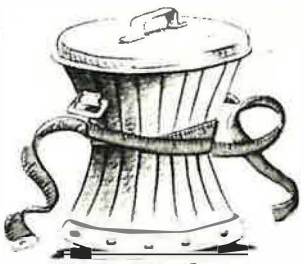
Michael J. Nicosia

WHITE PAPER

NEW YORK CITY RECYCLING STRATEGY



THE CITY OF NEW YORK

Edward I. Koch, ***Mayor***

DEPARTMENT OF SANITATION

Brendan Sexton, ***Commissioner***

OFFICE OF OPERATIONS PLANNING, EVALUATION AND CONTROL

JANUARY, 1988

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EXECUTIVE SUMMARY

The purpose of this document is to explain our rationale for rapidly increasing recycling citywide, to recommend program priorities, activities and timetables, and to propose supporting legislative and policy initiatives. We outline policies and programs needed to attain at least our 15% recycling goal by 1991 and to push recycling to its maximum potential.

To divert 15% of our garbage by 1994 will require immediate expansion of recycling collection and the creation of an infrastructure of processing facilities and markets.

GOALS

The Department's recycling recommendations are based on the success of its current program and an evaluation of economic incentives. They have two major goals. The first goal is to attain the maximum and quickest tonnage reduction possible in order to extend Fresh Kills' life and reduce future dependence on export or new landfill construction. This requires immediate and major expansion of recycling efforts.

It is time to recognize that the capacity in New York City's Fresh Kills landfill is an invaluable resource; once gone, no expenditure will bring it back. Our most recent estimates indicate that Fresh Kills will reach capacity in ten to twelve years. Tonnage has increased from less than 21,000 tons per day in Fiscal 1984 to more than 26,000 tons per day during Fiscal 1987. This increase is almost entirely due to private carter waste which is returning to the City as out-of-City disposal options have decreased or become more costly.

There will always be a need to landfill some portion of the City's waste which either cannot or should not be burned, or which is a residue from burning or recycling. Preserving this resource as

long as possible must be our first priority and is the primary rationale for supporting municipal recycling efforts. These efforts can be achieved both through collection mechanisms and legislative and policy initiatives.

The second recycling goal is to give high priority to materials whose removal provides economic, operational or environmental benefits to other disposal methods. Although resource recovery and landfilling are essential components of any solid waste management strategy, recycling is a necessity in making them work more effectively. For instance, one third of all of New York City's wastes will not burn or are unacceptable for disposal at resource recovery facilities. These two categories include glass and metal, most construction waste, tires, a large percentage of household bulk (e.g., major appliances, large furniture), and most of the dirt and other materials from street cleaning.

Recycling these materials can reduce landfill demand and will substantially reduce ash volume. Recycling specific materials can have environmental benefits and improve BTU content as well as facility operations. Incinerators will also benefit greatly from the removal of non-burnables from the waste stream and both incinerators and resource recovery facilities will probably come to depend on reuse of ash and combustion by-products, because we will not have the capacity to bury it all. Landfill operations improve with the removal of problematic materials such as tires and refrigerators. Both new landfills and export will be so expensive that they will only be practical if we have first reduced waste volume greatly by recycling and burning. Specifically, in this document the Department proposes collection programs to divert household bulk and other non-burnables and unacceptable materials from these disposal sites.

DISPOSAL ECONOMICS

Although recycling is often considered a net expense in the City, this is only because it is here now, while resource recovery, export or new landfills are just prospects. In reality, recycling

will be the key to making other approaches affordable. More stringent regulations for closing landfills in the Northeast and the fact that there is a "seller's market" for export of waste are increasing the cost of all waste disposal mechanisms at such a rate that we fully expect the tipping fee to continue to be raised each year. Tipping fees have increased more than 400% in the past five years and the last estimate of $51 per ton, will soon seem a bargain. In addition, reported export costs now reach $85 per ton and higher.

To force maximum possible recycling of commercial waste the City must charge the private sector for the true cost of disposal. Private carters are not yet paying a fee equal to the most recent estimate of Fresh Kills' replacement value, much less the higher cost that any future analysis will surely project. In the midst of a waste disposal crisis, it makes no sense to run a perpetual fire sale for tipping fees. Private carters have traditionally recycled easily accessible or valuable wastes. As disposal costs increased, private carters, recycling companies and transfer station operators have increased investments in separation equipment to extract recyclables. New tipping charges will further increase their economic incentive to continue recycling materials from commercial and construction waste whenever the cost of recycling is less than the cost of disposal. These recycling activities will help in reaching our percentage goals, although we cannot reliably predict how many tons will be diverted by fee increases.

Our plans for diversion of this waste stream are primarily regulatory. They are designed to encourage the existing recycling trends and include: (1) increasing tipping fees very sharply; (2) banning selected materials from disposal facilities; (3) reducing or not charging tipping fees for segregated loads of recyclable materials; and (4) imposing legal or regulatory requirements that businesses separate out recyclables or that private carters recycle certain materials.

Programs and policies to further encourage recycling from the private sector should first target the estimated 3,800 tons per day of commercial and construction waste which is either non-burnable or unacceptable at resource recovery facilities.

MANDATORY RECYCLING

Financial incentives however, do not exist for fully 60% of the waste generated in New York City. Therefore, it is essential to create policy, regulatory and legislative mechanisms to require recycling from those who do not pay for waste collection or disposal. This means that recycling must be mandatory to ensure the highest level of participation and lowest per ton cost of collection. Those affected include homeowners, apartment dwellers, and tax-exempt property owners who have no direct economic incentive to reduce current or future City disposal costs. City agencies also have no direct budget incentive to recycle, even if the cost of separating out materials for recycling would cost their agency less than the cost to the City of collecting and disposing of those recyclables as garbage.

Recycling 4,200 tons per day (15% recycling based on 28,000 tons per day of garbage in 1991) can and should be achieved primarily by recycling material from these individuals and agencies. They are the highest and most immediate priority for the Department collection programs described in this document. Little recycling is done now from these locations and any recycling achieved by mandatory participation in Department programs will result in system-wide savings for regular garbage collection.

DEPARTMENT RECYCLING PROGRAMS

We have concluded that a successful and cost-effective commitment to recycling requires the City to:

1. Establish a citywide mandatory waste separation and recycling program directed primarily at those who receive free collection or disposal services.

2. Site and build processing facilities for many of the materials collected by the Department for recycling (as well as support the development of facilities in the private sector) which are more efficient and can accept a wider range and type of materials.

3. Actively promote markets for materials which are collected for recycling purposes.

Implementation of the Department's programs will enable the City to divert the materials listed in Exhibit I, assuming a well-enforced mandatory program. Diversion of the 4,375 tons per day projected from the non-commercial waste stream will enable the City to exceed its 15% goal.

The most visible and largest program recommended by the Department is to expand our current programs to collect six materials. These six materials would be separated by residents and agency employees and set out in two separate piles (3 types of paper in one and 3 types of containers in another). By limiting sorting to two piles we increase ease of participation and worker efficiency. Where possible, the Department will collect using containerized vehicles, which are cheaper to operate. For most of the City however, access and storage space limitations will require pick up at the curb, much like the current curbside program. The costs for both the curbside and containerized programs will be offset by savings from our regular household collection efforts. Because materials will be diverted away from the regular household waste, our existing routes can be extended. If we also replace one regular collection day with a recycling collection day the offset will be even greater.

Contingent upon the City's fiscal condition, we propose that our programs expand in Fiscal 1989 to cover all residents in Manhattan and Staten Island and in three districts in each of the three other boroughs. By the end of Fiscal 1991 all residents and agency employees in all boroughs should be mandated to divert all six

EXHIBIT I

TONNAGE TO BE DIVERTED

(by material)

Materials	Tons Per Day Recycled[a]
1. Newspaper, magazines, corrugated paper, and glass, metal and some plastic containers	2,270
2. Leaf and yard waste from the residential areas and parks	80
3. Household bulk materials	400
4. Lot cleaning	400
5. Other institutional material (e.g., paper, inter-agency construction waste, office paper, and metal and plastic)	200
6. Ferrous metal recovery at incinerator locations	200
7. Bottle bill materials	825
Subtotal	**4,375**
8. Private Carter Materials	550
GRAND TOTAL	**4,925**

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[a] By the end of Fiscal 1994.

materials; by then the Department's curbside and containerized programs should be capturing more than 1,000 tons per day.

In addition to mandatory separation of recyclable materials by households and agencies, we recommend the on-site processing by City agencies of some materials which are disposed of in large quantities, such as baling of corrugated in office buildings and composting of leaves at park locations.

PROCESSING FACILITIES

The City must establish processing facilities in each borough to further sort and prepare most of the recyclables collected by the Department. Existing private sector operations may be able to process mixed appliances and wood from household bulk collection and certain separated materials. However, there are currently no facilities available to accept other mixed materials from the residential waste stream, nor do composting sites exist for leaves and yard waste. The extraction of the remaining ferrous metal at incinerator sites, separation of dirt and recyclables at vacant lots and screening of excavation and demolition material at Fresh Kills for landfill cover will all require substantial investments in equipment. Transfer stations are also essential to lower transportation costs and provide interim storage before delivery to processing facilities.

Siting and construction must begin immediately for these facilities. Existing Department locations will be given priority as potential processing sites in order to minimize barriers to meeting the deadlines for expansion of collection programs.

Policies to encourage the private sector to expand or upgrade their own facilities to accept Department recyclables or process more non-burnable and unacceptable materials include: assistance in locating sites; changes in some transfer station regulations; financial assistance; and long term contracts which guarantee a

steady flow of materials and revenue. The City should purchase (contract for) transfer station services in areas where we cannot site our own processing centers.

MARKETS

Markets must be developed for recycled materials because current markets probably cannot absorb the potential tonnage in the Northeast region if most localities move toward municipal recycling. We will minimize market fluctuations by collecting materials with the highest potential for resale, processing them in a manner that makes them competitive and spreading market risk by collecting as many materials and targeting as many market options as possible.

Market development is critical to ensure a demand for collected recyclables. The City must create its own markets through direct use of materials by City agencies. For example, crushed glass can be used as a substitute for stone in asphalt while plant and composted leaves are useful as soil additives in parks. The City should also encourage new markets by specifying recycled content in products the City buys. And the State must make new market development for recycled materials a major priority for State agencies under the New York State Solid Waste Plan.

To attain these goals, we propose an implementation schedule which will enable the City to establish a collection, processing and marketing infrastructure to reach our 15% goal (although not until the end of Fiscal 1994). By the end of Fiscal 1991 we could be diverting approximately 3,200 tons per day (11.4%). Also by that time, dump fees should reach at least $30 per yard, raising at least an additional $75 million a year and diverting from our landfill 550 more tons per day (2.0%). However, because of the City's current fiscal condition this schedule may need to be revised.

LEGISLATIVE AND POLICY INITIATIVES

Legislative and policy initiatives will be effective mechanisms towards managing our solid waste. In addition to mandatory recycling, the City will actively propose and support waste reduction and recyclability legislation and revisions of building codes. These legislative actions and code revisions are attractive because, to a large extent, they will enable the City to exceed its 15% diversion goal as well as put the burden of cost on the private sector. However, as stated in our first goal, the City must achieve the maximum and quickest tonnage reduction possible. These initiatives supplement the recycling programs we put forth; they do not compete with or serve as substitutes for the recycling programs. Many of the legislative initiatives however cannot be implemented or have significant diversion impacts in the near term.

Waste reduction legislation is recommended to provide incentives for manufacturers to produce long-lasting, durable products or reusable products; to ban or severely tax excessive packaging and disposable goods; and to place deposits on targeted materials (e.g., beverage containers, batteries, tires). In order to improve the recyclability of the waste stream we recommend supporting legislative and policy initiatives which emphasize substituting hard-to-recycle materials which have not yet developed markets with easily recyclable materials which have available markets. Revisions in the New York City building codes must also be made too so that it is easier and safer for people to separate and store materials for recycling.

TABLE OF CONTENTS

TABLE OF APPENDICES

TABLE OF EXHIBITS

1. NEW YORK CITY SOLID WASTE MANAGEMENT STRATEGY

New York City's Fresh Kills landfill capacity is being rapidly depleted and no one solid waste disposal mechanism can manage the enormous volume of waste which the City generates each day. Recycling, the recovery of materials from the waste stream for reuse, diverts wastes from diminishing and increasingly costly landfill space. In addition, it provides economic, operational and environmental benefits to resource recovery, landfilling, incineration and export strategies. We will continue to raise the tipping fees each year based on the increasing costs of all disposal options. These increases spur greater recycling efforts among the commercial and construction sectors. However, for more than half of New York City's citizens and organizations no economic incentives exist; policy and legislative actions are required. Our pilot programs demonstrated both that New Yorkers will recycle and that there do exist economies of scale that make recycling an economically viable activity. Knowing this, we present recommendations for the design and scope of New York City's recycling programs.

RECYCLING

Garbage by itself is not worth anything except as a fuel. In order to sell any portion of municipal solid waste, it must first be upgraded to a product that has worth to the buyer. The first step in upgrading is to separate out materials with potential value. These materials must then be collected and delivered to intermediaries who will further sort, process and aggregate the materials to the requirements of the final consumer.

Although markets exist and can be strengthened for all of the materials targeted by the Department for recycling, market demand remains the single greatest limitation to recycling. Both regional and export market demand are limited and the potential availability of recyclable materials, if the entire Northeast region embarks on

collection programs, is larger than the current capacity of markets to absorb them. The City must act to increase market demand for all of the materials targeted for collection. This is essential in order to ensure their ultimate use as raw materials.

Every other waste disposal strategy depends on making recycling a success. This is true politically and operationally. Incinerators benefit greatly from getting unburnable materials out of the waste stream, and will probably come to depend on the reuse of ash and combustion by-products because we will not have the capacity to bury it all. Export of solid waste will be so expensive that it is only practical if we have first reduced waste volume greatly by recycling and burning. Although recycling is often considered a net expense in our City, this is only because it is here now and resource recovery, export, or new landfills are still just prospects. In reality, recycling will be the key to making other approaches affordable.

WASTE REDUCTION

Waste reduction programs reduce the amount of materials that become waste and thus reduce, at the source, the amount that has to be collected and recycled, burned, landfilled or exported. Waste can be reduced by substituting reusable, durable goods for disposable ones; by using refillable containers instead of disposable ones; or simply by eliminating excess materials. However, waste reduction is the least understood waste management option and the most difficult to implement because it depends on controlling either: (1) personal or organizational buying habits, or (2) a manufacturing process that may take place outside of the locality implementing a waste reduction initiative. Buying habits are difficult to control and usually depend on voluntary compliance in the presence of many purchasing alternatives. Control over manufacturing processes, which might be affected through the tax system or legal prohibitions, will most likely result in higher costs and/or fewer choices for the consumer. Most waste reduction

initiatives must overcome very strong opposition from the industry whose products the program seeks to reduce.

There are few precedents for government-sponsored waste reduction programs. The few measures passed in the last decade have been ineffective. We believe however, that with a more concerted effort from the Federal, State and Municipal levels, effective legislation could be proposed and passed. Many bills referred to as waste reduction legislation relate to other recycling or environmental issues. Some, for example, concern the collection of materials for recycling while others attempt to improve the recyclability or reduce the environmental impact of a particular substance. These efforts are discussed in more detail in Chapter 7.

RESOURCE RECOVERY FACILITIES

Resource recovery facilities are a critical component in any overall solid waste management strategy. They simultaneously convert solid waste to energy and reduce the total volume of waste collected. In addition, they provide an alternate disposal option (to landfilling) for wastes which cannot be recycled.

The limitations of these facilities cannot be ignored, however. At least one third of all of New York City's refuse is either non-combustible or contractually unacceptable for disposal at resource recovery plants (see Exhibit 1.1). In addition, these plants reduce, but do not eliminate, waste. Assuming two thirds, or 19,000 tons per day of waste were burned without separation of non-burnables, approximately 6,000 tons per day of ash would result and remain for final disposal at a landfill. There is a trend to more stringent regulation of ash disposal at the state and federal levels. At some future date ash may no longer be acceptable for routine landfilling. In fact, the current Draft Permit for the Brooklyn Navy Yard outlines special disposal requirements or pre-treatment for ash residue. Monofills (a landfill devoted entirely to one material, in this case, ash) may be mandated, incurring higher costs than regular landfills.

EXHIBIT 1.1

UNACCEPTABLE AND NON-BURNABLE MATERIALS

1. Unacceptable Materials[a]	Tons/Day[b]	
Delivered in Segregated Loads		
Household Bulk[c]	710	
Lot Cleaning	810	
Ash	690	
Street Dirt	1,010	
Construction	1,960	
Housing Authority	190	d
NYC Agencies	100	d
Household Waste	70	
Miscellaneous	60	
Subtotal	5,600	
Delivered in Regular DOS & Private Collections[e]		
Tires	190	
DOS Bulk	330	
Private Bulk	900	
Subtotal	1,420	
Total Unacceptable	7,020	
2. Non-Burnable in Regular DOS & Private Collections[e]		
Residential Metal & Glass	960	
Commercial Metal & Glass	900	
Total Non Burnable	1,860	
TOTAL UNACCEPTABLE AND NON-BURNABLE	8,880	

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a As defined in the Brooklyn Navy Yard Agreements.

b Figures are rounded to the nearest 10 tons from the First Quarter Fiscal 1988 Bureau of Waste Disposal Operations Loads and Tonnage Report.

c Household bulk consists of large items such as appliances, furniture, carpeting, lumber, tree branches, and construction waste from do-it-yourself home repairs.

d Does not include full pool of materials collected.

e Estimated tonnage which is mixed with other garbage (i.e, not segregated).

The environmental and operational limitations imply two directions for recycling:

a. Diversion of targeted materials from resource recovery facilities to enhance the plants' operational cost and performance, energy recovery potential (e.g., non-burnables) and environmental acceptability (e.g. batteries). Other materials should also be targeted for diversion because they may impede energy recovery, although they are capable of burning (e.g., leaves). If these diverted materials can then be recycled, landfill space will be saved.

b. Ash reuse must be a recycling priority. Road construction, cinder block substitutes, land reclamation or other ash uses must be developed and exploited. Ash recycling could, in the future, make the key difference in how great a role resource recovery can play in solving our crisis.

LANDFILLS

Landfilling will remain a necessary part of any solid waste management plan. Resource recovery-generated ash, and materials which can neither be easily recycled or cannot or should not be accepted or burned at the resource recovery plants require priority status for landfill disposal, both at our current landfill as well as at any future landfills.

As Fresh Kills reaches its maximum capacity we will have to open another landfill or begin to export waste. The politics of either option will be extremely sensitive. The unpopularity of accepting another municipality's waste is only further exacerbated when the waste's origin is New York City and the volume per day is so great. If, and it is debatable if, the waste is accepted beyond the City's limits, the price extracted by the importer will be very high (see Appendix A); the competitive practices that keep prices down in other markets will not apply here without extensive regulation or

intervention at the state or federal level. And, unlike landfills established a generation ago, a modern, lined, environmentally acceptable landfill is an expensive undertaking. In addition to the disposal fees charged by the importer, the logistical, operational and cost considerations for transporting solid waste remain difficult.

The Mayor and the Board of Estimate supported the Department in bringing the disposal charge in line with its true replacement value, although we have been prudent not to move so quickly as to create market disruptions. The disposal charge (tipping or dump fee) to private carters was raised this year from approximately $24 per ton to $38 per ton, but this 57% increase still does not reflect the true value of the landfill. The current estimate of this value is $51 per ton ($24.89 per yard). Implicit in this value are conservative assumptions that may not be realized: eight resource recovery facilities will be operating by 1997, recycling diversion levels will reach 15% by 1991, the cost of export will not exceed $85 per ton, capital costs will remain constant and ash disposal will not require special treatment. If any of these assumptions does not hold, the value of the landfill would increase further and even $51 per ton will be a bargain. We anticipate that with each yearly dump fee analysis our estimate of replacement value will increase.

The price increase has spurred the large private carters and their customers in New York City toward further recycling efforts to reduce costs. However, the financial incentive does not apply to the residential, governmental, and tax-exempt sectors because they pay no tipping fee. This means that for the 17,000 tons they dispose of daily, we must initiate and support other approaches to assist in extending the life of Fresh Kills.

2. CURRENT RECYCLING EXPERIENCES

In order to gain experience with recycling collection, public outreach, material handling and processing, and market development, the Department operates two direct collection recycling programs, manages the City Agency Office Paper program, and financially supports four others operated by outside groups under contract to the City. All of these efforts are extremely small when compared to the size of New York City and must be considered pilot programs. From them we are learning how to design large-scale, cost-effective programs that can reach and perhaps exceed our 15% recycling goal.

DIRECT COLLECTION PROGRAMS

Department personnel and equipment now collect recyclables in two programs: Curbside and Containerized Apartment House. In Exhibit 2.1 the actual and projected tonnages from both programs are presented.

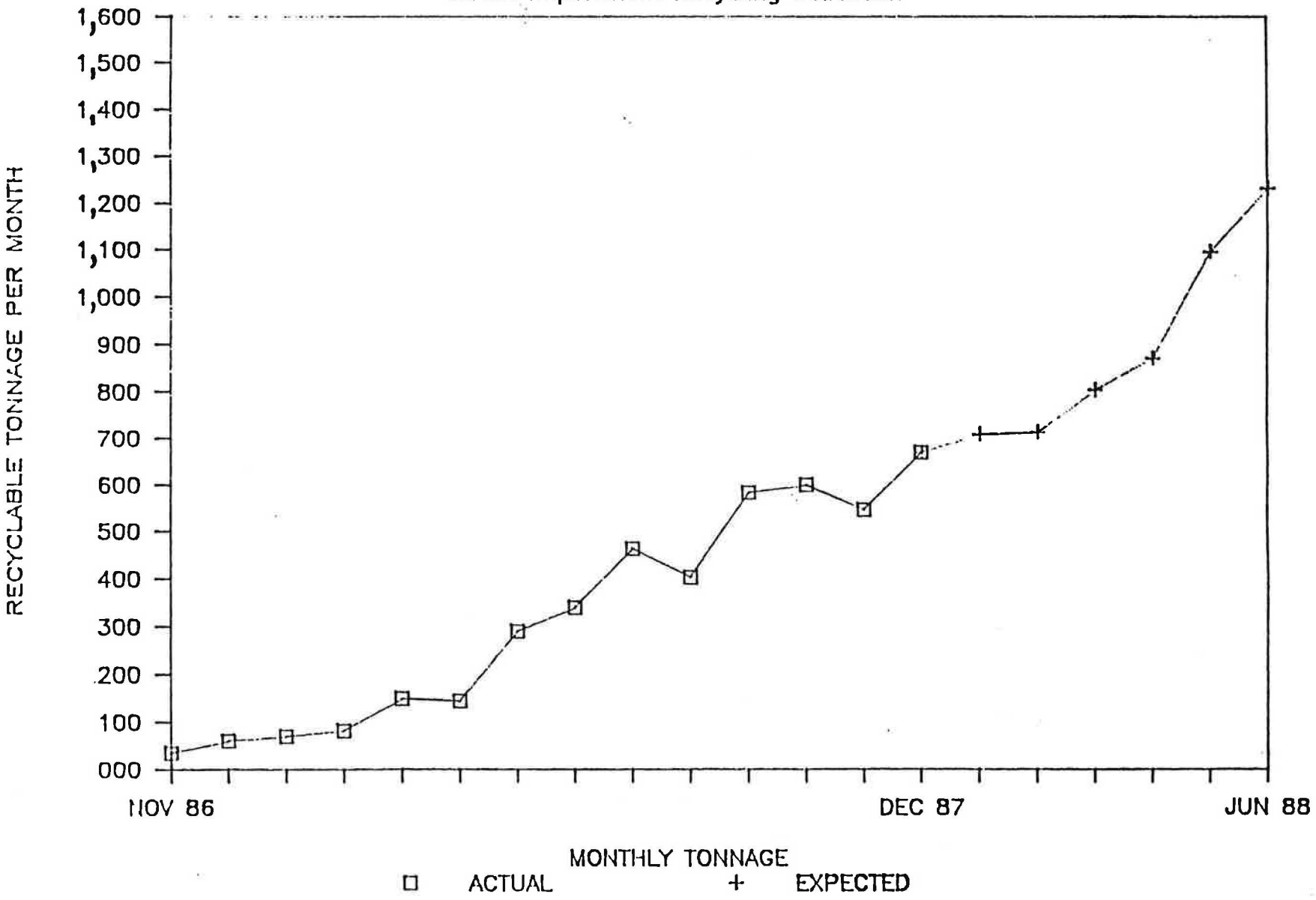
Curbside Collection: Started in November 1986 in one district, the Department now provides separate weekly pickup of newspapers to more than 110,000 households in all or part of six districts, two in Manhattan and one in each of the other boroughs. Modeled after successful programs in suburban areas, the selected areas are predominantly one and two family houses with the exception of the Manhattan districts in Greenwich Village, Soho, and Chelsea. Currently we collect about 410 tons of newspaper each month.

In the spring of 1988 we are due to add four more districts, bringing the total number of households to more than 200,000. Material expansion (glass and metal containers) to all but the two Manhattan curbside areas will also begin in the spring. We will collect an estimated 1,200 tons per month of paper, metal, and glass from these ten areas by July 1988 if we continue to achieve the same diversion rates achieved so far.

Containerized Apartment House Program: Also started in November 1986 in Manhattan and expanded to Queens in July 1987, this program now collects newspaper from almost 50,000 households in over 500 large apartment buildings. We are scheduled to extend collection to the Bronx in February and the other two boroughs by the spring of 1988. We will also expand collection to include glass and metal containers in the spring in two boroughs. This program is specifically designed for large apartment buildings and is considered a model by other cities planning recycling in dense

EXHIBIT 2.1

"Direct Department Recycling Collection



downtown areas. Almost 170 tons each month are collected now and we expect the program to more than triple in size by July 1988, as new buildings continue to be added in Queens and Manhattan, the other three boroughs begin to participate, and new materials are included.

INDIRECT COLLECTION PROGRAMS

The Department manages the City Agency Office Paper Recycling Program and supports four other programs (R2B2 Buy Back Center, the Environmental Action Coalition's Apartment House Program, Council on the Environment for New York City-Office Paper Recycling Service, and Voluntary Drop-Off Centers). (More detail is provided in Appendix B.) We group these together as indirect collection programs because the pickup of recyclables is not done by Sanitation personnel. Total collection from these five programs combined is now approximately 750 tons per month (see Exhibit 2.2). Our expectation of 1,550 tons per month by June 1988 is based on increased contract resources approved by the Board of Estimate in December 1987, as well as the impact of the recent Mayoral Directive to City agencies regarding office paper recycling.

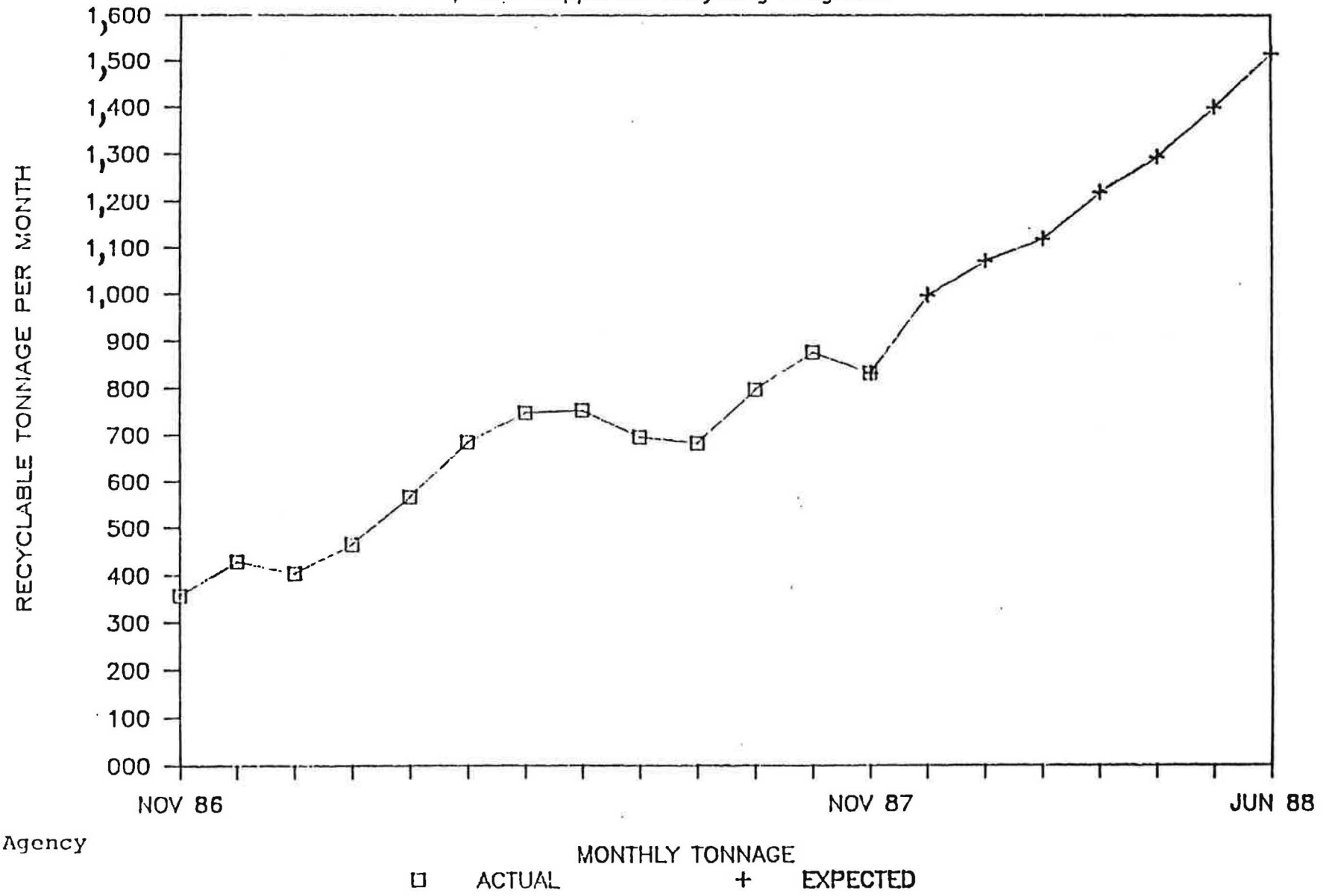
City Agency Office Paper Program: This program began under the auspices of the Department of General Services. The Department of Sanitation took over the program in July 1985. Since that time this program has collected and recycled over 2,300 tons of high grade office paper. The program currently recycles an average of 115 tons per month and is expected to increase to 750 tons per month by the end of Fiscal 1991. The program is currently operating in 41 agencies at 115 separate locations. Revenue from this program currently offsets all costs.

R2B2 Buy Back Center: Operated by a community development corporation in the South Bronx, R2B2 purchases 18 different recyclable materials from the general public. In December 1987 the Board of Estimate approved a contract modification which extends the City's contract with R2B2 and shifts the basis of payment to a per ton fee, making the contract performance driven. With these changes, R2B2 will be able to increase its processing capacity from 300 tons per month to more than 1,600 tons per month over the next two years.

Environmental Action Coalition's Apartment House Recycling Program: Started in 1984, this program coordinates the collection of recyclable material from apartment buildings by private dealers. The primary material collected is newspaper but the program is helping the Department learn how to best collect glass and metal containers as well. The program currently collects 100 tons of newspaper per month and is expected to increase to 200 tons per month in the next year.

EXHIBIT 2.2

DOS Supported Recycling Programs*



*City Agency
R2B2
EAC
CENYC
Drop-off

Council on the Environment of New York City (CENYC): The Office Paper Recycling Service of CENYC, under contract to the Department, coordinates with private paper dealers for the collection of high-grade white paper from corporate and non-profit offices. CENYC's three-year contract ended in November 1987 and a new, two-year contract was approved by the Board of Estimate in December 1987. Under the new contract, CENYC will be expanding from office paper to collection of corrugated paper, newspaper and plastic. In addition to private sector office buildings, the Council will also target large not-for-profit institutions, State and Federal agencies and schools. In particular, CENYC is implementing an innovative recycling program in elementary schools that teaches about the City's waste disposal problems while encouraging students to recycle waste paper generated in the classroom. CENYC programs currently recycle about 170 tons per month.

Voluntary Drop-Off Centers: The Department has provided financial and technical support to four small drop-off recycling centers that have been operated on a voluntary basis since the mid 1970's. Although together they now collect less than 40 tons per month, they educate a large number of people about recycling and the waste disposal crisis, and they have the potential for expansion if the focus is shifted from voluntary operations to operation by organizations with paid staff.

PROCESSING CENTERS

Processing centers upgrade the recyclables' worth by sorting, processing and aggregating the materials to the requirements of buyers. They are necessary for expanding Department recycling collection programs, particularly those aimed at non-burnables or mixed materials from the residential waste stream. Insufficient processing capacity is the second greatest impediment to recycling expansion, after market capacity, but we will have to solve the processing problem first.

To support the planned collection of glass and metal containers the Department has contracted for the reconstruction and operation of an Intermediate Processing Center (IPC) in East Harlem. Both the center and site are city-owned. Starting in spring 1988 the IPC will accept comingled (mixed together) bottles and cans, as well as some of the newspaper collected in our curbside and apartment house programs, separate them by material, and process each material for market. The IPC operator is also responsible for the sale of all materials delivered to the center.

We can implement direct collection of recyclables far faster than we can site and construct processing facilities. For example, we will be collecting more material than our IPC operator is obliged to accept before the facility opens, and will exceed its total capacity by Fiscal 1990. While we can partially compensate for this by diverting newspaper to private vendors (perhaps at a price in collection efficiency), there is no place at this time where we can bring the glass, metal, and plastic containers we plan to collect. New facilities must be built and interim measures planned while these facilities are sited and constructed. Opportunities for both steps are discussed in Chapter 5.

The space limitations of our first IPC make it more expensive to operate than other facilities in the region and increase per ton capital costs. The lack of space means that cheaper methods and additional markets cannot be exploited. In contrast, the same vendor who will operate the City's plant is involved with facilities in Massachusetts and other locations where tonnage capacity and material collection options have been increased. In Chapter 5 information is provided about opportunities for lowering processing costs in the future.

PUBLIC PARTICIPATION

So far, participation has been excellent for the early stages of our voluntary programs. The programs are strongly supported by community leaders and we have a waiting list of districts that want to be included. This has been reinforced by the number of positive responses to the Department's subway poster campaign (more than 1,000 letters), and comments voiced at public forums. The public is aware of the waste disposal crisis and the contribution recycling offers as one strategy to deal with it. Most important, however, we have learned that New Yorkers are willing to change their behavior to help recycling succeed.

Strong public participation cannot be taken for granted. We are not yet achieving the voluntary participation achieved by other localities with older programs, much less the highest rates achieved

with strictly enforced mandatory laws. Continued public education and outreach are essential in keeping the public aware of the programs and participating properly. The more we invest in outreach the more people participate, and the manner in which the public participates improves as well.

Not all participants in our recycling programs are altruistic in nature. Many have a direct economic interest in participation. For example, hospitals which pay for collection are seeking the services of our consultants to set up office paper recycling programs and are installing baling machines to enable them to sell their corrugated paper. The buy back center obtains most of its materials from entrepreneurs who are earning a living or supplementing a salary through collection from others. An increasing number of building managers are interested in joining our apartment house programs because recycling newspaper, bottles, and cans decreases the cost of garbage compactor maintanence and the frequency of repairs. Many customers served by the private sector are beginning to see recycling as a way to reduce disposal costs and, in the case of office buildings, a way to earn revenue from a valuable commodity. Obviously, continued tipping fee increases are a key tool in fostering this process.

WASTE COMPOSITION STUDIES

We sized our collection vehicles based on national averages for the composition of newspaper, bottles, and cans in the residential waste stream. From the very beginning of the curbside program however, we have collected more paper than originally projected and in some cases, trucks fill before the end of the work day. Our original estimate of the percentage of newspaper in our waste stream was fairly high (7%). As a result twelve hand-sorting studies were done by the Department. We found newspaper to comprise more than 14% of the waste stream in some seasons in some residential neighborhoods. We now use an estimate of 10% in projections for residential collection.

Based on evidence from our programs and results elsewhere, we

believe that certain products appear in our residential waste stream in disproportionate amounts. We will conduct more extensive studies of the waste stream to verify and quantify the amounts, identifying the materials by type and source.

COLLECTION OPERATIONS

The most important lesson we have learned from our pilot programs is that truck capacity is a critical factor in reducing collection costs. If we are to cut recycling collection costs, we must design larger trucks and seek out and encourage markets that can accept compacted materials (e.g., mixed broken glass).

Programs that are not directly operated with Department workers have also provided valuable insights. The flexibility of drop-off and buy back operations allows them to decide virtually overnight to accept a new material. They can choose to organize any apartment building willing to collect, for example, plastic laundry soap containers or glass bottles, with very little lead time as long as collection and marketing options are available. This makes these programs invaluable as we continue to experiment and evaluate different aspects of new collection programs, different approaches to gaining public participation, targeting materials and preparing them for collection, and market responses to additional materials.

MARKETS

To date we have only sought buyers of office paper and newspaper. We have found that there are clear limits to the ability of existing paper dealers to accept paper generated by our programs, for several reasons. Some dealers have capacity or processing limits, or limitations imposed by the requirements of their buyers. We are learning to better identify these constraints, as well as the degree of the dealer's interest in City bids for newspaper. In fact, bids have increased in number and dollar amount since the programs began operation, implying that dealers are adjusting their operations to fit our requirements.

Although we are receiving excellent prices for our office paper, very few paper dealers have the truck fleet to service so many building locations. As we add offices, however, existing trucks can be more effectively used by having more stops per route. Routes become more efficient and profitable for a dealer to service.

These impediments can be removed through longer contracting periods which can justify upgrading facilities and purchasing of vehicles, through policies which make City paper dealers more competitive in the regional marketplace, and policies which expand markets for all materials.

3. GOALS OF RECYCLING

The Department's recommended recycling programs address two primary waste disposal goals. The first is to divert the maximum amount of material from the waste stream in order to extend existing landfill capacity, reduce dependence on resource recovery, and reduce the eventual need for export. Our second goal is to divert specific materials from the waste stream that will allow disposal strategies to operate more efficiently and with a greater degree of public acceptance.

Our specific recycling collection programs are primarily directed at those who do not pay for waste collection or disposal and are based on the following four guidelines.

(1) Mandatory participation is necessary to ensure the highest level of participation for Department programs and lowest per-ton cost of collection. The acceptance of a citywide mandatory policy will involve the entire population, create awareness and peer pressure and foster the marshalling of the combined resources from all City agencies and community organizations. Each proposed program includes this mandate. Voluntary programs peak at a lower and less consistent level of participation which will not achieve long-term savings.

(2) Collecting mixed materials facilitates participation and is cheaper; therefore we recommend comingled materials collection rather than multiple separation. By comingled we mean several materials will be mixed together in one collection container. We recommend comingling glass, metal and plastic containers in one group and various paper goods in another. This method of collection strikes a balance between easy participation and collection and easy separation and processing.

(3) Government supported intermediate processing centers (IPCs) are necessary to process the collected comingled materials. New York City has no private sector separation facilities for comingled residential materials.

(4) Government supported market development initiatives are essential to guarantee that there will be sufficient demand for the materials collected. Existing demand is insufficient for the tonnages to be collected in the region and without markets, the materials will have to be stored or disposed.

We also recommend legislative and policy initiatives to reduce the amount of waste generated and to further facilitate recycling.

(1) Reduce or slow the growth in waste. We support stronger legislation to provide incentives for manufacturers to produce long-lasting, durable products or reusable products; to ban or severely tax excessive packaging and disposable goods; and to place deposits on targeted materials (e.g., beverage containers, batteries, tires).

(2) Improve the recyclability of the waste stream by supporting legislative and policy initiatives which emphasize substituting hard-to-recycle materials which have not yet developed markets with easily recyclable materials which have available markets.

(3) Revisions in the New York City building codes to make it easier for people to separate and store materials for recycling.

We further recommend that the City charge the private sector at least its full, true costs for waste disposal. This means a continued increase in tipping fees to provide an incentive for the privates to recycle to the fullest extent possible.

4. RECOMMENDATIONS FOR RECYCLING COLLECTION

In this chapter we present our recommendations for implementing citywide collection efforts in New York City. We believe that the collection implementation schedule we propose is ambitious but realistic and will enable the City to reach the 15% diversion goal by the early 1990's. However, in order to implement and maintain this schedule the City must start investing substantial funds this fiscal year as well as initiate the technical and legislative market support mechanisms required to protect these investments.

Based on current tonnage estimates, the City must divert approximately 4,200 tons per day if it is to meet the 15% goal. There are sufficient recyclable materials to meet this diversion level from the residences and institutions served by the Department, the Department's lot cleaning operations and governmental or tax-exempt institutions which have free disposal of their wastes at Department facilities. Any additional material recycled from the commercial or construction waste streams, as a result of market forces or Department incentives, provides the City with an opportunity to further exceed its goal and extend the landfill's life even longer.

TARGETING MATERIALS

The first step in designing a recycling program is deciding which materials to target for collection. First we targeted materials which were non-burnable or unacceptable at resource recovery facilities. We then added materials whose removal from the waste stream provides operational, environmental or revenue benefits to disposal facilities. Finally, we targeted materials that are easily identified and separated, that are available in large quantities, and for which markets exist (e.g., newspapers, corrugated, office paper).

These materials (as with all garbage) come to our disposal system from waste collected by the Department of Sanitation (DOS); waste brought to DOS for free disposal; and waste collected by private carters. For each of these waste streams we have identified diversion strategies that consider waste composition, collection mechanisms and market forces (see Exhibit 4.1).

Our recommendations have placed the greatest emphasis on the waste stream collected by the Department of Sanitation and the waste stream brought for free disposal. As shown in Exhibit 4.1 there is high potential for tonnage diversion, little current recycling, and no current financial incentive to the waste generator. The private carting waste stream can be directed to bring recyclables to specific locations either by Flow Control regulation or reduced tipping fees.

Based on the potential pool of recyclables within each waste stream and the participation rates achieved, the total tons per day diverted from waste disposal facilities could reach 4,925. The projected 4,375 tons per day diverted from the non-commercial waste stream alone will enable the City to exceed its 15% goal. In Exhibit 4.2 the tonnage distribution of the recyclables is presented.

EXHIBIT 4.1

WASTE STREAM SOURCES AND CHARACTERISTICS

1. **Waste collected by DOS - 13,390 Tons Per Day (TPD)**

Residential/Institutional	11,870 TPD
Separate Bulk	710 TPD
Lot Cleaning Operations	810 TPD

Recycling Mechanism: Primarily provide direct DOS collection of recyclables

- Curbside collection
- Containerized collection

Rationale for Recycling:

- Market forces do not apply (waste generators do not pay directly for collection or disposal), so law or regulation is required.
- Little recycling takes place now
- We control collection mechanism

2. Waste brought to DOS for free disposal - 1,640 Tons Per Day (TPD)

Other NYC Agencies	1,080 TPD
Housing Authority	390 TPD
State and Federal Government	20 TPD
Institutions	80 TPD
Household Waste	70 TPD

Recycling Mechanism: Primarily regulatory but could provide technical assistance and access to processing facilities.

- Require recycling or source separation at generator site
- Provide outlets for separated materials
- Facilitate markets for generated materials

Rationale for Recycling:

- Market forces do not apply (generators do not pay directly for disposal)
- Little recycling takes place now
- We can mandate material separation

3. Waste collected by Private Carters - 11,010 Tons Per Day (TPD)

Regular Collection	5,810 TPD
Containerized Collection	3,240 TPD
Construction Waste	1,960 TPD

Recycling Mechanisms: Primarily regulatory

- Charge at least the true cost of disposal
- Ban selected materials from disposal facilities
- Charge lower or no tipping fees for segregated loads delivered to processing facilities
- Require source separation by generators and carters

Rationale for Recycling:

Market forces apply (commercial sector pays for disposal out-of-pocket and will divert based on direct economic savings).

* Figures are rounded to the nearest 10 tons from the First Quarter Fiscal 1988 Bureau of Waste Disposal Operations Loads and Tonnage Report.

EXHIBIT 4.2

TONNAGE DISTRIBUTION OF RECYCLABLES

MATERIALS	TONS PER DAY
FROM WASTE COLLECTED BY DOS	
o Six mixed materials collected via curbside/containerized programs[a]	2,270
o Household Bulk	400
o Lot Cleaning	400
o Ferrous Metal Recovery[b]	200
o Bottle Bill at 90% redemption and 100% recycling (residential)[c]	825
FROM WASTE COLLECTED BY DOS OR HAS FREE DISPOSAL	
o Leaf/Yard Waste (residential/institutional)	80
o Additional institutional material	200
Subtotal	4,375
FROM WASTE COLLECTED BY PRIVATE CARTERS	
o Private Carter Materials	550
GRAND TOTAL	4,925

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a Includes some paper goods (newspaper, magazines, corrugated) and some container goods (glass, metal, plastics).

b Discussed in Chapter 5.

c Discussed in Chapter 7.

WASTE COLLECTED BY DOS

Both residential and institutional/governmental wastes are collected directly by the Department. The collection mechanisms for these waste streams include comingled collection of six materials; separate collection of leaf and yard waste; separate bulk collection; and lot cleaning. Indirect collection mechanisms (e.g., drop-off centers) will supplement these efforts. Some materials will be targeted for direct collection by a third party; some will be retrieved through a deposit mechanism or through separation at a disposal facility. We have assumed mandatory participation and derived diversion rates based on this.

Approximately 12,000 tons of waste per day are collected by the Department from households, institutions and City agencies. An additional 1,500 tons per day are collected from lot cleaning operations and separated household bulk.

High levels of participation can only be achieved with substantial public outreach to educate individuals about how, where, and when to participate in recycling programs (even with mandates). The Department will need at least one additional enforcement agent in each district dedicated to monitor and maintain compliance.

The percentage, by weight, that each targeted recyclable contributes to the waste stream must be determined. Vehicle sizing and route development are dependent on knowing the true pool of targeted recyclable materials available for collection in a given area. Waste composition studies must be conducted, involving hand-sorting of residential and institutional waste over four seasons and will require two years to complete.

Six Material Direct Collection

Residents and institutional/governmental employees will be required to separate six targeted materials from their regular

waste. The collection of these six materials will parallel our regular collection service and expand our current pilot recycling direct collection programs. The recyclables will be placed either in containers which are then lifted directly into a Department truck or at the curb where a Sanitation Worker will place them into a truck. We plan to implement containerized collection wherever feasible because it is a more cost-effective service but building storage and truck access requirements will limit the number of containerized sites available.

We have selected an implementation strategy that allows us to phase in districts rapidly; by the end of Fiscal 1991 all 59 districts will be participating in a recycling direct collection program of six targeted materials (see Exhibit 4.3). A more accelerated implementation schedule would be feasible only if the limited number of processing centers presently available could increase quickly.

The six targeted materials are some paper goods (newspaper, magazines, and corrugated) and some non-bottle bill container goods (metal, glass, and plastic). Combined, these materials comprise approximately 25% of the residential waste stream. Institutions are approximately 10% of the Department's collection efforts and our preliminary cost analyses have assumed the same composition distribution. Even with a mandatory law, a recycling program will not collect 100% of the targeted materials. With strong public education and enforcement efforts it may be possible to achieve diversion levels of 85% for paper goods and 60% for container goods. These participation levels will divert 2,270 tons per day. In Exhibit 4.4 the actual and projected per day recyclable material tonnage diversion levels from Fiscal 1987 through Fiscal 1996 are presented.

During Fiscal 1989 we propose expanding our programs to include all residents in the boroughs of Manhattan and Staten Island and residents in nine other districts (three in each of the other boroughs). Manhattan residents will initially be mandated to

EXHIBIT 4.3

Direct Collection Implementation

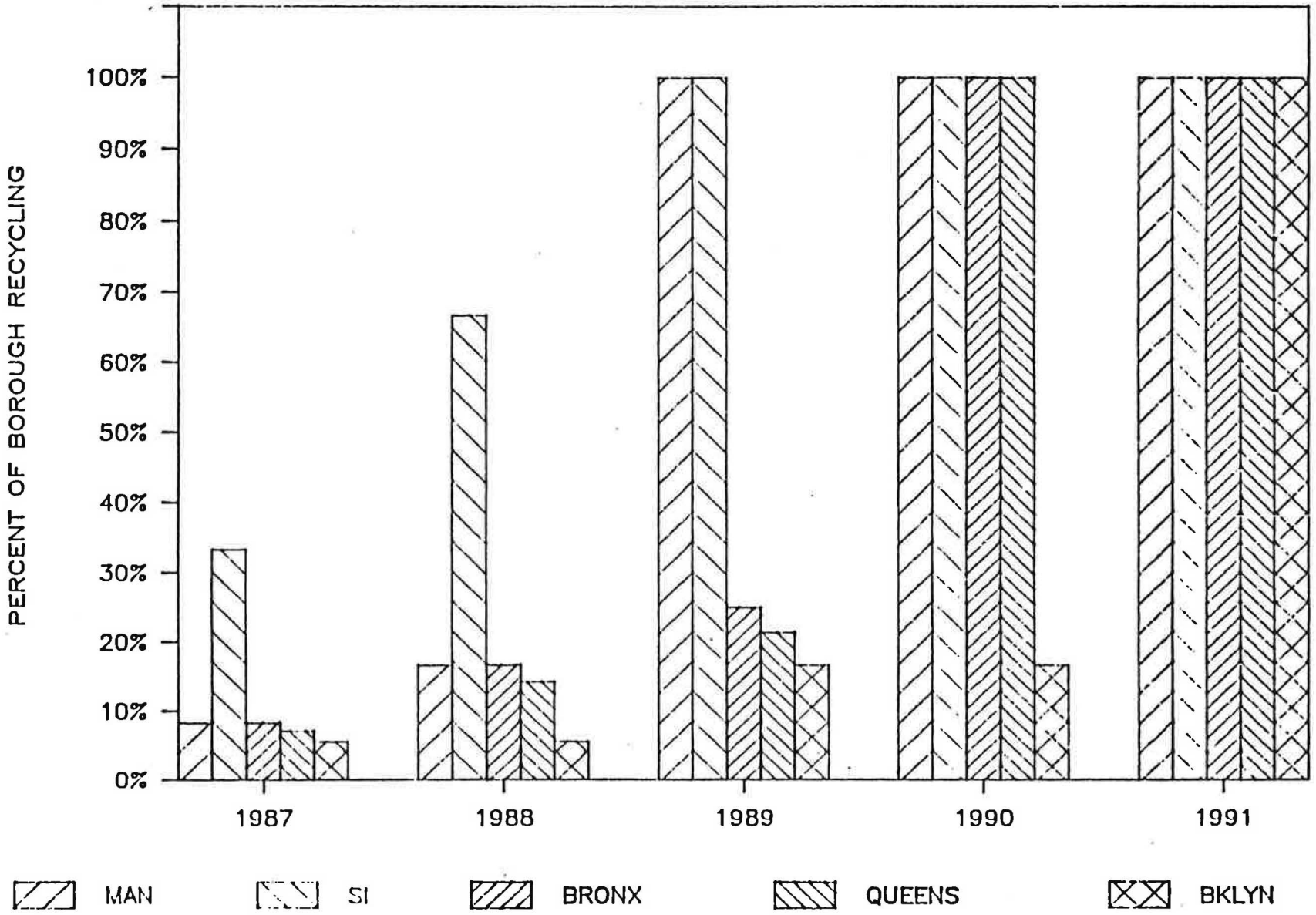
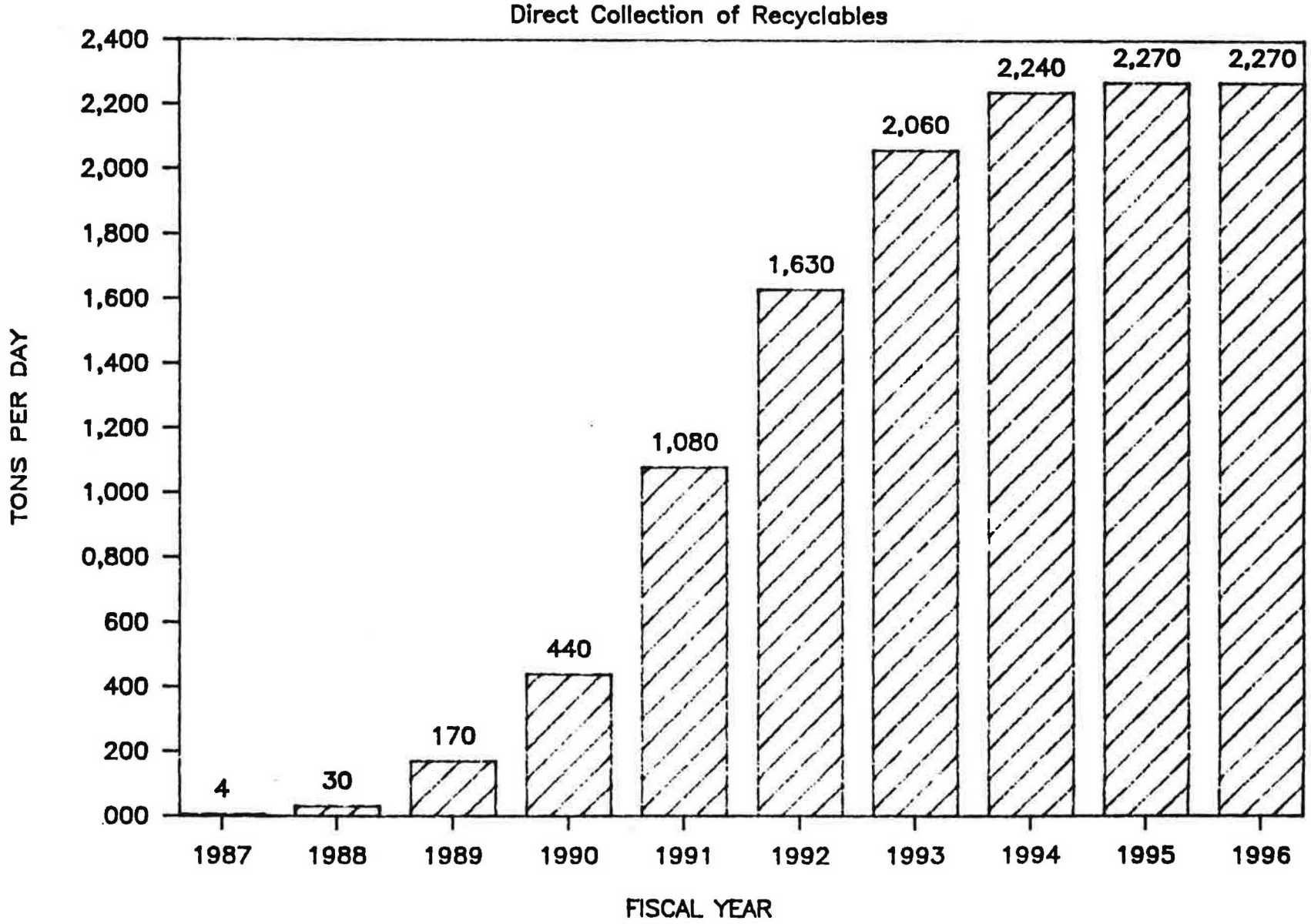


EXHIBIT 4.4


Direct Collection of Recyclables
TONS PER DAY
2,400
2,200
2,000
1,800
1,600
1,400
1,200
1,000
0,800
600
400
200
000
4
30
170
440
1,080
1,630
2,060
2,240
2,270
2,270
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
FISCAL YEAR

separate only newspapers; all other participants will be mandated to separate three materials (newspaper, metal and glass). By the end of Fiscal 1991 every district will be participating in the direct collection program, although the highest citywide level of participation will not be achieved until the end of Fiscal 1994.

There are three distinct ways the Department can conduct its Curbside and Containerized collection of the targeted paper and container goods:

(1) **In substitution for one regular collection service day**
Each household will have one regular collection service day replaced with a recycling collection service. On that day only the recyclable materials will be collected.

(2) **In addition to the regular collection service**
The regular household collection frequency remains the same and one extra collection service is added exclusively for recyclables; our pilot curbside and containerized programs currently operate this way. The extra collection would use specially designed recycling trucks with two separate compartments, one for paper goods and the other for container goods.

(3) **Concurrently with the present regular collection service**
The Department will design and purchase a new fleet of trucks which have three separate materials containers. One compacting container will hold regular household refuse; the two other containers will hold the paper goods and container goods. Each regular collection day the Department will collect all three types of materials.

Each of the these scenarios is assumed to divert the same tons of materials but will require different personnel, equipment, operational and participation demands. Under aggressive but

realistic assumptions about these demands the preliminary cost estimates associated with each of the scenarios approach or are cost-competitive with alternative waste disposal options. In Appendix C each of the scenarios and their inherent assumptions are discussed.

Preliminary cost analyses indicate that a substitution collection will be significantly more cost-effective than other collection approaches and therefore the collection service the Department would seek to implement citywide. However, because the City's neighborhoods differ, the overall residential recycling direct collection strategy for the six targeted materials may eventually become some combination of the three collection scenarios. Independent of the resulting collection services provided citywide, the tons per day diverted are assumed to reach and maintain the same 2,270 tons per day by 1995. Further, all buildings which receive curbside regular collection are assumed to receive curbside recycling collection.

Large outlays of capital and expense funds will be required to support additional personnel, purchase and maintain new equipment, conduct outreach and educational campaigns and provide program support. However, steady and increased public participation, actual route-by-route assessments, and equipment evaluations will enable us to reduce both the recycling and the regular collection costs.

Leaf and Yard Waste

Leaf and yard waste is a major target of suburban recycling programs in the Northeast. Portions of the outer borough residential collection routes are probably appropriate for separate collection of this waste on a seasonal basis. (An estimated one million people live in one family homes in New York City and more than one million households live in buildings with fewer than four apartments.) City Parks workers regularly truck large quantities of vegetative waste to City landfills and commercial landscapers often leave landscaping waste at the curb for Department pick-up as their disposal costs increase.

While collection disposal records kept by the Department of Parks and Sanitation do not currently provide accurate statistics on leaf and yard waste quantities, preliminary data from both Departments and a Cornell University study of New York City landscaper waste indicate that at least 100,000 cubic yards of leaves per year (25,000 tons) is easily available for separate collection and subsequent composting as high quality soil. Further research is likely to substantially increase that estimate.

Two collection activities must be implemented by Fiscal 1989 if leaf and yard waste composting is to achieve its potential by the early-to-mid 1990's.

1. Truck routes must be shifted in the fall to collect some portion of leaves separately from the Sanitation Department collection areas. We estimate that 3,500 tons per year can be diverted from Sanitation collection alone. In addition, the Parks Department should be directed to deliver leaves and other waste to composting sites.

2. Separate, dedicated vehicles must be assigned at least two days per week for 8 weeks, to pick up leaves from a targeted residential area. We will provide paper bags that can be composted along with the leaves on some routes and collect leaves in plastic bags on other routes.

Household Bulk

Household bulk consists of large items such as appliances, furniture, carpeting, lumber, tree branches, and construction waste from do-it-yourself home repairs. These items contribute approximately 1,000 tons per day to the residential waste stream (700 from segregated loads, 300 from mixed loads).

For Fiscal 1989 we propose a pilot program to divert 100 tons per day from the waste stream; fifty tons per day from areas where

we currently collect bulk separately and 50 tons per day from the Greenpoint bulk drop-off site. In the long run, we need to determine whether it is more cost-effective to provide separate bulk collection citywide (in addition to the separate bulk collection in the 14 sideloader districts) or to pull the bulk materials out after they are delivered in mixed loads to the waste disposal sites. Ultimately, between 400 and 600 tons per day of recyclable metal and wood could be diverted. Although this diversion will further enable our regular collection routes to be extended it is difficult to project an accurate offset savings because bulk is not consistently put out by all households on all collection days.

Lot Cleaning Operations

The Department's lot cleaning crews collect 800 tons per day of material composed of dirt, bulk, glass, metal and vegetative waste. This material is usually picked up with a front-end loader, placed in an open truck and delivered to an MTS. While loading, a great deal of dirt is unavoidably scraped up along with the litter and bulk items. Equipment that the Department is currently testing will allow us to screen out the dirt and leave it on the lot. This alone will cut lot cleaning waste by approximately a third, or 270 tons per day. Beginning in Fiscal 1989 we propose on-site screening of these materials. Much of the remaining waste is similar to household bulk and could be further processed to divert the recyclables. The total tons to divert from lot cleaning are estimated at 400 tons per day.

City Agency Office Paper Program

The City Agency Office paper program will generate 750 tons per month by the end of Fiscal 1991, in large part because it is now supported by a Mayoral Directive. Opportunities for increasing program tonnage after Fiscal 1991 depend largely on future waste composition studies and the participation of non-mayoral agencies.

Revenues from this program currently equal costs. Additional outreach, education, new program design, contract management and pick up coordination are necessary to meet the tonnage targets.

Institutional Corrugated Collection

For Fiscal 1989, we recommend implementing a pilot project in the downtown Manhattan area which would require the Department of General Services to separate and bale corrugated cartons at office locations served by Sanitation Department vehicles. Similar to the City Agency program, a vendor will pick up the baled corrugated and pay a per-ton price to the City. Simultaneously, collection of unbaled corrugated with a dedicated Department vehicle could operate as part of the pilot. This will allow the City to conduct a cost/benefit analysis of the two approaches.

Private vendor pick-up would require providing baling equipment for each building as well as preparing sites for equipment installation. Savings would be derived from the revenue received from the sale of materials. Site surveys and equipment bids for both pilot and expansion programs also need to be conducted in Fiscal 1989 before citywide cost estimates can be made. Separate collection of unbaled corrugated with a Department vehicle two days a week is necessary to conduct a Fiscal 1989 pilot program.

WASTE BROUGHT TO DOS FOR FREE DISPOSAL

Other City agencies, State and Federal governments, tax-exempt properties and private residences have the right to deliver waste to the Department for free disposal. Together they bring more than 1,600 tons per day. Although we do not have detailed waste composition analyses for this waste stream, we know that certain deliveries contain a high percentage of office paper, yard waste, bulk waste, or corrugated. We believe that at least 40% of this waste could be diverted for recycling.

For City agencies, which deliver two thirds of the waste brought for free disposal, policy directives must require programs which reduce the amount of waste delivered or require that recyclables be separated prior to delivery for Department recycling. Tax-exempt organizations could be charged for disposal of unsegregated waste with a change in the law.

To back up these regulations for all disposing agencies we will provide individuals and organizations with technical assistance about separation as well as access to Department processing facilities and vendor contracts. Large warehouse purges of recyclable bulk and paper materials will then be recycled through Department contracts with paper and metal recyclers or transfer station operators. Small tax-exempt institutions which cannot secure private recycling services will be incorporated into the City Agency Office Paper Program citywide, IPC's will be made available for large loads of institutional metal, glass and plastic containers, and a joint composting project between Sanitation and Parks would support a requirement that Parks separate leaves from refuse.

Other Indirect Collection

The buy back, drop-off and contract collection programs described in Chapter 2 can still provide valuable services. They will enable the Department to continue to test the viability of targeting particularly difficult-to-divert wastes, introduce recycling into neighborhoods which may require a financial incentive to participate and provide recycling opportunities to areas where we are not yet ready to begin a direct collection program. In addition, these mechanisms can accept separated materials if there are delays or capacity constraints with intermediate processing centers.

WASTE COLLECTED BY PRIVATE CARTERS

Private carters bring waste from both the commercial and construction sectors to Department disposal facilities and are charged a tipping fee. These carters respond somewhat to market forces and try to maximize their profits by minimizing their disposal costs. The privates have traditionally recycled easily accessible or valuable wastes like corrugated and office paper. In the last few years however, as disposal costs have increased sharply, they have begun investing in more sophisticated processing equipment to extract recyclables. For example, they have installed crushers to recycle concrete, shredders for both wood and metals and are installing conveyor systems to upgrade separation operations at their transfer stations.

Our plans for diversion of this waste stream are primarily regulatory, as summarized in Exhibit 4.1. We recommend increasing tipping fees very sharply; banning selected materials from disposal facilities; reducing or not charging tipping fees for segregated loads of recyclable materials; and imposing legal or regulatory requirements that the private carters must recycle or separate certain materials.

We have laid out a strategy for reaching the 15% goal, exclusive of the commercial and construction sectors. However, any recycling activity implemented as a result of Department initiatives will allow us to exceed our 15% goal, providing a further cushion for meeting this goal and extending the life of Fresh Kills. Significantly increased tipping fees will spur this movement.

5. PROCESSING CENTERS AND TRANSFER STATIONS

Even if we now collected our goal of 15% of the waste for recycling, New York City does not have the processing center capacity (both private and public) for this 4,200 tons of recyclables per day. An infrastructure to support our proposed recycling strategy must be developed if collection is to expand.

We must provide a variety of processing facilities and transfer stations to handle recyclables (e.g., comingled paper, comingled container goods, bulk materials, leaf and yard waste, lot cleaning waste, and construction waste). Department processing facilities could also be made available to private carters for recyclable loads at a reduced tipping fee.

PROCESSING CENTERS FOR COMINGLED MATERIALS

In order for the City's recycling programs to move out of the pilot phase into citywide implementation, a network of processing centers scattered throughout the City must be made available to process the projected 730 tons of mixed jars, bottles, and cans and 1,540 tons of mixed newspaper, magazines, and corrugated per day.

Some of the materials targeted for collection may ultimately be brought to private processors, although no private processing capacity for these materials in mixed form is available in the City at this time. Regardless of opportunities for developing processing facilities in the private sector, the Department must build no fewer than one facility per borough. A long-term operational strategy supported exclusively by outside contracts is not sound planning. We must locate new sites for these four new facilities within the next 6-12 months if we are to have five IPCs operating by the end of 1994, when 59 districts will be collecting 2,270 tons of recyclables per day. We recommend siting at Department-owned locations (e.g., Sanitation garages, landfills, future resource recovery facilities) whenever possible, in order to expedite the approval and construction process and minimize travel time.

The lowest collection costs will result if three-acre processing centers are located within or near each of the eleven zones serving the 59 districts, with an average processing capacity of approximately 200 tons per day. A conservative estimate of capital costs for 2,270 tons per day, if all capacity was built by the City, would be $56 million (excluding site acquisition costs), based on the average cost projections for the facilities being built in the region. The pilot IPC only has an 80 ton per day capacity. New technology options, increased capacity, vendor competition, and opportunities for marketing mixed glass cullet may reduce the eventual cost of eleven sites.

In order to avoid delaying the expansion of recycling programs while we construct our processing facilities, some mix of the following interim measures must be taken:

(1) Department contracts with existing out-of-city IPC's. This may be costly since it could require us to transport our materials long distances and is, therefore, viewed only as a short-term solution. For example, Philadelphia delivers materials to Camden, New Jersey, and North Hempstead and is planning to bring its materials to Groton, Connecticut until construction of their own facilities is completed.

(2) Department collection of a single material that would not require any separation. The single material could then be brought directly to an existing vendor. We are doing this now in our newspaper collection programs and could add one new material (glass or metal cans) for collection in our two compartment recycling trucks.

(3) Bid out mixed recyclables with a guaranteed tonnage clause in Fiscal 1989 to test private sector interest. This may become a long term measure as well.

During Fiscal 1989 an average estimate of 170 tons per day are scheduled for collection and funds must be budgeted for IPC operation and interim processing options. In addition funds may be needed for transportation costs that would be incurred if out-of-city processing sites were the only available option.

Staff is required in the immediate future to investigate technology options, recommend sites and issue RFP's for design, construction and operation of processing facilities, and determine and implement interim options of processing and sale of materials.

TRANSFER STATIONS

At least five outdoor transfer stations, one in each borough, must be sited and constructed for the materials collected by the Department. This will help lower truck relay costs and provide storage area when markets are temporarily unavailable, as has occasionally occurred in the newspaper collection program. Funds will be required for five outdoor sites with concrete floors, covered roofs with open sides, road access and space for at least four large roll-off containers.

GLASSPHALT

Off-the-shelf stone crushing equipment can be combined with magnetic separators to process comingled bottles and cans. The crushed glass can be used in place of stone aggregate in asphalt and the separated cans can be sold to metal dealers. A Long Island asphalt firm is currently processing glass from Oyster Bay in this fashion. The Departments of Sanitation and Transportation are planning a joint experiment in April 1988 to test the use of crushed glass at DOT's Hamilton Avenue Asphalt Plant and on nine Brooklyn streets. New York State has funded a similar Long Island pilot project to begin in 1988.

The Brooklyn asphalt plant could utilize between 45 and 275 tons per day of crushed mixed glass cullet from Department programs (5% - 30% of asphalt production). Offsetting savings would range from $137,000 to $825,000 per year based on the City's current costs for purchasing stone aggregate.

HOUSEHOLD BULK AND LOT CLEANING WASTE

Based on preliminary discussions with operators of several transfer stations and construction waste processing facilities we believe the private sector would respond to a bid to process bulk material from household collection and lot cleaning. In Fiscal 1989 we propose to test this approach by contracting for 100 tons per day of bulk processing. As part of the pilot we would also test the feasibility of partial separation of metal and wood materials by Department staff to reduce contracted processing costs.

COMPOSTING

We propose to operate a small leaf compost project (10,000 cubic yard) by Fiscal 1989. Finished leaf compost is black, crumbly and very similar to topsoil. The composting could be done on a site of less than three acres. The pilot site could be one which is designated for another long-term use because composting requires little site preparation cost and the composted material would be ready for use in less than 18 months.

Once the Department is able, directly or indirectly, to process vegetative wastes, we should ban large quantities of these wastes from disposal facilities and require that they be delivered to composting sites. A City compost operation could also accept yard waste from private carters and landscape contractors for a reduced tipping fee.

The final part of this project would involve a test of both City use as well as the sale of composted material, both of which are done by the municipalities in surrounding states.

FERROUS METAL EXTRACTION

Ferrous metals extracted magnetically from incinerator residue can be sold as scrap metal. We will conduct an analysis of the costs involved in installing the appropriate equipment at existing incinerator sites this fiscal year, as well as an analysis of ferrous metal content in the ash. Even with mandatory recycling we only expect to divert 60% of the metal containers from the waste stream; extraction would be necessary to obtain the remaining 40%. In total, approximately 200 tons per day can be extracted from the containers and other sources (e.g., nails) in the waste streams.

If ferrous metal could be taken from the garbage before burning this would have the advantage of eliminating some cadmium from the ash. Most of the cadmium in trash comes as rust proofing on ferrous metals. Cadmium is one of the two causes for ash failing E.P.A. toxicity tests, the other being lead.

EXCAVATION AND DEMOLITION

The Department submitted a plan to OMB for utilizing excavation and demolition materials (concrete, stone, asphalt, gravel, limestone,) received at the landfill for cover on the active bank and/or as stone for road building. The screening and crushing of the debris into material suitable for cover would reduce the amount of dirt we would have to buy.

The Department currently purchases 1.5 million cubic yards of dirt for landfill cover each year at a minimum cost of $10 per cubic yard. Approximately 200,000 cubic yards of these materials are brought in each year. For every cubic yard that can be processed and used as a substitute for purchase material, the Department saves $10 on purchase alone.

6. MARKETS

Market demand for some of the materials we have targeted for collection is less than the potential tonnage if localities in the Eastern region all implement major recycling programs. Paper and metal markets will be inundated at a time when growth in both industries is highly dependent on export sales. The scrap metal industry has serious problems due to environmental regulations which are constraining recycling opportunities. Plastics recycling is very new, and the glass industry's increasing use of recycled glass is partly offset by the fact that the glass industry is shrinking in the face of plastic competition. Obviously, then, we must do what we can to encourage growth in the markets for recyclables.

The following four assumptions about markets and market development have shaped Department recommendations for increasing market demand. First we define a market as <u>any</u> use other than disposal. Second, we believe that some demand for recycled materials will be created by a steady supply of homogeneous raw materials attractive to the end user. Third, we believe that the City can, and should, undertake substantial responsibility for regional market development even though most markets are regional and therefore out of our direct control. And finally, the City must set an example by buying recyclables and specifying recycled content in the goods it buys.

A staff unit dedicated to market development is needed to design and implement a market development plan. Cooperative planning efforts among this Department, DGS and OED need to begin, with the Sanitation Department serving as the lead agency. The planning should correspond to work being done at the state level by the Departments of Commerce and DEC, as well as by the Northeast regional coalition of state representatives who are planning joint market development initiatives.

Independent of City market development actions, the State must plan and implement initiatives which focus economic development

strategies on industries which use recycled materials. The bills introduced this year in the legislature directing State Departments to investigate and make recommendations are a good first step, but concrete programs for financial incentives must be proposed and implemented quickly. New York City must play a role in moving the State forward in this regard.

PLAN TO CAPITALIZE ON EXISITNG MARKETS

We collected newspaper first because paper dealers can purchase and process it for their own domestic and export markets. High grade paper was also targeted because its high value ensures sufficient demand even during market lows. We will design City processing facilities to provide a degree of glass, metal, and plastic processing sufficient for existing market quality demands.

PLAN FOR MINIMIZING THE IMPACT OF MARKET FLUCTUATIONS

We intend to spread market risk by collecting as many different materials and targeting as many market options as possible. We will need storage space for collected materials in order to negotiate for the highest prices and give us time to wait out short-term market lows. We will coordinate our processing strategies in order to capitalize on market variables. This means guaranteeing a mix of processing strategies that can process for both the higher value markets (glass sorted by color and crushed to specification) and lower value markets (mixed color glass with high contamination used in road building). We will seek long-term fixed price contracts and plan for a back up market whenever possible.

PLAN TO CREATE MARKETS THROUGH DIRECT USE BY CITY AGENCIES

New York City government helps create certain markets. In Chapter 5 we propose using crushed glass as a substitute for stone at the Brooklyn Asphalt Plant and using construction waste as road building material and landfill cover at Fresh Kills. The Department of Sanitation successfully used some wood chips from Parks

Department tree removal contracts as mulch in Fresh Kills this past year in place of purchased mulch.

There are other opportunities to use collected recyclables directly in the place of purchased products. We have described a pilot program to test composted leaves in New York City in Chapter 4. Crushed glass has been used as a substitute sandblasting material by at least one New York public works department, and the United States Air Force has used finely ground plastic to remove paint from aircraft in a process similar to sandblasting. These and similar uses should be tested and, if promising, expanded rapidly.

The residue from metal shredding operations, called "fluff", has been deemed acceptable for use as intermediate landfill cover in one state although it has yet to be tested in New York, and shredded tires are used in some states for rubberized asphalt. Recycled asphalt is common in many states and the Brooklyn plant has begun recycling asphalt dug up in roadway repairs. (Many of the City's road repair contractors have been using recycled asphalt for quite some time).

The State of Massachusetts will test mixed plastics as a raw material to make new plastic objects, particularly for products which the State purchases or manufactures, including road barriers, traffic cones, and even park benches. Applicability to City uses could be widespread, especially if applied to products manufactured directly, such as signs, or products manufactured by the prison system.

REMOVING DISCRIMINATION AGAINST RECYCLED PRODUCTS IN CITY PROCUREMENT POLICIES

A recently passed New York State law requires that all State purchasing policies be examined to remove discrimination against recycled products. Many specifications have requirements which either insist on virgin materials or which set standards which have no bearing on the performance requirements for that product. New

York City DGS should conduct its own internal series of product specifications.

PREFERENTIAL PROCUREMENT OF PRODUCTS WITH RECYCLED CONTENT

This is the most widespread and fastest growing strategy in the United States but its impact is as yet unknown. Similar to the recently enacted Local Law #20, it is based on three assumptions: 1) that manufacturers will respond to the demand of the government marketplace; 2) that government purchasing strength is a powerful tool to affect changes in manufacturing habits (non-federal government purchases are estimated to be 12% of the GNP); and that the combined, coordinated strategies of several localities is a way to increase the purchasing leverage of government.

Seventeen states and three localities now have some preferential procurement policy for recycled materials, usually focusing on paper purchases. The trend is growing to include other materials. New York State and New York City both provide a price preference by law of 10% for recycled paper and the State Solid Waste Management Plan recommends extension of that policy to other materials. Even without DEC initiative, interest is growing in the State legislature to introduce such legislation.

The Department recommends that preferential purchasing programs for materials other than paper be developed and supported by the City as long as their net costs are within reason.

The United States Environmental Protection Agency is now beginning to issue the four product guidelines required under the Resource Conservation and Recovery Act (RCRA) for the purchase of recycled materials by Federal agencies. A broad national coalition is forming to ensure that Congress' original intent for a price preference in government purchasing policy is clearly defined when RCRA is reauthorized by Congress in 1988.

7. LEGISLATIVE AND POLICY INITIATIVES

Legislative and policy initiatives are effective mechanisms for managing the disposal of our solid waste. Some, such as mandatory recycling, recyclability requirements, and market incentives will still require the City or the private sector to collect, process, and market the recyclables. Substantial City funds must be devoted to ensure these efforts are successful. Other initiatives such as waste reduction put the direct cost on the private sector and consumer and require little City, State, or Federal funding. The City strongly supports all these initiatives and recognizes that they do not serve as substitutes for one another. All of these waste reduction efforts must be combined with direct collection, processing, and marketing of recyclables for an effective program. We believe that the most expensive disposal option that will ultimately be available to the City is export, and that all efforts to reduce or divert wastes from export will save the City large future outlays of expense and capital funds.

In the 1987 State legislative session the Department supported several bills that were subsequently passed by the legislature. These include legislation requiring state and local governments to review procurement specifications to eliminate discrimination against the use of secondary materials, legislation directing the State Department of Transportation to conduct a pilot project to study the feasibility of using scrap rubber in asphalt, legislation directing the state agencies to encourage businesses which use secondary materials in New York, legislation directing the Port Authority to set up a program for export of recyclables, legislation to allow additional 1972 EQBA funds to be used for local recycling projects, and legislation expanding the Environmental Facilities Corporation mandate for recycling. The Port Authority bill was subsequently vetoed by the Governor.

The Department also supported several bills which did not pass, including a bill to exempt refillable containers from the sales tax, a Department of Transportation study of ash as roadbed material, a battery deposit bill, and a bill to require an evaluation of solid waste generation as part of the Environmental Impact Statement for all projects. A complete list of all State bills proposed in the 1987 legislative session which impact on recycling is provided ing Appendix G.

For the 1988 session the Department has prepared for submission several bills described in this section. They include changes in the "Bottle Bill", deposits on tires and batteries, and a packaging bill which encourages recycled content and recyclability through a tax and credit system.

Last year, the City supported the passage of Local Law 20 to provide a 10% preference for paper products with recycled content and issued a Mayoral Directive requiring all agencies to comply with the City Agencies Office Paper Recycling Program. Recently, Mayor Koch signed an Executive Order banning the use of styrofoam products by City Agencies. In addition, the Mayor introduced a City Ordinance to ban the use of styrofoam take-out containers.

WASTE REDUCTION AND RECYCLABILITY

Both waste reduction and waste recyclability are conceptually closely linked because each attempts to manage what flows into the waste stream. However, in practice, they are separate programs.

A waste reduction program helps to reduce the amount of material that becomes waste, thus reducing the amount that has to be collected and recycled, incinerated, or landfilled. This is accomplished by either substituting reusable, durable goods for disposable goods; by substituting refillable containers for disposable containers; or simply by eliminating excess materials.

A program to increase the recyclability of the waste stream emphasizes replacing hard-to-recycle materials with easily recyclable materials which have available markets. This then makes it possible for either the private or public sector to implement programs for collection and sale of these materials.

Waste reduction and recyclability programs must be carefully planned to ensure that they are compatible. For example, a program to reduce the volume of packaging materials could focus on substituting a bulky material such as corrugated boxes with a thin plastic wrap material. This substitution would have a two-fold impact. The waste stream would, in fact, be smaller, but the plastic is much more difficult to recycle than the corrugated. In this situation recycling collection would be the better option.

Waste reduction programs would achieve the maximum possible results through establishing bans or taxes on certain products deemed excessive or unneccessary. In contrast, recyclability programs achieve the desired results by substituting one material for another in the same product to ensure that the product can be recycled.

Waste Reduction

Quantifying the impact of waste reduction efforts on the City's waste stream is extremely difficult both because of the lack of successful waste reduction programs elsewhere and the lack of data linking specific products to waste composition figures.

The New York State Solid Waste Management Plan calls for a statewide waste reduction goal of 8-10% in addition to a 40% recycling goal by 1997. The state plan talks about achieving this goal primarily through increasing deposits and through packaging legislation. New York City has focused its legislative initiatives on these two strategies, in addition to exploring opportunities for shifting away from disposables and encouraging product reuse.

Packaging is targeted for waste reduction because it comprises approximately 32% of the national waste stream. Of the 32% the Department has targeted corrugated boxes for recycling collection because they are easily separated and have a consistent market. Glass, steel, aluminum and plastic containers comprise 12% of the waste stream. The current bottle bill targets almost half of these containers and the Department plans have recommended that some additional beverage containers be added to the bill. The remaining containers are targeted for direct collection and recycling. This leaves almost 9% of the waste stream appropriate for excess packaging legislation.

Packaging Waste as a Percent of Total Waste

Corrugated Boxes	9.0
Wood	1.4
All Containers (Glass, Steel, Aluminim, Plastics)	12.5
Potential Targets for Excess Packaging Legislation (Aluminum foil and closures, other paperboard, paper and plastic)	8.8
Total Packaging and Containers	31.7

A deposit is a financial incentive for a consumer to return a purchased item to the point of purchase or redemption center. A deposit system is only successful in reducing the waste stream, however, if the deposit materials are actually returned and subsequently recycled. In addition, the pool of materials for which deposits are appropriate is limited. The material must be easily identified and there must be a logical entity and mechanism through which to redeem the deposit. Finally, in order for deposit legislation to be effective, market development efforts, enforcement programs and education campaigns must occur simultaneously with passage of deposit legislation.

Returnable Container Law

With active support from New York City, the Returnable Container Law became effective in July 1983. Based on a 90% return rate, the Department projected that the law would reduce the City's residential waste stream by 825 tons per day. Unfortunately, the return rate has been disappointingly low in New York City. A 1987 Franklin Associates study estimated returns at 60 to 70 percent in the City compared to 85 to 90 percent upstate. Others say the City's return rate is even lower, and all agree that returns are not all recycled.

The low return rate stems from a series of problems which include: 1) insufficient DEC enforcement in New York City; 2) penalties insufficient to overcome the economic returns of violating the law; 3) deposit avoidance and the sale of illegally marked containers; 4) refusal to redeem containers by both retailers and distributors; 5) lack of "third party" collection systems and redemption centers, which were thought to be a solution for small stores; and 6) business problems between the large franchised beer distributors and the independent wholesalers.

To improve the effectiveness of the bottle bill, the Department has prepared State legislation to initiate the deposit with the manufacturer, rather than distributor; provide for co-enforcement by the Department and the DEC at both a retail and distributor level; increase the deposit to 10¢ per container, and increase fines. In addition, we will recommend that wine coolers be added to container legislation and that opportunities for further expansion be investigated in the coming year.

The Department's assumption of local enforcement would require hiring additional enforcement personnel in the next two years.

New Deposit Legislation

In addition to deposits on beverage containers, deposits could be used to encourage the return of products which are environmentally unsound when burned or buried in landfills, such as tires and batteries. Last year, the Department supported proposed State legislation placing deposits on certain batteries and pesticide containers. This year the Department has prepared more extensive State legislation to place deposits on all tires and batteries.

The Department's battery bill expands the deposit on batteries to include all wet or dry cell batteries used in automobiles, households, and consumer products. (The scope of last year's Assembly bill was limited to non-rechargeable mercuric oxide or silver oxide batteries). The Department's bill proposes a 25¢ deposit on household batteries and a $5 deposit on car batteries. In addition, the Department's bill allows the DEC Commissioner to ban batteries from disposal facilities 24 months after the enactment of the legislation if sufficient markets exist to recycle the waste batteries.

The Department's tire bill proposes a $2 deposit on tires to prevent tires from littering vacant lots and to direct their proper disposal through the tire manufacturers or importers. In addition, DEC is directed to investigate and develop new tire recycling options and correct abuses at existing tire disposal sites using unredeemed deposits.

Packaging and Disposable Products

The best opportunities for meaningful waste reduction lie in national legislation to affect national manufacturing trends through reducing packaging volume and eliminating disposable products. The City must play a leadership role to obtain national legislation in

the next few years. A coordinated regional approach is the next best strategy. Efforts should focus on reducing packaging and on rewarding manufacturers who produce long-lasting durable products or reusable products, such as refillable beverage containers or reusable containers for products sold in large quantities.

Further packaging reduction efforts must focus on elimination of excess packaging and on requiring that containers be designed to be refillable by the manufacturer as well as returnable, thus creating a return mechanism that ensures reuse instead of depending on a recycling market. In New York State, the bottling industry had already changed to non-refillable containers when the bottle bill was instituted.

The City has prepared a State packaging bill which imposes taxes and credits based on recyclability and recycled content of packaging. This is described later in the section on recyclability. However, the bill also provides a credit for containers which can be refilled by the manufacturer. All "Bottle Bill" containers are exempted. Future State legislation could be proposed to ban or create a disincentive for the sale of certain non-refillable containers.

Barring a return to the "olden days" when products were sold loose from large kegs, the most dramatic excess packaging initiative would be a ban on all packaging which used more than one package layer. This could include non-food products, retail fast food, and retail packaged food. For example, toothpaste tubes would have to be sold without the box, and cereal would have to be sold in boxes without an inner bag. Multiple single servings, such as boxes of individual portions of soup, juice, chocolate, or cheese, would not be allowed. The exception to this would be only where more than one layer was required to protect human health, safety and the integrity of the product.

This dramatic step however, would have vast impact on businesses and consumer purchasing options. There may be cases where product integrity would be decreased by removal of packaging, thus reducing the salability of that product. Exemptions may be numerous and hard to administer and interstate manufacturing and sales would make marketing under these conditions difficult.

Another approach is to create a government review mechanism for all new packaging, based on solid waste impact. The Minnesota State legislature passed a law in 1973 giving the Minnesota Pollution Control Agency the authority to review and prohibit the sale of any new packaging or a change in packaging for food and beverage containers, household and cleaning supplies, cosmetic and toiletries, if the Agency determined that it constituted a solid waste disposal problem or was inconsistent with state environmental policies.

This law was challenged in court for six years on the grounds that it violated the interstate commerce clause of the U.S. Constitution. In Can Manufacturers Co. v. State, it was decided that the benefits to the environment outweighed alleged burdens on interstate commerce and the law was upheld in 1979. It has never been implemented, however, because it sets up a burdensome administrative review process. In 1982, an advisory committee met and decided to abandon the packaging review law in favor of exploring other ways to effect waste reduction and recycling.

While it is widely recognized that our society has increasingly become a "throwaway society" in which disposable convenience products are replacing durable goods, this fact has not been quantified by any waste composition study. Disposable food service and/or convenience products could be either selectively banned or taxed at a high rate to discourage their use.

Banning the use of diposable containers in food service establishments would, in effect, eliminate take out service unless customers were required to bring in their own containers or restaurants sold food in reusable containers which had a deposit for return. A less drastic alternative would be a substantial tax on all disposable containers in food service industries, including beverage cups, paper and plastic food containers, aluminum pans, foil, bags, etc.

It would be easier to ban specific convenience products designed for limited or one time use. These range from the new disposable cameras to items so integrated into current lifestyles that they are considered necessities (paper towels, tissues). Banning some of these products to reduce the waste stream would be met with consumer resistance and, as with all of these proposals, an educational campaign must be launched if consumers are to understand and comply with it.

Selective bans would directly impact consumers' "throwaway" lifestyle resulting in reduced solid waste problems. In addition, bans would have a strong educational impact, thus making consumers aware of the implicit costs of products in waste disposal. Such bans increase production and use of re-usable/durable products. Negative aspects to bans include a significant impact on consumers' lifestyles and manufacturing businesses, strong consumer resistance, and a potential for disposables to be sold illegally or purchased elsewhere.

The City should set an example to the public through its purchasing policies. The Department recommends that DGS and all City Mayoral and non-Mayoral agencies be required to examine their purchasing policies to recommend and report on the use of disposables and opportunities for replacing disposables with durables.

Recyclability

Programs to increase the recyclability of the waste stream also require some change in the way we do business and in the products we purchase. But instead of eliminating a certain product from the market, recyclability programs focus on substituting a recyclable product for a non-recyclable product. That substitution alone does not reduce the number of tons entering our waste stream. These programs are only effective waste management tools when coupled with recycling collection and marketing of materials.

Packaging

Ways to create a more biodegradeable and/or recyclable waste stream have been the focus of attention recently at the local, state and regional levels. In most cases, these initiatives have focused on packaging wastes and even more specifically on plastic packaging, since plastic packaging comprises the fastest growing type of packaging.

The greatest impact on recyclability is achieved if changes take place at the manufacturing level. Manufacturers have the ability to create a more recyclable package by substituting materials for which a recycling technology and market exists (such as glass, aluminum, paper and cardboard) for materials which cannot or are not being recycled (such as styrofoam and many plastics). Or, a more recyclable waste stream can be created by substituting single material, easy to recycle products (i.e.: 100% paper or 100% aluminum) for non-recyclable, multimaterial products (i.e., wax coated paper, aluminum coated paper, composite plastics).

In the Northeast region, government representatives and environmental groups are meeting to review opportunities for joint action to affect recyclability. New York City is participating in a regional task force on packaging sponsored by the New York State DEC.

A three-tier tax proposal to encourage packaging recyclability was introduced in the State legislature last year. Commissioner Sexton testified at a State Assembly Committee hearing in December, 1987 and presented the Department's detailed comments on the bill. Subsequently, the Department prepared a revised packaging tax bill for introduction in this year's legislature to increase the tax and scope of the bill.

The City's packaging tax bill refines the taxing mechanism to make it clearer that the tax is placed at the manufacturing level if the manufacturer is located in New York State. The bill also expands the scope of the tax by removing the exemption for closures, and manufacturing and shipping containers. In addition, the City bill includes prepared foods containers and bags in the tax scheme and sets up a Packaging Review Board to oversee the implementation of the bill and authorize credits and exemptions.

The City bill also clarifies the provisions for granting credits by requiring that the Packaging Review Board annually establish standards for the recyclability credit. Another major provision of the City bill is to require the Board to set a schedule of taxes based on the relative size of the container. In no event shall the minimum tax proposed be less than three cents for each container.

The Original New York Seltzer Company recently began marketing their soda in a plastic can. If the plastic can catches on in the market, it has the potential to replace aluminum cans that have a high recycling rate. There is no apparent real value offered to consumers by the plastic can: it costs more than aluminum cans, it is heavier than aluminum cans, and it does not improve the quality or prolong the shelf life of beverages. It appears that the plastic can is no more than a marketing gimmick. New York City should take a firm stand in opposition to the introduction of the plastic can in an effort to set a precedent and to stop a dangerous packaging trend

before it is too late. The City's stand against the plastic Coca Cola can last year contributed to that company's decision to postpone further use.

Disposable Products

While a waste reduction program would focus on banning or discouraging disposable products (diapers, razors, cameras, food take out containers, shopping bags), a waste recyclability program would instead focus on making disposable products more recyclable.

For example, instead of banning all shopping bags, the City could ban the use of plastic shopping bags. Or, the City could impose a tax on plastic bags, in an effort to shift consumer demand towards paper.

Instead of a ban, the city could require that all take out food containers be made from biodegradeable or recyclable materials (as proposed by Suffolk County). Mayor Koch has already taken the first step by signing an Executive Order banning the use of styrofoam products by City Agencies and encouraging the use of substitutes with recycled content. He also introduced a City Ordinance to ban the use of styrofoam take out containers from food service establishments.

Remanufacturing

The rebuilding or reconstruction of used equipment is a waste reduction strategy which is gaining increasing interest and is within the power of local, state, and national government purchasing entities. Some procurement officials are now developing bid requests to attract rebuilt equipment from office copiers, typewriters and computers to automative parts and transformers. Nationwide, remanufacturing is considered by purchasing agents as a way to save purchasing dollars as well as create local jobs. The first objective may be cost savings but these rebuilt purchases

deserve to be considered part of the solid waste strategy and given emphasis for that reason also. The Department recommends that this waste reduction strategy be built into City purchasing policy, whenever the product is equal in performance, and that DGS be required to report on product purchase opportunities.

Education Campaign

Opportunities for public education are within the City's control, and can complement state and national efforts. Individual and corporate purchasing habits can greatly affect waste generation and may ultimately have some impact on manufacturer behavior. We recommend that the Department conduct a major public education campaign, in an effort to educate consumers and change their purchasing habits. This should include subway posters, brochures, school programs, seminars for business leaders, and all forms of media advertising.

COLLECTION SUPPORT

There are four policy strategies which will support collection of recyclables. They are:

1. Mandatory source separation.
2. Reduced or free dumping for materials delivered in segregated form.
3. Revisions in building codes to make it feasible for more buildings to separate garbage and store the recyclables.
4. Requirements for specific institutions/organizations to process recyclables on-site (e.g., baling corrugated).

1. Mandatory Materials Separation

Laws and policies which require separation of selected materials are a growing trend and the Department recommends a mandatory approach in New York City. One recommended implementation schedule is discussed in Chapter 4.

Common enforcement mechanisms include: a) refusing to pick up unsorted waste; b) fines for not separating; c) refusing to accept some materials; and d) charging a higher fee when material is not source separated.

The Commissioner of Sanitation currently has the power to decide how and when materials should be put out for Department collection. We must change our requirements to designate targeted materials, the way they are set out (e.g., in plastic bags, bundled) and the location and time to set them out. Under the Commissioner's current powers, we can fine those entitled to Department collection when they do not comply.

The Commissioner does not currently have the power to charge for Department services if trash is not separated, nor does he have the power to refuse to pick up garbage on scheduled garbage collection days if recyclables have not been sorted out. The people and places entitled to free Department collection are defined by the City Charter and therefore fines are our only recourse at this time.

In order to implement a mandatory materials separation program in New York City, we recommend that the City consider changes in the law that prevent the Department from charging tax-exempt institutions a fee for refuse collection if they do not separate their waste.[1]

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[1] In addition, the City should accelerate funding and implementation of the City Agencies Office Paper Recycling Program and begin collecting corrugated cardboard from City offices; require the Parks Department to prepare a detailed report on the quantity of organic material that is now thrown out and the opportunities for and cost of chipping, shredding and composting park waste for use in City park land; and ensure that any waste composition study includes a detailed analysis of each City agency's specific and unique waste stream and that each City agency be directed to comply.

2. Reduced or Free Dumping for Separated, Recyclable Materials

By dedicating an area at our disposal facilities to separated, recyclable materials and simultaneously allowing private carters to bring those separated materials to these sites at a reduced tipping fee, we would save landfill space and obtain materials that could be processed and sold. A variation would be to charge a reduced or no tip fee to dump separated materials delivered directly at our IPC's. Carefully targeting materials would allow us to focus on certain unacceptable or non-burnable materials and might provide the City with a net profit. This approach would only be used in instances where the private sector does not have access to recycling markets or processing facilities (e.g. mixed bottles and cans).

3. Revisions in Building Codes Which Make it Easier for People to Participate

Changing building requirements for residential and commercial buildings could play a major role in making it easier for multi-family dwellings and commercial buildings to separate and store materials for recycling. In many buildings, space is not available for storage bins, or available space is not compatible with fire regulations. An example of the needed changes is found in the recently enacted Quality Housing Codes that require adequate recycling facilities. These new regulations, however, cover only residential buildings in a limited portion of the City. We would support additional legislation to address new construction not covered by the Quality Housing code. In Seattle, which will begin citywide collection of recyclables for all buildings under four units next February, their Department of Construction and Land Use is changing the construction permit process for multi-family dwellings to ensure that space is made available for collection and storage of recyclables. These changes are important for future new development and can be incorporated in plans for extensive building rehabilitation, but do not change other existing buildings.

The Department is drafting legislation that would require builders of new residential buildings to designate adequate space for indoor storage of recyclables and recycling containers, and insure truck access to that material.

4. Requirements for On-Site Processing of Materials

This policy is implemented most easily and effectively with City agencies which have no reason to spend capital or operating funds to separate and process materials we must pick up as refuse. Corrugated boxes comprise a high proportion of the waste from institutional and office buildings. It is also a hard-to-compact waste which takes up disproportionate space in collection vehicles. Large retail stores have long separated corrugated and baled it for recycling collection. Hospitals, which now pay for Department collection, have started to install corrugated balers in order to reduce their garbage collection costs and obtain revenue. City agencies which dispose of corrugated should install balers for similar reasons. The cost to the City will be recovered from reduced collection and disposal costs and sales revenue.

In the private sector this policy could be implemented by requiring large apartment buildings to install balers for corrugated and/or glass crushers. For businesses the City could require installation of appropriate processing equipment for their particular waste stream and change the license conditions for private carters to require collection of separated waste. This is now being done in other localities.

PROCESSING SUPPORT

Policies to support our processing plans fall into three broad categories:

1. Policies which make it easier for private recycling business to operate. This includes a) easing regulations; or b) assisting business to obtain sites in commercial and industrial zones.

2. Policies which provide financial assistance for capital costs to modernize facilities, allowing them to become more competitive in the market place. This includes direct grants or tax incentives.

3. Contracts for City recyclables which guarantee a steady flow of recyclable materials or a guaranteed payment in lieu of materials. This can provide the backing needed for major capital investments.

In all cases the criteria for processing policy initiatives should be to encourage processing technologies which can accept collection of mixed recyclables such as those targeted by the Department as a high priority. Non-burnables and materials unacceptable for resource recovery facilities should have the highest priority.

MARKET SUPPORT

Opportunities for City initiatives which have an impact on market development have already been discussed in Chapter 6. However this is an area in which the State alone and in concert with other states in the region, can play a major role. Markets for recycled products are regional. A paper mill located in upstate New York or a glass mill located in New Jersey both draw materials from

New York City. The State must plan and implement initiatives which focus economic development strategies on industries which use recycled materials. The bills introduced this year in the legislature directing State Departments to investigate and make recommendations are a good first step, but concrete programs for finanical incentives must be proposed and implemented quickly. New York City must play a role in moving the State forward in this regard.

8. SOLID WASTE MANAGEMENT TRENDS

PUBLIC SECTOR

States and localities are setting waste management priorities which emphasize waste reduction and recycling over resource recovery, incineration, and landfilling options. As localities add new materials to their recycling programs they have begun to sponsor intermediate processing facilities (IPCs) which can upgrade the materials for sale. Appendix D lists IPCs which have been planned recently in the Northeast.

At the Sixth National Recycling Congress, attended last month by over 600 business and government representatives, twenty representatives from large cities met to share recycling plans and problems. The group included individuals from Seattle, Philadelphia, San Jose, Austin, Minneapolis, Washington D.C., San Diego, Boston, San Francisco, Los Angeles, New York City, and other, smaller cities. Most emphasized that economics were driving their municipality's efforts, and that the expansion of recycling programs over the next few years would continue. For example:

- In **Los Angeles**, success of a pilot curbside program, together with public support for recycling, led to a recommendation to the Mayor by the Department of Public Works that the city institute mandatory recycling collection citywide;
- **Seattle's** citywide plans for mandatory recycling as part of a 40% recycling goal were preceded by environmental problems at their landfill and an analysis of the costs of current and future disposal as well as environmental concerns; and,
- **San Francisco**, with the highest recycling rate of any large urban area (25%), has recently decided to institute curbside collection as part of its effort to increase that rate to 33%.

PRIVATE SECTOR

Large waste management firms, trade associations and engineering companies are responding to the increased focus on recycling. Waste Management Inc. and Browning Ferris Industries, industry leaders,

are both offering recycling planning and direct collection services to their clients. Waste Management Inc. now operates some of the most successful municipal recycling collection programs in the country, including San Jose, California. Engineering firms such as R.W. Beck, Malcolm Pirnie, William Kosulich, Ogden Martin, and HDR are just a few that have recently hired recycling specialists or created recycling departments to provide technical support for recycling programs. Their planning documents and operational scenarios all stress the financial benefits of recycling to resource recovery and landfill operations.

Commercial carters and transfer station operators are increasing their investment in processing equipment, and new companies are beginning to bid on the IPCs which are now planned in the Northeast. For instance, the Ogden Martin firm has just announced that it plans to offer IPCs at its resource recovery sites and elsewhere to municipalities. Firms which recycle "bottle bill" materials are now adapting their equipment to accept mixed household containers from municipal recycling programs. This increased vendor competition is expected to bring down processing costs in the next few years. In addition, legislation mandating control over solid waste disposal locations, known as "flow control" laws, will further drive the private waste management industry to reduce waste volume and step up materials recovery.

Recycling is also gaining attention from the manufacturing sector both in response to the threat of regulation for certain waste materials and to government interest in procuring products with recycled contents. The glass industry is using more recycled glass in its containers. A joint industry effort created a "Plastic Recycling Corporation" in both California and New Jersey to foster increased collection and plastic processing, while a "Plastics Institute", was established at Rutgers University to foster improved technology and market development. These actions ocurred after both states proposed regulations to impose penalties on beverage containers which are not recycled. New paper companies are responding to bids which prefer recycled content. Waste exchanges,

which link firms with recyclable waste to firms which use the materials, are growing in number and size.

REGIONAL TRENDS

In the past two years, states in the Northeast have also been among the most active in the nation. For example:

- **New Jersey, Rhode Island, and Connecticut** have passed legislation which: (a) requires mandatory recycling by all localities, (b) controls, in some way, the amount and type of materials to be recycled, and (c) sets deadlines for implementation. Connecticut and New Jersey have designated statewide goals of a 25% diversion level. Resource recovery is part of the waste management strategy in all three states and non-burnable materials have been targeted in Rhode Island and New Jersey.

- **Vermont** has passed a law requiring completion of state and regional solid waste plans which emphasize waste reduction and recycling. The law also levies taxes on private and municipal landfills to both create increased economic incentives for recycling as well as raise funds for waste management strategies.

- **Massachusetts** has established a State Solid Waste Office which has emphasized regional recycling planning. A pending state bill would provide support for the processing of recyclable materials collected by localities which agree to pass mandatory recycling ordinances.

- A bill in the **Pennsylvania** legislature would require the establishment of recycling programs to collect at least three materials in all localities with a population of over 10,000. The bill would also require recycling in commercial establishments.

Many of these states specifically take responsibility for processing municipally collected recyclables, recommend state initiatives to stimulate markets through purchasing policies and financial incentives, and are contemplating measures to affect waste stream recyclability and encourage waste reduction. Appendix E contains more detailed information on the Northeast states' solid waste programs.

NEW YORK STATE TRENDS

In January 1987, the New York State Department of Environmental Conservation (DEC) issued a draft solid waste management plan and completed it in March. The most striking element of the plan is its call for a shift away from landfilling over the next ten years in favor of waste reduction, recycling, and resource recovery. The plan establishes a 50% diversion goal by 1997, to be achieved through waste reduction, recycling, and reuse. The plan also requires that the state follow a waste management hierarchy which puts reduction first, recycling/reuse second, and resource recovery third. Landfilling is fourth, only to be used as a last resort for non-recyclables, or ash residue. The details of this plan can be found in Appendix F.

Of more immediate interest to New York City are the Draft Construction Permit and the Draft Operating Permit issued by the DEC for the Brooklyn Navy Yard Resource Recovery Facility. These permits clearly state that the development of a comprehensive recycling plan, the incorporation of the plan into the City's long term solid waste management strategy, and the continuance of recycling programs are required conditions, and that oversight is structured to ensure monitoring of implementation in all five City boroughs.

More recently, in June of this year, the Commissioner of DEC issued a policy directive requiring that DEC staff evaluate solid waste disposal initiatives according to the hierarchy established in the solid waste plan. In addition, he required that Draft Environmental Impact Statements (DEIS) for solid waste management facilities contain a detailed analysis of source separation and recycling. If a DEIS shows that source separation and recycling are feasible, the implementation of these programs will be made a permit condition. The details of the Commissioner's policy memo and copies of the Draft permits can be found in Appendix F.

Also in June 1987, the DEC released "Solid Waste Guide #1", a handbook on resource recovery permit evaluation criteria. This document is significant because it details the information to be submitted to DEC in support of an application for a permit to construct a resource recovery facility. It requires that a comprehensive analysis of recycling opportunities and a detailed description of the programs and their implementation be submitted for DEC review in accordance with the Commissioner's policy directive discussed above.

The New York State legislature is increasingly introducing recycling bills each year. Appendix G identifies these bills by Recycling legislation category (e.g., deposit, procurement), with a description of each and its final status.

APPENDIX A

REGIONAL WASTE EXPORT COSTS

Locality	Tipping Fee ($/Ton)(1)	Final Disposal Location	Transportation Cost ($/Ton)(2)	Total Current Disposal Cost ($/Ton)
New York				
New York City	38	Fresh Kills	-	38
Hempstead	51	Upstate NY, PA	16-49	67-100
North Hempstead	40	" "	16-49	56-89
Oyster Bay	75	WI	57	132
New Jersey				
Bergen Co.	16	PA,MI,OH	-	16(2)
Hudson Co.	22	" " "	-	22(3)
Somerset Co.	58	" " "	-	58(4)
Morris Co.	58	" " "	-	58(4)
Middlesex Co.	58	PA	-	100
Hunterdon Co.	100	PA	-	100
Essex Co.	102	PA,MI,OH	-	102
Passaic Co.	65	PA	-	65
Union Co.	102	PA,MI,OH	-	102
Springfield Co.	102	" " "	-	102

Notes

(1) Rate charged to private carters at facility gate. Municipal rates, or long term contract rates may be lower in some cases. Rates rounded to nearest dollar.

(2) Various contact rates (up to $100 per ton) will take effect in January 1988 when Hackensack Meadowlands Development Corporation (HMDC) Bergen landfill closes.

(3) Various contract rates (up to $100 per ton) will take effect in March 1988 when HMDC baler and balefill close.

(4) In January 1988 when Edgeboro (private) landfill closes, this cost is expected to go to $107 per ton.

APPENDIX B
RECYCLING COLLECTION PROGRAMS

This Appendix provides more detail on Sanitation Direct Recycling Collection Programs and Sanitation Supported and Indirect Recycling Collection Programs, for the residential and institutional waste streams.

Residential Programs

The Department is currently operating two residential recycling direct collection programs (curbside and containerized apartment house) and supporting three indirect residential recycling collection programs (Environmental Action Coalition (EAC), Buyback Centers, and Drop Off Centers).

Curbside Collection Program

The Curbside Recycling pilot program began in November 1986 in a section of Manhattan's Community Board 2 (Greenwich Village). Since then, the curbside pilot programs have expanded to the other four boroughs. The Bronx Pilot Program began in March and includes part of Community Board 10 (Neighborhoods of Waterbury/La Salle, Spencer Estates, Country Club); the Queens Pilot Program began in April and includes part of Community Board 6 (parts of Rego Park, and Forest Hills); the Staten Island Pilot Program began in May and includes all of Community Board #3; and, the Brooklyn Pilot Program began in June and includes part of Community Board 10 (Dyker Heights).

Once a week, residents in these pilot areas place their bundled newspapers at the curb to be picked up by a Department of Sanitation recycling truck. The City then delivers the separated newspapers to a paper dealer who in turn sells the paper to a mill that recycles the newspaper into reusable paper products. Only newspapers are being collected at this time Beginning in Spring 1988, residents will be asked to start separating household glass and metal that are not covered by the State Returnable Container Law.

Approximately 110,000 households are now participating in the curbside collection pilot programs. We are planning to expand the pilot neighborhoods during the coming year. The first scheduled expansion was in the Bronx: beginning on September 16th the pilot area expanded to include more of Community Board 10 (Pelham Bay area). The second expansion began in Manhattan: beginning on October 22nd, the pilot area expanded to include more of Community Board 2 (SoHo), and on November 17th the pilot area expanded to include a part of Community Board 4 (Chelsea). An additional expansion of the program is scheduled to take place in late Spring 1988 to four neighborhoods.

Containerized Apartment House Program

The Containerized Apartment House program was originally conceived as an alternative to curbside collection for recyclables that could be targeted in large apartment houses. This program began in November 1986. Residents in participating buildings are asked to keep their newspapers separate from the rest of their garbage and to place them in a designated place either on each floor or elsewhere in the building. Building staff then collect the separated newspapers as they accumulate and deposit them into a one or two cubic yard container provided by the Department for the collection of newspapers. Special City recycling trucks empty the containers once a week and then deliver the newspapers to a paper dealer. At present, only newspaper is being collected, but in the future we will provide additional containers for the collection of bottles and cans.

Currently, the Apartment House Containerized Program is operating in Manhattan and Queens. We estimate that 67,000 people are participating in the program and we continually survey new buildings to be brought into the program. The program is scheduled to expand into the Bronx in the Fall, Brooklyn in the Winter, and Staten Island in the Spring of 1988.

Site visits are conducted by Department staff to determine whether a particular building is suitable for the Containerized Program. In order for a building to be suitable, it must be large enough to fill a container each week (150 units or more); there must be space on every floor for residents to place the newspaper (i.e., a trash chute room); and there must be a location in the building to store the container while permitting easy access from the street for the recycling trucks. Most importantly, a building manager/superintendent must be interested in participating in the program.

Environmental Action Coalition (EAC)

EAC is a non-profit environmental education organization which has been funded by the Department since November, 1984 to start additional recycling programs in apartment buildings in all five boroughs. EAC's program was originally designed in part to test the effectiveness of alternative collection mechanisms to the containerized program and to evaluate the interest of the private sector in recycling operations.

In the first two years of the program, over 10,000 residential units joined their newspaper recycling program. In the third year of the program EAC will add 11,000 units to the program and 18,000 more units in the fourth year.

EAC began organizing the collection of materials other than newspapers (glass and metal containers, laundry detergent containers) during their third contract year.

Buy-back Centers

Any location where individuals can bring recyclables and get paid for them is technically classified as a buyback center. These centers have long existed for newspaper, corrugated boxes and scrap metal in this City. However, paper dealers and scrap metal dealers traditionally impose minimum quantities and quality controls which exceed what the average individual can supply. In the past few years some localities (e.g. Philadelphia, Seattle, Chicago) have experimented with the creation of publically-sponsored multi-material buyback centers. These facilities accept, at the door, a wide variety of materials which traditional scrap dealers do not accept (glass, plastic, tin cans) and pay by the pound. Individuals bring materials generated in their own households, building superintendents bring materials from their buildings, owners of small vans scavenge or generate "accounts" for which they service and split profits. These multi-material buyback centers have usually received some government funding and are often run by organizations in lower-income areas.

R2B2 received a two-year contract from the Sanitation Department in November 1985 to purchase and install capital equipment for the collection and processing of a wide variety of materials and to staff a facility that would accept materials from the public, engage in market activities to obtain buyers for collected material, do outreach designed to bring in customers and generally experiment with outreach, processing, and marketing strategies. They opened their doors to the public six months later, in April 1986 and have continued to steadily increase their collection of recyclable materials.

Their contract was renewed in a modified form for another two years in December, 1987. The changes include increased financial resources, which will assist R2B2 in acquiring new premises and expanding processing capacity. In addition, the basis of payment to the organization will now be by the tons, creating an incentive for higher output which did not exist under the previous agreement.

Drop-Off Centers

A drop-off center is any location to which an individual can bring materials, usually in source-segregated form and without receipt of financial compensation. In New York City these sites have traditionally been operated by volunteers and sponsored by small neighborhood or environmental organizations. In the mid-1970's there were fifteen such sites; today there are only four small voluntary centers remaining because of their inability to survive on a totally volunteer basis. In other localities drop-off centers take many different forms in addition to being small voluntary locations. Many areas use them as an alternative to curbside and dedicate a municipally-owned site, serviced by public works employees or by staff from a non-profit organization working under contract to the municipality, to be open a limited number of days and hours per week. Other localities are not experimenting with siting unmanned containers and some localities attempt to bring drop-off centers to neighborhoods at specific dates by using mobile vans. Another option is to contract out to an organization which has a site and which has a compatible mission (job training, sheltered workshop, environmental education).

Although it is usually harder to get and sustain public participation and consequently the tonnage collected is usually much lower than that from direct collection, the major advantage of a drop-off center is that its costs are specifically lower than municipal collection. In particular, with far less capital expense invested, we can test public participation in selected neighborhoods and the collection of and markets for new materials (i.e., plastics) prior to collection and processing with Department of Sanitation resources.

In FY '87 we began to provide financial support to three of the four existing voluntary centers in the City. We have designed a generic poster that can be used by all drop-off centers free of charge to educate neighborhood residents about services and hours of operation. During FY'88 we plan to research and outreach to a wide range of organizations which might want to sponsor drop-off center activities and fund contracts for centers which are sponsored by organizations characterized as:

- Volunteer efforts by small neighborhood organizations which usually occupy public space or space donated by another organization;

- Drop-off center service sponsored by organizations which have a social service or job-training mission which would be enhanced by this activity (sheltered workshops, Salvation Army, drug-rehabilitation services);

- Services provided by educational institutions which see environmental services as compatible with their mission (environmental centers such as High Rock Conservation Center, Botanical Gardens, colleges); or,

- o Charitable institutions and organizations which would sponsor a program to which members could contribute materials in lieu of or in addition to funds (the latter has been done in New Jersey, for example).

We also are seeking ways to identify and initiate mobile drop-off services using Department recycling vehicles (on their offdays) and contract for the design of stationary containers to be serviced (taken to a recycling vendor) either by an outside organization or the Department.

Institutional Programs

The Department is currently operating one institutional recycling program and is supporting another.

City Agency Office Paper

For this program, the Department serves as the coordinator between the private paper vendors who pay for the privilege of collecting high-grade office paper and the participating City Agencies. Large canvas bins are placed in offices and high paper generation areas (such as computer centers) and participating employees are provided with desk-top folders, recycling literature and boxes for intermediate sorting. A private vendor is contracted to pickup the large bins when full.

In FY'86 we concentrated on tightening up control procedures for the program. In FY'87 we developed markets and procedures for accepting mixed paper from file purges and records management areas as part of the program. We are now providing mechanisms for small non-profits and quasi-public agencies to be serviced by the program as well. We are recommending that bulk pickup requests to the Department be coordinated so that some requests can be serviced by the paper vendor instead of collected as garbage.

Council on the Environment of New York City

Beginning in November, 1984 the Department has contracted with the Council on the Environment of New York City (CENYC) (a not-for-profit organization) for a program directed through their Office Paper Recycling Service (OPRS) department. OPRS is a consulting service, subsidized since 1979 with grants, government contracts and some earned revenues. OPRS acts as an intermediary between private sector offices which wish to source segregate their waste paper for recycling and paper dealers who pickup and pay for office paper which has been separated from contaminants (e.g., carbon paper, food containers, glue envelopes). Federally funded office waste composition studies have clearly shown that 77% of office waste is paper which would have recycling value if source separated.

These programs have a demonstrated life span of at least seven years (this is only how long CENYC has been providing technical services to New York City offices). CENYC does not continue its advisory role beyond the initial few months of a program's implementation. Average monthly tonnage from public sector and corporate offices have increased to more than 130 tons per month in January, 1987. Even assuming no additional tonnage increases, the cost per ton is approximately $21. This does not include the revenue which goes to the participating offices.

The City's contract with the Council expired at the end of November 1987, and was renewed in a modified form in December. The new, two-year contract provides for CENYC to focus on additional materials - corrugated paper, newspaper and plastic - and target a range for organizations previously not included. These include not-for-profit agencies, State and Federal offices and schools. The programs in the schools are also to include an educational component, to enable students to understand the role of recycling in a comprehensive waste management system.

APPENDIX C

DIRECT COLLECTION OF SIX MATERIALS

The direct collection of the six targeted materials (newspaper, magazines, corrugated, bottles, cans, plastics) is projected to divert approximately 2,300 tons per day from our waste disposal system. This diversion will be the single largest recycling program conducted by the Department, both with respect to tonnage diverted and costs incurred. In this appendix the scenarios evaluated for collecting these materials for program implementation and full-scale maintenance (steady-state) are discussed.

We have selected an implementation strategy that allows us to phase in all materials for all districts rapidly; by the end of Fiscal 1991 all 59 districts will be participating in a recycling direct collection program of all six materials.

There are three distinct ways the Department can provide curbside and containerized direct collection of targeted paper and container goods: (1) in substitution of one regular collection service day, (2) in addition to the regular collection service or (3) concurrently with the present regular collection service. Descriptions of each scenario are detailed in Exhibits C.1, C.2, and C.3 respectively. Each scenario will have varying cost and operational impacts on the personnel, equipment and facility resources of the Department as well as the participation demands placed on the public. Ultimately, the differences in communities may require us to incorporate a combination of direct collection scenarios. However, as discussed in Chapter 4, we will push to implement a substitution collection service citywide because our preliminary cost analyses indicate that this is the most cost-effective strategy.

EXHIBIT C.1
SCENARIO 1: SUBSTITUTE COLLECTION

The overall strategy of this collection program is to replace one regular collection day with a collection day for recyclable materials. For example, if a household is presently serviced three times per week for regular household material, this service would be reduced to two times per week and the third day of service would be provided for recyclable materials. The same collection trucks used in the regular household collection operation would be used to collect recyclable paper material. Collection of container goods would require the design, purchase, and maintenance of a new type of vehicle which would load these materials from the top. Two trucks would be required to cover the same route because our collection trucks could not keep the recyclable paper goods separate from the recyclable container goods. However, this does not imply that the number of vehicles required would increase significantly.

Separate recycling routes are needed in this plan. Because the volume capacity of the recyclable materials is high and because current processing and market forces have resisted compacting these materials, the recycling routes are often capacity, rather than time, constrained. In light of this and to assess the cost implications for conducting a program of this type more accurately, we derived preliminary steady-state cost estimates for each of two sub-scenarios (1A, 1B), each with different materials and capacity constraint assumptions.

- Scenario 1A assumes that plastic compaction is equal to the removal of plastics. Currently recyclable plastics represent 2% of the targeted waste stream by weight but a substantially higher percentage of the total volume; this causes the cost for collection of container goods to be disproportionately higher than those for paper goods.
- Scenario 1B assumes that there will be sufficient time to cover a route which holds 40 cubic yards of each group of recyclable materials; this requires that either: (1) processing or transfer facilities are located nearby so that more than one dump can be made; or, (2) a 40 cubic yard truck can be designed.

EXHIBIT C.2
SCENARIO 2: ADDITIONAL COLLECTION

The regular household collection frequency remains the same and one extra collection service is added for collection of recyclable materials exclusively; our pilot curbside and containerized programs currently operate this way. The extra collection would use specially designed recycling trucks with two separate compartments, one for paper goods and the other for container goods.

Separate recycling routes are needed in this plan. Because the volume capacity of the recyclable materials is high and because processing and market forces have resisted compacting these materials, the recycling routes are often capacity, rather than time, constrained. In light of this and to assess the cost implications for conducting a program of this type more accurately, we derived preliminary steady-state cost estimates for each of two sub-scenarios (2A, 2B), each with different materials and capacity constraint assumptions.

- **Scenario 2B** assumes that plastic compaction is equal to the removal of plastics. Currently recyclable plastics represent 2% of the targeted waste stream by weight but a substantially higher percentage of the total volume; this causes the cost for collection of container goods to be disproportionately higher than those for paper goods.
- **Scenario 2B** assumes that there will be sufficient time to cover a route which holds 40 cubic yards of each group of recyclable materials; this requires that either: (1) processing or transfer facilities are located nearby so that more than one dump can be made, or, (2) a 40 cubic yard truck can be designed.

EXHIBIT C.3
SCENARIO 3: CONCURRENT COLLECTION

Both the regular collection and the recycling collection services could operate concurrently, using a new (but currently non-existent) type of vehicle called an omnibus; replacement of all or a major part of the current fleet with this vehicle would be required. Resources must be dedicated to research and develop the equipment needed to perform this dual collection function. Los Angeles is currently testing a more limited version of this type of vehicle.

The advantage of this scenario is that it would provide individual households with the opportunity to place their recyclable materials at the curb on each of their collection days rather than just on one recycling day each week. Possible confusion about the day of recycling service would be eliminated and the storage space needed for recyclable materials is reduced.

The Sanitation Workers will be loading material into three different compartments rather than a single one. Dump frequency and dump location are assumed not to change. This enables us to minimize transportation costs, but our present disposal facilities will have to be modified to enable them to accept (for either transfer or processing) the recyclable materials also.

The overall residential recycling direct collection strategy for the six targeted materials will eventually become some combination of these three collection scenarios. In order to most conservatively estimate the total implementation costs for this program we have assumed that the additional collection scenario is phased in citywide and that all households currently receiving curbside regular collection will receive curbside recycling collection. This strategy is potentially the most costly but does ensure, initially, minimum disruption to regular collection services for both the public and the Department by enabling maximum flexibility in the design of routes, the delivery location for the materials, and modifications to the collection operations as more materials are added and participation is increased.

Large outlays of capital and expense monies will be required during the phase in period (Fiscal 1988- Fiscal 1995) because of the necessary resource changes to our personnel, equipment, and facilities. Offsetting savings will be achieved from reductions in regular collection costs because of increased and consistent participation.

Rerouting is required to achieve the offsetting savings from regular collection. In the concurrent collection scenario, route lengths remain the same. In both the substitution and additional collection scenarios the regular collection route lengths can be extended because there is less waste to collect at each stop (and therefore less time required). The substitution scenario will require the most extensive rerouting of the regular collection routes, unlike the additional and concurrent collection scenarios, because a community's days of collection may be significantly changed (e.g., Monday, Wednesday, Friday collection is changed to Monday, Thursday collection).

Regardless of the scenario, the rerouting effort in a district could not be proposed until at least a 12%-13% diversion level is achieved. Agreement with the Sanitation Workers' union, as per the Kelly Agreement, is required before any route extension is feasible however. The earliest any district is projected to reach steady-state (i.e., 19% diversion after 3 years with six materials) is the end of Fiscal 1993 (52 districts) and the latest is the end of Fiscal 1994 (7 districts).

The total cost to recycle one ton of recyclables is the recycling collection cost plus the processing cost. If the sum of these costs is less than or equal to the sum of the costs of regular collection and future landfill disposal then curbside recycling is clearly a viable, cost-effective waste management strategy.

Because many benefits attributable to recycling are not quantified and could reduce the per ton cost of recycling it is important to evaluate the citywide direct collection of the six targeted materials on other criteria, in addition to costs. In particular, the environmental benefits and operational efficiencies derived from the diversion of targeted wastes would place a positive value on diversion and resulting reduction in the cost per ton of recycling. More importantly, the replacement value of the landfill is still undervalued, and when refinements to assumptions implicit in landfill value estimates are performed, the recycling option will become more attractive.

Because of the diversity that makes this City so unique, the actual implementation of recycling programs at the community level may differ from our proposed collection strategy. As we phase the programs into different communities we will be able to review the results obtained from participation surveys and waste composition studies and, where necessary, change some of our original assumptions so that the ultimate collection program implemented is operationally most feasible.

Operational Considerations:

One advantage of either substitute or additional collection is that the placement of transfer stations and processing centers is independent of the present disposal site locations. Under the concurrent scenario it is assumed that all the collected materials would be unloaded in one location, for example, a resource recovery plant. This may not be feasible at all disposal locations. The preferred strategy would be to site processing facilities in centrally located areas, so that the ability to make more than one load is possible and the other transportation costs (e.g., relays) are reduced.

Although we will advocate providing a substitution collection service, it may, in fact, only be suitable in those communities which receive service at least three times a week (approximately half the households presently serviced). Substitution in communities which have two day a week service would require people to store more than 80% of their wastes, including all their raw garbage for a week, which could generate community opposition.

APPENDIX D
PROCESSING CENTER REVIEW

INTERMEDIATE PROCESS FACILITY
CAMDEN, NEW JERSEY

1.	Location	- City of Camden, New Jersey
2.	Implementing Agency	- County of Camden
3.	Site Geography	- Closed, private scrap metal business, approximately 14 acres
4.	Facility Size	- Leased inside space 10,000 square feet, leased outside area 1/2 acre
5.	Design Capacity	- 80 tons per day Average throughput = 50 tons per day Highest daily throughput = 70 tons per day
6.	Materials Processed	- Glass bottles and containers (all colors), metal cans (aluminum, tin plated steel, bi-metal)
7.	Vendor/Operator	- a) owner of equipment - Camden, New Jersey - b) Operator - Giordano Joint Venture - c) Resource Recovery Systems, Inc. Lyme, Ct. (Primary Partner) - d) R.R.S., Inc. - equipment supplier of glass crusher, conveyors, can flatteners
8.	Capital Cost of Structure	- Lease, $90,000 per year (improvement costs to building included in five year lease payment, $78,000 costs of improvements)

9. Capital Cost of Equipment	-	$393,000, includes glass crushers, conveyors, total assembly and installation of all equipment (can flattener an blower provided free by Reynolds Aluminum, can shredder provided free by Vulcan Materials of Baltimore, Maryland).
10. Operating Costs	-	$230,264.43 (Jan. - June, 1987) All operating costs are paid from the receipt of material sales
11. Revenue Sharing (after expenses)	-	a) $100,000 to remain in cash account of operator at end of each year for contingencies b) $100,00 to $200,00 Private operator retains 60%, County receives 40% c) above $200,000 - Private operator and County share 50% each
12. Delivered Material Payment	-	No payment charged to delivering municipality - Profit sharing to municipalities expected to be $4 to $8 for delivered materials
13. Residue	-	14 - 18% Projected to be reduced to 8% by February 1, 1988 (new equipment to be purchased)
14. Description of Process	-	Facility accepts commingled (mixed) bottles and cans. Ferrous metal cans separated by magnet, tin plated steel cans shredded, bi-metal cans flattened and bailed, aluminum cans flattened and blown into closed trailer, glass manually separated by color and crushed
15. Population Served	-	460,000 Camden County 180,000 Outside Camden County
16. Deposit Legislation	-	No

INTERMEDIATE PROCESS FACILITY
MONMOUTH COUNTY, NEW JERSEY

1.	Location	- Long Branch, New Jersey
2.	Implementing Agency	- Monmouth Recycling Corp (Private Business)
3.	Site Geography	- Existing private scrap metal business, approximately 2.6 acres
4.	Facility Size	- Building size - 10,500 square feet
5.	Design Capacity	- 10 tons per hour, local approvals to operate eleven hours per day, maximum throughput 110 tons per day
6.	Materials Processed	- All glass bottles and containers, metal cans (bi-metal cans to be added by April 1, 1988) - Scrap yard handles other scrap metals (non container metal)
7.	Vendor/Operator	- Monmouth Recycling Corporation Owner and Operator of Plant and Equipment; Equipment is proprietory
8.	Capital Cost of Structure	- $225,000 includes new building, site improvements, site previously owned by Monmouth Recycling Corporation
9.	Capital Cost of Equipment	- $300,000 for current system, includes glass crusher, aluminum can system and conveyors - Tin plated and bi-metal can equipment is to be added by April 1, 1988 for cost of $50,000.

10. Operating Costs - $630,000 per year (estimated)

11. Revenue Sharing - Private company retains all income

12. Delivered Material Payment - $5.00 per ton for mixed cans & bottles. Separated materials delivered:

Clear glass	-	$35/ton
Brown glass	-	$25/ton
Green glass	-	$20/ton
Mixed glass	-	$ 5/ton
Aluminum	-	$800/ton

13. Residue - Estimated at 5%, to reduce to 2% by April 1, 1988 when bi-metal and tin can system is installed

14. Description of Process - On October 1, 1987 the facility will accept aluminum and color separated glass, in addition to mixed glass and aluminum; aluminum to be flattened, glass to be separated by color and then crushed

15. Population Served - 580,000

16. Deposit Legislation - No

PLANNED
INTERMEDIATE PROCESS
FACILITY
JOHNSTON, RHODE ISLAND

1.	Location	- Johnston, Rhode Island
2.	Implementing Agency	- Rhode Island Solid Waste Management Corporation (RISWMC) (Governmental Agency)
3.	Site Geography	- Adjacent to 600 acre site dedicated to landfill and planned resource recovery facility. Recycling facility to occupy approximately 7 acres
4.	Facility Size	- Building Size - 39,600 square feet
5.	Design Capacity	- Bottles, cans and plastic containers: 80 tons per day Newspaper: 60 tons per day
6.	Materials Processed	- All glass bottles and containers, all metal cans (bi-metal cans unlikely), All H.D.P.E. & P.E.T. plastic bottles, newspaper
7.	Vendor/Operator	- a) Owner - Rhode Island Waste Management Corporation b) Operator - New England CRINC (3 year contract) c) Equipment Supplier - Bezner Company, Ravensburg West Germany; Bollegraff, Holland (baler)
8.	Capital Cost of Structure	- $2,300,000, includes all site preparation
9.	Capital Cost of Equipment	- $1,800,000 for all equipment including installation - glass crushers, conveyors, flatteners, balers for plastic and newspaper and perforators

10. Operating Costs	-	$1,409,101.85 - Bid price by New England CRINC, annual cost; contract for three years
11. Revenue Sharing (after expenses)	-	Up to $1,000,000: 90% to RISWMC; 10% to Operator Above $1,000,000: 97.5% to R.I.S.W.M.C.; 2.5% to Operator.
12. Delivered Material Payment		None
13. Residue	-	10% or less - guaranteed by contract
14. Description of Process	-	Facility accepts commingled glass bottles, cans, plastic bottles (milk & soda) and newspaper paper is baled; ferrous cans are shredded; aluminum cans re-flattened; milk bottles (H.D.P.E. plastic) are ground; soda bottles (P.E.T. plastic) are perforated and baled
15. Population Served	-	1,000,000 - Population of of State of Rhode Island
16. Deposit Legislation	-	No

PLANNED
INTERMEDIATE PROCESS
FACILITY
SPRINGFIELD, MASSACHUSETTS

1.	Location	- Springfield, Massachusetts
2.	Implementing Agency	- Massachusetts Department of Environmental Quality Engineering (State Government)
3.	Site Geography	- 2.6 acres, dedicated to intermediate process facility
4.	Facility Size	- Two buildings - 11,250 square feet each: Total - 22,500 square feet
5.	Design Capacity	- Bottles, cans, paper Containers - 80 tons per day Paper - up to 160 tons per day
6.	Materials Processed	- All glass bottles or glass containers, metal and aluminum cans, (bi-metal cans not likely to be included at this time), newspaper, corrugated and mixed paper
7.	Vendor/Operator	- Owner: Resource Recovery Systems, Inc. - Operator: Resource Recovery Systems, Inc. - Equipment Supplies: Resource Recovery Systems, Inc.
8.	Capital Cost of Structure	- $3,200,000 - includes new structures, demolition of old buildings, and all site preparation
9.	Capital Cost of Equipment	- $994,000
10.	Operating Costs	- $1,149,000 - Bid Price per year
11.	Revenue Sharing (after expenses)	- Up to $200,000: 60% - State of Massachusetts 40% - Operator Over $200,000: 80% - State of Massachussetts 20% - Operator

12. Delivered Material Payment	- None
13. Residue	- Less than 10%
14. Description of Process	- Facility accepts comingled (mixed) bottles and cans, ferrous metal cans separated by magnet, tin plated steel cans shredded, bi-metal cans flattened and baled, aluminum cans flattened and blown into closed trailer, glass manually separated by color and crushed; newspaper, corrugated, mixed paper to be baled
15. Population Served	- 450,000
16. Deposit Legislation	- Yes (bottles and aluminum cans)

PLANNED INTERMEDIATE
PROCESS FACILITY
NORTH HEMPSTEAD, NEW YORK

1.	Location	- Town of North Hempstead, Long Island
2.	Implementing Agency	- Town of North Hempstead
3.	Site Geography	- On Port Washington peninsula, West Shore Road in Roslyn
4.	Facility Size	- 220 feet X 100 feet
5.	Design Capacity	- Operating a minimum of 8 hours per day: 70 tons per day - newspaper 2.5 tons per day - aluminum 55 tons per day - glass 20 tons per day - tin
6.	Materials Processed	- newspaper, aluminum, glass, tin
7.	Vendor/Operator	- not finalized yet - vendor of choice: Resource Recovery Systems
8.	Capital Cost of Structure	- Unknown
9.	Capital Cost of Equipment	- Unknown
10.	Operating Costs	- Unknown
11.	Revenue Sharing (after expenses)	- Yes
12.	Delivered Material Payment	- No Payment No tip fee
13.	Residue	- Only facility rejects
14.	Description of Process	- Mixed metal and glass on a conveyor belt; magnets and blowers to separate aluminum; hand sorting of colored glass, glass crushers, newspaper baled separately
15.	Population Served	- Approximately 216,000 - 218,000
16.	Deposit Legislation	- Yes

PLANNED INTERMEDIATE
PROCESS FACILITY
NEW YORK, NEW YORK

1.	Location	- 225 E. 127th St, Manhattan
2.	Implementing Agency	- NYC, Department of Sanitation
3.	Site Geography	- Existing IPC for metal and glass - site approximately 1 acre
4.	Facility Size	- Building: 5,000 sq. ft.; Shed: 30' X 40' for newspaper
5.	Design Capacity	- 80 tons per shift
6.	Materials Processed	- All glass containers, tin cans, aluminum cans, aluminum foil, newspaper
7.	Operator	- Resource Recovery Systems, (East Lyme, Ct.) to operate for DOS - (RRS designed equipment)
8.	Capital Cost of Structure	- $3.5 million
9.	Capital Cost of Equipment	- Approximately $300,000
10.	Operating Cost	- $432,000/year ceiling amount
11.	Revenue Sharing	- City receives all income from sales over $144,000; operator receives 1st $144,000 per year
12.	Delivered Material Payment	- None
13.	Residue	- Bi-metal cans, broken glass, misc. metal, plastics, City will cart rejects; no estimates made.

14. Description of Process	- Mixed metal and glass - will be delivered and sorted from a passing conveyor line. Newspaper will be delivered separately and processed for sale.
15. Population Served	- Will be the only IPC servicing the City's curbside collection and apartment house recycling programs
16. Deposit Legislation	- Yes

APPENDIX E
RECYCLING TRENDS IN THE NORTHEAST: PROGRAM SUMMARIES

RHODE ISLAND

Rhode Island passed a Comprehensive Solid Waste Management Bill in June, 1986 which includes provisions for a statewide mandatory recycling program. The components of the mandatory recycling program are as follows:

1. The Rhode Island Department of Environmental Management (DEM) is responsible for administering the program. The Rhode Island Solid Waste Management Corp. will work with DEM on implementing individual programs.

2. The DEM is responsible for formulating rules and regulations for implementing the program. The regulations were finalized on January 1, 1987. Further amendments to the regulations were recently drafted.

3. Mandatory Recycling will become effective in all of Rhode Island's (39) cities & towns on a staggered schedule during the next three years. Two pilot curbside programs will take place this fall. The first mandatory community program is scheduled to come on-line in March.

4. All residents will be required to separate their waste into three categories:

    a. Newspaper;
    b. Mixed recyclables: aluminum, glass, tin-coated steel cans, and some plastics;
    c. Other household waste.

5. The state will be responsible for the construction of a Materials Recovery Facility (MRF) at all resource recovery facilities & landfills throughout the State.

6. The first MRF will be built at the Central Landfill in Johnston. Ground was broken in August. The MRF is expected to be operating in early 1988.

7. The legislation requires rules & regs to be drafted by January 1, 1988 for the recycling of commercial waste to include:

    a. Cardboard
    b. Office Paper
    c. Bottles & Cans

MASSACHUSETTS

1. State Solid Waste Bill:

   a. Pending - passed unanimously by the House
      - held up in the Senate;

   b. House bill sets aside $25 million in grants for regional & local recycling programs;

   c. Current Senate version cuts House Bill amounts in half.

2. Regional Recycling Planning Process:

   a. DEQE model for planning regional recycling programs of approx. 500,000 people per region;

   b. State will pay up-front capitol costs of reginal facility (i.e., construction of MRF, collection vehicles & household containers, and publicity);

   c. Towns must pass mandatory recycling ordinances to be included in Reginal plan;

   d. Towns must collect materials & deliver to the MRF.

3. Status of Regional Programs:

   a. The first regional MRF is planned for the Springfield area;

   b. Most towns in the region have passed mandatory recycling ordinances;

   c. Operator has been selected;

   d. Projected date of ground-breaking: late Fall 1987;

   e. Funding - existing MA Bond Issue;

   f. Funding for future Regional MRF's: the pending SW bill or other unnamed sources.

VERMONT

1. State Solid Waste Law:

   a. Signed in June 1987 (PA #78);

   b. Requires the completion of a State Solid Waste Plan by April 1988 and the completion of Regional Solid Waste Plans by 1990;

   c. Requires Solid Waste plans to emphasize waste reduction and recycling;

   d. Levies a $240/cu yd or $6/ton tax on private and municipal landfills. It is hoped that the tax will indirectly encourage increased recycling.

2. Solid Waste Task Force:

   a. Governor is establishing a Solid Waste Advisory Committee - - to be established by end of October 1987;

   b. Committee will (in part) review existing nationwide packaging waste reduction initiatives;

   c. Committee will make recommendations to the Legislature by January 1989.

3. Styrofoam Ban:

   a. In September 1987 the Governor issued an Executive Order banning the use of "Styrofoam" cups, plates and bowls in State institutions;

   b. Paper products will be substituted.

4. Office Paper Recycling:

   a. Pilot in State Gov't offices started this past summer;

   b. Voluntary program.

REGIONAL TASK FORCES ON WASTE REDUCTION & MARKET DEVELOPMENT

1. New York State DEC:

The DEC has coordinated a group of recycling directors from the Northeast states from Maine to Delaware plus the Great Lakes States. Nine States were represented at the first meeting which was held in Albany in June, 1987. At this meeting they:

a. Shared program information;

b. Agreed to work on packaging & waste reduction issues;

c. Discussed ways to develop uniform packaging standards that can be adopted regionally;

d. Agreed to work together and with the packaging industry to develop model packaging control legislation;

e. Discussed with the SPI representative the possibility of embossing plastic with a descriptive code to facilitate source separation.

f. There will be a follow-up meeting the end of October at which time they will begin to work on drafting legislation for introduction next session.

2. Council of State Governments:

The LCSWM held a conference in NYC in February 1987 at which resolutions were voted on which called for the coordination and cooperation of the Northeast states in future solid waste management. The resolutions called for the CSG to be the organizing agency. The CSG brought together a group of recycling coordinators for their first meeting that was held in Boston on September 10th. At this meeting, the group:

a. Shared program information;

b. Agreed to set as their first priority establishing definitions for recycled paper products which could then be used to promote regional standardized State procurement specs;

c. Agreed to hire a consultant to do a background study, develop the definitions, and draft model procurement legislation;

d. The consultant's report will be circulated for comments to the task force members prior to the next meeting (roughly in early winter).

NEW JERSEY

New Jersey passed a Statewide Mandatory Source Separation and Recycling Act on April 20th, 1987. Prior to the adoption of this Act, it is estimated that 150 of New Jersey's 567 municipalities had some sort of mandatory recycling program and up to 290 others had voluntary programs. Under the Law all municipalities will be required to recycle a minimum quantity of materials within a specified period of time. Also, the Law includes provisions to create demand for recycled goods and stimulate investment in the recycling industry. The key provisions of the Law are as follows:

1. County Responsibilities:

   a. Must designate a district recycling coordinator within six months of passage of the law;

   b. Must adopt a district plan (within six months of passage) identifying which materials will be recycled (leaves and at least three other materials);

   c. District plan must include a strategy for the collection, marketing and disposition of the collected materials in each municipality;

   d. County has 6 months from the time the plan is submitted to solicit proposals for processing & marketing collected materials;

   e. If the county fails to find a market, the DEP may grant or deny an exemption of the plan.

2. Municipality's Responsibilities:

   a. Must appoint a recycling coordinator;

   b. Must adopt a mandatory source separation ordinance within 30 days of having a market agreement;

   c. Must provide a collection system for the recyclables designated in the district plan within 6 months from the time the plan is approved.

3. Recycling Goals:

   a. The first year of the law - - 15% of the prior year's total MSW stream;

   b. For the second year of the law - - 25% of the prior year's total MSW stream.

NEW JERSEY (continued)

c. If the [industrial] recycling rate for plastic and bi-metal beverage containers does not equal that for glass and aluminum at the end of the first year, the DEP will make recommendations that may lead to the implementation of a deposit system.

4. Funding:

a. Appropriates $8.5 million immediately from the State general fund.

(1) $7.8 million to help communities start recycling programs

(2) $500,000 to the Office of Recycling

(3) $200,000 for market studies

b. Increases the surcharge on solid waste disposal fees from 40¢ per ton to $1.50 per ton to help fund recycling programs.

5. Market Development:

a. The Act established goals and a schedule for increased state & local government purchase of products made from recycled (post-consumer) materials;

b. The Act allocates $200,000 immediately to fund a set of market studies to be completed early in 1988;

c. The Act provides funds for grants & low-interest loans to recycling enterprises;

d. The Act allows for half the cost of new recycling equipment to be credited against the State Corporate Business Tax if the equipment is used exclusively to transport or process recyclable materials or to manufacture new products made of at least 50% post-consumer materials.

CONNECTICUT

1. Municipal Solid Waste Recycling Act of 1986:

In a special session after the official end of the 1986 legislative session, the Governor signed into Law Public Act 86-1. This Law:

a. Established a task force to assist DEP with the development of a municipal solid waste recycling plan. The plan must:

(1) focus on regional recycling programs;

(2) be compatible with the States's resouce recovery program;

(3) establish recycling goals and target dates for municipalities; and

(4) be completed and submitted to the Governor by January 1987.

b. Esablished a $10 million Municipal Solid Waste Recycling Trust Fund. The Fund will be used to provide grants to municipalities to/for:

(1) develop and build intermediate processing centers; and

(2) the purchase of collection equipment and household containers.

2. Mandatory Recycling and Source Reduction Planning Law of 1987:

On July 2, 1987, the Governor signed into Law PA 87-544. This Law sets up a schedule for achieving a statewide goal of 25% (by weight) reduction of the annual tonnage of municipal Solid Waste generated through recycling & waste reduction by 1991. The major provisions of the Law are as follows:

a. DEP must adopt regulations by Feb. 1, 1988, designating which materials must be recycled.

b. DEP must revise the state solid waste plan by June 1, 1988 to include a strategy to recycle not less than 25% after Jan 1, 1991.

c. Municipalities must submit a recycling plan to DEP; if they fail to do so, DEP can order a municipality to deliver its recyclables to a regional IPC.

d. After Jan. 1, 1991 - no item designated by DEP as recyclable can be knowingly accepted for disposal by a landfill or a resource recovery facility.

e. Establishes a task force to study ways to reduce packaging in the waste stream.

f. Creates a permanent advisory council to advise the DEP on implementation for the recycling program.

g. Sets aside funds for conducting marketing studies and for studying the possiblity of recycling incinerator ash.

3. Status of Regional Programs

DEP believes that the states recycling programs will ultimately be divided into 7-9 Regions and will revolve around regional IPC's. In July 1987 the DEP announced the recipients of the first three grants for regional recycling facilities. These three projects will encompass onver one third of Connecticut residents. The grants, totaling over $6 million, were awarded to the following:

a. Southeastern Connecticlut Regional Resource Recovery Authority.

- o $1.1 million
- o Regional program (21 municipalities)
- o Re-hab of existing (Groton) facility
- o Will include a pilot to collect corrugated

b. South Central Regional COuncil of Governments

$75,000 to study and design a regional recycling program to include 21 municipalities.

c. Greater Bridgeport Region Solid Waste Adisory Board

- o $5 million
- o Regional program (12 municipalities)
- o Construct a facility to process 100 tpd of non-deposit glass and metal and 100 tpd of paper
- o design a regional collection program

LONG ISLAND

The history of recycling on Long Island has consisted of small, scattered voluntary programs. Currently, however, municipalities in Nassau and Suffolk Counties are quickly starting to require that recycling programs be implemented to meet the 1991 landfill closure deadline imposed by the State Legislature.

The responsibility for solid waste management is with the individual towns and cities on Long Island. Examples of some existing programs or plans for programs are as follows:

1. Town of Huntington

   - o currently in initial phase of pilot program
   - o currently collecting commercial corrugated only
   - o will expand to paper
   - o by 1988 - will include curbside collection for all residential areas in the town

2. Town of Islip

   - o passed a mandatory residential source separation ordinance in 1980
   - o not enforced in the early years; now, town-wide mandatory residential source separation is being enforced
   - o residential curbside collection of metal cans, glass bottles and jars, newspapers and corrugated carboard
   - o recycling goal of 50% by 1990
   - o operates a processing facility with town personnel in a renovated incinerator site

3. Town of North Hempstead

   - o had voluntary drop off centers for glass, cans, paper
   - o July 1987 - Started mandatory curbside collection of non returnable glass, metal & newspapers
   - o town landfill will turn away loads containing recyclables
   - o planning to build a town IPC to sort bottles and cans (still negotiating the contract)

- o next - commercial separation of cardboard and office paper
- o looking to site a compost facility

4. Town of Hempstead

- o implementing a pilot curbside collection program for newspapers, glass and cans
- o examining the feasibility of using glassphalt

5. East Hampton

- o pilot program started in September
- o 100 households bring separated recyclables to the landfill twice a week
- o Recyclables: food waste; paper & cardboard; glass bottles & metal cans; non recyclables
- o recyclables other than compost goes to IPC in Groton, CT
- o Compost is done in town.
- o 70% recycling goal

c. Within one year, one third of the city must begin separating its trash and receive recycling collection; within 18 months two-thirds and within two years the whole city must be participating.

d. The Mayor must appoint an Advisory Committee made up of recycling experts to guide the city's efforts, and a Task Force made up of the heads of city agencies affected by the bill to implement the program.

PENNSYLVANIA

1. State Solid Waste Bill:

A comprehensive solid waste bill is pending in the legislature. It contains provisions to phase in recycling programs state-wide to the point where two thirds of the state's population will be recycling. Key recycling provisions are as follows:

a. Requires municipalities of over 10,000 people to establish curbside recycling programs within two years;

b. Requires municipalities of between 5,000 and 10,000 people to establish curbside recycling programs within three years;

c. Collection programs will target at least leaves, clear glass, and aluminum;

d. Commercial establishments and institutions would be required to recycle office paper, aluminum, corrugated cardboard and leaves;

e. Requires landfill, resource recovery, and transfer station operators to establish at least one drop-off center for recyclables;

f. Requires priority be given to recycling programs in county solid waste planning;

g. Includes a 5% state procurement price preference for state purchase of recycled and recyclable materials by DGS;

h. Authorizes state funding for county recycling coordinators;

2. Philadelphia's Mandatory Recycling Law:

In June 1987 the Philadelphia City Council passed a bill that requires the City to establish mandatory recycling of both residential and commercial waste. The major aspects of the bill are summarized below.

a. Within two years of enactment, 25% of the waste stream must be recycled; 35% within three years and 50% within four years.

b. The material to be separated for recycling will be: paper, plastic containers, glass containers, metal cans, garbage, and yard waste.

APPENDIX F
NEW YORK STATE TRENDS

1. DEC Solid Waste Management Plan

In January 1987, the DEC issued a draft solid waste management plan and finalized the plan in March. The most striking element of the plan is that it calls for a shift away from the traditional landfilling of solid waste over the next ten years in favor of waste reduction, recycling and resource recovery. The plan proposes that we accomplish this through adhering to the following goals:

a. Reduce the waste stream by 50% by 1997 through waste reduction, recycling and reuse;

b. Follow a waste management hierarchy which puts waste reduction first, recycling/reuse second, resource recovery third, and landfilling fourth, only to be used as a last resort for non-recyclables, non-burnables, or ash residue;

c. Introduce legislation to:

   1. curb excess packaging and create more recyclable packaging;

   2. expand the Bottle Bill to include more beverage containers and increase the deposits;

   3. raise the price preference for recycled paper to 20% for State contracts;

   4. require all contractors working for the State to use recycled materials in at least 25% of their contract related work; and

   5. establish incentives for investors in recycling systems and equipment.

d. Require the cooperation of the Department of Commerce for market development activities.

2. Policy Directive - Department of Environmental Conservation

On June 15, 1987, the Commissioner of DEC issued a policy directive requiring that Department staff evaluate solid waste disposal initiatives according to the hierarchy established in the Solid Waste Management Plan. In addition, he required that draft Environmental Impact Statements for solid waste management facilities contain a detailed analysis of source separation/ recycling. This analysis must include the following:

- identification of the quantity of recyclable materials in the waste stream that potentially could be recovered;
- identification of potential markets;
- identification of any existing materials recovery programs;
- identification of any local laws and ordinances necessary to implement recycling;
- schedule for implementation;
- projected reduction of solid waste as a result of the program; and
- long term projected savings in landfill and disposal costs.

The Commissioner further states that if the DEIS shows that source separation/recycling is feasible, the implementation of these programs will be made a permit condition (under 6 NYCRR Part 360) of the Permit to Construct for a resource recovery facility or a solid waste landfill.

3. DEC Solid Waste Guide #1

In June 1987, the DEC released Solid Waste Guide #1, a handbook on resource recovery permit evaluation criteria. This document is significant because it details the information to be submitted to DEC in support of an application for a (Part 360) permit to construct a resource recovery facility. It requires that a comprehensive analysis of recycling opportunities and a detailed description of the programs and a plan for implementation be submitted for DEC review in accordance with the Commissioner's policy directive.

4. Brooklyn Navy Yard Permit Requirements

Both the Draft Construction Permit and the Operating Permit for the Brooklyn Navy Yard Resource Recovery Facility clearly state that the development of a comprehensive recycling plan, the incorporation of the plan into the City's longterm solid waste management strategy, and the continuance of the program are required conditions of the permits.

a. Construction Permit:

The Draft Construction Permit for the Brooklyn Navy Yard Resource Recovery Facility requires that a recycling plan be submitted to the DEC for review and approval within three months of the issuance of the Construction Permit. The plan must:

- o be consistent with the 50% recycling goal in the State Plan;
- o estimate the quantities of recyclable materials in the waste stream;
- o discuss potential markets;
- o discuss procedures for separating, collecting and storing materials;
- o analyze state and local legislation required;
- o include a public education program; and
- o be implemented in at least one borough within 12 months of the recycling plan's approval. The implementation of source separation/recycling in the remaining boroughs must be integrated with the development of future facilities.

b. Operating Permit:

The Draft Operating Permit for the Brooklyn Navy Yard Resource Recovery Facility requires that the source separation/recycling plan required under the Permit to Construct must continue to be implemented in at least one borough. The operating permit requires that:

- o performance data be reviewed every six months;
- o the source separation/recycling plan be evaluated and a final report be submitted to the DEC for review prior to the expiration of the permit; and
- o source separation/recycling must be integrated in the development of future resource recovery facilities.

APPENDIX G
STATUS OF NEW YORK STATE LEGISLATION

The following is a summary of the status of major solid waste initiatives in the New York State legislature for 1987.

Summary of State Legislation 1987:

CATEGORY	BILL/CHAPTER #	DESCRIPTION	STATUS
1) Deposits	A.6076-a	Battery deposit	Assembly Codes
	A.6615	Tire deposit	Assembly Codes
	A.5654	Bottle Deposit	Assembly Commerce
	A.2698/S1882	Bottle Deposit	Assembly Commerce
	A.7482/S.4664	Governors unclaimed Deposit bill	Assembly Commerce
	A.5225	Deposit on alcohol and wine in containers 17oz or less.	Assembly Commerce
	A7622/S.5870	Exclusive geographic territories for beer distribution	Assembly Commerce
	S.917	Liquor and wine deposit	Senate Finance
	A.4987	Fruit juice, wine coolers alcoholic beverages deposit	Assembly Commerce
	A.835/S.503	Liquor and wine container deposit	Assembly Commerce
	A.2698/S.1882	Wine products as "beverage"	Assembly Commerce
	A.8478/S.6388	Wine products included redemption centers required to be in contract with a dealer	Assembly Commerce

CATEGORY	BILL/CHAPTER #	DESCRIPTION	STATUS
2) Procurement:			
	Chapter 849	State agencies must favor recycled products	L.1987
	A.6059/S.4849	Port Authority directed to set up export market program for recyclable materials	Veto 12/23/87
	A.7831-a/S.5734-b	Secondary Materials industry expansion in NYS	Recalled
	A.8544	Purchases and spec. for materials	Assembly W & M
	S.5733	Secondary materials utilization	Senate EnCon
3) Recycling Enhancement:			
	Chapt. 599	NYS DOT tire asphalt pilot program	L.1987
	Chapt. 615	Commerce directed to increase secondary materials utilization	L.1987
	A.567/S.1064	Recycling Fund	Assembly EnCon
	A.4172/S.3154	NYS DOT study for solid waste ash for road construction	Assembly EnCon
	A. 803/S. 502	DEC grants based on maximum recycling	Assembly W & M
	A.6074/S.6270	"Right to recycle" flow control	Passed Assembly
	A.6075	Solid Waste Permits require recycling	Passed Assembly
	S.5733	Approp. $8 million to Dept. of Commerce for Secondary Materials Fund	Senate EnCon

CATEGORY	BILL/CHAPTER #	DESCRIPTION	STATUS
	S.1412	Prohibits operation of resource recovery where 10%-25% recycling is not in solid waste plan	EnCon Senate
	A.5390/S.3521	$100,000 to DEC for mandatory recycling study	Assembly EnCon
	A.8556	Mandatory separation and recycling	Assembly Commerce
	A.803/502	Source Separation Plans	Assembly EnCon
	S.1064	Statewide recycling program	Senate EnCon
4) Technical/Financial Assistance to Local Government:			
	Chapt. 464	1972 EQBA money available for local govt. recycling projects	L.1987
	Chapt. 477	DEC directed to assist municipalities on solid waste plans	L.1987
	Chapt. 490	Expands Environmental Facilities Corp. mandate for recycling	L. 1987
	A.4190/S.3155	$2 million to DEC for municipal source separation grants	Assembly EnCon
	A.6674/S.5735	Secondary Materials Institute	Passed Senate
	S.6403	Temp. State Commission to advise on solid waste recycling	Senate Finance
	S.6288	NYS local resource reuse and development program	Senate Finance
	A.8598/S.6308	Long Island Waste Recycling Corp. Act: Implement state solid Waste Management Plan	Senate EnCon

CATEGORY	BILL/CHAPTER #	DESCRIPTION	STATUS
5) Recycled Products/Industry Preferences:			
	A.6078/S.4851	Property tax abatement for private recycling facilities	Assembly W & M
	A.6079/S.4850	Eliminate sales tax on second-hand goods less than $200 value	Assembly W & M
	A.7734	Car air bags stated on title	Assembly W & M
	A.7733	Provides air bags removed before dismantled	Assembly Transp.
	A.566/S.1414	Recycling Investment Tax Credit	Assembly EnCon
6) Solid Waste Impact:			
	A.6077	EIS requires "Solid Waste Impact Statement	Assembly 3rd read.
	A.6832	Establish a Solid Waste Policy for NYS	Assembly 3rd read.
7) Packaging:			
	A.6804/S.5732	Packaging tax	Assembly W & M
	A.6080/S. 4847	Eliminate sales tax on re-useable commercial packaging	Passed Assembly
	A.771	5¢ Tax on vendor bags; discourage use	Assembly W & M