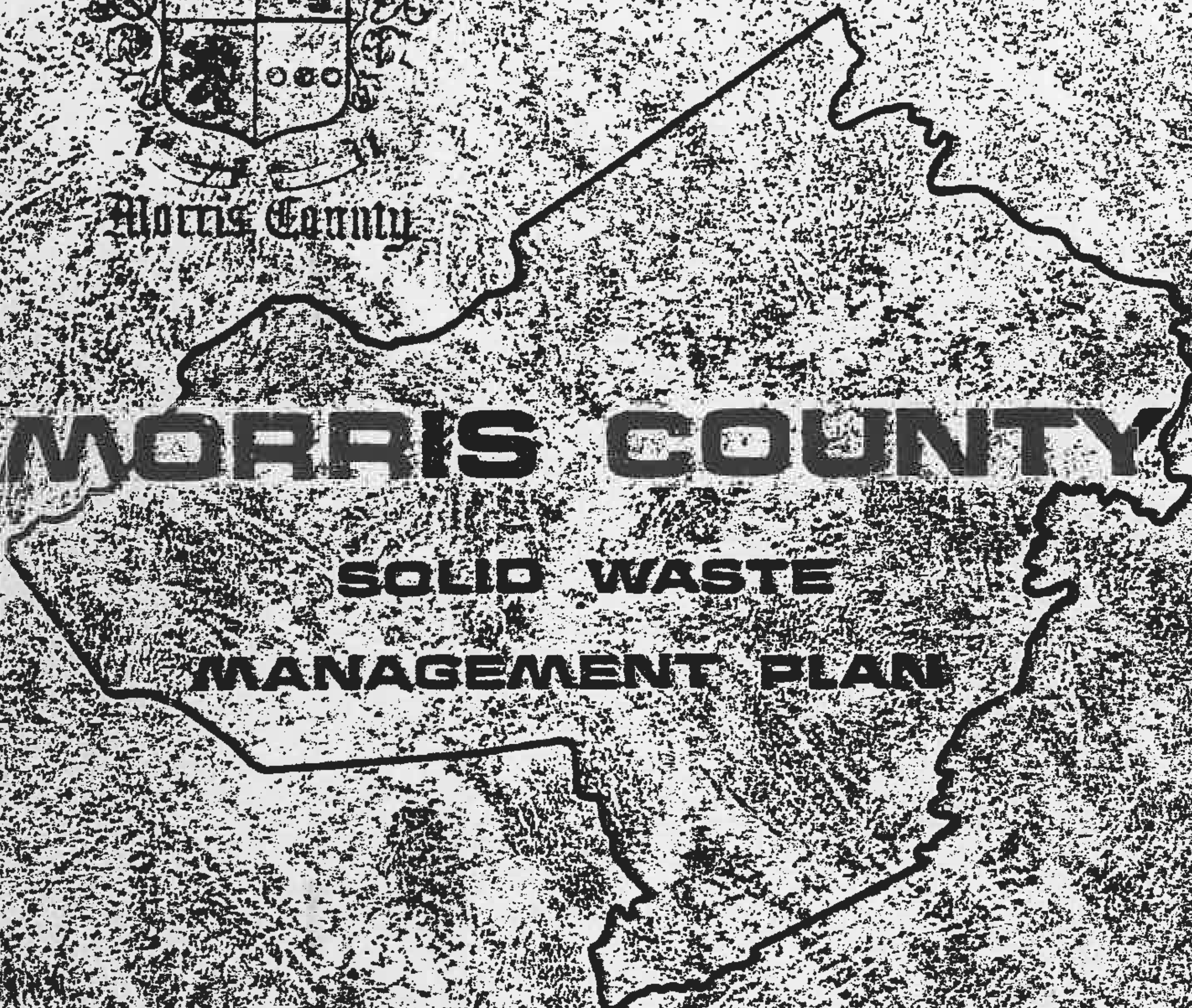
"1979"

Morris County



MORRIS COUNTY

SOLID WASTE MANAGEMENT PLAN

MORRIS COUNTY
BOARD OF CHOSEN FREEHOLDERS
SOLID WASTE ADVISORY COUNCIL

ras ASSOCIATES

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FOREWORD

The following is a copy of Morris County's Solid Waste Management Plan. This Plan was developed by the Morris County Solid Waste Advisory Council (SWAC) and their Consultants, and was approved for submission to the Freeholders.

On November 20, 1979 a Public Hearing was held by the Board of Chosen Freeholders at which time the public was invited to comment on the Plan's content.

At their regular semi-monthly meeting on December 12, 1979, the Morris County Board of Chosen Freeholders unanimously adopted the following Solid Waste Management Plan.

ACKNOWLEDGEMENTS

The following Solid Waste Management Plan was prepared for the Morris County Board of Chosen Freeholders in conjunction with the Solid Waste Advisory Council.

RAS Associates would like to thank the persons and agencies listed below who have contributed in the development of this Plan:

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INTRODUCTION AND OVERVIEW

This document presents the results of a concerted effort by Morris County to identify the needs of the County in the area of solid waste management, and to offer comprehensive solutions which satisfy these needs through the coming decade, as mandated by Chapter 326, Public Law 1975 of the State of New Jersey, approved February 23, 1976. Several viable alternatives have been offered, all of which involve the utilization of high technology resource recovery systems for processing the majority of the County's solid waste stream by 1985. The alternative given highest ranking envisions a regional approach to solid waste disposal, with the development and utilization of resource recovery facilities in the western area of Morris County and the City of Paterson in Passaic County, in addition to County encouragement of source separation programs. Should the Lakeland Solid Waste Authority's plans proceed as anticipated, an additional resource recovery facility would be constructed in the Lakeland area. All alternatives propose continued use of upgraded landfills until the implementation of resource recovery.

Currently, greater than 400,000 tons of solid waste are generated within the County each year. Much of this waste originates in Morris County's east-central region, reflecting the area's high population density and significant industrialization.

The majority of solid wastes generated within the County are disposed of within the two large BPU regulated landfills in Chester and Mt. Olive Townships. The closure of the Fenimore Landfill in Roxbury Township significantly increased waste disposal rates at these facilities. These facilities have also incurred further depletion of capacity due to the importation of wastes from other counties.

The planned closure of the HMDC landfills may exert a two fold effect on the Chester Hills and Mount Olive facilities. At the present time, most of the solid waste exported from Morris County is transported to the HMDC landfills for disposal. The County's BPU regulated landfills represent two of a diminishing number of alternative disposal locations. This lack of available alternative disposal sites may also result in a substantial increase in waste importation. An additional consideration lies in a projected 14.6% increase in the County's solid waste generation rate by the end of the planning period (1990), primarily as a result of increasing population and industrial development.

Greater than half of the present municipal solid waste stream in Morris County is collected privately, posing a potential handicap to the control of waste flow necessary to assure adequate tonnage delivery to proposed resource recovery facilities. Thus, it is recommended that the County obtain a franchise from the Board of Public Utilities. This will also afford a degree of control over the industrial waste stream, which for the most part is collected through individual agreements with private collection firms.

Listed below are the four sections into which this plan has been divided, including a brief description of the topics addressed in each section:

I. IDENTIFICATION OF TECHNICAL NEEDS

The initial step in the planning process involves assessment of the existing generation rate and collection, transport, and disposal practices with respect to solid wastes, septic wastes and sewage sludges. In conjunction with population and employment projections, this data is utilized in the forecasting of future waste generation rates.

II. DEVELOPMENT AND EVALUATION OF ALTERNATIVES

Several alternatives for solid waste processing and disposal are examined, with those offering potential as Full-County options identified.

III. SELECTION OF SOLID WASTE MANAGEMENT SYSTEMS

Full-County Alternatives are screened based upon technical, economic, environmental, siting, and socio-political considerations. Viable options are selected, and included as part of an overall solid waste management plan. Septic waste and sludge management plans are also provided.

IV. FINANCIAL, MANAGEMENT AND INSTITUTIONAL PLANS, AND IMPLEMENTATION SCHEDULE

Methods of achieving waste control and of financing resource recovery systems are addressed. Administrative and management options are discussed, in addition to the concept of rate averaging. Coordination with regulatory agencies, plan update and enforcement provisions, and an implementation schedule are also included in this section.

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Prepared For

THE MORRIS COUNTY BOARD OF CHOSEN FREEHOLDERS

in Cooperation With

THE MORRIS COUNTY SOLID WASTE ADVISORY COUNCIL

December 1979

Prepared By

RAS ASSOCIATES
Reutter, Anderson, Schoor Associates

TASK I
IDENTIFICATION OF TECHNICAL NEEDS

TASK I
IDENTIFICATION OF TECHNICAL NEEDS

A. INTRODUCTION

Under Chapter 326 of P.L. 1975 each county within the State of New Jersey and the Hackensack Meadowlands Development Commission is required to formulate a solid waste management plan for a ten year planning period (1980-1990).

Prior to the formulation of the solid waste mangement plan for Morris County the existing generation, collection and disposal system must be examined. The objective of Task 1 planning activities was to create a comprehensive solid waste data base, to define the existing collection and disposal practices, and to project future waste generation rates for Morris County. It should be noted that there are several waste classifications for which planning will be completed at the state level. A summary of waste classifications and planning responsibilities is shown in Table 1-1.

In the past, information regarding generation, collection and disposal of solid wastes was difficult to obtain. As a greater awareness of the problems related to solid waste arose, the need for such data became evident. Although much of this needed data is now available in the form of municipal surveys, weighing programs, collector/hauler reports and disposal facility reports, there are still informational gaps for which allowances must be made.

The Solid Waste Administration, several years ago, began a reporting program for all solid waste collected or disposed of in New Jersey. Every year during the months of May and June each individual or business that collects and transports waste in the state is required to complete a report on wastes collected during the preceding calendar year. These reports include information on the amount, type, origin and disposal location of all waste collected and transported by them during the preceeding year. All reports from collector/haulers statewide are entered into a computer and the data is then compiled by county, disposal location, origin, etc.

Disposal facilities are also required to report the quantities and types of waste accepted for disposal on a yearly basis. This data is also entered into a computer and compiled in the same fashion as the collector/hauler reports.

These yearly reports are only as complete and accurate as the information supplied to the state by individual collector/haulers reports. The most current reports available are for 1977 and were relied on heavily for the purpose of this report.

Information regarding present and future population of municipalities within Morris County was obtained from the Morris County Planning Board. An estimate of population for 1985 was developed using 1980 and 1990 projections. See Appendix 1.

TABLE 1-1

WASTE CLASSIFICATIONS AND PLANNING RESPONSIBILITIES

		COUNTY PLANNING	STATE PLANNING
	Solid Wastes		
10	Municipal	X	
12	Dry Sewage Sludge	X	
13	Bulky Waste	X	
17	Dry Hazardous Waste		X
18	Dry Non-Hazardous Chemical Waste		X
23	Vegetative Waste	X	
25	Animal & Food Processing Waste	X	
26	Oil Spill Clean-up Waste	X	
27	Non-Chemical Industrial Waste	X	
	Liquid Wastes		
70	Waste Oil & Sludges	X	
72	Bulk Liquid & Semi-Liquids	X	
73	Septic Tank Cleanout Wastes	X	
74	Liquid Sewage Sludge	X	
76	Liquid Hazardous Waste		X
77	Liquid Chemical Waste		X

To supplement SWA data, a survey of all private and municipal collector/haulers who provide municipal and industrial waste collection services in Morris County was undertaken. They were asked to list the municipalities in which they provide collection services, whether they collect residential, commercial-institutional, and/or industrial waste and the number of truckloads removed for each waste category, by municipality. During this supplemental survey, special attention was paid to clarifying and reducing inconsistencies in the SWA data with previous surveys conducted by Morris County.

The Task 1 section of this report is divided into several major categories. First, solid waste generation rate information is presented. Included in this section is information on existing solid waste generation as well as future projections. Next, the existing collection, transport and disposal practices are examined, after which a discussion on the existing sludge and septic waste collection and disposal system will be presented. Finally, the energy and material market survey will be discussed, followed by a short narrative on the public information and participation program.

Supplemental information to this report, including discussions on land use and development trends, population projections, etc., can be found in Appendix 1.

B. SOLID WASTE GENERATION

1. Existing Rates.

a. Municipal Wastes. Municipal wastes are generally defined as those wastes originating in private households as well as commercial waste from wholesale, retail or service establishments, and institutional wastes. The Solid Waste Administration (SWA) definition of municipal waste is included in Appendix 1. These wastes are reported as type "10" wastes.

The primary components of municipal waste are paper, food and yard wastes, glass, and metal. Numerous surveys have been conducted to determine the composition of municipal waste. A compilation of 41 sets of municipal waste composition data based on sampling, segregation and weighing of refuse (Wilson, 1977) is shown in Table 1-2.

Collection of municipal waste is offered as a municipal service in 24 municipalities in Morris County. Collection is accomplished either by municipal forces or private collector/haulers under contract to the municipality. Table 1-3 shows the total tonnage of municipal waste in each locality expected to be collected in 1979 by municipal service collection. Table 1-3 also lists the collector/haulers providing contract disposal service. These figures are based on the current number of truckloads per week hauling collected waste from each municipality. Any municipal waste generated in these 24 municipalities which is not included in the municipal service collection system is handled by collector/haulers under individual contract to private households or commercial establishments. This second form of collection (referred to as scavenger service) is utilized by the remaining 15 Morris County municipalities for the entire municipal waste stream. The estimated amount of municipal waste which will be collected in 1979 by scavenger service is depicted in Table 1-4 for each of the 39 municipalities in Morris County. In Appendix 1 is a list of the collector/haulers providing scavenger service to Morris County municipalities.

TABLE 1-2

PERCENTAGE COMPOSITION OF MUNICIPAL SOLID WASTE

Component	Percentage
Food Wastes	20.0
Yard Wastes	13.9
Glass	9.8
Metal	8.4
Paper	37.4
Plastics	1.4
Leather and Rubber	1.2
Miscellaneous	3.4
Textiles	2.2
Wood	3.1

Source: Wilson, Handbook of Solid Waste, 1977, Van Nostrand Reinhold

TABLE 1-3

1979 MUNICIPAL WASTE COLLECTED BY MUNICIPAL SERVICE

Municipality	Collection Type	Tons/Year	Contractor
Boonton Town	Contract	3,510	Tri-County Disposal Service
Butler Boro	Contract	4,836	Waste Disposal Inc.
Dover Town	Contract	6,719	J. Filiberto Sanitation Inc.
Florham Park Boro	Contract	3,588	Bill Pryer Private Disposal
Hanover Township	Municipal	6,094	—
Jefferson Township	Contract	11,172	Frank Fenimore Inc.
Kinnelon Boro	Contract	2,633	Browning-Ferris Industries
Lincoln Park Boro	Contract	3,949	Browning-Ferris Industries
Madison Boro	Contract	10,881	West Essex Disposal Co., Inc.
Mine Hill Township	Contract	2,194	Frank Fenimore Inc.
Morris Township	Municipal	9,828	—
Morris Plains Boro	Contract	3,990	J. Filiberto Sanitation Inc.
Morristown Town	Municipal	5,281	—
Mt. Arlington Boro	Municipal	2,184	—
Mt. Olive Township	Municipal	5,733	—
Netcong Boro	Contract	2,194	Frank Fenimore Inc.
Parsippany-Troy Hills Twp.	Contract	17,550	Browning-Ferris Industries
Passaic Twp.	Contract	3,510	Statewide Environmental Contractors
Randolph Twp.	Contract	6,143	Hamm's Sanitation
Riverdale Boro	Contract	1,755	Susens Disposal Service
Rockaway Boro	Contract	7,923	Morristown Disposal
Roxbury Twp.	Municipal	13,000	—
Victory Gardens Boro	Contract	439	Pontie Disposal
Wharton Boro	Municipal	2,730	—
		137,836	

TABLE 1-4

1979 SCAVENGER – COLLECTED MUNICIPAL WASTE

Municipality	Tons/Year
Boonton Town	12,014
Booton Township	2,286
Butler Boro	–
Chatham Boro	2,697
Chatham Township	2,710
Chester Boro	1,611
Chester Township	2,060
Denville Township	17,059
Dover Town	1,359
East Hanover Township	15,961
Florham Park Boro	2,042
Hanover Township	11,896
Harding Township	2,533
Jefferson Township	–
Kinnelon Boro	183
Lincoln Park Boro	758
Madison Boro	–
Mendham Boro	2,016
Mendham Township	3,345
Mine Hill Township	–
Montville Township	15,335
Morris Township	2,536
Morris Plains Boro	6,075
Morristown Town	10,032
Mountain Lakes Boro	3,326
Mt. Arlington Boro	–
Mt. Olive Township	1,976
Netcong Boro	–
Parsippany - Troy Hills Township	15,539
Passaic Township	4,723
Pequannock Township	11,224
Randolph Township	3,902
Riverdale Boro	–
Rockaway Boro	925
Rockaway Township	5,661
Roxbury Township	4,682
Victory Gardens Boro	92
Washington Township	3,924
Wharton Boro	606
Various	12,763
County Total	183,851 Tons

Municipal waste generation in Morris County is the sum total of municipal waste collected by municipal and scavenger services. Table 1-5 lists the 1979 municipal waste generation for each municipality. Waste generation rates in lbs./capita/day are also presented in Table 1-5. As can be seen from the table, there are significant variations in these rates, ranging from 1.53 to 9.94. When the municipal waste reported as originating in "various" municipalities is included in the county total, a county-wide per capita generation rate of 4.23 lbs./capita/day is obtained for municipal wastes.

Various surveys have been performed in the past to establish waste per capita generation rates. Results of two of these surveys are shown in Table 1-6. There are, of course, other wastes, including sludges, street sweepings, bulky wastes, etc., generated at the municipal level, but this study deals primarily with the municipal waste classes indicated in the table. Solid waste generation rates are classified by the size and type of community.

The data in the table is based on two surveys. The three right hand columns contain the data from the 1968 National Solid Waste Survey. Per capita generation rates are shown for urban and rural areas, and the national average is also indicated. In the six left hand columns, data is shown from a Pennsylvania State University survey. This generation rate is categorized by population class intervals.

For purposes of comparison with Morris County generation figures, an expected range of per capita generation rates has been established for each municipality. The expected range was estimated based on population density in each municipality. These expected ranges are shown in Table 1-7. Municipal generation rates and the expected range for each municipality are shown in Table 1-8. Also shown in the table in the right-hand column are the percentage deviations from the end of the range where survey estimates fell outside of the expected range.

A review of the table shows that for most municipalities, per capita generation rates fell close to or within their respective ranges. The most significant deviations occurred in five municipalities (Boonton Town, East Hanover Township, Hanover Township, Morris Plains Boro, and Passaic Township) where the generation rate exceeded the expected range by 25 percent or greater. Scavenger collection may inflate the municipal waste generation rates due to the fact that scavenger vehicles will often collect municipal and industrial wastes simultaneously. These "mixed loads" are often reported as municipal waste (Type 10). Scavengers will also collect municipal wastes from a number of small municipalities at the same time. These wastes are reported as originating from "various" municipalities and cannot be assigned to an individual municipality's generation. Segregation of "Various" collection by municipality would lower the individual generation rates of the municipalities involved.

Of the five municipalities which had high generation rates, waste generated by high employment in four of the municipalities accounts for the high rates (Boonton Town, E. Hanover Twp., Hanover Twp., and Morris Plains Boro). Shown in Table 1-9 is information on the number of employees per resident, along with municipal, industrial, and total waste generation.

TABLE 1–5

MUNICIPAL WASTE GENERATION*

Municipality	1979 Population	Tons/Year	Lb./Capita/Day
Boonton Town	8,851	15,524	9.64
Boonton Twp.	3,325	2,286	3.78
Butler Boro	7,363	4,836	3.61
Chatham Boro	8,963	2,697	1.65
Chatham Twp.	9,113	2,710	1.63
Chester Boro	1,545	1,611	5.73
Chester Twp.	4,999	2,060	2.26
Denville Twp.	14,795	17,059	6.34
Dover Town	13,921	8,078	3.19
E. Hanover Twp.	9,410	15,961	9.32
Florham Park Boro	8,159	5,630	3.79
Hanover Twp.	12,214	17,990	8.09
Harding Twp.	3,540	2,533	3.93
Jefferson Twp.	15,811	11,172	3.88
Kinnelon Boro	7,952	2,816	1.94
Lincoln Park Boro	8,739	4,707	2.95
Madison Boro	15,893	10,881	3.75
Mendham Boro	5,094	2,016	2.17
Mendham Twp.	4,901	3,345	3.74
Mine Hill Twp.	3,641	2,194	3.30
Montville Twp.	14,528	15,335	5.78
Morris Twp.	20,677	12,364	3.28
Morris Plains Boro	5,549	10,065	9.94
Morristown	16,016	15,313	5.24
Mountain Lakes Boro	4,567	3,326	4.00
Mt. Arlington Boro	3,843	2,184	3.11
Mt. Olive Twp.	17,965	7,709	2.35
Netcong Boro	3,250	2,194	3.70
Parsippany-Troy Hills	52,701	33,089	3.44
Passaic Twp.	7,614	8,233	5.92
Pequannock Twp.	14,157	11,224	4.34

*It should be noted that in some instances where a Boro and Township or a Town and a Township have the same name (e.q. Mendham) wastes may be misreported as to origin.

TABLE 1-5 (cont.)

MUNICIPAL WASTE GENERATION

Municipality	1979 Population	Tons/Year	Lb./Capita/Day
Randolph Twp.	18,482	10,045	2.97
Riverdale Boro	2,652	1,755	3.63
Rockaway Boro	6,954	8,848	6.97
Rockaway Twp.	20,269	5,661	1.53
Roxbury Twp.	19,248	17,682	5.03
Victory Gardens Boro	1,208	531	2.40
Washington Twp.	10,382	3,924	2.07
Wharton Boro	5,441	3,336	3.36
Various	–	12,763	–
Totals	417,005	321,687	4.23

TABLE 1-6

PER CAPITA SOLID WASTE GENERATION RATES FOR VARIOUS SIZED MUNICIPALITIES[1]

	Small, Rural (< 1000 Pop.)	Small, Industrial (1,000 - 10,000 Pop.)	Medium, Rural (10,000 - 25,000 Pop.)	Medium, Urban (25,000 - 75,000 Pop.)	Medium, Industrial (75,000 - 100,000 Pop.	Large (>100,000 Pop.)	Nat. S.W. Survey - 1968 RURAL	Nat. S.W. Survey - 1968 URBAN	Nat. S.W. Survey - 1968 AVERAGE
Residential	2.0	2.0	2.4	2.4	2.4	2.4	3.0	3.2	3.1
Commercial	1.5	2.0	2.5	2.5	3.5	3.5	0.4	1.2	1.0
Industrial	0.0	0.5	0.5	1.2	1.8	3.0	0.4	0.6	0.6
TOTAL	3.5	4.5	5.4	6.1	7.7	8.9	3.8	5.0	4.7

[1] From "Solid Wastes", Chapter 2, Solid Waste Characteristics, Table 10, Pennsylvania State University, Civil Engineering Dept., Workshop Proceedings, 1972.

TABLE 1-7

EXPECTED PER CAPITA MUNICIPAL WASTE GENERATION RATE RANGES

(LB./CAPITA/DAY)

Population Density Greater than 2,000 People/Mile^2

	Low*	High
Residential	3.2	2.4
Commercial	0.0	3.5
Industrial	0.0	1.8
Total	3.2	7.7

Population Density Between 2,000 and 600 People/Mile^2

	Low*	High
Residential	3.0	2.4
Commercial	0	2.5
Industrial	0	0.5
Total	3.0	5.4

Population Density Less Than 600 People/Mile^2

	Low	High
Residential	2.0	3.0
Commercial	0	0.4
Industrial	0	0.4
Total	2.0	3.8

*Note-Low and High value columns are developed from different surveys and are not additive. Low values assume that municipalities collect primarily residential wastes only.

TABLE 1-8

PER CAPITA GENERATION RATES FOR MUNICIPALITIES MUNICIPAL WASTES

Municipality	Municipal Waste Generation (Lb./Capita/Day)	Expected Range (Lb./Capita/Day)	Deviation From End of Expected Range
Boonton Town	9.64	3.2 – 7.7	Higher by 25%
Boonton Twp.	3.78	2.0 – 3.8	As Expected
Butler Boro	3.61	3.0 – 5.4	As Expected
Chatham Boro	1.65	3.2 – 7.7	Lower by 48%
Chatham Twp.	1.63	3.0 – 5.4	Lower by 46%
Chester Boro	5.73	3.0 – 5.4	Lower by 6%
Chester Twp.	2.26	2.0 – 3.8	As Expected
Denville Twp.	6.34	3.0 – 5.4	Higher by 17%
Dover Town	3.19	3.2 – 7.7	As Expected
E. Hanover Twp.	9.32	3.0 – 5.4	Higher by 73%
Florham Park Boro	3.79	3.0 – 5.4	As Expected
Hanover Twp.	8.09	3.0 – 5.4	Higher by 50%
Harding Twp.	3.93	2.0 – 3.8	Higher by 3%
Jefferson Twp.	3.88	2.0 – 3.8	Higher by 2%
Kinnelon Boro	1.95	2.0 – 3.8	Lower by 3%
Lincoln Park Boro	2.96	3.0 – 5.4	Lower by 1%
Madison Boro	3.76	3.2 – 7.7	As Expected
Mendham Boro	2.17	3.0 – 5.4	Lower by 28%
Mendham Twp.	3.75	2.0 – 3.8	As Expected
Mine Hill Twp.	3.31	3.0 – 5.4	As Expected
Montville Twp.	5.80	3.0 – 5.4	As Expected
Morris Twp.	3.29	3.0 – 5.4	As Expected
Morris Plains Boro	9.97	3.2 – 7.7	Higher by 29%
Morristown	5.25	3.2 – 7.7	As Expected
Mountain Lakes Boro	4.00	3.2 – 7.7	As Expected
Mt. Arlington Boro	3.12	3.0 – 5.4	As Expected
Mt. Olive Twp.	2.36	2.0 – 3.8	As Expected
Netcong Boro	3.71	3.2 – 7.7	As Expected
Parsippany-Troy Hills Twp.	3.45	3.2 – 7.7	As Expected
Passaic Twp.	5.94	2.0 – 3.8	Higher by 56%
Pequannock Twp.	4.36	3.2 – 7.7	As Expected

TABLE 1-8 (cont.)

PER CAPITA GENERATION RATES FOR MUNICIPALITIES MUNICIPAL WASTES

Municipality	Municipal Waste Generation (Lb./Capita/Day)	Expected Range (Lb./Capita/Day)	Deviation From End of Expected Range
Randolph Twp.	2.97	3.0 – 5.4	Lower by 1%
Riverdale Boro	3.64	3.0 – 5.4	As Expected
Rockaway Boro	6.99	3.2 – 7.7	As Expected
Rockaway Twp.	1.53	2.0 – 3.8	Lower by 24%
Roxbury Twp.	5.05	3.0 – 5.4	As Expected
Victory Gardens Boro	2.42	3.2 – 7.7	Lower by 24%
Washington Twp.	2.08	2.0 – 3.8	As Expected
Wharton Boro	3.37	3.2 – 7.7	As Expected
Morris County	4.27	3.8 – 5.0	As Expected

TABLE 1-9

COMMERCIAL EMPLOYMENT AND ITS RELATION TO GENERATION RATE

Municipality	Employees Per Resident	Total Generation lb./cap./day	Industrial[1] Waste lb./cap./day	Municipal[2] Waste lb./cap./day
Boonton Town	.36	10.01	.32	9.64
Boonton Twp.	.67	6.72	2.9	3.78
Butler Boro	.26	3.6		
Chatham Boro	.25	1.68		
Chatham Twp.	.09	1.63		
Chester Boro	.61	6.22	.23	5.73
Chester Twp.	.17	2.60		
Denville Twp.	.24	7.38		
Dover Town	.49	4.60	.86	3.19
East Hanover Twp.	.82	12.35	3.00	9.32
Florham Park Boro	.85	4.7	.26	3.79
Hanover Twp.	.89	11.83	3.5	8.09
Harding Twp.	.1	4.15		
Jefferson Twp.	.05	3.87		
Kinnelon Boro	.08	1.94		
Lincoln Park Boro	.2	2.95		
Madison Boro	.25	3.83		
Mendham Boro	.13	2.52		
Mendham Twp.	.05	4.09		
Mine Hill Twp.	.02	3.31		
Montville Twp.	.24	7.57		
Morris Twp.	.31	4.68		
Morris Plains Boro	1.15	13.8	3.27	9.94
Morristown Town	1.05	7.49	.65	5.25
Mountain Lakes Boro	.14	4.19		
Mount Arlington Boro	.04	3.19		
Mount Olive Twp.	.08	2.86		
Netcong Boro	.35	4.31	.59	3.70
Parsippany-Troy Hills Twp.	.24	4.22		
Passaic Twp.	.17	5.95		
Pequannock Twp.	.21	4.34		
Randolph Twp.	.14	3.38		
Riverdale Boro	.7	3.84		
Rockaway Boro	.35	7.01		6.97

[1] SWA Type "27" Waste

[2] SWA Type "10" Waste

TABLE 1-9 (cont'd)

COMMERCIAL EMPLOYMENT AND ITS RELATION TO GENERATION RATE

Municipality	Employees Per Resident	Total Generation lb./cap./day	Type 27 Industrial Waste lb./cap./day	Type 10 Municipal Waste lb./cap./day
Rockaway Twp.	.15	2.46		
Roxbury Twp.	.21	5.49		
Victory Gardens Boro	3.1	2.40		2.40
Washington Twp.	.06	2.17		
Wharton Boro	.4	5.78	2.39	3.36
Various				
Total	.39 lb/cap/day	5.39	.740 lb/cap/day	4.23

The overall county generation rate of 4.23 lb./capita/day for municipal waste falls within the expected range of 3.80 lb./capita/day to 5.0 lb./capita/day obtained from national surveys.

b. Industrial, Commercial and Other Solid Wastes. Industrial commercial and other solid wastes include all those solid wastes not categorized as municipal wastes. For purposes of this study this category also includes liquid wastes other than septic wastes and sewage sludges. The solid wastes that are considered here include bulky wastes, dry hazardous wastes, dry non-hazardous chemical wastes, vegetative wastes, and non-chemical industrial waste. Liquid wastes include waste oil and sludges, bulk liquids and semi-liquids, liquid hazardous wastes and liquid chemical wastes. The Solid Waste Administration definitions of these wastes are included in Appendix 1.

Presented previously in Table 1-9 was information on commercial employment and its relation to the municipal waste generation rate. Also shown in the table are the industrial and total waste generation rates. Again, close correlation was found between high employment per resident, high industrial waste generation and high total waste generation.

Total 1979 generation of the above mentioned solid waste is listed in Table 1-10 along with per capita generation rates. An estimated total of 85,335 tons will be generated in Morris County in 1979. A breakdown of waste production by municipality is shown in Table 1-11.

Table 1-12 shows liquid waste generation for 1977 attributed to industry and commerce. Only those municipalities which were reported as origins of liquid waste are shown in the table. Morris County generated 4,237,972 gallons of liquid waste in 1977 as reported by the collector/haulers.

c. Solid Waste Generation Summary. The total amount of solid waste generated in Morris County is the sum total of municipal, commercial and industrial wastes. Table 1-13 lists 1979 total waste generation by municipalities. A per capita generation rate of 5.40 lb./cap./day is obtained for a county average as shown in Table 1-9 (presented previously).

In Figure 1-1 an indication of the county-wide distribution of waste generation is shown. As can be seen, much of the waste generated originates in the east-central region of the county. This would be expected due to the concentration of industry and high population density in the area.

d. Composition of Wastes. The composition of the solid waste stream can be stated in terms of each category's percentage contribution to the total solid waste flow. The overall composition of Morris County's wastes is approximately 79% municipal, 6% bulky, 1% vegetative, 14% industrial. Several of these categories may in turn be further subdivided as to their composition. This information is useful in determining the components of each category available for recycling or processing.

TABLE 1-10

1979 INDUSTRIAL AND COMMERCIAL WASTE GENERATION RATES

Waste Type	Tons/Year	Generation Rate (Lb./Capita/Day)
13	26,329	0.350
17	170	0.002
18	184	0.002
23	2,752	0.037
27	55,900	0.742
Total	85,335	1.133

13 — Bulky Waste

17 — Dry Hazardous Waste *

18 — Dry Non-Hazardous Chemical Waste *

23 — Vegetative Waste

27 — Non-Chemical Industrial Waste

*State planning responsibility, not in County Plan.

TABLE 1-11

INDUSTRIAL AND COMMERCIAL WASTE BY MUNICIPALITY (TONS)

Municipality	13	17	18	23	27	Total
Boonton Town	139	–	–	–	510	649
Boonton Twp.	–	–	–	18	1,772	1,790
Butler Boro	3	–	–	–	–	3
Chatham Boro	59	–	–	–	–	59
Chatham Twp.	5	–	–	–	–	5
Chester Boro	79	–	–	–	66	145
Chester Twp.	321	–	–	–	–	321
Denville Twp.	–	–	–	92	2,785	2,877
Dover Town	1,514	–	–	–	2,100	3,614
E. Hanover Twp.	75	17	2	–	5,156	5,250
Florham Park Boro	402	–	–	559	394	1,355
Hanover Twp.	425	51	–	–	7,904	8,380
Harding Twp.	150	–	–	–	–	150
Jefferson Twp.	–	–	–	–	–	–
Kinnelon Boro	–	–	–	–	–	–
Lincoln Park Boro	–	–	–	–	–	–
Madison Boro	51	–	–	54	129	234
Mendham Boro	325	–	–	–	–	325
Mendham Twp.	310	–	–	–	–	310
Mine Hill Twp.	21	–	–	–	–	21
Montville Twp.	62	–	–	22	4,668	4,752
Morris Twp.	1,528	–	–	–	3,765	5,293
Morris Plains Boro	570	66	6	–	3,317	3,959
Morristown	2,960	2	28	1,684	1,914	6,588
Mountain Lakes Boro	21	–	–	149	–	170
Mt. Arlington Boro	–	–	–	54	–	54
Mt. Olive Twp.	1,653	–	–	9	–	1,662
Netcong Boro	–	–	–	9	353	362
Parsippany-Troy Twp.	–	–	–	22	7,572	7,594
Passaic Twp.	–	34	–	–	–	34
Pequannock Twp.	–	–	–	–	–	–

TABLE 1-11 (cont.)

INDUSTRIAL AND COMMERCIAL WASTE BY MUNICIPALITY (TONS)

Municipality	13	17	18	23	27	Total
Randolph Twp.	6	–	59	–	1,301	1,366
Riverdale Boro	–	–	89	8	5	102
Rockaway Boro	53	–	–	–	–	53
Rockaway Twp.	949	–	–	–	2,507	3,456
Roxbury Twp.	26	–	–	54	1,551	1,631
Victory Gardens Boro	–	–	–	–	–	–
Washington Twp.	173	–	–	–	20	193
Wharton Boro	36	–	–	–	2,377	2,413
Various	14,413	–	–	18	5,734	20,165
Total	26,329	170	184	2,752	55,900	85,335

TABLE 1-12

1977 LIQUID WASTE GENERATION BY MUNICIPALITY IN GALLONS/YEAR

Municipality	70	72	76	77	Total
Denville Twp.	–	–	–	10,000	10,000
Dover Town	–	–	–	172,900	172,900
East Hanover Twp.	–	–	240	–	240
Florham Park Boro	–	–	–	605	605
Hanover Twp.	–	1,424,100	1,783	164,865	1,590,748
Morris Plains Boro	–	–	580	73,630	74,210
Morristown	–	–	8,445	275	8,720
Netcong Boro	–	–	–	7,050	7,050
Parsippany-Troy Hills Twp.	–	–	–	898,000	898,000
Randolph Twp.	–	–	13,274	19,000	32,274
Rockaway Twp.	–	–	–	713,985	713,985
Victory Gardens Boro	–	–	–	50,000	50,000
Various	75,000	580,000	2,750	21,490	679,240
Total	75,000	2,004,100	27,072	2,131,800	4,237,972

70 – Waste Oil and Sludges
72 – Bulk Liquid and Semi-liquids
76 – Liquid Hazardous Waste *
77 – Liquid Chemical Waste *

*State planning responsibility, not in County Plan.

TABLE 1-13

1979 SOLID WASTE GENERATION BY WASTE TYPE (TONS)

Municipality	Municipality Collected 10	All Other 10	13	17	18	23	27	Total
Boonton Town	3,510	12,014	139	—	—	—	510	16,173
Boonton Township	—	2,286	—	—	—	18	1,772	4,076
Butler Boro	4,836	—	3	—	—	—	—	4,839
Chatham Boro	—	2,697	59	—	—	—	—	2,756
Chatham Township	—	2,710	5	—	—	—	—	2,715
Chester Boro	—	1,611	79	—	—	—	66	1,756
Chester Township	—	2,060	321	—	—	—	—	2,381
Denville Township	—	17,059	—	—	—	92	2,785	19,936
Dover Town	6,719	1,359	1,514	—	—	—	2,100	11,692
E. Hanover Township	—	15,961	75	17	2	—	5,156	21,211
Florham Park Boro	3,588	2,042	402	—	—	559	394	6,985
Hanover Township	6,094	11,896	425	51	—	—	7,904	26,370
Harding Township	—	2,533	150	—	—	—	—	2,683
Jefferson Township	11,172	—	—	—	—	—	—	11,172
Kinnelon Boro	2,633	183	—	—	—	—	—	2,816
Lincoln Park Boro	3,949	758	—	—	—	—	—	4,707
Madison Boro	10,881	—	51	—	—	54	129	11,115
Mendham Boro	—	2,016	325	—	—	—	—	2,341
Mendham Township	—	3,345	310	—	—	—	—	3,655
Mine Hill Township	2,194	—	21	—	—	—	—	2,215
Montville Township	—	15,335	62	—	—	22	4,668	20,087
Morris Twp.	9,828	2,536	1,528	—	—	—	3,765	17,657
Morris Plains Boro	3,990	6,075	570	66	6	—	3,317	14,024
Morristown	5,281	10,032	2,960	2	28	1,684	1,914	21,901

TABLE 1-13 (cont.)

1979 SOLID WASTE GENERATION BY WASTE TYPE (TONS)

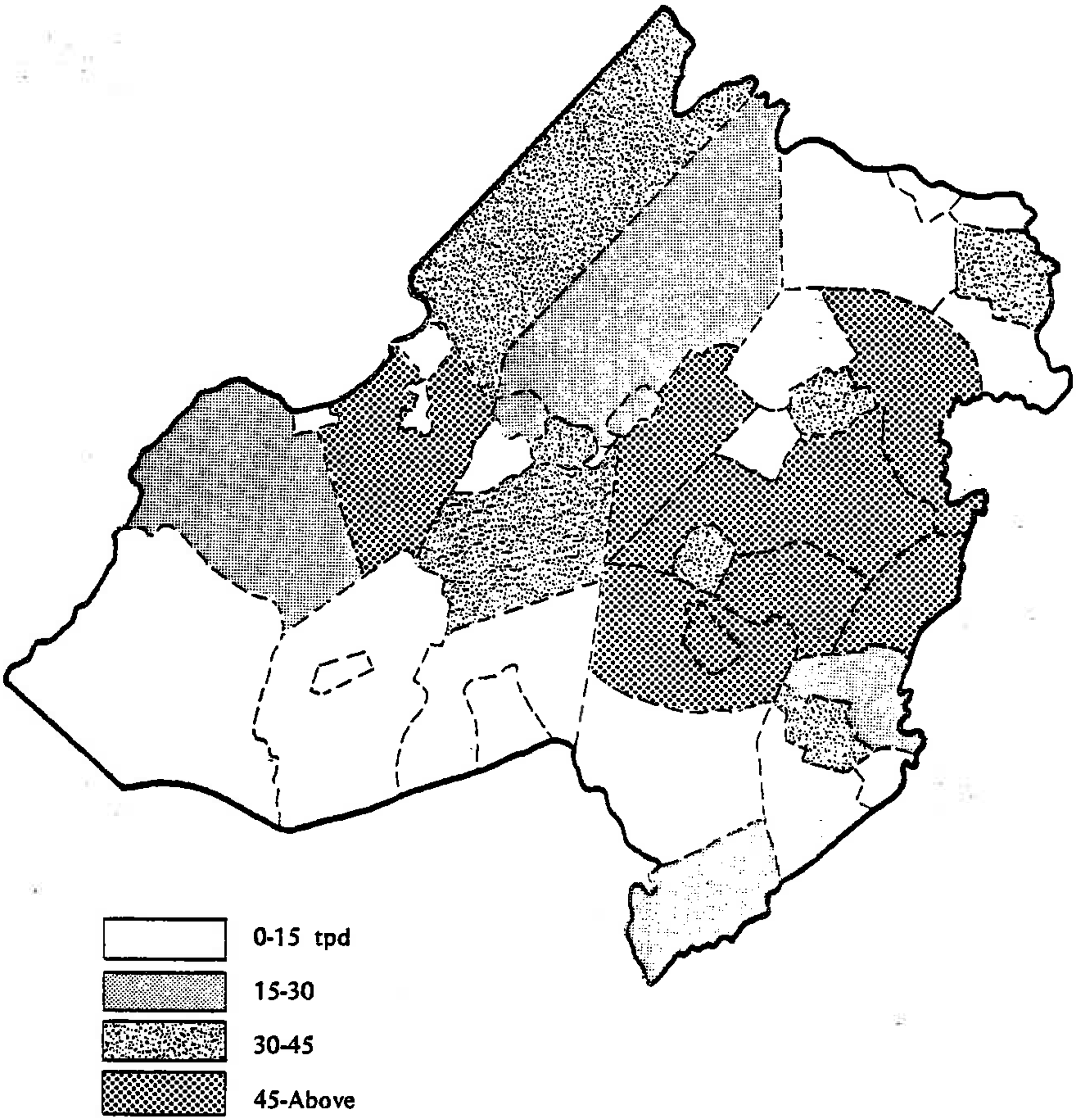
Municipality	Municipality Collected 10	All Other 10	13	17	18	23	27	Total
Mountain Lakes Boro	—	3,326	21	—	—	149	—	3,496
Mt. Arlington Boro	2,184	—	—	—	—	54	—	2,238
Mt. Olive Twp.	5,733	1,976	1,653	—	—	9	—	9,371
Netcong Boro	2,194	—	—	—	—	9	353	2,556
Parsippany-Troy Hills Twp.	17,550	15,539	—	—	—	22	7,572	40,683
Passaic Twp.	3,510	4,723	—	34	—	—	—	8,267
Pequannock Twp.	—	11,224	—	—	—	—	—	11,224
Randolph Twp.	6,143	3,902	6	—	59	—	1,301	11,411
Riverdale Boro	1,755	—	—	—	89	8	5	1,857
Rockaway Boro	7,923	925	53	—	—	—	—	8,901
Rockaway Twp.	—	5,661	949	—	—	—	2,507	9,117
Roxbury Twp.	13,000	4,682	26	—	—	54	1,551	19,313
Victory Gardens Boro	439	92	—	—	—	—	—	531
Washington Twp.	—	3,924	173	—	—	—	20	4,117
Wharton Boro	2,730	606	36	—	—	—	2,377	5,749
Various	—	12,763	14,413	—	—	18	5,734	32,928
Total	137,836	183,851	26,329	170	184	2,752	55,900	407,022
Total Type 10	321,687							

10 — Municipal Waste
13 — Bulky Waste
17 — Dry Hazardous Waste
18 — Dry Non–Hazardous Chemical Waste
23 — Vegetative Waste
27 — Non-Chemical Industrial Waste

FIGURE 1-1

TOTAL SOLID WASTE GENERATION

(1979)



tpd: tons/day

The composition of the various waste classes from previous studies in other areas are shown in Tables 1-14, 1-15, and 1-16. Composition of municipal waste was presented previously in Table 1-2.

It should be noted that the actual composition of the industrial waste stream may vary from that shown in the table, since the composition of the industrial waste stream in the County is highly dependent on the industries involved. However, the composition of municipal, bulky, and commercial wastes would not be expected to vary substantially from the compositions indicated in the tables. The only true method of defining waste stream composition in Morris County would be to undertake actual waste composition testing.

2. Future Waste Projections. To plan for an effective solid waste management system for Morris County, it is necessary to make projections as to the types and amounts of wastes that can be expected in the future. In this section, projections for future years will be presented.

a. Municipal Wastes. Municipal waste quantities rely to a great extent on the population of a given municipal area. In the past it was assumed that the per capita generation rate for municipal wastes increased by 2-4% annually. At present, the EPA is no longer predicting annual increases and does not have a set policy on predicting generation rates. A review of past and present data as well as future employment and population projections for Morris County generally indicate relatively small increases in population and employment levels. Due to these factors, no substantial increases in the municipal per capita generation rate are expected. Future increases in the total municipal solid waste stream are, however, expected to result from population increases.

Projections of future municipal waste production for the purpose of this study were based on the average per capita generation rates for 1979 and population projections from the Morris County Planning Board.

Projected municipal waste generation for 1980, 1985 and 1990 is shown in Table 1-17. All thirty-nine municipalities are shown to have increasing populations and waste quantities from 1980 through 1990. Using 1979 as the base year, a 15% overall increase is expected in municipal waste generation by the end of the ten year planning period (1990). Figure 1-2 depicts the solid waste generation by municipality projected for 1990.

b. Industrial, Commercial and Other Solid Wastes. Industrial and commercial waste projections to the year 1990 have been estimated based on future employment projections for Morris County. (Employment Projections from — Greenburg, Michael, New Jersey Towards the Year 2000). Table 1-18 lists these estimates in five year intervals. Projected increases in the following waste categories; non-chemical industrial waste, dry non-hazardous chemical waste and dry hazardous waste, are a reflection of the forecasted increase in employment in the manufacturing industry. Similarly, the projected decline in employment in the agriculture, forestry, and food processing industries will result in a reduction in vegetative waste towards the

TABLE 1-14

TYPICAL COMPOSITION OF BULKY WASTE

Component	Percent
Trees, Stumps, Brush	3
Furniture, Fixtures, Appliances	41
Lumber, Remodeling Waste (burnable)	6
Cardboard and Paper	1
Rubbish (burnable)	16
Nonburnables	33

Source: Wilson, 1977.

TABLE 1-15

TYPICAL COMPOSITION OF COMMERCIAL SOLID WASTES

Component	PERCENTAGE	
	I	II
Metal	10.6	6
Paper	60.4	57
Plastics	9.4	1
Textiles	–	1
Wood	–	2
Food Waste	7.1	24
Yard Waste	–	0
Glass	11.3	6
Miscellaneous	1.2	3

Source: Wilson, 1977

TABLE 1-16

TYPICAL COMPOSITION OF INDUSTRIAL WASTE

Component	Percentage
Paper	45.8
Wood	7.1
Plastic	15.1
Glass	2.7
Metals	3.6
Stone, Sand	5.5
Organic Chemicals	2.8
Textiles, Rags	3.2
Ceramics	0.5
Inorganic Chemicals	0.4
Petrochemical	1.8
Mixed Commercial	3.3
Food	5.7
Miscellaneous	4.2

Source: Wilson, 1977

TABLE 1-17

MORRIS COUNTY — MUNICIPAL WASTE PROJECTIONS

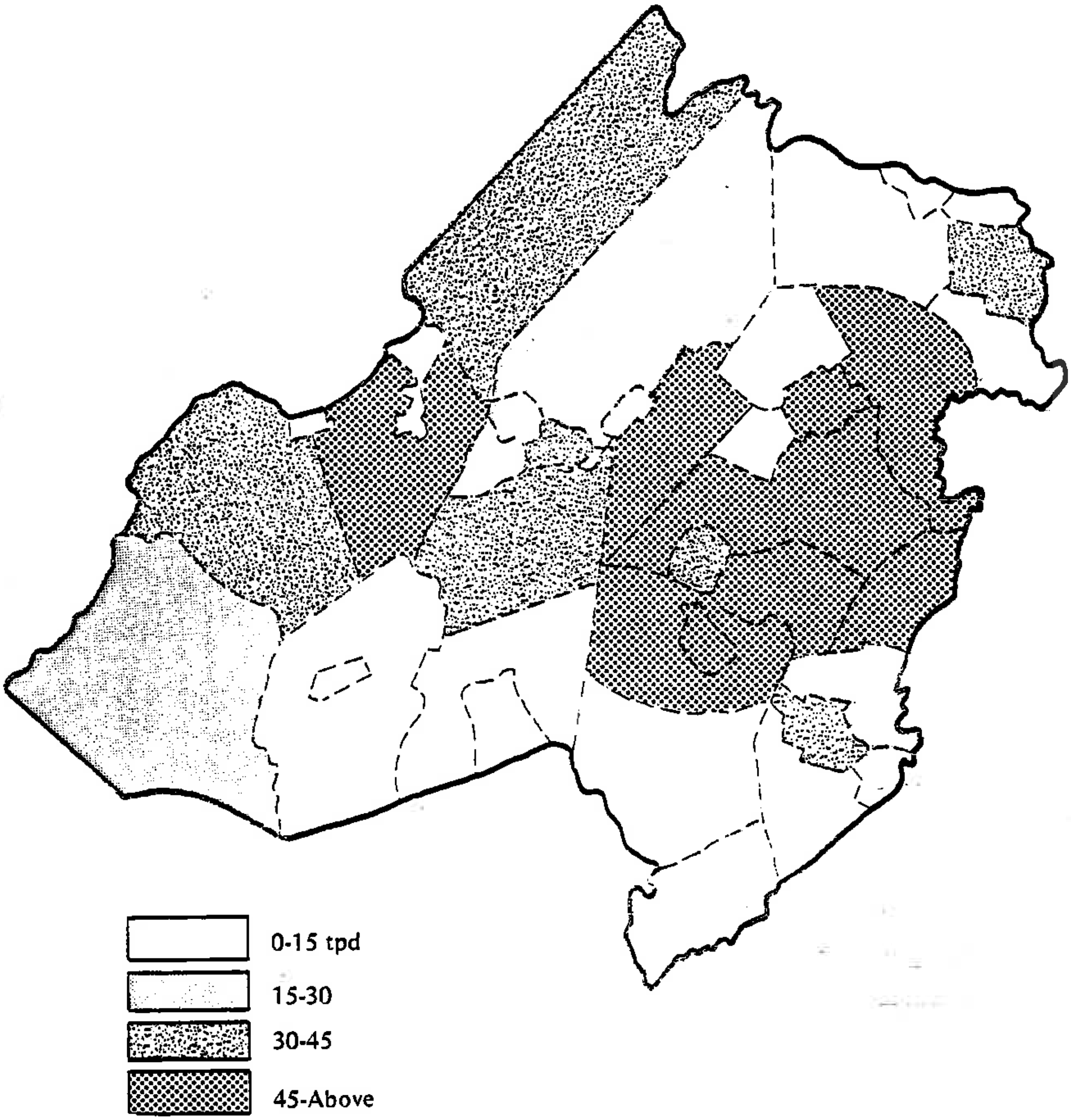
Municipality	Lb./Capita/Day	Projections (Tons/Year) 1980	1985	1990
Boonton Town	9.64	15,454	15,770	16,086
Boonton Twp.	3.78	2,312	2,482	2,656
Butler Boro	3.61	4,852	5,131	5,410
Chatham Boro	1.65	2,678	2,708	2,738
Chatham Twp.	1.63	2,734	2,981	3,228
Chester Boro	5.73	1,643	1,825	2,007
Chester Twp.	2.26	2,089	2,301	2,513
Denville Twp.	6.34	17,155	18,199	19,243
Dover Town	3.19	8,014	8,058	8,102
E. Hanover Twp.	9.32	16,348	18,256	20,164
Florham Park Boro	3.79	5,644	5,854	6,064
Hanover Twp.	8.09	18,174	19,831	21,488
Harding Twp.	3.93	2,557	2,754	2,951
Jefferson Twp.	3.88	11,245	12,210	13,175
Kinnelon Boro	1.94	2,827	2,979	3,131
Lincoln Park Boro	1.94	4,688	4,785	4,882
Madison Boro	3.75	10,826	10,980	11,134
Mendham Boro	2.17	2,054	2,367	2,680
Mendham Twp.	3.74	3,426	3,928	4,430
Mine Hill Twp.	3.30	2,198	2,303	2,408
Montville Twp.	5.78	15,627	17,474	19,321
Morris Twp.	3.28	12,431	13,205	13,979
Morris Plains Boro	9.94	10,047	10,419	10,791
Morristown	5.24	15,159	15,167	15,187
Mountain Lakes Boro	4.00	3,316	3,367	3,418
Mt. Arlington Boro	3.11	2,207	2,360	2,513
Mt. Olive Twp.	2.35	8,012	9,782	11,552
Netcong Boro	3.70	2,208	2,411	2,614
Parsippany—Troy Hills Twp.	3.44	33,061	34,436	35,811

TABLE 1-17

MORRIS COUNTY – MUNICIPAL WASTE PROJECTIONS (cont.)

Municipality	Lb./Capita/Day	Projections (Tons/Year) 1980	1985	1990
Passaic Twp.	5.92	8,315	8,753	9,191
Pequannock Twp.	4.34	11,212	11,533	11,854
Randolph Twp.	2.97	10,285	11,951	13,617
Riverdale Boro	3.63	1,749	1,792	1,835
Rockaway Boro	6.97	8,918	9,599	10,280
Rockaway Twp.	1.53	5,700	6,073	6,446
Roxbury Twp.	5.03	18,014	20,150	22,286
Victory Gardens Boro	2.40	535	590	645
Washington Twp.	2.07	4,121	4,900	5,679
Wharton Boro	3.36	3,341	3,457	3,573
Various	–	12,864	13,818	14,772
Morris County	4.23	324,040	346,947	369,854
% Increase Over Base Year 1979		0.73	7.85	14.97

FIGURE 1-2
TOTAL SOLID WASTE GENERATION
(1990)



tpd: tons/dav

TABLE 1-18

INDUSTRIAL AND COMMERCIAL WASTE PROJECTIONS

Waste Type	Projections (Tons/Year) 1979	1980	1985	1990
13	26,329	26,537	28,504	30,471
17	170	175	186	194
18	184	190	202	211
23	2,752	2,613	2,090	1,916
27	55,900	57,598	61,236	63,904
TOTAL	85,335	87,113	92,218	96,696

13 — Bulky Waste

17 — Dry Hazardous Waste *

18 — Dry Non-Hazardous Chemical Waste *

23 — Vegetative Waste

27 — Non-Chemical Industrial Waste

*State planning responsibility, not in County Plan.

year 1990. Bulky waste is generated in the individual household ("white goods", etc.) as well as industry. Increases in population have therefore been taken into consideration for projections of this waste type. Table 1-18 shows a gradual increase in bulky waste generation.

Projected generation of waste oils, bulk liquids and semi-liquids, liquid hazardous wastes and liquid chemical wastes are based on employment trends in the manufacturing industries. These projections are shown in Table 1-19. As is the case for commercial and industrial wastes, an increase in quantities generated is projected.

Total solid waste generation predictions are shown in Table 1-20. These figures include municipal wastes, and commercial and industrial wastes. An increase of 14.6% between 1979 and 1990 is expected for total solid waste production.

c. Waste Projection Summary. The prediction of solid and liquid waste quantities is dependent upon the accuracy and completeness of the population and economic projections they are based on. There are many economic and social factors which play a role in these predictions, along with many intangibles.

The state law governing the "326" plans calls for an updating process every two years. At each two year review the most current population and economic indicators should be studied. Solid waste projections should then be adjusted accordingly.

C. EXISTING COLLECTION, TRANSPORT AND DISPOSAL PRACTICES

1. Municipal Wastes.

a. Collection. As stated in Section B, three types of municipal waste collection exist in Morris County. Collection is accomplished by either municipal forces (municipal collection), collector/haulers under contract to a municipality (contract collection), or collector/haulers under contract to individual household (private collection or scavenger service).

Seventeen of the thirty-nine municipalities in Morris County presently have contracts with individual collector/haulers to collect and dispose of their municipal wastes. These contracts have durations usually ranging from one to five years and are very specific as to types of wastes accepted and the frequency of service. Collection and disposal costs are combined for a yearly cost to the municipality. Table 1-21 shows those municipalities that utilize contract collection and the annual contract cost. Costs as shown are approximate annual contract amounts, even though actual payments and payment frequencies vary.

Municipal collection is practiced in seven Morris County localities. Collection is accomplished by municipal employees operating municipally owned equipment. Determination of the true cost of municipal collection is often difficult because the municipality's costs for solid waste services are included in a number of different line items within the municipal budget.

TABLE 1-19
LIQUID WASTE PROJECTION*
IN GALLONS/YEAR

		Projections		
1977	1979	1980	1985	1990
2,131,800	2,259,218	2,327,828	2,474,849	2,582,664

* Includes waste oils, bulk liquids and semi-liquids, liquid hazardous wastes and liquid chemical wastes.

TABLE 1-20

TOTAL SOLID WASTE PROJECTIONS FOR MORRIS COUNTY IN TONS/YEAR

	1979	1980	1985	1990
Municipal	321,687	324,040	346,947	369,854
Industrial, Commercial & Other Solid Wastes	85,335	87,113	92,218	96,696
TOTAL	407,022	411,153	439,165	466,550
Projected Per Capita Generation Rates	5.39	5.40	5.37	5.34
		lb/cap/day		

TABLE 1-21

MUNICIPAL COLLECTION AND DISPOSAL CONTRACTS

Municipality	Annual Cost
Boonton Town	$ 88,134
Butler Boro	48,535
Dover Town	31,376
Florham Park Boro	35,000
Jefferson Twp.	161,667
Kinnelon Boro	140,622
Lincoln Park Boro	166,800
Madison Boro	344,000
Mine Hill Twp.	35,500
Morris Plains Boro	62,409
Netcong Boro	69,176
Parsippany-Troy Hills Twp.	659,800
Passaic Twp.	89,183
Randolph	103,000
Riverdale	23,850
Rockaway Boro	32,350
Victory Gardens	25,200

Municipal waste collection practices for the municipalities served by municipal collection or municipal contract collection are shown in Table 1-22. In all instances wastes are collected after being placed in appropriate containers at curbside. Municipal wastes are generally picked up twice weekly by compactor trucks ranging in size from 20 to 31 cubic yards in capacity. In most instances, 25 C.Y. trucks are used with a 2-3 man crew.

Special collections for leaves, bulky household wastes and tree parts vary in frequency. Several towns will collect any article placed at the curb while others will only pick up large items, leaves, etc. after an appointment is made. A summary of leaf collection and disposal practices by municipality is shown in Table 1-23. As indicated in the table, many of the municipalities perceive seasonal leaf generation as a problem. Many of these towns find themselves making increased expenditures every year for leaf collection and disposal. In some cases, local composting areas fill up with unclaimed, composted leaves. Where leaves are picked up as part of household collection services, leaf collection is not generally perceived as a problem. One aspect of separate leaf collection that may contribute to the problem is that when separate collection is provided, individual householders may dispose of more leaves, rather than use the leaves as mulch, allow them to decompose in an uninhabited area or compost them on their own. All this suggests that leaf composting facilities should be kept as small as possible, and every effort should be made to publicize that composted leaves are available for use as mulch, and the leaves should not be inventoried on a large scale basis at composting sites. Wherever possible, leaves should be utilized by individual homeowners.

Fifteen Morris County municipalities utilize scavenger service for municipal waste. Because contracts are on a individual household basis, pick up frequencies and locations vary within any given municipality.

From an efficiency standpoint, municipal contract collection generally is superior to municipal collection while the efficiency of scavenger service can vary greatly depending on a number of conditions.

The single most important factor in waste collection efficiency is the payload density achieved by compactor type collection vehicles. Payload density (measured in Lb./C.Y.) increases as a greater amount of waste is compacted into a vehicle. High payload density will reduce the number of truckloads needed for collection in a given municipality, thereby reducing collection cost.

Among the factors influencing payload density is truck size and age. Various truck weighing surveys have shown that larger volume trucks tend to achieve a higher density. The same is true of newer vehicles. On the average, municipalities who collect their own waste use the smaller 20 C.Y. compactor truck while municipal contract collector/haulers utilize the larger 25 C.Y. and 31 C.Y. vehicles. Also, municipal contract collectors tend to replace their vehicles more often then municipal collection forces.

Landfill tipping fees based on cubic yards encourage a collector/hauler, either municipal or private, to achieve the highest payload density possible in order to eliminate

TABLE 1-22

MUNICIPAL COLLECTION PRACTICES

Municipality	Point Of Pick-Up	Frequency of Collection	Size of Trucks
Boonton Town	Curbside	2/week	25
Butler Boro	Curbside	2/week	31
Dover Town	Curbside	2/week	25
Florham Park Boro	Curbside	2/week	20
Hanover Twp.	Curbside	2/week	25
Jefferson Twp.	Curbside	2/week	25
Kinnelon Boro	Curbside	2/week	25
Lincoln Park Boro	Curbside	2/week	25
Madison Boro	Backyard	2/week	31
Mine Hill Twp.	Curbside	1/week (Res.) 2/week (Com.)	25
Morris Plains Boro	Curbside	2/week	25
Morristown	Curbside	2/week	25
Morris Twp.	Curbside	2/week	20
Mt. Arlington Boro	Curbside	2/week	20
Mt. Olive Twp.	Curbside	2/week	20
Netcong Boro	Curbside	2/week	25
Parsippany-Troy Hills Twp.	Curbside	2/week	25
Passaic Twp.	Curbside	2/week	25
Randolph Twp.	Curbside	2/week	25
Riverdale Twp.	Curbside	2/week	25
Rockaway Boro	Curbside	1/week 2/week (Jun.-Oct.)	25
Roxbury Boro	Curbside	2/week	25
Victory Gradens Boro	Curbside	2/week	25
Wharton Boro	Curbside	2/week	20

TABLE 1-23
LEAF COLLECTION AND DISPOSAL

	Service Provision	Collection Period	Disposal	Quantity	Annual Cost	Are Leaf Collections Perceived as a Problem?
Boonton	M	2	L			Yes
Boonton Twp.	I	—	—	—	—	—
Butler	MC	3	L	—	—	—
Chatham						
Chatham Twp.	I	—	C	—	—	—
Chester	MC	2	L	—	1,800.00	Yes
Chester Twp.	I					Yes
Denville	M	3	L	15,000 bags	24,400.00	Yes
Dover	M	3	C	100 yd.[3]	30,000.00	Yes
East Hanover						
Florham Park	M	12	C		17,000.00	Yes
Hanover	M	3	C	7,752 yd.[3]		No
Harding						
Jefferson	MC & I	12 MC	L	—	—	—
Kinnelon	I	—	C	—	—	No
Lincoln Park	MC	2	L	—	—	No
Madison						
Mendham	MC	1	L	—	9,930.00	No
Mendham Twp.	I	—	—	—	—	Yes
Mine Hill	MC	12	L	—	—	Yes
Montville	I & MC	12	L	—	—	Yes
Morris Plains						
Morristown	M	3	C	4,560 yd.[3]	21,200.00	—
Morris Twp.	M	3	L	100,000 yd.[3]	73,100.00	Yes
Mountain Lakes	M	2	L&C	865 yd.[3]	5,293.75	Yes
Mt. Arlington	M	4	L	100 yd.[3]	—	No

TABLE 1-23
LEAF COLLECTION AND DISPOSAL (Cont.)

	Service Provision	Collection Period	Disposal	Quantity	Annual Cost	Are Leaf Collections Perceived as a Problem?
Mt. Olive	M	12	L	–	–	–
Netcong						
Parsippany-Troy Hills						
Passaic	I	–	C	–	–	–
Pequannock	M	3	C&L	9,000-12,000 $yd.^3$	30,572.09	Yes
Randolph						
Riverdale	MC	2	L	75 $yd.^3$	2,000.00	–
Rockaway						
Rockaway Twp.	MC	12	L	110 truck loads	–	Yes
Roxbury						
Victory Gardens	MC	2	L	–	–	Yes
Washington	I	–	–	–	–	–
Wharton	M	3	L	240 $yd.^3$	–	No

Service Provision:

MC - municipal contract
M - Municipality
PC - Private Contract
I - Individual Homeowner

Collection Period

Number of months per year

Disposal:

L - Landfill
C - Compost
I - Incineration

excessive disposal costs. This "encouragement" does not exist for municipalities who operate their own collection fleet and landfill. The cost of operating a municipal landfill is not paid for by tipping fees, but, by the municipal budget.

Many other variables can influence payload density, some of which are the type of waste collected and the attitude and supervision of the collection crew. Payload density influences the efficiency of scavenger service as well as municipal and municipal contract collection. However, other varibles will affect scavenger service efficiency, most notably the distance between stops along a given collection route. If the collection stops are an appreciable distance apart from each other, efficiency will decrease since more time will be required to collect a truckload of waste. Scavenger service collection will approach the efficiency of municipal contract collection as the distance between stops decreases.

An overall review of the cost of residential collection and disposal service in Morris County showed the following average cost per household for service, by collection type:

	Average Cost ($/Yr.)
Municipal Contract Collection	$ 35.90
Municipal Collection	$ 39.90
Scavenger (Private) Collection	$ 43.00

Wide variations between municipalities were found, as would be expected, since some localities are great distances from disposal facilities, while other localities are very close to disposal facilities. Scavenger, or private collection, is rate-regulated by the BPU, and great variances between individual collector's tariff schedules cause widely varying charges for service in different areas.

b. Transport of Municipal Waste. The transport of municipal wastes from the collection area to disposal site is undertaken by the same company or municipal department which collects the waste in each municipality. After completion of its collection route, a refuse vehicle will proceed to the disposal site. Table 1-24 lists the routes, and their approximate mileages, most frequently used in the transport of municipal waste from the Morris County municipalities that utilize municipal or municipal contract collection to the disposal site. Figure 1-3 shows the principal haul routes used for municipal waste transport.

Refuse transport costs ($/ton) were calculated for municipalities in Morris County using the following factors:

– Cost per Mile. Determination of the aggregate cost per mile traveled for the commonly used 25 cubic yard rear loading packer truck is depicted in Table 1-25 along with a summary of costs per mile for various sized refuse vehicles.

Table 1-24

Municipal Waste Transport Routes

Municipality	Disposal Area	Route	Approximate Round Trip Mileage
Boonton Town	N. Arlington, Bergen Co.	Rt. 287 South to Rt. 80 East to Rt. 280 East to to Rt. 17 North	54
	or		
	Mt. Olive, Morris Co.	Rt. 287 South to Rt. 80 West to Rt. 206 South	41
Butler Boro	Kearny, Hudson Co.	Rt. 23 South to Rt. 506 East to Rt. 7 South	44
Dover Town	Chester Township, Morris Co.	Rt. 513 South to Rt. 24 West to Parker Rd. South	23
Florham Park Boro	Mt. Olive, Morris Co.	Rt. 608 North to Rt. 632 North to Rt. 10 West to Rt. 287 North to Rt. 80 West to Rt. 206 South	52
Hanover Township	Mt. Olive, Morris Co.	Rt. 10 West to Rt. 46 West to Rt. 206 South	42
Jefferson Township	Mt. Olive, Morris Co.	Bershire Valley Rd. South to Rt. 15 South to Rt. 80 West to Rt. 206 South	38
		or	
		Howard Blvd. South to Rt. 616 South to Rt. 631 West to Rt. 206 South	22
Kinnelon Boro	Mt. Olive, Morris Co.	Miller Rd. South to Rt. 618 South to Rt. 603 West to Rt. 80 West to Rt. 206 South	46

Table 1-24 (Continued)

Municipal Waste Transport Routes

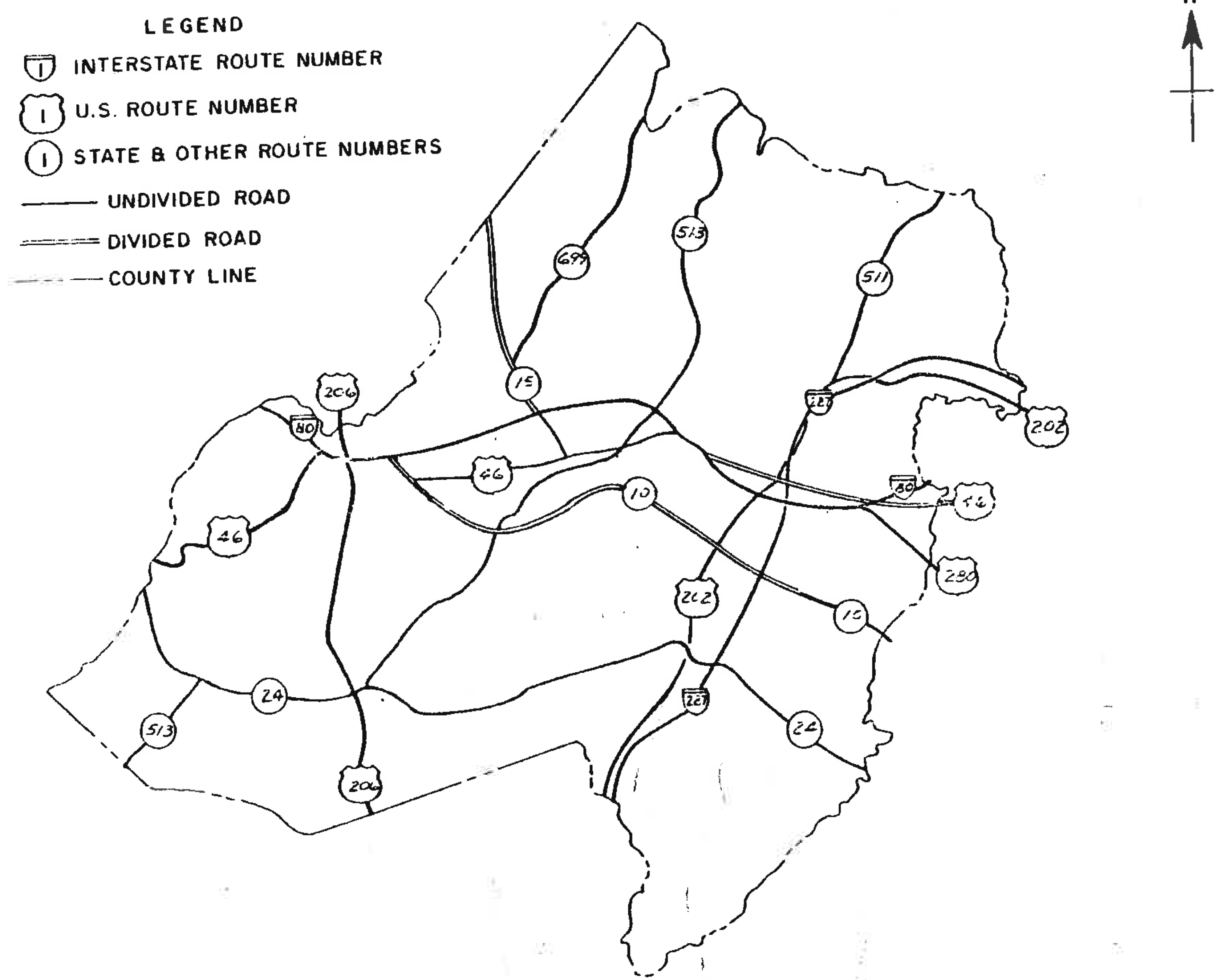
Municipality	Disposal Area	Route	Approximate Round Trip Mileage
Lincoln Park Boro	N. Arlington, Bergen Co.	Rt. 511 North to Rt. 23 South to Rt. 506 East to Rt. 17 North	50
Madison Boro	Kearny, Hudson Co.	Rt. 24 East to N.J. Turnpike North	48
	or Mt. Olive, Morris Co.	Rt. 24 West to Rt. 287 North to Rt. 80 West to Rt. 206 South	48
Mine Hill Township	Mt. Olive, Morris Co.	Rt. 46 West to Rt. 206 South	16
Morris Plains Boro	Chester Township, Morris Co.	Rt. 202 South to Rt. 24 West to Parker Rd. South	34
Morristown	Chester Township, Morris Co.	Rt. 24 West to Parker Rd. South	30
Morris Township	Mt. Olive, Morris Co.	Rt. 10 West to Rt. 613 West to Rt. 206 North	28
		or Rt. 287 North to Rt. 80 West to Rt. 206 South	40
Mt. Arlington Boro	Mt. Arlington, Morris Co.	—	—
Mt. Olive Township	Mt. Olive, Morris Co.	—	—
Netcong Boro	Mt. Olive, Morris Co.	Rt. 206 South	6
Parsippany—Troy Hills Twp.	Mt. Olive, Morris Co.	Rt. 80 West to Rt. 206 South	41
Passaic Township	Edison, Middlesex Co.	Mountain Ave. to Rt. 22 West to Rt. 529 South to Rt. 287 South	54

TABLE 1-24 (Continued)

Municipal Waste Transport Routes

Municipality	Disposal Area	Route	Approximate Round Trip Mileage
Riverdale Township	Lafayette, Sussex Co.	Rt. 23 North to Rt. 94 South	58
Rockaway Boro	Mt. Olive, Morris Co.	Rt. 666 North to Rt. 80 West to Rt. 206 South	24
Roxbury Township	Mt. Olive, Morris Co.	Moonie Rd. North to Mountain Rd. West	10
		or	
		Rt. 206 South	10
Victory Gardens Boro	Mt. Olive, Morris Co.	Rt. 665 North to Rt. 513 West to Rt. 643 North to West Clinton St. to Rt. 80 West to Rt. 206 South	24
Wharton Boro	Wharton, Morris Co.	—	—

FIGURE 1-3



LEGEND
INTERSTATE ROUTE NUMBER
U.S. ROUTE NUMBER
STATE & OTHER ROUTE NUMBERS
UNDIVIDED ROAD
DIVIDED ROAD
COUNTY LINE
N
206
80
15
699
513
511
287
202
46
10
80
46
280
202
15
24
287
513
24
206
46

TABLE 1-25

TRANSPORT COSTS PER MILE

Cost Component	Cost Factors (Per Mile)	Unit Cost	Cost per Mile ($)
Fuel Consumption	0.109	$ .70/Gal	$ .0763
Oil Consumption	0.001	5.33/Gal	.0053
Tire Wear	0.0004	175.00/Tire	.0700
Depreciation	0.0000016	45,000.00/Truck	.0720
Maintenance			
(Truck Value)	0.000018	45,000.00/Truck	.0810
(Mechanic Labor)	0.005	12.33/Hr.	.0617
Driver Time	0.04	12,50/Hr.	.500
		TOTAL	$ 0.8663

Summary

Truck Size	Cost/Mile ($)
20 C.Y.	0.8493
25 C.Y.	0.8663
31 C.Y.	0.9300
65 C.Y. (Transfer Trailer)	1.0510

– Number of Truck Trips to Disposal Site. The current number of truckloads required per week to collect a given municipality's waste. (This was obtained in a phone survey of municipal contract and municipal collectors in Morris County).

– Quantity of Municipal Waste. Tons per week transported to disposal site as calculated from the number of weekly truckloads.

– Round Trip Mileage. Estimated by distance from center of municipality to disposal area.

– Turnaround Time. Time spent at disposal site will result in an expense due to the driver's wages. Weekly turnaround time cost is a function of the number of trips and is independent of the round trip mileage.

These factors and the cost to transport one ton of municipal refuse are listed in Table 1-26. Waste transport costs were determined only for those municipalities where municipal contract or municipal collection exists. Transport costs for those municipalities where a disposal site is within the municipality's borders will prove to be negligible and were not calculated in Table 1-26.

The average cost per ton for the transport of waste from collection area to disposal site is $4.21/ton.

2. Industrial, Commercial and Other Solid Wastes. Collection of industrial and commercial waste is undertaken by private collector/haulers contracted by the individual industrial or commercial establishments. These refuse haulers generally use their own collection vehicles for transporting waste to the disposal site.

Bulky waste collection methods vary in Morris County. These methods include collection by municipal forces, private collectors under contract to individual concerns, and private individuals or companies such as construction contractors who haul their own bulky waste to a disposal site. In most municipalities, a combination of the above methods exist. Bulky waste is usually transported to a disposal site by the collection vehicle.

TABLE 1-26

MUNICIPAL WASTE TRANSPORT COSTS (1979)

Municipality	Mileage (Round Trip)	No. of Trips/Wk	Tons/Week	$/Mile	$/Subtotal	Turnaround Cost($)	Total Cost Per Week($)	$/Ton
Boonton Town	48	8	67.5	.8663	332.66	25.00	357.66	5.3[illegible]
Butler Boro	44	8	93	.9300	327.36	25.00	352.36	3.79
Dover Town	23	16	127	.8663	318.80	50.00	368.80	2.86
Florham Park Boro	52	12	69	.8493	529.96	37.50	567.46	8.22
Hanover Twp.	42	15	117	.8663	545.77	46.88	592.65	5.07
Jefferson Twp.	30	25	211	.8663	649.73	78.13	727.86	3.45
Kinnelon Boro	46	6	51	.8663	239.10	18.75	257.85	5.06
Lincoln Park Boro	50	9	76	.8663	389.84	28.13	417.97	5.50
Madison Boro	48	18	209	.9300	803.52	56.25	859.77	4.11
Mine Hill Boro	16	5	42	.8663	69.30	15.63	84.93	2.02
Morris Plains Boro	34	9	77	.8663	265.09	28.13	293.22	3.81
Morristown	30	13	102	.8663	337.86	40.63	378.49	3.71
Morris Twp.	34	36	189	.8493	1039.54	112.50	1152.04	6.10
Netcong Boro	6	5	42	.8663	25.99	15.63	41.62	0.99
Parsippany-Troy Hills Twp.	41	40	338	.8663	1420.73	125.00	1545.73	4.57
Passaic Twp.	54	8	68	.8663	374.24	25.00	399.24	5.87
Randolph Twp.	42	14	118	.8663	509.38	43.75	553.13	4.69
Riverdale Boro	58	4	34	.8663	200.98	12.50	213.48	6.28
Rockaway Boro	24	18	152	.8663	374.34	56.25	430.49	2.83
Roxbury Twp.	10	32	250	.8663	277.22	100.00	377.22	1.51
Victory Gardens Boro	24	1	9	.8663	20.79	3.13	23.92	2.66

County Average: 4.21/Ton

3. Disposal of Wastes. Morris County municipalities are dependent on landfills regulated by the New Jersey Bureau of Public Utilities (BPU) for a majority of their solid waste disposal. Landfills designated as BPU regulated, charge a set fee, or tipping fee, to persons utilizing their facilities. Under BPU regulations, no one can be refused use of the facility, regardless of the truck's origin as as long as the waste is of an approved classification. If a compactor truck from Peoria, Ill. would want to dispose of its load at a New Jersey BPU landfill it could not be turned away. Landfills not regulated by the BPU, usually small municipal disposal areas, must restrict use to wastes generated in a specific locale, or they, too would be subject to BPU regulation.

Solid wastes generated within Morris County are disposed of at locations within the county as well as several locations in other counties. Until 1978, three major solid waste disposal areas were operating in the county. These three BPU regulated landfills were the Morris County Landfill in Mt. Olive, Chester Hills in Chester Township and Fenimore's in Roxbury Township. In 1977, 80% of the total solid waste generated in the county was disposed of at these three sites. Of the remaining 20% of solid wastes generated, 2% were disposed in small municipal landfills located within Morris County. Table 1-27 lists wastes generated in Morris County and disposed of within the County.

The remaining 18% of solid waste generated within Morris County in 1977 was exported to surrounding counties for disposal. These amounts and locations are listed in Table 1-28. The majority of these wastes went to HMDC landfills and landfills in Sussex County. Figure 1-4 depicts this exportation graphically.

While wastes generated within the county were being exported for disposal in 1977, wastes generated in other counties were entering the three Morris County landfills mentioned earlier for disposal. (Table 1-29). A total of 97,141 tons were imported for disposal in 1977. This is shown graphically in Figure 1-5. These wastes accounted for 23% of the total waste disposed at the three major landfills in 1977.

Table 1-30 summarizes the net import-export situation as it appeared in 1977. It is interesting to note that a net gain of 22,000 tons of solid waste was incurred for the year indicating more waste was imported for disposal than was exported for disposal.

In early 1978, the Fenimore Landfill in Roxbury Township ceased accepting wastes from sources other than from their own collection vehicles. Consequently, the two remaining BPU landfills, Morris County Landfill and to a lesser extent Chester Hills, experienced marked increases in the amount of solid waste accepted for disposal.

Under orders from the SWA, the Fenimore landfill stopped all disposal of solid wastes in January 1979. Due to its proximity to the Fenimore site, the Combe (Mt. Olive) landfill experienced an increase in waste accepted for disposal. In September, 1978 both the Chester Hills landfill in Chester and the Morris County Landfill in Mt. Olive changed ownership. The new names of the landfills are Combe Fill (Chester Hills) and Combe Fill (Mt. Olive).

TABLE 1-27

WASTES GENERATED IN MORRIS COUNTY AND DISPOSED OF IN MORRIS COUNTY (1977)

Disposal Location	Municipal (Tons)	Non-Municipal (Tons)	Total (Tons)
Chester*	39,407	22,434	61,841
Mt. Olive*	73,501	32,603	106,104
Roxbury* (now closed)	135,209	23,428	158,637
Hanover Twp.	–	664	664
Mt. Arlington	3,500	–	3,500
Wharton	3,308	–	3,308
Mendham	120	–	120
TOTAL	255,045	79,129	334,174 Tons

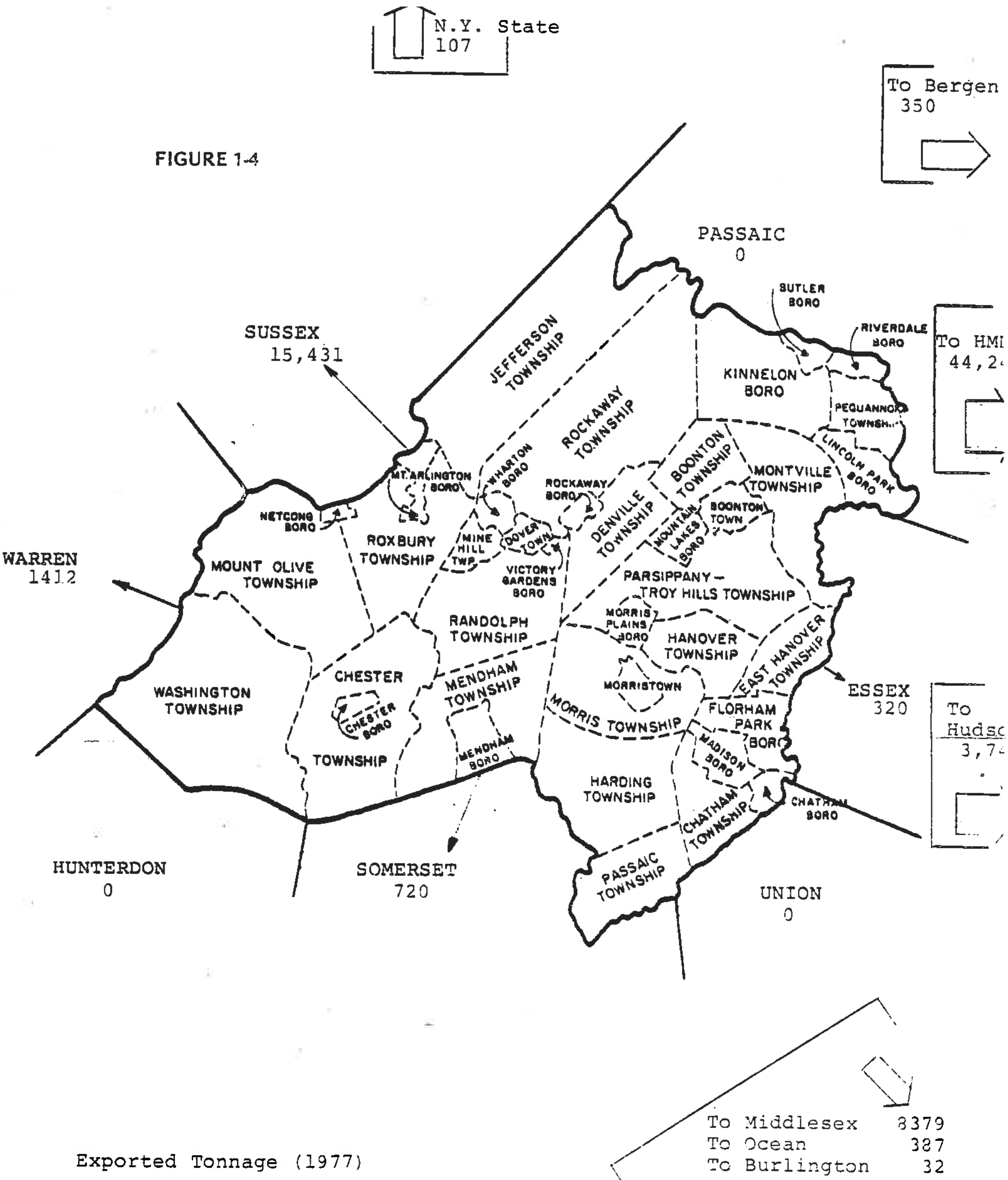
*BPU Landfills

TABLE 1-28

WASTES GENERATED IN MORRIS COUNTY & EXPORTED FOR DISPOSAL (1977)

		Municipal (Tons)	Non-Municipal (Tons)	Total (Tons)
HMDC Landfills		42,596	1,647	44,243
Somerset County		720	–	720
Sussex County	(Hamm's)	15,113	98	15,211
	(Byram Twp.)	–	220	770
Middlesex County		8,107	272	8,379
Ocean County		387	–	387
Burlington County		–	32	32
Bergen County		350	–	350
Hudson County		3,745	–	3,745
Warren County		1,412	–	1,412
New York State		–	107	107
Essex County		–	320	320
TOTAL		72,430	2,696	75,126

FIGURE 1-4



Exported Tonnage (1977)

Total 75,126 Tons

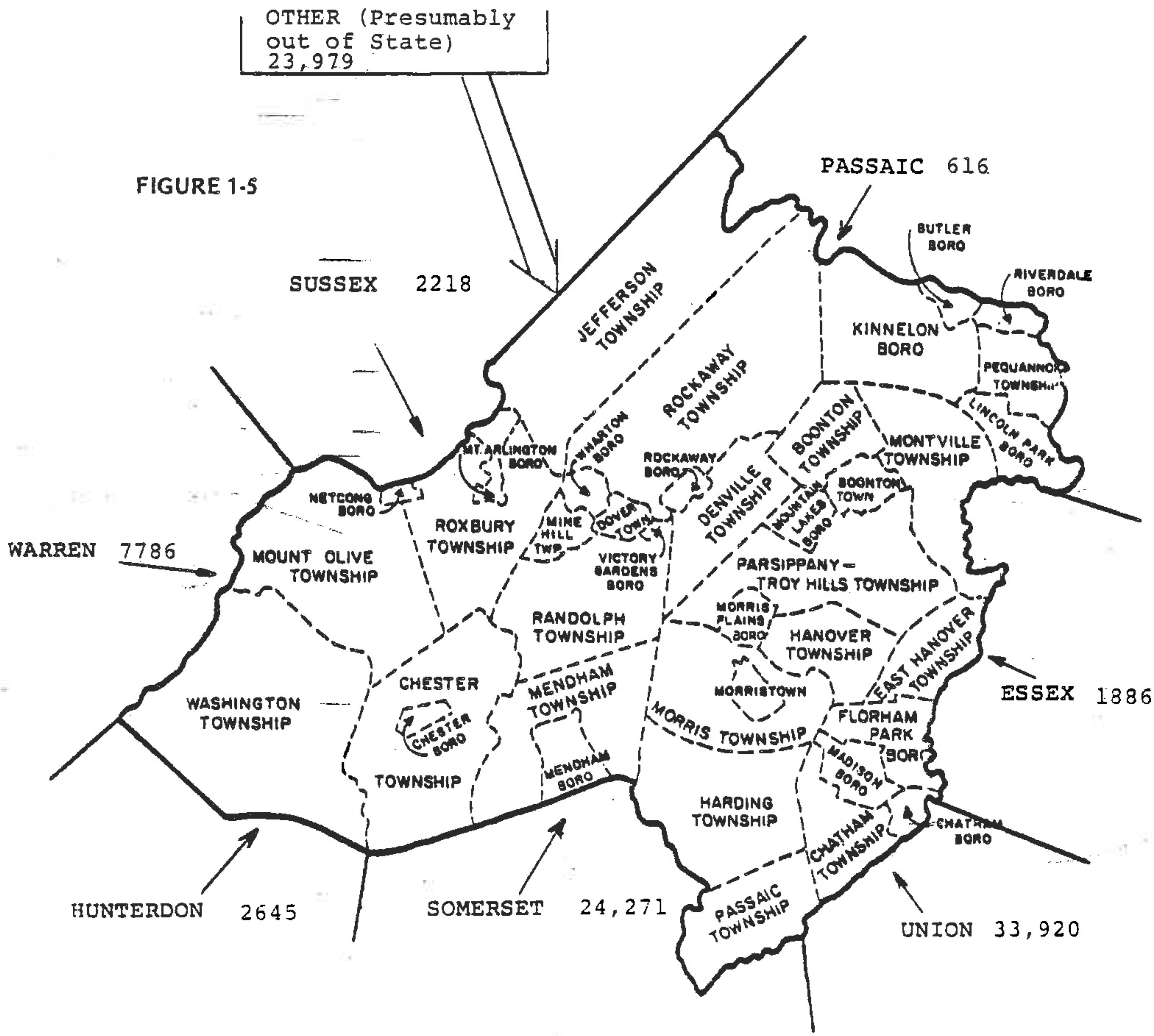
TABLE 1–29

1977 IMPORTED WASTE TONNAGES
(All to BPU Landfills)

Imported From \ To	Roxbury*	Chester	Mt. Olive	Total
Essex	801	500	585	1,886
Passaic	112	–	504	616
Sussex	1,339	546	333	2,218
Hunterdon	–	2,465	–	2,465
Somerset	–	23,220	1,051	24,271
Union	–	177	33,743	33,920
Warren	–	7,592	194	7,786
Other (NYS?)	23,979	–	–	23,979
Total	26,331	34,500	36,410	97,141

*Now Closed

FIGURE 1-5



Imported Tonnage (1977)

Total 97,141 Tons

TABLE 1-30

WASTE GENERATION SUMMARY

Waste Generated in Morris and (1977) Disposed of in Morris	334,178 Tons (81.6%)
Waste Generated in Morris and Exported for Disposal	75,126 Tons (18.4%)
Total	409,304 Tons (100%)

WASTE DISPOSAL SUMMARY

Waste Generated in Morris and Disposed of in Morris	334,178 Tons (77.5%)
Waste Generated in Other Counties and Imported for Disposal in Morris	97,141 Tons (22.5%)
Total	431,319 Tons (100%)

Currently, the Mt. Olive site is accepting approximately 859 tons per day compared to 408 tons per day in 1977. Almost all of this 110% increase can be accounted for by the closure of Fenimore's.

The Combe Fill (Chester Hills) has increased their acceptance rate from 340 tons per day in 1977 to 468 tons per day in 1979; a 38% increase. Closure of other landfills as well as considerable growth in surrounding areas can account for this increase. See Table 1-31.

It should be noted that data presented in this section is the best available data. Due to the increasing scarcity of available landfilling capacity and the non-restrictive nature of BPU-regulated landfills, the entire disposal system is subject to change at any time. Close monitoring of the disposal situation by the County is essential.

4. Existing Solid Waste Disposal Areas, Transfer Stations and Processing Facilities. Presented in this section are dicussions on each of the registered solid waste disposal and processing facilities currently operating in Morris County. Information presented was gathered from SWA files, previous reports and site visitations. Discussions are presented by facility identification number. The location of the facilities are shown by SWA I.D. number on Figure 1-6.

Combe Fill Corporation (Chester Hills) Landfill (1407A) — The Combe Fill Corporation landfill is located off Parker Road within Chester and Washington Townships. Until the fall of 1978 it was owned and operated by Filiberto Sanitation and known as the Chester Hills Landfill.

Approximately 35-40% of the 200 acre site is presently being utilized for landfilling operations. Waste acceptance rates for 1976 and 1977 were 327,332 and 311,194 c.y.'s, respectively according to facility reports. The following quantities of waste were reportedly disposed in 1976 and 1977:

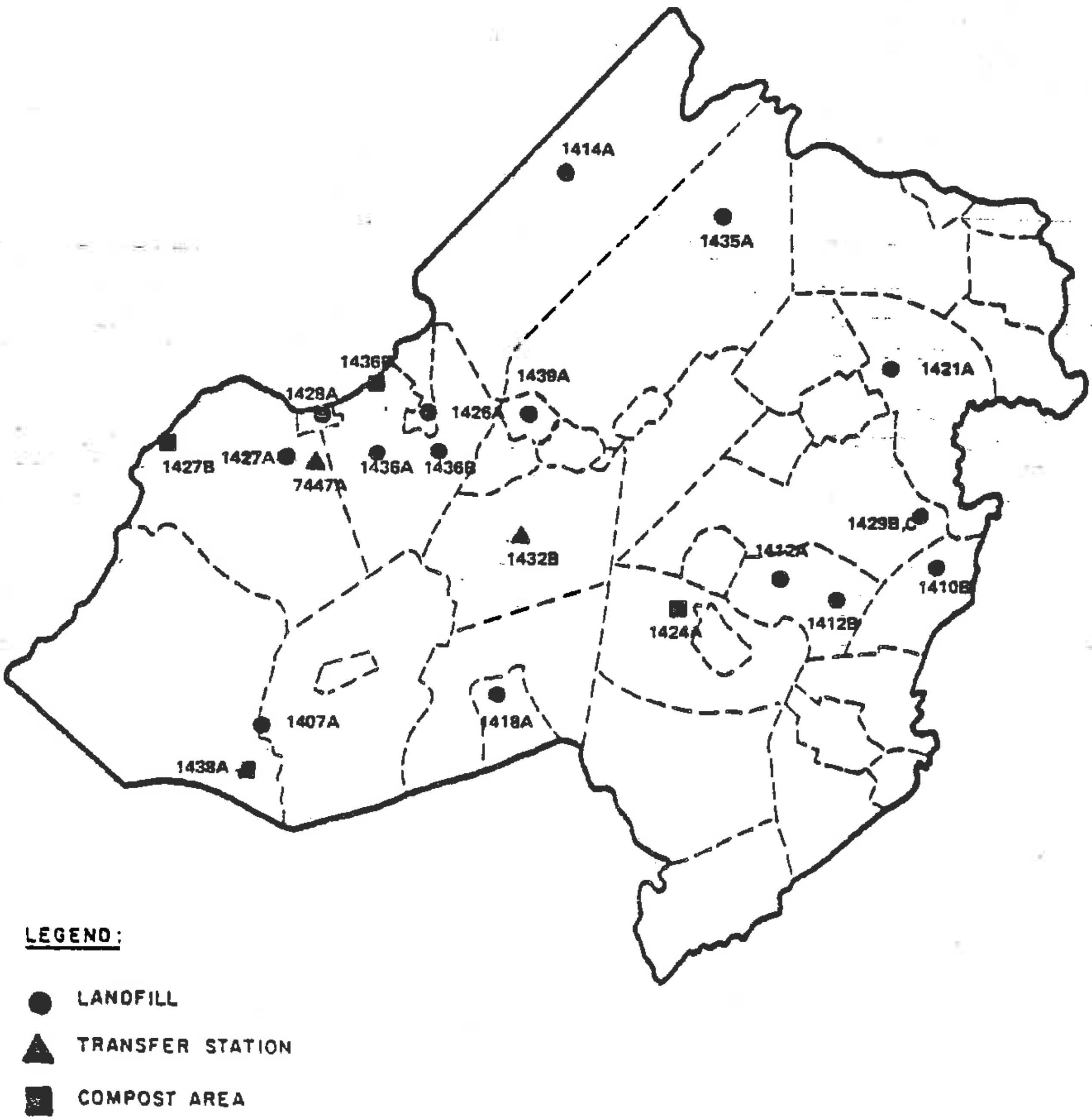
CUBIC YARDS

	Non-Compacted 1976	Non-Compacted 1977
Municipal	165,762	153,589
Bulky	43,442	44,745
Vegetative	12,186	12,310
Industrial (non-chemical)	105,842	100,550

The landfill is one of the two BPU registered landfills within Morris County. Remaining capacity at the landfill is estimated to be 13 years and 2,000,000 tons under the currently approved engineering plan.

TABLE 1-31
LANDFILL DISPOSAL SUMMARY — BPU LANDFILLS

Mt. Olive	Tons/Day	Tons/Year
1977	408	127,298
1979	859	268,125 (110% increase)
Roxbury (now closed)		
(1977)	(508)	(158,637)
Chester		
1977	340	106,104
1979	468	146,250 (38% increase)



MORRIS COUNTY

Registered Solid Waste Facilities

FIGURE 1-6

Three monitoring wells and two potable water wells are sampled on a quarterly basis to ascertain groundwater quality. Review of the limited monitoring well data available shows that there may be some low level contamination, however the effects on water supplies, if any, are unknown. The trench method of fill is used and all cover material is available on-site.

SWA inspection records indicate inadequate cover and wind-blown litter violations in the past.

Whippany Paper Board Company (1412A) – The Whippany Paper Board Company landfill is located off of Parsippany Road in Hanover Township. It is used only for residues from the Company's operations and does not accept waste from any other origins. Approximately 50-55 acres of a 75 acre tract are utilized for the landfill. If needed, additional acreage can be incorporated into the operation.

Waste acceptance rates for 1976 and 1977 were 18,824 and 35,700 cubic yards. The following quantities of waste were disposed.

CUBIC YARDS

	Non-Compacted	
	1976	1977
Dry Sewage Sludge	–	14,500
Bulky	6,271	5,800
Industrial (non-chemical)	12,553	15,400

Remaining capacity of the landfill is estimated to be 50 years. An engineering plan has been approved by the S.W.A.

Inspection violations as reported by the SWA in the last several years have included width of working face greater than permitted, disposal in the vicinity of surface waters, visible scattered refuse, and inadequate cover material and grading.

Jefferson Township Landfill (1414A) – The Jefferson Township landfill is located off of Weldon Road in Lake Hopatcong. The landfill site is approximately 10 acres in size.

The landfill is registered to accept municipal, bulky, tires, leaves and chopped trees, and tree stumps. The solid waste stream in 1976 and 1977 were divided into the following components:

CUBIC YARDS

	Non-Compacted 1976	1977
Municipal	8,636	4,000
Ferrous Metals	40	50
Wood	7.5	

The landfill was officially closed in the summer of 1978 for land area limitations. The landfill did operate with an approved SWA engineering plan.

Inspection violations as reported by the SWA in the last several years have included inadequate cover material, improper slope stabilization, excessive grades and inadequate cover material of bulky items.

Mendham Borough (1418A) – The Mendham Borough landfill is located directly behind the Public Works garage off Ironia Road in Mendham. The site consists of approximately 15 acres. The landfill is used for wastes generated by the town in its municipal buildings and fire hall. No residential waste is accepted at this site.

Waste acceptance rates for 1976 and 1977 were approximately 130 cubic yards per year. The following wastes were disposed:

CUBIC YARDS

	Non-Compacted 1976	1977
Municipal	10	10
Dry Sewage Sludge	1	1
Bulky	10	10
Vegetative	110	110

The Borough operates a recycling center at the landfill. During 1976, approximately 30 tons of ferrous metals, 2 tons of non-ferrous, 200 tons of newspaper and 100 tons of miscellaneous paper was recycled.

In 1977, the remaining life expectancy of the site was reported to be 39 years. A proposed engineering design has been submitted to the SWA.

Past violations reported by the SWA have included failure to notify SWA of a fire on the landfill and to initiate all necessary actions to extinguish the fire, inadequate cover material, the acceptance of septic waste and sewage sludge, working face exceeding permitted width and disrupted refuse.

Ecology Lake Club, Inc. Landfill (1421A) – The Ecology Lake Club, Inc. landfill is located off of Riverside Drive in Montville. The design life of the site is for one year and will be limited to accepting trees and tree stumps. After the one year period, the landfill is to be converted into a recreational area. An engineering plan has been approved by the SWA.

Morristown Composting Facility (1424A) – The Morristown Composting Facility is located off of Lake Road in Morristown. The facility is registered to accept vegetative waste. In 1976, approximately 500 cubic yards of waste material was disposed of. An engineering plan has been approved by the SWA. Inspection violations reported in the last several years included material other than vegetative waste being disposed of and inadequate cover material.

Mount Arlington Borough Landfill (1426A) – The Mount Arlington Borough landfill is located off of Berkshire Avenue, in Mount Arlington. The site size is approximately 4 acres. During 1977, approximately 10,600 cubic yards (compacted) of municipal wastes were disposed. Only wastes generated in Mt. Arlington are accepted for disposal. Remaining capacity of the landfill has been estimated at approximately 15 years.

Inspection violations reported by the SWA in the last several years have included inadequate cover material, poor compaction, visible scattered refuse, excessive grades, and the disposal of septic waste and sewage sludges.

Combe Fill Corporation (Mt. Olive) Landfill (1427A) – The Combe Fill Corporation (Mt. Olive site) formerly Morris County Landfill, Inc. is located off of Goldmine Road in Mount Olive. The size of the site is approximately 100 acres and is a registered BPU landfill. At present the site is accepting more waste than any other site in Morris County. Wastes from surrounding counties are also deposited at this site. Approximately 75-80 trucks enter the landfill daily.

The total amount of waste material accepted in 1977 was 472,800 cubic yards. The solids stream was divided into the following components:

	CUBIC YARDS
Municipal	336,375
Dry Sewage Sludge	2,600
Bulky	40,200
Vegetative	3,000
Animal & Food Processing	2,600
Industrial (non-chemical)	88,025

Five monitoring wells are located around the landfill site. Review of the limited monitoring well data available shows that there may be some low level contamination, however the effects on water supplies, if any, are unknown.

An engineering plan has been approved by the SWA. Revised engineering plans for expansion are presently being reviewed by SWA.

The trench filling method is utilized and all cover material is obtained on-site. Under present acceptance rates and engineering plans, the estimated remaining life is approximately .75 years or 206,000 tons. If the engineering plan being considered by the SWA is approved, the remaining capacity would be 4,000,000 tons.

Violations as reported by the SWA have included visible scattered refuse, excessive grades, inadequate cover material, poor grade stabilization, visible scattered paper, and the disposal of waste material near surface water bodies.

Stephens State Park Composting Facility (1427B) – The Stephens State Park compost facility is located off of Hackettstown Road in Mount Olive Township. In 1976 and 1977, approximately 2 to 3 cubic yards of vegetative waste were disposed. An engineering plan is not required by the SWA. There have been no known violations.

United States Mineral Product Co. (1428A) – The United States Mineral Products Company is located off of Furance Street in Netcong. In 1976, approximately 3,200 cubic yards of non-chemical industrial waste were disposed at this site. Remaining capacity has been estimated to be nine years. There have been no known reported violations. The site is limited to waste produced at the Company's plant. No outside waste is accepted.

Hercules Incorporated Landfill (1436B) – The Hercules, Inc. landfill is located on the site of the Company's manufacturing facility off of Howard Boulevard in Kenvil. The landfill is limited to wastes generated at the plant such as cardboard, paper and dead tree stumps.

A new 3 acre area was recently opened with adequate capacity for 30 years.

In 1976 and 1977, waste acceptance rates were 910 and 765 cubic yards. The following quantities of waste were reportedly disposed:

CUBIC YARDS

	Non-Compacted 1976	Non-Compacted 1977
Municipal	900	750
Vegetative	10	15

An engineering plan has been approved by the SWA. Two groundwater monitoring wells were installed at the landfill. There have been no reported violations.

Hopatcong State Park Composting Facility (1436C) – The Hopatcong State Park composting facility is located off of Landing Road in Hopatcong. In 1977, approximately 5 cubic yards of vegetative waste were disposed. There were no inspection reports on file at the time of the review.

Hacklebarney State Park Composting Facility (1438A) – The Hacklebarney State Park Compost Facility is located off of Long Valley Road in Washington Township. In 1976 and 1977, approximately 50 cubic yards of branches and tree clippings were disposed. An engineering plan is not required by the SWA.

Deskovik Landfill (1410B) – The Deskovik landfill is located off of Klinger Road in East Hanover. In the last several years, construction and demolition, leaves and chopped trees, and tree stump wastes were disposed of at the site.

The landfill size is approximately 4 acres. Remaining capacity has been estimated to be 7 years.

Past violations have included too wide a working face, improper stabilization, and inadequate cover material.

Jacobs Road Landfill (1435A) – The Jacobs Road landfill is located off of Jacobs Road in Rockaway Township. This facility accepts bulky and vegetative wastes from residents only. The existing landfill is estimated to be 2 acres. The Township owns a substantial amount of land surrounding the existing site. Remaining life of the landfill is approximately 20 years.

Waste generation rates for 1976 and 1977 are as follows:

CUBIC YARDS

	Non-Compacted	
	1976	1977
Bulky	5,700	2,016
Vegetative	84	1,007

The actual volume of waste material accepted may be substantially less than the reported volumes. An engineering plan was submitted to the SWA in 1974, but was apparently neither approved nor disapproved. SWA inspections in the past have included insufficient cover and operating two working faces.

R&R Sanitation (1432B) – The R&R Sanitation Company operates a transfer station off of Access Drive and Calais Road in Randolph Township. The transfer station consists of two 20,000 gallon storage tanks, a delivery area, and an export area. The facility is registered to accept septic waste and liquid sewage sludge.

Advanced Environmental Technology Corporation (7427A) – The Advanced Environmental Technology Corporation transfer, storage and reclamation center is located off of Gold Mine Road in Mout Olive Township. Advanced Environmental Technology Corporation utilizes 2,500 square feet of a 4,050 square foot building situated on 2.3 acres.

The site has received a Temporary Operation Authorization from the SWA and is registered to process hazardous waste, waste oil, hazardous waste liquid, and chemical waste liquid. The facility has a daily capacity of 100 drums at an average weight of 250 lbs. Maximum storage time is four weeks. Waste material is processed and transferred to an appropriate landfill.

A potable water well will be utilized for sampling. There have been no reported violations.

Borough of Wharton Sanitary Landfill (1439A) – This municipality owned and operated landfill has served the Borough as a disposal site for approximately 30 years. Located on Lafayette Street in Wharton, the 4 acre facility is used primarily by municipal collection vehicles.

Waste disposed of at the site in 1977 consisted of 5,700 cubic yards of municipal waste, 2,850 cubic yards of bulky waste, and 2,850 cubic yards of vegetative waste. 330 tons of glass were reported reclaimed in the same year. Remaining life of the landfill was estimated at 7 years in 1978.

An engineering design plan for the site is currently under review by the SWA. Periodic inspections of the landfill by the SWA had found no deficiencies on 8 of the 11 inspection visits during 1977 and 1978. The inspection records indicate instances of insufficient cover.

Further discussion of sanitary landfills closed in recent years will be included in subsequent sections of this plan.

5. Recycling and Resource Recovery. Recyling and resource recovery have the potential to reduce by 80-90% the amount of Morris County's solid wastes going to landfilling. At the present time, however, only a small percentage of the county's wastes are being recycled; and no large scale resource recovery facility is in operation. Many factors have a bearing on the feasibility and success of such programs. This section will deal with a description of existing recycling programs, and the current markets for materials and energy recovered from solid wastes. A full discussion of recycling and resource recovery, and proposals for management options to encourage and develop such programs, will be evaluated along with other management alternatives.

Recycling programs may be designed to recover materials from the residential, commercial or industrial waste streams. Various types of paper, glass or metals are the primary objects of recycling activities; although many other materials may be recyclable depending upon their value and availability in the waste stream.

The recovery of chemical and industrial wastes is a specialized field unto itself, whereby one firm's waste may become another's raw material. Arranging such transfers requires knowledge of an specific industrial requirements for chemical raw materials and the nature of waste chemicals produced by other firms.

An inventory detailing the composition of specific industrial waste materials and the raw material requirements of firms within the area, may be compiled in an effort to promote mutually beneficial contact between waste producers and potential waste consumers. A statewide list of this information is periodically issued by the New Jersey Chamber of Commerce in Newark, using information obtained through interviews with the various industrial establishments. A sample copy of one of these documents is contained in Appendix 1.

More than thirty recycling programs in Morris County recover materials from the residential waste stream. Table 1-32 is a listing providing particulars on a number of these programs currently active within the County. Often, recycling activities are employed as a means of obtaining revenue for social or civic organizations. In a few cases, these programs are municipally sponsored.

Newspaper, glass, and metal cans represent the materials most often removed and recycled from the municipal waste stream. Collection of these materials is often afforded through establishment of recycling centers where separated materials are deposited by individuals practicing source separation. In some cases, curbside glass or newspaper collection is provided.

Excepting municipally sponsored activities, the county recycling effort is being conducted on a strictly voluntary basis. Although municipal personnel are utilized for materials collection, for the operation of municipally operated recycling centers, and for transportation in some cases of the materials to their respective markets, no municipalities currently mandate source separation. Owing to this as well as to low levels of public participation, considerably less than the potential 20% recyclable fraction of residential wastes (N.J.D.O.E. Master Plan, 1979) is currently being recycled in Morris County.

Recycling potential of commercial wastes is enhanced by the fact that considerable quantities of easily separated materials often arise from day to day operations of several concerns. For example, supermarkets generate large quantities of corrugated paper (cardboard) which may be baled and sold. Bars generate considerable volumes of alcoholic beverage bottles, as well as corrugated paper. Refuse from office buildings consists largely of paper wastes, of which at least 50% is recoverable. Despite these advantages, the recycling of commercial wastes is presently carried out to a lesser extent than that of residential wastes.

TABLE 1–32

COMMUNITY RECYCLING PROGRAMS IN MORRIS COUNTY

Municipality	Material recycled: organization(s) involved-contact person/location of recycling center: curbside pick-up or drop-off, frequency	Paper	Recycled Quantities (Tons/Yr) Glass	Alum.	Tin
Boonton Twp.	Newspaper; Boy Scouts-Ted Witty/drop-off, every day.	(2)			
Butler	Newspaper, Magazines; Boy Scouts-Raymond Struble/curbside, every 3 months.	52 M			
Chatham Borough	Glass; JC's-Harold Butt/High School; drop-off 1st Saturday each month.	0	60	0	0
Chester Borough	Newspapers; Boy Scouts-Melvin Blaufoss/paper shed at Chester Baseball Diamond; also curbside, beginning in September the last Sunday of every second month.	95(1)	0	0	0
Denville Twp.	Newspaper, Glass; Environmental Commission-Clyde Compton/ The Public Works yard, 140 Morris Ave.; drop-off, Monday—Friday 8:00 am - 4:30 pm and Saturday 9:00 am - 1:00 pm.	60	70	0	0
Dover	Paper; Boy Scouts-Bob Pruder/Sacred Heart Church; drop-off, once a month.	43 M	0	0	0
E. Hanover	Newspapers; Boy Scouts-John Hunter/curbside, six times during school year.	84 M	20	4	0
	Glass and Aluminum; American Legion Post 421-Wm. Courter, Town Garage-Melanie Lane; drop-off, every day.				
Florham Pk.	Newspapers, Magazines; Kiwanis-Mr. Droit/Town disposal site, Columbia Tpke; drop-off, semi-monthly.	24 M	6	0	0
	Glass; JC's-Bill Cullen/same as above; drop-off, second and fourth Saturday each month.				
Hanover Twp.	Newspaper; Whippany Fire Dept.-Bob Newell/440 Rt. 10; drop-off, monthly.	240	(2)	0	0
	Glass; call Town Hall.				
Harding Twp.	Paper, Glass, Aluminum, Tin; Boy Scouts-Herb Rottner, Mercer Blanchard/Harding Twp. School; drop-off, 1st Saturday each month.	84 M	54	1	6
Kinnelon	Glass, Aluminum, Newspaper; Reform Church-Paster Higgins/155 Kinnelon Rd; drop-off, first Saturday each month.	72	.4	.4	0
Madison	Newspapers, Glass; Boy Scouts-Mr. Schumacher/Borough garage; drop-off, third Saturday each month.	132	90	0	0
Mendham Boro & Twp.	Paper, Glass; JC's-Mr. Nutt/Town Garage; drop-off, Ironia Road.	(2)			
Mine Hill	Newspaper, Glass, Aluminum; Boy Scouts-Bob Wolff/New Municipal Building; curbside, about every 10 weeks.	114	8	.25	0
Montville Twp.	Newspaper, Glass, Aluminum; Boy and Girl Scouts-Ned Witty, Bill Mahon/Town Hall; drop-off, every Saturday.	247 M	135	1	0
Morris Plains	Newspapers, Mixed Paper, Print-outs, Magazines; Fire Department-Russell Haas/curbside, four times a year as published in municipal calendar.	140 M	0	0	0

TABLE 1–32 (cont.)

Municipality	Material recycled: organization(s) involved-contact person/location of recycling center: curbside pick-up or drop-off, frequency	Recycled Quantities Paper	Glass	Alum.	Tin
Morris Twp.	Paper; Fairchild F.D.-Wm. Kenny/Sherman Ave; curbside, every 3 months.	133 M	0	0	0
	Paper; Collinsville F.D.-Tom Moreland/curbside, unknown.				
	Paper; Woodland F.D.-Howard Plant/curbside, every 3 months.				
	Paper; Hillside F.D.-Mike Ryer/curbside, every 3 months.				
Morristown	Paper, Glass; High School Key Club-Rober Mumford/Lake Rd.; drop-off, every 3 weeks.	301	22	0	0
Mt. Lakes	Newspaper, Glass, Aluminum: Jr. Womens Club-Richelle Ryan/ Town Garage; last Saturday of each month, 9am-12 noon.	60	24	3	0
Parsippany	All Paper; Boy Scouts-Bruce Benson/curbside, last Saturday of each month.	60 M			
Passaic Twp.	Newspaper, Glass, Aluminum; 13 volunteer groups-Doris Faenza/ Township Garage-Warren Ave; drop-off, every Saturday 9am to 12 noon.	99, 5 M	39	0	0
Randolph Twp.	Newspaper, Cardboard; Environmental Committee-Carl Jeffcoat/ Town Hall; drop-off, every day.	84 M	0	0	0
	Material unknown; Ironia Fire Dept.-John McAndrew				
Riverdale	Newspaper; Boy Scouts-John DeGraw/curbside, each month.	72	0	0	0
Rockaway Borough	Newspaper; Sacred Heart School-Principal/drop-off, each month.	90	0	0	0
Roxbury Twp.	Newspaper; Boy Scout Troop 159-Charles Allpaugh/Redeemer Lutheran Church, Eyland Ave; curbside 2nd Saturday each month 9am to 5pm.	96	0	0	0
	Material Unknown; Boy Scout Troop 54-Norma Fowler/Methodist Church.				
	Glass; Junior Womens' Club-Susan Mattson/Town Hall, every day.				
Washington Twp.	Paper; Boy Scouts-George Spiwak/Long Valley-town center; 3rd Sunday each month.	240	0	0	0
Wharton	Glass; Dept. of Public Works/curbside, 2nd Wednesdays each month.	0	21	0	0
	TOTAL	1431, 1196 M	549	10	6

M = Mixed paper

(1) – Includes Chester Twp.

(2) – No data on quantity available.

D. SLUDGE AND SEPTIC WASTES GENERATION, COLLECTION, AND DISPOSAL

The Solid Waste Administration classifies wastewater sludges and septic tank cleanout wastes as solid wastes, mandating consideration of these wastes as a portion of the total solid waste stream. The SWA definition of these waste types is included in Appendix 1.

In an attempt to coordinate planning efforts for sewage sludge and septage utilization and disposal, the NJDEP Division of Water Resources has distributed a Program Guidance Document to Solid Waste Management District (SWMD's) and 201 facilities planning agencies. This document defines the respective areas of responsibility to avoid duplication of efforts and to assure the completion of plans.

The 201 agencies have the primary responsibility in planning, design, and construction of permanent septage and sewage sludge treatment facilities. The ultimate disposal and utilization of septage and sewage sludges are also deemed the responsibility of the 201 agencies. Proposed plans by the 201 agencies to deal with these waste types must be included, whenever possible, in the county solid waste management plans.

The state recognized the importance of cooperation between 201 agencies and SWMD's and called for a review by each SWMD of 201 plans before being submitted to the State.

Until completion of permanent facilities for the disposal and/or utilization of sludges and septage, the Solid Waste District (SWMD) along with the SWA have sole responsibility in developing adequate interim measures.

1. Sludge.

a. Generation. Municipal wastewater treatment facilities in Morris County account for the production of greater than 35 million gallons per year of excess sewage sludge. Sludge generation rates vary from one facility to the next, depending upon such factors as design capacity, treatment process employed, and the nature of the wastewater itself.

The Musconetcong Treatment Plant in Stanhope and the Butler Bloomingdale Treatment Plant in Bloomingdale represent the only facilities outside of Morris County currently accepting wastewater originating within Morris County. The Hackettstown M.U.A. Treatment Plant in Washington Township (Morris County) is the only facility located in Morris County currently accepting wastewater generated outside of Morris County. A brief description of the principal treatment facilities within Morris County, and of the two facilities accepting wastewater from Morris County, is provided below. Table 1-33 provides a summary of sludge generation at each facility. Figure 1-7 provides approximate locations of existing wastewater treatment facilities, with the map numbers corresponding to the numbering system in Table 1-33.

The Butler Bloomingdale Treatment Plant located in Bloomingdale, Passaic County, serves Butler Boro, Bloomingdale Boro, and a small portion of Kinnelon Boro. About 20% of 2.25 mgd average influent to the trickling filter process originates in Morris County. Excess sludge, estimated at 1.4 million gallons per year, is vacuum filtered and landspread on site. Plans currently call for expansion up to 3.1 mgd within 10 years.

TABLE I—33

SEWAGE TREATMENT PLANTS IN MORRIS COUNTY
(1979)

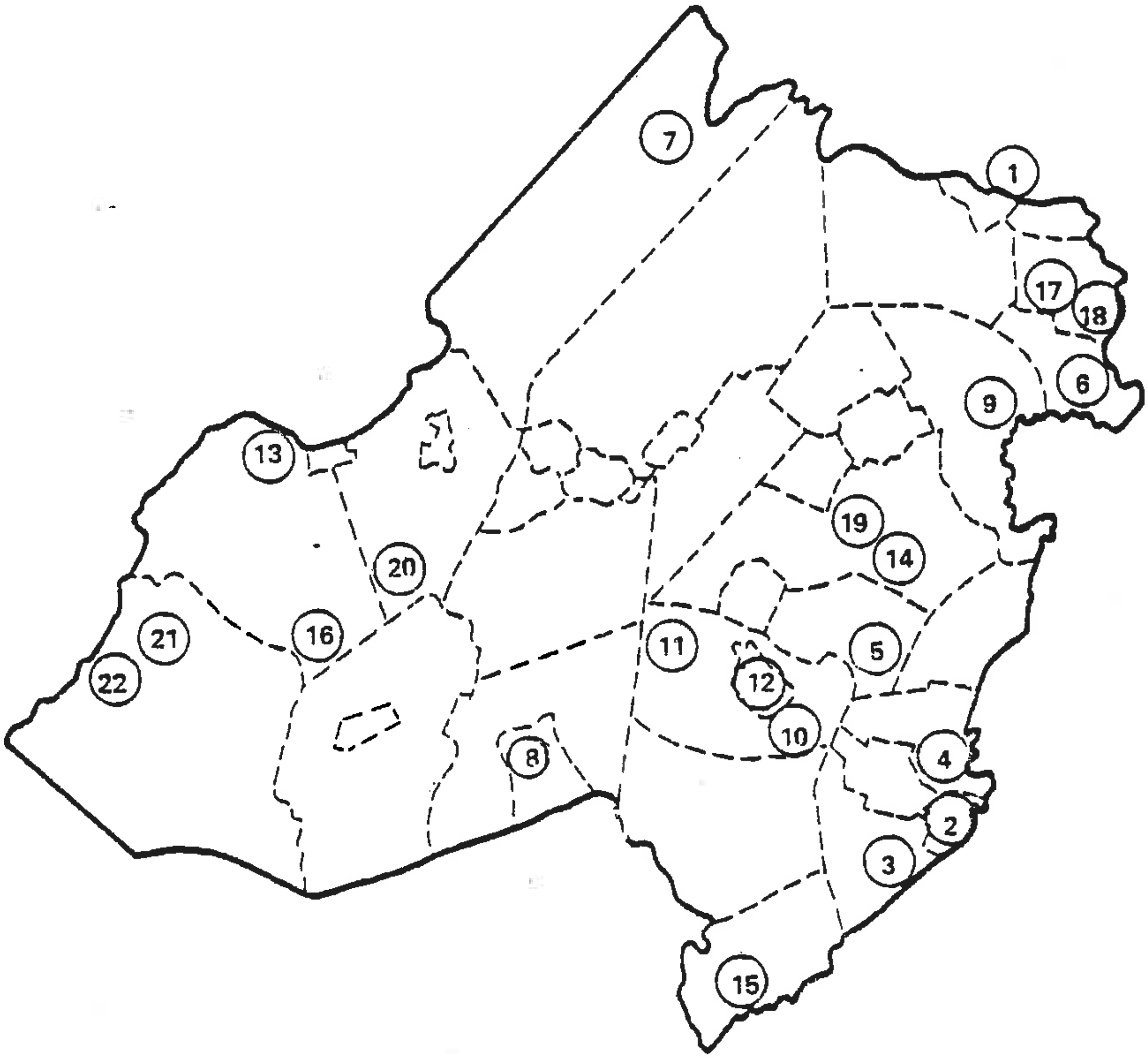
	Treatment Plant/ Municipality	Average Flow (mgd)·	Sludge Production million gallons/year	Sludge Processing	Sludge Disposal
1.	Butler-Bloomingdale/ Bloomingdale	2.25	1.4	Vacuum filtration	Land disposal on site
2.	Madison-Chatham Joint Meeting/ Chatham Boro	3	3.2	Bed drying	Land disposal on site
3.	Main TP/Chatham Twp.	0.75	0.1	Digestion, bed drying	Land disposal on site
4.	Florham Park Sewerage Authority	0.8	0.46	Digestion, vacuum filtration	Land disposal on site
5.	Hanover Sewage Authority	1.8	2.8	Bed Drying	Land disposal on site
6.	Lincoln Park TP	0.09	0.07	—	Ocean disposal
7.	High Ridge Water and Sewer Co./Jefferson	0.07	0.015	Bed drying	Transported by private hauler and landfilled
8.	Mendham Boro TP	0.35	0.6	Bed drying	Land disposal on site
9.	Montville MUA	0.035	0.0055	—	Incineration Parsippany-Troy Hills TP
10.	Woodland TP/Morris Twp.	1.0	0.8	—	Ocean disposal
11.	Butterworth TP/Morris Twp.	1.4	1.2	—	Ocean disposal
12.	Morristown Dept. of Sewers	2.2	0.9	Digestion	Transported by private hauler and landfilled

TABLE 1—33 (cont.)

	Treatment Plant/ Municipality	Average Flow (mgd)	Sludge Production million gallons/year	Sludge Processing	Sludge Disposal
13.	Musconetcong Sewerage Plant/Stanhope	0.85	3.94	Vacuum filtration	Transported to Morris County landfill
14.	Parsippany-Troy Hills TP	7	9.0	Vacuum filtration	Incineration on site
15.	Passaic Twp. TP	0.65	0.1	Bed dried	On site composting
16.	Mt. Olive (Package TP's)	0.6	0.45	—	Transported by Twp. to landfills, ocean disposal
17.	Greenview/Pequannock Twp.	0.3	0.33	—	Ocean disposal
18.	Riverside/Pequannock Twp.	0.007	—	—	Ocean disposal
19.	Rockaway Valley Region Sewerage Authority/Parsippany-Troy Hills	7.4	8.4	Vacuum filtration	Transported by private hauler and landfilled
20.	Roxbury Twp. TP	0.85	1.5	—	Ocean disposal
21.	Schooley's Mountain/ Washington Twp.	0.2	0.18	—	Ocean disposal
22.	Hacketstown MUA/ Washington Twp.	1.1	0.985	Digestion, bed drying	Residential pickup, land disposal on site
	Total		36.44		

FIGURE 1–7

EXISTING SEWAGE TREATMENT PLANTS WITHIN MORRIS COUNTY



See Table 1–33 for Treatment Plant Identification by number

Located in Chatham Boro, the Madison-Chatham Joint Meeting facility accepts about 3 mgd of wastewater, generating about 3.2 million gallons per year of excess sludge. The sludge is bed dried and landfilled on site.

Of the two facilities serving the residents of Chatham Township, only the Main Plant produces appreciable amounts of excess sludge. Treatment of 0.75 mgd by trickling filters leads to the generation of 102,400 gallons of digested sludge per year, which is landfilled on site. Plans have been completed for expansion to 2 mgd and for the installation of a vacuum filter.

The Florham Park Sewerage Authority facility serves Florham Park Boro and 259 homes in East Hanover Township. Designed for 1 mgd, it currently provides activated sludge treatment for an average influent of 0.8 mgd. About 460,000 gallons of digested sludge per year undergo vacuum filtration prior to landfilling on site.

The Hanover Sewage Authority's trickling filter facility serves virtually all of Hanover Township as well as minor portions of Morris Plains Boro and Parsippany-Troy Hills Township. The average plant flow of 1.8 mgd exceeds the design capacity of 1.5 mgd. Expansion to a design capacity of 3.0 mgd is currently underway. About 2.8 million gallons per year of excess sewage sludge is bed dried and landfilled on site.

A modified aeration facility in Lincoln Park Boro serves about 15% of the Boro's residents. With a design capacity of 90,000 gallons per day, about 70,000 gallons per year of excess sewage sludge is currently barged to sea. The facility will cease operations when the Two Bridges treatment plant comes on line.

The Two Bridges facility, located in Lincoln Park, is scheduled to begin operation in the fall of 1979. Utilizing the UNOX activated sludge process, the plant will have a design capacity of 7.5 mgd. Wastewater originating in Fairfield Boro, Essex County, as well as in Lincoln Park Boro and Pequannock Township in Morris County, will constitute the influent to the plant. Excess sludge generated at the facility will undergo vacuum filtration prior to incineration on site. It will take a minimum of five years for the influent to the facility to equal the design capacity. In the interim, the sludge incineration unit will have excess capacity available for the processing of liquid sewage sludge generated at other area treatment plants.

The High Ridge section of Jefferson Township, a development consisting of 248 homes, is serviced by a package activated sludge treatment plant. With an average influent of 70,000 gallons per day, an estimated 15,000 gallons per year of excess sludge undergoes bed drying prior to packaging into plastic bags. The bags are hauled to an off-site landfill.

About 75% of the residents in Mendham Boro are served by a modified high rate activated sludge treatment facility. The average flow of 0.35 mgd is anticipated to equal the design capacity of 0.5 mgd within two years. About 0.6 million gallons of aerobically digested sewage sludge is bed dried and landfilled on site. A filter press for sludge dewatering is due to be installed in the fall of 1979.

A package activated sludge plant operated by the Montville Municipal Utilities Authority treats the fraction of the township's wastewater not serviced by the Parsippany-Troy Hill facility. With an average flow of 35,000 gallons per day, about 5,500 gallons per year of excess sludge is generated. This liquid sludge is hauled to the Parsippany-Troy Hills plant where it is incinerated.

Two similar facilities in Morris Township utilize the activated sludge process for wastewater treatment. The Woodland plant, with a design capacity of 2 mgd, currently averages about 1 mgd in influent generated in Morris Township. The Butterworth Plant, also designed for 2 mgd, experiences an average flow of 1.4 mgd. Two thirds of this influent originates in Morris Plains Boro. The balance of the influent arises from Morris Township, with a minor contribution from Parsippany-Troy Hills Township.

Combined, the two plants generated about two million gallons per year of excess sludge, which is currently barged to sea. Future plans call for the Woodland plant design capacity to be increased to 3.2 mgd and for the installation of an on site incinerator for sludge disposal. The Butterworth plant is to be expanded to 4.2 mgd in 1983-1984.

The Morristown Department of Sewers treatment plant, with an average flow of 2.2 mgd, serves all of Morristown and a small portion of Morris Township. This activated sludge plant produces about 900,000 gallons of digested sludge per year, which is hauled to Southern New Jersey for disposal in landfills. Planned expansion to 2.5 mgd has been approved by the EPA and should begin in the near future.

The Musconetcong Sewerage Plant, in Stanhope, Sussex County, receives about 60% of its 0.85 mgd of influent from Roxbury Township, Mt. Olive Township, and Netcong Boro in Morris County. Utilizing contact stabilization, an estimated 130,000 gallons of excess sewage sludge per year undergoes vacuum filtration, prior to being hauled to the Morris County Landfill in Mt. Olive Township for disposal. Current plans call for expansion to 4-4.5 mgd prior to 1985.

The wastewater treatment facility in Passaic Township supplies trickling filter treatment to an average of 0.65 mgd, constituting all of the township's wastewater. An estimated 100,000 gallons per year of excess digested sludge is bed dried and composted on site. Expansion to 2 mgd is planned to be undertaken by 1984.

The Parsippany-Troy Hills facility, designed for 16 mgd, currently receives an average of 7 mgd from the residents of Parsippany-Troy Hills Township, Montville Township, and Mountain Lakes Boro. Nearly nine million gallons per year of excess sludge arises from this activated sludge facility. This sludge is vacuum filtered and then incinerated on site.

In Mt. Olive Township, the Flanders, Oakwood Village, and Eagle Rock plants with design flows of 0.365, 0.25, and 0.25 respectively utilize the activated sludge process to treat their influent. Combined, the actual flows total about 0.6 mgd, generating nearly 450,000 gallons of excess sludge per year, which is disposed of in the ocean. The Eagle Rock facility is planned to be expanded to 1.25 mgd, probably prior to 1985.

The Pequannock Township and Greenview facilities in Pequannock Township each utilize contact stabilization for treating the township's wastewater. The larger Pequannock Township plant has an average flow of 0.3 mgd, while the Riverside plant flow averages 7,000 gallons/day. Combined, the plants produce roughly 330,000 gallons per year of excess sludge, which currently is disposed of in the ocean.

The Rockaway Valley Regional Sewage Authority (RVRSA), comprised of nine municipalities, operates a 7.4 mgd (average flow) facility located in Parsippany-Troy Hills. The nine municipalities include Boonton Town, Boonton Township, Denville Township, Dover Town, Rockaway Boro, Rockaway Township, Randolph Township, Victory Gardens Boro, and Wharton Boro. The 8.4 million gallons of sludge per year resulting from the activated sludge process is vacuum filtered to 21,000 cubic yards and hauled to the Morris County landfill. Plans for expansion to 12 mgd have been approved by the DEP, and are now under study by the EPA.

In Roxbury Township, an activated sludge plant designed for 1 mgd receives an average flow of 0.85 mgd. Producing 1,500,000 gallons per year of excess sludge, it currently utilizes ocean dumping as a disposal technique. A contract providing for incineration of Roxbury's sludge at the new Two Bridges facility will be effectuated upon the opening of that facility. The plant is to be expanded to 3 mgd in the early 1980's, with a portion of the influent coming from Mine Hill and Randolph Townships.

The Schooley's Mountain facility in Washington Township processes 200,000 gallons per day of the Township's wastewater. Utilizing rotating biological dics for treatment, the plant produces about 180,000 gallons per year of excess sludge, which is currently barged to sea. Expansion of the facility to 0.5 mgd is to occur within 10 years.

Also located in Washington Township, a treatment facility operated by the Hackettstown Municipal Utilities Authority receives an average of 1.1 mgd from Hackettstown, Independence and Mansfield, in Warren County, with a small portion of its influent originating in Washington Township. With a present design capacity of 1.65 mgd and a sludge generation rate of about 985,000 gallons per year, planned expansion to 3.3 mgd should occur prior to 1985. At the present time, the excess sludge from this activated sludge facility is digested, bed dried, and made available for residential pickup. That which is not picked up is landfilled on site.

b. Disposal. At the present time, on site land disposal represents the sludge disposal alternative most commonly practiced by the wastewater treatment facilities. Disposal at off-site landfills is the second most commonly exercised option. In combination, land disposal is utilized for nearly 60% of the sludge generated in facilities treating the wastewater of Morris County.

The remainder of Morris County's sludge is either incinerated, barged to sea, or composted. Ocean disposal will cease to be a viable alternative as of December 31, 1981; phase-out and elimination of this disposal method is mandated by the federal Marine Protection, Research, and Sanctuaries Act Amendments of 1977.

Sludge incineration is currently practiced at the Parsippany-Troy Hills facility. The nearly completed Two Bridges facility will also utilize on site incineration for sludge disposal. Excess incineration capacity exists at each of the two facilities. As a result, these facilities have indicated a willingness to accept sludges generated elsewhere. The Parsippany-Troy Hills plant currently disposes of sludge generated by the Montville M.U.A. facility. Roxbury Township has entered into a five year agreement with the Two Bridges facility for disposal of its sewage sludge.

Composting of sewage sludge is currently practiced at the Passaic Township facility. Increased utilization of this technique at other Morris County Wastewater Treatment Facilities appears certain. The DEP in its "Interim Guidelines for the Preparation of 201 Sludge Management Plans" indicated that aerobic sludge composting represented. . . . "the most desirable technique for the stabilization of sewage sludge prior to land application." The agency envisions use of the composting product in conjunction with soil for landfill cover material.

Table 1-34 lists the sludge disposal alternatives currently in use in Morris County and the facilities practicing each alternative.

2. Septic Wastes.

a. Generation. Areas as yet unserviced by sewage systems, including individual households, businesses, and some industries, rely upon individual septic systems for wastewater treatment and disposal. These septic systems currently handle about 45% of the wastewater generated in Morris County. Table 1-35 lists the extent of septic service estimated for each of the municipalities in the County.

With the passage of time, solids buildup and/or excessive hydraulic loading necessitates the emptying of the septage system's retention tank. This service is provided by private collectors ("honeydippers") through individual agreements with those utilizing septage systems.

Each "honeydipper" is required by the State to obtain an annual operating permit. When applying to the State for this permit, a listing of sources, quantities and disposal locations of septic tank cleanout wastes* collected by the "honeydipper" during the previous year must be supplied.

The SWA incorporates this data into what are termed "Collector/Hauler" reports. The most recent available collector/hauler reports are for the year 1977. Table 1-36 lists the quantities of septic tank clean out wastes originating in each Morris County municipality as reported to the SWA for the year 1977. Based upon these reports, about 3.6 million gallons of septic clean out wastes were collected in Morris County in 1977.

Our own estimates indicate the reported figure understates the actual generation rate by a factor of two, i.e., the actual generation rate is nearly twice the reported figure. Using an average septage generation rate of 0.0898** gallons per capita per day, and an estimated 45% of

*SWA Type 73 also referred to as Septage.

**Septic Wastes Management Plan, Atlantic County Sewerage Authority, LGEHRR, John G. Reutter Associates, 1978

TABLE 1—34

SEWAGE SLUDGE DISPOSAL IN MORRIS COUNTY

Disposal Alternative	Facilities Practicing This Alternative	% of Total Sludge Disposed of by This Alternative
On-Site Land Disposal	Butler/Bloomingdale TP Chatham Twp. (2 plants) Florham Park TP Hanover Twp. TP Mendham Boro TP Hackettstown M.U.A. Madison-Chatham Joint Meeting	26%
Off-Site Landfilling	RVRSA Morristown Dept. of Sewers TP High Ridge TP/Jefferson Twp. Musconetcong TP/Stanhope	36%
Ocean Disposal	Lincoln Park Boro Morris Twp. (2 plants) Mt. Olive Twp. (3 plants) Pequannock Twp. (2 plants) Schooley's Mountain/Washington Twp. Roxbury Twp. TP	12%
Incineration	Parsippany-Troy Hills TP Montville MUA (to Parsippany-Troy Hills)	25%
On-Site Composting	Passaic Twp. TP	1%

TABLE 1—35

CURRENT EXTENT OF SEPTIC SERVICE IN MORRIS COUNTY

Municipality	Percentage of Total Wastewater Treated By Septage Systems
Boonton Town	5%
Boonton Twp.	80%
Butler Boro	10%
Chatham Boro	0%
Chatham Twp.	5%
Chester Boro	100%
Chester Twp.	100%
Denville Twp.	50%
Dover Town	0%
East Hanover Twp.	45%
Florham Park Boro	5%
Hanover Twp.	10%
Harding Twp.	100%
Jefferson Twp.	90%
Kinnelon Boro	45%
Lincoln Park Boro	85%
Madison Boro	0%
Mendham Boro	25%
Mendham Twp.	100%
Mine Hill Twp.	100%
Montville Twp.	65%
Morris Twp.	45%
Morris Plains Boro	0%
Morristown Town	0%
Mountain Lakes Boro	0%
Mount Arlington Boro	90%
Mount Oliver Twp.	60%
Netcong Boro	0%
Parsippany-Troy Hills Twp.	25%
Passaic Twp.	0%
Pequannock Twp.	80%
Randolph Twp.	80%
Riverdale Boro	100%
Rockaway Boro	0%
Rockaway Twp.	70%
Roxbury Twp.	75%
Victory Gardens Boro	0%
Washington Twp.	90%
Wharton Boro	80%

TABLE 1—36

SOURCES AND QUANTITIES OF SEPTIC CLEAN OUT WASTES
AS REPORTED TO THE SOLID WASTE ADMINISTRATION FOR 1977

Municipality	Gallons of Septic Clean Out Wastes Collected
Boonton Town	10,000
Boonton Twp.	99,500
Butler Boro	14,500
Chatham Boro	0
Chatham Twp.	0
Chester Boro	0
Chester Twp.	0
Denville Twp.	34,000
Dover Town	31,000
East Hanover Twp.	139,000
Florham Park Boro	0
Hanover Twp.	414,000
Harding Twp.	0
Jefferson Twp.	557,025
Kinnelon Boro	397,000
Lincoln Park Boro	113,000
Madison Boro	0
Mendham Boro	0
Mendham Twp.	0
Mine Hill Twp.	3,000
Montville Twp.	23,500
Morris Twp.	0
Morris Plains Boro	0
Morristown Town	0
Mountain Lakes Boro	4,000
Mount Arlington Boro	40,000
Mount Olive Twp.	24,500
Netcong Boro	0
Parsippany-Troy Hills Twp.	2,500
Passaic Twp.	0
Pequannock Twp.	245,000
Randolph Twp.	41,000
Riverdale Boro	89,000
Rockaway Boro	57,000
Rockaway Twp.	49,500
Roxbury Twp.	95,000
Victory Gardens Boro	0
Washington Twp.	0
Wharton Boro	0
Various	1,101,950
Total	3,584,975

the wastewater in the county undergoing septic treatment, septic clean out wastes generated in Morris County total between 5 and 7 million gallons per year. This estimate compares favorably with the estimated 5.7 million gallons per year as calculated by the Office of Sludge Management and Industrial Pretreatment of the DEP.

b. Collection and Disposal of Septic Wastes. Municipal collection of septic tank clean out wastes is not provided by any of the 39 Morris County municipalities. As a result, private collector/haulers represent the sole means of collection of these wastes.

At the present time, three wastewater treatment plants within the county accept septage wastes. The Two Bridges Facility, which began operations after the initial draft of this report, is now accepting septic wastes generated within its service area. The Roxbury Plant accepts all of the septic tank clean out wastes collected within the municipality, amounting to about 360,000 gallons per year. This waste is fed directly into the raw sludge holding tank. The Parsippany-Troy Hills facility accepts about 120,000 gallons per year of septic wastes collected in Montville Twp., Mountain Lakes Boro, and Parsippany-Troy Hills Twp. itself, representing the municipalities utilizing the facility for wastewater treatment. The waste is accepted at the plant from private haulers with receipts detailing the point of origin. The RVRSA facility in Parsippany-Troy Hills Twp. accepts about 400,000 gallons of septic tank clean out wastes per year collected and stored in a holding tank in the town of Boonton. This holding tank feeds a sewer main for travel to the treatment plant. In combination, the three treatment plants currently accept an estimated 12%—17% of the septic tank cleanout waste generated within the county. A summary of the use of treatment plants for disposal of this waste is provided in Table 1-37.

At the present time, none of the existing landfills in Morris County are permitted to accept septic tank clean out wastes. Disposal of this waste onto Morris County farmlands is currently not being practiced. Thus, the 85% of the septic tank clean out waste generated in Morris County which is not accepted at an in-county wastewater treatment facility must be exported out of the county for purposes of disposal. Table 1-38 lists the quantities and disposal locations of septic tank clean out wastes exported from sources in Morris County as provided in the 1977 SWA collector/hauler reports.

Prior to the end of 1978, a sizeable portion of the septic wastes collected in Morris County were transported by tank truck to Kearny or Bayonne for barging to sea. As of December 31, 1978, ocean disposal of all septic wastes was ceased as part of New Jersey's implementation plan to meet the 1981 ocean disposal termination deadline.

3. "201" Facilities Planning. In the Program Guidance Document distributed to the Solid Waste Management Districts, the SWA mandated that the solid waste management plans must conform with current 201 facilities planning. In an effort to comply with this objective, projections for future sewage sludge and septic wastes generation in Morris County have been estimated based upon new facilities construction and expansion of existing facilities as currently forseen by the 201 planning agencies.

The service area of the individual Facilities Planning Area (FPA) is in many cases defined by the area drainage basin crossing both municipal and county boundaries. Owing to the fact that population projections are a cornerstone in the development of waste projections, and that the

TABLE 1—37

SEPTIC TANK CLEAN OUT WASTES DISPOSAL AT
MORRIS COUNTY WASTEWATER TREATMENT FACILITIES

Facility	Location	Gallons of Septic Tank Clean Out Wastes Accepted per Year	Waste Origin
Roxbury TP	Roxbury Twp.	360,000	Roxbury Twp.
Parsippany-Troy Hills TP	Parsippany-Troy Hills Twp.	120,000	Parsippany-Troy Hills Twp., Montville Twp., Mountain Lakes Boro
RVRSA	Parsippany-Troy Hills Twp.	400,000	Boonton Town
Total		880,000	

TABLE 1—38

SEPTIC TANK CLEAN OUT WASTES EXPORTED FROM MORRIS COUNTY IN 1977

Disposal Location	Gallons of Septic Clean Out Wastes
Fairfield Boro, Essex County	559,500
Kearny Town, Hudson County*	1,218,625
Bayonne City, Hudson County*	463,950
Sparta Twp., Sussex County	618,500
Lafayette Twp., Sussex County	160,400
Raritan Boro, Somerset County	50,000
New York (Various)	400,000
Total	3,470,975

*Note: No delineation is made between wastes disposed of in Hudson County landfills and those loaded on barges in Hudson County locations for ocean disposal.

population projections supplied to us by the Planning Board were categorized based upon municipal boundaries, each Morris County municipality was assumed to lie within one and only one FPA when projections were compiled. While this may vary the waste projections for some individual FPA's, the countywide totals remain virtually unchanged.

Five Facilities Planning Areas are wholly contained within Morris County. Portions of five additional FPA's are included within the County boundaries. Table 1-39 lists these ten FPAs and the county municipalities included within the area.

With the exception of the nearly completed Two Bridges facility in Lincoln Park Boro, no new major wastewater treatment facilities are to be constructed in the County prior to 1990. Projected increases in wastewater flows are to be incorporated into the several existing facilities which are to undergo expansion.

A discussion of the expansion plans for each FPA has been provided, followed by a tabular summary of sewage sludge and septic waste generation projections for the FPA for 1985 and 1990. Table 1-40 lists the assumptions utilized when making these projections. The generation of sewage sludge is inversely related to the generation of septic wastes. Excluding new population, an increase in the generation of sewage sludge would correspond to a decrease in septic waste generation. New population may utilize septic systems, wastewater treatment facilities, or a combination of the two. Due to this relationship, maxima and minima for these waste types have been projected for each FPA. A maximum projection for sewage sludge generation corresponds to the minimum projection of septic wastes for the FPA, with the reverse also holding true. The Florham Park treatment plant in the Livingston-Florham Park FPA receives an average flow of 0.8 mgd. With a design flow of 1 mgd, the excess capacity deems it capable of serving the expected increase in the Boro's population by 1990 as well as extending service to all Boro areas currently utilizing septic systems. (See Table 1-41).

The Musconetcong Sewerage Authority plant in the Musconetcong FPA plans to expand its facility from its present 1 mgd to between 4 and 4.5 mgd. It plans to encorporate previously unsewered areas in Jefferson, Mt. Arlington, Roxbury, and Mt. Olive townships, as well as providing service to the expected population growth in the Boro of Netcong which is presently serviced by the facility. See Table 1-42.

The Parsippany-Troy Hills facility serving the Parsippany-Troy Hills FPA is designed to receive 16 mgd while currently receiving about 7 mgd. The average flow is expected to increase due to extension into previously unsewered areas of Parsippany-Troy Hills and Montville, population increases within the FPA, with an additional 2 mgd as a portion of East Hanover is to be serviced by the facility (See Table 1-43).

The major facility in the Pequannock River Basin FPA is the Butler-Bloomingdale treatment plant. The presently over burdened facility is to be expanded to 3.1 mgd, providing sewage service to Butler and Kinnelon Boros. Riverdale Boro, also within the EPA, is not to be sewered prior to 1990 (See Table 1-44).

TABLE 1–39

"201" FACILITIES PLANNING AREAS FOR MORRIS COUNTY

Facility Planning Area	Morris County Municipalities
1. Livingston-Florham Park	Florham Park Boro
2. Musconetcong Sewerage Authority	Netcong Boro Jefferson Twp.* Mt. Arlington Boro
3. Parsippany-Troy Hills	Parsippany-Troy Hills Twp. East Hanover Twp. * Montville Twp. Mountain Lakes Boro
4. Pequannock River Basin	Bulter Boro Kinnelon Boro Riverdale Boro
5. Pequannock, Lincoln Park, & Fairfield	Lincoln Park Boro Pequannock Twp.
6. Rockaway Valley Regional Sewerage Authority	Boonton Town Boonton Twp. Denville Twp. Dover Town Rockaway Boro Rockaway Twp. Victory Gardens Boro Wharton Boro
7. Roxbury	Roxbury Twp.. Mine Hill Twp.
8. Upper Passaic	Madison Boro Chatham Boro Chatham Twp. Passaic Twp.
9. Washington-Mt. Olive	Washington Twp. Mt. Olive Twp.*
10. Whippany River Basin	Morris Twp. Morristown Town Hanover Twp. Morris Plains Boro Randolph Twp. *

*A portion of these municipalities lie within another FPA

TABLE 1—40

The following assumptions were utilized in the prediction of maximum and minimum sewage sludge and septic waste quantities:

Maximum Sewage Sludge Production (Minimum Septic Wastes Production)

1. All proposed facility expansions, including the installation of all wastewater collection systems, are completed prior to 1985.

2. If sufficient facility capacity exists, all new population within the facility's planning area is sewered.

3. If additional capacity exists, portions within the planning area currently relying on septic systems become sewered prior to 1985.

4. Design capacities of wastewater facilities are not exceeded prior to 1990.

5. Current per capita wastewater generation rates were calculated for each facilities planning area by dividing current average flow by the current sewered population. For presently unsewered areas, a rate of 100 gallons per capita per day was assumed. The per capita generation rate as calculated or estimated was assumed to apply to all present and future population.

6. Sludge production per unit volume of treated wastewater will remain unchanged through 1990.

Maximum Septic Wastes Production (Minimum Sewage Sludge Production)

1. Flows to existing facilities remain unchanged through 1990 due to delays in plant expansions or to delays in the installation of additional wastewater collection networks.

2. All additional population in the County through 1990 utilizes septic systems.

3. In all areas, a septic wastes per capita generation rate of .0848 gallons per capita per day (32.78 gallons per capita per year) was assumed.

TABLE 1—41

FACILITIES PLANNING AREA: LIVINGSTON — FLORHAM PARK

Facility	1979 Flow (mgd)	1979 Sludge Production (million gallons per year)	1985 Flow (mgd)	1985 Sludge Production (million gallons per year)	1990 Flow (mgd)	1990 Sludge Production (million gallons per year)
Florham Park TP	0.8	0.46	0.87	0.50	0.9	0.52

Planning Area Totals (million gallons per year)	1979	1985	1990
Maximum Sludge Production	0.46	0.5	0.52
Minimum Sludge Production	0.46	0.46	0.46
Maximum Septic Waste Production	0.013	0.024	0.034
Minimum Septic Waste Production	0.013	0	0

TABLE 1—42

FACILITIES PLANNING AREA: MUSCONETCONG SEWERAGE AUTHORITY

Facility	1979 Flow (mgd)	1979 Sludge Production (million gallons per year)	1985 Flow (mgd)	1985 Sludge Production (million gallons per year)	1990 Flow (mgd)	1990 Sludge Production (million gallons per year)
Musconetcong TP	0.85	3.94	4	18.5	4	18.5
High Ridge Water and Sewer Co. TP	0.07	0.015				

Planning Area Totals (million gallons per year)	1979	1985	1990
Maximum Sludge Production	3.96	18.5	18.5
Minimum Sludge Production	3.96	3.96	3.96
Maximum Septic Waste Production	.58	.65	.73
Minimum Septic Waste Production	.58	0	0

TABLE 1–43

FACILITIES PLANNING AREA: PARSIPPANY–TROY HILLS

	1979		1985		1990	
Facility	Flow (mgd)	Sludge Production (million gallons per year)	Flow (mgd)	Sludge Production (million gallons per year)	Flow (mgd)	Sludge Production (million gallons per year)
Parsippany-Troy Hills TP	7	9	10.8	13.88	12	15.43
Montville MUA TP	0.035	0.0055				

Planning Area Totals (million gallons per year)	1979	1985	1990
Maximum Sludge Production	9	13.88	15.43
Minimum Sludge Production	9	9	9
Maximum Septic Waste Production	0.88	1.06	1.23
Minimum Septic Waste Production	0.88	0.18	0.32

TABLE 1—44

FACILITIES PLANNING AREA: PEQUANNOCK RIVER BASIN

Facility	1979 Flow (mgd)	1979 Sludge Production (million gallons per year)	1985 Flow (mgd)	1985 Sludge Production (million gallons per year)	1990 Flow (mgd)	1990 Sludge Production (million gallons per year)
Butler Bloomingdale	2.25	1.4	2.9	1.77	3.0	1.84

Planning Area Totals (million gallons per year)	1979	1985	1990
Maximum Sludge Production	1.4	2.9	3.0
Minimum Sludge Production	1.4	1.4	1.4
Maximum Septic Waste Production	.14	.17	.20
Minimum Septic Waste Production	.14	0	0

Encompassing all three municipalities, the Pequannock, Lincoln Park and Fairfield FPA will utilize the nearly completed Two Bridges facility in Lincoln Park for wastewater generated within the planning area. With a design flow of 7.5 mgd, the facility will have ample capacity to provide sewage service for the entire current and predicted planning area population and may accept all wastewater now being treated at the lesser existing facilities within the area (See Table 1-45).

Included within the Rockaway Valley Regional Sewage Authority (RVRSA) Facilities Planning Area are Boonton Town, Boonton Township, Denville Township, Dover Town, Rockaway Boro, Rockaway Township, Victory Gardens Boro, Wharton Boro, and a portion of Randolph Township. The RVRSA treatment plant, located in Parsippany-Troy Hills, currently accepts and average flow of 7.4 mgd. By expanding to 12 mgd, the facility plans to expand its service area to a portion of the FPA currently relying upon septic systems in addition to providing service to a portion or all of the increase in population expected in the area. (See Table 1-46).

The Roxbury FPA includes Roxbury and Mine Hill Townships. The major wastewater treatment facility in the area, located in Roxbury Township, currently accepts an average flow of 0.85 mgd from areas within the municipality. Planned expansion to 3 mgd should prove sufficient to allow incorporation of the expected sizeable population increase within the FPA, as well as a minor net reduction in the number of people relying upon septic systems. A further reduction in the septic population should occur as a portion of Roxbury Township is to be served by the Musconetcong Sewerage Authority's treatment plant in Stanhope. Mine Hill Township is not planned to be sewered prior to 1990 (See Table 1-47).

Included within the Upper Passaic FPA are wastewater treatment facilities in Chatham Boro, Chatham Township, and Passaic Township. The Madison-Chatham Joint Meeting facility has a design capacity of 4 mgd, and currently receives an average flow of 3 mgd. The present excess capacity allows for sewering of the expected population increases in the two Boros through 1990.

The Main Plant in Chatham Township accepts an influent approximating its design capacity of 0.75 mgd. Expansion of the plant as planned to 2 mgd will enable the facility to service those presently utilizing septic systems as well as all expected increases in population by 1990.

The trickling filter plant in Passaic Township plans to expand its capacity to 2 mgd. It currently accepts nearly 0.65 mgd, which is its design capacity. Expansion of the facility will allow for the incorporation of flows currently undergoing treatment in smaller facilities in Warren Township, as well as allowing for additional population within the township through 1990. (See Table 1-48).

The Washington-Mt. Olive FPA is currently served by two major facilities in Washington Township and several minor facilities in Mt. Olive Township. The Hackettstown MUA facility in Washington Township plans to double its current design capacity of 1.65 mgd, with most of its influent originating outside of Morris County. The Schooley's Mountain facility in Washington

TABLE 1–45

FACILITIES PLANNING AREA: PEQUANNOCK, LINCOLN PARK, AND FAIRFIELD

Facility	1979 Flow (mgd)	1979 Sludge Production (million gallons per year)	1985 Flow (mgd)	1985 Sludge Production (million gallons per year)	1990 Flow (mgd)	1990 Sludge Production (million gallons per year)
Lincoln Park	.09	.07	0	0	0	0
Pequannock (2 plants)	1.6	.33	0	0	0	0
Two Bridges	0	0	7.5	8.5	7.5	8.5

Planning Area Totals (million gallons per year)	1979	1985	1990
Maximum Sludge Production	.4	8.5	8.5
Minimum Sludge Production	.4	.4	.4
Maximum Septic Waste Production	.061	.063	.065
Minimum Septic Waste Production	.06	0	0

TABLE 1–46

FACILITIES PLANNING AREA: ROCKAWAY VALLEY REGIONAL SEWAGE AUTHORITY

Facility	Flow (mgd)	1979 Sludge Production (million gallons per year)	Flow (mgd)	1985 Sludge Production (million gallons per year)	Flow (mgd)	1990 Sludge Production (million gallons per year)
RVRSA TP	7.4	8.4	12	13.62	12	13.62

Planning Area Totals (million gallons per year)	1979	1985	1990
Maximum Sludge Production	8.4	13.62	13.62
Minimum Sludge Production	8.4	8.4	8.4
Maximum Septic Waste Production	1.09	1.21	1.33
Minimum Septic Waste Production	1.09	1.02	1.03

TABLE 1–47

FACILITIES PLANNING AREA: ROXBURY TOWNSHIP

Facility	Flow (mgd)	1979 Sludge Production (million gallons per year)	Flow (mgd)	1985 Sludge Production (million gallons per year)	Flow (mgd)	1990 Sludge Production (million gallons per year)
Roxbury Twp. TP	0.85	1.5	3.0	5.3	3.0	5.3

Planning Area Totals (million gallons per year)	1979	1985	1990
Maximum Sludge Production	1.5	5.3	5.3
Minimum Sludge Production	1.5	1.5	1.5
Maximum Septic Wastes Production	0.59	0.69	0.77
Minimum Septic Wastes Production	0.59	0.13	0.25

TABLE 1—48

FACILITIES PLANNING AREA: UPPER PASSAIC BASIN

Facility	Flow (mgd)	1979 Sludge Production (million gallons per year)	Flow (mgd)	1985 Sludge Production (million gallons per year)	Flow (mgd)	1990 Sludge Production (million gallons per year)
Madison-Chatham Joint Meeting	3	3.2	3.03	3.25	3.07	3.3
Chatham Twp. TP	0.75	0.1	0.87	0.12	0.94	0.13
Passaic Twp. TP	0.65	0.1	1	0.15	2	0.31

Planning Area Totals (million gallons per year)	1979	1985	1990
Maximum Sludge Production	3.4	3.52	3.74
Minimum Sludge Production	3.4	3.4	3.4
Maximum Septic Wastes Production	0.015	0.066	0.12
Minimum Septic Wastes Production	0.015	0	0

Township plans expansion from its present 0.2 mgd to 0.5 mgd. This expansion will allow for the expected population increase by 1985, after which all new population will require individual septic systems. The Eagle Rock facility in Mt. Olive Township plans to expand from its current 0.25 mgd capacity to 1.25 mgd by 1990 (See Table 1-49).

Within the Whippany River Basin FPA are two treatment plants in Morris Township, and two others in Hanover Township and Morristown. The woodland plant in Morris Township is to expand from its current design capacity of 2 mgd to 2.5 mgd. The Butterwoth Plant in Morris Township is to expand to 3.3 mgd, with 0.6 mgd of this flow originating in Randolph Township. Combined, the expanded plants will have the capacity to receive wastewater generated by the two predicted population increases in Morris Township and Morris Plains Boro as well as the sewering of the portion of the FPA now relying upon individual septic systems.

The Morristown Department of Sewers plant currently accepts about 2 mgd, which exceeds its design capacity of 1.5 mgd. The facility is to expand to 2.5 mgd, although a decline in population is expected between now and 1990.

The 1.5 mgd facility in Hanover Township is expanding to 3 mgd, a capacity enabling it to treat all of the wastewater generated by the expected 1990 population increase as well as the sewering of all areas currently utilizing septic systems within the Township (See Table 1-50).

Chester Boro, Chester Township, Mendham Boro, Mendham Township, and Harding Township as of this time have not been included in submitted 201 facilities plans. The Mendham Boro treatment plant represents the only major facility located within the "unplanned" area. Actual flow at this facility should achieve the design flow of 0.5 mgd prior to 1985. The majority of the unplanned area will rely upon septic systems through 1990. (See Table 1-51).

Table 1-52 provides county-wide projections of sewage sludge generation by FPA for 1985 and 1990. Table 1-53 lists corresponding septic wastes generation projections.

The current and predicted sludge generation rates indicate the volumes of sludge produced prior to the application of sludge dewatering techniques, such as bed drying or vaccuum filtration. Hence, actual volumes requiring disposal may be considerably less than the volume of sludge being generated at each facility.

E. RECOVERED ENERGY AND MATERIALS MARKETS

1. Introduction. RAS Associates conducted a survey to identify potential users of recovered energy and materials in Morris County. A list of potential users was compiled by using the New Jersey State Industrial Directory and major industrial employers within specific four digit standard industrial classification numbers (SIC). In compiling the list, factors such as industrial processes, energy requirements and material requirements of the potential users were considered. Energy market and materials market short form questionnaires were prepared and sent to each of the potential users. A copy of each questionnaire appears in Appendix 1.

TABLE 1—49

FACILITIES PLANNING AREA: WASHINGTON/MT. OLIVE

Facility	1979 Flow (mgd)	1979 Sludge Production (million gallons per year)	1985 Flow (mgd)	1985 Sludge Production (million gallons per year)	1990 Flow (mgd)	1990 Sludge Production (million gallons per year)
Schooleys Mountain TP	0.2	0.18	0.5	0.45	0.5	0.45
Hackettstown MUA	1.1	0.985	3.3	3.0	3.3	3.0
Eagle Rock Village	0.15	0.17	0.25	0.28	1.25	1.42

Planning Area Totals (million gallons per year)	1979	1985	1990
Maximum Sludge Production	1.3	3.73	4.87
Minimum Sludge Production	1.3	1.3	1.3
Maximum Septic Wastes Production	0.660	0.90	1.1
Minimum Septic Wastes Production	0.66	0.76	0.63

TABLE 1–50

FACILITIES PLANNING AREA: WHIPPANY RIVER BASIN

Facility	1979 Flow (mgd)	1979 Sludge Production (million gallons per year)	1985 Flow (mgd)	1985 Sludge Production (million gallons per year)	1990 Flow (mgd)	1990 Sludge Production (million gallons per year)
Morris Twp. (2 plants)	2.4	2	4.66	3.9	5.54	4.6
Morristown Dept. of Sewers	2.2	0.9	2.18	0.9	2.18	0.9
Hanover Twp. TP	1.8	2.8	2.2	3.4	2.39	3.7

Planning Area Totals (million gallons per year)	1979	1985	1990
Maximum Sludge Production	5.7	8.2	9.2
Minimum Sludge Production	5.7	5.7	5.7
Maximum Septic Wastes Production	0.83	1.0	1.2
Minimum Septic Wastes Production	0.83	0	0

TABLE 1–51

FACILITIES PLANNING AREA: UNPLANNED AREAS*

Facility	1979 Flow (mgd)	1979 Sludge Production (million gallons per year)	1985 Flow (mgd)	1985 Sludge Production (million gallons per year)	1990 Flow (mgd)	1990 Sludge Production (million gallons per year)
Mendham Boro TP	0.35	0.60	0.50	0.86	0.50	0.86

Planning Area Totals (million gallons per year)	1979	1985	1990
Maximum Sludge Production	0.60	0.86	0.86
Minimum Sludge Production	0.60	0.60	0.60
Maximum Septic Wastes Production	0.53	0.63	0.71
Minimum Septic Wastes Production	0.53	0.57	0.65

*At the present time, the Mendham Boro facility represents the only major wastewater treatment plant within these areas.

TABLE 1–52

COUNTY WIDE PROJECTIONS FOR SEWAGE SLUDGE (MILLION GALLONS PER YEAR)*

Facility Planning Area		1979	1985	1990
1. Livingston-Florham Park	Maximum sludge production	.46	.50	.52
	Minimum sludge production	.46	.46	.46
2. Musconetcong Sewerage Authority	Maximum sludge production	3.96	18.5	18.5
	Minimum sludge production	3.96	3.96	3.96
3. Parsippany-Troy Hills	Maximum sludge production	9.00	13.88	15.43
	Minimum sludge production	9.00	9.00	9.00
4. Pequannock River Basin	Maximum sludge production	1.40	2.90	3.00
	Minimum sludge production	1.40	1.40	1.40
5. Pequannock, Lincoln Park, Fairfield	Maximum sludge production	.40	8.5	8.5
	Minimum sludge production	.40	.40	.40
6. Rockaway Valley Regional Sewage Authority	Maximum sludge production	8.40	13.62	13.62
	Minimum sludge production	8.40	8.40	8.40
7. Roxbury Township	Maximum sludge production	1.50	5.30	5.30
	Minimum sludge production	1.50	1.50	1.50
8. Upper Passaic	Maximum sludge production	3.40	3.52	3.74
	Minimum sludge production	3.40	3.40	3.40
9. Washington-Mt. Olive	Maximum sludge production	1.30	3.73	4.87
	Minimum sludge production	1.30	1.30	1.30
10. Whippany River Basin	Maximum sludge production	5.70	8.20	9.20
	Minimum sludge production	5.70	5.70	5.70
Areas without submitted "201" Facilities Plans	Maximum sludge production	.60	.86	.86
	Minimum sludge production	.60	.60	.60
Totals	Maximum sludge production	36.12	79.51	83.54
	Minimum sludge production	36.12	36.12	36.12

*See Table 1-40 for assumptions

TABLE 1–53

COUNTY WIDE PROJECTIONS FOR SEPTIC WASTES (MILLION GALLONS PER YEAR)*

Facility Planning Area		1979	1985	1990
1. Livingston-Florham Park	Maximum septic waste production[1]	0.013	0.024	0.034
	Minimum septic waste production	0.013	0	0
2. Musconetcong Sewerage Authority	Maximum septic waste production	.580	.650	.750
	Minimum septic waste production	.580	0	0
3. Parsippany-Troy Hills	Maximum septic waste production	0.88	1.06	1.23
	Minimum septic waste production	0.88	0.18	0.32
4. Pequannock River Basin	Maximum septic waste production	0.14	0.17	0.20
	Minimum septic waste production	0.14	0	0
5. Pequannock, Lincoln Park, Fairfield	Maximum septic waste production	0.061	.063	.065
	Minimum septic waste production	0.061	0	0
6. Rockaway Valley Regional Sewage Authority	Maximum septic waste production	1.09	1.21	1.33
	Minimum septic waste production	1.09	1.02	1.03
7. Roxbury Township	Maximum septic waste production	0.59	0.69	0.77
	Minimum septic waste production	0.59	0.13	0.29
8. Upper Passaic	Maximum septic waste production	0.015	0.066	0.120
	Minimum septic waste production	0.015	0	0
9. Washington-Mt. Olive	Maximum septic waste production	0.66	0.90	1.10
	Minimum septic waste production	0.66	0.76	0.63
10. Whippany River Basin	Maximum septic waste production	0.83	1.00	1.20
	Minimum septic waste production	0.83	0	0
11. Areas without submitted "201" Facilities Plans	Maximum septic waste production	.53	.63	.71
	Minimum septic waste production	.53	.57	.65
Totals	Maximum septic waste production	5.39	6.46	7.49
	Minimum septic waste production	5.39	2.66	2.88

*See Table 1-40 for assumptions

[1] Represents amount of septic tank cleanout wastes produced.

Telephone interviews were conducted a few days after the mailing of the questionnaires to quickly identify those industries with an interest in recovered energy and/or materials and to assist them in completing the questionnaire. After the interested companies were identified, plant interviews were arranged with company officials. A summary of the survey mailings and responses is shown in Table 1-54.

2. Results of the Market Survey

a. Materials. Forty surveys were sent to potential material users through the County. A total of eight potential users of recovered materials responded. Of the eight, four (4) indicated a negative response to any type of resource recovery. Mt. Hope Materials Company indicated an interest in receiving recycled materials and also indicated an interest in a Resource Recovery Plant to produce energy (see Table 1-54). The Picatinny Arsenal was uncertain as to their interest in receiving recycled materials. Jersey Central Power & Light Company expressed interest in a resource recovery system. Thatcher Glass indicated a potential use of clean bottle quality glass. Overall, the potential for a recovered materials market in Morris County is good at the present time. Significant users of recovered materials at the present are the Garden State Paper Company who recycle newspaper, and Thatcher Glass who recycle glass (Thatcher Glass is one of the largest users of cullet in the East.).

Whippany Paper Board in Whippany uses a considerable amount of recycled paper, but no information was available on their exact capacity.

b. Energy. 136 surveys were sent to potential energy users. Thirty-one potential users of recovered energy responded to the Energy Market Survey. Of the 31, twelve indicated positive responses in their interest for recovered energy. The data submitted by each industry is shown in Tables 1-56 and 1-57.

The positive responses varied in their level of interest. New Jersey Power & Light Company and the Picatinny Arsenal showed a high level of interest. Eight companies indicated a moderate level of interest, and two indicated low interest in utilizing recovered energy.

Six potential users indicated an interest in some form of RDF as an energy source but most required an economic and feasibility analysis before making a commitment to use RDF. Since all the industries contacted used oil (No. 2, 4, or 6) or natural gas or a combination of these, substantial boiler modifications would have to be made to accommodate RDF combustion. No indication of air pollution control equipment was made by any of the companies burning oil or gas.

The Picatinny Arsenal was the only facility with a boiler originally designed to burn coal. They now burn No. 6 oil. The arsenal could be the primary consumer of RDF in Morris County since modifications of the boiler to burn RDF are feasible and part of the air pollution control equipment required, i.e. scrubbers, are present.

TABLE 1–54
MORRIS COUNTY MARKET SURVEY

STATISTICAL SUMMARY (ENERGY)

Total Number of Inst. (Public & Private) Included in Market Study	136
Total Responses Received	30
Positive Responses (All Accompanied by Relevant Energy Data)	12
Negative Responses (Indicated bv Mail)	10
Negative Responses (Accompanied by Relevant Energy Data	8

STATISTICAL SUMMARY (MATERIALS)

Total Number of Companies Included in Survey	40
Mail Responses Received	8
Positive Responses	2
Negative Responses	5
Questionable Responses	1

TABLE 1—55

POTENTIAL MATERIAL CONSUMERS

Firm (Name and Location)	Contact	Interest In Recycled Materials	Materials Of Interest	Additional Information
Jersey Central Power & Light Co. Morristown, NJ	R.B. Smith Mgr.-Bldgs.	No	None	Interested in operating a portion of a MSW Plant
Mt. Hope Materials Co./ Mt. Hope Mining Co. Wharton, NJ	Richard M. Hale President	Yes	Unspecified	The property owned by this company is "ideally" located for a resource recovery plant. It also adjoins a large government facility that would consume all the energy produced that would not be used by this company
U.S. Army Research & Dev. Command (Picatinny Arsenal) Dover, NJ	Anthony P. Gagas Energy Consv. & Env. Prot. Off.	Uncertain	Unspecified	Interested in a resource recovery system but require more details to decide feasibility of utilization
Thatcher Glass Mfg. Co. Wharton, NJ	John L. Decker Plant Engineer	Yes	Glass	Must be clean glass of bottle quality and type

TABLE 1–56
REFUSE DERIVED ENERGY UTILIZATION POTENTIAL

Firm (Name and Location)	Annual Fuel Consumption	RDF Equivalency (Tons/Yr.)	Energy Form Preferred	Level Of Interest	Long-Term Contract Consideration	Comments
Aircraft Radio & Control Boonton, NJ	$23,000 \times 10^6$ Btu/Yr.	1,769		Low		Interest depends on economics of retro-fitting
Automatic Switch Co. Florham Park, NJ	15.3×10^6 Btu/Hr. $= 1.34 \times 10^{11}$ Btu/Yr. (steam used 24 Hr., 7 days/week)	10,310	RDF	Moderate	Yes	
Dayco/Nat'l Hose Div. Dover, NJ	$83,625 \times 10^6$ Btu/Yr.	6,432	Powder	Moderate	Yes	
Glasflex Corp. Stirling, NJ			High Temp. Water	Low	Yes	
Hewlett Packard Rockaway, NJ	6.737×10^6 Bt./Hr.			No Interest		Interested only in energy recovered for elec.
Jersey Central Power & Light Co.				High		Currently investi-gating refuse re-covery to G.E. in power plants
Pfizer, Inc. Consumer Products Division Parsippany, NJ	$67,805 \times 10^6$ Btu/Yr.	5,216	Steam	Moderate		

TABLE 1–56 (cont.)

Firm (Name and Location)	Annual Fuel Consumption	RDF Equivalency (Tons/Yr.)	Energy Form Preferred	Level Of Interest	Long-Term Contract Consideration	Comments
PVO Int'l Inc. Boonton, NJ	41×10^6 Btu/Hr. $= 3.07 \times 10^{11}$ Btu/Yr. (steam used 24 hr/ day 6 day/wk)	23,616	Powder	Moderate	Yes	Will consider use of RDF if cost of modifying boilers & fuel costs is lower than curren oil burning costs
Rowe Int'l Inc. Whippany, NJ	22.54×10^6 Btu/Hr.		Briquette	Moderate	Yes	Interested only if present equipmen can be converted
Stapling Machine Co. Rockaway NJ			RDF	Moderate	Yes	Want to be assure of an adequate sup ply & price stabilit
Tenco Morris Plains, NJ	30×10^6 Btu/Hr. $= 1.87 \times 10^{11}$ Btu/Hr. 24 Hr./Day - 5 days/wk	14,400	Steam High Temp Water	Moderate	Yes	
The Estee Corp. Parsippany, NJ	12×10^6 Btu/Hr. $= 3.74 \times 10^{40}$ Btu/Hr. (steam used 10 hr./day 7 day/week)	2,880	Steam	Moderate	Yes	Would like to kno specifics of possib steam generation
U.S. Army Research & Dev. Command (Picatinny Arsenal) Dover, NJ	138,064 lb./hr.		Powder or Briquettes	High	Yes	Contract would ha to be negotiated at later date

NOTE: 1 Ton RDF = 13×10^6 Btu
1 Lb. RDF = 6,500 Btu

One 2,500 Ton/Day Resource Recovery Plant will Produce 471,200 Tons of RDF per year.

TABLE 1–57

EXISTING FUEL UTILIZATION OF CANDIDATE RDE CONSUMERS

Firm (Name and Location)	No. of Boilers	Year Installed	Boiler Capacity (Lb./Hr.)	Fuel Type Used	Annual Fuel Consumption
Aircraft Radio & Control Boonton, NJ	1			No. 2 Oil	$23,000 \times 10^6$ Btu/Yr.
Automatic Switch Co. Florham Park, NJ	4	1956 1956 1965 1969		Gas Oil	15.3×10^6 Btu/Hr.
Dayco/Nat'l Hose Div. Dover, NJ	9	5-20 Years Old		Gas No. 2 Oil No. 6 Oil	$83,625 \times 10^6$ Btu/Yr.
Glasflex Corp. Stirling, NJ				Oil Gas	
Hewlett Packard Rockaway, NJ	2	1913 1961		No. 2 Gas No. 4 Gas No. 2 Oil	6.737×10^6 Btu/Hr.
Jersey Central Power & Light Co.					
Pfizer, Inc. Consumer Products Division Parsippany, NJ	3	1958 1965 1970		Gas No. 2 Oil No. 4 Oil	$67,805 \times 10^6$ Btu/Yr.
PVO Int'l Inc. Boonton, NJ	3	1943 1948	41,000 (winter demand)	No. 2 Oil	Winter Avg. Output 41×10^6 Btu/Hr.
Rowe Int'l Inc. Whippany, NJ	2	1950 1960		Gas No. 4 Oil	22.54×10^6 Btu/Hr.

TABLE 1–57 (cont.)

Firm (Name and Location)	No. of Boilers	Year Installed	Boiler Capacity (Lb./Hr.)	Fuel Type Used	Annual Fuel Consumption
Stapling Machine Co. Rockaway, NJ	2	1948 1954		Oil	
Tenco Morris Plains, NJ	2	1959 1961	Avg. Steam Demand 31,000	No. 6 Oil	30×10^6 Btu/Hr.
The Estee Corp. Parsippany, NJ	1	1976	Avg. Steam Demand 10,000	No. 2 Oil No. 4 Oil Gas	12×10^6 Btu/Hr.
U.S. Army Research & Dev. Command (Picatinny Arsenal) Dover, NJ	1	1956	160,000	No. 6 Oil Coal	138,064 Lb./Hr.

3. Industrial Waste Generation Survey. A survey was sent to nearly 150 major industries within Morris County in hopes of determining industrial waste generation. A copy of the questionnaire can be found in Appendix 1.

Approximately 40 responses were received to the survey. The results are shown in Table 1-58 and were divided into four broad catagories: Office and Research, Light Industry, Paper and Paper Products, and Heavy Industry. Numbers are presented in pounds per employee per day.

As has been the case in many previous industrial surveys, a very wide range of generation rates were reported. Many factors account for these fluctuations including differences in manufacturing processes, compaction, and reporting procedures. These numbers are presented for informational purposes only and were not used in computing future industrial production.

4. Recommendation on Refuse Derived Fuel User. As part of the energy market survey, a meeting was held with the leading candidate refuse derived fuel user (the U.S. Army Research and Development Command at Picattiny Arsenal). At the meeting, it was learned that existing boiler modifications are under consideration, and that boiler modifications to accommodate the firing of RDF could be possible.

Given the location and type of programs conducted at the Arsenal, it was agreed that locating a resource recovery facility on-site would be unlikely, and that the most optimum system of RDF firing would probably involved the delivery of powdered or briquetted prepared fueld to the Arsenal. Fuel preparation would take place at a resource recovery facility located elsewhere in the County.

It was agreed between all parties to keep each other fully informed of future plans. It was further agreed that the next step in the development of a resource recovery facility would be a feasibility study. It is recommended that such a study be conducted jointly by the Arsenal and the County. Following feasibility study completion, final decisions can be made and the necessary institutional and contractural arrangements completed (This will be discussed further in Section IV).

F. PUBLIC INFORMATION AND PARTICIPATION PROGRAM (PIPP)

Under Chapter 326, the solid waste management planning districts are required to "Provide citizens and municipalities with opportunities to contribute to the development and implementation of solid waste management plans by requiring public hearings prior to their adoption . . . .".

The NJDEP guidelines for the preparation of the plan mandate two basic components for the PIPP.

a. A process for keeping the public informed of the district's plan development and implementation program.

TABLE 1–58

INDUSTRIAL WASTE SURVEY

Office and Research

2.8 lb./emp./day
1.6
3.6
19.6
6.05

Light Industry

27.4	3.6
1.6	2.0
5.0	8.2
12.3	3.4
5.1	3.5
15	4.9
3.2	7.2
.9	

Paper and Paper Products

20.7	16.1
1.4	.95
10	
42.9	
4.6	

Heavy Industry

1.7	12
3.4	17.1
3.9	20.5
26	7.4
26	
.6	
4.7	

b. A process for the receipt, evaluation and consideration of public input during plan development and implementation process.

Furthermore, the Guidelines state that the PIPP should involve the following groups:

- The District's Solid Waste Advisory Council
- The Solid Waste Management Industry
- Public Agencies involved in related planning and implementation activities
- The General Public

The Morris County PIPP consists of the following elements:

- News bulletin
- Public Meetings
- Collector/Hauler Surveys

A complete compilation of PIPP features is included in the PIPP Supplement at the completion of plan development.

TASK II

DEVELOPMENT AND EVALUATION OF ALTERNATIVES

TASK II
DEVELOPMENT AND EVALUATION OF ALTERNATIVES

A. INTRODUCTION

This section of the Morris County Solid Waste Management Plan will identify and discuss alternative systems for the collection and disposal of solid wastes. Particular emphasis will be placed on the implementation of resource recovery technologies, which could become operational within five years and provide a long term solution to solid waste management. Possible use of landfill and resource recovery facilities in other counties will also be considered. Source separation program implementation will also be emphasized for near-term waste flow reduction.

Waste management alternatives will be screened by evaluating the environmental and economic feasibility of each. In a subsequent chapter, a solid waste management alternative will be selected and developed into a solid waste management plan. Alternatives for septic and sludge management will be discussed, and septic and sludge management plans will also be selected.

All cost estimates as presented in this section were derived following the same general procedure. Initially, various equipment manufacturers were contacted to obtain a range of price quotes for major equipment purchases. These prices were then increased by a set percentage to include the ancillary costs associated with installation. An estimate for site preparation was combined with land cost, with the purchase price of the land based on required site acreage and average market value of the site(s) investigated. Facilities construction costs, excluding major equipment installation, were estimated based on a unit cost per square foot. Operation and maintenance costs were estimated based on required number of employees, anticipated utilities cost, and a fixed percentage of the purchase price of the major equipment. Finally, these cost estimates were compared to those made available by existing operations throughout the country, and amended as necessary.

A table of estimated costs is presented for each solid waste processing/disposal facility discussed in this Section. Preceeding each table is a listing, detailing the basis for each line item and including assumptions utilized in the computation.

B. RESOURCE RECOVERY SYSTEMS (HIGH TECHNOLOGY)

In the last decade, many types and sizes of resource recovery facilities have been proposed and built in the U.S. and throughout the world. Some of these facilities have been pilot or demonstration type plants, constructed to show how a given technology works.

Due to the rapidly dwindling landfill space in Northern New Jersey, it is important that any resource recovery technology considered be well developed. In addition, the technology must be implementable within a few years. Leading candidate technologies that meet this criteria include mass burning, refuse derived fuel (RDF) and pyrolysis. Each of these technologies will be reviewed.

Not considered in this section is the co-disposal of solid waste and sewage sludge through anaerobic digestion. Although methane, a valuable fuel, is produced as an end product of this "bioconversion" process, the required technology is at the present time in the research and laboratory scale test stage, with commercial scale implementation a possibility only in the latter stages of the planning period.

1. Mass Burning. The most common type of mass-burning resource recovery facility currently proposed for waste disposal is waterwall incineration. The generation of steam from burning unprocessed refuse in waterwall boilers has been practiced for more than 20 years in Europe. Its rapid acceptance has lead to the construction of several hundred units in Europe and Japan ranging in size from less than 100 tons per day to more than 2,000 tons per day in an Amsterdam facility. In the United States, the few plants which have been built have all been built since 1967.

Steam is produced at a rate of from one to three pounds per pound of solid waste, depending on design, operating conditions and the heat value of the solid waste. The steam can be used directly in turbines to drive major industrial process equipment or it can be used in a turbo-generator to produce electricity. A new conceptual application is co-generation or feeding the steam to an extracting steam turbine to generate electricity with a portion of the steam extracted for use as process steam. Technically, mass burning refuse boilers have demonstrated good and reliable performance and have received national acceptance.

Waterwall combustion systems are available from firms such as Wheelabrator-Frye, Inc. (WFI), Universal Oil Products (UOP) and Titan Environmental Services. WFI, headquartered in Boston, Massachusetts represents the Von Roll Company of Zurich. Its Saugus, Massachusetts facility is the most successful commercial facility in the United States. Other WFI facilities are planned for Logan Township in Gloucester County, New Jersey, Minneapolis-St. Paul and Westchester County, New York. UOP is a wholly owned subsidiary of the Signal Company, a large company involved in oil exploration, refining and distribution of petroleum based products. UOP is in the process of negotiating for resource recovery projects in the North Andover area of northeastern Massachusetts and in Pinellas County, Florida (near Tampa). Titan Environmental Services is located in Paramus, New Jersey. The Environmental Service Division is in the business of designing, constructing, financing and lease-operating resource recovery facilities. The Titan firm has stated that the constitutional and institutional constraints in New Jersey have kept them from structuring any projects for the state.

In the mass burning system, unprocessed municipal solid waste is deposited on a tipping floor, then pushed into a large storage pit. A loading crane mixes the refuse before transferring it to the furnace feed hopper, as shown in Figure 2-1. From the feed hopper, the waste is fed onto mechanical grates where continuous combustion occurs as it travels through the furnace. Non-combustibles fall off the end of the grate, are quenched with water and then conveyed to trucks for transport to a residue disposal site. Ferrous metal is generally recovered from the residue conveyor.

As the waste travels on the grate, the combustion reduces the volume by approximately 95% and the heat energy is conveyed to the water filled boiler tubes in the upper section of the furnace. Generated steam is piped to the market user. The flue gases, after transferring their heat, pass through an electrostatic precipitator for cleaning prior to stack discharge.

The basic difference between the available commercial systems lies in the boiler tube configuration, type of grate and excess air requirements. Boiler tubes are arranged to maximize the efficiency of heat transfer without causing excessive tube failure through corrosion. The three types of grates used are the reciprocating (back and forth), rocking and traveling grate. Each differ in the manner in which they agitate and turn the refuse over to facilitate burn out and maximize heat release. Air is introduced in the furnace beneath the grates (underfire air) to aid in combustion and to keep the grates cool. Air is also introduced above the refuse bed (overfire air) to promote mixing of the gases (turbulence) and to aid in combustion. These variables and the resident time and temperature combine to offer different processing methods.

Figure 2-2 illustrates an energy balance for a typical mass burning refuse boiler. In a well designed and operated unit, energy conversion efficiencies could exceed the 62% shown. Design changes in boiler tubes, for example, can allow the furnace to operate at lower excess air levels. This will result in reducing flue gas losses and accordingly raise the availability of BTU sold per BTU input. A 1000 ton per day plant can market approximately 190,000 lbs. of saturated steam per hour.

Economic transport of steam dictates that the market user be no more than two miles of the facility. In addition, condensate return from market is preferred to reduce overall system energy requirements. Finally, since refuse is a heterogeneous material, it is important that the crane operator properly mix the feed before charging. Insufficient mixing not only reduces the stability of steam produced but also can cause damage to the grates.

Progress has been made on adding new refuse boiler capacity in the United States. No new contracts, however, have been signed since late 1976. Several potential applications are now in the negotiating stage or in the final evaluation stage. The twin cities of Minneapolis and St. Paul, Minnesota are particularly noteworthy since they are presently closing contracts for a 1500 ton per day facility.

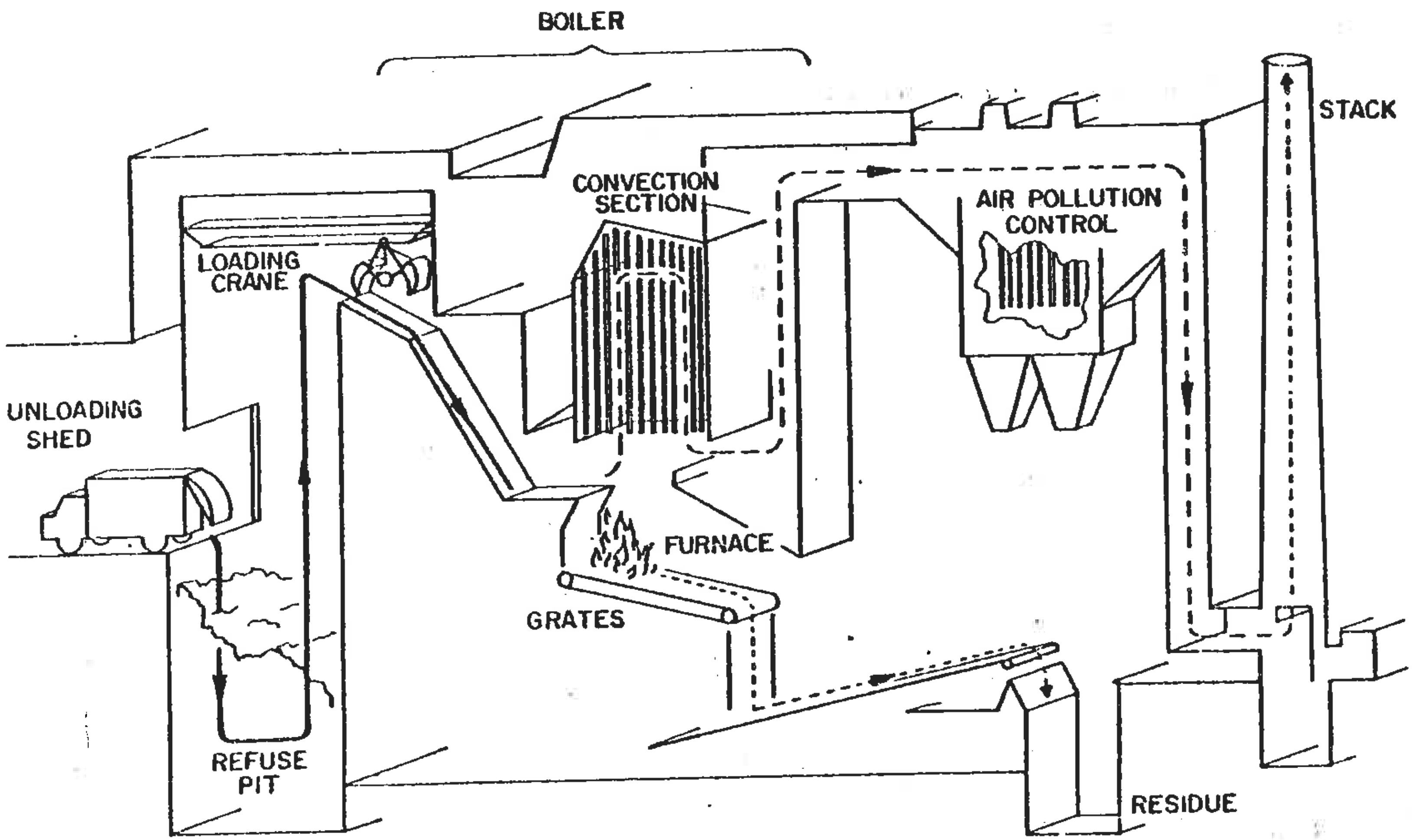


FIGURE 2-1 TYPICAL WATERWALL FURNACE

Source: USEPA, Resource Recovery Plant Implementation, Technologies

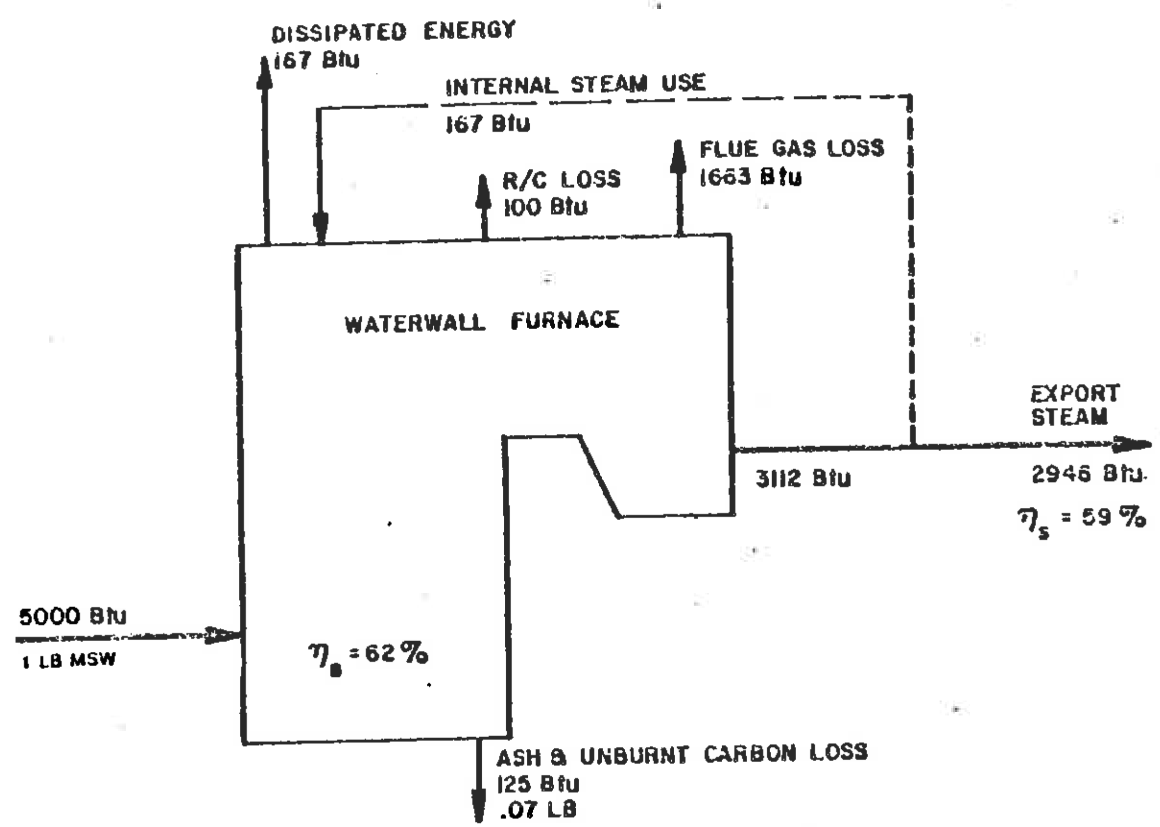


FIGURE 2-2 TYPICAL WATERWALL FURNACE ENERGY BALANCE

Source: USEPA, Resource Recovery Plant Implementation, Technologies

Cost estimates for 1000 and 1500 ton per day mass burning facilities are shown in Table 2-1. Cost information shown in the table does not represent any specific system, but rather an average cost of a typical waterwall combustion facility. Tipping fees are estimated to be between $16 and $32 per ton (June 1979 dollars) including a credit for recycled energy and materials. Assumptions made in completing the estimated are as follows:

Operation:

(1) Processing capacities of 1000 and 1500 tons per day.

(2) Furnace or boiler operation of 6 days per week, 24 hours per day, year-round.

(3) Installed, design or rated capacity 25 percent greater than processing capacity or 1250 and 1875 tons per day, respectively, i.e., boiler availability of 80 percent.

(4) Throughput at processing capacity; i.e., 100 percent utilization of processing capacity.

(5) Annual throughput of 312,000 and 468,000 tons per year, respectively.

System Capital Cost:

(1) 2 boilers for 1000 and 1500 ton per day plants.

(2) Saturated steam conditions, i.e., virtually no superheat.

(3) Auxiliary fossil fuel firing and/or auxiliary fossil fuel boiler.

(4) Ferrous recovery.

Other Capital Costs – Includes:

(1) Bonding or Financing Cost – Monies expended to investment banking firm, authority, legal counsel and consultants for services rendered in executing the sale of the bond issue.

(2) Net Interest Cost During Construction – Cost attributable to the differential between the interest on construction financing and the interest on bond income.

TABLE 3-1

COST ESTIMATE

WATERWALL INCINERATOR PROJECTS (1,000's OF DOLLARS)

	1,000 Tons/Day (312,00 Tons/Yr.)	PROCESSING CAPACITY 1,500 Tons/Day (468,000 Tons/Yr.)
CAPITAL		
System	$ 73 – 78,000	$ 78 – 83,000
Net Interest During Construction	2,300	2,500
Debt Service Reserve	7,300	8,400
Operating Cost Reserve	3,200	4,500
Bonding Cost	1,800	2,000
Start-Up Contingency	2,900	3,200
Land and Site Preparation	1,000	1,300
CAPITAL COST RANGE	$ 91,500 - 96,500	$ 99,900 – 104,900
AVERAGE CAPITAL COST	$ 94,000	$ 102,400
ANNUAL COSTS		
Operation & Maintenance	$ 3,900 – 5,400	$ 5,400 – 7,[illegible]
Amortization of Capital	9,300 – 9,800	10,200 – 10,700
ANNUAL COST	$ 13,200 – 15,300	$ 15,600 – 18,000
UNIT COST ($/Ton)	$42.30 - $49.03	$ 33.33 - $ 39.74

June 1979 Dollars

TABLE 3-1(cont.)

COST ESTIMATE

WATERWALL INCINERATOR PROJECTS (1,000's OF DOLLARS) Cont.

		PROCESSING CAPACITY
	1,000 Tons/Day (312,000 Tons/Yr.)	1,500 Tons/Day (468,000 Tons/Yr.)
REVENUES		
Steam Sales	$ 4,500	$ 6,700
Ferrous Sales	270	410
Interest on Debt Service Reserve and Operating Cost Reserve (6-1/2%) simple interest)	680	840
SUBTOTAL	$ 5,450	$ 7,950
ANNUAL DISPOSAL CHARGE	$ 7,750 - 9,850	$ 7,650 - 10,650
UNIT DISPOSAL CHARGE ($/Ton)	$24.83 - 31.57	$16.35 - 22.76

June 1979 Dollars

(3) Start-Up Contingency — Funds expended during the start-up period when revenues are negligible.

(4) Debt Service or Bond Reserve — Bond sales typically contain a reserve fund to protect the bondholders (capital contingency).

(5) Operating Cost Reserve — Fund created to cover operating contingencies such as operator non-performance, major unscheduled repairs, alternative differential disposal costs or some other unpredictable change in operation.

(6) Land and site preparation at $50,000 per acre.

Excludes:

(7) Capital cost associated with residue disposal.

(8) Cost of replacing major system components.

It should be noted that the estimated cost of waterwall incineration includes the direct feed of refuse into the incinerator. The estimated cost of refuse derived fuel (presented later) does not include the cost of transportation to the location where the fuel is fired. If the distance between the RDF facility and the location where the fuel is fired becomes more than ten miles, the cost difference between RDF and waterwall incineration narrows.

2. Pyrolysis. The generation of pyrolytic gas from solid waste, while being successful on the pilot scale has had a problematic history at the demonstration scale. The most notable failure occurred due to the inadequate performance of the U.S. EPA sponsored 1000 ton per day Monsanto Langard pyrolysis system in Baltimore, Maryland. The more recent closure of the 200 ton per day Occidental Petroleum pyrolysis unit in San Diego, California marked the end of major corporate investment in this technology. The probability of procuring the significant capital funds necessary for construction of a commercial scale pyrolysis facility at this time could well be hampered in light of these unsuccessful efforts. However, new processes are still being tried, and many of these processes offer promising solutions to the technical problems of the past.

One of the leading pyrolysis systems is the Union Carbide Purox System. The system is designed to convert municipal solid waste (and sludge in some cases) into a clean burning, low sulfur fuel gas; an inert, glassy aggregate; and ferrous metal for recycling. The wastewater stream produced is cleaned before being discharged into a sanitary sewer system.

The gases leaving the pyrolytic reactor contain 30 to 40 percent moisture which is removed in a gas cleaning unit, along with ash, tars and other combustible liquids. The resultant fuel gas contains approximately 65 percent CO and H_2 in a ratio of about two to one. The heating value ranges from 300 to 390 Btu/cu.ft. as compared with natural gas at 1050 Btu/cu. ft.

The pyrolysis process involves three fundamental steps: refuse preparation, pyrolysis and gas cleaning as shown in Figure 2-3. Refuse preparation involves the use of refuse shredder to reduce the size of municipal solid waste. Shredded refuse is conveyed past a magnetic separator that extracts ferrous metals, before being introduced into the pyrolysis reactor by air locking feed rams.

The key component of the Purox system is the vertical shaft furnance, where shredded solid waste passes through three processing zones. Oxygen is introduced in the lower zone at a rate of about 0.2 tons per ton of solid waste. In the upper zones, refuse is dried by hot gases; in the middle zone, refuse is pyrolyzed into gases, liquids and char; in the bottom zone, the oxygen reacts with the char to provide the heat required (approximately 3000 Deg. F.) to melt or slag any non-combustible materials. The molten slag mixture continuously drains into a water quench tank. The residue is extracted through a water seal and is collected as a hard granular aggregate. Gas cleaning equipment removes condensables and leaves the fuel gas suitable for a waste heat boiler.

The majority of energy consumed in the Purox process is in refuse shredding and oxygen production. See Figure 2-4. Fuel gas production is about 11 cubic feet per pound of solid waste. If the fuel is used in a boiler, the combustion efficiency would approximate 90 percent, with a net system efficiency of about 58 percent. The energy products, therefore, can be low-Btu fuel gas, steam and/or electricity. For some applications in the United States, consideration has been given to adding conventional back-end process technology to produce either ammonia (NH_3), methanol (CH_3OH) or methane (CH_4), however, the economic viability remains uncertain.

The Purox process has been demonstrated at a prototype demonstration plant in South Charleston (200 tons per day). Currently, Union Carbide is marketing 350 tons per day Purox modules. Tests have also been made to accommodate sewage sludges into the Purox process (co-disposal). Figure 2-5 shows a typical mass balance of one type of co-disposal arrangement.

Cost estimates for 1,000 and 1,500 ton per day pyrolysis facilities are shown in Table 2-2. Cost information shown in the table represents the approximate costs of a Purox type pyrolysis system. Tipping fees are estimated to be between \$23 and \$40 per ton (June 1979 dollars), including credits for the sale of pyrolytic gas and recycled materials. Assumptions used in completing the estimate are as follows:

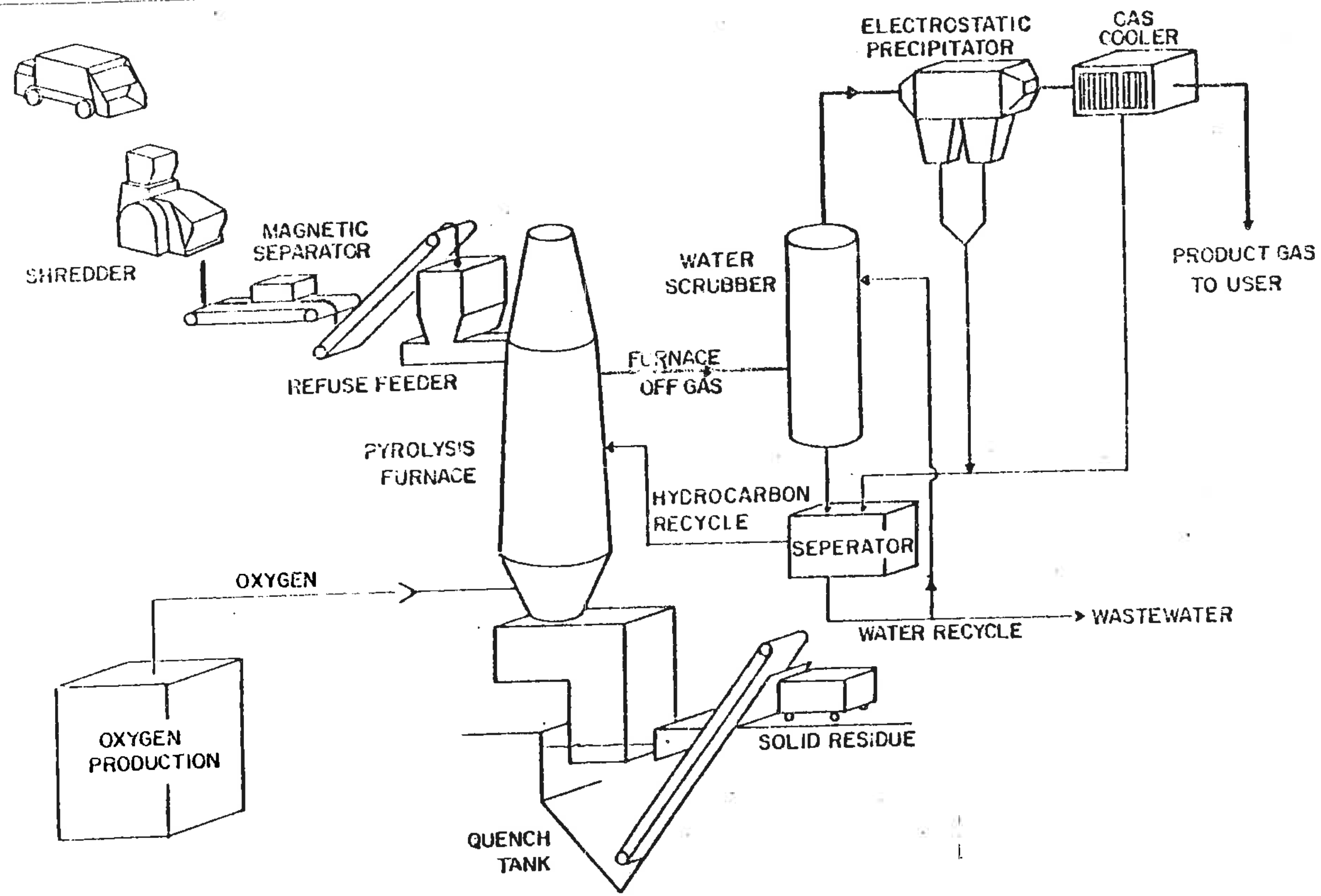


FIGURE 2-3 UNION CARBIDE PUROX SYSTEM

Source: USEPA, Resource Recovery Plant Implementation, Technologies

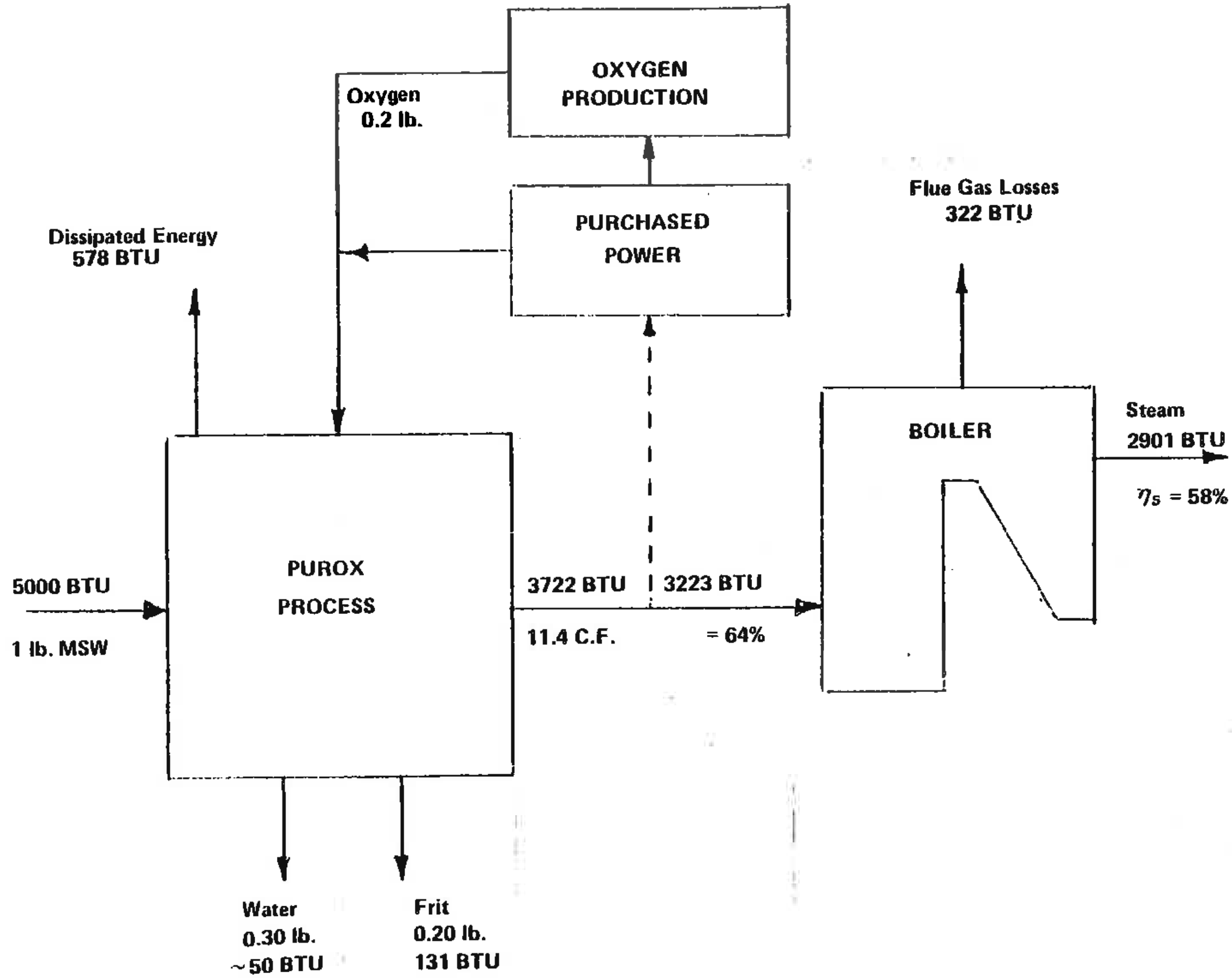
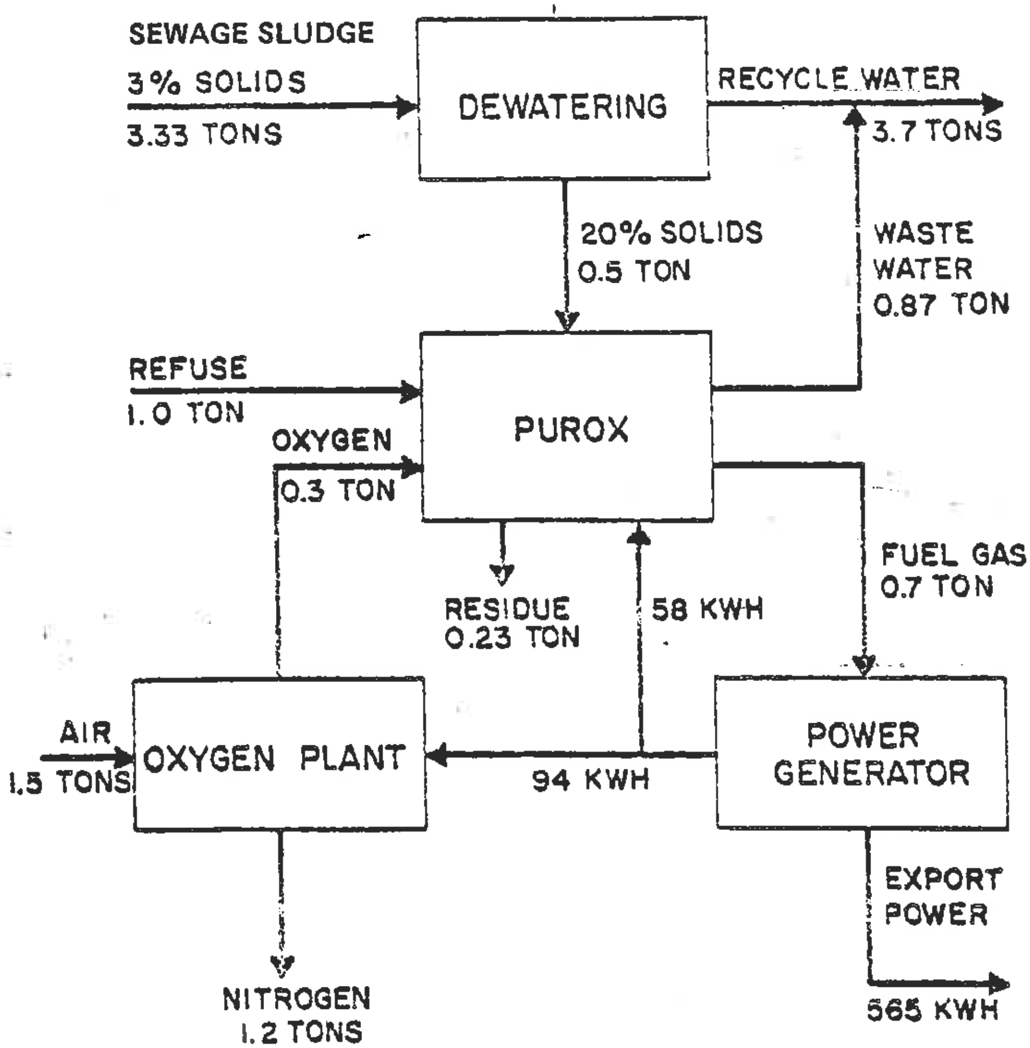


FIGURE 2-4
ENERGY BALANCE FOR PUROX SYSTEM
Source: USEPA, Resource Recovery Plant Implementation, Technologies



CO-DISPOSAL OF SEWAGE SLUDGE
AND REFUSE IN THE PUROX SYSTEM

FIGURE 2-6

TABLE 2-2

COST ESTIMATE

PUROX PYROLYSIS PROJECTS (1,000's OF DOLLARS)

	PROCESSING CAPACITY	
	1,000 Tons/Day (312,000 Tons/Yr.)	1,500 Tons/Day (468,000 Tons/Yr.)
CAPITAL		
System	$75,000 - $ 95,000	$ 95,000 – $ 115,000
Bonding Cost	2,000	2,400
Net Interest During Construction	2,500	3,000
Start-Up Contingency	3,000	3,800
Debt Service Reserve	8,000	9,600
Operating Cost Reserve	3,500	5,000
Land and Site Preparation	1,000	1,200
CAPITAL COST RANGE	$95,000 – $115,000	$120,000 – $ 140,000
AVERAGE CAPITAL COST	$105,000	$130,000
ANNUAL COSTS		
Operating & Maintenance	$ 4,700 –$ 6,200	$ 6,600 – $ 8,900
Amortization of Capital	9,700 – 11,700	12,200 – 14,300
ANNUAL COST	$14,400 – $ 17,900	$ 18,800 – $ 23,200
UNIT COST	$46.15 - $ 57.37	$ 40.17 - $ 49.57
ANNUAL REVENUES		
Gas Sales	$ 3,800	$ 5,700
Ferrous Sales	760	1,100
Interest on Debt Service	750	950
Reserve & Operating Cost Reserve (6-1/2% Simple Interest)		
Subtotal	$ 5,310	$ 7,750
ANNAUL DISPOSAL CHARGE	$ 9,090 – $ 12,590	$ 11,050 – $ 15,450
UNIT DISPOSAL CHARGE	$29.13 - $40.35	$23.61 - $33.01

June 1979 Dollars

All costs are in June 1979 dollars.

Operation:

(1) Processing capacities of 1000 and 1500 TPD.

(2) Furnace operation of 6 days per week, 24 hours per day, year-round.

(3) Installed, design or rated capacity of 29%, greater than processing capacity of 1400 and 2100 TPD, respectively.

(4) Throughput at processing capacity, i.e., 100% utilization of processing capacity.

(5) Annual throughput of 312,000 and 468,000 tons per year, respectively.

(6) No co-disposal.

System Capital Cost:

(1) 4 – 350 TPD modules for 1000 TPD plant, and 6 – 350 TPD modules for 1500 TPD.

(2) Oxygen plant and Unox plant.

(3) Fuel produced is 350 Btu/cu. ft.; i.e., no methanation unit.

(4) Auxiliary fossil fuel boiler.

Other Capital Costs — Includes:

(1) Bonding or Financing Cost – Monies expended to investment banking firm, authority, legal counsel and consultants for services rendered in executing the sale of the bond issue.

(2) Net Interest Cost During Construction — Cost attributable to the differential between the interest on construction financing and the interest on bond income.

(3) Start-Up Contingency – Funds expended during the start-up period when revenues are negligible.

(4) Debt Service or Bond Reserve — Bond sales typically contain a reserve fund to protect the bondholders (capital contingency).

(5) Operating Cost Reserve — Fund created to cover operating contingencies such as operator non-performance, major unscheduled repairs, alternative differential disposal costs or some other unpredictable change in operation.

(6) Land and site preparation at $50,000 per acre.

Excludes:

(7) Capital cost associated with residue disposal, however not likely.

(8) Cost of replacing major system components.

Alternative pyrolysis systems include those available from Torrax and Occidental. The basic differences in the Torrax System as compared to the Purox system is that no refuse preprocessing is required, hot air is used in the vertical combustion chamber instead of oxygen and the resultant fuel gas, with its relatively low Btu content, is injected in a waste heat boiler and recovered as steam. In the United States, Torrax was developed by Carborundum and Andco in their 75 ton per day (TPD) pilot plant in Orchard Park, New York.

The Occidental process (originally the Garrett system) utilizes fluff RDF, together with the heated solid residue after the pyrolysis reaction, as feed to a vertical, stainless steel reactor. The material exiting the reactor consists of a mixture of char, ash and pyrolytic gases. The gases are rapidly cooled to produce an oil-like liquid fuel. The pyrolytic oil is expected to have a heating value of approximately 10,500 Btu per pound as compared with 18,000 Btu per pound for No. 6 fuel oil.

3. Refuse Derived Fuel (RDF). During the 1970's, the development of refuse derived fuel (RDF) technology has come from a concept to the installation of several commercial facilities. RDF processes mechanically extract the combustible fraction of municipal solid waste for use as a substitute for fossil fuels.

Initially, development was slow because the market was not receptive to solid fuels. In the 1960's, the country made a transition from coal to gaseous and liquid fossil fuels. Air pollution laws and the excellent availability of low cost oil and natural gas caused the change to new types of boilers, without ash handling equipment. When the impact of the Arab oil embargo was felt by industries and utilities, plans for future energy supply began to adjust. While no definitive conclusions have been reached, a new trend is being established. The United States will be converting to a more balanced usage of fossil fuels with a higher percentage of coal in the energy mix.

In the State of New Jersey, 50 percent of the industrial boilers are more than 25 years in age and approximately half of these are in excess of 30 years old. During the next five to ten years, most of these boilers will be replaced. Corporate management, not wanting to be held captive to an oil based energy supply, is investigating steam boilers which have the capability to burn oil, gas, coal and/or a suitable fossil fuel substitute.

The opportunities to link energy supply problems with solid waste disposal are numerous with successful applications inevitable. Processes to manufacture RDF in sizes from 4 inch to a powder have demonstrated good performance and are commercially available. In addition, steam boilers which use RDF have been ruled by the Internal Revenue Service as tax exempt capital equipment items.

Many large boiler manufacturers in the United States – Foster Wheeler, Babcox and Wilcox, Combustion Engineering and Erie City Boiler – have recognized the opportunities. They have designed the "dedicated" boiler which is capable of firing 100 percent RDF. One dedicated boiler facility is currently under construction at the Hooker Chemicals and Plastics Corporations plant in upstate New York.

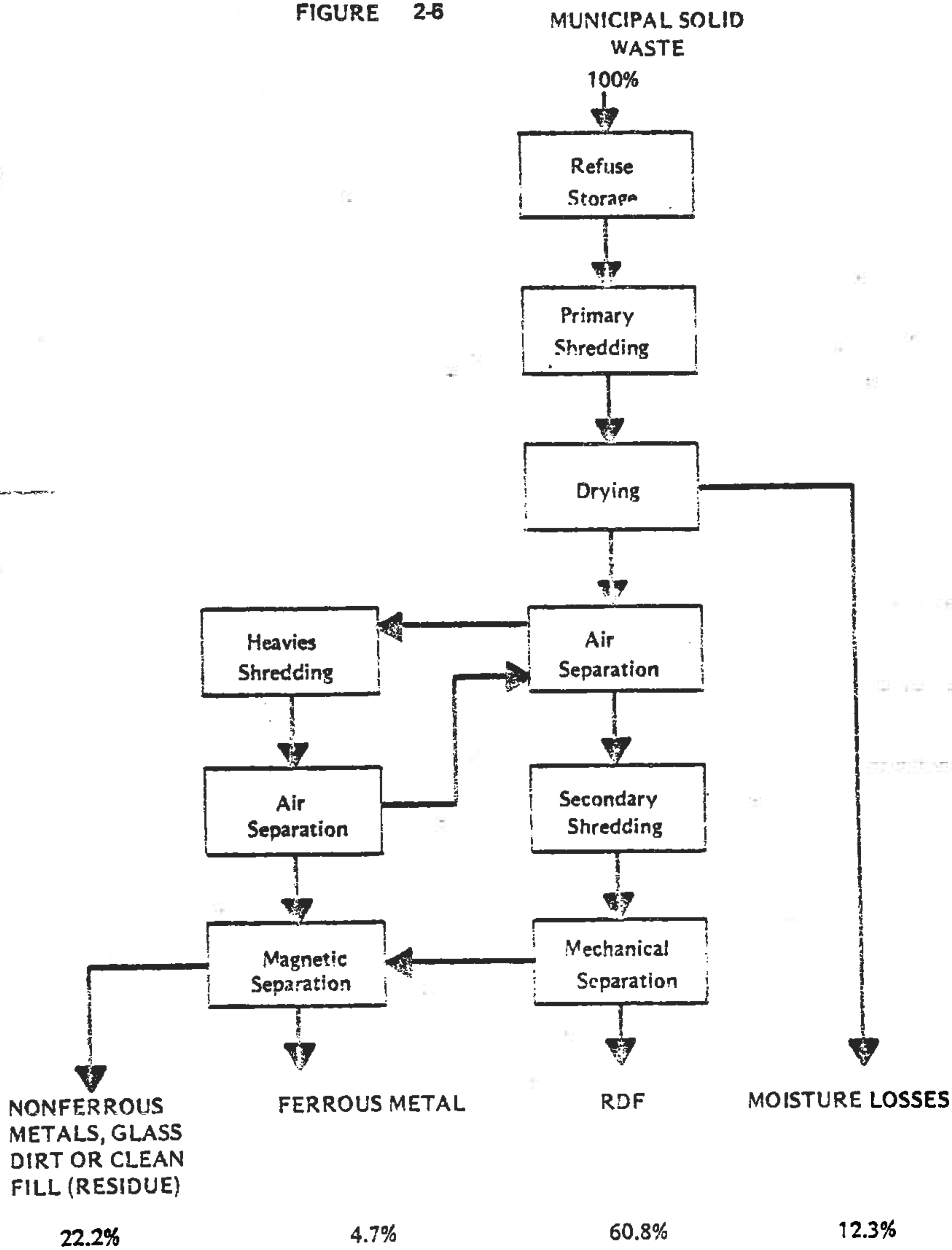
The traditional approach to RDF application is also well underway. This approach consists of modifying existing boilers to pneumatically feed RDF for co-firing in coal boilers. Facilities currently operating in Milwaukee, Wisconsin, Brockton, Massachusetts and Ames, Iowa are successful producing RDF for co-firing large boilers.

Currently, emphasis has been placed on the recovery of materials from solid municipal waste. Materials considered for recovery include ferrous and non-ferrous metals, glass, paper and even plastics. Considering present day technology, only the recovery of ferrous and non-ferrous metals appears to be viable economically. However, due to the dry type separation employed at RDF plants, additional technologies can easily be added to recover more portions of the recycleable waste stream, as the technology becomes economically viable.

An RDF plant is a processing facility where municipal solid waste is shredded and classified. Several types of RDF can be produced: fluff RDF, pelletized RDF and powder RDF. The RDF must have the physical and combustion properties necessary to make it compatible with the specific boiler-furnace firing and ash handling system being considered. Figure 2-6 is a schematic representation of a typical process train showing approximate quantities of RDF, ferrous metals and other non-combustibles.

RDF PROCESS SCHEMATIC DIAGRAM

FIGURE 2-6



Fluff RDF burns efficiently in suspension as it falls down through the turbulent flame zone of a boiler. It can be burned in both suspension-fired and cyclone fired boilers, and in certain stoker and spreader-stoker fired boilers. It is most applicable to large utility-class boilers, however, new combustion systems such as fluidized-bed furnaces may also be amenable, as they become available for commercial use. Particle sizes generally range from 1/4 inch to 2 inch for co-firing with pulverized coal, however, particle sizes of 4 inch minus have provided efficient burnout for dedicated boilers.

Upon delivery to the site, the solid waste is dumped on a concrete pad sufficient in size to store an adequate supply of waste. Specially equipped front end loaders pick up the refuse and deposit it on a conveyor belt for feeding the primary shredder. After size reduction, the waste moves to an air dryer, where moisture is removed. The drying process facilitates further processing and permits the production of a fuel with a uniform moisture content. After drying, the shredded refuse is air classified to separate the light combustible fraction from the heavier non-combustible fraction containing ferrous and non-ferrous metals, glass and miscellaneous materials. The light fraction undergoes further size reduction and mechanical separation to remove most of the remaining fine non-combustibles. The RDF product would then be conveyed to delivery vehicles or stored in silos on-site.

The heavy fraction is further shredded and classified to separate any remaining combustibles which are recycled to the first air separator. The heavies are then combined with non-combustibles rejected from the mechanical separator and fed to a magnetic separator where the ferrous metals are recovered for sale. The remaining non-combustibles, consisting principally of glass, dirt and non-ferrous metals such as aluminum, zinc, lead and copper, could be further processed for materials recovery or placed in a landfill.

Fuel can be reclaimed from storage at the fuel processing plant and delivered to packer trucks or rail cars for shipment to a dedicated boiler or co-fired boiler. Alternatively, it can be moved pneumatically if the steam plant is located near the fuel preparation plant. When the fuel is delivered via truck or rail, it is transferred pneumatically to storage bins at the steam plant. The air used to transport the fuel is exhausted to the atmosphere, after passing through a bag filter to remove particulates, or can be used as combustion air.

The transport of RDF can be costly when the product must be hauled from the refuse processing plant to the boiler site. This entails surge storage after processing, transportation, and re-storage at the boiler plant. Significant savings and system simplicity can be accomplished when the RDF plant is within conveyor (pneumatic, mechanical) distance of the boiler plant.

Figure 2-7 illustrates one method of receiving and firing RDF. The storage bins are large, rectangular, straight-walled steel bins with "live bottoms". Rotating screw or drag conveyors reclaim the fuel from the base of the storage bin and convey it to the pneumatic transport unit. The pneumatic feeder meters the flow of RDF to a boiler for suspension burning. For co-firing applications, the RDF is fed between coal-fired burners to assure contact with high-temperature flame and complete combustion. Feed rates of 20 percent RDF (80 percent coal), on a BTU supplied basis, have been achieved, but not consistently.

The recovered ferrous is prepared for market by several stages of shredding, classification and magnetic separation, using equipment presently employed by the auto shredding industry. The ferrous fraction generally consists of flat chips of metal, nominally two inches (2") in size with traces of organics. Market studies indicate that ferrous scrap is acceptable for detinning, or can be sold directly to the steel industry.

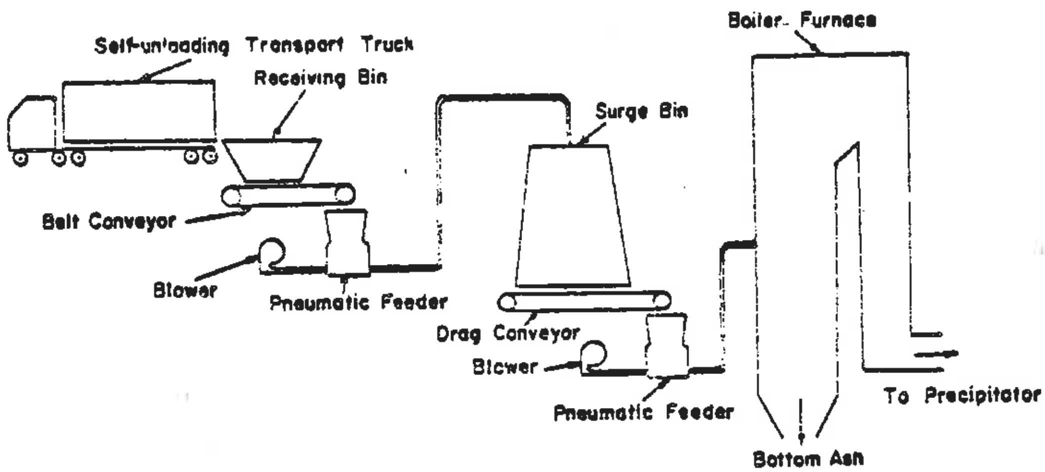
The non-ferrous metals, glass, dirt, and other dense components of the municipal solid waste stream can be further processed to recover marketable items. One process train involves the use of a trommel (inclined rotating circular screen), a rising current separator, shear shredder, rod mill, and screens to produce a 30 percent enriched non-ferrous mix. The economic feasibility is marginal, but increasing with time, as unit processes are refined and arranged to accommodate market requirements. The non-ferrous, non-combustible stream can also be heat-treated to burn off the contained organics and sterilize the residue, or it can be landfilled without further processing.

An energy balance for a typical fluff RDF plant is offered as Figure 2-8. It is based on a system having two-stage shredding, a trommel screen, air classification, and truck transport to a user 15 miles away. Sixty-two (62) percent of the refuse received is assumed recovered as RDF. The process illustrated previously in Figure 2-6 included drying and classification of non-combustibles. The energy expended for drying and non-combustible separation would be offset by the increased recovery yield. Therefore, Figure 2-8 provides a reasonable estimate of energy inputs and outputs.

RDF can have a nominal particle size of twenty to thirty mesh (screen sizing) up to four inches. Densified and powder RDF forms are available commercially. RDF can be densified into a briquette or pelletized form to simulate that of solid coal or coke. The densified forms are more convenient to handle than fluff-RDF and more compatible with stoker-type furnaces. A pulverized powder-like RDF has, perhaps, the greatest overall applicability to existing combustion systems. Powder RDF requires significantly greater levels of investment for processing than fluff, and would inevitably have to be offered at a higher cost than fluff. The most highly developed processing system for powdered RDF is the Eco-Fuel II[R] concept, patented by Combustion Equipment Associates. Such a facility is presently under design for a site in Newark, New Jersey.

FIGURE 2-7

RDF RECEIVING AND FIRING FACILITY



Source: Energy from Solid Waste, Cheremisinoff and Morresi, 1976, p. 53.

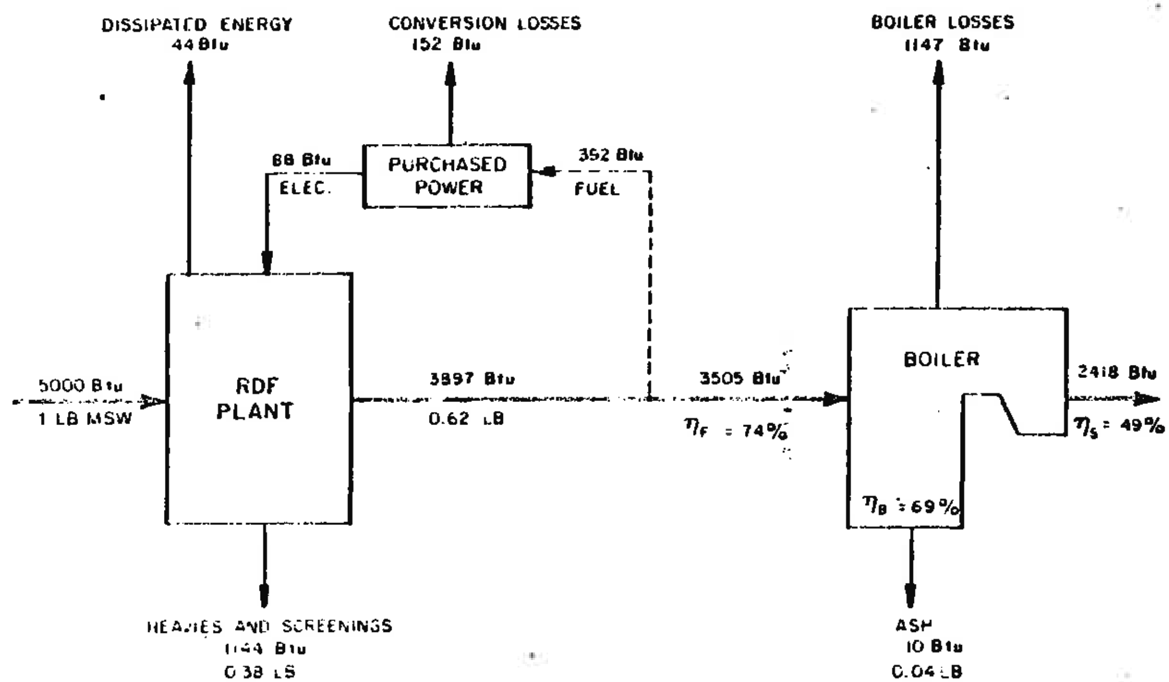


FIGURE 2-8 FLUFF RDF ENERGY BALANCE

Source: USEPA, Resource Recovery Plant Implementation, Technologies

Cost estimates for 1000 and 1500 tons per day RDF facilities are shown in Table 2-3. Cost estimates shown in the table represent typical values for a pelletized fuel type RDF facility. Without sale of the non-ferrous mix, tipping fees are estimated to range between $9 and $15 per ton (1979 dollars). Assumptions made in completing the cost estimates are as follows:

Operation:

(1) Processing capacities of 1000 and 1500 tons per day.

(2) RDF plant operation of 6 days per week, 24 hours per day, year-around.

(3) Installed, design or rated capacity 25 percent greater than processing capacity or 1250 and 1875 tons per day, respectively; i.e., processing equipment availability of 80 percent.

(4) Throughput at processing capacity; i.e. 100 percent utilization of processing capacity.

(5) Annual throughput at 312,000 and 468,000 tons per year, respectively.

System Capital Cost:

(1) RDF plant with ferrous and 30 percent enriched non-ferrous mix recovery sub-systems.

(2) Two dedicated boilers at RDF user location with air pollution control.

(3) RDF transport vehicles and RDF storage bins.

Other Capital Costs — Includes:

(1) Bonding or Financing Cost — Monies expended to investment banking firm, authority, legal counsel and consultants for services rendered in executing the sale of the bond issue.

(2) Net Interest Cost During Construction — Cost attributable to the differential between the interest on construction financing and the interest on bond income.

(3) Start-Up Contingency — Funds expended during the start-up period when revenues are negligible.

TABLE 2-3

COST ESTIMATE

REFUSE DERIVED FUEL PLANT WITH DEDICATED BOILER FIRING PELLETIZED FUEL
(1,000's OF DOLLARS)

	1,000 Tons/Day (312,000 Tons/Yr.)	1,500 Tons/Day (468,000 Tons/Yr.)
CAPITAL		
RDF PLANT	$ 26,000 - 31,000	$ 38,000 – 43,000
Dedicated Boilers	6,300	8,400
Subtotal	$ 32,300 – 37,300	$ 46,400 – 51,400
Bonding Cost	800	1,100
Net Interest During Construction	1,100	1,600
Start-Up Contingency	1,400	1,900
Debt Service Reserve	3,400	4,800
Operating Cost Reserve	2,100	2,900
Land and Site Preparation	1,100	1,300
CAPITAL COST RANGE	$ 42,200 – 47,200	$ 60,000 – 65,000
AVERAGE CAPITAL COST	42,400	62,500
ANNUAL COSTS		
Operating and Maintenance	$ 4,500 – 5,000	$ 5,700 – 7,100
Amortization of Capital	4,300 – 4,800	6,100 – 6,600
ANNUAL COST	$ 8,800 – 9,800	11,800 – 13,700
UNIT COST	$ 28.20 - 31.41	$25.21 - 29.27

June 1979 Dollars

TABLE 2-3 (Cont.)
COST ESTIMATE
REFUSE DERIVED FUEL PLANT WITH DEDICATED BOILER FIRING PELLETIZED FUEL (cont.)
(1,000's OF DOLLARS)

	1,000 Tons/Day (312,000 Tons/Yr.)	1,500 Tons/Day (468,000 Tons/Yr.)
ANNUAL REVENUES		
RDF Sales	$ 4,150	$ 6,170
Ferrous Sales	760	1,100
30% Enriched Non-ferrous mix	670	1,000
Interest on Debt Service Reserve & Operating Cost Reserve	350	500
Subtotal	$ 5,930	$ 8,770
ANNUAL DISPOSAL CHARGE	$ 2,870 - 3,870	$ 3,030 - 4,930
UNIT DISPOSAL CHARGE	$ 9.20 - 12.40	$ 6.47 - 10.53
UNIT DISPOSAL CHARGE WITHOUT REVENUE FROM NON-FERROUS MIX	$ 11.37 - 14.55	$ 8.61 - 12.67

June 1979 Dollars

(4) Debt Service or Bond Reserve — Bond sales typically contain a reserve fund to protect the bondholders (capital contingency).

(5) Operating Cost Reserve — Fund created to cover operating contingencies such as operator non-performance, major unscheduled repairs, alternative differential disposal costs or some other unpredictable change in operation.

(6) Land and site preparation at $50,000 per acre.

Excludes:

(7) Capital cost associated with residue disposal.

(8) Co-generation equipment.

(9) Cost of replacing major system components.

(10) Cost of RDF transport (RDF plant to firing location).

4. Modular Incineration, as the name implies, makes use of one or more small scale incinerator "modules" for the combustion of various materials, including solid waste. This modular concept shows particular promise in the area of solid waste disposal for smaller communities whose waste generation rate is insufficient to justify several disposal alternatives where economic considerations mandate economy of scale.

The use of small scale incinerators was common practice in the past. In many instances, these units were located on site, for use by apartment houses or commercial institutions. Unfortunately, these early designs often resulted in emissions of smoke, particulates and odors due to incomplete combustion of the waste material. The addition of costly pollution control equipment proved to be prohibitive for small incineration units. As the need for protecting the environment become apparent, more stringent air pollution codes were enacted nationwide, signaling a rapid decline in the use of small as well as large incinerators as a waste disposal technique. In general, increased use of landfills was the end result.

More recently, technological advances in combination with dwindling land area amenable to landfilling have spurred renewed interest in incineration for both solid waste disposal and energy recovery in the form of steam. Until recently, waterwalled incinerators received the bulk of attention in this area, with many successful large scale operations in Europe leading the way for similar applications in this country. However, the high capital and operating costs of these incinerators dictate the use of large facilities to take advantage of economies of scale. Such large operations require waste volumes characteristic of the larger metropolitan areas.

The modern modular incinerator offers promise in overcoming size limitations as well as pollutant emission problems. Reduction of emissions to achieve current ambient air quality standards may be accomplished through utilization of a multiple chamber "starved" or controlled air incineration. In this system, the primary incineration chamber is used to volatilize the waste in an atmosphere difficient of oxygen, in much the same way a pyrolysis system operates. Unlike a pyrolysis process, a secondary chamber is provided in which the volatized products are ingnited in the presence of excess air to complete the combustion process (See Figure 2-9). Some innovative designs utilize the heat of combustion of these volatile products as transmitted in the fluegas as the energy source for the firing of a waste heat boiler, recovering energy in the form of steam.

Although modular incinerator offers promise as a disposal alternative for some small communities or industries, application of this technology on a county-wide basis would be difficult to implement due to the more complex financial and institutional arrangements needed for multiple facilities. Moreover, greater than 40 individual 25 TPD modules would be required within the county by 1985, with each module grouping requiring its own steam market to offset the significant capital and operating costs associated with this option. Thus, modular incineration appears limited to application on an individual community or industry basis; its use as a full county alternative will be omitted from subsequent discussion.

C. LANDFILLING

Land disposal of solid wastes has been practiced since early times. Primarily due to economic considerations, this low technology approach to solid waste disposal remains the most widely used disposal technique in the State of New Jersey.

Current landfill practice differs greatly from that in the past. Initially, solid waste was deposited on a selected piece of land and allowed to decompose in the open air; hence the term "open dump." Problems associated with these "dumps" include odors, airborne litter, contamination of ground and surface waters, and the harborage of disease vectors such as flies, mice, and rats.

Utilizing the significant fuel content in solid wastes, "dumps" were often set aflame to effect volume reduction. These "open burning dumps" added air pollution emissions to an already lengthy list of environmental insults.

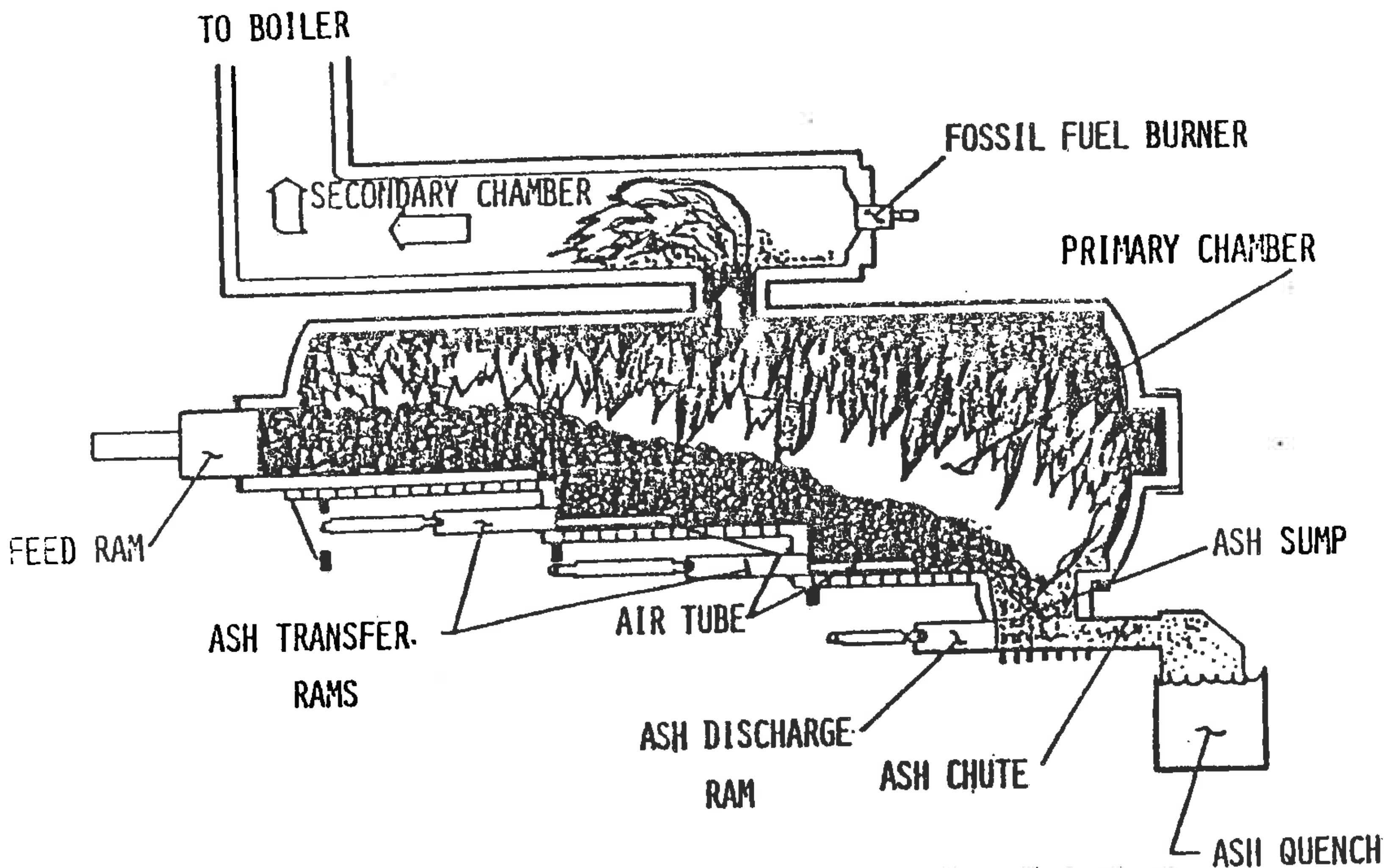


Figure 2-9 Cross section through a typical CS 1200 MSW continuous starved air incinerator.

In the early 20th century, the practice of burying solid waste with earth materials began to gain in acceptance. In the more recent past, implementation of further strategies designed to mitigate environmental problems associated with this land disposal technique lead to the concept of a "sanitary landfill." Currently, state of the art refinements to sanitary landfilling operations have led to the concept of a "secure" or "controlled" sanitary landfill.

A controlled sanitary landfill is a disposal facility designed to isolate the waste material from the surrounding environment and thereby minimize adverse environmental impact. These isolation techniques vary from one facility to the next, but most incorporate some or all of the following procedures.

1. Cover. Three stages of covering with earth materials are utilized in a properly operated sanitary landfill. Daily cover is applied at the end of the operational day to the working surface of the compacted waste material, which may be exposed no longer than 24 hours under DEP regulations. Consisting of a minimum six inch thickness after compaction, daily cover serves to minimize odors, to prevent entrainment of material in the wind, to serve as a precipitation and fire barrier, and to deny disease vectors access to the waste for food or shelter. Intermediate cover, with a minimum thickness of 1 foot after compaction, serves the same functions as daily cover, although by virtue of its thickness remains effective for much longer periods. Exposure of this type of cover is limited to a maximum of six months by state regulations. Final cover, mandated to have a minimum thickness of 2 feet by the state, provides the isolation functions of daily and intermediate covers, in addition to serving as a growth medium for vegetation atop the completed fill area.

2. Lining/Leachate Control. The sides and bottom of the fill area may be lined with impermeable material so as to prevent the leachate water from percolating through the waste contaminating groundwater supplies. Where sufficient distance exists between the groundwater and the fill bottom, natural attenuation of the leachate through physico-biological action in the subsurface soils may occur, and liners need not be utilized. For the most part, the depth to the water table is minimal in the State of New Jersey, mandating the use of one or more layers of lining material.

Recent innovations include the lining of the surface of the completed landfill with impermeable material. Such a design may incorporate a two layer final cover. The lower layer may be of impermeable material, the upper lay of soil more conducive to the growth of vegetation.

A leachate collection system may be located atop the bottom liner in areas where percolated water will collect. This highly polluted liquid may undergo treatment so as to remove inorganic materials and destroy potentially harmful organisms.

Treated leachate may be spray irrigated upon areas with intermediate or daily cover to enhance evaporation, or may be delivered to local sewage treatment plants for further treatment.

3. Gas Venting. Decomposition of waste material in the anaerobic environment of a sanitary landfill leads to the generation of significant quantities of gaseous decomposition products, primarily carbon dioxide and methane. Lateral methane migration may constitute a hazard to the surrounding area. A system of methane vents in the fill area allows vertical escape of the lighter than air methane, mitigating problems due to lateral migration. These vents may be incorporated into a collection system for use of the off gas as a low grade gaseous fuel.

4. Compaction. Prior to the application of cover material, heavy equipment with a minimum gross weight of 10,000 pounds should travel over the waste one or more times. Such a procedure compacts the waste, conserving valuable landfill space. Properly compacted waste may exhibit an in place density of greater than 1000 pounds per cubic yard. Poor compaction practices enhance erosion of cover material while wasting useable volume.

5. Grading and Drainage. To minimize the generation of leachate, proper grading of the landfill site must serve to divert precipitation and subsequent runoff from the fill area. Ponding of water upon exposed fill surfaces is indicative of poor grading and drainage practices.

6. Monitoring Wells. Periodic analysis of the groundwater at various points within and around the fill area is necessary to detect the initiation of groundwater contamination in the event of failure of the liner to contain leachate generated within the fill area.

The aforementioned techniques designed to protect the environment require significantly greater capital and operating expenditures than those encountered in simplistic "open dumps". Table 2-4 provides cost estimates for a 1000 ton per day and 1500 ton per day controlled sanitary landfill.

Assumptions made in completing the cost estimate are as follows:

- 50 foot fill height.
- On-site leachate pretreatment with discharge to sanitary sewer.
- In-place refuse density of 1000 pounds per cubic yard.
- 312 operating days per year.

TABLE 2-4

COST ESTIMATE

CONTROLLED SANITARY LANDFILL (1,000's OF DOLLARS)

	1,000 Tons/Day (312,000 Tons/Yr.)	1,500 Tons/Day (468,000 Tons/Yr.)
CAPITAL COSTS		
Synthetic Bottom Liner	2,178	3,267
Leachate Collection System	760	1,140
Leachate Treatment Plant	820	1,189
Land	750	1,125
Site Preparations & Engineering	930	1,302
Clay "Cap" Liner	1,734	2,601
Revegetation	125	187
Ditching and Berming	78	117
Capital Cost	7,375	10,928
ANNUAL COSTS		
Salaries	227	340
Utilities	83	120
Engineering, Administration, Lab	50	70
Operating Equipment		
— Amortization	241	360
— Operation	125	187
Amortization of Capital	750	1,111
Annual Cost	1,476	1,658
Unit Cost (with on-site cover)*	$ 4.73	$ 3.54
Unit Cost (with off-site cover)*	5.08	3.89
Unit Cost (with off-site cover & scales) *	5.15	3.96

*exclusive of profit

June 1979 Dollars

- 8% inflation factor for capital recovery calculations.

- Land costs of $6,000 per acre.

- 10 year landfill life expectancy.

D. COLLECTION/TRANSFER SYSTEMS

1. Collection Practices. Collection of municipal solid wastes may be accomplished by municipal forces, by private haulers under contract to a municipality (municipal contract collection) or by private haulers through agreements with individual households. Commercial and industrial solid waste collection is generally limited to private haulers under agreement with commercial/industrial establishments. An optimal collection system must complement the selected disposal alternative to insure an effective county-wide solid waste management plan.

From the standpoint of collection efficiencv, two major factors are payload density and travel distance. Payload density has been found to vary with the size and condition of the collection vehicle. Large trucks (25 cubic yards or more) generally achieve greater densification. The same holds true for newer trucks. Commonly, private haulers utilize larger trucks and replace them on a more frequent basis than municipal forces.

Disposal tipping fees based on cubic yards have traditionally encouraged a collector/hauler, either municipal or private, to achieve the highest payload density possible in order to eliminate excessive disposal costs. Cubic yard tipping fees basically mean that a collector/hauler's disposal costs are a function of the number of trips to the disposal site, not the actual amount of waste transported. This "encouragement" to keep trips to the disposal site at a minimum does not exist for municipalities who operate their own collection fleet and utilize a disposal contract with a landfill. The municipality is charged a fixed fee (on a one to five year basis) by the landfill irregardless of the number of trips to the site.

A conversion of tipping fees based on cubic yards to fees based on tons would eliminate the strongest profit incentive in the solid waste collection system (the less significant incentive to keep trips at a minimum due to transport costs would still remain). The removal of this incentive for high payload density would seriously reduce collection efficiency and increase collection costs.

Collection by private haulers through individual agreements with households represents a fragmented approach which tends to maximize travel distances in the collection scheme. Municipal or municipal contract collection minimize necessary travel by collecting all of the municipal solid wastes in a given area, diminishing the distance between collection stops.

Other varibles influence payload density and collection efficiency, some of which are attitude and supervision of collection crew, type of waste collected, and the weather during collection. However, these factors are basically uniform for both public and private collection crews and cannot be assigned as an advantage to either municipal, municipal contract collection, or private collection.

2. Transfer Systems. In contrast to previously discussed alternatives, a transfer station does not represent a solid waste disposal alternative. The function of such a facility is to optimize haul distances between collection and disposal location, thereby reducing overall disposal costs.

A transfer station is a facility where refuse from collection vehicles is deposited and reloaded into larger vehicles for transport to a disposal location. One transfer trailer is usually capable of accepting the wastes from three or four collection vehicles. The use of one vehicle rather than several to transport this waste to its disposal location forms the basis of the transfer station concept.

Transfer stations vary widely in both size and complexity. A small community may utilize a conveniently placed "roll off" container, hauling it to a disposal site on a regular basis or when it fills. A larger facility may utilize a storage silo or silos, limiting odors and disease vector problems. Compaction equipment may be supplied by the transfer station, or may be self contained in the long haul transfer trailer. A transfer station may be accompanied by a recycling operation to reduce the volume of refuse to be hauled to the disposal site.

The feasibility and scale of a transfer system depend to a great extent on the distance to the disposal location and the actual volume of solid waste to be hauled. To minimize travel, the facility should ideally be located in the centroid of the area of generation. The economic incentive of transfer station utilization will increase with increasing distance to disposal location. With distance playing so vital a role in transfer station economics, cost estimates for such facilities will be presented in a later section after site options have been identified.

E. SOURCE SEPARATION/RECYCLING

Part of any alternative chosen as the final solid waste management plant should be waste flow reduction through recycling programs.

There are several types of source separation/recycling programs which can be considered for use in reducing the waste stream. Curbside collection and recycling center programs are most generally instituted on the municipal level, while office paper programs may be used to reduce the commercial waste stream. In addition, corrugated cardboard is often separated from the waste stream at supermarkets or transfer stations. The characteristics of the particular municipality or region must be taken into account in order to devise a program which fits local needs and is workable.

The curbside collection of recyclable materials from the resident's home is the optimum means of conducting a source separation program. This type of program can achieve the highest levels of public participation and material recovery (paper, glass, metals). The pickup may be carried out by the municipality or by the contractor who handles the refuse. Alternately, a separate contractor may be hired to collect the recycled materials as has been done in some New Jersey communities.

The most commonly used means of recycling is through the establishment of recycling centers. Residents may bring certain materials (typically newspaper, glass or cans) to these drop-off locations. These programs are generally voluntary and operated by a local organization for fund raising, or by the municipality. The level of public participation will not be as high for recycling centers as for curbside pick-up, but they are appropriate in terms of program economics in areas where curbside pick-up would not be feasible.

Businesses wishing to reduce their waste stream should consider office paper recycling programs. There is currently a strong market for computer printouts and tab cards. In most programs, employees are asked to accumulate recyclable paper and deposit it in barrels periodically. This paper is then brought to a central pick-up location for the paper dealer.

1. Processing of Recovered Materials. At present, most recovered materials are processed manually by recycling volunteers. They may color sort glass, remove neck rings, segregate cans according to metallic composition, separate newspapers from magazines, or crush glass and cans to reduce volume. The materials are often stored temporarily until sufficient amounts are accumulated for transport. If adequate pre-market processing is not carried out, the recovered materials may not meet industry quality standards.

In addition, in order to reach the 20% waste stream reduction goal in any area, the combined recovery of glass, metal and paper is necessary, along with a high level of participation. The manual processing of large amounts of recovered materials could become an overwhelming task for voluntary labor. The many separations required in a multi-material program could also increase the inconvenience for the homeowner and therefore reduce participation. However, if residents were allowed to mix all metals and glass, this material could then be taken to an intermediate processing center where glass would be color separated and cans sorted according to composition. This arrangement would facilitate multi-material source separation programs and enable the provision of high quality materials to user-markets. However, the revenues going back to the municipality from each ton of material recycled would be lower due to the extra material handling step.

Intermediate processing facilities use a combination of automated and manual processes for sorting materials. There is, at present, one such facility in Berlin, New Jersey operated by Recycling Enterprises, Inc. In Morris County, an intermediate processing center could be located at a scrap yard, a transfer station, or at the site of an industry using the material.

Specific recommendations will be presented in a later section outlining goals and objectives of county-wide recycling programs.

Again, it should be stated that these programs will be an integral part of any alternative(s) chosen.

F. IDENTIFICATION OF BASIC SOLID WASTE DISPOSAL/PROCESSING ALTERNATIVES

Outlined in this section are the basic disposal/processing alternatives which are now or will be available to Morris County. These basic alternatives vary in their availability to each individual municipality in the County. It may be necessary to interface two or more of the basic alternatives in order to develop a comprehensive disposal plan for all the municipalities in Morris County. In subsequent sections of this plan, full-county, staged alternatives will be developed.

Disposal costs listed for each alternative are in June 1979 dollars unless otherwise noted.

1. Exportation to CEA Resource Recovery Facility (Newark). Combustion Equipment Associates (CEA) is planning to build a resource recovery facility in Newark's east ward that would begin operation in 1983. The facility is being designed to process 2000 TPD with capabilities to expand to 3000 TPD.

The CEA facility will produce a powder type refuse derived fuel which will be sold to PSE&G. The recovery of ferrous material will be included in the process. Disposal costs will range from $4.00 to $11.00 per ton.

2. County Waterwalled Incineration Resource Recovery Facility. A facility of this type could be located in Morris County to burn waste enmasse and provide steam for direct industrial consumption or for driving a turbine for electrical production. Disposal tipping fess should approximate $16 to $32 per ton. Such a facility would require about five years to become operational.

3. County Pyrolysis Resource Recovery Facility. This alternative would involve thermally processing Morris County's solid waste in an oxygen free or oxygen deficient environment to produce solid, liquid, and gaseous fuels, in addition to an inert residue requiring further disposal. Disposal tipping fees have been estimated to range from $23 to $40 per ton, with a minimum startup period of about five years.

4. County Refuse Derived Fuel Resource Recovery Facility. The County may construct a facility for its own use, similar to the facility currently under construction by Combustion Equipment Associates in Newark. The product fuel may be a coarse shred, a "fluff", a powder, or pelletized fuel depending upon current market requirements. With a minimum lead time of five years prior to utilization of a facility of this type, disposal tipping fees have been estimated at $9 to $15 per ton for a pelletized fuel producing facility. A pelletized fuel facility would produce a suitable refuse derived fuel for firing as a supplemental fuel at the power plant at Picatiny Arsenal.

5. Utilization of Existing Landfills. The remaining life of the existing BPU regulated sanitary landfills in Morris County may be viewed as a function of future alterations in the rates of waste importation and exportation as well as approval of proposed expansion plans. With no alteration in importation/exportation, and the closure of the Morris County landfill at the end of 1979, an unexpanded Chester Hills landfill will use up its remaining capacity of 2.2 million tons in about five years. With a possible increase in importation and decrease in exportation, in combination with the closure of the Morris County landfill, an unexpanded Chester Hills facility will reach present capacity in about 3.5 years. At present rates of waste importation/exportation, if both landfills remain open and the Morris County landfill expansion is approved, the total available capacity of 6.2 million tons will be reached in about 15 years. With an increase in importation and decrease in exportation, if both landfills remain open and the Morris County landfill expansion approved, the remaining life of the landfills would be about 9.8 years (See Matrix, Table 2-5). Expansion of the Morris County Landfill is pending approval by the Solid Waste Administration, which as yet has not acted upon submitted expansion plans.

6. Development of New County Landfill. A large landfill, utilizing state of the art technology to protect the environment, could be constructed within Morris County. A major difficulty in this alternative would involve locating a site suitable for landfill development and acceptable to the community at large. Disposal tipping fees for this aternative should lie between $3.50 and $5 per ton,* with implementation possible in 1 – 2 years.

*Exclusive of profit

TABLE 2-5

REMAINING LIFE OF EXISTING LANDFILLS IN MORRIS COUNTY

	Importation	Exportation	Closure	Expansion	Total Capacity (millions of tons)	Remaining Life (Years)
Condition 1	Unchanged	Unchanged	Morris Co. Landfill End of 1979	No	2.2	5.3
Condition 2	Increased	Decreased	Morris Co. Landfill End of 1979	No	2.2	3.5
Condition 3	Unchanged	Unchanged	No	Morris Co. Landfill	6.2	15
Condition 4	Increased	Decreased	No	Morris Co. Landfill	6.2	9.8

7. Exportation to Passaic County Resource Recovery Facility. If Passaic County decides to construct such a facility to dispose of its solid wastes, excess capacity for importation from other counties could be made available. According to the solid waste management plan adopted by Passaic County, disposal tipping fees for a county RDF facility would be about $5.25 per ton, for a 2000 ton per day facility, or $7.35 per ton for a 1500 ton per day facility. If waterwall incineration is selected, a 2000 ton per day unit would have an estimated disposal tipping fee of $15.10, or $18.51 should the facility have a 1500 ton per day capacity.

8. Exportation to Lakeland Resource Recovery Facility. As in Passaic County, the Lakeland area may construct a facility with excess capacity to incorporate imported wastes. Disposal tipping fees at the Lakeland facility have been estimated at approximately $15.50 dollars per ton.

G. IDENTIFICATION OF FULL COUNTY ALTERNATIVES

The basic solid waste disposal alternatives described in Section E may be used to formulate viable "full-county" alternatives for solid waste disposal. These alternatives consider timing requirements for implementation, in addition to the need for a comprehensive solid waste disposal plan for all of the 39 municipalities comprising Morris County. Full County alternatives are as follows:

1. Under this alternative, existing landfills would be upgraded and used until 1985 when a new county-wide RDF facility would be brought on-line. The facility would have a capacity of 1100 TPD.

2. As in Alternative No. 1, existing landfills would be upgraded and used to dispose of the County's waste until 1985. At that time, a new County-wide mass burning facility would come on-line. The facility would have a capacity of 1100 TPD.

3. Also as in Alternative No. 1, existing landfills would be upgraded and used to dispose of the County's waste until 1985. At that time, a new County-wide pyrolysis facility would come on-line. The facility would have a capacity of 1100 TPD.

4. Three municipalities within Morris County are included in the proposed Lakeland Region. They are Butler, Kinnelon, and Pequannock. These communities account for 60 TPD of municipal waste. Option four calls for the use of Morris County landfills by all municipalities until 1983 when a Lakeland Resource Recovery facility would be operational. From 1983 to 1985 the remaining 36 municipalities would continue to use Mount Olive and Chester Hills landfills. A County RDF facility would be operational in 1985 with a capacity of 1000 TPD at which time all non-Lakeland communities would use the facility.

5. Option 5 consists of the same time frame as option 4, the only difference being the use of a mass burning facility instead of an RDF plant.

6. Under this option, all Morris County waste would continue to utilize existing landfills until the Passaic County resource recovery facility becomes operational. All wastes from Morris County would be disposed of at the Passaic RRF starting in 1985.

7. This alternative is the same as alternative 6, except that Lakeland communities (including Butler, Kinnelon, and Pequannock) would utilize the Lakeland RRF starting in 1983.

8. A new RDF resource recovery facility (1000 TPD) would be constructed to handle wastes from the western half of Morris County, and imported wastes from Sussex and/or Warren Counties under this alternative (approximately 600 TPD would be accepted from the western counties), starting in 1985. Wastes from the eastern half of Morris County would use the Passaic County resource recovery facility starting in 1985. Existing landfills would be utilized until 1985, when both RRF's would become operational.

9. This alternative is the same as alternative 8, except that Lakeland communities (including Butler, Kinnelon and Pequannock) would utilize the Lakeland RRF starting in 1983.

10. Under this alternative, communities from the eastern half of the County would use the Newark resource recovery facility starting in 1983. The western half of the County would use a new RDF resource recovery facility (1000 TPD), along with sections of counties to the west, starting in 1985. Existing landfills would be utilized until the facilities become operational.

11. Under this alternative, a new County landfill would be constructed to handle all wastes from the County, starting in 1981. Existing landfills would be used until 1981.

12. A new County-wide transfer system would be constructed under this alternative, starting operation in 1981. All wastes from the County would be transferred to landfills in Middlesex County.

13. Under this alternative, the Mount Olive landfill would close in 1981. A transfer station at the Mount Olive site would be installed to transfer wastes to the Chester Hills landfill. The Chester Hills landfill and Mount Olive transfer station would be utilized throughout the planning period.

14. A transfer station serving eastern communities would be constructed under this alternative, starting operation in 1981. The transfer station would handle wastes currently being disposed of in HMD landfills, transferring these wastes westward for disposal in either the Mount Olive or Chester Hills landfills.

15. Under this alternative, both existing landfills would be upgraded, and would handle all wastes generated throughout the planning period. The Mount Olive landfill would be expanded and no new facilities would be constructed under this alternative.

16. Shredding and/or baling systems would be constructed at both existing landfills, starting operation in 1981. This would extend the life of both landfills, which would be utilized throughout the planning period.

TASK III

SELECTION OF SOLID WASTE MANAGEMENT SYSTEMS

TASK III
SELECTION OF SOLID WASTE MANAGEMENT SYSTEMS

A. PRELIMINARY SCREENING OF ALTERNATIVES

The 16 full county alternatives outlined in Section II-G have been subjected to a preliminary screening in order to identify the most feasible options for subsequent detailed analysis on a cost effective basis. Considered in the preliminary screening were social, political, and economic factors, input from the Morris County Solid Waste Advisory Council, the results of an opinion survey of Morris County collector/haulers on solid waste disposal practices, and views expressed at public hearings held during the planning process.

Alternative 1—Construction of a refuse derived fuel facility capable of accepting the County's solid wastes offers several advantages. A troublesome waste product is converted into a valuable resource through proven technological means at reasonable cost. Use of such a facility is in keeping with the spirit of both State (Public Law Chapter 326) and Federal (Resource Conservation and Recovery Act) mandate.

Resolution: This Alternative should be further considered.

Alternative 2—As in alternative 1, this alternative is attractive from a resource conservation and proven technological standpoint. However, the estimated tipping fees for such a facility were developed assuming an income from steam markets. Such a market must exist within 2 miles of the facility to prevent excessive energy loss. A suitable steam market has not been identified in Morris County. A lack of flexibility in marketing the product, in addition to already high tipping fees weigh disfavorably in consideration of this alternative.

Resolution: This Alternative should be deleted from further consideration.

Alternative 3—Pyrolysis of solid waste represents a recent technological advance, producing fuel gas from solid waste through physico-chemical rather than biological means. To the present time, demonstrative efforts in commercial scale pyrolysis facilities have proved erratic, emphasizing a need for further technological development in the area. It is felt that Morris County should avoid dependance upon unproven technologies in seeking solutions to solid waste disposal.

Resolution: This Alternative should be deleted from further consideration.

Alternative 4—This differs from alternative 1 only in that the three Morris County municipalities included within the Lakeland Region do not bring their wastes to the Morris County refuse derived fuel facility. Although the planned capacity of the facility would diminish by 100 tons per day, the benefits as described under alternative 1 would continue to apply.

Resolution: This Alternative should be further considered.

Alternative 5—Analagous to alternative 2, an undemonstrated steam market and high disposal cost leads to waryness when considering this option.

Resolution: This Alternative should be deleted from further consideration.

Alternative 6—Although waste exportation will add to transportation expenditures, the Passaic facility would represent an environmentally acceptable disposal option of proven technology, serving to promote resource conservation.

Resolution: This Alternative should be further considered.

Alternative 7—Excepting Lakeland's three Morris County Communities, this alternative is identical to Alternative 6. The reduction of the Lakeland waste from Morris County's total generation rate makes acceptance at the Passaic facility all the more feasible.

Resolution: This Alternative should be further considered.

Alternative 8—This alternative distributes the waste stream between two resource recovery facilities, while accounting for possible importation from counties to the west of Morris County. Use of sound, environmentally oriented technologies offering sensible solutions to solid waste disposal for Morris County merits more detailed analysis.

Resolution: This Alternative should be further considered.

Alternative 9—This alternative differs from alternative 8 only in the diversion of the Lakeland area's waste to Lakeland's own facility. The benefits of this option thus approximate those of option 8.

Resolution: This Alternative should be further considered.

Alternative 10—The Newark RDF facility is utilized for disposal of the solid wastes from the eastern portion of the county, rather than utilizing the Passaic County Facility. Aside from this, option 10 is equivalent to option 8, offering the same relative advantages.

Resolution: This Alternative should be further considered.

Alternative 11—Morris County is expected to experience continued rapid residential development. From the aspect of land use planning, this factor is not amenable to the construction of a new County landfill, making siting of the facility difficult if not impossible without substantial community opposition.

Resolution: This Alternative should be deleted from further consideration.

Alternative 12—This simplistic approach does not offer a solution to the problem of solid waste disposal. It merely suggests movement of this problem to a new location. Such practices should be avoided when seeking lasting solutions in the development of a comprehensive solid waste management plan.

Resolution: This Alternative should be deleted from further consideration.

Alternative 13—For much the same reasons as given in alternative 12, this option represents an unfavorable approach. Should Morris County exercise this alternative, the landfill at Chester Hills would reach capacity in 3.5 to 5.3 years, depending upon the rates of solid waste importation and exportation.

Resolution: This Alternative should be deleted from further consideration.

Alternative 14—This alternative offers only a piecemeal solution to the county-wide solid waste transport and disposal problem. Transfer stations will be considered later in conjunction with county-wide and regional disposal alternatives.

Resolution: This Alternative should be deleted from further consideration.

Alternative 15—In the interest of prevention of potentially significant environmental degradation, the landfills at Mount Olive and Chester Hills should be upgraded, using effective state of the art technology. However, utilization of expanded fill space represents a waste of the materials and energy recoverable from the waste through currently proven technological means. In addition, landfill expansion would encroach upon increasingly valuable landspace, suitable for more beneficial usage.

Resolution: This Alternative should be deleted from further consideration.

Alternative 16—This alternative requires significant expenditures in terms of capital and energy, while delaying rather than solving the impending problems faced by Morris County in the area of solid waste disposal. As in alternative 15, recoverable materials and energy are lost through this option.

Dependant on the status of implementation this alternative may lend itself to further investigation in future plan updates.

Resolution: At the present this Alternative should be deleted from further consideration.

To summarize, the alternatives which will now be further considered are as follows:

Alternative No.	Description
1	Use of upgraded and expanded M.O. landfill and upgraded C.H. landfill until 1/85. East and West to Ledgewood RRF, 1/85.
4	Use of upgraded and expanded M.O. landfill and upgraded C.H. landfill until 1/85. Lakeland communities to Lakeland RRF 1/83. East and West to Ledgewood RRF, beginning 1/85.
6A, 6B	Use of upgraded and expanded M.O. landfill, and upgraded C.H. landfill until 1/85. East and West to Passaic Co. RRF, 1/85.
7A, 7B	Use of upgraded and expanded M.O. landfill and upgraded C.H. landfill until 1/85. Lakeland communities to Lakeland RRF, 1/83. East and West to Passaic Co. RRF, 1/85.
8A, 8B	Use of upgraded and expanded M.O. landfill, and upgraded C.H. landfill until 1/85. East to Passaic Co. RRF 1/85. West to Ledgewood RRF 1/85.
9A, 9B	Use of upgraded and expanded M.O. landfill, and upgraded C.H. landfill until 1/85. Lakeland communities to Lakeland RRF beginning 1/83. East to Passaic RRF 1/85 west plus imported wastes to Ledgewood RRF, 1/85.

Alternative No.	Description
10	Use of upgraded and expanded M.O. landfill, and upgraded C.H. landfill until 1/83 for the east, 1/85 for the west. East to Newark RRF, 1/83. West plus imported wastes to Ledgewood RRF, 1/85.

B. COST-EFFECTIVENESS ANALYSIS

The task of selecting optimum locations for solid waste facilities merits detailed analysis, in that several factors associated with facility siting may have significant socio-economic impact in the overall solid waste management scheme. General siting criteria will be discussed, followed by a matrix applying these criteria to candidate sites within Morris County. This in turn will be followed by a preliminary economic analysis of the possible use of transfer stations in conjunction with applicable alternatives which have progressed beyond preliminary screening. This section will conclude with a cost-effectiveness analysis for each of these screened alternatives, comparing costs both with and without utilization of transfer stations.

1. Siting Criteria. Public acceptance is perhaps the singlemost important objective to be achieved when siting a solid waste facility. The community's concern often centers around the potential for environmental degradation resulting from the operations of such a facility, including noise, odors, disease vectors, traffic congestion, and, in some cases, air and water pollution. While proper engineering design may minimize the environmental impact of such a facility, acceptance by the public is most likely to be achieved through siting of the facility in areas zoned to accommodate industry with a similar environmental climate, or in outlying areas with little or no residential land usage.

A second important objective in siting a solid waste facility deals with minimizing travel distances. This pertains to the distances between points of collection and the processing facility as well as to the distance between the facility and the destination of its product(s). Sites should be sought in the "weighted center" of the county, with the "weighting" based on localized solid waste generation. In this respect, proper siting may have a significant economic impact in the overall solid waste management scheme.

Akin to the above objectives is the selection of a site accessible to major roads capable of accommodating significant numbers of solid waste vehicles connecting collection areas with the facility. Accessibility to railroads may be an important consideration in a facility utilizing front end separation, in that it may facilitate delivery of recovered materials to their respective markets.

Site acreage involves logistic as well as economic considerations. A refuse derived fuel facility capable of processing 1100 tons per day would require a minimum of 20 acres. The purchase price of this land may exert a significant effect on the overall capital cost of a solid waste facility.

Site availability is of particular concern when considering time requirements for initiating facility construction. Municipally or county-owned sites may thus be more attractive than those which must be purchased from the private sector.

In view of facility construction, the topography and drainage of proposed sites must enter into consideration. High technology facilities utilize heavy machinery whose burden must enter into the design. The cost of site preparation may be high if filling of low lying areas or leveling of uneven areas is required.

Lastly, overall area planning must be examined in light of the effects of the operation of a resource recovery facility. For example, a refuse derived fuel facility may spur satellite industries with the promise of a continuous supply of energy. Based on municipal zoning maps and maps of primary transportation routes, a preliminary siting field investigation of all areas zoned commercial and/or industrial and near primary transportation routes was conducted jointly by the County Planning Board and RAS Associates. Three candidate sites within the County fared best in light of the environmental and planning siting criteria mentioned above.

The matrix in Table 3-1 applies these criteria to these three candidate sites within Morris County. It should be noted that siting as presented in this section is simply designed to identify candidate locations. Actual proposals to construct facilities on any of the candidate sites should be subject to further feasibility studies. For the purposes of the cost-effectiveness analysis, it was assumed that the Landing site would be developed as a resource recovery facility. In fact, each of the three sites appears suitable for facility development.

2. Transfer Station Optimization Analysis. As the hauling distance between the point of solid waste collection and its ultimate disposal or processing location increases, the cost of directly hauling the waste is greatly increased. The time necessary to travel these distances also increases the nonproductive time of collection crews and equipment thus reducing collection efficiency. The implementation of transfer stations may offer potential savings in this type of situation.

In evaluating the cost effectiveness of the alternatives meriting further consideration, it was found that three (3) transfer station sites may be of benefit throughout the various alternatives. One of the sites, on Gold Mine Road in Mount Olive Township, could accommodate the waste generated in the western municipalities and is easily accessible by way of Interstate Highway 80. It is also located in the area of greatest waste generation in the western section of the county.

Possible transfer stations to accommodate the waste generated in the eastern municipalities are located:

TABLE 3-1
MORRIS COUNTY RESOURCE RECOVERY FACILITY
SITE EVALUATION CRITERIA MATRIX

CRITERIA \ SITE	LANDING	RT 80/ 206 MT. OLIVE	RT 80/ 206 ROXBURY
1. Potential for Public Acceptance	Good	Excellent	Excellent
2. Proximity to Collection Areas	Excl. for West Fair for East	Excl. for West Fair for East	Excl. for West Fair for East
3. Access to Major Highways	Excellent	Excellent	Excellent
4. Access to Railways	Good	None	None
5. Site Size (Acres)	50	172	55
6. Land Acquisition	Private Ownership	Private Ownership	Private Ownership
7. Land Preparation	Some Land Clearing Required	Minimal	Some filling of low areas required, some land clearing required
8. Current Site Use	Vacant, Wooded	Vacant, Formerly Agricultural	Vacant
9. Surrounding Land Use	Int. Hwy. 80, Commercial, Low Density Res.	Existing Landfill, Agricultural, Vacant	Agricultural, Vacant

a. near the intersection of Interstate Highways 80 and 287, and

b. near the intersection of Interstate Higways 80 and 280 in the vicinity of Edward's Road.

Figure 3-1 shows the approximate locations of all three transfer station sites within the county.

For a transfer station to be cost effective, a comparison must be made of the potential savings generated by the facility versus its costs. Tables 3-2, 3-3, and 3-4 show a preliminary cost estimate for each transfer station including capital, operating and maintenance costs. The assumptions made in calculating these costs are as follows:

a. Waste generation rates of 675 and 400 tons per day from the eastern and western municipalities, respectively.

b. 312 operating days per year at 8 hours per day.

c. Land costs of $10,000 and $6,000 per acre for eastern and western locations, respectively.

d. 8% interest rate for annual capital recovery calculations.

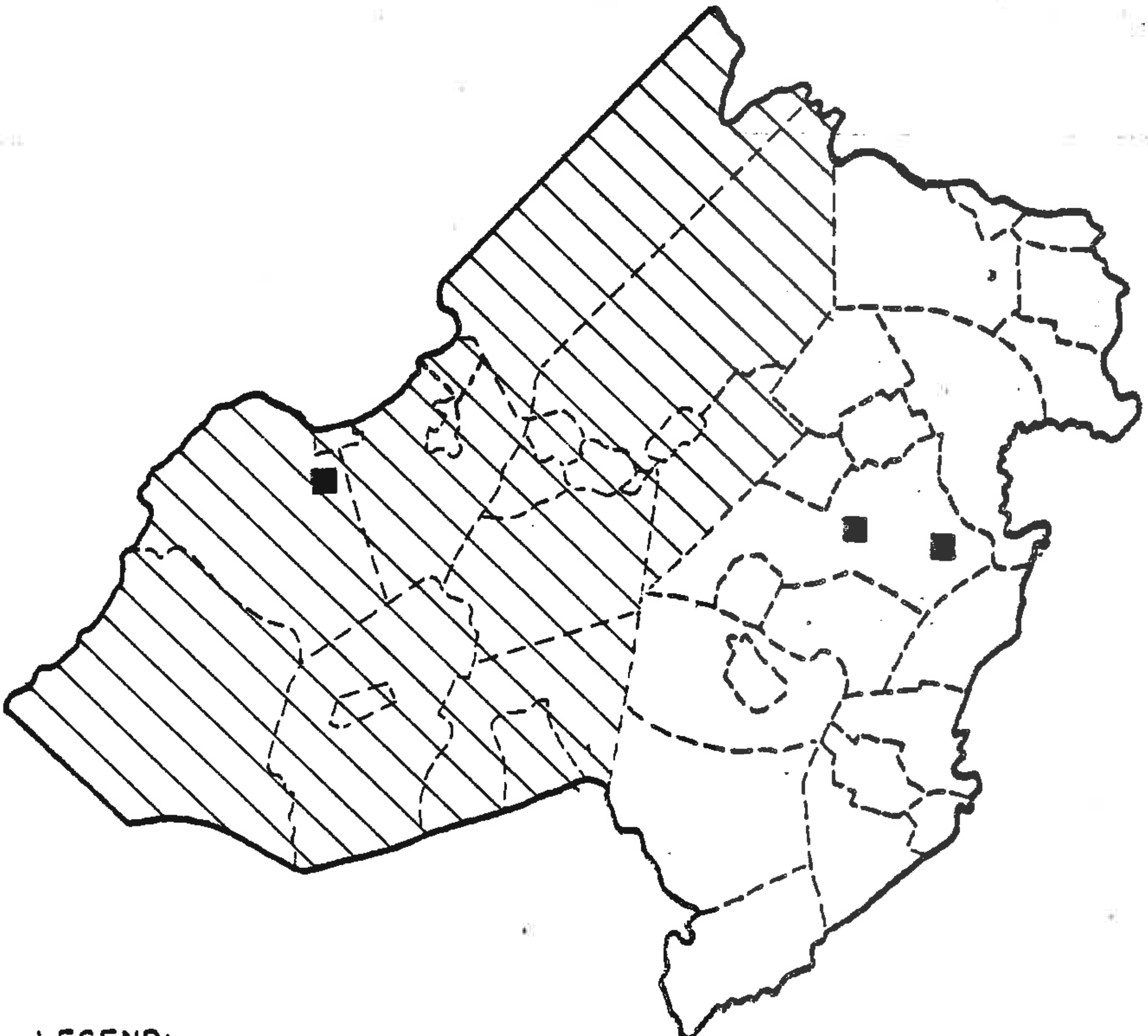
A comparison of transportation costs of each alternative, with and without transfer stations, appears in Table 3-5. Referring to this table, it is shown that the cost of utilizing transfer stations is uneconomical at the present time. This is due to the excellent network of roadways throughout the county offering efficient, direct hauling of the waste to the disposal of processing locations. Since the accuracy of the cost-effective calculations is approximately + or - 10%, the cost of utilizing transfer stations in some of the alternatives may merit more detailed examination. With expected significant increases in transport costs, the utilization of transfer stations in all of the alternatives considered here should be re-examined when the plan receives its scheduled updating in two years.

3. Full County Alternatives. In this section, the seven alternatives meriting further consideration after preliminary screening will receive an economic analysis. The primary components of this analysis will be the municipal waste transport and disposal costs that will arise from each of the various proposals.

For comparison purposes, the current (1979) costs of transporting and disposing of municipal wastes are displayed in Tables 3-6 and 3-7 for the eastern and western municipalities in

FIGURE 3–1

PROPOSED TRANSFER STATION LOCATIONS



LEGEND:

- FOR USE BY WESTERN MUNICIPALITIES
- FOR USE BY EASTERN MUNICIPALITIES
- TRANSFER STATIONS

TABLE 3-2

CAPITAL COST FOR GOLD MINE ROAD TRANSFER STATION (400 TPD)

Item	Unit Cost	No. Units	Total Cost	Asset Life (Yrs.)	CRF	Annual Cost
1. Land & site development	$6,000/Ac.	3	$ 18,000	30	0.08883	$ 1,599
2. Building & Utility Construction	$ 35/sq. ft.	3500 sq. ft.	122,500	30	0.08883	10,882
3. Stationary Equipment						
Compactors (11 CY)	30,000	2	60,000	10	0.14903	8,942
Frame	2,500	2	5,000	10	0.14903	745
Hopper	7,000	2	14,000	10	0.14903	2,086
Conveyors (22' long) (48" wide)	1,500/ ft	2	66,000	10	0.14903	9,836
Subtotal			285,500			34,090
4. Engineering Fee 5% Item 1			900	20	0.10185	92
Permits			900	20	0.10185	92
Licenses & Legal Fees 15% Items 2 & 3			40,125	20	0.10185	4,087
Subtotal			327,425			38,361
5. Contingency - 10% Items 1 to 4			32,743	10	0.14903	4,880
TOTAL			$ 360,168			$ 43,241

TABLE 3-2 (continued)

ANNUAL O&M COSTS FOR GOLD MINE ROAD TRANSFER STATION (400 TPD)

Item	Unit O&M Cost	Total Cost
1. Labor		
— one supervisor	$ 8.25/Hr.	$ 20,592
— four employees	$ 6.00/Hr.	59,904
— fringe benefits	30% of wages	24,149
— overhead	$ 0.08/ton	9,984
2. Facility & equipment maint. Materials & Supplies	$ 0.32/ton processed	39,936
3. Utilities (heat, elec., telephone, water)	$ 0.17/ton processed	21,216
4. Other Expenses, & Contingency	$ 0.10/ton processed	12,480
Total Annual O&M Cost		$ 188,261
Unit O&M Cost		$ 1.51/ton

NOTE: Assume 8 Hrs./Day, 312 Day/Yr. Operation

	Annual Capital Cost	43,241
TOTAL ANNUAL T/S COST		$ 231,502

TABLE 3-3

CAPITAL COST FOR ROUTE 287-80 TRANSFER STATION (676 TPD)

Item	Unit Cost	No. Units	Total Cost	Asset Life (Yrs.)	CRF	Annual Cost
1. Land & Site development	$ 10,000/Ac.	3	$ 30,000	30	0.08883	$ 2,665
2. Building & Utility construction	35/sq. ft.	6,000/sq.ft.	210,000	30	0.08883	18,654
3. Stationary Equipment						
Compactors (11 CY)	30,000	3	90,000	10	0.14903	13,413
Frame	2,500	3	7,500	10	0.14903	1,118
Hopper	7,000	3	21,000	10	0.14903	3,130
Conveyors (32′ long) (48″ wide)	1,500/ft.	2	96,000	10	0.14903	14,307
Subtotal			454,500			53,287
4. Engineering Fee 5% Item 1			1,500	20	0.10185	153
Permits			1,500	20	0.10185	153
Licenses & Legal Fees 15% Items 2 & 3			63,675	20	0.10185	6,485
Subtotal			521,175			60,078
5. Contingency - 10% Items 1 to 4			52,118	10	0.14903	7,767
TOTAL			$ 573,293			$ 67,845

TABLE 3-3 (continued)

ANNUAL O&M COSTS FOR 287-80 TRANSFER STATION (675 TPD)

Item	Unit O&M Cost	Total Cost
1. Labor		
— one supervisor	$ 8.25/Hr.	$ 20,592
— six employees	$ 6.00/Hr.	89,856
— fringe benefits	30% of wages	33,134
— overhead	$ 0.08/Ton	16,848
2. Facility & Equipment maint. Materials & Supplies	$ 0.32/ton processed	67,392
3. Utilities (heat, elec., telephone, water)	$ 0.17/ton processed	35,802
4. Other expenses & contingency	$ 0.10/ton processed	21,060
Total Annual O&M Cost		$ 284,684
Unit O&M Cost		$ 1.35/Ton

NOTE: Assume 8 Hr./Day, 312 Day/Yr. operation

	Capital Cost	$ 67,845
TOTAL ANNUAL COST OF T/S		$ 352,529

TABLE 3-4

CAPITAL COST FOR EDWARDS ROAD TRANSFER STATION (675 TPD)

Item	Unit Cost	No. Units	Total Cost	Asset Life (Yrs.)	CRF	Annual Cost
1. Land & Site development	$ 10,000/Ac.	3	$ 30,000	30	0.08883	$ 2,665
2. Building & Utility construction	35/sq. ft.	6,000/sq.ft.	210,000	30	0.08883	18,654
3. Stationary Equipment						
Compactors (11 CY)	30,000	3	90,000	10	0.14903	13,413
Frame	2,500	3	7,500	10	0.14903	1,118
Hopper	7,000	3	21,000	10	0.14903	3,130
Conveyors (32' long) (48" wide)	1,500/ft.	2	96,000	10	0.14903	14,307
Subtotal			454,000			53,287
4. Engineering Fee 5% Item 1			1,500	20	0.10185	153
Permits			1,500	20	0.10185	153
Licenses & Legal Fees 15% Items 2 & 3			63,675	20	0.10185	6,485
Subtotal			521,175			60,078
5. Contingency - 10% Items 1 to 4			52,118	10	0.14903	7,767
TOTAL			$ 573,293			$ 67,845

TABLE 3-4 (continued)

ANNUAL O&M COSTS FOR EDWARD'S ROAD TRANSFER STATION (675 TPD)

Item	Unit O&M Cost	Total Cost
1. Labor		
– one supervisor	$ 8.25/Hr.	$ 20,592
– six employees	$ 6.00/Hr.	89,856
– Fringe Benefits	30% of wages	33,134
– overhead	$ 0.08/ton	16,848
2. Facility & Equipment maint. Materials & Supplies	$ 0.32/ton processed	67,392
3. Utilities (heat, ele... telephone, water)	$ 0.17/ton processed	35,802
4. Other Expenses & Contingency	$ 0.10/ton processed	21,060
Total Annual O&M Cost		$ 284,684
Unit O&M Cost		$ 1.35/ton

NOTE: Assume 8 Hr./Day, 312 Day/Yr. Operation

	Capital Cost	$ 67,845
TOTAL ANNUAL COST OF T/S		$ 352,529

TABLE 3-5

MORRIS COUNTY — ANNUAL MSW TRANSPORT COSTS

Note: All costs in March 1979 Dollars. Costs in parenthesis( ) indicate transport cost using a transfer station

Alternative Number	From \ To	Chester Hills & Mt. Olive L/F's	Landing RRF	Passaic RRF	Lakeland RRF	Newark RRF	% Cost Diff. with T/S
1. 1983	East	950,000 (1,131,000)					19% higher
	West	261,000 (*)					
1985	East		1,039,000 (1,086,000)				5% higher
	West		255,000 (*)				
4. 1983	East	833,000 (1,042,000)					25% higher
	West	261,000 (*)					
	Lakeland				26,000 (*)		
1985	East		923,000 (1, 001,000)				8% higher
	West		255,000 (*)				
	Lakeland				27,000 (*)		
6. 1985	East			925,000 (1,104,000)			19% higher
	West			819,000 (945,000)			15% higher

TABLE 3-5 (cont.)
MORRIS COUNTY – ANNUAL MSW TRANSPORT COSTS

Alternative Number	To / From	Chester Hills & Mt. Olive L/F's	Landing RRF	Passaic RRF	Lakeland RRF	Newark RRF	% Cost Diff. with T/S
7. 1983	East	833,000 (1,042,000)					25% higher
	West	261,000 (*)					
	Lakeland				26,000 (*)		
1985	East			865,000 (1,024,000)			18% higher
	West			819,000 (945,000)			15% higher
	Lakeland				27,000 (*)		
8. 1985	East			925,000 (1,104,000)			19% higher
	West		255,000 (*)				
9. 1985	East			865,000 (1,024,000)			18% higher
	West		255,000 (*)				
	Lakeland				27,000 (*)		

TABLE 3-5 (cont.)

MORRIS COUNTY – ANNUAL MSW TRANSPORT COSTS

Alternative Number	From \ To	Chester Hills & Mt. Olive L/F's	Landing RRF	Passaic RRF	Lakeland RRF	Newark RRF	% Cost Diff. with T/S
10. 1983	East					906,000 (1,097,000)	21% higher
	West	261,000 (*)					
1985	East					925,000 (1,104,000)	19% higher
	West		255,000 (*)				

(*) Indicates no transfer station is used for that region in the alternative

TABLE 3-6

1979 MUNICIPAL SOLID WASTE TRANSPORT & DISPOSAL COSTS FOR EASTERN MORRIS COUNTY

Municipalities W/Municipal Collection	1979 Population	1979 Tons/Yr.	Annual Transport Costs ($)	Annual Disposal[1] Costs ($)	Total Transport & Disposal ($)	$/Ton	$/Capita
Boonton Town	8,851	15,524	70,000	53,000	123,000	7.92	13.90
Butler Boro	7,363	4,836	23,000	16,000	39,000	8.06	5.30
Florham Park Boro	8,159	5,630	44,000	19,000	63,000	11.19	7.72
Hanover Twp.	12,214	17,990	81,000	61,000	142,000	7.89	11.63
Kinnelon Boro	7,952	2,816	17,000	10,000	27,000	9.59	3.40
Lincoln Park Boro	8,739	4,707	26,000	16,000	42,000	8.92	4.81
Madison Boro	15,893	10,881	33,000	37,000	70,000	6.43	4.40
Morris Twp.	20,677	12,364	87,000	42,000	129,000	10.43	6.24
Morris Plains Boro	5,549	10,065	33,000	34,000	67,000	6.66	12.07
Morristown Town	16,016	15,313	49,000	52,000	101,000	6.60	6.31
Parsippany-Troy Hills Twp.	52,701	33,089	138,000	113,000	251,000	7.59	4.76
Passaic Twp.	7,614	8,233	34,000	28,000	62,000	7.53	8.14
Riverdale Boro	2,652	1,755	12,000	6,000	18,000	10.26	6.79
TOTAL	174,380	143,203	647,000	487,000	1,134,000		
				East County Avg.		7.92	6.50

Municipalities W/Private Collection	1979 Population	1979 Tons/Yr.	Annual Transport[2] Costs ($)	Annual Disposal Costs ($)	Total Transport[2] & Disposal ($)	$/Ton[3]	$/Capita[3]
Boonton Twp.	3,325	2,286	–	8,000	–	3.40	2.41
Chatham Boro	8,963	2,697	–	9,000	–	3.40	1.00
E. Hanover Twp.	9,410	15,961	–	54,000	–	3.40	5.74
Harding Twp.	3,540	2,533	–	9,000	–	3.40	2.54
Montville Twp.	14,528	15,335	–	52,000	–	3.40	3.58
Mountain Lakes Boro	4,567	3,326	–	11,000	–	3.40	2.41
Pequannock Twp.	14,157	11,224	–	38,000	–	3.40	2.68
TOTAL	58,490	53,362	–	181,000			
					Avg.		3.09

[1]Based upon current rate of $0.85 per cubic yard at disposal areas

[2]Transport costs for private collection are variable, depending upon the individual collection service and the proximity of the locality to the disposal area

[3]Includes estimated collective disposal costs only

TABLE 3-7

1979 MUNICIPAL SOLID WASTE TRANSPORT & DISPOSAL COSTS FOR WESTERN MORRIS COUNTY

Municipalities W/Municipal Collection	1979 Population	1979 Tons/Yr.	Annual Transport Costs($)	Annual Disposal[1] Costs($)	Total Transport & Disposal ($)	$/Ton	$/Capita
Dover Town	13,921	8,078	20,000	27,000	47,000	5.82	3.38
Jefferson Twp.	15,811	11,172	34,000	38,000	72,000	6.44	4.55
Mine Hill Twp.	3,641	2,194	4,000	7,000	11,000	5.01	3.02
Mt. Arlington Boro	3,843	2,184	6,000	7,000	13,000	5.95	3.38
Mt. Olive Twp.	17,965	7,709	11,000	Free	11,000	1.43	.61
Netcong Boro	3,250	2,194	2,000	7,000	9,000	4.10	2.77
Randolph Twp.	18,482	10,045	21,000	34,000	55,000	5.48	2.98
Rockaway Boro	6,954	8,848	19,000	30,000	49,000	5.54	7.05
Roxbury Twp.	19,248	17,682	25,000	60,000	85,000	4.81	4.42
Victory Gardens	1,208	531	2,000	2,000	4,000	7.53	3.31
Wharton Boro	5,441	3,336	11,000	11,000	22,000	6.59	4.04
TOTAL	109,764	73,973	155,000	223,000	378,000		
				West County Avg.		5.11	3.44

Municipalities W/Private Collection	1979 Population	1979 Tons/Yr.	Annual Transport[2] Costs ($)	Annual Disposal Costs($)	Total Transport[2] & Disposal ($)	$/Ton[3]	$/Capita[3]
Chester Boro	1,545	1,611	–	5,000	–	3.40	3.24
Chester Twp.	4,999	2,060	–	7,000	–	3.40	1.40
Denville Twp.	14,795	17,059	–	58,000	–	3.40	3.92
Mendham Boro	5,094	2,016	–	7,000	–	3.40	1.37
Mendham Twp.	4,901	3,345	–	11,000	–	3.40	2.24
Rockaway Twp.	20,269	5,661	–	19,000	–	3.40	0.94
Washington Twp.	10,382	3,924	–	13,000	–	3.40	1.25
					Avg.	3.40	1.94

[1]Based upon current landfill tipping fees of $0.85 per cubic yard

[2]Transport costs for private collection are variable, depending upon the individual collection service and the proximity of the locality to the disposal area

[3]Includes estimated collective disposal costs only

Morris County respectively. The annual transport costs were calculated based on the unit transport costs developed for each municipality in Section I C1a (See Table 1-26). Annual disposal costs are based on current tipping fees at landfills being utilized by Morris County. For the eastern communities providing municipal or municipal contract collection, the average cost for solid waste transport and disposal is currently estimated to be $5.01 per capita per year. Current expenditures for the western communities utilizing these collection schemes are estimated to be $3.49 per capita per year. The geographical difference in most may be attributed to shorter haul distances in the western portion of Morris County.

The following analysis includes projections of transport and disposal costs for each of the seven disposal alternatives in 1985, reflecting the minimum of five years necessary for the construction of resource recovery facilities. In alternatives which include utilization of the Lakeland Resource Recovery Facility, which is to be in operation in 1983, or full county use of the Morris County Landfill, cost estimates for that year have been provided. For alternatives in which the Passaic County Resource Recovery Facility is to be utilized, the analyses have been subdivided into parts A and B, accounting for construction of a Refuse Derived Fuel (A) or Waterwall Incineration (B) facility.

All cost figures in this section are in June 1979 Dollars unless otherwise noted.

Cost comparisons between options as discussed in this section have been limited to those communities providing municipal or municipal contract collection only. The variable costs for private collection are not readily available in this highly competitive industry. Thus, municipalities depending on private collection were segregated in the cost analysis, with cost figures reflecting disposal tipping fees only.

Alternative 1. Awaiting the construction of a refuse derived fuel facility at the Ledgewood site by 1985 eastern and western communities are to utilize an expanded and upgraded Morris County Landfill in Mount Olive and an upgraded Chester Hills landfill (Figures 3-2 and 3-3). The $6 per ton tipping fee as presented in the 1983 economic analyses (Tables 3-8 and 3-9), reflects added fees necessary to offset the cost of upgrading the existing landfills with state of the art environmental controls. For communities with municipal or municipal contract collection, overall per capita costs will increase by 34% in the east, to $8.74, and by 58% in the west, to $5.43*. The geographical disparity in costs may be attributed to greater haul distances for the eastern communities.

Note: If source separation programs can effectively reduce the waste stream, collection, transport and disposal costs could be reduced accordingly.

FIGURE 3–2

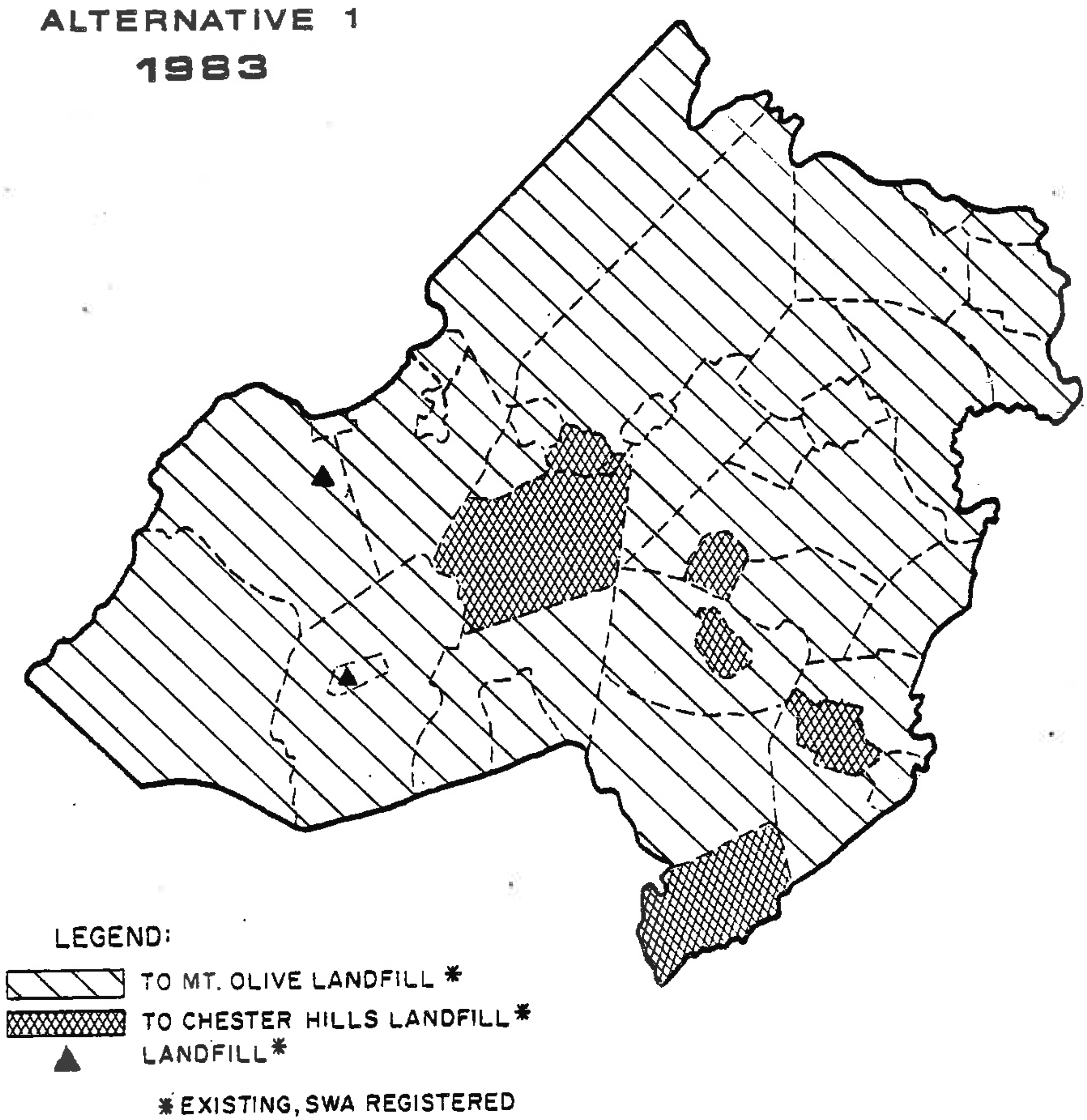

ALTERNATIVE 1
1983
LEGEND:
TO MT. OLIVE LANDFILL *
TO CHESTER HILLS LANDFILL *
LANDFILL *
* EXISTING, SWA REGISTERED

FIGURE 3–3

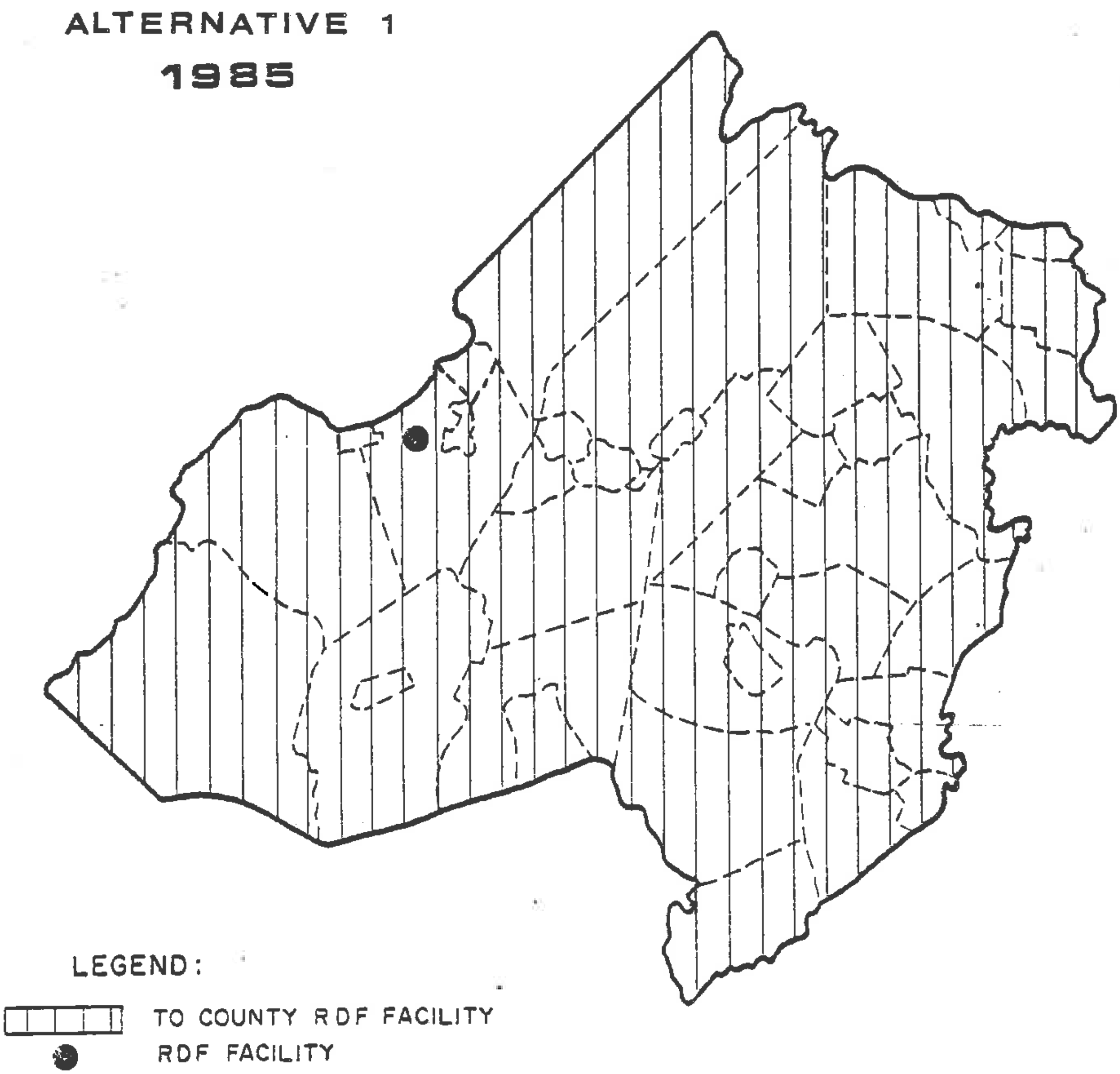

ALTERNATIVE 1
1985
LEGEND:
TO COUNTY RDF FACILITY
RDF FACILITY

TABLE 3-8

1983 MUNICIPAL SOLID WASTE TRANSPORT & DISPOSAL COSTS
ALTERNATIVE NO. 1* (EAST)

Municipalities W/Municipal Collection	1983 Population	1983 Tons/Yr.	Annual Transport Costs ($)	Annual Disposal Costs ($)	Total Transport & Disposal ($)	$/Ton	Annual $/Capita
Boonton Town	8,919	15,644	71,000	94,000	165,000	10.55	18.50
Butler Boro	7,642	5,019	26,000	30,000	56,000	11.16	7.32
Florham Park	8,363	5,770	47,000	35,000	82,000	14.21	9.81
Hanover Twp.	13,014	19,168	88,000	115,000	203,000	10.59	15.60
Kinnelon Boro	8,240	2,918	18,000	18,000	36,000	12.34	4.37
Lincoln Park Boro	8,811	4,746	27,000	28,000	55,000	11.59	6.24
Madison Boro	15,948	10,918	34,000	66,000	100,000	9.16	6.27
Morris Twp.	21,566	12,895	94,000	77,000	171,000	13.26	7.93
Morris Plains Boro	5,662	10,270	35,000	62,000	97,000	9.44	17.13
Morristown Town	15,864	15,167	45,000	91,000	136,000	8.97	8.57
Parsippany-Troy Hills Twp.	53,971	33,886	143,000	203,000	346,000	10.21	6.41
Passaic Twp.	7,933	8,578	37,000	51,000	88,000	10.26	11.09
Riverdale Boro	2,682	1,775	15,000	11,000	26,000	14.65	9.69
TOTAL	178,615	146,754	680,000	881,000	1,561,000		
					East County Avg.	10.64	8.74

Municipalities W/Private Collection	1983 Population	1983 Tons/Yr.	Annual Transport[1] Costs ($)	Annual Disposal Costs($)	Total Transport[1] & Disposal ($)	$/Ton[2]	Annual $/Capita[2]
Boonton Twp.	3,513	2,414	—	14,000	—	6.00	3.99
Chatham Boro	8,959	2,696	—	16,000	—	6.00	1.79
Chatham Twp.	9,691	2,882	—	17,000	—	6.00	1.75
E. Hanover Twp.	10,313	17,493	—	105,000	—	6.00	10.18
Harding Twp.	3,738	2,675	—	16,000	—	6.00	4.28
Montville Twp.	15,855	16,735	—	100,000	—	6.00	6.31
Mountain Lakes Boro	4,595	3,347	—	20,000	—	6.00	4.35
Pequannock Twp.	14,385	11,405	—	68,000	—	6.00	4.37
TOTAL	71,049	59,647		356,000			
					Avg.	6.00	5.01

*Assumes Disposal at Mt. Olive Landfill, or Chester Hills Landfill, as practiced in 1979

[1]Transport Costs for Private Collection are variable, depending upon the individual collection service and the proximity of the locality to the disposal area.

[2]Includes Estimated Collective Disposal Costs Only.

TABLE 3-9

1983 MUNICIPAL SOLID WASTE TRANSPORT & DISPOSAL COSTS ALTERNATIVE NO. 1* (WEST)

Municipalities W/Municipal Collection	1983 Population	1983 Tons/Yr.	Annual Transport Costs ($)	Annual Disposal Costs ($)	Total Transport & Disposal ($)	$/Ton	Annual $/Capita
Dover Town	13,856	8,040	20,000	48,000	68,000	8.46	4.91
Jefferson Twp.	16,733	11,824	36,000	71,000	107,000	9.05	6.39
Mine Hill Twp.	3,753	2,261	5,000	14,000	19,000	8.40	5.06
Mt. Arlington Boro	4,046	2,299	6,000	14,000	20,000	8.70	4.94
Mt. Olive Twp.	21,147	9,074	13,000	54,000	67,000	7.38	3.17
Netcong Boro	3,450	2,330	3,000	14,000	17,000	7.30	4.93
Randolph Twp.	20,762	11,285	24,000	68,000	92,000	8.15	4.43
Rockaway Boro	7,330	9,327	20,000	56,000	76,000	8.15	10.37
Roxbury Twp.	21,004	19,296	27,000	116,000	143,000	7.41	6.81
Victory Gardens	1,292	568	2,000	3,000	5,000	8.80	3.87
Wharton Boro	5,563	3,411	12,000	20,000	32,000	9.38	5.75
TOTAL	118,936	79,715	168,000	478,000	646,000		
					West County Avg.	8.10	5.43

Municipalities W/Private Collection	1983 Population	1983 Tons/Yr.	Annual Transport Costs($)[1]	Annual Disposal Costs($)	Total Transport & Disposal ($)[1]	$/Ton[2]	Annual $/Capita[2]
Chester Boro	1,681	1,752	–	11,000	–	6.00	6.54
Chester Twp.	5,378	2,216	–	13,000	–	6.00	2.42
Denville Twp.	15,421	17,781	–	107,000	–	6.00	6.94
Mendham Boro	5,663	2,242	–	13,000	–	6.00	2.30
Mendham Twp.	5,460	3,727	–	22,000	–	6.00	4.03
Rockaway Twp.	21,211	5,924	–	36,000	–	6.00	1.70
Washington Twp.	12,140	4,588	–	28,000	–	6.00	2.31
TOTAL	66,954	38,230	–	230,000	–		
					Avg.	6.00	3.44

*Assumes Disposal at Mt. Olive Landfill, or Chester Hills Landfill, as practiced in 1979

[1]Transport Costs for Private Collection are variable, depending upon the individual collection service and the proximity of the locality to the disposal area.

[2]Inclues Estimated Collective Disposal Costs Only.

Tables 3-10 and 3-11 provide 1985 cost estimates for eastern and western communities utilizing the Landing Facility, whose 1100 TPD capacity should prove adequate to provide for the expected full county generation role in 1990. For the eastern communities with municipal or municipal contract collection, annual per capita costs will increase by 125% over current rates, to $14.64. Western communities with similar collection practices will find their costs increased by an average of 185%, to $9.79 per capita per year.

Alternative 4. This disposal plan finds the eastern communities of Butler, Kinnelon, and Pequannock disposing of their waste at a Lakeland Resource Recovery Facility, beginning operation in 1983. (Figure 3-4). As indicated in Table 3-12, the average annual per capita cost for Butler and Kinnelon Boros will increase by 75% by 1983 to $7.56. The remaining Morris County Communities will dispose of their wastes as outlined in Alternative No. 1 (See Figure 3-2). 1983 transport and disposal costs are shown in Tables 3-13 and 3-14. The capacity of the Landing facility under this alternative has been reduced to 1000 TPD, owing to the loss of waste now going to the Lakeland facility. (See Figure 3-5). Total 1985 average annual per capita costs for the east (Table 3-15) and the west (Table 3-16) roughly parallel those for Alternative No. 1. Table 3-17 provides 1985 cost estimates for the Lakeland communities. Discounting inflation, the yearly average per capita cost of $7.58 for Lakeland remains virtually unchanged between 1983 and 1985.

Alternative 6. The Passaic County Solid Waste Management Plan recommends construction of a refuse derived fuel or waterwalled incineration facility for disposal of its solid waste by 1985, with the City of Paterson a strong candidate as the facility's site. Alternative 6A assumes transport of all of Morris County's solid waste to a 2000 TPD refuse derived fuel facility, while Alternative 6B assumes the Passaic facility to be a waterwall incinerator. Figure 3-6 depicts this waste flow scheme for 1985. As in Alternative 1, the interim period calls for full county use of upgraded Mount Olive and Chester Hills Landfills, with the Mount Olive facility undergoing adequate expansion. As may be seen in Tables 3-18 and 3-20 for the east, and Tables 3-19 and 3-21 for the west, the type of facility chosen by Passaic County will significantly affect the disposal tipping fee and hence the overall cost of disposal. Average yearly per capita expenditures for eastern Morris County, in 1985, will amount to $8.13 for an RDF facility, or $16.20 should a waterwalled incinerator be utilized. This difference due to facility type is paralleled for the western communities, with average annual per capita costs of $8.18 and $14.77 for RDF or waterwall incineration facilities respectively. Thus, for eastern Morris County, this alternative finds per capita costs rising from 25% to 149% over current figures, while western communities face an average per capita increase of 138% to 329% above 1979 costs.

Alternative 7. Aside from the eastern communities of Butler Boro., Kinnelon Boro, and Pequannock Township disposing of their wastes at a Lakeland RRF beginning in 1983, this

TABLE 3-10

1985 MUNICIPAL SOLID WASTE TRANSPORT & DISPOSAL COSTS
ALTERNATIVE NO. 1* (EAST)

Municipalities W/Municipal Collection	1985 Population	1985 Tons/Yr.	Annual Transport Costs ($)	Annual Disposal Costs ($)	Total Transport & Disposal ($)	$/Ton	Annual $/Capita
Boonton Town	8,991	15,770	63,000	204,000	267,000	16.93	29.70
Butler Boro	7,812	5,131	23,000	66,000	89,000	17.35	11.39
Florham Park	8,485	5,854	41,000	76,000	117,000	19.99	13.79
Hanover Twp.	13,464	19,831	90,000	257,000	347,000	17.50	25.77
Kinnelon Boro	8,412	2,979	16,000	39,000	55,000	18.46	6.54
Lincoln Park Boro	8,883	4,785	25,000	62,000	87,000	18.18	9.79
Madison Boro	16,038	10,980	47,000	142,000	189,000	17.21	11.78
Morris Twp.	22,084	13,205	97,000	171,000	268,000	20.30	12.14
Morris Plains Boro	5,744	10,419	40,000	135,000	175,000	16.80	30.47
Morristown Town	15,870	15,173	76,000	197,000	273,000	17.99	17.20
Parsippany-Troy Hills Twp.	54,847	34,436	134,000	446,000	580,000	16.84	10.57
Passaic Twp.	8.085	8,753	62,000	113,000	175,000	19.99	21.62
Riverdale Boro	2,708	1,792	12,000	23,000	35,000	19.53	12.92
TOTAL	181,433	149,108	726,000	1,931,000	2,657,000		
					East County Avg.	17.82	14.64

Municipalities W/Private Collection	1985 Population	1985 Tons/Yr.	Annual Transport Costs ($)[1]	Annual Disposal Cost ($)	Total Transport & Disposal ($)[1]	$/Ton[2]	Annual $/Capita[2]
Boonton Twp.	3,613	2,482	–	32,000	–	12.96	8.86
Chatham Boro	8,999	2,708	–	35,000	–	12.96	3.89
Chatham Twp.	10,023	2,981	–	39,000	–	12.96	3.89
E. Hanover Twp.	10,763	18,256	–	237,000	–	12.96	22,02
Harding Twp.	3,848	2,754	–	36,000	–	12.96	9.36
Montville Twp.	16,555	17,474	–	226,000	–	12.96	13.65
Mountain Lakes Boro	4,623	3,367	–	44,000	–	12.96	9.52
Pequannock Twp.	14,547	11,533	–	149,000	–	12.96	10.24
	72,971	61,555	–	798,000	–		
					Avg.	12.96	10.94

*Assumes County RDF Facility at Landing, 1000 TPD Capacity

[1]Transport Costs for Prive Collection are variable, depending upon the individual collection service and proximity of the locality to the disposal area.

[2]Includes Estimated Collective Disposal Costs Only.

TABLE 3-11

1985 MUNICIPAL SOLID WASTE TRANSPORT & DISPOSAL COSTS
ALTERNATIVE NO. 1* (WEST)

Municipalities W/Municipal Collection	1985 Population	1985 Tons/Yr.	Annual Transport Costs ($)	Annual Disposal Costs ($)	Total Transport & Disposal ($)	$/Ton	Annual $/Capita
Dover Town	13,886	8,058	14,000	104,000	118,000	14.64	8.50
Jefferson Twp.	17,279	12,210	31,000	158,000	189,000	15.48	10.94
Mine Hill Twp.	3,823	2,303	3,000	30,000	30,000	14.33	8.63
Mt. Arlington Boro	4,154	2,360	4,000	31,000	35,000	14.83	8.43
Mt. Olive Twp.	22,797	9,782	14,000	127,000	141,000	14.41	6.19
Netcong Boro	3,570	2,411	2,000	31,000	33,000	13.69	9.24
Randolph Twp.	21,988	11,951	22,000	155,000	177,000	14.81	8.05
Rockaway Boro	7,544	9,599	23,000	124,000	147,000	15.31	19.49
Roxbury Twp.	21,934	20,150	15,000	261,000	276,000	13.70	12.58
Victory Gardens	1,342	590	2,000	8,000	10,000	16.95	7.45
Wharton Boro	5,639	3,457	9,000	45,000	54,000	15.62	9.58
TOTAL	123,956	82,871	139,000	1,074,000	1,213,000		
					West County Avg.	14.64	9.79

Municipalities W/Private Collection	1985 Population	1985 Tons/Yr.	Annual Transport[1] Costs ($)	Annual Disposal Costs ($)	Total Transport[1] & Disposal ($)	$/Ton[2]	Annual $/Capita[2]
Chester Boro	1,751	1,825	–	24,000	–	12.96	13.71
Chester Twp.	5,584	2,301	–	30,000	–	12.96	5.37
Denville Twp.	15,783	18,199	–	236,000	–	12.96	14.95
Mendham Boro	5,979	2,367	–	31,000	–	12.96	5.18
Mendham Twp.	5,754	3,928	–	51,000	–	12.96	8.86
Rockaway Twp.	21,745	6,073	–	79,000	–	12.96	3.63
Washington Twp.	12,964	4,900	–	64,000	–	12.96	4.94
	69,560	39,593	–	515,000	–		
					Avg.	12.96	7.40

*Assumes County RDF Facility at Landing, 1000 TPD Capacity

[1]Transport Costs for Private Collection are variable, depending upon the individual collection service and the proximity of the locality to the disposal area.

[2]Includes Estimated Collective Disposal Costs Only.

FIGURE 3–4

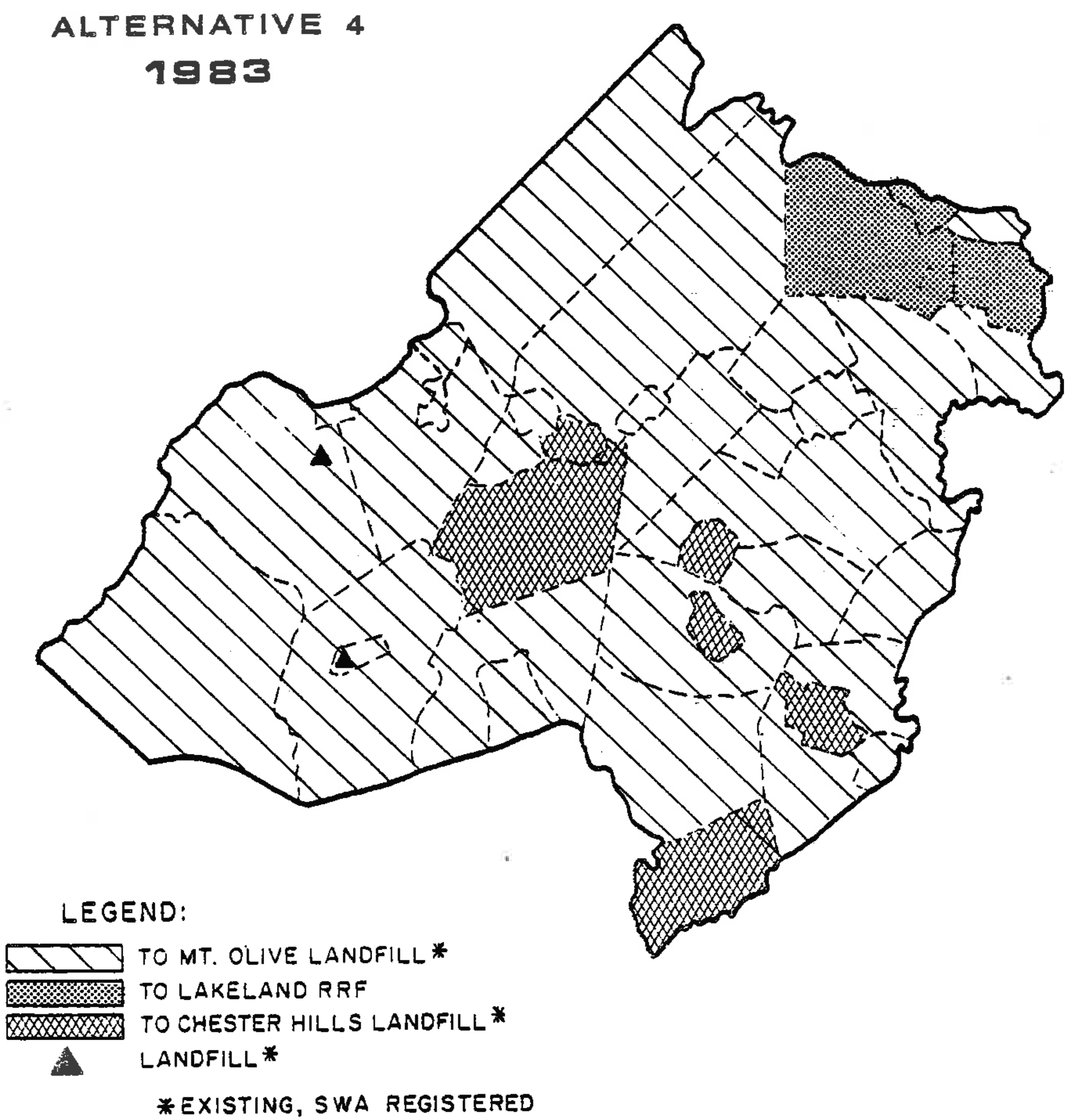
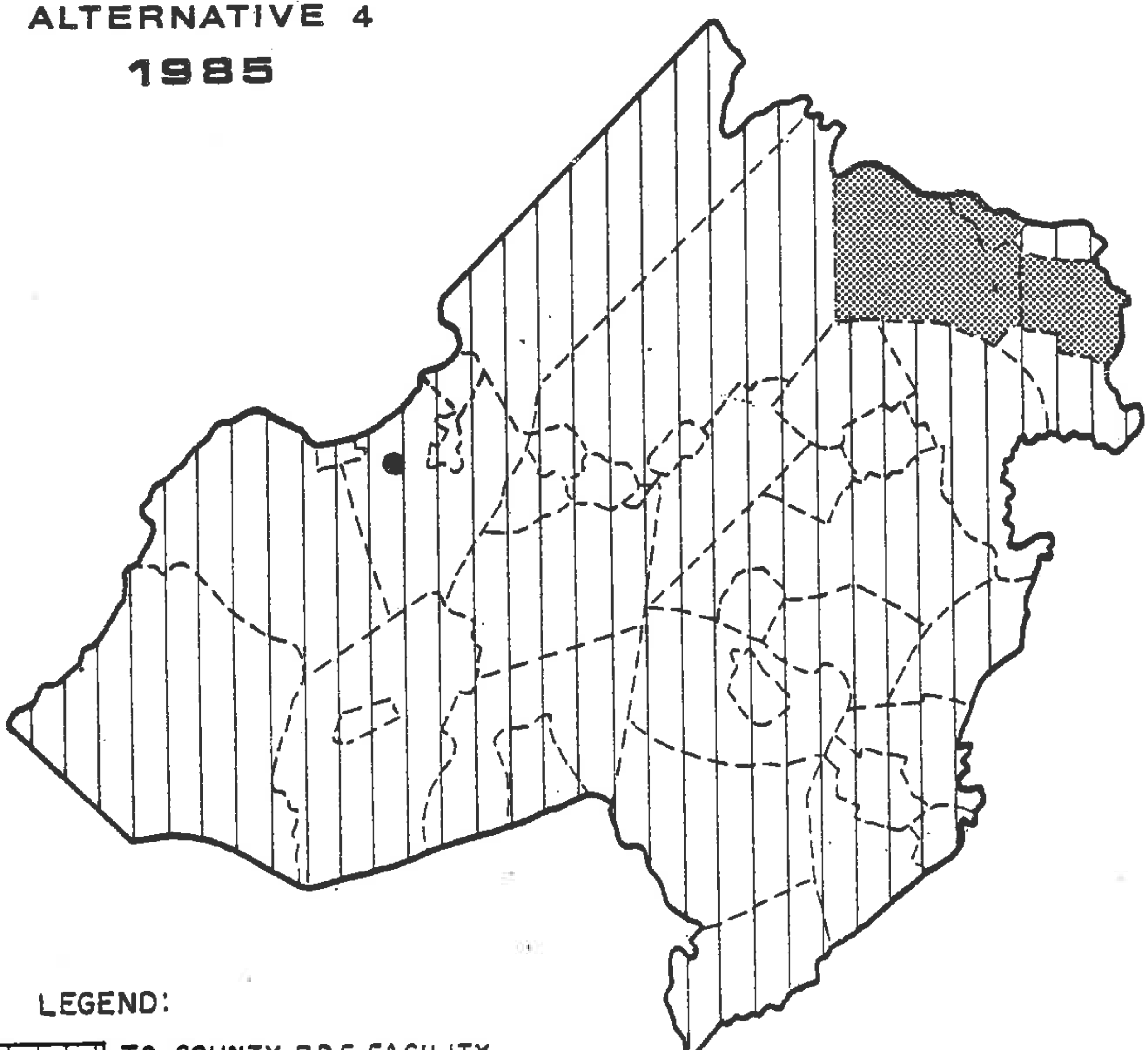

ALTERNATIVE 4
1983
LEGEND:
TO MT. OLIVE LANDFILL*
TO LAKELAND RRF
TO CHESTER HILLS LANDFILL*
LANDFILL*
*EXISTING, SWA REGISTERED

FIGURE 3–5

ALTERNATIVE 4
1985



LEGEND:

TO COUNTY RDF FACILITY
TO LAKELAND RRF
RDF FACILITY

TABLE 3-12

1983 MUNICIPAL SOLID WASTE TRANSPORT & DISPOSAL COSTS

ALTERNATIVE NO. 4 (LAKELAND)

Municipality	1983 Population	1983 Tons/Yr.	Annual Transport[1] Costs ($)	Annual Disposal Costs ($)	Total Transport & Disposal ($)	$/Ton	Annual $/Capita
Butler Boro	7,642	5,019	5,000	69,000	74,000	14.74	9.68
Kinnelon Boro	8,240	2,918	6,000	40,000	46,000	15.76	5.58
Pequannock Twp.*	14,385	11,405	–	157,000	–	13.75	10.91
TOTAL	30,267	19,342	11,000	266,000	120,000		
				Lakeland Communities Avg.[2]		15.12	7.56

*Denotes municipality with private collection. Therefore transport costs are variable, depending upon the individual collection service and the proximity of the locality to the disposal area.

[1]Assumes RRF located in Wanaque Boro

[2]Does not include Pequannock Twp.

TABLE 3-13

1983 MUNICIPAL SOLID WASTE TRANSPORT & DISPOSAL COSTS
ALTERNATIVE NO. 4* (EAST)

Municipalities W/Municipal Collection	Population	Tons/Year	Annual Transport Costs ($)	Annual Disposal Costs($)	Total Transport & Disposal Costs	$/Ton	Annual $/Capita
Boonton Town	8,919	15,644	71,000	94,000	165,000	10.55	18.50
Florham Park	8,363	5,770	47,000	35,000	82,000	14.21	9.81
Hanover Twp.	13,014	19,168	88,000	115,000	203,000	10.59	15.60
Lincoln Park Boro	8,811	4,746	27,000	28,000	55,000	11.59	6.24
Madison Boro	15,948	10,918	34,000	66,000	100,000	9.16	6.27
Morris Twp.	21,566	12,895	94,000	77,000	171,000	13.26	7.93
Morris Plains Boro	5,662	10,270	35,000	62,000	97,000	9.44	17.13
Morristown Town	15,864	15,167	45,000	91,000	136,000	8.97	8.57
Parsippany-Troy Hills Twp.	53,971	33,886	143,000	203,000	346,000	10.21	6.41
Passaic Twp.	7,933	8,578	37,000	51,000	88,000	10.26	11.09
Riverdale Boro	2,682	1,775	15,000	11,000	26,000	14.65	9.69
TOTAL	162,733	138,817	636,000	833,000	1,469,000		
					East County Avg.	10.58	9.02

Municipalities W/Private Collection	Population	Tons/Year	Annual Transport[1] Costs ($)	Annual Disposal Costs($)	Total Transport[1] & Disposal Costs	$/Ton[2]	Annual $/Capita[2]
Boonton Twp.	3,513	2,414	–	14,000	–	6.00	3.99
Chatham Boro	8,959	2,696	–	16,000	–	6.00	1.79
Chatham Twp.	9,691	2,882	–	17,000	–	6.00	1.75
E. Hanover Twp.	10,313	17,493	–	105,000	–	6.00	10.18
Harding Twp.	3,738	2,675	–	16,000	–	6.00	4.28
Montville Twp.	15,855	16,735	–	100,000	–	6.00	6.31
Mountain Lakes Boro	4,595	3,347	–	2,000	–	6.00	4.35
TOTAL	56,664	48,242	–	288,000			
					Avg.	6.00	5.08

*Assumes Disposal at Mt. Olive Landfill or Chester Hills Landfill, as practiced in 1979

[1]Transport costs for private collection are variable, depending upon the individual collection service and the proximity of the locality to the disposal area.

[2]Includes estimated collective disposal costs only.

TABLE 3-14

1983 MUNICIPAL SOLID WASTE TRANSPORT & DISPOSAL COSTS
ALTERNATIVE NO. 4* (WEST)

Municipalities W/Municipal Collection	1983 Population	1983 Tons/Yr.	Annual Transport Costs ($)	Annual Disposal Costs ($)	Total Transport & Disposal ($)	$/Ton	Annual $/Capita
Dover Town	13,856	8,040	20,000	48,000	68,000	8.46	4.91
Jefferson Twp.	16,733	11,824	36,000	71,000	107,000	9.05	6.39
Mine Hill Twp.	3,753	2,261	5,000	14,000	19,000	8.40	5.06
Mt. Arlington Boro	4,046	2,299	6,000	14,000	20,000	8.70	4.94
Mt. Olive Twp.	21,147	9,074	13,000	54,000	67,000	7.38	3.17
Netcong Boro	3,450	2,330	3,000	14,000	17,000	7.30	4.93
Randolph Twp.	20,762	11,285	24,000	68,000	92,000	8.15	4.43
Rockaway Boro	7,330	9,327	20,000	56,000	76,000	8.15	10.37
Roxbury Twp.	21,004	19,296	27,000	116,000	143,000	7.41	6.81
Victory Gardens	1,292	568	2,000	3,000	5,000	8.80	3.87
Wharton Boro	5,563	3,411	12,000	20,000	32,000	9.38	5.75
TOTAL	118,936	79,715	168,000	478,000	646,000		
					West County Avg.	8.10	5.43

Municipalities W/Private Collection	1983 Population	1983 Tons/Yr.	Annual Transport[1] Costs($)	Annual Disposal Costs($)	Total Transport[1] & Disposal ($)	$/Ton[2]	Annual $/Capita[2]
Chester Boro	1,681	1,752	–	11,000	–	6.00	6.54
Chester Twp.	5,378	2,216	–	13,000	–	6.00	2.42
Denville Twp.	15,421	17,781	–	107,000	–	6.00	6.94
Mendham Boro	5,663	2,242	–	13,000	–	6.00	2.30
Mendham Twp.	5,460	3,727	–	22,000	–	6.00	4.03
Rockaway Twp.	21,211	5,924	–	36,000	–	6.00	1.70
Washington Twp.	12,140	4,588	–	28,000	–	6.00	2.31
TOTAL	66,954	38,230	–	230,000	–		
					Avg.	6.00	3.44

*Assumes Disposal at Mt. Olive Landfill, or Chester Hills Landfill, as practiced in 1979

[1]Transport Costs for Private Collection are variable, depending upon the individual collection service and the proximity of the locality to the disposal area.

[2]Inclues Estimated Collective Disposal Costs Only.

TABLE 3-15

1985 MUNICIPAL SOLID WASTE TRANSPORT & DISPOSAL COSTS
ALTERNATIVE NO' 4* (EAST)

Municipalities W/Municipal Collection	1985 Population	1985 Tons/Year	Annual Transport Costs ($)	Annual Disposal Costs($)	Total Transport & Disposal Costs	$/Ton	Annual $/Capita
Boonton Town	8,991	15,770	63,000	204,000	267,000	16.93	29.70
Florham Park	8,485	5,854	41,000	76,000	117,000	19.99	13.79
Hanover Twp.	13,464	19,831	90,000	257,000	347,000	17.50	25.77
Lincoln Park Boro	8,883	4,785	25,000	62,000	87,000	18.18	9.79
Madison Boro	16,038	10,980	47,000	142,000	189,000	17.21	11.78
Morris Twp.	22,084	13,205	97,000	171,000	268,000	20.30	12.14
Morris Plains Boro	5,744	10,419	40,000	135,000	175,000	16.80	30.47
Morristown Town	15,870	15,173	76,000	197,000	273,000	17.99	17.20
Parsippany-Troy Hills Twp.	54,847	34,436	134,000	446,000	580,000	16.84	10.57
Passaic Twp.	8,095	8,753	62,000	113,000	175,000	19.99	21.62
Riverdale Boro	2,708	1,792	12,000	23,000	35,000	19.53	12.92
TOTAL	165,209	140,998	687,000	1,826,000	2,513,000		
					East County Avg.	17.82	15.21

Municipalities W/Private Collection	1985 Population	1985 Tons/Year	Annual Transport[1] Costs ($)	Annual Disposal Costs($)	Total Transport[1] & Disposal Costs	$/Ton[2]	Annual $/Capita[2]
Boonton Twp.	3,613	2,482	–	32,000	–	12.96	8.86
Chatham Boro	8,999	2,708	–	35,000	–	12.96	3.89
Chatham Twp.	10,023	2,981	–	39,000	–	12.96	3.89
E. Hanover Twp.	10,763	18,256	–	237,000	–	12.96	22.02
Harding Twp.	3,848	2,754	–	36,000	–	12.96	9.36
Montville Twp.	16,555	17,474	–	226,000	–	12.96	13.65
Mountain Lakes Boro	4,623	3,367	–	44,000	–	12.96	9.52
TOTAL	58,424	50,022	–	649,000	Avg.	12.96	11.11

*Assumes RDF Facility at Landing, 1000 TPD Capacity

[1]Transport costs for private collection are variable, depending upon the individual collection service and the proximity of the locality to the disposal area.

[2]Includes estimated collective disposal costs only.

TABLE 3-16

1985 MUNICIPAL SOLID WASTE TRANSPORT & DISPOSAL COSTS
ALTERNATIVE NO. 4* (WEST)

Municipalities W/Municipal Collection	1985 Population	1985 Tons/Yr.	Annual Transport Costs ($)	Annual Disposal Costs ($)	Total Transport & Disposal ($)	$/Ton	Annual $/Capita
Dover Town	13,886	8,058	14,000	104,000	118,000	14.64	8.50
Jefferson Twp.	17,279	12,210	31,000	158,000	189,000	15.48	10.94
Mine Hill Twp.	3,823	2,303	3,000	30,000	30,000	14.33	8.63
Mt. Arlington Boro	4,154	2,360	4,000	31,000	35,000	14.83	8.43
Mt. Olive Twp.	22,797	9,782	14,000	127,000	141,000	14.41	6.19
Netcong Boro	3,570	2,411	2,000	31,000	33,000	13.69	9.24
Randolph Twp.	21,988	11,951	22,000	155,000	177,000	14.81	8.05
Rockaway Boro	7,544	9,599	23,000	124,000	147,000	15.31	19.49
Roxbury Twp.	21,934	20,150	15,000	261,000	276,000	13.70	12.58
Victory Gardens	1,342	590	2,000	8,000	10,000	16.95	7.45
Wharton Boro	5,639	3,457	9,000	45,000	54,000	15.62	9.58
TOTAL	123,956	82,871	139,000	1,074,000	1,213,000		
					West County Avg.	14.64	9.79

Municipalities W/Private Collection	1985 Population	1985 Tons/Yr.	Annual Transport[1] Costs ($)	Annual Disposal Costs ($)	Total Transport[1] & Disposal ($)	$/Ton[2]	Annual $/Capita[2]
Chester Boro	1,751	1,825	–	24,000	–	12.96	13.71
Chester Twp.	5,584	2,301	–	30,000	–	12.96	5.37
Denville Twp.	15,783	18,199	–	236,000	–	12.96	14.95
Mendham Boro	5,979	2,367	–	31,000	–	12.96	5.18
Mendham Twp.	5,754	3,928	–	51,000	–	12.96	8.86
Rockaway Twp.	21,745	6,073	–	79,000	–	12.96	3.63
Washington Twp.	12,964	4,900	–	64,000	–	12.96	4.94
	69,560	39,593	–	515,000	–		
					Avg.	12.96	7.40

*Assumes County RDF Facility at Landing, 1000 TPD Capacity.

[1]Transport Costs for Private Collection are variable, depending upon the individual collection service and the proximity of the locality to the disposal area.

[2]Includes Estimated Collective Disposal Costs Only.

TABLE 3-17

1985 MUNICIPAL SOLID WASTE TRANSPORT & DISPOSAL

ALTERNATIVE NO. 4 (LAKELAND)

Municipality	1985 Population	1985 Tons/Yr.	Annual Transport[1] Costs ($)	Annual Disposal Costs ($)	Total Transport & Disposal ($)	$/Ton	Annual $/Capita
Butler Boro	7,812	5,131	5,000	71,000	76,000	14.81	9.73
Kinnelon Boro	8,412	2,979	6,000	41,000	47,000	15.78	5.59
Pequannock Twp.*	14,547	11,533	—	159,000	—	13.79	10.93
TOTAL	30,771	19,643	11,000	271,000	123,000		
				Lakeland Communities Avg.[2]		15.17	7.58

*Denotes municipality with private collection. Therefore transport costs are variable, depending upon the individual collection service and the proximity to the locality to the disposal area.

[1]Assumes RRF located in Wanaque Boro.

[2]Does not include Pequannock Twp.

FIGURE 3-6

TABLE 3–18

1985 MUNICIPAL SOLID WASTE TRANSPORT & DISPOSAL COSTS
ALTERNATIVE NO. 6A* (EAST)

Municipalities W/ Municipal Collection	1985 Population	1985 Tons/Yr.	Annual Transport Costs ($)	Annual Disposal Costs($)	Total Transport & Disposal ($)	$/Ton	Annual $/Capita
Boonton Town	8,991	15,770	64,000	83,000	147,000	9.32	16.32
Butler Boro	7,812	5,131	15,000	27,000	42,000	8.19	5.38
Florham Park	8,485	5,854	46,000	31,000	77,000	13.15	9.07
Hanover Twp.	13,464	19,831	90,000	104,000	194,000	9.78	14.41
Kinnelon Boro	8,412	2,979	11,000	16,000	27,000	9.06	3.21
Lincoln Park Boro	8,883	4,785	10,000	25,000	35,000	7.31	3.94
Madison Boro	16,038	10,980	48,000	58,000	106,000	9.65	6.61
Morris Twp.	22,084	13,205	97,000	69,000	166,000	12.57	7.52
Morris Plains Boro	5,744	10,419	45,000	55,000	100,000	9.60	17.41
Morristown Town	15,870	15,173	76,000	80,000	156,000	10.28	9.83
Parsippany-Troy Hills Twp.	54,847	34,436	120,000	181,000	301,000	8.74	5.49
Passaic Twp.	8,095	8,753	63,000	46,000	109,000	12.45	13.47
Riverdale Boro	2,708	1,792	6,000				
TOTAL	181,433	149,108	691,000	784,000	1,475,000		
					East County Avg.	9.89	8.13

Municipalities W/Private Collection	1985 Population	1985 Tons/Yr.	Annual Transport[1] Costs($)	Annual Disposal Costs ($)	Total Transport[1] & Disposal ($)	$/Ton[2]	Annual $/Capita[2]
Boonton Twp.	3,613	2,482	–	13,000	–	5.25	3.60
Chatham Boro	8,999	2,708	–	14,000	–	5.25	1.56
Chatham Twp.	10,023	2,981	–	16,000	–	5.25	1.60
E. Hanover Twp.	10,763	18,256	–	96,000	–	5.25	8.92
Harding Twp.	3,848	2,754	–	14,000	–	5.25	3.64
Montville Twp.	16,555	17,474	–	92,000	–	5.25	5.56
Mountain Lakes Boro	4,623	3,367	–	18,000	–	5.25	3.89
Pequannock Twp.	14,547	11,533	–	61,000	–	5.25	4.19
TOTAL	72,971	61,555	–	324,000			
					Avg.	5.25	4.44

* Assumes Full County Waste to Passaic RDF Facility, 2000 TPD Capacity.

[1]Transport costs for private collection are variable, depending upon the individual collection service and the proximity of the locality to the disposal area.

[2]Includes Estimated Collective Disposal Costs Only.

TABLE 3–19

1985 MUNICIPAL SOLID WASTE TRANSPORT & DISPOSAL COSTS
ALTERNATIVE NO. 6A* (WEST)

Municipalities W/ Municipal Collection	1985 Population	1985 Tons/Yr.	Annual Transport Costs ($)	Annual Disposal Costs ($)	Total Transport & Disposal ($)	$/Ton	Annual $/Capita
Dover Town	13,886	8,058	42,000	42,000	84,000	10.42	6.05
Jefferson Twp.	17,279	12,210	76,000	64,000	140,000	11.47	8.10
Mine Hill Twp.	3,823	2,303	16,000	12,000	28,000	12.16	7.32
Mt. Arlington Boro	4,154	2,360	24,000	12,000	36,000	15.25	8.67
Mt. Olive Twp.	22,797	9,782	109,000	51,000	160,000	16.36	7.02
Netcong Boro	3,570	2,411	18,000	13,000	31,000	12.86	8.68
Randolph Twp.	21,988	11,951	71,000	63,000	134,000	11.21	6.09
Rockaway Boro	7,544	9,599	45,000	50,000	95,000	9.90	12.59
Roxbury Twp.	21,934	20,150	143,000	106,000	249,000	12.36	11.45
Victory Gardens	1,342	590	5,000	3,000	3,000	13.56	5.96
Wharton Boro	5,639	3,457	31,000	18,000	49,000	14.17	8.69
TOTAL	123,956	82,871	580,000	434,000	1,014,000		
					West County Avg.	12.24	8.18

Municipalities W/Private Collection	1985 Population	1985 Tons/Yr.	Annual Transport[1] Costs ($)	Annual Disposal Costs ($)	Total Transport[1] & Disposal ($)	$/Ton[2]	Annual $/Capita
Chester Boro	1,751	1,825	–	70,000	–	5.25	5.71
Chester Twp.	5,584	2,301	–	12,000	–	5.25	2.15
Denville Twp.	15,783	18,199	–	96,000	–	5.25	6.08
Mendham Boro	5,979	2,367	–	12,000	–	5.25	2.01
Mendham Twp.	5,754	3,928	–	21,000	–	6.25	3.65
Rockaway Twp.	21,745	6,073	–	32,000	–	5.25	1.47
Washington Twp.	12,964	4,900	–	26,000	–		2.01
TOTAL	69,560	39,593		209,000			
					Avg.	5.25	3.00

* Assumes Full County Waste to Passaic RDF Facility, 2000 TPD Capacity.

[1]Transport Costs for Private Collection are variable, depending upon the individual collection service and the proximity of the locality to the disposal area.

[2]Includes Estimated Collective Disposal Costs Only.

TABLE 3–20

1985 MUNICIPAL SOLID WASTE TRANSPORT & DISPOSAL COSTS

ALTERNATIVE NO. 6B (EAST)

Municipalities W/ Municipal Collection	1985 Population	1985 Tons/Yr.	Annual Transport Costs ($)	Annual Disposal Costs($) [1]	Total Transport & Disposal ($)	$/Ton	Annual $/Capita
Boonton Town	8,991	15,770	64,000	238,000	302,000	19.15	33.59
Butler Boro	7,812	5,131	15,000	77,000	92,000	17.93	11.78
Florham Park	8,485	5,854	46,000	88,000	134,000	22.89	15.79
Hanover Twp.	13,464	19,831	90,000	299,000	389,000	19.62	28.89
Kinnelon Boro	8,412	2,979	11,000	45,000	56,000	18.80	6.66
Lincoln Park Boro	8,883	4,785	10,000	72,000	82,000	17.14	9.23
Madison Boro	16,038	10,980	48,000	166,000	214,000	19.49	13.34
Morris Twp.	22,084	13,205	97,000	199,000	296,000	22.42	13.40
Morris Plains Boro	5,744	10,419	45,000	157,000	202,000	19.39	35.17
Morristown Town	15,870	15,173	76,000	229,000	305,000	20.10	19.22
Parsippany-Troy Hills Twp.	54,847	34,436	120,000	520,000	640,000	18.59	11.67
Passaic Twp.	8,095	8,753	63,000	132,000	195,000	22.28	24.09
Riverdale Boro	2,708	1,792	6,000	27,000	33,000	18.42	12.19
TOTAL	181,433	149,108	619,000	2,249,000	2,940,000		
					East County Avg.	19.72	16.20

Municipalities W/Private Collection	1985 Population	1985 Tons/Yr.	Annual Transport Costs($) [2]	Annual Disposal Costs ($) [1]	Total Transport & Disposal ($)	$/Ton [3]	Annual $/Capita [3]
Boonton Twp.	3,613	2,482	–	37,000	–	15.10	10.24
Chatham Boro	8,999	2,708	–	41,000	–	15.10	4.56
Chatham Twp.	10,023	2,981	–	45,000	–	15.10	4.49
E. Hanover Twp.	10.763	18,256	–	276,000	–	15.10	25.64
Harding Twp.	3,848	2,754	–	42,000	–	15.10	10.91
Montville Twp.	16,555	17,474	–	264,000	–	15.10	15.95
Mountain Lakes Boro	4,623	3,367	–	51,000	–	15.10	11.03
Pequannock Twp.	14,547	11,533	–	174,000	–	15.10	11.96
TOTAL	72,971	61,555	–	930,000	–		
					Avg.	15.10	12.74

[1] Assumes Full County Waste to Passaic Waterwall Incinerator, 2000 TPD Capacity.

[2] Transport costs for private collection are variable, depending upon the individual collection service and the proximity of the locality to the disposal area.

[3] Includes estimated collective disposal costs only

TABLE 3–21

1985 MUNICIPAL SOLID WASTE TRANSPORT & DISPOSAL COSTS

ALTERNATIVE 6B* (WEST)

Municipalities W/ Municipal Collection	1985 Population	1985 Tons/Yr.	Annual Transport Costs ($)	Annual Disposal Costs ($)	Total Transport & Disposal ($)	$/Ton	Annual $/Capita
Dover Town	13,886	8,058	42,000	122,000	164,000	20.35	11.81
Jefferson Twp.	17,279	12,210	76,000	184,000	260,000	21.29	15.04
Mine Hill Twp.	3,823	2,303	16,000	35,000	51,000	22.15	13.34
Mt. Arlington Boro	4,154	2,360	24,000	36,000	60,000	25.42	14.44
Mt. Olive Twp.	22,797	9,782	109,000	148,000	257,000	26.27	11.27
Netcong Boro	3,570	2,411	18,000	36,000	54,000	22.40	15.13
Randolph Twp.	21,988	11,951	71,000	180,000	251,000	21.00	11.42
Rockaway Boro	7,544	9,599	45,000	145,000	190,000	19.79	25.19
Roxbury Twp.	21,934	20,150	143,000	304,000	447,000	22.18	20.37
Victory Gardens	1,342	590	5,000	9,000	14,000	23.73	10.43
Wharton Boro	5,639	3,457	31,000				
TOTAL	123,956	82,871	580,000	1,251,000	1,831,000		
					West County Avg.	22.09	14.77

Municipalities W/Private Collection	1985 Population	1985 Tons/Yr.	Annual Transport[1] Costs ($)	Annual Disposal Costs ($)	Total Transport[1] & Disposal ($)	$/Ton[2]	Annual $/Capita
Chester Boro	1,751	1,825	–	28,000	–	15.10	15.99
Chester Twp.	5,584	2,301	–	35,000	–	15.10	6.27
Denville Twp.	15,783	18,199	–	275,000	–	15.10	17.42
Mendham Boro	5,979	2,367	–	36,000	–	15.10	6.02
Mendham Twp.	5,754	3,928	–	59,000	–	15.10	10.25
Rockaway Twp.	21,745	6,073	–	92,000	–	15.10	4.23
Washington Twp.	12,964	4,900	–	74,000	–		
TOTAL	69,560	39,593	–	599,000	Avg.	15.10	8.11

*Assumes Full County Waste to Passaic Waterwall Incinerator, 2000 TPD Capacity.

[1]Transport costs for private collection are variable, depending upon the individual collection service and the proximity of the locality to the disposal area.

[2]Includes Estimated Collective Disposal Costs Only.

alternative calls for the same waste flow scheme as outlined in Alternative 6. 1983 costs for these three municipalities are contained in Table 3-22. Tables 3-23 and 3-24 for the eastern and western municipalities, respectively, provide 1983 costs estimates for the remaining Morris County municipalities, utilizing in county landfills (Figure 3-7) until 1985 (Figure 3-8), when the Passaic Facility is to begin operation. Tables 3-25, 3-26, 3-27, and 3-28 provide 1985 cost estimates for the eastern and western municipalities whose waste is to go to the Passaic facility. Yearly average per capita costs range from $8.18 for the western communities for a Passaic RDF facility to $16.90 for the eastern communities should Passaic elect to construct a waterwalled incinerator. 1985 Lakeland costs under this alternative are shown in Table 3-29.

Alternative 8. This alternative is similar to Alternative 6 except that in 1985 the western municipalities will use the Landing RDF/RRF facility which will also accept additional waste imported from Sussex and Warren counties. Figure 3-9 graphically depicts this waste flow.

Tables 3-30 and 3-31 show average yearly per capita expenditures for the eastern municipalities depending upon whether the Passaic facility is chosen to be RDF at a 1500 TPD capacity (8A) or a waterwalled incinerator at a 1500 TPD capacity (8B). Since the Passaic facility is not to accept waste from the western communities of Morris county, the disposal tipping fee will increase over that of Alternative 6 to $7.35 per ton for the RDF facility or $18.51 per ton for the waterwalled incinerator, due to a loss in economy of scale. Average yearly per capita cost increases of 52% or 193% in 1985 will result for the east with RDF or waterwalled incineration, respectively. Costs per capita for the western communities utilizing the Landing facility are shown in Tables 3-32 and 3-33 for 1985. An average increase of 185% over 1979 yearly per capita costs is expected for the west.

Alternative 9. This disposal plan is similar to alternative 8 except that the Lakeland communities of Morris County will utilize their own RRF facility starting in 1985. This plan is depicted in Figure 3-10. Without the waste stream from the Lakeland communities, the average annual disposal cost per capita for the eastern communities is expected to rise 58% or 205% over that of 1979, depending upon whether the Passaic facility is RDF or a waterwalled incinerator. The yearly average cost per capita for the Lakeland communities is expected to be approximately $7.58. Annual transport and disposal costs for the eastern and Lakeland communities (1985) appears in Tables 3-34, 3-35 and 3-36. The annual transport and disposal costs of the western communities (1985) utilizing the Landing facility remain unchanged from that of Alternative 8, as shown in Tables 3-37 and 3-38.

Alternative 10. Starting in 1983 the eastern communities in this alternative will use the Newark RDF facility to dispose of their waste. The Newark facility is presently under construction and will have a capacity of 2000 TPD, expandable to 3000 TPD. It will be privately

TABLE 3–22

1983 MUNICIPAL SOLID WASTE TRANSPORT & DISPOSAL COSTS

ALTERNATIVE NO. 7 (LAKELAND)

Municipality	1983 Population	1983 Tons/Yr.	Annual Transport[1] Costs ($)	Annual Disposal Costs ($)	Total Transport & Disposal ($)	$/Ton	Annual $/Capita
Butler Boro	7,642	5,019	5,000	69,000	74,000	14.74	9.68
Kinnelon Boro	8,240	2,918	6,000	40,000	46,000	15.76	5.58
Pequannock Twp.*	14,385	11,405	–	157,000	–	13.75	10.91
TOTAL	30,267	19,342	11,000	266,000	120,000		
				Lakeland Communities Avg.[2]		15.12	7.56

*Denotes municipality with private collection. Therefore transport costs are variable, depending upon the individual collection service and the proximity to the locality to the disposal area.

[1]Assumes RRF located in Wanaque Boro

[2]Does not include Pequannock Twp.

TABLE 3-23

1983 MUNICIPAL SOLID WASTE TRANSPORT & DISPOSAL COSTS
ALTERNATIVE NO. 7* (EAST)

Municipalities W/Municipal Collection	Population	Tons/Year	Annual Transport Costs ($)	Annual Disposal Costs($)	Total Transport & Disposal Costs	$/Ton	Annual $/Capita
Boonton Town	8,919	15,644	71,000	94,000	165,000	10.55	18.50
Florham Park	8,363	5,770	47,000	35,000	82,000	14.21	9.81
Hanover Twp.	13,014	19,168	88,000	115,000	203,000	10.59	15.60
Lincoln Park Boro	8,811	4,746	27,000	28,000	55,000	11.59	6.24
Madison Boro	15,948	10,918	34,000	66,000	100,000	9.16	6.27
Morris Twp.	21,566	12,895	94,000	77,000	171,000	13.26	7.93
Morris Plains Boro	5,662	10,270	35,000	62,000	97,000	9.44	17.13
Morristown Town	15,864	15,167	45,000	91,000	136,000	8.97	8.57
Parsippany-Troy Hills Twp.	53,971	33,886	143,000	203,000	346,000	10.21	6.41
Passaic Twp.	7,933	8,578	37,000	51,000	88,000	10.26	11.09
Riverdale Boro	2,682	1,775	15,000	11,000	26,000	14.65	9.69
TOTAL	162,733	138,817	636,000	833,000	1,469,000		
					East County Avg.	10.58	9.02

Municipalities W/Private Collection	Population	Tons/Year	Annual Transport[1] Costs ($)	Annual Disposal Costs($)	Total Transport[1] & Disposal Costs	$/Ton[2]	Annual $/Capita[2]
Boonton Twp.	3,513	2,414	–	14,000	–	6.00	3.99
Chatham Boro	8,959	2,696	–	16,000	–	6.00	1.79
Chatham Twp.	9,691	2,882	–	17,000	–	6.00	1.75
E. Hanover Twp.	10,313	17,493	–	105,000	–	6.00	10.18
Harding Twp.	3,738	2,675	–	16,000	–	6.00	4.28
Montville Twp.	15,855	16,735	–	100,000	–	6.00	6.31
Mountain Lakes Boro	4,595	3,347	–	2,000	–	6.00	4.35
TOTAL	56,664	48,242	–	288,000			
					Avg.	6.00	5.08

*Assumes Disposal at Mt. Olive Landfill or Chester Hills Landfill, as practiced in 1979

[1]Transport costs for private collection are variable, depending upon the individual collection service and the proximity of the locality to the disposal area.

[2]Includes estimated collective disposal costs only.

TABLE 3–24

1983 MUNICIPAL SOLID WASTE TRANSPORT & DISPOSAL COSTS
ALTERNATIVE NO. 7* (WEST)

Municipalities W/ Municipal Collection	1983 Population	1983 Tons/Yr.	Annual Transport Costs ($)	Annual Disposal Costs ($)	Total Transport & Disposal ($)	$/Ton	Annual $/Capita
Dover Town	13,856	8,040	20,000	48,000	68,000	8.46	4.91
Jefferson Twp.	16,733	11,824	36,000	71,000	107,000	9.05	6.39
Mine Hill Twp.	3,753	2,261	5,000	14,000	19,000	8.40	5.06
Mt. Arlington Boro	4,046	2,299	6,000	14,000	20,000	8.70	4.94
Mt. Olive Twp.	21,147	9,074	13,000	54,000	67,000	7.38	3.17
Netcong Boro	3,450	2,330	3,000	14,000	17,000	7.30	4.93
Randolph Twp.	20,762	11,285	24,000	68,000	92,000	8.15	4.43
Rockaway Boro	7,330	9,327	20,000	56,000	76,000	8.15	10.37
Roxbury Twp.	21,004	19,296	27,000	116,000	143,000	7.41	6.81
Victory Gardens	1,292	568	2,000	3,000	5,000	8.80	3.87
Wharton Boro	5,563	3,411	12,000	20,000	32,000	9.38	5.75
TOTAL	118,936	79,715	168,000	478,000	646,000		
					West County Avg.	8.10	5.43

Municipalities W/Private Collection	1983 Population	1983 Tons/Yr.	Annual Transport[1] Costs($)	Annual Disposal Costs($)	Total Transport[1] & Disposal ($)	$/Ton[2]	Annual $/Capita[2]
Chester Boro	1,681	1,752	–	11,000	–	6.00	6.54
Chester Twp.	5,378	2,216	–	13,000	–	6.00	2.42
Denville Twp.	15,421	17,781	–	107,000	–	6.00	6.94
Mendham Boro	5,663	2,242	–	13,000	–	6.00	2.30
Mendham Twp.	5,460	3,727	–	22,000	–	6.00	4.03
Rockaway Twp.	21,211	5,924	–	36,000	–	6.00	1.70
Washington Twp.	12,140	4,588	–	28,000	–	6.00	2.31
TOTAL	66,954	38,230	–	230,000	–		
					Avg.	6.00	3.44

*Assumes Disposal at Mt. Olive Landfill, or Chester Hills Landfill, as Practiced in 1979.

[1]Transport Costs for Private Collection are variable, depending upon the individual collection service and the proximity of the locality to the disposal area.

[2]Inclues Estimated Collective Disposal Costs Only.

FIGURE 3–7

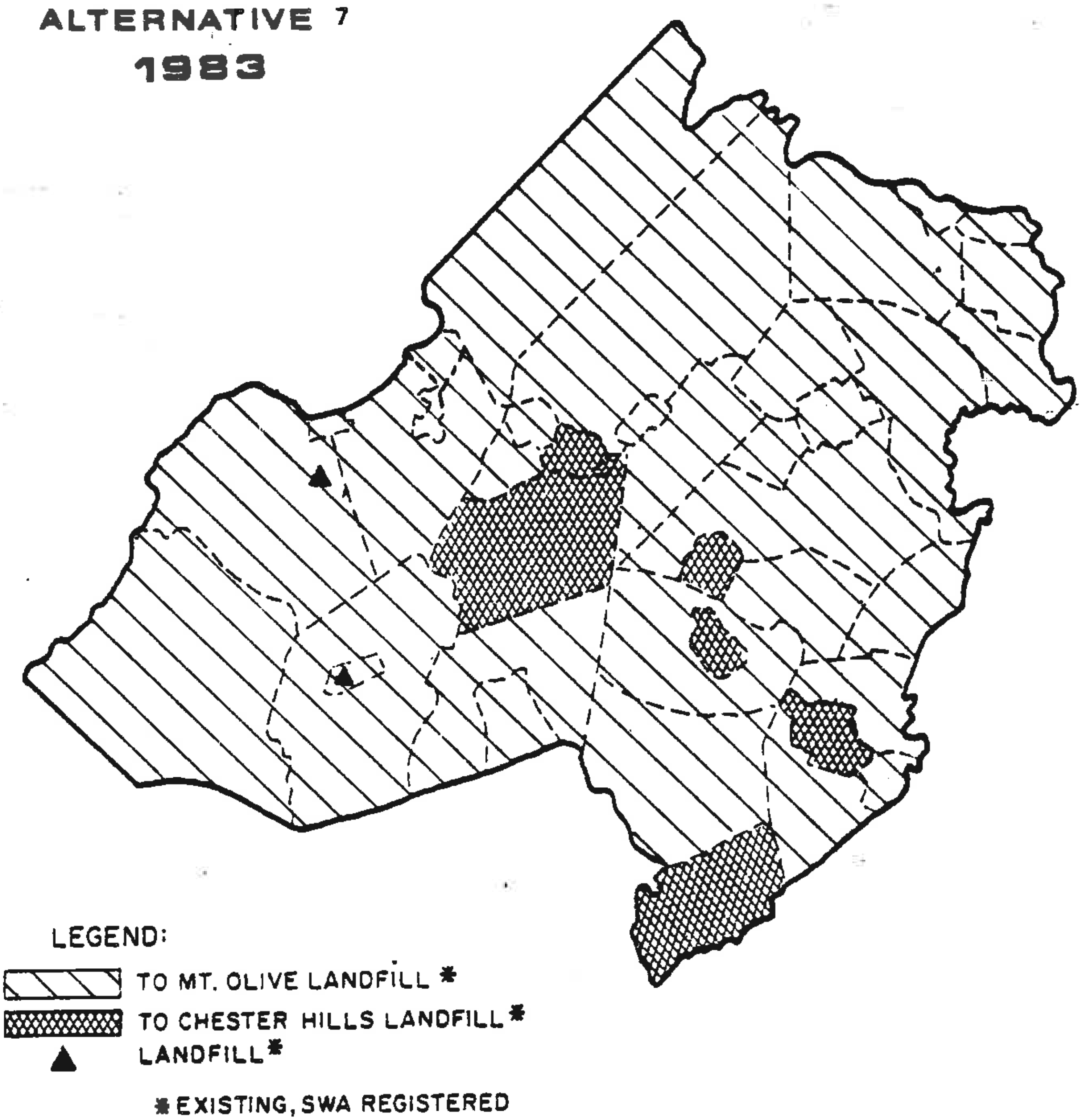

ALTERNATIVE 7
1983
LEGEND:
TO MT. OLIVE LANDFILL *
TO CHESTER HILLS LANDFILL *
LANDFILL *
* EXISTING, SWA REGISTERED

FIGURE 3–8

TABLE 3–25

1985 MUNICIPAL SOLID WASTE TRANSPORT & DISPOSAL COSTS
ALTERNATIVE 7A* (EAST)

Municipalities W/ Municipal Collection	1985 Population	1985 Tons/Year	Annual Transport Costs ($)	Annual Disposal Costs($)	Total Transport & Disposal Costs	$/Ton	Annual $/Capita
Boonton Town	8,991	15,770	64,000	83,000	147,000	9.32	16.35
Florham Park	8,485	5,854	46,000	31,000	77,000	13.15	9.07
Hanover Twp.	13,464	19,831	90,000	104,000	194,000	9.78	14.41
Lincoln Park Boro	8,883	4,785	10,000	25,000	35,000	7.31	3.94
Madison Boro	16,038	10,980	48,000	58,000	106,000	9.65	6.61
Morris Twp.	22,084	13,205	97,000	69,000	166,000	12.57	7.52
Morris Plains Boro	5,744	10,419	45,000	55,000	100,000	9.60	17.41
Morristown Town	15,870	15,173	76,000	80,000	156,000	10.28	9.83
Parsippany-Troy Hills Twp.	54,847	34,436	120,000	181,000	301,000	8.74	5.49
Passaic Twp.	8,095	8,753	63,000	46,000	109,000	12.45	13.47
Riverdale Boro	2,708	1,792	6,000	9,000	15,000	8.37	5.54
TOTAL	165,209	140,998	665,000	741,000	1,406,000		
					East County Avg.	9.97	8.51

Municipalities W/Private Collection	1985 Population	1985 Tons/Year	Annual Transport[1] Costs ($)	Annual Disposal Costs($)	Total Transport[1] & Disposal Costs	$/Ton[2]	Annual $/Capita[2]
Boonton Twp.	3,613	2,482	–	13,000	–	5.25	3.60
Chatham Boro	8,999	2,708	–	14,000	–	5.25	1.56
Chatham Twp.	10,023	2,981	–	16,000	–	5.25	1.60
E. Hanover Twp.	10,763	18,256	–	96,000	–	5.25	8.92
Harding Twp.	3,848	2,754	–	14,000	–	5.25	3.64
Montville Twp.	16,555	17,474	–	92,000	–	5.25	5.56
Mountain Lakes Boro	4,623	3,367	–	18,000	–	5.25	3.89
TOTAL	58,424	50,022	–	263,000			
					Avg.	5.25	4.50

*Assumes Full County Waste (Minus Lakeland) to Passaic RDF Facility, 2000 TPD Capacity.

[1]Transport costs for private collection are variable, depending upon the individual collection service and the proximity of the locality to the disposal area.

[2]Includes estimated collective disposal costs only.

TABLE 3–26

1985 MUNICIPAL SOLID WASTE TRANSPORT & DISPOSAL COSTS
ALTERNATIVE NO. 7A (WEST)*

Municipalities W/ Municipal Collection	1985 Population	1985 Tons/Yr.	Annual Transport Costs ($)	Annual Disposal Costs ($)	Total Transport & Disposal ($)	$/Ton	Annual $/Capita
Dover Town	13,886	8,058	42,000	42,000	84,000	10.42	6.05
Jefferson Twp.	17,279	12,210	76,000	64,000	140,000	11.47	8.10
Mine Hill Twp.	3,823	2,303	16,000	12,000	28,000	12.16	7.32
Mt. Arlington Boro	4,154	2,360	24,000	12,000	36,000	15.25	8.67
Mt. Olive Twp.	22,797	9,782	109,000	51,000	160,000	16.35	7.02
Netcong Boro	3,570	2,411	18,000	13,000	31,000	12.86	8.68
Randolph Twp.	21,988	11,951	71,000	63,000	134,000	11.21	6.09
Rockaway Boro	7,544	9,599	45,000	50,000	95,000	9.90	12.59
Roxbury Twp.	21,934	20,150	143,000	106,000	249,000	12.36	11.45
Victory Gardens	1,342	590	5,000	3,000	8,000	13.56	5.96
Wharton Boro	5,639	3,457	31,000	18,000	49,000	14.17	8.69
TOTAL	123,956	82,871	580,000	434,000	1,014,000		
					West County Avg.	12.24	8.18

Municipalities W/Private Collection	1985 Population	1985 Tons/Yr.	Annual Transport[1] Costs ($)	Annual Disposal Costs ($)	Total Transport[1] & Disposal ($)	$/Ton[2]	Annual $/Capita[2]
Chester Boro	1,751	1,825	–	10,000	–	5.25	5.71
Chester Twp.	5,584	2,301	–	12,000	–	5.25	2.15
Denville Twp.	15,783	18,199	–	96,000	–	5.25	6.08
Mendham Boro	5,979	2,367	–	12,000	–	5.25	2.01
Mendham Twp.	5,754	3,928	–	21,000	–	5.25	3.65
Rockaway Twp.	21,745	6,073	–	32,000	–	5.25	1.47
Washington Twp.	12,964	4,900	–	26,000	–	5.25	2.01
TOTAL	69,560	39,593		209,000			
					Avg.	5.25	3.00

*Assumes Full County Waste (Minus Lakeland) to Passaic RDF Facility, 2000 TPD Capacity

[1]Transport costs for private collection are variable, depending upon the individual collection service and the proximity of the locality to the disposal area.

[2]Includes Estimated Collective Disposal Costs Only.

TABLE 3–27

1985 MUNICIPAL SOLID WASTE TRANSPORT & DISPOSAL COSTS ALTERNATIVE 7B* (EAST)

Municipalities W/ Municipal Collection	1985 Population	1985 Tons/Year	Annual Transport Costs ($)	Annual Disposal Costs($)	Total Transport & Disposal Costs	$/Ton	Annual $/Capita
Boonton Town	8,991	15,770	64,000	238,000	302,000	19.15	33.59
Florham Park	8,485	5,854	46,000	88,000	134,000	22.89	15.79
Hanover Twp.	13,464	19,831	90,000	299,000	389,000	19.62	28.89
Lincoln Park Boro	8,883	4,785	10,000	72,000	82,000	17.14	9.23
Madison Boro	16,038	10,980	48,000	166,000	214,000	19.49	13.34
Morris Twp.	22,084	13,205	97,000	199,000	296,000	22.42	13.40
Morris Plains Boro	5,744	10,419	45,000	157,000	202,000	19.39	35.17
Morristown Town	15,870	15,173	76,000	229,000	305,000	20.10	19.22
Parsippany-Troy Hills Twp.	54,847	34,436	120,000	520,000	640,000	18.59	11.67
Passaic Twp.	8,095	8,753	63,000	132,000	195,000	22.28	24.09
Riverdale Boro	2,708	1,792	6,000	27,000	33,000	18.42	12.19
TOTAL	165,209	140,998	665,000	2,127,000	2,792,000		
					East County Avg.	19.80	16.90

Municipalities W/Private Collection	1985 Population	1985 Tons/Year	Annual Transport[1] Costs ($)	Annual Disposal Costs($)	Total Transport[1] & Disposal Costs	$/Ton[2]	Annual $/Capita[2]
Boonton Twp.	3,613	2,482	–	37,000	–	15.10	10.24
Chatham Boro	8,999	2,708	–	41,000	–	15.10	4.56
Chatham Twp.	10,023	2,981	–	45,000	–	15.10	4.49
E. Hanover Twp.	10,763	18,256	–	276,000	–	15.10	25.64
Harding Twp.	3,848	2,754	–	42,000	–	15.10	10.91
Montville Twp.	16,555	17,474	–	264,000	–	15.10	15.95
Mountain Lakes Boro	4,623	3,367	–	51,000	–	15.10	11.03
TOTAL	58,424	50,022	–	756,000	–		
					Avg.	15.10	12.94

* Assumes Full County Waste (Minus Lakeland) to Passaic Waterwall Incinerator, 2000 TPD Capacity.

[1]Transport costs for private collection are variable, depending upon the individual collection service and the proximity of the locality to the disposal area.

[2]Includes estimated collective disposal costs only.

TABLE 3–28

1985 MUNICIPAL SOLID WASTE TRANSPORT & DISPOSAL COSTS ALTERNATIVE 7B* (WEST)

Municipalities W/ Municipal Collection	1985 Population	1985 Tons/Yr.	Annual Transport Costs ($)	Annual Disposal Costs ($)	Total Transport & Disposal ($)	$/Ton	Annual $/Capita
Dover Town	13,886	8,058	42,000	122,000	164,000	20.35	11.81
Jefferson Twp.	17,279	12,210	76,000	184,000	260,000	21.29	15.04
Mine Hill Twp.	3,823	2,303	16,000	35,000	51,000	22.15	13.34
Mt. Arlington Boro	4,154	2,360	24,000	36,000	60,000	25.42	14.44
Mt. Olive Twp.	22,797	9,782	109,000	148,000	257,000	26.27	11.27
Netcong Boro	3,570	2,411	18,000	36,000	54,000	22.40	15.13
Randolph Twp.	21,988	11,951	71,000	180,000	251,000	21.00	11.42
Rockaway Boro	7,544	9,599	45,000	145,000	190,000	19.79	25.19
Roxbury Twp.	21,934	20,150	143,000	304,000	447,000	22.18	20.37
Victory Gardens	1,342	590	5,000	9,000	14,000	23.73	10.43
Wharton Boro	5,639	3,457	31,000	52,000	83,000	24.00	14.72
TOTAL	123,956	82,871	580,000	1,251,000	1, 831,000		
				West County Avg.		22.09	14.77

Municipalities W/Private Collection	1985 Population	1985 Tons/Yr.	Annual Transport[1] Costs ($)	Annual Disposal Costs ($)	Total Transport[1] & Disposal ($)	$/Ton[2]	Annual $/Capita[2]
Chester Boro	1,751	1,825	–	28,000	–	15.10	15.99
Chester Twp.	5,584	2,301	–	35,000	–	15.10	6.27
Denville Twp.	15,783	18,199	–	275,000	–	15.10	17.42
Mendham Boro	5,979	2,367	–	36,000	–	15.10	6.02
Mendham Twp.	5,754	3,928	–	59,000	–	15.10	10.25
Rockaway Twp.	21,745	6,073	–	92,000	–	15.10	4.23
Washington Twp.	12,964	4,900	–	74,000	–	15.10	5.71
TOTAL	69,560	39,593	–	599,000			
					Avg.	15.10	8.61

*Assumes Full County Waste (Minus Lakeland) to Passaic Waterwall Incinerator, 2000 TPD Capacity.

[1] Transport costs for private collection are variable, depending upon the individual collection service and the proximity of the locality to the disposal area.

[2] Includes estimated collective disposal costs only.

TABLE 3–29

1985 MUNICIPAL SOLID WASTE TRANSPORT & DISPOSAL

ALTERNATIVE NO. 7 (LAKELAND)

Municipality	1985 Population	1985 Tons/Yr.	Annual Transport[1] Costs ($)	Annual Disposal Costs ($)	Total Transport & Disposal ($)	$/Ton	Annual $/Capita
Butler Boro	7,812	5,131	5,000	71,000	76,000	14.81	9.73
Kinnelon Boro	8,412	2,979	6,000	41,000	47,000	15.78	5.59
Pequannock Twp.*	14,547	11,533	–	159,000	–	13.79	10.93
TOTAL	30,771	19,643	11,000	271,000	123,000		
				Lakeland Communities Avg.[2]		15.17	7.58

*Denotes municipality with private collection. Therefore transport costs are variable, depending upon the individual collection service and the proximity of the locality to the disposal area.

[1]Assumes RRF located in Wanaque Boro.

[2]Does not include Pequannock Twp.

FIGURE 3–9

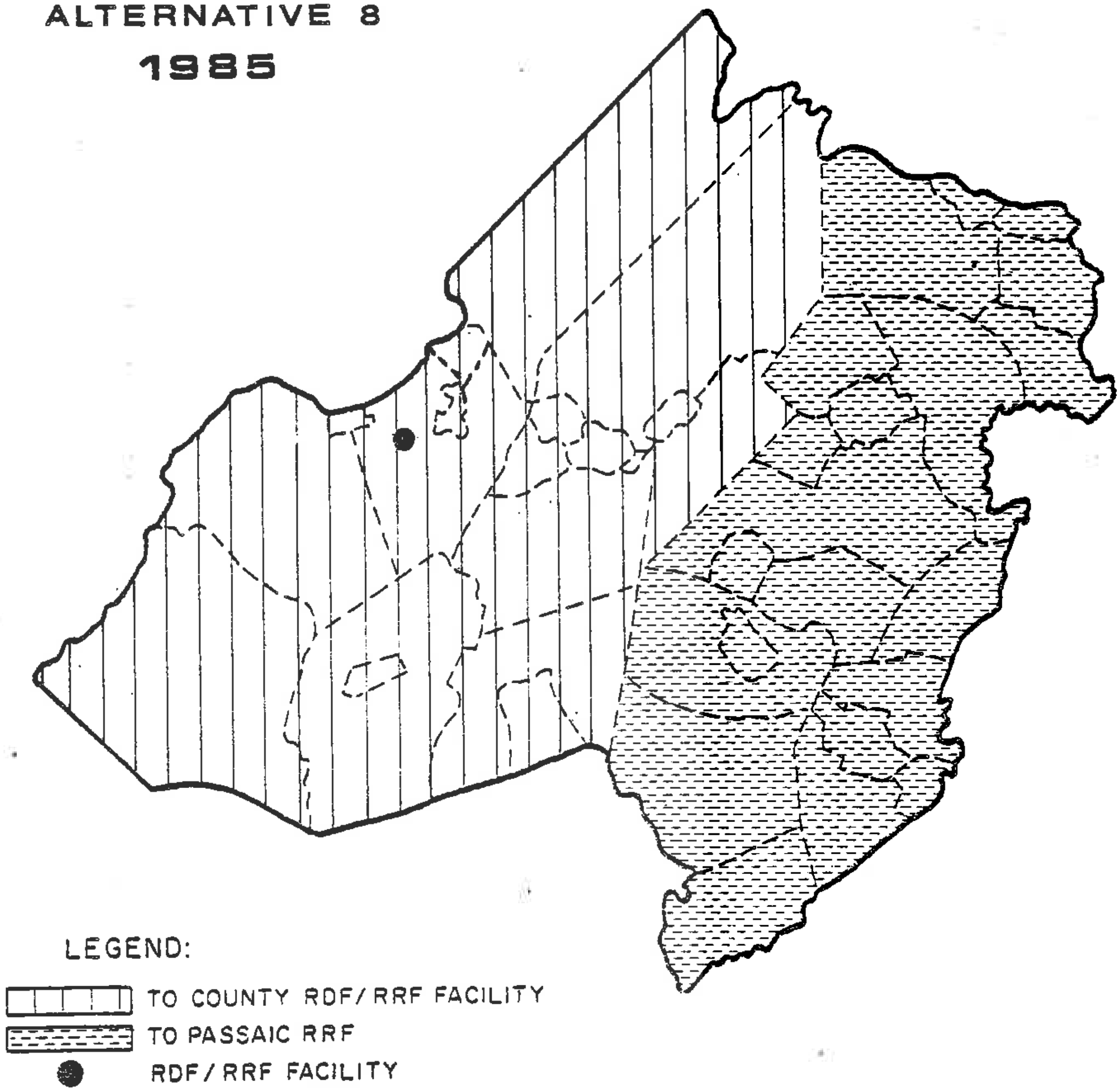

ALTERNATIVE 8
1985
LEGEND:
TO COUNTY RDF/RRF FACILITY
TO PASSAIC RRF
RDF/RRF FACILITY

TABLE 3–30

1985 MUNICIPAL SOLID WASTE TRANSPORT & DISPOSAL COSTS
ALTERNATIVE NO. 8A* (EAST)

Municipalities W/ Municipal Collection	1985 Population	1985 Tons/Yr.	Annual Transport Costs ($)	Annual Disposal Costs($)	Total Transport & Disposal ($)	$/Ton	Annual $/Capita
Boonton Town	8,991	15,770	64,000	116,000	180,000	11.41	20.02
Butler Boro	7,812	5,131	15,000	38,000	53,000	10.33	6.78
Florham Park	8,485	5,854	46,000	43,000	89,000	15.20	10.49
Hanover Twp.	13,464	19,831	90,000	146,000	236,000	11.90	17.53
Kinnelon Boro	8,412	2,979	11,000	22,000	33,000	11.08	3.92
Lincoln Park Boro	8,883	4,785	10,000	35,000	45,000	9.40	5.07
Madison Boro	16,038	10,980	48,000	81,000	129,000	11.75	8.04
Morris Twp.	22,084	13,205	97,000	97,000	194,000	14.69	8.78
Morris Plains Boro	5,744	10,419	45,000	77,000	122,000	11.71	21.24
Morristown Town	15,870	15,173	76,000	112,000	188,000	12.39	11.85
Parsippany-Troy Hills Twp.	54,847	34,436	120,000	253,000	373,000	10.83	6.80
Passaic Twp.	8,095	8,753	63,000	64,000	127,000	14.51	15.69
Riverdale Boro	2,708	1,792	6,000	13,000	19,000	10.60	7.02
TOTAL	181,433	149,108	691,000	1,097,000	1,788,000		
					East County Avg.	11.99	9.85

Municipalities W/Private Collection	1985 Population	1985 Tons/Yr.	Annual Transport[1] Costs($)	Annual Disposal Costs ($)	Total Transport[1] & Disposal ($)	$/Ton[2]	Annual $/Capita[2]
Boonton Twp.	3,613	2,482	–	18,000	–	7.35	4.98
Chatham Boro	8,999	2,708	–	20,000	–	7.35	2.22
Chatham Twp.	10,023	2,981	–	22,000	–	7.35	2.19
E. Hanover Twp.	10,763	18,256	–	134,000	–	7.35	12.45
Harding Twp.	3,848	2,754	–	20,000	–	7.35	5.20
Montville Twp.	16,555	17,474	–	128,000	–	7.35	7.73
Mountain Lakes Boro	4,623	3,367	–	25,000	–	7.35	5.41
Pequannock Twp.	14,547	11,533	–	85,000	–	7.35	5.84
TOTAL	72,971	61,555	–	452,000			
					Avg.	7.35	6.19

*Assumes East County Waste to Passaic RDF Facility, 1500 TPD Capacity.

[1]Transport costs for private collection are variable, depending upon the individual collection service and the proximity of the locality to the disposal area.

[2]Inclues Estimated Collective Disposal Costs Only.

TABLE 3–31

1985 MUNICIPAL SOLID WASTE TRANSPORT & DISPOSAL COSTS ALTERNATIVE NO. 8B* (EAST)

Municipalities W/ Municipal Collection	1985 Population	1985 Tons/Yr.	Annual Transport Costs ($)	Annual Disposal Costs($)	Total Transport & Disposal ($)	$/Ton	Annual $/Capita
Boonton Town	8,991	15,770	64,000	292,000	356,000	22.57	39.60
Butler Boro	7,812	5,131	15,000	95,000	110,000	21.44	14.08
Florham Park	8,485	5,854	46,000	108,000	154,000	26.31	18.15
Hanover Twp.	13,464	19,831	90,000	367,000	457,000	23.04	33.94
Kinnelon Boro	8,412	2,979	11,000	55,000	66,000	22.16	7.85
Lincoln Park Boro	8,883	4,785	10,000	89,000	99,000	20.69	11.14
Madison Boro	16,038	10,980	48,000	203,000	251,000	22.86	15.65
Morris Twp.	22,084	13,205	97,000	244,000	341,000	25.82	15.44
Morris Plains Boro	5,744	10,419	45,000	193,000	238,000	22.84	41.43
Morristown Town	15,870	15,173	76,000	281,000	357,000	23.53	22.50
Parsippany-Troy Hills Twp.	54,847	34,436	120,000	637,000	757,000	21.98	13.80
Passaic Twp.	8,095	8,753	63,000	162,000	225,000	25.71	27.79
Riverdale Boro	2,708	1,792	6,000	33,000	39,000	21.76	14.40
TOTAL	181,433	149,108	619,000	2,759,000	3,450,000		
					East County Avg.	23.14	19.02

Municipalities W/Private Collection	1985 Population	1985 Tons/Yr.	Annual Transport[1] Costs($)	Annual Disposal Costs ($)	Total Transport[1] & Disposal ($)	$/Ton[2]	Annual $/Capita[2]
Boonton Twp.	3,613	2,482	–	46,000	–	18.51	12.73
Chatham Boro	8,999	2,708	–	50,000	–	18.51	5.56
Chatham Twp.	10,023	2,981	–	55,000	–	18.51	5.49
E. Hanover Twp.	10.763	18,256	–	338,000	–	18.51	31.40
Harding Twp.	3,848	2,754	–	51,000	–	18.51	13.25
Montville Twp.	16,555	17,474	–	323,000	–	18.51	19.51
Mountain Lakes Boro	4,623	3,367	–	62,000	–	18.51	13.41
Pequannock Twp.	14,547	11,533	–	219,000	–	18.51	14.64
TOTAL	72,971	61,555	–	1,138,000	Avg.	18.51	15.60

*Assumes East County Waste to Passaic Waterwall Incinerator, 2000 TPD Capacity.

[1]Transport costs for private collection are variable, depending upon the individual collection service and the proximity of the locality to the disposal area.

[2]Includes estimated collective disposal costs only.

TABLE 3–32

1985 MUNICIPAL SOLID WASTE TRANSPORT & DISPOSAL COSTS
ALTERNATIVE 8A* (WEST)

Municipalities W/ Municipal Collection	1985 Population	1985 Tons/Yr.	Annual Transport Costs ($)	Annual Disposal Costs ($)	Total Transport & Disposal ($)	$/Ton	Annual $/Capita
Dover Town	13,886	8,058	14,000	104,000	118,000	14.64	8.50
Jefferson Twp.	17,279	12,210	31,000	158,000	189,000	15.48	10.94
Mine Hill Twp.	3,823	2,303	3,000	30,000	30,000	14.33	8.63
Mt. Arlington Boro	4,154	2,360	4,000	31,000	35,000	14.83	8.43
Mt. Olive Twp.	22,797	9,782	14,000	127,000	141,000	14.41	6.19
Netcong Boro	3,570	2,411	2,000	31,000	33,000	13.69	9.24
Randolph Twp.	21,988	11,951	22,000	155,000	177,000	14.81	8.05
Rockaway Boro	7,544	9,599	23,000	124,000	147,000	15.31	19.49
Roxbury Twp.	21,934	20,150	15,000	261,000	276,000	13.70	12.58
Victory Gardens	1,342	590	2,000	8,000	10,000	16.95	7.45
Wharton Boro	5,639	3,457	9,000	45,000	54,000	15.62	9.58
TOTAL	123,956	82,871	139,000	1,074,000	1,213,000		
					West County Avg.	14.64	9.79

Municipalities W/Private Collection	1985 Population	1985 Tons/Yr.	Annual Transport Costs ($)[1]	Annual Disposal Costs ($)	Total Transport[1] & Disposal ($)	$/Ton[2]	Annual $/Capita[2]
Chester Boro	1,751	1,825	–	24,000	–	12.96	13.71
Chester Twp.	5,584	2,301	–	30,000	–	12.96	5.37
Denville Twp.	15,783	18,199	–	236,000	–	12.96	14.95
Mendham Boro	5,979	2,367	–	31,000	–	12.96	5.18
Mendham Twp.	5,754	3,928	–	51,000	–	12.96	8.86
Rockaway Twp.	21,745	6,073	–	79,000	–	12.96	3.63
Washington Twp.	12,964	4,900	–	64,000	–	12.96	4.94
	69,560	39,593	–	515,000	–		
					Avg.	12.96	7.40

*Assumes West County Waste to Landing RDF Facility, 1000 TPD Capacity

[1]Transport Costs for Private Collection are variable, depending upon the individual collection service and the proximity of the locality to the disposal area.

[2]Includes Estimated Collective Disposal Costs Only.

TABLE 3–33

1985 MUNICIPAL SOLID WASTE TRANSPORT & DISPOSAL COSTS
ALTERNATIVE 8B* (WEST)

Municipalities W/ Municipal Collection	1985 Population	1985 Tons/Yr.	Annual Transport Costs ($)	Annual Disposal Costs ($)	Total Transport & Disposal ($)	$/Ton	Annual $/Capita
Dover Town	13,886	8,058	14,000	104,000	118,000	14.64	8.50
Jefferson Twp.	17,279	12,210	31,000	158,000	189,000	15.48	10.94
Mine Hill Twp.	3,823	2,303	3,000	30,000	30,000	14.33	8.63
Mt. Arlington Boro	4,154	2,360	4,000	31,000	35,000	14.83	8.43
Mt. Olive Twp.	22,797	9,782	14,000	127,000	141,000	14.41	6.19
Netcong Boro	3,570	2,411	2,000	31,000	33,000	13.69	9.24
Randolph Twp.	21,988	11,951	22,000	155,000	177,000	14.81	8.05
Rockaway Boro	7,544	9,599	23,000	124,000	147,000	15.31	19.49
Roxbury Twp.	21,934	20,150	15,000	261,000	276,000	13.70	12.58
Victory Gardens	1,342	590	2,000	8,000	10,000	16.95	7.45
Wharton Boro	5,639	3,457	9,000	45,000	54,000	15.62	9.58
TOTAL	123,956	82,871	139,000	1,074,000	1,213,000		
					West County Avg.	14.64	9.79

Municipalities W/Private Collection	1985 Population	1985 Tons/Yr.	Annual Transport[1] Costs ($)	Annual Disposal Costs ($)	Total Transport[1] & Disposal ($)	$/Ton[2]	Annual $/Capita[2]
Chester Boro	1,751	1,825	–	24,000	–	12.96	13.71
Chester Twp.	5,584	2,301	–	30,000	–	12.96	5.37
Denville Twp.	15,783	18,199	–	236,000	–	12.96	14.95
Mendham Boro	5,979	2,367	–	31,000	–	12.96	5.18
Mendham Twp.	5,754	3,928	–	51,000	–	12.96	8.86
Rockaway Twp.	21,745	6,073	–	79,000	–	12.96	3.63
Washington Twp.	12,964	4,900	–	64,000	–	12.96	4.94
	69,560	39,593	–	515,000	–		
					Avg.	12.96	7.40

* Assumes West County Wastes to Landing RDF Facility, 1000 TPD Capacity

[1] Transport Costs for Private Collection are variable, depending upon the individual collection service and the proximity of the locality to the disposal area.

[2] Includes Estimated Collective Disposal Costs Only.

FIGURE 3–10

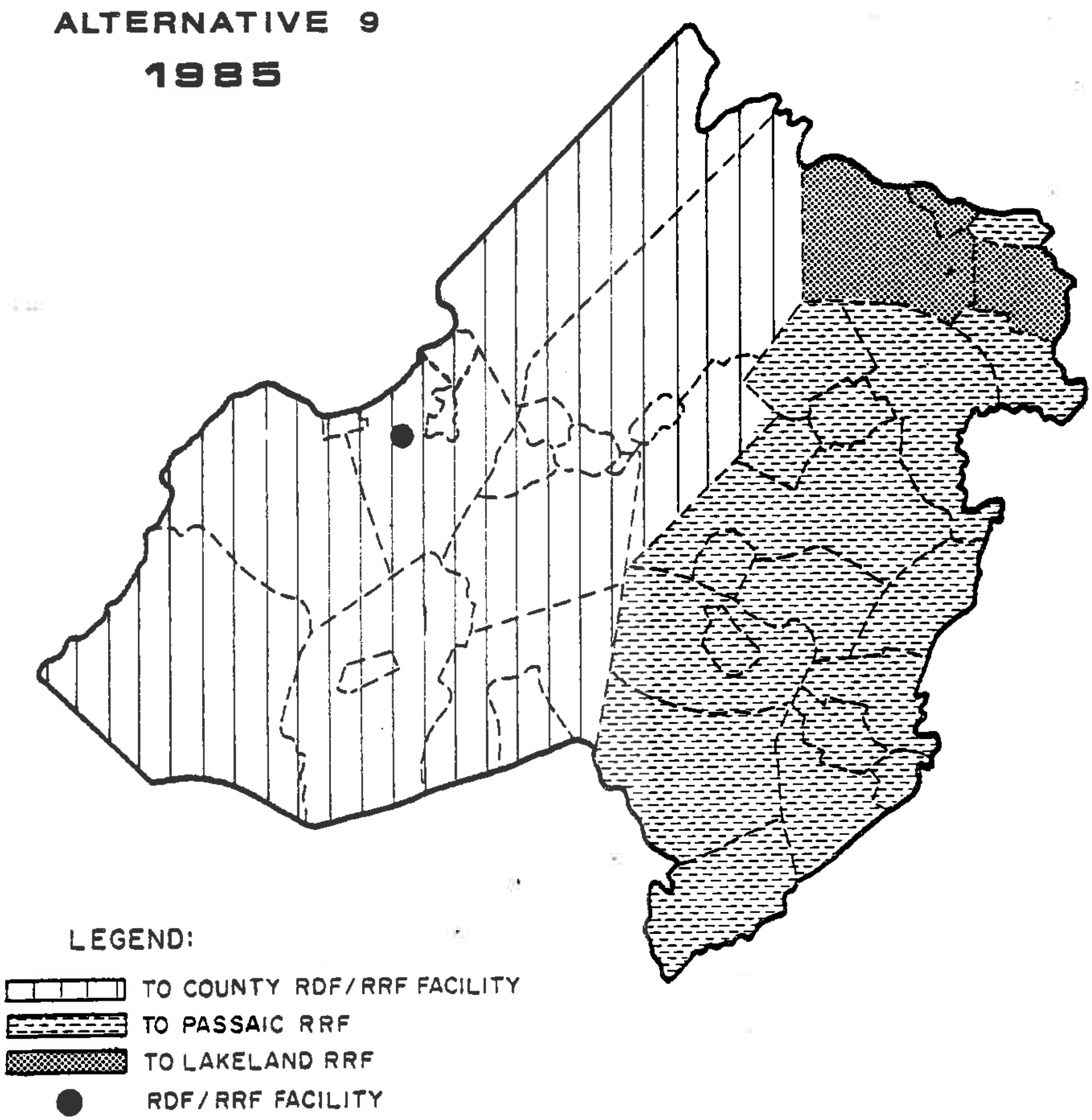

ALTERNATIVE 9
1985
LEGEND:
TO COUNTY RDF/RRF FACILITY
TO PASSAIC RRF
TO LAKELAND RRF
RDF/RRF FACILITY

TABLE 3–34
1985 MUNICIPAL SOLID WASTE TRANSPORT & DISPOSAL COSTS
ALTERNATIVE 9A*(EAST)

Municipalities W/ Municipal Collection	1985 Population	1985 Tons/Year	Annual Transport Costs ($)	Annual Disposal Costs($)	Total Transport & Disposal Costs	$/Ton	Annual $/Capita
Boonton Town	8,991	15,770	64,000	116,000	180,000	11.41	20.02
Florham Park	8,485	5,854	46,000	43,000	89,000	15.20	10.49
Hanover Twp.	13,464	19,831	90,000	146,000	236,000	11.90	17.53
Lincoln Park Boro	8,883	4,785	10,000	35,000	45,000	9.40	5.07
Madison Boro	16,038	10,980	48,000	81,000	129,000	11.75	8.04
Morris Twp.	22,084	13,205	97,000	97,000	194,000	14.69	8.78
Morris Plains Boro	5,744	10,419	45,000	77,000	122,000	11.71	21.24
Morristown Town	15,870	15,173	76,000	112,000	188,000	12.39	11.85
Parsippany-Troy Hills Twp.	54,847	34,436	120,000	253,000	373,000	10.83	6.80
Passaic Twp.	8,095	8,753	63,000	64,000	127,000	14.51	15.69
Riverdale Boro	2,708	1,792	6,000	13,000	19,000	10.60	7.02
TOTAL	165,209	140,998	665,000	1,037,000	1,702,000		
					East County Avg.	12.07	10.30

Municipalities W/Private Collection	1985 Population	1985 Tons/Year	Annual Transport[1] Costs ($)	Annual Disposal Costs($)	Total Transport[1] & Disposal Costs	$/Ton[2]	Annual $/Capita[2]
Boonton Twp.	3,613	2,482	–	18,000	–	7.35	4.98
Chatham Boro	8,999	2,708	–	20,000	–	7.35	2.22
Chatham Twp.	10,023	2,981	–	22,000	–	7.35	2.19
E. Hanover Twp.	10,763	18,256	–	134,000	–	7.35	12.45
Harding Twp.	3,848	2,754	–	20,000	–	7.35	5.20
Montville Twp.	16,555	17,474	–	128,000	–	7.35	7.73
Mountain Lakes Boro	4,623	3,367	–	25,000	–	7.35	5.41
TOTAL	58,424	50,022	–	367,000	–		
					Avg.	7.35	6.28

* Assumes East County Waste (Minus Lakeland) to Passaic RDF Facility, 1500 TPD capacity.

[1] Transport costs for private collection are variable, depending upon the individual collection service and the proximity of the locality to the disposal area.

[2] Includes estimated collective disposal costs only.

TABLE 3–35

1985 MUNICIPAL SOLID WASTE TRANSPORT & DISPOSAL COSTS

ALTERNATIVE NO. 9B*(EAST)

Municipalities W/ Municipal Collection	1985 Population	1985 Tons/Year	Annual Transport Costs ($)	Annual Disposal Costs($)	Total Transport & Disposal Costs	$/Ton	Annual $/Capita
Boonton Town	8,991	15,770	64,000	292,000	356,000	22.57	39.60
Florham Park	8,485	5,854	46,000	108,000	154,000	26.31	18.15
Hanover Twp.	13,464	19,831	90,000	367,000	457,000	23.04	33.94
Lincoln Park Boro	8,883	4,785	10,000	89,000	99,000	20.69	11.14
Madison Boro	16,038	10,980	48,000	203,000	251,000	22.86	15.65
Morris Twp.	22,084	13,205	97,000	244,000	341,000	25.82	15.44
Morris Plains Boro	5,744	10,419	45,000	193,000	238,000	22.84	41.43
Morristown Town	15,870	15,173	76,000	281,000	357,000	23.53	22.50
Parsippany-Troy Hills Twp.	54,847	34,436	120,000	637,000	757,000	21.98	13.80
Passaic Twp.	8,095	8,753	63,000	162,000	225,000	25.71	27.79
Riverdale Boro	2,708	1,792	6,000	33,000	39,000	21.76	14.40
TOTAL	165,209	140,998	665,000	2,609,000	3,274,00		
					East County Avg.	23.22	19.82

Municipalities W/Private Collection	1985 Population	1985 Tons/Year	Annual Transport[1] Costs ($)	Annual Disposal Costs($)	Total Transport[1] & Disposal Costs	$/Ton[2]	Annual $/Capita[2]
Boonton Twp.	3,613	2,482	–	46,000	–	18.51	12.73
Chatham Boro	8,999	2,708	–	50,000	–	18.51	5.56
Chatham Twp.	10,023	2,981	–	55,000	–	18.51	5.49
E. Hanover Twp.	10,763	18,256	–	338,000	–	18.51	31.40
Harding Twp.	3,848	2,754	–	51,000	–	18.51	13.25
Montville Twp.	16,555	17,474	–	323,000	–	18.51	19.51
Mountain Lakes Boro	4,623	3,367	–	62,000	–	18.51	13.41
TOTAL	58,424	50,022	–	925,000			
					Avg.	18.51	15.83

*Assumes East County Waste (Minus Lakeland) to Passaic Waterwall Incinerator, 1500 TPD capacity.

[1]Transport costs for private collection are variable, depending upon the individual collection service and the proximity of the locality to the disposal area.

[2]Includes estimated collective disposal costs only.

TABLE 3–36

1985 MUNICIPAL SOLID WASTE TRANSPORT & DISPOSAL

ALTERNATIVE NO. 9 (LAKELAND)

Municipality	1985 Population	1985 Tons/Yr.	Annual Transport[1] Costs ($)	Annual Disposal Costs ($)	Total Transport & Disposal ($)	$/Ton	Annual $/Capita
Butler Boro	7,812	5,131	5,000	71,000	76,000	14.81	9.73
Kinnelon Boro	8,412	2,979	6,000	41,000	47,000	15.78	5.59
Pequannock Twp.*	14,547	11,533	–	159,000	–	13.79	10.93
TOTAL	30,771	19,643	11,000	271,000	123,000		
				Lakeland Communities Avg.[2]		15.17	7.58

*Denotes municipality with private collection. Therefore transport costs are variable, depending upon the individual collection service and the proximity to the locality to the disposal area.

[1]Assumes RRF located in Wanaque Boro.

[2]Does not include Pequannock Twp.

TABLE 3–37

1985 MUNICIPAL SOLID WASTE TRANSPORT & DISPOSAL COSTS
ALTERNATIVE 9A* (WEST)

Municipalities W/ Municipal Collection	1985 Population	1985 Tons/Yr.	Annual Transport Costs ($)	Annual Disposal Costs ($)	Total Transport & Disposal ($)	$/Ton	Annual $/Capita
Dover Town	13,886	8,058	14,000	104,000	118,000	14.64	8.50
Jefferson Twp.	17,279	12,210	31,000	158,000	189,000	15.48	10.94
Mine Hill Twp.	3,823	2,303	3,000	30,000	30,000	14.33	8.63
Mt. Arlington Boro	4,154	2,360	4,000	31,000	35,000	14.83	8.43
Mt. Olive Twp.	22,797	9,782	14,000	127,000	141,000	14.41	6.19
Netcong Boro	3,570	2,411	2,000	31,000	33,000	13.69	9.24
Randolph Twp.	21,988	11,951	22,000	155,000	177,000	14.81	8.05
Rockaway Boro	7,544	9,599	23,000	124,000	147,000	15.31	19.49
Roxbury Twp.	21,934	20,150	15,000	261,000	276,000	13.70	12.58
Victory Gardens	1,342	590	2,000	8,000	10,000	16.95	7.45
Wharton Boro	5,639	3,457	9,000	45,000	54,000	15.62	9.58
TOTAL	123,956	82,871	139,000	1,074,000	1,213,000		
					West County Avg.	14.64	9.79

Municipalities W/Private Collection	1985 Population	1985 Tons/Yr.	Annual Transport Costs ($)[1]	Annual Disposal Costs ($)	Total Transport & Disposal ($)[1]	$/Ton[2]	Annual $/Capita[2]
Chester Boro	1,751	1,825	–	24,000	–	12.96	13.71
Chester Twp.	5,584	2,301	–	30,000	–	12.96	5.37
Denville Twp.	15,783	18,199	–	236,000	–	12.96	14.95
Mendham Boro	5,979	2,367	–	31,000	–	12.96	5.18
Mendham Twp.	5,754	3,928	–	51,000	–	12.96	8.86
Rockaway Twp.	21,745	6,073	–	79,000	–	12.96	3.63
Washington Twp.	12,964	4,900	–	64,000	–	12.96	4.94
	69,560	39,593	–	515,000	–		
					Avg.	12.96	7.40

* Assumes West County Waste to Landing RDF Facility, 1000 TPD Capacity.

[1] Transport Costs for Private Collection are variable, depending upon the individual collection service and the proximity of the locality to the disposal area.

[2] Includes Estimated Collective Disposal Costs Only.

TABLE 3–38

1985 MUNICIPAL SOLID WASTE TRANSPORT & DISPOSAL COSTS
ALTERNATIVE 9B* (WEST)

Municipalities W/ Municipal Collection	1985 Population	1985 Tons/Yr.	Annual Transport Costs ($)	Annual Disposal Costs ($)	Total Transport & Disposal ($)	$/Ton	Annual $/Capita
Dover Town	13,886	8,058	14,000	104,000	118,000	14.64	8.50
Jefferson Twp.	17,279	12,210	31,000	158,000	189,000	15.48	10.94
Mine Hill Twp.	3,823	2,303	3,000	30,000	30,000	14.33	8.63
Mt. Arlington Boro	4,154	2,360	4,000	31,000	35,000	14.83	8.43
Mt. Olive Twp.	22,797	9,782	14,000	127,000	141,000	14.41	6.19
Netcong Boro	3,570	2,411	2,000	31,000	33,000	13.69	9.24
Randolph Twp.	21,988	11,951	22,000	155,000	177,000	14.81	8.05
Rockaway Boro	7,544	9,599	23,000	124,000	147,000	15.31	19.49
Roxbury Twp.	21,934	20,150	15,000	261,000	276,000	13.70	12.58
Victory Gardens	1,342	590	2,000	8,000	10,000	16.95	7.45
Wharton Boro	5,639	3,457	9,000	45,000	54,000	15.62	9.58
TOTAL	123,956	82,871	139,000	1,074,000	1,213,000		
					West County Avg.	14.64	9.79

Municipalities W/Private Collection	1985 Population	1985 Tons/Yr.	Annual Transport[1] Costs ($)	Annual Disposal Costs ($)	Total Transport[1] & Disposal ($)	$/Ton[2]	Annual $/Capita[2]
Chester Boro	1,751	1,825	–	24,000	–	12.96	13.71
Chester Twp.	5,584	2,301	–	30,000	–	12.96	5.37
Denville Twp.	15,783	18,199	–	236,000	–	12.96	14.95
Mendham Boro	5,979	2,367	–	31,000	–	12.96	5.18
Mendham Twp.	5,754	3,928	–	51,000	–	12.96	8.86
Rockaway Twp.	21,745	6,073	–	79,000	–	12.96	3.63
Washington Twp.	12,964	4,900	–	64,000	–	12.96	4.94
	69,560	39,593	–	515,000	–		
					Avg.	12.96	7.40

* Assumes West County Waste to Landing RDF Facility, 1000 TPD Capacity.

[1] Transport Costs for Private Collection are variable, depending upon the individual collection service and the proximity of the locality to the disposal area.

[2] Includes Estimated Collective Disposal Costs Only.

owned and operated by Combustion Equipment Associates (CEA), who expect to charge a tipping fee of $12.50 per ton. The western communities will continue using the existing landfills until 1985, at which time the Landing RDF/RRF facility will accommodate the waste from the west plus waste importation from Sussex and Warren counties. This alternative is shown graphically in Figures 3-11 and 3-12.

Tables 3-39 and 3-40 show transport and disposal costs for the east and west in 1983. Transport and disposal costs are also shown in Tables 3-41 and 3-42 for 1985. Comparison of per capita costs in 1985 to that of 1979 costs reveals an average increase of 116% to $14.07 for the east and an average increase of 185% to $9.79 for the west implementing this alternative.

A summary of the costs under the various alternatives is shown in Table 3-43.

C. FINAL SCREENING OF ALTERNATIVES

Of the eleven alternatives subjected to the cost-effectiveness analysis (1, 4, 6 A&B, 7 A&B, 8 A&B, 9 A&B, and 10), all would result in an increase in tipping fees by 1985. Alternatives 1, 4, 8 A&B, 9 A&B and 10 call for the development of a new resource recovery facility in Morris County by 1985. Under Alternatives 6 A&B and 7 A&B, the County would be relying primarily on a resource recovery facility located outside of the County for disposal.

Of prime concern is the need for a reliable alternate to the landfill disposal of solid wastes. Resource recovery provides a positive approach to the realization of this objective by utilizing 60-80% of the waste stream which would otherwise require landfilling.

Alternatives 1, 4, 6a, 7a, 8a, 9a and 10 all incorporated RDF technology at varying scales and sites both within and outside the county. The following are potential advantages associated with these alternatives:

- Alternatives No. 1 and 4 completely internalize the transport, processing and disposal of Morris County solid wastes. Following this approach, the County and its municipalities do not have to rely on any other solid waste district for the successful implementation of the plan.

- Alternatives 6a and 7a offer the lowest costs for resource recovery which compare favorably with the projected cost of landfill disposal in 1983-85. These low costs are due to economies of scale possible by combining the wastes of Morris and Passaic counties. In addition, transport to Paterson via I-80 would be downhill, thus reducing costs compared to uphill hauls to Landing.

FIGURE 3—11

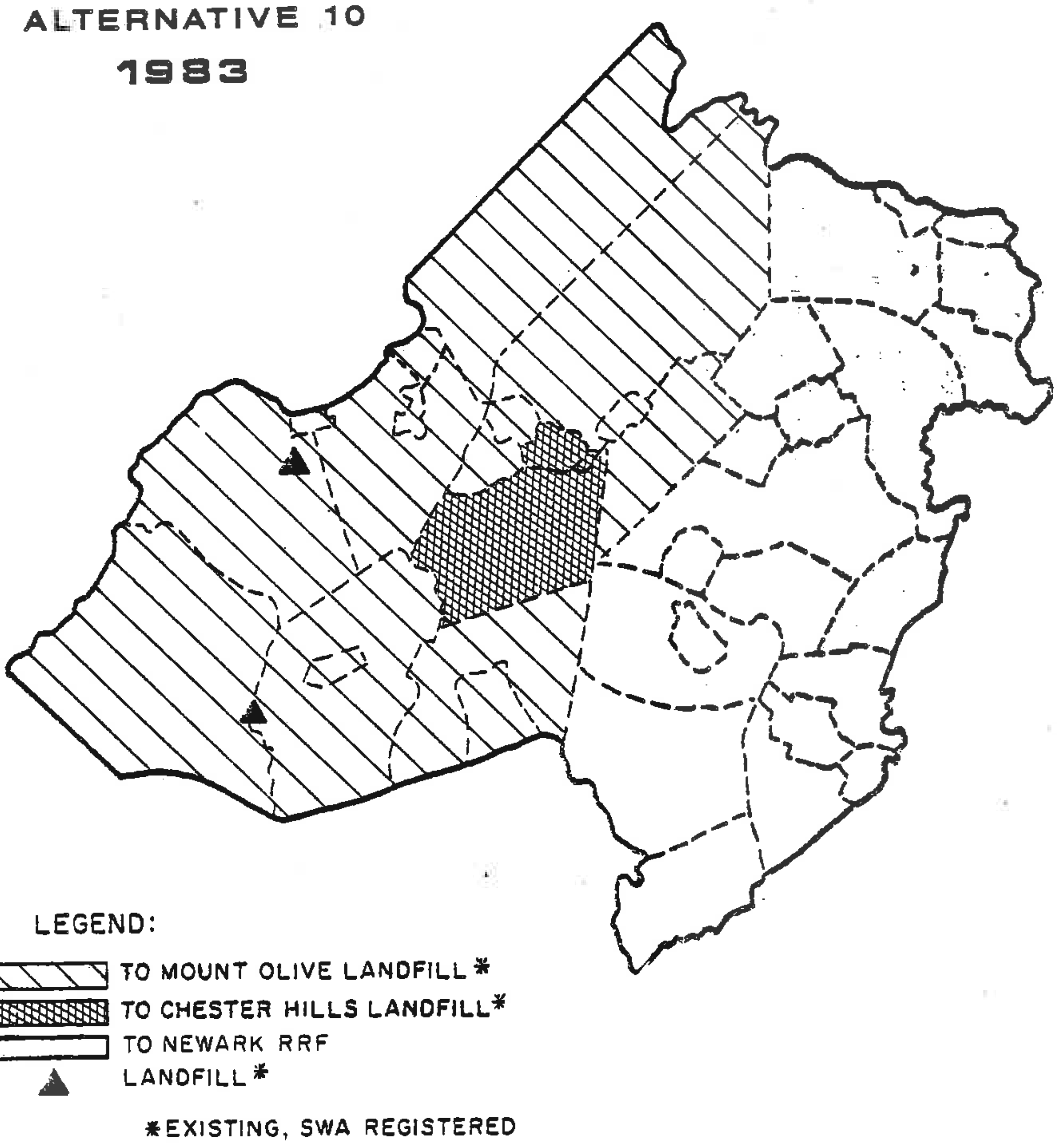
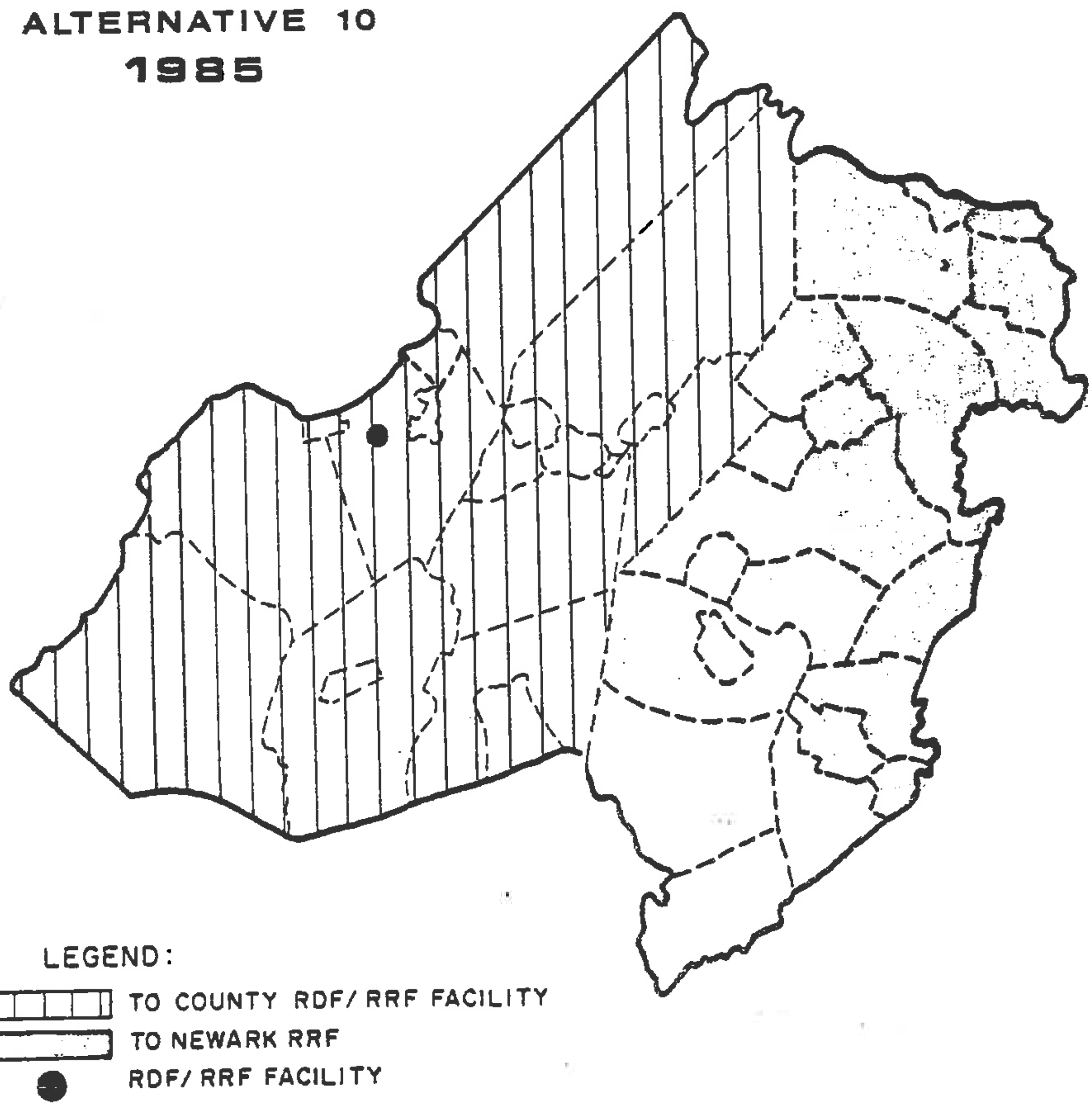

ALTERNATIVE 10
1983
LEGEND:
TO MOUNT OLIVE LANDFILL *
TO CHESTER HILLS LANDFILL*
TO NEWARK RRF
LANDFILL *
*EXISTING, SWA REGISTERED

FIGURE 3–12



ALTERNATIVE 10
1985
LEGEND:
TO COUNTY RDF/ RRF FACILITY
TO NEWARK RRF
RDF/ RRF FACILITY

TABLE 3–39

1983 MUNICIPAL SOLID WASTE TRANSPORT & DISPOSAL COSTS
ALTERNATIVE NO. 10* (EAST)

Municipalities W/ Municipal Collection	1983 Population	1983 Tons/Yr.	Annual Transport Costs ($)	Annual Disposal Costs($)	Total Transport & Disposal ($)	$/Ton	Annual $/Capita
Boonton Town	8,919	15,644	64,000	196,000	260,000	16.62	29.15
Butler Boro	7,642	5,019	15,000	63,000	78,000	15.54	10.21
Florham Park	8,363	5,770	46,000	72,000	118,000	20.45	14.11
Hanover Twp.	13,014	19,168	88,000	240,000	328,000	17.11	25.20
Kinnelon Boro	8,240	2,918	11,000	36,000	47,000	16.11	5.70
Lincoln Park Boro	8,811	4,746	10,000	59,000	69,000	14.54	7.83
Madison Boro	15,948	10,918	34,000	136,000	170,000	15.57	10.66
Morris Twp.	21,566	12,895	48,000	161,000	209,000	16.21	9.69
Morris Plains Boro	5,662	10,270	35,000	128,000	163,000	15.87	28.79
Morristown Town	15,864	15,167	45,000	190,000	235,000	15.49	14.81
Parsippany-Troy Hills Twp.	53,971	33,886	118,000	424,000	542,000	15.99	10.04
Passaic Twp.	7,933	8,578	37,000	107,000	144,000	16.79	18.15
Riverdale Boro	2,682	1,775	7,000	88,000	95,000	53.52	35.42
TOTAL	178,615	146,754	558,000	1,900,000	2,458,000		
					East County Avg.	16.75	13.76

Municipalities W/Private Collection	1983 Population	1983 Tons/Yr.	Annual Transport[1] Costs($)	Annual Disposal Costs ($)	Total Transport[1] & Disposal ($)	$/Ton[2]	Annual $/Capita[2]
Boonton Twp.	3,513	2,414	–	–	30,000	12.50	8.54
Chatham Boro	8,959	2,696	–	–	34,000	12.50	3.80
Chatham Twp.	9,691	2,882	–	–	36,000	12.50	3.71
E. Hanover Twp.	10,313	17,493	–	–	219,000	12.50	21.24
Harding Twp.	3,738	2,675	–	–	33,000	12.50	8.83
Montville Twp.	15,855	16,735	–	–	209,000	12.50	13.18
Mountain Lakes Boro	4,595	3,347	–	–	42,000	12.50	9.14
Pequannock Twp.	14,385	11,405	–	–	143,000	12.50	9.94
TOTAL	71,049	59,647			746,000		
					Avg.	12.50	10.50

* Assumes East County Waste to Newark RDF Facility, 2000 – 3000 TPD Capacity.

[1]Transport costs for private collection are variable depending upon the individual collection service and the proximity of the locality to the disposal area.

[2]Includes estimated collective disposal costs only.

TABLE 3–40

1983 MUNICIPAL SOLID WASTE TRANSPORT & DISPOSAL COSTS
ALTERNATIVE NO. 10* (WEST)

Municipalities W/ Municipal Collection	1983 Population	1983 Tons/Yr.	Annual Transport Costs ($)	Annual Disposal Costs ($)	Total Transport & Disposal ($)	$/Ton	Annual $/Capita
Dover Town	13,856	8,040	20,000	48,000	68,000	8.46	4.91
Jefferson Twp.	16,733	11,824	36,000	71,000	107,000	9.05	6.39
Mine Hill Twp.	3,753	2,261	5,000	14,000	19,000	8.40	5.06
Mt. Arlington Boro	4,046	2,299	6,000	14,000	20,000	8.70	4.94
Mt. Olive Twp.	21,147	9,074	13,000	54,000	67,000	7.38	3.17
Netcong Boro	3,450	2,330	3,000	14,000	17,000	7.30	4.93
Randolph Twp.	20,762	11,285	24,000	68,000	92,000	8.15	4.43
Rockaway Boro	7,330	9,327	20,000	56,000	76,000	8.15	10.37
Roxbury Twp.	21,004	19,296	27,000	116,000	143,000	7.41	6.81
Victory Gardens	1,292	568	2,000	3,000	5,000	8.80	3.87
Wharton Boro	5,563	3,411	12,000	20,000	32,000	9.38	5.75
TOTAL	118,936	79,715	168,000	478,000	646,000		
					West County Avg.	8.10	5.43

Municipalities W/Private Collection	1983 Population	1983 Tons/Yr.	Annual Transport[1] Costs($)	Annual Disposal Costs($)	Total Transport[1] & Disposal ($)	$/Ton[2]	Annual $/Capita[2]
Chester Boro	1,681	1,752	–	11,000	–	6.00	6.54
Chester Twp.	5,378	2,216	–	13,000	–	6.00	2.42
Denville Twp.	15,421	17,781	–	107,000	–	6.00	6.94
Mendham Boro	5,663	2,242	–	13,000	–	6.00	2.30
Mendham Twp.	5,460	3,727	–	22,000	–	6.00	4.03
Rockaway Twp.	21,211	5,924	–	36,000	–	6.00	1.70
Washington Twp.	12,140	4,588	–	28,000	–	6.00	2.31
TOTAL	66,954	38,230	–	230,000	–		
					Avg.	6.00	3.44

*Assumes Disposal at Mt. Olive Landfill, or Chester Hills Landfill, as practiced in 1979.

[1]Transport Costs for Private Collection are variable, depending upon the individual collection service and the proximity of the locality to the disposal area.

[2]Inclues Estimated Collective Disposal Costs Only.

TABLE 3–41

1985 MUNICIPAL SOLID WASTE TRANSPORT & DISPOSAL COSTS
ALTERNATIVE NO. 10* (EAST) 1985 TO NEWARK @ $12.50/TON

Municipalities W/ Municipal Collection	1985 Population	1985 Tons/Yr.	Annual Transport Costs ($)	Annual Disposal Costs ($)	Total Transport & Disposal ($)	$/Ton	Annual $/Capita
Boonton Town	8,991	15,770	64,000	197,000	261,000	16.55	29.03
Butler Boro	7,812	5,131	15,000	64,000	79,000	15.40	10.11
Florham Park	8,485	5,854	46,000	73,000	119,000	20.33	14.02
Hanover Twp.	13,464	19,831	90,000	248,000	338,000	17.04	25.10
Kinnelon Boro	8,412	2,979	11,000	37,000	48,000	16.11	5.71
Lincoln Park Boro	8,883	4,785	10,000	59,000	69,000	14.42	7.77
Madison Boro	16,038	10,980	48,000	137,000	185,000	16.85	11.54
Morris Twp.	22,084	13,205	97,000	165,000	262,000	19.84	11.86
Morris Plains Boro	5,744	10,419	45,000	130,000	175,000	16.80	30.47
Morristown Town	15,870	15,173	76,000	190,000	266,000	17.53	16.76
Parsippany-Troy Hills Twp.	54,847	34,436	120,000	430,000	550,000	15.97	10.03
Passaic Twp.	8,095	8,753	63,000	109,000	172,000	19.65	21.25
Riverdale Boro	2,708	1,792	6,000	22,000	28,000	15.63	10.34
TOTAL	181,433	149,108	619,000	1,861,000	2,552,000		
					East County Avg:	17.12	14.07

Municipalities W/Private Collection	1985 Population	1985 Tons/Yr.	Annual Transport[1] Costs ($)	Annual Disposal Costs ($)	Total Transport[1] & Disposal ($)	$/Ton[2]	Annual $/Capita[2]
Boonton Twp.	3,613	2,482	–	31,000	–	12.50	8.58
Chatham Boro	8,999	2,708	–	34,000	–	12.50	3.78
Chatham Twp.	10,023	2,981	–	37,000	–	12.50	3.69
E. Hanover Twp.	10,763	18,256	–	228,000	–	12.50	21.18
Harding Twp.	3,848	2,754	–	34,000	–	12.50	8.84
Montville Twp.	16,555	17,474	–	218,000	–	12.50	13.17
Mountain Lakes Boro	4,623	3,367	–	42,000	–	12.50	9.09
Pequannock Twp.	14,547	11,533	–	144,000	–	12.50	9.90
TOTAL	72,971	61,555	–	768,000			
					Avg.	12.50	10.52

*Assumes East County Waste to Newark RDF Facility, 2000 – 3000 TPD Capacity.

[1]Transport costs for private collection are variable, depending upon the individual collection service and the proximity of the locality to the disposal area.

[2]Includes estimated collective disposal costs only.

TABLE 3–42

1985 MUNICIPAL SOLID WASTE TRANSPORT & DISPOSAL COSTS

ALTERNATIVE 10* (WEST)

Municipalities W/ Municipal Collection	1985 Population	1985 Tons/Yr.	Annual Transport Costs ($)	Annual Disposal Costs ($)	Total Transport & Disposal ($)	$/Ton	Annual $/Capita
Dover Town	13,886	8,058	14,000	104,000	118,000	14.64	8.50
Jefferson Twp.	17,279	12,210	31,000	158,000	189,000	15.48	10.94
Mine Hill Twp.	3,823	2,303	3,000	30,000	30,000	14.33	8.63
Mt. Arlington Boro	4,154	2,360	4,000	31,000	35,000	14.83	8.43
Mt. Olive Twp.	22,797	9,782	14,000	127,000	141,000	14.41	6.19
Netcong Boro	3,570	2,411	2,000	31,000	33,000	13.69	9.24
Randolph Twp.	21,988	11,951	22,000	155,000	177,000	14.81	8.05
Rockaway Boro	7,544	9,599	23,000	124,000	147,000	15.31	19.49
Roxbury Twp.	21,934	20,150	15,000	261,000	276,000	13.70	12.58
Victory Gardens	1,342	590	2,000	8,000	10,000	16.95	7.45
Wharton Boro	5,639	3,457	9,000	45,000	54,000	15.62	9.58
TOTAL	123,956	82,871	139,000	1,074,000	1,213,000		
					West County Avg.	14.64	9.79

Municipalities W/Private Collection	1985 Population	1985 Tons/Yr.	Annual Transport[1] Costs ($)	Annual Disposal Costs ($)	Total Transport[1] & Disposal ($)	$/Ton[2]	Annual $/Capita[2]
Chester Boro	1,751	1,825	–	24,000	–	12.96	13.71
Chester Twp.	5,584	2,301	–	30,000	–	12.96	5.37
Denville Twp.	15,783	18,199	–	236,000	–	12.96	14.95
Mendham Boro	5,979	2,367	–	31,000	–	12.96	5.18
Mendham Twp.	5,754	3,928	–	51,000	–	12.96	8.86
Rockaway Twp.	21,745	6,073	–	79,000	–	12.96	3.63
Washington Twp.	12,964	4,900	–	64,000	–	12.96	4.94
	69,560	39,593	–	515,000	–		
					Avg.	12.96	7.40

* Assumes West County Waste to Landing RDF Facility, 1000 TPD Capacity.

[1]Transport Costs for Private Collection are variable, depending upon the individual collection service and the proximity of the locality to the disposal area.

[2]Includes Estimated Collective Disposal Costs Only.

TABLE 3–43
SUMMARY OF COSTS FOR WASTE TRANSPORT/DISPOSAL[1]

ANNUAL DOLLARS PER CAPITA

(Indicated in Parentheses is the Percentage Increase in Costs Over 1979*)

Alternative No.	1979 East[2]	1979 West	1979 Lakeland	1979 Full County[2]	1983 East[3]	1983 West	1983 Lakeland	1983 Full County[3]	1985 East[3]	1985 West	1985 Lakeland	1985 Full County[3]
1	6.50	3.44	4.31	5.32	8.74 (34%)	5.43 (58%)		7.41 (39%)	14.64 (125%)	9.79 (185%)		12.67 (138%)
4	6.50	3.44	4.31	5.32	9.02 (39%)	5.43 (58%)	7.56 (75%)	7.51 (41%)	15.21 (134%)	9.79 (185%)	7.58 (76%)	12.89 (142%)
6a	6.50	3.44	4.31	5.32					8.13 (25%)	8.18 (138%)		8.15 (53%)
6b	6.50	3.44	4.31	5.32					16.20 (149%)	14.77 (329%)		15.62 (194%)
7a	6.50	3.44	4.31	5.32	9.02 (39%)	5.43 (58%)	7.56 (75%)	7.51 (41%)	8.51 (31%)	8.18 (138%)	7.58 (76%)	8.37 (57%)
7b	6.50	3.44	4.31	5.32	9.02 (39%)	5.43 (58%)	7.56 (75%)	7.51 (41%)	16.90 (160%)	14.77 (329%)	7.58 (76%)	15.99 (201%)
8a	6.50	3.44	4.31	5.32					9.85 (52%)	9.79 (185%)		9.83 (85%)
8b	6.50	3.44	4.31	5.32					19.02 (193%)	9.79 (185%)		15.27 (187%)
9a	6.50	3.44	4.31	5.32					10.30 (58%)	9.79 (185%)	7.58 (76%)	10.08 (89%)
9b	6.50	3.44	4.31	5.32					19.82 (205%)	9.79 (185%)	7.58 (76%)	15.52 (192%)
10	6.50	3.44	4.31	5.32	13.76 (112%)	5.43 (58%)		10.43 (96%)	14.07 (116%)	9.79 (185%)		12.33 (132%)

*Note: The per capita cost of controlled landfilling, including transport cost, may be expected to rise to $7.70 by 1985, due to RCRA landfill upgrading requirements (45% increase over current costs).

[1] Based upon cost estimates for municipalities supplying municipal or municipal-contract collection only.

[2] Includes Lakeland communities.

[3] Excludes Lakeland communities in Alternatives 4, 7a, 7b, 9a and 9b.

TABLE 3—43 (cont.)

DOLLARS PER TON

(Indicated in Parentheses is the Percentage Increase in Costs Over 1979*)

Alternative No.	1979 East[2]	1979 West	1979 Lakeland	1979 Full County[2]	1983 East[3]	1983 West	1983 Lakeland	1983 Full County[3]	1985 East[3]	1985 West	1985 Lakeland	1985 Full County[3]
1	7.92	5.11	8.63	6.96	10.64 (34%)	8.10 (59%)		9.75 (40%)	17.82 (125%)	14.64 (186%)		16.68 (139%)
4	7.92	5.11	8.63	6.96	10.58 (34%)	8.10 (59%)	15.12 (75%)	9.68 (39%)	17.82 (125%)	14.64 (186%)	15.17 (76%)	16.64 (139%)
6a	7.92	5.11	8.63	6.96					9.89 (25%)	12.24 (140%)		10.73 (54%)
6b	7.92	5.11	8.63	6.96					19.72 (149%)	22.09 (332%)		20.57 (196%)
7a	7.92	5.11	8.63	6.96	10.58 (34%)	8.10 (59%)	15.12 (75%)	9.68 (39%)	9.97 (26%)	12.24 (140%)	15.17 (76%)	10.81 (55%)
7b	7.92	5.11	8.63	6.96	10.58 (34%)	8.10 (59%)	15.12 (75%)	9.68 (39%)	19.80 (150%)	22.09 (332%)	15.17 (76%)	20.65 (197%)
8a	7.92	5.11	8.63	6.96					11.99 (51%)	14.64 (186%)		12.94 (86%)
8b	7.92	5.11	8.63	6.96					23.14 (192%)	14.64 (186%)		20.10 (189%)
9a	7.92	5.11	8.63	6.96					12.07 (52%)	14.64 (186%)	15.17 (76%)	13.02 (87%)
9b	7.92	5.11	8.63	6.96					23.22 (193%)	14.64 (186%)	15.17 (76%)	20.04 (188%)
10	7.92	5.11	8.63	6.96	16.75 (111%)	8.10 (59%)		13.71 (97%)	17.12 (116%)	14.64 (186%)		16.23 (133%)

*Note: The per capita cost of controlled landfilling, including transport cost, may be expected to rise to $7.70 by 1985, due to RCRA landfill upgrading requirements (45% increase over current costs).

[1] Based upon cost estimates for municipalities supplying municipal or municipal contract collection only.

[2] Includes Lakeland communities.

[3] Excludes Lakeland communities in Alternatives 4, 7a, 7b, 9a and 9b.

- From the standpoint of transportation, the existing road network serves well in linking the major haul routes in Morris County to the City of Paterson. Routes I-80 and I-287 intersect in eastern Morris County, with the City of Paterson about 13 minutes to the east of the Morris County border via Interstate 80. The opening of these interstate highways has, in essence, created a major east-west transportation corridor. Use of this corridor has resulted in the increased use of the Mt. Olive Landfill; thus use of this corridor for the transport of solid waste has already been demonstrated.

- Alternatives 8a and 9a would provide for a diversified management system enabling Sussex and Warren counties to utilize resource recovery, while still achieving some economics of scale with Passaic County. The inclusion of Sussex and Warren counties in a joint management system could further reduce pressures on Morris County landfills by making landfills in those other counties available for the disposal of residue and nonprocessable wastes. Moreover, a delay in the planning and construction of any one facility would not affect the others, whose utilization would serve to ease the burden on landfills in the county.

- Alternative 10 or the inclusion of the Lakeland plan in any of the above alternatives could enable the diversion of a portion of the County's solid wastes to resource recovery in 1983, unlike the other options which could not be ready until 1985. However, transport of solid waste to Newark via I-280 with its preponderance of hills weighs disfavorably in the consideration of this option. If an alterante transportation route should become available, alternative 10 may then compare favorably with the others.

Alternatives 6b, 7b, 8b, and 9b assume the resource recovery facility in Paterson to be a waterwall incinerator. In that the tipping fee at the Paterson facility will weigh highly on final technology selection and energy market prices, it should be noted that costs included here for waterwall incineration represent maximum costs which may be anticipated. Should the waterwall incinerator be located in the close proximity to the steam user, or should some degree of front and fuel preparation be provided, the tipping fee at such a facility may be substantially reduced. Final decisions on use of the Paterson facility would be subsequent to a feasibility study which would provide information on site and technology selection, as well as tipping fees.

For all alternatives involving energy recovery,including RDF as well as steam producing facilities, long term advantages are envisioned in that the rate of increase in the cost of energy is expected to continue to exceed the general rate of inflation. Consequently, revenues derived from fuel sales may offset an increasing portion of the costs of facilities operation.

Application of the respective merits as discussed has resulted in the final ranking as presented in Table 3-44.

Rigid adherence to this ranking is not recommended, in that future events may alter the relative favorability of the stated alternatives.

It should be emphasized that although a ranking of alternatives was mandated, all seven represent viable solutions to Morris County's solid waste disposal needs for the length of the planning period.

D. SOLID WASTE MANAGEMENT PLAN SELECTION

The solid waste management plan recommended for Morris County consists of the following:

a. The development of a resource recovery facility in Landing or at suitable sites in the surrounding area employing refuse derived fuel technology, to be operational by 1985. Of the 1,000 ton per day capacity, 600 tons per day would be imported from Sussex, or Warren Counties. 400 tons per day would be generated by the western half of Morris County.

b. The development of a resource recovery facility by the Lakeland Solid Waste Authority serving the Morris County communities of Pequannock, Kinnelon and Butler, to be operational by 1983.

c. The development of a resource recovery facility in Paterson, Passaic County, employing waterwall incineration or refuse derived fuel technology. Wastes from the eastern half of Morris County would be exported to the Paterson facility for disposal starting in 1985.

d. Continued use of private sector landfills in Mount Olive and Chester Hills. Both landfills would be upgraded during the planning period. The Mount Olive facility would be granted a five year expansion, to operate from 1980 to 1985.

Also, continued use of the following existing, registered solid waste facilities, including limited use landfills, transfer stations, and composting facilities:

- Whippany Paper Board Landfill
- Mendham Borough Landfill
- Ecology Lake Club Landfill

TABLE 3–44

FINAL RANKING OF ALTERNATIVES

Ranking	Alternative Number*	Description Summary
1	9A, 9B	Use of upgraded and expanded M.O. landfill, and upgraded C.H. landfill until 1/85. Lakeland communities to Lakeland RRF beginning 1/83. East to Passaic RRF 1/85 west, plus imported wastes to Landing RRF, 1/85.
	8A, 8B	Same as 9A, 9B without Lakeland RRF.
2	10	Use of upgraded and expanded M.O. landfill, and upgraded C.H. landfill until 1/83 for the east, 1/85 for the west. East to Newark RRF, 1/83. West plus imported wastes to Landing RRF, 1/85.
3	4	Use of upgraded and expanded M.O. landfill, and upgraded C.H. landfill until 1/85. Lakeland communities to Lakeland RRF 1/83. East and west to Landing RRF, beginning 1/85.
	1	Same as 4, without Lakeland RRF.
4	7A, 7B	Use of upgraded and expanded M.O. landfill, and upgraded C.H. landfill until 1/85. Lakeland communities to Lakeland RRF, 1/83. East and west to Passaic Co. RRF, 1/85.
	6A, 6B	Same as 7A, 7B without Lakeland RRF.

*An alternative followed by "A" assumes Paterson Facility will be RDF. Those followed by a "B" assume the Paterson Facility will be a waterwall incinerator.

- Mt. Arlington Borough Landfill
- U.S. Mineral Products, Inc. Landfill
- Hercules, Inc. Landfill
- Jacobs Road Landfill
- Wharton Borough Landfill
- Advanced Environmental Technology Transfer Station
- R & R Sanitation Transfer Station

Regarding the above listed landfills, it is recommended that, upon completion of filling the existing permitted areas, that future filling be limited to inert materials or yard and garden wastes, or if not, the landfills should be upgraded. Also, the status of each of the facilities should be examined at the time of each plan update to evaluate their continued use.

e. Encouragement of the development of a private sector demolition and construction landfill, if a suitable location is identified. Such a landfill would ease the loading on the existing landfills, conserving space therein for future use.

f. The inception of a County Solid Waste Facility inspection system. This would require the hiring of a County Solid Waste Facility Inspector. The role of the inspector would be to work closely with municipalities, the landfill operators, the DEP/Solid Waste Administration, the County Planning Board, and local residents, to assure that the needs of the County and its residents are met during the operation of solid waste disposal facilities. The Solid Waste Facility Inspector would also obtain samples from groundwater monitoring wells at landfills for analysis.

g. Further evaluation of transfer systems in 1982. Current cost-effectiveness analyses indicate that transfer systems are marginally not cost-effective. If fossil fuel prices continue to rise, however, the transfer systems could well become cost-effective. Reevaluation in 1982 would allow adequate time for the development of transfer systems prior to the startup of resource recovery systems in 1985. An advantage of completing a cost-effectiveness analysis for transfer stations in 1982 is that final site selection information for facilities will be available. In addition, possible changes in waste generation districts to provide the lowest cost transport can be considered.

h. To insure the mitigation of environmental problems, Morris County should support efforts to develop state wide funding for the maintenance of landfills after closure, where landfills can no longer be maintained by the owners. Landfills which have been closed in recent years include the Henry Hansch Landfill (Whippany), the Frank Fenimore Landfill (Roxbury), and the Sharkey's Landfill (Parsippany-Troy Hills).

i. Encouragement and expansion of source separation programs, including voluntary household recycling programs and commercial/industrial recycling programs. Source separation programs should focus on the separation of such waste stream components as glass, steel, paper, and aluminum. For any components which would not be separated at resource recovery facilities, source separation programs should continue through the planning period. The role of the County will be to encourage municipalities and the private sector to initiate source separation programs and to assist, where possible, in the matching of markets to the recycled waste stream. The ultimate goal of the N.J. Department of Energy is a 20% reduction in the volume of solid waste through source separation programs. These programs and goals are outlined in the N.J. DOE Master Plan.

Specific recommendations on source separation are as follows:

- Provide technical assistance in designing and implementing municipal or commercial programs, and help obtain grants for start-up.
- Coordinate publicity for municipal programs.
- Arrange a source separation/recycling seminar to inform and educate the public on the advantages and merits of recycling.
- Work with local organizations, such as the Association of N.J. Environmental Commissions to train recycling leaders.
- Work with governments and industry to provide expanded markets for recovery materials and stronger incentives for recycling.
- Existing recycling programs should be continued and expanded.

j. It is suggested that the County consider the takeover of locally owned roads leading to active landfills. Specifically, Parker Road in Chester Township and Gold Mine Road in Mt. Olive and Roxbury Townships are heavily traveled by refuse trucks on their way to and from Chester Hills and Morris County landfills. Noticeable deterioration has occurred in the condition of the road surfaces. These roads are being utilized for the disposal of solid waste originating from throughout the County. The burden for the maintenance of these roads should not be born solely by the communities in which they are located.

k. As part of the continuing solid waste planning process, the county should keep abreast of the development of refuse derived fuel energy markets. The use of refuse derived fuel in new, existing or converted energy systems shall be encouraged.

The plan described above is illustrated graphically in Figures 3-13, 3-14, and 3-15. Should development of the resource recovery system(s) as described in a, b, and c above not occur as planned, the following alternatives should be considered:

- development of a resource recovery facility in Landing, employing refuse derived fuel technology, serving the entire County of Morris. This facility might be complemented with a transfer station in the eastern section of the County.

- exportation to the Paterson resource recovery facility of all of Morris County's wastes.

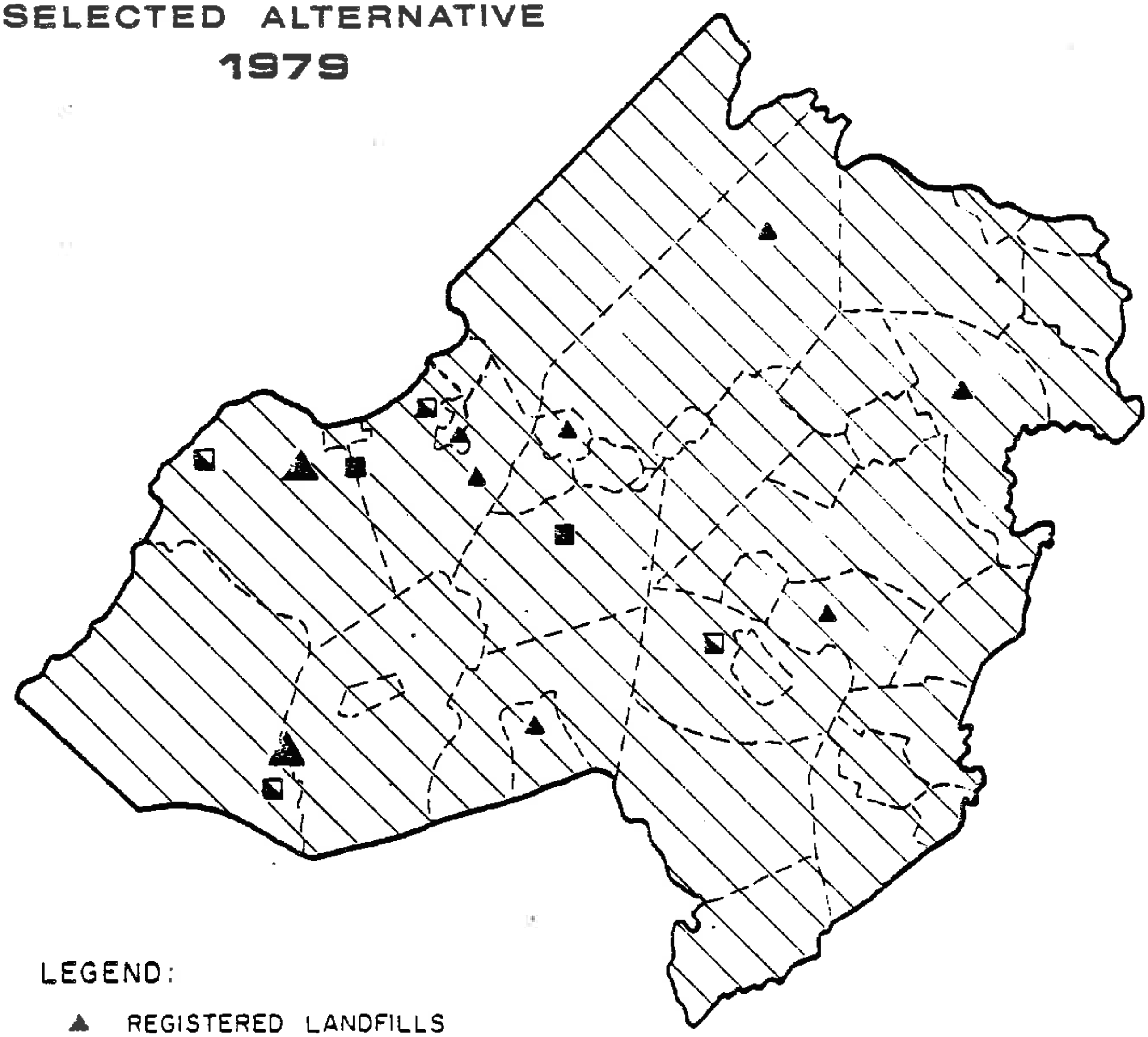
Exportation may be accomplished through the use of either one transfer station in the east, or one transfer station in the east and one in the west.

The existing collection system is deemed adequate for the planning period. It is expected that the decision on whether or not to provide collection service shall remain a municipal decision. With the current disposal problems, it is recommended that attention be directed towards the development and implementation of environmentally sound disposal facilities and resource recovery facilities. Following this, attention can then be turned to the consideration of changes in the collection systems. However, it is doubtful that many municipalities will provide additional services as long as municipal budget increases are limited by the "caps" law.

It should be noted that the current system of tipping fee charges levied by the cubic yard has provided an incentive for all collector/haulers to pack their trucks to the maximum extent possible prior to going to the landfill. As long as this financial incentive remains, it can be expected that the collection system will remain at least as efficient as it is currently.

It should be also noted that regardless of the option implemented for solid waste management in Morris County the cost of collection and disposal for the individual homeowner will increase over present levels. The cost of refuse disposal has been artifically low within New Jersey in the past. Under new landfill design regulations mandated by the state, new or expanded landfills will have to include environmental controls to avoid adverse effects. Therefore, future collection and disposal costs utilizing secure landfills will rise to $8-10/ton and equalize with the cost of resource recovery, probably within the duration of the planning period.

SELECTED ALTERNATIVE
1979



LEGEND:

- ▲ REGISTERED LANDFILLS
- ▲ REGISTERED BPU LANDFILLS
- COMPOSTING FACILITIES
- TRANSFER STATIONS
- CONTINUED USE OF MOUNT OLIVE AND CHESTER HILLS LANDFILLS

FIGURE 3–13

SELECTED ALTERNATIVE
1983

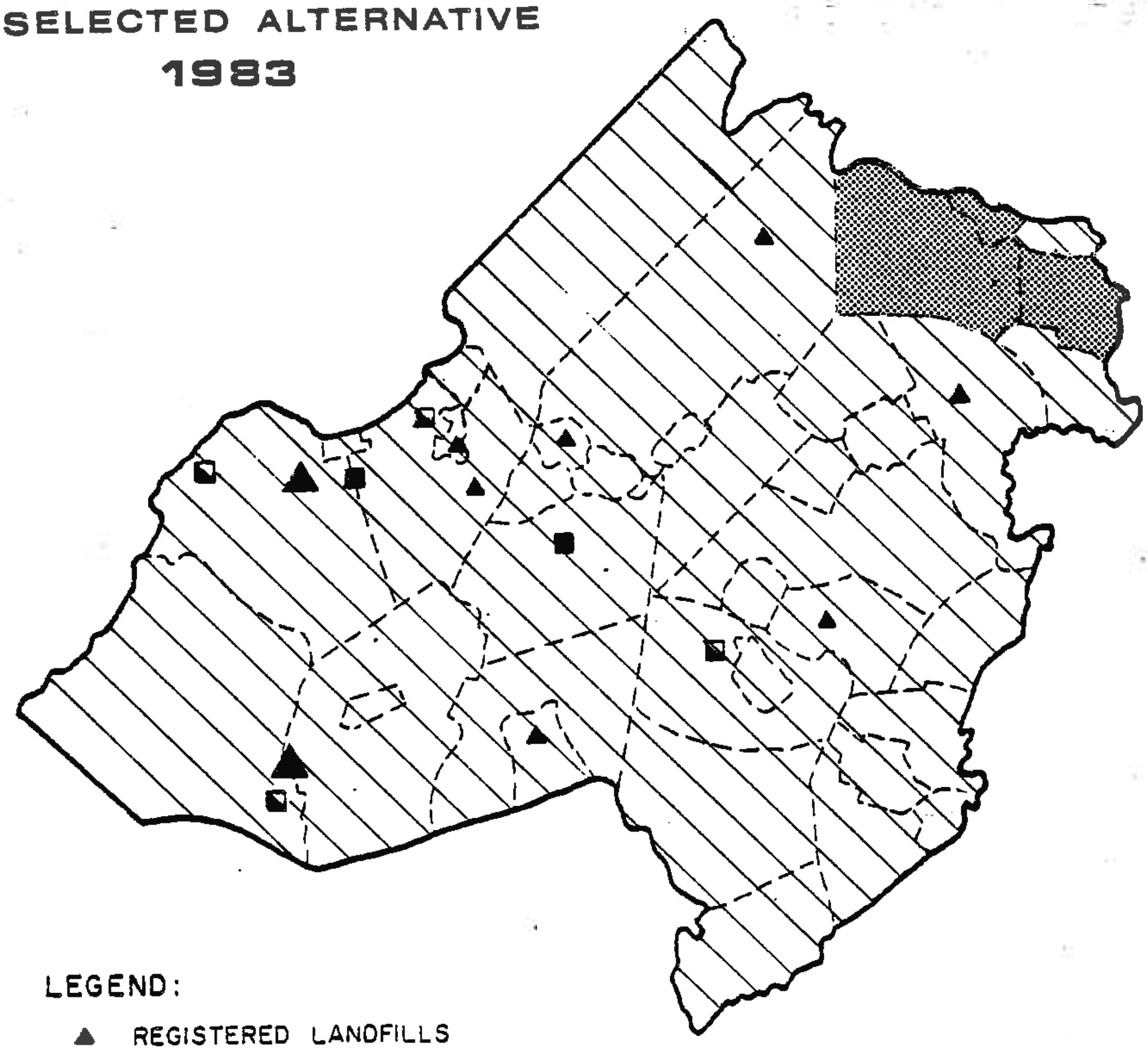


FIGURE 3–14

SELECTED ALTERNATIVE
1985

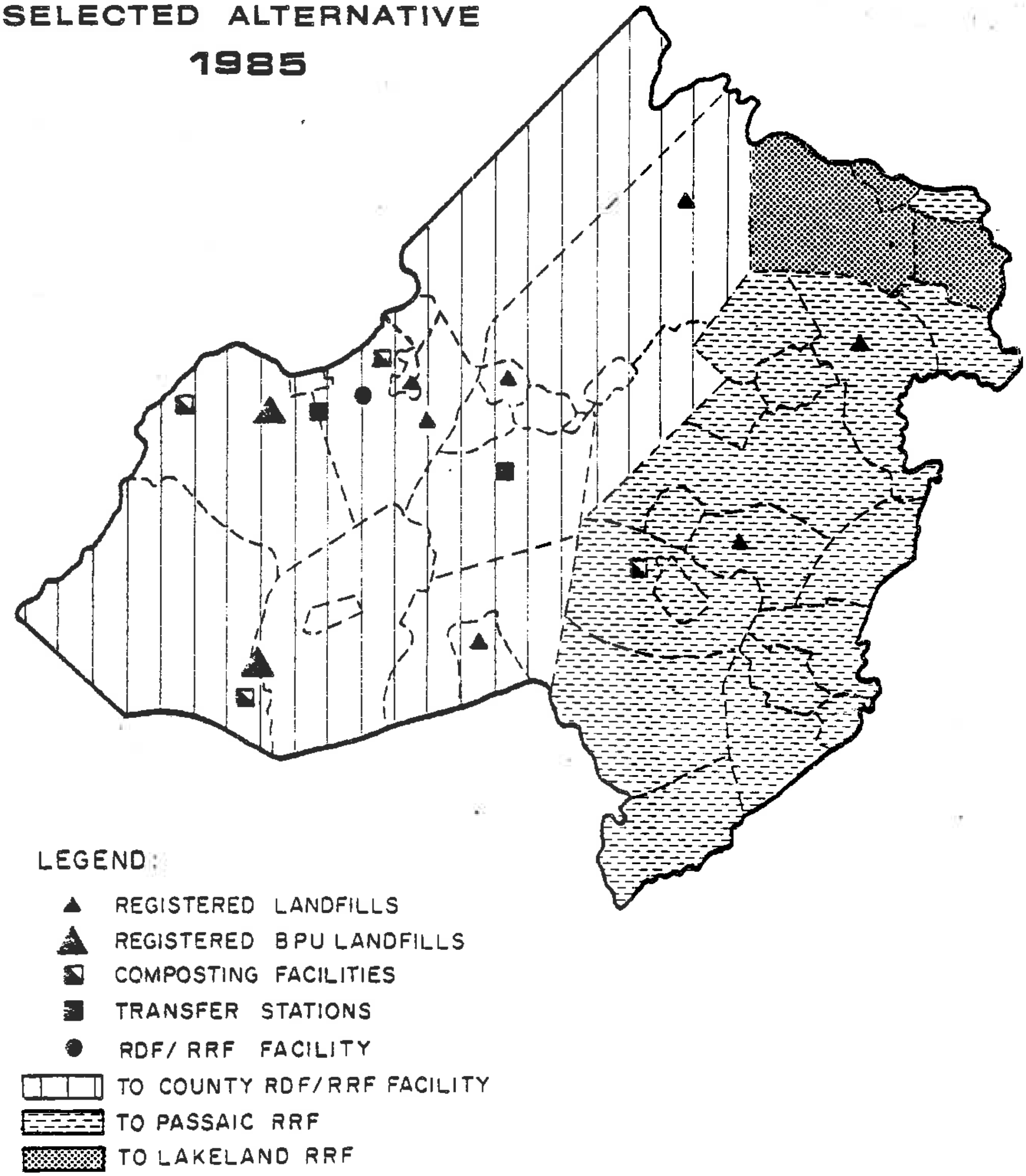


FIGURE 3–15

If resource recovery is implemented for all county municipal wastes by 1985, the present landfills would provide ample capacity for residue and nonprocessable wastes until as late as 1996. In the event resource recovery is not at all utilized in the 1980's present landfill capacity would be depleted by 1989 at which time a new landfill would have to be constructed. (See Figure 3-16).

A series of interim steps need to be taken to achieve implementation of proposed resource recovery technologies by 1985 (see proposed plan implementation schedule, Section IV). These procedures would include the following:

1. Final decision on development of resource recovery in the Lakeland region by 1/80 for a 1983 startup.

2. Final decisions on the development of a resource recovery facility in Morris County by 1982 for a 1985 startup.

3. Intercounty agreement with Passaic County by 1982 for exportation of Morris County waste to Paterson RRF beginning in 1985.

4. Intercounty agreement with Sussex and/or Warren Counties by 1982 concerning waste importation to western Morris County RRF beginning in 1985.

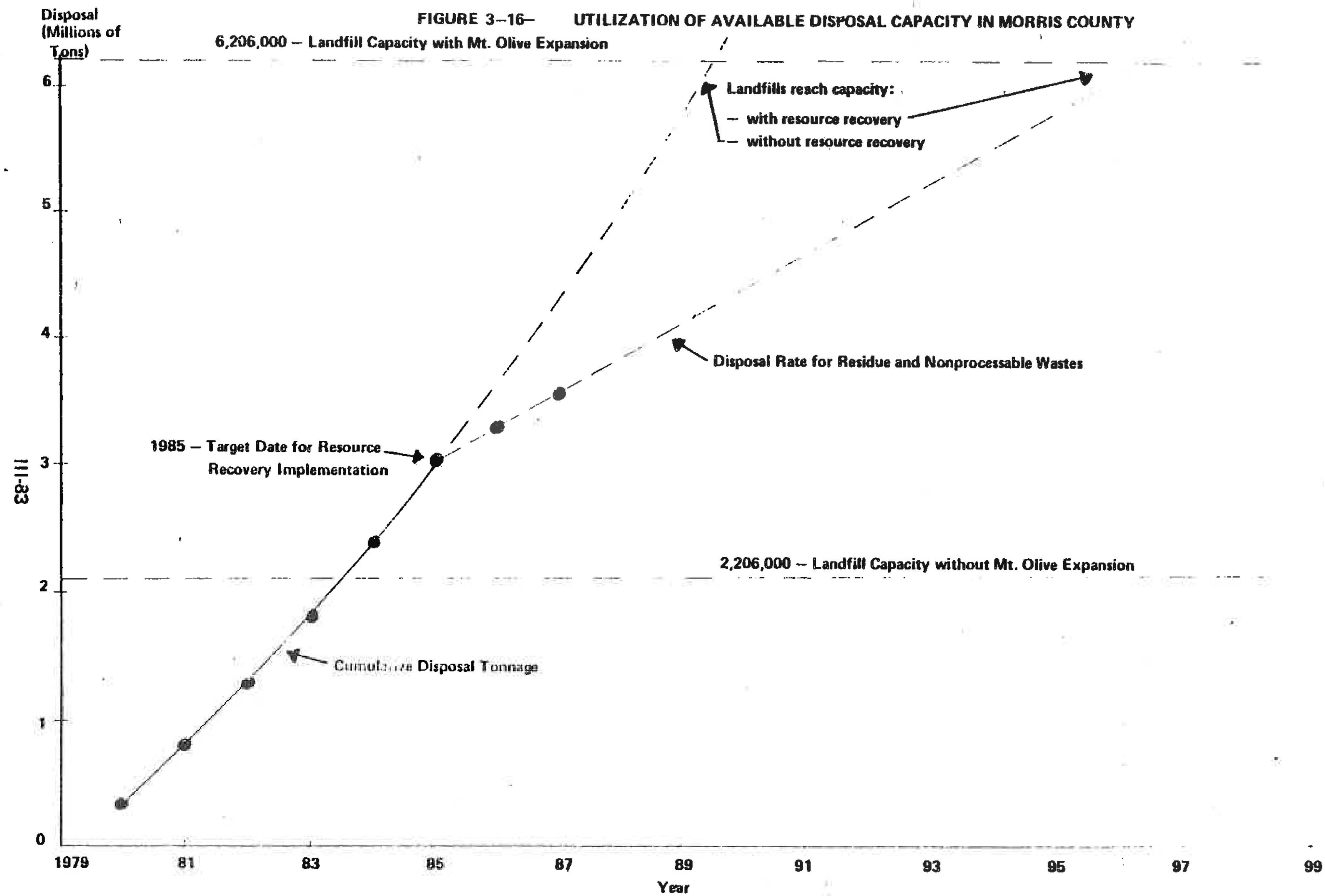
Regarding resource recovery development, its is also recognized that a small scale RDF technology is under consideration by Parsippany - Troy Hills. It is anticipated at this early stage that development may be in conjunction with the local wastewater treatment facility. Pending completion of more detailed arrangements and submission of formal engineering plans to the SWA, the SWAC should review the plans and make recommendations on whether the proposal is in conformance with this plan, at the same time making any necessitated plan revisions.

E. SEPTIC WASTE MANAGEMENT ALTERNATIVES AND PLAN SELECTION

Proper planning for septic waste disposal must receive serious consideration in that the pathogen laden waste offers continuous potential for the spread of disease. However, as stated in Section I.D., collection and disposal of septic waste is not provided by any Morris County municipality, making control of this waste stream at the municipal or county level difficult, at best.

It has been proposed by the NJDEP's Office of Sludge Management that, in the future, wastewater treatment works will be designed and constructed such that septic wastes may be accepted for treatment and disposal. At the present time, three such facilities within the county currently accept septic waste. Expansion of this practice to several facilities within the county operating below design capacity appears desirable.

FIGURE 3–16— UTILIZATION OF AVAILABLE DISPOSAL CAPACITY IN MORRIS COUNTY



With the cessation of ocean disposal and a waning number of landfills willing to accept septic wastes, the disposal problem of this waste has increased greatly in magnitude. Acceptable disposal methods have increased dramatically in price in the last few years. The estimated generation rate of septic waste in Morris County (5-7 million gallons per year) lies well above the volume (3.6 million gallons per year) reported as being collected to the Solid Waste Administration, which may be indicative of substantial illicit dumping of this waste product. In any event, this discrepancy underlines the need for more effective monitoring and enforcement on the part of the state.

The only short term solution to septic waste disposal would involve the utilization of the Modern Transportation Vacuum Filter Facility in Kearny, or the utilization of existing wastewater treatment plants that are not currently operating at design capacity. However, the lack of waste control may frustrate these intentions, unless a concerted enforcement effort detracts from the profitability of "underground" disposal techniques. If sewage treatment plants cannot or will not handle septic wastes, the feasibility of constructing a septic pretreatment facility should be studied.

The role of the County during the planning period will be to persuade municipalities and sewerage authorities to provide for septic waste disposal within their designated service areas. However, it should be noted that the 201 agencies have the primary responsibility in planning, design, and construction of permanent septage and sewage sludge treatment facilities. The ultimate disposal and utilization of septage and sewage sludges are also deemed the responsibility of the 201 agencies.

F. SLUDGE MANAGEMENT ALTERNATIVES AND PLAN SELECTION

Cessation of ocean disposal of waste sludge, as has already occurred for septic wastes, will further burden the task of finding acceptable disposal techniques for this waste product. In that ocean disposal accounts for about 12% of the County's generation rate, this additional burden in itself is not viewed as a severe problem.

Upgrading and expansion of the existing sewage treatment network, as currently foreseen within the several Morris County facilities planning areas, may significantly increase the sewage sludge generation rates. Coupled with the current trend in landfill closure, and the refusal of many landfills to accept sewage sludge, a clear need exists for comprehensive planning for the disposal of this waste material.

Acceptable disposal options may include incineration, composting, environmentally controlled landspreading, and co-disposal with solid waste. Near term disposal problems may be alleviated through service agreements with the Parsippany-Troy Hills and Two Bridges facilities, where significant excess capacity currently exists for sludge incineration. As in the case of septic wastes, the filtration facility in Kearny may also be utilized. The DEP Office of Sludge Management (OSM) has taken the position that landfilling of sewage sludge is not an acceptable alternative to ocean disposal; thus an increase in this practice should be avoided.

Composting, co-disposal, and land application represent long term alternatives for sewage sludge disposal. A sludge stabilized through composting may be more amenable to disposal in landfills. With the implementation of sludge pretreatment requirements, the feasibility of land application will increase. Co-disposal with solid waste for the production of methane on a commercial scale is currently under investigation in the State of New Jersey, offering promise of technological feasibility in the latter stages of the planning period. Again, as in septic wastes, primary responsibility for the ultimate disposal or utilization of sewage sludge lies within the 201 planning agencies.

TASK IV

FINANCIAL, LEGAL AND INSTITUTIONAL PLANS

TASK IV
FINANCIAL, LEGAL AND INSTITUTIONAL PLANS

A. INTRODUCTION TO WASTE CONTROL

As Morris County moves further toward the development of resource recovery system(s), control of the movement of solid waste will become more essential. The principal goal is to acquire the ability to contract, on a long term basis, for the necessary tonnage which will be processed in the resource recovery facility to satisfy the energy user. Revenue to repay the capital debt and to cover operating costs is derived from tipping fees and energy sales. Without a minimum continuous flow of solid waste to the facility, expected income will fall short of project costs and the project's viability will be jeopardized.

There are other fundamental advantages to waste control. Effective long-term planning requires knowledge of waste loadings over time and the rate at which the waste will actually deplete available and proposed processing/disposal facilities. Furthermore, until the waste can be directed to resource recovery facilities or environmentally sound landfills, it will go to the cheapest disposal site, jeopardizing the viability of the resource recovery plant.

Fundamental to the strategy to gain control of the waste stream is the understanding that municipalities currently control the disposition of solid waste in New Jersey; i.e., they are the current contracting units. Present solid waste collection is by: (1) municipal collection, (2) private collection under contract with municipalities, (3) private collection under contract with individual households, or (4) individual household transport to the disposal facility. New Jersey Public Law 1975, c. 326 now provides one additional collection arrangement: municipal franchise (Sec. 31). To date, this option has not been used.

In the United States, three methods have been used to gain control of the solid waste stream. The methods are:

- Long term contracts with individual municipalities.
- Franchising a particular area, be it municipal, county or regional.
- User charge system.

There are similarities and overlaps between the three approaches, e.g., waste control can be gained with a countywide franchise which is then supported by municipal contracts based on a user charge.

The significant differences between the three approaches have to do with the degree of control over the waste stream that can be pledged to any bondholder and to the facility.

1. Municipal Contracts. The municipal contract approach for waste control involves the development of contracts between the municipalities and the County's Designee* for the processing and/or disposal of municipal waste. Through the terms of each contract, the County's Designee would be responsible for disposal of delivered municipal refuse generated within each municipality and would be paid a service fee based on a standard formula applied to the tonnage delivered or guaranteed under contract. The municipality is reimbursed by the waste generators via property taxes or "Garbage District" taxes. Figure 4-1 is a simplified illustration of the flow of funds and method of payment that relates to residential waste disposal service under the municipal contract approach.

The opportunity for Morris County to receive the refuse depends on the extent to which the municipality has control of the refuse within its jurisdiction. It may be necessary to modify certain municipal contract rights in order for them to obtain the waste control for the County.

The State has enabling legislation that allows municipalities to contract for periods of up to 25 years with a resource conservation or recovery facility (Sec. 33(4)) of NJPL 1975, c. 326). Such contracts must be in conformance with an approved c. 326 County Solid Waste Management Plan and meet with the approval of the NJ Department of Community Affairs, Division of Local Government Services and the Department of Environmental Protection. However, existing contractual arrangements by municipalities must be analyzed and possibly revised.

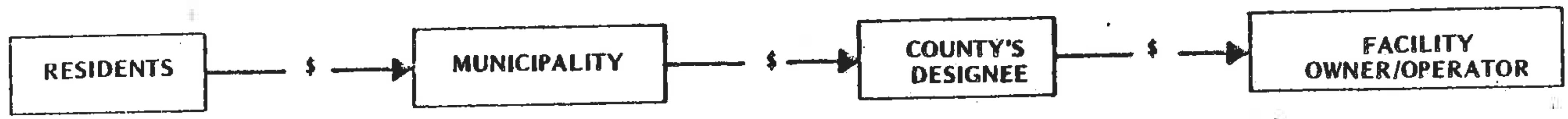
From a financial standpoint, a minimum of two-thirds of the tonnage required to satisfy the facility design capacity is necessary before the resource recovery project can be presented to the investment bankers for serious consideration.

The municipal contract approach to waste control is the least complex alternative, but normally involves a significant investment of time.

If the municipality collects its own waste, then it already has the waste control feature needed for contracting with the County or its designated agent. Such municipalities would only need to pass an ordinance stating that the municipality will guarantee to bring their waste to the new facility, when it comes on-line.

*The County's Designee would be the agency of the County which is charged with the responsibility for implementation of the Solid Waste Management Plan.

CASH FLOW



PAYMENT:	Portion of Municipal Tax (includes Collection and Disposal)	Scheduled Payment for Disposal	Pass through less administrative costs
BASED ON:	Real Estate Property Assessment Separate "Garbage District" Tax	Tipping rate times guaranteed tonnage as identified in contract between Municipality and Facility	

FIGURE 4–1
DISPOSAL SERVICE
MUNICIPAL CONTRACT APPROACH

Some communities sign contract with private collectors for periods generally ranging from one to three years. Under this situation, the municipality could change the designated disposal site from its current location (a landfill) to the resource recovery facility the next time it prepares its invitation to bid on collection service. [Alternatively, the community could add a provision stipulating that the collector will automatically transport the waste to the resource recovery facility when it becomes available.] Future or modified contractors with site designation clauses must make provisions for changes in haul distance. A specified unit hauling price should be added to or subtracted from the contracted service fee depending on whether the transportation time to the new facility is longer or shorter, respectively.

Municipalities that fit into these first two categories are listed below.

Municipal	Private Under Contract With Municipality
Hanover Twp.	Boonton Town
Morristown Town	Dover Town
Mt. Arlington Boro	Florham Park Boro
Mt. Olive Twp.	Jefferson Twp.
Roxbury Twp.	Kinnelon Boro
Wharton Boro	Lincoln Park Boro
Morris Twp.	Madison Boro
	Mine Hill Twp.
	Morris Plains Boro
	Netcong Boro
	Parsippany-Troy Hills Twp.
	Passaic Twp.
	Randolph Twp.
	Riverdale Boro
	Rockaway Boro
	Victory Gardens Boro

The municipal contracts may have to have a "put or pay" provision, depending on the quantity of waste scheduled for delivery to the designated facility. A "put and pay" provision means that the municipality must deliver a minimum tonnage, on a periodic basis, to the facility or pay as though it did deliver the guaranteed minimum tonnage. This has been considered an infringement upon the municipality's debt. From a financial viewpoint, however, it assures a flow of funds for payments to the bond holders.

When "put or pay" clauses are required in municipal contracts, the full provision generally does not take effect until the second or perhaps third year. Tonnage is estimated prior to the first year of delivery. Weighing records are kept during the year, and then a permanent waste quantity is established by adjusting the original estimate.

The investment banking community has revised its position on the traditional "put or pay" requirement, but certain circumstances must be met. The municipality must have control over collection and be willing to sign a clause committing all the municipal refuse collected within its jurisdiction. In addition, the quantity of refuse contractable for the project plus that tonnage not committed in the surrounding area must be significantly larger than the proposed plant capacity. The City of Newark contract, for example, does not contain a "put or pay" provision; it only guarantees that the City or any future subcontractors will deliver all that is collected within the City's borders.

There are two basic disadvantages to the municipal contract approach to waste control: (1) it is a time-consuming process and (2) all the municipal contracts must be virtually identical. One of the major difficulties is establishing identical contract terms with each of the municipalities. The contracts have to contain the same pricing formula and cover the same time frame. The basic difference is in the tonnage of waste committed, which is keyed to population. It is a difficult task to arrive at an agreement that is acceptable to all jurisdictions. This method of waste control has contributed to delaying several resource recovery projects throughout the country.

In the State of New Jersey, the only successful long term municipal contract is that between the City of Newark and a resource recovery firm. With only one municipality involved, of course, the contractural process is greatly simplified. Newark also controlled the waste stream since it collected and disposed directly in a contracted landfill site.

Should the County decide to pursue the municipal contract approach, the County would visit each municipality and request that they contract with the County or its designee to dispose of their waste at the selected facility. The term of the contract would be for a minimum of 20 years, with renewal available after the 20 year period in increments of five years.

The discussions with the municipalities should focus on the costs and benefits of resource recovery. The unit cost of disposal via a resource recovery facility will probably be higher in the near term than the present cost per ton at existing landfills. To more accurately evaluate the true cost of disposal, the towns should be shown how to allocate the total service cost into collection, transportation and disposal.

Additionally, it would benefit them to know and understand the impact that existing State Regulations, the new Federal sanitary landfill definition, and the future environmental legislative trends will have on the cost of disposal over the next 20 year period. If this accounting of true cost is not presented to the communities, they will not have a realistic picture of the situation they will be facing when they make their decision for resource recovery or conventional land disposal.

2. Franchise. Morris County could gain control of the waste stream by establishing a franchise. With this approach, the County's designee would petition the Board of Public Utilities (BPU) requesting that they be granted a franchise to control the disposal of solid waste within the District. The BPU has the power to designate any County as a franchise area. Specifically, Section 31 of NJ PL 1975, c. 326 states:

> "The Board of Public Utility Commissioners shall, after hearing, by order in writing, when it finds that the public interest requires, designate any municipality as a franchise area to be served by one or more persons engaged in solid waste collection and any solid waste management district as a franchise area to be served by one or more persons engaged in solid waste disposal at rates and charges published in tariffs or contracts accepted for filing by the board provided, however, that the proposed franchise area for solid waste collection or for solid waste disposal conforms to the solid waste management plan of the solid waste management district in which such franchise area is to be located, as such plan shall have been approved by the Department of Environmental Protection.
>
> The board shall encourage the consolidation of all accounts, customers, routes and facilities by persons engaged in solid waste collection or solid waste disposal within such franchise areas."

A franchise not only permits the County to have exclusive operational rights for disposal in a particular geographical area, but also requires waste generators, other than municipal, in the area to deliver refuse to a designated facility(ies). The County would perform an economic analysis to estimate the tipping fee and include it in the franchise petition. The review and approval of tipping rates is the responsibility of BPU. The BPU has maintained the position that they will entertain such petitions, but no franchises have been issued to date. Figure 4-2, illustrates the cash flow that relates to residential waste disposal under this approach.

The franchise method of gaining control of the waste stream is the best in terms of level of control and overall management of solid waste system. All the advantages to this approach stem

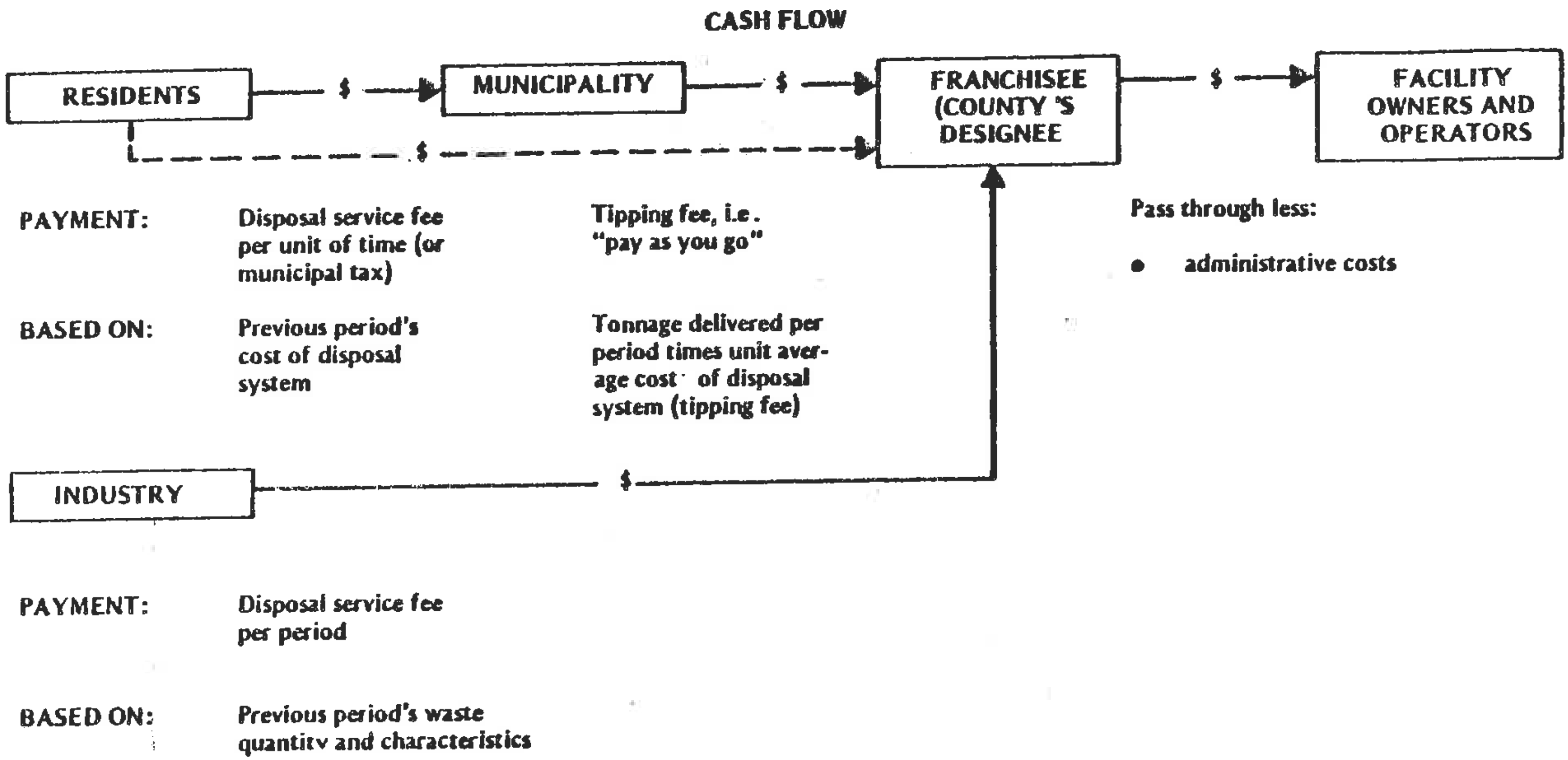


FIGURE 4–2

DISPOSAL SERVICE FRANCHISE APPROACH

from the high level of control over the entire waste stream in the County. It allows for a total system's management approach; i.e., all the municipal waste could be planned for optimal use. The franchisee can implement source separation programs and act as a clearinghouse for all imported waste as well as direct waste to any proposed resource recovery facility. Phased implementation would be facilitated, thus providing a smooth transition over time.

The County's designee could seek an average tipping rate within the County via its franchise application. In general, the rate structure and the consolidation of revenue associated with a franchise would foster effective and efficient management of improved public services throughout the solid waste system.

Highlights of the advantages associated with a franchise are:

- Complete control over the waste generated within the County, both municipally and privately collected.
- Creates a more predictable solid waste program with which industry will be better able to participate.
- Financial packaging for new facilities will be simpler and likely contain a lower interest rate on borrowing.

The franchise petitions BPU has reviewed to date have not been accompanied by support from many of the involved municipalities. The fundamental concern by the local municipalities has been that it creates a monopoly inside the franchised jurisdiction. Historically, there has not been a desire on the part of municipalities and their residents to have such control residing in one area. BPU records support this concern, indicating that towns with their own landfills or other disposal methods have been apprehensive of authorities, franchises and other forms of centralized governmental control. Typically, the strongest municipal support for a franchise petition has been generated by the host community (where a new facility is located).

In these previous attempts by the public and private sector to gain a franchise in a specific area, concern has been expressed that the service price may rise rapidly after they have made their commitment. Service rates, however, would be subject to the approval of the BPU and in time, rates would stabilize and become reasonably uniform among Solid Waste Districts.

If the franchise approach is pursued, it will be imperative that a comprehensive public information and participation program be designed and implemented in the County to educate the public-at-large to the benefits they will receive under a franchise system. These include the transfer of solid waste disposal responsibilities and confidence that a long-term solution, based on resource conservation and recovery, will result.

The BPU realizes that if they should grant Morris County a franchise for solid waste disposal, they would have to grant the other 21 districts a franchise also, if submitted and appropriately supported. The County's application would, therefore, be reviewed in context with state-wide costs and benefits. In addition to the DEP, neighboring counties and towns will be expressing their opinion.

The timing and approach to preparation of a franchise petition will be critical to its success. Close coordination with the 326 planning schedule and the neighboring counties is essential. Gaining the documented support of key municipalities within the County is fundamental.

3. User Charge System. The third method, the user charge concept, is used extensively in the United States and works similarly to the user charge placed on individual dwellings for wastewater collection and treatment or for other utility services. It involves the establishment of a fee structure for billing users directly for services rendered. The user makes payment to the County's designee on a monthly, quarterly, or yearly basis. Accumulated monies are used to pay for facility operation, whether operated by government or private enterprise, and to retire the capital debt. Figure 4-2, presents a simplified cash flow arrangement for a municipal refuse disposal service operating with the user charge system.

Once established, the user charge strongly encourages the waste generators to send their waste to the designated facility, since no waste generator would be inclined to pay twice for dispoal. The waste collector/hauler does not pay a tipping fee at the facility, although manifest systems might have to be established to assure that wastes delivered were generated within the County.

The user charge method is normally employed where a general obligation (GO) bond is used as the financing instrument. It adds protection to the full-faith-and-credit backing of the local government's offering.

Generally, the revenue received from user charges is sufficient to cover debt repayment. Funds are first applied to debt repayment, then the balance is applied to facility operating costs. When the facility is at full operating capacity, approximately half of the total owning and operating costs would be paid via user charges and the other half by by-product energy sales. Since waste is needed to produce the energy, enough waste must be received to cover the fixed operating costs or a loss will occur.

In the event that some customer does not pay the user charge, the service charge with interest is normally added to the property tax in the ensuing year.

A problem that has occurred with this approach is that the collector/haulers that use the facility have tended to drift into sections outside the geographical service area and therefore obtain free dumping for customers who did not pay the user charge. The cost of processing this incremenental tonnage must then be added to the user charge in the following year. With analogous reasoning, the user charge and the disposal service normally encompasses all commercial, institutional and industrial establishments (with a few exceptions) as well as residential dwellings. Otherwise, some residential haulers might collect from some businesses. This differs from the municipal contract approach where only municipal waste is handled.

Local acceptance of a user charge has been difficult because it is viewed no differently than a new fee. Since the charge is applied directly, it is more visible to the user and appears as another tax in another field. The only real problem with the service fee is that the user does not know exactly what his charge will be from year to year. With the municipal contract approach, the unit tipping fee is known, e.g., $X/ton, adjusted for inflation, as specified in the contract. Whereas, with the user charge the unit tipping fee is often not known. It is keyed to operating costs. This can result in a lower or higher charge depending on the by-product energy produced, plant operating efficiency and waste throughput.

4. Recommendations. A summary of waste control alternatives are shown in Table 4-1,,. Presently, only 43% of the municipal waste stream is either municipally collected or under contract to a municipality. It is therefore recommended that Morris County obtain a franchise from the Board of Public Utilities to guarantee an adequate supply of solid wastes to proposed Resource Recovery Facility(ies). A franchise would also facilitate the control over industrial wastes which presently are collected and disposed of by scavengers throughout Morris County. A franchise, if obtained, will afford the obvious benefits of overall waste control, allowing for timely, orderly landfill upgrading and resource recovery facility development, while avoiding recent problems of facility overloading.

B. FINANCIAL REQUIREMENTS AND ALTERNATIVES

1. Introduction. Any resource recovery project in Morris County, regardless of its size or type, must stand on its own as an economic entity. That is, the project's total capital and operating costs must be recovered through the income generated by the sale of recovery products and the receipt of disposal fees. The ability to demonstrate this will exert significant influence on the availability and cost of financing.

A resource recovery facility can be financed in one of three basic ways: General Obligation Bonds, Revenue Bonds (project financing) and private financing. A fourth option is leverage lease revenue bonds, a hybrid of Revenue Bonds. The ultimate financing mechanism may involve a combination of these three methods where permitted by statute.

TABLE 4–1
SUMMARY OF WASTE CONTROL ALTERNATIVES

Waste Control Alternatives	Overall County Control	Effectiveness of County-wide System Management	Type of County Designee	Implementation Ease / Time	Approvals Required: Municipal	Approvals Required: Local Government Services	Approvals Required: Board of Public Utilities	Long-term Contracting of Refuse	Effect on Financing Package	Potential Impact on Energy Supplied to Market
Municipal Contract	Good	Only for the designated resource recovery facility	Freeholders or Authority	Least complex but requires time for each municipality to sign — 2-3 years	Yes, all participating	Yes	Probably No*	Complete	Questionable since refuse tonnage is estimated	Problem Unlikely
Franchise	Best	Total systems management approach: • private haulers • resource recovery • source separation	Authority or County	Board of Public Utilities is grantor but no precedent to date — 1-2 years	Key Municipalities only	Questionable	Yes	Complete	Best	No Problem
User Charge	Fair	For all disposal facilities used but not landfill upgrading or importation	Authority or County	Easiest to implement but high public resistance (viewed as tax). Little time (less than one year) but need facility operating	Legally No	Probably No	Probably NO*	Questionable, Depends on Structure of Arrangement	Fair	Could be slight problem

*BPU involvement is evolving

TABLE 4-1 (cont.)

SUMMARY OF WASTE CONTROL ALTERNATIVES

Waste Control Alternatives	Municipalities Involved*	Waste Control (Guaranteed Tonnage): Area	Waste Control (Guaranteed Tonnage): Types	Residents Payment Method	Disposal Fee: Municipality Pays To	Disposal Fee: Tax Deductible
Municipal Contract	All	Only enough municipalities to satisfy facility requirements	Municipal Waste Only	Municipal Tax or "Garbage District" Tax	Facility Owned/ Operator	Yes
Franchise	All	Entire County	Normally all waste	Disposal Service Fee or Municipal Tax	Franchisee (County's Designee)	Yes, if residents pay through Municipal Tax
User Charge	All	Entire County	Normally all waste	User Charge To County's Designee	Not Applicable	No

*13 communities, excluding Lakeland municipalities, which have already joined the Lakeland Solid Waste Authority

A summary of the discussion which follows is offered in Table 4-2. It identifies the four financing options in terms of key decision-making elements. As noted, the County is charged with the responsibility of guaranteeing a long-term supply of waste to the facility under any and all financing plans.

2. General Obligation Bonds. General obligation (GO) bonds are long-term, tax exempt obligations secured by the full-faith-and-credit-of political jurisdiction, which in this case would be the County. The County would guarantee a GO bond based on its ability to levy taxes on all taxable real property, (i.e. such as ad valorem taxes) as may be necessary to pay the principal and interest on the bond. With GO bond financing, the capital market would evaluate the credit worthiness of the County and would not specifically evaluate the technical, marketing and economic risks of a particular project. This is different from project financing using a revenue bond. The capabilities of the facility would still be subject to scrutiny by the County in determining whether revenues would be sufficient to minimize its obligation through taxes.

The typical GO bond is offered competitively to investment banking houses and banks (underwriters). These underwriters make sealed bids for the right to purchase and resell the bonds. Usually, firms group together to form underwriting syndicates to purchase the entire bond issue. The bidder offering the lowest net interest cost to the jurisdiction is awarded the right to place the bonds on the market for resale to prospective bondholders.

GO bonds are generally the lowest cost alternative to financing public projects. The specific interest rate as a GO bond is a function of the credit rating of the County (the issuing jurisdiction) and the availability of money in the capital market.

The use of the GO bond instrument generally means that the County has decided to build, own and operate the facility. As owner/operator, the County acquires an advantage. County ownership affords County control and flexibility over the facility and the project operations. A direct link is thus provided between the County and the service it provides its residents. As owner, however, the County also assumes full risk for the project.

Accordingly, the major deterrent to using GO bonds is that all of the risks inherent in the project, including technology, energy markets, system operation and waste control would be the responsibility of the County.

The technological risk to the County would be 100%. It must be assured that the system selected is correct, that the facility was constructed properly and that the efficiencies and system output are what were desired. As owner and operator of the facility, the County is also responsible for energy and material by-products marketing. The operating risks of the plant,

TABLE 4–2

DECISION MAKING ELEMENTS FOR FINANCING OPTIONS

	RISK ELEMENTS							
Financing Option	Technology	Facility Operation	By-Product Marketing	Long Term Solid Waste Delivery Contracts	County Ownership	County Debt	Interest Rate	Tax Benefits on Capital Asset
General Obligation Bonds	Total Risk	Total Risk	Total Risk	Necessary	Yes	Does Increase	Low	Lost
Revenue Bonds	No Risk	No Risk	No Risk	Necessary	After Debt Retirement	No Impact	Within 150-250 Basis Points of G.O.	Normally Lost
Private Financing	No Risk	No Risk	No Risk	Necessary	No	No Impact	Highest	Gained
Leverage Lease Revenue Bonds	No Risk	No Risk	No Risk	Necessary	Could After Debt Retirement	No	At or Between G.O. and Revenue Bond	Gained

including processing efficiency, productivity, maintenance, providing sufficient operational budgets, monitoring refuse truck deliveries, and locating and keeping qualified personnel of a caliber that can understand and operate sophisticated equipment, would also be the County's responsibility.

The establishment of long-term contracts with the municipalities in the County to guarantee that refuse collected in each community is transported to the designated site is a responsibility of the County. This responsibility, however, is common to any and all financing approaches.

It is possible for Morris County to contract for all of these risks, i.e., the County could retain a firm to solidify market commitments, the county could hire an architectural/engineering firm to provide design and construction management services, and it could hire a contractor to operate the plant. Nevertheless, the County retains the responsibility for success of the plant over the life of the GO bond. In the event of a civil action, the County could bring suit against the individual contractors, but any failure jeopardizing bond holder repayments still remains at the government level.

The use of a GO bonds will impact the County's debt limit. In New Jersey, the Local Bond Law permits the County to incur debt, without the approval of the Local Finance Board, of an amount not exceeding two (2) percent of the average equalized property valuations in the County. Any debt in excess of that requires approval of the Local Finance Board. Because of the magnitude of capital required in a resource recovery facility, the impact, if the debt were included in the debt of the County, would be large and jeopardize available borrowing for other capital projects under consideration.

However, if the facility can be operated on a self-liquidating basis, the County is permitted, for as long as the facility is operating successfully, to deduct the amount of debt authorized for the facility from the gross debt of the County. Accordingly, with a self-liquidating GO bond, the debt would not impact on capital project borrowing. Nevertheless, if in any future year, expenses connected with the facility exceeded the income generated, the entire remaining debt is added back into the county debt, thus reducing borrowing capacity for other projects. The tax advantages which would be available to private business such as depreciation, investment tax credit and residual ownership values are lost with a GO bond offering.

To establish the bond on a self-liquidating basis, the Local Finance Board must be satisfied. The County would prepare a project report detailing the cash flow from which the Local Finance Board would base its approval.

There have been resource recovery projects in the United States that have gone forward with GO bonds issued through agencies of the State where the risks were shared proprotionately with the municipalities served. GO bonds have been used to finance resource recovery projects in Monroe County, New York and Ames, Iowa.

In general, however, there has been a tendency to avoid GO bond approaches. Most County and municipal governments feel that resource recovery technology and market prices for energy are in a dynamic state of flux. Such uncertainities have encouraged local governments to avoid full responsibility for the risks of progress in this area of public service.

Advantages:

a. Low Interest Rates – GO bonds carry the lowest interest rate of any long-term debt instrument because the risk to the bondholder is minimal since the County guarantees repayment through its tax collecting capacity.

b. GO bond issuing procedures are well understood and require a short lead time.

c. With the GO bond approach, the County assumes direct control over the project.

d. No technical or economic analysis of the resource recovery project to be funded is required.

e. More than one project, may be grouped under one bond issue.

Disadvantages:

a. Will impact the County's debt limit.

b. All the project risks (technical system, markets, system operation, waste control) are acquired by the County.

c. Tax benefits on the capital assets (investment tax credit, accelerate depreciation, residual ownership value) are lost.

d. An authority can not issue a GO bond because it does not have the requisite taxing powers.

e. Ease of raising capital may be deterrent to full consideration of the advantages of private system operation and of the technical and economic risks of the project.

3. Revenue Bonds. Most local governments, like Morris County, are leaning towards high technology resource recovery applications, funded by revenue bonds. This reduces the local government's level of risks and conserves their debt capacity and taxing powers for other essential governmental services.

A mechanism that is becoming more frequently used to avoid the disadvantages associated with GO bonds is the revenue bond. A revenue bond is issued to finance a single project with revenue producing services.

Revenue bonds are long-term, tax-exempt obligations issued by a specific governmental agency, an independent authority or a quasi-public agency which is created specifically for the project. Revenue bonds do not have the full-faith-and-credit backing; rather, they pledge the net revenue generated by the project for repayment of the debt. The increased risk of a revenue bond offering as viewed by the prospective bond purchaser results in a correspondingly higher interest rate.

A typical revenue bond is negotiated with one underwriter rather than competitively bid. The negotiations between the local authority or project sponsor and the underwriter will include a determination of the underwriter's profit and the interest rate. Negotiated interest rates are often higher than competitive interest rates, however, the incremented costs are partially offset by the advice the investment banking firm provides during its evaluation of the project and its preparation of the revenue bond circular and official statement.

The revenue bond circular and official statement summarize for the prospective bondholders the technical and economic feasibility of the project. The local authority usually hires a "third party" consultant to confirm the underwriter's costs and revenue estimates.

The principal reason for the attractiveness of revenue bonds in financing resource recovery is that it allows the participants to share in the risks and rewards of a project. Revenue bond financing allows for flexibility in structuring the financial package and the laws of the State of New Jersey provide a number of methods through which revenue bonds can be issued. Accordingly, arrangements for ownership, operation and control of the project can be negotiated as desirable to achieve the maximum benefit to both the County and any private firm. Ultimately, the participants in the transaction are in a better position to share the risks and economic benefits of the project.

Since revenue bonds are issued by an authority or specific agency without taxing power to secure the debt, they typically have interest rates 100 to 150 basis points higher than that of GO bonds. The incremental cost can be minimized with sound contractural agreements and financially secure project participants.

Prior to the issuance of a revenue bond, a comprehensive analysis of the facility plans and of the risks is required. Results are set forth in a prospectus or official statement which would be distributed in connection with the issuance of the bonds. It is essential that the revenues be sufficient to support the project. The technical and economic analysis gives particular emphasis to the technology, energy markets, level of waste control, operating expertise and efficiency.

The County is in a far different position of risk with revenue bonds than with GO bonds. Of the four basic areas of risk – technology, energy markets, system operation and waste control – only waste control is ultimately the County's responsibility.

The County must control a waste stream of sufficient quantity to meet the operational capacity of the plant. This contract guarantee will specify a mutually agreed upon tonnage (a daily or weekly average) to be delivered to the facility. This point cannot be over-emphasized, for it is paramount to the success of the project. Failure to deliver this tonnage would proportionately decrease the revenues to the project. As mentioned in the previous section of this report, the investment community may want a "put or pay" provision in the contract which states that should the County (via the users or municipalities) fail to deliver a specified tonnage in a specified period of time, they are required to pay as if it were delivered.

With revenue bonds, the technology risk is not assumed by the County or its designee, rather, by the resource recovery firm selected through evaluation by the County's designee. The resource recovery firm typically provides a performance quarantee as part of its contractural commitments. Likewise the marketing-related and operational risks are the responsibility of the private operator.

Even though the County or its designee is not liable for project risks beyond quaranteeing delivery of refuse, it will be evaluating risk elements for the purposes of resource recovery system procurement, overall system management and County participation in contract negotiations. The timing of full system operation and its operational capacity will be carefully analyzed in order to facilitate smooth interfacing with other disposal operations in the area.

The County should share in the gross revenue derived from tipping fees throughout the length of the contract, since it is responsible for waste delivery.

With revenue bonding, equity participation by the resource recovery firm is possible. Since many of the companies in the industry do not like or would not bid if equity participation is mandatory, most local governments, through their designee, will offer this as an option, which a proposer may take advantage of through an alternative bid. The benefit to the County, if this occurs, is a reduction in the amount of debt requested in the bond issue and a possible reduction in operational expenses. This option should be carefully reviewed during the preparation of the County's Invitation for Bid.

The majority of resource recovery projects have been and will likely continue to be financed with revenue bonds. Table 4-3 illustrates the preference of revenue bonds for financing resource recovery projects in the United States. As more facilities demonstrate reliable performance, the need for the more secure GO bond approach will diminish in favor of the revenue bond approach, with its risk and reward sharing characteristics.

Advantages:

a. Relatively low interest rate (compared to private financing) because interest on debt is tax-exempt.

b. Does not impact on the County's debt limit.

c. Bond repayment is provided through project revenues.

d. Provides a balance of risk and economic benefits among the key project participants.

e. Issuance of a revenue bond requires detailed documentation of the project's technology, products and economic viability, therefore, fostering responsible decision-making.

Disadvantages:

a. Interest rates are somewhat higher than that for GO bonds.

b. May only be used to finance a specific project.

c. Requires more time to arrange.

d. Tax benefits (investment tax credit, depreciation and residual ownership benefits) are normally lost.

A revenue bond is issued by an authority, a distinct local government agency or a quasi-public organization created for management of the project.

4. Private Financing. Private financing is a third alternative for financing a resource recovery facility. In this approach, the County would contract with a private firm for solid waste management services. The private firm would then raise the capital, purchase the equipment, construct the facility and operate the system.

TABLE 4–3

FINANCING MECHANISM USED FOR RESOURCE RECOVERY PROJECTS

LOCATION	COMPANY	PUBLIC AGENCY	TYPE OF FINANCING
Saugus, Massachusetts	Refuse Energy Systems (Wheelabrator-Frye/M. DeMatteo Co.)	Saugus Industrial Financing Authority	Private Equity and Revenue Bonds
Bridgeport, Connecticut	CEA/OXY Petroleum	Connecticut Resource Recovery Authority	General Obligation Bonds
Newark, New Jersey	CEA/OXY Petroleum	City of Newark	Private Financing
Hempstead, New York	Hempstead Resource Recovery Company (Parsons & Whittemore)	Town of Hempstead Industrial Development Agency	Revenue Bonds
Nashville, Tennessee	Nashville Thermal Transfer Corp.	Nashville Non-Profit Company (City of Nashville)	Revenue Bonds
Milwaukee, Wisconsin	Americology (American Can Co.)	City of Milwaukee	Private Financing
Monroe County, New York	Raytheon Services Corp.	County of Monroe	General Obligation Bonds
Akron, Ohio	City of Akron	Ohio Water Development Authority	Revenue Bonds
Dade County, Florida	Black-Clawson (Parsons & Whittemore)	Florida "Decade of Process" Agency	Revenue Bonds

In the event that a particular geographic area provides benefits which the private financial community views as outstanding, it is likely that there will be private business concerns which are willing to finance a facility. The County should explore this approach and offer it as an option when it solicits Invitations for Bid.

Interest rates, as compared to GO and revenue bonds, are substantially higher, since the tax exempt feature of public sector borrowing is not available. Most of the private firms in the industry may have internal complications in borrowing money of the magnitude required for construction of an resource recovery facility. Private sector capital programs dictate that the projects with the highest rate of return on investment (ROI) GO forward, assuming the risks are equal. If a private firm has an opportunity to invest in a non-resource recovery project with a high ROI, then it must also structure a correspondingly high ROI in its bid for a resource recovery project or forego the private financing approach.

In the event that private financing is obtained the risks involved in connection with technology and operation fall to the private entrepreneur rather than the County. However, as in the other methods discussed above, the County or its designee must secure control over the waste stream.

With private sector financing, the County would be relieved of having to devote capital bonds to the project, therefore, the County's debt would not be affected. The ownership of the facility generally remains with the private company after the contract life. The County could include a provision in the bid documents requesting that a County purchase program be established after the private company retired its project debt.

The tax incentives and benefits available under the Internal Revenue Code would be available to the private company. The tax savings will reduce costs to the company, however, the ROI required would more than offset these savings.

Private financing is primarily used in political jurisdictions with poor credit ratings or where the local government decides not to risk any money in solid waste management. Without assuming some risks, the local government foregoes the right to any future benefits associated with the solid waste system and forces higher service costs (except where host community benefits such as free or low cost disposal are provided).

Resource recovery facilities are privately financed either by a resource recovery system's developer or a facility by-product market user. Some firms with proprietary systems have privately financed one of their first installations for the purposes of penetrating the market and demonstrating their level of commitment. Once established, the firm may seek partial tax exempt funding on future projects in order to reduce their own capital outlays.

The Newark Resource Processing Facility will be financed privately by the system developers, Combustion Equipment Associates and OXY Petroleum. Another privately financed resource recovery facility is in the City of Milwaukee. The Milwaukee plant is the first one constructed by Americology, a division of American Can Company.

The largest, 2,200 ton per day, facility privately financed to date will be in Niagara Falls, New York. Hooker Chemical Company will build, own and operate the RDF facility and use the steam produced at their manufacturing site.

Advantages:

a. County does not contribute any capital funds.

b. Risks involved with system ownership and operation reside with the private firm. (The County, however, must secure control over the waste stream).

c. Tax benefits available to the private sector are gained.

Disadvantages:

a. The high cost of capital is reflected in higher service fees.

b. Potential benefits of future operations (e.g., higher revenues from escalating energy prices) are not shared with the County as much as they would be under alternative financing mechanisms.

c. County must locate an acceptable firm and negotiate a contract.

5. Leverage Lease Revenue Bond. A thorough investigation of leverage leasing will be warranted if the County selects revenue bonding as the financial instrument for capital formation for the resource recovery project. For the purposes of this report, however, it is important to compare leverage leasing with the other financial instruments and identify its unique features.

Leverage leasing is not a specific financial instrument but instead a financial package that combines several financial options. Bascially, it is a modification or refinement of revenue bonding applications. The arrangement involves the pooling of private and public sector funds to the benefit of both parties. The concept is based upon the benefits (lower costs for long-term capital and interest) that accrue to the local government when a financial intermediary is interposed between the long term source of capital (a bond) and the local government.

Normally 70 to 80% of the capital requirements are raised through a municipal revenue bond offering with its tax-exempt feature. The balance of the required capital (20 to 30%) is contributed by a private corporation or individual to gain the tax benefits available under current Internal Revenue Service rulings. This financial intermediary would receive the tax shelters (investment tax credits, accelerated depreciation and residual value of the plant) in return for furnishing "up-front" equity in the project.

Leverage leasing is an extremely complex mechanism to arrange. The legal contracts and the terms of agreement binding the County, the financial intermediary and the company operating the facility are complicated and take a great deal of time to formulate. Once negotiated, IRS rulings are required, adding possibly six to nine months.

The cost of financing with this hybrid of revenue bonding could equal general obligation bonding or be slightly lower, depending on the project appraisals prepared by the investment community, the combined credit rating of the project participants and the specific contractural agreements between major participants.

The risk to the County, as before, involves controlling the waste stream. All other risks associated with the project are assigned to the facility operator in much the same way as revenue bonds.

Leverage leasing presents a very positive cost picture of raising money for capital intensive projects. The prime cause for its slow acceptance is that the financial intermediary (equity participant) requires an indemnification clause for his commitment. In the event that the facility should fail during the course of the contract, the equity owner becomes liable to the Federal government for all tax savings accrued during the term of operation, assuming the asset has not been fully depreciated. The sheltered taxes then become payable in the year of failure. To protect himself against this possibility, it is normal for the equity owner* to ask to be indemnified by one of the involved parties for any tax losses.

Generally, the County's designee or the firm would be the one required to compensate the injured party. The amount of compensation could place the County's designee in a financially diasterous position, since the tax savings to the equity owner are substantial. The normal payback periods for the capital associated with this arrangement are no more than five years.

The complexity of this mechanism, therefore, must be weighed against the financial benefits to the county's designee and the people it serves. Consequently, full details must be provided in the Invitation to Bid and be thoroughly supported in the bidder's response to the County's designee, in order for a proper evaluation to occur.

*Equity owners must also keep abreast of changes in the tax laws to assure that new reforms do not impinge upon their involvement.

Leverage leasing has not been successfully applied to any resource recovery financial package to date. In fact, it has rarely been applied to any municipal projects in the United States. Nevertheless, this type of financing will gain popularity as an increasing number of plants demonstrate technical and market reliability.

Advantages:

a. Maximum utilization of tax shelters with benefits of tax-exempt revenue bond financing.

b. Reduces demand on County capital bonds.

c. Interest rate on entire financial package could equal or be lower than that for GO bonds.

d. County risks are low, i.e., only waste control, like that with a revenue bond approach.

e. Debt retirement is provided through long-term lease payments from the operating company.

Disadvantages:

a. Legally complex; time consuming to formulate and to gain IRS approval.

b. If the project failed, the indemnification clause required by the financial intermediary would severly constrain the County and/or the operator financially.

c. No applications in resource recovery financing to date.

6. Conclusion. General obligation bonds, revenue bonds and private financing have all been used to finance resource recovery projects. Leverage lease revenue bonds have not had an application in resource recovery project financing, but their future is promising. The decision on selecting the most appropriate method for Morris County rests with the trade-off of cost to the County versus the risks to the County.

GO bonds have the lowest interest rate, while private financing has the highest. With GO bonding, the County assumes full liability for the entire project, versus no liability (with the exception of waste control) under the other three options. Furthermore, a GO bond is the only financial instrument that will increase the County debt. The revenue bond offers an attractive balance of cost and liability to the County. The only risk is in guaranteeing a long-term supply of waste to the facility, a risk common to any financing approach.

Final decision on which financing method to be utilized should be made by the County, as the development of the resource recovery facility continues in the next several years. Which financing is eventually utilized will depend on the administrative agency selected to operate the status of waste stream control, and the level of bonded indebtedness already incurred by the County.

C. ADMINISTRATION AND MANAGEMENT OPTIONS

Before any county-wide solid waste system can be implemented, an implementation agency with requisite financial, jurisdictional, legal and operational capability is required. The county-based institutional structures available under New Jersey statutes are:

- County Department
- County Municipal Utilities Authority
- County Improvement Authority

Other institutional structures, based on aggregating municipalities, may be created to implement and administrate solid waste systems. The three major State Statutes concerning solid waste disposal as a multi-municipal basis are: (1) Incineration Authorities Law of 1948, (2) Solid Waste Management Authorities Law of 1968, and (3) The Consolidated Municipal Services Act. These structures, however, are not well-suited to a county-wide setting and will not be discussed.

The selection of an effective implementation agency should be made soon if the County is to achieve control over the waste stream in time for implementation of a major resource recovery system in the near future. A discussion of the requisite areas of responsibility that should be considered in selecting an institutional body follows.

—Financial Capabilities. While there are differences between the technical alternatives for solid waste management in terms of capital and operation and maintenance costs, the implementation agency must have the resources to meet these costs or be capable of acquiring them. Costs for solid waste processing and disposal facilities do not, at present, qualify for Federal or State funding such as is available in the wastewater treatment area. Accordingly, the costs of implementing regional solid waste/resource recovery systems will fall most heavily on counties, large cities or their designated authorities. Thus, the institutional body will be responsible for working closely with the investment banking community and local agencies in the preparation of a financial package. Each type of implementation agency has capital acquisition methods specific to its structure. If revenue bonds are to be used to finance the project, then the legal body must be an authority of some kind.

—Contractual Vehicle. An institutional body is necessary for procurement of the facility, to act as the vehicle for contracting, bid documentation and legal obligations between the various participants in the resource recovery project. The County's designated agent would also petition the Board of Public Utilities for a franchise, establish a user charge system and/or negotiate contracts with municipalities in the County. It must have the power to make these contractural obligations for a long time period (20 years or more).

—Control of Waste Stream. The implementation agency selected must have sufficient flexibility and authority to gain long-term waste control. Much difficulty and time is involved in establishing control over the sources, types and quantities of solid wastes entering the designated processing and disposal sites.

—Market Commitments. While the designated government agency is not ultimately responsible for facility by-product market arrangements, unless GO bonds are used, the development of markets for energy and materials up to and including the commitment stage (pre-contract stage) is important. The more the specific markets are developed and understood, the more detail the County's Invitation for Bid can be. In turn, responses from the resource recovery industry will be more definitive and easier to evaluate on an objective basis.

—Ability to Acquire Land. Generally, a public body has the legal ability to acquire property for a solid waste/resource recovery facility. The problem stems in overcoming public resistance to siting certain facilities in certain locations. New Jersey State laws allow governmental units and authorities to acquire land either by agreement with the owner(s) or by exercising their power of eminent domain. The difference between the alternative institutional structures is in the number of approvals required to site facilities.

Alternative implementation agencies which could be utilized in Morris County are discussed below.

1. County Department. The County Solid Waste Disposal Financing Law (NJSA 40:66A-31.1 et seq.) could be used by the County to create a new County department to handle solid waste management. The law allows the County to plan, finance and construct solid waste facilities. As such the County may contract with any government, private individual or corporation for the delivery, collection, processing and/or disposal of solid waste. This includes municipalities in the County and any adjoining county.

Financing of facilities may be affected through GO bonds, leases, grants and user fees for services. Revenue sharing funds may also be employed. Revenue bonds, however, cannot be issued. As previously mentioned, the County would have direct control over the system, but it would also assume all associated risks as legal owner/operator.

The County may acquire land by gift, purchase, lease or eminent domain, but governmental land not owned by the County cannot be acquired without the consent of the owner. Existing facilities owned by the private sector may be purchased at a mutually satisfactory price. If the parties fail to reach a price, even after submission to an arbitration board, the County may exercise its powers of eminent domain to obtain the property. The DEP must approve any solid waste facility plans and sites.

2. County Authority. A County Municipal Utilities Authority (MUA) or a County Improvement Authority (NJSA 40:37A-45) can be used to implement the Plan and supervise the solid waste management system. The powers provided to each are similar in terms of administrative structure, financing, contract negotiations, enforcement and land acquisition. With respect to a County MUA, Chapter 384 of the Laws of New Jersey of 1977 became effective on February 10, 1978 requiring some County Sewerage Authorities to reorganize as Municipal Utilities Authorities. Provisions of the MUA Act were expanded to include solid waste with Section 24 authorizing an MUA to undertake the financing of a solid waste facility as a general improvement.

Financing of solid waste facilities would be through the issuance of revenue bonds and/or private financing. Revenues to retire the debt would be generated from service contracts with participating municipalities and from energy and material product sales. An Authority can also purchase capital assets with income, leases and grants.

Contractural powers are broad, as an Authority may enter into all contracts necessary for fulfillment of its responsibilities. Enforcement powers would be established through the municipal contracts and user agreements negotiated with the municipalities. An Authority may acquire property by purchase, gift, grant or condemnation.

The basic difference between a County MUA and a County Improvement Authority involves site selection procedures. For an MUA, solid waste/resource recovery facility plans and sites require the approval of DEP. For an Improvement Authority, site selection requires the approval of the DEP plus municipalities comprising at least 75% of the County's population and the County Planning Board. These additional approvals could delay or modify implementation of specific elements of the Plan.

In general, a County authority has advantages over the County department. It provides the County with a vehicle to assume control over the solid waste system yet the County does not incur any financial obligations. An Authority would only assume liability in the area of waste stream control.

Since many obstacles have occurred in the past as new authorities and departments have been created to handle water and wastewater disposal problems in New Jersey, it is recommended that there be a maximum amount of interchange between municipalities and the County, as a final decision is reached on the implementation agency. A County decision with widespread municipal support will facilitate the sound creation of a legal body, with subsequent execution of municipal contracts for waste disposal at a new County facility. It should be noted that the existing County MUA (which currently is involved with water utility operations) could be designated as the implementation agency, negating the need of creating a new agency. Further, if the MUA or other implementing agency obtained a waste disposal franchise in the near term, it would be possible to execute control over importation and exportation of wastes, assuming that proper legal agreements could be reached between the implementing agency and the landfill operators.

D. RATE AVERAGING

One concept which has recently been advanced to economically allow for improvements in the solid waste disposal system is the concept of rate averaging. Under rate averaging systems, all disposal facilities charge one set unit tipping fee for disposal (say "X" dollars per cubic yard). All of the fees collected are pooled together to cover the operating costs of all the facilities. If rate averaging were in effect in a given disposal district, it would make no difference whether wastes were delivered to a conventional landfill, a controlled landfill, or a resource recovery facility; all would charge the same tipping fee.

Rate averaging as a public and municipal utility rate structure is not new. Nearly all electric and water utilities, as well as some sewerage utilities charge a uniform fee for service rendered regardless of the proximity of the users to the wells, generating station, or treatment plant. Rate averaging offers a reasonable solution to the problems that occur when some localities have to pay substantially higher disposal costs as new disposal facilities open, while other communities pay a fraction of these costs since their conventional landfills have not yet reached capacity. It should, however, be noted that the substantial rate differential that currently exists between conventional and controlled landfills will be narrowed within five years, as all conventional landfills will face substantial upgrading costs as a result of federal programs under the Resource Conservation and Recovery Act (RCRA). Under RCRA, most existing conventional landfills will be given five years to upgrade or be closed.

Rate averaging can be imposed over an entire county, over more than one-county, or over individual solid waste districts within a county. The final decision on where or when to implement rate averaging should rest with the agency selected to implement the solid waste management plan. Imposition of true rate averaging within a district may require the obtaining of a disposal franchise, to avoid institutional problems associated with dividing up collected revenues between private operators. After obtaining a franchise, the implementing agency could contract with private operators to run disposal facilities if desired for a specific fee, with the agency collecting revenues and tipping fees itself. The disposal facility would receive its contracted fee for disposal facility operation.

In essence, rate averaging of sorts may be introduced shortly in Morris County. Comb Fill Corp., owners and operators of the Chester Hills and Mount Olive landfills has proposed an equalization of tariffs at both facilities. Thus, substantially increased costs for environmental improvements proposed for the Mount Olive site will not fall only on municipalities and collector/haulers using that site. Rather, the tariff proposes a more moderate cost increase, which would be born equally by the users of both facilities.

E. COORDINATION WITH REGULATORY AGENCIES

1. Hackensack Meadowlands Development Commission (HMDC). With the current situation regarding solid waste disposal in Morris County, it is very important that the existing disposal facility in Mount Olive not be subject to further overloading. The HMDC Solid Waste Management Plan, however, calls for the exclusion of five municipalities in Morris County from continued dumping in Hackensack Meadowlands District Landfills. With the current institutional system of BPU registered landfills having to take all loads, the HMDC plan will undoubtedly result in increased disposal loadings at the Mount Olive facility, if implemented.

An even more problematic aspect of the HMDC plan involves the closure of HMDC disposal facilities (except for the HMDC baler and proposed Kingsland Lagoon Landfill) at the end of 1979. Such a closure could result in vastly increased waste quantities being delivered to the Mount Olive site for disposal from Passaic, Essex, and Union County communities, which may not be provided for in the HMDC Plan after the existing landfills close. This would seriously aggravate the existing situation at the Mount Olive landfill, where problems have already been experienced in just keeping up with increasing waste quantities.

It is the recommendation of this plan that HMDC be required to continue to provide for disposal capacity until alternatives for environmentally sound disposal or resource recovery can be implemented. It makes little environmental sense to send additional quantities of solid wastes to landfills located in the headwaters of the areas' water supplies until the landfills can be properly upgraded (which is proposed). On the other hand, continued disposal in the Meadowlands area would not be expected to have a substantial impact on water supplies, since the landfills are situated in salt water or brackish marsh areas. The HMDC should reconsider its position on exclusion of Morris County and other counties' wastes from district landfills, and instead should provide for a more orderly transition to resource recovery, avoiding the creation of additional problems in the near-term.

2. Department of Environmental Protection (DEP). The role of the DEP regarding the regulation of the solid waste management system in Morris county is as follows:

- registration of solid waste facilities and collector/haulers.
- administration of the hazardous waste "manifest" system and annual waste survey of waste generation, collection and disposal.
- review and approval of engineering plans for landfills, transfer stations, and resource recovery systems.
- inspection of solid waste transfer and disposal facilities with respect to enforcement of state regulations for operation of such facilities.
- review of solid waste management plans.

The section of the Department of Environmental Protection having prime administrative authority in the solid waste area is the Solid Waste Administration (SWA).

The ongoing regulatory programs of the SWA have had a substantial effect on the solid waste management system in the past decade. The closure of landfills has transformed the County disposal situation from one of numerous private and municipal landfills to one of reliance on only two private landfills. The most significant change in the disposal picture occurred when the Fenimore Landfill in Roxbury Township closed after the SWA rejected an expansion and upgrading plan and ordered closure after nearly two years of litigation and review. The SWA indicated that disposal alternatives to the Fenimore facility were available in Morris County.

Although alternatives were indeed available, the closure ordered by the SWA was ill-timed. When the closure occurred, the landfill had just been purchased by the current owner, and the waste volume quickly doubled with no warning. The equipment that the landfill had on-hand was inadquate to handle the additional load. This situation could easily have been avoided had adequate warning been given or had the Fenimore facility remained open another month or two. In the future, situations such as this should be avoided by closer coordination between the SWA, the County, and the facility operators.

Many complaints voiced about the DEP in general, in the past have centered around the decentralization of the various divisions of the DEP (air, water, solid waste, stream encroachment, etc.). Recently, much progress has been made in expediting and coordinating the departmental review process for proposed solid waste facilities. With continuing progress in this regard, regulatory delay should not interfere with the timely development of resource recovery systems.

3. N.J. Board of Public Utilities (BPU). The BPU is responsible for the economic regulation of landfills and collector/haulers in New Jersey. BPU regulates tipping fees at landfills, and collector/hauler charges for collection service. Since it is obvious that there will be substantial increases in disposal costs in the next decade, it is suggested that the BPU expedite collector/hauler requests to allow for increases in collection charges as a result of increased disposal costs. While it is recognized that BPU will not grant automatic "pass-throughs" of increased disposal costs, one option that could be considered would be as follows:

- as soon as approval is granted for increased disposal tipping fees, all collector/haulers using that facility are immediately notified that rates are to be increased after a 90 day period.

- all collector/haulers have two weeks to file for an increased collection tariff, which would could be collected starting at the same time as the disposal cost increase.

- BPU would screen all proposals, and act on the less complex increases before the 90 day period is up.

It is understood that the BPU is already expediting collector/hauler tariff increases to the extent possible. Continuation of this policy will assure that undue financial hardship is not placed on medium and small collector/haulers as disposal costs increase.

The BPU will also be called upon at some point in the early part of the planning period to grant a franchise to the County designee (or agency responsible for implementing this Plan). With the current solid waste management situation in Morris County, the granting of such a franchise will be fundamental in guaranteeing waste flow to resource recovery systems. To avoid adverse municipal and private sector reaction before the franchise application is acted upon, it is recommended that a public relations program be undertaken to gain the maximum amount of municipal and private sector support prior to applying for the franchise. If resource recovery development can take place with allowances for maximum public education coupled with reasonable allowances for the municipalities and private sector to increase their tariffs and taxes accordingly, it stands a much better chance of implementation. Further, near term source separation programs can go a long way in demonstrating the viability of resource recovery to the public. Lack of attention to these important public education and institutional issues has been one of the prime causes of the failure of resource recovery development in many states, including New Jersey.

4. U.S. Environmental Protection Agency (USEPA). The direct role of the USEPA in the development of a resource recovery facility will probably involve grants and/or implementation assistance. An indirect role* of the EPA will be in the issuance of air emissions permits for resource recovery plants, should the selected technology require air emissions.

It is recommended that the USEPA do everything possible to assure that resource recovery plants are issuedthe requisite air permits on a timely basis. Air enforcement programs which resulted in the wholesale closure of incinerators in the past decade have resulted in large quantities of solid wastes being placed in uncontrolled landfills, many of which were never designed to handle the large volume increases experienced. Thus, the short-term goal of decreased air pollution was not properly balanced against the resulting effects of possible long-term groundwater supply contamination. It would be hoped that a special Federal program could be developed to reduce the dependence on landfills by expediting air permits for incinerators as long as they meet basic emissions standards. Not allowing or delaying construction of resource recovery plants because air in a whole geographic region is of insufficient quality to meet Federal standards will only result in more solid wastes being placed in inadequate landfills, a much more serious and long-term environmental problem, than limited contraventions of air quality in a small area.

5. Coordination With Other Solid Waste Planning Districts. Morris County receives solid wastes from the following Districts: Union (122 tons per day); Somerset (50 tons per day); Essex (11 tons per day); Hunterdon (8 tons per day); and Sussex (7 tons per day).

Those municipalities in Union, Somerset, Hunterdon and Sussex Counties presently using landfills in Morris County should be allowed to continue to do so, prior to the implementation of resource recovery (high technology, energy recovery) facilities. At such time that resource recovery facilities are available for Union and Somerset Counties, the disposal of wastes from those counties in Morris County should cease. Additionally, it appears that it would be most efficient for Hunterdon County to send its wastes to a resource recovery facility in either Somerset or Middlesex County, and to end waste disposal in Morris County at that time. It is assumed that Union, Somerset and Hunterdon Counties will be working toward a 1985 implementation date for resource recovery. The disposal of Sussex County wastes in Morris County landfills can remain at present levels until implementation of resource recovery in 1985. If Sussex has decided to participate in this resource recovery system, the quantity of wastes coming to Morris from Sussex may increase in 1985.

*Federal Air Programs (Except for Prevention of Significant Deterioration) are administered by the DEP in New Jersey.

Allowances for the continued disposal of out of county wastes in Morris County are based upon the following assumptions, a change in any of which may necessitate a withdrawal of such allowances.

a. The Combe-Fill Landfill in Mt. Olive is granted an expansion and does not cease the acceptance of waste for any period of time prior to expansion.

b. Hamm's Landfill in Sussex County does not close as ordered until new landfill capacity in Sussex County for all wastes going to Hamm's can be provided.

c. No unanticipated increase in out of county waste disposal (including residue and nonprocessible waste from resource recovery facilities) occurs in Morris County.

Appendix 4 contains copies of the letters exchanged between Morris and sending counties on the issue of waste disposal.

F. DISCUSSION OF PROVISIONS FOR PLAN UPDATE AND ENFORCEMENT

Under Chapter 326, each solid waste management plan is to be updated every two years, as a minimum. (Plans can actually be updated at any time) For the Morris County Solid Waste Management Plan, responsibility for updating should remain the responsibility of the County Planning Board (under whose jurisdiction this plan was prepared), in cooperation with the Solid Waste Advisory Council. It should be noted that the Morris County Solid Waste Advisory Council is expected to continue an active role throughout the planning period. Following the creation of a new County authority or department ot handle solid waste management, the new agency would assume responsibility for updating the plan. It is assumed that following the next two year update by the Planning Board, responsibility would be turned over to the new agency.

G. IMPLEMENTATION SSCHEDULE

To implement this solid waste management plan, action will be required both on the part of Morris and/or Passaic Counties, counties to the west of Morris and private landfill operators. The schedule for resource recovery implementation is shown in Figure 4-3. As shown in the Figure, the next step in resource recovery system development will be feasibility studies. Feasibility studies will be required for both the Paterson RRF and the Landing RRF. The Landing RRF feasibility study should be undertaken by Morris County, either jointly or in cooperation with Picatinny Arsenal.

It is expected that the Paterson RRF feasibility study will be undertaken by the City of Paterson or County of Passaic. As soon as the feasibility studies are completed, final decisions can be reached by the County on which system(s) are to be constructed to handle the County's wastes starting in 1985.Items to be included in the feasibility study(ies) are as follows:

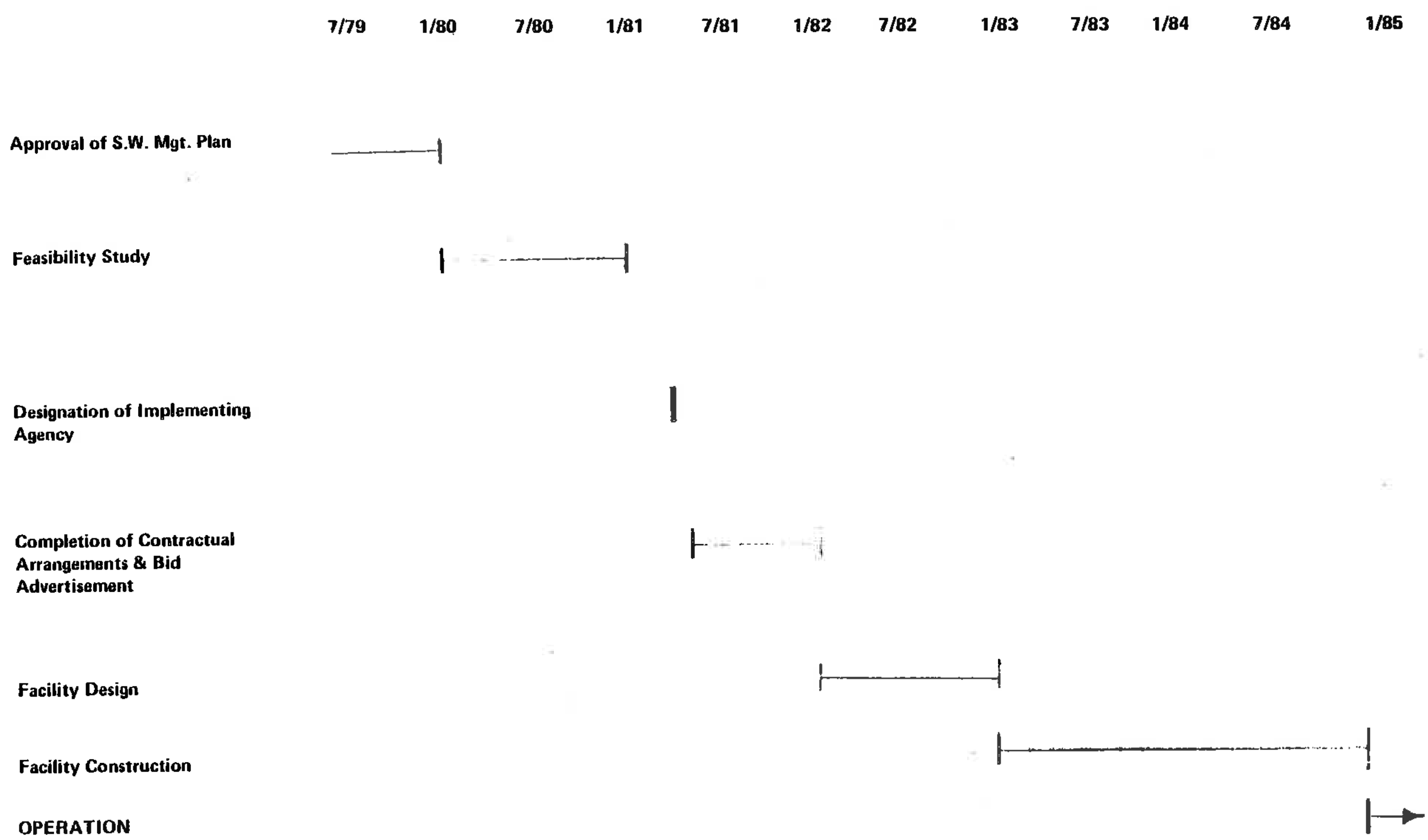


FIGURE 4–3
IMPLEMENTATION SCHEDULE
RESOURCE RECOVERY SYSTEM DEVELOPMENT

- Reexamination of waste flows.
- Evaluation of waste controls.
- More detailed site investigations, including soil borings, access locations, checking of area bridge and weight limits.
- Coordination and meetings with local officials.
- Further meetings with and identification of energy and/or material user(s). Obtain necessary letters of interest.
- Investigation of site utilities.
- Site selection.
- Construction recommendations - environmental and engineering.
- More detailed financial feasibility analysis.

Following the designation of an implementation agency in 1981, contractural arrangements with energy and/or material users would be completed. Bid advertisement for facility construction would take place between April 1981 and January 1982. Following completion of facility design by late 1982, the facility would be constructed during a two year period ending early in 1985.

To accomplish landfill expansion and upgrading, action will also be required by the landfill owners. It should be noted that partial environmental controls (runoff diversion and leachate handling systems) have already been constructed at both facilities. As part of the proposed expansion for the Mt. Olive facility, it is assumed that upgrading will take place. Pending the approval of expansion plans by the SWA by December 31, 1979, it is assumed that upgrading would take place during the next two years, being completed by late 1982. Following completion of work at the Mt. Olive facility, attention should then be turned to upgrading the Chester Hills facility, to meet Resource Conservation and Recovery Act time limitations for upgrading.

Upgrading schedules are dependent on the timely approval of expansion and upgrading plans by DEP/SWA and approval of rate increases to cover the improvements by the BPU. Further, BPU action will also be required to allow service limitations at either or both facilities while expansion is underway. It is anticipated that disposal service at both landfills will be needed through 1985, but a partial shift in the disposal load to the alternate facility as upgrading is undertaken will help to assure that upgrading can be completed in a timely manner.

APPENDIX 1

Population Projections
Land Use and Development Trends
SWA Waste Definitions
Collector/Haulers Operating in Morris County
Sample Copy — Chamber of Commerce Waste Information
Energy Market Questionnaire
Materials Market Questionnaire
Industrial Waste Generation Questionnaire

LAND USE AND DEVELOPMENT TRENDS

Morris is a County of transition between the urban development patterns characteristics of New Jersey's northeastern counties, and the rural nature of those in the northwest. The predominant type of land use is suburban residential, which in turn has attracted increasing amounts of commercial development. There is a marginal amount of heavy industry, although office buildings and some light industry are now developing in the county. The latest comprehensive land use data for each of the County's municipalities was compiled in November, 1973. This survey was made using the U.S. Bureau of the Census Geographic Base File and real property tax records. The Geographic Base File is essentially a computer image of a map containing the streets, waterways and political boundaries of the County with related information appended. Results of this study are presented in Table 1. The primarily residential nature of development trends in Morris County is expected to continue, although the pace has slowed considerably since the 1960's and early 1970's.

a. Commercial and Industrial Development.

Commercial and industrial development in the County has taken place primarily in the area bounded by the Butler, Netcong, Chatham, triangle, and along the transportation routes. In addition, a lesser amount of growth has occurred in the western part of the County especially in Mt. Olive Township. However, commercial and industrial growth is expected to concentrate in areas of presently existing development as described above. It is anticipated that this type of development will occur at a rate of 2.5 million square feet per year during the 1980-90 period. At a rate of five employees per 1,000 square feet of office space, as many as 12,500 jobs may be associated with this development. Offices and research and development facilities are expected to predominate along with some light industry. The Free Trade Zone in Mt. Olive Township is an example of the latter type. It is expected to total 2.2 million square feet and to employ as many as 3,000 people by the mid-1980's. Ancillary activities such as restaurants and hotels are expected to be attracted to areas where new commercial and industrial development occurs.

b. Transportation and Utilities.

A transportation and utility structure has developed in the County to serve the existing residential, commercial and industrial development. Transportation patterns accentuate an East-West flow, with Routes 10, 24, 46, 80 and 280 all oriented in that direction. Route 23 runs in a northwest to southeasterly direction through northeastern Morris County. Routes 287, 206 and 15 represent the major North-South corridors. These major arteries are experiencing

LAND USE PERCENTAGES (NOVEMBER, 1973)

	Vacant	Residential	Farm	Commercial	Industrial	Apartments	Exempt
Boonton	27	46	0.4	4	4	1.0	17
Boonton Twp.	25	59	6	0.4	3	3	7
Butler	19	53	0	7	9	1	10
Chatham	6	57	2	6	1	2	27
Chatham Twp.	17	37	7	4	0.3	0.2	33
Chester	12	27	25	32	0	0.1	4
Chester Twp.	14	21	45	1	1	0	19
Denville	38	35	1	7	2	0.2	11
Dover	14	41	0	8	5	1	31
East Hanover	33	23	8	15	9	0	13
Florham Park	22	25	0	18	17	0	18
Hanover	36	24	0.5	4	15	0.1	21
Harding	12	38	9	1	0	0	39
Jefferson	53	29	0.1	6	0.3	0	11
Kinnelon	58	24	0	14	0	0	4
Lincoln Park	53	18	8	7	3	0.7	10.1
Madison	9	65	1	5	0.1	2	19
Mendham	17	46	25	1	0	0.1	11
Mendham Twp.	29	45	15	1	0	0	9
Mine Hill	55	26	1	6	0	0	12
Montville	38	34	15	5	3	0	5
Morris Plains	24	42	0	9	14	0	11
Morristown	13	31	0	29	1	3	24
Morris Twp.	21	45	3	5	5	0.2	21
Mountain Lakes	19	37	1	2	0.3	0	40
Mt. Arlington	31	36	0	6	16	2	10
Mt. Olive	49	16	18	4	3	0	11
Netcong	29	43	0	9	6	0	13
Par-Troy	29	31	1	17	5	1	16
Passaic	35	26	14	4	1	0	15
Pequannock	31	42	6	6	4	0	11
Randolph	40	34	9	5	2	0.2	9
Riverdale	41	31	0	18	6	0.1	4
Rockaway	24	37	0	12	10	2	16
Rockaway Twp.	53	18	0.5	4	11	0.1	14
Roxbury	36	30	4	6	10	0	14
Victory Gardens	10	61	0	4	13	0	8
Washington	24	25	46	1	0.5	0	4
Wharton	41	30	0	4	11	1	13

LAND USE PERCENTAGES (NOVEMBER, 1973)

	Vacant	Residential	Farm	Commercial	Industrial	Apartments	Exempt
Boonton	27	46	0.4	4	4	1.0	17
Boonton Twp.	25	59	6	0.4	3	3	7
Butler	19	53	0	7	9	1	10
Chatham	6	57	2	6	1	2	27
Chatham Twp.	17	37	7	4	0.3	0.2	33
Chester	12	27	25	32	0	0.1	4
Chester Twp.	14	21	45	1	1	0	19
Denville	38	35	1	7	2	0.2	11
Dover	14	41	0	8	5	1	31
East Hanover	33	23	8	15	9	0	13
Florham Park	22	25	0	18	17	0	18
Hanover	36	24	0.5	4	15	0.1	21
Harding	12	38	9	1	0	0	39
Jefferson	53	29	0.1	6	0.3	0	11
Kinnelon	58	24	0	14	0	0	4
Lincoln Park	50	24	3	9	2	0.2	6
Madison	9	65	1	5	0.1	2	19
Mendham	17	46	25	1	0	0.1	11
Mendham Twp.	29	45	15	1	0	0	9
Mine Hill	55	26	1	6	0	0	12
Montville	38	34	15	5	3	0	5
Morris Plains	24	42	0	9	14	0	11
Morristown	13	31	0	29	1	3	24
Morris Twp.	21	45	3	5	5	0.2	21
Mountain Lakes	19	37	1	2	0.3	0	40
Mt. Arlington	31	36	0	6	16	2	10
Mt. Olive	49	16	18	4	3	0	11
Netcong	29	43	0	9	6	0	13
Par-Troy	29	31	1	17	5	1	16
Passaic	35	26	14	4	1	0	15
Pequannock	31	42	6	6	4	0	11
Randolph	40	34	9	5	2	0.2	9
Riverdale	41	31	0	18	6	0.1	4
Rockaway	24	37	0	12	10	2	16
Rockaway Twp.	53	18	0.5	4	11	0.1	14
Roxbury	36	30	4	6	10	0	14
Victory Gardens	10	61	0	4	18	0	8
Washington	24	25	46	1	0.5	0	4
Wharton	41	30	0	4	11	1	13

congestion problems during peak commuting hours, with Routes 206, 24, 10, 80 and 23 having the most severe problems. In addition to these major routes, there is a system of County and local roads connecting all parts of the County. Possible road network improvements within the County include the completion of the northern segment of Route 287 from Montville to Mahwah and the relocation of Route 24 from Chatham to Morristown. Other new roads, which could affect solid waste transportation within Morris County when they are complete, are the segment of Route 280 from Harrison to the New Jersey Turnpike at Jersey City, and Eisenhower Parkway from Livingston to Chatham. The completion of Route 280 would reduce the travel time from the Turnpike to Parsippany-Troy Hills by 50%. It is anticipated that this segment will be completed in 1980. All other road construction mentioned above, however, is not expected to be completed prior to 1990.

MORRIS COUNTY POPULATION PROJECTIONS*

MUNICIPALITY	1977	1979	1980	1985	1990
Boonton Town	8,930	8,851	8,811	8,991	9,171
Boonton Township	3,250	3,325	3,363	3,613	3,863
Butler Borough	7,314	7,363	7,387	7,812	8,237
Chatham Borough	9,091	8,963	8,899	8,999	9,099
Chatham Township	8,953	9,113	9,193	10,023	10,853
Chester Borough	1,484	1,545	1,576	1,751	1,926
Chester Township	4,859	4,999	5,069	5,584	6,099
Denville Township	14,630	14,795	14,878	15,783	16,688
Dover Town	14,140	13,921	13,811	13,886	13,961
East Hanover Township	8,955	9,410	9,638	10,763	11,888
Florham Park Borough	8,116	8,159	8,180	8,485	8,790
Hanover Township	11,965	12,214	12,339	13,464	14,589
Harding Township	3,473	3,540	3,573	3,848	4,123
Jefferson Township	15,605	15,811	15,914	17,279	18,644
Kinnelon Borough	7,891	7,952	7,982	8,412	8,842
Lincoln Park Borough	8,810	8,739	8,703	8,883	9,063
Madison Borough	16,053	15,893	15,813	16,038	16,263
Mendham Borough	4,903	5,094	5,189	5,979	6,769
Mendham Township	4,666	4,901	5,019	5,754	6,489
Mine Hill Township	3,627	3,641	3,648	3,823	3,998
Montville Township	13,975	14,528	14,805	16,555	18,305
Morris Township	20,453	20,677	20,789	22,084	23,379
Morris Plains Borough	5,568	5,549	5,539	5,744	5,949
Morristown Town	16,337	16,016	15,855	15,870	15,885

MORRIS COUNTY POPULATION PROJECTIONS*
(cont'd)

MUNICIPALITY	1977	1979	1980	1985	1990
Mountain Lakes Borough	4,595	4,567	4,553	4,623	4,693
Mount Arlington Borough	3,760	3,843	3,884	4,154	4,424
Mount Olive Township	16,550	17,965	18,672	22,797	26,922
Netcong Borough	3,210	3,250	3,270	3,570	3,870
Parsippany-Troy Hills Township	52,789	52,701	52,657	54,847	57,037
Passaic Township	7,461	7,614	7,690	8,095	8,500
Pequannock Township	14,188	14,157	14,142	14,547	14,592
Randolph Township	17,600	18,482	18,923	21,988	15,053
Riverdal Borough	2,669	2,652	2,643	2,708	2,773
Rockaway Borough	6,843	6,954	7,009	7,544	8,079
Rockaway Township	19,988	20,269	20,410	21,745	23,080
Roxbury Township	18,527	19,248	19,609	21,934	24,259
Victory Gardens Borough	1,190	1,208	1,217	1,342	1,467
Washington Township	9,337	10,382	10,904	12,964	15,024
Wharton Borough	5,424	5,441	5,449	5,639	5,829
TOTAL	407,179	413,732	417,005	447,920	478,835

*Morris County Planning Board

SOLID WASTE ADMINISTRATION

WASTE IDENTIFICATION AND DEFINITION

SOLIDS

SOLID WASTES	DEFINITIONS
10 Municipal (Household, Commercial and Institutional)	Waste originating in the community consisting of household waste from private residences, commercial waste which originates in wholesale, retail or service establishments such as restaurants, stores, markets, theatres, hotels and warehouses, and institutional waste material originating in schools, hospitals, research institutions and public buildings. Laboratory wastes and infectious wastes are not included in this category.
12 Dry Sewage Sludge	Sludge from a sewage treatment plant which has been digested and dewatered and does not require liquid handling equipment.
13 Bulky Waste	Large items of waste material such as appliances, furniture, whole trees, branches, tree trunks, and stumps. Also included are waste building materials and rubble resulting from construction, remodeling, repair and demolition operations on houses, commercial buildings, pavements and other structures. Discarded automobiles, trucks and trailers and large vehicle parts and tires are included under this category.
17 Dry Hazardous Waste	Non-liquid waste materials which pose a present or potential threat to human health, living organisms or the environment. ~~are inherently dangerous to handle or dispose of~~. Included in this category are waste materials which are toxic, corrosive, irritating or sensitizing, ~~biologically infectious~~, explosive or flamable. Included are dry pesticides and any containers that were used to ship or store hazardous wastes.

SOLIDS, cont.

WASTE ID	DEFINITIONS
17 Dry Hazardous Waste	Non-liquid waste materials which pose a present or potential threat to human health, living organisms or the environment. ~~are inherently dangerous to handle or dispose of~~. Included in this category are waste materials which are toxic, corrosive, irritating or sensitizing, ~~biologically infectious~~, explosive or flamable. Included are dry pesticides and any containers that were used to ship or store hazardous wastes.
18 Dry Non-Hazardous Chemical Waste	Non-liquid material normally generated by or used in chemical, petro-chemical, plastic, pharmaceutical, biochemical or microbiological manufacturing processes that is not included in the dry hazardous waste category.
23 Vegetative Waste	Waste materials from farms, plant nurseries, and greenhouses produced from the raising of plants. This waste includes such crop residues as plant stalks, hulls, leaves and tree wastes processed through a wood chipper.
25 Animal and Food Processing Wastes	Processing waste materials generated in canneries, slaughterhouses, packing plants or similar industries. Also included are dead animals.
26 Oil Spill Clean-Up Wastes	Wastes generated during an oil spill clean-up operation which include, but are not limited to, oil soaked sand and straw.
27 Non-Chemical Industrial Waste	Solid waste materials resulting from the manufacturing industry. Specifically not included is waste material of a chemical nature which is normally generated by, or used in, chemical, petro-chemical, plastic, pharmaceutical, biochemical or microbiological manufacturing processes.

WASTE IDENTIFICATION AND DEFINITION

LIQUIDS

LIQUID WASTES	DEFINITIONS
70 Waste Oil and Sludges	Automotive crank case drainings and other discarded oils from industrial, aviation and miscellaneous applications including waste oils and materials which are in the form of a highly concentrated slushy residue.
72 Bulk Liquid and Semi-Liquids	Liquid or a mixture consisting of solid matter suspended in a liquid media which is contained within, or is discharged from, any one vessel, tank or other container which has the capacity of 20 gallons or more. Included are bulk or semi-liquids for which there is not a specific waste category.
73 Septic Tank Clean-Out Wastes	Pumpings from septic tanks and cesspools. Not included are wastes from a sewage treatment plant.
74 Liquid Sewage Sludge	Liquid residue from a sewage treatment plant consisting of sewage solids combined with water and dissolved materials.
76 Liquid Hazardous Waste	Free flowing material which ~~is inherently dangerous to handle or dispose of,~~ poses a present or potential threat to human health, living organisms, or the environment. Included in this category are waste materials which are toxic, corrosive, irritating or sensitizing, ~~biologically infectious~~, explosive or flammable. This category shall include liquid pesticides.

COLLECTOR/HAULERS OPERATING IN MORRIS COUNTY* (MUNICIPAL WASTES)

Municipality	Collector/Hauler
Boonton Town	Thomas Rajioppi & Son
	J. Filiberton Sanitation Inc.
	Industrial Haulage
	Metropolitan Disposal Service
	James Valvano
	Tri-County Disposal Service
Boonton Township	Union Hill Disposal Co., Inc.
	Morris County Sanitation Service
Butler Borough	Waste Disposal Inc.
Chatham Borough	Model Disposal
	Town & Country Disposal Co.
Chatham Township	J.C. Bace Disposal
	Van Sant & Zukswert
	J. Costa Inc.
	Mary Scioscia
	Town & Country Disposal Co.
Chester Borough	J. Filiberto Sanitation, Inc.
Chester Township	J. Filiberto Sanitation, Inc.
Denville Township	Round Lake Sanitation Corp.
	J. Filiberto Sanitation
	Union Hill Disposal Co.
	Morris Co. Sanitation Service

*SWA Registered

COLLECTOR/HAULERS OPERATING IN MORRIS COUNTY* (MUNICIPAL WASTES) (cont'd)

Municipality	Collector/Hauler
Dover Town	J. Filiberto Sanitation Morris Co. Sanitation Service T&N Disposal Co.
East Hanover Township	M&H Services Frank V. Bace Private Disposal Union Hill Disposal Co. E. Hanover Private Disposal Frontier Disposal Corp. Morris Co. Sanitation Service Anthony J. Miele
Florham Park Boro	Frank V. Bace Private Disposal Bill Pryer Private Disposal Town & Country Disposal Co.
Hanover Township	Joe Giaroine Disposal S&H Trucking J. Filiberto Sanitation Industrial Haulage Corp. Mauriello Disposal Inc. Morris County Sanitation Service Anthony J. Miele
Harding Township	Gerardo Rubinetti
Kinnelon Borough	J. Filiberto Sanitation BFI of North Jersey
Lincoln Park Boro	Round Lake Sanitation BFI of North Jersey

*SWA Registered

COLLECTOR/HAULERS OPERATING IN MORRIS COUNTY* (MUNICIPAL WASTES) (cont'd)

Municipality	Collector/Hauler
Madison Borough	Frank Bace Private Disposal S&H Trucking J. Filiberto Sanitation
Mendham Borough	J. Filiberto Sanitation Gunther Motors Inc.
Mendham Township	J. Filiberto Sanitation Inc.
Montville Township	Joe Giardine Disposal Wayne Disposal Service Metropolitan Disposal Service James Valvano Lovis Pinto & Son, Inc. Tri-County Disposal Service, Inc.
Morris Township	M.B. Rowe Private Disposal Service J. Filiberto Sanitation, Inc. Mauriello Disposal Inc. Anthony J. Miele
Morris Plains Borough	J. Filiberto Sanitation, Inc. C. Pyskaty & Sons, Inc. Morris County Sanitation Service, Inc.
Morristown Town	Frank Bace Private Disposal S&H Trucking M.B. Rowe Private Disposal Service J. Filiberto Sanitation, Inc. Morris County Sanitation Service, Inc. Carmine Franco & Co., Inc. T&N Disposal Co., Inc. Anthony J. Miele J. Costa Inc.

*SWA Registered

COLLECTOR/HAULERS OPERATING IN MORRIS COUNTY* (MUNICIPAL WASTES) (cont'd)

Municipality	Collector/Hauler
Mountain Lakes Borough	Vallario Disposal Co. Metropolitan Disposal Service Mountain Lakes Disposal Service
Mt. Olive Township	J. Filiberto Sanitation, Inc.
Netcong Borough	Frank Fenimore, Inc.
Parsippany-Troy Hills Township	S&H Trucking J. Filiberto Sanitation, Inc. Angelo Miele & Sons, Inc. Wayne Disposal Service Union Hill Disposal Co., Inc. BFI of North Jersey Inc. Metropolitan Disposal Service James Valvano Morris County Sanitation Service Inc. Tri-County Disposal Service, Inc.
Passaic Township	Lobar Hauling, Inc. Angelo Paollo, Jr. & Bros. Mary Scioscia
Pequannock Township	Round Lake Sanitation Corp. J. Filiberto Sanitation Inc. Pequannock Disposal Co. Vincent J. Dalbo
Randolph Township	J. Filiberto Sanitation Inc. Olsen & Lawson Inc. Mauriello Disposal Inc. Morris County Sanitation Service, Inc. T&N Disposal Co., Inc. Morristown Disposal Corp.

*SWA Registered

COLLECTOR/HAULERS OPERATING IN MORRIS COUNTY* (MUNICIPAL WASTES) (cont'd)

Municipality	Collector/Hauler
Riverdale Borough	Susens Disposal Service
Rockaway Borough	Susens Disposal Service Hamm's Sanitation Inc.
Rockaway Township	J. Filiberto Sanitation, Inc. Union Hill Disposal Co., Inc. Susens Disposal Service James Valvano C. Pizzi & Sons, Inc. Morris County Sanitation Service, Inc.
Roxbury Township	J. Filiberto Sanitation Inc. Zara Bros. Morris County Sanitation Service, Inc. T&N Disposal Co., Inc.
Victory Gardens Borough	J. Filiberto Sanitation Inc.
Washington Township	Cross Country Sanitation J. Filiberto Sanitation, Inc. Sanico, Inc.
Wharton Borough	J. Filiberto Sanitation, Inc.
Various Municipalities	Policastro Service, Inc. Pontie Disposal

*SWA Registered

NEW JERSEY STATE
CHAMBER OF COMMERCE
5 COMMERCE STREET ☐ NEWARK, N.J. 07102

May 4, 1978

A NEW STATE CHAMBER SERVICE . . .

INDUSTRIAL WASTE INFORMATION EXCHANGE

In view of the increasing scope of the problems connected with the generation, reuse and disposal of all forms of industrial waste, your State Chamber is establishing an Industrial Waste Information Exchange as a service to New Jersey industries.

To be operated on a confidential, non-profit basis, the Industrial Waste Information Exchange is designed to promote reuse and recycling of industrial waste material by listing such material which may be available or wanted by others. These listings will be published and distributed monthly to subscribers beginning in June 1978; those who wish to utilize this service will find the appropriate form on page three of this communication.

BACKGROUND

Legislation, both State and Federal, in recent years has contributed substantially to the problems of industrial firms in the handling of by-products and waste material. Environmental considerations and regulations preclude many of the historical methods of disposal such as open burning or use of landfills for certain materials.

The waste exchange concept is currently operating successfully in several ropean countries, as well as in several localities in this country. The chemical industry, in particular, has accomplished a lot in developing markets among individual firms in which the by-product from one plant has been utilized or reprocessed by other firms.

Saleable wastes are already being handled satisfactorily in many cases; nothing in this Exchange effort is intended to interfere with existing arrangements and agreements.

OPERATION AND PROCEDURE

The Exchange will function as a clearinghouse for information about types and quantities of industrial waste materials. It will gather and disseminate information monthly on waste material offered by companies and on waste materials which are wanted by other companies.

Listings of materials available or wanted are solicited by the Exchange. The Exchange provides a special "Material Information/Subscription Service Form" to interested firms on which they can make their wishes known (see page three). These

- over -

listings of materials available or wanted by respondent firms are handled on a confidential code number basis so that there is no disclosure of the firms involved.

Names of firms inquiring about specific listings will be forwarded promptly to the firm which placed the listing. It is the responsibility of the firm having the material to choose the inquirer, if any, with which it wishes to negotiate; the Exchange will not participate in negotiations.

The Exchange will not be responsible for determination of the character or content of any item listed, nor the determination of what may constitute a hazardous substance or create a hazardous condition. The Exchange will not make recommendations with respect to any legal requirements, particularly for the storage, handling, transportation, or disposal of what may be defined as hazardous substances.

Firms offering listings of available materials are not required to divulge any information as to what means they now use, or have used in the past, to dispose of waste materials.

As a matter of information, there is no governmental involvement whatsoever with this State Chamber-sponsored program. Although both State and Federal environmental control agencies have encouraged us to provide this service, the activity is entirely a private operation with no governmental support or participation.

LISTINGS

The Exchange solicits and will publicize two types of listings: that material which is "Available"; and that material which is "Wanted" by participating respondents. Additionally, if a firm also wishes to subscribe to the monthly "Listings", that service is available as a separate option.

Each listing will include an Exchange code number, a classification number, a description (and/or analysis) of the material, quantity per week or month, and general location where the material exists or is wanted. Listings will be carried for whatever period designated by the company.

A "Material Information/Subscription Service Form" is on page three of this communication. Only one item is to be listed on each form, so please make additional copies of each "available" or "wanted" item. See page four for proposed sample listings.

If you have waste material which you believe may be of use to another firm, or wish to list material wanted, and/or wish to subscribe to this service, please complete the "Material Information/Subscription Service Form" on page three, and forward to the New Jersey State Chamber at the address printed above.

##

78/48

April 6, 1979

Gentlemen:

The Morris County Planning Board is currently engaged in the preparation of a 326 Solid Waste Master Plan. As a part of the overall study, it is essential that we identify the potential markets for fuel/energy and recovered materials which could be recovered in a resource recovery operation.

In order to identify the market for the above elements, the Morris County Planning Board retained the services of a consulting team, Reutter Anderson Schoor (RAS) to conduct the prerequisite market analyses and technology assessment prior to optimum system selection. Based upon the industrial description in the Morris County Industrial Directory, enclosed please find questionnaire(s) on either fuel/energy and/or materials recovery. If you feel that your business could utilize either fuel/energy or recovered material and the appropriate questionnaire is not enclosed, please contact us immediately. All inquires should be directed to RAS at 201-566-0100. It is imperative that we identify all potential users in this time of energy shortages.

FUEL/ENERGY RECOVERY

If you are interested in considering the utilization of energy derived from the thermal reduction of solid waste, please complete and return the enclosed questionnaire. If you are not interested, we would ask that you indicate same and return the form for survey accuracy. Please understand that your reply represents a market indicator, and in no way obligates you. It may, however, provide a basis for further consideration, should a major resource recovery system be implemented in the Morris County area.

RECOVERED MATERIAL

If you are interested or have a potential market for use of recovered materials, please complete and return the enclosed questionnaire.

The primary material by-products of resource recovery system, are ferrous metal and unclassified process residue (a mixture of non-ferrous metals, glass, and other inert materials). If a demonstrated market for other material (i.e., aluminum or glass) is defined during this study, the Planning Board may consider the addition of appropriate processing systems for these materials, as well.

A self-addressed envelope is enclosed for your convenience. We would appreciate your response within two weeks. Your cooperation in this matter is deeply appreciated.

Sincerely,

RAS ASSOCIATES

Anthony Forlini

AF:djk

E1

SHORT FORM

______________ Firm I.D.

INITIAL QUESTIONNAIRE
POTENTIAL MARKETS FOR FUEL AND/OR ENERGY RECOVERED FROM SOLID WASTE

1. Firm name and address: ______________

2. Your name and title: ______________ Phone: ______________

3. Parent Company (if any): ______________

4. Current Energy Use at Your Plant:

a. Process ______________ 10^6 BTU/hr. Space Heating ______________ 10^6 BTU/hr.

b. Fuel/Energy Used: (1) ______________ (2) ______________ (3) ______________

Daily Amount: (1) ______________ (2) ______________ (3) ______________

c. What are the present costs of the following energy commodities you currently use?

Steam	$______________	/1000 lb.		
Gas	$______________	/1000 CF	or	$______________/Therm
Oil	$______________	/Gal.	No.	______________ Oil
Coal	$______________	/Ton		
Electricity	$______________	/KWH		

d. State age and type of current boiler/or heating equipment: ______________

e. Was boiler/or heating equipment originally designed primarily for one type of fuel?

______________ (Yes or No). If so, state fuel ______________ (coal, oil, gas, waste materials).

f. If you had a boiler originally designed for the fuel above, what is it burning now?

____

5. Steam Usage. If your facility uses steam, what is your:

a. Average Steam Demand: ______________ (lbs./hr.) Base Load Steam Demand: ______________ (lbs./hr.)

b. Steam Conditions: Temperature: ______________ Pressure: ______________

Special Requirements? ______________

c. Steam Use Pattern: ______________ Hours/Day: ______________ Days/Week

1) Would you require firm service? ______________ Yes ______________ No

2) Do you plan shutdowns on a ______________ Weekly; ______________ Monthly; ______________ Yearly basis?

3) Is your operation subject to major fluctuations in steam usage? ______________ Yes ______________ No.

Comments (daily, seasonal, etc.?) ______________

d. Steam Used For:

______________ Process steam heat ______________ Electric power generation

______________ Process pressure ______________ Comfort heating/air conditioning

______________ Refrigeration ______________ Other (specify): ______________

6. Solid Fuel. If you currently have a boiler fired by coal or originally designed for coal:

a. Does the boriler(s) have adequate air pollution control equipment? ________Yes ________No

What type? ____________________

b. Are pollution control equipment additions planned ? ________Yes ________No

What type? ____________________

c. Are boiler additions planned? ________Yes ________No

What type and size? ____________________

d. What coal-firing mechanisms are currently used? ____________________

____

7. Other Energy Use:

a. Does your facility use process air heat? ________Yes ________No

If yes, what: Temperature________ Purpose ________

____

b. Does your facility use high temperature water? ________Yes ________No

If yes, what: Temperature________ Purpose________

____

8. At an attractive price, would you be interested in one of the following types of refuse derived energy?

		YES	NO
a.	Refuse derived fuel (coal and/or oil substitute)	____	____
b.	Steam for all or a portion of your steam requirements	____	____
c.	Process air heat	____	____
d.	High temperature water	____	____

Comments: ____________________

____

9. Would you consider a long term contract for refuse derived energy? ________Yes ________No

Comments: ____________________

____

10. Solid Waste Quantities Generated at Plant:

Type	Quantity/Month Cubic Yards	Quantity/Month Tons	Quantity Recycled Per Year	Comments
Paper				
Wood				
Other Combustibles				
Glass				
Metals				
Other Non-Combustibles				
Miscellaneous Mixed Refuse				
Liquids/Sludge (specify unit)				

M 1

Firm I.D. ____________

MATERIALS SHORT FORM

INITIAL QUESTIONNAIRE FOR
POTENTIAL MARKETS FOR MATERIALS RECOVERED FROM SOLID WASTE

1. Firm name and address: ____________

2. Your name and title: ____________ Phone: ____________

3. Parent Company (if any) ____________

4. What recycled materials do your purchase?

Type	Volume	Comment

5. Do you process or refine the recycled materials? ______ yes, ______ no. If yes, what processing do you perform (describe)? ____________

6. Could you accept more recycled materials now? ______ yes ______ no. If yes, which types and what additional volume could you handle (describe)? ____________

7. Would you be interested in receiving recycled materials separated from municipal solid waste?

______ yes ______ no

8. What pricing method would you suggest (describe)?

____

9. Can you contract on a long term basis? Say 5 years ______ 10 years ______, 20 years ______

10. Would you be interested in operating a portion of a municipal solid waste operation plant?

______ yes ______ no

11. What other information or requirements do you have which would contribute to the assessment of your firm's involvement in a large scale resource recovery system (describe)? ____________

MORRIS COUNTY PLANNING BOARD

COURTHOUSE, MORRISTOWN, NEW JERSEY 07960 285-6183
Development Review 285-6187

INDUSTRIAL WASTE SURVEY
Theodore S. Pytlar, Jr.
Solid Waste Coordinator

A solid waste management plan for Morris County is being prepared in accordance with Chapter 326 of the New Jersey Public Laws of 1975. Responses to this survey will be used › estimate present and future industrial waste generation rates in Morris County for the Plan. This will be used as input in determining waste collection and disposal needs, as well as opportunities for energy and materials recovery. Your response will help insure the validity of our information.

All of the questions will not be applicable to your firm. Please answer those that are.

Name of Company ______________________________

Address ______________________________

City ________ ______________________________

Name and Title of Respondent ______________________________

Average Number of Employees ______________ Peak Number ____________

SIC Number ______________

Chief Product or Service ______________________________

A. SOLID WASTE PRODUCTION (Use Convenient Units)

Total

Average Week ________ lbs. ________ Tons ________ Cu. Yd.

Peak Week ________ lbs. ________ Tons ________ Cu. Yd.

Peak(s) Occur(s) ________ Spring ________ Summer ________ Fall ________ Winter ________

D. COST OF WASTE HANDLING

$__________ Annual $__________ Per Ton $__________ Per Cubic Yd.

Does cost of solid waste handling include any on-premises handling?

____

E. IS A CHANGE IN THE RATE OF REFUSE PRODUCTION ANTICIPATED IN THE FUTURE?

Projected Future Waste Generation

	Solid		Liquid
1990	__________ Tons/Wk or	__________ Cu. Yd.	__________ Gal/Wk.
1995	__________ Tons/Wk or	__________ Cu. Yd.	__________ Gal/Wk.

F. RECYCLING POTENTIAL FOR WASTE (% of Total Raw Materials)

	Solids	Liquids
In-Plant Recycling	__________ %	__________ %
From Local Recycling Programs and Scrap Dealers	__________ %	__________ %
Production Input-Consists of Waste Streams, Solid or Liquid, From Another Company	__________ %	__________ %
Total	__________ %	__________ %

What is the maximum percentage of recycled material that could be used in production if recycled materials were readily and consistently available at a competitive price, and if they consistently met quality specifications?

__________ % Comments ____

____

____

____

APPENDIX 4

LETTERS EXCHANGED BETWEEN
MORRIS COUNTY AND SENDING COUNTIES

MORRIS COUNTY PLANNING BOARD

COURTHOUSE, MORRISTOWN, NEW JERSEY 07960 285-6183
Development Review 285-6187

March 26, 1979

Mr. Guy E. Millard
Administrator
County Administration Building
Somerville, N.J. 08876

Dear Mr. Millard,

Morris County is in the process of preparing its District Solid Waste Management Plan as mandated under Chapter 326. As a Group III District, we are required to complete our plan by July 26, 1979. In devising the plan, it is necessary to determine the possible impact on it of the solid waste management plans being prepared by nearby districts. The Solid Waste Advisory Council of Morris County requests that they be informed if Somerset County is considering plans to dispose of any portion of its District solid waste stream in Morris County on a short or long term basis.

Chapter 326 requires that solid waste planning districts reach agreements with one another concerning the inter-district transport and disposal of solid wastes. These agreements must be included in the management plans of the sending and receiving districts. It is felt that a number of surrounding districts may be considering Morris County as a disposal location for their solid wastes. The Morris County SWAC wishes to be informed if this is the case, in order to determine if the reception of such wastes is acceptable to the County and its municipalities.

We look forward to discussing these matters with you in an effort to achieve the best apprcach to solid waste management in this region of New Jersey.

Yours truly,

Theodore Pytlar
Solid Waste Coordinator

Roswell Watkins, Chairman
Solid Waste Advisory Council

TP:ec

cc: Mr. Thomas J. Schrope
Senior Planner
Somerset County Planning Board

THE BOARD OF CHOSEN FREEHOLDERS
OF THE COUNTY OF SOMERSET
NEW JERSEY
COUNTY ADMINISTRATION BUILDING, SOMERVILLE
08876

THOMAS E. MAGGIO
Director
WARREN G. NEVINS
Deputy Director
DORIS W. DEALAMAN
VERNON A. NOBLE
MICHAEL J. CEPONIS

GUY E. MILLARD
County Administrator
MARGARET A. MACCINI
Clerk of the Board

(201) 725-4700

April 6, 1979

Mr. Roswell Watkins, Chairman
Morris County Solid Waste Advisory Council
c/o Morris County Planning Board
Courthouse
Morristown, New Jersey 07960

Dear Mr. Watkins:

This letter is in response to your letter dated March 26, 1979 requesting information on plans being considered by Somerset County which involve the disposal of any portion of the waste stream in Morris County.

Initially, it should be noted that the Somerset County Solid Waste Advisory Council is presently in the process of screening the alternatives available to the County for the ten-year planning period. Thus, the SWAC is not yet in a position to make any determinations regarding long-term commitments for solid waste disposal. We will, however, keep you informed of our progress on the plan as it develops.

On a short-term basis, it seems certain that a small percentage of Somerset County's waste stream will continue to be exported to Morris County for disposal. The amount of wastes presently exported to Morris County has been estimated at 9% of the County's total waste stream or 15,690 tons/year. Accordingly, I suggest we immediately begin discussions in an attempt to reach a mutually acceptable agreement. I would suggest that our initial discussions take place at the staff level. If you are in agreement, your staff can contact Mr. Thomas J. Schrope, Solid Waste Coordinator at (201) 725-4700, Ext. 202.

We look forward to cooperating with you on this matter.

Very truly yours,

Guy E. Millard

Guy E. Millard
County Administrator

ag

cc: Theodore Pytlar
Solid Waste Coordinator
c/o Morris County Planning Board
Somerset County Freeholder Dir. Thomas E. Maggio
Morris County Freeholder Dir. A. W. Scerbo
Thomas J. Schrope

MORRIS COUNTY PLANNING BOARD

COURTHOUSE, MORRISTOWN, NEW JERSEY 07960 285-6183
Development Review 285-6187

May 24, 1979

Mr. Guy E. Millard
County Administrator
Somerset County
Administration Building
Somerville, New Jersey 08876

Dear Mr. Millard:

The Morris County Solid Waste Advisory Council has recognized that limited remaining landfill capacities in Morris County and elsewhere necessitate planning for resource recovery operations, in order to greatly reduce the waste load directed to landfills. During the interim period prior to the implementation of resource recovery, the availability of landfill capacity must be maintained. Therefore, the SWAC feels that the existing disposal of a small percentage of Somerset County's waste stream in Morris County should be allowed to continue. (According to DEP-1977 data, 24,271 tons of municipal, bulky, and industrial wastes were disposed of in Morris County.) However, we do not contemplate agreeing to the disposal of any additional quantities of out of county wastes in Morris County during the interim period.

Staff level discussions between Mr. Schrope and Mr. Pytlar indicate that Somerset County's plan will be to develop resource recovery operations for Somerset County. Based upon this, we anticipate that your plan will project a time four to six years hence when disposal of Somerset County wastes in Morris County landfills will be ended.

I hope this letter provides a sufficient response for the continuation of your planning.

Sincerely,

Roswell Watkins
Chairman
Solid Waste Advisory Council

RW:js

OFFICE LOCATED AT 3 SCHUYLER PLACE, MORRISTOWN

MORRIS COUNTY PLANNING BOARD

COURTHOUSE, MORRISTOWN, NEW JERSEY 07960 285-6183
Development Review 285-6187

July 9, 1979

Mr. Thomas Schrope
Solid Waste Coordinator
Somerset County Planning Board
County Administration Building
Somerville, NJ 08876

Dear Mr. Schrope:

Please include the following comments as part of your public hearing record concerning Somerset County's Draft Solid Waste Management Plan.

The Morris County Solid Waste Advisory Council would like to congratulate Somerset County on the completion of its Solid Waste Management Plan. We would also like to express our pleasure at seeing that Somerset County is calling for a progressive solid waste management system which will minimize the amount of materials requiring landfill disposal, while still recognizing that landfills will continue to be necessary.

Your Plan's discussion of the possible necessity of a central county landfill in Somerset County was encouraging to Morris County. Since our last formal communication with you, it has become apparent that the major landfills in Morris County and those elsewhere in northern New Jersey will be subject to a heavy disposal burden until resource recovery facilities come on line. The State is calling upon Morris and Middlesex Counties to accept wastes that are currently disposed of in the Hackensack Meadowlands. The Solid Waste Administration has issued a closure order to the largest landfill in Sussex County which, if carried out, will increase disposal quantities in Morris County. In addition, public opposition is increasing to any expansion in the existing landfilling operations in Morris County. Therefore, if Somerset County were to establish the capability to dispose of its own wastes at a landfill within the county and end the disposal of any Somerset County wastes in Morris County, it would be most helpful in reducing the pressure on the landfills here. We feel a landfill capable of handling Somerset County's wastes could come on line in 1982. The Morris County SWAC urges Somerset County to pursue this goal in its ongoing solid waste planning and implementation process, so as to move as quickly as possible to an in-county solution to its solid waste management needs.

Sincerely,

Roswell Watkins

Roswell P. Watkins, Chairman
Solid Waste Advisory Council

Theodore S. Pytlar Jr.

Theodore S. Pytlar, Jr.
Solid Waste Coordinator

TSP:rm

The Board of Chosen Freeholders of the County of Hunterdon New Jersey

Administration Building, Flemington
08822

njamin B. Kirkland, Director
orge B. Melick
orge D. Muller

Dorothy K. Bertany
Clerk of the Board
(201)782-4300

April 18, 1979

Mr. Theodore Pytlar
Solid Waste Coordinator
Morris County Planning Board
Courthouse
Morristown, New Jersey 07960

Subject: Response to Letter of March 26, 1979
Concerning Regional Solid Waste Disposal

Dear Mr. Pytlar:

This letter is in response to the letter addressed to the Hunterdon County Solid Waste Advisory Council from you and Mr. Roswell Watkins, Chairman, Morris County S.W.A.C.

Under P.L. 1975, C. 326.12b3, each solid waste district that desires to utilize disposal facilities in another county must obtain approval from that county. Accordingly, this letter represents a formal request to utilize solid waste disposal facilities in Morris County.

Hunterdon County does not have operating sanitary landfills within its district. Currently, residential, commercial, industrial, and agricultural solid waste is hauled for disposal to various privately operated landfills in adjoining counties. This is a pattern that has been utilized for many years.

The Hunterdon County Solid Waste Council and the Hunterdon County Planning Board are studying alternatives. Resource recovery is seen as a viable, long-term solution to this problem on a regional basis. However, the solid waste tonnages produced by Hunterdon County, about 350 to 400 tons per day, make a separate resource recovery facility economically impractical.

During the interim period until regional resource recovery facilities become available, Hunterdon County proposes to construct a solid waste transfer station to economically haul waste to existing landfills. Currently, some residential, commercial, and industrial solid wastes are hauled for disposal in landfills in Morris County. The exact tonnage is not fully determined but could be in the range of 75 to 100 tons per day.

Accordingly, in order to continue with our planning we formally request that you respond to the following questions or requests:

1. Would Morris County accept wastes from part or all of Hunterdon County in any resource recovery facility proposed by Morris County? What steps or committments would be required to be included in the Morris County Plan?

2. Would solid wastes from Hunterdon County be accepted in Morris County landfills on an interim basis, prior to the development of resource recovery facilities?

3. Hunterdon County now formally requests that solid waste currently being disposed of in Morris County facilities be allowed to continue to do so on a long-term basis.

Because of time constraints, we would greatly appreciate it if you would respond to this letter by return mail so that we may proceed with the development of our solid waste management plan.

Very truly yours,

George D. Muller

Freeholder George D. Muller

August Knispel

August Knispel, Chairman
Hunterdon County Solid Waste
Advisory Council

MORRIS COUNTY PLANNING BOARD

COURTHOUSE, MORRISTOWN, NEW JERSEY 07960 285-6183
Development Review 285-6187

March 29, 1979

Dear Mr. Sgroi,

This letter is being sent in response to your letter of March 1, 1979 on behalf of Freeholder Director Scerbo and the Morris County Solid Waste Advisory Council. It is understood that, at the present time, Summit and New Providence are the only municipalities in Union County whose solid wastes are disposed of in Morris County. These wastes are transported by the City of Summit from its transfer station to one of the Combe Fill disposal sites in western Morris County, at a rate of 66.9 tons per day. Morris County does not object to the continuance of this pattern. Our solid waste plan will include these wastes on an interim basis. However, this does not apply to solid wastes of any type generated in any other municipality of Union County, or any expansion of the capacity of the Summit Transfer Station. We assume, as you do, that these other wastes from Union County will continue to be disposed of in the Districts where they are at present. It is important that the areas of northern New Jersey, which are presently the focus of urban solid waste disposal, also become the focus of resource recovery at the earliest possible time. However, this will be less likely to occur if urban wastes are redirected to outlying disposal areas such as in Morris County. In addition, please plan to direct the solid wastes generated in Summit and New Providence to a resource recovery facility, when such becomes available, so that the disposal of these wastes in landfills within Morris County will eventually end.

At this time, we cannot agree to reserve landfill capacity for process residues, non-processable waste and as an emergency back-up, as you request. The determination of the availability of such capacity necessitates specific data concerning expected residue and non-processable tonnages, and the frequency of plant "down-time" which would require landfilling of raw solid wastes. In addition, every effort should be made to identify and/or develop markets for process residue and unprocessables. It should not be assumed that they must be landfilled. We also suggest that other resource recovery facilities, which will be in operation in northern New Jersey, be considered as emergency back-up when any one plant is down.

It is hoped that this response allows you to proceed with your planning. We look forward to continuing discussion and cooperation in solid waste management planning.

Sincerely,

Theodore Pytlar
Solid Waste Coordinator

Roswell Watkins, Chairman
Solid Waste Advisory Council

cc: Mr. Daniel O'Hern, Commissioner N.J.D.E.P.
Ms. Beatrice Tylutki
Mr. Joseph Kazar

MORRIS COUNTY PLANNING BOARD

COURTHOUSE, MORRISTOWN, NEW JERSEY 07960 285-6183
Development Review 285-6187

May 29, 1979

Mr. George D. Muller
Board of Chosen Freeholders
Hunterdon County Administration Building
Flemington, N.J. 08822

Dear Freeholder Muller,

In view of the limited remaining capacity of existing landfills in Morris County and increasing citizen opposition to their expanded use, the Morris County Board of Chosen Freeholders and their Solid Waste Advisory Council do not presently contemplate encouraging the disposal of additional quantities of solid wastes from out of county, which would increase current disposal rates at those landfills. Our most recent data indicates that 7-8 tons per day of solid wastes from Hunterdon County are disposed of at the Chester Hills Landfill in Morris County. We do not anticipate taking any action to stop this flow as long as the landfills currently operating in the county remain open. However, the largest landfill in Morris County is scheduled to close within a year. If this occurs the amount of out of county wastes disposed in Morris County may have to be drastically reduced.

The Morris County SWAC is currently investigating the feasibility of a resource recovery facility in the county as opposed to sending wastes to a facility in Essex or Passaic counties. If a facility in Morris County proves to be feasible, the possibility of receiving wastes from Hunterdon County will be open. Although, existing transportation routes from Hunterdon to any likely resource recovery sites in Morris County would probably make such a haul less economical than other alternatives available to you.

As the deadline for the completion of our Chapter 326 Plans is near, I expect that it will be known shortly what direction Morris County's Solid Waste Management Plan will be taking. I will keep you informed of our progress so that this discussion may proceed further, if necessary.

Sincerely,

Theodore Pytlar
Solid Waste Coordinator

TP:ec

cc: August Knispel
Morris County SWAC

Essex County Transition Office
RUTGERS—NEWARK
18 Washington Pl., Newark, N.J. 07102
(201) 648-5169

April 18, 1979

Ted Pytlar
Morris County Planning Board
Courthouse
Morristown, New Jersey 07960

Dear Mr. Pytlar:

Essex County is examining various alternatives for disposal of our solid waste during the interim period between January 1, 1980 and the operational date of a resource recovery facility in the County, which we estimate to be in the period 1983 to 1985. As I mentioned to you at a recent Technical Advisory Group meeting, we would like to consider Morris County landfill sites for the interim disposal of at least a portion of our waste. We are particularly interested in exploring with you the possibility of some of the Western Essex County municipalities utilizing landfills in Morris County.

I would appreciate the opportunity to meet with you at your earliest convenience to discuss this matter further.

Sincerely,

David K. Hull

David K. Hull
Director

DKH/la

MORRIS COUNTY PLANNING BOARD

COURTHOUSE, MORRISTOWN, NEW JERSEY 07960 285-6183
Development Review 285-6187

May 24, 1979

Mr. David K. Hull, Director
Essex County Transition Office
18 Washington Place
Newark, New Jersey 07102

Dear Mr. Hull:

The Morris County Solid Waste Advisory Council has determined that there should be no increase in the amount of out of county solid waste disposed of in Morris County. Therefore, Morris County cannot agree to accept any additional wastes from western Essex County, as you have proposed. The two major landfill sites in Morris County are presently overburdened as a result of recent landfill closings. So, it is not feasible for these sites to accept any additional waste quantities from out of county.

I suggest that the present disposal patterns in northern New Jersey be maintained during the period prior to the implementation of resource recovery. Short term landfill crises should be abated so that we may concentrate on moving toward the implementation of resource recovery as swiftly as possible.

Sincerely,

Theodore S. Pytlar
Solid Waste Coordinator

TSP:js