NON-SELECTED

SYSTEMS

Before selecting the solid waste management system contained within this Plan update, Leelanau County developed and considered other alternative systems. The following section provides a brief description of these non-selected systems and an explanation why they were not selected.

ALTERNATIVE NO. 2 - TRANSFER STATION WITH WASTE DIVERSION

System Components:

- Waste collection by private haulers who transport the wastes to the transfer station.
- Drop off sites for recyclables with collected materials transported to a processing plant.
- Composting program consisting of a drop-off site for yard wastes.
- Household hazardous waste collection program with disposal at a licensed out of County facility.
- Public education program encouraging source reduction, recycling, composting, and proper hazardous waste disposal.
- Transfer station where wastes are compacted into large containers to be hauled to a licensed disposal site. The site could be the existing in-County landfill or a site located out of County.

Resource Conservation Efforts:

Resource conservation efforts included in this alternative consist of recycling, composting, and source reduction that could occur as a result of the public education program. The recovery of wastes that are then recycled can reduce the need to consume non-renewable materials in manufacturing processes.

Volume Reduction Techniques:

The public education program can provide information on how industries, commercial establishments, and the general public can modify their operations to reduce the quantity of wastes created. The education program and the household hazardous waste program can also decrease waste volumes to be handled at the local facilities by creating opportunities for proper disposal of hazardous wastes.

Resource Recovery Programs:

The resource recovery programs in this alternative consist of recycling and composting. The proposed recycling system consists of drop-off sites with voluntary participation. The collected materials would be processed and shipped to markets where they could be reused. The composting program would include a drop-off site for yard wastes with voluntary participation. Hauling and processing of collected materials would be contracted to private enterprise.

Factors affecting the proposed recycling and composting programs include:

1. Willingness of the public to source separate wastes and take them to a drop-off site.
2. Public awareness as to the need for recycling and composting.
3. Convenient drop-off sites.

4. Willingness of private enterprise to pick up source separated materials and transport them to processing centers and to markets.
5. Financial support by county government.
6. Availability of markets for recovered materials within a reasonable haul distance.

Impediments to implementing the proposed recycling and composting programs include:

1. Inconvenience to the individual.
2. The "Throw-away society" tradition.
3. Present cost to the individual for recycling and composting is higher than that for landfilling.
4. Public lack of knowledge as to how the solid waste system works and the importance of recycling and composting.
5. Ignorance of consequences to personal and environmental health caused by throw-away waste disposal.

Methods of removing or minimizing the impediments include:

1. Public education
2. Convenient drop-off sites for source separated material.
3. Collection and landfill tipping fees based on a by-the-bag system to encourage volume reduction.
4. Financial incentives to encourage recycling.
5. Ordinances prohibiting certain items from being disposed of in landfills.
6. Create markets by requiring all governmental units to purchase supplies made from recycled materials.
7. Continued County financial support of the recycling program.
8. Provide County financial support for implementing a yard waste composting program.
10. Create opportunities for private enterprise to profitably participate in recycling and composting programs.
11. Obtain grants or low interest loans to support recycling and composting programs.

How recycling and composting and other processing or disposal methods can compliment each other and the feasibility of excluding site separated material and source separated material from other processing or disposal methods :

Recycling, composting, and hazardous waste collection can compliment other phases of the solid waste management system. By recovering a portion of the waste stream, the remaining waste volume that must be handled and disposed of will be reduced. This will reduce the required capacity and therefore the cost of any future solid waste facilities that are needed. Reducing the waste volume will also extend the life of the existing landfill and delay the need to establish a new one. The removal of household hazardous wastes from the waste

stream will allow the landfill and other waste facilities to operate in an environmentally safe manner.

The feasibility of excluding recoverable materials from landfill disposal depends mostly on the willingness of the public to participate in the waste diversion programs. The quantities of recycled materials shown on page II-1 indicate that 1810 tons of material were recycled in 1997 from a total waste stream of 21,010 tons. The recycled material represents only 8.6% of the waste volume generated. The 1989 Solid Waste Plan includes data from a waste stream assessment performed at Glen's Landfill in 1988. The waste stream assessment found that over half the waste stream consisted of materials that are presently being recycled. This is a good indication that the materials are available in the waste stream and are capable of being recovered with cooperation of the public.

Benefits that could result from the implementation of a recycling and composting program include:

Since a large portion of Leelanau County's economy is based on tourism, preservation of the environment will result in economic benefits. Environmental and economic benefits from recycling and composting include:

1. Energy savings by using recovered rather than virgin materials.
2. Conservation of natural resources.
3. Avoiding the need for additional land to be dedicated for landfill and other disposal sites.
4. Preservation of existing environmental conditions.

Feasibility of source separation of materials that contain potentially hazardous components at disposal areas:

The transfer station and landfill would be natural sites for collecting hazardous wastes that are source separated from the waste stream. These materials could be prevented from entering the waste stream and possibly disrupting performance of the system. By collecting hazardous wastes at the same locations used for disposal of other wastes, it would be more convenient for individuals to separate rather than co-mingle these wastes. This type of system would encourage customers who haul their own wastes to disposal sites to source separate their hazardous wastes, but for customers served by haulers, the haulers will not likely be able to keep them separated.

Collection of hazardous wastes at the disposal areas would create some problems. Storage and handing would be needed at these sites. A professional person who can identify the wastes and determine how to safely store these wastes would be required.

Collection Processes:

The existing system of private haulers would be utilized for solid waste collection and transportation to the transfer station.

Transportation:

The transfer station would include a tipping floor where collected waste would be dumped. Some hand sorting of recyclables could be performed. The waste would be compacted and reloaded into a large, 75-100 cubic yard tractor-trailer rig that would haul the waste to either the in-County landfill or a disposal site located outside the County.

Disposal Areas:

With this alternative, either the in-County landfill or an out of County site would be used for the ultimate disposal of solid wastes. The system would be flexible enough to allow disposal at different sites.

Institutional Arrangements:

If an out of County disposal site were utilized, agreements with the county in which the site is located would be necessary. That county's solid waste plan would need to include provisions allowing Leelanau County to use the disposal site. Contracts with private enterprise would be needed for hauling recyclable materials and yard wastes.

Educational and Informational Programs:

The existing public education program that is funded through a portion of the costs paid to operate the recycling drop-off sites would continue under this alternative.

Sanitary Landfill

It is expected that the existing in-County landfill would be retained under this alternative. This alternative could also be utilized if the landfill were to eventually close. Collected wastes would continue to be hauled in large trucks, only to a different disposal site. If the new disposal site were located considerably farther from the transfer station, additional rolling stock may be needed to haul the wastes.

Ultimate Disposal Area Uses

When landfills are eventually closed, they must be capped with an impermeable layer to prevent precipitation from entering the buried waste and creating leachate. Closed landfill sites are not well suited to all types of future development. Buildings should not be constructed since the settlement of wastes and the creation of methane from waste decomposition are likely to occur. Land uses best suited for closed disposal sites are recreational and agricultural uses.

No ultimate land use for a transfer station site is being considered since such a site would likely be used for a long period of time no matter where and what type of ultimate disposal site receives the waste.

Capital, Operational, and Maintenance Costs:

(See "Estimated Budgets for Components of Solid Waste Management Alternatives" beginning on page B-18 for detailed estimates.)

	Annual Cost
Collection and Transportation (19,200 Tons @ $90)	$ 1,728,000
Recycling Drop-off Sites	$ 112,000
Yard Waste Composting	$ 29,000
Household Hazardous Waste Collection	$ 8,000
Public Education	$ 8,000
Transfer Station (including Disposal Costs)	$ 1,105,000
Total Estimated Cost	$ 2,990,000
Estimated Cost per Ton (@ 19,200 TPY)	$ 155

Evaluation Summary of Non-Selected System:

This non-selected system was evaluated to determine its potential of impacting human health, economics, environmental, transportation, siting, and energy resources of the County. In addition, it was reviewed for technical feasibility, and whether it would have public support. The following is a brief summary of that evaluation along with an explanation as to why this system was not chosen to be implemented.

Technical Feasibility

This alternative includes mostly existing systems except for the transfer station and the composting system. The technology exists for these systems to be implemented and there are many similar systems in existence.

Economic Feasibility

This alternative will have an economic impact. The development of a new transfer station facility would increase costs over the present level. Costs could also increase if the transfer station were used to haul to a distant out of County disposal facility with long hauling distances and high disposal fees. Costs versus the existing system would also increase slightly due to the implementation of a yard waste composting program and possible expansion of the recycling and household hazardous waste collection programs. The preferred method of developing the proposed facilities would be by private enterprise.

Access to Land and Transportation Routes

A suitable parcel of land would be required for the development of a transfer station. Approximately 5 acres would be needed. The existing transportation system may need to be upgraded depending on the location of the transfer station. The ideal site would be centrally located in the County on an all weather road capable of handling a reasonable volume of truck traffic.

An additional land requirement would be a 5-10 acre parcel for a yard waste drop-off site. A suitable site would be conveniently located with good access to the County road system.

Energy

The use of a transfer station could result in an energy savings if the collected wastes are hauled to an in-County transfer station. For some of the haulers, the transfer station will be a more convenient location than the landfill for emptying collection trucks. This would result in a lower driving mileage for the trucks. Hauling the collected wastes to an out of County disposal site may increase the energy requirements, depending mostly on the hauling distance. If an out of County disposal site were utilized, energy costs for waste hauling would be considerably higher without a transfer station.

Environmental

This system would have a slight effect on the environment since an additional site will be dedicated to solid waste management. If the collected wastes were shipped out of the County, the transfer station could have a positive environmental effect since the existing landfill could then be closed and capped.

Public Acceptability

The proposed transfer station would probably receive public acceptance, especially if it were necessary to use an out of County site for disposal. Some scattered opposition would be expected, especially from people who live nearest to the proposed site.

Public Health

This alternative could have a slight impact on public health if both a transfer station and a landfill are in operation at the same time. Proper operation of these facilities will minimize public health concerns.

Siting

The siting of a transfer station could be difficult. The site would need to be centrally located, on an all weather road, and in a location acceptable to the public. Many sites that are otherwise suitable may become unacceptable due to public opposition.

Advantages and Disadvantages of Non-Selected System:

Advantages:

1. This alternative utilizes all of the existing components of the solid waste management system.
2. The system offers flexibility by allowing ultimate waste disposal at alternate sites. This would be a very significant advantage if the in-County landfill were to close or otherwise become unavailable.
3. This alternative provides opportunities for recycling, composting, and household hazardous waste collection that can be expanded in the future.
4. Another opportunity for private enterprise to become involved with solid waste will occur with the addition of a transfer station and a yard waste drop-off site.
5. Recycling opportunities would be available to all County residents.
6. Composting opportunities for yard waste would become available.

Disadvantages:

1. Costs will increase due to the need to develop and operate a new facility.
2. Another parcel of land would become dedicated to solid waste, precluding its use for another purpose.
3. Siting a transfer station may be difficult due to the requirements for a convenient location, transportation access, and public acceptance.
4. Recycling opportunities would be available but not necessarily convenient to all County residents.
5. This alternative may not result in a the maximum waste volumes being diverted from the landfill.

ALTERNATIVE NO. 3 - COMPULSORY RESOURCE RECOVERY

System Components:

- Mandatory separation of marketable wastes by waste generators. Selected wastes, typically paper, newsprint, cardboard, glass, aluminum, tin cans, and plastics would be separated by residential, commercial and industrial waste generators. Industries that generate significant volumes of certain other wastes that could be diverted from the waste stream would be required to do so.
- Waste collection by private haulers.
- Curbside collection of source separated wastes by private haulers in the more densely populated portions of the County. These materials would be either collected with separate vehicles from the non- separated waste collection or with the same vehicles with dedicated compartments for separated wastes.
- Drop off sites for recyclables for waste generators not served by curbside collection.
- Transport collected materials to a processing plant.
- Composting program consisting of a drop-off site for yard wastes.
- Expanded household hazardous waste collection program with disposal at a licensed out of County facility.
- Expanded public education program encouraging source reduction, recycling, composting, and proper hazardous waste disposal.
- Disposal of wastes not removed by the diversion methods listed above at a licensed in-County landfill.

Resource Conservation Efforts:

Resource conservation efforts included in this alternative consist of recycling, composting, and source reduction that could occur as a result of the public education program. These programs would be greatly intensified over similar programs proposed in the other alternatives. The recovery of wastes that are then recycled can reduce the need to consume non-renewable materials in manufacturing processes.

Volume Reduction Techniques:

The public education program can provide information on how industries, commercial establishments, and the general public can modify their operations to reduce the quantity of wastes created. The education program and the household hazardous waste program can also decrease waste volumes to be handled at the local facilities by creating opportunities for proper disposal of hazardous wastes.

Resource Recovery Programs:

The resource recovery programs in this alternative consist of recycling and composting. The proposed recycling system consists of curbside collection of source separated materials in the more densely populated portions of the County and drop-off sites available to the remainder of the County residents. The collected materials would be processed and shipped to markets where they could be reused. The composting program would include a drop-off site for yard wastes with voluntary participation. Hauling and processing of collected materials would be contracted to private enterprise.

Factors affecting the proposed recycling and composting programs include:

1. Willingness of the public to source separate wastes despite the mandatory requirement.
2. Public awareness as to the need for recycling and composting.
3. Willingness of residents not served by curbside collection to source separate wastes and take them to a drop-off site.
4. Convenient drop-off sites for those not served by curbside collection.
5. Ability of the County to enforce mandatory recycling.
6. Willingness of private enterprise to pick up source separated materials and transport them to processing centers and to markets.
7. Financial support by County government.
8. Availability of markets for recovered materials within a reasonable haul distance.

Impediments to implementing the proposed recycling and composting programs include:

1. Inconvenience to the individual.
2. Opposition to government interference with individual life styles by mandating recycling.
3. Higher costs.
4. Public lack of knowledge as to how the solid waste system works and the importance of recycling and composting.
5. Ignorance of consequences to personal and environmental health caused by throw-away waste disposal.

Methods of removing or minimizing the impediments include:

1. Public education
2. Convenient drop-off sites for source separated material.
3. Collection and landfill tipping fees based on a by-the-bag system to encourage volume reduction.
4. Higher landfill tipping fees to encourage source separation.
5. Financial incentives to encourage recycling.
6. Ordinances prohibiting certain items from being disposed of in landfills.

7. Create markets by requiring all governmental units to purchase supplies made from recycled materials.
8. Continued County financial support of the recycling program.
9. Provide County financial support for implementing a yard waste composting program.
10. Create opportunities for private enterprise to profitably participate in recycling and composting programs.
11. Obtain grants or low interest loans to support recycling and composting programs.

How recycling and composting and other processing or disposal methods can compliment each other and the feasibility of excluding site separated material and source separated material from other processing or disposal methods :

Recycling, composting, and hazardous waste collection can compliment other phases of the solid waste management system. By recovering a portion of the waste stream, the remaining waste volume that must be handled and disposed of will be reduced. This will reduce the required capacity and therefore the cost of any future solid waste facilities that are needed. Reducing the waste volume will also extend the life of the existing landfill and delay the need to establish a new one. The removal of household hazardous wastes from the waste stream will allow the landfill and other waste facilities to operate in an environmentally safe manner.

The feasibility of excluding recoverable materials from landfill disposal depends mostly on the willingness of the public to participate in the waste diversion programs and the County's ability to enforce participation. The quantities of recycled materials shown on page II-1 indicate that 1810 tons of material were recycled in 1997 from a total waste stream of 21,010 tons. The recycled material represents only 8.6% of the waste volume generated. The 1989 Solid Waste Plan includes data from a waste stream assessment performed at Glen's Landfill in 1988. The waste stream assessment found that over half the waste stream consisted of materials that are presently being recycled. This is a good indication that the materials are available in the waste stream and are capable of being recovered with cooperation of the public. A mandatory recycling program can assist in recovering some of those materials that are presently being landfilled.

Benefits that could result from the implementation of a recycling and composting program include:

Since a large portion of Leelanau County's economy is based on tourism, preservation of the environment will result in economic benefits. Environmental and economic benefits from recycling and composting include:

1. Energy savings by using recovered rather than virgin materials.
2. Conservation of natural resources.
3. Avoiding the need for additional land to be dedicated for landfill and other disposal sites.
4. Preservation of existing environmental conditions.

Feasibility of source separation of materials that contain potentially hazardous components at disposal areas:

The landfill would be a natural site for collecting hazardous wastes that are source separated from the waste stream. These materials could be prevented from entering the landfill and possibly disrupting its performance. By collecting hazardous wastes at the same location used for disposal of other wastes, it would be more convenient for individuals to separate rather than co-mingle these wastes. This type of system would encourage customers who haul their own wastes to disposal sites to source separate their hazardous wastes, but for customers served by haulers, the haulers will not likely be able to keep them separated.

Collection of hazardous wastes at the disposal area would create some problems. Storage and handling would be needed at the landfills. A professional person who can identify the wastes and determine how to safely store these wastes would be required.

Collection Processes:

The existing system of private haulers would be utilized for solid waste collection and transporting it to the transfer station. Curbside collection of source separated materials would be performed by private enterprise.

Transportation:

The existing system of private haulers would be utilized to transport the collected wastes to the landfill for disposal. Private enterprise would also be utilized for hauling source separated materials that are collected by curbside collection and at drop-off sites.

Disposal Areas:

With this alternative, the in-County landfill would be used for the ultimate disposal of solid wastes that are not otherwise removed from the waste stream.

Institutional Arrangements:

Since Leelanau County has a landfill and many of the surrounding counties do not, the local landfill

serves several other counties. The landfill needs to be identified in these counties Solid Waste management Plans as their primary or contingency disposal site. Agreements between counties are necessary to allow out of County waste disposal in Leelanau County. Also, Leelanau County will need agreements with other counties in which landfills or other disposal sites are located to utilize these sites on a contingency basis. Contracts with private enterprise would be needed for hauling recyclable materials and yard wastes.

Educational and Informational Programs:

The existing public education program that is funded through a portion of the costs paid to operate the recycling drop-off sites would be expanded under this alternative.

Sanitary Landfill

The existing in-County landfill would be utilized for the disposal of wastes that cannot be removed from the waste stream.

Ultimate Disposal Area Uses

When landfills are eventually closed, they must be capped with an impermeable layer to prevent precipitation from entering the buried waste and creating leachate. Closed landfill sites are not well suited to all types of future development. Buildings should not be constructed since the settlement of wastes and the creation of methane from waste decomposition are likely to occur. Land uses best suited for closed disposal sites are recreational and agricultural uses.

Capital, Operational, and Maintenance Costs:

(See "Estimated Budgets for Components of Solid Waste Management Alternatives" beginning on page B-18 for detailed estimates.)

	Annual Cost
Collection and Transportation (18,740 Tons @ $100)	$ 1,874,000
Recycling Drop-off Sites	$ 90,000
Curbside Collection	$ 72,000
Yard Waste Composting	$ 29,000
Household Hazardous Waste Collection	$ 15,000
Public Education	$ 18,000
Landfill Disposal	$ 806,000
Total Estimated Cost	$ 2,904,000
Estimated Cost per Ton (@ 19,200 TPY)	$ 150

Evaluation Summary of Non-Selected System:

This non-selected system was evaluated to determine its potential of impacting human health, economics, environmental, transportation, siting, and energy resources of the County. In addition, it was reviewed for technical feasibility, and whether it would have public support. The following is a brief summary of that evaluation along with an explanation as to why this system was not chosen to be implemented.

Technical Feasibility

This alternative includes mostly existing systems except for the curbside collection of recyclables and the composting system. The technology exists for these systems to be implemented and there are many similar systems in existence.

Economic Feasibility

This alternative will have an economic impact. Curbside collection of recyclables, the yard waste composting program, and the intensified public education and household hazardous waste programs will result in higher costs. The preferred method of developing the new and expanded programs would be through significant involvement by private enterprise.

Access to Land and Transportation Routes

The existing landfill is located on a state highway with good access. It is located near the south boundary of the County, not centrally located. The only additional land required for this alternative would be a 5-10 acre parcel for a yard waste drop-off site. A suitable site would be conveniently located with good access to the county road system.

Energy

This alternative would likely increase energy consumption in the collection process unless normal waste and source separated materials are collected with the same vehicles using separate compartments. It is more likely that the source separated materials will be collected and hauled by separate vehicles. Increasing the quantity of materials removed from the waste stream will result in additional shipping costs due to the higher volume. Some energy savings will result in manufacturing processes that can use the reclaimed materials rather than virgin materials.

Environmental

This system would have a noticeable effect on the environment. The volume of waste

disposed of will decrease, thus slowing the rate at which landfill expansion will be necessary. The reclaimed materials will help conserve resources in manufacturing processes by decreasing the demand for virgin materials. Since the landfill is already in place, the only new site that will be dedicated to solid waste management will be the yard waste drop-off site.

Public Acceptability

Public acceptability to lower volumes of waste being disposed of at the landfill would be very favorable. A considerable amount of public opposition to mandatory source separation could be expected.

Public Health

This alternative could have a slight impact on public health with a smaller quantity of waste being disposed of at the landfill.

Siting

The only new facility to be sited under this alternative would be the yard waste drop-off site. It should not be too difficult to find a suitable site that would be acceptable to the public.

Advantages and Disadvantages of Non-Selected System:

Advantages:

1. This alternative utilizes all of the existing components of the solid waste management system.
2. The alternative would increase the amount of waste being diverted from the landfill by intensifying the recycling, composting, and household hazardous waste programs.
3. This alternative provides increased opportunities for recycling, composting, and household hazardous waste collection that can be further expanded in the future.
4. Another opportunity for private enterprise to become involved with solid waste will occur with the addition of curbside collection of recyclables, a yard waste drop-off site, and an expanded hazardous waste collection program.
5. Recycling opportunities would be available to all County residents. More convenient opportunities would be available to residents living where curbside collection is available.
6. Composting opportunities for yard waste would become available.

Disadvantages:

1. Costs will increase due to the expanded recycling, composting, and hazardous waste programs.
2. Many residents will be opposed to mandatory recycling.
3. Recycling opportunities would be available but not necessarily convenient to all County residents.

ESTIMATED BUDGETS FOR COMPONENTS OF SOLID WASTE MANAGEMENT ALTERNATIVES

LANDFILL DISPOSAL

Assume all landfill disposal will occur at the existing site (Glen's Landfill) and that the existing tipping fee of $14 per cubic yard will remain constant for the near future.

The tipping fee on a per ton basis, assuming 3 cubic yards per ton, is $42 per ton.

Use $42 per ton for landfill disposal cost for the present volume of 19,200 tons per year requiring landfill disposal. This results in a total annual cost of $806,000 in landfill disposal fees for Leelanau County.

If future recycling efforts significantly reduce the waste volume received at the landfill, tipping fees will likely increase. For this report, it will be assumed that the tipping fees will be increased to the amount needed to gross $806,000 for the volume of waste landfilled from Leelanau County.

COLLECTION AND TRANSPORTATION

Collection and transportation includes the cost for private haulers to provide curbside collection of wastes and transport them to a disposal site. Cost estimates are based on utilizing existing system of private haulers.

National average operating costs for waste haulers:

30%	Disposal Costs
70%	Collection and Transportation

Using this cost breakdown, collection and transportation costs can be estimated as follows:

Present disposal cost (30% of total)	$ 42/Ton
Total cost for collection, transportation, and disposal (100%)	$140/Ton
Estimated collection and transportation cost (70% of total)	$ 98/Ton
Estimated collection and transportation cost (Rounded)	$100/Ton

The estimated collection and transportation costs can be verified using the present monthly rates charged by haulers for residential collection.

Present residential fee (from Cedar Disposal) (includes collection, transportation, and disposal)	$ 16/month
Annual Leelanau Co. residential waste volume (from page II-1)	8700 Tons
Approximate 1997 County population	19,000

Estimated residential per capita waste generation rate	0.46 Tons/capita/year 2.5 lb/capita/day
Estimated number of persons per household	3
Estimated residential per household waste generation rate	7.5 lb/household/day 225lb/household/month
Estimated cost per pound at $16/ month	$0.07/lb
Estimated cost per ton (collection, transportation and disposal)	$140/Ton
Less disposal cost	$ 42/Ton
Estimated collection and transportation cost	$ 98/Ton
Estimated collection and transportation cost (Rounded)	$100/Ton

This verifies the initial collection and transportation cost estimate of $100 per ton. Use this figure for waste collection estimates.

If haulers providing curbside pickup have access to a transfer station centrally located within the County, the transportation costs will decrease slightly. For this report, collection and transportation costs will be estimated to be 90% of the present cost or $90 per ton.

RECYCLING

Drop-off Sites

Leelanau County presently operates seven recycling drop-off sites. Two additional sites are operated by private enterprise. The cost for the County to operate the seven sites is approximately $10,000 per month which includes staffing, transportation, and processing of materials. For Alternatives No. 1 and 2, it will be assumed that these costs will remain roughly the same which results in an annual cost of $120,000. The costs for the two privately operated sites are already included in disposal fees.

For Alternative No. 3, the entire recycling system will be intensified. With the addition of curbside collection of recyclables in the more heavily populated areas, the volumes received at the drop-off sites would be expected to decrease. This decrease would be partially offset by an increase in participation by individuals that are not served by curbside collection due to mandatory recycling requirements. For estimating purposes, it is assumed that the drop-off site operational costs will be approximately 75% of the existing cost, or $90,000 per year, for Alternative No. 3.

Curbside Collection

The proposed curbside collection program will be available to approximately 25% of the County's population or about 2000 homes. It is estimated that the curbside collection system will program will increase the quantities of materials recycled as listed on page II-1 by 25%.

Materials	1997 Annual Quantity Quantity (Tons)	Estimated Future Quantity with Curbside Collection
Aluminum and Tin	50	65
Glass	140	175
Paper Products	480	600
Plastics	20	25
Commercial Cardboard	500	625
Construction and Demolition	370	465
Metal	190	240
Textiles	60	75
Total Recycled	1810	2270
Additional Recycled Quantity	460 Tons	
Remaining Waste Needing Disposal	18,740 Tons	

Curbside Collection Cost:

Based on 2000 homes in the more densely populated portions of Leelanau County, the estimated cost to provide curbside collection of source separated recyclables would be approximately $3 per household per month. This cost would include collection and transportation to a processing facility. The private enterprise performing the collection would handle the transportation to markets and receive the commodity value for the materials.

No. of Households served by Curbside Collection	2000
Monthly Cost per Household	$ 3
Annual Cost per Household	$ 36
Total Annual Cost	$72,000

YARD WASTE COMPOSTING

Yard waste composting estimates are based on the following system:

Drop-off site centrally located in Leelanau County.
Site operated by private enterprise contracting with County.
Collected materials hauled from site for processing by private contractor.

Form 1989 Solid Waste Plan, yard waste represents 2.2% of total County waste stream. It is estimated that approximately 25% of the available yard waste could be collected.

Estimated total Leelanau Co. solid waste stream, 1997	19,200 Tons
Estimated yard waste from Leelanau Co. 1997 (2.2% of total)	400 Tons
Estimated annual quantity of yard waste to be collected at drop-off site (25% of total)	100 Tons 300 cu yd

Estimated Capital Costs

Plant		
Land, 5 acres at $3000		$ 15,000
Site Development		$ 30,000
Engineering, Legal, Administrative, and Contingencies (25%)		$ 10,000
Total Capital Cost for Plant		$ 55,000
Annual Debt Retirement (20 yrs @ 8%)		$ 6,000
Equipment		
Loader	$ 100,000	
Miscellaneous Equipment	$ 20,000	
Total Equipment Cost	$ 120,000	
Annual Debt Retirement (8 yrs @ 8%)	$ 20,000	

Estimated Operational Costs

Equipment	$ 500
Hauling fees, 300 cu yd/ year @ $7.00	$ 2100
Administration	$ 400
Total Estimated Annual Operational Cost	$ 3000

Yard Waste Composting Cost Summary

Initial Capital Costs

Plant	$ 55,000
Equipment	$ 120,000
Total	$ 175,000
Annual Debt Retirement	
Plant	$ 6,000
Equipment	$ 20,000
Total	$ 26,000
Annual Operational Cost	$ 3,000
Total Annual Cost	$ 29,000
Cost/Ton of composted yard waste (@100 TPY)	$ 290
Cost/Ton of total waste stream (@ 50 TPD)	$ 1.50

HOUSEHOLD HAZARDOUS WASTE COLLECTION

The current household hazardous waste collection system costs approximately $50 per drop-off with approximately 100-150 participants annually.

For Alternatives No. 1 and 2, the estimated household hazardous waste collection costs will be based on an aggressive version of the present system as follows:

150 drop-offs @ $50 =	$7500/ year
Rounded up	$8000/year

For Alternative No. 3, a more intensive collection system is anticipated. The estimated annual budget will be $15,000 which will allow approximately 300 participants.

PUBLIC EDUCATION PROGRAM

The present public education program is funded through the costs of the County's seven recycling drop-off sites. Out of the County's fees for these sites, $700 per month is dedicated for public education for a total of $8400 per year. For Alternatives No. 1 and 2, the present system will be utilized where the public education costs are already included in the recycling system cost.
For Alternative No. 3, a much more intensive public education program will be needed. The program would probably also include some enforcement of the mandatory recycling participation. This would likely more than double the present cost. For Alternative No. 3, it will be assumed that an additional $10,000 annual cost will be needed for the public education program.

TRANSFER STATION

Assume site is centrally located in Leelanau County on all weather road.

The facility will serve Leelanau County only, approximately 50 TPD capacity. Capacity for entire county waste stream.

Estimated Capital Costs

Plant	
Land, Building, Sitework	
(Includes scales, crane, etc.)	$500,000
Engineering, Legal, Administrative,	
and Contingencies (25%)	$125,000
Total Capital Cost for Plant	$625,000
Annual Debt Retirement (20 yrs @ 8%)	$ 65,000
Rolling Stock	
1 Loader @ 100,000	$ 100,000
1 Tractor @ 95,000	$ 95,000
2 Trailers @ 75,000	$ 150,000
Total Rolling Stock	$ 345,000
Annual Debt Retirement (8 yrs @ 8%)	$ 60,000

Estimated Operation & Maintenance Costs

Wages & Benefits	
4 people @ $30,000	$ 120,000
Landfill Tipping Fees	
50 TPD @ $14/cu.yd..	$ 770,000
Miscellaneous Expenses	
Fuel, Insurance, Repairs, Engineering, etc.	
Short Haul (to in-County Landfill)	$ 80,000
Long Haul (to out of County site)	$ 110,000
Administration & Management	$ 10,000
Total Operation & Maintenance Cost, Short Haul	$ 980,000
Total Operation & Maintenance Cost, Long Haul	$1,010,000

Transfer Station Cost Summary

Initial Capital Costs	Short Haul Distance	Long Haul Distance
Plant	$ 625,000	$ 625,000
Equipment	$ 345,000	$ 345,000
Total	$ 970,000	$ 970,000
Annual Debt Retirement		
Plant	$ 65,000	$ 65,000
Equipment	$ 60,000	$ 60,000
Total	$ 125,000	$ 125,000
Annual O & M Cost	$ 980,000	$1,010,000
Total Annual Cost	$1,105,000	$1,135,000
Cost/Ton (@ 19,200 TPY)	$ 58	$ 59

Present collection and transportation cost (cost to haul to landfill with collection vehicles) is approximately $100/ton. With a conveniently located transfer station, it is estimated that collection and transportation costs will be approximately 90% of the present cost or $90/ton.

Estimated Collection & Transportation Cost	$ 90/T
Estimated Transfer Station Cost	$ 59/T
Total Estimated Cost using Transfer Station	$ 149/T