

**LU-24-027 IN-PERSON TESTIMONY
SUBMITTAL COVER SHEET**

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Testimony Rebuttal: "Consensus Is Not Truth"

By Marcy Follett

14605 Corvallis Rd

Monmouth OR 97361

Owner in the affected area

From the time Coffin Butte was created, it was intended as a local landfill—part of a national effort to eliminate our dependence on landfills altogether. Agreements were made with the public after full participation. In the 1970s, we made real progress in reducing, recycling, and reusing. That momentum has been reversed.

1. Oregon's Surrender of Sovereignty

Today, Oregon has surrendered its sovereignty in the area of recycling. The passage of the Plastic Pollution and Recycling Modernization Act handed governance over to a cooperative of corporations, not the people. This is not just policy—it's a structural shift in power.

2. Franchise Agreement Reversal

The original franchise agreement for Coffin Butte was so strong it was included in the EPA's textbook on how to write a franchise agreement. Today's franchise agreement is the opposite: it removes limits, removes accountability, and removes the public from the process.

3. False Justification Through Past Actions

It has been said that past actions justify and even dictate approval of this CUP. That may be true—if those actions occurred in an open, unsteered forum. But that is not what we had. The BCTT process was steered. The public record was incomplete. Foundational documents were

erased or ignored. The Chemeketa Region Solid Waste Group documents were first evidence foundational.

4. Home Rule and Procedural Integrity

The trend we are on may support the state's agenda, but we are a home rule county. We do not govern by trend—we govern by truth. Commissioners are being told what they can and cannot consider, what they can and cannot think. They are being warned to make a decision that avoids appeal. But appeal is not the measure of justice.

5. A Call to Honor

Our soldiers gave their lives to ensure our freedom. That freedom includes the right to govern ourselves, to protect our homes, and to reject corporate capture. Even if commissioners had a role in steering this process, now is the time to correct course. The end result, if this CUP is approved, will not be good. It will be irreversible.

Final Statement

Do not approve this CUP. Do not entrench Republic Services. Do not erase our history. Do not surrender our future.

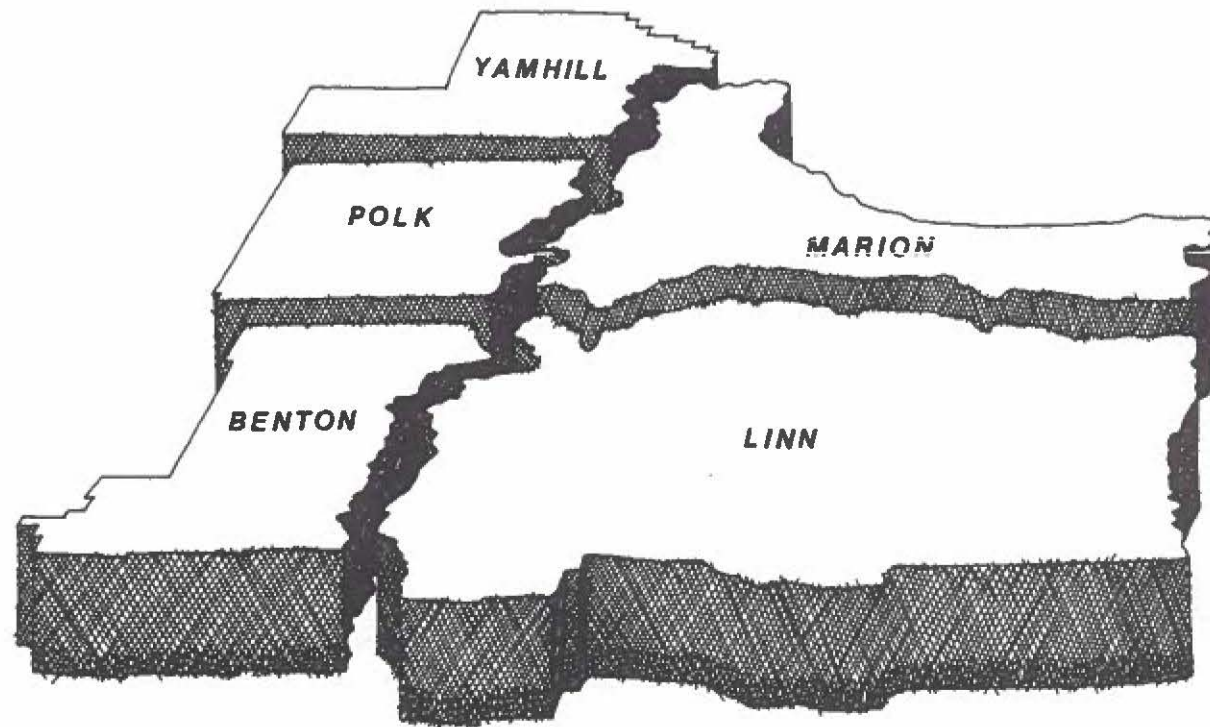




Vernon Schwik

Chemeketa Region Solid Waste Management Program

Technical Report



Stevens, Thompson & Runyan, Inc.
Engineers / Planners

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**TO: Five County Boards of Commissioners
respective City Councils, and
Citizens of the Chemeketa Region**

We are pleased to present you the Chemeketa Region Solid Waste Management Plan. This Plan is the result of considerable research, study, deliberations, negotiations and compromises, concerning the problems of development of a Solid Waste Management Plan for the area comprising Benton, Linn, Marion, Polk and Yamhill Counties and the cities and citizens residing in this great area.

Following more than two years of data gathering, feasibility studies, preliminary engineering by a local technical staff and the consulting firm of Stevens, Thompson & Runyan, Inc., assistance from local government, state agencies, and the private solid waste collection and disposal industry, private citizens and many hours of deliberations and study by the Chemeketa Region Board of Directors, the Board has adopted a Plan that will serve as a guide for development of a viable solid waste management system for the five-county Region.

As the Plan is implemented through various interrelated measures and agreements between local government agencies and/or the private solid waste collection industry, conditions and values will change and the Plan must be revised and updated

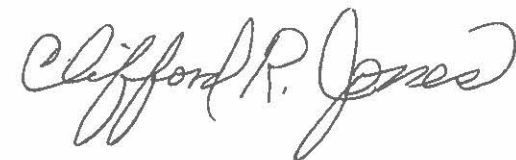
to take advantage of the rapidly changing technology that is continually appearing on the horizon of the solid waste management field.

All those who have shared in the Program, along with interested citizens, will be asked to review and update the Plan and to continue to participate in the decisions toward implementation of the solid waste management system.

The Plan is the first step in solving the problems in solid waste management. Ongoing concentrated efforts by all governments and the private industry must continue in order to provide the best economical and efficient system for utilization and final disposal of solid waste in a manner that makes sense to the citizens of the Chemeketa Region.

Respectfully,

Chemeketa Region Board of Directors

A handwritten signature in black ink, reading "Clifford R. Jones". The signature is written in a cursive, flowing style with a large, prominent "C" at the beginning and a long, sweeping underline.

Clifford R. Jones, Board Chairman

RESOLUTION OF ADOPTION

WHEREAS, the Chemeketa Region Solid Waste Management Program is a cooperative venture of Benton, Linn, Marion, Polk and Yamhill Counties; and

WHEREAS, the members of the Chemeketa Region Solid Waste Management Board of Directors have cooperatively conducted a study of solid waste management activities in the Region; and

WHEREAS, the Chemeketa Region Staff and the professional engineering firm of Stevens, Thompson & Runyan, Inc., have completed said study with recommended short- and long-range plans for solid waste management within the Chemeketa Region; and

WHEREAS, the Plan consists of 3 printed volumes, Volume I, Summary; Volume II, Technical Report; and Volume III, Appendix.

NOW, THEREFORE, The Chemeketa Region Board of Directors hereby adopts and approves aforesaid three volume plan dated November, 1974, and further orders that said plan be submitted to the member governments for their consideration and adoption.

Dated this 6th day of
November, 1974.

Chemeketa Region Board of Directors



Clifford R. Jones, Board Chairman



Stevens, Thompson & Runyan, Inc.

Engineers / Planners

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1920

Portland
Seattle
Boise
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PT-916.131

November 1, 1974

Board of Directors
Chemeketa Solid Waste Region
220 High Street, N. E.
Salem, Oregon 97301

Gentlemen:

Transmitted herewith is the final report of a "Solid Waste Management Plan" for the Chemeketa Region. The report is presented in the following three volumes:

Volume I	— Summary Report
Volume II	— Technical Report
Volume III	— Appendix

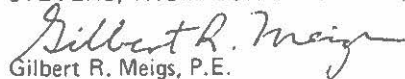
It has been reviewed by the franchised collectors, the Oregon State Department of Environmental Quality, each member county and various other committees and organizations. The report has incorporated all of the Board's recommendations and policy decisions into a workable Recommended Plan with the objective of regional resource recovery.

It has been a pleasure to assist the Chemeketa Board and the member County Boards in the preparation of a comprehensive plan which offers an action plan and guide to effective management of regional solid waste problems. The plan will guide a coordinated regional program to recover solid fuel from mixed solid wastes and to provide for proper disposal of residues or unprocessed wastes.

Thank you for the opportunity to assist the Chemeketa Region in this endeavor. Please do not hesitate to contact us if we can be of further assistance during implementation of this program.

Very truly yours,

STEVENS, THOMPSON & RUNYAN, INC.


Gilbert R. Meigs, P.E.
Senior Vice President

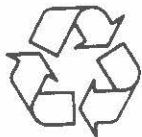
VOLUME II

technical report

A society in which consumption has to be artificially stimulated in order to keep production going is a society founded on trash and waste, and such a society is a house built upon sand.

Dorothy L. Sayers
in *Creed or Chaos*

This report was prepared by the Chemeketa Region with the technical assistance of Stevens, Thompson & Runyan, Inc. It was financed, in part, through grants from the Oregon State Department of Environmental Quality and the U. S. Environmental Protection Agency under Grant No. 1-G05-EC-00070-01, and in-kind services of local government, solid waste industry and civic groups.



Text for this report has been printed on
100% recycled paper.

Chemeketa Solid Waste Region
220 High Street, N. E.
Salem, Oregon 97301

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5505 S. E. Milwaukie Avenue
Portland, Oregon 97202

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PREFACE

SCOPE OF THE REPORT

This report presents an initial and long-range solid waste management plan for the Chemeketa Region. It provides a record of present solid waste management practices and develops a 20-year plan which will enable the five counties and 48 municipalities in the Region to meet their future waste disposal needs.

The plan was based upon data collected over a two-year period from 1971 to 1973 primarily through interviews with collection and disposal site operators and a local staff review of waste disposal practices. In most instances, estimates were made because of the lack of adequate or reliable measurements; financial resources were not available to provide detailed measurements. The recommended facilities should be considered to represent typical systems which will, in all cases, have to be verified by preliminary design.

The report was limited in scope with regard to evaluation of collection and home separation programs. It is intended primarily to present a plan selected by the Chemeketa Region for management of transfer, processing, and disposal elements of solid waste generated in the Region. The work program and budget under which the plan contained herein was developed has limited functions of both the consultant and the Chemeketa staff primarily to these

areas. This report essentially incorporates existing private industry collection and other solid waste management functions. It is beyond the scope of this report to evaluate in detail any of the recent concepts in source reduction, source separation, and collection.

A great deal more technical information than is contained in this report is available in the Chemeketa Region or specific county offices. The reader is encouraged to inquire further regarding detailed information which, because of volume and cost, has not been published in the Technical Report or Appendix. Selected references, essential to the future implementation, are listed at the end of this report.

CONSULTANT AND STAFF RESPONSIBILITIES

Responsibility for the various tasks in the preparation of the solid waste management plan contained herein was shared between Chemeketa staff and the consultants.

The staff was responsible for gathering data about present solid waste management practices, evaluating resource recovery activities, projecting solid waste quantities, estimating site needs and preparing feasibility studies for rural local transfer or disposal site facilities. Additional activities of the staff essential to preparation of the plan included coordination with state,

federal and local government and the solid waste industry; evaluation of administrative and legislative needs; and development of a public relations program. Many other staff functions during the study period were also important to the overall regional solid waste management program: manpower training, recycling promotion, and evaluation of new equipment or systems.

Consultant responsibilities included preparing feasibility studies for major regional landfills and heat recovery systems, estimating costs for urban or regional facilities, evaluating regional transfer and resource recovery (processing) systems, providing general technical assistance to the staff, preparing a recommended implementation program and publication of the final report. Feasibility reports prepared during the study period were published under separate cover. Assistance in coordination with state, federal and local government and the solid waste industry was a continuing responsibility of the consultant. Assessment and application of the best available technology was a general consultant responsibility. When requested, overall guidance to the staff and the Board was provided by the consultant on specific subjects.

It should be noted that the recommendations contained herein are those of the Chemeketa Region Board of Directors. Consultant services were utilized only to

the extent described above to advise the Chemeketa staff and the Board on specific technical matters. The recommendations reflect a composite of local policies, regulatory guidelines, technical considerations, and various other constraints.

ACKNOWLEDGEMENTS

Acknowledgement is given to the many individuals, agencies and organizations which have played important roles in developing a solid waste management plan for the Chemeketa Region. Much time and effort was devoted beyond that normally required in order to devise a better system of waste disposal and preservation of the Region's natural resources. It has been with a real spirit of cooperation and a hope for a better future that those acknowledged below have contributed their efforts.

Chemeketa Region Board of Directors

Cliff Jones, Polk County
Commissioner—Chairman
Jess Howard, Yamhill County
Commissioner—Vice
Chairman
Mel Hawkins, Benton County
Commissioner
Vern Schrock, Linn County
Commissioner
Pat McCarthy, Marion County
Commissioner
Meredith Mills, Salem
Councilman

Bob Jones, Albany
Councilman
Aaron Mercer, Dallas
Councilman
Lyle Winters, Lebanon
Councilman
Bill Achoff, Assoc. Oregon
Industries
Sharon Fatland, League of
Women Voters
C. S. Sherman, Marion County
Sanitarian
Roger Emmons, Oregon Sanitary
Service Institute

Chemeketa Project Staff

Funding and Technical Assistance
Oregon Department of
Environmental Quality
Bureau of Governmental
Research, University of
Oregon
Soil Conservation Service, USDA
U. S. Environmental Protection
Agency
Mid-Willamette Valley Air
Pollution Authority

Informational and Advisory Assistance

Oregon Sanitary Service Institute
The Solid Waste Industry of the
Chemeketa Region
U. S. Forest Service
Oregon Department of Forestry

Center for Population Research
and Census, Portland State
University
Associated Oregon Industries
Council of Governments,
Districts 3 and 4
League of Women Voters

Consultants

Stevens, Thompson &
Runyan, Inc.
Bartle Wells Associates (Financial
Subcontractor)

Special recognition should be given to the many Model Plan Committee members who have served without compensation and in addition to other duties. The Committee's early efforts were undertaken at a time when there was little public interest in solid waste management. For those important initial accomplishments special appreciation is due. Of the 130 members, the following subcommittees are acknowledged:

Public Relations—Sharon Fatland,
Chairman
Recycling—C. S. Sherman, Chairman
Finance—Cliff Jones, Chairman
Management Systems—Dick Lucht,
Chairman
Legal—Roger Emmons, Chairman



introduction
1

In April 1970, a group of interested persons from Benton, Linn, Marion, Yamhill and Polk Counties met to begin finding a solution to the solid waste management problems common to the five counties. These individuals conceived of a regional approach to solid waste management and their efforts led to the formation of a planning group known as the Model Plan Committee. This committee was ultimately composed of 130 members representing city, county, state and federal government; the solid waste industry; interested groups and businesses; and the general public. Acting through various subcommittees and the Marion County Department of Public Works, the Model Plan Committee completed an initial plan and formed the basis for creation of the "Chemeketa Region," an intergovernmental solid waste planning program. The U. S. Environmental Protection Agency supplied an initial grant during 1972 for the preparation of a solid waste model plan by the Chemeketa Region. A subsequent DEQ grant has enabled the program to continue to the present date.

During the period from 1971 to the present, specific accomplishments of the Chemeketa Region can be cited in the categories of planning, administrative and legislative activities and improved solid waste management practices. There have been notable administrative and legislative accomplishments related to the Region in

its three years of operation. Development of regional cooperation in solid waste management has been an important intergovernmental accomplishment. Another notable accomplishment has been preparation of a model franchise ordinance which has been adopted by the Region Board of Directors and at the present time is being considered for adoption by counties and cities in the Region. Also during the three-year period, specific improvements in solid waste facilities or operations have been implemented. These improvements have been, primarily, closure of inadequate disposal sites, upgrading of existing sites, establishment of new sanitary landfill sites and recycling activities.

An initial planning program funded through the EPA grant and in-kind services resulted in a draft report for a regional solid waste management program. In-kind services were furnished by Linn, Benton, Marion, Polk and Yamhill Counties and the Oregon Sanitary Service Institute. That report, published as a draft in March 1973, provided much of the background information needed to prepare the present plan. Subsequent evaluation of existing solid waste practices and three alternative regional plans has been completed through both Region staff and contractual services. These evaluations together with the recommended plan and implementation program are contained in this report, which is the culmination of all

previous solid waste planning activities in the Region. After adoption by local government, implementation of the recommended plan should follow a more fully coordinated regional approach.

The report is organized into five chapters. Chapter I describes the background of the study, identifies the goals and objectives and delineates the study area; Chapter II summarizes the guidelines and requirements of federal, state and local regulatory agencies as applicable to solid waste management in the Region; Chapter III documents present solid waste management practices in the Region; Chapter IV projects the solid waste management needs, evaluates alternative management plans and selects a recommended plan; and Chapter V recommends an organizational and financial program to implement the plan. A summary report and an appendix have been published separately.

GOALS AND OBJECTIVES

It is the primary goal of this program to develop a regional plan to meet both short- and long-range needs for safe, efficient and sanitary storage, collection, transportation and disposal of solid wastes, and to increase to the maximum the salvage, reclamation and reuse of materials from the solid waste stream.

Several objectives were set forth at the onset of this program to insure that the primary goal was achieved. They are:

- Insure development of an economical plan with maximum economy of scale and the least risk of investment capital.
- Insure development of a plan which will enhance conservation of land or natural resources with minimum consumption of energy and maximum resource recovery.
- Insure development of a plan which enhances public acceptance of an improved solid waste management program.
- Insure development of a plan which has the least possible adverse environmental impact.
- Insure development of a reliable and flexible system which complies with regulatory requirements and provides opportunities for implementation by industry.

It was recognized that it was unlikely that one system or plan could achieve all of the above objectives. Selection of a recommended plan, after evaluation of the alternatives applicable to the Region, would be based upon how completely the new management program would achieve the objectives initially established and would recognize the remaining objectives as future goals.

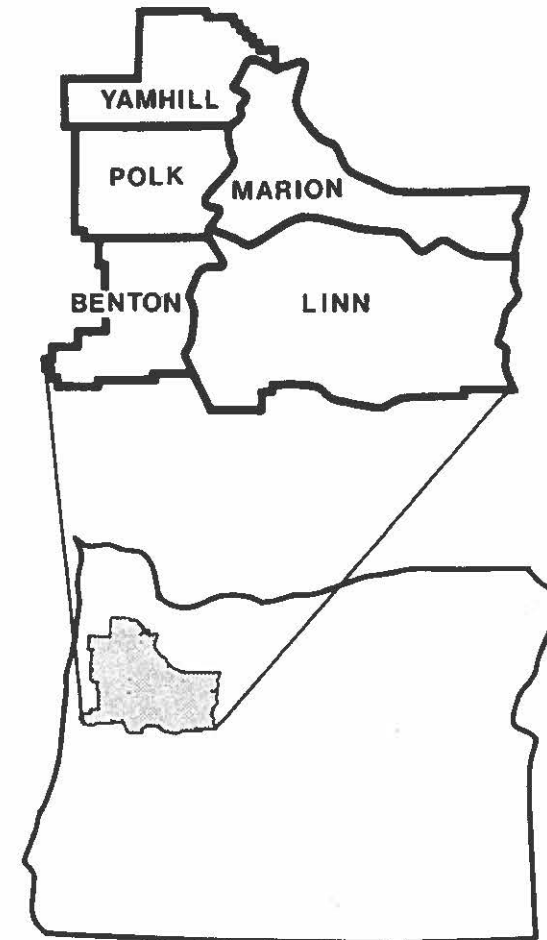
STUDY AREA

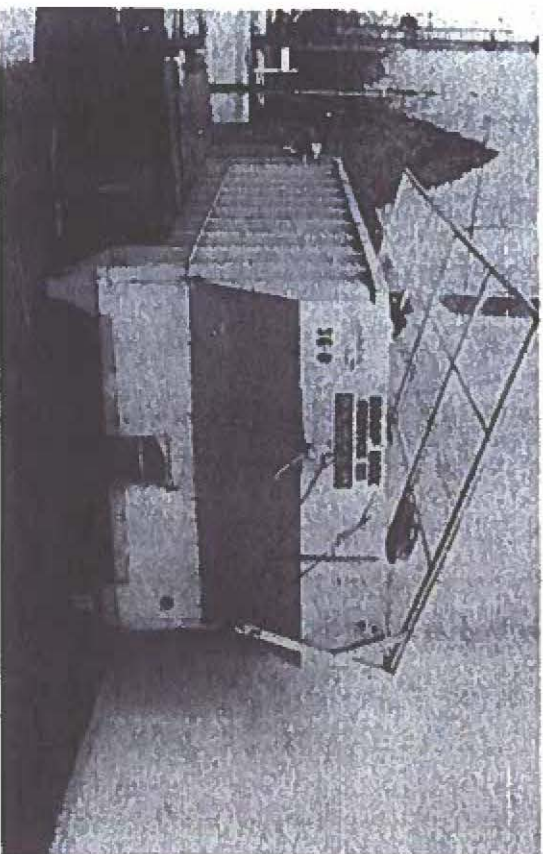
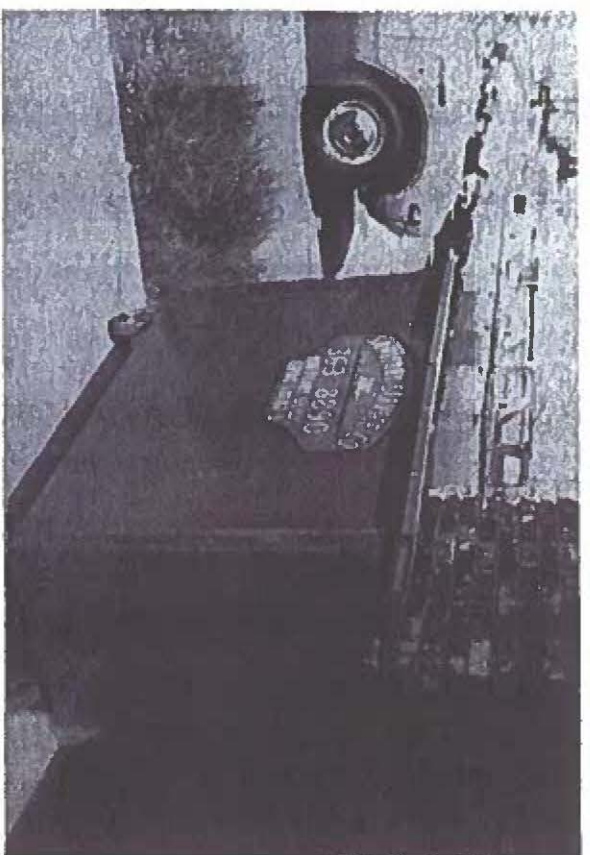
The Chemeketa Region encompasses Benton, Linn, Marion, Polk and Yamhill Counties in northwestern Oregon. Almost all of the Region's 5,500 square miles are within three major drainage subbasins: the Coast Range, Santiam and Pudding River drainages. These three basins collectively make up the "Middle Subarea" of the Willamette River Basin.

The Willamette Valley is the most prominent physical feature of the Region. The Valley supports a wide variety of agricultural activities, as well as being the location for major urban settlements which sustain a wide variety of commercial and industrial activities. Of the total Region acreage, about 60 percent is productive forest land. Major recreational areas are also located in the Region.

Nearly half of the Region's 1973 population of 382,500 resides in Marion County. The Region has 18 percent of Oregon's population and six percent of the state's land area. Major urbanizing areas of the Region are Corvallis in Benton County; Albany, Lebanon and Sweet Home in Linn County; Salem and Woodburn in Marion County; Dallas and Monmouth-Independence area in Polk County; and the McMinnville and the Newberg-Dundee areas in Yamhill County.

**FIGURE I-1
Vicinity Map**





**regulatory
guidelines
&
requirements II**



FEDERAL

The first major legislation dealing specifically with solid waste management was the Solid Waste Disposal Act of 1965. The objective of this act was to provide for new technological research and development in solid waste management and, in addition, for federal grants to state and local government solid waste projects. This Act was amended in 1970 (Resource Recovery Act), continuing with the same objective, but emphasizing conservation of natural resources through solid waste recovery and recycling.

In 1970, the National Materials Policy Act declared it national policy to enhance environmental quality and conserve materials by efficient utilization of resources and technical means. The Act created the National Commission of Materials Policy to investigate this policy, including recycling, reuse or self destruction of materials.

Two other federal acts—the National Environment Policy Act of 1969 and the Environmental Quality Improvements Act of 1970—provide overall federal government environmental improvement goals and policies relative to solid waste.

Agencies involved in solid waste on a federal level include:

Environmental Protection Agency

(EPA): The Environmental Protection Agency is the major federal agency involved in solid waste management planning. Shortly after passage of the Resource Recovery Act in 1970, EPA began formulating guidelines for solid waste management and establishing requirements for land disposal sites. These requirements insure that design, construction and operation of disposal sites meet environmental standards for the area in which they are located. These guidelines are mandatory for other federal agencies and are recommended to state and local agencies. (12)

Specific guidelines for federal agencies require disposal in sanitary landfill only, rather than open dumps or modified landfills as in the past. Guidelines generally set sanitary landfill as a minimum standard of performance for mixed refuse disposal sites. For western Oregon, major upgrading of sites is required to enable year-round daily cover. Exceptions to this requirement would include the use of modified landfills for disposal of demolition wastes and limited operation sanitary landfills in remote areas.

U. S. Bureau of Land Management

(BLM): The Bureau of Land Management is responsible for the management of surplus federal land sales and leases relative to its use by public agencies as refuse disposal sites. This agency also establishes regula-

tory guidelines for this use. In many cases, BLM allows sanitary landfills on its land. This has a significant effect on many sites in Oregon because of the large amount of BLM land, which frequently is land of a type not usable or desirable for purposes other than open space, grazing or waste disposal. Waste disposal can be compatible and have beneficial uses, however, because solid waste can reclaim otherwise useless or marginal land.

U. S. Forest Service (USFS): This agency provides regulations for the collection and disposal of refuse from recreational areas and regulates timber wastes in the management of national forests. In addition, the USFS administers the use of its land, some of which may be used as disposal sites. In many instances, the Forest Service establishes the sanitary landfill as the minimum performance for use of USFS lands; generally, use of sites by USFS is limited to sanitary landfills only, whether on Forest Service land or not. This also adds impetus to upgrade sites.

U. S. Bureau of Mines: The Bureau of Mines is involved in solid waste management from the standpoint of solid waste utilization in metallurgical or chemical processes.

U. S. Army Corps of Engineers: The Corps deals with solid waste removal and disposal in navigable waters and issues per-

mits for work on same. The result is limited control over use and establishment of floodplain disposal sites. The Corps also aids in evaluation of flood control measures required for existing sites in floodplains. This agency may restrict disposal site establishment or operation near navigable waters to prevent erosion during flooding or diversion of the established flow or channel.

Soil Conservation Service (SCS): The SCS is considered to be the federal agency most knowledgeable on soils and is involved in solid waste with regard to performing soils surveys for local governments. It has no regulatory authority, but its technical evaluations have considerable impact upon potential use of an area for disposal sites and methods of development or use of existing sites.

U. S. Department of Labor: The U. S. Department of Labor is presently establishing safety standards for solid waste collection, transport, and processing equipment. Establishment of the standards by the Occupational Safety and Health Administration is expected to result in a significant impact upon the design and operation of solid waste systems. Increased costs are likely to be incurred to provide new or additional safety equipment and less efficient—although safer—equipment and operations.

Interstate Commerce Commission

(ICC): The ICC sets rates for rail and truck transport of materials. Because preference is given to primary or natural (raw) materials rather than materials recovered from wastes, movement of secondary materials and wastes is greatly affected. Lower rates for shipment of secondary materials will have the greatest impact upon implementation of resource recovery which is not subsidized with public funds or volunteer labor. This inequity favoring primary materials should be changed to at least provide fair and equal treatment which would allow secondary materials to be competitive.

STATE

Under ORS 459.015, it is the policy of the state to establish statewide comprehensive programs for solid waste management, providing advisory technical and planning assistance to local governments. The state also provides for adoption of minimum standards of performance for proper solid waste management and provides authority for counties to establish a coordinated program for solid waste management. Retention of primary responsibility for solid waste management of the local government level and maximizing involvement of the solid waste industry are an expressed intent of the state policy.

On a state level, agencies involved in solid waste management include:

Department of Environmental Quality

(DEQ): As authorized by ORS Chapter 459, the DEQ regulates and prescribes procedures for management of solid waste. It is responsible for developing a long-range statewide management plan and program and for providing technical and planning assistance to local governments in program implementation. The Department promotes research and demonstration of improved and innovative methods of solid waste management. Finally, DEQ is authorized to grant permits for establishing and operating solid waste transfer, processing and disposal facilities.

The Air Quality Division of DEQ regulates noise levels and allowable conditions for the prohibition, when necessary, of open burning so as to maintain air quality and avoid public nuisance. Through its program of air and water pollution control and solid waste management, the DEQ sets the minimum performance standards for solid waste disposal in the state. (13)

Of special interest is the mandate of ORS 459.035 stating that the Department shall provide to local government and the solid waste industry "advisory technical and planning assistance in development and implementation of effective solid waste

management plans and practices and assistance in training of personnel in solid waste management." This statute also requires the DEQ to "assist in surveys to locate potential disposal sites."

Highway Division: This agency is responsible for collection of roadside litter on state highways and for collection of waste from state parks. An additional duty of the Highway Division is to enforce statutory limitations on axle weights of motor vehicles using the public highways. Senate Bill 457 (1973 Legislature) raised the legal load limitations of refuse-hauling vehicles on U. S. and state highways. Previous single axle limitations had been 18,000 pounds and 20,000 pounds for Interstate 5 and U. S. or state highways, respectively. These limitations were raised to 22,000 pounds by Senate Bill 457, for only U. S. and state highways. This weight limitation applies only to rear-loading self-compactor vehicles when loaded with garbage or refuse.

Board of Health

(BOH): Recommendations on hazardous waste disposal site license applications are made by the Sanitary Division of the State Board of Health. Also, the Board of Health assists in evaluation of existing and proposed disposal sites, considering sanitary and health aspects.

State Accident Insurance Fund (SAIF):

The State Accident Insurance Fund is involved in solid waste management with regard to enforcement of the Oregon Safe Employment Act and assistance in safety matters. These requirements result in additional costs for new safety equipment and, in some instances, less efficient—although safer—equipment or operations.

Land Conservation and Development

Commission (LCDC): Statutory authority has recently been given to the Land Conservation and Development Commission to regulate water and sewer facility construction, road construction and site selection for schools and solid waste facilities in certain designated areas of concern. At the present time the extent to which this agency will regulate solid waste facilities has not been defined, however, it is apparent that the agency will have some control over the location of solid waste facilities.

LOCAL

Chemeketa Region

The Boards of Commissioners of Benton, Linn, Marion, Polk and Yamhill Counties and the Linn-Benton and Mid-Willamette Valley Councils of Governments, in 1973, signed resolutions forming the Chemeketa

Region as a solid waste planning body. The Region, headed by a Board of Directors and its staff, is responsible for development of a solid waste management plan on a regional basis. Five county subcommittees handle and provide input for the development of the overall regional solid waste plan. Although these planning functions are not at the present time regulatory, it is anticipated that adoption of a comprehensive plan by local governments will result in guidelines that will, under most circumstances, define future solid waste management responsibilities and activities to be conducted in the Region.

A comprehensive solid waste ordinance (Appendix B) has been adopted by the Chemeketa Region Board of Directors. This model ordinance covers franchising of collection services, disposal sites and septic tank pumpings lagoons; user rate regulations; public responsibility; nuisance abatement and abandoned vehicles; and establishment of a solid waste advisory committee. Transfer and resource recovery activities (utilization) are also covered in the ordinance. The ordinance is now before counties and cities of the Region for consideration and if adopted will repeal any existing county or city ordinance which is in conflict.

Regional Air Quality Control

Authorities: Regional Air Quality Control Authorities are authorized under ORS 449.855 to set standards and enforce rules of the State Environmental Quality Commission (EQC) pertaining to air quality in the Region. Although standards and enforcement activities of a regional air quality control authority must not conflict with the rules, regulations, or standards of the EQC, regulations can have an impact on solid waste management in the local area. The Mid-Willamette Valley Air Pollution Authority (MWVAPA) presently prohibits open burning of wastes, except for limited periods during which yard trimmings may be burned, and regulates design and operation of solid waste incinerators.

Councils of Governments: Councils of Governments (COG's) are involved in solid waste management with respect to coordination and planning functions. The COG's also act to screen applications for public funds to assure regional compatibility and to minimize duplication of effort.

County

Under ORS 459.065, a county is authorized to enter into agreement with any local government or person to plan, establish and maintain operation of a regional solid waste management system and for employment of persons to operate a site owned by the county.

Agencies involved at the county level include:

Board of Commissioners: A county Board of Commissioners is authorized under ORS 459 to regulate solid waste management. Each of the five counties in the Region has a Board of Commissioners which controls solid waste activities through ordinances adopted under ORS 459 and through activities of the State DEQ and State Board of Health. Each Board has adopted an ordinance requiring franchises for solid waste collection and disposal in their respective counties, and has authority under ORS 459 (and other statutes) to acquire and operate disposal sites. Present franchise areas and disposal sites are identified in Chapter III. The Board may obtain land for disposal sites by eminent domain and require franchise fees. Present guidelines of most of the county boards serve to promote use of private or commercial collection and disposal services to the maximum extent possible. In addition, one commissioner from each county is represented on the Chemeketa Region Board of Directors for development of a regional solid waste management plan.

Health Departments: County Health Departments of the Region are involved with solid waste for elimination of health hazards, nuisance abatement, and enforcement of rules of the Environmental Quality Commission. Health Departments may

conduct routine evaluations of existing and proposed disposal sites, and give guidance in overall programs for management of waste. In Benton County this Department is the primary local agency conducting a regulatory program for the abatement of nuisances or health hazards resulting from improper solid waste disposal.

Public Works/Road Departments: County Public Works or Road Departments provide technical assistance for cities of the Region involved in solid waste disposal and may assist the county planning departments or Chemeketa Region in the collection of data or engineering evaluation of solid waste facilities. Public Works Departments in Linn, Marion, Yamhill and Polk Counties have acquired and operated disposal sites for public use and have conducted nuisance abatement programs under county ordinances.

Planning Departments: Each county planning department is involved in solid waste management through land use, zoning, conditional use permits and other planning functions. Data is frequently furnished by county planning departments for use in preparation of local or regional solid waste management plans. Marion and Polk Counties have a comprehensive zoning ordinance dealing with solid waste disposal sites. Marion County also has a special ordinance which allows disposal sites as conditional uses in all zones of the county.

Linn County's zoning ordinance sets forth criteria and standards for solid waste disposal sites as a conditional use permit. Linn County was the first to include transfer stations as conditional use with disposal sites in zones other than the farm zone. Zoning ordinances in Yamhill and Benton Counties permit sanitary landfills as conditional use in six zoning classifications. In addition, the Benton County Planning Commission has under review a zoning ordinance which would permit transfer stations without processing facilities in all zones as conditional uses and would specifically allow processing facilities in industrial zones.

Municipal

The powers of the incorporated areas with regard to solid waste management parallel those of the Counties (ORS 459). Also, a city may acquire land for disposal sites by eminent domain. Most important, however, is that the cities may also require franchises for collection within their boundaries and may also join counties in regional solid waste management programs (ORS 459.065).

In the 48 municipalities within the five-county Region, ordinances and their content vary with the counties'. The enforcement agency is usually the Public Works Department in large cities or other municipal employees in smaller cities. The

comprehensive solid waste ordinance discussed previously is also before the cities for review and consideration for adoption.

Special Districts

Sanitary Districts may be formed, under ORS 450.009, for the purpose of providing sanitation facilities and services.

ORS 450.075 authorizes a sanitary district to maintain and operate disposal sites and solid waste collection and disposal systems in compliance with statutes pertaining to such operation. They may also promulgate regulations controlling solid wastes within their boundaries. A city must consent to inclusion in a sanitary district for any purpose.

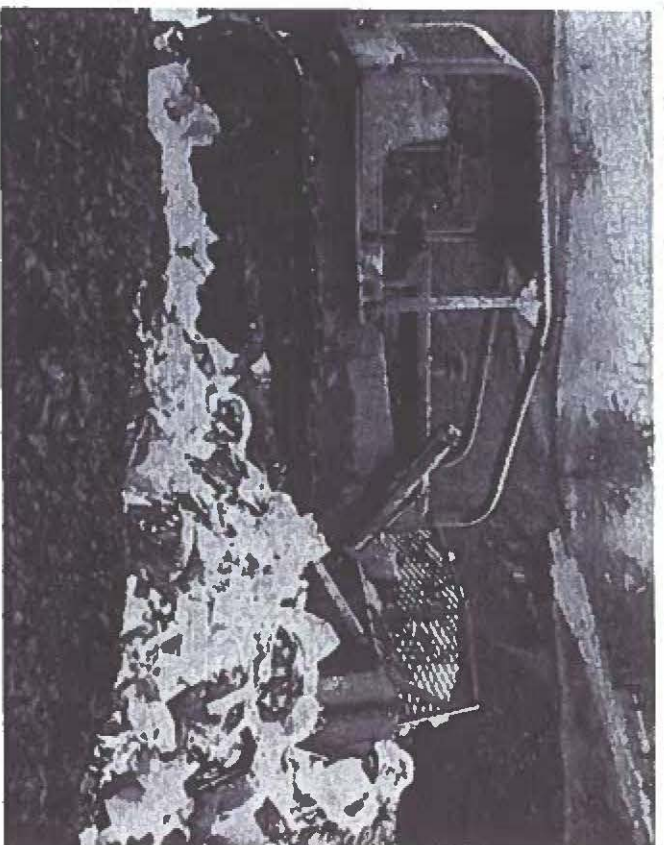
Sanitary Authorities are authorized, under ORS 450.820, to "maintain and operate disposal sites and garbage collection systems in compliance with ORS 495.005 to 459.285 and subsections (1), (2) and (3) of ORS 459.992." A sanitary authority may also regulate storage, collection, transportation and disposal of solid wastes within its boundaries. It has broad powers to carry out any other act for which purpose the authority was formed and may condemn property for disposal sites. A city must also consent to inclusion in a sanitary authority.

County Service Districts may be established under ORS 451.010, regarding solid waste

disposal. When authorized, the county court may construct, maintain and operate solid waste disposal facilities within these service districts in the county. Under this statute, the Board of Commissioners would be the governing body and may have a manager or technical staff to conduct day-to-day operations of the district.

The Board of Commissioners, acting as the directors of the district, may also adopt and enforce regulations for storage, collection, transportation and disposal of solid waste within the district. Regulations so adopted are supplemental to requirements of the State Environmental Quality Commission. After adoption of a solid waste master plan, the district may require construction or operation of facilities under its jurisdiction to conform to the master plan. Consent of a city must also be obtained to be included in a county service district.

At the present time, no special districts in the Region own or operate solid waste facilities or systems.



**existing
conditions
III**

BACKGROUND OF THE REGION

Natural and Physical Characteristics

Most of the five-county area is part of the Willamette Basin and consists of three major geological provinces: the Coast Range, the Willamette Valley and the Cascade Range.

TOPOGRAPHY. The Coast Range is composed of irregular ridges and steep slopes generally ranging in altitude from 1,000 to 3,000 feet, although Mary's Peak in western Benton County is over 4,000 feet high.

The Willamette Valley is a very even and regular plain, generally broken only by stream valleys. The valley floor elevations range from 150 to 350 feet. Most of the heavily settled areas of the valley are level, including the Salem, Newberg, McMinnville, Albany and Corvallis areas. In contrast, the valley area in Polk and Yamhill Counties is characterized by gently rolling terrain.

The Cascade Range is composed mainly of sharp ridges, steep slopes and deep canyons. Elevations range from 1,000 to over 6,000 feet, with a few volcanic peaks rising to much greater elevation.

GEOLOGY. The Coast Range province includes western and central Yamhill, Polk

and Benton Counties. This area is characterized by rugged foothills of eroded sedimentary and volcanic rocks underlain by hard sandstones and shales with basalt forming the core of the range. Sedimentary and marine sandstone deposits are found in the Yamhill Valley and in the Dallas and Camp Adair areas. Marine sediments comprise about half the area of western Polk and Benton Counties. The basic igneous rock areas (such as Mary's Peak) generally are not eroded as much as the sedimentary areas, which are characterized by slump and slide hazard, especially in the rainy season.

The Willamette Valley comprises the central portion of all five counties. This broad alluvial plain exhibits very few outcrops of bedrock, although the northern portion has several low ranges, noticeable in eastern Yamhill County. The area is composed mainly of sediments from the Coast and Cascade Ranges.

The Cascade Range forms the eastern border of the Willamette Basin and contains the eastern part of Marion County and central and eastern Linn County. The Range is composed mainly of lava flows of varying ages of which many of the young flows continue to experience slow mass movements creating many slumps and slide areas.

SOILS. Soils information to be considered in a solid waste management program includes suitability for sanitary landfills and the soils capability classification which indicates the optimum uses for soil associations. The latter information is significant in projecting future land uses and solid waste loadings.

There are six general soil association groups located in the Willamette Basin: alluvial bottomland soils, terrace soils, foothills and upland soils, upland soils, loamy mountainous soils and high mountainous soils. At the present time, there are no plans or proposals to establish landfills in the loamy mountainous or high mountainous soils.

Only a few soils series have optimum characteristics for sanitary landfill siting, and many have a large number of unsuitable characteristics. A major limitation in the Willamette Basin is the depth to seasonal water table. With respect to landfills, soil depth and slope are major problems in most of the upland soils, while flood hazards and risk of groundwater contamination are major problems of the lowland soils. Soil texture, surface drainage and stoniness are relatively slight problems in the five-county area.

Detailed information on particular soil types at the various landfill sites was evaluated by the Soil Conservation Service.

The soil conditions of each solid waste site will be discussed in later sections.

CLIMATE. The Willamette Basin has a temperate, subcoastal climate with distinct seasonal differences. There are also pronounced climatic differences relative to elevation. Most of the 63 inches average annual precipitation occurs in the winter months with very little rain occurring in summer. Precipitation intensity increases drastically in both the Coast Range and the Cascade Range. In addition, heavy accumulations of snow in these ranges account for heavy runoff in the spring and summer.

On the valley floor, rainfall averages about 40 inches per year with an average monthly high totalling around 6.6 inches in December to the low monthly average of approximately 0.3 inches in July. Temperatures are moderate, ranging from approximately 67 degrees in July to 39 degrees in January. The heavy precipitation seasons pose the most serious concerns in solid waste management. Landfill covering, leachate and runoff are all significantly affected by the heavy winter precipitation.

HYDROLOGY. Almost all of the area is within three major subbasins: the Coast Range, Santiam and Pudding River drainages. These three basins collectively make up the "Middle Subarea" of the Willamette River drainage area.

The Santiam Subbasin occupies 20 percent of the total Willamette Basin and extends over 2,440 square miles of Linn County and southern Marion County. The major watercourses of the Santiam Subbasin are the North and South Santiam Rivers, the Calapooia River and Muddy Creek. In addition, three major reservoirs are located in the Santiam Subbasin: Foster and Green Peter Reservoirs on the South Santiam River and Detroit Reservoir on the North Santiam River.

The Coast Range Subbasin occupies 15 percent of the Willamette Basin, approximately 1,794 square miles in Yamhill, Polk and Benton Counties. Yamhill County is drained by the South and North Yamhill Rivers, Polk County by tributaries of the South Yamhill, and by Rickreall Creek and the Luckiamute River. Benton County is drained by the Mary's River and Muddy Creek.

Most of Marion County is drained by the Pudding River Subbasin. The major streams include the Pudding and Little Pudding Rivers, Butte, Mill, Silver and Champoege Creeks. The location and evaluation of floodplains is an important process in planning for future development. In particular, the intensity of flood hazard should be estimated for any site selected for the construction of a public facility such as a sewage treatment plant or a sanitary landfill. Generally, floodplain areas per se are

considered particularly unsuitable for sanitary landfill sites because of the increased costs for flood protection. However, in the Willamette Valley, many landfills are located in floodplain corridors. This is generally because of a lack of suitable sites elsewhere. Also, of all the Willamette Basin soil types, alluvial soils in floodplain or terrace areas generally have the fewest limitations for use as landfill sites. The important considerations in evaluating a specific site for landfill suitability would be the frequency and height of flooding.

Benton and Linn Counties have promulgated and are enforcing zoning laws for floodplain developments. The Corps of Engineers is presently cooperating with Marion and Polk Counties and the City of Salem in developing rate structures for federal subsidization of floodplain insurance.

The protection of groundwater quality is extremely important in the Willamette Basin because of the intensive use of this resource for domestic, agricultural and industrial purposes. Leachate from solid waste buried in landfills and surface runoff from open dumps are potential hazards to both ground and surface waters.

A generalized description of groundwater availability and distribution in the five-county area will serve as background to an understanding of the importance of this resource.

Coast Range Subbasin: Much of the Coast Range is impermeable to surface waters and yields little or no groundwater. These impermeable formations underlie the Willamina, Dallas, Falls City, Monmouth, Independence and North Corvallis areas as well as all of western Yamhill, Polk and Benton Counties. The alluvial formations along the Yamhill River and Palmer Creek are aquifers, however, and yield moderate to abundant supplies of groundwater. In central Yamhill County, the depth to groundwater varies from surface to 100 feet, and wells in this formation produce low yields. Along the Yamhill River and Palmer Creek in eastern Yamhill and north-eastern Polk County, the formation yields moderate quantities from wells of various depths. Extensive groundwater discharge or seepage to river flow occurs from this area.

Northeastern Yamhill County (including the Newberg and Dundee area, north-eastern Polk County and West Salem) is characterized by low yields from wells to 250 feet in depth in fractured basalt formations. Domestic wells generally use shallow perched water tables as the main water table is several hundred feet deep.

Floodplain areas of the Willamette River in Yamhill and Polk County and the Luckiamute drainage in southeastern Polk County have high water levels of variable depth due to the influence of the rivers. Wells along the Willamette have high yields from depths of 40 to 70 feet while along the Luckiamute the water is shallower with low yields. In large areas of eastern Benton County, including Corvallis, North Albany and Philomath, the areas along the river have a depth to the groundwater table of 20 feet or less. Wells in the more developed areas not near the river vary from 20 to 140 feet deep.

Pudding Subbasin: In western Marion County, the floodplain areas of the Willamette River are underlain by a shallow variable water table. The central and north central part of the county is underlain by variable perched water tables having a depth ranging from the surface to 10 feet. Wells in the northeast part of Salem and the Cities of Gervais, Woodburn, St. Paul, Donald, Hubbard and Aurora vary greatly in yields and in depths which range from 50 to 500 feet. The southwestern part of Marion County (south of Salem and west of Turner) has a deep water table which is reflected by wells extending from 200 to 500 feet with average yields. Aurnsville, Turner and the area south of Mill Creek have a water table which is quite high and it is also connected to streamflow in the Santiam River.

Most of eastern Marion County including Scotts Mills and west Silverton is an area of low yields at depths of 100 to 300 feet.

Santiam Subbasin: A large portion of western Linn County and southern Marion County (including Albany, Lebanon, Halsey, Brownsville, Sweet Home, Waterloo, Foster Reservoir area, Jefferson, Stayton, Lyons, Mill City and Gates) has wells which vary in depth from 30 to 135 feet, although the depth to water table is generally 10 to 20 feet. Wells in this area vary greatly in yields depending on whether they are located in floodplains or in the uplands areas. The central and eastern portions of Linn County and southwest Marion County have a very deep water table. Well yields are generally low at depths to 350 feet.

MINERAL RESOURCES AND TIMBER. Mining activity in this region has been minor in recent years. There are deposits of bauxite in the Salem hills; quartz-bearing veins including copper, lead, zinc, gold and silver at North Santiam, Marion County and Quartzville and Blue River in Linn County; clays in the King locality and Marion County; and Willamina clay in southern Yamhill County.

Timber is a major industry in the Chemeketa Region. A total of 2,204,000 acres, 60 percent of the Region, is in productive forest land. Of this total,

920,000 acres are publicly owned; 508,000 acres are owned by the forest industry; and 776,000 acres are privately owned. In 1970 there were 980,336,000 board feet harvested in the Region, the majority of which was Douglas fir and western hemlock.

Historically, the forest products industry has produced problems in solid waste management. The wood products industry has always been a heavy producer of wood residues, both production process and non-production process. Generally, production process wood residues are being utilized by the industry because of their economic value in other industrial processes. However, the nonproduction process residues have no economic value and in many instances they are entering the public disposal system.

Social and Economic Characteristics

AREA POPULATION. Population is an essential concern in solid waste management not only to estimate the quantities of solid waste generated but to indicate locations of sources of solid waste which in turn directly affect transportation requirements.

While Oregon is growing generally at the same rate as the Pacific Northwest, the Willamette Valley is growing more rapidly than the state as a whole. For example, the

Table III-1
COUNTY POPULATIONS AND PERCENT CHANGE

	1950	1960	1970
Benton	31,570 (+69.5)	39,165 (+24.1)	53,776 (+37.3)
Linn	54,317 (+78.2)	58,867 (+ 8.4)	71,914 (+22.2)
Marion	101,401 (+34.8)	120,888 (+19.2)	151,309 (+25.2)
Polk	26,317 (+31.7)	26,523 (+ 0.8)	35,349 (+33.3)
Yamhill	33,484 (+27.1)	32,478 (- 3.0)	40,213 (+23.8)
TOTALS	247,089	277,921	352,561

Willamette Valley is only 14 percent of the total state area, but it contains approximately 70 percent of the state population. This density is also reflected in the fact that each of the five counties in the Region has experienced a population increase of over 20 percent in the past ten years.

The latest estimate of existing population in the five-county area is illustrated in Table III-2. This information was prepared by the Center for Population Research and Census at Portland State University in July of 1973. The total population of the Chemeketa Region is therefore estimated to be approximately 382,500.

Table III-2
CHEMEKETA REGION
ESTIMATED POPULATION
July 1, 1973

Benton County	60,900
Linn County	78,100
Marion County	160,600
Polk County	39,500
Yamhill County	43,400
TOTAL	382,500

COUNTY POPULATION. For the county areas, a general pattern of increasing urban densities is evident, as shown on Table III-3. In nearly all cases, the urban density percentage would be significantly higher, since these figures do not include persons living in urbanizing areas immediately around the incorporated limits.

By counties, the general areas of increasing density (mainly unincorporated vicinities of urban places) include the north Marion County corridor and the areas surrounding Salem, the West Salem and Monmouth areas in Polk County; northeastern Yamhill County (especially the McMinnville and Newberg areas), the areas surrounding Corvallis in Benton County, and the Albany area in Linn County.

ECONOMIC CONDITIONS. Historically the Chemeketa Region was founded on an agricultural economic base. It was, in fact, the land which attracted the early settlers to the Willamette Valley. As the Region grew, timber became an additional contribution to the economy. Today the Region contains a diverse economic base. Lumber and agriculture still play important roles, although other manufacturing and nonmanufacturing activities form the majority of the economic base.

Because the Region has a large percentage of manufacturing activities, the economy

Table III-3
URBAN DENSITY POPULATION

	1960	Percent	1970	Percent
Linn County				
Incorporated	26,523	45	34,056	47
Unincorporated	32,344	55	37,858	53
Benton County				
Incorporated	22,402	57	37,284	69
Unincorporated	16,763	43	16,492	31
Marion County				
Incorporated	60,117	50	86,904	57
Unincorporated	60,771	50	64,405	43
Polk County				
Incorporated	13,927	53	20,751	59
Unincorporated	12,596	47	14,598	41
Yamhill County				
Incorporated	17,967	55	23,901	60
Unincorporated	14,511	45	16,312	40

has the ability to remain fairly resilient to fluctuation. Part of this diversity is the result of governmental employment. State government is the major employer with the capital located in Salem. In addition, one of the state's major universities is located in Corvallis.

In the manufacturing base, certain groups are producing wastes which are entering the public stream. As stated previously, the wood products industry contributes both processed and nonprocessed wood residues. The agriculture industry, especially in the food processing activities, produces large volumes of wastes. Also, the manufacturing of trailers, mobile homes, and campers, which constitutes a large industry in the Chemeketa Region, generates large amounts of wood, plastic, and metal scraps that enter public disposal sites.

Employment and Income: The employment picture in the Chemeketa Region is slightly higher than the national level. The annual average, based on 1973 data, was 6.2 percent unemployed. Average income was \$10,111, approximately \$100 above the national average. Although the income levels seem fairly good, 9.7 percent of the families in the Region fall within the poverty level.

Generally, national data seems to indicate that the higher the income level and the more urban the population the greater the

per capita waste generation. The Chemeketa Region can be characterized as rural with major urban concentrations and as having an average income level. Of additional relevance to a solid waste management program is that implementation could be done either with public funds or through private enterprise. Generally, higher income levels indicate the program should be financed from user fees or collection charges rather than public sources. Lower income population is more likely to favor a tax or public-supported system. These categorical divisions by income levels are not always clear-cut, however, because in many instances lower income levels are less likely to vote for any tax supported bonds to finance capital improvements.

Housing: Housing is of major importance, since housing type and location affect the means of collection and disposal. Solid waste collection is more economical and less time consuming in areas of multi-family housing because population densities are higher in these areas than in areas of detached homes occupying large parcels of land.

Although the percentage of single-family dwellings is near 80 percent for the Region, the housing trend has been away from the single-family detached unit and toward the multi-family unit. Furthermore, all indicators point toward increasing multi-family

construction and, therefore, increasing population densities.

Table III-4
HOUSING INFORMATION(1)

	Housing Units	Percent Single Units
Benton	16,615	69.0
Linn	23,905	83.4
Marion	50,597	79.2
Polk	11,705	81.6
Yamhill	13,164	83.7
TOTAL	115,986	79.4

Housing locations will also affect collection and disposal sites. Again, in urban and in rural towns, collection will be easier, since housing units are located relatively close together. However, the location of housing in rural areas on large parcels of land will produce added travel time which in turn increases collection costs.

With the exceptions of Salem and Corvallis, most of the unincorporated areas show housing growth rates similar to their respective counties. Salem and Corvallis, being the two largest urban centers, have far greater growth rates, and these two cities will play an important role in the collection and disposal of solid wastes generated over

the next twenty years. It is also anticipated, through the use of land use controls, that future development will be contained within the expanding urban areas and rural centers of the five-county area as opposed to an increase in strictly rural, low-density housing. This trend should be helpful to the problem of solid waste management.

Another area which affects solid waste management is seasonal housing including vacation homes and migratory housing. Both types of housing are generally at high usage during summer months and, therefore, produce additional solid waste loadings. Migrant housing is usually confined to a relatively small number of sites and should be able to be assimilated into a management program. However, vacation housing will be far more difficult to manage, since it generally occurs on a low-density basis and at some distance from urban centers.

LAND USE AND ZONING. Because of the extensive size of the Chemeketa Region, a variety of landscapes are included which support widely differing land uses. The Willamette Valley with its broad alluvial plain is the most prominent physical feature of the Region. The valley supports a wide variety of agricultural activities as well as being the location for major urban settlements which in turn sustain a wide variety of commercial and industrial activities. Both the Coast Range

and Cascade Range are important because of their contribution to the lumber and forest products industry in terms of commercial timber production. These mountain areas also provide a wide range of recreational opportunities helping to sustain the tourist and recreational economy of the Region.

Each of the counties in the Region has developed land use plans and has enacted zoning in an effort to direct future growth and minimize the effects of conflicts between major land uses. The specific nature of the land uses and zones which affect the individual disposal sites will be discussed later.

The existing character of each county can be summarized as follows.

Benton County: Benton County is essentially a rural county capitalizing on its agricultural and timber lands. Corvallis comprises the major urban area and is the site of Oregon State University.

Linn County: Linn County is also an extensive rural county, again dependent on agriculture and lumber. The Cascades, however, offer a wide variety of recreational opportunities. Major centers of urban population include Albany, Lebanon and Sweet Home. The Albany area, located in the center of the valley, is the largest city and is a dominant industrial base.

Marion County: Although Marion County contains extensive rural areas, it is characterized more as half urban-half rural because of the dominance of the Salem metropolitan area. Besides the Salem urban area, the county contains a number of small cities scattered throughout the valley. Because of this urban character, the county has an extensive commercial and industrial base. Besides land uses associated with urbanization, the county also relies heavily on agriculture and lumbering activities as well as a certain amount of recreational usage.

Polk County: Polk is also a predominantly rural county, experiencing urban and suburban development pressures. Again, agriculture and commercial lumber production are major land uses. Growing urban areas include Dallas, the largest, and the Monmouth-Independence area.

Yamhill County: Because of the proximity to the Portland metropolitan area, Yamhill County is experiencing considerable development pressure. In essence, the county is showing signs of change from a rural county to an urban area, especially in the corridor between McMinnville and Portland. The major urbanizing areas are McMinnville and the Newberg-Dundee area. Outside the Portland-McMinnville corridor, the county still retains its basic rural

character with agriculture and commercial timber production being the predominant land uses.

RECREATION. Consistent with national trends, the demand for recreational facilities in the Chemeketa Region has been increasing rapidly due to the rising income, increased leisure time and high degree of mobility of the average working American. As the population increases and as tourism expands, the demand for an additional number and variety of facilities will produce outdoor recreation needs several times greater than those of today.

The major recreational areas in the Chemeketa Region are located in the North and South Santiam Basins. More specifically, they are centered around Detroit, Green Peter and Foster Reservoirs. Attendance records for park facilities in these areas have shown a steady increase in usage, both in overnight and day visitation, over the past five seasons. In all likelihood, these demands will continue to increase.

Because of the expanding nature of this segment of the economy, there are and there will continue to be problems in solid waste management. Recreation produces two general problems. First of all, the amount of solid waste generated in the Region is increased by noncounty tourists who utilize local recreational facilities. Secondly, many of the recreational areas

which generate wastes are located in either distant or remote areas which in turn create problems in transporting wastes over long distances to acceptable disposal points.

TRANSPORTATION NETWORK. In solid waste planning, transportation modes are important when considering the transporting of recyclable materials either from one location to another within the study area or to a point entirely outside the Region. Feasible forms of transportation in the Chemeketa Region include rail, barge and trucking.

As far as rail service is concerned, the Willamette Valley contains the Southern Pacific's main north-south line. The Burlington-Northern Railroad also serves the area on the Southern Pacific line. As a result, there is direct rail access to Portland, Seattle, as well as to California.

The Willamette River is readily navigable by barge to Salem. The Corps of Engineers maintains a minimum channel depth of six feet by approximately 100-120 feet wide to Salem. With the exception of a few weeks in the summer, the probability is good that the above channel will be open. Barges up to 175 feet long by 35 feet wide with a 750-ton capacity have navigated to Salem.

The channel depth from Salem to Albany is maintained at a minimum of 3½ feet. A

navigation problem (rock shell) exists near the confluence of the Santiam and the Willamette Rivers. Barges with a 175-ton capacity have traveled as far as Albany.

Highways will probably constitute the most important form of transportation. The most dominant element of the highway system is Interstate 5, located on a north-south axis along the floor of the valley. The other major north-south highways include U. S. 99E and U. S. 99W which run parallel to each other on opposite sides of the Willamette River.

Principal east-west highways include U. S. 20 and State 34 in Linn and Benton Counties, State 22 in Marion County, and State 22 and State 18 in Polk and Yamhill Counties.

Highway transportation, however, does pose some restrictions. These restrictions are in the form of truck size and weight limitations. For illustrative purposes, these limitations are summarized in Table III-5 and Table III-6.

Table III-5
TRUCK SIZE LIMITATIONS

Height	13' - 6"	
Width	8' - 8 1/4"	across tires
Length		
Semi or full trailer	40' - 0"	on designated highways or
	45' - 0"	under special conditions
Tractor and semi	60' - 0"	on designated highways
Truck and full trailer	65' - 0"	on designated highways or
	75' - 0"	on Class 1 highways
Tractor and semi and full trailer	75' - 0"	on designated highways or
	105' - 0"	for triples on designated highways

Table III-6
TRUCK WEIGHT LIMITATIONS

Axle Load Limits (Pounds)		
Single	18,000	on I-5
	20,000	on U. S. and State highways
	22,000	on U. S. and State highways for loaded compactor trucks
Tandem	32,000	on I-5
	34,000	on U. S. and State highways
Gross Weight Limits (Pounds)		
3-Axles	49,000	on designated highways
4-Axles	63,000	on designated highways
5-Axles	73,280	on designated highways with permit
Total Gross Weight	76,000	on designated highways with permit

Governmental Characteristics

A solid waste management program involves various levels of government both in terms of administering standards and in collection of wastes.

FEDERAL. The Environmental Protection Agency (EPA) administers federal planning grants and provides technical assistance for solid waste management to state and local agencies. Oregon is within EPA Region X, headquartered in Seattle, Washington. In addition, the U. S. Forest Service (USFS) and the Bureau of Land Management (BLM) are responsible for waste collection at the various parks and camping facilities on federal lands.

STATE. The State of Oregon administrative district system includes Marion, Polk and Yamhill Counties as District 3 and Linn and Benton Counties as District 4. The Oregon Department of Environmental Quality (DEQ) administers solid waste management regulations and programs in the state. Marion, Polk and Yamhill Counties are administered by the DEQ district office in Salem; Linn and Benton Counties are administered by the DEQ district office in Eugene.

REGIONAL. Marion, Polk and Yamhill Counties along with the City of Salem and numerous other communities in the tri-county area are organized into the Mid-

Willamette Valley Council of Governments. Linn and Benton Counties are represented along with Lincoln County in the Oregon District 4 Council of Governments. These two councils of governments have entered into a formal association for the purposes of conducting the Regional Solid Waste Management Plan for the five-county area.

COUNTY. The Regional Solid Waste Management Plan includes the total area of five counties: Marion, Polk, Yamhill, Linn and Benton. Each county is governed by a Board of Commissioners, with one commissioner from each county represented on the Board of Directors of the Chemeketa Region. The counties have primary responsibility for developing and implementing solid waste management programs.

CITY. There are 48 municipalities within the five-county area. Marion County includes 18 communities; Polk, 4; Yamhill, 10; Linn, 13; and Benton, 3. (The City of Salem and the communities of Idanha, Mill City and Willamina are within two counties.) Although cities are not authorized through state-enabling legislation to develop regional solid waste programs, they do have the authority to grant collection franchises and have the right of eminent domain to obtain land for disposal sites.

RELATED GOVERNMENT AGENCIES. Franchised collection areas are of special concern in this Regional Solid Waste Management Plan. Marion County has 16 franchised collection areas; Linn County, 8; Polk County, 6; and Benton and Yamhill Counties have 3.

Environmental Quality

Protection of the environment is an essential element in the planning of future solid waste disposal sites. In the Chemeketa Region this is especially critical, since several of the existing and proposed sites are relatively close to major population centers.

A disposal site should not create a nuisance nor should it degrade the aesthetics of the surrounding area. This implies that proper precautions and safeguards must be exercised in order to protect neighboring land and/or land uses. To the extent feasible, disposal sites should be screened from adjacent roads and dwellings. Operation of the site should be directed toward an eventual future use that restores or enhances the aesthetic value of the land.

Preventing potential problems relating to air and water pollution is also essential. Potential air pollution is related to climatological conditions which can vary considerably over short periods of time. The potential is related to occurrences of

thermal inversions of atmospheric layers which can trap smoke at low elevations for relatively long periods. There is no landfill burning permitted at the 19 disposal sites, but there are some on-site incinerators at schools, stores and hospitals plus a few wigwam burners within the Region.

Leachate from buried solid waste in landfills and surface runoff from open disposal sites can pose potential hazards to both ground and surface waters. Where leachate and drainage problems have been encountered in the field, they can generally be corrected by proper engineering design and operation.

Proper floodproofing measures can help to reduce or prevent flood damage or resulting pollution. These measures will, however, add significantly to the cost of developing and maintaining these sites.

Presently, the only sources of noise pollution are handling of rubbish containers, collection trucks and mechanical equipment in operation at the landfill sites. The noise from the foregoing sources has not been excessive where OSHA standards have been met. A continuing effort must be maintained to keep noise at acceptable levels, especially where future reclamation sites are near urban areas. It is not expected that noise will be a major environmental problem.

PRESENT SOLID WASTE MANAGEMENT PRACTICES

This section serves to document present solid waste disposal practices in the Chemeketa Region; the deficiencies and attributes of various elements of the system are analyzed and form the basis for the recommendations contained in Chapter IV entitled "The Plan."

Included in this section is an evaluation of present solid wastes generated in the Chemeketa Region, current collection practices, existing disposal sites, present resource recovery activities and financial aspects of present solid waste management practices. Projections of the present population and present quantities of wastes are included in the section entitled "Planning Criteria and Projections," Chapter IV.

Present Solid Waste Generation

It is generally acknowledged that the per capita weight of solid wastes has been increasing for the last 40 years. The portion of the total solid wastes from residential and commercial sources generated in an area reflects, more than any other factor, the affluence of our society. A national survey in 1968 evaluated the per capita amounts of solid wastes generated from all sources and determined that residential and commercial wastes amounted to slightly over 4 LBS/CAP/DAY, industrial wastes to

nearly 2 LBS/CAP/DAY and demolition wastes to slightly less than 1 LB/CAP/DAY. As a percentage, residential and commercial wastes were found to be slightly over 50 percent of the total wastes collected in the United States. Industrial and demolition wastes were found to be approximately 25 percent and 10 percent, respectively, of the total. Other types of municipal and institutional wastes made up the remainder of the total wastes identified in the 1968 national survey.

It has been determined by the Chemeketa Region that mixed wastes presently entering the public waste disposal system in the Region amount to 4.92 LBS/CAP/DAY. This factor includes residential, commercial, industrial and miscellaneous wastes, but does not include demolition wastes. It reflects the quantity of wastes actually disposed of within the Region rather than an assumed rate of waste generation (all waste generated may not actually reach the public disposal system) and was utilized as an initial point from which to project future waste quantities.

DATA COLLECTION. The type and quantities of solid waste presently generated within the Chemeketa Region were determined from collection records, disposal site records, a survey of the commercial and industrial solid waste sources conducted by the Mid-Willamette Valley

Air Pollution Authority, and investigations into specific waste types such as junk automobiles, tires, radioactive wastes, the food processing industry, etc. The resulting data reflects the type, location of generation and approximate quantities of solid wastes that normally enter either the public or private disposal systems within the Region. Thus, the quantities represent solid wastes for disposal rather than waste generated. Very few of the wastes which are reclaimed or recycled are accounted for in this study due to a lack of available data. Also, the quantities of animal and mining wastes were not accounted for in this study, since these areas are being managed by other organizations.

The types of solid wastes documented in this study have been grouped into four basic categories. The public and private disposal categories reflect different areas of responsibility. The four basic categories include:

- Solid Wastes for Public Disposal
- Solid Wastes for Private Disposal
- Special Wastes
- Reclaimed, Reused or Recycled Wastes

The types of solid wastes are described by the source of generation (i.e., residential, commercial, etc.) in most cases. The composition of a particular source of solid waste is assumed to be similar for all of the

Region when, in fact, the composition will vary somewhat from community to community depending upon population densities, income levels, living styles, industry types, types of agriculture, and type of commercial activities.

In most instances, waste quantities utilized in the report are given in tons. Use of this unit of measure allows the solid waste system performance to be compared with systems from other areas outside the Region. The waste densities used to convert between units of volume and weight in this report are listed below for the various types of waste.

Waste Type	Assumed Density(2) LBS Per Uncompacted CY
Residential	170
Commercial	170
Industrial	
Plant Trash	170
Canning	600
Forest Products	500
Sludges	2,000
Institutional	170
Agricultural	
Straw	100
Vegetable and Fruit Wastes	600
Demolition and Construction	700
Park and Beach	170
Street and Alley	170
Catch Basin	2,000
Sewage Treatment Plant	2,000
Trees and Landscaping	500

Although the above factors were used in the original estimates for volumes and tonnages of wastes generated in the Region, other approximate factors are more convenient to use. Solid waste density in a compactor truck is assumed to average 400 LBS/CY. Although it is acknowledged that higher densities (in the range of 500 to 700 LBS/CY) are possible, it is believed that partial and low density loads can reduce the overall density to average 400 LBS/CY for planning purposes. Similarly loose volumes in drop boxes are more conveniently assumed to be 200 LBS/CY when it is considered that on occasion the boxes would be only partially filled with low density material. In both situations it must be recognized that the assumed densities result in estimates suitable for general planning. For preliminary design of specific facilities more refined estimates or actual truck weights should be obtained.

In general, estimates of the wastes generated in the Region have been based upon data compiled by the Mid-Willamette Valley Air Pollution Authority and the Chemeketa Region staff in 1971 and 1972. During this period, industrial waste sources were interviewed by the Mid-Willamette Valley Air Pollution Authority and the amounts of wastes generated by each source were estimated. This information was organized by Standard Industrial Classification and formed the basis for estimates

of the amounts of industrial wastes generated in the Region in 1973.

During the same period, 1971-1972, franchised collectors and disposal site operators were interviewed by the Chemeketa Region staff. The information gathered consisted primarily of estimates of the volume of mixed refuse hauled in the packer vehicles. An estimate of this amount as a percentage of the total mixed refuse disposed of was also made at the same time by the franchise operator. The quantity of wastes hauled by the general public was then calculated from the estimated amount and percentage not collected by the franchised operator. Amounts of wastes hauled by others, primarily cities, were also estimated and combined with the other estimates to obtain the total amounts estimated to be generated in the Region. The total amount of wastes by type which resulted from manipulation of the 1971-1972 field data is presented in Table III-7 as the 1973 solid wastes generated in the Region. A per capita waste factor was calculated from the tonnages for each type of waste for a 1973 population of 382,500 (see Table III-8). A detailed breakdown of quantities and an example of the procedures used to prepare the estimated Region total is given in Appendix C.

Table III-7
SOLID WASTE FOR
CHEMEKETA REGION 1973

Type of Waste	T/YR
Residential	137,350
Commercial	55,380
Industrial	116,170
Agricultural	8,130
Institutional	14,660
Demolition	54,333
Street and Alley	3,080
Tree and Landscaping	3,640
Park and Beach	1,320
Catch Basin	1,980
Sewage Treatment Plant	2,320
TOTAL	<u>398,363</u>

Table III-8
CHEMEKETA REGION
PER CAPITA WASTE GENERATION
FOR PUBLIC DISPOSAL

Type	LBS/CAP per day ¹
Residential	1.97
Commercial	.79
Industrial	1.66
Agricultural	.13
Institutional	.21
Street and Alley	.04
Tree and Landscaping	.04
Park and Beach	.02
Catch Basin	.03
Sewage Treatment Plant	.03
TOTAL	<u>4.92</u>

¹ Based on 1971-1972 waste volume
base data and 1973 population
(estimated).

It is recognized that differences between the reported and actual quantities have inevitably occurred in the gathering and manipulation of the data. Most notable is the 2- to 3-year difference between the time the field data was gathered and the 1973-1974 per capita waste factor which was calculated and projected from that data. Using the 1973 population for 1971-1972 data is not believed to be of major significance, but it does account for an approximate 10 percent underestimate because the 1971 Region population was 364,010 rather than 382,500 as used to calculate the waste factor. Other changes have occurred in the Region, such as increased quantities of wastes received from other areas (Washington County) and in population distribution throughout the Region. In each service area, an inexactness was also introduced by using a region average per capita waste factor to calculate projected waste tonnages. In these instances, a waste tonnage lower than actually generated in the service area resulted, while in other instances the calculated quantities were higher. It is not believed that the above inexactness varies sufficiently (on the order of 20-40 percent) from the present actual quantities to require updated field measurements and recalculation of the estimates. It should be noted, however, that preliminary engineering of specific facilities should include revision of the estimated quantities of wastes to be received at the facility.

RESIDENTIAL AND COMMERCIAL (MIXED) WASTES. Residential and commercial wastes include primarily wastes from households and commercial establishments and consist of garbage (food waste), rubbish, ashes, and some bulky wastes (appliances). This category of waste, also known as mixed waste, constitutes the majority of the total amount of waste handled in the Region and that portion which requires timely collection, transport and disposal (or processing) to avoid decomposition and objectionable or unhealthful effects. During 1972, approximately 190,000 tons of mixed wastes entered the Region's public waste disposal sites.

Mixed wastes of a type similar to that generated from residential and commercial sources are also generated from recreational activities in the Region. Mixed wastes from recreational activities are included in the total amounts of this type. No attempt was made to separately identify recreational waste generation or disposal.

Generally, this category of wastes requires the greatest financial expenditure for its proper management. The majority of local solid waste funds is spent on collection, transportation and disposal of mixed wastes. Nuisance conditions resulting from improper accumulation, storage, collection, or disposal of mixed wastes are a recurring problem and one of the historical reasons

local government has become involved in solid waste management. More recent interest in the characteristics and quantities of mixed wastes has been stimulated by concern over the costs of transporting wastes over significant distances to resource recovery centers and the potential revenues to be derived from processing the wastes to produce a secondary fuel. Further interest in mixed wastes has arisen from the increasing difficulty in locating disposal sites where acceptable to the public and many other concerned organizations or groups.

INDUSTRIAL AND INSTITUTIONAL WASTES. At the present time, approximately 116,000 tons of industrial wastes and 15,000 tons of institutional wastes are generated annually in the Region. Included in this category are garbage, rubbish or trash, bulky wastes, ashes, and hazardous wastes. Wastes of special types which originate from industries in the Region are included in a subsequent section.

Industrial wastes of the above types create difficulties in both handling and disposal. Paper, cardboard, wood, and plastic from trailer manufacturing cause handling problems at a transfer station serving the Stayton area. The principal effect is jamming of the station's compactor due to oversized pieces. The sheer volume of trailer manufacturing wastes causes disposal difficulties at the Whiteson sanitary landfill

near McMinnville. Similar difficulties occurred at the High Heaven site formerly in use near McMinnville.

Institutional wastes are primarily generated at colleges and universities, government offices and nursing homes. In some instances, these wastes may be hazardous, but usually consist of garbage, rubbish or trash, and ashes. The institutional wastes are handled and disposed of with other mixed wastes in the Region. Hazardous wastes are generated in small quantities and if received at landfills are usually buried in a special location.

MISCELLANEOUS WASTES.

Miscellaneous wastes consist of street and alley sweepings, tree and landscaping residues, park and beach litter, catch basin cleanings, and sewage treatment plant residues. Approximately 12,000 tons of miscellaneous residues are generated annually in the Region. Most significant of the miscellaneous wastes are residues from sewage treatment plants. Sewage treatment plant residues, or sludges, are presently not received at any disposal site in the Region and, through the Department of Environmental Quality, are controlled separately from other solid wastes.

DEMOLITION WASTES. Demolition wastes are identified separately because of their relatively inert composition and high density. In general, heavy demolition

wastes can be difficult to handle, collect and transport, but due to their inert composition may be disposed of in landfills close to the source of generation. In many cases, this type of waste has little value for resource recovery and may be more beneficially used for land reclamation in the local area.

Demolition wastes consist of building materials—wood, masonry, concrete, asphalt, plaster, roofing, paper, metal, trees, tree roots, limbs and shrubs. Approximately 50,000 T/YR are generated in the Region. These wastes are presently landfilled at two demolition sites (Corvallis and Fowler) and, to a minor extent, at one mixed refuse landfill (Monroe).

SPECIAL WASTES. Special wastes essentially consist of industrial or commercial waste oil, sludges, wood residue, cannery wastes, septic tank sludges, hospital wastes, environmentally hazardous wastes, tires, bulky wastes, agricultural wastes and dead animals. These special wastes are summarized below. Further data can be found in Appendix D.

Oil and Oil Sludges: Waste oil and oil sludges are generated in the Region from numerous industrial and commercial activities. It is estimated that approximately 1,200,000 gallons of waste oil are generated annually, the majority of which is disposed of as a dust pallative or

reclaimed at reprocessing centers near Eugene. Some of the waste oil is mixed with fuel oil for combustion or is used in weed control. A lack of demand for refined oil hampers reprocessing activities. No waste oil is known to enter existing mixed refuse disposal sites in the Region. Indiscriminate dumping of waste oil can degrade water quality if it is allowed to enter storm sewers.

Industrial and Other Sludges: Industrial sludges, other than oil sludges, that are of importance in the Region are those generated by the pulp and paper industries. These industries are concentrated in the Salem and Newberg areas and generate approximately 3,000 T/YR of sludge. Private disposal of pulp mill sludge also occurs on Minto Island near Salem.

Generation of pulp mill sludge is not considered to result in significant problems at the existing disposal sites. Dewatering of the sludge prior to landfilling prevents adverse effects and in some instances appears to retard leachate movement. Some industrial sludges are suspected to enter the Albany disposal site.

Industrial Wood Residues: Industrial wood residues consist of bark, sawdust, shavings, slabs, veneer and plywood trim, peeler cores and sanderdust. These wastes result from processing of timber into lumber, plywood and other wood products.

It is estimated that approximately 60 percent of the volume of a log becomes wood residue with the remaining 40 percent ending up as lumber. Of the residue, it is estimated that 54 percent is now used for wood composition board, 22 percent for fuel and 5 percent for miscellaneous purposes. Nineteen percent is not used and presents a disposal problem. Thus, slightly over 11 percent of the volume of logs becomes residue. Disposal is required for nearly 140,000 T/YR of residue. Most of this waste is incinerated or buried at private sites but a portion is disposed of at mixed refuse landfills. Wood residue is utilized at most disposal sites as a cover material for use in wet weather and only poses a problem at sites which are limited in volume. The present Lebanon site receives a large volume of wood wastes. Approximately 17,000 tons of wood residue reach the Region's mixed refuse landfills annually.

Cannery Wastes: Cannery wastes consist of vegetable, fruit and berry crop wastes. Approximately 17,500 tons are generated annually. These wastes are seasonal, generated in large quantities over short periods of time and, as presently received, have an objectionable odor and high water content. Most of the cannery wastes enter the public waste disposal system at the Brown's Island sanitary landfill near Salem.

Septic Tank Pumpings: Septic tank pumpings entering the public solid waste system amount to 4,000 tons (960,000 gallons) annually. This type of waste is controlled by the county health departments and the State Department of Environmental Quality. Since this waste is of sewage origin, it poses a potential public health hazard and must be properly handled. At the present time, septic tank pumpings enter the public solid waste system at either the Cal Nored or Roto Rooter sludge disposal sites in Linn County. Other septic tank pumpings are disposed of at sewage treatment plants in the Region and were not inventoried during this study.

Hospital Wastes: Based on data from the Chemeketa Solid Waste Inventory, approximately 50 tons of hospital wastes are generated annually. This amount includes pathogenic wastes, such as bandages or human tissue, which are incinerated at the individual hospitals. Other nonpathogenic hospital wastes, such as garbage and trash, are included in the mixed wastes generated in the Region. Thus, hospital wastes, as presently handled, pose no significant solid waste management problems.

Environmentally Hazardous Wastes: Pesticides and radioactive wastes are considered to be environmentally hazardous and as such are directly controlled by the Department of Environ-

mental Quality. Data obtained from the Chemeketa Solid Waste Inventory resulted in an estimate of approximately 6,900 gallons (24 tons) of pesticides and pesticide containers generated annually in the Region. This waste, although of small quantities, requires special precautions to avoid pollution of ground and surface water supplies or direct hazard to animals or humans. Disposal of pesticides and pesticide containers appears to be a problem of sufficient magnitude to require further investigation.

Radioactive wastes generated in the Region are estimated to amount to 1,200 CF/YR. This minor quantity is not accepted at any of the existing facilities and it is assumed the wastes are transported to Hanford, Washington, for disposal.

Tires: Based on a survey by the Yamhill County Department of Public Works (1972), approximately 6,000 tons of tires are generated annually in the Region. Over half this amount is generated and disposed of in Marion County. Because of their form and the material of which tires are made, handling and disposal problems are created. Tires are presently accepted at only two landfills (Corvallis and Macleay) in the Region. At one site (Macleay) the tires are split before burial, while at another site (Corvallis) the tires are buried whole.

Bulky Wastes: Bulky wastes consist primarily of vehicle hulks and appliances. Both of these materials are generated within the Region and are received at existing facilities. It is estimated that 23,000 tons of vehicle hulks and 820 tons of appliances are generated in the Region annually. The majority of the vehicle hulks and a portion of the appliances are reclaimed by local salvage operations prior to entering the public waste disposal system. Most of the appliances generated in the Region enter existing disposal sites where an estimated one-fifth are segregated and ultimately reclaimed.

Bulky wastes have in the past created a significant solid waste management problem due to difficulties with handling and disposal. However, through recent technological advances, this waste can now be shredded and reused in the secondary metals market. Handling problems still persist for this portion of the total mixed waste but disposal problems have decreased due to greater reuse.

Agricultural Wastes: Agricultural wastes amount to about 8,000 T/YR and consist of rubbish and trash; vegetable, fruit and berry crop wastes; manure; prunings and waste straw. Of the foregoing items, the only ones which reach the present landfill sites in any significant quantity are rubbish and trash. Manure and vegetable matter are used as fertilizers. Prunings are frequently

shredded for use as mulch. In excess of a million tons per year of waste straw is presently burned.

Dead Animals: Approximately 25 T/YR of dead cats, dogs, horses, and cows are generated in the Region. No significant problems arise because only small animals reach the disposal sites for burial. Larger animals are rendered.

Present Collection Practices

Timely and efficient collection of solid wastes is an essential element of any solid waste management program. Mixed wastes, also known as residential and commercial wastes, constitute the largest amounts to be handled on a continual basis and are the type which can cause the most objectionable or unsanitary conditions if improperly collected. Generally, collection of mixed wastes has been a nearly exclusive function of the solid waste industry within the Region. The development of a solid waste management plan for the Region has been directed toward providing systems which will enable continued efficient collection and disposal of mixed wastes.

Certain industrial and institutional wastes, other than special wastes, are usually collected with mixed wastes and cease to be identifiable as to their origin. Commercial services are ordinarily utilized for collection of those industrial and institutional

wastes that do not require special handling, although in some instances direct hauling may be utilized by the generator of the wastes. Miscellaneous wastes such as street sweepings or tree trimmings usually are collected by municipalities and hauled directly to the point of disposal. Since these wastes are relatively small amounts and are separately collected by municipalities, they have little impact upon a regional collection system.

Special wastes frequently require special collection methods to avoid objectionable effects. For the most part, special wastes are hauled by the generator of the wastes directly to the point of disposal; however, in some instances, commercial services are utilized. In general, special wastes are difficult and costly to collect and usually cannot be handled with mixed wastes. A more detailed evaluation pertaining to present collection practices in the Region is presented below for commercial collection services, government collection activities and direct hauling.

COMMERCIAL COLLECTION

SERVICES. Regular collection service to residential, commercial and industrial accounts is provided by 26 private firms operating in the Region. Most of the collectors are franchised by the counties in which the service is provided, except for the firms which operate exclusively within municipal boundaries. For example, City Sanitary

Service and Stayton Sanitary are franchised only by the Cities of Salem and Stayton, respectively. Other commercial services may be franchised by more than one governmental jurisdiction. The areas in which each collection service is franchised within the Region are given in Figure III-1.

In the five-county area over 6,000 commercial accounts and 70,000 residential accounts are serviced. Approximately 65 to 70 percent of the total Region population (about 250,000 people) is served by commercial collectors. Waste from the balance of the population either finds its way to authorized disposal sites via private vehicles or ends up in unauthorized dumps as litter, or is disposed of in back yards and fireplaces. Typical collection fees are listed in Table III-9 and indicate the present range of costs for back yard collection, transportation and disposal of residential and commercial solid wastes within the Region.

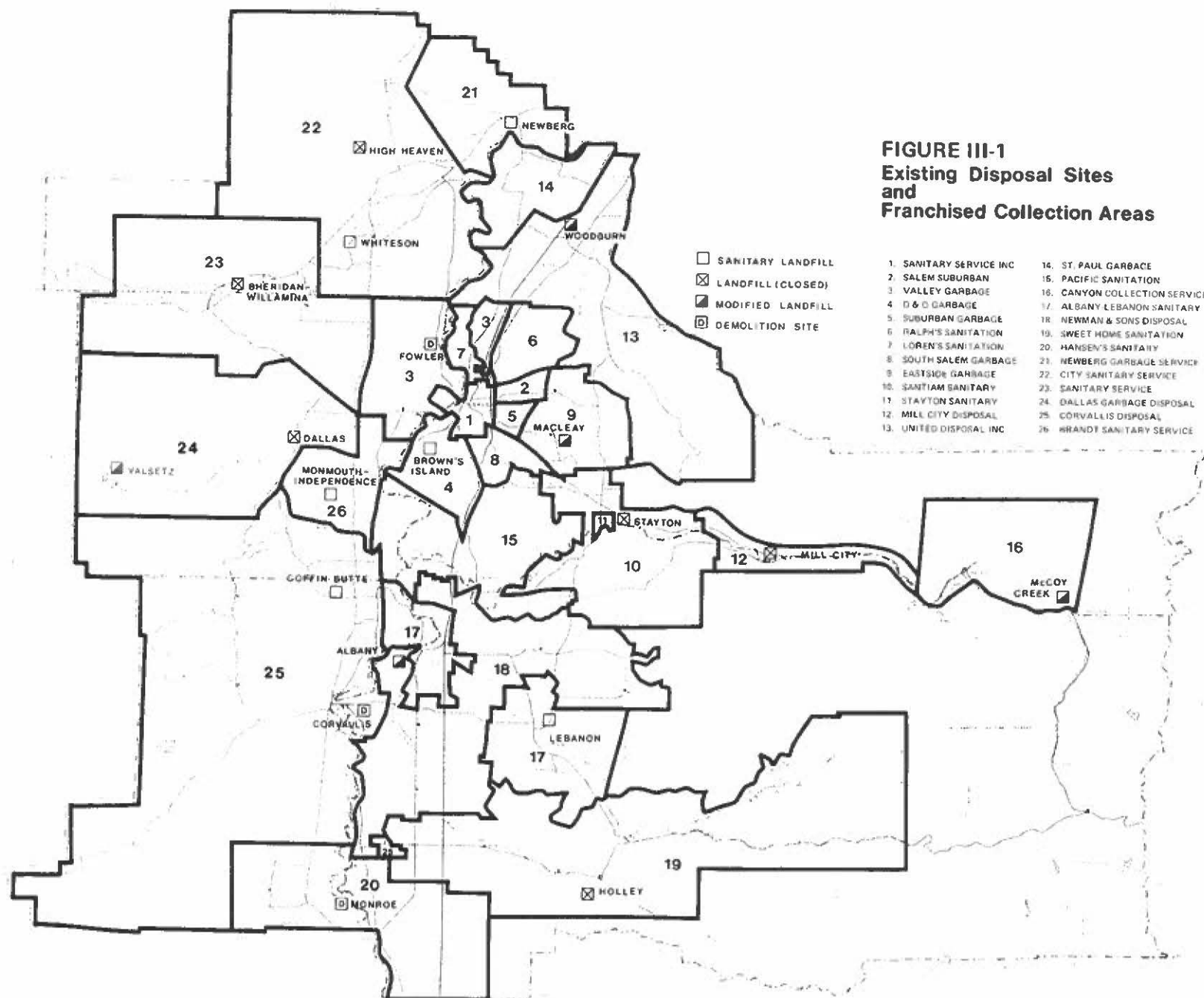


Table III-9
CHEMEKETA REGION
COMMERCIAL COLLECTION CHARGES
1971-1972

Household—weekly pick up
1 can: ranged from \$2.30 to \$4.00
2 cans: ranged from \$1.35 to \$2.00
Apartment Houses—weekly pick up
per can: ranged from \$2.30 to \$2.75
Mobil Homes—weekly pick up
per can: ranged from \$2.30 to \$2.75
Commercial Containers—weekly pick up
1 CY: ranged from \$11 to \$18
20 CY: ranged from \$22 to \$35
30 CY: ranged from \$45 to \$52.50

The most common collection vehicle used in the Region is the 20-cubic yard, rear-loading packer truck. Most trucks use a two-man crew. Satellite vehicles (Cushman Scooters) are being used by two collection firms to service residential areas in heavily populated urban communities with narrow streets and long driveways. An adaptation of the satellite vehicle concept is being used in rural areas to help eliminate the expense and problems of operating large trucks over long rural roads with infrequent customers. Drop box containers are used throughout the Region to handle wastes not readily compacted and hauled in a typical packer

truck, or generated in large volumes by a single source.

Mixed waste from household and commercial sources constitutes the largest single type of waste collected in the Region. Approximately 140,000 T/YR of residential wastes and approximately 50,000 T/YR of commercial wastes are collected in the Region by commercial services. A large portion of the approximately 120,000 tons of industrial and 15,000 tons of institutional wastes generated in the Region annually are also collected by commercial collection services.

Problems presently associated with collection are noise, type and weight of containers, back yard locations and animals. The present packer trucks generate noise which on occasion may disturb residents. Containers may be encountered which collapse under loads or are too heavy for a man to lift safely. Underground containers are considered to be a great deal more dangerous to lift than standard containers. Back yard container locations occasionally pose the problem of gates and doors. Animals foraging among bags or containers at curb side are also a problem.

Other problems are associated with solid waste collection vehicles and operational costs. A proliferation of firms in the same areas could result in duplication of services and higher costs of collection. With the

exception of one small area near Stayton, this condition is avoided by the present franchise system. Collection in congested areas frequently results in slower and more costly operation of collection vehicles. Of concern also is the haul distance from the termination of a collection route to the point of unloading. Distance to the disposal point affects wear and tear on equipment and size of efficient vehicles because of gross weight restrictions. These problems exist to a limited extent in some areas of the Region.

GOVERNMENTAL COLLECTION ACTIVITIES. Governmental entities are involved in collection of litter, recreational wastes, and miscellaneous wastes. Litter is collected by the county and state government agencies for maintenance of public roads. Recreational wastes are collected as a part of routine maintenance of public parks and other recreational facilities. For normal maintenance of municipal streets and utilities, miscellaneous wastes are collected by governmental agencies and transported to the point of disposal. The costs of governmental collection activities and the quantities of wastes handled were not separately identified during the study. However a notable problem is abuse of free litter stations due to dumping of household garbage and other wastes by the general public.

Highway litter falls under the jurisdiction of the State Highway Department or the County Roadmaster. The State Highway Department crews pick up litter and haul it directly to the disposal sites. The Department also owns and maintains containers along the roadside which are serviced by the Department or under contract with commercial services. The counties also have crews to pick up litter and empty containers for direct haul to landfills. Benton County employs service groups, such as Boy Scouts, to collect litter.

Recreational wastes from camps and park grounds are handled similarly to highway litter. County Park Departments collect wastes in Yamhill, Benton and Linn Counties, while a Regional Park Department is responsible for Marion and Polk Counties. Wastes from federal and state recreational facilities are hauled directly by the responsible agency to the disposal site.

Miscellaneous wastes (street sweepings, sewage treatment sludge, etc.) are hauled by municipal departments usually in open trucks or tanker trucks directly to the point of disposal. Costs of these collection activities are usually incurred as a part of the normal operation of the municipal utility or other activity.

DIRECT HAULING. Some mixed wastes, much of the demolition wastes, and most of the special wastes are hauled directly to

the disposal site by the generator of the waste. At most of the disposal sites in the Region the general public brings in household wastes in private vehicles. The amounts brought in to each site by the general public have been calculated from an estimated percentage of the total population not served by commercial services. This method of collection and transport of mixed wastes is considered to be generally inefficient compared to commercial collection methods. It also is considered to be waste fuel and causes higher disposal point costs to accommodate high traffic volumes.

Much of the demolition wastes generated in the Region are collected by commercial services in drop boxes and hauled directly to disposal sites in the Region. Some demolition wastes, however, are hauled in open trucks directly to the disposal site by the generator of the waste.

Special wastes on the whole are collected by private concerns. A portion of waste oil is picked up by re-refiner firms. Industrial sludges and wood residue are delivered to the disposal sites by industries' trucks. Cannery wastes are a problem for collectors because specially-lined open trucks are required to minimize leakage. Septic tank sludges are pumped and hauled by private concerns either to treatment plants or one of two septic tank disposal sites in Linn County. Nonpathogenic hospital wastes are handled by collectors in the same fashion

as other commercial wastes. Pesticides, as previously discussed, are environmentally hazardous items which require special handling. Tires are usually purchased and collected by retreaders who recap and sell the usable tires and haul the unusable tires in their own trucks directly to some landfill sites. To dispose of abandoned vehicle hulks, salvage dealers pick up the hulks and strip, compact, and haul them in their own trucks or trailers to Portland scrap metal dealers. Limited quantities of agricultural wastes are hauled by private industry or farmers directly to the disposal sites.

Present Transfer Systems

The transport of solid wastes from the collection zone to the point of unloading may require long distance hauling. Until recent years, disposal sites have been located near communities or areas in which the wastes were collected and the transfer element usually consisted of relatively short direct hauls in conventional compactor vehicles. With consolidation of landfills for various reasons and with the extension of more convenient facilities into rural areas, transfer systems have become an important element of the overall solid waste management system. Two transfer systems are in operation in the Chemeketa Region—the Stayton transfer system and the Monroe transfer system.

STAYTON TRANSFER SYSTEM. A compacting-type transfer system was placed into operation in October 1972 to replace the Stayton landfill. The station includes a metal hopper mounted above a stationary compactor. The hopper has a capacity of 40 CY, and the waste is compacted into a 30 CY enclosed container. Compacted wastes are then transported to the Brown's Island disposal site.

Some problems have been encountered at the facility. Some large industries generate types of waste which are difficult to process through this type of compactor. Wood pallets and various lengths of used lumber frequently jam in the compactor requiring the operator to separate and cut the waste.

Operating costs per CY could be reduced by utilizing larger containers for transport or trucks which could transport more than one container at a time. Total costs per CY would increase, however, because new equipment would be required. The service area or amount of wastes handled could be increased and the overall efficiency of the operation improved with the new equipment.

MONROE TRANSFER SYSTEM. This operation was installed jointly by the City of Monroe and Benton County. The operation consists of a 30 CY drop box positioned against a concrete retaining wall,

enabling the user to dump directly into the box. The hauling is by contract with the Corvallis Disposal Company. The facility is open to the public two days a week, Wednesday and Saturday. An attendant is on duty. A fee is also charged for disposal.

No technical problems are known to exist with this facility. Its importance with respect to consideration of future transfer proposals is that it is a publicly-owned station which is serviced under contract with a commercial collection service. This arrangement appears to be working satisfactorily from both public and private viewpoints.

Present Disposal Practices

Present solid waste disposal practices were evaluated under two broad categories: public disposal practices and private disposal practices. Public disposal practices include disposal sites or facilities which are either publicly or privately owned and which are open to or used for the disposal of wastes collected from the general public. Private disposal practices include only disposal sites or facilities privately owned and used only for disposal of wastes from a private source. Usually a private disposal site is operated by an industry to dispose of wastes resulting from that industry's manufacturing or plant operations. Public disposal practices are of primary importance in developing a regional solid waste

management plan and will be considered in detail in this report.

Anticipated future conditions or proposed future development or use of disposal sites are projected and evaluated in Chapter IV. Only existing public and private disposal practices are evaluated in this chapter.

PUBLIC WASTE DISPOSAL PRACTICES. Land disposal is utilized in the Region for three categories of solid wastes: mixed refuse, demolition wastes, and septic tank sludge. Mixed refuse constitutes the largest quantity of waste for land disposal and poses the most significant problems to be overcome in the development of a solid waste management system. Wastes entering mixed refuse landfills have the greatest potential for damage to the environment or threat to public health if the site is improperly designed, developed or operated. With the anticipated development of resource recovery, the waste presently entering mixed refuse landfills is expected to become less putrescible or hazardous and potentially offer wider uses in land reclamation projects.

An evaluation of present disposal practices was conducted to assess the available capacity and present deficiencies which must be corrected at each site in the development of a regional solid waste management plan.

It should also be recognized that changes after processing in the character of the present mixed refuse will have a significant effect upon measures that will have to be taken in the future to overcome the present deficiencies.

Demolition landfills are important to an evaluation of the present solid waste system because of the difficulty with transport and disposal of heavy demolition wastes. Since demolition wastes are relatively inert, usually of high density, and generally bulky or difficult to handle, they are ordinarily landfilled separately from mixed refuse at a site as close as possible to the point of generation. Evaluations of the present demolition sites were also conducted to assess the available capacity and present deficiencies to be considered in development of a regional plan for management of demolition wastes.

Septic tank sludge lagoons are presently used for land disposal of a portion of the septic tank sludge pumped in the Region. Evaluations were performed to determine deficiencies of the present sludge lagoons and to provide a basis for development of a program to properly dispose of septic tank sludge.

Each of three types of public disposal facilities are evaluated in the following sections.

Existing Mixed Refuse Disposal Sites: Of the original 17 mixed refuse landfills in the Region, as of 1970, seven have been closed and one new site has been opened. Six sites are operated as sanitary landfills with daily cover, and five are operated as modified landfills with cover at least once a week. Most of the disposal sites have no recycling or processing facilities. Locations of each of the existing disposal sites are given in Figure III-1. Five disposal sites (Brown's Island, Coffin Butte, Lebanon, Newberg, and Whiteson) are considered regional sites in that they receive wastes from more than one community. These sites are important to the present system and will be essential in the development of a plan for future solid waste management. Six other disposal sites (Albany, Macleay, Monmouth-Independence, McCoy Creek, Woodburn, and Valsetz) are considered local sites in that they serve only a single community or a small local area. The local sites are also important in the present and future system to ensure economical disposal of wastes in a satisfactory manner with minimal transport costs. Evaluated in the following sections are the eleven existing mixed refuse sites, including the recently opened Whiteson site in Yamhill County. For data on soils, geology and other detailed information, the reader should refer to the list of selected references which includes interim reports on various sites in the Region.

Albany Site: The existing Albany site (Linn County) is located approximately two miles southwest of Albany and to the east of the Calapooia River, which flows through the property. The site is owned by the City. It is privately operated and serves the City of Albany and Linn County west of Interstate 5.

An area method of landfilling is used under difficult operating conditions which result from highly saturated soils during wet weather, limited space, topography, and site arrangement. These conditions are recognized as severe limitations for continued use.

FIGURE III-2
Albany Site



Brown's Island Site: The Brown's Island site (Marion County) is located three miles southwest of the City of Salem off of River Road South. It is privately owned and operated and has been a regional landfill site to serve the City of Salem and other areas of Marion County. This disposal site is presently operated under a franchise from Marion County.

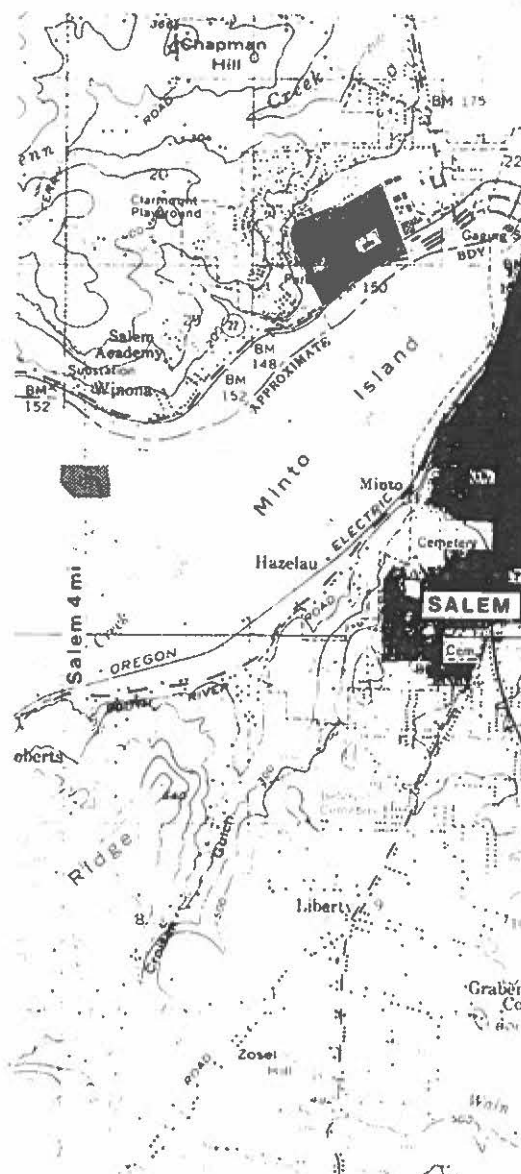
The site, containing 150 usable acres, receives about 130,000 tons per year of household, commercial, industrial, and agricultural wastes. Agricultural wastes are disposed of in open trenches, while the remainder of the wastes are covered daily in an area method sanitary landfill. Food processing wastes pose the most serious disposal problem at the present time due to their high water content and the obnoxious odors which are generated from partial decomposition.

Existing access to the site is approximately three miles on River Road South and about $\frac{3}{4}$ -mile on Brown's Island Road. River Road South is generally substandard for access to a regional landfill site. Marion County has recently upgraded Brown's Island Road for the purpose of allowing access to the site during normal annual flooding. However, severe problems of flood water constriction and erosion have been noted and further improvements will be necessary to allow continued use of the site.

Although the present landfill operation is not in conflict with land use and zoning classifications that denote agricultural usage (RA), the site does exist in the floodplain of the Willamette River and is subjected to periodic flooding which restricts access and hampers landfill operations. This annual flood hazard is the most serious operational problem of the site at the present time. Soil at the site makes good cover material because of year-round workability; however, it limits the site's use in an area fill because of high permeability.

A master plan has been prepared for ultimate use of the site as a park. Landfilling, if carefully engineered, could be generally compatible with the intended final park development.

FIGURE III-3
Brown's Island Site



Coffin Butte Site: The existing Coffin Butte site (Benton County) contains a total of 84 acres of which approximately 60 acres are usable. The site is located approximately eight miles north of Corvallis and 1¼ miles west of 99W on County Road 45-01 near the old Camp Adair. The entire landfill operation is privately owned and operated.

The site presently receives a total of approximately 40,000 tons annually of residential, commercial, and industrial wastes from Corvallis and a portion of Benton County. An estimated 2,400 T/YR of waste are directly hauled by the general public. An estimated 75 to 100 private vehicles use the site on an average day.

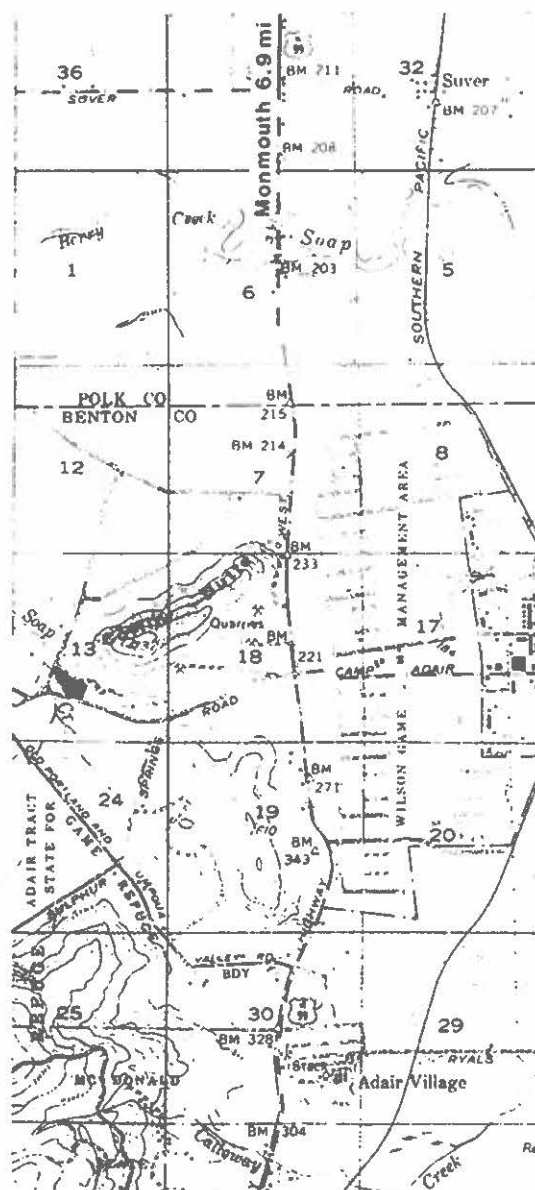
Recycling practices are reducing landfill needs to a limited extent. Cardboard is separated in Corvallis and baled for resale by the area's franchised collector. White goods are presently stockpiled at the site and periodically delivered to scrap dealers for processing. Landfilling of the remaining solid waste is done by the ramp method. Ultimate uses of filled areas are restricted primarily to agricultural grazing because of the steepness of slopes. Due to the steepness of the fill area, covering is difficult in wet weather and drainage into the buried refuse is hard to control.

The existing site is well above the floodplain of nearby Soap Creek. Inter-

ference from surface water and groundwater are significant occurrences as evidenced by seeps and springs which occur above and below the fill during extreme wet seasons. Limited recharge of groundwater occurs from drainage off Coffin Butte and other surrounding hills due to a sharp interface of overburden and basalt outcroppings at the base of the hills. A leachate and drainage control system has been partially constructed to alleviate these conditions.

Future use of the site as a regional landfill with a larger service area is not feasible due to limited size and physical features. Recently, an adjoining parcel containing 100 acres of relatively flat land was approved by Benton County for use as a regional sanitary landfill. This area was evaluated in site feasibility studies previously published as interim reports.(3)

FIGURE III-4
Coffin Butte Site



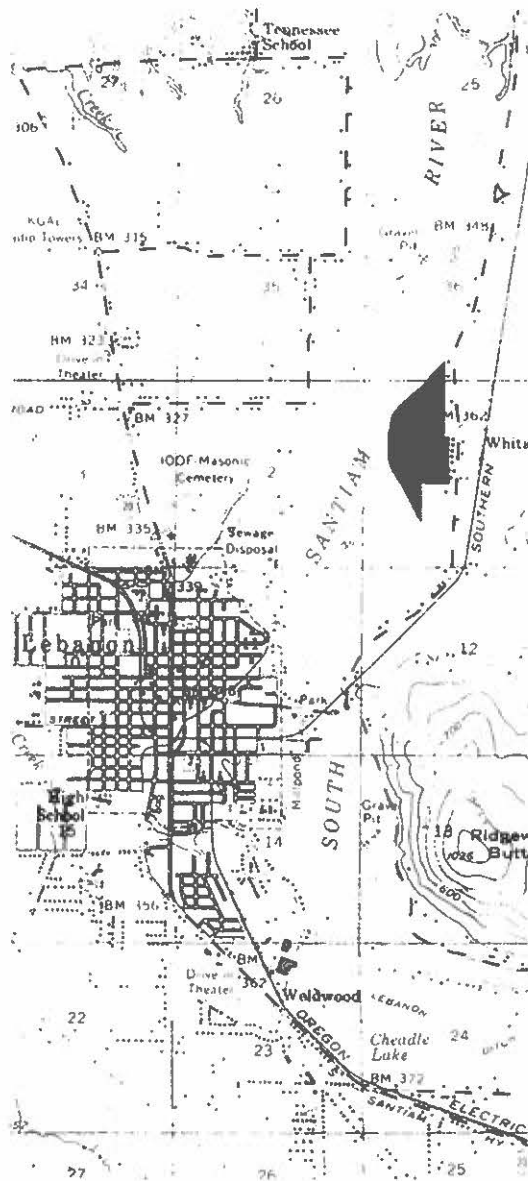
Lebanon Site: The Lebanon disposal site (Linn County) contains 83 usable acres of which 45 acres are owned by the City of Lebanon and 38 acres are owned by Linn County. Located off Brewster Road about two miles northeast of Lebanon, the site is in an area of part floodplain and part hill-side terrain. It is privately operated and serves the City of Lebanon and the surrounding county area. The site is zoned ART, agriculture-recreation-timber, in an area of predominately mixed rural residential and agricultural land use development.

Present annual quantities of solid wastes amount to a total of approximately 167,500 CY (30,000 tons) of residential, commercial and industrial wastes. There is no established method of processing wastes prior to disposal. Bulky metal items are stockpiled on an upper bench as salvage with all other material compacted and covered in an area method sanitary landfill. Public use of the Lebanon site consists of approximately 2,700 T/YR which is direct hauled. Usage ranges between 85 to 120 vehicles per day.

Remaining capacity of the Lebanon site within the existing property is estimated to be 900,000 tons of solid wastes. Future use of this available capacity is evaluated in Chapter IV.

Soils on the site are classified as sandy and silty loams to depths of 5 to 6 feet. Below 95 feet in depth rock is present. Workability and compaction properties of the soils are adequate for normal operations.

FIGURE III-5
Lebanon Site



McCoy Creek Site: Located on USFS land approximately one mile east of Idanha, Oregon, the McCoy Creek site (Marion County) contains 50 usable acres of which 10 acres are presently in use. The site is in steep terrain surrounded by forest and is under a lease permit to Marion County from the U.S. Forest Service. It is privately operated and serves the City of Idanha, the City of Detroit, the USFS and surrounding rural areas of eastern Marion and Linn Counties. The site is located approximately 1/4-mile from State Highway 22. The North Fork of the Santiam River is about 1/2-mile to the south and McCoy Creek about 1,000 feet below the site.

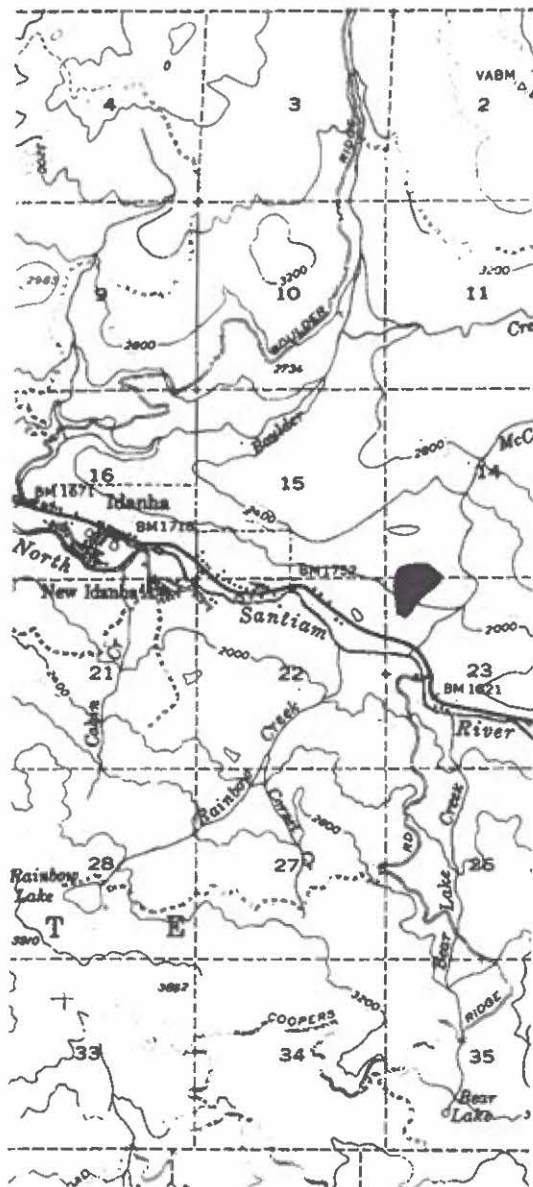
Present annual solid wastes amount to 3,000 CY of residential, commercial, recreational wastes and highway litter. White goods are flattened before burying in the fill; salvageable materials are removed about twice yearly. The site is open to the public only one day a week and at the end of the day all wastes are compacted and covered. A trench method of sanitary land-filling is conducted.

Increased use, because of recreational activity in the area, is experienced from May to October.

Surface drainage is away from the site and present operational area due to topography. Other than McCoy Creek, there are

no known springs, ponds, or wells in the area. A well across from the North Fork of the Santiam River indicates that the area's groundwater table is quite deep. Due to the lack of surface water effects and the absence of a shallow groundwater table leachate production is believed to be minimal. Blowing papers are negligible due to protection by surrounding timber and site maintenance. There are no residences near the site.

FIGURE III-6
McCoy Creek Site

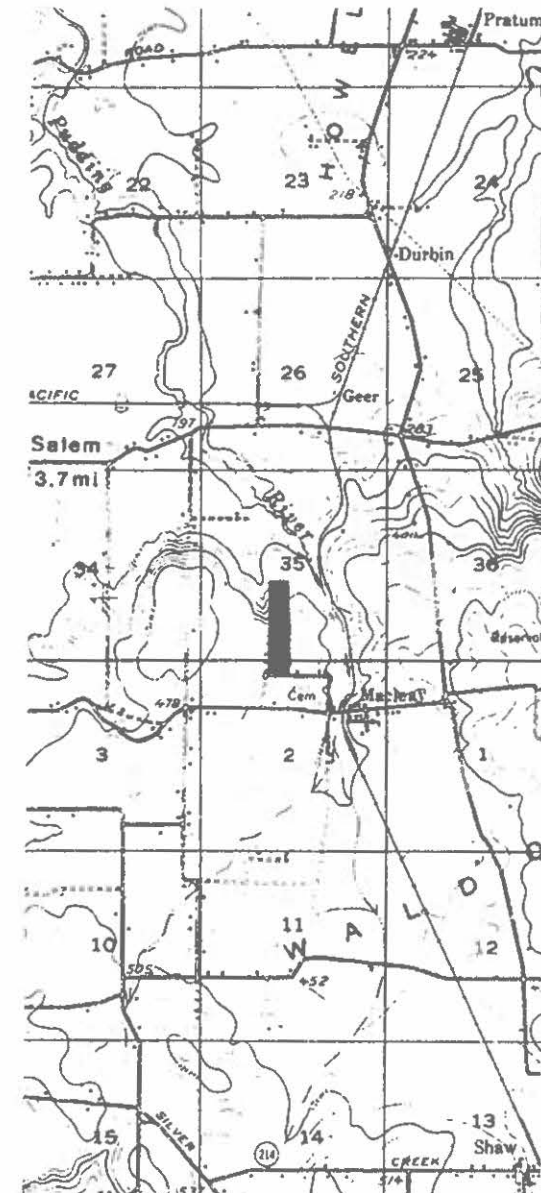


Macleay Site: This site, containing 25 usable acres, is owned and operated by Marion County. Located about $\frac{3}{4}$ mile northwest of Macleay, the site accepts some mixed wastes and is a disposal center for tires from Salem and the surrounding area. It is also a backup site for the Brown's Island site during periods when high water renders Brown's Island inaccessible.

At present, the site annually receives 20,000 CY (4,000 residential wastes and tires. Residential wastes are accepted only from individuals; commercial collectors are not allowed to use the site. Tires are accepted, however, from any source. At the site, tires are split and buried in a special trench. Mixed wastes are compacted and covered periodically in an area method landfill.

Existing topography of the site indicates that the direction of groundwater flow is northwesterly towards the Little Pudding River. Down-gradient uses are primarily agriculture. The Macleay site is free from flooding. All surface runoff is in a northerly direction. A drainage ditch on the east side acts as a diversion structure for local storm runoff. Other than the caretaker's residence, there are no residences within 1,000 feet of the operational area. There are no springs or ponds in the area, but a well does exist at the caretaker's residence which is upgrade from the operational area.

FIGURE III-7
Macleay Site



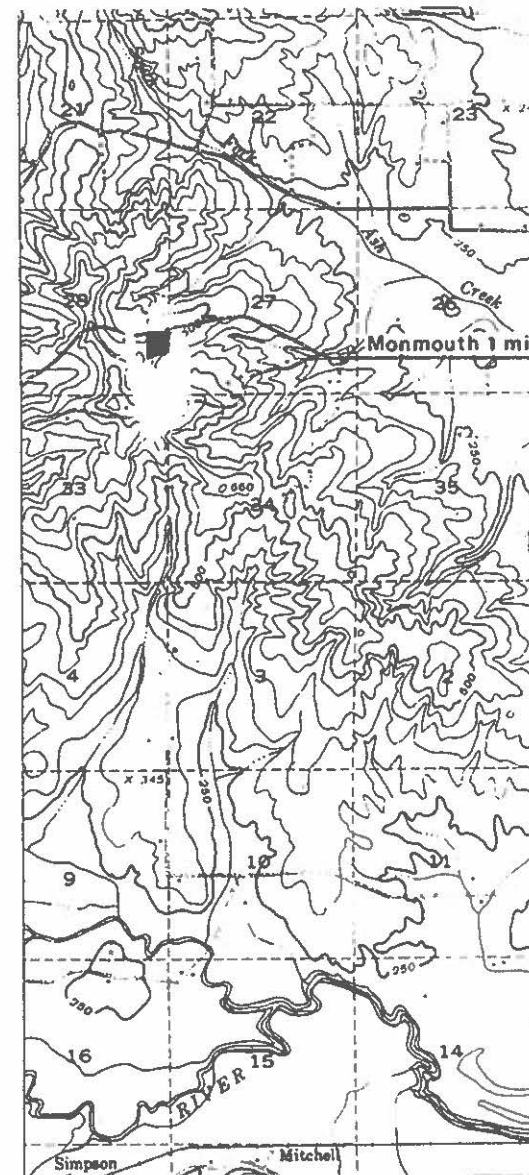
Monmouth-Independence Site: Under the jurisdiction of Polk County, a privately owned and operated disposal site is located 3½ miles west of Monmouth in the vicinity of Fishback Hill. This site, containing seven usable acres is in flat terrace country with some rolling hills. It serves the cities of Monmouth, Independence, Dallas and the surrounding Polk County area.

At present the site annually receives approximately 64,000 CY of mixed residential, commercial, industrial and some demolition wastes. White goods are occasionally scavenged by the public but are otherwise buried with other wastes in an area method modified landfill. Access to the site is by a short gravel road off State Highway 51. There are no residences on or within view of the site. The only existing building is an office and workshop. Present zoning of the site is Exclusive Farm Use and is shown on the land use plan as agriculture and undeveloped land.

Water used at the site is supplied by the Monmouth Water District because the area lacks developable groundwater. Site topography indicates that groundwater, if present, would flow southeasterly in which direction there are no known developed uses. The site is remote from any surface water and is free from any flooding. Absence of a groundwater table shallower than 150 feet and absence of surface water

drainage indicate that leachate production is probably minimal. Diversion ditches or berms have not been necessary.

FIGURE III-8
Monmouth-Independence Site



Newberg Site: Yamhill County franchises a 42-acre privately owned and operated disposal site located about two miles south of the City of Newberg. The site is partially in the Willamette River floodplain. The area served by the site includes the City of Newberg, the northeast portion of Yamhill County, the southwestern portion of Washington County, and on some occasions Clackamas County.

Present annual quantities of solid wastes amount to 48,000 CY (about 9,600 tons) of residential, commercial, industrial and pulp wastes; tires; and white goods. White goods are separated and transported to Portland for scrap and all other material is compacted and covered in an area method sanitary landfill. In addition to white goods, some paper, cardboard and junk metal salvage projects are conducted at the site.

For environmental protection measures, the greatest attention has been given to water pollution prevention. Water tables determined from well logs indicate that the local groundwater is approximately at river level. No known studies are available on groundwater but existing topography of the site indicates that the direction of the flow is southerly to the river. There are no known uses of subsurface waters down-gradient. A dike has been constructed around the area used

for summer operations. Higher ground is available for winter operations. The dike also prevents inundation and erosion from Chehalem Creek or the Willamette River. Surface water from the higher ground in the adjoining terrace could be diverted by means of a drainage ditch below the terrace and above the landfill area with discharge to a slough. A paved County Road No. 65, known as "River Road," provides access to the site with a gravel on-site road to the operational area. There is one mobile home and one residence on the upper level approximately 300 feet from the site operations.

FIGURE III-9
Newberg Site



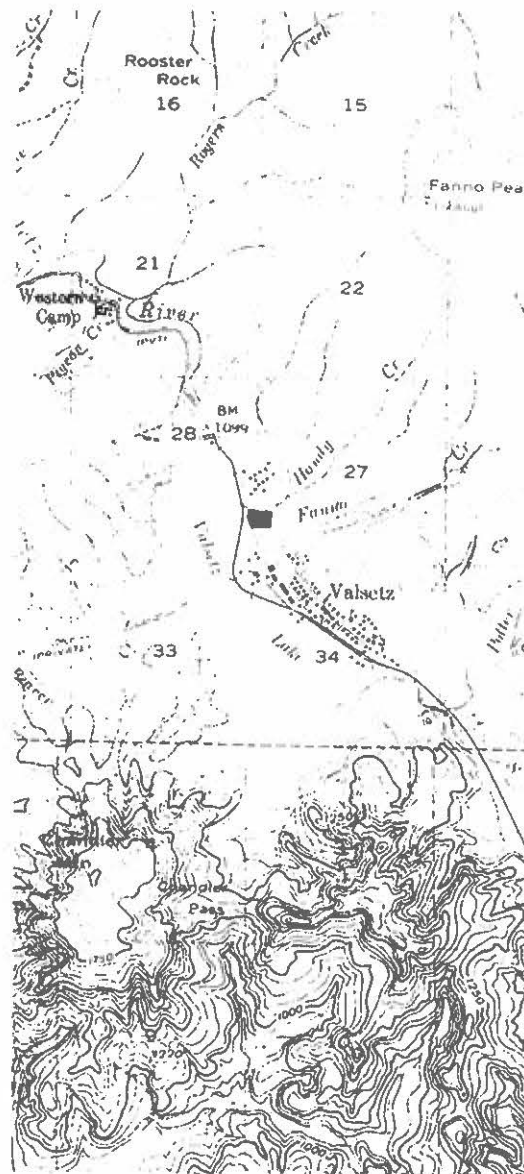
FIGURE III-10
Valsetz Site

Valsetz Site: The Valsetz disposal site (Polk County) is located about one mile west of Valsetz. The site presently occupies only about one acre. It serves a population of about 500 in and around Valsetz. Boise Cascade Company owns and operates this site without charge to residents of this mill community.

Access to the site is 1½ miles of gravel road (Western Road) off County Road 8610 (Valsetz Road). Land use in the vicinity is forest land and the site is zoned for timber conservation.

Present annual solid wastes amount to 1,400 CY of residential, commercial, and demolition wastes; tires; tree trimmings and white goods. No special handling is utilized at this site and all solid wastes are buried in an area method modified landfill.

The site is located on a bench adjoining a hillside so that all surface water drains off to the west or north toward Hardy Creek. A ditch on the north side acts to contain and filter surface drainage prior to reaching Hardy Creek. Information on groundwater flow is not available. However, topography of the site indicates the groundwater flows northerly with no known down-gradient uses. Surface and groundwater conditions indicate minimal leachate production at the site. There are no buildings or major improvements on the site.



Whiteson Site: This site, containing 28.4 usable acres of a 40-acre tract, is about 2½ miles west of Whiteson and 6 miles south of McMinnville, in Yamhill County. The site is partially in the South Yamhill River floodplain with relatively low rolling farmland surrounding the site. Privately operated, but under the ownership and control of Yamhill County, the site serves the City of McMinnville and western Yamhill County.

Approximately 130,000 CY/YR of mixed residential, commercial and industrial wastes are handled and landfilled by the trench method.

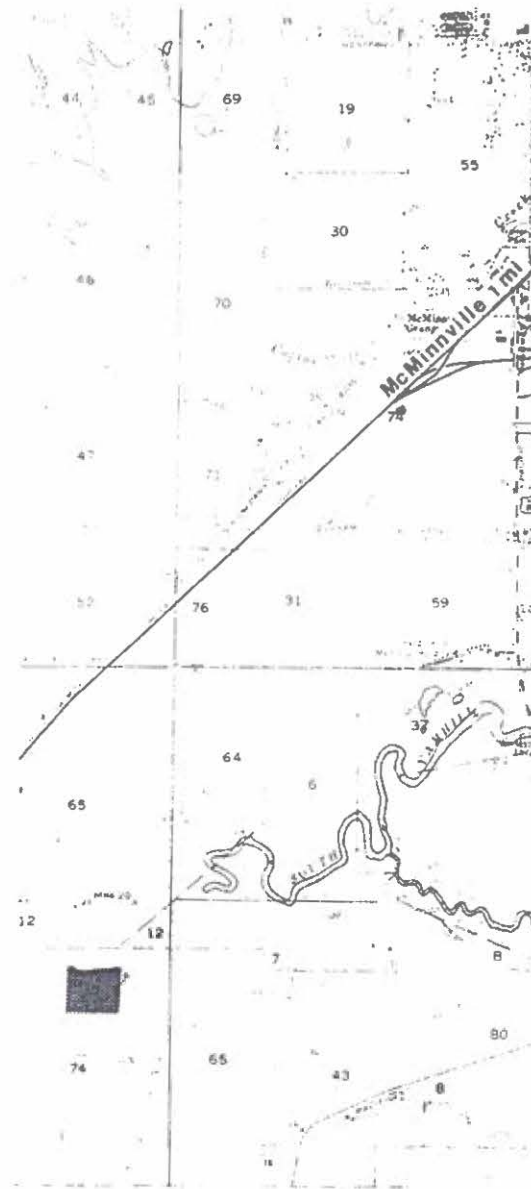
The permeability of subsurface soil is low and, as a result, a minimal amount of local groundwater migrates vertically through the clayey materials. Most of the local groundwater recharge appears to be contained within the upper several feet of silt loam and silty clay. Horizontal migration has been cut off with "french" drains constructed along the higher side. A significant amount of surface water which drains across the site has been diverted around the fill to a storm drain.

The U. S. Corps of Engineers and State Engineer's office have recorded the approximate height of the 1964 flood (estimated to be 100 years frequency) to be 135 feet above main sea level. Thus a levee was constructed at 139 feet elevation.

FIGURE III-11
Whiteson Site

The average elevation of the upper area is 150 feet. Current velocities during high floods are less than two feet/second and the levee also provides erosion protection. Summer filling of a floodplain section of the site (approximately six acres) according to the Corps, would exhibit negligible effects upon upstream flood levels.

Bordered on two sides by the South Yamhill River, the site is down-gradient of all known uses of groundwater. No wells or other groundwater uses appear affected through existence of the site. The only building in the immediate vicinity of the site is a residence near the access road to the site. This residence is significantly affected by traffic approaching the site. Traffic is estimated at an average of 12 commercial and 30 private vehicles per day. There are about 20 residences within a one-mile radius.



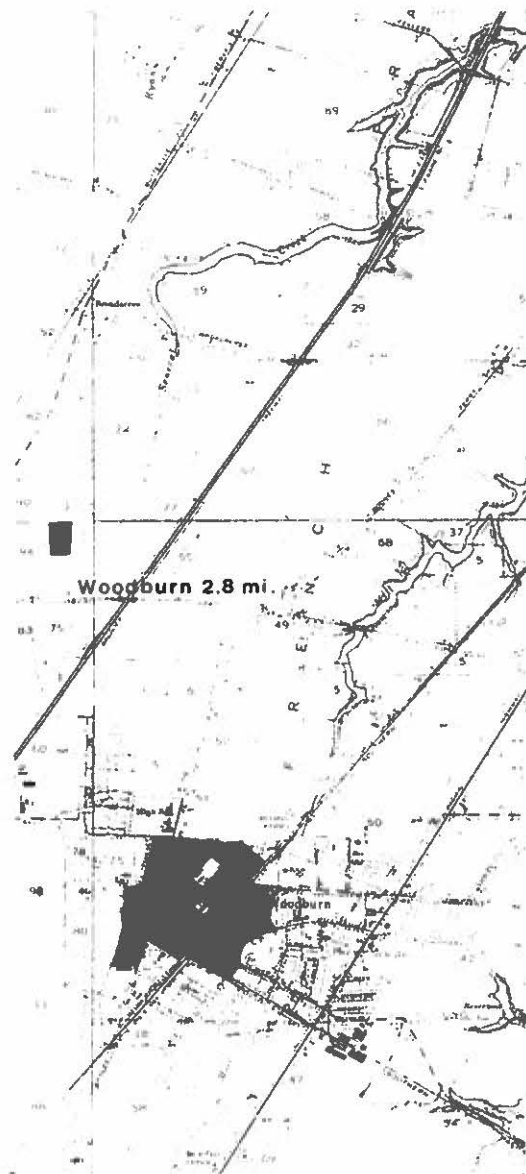
Woodburn Site: The present Woodburn disposal site, owned by Marion County but privately operated, is located three miles northwest of Woodburn. The site contains 10 acres of which only eight are usable. It serves the Cities of Woodburn, Gervais, Aurora, Hubbard, Mt. Angel, Silverton, Scotts Mills, Donald and St. Paul in Marion County and the Wilsonville area in Clackamas County.

Land use of the area is agriculture and zoning is Residential-Agriculture.

At present, the Woodburn site handles 130,000 CY/YR of residential, commercial, industrial, and food processing wastes. White goods are separated and transported to a ferrous metals broker in Portland. All other waste materials are compacted and covered bi-weekly in an area method modified landfill.

Topographically, the area is flat with the present fill considerably above surrounding terrain. Since the present site is filled to capacity an evaluation of groundwater conditions, surface water effect, and potential for leachate production was not undertaken during the study. The existing site is to be permanently closed during 1974.

FIGURE III-12
Woodburn Site



Existing Demolition Disposal Sites: Three landfills are operated in the Region for disposal of an estimated 167,000 CY/YR of demolition wastes and land clearing debris. The sites are considered modified landfills and serve the major urban areas around Salem and Corvallis, as well as other outlying areas within economical hauling distances. The existing sites are important in the evaluation of the present public system because of continued demand, need for control of dumping, and the difficulty with private transport and disposal of demolition wastes if mixed with other wastes. Separate handling of demolition wastes from mixed wastes is usually necessary, primarily to prevent problems at regional sanitary landfills.

Corvallis Demolition Site: The Corvallis demolition site, owned and operated by Valley Landfills, contains 100 usable acres and is located about ¼ mile southeast of Corvallis in Linn County. Under the control of Linn County, the site serves the cities of Corvallis and Philomath and surrounding portions of Benton, Linn and Polk Counties. Agricultural land use predominates in the area which is zoned OLU--General Farming and Light Industry (no residential).

Presently, about 104,000 CY/YR of demolition wastes and land clearing debris are received at the site annually. Some salvageable materials are reclaimed; the

remaining wastes are buried in an area method modified landfill.

Soil at the site is about six feet in depth underlain with gravel to depths in excess of 60 feet. Well logs indicate a local groundwater table at a depth of 20 feet with 10-foot seasonal fluctuations. No information on groundwater is available but topography suggests a north or north-westerly flow with no known down-gradient used. Because the Willamette River borders its western edge and elevation, the site has been diked on all sides. Dikes also divert surface water from other areas away from the site. A gravel access road maintained by the operator connects to Ireland Road. No buildings exist on the site nor can it be viewed from any residence. An aeration pond in the south half of the site provides treatment through aeration for site drainage. Because of the large amounts of leafy or organic material deposited, this control feature has been incorporated into the operational features.

FIGURE III-13
Corvallis Demolition Site



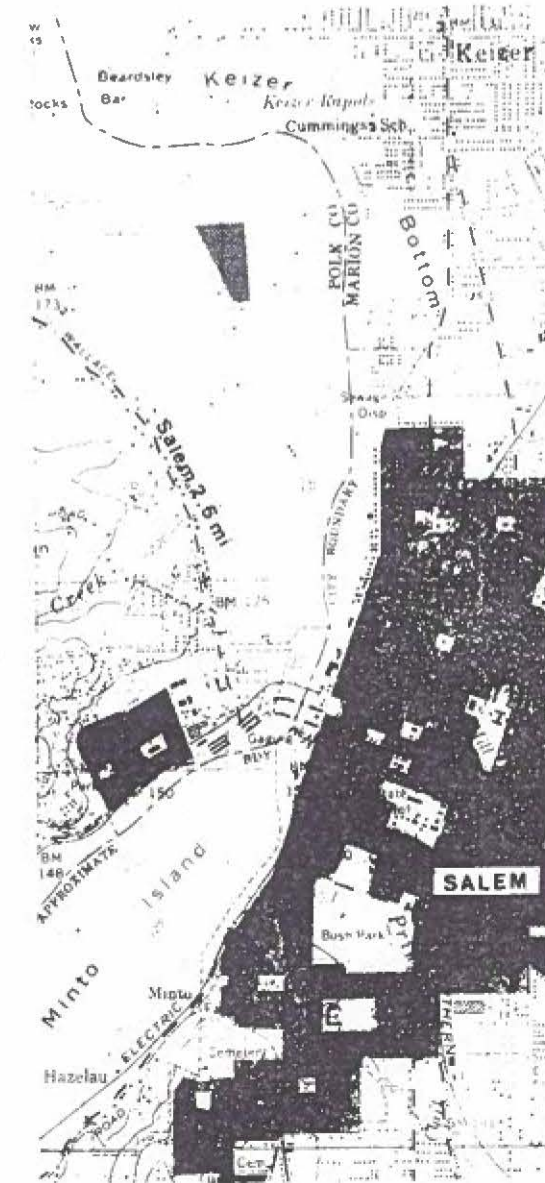
Fowler Demolition Site: The Fowler demolition site (Polk County), is privately owned and operated. It is located near Salem about 1½ miles east of the community of Brush College. The site which contains 14 usable acres is within the Willamette River floodplain. It serves the City of Salem and the surrounding area in Marion and Polk Counties. Agricultural and sand and gravel activities predominate in the general area. Zoning is presently Exclusive Farm Use.

Presently about 63,000 CY of demolition waste and land clearing debris are received at the site annually. Occasionally tires and car bodies are accepted at the site. Wastes are compacted and covered weekly in an area method modified landfill.

Soil at the site is approximately seven feet deep and is underlain with rock. Well logs indicate a local groundwater table at a depth of 17 feet. No information is available on groundwater flow; however, topography suggests a northeasterly direction with only irrigation down-gradient uses. The Willamette River, 1,500 feet to the east, influences surface water elevations near the site. No surface water diversion ditches or structures exist.

Access includes a gravel road off River Bend Road which connects to State Highway 221. Residences and an office are located near the entrance.

FIGURE III-14
Fowler Demolition Site



Monroe Demolition Site: The Monroe demolition site is owned and operated by the City of Monroe and Benton County. It is located approximately one-half mile east of Monroe on 30 acres. Five acres are usable for waste disposal. The site is presently open to the public two days per week to serve approximately 1,000 people. An estimated 450 CY of demolition wastes, bulky wastes, tires, white goods, and autos are received annually. No burning occurs. Wastes are compacted periodically. The property is zoned Exclusive Farm Use and the surrounding land use is predominately agriculture. A need exists for an operational plan and a pressure water system. Future use of the Monroe demolition site is discussed in Chapter IV.

Existing Sludge Disposal Sites: Two existing sludge lagoons handle an estimated 1,000,000 gallons of the septic tank sludge generated in the Region. The majority of septic tank sludge generated is handled by sewage treatment plants. Historical records of this quantity are not available. No other sludge disposal sites for public use exist in the Region. Private sites, however, are used for special wastes such as pulp mill clarifier sludge.

Cal Nored Sludge Lagoon: The Cal Nored sludge lagoon (Linn County) is located about two miles south of the City of Albany and is privately owned and

operated. No definable service area exists for use of this facility. Topography of the area is generally flat with swales to the northwest and east of the site. Access to the site is by Oakville Road.

Agricultural land uses predominate in the area which is zoned SR, Suburban-Residential. Conditional use has been authorized for continued operation of the facility in the SR zone.

Only residential septic tank sludge (pumpings) is accepted at the site. An estimated 500,000 gallons of waste are dumped annually into a diked lagoon by several septic tank pumpers operating in the area. Since more than one operator is using the lagoon, accurate volume estimates or records are not available. The quantities received appear to be within the holding capacity of the lagoon. No other treatment of the waste is provided.

The lagoon which is diked and fenced, is located in the floodplain of the Calapooia River. A three-foot freeboard is maintained with no overflow pipe. A gate on the gravel access road is locked when the operator is not in attendance. Vegetation screens the site from view. There are no buildings on the site and the nearest residence is approximately 200 yards to the east.

The nearest domestic well is about 400 yards from the lagoon. There are no indications that pollutants have leached into the groundwater or surrounding surface waters. The lagoon is considered to be satisfactorily operated and maintained.

FIGURE III-15
Cal-Nored Sludge Lagoons



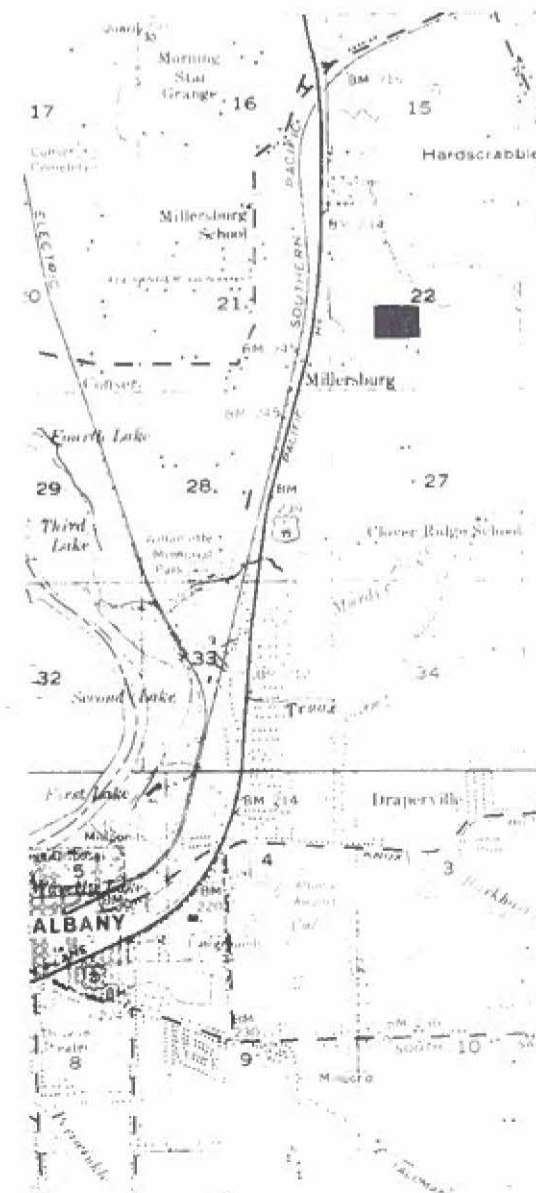
Roto Rooter Sludge Lagoon: This sludge lagoon (Linn County) is owned by Delbert M. Cox and operated by Delbert E. Brown. The surrounding area is rolling hills and the lagoon itself is on a hillside.

Used only by the operator, the facility accepts only residential septic tank sludge. An estimated 500,000 GAL/YR of pumpings are stored in the lagoon. No other treatment is provided.

Clay soils at the site have been used to line the bottom and inner faces of the lagoon dikes to reduce exfiltration. A 16 foot wide berm exists around the perimeter of the lagoon. Approximately a three-foot freeboard is maintained with no overflow pipe. Surface water diversion ditches have been constructed around the dikes. Access to the site is over a gravel road and is controlled by a locked gate and cyclone fence. There are no buildings at the site and the nearest residence is approximately 600 yards to the south. No streams, springs, ponds, or wells are known to exist at the site. Vegetation screens the lagoon from view. The lagoon is considered to be maintained in a satisfactory manner.

Ranching land uses predominate in the area which is zoned ART, agriculture-residential-timber. Conditional use has been granted for continued operation of the facility in the ART zone.

FIGURE III-16
Roto-Rooter Sludge Lagoons



PRIVATE WASTE DISPOSAL

PRACTICES: Private waste disposal practices include primarily landfills or facilities privately owned and used only for disposal of wastes from a private source. Public use or disposal of wastes collected from the general public is not allowed at a private disposal site or facility. Such a site is usually provided by an industry or institution to dispose of wastes resulting from its own manufacturing or institutional operations.

Little information about private disposal practices is available. Most of the data available for this report was obtained from inventories conducted during 1971 and 1972 by the Mid Willamette Valley Air Pollution Authority. The major relevance of an evaluation of current private disposal practices is to estimate the amounts of wastes which could be expected to enter the public system under future conditions.

According to the available 1971-1972 information, the region had about 60 private industrial waste disposal sites, most of which were in Marion and Linn Counties. Also at that time about 45 commercial, industrial, or institutional incinerators and five wigwam waste burners existed in the Region. There were no municipal incinerators in the Region.

It has been estimated that wastes for private disposal historically amounted to

about 1,000,000 uncompacted CY/YR of solid wastes. Wastes disposed of at incinerators were not inventoried or included in this total. Approximately 270,000 uncompacted CY of solid wastes, primarily wood residues, were incinerated annually in the five wigwam waste burners in use at that time. A remaining 730,000 CY of wastes were disposed of on land by various means. Approximately 200,000 CY/YR were lagooned, 12,000 CY/YR entered private open dumps, 75,000 CY/YR were privately landfilled, and 486,000 CY/YR were stockpiled for later utilization.

The 1971-1972 data has not been updated but knowledge concerning various present economic and environmental conditions in the Region suggests probable changes that have occurred in the intervening period. The number of wigwam wood waste burners and the amount of wood residue incinerated has probably decreased due to more restrictive air quality standards and sale or greater utilization of wood waste materials for new products. It also appears that the number of landfills and the amount of wastes disposed of in them have increased as an alternative to more restrictive air quality standards. The amount of wood wastes stockpiled previously represented nearly half of the total amount of wastes for private disposal. This amount fluctuates considerably under short-term economic conditions but is still about half of the amount for private

disposal—assuming that increased quantities from industrial growth and phase out of wigwam burners have been offset by a greater demand for hog fuel. The number of open dumps, lagoons and land spreading operations also fluctuates with anticipated increases in land spreading for agricultural wastes.

It should be noted that the disposal of wood waste in the Region's landfills is not compatible with the Department of Environmental Quality goals and objectives. A decrease in the amount of landfill volume consumed by wood wastes and improved incineration, reuse, or recovery are goals which should be considered for the Region.

Present Resource Recovery Practices

Reclaimable solid wastes include the waste materials which might normally be discarded but instead are recycled or recovered for reuse and future processing/utilization.

Chemeketa Region's proximity to the Portland metropolitan area with its secondary materials market enhances resource activities in the Region.

Present solid waste reclamation efforts consist of salvage at the disposal site by attendants; source reduction of mixed, industrial, and commercial wastes either by

the owner or collector; separate collection of ferrous scrap by secondary materials dealers; oil re-refining; house-to-house pickup or delivery of separated materials to a collection depot by householders for further sorting by civic or environmental groups; activities regarding returnable beverage containers; agricultural use of grass, straw and cannery wastes; and industrial reclamation of wood, metal and paper production wastes.

MATERIALS. Materials which are presently reclaimed and reprocessed within the Region include metals, glass, newspaper, kraft paper and cardboard from municipal, commercial and industrial wastes; animal feed from cannery wastes and straw; metals from white goods and autos; and particleboard.

METHODS. The present method of reclamation of municipal, commercial and industrial wastes and scrap is either presegregation at the source or hand sorting at the disposal site. The waste oil is re-refined by filtering and distillation at chemical refineries and is also used as a fuel mixed with conventional fuel oil. Returnable bottles are reused by the various companies involved while one industry processes non-returnable containers as cullet into new glass containers. Pilot plant operations have densified grass and grain straw into cubes and pellets for shipment to Japan for cattle feed. Cannery wastes are settled and

dewatered for animal feeding and soil enrichment. Wood wastes are chemically treated to extract the lignin for paper production or, with the aid of a binder, formed under pressure into particleboard, briquettes and presto-logs or reduced in size for bark dust and chip export. Chemically-treated newspaper is combined with fly-ash, fir planer shavings and other types of waste paper and compressed into conduit pipe, flower pots and exterior siding. Newspaper is also exported from the Region in large quantities. Kraft paper mills utilize waste corrugated cardboard in the manufacture of kraft paper and new corrugated cardboard. The Region has one steel mill in operation with two electric furnaces which utilize 100 percent scrap as raw material, which can be ferrous metals from compacted white goods or shredded auto bodies.

AMOUNTS. It is estimated that municipal solid waste is composed of: paper, 50 percent (including 8 percent newspaper, 10 percent cardboard and 32 percent other paper); metal, 8 percent (including 6 percent ferrous metals and 2 percent nonferrous metals); glass, 7 percent; wood, yard, brush, etc., 15 percent (including 10 percent yard and 5 percent from other sources); rubble and trash, 6 percent; plastics and textiles, 2 percent (textiles, ½ percent); and garbage, 12 percent. The foregoing and following figures are tabulated in Table III-10.

Of the 16,591 T/YR of newsprint, about 12 percent (2,000 tons) of the estimated usage is recycled. An estimated 5,000-6,000 tons of cardboard is being recycled. This represents about 25-30 percent cardboard which is potential solid waste.

Tin cans which comprise over five percent of the total municipal solid waste burden are currently recovered by only a few community recycling centers at a rate of about 60 T/YR, slightly over ½ percent of the total available supply.

The amount of glass in solid waste has been affected by the Oregon Bottle Bill. About 38 percent of the potential glass in solid waste is containers affected by the Bottle Bill. Of the 14,517 T/YR of glass in the Region, 90 percent or 13,065 tons is estimated to be glass containers of which 41 percent is estimated to be beer and soft drink containers. Thus, 5,392 tons of glass could be covered under the Bottle Bill. If each container made ten trips, the amount removed would be 90 percent or 4,853 tons per year, which is approximately 34 percent of the amount of glass in the Chemeketa Region. In addition, community recycling projects have recovered about 250 tons for recycling as cullet.

Textiles represent about ½ percent of the municipal solid waste. Much more could be

Table III-10
RECYCLING SUMMARY

Commodity	% of Municipal Mixed Refuse	Amount Generated, T/YR	Amount Recovered, T/YR	Percent Recovered
Glass				
Nonbottle Bill	4.4	9,125	250	2.7
Bottle Bill	2.6	5,392	4,853	90.0
Paper				
Newspaper	8.0	16,591	2,000	12.1
Corrugated Cardboard	10.0	20,739	5,500 ¹	26.5
Fine & Mixed Paper	32.0	66,364	5,000 ¹	—
Ferrous Metal				
(Tin) Cans	5.0	10,370	60	0.6
Other	1.0	2,074	4,240 ²	0.0
Nonferrous Metal	2.0	4,148	2,000 ³	0.0
Textiles	0.5	1,037	1,700 ³	0.0
Garbage	12.0	24,887	—	—
Rubble & Trash	6.0	12,443	—	—
Plastic	1.5	3,111	—	—
Wood, Yard, Brush	15.0	31,109	—	—
Total Mixed Refuse	100.0 ⁴	207,390 ⁵		
Special Wastes				
Oil (Crankcase)		2,000,000 gal/yr	820,000 gal/yr ⁶	41.0 ⁷
Tires		6,150 T/YR	1,600 T/YR	26.0

¹ 4,000 T/YR of fine paper recovered; 1,000 T/YR of mixed paper recovered.

² Recovered tonnage is larger than mixed municipal refuse since tonnage recovered includes material from sources other than municipal refuse.

³ Recovered tonnage includes material from sources other than municipal refuse.

⁴ The percentages are national figures.

⁵ The 207,390 tons is the summation of commercial, residential and institutional wastes reported in the Region in 1972 of which 137,350 tons is residential waste.

⁶ 400,000 gallons crankcase oil; 420,000 gallons crankcase oil (dust control).

⁷ 20 percent crankcase oil; 21 percent crankcase oil (dust control).

expected if it were not for reclamation activities of charitable organizations. Although accurate figures are not available, it is estimated that over approximately 1,700 tons of textiles per year are recovered for resale.

Figures for the amount of lube oil disposed of are rough estimates, but, reports indicate that of an estimated 2,000,000-gallon consumption per year in the Region, 20 percent or 400,000 gallons are collected for re-refining.

Like textiles, much of the nonferrous metals presently recycled do not appear in the solid waste stream figures because such a large amount is constantly diverted before entry into the solid waste stream. National estimates are that about 48 percent of the nonferrous metals available for recycling are actually recycled. From these figures, it is estimated that 1,000-3,000 tons per year are recovered in the Region and about 2,000 tons per year are lost in the solid waste stream.

Of the total amount of tires generated in the Region, it is estimated that 1,600 T/YR are retreaded and about 4,550 T/YR become waste.

Fine grade paper and mixed grades make up 32 percent of the waste stream. Although accurate figures are not available, it is believed that around 4,000 T/YR of

fine grades are recycled with approximately ¼ that amount for mixed grades.

VALUES. Unit values for these materials vary with the market demand, degree of purity and processing. Prices (December 1973) given below are approximate to give an indication of worth to the generator.

Material	Price, \$/TON ¹
Newspaper	\$ 10- 30
Corrugated Cardboard	35- 55
Fine Grade Paper	15-270
Mixed Paper	0- 20
Glass Cullet	15- 20
Tin Cans	10- 20
Aluminum	180-220
Copper	500-800
Lead	140-240
Zinc	120-200
Steel	5- 50

¹ December 1973, f.o.b. Portland.

IMPACT. Since recycling activities often involve a source diversion of materials which precludes their collection with other solid waste, impact on disposal and collection is one of reducing waste volumes from those expected with no recycling. However, if demand for materials being recycled diminishes, the solid waste collection and disposal system is forced to absorb the increased burden. Approximately

20,000 T/YR are estimated to be removed from municipal solid waste via reuse and recycling--this is approximately ten percent of the generated municipal solid waste.

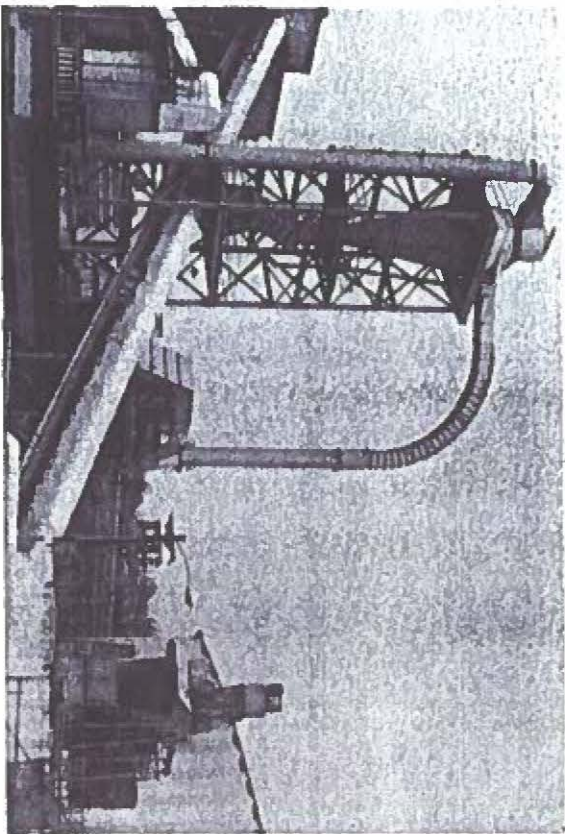
Those items now recycled from residential sources that could appear in routine solid waste collection include glass containers, tin cans, newsprint, old clothing and other textiles (tires and motor oil are not included in normal residential collection practices). None of these items are currently separated for recycling by solid waste collectors. These items amount to 4,010 T/YR; however, if the volume reduction effect of the Bottle Bill is included the amount would be increased to 8,863 T/YR removed by reuse and recycling. In effect, this would be 6.5 percent of the 137,350 tons of the 1973 theoretical generated residential waste.

The major recycled item from commercial sources is paper, particularly corrugated cardboard. Collection of postconsumer corrugated is currently done by both solid waste collectors and specialized waste paper collectors. Approximately 5,500 T/YR, or 26.5 percent, of the total amount of corrugated cardboard available is collected from these sources. In some areas, prices (1973) approaching \$50 per ton (f.o.b. Portland) have made this a highly sought-after commodity. In other areas, remoteness or quantity available have reduced recycling attempts. Since the

handling of corrugated for recycling is more efficient if it is collected with a minimum of contamination from other materials, some solid waste collectors have reorganized their routes so as to obtain maximum loads of segregated cardboard. Separate collection is not mandatory if processing residue can be handled. In Albany, the recovery facility is located on the road to the landfill; since the material is not always completely segregated, this location permits a short haul to dispose of residue. To induce commercial accounts to separate their cardboard wastes, the collectors offer lower collection rates. In some cases, especially where the generator may bale the cardboard, the solid waste collector will purchase the former waste material. Paper dealers almost always pay the generator for the materials collected.

Where controls are not available, an excessive amount of collectors may enter the field, thus reducing the potential of any one firm having an efficient system. All areas of the Chemeketa Region are under solid waste collection franchises which have been extended to include collection for recycling in some instances. Such a practice of restricting entry gives increased viability to the collection program so long as the franchise administrator assures that all opportunities for recycling are actively pursued.

LIMITATIONS. Limitations to current resource recovery activities are essentially the low demand for secondary materials and associated high risk to the industry. The cyclic variation in demand makes it difficult to plan for investment financing. Disposal site salvage is limited by high labor costs for small volumes of materials. Institutional barriers, such as discriminatory freight rates, also limit resource recovery activities.



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plan
IV

PLANNING CRITERIA AND PROJECTIONS

Economic Projections

Regional economic growth to the year 1994 will likely be characterized by a steady upward progression of total employment, by an increasing concentration of economic growth in the larger communities of the Region, and by the strengthening of past economic trends, especially in the areas of construction, manufacturing and commercial and service activities.

Manufacturing is expected to increase at a rapid rate during the next 20 years, then decline somewhat thereafter. However, manufacturing employment is expected to decline in relative economic importance over the next 25 years. This decline, estimated at five percent, reflects the past trends toward plant automation and mechanization and the distorting effects caused by rapid growth in retail and service industries.

Agriculture will continue to decline in relative economic importance. The rate of decline will be somewhat less pronounced than in previous periods and is expected to be only moderate beginning in the eighties. Large declines in agricultural employment are anticipated. Indeed, agricultural employment may decrease by 25-35 percent.

The projected decline in agricultural and industrial employment during the 1974-1994 period will be offset almost entirely by the growth in commercial and service employment. The majority of all regional employment is forecasted to occur in these two sectors.

Retailing is projected to rise fairly rapidly in actual employment. Service employment, primarily generated by the growth in professional and governmental activities, is assumed to increase at a moderate rate and is expected to provide the vast majority of all employment in the Region.

Population Projections

The Willamette Valley has historically contained the state's highest population densities as well as having the largest growth rates. As a result, the population projections for the five counties in the Chemeketa study area are very generous. Figure IV-1 illustrates these projections based on ten-year intervals. In addition, the following sections present short discussions of expected growth patterns within each county and the distribution of population throughout the incorporated areas. This type of data will be useful in developing service areas for solid waste collection and locating regional facilities.

FIGURE IV-1
Regional Population Projections

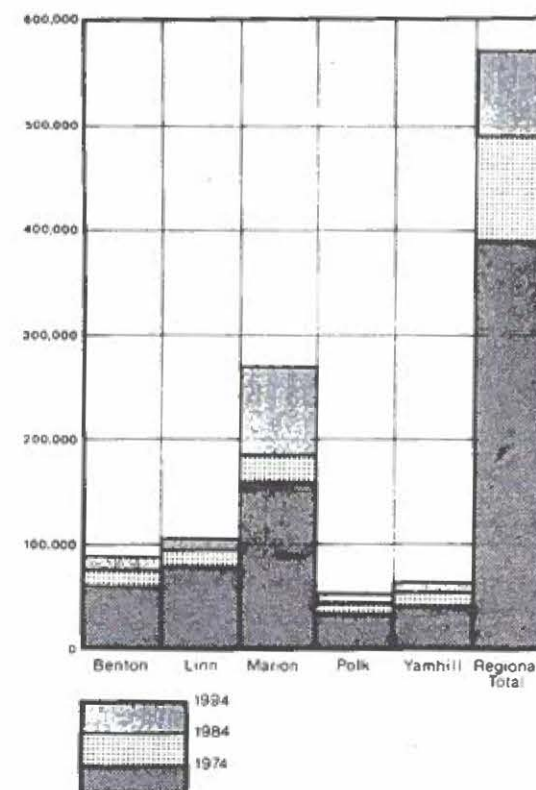
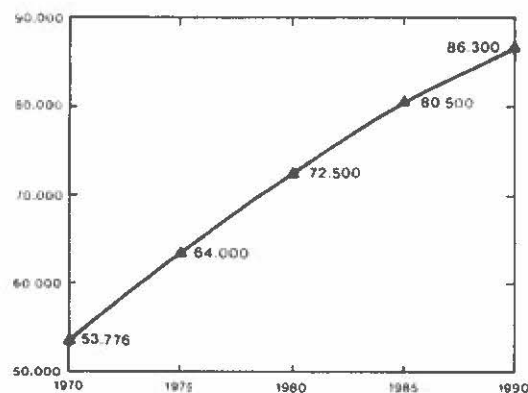


FIGURE IV-2
Benton County Population Projections



BENTON COUNTY. Benton County is anticipating a population increase of 25,000 by 1990. Most of this increase will be centered in the City of Corvallis and surrounding urbanized area. This community has shown a 70 percent increase over the past decade, and the area should remain one of the fastest growing communities of the Willamette Valley. This is a direct result of the influence of Oregon State University and a favorable location between Eugene and the northern portions of the Willamette Valley. Projected city populations are listed in Table IV-1.

LINN COUNTY. As illustrated in Figure IV-3, Linn County is expecting an increase of approximately 20,000 persons by 1990. Albany will continue to be the major growth center as indicated by its steady and rapid growth over the past three decades. This trend is expected to continue because of the city's location and diversified industrial base.

In the rural areas, it is likely that Brownsville, Lebanon, Halsey, Harrisburg, Mill City and Sweet Home will continue to show significant growth rates as a result of existing industries, favorable locations and increasing potentials for recreational development. Projected city populations are listed in Table IV-2.

FIGURE IV-3
Linn County Population Projections

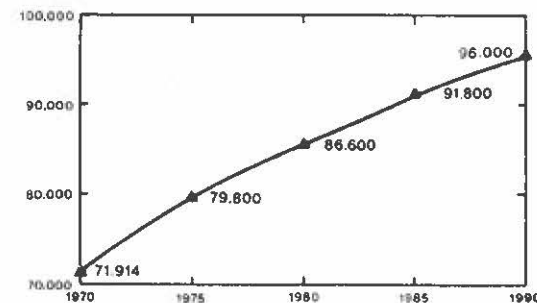


Table IV-1
POPULATION PROJECTIONS
FOR BENTON COUNTY INCORPORATED CITIES

City	1970	1972	1975	1980	1985	1990
Corvallis	35,153	36,800	40,000	45,700	50,300	55,800
Monroe	443	470	500	550	600	650
Philomath	1,688	1,875	1,900	2,250	2,500	3,000
TOTAL	<u>37,284</u>	<u>39,145</u>	<u>42,400</u>	<u>48,500</u>	<u>53,400</u>	<u>59,450</u>

Table IV-2
POPULATION PROJECTIONS
FOR LINN COUNTY INCORPORATED CITIES

City	1970	1972	1975	1980	1985	1990
Albany	18,181	20,400	22,300	25,800	29,000	31,400
Lebanon	6,636	7,625	8,000	8,800	9,680	10,600
Sweet Home	3,799	3,990	4,000	4,280	4,500	4,800
Other Cities	<u>5,675</u>	<u>5,801</u>	<u>6,250</u>	<u>6,900</u>	<u>7,600</u>	<u>8,300</u>
TOTAL	<u>34,291</u>	<u>37,816</u>	<u>40,550</u>	<u>45,780</u>	<u>50,780</u>	<u>55,100</u>

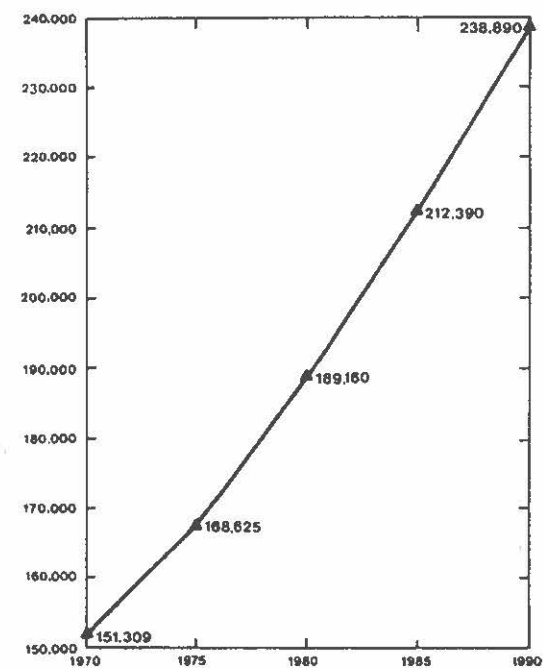
MARION COUNTY. Of the five county area, Marion County is projected to have the greatest population increase—an additional 88,000 by 1990 or a total approaching 240,000. This rate of growth is not unexpected, since the Salem area is the third largest metropolitan area in the state, is located in the mid point of the valley and contains state government operations.

In addition to the continued expansion of the Salem urbanizing area, Table IV-3 shows a noticeable shifting of population growth to the northern portion of the county. This shift is predicted to occur primarily in the Hubbard-Woodburn area which contained approximately 11 percent of the county's population in 1970. This percentage is expected to increase to almost 14 percent by 1990.

Table IV-3
POPULATION PROJECTIONS FOR
MARION COUNTY INCORPORATED CITIES

City	1970	1972	1975	1980	1985	1990
Aumsville	590	730	940	1,150	1,400	1,700
Aurora	306	360	590	760	970	1,250
Detroit	328	340	375	420	465	510
Donald	231	220	350	470	640	860
Gates	250	240	290	330	370	410
Gervais	746	745	990	1,180	1,400	1,660
Hubbard	975	1,170	1,590	2,050	2,650	3,420
Idahna	280	279	300	320	340	360
Jefferson	936	1,025	1,260	1,550	1,890	2,300
Mill City	328	340	375	420	465	510
Mt. Angel	1,973	2,120	2,480	2,850	3,350	3,900
St. Paul	347	335	470	520	575	630
Salem	62,960	68,272	75,783	89,022	109,360	122,565
Scotts Mills	208	230	270	310	350	390
Silverton	4,301	4,525	5,800	6,400	7,100	7,900
Stayton	3,170	3,375	3,790	4,360	5,020	5,760
Sublimity	634	630	815	940	1,080	1,240
Turner	846	830	1,325	1,650	1,975	2,300
Woodburn	7,495	8,260	9,550	10,900	12,430	14,160
TOTAL	86,904	94,026	107,343	125,602	151,830	171,825

FIGURE IV-4
Marion County Population Projections



POLK COUNTY. A 42 percent population increase is projected for Polk County in the next two decades, or an increase from approximately 35,000 in 1970 to about 50,000 in 1990. This projection is based on the assumption that the county will continue to contain 1.7 percent of the state's population as the county has over the past 40 years.

Table IV-4 illustrates projected increases for Polk County communities. Projections for Dallas, Independence, Falls City and Willamina indicate a growth rate similar to past trends while West Salem and Monmouth are expected to grow at accelerating rates.

FIGURE IV-5
Polk County Population Projections

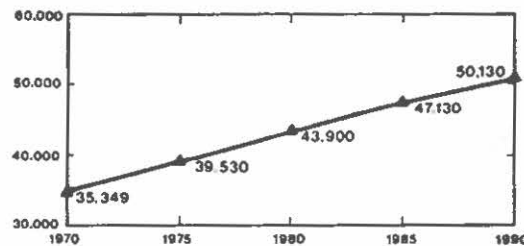


Table IV-4
POPULATION PROJECTIONS
FOR POLK COUNTY COMMUNITIES

City	1970	1972	1975	1980	1985	1990
Dallas	6,361	7,065	7,060	7,770	8,630	9,500
Falls City	745	755	770	790	800	810
Independence	2,594	3,145	3,450	3,950	4,450	4,900
Monmouth	5,237	5,725	6,090	6,940	7,670	8,400
West Salem	5,336	6,328	6,330	7,330	8,700	10,100
Willamina	478	505	520	570	660	750
TOTAL	20,751	23,523	24,220	27,350	30,910	34,460

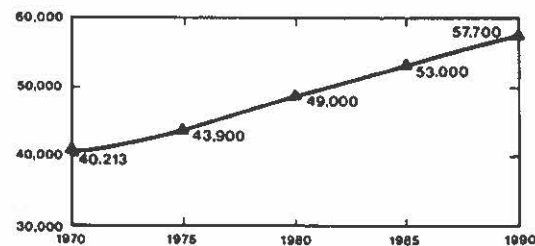
Table IV-5
POPULATION PROJECTIONS
FOR YAMHILL COUNTY COMMUNITIES

City	1970	1972	1975	1980	1985	1990
Amity	708	795	735	770	825	860
Carlton	1,126	1,215	1,251	1,289	1,328	1,367
Dayton	949	1,065	1,275	1,370	1,400	1,425
Dundee	588	780	660	800	900	1,000
Lafayette	786	940	951	1,116	1,350	1,585
McMinnville	10,125	11,950	11,750	13,500	15,000	17,000
Newberg	6,507	7,635	8,159	9,891	12,463	15,034
Sheridan	1,881	1,970	2,174	2,247	2,324	2,404
Willamina	715	755	1,325	1,380	1,450	1,525
Yamhill	516	540	530	540	550	575
TOTAL	23,901	27,645	28,810	32,903	37,590	42,775

YAMHILL COUNTY. A population increase of approximately 18,000 is projected for Yamhill County. This will produce a 1990 population approaching 58,000. This figure is based on a 1969 projection made by the Bureau of Governmental Research and Service at the University of Oregon with adjustments based on the 1970 census.

The influence of the growing Portland metropolitan area is quite pronounced, especially in the northern portion of the county. As a result, the Cities of Newberg, Dundee, McMinnville, Dayton and Lafayette are projected for high rates of growth in the coming years, while other communities (as indicated by Table IV-5) are projected to have a much slower rate of growth.

FIGURE IV-6
Yamhill County Population Projections



Future Land Use and Environmental Quality

There is a close functional relationship between areawide comprehensive planning and solid waste management, especially in regard to future development. Therefore, long-range land use plans are extremely helpful in developing a solid waste management program. In the Chemeketa study area, there are various governmental levels involved in long-range planning.

The State of Oregon is involved, through *Operation Foresight* in an environmental protection plan for the Willamette Valley. Hopefully, this program will be implemented through regional and local agencies. Regional agencies undertaking areawide planning in the Chemeketa Region include the Mid-Willamette Valley Council of Governments (Oregon District 3) for Marion, Polk and Yamhill Counties and Oregon District 4 Council of Governments for Linn and Benton Counties. Active planning is also taking place at the county community levels.

Existing and projected development trends as they affect the major growth areas of each county are briefly discussed in the following sections.

BENTON COUNTY. The development of additional commercial and residential areas is the most significant planning feature for Benton County. The Urban Area Plan includes the majority of population of Benton County in Corvallis, Philomath and vicinities. The Urban Area Plan, designed to serve the needs of the next 20 years, also provides additional industrial land. Commercial development will be concentrated in the existing urban centers of Corvallis and Philomath, with some new development taking place along the Highway 99W corridor and at intersections of regional highways. The development of new land uses in the Adair area may occur in the next few years and may draw existing urban area land uses northward.

LINN COUNTY. Linn County will continue to remain a rural area with major urban growth occurring in Albany, Lebanon and Sweet Home. Albany will experience the greatest amount of urban growth with residential expansion projected for the southwest and northeast areas. Albany will also continue to be the major industrial area of the county. The communities of Lebanon and Sweet Home will also experience residential growth along with some expansion of the industrial base. The remainder of the county will retain its rural character—essentially small communities scattered throughout the agricultural area of the Willamette Valley and the forest areas of the Cascades.

MARION COUNTY. Although Marion County contains a great deal of rural farmland and forest areas, it is generally characterized by one major city with a scattering of smaller communities which are potentially developable. The growth and development of these communities in future years is a subject of major importance in the county planning program.

The major urban area in the entire Chemeketa Region will continue to be the Salem Area. It is projected that there will be an increase of over 80 percent in population within the next 25 years and that most of this increase will be accommodated in medium-density residential development in the south, southeast, and northeast

portions of the Salem Area. An increase in industrial development is also forecasted in this area as well.

Outside the Salem urbanizing area, growth will be encouraged in local communities. The areas likely to show the most increases will be along the 99E corridor north of Salem. These communities would include Woodburn, Aurora and Hubbard. To the east, the Cities of Mt. Angel and Silverton show potential as do several of the communities along the North Santiam Highway.

POLK COUNTY. Polk County is a predominantly rural area experiencing urban and suburban development pressures in several areas. Dallas, the County Seat, is expected to show a 50 percent growth increase by 1990, mostly in the form of medium-density residential areas. The Monmouth-Independence area is also expected to show significant residential expansion. In addition to these residential growth areas, there is potential to develop commercial uses at various locations along Highway 22 between Dallas and West Salem.

YAMHILL COUNTY. Because of the proximity to the Portland metropolitan area, the northeast portions of the county will continue to feel development pressures. The major area of influence is the corridor between McMinnville and

Portland. McMinnville will continue to be the dominant urban area, although the Newberg-Dundee area is expected to attract an increasing amount of residential development. Because these communities are located on Highway 99W they will also attract additional industrial activities.

Other communities in the county which are expected to show significant growth include Lafayette, Willamina and Sheridan. Outside of the Portland-McMinnville corridor the county will remain basically rural in character.

One major environmental problem which can be anticipated is associated with urban areas and the need to locate and develop suitable and economical solid waste facilities. Because of higher land use intensities in urban areas, solid waste generation is also increased. Therefore, the potential for conflicts between urban land uses and solid waste facilities will be increased as appropriate locations for these facilities are sought.

Adding to the problem is the fact that many regulatory measures, primarily zoning ordinances, do not address themselves to certain types of facilities, mainly transfer stations and resource recovery centers. These facilities are many times excluded from zones not because they are inappropriate, but rather, because they are new concepts and have not yet

been considered within the ordinance, especially in terms of the critical locational requirements necessary to ensure successful operation of the overall system.

All cities and counties in the Region should insure that land use and zoning adequately provide for:

1. Construction and operation of resource recovery facilities in industrial zones,
2. Establishment and operation of neighborhood recycling centers, "drop off" stations or similar facilities in residential zones, and
3. Construction and operation of rural drop box stations and urban transfer stations in all zones.

As mentioned earlier, most of the population settlements occur in the valley areas where temperature inversions are relatively common. Smoke and odors, therefore, tend to be retained within these areas. This will place severe limits on combustion as a means of disposing of wastes. It also means that daily covering of wastes will be necessary to reduce odors. In the long run, these factors will make disposal more costly.

It will also be imperative that proper drainage measures are implemented to eliminate the possibilities of surface and

groundwater contamination from leachate. In addition, higher density residential land use will place restrictions on noise emissions from processing operations, the impact of which will be increased cost of processing for waste recovery or for disposal.

Projected Solid Waste Generation

Projection of solid waste quantities is at best a risky undertaking because few such projections have been made in Oregon and historical data to confirm the accuracy of the methods in use is lacking. It is known, however, that the amounts of solid wastes generated are related closely to the total population, economic conditions, and social patterns or life styles that exist in an area. As the total population increases, the total amount of solid waste has been observed to increase, although not in direct proportions. Economic conditions, primarily greater or lesser industrial activity, wastefulness associated with affluence, and increased source separation or reduction affect the total amounts of wastes generated and the amounts which enter the public system. Social patterns or life styles affect primarily the amounts of wastes which enter public systems, due to greater or lesser usage of the facilities provided, and in addition, may cause shifting of waste loads within an area. As noted in Chapter III, the amounts of solid wastes generated become somewhat synon-

ymous with the amounts disposed of or entering the public system; it is an almost impossible task to determine the quantities which are generated but do not enter the public system. Essentially the amounts estimated, in Chapter III, to be generated were amounts entering the public system. In the projection of solid wastes an attempt was made to forecast the increase in the present quantities due to population growth, changes in per capita waste generation due to economic conditions, and changes in system usage due to anticipated social conditions, packaging policies, or recycling.

The categories of solid waste having the most impact upon the selection of a solid waste collection, transport, processing and disposal system are mixed, demolition and industrial wastes. Mixed wastes require timely collection, transport, and disposal and offer moderate to high potential for processing to recover valuable constituents. Industrial wastes affect selection of a system due to the significant quantities which may be included in the public system at the present time or which may need to be handled in the future due to changes in economic conditions or difficulty with private disposal facilities. They offer the highest potential for material recovery. Demolition wastes affect selection of the recommended system because of their relatively inert composition and high density which make

collection and transport difficult. Also, this type of waste has the lowest value for resource recovery and may be more beneficially used for land reclamation near the source of generation. Special or specified wastes do not materially affect selection of the recommended system because facilities would be provided only to meet anticipated special purpose needs. Such wastes would seldom be handled within the recommended transport or processing system. Recovery of special waste of potential value must be evaluated on a case by case basis, generally with the source of generation encouraged to undertake such programs.

MIXED WASTES. To project mixed wastes, the Region was divided into service areas or districts. The districts are not legal boundaries but delineate existing collection zones for which data is available or are areas around which a system can be analyzed. As shown in Figure IV-7, 21 service areas were identified based upon existing franchise areas, population concentrations, and other geographical features. Each service area consisted of one or more voter registration precincts which aided in defining the base population.

The population of each service area was estimated through comparison of the voter registration. For each of the five counties, the 1973 voter registration was compared to the 1973 estimated population. A correl-

ation factor of two was established for all counties, assuming 50 percent of the population being registered voters. Projected population figures for the service areas were obtained by assuming that future population distribution would remain relative; therefore, ratios developed for 1973 data could be utilized for estimating service area population in 1974, 1984, and 1994. These population projections were made utilizing curves plotted from data tabulated in the publication entitled "Population Growth in the Mid Willamette Valley," Issue No. 7, March 1973 prepared by COG District 3 plus additional data furnished by COG District 4. (These overall projections were previously illustrated in Chapter IV.)

Mixed waste projections were made by using the per capita waste quantity estimated on the basis of 1971-1972 field data and 1973 base population to give a waste factor considered to represent 1974 conditions. The mixed waste factor included all residential, commercial, institutional, miscellaneous, industrial and recreational wastes. Demolition and special or specified wastes were projected separately as discussed in a subsequent section.

The 1974 factor was projected to increase at a rate of 1.3 percent per year compounded annually through 1984. The rate of annual increase for the Region was based upon a similar increase which occurred in the United States during the period 1920 to 1970. This rate of increase in mixed wastes was assumed to reflect economic changes that would affect the amounts of industrial wastes entering the public system, increases in use of convenience packaging, and changes in life style within the total Region.

Between 1984 and 1994 the per capita mixed waste factor was assumed to remain constant to reflect reductions in convenience packaging and other methods to reduce waste generation. The factors used, as given in Table IV-6, were 4.92 LBS/CAP/DAY (for 1974) which was compounded annually to 5.60 LBS/CAP/DAY in 1984. Based upon the above factors, projections of the mixed waste quantities for the various regional service areas are given in Figure IV-8.

Variations from actual quantities may result within each service area due to the following:

1. A regional average per capita waste factor was used for each service area.

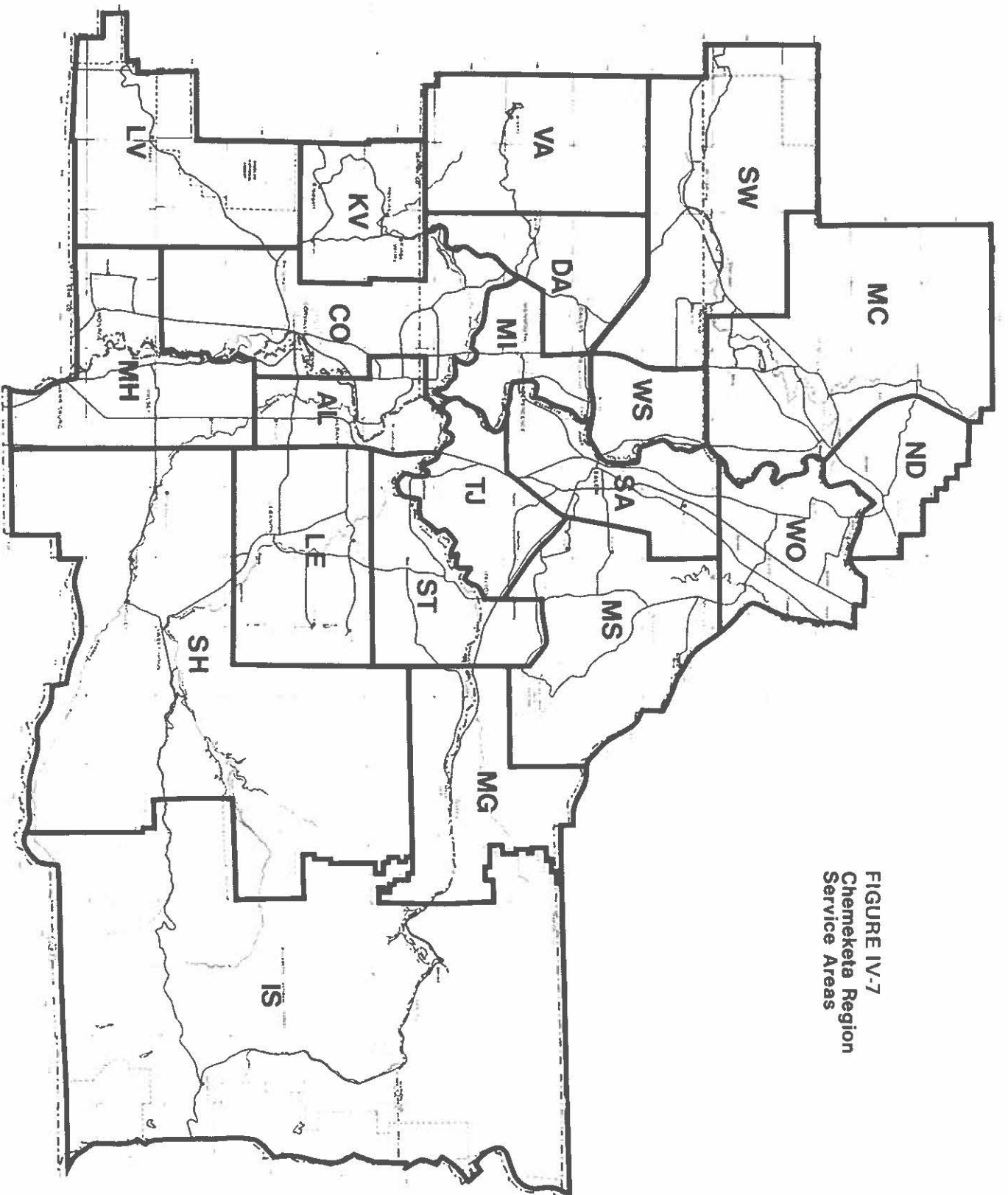


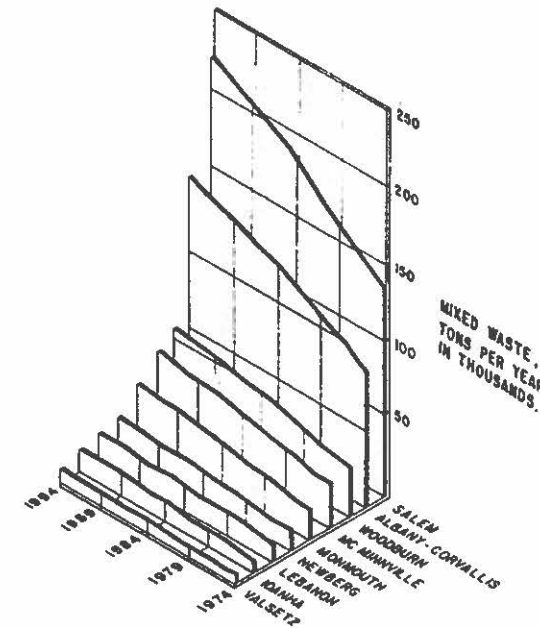
FIGURE IV-7
Chemeketa Region
Service Areas

Table IV-6
CHEMEKETA REGION
SOLID WASTE PROJECTIONS BY SERVICE AREAS

Service Area*	Population			Mixed Waste, T/YR		
	1974	1984	1994	1974	1984	1994
ND	13,162	16,159	19,184	11,818	16,514	19,606
MC	24,099	29,585	35,124	21,638	30,236	35,897
SW	7,867	9,656	11,466	7,064	9,868	11,718
WS	12,203	14,981	17,786	10,957	15,311	18,177
VA	345	424	503	310	433	514
DA	11,358	13,945	16,555	10,198	14,252	16,919
MI	10,668	13,097	15,549	9,579	13,385	15,891
KV	1,228	1,508	1,790	1,103	1,541	1,829
LV	1,075	1,319	1,566	965	1,348	1,600
CO	59,786	73,397	87,139	53,682	75,012	89,056
MH	6,255	7,679	9,117	5,616	7,848	9,318
AL	30,584	37,547	44,576	27,461	38,373	45,557
ST	11,243	13,803	16,388	10,095	14,107	16,749
LE	20,338	24,968	29,643	18,262	25,517	30,295
SH	12,280	15,075	17,898	11,026	15,407	18,292
IS	921	1,131	1,342	827	1,156	1,372
MG	5,487	6,737	7,998	4,927	6,885	8,174
TJ	12,318	15,123	17,954	11,061	15,456	18,349
SA	104,376	128,139	152,130	93,719	130,958	155,477
MS	16,462	20,210	23,994	14,781	20,654	24,522
WO	21,681	26,617	31,601	19,468	27,203	32,296
TOTALS	383,736	471,100	559,303	344,557	481,464	571,608

* See Figure IV-7 for location and identification.

FIGURE IV-8
Solid Waste Projections by
Regional Service Areas



2. Industrial wastes were included with residential, commercial, and institutional wastes. Anticipated changes in industrial activities are not reflected in each service area.
3. The rate of increase in per capita waste generation (and the population growth) used in each service area was a regional average. Changes in social patterns or system usage are not reflected in each service area.

The projections of solid waste quantities for each service area could differ from existing and future quantities by 20 to 40 percent due to the approximations noted above. However, the impact on regional facilities is reduced by the fact that service areas are generally grouped, thereby reducing the effect of higher or lower amounts in any one service area. Thus, these variations will not be of great importance on a regional basis, but may affect the smaller facilities in local areas. A re-evaluation of solid waste projections should be made for each facility during preliminary engineering design or at some future date when long-range facility expansion is being considered.

DEMOLITION WASTES. Demolition wastes were projected separately from mixed wastes at a constant one percent per year of the present quantity received at each demolition landfill. No per capita

demolition waste factor was used nor was the projected amount directly related to population growth. The constant annual increase selected was assumed to reflect a gradual increase in the amount of demolition waste generated due to urban renewal and other construction activities within the Region. Projected demolition waste quantities are given in Appendix E for each existing demolition landfill.

INDUSTRIAL WOOD RESIDUES. It is generally anticipated that industrial wood residues will remain within the private waste disposal sector in approximately the same proportions as presently exist. No net change between the public and private system is expected to occur with respect to wood residues. It is anticipated that decreases in wood residues due to greater utilization will be offset within the public system by increases resulting from greater difficulty in obtaining private disposal sites.

SPECIAL (SPECIFIED) WASTES. Special or specified wastes were projected in a general nature for only septic tank sludges.

Septic Tank Sludges: As discussed in Chapter III, the present quantity of septic tank sludge disposed at facilities in the Region is about 1,000,000 gallons annually. This quantity was acknowledged to be less than the total generated in the Region due to undetermined amounts

disposed of at sewage treatment plants. It was also noted that the estimates of quantities presently lagooned are believed to be low due to insufficient sources of data. Even though existing data is lacking, it is generally anticipated that septic tank sludge entering solid waste system facilities will decline in the future.

Disposal of septic tank sludge is likely to become more stringently regulated by state and local agencies and is expected to be almost exclusively processed at public sewage treatment plants. This disposal method is forecast because increased difficulty is likely in locating and maintaining satisfactory private sludge lagoons. Processing at sewage treatment plants is desirable because of the similarity of the waste and the greater control possible. An additional factor causing the anticipated decline will be an increase in the proportion of the present population served by sanitary sewers.

ALTERNATIVE SOLID WASTE MANAGEMENT SYSTEMS

There are seven basic operational elements of a solid waste system: generation, storage, collection, transportation, processing, disposal and resource recovery. The latter has only recently been recognized as to its importance in the total system. Each element can affect any other element and not all may be controlled or

conducted by the same organization. A large variety of alternative systems can be developed from the management standpoint for combinations of each of the operational elements. During the proposed initial planning period, only those systems most appropriate or feasible in terms of meeting present and future needs of the Region were identified for further detailed evaluation and are presented in the following section.

Alternative Systems

In developing a solid waste management plan suitable for the Chemeketa Region, three alternative transportation, processing and disposal systems were considered for detailed evaluation. These systems as proposed would handle mixed refuse, industrial or institutional wastes and demolition wastes. Facilities to handle special wastes and the problems associated with this type of waste were considered apart from the alternative systems and are included in the overall recommended management program. Elements of each alternative were evaluated based upon the specific objectives to be achieved. The alternative selected was later adjusted to minimize costs as well as to achieve other objectives not previously recognized.

The time period for each alternative was defined as 1974-1994 with an initial period and a long-range period. Each alternative

system given detailed evaluation included: nine sanitary landfills, two demolition sites and a rural drop box system commencing in 1974. Closure of disposal sites which would reach capacity or which would become unnecessary upon implementation of the plan were also indicated for each alternative. Due to case by case circumstances, dates given in the discussion may vary slightly due to short-term changes in usage or available revenues.

Within the framework of the alternative plans, numerous existing and potential locations for handling the disposal facilities have been considered. Locations of facilities considered in the alternative plans are intended to represent only a general area or community to be served. New site locations will depend on specific land availability and on an actual preliminary engineering evaluation.

ALTERNATIVE A. Alternative A was formulated to evaluate a five-county system based generally upon waste disposal in sanitary landfills with transfer systems to enable consolidation of sites to a limited extent. The objectives met by this alternative system are to:

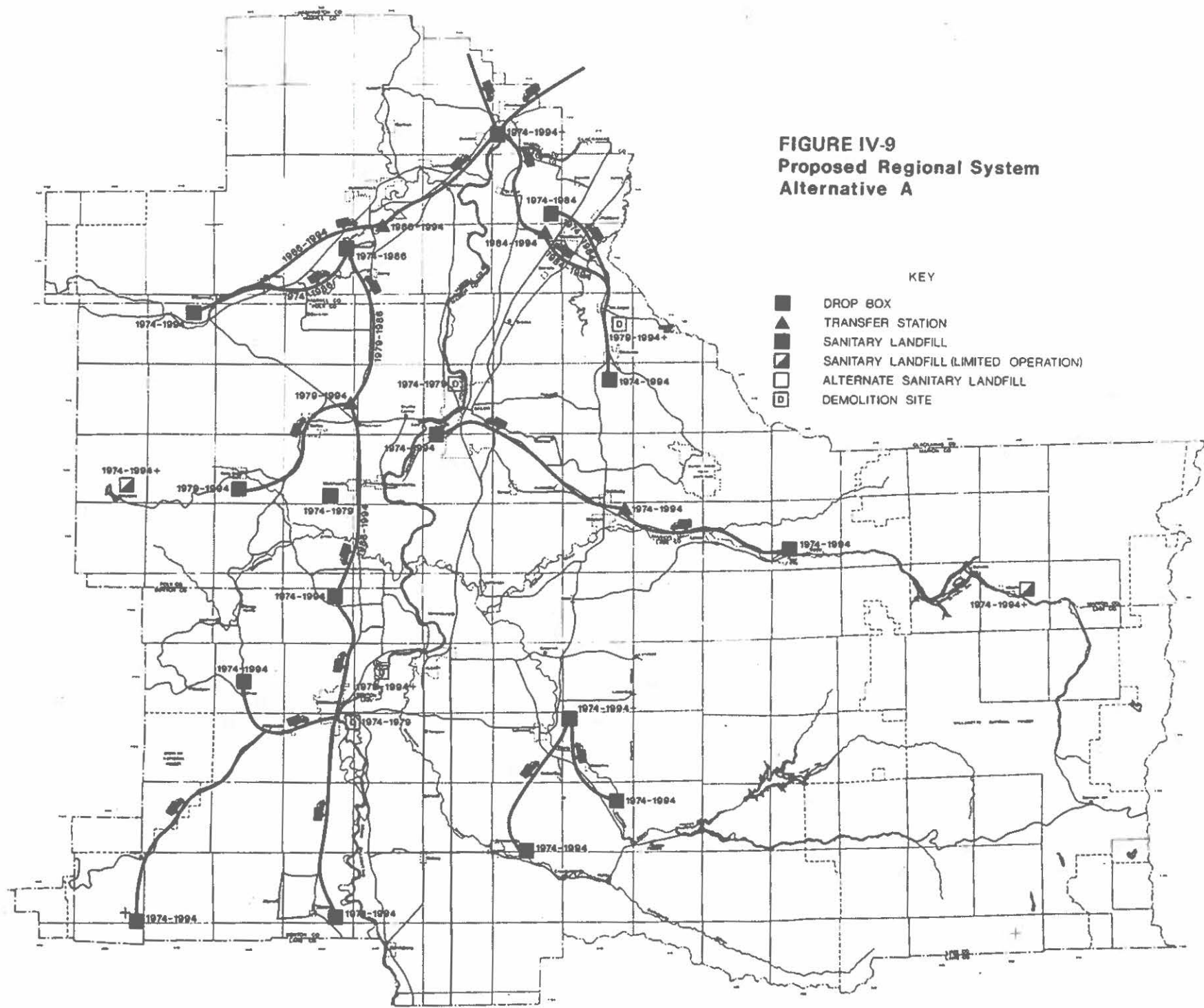
- . Minimize the capital investment required.
- . Minimize the risk of investment in new or relatively unproven facilities.

- . Minimize transport elements and consumption of fossil fuels.
- . Provide adequate public convenience.
- . Insure the least possible adverse environmental impact of solid waste disposal.
- . Provide easy opportunities for implementation by industry.
- . Insure development of a reliable system adequate to meet the long-range waste disposal requirements of the Region.
- . Insure that the system will comply with applicable existing regulatory requirements.

The specific rural drop box stations, urban transfer facilities and disposal sites which were included in Alternative A for detailed evaluation are shown in Figure IV-9. During the initial period (1974-1979), the system would include closure of two disposal sites and construction of seven rural drop convenience stations in addition to one existing station. Specifically:

1. The existing Albany and Macleay disposal sites would be closed during 1974. Wastes from the Albany and Corvallis areas would be hauled directly to a new regional landfill developed in north Benton County. The Benton County landfill would replace the existing Coffin Butte landfill at a new adjacent site and would serve nearly all of Benton County,

FIGURE IV-9
Proposed Regional System
Alternative A



southeastern Polk County, and western Linn County. The Salem (SA) and Mt. Angel-Silverton (MS) service areas would haul approximately 7 percent of the waste generated directly to the existing Brown's Island regional landfill. The remaining wastes would be hauled directly to the Newberg or Woodburn landfills. The existing Newberg landfill would serve portions of Clackamas and Washington Counties, most of Yamhill County and northern Marion County. A new site near Woodburn would serve portions of Clackamas County and northern Marion County. The Brown's Island site would serve eastern Polk County, southwestern Marion County and a portion of northern Linn County. Under this alternative a drop box station constructed near Silverton could also serve portions of the Salem and Mt. Angel-Silverton service areas.

2. Drop box stations would be installed during 1974 at Lobster Valley, Wren, Brownsville, Sweet Home, Mill City, and Willamina. The existing Monroe drop box station would continue in operation. The Lobster Valley drop box station would be located south of Alsea (Siuslaw National Forest) and would serve a portion of the Lobster Valley (LV) service area of Benton County. A drop box station at Wren, north of Philomath, would serve a

portion of the King's Valley service area of Benton County. A drop box station near Brownsville would serve a portion of the Sweet Home (SH) and Monroe-Halsey (MH) service areas of Linn County. The Sweet Home service area of Linn County would be partially served by a drop box station near Sweet Home. A drop box station near Mill City would serve a portion of the Mill City-Gates (MG) service area of Linn and Marion Counties. A portion of Sheridan-Willamina (SW) service area of Yamhill and Polk Counties would be serviced by a drop box station near Willamina. Continuation of the existing Monroe drop box station would provide service to a portion of the Monroe-Halsey (MH) service area of Benton and Linn Counties.

During the long-range period (1980-1994), the system would include closure of five existing disposal sites, establishment of two new demolition sites, establishment of one new rural drop box station and the construction of three urban transfer stations. This alternative would involve the following specific long-range facilities and elements:

1. Close the existing Monmouth-Independence disposal site during 1979, the Woodburn disposal site in 1984, and the Whiteson disposal site

in 1986. Until closed in 1979 the Monmouth-Independence site would serve the Monmouth-Independence (MI) and Dallas (DA) service areas of Polk County. While in operation, the existing Whiteson site would serve the majority of Yamhill County and portions of Polk County.

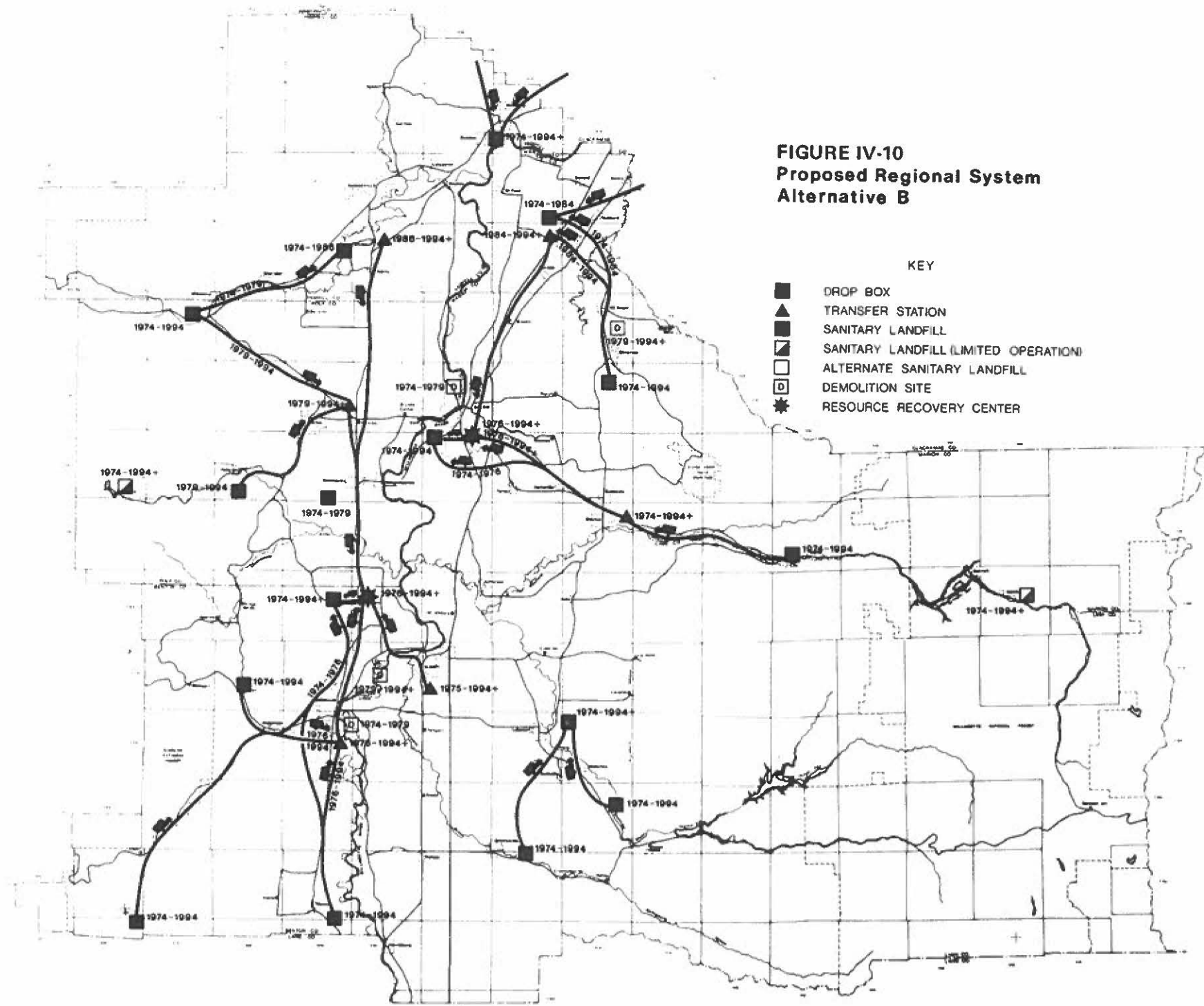
2. A drop box station would be constructed in 1979 near Falls City to serve a portion of the Dallas (DA) service area of Polk County.
3. Urban transfer stations would be constructed near Rickreall in 1979, north of Woodburn in 1984, and near McMinnville in 1986. The Rickreall station would serve portions of the Monmouth-Independence (MI) and Dallas (DA) service areas of Polk County. The Woodburn (WO) and Mt. Angel-Silverton (MS) service areas of Marion County and a portion of Clackamas County would be serviced by a transfer station located north of Woodburn. The McMinnville station would service the Sheridan-Willamina (SW) and McMinnville (MC) service areas of Polk and Yamhill Counties.
4. The existing Corvallis and Fowler demolition landfills would be closed in 1979 and replaced with two new demolition sites. One new demolition site (Tremaine) would utilize existing

gravel pits north of Corvallis. Another site would be developed north of Silverton.

Estimates of initial capital costs and initial annual costs for each facility of Alternative A are given in Appendix F. The total initial capital cost of rural facilities would be approximately \$400,000 and that of urban and regional facilities would be approximately \$2.9 million if Alternative A were to be implemented as formulated. Expenditures would be largely in the initial or early period.

KEY

	DROP BOX
	TRANSFER STATION
	SANITARY LANDFILL
	SANITARY LANDFILL (LIMITED OPERATION)
	ALTERNATE SANITARY LANDFILL
	DEMOLITION SITE
	RESOURCE RECOVERY CENTER



ALTERNATIVE B. Alternative B was formulated to evaluate a system based generally upon regional use of resource recovery. Transfer elements were included where necessary to make large-scale resource recovery feasible and to enable consolidation or replacement of landfills which were found to be unnecessary or which would reach capacity during the 20-year period. The objectives met by this alternative system are to:

- Minimize the net annual cost of the system.
- Minimize the risk of investment in new or relatively unproven systems. (A slight risk would be acceptable when offset by opportunities for favorable revenues.)
- Maximize energy recovery but not necessarily at facilities constructed under the plan.
- Maximize resource recovery of all potentially reclaimable materials.
- Maximize conservation of land or natural resources of the Region.
- Maximize economy of scale to minimize unit costs and promote efficient operations.
- Maximize public convenience.
- Minimize the impact of traffic resulting from the system.
- Insure the least possible adverse environmental impact of solid waste disposal.

- Provide opportunities for implementation by industry.
- Insure development of a reliable system adequate to meet the long-range waste disposal requirements of the Region.
- Insure that the system will comply with applicable existing regulatory requirements.
- Insure development of a flexible system which can be implemented in phases and which can utilize future technological advancements.

The specific rural drop box stations, urban transfer facilities, resource recovery facilities and disposal sites which were included in Alternative B for detailed evaluation are presented in Figure IV-10. During the initial period, 1974-1976, the system would include closure of two existing disposal sites, construction of seven rural drop box stations, construction of one urban transfer station and completion of design for two regional resource recovery centers.

This alternative would consist of specific initial facilities or operational elements as follows:

1. Close the Albany and Macleay disposal sites during 1974. Wastes from the Albany service area would be hauled directly to the North Benton County disposal site until 1975; at that time a transfer station would be constructed near Albany to serve the same area. Wastes from the Macleay area would be hauled directly to the Brown's Island site or to a rural drop box station which would be constructed near Silverton in 1974. The Silverton drop box station would serve, under Alternative A, a portion of the Mt. Angel-Silverton (MS) service area of Marion County.
2. Construct rural drop box stations during 1974 at Lobster Valley, Wren, Brownsville, Sweet Home, Mill City and Willamina. The existing Monroe station would be continued.
3. Preliminary and final engineering design of resource recovery centers at Salem and in North Benton County would be completed prior to 1976. The Southeast Salem Resource Recovery Center would be considered a regional facility that would serve eastern Polk County and nearly all of Marion County. A similar regional resource recovery center located north of Corvallis would serve most of southern Polk County, nearly all of Benton County and western Linn County.

During the long-range period (1977-1994), the system would include closure of five existing disposal sites, establishment of two new demolition sites, establishment of one new rural drop box station, construction of four urban transfer stations and construction of the two regional resource recovery centers.

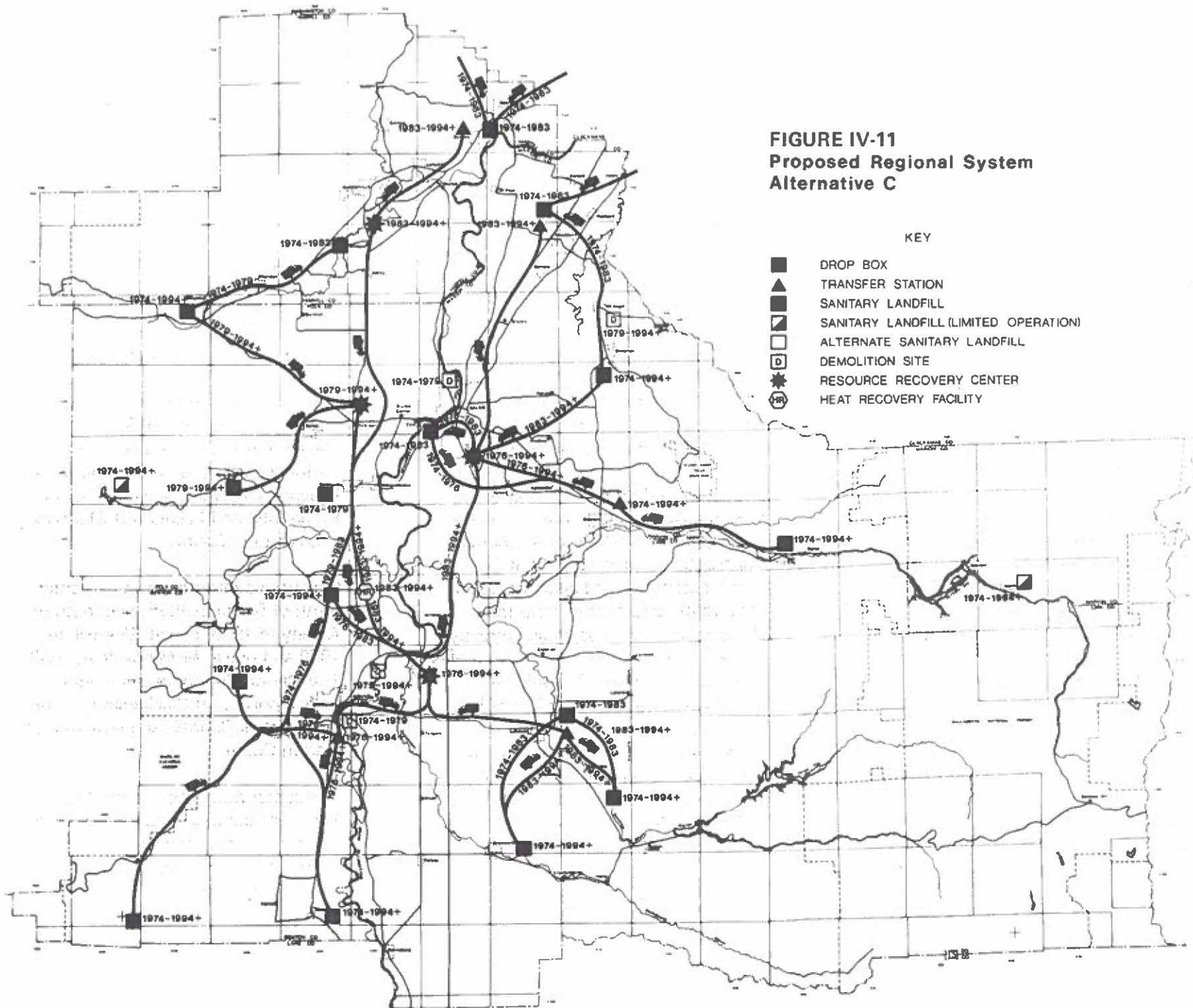
This alternative would involve the following long-range facilities or operational elements:

1. Construct in 1976 an urban transfer station south of Corvallis to serve a portion of the Corvallis service area of Benton County.
2. Construct resource recovery centers south of Salem and in North Benton County in 1976.
3. Close the Monmouth-Independence disposal site during 1979, the Woodburn disposal site in 1984 and the Whiteson site in 1986. A rural drop box station would be constructed at Falls City in 1979. Urban transfer stations would be constructed at Rickreall in 1979, at Woodburn in 1984 and at McMinnville in 1986.
4. Close the Corvallis and Fowler Demolition sites in 1979 and establish new demolition sites at Tremaine and north of Silverton in 1979.

Estimates of initial capital and initial annual costs for each facility of Alternative B are given in Appendix E. The total initial capital cost of rural facilities would be approximately \$400,000 and that of urban and regional facilities would be approximately \$10.1 million if Alternative B were to be implemented.

KEY

	DROP BOX
	TRANSFER STATION
	SANITARY LANDFILL
	SANITARY LANDFILL (LIMITED OPERATION)
	ALTERNATE SANITARY LANDFILL
	DEMOLITION SITE
	RESOURCE RECOVERY CENTER
	HEAT RECOVERY FACILITY



ALTERNATIVE C. Alternative C was formulated to evaluate a system based generally upon an extensive resource recovery system directed primarily at heat recovery. Similar to Alternative B, transfer elements were included where necessary to make large-scale heat recovery feasible. Transfer elements were also included to enable consolidation or replacement of landfills found to be unnecessary or which would reach capacity during the 20-year period. Objectives met by this alternative system are to:

- Minimize the net annual cost of the system. (Capital investment would not necessarily be minimized.)
- Maximize energy recovery at facilities constructed under the plan.
- Maximize conservation of land or natural resources of the Region.
- Maximize economy of scale to minimize unit costs and promote efficient operations.
- Maximize public convenience.
- Minimize the impact of traffic resulting from the system.
- Insure the least possible adverse environmental impact of solid waste disposal.
- Insure development of a reliable system adequate to meet the long-range waste disposal requirements of the Region.
- Insure that the system will comply with applicable existing regulatory requirements.

The specific rural drop box stations, urban transfer facilities, resource and energy recovery facilities and disposal sites which were included in Alternative C for detailed evaluation are presented in Figure IV-11. During the initial period, 1974-1980, the system would include closure of two existing disposal sites, construction of seven rural drop box stations, construction of one transfer station and completion of design of four resource recovery centers and one heat recovery facility. This alternative would consist of the following initial facilities and operational elements:

1. Close the Albany and Macleay disposal sites during 1974. Wastes from the Albany area would be hauled directly to the North Benton County disposal site until 1975; at that time a transfer station would be constructed to serve the area. Wastes from the Macleay area would be hauled directly to the Brown's Island site or to a rural drop box station which would be constructed near Silverton in 1974.
2. Construct new rural drop box stations during 1974 at Lobster Valley, Wren, Brownsville, Sweet Home, Mill City and Willamina. The existing Monroe station would be continued.
3. Preliminary and final engineering design of four resource recovery centers and one heat recovery facility would be completed prior to 1980.

During the long-range period (1981-1994), the system would include closure of eight existing disposal sites, establishment of two new demolition sites, construction of one new rural drop box station, construction of four new urban transfer stations, construction of the four resource recovery centers and construction of one heat recovery facility. This alternative would involve the following facilities or elements:

1. Construct urban transfer stations south of Corvallis in 1976 and at Lebanon in 1983. The Lebanon station would be located to the east of Lebanon and would serve the Sweet Home (SH) and Lebanon (LE) service areas of Linn County.
2. Construct a resource recovery center south of Salem in 1976, one south of Albany in 1976, one at Rickreall in 1979 and one at McMinnville in 1983. The Marion County center would serve a portion of Clackamas County, eastern Polk County, and nearly all of Marion County.

The center near Albany would be known as the Linn County Resource Recovery Center and would serve nearly all of Benton County and western Linn County.

A facility north of Rickreall would be known as the Polk County Regional Resource Recovery Center and would serve most of Polk County. Yamhill County's regional resource recovery center would be located north of McMinnville and would serve the Newberg-Dundee and McMinnville service areas of Yamhill County.

3. Close disposal sites at Monmouth-Independence during 1979, and at Woodburn, Newberg, Whiteson, Brown's Island and Lebanon by 1983. Construct a rural drop box station at Falls City in 1979 and urban transfer stations at Woodburn and Newberg in 1983. The existing Lebanon regional landfill would serve the Sweet Home (SH) and Lebanon (LE) service areas of Linn County.
4. Close Corvallis and Fowler demolition sites in 1979 and open new demolition sites at Tremaine and north of Silverton in 1979.
5. By 1983, construct a heat recovery facility in North Benton County that would serve essentially all of the urban and high population density areas of the Chemeketa Region.

Estimates of initial capital and initial annual costs for each facility of Alternative C are given in Appendix F. The total initial capital cost of rural facilities would be approximately \$400,000 and that of urban and regional facilities would be approximately \$28.4 million if Alternative C were to be implemented. Capital costs are extensive in the long-range phase. In an inflationary economy it may not be feasible to provide these facilities as required unless large industrial or federal financing is available. Further details regarding this alternative are included in Reference 4.

Collection Systems

This section evaluates various collection systems that may be applicable to the Region with respect to the alternative systems previously formulated. Technology in the collection equipment industry is advancing rapidly and other concepts may present feasible alternatives within the near future. With increased emphasis on source separation of recoverable wastes, continued appraisal of more efficient or economical methods is important.

It should be noted that source separation and separate collection systems for specific materials were beyond the scope of this report. This evaluation is limited to possible new developments which may enhance present collection methods and which will be compatible with mechanical-type rather than labor-intensive resource recovery systems.

Collection includes the manpower, equipment and facilities required to pick up or remove solid wastes from the storage site at the source of generation, place the waste in a collection vehicle, haul the waste to a local collection point and then discharge the waste from the collection vehicle.

Important characteristics which affect the efficiency of a collection system include:

- . Type, amount and frequency of waste collected
- . Pick-up operations and interface with storage equipment
- . Type, size and performance of equipment and/or containers
- . Crew size
- . Route and haul time
- . Interface with the collection point operations and waste separation
- . Weather
- . Ordinance and franchise requirements

PRIVATE. The term "private vehicle" is used to designate a vehicle that is operated by an individual rather than a collection company. Types of private vehicles include automobiles, automobiles with trailers, pick-up trucks and small trucks. Private or direct hauling is considered a combination of collection and transport elements.

Vehicles of this type carry, on the average, from 0.4 loose CY (0.034 ton) in automobiles to 7 loose CY (0.7 ton) in trucks under 10,000 GVW. Unloading time for private vehicles averages from 4 to 10 minutes; however, maximum unloading time can be up to 20 minutes in some instances. For planning purposes, an average load for all private vehicles is assumed to contain about 2 loose CY, weigh about 0.2 tons and require about six minutes to unload.

Extensive use of this method in urban areas is not encouraged because it is not as efficient as commercial collection operations. Due to a lower payload, the amount of fuel consumed per ton of waste is much greater with direct or private hauling than with commercial vehicles. Also, considerable congestion and litter may occur at the unloading point or along the haul route due to large numbers of private vehicles. Transfer facilities and landfill access or unloading areas handling private vehicles must be designed for traffic volumes much larger than those of facilities handling only commercial vehicles. Thus, the total system cost is significantly affected by the extent to which private or direct hauling is accommodated.

In addition, large portions of the waste may not get into the controlled solid waste system and may result in litter and public health problems. Private vehicles are only suitable for hauling unexpected peak waste loads, bulky materials or refuse. It must be recognized, however, that in some rural areas direct or private hauling continues to be necessary and curtailment of this activity without an acceptable substitute could lead to promiscuous dumping, littering or other objectionable practices such as unsanitary backyard dumping or burning.

COMMERCIAL. Commercial collection service includes all conventional collection

vehicles and specialized equipment recently developed to increase efficiency or reduce costs. Of primary concern in this collection method is the potential for continued use of existing equipment with replacement equipment designed to utilize more efficient or labor-saving devices wherever possible.

Three general types of packer trucks are available and are classified by method of loading—side, rear or front. Side and rear loaders are used when loose refuse is to be handled or when storage containers of loose refuse are to be collected. The refuse is dumped into a charging hopper at the back or directly into the side of the truck. The material in the hopper is mechanically dumped or pushed into the body of the packer where it is subsequently compacted to at least half of its original bulk. Side and rear loaders can also be fitted with devices for lifting containers (1-10 CY size) and dumping their contents into the loading hopper. Front-loading trucks mechanically lift one to ten cubic yard containers over the truck cab and dump the refuse into the packing area. All three types of packer trucks are unloaded by dumping out of the rear of the vehicle. Packer trucks in common use range in size from 13 to 31 cubic yards. Smaller packer trucks are available in 5, 10 and 14 cubic yard capacities and are suitable for use around housing complexes or certain rural routes.

Open trucks are also used but have no compaction device for reducing the volume or bulk of the waste. This type of truck is best suited for waste materials that will not compact appreciably and for collecting special wastes and residential waste from rural areas where less dead weight of the truck is an advantage.

The tilt-frame truck is a conventional truck chassis with a special tilt-frame hoist which is designed to pull a large container onto the vehicle and slide the container off at a desired location. The tilt-frame truck is used for larger enclosed containers used with stationary compactors and also for the large open-top containers used for uncompacted wastes.

The hoist-frame truck consists of a heavy-duty hoist system mounted on a conventional truck chassis and is designed to handle large special purpose, rear-loading containers with capacities up to 16 cubic yards.

The satellite vehicle is a small, three-wheeled, scooter-type vehicle on which is mounted a 1¼ to 2 cubic yard open-top container. The containers can be tilted hydraulically to dump 41 to 55 inches off the ground, usually into a rear-loading packer truck. This type of equipment is used to service individual homes as part of the collection system of some municipalities.

MECHANIZED COLLECTION. Some recent advances have been made in various U. S. communities toward reducing costs and improving collection service. Collection costs are the largest part of all expenditures for solid waste management and are also the most noticeable to the public. New systems of mechanized collection have been recently implemented which may reduce collection costs.

Several cities utilize mechanized systems of refuse collection at the present time and are noted below.(5)

Tolleson, Arizona: The City of Tolleson has, since 1969, used a collection vehicle which picks up 55 gallon barrels placed at curbside by each household. The vehicle is able to scoop up and empty each barrel without stopping. Service is provided to approximately 1,000 homes in less than six hours on a three-times-a-week schedule. The drums are provided by the City.

Scottsdale, Arizona: Half the population of Scottsdale is served by a mechanized system and the other half by a conventional collection system. The mechanized system provides alley service twice a week, collecting 300-gallon, low-cost containers serving four households, and curb service twice a week, collecting refuse from 80-gallon containers, each serving one household. The containers are provided by the City.

Fort Lauderdale, Florida: The City of Ft. Lauderdale also provides 80-gallon containers to each household. Each rear loader is equipped with a "Modification Kit" which elevates the container and empties it into the typical compactor truck. The mechanism then returns the containers to the curb. This system is the least complicated mechanized system.

Bellaire, Texas: Bellaire has developed mechanized bag collection utilizing a truck which picks up plastic bags as well as other disposable containers at the curb. These "one-way" disposal bags have the advantage of being sanitary and convenient because the container is not replaced after collection. This one-man equipment is able to collect at a rate of 750 homes per man-day.

Mechanized collection systems in some situations may result in cost savings. Cost reductions utilizing mechanized collection rather than a conventional collection system will depend on a number of factors which require evaluation for each specific situation. Not the least of these factors is acceptance of newer methods by the residents and the assurance that lower costs will actually result when all costs are considered.

LIQUID TRANSPORT IN PIPES. This method uses the flow of liquid in pipes to carry the waste materials to a central

processing point. A common example is the garbage grinder which discharges ground food wastes into the sanitary sewer system from kitchen sinks. The food wastes and other garbage represent only about 14 percent (by weight) of municipal wastes and about 12 percent (by weight) of wastes generated from the residential sources. The sewers are capable of transporting the ground garbage; however, some sewage treatment plants may not be capable of handling the increased solids loading.

Current solid waste literature contains numerous proposals for using liquid transport in pipelines to carry all or nearly all municipal solid wastes from the source of generation to a central disposal or processing point. The wastes would require extensive size reduction (shredding and grinding) to flow with the liquid and new treatment systems would have to be constructed. Many proposed systems are presently in the conceptual stage and need additional development before they are technically feasible. Cost estimates indicate proposed concepts are not economically feasible unless the transport distance is over 100 miles and initial costs are amortized over time periods on the order of 40 to 50 years.

While this system is more convenient to the resident, it is disadvantageous in that additional sewage treatment facilities may be required, the cost is relatively high and

jurisdictional problems may arise with the involvement of various administrative entities. Other disadvantages include use of more water, lack of flexibility in locating routes and the central processing point, potential rat infestations resulting from the additional food supply in sewers, and hindrance of resource recovery.

RURAL CONTAINER SYSTEM. At least 15 counties in the United States are using the rural container or "area box" system to provide collection and disposal services to rural areas. This system combines collection and transport elements into a single operation and is intended primarily to provide improved practices in areas too sparsely populated to make commercial collection feasible and where promiscuous dumping is prevalent. The basic equipment includes a number of four to six cubic yard containers which are placed at convenient locations throughout the community, plus a front-loading packer truck for collecting the solid waste from the containers. Existing packers can be modified to pick up the containers. Some present systems provide a container within 10 minutes driving time from nearly all houses in the service area. The waste is collected from the containers about every two days and hauled to a regional or county disposal site. Existing crews from various county road departments are often used part-time to service and clean the container sites.

Each container site is suitable for a three to six-mile diameter service area containing up to approximately 420 people generating an average total of 840 pounds of waste per day. A single five cubic yard container can serve approximately 140 people (generation rate of 2.0 LBS/DAY; density of 170 LBS/CY; and peak daily load of 1.5 times average daily load) if the container is collected every two days. The collection vehicle collects from a number of container sites along a route.

Some advantages of the rural container system are:

- Collection and disposal services can be provided to rural areas at less cost than the conventional house-to-house collection method.
- System flexibility is achieved by relocating or adding containers as the community needs change.
- The container system is less costly than providing a number of small sanitary landfills throughout the rural area.
- The container system provides a controllable solid waste management system for the rural areas and offers convenient access to the public.

Some of the disadvantages of the rural container system include:

- Unit costs are high.

- A large number of container sites must be obtained and properly maintained.
- Containers are subject to vandalism.
- Significantly more fuel is consumed by direct hauling to the container site compared to conventional house-to-house collection.
- Large items cannot be deposited in the containers, but must be hauled to the disposal site by the generator or by special collection arrangements.
- The entire system must be publicly financed.

Unit cost rates for collection and transportation in the Region under this system can be expected to range from approximately \$10 to \$15 per CY of waste handled. The lower cost rates would be applicable to collection routes with a large number of containers (approximately 100). Capital investment costs will depend upon the number of containers used, the amount of preparation needed at each container site and the modification or purchase equipment to service the containers. Comparison of the rural container system with a rural drop box system should be undertaken to determine the most economical system.

PNEUMATIC COLLECTION SYSTEM. A pneumatic collection system utilizes underground vacuum tubes, conceivably servicing several high-density dwelling areas and light commercial

districts, which transfer refuse to a central storage facility for subsequent transport to a processing or disposal facility. In a modification of this system, refuse is collected by a vacuum-packer truck. High-rise buildings and hospitals are currently utilizing pneumatic collection systems.

Advantages of this system are its convenience to users and ultimate environmental improvement. However, estimated costs of this system are high, ranging from \$20/T for high density residential areas to a high of \$72/T for low-density, single-family residential areas; also, the system cannot accept bulky wastes and heavy metal or high-density materials.

CONCLUSIONS. Of the various alternative collection systems evaluated, only the conventional packer truck is believed to be practical for the next two decades in the Region. An effort should be made, however, to evaluate increased mechanization of collection services within high-density areas. Mechanization may help to offset rising labor costs. Collection will also continue as a function of the private sector.

Transport Systems

The transport element of a solid waste system includes the labor, equipment and facilities required to transport solid waste from the collection zone, or area, to the point of disposal. In this context, the point

of disposal may be either a resource recovery (processing) center, a landfill, or even an intermediate transfer point. The systems described in this section pertain only to the transport of mixed wastes including residential, commercial, institutional, miscellaneous, recreational and industrial wastes. Special, or specified, wastes and demolition wastes generally would not be handled on the transfer systems evaluated below. Two categories of transport systems are recognized: direct hauling in the collection vehicle and transfer systems utilizing specialized transport vehicles or equipment.

DIRECT HAUL. Direct haul involves the use of the collection vehicle which hauls wastes directly to the disposal point, unloads, and returns to the collection route area. (Direct haul by private vehicles was evaluated in the previous section as a collection method, but it is also a transport element.) An evaluation of direct hauling essentially entails an economic comparison of using collection vehicles to transport wastes the entire distance from the collection route to the disposal point and using transfer systems utilizing special equipment to accomplish the same result. Rural transfer systems cannot, however, be compared on the same basis as private direct hauling because other subjective factors, such as littering and promiscuous dumping, must be considered in addition to overall cost savings to users.

In the comparison of direct haul in collection vehicles and transfer vehicles consideration should be given to the cost savings which may result due to:

- Reduced operating costs resulting from a reduction in mileage traveled by the collection vehicle and from vehicle maintenance.
- Reduced nonproduction labor time of the collection crew for transit from the collection zone, or area, to the disposal point.
- Reduced operating and fixed annual costs due to a reduction in the number of crews and vehicles needed to service the collection routes.

The possible savings are not readily apparent and must be determined through a detailed analysis of the costs of each situation, except when distance or round-trip time obviously favors one method. Ultimately, the comparison depends upon the mileage between the collection zone and the disposal point and the time required to travel the round trip. Although various methods of comparison have been utilized, annual costs of each method should be determined and converted to daily time and usage costs to establish the cost per ton of waste transported. No specific mileage or time limits of one method outweigh those of another, but round-trip distances greater than 40 miles or round-trip transport times greater than

60 minutes usually make transfer the most economical system. Similarly, round-trip distances less than 20 miles or round-trip transport times less than 30 minutes usually favor direct haul with collection vehicles.

In most instances, a rigorous comparison of direct haul in collection vehicles and transfer systems was not made in this report. Situations in which direct haul would probably be more economical were identified throughout the Region, however.

TRANSFER SYSTEMS. Three basic transportation methods commonly used in the United States are the highway, rail and barge systems. Each system tends to be most feasible under a different set of conditions.

The more important characteristics which affect the technical and economic feasibility of a transfer system include:

- Round-trip time and distance between the collection area and transfer station.
- Availability of public access to the solid waste system including alternative disposal sites in the vicinity.
- Type and quantity of solid waste generated.
- Type, size and number of vehicles delivering waste to the station.
- Time of day and week when waste loads arrive.

- Transport vehicle route.
- Transport vehicle load optimization.
- Public health, nuisance, safety and environmental requirements.

The type and size of system must be selected to match the size and frequency of the solid waste load coming from the service area. The various types of transfer systems applicable to this region include rural drop box systems, highway transfer stations, rail transfer stations and barge transfer stations. Each is particularly suited for different types of incoming vehicles and waste quantities. A small town could not afford to construct and operate a rail transfer system and a large city would overwhelm a drop box station with its daily vehicle and waste loads.

Transfer systems can be used to accomplish the following objectives:

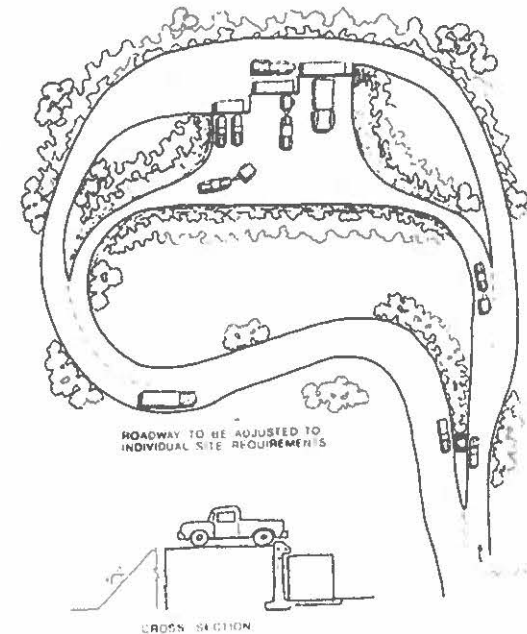
- Increase public access to the controlled solid waste system by offering more disposal points and shorter hauling distances. Public access is particularly important in rural communities and small towns where commercial collection services are not economically feasible. Public access to the disposal system is important in urban communities for occasional peak waste loads. The benefits are public convenience and a

lower potential for surreptitious dumping.

- Provide a substitute for deficient landfills or dumps. When the local open dump is closed, a disposal point is still required for the community. Transfer stations with transport to a regional disposal site can normally provide the same level of service as a local sanitary landfill, but at less cost if transport distances are not great.
- Provide locations for collecting reclaimable waste materials. Transport equipment can be used to haul an occasional load to a recycling center.
- Reduce the overall cost of hauling the solid waste from the collection area to the disposal site. The relative costs depend upon the size of the operation, the equipment and labor used, and the round-trip time and distance.

Rural Transfer Systems: A typical rural transfer station, suitable for use in the Region is shown in Figure IV-12. Vehicles enter the facility on a higher level than the 20 to 50 CY drop boxes which receive the wastes. All-weather access roads should be provided. Additional refinements could include a truck washing facility, comfort station, gates and fly screening. A waste density of 300 LBS/CY and an average of 90 percent use of the box capacity can generally be attained if an attendant is on duty to distribute and tamp the load whenever the facility is open to the public.

FIGURE IV-12
Typical Rural Transfer Station



The facility, as considered for use in the Region, would receive wastes only from private vehicles in rural areas or near small communities. To avoid overloading, no commercial collection vehicles would be permitted to use the facility. An attendant would be on duty at all times while the station would be open to collect fees, prevent vandalism and maintain the site. In most instances, servicing of the station would be done under contract with commercial services, therefore, no transport equipment would be provided as a part of the facility.

Capital and initial annual costs of rural transfer (drop box) stations for specific locations in the Region are given in Appendix F for the three alternatives given detailed evaluation. Only capital costs for the recommended rural facilities are summarized in Chapter V. Annual costs for rural facilities are also included in Chapter V, Implementation.

Urban Transfer Systems: Urban transfer systems differ from rural systems in that they handle larger amounts of waste per day, serve a larger population and utilize a more sophisticated station and hauling equipment. In the connotation of this evaluation, both urban and rural transfer systems utilize highway routes. Use of rail and barge routes for transporting wastes from rural or urban areas on a regional basis is evaluated in a subsequent section.

An urban or highway transfer system refers to a transfer station where solid wastes are transferred into a large container, semi-trailer or similar vehicle and then towed by a tractor along highway routes to a disposal point.

Transfer stations generally are suitable for service areas of approximately a 10- to 15-mile radius, that generate from 50 to 2,000 tons per day of solid waste, and have a haul distance ranging from 10 to 50 miles one way. More than two-thirds of the waste quantity entering the station should be arriving in the larger collection company vehicles (packer trucks).

The main physical requirement is that both the transfer station and the disposal point should be located near an arterial highway.

The same transfer station can be used permanently even though the disposal point location may change.

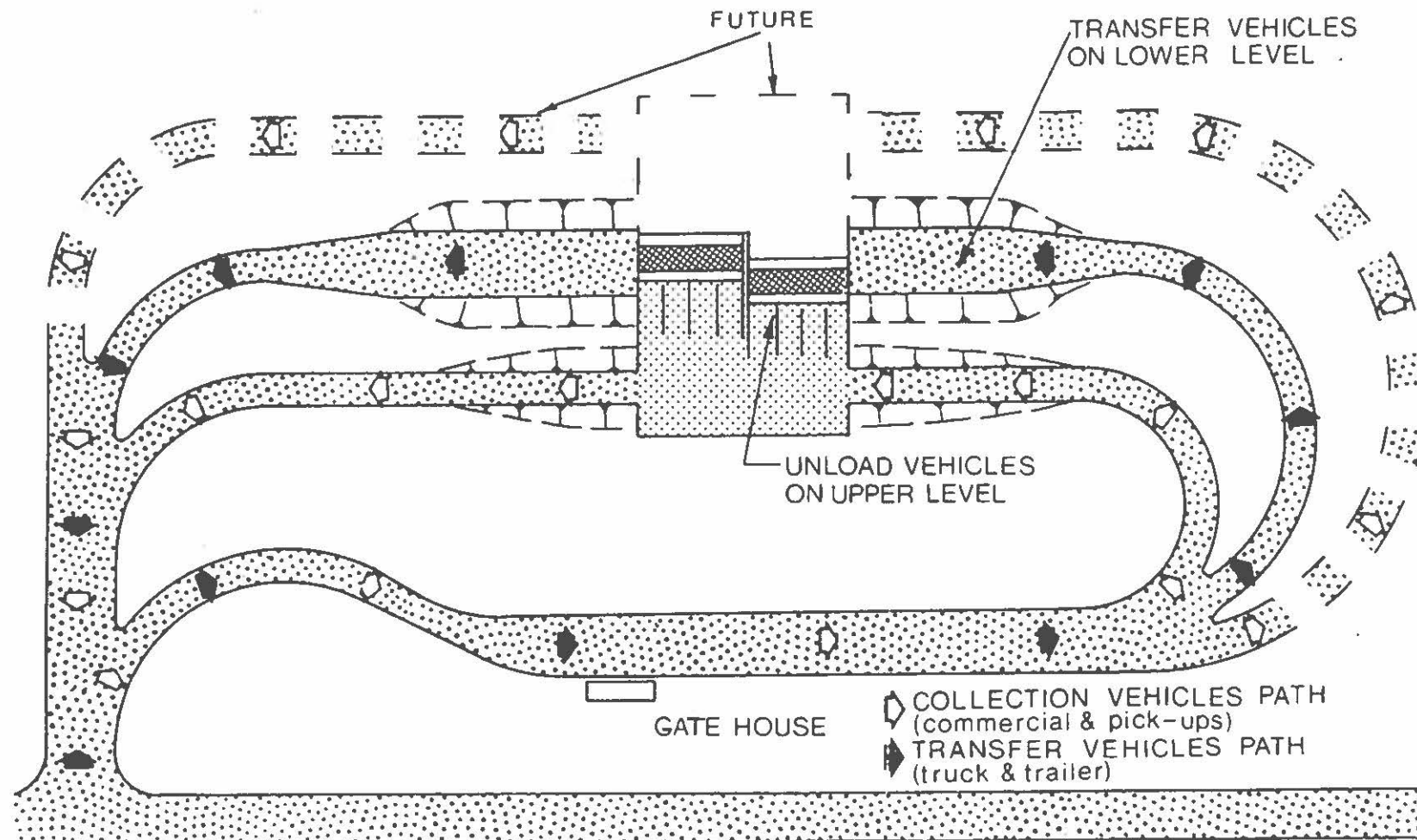
Planning cost estimates have been made for specific transfer stations that were proposed for detailed evaluation under the three alternative systems. Typical systems were evaluated for application under similar conditions at various locations throughout the Region. Although the estimates were adapted as closely as possible to the local conditions, it will still be necessary to perform preliminary

engineering of each facility prior to construction.

A typical urban transfer station evaluated for use in the Region is shown in Figure IV-13 and consists of concrete retaining walls, a steel roof enclosure, a wire mesh fence around the perimeter of the dump area, and a concrete dump chute or steel hopper. An enclosed direct dump station such as this would also have concrete or asphalt roadways and concrete pads on a lower level for loading of 80 CY (16-ton) transfer trailers. A two-lane asphalt paved road, asphalt paved dump area and administration building would be needed. Scales would be necessary if the station received wastes from more than one commercial collector or large amounts from the public. Due to the winter rainfall, a roof is necessary to minimize inconvenience, assure public acceptance and avoid excessive refuse moisture that would hinder resource recovery. Equipment needed for operation of the station includes a yard tractor to position transfer trailers and a tractor-mounted backhoe to level and compact loads. No shredding or other waste processing would take place at the station. Provisions can be provided for drop boxes to segregate recyclables, demolition wastes or nonprocessable trash.

Approximately 70 percent of the wastes are assumed to arrive at the station in commercial, self-compactor trucks with a

FIGURE IV-13
Typical Urban Transfer Station



4-ton payload and 30 percent to arrive in private vehicles carrying an average of 2 CY at 200 LBS/CY density. Although private vehicles operated by the general public usually carry only about ½ to 1 CY of household wastes, direct hauling by commercial establishments and low density wastes, such as tree trimmings, raise the average volume of all private vehicles to approximately 2 CY per vehicle. Peak volume and traffic was assumed to result from 50 percent of the collection vehicles arriving in a 2-hour period on a weekday and 50 percent of the private (public) vehicles arriving in a 7-hour period on a weekend. These assumptions were utilized to size the transfer stations to handle the number of vehicles and time required for unloading the amount of waste carried by each type of vehicle. Initially, each station was sized, under each alternative, to handle peak daily traffic without excessive queuing. In subsequent modifications to Alternative B, design criteria were altered to tolerate queuing on peak days in order to permit phased construction of some transfer stations. Capacity of each station to handle the total daily waste tonnage was based upon operation of the station in an 8-hour day under average conditions. It was assumed that peak day wastes would be temporarily stored at the station and could be handled within the next 24-hour period, by working overtime if necessary.

Also considered were two other types of transport equipment and modifications to the transfer station discussed above. A compactor-extruder system which includes vehicle unloading into a conveyor instead of a hopper, a stationary compactor, and an extruder that would produce a bale of solid waste to be transported on a flat bed trailer. The compactor-extruder system would still require a similar transfer station to accommodate vehicle unloading and traffic routing. Weight of the bale would be about 10 to 12 tons, but could be more depending upon the size that could be readily handled. Installed cost (1975) of the equipment required would be about \$12,000 for a 40- to 50-foot hydraulic conveyor, \$32,000 for a stationary compactor, and \$8,000 for an extruder. Savings in transport trailers and tamping backhoes would have to offset these costs to favor this system. Transport costs, difficulties with unloading and breaking up the bale at a resource recovery center, and keeping the waste intact during transport are believed to be the major problems to be overcome. Due to a lower payload than 80 CY (16-ton) trailers, about 20 to 40 percent higher operational costs would result from use of compactors. This is because of the greater number of trips required to transport a given amount of waste in a day's operation.

A similar type of compacting transfer station considered would utilize a hopper

or conveyor to charge a stationary compactor. The compactor would load a heavily reinforced drop box. Payload of this system would be about 10 tons to travel on interstate highways. Installed cost (1974 \$) of the compactor would be \$44,000. Lower payloads would result in about 40 percent higher operational costs. Savings over 80 CY (16-ton) trailers could result from elimination of tamping backhoes. Transport equipment costs would not be significantly different between each system, and the transfer stations would have to be comparable to accommodate traffic and vehicle routing.

The direct dump station and 80 CY transport trailers are considered satisfactory for use in urban areas of the Region and can be used as a basis to develop cost estimates. Although the latter two types of transfer systems were not used in system evaluations, preliminary design of each facility should re-evaluate their applicability.

Construction costs of proposed urban transfer stations would include site earthwork and grading, paved access roads, perimeter cyclone-type fencing, guard rails and traffic control bumpers, concrete slabs and retaining walls, steel roof enclosures, landscaping, contingencies, and architectural and engineering fees. The sites would have to be approximately two to five acres to accommodate structures, access roads,

and future expansion. A steel roof enclosure about 7,000 to 10,000 square feet would be provided ultimately, depending on station capacity. Sides of the enclosure would be wire mesh screen. The dump floor would be paved and 12 unloading positions would ultimately be provided. Except at the entrance, separate roads would be constructed for transfer vehicles and unloading vehicles. Transfer vehicles would be loaded on a concrete pad under a dump chute or hopper on a level lower than unloading vehicles. Access roads would be two-laned, asphalt-paved. A small office would be provided and would include toilets, washroom and lunchroom. Telephone, electrical, water and sewer utilities would also be included. Two transfer trailers would be positioned at one time to accommodate all 12 unloading positions at ultimate capacity. With crowding, the two trailers could allow 16 unloading positions at ultimate capacity.

Initial capital and initial annual costs are given in Appendix F for specific transfer facilities to be included in each alternative system. The estimates were derived by scaling actual construction costs (1975) of the King County, Washington, North East Transfer Station. Phased construction costs as presented at the end of this chapter were based upon partial construction of the unloading and traffic routing facilities but with no reduction in the daily waste handling capacity.

Rail Transfer Systems: A rail transfer system refers to a transfer station where solid wastes are transferred onto rail cars which are then towed along a railroad network to a disposal site.

Studies by the American Public Works Association have indicated that rail haul of municipal solid waste is not economically feasible (when compared to highway systems) unless the system is able to haul at least an average load of 1,000 T/DAY over a minimum one-way distance of approximately 100 miles. Large-scale operation is necessary to pay for the processing equipment that is required to achieve the rail car payload capacities. Rail cars suitable for hauling bailed municipal wastes or containers of shredded and tamped municipal solid wastes are capable of carrying payloads ranging from 50 to 100 tons, depending upon the size of the rail cars. To achieve maximum rail car payloads, the municipal solid wastes must be compacted or baled to a density of approximately 1,500 to 2,500 LBS/CY (approximately ten to one compaction ratios for uncompacted residential and commercial wastes). Otherwise, the waste will exceed the rail car volume capacity long before the weight capacity is reached. Sufficient compaction can be achieved either by high pressure baling or by shredding and tamping.

Since present waste quantities in the Region do not justify rail transport, no cost

estimates have been prepared for such a system.

Barge Transfer Systems: A barge transportation system would utilize a single barge or multiple barges towed by a tugboat. The economics of the method favors the use of a large barge towed over a long distance. As in rail transportation, the transport vehicle (barge) must be loaded as nearly as possible to its weight capacity to gain the most favorable transportation cost rates. When mixed municipal solid wastes are hauled, considerable compaction of the wastes is required to achieve the weight capacity of the barge. Without compaction, the volume capacity of the barge is exceeded long before its weight capacity.

Two transfer stations located alongside a navigable waterway would be required, one near the source of generation and another at the end of the trip. Three general methods for handling municipal solid wastes are:

- . Dump wastes directly onto the barge and use a dozer to spread and compact. Wastes must be unloaded by overhead clam shovel.
- . Utilize a fork lift truck or overhead crane to load and unload containers of shredded and tamped solid waste.
- . Utilize a fork lift truck or overhead crane to load and unload high compaction bales of solid waste.

These container or high density baling methods are favored because they offer greater flexibility, better litter control during loading and unloading, and higher waste compaction densities than the direct dump method.

Reclaimed materials (such as bales of paper) might be loaded directly onto the barge if delivered directly to the user. A container system could be used for small sized materials to minimize the loading and unloading time. Mixed municipal solid wastes must be transported daily to minimize nuisance conditions and public health problems. Waste containing non-putrescible materials could be temporarily stored until a full barge load can be accumulated.

Barge transport of solid wastes within the Region is not economically feasible when compared to highway transport. Barge transport to disposal sites outside the Region may become feasible in the future, but feasibility depends upon transportation rates, distance hauled, channel and flood conditions, amount of processing required and value of the waste. Since present or future conditions in the Region do not justify barge transport, no cost estimates have been prepared for such a system.

Resource Recovery Systems

Resource recovery is the extraction and reuse of materials from the solid waste stream for some beneficial purpose. Materials recovered include constituents such as metals and minerals which can be used as raw materials in the manufacture of new products. Utilization of components of waste as a fuel, production of compost using solid waste as a medium, and indirect utilization of processing residues to reclaim land are other methods of recovery. The market value of the materials recovered from solid waste has the most impact upon implementation of a viable recovery system.

Due to the multitude of resource recovery systems and processing methods either under development or in existence, it was necessary at the outset of this study to limit the scope of the evaluation. Evaluation of Alternative B considered resource recovery systems that would yield a marketable fuel while evaluation of Alternative C considered heat recovery systems that could be constructed under the regional program. Processing methods included in this report are only those which were essential to achieving the objectives of Alternative B or C; other processing methods were evaluated under previous interim studies and provided basic information to narrow the scope of this report. Heat recovery systems proposed under

Alternative C have been evaluated and are published in a separate report. Therefore, heat recovery systems are not presented in detail in this report.

Although a complete home separation program offers some potential advantages, the scope of this method was narrowed at the outset to only those activities which would enhance either Alternative B or C. Home or source separation of certain wastes such as newspapers or bottles and cans, should be recognized as a continuing future effort to reduce quantities and disposal costs. Any type of home separation program would be compatible with most regional processing systems.

PROCESSING ELEMENTS.

Primary Separation: Primary separation can be accomplished by either of two processes—hand operation or mechanical separation.

Separation by hand is the most common separation process and involves hand-picking selective waste components, i.e., materials which can be readily sold or salvaged. A number of composting and incineration operations have used manual separation methods to remove reclaimable waste materials or materials which might limit the effectiveness of the downstream operations. This method is limited to removing the larger sized objects and is expensive and inefficient.

A single man is able to remove approximately ½- to ¾-ton of newsprint and cardboard per hour from mixed wastes. This corresponds to 1-1/3 to 2 manhours per ton of material handled. Manual separation costs would, therefore, range from \$4.00 to \$6.00 per ton assuming a low labor rate (\$2.50/HR wage plus 20% benefits). However, labor rates are frequently higher than the value of the recovered material so any system must incorporate flexibility to rapidly adapt to changing market prices. Manual separation may be economically feasible for removing some items such as bulky materials if the economic efficiency of the overall process can be increased.

In mechanical separation, large volumes of waste are handled and separated into categories relying upon physical characteristics of the material. Mechanical separation is an important processing step in the recovery and utilization of mixed municipal solid wastes and is essential to subsequent waste processing steps such as incineration and composting. Some prior size reduction of the waste is usually required in order for mechanical separation to be economically efficient.

Size Reduction: Size reduction refers to the mechanical shredding or cutting of waste materials into smaller pieces. The purpose of size reduction is to permit more efficient separation and recovery processes

or to convert the solid waste into a form which is easier to handle or compact.

Secondary Separation and Packaging: In this step of processing, further refinement and size reduction of the waste material takes place, utilizing methods of mechanical separation, such as magnetic separation (removing of metals) or air classification (separating light material from heavy). Compaction and baling reduce the volume and increase the density of the wastes, resulting in easier handling and disposal, and cost reduction.

Conversion:

Heat Recovery: Combustion of municipal solid wastes has been used by numerous cities in the U. S. as a means of reducing the volume of waste for land disposal. Recent advances in the combustion process have been aimed at reducing air pollutants, increasing the firing efficiency and applying waste heat recovery techniques. The recovery of waste heat in conjunction with combustion of municipal wastes and wood residues is a method of reclaiming some value from the solid wastes generated.

Two general configurations are employed to convert the waste heat into a steam generation system. One uses a conventional refractory-lined furnace with waste heat boilers located in the flue. The

other has water-filled metal tubes built into the walls of the furnace. Both systems are capable of producing steam for sale as a heat source or, upon superheating, for power generation.

Most incinerators with waste heat recovery incorporate some processing with the feed system to obtain a more homogeneous fuel. This processing may include size reduction, removal of noncombustibles or predrying. The economic feasibility of waste heat recovery is very dependent upon the long-term (20 years or more) availability of a suitable source of fuel, plus nearby markets for the recovered steam. Further evaluation of heat recovery and other conversion processes, such as pyrolysis and composting, are presented in a separate publication.(4)

RESOURCE RECOVERY CENTER. A resource recovery center is in one sense a salvage operation and in another a processing step in disposal. It selectively removes valuable materials using mechanical methods and creates a more homogeneous, uniformly sized and less noxious waste residual for landfilling. The extraction processes thus help to conserve materials and energy while enhancing other environmental aspects of solid waste disposal.

The economics of resource recovery must be given careful consideration in deter-

mining the type of facility, methods used, equipment size and cost benefit to disposal. Numerous studies have been made on availability of markets for such secondary processed materials, their demand, and other factors such as freight rates and taxes. Specific attention to these variables is beyond the scope of this report. However, the feasibility of a specific processing center established to extract what appear to be valuable materials at this time can be analyzed. To do so requires selection of a system best suited to local collection practices and attitudes. The system may be based upon preseparation of solid wastes at the source of generation with separate transport, or it may follow conventional practices of mixed waste collection. In either case, the overall size and type of system must be scaled to the area's projections as to quantities of waste.

Due to limitations in the work scope, preseparation of wastes at the source has not been evaluated in detail in this report. The potential for a major solid waste management system based upon source separation exists in many urban areas and may exist within the Chemeketa Region. This evaluation was limited to those activities which would enhance the existing system and mechanical types of resource recovery systems. Manual or labor intensive activities may, however, be conducted as an initial phase of mechanical processing systems. A decision to implement a labor

intensive system, as an initial phase of mechanical systems, depends upon various local social and economic factors rather than an engineering evaluation of the application of technology to solid waste management.

The flow sheet shown in Figure IV-14 requires as major equipment items: shredder, air separator or classifier, magnetic separator, nuggetizer for ferrous metals, paper baler and stationary compactor for combustibles. The complete facility can be fully developed initially or in stages, i.e., a paper baler may be first installed followed by a shredder and magnetic separator and, finally, at some later date, the air separator and compactor.

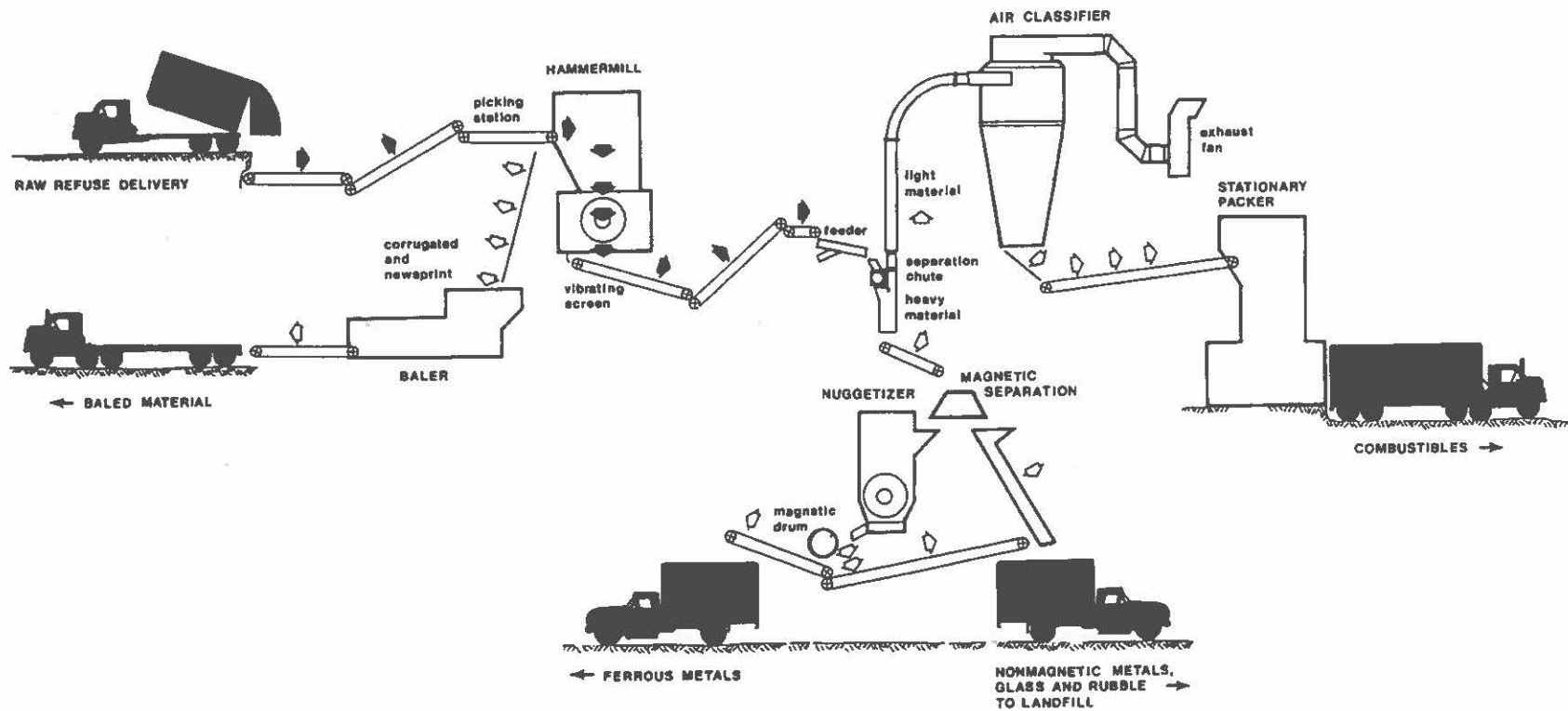
Weighing Facilities: The facility operating on a regional concept would receive wastes from numerous sources and collectors. To maintain adequate records, a scale should be utilized to fully account for costs of processing and to apportion actual disposal charges. Because transfer vehicles are anticipated to be in use, scales 70 feet long with a capacity of 75 tons are proposed. A scale attendant would enter account numbers along with automatic recording of gross vehicle weight for later computer billing using established vehicle tare weights or reweighs.

Building Requirements: The entire processing area is proposed to be enclosed in

order to give all-weather convenience, maintain cleanliness, reduce noise and help control refuse moisture. The latter is particularly important in processing combustibles to meet quality control specifications as to Btu value for burning. Specific areas of the building are: dumping floor, storage pit, shredding room, baling room, processed material storage area and shipping docks. Other areas may be designated for bulky refuse handling, residue handling, and administration and maintenance. In the initial period an overall building size 120 feet by 160 feet should be adequate, with the space divided about equally for the dumping floor and processing. Expansion in the long-range period would double the building size at most facilities.

Shredders: The refuse would be shredded to meet an established specification for burning combustibles preferably not greater than four inches particle size. Preliminary analysis of equipment has allowed for selection of either a horizontal-shaft or vertical-shaft shredder. Because shredders are high maintenance items, standby capacity is needed if backup facilities are not provided for waste disposal or storage during equipment shutdown. Shredders would be controlled for dust emissions through the location and design of air classification equipment so as to provide a negative air discharge.

FIGURE IV-14
Resource Recovery Schematic



Air Classification: Following shredding of the mixed refuse, air separated combustibles could be conveyed to an automatic horizontal baler which would compress and tie approximately 20 T/HR of recovered material. The baler could be arranged so as to ultimately receive material from any shredder and air classifier capable of operating on heated forced air which aids in controlling moisture content.

Use of a stationary compactor and transfer trailer can be substituted for a combustible baler when the refuse derived fuel is sold to a single customer or when haul costs are favorable.

Heavier particles removed by the classifier would be passed through magnetic separators to pull off ferrous metals and the final residue transported to a regional landfill site.

Marketing of Combustibles: The unique element in the operation of the processing center is the separation of dry organics in a form such that they become a marketable, nonstandard fuel similar to hog fuel, but with a slightly higher Btu value and easier handling properties. The combustibles are delivered to the user in a compacted or baled form where they are passed through a hogger to be broken up and fed into a steam plant. Potential users include private industry, public agencies and college campuses.

Facility Cost: The capital costs for initial construction have been estimated for purposes of planning and alternative plan comparison. It is assumed that a more detailed site and cost analysis would be made prior to design initiation. Current estimated initial capital and annual costs of buildings, equipment and other support facilities are summarized in Appendix F for Alternatives B and C. Initial capital costs of resource recovery facilities included in the recommended plan are given at the end of this chapter. Annual costs are presented in Chapter V.

INTERRELATIONSHIP WITH TRANSFER AND DISPOSAL

SYSTEMS. Resource recovery activities are greatly affected by transfer systems and can significantly reduce the volume of waste to be landfilled. In general, resource recovery systems to be economically feasible must process large quantities of wastes on a sustained basis. Rural counties or regions ordinarily must transfer wastes into one central area in order to accumulate sufficient quantities to make resource recovery financially attractive. Thus, an additional expense of transfer must usually be incurred to obtain a revenue from processing of solid wastes. However, savings consisting of a reduction in required landfill volume capacity can result through implementation of the proposed resource recovery system. Regional sanitary landfills at North Benton County, Salem and

Newberg will be able to dispose of residues beyond 1994. Whereas, without resource recovery, these facilities would have to develop additional areas.

OTHER RESOURCE RECOVERY OR RECYCLING ACTIVITIES. Other resource recovery or recycling activities regarding paper, newsprint, corrugated paper, other paper, ferrous metals, non-ferrous metals, glass, textiles, tires, waste oils and abandoned vehicles were evaluated during the course of the study. Detailed information on these related activities has not been published but is available from the Chemeketa Region. (11)

Alternative plans were reviewed to evaluate potential conflicts between source separation and the recommended industrial type of resource recovery program. Only under Alternative C does a potential for a major conflict exist if source separation of paper were to become extensive. The impact of source separation of paper upon Alternative C is evaluated in Reference 4.

Disposal Systems

This section evaluates alternative disposal systems applicable to the Region. This element includes the labor, equipment, facilities and natural resources required to accomplish final disposal of residues from the Region's solid waste management system. The final disposal element must be

accomplished in a manner that prevents public health hazards, environmental degradation, safety hazards and nuisance conditions. Also to be considered are federal, state and local regulatory criteria, public access and acceptance, local governmental acceptance, resource utilization, available technology and financial matters.

At the outset, this element was narrowed to give detailed consideration only to landfills as ultimate disposal methods. Stockpiling, ocean dumping and long haul out of the Region are believed to be impractical or unacceptable. Spreading or soil incorporation of solid wastes was considered only for special or specified wastes. Landfill disposal methods are evaluated below for application to various local or regional areas.

MIXED REFUSE LANDFILLS. Mixed refuse landfills are considered under each of the alternative plans to be the ultimate disposal method for both unprocessed and processed wastes. There is no other method of disposal which offers equal reliability, flexibility and low cost obtained through a properly designed and operated sanitary landfill.

However, upgrading of present sites will be necessary to overcome physical and operational deficiencies. Development of new sites will also be inevitable to meet future needs of the regional program.

Mixed refuse landfills are classified as modified or sanitary landfills depending upon the frequency of cover and other degrees of operational control.

Sanitary landfill is a method of disposing of solid waste by properly spreading, compacting and adequately covering the waste daily. Wastes are covered to control vectors, litter, fire moisture and to maintain proper appearance of the site. Landfilling can be accomplished by the trench method, whereby waste is spread and compacted in an excavated trench and covered with the excavated soil; by the area method, whereby waste is spread, compacted and covered on the natural ground surface; or by a combination of both methods. No burning of wastes takes place at a sanitary landfill. Elements basic to landfill design are the amount of solid waste to be landfilled, site operation, and final use of the site. A completed landfill should be inspected by a government agency and a detailed description recorded so as to provide future users with adequate background information on the site.

Modified landfills also include compaction and cover of the deposited wastes, but at specific designated intervals other than daily. Also, all environmental or operational factors may not be controlled to the extent that they are in a sanitary landfill.

The sanitary landfill is considered today to be the most economical method of ultimate disposal. Increased quantities of waste can be buried without adding more personnel or equipment by increasing the operating time up to certain limits. A sanitary landfill, if properly operated, produces no objectionable odors or vector problems. Land, which without improvements is unsuitable for other purposes, can be reclaimed. Upon completion, a landfill can be utilized for recreational purposes such as parks or playgrounds, for agriculture, or for light construction. If a sanitary landfill is properly planned, designed and operated, potential problems, such as groundwater pollution or hazardous gas production resulting from waste decomposition, can be avoided.

In general, the unit costs of landfill disposal decrease with the larger capacity sites. Smaller sites, in many instances, are more costly to develop and operate than a transfer system to a site with a larger capacity. In the evaluation of landfill disposal for the Region, it was determined that a level of performance equivalent to a sanitary landfill will be necessary. Included in this criteria is daily cover, leachate control, drainage control, adequate utilities and access, and adequate operating equipment.

Wastes to be received at landfills in the Region in the initial period will have much

the same characteristics as those presently received. However, upon implementation of resource recovery, regional landfills will benefit from over a 50 percent reduction in waste tonnage. What residue results from resource recovery will be relatively inert and greatly reduce potential environmental hazards associated with conventional landfill for mixed wastes. Landfill of unclassified milled wastes may not be undertaken in the Region due to the anticipated demand for refuse-derived fuel.

Local areas will remain dependent on landfills for residential, commercial, industrial and agricultural wastes. Generally, vehicle hulks, hazardous wastes, environmentally hazardous wastes, large dead animals, logging slash, grass and grain straw, industrial sludge, and septic tank sludge will not be accepted at either regional or local mixed refuse landfills. These and demolition wastes will be disposed of at specifically designated sites. These sites are evaluated in a subsequent section concerning special purpose landfills.

Factors considered in the selection of a new site or continuation of an existing site include:

- . Life or capacity
- . Access
- . Location with respect to other facilities
- . Land use and zoning

- . Availability of land
- . Final use
- . Flood protection
- . Leachate control
- . Groundwater control and protection
- . Surface water control
- . Traffic congestion
- . Soil workability
- . Availability of cover material
- . Buffer zones

With respect to the above factors, landfill capacity requirements were determined by projected waste tonnages. Usable area or capacity was estimated and compared for usage by service areas identified under each alternative. Access was evaluated with respect to haul distance, traffic congestion, condition of roads connecting the site with the generation areas. The location of each site was evaluated to assure its compatibility with transfer stations serving other regional or local areas and with regional resource recovery centers. Land use and zoning were evaluated to determine compatibility of the site with other activities or objectives of the local area. Availability of land was assessed to assure, insofar as possible, that new sites or expansion areas could be obtained during implementation of the plan. Final use of the site or intermediate areas after closure was identified. Flood protection measures were recommended for specific floodplain sites. Leachate control measures were recommended as necessary. Groundwater was

evaluated to determine if measures to prevent interference with landfill operations were required, as if a significant pollution hazard would probably exist. Measures to divert surface water were identified. Traffic congestion at both off- and on-site access roads and at the working face were evaluated. Soil workability and availability of cover material were evaluated from available soil data; soil investigations were only performed at some regional sites. In areas of potential conflict with surrounding land uses, buffer zones were identified.

Five mixed refuse disposal sites (Brown's Island, North Benton County, Lebanon, Newberg and Whiteson) were evaluated for development or continuation as regional landfills under the three alternative systems. An additional regional site (S. E. Salem) was considered for use as a residue landfill only. Five other local disposal sites (Macleay, Monmouth-Independence, McCoy Creek, Woodburn and Valsetz) were evaluated for continued use under any of the alternatives.

Feasibility studies have been previously prepared for specific disposal sites and that information is only summarized in this report. Sites are evaluated below for the impact resulting from future use under each alternative. Service areas and waste flows for sites are given in Appendix E, as incorporated in the different alternatives.

Brown's Island Regional Site: Existing conditions at the Brown's Island site were presented in Chapter III. Future use of this site was evaluated under the three alternatives. Under Alternative A, the site would have to receive approximately 3,800,000 tons of unprocessed waste during a 20-year period (1974-1994). Adequate flood protection measures, access road improvements and infiltration and leachate control would allow use of the site (with the availability of 60 acres of adjoining land) in conformance with regulatory criteria.

Alternative B would necessitate use of the site beyond 1994 to dispose of approximately 1,300,000 tons of residue from resource recovery. Similar upgrading, land acquisition and developmental measures would be required but to a lesser degree.

Under Alternative C, the site would receive approximately 800,000 tons of unprocessed wastes during a 10-year period (1974-1984) after which time all wastes would be diverted to a regional heat recovery facility. Similar upgrading and developmental measures would be required, but to the least extent of the three alternatives. No additional land would be required under Alternative C.

Technical evaluations(6,7) of the feasibility for use of the Brown's Island site under each of the alternatives have been

previously prepared. A comparison summary of the most important factors is given in Table IV-7.

Under Alternatives A and B, expansion of the site beyond the existing ownership boundaries would be required. Future use of the site may have to be limited to the present boundary to be compatible with the regional park plan and to avoid river channel or floodplain obstructions. Land that would have to be used for future expansion has already been acquired for the Willamette Greenway system under which interim use as a sanitary landfill is not presently permitted. Minimum setbacks within the Willamette River floodplain limit usable area for the landfill.

Under Alternative A, ongoing use of the site would be fully compatible with other elements of the regional system which would be primarily directed toward land disposal. It would also be fully compatible with the regional system under Alternative C because after 1983 no landfill would be required in the Salem area. The site would, however, under Alternatives A and B have difficult access and traffic congestion due to its general location. If the proposed resource recovery center were located in southeast Salem, residue transport to the site would require highway transfer vehicles. However, if the residue landfill were located adjacent to the center, more efficient off-road equipment could be

used. Off-site access improvements would be essential for long-term use of the site. It is not feasible under Alternative B to locate the resource recovery center near Brown's Island because of more severe access and traffic problems for incoming vehicles and nonavailability of land in the floodplain.

Initial capital and annual cost estimates to develop and operate the site under the three alternatives are given in Appendix F. Development costs would be about \$1,113,200 under Alternative A, \$640,200 under Alternative B and \$518,300 under Alternative C.

It is concluded that the Brown's Island site cannot be used without great technical difficulty and expense during the 20-year periods necessary under Alternatives A and B. It would be possible to continue use for a limited period if access and flood protection measures can be provided at a reasonable cost. If the site is restricted to its existing boundary under either Alternative A or B, the duration of the site use would have to be shortened to less than five years. A new site, such as an abandoned gravel pit, should be anticipated in the southeast Salem area to be more compatible with the regional system beginning in 1979-1980.

A need also exists for further study of a site to backup the Brown's Island regional landfill. As noted in a subsequent section,

Table IV-7
BROWN'S ISLAND REGIONAL SITE
COMPARISON SUMMARY

Factor	Alternative A	Alternative B	Alternative C
1. Disposal Method	Area SLF	Area SLF	Area SLF
2. Additional Land Req'd	70 Acres	60 Acres	None
3. Waste Projected	3,772,000 Tons SW	1,292,000 Tons SW	822,000 Tons SW
4. Capacity	3,772,000 Tons SW	1,292,000 Tons SW	822,000 Tons SW
5. Life	20+ years (1974-1994+)	20+ years (1974-1994+)	10 years (1974-1984)
6. Site Accessibility	Paved, Brown's Island Rd. and River Rd. from Salem	Same as Alt. A	Same as Alt. A
7. Road System	U.S.-State Hwy.; County Rd.	Same as Alt. A	Same as Alt. A
8. Haul Distance	3 miles from Salem	Same as Alt. A	Same as Alt. A
9. Buffer Zones	Conservation & Park Areas	Same as Alt. A	Same as Alt. A
10. Land Availability	Confine to existing areas	Same as Alt. A	Same as Alt. A
11. Land Use	Presently idle or sep. future recreation	Same as Alt. A	Same as Alt. A
12. Zoning	RA (residential-agricultural)	Same as Alt. A	Same as Alt. A
13. Final Use	Regional park or agriculture	Same as Alt. A	Same as Alt. A
14. Auxiliary Transport	Rail, barge possible	Same as Alt. A	Same as Alt. A
15. Leachate Control	Collection, treatment, land disposal	Same as Alt. A	Same as Alt. A
16. Groundwater	Fluctuates with river; future fill above natural ground	Same as Alt. A	Same as Alt. A
17. Flood Protection	Dikes, access road improvements, & back-up site req'd	Same as Alt. A	Same as Alt. A
18. Springs & Surface Water	No springs or ponds, Willamette River floodplain	Same as Alt. A	Same as Alt. A
19. Traffic Congestion	Severe on River Rd. & in Salem	Same as Alt. A	Same as Alt. A
20. Soils & Geology	Silty & sandy loam over sands & gravels; good workability but high permeability	Same as Alt. A	Same as Alt. A
21. Compatibility with System	Fully compatible	Limited compatibility w/transfer & resource recovery due to access and location	Fully compatible

the Macleay site is recommended to provide emergency backup to the Brown's Island site. It is recognized that the inter-relationship between the S. E. Salem Resource Recovery Center, the Brown's Island site, and the Macleay site need further evaluation regarding waste flow and contingency operations under emergency conditions.

North Benton County Regional Site: The conditions pertaining to the use of the existing Coffin Butte site were included in Chapter III. Future use of a regional site in the same vicinity was evaluated under the three alternatives. In each alternative, a regional landfill need was indicated in the vicinity of Granger and Camp Adair for a 20-year period (1974-1994+). Different waste types and flows would occur, however, under the different alternatives.

Under Alternative A the Benton County landfill would require handling nearly 3,000,000 tons of unprocessed waste from southern Polk County, Benton County and western Linn County (see Appendix E). On an annual basis, the site would receive approximately 90,000 tons of wastes from this service area with the amount doubling by 1994.

Under Alternative B, the site would serve the same areas as Alternative A. However, a resource recovery center would be built in the same general area which would reduce the amount of waste received at the land-

fill. A total of approximately 1,600,000 tons of residue and 180,000 tons of unprocessed wastes would be landfilled by 1994.

Under Alternative C, the site would serve primarily as a residue landfill for a heat recovery facility also located in North Benton County. In the later years, this facility would serve virtually all of the major populated areas of the Region. A cumulative total of approximately 1,760,000 tons of wastes and incinerator ash would be landfilled by 1994.

Evaluations were made of the feasibility for development of several different sites in the vicinity of the existing Coffin Butte site. Floodplain restrictions, land use, zoning and land availability led to the eventual selection of the proposed site.

A comparison summary for use of the North Benton County site under the three alternatives is given in Table IV-8. Under Alternative A, development of the new site would require lease or purchase of about 100 acres with site preparation, improvements to access roads, access control, landscaping, leachate and drainage control, utilities and other support facilities. Leachate and drainage control would be essential to handle the area previously filled at the old Coffin Butte site as well.

Land acquisition could be reduced to 60 acres under Alternative B; leachate and

drainage control measures would be reduced in scope. Due to the reduced total quantity of waste to be landfilled, other developmental measures would also be less.

Alternative C would also require a total of 100 acres and similar site development measures. However, measures for leachate and drainage control could be significantly reduced under Alternative C due to the characteristics of the incinerator residue which would be received.

Public use of the site would only occur under Alternative A. Under Alternative B both commercial and public use would be prohibited if an alternate transport and processing system is provided. Only transfer vehicle transport would be allowed under Alternative C. These decisions were justified as the site is considered to have poor access for the public and for commercial traffic from Albany, but is considered to have good accessibility for Corvallis commercial traffic. Distance from communities and litter were also considered.

As given in Appendix F, the capital costs (including land) to develop the site would total \$360,600 under Alternative A, \$280,600 under Alternative B and \$360,000 under Alternative C. The expenditures for preparation of the site vary initially and with time depending on the amount of wastes anticipated.

Table IV-8
NORTH BENTON COUNTY REGIONAL SITE
COMPARISON SUMMARY

Factor	Alternative A	Alternative B	Alternative C
1. Disposal Method	Ramp SLF	Same as Alt. A	Same as Alt. A
2. Additional Area Req'd	100 Acres	60 Acres	100 Acres
3. Waste Projected	Approx. 2,870,00 Tons	Approx. 1,780,000 Tons	Approx. 1,760,000 Tons
4. Capacity	2,904,000 Tons	1,704,000 Tons	2,904,000 Tons
5. Life	20+ years (1974-1994+)	19+ years (1974-1993+)	20+ years (1974-1994+)
6. Site Accessibility	Poor for public; poor for commercial from Albany	No public use; good comml. Corvallis; poor comml. from Albany	No public use; no comml. direct use
7. Road System	U.S.-State Hwy.; County Road	Same as Alt. A	Same as Alt. A
8. Haul Distance	Approx. 10 mi. Albany; 12 mi. to Corvallis	Same as Alt. A	Same as Alt. A
9. Buffer Zones	Required on south & east sides	Same as Alt. A.	Same as Alt. A
10. Land Availability	Option to purchase	Other 40 acres avail.	Same as Alt. A
11. Land Use	Agriculture (idle)	Same as Alt. A	Same as Alt. A
12. Zoning	R-A, Suburban Res./agriculture	Same as Alt. A	Same as Alt. A
13. Final Use	Agriculture	Same as Alt. A	Same as Alt. A
14. Auxiliary Transport	Potential rail	Same as Alt. A	Same as Alt. A
15. Leachate Control	Collection system; lagoons, land disposal	Same as Alt. A	Same as Alt. A
16. Groundwater	At 10-20-foot depths or more low yield wells	Same as Alt. A	Same as Alt. A
17. Flood Protection	None required	Same as Alt. A	Same as Alt. A
18. Springs & Surface Water	Intermittent springs to west & ponds to north; none in working area	Same as Alt. A	Same as Alt. A
19. Traffic Congestion	Severe Hwy. 20 and County Rd.	Minor Hwy. 20 & 99W; severe on County Rd.	None; residue transport only
20. Soils & Geology	Witzel very cobbly, silty, clay loam underlain by basalt rock	Same as Alt. A	Same as Alt. A
21. Compatibility with System	Fully compatible	Fully compatible	Fully compatible

Lebanon Regional Site: Present conditions pertaining to the Lebanon site were given in Chapter III. Future use of the Lebanon site is anticipated under all of the proposed alternatives.

Under Alternatives A and B, the site would be upgraded for continued operation to receive a total of approximately 840,000 tons of unprocessed waste during the 20-year period (1974-1994). Wastes from the Sweet Home and Lebanon service areas of Linn County would be received at an initial rate of approximately 30,000 tons per year which would increase to approximately 50,000 tons per year by 1994.

Under Alternative C, a total of only about 300,000 tons of unprocessed waste would be received from the same service areas. After 1983 wastes from the Sweet Home-Lebanon areas would be transferred to the resource recovery center near Albany to be ultimately recovered as steam at the proposed regional facility.

Remaining capacity of the present site is estimated to be 900,000 tons of solid waste which would be adequate to meet the needs of the area for nearly a 20-year period without acquisition of additional land. An area method of landfill could be utilized for residential, commercial and industrial wastes. Appliances and other large scrap should be reclaimed. Final use

of the site has not been identified but presumably could be phased to agricultural grazing or cropland.

Flood control dams on the South Santiam River have reduced flood hazard to the site. As an added precaution, a dike is under construction along the western edge. Surface water diversion ditches will also be necessary. Leachate monitoring wells should be installed and, if needed, a leachate collection and treatment system could be constructed. Traffic congestion is not expected to be a problem for use under any of the regional alternatives.

It is concluded that the Lebanon site can be used under all three alternatives in much the same manner during the initial period. As given in Appendix F, the initial capital cost is estimated to be \$121,400 (including land) for upgrading operations and would remain the same under all alternatives. Annual costs would also be the same under Alternatives A and B.

A comparison summary for alternative uses of the site is given in Table IV-9.

Newberg Regional Site: Conditions pertaining to present use of the Newberg site were evaluated in Chapter III. Future use of the site as a regional sanitary landfill appears feasible under the three alternative systems.

Under Alternative A, the Newberg site would be upgraded to receive nearly 1,400,000 tons of unprocessed wastes from service areas in Yamhill County, northern Marion County and Washington County.

Under Alternative B, the site would be upgraded to receive approximately 500,000 tons of unprocessed wastes from only Newberg and southwestern Washington County.

Under Alternative C, the site would receive a total of approximately 170,000 tons of unprocessed wastes for an eight-year period from 1974 to 1982 after which time wastes would be transferred to a processing center near McMinnville.

During the initial period, the site would continue to be upgraded and operated in much the same manner under all of the alternatives. Residential, commercial and industrial wastes, pulp mill sludge, tires and appliances would be buried in an area method sanitary landfill.

With the purchase of additional properties, adequate soil cover can be made available. Pulp mill sludge also offers some potential for use as intermediate cover.

Milling to achieve volume reduction would assist in reducing land requirements and enhancing final stability of the site. However, the economics for facility installation

Table IV-9
LEBANON REGIONAL SITE
COMPARISON SUMMARY

Factor	Alternative A	Alternative B	Alternative C
1. Disposal Method	Area SLF	Area SLF	Area SLF
2. Additional Area Req'd	None, City-County Combined	None, City-County Combined	None, City-County Combined
3. Waste Projected	Approximately 840,000 Tons	Same as Alt. A	Approx. 300,000 Tons
4. Capacity	900,000 Tons	Same as Alt. A	900,000 Tons
5. Life	20 years (1974-1994)	Same as Alt. A	9 years (1974-1983)
6. Site Accessibility	Good from all areas	Same as Alt. A	Same as Alt. A
7. Road System	Brewster Rd. to Hwy. 20, satisfactory	Same as Alt. A	Same as Alt. A
8. Haul Distance	2 miles from Lebanon	Same as Alt. A	Same as Alt. A
9. Buffer Zones	None required	Same as Alt. A	Same as Alt. A
10. Land Availability	Presently owned	Same as Alt. A	Same as Alt. A
11. Land Use	Agriculture, residential	Same as Alt. A	Same as Alt. A
12. Zoning	ART, agriculture-recreation-timber	Same as Alt. A	Same as Alt. A
13. Final Use	Unknown, probably agriculture	Same as Alt. A	Same as Alt. A
14. Auxiliary Transport	Potential rail	Same as Alt. A	Same as Alt. A
15. Leachate Control	Monitoring wells only	Same as Alt. A	Same as Alt. A
16. Groundwater	Approx. 44 feet below surface	Same as Alt. A	Same as Alt. A
17. Flood Protection	Dikes needed	Same as Alt. A	Same as Alt. A
18. Springs & Surface Water	Surface water diversion needed	Same as Alt. A	Same as Alt. A
19. Traffic Congestion	Unlikely	Same as Alt. A	Same as Alt. A
20. Soils and Geology	5-6 feet of sandy, silty loam overlying tighter soils	Same as Alt. A	Same as Alt. A
21. Compatibility with System	Fully compatible	Same as Alt. A	Same as Alt. A

without material recovery appears infeasible based on the unit cost for quantities processed.

Monitoring of groundwater conditions particularly adjacent to the river should be an ongoing program as should the use of dikes or other methods to divert surface waters away from active landfill areas until final cover and stability from erosion is obtained. A specific operational plan for both summer and winter conditions should be identified to insure continuous and effective site use.

It is concluded that the Newberg site can be upgraded and continued in operation to meet the projected waste disposal needs under all three alternatives. Capital costs are estimated to be about \$63,900 (including land) remaining the same for each alternative.

A comparison summary for alternative uses of the site is given in Table IV-10.

S. E. Salem Regional Site: Although not included in the three basic alternative systems, a landfill site in southeast Salem was evaluated during the study period for use as a regional residue landfill. The site was intended, only under Alternative B, to be used for disposal of processed residue from the S. E. Salem Resource Recovery Center. This would avoid transporting the material to Brown's Island. Two existing

gravel pits were evaluated: M. P. Materials and Walling Sand and Gravel. Both are located near the Salem Municipal Airport and are easily accessible to Interstate 5.

The M. P. Materials site is located near the junction of Airport Road, S. E., and Turner Rd., S. E., on property zoned RA, Residential. No immediately adjacent property appeared readily suitable as a site for a regional resource recovery center. Traffic congestion could be a potential problem at the entrance to Turner Road if all residues were transported in highway vehicles. Although no measurements were made, the capacity of the site appeared sufficient to dispose of residue wastes from 1976 to 1994 or beyond. A dewatering system would probably be necessary, as well as entrance improvements.

The Walling Sand and Gravel Co. gravel pits are located between 16th Street, S. E., and 22nd Street, S. E., on McGilchrist Street in an area zoned HI, Heavy Industrial. Adjacent property already committed to industrial uses appeared to be well suited as a potential site for a regional resource recovery center. It appeared possible to construct an exclusive access road between the industrial sites and the gravel pits to enable use of off-road transport vehicles. Rail is readily available and the present use of the existing road network includes heavy industrial vehicles. A dewatering system, as well as fencing and equipment maintenance

facilities, would be necessary to develop the site. Capacity appeared adequate for the anticipated use. Both sites would require access control to prevent unauthorized use. Although both sites could probably be utilized, the Walling Sand and Gravel site would be preferable because of compatible zoning and surrounding land use, availability of adjoining sites for a processing center, and compatibility with the existing road network.

Protection of groundwater will be a major concern for either site with the level of protective measures largely dependent on the character of materials being landfilled. Inert demolition waste could be used to bring the level of the pits above the water table. If resource recovery then removes the organic and putrescible wastes as a combustible fuel, the inert residue could be safely landfilled. In case the material is not sufficiently processed, capacity at Brown's Island could be used to back up the system. In case additional landfill capacity is needed for unprocessed wastes over the long-range period, a contingency plan could include use of the Macleay site in Marion County. With use of the latter as a drop box site and special waste processing site, landfill operation could be quickly mobilized. A summary for use of the site under Alternative B only is given in Table IV-11.

Table IV-10
NEWBERG REGIONAL SITE
COMPARISON SUMMARY

Factor	Alternative A	Alternative B	Alternative C
1. Disposal Method	Area SLF	Area SLF	Area SLF
2. Additional Area Req'd	50 acres	50 acres	None
3. Waste Projected	Approx. 1,400,000 tons	Approx. 500,000 tons	Approx. 170,000 tons
4. Capacity	1,400,000 tons w/land acquisition	500,000 tons w/land acquisition	170,000 tons
5. Life	20 years (1974-1994)	20 years (1974-1994)	8 years (1974-1982)
6. Site Accessibility	Poor access into site; easily	Same as Alt. A	Same as Alt. A
7. Road System	Co. Road to State Highway	Same as Alt. A	Same as Alt. A
8. Haul Distance	2 miles from Newberg	Same as Alt. A	Same as Alt. A
9. Buffer Zones	None required	Same as Alt. A	Same as Alt. A
10. Land Availability	Unknown	Same as Alt. A	Same as Alt. A
11. Land Use	Agriculture	Same as Alt. A	Same as Alt. A
12. Zoning	Agriculture	Same as Alt. A	Same as Alt. A
13. Final Use	Agriculture or Recreation	Same as Alt. A	Same as Alt. A
14. Auxiliary Transport	None	Same as Alt. A	Same as Alt. A
15. Leachate Control	None to be provided	Same as Alt. A	Same as Alt. A
16. Groundwater	Fluctuates w/the Willamette River	Same as Alt. A	Same as Alt. A
17. Flood Protection	Diking, access road improvements needed	Same as Alt. A	Same as Alt. A
18. Springs and Surface Water	Chehalem Creek and the Willamette River	Same as Alt. A	Same as Alt. A
19. Traffic Congestion	Severe at entrance and River Road	Moderate at entrance and River Road	Moderate at entrance and River Road
20. Soils and Geology	Silty, sandy loam to 6 feet	Same as Alt. A	Same as Alt. A
21. Compatibility with System	Fully compatible	Same as Alt. A	Same as Alt. A

Table IV-11
SE SALEM REGIONAL SITE
SUMMARY

Factor	Alternative B
1. Disposal Method	Area residue landfill
2. Additional Area Req'd	None
3. Waste Projected	1,292,000 tons
4. Capacity	Greater than 1,300,000 tons
5. Life	18+ years (1976-1994+)
6. Site Accessibility	Off-road access possible; excellent area accessibility
7. Road System	McGilchrist Rd. & Turner Rd. to I-5
8. Haul Distance	Adjacent to RRC sites
9. Buffer Zones	None req'd except fencing
10. Land Availability	Lease or purchase from private owner
11. Land Use	Industrial, natural resource
12. Zoning	IH, Heavy Industrial
13. Final Use	Industrial site
14. Auxiliary Transport	Potential rail
15. Leachate Control	Not required
16. Groundwater	Dewatering system or initial demolition filling
17. Flood Protection	None required
18. Springs & Surface Water	Infiltration from gravel strata
19. Traffic Congestion	None likely; exclusive access
20. Soils & Geology	Sands and gravels
21. Compatibility w/System	Excellent

It should be noted that a five-year period exists during which other alternative residue disposal sites may be investigated and evaluated. Final selection of the residue disposal site must be coordinated with the design, construction, and operation of the processing center during this time period.

Whiteson Regional Site: Present conditions pertaining to the Whiteson site were given in Chapter III. Future use of the site as a regional sanitary landfill appears feasible under all three alternatives.

Under Alternative A, the site would receive a total of approximately 630,000 tons of unprocessed waste during the first 12-year period (1974-1986). Until closure of the site in 1986, it would receive wastes from service areas in Polk County and the McMinnville area of Yamhill County.

Under Alternative B, wastes from the same service areas would be transferred to a resource recovery center after 1986.

Under Alternative C, the site would receive approximately 270,000 tons of unprocessed wastes and be operated only for an 8-year period (1974-1982). It would be replaced with a processing-transfer facility similar to that at Lebanon. After 1982, all processed materials and residues would be transferred to the heat recovery facility proposed in North Benton County.

Under all of the alternatives, the site would receive residential, commercial and industrial wastes for burial in a sanitary landfill operated initially in trenches, thence in an area method. White goods and other scrap would be stored in a separate area for reclamation. Area filling on top of trenches would enable the site to adequately handle the 460,000 tons for disposal under Alternative B but would require excessive depths or area expansion to dispose of the 630,000 tons projected under Alternative A. Waste quantities received under Alternative C could be readily landfilled.

Soils at the site are heavy clays which are poorly workable in wet weather but which limit leachate production and travel. Flood and surface water control measures are provided or planned for future construction. A french drain controls subsurface water entering buried refuse. Bulky wastes are generated in large quantities in the McMinnville service area and have a major impact on the landfill operations. Volume reduction by source separation and recovery or size reduction by milling these wastes appears necessary to conserve capacity at the site. Since wood residue disposal provides a significant portion of the revenue to operate the site, reduced quantities of this waste would require extensive readjustment of the operational program.

It is concluded that the Whiteson site could not be used for the entire period of Alternative A but could be used for the proposed periods of Alternatives B and C, respectively. No additional major capital costs would be incurred under any alternative. Summary of the uses of the site under the three alternatives is given in Table IV-12.

Albany Site: Existing conditions regarding the Albany site were evaluated in Chapter III. No future use is proposed for the site because of the difficult operating conditions and future capacity requirements. Under all alternatives, use of the site would be terminated. Wastes from the service area would be landfilled at the North Benton County site under Alternative A, would be transferred to North Benton County Resource Recovery Center under Alternative B, or would be incinerated under Alternative C at the proposed regional facility in Benton County.

Macleay Site: Existing conditions at the Macleay site were evaluated in Chapter III. Under all alternatives, the site would be closed during 1974 or early 1975. Wastes from the area would be hauled to the Brown's Island site under Alternative A or be transferred to a Resource Recovery Center in S. E. Salem under Alternatives B or C. The site has served as a backup for the Brown's Island site and may continue to do so in the future if the need arises.

Continued use of the Macleay site as a backup to the Brown's Island regional site and the S. E. Salem Resource Recovery Center was selected primarily on the basis of least initial cost. Duplicate equipment at the processing facility is not indicated because the maximum duration of emergency downtime is expected to be two weeks annually and it is considered more acceptable to rely upon the Macleay and Brown's Island sites for backup facilities. Further evaluation of the capacity and anticipated use of the Macleay site should be undertaken concurrently with preliminary design of the Salem processing facility.

Monmouth-Independence Site: Existing conditions pertaining to the Monmouth-Independence site were evaluated in Chapter III. Under all three alternatives, the site would have to handle approximately 130,000 tons of unprocessed waste during the next five years (1974-1979). Approximately 19,000-24,000 T/YR of wastes would be received from the Monmouth-Independence and Dallas areas during this time. Beyond 1979, wastes from the area would be transferred to the North Benton County landfill (Alternative A), the North Benton County Resource Recovery Center (Alternative B), or would be processed near Rickreall and hauled to the incineration facility in Benton County (Alternative C).

Table IV-12
WHITESON REGIONAL SITE
COMPARISON SUMMARY

Factor	Alternative A	Alternative B	Alternative C
1. Disposal Method	Trench and area SLF	Trench and area SLF	Trench and area SLF
2. Additional Area Req'd	10 acres (approx.)	None	None
3. Waste Projected	Approx. 630,000 Tons	Approx. 460,000 Tons	Approx. 270,000 Tons
4. Capacity	Approx. 460,000 Tons	Approx. 460,000 Tons	Approx. 460,000 Tons
5. Life	12 years (1974-1986)	12 years (1974-1986)	8 years (1974-1982)
6. Site Accessibility	Good for service area	Same as Alt. A	Same as Alt. A
7. Road System	Co. Rd. and 99W	Same as Alt. A	Same as Alt. A
8. Haul Distance	6 mi. south to McMinnville	Same as Alt. A	Same as Alt. A
9. Buffer Zones	South and east sides	Same as Alt. A	Same as Alt. A
10. Land Availability	Owner by county	Same as Alt. A	Same as Alt. A
11. Land Use	Agriculture	Same as Alt. A	Same as Alt. A
12. Zoning	None	Same as Alt. A	Same as Alt. A
13. Final Use	Agriculture	Same as Alt. A	Same as Alt. A
14. Auxiliary Transport	None	Same as Alt. A	Same as Alt. A
15. Leachate Control	Interception and Prevention	Same as Alt. A	Same as Alt. A
16. Groundwater	Below 35 feet	Same as Alt. A	Same as Alt. A
17. Flood Protection	Dikes needed	Same as Alt. A	Same as Alt. A
18. Springs and Surface Water	Diversion ditches needed	Same as Alt. A	Same as Alt. A
19. Traffic Congestion	Not likely	Same as Alt. A	Same as Alt. A
20. Soils and Geology	Silts and clays	Same as Alt. A	Same as Alt. A
21. Compatibility with system	Compatible, but limited life	Fully compatible	Fully compatible

Residential, commercial and industrial wastes would be buried in an area method sanitary landfill. White goods would be separated and reclaimed.

Adequate soil cover consisting of silty clay loam is available for remaining use. Surface and groundwater control measures do not appear to be necessary for remaining use of the site.

McCoy Creek Site: Existing conditions pertaining to the McCoy Creek site were evaluated in Chapter III. Future use of the site under all alternatives would be identical. It would receive approximately 25,000 tons of unprocessed wastes during the entire 20-year period (1974-1994) from the Idanha-Santiam Junction area. Approximately 800 T/YR are estimated to be generated in this area, plus an unknown amount of recreational area wastes from forest lands.

Residential, commercial and recreational wastes, litter and white goods would be buried in a trench-type sanitary landfill. In addition to the present 10 acres, 40 acres are available for expansion.

Groundwater, surface water and leachate control are not anticipated to be future problems with use of the McCoy Creek site.

Valsetz Site: Existing conditions pertaining to the Valsetz site were evaluated in

Chapter III. Under the three alternative systems, the site would be used for at least a 20-year period (1974-1994) to landfill approximately 9,000 tons of unprocessed wastes from the community of Valsetz. An initial rate of approximately 300 T/YR is projected to increase to approximately 500 T/YR by 1994.

Residential, commercial and demolition wastes, white goods and tree trimmings will be buried in an area method modified landfill. The property presently in use could be extended to meet the needs of the area.

The silty loam soil exists at depths of approximately six feet with an underlay of rock at 20 feet which could limit cover material. Groundwater, surface water and flooding problems are not expected under the anticipated future use. Leachate control would utilize existing ditches and ponds. Traffic congestion is not anticipated.

Initial capital cost to develop the site is estimated to be \$7,400 under all alternatives. This expenditure is primarily for fencing, signing and other improvements to upgrade usage and operational control to those for a sanitary landfill. To avoid the high costs of daily covering, a limited period of operation (one or two days per week) appears preferable. This would be similar to the McCoy Creek site.

Woodburn Site: Existing conditions pertaining to the present Woodburn site were evaluated in Chapter III. Future use of a new replacement site near the existing site would be included under all alternatives.

Under Alternatives A and B, the new site would receive approximately 500,000 tons of unprocessed wastes from the Woodburn and Mt. Angel-Silverton areas of Marion County and a portion of Clackamas County. Generated wastes have been estimated to be approximately 35,000 T/YR which would increase to approximately 50,000 T/YR by 1984. By such time, the site would be closed and all mixed wastes transferred to the Newberg site.

Under Alternative C, the site would be closed by 1982 and wastes would be transferred to a processing-transfer facility in S. E. Salem, thence to the regional incineration and heat recovery plant in Benton County.

Residential, commercial, industrial and food processing wastes would be buried in a trench sanitary landfill. Cardboard and white goods would be reclaimed in a separate area.

Adequate soil cover consisting of silt loam is available on site. High groundwater conditions, however, do pose special design

and operation problems by limiting depth of excavation and requiring leachate control.

Filling should be restricted to above water table elevations and be phased to achieve optimum use of available soils for constructing area lifts over filled trenches. At least two feet of cover should be planned for all filled areas with contouring for eventual reuse for agricultural or park development.

Initial capital costs to develop the site have been estimated to be about \$60,000, remaining the same under each alternative system.

DEMOLITION LANDFILLS. Generally, demolition wastes can be landfilled in small quantities with little difficulty. However, when the amount exceeds about 30 percent of the total waste to be handled, special equipment may be necessary to move, compact or cover heavy or bulky materials. Landfill of demolition wastes can be done with little separation or special handling methods. Transfer and resource recovery systems may, however, be adversely affected by some types of demolition wastes. Wood residues have potential value for energy and should be diverted to processing systems wherever feasible.

Rural transfer systems are the type most affected by large amounts of demolition

wastes. Concrete, rock or other heavy materials can overload a drop box causing delays or damage to the equipment. To overcome this problem, an attendant has been assumed to be essential to operation of a rural transfer system. An important duty of the attendant would be to prevent heavy demolition materials from being deposited in the drop box and designating proper separation and disposal of these wastes.

Urban transfer systems are also vulnerable to overloading from excessive heavy demolition materials. The typical system previously discussed would be protected from overloading by the facility attendants, but excessive amounts would need to be diverted to an alternative disposal location.

Due to the above considerations, it will be necessary to continue to provide sufficient demolition landfills in the Region. Locations of the landfills will have to be as close as possible to the source of waste generation, primarily the urban areas of Salem, Albany and Corvallis. Uses of existing and proposed demolition landfills are presented in this section.

Corvallis Demolition Site: Existing conditions at the Corvallis demolition landfill were previously evaluated in Chapter III. Under all three alternatives, the site would continue in use until full, projected to occur about 1979. During this

five-year period, approximately 210,000 tons of demolition wastes would be received from the Corvallis-Albany urban area at a rate of approximately 35,000 T/YR. A new demolition site could be developed at the existing Tremaine gravel pits for replacement of the site under all three alternatives.

The site would receive demolition wastes and land clearing debris which would be buried in an area method modified landfill with weekly cover. Recovery of processible or combustible materials should be considered by 1976 to be compatible with other regional programs. Adequate cover material is available for remaining use of the site. Existing dikes are anticipated to be adequate for flood and surface drainage control. No additional leachate control measures or access road improvements are believed to be necessary. Traffic congestion is not anticipated to be a future problem. Upon completion, the site should receive final cover sufficient for agricultural usage.

Fowler Demolition Site: Existing conditions pertaining to the Fowler demolition landfill were evaluated in Chapter III. Under all three alternatives, the site would be continued in operation until the remaining capacity is exhausted (about 1979) to serve the Salem and surrounding urban area. Approximately 130,000 tons of wastes would be received during the 5-year period at a rate of about

22,000 T/YR. In 1979 a new demolition landfill could be established near Silverton to replace the site.

The site would continue to receive only demolition wastes and land clearing debris, all of which would be buried in an area method modified landfill (weekly cover). Final use of the site would be presumably agricultural grazing or cropland.

Soil cover availability should be adequate for remaining use of the site. Groundwater and surface water conditions are not believed to require construction of any diversion structures, dikes or ditches. Although the site is in the Willamette River floodplain, no flood protection measures are proposed because of the inert character of the waste and the lack of a need for continuous use.

Monroe Demolition Site: Existing conditions at the Monroe demolition site were evaluated in Chapter III. The remaining capacity of the site has not been determined; however, the need for a demolition landfill in Benton County has been recognized. Although a detailed evaluation has not been made, continued use of the site until its capacity is exhausted is recommended in order to provide a facility for demolition waste disposal in Benton County. Further evaluation of the site is also recommended.

Other Demolition Sites: Two potential demolition sites were identified during the study period for use under long-range plans. The sites, either separately or in combination with the Corvallis, Fowler, Silverton or Tremaine demolition landfills, could serve parts of the Region.

One site in Linn County (SE¼, Section 10, T11S, R3W) could be developed from an old quarry owned by Albany Rock Products. Another site in Yamhill County, north of McMinnville, (NE¼, Section 19, T3S, R4W) also offers potential for development as a demolition landfill.

Further investigation and operational plans should be developed as need arises. No cost estimates have been prepared for development or use of these sites.

SLUDGE LAGOONS. Two existing septic tank sludge lagoons were previously evaluated in Chapter III. Future management of this waste disposal has been considered as a necessary element separate from mixed refuse and demolition wastes.

Generally, it is anticipated that the future need for septic tank sludge lagoons will diminish. It is projected that the sludge entering the public system will decrease or remain constant because population growth will be offset by new sanitary sewer services. In addition to a larger percentage of the population projected to be served by

public sewers, greater usage of sewage treatment plants for disposal of septic tank pumpings is anticipated. Future use of the existing sludge lagoons is evaluated below in light of the above factors.

Cal Nored Sludge Lagoon: Under any of the alternatives, the Cal Nored sludge lagoons should be phased out in a three- to five-year period. During that period, the Region's sewage treatment plants should be programmed to upgrade capability to handle septic tank pumpings. No major improvements are recommended for continued use of the site.

Roto Rooter Sludge Lagoon: Like the Nored facility, the Roto Rooter sludge lagoon should be phased out in a three- to five-year period. No major improvements are recommended for continued use of the site during the remaining usage.

SELECTION OF THE RECOMMENDED PLAN

This section describes the procedures used to select the recommended plan, how the recommended plan achieves the desired planning objectives and what modifications to the selected alternative plan were actually developed. As was discussed for the alternative plans, specific goals and objectives for the Region were intended to be incorporated in the recommended plan.

Obviously, there are many criteria and constraints in selecting a final plan and many variations could be proposed. With the guidance of the Chemeketa Board, one of the three alternative plans proposed was selected and became subject to further detailed evaluation before emerging as the recommended plan set forth in the next section.

Procedures

Three alternative plans for regional systems were proposed as described in a previous section. Each included a planning level analysis of facility needs, size, capital costs and approximate total annual costs. The plans were presented to the Chemeketa Board for discussion in light of meeting existing regulations and controls, and the established goals and objectives. Plans were discussed particularly in terms of capital costs. A consensus was reached to select Alternative B (Figure IV-10) as best meeting these requirements.

Detailed financial analysis was undertaken on this plan resulting in capital cost adjustments, additional phasing of facilities where high growth would indicate future expansion and facility deferral if not economically feasible during the indicated implementation period. Further discussions with involved parties also resulted in additional facility phasing or relocations to achieve a workable final plan.

To add flexibility in allowing for different approaches to implement plans in each county, Alternative B, as modified, was further adjusted as to initial and long-range periods. The importance of recognizing an initial period for major facilities was to allow for the possibility of different rates of progress in each county together with optimum use of acceptable existing facilities.

The culmination of the above action was the Chemeketa Boards's general concurrence with the Recommended Plan presented in detail in the next section. Further review of the Recommended Plan by the various counties and cities in the Region will follow publication of this report. Adoption of the Recommended Plan by the counties and most of the cities will mark the end of the planning process and the beginning of implementation of a regional solid waste management plan.

Planning Objectives Achieved

In the previous section, broad objectives were established for Alternative B. Due to capital and annual operating costs, particularly in the initial period of implementation, it became apparent that not all of the objectives could be fully realized.

Public convenience, primarily outside the main urban areas, will not be as great as anticipated due to high user costs which

would tend to discourage rather than encourage use. Voluntary use of rural collection services will be necessary unless increased illegal dumping activity leads to intolerable conditions which would require publicly financed special districts or a county-wide subsidy of rural drop box stations.

Continued use of short-term landfills will be necessary in some areas because of the high costs of consolidation into regional sites. These smaller sites will have to meet all operating controls and requirements probably at higher user costs. Incentives to close such sites and utilize regional resource recovery facilities must be reviewed annually.

A lack of large energy users in the proper location and the unavailability of suitable supplementary fuels make construction of a heat recovery facility technically infeasible for the Region. Maximum energy recovery will not therefore be achieved at facilities constructed under the Recommended Plan. However, resource recovery as recommended would result in conversion of a portion of the Region's solid waste into a marketable fuel which can be used in existing boilers. So, although energy recovery is not maximized, it is significantly enhanced when considered for the entire Region.

Under Alternative B as modified, resource recovery is maximized except in outlying areas where the use of local landfills essentially reduces the energy which would be consumed in transporting the waste to a regional resource recovery center. It is probable that the energy saved would nearly equal the energy which could be derived by processing wastes from these areas. Inclusion of an additional resource recovery center at Newberg will represent a net savings in energy by reducing transportation of those wastes to North Benton County or recovery of wastes initially proposed to be landfilled.

An objective achieved under the Recommended Plan that was not included in the original objectives is minimization of initial capital investment through phasing of major facilities. The purpose of this objective is to enhance the ease with which local government and industry can finance the Recommended Plan and to enhance public acceptance of the Chemeketa Region's program and the Recommended Plan.

Specific Modifications

Specific modifications to Alternative B, resulting from the procedures noted above are:

- Early closure of the Brown's Island sanitary landfill is shown in the

Recommended Plan because costs to develop the site for long-term use are estimated to be much greater than originally anticipated. In lieu of long-term use as a large-scale sanitary landfill, the Brown's Island site will be upgraded for short-term use only, during which time gravel pits near the S. E. Salem Resource Recovery Center will be evaluated and developed as a residue landfill. The feasibility of land reclamation with air classifier residue will be demonstrated at the gravel pits while the Brown's Island site will be available in the short-range period. Also during the trial period, enhancement of Brown's Island may be demonstrated by raising the site above flood elevation.

A smaller transfer facility would be constructed to serve the Corvallis urban area. Detailed evaluation disclosed that only about 10 percent of the city's wastes would have to be handled initially at the transfer station, with the remaining wastes hauled directly to the North Benton County Resource Recovery Center. Expansion of the initial drop-box type station into a compacting-type urban transfer station would be done in the long-range period if usage so dictated. Minor modifications to the existing Stayton Transfer Station were determined to be all that will be necessary to provide a long-term transfer system

for that community. A new facility as originally included in Alternative B was found to be an unnecessary expense in the Recommended Plan. Primarily due to a desire to spread capital expenditures over as long a period as possible, urban (compacting) transfer stations, resource recovery centers, and some regional landfills are indicated for phased construction. In addition, initial construction of resource recovery centers will not include standby equipment as originally proposed. It was determined that the Region can tolerate some congestion at transfer stations during peak days, will have sufficient landfill backup to accept some downtime at resource recovery centers, and prefers to develop facilities only as needed. With those considerations in mind, a phased construction program was selected in the Recommended Plan. In Alternative B as originally formulated, a sanitary landfill would be developed at Newberg for use during the entire 20-year period. During evaluation of Alternative B, a transfer system to transport the Newberg-Dundee area wastes to the North Benton County Resource Recovery Center was considered as a modification for the long-range period. Further evaluation has resulted in the recommendation that a resource recovery center be constructed at

Newberg to serve Newberg, Dundee, McMinnville, most remaining areas of Yamhill County, and portions of northwestern Polk County.

Construction schedules for rural drop box stations have been deleted in the long-range period of the Recommended Plan. This modification was made primarily due to a desire to minimize capital costs of the Recommended Plan and to promote economy of operation. Actual construction of these facilities in the long-range period will depend entirely upon a demonstrated demand by residents of the local area or upon intolerable waste disposal nuisances resulting from lack of a convenient public facility.

The existing Macleay landfill site will be retained under the Recommended Plan as a limited sanitary landfill. The landfill will be operated only on an emergency basis when the resource recovery center at Salem is not functioning. This plan feature avoids using the gravel pit residue landfill for putrescible wastes. The site will not be used for regular landfilling, but will serve as one of the rural drop box stations.

A landfill was recognized to be necessary to provide emergency backup to the Rickreall Transfer Station. Development of either a new landfill or the existing Monmouth site is

indicated to serve Polk County under such conditions. Further evaluation of contingency plans for Polk County should be undertaken concurrent with preliminary design of the Rickreall Transfer Station.

THE RECOMMENDED PLAN

In the future, individual communities will be unable to effectively solve the economic, social, scientific and technical problems of solid waste disposal. A regional approach to solid waste disposal will be necessary. Such an approach is particularly important from a facility planning standpoint and for overall economy.

The planning alternatives for a region as large as the Chemeketa Region are almost limitless. In order to simplify and reduce the number of alternatives, preselection criteria were identified to assist in the task of plan development. Significant criteria included:

- Consolidation of numerous landfills into fewer regional sites will be necessary because of higher operational standards, tighter and more expensive environmental controls and the unavailability of adequate, long-term sites in many areas.
- Resource recovery will be stressed and be a more involved element of disposal systems in the future. This

will require that the long-range plan be flexible. It must allow the addition of recovery equipment without replacing or competing with a long-term facility which does not recover any value from the region's wastes and to which local financing is committed. Regardless of the type of new program proposed, increased cost can be expected and resource recovery may aid in returning revenues to offset future increases in disposal costs.

Resource recovery on a large scale can be expected to significantly reduce the need for sanitary landfills but not eliminate this need completely in the foreseeable future.

At least one sanitary landfill will be necessary in each county for some time.

An increasing need to have special waste problems solved at the source of generation rather than by use of public disposal sites must be recognized.

Any plan developed on a regional basis must continue to recognize the ability to be implemented by both private industry and public agencies, either separately or jointly, in order to be economical and offer the best public service.

Elements of the Recommended Plan

While the alternative plan chosen as best meeting planning criteria and local conditions can be considered a composite system, in actuality it represents a highly interfaced set of local facilities which operate independently but under a joint program of cooperation. The overall recommended initial and long-range plans shown in Figures IV-15 and IV-16, consider a total of nine regional service areas and contain two major phases for scheduling future system upgrading and addition of new facilities. The initial and long-range periods will vary from county to county. Resource recovery is a key element in the system and requires special facilities to be implemented. Continuation of collection activities in the same general manner as is presently practiced is recommended in both the initial and long-range plans.

Based on physical, economic, and planning constraints, the approximate years of usefulness for each disposal site will be as shown in Table IV-13 under the Recommended Plan.

Specific elements of the Recommended Plan by regional service area include:

NEWBERG AREA. By upgrading and expanding the existing sanitary landfill, this area's program will continue much as it is at present. On an indefinite basis, mixed

Table IV-13
ESTIMATED PERIODS OF USE FOR
REGIONAL AND LOCAL LANDFILLS

Landfill Site	County	Status	Years of Use
Regional			
Brown's Island	Marion	Exist.	1974-1979
North Benton	Benton	New	1974-1994+ ¹
Lebanon	Linn	Exist.	1974-1994+
Newberg	Yamhill	Exist.	1974-1994+
Whiteson	Yamhill	Exist. ²	1974-1986
S.E. Salem	Marion	New	1977-1994+
Local			
Macleay	Marion	Exist.	1974-1986 ³
Monmouth- Independence	Polk	Exist.	1974-1979
McCoy Creek	Marion	Exist.	1974-1994+
Woodburn	Marion	New	1974-1984
Valsetz	Polk	Exist.	1974-1994+
Demolition			
Corvallis	Linn	Exist.	1974-1979
Fowler	Marion	Exist.	1974-1979
Monroe	Benton	Exist.	1974+
Silverton	Marion	New	1979-1994+
Tremaine	Benton	New	1979-1994+

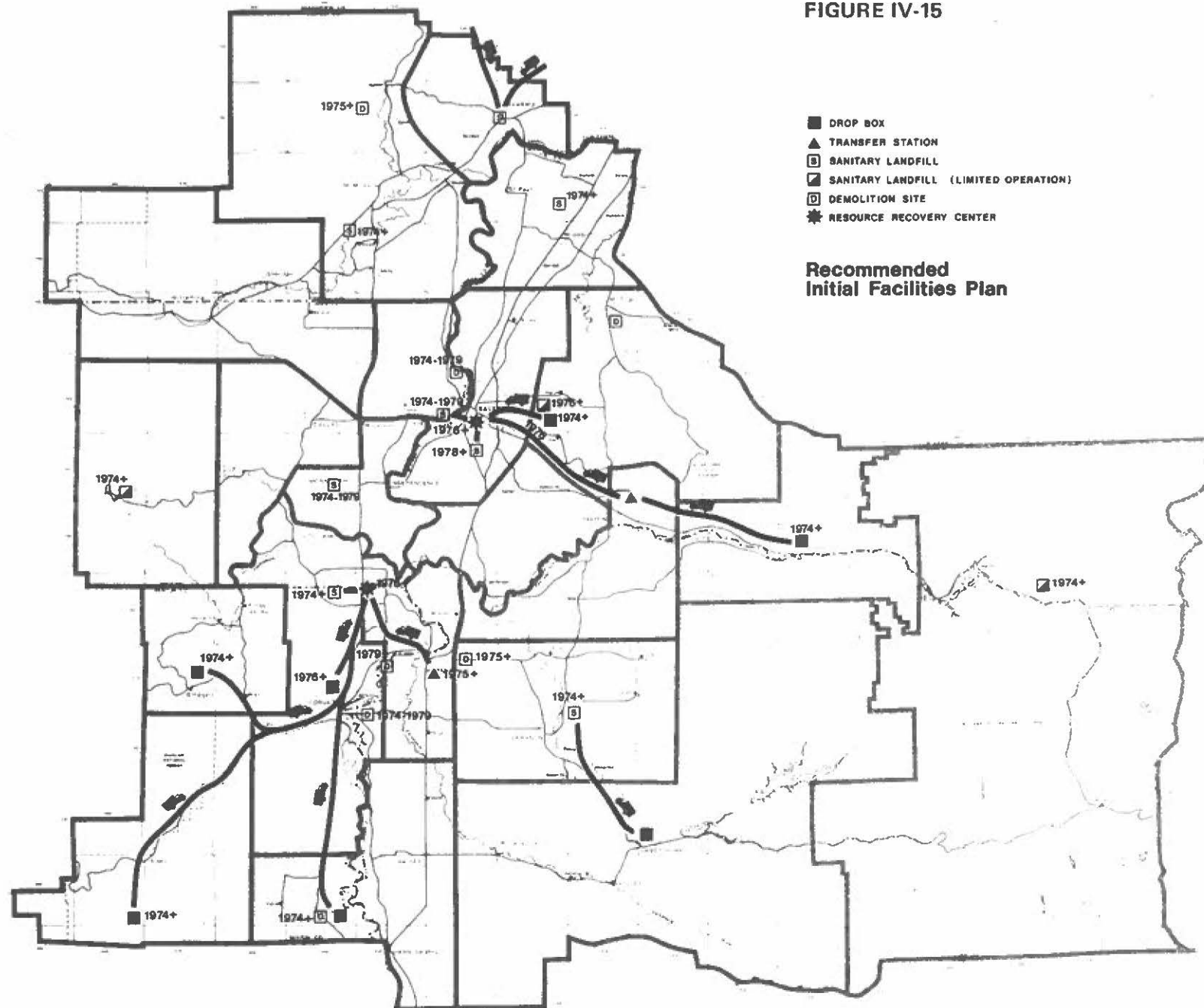
¹ Plus (+) indicates capacity may extend life beyond planning period.

² Site was developed during planning study (1973).

³ Macleay site to serve only as back up to S. E. Salem.

-  DROP BOX
-  TRANSFER STATION
-  SANITARY LANDFILL
-  SANITARY LANDFILL (LIMITED OPERATION)
-  DEMOLITION SITE
-  RESOURCE RECOVERY CENTER

Recommended Initial Facilities Plan



wastes from Washington County would be handled at the Newberg sanitary landfill.

Initial facility improvements should be adequate through about 1987. By this date, waste volume of the area plus consolidation with the McMinnville area should lead to the feasibility of constructing a regional resource recovery facility. Daily handling capacity would be just over 200 tons.

WOODBURN AREA. As with most areas in urgent need of new disposal facilities, numerous alternatives were considered for long-term implementation for the Woodburn area. Two options were considered: (1) construction of a compacting-type transfer station with initial transport of wastes to the Newberg sanitary landfill and later to the Salem Resource Recovery Center (see Salem area); or (2) preparation of a new local sanitary landfill to serve only the local area for approximately ten years, at which time it would be replaced with a transfer system. Resulting costs to the users are approximately the same.

The Recommended Plan for the Woodburn area is to utilize the new sanitary landfill from 1974 to 1984 after which time wastes would be transported to the Salem Resource Recovery Center. Construction of a transfer station in about 1984 would replace the new sanitary landfill. The actual date for conversion of the landfill to a

transfer station will depend, however, upon the construction and operation of the Salem Resource Recovery Center. Favorable economic conditions at the processing center or significant difficulties with land-filling may result in this conversion at an earlier date than 1984. At this time, however, it is the recommendation of the Board that the new landfill be planned for use during the next ten-year period.

McMINNVILLE AREA. As one of the areas which has proceeded to implement new facilities while regional planning was still in progress, a sanitary landfill adequate for the initial period would continue as the primary disposal operation. Rural area drop boxes may be added if and when necessary to provide greater public convenience, e.g., in the Sheridan-Willamina area, but these will depend on their economic feasibility.

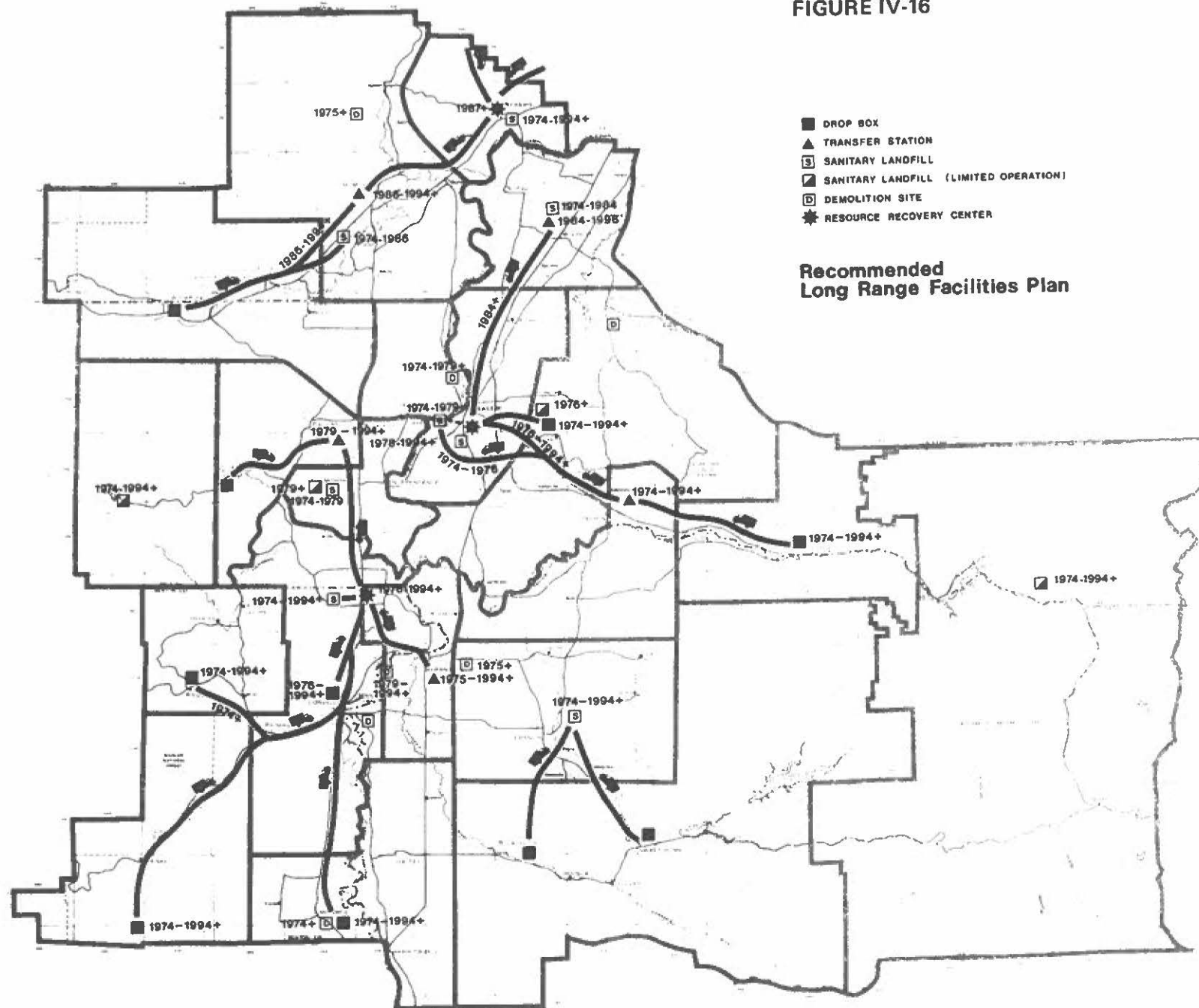
Based on projections of waste quantities, the Whiteson sanitary landfill would serve the area until about 1986. Following that date, consolidation of disposal operations with Newberg and implementation of resource recovery is recommended.

ALBANY-CORVALLIS AREA. The Albany-Corvallis area is the second largest generator of solid waste in the Region. Sufficiently large quantities will be generated in a fairly confined area to make large-scale resource recovery economically feasible. The plan as selected for this area

combines transfer, processing and disposal elements into a system that will result in economical solid waste management with maximum conservation of the area's land and other natural resources.

Under the initial plan (1974-1976) the most important elements of the recommended system would be constructed. A resource recovery center would be built during 1976 in the general vicinity of Camp Adair, approximately centered between Corvallis and Albany, the population centers of the area. In 1974 or early 1975, a new landfill would be developed to the east of the present Coffin Butte site to dispose of unprocessed wastes prior to construction of the resource recovery center, but only residue thereafter. An urban transfer station would be constructed in 1975 near Albany to transport wastes to the North Benton County Resource Recovery Center. Another drop-box type transfer station would be constructed in 1976 near Corvallis to transport approximately 10 percent of the wastes from that urban area to the processing center. The remaining wastes from Corvallis would be hauled directly to the processing center in packer trucks. In the initial period, the Corvallis transfer station would have a capacity of only about 10 TPD, but the site should have the flexibility to expand in the long-range period if usage so dictated. Rural drop box stations at Blodgett, Lobster Valley and

- DROP BOX
- ▲ TRANSFER STATION
- ③ SANITARY LANDFILL
- ☑ SANITARY LANDFILL (LIMITED OPERATION)
- ⓓ DEMOLITION SITE
- ✳ RESOURCE RECOVERY CENTER



Monroe would transport wastes from these areas to the North Benton County Resource Recovery Center. A modified landfill at Albany would be closed upon construction of the Albany Transfer Station, and the existing Coffin Butte sanitary landfill would be closed upon development of the adjacent site as a regional landfill.

Under the long-range plan (1976-1994+) the facilities described above would be continued in operation and expanded as necessary to meet increased waste volume. In about 1986, it would be necessary to install additional equipment and enlarge the structure or operate a second shift to essentially double the capacity of the processing center. Development of additional fill areas would be necessary in about 1980 at the regional landfill to allow sufficient capacity for disposal of residue until beyond 1994. The Albany Transfer Station, if constructed of sufficient capacity in the initial period, would not have to be expanded in the long-range plan. The Corvallis Transfer Station would have to be upgraded to have sufficient capacity to handle the projected amount of waste, although this construction has been shown in the plan to be dependent upon usage.

In 1979, wastes from Polk County would be transported into the North Benton County Resource Recovery Center through a transfer station constructed near Rickreall.

MONMOUTH-INDEPENDENCE AREA. A lack of suitable landfill sites in Polk County has resulted in a need to upgrade the existing Monmouth sanitary landfill to enable its continued use until about 1979. During this initial period (1974-1979), wastes from the Monmouth-Independence and Dallas areas would be landfilled at the Monmouth site.

In the long-range period (1979-1994), a compacting-type transfer station would be constructed near Rickreall. The Rickreall station would also receive wastes from a rural drop box station at Falls City, when the latter facility is constructed. It would transport all mixed wastes from the Dallas and Monmouth-Independence areas to the North Benton County Resource Recovery Center. Construction of the Falls City station will depend primarily on a demand for the facility by the local residents; its economic feasibility should be re-evaluated about 1976.

After the Rickreall Transfer Station is placed into operation, the existing Monmouth landfill would be closed to regular use. This should occur in about 1979. A backup landfill, however, will be necessary in the event of extended downtime at the transfer station. Further evaluation should be made regarding either development of a new site in Polk County or the existing Monmouth landfill for this purpose.

SALEM AREA. The Salem area will generate the largest amounts of mixed waste to be handled under the recommended plan. Large-scale resource recovery has been found to be economically feasible and implementation of the Recommended Plan will assure maximum conservation of land and other natural resources of this area.

In the initial plan (1974-1976) a resource recovery center would be constructed in southeast Salem during 1976. The processing center would receive wastes from a transfer station at Stayton. Since the Stayton station is already in service, it would only require minor upgrading to provide satisfactory long-range service. A rural drop box station at Mill City would be constructed in 1974 to transport wastes to the Stayton station. A similar station at Macleay would be constructed in 1974 and would transport wastes to the regional landfill until the S. E. Salem processing center is placed into operation. Disposal of unprocessed wastes would take place at the Brown's Island site from 1974 to 1976. After 1976, residue from the processing center would be landfilled in a demonstration program at gravel pits in S. E. Salem or at Brown's Island. By 1979, use of the gravel pits for land reclamation with air classifier residue should be sufficiently demonstrated so that the Brown's Island site can be phased out. Costs to upgrade the Brown's Island site would be incurred

in 1974 or early 1975, and development funds for the S. E. Salem site would have to be expended in 1976 to have it available for demonstration use during 1977 and 1978. The existing Macleay site has already been upgraded and would be closed to further routine use in order to reserve its capacity to back up the resource recovery facility.

In the long-range plan (1977-1994) capacity of the resource recovery center would need to be essentially doubled by 1986 to handle daily waste volumes. The Woodburn Transfer Station would need to be enlarged at about the same time, also due to increased waste volume and vehicular traffic. No expansion of the Stayton or Mill City stations is projected for their continued operation during the long-range period. The Macleay station would also be continued in operation; no expansion is projected. The Macleay landfill would be retained for the 20-year period as an emergency backup for Salem area facilities.

It should be noted that a need exists for further study of a site to backup the Brown's Island regional landfill. Although the Macleay site is recommended to provide emergency backup to the Brown's Island site, it is recognized that the inter-relationship between these disposal sites and the reliability of the S. E. Salem Resource Recovery Center needs further

evaluation regarding waste flow and contingency operations under emergency conditions. Alternative development methods or uses of the Brown's Island site should also be evaluated during the trial period in the event the gravel pits are found to be unsuitable for residue disposal.

LEBANON AREA. The Lebanon-Sweet Home area does not generate sufficient quantities of wastes to economically justify large-scale processing, and the area is too distant from the North Benton County Resource Recovery Center to allow transport at an acceptable cost. Thus, the area will have to rely upon a sanitary landfill for waste disposal for some time.

In the initial plan (1974-1976) the present Lebanon sanitary landfill would be upgraded (in 1974 or early 1975) for long-term use to serve both the Lebanon and Sweet Home service areas. A drop box station would continue to be used at Sweet Home and wastes would be transported to the Lebanon landfill.

In the long-range plan (1977-1994) the initial facilities would be continued in operation and a rural drop box station would be added at Brownsville. The Brownsville station, if needed, would also transport wastes to the Lebanon landfill.

IDANHA AREA. Due to its remote location, the Idanha area has no practical

opportunity to participate in regional resource recovery. The area also will generate the second lowest amount of wastes in the Region.

In the initial plan (1974-1976) the existing McCoy Creek landfill would be prepared for long-term use. It would be continued in operation during the long-range plan (1977-1994) as a limited operation sanitary landfill to serve the Idanha area and federal lands.

VALSETZ AREA. The Valsetz area will generate the lowest amount of wastes of the Region and is a considerable distance from regional systems proposed at Salem, Newberg or in North Benton County.

In the initial plan (1974-1976) the Valsetz site would be upgraded to a limited operation sanitary landfill which would continue to serve the area for the long-range period.

Cost of the Recommended Plan

Summary cost estimates for each of the facilities in the recommended initial and long-range plans are presented in Tables IV-14 through IV-21. The estimates are based on 1974 dollars with no adjustments for inflation. Total capital cost of the initial plan (1974-1976) will be approximately \$4.9 million, which includes \$70,000 for rural drop box facilities,

\$380,000 for transfer systems, \$700,000 for landfills and \$3,800,000 for resource recovery. Total capital cost of the long-range plan will be approximately \$6.9 million, which includes \$60,000 for additional rural facilities, \$1,500,000 for additional or expanded transfer systems, \$150,000 in landfill improvements and \$5,200,000 for new and expanded resource recovery facilities.

Relation To Other Areas

The resource recovery system recommended for use in the Region should be compatible with resource recovery activities in adjacent areas. Some exchanges of unprocessed wastes and marketable fuels will occur.

Wastes from western Washington County could be processed at the Newberg Resource Recovery Center after about 1986. If the waste flow from Washington County could be insured through an inter-governmental agreement, it would become economically feasible to construct the Newberg facility prior to 1986. No infringement upon fuel markets of the Metropolitan Service District -Columbia Regional Association of Governments (MSD-CRAG) program is anticipated because of the availability of potential industrial users in the Region which could probably utilize the refuse derived fuel produced at the Newberg facility. Also the

MSD-CRAG fuel markets are reported to be directed more toward the Camas and Longview, Washington, areas than the Chemeketa Region.

Lane County and the Lane Council of Governments resource recovery program is directed toward development of an energy recovery facility utilizing wood and solid wastes from the Lane County area. Approximately 10 to 20 TPD of solid wastes from the Brownsville area would be diverted from Lane County's facility. This amount is insignificant considering that the Lane County facility would process approximately 700 TPD. Since a deficit of wood wastes reportedly exists in the Lane County area, combustibles produced at the Chemeketa facilities could be sold to the Lane County energy generation facility if sufficient markets do not materialize in or become more readily available to the Chemeketa Region.

Table IV-14
CHEMEKETA REGION
RURAL DROP BOX STATIONS
INITIAL CAPITAL COSTS (1974 \$)
1974-1976 CONSTRUCTION PERIOD

Item	Blodgett	Lobster Valley	Mill City	Macleay	Monroe	Region Total
Land	\$ 2,000	\$ 2,000	\$ —	\$ —	\$ —	\$ 4,000
Station Development	<u>12,800</u>	<u>12,800</u>	<u>12,800</u>	<u>17,300</u>	<u>7,700</u>	<u>63,400</u>
TOTAL CAPITAL COSTS	\$14,800	\$14,800	\$12,800	\$17,300	\$7,700	\$67,400

Table IV-15
CHEMEKETA REGION
RURAL DROP BOX STATIONS
LONG-RANGE CAPITAL COSTS (1974 \$)
1977-1994 CONSTRUCTION PERIOD¹

Item	Brownsville	Falls City	Sweet Home	Willamina	Region Total
Land	\$ 2,000	\$ 2,000	\$ —	\$ 2,000	\$ 6,000
Station Development	<u>12,800</u>	<u>12,800</u>	<u>12,800</u>	<u>12,800</u>	<u>51,200</u>
TOTAL CAPITAL COSTS	\$14,800	\$14,800	\$12,800	\$14,800	\$57,200

¹ Construction as required.

Table IV-16
CHEMEKETA REGION TRANSFER STATIONS
INITIAL CAPITAL COSTS (1974 \$)
1974-1976 CONSTRUCTION PERIOD

Item	Stayton	Albany	Corvallis	Region Total
Land	\$ —	\$ —	\$ —	\$ —
Station Construction				
Site Work	1,100	38,600	3,100	42,800
Fencing	3,600	14,700	3,600	21,900
Traffic Control	—	4,200	—	4,200
Concrete Work	9,200	34,500	9,200	52,900
Building	—	52,800	—	52,800
Landscaping	500	12,000	500	13,000
Contingencies	—	15,000	—	15,000
Engineering	—	13,000	—	13,000
TOTAL				
STATION CONSTRUCTION	\$14,400	\$184,800	\$16,400	\$215,600
Station Equipment				
Yard Tractor	\$ —	\$ 8,000	\$ —	\$ 8,000
Backhoe	—	12,000	—	12,000
Drop Boxes ¹	2,800	—	—	2,800
TOTAL				
STATION EQUIPMENT	\$ 2,800	\$ 20,000	\$ —	\$ 22,800
Transport Equipment				
Tractors	\$ —	\$ 50,000	\$ —	\$ 50,000
Trailers	—	80,000	—	80,000
Drop Boxes	2,800	—	5,600	8,400
TOTAL				
TRANSPORT EQUIPMENT	\$ 2,800	\$130,000	\$ 5,600	\$138,400
TOTAL CAPITAL COSTS	\$20,000	\$334,800	\$22,000	\$376,800

¹ For demolition and nonprocessible wastes.

Table IV-17
CHEMEKETA REGION TRANSFER STATIONS
LONG-RANGE CAPITAL COSTS (1974 \$)
1977-1994 CONSTRUCTION PERIOD

Item	Rickreall	McMinnville	Corvallis	Woodburn	Region Total
Construction Year	1978	1985	¹	1984	—
Land	\$ —	\$ 12,500	\$ —	\$ —	\$ 12,500
Station Construction					
Site Work	17,300	38,600	50,300	38,600	144,800
Fencing	9,500	14,700	20,200	14,700	59,100
Traffic Control	2,100	4,200	6,700	4,200	17,200
Concrete Work	17,300	54,500	70,600	54,500	196,900
Building	26,400	94,600	121,000	94,600	336,600
Landscaping	—	19,000	23,500	19,000	61,500
Contingencies	3,400	17,400	20,200	17,400	58,400
Engineering	8,000	19,000	23,500	19,000	69,500
TOTAL					
STATION CONSTRUCTION	\$ 84,000	\$ 262,000	\$ 336,000	\$ 262,000	\$ 944,000
Station Equipment					
Yard Tractor	\$ —	\$ 8,000	\$ 8,000	\$ 8,000	\$ 24,000
Backhoe	12,000	12,000	12,000	12,000	48,000
Drop Boxes ²	2,800	2,800	2,800	2,800	11,200
TOTAL					
STATION EQUIPMENT	\$ 14,800	\$ 22,800	\$ 22,800	\$ 22,800	\$ 83,200
Transport Equipment					
Tractors	\$ 25,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 175,000
Trailers	40,000	80,000	80,000	80,000	280,000
TOTAL					
TRANSPORT EQUIPMENT	\$ 65,000	\$ 130,000	\$ 130,000	\$ 130,000	\$ 455,000
TOTAL CAPITAL COSTS	\$ 163,800	\$ 427,300	\$ 488,800	\$ 414,800	\$ 1,494,700

¹ Upgrading depends upon demand.

² For demolition only.

Table IV-18
CHEMEKETA REGION
RESOURCE RECOVERY CENTERS
INITIAL CAPITAL COSTS (1974 \$)
1974-1976 CONSTRUCTION PERIOD

Item	S.E. Salem	N. Benton	Region Total
Construction Year	1976	1976	—
Land	\$ 100,000	\$ 80,000	\$ 180,000
Facilities			
Site Work	82,500	55,500	138,000
Utilities	50,000	50,000	100,000
Building	180,000	130,000	310,000
Equipment			
Equip. Installation	300,000	291,500	591,500
Scales	40,000	40,000	80,000
Shredder	375,000	375,000	750,000
Air Classification	250,000	250,000	500,000
Residue Disposal	45,000	45,000	90,000
Conveyors	80,000	80,000	160,000
Paper Baler	10,000	10,000	20,000
Mag. Separation	35,000	35,000	70,000
Compactor	40,000	40,000	80,000
Front-end Loaders	28,000	14,000	42,000
Misc. Equipment	<u>11,000</u>	<u>11,000</u>	<u>22,000</u>
Subtotals (excluding land)	\$1,526,500	\$1,427,000	\$2,953,500
23% Engineering & Contingencies	<u>351,100</u>	<u>328,200</u>	<u>679,300</u>
Subtotals (excluding land)	\$1,877,600	\$1,755,200	\$3,632,800
TOTAL CAPITAL COSTS	\$1,977,600	\$1,835,200	\$3,812,800

Table IV-19
CHEMEKETA REGION
RESOURCE RECOVERY CENTERS
LONG-RANGE CAPITAL COSTS (1974 \$)
1977-1994 CONSTRUCTION PERIOD

Item	S.E. Salem ¹	No. Benton ¹	Newberg	Region Total
Construction Year	1986	1986	1986	-
Land	\$ -	\$ -	\$ 50,000	\$ 50,000
Facilities				
Site Work	50,000	40,000	45,000	135,000
Utilities	-	-	40,000	40,000
Building	180,000	130,000	130,000	440,000
Equipment				
Equip. Installation	340,000	317,500	270,000	927,500
Scales	-	-	40,000	40,000
Front-end Loader	-	-	14,000	14,000
Shredder	375,000	375,000	375,000	1,125,000
Air Classification	250,000	250,000	250,000	750,000
Residue Disposal	-	-	45,000	45,000
Conveyors	80,000	80,000	80,000	240,000
Paper Baler	10,000	10,000	10,000	30,000
Mag. Separation	35,000	35,000	35,000	105,000
Addt'l Mat'l Rec.	82,500	65,000	-	147,500
Compactor	-	-	40,000	40,000
Misc. Equipment	<u>25,000</u>	<u>25,000</u>	<u>25,000</u>	<u>75,000</u>
Subtotals (exc. land)	\$1,427,500	\$1,327,500	\$1,399,000	\$4,154,000
23% Engineering & Contingencies	<u>328,300</u>	<u>305,300</u>	<u>321,800</u>	<u>955,400</u>
Subtotals (exc. land)	\$1,755,800	\$1,632,800	\$1,720,800	\$5,109,400
TOTAL CAPITAL COSTS	\$1,755,800	\$1,632,800	\$1,770,800	\$5,159,400

¹ Expansion only.

Table IV-20
CHEMEKETA REGION SANITARY LANDFILLS
INITIAL CAPITAL COSTS (1974 \$)
1974-1976 CONSTRUCTION PERIOD

Item	Brown's Island	S.E. Salem	Lebanon	Monmouth	Newberg	Woodburn	N. Benton County	Valsetz	McCoy Creek	Region Total
Land	\$ —	\$100,000	\$ —	\$ —	\$ —	\$ —	\$ 20,000	\$ —	\$ —	\$120,000
Site Development/Upgrading										
On-site Access Roads	3,200	—	3,000	3,200	6,300	5,000	4,300	—	8,000	33,000
Drainage Control	6,300	10,000	—	500	—	—	10,500	—	—	27,300
Leachate Collection	5,600	—	1,000	1,000	—	2,000	9,000	—	—	18,600
Leachate Disposal	20,000	—	3,000	—	1,000	3,000	10,000	—	—	37,000
Flood Protection	73,000	—	—	—	—	—	—	500	—	73,500
Attendant Facilities	—	5,000	16,000	200	4,000	18,500	5,000	—	4,500	53,200
Utilities	—	—	3,500	—	—	6,000	20,000	5,700	5,700	40,900
Access Control (Fencing)	—	24,000	4,000	300	300	—	7,600	—	500	36,700
Landscaping	—	—	—	—	—	—	3,000	—	—	3,000
Scales ³	—	—	—	—	—	—	—	—	—	—
Wash Rack	—	—	1,500	—	—	1,500	—	—	—	3,000
Equipment Maint. Facility	—	5,000	—	—	—	—	40,000	—	—	45,000
Clearing & Excavation	—	—	—	—	—	14,000	2,800	—	—	16,800
Subtotal (excl. land)	108,100	44,000	32,000	5,200	11,600	50,000	112,200	6,200	18,700	388,000
Engineering & Cont.	10,800	6,000	6,400	1,000	2,300	10,000	11,200	1,200	3,300	52,200
TOTAL SITE DEV/UPGRADING	\$118,900	\$50,000	\$38,400	\$6,200	\$13,900	\$60,000	\$123,400	\$7,400	\$22,000	\$440,200
Equipment										
Landfill Equipment	— ¹	60,000	— ¹	— ¹	— ¹	— ²	— ²	— ¹	— ¹	60,000
Transport Tractor	—	25,000	—	—	—	—	—	—	—	25,000
Transport Trailer	—	35,000	—	—	—	—	—	—	—	35,000
TOTAL EQUIPMENT	—	\$120,000	—	—	—	—	—	—	—	\$120,000
TOTAL CAPITAL COSTS	\$118,900	\$270,000	\$38,400	\$6,200	\$13,900	\$60,000	\$143,400	\$7,400	\$22,000	\$680,200

¹ Continue use of existing equipment.

² Relocation of existing equipment.

³ Located at resource recovery facilities.

Table IV-21
CHEMEKETA REGION SANITARY LANDFILLS
LONG-RANGE CAPITAL COSTS (1974 \$)
1977-1994 CONSTRUCTION PERIOD

Item	Newberg	N. Benton County	Lebanon	Region Total
Land	\$20,000	\$40,000	\$ —	\$ 60,000
Site Development/Upgrading				
On-site Access Roads	5,000	2,800	7,000	14,700
Drainage Control	—	10,500	5,000	15,500
Leachate Collection	1,000	6,500	2,000	9,500
Leachate Disposal	2,000	—	3,000	5,000
Flood Protection	10,000	—	—	10,000
Utilities	1,000	—	2,000	3,000
Access Control (Fencing)	1,000	—	1,000	2,000
Landscaping	1,000	1,000	2,000	4,000
Clearing	1,000	7,100	5,000	13,100
Subtotal (excl. land)	\$22,000	\$27,800	\$27,000	\$ 76,800
Engineering & Cont.	<u>4,400</u>	<u>5,600</u>	<u>5,400</u>	<u>15,400</u>
TOTAL SITE DEV/UPGRADING	\$26,400	\$33,400	\$32,400	\$ 92,200
TOTAL CAPITAL COST	\$46,400	\$73,400	\$32,400	\$152,200

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implementation
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The adoption of a master plan for solid waste management is only the first step in implementing such a program. A schedule of future coordinated actions includes many other elements, from advanced planning and preliminary design of specific proposed facilities to regional financial programs.

This chapter evaluates existing and proposed organizational structures to finance, construct and operate proposed facilities in each county. It also presents a strategy for program implementation including a schedule for involvement of local government, industry and other affected parties. Finally, it summarizes specific recommendations as to organizational roles including the required financing resources. Organizational roles will involve cities, counties, an inter-governmental agency, and private industry through operations, franchises and contract procurement. Financing requirements, possible sources of funds and specific recommendations for funding are presented. Various sources of funds which were proposed include bonding, user charges, and revenues from sale of recoverable materials.

ORGANIZATION AND AUTHORITY

To achieve effective implementation of the Recommended Plan, some governmental unit must be given overall responsibility

and authority to administer the solid waste management program of the Chemeketa Region. In this section the capabilities of existing and alternative organization(s) are evaluated, and a recommended organization to implement the Recommended Plan is selected. Since many organizational structures are possible, only those that may be appropriate to implement the Recommended Plan were evaluated.

Existing Organization and Authority

The existing organization known as the Chemeketa Region Solid Waste Planning and Management Program was established by an Intergovernmental Cooperation Agreement executed on May 17, 1973, among the counties of Benton, Linn, Marion, Polk and Yamhill and Mid-Willamette Valley and Oregon District 4 Councils of Government. This Agreement created a 13-member Board of Directors, made up of public officials and citizens, to prepare and approve a plan and adopt rules and regulations for the operation of the plan. The resolution could be continued as presently organized for the implementation of the program with certain modifications depending on defined responsibilities. The agreement under which the present planning program was conducted may be found in Appendix G.

Other existing organizational structures authorized for involvement in solid waste

management have been discussed in Chapter II with respect to their statutory functions. County service districts and sanitary districts or authorities are special districts which could regulate or operate solid waste operations. At the present time, no special districts are either regulating or operating solid waste systems in the Region.

Historically, solid waste disposal activities have been conducted or controlled by cities and counties through franchises. Considerable experience in basic operations lies with the specific county agencies such as public works or road departments, planning and health departments plus many private firms generally involved in both collection and disposal. The latter should be recognized as an important element in the existing management organization. Involvement of private enterprise in future programs is a strong consideration because of incentives for regulated competition, employment and tax base growth, and not the least important, a strong understanding of waste disposal and marketing of recoverable materials.

Cities are involved in solid waste management directly through collection franchises within their boundaries. They are also authorized to condemn land for disposal sites and could participate in financing transfer, processing or disposal systems.

Cities have a great deal of interest in any element of a solid waste program which affects collection rates within their boundaries. Municipal government will play an increasingly important future role in implementation of solid waste management systems with regard to location of transfer and resource recovery facilities. The support and involvement of cities will be an important step in implementation of the plan.

It is concluded that the existing organization(s) have functioned quite effectively in the preparation of a regional solid waste management plan, but may need to be modified to implement a regional program of the scope selected as the Recommended Plan. The existing separate city and county governments are fully capable of implementing, in cooperation with the solid waste industry, most of the independent and local elements of the Recommended Plan. Regional processing facilities and, in some instances, regional landfills or transfer stations are, however, dependent upon waste flow control which requires assured, coordinated regional action. It is also unlikely that a sound financial program could be obtained on other than a regional basis for these types of facilities.

It appears possible to continue and modify the present Intergovernmental Agreement to provide for waste flow control, distribution of revenue from processing

facilities, and assurance that facilities required for overall success of a regional program will actually be provided at the proper time. Evaluated in the following section are other organizational structures, and possible modifications to the existing organizations that may be used to implement the Recommended Plan.

Alternative Organizational Structures

Comparison of the existing structures with other possible organizations is necessary to assure the selection of the most effective and appropriate management organization for the Region. This work has been, in part, the result of the efforts of the Legal Subcommittee (9) and a financial consultant (10). Three basic categories of structures evaluated in this section consist of cooperative agreements utilizing existing governmental units, formation of new governmental units, or separate actions by existing governmental units.

INTERGOVERNMENTAL AGREEMENT. Continuation of the present Intergovernmental Agreement (Appendix G) typifies a cooperative approach utilizing existing governmental units. Present county governments have specific authority pursuant to ORS Chapter 287 and 459 to issue general obligation bonds, industrial revenue bonds, and secure State grants and loans to acquire, operate and maintain solid waste transfer,

processing or disposal facilities. Through these procedures and by intergovernmental agreement, the existing Boards of Commissioners could coordinate, through a regional board, with other agencies and private industry to solve regional problems for actual construction and operation of planned facilities and to deal with special financing situations.

General obligation bonds issued by each county would be limited to two percent of true cash value of all taxable property. Each county could, under its existing Board of Commissioners, call for an election for a certain amount of bonds to be used in conjunction with DEQ grants and loans to acquire, operate, and maintain disposal sites and other facilities. Through this procedure, the existing Boards of Commissioners could enter into inter-county agreements which could authorize a supervisory board to coordinate, with private industry, the use and expenditures of funds. Before such a plan could operate, of course, the citizens of the counties would have to approve, at a general or special election, the necessary bonds and pledge their payment by an ad valorem tax on all taxable real property in the county.

The Chemeketa Board could continue with its present makeup consisting of two citizens members; one county sanitarian; five elected county commissioners, one from each county; two small city-elected

representatives, one from each Council of Governments' area; two large-city representatives, one from each Council of Governments area; and one Oregon Sanitary Service Institute member or representative. With this composition, the Board would be limited to an advisory and coordinating role. Functions of the Board and any administrative staff would be similar to the present functions with some slight expansion as given in Table V-1. Expansion of the Board to include additional members could be negotiated by agreement between the present members.

Waste flow control, revenue distribution, and timely construction of regional facilities will be functions essential to success of a regional program. These functions would be coordinated and recommended by the Board, in an advisory capacity to each of the individual counties. Since it is likely that these functions must be ensured before financing of the regional facilities can be accomplished, it will be necessary for a separate waste flow control agreement to be adopted by the individual counties (upon the recommendation of the Board).

Under this arrangement, the Board would not be authorized to levy taxes and own, construct or operate facilities; such functions would be done by the separate governmental units. Rate setting or any regulatory functions would also be advisory

Table V-1
INTERGOVERNMENTAL AGREEMENT ORGANIZATION
CHEMEKETA REGION

Board of Directors

Two citizen members, one from each Council of Governments' area; one county sanitarian; five elected county commissioners, one from each county; two small city-elected representatives, one from each Council of Governments' area; two large city representatives, one from each Council of Governments' area; and one Oregon Sanitary Service Institute member or representative. The Board should be constituted such that there are no less than two representatives from each county (additional membership as may be agreed upon).

Functions of the Board of Directors

1. Recommend and coordinate franchise disposal fees or other revenue sources obtained by individual counties.
2. Recommend and coordinate franchise agreements, operating contracts, user charges, and other revenue sources.
3. Coordinate and assist in arranging public financing when required for facilities of the master plan.
4. Coordinate franchise agreements for resource recovery, landfill, and transfer facilities.
5. Assist in master planning for solid waste management.
6. Upon request by member counties, serve as liaison with state and federal agencies.
7. Coordinate adoption and maintenance of the regional solid waste management plan.
8. Coordinate the character, size, and relative timing of any proposed solid waste facility that affects the master plan.
9. Coordinate and recommend waste flow from collector, drop box or transfer to downstream facilities.
10. Recommend regulations on the types of wastes receivable at demolition sites.
11. Recommend the adoption of uniform solid waste ordinances.
12. Recommend and coordinate inter-county repayment of increased facility costs and allocation of revenues and expenditures for multicounty facilities.
13. Provide public information programs.
14. Provide programs for training and safety for solid waste activities.
15. Encourage standby equipment pooling arrangements.

functions only. Mutual confidence and trust between counties and cities of the region would be the link between separate local programs and a coordinated regional program. Failure of any participant to provide financing or construction of essential regional facilities could jeopardize implementation of the overall program and it is likely heavier reliance would be placed upon private industry to construct, as well as operate, facilities than under a regional organization with taxing or regulatory authority. It is uncertain whether this organizational structure would have an adequate regional base in the view of lending and bonding institutions or agencies administering federal and state grant or loan programs. The one major weakness is the dependence upon five separate counties to provide local funds for publicly financed facilities at a time compatible with the overall regional program.

The advantages of continued reliance upon the Intergovernmental Agreement Organization include:

- It does not establish any new special districts, taxing authority or new problems as to formation and representation.
- It continues a solid waste management board at the regional level to advise and coordinate.

- Ultimate responsibility for the program remains with units of local government, primarily counties.
- It is a highly flexible structure which can be readily adapted to changing conditions by modification of the agreement.
- It coordinates a regional program as a part of the statewide solid waste management action plan.
- It provides a method of coordinating technical assistance to local government and private industry for their problems in solid waste management planning and implementation.
- It requires a relatively simple procedure and short time for development and ratification by the affected governmental bodies.

Major disadvantages of the Intergovernmental Agreement Organizational structure are the following:

- It requires numerous contracts to ensure and develop financing of specific facilities.
- It requires a separate waste flow control agreement to ensure adequate revenues from regional facilities.
- It provides no assurances to member counties and cities, except by their confidence in each other, that regional facilities necessary to support other local facilities will be provided when needed.

- It limits financial means primarily to the capability of the local governmental unit proposing to provide specific facilities.
- It requires individual counties to share financial responsibility for facilities in other counties, e.g., resource recovery centers. Or, alternatively, counties with resource recovery centers would have to assume financial responsibility for costs which depend on inter-county cooperation for repayment.

INTER-COUNTY SERVICE

DISTRICT. An inter-county service district is an example of a new governmental unit which could be created to implement the Recommended Plan.

As discussed in Chapter II, county service districts can be formed within counties for such items as sewage, lighting, drainage and the disposal of solid wastes. A service district can include all or a portion of a county. The Board of County Commissioners constitutes the governing board of the district. Before such a district could be formed and bonds issued, it would have to be approved by the citizens in the district at a general or special election.

This type of district is generally operated within the boundaries of a single county. ORS 198.705 to 198.725 indicate that although it is called a county service district, it can include "areas in more than

one county as well as a city if the city approved." When the service district includes more than one county, the governing body of the "principal county" constitutes the governing body for the service district. The "principal county" is that county within the district with the greatest portion of the value of all taxable property. It appears that if such an inter-county service district were formed, the governing body would be the Marion County Board of Commissioners.

If such a district were formed, it could, of course, have an advisory board or committee which could assist in the operation of the service district. Such a committee could be obtained from the counties and cities involved, similar to the present Chemeketa Board of Directors.

The inter-county service district offers several distinct advantages:

- It allows unified responsibility for operation of all regional facilities regardless of internal jurisdictional boundaries.
- It provides for uniform user fees to ensure waste flow and efficient use of facilities provided.
- It minimizes chances of a local area failing to implement a regional facility for financial reasons by providing for a single bond election covering the entire service district.

- Actual responsibility and authority rests with a Board of County Commissioners which serves as the Governing Board.

- It provides flexibility in ownership and operation alternatives using private enterprise and private financing as well as public funds, grants and loans to achieve the lowest possible cost of service.

Disadvantages of the inter-county service district organization are the following:

- It requires the initial and continued support of the "principal" county, Marion County, to initiate formation and actual organization of the district.
- It requires all jurisdictions to delegate certain functions to Marion County upon establishment of the district.
- It must have membership from all counties and major incorporated areas which are involved in facility implementation.
- Legal authority remains to be researched for all charter provisions of involved counties and statutory provisions covering counties and solid waste management.
- Boundaries and district formation would have to have the approval of Boundary Commissions with jurisdiction in the proposed service area.

The problems of forming such new territories, obtaining the consent of the people on the formation as well as the bonding, and obtaining the concurrence of the state boundary commissions in the various jurisdictions must be carefully weighed. The process may be lengthy, but the base for long-range implementation and for tax support can be secure and broad, lessening the burden on some local areas. A ready means of procuring and franchising private enterprise for operation of facilities is provided, particularly for regional resource recovery facilities serving more than one county.

The present attitudes prevailing in the Region make the Inter-County Service District an unpopular organizational structure unlikely to generate essential support for revenue measures. It is also probable that such an organization would not receive total support of State agencies and boundary commissions due to the special purposes for which it would function. Recognition of these attitudes is a practical assessment of the suitability of this organization although it should be noted that the Inter-County Service District remains as a technically feasible implementing organization.

LOCAL GOVERNMENT. Reliance upon existing governmental units without a regional organization would utilize existing city and county jurisdictions to implement

all facilities within their areas of responsibility. This alternative allows each county flexibility to form and commit to priorities in light of other local needs. Program funding, while more limited, is locally controlled.

Operational flexibility also is provided; it offers arrangements for local franchises to private industry if public funds or operating capabilities are not available.

No regional agency is utilized under this alternative. Thus, each county must pursue its own implementation program together with funding such as DEQ grant and/or loan applications.

Advantages of using local government without a regional organization for implementation include:

- No new special districts, taxing authorities, or new problems as to formation and representation are created.
- Ultimate responsibility remains with units of local government, primarily counties.
- The structure is highly flexible to meet changing conditions.
- No time or funds are required to utilize the existing organizations.

Disadvantages of separate local government implementation include:

- No regional level organization would exist to coordinate planning and regional facility implementation.
- A unified regional program as a part of the state-wide solid waste management plan would be lacking.
- Technical assistance to local government and private industry for their problems in solid waste management would not be available on a regional level.
- No assurance is provided to other governmental units or to industry—except through mutual confidence—that regional facilities would be provided when needed.
- Waste flow control and revenue distribution would be difficult or impossible to ensure.
- Financial means would be limited to the capability of the local governmental units attempting to provide the specific facilities.

It appears that cities and counties would have to rely more heavily upon private industry to provide facilities serving regional areas. The ability to fund or operate such services would be restricted to fewer local jurisdictions because of possible voter reluctance to approve financial support. Cities are afforded equal opportunity to enter into arrangements to provide local facilities and maintain control. In some cases, there may be no other means of providing the facilities. It

may be possible for two or more local jurisdictions to be competing for wastes in order to lower costs or provide surplus revenues. This procedure increases the risk of investment.

Although a management program based on reliance upon existing local government without a regional organization could function in the Region, such an arrangement would jeopardize regional facilities dependent upon waste flow control and proper timing of construction of other facilities. Such an organization would be suitable for implementation of Alternative A, rather than the Recommended Plan.

OTHER ALTERNATIVE ORGANIZATIONS. Another organizational structure which could be utilized to implement the Recommended Plan would be one based upon a combination of the intergovernmental agreement and an inter-county service district. The inter-governmental agreement could be utilized to provide for regional solid waste management functions in combination with an inter-county service district organized solely to finance regional facilities.

The combination, or joint agency, organization would depart from the present organization primarily through separation of advisory and legislative roles. Legislative roles could include contracting with the state, possibly the issuance of bonds,

- drafting of model ordinances, franchising resource recovery centers, and assigning shares of financial responsibility among participating counties and cities. Under this organization, legislative roles would be left to elected officials which would make up a regional board. From time to time the legislative body would have to regulate waste processors, lend money for purchasing or improving their facilities, review their requests to change rates or charges, and renew or terminate their franchises. Since these functions would preclude industry participation on the legislative body, a separate advisory committee would be necessary to provide continued input from the industry. A broad management scope could be obtained through representation of public agencies, private industry, and civic groups on the advisory committee. The advisory committee could not perform regulatory or financial functions but could make recommendations on such matters to the legislative body.

Advantages and disadvantages of the combination, or joint agency, organization would include many of the advantages and disadvantages of the separate intergovernmental agreement and inter-county service district organizations. Advantages of the combination, or joint agency, organization would be:

- It continues a regional advisory board to advise and coordinate management functions.
- It coordinates a regional program as a part of the statewide solid waste management action plan.
- It provides a method of providing technical assistance to local government and private industry for their problems in solid waste management planning and implementation.
- It allows unified operation responsibility of all regional facilities regardless of internal jurisdictional boundaries.
- It provides for uniform user fees to ensure waste flow and efficient use of facilities provided.
- It minimizes chances of a local area failing to implement a regional facility for financial reasons by providing for a single bond election covering the entire service district.
- It provides flexibility in ownership and operation alternatives using private enterprise and private financing as well as public funds, grants and loans to achieve the lowest possible cost of service.

Disadvantages of using the combination, or joint agency, organization would include:

- Ultimate responsibility would be divided between a regional legislative body and a regional management committee.

- It would not be readily adapted to changing conditions due to the reliance upon an inter-county service district for financial measures.
- It requires the initial and continued support of the "principal" county, Marion County, to initiate formation and actual operation of the inter-county service district.
- It requires all jurisdictions to delegate certain functions to Marion County upon establishment of the district.
- It must have membership from all counties and major incorporated areas which are involved in facility implementation.
- Legal authority remains to be researched for all charter provisions of involved counties and statutory provisions covering counties and solid waste management.
- Boundaries and district formation would have to have the approval of Boundary Commissions with jurisdiction in the proposed service area.

A "joint agency" is not recommended because the present attitudes prevailing in the Region also make this organizational structure unpopular and unlikely to generate essential support for formation and revenue measures. Such difficulties would impede implementation of the Recommended Plan. Recognition of these attitudes is a practical assessment of the

suitability of this organization, although it should be noted that it remains as a technically feasible implementing organization.

Recommended Organization

The previous section described various approaches to the designation of an organizational structure to implement the recommended solid waste management plan. The alternatives are clearly not all inclusive, but are limited to the approaches surrounding county governments, comparison of future facility needs, and possible implementation problems (related only to the Recommended Plan). Other organizational structures applicable to implementation of Alternatives A and C were not evaluated due to selection by the Board of Alternative B, with modifications, to be designated the Recommended Plan.

The recommended organization is based on the Intergovernmental Agreement as previously described. This organizational structure has gained the respect and popular support of key local government units within the Region. Their voting members on the Board have indicated willingness to enter into basic contractual agreements setting up organizational structure and flow control on a sufficient long-term basis to implement the plan.

At the time of this writing, the Legal Subcommittee is investigating various alternatives to provide longer term city agreements where existing charter limitations may limit the duration of city participation. This may involve a combination of state legislation to be proposed, local popular vote and charter interpretations.

The good faith demonstrated between member counties, key cities and the two COG districts throughout the planning and preliminary implementation period has demonstrated the ability of this organizational system.

The Intergovernmental Cooperation Agreement system does require more coordination and public relations type activities by both the staff and Board for effective communication between member governments and implementation of the plan. This is anticipated in Table V-1, Intergovernmental Agreement Organization, and in Table V-10, Initial Administrative Costs for the Chemeketa staff.

STRATEGY AND SCHEDULE

Implementation of an adopted plan is probably the most difficult step in a program because of financial and legal implications plus obtaining public and business support as well as the support of municipalities. To maintain progress in this

implementation, a schedule is important to indicate major "milestones" or intermediate objectives.

The schedule for implementation of the recommended plan includes upgrading or closure of existing disposal sites, development of the recommended system, operation of new or upgraded facilities, financing, legal steps for organization, franchising and operation contract procurement.

Current regulations generally make it imperative to upgrade existing sites in the initial plan, while other elements can be undertaken at a later date. The recovery centers will require considerable time for detailed planning and design, financing and construction. Intergovernmental agreements, franchises and private contracts will also require time to procure or negotiate.

A schedule for implementation of the plan is presented in Table V-2. Primary responsibility has been suggested to ensure that one agency or group is assigned the responsibility for coordination and takes the necessary action to complete that element of the plan. Secondary responsibility can be widespread involving industry, the general public, state agencies, and others. These are listed in the proposed schedule and may take the form of an optional responsibility, support role, review

Table V-2
IMPLEMENTATION SCHEDULE
1974-1980

			X † •	PRIMARY RESPONSIBILITY SECONDARY RESPONSIBILITY COORDINATION/COMMUNICATION	Gen. Public	Chem. Region	Co. Comm.	Co. SW Comm.	Cities	SW Industry	State DEQ	Press	Bus. & Ind.	Consultants
PERIOD				ACTIVITY										
4Q	74	.		Review Final Plan		X	†	†	†	†	†			
1Q	75	.		Adopt Final Plan	•	X	†	•	†	•	•	•	•	
1Q	75	.		Develop Intergovernmental Agreement		X	†	•	†	•		•		
1Q	75	.		Obtain Plan Support from Cities and Others	†	X	†	†	†	†	•	•	†	
1Q	75	.		Begin Preliminary Engineering or Construction Improvements for Initial Phase Facilities: Rural Drop Boxes, Landfills and Transfer Stations		†	X		†	†	†			
2Q	75	.		Re-review Final Plan		X	†	†	†	†	†			
3Q	75	.		Complete Financial and Franchising Arrangements for Initial Facilities		†	X	†	†	†	†	•	•	
4Q	75	.		Begin Site Selection, Engineering and Financial Arrangements for Resource Recovery Facilities	•	†	X	†	†	†	†	•	†	†
		.		Develop New Demolition Landfills in Marion, Linn and Yamhill Counties (if needed)	•	†	X	†		†	†	•	•	
1Q	77	.		Begin Construction of Resource Recovery Facilities		†	X		†					†
4Q	77	.		Commence Operation of Resource Recovery Facilities	†		X		†	†		†	†	
1Q	78	.		Initiate Use of Residue Fills on Experimental Basis		•	X	•		†	†			†
4Q	79	.		Phase Out Remaining Use of Landfills at Brown's Island and Monmouth-Independence	†	•	†	•	†	X	•	†	†	
1Q	80	.		Develop New Demolition Site in Benton County and Close Existing Site	•	†	X	†		†	†	•	•	

and approval, or simply active participation for information purposes, advisory efforts or public hearings.

FINANCING PLAN

Financing of initial and long-range capital improvements will be a major element in implementation of the plan. Unlike other utilities such as water supply and sewage disposal, private enterprise owns or operates many of the Chemeketa Region solid waste systems. Placing requirements upon the industry for use, design or operation of present and future systems would require considerable coordination by public agencies.

It is preferable that development of local disposal sites, drop boxes and transfer stations be financed by a combination of private and public funds to enable early implementation. Recovery facilities and equipment require a different approach to ensure regional support which can be modified, if necessary, to attract as much local private capital as possible. Formation of a successful financing plan must consider a number of factors, including:

- Capital fund sources
- Methods for public agencies and the private sector to administer, regulate, and operate the system
- Program expenditures
- Types and uses for revenue sources

These factors are addressed in the following sections.

Program Costs

Initial program costs are summarized in Table V-3 for land and facility construction. Equipment has been included only in transfer stations and resource recovery centers; other necessary equipment has been determined to be available and would be initially provided by the solid waste industry.

Figures V-1 and V-2 graphically show the breakdown between types of facilities. While this shows expenditures as present costs, the resource recovery facility implementation clearly requires the largest source of funds. Private financing should be encouraged to the highest extent because of the nature of the proposed facilities and their operation. To ensure satisfactory implementation and lowest possible cost of service a regional approach should be utilized.

As a basis for planning replacement, estimated service lives for facility items are:

- For land and construction—20 years, excepting some existing landfills and the landfill at Woodburn
- For resource recovery equipment—20 years, excepting \$627,300 of equipment with a life of 5 years at

- Southeast Salem and 10 years at North Benton and Newberg
- For all other equipment—7 years

Capital costs shown in Table V-3 must be adjusted for inflation. An 8 percent annual inflation factor was used to project land and construction costs, and a 6 percent factor was used for equipment costs.

Table V-4 shows accumulated capital costs for the program, including inflation. Also shown are costs for replacing first-generation and existing equipment as it wears out.

About \$5.4 million is required to implement the initial construction program. This amount includes \$1.8 million for land and construction and \$3.6 million for equipment. The major cost is \$3.3 million for equipment at the Southeast Salem and North Benton resource recovery centers.

During the period between 1977-1995, additional capital costs amount to \$26.4 million. Major costs include:

- \$2.0 million in 1986 to construct the Newberg and expand the Southeast Salem and North Benton resource recovery centers
- \$8.8 million in 1986 for equipment to expand the Southeast Salem and

Table V-3
CHEMEKETA REGION
RECOMMENDED PLAN
CAPITAL COST SUMMARY (1974 \$)
1974-1994

	Initial Period	Long-Range Period	Program Total
Rural Drop Box Stations			
Land	\$ 4,000	\$ 6,000	\$ 10,000
Station Construction	63,400	51,200	114,600
TOTAL	\$ 67,400	\$ 57,200	\$ 124,600
Transfer Stations			
Land	\$ -	\$ 12,500	\$ 12,500
Station Construction ¹	238,400	1,027,200	1,265,600
Transport Equipment	138,400	455,000	593,400
TOTAL	\$ 376,800	\$1,494,700	\$ 1,871,500
Resource Recovery Centers			
Land	\$ 180,000	\$ 50,000	\$ 230,000
Center Construction ²	3,632,800	5,109,400	8,742,200
TOTAL	\$3,812,800	\$5,159,400	\$ 8,972,200
Sanitary Landfills			
Land	\$ 120,000	\$ 60,000	\$ 180,000
Site Development	440,200	92,200	532,400
Landfill Equipment ³	120,000	-	120,000
TOTAL	\$ 680,200	\$ 152,200	\$ 832,400
Region Total			
Land	\$ 304,000	\$ 128,500	\$ 432,500
Facility Construction	4,374,800	6,280,000	10,654,800
Equipment	258,400	455,000	713,400
TOTAL	\$4,937,200	\$6,863,500	\$11,800,700

- ¹ Includes station equipment.
² Includes processing equipment.
³ Includes off-road transport equipment.

FIGURE V-1
Recommended Plan—Initial Capital Costs (1974 \$)

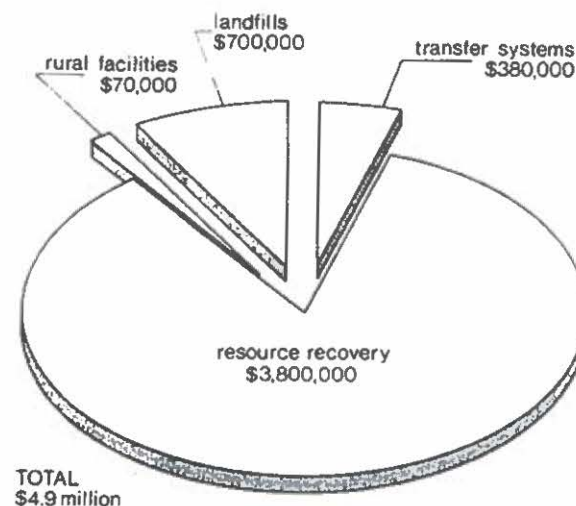


FIGURE V-2
Long-Range Capital Costs (1974 \$)

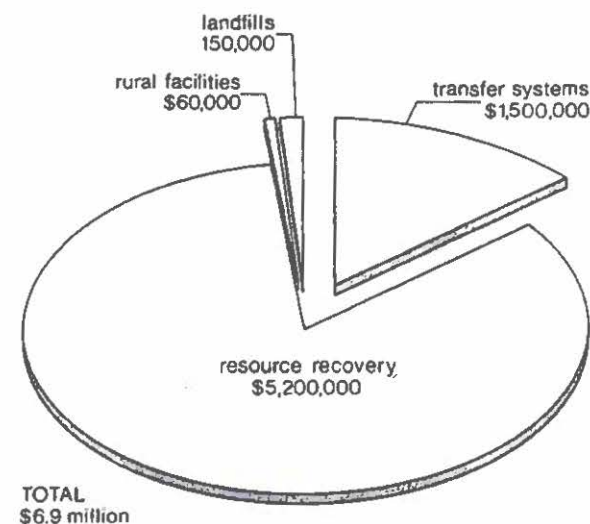


Table V-4
SUMMARY OF CAPITAL COSTS (\$000) (ESCALATED)
CHEMEKETA SOLID WASTE MANAGEMENT PLAN

Facility	Land and Facility Construction	Escalated Capital Costs First Generation Equipment	Replacement Equipment	Total
1974/75 Through 1976/77				
Rural drop box stations	\$ 72.8	\$ 86.4	\$ —	\$ 159.2
Transfer stations	232.9	190.8	—	423.7
Sanitary landfills	454.5	—	—	454.5
Resource recovery centers	996.2	3,324.4	—	4,320.6
Subtotal	<u>\$1,756.4</u>	<u>\$ 3,601.6</u>	<u>\$ —</u>	<u>\$ 5,358.0</u>
1977/78 Through 1994/95				
Rural drop box stations	\$ 16.1	\$ 13.0	\$ 374.3	\$ 403.4
Transfer stations	1,320.0	704.3	2,322.7	4,347.0
Sanitary landfills	388.4	170.2	3,072.6	3,631.2
Resource recovery centers	2,030.9	8,758.9	7,256.8	18,046.6
Subtotal	<u>\$3,755.4</u>	<u>\$ 9,646.4</u>	<u>\$13,026.4</u>	<u>\$26,428.2</u>
TOTAL	\$5,511.8	\$13,248.0	\$13,026.4	\$31,786.2

North Benton resource recovery centers and begin operation of the Newberg center.

\$7.3 million to replace equipment at the resource recovery centers

\$5.8 million to replace equipment at rural convenience and transfer stations, sanitary landfills.

Capital Fund Sources

Both the private sector and public agencies have provided capital funds for existing solid waste facilities. Both can provide capital needs of this program.

PUBLIC SOURCES. Public agencies can meet capital costs by use of grants, loans, bond sales, and lease-purchase methods. Sources of grants and loans are or may be available through the Farmers Home Administration, U.S. Environmental Protection Agency, and the State Department of Environmental Quality.

Farmers Home Administration: The Farmers Home Administration (FHA) has long been involved in financial assistance to rural communities under 10,000 population. Their programs have, in the past, primarily funded water and sewerage systems through both grants and loans. More recently, however, financial aid through the Rural Development Act has become available for solid waste projects. At the present time, the agency is

authorized to make loans bearing an interest rate of 5 percent for 40 years to finance land, construction of improvements, engineering and legal fees, and equipment. There is no dollar limit on the amount of the loan; however, larger loans would not be funded as quickly as the smaller ones. The loans can be made for the full amount of the project. Any loan must be secured with a satisfactory repayment schedule. Cities, counties or special districts would be eligible for the loans, and it is satisfactory to combine FHA loans with loans or grants from other public funds. Funding of the loan program is presently adequate for small projects (under \$50,000). No grant funds are available from FHA at this time.

U. S. Environmental Protection Agency: At the present time, no EPA grants or loans are authorized for implementation of solid waste projects. Grants for solid waste planning, such as received for initial regional planning, are no longer available. It is unlikely EPA funds will be available for future implementation of the plan unless a unique process were to be demonstrated within the system. Several bills before Congress are aimed at resource recovery with possible planning and construction grants in this area. Final legislation cannot be predicted but may follow a recent preference for loan guarantees instead of construction grants. Loan guarantees tend to reduce risks of

investment and encourage use of industrial capital.

Oregon Department of Environmental Quality: Grants and loans for implementation of solid waste transfer, processing and disposal systems are available from the DEQ pollution control bonds fund. Generally, the funds can only be disbursed to a public body such as a city, county or special district. Eligible costs include land acquisition; engineering design and supervision; construction of structures, site development, and utilities; and initial purchase of major equipment. Special conditions pertaining to major equipment require open bidding and a sinking fund for replacement and limit funding to initial purchases essential to sustain the project.

Up to 30 percent of the eligible costs could be financed through a grant, but the remaining 70 percent must be repaid over a 20-year period at approximately 5 percent interest. An adequate financial program must be established to ensure repayment of the bonds. Any facilities may be leased or franchised to private enterprise for operation. From the 30 percent grant, deductions are made for planning grants previously given to a public body if the portion of the funds previously spent on a given project can be identified. This report (considered Phase I planning) was financed through a DEQ grant. Phase II (advanced

planning) funds are also available for 100 percent funding of more specific solid waste system plans, site selection, preliminary design or other approved investigations.

At the present time, it is required that the applicant prepare and obtain voter approval for a bond issue in the amount of the loan. The state would then buy the bonds at approximately 5 percent interest if no lower bids were received. A legal question is being resolved as to whether the loan can be obtained from the state without a bond issue and its associated expenses. A satisfactory means of securing repayment of the bonds without obligating real property appears to be an obstacle to this approach.

County Bonds: Public agencies may also sell bonds in the usual way to meet capital needs. Counties can use general obligation bonds, and if authorized by charter, revenue bonds. Voter approval is required. The current assessed values for the five counties of the Chemeketa Region and the amounts of debt that may be incurred are:

County	Assessed Value	County Debt Limitation	
Benton	\$ 498,300,000	2%	\$ 9,966,000
Linn	1,003,400,000	2%	20,068,000
Marion	1,457,200,000	2%	29,144,000
Polk	371,100,000	2%	7,422,000
Yamhill	441,200,000	2%	8,824,000
TOTAL	\$3,771,200,000		\$75,424,000

Ample bonding capacity remains for counties to finance the program. Either general obligation or revenue bonds can be repaid from direct charges rather than taxes. The program, if financed by bonds, should have no adverse effect on taxes or bonding capacity in the Region.

County service districts (CSD's) can also issue general obligation and revenue bonds with voter approval. CSD's are authorized in individual counties under ORS 451 ff. Under ORS 198 ff., the CSD appears to be applicable on a multicounty basis. General obligation bonding for CSD's is limited to 2 percent of assessed valuation, far in excess of any debt required for the solid waste management program. No reason appears for forming CSD's within the separate counties of the Chemeketa Region to finance the solid waste management program. If a CSD is formed for this program, it should be formed only as a regional financing vehicle. Bonds issuable by a five-county CSD would require approval only at a region-wide election rather than separately in every county.

An additional method of bond financing is proposed by Senate Bill 1018 as introduced in the 1974 session of the Legislative Assembly. SB 1018 would permit counties to issue industrial development bonds, that is, bonds of the county issued to finance facilities for use by private enterprise, and secured solely by the rents and revenues of

the project. Counties would be expressly prohibited from operating any facility as a business other than as lessor or seller. This bill also affirms the power of counties to lease or sell facilities to private parties and permits counties to negotiate construction contracts. Bonds would be issuable without a vote.

The advantage of industrial revenue bonds proposed under SB 1018 over other forms of revenue bonds is primarily the exemption from voting. Counties already have powers to lease or franchise facilities for private operation, and state policy under ORS 459.015(7) encourages use of private industry's capability and expertise. Bonds issued under SB 1018 would sell at terms comparable to other revenue bonds if the county could reserve the right, upon default of rent, to enter promptly, and lease the facility to others or operate it with county personnel. However, if the county were unable to immediately protect its stream of revenues upon default of rent, industrial revenue bonds under SB 1018 would carry a substantial interest penalty over conventional revenue bonds.

Lease-purchase methods can be used to acquire needed equipment. Both first-generation and replacement equipment can be purchased this way. Current lease-purchase information indicates that 7 percent financing can be arranged through banks for lease terms comparable

to estimated equipment service lives. Lease-purchase is especially desirable in financing periodic replacements because it smooths the flow of capital funds and sets an orderly procedure for regularly updating equipment in use.

Municipal Bonds: Capital funds for financing of specific facilities may also be provided by municipalities in the Region. In most instances, only those facilities to be located within incorporated boundaries would be considered for municipal financial assistance. The Southeast Salem Resource Recovery Center, the Woodburn, Corvallis, Albany, Rickreall, and McMinnville transfer stations, and the Southeast Salem and Lebanon landfills are the facilities most likely to be considered for municipal financial involvement. Municipal financing could include general obligation bonds, industrial revenue bonds, or use of funds on hand—all of which could be used separately or in combination with county or private funds to make up the local share of capital costs. Municipalities could also assume the role of applicant for federal or state grants and loans.

Even though the financing plan developed in this report is based upon separate county capital fund sources, municipalities may also be involved. Actual participation would be negotiated between the separate counties and municipalities during imple-

mentation of the Recommended Plan. It is beyond the scope of this report to further delineate municipal financing of local and regional facilities.

PRIVATE SOURCES. The private sector of the solid waste management industry can also supply capital. To compensate for improvement of existing facilities, franchise agreements can be renegotiated. New facilities can be better financed by soliciting proposals from existing franchised operations individually, in concert, or from national waste system companies. The cost of private financing to users of the system will depend on the rate of return required by the investors.

A 10 percent rate of return over the estimated service life of the facilities has been assumed for estimating and comparing the cost of private financing in this report.

RECOMMENDED CAPITAL FUND SOURCES. Table V-5 compares public and private financing costs. The comparison is based on costs provided for the Southeast Salem Resource Recovery Center. The cost per ton can be 20 percent less if tax exempt financing is used. Capital costs are about 40 percent less. Operation and maintenance costs are the same because this plan relies on the private sector to operate all facilities.

Table V-5
CAPITAL FUND SOURCE COMPARISON (1977/78)
CHEMEKETA SOLID WASTE MANAGEMENT PROGRAM

Item	Service Life	Construction Cost ¹	Cost Comparison	
			Public Financing	Private Financing
Southeast Salem Resource Recovery Center:				
Capital Costs				
Land and fixed facilities	20	\$ 565,000	\$ 39,800	\$ 73,000
Equipment	20	972,900	68,500	125,700
Equipment	5	704,800	124,800 ²	204,500
Subtotal		\$2,242,700	\$233,100	\$403,200
Operation & maintenance ¹			491,900	491,900
TOTAL ANNUAL COST			\$725,000	\$895,100
Annual cubic yards (400 LB/CY)			955,000	955,000
Capital cost per CY			\$0.24	\$0.42
O & M cost per CY			0.52	0.52
TOTAL COST PER CY			\$0.76	\$0.94

¹ Includes inflation.

² Includes \$75,100 annual equipment deposit reserve payment to meet loan amount of \$49,700 after equipment is retired.

Source: Bartle Wells Associates

For facilities other than resource recovery centers, the overall savings through public financing will be less. Capital cost savings will be similar to those for resource recovery centers, but operating costs which do not change will form the larger part of the overall cost.

Private financing is recommended for improvements needed at privately owned facilities and for all transport and landfill equipment. Although somewhat higher financing costs are introduced, private financing will expedite improvements at existing sites and avoid the need to prescribe maintenance standards for equipment. It is desired that opportunities be provided for private industry to finance other facilities such as regional transfer stations or resource recovery centers. The ease at which industry can obtain financing for these types of facilities is, however, unknown during the planning period. For that reason the financing plan is based upon public funds or obligations for major new facilities, but it is understood that private financing will be encouraged whenever competitive or advantageous to reduce costs or promote efficiency of operations.

A procedure which appears to offer maximum opportunity for private involvement while assuring a sustained overall program is to advertise for proposals from industry to construct or operate

specific facilities. In return for industry investment, franchises or other benefits would be awarded. The length of time during which proposals would be accepted by the unit of local government would be greater for the more costly and complex facilities. At the end of the advertisement period, if no acceptable proposals were received or awarded, then local government would need to proceed with implementation measures based on public financing as presented in this report.

Private sector investments required for the program amount to \$7.4 million, composed as follows:

Land and construction for existing facilities	\$ 326,500
First-generation and replacement equipment	<u>7,026,200</u>
TOTAL	<u>\$7,352,700</u>

Public investments required for the program amount to \$24.5 million, of which \$18.0 million is for resource recovery centers. Eleven million dollars for resource recovery equipment can be met by lease-purchase. Table V-6 shows that the remaining \$13.5 million can be met by:

DEQ Grants (1975-1986)	\$ 4,046,300
DEQ Loan (1975)	3,332,200
Resources on Hand (1975-1986)	281,300
General Obligation Bonds	<u>5,827,800</u>
TOTAL	<u>\$13,487,600</u>

The general obligation bonds will be required for capital funds if state loans cease to be available. For purposes of this financing plan, general obligation bonds (or DEQ loans) are assumed for facilities to be funded in 1984 or later, namely:

- . Construction
 - McMinnville transfer station
 - Newberg resource recovery center
 - Woodburn transfer station
- . Expansion
 - Lebanon and Newberg landfills
 - Southeast Salem and North Benton resource recovery centers

DEQ grants (30%) were assumed to be available to fund projects to be constructed prior to 1987. General obligation bonds may also be required to secure the suggested loan of state pollution control bond funds. It is assumed each county would obtain a DEQ loan through general obligation bonds, if necessary. It is also assumed that Benton and Marion Counties will each finance regional resource recovery centers as a local obligation.

SB 1018 could offer an alternative to use of general obligation bonds and possibly also to private financing of first-generation and replacement equipment. Whether or not the state will accept SB 1018 revenue bonds as security for loan repayment remains to be tested. Similarly the marketability of SB 1018 revenue bonds in the municipal market will depend on the the security features built into each particular issue, and especially on the recourse available to the issuer in event of default.

Expenditures

Annual expenditures include capital repayments, lease-purchase payments, operation and maintenance costs, and administrative costs.

CAPITAL REPAYMENTS. Capital repayments for private capital include land and improvements. Public capital repayments (Table V-7) include general obligations and monies borrowed from reserves. Reserve repayments are based on 6 percent interest over 20 years. DEQ loan obligations are based on 5 percent interest for 17 years (1977-1994). General obligations or future DEQ loans are based upon 7.5 percent interest for 17 years (1987-1994). It is assumed for both types of obligations that 2.4 years of funded interest (no principal payments) and 2 percent of the construction fund for legal and administrative fees would be included in the total

obligation amounts. All general obligations or loans would require voter approval in the county (or city) constructing the facility. A contract between the separate counties (or cities) and the regional organization would establish revenue repayment provisions to meet bond service or loan payments.

ANNUAL EQUIPMENT LEASE COSTS. Table V-8 shows lease costs for all equipment to be acquired by the private sector and for equipment lease-purchased by each county (or city). Except for resource recovery equipment to be purchased with state grant/loan funds in 1976, the annual costs for both public and private acquisitions are based on lease-purchase procedures. Annual costs are determined by amortizing acquisition costs over estimated service lives at current interest rates. No allowance is made for possible salvage values.

Annual costs for rural drop box stations, transfer stations, and landfill equipment include a 10 percent rate of return on private investments. Costs shown allow repayments for all existing and replacement equipment used in the program at these facilities.

All resource recovery equipment acquired after 1976 with service lives of 10 or less years can be lease-purchased by the individual counties (or cities) at about a 7 percent tax-exempt interest rate.

OPERATION AND MAINTENANCE COSTS. Table V-9 shows operation and maintenance costs. Projections, based on the 1974-level costs include a 6 percent annual inflation allowance.

Operation and maintenance costs for the Brown's Island, Southeast Salem, and North Benton landfills anticipate a 50 percent decrease in costs when resource recovery centers begin operation.

ADMINISTRATIVE COSTS. Administrative costs are estimated in Table V-10. Costs were established on a 1974-cost level and escalated 6 percent a year. It is assumed all administrative costs would be apportioned between the member counties by agreement as is presently the case. The costs could be reimbursed by either direct payments or in-kind services, whichever is most suitable to the particular county. Apportionment of the annual administrative costs between each county on the basis of population would be approximately as follows:

Marion County	(42%)	\$14,100
Benton County	(16%)	5,400
Linn County	(20%)	6,700
Polk County	(11%)	3,700
Yamhill County	(11%)	3,700
Region Total		<u>\$33,600</u>

Table V-6
OBLIGATION AMOUNTS BY COUNTY

Facility/County	Constr. Year	Constr. Cost 1974	1975	1976	Escalated Costs		1986	Total
					'77-'80	'84-'85		
MARION COUNTY								
Mill City, Macleay DB	1975	30,100	32,500	—	—	—	—	32,500
Woodburn TS	1984	262,000	—	—	—	565,600	—	565,600
S.E. Salem LF (Land)	1975	100,000	108,000	—	—	—	—	108,000
S.E. Salem LF (Constr.)	1979	50,000	—	—	73,500	—	—	73,500
S.E. Salem RRC	1976	1,977,600	—	2,242,800	—	—	—	2,242,800
S.E. Salem RRC Expan.	1986	1,128,500 ¹	—	—	—	—	2,413,900	2,413,900
Subtotal			140,500	2,242,800	73,500	565,600	2,413,900	5,436,300
30% DEQ Grant			42,100	672,800	22,100	169,700	724,200	1,630,900
Local Amount			98,400	1,570,000	51,400 ²	395,900	1,689,700	3,805,400
Obligation Amount			1,668,400	—	—	2,085,600	—	3,754,000
BENTON COUNTY								
Blodgett, Lobster Valley								
Monroe DB	1975	37,300	40,300	—	—	—	—	40,300
Corvallis TS	1975	16,400	17,600	—	—	—	—	17,600
N. Benton LF Expan.	1980	73,400	—	—	116,500	—	—	116,500
N. Benton RRC	1976	1,835,200	—	2,077,800	—	—	—	2,077,800
N. Benton RRC Expan.	1986	1,005,500 ¹	—	—	—	—	2,129,100	2,129,100
Subtotal			57,900	2,077,800	116,500	—	2,129,100	4,381,300
30% DEQ Grant			17,400	623,300	35,000	—	638,700	1,314,400
Local Amount			40,500	1,454,500	81,500 ²	—	1,490,400	3,066,900
Obligation Amount			1,495,000	—	—	1,490,400	—	2,985,400
LINN COUNTY								
Sweet Home DB	1977	12,800	—	—	16,100	—	—	16,100
Albany TS	1975	184,800	199,600	—	—	—	—	199,600
Lebanon LF	1975	38,400	41,500	—	—	—	—	41,500
Lebanon LF Expan.	1986	32,400	—	—	—	—	81,600	81,600
Subtotal			241,100	—	16,100	—	81,600	338,800
30% DEQ Grant			72,300	—	4,800	—	24,500	101,600
Local Amount			168,800	—	11,300 ²	—	57,100 ²	237,200
Obligation Amount			168,800	—	—	—	—	168,800

Table V-6 (Continued)

Facility/County	Constr. Year	Constr. Cost 1974	1975	1976	Escalated Costs		1986	Total
					'77-'80	'84-'85		
POLK COUNTY								
Rickreall TS	1978	84,000	—	—	114,300	—	—	114,300
Subtotal			—	—	114,300	—	—	114,300
30% DEQ Grant			—	—	34,300	—	—	34,300
Local Amount			—	—	80,000 ²	—	—	80,000
Obligation Amount			—	—	—	—	—	—
YAMHILL COUNTY								
McMinnville TS	1985	274,500	—	—	—	640,000	—	640,000
Newberg LF Expan.	1986	46,400	—	—	—	—	116,800	116,800
Newberg RRC	1986	1,143,500	—	—	—	—	2,460,100	1,460,100
Subtotal			—	—	—	640,000	2,576,900	3,216,900
30% DEQ Grant			—	—	—	192,000	773,100	965,100
Local Amount			—	—	—	448,000	1,803,800	2,251,800
Obligation Amount			—	—	—	2,251,800	—	2,251,800
REGION TOTAL								
			439,500	4,320,600	320,400	1,205,600	7,201,500	13,487,600
30% DEQ Grant			131,800	1,296,100	96,200	361,700	2,160,500	4,046,300
Local Amount			307,700	3,024,500	224,200 ²	843,900	5,041,000	9,441,300
Obligation Amount			3,332,200	—	—	5,827,800	—	9,160,000

NOTES:

¹ Excludes \$627,300 of first generation equipment acquired by lease purchase arrangements.² Reserves on hand to meet small obligations: total obligations met from reserves = \$281,300.
DEQ grants assumed to be available through 1986.

Table V-7
CAPITAL REPAYMENTS BY COUNTY

Obligation	Year	Constr. Fund	Funded ¹ Interest	Other ² Costs	Total Obligations	Repayment Period	Annual ³ Repayment
DEQ LOAN, 5%	1975						
Marion County		1,668,400	200,200	84,800	1,953,400	77-94	152,500
Benton County		1,495,000	179,400	111,400	1,785,800	77-94	140,000
Linn County		168,800	20,300	14,700	203,800	77-94	16,000
Polk County		—	—	80,000	80,000	77-94	7,000
Yamhill County		—	—	—	—	77-94	—
REGIONAL TOTAL		<u>3,332,200</u>	<u>399,900</u>	<u>290,900</u>	<u>4,023,000</u>	<u>77-94</u>	<u>315,500</u>
G.O. BONDS, 6.5%	1985						
Marion County		2,085,600	325,400	41,700	2,452,700	87-04	206,000
Benton County		1,490,400	232,500	29,800	1,752,700	87-04	147,000
Linn County		—	—	57,100	57,100	87-04	5,000
Polk County		—	—	—	—	87-04	—
Yamhill County		<u>2,251,800</u>	<u>351,300</u>	<u>45,000</u>	<u>2,648,100</u>	<u>87-04</u>	<u>226,000</u>
REGIONAL TOTAL		<u>5,827,800</u>	<u>909,200</u>	<u>173,600</u>	<u>6,910,600</u>	<u>87-04</u>	<u>584,000</u>

NOTES:

¹ 2.4 years interest—no principal payments.

² Reserves, plus 2% of construction fund.

³ 17 years at stated interest for construction fund plus 20 years at 6% for reserve repayments.

Table V-8
ANNUAL EQUIPMENT LEASE COSTS—CHEMEKETA SOLID WASTE MANAGEMENT PLAN

Facility/County	1975/76	76/77	77/78	78/79	79/80	80/81	84/85	87/88
Marion County								
Mill City DB ¹	1,100 ²	2,200	2,200	2,200	2,200	2,200	3,300	3,300
Macleay DB ¹	3,000 ²	6,000	6,000	6,000	6,000	6,000	9,100	9,100
Stayton TS	8,700 ³	8,700 ³	8,700 ³	8,700 ³	8,700 ³	13,100	13,100	19,700
Woodburn TS	—	—	—	—	—	—	50,000	50,000
Brown's Island SLF	32,000 ³	32,000 ³	32,000 ³	32,000 ³	32,000 ³	—	—	—
S.E. Salem LF	—	—	—	—	—	35,000	35,000	52,600
S.E. Salem RRC	—	—	—	—	—	—	243,800	652,600
Subtotal	54,800	48,900	48,900	48,900	48,900	56,300	354,300	787,300
Benton County								
Blodgett, Lobster Valley								
Monroe DB ¹	3,900 ²	7,800	7,800	7,800	7,800	7,800	11,800	11,800
Corvallis TS	1,600 ²	3,100	3,100	3,100	3,100	3,100	4,600	4,600
N. Benton SLF	25,100 ³	25,100 ³	25,100 ³	25,100 ³	35,700	35,700	35,700	53,700
N. Benton RRC	—	—	—	—	—	—	—	381,000
Subtotal	30,600	26,000	36,000	36,000	46,600	46,600	52,100	451,100
Linn County								
Sweet Home DB ¹	—	—	2,500 ³	2,500	2,500	2,500	3,800	3,800
Albany TS	—	34,600	34,600	34,600	34,600	34,600	52,100	52,100
Lebanon SLF	28,100 ³	28,100 ³	24,500	24,500	24,500	24,500	36,800	36,800
Subtotal	28,100	62,700	61,600	61,600	61,600	61,600	92,700	92,700
Polk County								
Rickreall TS	—	—	—	—	—	23,300	23,300	35,000
Monmouth SLF	9,200 ³	9,200 ³	9,200 ³	9,200 ³	9,200 ³	—	—	—
Subtotal	9,200	9,200	9,200	9,200	9,200	23,300	23,300	35,000
Yamhill County								
McMinnville TS	—	—	—	—	—	—	—	66,900
Newberg SLF	17,100 ³	17,100 ³	17,100 ³	17,100 ³	20,600	20,600	20,600	31,000
Whiteson SLF	27,700 ³	27,700 ³	27,700 ³	27,700 ³	27,700 ³	27,700 ³	—	—
Newberg RRC	17,100 ³	17,100 ³	17,100 ³	17,100 ³	20,600	20,600	20,600	20,600
Subtotal	61,900	61,900	61,900	61,900	68,900	68,900	41,200	118,500
REGIONAL TOTAL	184,600	208,700	217,600	217,600	235,200	256,700	563,600	1,484,600

¹ Allocated lease-purchase cost of equipment shared with other sites.

² Based on one-half year of operation.

³ Based on existing equipment values and service lives.

Table V-9
ANNUAL OPERATION AND MAINTENANCE COSTS²—CHEMEKETA SOLID WASTE MANAGEMENT PLAN

Facilities/County	1974 Level \$ O & M Costs ¹	1975/76	76/77	77/78	78/79	79/80	80/81	84/85	87/88
Marion County									
Mill City DB	10,100	5,400 ³	11,300	12,000	12,800	13,500	14,300	18,100	21,500
Macleay DB	27,700	14,700 ³	31,100	33,000	35,000	37,100	39,300	49,600	59,100
Stayton TS	62,200	65,900 ⁴	69,900	74,100	78,500	83,200	88,200	111,400	132,700
Woodburn TS	122,000	—	—	—	—	—	—	218,500	260,200
Woodburn SLF	100,600	106,600	113,000	120,000	127,000	134,600	142,700	—	—
Brown's Island SLF	236,800	251,000 ⁴	266,100	141,000 ⁵	149,500	158,400	—	—	—
S.E. Salem LF	57,800	—	—	—	—	—	82,000 ⁴	103,500	123,300
S.E. Salem RRC	413,000	—	—	491,900 ⁴	521,400	552,700	585,800	739,600	880,900
Subtotal	1,030,200	443,600	491,400	872,000	924,200	979,500	952,300	1,240,700	1,477,700
Benton County									
Blodgett, Lobster Valley									
Monroe DB	36,000	19,100 ³	40,400	42,900	45,400	48,200	51,100	64,500	76,800
Corvallis TS	48,000	25,400 ³	53,900	57,200	60,600	64,200	68,100	86,000	102,400
N. Benton SLF	147,000	155,800 ⁴	165,200	87,500 ⁵	82,800	98,400	104,300	131,600	156,800
N. Benton RRC	278,000	—	—	331,100 ⁴	351,000	372,000	394,300	497,900	593,000
Subtotal	509,000	200,300	259,500	518,700	539,800	582,800	617,800	780,000	929,000
Linn County									
Sweet Home DB	15,000	—	—	17,900 ⁴	18,900	20,100	21,300	26,900	32,000
Albany TS	104,000	—	116,900 ⁴	123,900	131,300	139,200	147,500	186,200	221,800
Lebanon SLF	84,100	89,100 ⁴	94,500	100,200	106,200	112,500	119,300	150,600	179,400
Subtotal	203,100	89,100	211,400	242,000	256,400	271,800	288,100	363,700	433,200
Polk County									
Rickreall TS	68,700	—	—	—	—	—	97,500 ⁴	123,000	146,500
Monmouth SLF	57,900	61,400 ⁴	65,100	69,000	73,100	77,500	—	—	—
Subtotal	126,600	61,400	65,100	69,000	73,100	77,500	97,500	123,000	146,500
Yamhill County									
McMinnville TS	116,200	—	—	—	—	—	—	—	247,900 ³
Newberg SLF	85,900	91,100 ⁴	96,500	102,300	108,400	115,000	121,900	153,800	91,600
Whiteson SLF	161,100	170,800 ⁴	181,000	191,900	203,400	215,600	228,500	288,500	—
Newberg RRC	262,000	—	—	—	—	—	—	—	558,800 ⁴
Subtotal	625,200	261,900	277,500	294,200	311,800	330,600	349,400	442,300	898,300
REGIONAL TOTAL	2,494,100	1,056,300	1,304,900	1,995,900	2,105,300	2,242,200	2,305,100	2,949,700	3,884,700

¹ Source: STR (1974 \$ value).

² Operation and maintenance projections include 6 percent annual inflation factor.

³ Projection based on six-month operation.

⁴ Projection based on full operation under the new program.

⁵ Operation and maintenance costs estimated by STR to decrease 50 percent.

Table V-10
INITIAL ADMINISTRATIVE COSTS¹
CHEMEKETA REGION STAFF

Position/Expense Item	Direct Salary	Payroll Overhead	Annual Total
Director (full-time)	\$16,000	\$2,500	\$18,500
Secretary (full-time)	8,100	1,200	9,300
Subtotal Salaries	\$24,100	\$3,700	\$27,800
Office and Support Facilities			5,800
TOTAL Annual Requirements			\$33,600

¹ Cost estimate based on agency information.

TOTAL ANNUAL COSTS. Total annual costs for the next 12-year period are given in Table V-11 for each county by type of expenditure. The annual costs of each county program would include repayment of DEQ loans, repayment of general obligation bonds or reserve accounts, equipment lease costs, operation and maintenance costs, and apportioned regional administrative costs. Reapportionment of these costs and redistribution of revenues between counties and cities of the Region are assumed to be highly subject to negotiation during establishment of the Intergovernmental Agreement and are not included in this financing plan.

Revenue Sources

Annual revenues from all sources must equal or exceed annual expenditures. The historical revenue sources for solid waste systems include ad valorem taxes, gate fees, and house-to-house collection charges. Revenues from recovered materials can help pay expenses at the recovery centers as soon as markets are developed for sale of these materials. Indirect user charges may possibly be used as a supplemental revenue, to maintain gate fees at or near current levels.

AD VALOREM TAXES. Ad valorem taxation is a method of spreading cost among all property owners within the taxing agency. The property tax is suitable

where waste generation relates closely to assessed value. The property tax may be a reasonable way to apportion costs among residents, but is often a poor measure of commercial, industrial, or agricultural solid waste generation. Counties could use their existing tax base levies for regional costs. Each county would need to contribute funds based on estimated waste generation or some other equitable basis. Voter approval would be required in each county to increase the tax base unless funds were diverted from other existing programs. Because the existing tax base is committed to meet other needs, the ad valorem tax is not recommended as a way of paying program costs. Local waste management costs may continue to be met from this source, but should be at lower levels because all disposal costs will be met from other revenue sources.

GATE FEES. Gate fees have been typically charged at existing landfill facilities to pay all disposal costs, including disposal franchise fees and any capital repayments for public agency investments. Gate fees should continue to provide the majority of revenues needed for the solid waste program, but should not be set at levels which discourage facility use. Gate fees can be set at transfer stations, processing facilities, 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 received.

Table V-11
TOTAL ANNUAL COSTS BY COUNTY—CHEMEKETA SOLID WASTE PLAN

Expenditure/County	1975/76	76/77	77/78	78/79	79/80	80/81	84/85	87/88
Marion County								
DEQ Loan Repayment	—	—	152,500	152,500	152,500	152,500	152,500	152,500
G.O./Reserve Repayment	—	—	—	—	—	—	—	206,000
Equipment Lease Costs	54,800	48,900	48,900	48,900	48,900	56,300	354,300	787,300
O & M Costs	443,600	491,400	872,000	924,200	979,500	952,300	1,240,700	1,477,700
Administrative Costs	14,100	14,900	15,800	16,800	17,800	18,900	23,800	28,400
Subtotal	512,500	555,200	1,089,200	1,142,400	1,198,700	1,180,000	1,771,300	2,651,900
Benton County								
DEQ Loan Repayment	—	—	140,000	140,000	140,000	140,000	140,000	140,000
G.O./Reserve Repayment	—	—	—	—	—	—	—	147,000
Equipment Lease Costs	30,600	26,000	36,000	36,000	46,600	46,600	52,100	451,100
O & M Costs	200,300	259,500	518,700	539,800	582,800	617,800	780,000	929,000
Administrative Costs	5,400	5,700	6,100	6,400	6,800	7,200	9,100	10,900
Subtotal	236,300	291,200	700,800	722,200	776,200	811,600	981,200	1,678,000
Linn County								
DEQ Loan Repayment	—	—	16,000	16,000	16,000	16,000	16,000	16,000
G.O./Reserve Repayment	—	—	—	—	—	—	—	5,000
Equipment Lease Costs	28,100	62,700	61,800	61,600	61,600	61,600	92,700	92,700
O & M Costs	89,100	211,400	242,000	256,400	271,800	288,100	363,700	433,200
Administrative Cost	6,700	7,100	7,500	8,000	8,500	9,000	11,300	13,500
Subtotal	123,900	281,200	327,100	342,000	357,900	374,700	483,700	560,400
Polk County								
DEQ Loan Repayment	—	—	7,000	7,000	7,000	7,000	7,000	7,000
G.O./Reserve Repayment	—	—	—	—	—	—	—	—
Equipment Lease Costs	9,200	9,200	9,200	9,200	9,200	23,300	23,300	35,000
O & M Costs	61,400	65,100	69,000	73,100	77,500	97,500	123,000	146,500
Administrative Costs	3,700	3,900	4,200	4,400	4,700	5,000	6,300	7,500
Subtotal	74,300	78,200	89,400	93,700	98,400	132,800	159,600	196,000
Yamhill County								
DEQ Loan Repayment	—	—	—	—	—	—	—	—
G.O./Reserve Repayment	—	—	—	—	—	—	—	226,000
Equipment Lease Costs	61,900	61,900	61,900	61,900	68,900	68,900	41,200	118,500
O & M Costs	261,900	277,500	294,200	311,800	330,600	349,400	442,300	898,300
Administrative Costs	3,700	3,900	4,200	4,400	4,700	5,000	6,300	7,500
Subtotal	327,500	343,300	360,300	378,100	404,200	423,300	489,800	1,250,300
Region Total								
DEQ Loan Repayment	—	—	315,500	315,500	315,500	315,500	315,500	315,500
G.O./Reserve Repayment	—	—	—	—	—	—	—	584,000
Equipment Lease Costs	184,600	208,700	217,600	217,600	235,200	256,700	563,600	1,484,600
O & M Costs	1,056,300	1,304,900	1,995,900	2,105,300	2,242,200	2,305,100	2,949,700	3,884,700
Administrative Costs	33,600	35,500	37,800	40,000	42,500	45,100	56,800	67,800
GRAND TOTAL	1,274,500	1,549,100	2,566,800	2,678,400	2,835,400	2,922,400	3,885,600	6,336,600

HOUSE-TO-HOUSE COLLECTION

CHARGES. House-to-house collection charges are billed by franchise collectors for collection services. Rates are set to recover franchise collection fees, collection and transport costs, and any disposal fees charged. Rates include a reasonable profit for the collector. Collection rate adjustments for increased or decreased costs of doing business are subject to approval by the franchising agency.

Franchising agencies will need to evaluate collection rate increases between 1975-1976 through 1977-1978 as the new and more costly disposal methods are brought on-line. Franchising agencies should require collectors to provide data on both increased disposal charges and any savings in transport costs afforded if haul distances are shortened by the new facilities.

FRANCHISE FEES. Cities and counties currently levy franchise or license fees for collection and disposal franchises. Fees are charged to pay the administrative costs of monitoring activities and may in some cases provide additional general fund revenue.

Franchise fees for facilities should be set to recover administrative costs. Initially each county should recover its apportioned share of administrative costs by establishing a franchise fee per

ton of waste disposed of at resource recovery centers and landfills receiving unprocessed wastes. Actual experience in administering transfer, resource recovery, and landfills may later require that different fees be charged at each type of facility.

INDIRECT USER CHARGES. Indirect user charges are charges levied on the basis of waste generation rather than measured use. Oregon Revised Statutes 268 and 451 clearly give authority to metropolitan service districts and county service districts to levy indirect user charges for solid waste disposal. It is possible that this authority may be available to separate counties if ORS 268, 451, and 459 can legally be interpreted to give such broad powers to counties which do not form special districts. Legal research will be necessary to clarify this point and future legislative action may be desirable.

In the event such powers are available to separate counties, then this revenue source may be considered to supplement any gate fees at rural drop box stations. Gate fees could then be kept at levels comparable to those nearby transfer stations to avoid high fees which could discourage use or low fees which could divert wastes from transfer stations. As an alternative to levying gate fees at rural sites, an indirect user charge can be used to pay all costs at rural convenience stations and transfer stations. However, full indirect support will not be

needed if, as planned, rural drop box stations will have attendants during all hours of operation.

SALES OF RECOVERED

MATERIAL. Revenues from sales of recovered material can help pay expenses of the recovery centers as soon as markets are developed. Current market prices indicate a possible price of \$5.70 per ton of processed waste. Of this price, \$3.20 per ton can be earned from sales of ferrous and combustible materials. Revenues are estimated for 80 percent of the incoming waste at \$3.20 per ton, escalated at 6 percent per year, producing \$866,000 in 1977-78. These revenues rely on establishing markets at projected prices for both ferrous and combustible materials.

Additional revenue of up to \$1.50 per ton of processed waste for corrugated paper is attainable at current market prices. Corrugated paper now constitutes 10 percent of the waste entering the waste stream. However, much of this tonnage may be diverted for direct sale by collectors, and is not counted upon as a revenue source.

Revenues from newsprint should not be relied upon either, because no facilities are included to handle this material. It is anticipated that newsprint not recovered or separated by local programs will be processed for recovery as a combustible material.

Revenue and Expense Projections

Table V-12 summarizes revenues and expenses for the total regional program. To remain conservative, costs have been estimated on the basis of 100 percent of tonnage forecast by the Chemeketa staff, but revenues from sales of secondary materials have been estimated on 80 percent of the potential quantities.

A regional average gate fee of \$3.55 is required per ton of waste in 1975-76. This fee will increase when the resource recovery centers begin operation in 1977-78, depending upon establishment of markets for the sale of ferrous and combustible materials. Gate fees will decrease after 1979-80 if ferrous and combustible material can be sold at projected market price.

Revenues for the Newberg processing center are not included. Based on revenue assumptions similar to those used for the two initial centers, the gate fee at Newberg would be much higher than that for continuing landfill operations at this site. The actual construction date for the center and for expansion of initial centers will depend on the success in obtaining markets for secondary materials and the actual quantities of waste disposed of.

Adoption of a regional average gate fee appears to be desirable to aid in waste flow control. Waste piracy between counties should be controlled through the Intergovernmental Agreement. Private hauling of wastes to disposal points having lower disposal costs could, however, cause significant imbalances in the overall regional system. It is possible that some private hauling could result in larger quantities of wastes to be transported greater distances than necessary simply because of the public's desire to find the cheapest disposal point without proper consideration of all costs involved.

It is recognized that a regional average gate fee may be a somewhat over-simplified allocation of costs. The recommended organization, however, negates any method of allocation of costs on a regional basis since separate counties will be the primary source of local public funds. In addition, negotiation of a separate agreement for waste flow control must be compatible with any method of cost allocation and revenue distribution. At the time of negotiation of a waste flow control agreement, a method must be selected to establish gate fees compatible with financing of specific facilities.

PLAN REVIEW AND UPDATING

This solid waste management plan should be reviewed on a regular basis with major updating occurring at approximately five-year intervals. Minor revisions and updating of the plan can be accomplished during the intervening period by amendments to the resolution of final adoption. In this manner, the plan can be kept current with changes in land use policies, solid waste regulations and standards, changes in technology, and changes in implementation measures.

Table V-12
REGION AVERAGE UNIT COSTS CHEMEKETA SOLID WASTE PLAN

	1975/76	76/77	77/78	78/79	79/80	80/81	84/85	87/88
Total Region Costs ¹	1,274,500	1,549,100	2,566,800	2,678,400	2,835,400	2,922,400	3,885,600	6,336,600
Revenues								
Secondary Mat'l Sales	—	—	866,200	950,200	1,041,200	1,230,200	1,752,900	2,441,900
Net Program Cost	1,274,500	1,549,100	1,700,600	1,728,200	1,794,200	1,692,200	2,132,700	3,894,700
Region Annual Waste Tonnage	359,149	371,968	384,970	398,248	411,806	425,610	481,464	509,364
Region Average Unit Cost								
\$/Ton	3.55	4.16	4.42	4.34	4.36	3.98	4.43	7.65
\$/Compacted CY ²	0.71	0.83	0.88	0.87	0.87	0.80	0.89	1.53
\$/Loose CY ³	0.36	0.42	0.44	0.43	0.44	0.40	0.44	0.77

NOTES:

¹ See Table V-11.

² 400 LB/CY avg.

³ 200 LB/CY avg.

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13. Oregon Administrative Rules, Chapter 340.

