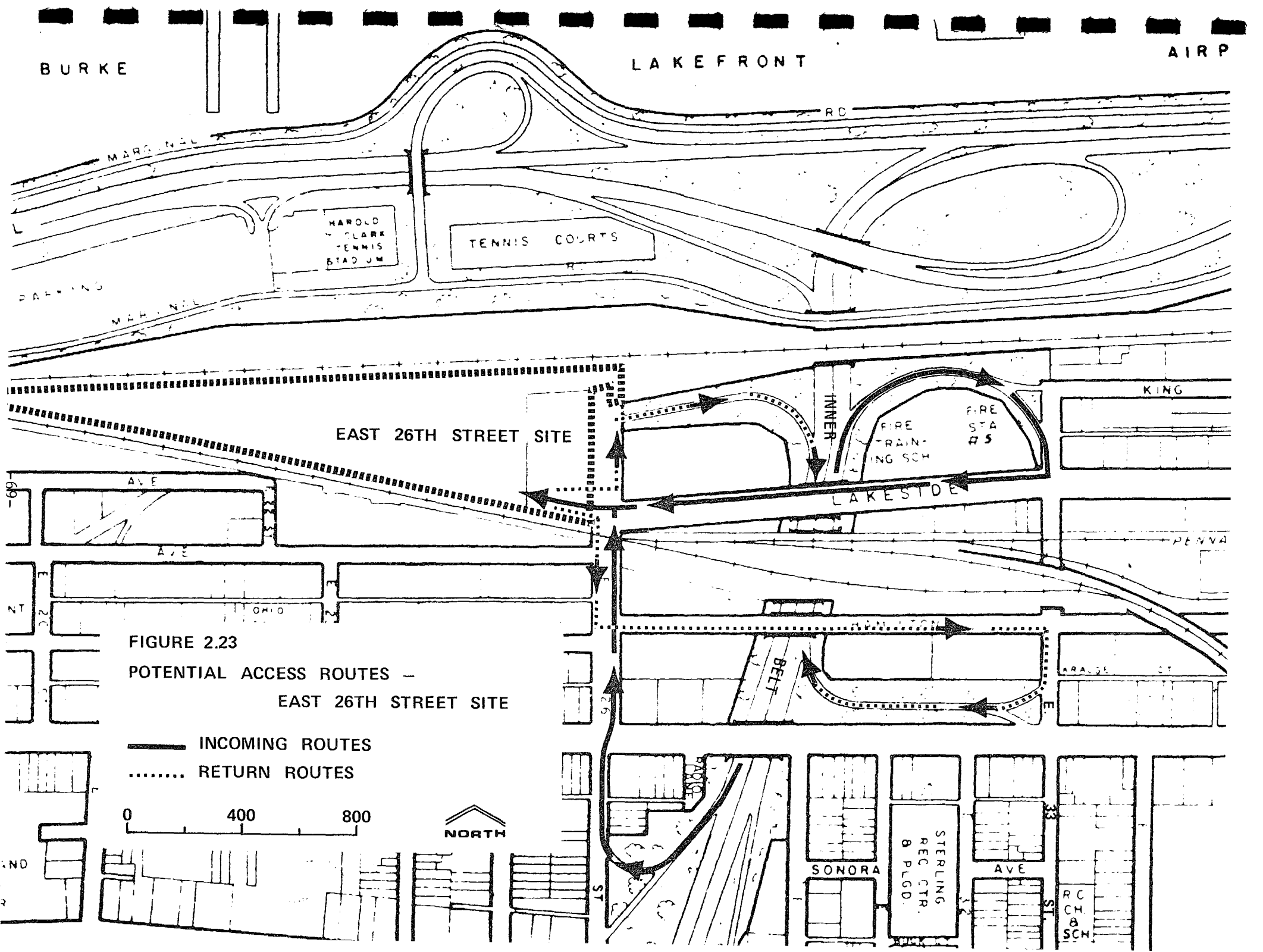


FIGURE 2.23

POTENTIAL ACCESS ROUTES – EAST 26TH STREET SITE

After projecting annual solid waste by community (1985),[17] formulating a list of assumptions, and establishing the given information, truck traffic by community (1985) was calculated (Appendix D). These figures were then compiled into numbers reflecting daily truck traffic generated by the RRF (1985) (Table 2.5).

At this point it should be noted that 22 trucks per day would carry residue from the proposed RRF to landfills. Figures showing traffic generated by the proposed RRF do not show these trucks because it is unknown where landfills will be available in 1985, and therefore what routes these trucks will be taking. These trucks will not exceed the legal weight limit of 80,000 pounds.

Table 2.5
TRUCKS TRAVELING DAILY TO RESOURCE RECOVERY FACILITY (1985)[18]

Alternative 1	474 vehicles
Alternative 2	302 vehicles

These figures are based on the assumption that communities would continue using similar sized vehicles as those used today. However, if the recent trend to larger collection vehicles continues, substantially fewer trucks as well as fewer trips to the disposal site would be required.

17. RPC, 1979 Update: Cuyahoga County Solid Waste Community Practices Survey. 1985 Data:
Projections are based upon ratio of 1979 population data and 1979 annual solid waste quantity data to projected 1985 population data, i.e.:

18. $\frac{\text{1979 Population}}{\text{1979 Annual Solid Wastes}} = \frac{\text{1985 Population}}{x}$, where x = Projected 1985 Annual Solid Wastes

These figures represent totals for the fifty communities which appear in Table 3.2. However, no data was available for the following communities: Linndale, Orange, Riveredge Twp. and Warrensville Twp. Projected solid waste totals for these communities are minimal due to low population totals.

After considering the origins of all trucks, the volume of truck traffic added to specific roads was determined. These volumes were calculated for each alternative (Figures 2.24 and 2.25).

Bridges are an important part of the access routes to the proposed sites. There are three bridges to be considered. One bridge crosses the Shoreway and two bridges cross the Innerbelt.

There are legal limits which govern weight per axle. These weight limits maximize the area over which weight is distributed. All three bridges were designed to handle vehicles not exceeding the legal weight limit per axle. Any truck traffic generated by the resource recovery facility would not exceed the weight limits of these bridges. Therefore, each bridge could handle any traffic generated by the proposed resource recovery facility.[19] The additional traffic volumes would most likely not affect the lifetime of these bridges.

South Marginal Road may not be wide enough to handle traffic generated by the proposed RRF (Table 2.6). The right-hand turn from East 55th Street to the two-lane South Marginal Road could pose some difficulty for transfer vehicles.

Table 2.6
STREET WIDTHS OF POTENTIAL ACCESS ROUTES

Street	Width
East 55th Street	4 lanes
South Marginal Road	2 lanes
Marquette Street	4 lanes
East 26th Street	3 lanes
East 33rd Street	3 lanes
Lakeside Avenue	3 lanes
Hamilton Avenue	3 lanes

19. David Leake, Assistance in Bridge Engineering, Ohio Department of Transportation, District 12.

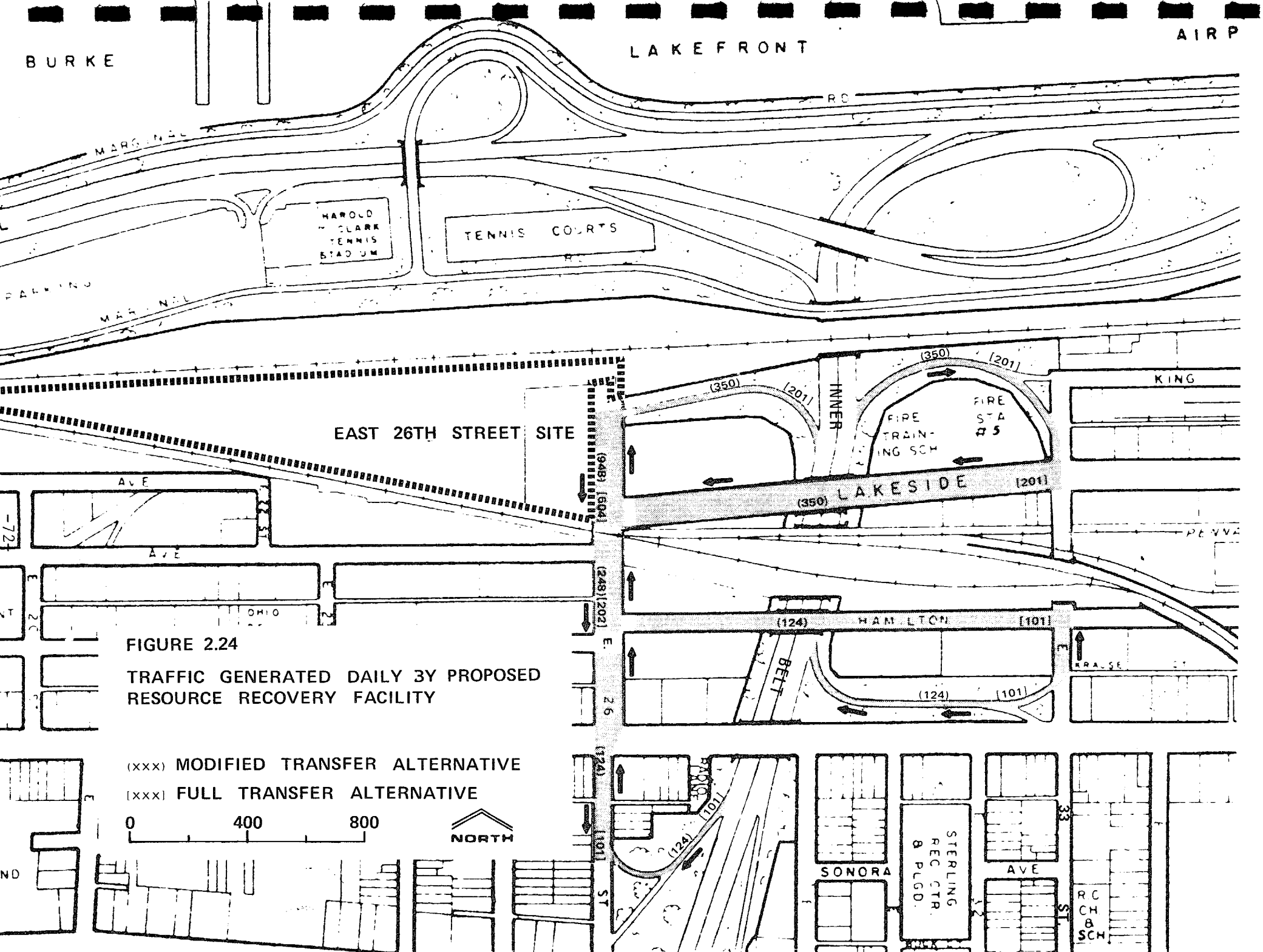


FIGURE 2.24

TRAFFIC GENERATED DAILY 3Y PROPOSED RESOURCE RECOVERY FACILITY

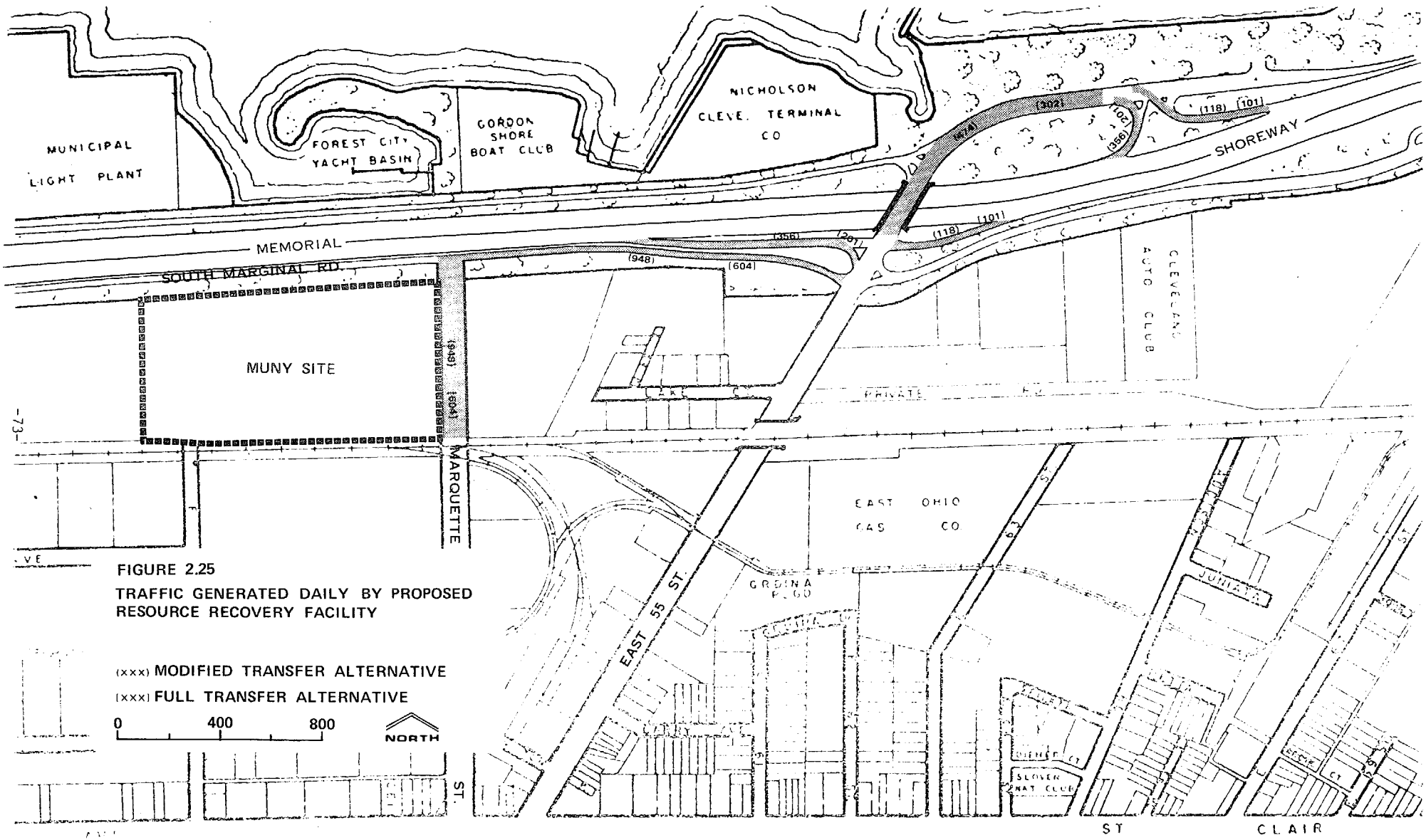


FIGURE 2.25

TRAFFIC GENERATED DAILY BY PROPOSED RESOURCE RECOVERY FACILITY

Traffic signals presently regulate the flow of traffic on East 55th Street near the Shoreway. Future improvement of the traffic signal system on East 55th Steet would assure a steady flow of traffic. Plans are presently being formulated to synchronize these signals.[20] This planning would assure a continuous flow of traffic to and from the Muny site.

One traffic signal presently controls traffic at the intersection of East 26th Street and St. Clair Avenue. Improved regulation of traffic at this intersection would probably be needed if the proposed RRF were to be located at the East 26th Street site.

Finally, the Conrail tracks on East 26th Street near Lakeside Avenue could possibly hinder traffic to and from the proposed RRF. Approximately 30% of all traffic to and from the potential East 26th Street site would possibly cross these tracks. If the crossing were blocked for any length of time, trucks would probably be backed-up on to the East 26th Street site preventing all trucks from leaving the site. In addition, trucks backed-up south on East 26th Street would probably block east-west traffic on Lakeside and Hamilton Avenues.

The severity of the problem would depend on how long the crossing is blocked. A possible solution would be a grade separation. The implementation of this solution would be complex and expensive.

No railroad crossings would hinder traffic to and from the Muny site. The impact of traffic around the proposed sites will be discussed further in Chapter IV.

20. City of Cleveland, Traffic Engineering and Parking.

II.G. Utilities

1. Gas

Natural gas will be needed only for the heating of building and office space. No auxiliary fuels will be used in the waste-burning process.

East 26th Street Site

Low-pressure gas lines with diameters of six, eight, twelve, and twenty-four inches can be found west of East 26th Street under Lakeside Avenue. East of East 26th Street under Lakeside Avenue there is a twelve inch low-pressure gas line. In East 26th Street there are low-pressure gas lines with diameters of four, eight, twelve, and twenty-four inches.

Muny Site

A four inch low-pressure gas line is located under Marquette Street adjacent to the proposed Muny site. A four inch low-pressure gas line is also located along East 53rd Street between Lakeside Avenue and Hamilton Avenue. Finally, a twenty-four inch low-pressure gas line is located under Hamilton Avenue between East 49th Street and Marquette Avenue (Figure 2.26).

2. Water

In the Cleveland metropolitan area, the size of water supply lines ranges from six to twelve inches. Larger mains are used strictly for distribution to smaller lines and are never used to directly supply any types of land use. Therefore, the location of twelve, ten, eight and six inch water lines relative to the proposed sites is important.

East 26th Street Site

Twelve inch water lines are located under Lakeside Avenue, and six inch water lines are located under Davenport Avenue and East 26th Street near this site.

Muny Site

A twelve inch water line is located under Marquette Avenue, while eight

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ENVIRONMENTAL IMPACT ASSESSMENT REPORT

NATURAL GAS LINES

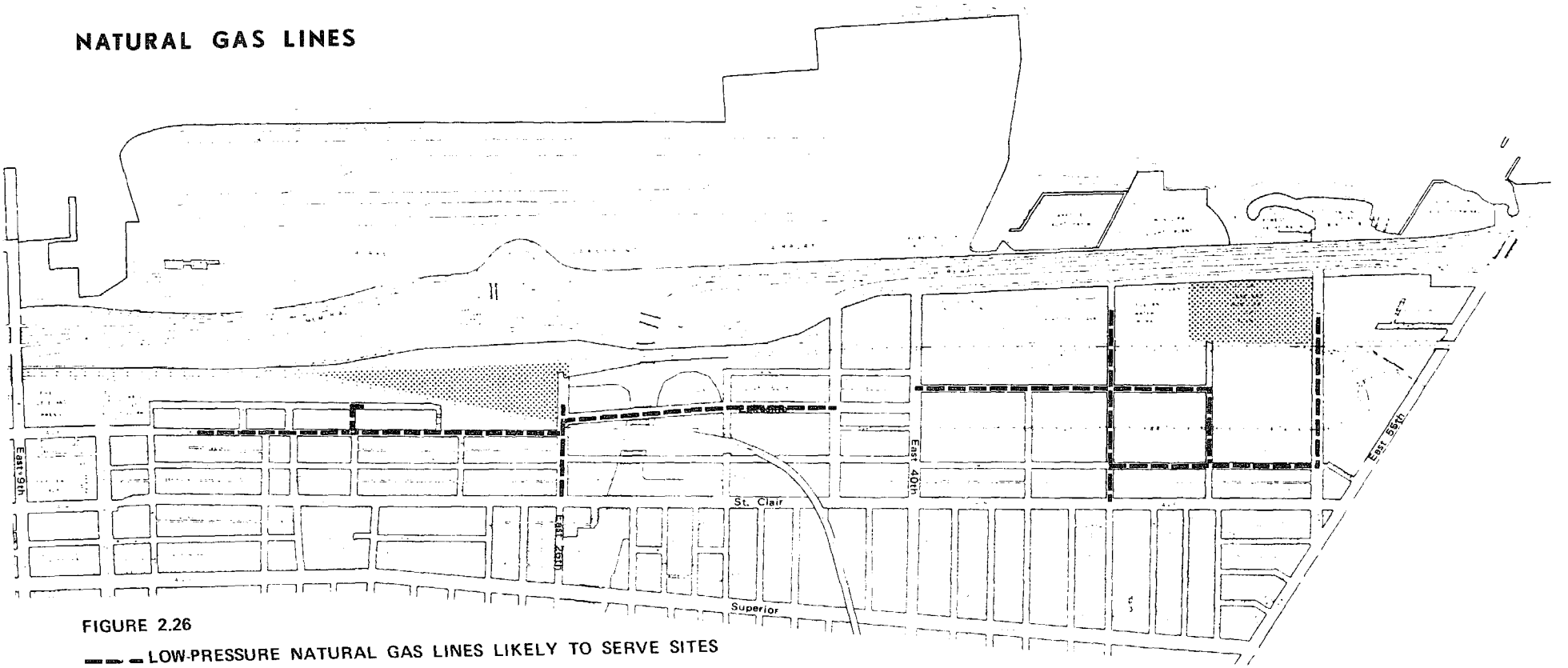

FIGURE 2.26

LOW-PRESSURE NATURAL GAS LINES LIKELY TO SERVE SITES

POTENTIAL SITES FOR RESOURCE RECOVERY FACILITY

SOURCE: EAST OHIO GAS COMPANY

0 1100 2200

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WATER LINES

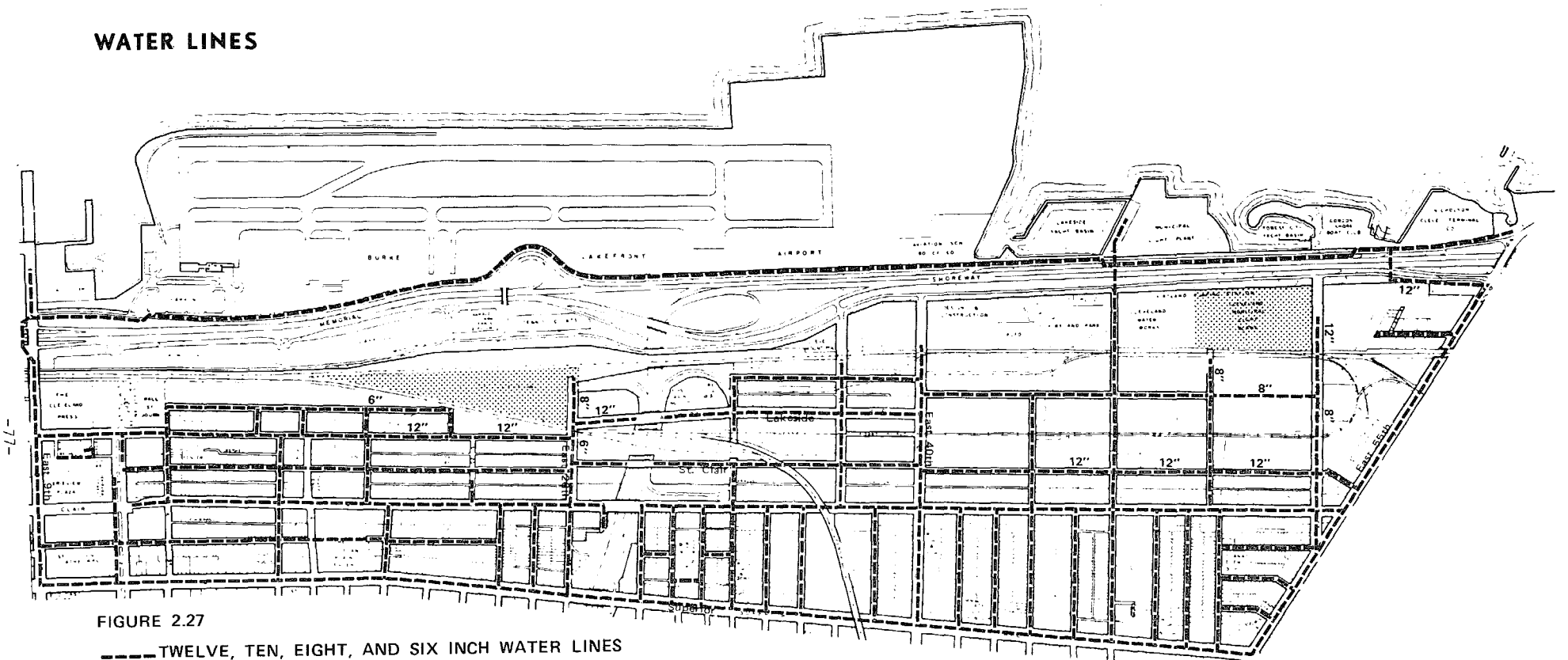

FIGURE 2.27

----TWELVE, TEN, EIGHT, AND SIX INCH WATER LINES

POTENTIAL SITES FOR RESOURCE RECOVERY FACILITY

SOURCE: CITY OF CLEVELAND, DIVISION OF WATER

0 1100 2200

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inch water lines service East 49th Street, East 53rd Street and Lakeside Avenue (see Figure 2.27).

3. Sewers

Most sewers in Cleveland are combined, and therefore handle both sanitary wastewater and stormwater. Reference to "sewers" will mean combined sanitary-storm water sewers.

Two sewer shapes are common in the proposed project area: circular and egg-shaped. Full flow capacity of these sewers was determined through the following formula:

full flow = $x^{\frac{1}{2}}$ x y,

where x = the slope of the sewer,

and y = the full flow coefficient determined from the tables located in Appendix C.

East 26th Street Site

A Number 11 sewer extends north under East 26th Street to Lakeside Avenue where it discharges to the Easterly Interceptor. This egg-shaped sewer has a full flow of 80,608 gallons per minute (178.68 cubic feet per second). The elevation of this sewer is approximately 614 feet above sea level. A large portion of this site is at least 620 feet above sea level. Therefore, use of this sewer would only be possible with the construction of a pump station to transfer sewage from lower elevations of the site. There is an overflow to Lake Erie just before this sewer discharges to the Easterly Interceptor. The overflow sewer is in East 26th Street north of Lakeside Avenue.

Another sewer extends east from East 22nd Street to East 26th Street where it discharges to the Number 11 sewer on East 26th Street. Capacity is not known.

The largest sewer near the East 26th Street site is the Easterly Interceptor sewer located in Lakeside Avenue. This sewer carries wastewater to the Easterly Wastewater Treatment Plant (see Figure 2.28). Direct

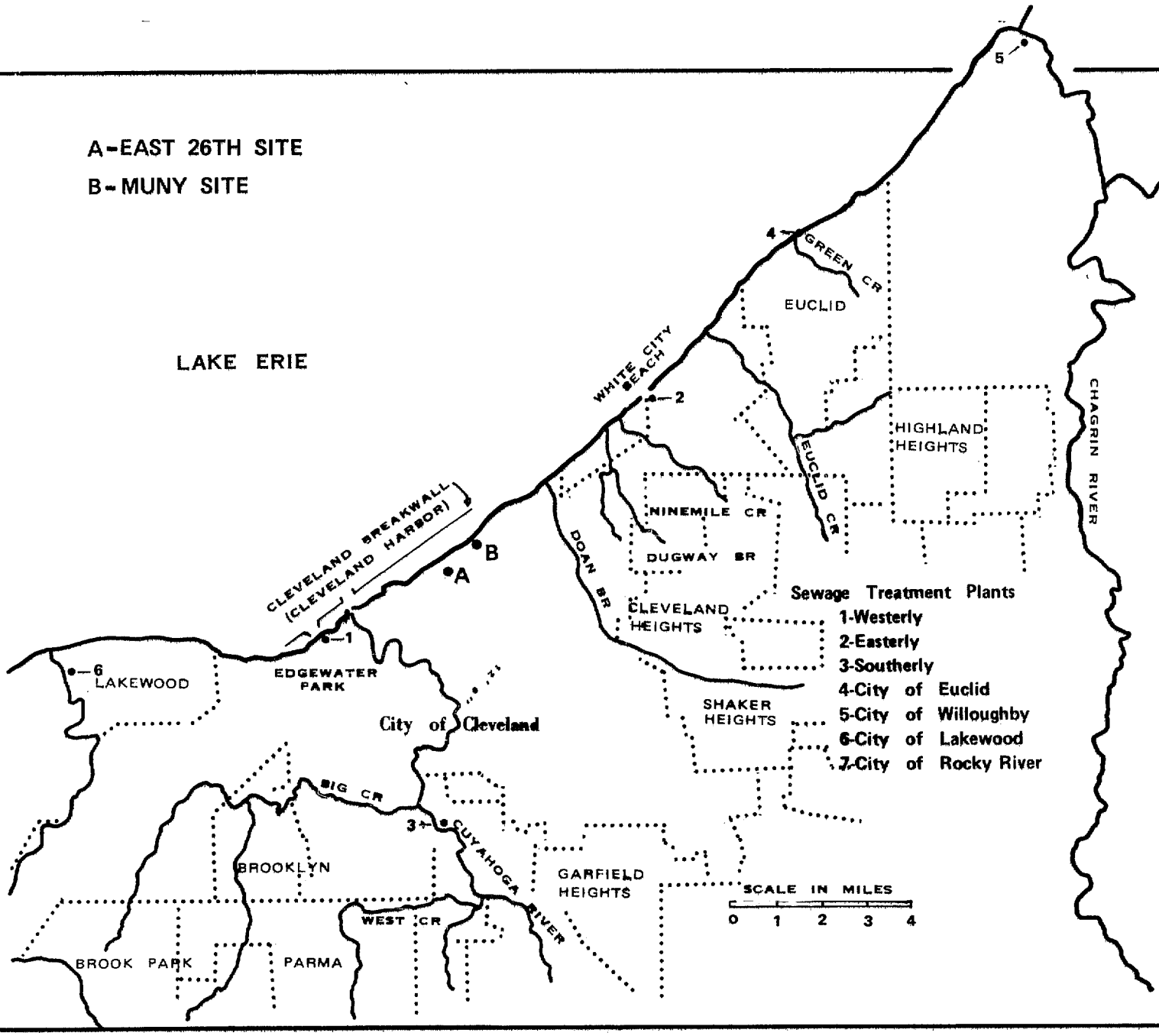

FIGURE 2.28

WASTEWATER TREATMENT PLANTS IN THE CLEVELAND-LAKE ERIE AREA

SOURCE: "Water Quality Baseline Assessment for Cleveland Area – Lake Erie, Volume I – Synthesis", Garlauskas, A.B. and Hanok, M., EPA 905/9-74-005, May 1974

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SEWERS

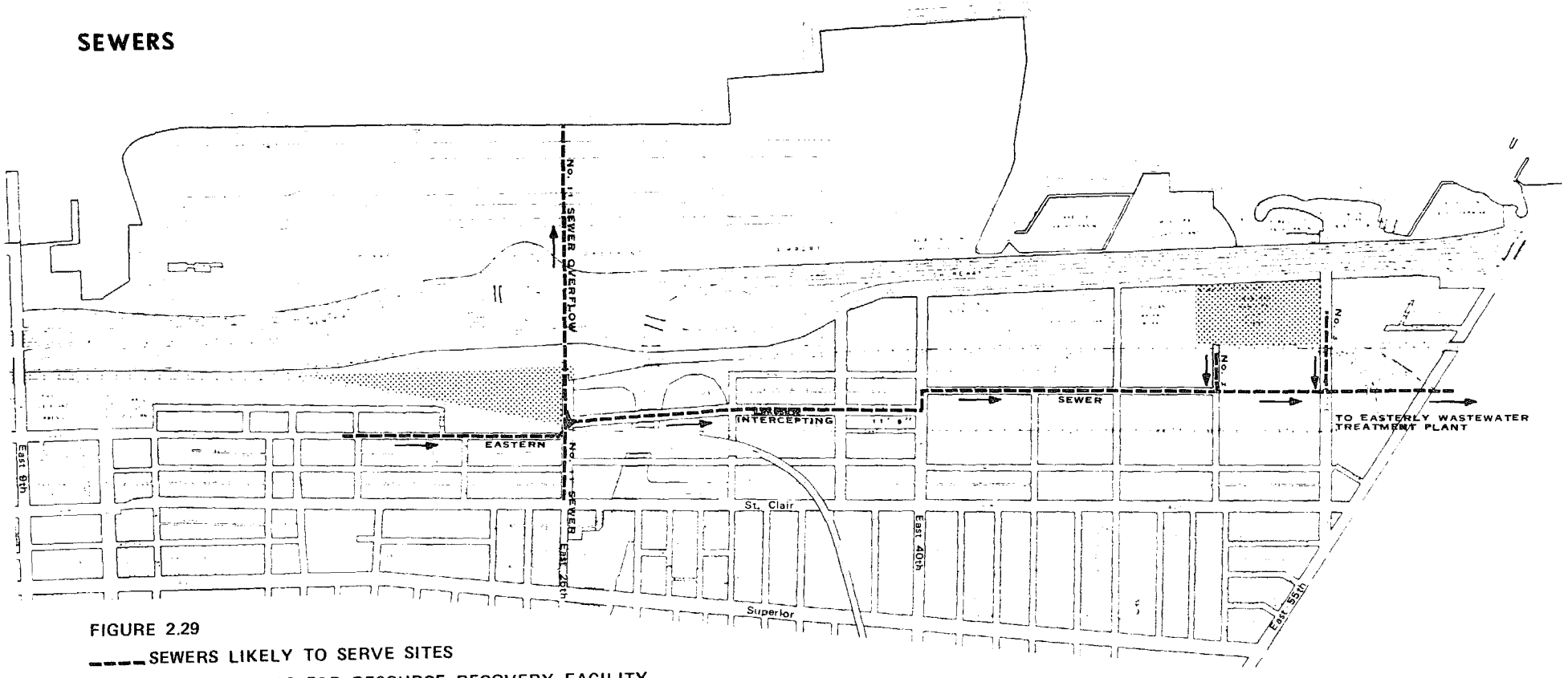

FIGURE 2.29

____ SEWERS LIKELY TO SERVE SITES

▒ POTENTIAL SITES FOR RESOURCE RECOVERY FACILITY

SOURCE: CITY OF CLEVELAND, DIVISION OF SEWERS

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connection from the resource recovery plant to the interceptor is not permitted.

Muny Site

A Number 3 sewer under Marquette Street having a full flow of 10,863 gallons per minute (24.08 cubic feet per second) extends north from Lakeside Avenue to the site. Elevation at its upstream end is approximately 607 feet. Since about half of the Muny Site is less than 607 feet above sea level, a pumping facility would be required to move wastewater from the lower portions of the site.

A Number 2 sewer under East 53rd Street having a full flow of 4,908 gallons per minute (10.88 cubic feet per second) extends north from Lakeside Avenue to the Conrail tracks. Direct connection to this sewer would require tunneling beneath the Conrail tracks. A pumping station would be required to move sewage from a large portion of this site to this sewer. Presently, there are no connections made to this sewer.

A local sewer under Lakeside Avenue having a diameter of seven feet extends from East 53rd Street to Marquette Street where it discharges into the Easterly Receptor. Capacity of this sewer is approximately 126,316 gallons per minute (280 cubic feet per second).

The Easterly Interceptor is also located under Lakeside Avenue. This is the same sewer that was described earlier. This sewer extends east toward the Easterly Wastewater Treatment Plant and has a diameter of 12 feet (Figure 2.29).

4. Electricity

The availability of electricity for purchase would be important because the proposed facility will not have the capacity to supply itself with energy during periods of operation breakdown. Since both potential sites

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C.E.I. HIGH-POWER ELECTRIC TRANSMISSION LINES

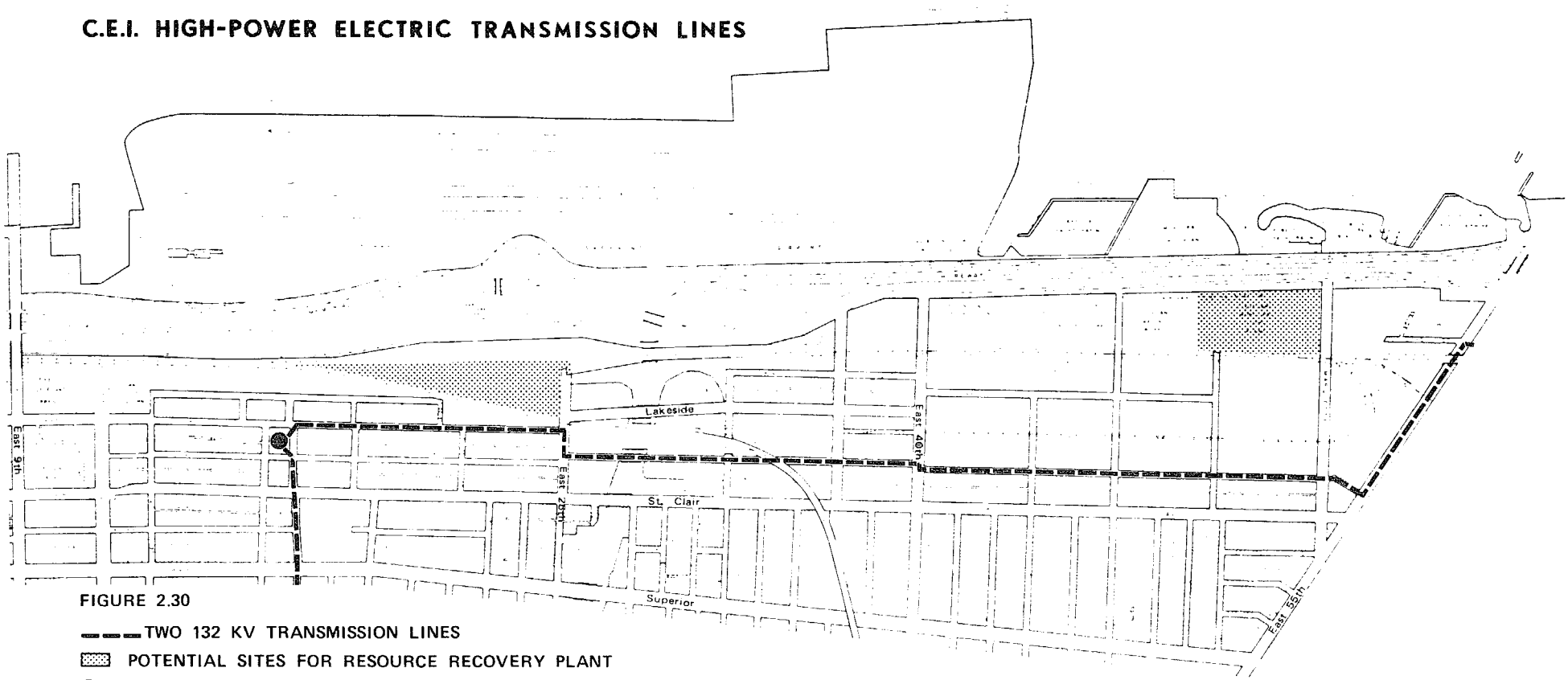

FIGURE 2.30

TWO 132 KV TRANSMISSION LINES

POTENTIAL SITES FOR RESOURCE RECOVERY PLANT

C.E.I. SUBSTATION

SOURCE: CLEVELAND ELECTRIC ILLUMINATING COMPANY (C.E.I.)

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MUNI HIGH-POWER ELECTRIC TRANSMISSION LINES

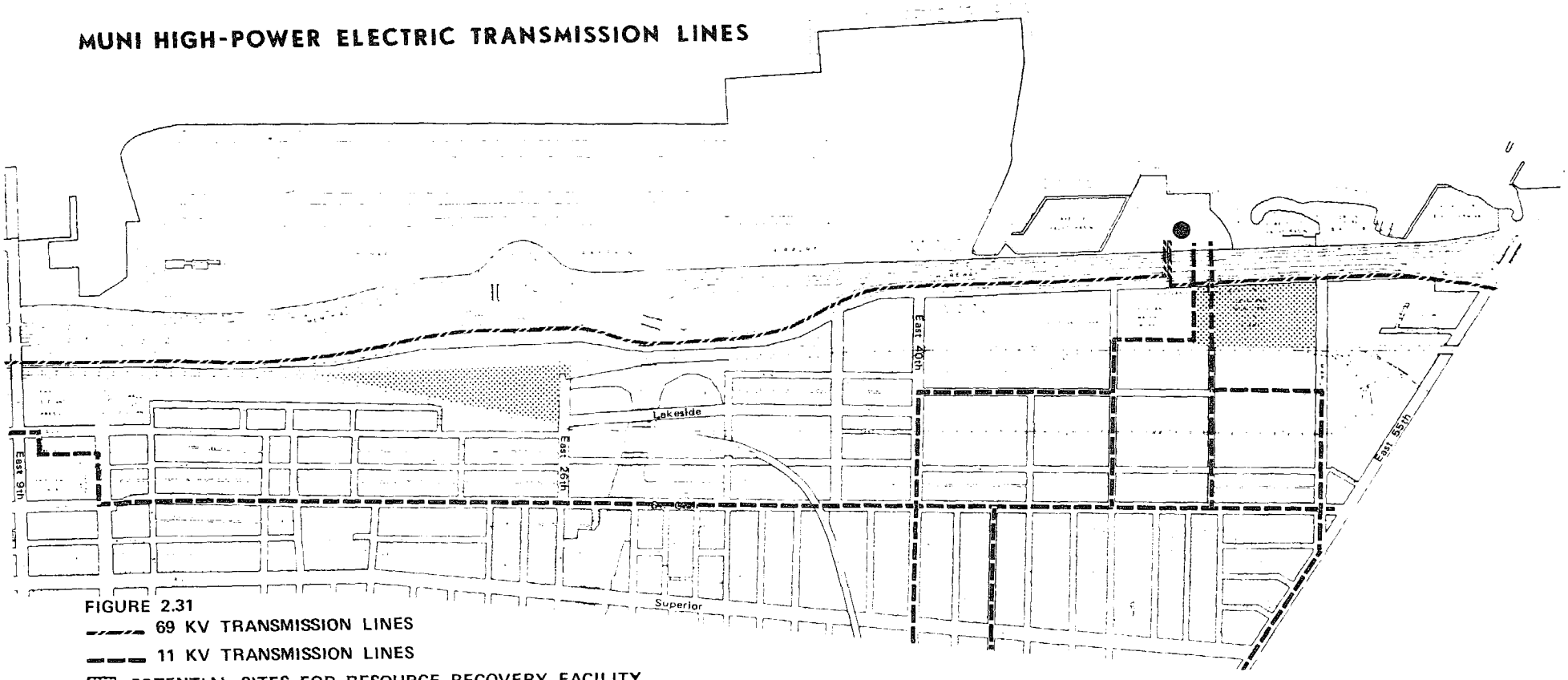

FIGURE 2.31

69 KV TRANSMISSION LINES

11 KV TRANSMISSION LINES

POTENTIAL SITES FOR RESOURCE RECOVERY FACILITY

CLEVELAND MUNICIPAL LIGHT PLANT

SOURCE: CITY OF CLEVELAND, DIVISION OF LIGHT AND POWER (MUNI)

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are relatively near a source of electricity, electrical service to a resource recovery facility should not be a significant problem.

East 26th Street Site

The Cleveland Electric Illuminating Company (C.E.I.) steam plant and substation are approximately 800 feet from this site. Two 132 kilovolt transmission lines from C.E.I. are located in Lakeside Avenue directly north of this site and are approximately 100 feet away. These lines travel south on East 26th Street to Hamilton Avenue, and continue east on Hamilton Avenue (Figure 2.30).

Muny Site

The Cleveland Municipal Light and Power Plant (Muny) is located approximately 400 feet from the proposed Muny site. One 69 kilovolt transmission line from Muny passes the site along South Marginal Road. In addition, several eleven kilovolt transmission lines from Muny pass through the western portion of the site, and a pair of 132 kilovolt transmission lines from C.E.I travel east along Hamilton Avenue to East 55th Street where they continue north past the Conrail tracks (Figure 2.31).

5. Steam Lines

The relative proximity of the East 26th Street Site to the C.E.I. Steam Plant and steam grid was an important consideration in the selection of the East 26th Street Site. Presently C.E.I. produces steam for customers located in the downtown area, including many large office buildings. The production of steam for sale to C.E.I. would likely be an important operation for a facility located on the East 26th Street Site (see Figure 2.32).

CUYAHOGA COUNTY RESOURCE RECOVERY PROJECT
ENVIRONMENTAL IMPACT ASSESSMENT REPORT

C.E.I. STEAM LINES

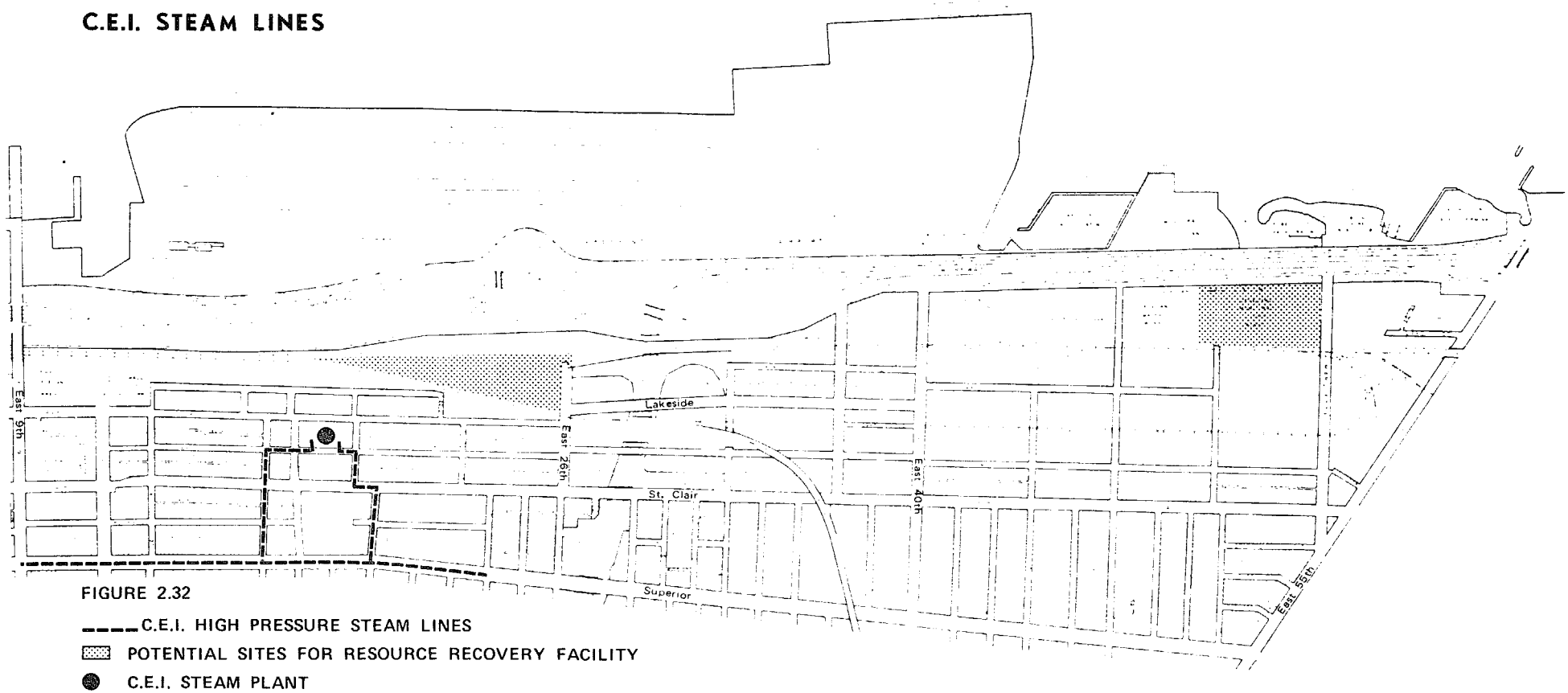

FIGURE 2.32

- C.E.I. HIGH PRESSURE STEAM LINES
- POTENTIAL SITES FOR RESOURCE RECOVERY FACILITY
- C.E.I. STEAM PLANT

SOURCE: CLEVELAND ELECTRIC ILLUMINATING COMPANY (C.E.I.)

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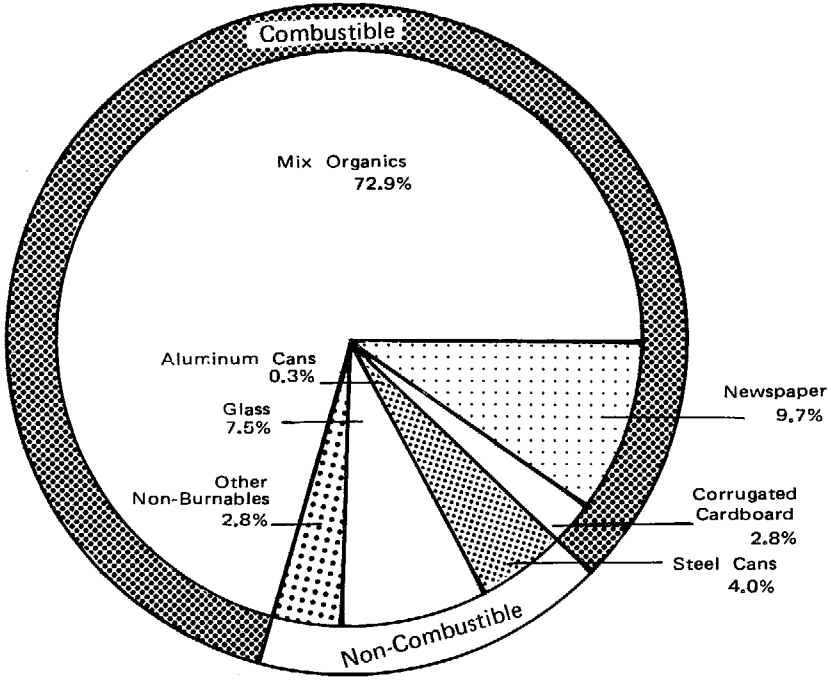
III. Waste Stream Characteristics

III.A. Waste Stream Composition and Solid Waste Quantity Fluctuations

One of the more important characteristics of the solid waste stream is its composition. An analysis of that portion of the solid waste stream that is comprised of combustible and non-combustible wastes allows for a determination of which types of wastes can be utilized for conversion of waste to energy and those which can be recovered and reused. Figure 3.1 on the following page depicts the 1974 national average of the composition of the residential waste stream. As is shown by Figure 3.1, 72.1% of the residential waste stream consisted of combustible materials such as corrugated paper, office paper and other organic wastes.[1] Non-combustible materials such as glass, aluminum cans and other non-organic wastes comprised 27.9% of the residential waste stream. While this information reflects the national average, a more current analysis of the Cuyahoga County solid waste stream was conducted by Resource Technology Corporation during January, 1980 at the Ridge Road Transfer Station in the City of Cleveland.[2] The Ridge Road Transfer Station was chosen as the sampling location primarily because it handles a representative segment of the total potential municipal solid waste stream for the Cuyahoga County resource recovery facility. The results of this sampling program, also shown in Table 3.1, show that in comparison to the national average, the Cuyahoga County waste stream shows a proportion for mixed organics that is 15% higher, while all other categories of the waste stream are reasonably close to the national average with the exception of Other Ferrous Metals and Corrugated Cardboard which have lower percentages than the national average. Although there was a higher percentage of organics in the sampled wastes, i.e., approximately 85% compared with about 80% for the national average, it should be noted that caution should be exercised in equating the ultimate waste stream composition of

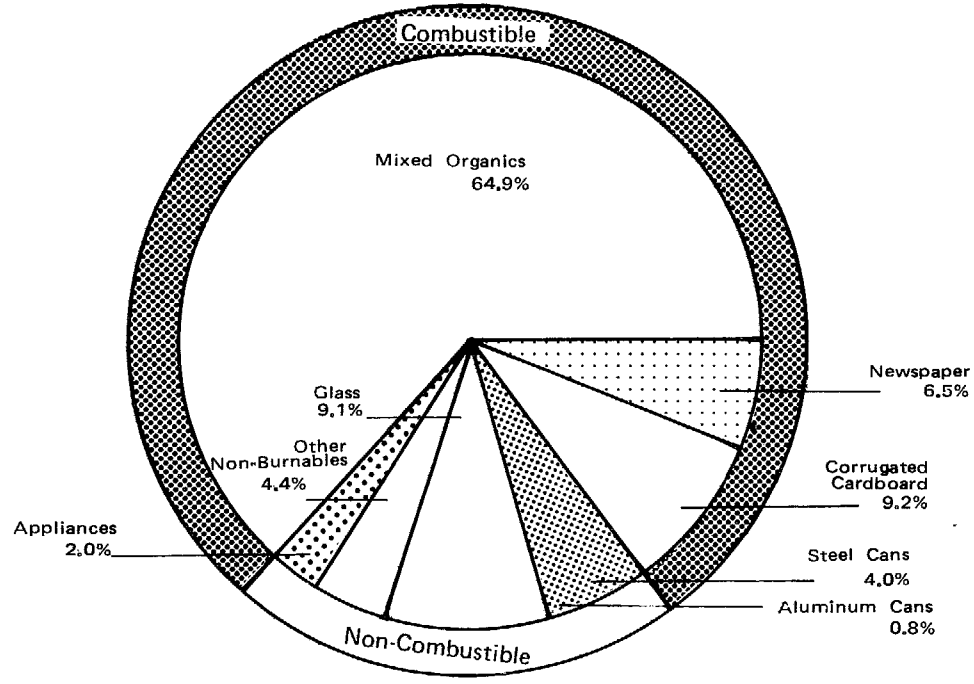
1. RPC, Office of the Cuyahoga County Sanitary Engineer, Cuyahoga County Solid Waste Management Report (June, 1980), p. 31.
2. Bechtel, Solid Waste Resource Recovery Facility Phase II Report (Aug., 1980) pp. 1-18.

FIGURE 3.1
COMPOSITION OF MUNICIPAL WASTE SYSTEM
CLEVELAND - 1980



SOURCE: Survey at Ridge Rd. Transfer Station, conducted by Bechtel, Inc. January, 1980.

COPMPOSITION OF MUNICIPAL WASTE SYSTEM
U.S.E.P.A. - 1977



SOURCE: U.S.E.P.A. Survey, 1977

TABLE 3.1 RESULTS OF RIDGE ROAD TRANSFER STATION WASTE COMPOSITION STUDY COMPARED TO NATIONAL AVERAGES

Material category	Percent of waste stream	
	National average	Ridge Road Sample
Mixed Organics	63.9	72.87
Steel cans	4.0	4.01
Other ferrous metals	2.8	0.75
Mixed non-ferrous	0.4	0.23
Aluminum cans	0.8	0.32
Other aluminum	0.2	0.45
Loose newspaper	6.5	9.60
News/bundles		0.16
Glass	9.2	7.51
Corrugated cardboard	9.2	2.74
Inorganics	1.0	1.36
Major appliances	2.0	0

Source: PEDCo Environmental, Source Separation in Cuyahoga County, (Dec., 1980), p. 4.

the County's 1750 ton per day facility and the waste stream composition from Ridge Road sampling program (30,000 lbs.) due to the difference in scale.

A knowledge of solid waste quantity fluctuations is important for the following reasons:[3]

1. Daily fluctuations provide the basis for determining peak day traffic. Storage area and handling requirements at transfer stations are also determined from daily fluctuation data. Available data show peak day solid waste quantities twice that of the annual daily average.

2. Weekly fluctuations are important when sizing solid waste storage at a resource recovery facility and determining the required peaking capacity.

3. Monthly fluctuations are important when sizing solid waste storage at a resource recovery facility and determining fluctuations in energy output. Specifically, the nominal size of waterwall incinerators and the monthly steam production can be determined.

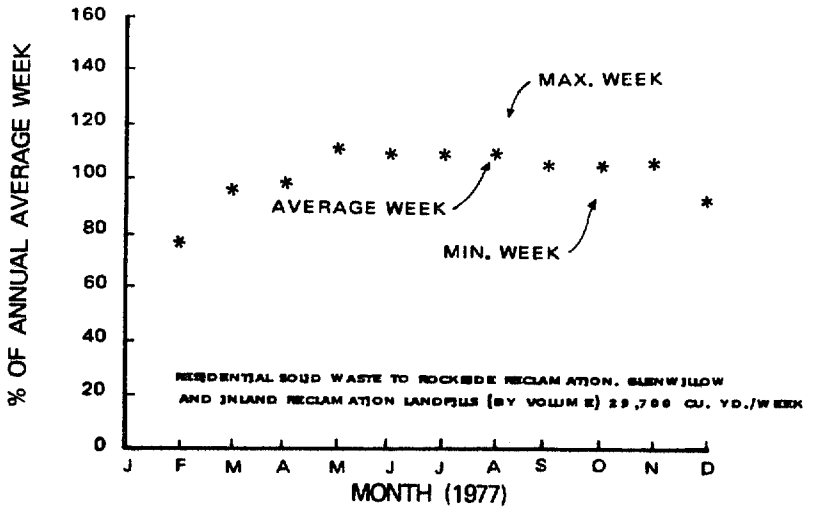
In order to determine solid waste quantity fluctuations that are likely to occur with respect to the County project, records from one incinerator, two transfer stations and three landfills in the County were analyzed in 1977. Volume data were analyzed from the Rockside Reclamation, Inland Reclamation and Glenwillow Works landfills. Weighed data were analyzed from the Rocky River and Shaker Heights Transfer Stations and from the Lakewood Incinerator. The volume data represented a data base of about 30,000 cubic yards per week (800 to 1100 tons per day). The weighed data was for about 20% as much solid waste, about 1350 tons per week (190 tons per day).

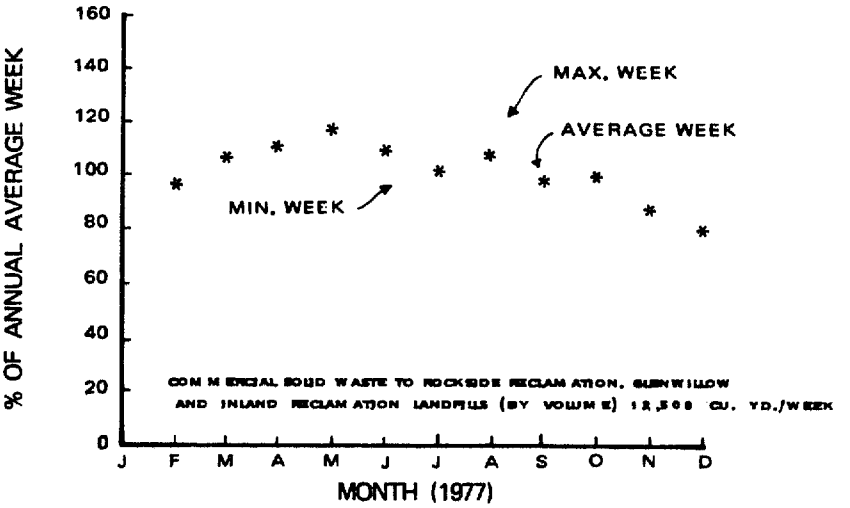
Figure 3.2 on the following page shows a graphic representation of the solid waste quantity fluctuations for the solid waste quantity data analyzed in 1977. Monthly solid waste is plotted in Figure 3.3 as each month's weekly average percentage of the annual weekly average which allows for comparison of each month's peak and minimum week data. Analysis of the data indicated:

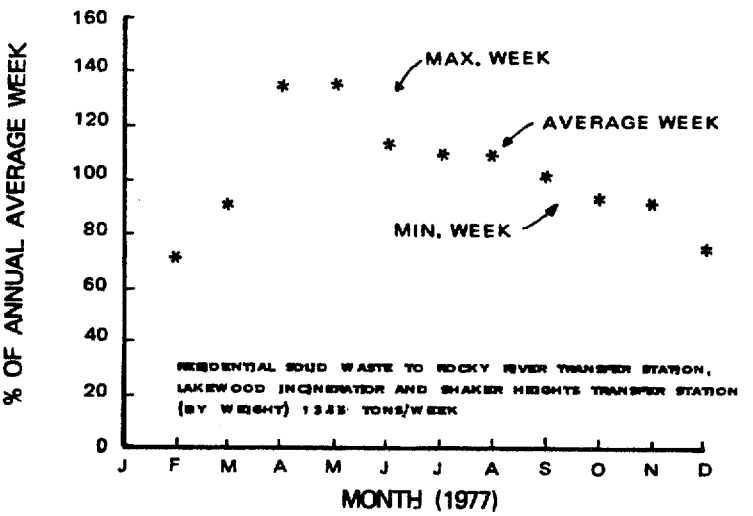
1. Seasonal fluctuations in commercial and residential solid waste differed significantly. Indications were that a facility receiving both commer-

3. Stanley Consultants, Resource Recovery from Municipal Solid Waste in Cuyahoga County-Implementation Plan (August, 1978), p. 8.

FIGURE 3.2 SOLID WASTE QUANTITY FLUCTUATIONS







SOURCE: Stanley Consultants, Resource Recovery From Municipal Solid Waste in Cuyahoga County - Memorandum 4 : Implementation Plan (August, 1978), Figure 2

cial and residential wastes will have lower annual solid waste quantity fluctuations.

2. Fluctuations in solid waste were less for larger service areas than for small. The fluctuations for the combined weighed solid waste were less than they were for any of the three individual weighed samplings. The data for the residential solid waste going to the three landfills could not be directly compared to the weighed data since volume data did not distinguish between full and partially full loads, which tends to smooth out fluctuations. However, even when considering possible partially full loads, the volume data tended to indicate less quantity (weight) fluctuations due to larger service areas.

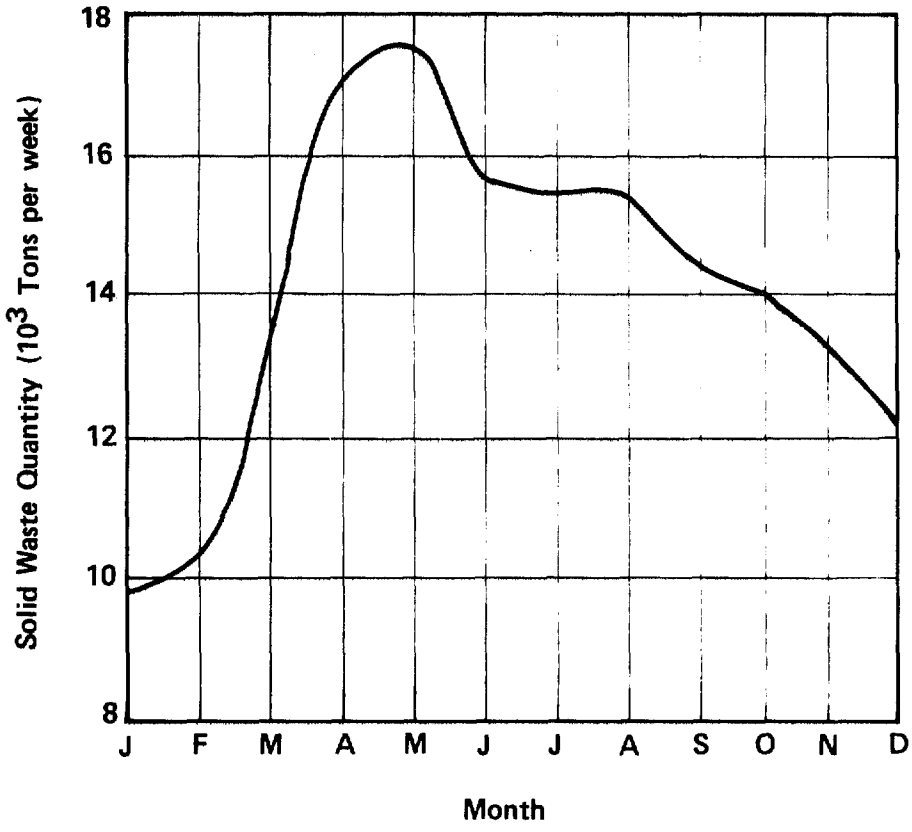
3. Peak residential solid waste quantities occur late in April and May. Spring clean-up operations can account for some of this increase. Increased moisture content may account for some of the increase.

In order to assist in the planning of the County's resource recovery facility and the determination of steam availability, an estimate of solid waste quantity fluctuations was prepared. Figure 3.3 on the following page shows the predicted weekly average solid waste quantities for any given month during the year. The monthly weekly average values range from a low of 70% in January to 125% in May (expressed as a percent of the annual weekly average). Weekly fluctuations within the month of May can be expected to range from about 110% to 140% of the annual weekly average. These monthly trends are expected to remain the same for larger systems.

III.B. Waste Origins

The purpose of this section of the Environmental Impact Assessment Report is to explain the origin of the solid wastes which are expected to be hauled to the resource recovery facility. It is assumed that the solid wastes to be hauled to the County's resource recovery facility will consist of municipally controlled solid wastes. Municipally controlled solid wastes include municipally collected residential wastes, and in some cases commercial and institutional, and privately collected residential wastes which are subject to contractual arrangements between the private hauler and the municipality. Industrial and commercial wastes outside any local collection contract are not expected to be hauled to the facility.

FIGURE 3.3 PROJECTED MONTHLY SOLID WASTE QUANTITIES



SOURCE: Stanley Consultants, Resource Recovery from Municipal Solid Waste in Cuyahoga County - Memorandum 4: Implementation Plan (August, 1978).

On the basis of these assumptions, annual solid waste quantities for each County community were projected for 1985, the estimated year of the start-up of the resource recovery facility.[4]

To date, a total of 37 communities have signed Letters of Intent to participate in the County's resource recovery program indicating their willingness to bargain in good faith. In addition, 13 other communities have signed Resolutions of Support or are otherwise expected to haul their wastes to the County's facility. Table 3.2 on the following page lists these 50 communities. Communities that have signed Letters of Intent have been designated with an asterisk (*). Figure 3.4 illustrates the geographic distribution of communities signing Letters of Intent and Resolutions of Support.

Table 3.2 and Figure 3.5 also show projected 1985 annual tonnage for the abovementioned 50 communities based on a five day week. Annual tonnage data represents the amounts of municipally controlled solid wastes that are expected to be hauled to the County's facility from the 37 communities that have signed Letters of Intent and the 13 other communities that may participate in the County's program. Assuming that these 50 communities will haul 100% of their projected 1985 solid wastes to the County's facility, nearly 646,700 tons per year, or about 2500 tons per day of municipally controlled solid wastes are expected to be hauled to the County's facility in 1985. However, a more reasonable assumption is that some of the outlying communities may not choose to participate in the County's program. Consequently, only a portion of their total wastes (50% for Letter of Intent communities, 25% for Resolutions of Support) should be calculated. Using this methodology, the total tonnage per year would be 574,609 tons or 2200 tons per day based on a five day work week. The size of the resource recovery facility, in terms of processing capacity is expected to be between 1400 and 1600 tons per day based upon a seven day week. It is apparent, however, that since the wastes would be collected on a five-day week basis, some storage for weekend consumption would

4. RPC, OEPA, Office of the Cuyahoga County Sanitary Engineer, Cuyahoga County Solid Waste Management Report, June, 1980, pp. 34-35.

TABLE 3.2

PROJECTED 1985 EXPECTED SOLID WASTE

PROBABLE PARTICIPATING COMMUNITIES	PROJECTED 1985 ANNUAL TONNAGE	PROJECTED 1985 TONS PER DAY
Beachwood*	4,682	18
Bedford*	4,867	19
Bedford Heights*	5,153	20
Berea*	7,491	29
Bratenahl*	444	2
Brooklyn*	6,258	24
Brooklyn Heights*	845	3
Brook Park*	14,341	55
Cleveland*	231,291	890
Cleveland Heights*	29,055	112
Cuyahoga Heights	520	2
East Cleveland*	13,675	53
Garfield Heights*	14,172	55
Lakewood*	42,717	164
Linndale	-	-
Maple Heights*	14,159	55
Middleburg Heights*	5,581	22
Newburgh Heights*	1,820	7
North Randall	260	1
Olmsted Township	4,336	17
Parma	55,956	215
Parma Heights*	7,060	27
Riveredge Township	-	-
Seven Hills*	5,992	23

(Continued)

TABLE 3.2 (Cont'd)

PROJECTED 1985 EXPECTED SOLID WASTE

PROBABLE PARTICIPATING COMMUNITIES	PROJECTED 1985 ANNUAL TONNAGE	PROJECTED 1985 TONS PER DAY
Shaker Heights*	16,500	64
South Euclid*	11,113	43
University Heights*	8,028	31
Warrensville Heights	6,364	25
Warrensville Township	-	-
Subtotal[1]	512,680	1976

PROBABLE PARTICIPATING COMMUNITIES HAVING SUBMITTED LETTERS OF INTENT	PROJECTED 1985 ANNUAL TONNAGE	PROJECTED 1985 TONS PER DAY
Bay Village*	15,446	59
Brecksville*	3,511	14
Fairview Park*	7,734	30
Glenwillow*	260	1
Highland Heights*	1,660	6
Independence*	3,843	15
Lyndhurst*	9,222	36
Mayfield Heights*	8,150	31
North Olmsted*	22,538	87
North Royalton*	6,206	24
Olmsted Falls*	3,575	14
Pepper Pike*	2,727	11
Richmond Heights	2,768	11
Rocky River*	13,212	51

(Continued)

TABLE 3.2 (Cont'd)

PROJECTED 1985 EXPECTED SOLID WASTE

PROBABLE PARTICIPATING COMMUNITIES HAVING SUBMITTED LETTERS OF INTENT	PROJECTED 1985 ANNUAL TONNAGE	PROJECTED 1985 TONS PER DAY
Strongsville*	11,281	43
Walton Hills*	1,364	5
Woodmere*	203	1
	113,700	439
Subtotal[2]	56,850 (50%)	220

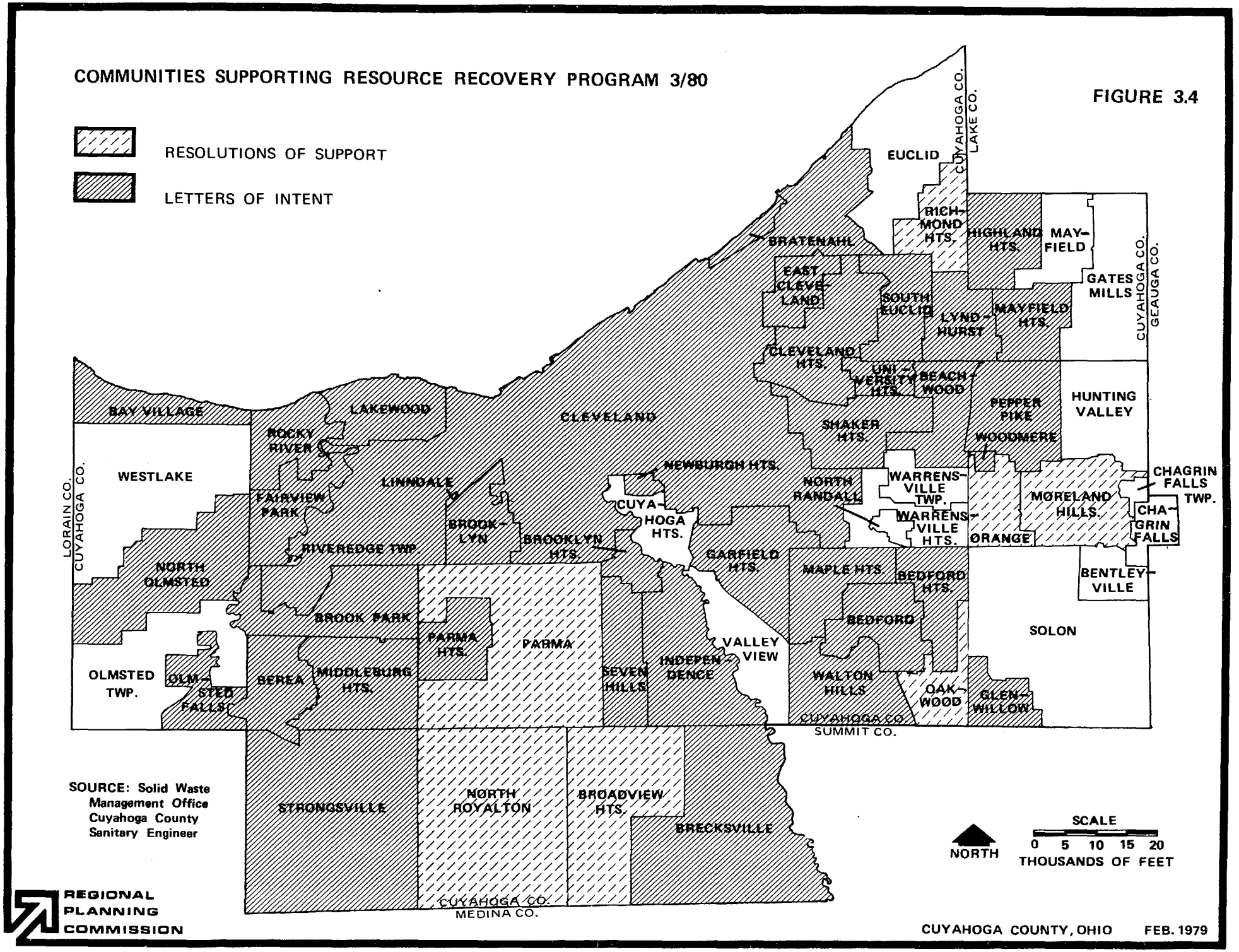
POSSIBLE PARTICIPATING COMMUNITIES HAVING SUBMITTED RESOLUTIONS OF SUPPORT	PROJECTED 1985 ANNUAL TONNAGE	PROJECTED 1985 TONS PER DAY
Broadview Heights	17,366	67
Moreland Hills	952	4
Oakwood	1,985	8
Orange	-	-
	20,303	79
Subtotal[3]	5,076 (25%)	20
GRAND TOTAL	574,606	2,216

*letter of Intent Communities

1. Figures represent 100% of the solid waste from probable participating communities.

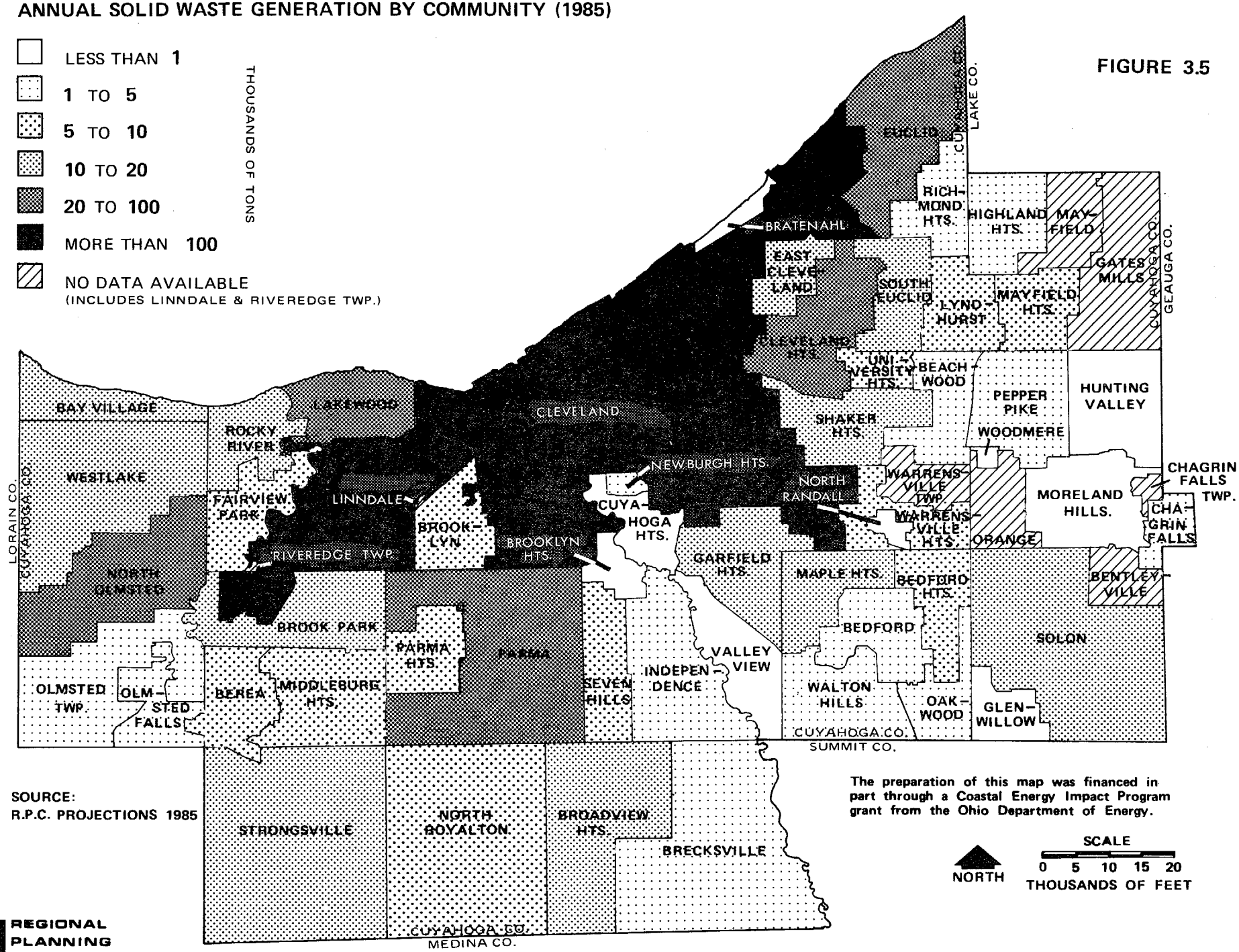
2. Figures represent 50% of the solid waste from possible participating communities submitting letters of intent. It is assumed that 50% of these communities will participate.

3. Figures represent 25% of the solid waste from possible participating communities submitting resolutions of support. It is assumed that 25% of these communities will participate.


COMMUNITIES SUPPORTING RESOURCE RECOVERY PROGRAM 3/80
FIGURE 3.4
RESOLUTIONS OF SUPPORT
LETTERS OF INTENT
EUCLID
CUYAHOGA CO.
LAKE CO.
RICH-MOND HTS.
HIGHLAND HTS.
MAY-FIELD
GATES MILLS
CUYAHOGA CO.
GEAUGA CO.
BRATENAHL
EAST CLEVE-LAND
SOUTH EUCLID
LYND-HURST
MAYFIELD HTS.
CLEVELAND HTS.
UNI-VERSITY HTS.
BEACH-WOOD
PEPPER PIKE
HUNTING VALLEY
SHAKER HTS.
WOODMERE
BAY VILLAGE
LAKEWOOD
CLEVELAND
ROCKY RIVER
WESTLAKE
LORAIN CO.
CUYAHOGA CO.
LINNDALE
NEWBURGH HTS.
NORTH RANDALL
WARRENS-VILLE TWP.
CHAGRIN FALLS TWP.
FAIRVIEW PARK
CUYA-HOGA HTS.
MORELAND HILLS.
CHA-GRIN FALLS
BROOK-LYN
BROOKLYN HTS.
WARRENS-VILLE HTS.
ORANGE
RIVEREDGE TWP.
GARFIELD HTS.
NORTH OLMSTED
MAPLE HTS.
BEDFORD HTS.
BENTLEY-VILLE
BROOK PARK
BEDFORD
SOLON
PARMA HTS.
PARMA
VALLEY VIEW
OLMSTED TWP.
OLM-STED FALLS
BEREA
MIDDLEBURG HTS.
SEVEN HILLS
INDEPEN-DENCE
WALTON HILLS
OAK-WOOD
GLEN-WILLOW
CUYAHOGA CO.
SUMMIT CO.
STRONGSVILLE
NORTH ROYALTON
BROADVIEW HTS.
BRECKSVILLE
CUYAHOGA CO.
MEDINA CO.
NORTH
SCALE
0 5 10 15 20
THOUSANDS OF FEET
SOURCE: Solid Waste Management Office Cuyahoga County Sanitary Engineer
REGIONAL PLANNING COMMISSION
CUYAHOGA COUNTY, OHIO
FEB. 1979

ANNUAL SOLID WASTE GENERATION BY COMMUNITY (1985)

FIGURE 3.5



SOURCE:
R.P.C. PROJECTIONS 1985

The preparation of this map was financed in part through a Coastal Energy Impact Program grant from the Ohio Department of Energy.

NORTH

SCALE
0 5 10 15 20
THOUSANDS OF FEET

REGIONAL PLANNING COMMISSION

be required. The basis for estimating the size of the plant is an analysis of the comparative risks and impacts of oversizing and undersizing the facility.

As was noted above, only municipally controlled solid wastes, that is, municipally collected residential wastes and in some cases commercial and institutional wastes, and privately collected residential wastes subject to contractual arrangements between the municipality and the private hauler, are expected to be hauled to the County's facility. It is recognized, however, that there are other types of solid wastes being generated within the County communities that will not be hauled to the County's facility. These wastes include municipally and/or privately collected commercial, industrial, institutional (schools, hospitals, etc.), construction, demolition, agricultural, sewage treatment plant and water treatment plant wastes and may comprise 50 percent of a community's overall wastes. It is assumed that municipally and/or privately collected commercial, industrial, institutional, construction and demolition wastes will continue to be hauled to landfills or incinerators for processing and disposal. Agricultural wastes are generally discarded where generated in rural areas, and due to the urbanized nature of Cuyahoga County, were not considered in projecting maximum or expected solid waste quantities. Finally, it is assumed that the major sewage and water treatment plants in the County processing sludge material by incineration or other means and disposing of residuals at landfills will continue to do so.

Some modification in the abovementioned projected 1985 expected annual tonnage and expected daily tonnage data will most likely occur because of changes in collection and/or hauling methods, potential recycling or source separation programs and changes in community interest in the County's project. In June, 1980, RPC prepared a transfer station analysis study which divided the County into Planning Service Areas (PSAs) which represent communities or groups of communities that are contiguous and have common characteristics such

as existing service agreements, solid waste volumes and transportation links.[5] These communities are either served by or have the potential to be served by common transfer stations and/or disposal facilities. As a result, changes in existing community collection and/or hauling methods to methods designed to achieve regional economies of scale may affect amounts of solid wastes to be hauled to the County's facility.

The initiation of various recycling or source separation programs in the County's communities may also result in modification in the projected 1985 expected annual and expected daily tonnage data. Earlier in this section, Table 3.1 summarized the results of a special sampling of the municipal waste stream at the Ridge Road Transfer Station to determine the percent composition of materials categories. Tables A-1 through A-4 in Appendix A show the tons of recoverable materials for each community based on their projected 1985 population and participation rates of 100, 50, 25 and 10 percent.[6] The 100 percent scenario represents the potential if source separation is mandated by local ordinance and everyone participates while the other scenarios apply variably depending on the phase of development of the source separation project. In the earlier stages of development of source separation programs, programs are expected to operate at less than a break-even level due to participation rates of 10 percent or less.[7] Source separation programs in Cuyahoga County are relatively new. Growth in participation rates will vary among communities based on factors such as population mix, community support and source separation program mechanics.[8] However, due to the fact that most recoverable materials are non-burnable, the total energy output of the County's resource recovery facility is not expected to be significantly affected. A listing of existing materials recycling projects in Cuyahoga County communities is shown by Table 3.3 on the following page.[9]

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5. PEDCo Environmental, Source Separation in Cuyahoga County, (Dec., 1980), p. 6. See also: RPC, OEPA, Office of the Cuyahoga County Sanitary Engineer, Cuyahoga County Solid Waste Management Report, (June, 1980), pp. 75-120.
6. Ibid., p. 5.
7. Ibid., pp. 5-6.
8. Ibid.
9. Ibid., p. 12.

TABLE 3.3 MATERIALS RECYCLING PROJECTS IN CUYAHOGA COUNTY

Community	Materials recycled and number of programs
Bay Village	Paper-1, glass-1
Beachwood	Paper-1
Bedford	Paper-2
Bedford Heights	Paper-1
Bentleyville	No data
Berea	Paper-1
Bratenahl	Paper-1
Brecksville	--
Broadview Heights	Paper-1
Brooklyn	Paper-3, aluminum-1
Brooklyn Heights	Paper-1
Brook Park	--
Chagrin Falls	Paper-2
Cleveland	Paper-8
Cleveland Heights	Paper-1
Cuyahoga Heights	--
East Cleveland	Paper-1
Euclid	Paper-2
Fairview Park	Paper-2
Garfield Heights	Paper-2
Gates Mills	--
Glenwillow	No data
Highland Heights	--
Hunting Valley	--
Independence	Aluminum-1
Lakewood	Paper-6
Lindale	No data
Lyndhurst	Paper-2, aluminum-1
Maple Heights	--
Mayfield	--
Mayfield Heights	--
Middleburg Heights	--
Moreland Hills	--
Newburgh Heights	No data
North Olmsted	Paper-3
North Randall	
North Royalton	--
Oakwood	--
Olmsted Falls	Paper-1
Orange	Paper-1
Parma	Paper-1
Parma Heights	Paper-1
Pepper Pike	--
Richmond Heights	Paper-1, aluminum-1
Rocky River	Paper-4, aluminum-1, glass-1
Seven Hills	--
Shaker Heights	Paper-3 (319 tons in 1979), glass-2 (73 tons in 1979), aluminum-2
Solon	--
South Euclid	Paper-1, aluminum-1
Strongsville	Paper-1
University Heights	Paper-1
Valley View	--
Walton Hills	Paper-1
Warrenville Heights	Glass-1
Westlake	Paper-1
Woodmere	--

Source: Pedco Environmental Source Separation in Cuyahoga County, Dec. 1980.

III.C. Routing

At the present time, communities in Cuyahoga County utilize one of three options with regard to the hauling of solid waste. The first and most common option is for the community to have its collection vehicles haul the wastes directly to a landfill or incinerator. The second alternative is to have municipal collection vehicles take their wastes to a transfer station, where larger vehicles then haul the wastes to a landfill. And thirdly, some communities contract with private collection and hauling firms to haul their wastes to a disposal site. Obviously, the hauling route depends on the location of the disposal site relative to the community.

A resource recovery facility would provide a centralized disposal facility for a large number of the County's municipalities. Both sites for the proposed plant are located near downtown Cleveland, and have excellent access to the rest of the County. The proximity of the sites to the Memorial Shoreway would allow the communities in the County to utilize interstate highways for much of the haul route.

As part of the resource recovery project, studies are currently being undertaken which will evaluate the possibility of instituting a County-wide network of transfer stations. The most significant problem encountered when proposing this system of transfer stations is the determination of a threshold limit on the number of stations actually required. The primary considerations in determining the scope of a transfer station network are summarized below.

Existing Facilities

The advantage of utilizing existing transfer stations is obvious: they are already sited and construction has been completed. The siting of new facilities is difficult, particularly in a highly developed urban area. Consequently, the use of other existing solid waste facilities, particularly obsolete municipal incinerators, should be seriously considered as possible transfer station sites.

While substantial conversion costs may be necessary, the construction of the building would not be required.

Service Area

Although most of the existing transfer stations service only the communities in which they are located, it is necessary to define larger service areas for regional facilities. It is apparent that a greater economy of scale can be achieved by several contiguous communities cooperating to utilize one transfer facility rather than each municipality building its own. Location of a facility within each service area is dependent on the remaining factors: volume and accessibility.

Volume. In order to determine the size requirement of the new facilities, it was necessary to estimate the amount of solid waste generated by each community for 1985, the year in which the resource recovery facility is expected to be completed. This was estimated by utilizing current annual waste generation figures for each community, dividing the figures by the city's population, and projecting this per capita figure to 1985. It was then necessary to determine the projected tonnage per working day of each community in their respective service areas. This enabled the size of each facility to be estimated in tons per day.

Accessibility. The location of the proposed transfer stations is highly dependent on the proximity to major arterials, preferably interstate highways. This facilitates the movement of collection vehicles to and from the transfer stations as well as the flow of transfer vehicles from the transfer facility to the disposal site. Good accessibility also reduces transport time.

The seven transfer stations proposed in this study include four existing stations (East Cleveland, Cleveland, Cleveland Heights and Shaker Heights) two converted municipal incinerators (Parma and Lakewood) and one new facility

(southeast suburbs).

The final determination on the number and location of transfer stations will be dependent on the cost per ton. Since the resource recovery plant will be located relatively close to some existing transfer stations, it is possible that it could be cheaper to direct haul the wastes from those communities. Even with a system of seven transfer stations, a number of communities would still haul direct to the plant.

There are several advantages which a transfer station has over direct hauling. First, it is beneficial in the sense that collection vehicles can return to their routes more quickly. Secondly, labor costs are reduced, since in most cases two or three men ride to the disposal site in the collection vehicle. A nearby transfer station thus reduces time spent away from the route. Thirdly, a decrease in maintenance costs can be achieved as collection vehicles are not designed for highway travel, and would not be subjected to the hazards of driving through landfills. Fourthly, a decrease in fuel costs would be achieved. Fifth, transfer stations allow communities to continue to use smaller and less expensive collection vehicles. And, finally, there would be substantially less congestion at the disposal site, regardless whether it is a landfill or the proposed resource recovery facility, since fewer trucks would be received at the site.

The advantage of fewer hauling vehicles also reduces the traffic flow on the streets near the resource recovery plant. Assuming the seven transfer stations discussed earlier are implemented, the following traffic pattern would most likely occur. Figures 3.6 and 3.7 indicate the minimum and expected transfer station service areas.

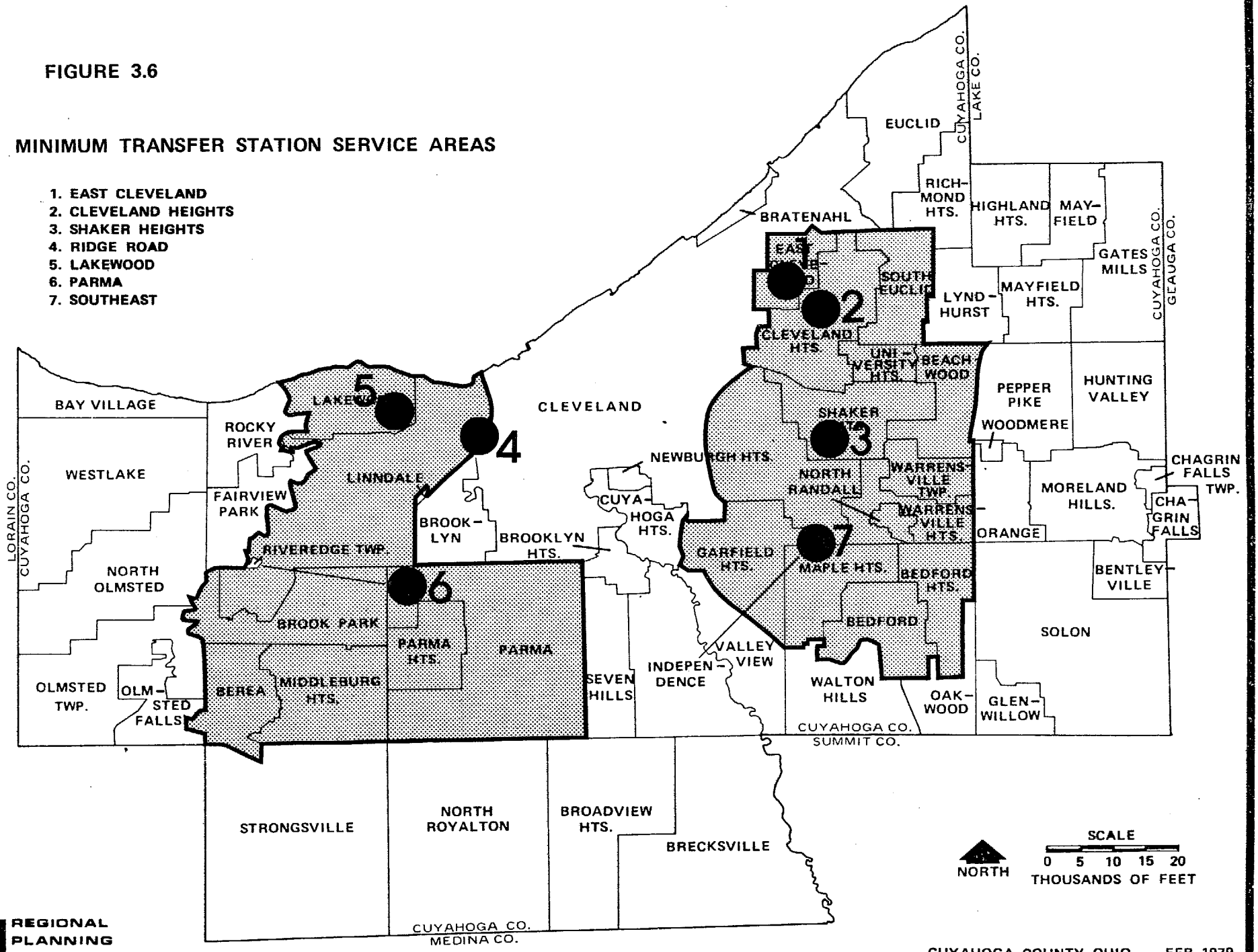
1. East Cleveland Transfer Station

This facility on Eddy Road near Euclid Avenue has been in operation since 1962, and consideration currently is being given to upgrading or replacing the station. Under the proposed transfer network, only the City of East Cleveland

FIGURE 3.6

MINIMUM TRANSFER STATION SERVICE AREAS

1. EAST CLEVELAND
2. CLEVELAND HEIGHTS
3. SHAKER HEIGHTS
4. RIDGE ROAD
5. LAKEWOOD
6. PARMA
7. SOUTHEAST



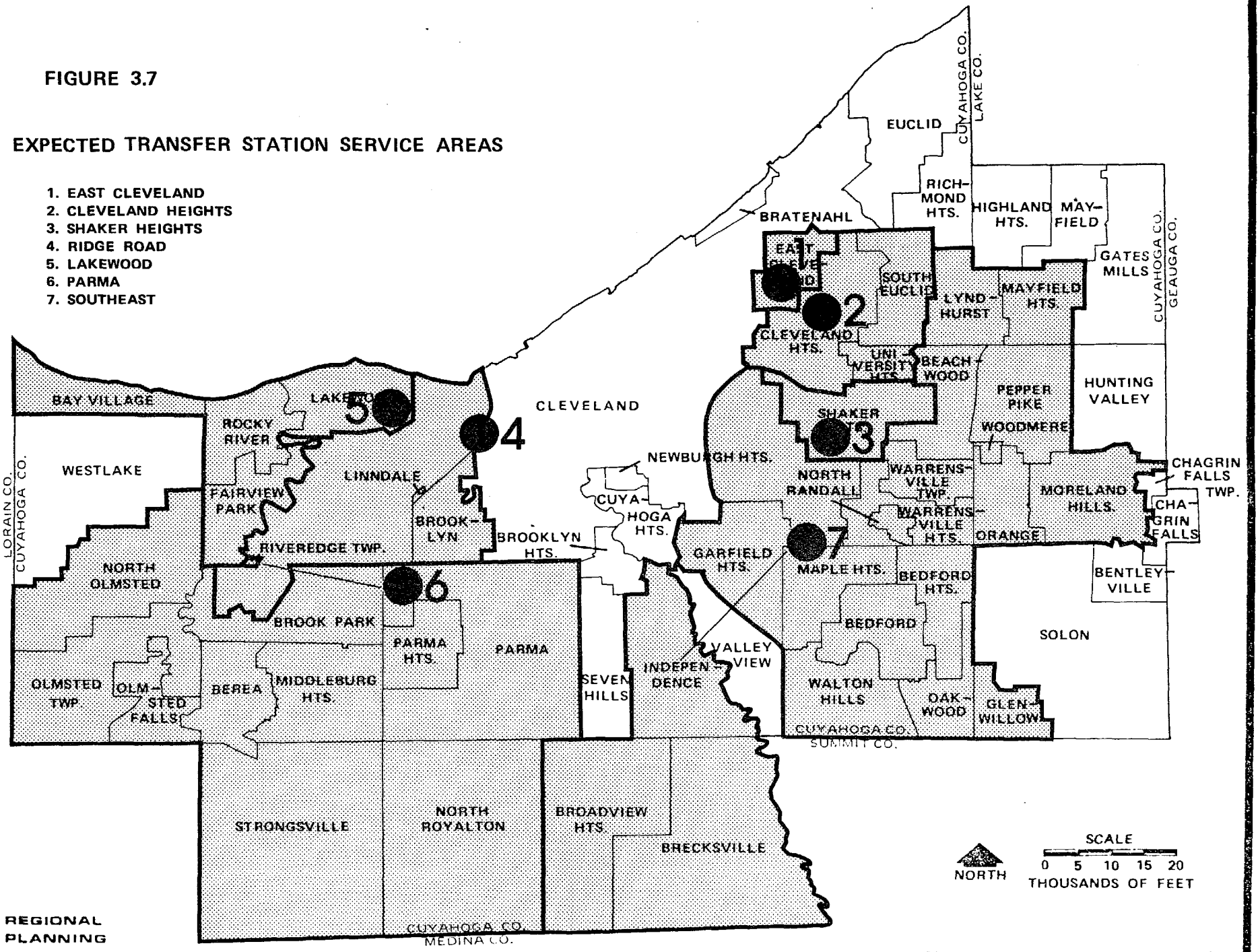
REGIONAL PLANNING COMMISSION

CUYAHOGA COUNTY, OHIO FEB. 1979

FIGURE 3.7

EXPECTED TRANSFER STATION SERVICE AREAS

1. EAST CLEVELAND
2. CLEVELAND HEIGHTS
3. SHAKER HEIGHTS
4. RIDGE ROAD
5. LAKEWOOD
6. PARMA
7. SOUTHEAST



would utilize the facility in conjunction with a resource recovery plant. Most adjoining communities would either utilize the Cleveland Heights station or direct haul to the resource recovery plant. It is possible that due to East Cleveland's relative proximity to downtown Cleveland, a transfer station may not be essential if the resource recovery plant is constructed.

The haul route to the plant would be via Eddy Road to Interstate 90. The distance to the resource recovery plant would be the least of any transfer station, approximately 5 miles one-way.

2. Cleveland Heights Transfer Station

This facility began operation in 1972, following its conversion from use as an incinerator. It is located on Mayfield Road near Superior Avenue. In the proposed transfer station network, the Cleveland Heights facility would serve the communities of Cleveland Heights and University Heights, which use the facility at the present time, and South Euclid. The haul route to the resource recovery plant would be north on Superior to Euclid Avenue, east on Euclid to Eddy Road, north on Eddy Road to Interstate 90 and west to downtown Cleveland. The distance one-way is approximately 6 miles.

3. Shaker Heights Transfer Station

This station, located on Chagrin Boulevard, started operation in 1971. Under the proposed network, the facility would continue to serve only the City of Shaker Heights. The route to the resource recovery plant in downtown Cleveland would be via Kinsman Road to Woodland to Interstate 77, a distance of 8 miles.

4. Cleveland Transfer Station

The Ridge Road transfer station is located on Ridge Road south of Denison Avenue on the west side of Cleveland. Since the resource recovery plant would be located in Cleveland part of the City could haul directly to the plant.

Under the County-wide system, the Ridge Road station would handle the west side of the City and possibly two smaller communities. Distance from the station to the resource recovery plant is 8 miles via Denison Avenue and Interstate 71.

5. Lakewood Transfer Station

The City of Lakewood has been operating an incinerator since 1931, but due to old age and increasingly stringent air pollution regulations, the city will cease operation of the facility and either demolish it or consider it for a potential transfer station in the future. Under the County's system, the Lakewood station would handle the City's waste, and possibly some additional northwest suburbs' as well. The most direct route from the transfer station to the resource recovery plant would be via Berea Road, West 117th and Interstate 90, a distance of approximately nine miles.

6. Parma Transfer Station

Like Lakewood, the City of Parma has also expressed an interest in converting its obsolete incinerator to a transfer station. Located in the northwest corner of the City at West 130th and Brookpark, it would serve Parma and the southwest suburbs of the County. Access to the resource recovery plant would be via Interstate 71 and the distance is estimated at 12 miles.

7. Southeast Transfer Station

While no specific site for a transfer station has been proposed in the southeast part of the County as yet, a large number of communities in this area would benefit from such a facility. The station should be located along the Interstate 480 corridor and thus would have excellent access to downtown Cleveland via Interstates 480 and 77, a distance of approximately 12 miles.

Direct Haul

There are some communities in the County which are not placed into one of the transfer station service areas. This is due to the fact that they are either

too distant from one of the existing or proposed transfer stations, or they would have easy and direct access to the resource recovery plant. Because these communities are scattered around the County, a separate transfer facility to serve them would not be feasible.

It is possible that the economic analysis will indicate that one more of the transfer stations is not economically viable. In this case, there would be additional communities direct hauling to the resource recovery plant. Should this occur, it is expected that the increased number of vehicles hauling direct to the plant will result in longer turn-around times at the plant, thus increasing the cost of collection since vehicles will take longer to return to their collection routes.

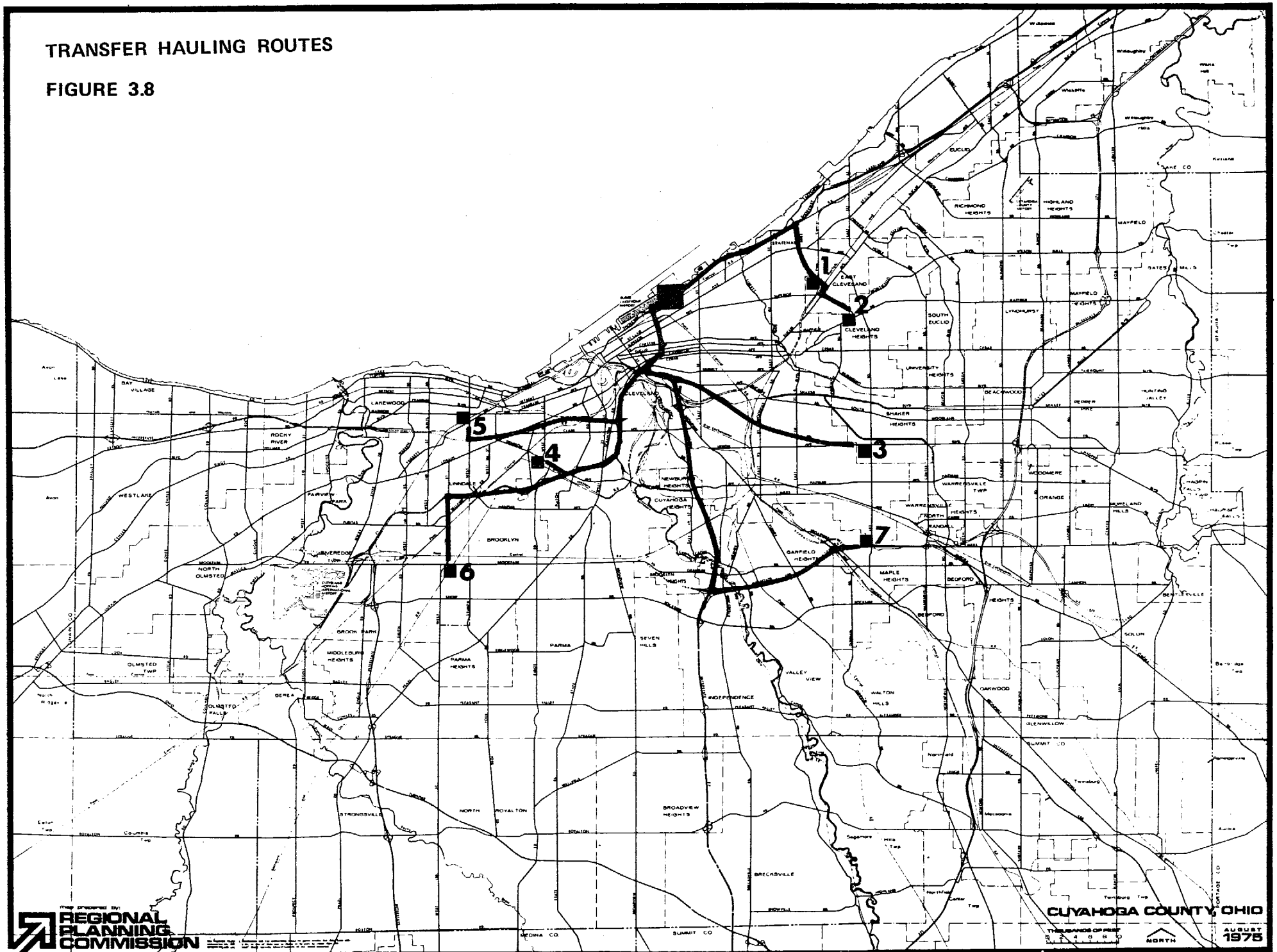
A much more detailed analysis of the operational capability of the street system to adequately handle the traffic generated at each proposed solid waste transfer site appears in Chapter 9 of the Cuyahoga County Solid Waste Management Plan (Regional Planning Commission, 1980). The following conclusions regarding routing can be made:

1) The implementation of a transfer station system such as the one proposed in this report could result in an approximate 45% reduction in the total number of waste vehicles on the County's roads.
2) Use of the transfer station sites in this report should not have any significant effect on the flow of traffic around the sites, as long as collection vehicles avoid peak-hour traffic periods as much as possible.
3) Since collection and transfer vehicles will be primarily utilizing high capacity arterials and interstates, the overall impact on traffic flow into the downtown area should be minimal.

The primary routes which can be expected to be used from each of the transfer station areas for either direct haul or transfer sites appear in Figure 3.8.

TRANSFER HAULING ROUTES

FIGURE 3.8



IV. Probable Impact of the Project on the Environment

IV.A. Impact on Utility Services

1. Gas

Natural gas would be needed only for heating of building and office space at the proposed resource recovery facility. Therefore, the demand for natural gas would be relatively low.

East 26th Street Site

Four inch low-pressure gas lines would adequately serve the proposed resource recovery facility. A six inch low-pressure gas line under Lakeside Avenue, or a four inch low-pressure gas line under East 26th Street would be able to serve the proposed facility. Should the demand for natural gas be greater than presently estimated, larger gas lines are potentially available for service. Eight, twelve, and twenty-four inch low-pressure gas lines are located along Lakeside Avenue and East 26th Street.

Muny Site

A four inch low-pressure gas line under Marquette Avenue would probably be sufficient to serve the proposed facility. If the demand for natural gas would be greater than presently anticipated, a larger gas line is potentially available to increase the existing supply to the site. A twenty-four inch low-pressure gas line is located under Hamilton Avenue between East 49th Street and Marquette Avenue.

2. Water

Water would be used at the resource recovery facility for pit-washing, ash-quenching, fly-ash wetting and cooling processes. Demand for water at the two sites would not be the same because of differences in facility design. If the facility were located on the East 26th Street site, the facility would probably be designed to produce steam for sale to CEI. Some electricity would also be generated at this site. A facility located on the Muny Site would most likely be designed to generate electricity for sale to Muny.

East 26th Street Site

Demand for water by a facility located on this site would be approximately 1.44 to 2.16 million gallons per day. Presently this area is served by an eight inch water main under East 26th Street and a twelve inch water main under Lakeside Avenue (see Figure 2.27). No records are available describing the capacity of these water mains. The availability of water in this area is being studied.

Muny Site

Demand for water by a facility located on this site would be approximately 1.44 million gallons per day. Indications are that the twelve inch water main which terminates at a point approximately 600 feet east of the center line of Marquette Street along South Marginal Road could presently meet this demand. This water main has a static water pressure of 90 pounds per square inch (psi) with a flow of 2.64 million gallons per day (M.G.D.) available at 77 psi and a flow of 6.55 M.G.D. available at 20 psi.[1] Present policy requires that a water main extend across the entire frontage of the premises served. Therefore, this twelve inch main, if selected to serve the site, would have to be extended in order to cover the entire frontage on South Marginal Road (see Figure 2.27).

3. Sewers

Much of the water used by the resource recovery facility will be reused for steam production and cooling processes. However, there are operations which can be expected to produce wastewater from the facility.

The following list shows potential full flow capacity of sewers near potential sites for the resource recovery facility.

1. Department of Public Utilities, Cleveland, Ohio, April 1981.

Sewer	Full Flow Capacity (gallons per minute)
Number 11 sewer in East 26th Street	80,608
Easterly Interceptor	Undetermined Capacity
Number 3 sewer in Marquette Street	10,863
Number 2 sewer in East 53rd Street	4,908

All existing sewers surrounding the potential sites have capacities which overwhelmingly exceed the potential outflow of the resource recovery facility. The sewer with the lowest capacity located in East 53rd Street is presently unused by surrounding development. It would undoubtedly be able to handle the flow of wastewater from the resource recovery facility. According to sources at the City of Cleveland Sewer Department, the flow of wastewater from the resource recovery facility would likely have negligible impacts on the municipal sewer system.

Discharge regulations of the Northeast Ohio Regional Sewer District would have to be met insofar as pretreatment is concerned. Neutralization of the wastewater by the addition of acid or base chemicals will be required for pH levels above 10 and below 5.5, before discharging to the municipal sewer system. The degree of pretreatment hinges on the characteristics of the wastewater, which are not predictable at this time. There is no foreseeable problem in meeting pretreatment requirements for the facility.[2]

4. Electricity

Because the operation of the proposed resource recovery facility would be an interruptible operation, i.e., breakdowns of equipment and the lack of an auxiliary fuel will cause an interruption in the generation of electricity, electricity would have to be purchased for the operation of the plant. Demand for electricity would be approximately three megawatts.

2. Solid Waste Resource Recovery Facility, Phase II, Bechtel Corporation, August 1980.

According to sources at C.E.I., existing transmission lines of C.E.I. and Muny have the capacity to serve the resource recovery facility at either site.

IV.B. Impact on Coastal Zone Areas

1. The Coastal Zone Management (CZM) Program

The Coastal areas of the nation received recognition as valuable and irreplaceable resources when Congress passed the Coastal Zone Management Act in 1972. The main purposes of the Act were to "encourage coastal states to develop and implement programs to protect coastal resources, address coastal problems and provide for management of coastal development. Planning for erosion, shoreline access and energy facility siting is also required by 1976 amendments to the CZM Act.[3]

The Ohio Department of Natural Resources (ODNR) was designated as the lead agency to develop Ohio's CZM program for Lake Erie and its shoreline in 1973. Since 1973, detailed studies of resources and problems of the coastal zone have been completed, geographic areas requiring special management have been designated, and the policies for the CZM program have been considered by countywide citizen advisory groups.

The results of the resource studies and recommendations by the advisory groups have led ODNR to the development of proposed objectives and policies for coastal zone management.

In assessing the potential impact that the proposed resource recovery facility would have on the Coastal Zone, an analysis of the two proposed sites must be made which will address the key issues and concerns of the CZM Program. This section will focus on how the proposed facility would affect: Coastal Erosion, Flood Hazard Areas, Air and Water Quality, Recreation and Public Access to the Lake, Environmentally Sensitive Areas, Energy and Mineral Resource Areas, and General Development of the Coastal Zone.

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3. Spring 1979 Public Review Draft, Ohio CZM Program, Ohio Department of Natural Resources, p.1.

2. Relationship of the Proposed Resource Recovery Facility to the Coastal Zone

The Coastal Zone extends from shore out to the U.S. Canadian boundary "and inland to the extent necessary to include all land and water uses which have a direct and significant impact on coastal water and resources.[4] Within the CEIP study area, the Coastal Zone boundary runs inland to the Conrail tracks.

As Figure 4.1 illustrates, both the Muny Site and the East 26th Street Site are near the Coastal Zone. The Muny Site is within the boundaries of the Coastal Zone and the East 26th Street Site is immediately adjacent to the Coastal Zone. Both sites lie south of the Shoreway, but the Muny Site is physically closer to the Lake Erie shoreline.

Both of the sites are in the midst of a predominantly industrially developed section of the Coastal Zone.

3. Potential Effects on the Coastal Zone

a. Coastal Erosion and Flood Hazard Areas

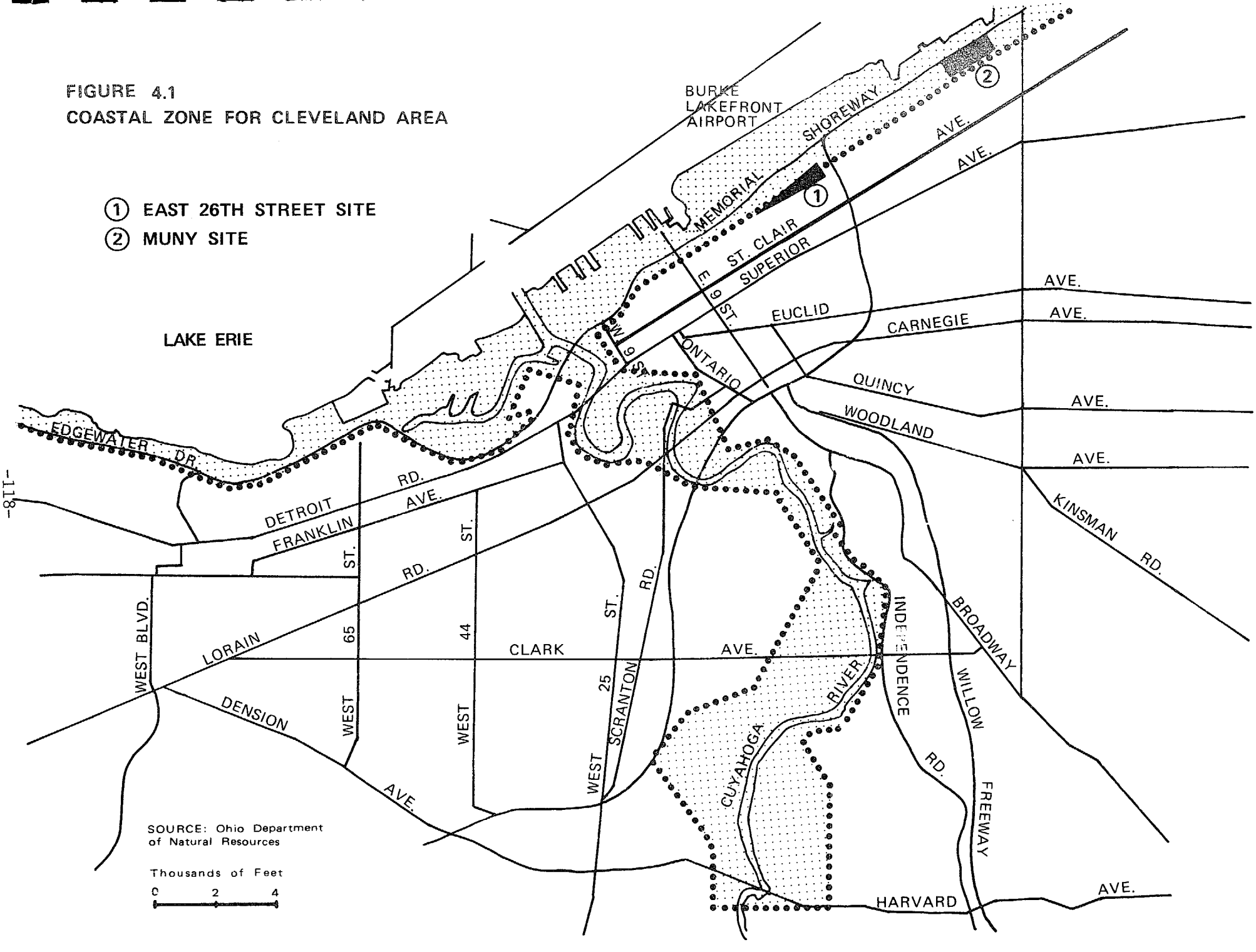
Coastal erosion is a serious problem affecting the increasing recession of Lake Erie's shoreline. Development allowed to locate in an erosion hazard or flood hazard area would be subject to severe property damage in addition to endangering public health, safety and welfare.

The Ohio CZM Program seeks to minimize the impacts of erosion and flooding upon the occupants of the coastal area and to eliminate public investment for non-compatible development in coastal hazard areas. It is therefore significant that the proposed resource recovery facility is located outside the erosion flood hazard area.

The proposed Muny Site is situated over 500 feet from the shoreline and is physically separated from the shoreline by the Memorial Shoreway.

4. Ibid., p.3.

FIGURE 4.1
COASTAL ZONE FOR CLEVELAND AREA



The proposed East 26th Street Site is physically separated from the Lake by the Clark Tennis Stadium and Tennis Courts, the Memorial Shoreway, and Burke Lakefront Airport. The site is located approximately 2400 feet from the Lake.

Presently, a breakwall located approximately 3000 feet from the shoreline serves to reduce the effects that wave action would have on the shoreline. Erosion, therefore, is not as significant along this section of shoreline as it is along other unprotected stretches. Neither site is located in an erosion or flood hazard area and neither site would be affected by or have any effect on coastal erosion and flood hazard areas.

b. Air Quality

The location of a resource recovery facility within the Coastal Zone raises valid concerns of its potential effect upon air and water quality. In an area that is targeted for attainment of National Ambient Air Quality Standards (NAAQS) set by U.S. EPA, any further addition of contaminants to the air would not only postpone attainment of standards, but more importantly could contribute to further degradation of air quality. In turn, air pollution would likely fall from the atmosphere with precipitation, causing water pollution where this precipitation falls into the lake.

The lowest achievable emission rates (LAER) for SO_2 and TSP will be of major concern.[5] The emission of dioxins will also be a concern. Any potential deterioration of air and water quality in the Coastal Zone would likely be controlled through strict enforcement of U.S. and Ohio EPA regulations. A more detailed discussion of air pollution emission controls and performance standards appears in the following chapter.

5. Solid Waste Resource Recovery Facility, Phase II Report, Bechtel, Inc., August 1980, pp. 7-9.

c. Water Quality

The most serious problem affecting the entire Coastal Zone is the pollution of Lake Erie and its tributaries. Lake Erie has changed over the last 100 years from a generally clear, low plankton, low nutrient lake supporting an abundance of fishlife, to a lake which is eutrophic (high in plant nutrients), with extensive areas of low dissolved oxygen, toxic chemicals, overabundant plankton, and low fish populations.[6]

By the 1960's and early 1970's, water quality had become so poor that nearly the entire lowermost layer of the central basin of the lake was devoid of oxygen. During summer, massive algae blooms were common in the western basin. Recently the trend toward low water quality has stabilized and is slowly improving.[7] However, efforts to solve the water quality problems must continue.

The present eutrophic state of the lake is due to nutrient enrichment, predominantly phosphorus. More than 50% of this nutrient derives from nonpoint sources, such as agriculture, urban runoff, construction, eroding shorelines, and the atmosphere. Sewage treatment plants contribute 32% of the phosphorus found in the lake. High nutrient levels reduce high-value fish populations and create foul tasting drinking water. Figure 4.2 indicates pollution intensity near the Cleveland lakefront in 1974. Since that time, water quality has improved dramatically.

Toxic chemicals that do reach the lake impact aquatic life and man's use of the Lake's resources. Governmental involvement mainly through the U.S. EPA has established programs to control and eliminate discharges of toxic effluent into the Lake.

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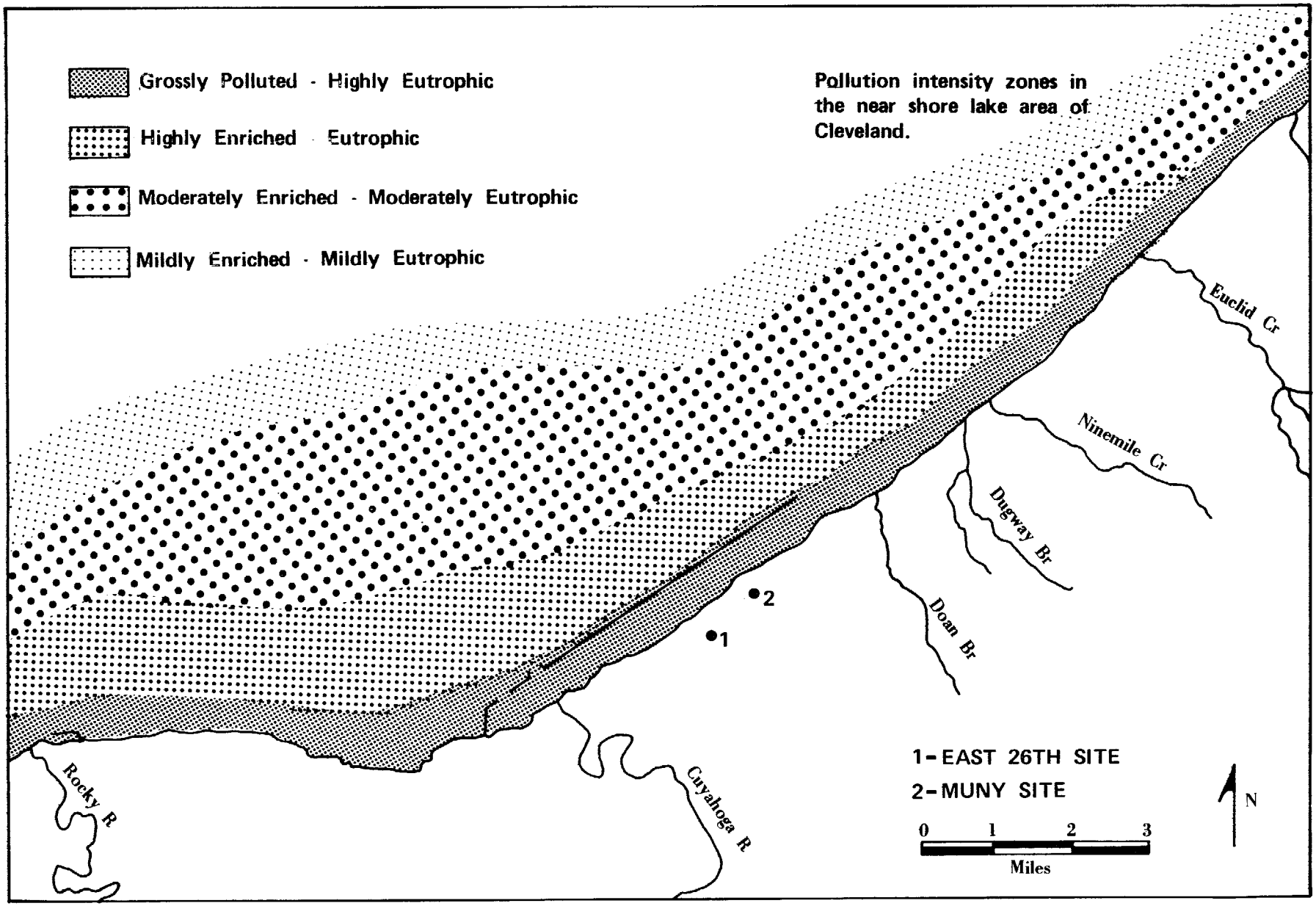
6. Spring 1979, Public Review Draft, Ohio CZM Program, Ohio Department of Natural Resources, p. 54.
7. Ibid., pp. 54 and 56.

FIGURE 4.2 POLLUTION INTENSITY ZONES - CLEVELAND NEAR SHORE LAKE AREA



SOURCE: "Water Quality Baseline Assessment for Cleveland Area - Lake Erie, Volume I - Synthesis", Garlauskas, A.B. and Hanok, M., EPA 905/9-74-005, May 1974

The Federal Water Pollution Control Act (1972) and its subsequent amendments established several programs to eliminate pollutant discharges into U.S. waters. These federal programs are implemented by the states under U.S. EPA approval.[8]

Section 201 requires planning and construction of municipal sewage treatment facilities. Section 208 requires Areawide Water Quality Management Plans which integrate the technical needs for pollution control and the management arrangements capable of implementing the controls. Section 401 requires certification that any proposed discharge into navigable waters will meet effluent and water quality standards. Section 402 established the National Pollutant Discharge Elimination System (NPDES) as the enforcement mechanism for achieving water quality standards. An NPDES permit, issued by OEPA authorizes certain levels of pollutant discharge and requires the service owner to monitor and routinely report actual effluent quality.[9]

OEPA has developed water quality standards to protect the health and welfare of the public and further the goals set forth under the Federal Water Pollution Control Act (FWPCA). However, the adoption of water quality standards has not solved all the water pollution problems. The authority to plan, develop and implement the requirements of FWPCA is not vested in any single government entity in Ohio. It is therefore important that construction of municipal sewage collection and treatment facilities and issuance of NPDES permits continue.[10]

It is expected that any excess wastewater from the facility will be discharged into the existing sewer. Due to the design of the existing sewage treatment system, a significant problem has often re-occurred. During

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8. Ibid., p.56.
9. Ibid., p.57.
10. Ibid., p.58.

periods of heavy runoff, excess wastewater goes into overflow sewers and is carried directly into the lake untreated. This problem would be most evident for wastewater discharged at the East 26th Street site where an overflow sewer is located in East 26th Street. It is unlikely that the resource recovery facility would cause this problem to be any more severe than it is at the present time as it would have to meet Sewer District standards. The quality of the wastewater being discharged by the resource recovery facility would be similar to that of wastewater already in the sewers.

Depending on the design of the facility, water used for cooling may be discharged directly into Lake Erie. This water will be heated to a temperature warmer than that of the Lake, but will not contain any contaminants. U.S. and Ohio EPA regulations controlling thermal pollution will have to be considered.

d. Recreation and Coastal Access

The most successful cities are those having a balance of elements necessary for growth and stability. Recreational facilities are essential to this stability and must grow, both in quantity and quality, as the other elements of the city develop. Unfortunately, the growth of parks and recreational facilities is often hindered by the many problems faced by urban areas. Thus, it is especially important to monitor new development near existing parks and recreational facilities as a measure against encroachment and adverse environmental impact.

In addition to the boating, fishing and swimming activities offered by the Cleveland shoreline, the aesthetic beauty of the lakefront can not be measured. Some parks take advantage of this aesthetic beauty by providing visual access to the water. There is a severe shortage of visual access along the entire Cleveland lakefront, especially in the downtown area near the port facilities. Although some open space parks

do exist along the Cleveland shoreline, there are many stretches of shoreline which are visually and physically inaccessible to the public. This is an outgrowth of the haphazard development of the lakefront and a tendency to overlook the aesthetic qualities of the shoreline. Better planning in the future, particularly with regard to redevelopment, may allow a reversal of this trend.

Public recreational facilities represent an excellent use of the lakefront. They allow maximum use of water oriented recreation by the public, general access to the shoreline and lake, and preservation of the shoreline for a maximum number of people.

Private recreational facilities are less desirable, but they do afford specific groups of people water-oriented activities. The overall needs of the Cleveland lakefront include additional beaches, parks and areas of public access along the shoreline in order that the public may better enjoy it as a natural resource.

Those recreational facilities located in the Coastal Zone which may be affected by the proposed resource recovery facility include a state park, a municipal park, boating marinas and yacht clubs, a tennis stadium, and tennis courts (see Figure 4.3). Recreational land uses presently utilize 40.6% of the Cleveland shoreline (see Table 4.1).

In 1977 the Ohio Department of Natural Resources (ODNR) took over the ownership, care and maintenance of the four lakefront parks owned by the City of Cleveland. Through the acquisition of these parks, ODNR has established a solid foundation for the restoration of Cleveland's lakefront. The four parks are Edgewater, Gordon, White City and Wildwood (see Figure 4.3). These four existing parks are cumulatively referred to as the Cleveland State Park. Although these four parks are not as large as most state parks, they do afford access to Lake Erie. Beaches, fishing

1 EDGEWATER PARK (CLEVELAND LAKEFRONT STATE PARK)
2 EDGEWATER MARINA
3 EDGEWATER YACHT CLUB
4 BULKLEY TENNIS COURTS
5 WEST 85th ST. PARK
6 CUDELL PARK
7 JOHN GALLAGHER
8 PUBLIC SQUARE
9 HUNTINGTON PARK
10 HANNA MALL
11 DONALD GRAY GARDENS
12 CHESTER COMMONS
13 HAROLD CLARK TENNIS STADIUM
14 TENNIS COURTS
15 STERLING RECREATION CENTER & POOL
16 KIRTLAND PARK
17 LAKESIDE YACHT CLUB
18 FOREST CITY YACHT CLUB
19 GORDON SHORES YACHT CLUB
20 EAST 55th MARINA (CLEVELAND LAKEFRONT STATE PARK)
21 GORDON PARK (CLEVELAND LAKEFRONT STATE PARK)
22 ROCKEFELLER PARK (CLEVELAND LAKEFRONT STATE PARK)

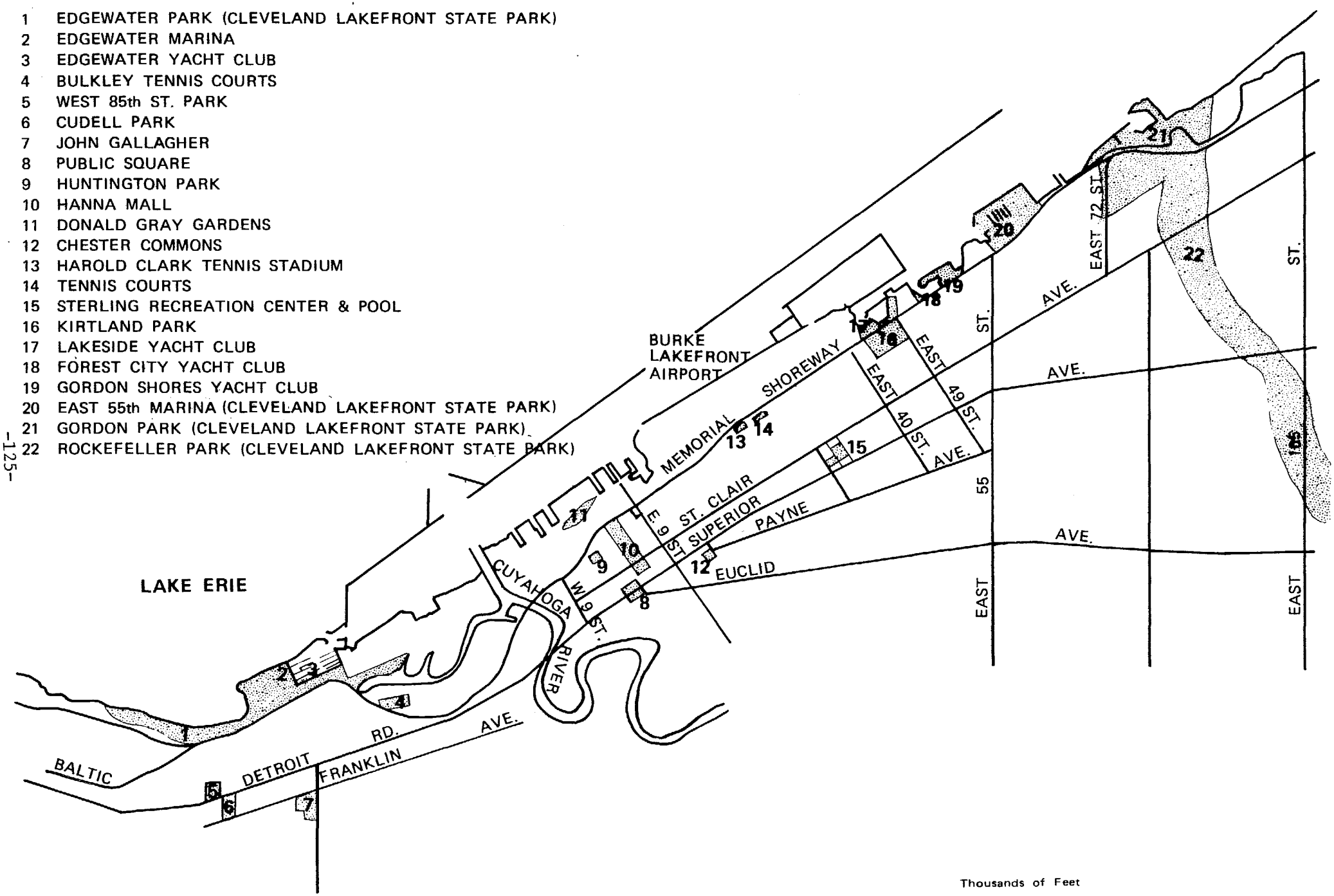

FIGURE 4.3 PARKS & RECREATION FACILITIES FOR CLEVELAND LAKEFRONT AREA

TABLE 4.1

DISTRIBUTION OF SHORELINE LAND USE
CITY OF CLEVELAND
1977

Use	Shoreline Frontage (ft.)	Percent of City Shoreline	Cleveland's Shoreline as a % of Cuyahoga County's Shoreline
TOTAL RESIDENTIAL	9,000	11.8%	11.9%
Single Family	7,800	10.2%	11.9%
High Rise Apts.	1,200	1.6%	13.0%
TOTAL RECREATIONAL	31,400	40.6%	60.2%
Municipal Recreation*	20,600	26.7%	74.1%
Private Recreation	4,600	5.9%	28.7%
Marinas	6,200	8.0%	100.0%
TOTAL COMMERCIAL	200	0.2%	50.0%
TOTAL INDUSTRIAL	24,800	31.9%	100.0%
Light Manufacturing	800	1.0%	100.0%
Port Facilities	7,000	9.0%	100.0%
Energy Producers	2,400	3.1%	100.0%
Sewage Treatment	4,000	5.1%	100.0%
Airport	8,000	10.4%	100.0%
Heavy Industrial	2,600	3.3%	100.0%
TOTAL INSTITUTIONAL	5,200	6.5%	72.2%
Schools	3,000	3.7%	88.2%
Military	2,200	2.8%	84.7%
TOTAL VACANT	7,000	9.0%	74.5%
Landfill	5,000	6.4%	100.0%
Other Vacant	2,000	2.6%	45.5%
TOTAL LAND USE	77,600 (14.6 mi.)	100.0%	45.5%

*Includes parks taken over by State of Ohio.

Source: Regional Planning Commission, Second Year Coastal Zone Management Report, 1977.

piers, marinas and yacht clubs in the Coastal Zone that may be affected by the resource recovery facility appear in Table 4.2. The effects of the resource recovery facility on marinas and yacht clubs would most likely be negligible.

Gordon Park is the only one of the four parks making up the Cleveland Lakefront State Park which could be impacted by construction of the resource recovery facility. Gordon Park, located on the lakeside near East 72nd Street, is approximately two and one-half miles from the East 26th Street site and approximately one and one-half miles from the Muny site. Facilities available at Gordon Park include the following: parking, shelters, twelve tennis courts, six softball diamonds, a soccer field, bleachers, a marina and boat launching facilities.

TABLE 4.2
Yacht Clubs and Marinas

Facility	Location
Edgewater Marina	6700 West Shoreway
Edgewater Yacht Club	6700 West Shoreway
Lakeside Yacht Club	4851 North Marginal Road
Forest City Yacht Club	5300 Memorial Shoreway
Gordon Shore Yacht Club	5401 Memorial Shoreway
East 55th Marina	East 55th and Shoreway

Kirtland Park, located approximately 800 feet west of the Muny site on South Marginal Road, is the only park operated by the City of Cleveland in the Coastal Zone that may be affected by the resource recovery facility. Facilities available include the following: restrooms, drinking fountains, seating, a softball field, bleachers, and an amphitheater.[11]

Tennis courts and the Harold T. Clark Tennis Stadium are located south of the Shoreway approximately 400 feet from the proposed East 26th Street site.

11. Cleveland Parks and Recreation Study, William A. Behnke Associates, Landscape Architects, 1976, p. 53.

Any reduction in air or water quality or increase in litter as a result of the proposed resource recovery facility must be controlled to insure that the impacts upon nearby recreation facilities are minimal. It is unlikely that these process emissions would be a problem because federal, state and local regulations governing these process emissions will be met. Additional information concerning process emissions are discussed in Chapter V.

4. Objective of CZM Program

The objective of the CZM Program concerning recreation is as follows: "Improve existing and develop new public shoreline recreation and access opportunities". ODNR, as designated lead agency, will administer and monitor the CZM Program. The following policies will be used to implement the recreational objective of the CZM Program:

1) ODNR, through the State Parks Program, Community Parks and Recreation Program and Urban Rivers and Waterfront Development Program, will continue to increase public recreation facilities and access in the coastal area.

2) ODNR, through its fish and wildlife management programs, will continue to increase public fishing access and hunting opportunities in the coastal area.

3) ODNR, through the Division of Watercraft Community Assistance Program and the Lake Erie Refuge Harbors Program, will continue to increase opportunities for public recreational boating in the coastal area.

4) ODNR, through the Statewide Trails Program, will encourage development of hiking and bicycling trails along the Lake Erie shoreline.

5) The CZM Program will encourage the retention of surplus public property along the shoreline in public ownership.[12]

a. Impacts Upon Recreation in the Coastal Zone

The proposed resource recovery facility will probably not interfere with the recreational objectives of the CZM Program. Most importantly,

12. Spring 1979 Public Review Draft, Ohio CZM Program, Ohio Department of Natural Resources, p. 7.

the potential sites are located far enough from the shoreline to avoid conflict with potential recreational opportunities. No land along the shoreline would be lost to private ownership.

The impacts due to air pollution, water pollution, odors, noise and litter upon existing recreational facilities would have to be determined. Such negative impacts would adversely affect existing facilities, and will be discussed in Chapter V.

b. Environmentally Sensitive Areas

Lake Erie is an environmentally sensitive area, as defined by the CZM Program, which would be influenced by the proposed resource recovery facility. The Lake is generally divided into three distinct basins: western, central, and eastern. The Cleveland Harbor area, which includes both of the proposed refuse facility sites, is located in the western one-third of the central basin. The lake is generally deeper and has more water circulation from west to east. The central basin has a mean depth of 60 feet and a maximum depth of 80 feet.[13]

Water temperatures increased uniformly from top to bottom from autumn until late spring. During the spring, warming of the surface of the lake causes an increase in the density of the surface water which sinks and results in the spring overturn. As the lake warms to its summer temperature, a stratification sets in resulting in the formation of three layers; the hypolimnion (the lower fairly homogeneous cold layer), the epilimnion (an upper homogeneous layer of warmer waters), and the thermocline (a fairly narrow layer of rapid temperature change from the warm upper layer to the cold lower layer). There is very little exchange of water between the layers. As the surface waters are cooled during the fall they become denser as they approach 4°C and then begin to sink to the bottom creating the

13. Corps of Engineers, U.S. Army Buffalo District (1975) Preliminary Feasibility Study of Cleveland Harbor, Ohio.

fall overturn. Ice then forms on the surface and winter conditions resume as before.[14]

During the past forty years, the addition of phosphorus to Lake Erie has been a problem. Phosphorus enters the lake in many ways: from runoff, agricultural land uses, industrial land uses, municipally treated sewage, etc. The addition of phosphorus to the lake has stimulated the growth of unsightly primitive blue green algae and other plants causing a depletion of oxygen in large portions of the lake. Since 1971, the U.S. has spent more than $4.3 billion on sewers and treatment plants in the Great Lakes Basin, in part to reduce phosphorus pollution.[15] As a result of these efforts, areas of the lake lacking oxygen have been reduced in size (see Figure 4.4).

Water runoff into Lake Erie is provided primarily from local rivers, streams and surface runoff. Major pollution points include the Cuyahoga River mouth and the Easterly and Westerly Waste Water Treatment Plants. Water quality deteriorates from west to east across the Cleveland shoreline, and improves further out from shore. Most of the rain which falls along the Lake Erie shoreline is carried into the Lake as surface runoff. Clay is often carried into the Lake by this runoff, and very little water is retained by soils along the shore.[16]

Lake Erie is the shallowest of the Great Lakes and as such is subject to rapid condition changes in local depth, temperature, and sediment levels. This shallow depth also means that pollutant loads caused either by runoff or by discharge have a quicker and possibly more irreversible effect on Lake Erie than on the other Great Lakes. Both of the proposed project sites lie directly in the Lake Erie watershed and just to the east of the Cuyahoga River discharge. Approximately 80% of the Cuyahoga River dis-

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14. Corps of Engineers, U.S. Army Buffalo District (1976) Cleveland Harbor Navigation Project, Cleveland, Ohio, Draft Environmental Statement.
15. An Explosion of Life, Great Lakes Communicator, November 1979, p.3.
16. Corps of Engineers, U.S. Army Buffalo District (1976) Cleveland Harbor Navigation Project, Cleveland, Ohio, Draft Environmental Statement.

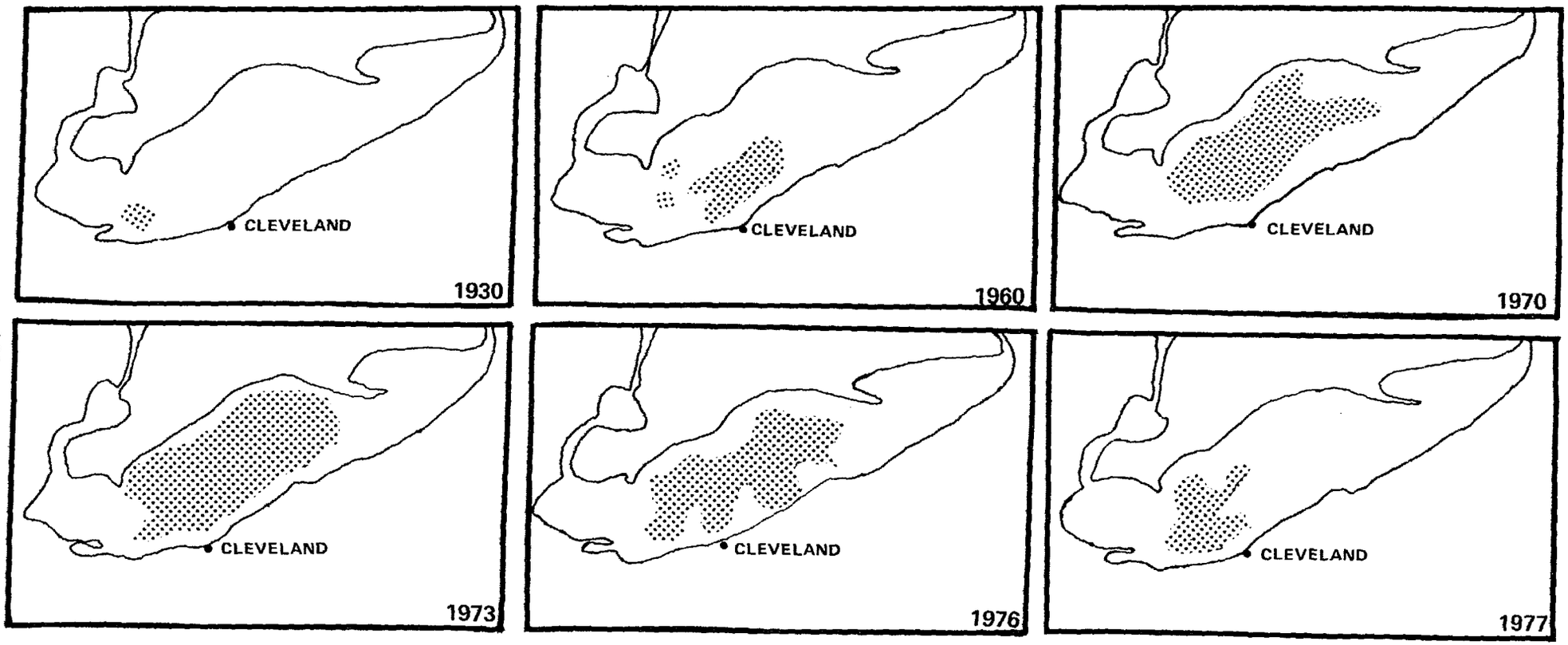

FIGURE 4.4

DEAD AREAS OF LAKE ERIE'S BOTTOM

AREAS STARVED OF OXYGEN SOMETIME EACH SUMMER.

SOURCE : GREAT LAKE COMMUNICATOR, NOVEMBER 1979, PAGE 4.

charge is trapped by the Cleveland Harbor Breakwall and flows along the immediate shoreline east past both proposed facility sites. The Cleveland Harbor would be more likely to experience impacts associated with the proposed resource recovery facility as opposed to the entire lake in general.

The Cleveland Harbor is, for the most part, an artificial environment. The man-made segmentation of the harbor has created a number of microhabitats. At one time, Lake Erie was inhabited by such fresh water species as the great northern pike, muskellunge, walleye, lake trout, silver chub, burbot, and smallmouth blackbass. The ongoing pollution served to gradually extirpate or greatly reduce these and other species in the Cleveland Harbor area. Recent antipollution efforts have shown that this condition can be reversed. Examination of both the proposed sites indicates no difference in the current or projected water conditions.

The growth of the Cleveland area and the resulting deterioration of the lake has resulted in an increased nutrient level in the lake which intensifies near the shoreline. The increased pollution and resulting high nutrient levels have resulted in the proliferation of eutrophic phytoplankton. Eutrophic forms are those adapted to low dissolved oxygen and high nutrient levels. The high nutrient levels have allowed a tremendous production of these eutrophic forms resulting in a tremendous increase in the overall biomass.

High biomass production periods occur in the spring and fall due to the biennial turnovers. The production is higher in the fall due to the favorable water temperature conditions. During August and September, the green algae are the dominant form followed by Ceratium. Diatoms are the most dominant form in the winter.[17] Algae production can reach such

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17. Water Quality Baseline Assessment for Cleveland Area - Lake Erie, Volume I - Synthesis, Garlauskas, A.B. and Hanok, M., EPA 905/9-74-005, U.S. Environmental Protection Agency, Region V, May 30, 1974.

an amount in late summer that the Cleveland shoreline can experience an algae bloom, during which the nearshore waters become a greenish color because of the heavy biomass production. The overall result of the continuous pollution is increased decay of organic matter, a lowering of the dissolved oxygen content of the water, increased water temperatures, increased water turbidity, and a resulting change in the ability of the area to support a freshwater aquatic community (See Figures 4.5 and 4.6).

Pollution-caused turbidity and siltation have decreased available light penetration and also have continuously covered bottom growing aquatic plants with silt. As a result, aquatic vegetation beds have been largely destroyed. Currently, the only attached vegetation includes attached algae on restricted breakwall areas, pilings and docks below the water surface. Growth in the spring is initially made up of attached green algae (Ulothrix) which is then gradually replaced by mats of Cladophora. The formed algae mats contain an extremely complicated microecosystem which forms an extremely important food source for young fish in the area particularly when the absence of normal bottom vegetation is considered.[18]

The pollution and increasingly eutrophic nature of the harbor area has affected animal life as well as plants. Pollution tolerant species of invertebrates such as oligochaetes (slugworms), chironomids, and fingernail clams are now the dominant species of the bottom dwellers.[19] Cladocerans and a brackish water species, Eurytemore affinis are dominant among zooplankton; and reflect again the succession toward eutrophic animal and plant forms.[20] Altogether, over 100 types of benthic macro-

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18. Water Quality Baseline Assessment for the Cleveland Area-Lake Erie, Volume II-The Fishes of the Cleveland Metropolitan Area Including the Lake Erie Shoreline, Chicago: Office of Research and Development, U.S. EPA, A.M. White, M.B. Trautman, E.J. Foell, M.P. Kelty and R. Gaby (1975).
19. Garlauskas, A.B., op. cit.
20. Corps of Engineers, U.S. Army Buffalo District (1975) Preliminary Feasibility Study of Cleveland Harbor, Ohio.

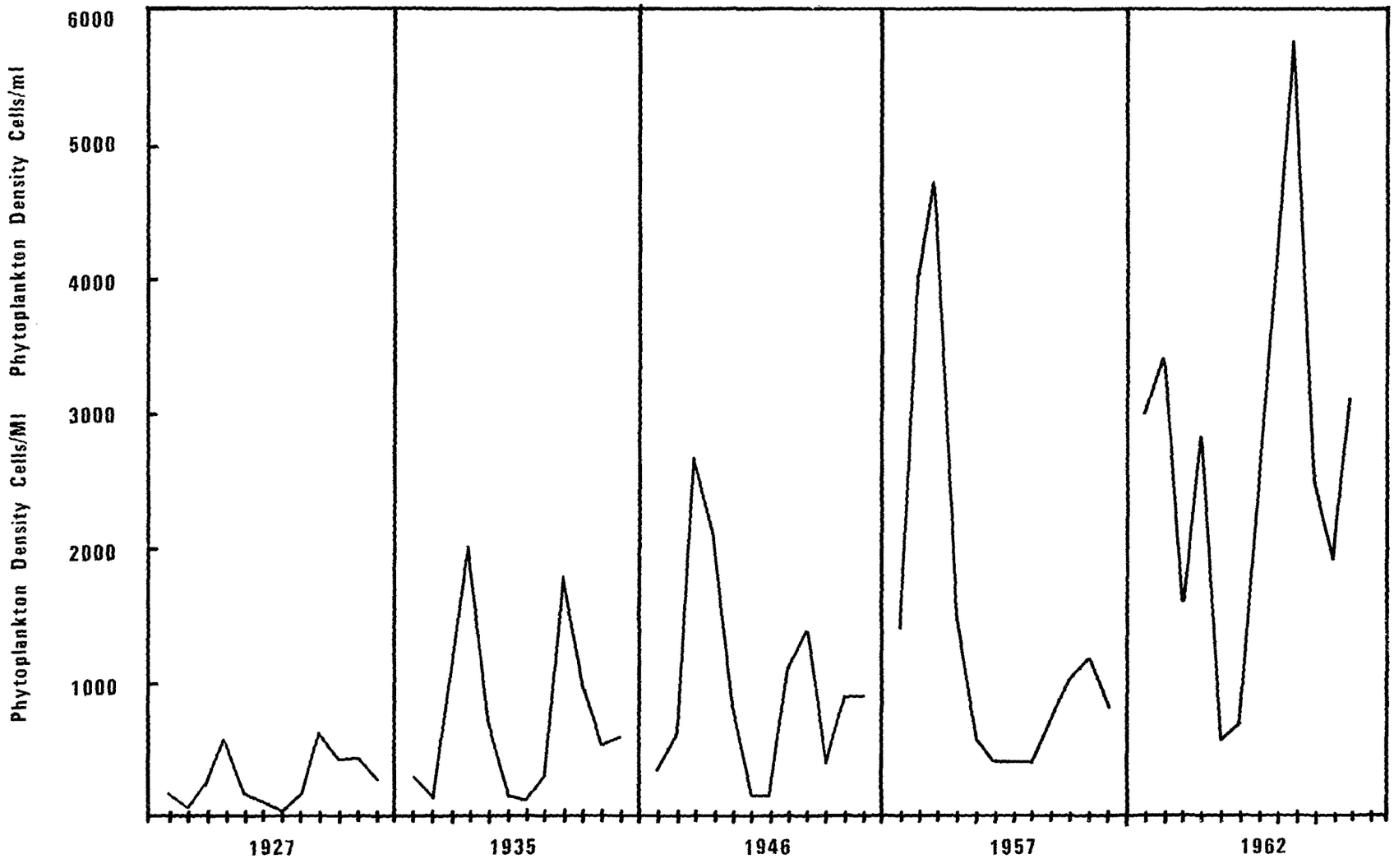
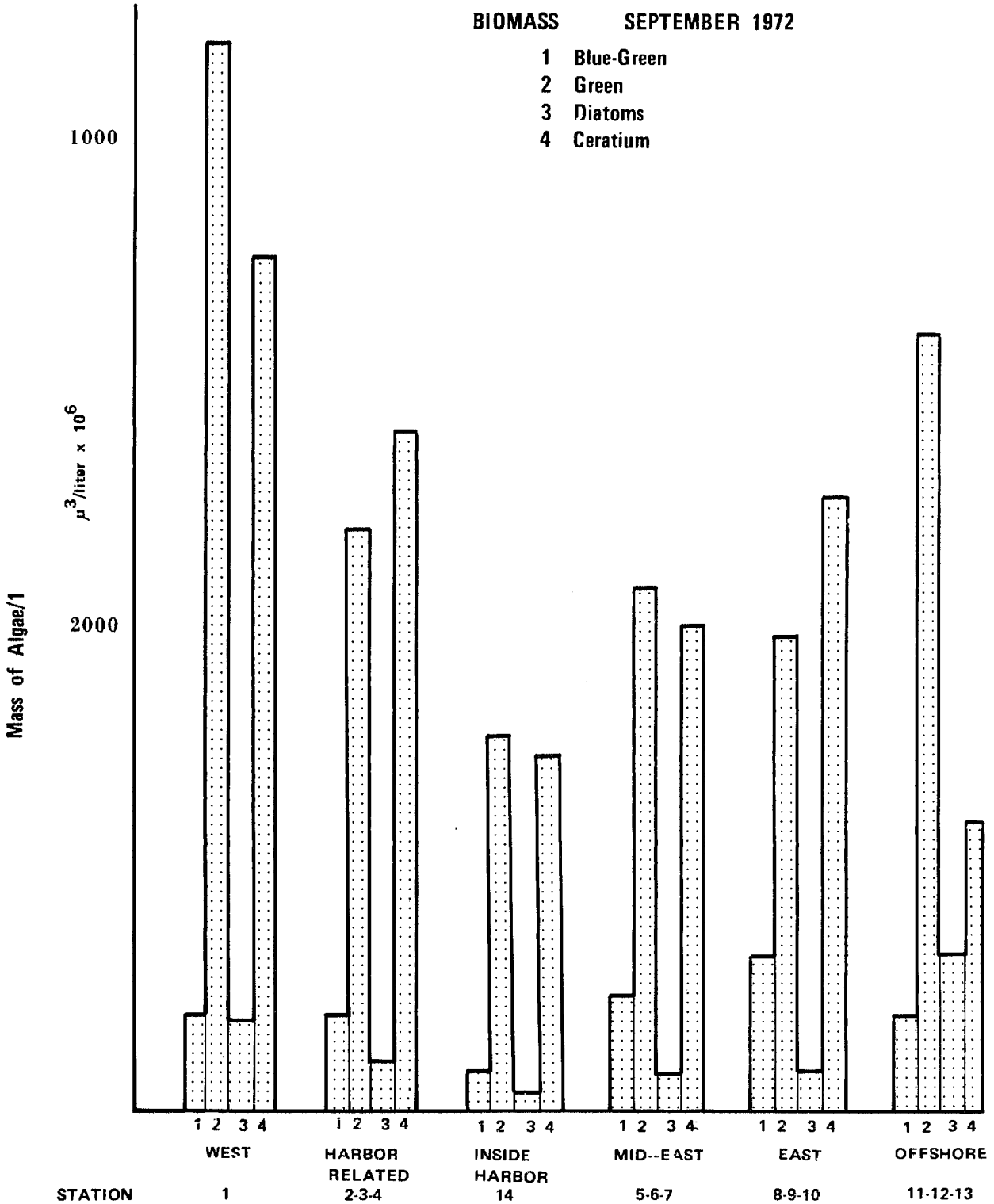


FIGURE 4.5 MONTHLY AVERAGES OF PHYTOPLANKTON ABUNDANCES FOR SELECTED YEARS SHOWING THE TREND.

SOURCE: "Water Quality Baseline Assessment for the Cleveland Area - Lake Erie, Volume I, Synthesis", Garlauskas, A.B. and Hanok, M., EPA 905/9-74-005, U.S. Environmental Protection Agency. Region V, May 30, 1974.

FIGURE 4.6

BIOMASS SEPTEMBER 1972



Distribution of the major groups of algae. Data from geographically related stations are grouped (Alldridge, 1973).

SOURCE: "Water Quality Baseline Assessment for the Cleveland Area-Lake Erie, Volume I-Synthesis", Garlauskas, A.B. and Hanok, M., EPA 905/9-74-005, U.S. Environmental Protection Agency, Region V, May,30, 1974.

invertebrates have been reported in the harbor area within the general vicinity of the two proposed sites. While the pollution tolerant species remain clearly dominant, the most important benthic prey for the remaining clean water fish forms remain crayfish, amphipods, isopods, and chironomids. These species use the breakwalls, piers, and marina areas for habitat.[21]

In a climax or self-perpetuating community, no species should hold over 25% of the population. In the Cleveland Harbor area, study of the benthos in the vicinity of the Municipal Power Plant indicates that 90% of the biomass and 99% of the species in abundance were the pollution tolerant species oligochaetes (slugworms). This shows the extremely delicate nature of the ecosystem involved.[22]

Currently the harbor is dominated by pollution-tolerant fish. Current species include the eastern gizzardshad, carp, goldfish, yellow perch, brown bullhead and the emerald shiner. Gizzardshad are the most predominant species during the winter while perch predominate in the summer.[23] Table 4.3 lists the relative abundance of fishes in the Cleveland Harbor.

Spawning areas are common along the outer breakwall of the harbor and adjacent marina areas. Successful reproduction of twenty-four species of fish has been determined within the Cleveland Harbor and adjacent marinas (see Table 4.4).

A total of forty-six species and sub-species have been documented as present within the Cleveland Harbor and adjacent marinas. Many of these are experiencing reproductive distress. A list of endangered fish

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21. Cleveland Lakefront State Park, ODNR, Behnke, Dickson, Trach Landscape Architects, Architects, Engineers, 1979.
22. Corps of Engineers, U.S. Army Buffalo District (1975) Preliminary Feasibility Study of Cleveland Harbor, Ohio.
23. Waterline Quality Baseline Assessment for the Cleveland Area-Lake Erie, Volume II-The Fishes of the Cleveland Metropolitan Area Including the Lake Erie Shoreline, Chicago: Office of Research and Development, U.S. EPA, A.M. White, et al (1975).

TABLE 4.3

The Relative Abundance of Fishes Collected in the Cleveland Harbor and Adjacent Marinas (Revised July, 1974)

Species	No. Collected	% of Total
Longnose Cat	1	0.01
Alewife	92	0.85
Eastern Gizzardshad	2525	23.43
Chinook Salmon	9	0.08
Coho Salmon	42	0.39
Rainbow Trout	2	0.02
Rainbow Smelt	323	3.00
Northern Pike	15	0.14
Carp	64	0.59
Goldfish	97	0.90
Golden Shiner	393	3.65
Longnose Dace	1	0.01
Creek Chub	1	0.01
Western Blacknose Dace	1	0.01
Common Emerald Shiner	4092	37.97
Striped Shiner	1	0.01
Spottail Shiner	903	8.38
Spotfin Shiner	6	0.06
Northeastern Sand Shiner	33	0.31
Northern Mimic Shiner	6	0.06
Northern Fathead Minnow	1	0.01
Bluntnose Minnow	74	0.69
Stoneroller Minnow	2	0.02
Eastern Quilback	1	0.01
Black Redhorse	1	0.01
Golden Redhorse	2	0.02
Northern Shorthead Redhorse	1	0.01
Common White Sucker	89	0.83
Channel Catfish	2	0.02
Brown Bullhead	23	0.21
Black Bullhead	14	0.13
Stonecat Madtom	13	0.12
Trout-perch	153	1.42
Brook Silverside	3	0.03
White Bass	223	2.07
White Crappie	80	0.74
Black Crappie	11	0.10
Northern Rockbass	5	0.05
Northen Largemouth Blackbass	3	0.03
Warmouth Sunfish	1	0.01
Green Sunfish	3	0.03
Bluegill Sunfish	4	0.04
Pumpkinseed Sunfish	34	0.32
Yellow Walleye	2	0.02
Yellow Perch	1254	11.64

(Continued)

Table 4.3 (cont'd.)

Species	No. Collected	% of Total
Northern Logperch Darter	1	0.01
Freshwater Drum (Sheepshead)	170	1.58
TOTALS (47 Species	10,777	100.05%

*Water Quality Baseline Assessment for the Cleveland Area - Lake Erie, Volume II - The Fishes of the Cleveland Metropolitan Area Including the Lake Erie Shoreline, Chicage: Office of Research and Development, U.S. EPA, A.M. White, et al (1975).

TABLE 4.4

Species of Fishes Collected as Fry or Young-of-the-Year in the Cleveland Harbor, 1972-1974.*

Species	Abundance
Alewife	Abundant
Eastern Gizzardshad	Abundant
Rainbow Smelt	Abundant
Eastern Quilback	Rare
Common White Sucker	Uncommon
Carp	Common
Goldfish	Common
Golden Shiner	Abundant
Longnose Dace	Rare
Common Emerald Shiner	Abundant
Spottail Shiner	Uncommon
Fathead Minnow	Rare
Bluntnose Minnow	Common
Trout-perch	Rare
Brook Silverside	Rare
White Bass	Uncommon
Rockbass	Uncommon
Largemouth Blackbass	Rare
Green Sunfish	Uncommon
Bluegill Sunfish	Common
Pumpkinseed Sunfish	Abundant
Yellow Perch	Common
Northern Logperch Darter	Rare
White Crappie	Uncommon

*Corps of Engineers, U.S. Army Buffalo District (1976), Feasibility Report for Harbor Modification, Revised Draft Environmental Statement, leveland Harbor, Ohio.

is included in Table 4.5. However, none of these endangered fish are found exclusively in the Cleveland Harbor area. This statement is true for aquatic vegetation and invertebrate animals as well.[24]

Coho and Chinook salmon which have been stocked in the lake are also inhabitants of the harbor waters during the winter. Schools of gizzardshad, alewife, and emerald shiners near the Municipal Power Plant attract the salmon.

As a result of pollution in the Cleveland Harbor area, the water quality has become less desirable to clean-water fish. Pollutant-tolerant fish are most common. These conditions effectively eliminate inhabitation by any endangered species although individuals of endangered species may pass through the harbor occasionally.

The upland sandpiper (Bartramia longicaudo) is the only species listed as "endangered" by the State of Ohio known to nest in the coastal zone area. It nests at Burke Lakefront Airport and ranges throughout Canada and parts of the northern United States.

In addition, individuals of seven other bird species listed as "endangered" by the State of Ohio have been known to pass through or near Cleveland on migrations or general movement. It is doubtful that these birds would nest in the harbor area due to the surrounding industrial environment.[25]

The harbor does offer refuge to a large number of migrating ducks, Canadian geese, and whistling swans. The warm waters discharged by the power plants and the refuge provided by the harbor are especially attractive to these migrating birds. There are also some species of hawks that migrate through this area from the central and western states up

24. Ibid.
25. Corps of Engineers, U.S. Army Buffalo District (1976) Feasibility Report for Harbor Modification, Cleveland Harbor, Ohio, Volume I, Main Report.

TABLE 4.5

List of Fish Species which are Considered Rare or Extirpated Within the Study Area.*

Common Name	Scientific Name	Current Status
Silver Lamprey	Ichthyomyzon unicuspis	Rare
Sea Lamprey	Petromyzon marinus	Rare
Lake Sturgeon	Acipenser fulvescens	Probably Extirpated
Spotted Gar	Lepisostens oculatus	Extirpated
Mooneye	Hiodon tergisus	Extirpated
Brown Trout	Salmo trutta	Rare
Brook Trout	Salvelinus fontinalis	Rare
Lake Trout	Salvelinus namaycush	Extirpated
Cisco	Coregonus artedii	Extirpated
Lake Whitefish	Coregonus clupeaformis	Extirpated
Northern Pike	Esox luscius	Rare
Lake Muskellunge	Esox m. masquinongy	Rare
Bigmouth Buffalofish	Ictobius cyprinellus	Extirpated
Eastern Quilback	Carpiodes c. cyprinus	Rare
Silver Redhorse	Moxostoma anisurum	Extirpated
Black Redhorse	Moxostoma duquesnei	Rare
Northern Redhorse	Moxostoma macrolepidotum	Rare
Longnose Sucker	Catostomus catostomus	Extirpated
Spotted Sucker	Minytrema melanops	Rare
Lake Chubsucker	Ritmyzon sucetta	Rare
Hornyhead Chub	Nocomis biguttata	Rare
Silver Chub	Hybosis storeriana	Extirpated
Longnose Dace	Rhinichthys cataractae	Rare
Pugnose Minnow	Notropis emiliae	Rare
Redfin Shiner	Notropis umbratilus	Rare
Bigmouth Shiner	Notropis dorsalis	Rare
Mimic Shiner	Notropis v. voluncellus	Rare
Flathead Catfish	Pylodictus olivaris	Extirpated
Brindled Madtom	Noturus miuris	Extirpated
Tadpole Madtom	Noturus gyrinus	Extirpated
Eel	Anguilla rostrata	Extirpated
Burbot	Lota lota lacustris	Rare
Brook Silverside	Labidesthes sicculus	Rare
Orange-spotted Sunfish	Lepomis humilus	Rare
Longear Sunfish	Lepomis megalotis	Extirpated
Sauger	Stizestedion canadense	Extirpated
Walleye	Stizostedion v. vitreum	Rare
Blue Pike	Stizostedion v. glaucum	Extirpated (Extinct?)
Blackside Darter	Percina maculata	Rare
Channel Darter	Percina copelandi	Extirpated
Ohio Logperch Darter	Percina c. caprodes	Rare
Northern Logperch Darter	Percina c. semifasciata	Rare
Sand Darter	Ammocrypta pellucida	Extirpated
Scaly Johnny Darter	Etheostoma nigrum culepis	Rare
Iowa Darter	Etheostoma exile	Extirpated
Central Mottled Sculpin	Cottus b. bairdi	Rare
Northern Mottled Sculpin	Cottus b. kumleini	Rare

*Water Quality Baseline Assessment for the Cleveland Area - Lake Erie, Vol. II - The Fishes of the Cleveland Metropolitan Area Including the Lake Erie Shoreline, Chicago: Office of Research and Development, U.S. EPA, A.M. White, et al (1975).

the Ohio River Valley. Especially common in the harbor area are Bonaparte's ring-billed gulls and herring gulls. These gulls rest on breakwater and channel markers, and feed in the surrounding waters. In addition to the aforementioned birds, field work and a literature survey by the Cleveland Environmental Research Group indicated the presence of a total of 70 species of water and shore birds in the immediate area of the Municipal Power Plant. A summarized list of bird species in the Cleveland area appears in Appendix B. Species of birds likely to utilize the waters of the Cleveland Harbor are also indicated here.

c. Impact Upon Environmentally Sensitive Areas

Development of the resource recovery facility in the Coastal Zone would have little or no impacts upon Lake Erie. The steady continuous release of warm water from the facility would most likely have only minimal impacts on local fish populations. There would be no contaminants in this warm-water discharge.

Water fowl may possibly benefit during the winter months from the warm water discharged by the proposed facility. The open water of the harbor would likely serve as a refuge from severe storms on the lake.

Wastewater from the resource recovery facility would first be discharged to the local sewer system and treated at the Easterly Wastewater Treatment Plant before being discharged into the lake. This wastewater, after proper treatment, would therefore have no impact on Lake Erie. Additional information about wastewater discharge to the local sewage system appears in Chapter V.

d. Energy and Mineral Resources

The location of energy-generating facilities along Lake Erie is not uncommon. Presently, numerous coal-fired and nuclear generating facilities are located in the Lake Erie Coastal Zone. Four new nuclear units are now being constructed with two more being planned.

Three factors make coastal areas desirable for the location of energy-generating facilities:

1. proximity to large coastal urban areas,
2. competitive shipping advantages of Lake Erie, and
3. nearly unlimited supply of water for cooling.[26]

With the increasing demand for electricity, the Ohio CZM Program realizes that there will be an increasing need for energy-production facilities. Impacts upon the coastal zone will have to be weighed. In short, the CZM Program recognizes that new energy-production facilities will require land within the coastal zone. Development of the resource recovery facility would probably not conflict with the objectives of the CZM Program provided that the impacts on the environment are minimized.

No mineral resources in the coastal zone would be impacted by the proposed resource recovery facility. The nearest mineral resource to the project study area would be the salt mines located west of the Cuyahoga River. These mines are approximately 1500 feet below the lake's surface. It is very doubtful that the proposed resource recovery facility would have any impact on these salt mines or any other mineral resources. However, as a result of energy recovered from waste incineration, there will be a net savings in coal resources which would otherwise be used by the utility companies.

e. Aesthetics and General Development

Visual access, expansive views and other aesthetic considerations make the coastal zone a desirable place to live, work and recreate. Decisions to built multi-story buildings along the shoreline must be considered carefully. Provision of open space and/or an observation deck at the RRF should be considered during the design process.

26. Spring 1979 Public Review Draft, Ohio CZM Program, Ohio Department of Natural Resources, p. 85.

Aesthetic considerations are addressed by the CZM Program through the encouragement of wise shoreline development in coastal communities. The Ohio Department of Natural Resources will provide visual access and encourage the visual quality (aesthetics) of the shoreline through acquisition and development of public access areas and state parks or by the dedication of areas as state nature preserves or wildlife areas.[27]

In addition, the State of Ohio also plays a role in preserving the aesthetic value of the coastal zone through the acquisition and development of public access areas and state parks.

The CZM Program will also consider the aesthetic values of visual access to the shoreline during the review of projects for which the CZM Program will have review authority. Aesthetics are addressed more fully in Chapter V.

The objective of the CZM Program as related to general development is to encourage wise shoreline development of the Coastal Zone. Specifically, this objective applies to port development, industrial and commercial development, development of navigational waters, residential development and agricultural development.

The CZM Program recognizes that a sound, viable and progressive economy is an essential element of the Lake Erie region and that the shoreline is often a desirable location for commercial and industrial uses. Therefore, since the potential sites are already located in industrialized areas, it is most likely that the resource recovery facility would be compatible with the general development of the Coastal Zone.

5. Consistency of the Proposed Resource Recovery Facility with the Objectives of the CZM Program

Objective: Minimize the dangers and impacts of erosion and flooding upon the Health, safety and welfare of the occupants of Ohio's

27. Ibid., p. 102.

coastal area; promote effective hazard area protection; and eliminate public investment for noncompatible development in coastal hazard areas.

The extreme setback of the potential sites from the shoreline makes them acceptable with respect to this objective. The proposed sites are well beyond the 30-year Lake Erie erosion hazard area.

Objective: Enhance the quality and management of air and water in the Coastal area.

Further deterioration of air and water quality in the Coastal Zone would likely be controlled through strict enforcement of U.S. and Ohio EPA regulations. All wastewater would be pretreated before being discharged to the regional sewer system. At the Easterly Sewage Treatment Plant, this wastewater would again be treated before being discharged to the lake. This wastewater should have no impact on the aquatic environment of the lake.

If water used for cooling is discharged directly into the lake the temperature of this water will have to be monitored so that the water temperature discharge requirements as outlined by the U.S. and Ohio EPA are not violated.

Objective: Improve existing and develop new public shoreline recreation and access opportunities.

The construction of the resource recovery facility on either potential site would not interfere with recreational opportunities in the coastal zone or with visual access to the lake since they are both so well-removed from the shoreline.

The impact of process emissions upon existing recreational facilities would have to be determined. The impacts due to air pollution, water pollution, odors, noise and litter would be controlled by performance standards as outlined by the U.S. and Ohio EPA.

Objective: Protect, conserve and restore environmentally sensitive areas, including wetlands, natural areas, wildlife habitat and endangered species habitat.

Impacts upon Lake Erie and the Cleveland Harbor area would most likely be negligible. Warm water discharged into the lake from cooling processes would most likely have only minimal impacts on local fish populations. All wastewater would first be treated at the Easterly Sewage Treatment Plant before being discharged into Lake Erie. This wastewater would then have no impact upon the lake.

The nesting habitat of the endangered species, the upland sandpiper, at Burke Lakefront Airport would probably not be impacted by the resource recovery facility. Additional air pollution in the area could possibly affect this habitat, but is unlikely to have any effect since U.S. and EPA emission regulations would have to be observed.

Objective: Assure that development and utilization of the Coastal regions energy resources and supplies occurs in a wise and responsible manner; and promote wise use and proper extraction of coastal mineral resources in the coastal area.

The CZM Program recognizes the need for a rational allocation of land in the coastal zone for the production of energy and would therefore possibly support the construction of the resource recovery facility along the Cleveland shoreline.

The nearest mineral resource is the salt mine located west of the Cuyahoga River and 1500 feet beneath the earth's surface. It is doubtful that any mineral would be affected.

Objective: Encourage wise shoreline development in coastal communities.

This objective concerns sound shoreline development as related to: the development of ports, the extension of the navigation season, residential development, industrial and commercial development, agricultural development, and the responsibilities of local governments.

It can be concluded that the construction of the proposed resource recovery facility in the Coastal Zone would hinge primarily on its impacts on air quality, existing recreational facilities, and the recreational potential of the coastal zone.

IV.C. Historic-Archaeologic Impact

The two proposed sites for the Resource Recovery Facility are located within the Cleveland Harbor Area, which has been a major center for growth and industrial expansion since the 1830s. According to a preliminary review of archaeological, historical and paleontological records, neither of these sites contain any known cultural resources. However, the study area as a whole does contain one property that is listed in the National Register of Historic Places: North Presbyterian Church, located at Superior Avenue and East 40th Street, as well as three properties which have been identified as being eligible for the National Register of Historic Places.[28]

Archaeological Resources

Ohio's first inhabitants, Paleo-Indians, existed approximately 10,000 to 20,000 years ago in this region, and were foragers and hunters of the presently extinct big game animals of the last ice age. Generally, this group was organized in small family bands which traveled over a wide range for wild foods and lived in seasonal camps.

Subsequent cultural stages included the Archaic Stage (∽800-10,000 BC), which is characterized by larger and more centrally-based social groups; and the Woodland Stage (∽10,000 BC-400 AD), which witnessed tremendous population growth, increasing sedentism, and the introduction of plant cultivation and farming of native crops.[29]

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28. Correspondence from Eric Johannesen, Preservation Officer, Western Reserve Historical Society, April 13, 1981.
29. Nancy White, Abstract presented at Cleveland Museum of Natural History Workshop, September 24, 1980.

According to the Cleveland Museum of Natural History, there are no known archaeological sites within either of the proposed sites for the Resource Recovery Facility. However, since these two sites are areas of minimal disturbance and are also a part of Lake Erie Beach Ridge, an area utilized by prehistoric peoples for camp sites, it is recommended that a review of the existing archaeological literature and a field survey be conducted prior to groundbreaking efforts (Phase 1 and 2 of an archaeological survey, as described by the Ohio Archaeological Council.)[30]

Historical Resources

The most notable period of historic human occupation in northern Ohio was in the 1600s when the Europeans began to settle in this area. Northern Ohio was previously occupied by the Iroquois and Erie Indian tribes, who experienced a major cultural displacement between 1680 and 1790. By the mid-1700s, various Indian tribes were reoccupying parts of Ohio, but none of these settlements were on original pre-contact land.[31]

Moses Cleaveland originally surveyed the Cleveland Harbor area in 1796, and later in that year, land east of the Cuyahoga River was acquired from the Mohawk and Seneca tribes. The City of Cleveland developed into a mercantile town in the early 1800s and experienced an industrial boom by the 1860s.[32]

There are no historic properties located within the two project sites; however, within the entire study area there is one property listed in the National Register of Historic Places, the North Presbyterian Church on Superior Avenue on East 40th Street. In addition to this church, the Western Reserve Historical Society identifies three historic properties which are eligible for the National Register: (1) Immaculate Conception Church, located on Superior Avenue at East 41st Street; (2) Reserve Terminals Company Warehouse (Brownhoist), located on Hamilton Avenue at East 45th Street; and (3) the former Brownhoist office

30. Correspondence from Alfred Lee, Regional Preservation Archaeologist, Cleveland Museum of Natural History, April 10, 1981.
31. U.S. Army Buffalo District Corps of Engineers, Cleveland Harbor, Ohio Feasibility Report for Harbor Modification EIS, June, 1976, pp. G-17 to G-19.
32. U.S. Army Buffalo District Corps of Engineers, op. cit.

building at the northwest corner of St. Clair Avenue and East 45th Street.[33] Each of these historic properties is shown in Figure 4.7.

Development of the Resource Recovery Project on the proposed sites would not pose a significant impact on any of the above-mentioned properties.

Paleontological Resources

Chagrin Shale is the principal rock unit contained within the study area. According to the Cleveland Museum of Natural History, until recently, invertebrate fossils were considered practically absent from Chagrin Shale. However, in 1980 some Artirodire fish fossils have been found in the Chagrin Shale in this area.

Therefore, the Cleveland Museum of Natural History encourages a preliminary field survey of the two project sites before there is further ground disturbance. To date, there are no records of fossil recovery from either of the sites.[34]

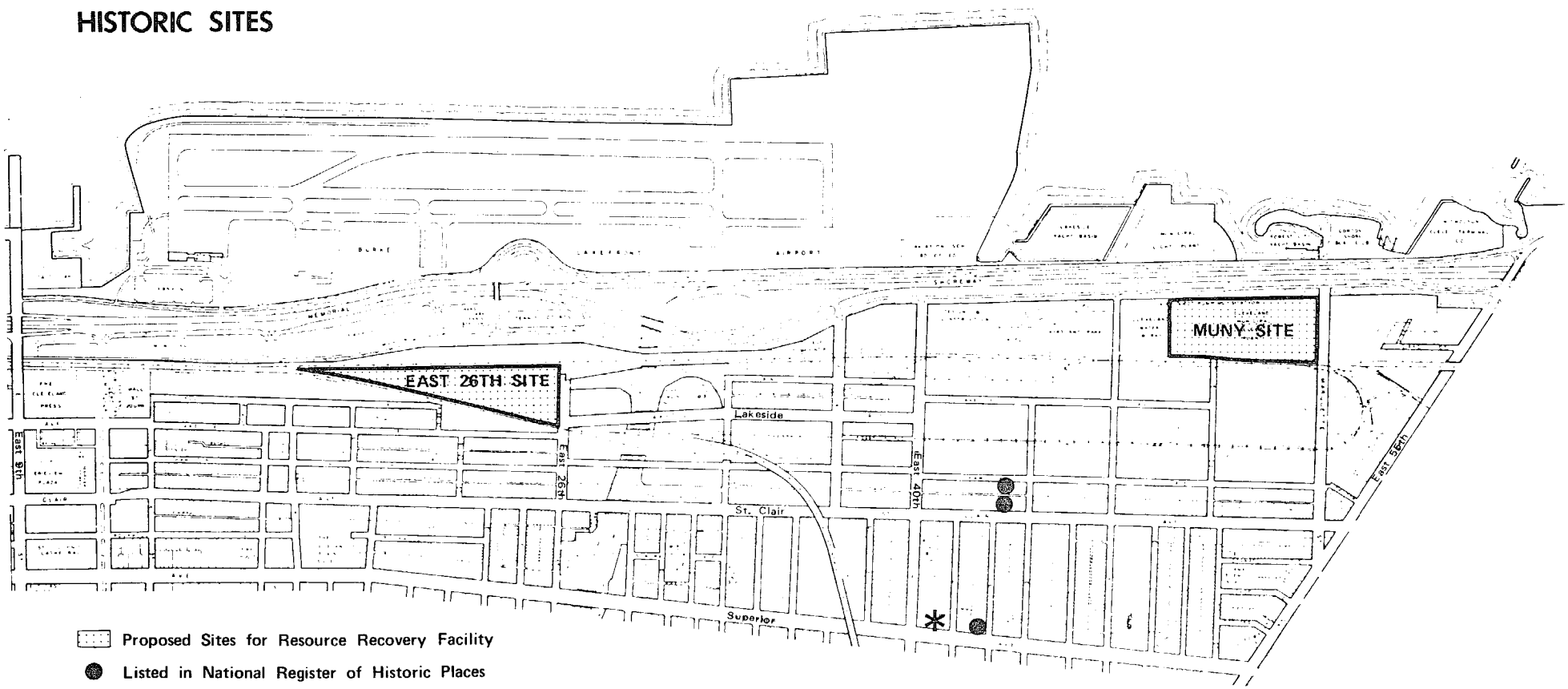
IV.D. Impact on Socio-Economic Conditions

As a major metropolitan area, Cuyahoga County is comprised of many interdependent municipalities. The residents of Cleveland, the County's core, make up the largest block of the County's poor. In 1970, the City of Cleveland had 76% of those families in Cuyahoga County with incomes below the poverty level.[35] The City of Cleveland also had more than one-third of the County's population in 1976, but only one-fifth of the County's assessed residential value.[36]

The following census tracts have been evaluated with regard to potential socio-economic impacts of the proposed resource recovery facility: 1072, 1073,

33. Correspondence from Eric Johannesen, op. cit.
34. Based on a telephone interview with Michael Williams, Staff Paleontologist, Cleveland Museum of Natural History, April 16, 1981.
35. U.S. Census, 1970, General Social/Economic Characteristics, Fourth Count.
36. Knight, R., (1980), "The Region's Economy: Transition to What?" Presented at the Second Annual Fall Seminar-Governing Greater Cleveland Options for the '80s, Cleveland State University, College of Urban Affairs.

CUYAHOGA COUNTY RESOURCE RECOVERY PROJECT
ENVIRONMENTAL IMPACT ASSESSMENT REPORT
HISTORIC SITES



Proposed Sites for Resource Recovery Facility

Listed in National Register of Historic Places

Eligible for National Register of Historic Places

FIGURE 4.7

REGIONAL PLANNING COMMISSION

0 1100 2200

NORTH

The preparation of this map was financed in part through a Coastal Energy Impact Program grant from the Ohio Department of Energy.

1074, 1075, 1081, 1082, and 1111 (see Figure 4.8). These tracts had a 1980 population of 2598, a decrease of 24% from 1970. According to the 1980 census, 78.79% of the population was white; 12.97% was black; 6.51% was Asian and Pacific Islander; and 2.27% were persons of Spanish origin.

In 1970, approximately 8.23% of the population was under ten years old; 68.97% was over twenty years old; and 18.34% was over 60 years old. In addition, 1477 persons at least sixteen years old were part of the labor force with 6.30% being unemployed. The mean family income in 1970 was approximately $8,619.[37]

There were 840 families residing in the impact area with 11.90% having incomes below the poverty level. Only 7.44% of all families in the City of Cleveland had incomes below the poverty level.[38]

A total of 1649 family units were present in the impact area, with a vacancy rate of 3.94% in 1977. Table 4.6 indicates the occurrence of each type of family unit in the area to be impacted.

TABLE 4.6
FAMILY UNITS BY DWELLING TYPE (1977) - SOCIO-ECONOMIC IMPACT AREA

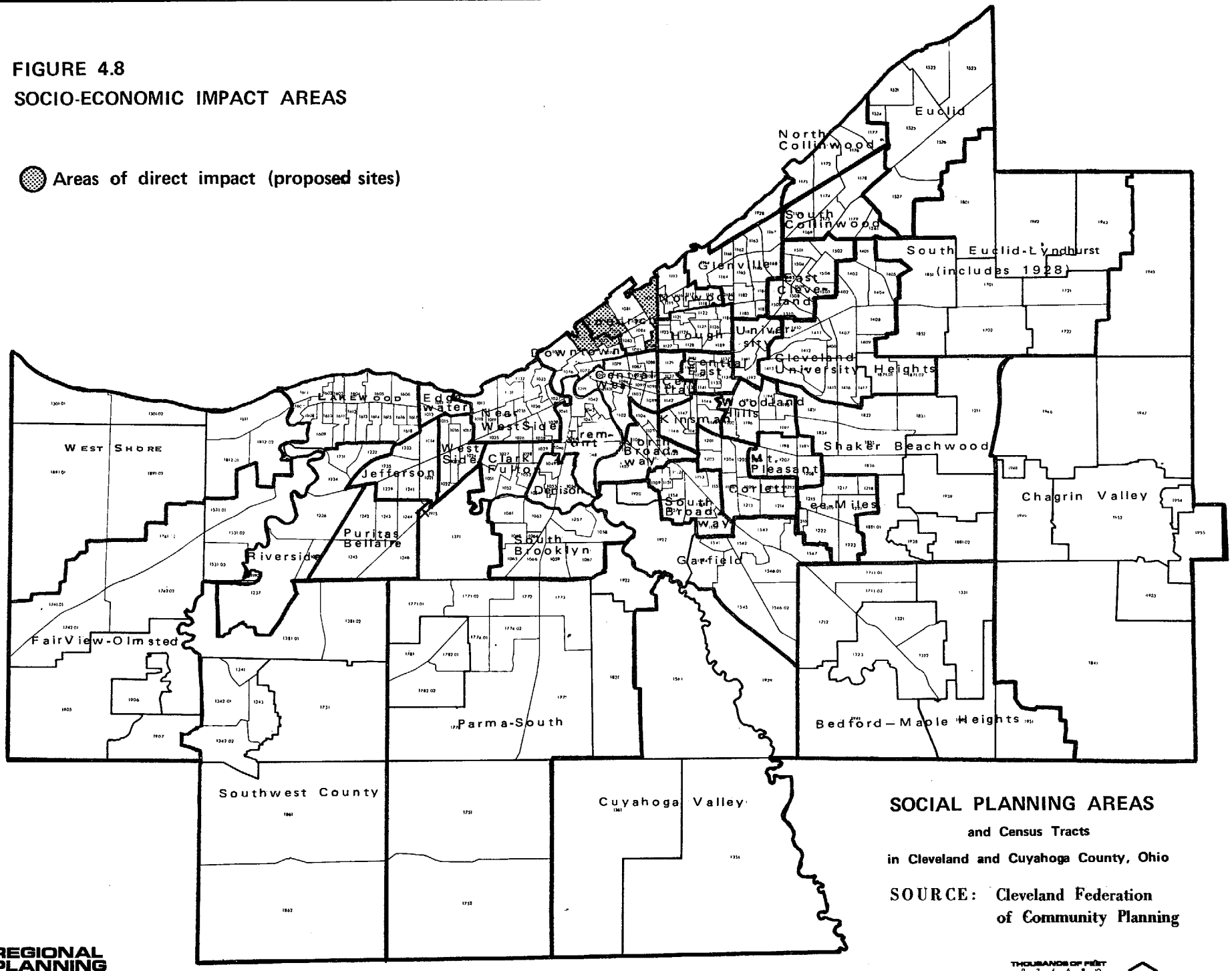
Dwelling type	Number of Units	Percentage of Total
Single-family	170	10.31
Two-family	311	18.86
Row house terrace	16	0.97
Flats over stores	141	8.55
Four-family apartments	46	2.79
Large apartments	522	31.66
Miscellaneous dwellings	443	26.86
TOTAL	1649	100.00

Source: Real Property Inventory of Metropolitan Cleveland, Family and Housing Characteristics for 1977, Part I of Report 54, pp. 23 and 24.

37. U.S. Census, 1970, General Social/Economic Characteristics, Fourth Count.
38. Ibid.

FIGURE 4.8

SOCIO-ECONOMIC IMPACT AREAS



A substantial percentage of all housing units (86.0%) were built in 1939 or earlier, and 68.3% of all units were renter occupied.[39]

The construction of the resource recovery facility will most likely have little impact on the creation of jobs for persons in the immediate socio-economic impact area, even though 60-100 permanent jobs would be created. Skilled workers would most likely be required for construction and operation of the proposed facility and would be readily available from the pool of skilled workers found in the metropolitan area. Although some semi-skilled and unskilled positions may be provided, it is doubtful that the proposed facility would create many jobs for persons in the immediate area since the competition for these jobs would be areawide. In addition, the creation of secondary employment opportunities would probably be negligible since the daily needs of the work force would be easily met by the existing commercial establishments of downtown Cleveland.

The City of Cleveland would receive revenue from income tax, but it is unlikely that there would be any property tax revenue since the facility would most likely be tax exempt. Therefore, the surrounding neighborhood would receive little direct benefit from the additional taxes generated by the facility.

In the area of health and safety, the proposed sites appear to be adequately served. Police statistics indicate that the crime rate in the surrounding neighborhood is below average due to its location in a light industrial/warehousing area. The average response time is not available for the surrounding neighborhood but is dependent on the nature of the call.

Fire stations are within the required 3-5 minute response time to the proposed sites. Fire Headquarters is located at 1645 Superior Avenue, Station

39. U.S. Census, 1970, General Social/Economic Characteristics, Fourth Count.

No. 5 is located at 3201 Lakeside Avenue, and Station No. 19 is located at 1321 East 55th Street. The City of Cleveland has the highest fire insurance rating of all communities in Cuyahoga County.[40] Cincinnati is the only community in the State of Ohio with a better fire insurance rating. Fire insurance ratings indicate the adequacy of water supply, fire-fighting facilities, fire alarms, fire prevention, building department, and structural conditions. Inside the facility, regulations of the Occupational Safety and Health Act (OSHA) will be enforced. Therefore, the employees and the facility would most likely be adequately safeguarded from the dangers of fire.

The health and safety of surrounding neighborhoods is not expected to be adversely affected since the nearest residential development to either site is approximately 1/4 of a mile away. There are also no schools, parks, or playgrounds along the routes used by trucks entering and leaving the facility. The resource recovery facility would therefore be compatible with predominantly industrial/warehousing land uses.

IV.E. Impact on Traffic

As a solid waste disposal site for many communities in the County, the proposed resource recovery facility will generate additional vehicular traffic in the vicinity of both sites. Collection, transfer, maintenance and residue hauling vehicles, as well as employees' and visitors' cars will travel to and from the facility on a daily basis. It is anticipated, however, that collection and transfer vehicles will comprise the bulk of the vehicular traffic.

As noted in Chapter II, the number of collection and transfer vehicles are dependent on a number of variables. A recent trend in municipal waste operations is the utilization of larger collection vehicles, predominantly 31 cubic yard packers. This trend reflects municipal efforts to reduce collection and

40. U.S. National Board of Fire Underwriters, 1977.

hauling costs through increased waste capacity, less time away from collection routes, and fewer trips to disposal sites resulting in fuel savings. Therefore, the number of municipal waste collection vehicles will continue to decline. Consequently, the total number of collection and transfer vehicles expected to use the resource recovery facility will probably be less than the projected 302 to 474 vehicles per day by 1985.

East 26th Street Site

Average daily traffic counts (1976, 1979, and 1981) and traffic generated daily (1985) by the proposed resource recovery facility are shown in Figures 4.9 and 2.24, respectively. Traffic generated by the proposed facility would increase the daily volume of traffic by 38.28% to 60.08% on East 26th Street north of Lakeside Avenue. East 26th Street between Lakeside Avenue and Hamilton Avenue would experience a traffic volume increase of approximately 13.0% to 17.0%. Lakeside Avenue from East 26th to East 33rd Streets would experience an approximate 5.0 to 9.0% daily traffic volume increase (see Table 4.6).

TABLE 4.6
PERCENT INCREASE IN DAILY TRAFFIC COUNTS
DUE TO RESOURCE RECOVERY FACILITY

Location	Existing Daily[A] Traffic Counts	Projected 1985 Daily Traffic Counts	Percent Increase
South Marginal Road (Between East 55th Street and Marquette Street)	2147*	2751-3095	28.13-44.15
Marquette Street (From Conrail Tracks to South Marginal Road)	585*	1189-1533	103.25-162.05
East 26th Street (North of Lakeside Avenue)	1578*	2182-2526	38.28-60.08
East 26th Street (Lakeside Avenue to Hamilton Avenue)	1503*	1705-1751	13.44-16.50
Lakeside Avenue (Between East 26th Street and East 33rd Street)	3763*	3964-4113	5.34-9.30

(continued)

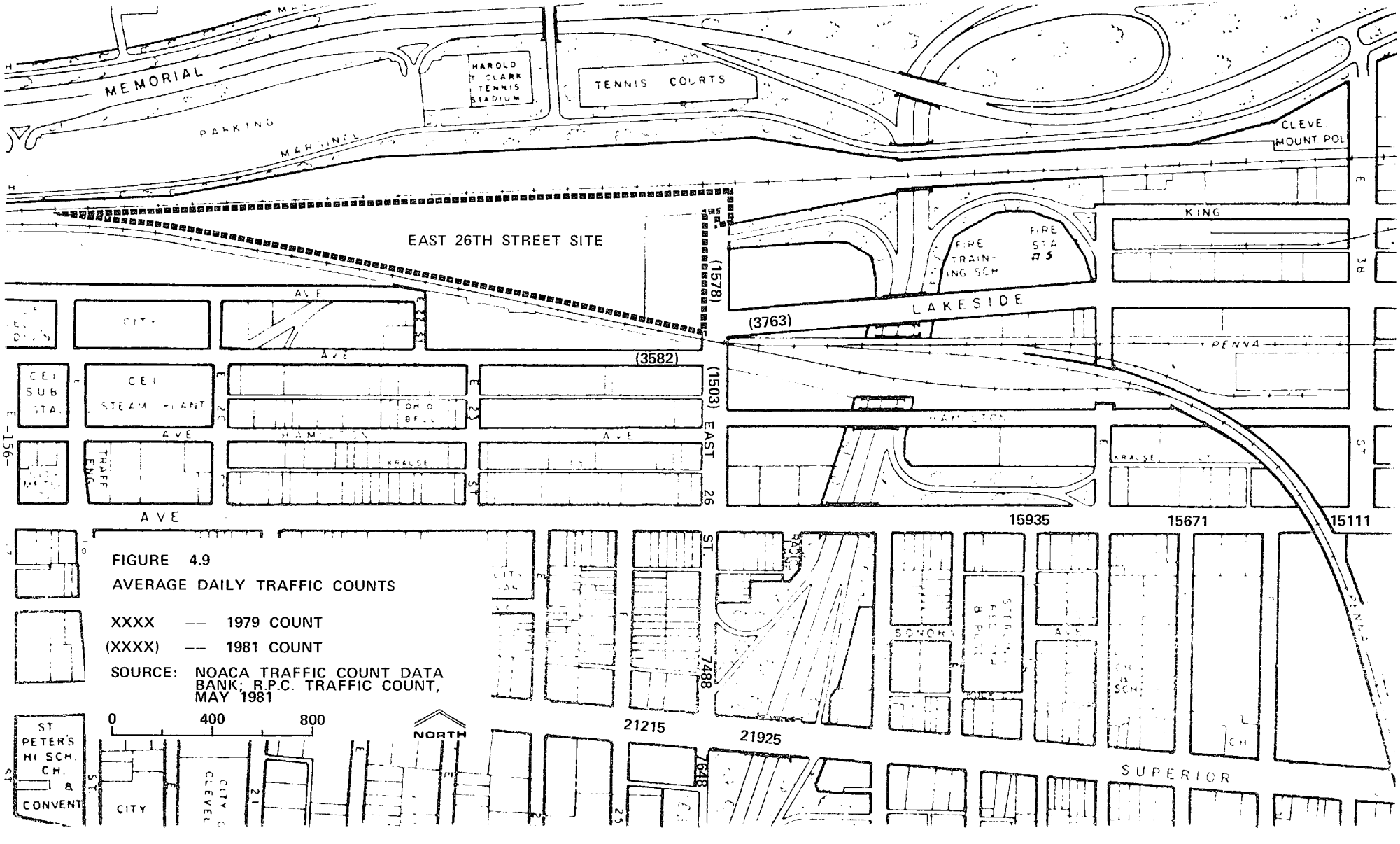


FIGURE 4.9

AVERAGE DAILY TRAFFIC COUNTS

XXXX -- 1979 COUNT

(XXXX) -- 1981 COUNT

SOURCE: NOACA TRAFFIC COUNT DATA BANK; R.P.C. TRAFFIC COUNT, MAY 1981

Table 4.6 (cont'd.)

Location	Existing Daily Traffic Counts	Projected 1985 Daily Traffic Counts	Percent Increase
Eastbound Shoreway Exit Ramp at East 55th Street	2728**	2929-3084	7.37-13.05
Eastbound Shoreway Entrance Ramp at East 55th Street	6403**	6504-6521	1.57-1.84

Source: NOACA Traffic Count Data Bank; R.P.C. Traffic Count, May 1981.
*RPC Traffic Count, May 1981.
**NOACA Traffic Count Data Bank.
A-24 hour projections based on 8-hour counts.

Although the volume of traffic along East 26th Street, East 33rd Street, Lakeside Avenue and Hamilton Avenue would increase, the ability of the streets to handle additional traffic would not be exceeded (see Figure 4.10). The segment of East 26th Street south of St. Clair Avenue to the Innerbelt exit ramp would possibly be used at 83.58% of total capacity. All other streets would be utilized at no more than 36% of total capacity (see Table 4.7). Therefore, traffic generated by the resource recovery facility would most likely have little impact on roads providing immediate access to the East 26th Street Site.

TABLE 4.7

PROJECTED (1985) DAILY TRAFFIC COUNTS
COMPARED TO STREET VOLUME CAPACITIES

Location	1985 Estimated Count	Street Capacity	1985 Estimated Count as Percentage of Street Capacity
South Marginal Road (Between East 55th Street and Marquette Street)	2,751-3,095*	6,300	43.67-49.13
Marquette Street (From Conrail Tracks to South Marginal Road)	1,189-1,533*	-	-

(continued)

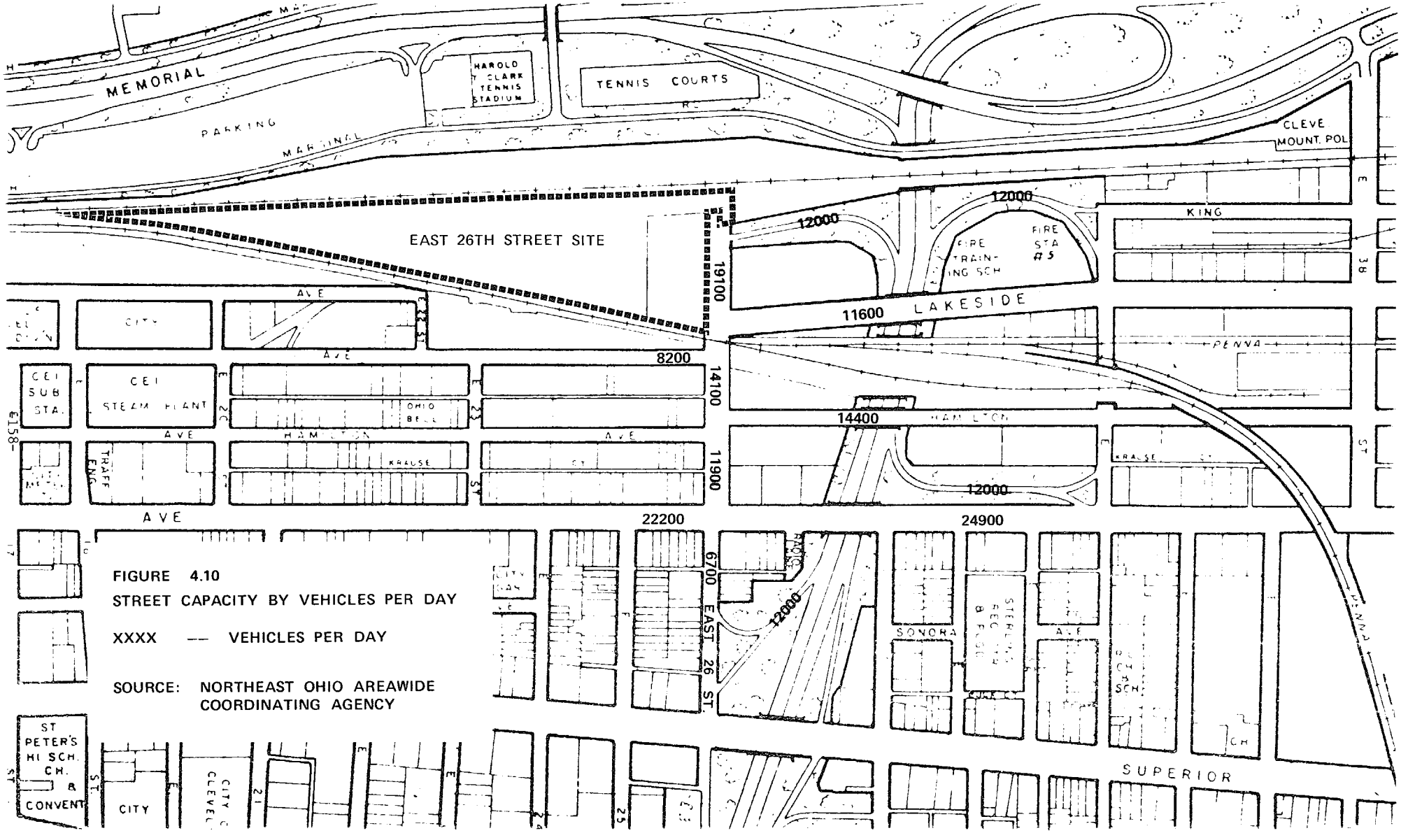


FIGURE 4.10

STREET CAPACITY BY VEHICLES PER DAY

XXXX — VEHICLES PER DAY

SOURCE: NORTHEAST OHIO AREAWIDE COORDINATING AGENCY

Table 4.7 (cont'd.)

Location	1985 Estimated Count	Street Capacity	1985 Estimated Count as Percentage of Street Capacity
East 26th Street (North of Lakeside Avenue)	2,182-2,526*	19,100	11.42-13.22
East 26th Street (Lakeside Avenue to Hamilton Avenue)	1,705-1,751*	14,100	12.09-12.42
Lakeside Avenue (Between East 26th Street and East 33rd Street)	3,964-4,113*	11,600	34.17-35.46
Eastbound Shoreway Exit Ramp at East 55th Street	2,900**	12,000	24.17
Eastbound Shoreway Entrance Ramp at East 55th Street	6,700**	12,000	55.83
East 26th Street (Between Hamilton Avenue and St. Clair Avenue)	3,400**	11,900	28.57
East 26th Street (St. Clair Avenue south to Innerbelt Exit Ramp)	5,600**	6,700	83.58
Hamilton Avenue (Between East 26th Street and East 33rd Street)	1,700**	14,400	11.80

Source: NOACA Traffic Count Data Bank, NOACA System (S-47) and R.P.C. Traffic Count, May, 1981.

*Figures are derived through a combination of an R.P.C. Traffic Count, May 1981, and the possible traffic generated by the resource recovery facility. These figures reflect recent trends and were developed because no count existed for these street sections.

**Actual 1985 projected traffic counts from the NOACA Traffic Count Data Bank and NOACA System (S-47) derived from 1976 and 1979 counts.

Muny Site

Average daily traffic counts (1976, 1979 and 1981) and traffic generated daily (1985) by the proposed resource recovery facility are shown in Figures 4.11 and 2.25, respectively. Traffic generated by the proposed facility would possibly increase the daily volume of traffic by approximately 100.0% to

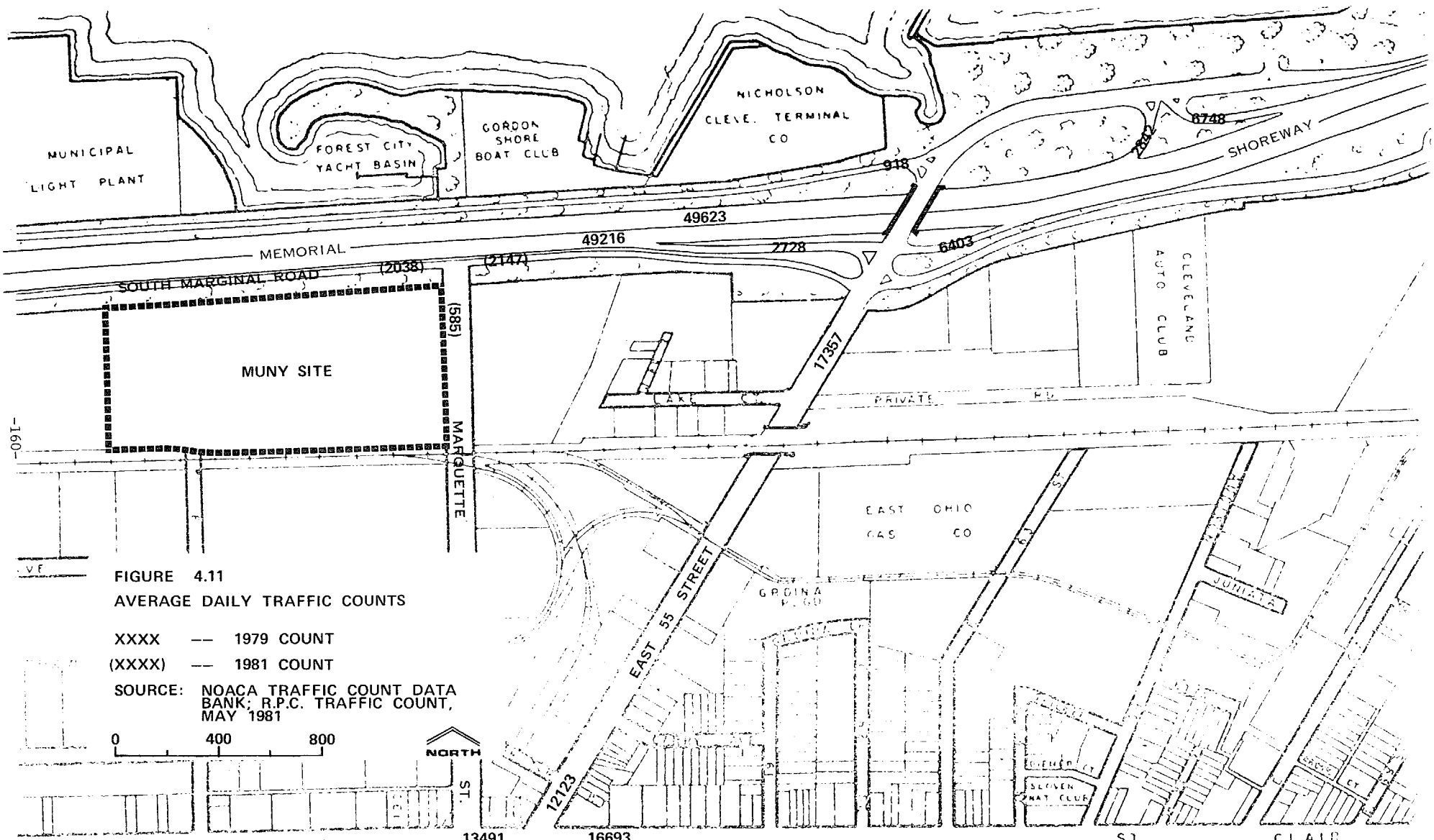


FIGURE 4.11
AVERAGE DAILY TRAFFIC COUNTS

XXXX -- 1979 COUNT
(XXXX) -- 1981 COUNT
SOURCE: NOACA TRAFFIC COUNT DATA BANK; R.P.C. TRAFFIC COUNT, MAY 1981

163.0% on that segment of Marquette Street between the Conrail tracks and South Marginal Road. South Marginal Road from Marquette Street to East 55th Street would possibly experience an approximate 28.0% to 44.0% increase in the daily volume of traffic (see Table 4.6).

Although large percentage increases in the daily volumes of traffic may be expected along potential access routes to and from the proposed facility, these routes have the capacity to handle substantially higher volumes of traffic.

South Marginal Road has the capacity to carry 6,300 vehicles per day (see Figure 4.12). With the development of the resource recovery facility, South Marginal Road would then be used at approximately 44.0% to 49.0% of its total capacity (see Table 4.7). Even though the capacity of Marquette Street is unknown, it would most likely have the capability of serving substantially more vehicles per day than those presently using it. Marquette Street is approximately fifty feet wide, has a daily traffic count of 585, and is in very good condition.

Presently, the volume of traffic on East 55th Street is substantial and thus traffic generated by the proposed facility would most likely have little impact. The Transportation Section at the Northeast Ohio Areawide Coordinating Agency has indicated that the addition of several hundred vehicles to East 55th Street would have little impact on traffic. Therefore the total impact on traffic would not be substantial.

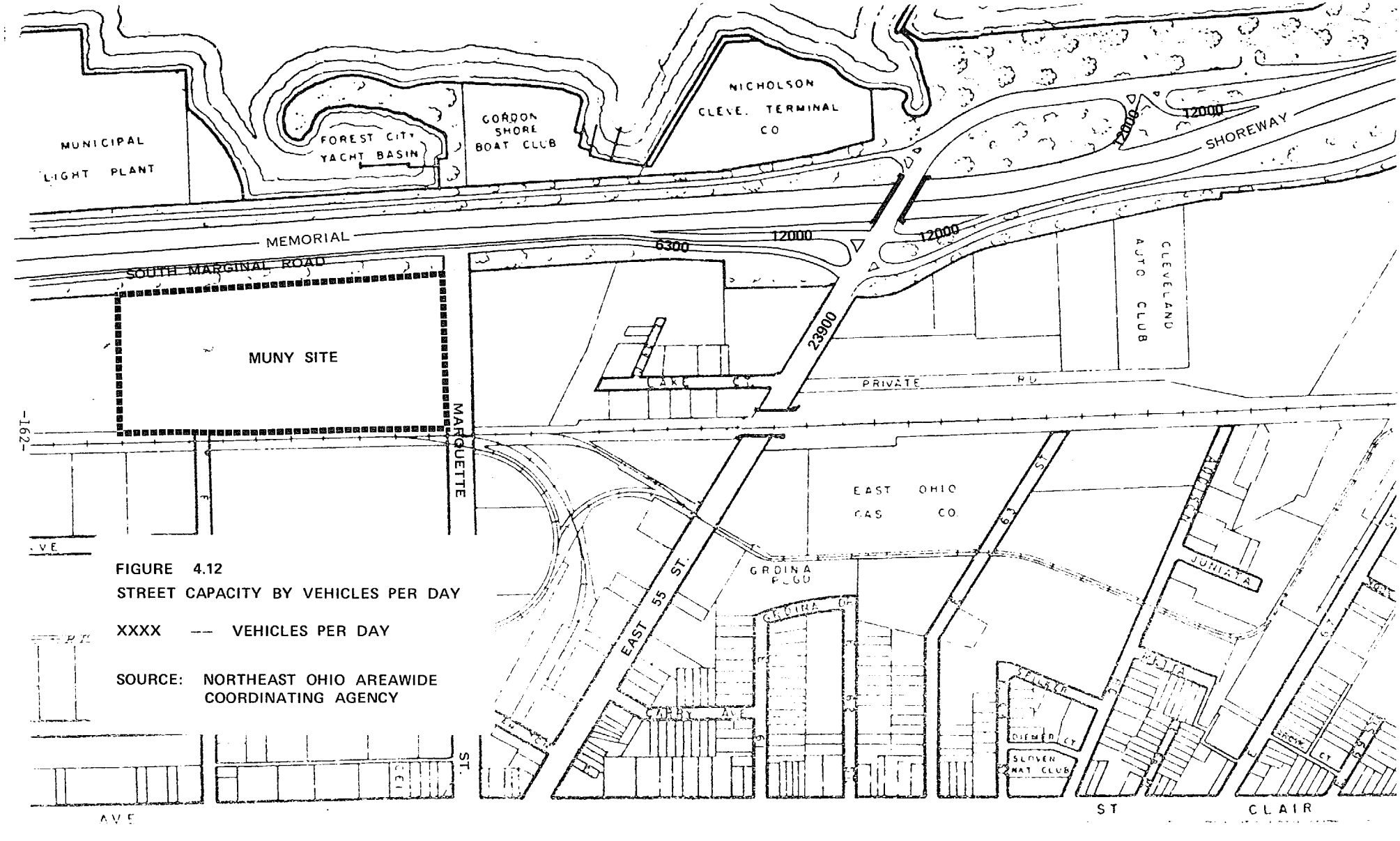


FIGURE 4.12
STREET CAPACITY BY VEHICLES PER DAY

XXXX -- VEHICLES PER DAY

SOURCE: NORTHEAST OHIO AREAWIDE COORDINATING AGENCY

V. Performance Standards

PERFORMANCE STANDARDS - Introduction

The term "performance standards" has become closely associated with industrial zoning in many communities. By instituting such standards, these communities attempt to regulate the discharge of any undesirable emissions from industrial and manufacturing establishments. Through this type of regulation, industrial uses become more compatible with the surrounding environment. A resource recovery plant, as a waste processing facility, can be expected to generate process emissions. However, it is possible to satisfy all emissions standards in order to minimize any potential impact on the surrounding area. This section will discuss the expected process emissions and their regulation.

V.A. Emergency Provisions

Safety provisions normally provided for an industrial plant are consistent with standards established in local codes as well as those of the National Fire Protection Association. Such provisions would include sprinkler and fire standpipe equipment, fire detection systems and lightning protection equipment.[1] Since there will be no processing of waste prior to incineration, it is expected that the threat of explosions or fires will be very minimal at the County's facility. In spite of the fact that much of the municipal waste stream is combustible and such items as aerosol cans may cause minor explosions inside of the furnace, there should be no more impact on the resource recovery facility than any other municipal incinerator. Enactment of ordinances prohibiting highly flammable materials from being disposed of at the County's plant will further reduce the threat of explosions.

The County's decision to employ a full service contractor will reduce the number of problems which could occur during facility operation. With

1. Interview with Daniel J. Dent, Bechtel, Inc., March 18, 1981.

one company responsible for the design, construction, maintenance and operation of the facility, downtime from equipment failures or other factors is expected to be minimal. In addition, the five firms which have been selected to bid on the plant by the Cuyahoga County Commissioners have all had considerable experience in the field of resource recovery. This experience will insure the highest design standards will be employed in the construction of the plant.

V.B. Process Emissions

The emissions which will be produced by the resource recovery plant are actually by-products from the processing and incineration of solid waste. The emissions are undesirable and efforts must be made to control them and minimize their impact on the surrounding environment. The emissions expected to be produced in varying levels include residue, liquid wastes, air pollution, odor, noise, dust and litter. Each of these emissions and its potential impact are discussed in the following section.

1. Residue

In evaluating the impact of a resource recovery facility, a key consideration is the disposal of combustion ash and residues. This section is divided into three parts. The first will examine the character and volume of the residue and the ash. The second will describe the various disposal options and their impact. The third will discuss pollution performance standards for post combustive residue and explore the federal, state and local standards these combustion residues must meet prior to disposal.

Residue Characteristics

COLLECTION PROCESS - As has been noted above, the proposed resource recovery facility's main product will be energy in the form of steam and/or electricity. An additional by-product of the process will be

post-combustion residue. Fly ash is basically particulate material contained in the exhaust gas that is collected in the air pollution control equipment. Bottom residue (in the form of ash, ferrous and non-ferrous metals, unburned combustibles, glass and rocks) is material that remains on the moving grates after it goes through the furnace. This material drops off the grate into a water bath where it is quenched. It is then conveyed to another hopper where it is drained prior to loading in trucks for disposal.

The collected fly ash is conveyed either mechanically or pneumatically to the main ash and residue hopper where it is to be mixed with the bottom residue. Depending upon marketability, ferrous and potentially non-ferrous metals can be removed at this point for sale to the secondary metals market. Presently, there is a lack of interest by this market but metals removal would remain as an option for the full service contractor. The contractor would have to bear the entire cost of purchasing the additional equipment, in exchange for obtaining all the revenue derived from this investment.

Following this optional processing step, the mixture of fly ash and bottom residue is ready to be loaded into trucks for transport to a disposal site.

COMPOSITION — Though it is impossible to accurately estimate the exact chemical and material composition of the residue left following combustion, an idea of what can be expected can be obtained by looking at the performance of similar type facilities around the country.

In a report prepared by the United States Environmental Protection Agency (USEPA) in 1970, seven incinerators were evaluated.[2] The purpose

2. W. C. Achinger and L.L. Daniels, An Evaluation of Seven Incinerators (Washington, D.C. Government Printing Office, 1970).

of the study was to obtain data about the quality and quantity of solid waste processed, and about the residue, gasborne particulate emissions, fly ash and wastewater produced as a result of incineration. The results of this study are valid for analysis here because the technology of incineration has not changed significantly since 1970 and five of the seven incinerators have configurations similar to the proposed resource recovery facility. The only difference is that heat was not being recovered for energy production.

Table 5.1 presents the results of this analysis of residue composition for the incinerators having a configuration similar to the proposed facility.[3]

TABLE 5.1

Residue Composition
(Percent by Weight)

Component	Incinerator				
	B	D	E	F	G
Fines	52.5	36.4	74.5	79.4	52.6
Unburned Combustibles	(+)	35.8	.1	.7	1.1
Metals	14.6	14.5	21.4	16.8	20.0
Glass, Rock	32.9	13.3	4.0	3.1	26.3

(+) Unburned combustibles included in the fines.

Fines are materials that can pass through a 0.5 inch wire mesh screen. Unburned combustibles are visibly identifiable combustible materials that pass through the incinerator without being burned. The differences between the incinerators can largely be explained by differences in design. For example, the high fine content of residue from

3. Ibid.

incinerators E and F is probably due to the fact that they utilize rotary kilns. The tumbling action of the kiln reduces the size of glass and rock. The higher percentage of fines in F can be explained by the fact that its kiln is five feet longer than incinerator E. Incinerator D has a very high percentage of unburned combustibles compared to the other incinerators. This is due to the fact that during the sampling period, the furnace was overloaded (an adjacent furnace was shut down) causing a lack of agitation on the grate.

In appearance, residue leaving the facilities is an extremely moist, black material. Moisture content depends on several variables, such as absorptive capacity of the residue and the make-up of the waste stream, causing the moisture content to range typically from 20% to 50%. The residue dries rapidly, with the result being a graying soil-like material with a reported moisture figure of 10%-12%. A visual inspection indicates glass is the dominant component of the residue.[4]

VOLUME - A key issue in the design of a solid waste system based on a resource recovery facility is the volume of fly ash and bottom residue that will be produced. This is important both in determining the number of vehicles needed to transport this material and the range of disposal options. Table 5.2 presents the amounts of residue material that can be expected based on the 1985 estimates of solid waste in Solid Waste Management Report for the 37 communities who have agreed to participate in the project. Three assumptions were made in developing Table 5.2. First, it was assumed that the facility would operate 85% of the time; secondly, that the weight of outgoing residue would constitute about 25% of the incoming waste; thirdly, the density of post-combustive residue would be 2000 lbs. per cubic yard. (1 cubic yard = 1 ton.)

4. RESCO Residue Program Review and Update (Hampton, New Hampshire: Wheelabrator-Frye, Inc., 1980).

TABLE 5.2

MUNICIPAL SOLID WASTE PROCESSING-
BY RESOURCE RECOVERY FACILITY - 1985

LETTER OF INTENT COMMUNITIES

Community	1985 Solid Waste (Tons)	Bypass Facility 15% (Tons)	Residue (Tons)	Total to be Disposed (Tons)
Bay Village	15,446	2,317	3,282	5,599
Beachwood	4,682	702	995	1,697
Bedford	4,867	730	1,034	1,764
Bedford Hts.	5,153	773	1,095	1,868
Berea	7,491	1,124	1,592	2,716
Bratenahl	444	67	94	161
Brecksville	3,511	527	746	1,273
Brooklyn	6,258	939	1,330	2,269
Brooklyn Hts.	845	127	180	307
Brook Park	14,341	2,151	3,048	5,199
Cleveland	328,038	49,206	69,708	118,914
Cleveland Hts.	29,055	4,358	6,174	10,532
East Cleveland	13,675	2,051	2,906	4,957
Fairview Park	7,734	1,160	1,644	2,804
Garfield Hts.	14,172	2,126	3,012	5,138
Glenwillow	260	39	55	94
Highland Hts.	1,660	249	353	602
Independence	3,843	576	817	1,393
Lakewood	42,717	6,408	9,077	15,485
Lyndhurst	9,222	1,383	1,960	3,343
Maple Hts.	14,149	2,122	3,007	5,129
Mayfield Hts.	8,150	1,223	1,732	2,955
Middleburg Hts.	5,549	832	1,179	2,011
Newburgh Hts.	1,820	273	387	660
North Olmsted	22,538	3,381	4,789	8,170
North Royalton	6,206	931	1,319	2,250
Olmsted Falls	3,575	536	760	1,296
Parma Hts.	7,060	1,059	1,500	2,559
Pepper Pike	2,727	409	580	989
Rocky River	13,212	1,982	2,808	4,790
Seven Hills	5,992	899	1,273	2,172
Shaker Hts.	16,500	2,475	3,506	5,981
South Euclid	11,113	1,667	2,362	4,029
Strongsville	11,281	1,692	2,397	4,089
University Hts.	8,028	1,204	1,706	2,910
Walton Hills	1,364	205	290	495
Woodmere	203	30	43	73
TOTAL	652,881	97,933	138,740	236,673

The following equations were used to develop Table 5.2:

1. MSW (tons/year) x .85 x .25 = (tons/year)

2. Residue (tons/year) x $\frac{2000 \text{ lbs.}}{\text{ton}}$ = Residue (lbs./year)

3. Residue (lbs./year) ÷ Residue Density $\frac{(2000 \text{ lbs.})}{(\text{cubic yard})}$ = Residue Volume (cubic yards)

Applying these equations to the 1985 total gives the following results:

1. 652,881 MSW (tons/year in 1985) x .85 x .25 = 138,740 residue (tons/yr)

2. 138,740 residue (tons/year in 1985) x $\frac{2000 \text{ lbs.}}{\text{ton}}$ = 277,480,000 residue (lbs./yr)

3. 277,480,000 residue (lbs./year) ÷ $\frac{2000 \text{ lbs.}}{\text{cubic yrd.}}$ = 138,740 residue (cub.yds.)

In terms of transportation, 138,740 cubic yards, or 138,740 tons, of residue must be moved from the resource recovery facility to the landfill. Given a 40-ton road limit and the fact that 1 cubic yard of residue weighs 1.0 tons and a five-day week, approximately 22 vehicle-loads (25 cubic yard vehicles) will be required a day.

Disposal Options

Even after processing, there will be substantial amounts of post-combustive residue and bypass municipal solid waste (non-burnables) that will require disposal. The purpose here will be to define the range and impact of disposal options available to the full service contractor.

It is important to evaluate residue disposal and municipal solid waste as two separate issues. The disposal of the raw solid waste is fairly straight-forward. It is presented here because it represents a cost to the County. It is important to note that if bypass waste and residue are landfilled together, the bypass requires 2-1/2 times more space than the residue.

The analysis that follows will be divided into two parts. The first part will look at landfill disposal and examine the amounts and

type of landfill space required to dispose of both the bypass MSW and the residue. The second part will present the other possible options for disposal of the residue.

LANDFILL - Table 5.2 presents the total amount of bypass MSW and the post combustive residue that must be disposed of in 1985 for the 37 Letter of Intent communities. There will be 391,732 cubic yards (97,933 tons) of bypass MSW and 138,740 cubic yards (tons) of residue to be disposed of. For purposes of analysis here, it will be assumed that 530,472 cubic yards or 236,673 tons will have to be landfilled.[5] This represents the maximum amount the full service contractor will have to dispose of in 1985. This assumes that no other feasible economic use will be found for the residue and that the facility will be down 15% of the time. Though the facility will have four days of storage in its receiving pit, any extended shutdown will require MSW to bypass the facility.

Given the volume of material, a determination of the amount of landfill space required can be made. The land area required primarily depends on the character and quantity of the wastes, the efficiency of compaction, the depth of fill and the desired lifetime of the site as a landfill. Assuming that all the bypass MSW and the residue are landfilled, the following calculations can be made:

1. 138,740 residue (cubic yards) $\div \frac{4840 \text{ cu. yds.}}{\text{acre}}$ = 28.67 acre-yds. (residue)

2. 391,732 MSW Bypass (cubic yds. $\div \frac{4840 \text{ cu. yds.}}{\text{acre}}$) = 80.94 acre-yds. (MSW Bypass)

3. 80.94 acre-yds. x .5 (compaction ratio) = 40.47 acre-yds. (MSW Bypass)

4. 40.47 acre-yds. (Bypass MSW) + 28.67 acre-yds. (residue) = 69.14 acre-yds. (landfills needed)

5. 138,740 cubic yards of residue at 2000 lbs/c.y. and 391,732 cubic yards of municipal solid waste at 500 lbs./c.y.

If the landfilled material is stockpiled to a 9-foot level height, 23.05 acres of landfill will be required. This compares with 180 acres that would be needed in 1985 if all the municipal solid waste in the 37 communities was landfilled. From this analysis, it can be seen that the development of a resource recovery facility will extend the life of landfill eightfold in 1985 alone. In addition, the USEPA has indicated that residue could be used as a cover material, thereby increasing by about 20 percent (an additional 2 years) the site volume that can be used for solid waste disposal.

The next step is to compare the projected need for landfill space with the existing available space. As a part of the Solid Waste Management Report, prepared in 1980 by Regional Planning Commission, an analysis of the existing and future potential for sanitary landfills in the County was completed. The study concluded that in terms of currently licensed landfills, solid waste disposal would be provided for only 3 to 4 years. After 1985, only a few municipally-owned landfills and industrial landfills would have any continued disposal capacity. Since project start-up is projected for 1985, it is obvious that existing in-county space will be at capacity. On the other hand, substantial landfill resources do exist outside the County. A significant amount of municipal solid waste is already being transported outside the county at the present time. The key here is transportation and vehicle costs.

Clearly, existing county landfills will be inadequate. Rising Costs are making landfill outside the county unattractive. The only alternative would be the development of new landfills in the county. The Solid Waste Management Report also looked at this issue. A suitability analysis was

prepared for Cuyahoga County evaluating the extent of limitations on potential landfill availability. Four general criteria were used to evaluate the potential for landfill development. These were:

1. Environmental criteria (wetlands, floodplains, endangered species habitat, aquifer recharge zones, active fault zones and bird hazard areas).

2. Availability (vacant land).

3. Policy (industrial zoning).

4. Soil Limitations

This analysis indicated that 285,102 acres of land or 97.5% of the County should be considered unavailable for future landfill development. Only 679 scattered acres, 0.27% of the County, has moderate limitations and 61,622 or 2.3% of the land area exhibit severe limitations.

In summary, the potential for new landfills in the county is limited. The constraints to landfill development, both in the county and in adjacent counties center on three issues. The first is that there is a relatively small amount of suitable vacant land available for landfill development. Second, political problems make siting difficult. The third issue is the costliness of compliance with governmental and environmental regulations. New landfill development represents a substantial cost. Therefore, it would be in the best interest of both the County and the full-service contractor to keep the resource recovery facility open to find alternative uses for residue and to reduce the amount of material that needs to be disposed of.

OTHER DISPOSAL OPTIONS - A review of the literature on existing incinerators and resource recovery facilities indicated that there is a wide variety of proposed uses for post-combustive residues. Though much research has been completed there has been little market interest in residue material.

The most obvious possibility is the sale of post-combustive ferrous and non-ferrous residues. While it is highly feasible to extract and sell ferrous metals after combustion, this is not the case with non-ferrous metals. Based on a survey completed in January 1980 at the Ridge Road transfer station, steel cans and ferrous metals represent 4.76% of Cuyahoga County's municipal waste stream. If this material were removed, 31,077 tons of ferrous metals would be available for reclamation and sale. This would reduce the amount of residue to be disposed of from 138,740 cubic yards per year to 107,663 cubic yards per year, reducing the acre-yards of landfill required to 20.94 acre-yards per year. The collection and sale of ferrous metal and non-ferrous, if it becomes economically feasible, will be an option for the full-service contractor.

Other commercial uses for the residue will hinge on the progress made in no longer regarding the material as solid waste and in resolving questions of ultimate liability. Possible applications dependent on such a determination would include use for final landfill cover, growth of ornamental plants and shrubs, park and golf course cover, roadway and backfill, embankments and land reclamation for non-structural applications. Other possible uses that depend on physical and chemical analysis of the residue are asphalt-free roadways and parking lots and non-structural masonry.

Experiments are currently being conducted at the University of Massachusetts to evaluate the impact of using residue as a final cover for landfills and as a vegetative growth medium.[6] Of particular concern are the effects of heavy metals concentration on vegetation and ground

6. RESCO Residue Program Review and Update, (Hampton, New Hampshire, Wheelabrator-Frye, Inc., 1980).

water. Initial findings have indicated that plant growth in residue medium are not toxic and that residue piles can support plant growth soon after placement. Experiments were conducted with turf, vegetables, and commercial plants and flowers. None of the test species have exhibited symptoms of heavy metal toxicity, although all of the plants did take up some heavy metals from the residue.

The State of Massachusetts Department of Public Works is presently conducting an experimental project in which residue from the RESCO resource recovery facility near Boston (see Figure 1.4) is being used as an aggregate substitute with asphalt in road construction. This material will be used to pave a portion of Route 129 (four lane limited access freeway) in Lynn, Massachusetts. The test strip will be evaluated over a five-year period to determine compaction characteristics, potential leachate impacts and strength tests. Other tests are being done at the RESCO facility to determine potential of residue as a roadway construction material in areas of varying traffic type density and volume. Performance data from the Lynn paving project and the RESCO tests are important to the future commercial use of residue in asphalt mixes.

All these studies are on-going and should offer conclusive evidence about residue usage by the time the Cuyahoga County facility will be starting up. At issue in all of the proposed uses is the regulatory agencies' definition of residue. Existing regulations define residue as solid waste, so commercial use of residue is restricted by the regulations for the transportation, storage and disposal. The studies cited above indicate the residue should not be classified as solid waste, but as a valuable resource that could be used for a variety of economic purposes. Such applications would substantially cut disposal costs, bring

in additional revenue and truly "recover" all of the resources in municipal solid waste.

Residue Standards

It should be noted that process emission standards for residue are in a state of development at the present time. Substantial research is being conducted into the composition and character of the material. The ultimate classification as hazardous or non-hazardous, and whether the residue is defined as a solid waste will have much to do with the usability of residue for road building and as a growth medium. Since these standards are critical to the design of a resource recovery system, they should be monitored closely during the life of the project.

FEDERAL STANDARDS - Based on conversations with Mr. David Sussman of the Office of Solid Waste Programs, United States Environmental Protection Agency (USEPA), no specific standards regarding residue disposal from the incineration of municipal solid waste exist at the federal level. Such residue is theoretically covered by the hazardous waste regulations. This creates a problem because of the stringent requirements for the disposal of hazardous materials.

At issue is the possible presence of water soluble oxides, heavy elements and pesticides in the residue. The residue from a municipal scale incinerator generally retains much of the water after quenching and residue trucks often go to the landfill with water pouring off of them. Because incinerator residues can contain considerable quantities of free moisture, they could present a potential leachate threat to the disposal site. This free moisture readily drains from the residue and could contribute to the leachate generation at the site.

On-going research at the University of Massachusetts is examining this issue. In this study, bottom ash from the RESCO resource recovery

facility near Boston, Massachusetts was analyzed. This facility incinerates municipal solid waste to produce energy. Chemical analysis of the bottom ash indicated that it contains large amounts of copper, zinc, cadmium, nickel, lead and chromium. These metals in soluble form could constitute a real threat to the environment if they were leached by rainfall or runoff. Leachate and horticultural studies indicated just the opposite. The metals do not leach out of the ash. The hypothesis[7] is that incineration "heat treats" the heavy metal component, bonding the metals into materials that are much less water soluble than those found in the raw waste stream. These results refute the claim that residue leachate will produce greater heavy metals levels than conventional leachate due to the fact that the residue's metals content is much greater relative to the raw waste stream.

Sussman indicated that the USEPA has recently completed extensive chemical and leachate analyses of five mass burning facilities in the U.S. These tests came to the same conclusions as the University of Massachusetts study: that, in general, combustion residue is not hazardous but a biologically inert material. Administratively, USEPA will allow landfill disposal of residue under the same requirements as ordinary solid wastes. A toxicity test will be required during the start-up phase for each new mass burning facility. Chemical and leachate tests will be conducted on the residue to determine if any hazardous material is present. If tests indicate that it is not hazardous, combustion residue could be disposed of without cover in sanitary landfill or used as a cover. If a low level of toxicity is discovered, the residue will have to be disposed of in a special waste facility. There are presently four such facilities in northeastern Ohio.

7. RESCO Residue Program Review and Update, Hampton, New Hampshire, Wheelabrator-Frye, 1980.

The USEPA has established final regulations regarding the classification of landfill disposal facilities and practices.[8] The criteria for classification by USEPA as a sanitary landfill includes the following restrictions:

(a) (The Landfill) shall not restrict flow in a flood plain or pose a health hazard due to potential washout,

(b) shall not take or contribute to the taking of any endangered or threatened species or adverse modification of a critical habitat,

(c) shall not cause discharge of pollutants into waters in violation of Sections 402, 404, or 408 of the Clean Air Act,

(d) shall not contaminate underground drinking water source beyond the site boundaries,

(e) shall not operate without daily cover to minimize disease vectors,

(f) shall not engage in open burning,

(g) shall not permit concentration of explosive gases

(h) shall not pose a bird hazard to aircraft that may attract birds within 10,000 feet of a jet aircraft runway, or 5,000 feet of a piston aircraft runway.

STATE STANDARDS - In the State of Ohio, any facility that is used for the purpose of disposing of solid waste material must have a license from the County Board of Health and must conform with applicable state regulations. This license is renewable on an annual basis. There are no license requirements for the transportation of solid wastes, but ash should be trucked from the facility in covered trucks to eliminate fugitive dust.

State regulations regarding hazardous wastes are presently undergoing revision by the Ohio Senate and House of Representatives. If combustion residue is categorized as a hazardous waste under these revised regulations, permit requirements will apply for their disposal. This

8. Federal Register, Vol. 44, No. 179, September 13, 1979.

is highly unlikely, given the results of the USEPA study cited above. Nevertheless, if the State were to adopt more stringent requirements, a significant cost would be added to the project.

2. Liquid Wastes

The estimates for water consumption by the resource recovery facility range from 1000 gallons per minute at the Muny site to 1500 gallons per minute at the East 26th Street site. Much of this water, especially that which is used for steam production and cooling, will be continuously re-used. However, there are operations which can be expected to produce wastewater from the facility of varying concentrations and compositions of organic and inorganic materials. These include:

.Washdown of equipment, tipping bay, and storage pit areas

.Boiler blowdown

.Residue (ash) quenching

.Domestic sewage

.Water treatment process and discharges

Although it is premature at this stage to try to develop accurate data for wastewater characteristics and flow rates, an estimate of the wastewater flow from the facility is approximately 250,000 gallons per day. The actual composition of the wastewater will be affected by items such as the types of ash quenching system, biochemical oxygen demand (BOD), loading of the leachate produced in the receiving and storage areas, and the water treatment requirements. The wastewater BOD strength from the facility will probably be less than the average BOD strength of domestic sewage.[9] With an estimated maximum of 100 employees, the minimum effluent discharge from lavatory and shower facilities, based on 30

9. Bechtel, Inc., Phase II Report, August, 1980, pp. 8-10.

gallons per capita per day, would necessitate a design flow of at least 3000 gallons per day from these sanitary facilities.

The residue which will be hauled to a landfill will be considerably more dense than the solid waste prior to incineration. Table 5.3 shows the water soluble portion of residue from a solid waste incinerator.

TABLE 5.3

RESIDUE - WATER SOLUBLE PORTION

Component	Average Concentration (Percent by dry weight of sample)
Hydrocarbons	9.17
Alkalinity	0.19
Nitrate Nitrogen	0.00035
Phosphate	0.00044
Chloride	0.08
Sulfate	0.24
Sodium	0.20
Potassium	0.045
Iron	0.012
Total Water Soluble Portion	10

Source: Stear, James R., Municipal Incineration: A Review of Literature, E.P.A. Office of Air Programs, June, 1971.

Discharge regulations of the Northeast Ohio Regional Sewer District must be met insofar as pretreatment is concerned. Neutralization of the

wastewater by the addition of acid or base chemicals will be required for pH levels above 10 and below 5.5, before discharging to the municipal sewer system. The degree of pretreatment hinges on the characteristics of the wastewater, which are not predictable at this stage. There is no foreseeable problem in meeting pretreatment requirements for the facility.[10] Following discharge into the sanitary sewer system, the treated wastewater would then proceed to the nearest sewage treatment plant prior to discharge into the lake. Therefore, it is not anticipated that there would be any impact on water quality.

An alternative to utilizing cooling water from the Cleveland Water System is to pump water directly from Lake Erie. The lake water would be utilized in the cooling tower process at a rate estimated at 35,000 gallons per minute. This water would then be returned to the Lake at a higher temperature.

Projected temperature release levels range from 90°F. in the summer to 80°F maximum in the winter. A steady continuous release of water at these temperatures would not be likely to produce any adverse effect on the Lake. However, rapid fluctuations in the release volume and/or temperature could cause localized fish kills. Release of warmed water at a regular rate during the winter months could have a beneficial effect of providing open water area for waterfowl, increased winter production of primary aquatic food sources, and enhancing fish carrying capability in the localized area during fall, winter and spring.

The following factors will have to be examined after completion of the plant design to insure that there are no environmental problems present:

10. Ibid., p. 8-11.

(1) Examination of peak levels of water discharge into the sanitary sewer to insure that the sewer will handle the load.

(2) Examination of the plant design to insure that all storm runoff is confined to the plant site, where catch basins will carry the runoff to the storm sewers.

(3) Examination of the plant water treatment section to insure that it complies with applicable standards in water quality.

3. Air Emissions

(Most of the information contained in this section is derived from the August, 1980 Phase II Report of Bechtel, Incorporated, since more detailed information on the plant is not yet available.)

A major environmental factor resulting from the installation of a resource recovery facility such as that proposed for Cuyahoga County is the potential for air pollution and to conform with standards set by the U.S. Environmental Protection Agency (USEPA). Solid waste resource recovery systems all emit various air contaminants as by-products of the combustion process, and their impact on a poor air quality region such as Cuyahoga County becomes very critical.[11]

The legislative history of The Clean Air Act extends back to 1970 when the original framework was established. Subsequent amendments in 1974 and again in 1977 authorized a comprehensive regulatory program that is administered by the U.S. Environmental Protection Agency. The U.S. EPA promulgated primary and secondary ambient air quality standards to protect the public health and welfare, respectively, from sulfur dioxide (SO_2), total suspended particulates (TSP), ozone (O_3), carbon monoxide (CO), nitrogen oxides (NO_x), and hydrocarbons (HC). On October 5, 1978, the U.S. EPA promulgated the National Ambient Air Quality Standard (NAAQS) for lead also. Primary air quality standards are based on health, and specify the levels of pollution which cannot be exceeded

11. Ibid., pp. 7-11.

without threatening adverse effects on human health. Secondary air quality standards set limits on concentrations of pollution that cannot be exceeded without threatening adverse effects on public welfare (vegetation, property damage, scenic value, etc.) The National Ambient Air Quality Standards are shown in Table 5.4.

Following establishment by the U.S.EPA of the air quality standards, the Clean Air Act directed state agencies to develop and adopt State Implementation Plans (SIP) setting forth all of the necessary control efforts to achieve compliance with the standards. The latest deadline for submission of the SIP was July 1, 1979, but to date, this had not been met by all states. The Ohio SIP has been submitted to the U.S. EPA but has not yet been approved.

The 1977 Amendments to the Clean Air Act include provisions designed for the Prevention of Significant Deterioration (PSD) of existing air quality in areas which are presently cleaner than would be required to meet primary and secondary ambient air quality standards. The facilities subject to the preconstruction review and PSD permit requirements are stationary sources of air pollution from among 28 listed categories which "emit, or have the potential to emit" 100 tons per year or more of any air pollutant plus any other stationary source with the potential to emit 250 tons per year or more of any air pollutant. "Potential to emit" is now determined with pollution control equipment in operation. PSD regulations require new facilities to utilize the Best Available Control Technology (BACT) to achieve maximum levels of control of each pollutant.

Further, the U.S. EPA developed an area classification scheme to be used nationwide. This classification scheme has three classes. The Class I category includes the pristine areas subject to tightest control. Class II category covers areas of moderate allowable growth. Class III

TABLE 5.4

NATIONAL AMBIENT AIR QUALITY STANDARDS

POLLUTANT	AVERAGING TIME	FEDERAL PRIMARY ug/m^3	STANDARDS@ SECONDARY ug/m^3	OHIO PRIMARY ug/m^3	STANDARDS@@ SECONDARY ug/m^3
TSP	ANNUAL	75	60*	75	60
	24-HOUR**	260	150	260	150
SO_2	ANNUAL	80	-	80	-
	24-HOUR**	265	-	265	-
	3-HOUR**	-	1300	-	1300
NO_2&	ANNUAL	100	-	100	-
CO	8-HOUR**	10,000	-	10,000	-
	1-HOUR**	40,000	-	40,000	-
HC	3-HOUR**	160*	-	-	-
OZONE(O_3)	1-HOUR**	235	-	240	-
LEAD	3-MONTH	1.5	-	-	-

* Guidelines only.
** Not to be exceeded more than once per year.
@ 1977 Clean Air Act; Prevention of Significant Air Quality Deterioration.
@@ All Ohio Standards are under review by U.S. EPA.
& Nitrogen dioxide.

Source: Bechtel, Inc., Phase II Report, August, 1980.

category covers areas of major industrialization. Certain areas are designed permanently as Class I areas. There are (a) international parks, (b) national wilderness areas and memorial parks exceeding 5,000 acres, and (c) national parks exceeding 6,000 acres.

Together with the ambient air quality standards, sources that are required to conform to PSD regulations must not cause increases in ambient pollutant concentrations which exceed the increments listed in Table 5.5.

TABLE 5.5

ALLOWABLE AIR QUALITY INCREMENTS

Land Area Type*	MAXIMUM NEW SOURCE INCREMENT (ug/m^3)				
	SO_2			TSP	
	3-hour°	24-hour°	Annual	24-hour°	Annual
Class I	25	5	2	10	5
Class II	512	91	20	37	19
Class III	700	182	40	75	37

Source: Bechtel, Inc., Phase II, Report, August, 1980.

* Classes I, II, III areas designate different categories of clean air areas, with Class I the most pristine.

° All 3-hour and 24-hour values may be exceeded once per year.

TABLE 5.6

ALLOWABLE AIR QUALITY INCREMENTS*
(NON-ATTAINMENT AREAS)

Pollutant	AVERAGING TIME				
	Annual (ug/m^3)	24-Hour (ug/m^3)	8-hour (ug/m^3)	3-hour (ug/m^3)	1-hour (ug/m^3)
TSP	1	5	-	-	-
SO_2	1	5	-	25	-
NO_2	1	-	-	-	-
CO	-	-	500	-	2000

Source: Bechtel, Inc., Phase II Report, August, 1980.

*These increments are applicable to sources outside of the non-attainment area.

In addition, the New Source Performance Standards (NSPS) were developed by the U.S. EPA to place additional limitations on emissions of specific pollutants from various sources such as incinerators and electric steam generating units. The New Source Performance Standards ultimately result in new plants utilizing the best systems of emission reduction which the U.S. EPA determines have been adequately demonstrated in the industry.

The last vital components of the Clean Air Act Amendments are the requirements for non-attainment areas. Non-attainment permit requirements apply to areas in which any ambient air quality standard is being violated. Sources subject to non-attainment requirements include any new plant (or modification) with potential emissions equal to or greater than 100 tons per year of TSP, SO_2, NO_x, hydrocarbons, carbon monoxide, lead, beryllium, mercury, vinyl, chloride, asbestos, fluoride and sulfuric mists. Table 5.6 lists the allowable air quality increments for non-attainment areas.

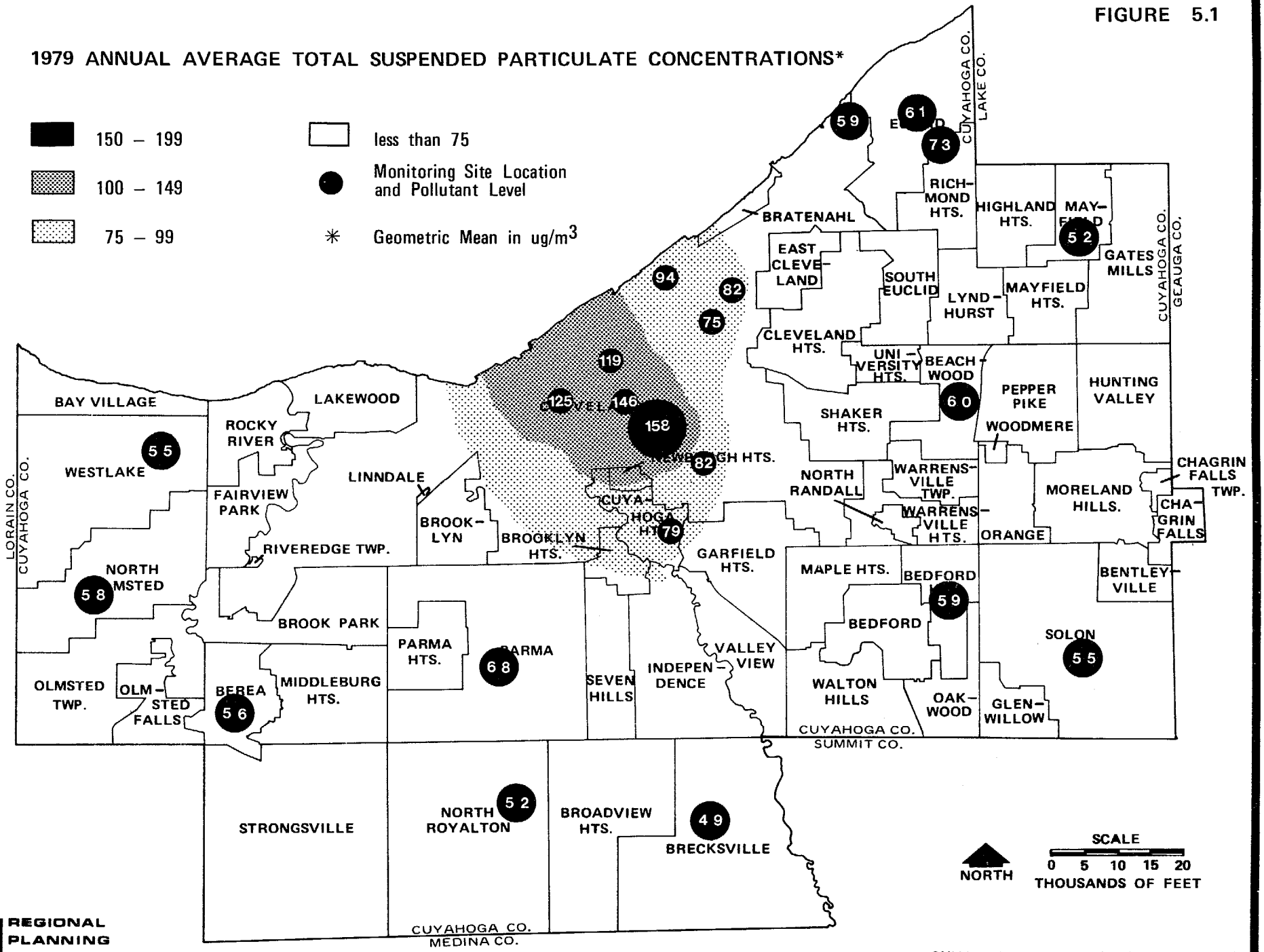
Site Classification

Cuyahoga County has a Class II designation under the U.S.E.P.A. area classification scheme. Thus, the area is provided some allowances for industrial growth. At the present time, the County is a non-attainment area for ozone, CO and SO_2. For total suspended particulate matter (TSP), the heavily industrialized areas are non-attainment, whereas the peripheral areas are not. For NO_x, the County is in an attainment area. Figures 5.1 through 5.3, obtained from the Cleveland Division of Air Pollution Control, indicate concentrations of NO_x, SO_2 and TSP for 1979.

For particulate matter, both potential sites are located in the 100-149 microgram per cubic meter concentration area. For nitrogen oxide, the annual average site concentration (for both sites) is 70-79, while the sulfur dioxide concentration is less than 60.

FIGURE 5.1

1979 ANNUAL AVERAGE TOTAL SUSPENDED PARTICULATE CONCENTRATIONS*

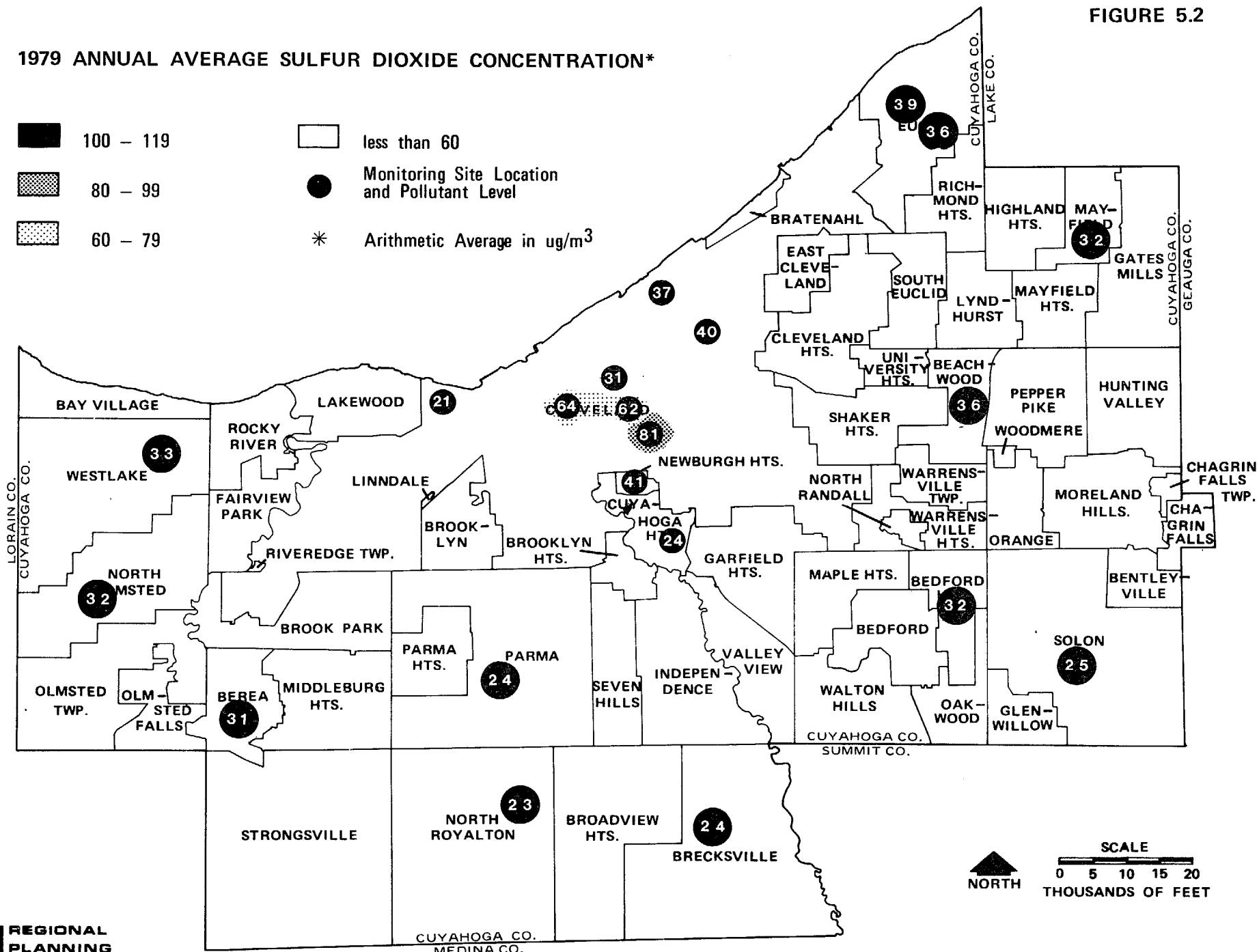


REGIONAL PLANNING COMMISSION

CUYAHOGA COUNTY, OHIO FEB. 1979

FIGURE 5.2

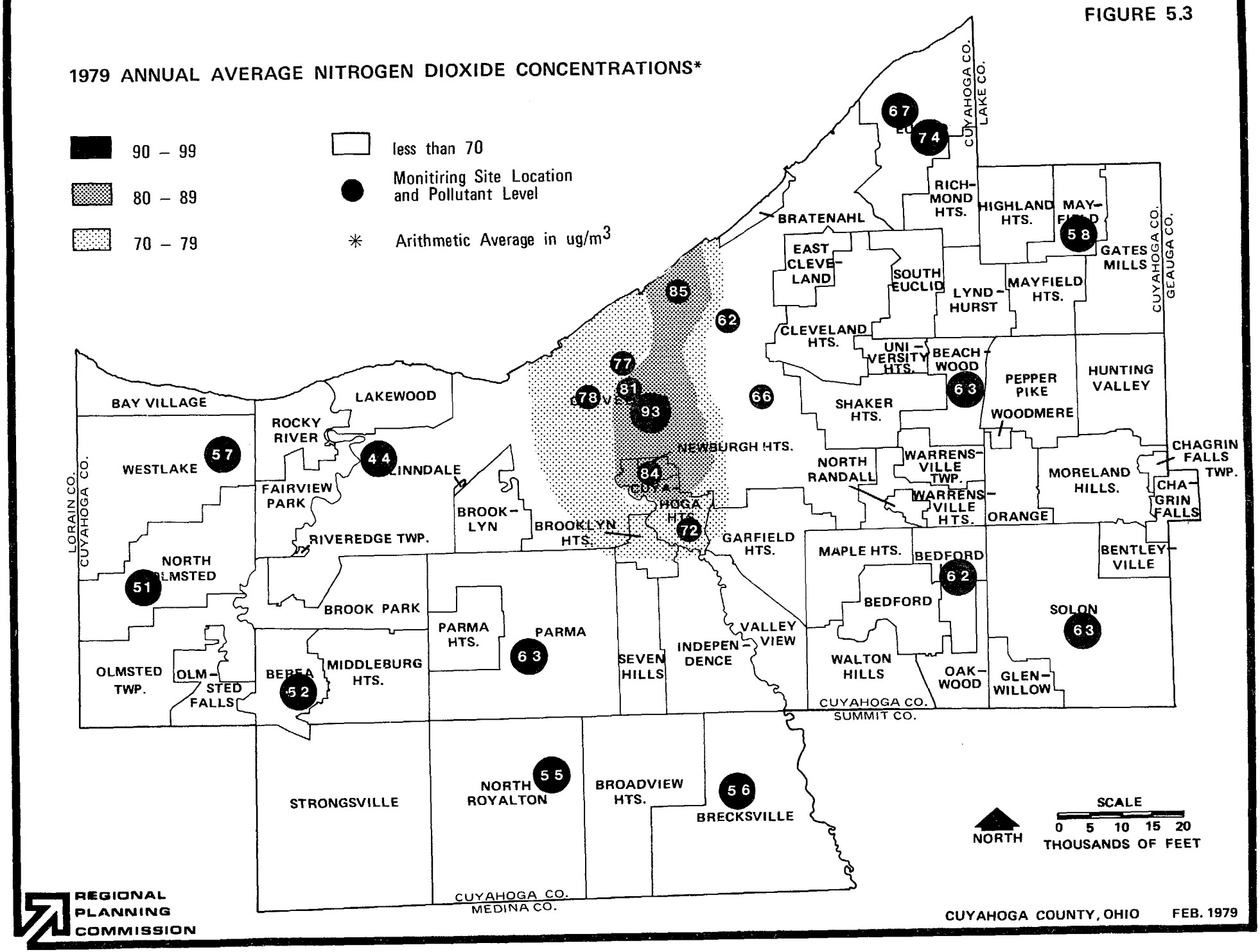
1979 ANNUAL AVERAGE SULFUR DIOXIDE CONCENTRATION*



REGIONAL PLANNING COMMISSION

CUYAHOGA COUNTY, OHIO FEB. 1979

FIGURE 5.3


1979 ANNUAL AVERAGE NITROGEN DIOXIDE CONCENTRATIONS*
90 – 99
80 – 89
70 – 79
less than 70
Monitiring Site Location and Pollutant Level
* Arithmetic Average in ug/m3
CUYAHOGA CO.
LAKE CO.
CUYAHOGA CO.
GEAUGA CO.
LORAIN CO.
CUYAHOGA CO.
CUYAHOGA CO.
SUMMIT CO.
CUYAHOGA CO.
MEDINA CO.
BAY VILLAGE
WESTLAKE
ROCKY RIVER
LAKEWOOD
LINNDALE
FAIRVIEW PARK
RIVEREDGE TWP.
NORTH OLMSTED
OLMSTED TWP.
OLMSTED FALLS
BEREA
BROOK PARK
MIDDLEBURG HTS.
STRONGSVILLE
BROOKLYN
BROOKLYN HTS.
PARMA HTS.
PARMA
NORTH ROYALTON
BROADVIEW HTS.
BRECKSVILLE
SEVEN HILLS
INDEPENDENCE
VALLEY VIEW
GARFIELD HTS.
NEWBURGH HTS.
CUYAHOGA HTS.
BRATENAHL
EAST CLEVELAND
CLEVELAND HTS.
SOUTH EUCLID
RICHMOND HTS.
HIGHLAND HTS.
MAYFIELD
GATES MILLS
LYNDHURST
MAYFIELD HTS.
UNIVERSITY HTS.
BEACHWOOD
SHAKER HTS.
PEPPER PIKE
WOODMERE
HUNTING VALLEY
NORTH RANDALL
WARRENSVILLE TWP.
WARRENSVILLE HTS.
ORANGE
MORELAND HILLS.
CHAGRIN FALLS TWP.
CHAGRIN FALLS
MAPLE HTS.
BEDFORD
BEDFORD
BENTLEYVILLE
SOLON
WALTON HILLS
OAKWOOD
GLENWILLOW
67
74
58
85
62
77
81
78
93
66
63
57
44
84
72
51
52
63
55
56
62
63
NORTH
SCALE
0 5 10 15 20
THOUSANDS OF FEET
REGIONAL PLANNING COMMISSION
CUYAHOGA COUNTY, OHIO
FEB. 1979

The average air quality of the Cleveland area has improved since the implementation of federal and state air standards. Tables 5.7 and 5.8 show the trends in SO_2 and TSP concentrations from 1970-1977. The site number refers to the location of the sampling unit. These figures verify the fact that the air quality is improving.

An "episode" is defined as a period of time when the air contains a pollutant that is at such a concentration as to cause harmful effects, possibly damaging to the health of certain individuals. "Alert", "warning" and "emergency" are the levels (in increasing order) of the potential harm of the episode. Table 5.9 shows the quantity and quality of the alert episodes in Cleveland from 1973 to 1977. Only fifteen such episodes occurred for this period.

To provide an accurate qualitative and quantitative analysis of the effects this facility will have on the surrounding environment, a detailed description (i.e. plant layout and design) is necessary. As was previously mentioned, the RRF has not yet proceeded to this point. Therefore, an overview of the possible effects is only speculative. Once the plant design is completed, a more in-depth analysis should be conducted.

To clearly understand these effects, existing disposal practices must be analyzed. There is no air pollution associated with landfills, which is the predominant form of waste disposal in Cuyahoga County. Incinerators, however, are major sources of air pollutants. At the present time, there are two existing incinerators operating in Cuyahoga County in the Cities of Lakewood and Euclid, although the Lakewood facility is expected to close in the near future.

TABLE 5.7

ANNUAL CONCENTRATIONS OF SULFUR DIOXIDE FOR SELECTED SITES*

1970-1977

SITE NO.	YEAR							
	1970	1971	1972	1973	1974	1975	1976	1977
1	116**	87	92	70	77	79	65	64
3	74	69	76	74	51	57	60	51
5	96	67	66	60	42	53	40	49
7	63	54	65	70	49	46	39	39
9	100	66	87	73	82	92	97	80
10	123	79	81	58	68	54	67	57

Source: Cleveland Division of Air Pollution Control.

*Sites selected are those in continuous operation from 1970 to 1977 which contained an adequate number of representative samples for each year.

**Concentrations in micrograms per cubic meter (ug/m^3).

TABLE 5.8

ANNUAL CONCENTRATIONS OF TOTAL SUSPENDED PARTICULATES FOR SELECTED SITES*

1970-1977

SITE NO.	YEAR							
	1970	1971	1972	1973	1974	1975	1976	1977
1	187**	183	170	158	175	149	141	136
3	124	122	95	90	76	93	84	81
5	135	120	94	92	88	89	83	79
7	94	91	81	72	64	71	72	67
8	94	89	76	68	72	69	64	62
12	86	92	73	66	60	67	57	48
17	136	146	117	118	95	98	93	49
19	88	89	79	63	58	65	58	103

Source: Cleveland Division of Air Pollution Control.

*Sites selected are those in continuous operation from 1970 to 1977 which contained an adequate number of representative samples for each year.

**Concentrations on micrograms per cubic meter (ug/m^3).

TABLE 5.9

ALERT EPISODES

1973-1977°

Date	Index	Pollutants	Duration*
1-27-3	250	Particulates	22
3-3-73	234	Particulates	10
7-19-73	205	Product**	27
9-5-73	258	Product	21
10-10-73	200	Particulates	38
10-23-73	237	Product	72
5-21-74	232	Product	22
11-9-74	239	Particulates	25
5-9-75	237	Product	68 1/2
7-31-75	228	Ozone/Product	74
4-14-76	203	Product	21 1/2
5-28-76	213	Product	19
6-2-76	253	Product	23 1/4
6-4-76	213	Product	23
6-24-76	214	Product	22

Source: Cleveland Division of Air Pollution Control.

°Alert Episodes in 1977— None.

*Duration in hours.

**Product refers to the synergism that occurs between particulates and sulfur dioxide when levels are sufficiently high.

Air Quality Analysis

This analysis was carried out to establish, on a non-site-specific basis, the order-of-magnitude effect of pollutants from a resource recovery facility burning an average of 1750 tons per day (2250 tons per day, peak) of municipal solid waste. The capacity presently estimated for the Cuyahoga County resource recovery facility is 1400 TPD (7-day week).

The results of the analysis enable a preliminary determination of whether air emission standards can be met by the facility. In addition, they provide a preliminary basis for prediction of the most stringent level of pollution control that could be required for the resource recovery facility, and the resultant net effect of the pollutants on the surrounding environment. A summary of permit requirements for the facility appears in Appendix E.

Pollutants Considered

Several categories of pollutants will be emitted from the stack of the resource recovery facility during the periods of its operation, each of which will impact, to varying degrees, the air quality of the surrounding regions in Cuyahoga County.

Emission rates were estimated for all significant pollutants in the flue gas from the facility. These include hazardous pollutants as well as pollutants which will possibly be subject to more stringent EPA regulations in the future.

Of the seven pollutants whose emissions were addressed, total suspended particulates (TSP), sulfur dioxide (SO_2), nitrogen oxides (NO_x), carbon monoxide (CO), hydrocarbons (HC), and lead (Pb), each has a National Ambient Air Quality Standard. Hydrogen chloride (HCl) does not have a NAAQS at present, but there are indications that U.S. EPA may promulgate one in the future.

Air dispersion modeling analyses were performed to predict maximum short-term concentrations of total suspended particulates, sulfur dioxide, lead, and hydrogen chloride.

Estimates of Emissions

Stack emissions are calculated by alternative methods for each pollutant, but all calculations were performed for two MSW firing rates at the resource recovery facility. The first firing rate of 1750 tons MSW per day represents the projected average rate at the facility during its operational life. The second firing rate of 2250 tons MSW per day represents the peak daily rate anticipated at the facility during any period of the year. These firing rates were determined from the refuse quantity and fluctuations analysis in Chapter III.

In estimating TSP emissions, it was assumed that pollution control equipment was operating as designed. The most stringent control requirement that can be called for to limit the emission level of this pollution is the LAER requirement for a non-attainment area. The NSPS standard for Steam-Electric Generating Units does not apply to the resource recovery facility because each boiler/incinerator unit will probably have a capacity that is less than 250 million BTU/hr heat input. However, it was felt that this NSPS establishes a level of TSP control that is as stringent if not more stringent than the level of control which is achievable by a refuse fired boiler, and therefore provided a reasonable goal for LAER. This NSPS control limit of 0.03 pounds of TSP per million BTU of heat input was therefore used as a TSP control level for this analysis. As a comparison, the NSPS incinerator standard of 0.08 grains per dry standard cubic foot is equivalent to approximately 0.2 pounds per million BTU of heat input.

SO_2 emissions were calculated from the stoichiometric equation for sulfur oxidation, using an MSW sulfur content of 0.2 percent for annual emissions and 0.4 percent for short-term SO2 emissions. These sulfur

contents are in keeping with reported test results of MSW composition which indicate an average sulfur content for MSW of 0.2 percent, with an occasional increase to about 0.4 percent. A conservative assumption is made that all sulfur is oxidized to SO_2 gas.

CO emissions from the facility will be negligible. Advanced technology of the mass burning furnaces allows control of excess air rate and grate speed to ensure complete combustion of the organic components of the MSW.

HC emissions were considered insignificant, since the extended residence times and excess air in the mass burning furnaces oxidizes most of the hydrocarbons in the fuel.

NO_x emissions were considered insignificant, since flame temperatures in the furnaces will be held down by the excess air and moisture content of the fuel, and by proper design of the furnace.

For lead, several sources of information were reviewed to establish a satisfactory estimate of lead emissions from the stack. The data used[12] for lead content of the flue gas was adjusted to the percentage efficiency of TSP control equipment which corresponds to that required to meet the NSPS standard for TSP of 0.03 pounds per million BTU heat input. It was assumed that lead emissions were mostly particulate and that these particles were removed from the flue gas by the pollution control equipment with the same efficiency as TSP.

HCl emissions were calculated from the stoichiometric equation using EPA's average percentage composition of 0.46 percent chloride in the MSW, and assuming complete conversion of chlorine to HCl gas.

12. F.L. Cross, Jr., R.J. Drago, and H.E. Francis, 1970, "Metal and Particulate Emissions from Incinerators Burning Sewage Sludge and Mixed Refuse," Proceedings of 1970 National Incinerator Conference, ASME, Cincinnati, Ohio, May 17-20, 1970.

Table 5.10 summarizes the emission factors that were used in the environmental analysis and Table 5.11 summarizes the emission rates for the two MSW firing rates and the estimated annual emissions for each pollutant.

TABLE 5.10

EMISSION FACTORS

Pollutant	Pounds of Emission Per Ton of MSW Fired
TSP	0.27
SO_2 (@ 0.2% S)	8.0
SO_2 (@ 0.4% S)	16.0
Lead	0.004
HCl	9.5

TABLE 5.11

RATES OF EMISSION
(pounds per hour except as noted)

MSW FIRING Rate	TSP	SO_2 (@ 0.2% sulfur)	SO_2 (@ 0.4% sulfur)	Lead	HCl
1750 Tons/ Day	20 (86 Tons/ Year)	583 (2555 Tons/ Year)	1167	0.29	693
2250 Tons/ Day	26	750	1500	0.38	890

Comparison of emissions tabulated here was made with emission rates at European facilities burning MSW in mass burn boilers as summarized in a report prepared by Battelle.[13] There was enough correlation with these figures to give confidence in the numbers used in this analysis. All the emission values used here are considered to be conservative and provide reasonable inputs for a good "first-phase" determination of the air quality impact of the proposed resource recovery facility.

Estimates of Pollutant Concentrations

The USEPA requires that estimates of ground level concentrations of pollutants be made prior to installation of a new facility that will be subject to PSD and non-attainment regulations. The most convenient method of determining these concentrations for a source such as the resource recovery facility is to develop a dispersion model of the facility emissions. With this approach, a computer program is used to simulate conditions for dispersion of pollutants in the vicinity of a point source or several point sources. In essence, the dispersion model provides a method for translating estimated stack emissions into estimated pollutant concentrations at ground level.

USEPA has established a computer network called UNAMAP (Users Network for Applied Modeling of Air Pollution) which has several modeling programs in its catalog. For this analysis, USEPA's UNAMAP Program PTMAX was used to determine the maximum estimated short-term ambient concentrations of pollutants resulting from the estimated stack emissions. PTMAX is an interactive point source dispersion program that computes maximum average 1-hour ground level concentrations for any possible combination of wind speed and weather stability using a Gaussian plume model. USEPA

13. "Refuse - Fired Energy Systems in Europe: An Evaluation of Practices"; An Executive Summary. USEPA Report SW771, November 1979.

air dispersion guidelines[14] recommend that for the initial pollutant concentration estimates, short-term concentrations be determined in lieu of long-term concentrations, since such an analysis yields more conservative results than the latter approach.

It was assumed that the facility will have four 600-ton-per-day mass burn boilers with separate flues for each furnace, all contained in a single stack. A stack height of 200 feet was assumed because this is a typical height for this type and size facility. The ambient air temperature was assumed to be 68°F and the flue gas exit temperature was assumed to be 400°F. Stack gas flow rates were estimated from combustion calculations assuming an excess air rate of 100 percent. The maximum ambient concentrations obtained from PTMAX model studies are shown in Table 5.12.

TABLE 5.12

MAXIMUM 1-HOUR POLLUTANT CONCENTRATIONS, MICROGRAMS PER CUBIC METER

MSW Firing Rate	TSP (ug/m^3)	SO_2 (@ 0.4% Sulfur) (ug/m^3)	Lead (ug/m^3)	HCl (ug/m^3)
1750 Tons/Day	2.1	126	0.03	75
2250 Tons/Day	2.3	136	0.03	81

All of the maximum ground level concentrations in Table 5.12 occur within one kilometer of the source. These concentrations were extrapolated to 3- and 24-hour concentrations in order to allow comparisons with the 5.13. respective NAAQS. Multiplying factors suggested by USEPA[15] for calculation of 3-, 8-, and 24-hour averaging times are listed in Table 5.13.

14. "Guidelines for Air Quality Maintenance Planning and Analysis, Volume 10: Procedures for Evaluating Air Quality Impact of New Stationary Sources"; EPA-450/4-77-001, October 1977.

15. "Guidelines for Air Quality Maintenance Planning and Analysis, Volume 10: Procedures for Evaluating Air Quality Impact of New Stationary Sources"; EPA-450/4-77-001, October 1977.

TABLE 5.13

POLLUTANT CONCENTRATION CONVERSION FACTORS

AVERAGING TIME	MULTIPLYING FACTOR
3 hours	0.9 (±0.1)
8 hours	0.7 (±0.2)
24 hours	0.4 (±0.2)

The multiplication factors are based on USEPA's experience with elevated point sources, and are conservative guidelines for converting to averaging times greater than 1-hour. The numbers in parentheses are recommended limits to which one may diverge from the multiplying factors to compensate for factors such as stack height, aerodynamic downwash, and terrain. For this particular analysis, multiplying factors of 0.9 and 0.4 were used for 3- and 24-hour averaging times, respectively. The adjusted maximum ground level concentrations are listed in Table 5.14.

TABLE 5.14

MAXIMUM 3- AND 24-HOUR POLLUTANT CONCENTRATIONS

Averaging Time	TSP (ug/m^3)	SO_2 (@ 0.4% Sulfur) (ug/m^3)	Lead (ug/m^3)	HCl (ug/m^3)
3-Hour	2.0	122	0.03	73
24-Hour	0.9	54	0.01	32

Impact of Emissions

The impact of the pollutants from the facility was evaluated by comparing the levels of the ground level concentrations of the pollutants resulting from the facility's operation with the significant air quality increments for non-attainment areas that were given earlier in this section. The smallest and thus critical pollutant increments are the PSD

levels of significance available to sources outside the non-attainment areas. These represent the increments above which level pollutant emission concerntrations are considered significant by USEPA criteria.

The maximum estimated 24-hour ground level concentration of TSP from the facility is 0.9 ug/m^3, which is below the PSD level of significance of 5 ug/m^3, therefore the level of control assumed 0.03 pounds of TSP per million Btu heat input, is considered reasonable. Non-attainment requirements as described earlier in this section will still have to be met.

The maximum estimated 3-hour ground level concentration of SO_2 from the facility is 122 ug/m^3 which is above the level of significance of 25 ug/m^3. The predicted 24-hour ground level concentration of SO_2, 54 ug/m^3 also exceeds the significance level of 5 ug/m^3. Further analysis of SO_2 emissions will be required when more details on the site and technology are known, in order to assess the magnitude and impact of SO_2 emissions from the facility. It should be noted, however, that the average SO_2 emissions from the facility are estimated to be 0.9 pounds per million Btu heat input. This is lower than the upper limit of 1.2 pounds per million Btu, which has been established in the NSPS for Electric Utility Steam Generating Units.

The maximum estimated 1-hour lead concentration from the facility is 0.03 ug/m^3. This is significantly lower than the only available EPA Standard of 1.5 ug/m^3 which is based on a 3-month average. Site specific weather data is required to extrapolate predicted 1-hour lead concentrations to a 3-month average. Similar calculations have indicated, however, that the 3-month average concentration will be two to three orders-of-magnitude lower than the 1-hour concentration. It can be concluded,

therefore, that lead emissions from the facility will have negligible effect on the ambient lead concentration at or near the facility site.

No USEPA standard exists at present for HCl emissions, but these emissions may approach human detection levels, particularly in multiple combustion source areas. HCl emissions affect machinery by hastening corrosion and in sufficient concentrations can affect human health. It is, therefore, useful to have at least an order-of-magnitude estimate of HCl concentration at the facility. At concentrations of 1 to 5 ppm (1400 to 7300 ug/m^3), most people can detect HCl odor.[16] The results of this analysis show an estimated maximum 1-hour HCl concentration of 81 ug/m^3, which is far below the threshold detection range. It is reasonable to assume that ambient concentrations resulting from HCl emissions from the facility will not approach a significant level.

The results of this modeling analysis must be viewed as a screening or first-phase evaluation of effects of pollutants from the resource recovery facility. They must not be viewed as conclusive results for EPA approval purposes. When the site for the facility is determined, a site-specific environmental analysis must be carried out, to establish the impact of air pollutants in that specific area. In addition to this, a final analysis must be carried out by the facility contractor using actual design parameters and emission levels after the design of the facility is completed.

Air Pollution Control Requirements

Based on the pollutant concentrations summarized in Table 5.14, the use of properly designed and operated electrostatic precipitators (ESPs) or baghouses can provide adequate air pollution control for the facility.

16. "Estimated Ground Level Concentrations of Pollutants from Waste-to-Energy Facilities"- Olexsey, Freeman, Brailey, 1980 National Waste Processing Conferenc

ESPs may prove to be the better choice in the final design of the facility because of their lower operation and maintenance costs and because baghouses are not suited for the higher operating temperatures which may be encountered. Installation of either of these two control devices should result in TSP concentrations from the facility below the PSD levels of significance.

Additional analysis will have to be performed to confirm the fact that SO_2 emissions are within allowable limits. Sulfur dioxide concentrations in Cuyahoga County will experience a net reduction, however, due to the installation of the facility, if this results in the reduced operation of other steam or electric generating facilities now using fossil fuel.

The RRF will produce no secondary pollutants directly. However, increased traffic in that area will produce ozone, the major constituent of secondary pollutants. The areas are both heavily industrialized and major traffic areas. The addition of the RRF will not increase air pollutants on a regional level since the trucks are only being re-routed from the landfill to the RRF. However, the local air quality could possibly decrease. This impact should be minimal since the trucks must meet USEPA emissions standards.

4. Noise The amount of noise which will emanate from the County's resource recovery plant will be minimal. Other facilities, particularly those which process waste before incineration with heavy equipment such as shredders, can produce excessive noise levels. The lack of such equipment in the County's plant will avert this problem. Some noise from plant equipment, however, may be expected.

Other noise produced at the facility will be a combination of traffic noise from trucks entering and leaving the site and discharging their

loads. Traffic noise abatement is possible by maintaining good, smooth road surfaces to and from the facility, and insisting on properly maintained truck exhaust silencer systems on the MSW delivery and residue disposal vehicles.

The existing ambient noise environment around both sites is significantly affected by four major noise generators. First, Burke Lakefront Airport is located less than one-half mile north of the East 26th Street site and less than one mile northwest of the Muny site. Aircraft operations (see Table 5.15) therefore produce considerably high levels of noise in the area at various intervals. Secondly, both sites are located very close to major interstate highways (the East 26th site is approximately 800 feet from the Innerbelt and the Muny site is less than 100 feet from the Memorial Shoreway). Vehicular traffic on these eight-lane highways is very heavy, particularly during peak hours, and thus contribute substantially to noise levels in the area. Thirdly, the presence of other traffic generators such as industries, warehouses and truck terminals near both sites results in additional noise producing truck traffic. Finally, both sites are immediately adjacent to railroads which, like the airport, raise noise levels to considerably high peaks at certain times. As a result of these existing high noise levels, it is not expected that vehicle noise from in and around the resource recovery plant will severely impact the surrounding area.

If required, construction of earth embankments and other landscaping along the boundaries of the facility site could assist in buffering the facility noise from the surrounding environment. A plant design that keeps any noise producing operations enclosed within the building will result in low noise levels from the facility.

TABLE 5.15

BASIC AVIATION FORECASTS— BURKE LAKEFRONT AIRPORT

	1980	1985	1990	2000
Passenger enplanements				
scheduled airlines	84,575	90,000	110,000	152,000
Aircraft operations*				
Air carrier	7,039	7,000	8,000	10,000
Air taxi	2,733	5,000	6,000	7,000
General aviation	47,091	49,000	51,000	55,000
Military	1,748	2,000	2,000	2,000
Total	58,611	63,000	67,000	74,000
Based aircraft				
Single-engine propeller	21	20	18	16
Multi-engine propeller	15	17	20	24
Business jet	3	4	5	7
Helicopter	3	3	3	3
Total	42	44	46	50

*Historical aircraft operations: Federal Aviation Administration, "Air Traffic Tower Records", 1980.

Source: Peat, Marwick, Mitchell & Co., 1981.

5. Odor Due to the characteristics of municipal solid waste (MSW) odors may pose a problem at resource recovery facilities. The areas most susceptible to odor production are the receiving and storage areas of the facility.

A plant design that provides for proper enclosure of MSW receiving and storage areas, combustion area and ash storage area will allow for significant reduction in odors from the facility. Burning of odor containing air within the facility in the combustion process will eliminate odors spreading to the environment outside of the facility. A continuous feed of MSW from the storage pit into the furnaces will minimize the storage time of the refuse and hence reduce the odors associated with putrefaction of the waste.

6. Dust The utilization of the mass burn technology in the County's resource recovery facility will minimize the potential of dust in the plant itself.

This is due to the fact that many dust problems are associated with facilities that process wastes through such devices as shredders and air classifiers. Nevertheless, substantial amounts of dust generated by trucks dumping in the receiving area could also be a problem at a mass burn facility. In such instances, dust can pose a potential health hazard to workers in the pla and protective masks and other devices should be worn.

Fugitive dust can be a real health problem near the facility if it is not properly controlled. Fugitive dust is a combination of airborne dust eminating from streets, ash trucks, crushed garbage dropped off hauling trucks, and similar sources. Ash should be trucked from the facility in covered trucks and adequate provision should be made for hard surfaced areas in and on the periphery of the plant area to minimize this dust. Maintenance of grassed areas around the facility, together with landscaping and wind breakers, will also assist in cutting down nuisance effects of fugitive dust.

V.C. Maintenance Codes

The construction of a resource recovery facility in any area of a community may have a potential impact on the environment and the well being of workers and residents near the site of the facility. Over the years, the public has traditionally associated the operation of incinerators and sanitary landfills with strewn debris and garbage, rodents, flies and other vectors, odors, noise and other undesirable side effects. In recent years, shortages of available landfill space, the energy crisis and other factors have prompted the construction of resource recovery facilities. Despite the fact that there are several successful operational resource recovery facilities around the world which have provided an economically viable alternative to sanitary landfilling, as well as a supplement to decreasing energy supplies, the public's concern with the odor, litter, noise and other problems inherent to handling solid wastes in any fashion has also been extended to the operation of resource recovery

facilities. As a result, new resource recovery facilities, such as the County's proposed facility, must be designed and operated so as to minimize or eliminate these potentially adverse environmental impacts.

The purpose of this section is to discuss some of the measures that can be taken to minimize some of the negative environmental impacts associated with resource recovery facilities identified in the preceding section. It includes a discussion of standards for maintaining the site of the resource recovery facility and the state of repair and cleanliness of vehicles used for hauling wastes to and ash residual from the facility. In addition, consideration is given to measures that may be taken to minimize the impact of the resource recovery facility on the aesthetics of the surrounding area.

1. Site Maintenance Several measures may be taken to insure the proper maintenance of the final site selected for construction of the County's resource recovery facility, foremost of which is keeping good housekeeping and facility maintenance at a consistently high level. In order to prevent wastes and other debris from littering the facility property or the surrounding neighborhoods, the final site selected for the County's facility should be cleaned on a regular basis, including sweeping the drives and parking areas with a street sweeper. The resource recovery facility should be designed to help prevent the spread of litter. The solid wastes transported to the facility will be dumped into a completely enclosed receiving pit area, the only area on the facility's site that will be used for the storage of wastes. The delivered wastes will then be transferred immediately by an overhead crane to the facility's furnace where it will be incinerated. To maintain the cleanliness of the receiving pit area, it should be completely emptied and washed down on a regular basis.

In addition to the solid wastes stored at the resource recovery, other potential sources of strewn wastes and debris are wastes spilled from collection and transfer station vehicles while en route to the County's facility and wastes spilled from vehicles hauling ash residuals or other materials from the facility for recovery or final disposal at a sanitary landfill. To prevent the spillage of wastes by these vehicles, all collection transfer station or other vehicles hauling wastes or ash residuals or other materials from the resource recovery facility should be of the type which completely encloses its load. According to Chapter 613 - Littering, Section 613.07: Truck Loads Causing Litter of the Codified Ordinances of the City of Cleveland, all vehicles transporting materials over any public street, road or highway within the City of Cleveland must be so loaded as to prevent the spillage of their loads on the City's streets, roads or highways. Penalties of not less than $10 and not more than $50 are assessed for violations. A substantial increase in this penalty would assure better compliance with this ordinance.

Another potentially adverse environmental impact associated with the operation of resource recovery facilities is that they can likely be a breeding environment for rats, mice, flies and other vectors. These pests may be transported into the facility by collection and transfer station vehicles and preventative measures must be taken to insure that the facility itself does not bcome their breeding environment. Keeping the collection and transfer station vehicles and the facility clean can help to minimize this potential problem. It is assumed that the communities that are expected to haul their municipal solid wastes directly to the resource recovery facility will be responsible for keeping their collection vehicles clean. At the present time, the decision as to whether or not secondary hauling — that is, from the transfer station to the resource recovery facility — will be included in the contract with the full service contrac-

tor is pending.[17] If secondary hauling is not included in the contract with the full service contractor, the washdown and maintenance of collection and transfer station vehicles will occur at the transfer station and will be the responsibility of the municipalities involved.[18] The decision as to whether or not residue hauling will be included in the contract with the full service contractor is also pending. Maintenance and washdown of residue hauling vehicles will occur at the resource recovery facility if residue hauling is included in the contract with the full service contractor. If, on the other hand, residue hauling is performed by a private contractor, the private contractor will be responsible for the maintenance and cleanliness of residue hauling vehicles. Whatever the outcome of this decision, residue will be wetted and residue hauling vehicles will be completely covered to prevent the potential for windblown debris.

As was noted above, the resource recovery facility itself may also be a breeding environment for rodents, flies and other vectors. To minimize this problem, the full service contractor should hire a professional exterminator to check for rodents, flies and other vectors on a regular basis. If a rodent or other vector problem is identified on the site of the resource recovery facility, corrective action should be taken immediately. To further reduce the potential for vectors, the receiving pit area of the resource recovery facility should be completely emptied and washed down on a regular basis. The cleanliness of the recovery pit area can also be enhanced by maintaining a "first-in, first-out" solid waste inventory whereby stored solid wastes are not allowed to accumulate while

17. Telephone Interview w/ Dan Dent, Bechtel, Incorporated, March 19, 1981.
18. Ibid.

newly delivered solid wastes are processed.[19] Since the ash residual left after incineration of solid wastes is low in putrescible content, it does not provide a good breeding environment for vectors.

Although the decision as to who will be responsible for the washdown and maintenance of collection, transfer station or residual hauling vehicles has not been made, regular washdown of the waste and residue hauling vehicles and the receiving pit area of the County's facility may also help to control unpleasant odors. It is anticipated that little or no odors will originate from proposed resource recovery facility's residue disposal area since the amount of putrescible content in ash residue has been shown to be less than .2 percent.[20]

In addition to the above-mentioned design and operative features of the County's proposed facility, the geographic location of the final site selected for construction of the facility and the expected lot coverage of the facility when constructed will also ameliorate any adverse environmental impact on the surrounding land uses due to unpleasant odors. As was noted in the Land Use Study section of this Environmental Impact Assessment Report, the two alternative sites being considered for construction of the County's resource recovery facility are both located in areas already zoned for industrial use. Neither the proposed Municipal Light Plant site nor the alternatively proposed East 26th Street site are located adjacent to residential development. The closest residential development to the proposed Municipal Light Plant site is approximately one-third of a mile to the southeast, while the closest residential development to the proposed East 26th Street site is one-fourth of a mile to the south.

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19. Stanley Consultants, Resource Recovery from Municipal Solid Waste in Ohio, (Cleveland, 1976), p. III-78.
20. Bricker, Paul W., "Testing Harrisburg's Refuse Incinerator", represented from The American City, June, 1975.

Each of the proposed sites for the County's resource recovery facility is separated from residential development by existing industrial development. Any unpleasant odors these adjacent uses might be subject to could be minimized by such site planning features as adequate setbacks, berms, foliage screens or buffer zones. Forty percent of the East 26th Street site, or just under five acres, is expected to be occupied by the resource recovery plant and ten percent, or just over one acre, is expected to be used for parking purposes. Due to the triangular shape of this site, the western section of the site is not useful for development purposes. As a result, the developable area of the proposed East 26th Street site is about 12 acres. In comparison, twenty-five percent of the 18-acre Municipal Light Plant site, or just over four acres, is expected to be occupied by the resource recovery plant and six percent, or just over one acre, is expected to be used for parking and access.

It is not anticipated that noise emissions from the proposed facility will result in a significant adverse impact upon surrounding land uses. The Occupational Safety and Health Act of 1970 (OSHA) specifies that 90 decibels is the maximum noise a worker should be exposed to in an 8-hour working day.[21] Consequently, noise levels external and internal to the operation of the County's proposed resource recovery facility must be kept at 90 decibels or less. Where this is not practical or possible, workers should wear protective ear equipment.

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21. Stanley Consultants, op. cit., p. III-78.

2. Vehicle Standards The transport of municipal solid wastes and ash residuals by collection, transfer station and residue hauling vehicles is crucial to the resource recovery process. Consequently, standards for the operation, maintenance and cleanliness of collection, transfer station and residue hauling vehicles must be developed to minimize the impact of solid waste and residuals hauling on the environment.

In order to minimize the exposure of surrounding land uses to vehicular noise generated by collection and transfer station vehicles while hauling wastes to the County's proposed resource recovery facility and to minimize the impact upon rush hour traffic, the time of dumping of collection and transfer station vehicles hauling wastes to the County's facility will most likely be restricted to the hours of 9:00 A.M.-3:30 P.M. It is not anticipated that vehicles hauling wastes to the facility or ash residuals or recoverable materials from the facility for final disposition will interfere significantly with the normal traffic flow in the area of the site selected for construction of the County's facility. It is expected that collection and transfer station vehicles will haul mainly on the County's interstate highway system when hauling wastes to the resource recovery facility. Vehicles returning to their respective municipalities are also expected to utilize the County's interstate highway system, as are vehicles transporting ash residuals or recoverable materials from the resource recovery facility for final disposal or recovery.

As was noted earlier, the decision as to who will be responsible for the washdown and maintenance of collection, transfer station or residual hauling vehicles is pending. If secondary hauling is not included in the contract with the full service contractor, the washdown and maintenance of collection and transfer station vehicles is expected to be

performed at the transfer station by the municipalities utilizing the transfer station. Likewise, if residue hauling is not included in the contract with the full service contractor, the private hauler transportating the ash residue to a sanitary landfill is expected to be responsible for the maintenance and cleanliness of residue hauling vehicles. It is assumed the communities hauling their wastes directly to the resource recovery facility will be solely responsible for the maintenance and cleanliness of their collection vehicles.

3. Aesthetic Considerations

The fact that the County's proposed resource recovery facility will be visible from the Lakefront if constructed on one of the two alternative sites necessitates consideration of the proposed facility's aesthetic impact. Although architectural design is often a matter of individual taste, the County's facility should be designed to insure compatibility with the surrounding area. Both alternative sites are located in predominantly industrial areas. Although the resource recovery facility will be an industrial type use, it is expected that its design will be compatible with the surrounding area in terms of scale and architectural design. Figures 5-4, 5-5 and 5-6 are examples of resource recovery facilities in Europe and Japan which have incoporated unique architectural features into their design.

In order to minimize the impact of the construction of the facility on the surrounding area, full service contractors responding to Cuyahoga County's resource recovery facility must address the aesthetic impact of the facility's construction on the surrounding environment.[22] Potential full service contractors should include topographic and architectural drawings in their responses to the County's RFP.[23] Other measures

22. Meeting with Pat Holland, Assistant Director for Resource Recovery, Cuyahoga County, 3-27-81.
23. Ibid.

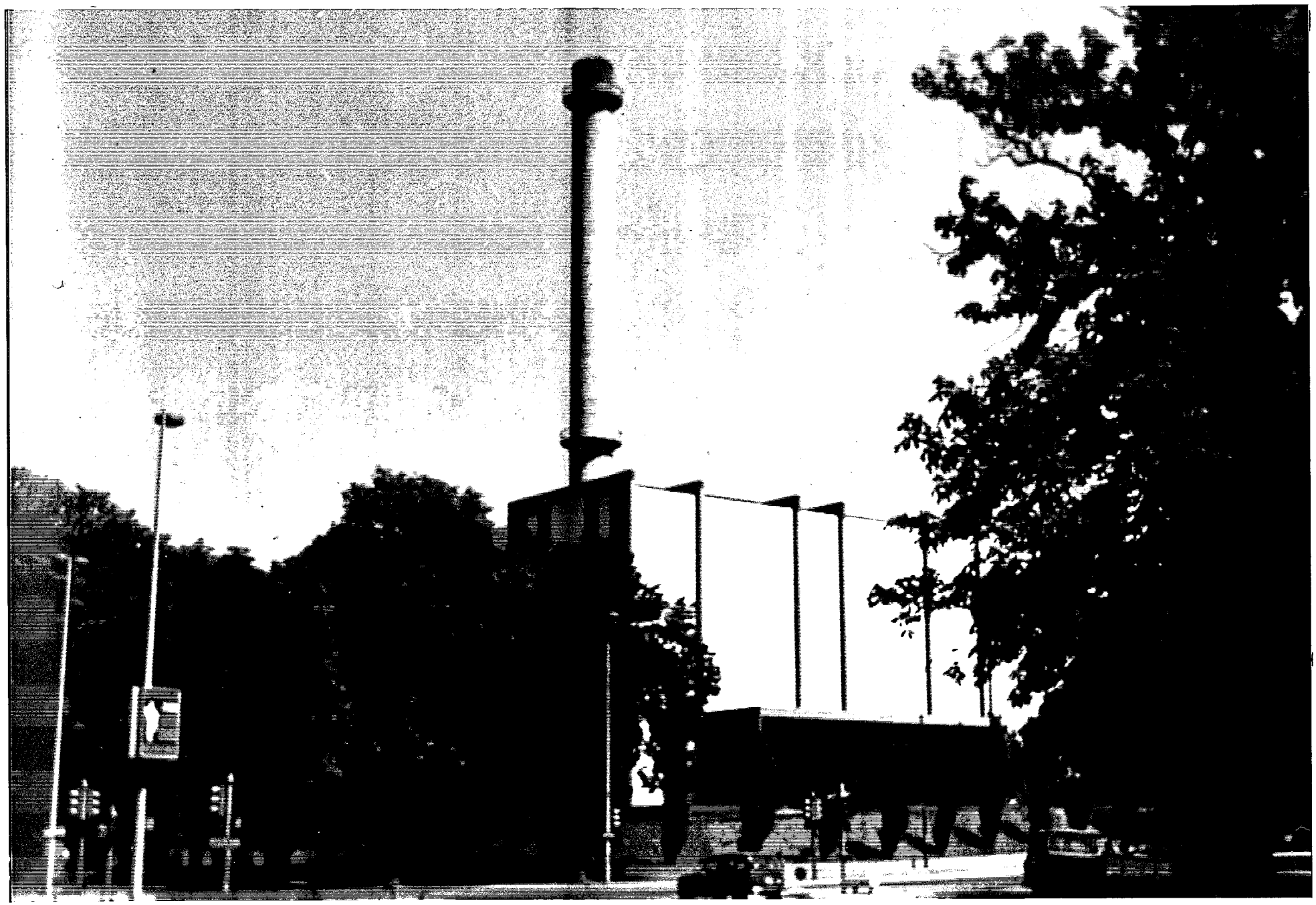


FIGURE 5-4 THIS RESOURCE RECOVERY PLANT PROVIDES DISTRICT HEATING FOR THE CITY OF METZ, FRANCE.

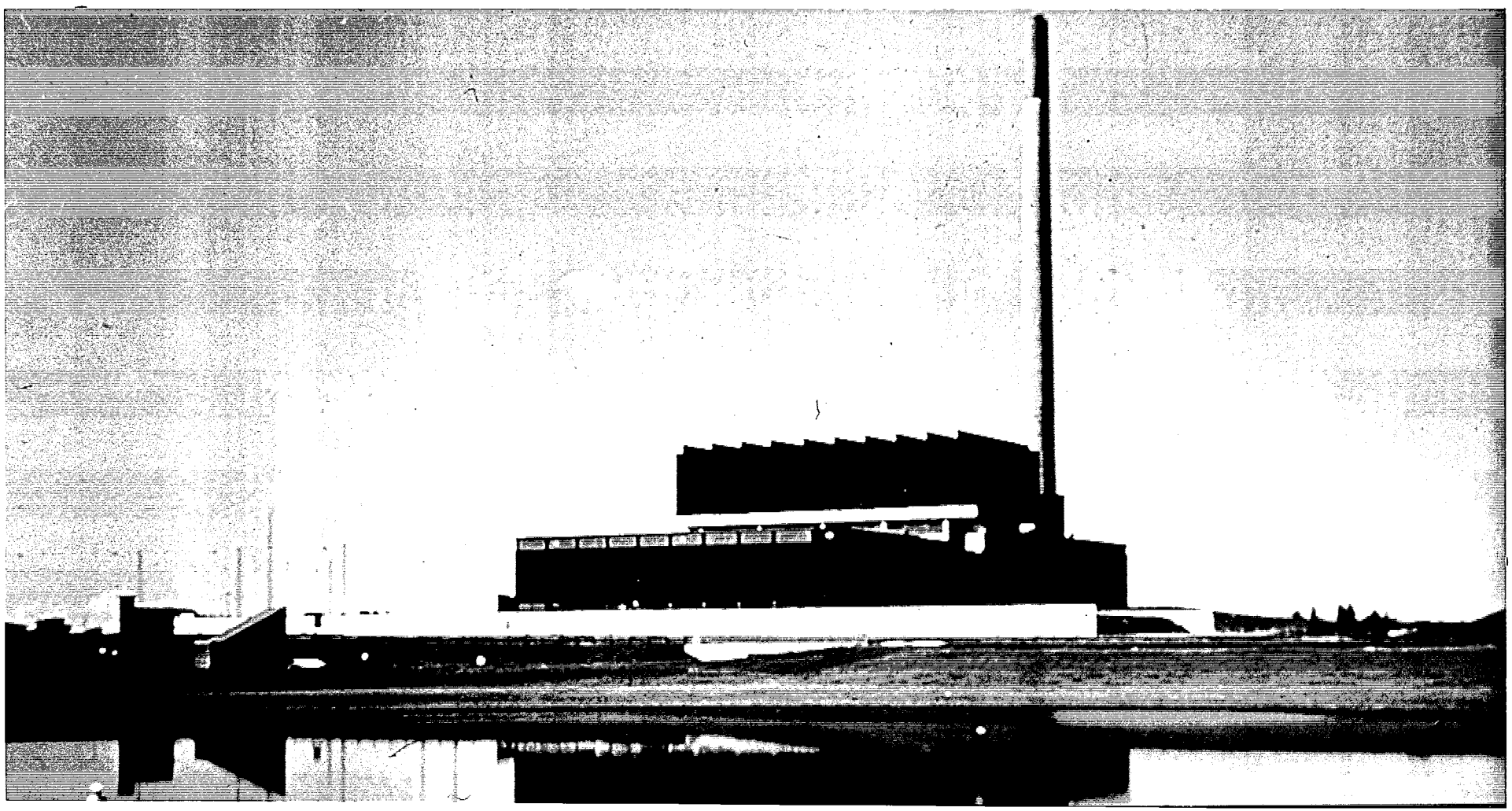


FIGURE 5-5 THIS 1200 TON PER DAY FACILITY IN VESTFORBRAENDING, DENMARK HAS BEEN OPERATIONAL SINCE 1971.

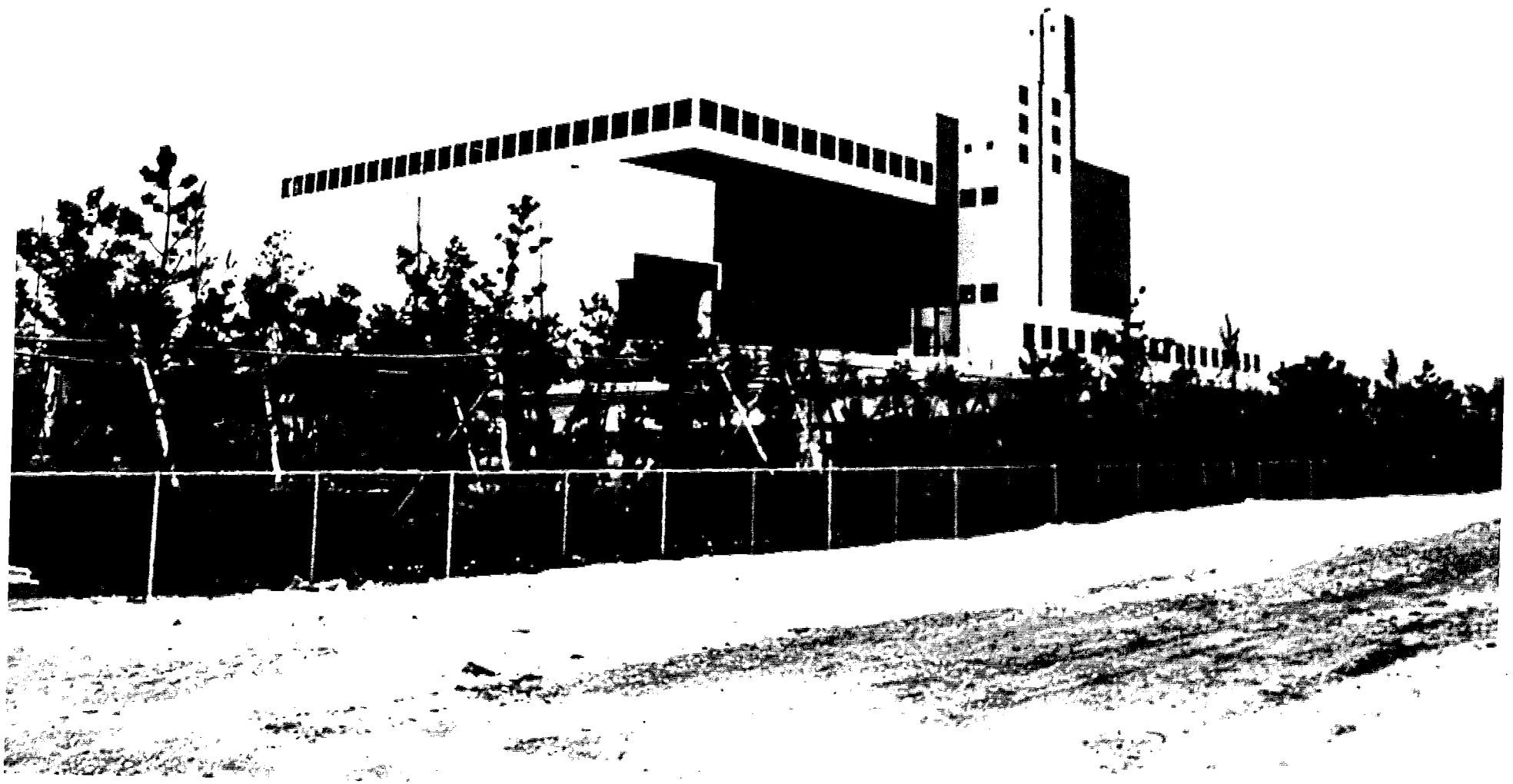


FIGURE 5-6 THIS RESOURCE RECOVERY FACILITY IN JAPAN HAS BEEN OPERATIONAL SINCE 1974.

which might be instituted to ease the facility's impact on the surrounding area include proper selection of building materials, use of wall graphics, use of aesthetically pleasing colors and adequate landscaping. In order to provide the City of Cleveland with an opportunity to review the design of the County's proposed facility, the City of Cleveland's Fine Arts Advisory Committee of the City of Cleveland Planning Commission should review the final design of the proposed resource recovery facility. The Fine Arts Advisory Committee is authorized to review all publicly financed development projects in the City of Cleveland.

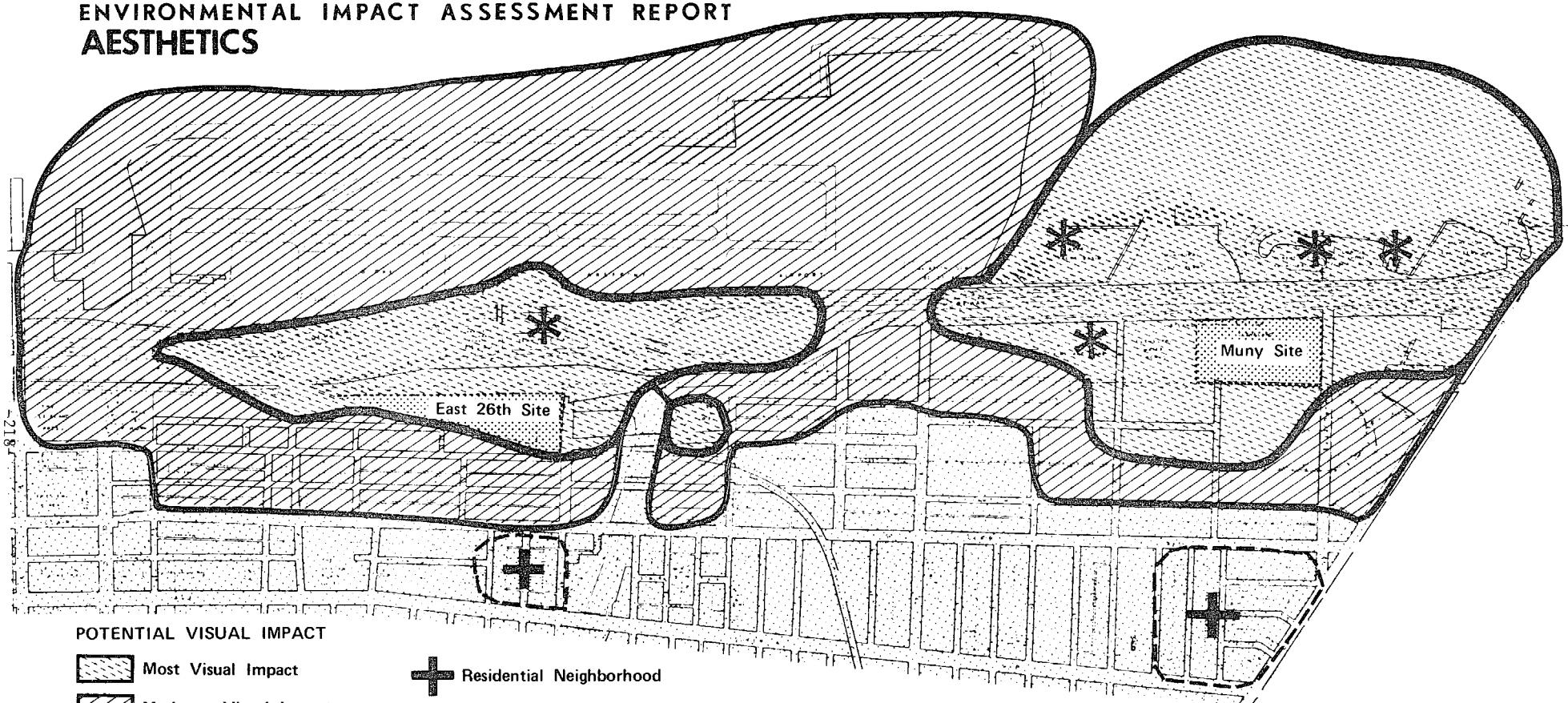
East 26th Street Site

The East 26th Street Site is a triangular piece of land that has a panoramic view of the Lake Erie coastline and Burke Lakefront Airport. The site is bordered by rail lines on the north and south sides and East 26th Street on the east side. From an aesthetic standpoint, it would be difficult to find a more blighted area in downtown Cleveland. Since the area is used as a storage yard for containerized freight as well as a dumping area, it would appear that any type of development that would occur here would be beneficial to the area. If a Resource Recovery Plant were constructed at this site it probably would not have a severe impact on the areas to the south and southwest. A seven story building, owned by the Reserve Terminals Company, buffers the site to the south. Therefore, it would be very difficult to see the Resource Recovery Plant from the south due to the height, area, and location of this large industrial building. The proposed plant would, however, most likely be visible from the Shoreway, although the site is slightly lower in elevation and is buffered by the existing railroad storage lines, which would make it more difficult to see the site. From Figure 5.16, it is apparent that the area that would have the most visual impact is along the Shoreway, north of the site. Existing conditions at both sites are illustrated in Figure 5.17.

CUYAHOGA COUNTY RESOURCE RECOVERY PROJECT

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

AESTHETICS



POTENTIAL VISUAL IMPACT

- Most Visual Impact
- Moderate Visual Impact
- Slight or No Visual Impact

- Residential Neighborhood
- Recreation with Direct Visibility of Plant Site.

FIGURE 5.16

0 1100 2200

NORTH

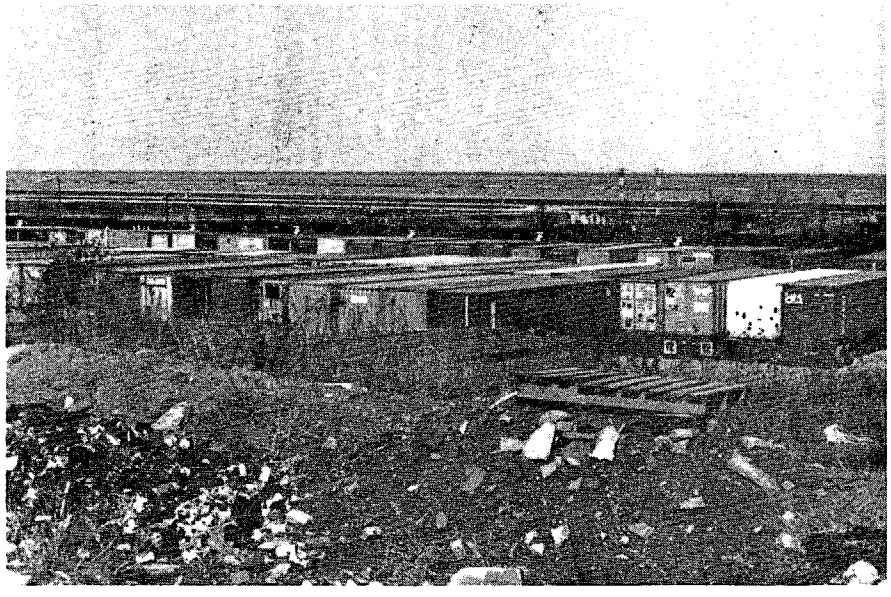
REGIONAL PLANNING COMMISSION

The preparation of this map was financed in part through a Coastal Energy Impact Program grant from the Ohio Department of Energy.

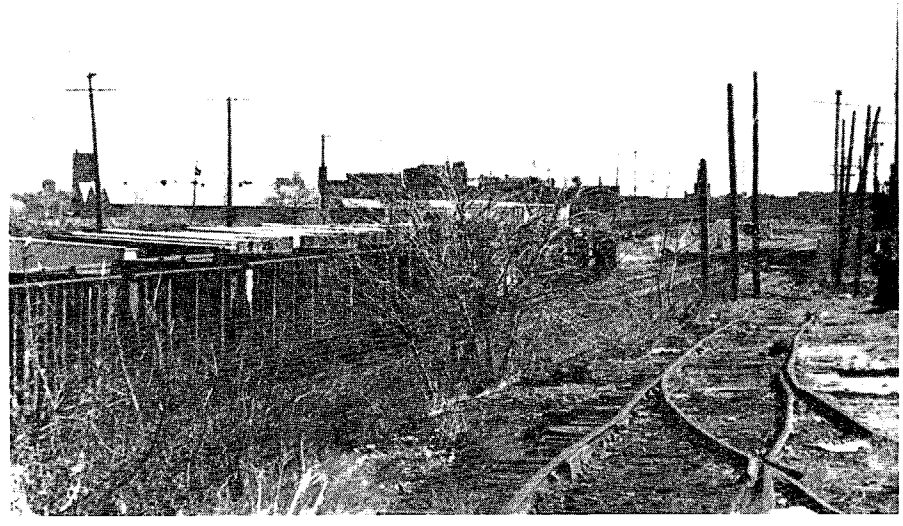
FIGURE 5.17 EXISTING CONDITIONS

EAST 26TH STREET SITE EXISTING CONDITIONS

1. Looking northwest. Note container storage on site.

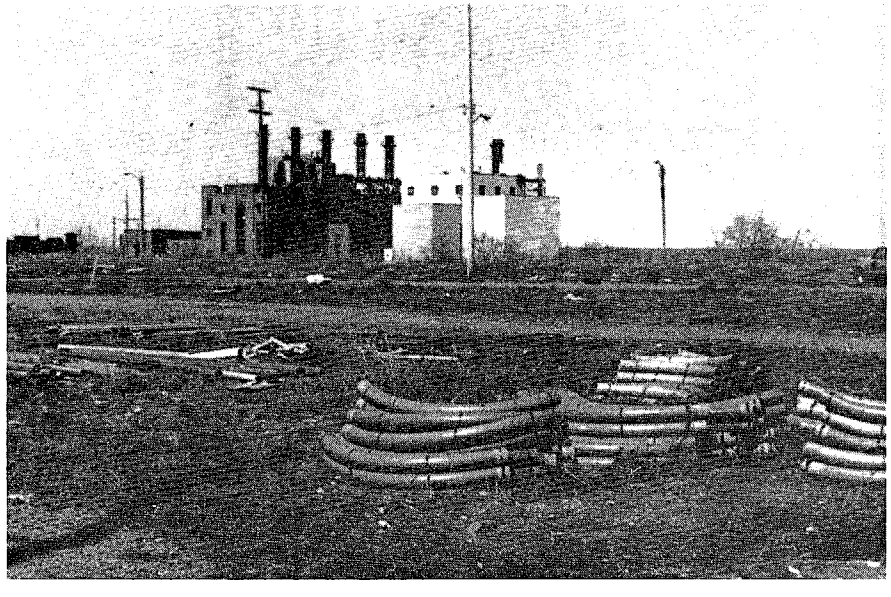


2. Looking northeast.

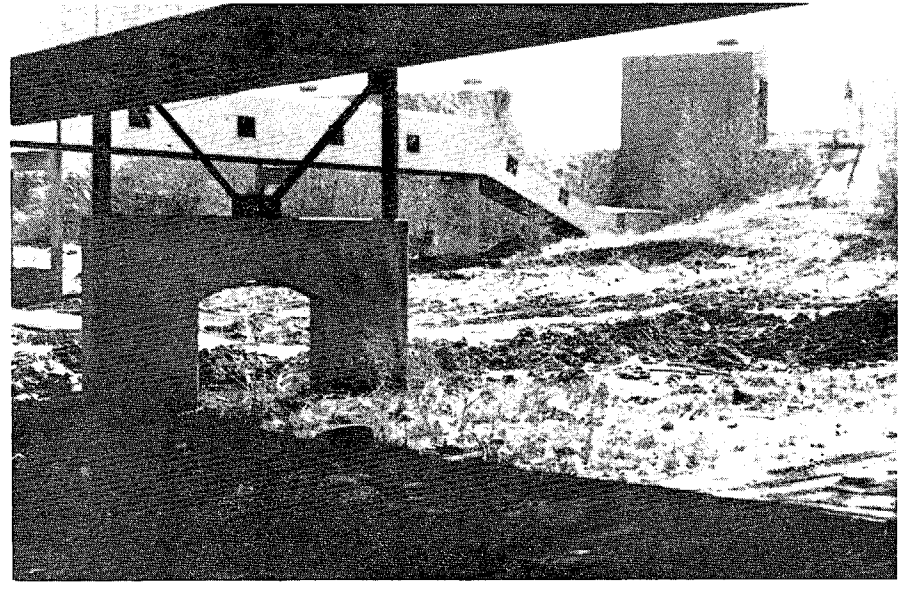


MUNY SITE EXISTING CONDITIONS

3. Looking northwest, site in foreground. Note Municipal Light Plant.



4. Looking south. Note obsolete coal conveyor belt in foreground.



Muny Site

The Muny Site is a rectangular piece of land that also has a panoramic view of the Lake Erie coastline. The Muny Site is actually closer to the lake than the East 26th Street Site and is within 2000' of three yacht clubs: Lakeside, Forest City, and Gordon Shore. Portions of the Muny Site exhibit some vegetation, and there is a fairly large stand of trees that buffers the site on the north side. Since approximately half of the site is comprised of an abandoned steam plant and coal storage area this site is also a very blighted area. The northeastern portion of the site does have a grass-covered field which is attractive. However, the overall appearance of the Muny Site is that of a blighted, under-utilized area which seems to have potential for some type of development. The Muny Site is somewhat more visible than the East 26th Street Site, as can be observed in Figure 5.16. As was the case with the East 26th Street Site, the major visual impact area is along the Shoreway, to the north of the site. However, since the Muny Site is closer to Lake Erie, the proposed Resource Recovery Plant may have a more significant impact on the shoreline than the East 26th Street Site.

Conceptual Sketches

The following series of sketches attempt to portray how the Resource Recovery Plant may appear. The actual design and construction of the plant may differ from the sketches, since the final architectural design has not been finalized. It should be noted that the purpose of these sketches of both sites is to indicate how the plant could impact the areas around the sites.

As mentioned, the actual design and construction of the Resource Recovery Plant will determine the severity of the aesthetic impact on the Cleveland area. Adequate buffers, either earth berms or proper vegetation, should

help create a harmonious development at either of the sites under study. Buffering the facility is the most important aspect in ensuring that the Resource Recovery facility will not severely impact the area. Although graphics or color schemes may make the plant more attractive, any structure of this size will require adequate buffering. Large trees, preferably coniferous, will help screen the facility from the Cleveland Lakefront and the Memorial Shoreway. If evergreens are used, the buffer would be effective during the winter months as well.

The aesthetic and visual impact on the Cleveland area can be separated into four major impact areas: residential impact, office-commercial impact, industrial impact, and Shoreway impact.

Residential Impact

It was determined from site surveys and photographic studies that any impact on residential areas in the City of Cleveland would be minimal. The closest residential areas to either of the sites are approximately 1400 feet away. As can be seen by Figure 5.16, the residential areas nearest to the proposed sites will have only slight visual impact from the Resource Recovery Facility. Sketch 4 shows how these residential neighborhoods may be impacted. The only part of the facility which could actually be seen from these neighborhoods would be the stack which will be 200-250 feet in height. It should be noted that the CEI steam plant which is located approximately 2000 feet from the East 26th Street site, has two stacks similar in scale to the one proposed at the Resource Recovery Plant. Other residential areas in the City of Cleveland that are not on Figure 5.16 will most likely not experience visual impact from the proposed facility if it is developed at either of the alternative sites.

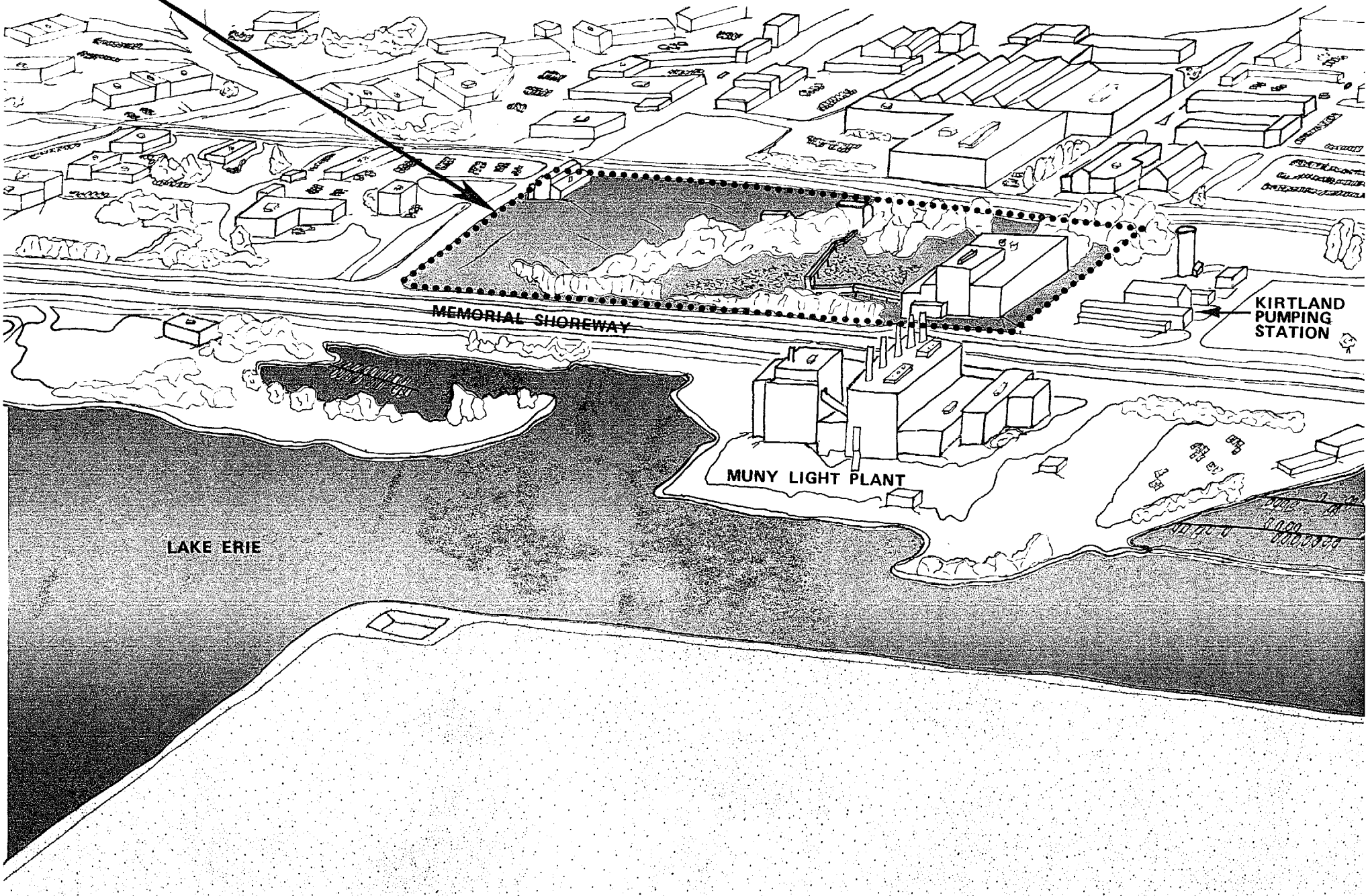
Office-Commercial Impact

The office-commercial sector of downtown Cleveland may realize some minor visual impact from the Resource Recovery Facility. However, this impact

AESTHETICS

EXISTING CONDITIONS

SKETCH 1



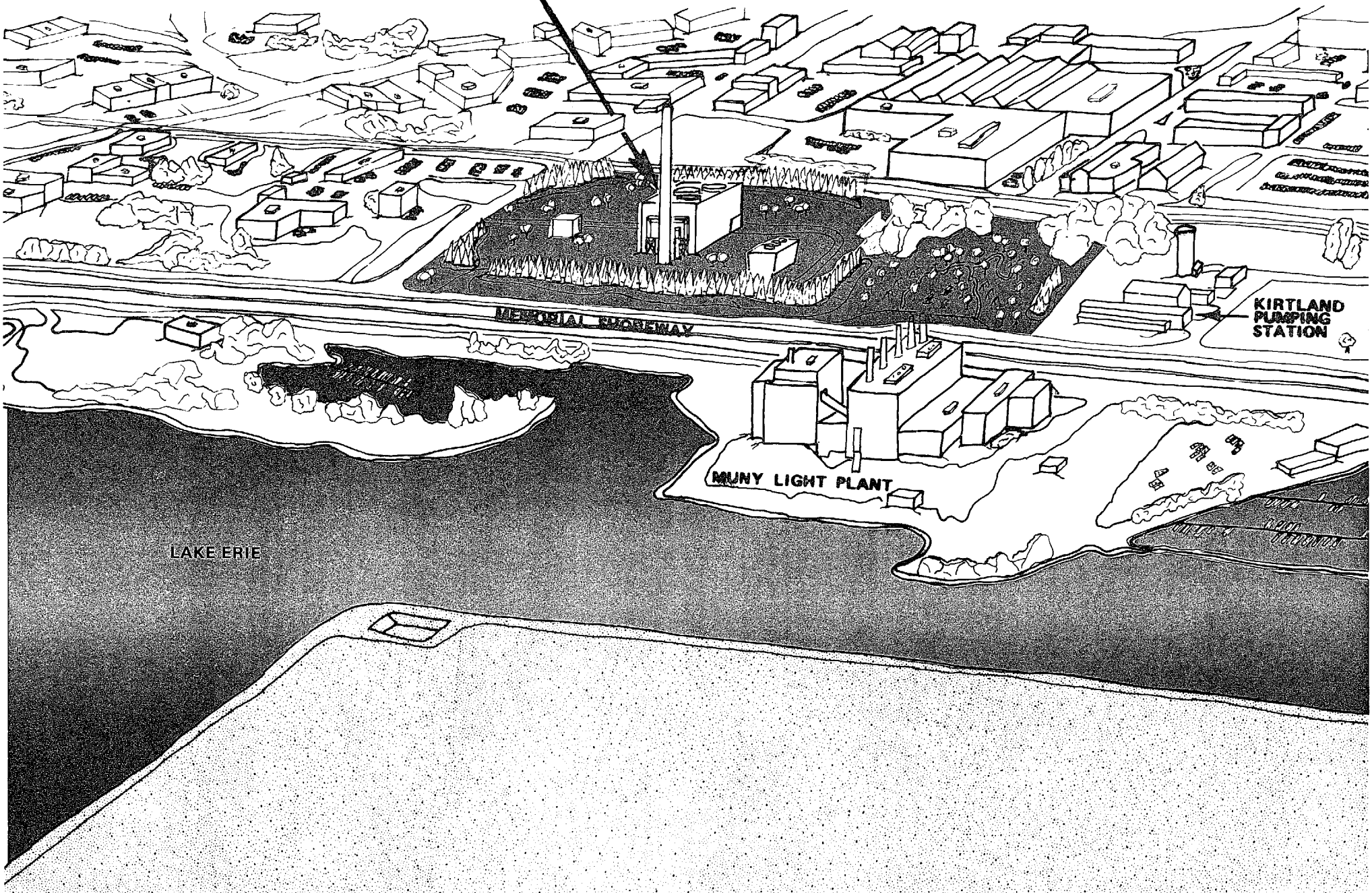
AESTHETICS

MUNY - SITE

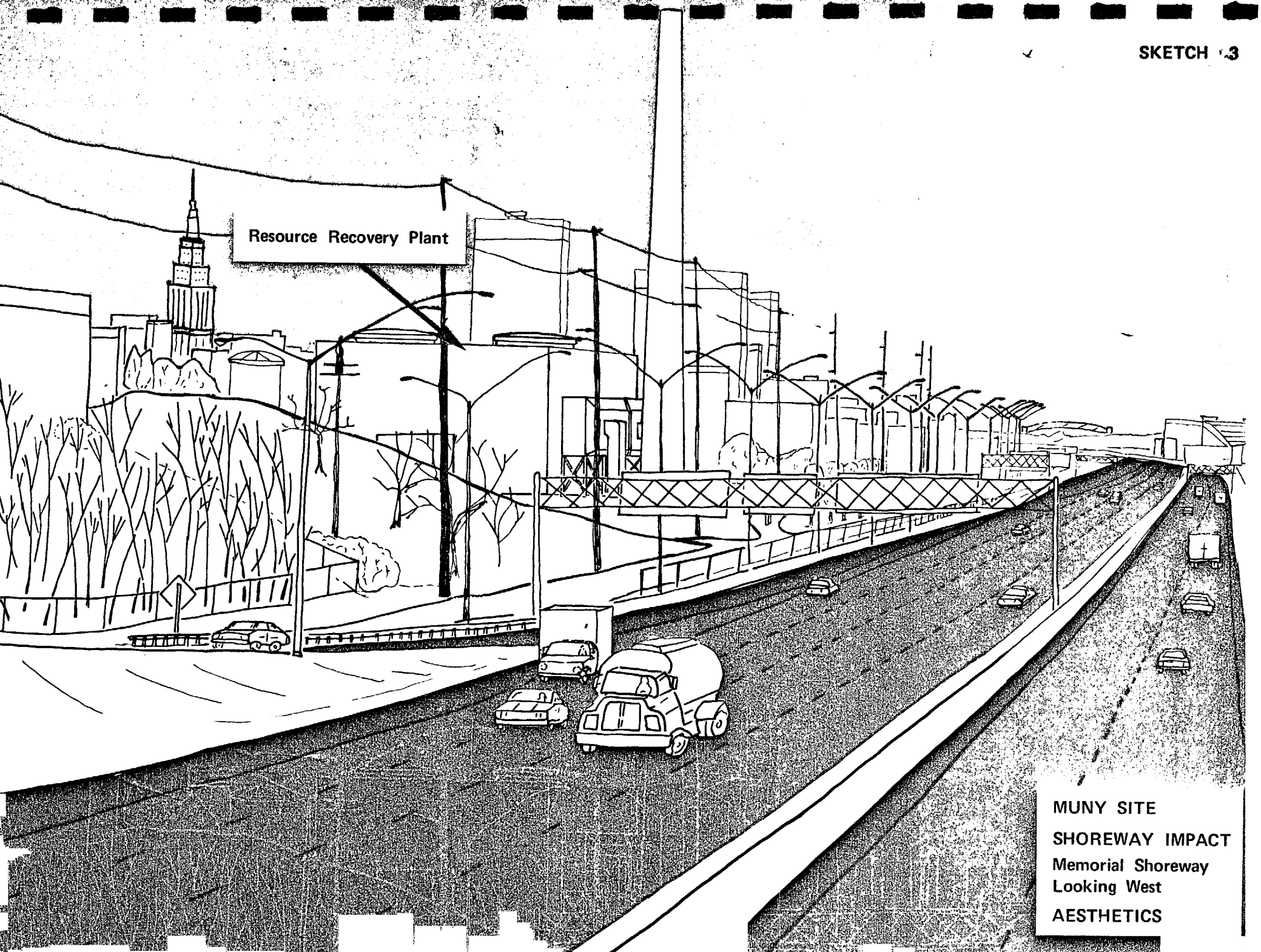
RESOURCE RECOVERY PLANT

CONCEPTUAL SKETCH PLAN

SKETCH 2



SKETCH 3



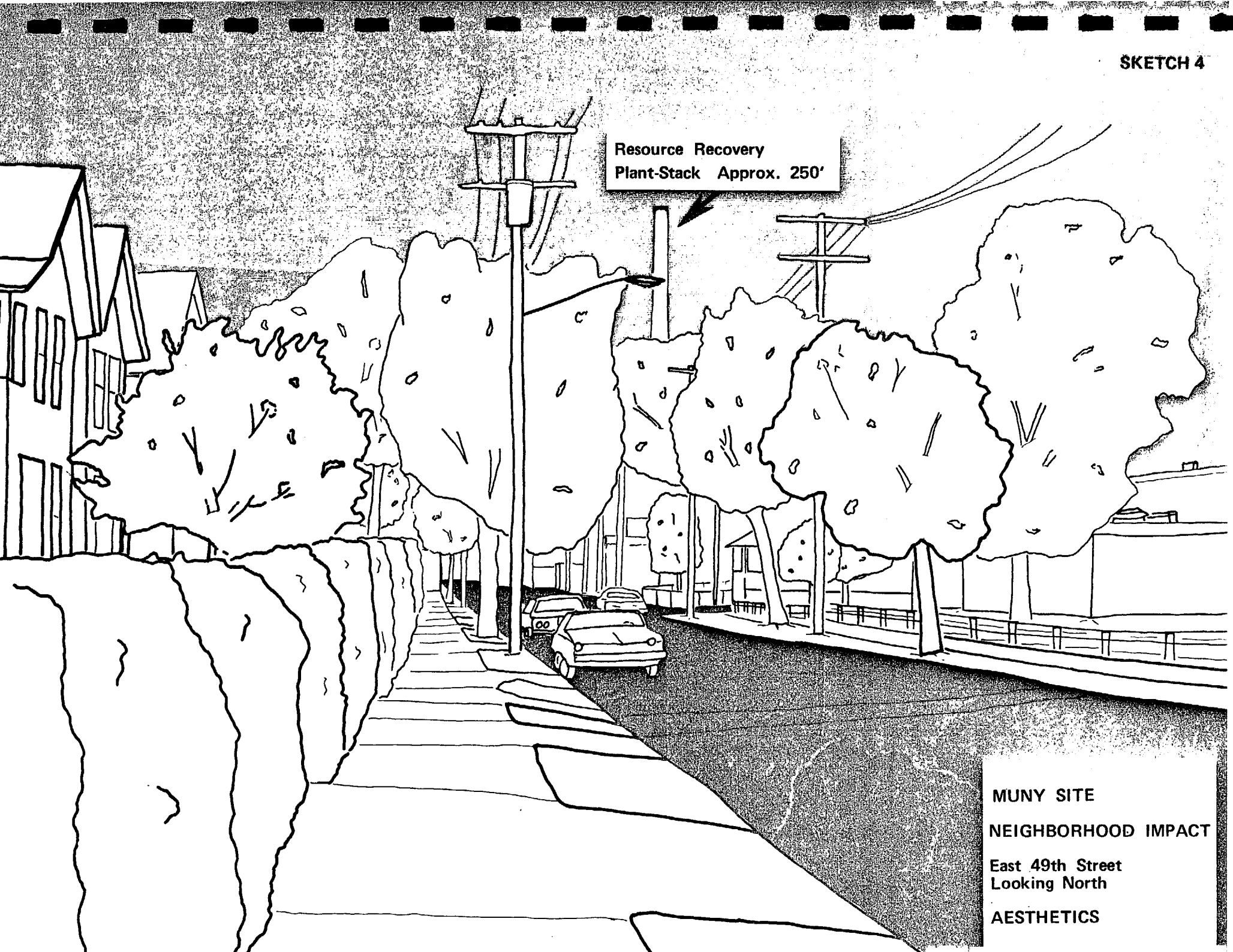
MUNY SITE

SHOREWAY IMPACT

Memorial Shoreway
Looking West

AESTHETICS

SKETCH 4



MUNY SITE

NEIGHBORHOOD IMPACT

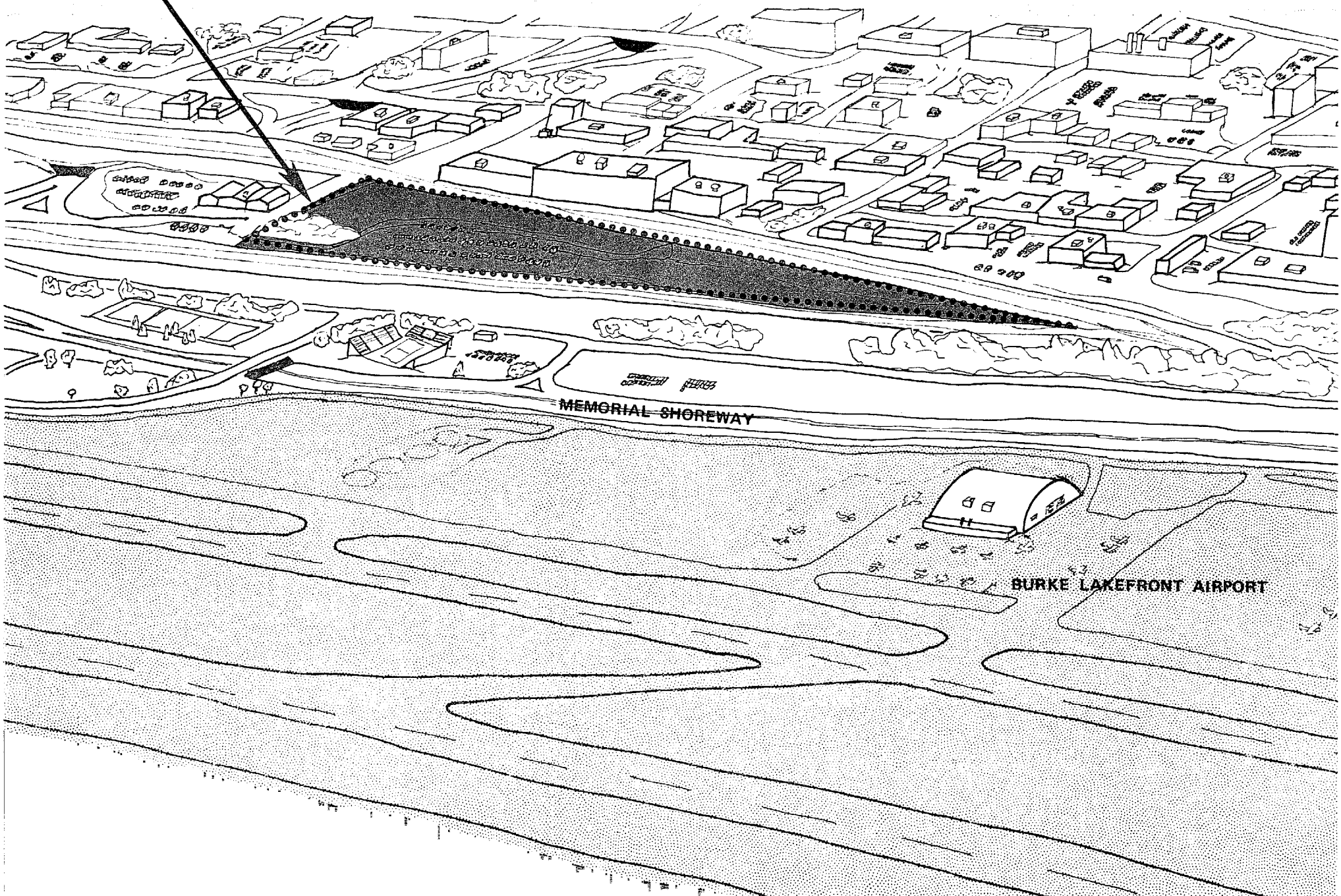
East 49th Street
Looking North

AESTHETICS

AESTHETICS

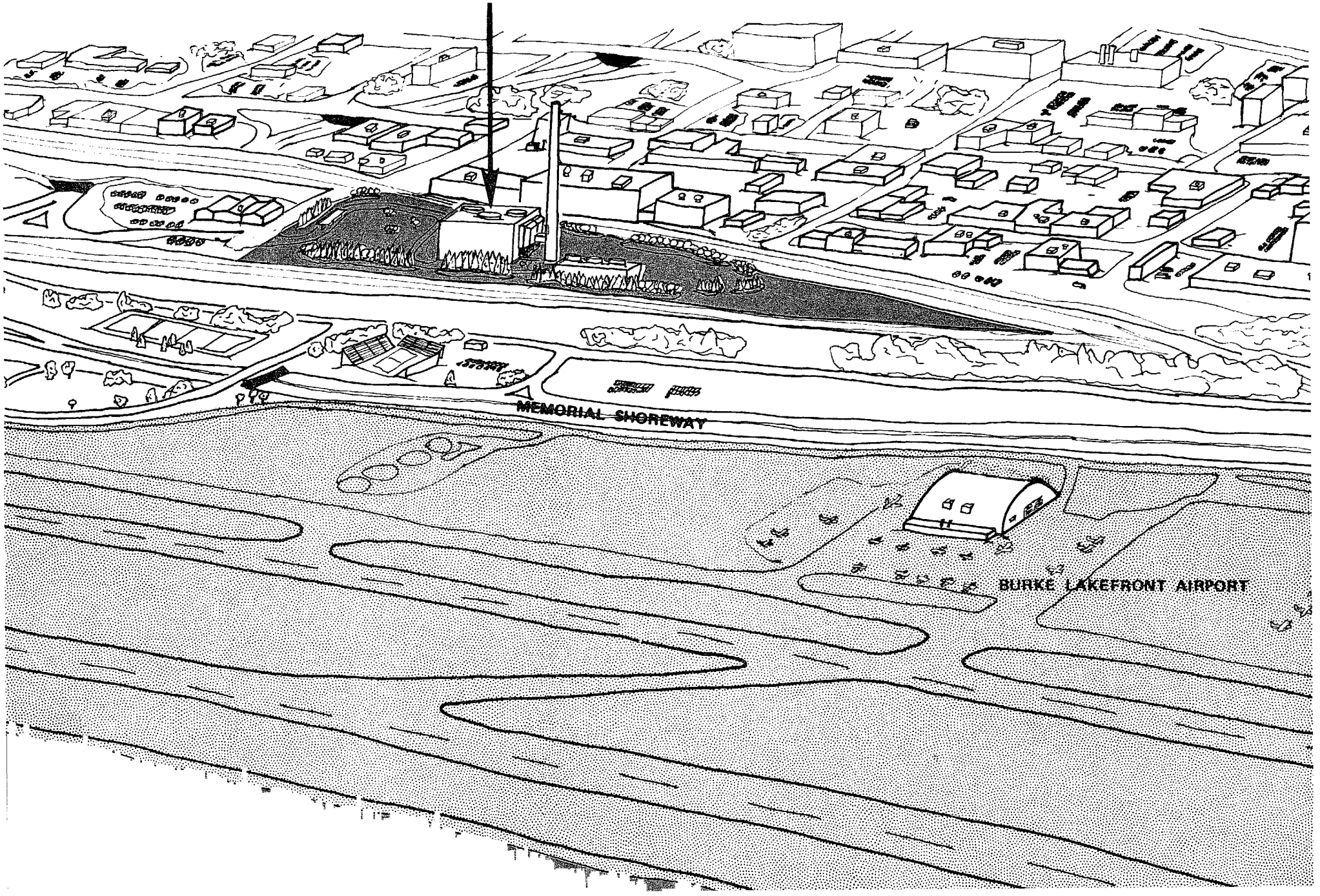
EXISTING CONDITIONS

SKETCH 5

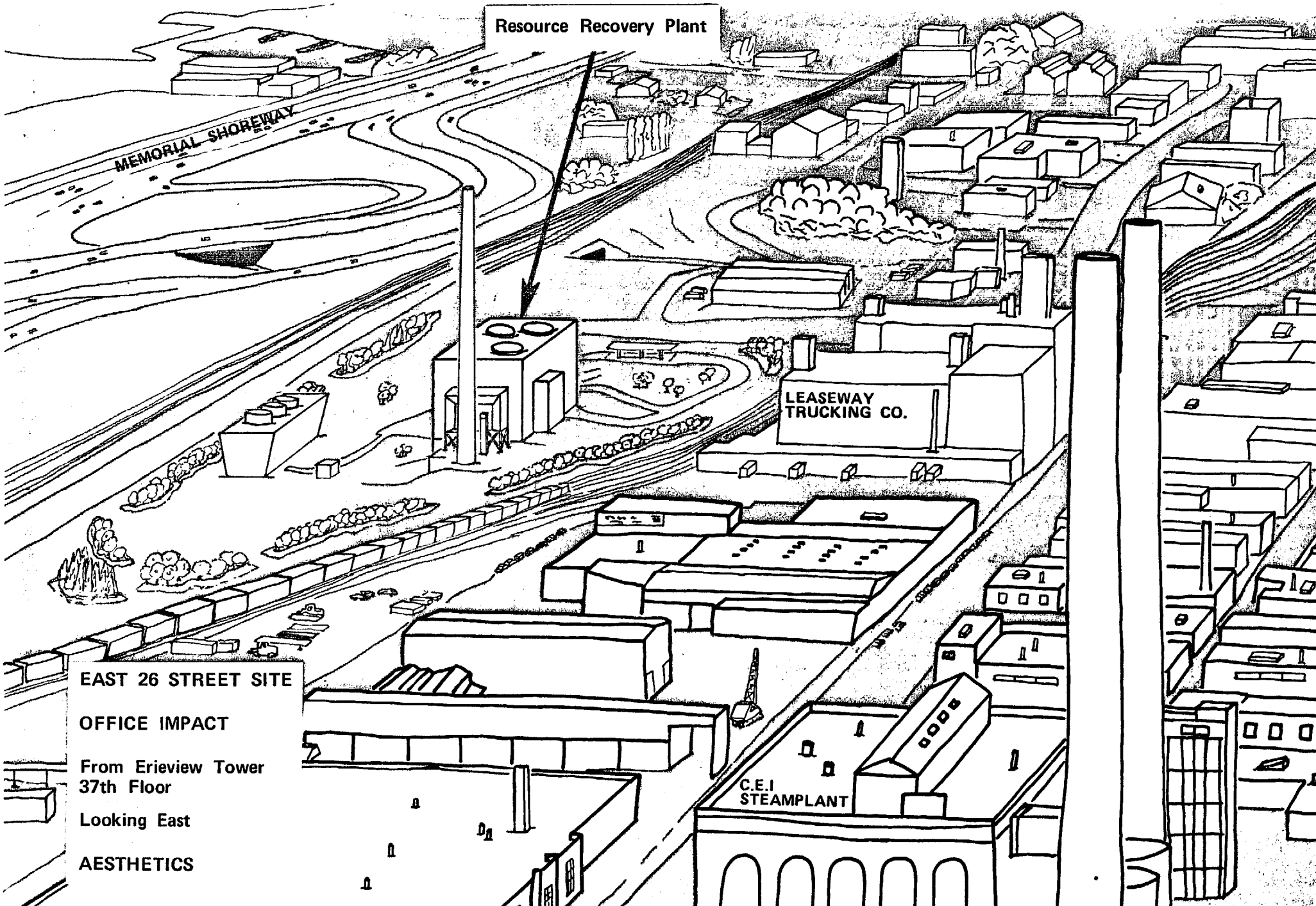


AESTHETICS

EAST 26 STREET SITE — RESOURCE RECOVERY PLANT — CONCEPTUAL SKETCH PLAN — SKETCH 6



SKETCH 7



EAST 26 STREET SITE

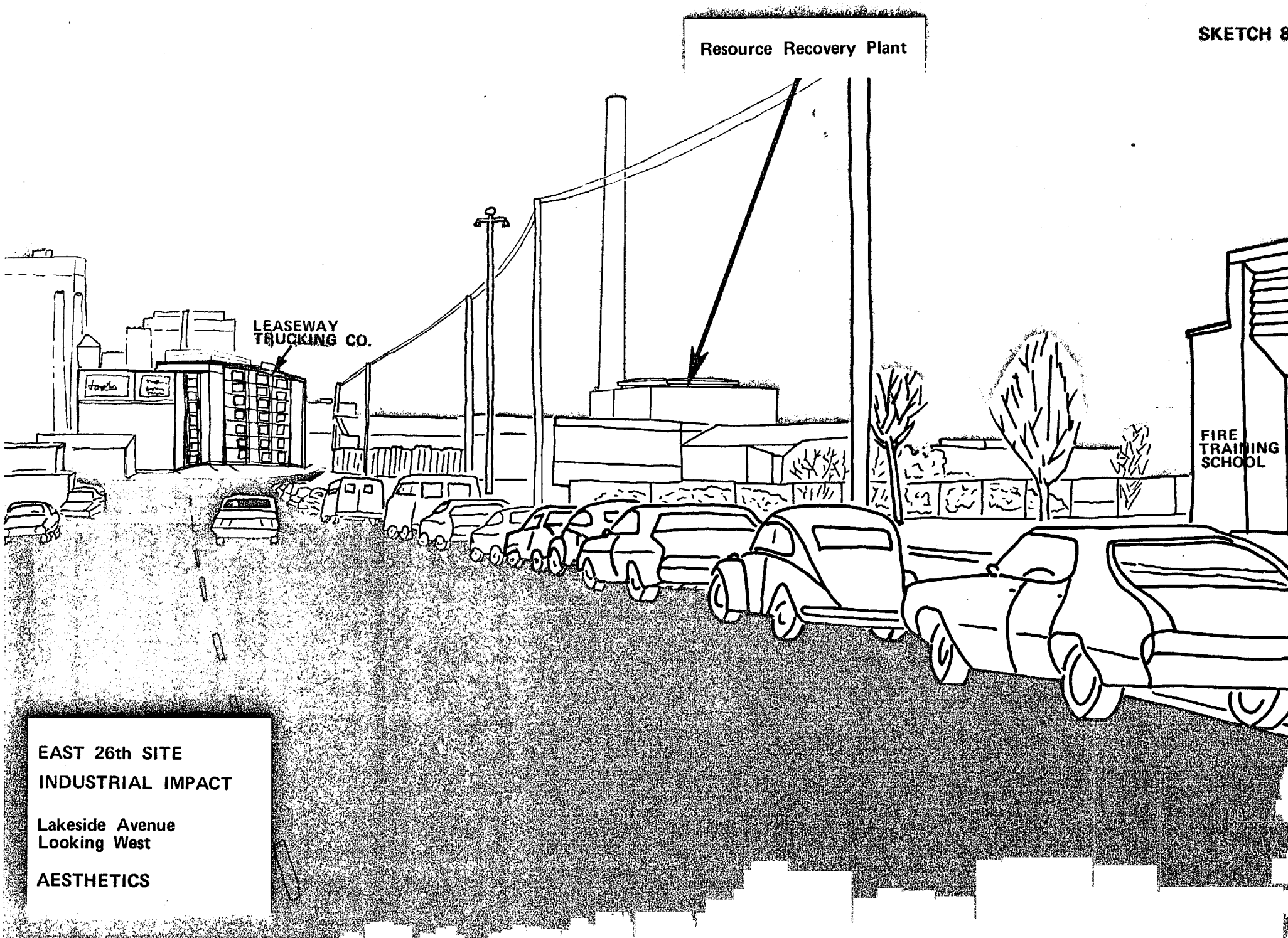
OFFICE IMPACT

From Erieview Tower 37th Floor

Looking East

AESTHETICS

SKETCH 8



EAST 26th SITE

INDUSTRIAL IMPACT

Lakeside Avenue
Looking West

AESTHETICS

should be minimal since both sites are located almost one mile from the heart of the Cleveland Business District. Only office workers in the highest of the office towers will be able to see the facility. As indicated by Sketch 7, taken from the thirty-seventh floor of the Erieview Tower, the facility will be visible, especially if the East 26th Street site were selected. This sketch also shows that the CEI steam plant already impacts the view more than the proposed Resource Recovery Plant. The majority of offices in downtown Cleveland have no views of either of the alternative sites. Therefore, the impact of the proposed plant will affect only a small segment of office workers, and even this visual impact would be minimal.

Industrial Impact

It is highly unlikely that any aesthetic or visual impact would detract from the industrial area that surrounds the proposed sites. These sites are in an older industrial belt that is comprised of storage yards, vacant buildings, scrap piles, and other blighting influences. The industrial areas are already "impacted" and, therefore, any type of new development could act as a revitalizing factor in an already blighted area. From the survey it was determined that the industries in the area will benefit from the Resource Recovery Plant rather than be impacted by it. Sketch 8 shows how the plant could look from Lakeside Avenue just east of the East 26th Street site. The sketch indicates that the plant will most likely be compatible with the surrounding industrial uses.

Shoreway Impact

The most significant aesthetic impact the Resource Recovery Plant will have is on the Lake Erie shoreline and the Memorial Shoreway. From the analysis it was determined that people using the Shoreway, Lake Erie, and the numerous recreational areas along the coast will have visual awareness of the plant. Whether the visual aspects are detrimental or not will depend

on the actual design and construction of the plant. Nevertheless, the majority of people will view the plant from either the Lake or the Shoreway. Therefore, the design must be sensitive to the coastline, requiring adequate buffers on the northern edge of the Resource Recovery Plant. Sketches 1, 2, 5 and 6 show the alternative sites from an aerial view along the coast. Sketches 1 and 5 show how the sites exist today and sketches 2 and 6 portray how the plant could look upon completion. As is indicated on the sketches, the plant is compatible with the other structures in the area. Sketch 3 shows how the plant could look from the East 55th Street overpass. Similarly, it can be observed that the plant seems to conform with the existing uses in the area.

VI. Probable Positive Impacts of the Proposed Project

VI.A. Employment

In assessing the number of new jobs to result from the construction of a resource recovery facility, three types of employment were noted. These were temporary, permanent and secondary employment.

1. Temporary

Temporary employment consists of the various individuals who will be hired to construct the resource recovery facility and new transfer station as well as those workers who will be involved in the rehabilitation of existing transfer facilities. The volume of employment begins at a rather low level, builds up to some peak and then declines rapidly in the final stages. It is difficult to generalize on the peak employment to be expected for the construction of a given sized plant. It depends on the type and size of the plant, the difficulty of building and the relative importance of auxiliary structures like cooling towers.[1] Nevertheless, it is possible to look at similar type facilities in similar settings. For example, the Recycle Energy System in Akron, Ohio had a maximum construction work force of 210 workers on site during the most intensive construction phase. The average number of workers on site was 100 to 200 over the 29 month construction period.

Because of the proposed facility's location in a major metropolitan area, the large pool of skilled workers required for this type of construction will be readily available within a daily commuting distance. As a result, secondary employment benefits in terms of commercial and service jobs in the immediate area of the plant site are not expected. The daily needs of the construction work force can very easily be accommodated by the wide array of commercial establishments in downtown Cleveland.

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1. Berkshire County Regional Planning Commission. Evaluation of Power Facilities·A Reviewers Handbook, (Washington, D.C.; HUD Office of Policy and Program Development, 1974) pp. 171 - 172.

2. Permanent Employment

The resource recovery facility will create three types of permanent jobs. The three types are jobs at the facility itself, at the transfer station and in transportation of raw solid waste and post-combustive residue. Bechtel, Inc., the engineering consultants to Cuyahoga County, indicated the facility's personnel requirements will range from 60 to 100 permanent employees. A twenty-four hour, seven day a week operation will require that these individuals be split among three shifts.

The personnel requirements at the transfer stations were calculated from data prepared by Stanley Consultants.[2] This data is presented below in Table 6.1.

TABLE 6.1

EMPLOYEES PER TRANSFER STATION CAPACITY

Employment Class	Number of Employees		
	100 tpd	200 tpd	500 tpd
Supervisor	-	-	1
Secretaries & Office	1	1	1
Equipment Operator	1	1	2
Mechanical/Foreman	1	1	1
General Laborer	-	1	3
TOTAL	3	4	8

This data was compared with expected intake (tons per day in 1985) of the seven existing or proposed transfer stations. The expected intake tonnage for the stations and projected number of employees is presented in Table 6.2. This calculation indicates that 34 employees will be required at the transfer stations. Since some transfer stations will be already operating, only a few new jobs would be created.

2. Stanley Consultants. Resource Recovery from Municipal Solid Waste in Cuyahoga County - Memo 2 and 3 Preliminary Evaluation of Alternatives (Columbus, Ohio Environmental Protection Agency, 1978) p. 111 - 114.

TABLE 6.2

TRANSFER STATION EMPLOYEES

Station	Expected Tonnage (1985)	Number of Employees
East Cleveland	53	3
Cleveland Heights	186	4
Shaker Heights	64	3
Ridge Road	204	4
Lakewood	234	4
Parma	453	8
Southeast-Garfield Hts.	439	8
TOTAL	1633	34

The number of drivers needed to transport municipal solid waste (MSW) from the transfer stations to the resource recovery facility and to transport post-combustive residue away from the facility depends on two variables. The first is the number of trips required and the second is the distance between the two points. The following assumptions were made about transporting raw MSW to the facility from the transfer station:

- the maximum roundtrip from transfer station to facility and back is 24 miles. It is assumed that this trip will take one (1) hour.
- it will take one-half (1/2) of an hour to load the truck at the transfer station.
- it will take one-half (1/2) of an hour to unload the truck at the facility.
- based on an eight-hour day, one truck will be able to make 4 trips per day.
- one driver is needed per truck.

Table 6.3 presents the number of drivers needed to transport the MSW to the facility based on these assumptions and the number of 75 cubic yard truck-loads at each transfer station.

TABLE 6.3

DRIVERS TO RESOURCE RECOVERY FACILITY

Transfer Station	One-Way Distance (T.S. to Facility) Miles	Trucks per Day	Drivers Needed
East Cleveland	5	4	1
Cleveland Hts.	6	11	3
Shaker Hts.	8	4	1
Ridge Road	8	12	3
Lakewood	9	17	4
Parma	12	26	7
Southeast Garfield Hts.	12	22	6
TOTAL		96	25

The number of drivers needed to transport post-combustive residue away from the facility was also based on several assumptions. One is that the greatest distance residue would be transported will be comparable to the distance to Weibush Landfill in Portage County, a 130-mile roundtrip. It was also assumed that the roundtrip time would be 2½ hours, loading at the facility 1/2 hour, and unloading at the landfill 1/2 hour, for a total roundtrip of 3½ hours. These numbers were used because they represent the furthest distance waste was transported in recent years.

Given this time frame, one vehicle could make two trips per day. Based on 22 vehicle-loads of residue per day (Chapter III) and the assumptions detailed above, eleven drivers will be required for residue transport. If a close landfill or another use is found for the residue the trip time and number of drivers needed could be reduced accordingly. Similarly, a system of transfer stations and a centralized resource recovery plant would result in a net reduction in labor and equipment during the collection phase of operations.

In summary, the permanent full-time jobs required by the resource recovery facility are as follows:

Job Location	Number of Jobs
Resource Recovery Facility	60 - 100
Transfer Station	34
Transport to Facility	25
Residue Transport	11
TOTAL	130 - 170

3. Secondary Employment

As noted earlier, no direct secondary employment will result from the location of a resource recovery facility in downtown Cleveland. Restaurants and other commercial establishments in the surrounding area may benefit, but significant numbers of jobs will not result.

On the other hand, the location of the facility in the downtown area may have the effect of retaining jobs there. The Greater Cleveland Growth Association estimates that there are from 125,000 to 150,000 jobs in downtown Cleveland. All of the commercial, governmental and industrial establishments providing these jobs are in one way or another served by the two potential energy markets of the resource recovery facility, the Municipal Light Plant and the CEI steam grid.

The Cleveland Division of Light and Power (Muny) distributes electricity purchased elsewhere (80% from CEI) to residential, commercial and industrial customers in Cleveland at a reduced rate when compared with what CEI charges its customers. The ability to provide additional energy at lower costs through the resource recovery facility during a period of rising energy costs may have the effect of making downtown a more attractive place to locate or stay, if all other location factors are equal. The Cleveland Electric Illuminating Company (CEI) owns and operates a steam district heating system which serves approximately 365 customers (1979) in downtown Cleveland. The system consists of 20 miles of steam lines serving an area extending east-west from East 24th Street to West 9th Street and north-south from Lakeside Avenue to Prospect Avenue/Bolivar Road-Canal Road. The

system is currently being fueled by coal. If a resource recovery facility comes on line, it is expected that it would supply 55% of the annual steam demand, thereby reducing the amount of coal required. This should keep steam costs down, making the buildings in the steam district more attractive in terms of energy costs than other locations. This could also have the effect of retaining jobs in the downtown area.

VI.B. Economic Benefits

The following section outlines the major economic benefits to the County and 37 participating communities as a result of the construction and operation of a solid waste resource recovery facility in Cuyahoga County. Since the project is in a very preliminary stage it is difficult to determine precisely the actual dollar amounts of these benefits or what the construction and operation costs of the facility will be. The purpose here is to outline where economic benefits will result from the project so that when a detailed cost/benefit analysis is prepared, those listed here will be included.

1. Production of steam and/or electricity from a previously unused resource, municipal solid waste

The County will obtain revenue from the sale of steam and/or electricity produced from municipal solid waste which previously represented a cost to the 37 participating communities. The use of municipal solid waste is a direct substitution for coal. This represents not only a savings of a non-renewable energy source but also conserves energy in terms of mining and transportation of the coal from the mine to Cleveland. The revenue from the sale of the steam and electricity will pay off part of the bonds used to finance the facility. As has been noted, two sites in downtown Cleveland are under consideration. Both have economic benefits. The production of steam at the CEI site would enhance the economic viability of the downtown steam grid. If the site adjacent to the Municipal Light Plant is chosen, it will

return that facility to an economic use, allowing the City of Cleveland to again sell electricity to its residents.

2. Reduced need for landfill space

As has been noted in this study and in the Solid Waste Management Report prepared by RPC, communities in Cuyahoga County face an acute problem if the primary means of solid waste disposal continues to be landfills. Existing landfills are nearing capacity or are located long distances from the original collection point. New landfills are difficult and costly to develop due to the lack of suitable land, citizen opposition and stringent environmental regulations. The construction of a resource recovery facility represents a solution to this refuse crisis.

The principal advantage of the facility is that through processing, it substantially reduces the weight and volume of the incoming municipal solid waste. Calculations in Chapter III indicate that if the facility is brought on line in 1985, it would reduce the required landfill space for municipal waste by 89%. It would take ten years of operation before the facility would produce the same volume of material to be landfilled as would be required in 1985 without the facility. The USEPA has indicated that residue material can be disposed of in a landfill without earth cover or could be used as a cover material. This would have the effect of extending landfill lifetimes even further (At a 1:4 earth to waste ratio, the available space would increase 20%.). Finally, the possibility of ferrous recovery and the use of residue for other purposes (see Chapter III) would also reduce the amount of material that would have to be landfilled.

In terms of direct economic benefit to the communities involved, landfill costs would be significantly reduced as a result of a resource recovery facility. With less material to dispose of,

smaller amounts of landfill space will be needed. Development costs (land, site development, engineering and equipment costs) as well as operation and maintenance costs (salaries, benefits, repair and replacement costs) will also be reduced.

3. Reduced transportation costs

It is reasonable to expect substantial savings in the cost of transportation through the use of a centrally located resource recovery facility and a network of transfer stations. The function of a transfer station is to serve as a central collection point for waste collection vehicles, where the waste is further compacted and then transported by larger vehicles to a disposal facility. A transfer vehicle has a capacity of 75 cubic yards of waste compacted to 18 tons. Thus, an economy of scale is achieved in transporting the waste. Other advantages of transfer stations are discussed in Chapter III.

Obviously, there will always be some residue material that will have to be transported to landfill disposal sites. Here, too, vehicles designed for highway travel would replace collection vehicles. In addition, the reduced volume of residue means corresponding reductions in transportation costs. Fewer trips, fewer vehicles and less personnel add up to reduced capital costs, payrolls, energy use and wear on equipment.

Overall, a collection and disposal system based on centrally located transfer stations, a downtown resource recovery facility and a single landfill disposal site will be more efficient and greatly reduce costs when compared to 37 communities individually providing this service.

4. The Construction and operation of a resource recovery facility and transfer station network would mean additional temporary and permanent employment in a stagnant employment market.

The expected numbers are discussed in the previous section.

5. Increased tax revenue to the City and County

Both sites are currently vacant and serve no economic purpose. Therefore, the placement of a resource recovery facility at either site would be an asset to the City of Cleveland. The City would receive additional revenues from the income tax paid by facility employees. All participating cities would benefit because the substitution of a resource recovery facility and transfer station network for the existing fragmented system should stabilize and reduce budgetary outlays for waste disposal, thereby eliminating the need for increased taxes or charges for waste disposal. The County could also realize some indirect tax benefits from the facility. Since less land would be required for landfills, the land can be developed for other property tax generating uses.

6. Sale of post-combustive residue

As noted in Chapters III and IV, research indicates that the potential exists for the sale of residue materials for various purposes. If residue recovery is technically and economically feasible, it would represent two economic benefits to the project. One would be the revenue derived from the sale. The other would be a further reduction in the amount of landfill space required.

Currently, there is a market demand only for the incinerated ferrous metals. The cost of equipment to separate the ferrous from the residue would have to be exceeded by the revenues to make such a step attractive. On the other hand, the marketability of the remaining residue depends upon research findings and regulatory determinations at the federal and state level. The only cost for recovery of this material would be in developing a market outreach to business, industry and government, educating them as to the uses for the material. Since the only other alternative is to dispose of it in a landfill at cost, the residue material could be priced very competitively to encourage use.

VI.C. Energy Conservation

One of the direct benefits of the proposed resource recovery facility is the conservation of non-renewable fossil fuels, specifically coal. The production of energy from solid waste, as a substitute for the use of fossil fuels, is specifically encouraged by the federal government. In 1978, the Federal Energy Regulatory Commission (FERC) issued regulations requiring electric utilities to purchase electric power from and sell electric power to qualifying cogeneration and small power production facilities like the proposed resource recovery facility. The price utilities would have to pay to the small power production facility is based on the utility's avoided cost. Avoided costs are the incremental costs to an electric utility of acquiring additional electric energy and/or capacity either by producing the power itself or purchasing it from another source.

The intent of the regulations is to encourage the conservation of non-renewable fossil fuels by taking advantage of opportunities for cogeneration and the use of solid waste as fuel. The effect of the regulations is to make it easier for resource recovery facilities to obtain long-term contracts for the steam or electricity they produce. Such contracts, because they pay off the bonds and reduce tipping fees, are very important to the economic viability of the project.

In the case of a proposed resource recovery facility in downtown Cleveland, the Cleveland Electric Illuminating Company (CEI) would be the electric utility affected by this regulation. The regulations and existing markets result in three different production alternatives. One alternative is to construct a direct tie-in to the CEI system. A second, also covered by the FERC regulations, would be a cogeneration facility that would provide steam to the downtown CEI grid and electricity to CEI. The

third alternative would be the sale of steam and/or electricity to the City of Cleveland Muny System for its Shoreway facility.

Calculations were made as to the potential energy that would be saved if municipal solid waste was substituted for coal. 652,881 tons of MSW will be available for processing at the facility from the 37 participating communities in 1985. Assuming an 85% operating schedule (the plant will be shut down 15% of the time for various reasons), 554,948 tons actually will be processed. Based on an equivalency ratio of 3.5 pounds of MSW to 1.5 pounds of coal[3], the MSW throughput would produce an amount of energy equal to what would be produced from 241,282 tons of coal. This represents a savings of 661 tons of coal a day in 1985.

An evaluation was made as to the amount of steam and/or electricity each of three potential energy production alternatives would generate. Alternative 1, the direct production of electricity with a tie-in to the CEI grid, would result in average electric sale of 35.0 megawatts and a total annual sale of 275 million kilowatts of electricity. The net system capability of CEI is approximately 4500 megawatts. The resource recovery facility production capability would supply approximately .78% or 35.0 megawatts. The resource recovery production could be easily absorbed into the grid.

Alternative 2 is a cogeneration set-up which would provide steam on demand to the CEI steam grid and produce electricity with any excess steam. In this case, the facility would incorporate an automatic extraction condensing turbine with the capability of condensing 100 percent of the facility's steam output. The resource recovery facility turbine-generator would be controlled to extract steam at a pressure adequate

3. Stephen J. Levy and H. Gregar Rigo, Resource Recovery Plant Implementation: Guides for Municipal Officials-Technologies, Washington, D.C., USEPA, 1976, p. 21.

to meet the needs of the CEI steam distribution system and at a rate which attempted to meet the demand of the system. When the distribution system demand drops below the output of the resource recovery facility, steam would be condensed to increase electrical output. An analysis of this concept which considers the monthly fluctuation in MSW quantity and the monthly variation in the steam grid demand indicates that a 1750 ton per day facility could supply approximately 55% of total annual steam demand while cogenerating 185 million kilowatt hours of electricity. This type of system has significant advantages. Cogeneration facilities use more of the energy available and reduce losses that are unrecovered in a fossil-fueled condensing method facility.

Such a system increases the basic cycle efficiency, allowing the utilization of a much larger portion of the refuse fuel value. This results in an improvement in the economies of a resource recovery facility as more product results in more revenue. Cogeneration is also flexible; varying rates of production allow the facility to follow variations in energy market demand.

Alternative 3, steam or electric production for sale to the Muny Lake Road plant, would result in reducing the Muny system's total dependency on outside sources of power and enable it to get back into the production business. Muny's system demand ranges from a peak of approximately 100 megawatts to a low of 40 megawatts. With the exception of three 17 MW gas turbine peaking units, Muny has no generating capability. Under this alternative, the RRF could sell electricity to Muny from its own generator. The potential average electric output of the Muny facility is 35.0 MW. A resource facility designed around the sale of steam or

electricity to the Municipal Light Plant would meet 35% to 87% of that system's demands.

Indirect energy conservation would also be a result of the project. As noted above, 241,282 tons of coal will be replaced by 554,948 tons of municipal solid waste. Additional savings will be achieved through a reduction in mining and transportation requirements. Since the MSW would have to be disposed of whether a resource recovery facility existed or not, transportation of MSW to the facility would not result in any additional energy usage. In fact, energy will probably be saved, because a more efficient collection and transportation system based on transfer stations is a part of the proposed resource recovery project.

VI.D. Benefit of Resource Recovery on the Environment.

Another significant set of benefits of the proposed resource recovery facility is the reduction of pollution and greater resource conservation. The advantages of the facility in reducing pollution are twofold. In terms of air and solid waste pollution, the actual amount of degradation will be significantly reduced. In terms of water pollution and residue disposal, the polluting material has either changed medium or is easily collectible as a result of the project. Resource conservation has been discussed elsewhere in this study. In summary, the facility would substitute solid waste fuel for other non-renewable fuels. Additionally, processing creates a material which is more valuable for secondary purposes than the original raw solid waste. The following examines these benefits in more detail.

Reduction in Pollution

It is safe to say that the proposed resource recovery facility will have a positive impact on air, water and land resources. Reduced levels of air pollution, in particular sulfur dioxide, can be expected because the burning of municipal solid waste will substitute directly for the use of high sulphur

coal in the production of electric power and steam. The facility will employ the latest in pollution control equipment and therefore replace antiquated or ineffective equipment used at other facilities. The reduction through incineration of municipal solid waste to residue also represents a reduction in pollution. The post-combustive volume of the residue is substantially less than raw waste and results in a relatively benign substance in comparison. There is no potential for methane production or for problems with insects and rodents. It also appears that the residue is significantly less of a chemical and leachate hazard than raw waste, which seems to be contradictory, since non-combustible heavy metals are concentrated in the residue following incineration. Research indicates that the heavy metals are bound into compounds that are insoluble. Residue has been shown to be an excellent growth medium for various plant species. Plants grown in incinerator residue exhibit no increase in levels of toxicity. Residue, therefore, could be used to reclaim damaged ecological systems such as abandoned landfill and strip mines.

Some accumulation of leachate will result from the various operations of the facility. Unlike leachate and runoff from landfill disposal, the RRF leachate can be easily collected on-site and treated prior to release into the sewer systems.

Resource Conservation

As noted in the previous section the construction and operation of a resource recovery facility would save approximately 241,000 tons of coal a year. Additionally 138,740 cubic yards or 138,740 tons of residue will be available for use as aggregate substitute or growth medium, saving an equal amount of sand, gravel and topsoil. 31,077 tons of ferrous material is also available for possible reclamation. Probably the most significant area of resource conservation in terms of Cuyahoga County's solid waste problem is the conservation

of land. Without the facility, an additional 157 acres of land would be required annually to accommodate the participating communities' annual solid waste disposal needs. Additional fuel savings would be achieved through reduced hauling mileage by collection vehicles for many communities. Implementation of a transfer station network would further reduce hauling costs.

VII. Alternatives

To date, a substantial number of variables relating to the resource recovery plant have been evaluated. The following section summarizes some of these alternatives.

VII.A. Alternative Site Considerations

As discussed in Chapter II, the specific site for the resource recovery facility has not as yet been determined. The location originally proposed for the plant, the industrial Cuyahoga Valley, is no longer being considered as a prime site, due to decreasing interest from potential industrial steam customers.

A resource recovery plant which sells steam as its energy product requires a location in proximity to its main customer, since steam pressure decreases rapidly with increasing distance. On the other hand, a facility which generates electricity as its energy product is much more flexible with respect to its location, as a tie-in with high voltage lines is less restrictive.

Although one of the two sites which are being evaluated in this report will most likely be the site for the resource recovery plant, it is possible that another site could be considered. However, due to the scarcity of large tracts of vacant land and the requirements of such a facility (i.e., centrality, accessibility, surrounding land use, zoning, etc.) the two sites under consideration at the present time appear to be most advantageous.

VII.B. Alternative Process Considerations

The system which will be utilized by the County's resource recovery plant is most often referred to as a waterwall incinerator, whereby the burning of solid waste takes place in a specially designed furnace covered with water filled pipes, and incorporating other boiler tubes to recover

heat. In most systems using this type of furnace, the solid waste is burned without prior processing on mechanical grates which move the waste through the furnace. Although the County's plant will utilize this method, other systems are in operation in many communities. These alternative processes can be summarized as follows:

- Semi-Suspension Incineration

  This system also utilizes a waterwall incinerator, but instead of a grate, the waste is shredded and burned in a state of semi-suspension.

- Refuse Derived Fuel (RDF) System

  This designates a processing system employing size reduction and classification of waste to produce both a combustible fraction and a "heavies" fraction which may be processed for materials recovery. This may be either a "wet" or a "dry" process. These systems are also called "supplemental fuel" systems, since the combustible fraction would typically be marketed as a fuel to outside users e.g. utilities and industries, for use as a supplement to coal (or possibly oil) in their existing boilers. Some waterwall combustion systems (as mentioned above) would also involve such a processing system though the waste might be shredded more coarsely, and may or may not be classified.

- Pyrolysis Systems

  Pyrolysis is a broad term given to a variety of processes where either processed or unprocessed waste is decomposed by the action of heat in an oxygen deficient atmosphere. This results in production of combustible gases or liquids depending on operating conditions. These products may be either burned immediately to produce steam or, those whose quality is high enough, may be transported or stored for use elsewhere.

- Biological Conversion Systems

  Biological conversion involves the decomposition of solid waste by bacterial action to produce combustible gases. These gases could be burned immediately to produce steam, or transported for use elsewhere if their quality is high enough. Biological conversion occurs in landfills, and gas wells may be used to collect the gas if conditions are correct. Alternatively, digestion can take place in controlled vessels.

. Waste Fired Gas Turbine

This technology involves the burning of solid waste in a special incinerator and the use of the resulting hot gases to drive a gas turbine for energy production.[1]

Each of these systems has advantages and drawbacks, and each is in a different stage of technological development. The County's proposal to utilize a waterwall incinerator is the most thoroughly proven resource recovery technology. Most of the experience has been in Europe rather than the United States, where approximately 200 of these systems have been installed. However, their utilization around the world is increasing, with over sixty in Japan, South America and the United States. Traditionally, the United States has lagged behind other countries in the resource recovery plant because of poor market potential, availability of landfill space, and institutional barriers.

VII.C. Alternative Energy Products

The successful implementation of a resource recovery system depends upon the ability to sell the recovered products. Revenues from the sale of recovered products can help to offset the cost of owning and operating the plant; without such revenues, the cost of most resource recovery systems would be prohibitively high.

To be marketable, products reclaimed from energy and materials recovery systems must have qualities that are acceptable to the user. Steam and electricity produced from solid waste are similar to those products from other sources. However, refuse-derived-fuels (solid, liquid, and gaseous) have characteristics that are different from conventional fossil fuels.

1. Levy, Stephen and Rigo, H., Resource Recovery Plant Technologies, U.S.E.P.A., 1976, p. 4.

Some of the more important fuel characteristics are: ash content, higher heating value, corrosiveness, viscosity, and moisture content. Similarly, the quality of recovered materials must be commensurate with user specifications.[2]

Materials recovery encompasses methods and procedures for extracting useful materials from solid waste for return to the economy. The prime objectives in the development of materials recovery systems are: (1) to conserve natural resources and energy; (2) to reduce land requirements for disposal; (3) to facilitate the preparation of refuse derived fuels for energy recovery systems.

Materials can be recovered through source separation or mechanical separation. Source separation in Cuyahoga County was discussed in Chapter III. Mechanical separation methods capable of segregating solid waste into valuable components have developed, based on techniques used in the mining and paper industries. These methods are aimed at minimizing the level of impurities in recovered products so that maximum dollar value can be obtained for the recovered material. Material recovery systems have concentrated on the reclamation of fiber or paper (the most abundant component in solid waste); ferrous metals (the most easily extractable); aluminum (the most highly valued); and glass (the most difficult to extract).

Mechanical processing of mixed or partially concentrated waste is often combined with energy recovery in resource recovery plants. Recovery of ferrous materials is a relatively simple process whereby metals are extracted through magnetic separation. Methods for extracting aluminum, glass and other materials from the waste stream are much more complex. The various technologies employed in this extraction are still in a relatively

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2. Ibid, p. 13.

early stage of development. Consequently, plants which attempt to incorporate these technologies undergo certain financial risks, including malfunctioning equipment, production of products which do not meet required specifications and possible economic penalties.

The Cuyahoga County resource recovery plant is not expected to include materials recovery capability (with the exception of possibly incinerated ferrous products). Thus, it is expected that the plant's mass burn system will minimize any financial and technological risks involved in the operation of the facility.

The decision whether to produce steam or to co-generate steam and electricity is dependent on the energy customer. It is anticipated that if the plant is situated at the East 26th Street site, the Cleveland Electric Illuminating Company would purchase steam for their downtown steam loop, electricity to supplement their East 72nd Street power plant, or both. If the plant is located on the Muny site, it is expected that the Cleveland Division of Light and Power would purchase electricity only.

VII.D. Alternatives to Resource Recovery

There are several disposal alternatives which the communities in Cuyahoga County will have during the 1980's. The most obvious option, sanitary landfills inside Cuyahoga County, will require expansion of existing landfills or siting of new ones. However, the environmental and zoning problems of locating new landfills are substantial. This would also apply to the second option, locating landfills outside of the County, where more undeveloped land is available. Incineration of solid waste by municipalities, a third option, was a popular method of disposal during the 1960's and 1970's, but strict environmental regulations closed most municipal incinerators and only two remain in operation. The high cost of air pollution control equipment will prevent any new incinerators

from being constructed. Finally, some efforts have been made by civic groups, a few municipalities and industry to remove from the waste stream certain wastes, such as newspaper, corrugated cardboard, glass, rubber, aluminum and other metals. Some of these materials have enough value to be collected and recycled. It is likely that recycling programs and source separation procedures will become more popular in the future. However, at most this would only affect 10% to 20% of the waste stream. Thus, a large majority of the waste stream will need to be disposed of permanently, and landfills will remain the prime alternative to resource recovery.

The potential for new or expanded landfills in Cuyahoga County is extremely limited due to three main constraints. First, in a developed urban county such as Cuyahoga, there exists a relatively small amount of vacant land available for this type of large area development. Second, public opinion and other social pressures make the siting of any landfill extremely difficult. The developed state of the county compounds the real or perceived problems of landfill operations. Third, governmental health and environmental regulations under both the OEPA and U.S. EPA will severely limit future landfill siting and operations. A major determinant (beyond public opinion) in the future of any sanitary landfill will be increased governmental controls.

It is clear that the current licensed landfills in Cuyahoga County will provide solid waste disposal for only 3 to 4 years. After 1985, only a few municipally owned landfills and industrial landfills will have some continued disposal capacity. Therefore, without the development of other alternatives such as materials conservation, resource recovery (energy production), new landfills, or expansion of existing landfills, most municipal and private haulers will be faced with the necessity of hauling solid waste to landfills well beyond the borders of Cuyahoga County.

VIII. Probable Unavoidable Adverse Environmental Effects

Despite preventative measures which will be taken during construction and operation of the facility to minimize any potential negative impacts on the environment, some adverse effects can be expected to occur. The following section summarizes these possible effects.

VIII.A. Land Alterations

It is anticipated that the existing contour of the land at each site would be altered by the construction of the resource recovery facility. However, much of the land at each site is already comprised of landfill and thus, has already been altered from its original state.

At the present time, the Muny site is comprised of vacant land and an abandoned, dilapidated structure which formerly served as a steam plant. The East 26th Street site is being utilized as a dumping area and a storage area for truck containers. The finished site for the facility will be completely landscaped, planted and maintained to present a more aesthetic appearance to the general public.

VIII.B. Noise / Air Pollution Effects

It is anticipated that the only substantial increase in noise levels in the area would originate from the trucks which will utilize the plant. Since the area around both sites is non-residential and many factories and warehouses already generate substantial truck traffic, the impact from increased noise resulting from vehicular traffic should be minimal.

Since the plant will produce some air pollution, permits must be obtained. According to Bechtel, Incorporated, consulting engineers for the project, the proposed resource recovery facility permit process will follow the non-attainment process path for total suspended particulates, sulphur dioxide, ozone, and carbon monoxide since it will be located in a non-attainment area for

these pollutants. To obtain a Permit for Prevention of Significant Deterioration (PSD) a new source in a non-attainment area must meet four conditions relative to each pollutant in question:

a. It must incorporate emission controls in the facility to achieve the lowest achievable emission rate (LAER).

b. Other sources in the State owned by the applicant must be in compliance with all applicable emissions standards and limitations or be on schedule to do so.

c. Offsets must be obtained which are greater than one-to-one. That is, more than one unit of pollution must be removed from the area (by way of reduction of emissions from operating facilities) for each unit of pollution released to the air from the proposed facility.

d. A positive net air quality benefit must be obtained. That is "on balance" the air quality must be improved in the same general areas as the proposed facility.

The resource recovery facility's non-attainment LAER requirements will affect SO_2 and TSP controls primarily since CO and NO_x emissions can be controlled by combustion process design.

For any pollutant that impacts on an attainment area, the following requirements of the PSD regulations must be met:

- The "best available control technology" (BACT) must be installed.
- Any new emissions must not cause a violation of any PSD increment.
- Any new emissions must not cause a violation of any air quality standard.
- The installation must not have a deleterious impact on soils, vegetation, and visibility.

The "Emission Offset Interpretative Ruling" allows firms to locate, or expand, in non-attainment areas provided they install the best available control technology and also undertake a program to reduce pollutants from existing sources.[1] That is to say, even with the best available control technology, new sources will add some increment of air pollution and this added increment must be compensated (i.e., must be "offset")by a reduction from other sources.

[1]Federal Register, Vol. 44, No. 11 - January 16, 1979.

Conformance with the non-attainment regulation for the major pollutants from the facility will ensure that PSD regulations are met, since the former requirements are more stringent than the latter.

VIII.C. Land Use Impact

It was apparent from the land use survey that the predominant land uses within the CEIP Study Area are transportation, utilities and industry. Transportation facilities and utilities comprise 502 acres or about 47% of the total acreage within the Study Area, while industrial uses comprise nearly 210 acres or about 20% of the total acreage within the Study Area.

Overall, it is not anticipated that the construction of the County's resource recovery facility on either of the alternatively proposed sites will result in a significant adverse environmental impact upon surrounding land uses. The bases for this conclusion are:

1. Both alternative sites are located in areas zoned for and being used for industrial operations.

2. The proposed construction of a resource recovery facility, an industrial use, on either of the alternative sites is compatible with land uses immediately surrounding the sites. The East 26th Street site is surrounded by truck terminal use on the east, by truck terminal and industrial use on the south and by the Shoreway on the north, south and east and by a park on the immediate west.

3. There is no residential development in the areas immediately surrounding the alternatively proposed sites. Residential development is buffered from each site by existing industrial use. Should future high density residential development occur in the vicinity of either site, some visual impact from the facility could result.

4. Collection vehicles and/or transfer station rigs hauling wastes to and the ash residual from the chosen resource recovery site will use the County's interstate system, thus avoiding residential areas.

VIII.D. Construction Impacts

As with any major project, certain temporary adverse impacts could result during construction of the resource recovery facility. These include noise, vibration and dust. However, these are expected to be intermittent and of short duration.

During construction, some vegetation or wildlife could be disturbed. None

of the flora or fauna in the vicinity of either site is of a rare or endangered species.

VIII.E. Traffic Impact

While the amount of vehicular traffic around the resource recovery plant will increase as a result of operations, the impact on traffic patterns around each site is not expected to be significant. The number of trucks which would utilize the facility is dependent on a number of factors, including size of collection vehicles, number of participating communities, and possible implementation of a network of transfer stations. Additional traffic generated by employees, visitors, maintenance vehicles and residue hauling trucks is also anticipated. The total amount of traffic generated by the facility will not result in exceeding the capacity of any roads in the area.

Although both the East 26th Street and the Muny sites are located very close to major interstate highways and thus have good access to the rest of the County, each site has a potential problem with regard to traffic flow. The East 26th Street site is adjacent to a major railroad crossing, which could impede traffic moving north and south on East 26th Street. Estimated Shoreway traffic using the Muny site would have to exit at East 55th Street and make a sharp 180-degree turn on to the South Marginal, which could present some difficulty for large trucks. A short exit ramp off the Shoreway to the South Marginal near the Muny site could be constructed to alleviate this problem.

Since both sites are located so close to major freeways, use of local streets by trucks using the facility should be minimal. It will be necessary to design the on-site access areas so that vehicles waiting to use the facility do not back up onto local streets.

IX. Relationship between Local Short Term Uses of the Environment and Long Term Productivity

The two areas which are proposed as possible sites for the County's resource recovery plant are located in areas of industrial and transportational land use. The natural environment of the entire area has been disturbed by other developments for over one hundred years. Thus, it is not expected that construction or operation of the proposed facility will further affect the natural environment of the area.

There are two major benefits which a resource recovery facility may have on the environment. First, since the facility serves as an alternative means of solid waste disposal, the need for land disposal sites is significantly reduced. Secondly, the use of the solid waste as an energy alternative results in the conservation of other sources of fuel, most notably coal and petroleum products.

A number of impacts have been identified in this report. However, the most significant impact in terms of the effect of a resource recovery facility on the surrounding environment is expected to be on traffic. Although congestion on the adjoining roads is expected to be minimal, the large number of trucks approaching the sites nonetheless could pose some problems. The advantages of a major energy recovery facility, however, appear to outweigh any negative impacts which may occur.

IX.A. Project Life Expectancy

It is expected that the bonds which will finance the resource recovery plant will be retired over a twenty-year period. Proper maintenance, however, could result in the extension of the life of the plant for several additional years. While utilization of the plant should have minimal effect on the building itself, the upgrading or replacement of operating equipment will likely be required at various intervals.

A major advantage of the resource recovery means of solid waste disposal is that of avoiding escalating landfill costs. Initially, the cost of disposal at a resource recovery facility could be higher than at surrounding landfills. However, as landfill costs continue to rise as a result of environmental regulations, scarcity of available sites, political pressures, and increasing fuel costs, the cost of resource recovery is expected to be less over a longer period of time.

IX.B. Project Delay Considerations

The implementation of a project which is as large in scope as the proposed resource recovery facility is very complex. Contracts with municipalities and with an energy purchaser must be secured, decisions with regard to facility design, capacity and operation must be made, a full-service contractor and arrangements for financing must be obtained, and a number of their questions regarding the plant must be answered before construction begins. Any complications in the decision-making process or in negotiations will most likely result in project delays.

The present schedule indicates that initial operations of the facility will begin in 1985. Two factors in particular compel adherenceto the schedule as closely as possible: decreasing availability of landfill space and increasing construction costs. The following chart summarizes the major activities from the beginning of Phase III through facility operation.

IX.C. Use of Site

Both of the sites under consideration for the resource recovery plant are similar in size (12 - 18 acres) but differ in shape. The East 26th Street site is triangular, while the Muny site is a rectangular parcel. The layout and plant design will thus be dependent on the selected site.

It is estimated that on the Muny site, approximately 25% of the land will be used for structures and 6% for access drives, parking and tipping areas. This would result in almost 70% of the site being retained for landscaped areas and open space. The East 26th Street site would necessitate much heavier site utilization due to its configuration. Approximately 40% of this site would be utilized for structures and 10% for paved areas, thus resulting in 50% of the site being retained as landscaped areas and open space.

The site will be comprised of the main incinerator building, an ash disposal building, a scale building, and possible areas for cooling towers and/or condensers, depending on the type of energy to be produced as well as the site. Both sites have substantial variations in elevation. Since the plant itself is expected to be a bi-level operation, it is expected that this variation will be utilized in the layout of the plant. Thus, the tipping area would be located on one level and the pit would be situated at a lower level.

X. Irreversable Committments of Resources

X.A. Land Resources

Since no disposal or long-term storage of solid waste or process residues will occur at either site, there will be no irretrievable damage to land resources. All structures, roads and utilities are considered to be short-term, retrievable commitments. Thus, the lack of environmental impact by a resource recovery facility on land resources is of major significance when compared to the impact of a sanitary landfill.

X.B. Alternate Resource Effects

As has been indicated earlier in this report, the resource recovery facility will incinerate solid waste to produce supplemental energy for a major utility. The potential savings to coal resources could exceed 241,000 tons per year.

Energy resources which will be consumed during construction and operation of the facility will be minimal. Fuel for construction vehicles and waste vehicles will consume normal amounts of gasoline and oil. A small amount of natural gas will be required for office heating, and a small portion of the electricity produced by the facility will be consumed in-house.

The conclusion of their study indicates that the project would have a positive overall effect on the ecology of the region. The potential savings to the environment through reduced need for landfill space, reduction of air and water pollution, and energy conservation can be considered substantial when compared to the negative impacts of the facility as identified in this report.

Appendices

Appendix A

Materials Recovery Potential

TABLE A-1 ESTIMATED 1985 MATERIALS RECOVERY POTENTIAL BY COMMUNITY AT THE ONE HUNDRED PERCENT PARTICIPATION LEVEL
(tons)

Community	Steel cans	Other ferrous	Aluminum cans	Other aluminum	Loose newspapers	News bundles	Glass	Corrugated
Bay Village	620	125	46	77	1,480	31	1,160	420
Beachwood	190	37	14	23	550	9	350	125
Bedford	195	39	15	25	465	10	365	130
Bedford Heights	205	41	15	25	495	10	385	140
Berea	300	60	25	37	720	15	560	200
Bratenhal	18	4	1	2	43	1	33	12
Brecksville	140	28	10	18	335	7	265	95
Broadview Heights	695	140	52	85	1,665	35	1,300	470
Brooklyn	250	50	19	31	600	12	470	170
Brooklyn Heights	34	7	3	4	81	2	63	23
Brook Park	575	115	43	72	1,375	30	1,075	385
Chagrin Falls	90	18	7	11	215	4	170	60
Cleveland	13,100	2,625	985	1,640	31,500	656	24,600	8,850
Cleveland Heights	1,160	230	87	145	2,790	58	2,180	785
Cuyahoga Heights	20	4	2	3	50	1	39	14
East Cleveland	550	110	41	68	1,310	27	1,025	370
Euclid	1,220	240	91	150	2,930	61	2,290	820
Fairview Park	310	62	23	38	740	15	580	210
Garfield Heights	570	110	42	70	1,360	28	1,060	380
Glenwillow	10	2	1	1	25	1	20	7
Highland Heights	66	13	5	8	160	3	125	45
Hunting Valley	26	5	2	3	62	1	50	18
Independence	150	30	12	20	370	8	290	100
Lakewood	1,700	340	130	210	4,100	85	3,200	1,150
Lyndhurst	370	74	28	46	885	18	690	250
Maple Heights	570	110	42	70	1,360	28	1,060	380
Mayfield Heights	320	65	25	40	780	16	610	220
Middleburg Heights	220	45	17	28	540	11	420	150
Moreland Hills	38	8	3	5	90	2	70	26
Newburgh Heights	73	15	5	9	170	4	140	50
North Olmsted	900	180	67	110	2,160	45	1,690	610
North Randall	10	2	1	1	25	1	20	7

(continued)

TABLE A-1 (continued)

Community	Steel cans	Other ferrous	Aluminum cans	Other aluminum	Loose newspapers	News bundles	Glass	Corrugated
North Royaton	250	50	19	31	600	12	470	170
Oakwood	80	16	6	10	190	4	150	45
Olmsted Falls	140	29	11	18	340	7	270	100
Olmsted Township	170	35	13	22	416	9	330	120
Parma	2,240	450	170	280	5,370	110	4,200	1,510
Parma Heights	280	56	21	35	680	14	530	190
Pepper Pike	110	22	8	14	260	5	200	74
Richmond Heights	110	22	8	14	265	5	210	75
Rocky River	530	105	40	66	1,270	26	990	360
Seven Hills	240	48	18	30	575	12	450	160
Shaker Heights	660	132	50	82	1,580	33	1,240	450
Salon	490	100	37	62	1,180	25	920	330
South Euclid	440	90	33	55	1,070	22	830	300
Strongsville	450	90	34	56	1,080	23	850	300
University Heights	320	64	24	40	770	16	600	220
Valley View	30	6	2	4	70	1	55	20
Walton Hills	55	11	4	7	130	3	100	37
Warrensville Heights	250	50	19	32	610	13	480	170
Westlake	530	110	40	67	1,280	27	1,000	360
Woodmere	8	2	1	1	19	1	15	5

TABLE A-2 ESTIMATED 1985 MATERIALS RECOVERY POTENTIAL BY COMMUNITY AT THE FIFTY PERCENT PARTICIPATION LEVEL
(tons)

Community	Steel cans	Other ferrous	Aluminum cans	Other aluminum	Loose newspapers	News bundles	Glass	Corrugated
Bay Village	310	512	23	38	740	15	580	210
Beachwood	95	18	7	12	275	4	175	62
Bedford	98	20	8	12	232	5	182	65
Bedford Heights	102	20	8	12	248	5	192	70
Berea	150	30	12	18	360	8	280	100
Bratenhal	9	2	1	1	22	1	16	6
Brecksville	70	14	5	9	168	3	132	48
Broadview Heights	348	70	26	42	832	18	650	235
Brooklyn	125	25	10	15	300	6	240	85
Brooklyn Heights	17	3	1	2	40	1	32	12
Brook Park	288	58	22	36	688	15	538	193
Chagrin Falls	45	9	4	5	108	2	85	30
Cleveland	6,550	1,312	492	820	15,750	328	12,300	4,425
Cleveland Heights	580	115	44	72	1,395	29	1,090	388
Cuyahoga Heights	10	2	1	2	25	1	20	7
East Cleveland	275	55	20	34	655	14	512	185
Euclid	610	120	45	75	1,465	30	1,145	410
Fairview Park	155	31	12	16	370	8	290	105
Garfield Heights	285	55	21	35	680	14	530	190
Glenwillow	5	1	1	1	12	1	10	3
Highland Heights	33	6	2	4	80	1	62	22
Hunting Valley	13	2	1	1	31	1	25	9
Independence	75	15	6	10	185	4	145	50
Lakewood	850	170	65	105	2,050	42	1,600	575
Lyndhurst	185	37	14	23	442	9	345	125
Maple Heights	285	55	21	35	680	14	530	190
Mayfield Heights	160	32	12	20	390	8	305	110
Middleburg Heights	110	22	8	270	5	5	210	75
Moreland ills	19	4	2	2	45	1	35	13
Newburgh Heights	36	8	2	5	85	2	70	25
North Olmsted	450	90	34	55	1,080	22	845	305
North Randall	5	1	1	1	12	1	10	2

(continued)

TABLE A-2 (continued)

Community	Steel cans	Other ferrous	Aluminum cans	Other aluminum	Loose newspapers	News bundles	Glass	Corrugated
North Royalton	125	25	10	15	300	6	235	85
Oakwood	40	8	3	5	95	2	75	22
Olmsted Falls	70	15	5	9	170	4	135	50
Olmsted Township	85	18	6	11	208	5	165	60
Parma	1,120	225	85	140	2,685	55	2,100	700
Parma Heights	140	28	10	18	340	7	265	95
Pepper Pike	55	11	4	7	130	2	100	37
Richmond Heights	55	11	4	7	132	2	105	38
Rocky River	265	52	20	33	635	13	495	180
Seven Hills	120	24	9	15	288	6	225	80
Shaker Heights	330	66	25	41	590	16	620	225
Salon	245	50	18	31	590	12	460	165
South Euclid	220	45	16	28	535	11	415	150
Strongsville	225	45	17	28	540	12	425	150
University Heights	160	32	12	20	385	8	300	110
Valley View	15	3	1	2	35	1	28	10
Walton Hills	28	5	2	4	65	2	50	18
Warrensville Heights	125	25	10	16	305	6	240	85
Westlake	265	55	20	34	640	14	500	180
Woodmere	4	1	1	1	10	1	8	2

TABLE A-3 ESTIMATED 1985 MATERIALS RECOVERY POTENTIAL BY COMMUNITY AT THE TWENTY-FIVE PERCENT PARTICIPATION LEVEL
(tons)

Community	Steel cans	Other ferrous	Aluminum cans	Other aluminum	Loose newspapers	News bundles	Glass	Corrugated
Bay Village	155	31	12	19	370	8	290	105
Beachwood	48	9	4	6	138	2	88	31
Bedford	49	10	4	6	116	2	91	32
Bedford Heights	51	10	4	6	124	2	96	35
Berea	75	15	6	9	180	4	140	50
Bratenhal	4	1	0	1	11	0	8	3
Brecksville	35	7	2	4	84	2	66	24
Broadview Heights	174	35	13	21	416	9	325	118
Brooklyn	62	12	5	7	150	3	118	42
Brooklyn Heights	8	2	1	1	20	1	16	6
Brook Park	144	29	11	18	344	7	269	96
Chagrin Falls	22	5	2	3	54	1	42	15
Cleveland	3,275	656	246	410	7,875	164	6,150	2,212
Cleveland Heights	290	58	22	36	697	14	545	196
Cuyahoga Heights	5	1	1	1	12	0	10	3
East Cleveland	138	28	10	17	328	7	256	92
Eculid	305	60	23	38	732	15	572	205
Fairview	78	16	6	10	185	4	145	52
Garfield Heights	142	28	10	18	340	7	265	95
Glenwillow	2	1	0	0	6	0	5	2
Highland Heights	1	3	1	2	40	1	31	11
Hunting Valley	6	1	1	1	16	0	12	5
Independence	38	8	3	5	92	2	72	25
Lakewood	425	85	32	52	1,025	21	800	288
Lyndhurst	92	18	7	12	221	5	172	62
Maple Heights	142	28	10	18	340	7	265	95
Mayfield Heights	80	16	6	10	195	4	152	55
Middleburg Heights	55	11	4	7	135	3	105	38
Moreland Hills	10	2	1	1	22	1	18	6
Newburgh Heights	18	4	1	2	42	1	35	12
North Olmsted	225	45	17	28	540	11	422	152
North Randall	2	1	0	0	6	0	5	2

(continued)

TABLE A-3 (continued)

Community	Steel cans	Other ferrous	Aluminum cans	Other aluminum	Loose newspapers	News bundles	Glass	Corrugated
North Royalton	62	12	5	8	150	3	118	42
Oakwood	20	4	2	2	48	1	38	11
Olmsted Falls	35	7	3	5	85	2	68	25
Olmsted Township	42	9	3	5	104	2	82	30
Parma	560	112	42	70	1,342	28	1,050	378
Parma Heights	70	14	5	9	170	4	132	48
Pepper Pike	27	5	2	4	65	1	50	18
Richmond Heights	27	5	2	4	66	1	52	19
Rocky River	132	26	10	16	318	6	248	90
Seven Hills	60	12	5	8	144	3	112	40
Shaker Heights	165	33	12	20	395	8	310	112
Salon	122	6	9	16	295	6	230	82
South Euclid	110	22	8	14	268	6	208	75
Strongsville	112	22	8	14	270	6	212	75
University Heights	80	16	6	10	192	4	150	55
Valley View	8	2	1	1	18	0	14	5
Walton Hills	14	3	1	2	32	1	25	9
Warrensville Heights	62	12	5	8	152	3	120	42
Westlake	132	28	10	17	320	7	250	90
Woodmere	2	1	0	0	5	0	4	1

TABLE A-4 ESTIMATED 1985 MATERIALS RECOVERY POTENTIAL BY COMMUNITY AT THE TEN PERCENT PARTICIPATION LEVEL
(tons)

Community	Steel cans	Other ferrous	Aluminum cans	Other aluminum	Loose newspapers	News bundles	Glass	Corrugated
Bay Village	62	12	5	8	148	3	116	42
Beachwood	19	4	1	2	55	1	35	12
Bedford	20	4	2	2	46	1	36	13
Bedford Heights	20	4	2	2	50	1	38	14
Berea	30	6	2	4	72	2	56	20
Bratenhal	2	1	0	1	4	0	3	1
Brecksville	14	3	1	2	34	1	26	10
Broadview Heights	70	14	5	8	166	4	130	47
Brooklyn	25	5	2	3	60	1	47	17
Brooklyn Heights	3	1	1	1	8	1	6	2
Brook Park	58	12	4	7	138	3	108	38
Chagrin Falls	9	2	1	1	22	1	17	6
Cleveland	1,310	262	98	164	3,150	66	2,460	885
Cleveland Heights	116	23	9	14	279	6	218	78
Cuyahoga Heights	2	1	1	1	5	0	4	1
East Cleveland	55	11	4	7	131	3	102	37
Euclid	122	24	9	15	293	6	229	82
Fairview Park	31	6	2	4	74	2	58	21
Garfield Park	57	11	4	7	136	3	106	38
Glenwillow	1	1	0	0	2	0	2	1
Highland Heights	7	1	1	1	16	1	12	4
Hunting Valley	3	1	1	1	6	0	5	2
Independence	15	3	1	2	37	1	29	10
Lakewood	170	34	13	21	410	8	320	115
Lyndhurst	37	7	3	5	88	2	69	25
Maple Heights	57	11	4	7	136	3	106	38
Mayfield Heights	32	6	2	4	78	2	61	22
Middleburg Heights	22	4	2	3	54	1	42	15
Moreland Hills	4	1	1	1	9	1	7	3
Newburgh Heights	7	2	1	1	17	1	14	5
North Olmsted	90	18	7	11	216	4	169	61
North Randall	1	1	0	0	2	0	2	1

(continued)

TABLE A-4 (continued)

Community	Steel cans	Other ferrous	Aluminum cans	Other aluminum	Loose newspapers	News bundles	Glass	Corrugated
North Royalton	25	5	2	3	60	1	47	17
Oakwood	8	2	1	1	19	1	15	4
Olmsted Falls	14	3	1	2	34	1	27	10
Olmsted Township	17	4	1	2	42	1	33	12
Parma	224	45	17	28	537	11	420	151
Parma Heights	28	6	2	4	68	1	53	19
Pepper Pike	11	2	1	1	26	1	20	7
Richmond Heights	11	2	1	1	26	1	21	8
Rocky River	53	10	4	7	127	3	99	36
Seven Hills	24	5	2	3	58	1	45	16
Shaker Heights	66	13	5	8	158	3	124	45
Salon	49	10	4	6	118	2	92	33
South Euclid	44	9	3	5	107	2	83	30
Strongsville	45	9	3	6	108	2	85	30
University Heights	32	6	2	4	77	2	60	22
Valley View	3	1	1	1	7	0	6	2
Walton Hills	6	1	1	1	13	1	10	4
Warrensville Heights	25	5	2	3	61	1	48	17
Westlake	53	11	4	7	128	3	100	36
Woodmere	1	1	0	0	2	0	2	1

Appendix B

Cleveland Area Bird Counts

Appendix B

SUMMARY OF DATA FROM THE SIXTY-FOURTH THROUGH THE SEVENTY-THIRD CHRISTMAS BIRD COUNTS AT CLEVELAND, OHIO

Species	No. years recorded out of 10 years	Average no./year in years recorded
Ring-billed Gull*	10	14104
Bonaparte's Gull*	10	5480
Herring Full*	10	4212
Starling	10	1302
House Sparrow	10	872
Mallard*	10	703
Common Crow	10	363
Black-capped Chickadee	10	347
Black Duck*	10	307
Dary-eyed Junco	10	294
Cardinal	10	278
Tree Sparrow	10	262
Common Goldeneye*	10	212
Tufted Titmouse	10	183
Blue Jay	10	181
American Goldfinch	10	121
Red-breasted Merganser*	10	117
Downy Woodpecker	10	98
Cedar Waxwing	10	98
Mourning Dove	10	92
White-breasted Nuthatch	10	80
Song Sparrow	10	56
Lesser Scaup*	10	39
American Robin	10	38
Hairy Woodpecker	10	32
Redhead*	10	17
Red-bellied Woodpecker	10	17
Bufflehead*	10	16
White-throated Sparrow	10	15
Eastern Bluebird	10	12
Red-tailed Hawk	10	6
Belted Kingfisher	10	5
Pileated Woodpecker	10	5
Brown Creeper	10	5
Golden-crowned Kinglet	10	5
American Kestrel	10	4
Canada Goose*	9	719
Snow Buntling	9	48
Red-breasted Nuthatch	9	22
Ruddy Duck*	9	21

* = Species of birds likely to utilize the waters of the Cleveland Harbor area for feeding or resting.

Appendix B

SUMMARY OF DATA FROM THE SIXTY-FOURTH THROUGH THE SEVENTY-THIRD CHRISTMAS BIRD COUNTS AT CLEVELAND, OHIO (Cont'd)

Species	No. years recorded out of 10 years	Average No./year in years recorded
Ring-necked Pheasant	9	10
Common Flicker	9	7
Rufous-sided Towhee	9	6
Wood Duck	9	5
American Wigeon*	9	4
Barred Owl	9	2
Carolina Wren	9	2
Greater Scamp*	8	144
Common Merganser*	8	85
Field Sparrow	8	5
Winter Wren	8	2
Pine Siskin	7	20
American Coot*	7	8
Great Black-backed Gull*	7	7
Horned Grebe*	7	3
Swamp Sparrow	7	3
Hooded Merganser*	7	2
Yellow-bellied Sapsucker	7	2
Evening Grosbeak	6	9
Horned Lark	6	5
Purple Finch	6	4
Pied billed Grebe*	6	3
Red-shouldered Hawk	6	2
Mockingbird	6	2
Brown-headed Cowbird	6	2
Common Crackle	6	1
Great Horned Owl	6	1
Canvasback*	5	36
Red-winged Blackbird	5	3
Pintail*	5	2
Rough-legged Hawk	5	2
Common Redpoll	4	65
Killdeer	4	6
Gadwall*	4	3
Ruby-crowned Kinglet	4	3
Great Blue Heron	4	2
Green-winged Teal*	4	2
Cooper's Hawk	4	2
Red-headed Woodpecker	4	2
Common Snipe	4	1

* = Species of birds likely to utilize the waters of the Cleveland Harbor area for feeding or resting.

Appendix B

SUMMARY OF DATA FROM THE SIXTY-FOURTH THROUGH THE SEVENTY-THIRD CHRISTMAS BIRD COUNTS AT CLEVELAND, OHIO (Cont'd)

Species	No. years recorded out of 10 years	Average no./year in years recorded
Bobwhite	3	24
Yellow-rumped Warbler	3	7
White-winged Scoter*	3	3
Ruffed Grouse	3	3
Hermit Thrush	3	3
Surf Scoter*	3	2
White-crowned Sparrow	3	2
Brown Thrasher	3	1
White-winged Crossbill	2	32
Red Crossbill	2	7
Whistling Swan*	2	3
Oldsquaw*	2	2
Marsh Hawk	2	2
Northern Shrike	2	2
Eastern Meadowlark	2	2
Lapland Longspur	2	2
Double-crested Cormorant*	2	1
Sharp-shinned Hawk	2	1
American Woodcock	2	1
Glaucous Gull*	2	1
Gray Catbird	2	1
White-fronted Goose*	1	5
Common Loon*	1	1
Snow Goose (Blue morph)*	1	1
Shoveler*	1	1
Ring-necked Duck*	1	1
King Eider*	1	1
Common Scoter*	1	1
Franklin's Gull*	1	1
Screech Owl	1	1
Eastern Phoebe	1	1
Boreal Chickadee	1	1
Swainson's Thrush	1	1
Northern Oriole	1	1

Average number of species recorded per census = 72

Average number of individuals recorded per census = 30,569.

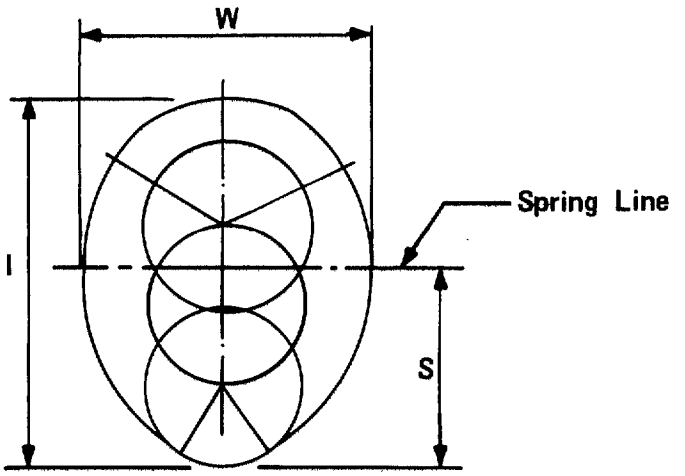
* = Species of birds likely to utilize the waters of the Cleveland Harbor area for feeding or resting.

Appendix C

Sewer Data

APPENDIX C–1 TYPES OF EGG SHAPED SEWERS

"A" - 1 Ring of Brick All Around
"B" - 1 Ring of Brick All Around & 1 Ring Extra on Arch
"C" - 2 Rings of Brick All Around
"D" - 2 Rings of Brick All Around & 1 Ring Extra on Arch
"E" - 3 Rings of Brick All Around



APPENDIX C–2

EGG SHAPED SEWERS					EQUIV-ALENT DIAMETER
No.	H FEET	W FEET	S FEET	AREA SQ.FT.	
2	2.25	1.94	1.28	3.41	2.08
3	2.75	2.23	1.64	4.75	2.46
4	3.23	2.54	1.70	6.35	2.84
5	3.74	2.95	1.98	8.55	3.30
6	4.23	3.34	2.23	10.90	3.73
7	4.69	3.70	2.48	13.39	4.15
8	5.12	4.04	2.71	16.00	4.51
9	5.54	4.37	2.93	18.72	4.83
10	5.94	4.69	3.14	21.54	5.24
11	6.33	4.99	3.35	24.46	5.58
12	6.71	5.29	3.55	27.47	5.91
13	7.08	5.58	3.74	30.57	6.24
14	7.44	5.87	3.93	33.74	6.55
15	7.79	6.14	4.12	36.99	6.86
16	8.13	6.41	4.30	40.32	7.16
17	8.47	6.68	4.47	43.71	7.46
18	8.79	6.94	4.65	47.17	7.75
19	9.12	7.19	4.82	50.70	8.02
20	9.43	7.44	4.98	54.29	8.31

APPENDIX C-3

FULL FLOW COEFFICIENT VALUES

To use, multiply factor with corresponding N and pipe size by the square root of the percent slope. The result is expressed in cubic feet per second.

Cir.Diameter Pipe Size	N=0.010	N=0.011	N=0.012	N=0.013	N=0.014	N=0.015	N=0.01
8	1.571	1.428	1.309	1.208	1.122	1.047	0.982
10	2.848	2.589	2.373	2.191	2.034	1.899	1.780
12	4.632	4.211	3.860	3.563	3.308	3.088	2.895
15	8.398	7.635	6.998	6.460	5.999	5.599	5.249
18	13.656	12.415	11.380	10.505	9.754	9.104	8.535
20	18.086	16.442	15.507	13.912	12.919	12.057	11.304
21	20.599	18.726	17.166	15.845	14.714	13.733	12.287
24	29.409	26.735	24.508	22.622	21.006	19.606	18.381
27	40.261	36.601	33.551	30.970	28.579	26.841	25.163
30	53.322	48.475	44.435	41.017	38.087	35.548	33.326
33	68.753	62.503	57.294	52.887	49.109	45.835	42.971
36	86.708	78.825	72.257	66.698	61.934	57.805	54.193
39	107.34	97.582	89.450	82.569	76.671	71.560	67.088
42	130.79	118.90	108.99	100.61	93.421	87.193	81.741
45	157.21	142.92	131.01	120.93	112.29	104.81	98.256
48	186.74	169.76	155.62	143.65	133.39	124.49	116.71
51	219.50	199.55	182.92	168.85	156.79	146.33	137.19
54	255.64	232.40	213.03	196.65	182.60	170.43	159.78
57	295.29	268.45	246.08	227.15	210.92	196.86	184.56
60	338.58	307.80	282.15	260.45	241.84	225.72	211.61
63	385.62	350.56	321.35	296.63	275.44	257.08	241.01
66	436.55	396.86	363.79	335.81	311.82	291.03	272.84
69	491.49	446.81	409.58	378.07	351.06	327.66	307.18
72	550.56	500.51	458.80	423.51	393.26	367.04	344.10
75	613.88	558.07	511.57	472.22	438.49	409.25	383.68
78	681.56	619.60	567.97	524.28	486.83	454.37	425.98
81	753.72	685.20	628.10	579.78	538.37	502.48	471.08
84	830.48	754.98	692.07	638.83	593.20	553.65	519.05
87	911.95	829.05	759.96	701.50	651.39	607.97	569.97
90	998.23	907.48	831.86	767.87	713.02	665.49	623.89
93	1089.4	990.36	907.83	838.00	778.14	726.27	680.88
96	1185.7	1077.9	988.08	912.08	846.93	790.47	741.63
99	1287.1	1170.1	1072.6	990.08	919.36	858.07	804.44
102	1393.8	1267.1	1161.5	1072.2	995.57	929.20	871.13
105	1505.8	1368.91	1254.8	1158.3	1075.6	1003.9	941.13
108	1623.2	1475.6	1352.7	1248.6	1159.4	1082.1	1014.5
111	1746.3	1587.5	1455.3	1343.3	1247.4	1164.2	1091.4
114	1875.0	1704.5	1562.5	1442.3	1339.3	1250.0	1171.4
117	2009.5	1826.8	1674.6	1545.8	1435.4	1339.7	1255.9
120	2150.0	1954.5	1791.7	1653.8	1535.7	1433.3	1343.8
123	2296.1	2087.4	1913.4	1766.2	1640.1	1530.7	1435.1
126	2448.5	222.59	2040.4	1883.5	1748.9	1632.3	1530.3
129	2607.1	2370.1	2172.6	2005.5	1862.2	1738.1	1629.4
132	2771.9	2519.9	2309.9	2132.2	1979.9	1847.9	1732.4
135	2943.1	2675.5	2452.6	2263.9	2102.2	1962.1	1839.4
138	3120.8	2837.1	2600.7	2400.6	2229.1	2080.5	1950.5
141	3305.0	3004.5	2754.2	2542.3	2360.7	2203.3	2065.6
144	3495.8	3178.0	2913.2	2689.1	2497.0	2330.5	2184.9

APPENDIX C-3 (cont'd.)

Cleveland Egg Pipe Size	N=0.010	N=0.011	N=0.012	N=0.013	N=0.014	N=0.015	N=0.016
#2	32.652	29.683	27.210	25.177	23.323	21.768	20.407
#3	51.077	46.434	42.565	39.290	36.484	34.052	31.923
#4	74.918	68.107	62.431	57.629	53.513	49.945	46.824
#5	111.80	101.64	93.166	85.999	79.857	74.533	69.875
#6	154.99	140.90	129.15	119.22	110.70	103.32	96.866
#7	203.36	184.87	169.47	156.43	145.26	135.57	127.10
#8	257.16	233.78	214.30	197.82	183.69	171.44	160.73
#9	317.34	288.49	264.45	244.11	226.67	211.56	198.34
#10	383.66	348.79	319.72	295.13	274.05	255.78	239.79
#11	453.69	412.45	378.08	348.99	324.06	302.46	283.56
#12	528.81	480.74	440.68	406.78	377.72	352.54	330.51
#13	611.26	555.69	509.39	470.20	436.62	407.51	382.04
#14	695.63	632.39	579.69	535.10	496.88	463.75	434.77
#15	786.92	715.39	655.77	605.33	562.09	524.62	491.83
#16	882.07	801.88	735.06	678.52	630.05	588.05	551.29
#17	984.10	894.64	820.08	757.00	702.93	656.07	615.06
#18	1089.4	990.41	907.87	838.04	778.18	726.30	680.91
#19	1197.6	1088.7	998.00	921.23	855.43	798.40	748.50
#20	1312.2	1192.9	1093.5	1009.4	937.30	874.81	820.13

Appendix D

Traffic Information

Appendix D-1

GIVEN INFORMATION USED IN PROJECTING THE NUMBER OF TRUCKS TRAVELING TO THE PROPOSED RESOURCE RECOVERY FACILITY (1985)

1. Collection vehicles -	1 cubic yard = 350 pounds
2. Transfer vehicles -	4.17 cubic yards = 1 ton

3. Transfer station vehicles have a 75 cubic yard capacity and an 18 ton weight limit.

Appendix D-2

ASSUMPTIONS USED IN PROJECTING THE NUMBER OF TRUCKS TRAVELING TO THE PROPOSED RESOURCE RECOVERY FACILITY (1985)

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1. Most communities will be using 25 cubic yard collection vehicles in 1985 because of the potential cost savings.

2. Some communities will continue to use collection vehicles smaller than 25 cubic yards because they will not generate enough waste to require larger vehicles. These communities are: Bratenahl, Cuyahoga Heights, East Cleveland, Glenwillow, Moreland Hills, North Randall, and Woodmere.

3. The City of Cleveland will probably continue to use 20 cubic yard vehicles on many collection routes because of the ease in maneuverability on the more narrow Cleveland streets and alleyways.

4. Communities presently owning 30 and 31 cubic yard collection vehicles will be assumed to own all 30 or 31 cubic yard collection vehicles in 1985. These communities are: Brook Park and Highland Heights.

5. The City of Cleveland will own the same number of 20, 25, and 30 cubic yard collection vehicles in 1985.

6. Partial truckloads were counted as full truckloads and were added to the number of trucks traveling to the proposed RRF; i.e., collection vehicles at the end of their route will not always be full, but will have to travel to the RRF.

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Appendix E

Permit Requirements

☒ Meeting ☐ Telecon ☐ Conference Report

Subject: Job 13389-003 Cuyahoga County Resource Recovery Project Building Permit Procedure	Page 1 of 1 No. 82
Date, Time & Place January 13, 1981 City Hall, Cleveland, Ohio	Date Issued: 1/21/81
	File: 5.1 10.2

Originated by:	Recorded By:	Action Item No. & Party
Bechtel	D. J. Dent DJDent	

Participants: Laik Ali - Supervisor, Plans and Examinations Section - Cleveland Dept. of Community Development, Division of Building. 216-664-2927
D. J. Dent - Bechtel
E. H. Hohman "

The purpose of the meeting was to determine the procedure and requirements for obtaining a Building Permit for the resource recovery facility.

To obtain a Building Permit, the contractor must submit three sets of drawings with a completed application to the Cleveland Department of Community Development, Division of Building - Plans and Examinations Section. They will review and send plans to the Health Dept., Street and Traffic Engineering Dept. and the Zoning Dept. for review.

The Plans and Examinations Section will also obtain reviews (for separate permits) by the Bureau of Smoke (Division of Air Pollution Control), the Division of Fire, The Division of Streets and the Utilities (water and sewer) Dept.

Ali suggested that, prior to submitting an application for Building Permit, preliminary plans be submitted and reviewed with the Planning Commission.

A water permit must be obtained prior to obtaining a Building Permit.

The entire Building Permit process including Planning Commission review takes about 30 to 60 days.

Copies of the application were obtained.

DJD:kcs

Distribution: W. R. Elliott, D. J. Dent, E. H. Hohman, Files

☐ Meeting ☒ Telecon ☐ Conference Report

Subject: Job 13389-003 Cuyahoga County Resource Recovery Project City of Cleveland Air Pollution Codes	Page 1 of 1
Date. Time & Place December 31, 1980, 10 A.M.	Date Issued: January 5, 1981
	File: 4.0, 10.2

Originated by:	Recorded By: E. H. Hohman EHH	Action Item No. & Party

Participants: Thomas A. Graske - Public Information Office, Division of Air Pollution Control, City of Cleveland (664-3500)

E. H. Hohman - Bechtel

The air pollution codes for Cleveland (Title Five - Air Pollution Control of Part Two - Health Code of the Codified Ordinances of Cleveland) include limitations on odors (Chapter 267), fugitive emissions (Chapter 277), nuisances (also Chapter 277), and hazardous pollutants (Chapter 281). Emissions from the resource recovery facility must comply with these limits as well as the federal and state limits. A copy of the up-to-date air pollution codes was obtained from the City of Cleveland.

The Air pollution Control Division has prepared a proposed noise control ordinance for the City Council's consideration. The ordinance contains numerical limitations in decibels.

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GPD-1205 10/78 (H&CF ENG 97)

☐ Meeting ☒ Telecon ☐ Conference Report

Subject: Job 13389-003 Cuyahoga County Resource Recovery Project Sewer Discharge Requirements Date, Time & Place December 31, 1980; 2 P.M.	Page 1 of 1 Date Issued: January 5, 1981 File: 4.0, 10.2

Originated by:	Recorded By: E. H. Hohman EHH	Action Item No. & Party

Participants: Larry Adloff - Northeast Ohio Regional Sewer District (641-6000)

E. H. Hohman - Bechtel

The most up-to-date Northeast Ohio Regional Sewer District Code of Regulations in force is that dated August 15, 1978, as revised by Resolution 504-80. A copy of these documents was obtained from the Regional Sewer District.

Revisions to Chapter 9 - Regulation of Discharges of the Code of Regulations, previously ~~reviewed~~ received from the Regional Sewer District (See Attachment C of Meeting Notes #38), are still pending. They are being reviewed by the Ohio EPA, and the Regional Sewer District is not in agreement with the more stringent limits being suggested by the Ohio EPA.

The Regional Sewer District is also awaiting approvals from the U.S.EPA and Ohio EPA to become the controlling entity for the enforcement of the Federal pretreatment regulations.

Distribution: W. R. Elliott, D. J. Dent, E. H. Hohman, Files

GPD-1205 10/78 (H&CF ENG 97)

☐ Meeting ☒ Telecon ☐ Conference Report

Subject: Job 13389-003 Cuyahoga County Resource Recovery Project Air Pollution Permits Date. Time & Place December 30, 1980; 11 A.M.	Page 1 of 1 Date Issued: January 5, 1981 File: 4.0, 10.2

Originated by:	Recorded By: E. H. Hohman EHH	Action Item No. & Party

Participants: Edward J. Fasko - Division of Air Pollution Control, City of Cleveland (664-3508)
E. H. Hohman - Bechtel

Project status was briefly reviewed with Fasko, particularly the change in the energy market to CEI and MUNI, the alternative sites, and the project schedule.

The pending air pollution Permit to Install (PTI) for the project will expire in the end of January 1981, 18 months after the application was submitted by the County on June 19, 1979, According to Fasko, there are two options available.

(1) The County can file for an extension of the PTI. A letter requesting an extension should be sufficient.

(2) The County can allow the PTI to expire and then file a new PTI once the facility and site are better defined.

Both options assume that the full service contractor will actually obtain the PTI based on his particular facility design. Fasko thinks that filing a new PTI is preferable, although either option is acceptable.

Following construction of the facility, a permit to operate is also required. This permit is issued based on stack testing.

The Cleveland Division of Air Pollution Control has responsibility for reviewing PTI's and operating permits for facilities in Cuyahoga County.

Distribution: J. J. Garner, P. J. Holland, W. R. Elliott, D. J. Dent, E. H. Hohman, Files

CRD 1205 10/78 (H&CE ENG 97)

☐ Meeting ☒ Telecon ☐ Conference Report

Job 13389-003 Subject: Cuyahoga County Resource Recovery Project Sewer Service to Potential Sites Date, Time & Place January 15, 1981; 3 P.M.	Page 1 of 1 Date Issued: January 20, 1981 File: 4.0, 10.1.3

Originated by:	Recorded By: E. H. Hohman EHH	Action Item No. & Party

Participants: Tom Marsalis - Division of Utilities Engineering, City of Cleveland
E. H. Hohman - Bechtel

Connections to Cleveland sewers require permits issued by the City of Cleveland Division of Water Pollution Control. If the connection is to an interceptor owned by the Northeast Ohio Regional Sewer District, the connection is reviewed by the Regional Sewer District; but the basic review of the facility and permit issuance are still by Cleveland.

Plans for the wastewater collection system are reviewed by the Chief Plumbing Inspector in the Department of Building for work inside the property line; and reviewed by Utilities Engineering for work outside the property line and connection to the sewer. Standards required to be followed include the Ohio Code and the uniform standards code for sewer specifications. Pollutant limitations for discharges to Cleveland sewers are contained in the Regional Sewer District Standards for discharges to sewers.

Mr. Marsalis suggested that the availability of water and sewer service to the resource recovery facility at the two potential sites be requested during project planning, in a letter to David J. Pfeiffer, Acting Commissioner, Division of Utilities Engineering. If service is not available, Utilities Engineering will determine what is required to provide water and sewer service.

There are existing sewers near both sites. A major east-west interceptor sewer, owned by the Regional Sewer District, extends from downtown Cleveland to the Easterly Wastewater Treatment Plant along Lakeside Avenue. This interceptor has a diameter of 12 ft. Other major sewers near the potential sites are a 5 to 6 ft. equivalent diameter sewer in East 26th Street; and a sewer in East 53rd Street. Storm sewers discharging to Lake Erie are also near both sites.

Distribution: P. J. Holland, W. R. Elliott, D. J. Dent, E. H. Hohman, Files

GPD-1205 10/78 (H&CF ENG 97)

☐ Meeting ☒ Telecon ☐ Conference Report

Job 13389-003 Subject: Cuyahoga County Resource Recovery Project Water Service to Potential Sites Date, Time & Place January 15, 1981: 10 A.M.	Page 1 of 1 Date Issued: January 16, 1981 File: 4.0, 10.1

Originated by:	Recorded By: E. H. Hohman EHH	Action Item No. & Party

Participants: Frank Malatesta - Permit and Sales Office, Department of Water, City of Cleveland 664-2740
E. H. Hohman - Bechtel

The Permit and Sales Office of the City of Cleveland Department of Water must approve connections for water service. The procedure is as follows:

1. Copies of the mechanical site plans are submitted to the Permit and Sales Office.
2. City Engineers then review the plans, check fire flows etc.
3. The City then tells the owner what the connection requirement and costs are.

According to Mr. Malatesta, the Muny site could be provided water service from the 12 inch diameter water main in Marquette Avenue. In fact, there is now an old 8 inch connection, not used, to the site. The 12 inch line connects to a 16 inch water main in Lakeside Avenue. The East 26th Street and Lakeside Avenue site would be served from the 16 inch diameter water main in East 26th as Lakeside Avenue "jogs".

Water and sewer charges are based on use or discharge at flat rates. Present costs for water and sewerage, according to Mr. Malatesta, are the following:

Water	$2.37/1,000 cu. ft.
Sewerage	$4.35/1,000 cu. ft.

Distribution: W. R. Elliott, D. J. Dent, Files, E. H. Hohman