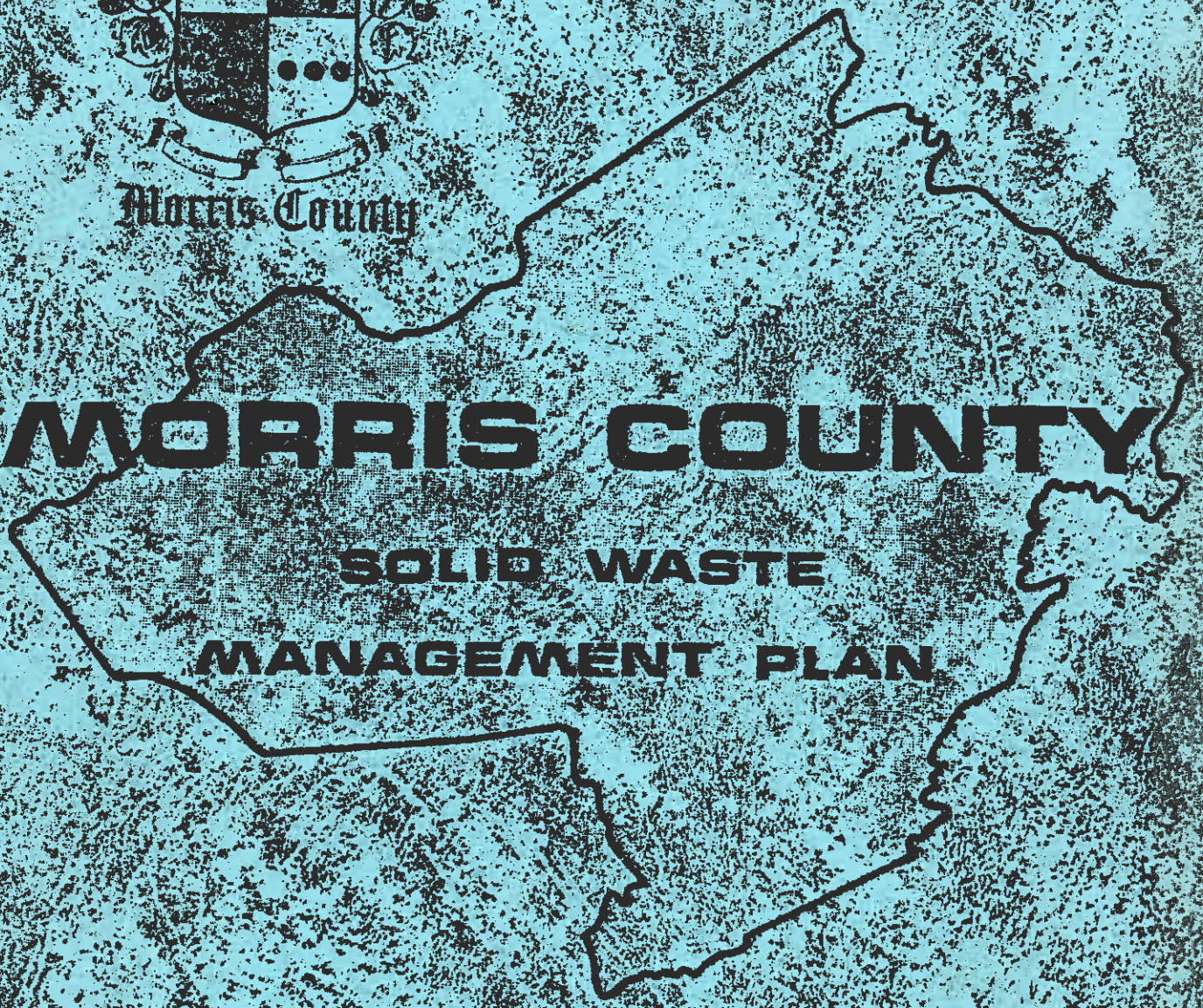
Morris County

EXECUTIVE SUMMARY



MORRIS COUNTY

SOLID WASTE MANAGEMENT PLAN

MORRIS COUNTY
BOARD OF CHOSEN FREEHOLDERS
SOLID WASTE ADVISORY COUNCIL

ras ASSOCIATES
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MORRIS COUNTY SOLID WASTE MANAGEMENT PLAN

EXECUTIVE SUMMARY

Prepared For

THE MORRIS COUNTY BOARD OF CHOSEN FREEHOLDERS

IN COOPERATION WITH

THE MORRIS COUNTY SOLID WASTE ADVISORY COUNCIL

Prepared Jointly By:

RAS ASSOCIATES
MORRIS COUNTY PLANNING BOARD

September, 1979

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INTRODUCTION

In accordance with the requirements of the State Solid Waste Management Act as amended by Chapter 326 of the Public Laws of 1975, Morris County has developed a ten-year Solid Waste Management Plan. Each county in New Jersey and the Hackensack Meadowlands Development Commission have prepared similar plans in an effort to provide direction toward achieving solutions to the growing solid waste disposal problem in this state. The following summary of the Morris County Draft Solid Waste Management Plan includes data on present as well as projected solid waste generation, collection, and disposal; alternatives available to the County, and recommendations for the ten-year planning period. This Plan is now being submitted to the Morris County Board of Freeholders following submission approval by the Morris County Solid Waste Advisory Council (SWAC). The Freeholders, as required by law, will hold a public hearing to receive public comments on the plan prior to adopting the plan.

I. BACKGROUND DATA AND PROJECTIONS

A. GENERATION

Solid and liquid wastes as catagorized by the SWA are shown below. The waste types generated in greatest quantity and of primary interest in the Plan include municipal, non-chemical industrial, sewage sludges and septic tank clean out wastes.

SOLID WASTE CATEGORIES

Solid

- Municipal (household, commercial and institutions)
- Dry Sewage Sludge
- Bulky Waste
- Dry Hazardous Waste*
- Dry Non-Hazardous Chemical Waste*
- Vegetative Waste
- Animal and Food Processing Wastes
- Oil Spill Clean-Up Wastes
- Non-Chemical Industrial Waste

Liquid

- Waste Oil and Sludges
- Bulk Liquid and Semi-Liquids
- Septic Tank Clean-Out Wastes
- Liquid Sewage Sludge
- Liquid Hazardous Waste*
- Liquid Chemical Waste*

Waste generation rates for various solid waste categories were determined for each municipality in the County. These rates were based upon data supplied by the N.J. Department of Environmental

Protection, Solid Waste Administration (SWA), and an extensive survey of municipalities and refuse collector/haulers operating in the county. The survey was conducted by the County and its consultants. Liquid waste generation rates were developed from SWA data and interviews with personnel from sewage treatment plants in Morris County. The septic tank clean-out waste generation rate was difficult to ascertain due to the fact that much of these wastes are disposed of in manners not consistent with State regulations. A summary of current waste generation can be found in Table 1.

*Not required for consideration in county solid waste plans.

TABLE 1

WASTE GENERATION SUMMARY – MORRIS COUNTY TOTAL

SOLID WASTE GENERATION, 1978

	TONS/YEAR
Municipal Waste (10)*	
Municipally Collected	137,836
All Other	183,851
Municipal Total	321,687
Bulky Waste (13)	26,329
Dry Hazardous Waste (17)	170
Dry Non-Hazardous Chemical Waste (18)	184
Vegetative Waste (23)	2,752
Non-Chemical Industrial Waste (27)	55,900
TOTAL	407,022

LIQUID WASTE GENERATION, 1977

	GALLONS/YEAR
Waste Oil & Sludges (70)	75,000
Bulk Liquid & Semi-Liquids (72)	2,004,100
Liquid Hazardous Waste (76)	27,072
Liquid Chemical Waste (77)	2,131,800
TOTAL	4,237,972

SLUDGE & SEPTIC WASTES, 1979

	MILLION GALLONS/YEAR
Sewage Sludge	36.12
Septic Wastes	5.39

*SWA Waste Classifications

Projections of solid and liquid waste quantities through 1990 were based upon population growth, employment projections, per capita waste generation trends, and the proposed expansion plans of sewage authorities. Overall increases in population, employment and sewage flow in Morris County will result in increasing total production waste even though virtually no change is predicted in per capita generation. Existing and projected generation rates are compared to existing disposal capacity in the disposal section of this summary. A summary of future waste generation can be found in Table 2.

B. COLLECTION

The majority of solid and liquid wastes generated in Morris County are collected by private firms under contract with homeowners, private businesses, municipalities, or other governmental units. Municipal departments also provide solid waste collection service in several municipalities. Table 3 lists the type of collection services available throughout Morris County. Some commercial and industrial wastes are collected as part of municipal or municipal contract collection, but the greater part are collected under private contract terms. Septic and other types of liquid wastes are collected solely by private contractors.

Waste collection by private firms tends to be more efficient than municipal collection due to the economic incentive of the private firms to minimize transport and disposal costs. However, when private collector/haulers have large gaps between collection points, fuel use efficiency decreases. Incentives for efficient collection may decrease as disposal facilities begin to charge by the ton for disposal instead of on a cubic yard basis as is presently the case. Conversely, the incentive to minimize transportation costs will remain.

C. SOLID WASTE DISPOSAL

Morris County municipalities are dependent on landfills regulated by the New Jersey Bureau of Public Utilities (BPU) for the 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 long as the waste is of an approved classification. If a compactor truck from Peoria, Il. desires 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 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% generated, 2% was disposed of in small municipal landfills located within Morris County. The remaining 18% of solid waste generated within Morris County in 1977 was exported to surrounding counties for disposal. The majority of these wastes went to HMDC landfills and landfills in Sussex County.

TABLE 2

WASTE PROJECTION SUMMARY – MORRIS COUNTY TOTAL

SOLID WASTE GENERATION (TONS/YEAR)	1980	1985	1990
Municipal Waste (10)	324,040	346,947	369,854
% Increase over 1979	0.73%	7.85%	14.97%
Bulky Waste (13)	26,537	28,504	30,471
Dry Hazardous Waste (17)	175	186	194
Dry Non-Hazardous Chemical Waste (18)	190	202	211
Vegetative Waste (23)	2,613	2,090	1,916
Non-Chemical Industrial Waste (27)	57,598	61,236	63,904
TOTAL	411,153	439,165	466,550
PROJECTED SOLID WASTE PER CAPITA GENERATION RATE			
(lb./Capita/day)	5.40	5.37	5.34
LIQUID WASTE (GALLONS/YEAR)	2,327,828	2,474,849	2,582,664
SLUDGE & SEPTIC WASTES (MILLION GALLONS PER YEAR)			
Sewage Sludge	–	36.12-72.55	16.12-77.62
Septic Wastes	–	2.66-6.46	2.88-7.49

TABLE 3

MUNICIPAL WASTE COLLECTION PRACTICE

MUNICIPAL COLLECTION	PRIVATE COLLECTION UNDER CONTRACT WITH MUNICIPALITY	PRIVATE COLLECTION UNDER CONTRACT WITH HOMEOWNER
Hanover Twp.	Boonton Town	Boonton Twp.
Morristown Towns	Dover Town	Chatham Boro
Mt. Arlington Boro	Florham Park Boro	Chatham Twp.
Mt. Olive Twp.	Jefferson Twp.	Chester Boro
Roxbury Twp.	Kinnelon Boro	Chester Twp.
Wharton Boro	Lincoln Park Boro	Denville Twp.
Morris Twp.	Madison Boro	E. Hanover Twp.
	Mine Hill Twp.	Harding Twp.
	Morris Plains Boro	Mendham Boro
	Netcong Boro	Mendham Twp.
	Parsippany-Troy Hills Twp.	Montville Twp.
	Passaic Twp.	Mountain Lakes Boro
	Randolph Twp.	Pequannock Twp.
	Riverdale Boro	Rockaway Twp.
	Rockaway Boro	Washington Twp.
	Victory Gardens Boro	

While wastes generated within the county were being exported for disposal in 1977, wastes generated in other counties were entering the three Morris County BPU landfills for disposal. A total of 97,141 tons were imported for disposal in 1977. These wastes accounted for 23% of the total waste disposed of at the three major landfills in 1977.

Table 4 summarizes the waste disposal 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, the Morris County Landfill and to 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 Januay 1979. Due to its proximity to the Fenimore site, the Combe Fill (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).

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) Landfill has increased its 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.

In addition to the major BPU landfills, their are a number of small, municipal landfills (Wharton, Mt. Arlington, Mendham, Rockaway Twp.), leaf and brush composting areas, private disposal sites and waste transfer facilities (Figure 1).

The remaining useful life of the Mt. Olive and Chester Hills sites are dependent upon a number of factors including the regulatory decisions of the SWA, future rates of solid waste generation, the fates of other landfills in the surrounding region and the solid waste management practices utilized in the next decade. These two sites have a maximum remaining capacity of six million tons of solid waste, assuming Mt. Olive is expanded. Based upon current trends, it appears that landfills in Sussex, Middlesex, Bergen (Hackensack Meadowlands) and Hudson (Hackensack Meadowlands) counties will become unavailable for the disposal of Morris County wastes in the next few years. The disposal of out of county wastes from Union and Somerset counties in particular is expected to continue with increases due to population growth in sending municipalities. When the above considerations are added to projected waste generation rates in Morris County it becomes possible to predict remaining landfill life in the county. Figure 2 shows that remaining landfill capacity will be used up by 1990, assuming no change in current disposal

TABLE 4

WASTE SUMMARY – 1977

WASTE GENERATION

Wastes Generated in Morris and Disposed of in Morris

BY DISPOSAL LOCATION

Chester	61,841	Tons/Year
Mt. Olive	106,104	
Roxbury	158,637	
Hanover Twp.	664	
Mt. Arlington	3,500	
Wharton	3,308	
Mendham	120	
TOTAL		334,174 Tons/Year (81.5%)

Wastes Generated in Morris and Exported for Disposal

BY DISPOSAL LOCATION

HMD Landfills	44,243	Tons/Year
Somerset	720	
Sussex	15,981	
Middlesex	8,379	
Ocean	387	
Burlington	32	
Bergen	350	
Hudson	3,745	
Warren	1,412	
N.Y. State	107	
Essex	320	
TOTAL		75,676 Tons/Year (18.4%)
TOTAL WASTE GENERATION		409,850 Tons/Year (100%)

TABLE 4 (cont'd)

WASTE SUMMARY – 1977

WASTE DISPOSAL

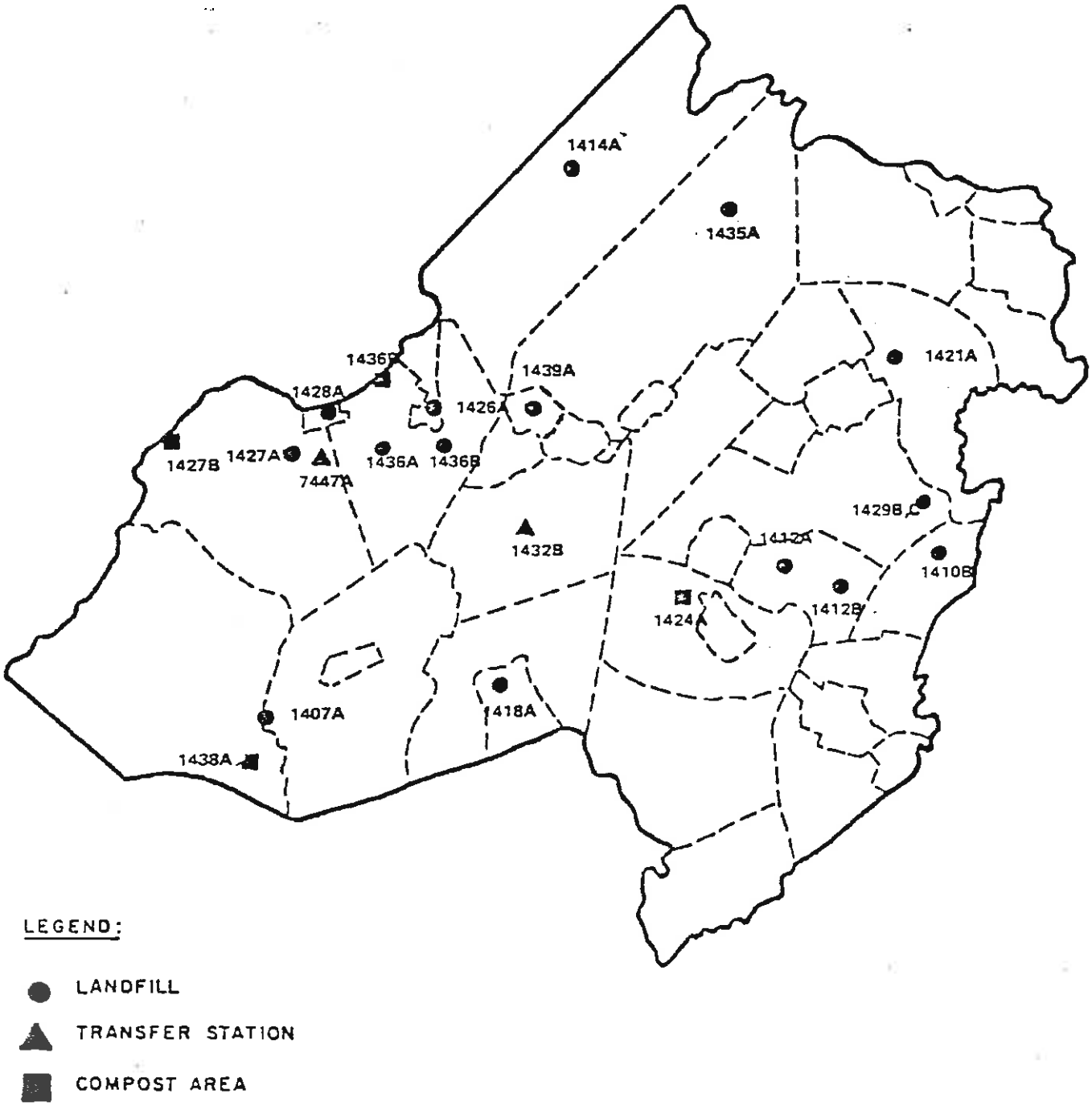
Wastes Generated in Morris and Disposed of in Morris

TOTAL	334,174 Tons/Year (77.5%)

Wastes Generated in Other Counties and Imported for Disposal in Morris

FROM

Essex	1,886	Tons/Year
Passaic	616	
Sussex	2,218	
Hunterdon	2,465	
Somerset	24,271	
Union	33,920	
Warren	7,786	
Other	23,979	
TOTAL		97,141 Tons/Year (22.5%)
TOTAL WASTE DISPOSAL		431,315 Tons/Year (100%)

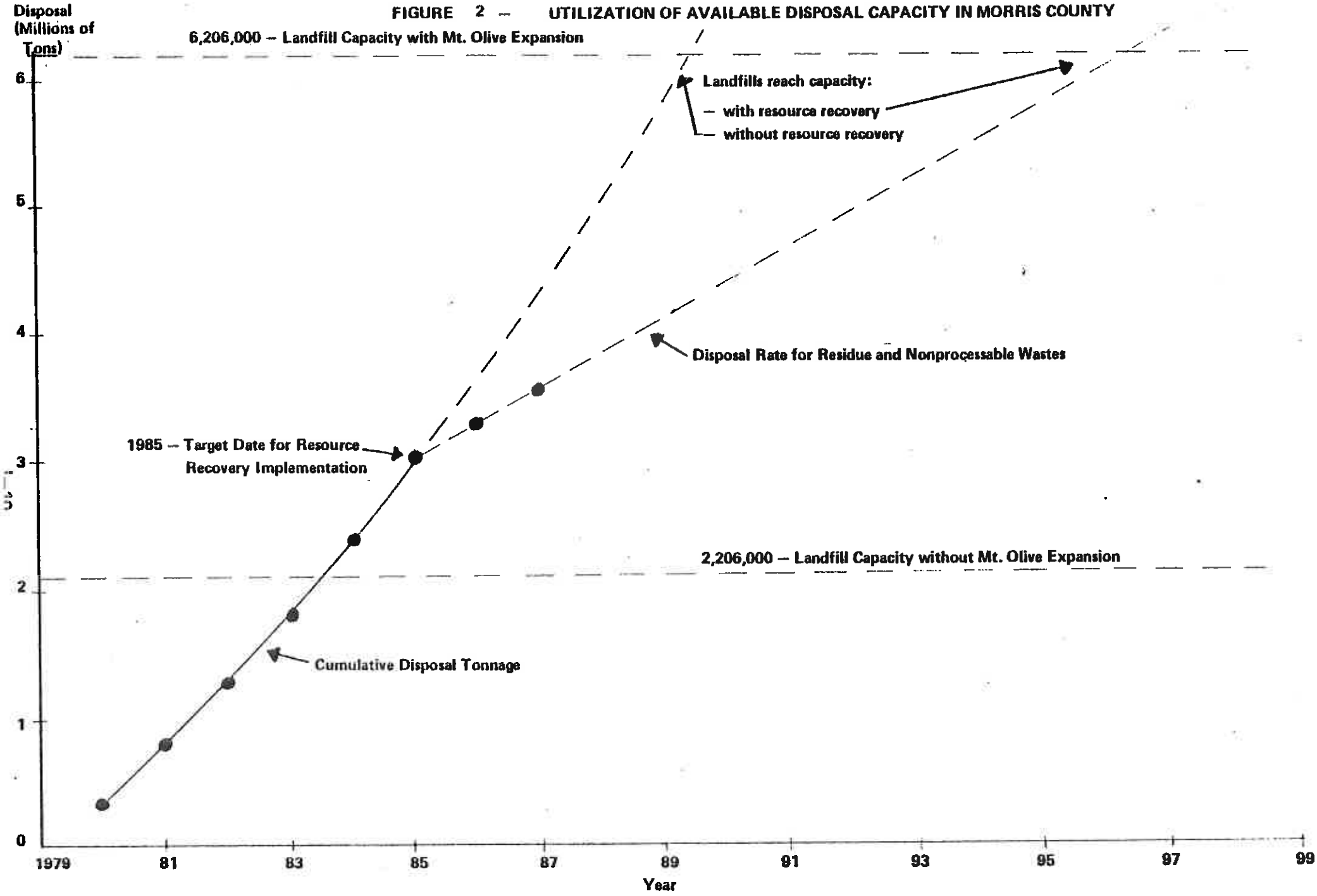


MORRIS COUNTY

Registered Solid Waste Facilities

FIGURE 1

FIGURE 2 — UTILIZATION OF AVAILABLE DISPOSAL CAPACITY IN MORRIS COUNTY



practices. The complete utilization of landfill capacity could occur prior to 1990 if the HMDC carries out its plans to close all but one landfill by the end of 1979, and no alternative facilities are provided for the wastes currently going there; or if the SWA follows through on its closure order for Hamm's Landfill in Sussex County, scheduled for September 30. Either of these developments could cause a large increase in the quantities of out of county wastes disposed of in Morris.

D. SEPTIC AND SLUDGE DISPOSAL

The disposal of sewage sludges may be carried out in three general ways: land disposal, ocean disposal and incineration. At the present time, on-site land disposal represents the sludge disposal alternative most commonly practiced by 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 municipalities.

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. The use of composting and incineration (possibly with solid waste) will increase as a result of the termination of ocean dumping.

At the present time, three wastewater treatment plants within the county accept septic wastes for treatment and disposal. The Roxbury treatment plant accepts all of the septic tank clean out wastes collected within the municipality, amounting to about 360,000 gallons per year. 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 Boonton Town. This holding tank feeds a sewer main leading to the treatment plant. In combination, the three treatment plants currently accept an estimated 12-16% of the septic tank clean out waste generated within the County.

Currently, 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 not being practiced at the present time. 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.

Prior to the end of 1978, a sizable 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.

The scarcity of acceptable disposal facilities for septic wastes is a problem in Morris County and the entire state. Consequently illicit disposal can result and pose a public health hazard.

E. COSTS

Solid waste management costs can be divided into three components: collection, transportation and disposal. Collection costs are related to routing, labor and equipment efficiency. Transport costs to and from the disposal site ($/ton) are determined by collection vehicle operation cost, number of trips to the disposal site, quantity of waste, round trip mileage and time spent at the disposal site. These factors were utilized to determine the cost to transport wastes in Morris County on a per ton basis. This was done only for those municipalities which have municipal or municipal contract collection (Table 5). Transport and collection costs, which comprise approximately 80% of total solid waste management costs, will rise with fuel costs and inflation.

Disposal costs make up 20% or less of the total costs. Current disposal fees for municipal solid wastes are $0.95 at Mt. Olive and $0.75 per cubic yard at Chester Hills. Disposal (tipping) fees are regulated by the BPU and are lower than in surrounding states; thereby making New Jersey an attractive location for the disposal of out of state wastes. Tipping fees will rise as new and existing landfills install environmental controls. Combe Fill Corp. presently has an application pending with the BPU to raise tipping fees above $1.50 per cubic yard at both of their landfills in Morris County.

F. RECYCLING/SOURCE SEPARATION

The recovery and sale of certain components of the waste stream is carried out by numerous local recycling programs in the county. Newspapers, bottles and cans are most commonly recycled. In addition, some businesses find it profitable to recycle computer printouts, tab cards and carboard. The markets available for the sale of these materials are relatively strong in New Jersey as compared to other sections of the county.

Although numerous, existing recycling efforts in the country have had little impact on the flow of wastes to the landfills; less than a 5% reduction is achieved. The potential to reduce the waste stream by 20% has been demonstrated, but requires a more organized and consistent municipal and county effort than has been associated with recycling up until now.

G. MUNICIPAL INITIATIVES

Four municipalities in Morris County are currently considering resource recovery systems. The Lakeland Regional Solid Waste Management Authority consisting of Butler, Kinnelon and Pequannock and three municipalities in Passaic county has been active for several years. They desire to initiate resource recovery operations in that area. Legislation designating Lakeland as a separate solid waste management planning district has been passed by the State Legislature and awaits the Governor's signature.

TABLE 5

MUNICIPAL WASTE TRANSPORT COSTS

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	5.30
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	3.46
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

A proposal has been made to Parsippany-Troy Hills to build a resource recovery facility at the site of Sharkey's Dump which would process the Township's solid waste. The proposal is under consideration.

II. ALTERNATIVES AND RECOMMENDATIONS

There are several disposal and processing technologies available which may be considered for Morris County. The possibility that some of these technologies may be utilized conjunctively at different sites both within and outside of the county gives rise to a large number of management system alternatives which may be considered.

A. LANDFILLING

All of Morris County's solid wastes are presently disposed of by landfilling. Landfilling is the controlled burial of wastes so as to minimize fires, health hazards such as rodents and insects, and pollution of water and air. State and Federal regulations will require all landfills to install additional environmental controls so as to isolate the polluted leachate from surface and groundwaters, and to control and vent landfill gases. These regulations will cause tipping fees at landfills to rise to $6.00 - $10.00 per ton by 1985. It is also becoming increasingly difficult to open new landfills due to strong public opposition, the large amounts of land needed and the high cost of site preparation. In fact, inability to open new landfills has been the cause of a number of governmental decisions elsewhere to institute resource recovery operations. However, landfills will continue to be needed to dispose of 10-40% of the wastes not processable by resource recovery and the process residue.

The recommended Solid Waste Management Plan includes the following key features regarding landfilling:

1. Provide adequate landfill capacity in the short-term by supporting a 5 year expansion of the Mt. Olive landfill.

2. Encourage the installation of environmental controls at Mt. Olive and Chester Hills.

3. The County should consider hiring a landfill inspector and consider taking over access roads (Parker Road, Gold Mine Road) to landfills in order to assist Chester Township and Mt. Olive Township, to better distribute the cost burden of landfilling among all 39 municipalities.

4. The diversion of inert wastes (construction and demolition wastes) to special landfills would preserve capacity in the landfills accepting putrescible wastes, which comprise the largest portion of the waste stream. Therefore development of such landfills by the private sector should be encouraged.

B. CENTRALIZED RESOURCE RECOVERY

The purpose of resource recovery facilities is to process solid wastes so as to recover energy and materials. The energy product is of primary importance because the revenues gained from it are by far greater than the revenues to be gained from recovered materials (metal, glass, paper). Such facilities may process from 200 to 2000 or more tons per day of solid wastes. The various resource recovery processes may be differentiated on the basis of the means used to extract the energy from the waste.

Waterwall combustion systems burn raw solid wastes (which may be combined with sewage sludge in some systems) and utilize the heat to produce steam. These systems are in wide use in Europe and in a number of locations in the U.S.A. Tipping fees are high, ranging from $10-$32.00 per ton for 1000-1500 ton per day facilities. In addition, the facility must be located close to the steam user (within one mile). This process reduces waste volume by 95%.

Refuse derived fuel (RDF) systems consist of a series of waste sorting and processing steps which reduce the waste to a uniform size, separate the combustible from the noncombustible portions, and sometimes convert the combustible portion (RDF) to a powder or pelletized form. The RDF may then be shipped to an institutional, industrial or electrical utility boiler for co-combustion with coal.

Recent advances in boiler technology and the continual process of replacing old with new boilers provides a good opportunity to expand the use of RDF. Tipping fees range from $9-$15 per ton for 1000-1500 ton per day facilities. The price at which RDF may be offered to potential users compares favorably with conventional fuels. On a per million BTU basis current prices are as follows: $3.20-natural gas; $2.70-oil; $1.25-$1.50-RDF. An RDF facility has an advantage over other types of resource recovery in that no combustion or temporary storage of wastes occurs at the plant. Twelve RDF systems are currently in operation or under construction in the United States. Waste volume is reduced by 60-70%.

A pyrolysis system produces a low grade gas and/or liquid fuel by heating wastes in an oxygen deficient atmosphere. The process holds promise, but as yet no successful operating plants exist. Tipping fees are estimated to be $23-$40 per ton for a 1000-1500 ton per day plant.

Modular incinerators are a recent innovation which reduce air pollutants and the necessary daily waste tonnages associated with waterwall incineration. These 25 ton per day combustion units utilize a multiple chamber, "starved" air principle. A primary incineration chamber is used to volatilize the waste in an atmosphere deficient of oxygen, in much the same way as a pyrolysis system. Unlike pyrolysis, the volatilized products are ignited in a second chamber in the presence of excess air. The resultant heat may then be used to produce steam. This process results in air emissions which are much lower than conventional incinerators. Unfortunately tipping fees are at the same level as waterwall incineration, the steam user must be nearby, and many of these units would be needed to handle Morris County's wastes.

The composting of solid wastes and sludges is a process in which naturally occuring micro-organisms are utilized to breakdown and stabilize the wastes, producing an animal feed or soil conditioner. The nature of the final product is dependent upon the composition of the material being composted. Municipal solid waste is composted to produce animal feed and soil conditioner in Italy, while composting is being considered for the processing of sludges in many municipalities in New Jersey. The composting of solid wastes requires a predominantly agricultural region, which Morris County is not.

The incineration of sludge alone is accomplished in units specially designed for the purpose. If a use can be found for steam, such as heating the sewage treatment plant, these incinerators may be modified for that purpose. However, costs are high compared to the limited amount of energy which would be recovered at a plant in Morris County. A summary of the top-ranked solid waste alternatives evaluated in the plan can be found in Table 6.

The recommended Solid Waste Mangement Plan for Morris County includes the following key features regarding resource recovery:

1. Institute resource recovery for Morris County's wastes before landfill capacity is completely utilized. Initiation of resource recovery by 1985 could preserve existing landfill capacity until 1996.

2. RDF or waterwall systems should be considered at sites in Morris County and/or Paterson or Newark. (A hybrid waterwall system incorporating some elements of RDF technology may prove to be cost competitive with RDF).

3. Utilization of a resource recovery facility in Paterson for the eastern portion of Morris County and an RDF facility for the western portions of the county including Sussex and Warren County wastes is currently the most attractive alternative. This stems from the point of view of system flexibility, utilization of the potential RDF market in Morris County (Picatinny), and the possibility of directing process residues and nonprocessable solid wastes to landfills in Sussex and Warren as well as in Morris County.

4. Other management alternatives, such as sending all municipal solid wastes to Paterson, or the eastern portion of the County to Newark, should also be considered if the optimum system in 3, above, cannot be implemented.

5. The development of resource recovery processes in Lakeland and/or Parsippany might necessitate modifications in the scale or location of planned resource recovery facilities for the remainder of the County.

C. SOURCE REDUCTION

The amount of wastes destined for landfill disposal or resource recovery processing may be reduced through the institution of municipally sponsored source separation programs. These programs have the potential of providing revenues to the municipality or local organizations and savings in the form of reduced collection, transport and tipping fee costs as a result of the reduced waste stream. It has been shown that these programs would augment rather than conflict with existing recycling programs and future resource recovery operations. Newspaper, glass and metal cans would be recovered by these programs. The provision of curbside pick-up greatly increases the amount of material which can be recovered my minimizing homeowner inconvenience. The County can assist municipalities and organizations interested in such programs by informing them of alternate program designs, assessing cost effectiveness and coordinating municipal programs so as to achieve economies of scale.

TABLE 6

ALTERNATIVES RANKING SUMMARY

Ranking	Alternative Number[1]	Description Summary	1985 Average $/Ton[2]
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 Ledgewood RRF, 1/85.	13.02 20.04
	8A 8B	Same as 9A, 9B without Lakeland RRF	12.94
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 Ledgewood RRF, 1/85.	16.23
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 Ledgewood RRF, beginning 1/85.	16.64
	1	Same as 4, without Lakeland RRF	16.68
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.	10.81 20.65

TABLE 6 (cont'd)

ALTERNATIVES RANKING SUMMARY

Ranking	Alternative Number[1]	Description Summary	1985 Average $/Ton[2]
	6A	Same as 7A, 7B, without Lakeland	10.73
	6B	RRF	20.57

[1] 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.

[2] With rate averaging (all costs in June 1979 dollars)

TABLE 6 (cont'd)

ALTERNATIVES DELETED IN PRELIMINARY SCREENING

Alternative No.	Description
2	Existing L/F's upgraded and used until 1/85. Starting 1/85, an 1100 TPD County-wide mass burning facility would be operational.
3	Existing L/F's upgraded and used until 1/85. Starting 1/85 an 1100 TPD County-wide pyrolysis facility would be operational.
5	Existing L/F's upgraded and used until 1/85. Lakeland communities to Lakeland RRF, 1/83. East and West to County mass burning facility starting 1/85.
11	Existing L/F's used until 1/81. New County L/F to be operational starting 1/81.
12	Starting in 1981 a County-wide transfer system would be operational to transport wastes to Middlesex County L/F's.
13	Mt. Olive L/F to close in 1981. T/S located at Mt. Olive for transport of waste to Chester Hills L/F for duration of planning period.
14	T/S for the East, starting in 1981, for disposal at Mt. Olive and Chester Hills L/F's.

TABLE 6 (cont'd)

ALTERNATIVES DELETED IN PRELIMINARY SCREENING

Alternative No.	Description
15	Mt. Olive L/F upgraded and expanded and Chester Hills upgraded to accomodate wastes throughout the planning period.
16	Starting 1/81, shredding and/or baling systems operational to extend life of Mt. Olive and Chester Hills L/F's throughout planning period.

D. VOLUME REDUCTION

The volume of wastes to be disposed of by landfilling may be reduced through shredding or compaction-baling operations. These processes have the potential to extend the life of a landfill. However, they are nearly as costly as resource recovery yet they conserve no resources, except landfill space. Similar financing, siting and rating control obstacles may have to be dealt with as in resource recovery.

E. WASTE TRANSFER STATIONS

The efficiency of waste transport may be increased by utilizing waste transfer stations where the loads of typical 20-30 cubic yard collection vehicles are transfered to 65-80 cubic yard trailers. The cost effectiveness of transfer stations depends upon travel time to and from the disposal location, which is influenced by distance and the availability of highways or the necessity to use local roads. The current cost effectiveness of instituting a transfer system in Morris County for a number of landfill and resource recovery alternatives was carried out for this Plan. Due to the high speed road network connecting most of the areas within Morris County where transfer stations and resource recovery facilities are likely to be located with respect to each other and resource recovery sites outside the County, it was found that waste transfer is not currently cost effective. However, since fuel prices are escalating rapidly a reanalysis should be undertaken within two years.

The recommended Solid Waste Management Plan for Morris County includes the following:

1. The County should encourage municipalities and the private sector to initiate source separation programs, assist in analyzing program designs and cost effectiveness, marketing recovered materials and increasing incentives for recycling.

2. The use of shredding or baling operations should not be pursued at the present time. If resource recovery systems cannot be implemented this alternative may lend itself to future investigation.

3. The re-evaluation of waste transfer stations should be undertaken when the plan is updated in 1983.

III WASTE CONTROL, MARKETING, SITING, FINANCING AND MANAGEMENT

In order to effect resource recovery it is essential to achieve waste stream control, contract for the sale of the energy product, secure acceptable an site(s) and acquire capital funds to complete the project. A discussion of these aspects follows.

A. WASTE STREAM CONTROL

The principal goal of waste stream control is to acquire the ability to contract, on a long-term basis, for the necessary tonnage which will be processed at the resource recovery facility for 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.

In the United States, three methods have been used to gain control of the solid waste stream. These methods are:

- Long-term contracts with individual municipalities.
- Franchise of 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 lie within the degree of control over the waste stream that can be pledged to any bondholder and to the facility.

A summary of waste control alternatives are shown in Table 7. Presently, only 43% of the municipal waste stream is either collected by the municipality or under contract to a municipality.

B. MARKETING REFUSE DERIVED ENERGY

The purchaser(s) of the refuse derived energy (RDE) product must be established prior to construction of a resource recovery facility. Since RDE products would replace conventional fuels users must be assured of their suitability for combustion in their boilers. Therefore, the energy product must meet strict specifications for BTU content, reliability of supply, ash content and combustion emissions. For the same reasons, potential users will be hesitant to use RDE products unless they feel the potential benefits outweigh the risks. This is why RDE products must have a distinct price advantage over conventional fuels. When a RDE customer is

TABLE 7

SUMMARY OF WASTE CONTROL ALTERNATIVES

Waste Control Alternatives	Overall County Control	Effectiveness of County-wide System Management	Type of County Designee	Implementation Ease	Implementation 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 7 (cont'd)

SUMMARY OF WASTE CONTROL ALTERNATIVES (cont.)

Waste Control Alternatives	Municipalities Involved*	Waste Control (Guaranteed Tonnage)		Residents Payment Method	Disposal Fee	
		Area	Types		Municipality Pays To	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

established, the resource recovery system can be designed to produce a product which meets the needs of the user. Therefore, the County's prime concern will be to locate one or more energy users which are not likely to cancel their energy demand on a temporary or permanent basis. The U.S. Army installation at Picatinny has potential to be an excellent RDE customer based upon the above considerations.

C. SITING RESOURCE RECOVERY FACILITIES

The location of the energy user will influence the siting of the resource recovery facility. Acceptable sites must meet a number of criteria. Table 8 identifies three sites which meet the listed acceptability criteria. The Ledgewood site was used in computing cost effectiveness of the resource recovery alternatives. The three sites identified benefit from their proximity to Picatinny and the existing landfills which could be used for residue disposal. However, other sites may be found acceptable in the future.

D. FINANCIAL REQUIREMENTS AND ALTERNATIVES

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 recovered 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.

A summary of the available financing mechanisms is offered in Table 9. 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.

E. ADMINISTRATION AND MANAGEMENT

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

TABLE 8

MORRIS COUNTY RESOURCE RECOVERY FACILITY

SITE EVALUATION CRITERIA MATRIX

CRITERIA \ SITE	LEDGEWOOD	RT 80/206 MT. OLIVE	RT 80/200 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 Leveling Required	Minimal	Some filling of low areas required, some land clearing required
8. Current Site Use	Extraction, Wooded	Vacant, Formerly Agricultural	Vacant,
9. Surrounding Land Use	Int. Hwy. 80, Commercial, Low Density Res.	Existing Landfill, Agricultural, Vacant	Agricultural, Vacant

TABLE 9

DECISION MAKING ELEMENTS FOR FINANCING OPTIONS

Financing Option	RISK ELEMENTS				County Ownership	County Debt	Interest Rate	Tax Benefits on Capital Asset
	Technology	Facility Operation	By-Product Marketing	Long Term Solid Waste Delivery Contracts				
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 Impact	At or Between G.O. and Revenue Bond	Gained

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 further.

The requisite areas of responsibility that should be considered in selecting an institutional body are financial capabilities, contractural and legal authority, waste stream control, marketing commitments and land acquisition.

The Solid Waste Management Plan for Morris County includes the following key features regarding financial legal and institutional issues.

1. It is recommend 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.

2. Discussions should continue with Picatinny toward the goal of establishing an agreement for the purchase of refuse derived fuel. The County should undertake efforts to interest other large energy users in RDE.

3. Final decision as to 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, and the level of bonded indebtedness already incurred by the County.

4. A County authority has management advantages over a 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. 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. It should be noted that the existing County MUA could be designated as the implementing 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.

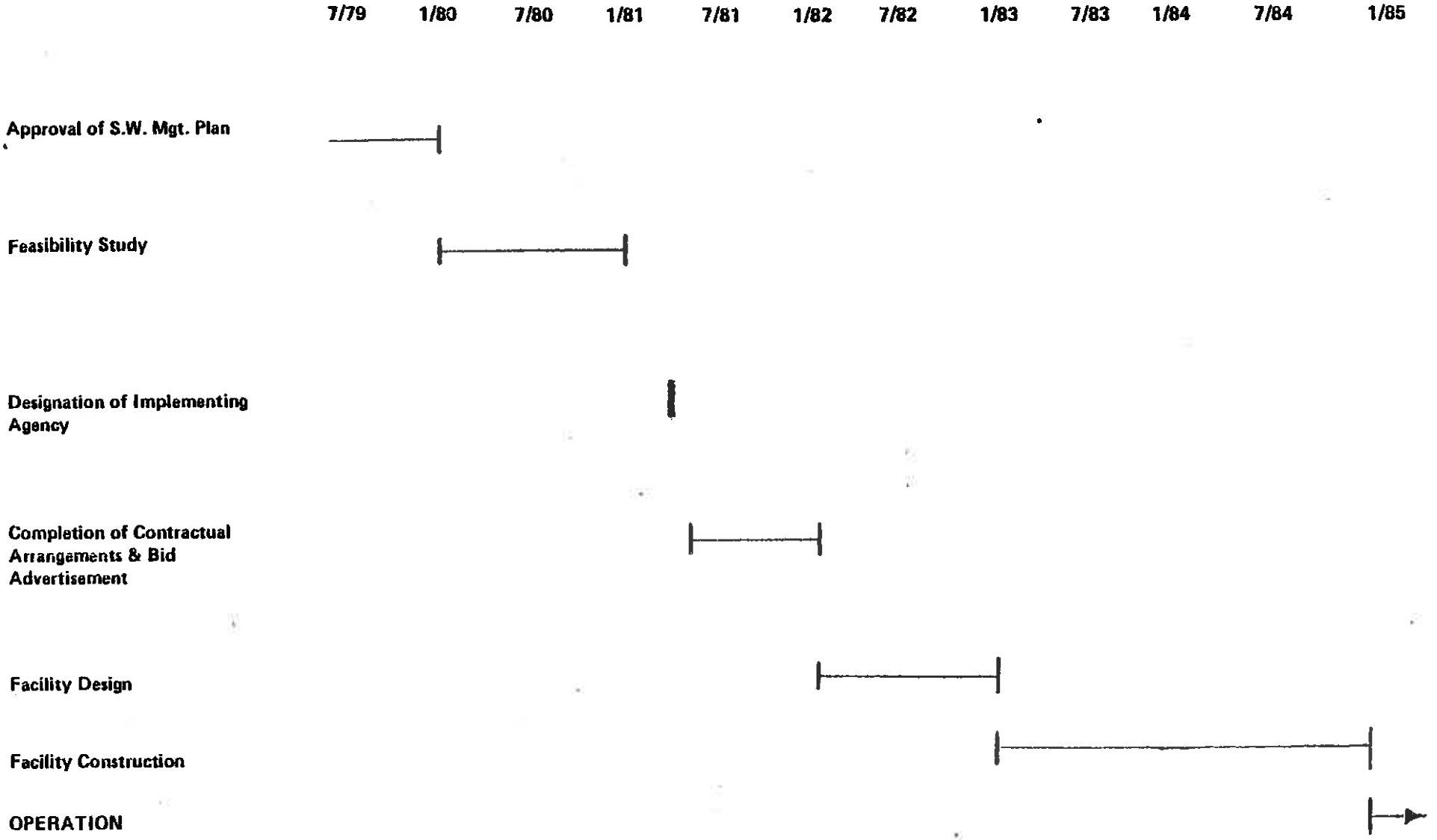
IV. IMPLEMENTATION SCHEDULE

In order to carry out the recommendations contained in this plan, specific determinations of their feasibility must be made. The participants in this process will be the Counties of Morris, Passaic, Sussex and Warren and private landfill operators. In addition, advice will be sought from the New Jersey Department of Environmental Protection, Bureau of Public Utilities, solid waste collector/haulers, and the financial sector.

The schedule for resource recovery implementation in 1985 is shown in Figure 3. A feasibility study of the western Morris resource recovery facility (RRF) and the Passaic County RRF will be required. Morris County should undertake the study of the western Morris RRF jointly or in cooperation with Picatinny Aresenal. When this process is complete, final decisions can be reached by the County on which systems(s) are to be constructed to handle the County's wastes starting in 1985. Then following the designation of an implementation agency in 1981, contractual 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 facilty 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. Partial environmental controls have already been constructed at both facilities. Pending approval of expansion plans for the Mt. Olive landfill site by the SWA by December 1979, it is assumed that upgrading would take place during the next two years. Following completion of work at the Mt. Olive facility, attention should then be turned to upgrading the Chester Hills facility.

FIGURE 3
RESOURCE RECOVERY IMPLEMENTATION SCHEDULE



IMPLEMENTATION SCHEDULE
RESOURCE RECOVERY SYSTEM DEVELOPMENT