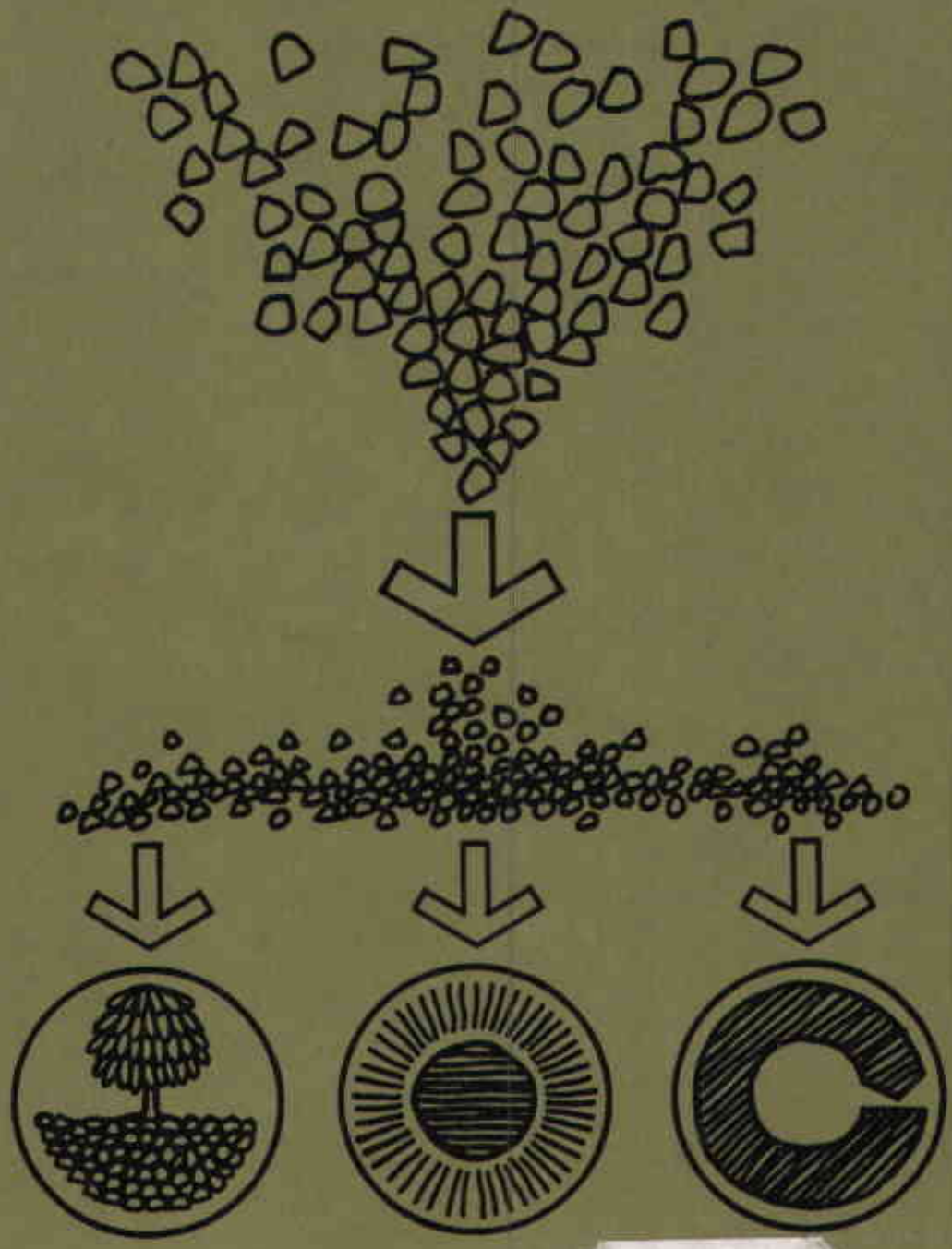
METROPOLITAN SERVICE DISTRICT
Solid Waste Management Action Plan
II

GREATER PORTLAND AREA, OREGON

BARTLE WELLS ASSOCIATES



Effective solid waste management is the responsibility and daily concern of many governmental agencies, officials, and members of the sanitation industry in the greater Portland Metropolitan Area. The co-operation and assistance of the following agencies has been most valuable in preparing this report.

Federal

U.S. Department of Agriculture
U.S. Forest Service, Civil Engineering Department
Soil Conservation Service

State of Oregon

Department of Environmental Quality
Forestry Department
State Engineers Office
State Highway Division

Regional

Columbia Region Association of Governments
Metropolitan Service District

County

Clackamas County Department of Public Works, Solid Waste Division
Clackamas County Planning Department
Columbia County Health Department
Columbia County Organization of Governments
Columbia County Planning Commission
Multnomah City-County Health Department
Multnomah County Department of Public Works
Multnomah County Planning Commission
Washington County Department of Public Works
Washington County Health Department
Washington County Planning Department

Municipal

City of Portland, Bureau of Refuse Disposal
The Municipalities throughout Clackamas, Columbia, Multnomah, and Washington counties

Advisory Groups and Participating Organizations

Clackamas County Solid Waste Commission
Clackamas County Collectors Association
Columbia County Solid Waste Advisory Committee
League of Women Voters
Local Commercial Refuse Collectors and Disposal Site Operators
Metropolitan Service District, Citizens Advisory Committee
Metropolitan Service District, Technical Advisory Committee
Multnomah County Collectors Association
Oregon Recycling Information and Organization Network
Portland Association of Sanitary Service Operators
Sanitary Truck Drivers Union Local Number 220
Washington County Refuse Haulers Association
Washington County Solid Waste Advisory Committee

We wish to express particular appreciation to William B. Culham, Director, Bureau of Refuse Disposal, City of Portland, whose knowledge, interest, and involvement in this project have been an invaluable contribution.

METROPOLITAN SERVICE DISTRICT
Solid Waste Management Action Plan II

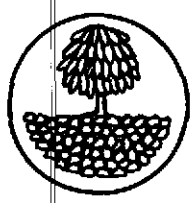
GREATER PORTLAND AREA, OREGON

Prepared by:

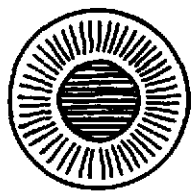
COR-MET
200 S.W. Market
12th Floor
Portland, Oregon 97201

18 April 1974 P7857.0

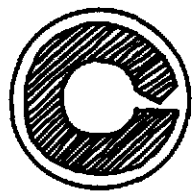
The cover is a graphical representation of the recommended solid waste management system for the Metropolitan Service District region: mixed refuse is milled to a convenient size *to become the source for:*



LAND RECLAMATION



ENERGY CONVERSION



MATERIALS RECLAMATION

Bartle
Wells
Associates
Municipal Financing Consultants
Shell Building Penthouse
100 Bush Street, San Francisco 94104 (415) 981-5751

April 18, 1974

Metropolitan Service District
6400 S.W. Canyon Court
Portland, Oregon 97221

Attention: Mr. Charles C. Kemper, Program Director

Gentlemen:

Our report on financing the Metropolitan Service District solid waste management plan accompanies this letter. The earlier draft report submitted for your review has been edited extensively, and suggestions offered in the review process have been incorporated. Subject to such changes as may be made in the physical plan, the report should provide a reasonably detailed guide to financing and carrying out the recommended program.

The financing plan seeks to take full advantage of possible grants and loans available through Oregon's Environmental Quality Commission. Even so, the strong emphasis on resource recovery and the need for transfer, milling, separation and transport elements to direct waste to recovery centers will require gate fees higher initially than those now in effect.

As revenues can be earned from resource recovery, especially within or near the district, future gate fees will be mitigated. Furthermore, within the overall cost of refuse processing, from point of origin to point of disposal or recovery, the increased gate fees required to advance into a regional management program are small. About ten cents will be added to the cost of handling a 32-gallon household container.

We have enjoyed working with you and the COR-MET team, and are grateful for the confidence you have placed in us.

Yours very truly,

BARTLE WELLS ASSOCIATES

Raymond K. O'Neil

Raymond K. O'Neil

Fred W. Cope

Frederick W. Cope

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CHAPTER 1

Chapter 1

INTRODUCTION

The solid waste management plan for metropolitan Portland responds to community concern for the effects of dumped refuse on the environment and for the value of resources lost in the dumping process.

At the state level these concerns have fostered formation of the Environmental Quality Commission, while at the urban level, a Metropolitan Service District has been voted into being. This solid waste management plan represents a cooperative effort of the two agencies to study the solid waste problem, define a solution and propose action.

Legislative Mandate on Solid Waste Management

Through legislation the State of Oregon has established policies and direction, grant and loan programs, and regulations for solid waste activities. State policy leaves prime responsibility for solid waste management with local governments. State grants and loans are provided to local agencies for implementing solid waste and other programs through a $160,000,000 bond fund. Legislation has also provided cities and counties with certain powers and authorized the Metropolitan Service District (MSD).

History of MSD

Enabling legislation, passed in 1969, authorized MSD to provide public services not adequately available through existing agencies. MSD was established by voter approval in the May 1970 primary election. The MSD boundary encompasses portions of Clackamas, Multnomah, and Washington counties.

MSD received a planning grant from the Department of Environmental Quality to study the area's needs and to develop any required regional solid waste management programs. The study area included the three counties partially encompassed by MSD, and Columbia County. Staff members of the Columbia Region Association of Governments (CRAG) were assigned by agreement with MSD to carry out the administrative requirements of the study.

COR-MET, a joint venture of CH2M-Hill of Portland and Metcalf & Eddy Engineers of Palo Alto, California, was retained as the engineering consultant. Bartle Wells Associates was separately retained as the financial consultant. The pre-final engineering report submitted by COR-MET on December 12, 1973, was used to develop this financial report.

Program Identification

The engineer's report proposes four solid waste systems:

Regional Processible System

Non-Processible Waste System

Scrap Tire System

Columbia County System

The regional system is the major system proposed for the MSD three-county area. The system includes six milling facilities, transport facilities, and sanitary landfills. This alternative was selected by MSD to foster recovery of secondary materials. The non-processible system is also planned for the three-county area, and the scrap tire system for the four-county area. The Columbia County system, developed separately from the regional system, includes four transfer facilities to serve adjacent communities and a central sanitary landfill.

Financing Plan Approach

The regional processible system requires an initial outlay of $26,800,000 to construct facilities to meet future waste disposal needs of the area and enable resource recovery. Both the capital and annual costs for the recommended system are higher than an alternative system designed to meet only the disposal needs of the area. The more costly system was recommended because state policy favors resource recovery programs, and because higher costs can be reduced if a sufficient market develops for sale of secondary materials.

The financing plan is based on paying all program costs initially from service charges and disposal fees without reliance on sales of secondary materials. However, the potential for reducing disposal fees through resource recovery is also identified in this report. Also discussed are the responsibilities of the various agencies in operating the program, the organizational, administrative, regulatory and legislative steps required, and issues that the MSD board will need to resolve to carry out the program.

CHAPTER 2

Chapter 2

EXISTING LEGISLATIVE FRAMEWORK

DIVISION OF POWERS AMONG AGENCIES

The federal government, State of Oregon, MSD, counties and cities have certain responsibilities in solid waste management. Table 1 describes the present financial, administrative, and regulatory roles of these entities. Table 2 lists specific powers of MSD, counties, cities, and the state.

Federal Government

Solid waste management remains a state and local responsibility because federal legislation and grant programs are limited to national programs. The 1965 Solid Waste Disposal Act, and its subsequent amendment in 1970, provides funds for demonstration, construction, and resource recovery programs. The Environmental Protection Agency (EPA) currently funds a limited number of local projects by selecting one or more local proposals, based on current EPA guidelines, that best appear to meet specified national technological goals. New legislation extended the Solid Waste Disposal Act through the 1974 fiscal year.

Rural areas or towns of less than 10,000 can apply for loans from the Farmer's Home Administration, Department of Agriculture, (Category 10.418, Water and Waste Disposal System for Rural Communities). Two Oregon counties have used this program for limited assistance. Previous grant provisions of the program have been terminated. Any local agency implementing a solid waste program with rural elements should inquire whether or not federal grants again become available subsequent to this report. The loan program should also be considered.

State of Oregon

The State of Oregon has undertaken to regulate and develop a statewide solid waste management program. The financial, administrative, and regulatory provisions of Oregon Revised Statutes (ORS) are identified in Volume I, Table 3, pages 4-3 thru 4-8. ORS 449, Water and Air Pollution Control Bonds, and ORS 459, Solid Waste Control, are the major enabling legislation for solid waste management by local governments.

The Environmental Quality Commission, under provisions of ORS 440.685, can grant funds to 30 percent of project costs for solid waste programs. The Commission can also acquire general obligation bonds, or other obligations of any agency, up to 70 percent of total project cost. The facilities must appear to the Commission to be not less than 70 percent self-supporting and self-liquidating from revenues, gifts, user charges, and other fees.

The State of Oregon established policies for a statewide solid waste management program under ORS 459. Key policy statements are as follows:

> "Retain primary responsibility for adequate solid waste management with local government units,..."
> "Provide advisory technical assistance and planning assistance..."
> "Provide for the adoption and enforcement of minimum performance standards..."
> "Encourage utilization of capabilities and expertise of private industry in accomplishing the purposes..."

Under Section 459.025, both the Environmental Quality Commission and the Department of Environmental Quality (DEQ) may enter into agreements with local government units for carrying out purposes of the act.

Metropolitan Service District

Under ORS 268, a metropolitan service district may provide public facilities not adequately available through other local agencies. Within its responsibility for regional aspects of solid waste disposal, a metropolitan service district may dispose and provide facilities for disposal of solid and liquid waste, and by agreement with local agencies, collect and transport such waste. Local responsibility for collection and transportation is limited to the local aspects of the solid waste program. In metropolitan matters, solid waste regulations adopted by MSD exceed or are at a higher level of authority than county and city ordinances. Table 2 summarizes the division of authority under present law.

Counties and Cities

Cities and home-rule counties may implement charter provisions related to solid waste programs not in conflict with state law. ORS 459 provides a further basis for local agencies to regulate solid waste programs. Cities are granted control over solid waste activities within their incorporated areas; counties within unincorporated areas.

Other Agencies

County service districts and sanitary districts or authorities (ORS 451 and ORS 450 respectively) can adopt solid waste regulations not in conflict with regulations of DEQ. General information relative to these agencies is included in Table 1.

TABLE 1
MSD SOLID WASTE MANAGEMENT STUDY
SUMMARY OF AGENCY RESPONSIBILITIES

Agency	Financial	Administrative and Regulatory	Legislative
Federal Government	Provide grants & loans to state & local government.	Promote programs, assist local government, in development of improved solid waste management programs. National standards for collection, recovery, & disposal of wastes. Regulations of hazardous wastes. Regulation of wastes on federal installations and lands. Policy & legislative directives emphasizing state & local government responsibility for funding & implementing solid waste management programs.	Solid Waste Disposal Act[1] PL 89-272 PL 91-512 Hazardous Waste Management Act, 1973.
State Government	Provide grants & loans to local government under provisions of ORS 449.	State policy, programs, and regulations. Disposal site & other permit regulations. Hazardous waste regulations. Policy emphasizing that local government retain prime responsibility for solid waste management. Regulations relative to agriculture, timber slash, & backyard burning, bottle bill.	ORS 447 ORS 449 ORS 459 ORS 483 ORS 517 ORS 541

Agency	Financial	Administrative and Regulatory	Legislative
Metropolitan Service District	Accept contributions Levy assessments Set charges Accept grants Borrow from state or agencies with territory in the district. Issue bonds Levy taxes	Authority from state law: To provide public services not adequately available through previously authorized governmental agencies. Subject to state law: May provide metropolitan aspects of solid and liquid waste disposal; may dispose and provide facilities for disposal of solid and liquid waste; may, by agreement with local government, collect and transport such waste.	ORS 268 ORS 459
County[2]	Prescribe rates for collection. Collect fees for franchises. Allocate general revenues. Issue bonds Levy taxes	Authority from state law; charter, or general law (excluding incorporated areas): May by ordinance, regulation, or order: Prescribe quality, character, & rates for the collection, transportation, and/or disposal of solid waste. Establish service areas, grant franchises for collection services. Prescribe procedures for issuance, renewal, & denial of franchises. May acquire and operate disposal sites. Cities includable by agreement.	ORS 459
County Service District		Not applicable to Clackamas, Multnomah, & Washington Counties.	ORS 451
Sanitary District or Authority		May maintain & operate disposal sites & solid waste collection & disposal systems in compliance with ORS 459.005-459.285. Excludes incorporated areas.	ORS 450

Governmental Agency	Financial	Administrative and Regulatory	Legislative
City[2]	Prescribe rates for collection. Collect fees for franchises. Allocate general revenues.	Authority from state law - homerule of cities, charter: May exercise by charter or ordinance any regulation not restricted by constitution or state law.	Charter, ORS 459

1 - Legislation has extended the Solid Waste Disposal Act through fiscal year 1974.

2 - A city or a county may enter any agreement deemed desirable for franchises, for planning or implementing solid waste management plans, for regional solid waste management study, for regional sites, or for employment of persons to operate sites.

TABLE 2
MSD SOLID WASTE MANAGEMENT STUDY
POWERS OF SOLID WASTE AGENCIES

	Agency			
	MSD	County	City	State
Statewide Program				X
Territorial jurisdiction	Portland SMSA[1]	Unincorporated	Incorporated	Statewide
Technical assistance				X
Grants and loans to local agencies				X
Establish performance standards				X
Define policies				X
Personnel training				X
Assist in disposal site surveys				X
Regulate to protect health				X
Regulate collection vehicle designs				X
Control environmental hazardous wastes				X
System planning	X	X	X	X
Contract with state & federal governments	X	X	X	X
Adopt ordinances, rules, regulations[2]	X	X	X	X
Agreements with local governments	(3)	X	X	X
Acquire property	X	(4)	(4)	
Has authority to:				
Collect	(6)	(8)	X	
Transfer	(6)	(8)	X	
Dispose of solid waste	(7)	X	X	
Regulate solid waste disposal	(7)	X	X	

Table illustrates the major legislative authorities that must be analyzed for regional solid waste programs.

1 - Requires consent of city before its territory can be included.
2 - Not in conflict with DEQ.
3 - Only cities and counties.
4 - By agreement with other local agencies, need consent of city or county if acquisition within the other jurisdiction.
5 - Transfer defined as transfer and subsequent transportation of wastes, including necessary facilities and equipment.
6 - Local transfer aspects only by agreement with other local agency.
7 - Metropolitan aspects of services not adequately available.
8 - Can collect or transfer by franchise or license.

PRESENT ROLES IN SOLID WASTE MANAGEMENT

Current solid waste management activities of agencies within the four county area are summarized in Volume I, Tables 2 and 3, pages 4-3 thru 4-12. An analysis of the information indicates that:

1. DEQ directly exercises all authority granted it by law and does not currently delegate its authority.

2. Clackamas, Columbia, and Washington counties have adopted similar solid waste ordinances for management of collection and disposal programs.

3. Most incorporated cities have ordinances for franchised collection and disposal, abandoned vehicles, and other nuisances, but do not administer or operate disposal sites. However, the City of Portland operates a site that serves the city and surrounding areas.

Table 3 summarizes the general programs currently operated in the four-county area. The current solid waste management system is primarily composed of disposal sites, sanitary landfills, dumps, and illicit dumps. There are no existing public programs for recovery, processing, transfer or transportation.

Collection practices and franchise conditions are summarized by county in Volume I, Chapters 6 thru 9.

Eleven operating disposal sites serving the four county area are identified in Volume I, Chapter 9. Information relative to site location, ownership, operation, type of material accepted, waste disposal in tons per year, site fees, and hours of operation are summarized in Tables 17 and 18, Volume 1, pages 9-2 thru 9-4. Additional information on each site is included by county in Volume I, Chapters 6 thru 9.

Existing County Programs

The counties potentially involved in a regional solid waste plan, those of Clackamas, Columbia, Multnomah, and Washington, have established plans to deal with solid waste disposal and collection functions under various ordinances. Washington County adopted Ordinances No. 59 and 83, effective March 23, 1971, to deal with solid waste collection and disposal. Columbia County enacted a single solid waste ordinance effective April 26, 1972, dealing with both collection and disposal functions, as did Clackamas County on June 10, 1970. Multnomah County does not appear to have a specific ordinance dealing with the solid waste disposal subject at this time, but the City of Portland regulates disposal at the St. John landfill which serves Multnomah County as well as the city.

TABLE 3
MSD SOLID WASTE MANAGEMENT STUDY
AVAILABLE PROGRAMS BY AGENCY

Process	Agency	Current Programs
Disposal		
	State	Policy and disposal site regulations, permit requirements.
	MSD	Under study.
	County	3 of the 4 counties have adopted solid waste regulations for franchised or licensed disposal.
	City	The City of Portland operates a disposal site; other cities require collectors to transport waste out of the city.
	Private Industry	Ownership and operation of the majority of sites.
Recovery		
	State	Policy and legislative authority for supporting resource recovery.
	MSD	Under study.
	County	No programs of a regional nature.
	City	No programs of a regional nature.
	Private Industry	Recovery programs have been implemented to remove items from the waste stream.
Processing		
	State	Policy and legislative authority for processing, including permit provisions.
	MSD	Under study.
	County	No programs of a regional nature.
	City	No programs of a regional nature.
	Private Industry	Processing programs have been implemented to remove items from the waste stream.
Transfer		
	State	Policy & legislative authority for transfer, including permit provisions.
	MSD	Under study.
	County	No programs of a regional nature.
	City	No programs of a regional nature.
	Private Industry	No programs of a regional nature.
Transportation		
	State	Legislative authority, permit requirements for septic pumper regulations.
	MSD	Under study.
	County	No programs of a regional nature.
	City	No programs of a regional nature.
	Private Industry	Ownership & operation of collection & transportation facilities.
Collection and Storage	All entities (excluding MSD)	Some involvement in the legislative, regulatory, financing, or operational aspects of collection and storage.

As permitted by state law, the county ordinances establish franchises, set rates, and prescribe operating standards for the collection and disposal of solid wastes within their jurisdictions.

Specific franchises are granted for collection and disposal functions.

Anyone collecting or disposing of solid wastes for compensation must be franchised.

Franchise fees shall be paid to the county.

Rate schedules are established by the county.

County regulations do not apply in incorporated areas.

Violations of county ordinances are penalized.

Joint franchises may be granted in conjunction with a regional planning approach including affected cities, or for specified solid waste collection and disposal.

In all counties, the definition of solid waste collection and disposal service includes transportation. For example, Washington County specifically defines "service" as "the collection, storage, transportation, and disposal of waste and solid waste." (Ordinance 59, Section 1, A-12).

Existing City Programs

A regional solid waste management program will affect the various cities in the four-county area. Of nine cities surveyed from those included in Volume I, all franchise collection and disposal under Oregon constitutional provisions for home rule. In some cases, these franchises are granted on an exclusive basis. City franchises generally prohibit solid waste disposal within city limits, unless otherwise stated. Portland is the only city which maintains its own disposal site.

City franchises also set ceiling rates for service provided, levy franchise fees, and generally permit householders to transport and dispose of waste generated by the household if no fee or compensation is received for collection and disposal. Franchises in the various cities run from a minimum of one to a maximum of ten years in length.

Present System Costs

Present costs of both collection and disposal programs are included in Volume I, Chapter 11. Current franchised collection fees include disposal. Fees are identified for each franchised hauler, by county, in Volume I, Chapters 6 thru 9. Disposal

fees are charged on estimated volumes with separate rates for compacted and loose material. Table 4 shows the apparent cost per ton and monthly disposal costs now charged at the Rossman, Santosh, and St. John landfills.

FUND SOURCES FOR SOLID WASTE MANAGEMENT

Solid waste management costs comprise capital and operating costs. Capital costs include land, equipment, and improvements, and can be spread over time through borrowing, bond issuance, or lease purchase. Operating costs include all planning, administration, collection, transportation, disposal site operation, and equipment maintenance associated with the program. The total annual expenditures for solid waste programs include both operating costs and capital costs expressed on an annual basis.

The corresponding revenue system must equal or exceed all annual expenditures. Potential revenue sources available for local agencies in Oregon include point-of-purchase charges for specified wastes, disposal charges for general and specific waste, franchise fees, license charges, and upon voter approval, ad valorem tax levies. Table 5 identifies the capital and revenue sources for MSD, counties, and cities.

Capital Fund Sources

The State of Oregon Grant/Loan Program available for solid waste facilities is administered through DEQ. A local agency may receive up to a 30 percent grant and a 70 percent loan for solid waste programs.

The Environmental Quality Commission currently has an authorization of $160,000,000 for all eligible programs. To date two issues of bonds have been sold, the first with a termination date of April 1, 1991, and the second with a termination date of November 1, 1992. Both issues were for $45,000,000. Current interest rates vary with bond maturity and range from 4 to 6 percent, with a net effective rate of 4.72 percent.

These funds are believed largely committed, but a portion of future issues under this authorization will be available for solid waste facilities. Land cost for solid waste facilities are considered an integral part of solid waste management programs, and are grant eligible. Permanent structures, site improvements, and equipment also appear to be eligible for grants and loans.

Loans. MSD has received legal advice that MSD may borrow funds from counties and cities within the district, or from the state, without voter approval. MSD's legal counsel also advises that the Environmental Quality Commission may lend funds directly to MSD without requiring MSD to issue bonds. To date the

Commission has lent funds only on the security of bonds issued. This policy may be an outgrowth of dealing with counties which ordinarily cannot borrow more than $5,000 without issuing bonds. The opportunity to borrow capital funds from the state without the procedural hurdle of a bond issue would be decisive in getting the MSD program off the ground.

The costs and delays of the voting procedure can be avoided.

MSD is the only existing agency already situated to borrow capital and use it for a regional solid waste management program.

Bond Sales. MSD, counties, and cities may use general obligation bonds and revenue bonds for solid waste facilities. The limitations for each agency are identified in Table 2. The current assessed valuation of MSD and Columbia County, and the amount of debt that may be incurred, are as follows:

Entity	($000) Assessed Valuation		Debt Limitation
MSD	$8,835,000	10%	$883,500,000
Clackamas County	1,155,000		
Multnomah County	6,070,000		
Washington County	1,610,000		
Columbia County	321,700	2%	6,434,000

Ample bonding capacity remains in all cases to finance the recommended solid waste management program. However, bonds do not appear to be a legal prerequisite to MSD's obtaining grants and loans from the Environmental Quality Commission. Even if bonds should be required, in the case of Columbia County, repayment can be made from direct charges rather than taxes. The solid waste management program should have no effect on tax rates or bonding capacity in the areas to be served.

Revenue Sources

The benefits that result from an improved waste management system should be identified in developing a revenue system for solid waste disposal. Some benefits that may result include an improved environment, reduced annoyance, reduced transportation costs, more convenient service, and better use of material resources.

The revenue structure must be designed to insure that measurable benefits are either returned to the user in decreased costs or used to help pay for the improved program.

Direct Service or User Charges. Direct service or user charges include gate fees and direct charges made for measurable benefits to local agencies, collectors, or communities as a result of a new program.

Gate fees have typically been charged at existing landfill sites to pay all disposal costs, including disposal franchise fees. The City of Portland currently establishes fees to recover disposal costs but does not use a franchise fee because the site is operated by city employees.

Gate fees should provide the majority of revenues needed for the solid waste system, but should not be set at levels which discourage facility use. Gate fees can be set at transfer, milling, or disposal sites to cover all solid waste management costs not recovered from other sources. Fees can be set by dividing the cost of service by the tonnage or volumes received.

Transportation Surcharges. Besides providing for waste disposal, the regional program also includes transportation of wastes from milling centers to landfills. The savings in haul cost to private collectors is another form of direct and measurable benefit. This savings can be recovered from haulers through a surcharge for transportation service or capacity financed by MSD.

Franchise Fees. Cities and counties currently use franchise or license fees for both collection and disposal franchises. MSD can use such fees to pay its cost in administering and monitoring franchised services.

Franchise or license fees can be based either on the quantities of waste being handled or on a percentage of gross revenues. The latter procedure is commonly used in the MSD region because of the difficulty in estimating quantities on a volume basis.

Point-of-Purchase Charges. Point-of-purchase charges can be levied on the sale of items that are difficult to dispose of or are found to create a special disposal problem. Although MSD can levy such fees, none are recommended within this plan. No wastes except for scrap tires have been recommended for separate handling and disposal. In the case of scrap tires, franchise and license fees applicable to scrap tire haulers are believed to be more practical than point-of-purchase charges because fees apply to all tires disposed of in the region. Point-of-purchase charges would not provide revenues from tires purchased outside the region and subsequently disposed of in the region.

Indirect User Charges. Indirect user charges are charges levied on beneficiaries in proportion to their waste generation rather than on measured disposal or collection quantities. MSD, counties and cities may impose indirect user charges under provisions of ORS 268 and 459. They may also enter into agreements with any local agency for developing this revenue source.

The indirect user charge can generate revenues for all or a percentage of system costs. Indirect user charges are usually not needed in urban areas because disposal costs compose only a small part of the combined cost of collection and disposal. Urban residents, already accustomed to paying directly for collection, will usually prefer paying a similarly direct charge for disposal.

Rural residents, on the other hand, now pay only a small disposal fee or use illicit dumps, and do not have to pay the cost of transporting wastes to approved sanitary landfills. Rather than raise rural gate fees high enough to pay for transportation, and thereby discourage use of the system, the indirect charge may be preferable in rural areas. The indirect charge obviates the need to provide attendants at all hours of operation at rural drop boxes.

This revenue source is not proposed for use within the MSD area, nor is this revenue source now proposed for the rural portions of the three-county area because drop box facilities were not included in the regional study.

To impose an indirect user charge MSD would first have to:

1. Classify beneficiaries according to waste generation.

2. Establish rates for uniform application within areas served.

3. Provide a method of collecting the charge.

The investigations required to establish the rate structures and property classifications could be reduced if this source of revenue were used only in rural areas. The classification rate system would be established on developed and undeveloped parcels of benefit. This approach would:

charge undeveloped parcels for the benefits from reduced illegal dumping and for roadside cleanup measures.

charge developed parcels with the cost of proper waste disposal based on wastes generated rather than just wastes legally disposed of.

Although the indirect user charge could be applied under existing law, collection may require legislative action. Collection requires that the charge be billed and collected with property taxes, and become a lien on the property served if no payment is made. Legislation would be needed to establish the lien, unless current assessment procedures can be used to assess property for delinquent accounts.

All four counties have developed computer programs for taxing purposes. Although the programs would be used to identify and bill beneficiaries, the data would require reorganization. Development of data from tax information should not occur until the need for, the magnitude of revenues, and the area of benefit are determined. 1970 census dwelling unit statistics would be used for preliminary estimates for evaluating the indirect user fee. 1970 census dwelling unit statistics for each of the four counties, the MSD area, and areas of each county outside MSD jurisdiction are included in Table 6.

Ad Valorem Tax Levy. Ad valorem taxation is a method of spreading cost among all the property owners within the taxing agency. The property tax is an equitable means of paying for services of general benefit, especially where waste generation is closely related to assessed value. The property tax may be a reasonable way to apportion cost among residents, but it is often a poor measure of commercial, industrial, or agricultural solid waste generation. The use of an ad valorem tax levy by MSD would require voter approval. Counties could use their existing tax base levies but would be required to increase the base by voter approval unless funds were diverted from other existing programs.

Once established, the tax base may be increased no more than 6 percent annually without voter approval. Costs of waste disposal can be expected to rise more than 6 percent a year because of annual inflation rates and the development of better but progressively more costly technology. For this reason the ad valorem tax is not recommended as a way of paying MSD or Columbia County costs.

TABLE 4
MSD SOLID WASTE MANAGEMENT STUDY
CURRENT DISPOSAL FEES

Site	Density	Cost/ Cubic Yard	Calculated Cost/Ton	Monthly Charge for 1 Cubic Yard w/Weekly Service[1]	Monthly Charge for 32 Gal. Can w/Weekly Service[2]
Santosh	Compacted[3]	$0.75	$3.00	$1.46	$0.23
	Loose[4]	0.50	4.00	2.17	--
St. John	Compacted[3]	0.70	2.80	1.37	0.21
	Loose[4]	0.40	3.20	1.73	--
Rossman	Compacted[3]	0.59	2.35	1.15	0.18
	Loose[4]	0.32	2.56	1.24	--

1 - Calculation based on 52 weeks per year, 12 months per year, 225# per cubic yard for serviced container, 250# for loose refuse.
2 - Calculation based on 52 weeks per year, 12 months per year, 225# per cubic yard for serviced container.
3 - Received at 500 pounds per cubic yard.
4 - Received at 250 pounds per cubic yard.

TABLE 5
MSD SOLID WASTE MANAGEMENT STUDY
FUND SOURCES FOR SOLID WASTE MANAGEMENT

Revenue Sources	MSD	County	City	State
Grants and Loans to local governments				X
Borrow from Counties and Cities Within District	X	n/a	n/a	n/a
Bonded Debt				
G.O. Bonds, upon voter approval	X	X	X	
Limitation	10% of T.C.V.	2% of T.C.V.	3% of T.C.V.	n/a
Revenue Bonds, upon voter approval No Limitations	X	(1)	(1)	n/a
Special Assessments	(2)	(3)	(3)	n/a
Direct Service or User Charges	X	X	X	n/a
Franchise Fees or License Surcharges	(4)	X	X	n/a
Point of Purchase Charges for Specified Wastes	X	(5)	(5)	Provide Legislative Support
Indirect Service or User Charges	X	X	X	Provide Legislative Support
A.V. Tax Levy, upon voter approval	1/2% of T.C.V.	(6)	(6)	n/a

1 - Must be authorized by charter.
2 - Lacks definite remonstrative procedures.
3 - Not identified for solid waste.
4 - Only for charges in connection with metropolitan aspects, unless agreement with local governments.
5 - Point of purchase charges should be established on a regional basis.
6 - Subject to 6 percent limitation of Oregon Constitution.

TABLE 6
MSD SOLID WASTE MANAGEMENT STUDY
POPULATION AND DWELLING UNITS - 1970 CENSUS

Territorial Jurisdiction	Population			Dwelling Units[1]		
	Study Area	MSD	Outside MSD	Study Area	MSD	Outside MSD
Clackamas County	166,100	111,300	54,800	54,600	36,700	17,900
Columbia County	28,800	--	28,800	9,500	--	9,500
Multnomah County	556,700	553,100	3,600	209,000	207,800	1,200
Washington County	157,900	143,500	14,400	52,400	47,800	4,600
Total	909,500	807,900	101,600	325,500	292,300	33,200

1 - Total dwelling units, including occupied trailer count

CHAPTER 3

Chapter 3

PROGRAM IDENTIFICATION

ENGINEERING SYSTEMS AND DESCRIPTIONS

The COR-MET engineering report includes four basic systems:

1. Regional Processible System.

2. Non-processible Waste System.

3. Scrap Tire System.

4. Columbia County System.

The regional processible system is the major system proposed for the MSD area. The system includes six milling facilities developed for the recovery of secondary materials, transport facilities, and sanitary landfills. MSD selected this system from four proposed alternative systems for processible wastes to enable resource recovery. Both capital and annual costs for the selected system are higher than the alternative designed to meet only the disposal needs of the area. The higher initial cost has been recognized and accepted in the expectation that resource recovery would eventually reduce the higher costs.

The non-processible system was developed for construction and demolition wastes that could not be handled by the processible system. Waste volumes for this system are estimated at about 11 percent of the total waste in the three-county area. The system is essentially a continuation of the demolition sites that exist in the three-county area. The engineer provided guidelines for the system but did not provide system costs because all costs are expected to be privately financed.

The scrap tire system was developed to reduce illegal tire disposal within the four-county area. The consultants and staff recommended scrap tire carrier and scrap tire processing permits to regulate the system under private ownership and operation. MSD subsequently adopted two ordinances that will take effect when specific conditions are developed and approved by the board.

The Columbia County system was developed as a separate system. The Columbia County system consists of four transfer sites to serve adjacent communities and one landfill for receiving all wastes from the Columbia County area. This includes both demolition and processible wastes.

The projected engineering costs for the regional processible system and the Columbia County system were based on the following operating conditions:

Regional Processible System:

1. Facilities designed for 100 percent of projected generated quantities.

2. All processible wastes handled by the proposed milling facilities.

3. Each milling facility open for the disposal of wastes by the general public, franchised haulers, and private haulers.

4. Waste from each of the defined generation centers routed to assigned milling facility.

5. Residual milled waste routed to assigned sanitary landfills.

6. Sanitary landfills receive only milled refuse.

Columbia County System:

1. Facilities designed for 85 percent of projected generated quantities.

2. Four transfer facilities receive processible and bulky wastes from public, private, and franchise haulers from the generation areas nearest the facility.

3. One sanitary landfill receives all non-processible wastes including paper sludges from the St. Helens area; processible and bulky wastes from public, private, and franchised haulers in the immediate area of the landfill; and all wastes handled from the transfer facilities.

PROGRAMS AND ADMINISTRATIVE AGENCIES

For implementation the four systems can be considered as two: a regional program, and a Columbia County system.

The regional program includes the regional processible system, the non-processible waste system, and the scrap tire system. The non-processible waste system is included as a regional concern because large quantities of processible materials are currently being disposed of at demolition sites. MSD should regulate both systems so that all processible waste disposal will comply with the standards established for the area.

The Columbia County system was developed separately. It should be implemented on a countywide basis. Columbia County is recommended as the implementing agency because the county currently regulates all disposal sites within the county, can enter into agreements will all incorporated cities where required, and would be the logical agency to contract with MSD for technical personnel and special services as needed.

ADJUSTMENTS TO ENGINEERING DATA

The engineering data on projected quantities, capital cost, and operation and maintenance costs required certain adjustments to enable development of the financing plan.

1. Waste quantities estimated on the basis of 100 percent of generation rates were reduced 15 percent for revenue projections.

2. Capital costs were adjusted to the date of construction using an annual inflation factor of 8 percent for construction and 5 percent for equipment purchases. Capital costs in the engineer's report were based on an ENR Construction Cost Index of 1770 i.e., 1973 costs.

3. Land values were developed from acreage and assessed values provided by the engineer. Assessed values were increased 50 percent to allow for probable underassessment, and an inflation factor of 6 percent per year was used to forecast acquisition costs in future years.

4. Operation and maintenance costs were separated for transfer, milling, and landfill elements to facilitate individual study. An inflation factor of 6 percent per year was used to forecast future costs.

CHAPTER 4

Chapter 4

THE REGIONAL PROGRAM

Tables 7 and 8 show the estimated quantities of waste now generated and disposed of in the three-county area, and potentially subject to handling as processible or non-processible waste. The quantities appear as follows:

	Processible	Non-Processible	Total
Generated (tons/year)	773,000	73,000	846,000
Disposed (tons/year)	688,000	86,000	774,000
Percent disposed	89%	118%	91%

These estimates, prepared by COR-MET, show that only about 90 percent of the waste generated in the three-county area is disposed of at recognized sites. They also suggest that the actual volume of non-processible waste in any given year may vary above or below estimated generation rates because construction and demolition activity is highly variable.

Table 7 also shows that only 66 percent of all disposed waste and 73 percent of all disposed processible waste is received at processible waste sites. The balance is received at demolition sites.

These results suggest caution in estimating the volume of wastes on which revenues can be earned to pay for the processible waste system. This financing plan assumes revenues and expenditures based on 85 percent of the generated quantities of processible waste projected by COR-MET. The 15 percent reduction allows for:

1. Continued loss of about 10 percent between generated and disposed quantities.

2. The difficulty of identifying and accounting for non-processible waste received at demolition sites.

3. Diversion of wastes from the waste stream before entering the regional system.

To obtain revenues from disposal of even 85 percent of the processible waste generated in the three-county area, MSD will have to divert most processible waste now received at demolition sites, or levy disposal charges on processible waste received at demolition sites.

PROGRAM EXPENDITURES

Total Annual Program Costs

Table 9 summarizes the total annual cost of the regional program through 1980/81, with subsequent costs at five-year intervals.

Administrative costs for the processible, non-processible, and scrap tire systems were determined from MSD and engineering information. Capital and operation and maintenance costs are identified only for the processible system, because the other systems do not require MSD ownership and operation. Processible system costs are further divided among the milling, transport, and landfill elements involved.

The total annual cost, projected to be about $6.7 million for 1978/79, is based on public financing. Costs for the milling, transport, and landfill elements include land acquisition and replacement equipment. Land needs are met by acquisition and lease arrangements. Equipment purchase is planned originally from grants and loans from DEQ. Equipment replacement is planned on a lease-purchase basis.

Current lease-purchase information indicates that 6 percent financing can be arranged for lease terms comparable to the projected service lives of the equipment leased. For financial planning, lease terms two years shorter than average service life have been used.

The authority of MSD to obtain equipment by lease-purchase may have to be established by legislation. The lease-purchase technique is especially desirable in financing periodic replacement of equipment because it evens out the flow of capital funds and sets an orderly procedure for regularly updating the equipment in use.

The annual capital costs are based on public rather than private financing. Public financing is proposed because:

1. Local agencies can use DEQ grants for solid waste facilities.

2. Private financing for a given amount is more costly than public.

3. Franchise agreements are difficult to structure when costs are financed over a term different from the life of the franchise, when facilities to be provided by private sources last beyond the franchise life, or when service lives may be extended or waste volumes reduced by resource recovery programs.

TABLE 9
ANNUAL PROJECTION (INCLUDING INFLATION FACTORS) ($000)
REGIONAL PROGRAM

	1975/76	1976/77	1977/78	1978/79	1979/80	1980/81	1985/86	1990/91	1995/96	2000/01
Administration	$191	$ 202	$ 215	$ 227	$ 241	$ 256	$ 342	$ 458	$ 613	$ 820
Milling										
Capital costs	$---	$ 43	$ 415	$1,080	$1,188	$1,169	$ 1,499	$ 2,553	$ 1,418[1]	$ 3,470
O&M costs	225	1,204	2,422	2,583	2,753	2,937	4,555	6,824	9,629	14,383
Subtotal	$225	$1,247	$2,837	$3,663	$3,941	$4,106	$ 6,054	$ 9,377	$11,047	$17,853
Transport										
Capital costs	$---	$ 11	$ 164	$ 340	$ 364	$ 360	$ 488	$ 1,056	$ 756[1]	$ 2,033
O&M costs	46	380	840	994	1,120	1,191	2,010	2,963	4,976	7,382
Subtotal	$ 46	$ 391	$1,004	$1,334	$1,484	$1,551	$ 2,498	$ 4,019	$ 5,732	$ 9,415
Landfill[2]										
Capital costs[3]	$ 30	$ 94	$ 415	$ 707	$ 748	$ 734	$ 968	$ 1,329	$ 1,324	$ 803
O&M costs	104	402	745	784	862	925	1,326	2,071	3,013	4,412
Subtotal	$134	$ 496	$1,160	$1,491	$1,610	$1,659	$ 2,294	$ 3,400	$ 4,337	$ 5,215
Annual Cost	$596	$2,336	$5,216	$6,715	$7,276	$7,572	$11,188	$17,254	$21,729	$33,303

1 - Figures show decline in lease-purchase payments that are over a short term.
2 - Disposal at 85 percent of projected generation.
3 - Annual lease for Durham, 1975/76 through 1977/78; and for Rossman, 1976/77 through 1980/81, is included.

Public financing does not prevent private operation. MSD can franchise private operation of any element being proposed for the program.

Estimated costs for the milling, transport, and landfill elements were segregated before calculating the annual capital needs for the regional processible system. This procedure provides a basis for considering different management and operational alternatives for each system element. It also provides a basis for comparing any private financing proposals that may be advanced.

Capital Costs

The total initial capital cost for the regional processible system is $26.8 million. This cost, to be incurred during 1975 and 1976, provides for the construction and acquisition of initial facilities including equipment for recovery of corrugated and ferrous materials. Future capital costs of $7.3 million include the costs to acquire the Alford site, develop the Alford and Hayden Island landfills, and expand the Hillsboro-Cornelius milling center. The capital requirement for equipment replacement are not included because they are proposed to be met by lease-purchase procedures. The initial and future capital requirements identified by system element are:

System Element	Capital Requirements	
	Initial	Future
Milling centers	$14,258,000	$2,118,000
Transport	2,597,000	--
Landfill	9,944,000	5,184,000
Total Capital Requirements	$26,799,000	$7,302,000

Initial capital costs for the system are proposed to be met from the DEQ grant/loan program. Initial grant and local amounts, by system element are:

System Element	Grant Amount	Local Amount	Total
Milling centers	$4,277,000	$ 9,981,000	$14,258,000
Transport	779,000	1,818,000	2,597,000
Landfill	2,983,000	6,961,000	9,944,000
Total	$8,039,000	$18,760,000	$26,799,000

Thirty percent of the initial capital costs are believed to be grant eligible and are indicated to be met from DEQ grants. The remaining 70 percent, met from DEQ loans, is the local amount to be repayed by system revenue. Grants have not been assumed in meeting future capital costs, but a continuing loan program has been assumed in estimating the cost of borrowing.

Annual capital costs as shown in Table 9 reflect repayment of DEQ loans and lease-purchase of replacement equipment. The large increase in annual capital costs for the milling center and transport elements between 1985/86 and 1990/91 is required for replacement equipment. The increase in annual capital costs for the landfill element during this same period reflects development costs for the Hayden Island landfill.

Table 10 identifies all land acquisition costs for the milling centers and landfills. Costs include acquisition of land for the milling centers and all undeveloped landfills, plus annual lease costs for the Rossman and Durham landfills.

Undeveloped landfill sites are recommended for purchase rather than lease because the benefits derived from land reclamation should be used to offset program costs in future years. The Rossman and Durham sites are recommended for lease because the Durham site has a short life, and the current owners of the Rossman site have already incurred major costs for land reclamation.

Tables 11 through 13 identify all capital costs for the milling center, transport, and landfill elements of the regional processible system. Costs for each facility are grouped by items with common inflation factors, service lives, or similar financing.

Table 11 shows the capital requirements of the milling centers. Equipment costs were identified in two groups because of their service lives. The first group includes only dust collectors, scales, and recorders that have 25-year service lives. The second group includes all other equipment. The total initial cost for milling centers is about $14.3 million. This cost includes all equipment necessary for the recovery of ferrous and corrugated materials. It does not include air separation equipment because detailed costs were not provided.

Replacement equipment needs were determined from Volume I, Table 50 and 51. All capital costs include a 25 percent engineering and contingency allowance to pay the cost of evaluating different kinds of equipment which may be available in the future.

Table 12 identifies all capital requirements of the transport element. About $2 million is required for the initial 24 units for handling wastes from the six milling facilities. Each unit, as defined by the engineer, includes one tractor and three trailers at a 1973 base cost of $94,000. Future equipment costs, to be financed by lease-purchase, are also summarized.

Table 13 identifies the capital costs for the landfill element of the system. The capital cost to acquire and develop the Old Pumpkin site was not included because it occurs late in the

TABLE 10
LAND ACQUISITION COSTS
REGIONAL PROCESSIBLE SYSTEM

Element	Assessed Value[1]	Acreage[2]	Acquisition Cost[3]
Milling Centers			
Columbia Boulevard	$18,200	5	$ 140,000
Durham	11,000	5	85,000
Hillsboro-Cornelius	2,500	5	20,000
Killingsworth and 82nd	15,800	5	120,000
S.E. Portland	50,000	5	380,000
Rossman	3,500	5	30,000
Landfill Sites			
Durham	$ --	--	$ 30,000[4]
Cipole	3,200[5]	240	1,152,000
Old Pumpkin	--	--	--
Rossman	3,500	110	60,000[4]
Alford	1,900	240	1,090,200[6]
St. John	--	--	--[7]
Hayden Island	3,300	740	3,663,000

1 - Assessed property values per acre for comparable sized parcels in the general area of the site, provided by COR-MET.
2 - Acreage requirements provided by COR-MET.
3 - Acquisition costs reflect a 50 percent increase in assessed values to account for possible underassessment.
4 - Annual lease based on a 10.2 percent rate of return.
5 - Value increased to account for assessment and deferred farm rate, back taxes.
6 - Annual inflation of 6 percent per year for 8 years included to reflect acquisition cost in 1981.
7 - Nominal annual lease recommended.

TABLE 11
CAPITAL COSTS FOR MILLING CENTER ELEMENT
REGIONAL PROCESSIBLE SYSTEM

Item	Life	Milling Facility	1973 Cost[1]	Construction/ Replacement Year[2]	Capital Cost[3]	Local Cost	Financing Method[6]	Unit Annual Lease Purchase Cost[7]
Land	25+	Columbia Boulevard	$	1975	$ 140,000	$ 98,000[4]	1st Obligation	$
		Durham		1974	85,000	59,500[4]	1st Obligation	
		Hillsboro - Cornelius		1975	20,000	14,000[4]	1st Obligation	
		Killingsworth, 82nd		1975	120,000	84,000[4]	1st Obligation	
		SE Portland		1975	380,000	266,000[4]	1st Obligation	
		Rossman		1975	30,000	21,000[4]	1st Obligation	
Buildings	25+	Columbia Boulevard	837,500	1976	1,055,000	738,500[4]	2nd Obligation	
		Durham	1,006,200	1975	1,174,000	821,800[4]	1st Obligation	
		Hillsboro Cornelius	478,800	1976	603,000	422,100[4]	2nd Obligation	
		Killingsworth, 82nd	837,500	1976	1,055,000	738,500[4]	2nd Obligation	
		SE Portland	1,006,200	1976	1,268,000	887,600[4]	2nd Obligation	
		Rossman	837,500	1976	1,055,000	738,500[4]	2nd Obligation	
		Hillsboro - Cornelius expansion	378,800	1987	1,113,000	1,113,000	5th Obligation	
Equipment	25+	Columbia Boulevard	112,500	1976	130,000	91,000[4]	2nd Obligation	
		Durham	150,000	1975	165,000	115,500[4]	1st Obligation	
		Hillsboro - Cornelius	68,800	1976	80,000	56,000[4]	2nd Obligation	
		Killingsworth, 82nd	112,500	1976	130,000	91,000[4]	2nd Obligation	
		SE Portland	150,000	1976	174,000	121,800[4]	2nd Obligation	
		Rossman	112,500	1976	130,000	91,000[4]	2nd Obligation	
		Hillsboro - Cornelius expansion	43,800	1987	87,000	87,000	5th Obligation	
Equipment	10+	Columbia Boulevard	965,000	1976	1,117,000	781,900[4]	2nd Obligation	
		Durham	1,122,500	1975	1,238,000	866,600[4]	1st Obligation	
		Hillsboro - Cornelius	497,500	1976	576,000	403,200[4]	2nd Obligation	
		Killingsworth, 82nd	965,000	1976	1,117,000	781,900[4]	2nd Obligation	
		SE Portland	1,122,500	1976	1,299,000	909,300[4]	2nd Obligation	
		Rossman	965,000	1976	1,117,000	781,900[4]	2nd Obligation	
		Hillsboro - Cornelius expansion	463,800	1987	918,000	918,000	5th Obligation	
Replacement equip.[5]	10+	Columbia Boulevard	965,000	1987	1,911,000	1,911,000	Lease Purchase	307,700
			965,000	1997	3,112,000	3,112,000	Lease Purchase	501,200
		Durham	1,122,500	1986	2,117,000	2,117,000	Lease Purchase	340,900
			1,332,500	1996	4,093,000	4,093,000	Lease Purchase	659,100
		Hillsboro, Cornelius	503,800	1987	998,000	998,000	Lease Purchase	160,700
			965,000	1997	3,112,000	3,112,000	Lease Purchase	501,100
		Killingsworth	965,000	1987	1,911,000	1,911,000	Lease Purchase	307,700
			965,000	1997	3,112,000	3,112,000	Lease Purchase	501,100
		SE Portland	1,122,500	1987	2,223,000	2,223,000	Lease Purchase	358,000
			1,332,500	1997	4,297,000	4,297,000	Lease Purchase	692,000
		Rossman	965,000	1987	1,911,000	1,911,000	Lease Purchase	307,700
			965,000	1997	3,112,000	3,112,000	Lease Purchase	501,100

1 - 1973 costs from COR-MET tables 49 and 51, Volume I, including 25 percent for engineering and contingencies.
2 - COR-MET dates.
3 - Inflation factor of 8 percent per year for buildings, 5 percent per year for all equipment.
4 - Items assumed eligible for 30 percent DEQ grant program.
5 - 25 percent for engineering and contingencies included in 10 year life equipment.
6 - Number indicates Obligation used to finance the item.
7 - *Annual lease purchase at 6 percent interest, eight year amortization period.*

TABLE 12
CAPITAL COSTS FOR TRANSPORT ELEMENT
REGIONAL PROCESSIBLE SYSTEM

Item	Life	Milling Facility	1973 Cost[1]	Construction/ Replacement Year[2]	Capital Cost[3]	Local Cost	Financing Method[5]	Unit Annual Lease-Purchase Cost[6]
Initial units	10+	Columbia Boulevard	$ 376,000	1976	$ 435,400	$ 304,800[4]	2nd Obligation	$
		Durham	282,000	1975	311,000	217,700[4]	1st Obligation	
		Hillsboro - Cornelius	282,000	1976	326,600	228,600[4]	2nd Obligation	
		Killingsworth, 82nd	470,000	1976	544,300	381,000[4]	2nd Obligation	
		SE Portland	658,000	1976	762,000	533,400[4]	2nd Obligation	
		Rossman	188,000	1976	217,700	152,400[4]	2nd Obligation	
Additional & Replacement Units	10+	For six centers	$ 282,000	1978	$ 359,900		Lease Purchase	58,000
			188,000	1979	251,900		Lease Purchase	40,600
			188,000	1983	306,200		Lease Purchase	49,300
			188,000	1985	337,600		Lease Purchase	54,400
			282,000	1986	531,800		Lease Purchase	85,600
			2,068,000	1987	4,094,500		Lease Purchase	659,400
			470,000	1988	977,100		Lease Purchase	157,300
			282,000	1989	615,600		Lease Purchase	99,100
			282,000	1993	748,200		Lease Purchase	120,500
			94,000	1994	261,900		Lease Purchase	42,200
			752,000	1995	2,199,800		Lease Purchase	354,200
			282,000	1996	866,200		Lease Purchase	139,500
			1,974,000	1997	6,366,300		Lease Purchase	1,025,200
			470,000	1998	1,591,600		Lease Purchase	256,300
			376,000	1999	1,336,900		Lease Purchase	215,300
			188,000	2000	701,900		Lease Purchase	113,000

1 - 1973 costs from COR-MET tables 49 and 52, Volume I; not adjusted for 85 percent of generated waste
2 - COR-MET dates.
3 - Inflation factor of 5 percent per year.
4 - Items assumed eligible for 30 percent DEQ grant program.
5 - Number indicates Obligation used to finance the item.
6 - Annual lease purchase at 6 percent interest, eight year amoritization period.

TABLE 13
CAPITAL COSTS FOR LANDFILL ELEMENT
REGIONAL PROCESSIBLE SYSTEM

Item	Life	Facility	1973 Cost[1]	Construction/ Replacement Year[2]	Capital Cost[3]	Local Cost	Financing Method[5]	Unit Annual Lease Purchase Cost[6]
Land	16+	Cipole	$ --	1975	$1,152,000	$ 806,400[4]	1st Obligation	$
		Old Pumpkin	--	1975	--	--		
		Hayden Island	--	1975	3,663,000	2,564,100[4]	1st Obligation	
		Alford	684,000	1981	1,090,000	1,090,000	3rd Obligation	
Construction & Installed	2+	Durham	274,000	1975	319,500	223,700[4]	1st Obligation	
Equipment	16+	Cipole	2,558,000[7]	1976	3,222,500	2,255,800	2nd Obligation	
		Old Pumpkin	628,000	1994	3,161,500	3,161,500[4]		
	9+	St. John	675,000[7]	1976	850,500	595,400[4]	2nd Obligation	
	13+	Hayden Island	1,197,000[7]	1986	3,256,000	3,256,000	4th Obligation	
	5+	Rossman	174,000	1976	219,000	153,300[4]	2nd Obligation	
	17+	Alford	419,000	1982	837,500	837,500	3rd Obligation	
Site Equipment Loaders	15+	Durham, Cipole, Old Pumpkin	56,000	1975	62,000	43,400[4]	1st Obligation	
	15+	St. John, Hayden Island	56,000	1976	65,000	45,500[4]	2nd Obligation	
	15+	Rossman, Alford	56,000	1976	65,000	45,500[4]	2nd Obligation	
Compactors	9±	Durham, Cipole, Old Pumpkin	95,000	1975	105,000	73,500[4]	1st Obligation	
			95,000	1984[8]	162,500	162,500	Lease Purchase	33,000
			190,000	1990	435,500	435,500	Lease Purchase	88,600
			~~190,000~~	~~1997~~	~~612,800~~	~~612,800~~	~~Lease Purchase~~	~~124,700~~
	7±	St. John, Hayden Island	95,000	1976	110,000	77,000[6]	2nd Obligation	
			190,000	1983	309,500	309,500	Lease Purchase	62,900
			190,000	*1990*[8]	*435,500*	*435,500*	*Lease Purchase*	*88,600*
			190,000	1997[8]	612,800	612,800	Lease Purchase	124,700
	7±	Rossman, Alford	95,000	1976	110,000	77,000	2nd Obligation	
			95,000	1983	154,700	154,700	Lease Purchase	31,500
			95,000	1996[8]	291,800	291,800	Lease Purchase	59,400

1 - 1973 costs from COR-MET tables 55 and 56, Volume I.
2 - COR-MET dates.
3 - *Inflation factor of 8 percent per year for construction, 5 percent per year for equipment.*
4 - Items assumed eligible for 30 percent DEQ grant program.
5 - Number indicates Obligation used to finance the item.
6 - Annual lease purchase at 6 percent interest, six year amortization period.
7 - Capital investment for dike pumps included. Replacement costs not calculated.
8 - Compactor replacement adjusted for disposal at 85 percent generated quantities.

study period. Compactor equipment replacement was delayed to reflect the longer service life that would result from processing 85 rather than 100 percent of the quantities estimated by COR-MET.

Except for lease and lease-purchase payments, local capital costs are proposed to be met from DEQ loans. The loans are to be secured by long term obligations payable serially.

Five separate obligations are recommended. Each obligation and its allocation to each system element are summarized in Table 14. Tables 14-1 through 14-5 show the repayment schedules. Each obligation includes an allowance of about 5 percent to cover administrative expenses, costs of issuance, start-up costs, and contingencies. Tables 15 through 17 show the resulting annual capital costs for all three systems.

An equipment deposit reserve is recommended for facilities with service lives less than 15 years. The reserve provides revenue accumulation during equipment service life to repay obligations which mature after the equipment wears out. Tables 15, 16, and 17 show needed deposits.

Annual deposits in the equipment reserve accumulate earnings at 7.5 percent per year during the actual equipment life. Annual payments from the reserve begin when the equipment is retired and continue until all obligation payments are made. With this approach current users of the system pay fees only to finance equipment then in service, never to continue payments on equipment long since retired. At the same time DEQ will have the advantage of a deposit reserve to secure payment of the long term loans even after the first generation of equipment is retired.

Operation and Maintenance Costs

Operation and maintenance costs for the milling, transport, and landfill elements of the regional processible system are shown on Table 18. Operation and maintenance costs were scaled down to reflect 85 percent of the quantities estimated by COR-MET.

Milling. Operation and maintenance costs, excluding labor and insurance, were decreased by 10 percent. This decrease was calculated from the operation and maintenance cost projections provided in Volume III, Tables 0-1 thru 0-19, based on adjusted generation rates in tons per year.

Transport. Operation and maintenance costs, excluding labor, were decreased by 15 percent, based on advice given by the engineer.

Landfill. Annual costs for equipment operation and maintenance, cover costs and labor costs, were recalculated based upon unit costs provided separately by the engineer, the cost projec-

tions provided in Volume III, Tables 0-20 thru 0-38, and adjusted generation rates. This procedure was also used to estimate the reduction in landfill cover and equipment operation and maintenance costs that result from the decrease in quantities provided by resource recovery.

Administrative Costs

Administrative costs determined for the regional program are shown in Table 19. Personnel requirements were estimated from engineering and agency information. Staff requirements are identified for the regional processible system, the non-processible waste system, and scrap tire system.

Administrative costs were established on a 1974 salary base and escalated 6 percent a year. Overhead expenses are included in the salary base of each position. The estimate also includes an allowance for contract services and contingencies.

PROGRAM REVENUES

Capacity charges, franchise fees, and gate fees are recommended for meeting the annual cash requirements of the regional program.

Recovery of Haul Cost Savings

The program will save haul costs because franchised collectors and other users will transport wastes shorter distances. Table 20 shows haul cost savings to be about $1 million per year. This amount represents a savings of up to $9 per ton per trip for outlying generation areas. Savings are based on representative collection vehicle costs for each generation center and include capital, labor, and operation and maintenance savings due to decreased haul distances.

Table 21 shows the present worth comparison between haul cost savings and regional transport costs through 1986/87. Projected haul cost savings are based on 1973 costs, plus 6 percent per year for annual cost inflation and 2 percent per year for quantity increases occurring subsequent to 1975. Savings, for the region, equal or exceed the cost of the regional transport element.

To recover haul cost savings, three methods have been considered:

1. Direct charges to each hauler based on his savings. A separate charge would have to be negotiated with each hauler based on his equipment and method of operation.

2. Transportation surcharges at each milling center that represent average savings for the areas served. The surcharge would be, in effect, an additional gate fee related to transportation rather than to disposal costs.

3. Capacity charges that assign average transport costs on a regional basis or on a countywide basis. The capacity charge involves a commitment by the hauler to pay the cost of the transport system in return for a savings in gate fee. Those who do not subscribe for capacity would pay the transport surcharge.

Capacity charges, based on transport capacity required, are recommended for several reasons.

1. The charge is directly tied to the cost of substituting the publicly owned transport system for haul in privately owned collection vehicles.

2. The charge can be based on the transport system costs, and can be structured to allocate transport costs on a countywide basis.

3. The approach is easier to administer than one which requires negotiating a separate charge for each collector.

4. The collector who feels that he will not save enough on his particular operation to warrant a purchase of capacity can opt not to purchase capacity or to delay his purchase until he re-equips to take full advantage of the new system.

5. The capacity charge grants each franchised collector a right to use the transport system in proportion to his advance commitment to help pay for it.

A 1,200 ton-per-year capacity unit is recommended to enable even very small collection services to purchase capacity in lieu of paying the transport charge. The transport surcharge per ton is set at 1/1000th of the capacity charge to encourage purchase.

The capacity charge is increased over a four-year phase to allow collectors time to recover haul cost savings, e.g., sell equipment, adjust personnel needs, and adjust franchise fees, if warranted.

Both capacity charges and transport surcharges are escalated at 7 percent per year after 1979/80.

TABLE 14
OBLIGATION NUMBER AND FACILITIES FINANCED ($000)
REGIONAL PROCESSIBLE SYSTEM

Obligation Number	Year	Length	Period	Amount Financed	Obligation Amount
1	1974	22	10/1/74 - 10/1/96	$ 6,275.2	$ 7,400
2	1975	22	10/1/75 - 10/1/97	12,483.9	14,600
3	1980	22	10/1/80 - 10/1/02	1,927.8	2,300
4	1984	22	10/1/84 - 10/1/06	3,256.0	3,800
5	1986	22	10/1/86 - 10/1/08	2,118.0	2,500

Obligation Number	Element and Item	Life Years	Amount	% of Oblig.
1	Milling			
	Land, construction and equipment	25	$ 1,479.8	23.6
	Equipment*	10	866.6	13.8
	Subtotal		$ 2,346.4	37.4
	Transport			
	Equipment*	10	$ 217.7	3.5
	Landfill			
	Land and construction	Varies	$ 3,594.2	57.3
	Equipment	15+	43.4	0.6
	Equipment*	10	73.5	1.2
	Subtotal		$ 3,711.1	59.1
	Total		$ 6,275.2	100.0
2	Milling			
	Construction and equipment	25	$ 3,976.0	31.9
	Equipment*	10	3,658.2	29.3
	Subtotal		$ 7,634.2	61.2
	Transport			
	Equipment*	10	$ 1,600.2	12.8
	Landfill			
	Construction	Varies	$ 3,004.5	24.1
	Equipment	15+	91.0	0.7
	Equipment*	7	154.0	1.2
	Subtotal		$ 3,249.5	26.0
	Total		$12,483.9	100.0
3	Alford Landfill Land and Construction	17+	$ 1,927.5	100.0
4	Hayden Island Landfill Construction	13+	$ 3,256.0	100.0
5	Hillsboro Cornelius Milling Center			
	Buildings	25	$ 1,200.0	56.7
	Equipment[1]	10	918.0	43.3
			$ 2,118.0	100.0

*Equipment deposit reserve recommended to fund repayment of equipment portion of loan upon retirement of equipment. No deposit recommended for equipment with 15 or more years service life.

TABLE 14-1
OBLIGATION NO. 1 - OCTOBER 1974
REGIONAL PROCESSIBLE SYSTEM

Year Maturing October 1	Principal Outstanding	Interest at 5%	Principal Maturing	Bond Service
1975/76	$7,400,000	$370,000	---	$370,000*
1976/77	7,400,000	370,000	---	370,000*
1977/78	7,400,000	370,000	$150,000	520,000
1978/79	7,250,000	362,500	250,000	612,500
1979/80	7,000,000	350,000	250,000	600,000
1980/81	6,750,000	337,500	250,000	587,500
1981/82	6,500,000	325,000	300,000	625,000
1982/83	6,200,000	310,000	300,000	610,000
1983/84	5,900,000	295,000	300,000	595,000
1984/85	5,600,000	280,000	300,000	580,000
1985/86	5,300,000	265,000	350,000	615,000
1986/87	4,950,000	247,500	350,000	597,500
1987/88	4,600,000	230,000	350,000	580,000
1988/89	4,250,000	212,500	400,000	612,500
1989/90	3,850,000	192,500	400,000	592,500
1990/91	3,450,000	172,500	450,000	622,500
1991/92	3,000,000	150,000	450,000	600,000
1992/93	2,550,000	127,500	450,000	577,500
1993/94	2,100,000	105,000	500,000	605,000
1994/95	1,600,000	80,000	500,000	580,000
1995/96	1,100,000	55,000	550,000	615,000
1996/97	550,000	27,500	550,000	577,500

Construction Fund	$6,275,200
Funded interest	740,000
Other costs	384,800
Obligation amount	$7,400,000

*Payable from bond proceeds.

TABLE 14-2
OBLIGATION NO. 2 - OCTOBER 1975
REGIONAL PROCESSIBLE SYSTEM

Year Maturing October 1	Principal Outstanding	Interest at 5%	Principal Maturing	Bond Service
1976/77	$14,600,000	$730,000	---	$ 730,000*
1977/78	14,600,000	730,000	---	730,000*
1978/79	14,600,000	730,000	$ 300,000	1,030,000
1979/80	14,300,000	715,000	500,000	1,215,000
1980/81	13,800,000	690,000	500,000	1,190,000
1981/82	13,300,000	665,000	500,000	1,165,000
1982/83	12,800,000	640,000	500,000	1,140,000
1983/84	12,300,000	615,000	600,000	1,215,000
1984/85	11,700,000	585,000	600,000	1,185,000
1985/86	11,100,000	555,000	600,000	1,155,000
1986/87	10,500,000	525,000	700,000	1,225,000
1987/88	9,800,000	490,000	700,000	1,190,000
1988/89	9,100,000	455,000	700,000	1,155,000
1989/90	8,400,000	420,000	800,000	1,220,000
1990/91	7,600,000	380,000	800,000	1,180,000
1991/92	6,800,000	340,000	800,000	1,140,000
1992/93	6,000,000	300,000	900,000	1,200,000
1993/94	5,100,000	255,000	900,000	1,155,000
1994/95	4,200,000	210,000	1,000,000	1,210,000
1995/96	3,200,000	160,000	1,000,000	1,160,000
1996/97	2,200,000	110,000	1,100,000	1,210,000
1997/98	1,100,000	55,000	1,100,000	1,155,000

Construction Fund	$12,484,000
Funded interest	1,430,000
Other costs	686,000
Obligation Amount	$14,600,000

*Payable from bond proceeds.

TABLE 14-3
OBLIGATION NO. 3 - OCTOBER 1980
REGIONAL PROCESSIBLE SYSTEM

Year Maturing October 1	Principal Outstanding	Interest at 5%	Principal Maturing	Bond Service
1981/82	$2,300,000	$115,000	---	$115,000*
1982/83	2,300,000	115,000	---	115,000*
1983/84	2,300,000	115,000	$ 70,000	185,000
1984/85	2,230,000	115,000	70,000	181,500
1985/86	2,160,000	108,000	80,000	188,000
1986/87	2,080,000	104,000	80,000	184,000
1987/88	2,000,000	100,000	90,000	190,000
1988/89	1,910,000	95,500	90,000	185,500
1989/90	1,820,000	91,000	90,000	181,000
1990/91	1,730,000	86,500	100,000	186,500
1991/92	1,630,000	81,500	100,000	181,500
1992/93	1,530,000	76,500	110,000	186,500
1993/94	1,420,000	71,000	110,000	181,000
1994/95	1,310,000	65,500	120,000	185,500
1995/96	1,190,000	59,500	120,000	179,500
1996/97	1,070,000	53,500	130,000	183,500
1997/98	940,000	47,000	140,000	187,000
1998/99	800,000	40,000	140,000	180,000
1999/00	660,000	33,000	150,000	183,000
2000/01	510,000	25,500	160,000	185,500
2001/02	350,000	17,500	170,000	187,500
2002/03	180,000	9,000	180,000	189,000

Construction Fund	$1,927,500
Funded interest	230,000
Other costs	142,500
Obligation Amount	$2,300,000

*Payable from bond proceeds.

TABLE 14-4
OBLIGATION NO. 4 - OCTOBER 1984
REGIONAL PROCESSIBLE SYSTEM

Year Maturing 10/1	Principal Outstanding	Interest at 5%	Principal Maturing	Bond Service
1985/86	$3,800,000	$190,000	$ --	$190,000*
1986/87	3,800,000	190,000	--	190,000*
1987/88	3,800,000	190,000	100,000	290,000
1988/89	3,700,000	185,000	120,000	305,000
1989/90	3,580,000	179,000	120,000	299,000
1990/91	3,460,000	173,000	140,000	313,000
1991/92	3,320,000	166,000	140,000	306,000
1992/93	3,180,000	159,000	140,000	299,000
1993/94	3,040,000	152,000	160,000	312,000
1994/95	2,880,000	144,000	160,000	304,000
1995/96	2,720,000	136,000	180,000	316,000
1996/97	2,540,000	127,000	180,000	307,000
1997/98	2,360,000	118,000	200,000	318,000
1998/99	2,160,000	108,000	200,000	308,000
1999/00	1,960,000	98,000	200,000	298,000
2000/01	1,760,000	88,000	220,000	308,000
2001/02	1,540,000	77,000	240,000	317,000
2002/03	1,300,000	65,000	240,000	305,000
2003/04	1,060,000	53,000	260,000	313,000
2004/05	800,000	40,000	260,000	300,000
2005/06	540,000	27,000	260,000	287,000
2006/07	280,000	14,000	280,000	294,000

Construction Fund	$3,256,000
Funded Interest	380,000
Other costs	164,000
Obligation Amount	$3,800,000

*Payable from bond proceeds.

TABLE 14-5
OBLIGATION NO. 5 - OCTOBER 1986
REGIONAL PROCESSIBLE SYSTEM

Year Maturing 10/1	Principal Outstanding	Interest at 5%	Principal Maturing	Bond Service
1987/88	$2,500,000	$125,000	$ --	$125,000*
1988/89	2,500,000	125,000	--	125,000*
1989/90	2,500,000	125,000	80,000	205,000
1990/91	2,420,000	121,000	80,000	201,000
1991/92	2,340,000	117,000	80,000	197,000
1992/93	2,260,000	113,000	90,000	203,000
1993/94	2,170,000	108,500	90,000	198,500
1994/95	2,080,000	104,000	100,000	204,000
1995/96	1,980,000	99,000	100,000	199,000
1996/97	1,880,000	94,000	110,000	204,000
1997/98	1,770,000	88,500	110,000	198,500
1998/99	1,660,000	83,000	120,000	203,000
1999/00	1,540,000	77,000	120,000	197,000
2000/01	1,420,000	71,000	130,000	201,000
2001/02	1,290,000	64,500	140,000	204,500
2002/03	1,150,000	57,500	140,000	197,500
2003/04	1,010,000	50,500	150,000	200,500
2004/05	860,000	43,000	160,000	203,000
2005/06	700,000	35,000	160,000	195,000
2006/07	540,000	27,000	170,000	197,000
2007/08	370,000	18,500	180,000	198,500
2008/09	190,000	9,500	190,000	199,500

Construction Fund	$2,118,000
Funded Interest	250,000
Other costs	132,000
Obligation Amount	$2,500,000

*Payable from bond proceeds.

TABLE 15
ANNUAL CAPITAL COSTS FOR MILLING CENTER ELEMENT ($000)
REGIONAL PROCESSIBLE SYSTEM

Year	Obligation No. 1 37.4%	Obligation No. 2 61.2%	Obligation No. 5 100%	Equipment Deposit Reserve[1] Deposits	Equipment Deposit Reserve[1] Expenditures	Lease Purchase	Total Annual Amount
1975/76	--	--		--			--
1976/77	--	--		$ 43			$ 43
1977/78	$194			221			415
1978/79	229	$630		221			1,080
1979/80	224	743		221			1,188
1980/81	220	728		221			1,169
1981/82	234	713		221			1,168
1982/83	228	698		221			1,147
1983/84	223	743		221			1,187
1984/85	217	725		221			1,163
1985/86	230	707		221		$ 341	1,499
1986/87	223	750		179	$(82)	1,783	2,853
1987/88	217	728		--	(429)	1,783	2,299
1988/89	229	707		45	(423)	1,783	2,341
1989/90	222	747	$205	45	(439)	1,783	2,563
1990/91	233	722	201	45	(432)	1,783	2,553
1991/92	224	698	197	45	(417)	1,783	2,530
1992/93	216	734	203	45	(431)	1,783	2,550
1993/94	226	707	198	45	(422)	1,442	2,196
1994/95	217	740	204	45	(434)	--	772
1995/96	230	710	199	45	(425)	659	1,418
1996/97	216	740	204	45	(434)	3,356	4,127
1997/98	--	707	198	45	(338)	3,356	3,968
1998/99	--	--	203	--	(88)	3,356	3,471
1999/00	--	--	197	--	(85)	3,356	3,468
2000/01	--	--	201	--	(87)	3,356	3,470

1 - Equipment Deposit Reserves:

13.8 percent of Obligation No. 1 -
a $42,600 annual deposit at 7.5 percent interest from 1976/77 through 1985/86.

29.3 percent of Obligation No. 2 -
a $178,800 annual deposit at 7.5 percent interest from 1977/78 through 1986/87.

43.3 percent of Obligation No. 5 -
a $44,800 annual deposit at 7.5 percent interest from 1988/89 through 1997/98.

TABLE 16
ANNUAL CAPITAL COSTS FOR TRANSPORT ELEMENT ($000)
REGIONAL PROCESSIBLE SYSTEM

Year	Obligation No. 1 3.5%	Obligation No. 2 12.8%	Equipment Deposit Reserve Deposits	Equipment Deposit Reserve Expenditures	Lease Purchase	Total Amount
1975/76	--	--	--		--	--
1976/77	--	--	$11		--	$ 11
1977/78	$18	--	88		$ 58	164
1978/79	21	$132	88		99	340
1979/80	21	156	88		99	364
1980/81	21	152	88		99	360
1981/82	22	149	88		99	358
1982/83	21	146	88		148	403
1983/84	21	156	88		148	413
1984/85	20	152	88		202	462
1985/86	22	148	88		230	488
1986/87	21	157	78		849	1,105
1987/88	20	152		(172)	1,006	1,006
1988/89	21	148		(169)	1,105	1,105
1989/90	21	156		(177)	1,105	1,105
1990/91	22	151		(173)	1,056	1,056
1991/92	21	146		(167)	1,056	1,056
1992/93	20	154		(174)	1,122	1,122
1993/94	21	148		(169)	1,078	1,078
1994/95	20	155		(175)	763	763
1995/96	22	148		(170)	756	756
1996/97	20	155		(175)	1,682	1,682
1997/98	--	148		(148)	1,938	1,938
1998/99	--	--		--	2,153	2,153
1999/00	--	--		--	2,266	2,266
2000/01	--	--		--	2,033	2,033

1 - Equipment Deposit Reserves:

3.5 percent of Obligation No. 1 -
a $10,800 annual deposit at 7.5 percent interest from 1976/77 through 1985/86.

12.8 percent of Obligation No. 2 -
a $78,100 annual deposit at 7.5 percent interest from 1977/78 through 1986/87.

TABLE 17
ANNUAL CAPITAL COSTS FOR LANDFILL ELEMENT ($000)
REGIONAL PROCESSIBLE SYSTEM

Year	Obligation No. 1 59.1%	Obligation No. 2 26.0%	Obligation No. 3 100%	Obligation No. 4 100%	Equipment Deposit Reserve[1] Deposits	Expenditures	Lease Purchase	Total Amount
1975/76	--	--			--			--
1976/77	--	--			$ 4			$ 4
1977/78	$308	--			17			325
1978/79	362	$268			17			647
1979/80	355	316			17			688
1980/81	347	310			17			674
1981/82	369	303			17			689
1982/83	361	296			17		$ 94	768
1983/84	351	316	$185		17		127	996
1984/85	343	308	182		4	$(14)	127	950
1985/86	363	300	188		4	(14)	127	968
1986/87	353	318	184			(22)	127	960
1987/88	343	310	190	$290		(21)	127	1,239
1988/89	362	300	186	305		(21)	33	1,165
1989/90	350	317	181	299		(22)	177	1,302
1990/91	368	307	186	313		(22)	177	1,329
1991/92	355	296	182	306		(21)	177	1,295
1992/93	342	312	186	299		(21)	177	1,295
1993/94	358	300	181	312		(21)	177	1,307
1994/95	343	315	186	304		(22)	177	1,303
1995/96	363	302	180	316		(21)	184	1,324
1996/97	342	315	184	307		(21)	309	1,436
1997/98	--	300	187	318		(14)	309	1,100
1998/99	--	--	180	309		--	309	798
1999/00	--	--	183	298		--	309	790
2000/01	--	--	186	308		--	309	803

1 - Equipment Deposit Reserves:

1.2 percent of Obligation No. 1 -
a $3,700 annual deposit at 7.5 percent interest from 1976/77 through 1985/86.

1.2 percent of Obligation No. 2 -
a $13,700 annual deposit at 7.5 percent interest from 1977/78 through 1983/84.

TABLE 18
ANNUAL O&M COSTS[1] ($000)
REGIONAL PROCESSIBLE SYSTEM

Element	1975/76	1976/77	1977/78	1978/79	1979/80	1980/81	1985/86	1990/91	1995/96	2000/01
Milling										
Columbia Boulevard	$---	$ 163[2]	$ 391.0	$ 391.7	$ 392.5	$ 393.2	$ 397.0	$ 401.0	$ 406.4	$ 490.2
Durham	201[3]	345[2]	318.9	322.6	325.8	329.2	346.4	446.9	528.6	552.6
Hillsboro-Cornelius	---	95[2]	229.1	230.8	232.1	233.3	309.7	371.8	385.5	399.0
Killingsworth & 82nd	---	128[2]	307.6	308.8	309.9	311.6	316.6	400.6	405.2	491.1
SE Portland	---	181[2]	434.9	437.3	439.8	442.0	514.4	523.6	539.1	552.2
Rossman	---	99[2]	236.7	238.7	240.6	243.9	379.8	390.1	407.2	497.4
Subtotal	$201	$1,011	$1,918.2	$1,929.9	$1,940.7	$1,953.2	$2,263.9	$2,534.0	$2,672.0	$ 2,982.5
Annual inflation[4]	24	193	503.5	652.7	812.2	983.7	2,291.5	4,289.5	6.956.7	11,400.1
Total Annual O&M Costs	$225	$1,204	$2,421.7	$2,582.6	$2,752.9	$2,936.9	$4,555.4	$6,823.5	$9,628.7	$14,382.6
Transport										
Columbia Boulevard	$---	$ 48[2]	$ 114.2	$ 114.2	$ 114.5	$ 115.1	$ 116.4	$ 105.9	$ 107.6	$ 109.5
Durham	41[3]	70[2]	68.4	143.0	143.6	144.1	148.0	173.2	462.6	536.7
Hillsboro-Cornelius	---	41[2]	99.1	101.2	123.7	124.1	157.3	190.2	112.9	138.2
Killingsworth & 82nd	---	60[2]	144.2	144.5	145.2	145.7	150.3	169.7	173.7	178.1
SE Portland	---	82[2]	196.7	197.2	198.3	198.8	312.2	319.7	353.3	388.6
Rossman	---	18[2]	42.8	42.8	63.9	64.0	114.0	141.5	170.7	179.8
Subtotal	$ 41	$ 319	$ 665.4	$ 742.9	$ 789.2	$ 791.8	$ 998.8	$1,100.2	$1,380.8	$ 1,530.9
Annual inflation[4]	5	61	174.6	251.3	330.3	398.8	1,011.0	1,862.4	3,595.0	5,851.6
Total Annual O&M Costs	$ 46	$ 380	$ 840.0	$ 994.2	$1,119.5	$1,190.6	$2,009.8	$2,962.6	$4,975.8	$ 7,382.5
Landfill										
Durham	$ 93[3]	$ 160	$ 163	$ ---	$ ---	$ ---	$ ---	$ ---	$ ---	$ ---
Cipole	---	---	---	155	174	176	186	196	---	---
Old Pumpkin	---	---	---	---	---	---	---	---	233	267
St. John	---	89[2]	213	214	215	217	347	---	---	---
Hayden Island	---	---	---	---	---	---	---	443	466	504
Rossman	---	89[2]	214	217	219	222	---	---	---	---
Alford	---	---	---	---	---	---	126	130	137	144
Subtotal	$ 93	$ 338	$ 590	$ 586	$ 608	$ 615	$ 659	$ 769	$ 836	$ 915
Annual inflation[4]	11	85	155	198	254	310	667	1,302	2,177	3,497
Total Annual O&M Costs	$104	$ 402	$ 745	$ 784	$ 862	$ 925	$1,326	$2,071	$3,013	$ 4,412

1 - O&M costs reduced to reflect 85 percent of generated quantities.
2 - Estimate for O&M based on 5 month period, 1977/78 base cost.
3 - Estimate for O&M based on 7 month period, 1977/78 base cost.
4 - O&M projections based on annual inflation factor of 6 percent per year from 1973 base cost.

TABLE 19
ANNUAL ADMINISTRATIVE COSTS[1]
REGIONAL PROGRAM

Committee/Position		Yearly Requirement[2]
MSD Board		$ 8,400
Technical Advisory Committee		9,000
Citizens Advisory Committee		7,200
Manager		27,500
Solid Waste Coordinator		18,600
Sanitary Engineer		19,900
Civil Engineer		19,900
Accountant		15,600
Secretary		10,100
Contingencies and contract services		33,800
Total Yearly Requirements:	1973/74	$170,000
	1974/75	180,000[3]
	1975/76	191,000[3]
	1976/77	202,000[3]
	1977/78	215,000[3]
	1978/79	227,000[3]
	1979/80	241,000[3]
	1980/81	256,000[3]
	1985/86	342,000[3]
	1990/91	458,000[3]
	1995/96	613,000[3]
	2000/01	820,000[3]

1 - Estimate for personnel needs based on engineering and agency information.
2 - Includes 30 percent for insurance, retirement, social security, office overhead and personnel expenses.
3 - Annual inflation of 6 percent per year.

TABLE 20
HAUL COST SAVINGS
REGIONAL PROCESSIBLE SYSTEM

Generation Center	Center to Existing Sites[1] Mileage	MPH	Center to Milling Centers[1] Mileage	MPH	Cost per Ton per Trip[2] Current System	New System	Savings	Processible Quantities Hauled[3] (Tons/Year)	Annual Savings
7	30	35	3	40	$38	$30	$8	11,800	$ 94,000
8	27	40	3	40	32	25	7	15,700	110,000
9	21	40	9	40	25	22	3	10,300	31,000
10	18	35	12	40	34	32	2	6,500	13,000
11	18	45	6	45	20	18	2	67,600	135,000
12	24	30	9	35	37	32	5	4,100	20,000
13	6	50	3	45	18	18	0	---	---
14	30	35	18	45	38	34	4	2,000	8,000
15 through 28: Same Haul Distances - No Savings									
29	15	35	9	40	22	20	2	14,200	28,000
30	18	35	9	40	21	18	3	13,000	39,000
31	12	40	9	45	21	20	1	3,200	3,000
32	12	35	9	40	22	20	2	5,700	11,000
33	12	40	6	45	18	16	2	20,900	42,000
34	9	35	6	45	15	14	1	11,500	11,000
35	9	35	9	45	8	8	0	---	---
36	3	30	6	30	18	19	1	17,300	-17,000
37	3	30	6	30	7	8	1	2,400	-2,000
38	9	40	3	45	7	5	2	4,200	8,000
39	6	35	3	40	18	17	1	28,700	29,000
40	9	40	3	40	12	11	1	1,700	1,700
41	12	40	3	40	20	17	3	38,300	115,000
42	12	35	6	35	20	18	2	19,200	38,000
43	9	40	6	35	20	20	0	---	---
44	9	40	3	35	18	16	2	6,900	14,000
45	12	35	3	35	21	20	1	34,300	34,000
46	12	35	6	35	21	20	1	83,800	84,000
47	15	40	6	35	20	18	2	46,600	93,000
48	18	40	12	40	34	32	2	11,700	24,000
49	21	40	12	40	29	26	3	6,000	18,000
50	21	45	18	45	37	36	1	1,000	1,000
Total									$1,005,000[4]

1 - Data provided by COR-MET.
2 - Data obtained from COR-MET computer reports.
3 - 85 percent of projected waste generation for 1975.
4 - Franchise collector savings are about 90 percent or $905,000 of the indicated figure.
Additional haul costs for centers 36 and 37 not included in total.

TABLE 21
HAUL COST SAVINGS VS. TRANSPORT COSTS ($000)
REGIONAL PROCESSIBLE SYSTEM

Year	Haul Cost Savings	Transport System Costs	Present Worth Comparison[1] Haul Cost Savings	Transport System Costs
1977/78[2]	$1,314	$1,004	$1,314	$1,004
1978/79	1,421	1,334	1,264	1,187
1979/80	1,536	1,484	1,290	1,246
1980/81	1,661	1,551	1,316	1,229
1981/82	1,796	1,713	1,342	1,280
1982/83	1,941	1,922	1,368	1,354
1983/84	2,099	2,095	1,396	1,393
1984/85	2,269	2,308	1,423	1,448
1985/86	2,454	2,498	1,453	1,479
1986/87	2,653	3,283	1,481	1,833
			$13,647	$13,453

1 - At 6 percent.
2 - First fiscal year service is available to haulers.

Initially haulers should be asked to subscribe for capacity annually, terminable upon loss of franchise. Capacity charges would be payable each quarter year in advance. Use of the system by subscribers will have to be reviewed annually to ensure that no subscriber pays more than a non-subscriber for the same tonnages.

Projected capacity units, charges and revenues, and transport surcharges for allocation on a regional basis are as follows:

Fiscal Year	Capacity Units	Unit Capacity Charge	Revenue	Non-subscriber Transport Surcharge
1975/76	49	$2,000	$ 98,000	$2.40
1976/77	208	2,100	437,000	2.40
1977/78	548	2,200	1,206,000	2.40
1978/79	564	2,300	1,297,000	2.40
1979/80	578	2,400	1,387,000	2.40
1980/81	593	2,550	1,512,000	2.55
1985/86	677	3,600	2,437,000	3.60
1990/90	767	5,050	3,873,000	5.05

Transport cost allocation on a countywide basis requires the following capacity charges and transport surcharges. The total revenues equal the regional amount but are matched to transport costs for the milling centers in each county.

	Clackamas County		Multnomah County		Washington County	
Fiscal Year	Capacity Charge	Transport Surcharge	Capacity Charge	Transport Surcharge	Capacity Charge	Transport Surcharge
1975/76	$ --	$ --	$ --	$ --	$2,000	$3.00
1976/77	1,600	1.90	1,800	2.20	2,400	3.00
1977/78	1,700	1.90	1,900	2.20	2,700	3.00
1978/79	1,800	1.90	2,000	2.20	2,900	3.00
1979/80	1,900	1.90	2,200	2.20	3,000	3.00

The projected revenues are based on selling capacity at 90 percent of disposed quantities because collectors currently handle 90 percent and will realize savings when capacity is purchased. Subscription of lesser amounts would provide greater revenues because non-subscribers pay somewhat higher rates.

Indicated capacity charges on a countywide basis provide revenues about equal to Multnomah haul cost savings and less than Washington County haul cost savings. Capacity charges are not offset by haul cost savings in Clackamas County because the program does not alter haul distances.

Franchise Fees

Franchise fees recommended to pay the administrative costs of the scrap tire system are based on unit tire surcharges. An annual revenue of about $36,000 can be realized for the scrap tire system based on the proposed unit tire surcharges and the number of tires that will be processed.

Tire Type	Proposed Surcharge Per Tire	Projected Annual Generation	Number Processed	Annual Revenue
Automobile	$0.02	1,400,000	1,000,000	$20,000
Truck	0.15	120,000	100,000	15,000
Earthmover	1.00	1,200	1,000	1,000
Total Annual Revenue				$36,000

Franchise fees recommended to pay the administrative costs of the non-processible waste system are based on gross revenues. A fee of 8 percent of gross revenue will provide an average annual revenue of $20,000. This initial annual amount is based on 100,000 tons per year, an average density of 340 pounds per cubic yard, and a gate fee of 50 cents per cubic yard.

Initial revenues will not equal the administrative expense necessary to divert the large quantities of processible waste currently being accepted at demolition sites. However, once regulations and control procedures are worked out, the 8 percent fee should pay subsequent costs allocable to the non-processible waste system.

Franchise fee revenue projections are based on a 6 percent annual increase. Revenues for both systems should be reviewed in the initial project years when more accurate waste volumes, gross revenues, and administrative costs are available.

Gate Fees

The direct gate fees collected at the milling centers must provide the major revenues for the regional program. Tables 22 and 23 show the yearly quantity projections used to calculate annual gate fee revenues.

SUMMARY OF REVENUES AND EXPENDITURES

Table 24, shows that the regional program can be implemented and financed in the initial years from the projected revenue sources. An initial subscriber gate fee of $7.60 per ton will be required. The non-subscriber gate fee, set at $10.00 per ton, includes the transport surcharge that equates to the capacity charges paid by subscribers.

As a result of increased gate fees the charge for weekly service of a 32-gallon garbage can will increase 40 cents a month or 10 cents per can. Charges for direct use by franchise collectors and the public will be increased about $1.20 per cubic yard for compacted material and 60 cents per cubic yard for loose material.

A uniform gate fee of $7.60 per ton is proposed regionwide to cover all milling and landfill costs. As a result collectors will be able to choose or be assigned milling centers on the basis of lowest total transport cost i.e., the sum of costs for hauling from point of collection to point of transfer to point of disposal. Waste can move across county lines as transport costs dictate rather than on the basis of which county has the lowest gate fee.

The uniform gate fee lies at the heart of the regional approach to solid waste management. However, Portland residents have already paid to establish the St. John landfill, while all other landfills will be purchased or leased from gate fee revenues. To make the uniform gate fee fair to Portland a compensation payment is recommended. An annual payment equal to 5 percent of the present book value (original cost less accrued depreciation) is suggested as a means of repaying Portland for the lease of its landfill to MSD. Compensation would end when the site is full and the MSD lease expires.

Revenues from capacity charges and transport surcharges fully pay the cost of transport service from the milling centers to the landfills. If capacity charges are varied from county to county, transport surcharges for non-subscribers will also vary. The regional rate is compared to the individual county rates below:

	Subscriber	Transport Surcharge	Non-Subscriber Rate
Regional	$7.60	$2.40	$10.00
Clackamas County	7.60	1.90	9.40
Multnomah County	7.60	2.20	9.80
Washington County	7.60	3.00	10.60

The initial gate fees and average fee increases for the region are:

	Compacted Wastes				Loose Wastes	
			Monthly Rate Per			
	Per Ton	Per CY	CY	32 Gal. Can	Per Ton	Per CY
Subscriber	$7.60	$1.90	$3.70	$0.60	$7.60	$1.00
Current rate (St. John)	2.80	.70	1.40	0.20	3.20	0.40
Increase*	$4.80	$1.20	$2.30	$0.40	$4.40	$0.60

* Capacity charges and transport surcharges are not included.

TABLE 22
ESTIMATED SOLID WASTE PROCESSED AND DISPOSED
REGIONAL PROCESSIBLE SYSTEM

Year	Current Disposal Tons/Year	Projected Generation Tons/Year[1]	Estimated Processed Tons/Year[2]
1973/74	688,070	773,400	---
1974/75	---	---	---
1975/76	---	---	65,000[3]
1976/77	---	838,240	277,000[3]
1977/78	---	860,080	731,070
1978/79	---	884,000	751,400
1979/80	---	906,880	770,850
1980/81	---	930,800	791,180
1981/82	---	956,280	812,840
1982/83	---	982,280	834,940
1983/84	---	1,008,280	857,040
1984/85	---	1,035,320	880,020
1985/86	---	1,062,360	903,000
1986/87	---	1,189,920	926,430
1987/88	---	1,118,000	950,300
1988/89	---	1,146,080	974,170
1989/90	---	1,173,640	997,590
1990/91	---	1,202,760	1,022,350
1991/92	---	1,237,600	1,051,960
1992/93	---	1,273,480	1,082,460
1993/94	---	1,313,520	1,116,490
1994/95	---	1,343,680	1,142,130
1995/96	---	1,380,080	1,173,068
1996/97	---	1,418,560	1,205,780
1997/98	---	1,457,040	1,238,480
1998/99	---	1,496,040	1,271,630
1999/00	---	1,535,560	1,305,230
2000/01	---	1,575,600	1,339,260

1 - 1973 data from COR-MET, Volume III, Table F-3;
1976 - 2000 quantities calculated from COR-MET data, Table J.
2 - COR-MET minimum anticipated quantity - 85 percent of generated quantities.
3 - Estimate for tons processed during start up period.

TABLE 23
ESTIMATED SOLID WASTE PROCESSED BY MILLING CENTER[1]
REGIONAL PROCESSIBLE SYSTEM

Year	Columbia Blvd.	Durham	Hillsboro - Cornelius	Killingsworth & 82nd	S.E. Portland	Rossman
1975/76	--	65,002[2]	--	--	--	--
1976/77	34,000[2]	131,720	13,000[2]	30,000[2]	48,000[2]	20,000[2]
1977/78	138,790	137,460	54,810	122,880	194,480	82,650
1978/79	140,110	143,650	57,460	125,090	198,900	86,190
1979/80	141,440	149,400	59,670	127,300	203,320	89,730
1980/81	142,770	155,580	61,880	129,950	207,740	93,260
1981/82	144,530	161,770	64,974	132,600	212,160	96,800
1982/83	146,300	167,520	68,510	135,250	216,580	100,780
1983/84	148,070	173,710	71,600	137,900	221,000	104,750
1984/85	149,840	179,890	75,140	140,560	225,420	109,170
1985/86	151,610	186,080	78,680	143,210	229,840	113,590
1986/87	153,370	192,710	82,210	145,860	234,260	118,010
1987/88	155,580	199,340	85,750	148,510	238,680	122,430
1988/89	157,350	205,970	89,280	151,610	243,100	126,850
1989/90	159,120	212,600	92,820	154,260	247,520	131,270
1990/91	161,330	219,230	96,800	157,350	251,940	135,690
1991/92	163,540	227,190	102,540	160,000	256,800	141,880
1992/93	166,190	235,140	108,290	163,100	261,660	148,070
1993/94	168,400	243,100	114,040	165,750	266,530	158,680
1994/95	171,050	251,060	119,780	168,400	271,390	160,450
1995/96	173,710	259,450	125,530	171,500	276,250	166,630
1996/97	176,360	267,850	132,160	174,590	281,550	173,260
1997/98	179,010	276,690	138,350	177,680	286,860	179,890
1998/99	181,660	285,530	144,530	180,780	292,160	186,970
1999/00	184,310	294,370	151,160	183,870	297,910	193,600
2000/01	187,410	303,210	157,350	186,970	303,650	200,670

1 - 85 percent generated quantities.
2 - Estimate for tons processed during start-up period.

TABLE 24
SUMMARY OF ANNUAL REVENUES AND EXPENDITURES ($000)
REGIONAL PROGRAM

Year	Gate Fee per Ton: Non Subscriber	Gate Fee per Ton: Subscriber	Revenues: Capacity Charges	Revenues: Non Subscriber	Revenues: Subscriber	Revenues: Total	Total Annual Program Requirements	Net Revenue	Cumulative Net Revenue[1]	Reserve Requirement[2]
1975/76	$10.00	$ 7.60	$ 98	$ 62	$ 447	$ 607	$ 596	$ 11	$ 67	$ 118
1976/77	10.00	7.60	437	274	1,897	2,608	2,336	272	398	508
1977/78	10.00	7.60	1,206	734	4,998	6,938	5,216	1,722	2,183	1,659
1978/79	10.00	7.60	1,297	742	5,144	7,183	6,715	468	2,718	2,820
1979/80	10.00	7.60	1,387	774	5,271	7,432	7,276	156	2,945	3,056
1980/81	10.50	7.95	1,512	834	5,657	8,003	7,572	431	3,451	3,073
1985/86	13.00	9.40	2,437	1,178	7,637	11,252	11,188	64	---	3,750
1990/91	18.00	12.95	3,873	1,829	11,919	17,621	17,254	367	---	4,464

1 - Includes franchise fee revenue of $56,000 for 1975/76 escalated at 6 percent per year.
2 - One year debt service plus two months administrative, lease and lease-purchase, and operation and maintenance costs.

A reserve fund is recommended for the regional program to meet programmed expenditures in the event that revenues fall below projections. The recommended amount includes one year's debt service and two months' administration, lease-purchase, and operation and maintenance expenditures. The projected cumulative net revenue shows the amount available to serve as a reserve fund.

The scrap tire system and the non-processible waste system revenues are included in the cumulative net revenue column. They do not provide sufficient revenues to affect gate fees for processible wastes.

RESOURCE RECOVERY BENEFITS

Resource recovery benefits are identified separately because net resource recovery revenues and disposal cost savings will remain very uncertain until markets are clearly established.

Direct benefits include resource recovery revenues and operation and maintenance savings. Depending on the response to resource recovery, indirect benefits may also result from deferring landfill acquisition and construction costs.

Although capital costs for air separation were not included in program costs, the benefits that might result from light combustible recovery was analyzed because:

1. Air separation equipment is recommended at one center if a market is obtained for light combustibles.

2. Potential benefits would reduce the gate fees needed to pay for the regional program.

3. Proposed engineering and financing requirements for landfill sites could be appreciably reduced because air separation would extend landfill service lines and reduce operation and maintenance costs.

Direct Benefits

Direct benefits include savings in landfill operation and maintenance costs as a result of reduced volumes to be compacted and covered, as well as revenues from sale of recovered materials. Together both forms of benefit would permit a reduction of gate fees as estimated in Table 25.

Ferrous and corrugated recovery programs can be used to reduce gate fees between $1.00 and $2.00 per ton in the initial program period because needed facilities are provided. The indicated gate fee reductions depend on a continued supply of corrugated material

in the waste stream. The higher reduction depends further on establishing a local market for the recovered materials.

Air separation, when implemented, may provide sufficient benefits to further reduce gate fees from $1.50 to $2.80 per ton of processed waste.

Indirect Benefits

Deferred capital costs for the landfill element can provide indirect benefits to reduce gate fees. If air separation is implemented or anticipated to occur prior to 1985/86, the capital costs for the Hayden Island and Alford landfills could be deferred. Gate fee reductions would be about as follows:

	Potential Gate Fee Reduction		
	Hayden Island	Alford	Total
1977/78	$0.34	$ --	$0.34
1985/86	0.27	0.21	0.48

Summary of Potential Gate Fee Reductions

The potential gate fee reductions from resource recovery are:

	Potential Gate Fee Reductions			
	Direct		Indirect	
	Corrugated & Ferrous	Air Separation	Capital Deferral*	Total
1976/77 - 1984/85	$1.00-2.00	$ --	$0.30	$1.30-2.30
1985/86 - 2000/01	1.00-2.00	1.50-2.80	0.50	3.00-5.30

* Average savings.

Transport cost savings are not expected. The engineer estimates haul costs for secondary materials to be equal to or less than hauling to the landfill. No additional transportation cost has been assigned in estimating operation and maintenance costs for resource recovery.

TABLE 25
RESOURCE RECOVERY BENEFITS
REGIONAL PROCESSIBLE PROGRAM

Program	Recov. Rate[1] % of cessed Tons	Recov. Cost[1] Per Ton Recovered Material	Market Price[1] Per Ton Recovered Material	Potential Gate Fee Reduction Per Ton of Processed Waste: From Revenues[2]	O&M Savings[3]	Total
Corrugated	3	$15.75[4]	$40.00	$0.73	--	--
Ferrous	7	0.25[5]	3.60 to 19.00[6]	0.23 to 1.31	--	--
Subtotal				$0.96 to 2.04	$0.05[7]	$1.00 to 2.10
Air Separation	65	0.65 to 2.65[8]	4.00[9]	$0.88 to 2.18	$0.62[10]	$1.50 to 2.80
Total: Corrugated, Ferrous and Air Separation				$1.84 to 4.22	$0.67	$2.50 to 4.90

1 - Data from COR-MET, Volume I, Chapter 12.
2 - Market price inflation assumed equal to recovery cost inflation.
3 - Calculated savings in landfill O&M costs.
4 - Labor @ $15 per ton, O&M @ $0.75 per ton (of recovered material).
5 - O&M, including loading recovered material.
6 - Market prices indicated for outside market reduced by shipping costs and potential local market.
7 - For 1977/78 fiscal year, from both corrugated and ferrous programs.
8 - Recovery cost range includes estimated amortized cost and dependes upon size of installed facility.
9 - Probable local market price.
10 - For 1985/86 fiscal year, with continued utilization of Alford, St. John and Cipole sites.

The initial increase in regional charges with potential resource recovery benefits are:[1]

	Compacted Wastes			
		Monthly Charge		
	Per CY	CY	32 Gal. Can	Loose Wastes Per CY
Weight	500 lb.	225 lb.	35-40 lb.	250 lb.
No resource recovery	$1.20	$2.30	$0.40	$0.60
Corrugated & ferrous	0.65	1.25	0.20	0.30
Corrugated, ferrous, & air separation[2]	-0.08	-0.15	-0.02	-0.10

1 - Capacity charges and transport gate fee surcharges are not included; maximum benefits indicated require markets for reclaimed materials.

2 - Potential benefits from air separation cannot be realized unless facilities are provided in initial year. Cost of air separation equipment is not included in the above estimates.

Potentially, even at present material prices, resource recovery can go far to offset the additional costs of introducing a milling system. However, markets must be found or developed if the savings are to be realized. The marketing opportunity is changing rapidly. Natural material resources such as wood products are diminishing or being exported more profitably. Imported materials are growing more costly. The energy cost to produce paper and steel from raw materials is rising relative to the cost of reclaiming or using scrap. These changes promise to increase demand and prices for recovered materials.

IMPLEMENTATION PLAN

Public and Private Roles

The implementation plan is based on full support of the regional program by local agencies and private operators. Table 26 shows public and private roles recommended for program implementation.

Local agencies regulate and administer local franchised collection.

MSD plans and regulates regional, transport, disposal, and resource recovery.

Private enterprise owns and finances collection services and may operate and maintain regional facilities.

TABLE 26
ROLES FOR PROGRAM IMPLEMENTATION
REGIONAL PROGRAM

System/Element	Agency Role[1] Planning and Regulation	Ownership and Financing	Operation and Maintenance	Agency Revenue Sources
Collection[2]	PUBLIC Local	PRIVATE Private franchises		(Public - existing franchise fees. (Private - existing customer charges.
		[3]		
Processible Waste System				(Public - user charges, gate fees, and resource recovery revenues.
Milling	MSD[4]	MSD	(5)	
Transport	MSD	MSD	(6)	
Landfill	MSD[4]	MSD	(5)	(Private - payments from MSD under contract terms.
Non Processible Waste System[7]	MSD[4]	Franchise for each facility		(Public - franchise fees based on gross revenues. (Private - gate fee charges.
Scrap Tire System	MSD	Permit for each collection and processing site		(Public - unit tire surcharges on licensed tire processors. (Private - direct user charges.

1 - Roles for: MSD in regional 3-County area; local cities and counties in respective jurisdictional area; private enterprise.
2 - Collection includes facilities developed for processible and non processible wastes below the regional program; MSD approval required for any program or facility that diverts wastes to alternate disposal sites.
3 - MSD policy may establish or allow private financing of certain milling, transport, and landfill facilities.
4 - In conformance with city or county zoning requirements and other authorities.
5 - Contract for each facility.
6 - Single contract.
7 - Delegated DEQ authority not shown.

Although MSD can adopt regulations to implement the regional program within its boundaries, it is recommended that an agreement be developed to clarify the roles of other agencies. Table 27 suggests agreement provisions.

MSD Policy Issues and Actions

Policy issues that the MSD board will need to resolve prior to authorizing engineering design contracts include:

1. Emphasis on tax-exempt public financing for facilities other than collection.
2. Heavy reliance on DEQ grants and loans.
3. Fee structure based on 85 percent of generated waste.
4. Substantial diversion of processible wastes from non-processible sites.
5. Use of capacity charges and transport surcharges to allocate transport costs on a countywide basis.
6. Equipment replacement on a lease-purchase basis.

The interim actions that need to be completed prior to engineering contracts include:

1. Approve pre-final plan concepts.
2. Conduct public hearings.
3. Submit final plan to DEQ for technical and policy approval.
4. Adopt final plans.
5. Request remaining Phase II funds.
6. Evaluate interim revenue sources.
7. Evaluate EPA grants for air separation equipment.
8. Confer with industry and affected land owners to determine the basis for incorporating existing sites.
9. Establish the basis for comparing any private financing proposals that may be advanced.
10. Begin negotiations with local agencies.
11. Adopt ordinances for implementation plan.

12. Resubmit plan to DEQ for approval.

13. Submit grant/loan application.

Implementation Steps

Table 28 shows the steps needed to implement the processible and non-processible systems of the regional program. Steps to incorporate existing systems are also identified.

The following steps must be completed by October of 1974 to meet initial design and construction schedules:

1. Plan adoption and agency agreements by cities and counties in the region.

2. DEQ commitment for interim and initial funds.

3. Durham milling center and landfill site clearances and options from involved jurisdictions, owners.

The implementation schedule is based on MSD's ability to obtain DEQ grant funds and to borrow the first and second obligations for DEQ without voter approval. If MSD is unable to obtain a DEQ commitment for the second obligation, MSD will need to either:

1. Seek voter approval for bond issuance in lieu of the second obligation, or

2. Proceed with the western Washington County segment of the processible system and seek voter approval for bond issuance after reviewing the performance of the Durham milling center.

Steps that occur subsequent to authorizing engineering design contracts in July are identified for each system. The steps to incorporate existing systems are also identified.

Processible System. Steps to implement the processible system include:

1. Determine and hire added administrative staff.

2. Solicit secondary market proposals.

3. Decide whether or not to acquire the Hayden Island site, and include air separation equipment.

4. Define operating contract provisions for resource recovery.

5. Offer transport capacity units for subscription, with payments to begin on completion of the Durham facilities.

6. Develop operating contracts for the milling, transport, and landfill elements as outlined in Table 29.

7. Design, award, and construct the Durham facilities.

8. Coordinate and conduct public hearings.

9. Solicit, receive, evaluate and award operating contracts for the Durham facilities.

10. Establish user charges and gate fees.

11. Administer and evaluate system, continue secondary market analysis, and amend contracts and procedures as needed.

Non-Processible System. Steps to implement the non-processible system include:

1. Prepare administrative procedures and operating standards.

2. Develop a permit system, and an enforcement record system, and practical methods to classify processible and non-processible wastes.

3. Determine MSD/DEQ roles and clarify interfaces.

4. Coordinate and conduct public hearings.

5. Prepare and adopt MSD ordinances and coordinate enactment of ordinances in three-county area outside of MSD.

6. Complete permit and reporting forms.

7. Solicit, receive, evaluate, and award disposal franchises.

8. Administer and evaluate system.

A practical method to classify processible and non-processible wastes is needed to prohibit processible wastes from demolition sites. Demolition site permits should be subject to revocation if significant processible quantities are accepted. Quarterly tonnage and volume reports should be required from each site.

An additional requirement that may be necessary is to require an MSD permit for use of a demolition site. All haulers would obtain annual MSD permits to handle non-processible wastes. The general public, or haulers with infrequent loads, would obtain permits when needed. Delivery of processible wastes to demolition sites would be cause for revoking the hauling permit.

TABLE 27
SUGGESTED AGREEMENT PROVISIONS
REGIONAL PROGRAM

For Planning and Regulatory Roles:

1. Local agencies in the 3-County area to adopt the master plan and the general sites specified, incorporate designated milling and disposal sites in land use and zoning plans subject to DEQ approval.

2. To safeguard the regional program, MSD to review and approve all disposal sites in the 3-County area outside MSD boundaries.

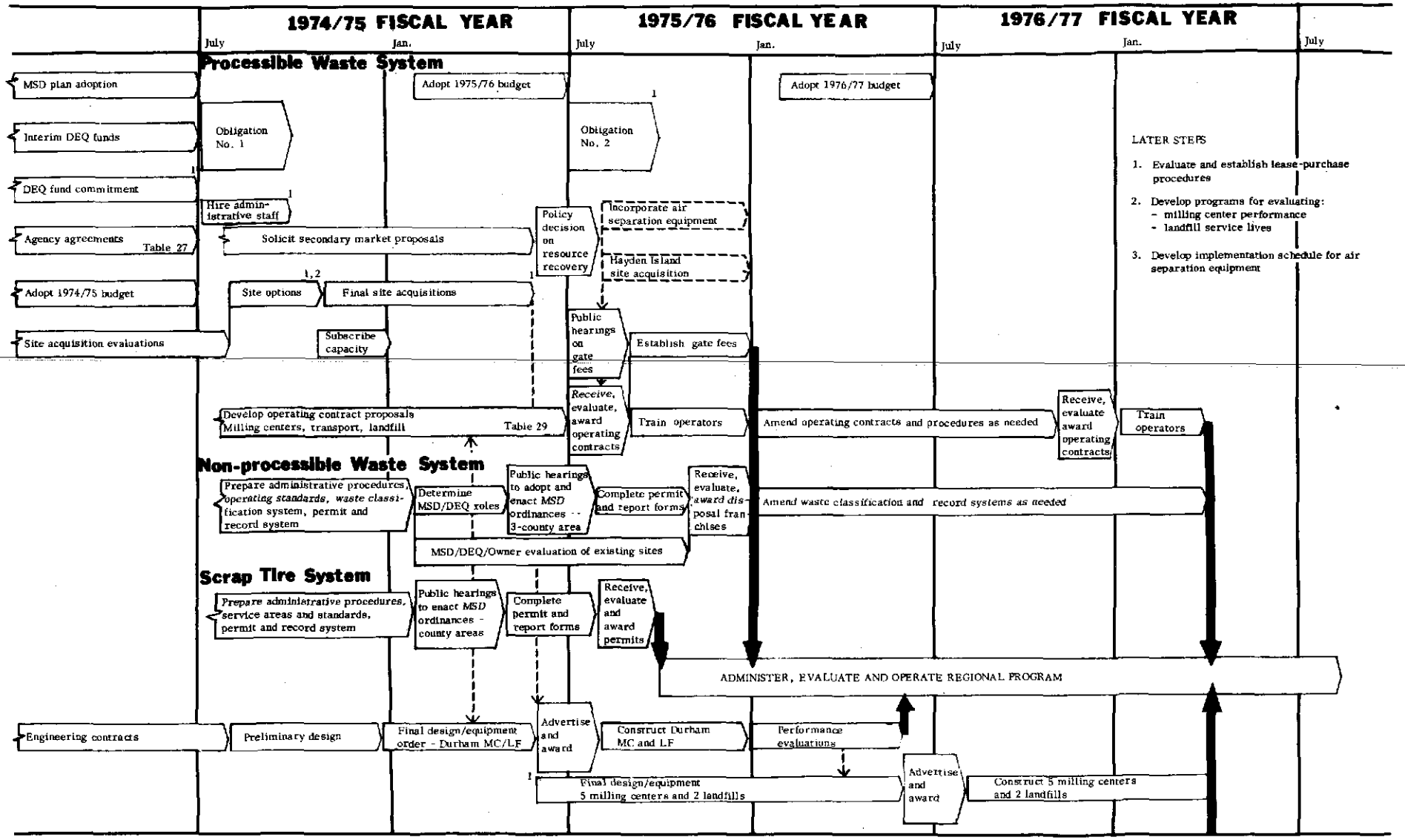
3. MSD to administer and regulate franchise disposal fees in the 3-County area outside MSD boundaries.

4. MSD to exercise exclusive authority to designate transfer or disposal facilities to be used by franchised and local collectors in the 3-County area.

5. Local agencies to adopt uniform ordinances on enforcement procedures, standards for collection franchises, illegal dumping, and scrap tire hauling.

6. Local agencies to provide available technical and administrative services on a reimbursement basis when needed for the regional program.

TABLE 28
IMPLEMENTATION SCHEDULE
REGIONAL PROGRAM



NOTES:
1. If MSD is unable to obtain DEQ fund commitment for second obligation, voter approval for bond issuance must be obtained or portions of indicated steps must be delayed.
2. Durham Milling Center and landfill site clearances required by October 1, 1974.

Scrap Tire System. Steps to implement the scrap tire system include:

1. Prepare administrative procedures, identify and develop minimum standards of service, identify tire carrier service areas, and develop the tire carrier and tire processing permit system and enforcement record system.

2. Coordinate and conduct public hearings.

3. Prepare and adopt MSD ordinances and accomplish enactment of ordinances in county areas outside MSD.

4. Complete permit and reporting forms.

5. Solicit, receive, evaluate, and award scrap tire carrier and processing permits.

6. Administer and evaluate system, develop action plan to clean up illicitly dumped tires, and perform technical evaluations of new equipment.

Incorporate Existing System. Local agencies have the dominant role in adjusting the existing collection system to the regional program. Franchising of service will remain a local function.

Local agencies must evaluate new customer charges to account for changes in transportation and disposal costs.

Disposal under the COR-MET plan clearly becomes a regional concern in which MSD will perform the major role. Eleven existing disposal sites serve the three-county area and must be addressed by MSD.

Six sites are demolition sites. The engineer indicated five sites can be included in the non-processible system. MSD should give first priority to include these sites. Sites are Grabhorn, Hillsboro, Lavelle, Lavelle and Yett, and Obrist. The engineer recommended that the Hidden Valley site be phased out and should be evaluated when implementing the non-processible system.

The other five sites are currently classified as mixed sites. The Frank site is the only mixed site recommended to be phased out. The Newburg and Woodburn sites are outside the region and will continue to operate. The St. John and Rossman sites are an integral part of the processible system.

MSD should meet with the current operator, DEQ, and Washington County to establish the closure date or the procedures to incorporate the Frank site in the regional processible or non-processible system.

MSD should evaluate the diversion of wastes to the Newburg and Woodburn sites from 1974 through 1976 and determine whether franchised collectors from Clackamas and Washington Counties should continue to use the sites.

The recommended agreement between MSD and the City of Portland to include the St. John landfill provides for:

1. MSD site lease at nominal rent.

2. Use of MSD compensation payment funds.

3. MSD capital funds for further improvements.

4. MSD payments for approved site operation and maintenance costs.

5. MSD contract for private operation if city elects not to operate the site.

The recommended agreement between MSD and the current property owner to include the Rossman site provides for:

1. Initial capital investment by MSD.

2. Operating contract with existing operator.

TABLE 29
OPERATING CONTRACT PROVISIONS
REGIONAL PROCESSIBLE SYSTEM

MILLING CENTERS - MSD request for proposal to include:

1. Manufacturer's performance data
2. Range of anticipated waste quantities
3. Maintenance responsibilities
4. Hours of operation
5. Provisions for operating resource recovery programs.

Private industry submits bid specifying options or alternatives for operation and maintenance of identified systems, unit cost per ton for contract payments, and minimum monthly payments.

TRANSPORT - MSD request for proposal to include:

1. MSD financing for equipment
2. Waste materials, quantities and distances to be hauled
3. Maintenance responsibilities
4. Hours of operation.

Private industry submits bid specifying type of equipment, maintenance options or alternatives, unit cost per ton mile for contract payments, and minimum monthly payment.

LANDFILL - MSD request for proposal to include:

1. Final site development and operation plan
2. MSD staging of capital improvements by other contracts
3. List of equipment available for compaction and spreading cover
4. Range of anticipated quantities
5. Maintenance responsibilities
6. Hours of operation.

Private industry submits bid specifying options or alternatives for operation, maintenance, compaction, and cover requirements, proof of source of cover if imported material is required, unit cost per ton for contract payments, and minimum monthly payment.

CHAPTER 5

Chapter 5

THE COLUMBIA COUNTY SYSTEM

The Columbia County System was developed separately from the regional program. The system includes four transfer facilities and one sanitary landfill. All facilities are planned to receive processible and bulky wastes from the public and from nearby franchised collectors. Transfer facilities are located at Clatskanie, Rainier, St. Helens, and Vernonia.

The landfill is to receive all wastes handled by the transfer facilities and all non-processible wastes brought directly to the site. The landfill is located near Scappoose.

The system does not include facilities for resource recovery because expected quantities will not support the cost.

Tables C-1 and C-2 show the estimated tons of waste generated and disposed of in the county in 1973/74.

	Processible	Non-Processible	Total
Generated	33,600	26,000	59,600
Disposed	27,500	23,400	50,900
Percent disposed	82%	90%	85%

Of the waste now generated in the county, 85 percent is disposed of at recognized sites. Paper sludges are the only identified non-processible waste and are disposed of at recognized sites.

Financing plan revenues are based on 85 percent of the total generated waste as estimated by COR-MET. This percentage was also used by COR-MET for system design. Two assumptions underlie the 85 percent ratio:

1. Transfer sites will be accessible enough to stimulate greater use by rural residents than in the past.

2. Non-processible paper sludges will be brought to the public landfill rather than stored or reprocessed at the point of origin.

Table C-3 allocates the expected tonnages among sites.

To earn the revenues as estimated, Columbia County will need to curtail illicit dumping in rural areas. In addition the county should investigate whether or not the disposal charges proposed for paper sludge will cause the industry to reduce quantities disposed of at the landfill.

TABLE C-1
ESTIMATED SOLID WASTE GENERATION[1]
(TONS PER YEAR)
COLUMBIA COUNTY SYSTEM

Year	Residential & Comm.	Industrial		Totals		County
		Proc-essible	Non-Proc.	Proc-essible	Non-Proc.	
1973/74[2]	17,370	16,220	26,000	33,590	26,000	59,590
1975/76	18,510	16,540	26,520	35,050	26,520	61,570
1980/81	21,580	17,320	27,870	38,900	27,870	66,770
1985/86	25,010	18,200	29,280	43,210	29,280	72,490
1990/91	28,650	19,080	30,790	47,730	30,790	78,520
1995/96	33,280	20,020	32,340	53,300	32,340	85,640
2000/01	38,220	21,060	33,960	59,280	33,960	93,240

1 - Data developed from COR-MET, Volume III, Tables F-3 & F-8
2 - Data from COR-MET, Volume III, Table F-3

TABLE C-2
CURRENT SOLID WASTE DISPOSAL BY TYPE[1]
(1973 TONS PER YEAR)
COLUMBIA COUNTY SYSTEM

Source	Disposal Site: Clatskanie	Coal Creek	Elsie	Mickeys	Santosh	County Total
Direct users	150	400	100	150	1,500	2,300
Franchised collectors:						
Compacted	1,950	1,100	---	---	7,300	10,350
Loose	---	---	---	---	2,400[2]	2,400
Industrial	---	---	---	1,650[3]	34,200[4]	35,850
Total	2,100	1,500	100	1,800	45,400	50,900
Estimated type of waste						
Residential & commercial	2,100	1,500	100	150	11,200	15,050
Industrial	---	---	---	1,650[3]	34,200[4]	35,850
Processible	2,100	1,500	100	1,800	22,000	27,500
Non-processible	---	---	---	---	23,400	23,400

1 - Data from COR-MET, Volume I, Table 18, and Volume III, Appendix C.
2 - Predominate commercial wastes.
3 - Boise-Cascade wood wastes.
4 - Includes 23,400 tons of paper sludge, defined as non-processible.

TABLE C-3
ESTIMATED SOLID WASTE DISPOSAL (TONS PER YEAR)
COLUMBIA COUNTY SYSTEM

Year	St. Helens Transfer Site	Other Transfer Sites	Santosh*	Total	Non-Processible Waste	Total County Waste
1975/76	19,400	5,900	4,400	29,700	22,400	52,100
1976/77	19,700	6,100	4,600	30,400	22,600	53,000
1977/78	20,000	6,300	4,700	31,000	22,800	53,800
1978/79	20,300	6,500	4,900	31,700	23,000	54,700
1979/80	20,700	6,700	5,000	32,400	23,300	55,700
1980/81	21,000	6,900	5,200	33,100	23,500	56,600
1985/86	22,600	8,000	6,100	36,700	24,700	61,400

* Wastes hauled direct to site by collectors and other users.

SYSTEM EXPENDITURES

Total Annual Costs

Table C-4 summarizes the total annual cash requirements for the system. Annual requirements are shown through 1980/81 and 1985/86.

Administration, operation and maintenance, and capital costs are identified separately. Both capital and operation and maintenance costs are allocated to the transfer, transport, and landfill elements.

The system will require $242,000 in its first full year of operation, 1975/76. Cash needs will increase to about $387,000 by 1980/81. The estimates provide money for land acquisition, initial construction, equipment purchases, and lease-purchase of replacement equipment.

The lease-purchase technique is desirable in financing periodic replacement of equipment because it evens out the flow of capital funds and sets an orderly procedure for updating equipment in use.

Annual capital costs are based on public rather than private financing.

1. The county qualifies for Environmental Quality Commission grants for solid waste facilities, through DEQ.

2. Private financing for a given amount is more costly than public.

3. Franchise agreements are difficult to structure when franchise periods, equipment life, and loan repayment periods differ from one another.

Public financing does not prevent private operation. Columbia County can franchise private operation of any element being proposed if costs appear comparable to those shown for the corresponding system element in Table C-9.

Capital Costs

The Columbia County System needs a capital investment of about $500,000 to fund construction and acquisition of initial facilities. In the future equipment can be replaced by lease-purchase. Initial capital needs are scheduled to be met from the DEQ grant/loan program as follows:

TABLE C-4
ANNUAL SYSTEM COSTS PROJECTION (INCLUDING INFLATION FACTORS)
COLUMBIA COUNTY SYSTEM

	1975/76	1976/77	1977/78	1978/79	1979/80	1980/81	1995/86
Administration	$ 19,400	$ 20,600	$ 21,800	$ 23,000	$ 24,500	$ 26,000	$ 34,800
Transfer							
Capital costs	$ --	$ 4,500	$ 13,400	$ 17,700	$ 21,700	$ 21,000	$ 17,700
O&M costs	36,600	38,800	41,200	43,600	46,200	49,000	65,600
Subtotal	$ 36,600	$ 43,300	$ 54,600	$ 61,300	$ 67,900	$ 70,000	$ 83,300
Transport							
Capital costs	$ 3,500	$ 6,000	$ 11,000	$ 13,300	$ 15,600	$ 15,200	$ 32,400
O&M costs	68,000	74,300	80,600	86,900	93,200	99,500	147,900
Subtotal	$ 71,500	$ 80,300	$ 91,600	$100,200	$108,800	$114,700	$180,300
Landfill							
Capital costs	$ 39,300	$ 45,500	$ 54,900	$ 61,500	$ 68,200	$ 72,100	$ 96,900
O&M costs	75,200	80,300	85,700	91,700	97,900	104,500	145,500
Subtotal	$114,500	$125,800	$140,600	$153,100	$166,100	$176,600	$242,400
Total Annual System Costs	$242,000	$270,000	$308,600	$337,700	$367,300	$387,300	$540,800

System Element	Grant Amount (30%)	Local Amount (70%)	Total Cost
Transfer	$ 67,000	$155,000	$222,000
Transport	37,000	87,000	124,000
Landfill	45,000	105,000	150,000
Total	$149,000	$347,000	$496,000

The anticipated DEQ loan must be secured by a bond obligation because counties cannot borrow more than $5,000 without issuing bonds. System revenues should be set and maintained to repay the loan and all subsequent system costs, including equipment replacement, without levying a tax.

Land costs have been estimated as shown in Table C-5. Land needs for transfer sites and the landfill and recommended to be met by purchase rather than lease because projected service lives exceed 25 years.

TABLE C-5
LAND ACQUISITION COSTS
COLUMBIA COUNTY SYSTEM

Element	Assessed Value[1]	Acreage	Acquisition Cost[2]
Transfer			
Clatskanie	$ 350	0.3 to 0.6	$ 2,500
Rainier	350	0.3 to 0.6	2,500
Vernonia	300	0.3 to 0.6	2,500
St. Helens	3,500	0.3 to 0.6	5,000
Landfill			
Santosh	300[3]	100	$45,000[4]

1 - Assessed property value per acre for comparable sized parcels provided by COR-MET.
2 - Estimated acquisition cost includes surveying and other related acquisition costs.
3 - Current assessed value per acre based on 240 acres.
4 - Estimated acquisition cost at 150 percent of current assessed value.

Table C-6 identifies capital costs for the transfer, transport, and landfill elements. Items with common inflation factors, service lives, or similar financing are grouped.

Table C-7 shows the repayment schedule for the 15-year obligation to the Environmental Quality Commission. The obligation includes an allowance of about 5 percent to cover contingencies, administration, and issuance costs. The 15-year loan period was used because the obligation is small, and should be repaid before compaction equipment has to be replaced.

Table C-8 shows the resulting annual capital costs for all three elements of the system. A construction allowance is provided to pay for dikes, clearing, and fencing that were included by the engineer within operation and maintenance costs.

An equipment deposit reserve is recommended for the transport element facilities which have service lives less than 15 years. The reserve serves as a sinking fund to repay the amount of the obligation which matures after the transport equipment wears out. Table C-8 shows the needed deposit.

Operation and Maintenance Costs

Table C-9 shows operation and maintenance costs for the transfer, transport, and landfill elements of the program. Operation and maintenance costs were developed from Volume I, Table 45. COR-MET provided supplemental data to permit future operation and maintenance costs to be estimated.

Administrative Costs

Table C-10 shows the annual administrative costs for the program. Administrative costs, established on a 1973 salary base, will escalate to about $19,000 for the 1975/76 fiscal year. Estimates assume use of personnel that serve other county programs.

SUMMARY OF REVENUES AND EXPENDITURES

Gate fees are recommended for meeting all annual costs. Gate fees will be charged at all transfer sites and at the central landfill. Table C-11 shows the revenues in comparison to the annual system costs and recommended reserve funds.

Separate gate fees are recommended for the processible and non-processible wastes received at the landfill. Gate fees recommended for processible wastes received at transfer sites include an added fee for allocated transport costs. The initial gate fees are:

Type of Waste	Facility	Gate Fee
Non-Processible	Santosh Landfill	$3.00/Ton
Processible	Santosh Landfill	$4.50/Ton
	St. Helens Transfer Site	$7.00/Ton
	Other Transfer Sites	$9.00/Ton

Gate fees charged at the transfer sites must be based on volumes rather than tons because scales are not provided. The charge per cubic yard for processible wastes for the recommended gate fees are:

Cost Per Cubic Yard	Santosh Landfill	St. Helens Transfer Site	Other Transfer Sites
Compacted	$1.15	$1.75	$2.25
Loose	0.60	0.90	1.20

The average fee increases over current rates charges at Santosh are:

	Compacted Wastes			
		Monthly Charge		Loose
Site	CY	CY	32 Gal. Can	Wastes CY
Weight	500 lb.	225 lb.	35-40 lb.	250 lb.
Santosh Landfill	$0.40	$0.75	$0.10	$0.10
St. Helens Transfer Site	1.00	1.95	0.30	0.40
Other Transfer Sites	1.50	2.90	0.45	0.65

The increased charge for weekly service of a 32-gallon garbage can calculates to about 10 cents per month for the Santosh area, 30 cents for the St. Helens area, and 45 cents for the outlying rural areas. The actual increase in monthly charges will be less than indicated in the St. Helens and Vernonia areas because indicated monthly increases do not reflect the savings that haulers will realize. No measurable savings will be realized in the other areas because transfer sites replace existing sites in the area.

The recommended gate fees provide revenues to pay system costs on the following basis:

1. Gate fees for non-processible wastes provide revenues equal to allocated administration and disposal costs.

2. Gate fees for processible wastes provide revenues equal to allocated administration, transfer, transport, and disposal costs.

TABLE C-6
CAPITAL COSTS FOR SYSTEM
COLUMBIA COUNTY SYSTEM

Element & Item	Life	Facility	1973 Cost[1]	Construction or Replacement Year[2]	Capital Cost[3]	Local Cost	Financing Method	Unit Annual Lease-Purchase Cost[4]
Transfer								
Land	25±		$ --	1974	$ 12,500	$ 8,800[5]	1st Obligation	
Construction	25±		103,600	1975	120,900	84,600[5]	1st Obligation	
Installed equipment	25±		47,700	1975	52,600	36,800[5]	1st Obligation	
Installed equipment	15±	St. Helens	32,500	1975	35,800	25,100[5]	1st Obligation	
Replacement equip.	15±	St. Helens	32,500	1990	74,500	74,500	Lease Purchase	$12,000
Transport								
Drop boxes	10±		55,125	1975	60,800	42,600[5]	1st Obligation	
Trucks	10±		57,000	1975	62,900	44,000[5]	1st Obligation	
Replacement drop boxes & trucks	10±		112,125	1985	201,400	201,400	Lease Purchase	32,400
Replacement drop boxes & trucks	10±		112,125	1995	328,000	328,000	Lease Purchase	52,800
Landfill								
Land	25+	Santosh	--	1974	45,000	31,500[5]	1st Obligation	
Site improvements	25±	Santosh	19,600	1975	22,900	16,000[5]	1st Obligation	
Compactor	15±	Santosh	75,000	1975	82,700	57,900[5]	1st Obligation	
Replacement of compactor	15±	Santosh	75,000	1990	171,900	171,900	Lease Purchase	27,700

1 - Data from COR-MET Volume I, Table 44.
2 - COR-MET data.
3 - Inflation factor of 8 percent per year for construction, 5 percent per year for equipment.
4 - Annual lease purchase at 6 percent interest, eight year amortization period.
5 - Items assumed eligible for 30 percent DEQ grant program.

TABLE C-7
OBLIGATION NO. 1 - OCTOBER 1974
COLUMBIA COUNTY SYSTEM

Year Ending Oct. 1	Principal Outstanding	Interest Payable @ 5%	Principal Maturing	Bond Service
1975/76	$400,000	$20,000	--	$20,000*
1976/77	400,000	20,000	--	20,000*
1977/78	400,000	20,000	$10,000	30,000
1978/79	390,000	19,500	20,000	39,500
1979/80	370,000	18,500	30,000	48,500
1980/81	340,000	17,000	30,000	47,000
1981/82	310,000	15,500	30,000	45,500
1982/83	280,000	14,000	30,000	44,000
1983/84	250,000	12,500	30,000	32,500
1984/85	220,000	10,500	30,000	40,500
1985/86	190,000	9,500	30,000	39,500
1986/87	160,000	8,000	40,000	48,000
1987/88	120,000	6,000	40,000	46,000
1988/89	80,000	4,000	40,000	44,000
1989/90	40,000	2,000	40,000	42,000

Construction Fund	$350,000
Funded interest	30,000
Other costs	20,000
Maturity Amount	$400,000

* 1-1/2 years interest payable from bond proceeds.

TABLE C-8
ANNUAL CAPITAL COSTS FOR SYSTEM ELEMENTS
COLUMBIA COUNTY SYSTEM

	Transfer Element			Transport Element				Landfill Element			
Year	1st Obligation	Lease Purchase	Total Annual Amount	1st Obligation	Equipment Reserve	Lease Purchase	Total Annual Amount	1st Obligation	Lease Purchase	Annual Construction	Total Annual Amount
1975/76	$ --		$ --	$ --	$3,500		$ 3,500	$ --		$ 39,300	$ 39,300
1976/77	4,500		4,500	2,500	3,500		6,000	3,000		42,500	45,500
1977/78	13,400		13,400	7,500	3,500		11,000	9,100		45,800	54,900
1978/79	17,700		17,700	9,800	3,500		13,300	12,000		49,500	61,500
1979/80	21,700		21,700	12,100	3,500		15,600	14,700		53,500	68,200
1980/81	21,000		21,000	11,700	3,500		15,200	14,300		57,800	72,100
1981/82	20,400		20,400	11,300	3,500		14,800	13,800		62,400	76,200
1982/83	19,600		19,600	11,000	3,500		14,500	13,400		67,400	80,800
1983/84	14,500		14,500	8,100	3,500		11,600	9,900		72,800	82,700
1984/85	18,100		18,100	10,100	3,500		13,600	12,300		78,600	90,900
1985/86	17,700		17,700	9,800	(9,800)	$32,400	32,400	12,000		84,900	96,900
1990/91	--	$12,000	12,000			32,400	32,400		$27,700	124,700	152,400
1995/96	--	12,000	12,000			52,800	52,800		27,700	183,200	210,200
2000/01	--	--	--			52,800	52,800		--	269,200	269,200

1 - COR-MET estimate of $33,700 for dikes, clearing, and fencing. Escalated at 8 percent per year.
2.49 percent of Obligation No. 1

2 - Equipment Deposit Reserve = a $3,500 annual deposit at 6.5 percent interest from 1975/76 through 1984/85.

TABLE C-9
ANNUAL OPERATION AND MAINTENANCE COSTS
COLUMBIA COUNTY SYSTEM

	1975/76	1976/77	1977/78	1978/79	1979/80	1980/81	1985/86
Transfer	$32,600	$32,600	$32,600	$32,600	$32,600	$ 32,600	$ 32,600
Annual inflation factor 6%/yr.	4,000	6,200	8,600	11,000	13,600	16,400	33,000
Total Annual O&M Costs	$36,600	$38,800	$41,200	$43,600	$46,200	$ 49,000	$ 65,600
Transport	$60,500					$ 66,200	$ 73,500
Annual inflation factor 6%/yr.	8,500					33,300	76,400
Total Annual O&M Costs	$68,000	$74,300*	$80,600*	$86,900*	$93,200*	$ 99,500	$147,900
Landfill	$66,900	$67,400	$67,900	$68,500	$69,000	$ 69,500	$ 72,300
Annual inflation factor 6%/yr.	8,300	12,900	17,800	23,200	28,900	45,000	73,200
Total Annual O&M Costs	$75,200	$80,300	$85,700	$91,700	$97,900	$104,500	$145,500

* Projected costs calculated on a straight line basis.

TABLE C-10
ANNUAL ADMINISTRATIVE COSTS
COLUMBIA COUNTY SYSTEM

Position	Working Hours Per Week[1]	Yearly Position Salary	Yearly Budget Requirement[2]	Yearly Program Cost
Refuse program supervisor	16	$14,600	$18,980	$ 7,600
Program technician	20	12,000	15,600	7,800
Clerk	8	7,180	9,334	1,870
Total yearly requirements			1973/74	$17,270
			1975/76	19,400[3]
			1976/77	20,600[3]
			1977/78	21,800[3]
			1978/79	23,000[3]
			1979/80	24,500[3]
			1980/81	26,000[3]
			1985/86	34,800[3]

1 - BWA estimate.
2 - Includes 30 percent for insurance, retirement, social security, office overhead, and personnel expenses; COR-MET data for supervisor and clerk.
3 - Annual inflation factor of 6 percent per year.

The amount of the initial gate fees allocated to system costs are:

	$0.40	Administration
	2.60	Landfill, capital & O&M
Non-processible gate fee	$3.00	
	1.50	Transfer site, capital & O&M
Processible gate fee	$4.50	
	2.50	Transport cost at St. Helens
St. Helens gate fee	$7.00	
	2.00	Added transport cost at other sites
Other transfer gate fees	$9.00	

If substantial volumes of paper sludges and other wastes are diverted from the system, gate fees may prove impractical as a means of paying system costs. In that event, the county may have to establish indirect user charges.

This concept is described in Chapter 2. The indirect user charge encourages system use by charging beneficiaries according to waste generation and decreasing or maintaining gate fees at current rates. Legislation would be needed to establish a lien for nonpayment equivalent to a lien for nonpayment of taxes. Where waste volumes permit, however, the gate fee is more clearly related to payment for services received, and is preferred.

IMPLEMENTATION PLAN

Public and Private Roles

Implementation requires support of both local agencies and private enterprise.

In implementing the plan the county will provide transfer stations adjacent to incorporated cities for the disposal of all processible wastes and needs assurance that local franchise collectors use provided facilities. An agreement between the county and incorporated cities should provide Columbia County with authority to:

1. Review and approve all disposal sites, including any within incorporated areas.

2. Exclusively franchise disposal sites and regulate disposal fees.

3. Exclusively designate transfer or disposal facilities to be used by franchised collectors.

Columbia County Policy Issues and Actions

Before design begins Columbia County will need to review the policies and assumptions of this report, viz:

1. To qualify for DEQ grants and loans and minimize borrowing costs, county voters will authorize bonds to be issued.

2. The DEQ loan can be repaid from user fees and charges based on 85 percent of generated waste and the continued disposal of paper sludges.

3. Required gate fees are not so high as to discourage system use, and therefore, indirect user charges need not be established.

4. The fee structure properly allocates disposal costs to all wastes, and transfer and transport costs only to processible wastes.

5. Equipment can be replaced in the future through lease-purchase.

Before beginning design a number of steps appear necessary:

1. Columbia County public information program with MSD participation.

2. Evaluation of any private financing alternatives that may be proposed for the transport element or other elements of the system.

3. Plan adoption by Columbia County.

4. Plan approval by cities and DEQ.

5. Request to MSD to administer Columbia County program, with agreement to pay MSD costs.

6. MSD request for interim DEQ funds to pay administrative and consulting costs prior to bond authorization.

7. Agreement between county and cities, contingent on system implementation.

8. MSD study of possible paper sludge diversion.

9. County selection of engineering consultant to work under MSD direction.

10. Plan review and re-estimate, if required.

11. Start of bond election procedure.

12. Application for DEQ funds contingent on bond approval.

To carry out this program by the 1975/76 fiscal year as recommended in Volume I, Chapter 2, a number of deadlines have to be met en route. The principal target dates are as follows:

Complete preliminary design	September 1974
Obtain site options	September 1974
Authorize final design	September 1974
Conduct bond election	November 1974
Award construction contracts	March 1975

The revenues and expenditures shown in Table C-11 anticipate 12 months of operation in 1975/76. If operation is delayed until after July 1975, revenues and expenditures will be reduced proportionately for the first year of operation.

Effect of Existing Disposal Sites

The engineering plan is based on disposal of all county wastes at the Santosh landfill. The present Mickey site is excluded from the recommended plan, and the Clatskanie site is proposed for phasing out as the new system goes into operation. No costs are provided for closing either the Mickey or Clatskanie site as their franchises expire or as DEQ orders closure.

If these existing sites remain open for receiving processible waste or paper sludges, franchise fees will have to be renegotiated. The new franchise fee would approximate the gate fees required for the county system, less only the variable operating costs saved through reduced waste volumes.

TABLE C-11
SUMMARY OF REVENUES AND EXPENDITURES
COLUMBIA COUNTY SYSTEM

	Gate Fee Per Ton										
		Processible[1]			Annual Revenues			Total		Cumulative	
Year	Non-Processible	Land-fill	St. Helens Transfer Site	Other Transfer Sites	Non-Processible	Processible	Total	Annual System Cost	Net Revenue	Net Revenue	Reserve Requirement[2]
1975/76	$3.00	$4.50	$ 7.00	$ 9.00	$ 65,000	$210,000	$275,000	$242,000	$33,000	$ 33,000	$ 45,000
1976/77	3.25	4.75	7.50	9.75	70,000	230,000	300,000	270,000	30,000	63,000	59,000
1977/78	3.50	5.00	8.00	10.50	80,000	250,000	330,000	309,000	21,000	84,000	82,000
1978/79	3.75	5.25	8.50	11.25	85,000	270,000	355,000	338,000	17,000	101,000	95,000
1979/80	4.00	5.50	9.00	12.50	90,000	300,000	390,000	367,000	23,000	124,000	108,000
1980/81	4.25	6.00	9.50	13.25	100,000	320,000	420,000	387,000	33,000	157,000	111,000
1985/86	5.50	8.00	12.00	14.00	140,000	430,000	570,000	541,000	29,000	--	--

1 - The gate fee for processible wastes is set to allocate transport costs to each transfer site. Transfer site costs are allocated to all processible wastes.

2 - One year debt service plus four months administration, lease-purchase, operation and maintenance, and annual capital expenditures.

CHAPTER 6

CHAPTER 6

THE MODIFIED REGIONAL PROGRAM

After completion of the financing plan, the regional program was changed to reduce the number of proposed milling centers and include air separation equipment in the initial stage. These changes reflect suggestions by private industry and an increased urgency given to recovering light combustible materials.

This chapter summarizes financing plan revisions required because of the program changes. Revisions are presented briefly in a form parallel to that of Chapter 4. Projections cover the first 10 years of the program.

The following revised tables are included in this chapter:

R-9	Annual Cost Projection (Including Inflation Factors)
R-11	Capital Costs for Program Elements
R-14	Obligation Number and Facilities Financed
R-14-1	Obligations
R-15	Annual Capital Costs for Program Elements
R-18	Annual Operation and Maintenance Costs
R-23	Estimated Solid Waste Processed by Milling Center
R-24	Summary of Annual Revenues and Expenditures

PROGRAM EXPENDITURES

Total annual costs for the modified regional program are estimated in Revised Table 9. The total annual cost for 1978/79, $5.6 million with public financing, is about $1.0 million less than in the original plan. Total annual costs comprise capital, operation and maintenance, and administration.

The total initial capital cost is $15.9 million, $10.9 million less than the original program cost. The decrease results primarily from the following changes:

1. Two milling centers were eliminated, one for the Hillsboro-Cornelius area and the other for southeast Portland.

2. Acquisition and improvement of three landfills have been deferred to an undetermined date. With light combustible materials diverted from the waste stream, the existing landfills, St. John and Rossman's, and the proposed landfill at Durham are expected to serve for many years. Because of its extended service life in the modified program the Durham landfill is now proposed for purchase rather than lease.

REVISED TABLE 9[1]
ANNUAL PROJECTION (INCLUDING INFLATION FACTORS) ($000)
REGIONAL PROGRAM

	1975/76	1976/77	1977/78	1978/79	1979/80	1980/81	1981/82	1982/83	1983/84	1984/85	1985/86
Administration	$191	$ 202	$ 215	$ 227	$ 241	$ 256	$ 271	$ 287	$ 304	$ 323	$ 342
Milling											
Capital costs	$---	$ 43	$ 335	$ 796	$ 879	$ 962	$ 973	$ 973	$ 973	$ 973	$ 973
O & M costs	340	1,253	2,269	2,409	2,553	2,706	2,869	3,041	3,223	3,417	3,622
Subtotal	$340	$1,296	$2,604	$3,205	$3,432	$3,668	$3,842	$4,014	$4,196	$4,390	$4,595
Transport[1]											
Capital costs	$---	$ 26	$ 103	$ 165	$ 177	$ 189	$ 190	$ 190	$ 190	$ 190	$ 190
O & M costs	138	457	792	843	894	947	1,004	1,064	1,128	1,196	1,268
Subtotal	$138	$ 483	$ 895	$1,008	$1,071	$1,136	$1,194	$1,254	$1,318	$1,386	$1,458
Landfill[1]											
Annual lease[2]	$---	$ 124	$ 124	$ 124	$ 124	$ 124	$ 124	$ 124	$ 124	$ 124	$ 124
Capital costs	---	4	59	139	153	167	169	169	169	169	139
O & M costs	114	436	802	856	908	962	1,020	1,081	1,146	1,214	1,288
Subtotal	$114	$ 564	$ 985	$1,119	$1,185	$1,253	$1,313	$1,374	$1,439	$1,507	$1,551
Annual Cost	$783	$2,545	$4,699	$5,559	$5,929	$6,313	$6,620	$6,929	$7,257	$7,606	$7,946

1 - Transport and disposal costs without resource recovery.
2 - Annua lease from 1976/77 fiscal year: Rossman site at $60,000 per year; compensation payment to city of Portland at $64,000 per year.

REVISED TABLE 11[1]
CAPITAL COSTS FOR PROGRAM ELEMENTS ($000)
REGIONAL PROCESSIBLE SYSTEM

Element/Item	Facility	Life	1973 Cost[2]	Construction/ Acquisition Year[3]	Capital Cost[4]	Local Cost[5]	Financing Method[6]
Milling							
Land	North Portland	25+		1975	$ 140	$ 98.0	0-1
	E. Washington			1974	85	59.5	0-1
	205 North			1975	120	84.0	0-1
	Rossman			1975	30	21.0	0-1
Buildings	North Portland	25+	$ 837.5	1976	1,055	738.5	0-2
	E. Washington		1,006.2	1975	1,174	821.8	0-1
	205 North		837.5	1976	1,055	738.5	0-2
	Rossman		1,006.2	1976	1,268	887.6	0-2
Equipment	North Portland	25+	487.5	1976	564	394.8	0-2
	E. Washington		525.0	1975	579	405.3	0-1
	205 North		487.5	1976	564	394.8	0-2
	Rossman		525.0	1976	608	425.6	0-2
Equipment	North Portland	10+	903.8	1976	1,046	732.2	0-2
	E. Washington		1,122.5	1975	1,238	866.6	0-1
	205 North		965.0	1976	1,117	781.9	0-2
	Rossman		1,061.2	1976	1,228	859.6	0-2
Transport							
	North Portland	10+	146.0	1976	169	118.3	0-2
	E. Washington		664.0	1975	732	512.4	0-1
	205 North		664.0	1976	769	538.3	0-2
	Rossman		146.0	1976	169	118.3	0-2
Landfill							
Land	Durham	10+	---	1975	300	210.0	0-1
Construction	Durham	10+	274.0	1975	320	224.0	0-1
	St. John	15+	675.0	1976	850	595.0	0-2
	Rossman	15+	174.0	1976	219	153.3	0-2
Loaders	Durham	15+	56.0	1975	62	43.4	0-1
	St. John	15+	56.0	1976	65	45.5	0-2
	Rossman	15+	56.0	1976	65	45.5	0-2
Compactors	Durham	10+	95.0	1975	105	73.5	0-1
	St. John	7+	95.0	1976	110	77.0	0-2
	Rossman	7+	95.0	1976	110	77.0	0-2

1 - Revised engineering data as provided by COR-MET.
2 - 1973 costs; all items except Transport and Landfill equipment include 25 percent for engineering and contingencies.
3 - COR-MET dates.
4 - Inflation factor of 8 percent per year for all construction, 5 percent per year for all equipment.
5 - All items assumed eligible for 30 percent DEQ grant program.
6 - 0-1 - first obligation.
0-2 - second obligation.
NOTE: Replacement equipment not included -- no equipment scheduled for replacement during 10 year period of this analysis.

REVISED TABLE 14
OBLIGATION NUMBER AND FACILITIES FINANCED ($000)
REGIONAL PROCESSIBLE SYSTEM

Obligation Number	Year	Length	Period	Amount Financed	Obligation Amount
1	1974	22	10/1/74 - 10/1/96	$3,419.5	$4,000
2	1975	22	10/1/75 - 10/1/97	7,721.7	9,100

Obligation Number	Element and Item	Life Years	Amount	% of Oblig.
1	Milling			
	Land, construction and equipment	25	$1,489.6	43.6
	Equipment*	10	866.6	25.3
	Subtotal		$2,356.2	68.9
	Transport			
	Equipment*	10	$ 512.4	15.0
	Landfill			
	Land and construction	Varies	$ 434.0	12.7
	Equipment	15+	43.4	1.3
	Equipment*	10	73.5	2.1
	Subtotal		$ 550.9	16.1
	Total		$3,419.5	100.0
2	Milling			
	Construction and equipment	25	$3,579.8	46.4
	Equipment*	10	2,373.7	30.7
	Subtotal		$5,953.5	77.1
	Transport			
	Equipment*	10	$ 774.9	10.0
	Landfill			
	Construction	Varies	$ 748.3	9.7
	Equipment	15+	91.0	1.2
	Equipment*	7+	154.0	2.0
	Subtotal		$ 993.3	12.9
	Total		$7,721.7	100.0

* - Equipment deposit reserve recommended to fund repayment of equipment portion of loan upon retirement of equipment. No deposit recommended for equipment with 15 or more years service life.

REVISED TABLE 14-1
OBLIGATIONS ($000)
REGIONAL PROCESSIBLE SYSTEM

Obligation No	Date of Issue	Year Maturing October 1	Principal Outstanding	Interest at 5 Percent	Principal Maturing	Bond Service
1	October 1974					
		1975/76	$4,000	$200	---	$200*
		1976/77	4,000	200	---	200*
		1977/78	4,000	200	$ 50	250
		1978/79	3,950	198	100	298
		1979/80	3,850	192	120	312
		1980/81 through 1996/97		---	---	331
	Construction Fund		$3,419.5			
	~~Funded Interest~~		~~400.0~~			
	Other Costs		180.5			
	Obligation Amount		$4,000.0			
2	October 1975					
		1976/77	$9,100	$455	---	$455*
		1977/78	9,100	455	---	455*
		1978/79	9,100	455	$100	555
		1979/80	9,000	450	200	650
		1980/81	8,800	440	300	740
		1981/82 through 1997/98		---	---	754
	Construction Fund		$7,721.7			
	Funded Interest		910.0			
	Other Costs		468.3			
	Obligation Amount		$9,100.0			

*Payable from bond proceeds.

REVISED TABLE 15
ANNUAL CAPITAL COSTS FOR PROGRAM ELEMENTS ($000)
REGIONAL PROCESSIBLE SYSTEM

Element/Year	Obligation No. 1	Obligation No. 2	Equipment Deposit Reserves* Deposits	Equipment Deposit Reserves* Expenditures	Total Annual Amount
Milling	68.9%	77.1%			
1975/76	---	---	---	---	---
1976/77	---	---	$ 43	---	$ 43
1977/78	$172	---	163	---	335
1978/79	205	$428	163	---	796
1979/80	215	501	163	---	879
1980/81	228	571	163	---	962
1981/82	228	582	163	---	973
1982/83	228	582	163	---	973
1983/84	228	582	163	---	973
1984/85	228	582	163	---	973
1985/86	228	582	163	---	973
Transport	15.0%	10.0%			
1975/76	---	---	---	---	---
1976/77	---	---	$ 26	---	$ 26
1977/78	$ 38	---	65	---	103
1978/79	45	$ 55	65	---	165
1979/80	47	65	65	---	177
1980/81	50	74	65	---	189
1981/82	50	75	65	---	190
1982/83	50	75	65	---	190
1983/84	50	75	65	---	190
1984/85	50	75	65	---	190
1985/86	50	75	65	---	190
Landfill	16.1%	12.9%			
1975/76	---	---	---	---	---
1976/77	---	---	$ 4	---	$ 4
1977/78	$ 40	---	19	---	59
1978/79	48	$ 72	19	---	139
1979/80	50	84	19	---	153
1980/81	53	95	19	---	167
1981/82	53	97	19	---	169
1982/83	53	97	19	---	169
1983/84	53	97	19	---	169
1984/85	53	97	4	(15)	139

* - Equipment Deposit Reserves - continued on following page.

REVISED TABLE 15 (CONT'D.)

* - Equipment Deposit Reserves:

Milling:

25.3 percent of Obligation No. 1 - a $43,000 annual deposit at 7.5 percent interest from 1976/77 through 1985/86.

30.7 percent of Obligation No. 2 - a $120,000 annual deposit at 7.5 percent interest from 1977/78 through 1986/87.

Transport:

15.0 percent of Obligation No. 1 - a $26,000 annual deposit at 7.5 percent interest from 1976/77 through 1985/86.

10.0 percent of Obligation No. 2 - a $39,000 annual deposit at 7.5 percent interest from 1977/78 through 1986/87.

Landfill:

2.1 percent of Obligation No. 1 - a $4,000 annual deposit at 7.5 percent interest from 1976/77 through 1985/86.

2.0 percent of Obligation No. 2 - a $15,000 annual deposit at 7.5 percent interest from 1977/78 through 1983/84.

REVISED TABLE 18
ANNUAL O&M COSTS[1] ($000)
REGIONAL PROCESSIBLE SYSTEM

	1975/76	1976/77	1977/78	1978/79	1979/80	1980/81	1981/82	1982/83	1983/84	1984/85	1985/86
Milling											
North Portland	$---	$ 178[2]	$ 427								
E Washington	303[3]	520	520								
205 North	---	181[2]	435								
Rossman	---	173[2]	415								
Subtotal	$303	$1,052	$1,797	$1,800	$1,800	$1,800	$1,800	$1,800	$1,800	$1,800	$1,800
Annual inflation[4]	37	201	472	609	753	906	1,069	1,241	1,423	1,617	1,822
Total Annual O&M Costs	$340	$1,253	$2,269	$2,409	$2,553	$2,706	$2,869	$3,041	$3,223	$3,417	$3,622
Transport											
North Portland	$---	$ 40[2]	$ 97								
E Washington	123[3]	211	211								
205 North	---	101[2]	243								
Rossman	---	32[2]	76								
Subtotal	$123	$ 384	$ 627	$ 630	$ 630	$ 630	$ 630	$ 630	$ 630	$ 630	$ 630
Annual inflation[4]	15	73	165	213	262	317	374	434	498	566	638
Total Annual O&M Costs	$138	$ 457	$ 792	$ 843	$ 894	$ 947	$1,004	$1,064	$1,128	$1,196	$1,268
Landfill-without resource recovery:											
Durham	$102[3]	$ 175	$ 175								
St. John	---	95[2]	229								
Rossman	---	96[2]	231								
Subtotal	$102	$ 366	$ 635	$ 640	$ 640	$ 640	$ 640	$ 640	$ 640	$ 640	$ 640
Annual inflation[4]	12	70	167	216	268	322	380	441	506	574	648
Total Annual O&M Costs	$114	$ 436	$ 802	$ 856	$ 908	$ 962	$1,020	$1,081	$1,146	$1,214	$1,288
Landfill-with resource recovery:[5]											
Durham			$ 121								
St. John			142								
Rossman			143								
Subtotal			$ 406	$ 410	$ 410	$ 410	$ 410	$ 410	$ 410	$ 410	$ 410
Annual inflation[4]			107	139	172	206	243	283	324	368	415
Total Annual O&M Costs[6]			$ 513	$ 549	$ 582	$ 616	$ 653	$ 693	$ 734	$ 778	$ 825

1 - Revised O&M costs provided by COR-MET for 10-year operating period, 1976/77 through 1985/86. No adjustment made in O&M costs for disposal at 85 percent of generated quantities.
2 - Estimate for O&M based on five-month period, 1977/78 cost.
3 - Estimate for O&M based on seven-month period, 1977/78 cost.
4 - O&M projections based on annual inflation factor of 6 percent per year from 1973 base cost.
5 - Landfill O&M costs for resource recovery provided by COR-MET based on reduced personnel and cover requirements with 70 to 80 percent material recovery.
6 - No reduction in landfill costs assumed for 1975/76 and 1976/77 fiscal years.

All capital costs for the milling center, transport and landfill elements are shown in Revised Table 11. The initial capital costs for the modified program are:

System Element	Grant Amount (30%)	Local Amount (70%)	Total
Milling centers	$3,561,000	$ 8,310,000	$11,871,000
Transport	552,000	1,287,000	1,839,000
Landfill	662,000	1,544,000	2,206,000
Total	$4,775,000	$11,141,000	$15,916,000

Both grant and local amounts are proposed to be met from the DEQ grant/loan program. The grant amount is $3.3 million less than for the original program, and the loan amount is $7.6 million less.

Two long term obligations are recommended to secure the DEQ loans. Each obligation and its allocation by system element are summarized in Revised Table 14. Uniform repayment schedules used in estimating annual program costs are shown in Revised Table 14-1.

Revised Table 15 shows the resulting annual capital costs for the three system elements, including needed equipment deposit reserves.

Operation and maintenance costs for the three system elements are shown in Revised Table 18. Costs are as estimated by COR-MET for the 10-year projection period, with an allowance added for inflation. Reduced landfill costs that may result from the potential 70 to 80 percent reduction in waste quantities by resource resource recovery are also shown.

Replacement equipment costs are not reflected in Revised Table 9 because first generation equipment serves through 1985/86. As equipment is replaced on a lease-purchase basis after 1985/86, annual costs will increase in proportion to the costs originally shown in Table 9.

Annual lease requirements reflect the following changes:

1. Deletion of the Durham landfill lease cost because the site is scheduled for purchase.

2. Inclusion of the compensation payment to the City of Portland for the St. John landfill.

The proposed payment to the City of Portland includes an annual interest payment of $13,000 per year throughout the life of the site for the city's $261,000 investment in land, and an annual payment of $7,000 per year over a 10-year period to repay the city's $51,000 investment in fixed facilities. The estimated $60,000 annual site lease for the Rossman landfill was not revised and remains in the annual lease requirement.

PROGRAM REVENUES

The capacity charges and gate fees needed to meet annual program costs decrease for the modified regional program.

For purposes of the modified program, capacity charges are based on recovering all costs incurred in moving wastes from milling centers to the landfills, rather than on identified savings in haul cost. The modified program will still serve to reduce haul costs because franchised collectors and other users will transport wastes shorter distances than at present. However, the haul cost savings projected in Tables 20 and 21 are not valid for the modified program. When final site selections have been made, the relationship between capacity charges and haul cost savings should be rechecked. With the exception of the North Portland and Rossman milling centers, haul cost savings are anticipated to equal or exceed recommended capacity charges.

Revised Table 23 shows the quantities used to calculate capacity charges, transport surcharges, and gate fee revenues. Capacity charges are based on purchase of capacity by haulers of 90 percent of the waste delivered for processing. Transport surcharges apply to the remaining 10 percent of the waste.

Revised capacity charges and transport surcharges are allocable to each milling center as follows:

Fiscal Year	North Portland	205 North	East Washington	Rossman	Regional Totals: Capacity Units[1]	Regional Totals: Revenues By Charge
Capacity Charges						
1975/76	---	---	$1,800	---	64	$ 115,000
1976/77	$1,100	$2,200	1,900	$400	277	418,000
1977/78	1,200	2,300	2,000	500	548	818,000
1978/79	1,300	2,400	2,100	600	563	910,000
1979/80[2]	1,400	2,500	2,200	700	578	992,000
1980/81	1,450	2,550	2,200	700	593	1,034,000
1981/82	1,500	2,600	2,200	700	610	1,075,000
1982/83	1,550	2,700	2,250	750	626	1,144,000
1983/84	1,600	2,800	2,250	750	643	1,197,000
1984/85	1,650	2,900	2,250	800	660	1,252,000
1985/86	1,700	3,000	2,300	800	677	1,326,000
Transport Surcharges						
1975/76	---	---	$2.20	---	---	$ 15,000
1976/77	$1.40	$2.50	2.20	$0.70	---	67,000
1977/78	1.40	2.50	2.20	0.70	---	124,000
1978/79	1.40	2.50	2.20	0.70	---	129,000
1979/80[2]	1.40	2.50	2.20	0.70	---	132,000
1980/81	1.45	2.55	2.20	0.70	---	138,000
1981/82	1.50	2.60	2.20	0.70	---	144,000
1982/83	1.55	2.70	2.25	0.75	---	153,000
1983/84	1.60	2.80	2.25	0.75	---	160,000
1984/85	1.65	2.90	2.25	0.80	---	167,000
1985/86	1.70	3.00	2.30	0.80	---	177,000

1 - Figures based on recommended 1,200 tons/year capacity unit.

2 - Figures increase after 1979/80 to provide revenues equal to projected transport costs.

REVISED TABLE 23
ESTIMATED SOLID WASTE PROCESSED BY MILLING CENTER[1]
(000 TONS PER YEAR)
REGIONAL PROCESSIBLE SYSTEM

Year	North Portland	E Washington	205 North	Rossman	Total
1975/76	---	85[2]	---	---	85[2]
1976/77	55[2]	145	85[2]	85[2]	370[2]
1977/78	139	192	190	210	731
1978/79	140	201	202	208	751
1979/80	141	209	206	215	771
1980/81	143	218	211	219	791
1981/82	145	227	215	226	813
1982/83	146	236	220	233	835
1983/84	148	245	224	240	857
1984/85	150	255	229	246	880
1985/86	152	265	233	253	903

1 - 85 percent of generated quantities.
2 - Estimate for tons processed during start up period.

SUMMARY OF REVENUES AND EXPENDITURES

As shown in Revised Table 24, an initial subscriber gate fee of $6.50 per ton is required for the modified program. This is $1.00 per ton less than the original program. The $6.50 per ton gate fee, combined with recommended capacity charges and non-subscriber transport surcharges, would meet all estimated program costs without reliance on income from resource recovery.

RESOURCE RECOVERY BENEFITS

Direct benefits include income from resource recovery and savings in landfill operation and maintenance costs. Indirect benefits will also be realized by deferring capital investment in landfills to replace those used initially.

Net income from sales of recovered materials can be used to reduce gate fees. The potential gate fee reductions shown in Table 25 for corrugated and ferrous materials remain valid. The potential gate fee reduction from air separation is now $2.60 per ton of processed waste. Landfill operation and maintenance cost reductions that may result from resource recovery range from $0.40 per ton of processed waste in 1977/78 to $0.50 per ton in 1985/86.

The total potential gate fee reductions from resource recovery are:

	Potential Gate Fee Reduction Per Ton of Processed Waste[1]		
	Revenues	O&M Savings	Total
Corrugated	$0.75	(2)	---
Ferrous	$0.25 to $1.30	(2)	---
Air separation	$2.60	(2)	---
	$3.60 to $4.65	$0.40	$4.00 to $5.05

1 - Figures rounded to nearest $0.05.
2 - Operation and maintenance savings not allocated to each recovery program.

The resulting gate fees required to support the modified regional program, with all expected resource recovery, will be in the order of $1.50 to $2.50 per ton of processed waste.

REVISED TABLE 24
SUMMARY OF ANNUAL REVENUES AND EXPENDITURES ($000)
REGIONAL PROGRAM

Year	Gate Fee Per Ton Subscriber	Revenues: Capacity Charges	Revenues: Transport Surcharge	Revenues: Gate Fee	Revenues: Total	Total Annual Program Requirements	Net Revenue	Cumulative Net Revenue[1]	Reserve Requirement
1975/76	$6.50	$ 115	$ 15	$ 553	$ 683	$ 783	$(100)	$ (44)	$ 130
1976/77	6.50	418	67	2,405	2,890	2,545	345	360	490
1977/78	6.50	818	124	4,752	5,694	4,699	995	1,418	1,203
1978/79	6.50	910	129	4,882	5,921	5,559	362	1,847	1,849
1979/80	6.50	992	132	5,011	6,135	5,929	206	2,124	2,001
~~1980/81~~	~~6.50~~	~~1,034~~	~~138~~	~~5,142~~	~~6,314~~	~~6,313~~	~~1~~	~~2,200~~	~~2,157~~
1981/82	6.75	1,075	144	5,488	6,707	6,620	87	2,366	2,219
1982/83	6.75	1,144	153	5,636	6,933	6,929	4	2,454	2,270
1983/84	7.00	1,197	160	5,999	7,356	7,257	99	2,642	2,325
1984/85	7.00	1,252	167	6,160	7,579	7,606	(27)	2,710	2,383
1985/86	7.25	1,326	177	6,547	8,050	7,946	104	2,914	2,415

1 - Includes franchise fee revenue of $56,000 for 1975/76 escalated at 6 percent per year.
2 - One year debt service plus two months administrative, lease and operation and maintenance costs.

As compared to current rates at the St. John landfill, the increase in regional charges are:

	Compacted Wastes			
	Monthly Charge			
	Per CY	CY	32-Gal. Can	Loose Wastes Per CY
	500 lb.	225 lb.	35-40 lb.	250 lb.
Current rate at St. John	$0.70	$1.37	$0.21	$0.40
Increase without resource recovery*	+0.93	+1.80	+0.28	+0.41
Increase with resource recovery*	-0.32	-0.64	-0.10	-0.21

* Capacity charges and transport surcharges are not included; increases based on current St. John rates.

As noted in Chapter 4 of this report, resource recovery at the present material prices estimated by the engineer can offset the additional costs of introducing a milling and recovery system as soon as markets are developed for the full volume.

CHAPTER 6

THE MODIFIED REGIONAL PROGRAM

After completion of the financing plan, the regional program was changed to reduce the number of proposed milling centers and include air separation equipment in the initial stage. These changes reflect suggestions by private industry and an increased urgency given to recovering light combustible materials.

This chapter summarizes financing plan revisions required because of the program changes. Revisions are presented briefly in a form parallel to that of Chapter 4. Projections cover the first 10 years of the program.

The following revised tables are included in this chapter:

R-9	Annual Cost Projection (Including Inflation Factors)
R-11	Capital Costs for Program Elements
R-14	Obligation Number and Facilities Financed
R-14-1	Obligations
R-15	Annual Capital Costs for Program Elements
R-18	Annual Operation and Maintenance Costs
R-23	Estimated Solid Waste Processed by Milling Center
R-24	Summary of Annual Revenues and Expenditures

PROGRAM EXPENDITURES

Total annual costs for the modified regional program are estimated in Revised Table 9. The total annual cost for 1978/79, $5.6 million with public financing, is about $1.0 million less than in the original plan. Total annual costs comprise capital, operation and maintenance, and administration.

The total initial capital cost is $15.9 million, $10.9 million less than the original program cost. The decrease results primarily from the following changes:

1. Two milling centers were eliminated, one for the Hillsboro-Cornelius area and the other for southeast Portland.

2. Acquisition and improvement of three landfills have been deferred to an undetermined date. With light combustible materials diverted from the waste stream, the existing landfills, St. John and Rossman's, and the proposed landfill at Durham are expected to serve for many years. Because of its extended service life in the modified program the Durham landfill is now proposed for purchase rather than lease.

REVISED TABLE 9[1]
ANNUAL PROJECTION (INCLUDING INFLATION FACTORS) ($000)
REGIONAL PROGRAM

	1975/76	1976/77	1977/78	1978/79	1979/80	1980/81	1981/82	1982/83	1983/84	1984/85	1985/86
Administration	$191	$ 202	$ 215	$ 227	$ 241	$ 256	$ 271	$ 287	$ 304	$ 323	$ 342
Milling											
Capital costs	$---	$ 43	$ 335	$ 796	$ 879	$ 962	$ 973	$ 973	$ 973	$ 973	$ 973
O & M costs	340	1,253	2,269	2,409	2,553	2,706	2,869	3,041	3,223	3,417	3,622
Subtotal	$340	$1,296	$2,604	$3,205	$3,432	$3,668	$3,842	$4,014	$4,196	$4,390	$4,595
Transport[1]											
Capital costs	$---	$ 26	$ 103	$ 165	$ 177	$ 189	$ 190	$ 190	$ 190	$ 190	$ 190
O & M costs	138	457	792	843	894	947	1,004	1,064	1,128	1,196	1,268
Subtotal	$138	$ 483	$ 895	$1,008	$1,071	$1,136	$1,194	$1,254	$1,318	$1,386	$1,458
Landfill[1]											
Annual lease[2]	$---	$ 124	$ 124	$ 124	$ 124	$ 124	$ 124	$ 124	$ 124	$ 124	$ 124
Capital costs	---	4	59	139	153	167	169	169	169	169	139
O & M costs	114	436	802	856	908	962	1,020	1,081	1,146	1,214	1,288
Subtotal	$114	$ 564	$ 985	$1,119	$1,185	$1,253	$1,313	$1,374	$1,439	$1,507	$1,551
Annual Cost	$783	$2,545	$4,699	$5,559	$5,929	$6,313	$6,620	$6,929	$7,257	$7,606	$7,946

1 - Transport and disposal costs without resource recovery.
2 - Annua lease from 1976/77 fiscal year: Rossman site at $60,000 per year; compensation payment to city of Portland at $64,000 per year.

REVISED TABLE 11[1]
CAPITAL COSTS FOR PROGRAM ELEMENTS ($000)
REGIONAL PROCESSIBLE SYSTEM

Element/Item	Facility	Life	1973 Cost[2]	Construction/ Acquisition Year[3]	Capital Cost[4]	Local Cost[5]	Financing Method[6]
Milling							
Land	North Portland	25+		1975	$ 140	$ 98.0	0-1
	E. Washington			1974	85	59.5	0-1
	205 North			1975	120	84.0	0-1
	Rossman			1975	30	21.0	0-1
Buildings	North Portland	25+	$ 837.5	1976	1,055	738.5	0-2
	E. Washington		1,006.2	1975	1,174	821.8	0-1
	205 North		837.5	1976	1,055	738.5	0-2
	Rossman		1,006.2	1976	1,268	887.6	0-2
Equipment	North Portland	25+	487.5	1976	564	394.8	0-2
	E. Washington		525.0	1975	579	405.3	0-1
	205 North		487.5	1976	564	394.8	0-2
	Rossman		525.0	1976	608	425.6	0-2
Equipment	North Portland	10+	903.8	1976	1,046	732.2	0-2
	E. Washington		1,122.5	1975	1,238	866.6	0-1
	205 North		965.0	1976	1,117	781.9	0-2
	Rossman		1,061.2	1976	1,228	859.6	0-2
Transport							
	North Portland	10+	146.0	1976	169	118.3	0-2
	E. Washington		664.0	1975	732	512.4	0-1
	205 North		664.0	1976	769	538.3	0-2
	Rossman		146.0	1976	169	118.3	0-2
Landfill							
Land	Durham	10+	---	1975	300	210.0	0-1
Construction	Durham	10+	274.0	1975	320	224.0	0-1
	St. John	15+	675.0	1976	850	595.0	0-2
	Rossman	15+	174.0	1976	219	153.3	0-2
Loaders	Durham	15+	56.0	1975	62	43.4	0-1
	St. John	15+	56.0	1976	65	45.5	0-2
	Rossman	15+	56.0	1976	65	45.5	0-2
Compactors	Durham	10+	95.0	1975	105	73.5	0-1
	St. John	7+	95.0	1976	110	77.0	0-2
	Rossman	7+	95.0	1976	110	77.0	0-2

1 - Revised engineering data as provided by COR-MET.
2 - 1973 costs; all items except Transport and Landfill equipment include 25 percent for engineering and contingencies.
3 - COR-MET dates.
4 - Inflation factor of 8 percent per year for all construction, 5 percent per year for all equipment.
5 - All items assumed eligible for 30 percent DEQ grant program.
6 - 0-1 - first obligation.
0-2 - second obligation.
NOTE: Replacement equipment not included -- no equipment scheduled for replacement during 10 year period of this analysis.

REVISED TABLE 14
OBLIGATION NUMBER AND FACILITIES FINANCED ($000)
REGIONAL PROCESSIBLE SYSTEM

Obligation Number	Year	Length	Period	Amount Financed	Obligation Amount
1	1974	22	10/1/74 - 10/1/96	$3,419.5	$4,000
2	1975	22	10/1/75 - 10/1/97	7,721.7	9,100

Obligation Number	Element and Item	Life Years	Amount	% of Oblig.
1	Milling			
	Land, construction and equipment	25	$1,489.6	43.6
	Equipment*	10	866.6	25.3
	Subtotal		$2,356.2	68.9
	Transport			
	Equipment*	10	$ 512.4	15.0
	Landfill			
	Land and construction	Varies	$ 434.0	12.7
	Equipment	15+	43.4	1.3
	Equipment*	10	73.5	2.1
	Subtotal		$ 550.9	16.1
	Total		$3,419.5	100.0
2	Milling			
	Construction and equipment	25	$3,579.8	46.4
	Equipment*	10	2,373.7	30.7
	Subtotal		$5,953.5	77.1
	Transport			
	Equipment*	10	$ 774.9	10.0
	Landfill			
	Construction	Varies	$ 748.3	9.7
	Equipment	15+	91.0	1.2
	Equipment*	7+	154.0	2.0
	Subtotal		$ 993.3	12.9
	Total		$7,721.7	100.0

* - Equipment deposit reserve recommended to fund repayment of equipment portion of loan upon retirement of equipment. No deposit recommended for equipment with 15 or more years service life.

REVISED TABLE 14-1
OBLIGATIONS ($000)
REGIONAL PROCESSIBLE SYSTEM

Obligation No	Date of Issue	Year Maturing October 1	Principal Outstanding	Interest at 5 Percent	Principal Maturing	Bond Service
1	October 1974					
		1975/76	$4,000	$200	---	$200*
		1976/77	4,000	200	---	200*
		1977/78	4,000	200	$ 50	250
		1978/79	3,950	198	100	298
		1979/80	3,850	192	120	312
		1980/81 through 1996/97		---	---	331
	Construction Fund		$3,419.5			
	~~Funded Interest~~		~~400.0~~			
	Other Costs		180.5			
	Obligation Amount		$4,000.0			
2	October 1975					
		1976/77	$9,100	$455	---	$455*
		1977/78	9,100	455	---	455*
		1978/79	9,100	455	$100	555
		1979/80	9,000	450	200	650
		1980/81	8,800	440	300	740
		1981/82 through 1997/98		---	---	754
	Construction Fund		$7,721.7			
	Funded Interest		910.0			
	Other Costs		468.3			
	Obligation Amount		$9,100.0			

*Payable from bond proceeds.

REVISED TABLE 15
ANNUAL CAPITAL COSTS FOR PROGRAM ELEMENTS ($000)
REGIONAL PROCESSIBLE SYSTEM

Element/Year	Obligation No. 1	Obligation No. 2	Equipment Deposit Reserves* Deposits	Equipment Deposit Reserves* Expenditures	Total Annual Amount
Milling	68.9%	77.1%			
1975/76	---	---	---	---	---
1976/77	---	---	$ 43	---	$ 43
1977/78	$172	---	163	---	335
1978/79	205	$428	163	---	796
1979/80	215	501	163	---	879
1980/81	228	571	163	---	962
1981/82	228	582	163	---	973
1982/83	228	582	163	---	973
1983/84	228	582	163	---	973
1984/85	228	582	163	---	973
1985/86	228	582	163	---	973
Transport	15.0%	10.0%			
1975/76	---	---	---	---	---
1976/77	---	---	$ 26	---	$ 26
1977/78	$ 38	---	65	---	103
1978/79	45	$ 55	65	---	165
1979/80	47	65	65	---	177
1980/81	50	74	65	---	189
1981/82	50	75	65	---	190
1982/83	50	75	65	---	190
1983/84	50	75	65	---	190
1984/85	50	75	65	---	190
1985/86	50	75	65	---	190
Landfill	16.1%	12.9%			
1975/76	---	---	---	---	---
1976/77	---	---	$ 4	---	$ 4
1977/78	$ 40	---	19	---	59
1978/79	48	$ 72	19	---	139
1979/80	50	84	19	---	153
1980/81	53	95	19	---	167
1981/82	53	97	19	---	169
1982/83	53	97	19	---	169
1983/84	53	97	19	---	169
1984/85	53	97	4	(15)	139

* - Equipment Deposit Reserves - continued on following page.

REVISED TABLE 15 (CONT'D.)

* - Equipment Deposit Reserves:

Milling:

25.3 percent of Obligation No. 1 - a $43,000 annual deposit at 7.5 percent interest from 1976/77 through 1985/86.

30.7 percent of Obligation No. 2 - a $120,000 annual deposit at 7.5 percent interest from 1977/78 through 1986/87.

Transport:

15.0 percent of Obligation No. 1 - a $26,000 annual deposit at 7.5 percent interest from 1976/77 through 1985/86.

10.0 percent of Obligation No. 2 - a $39,000 annual deposit at 7.5 percent interest from 1977/78 through 1986/87.

Landfill:

2.1 percent of Obligation No. 1 - a $4,000 annual deposit at 7.5 percent interest from 1976/77 through 1985/86.

2.0 percent of Obligation No. 2 - a $15,000 annual deposit at 7.5 percent interest from 1977/78 through 1983/84.

REVISED TABLE 18
ANNUAL O&M COSTS[1] ($000)
REGIONAL PROCESSIBLE SYSTEM

	1975/76	1976/77	1977/78	1978/79	1979/80	1980/81	1981/82	1982/83	1983/84	1984/85	1985/86
Milling											
North Portland	$---	$ 178[2]	$ 427								
E Washington	303[3]	520	520								
205 North	---	181[2]	435								
Rossman	---	173[2]	415								
Subtotal	$303	$1,052	$1,797	$1,800	$1,800	$1,800	$1,800	$1,800	$1,800	$1,800	$1,800
Annual inflation[4]	37	201	472	609	753	906	1,069	1,241	1,423	1,617	1,822
Total Annual O&M Costs	$340	$1,253	$2,269	$2,409	$2,553	$2,706	$2,869	$3,041	$3,223	$3,417	$3,622
Transport											
North Portland	$---	$ 40[2]	$ 97								
E Washington	123[3]	211	211								
205 North	---	101[2]	243								
Rossman	---	32[2]	76								
Subtotal	$123	$ 384	$ 627	$ 630	$ 630	$ 630	$ 630	$ 630	$ 630	$ 630	$ 630
Annual inflation[4]	15	73	165	213	262	317	374	434	498	566	638
Total Annual O&M Costs	$138	$ 457	$ 792	$ 843	$ 894	$ 947	$1,004	$1,064	$1,128	$1,196	$1,268
Landfill-without resource recovery:											
Durham	$102[3]	$ 175	$ 175								
St. John	---	95[2]	229								
Rossman	---	96[2]	231								
Subtotal	$102	$ 366	$ 635	$ 640	$ 640	$ 640	$ 640	$ 640	$ 640	$ 640	$ 640
Annual inflation[4]	12	70	167	216	268	322	380	441	506	574	648
Total Annual O&M Costs	$114	$ 436	$ 802	$ 856	$ 908	$ 962	$1,020	$1,081	$1,146	$1,214	$1,288
Landfill-with resource recovery:[5]											
Durham			$ 121								
St. John			142								
Rossman			143								
Subtotal			$ 406	$ 410	$ 410	$ 410	$ 410	$ 410	$ 410	$ 410	$ 410
Annual inflation[4]			107	139	172	206	243	283	324	368	415
Total Annual O&M Costs[6]			$ 513	$ 549	$ 582	$ 616	$ 653	$ 693	$ 734	$ 778	$ 825

1 - Revised O&M costs provided by COR-MET for 10-year operating period, 1976/77 through 1985/86. No adjustment made in O&M costs for disposal at 85 percent of generated quantities.
2 - Estimate for O&M based on five-month period, 1977/78 cost.
3 - Estimate for O&M based on seven-month period, 1977/78 cost.
4 - O&M projections based on annual inflation factor of 6 percent per year from 1973 base cost.
5 - Landfill O&M costs for resource recovery provided by COR-MET based on reduced personnel and cover requirements with 70 to 80 percent material recovery.
6 - No reduction in landfill costs assumed for 1975/76 and 1976/77 fiscal years.

All capital costs for the milling center, transport and landfill elements are shown in Revised Table 11. The initial capital costs for the modified program are:

System Element	Grant Amount (30%)	Local Amount (70%)	Total
Milling centers	$3,561,000	$ 8,310,000	$11,871,000
Transport	552,000	1,287,000	1,839,000
Landfill	662,000	1,544,000	2,206,000
Total	$4,775,000	$11,141,000	$15,916,000

Both grant and local amounts are proposed to be met from the DEQ grant/loan program. The grant amount is $3.3 million less than for the original program, and the loan amount is $7.6 million less.

Two long term obligations are recommended to secure the DEQ loans. Each obligation and its allocation by system element are summarized in Revised Table 14. Uniform repayment schedules used in estimating annual program costs are shown in Revised Table 14-1.

Revised Table 15 shows the resulting annual capital costs for the three system elements, including needed equipment deposit reserves.

Operation and maintenance costs for the three system elements are shown in Revised Table 18. Costs are as estimated by COR-MET for the 10-year projection period, with an allowance added for inflation. Reduced landfill costs that may result from the potential 70 to 80 percent reduction in waste quantities by resource resource recovery are also shown.

Replacement equipment costs are not reflected in Revised Table 9 because first generation equipment serves through 1985/86. As equipment is replaced on a lease-purchase basis after 1985/86, annual costs will increase in proportion to the costs originally shown in Table 9.

Annual lease requirements reflect the following changes:

1. Deletion of the Durham landfill lease cost because the site is scheduled for purchase.

2. Inclusion of the compensation payment to the City of Portland for the St. John landfill.

The proposed payment to the City of Portland includes an annual interest payment of $13,000 per year throughout the life of the site for the city's $261,000 investment in land, and an annual payment of $7,000 per year over a 10-year period to repay the city's $51,000 investment in fixed facilities. The estimated $60,000 annual site lease for the Rossman landfill was not revised and remains in the annual lease requirement.

PROGRAM REVENUES

The capacity charges and gate fees needed to meet annual program costs decrease for the modified regional program.

For purposes of the modified program, capacity charges are based on recovering all costs incurred in moving wastes from milling centers to the landfills, rather than on identified savings in haul cost. The modified program will still serve to reduce haul costs because franchised collectors and other users will transport wastes shorter distances than at present. However, the haul cost savings projected in Tables 20 and 21 are not valid for the modified program. When final site selections have been made, the relationship between capacity charges and haul cost savings should be rechecked. With the exception of the North Portland and Rossman milling centers, haul cost savings are anticipated to equal or exceed recommended capacity charges.

Revised Table 23 shows the quantities used to calculate capacity charges, transport surcharges, and gate fee revenues. Capacity charges are based on purchase of capacity by haulers of 90 percent of the waste delivered for processing. Transport surcharges apply to the remaining 10 percent of the waste.

Revised capacity charges and transport surcharges are allocable to each milling center as follows:

Fiscal Year	North Portland	205 North	East Washington	Rossman	Regional Totals: Capacity Units[1]	Regional Totals: Revenues By Charge
Capacity Charges						
1975/76	---	---	$1,800	---	64	$ 115,000
1976/77	$1,100	$2,200	1,900	$400	277	418,000
1977/78	1,200	2,300	2,000	500	548	818,000
1978/79	1,300	2,400	2,100	600	563	910,000
1979/80[2]	1,400	2,500	2,200	700	578	992,000
1980/81	1,450	2,550	2,200	700	593	1,034,000
1981/82	1,500	2,600	2,200	700	610	1,075,000
1982/83	1,550	2,700	2,250	750	626	1,144,000
1983/84	1,600	2,800	2,250	750	643	1,197,000
1984/85	1,650	2,900	2,250	800	660	1,252,000
1985/86	1,700	3,000	2,300	800	677	1,326,000
Transport Surcharges						
1975/76	---	---	$2.20	---	---	$ 15,000
1976/77	$1.40	$2.50	2.20	$0.70	---	67,000
1977/78	1.40	2.50	2.20	0.70	---	124,000
1978/79	1.40	2.50	2.20	0.70	---	129,000
1979/80[2]	1.40	2.50	2.20	0.70	---	132,000
1980/81	1.45	2.55	2.20	0.70	---	138,000
1981/82	1.50	2.60	2.20	0.70	---	144,000
1982/83	1.55	2.70	2.25	0.75	---	153,000
1983/84	1.60	2.80	2.25	0.75	---	160,000
1984/85	1.65	2.90	2.25	0.80	---	167,000
1985/86	1.70	3.00	2.30	0.80	---	177,000

1 - Figures based on recommended 1,200 tons/year capacity unit.

2 - Figures increase after 1979/80 to provide revenues equal to projected transport costs.

REVISED TABLE 23
ESTIMATED SOLID WASTE PROCESSED BY MILLING CENTER[1]
(000 TONS PER YEAR)
REGIONAL PROCESSIBLE SYSTEM

Year	North Portland	E Washington	205 North	Rossman	Total
1975/76	---	85[2]	---	---	85[2]
1976/77	55[2]	145	85[2]	85[2]	370[2]
1977/78	139	192	190	210	731
1978/79	140	201	202	208	751
1979/80	141	209	206	215	771
1980/81	143	218	211	219	791
1981/82	145	227	215	226	813
1982/83	146	236	220	233	835
1983/84	148	245	224	240	857
1984/85	150	255	229	246	880
1985/86	152	265	233	253	903

1 - 85 percent of generated quantities.
2 - Estimate for tons processed during start up period.

SUMMARY OF REVENUES AND EXPENDITURES

As shown in Revised Table 24, an initial subscriber gate fee of $6.50 per ton is required for the modified program. This is $1.00 per ton less than the original program. The $6.50 per ton gate fee, combined with recommended capacity charges and non-subscriber transport surcharges, would meet all estimated program costs without reliance on income from resource recovery.

RESOURCE RECOVERY BENEFITS

Direct benefits include income from resource recovery and savings in landfill operation and maintenance costs. Indirect benefits will also be realized by deferring capital investment in landfills to replace those used initially.

Net income from sales of recovered materials can be used to reduce gate fees. The potential gate fee reductions shown in Table 25 for corrugated and ferrous materials remain valid. The potential gate fee reduction from air separation is now $2.60 per ton of processed waste. Landfill operation and maintenance cost reductions that may result from resource recovery range from $0.40 per ton of processed waste in 1977/78 to $0.50 per ton in 1985/86.

The total potential gate fee reductions from resource recovery are:

	Potential Gate Fee Reduction Per Ton of Processed Waste[1]		
	Revenues	O&M Savings	Total
Corrugated	$0.75	(2)	---
Ferrous	$0.25 to $1.30	(2)	---
Air separation	$2.60	(2)	---
	$3.60 to $4.65	$0.40	$4.00 to $5.05

1 - Figures rounded to nearest $0.05.
2 - Operation and maintenance savings not allocated to each recovery program.

The resulting gate fees required to support the modified regional program, with all expected resource recovery, will be in the order of $1.50 to $2.50 per ton of processed waste.

REVISED TABLE 24
SUMMARY OF ANNUAL REVENUES AND EXPENDITURES ($000)
REGIONAL PROGRAM

Year	Gate Fee Per Ton Subscriber	Revenues: Capacity Charges	Revenues: Transport Surcharge	Revenues: Gate Fee	Revenues: Total	Total Annual Program Requirements	Net Revenue	Cumulative Net Revenue[1]	Reserve Requirement
1975/76	$6.50	$ 115	$ 15	$ 553	$ 683	$ 783	$(100)	$ (44)	$ 130
1976/77	6.50	418	67	2,405	2,890	2,545	345	360	490
1977/78	6.50	818	124	4,752	5,694	4,699	995	1,418	1,203
1978/79	6.50	910	129	4,882	5,921	5,559	362	1,847	1,849
1979/80	6.50	992	132	5,011	6,135	5,929	206	2,124	2,001
~~1980/81~~	~~6.50~~	~~1,034~~	~~138~~	~~5,142~~	~~6,314~~	~~6,313~~	~~1~~	~~2,200~~	~~2,157~~
1981/82	6.75	1,075	144	5,488	6,707	6,620	87	2,366	2,219
1982/83	6.75	1,144	153	5,636	6,933	6,929	4	2,454	2,270
1983/84	7.00	1,197	160	5,999	7,356	7,257	99	2,642	2,325
1984/85	7.00	1,252	167	6,160	7,579	7,606	(27)	2,710	2,383
1985/86	7.25	1,326	177	6,547	8,050	7,946	104	2,914	2,415

1 - Includes franchise fee revenue of $56,000 for 1975/76 escalated at 6 percent per year.
2 - One year debt service plus two months administrative, lease and operation and maintenance costs.

As compared to current rates at the St. John landfill, the increase in regional charges are:

	Compacted Wastes			
	Monthly Charge			
	Per CY	CY	32-Gal. Can	Loose Wastes Per CY
	500 lb.	225 lb.	35-40 lb.	250 lb.
Current rate at St. John	$0.70	$1.37	$0.21	$0.40
Increase without resource recovery*	+0.93	+1.80	+0.28	+0.41
Increase with resource recovery*	-0.32	-0.64	-0.10	-0.21

* Capacity charges and transport surcharges are not included; increases based on current St. John rates.

As noted in Chapter 4 of this report, resource recovery at the present material prices estimated by the engineer can offset the additional costs of introducing a milling and recovery system as soon as markets are developed for the full volume.