SOURCE REDUCTION AND RECYCLING ELEMENT

CITY OF MOUNTAIN VIEW

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INTRODUCTION

The Integrated Waste Management Act of 1989 (AB 939) mandated that each City and County in the State of California develop a Source Reduction and Recycling Element (SRRE) for inclusion in the County Integrated Waste Management Plan. This SRRE was prepared for the City of Mountain View in accordance with California Integrated Waste Management Board (CIWMB) regulations by a team of consultants including 3E Engineering and Gainer & Associates. The SRRE has been adopted by Mountain View and is written in a "the City will ... " format, rather than as a set of recommendations from the consultant team.

The Integrated Waste Management Act is a comprehensive law which will cause many changes to California's solid waste management system. AB 939 creates a waste management hierarchy in which landfilling is the least desirable form of solid waste management. The best form of solid waste management is source reduction (including reuse), followed by recycling and composting, and then transformation (combustion) and landfilling. This hierarchy reflects a desire to minimize the one time use of natural resources in our economic system.

The law requires that each local jurisdiction in the State must divert from disposal 25% of its waste stream by January 1, 1995 (short term) and 50% by January 1, 2000 (medium term) or risk fines of up to $10,000 per day. The CIWMB may grant extensions of up to one year for meeting the diversion objective if adverse market conditions beyond the control of the jurisdiction can be demonstrated.

WASTE CHARACTERIZATION

The CIWMB defines waste generation as the sum of waste disposed and waste diverted. Disposal includes landfilling and transformation (combustion) in CIWMB permitted facilities. After 1995, transformation can count as diversion under certain circumstances. Diversion includes source reduction, recycling, and composting. The current distribution of Mountain View wastes into these groups is presented in Figure ES-1. The diversion rate equals the total diversion divided by the total generation.

The City of Mountain View disposed of approximately 89,200 tons of solid waste in calendar year 1990. Waste disposed of by the franchisee at the Newby Island Landfill in San Jose is composed of approximately 32,100 tons from the residential sector, 26,300 tons from the commercial sector (non-residential wastes collected in front-loaders), and 21,600 tons from the industrial sector (wastes collected in debris boxes). 9,200 tons were self-hauled to the Vista Site landfill in Mountain View. About 200 tons of waste were disposed of at other landfills or transformation facilities. Distribution of disposed waste into the four waste sectors is presented in Figure ES-2.

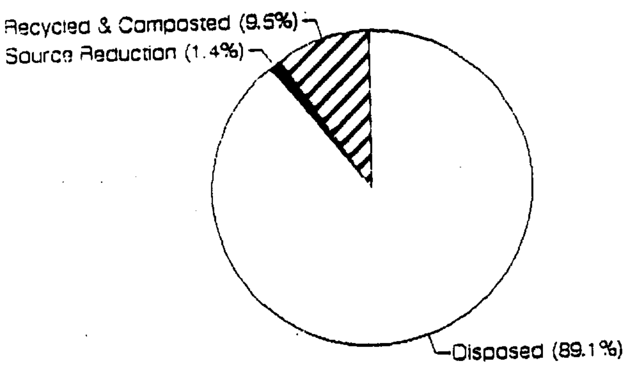

FIGURE ES-1 Distribution of Generated Waste

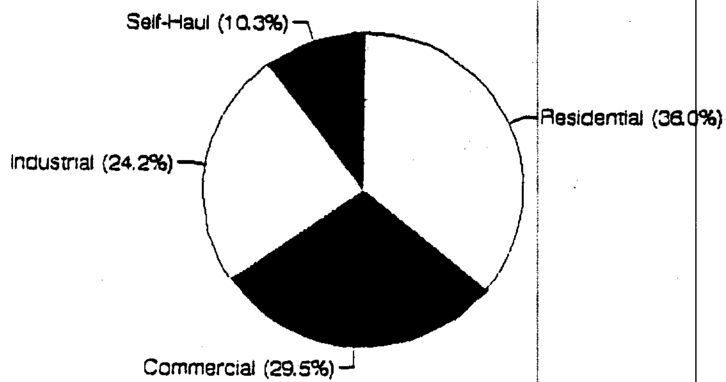

FIGURE ES-2 Distribution of Disposed Waste by Sector

The CIWMB has defined 36 waste types divided into eight categories. The disposed quantities in each of the eight categories are presented in Figure ES-3.

Existing diversion (sometimes referred to as the baseline diversion percentage) is equal to about 10.9% of the entire solid waste stream. This diversion occurs through a number of channels, including programs required or sponsored by the City, the State, a charity or other non-profit group, or the garbage franchisee. Some diversion occurs through the free market (for example, cardboard from large grocery stores) and by individual decisions (for example, the choice to use cloth diapers rather than disposable diapers). The amount of waste currently diverted is presented in Figure ES-4.

Details on diversion programs are provided in later sections of this summary devoted to source reduction, recycling, and composting.

The State mandated diversion rates of 25% in 1995 and 50% in 2000 will be based on the refuse generation rates in 1995 and 2000. Continued monitoring of refuse disposed and diverted is needed to meet the requirement for annual documentation of progress toward these goals.

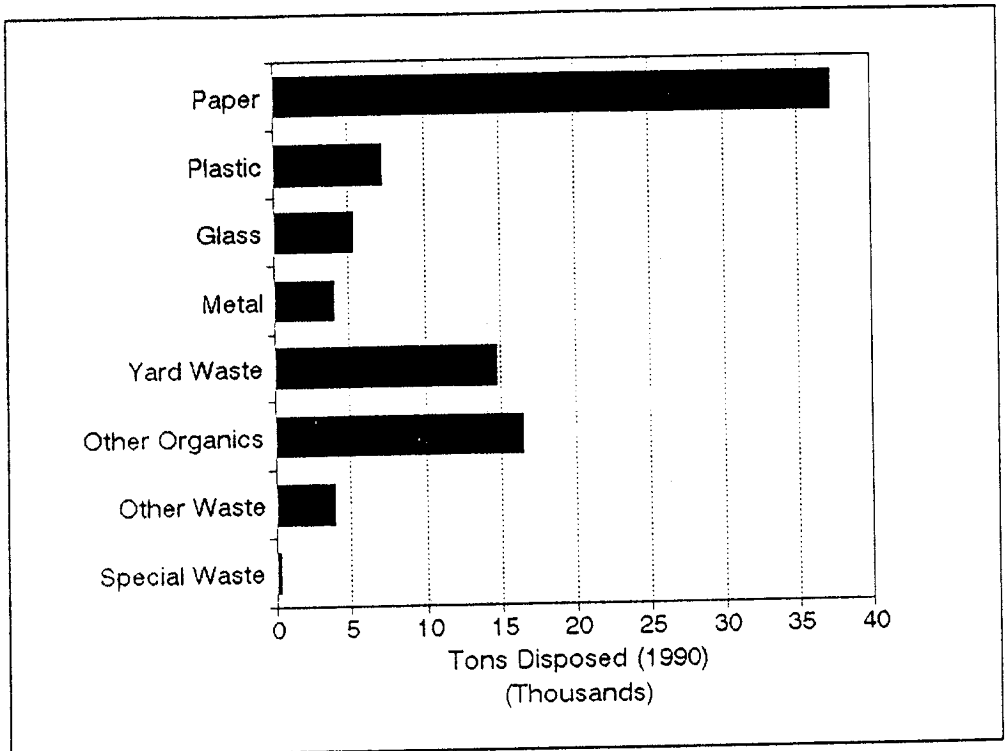

FIGURE ES-3 Quantities of Disposed Waste by Waste Category

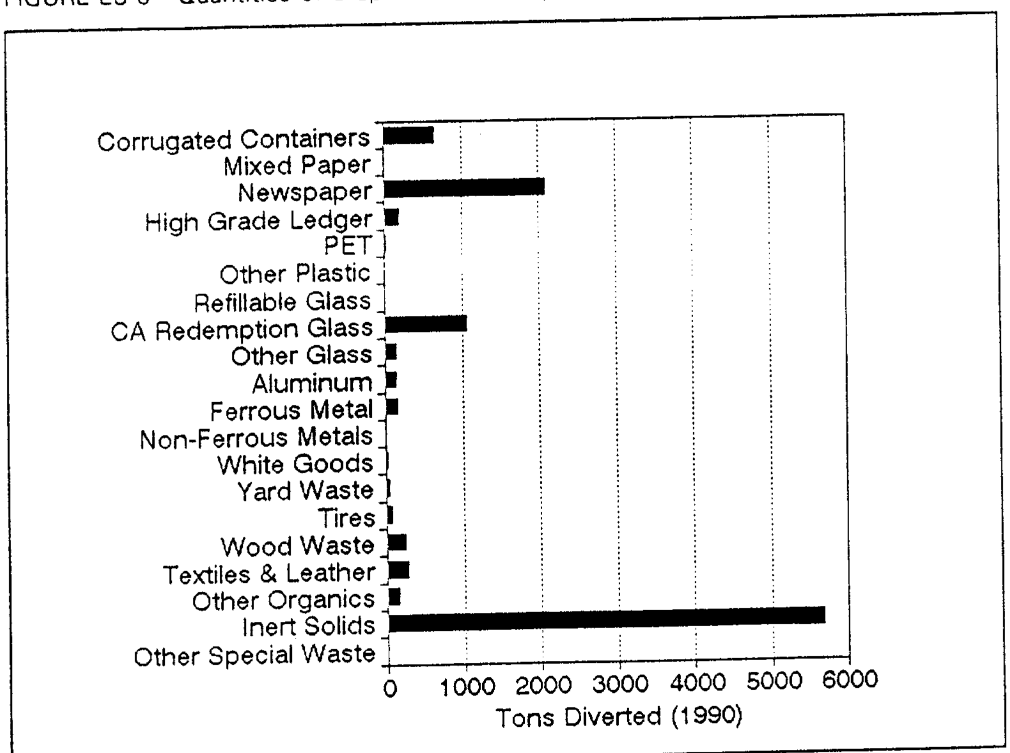

FIGURE ES-4 Quantities of Diverted Waste by Waste Type

SOURCE REDUCTION

Source reduction prevents production of solid waste. It includes activities that reduce the amount of a product in use and activities that prolong the useful life of a product. For example, paper and plastic grocery bags can be source reduced either by not using them or by reusing them. Source reduction also includes back yard composting and producing more durable products.

Source reduction currently accounts for 1.4% diversion of the waste stream. The SRRE estimates that .6% additional diversion will occur through source reduction prior to January 1, 1995, and another 2.2% additional will occur between January 1, 1995 and January 1, 2001. Total diversion through source reduction is therefore estimated to be 4.2% in the year 2000.

Existing source reduction activities in Mountain View include:

- Diaper services to avoid disposable diapers
- Tire reuse and retreading
- Grocery Bag reuse at the Mountain View Senior Center
- Double-sided copying
- Clothing donated and resold
- Reuse of asphalt and concrete by City Crews

Because of its large and growing commercial sector, most source reduction programs selected for Mountain View target the city's large number of businesses. Residential yard waste will also be targeted. The selected programs are listed below.

- Waste surveys at commercial and industrial sites (1992)
- In-house source reduction in City offices (1992)
- Technical assistance to businesses (1992)
- Quantity based user fees (1992 -- mild, 1995 -- steep)
- School curriculum and student projects (1992)
- Awards for commercial and industrial generators (1993)
- Drought-resistant landscape guidelines (1992)

- On-site yard waste management (1994)
- Participation in regional waste exchange (1995)

Source reduction is often the least expensive form of diversion, but it is personnel intensive and its effects are only seen over time. However, proving that source reduction actually has occurred, and quantifying it, is often difficult or expensive. For this reason, the selected source reduction activities are projected to divert only approximately 4% of the waste stream from disposal. Significantly greater diversion by source reduction may actually occur as a result of the implementation of the SRRE over ten years, and may be counted for compliance if it can be proven to have occurred.

RECYCLING

Recycling refers to the use of "waste" materials as raw material in the production of new items. Waste used in this way is often referred to as a "secondary material," or a "secondary feedstock."

Recycling currently amounts to about 9.2% of the waste stream. The SRRE estimates that 8.5% additional diversion will occur through recycling prior to January 1, 1995, and another 10.7% will occur between January 1, 1995 and January 1, 2000. Total diversion through recycling is therefore estimated to be 28.4% in the year 2000.

Existing recycling activities in Mountain View include:

- Single and multi-family recycling collection
- Buy-back and drop-off recycling centers
- Office paper recycling collection
- Commercial recycling programs
- Phone book drop-off
- Salvaging of white goods, scrap metal, and tires at the landfill
- Household hazardous waste drop-off days

Diversion programs selected for the short term planning period are structured to focus on materials for which markets and end uses are expected to be stable, or for which markets and end uses are local. Initially, a glut of secondary materials is expected due to the implementation of programs throughout California. In order to avoid rejection of collected materials in a buyer's market due to minor contamination, the recommendations focus on collection of source separated or minimally commingled materials for the short-term planning period. Collection of extensively commingled recyclables with capital intensive centralized processing is deferred until the medium-term planning period, when market stimulation programs should dissipate the buyer's market.

Recycling activities selected for the residential sector include:

- Addition of HDPE beverage containers to the residential sector program, if processing capability and markets can be found (when feasible).
- Expansion of number of multi-family units serviced in the curbside collection program (1992).
- Quantity based user fees (1992 & 1995).
- Expansion of materials collected in the medium term (1996).

Materials collected at the curbside will continue to be hauled to the City of Sunnyvale Recycling Yard, or directly to a broker. As more materials are added in the medium term, the City will need to shift to a larger and modernized processing facility.

Programs selected for the commercial/industrial sector include:

- Expanded collection of source separated materials from large generators of easily separated waste, requiring little or no processing in the short term (1993 & 1996).
- Expanded collection of commingled recyclables from smaller generators, and processing at centralized facilities which currently exist or are constructed by the private sector at no cost to the City (1993 & 1996).
- Raise refuse rates as an incentive for businesses to recycle (1993 & 1996).

Policies for the City of Mountain View include:

- Modify City regulations to stress recyclability, including high visibility for recycling containers and a recycling space allocation ordinance.

- Modify policies to expand recycling opportunities in the private sector, including participation in market development programs.

A high level of participation is necessary in order to achieve the 50% diversion objective. If high participation does not occur voluntarily, mandatory participation is a contingency measure.

COMPOSTING

Composting is defined by the CIWMB as the controlled biological decomposition of wastes. The CIWMB considers mulching (the spreading of undecomposed material on soil) to be recycling. Since feedstocks, processes, and markets for mulch are similar to those for compost, both processes are discussed in the Composting Component of Mountain View's SRRE. The feedstocks include yard waste, wood waste, and food waste. The first two materials can also be used as boiler fuel. Although conbustion (transformation) <u>may</u> count up to 10% of the 50% diversion goal in the medium-term planning period, this option has not been selected due to the uncertainty of the acceptance of this option as diversion and because state-mandated diversion goals may be achieved in the City of Mountain View without consideration of this option.

Composting currently accounts for 0.3% diversion of the waste stream in the form of wood waste and Christmas tree mulch. The SRRE estimates that an additional 8.0% diversion will occur through composting and mulching prior to January 1, 1995, and another 9.3% will occur between January 1, 1995 and January 1, 2001. Total diversion through composting is therefore estimated to be 17.6% in the year 2000.

New composting programs include yard waste, wood waste, and food waste collection, processing, and marketing. These wastes compose an estimated 27% of the Mountain View waste stream (15% yard waste, 7% wood waste, 5% food waste).

The collection of yard waste on a separate curbside collection route can be expensive. A relatively inexpensive way of collecting yard waste is in special bags which would be collected concurrently with mixed refuse. A pilot program to evaluate this relatively new technology is included in the SRRE. In the event that the bag system does not perform well, separate collection of yard waste will be necessary.

In the early phases of the composting program, only brushy yard waste and wood waste will be chipped, screened, and marketed as a mulch. The advantage of the mulching operation in the short term is that it has lower cost, is easier to permit, and produces a product which can be used for the extensive landscaping needs in Shoreline at Mountain View, or other City parks.

A drop-off facility at the Mountain View public dump will be developed first. Seasonal (twice per year) collection of residential brush may be implemented in 1992 to maximize use of the drop-off investment. These materials will be mulched and used for landscaping in Shoreline at Mountain View. In 1995, green yard waste will be added to the program and composted. In 1998 a food waste collection and processing system will be implemented.

SPECIAL WASTES

Special wastes are nonhazardous wastes requiring special collection or disposal procedures. They include sewage sludge, ash, asbestos, auto shredder residue, tires, white goods, dead animals, and other special waste. The primary purpose of the special waste component is to ensure that special wastes are handled in an environmentally sound way. Usually, their diversion from disposal is of secondary importance.

Sewage from Mountain View is currently treated at the Palo Alto Regional Water Pollution Control Plant (PARWPCP) in Palo Alto. The sludge generated at PARWPCP is incinerated on-site. The facility is not permitted by the CIWMB, and therefore is not included in the determination of generated waste. The only source of ash in Mountain View is from the sewage incinerator, and that ash is used by a copper smelter in Arizona.

Asbestos will continue to be disposed safely at permitted facilities. Programs aimed at reducing the production of tire wastes will be addressed through education. Tires will be prohibited from disposal at the Mountain View Landfill (they are currently recycled, but disposal is not prohibited).

White goods will continue to be separated at the landfill for eventual recycling. Dead animals will continue to be landfilled or recycled (rendered). A small public information effort will supplement the existing spaying and neutering program.

Other special waste includes litter, mattresses, street sweepings, water treatment sludge, and flood control channel dredge spoils. Diversion of street sweepings, water treatment sludge, and flood control channel spoils may not be practical at this time, due to the chemical content of street sweepings, the alum content of water treatment sludge, and the water content of flood channel spoils. The divertability of these wastes will be periodically reviewed. A mattress recovery program will be implemented. The diversion accomplished from the special waste programs is relatively minor on a percentage basis.

EDUCATION AND PUBLIC INFORMATION (EPI)

Most programs selected for implementation include an EPI component. Residents and businesses will need to be informed of curbside collection practices, rate increases, back yard composting practices, new ordinances, the availability of compost and mulch, and the importance of their participation in all programs. Businesses and institutions will be provided with instructions on how to reduce or recycle their wastes.

Educational media will include printed brochures and doorhangers, video tapes, a resource conservation directory, and personal contact through compost demonstration, neighborhood block leaders, information booths at public events, and school curricula. Mountain View will also utilize news media, especially continued use of The View, to publicize events and programs and to promote an awareness of solid waste issues.

FACILITY CAPACITY

The waste hauled by Mountain View's franchisee (Foothill Disposal Company) is disposed at the Newby Island Landfill in San Jose. A 35-year contract has recently been signed for the use of the Kirby Canyon Landfill. Self-hauled waste is disposed at the Vista Site at the Mountain View Landfill. Mountain View has reserved the right to dispose all of its franchised waste at Newby Island until November 1, 1993. The Vista Site is scheduled to close in October of 1991, but physical capacity exists until late 1992. Application has been made for regulatory approval for extending the closure schedule.

By implementing the plans in the SRRE, Mountain View will have avoided disposing 489,078 tons of waste by 2005, which amounts to approximately 5.3 years of capacity at current disposal rates. It is assumed that the waste generation rate rises until 2005 at a rate commensurate with the projected rate of growth for population and jobs in Mountain View.

The need for diversion equipment and processing facilities will increase over time as the diversion percentage increases. The SRRE addresses these needs by phasing in facilities over time. Design of diversion facilities must be planned to maintain flexibility. An effort to participate in regional processing facilities is being made. Participation in regional facilities should reduce the cost of services to the City of Mountain View. The plan allows the City to make use of one or more processing facilities, as needed, without committing the City to a specific facility.

This approach to facility construction avoids the financial risk of investment in large processing facilities in the short term and maximizes the opportunity for market development based on high quality source separated or semi-source separated materials. It emphasizes collection facilities rather than processing facilities in the short term (prior to January 1, 1995).

FUNDING

The estimated annual gross cost of all selected programs is \$1.5 million to 1995 and \$5.0 million through 2000. Annual expenditures for current solid waste and recyclables collection, disposal, and administration amount to approximately \$5.8 million.

Almost all of the new costs are for recycling and composting programs (see Figure ES-5).

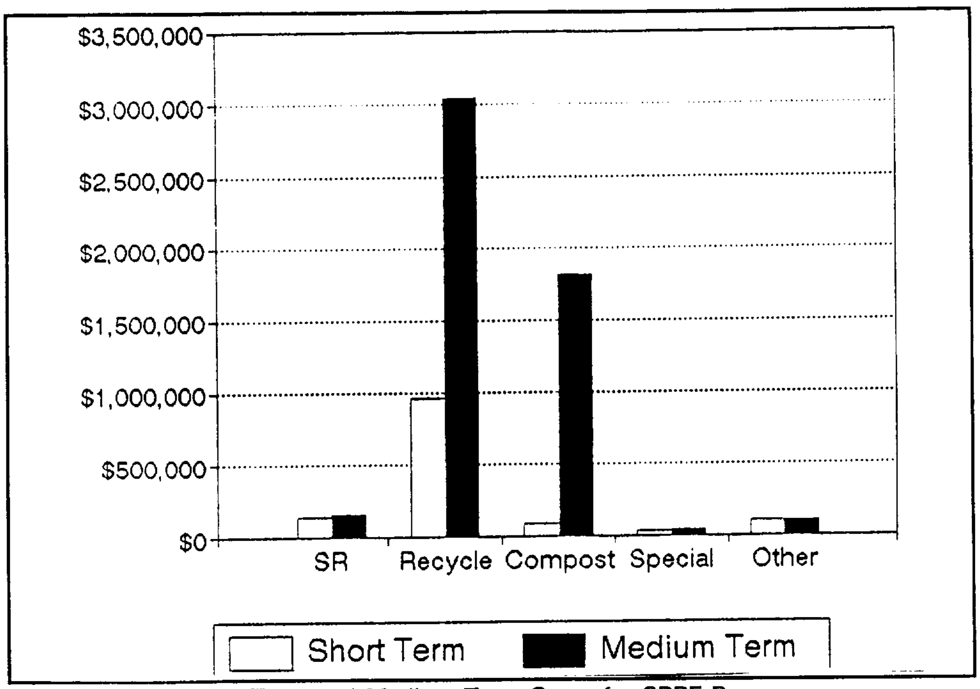

FIGURE ES-5 Short Term and Medium Term Costs for SRRE Programs

Program costs shown are on a gross basis. That is, resale revenues have not been subtracted from gross program costs. Resale revenues for recycling programs have in the past offset a significant portion of the cost of the program. Budgeting new programs based on past resale value, however, is risky due to an expected drop in resale value and the inclusion of lower value materials in new programs in order to achieve high diversion percentages. Education and public information costs for each program have been included in the cost estimates. The cost estimates also include a 20% contingency. The cost estimates do not include avoided landfill costs or avoided collection costs. These are difficult to quantify at present, but are very real cost savings which can be recaptured during program implementation.

The actual cost of program implementation over time could be much less than is estimated (potentially, as little as 60% of the budgeted costs). Large cost savings can be achieved during program implementation if sufficient staffing administrative commitments are made to effectively manage these programs, and if market development activities succeed.

Cost estimates and budgets based on worst case assumptions are an educational tool which, if explained to the public, are likely to create high levels of participation in diversion program and cost-saving innovations in the private sector.

Expansion of programs is especially expensive. The aggressive implementation of earlier diversion programs may decrease or eliminate the need for later expansion of diversion programs.

Recycling and composting collection, processing, and marketing will be funded by user fees. Increased fees will be paid more heavily by those who produce more garbage or refuse (quantity based user fees).

Resale revenues may be primarily retained by the City rather than the service provider. If resale revenues are retained in a separate fund, they could be used as contingency funds as needed, or to decrease the size of any later fee increases if no contingencies arise. The fund could also be used for the following purposes:

- An incentive payment to the service provider could be made for performance better than some contractually defined standard.
- Non-profit recycling groups could be funded for services not yet provided by the main service providers.
- Seed money could be provided to local businesses which will make use of secondary materials and create jobs.
- Donations could be made to a regional non-profit organization which provides educational services throughout Santa Clara County.

INTEGRATION

Program integration can occur in four ways:

CHAPTER I

LIST OF TABLES
(Following Text)

CHAPTER I
SOLID WASTE CHARACTERIZATION COMPONENT

This waste characterization component is based on a group of previous studies, supplemented by 3E Engineering as needed in order to comply with AB 939 regulations. The use of pre-existing information was chosen due to the large jurisdiction specific database available for the City of Mountain View. Pre-existing studies for wastes generated in the City of Mountain View were reviewed for consistency with the most recent waste characterization information. All previous studies conducted in Mountain View are consistent with one another within the confidence limits that are applicable to each study.

All 36 waste types have been quantified in the residential and commercial sectors. All 36 waste types have not been quantified in the industrial and self-haul sectors. Materials targeted for diversion in the industrial and self-haul sectors is quantified, however. Waste stream characterization of targeted materials only in the initial waste generation study is in accordance with modifications to AB 939 by AB 1820, and reflected in the additional guidelines for initial waste generation studies (Section 18722(i)(2)(c), Article 3, Chapter 9, Title 14 of the California Code of Regulations).

Quantities and mass fractions reported in this text or tables supersede those reported in appendices. The data in appendices is incomplete at times, and has been supplemented or amended.

A. SOLID WASTE GENERATION STUDY RESULTS

The CIWMB defines generation as disposal plus diversion. Disposal includes landfill disposal and transformation (combustion).

Total waste generation in Mountain View is estimated to be about 100,108 tons in 1990. Total diversion from Mountain View was estimated to be 10,899 tons in 1990. The system of reporting procedures used to quantify these wastes is summarized in Table I-8.

Based on this analysis, the current diversion rate is approximately eleven percent (10.9%). The disposed portion of the waste stream is rich in divertable materials, especially compostable materials such as yard, wood, and food wastes, and recyclable materials such as high grade office paper, corrugated cardboard, and mixed waste paper. Achieving the mandated diversion objectives of 25% and 50% is technically feasible, and is likely to be achievable at reasonable cost.

B. SOLID WASTE DISPOSAL CHARACTERIZATION

B.1. DISPOSED WASTE COMPOSITION AND QUANTITY

Mountain View's franchised refuse (residential, commercial, and industrial) is hauled by Foothill Disposal Company and disposed of at Newby Island Landfill in San Jose. Other waste (self-haul) is disposed of at the Vista Site at the Mountain View Landfill.

Tonnages disposed of are quantified from landfill operator records. All wastes are weighed at the two landfills which service the City of Mountain View. Breakdown of disposed waste quantities into sectors and into seasons is based on the franchised hauler's records.

In 1990, residential refuse disposed in Mountain View was 32,108 tons; commercial was 26,292 tons; industrial was 21,600 tons; self-haul was 9,000 tons. Estimated tonnage disposed of other than the Mountain View landfill and the Newby Island landfill was 210.7 tons in 1990. This includes estimated transformation of 76.5 tons of tires in the Oxford Energy tire combustion plant near Modesto, litter collected by CALTRANS and disposed at Zanker Road Landfill, and asbestos disposed at permitted landfills.

Total Mountain View disposal tonnage is estimated to be 89210.7 in 1990. Disposal data is presented in Table I-1.

Composition breakdown for wastes disposed in the four sectors is based on a variety of methodologies. Mass fractions and tonnages disposed for each waste type within each sector are presented in Table I-5.

Residential waste composition figures are a result of the application of comparable jurisdiction data. The residential sector waste stream composition is deemed comparable to that in the neighboring City of Sunnyvale. Composition data in Sunnyvale is available from a quantitative field analysis performed in 1990 during preparation of the Sunnyvale SRRE. Residentially, Sunnyvale and Mountain View are deemed similar on the basis of their average household income ($43,900 in Mountain View; $49,600 in Sunnyvale) and their average household size (2.13 in Mountain View; 2.36 in Sunnyvale). These demographic data are those reported for 1990 in "ABAG Projections '90, Forecasts for the San Francisco Bay Area to the year 2005".

Composition of industrial sector and other (self-haul) sector wastes was based on field analysis performed by Cal Recovery Systems in May 1989 (see appendix 2). The industrial sector wastes were sorted and weighed by waste type. The self-haul waste composition was estimated by visual inspection.

B.2. SPECIAL WASTES DISPOSED

Quantities of special waste were estimated by 3E Engineering. Quantification methodology and special wastes issues are discussed in Chapter V of this report.

Special wastes generated in Mountain View are generally included in tonnages disposed of by the franchisee unless special circumstances exist. Most CIWMB listed types of special wastes are either included in the self-haul or industrial tonnages, or hauled to Class I (hazardous waste) landfills. In the latter case, they are not within the scope of this document.

Special circumstances exist for some types of special wastes. For example, Newby Island landfill does not accept asbestos and auto shredder fluff for disposal. In addition, some tires generated in Mountain View are transformed at the Modesto Tire incineration facility. Quantities of these materials are therefore additive to the disposal tonnages reported from the Newby Island and City of Mountain View landfills.

Please note that sewage sludge is incinerated at the Palo Alto Regional Water Pollution Control Plant. Since the incinerator is not a CIWMB permitted transformation facility, Mountain View sewage sludge is not part of the waste stream as defined by the CIWMB.

Special waste tonnages listed in Table I-1 are for those wastes not disposed of at the City of Mountain View landfill or the Newby Island landfill. These wastes are disposed of at various other, currently unknown, landfills. These other landfills may change from time to time, since the self-hauler can dispose of the material at the permitted facility of their choice. In most instances, records indicating the disposal site are not available.

C. SOLID WASTE DIVERSION CHARACTERIZATION

C.1. DIVERTED WASTE COMPOSITION AND QUANTITY

Diversion includes source reduction, recycling, and composting of solid waste. A quantification of diverted waste by sector and waste type in Mountain View was performed by Emcon Associates (see Appendix 3) under contract to the County of Santa Clara. Supplementary information has been developed by 3E Engineering. Total current source reduction and recycling quantities by generation sector are presented in Tables I-2 and I-3, respectively.

No existing composting, or diversion of special wastes, has been identified.

Total diversion in Mountain View in 1990 was estimated to be 10,926 tons.

Existing programs are discussed in more detail in the existing conditions section of the source reduction and recycling components. In summary, however, the following significant diversion programs are currently in effect.:

- Reuse of concrete and asphalt by City crews
- Reuse of clothing
- Reuse of cotton diapers
- Curbside recycling
- Multi-Family Recycling
- Buy-back centers pursuant to AB 2020
- Newspaper drop-off boxes
- Foothill Disposal drop-off center
- Collection of high-grade paper in the commercial sector
- Collection of cardboard in the commercial sector
- Salvage at the Mountain View landfill
- Christmas tree collection

Many existing source reduction activities have not been accounted for in this diversion estimate. Most are not quantifiable, or have not been presented in this document because we believe that they are not in accordance with the legislative intent of AB 939. Examples include: 1) the repair of motor vehicles, buildings, roads, etc; 2) birth control and economic recession; 3) the use of plastics to reduce the weight of containers and durable goods; 4) the use of libraries, telephones, televisions, and radios to reduce the use of printed material; 5) the coating of metal, wood, and other materials to inhibit corrosion and decay; and, 6) the on-site uncontrolled decay of vegetation.

C.2. POTENTIAL DIVERSION

Diversion of waste from landfills can be accomplished through source reduction, recycling, composting, and transformation (after 1995). Virtually all waste types can be diverted through source reduction activities.

Most materials can be composted, although quality issues concerning MSW compost exist. A lesser number of materials can be recycled at present, but that is expected to change over the 15 year planning period. Consequently, there are no waste types that cannot be diverted from disposal. A possible exception in the short term is asbestos, but its generation is expected to decrease in the long term due to prohibitions on its use.

The diversion activities considered to be most appropriate for Mountain View are discussed in Chapters II, III, and IV of this report. A summary review of the divertability of each waste type has been provided per CIWMB regulations (see Table I-9).

D. WASTE GENERATION PROJECTIONS

The CIWMB requires that waste generation be projected for 15 years following the year for which the initial waste generation study is compiled. The projection must be by waste type, and must be performed for existing conditions and conditions projected to occur as a result of SRRE implementation. These required projections have been prepared, and are presented in Tables I-6 and I-7, respectively.

The reader is cautioned that the projections by waste type are not reliable due to several factors. These include:

- Purchasing preferences of the consuming public will change substantially over the 15 year period.
- Technology of production will change substantially over the 15 year period.
- The relative economics of various packaging and production processes, and therefore their impacts on the waste stream, will change substantially over the 15 year period.

The per resident and per job waste generation rates will likely increase for several years, then stabilize or decrease as the costs of solid waste services increase. The projections in Tables I-6, I-7, VII-1, and VII-2 assume per capita generation rates are even through the 15 year period, although they are actually rising at present. The reviewer may be interested in the projections assuming that the current increases in the per capita rate are sustained. Projections based on this assumption were prepared by Franklin Associates (see appendix 1).

E. FUTURE WASTE GENERATION STUDIES

E.1. GUIDELINES AND REGULATORY REQUIREMENTS

The Santa Clara County Integrated Waste Management Plan, of which this SRRE is a part, is to be submitted to the CIWMB by January 1, 1994. This date is based on the fact that the County of Santa Clara, as a whole, has remaining landfill capacity of greater than eight years (PRC Section 41791). A lesser County-wide landfill capacity would necessitate an earlier submittal of the County Plan.

Each year after 1994, Mountain View's SRRE Plan is to be reviewed by the City and County; and an annual report is to be submitted to the CIWMB (CIWMB Regulations Sections 18771 and 18787). The annual reviews are to be used to assess the progress toward the diversion objectives and must address the issue of changes in the quantity and composition of the waste stream. Either the jurisdiction, in performing the review, or the CIWMB, in reviewing the review, can determine that a revised SRRE is needed. A revision could necessitate another, and more extensive, waste generation study.

Furthermore, prior to the third anniversary of the approval of the County Plan (i.e., in 1997 unless an earlier revision is found to be necessary in the annual reviews), the local task force must review the County Plan to ensure that it is consistent with the diversion goals. The task force must prepare comments on the Plan for the County and for the CIWMB. The County must determine if a revision of the Plan is needed. The County and the CIWMB are to decide what aspects of the Plan are to be revised. The revised Plan is to be submitted to the CIWMB within five years of the previously-approved Plan.

If a waste generation study is required in a revised SRRE or in a revised County Plan, the study must be done by a quantitative field analysis (QFA) (CIWMB Regulations Section 18726) unless the CIWMB approves the use of another method. A QFA is a costly task and is not necessarily the best way to get the information needed to design, implement, and monitor diversion programs. The City may chose to perform a QFA if it is appropriate at some future date. However, the need to do a QFA can be delayed by carrying out selectively-targeted waste characterization studies on an on-going basis and by aggressively pursuing the diversion objectives in the near- and medium-term periods.

E.2. ANNUAL MONITORING AND FUTURE STUDIES

Selectively-targeted studies are discussed in the monitoring and evaluation sections of the source reduction, recycling, and composting components (Chapters II, III, and IV). The studies are primarily intended to provide adequate information to allow the City to annually evaluate the diversion programs and to modify the programs as needed. If conducted carefully, the studies may eliminate the need for significant revision of this component during any revision of the overall SRRE.

TABLE I-1: QUANTITY OF DISPOSED WASTE
(Tons in 1990)

	Residential	Commercial	Industrial	Self-Haul	Total	Percentage of Total
Newby Island Landfill						
Winter	8,027	6,573	5,400	0	20,000	22%
Spring	7,706	6,310	5,184	0	19,200	22%
Summer	8,188	6,704	5,508	0	20,400	23%
Fall	8,188	6,704	5,508	0	20,400	23%
Newby Island Total	32,108	26,292	21,600	0	80,000	90%
Mountain View Vista Site				9,000	9,000	10%
Other (b)				211	211	0%
Total	32,108	26,292	21,600	9,211	89,211	100%
% of Total	36%	29%	24%	10%	100%	

Notes: (a) Tonnage figures are for 1990. Seasonal breakdowns are based on 1989 data.

(b) Other waste includes wastes that are generally not disposed at the Newby Island and Mountain View Landfills. These include asbestos, tires and highway litter. See Table V-1 for details.

Table I-2: SOURCE REDUCTION QUANTITIES
(Tons in 1990)

WASTE TYPE	RESID. TONS	COMM. TONS	INDUST. TONS	SELF-HAUL TONS	DIVERTED TONS	PERCENT DIVERSION
PAPER	0.9	18.5	0.0	0.0	19.4	0.0
corrugated containers	0.9	0.0	0.0	0.0	0.9	0.0
mixed paper	0.0	0.0	0.0	0.0	0.0	0.0
newspaper	0.0	0.0	0.0	0.0	0.0	0.0
high grade ledger	0.0	18.5	0.0	0.0	18.5	0.0
other	0.0	0.0	0.0	0.0	0.0	0.0
PLASTIC	0.0	0.0	0.0	0.0	0.0	0.0
HDPE	0.0	0.0	0.0	0.0	0.0	0.0
PET	0.0	0.0	0.0	0.0	0.0	0.0
film	0.0	0.0	0.0	0.0	0.0	0.0
Other	0.0	0.0	0.0	0.0	0.0	0.0
GLASS	0.0	0.0	0.0	0.0	0.0	0.0
refillable containers	0.0	0.0	0.0	0.0	0.0	0.0
CA redemption	0.0	0.0	0.0	0.0	0.0	0.0
other recyclable	0.0	0.0	0.0	0.0	0.0	0.0
other non-recyclable	0.0	0.0	0.0	0.0	0.0	0.0
METAL	0.0	0.0	0.0	0.0	0.0	0.0
aluminum cans	0.0	0.0	0.0	0.0	0.0	0.0
bi-metal	0.0	0.0	0.0	0.0	0.0	0.0
ferrous metal & cans	0.0	0.0	0.0	0.0	0.0	0.0
non-ferrous metals	0.0	0.0	0.0	0.0	0.0	0.0
white goods	0.0	0.0	0.0	0.0	0.0	0.0
other	0.0	0.0	0.0	0.0	0.0	0.0
YARD WASTE	0.0	0.0	0.0	0.0	0.0	0.0
OTHER ORGANICS	425.3	0.0	0.0	12.6	437.9	0.4
food waste	0.0	0.0	0.0	0.0	0.0	0.0
tires & rubber	0.0	0.0	0.0	12.6	12.6	0.0
wood waste	0.0	0.0	0.0	0.0	0.0	0.0
crop residue	0.0	0.0	0.0	0.0	0.0	0.0
manure	0.0	0.0	0.0	0.0	0.0	0.0
textiles & leather	267.2	0.0	0.0	0.0	267.2	0.3
other	158.1	0.0	0.0	0.0	158.1	0.2
OTHER WASTE	0.0	937.0	0.0	0.0	937.0	0.9
inert solids	0.0	937.0	0.0	0.0	937.0	0.9
HHW & containers	0.0	0.0	0.0	0.0	0.0	0.0
SPECIAL WASTE	0.0	0.0	0.0	0.0	0.0	0.0
ash	0.0	0.0	0.0	0.0	0.0	0.0
sewage sludge	0.0	0.0	0.0	0.0	0.0	0.0
industrial sludge	0.0	0.0	0.0	0.0	0.0	0.0
asbestos	0.0	0.0	0.0	0.0	0.0	0.0
auto shredder waste	0.0	0.0	0.0	0.0	0.0	0.0
auto bodies	0.0	0.0	0.0	0.0	0.0	0.0
other	0.0	0.0	0.0	12.6	12.6	0.0
Totals	426.2	955.5	0.0	12.6	1,394.3	1.4

TABLE I-3: RECYCLING AND COMPOSTING QUANTITIES
(Tons in 1990)

MATERIAL	RESID. TONS	COMM. TONS	INDUST. TONS	SELF-HAUL TONS	DIVERTED TONS	PERCENT DIVERSION
PAPER	2,127.0	771.6	0.0	0.0	2,898.6	2.9
corrugated containers	44.0	599.5	0.0	0.0	643.5	0.6
mixed paper	0.0	12.2	0.0	0.0	12.2	0.0
newspaper	2,083.0	0.0	0.0	0.0	2,083.0	2.1
high grade ledger	0.0	159.9	0.0	0.0	159.9	0.2
other	0.0	0.0	0.0	0.0	0.0	0.0
PLASTIC	16.5	0.0	1.2	0.0	17.7	0.0
HDPE	0.0	0.0	0.0	0.0	0.0	0.0
PET	16.5	0.0	0.0	0.0	16.5	0.0
film	0.0	0.0	0.0	0.0	0.0	0.0
Other	0.0	0.0	1.2	0.0	1.2	0.0
GLASS	876.5	327.4	0.0	0.0	1,203.9	1.2
refillable containers	0.0	8.8	0.0	0.0	8.8	0.0
CA redemption glass	805.9	254.5	0.0	0.0	1,060.4	1.1
other recyclable	70.6	64.1	0.0	0.0	134.7	0.1
other non-recyclable	0.0	0.0	0.0	0.0	0.0	0.0
METAL	185.2	63.3	0.0	68.2	316.7	0.3
aluminum cans	127.0	0.0	0.0	0.0	127.0	0.1
bi-metal	0.0	0.0	0.0	0.0	0.0	0.0
ferrous metal & cans	53.2	61.4	0.0	46.5	161.1	0.2
non-ferrous metals	0.0	1.9	0.0	3.4	5.3	0.0
white goods	5.0	0.0	0.0	18.3	23.3	0.0
other	0.0	0.0	0.0	0.0	0.0	0.0
YARD WASTE	28.2	0.0	0.0	0.0	28.2	0.0
OTHER ORGANICS	0.0	289.5	0.0	0.0	289.5	0.3
food waste	0.0	0.0	0.0	0.0	0.0	0.0
tires & rubber	0.0	59.5	0.0	0.0	59.5	0.1
wood waste	0.0	230.0	0.0	0.0	230.0	0.2
crop residue	0.0	0.0	0.0	0.0	0.0	0.0
manure	0.0	0.0	0.0	0.0	0.0	0.0
textiles & leather	0.0	0.0	0.0	0.0	0.0	0.0
other	0.0	0.0	0.0	0.0	0.0	0.0
OTHER WASTE	0.0	0.0	0.0	4,750.0	4,750.0	4.7
inert solids	0.0	0.0	0.0	4,750.0	4,750.0	4.7
HHW & containers	0.0	0.0	0.0	0.0	0.0	0.0
SPECIAL WASTE	0.0	0.0	0.0	0.0	0.0	0.0
ash	0.0	0.0	0.0	0.0	0.0	0.0
sewage sludge	0.0	0.0	0.0	0.0	0.0	0.0
industrial sludge	0.0	0.0	0.0	0.0	0.0	0.0
asbestos	0.0	0.0	0.0	0.0	0.0	0.0
auto shredder waste	0.0	0.0	0.0	0.0	0.0	0.0
auto bodies	0.0	0.0	0.0	0.0	0.0	0.0
other	0.0	0.0	0.0	0.0	0.0	0.0
Totals	3,233.4	1,451.8	1.2	4,818.2	9,504.6	9.5

(a) Diversion is the diverted tonnage divided by the Total Waste Generated.

(b) Wood and Yard Waste recovery are considered composting in this document since capital facilities and end-uses are inter-related. Treating Wood Waste recovery as recycling would be confusing.

TABLE I-4: GENERATION AND DIVERSION RATE (1990)

WASTE TYPE	DISPOSED TPY (a)	DIVERTED TPY (b)	GENERATED TPY	PERCENT OF TOTAL WASTE STREAM	PERCENT OF WASTE TYPE DIVERTED
PAPER	37,272	2,918	40,190	2.9	7.3
corrugated containers	10,715	644	11,359	0.6	5.7
mixed paper	11,988	12	12,000	0.0	0.1
newspaper	5,445	2,083	7,528	2.1	27.7
high grade ledger	4,905	178	5,083	0.2	3.5
other	4,219	0	4,219	0.0	0.0
PLASTIC	7,252	18	7,270	0.0	0.2
HDPE	743	0	743	0.0	0.0
PET	185	17	202	0.0	8.2
film	3,005	0	3,005	0.0	0.0
Other	3,320	1	3,321	0.0	0.0
GLASS	5,334	1,204	6,538	1.2	18.4
refillable containers	2	9	11	0.0	80.7
CA redemption glass	482	1,060	1,542	1.1	68.8
other recyclable	3,742	135	3,877	0.1	3.5
other non-recyclable	1,108	0	1,108	0.0	0.0
METAL	3,992	317	4,309	0.3	7.3
aluminum cans	420	127	547	0.1	23.2
bi-metal	0	0	0	0.0	0.0
ferrous metal & cans	2,696	161	2,858	0.2	5.6
non-ferrous metals	457	5	462	0.0	1.1
white goods	64	23	88	0.0	26.6
other	355	0	355	0.0	0.0
YARD WASTE	14,766	28	14,795	0.0	0.2
OTHER ORGANICS	16,490	727	17,218	0.7	4.2
food waste	4,507	0	4,507	0.0	0.0
tires & rubber	482	72	554	0.1	13.0
wood waste	6,730	230	6,960	0.2	3.3
crop residue	0	0	0	0.0	0.0
manure	0	0	0	0.0	0.0
textiles & leather	482	267	749	0.3	35.7
other	4,290	158	4,448	0.2	3.6
OTHER WASTE	3,892	5,687	9,579	5.7	59.4
inert solids	3,860	5,687	9,547	5.7	59.6
HHW & containers	32	0	32	0.0	0.0
SPECIAL WASTE	211	0	211	0.0	0.0
ash	0	0	0	0.0	0.0
sewage sludge	0	0	0	0.0	0.0
industrial sludge	0	0	0	0.0	0.0
asbestos	130	0	130	0.0	0.0
auto shredder waste	0	0	0	0.0	0.0
auto bodies	0	0	0	0.0	0.0
other	81	13	93	0.0	0.0
Totals	89,209	10,899	100,108	10.9	

(a) From Table I-5.
(b) From Tables I-2 and I-3

TABLE I-5: QUANTITY AND COMPOSITION OF DISPOSED WASTE

	RESIDENTIAL		COMMERCIAL		INDUSTRIAL		SELF-HAUL	
WASTE TYPE	mass fraction	tons/year	mass fraction	tons/year	mass fraction	tons/year	mass fraction	tons/year
PAPER	0.408	13,100	0.543	14,277	0.446	9,625	0.029	270
corrugated containers	0.059	1,894	0.149	3,918	0.227	4,903	0.000	0
mixed paper	0.135	4,335	0.203	5,337	0.107	2,316	0.000	0
newspaper	0.082	2,633	0.092	2,419	0.018	393	0.000	0
high grade ledger	0.009	289	0.099	2,603	0.093	2,013	0.000	0
other	0.123	3,949	0.000	0	0.000	0	0.029	270
PLASTIC	0.076	2,440	0.117	3,076	0.080	1,736	0.000	0
HDPE	0.008	257	0.006	158	0.015	328	0.000	0
PET	0.004	128	0.002	53	0.000	4	0.000	0
film	0.030	963	0.053	1,393	0.030	648	0.000	0
Other	0.034	1,092	0.056	1,472	0.035	756	0.000	0
GLASS	0.044	1,413	0.075	1,974	0.086	1,857	0.010	90
refillable containers	0.000	0	0.000	2	0.000	0	0.000	0
CA redemption glass	0.015	482	0.000	0	0.000	0	0	0
other recyclable	0.024	771	0.060	1,578	0.065	1,394	0.000	0
other non-recyclable	0.005	161	0.015	394	0.021	463	0.010	90
METAL	0.037	1,188	0.052	1,367	0.054	1,167	0.029	270
aluminum cans	0.006	193	0.007	184	0.002	43	0.000	0
bi-metal	0.000	0	0.000	0	0.000	0	0.000	0
ferrous metal & cans	0.026	835	0.033	868	0.046	994	0.000	0
non-ferrous metals	0.002	64	0.010	263	0.006	130	0.000	0
white goods	0.002	64	0.000	0	0.000	0	0.000	0
other	0.001	32	0.002	53	0.000	0	0.029	270
YARD WASTE	0.255	8,188	0.051	1,341	0.080	1,728	0.381	3,510
OTHER ORGANICS	0.169	5,426	0.146	3,835	0.218	4,709	0.274	2,520
food waste	0.086	2,761	0.046	1,206	0.000	0	0.059	540
tires & rubber	0.015	482	0.000	0	0.000	0	0.000	0
wood waste	0.011	353	0.031	815	0.195	4,212	0.147	1,350
crop residue	0.000	0	0.000	0	0.000	0	0.000	0
manure	0.000	0	0.000	0	0.000	0	0.000	0
textiles & leather	0.015	482	0.000	0	0.000	0	0.000	0
other	0.042	1,349	0.069	1,814	0.023	497	0.068	630
OTHER WASTE	0.011	353	0.016	421	0.036	778	0.254	2,340
inert solids	0.010	321	0.016	421	0.036	778	0.254	2,340
HHW & containers	0.001	32	0.000	0	0.000	0	0.000	0
SPECIAL WASTE	0.000	0	0.000	0	0.000	0	0.023	211
ash	0.000	0	0.000	0	0.000	0	0.000	0
sewage sludge	0.000	0	0.000	0	0.000	0	0.000	0
industrial sludge	0.000	0	0.000	0	0.000	0	0.000	0
asbestos	0.000	0	0.000	0	0.000	0	0.014	130
auto shredder waste	0.000	0	0.000	0	0.000	0	0.000	0
auto bodies	0.000	0	0.000	0	0.000	0	0.000	0
other	0.000	0	0.000	0	0.000	0	0.009	81
Totals by sector	1.000	32,108	1.000	26,291	1.000	21,600	1.000	9,211

TABLE I-6: WASTE GENERATION PROJECTIONS WITHOUT SRRE

				1990			1991			1992	
	initial disposal rate	initial diversion rate	disposed amount	diverted amount	generated amount	disposed amount	diverted amount	generation	disposed amount	diverted amount	generation
PAPER	0.372	0.029	37,272	2,918	40,190	37,559	2,940	40,499	37,848	2,963	40,811
corrugated containers	0.107	0.006	10,715	644	11,359	10,797	649	11,447	10,881	654	11,535
mixed paper	0.120	0.000	11,988	12	12,000	12,080	12	12,093	12,173	12	12,186
newspaper	0.054	0.021	5,445	2,083	7,528	5,487	2,099	7,586	5,529	2,115	7,644
high grade ledger	0.049	0.002	4,905	178	5,083	4,943	180	5,122	4,981	181	5,162
other	0.042	0.000	4,219	0	4,219	4,252	0	4,252	4,285	0	4,285
PLASTIC	0.072	0.000	7,252	18	7,270	7,308	18	7,326	7,364	18	7,382
HDPE	0.007	0.000	743	0	743	748	0	748	754	0	754
PET	0.002	0.000	185	17	202	186	17	203	188	17	205
film	0.030	0.000	3,005	0	3,005	3,028	0	3,028	3,051	0	3,051
Other	0.033	0.000	3,320	1	3,321	3,346	1	3,347	3,371	1	3,373
GLASS	0.053	0.012	5,334	1,204	6,538	5,375	1,213	6,588	5,416	1,223	6,639
refillable containers	0.000	0.000	2	9	11	2	9	11	2	9	11
CA redemption glass	0.005	0.011	482	1,060	1,542	485	1,069	1,554	489	1,077	1,566
other recyclable	0.037	0.001	3,742	135	3,877	3,771	136	3,907	3,800	137	3,937
other non-recyclable	0.011	0.000	1,108	0	1,108	1,116	0	1,116	1,125	0	1,125
METAL	0.040	0.003	3,992	317	4,309	4,023	319	4,342	4,054	322	4,375
aluminum cans	0.004	0.001	420	127	547	423	128	551	426	129	555
bi-metal	0.000	0.000	0	0	0	0	0	0	0	0	0
ferrous metal & cans	0.027	0.002	2,696	161	2,858	2,717	162	2,880	2,738	164	2,902
non-ferrous metals	0.005	0.000	457	5	462	461	5	466	464	5	470
white goods	0.001	0.000	64	23	88	65	23	88	65	24	89
other	0.004	0.000	355	0	355	357	0	357	360	0	360
YARD WASTE	0.148	0.000	14,767	28	14,795	14,880	28	14,909	14,995	29	15,023
OTHER ORGANICS	0.165	0.007	16,491	727	17,218	16,618	733	17,351	16,745	739	17,484
food waste	0.045	0.000	4,507	0	4,507	4,542	0	4,542	4,577	0	4,577
tires & rubber	0.005	0.001	482	72	554	485	73	558	489	73	562
wood waste	0.067	0.002	6,730	230	6,960	6,782	232	7,014	6,834	234	7,068
crop residue	0.000	0.000	0	0	0	0	0	0	0	0	0
manure	0.000	0.000	0	0	0	0	0	0	0	0	0
textiles & leather	0.005	0.003	482	267	749	485	269	755	489	271	760
other	0.043	0.002	4,290	158	4,448	4,323	159	4,482	4,356	161	4,517
OTHER WASTE	0.039	0.057	3,892	5,687	9,579	3,922	5,731	9,653	3,952	5,775	9,727
inert solids	0.039	0.057	3,860	5,687	9,547	3,890	5,731	9,620	3,919	5,775	9,694
HHW & containers	0.000	0.000	32	0	32	32	0	32	33	0	33
SPECIAL WASTE	0.002	0.000	211	0	211	212	0	212	214	0	214
ash	0.000	0.000	0	0	0	0	0	0	0	0	0
sewage sludge	0.000	0.000	0	0	0	0	0	0	0	0	0
industrial sludge	0.000	0.000	0	0	0	0	0	0	0	0	0
asbestos	0.001	0.000	130	0	130	131	0	131	132	0	132
auto shredder waste	0.000	0.000	0	0	0	0	0	0	0	0	0
auto bodies	0.000	0.000	0	0	0	0	0	0	0	0	0
other	0.001	0.000	81	13	93	81	13	94	82	13	95
Totals	0.891	0.11	89,210	10,899	100,109	89,897	10,983	100,880	90,589	11,067	101,656

Notes: 1) Percentages in this table may differ from other tables due to rounding.
2) The diversion quantities given for material types in this table are estimates provided for regulatory purposes only and are not considered diversion objectives.

TABLE I-6 (CONTINUED)

	initial disposal rate	initial diversion rate	1993 disposed amount	1993 diverted amount	1993 generation	1994 disposed amount	1994 diverted amount	1994 generation	1995 disposed amount	1995 diverted amount	1995 generation
PAPER	0.372	0.029	38,139	2,986	41,125	38,433	3,009	41,442	38,729	3,032	41,761
corrugated containers	0.107	0.006	10,964	659	11,624	11,049	664	11,713	11,134	670	11,803
mixed paper	0.120	0.000	12,267	12	12,279	12,361	13	12,374	12,457	13	12,469
newspaper	0.054	0.021	5,571	2,131	7,703	5,614	2,148	7,762	5,658	2,164	7,822
high grade ledger	0.049	0.002	5,019	183	5,202	5,058	184	5,242	5,097	185	5,282
other	0.042	0.000	4,318	0	4,318	4,351	0	4,351	4,384	0	4,384
PLASTIC	0.072	0.000	7,421	18	7,439	7,478	18	7,497	7,536	18	7,554
HDPE	0.007	0.000	760	0	760	766	0	766	772	0	772
PET	0.002	0.000	189	17	206	191	17	208	192	17	209
film	0.030	0.000	3,075	0	3,075	3,098	0	3,098	3,122	0	3,122
Other	0.033	0.000	3,397	1	3,399	3,423	1	3,425	3,450	1	3,451
GLASS	0.053	0.012	5,458	1,232	6,690	5,500	1,241	6,741	5,542	1,251	6,793
refillable containers	0.000	0.000	2	9	11	2	9	11	2	9	11
CA redemption glass	0.005	0.011	493	1,085	1,578	497	1,093	1,590	500	1,102	1,602
other recyclable	0.037	0.001	3,829	138	3,967	3,859	139	3,998	3,888	140	4,028
other non-recyclable	0.011	0.000	1,134	0	1,134	1,142	0	1,142	1,151	0	1,151
METAL	0.040	0.003	4,085	324	4,409	4,117	327	4,443	4,148	329	4,477
aluminum cans	0.004	0.001	429	130	559	433	131	564	436	132	568
bi-metal	0.000	0.000	0	0	0	0	0	0	0	0	0
ferrous metal & cans	0.027	0.002	2,759	165	2,924	2,780	166	2,947	2,802	167	2,969
non-ferrous metals	0.005	0.000	468	5	473	471	5	477	475	6	481
white goods	0.001	0.000	66	24	90	66	24	90	67	24	91
other	0.004	0.000	363	0	363	366	0	366	369	0	369
YARD WASTE	0.148	0.000	15,110	29	15,139	15,227	29	15,256	15,344	29	15,373
OTHER ORGANICS	0.165	0.007	16,874	744	17,619	17,004	750	17,754	17,135	756	17,891
food waste	0.045	0.000	4,612	0	4,612	4,648	0	4,648	4,684	0	4,684
tires & rubber	0.005	0.001	493	74	567	497	74	571	500	75	57[illegible]
wood waste	0.067	0.002	6,887	235	7,122	6,940	237	7,177	6,993	239	7,232
crop residue	0.000	0.000	0	0	0	0	0	0	0	0	0
manure	0.000	0.000	0	0	0	0	0	0	0	0	0
textiles & leather	0.005	0.003	493	273	766	497	276	772	500	278	778
other	0.043	0.002	4,390	162	4,551	4,423	163	4,586	4,457	164	4,622
OTHER WASTE	0.039	0.057	3,982	5,819	9,802	4,013	5,864	9,877	4,044	5,909	9,953
inert solids	0.039	0.057	3,950	5,819	9,769	3,980	5,864	9,844	4,011	5,909	9,920
HHW & containers	0.000	0.000	33	0	33	33	0	33	33	0	33
SPECIAL WASTE	0.002	0.000	216	0	216	217	0	217	219	0	219
ash	0.000	0.000	0	0	0	0	0	0	0	0	0
sewage sludge	0.000	0.000	0	0	0	0	0	0	0	0	[illegible]
industrial sludge	0.000	0.000	0	0	0	0	0	0	0	0	[illegible]
asbestos	0.001	0.000	133	0	133	134	0	134	135	0	135
auto shredder waste	0.000	0.000	0	0	0	0	0	0	0	0	0
auto bodies	0.000	0.000	0	0	0	0	0	0	0	0	[illegible]
other	0.001	0.000	83	13	95	83	13	96	84	13	9[illegible]
Totals	0.891	0.109	91,286	11,153	102,439	91,989	11,239	103,228	92,698	11,325	104,023

TABLE I-6 (CONTINUED)

	initial disposal rate	initial diversion rate	1996 disposed amount	1996 diverted amount	1996 generation	1997 disposed amount	1997 diverted amount	1997 generation	1998 disposed amount	1998 diverted amount	1998 generation
PAPER	0.372	0.029	39,181	3,068	42,249	39,640	3,103	42,743	40,104	3,140	43,244
corrugated containers	0.107	0.006	11,264	677	11,941	11,396	685	12,081	11,529	693	12,223
mixed paper	0.120	0.000	12,602	13	12,615	12,750	13	12,763	12,899	13	12,912
newspaper	0.054	0.021	5,724	2,190	7,913	5,791	2,215	8,006	5,859	2,241	8,100
high grade ledger	0.049	0.002	5,156	188	5,344	5,217	190	5,406	5,278	192	5,470
other	0.042	0.000	4,435	0	4,435	4,487	0	4,487	4,540	0	4,540
PLASTIC	0.072	0.000	7,624	19	7,643	7,713	19	7,732	7,804	19	7,823
HDPE	0.007	0.000	781	0	781	790	0	790	799	0	799
PET	0.002	0.000	194	17	212	197	18	214	199	18	217
film	0.030	0.000	3,159	0	3,159	3,196	0	3,196	3,233	0	3,233
Other	0.033	0.000	3,490	1	3,491	3,531	1	3,532	3,572	1	3,574
GLASS	0.053	0.012	5,607	1,266	6,873	5,673	1,280	6,953	5,739	1,295	7,035
refillable containers	0.000	0.000	2	9	11	2	9	12	2	9	12
CA redemption glass	0.005	0.011	506	1,115	1,621	512	1,128	1,640	518	1,141	1,659
other recyclable	0.037	0.001	3,934	142	4,075	3,980	143	4,123	4,027	145	4,171
other non-recyclable	0.011	0.000	1,165	0	1,165	1,178	0	1,178	1,192	0	1,192
METAL	0.040	0.003	4,197	333	4,530	4,246	337	4,583	4,296	341	4,636
aluminum cans	0.004	0.001	441	134	575	446	135	581	452	137	588
bi-metal	0.000	0.000	0	0	0	0	0	0	0	0	0
ferrous metal & cans	0.027	0.002	2,835	169	3,004	2,868	171	3,039	2,901	173	3,075
non-ferrous metals	0.005	0.000	481	6	486	486	6	492	492	6	498
white goods	0.001	0.000	68	24	92	68	25	93	69	25	94
other	0.004	0.000	373	0	373	377	0	377	382	0	382
YARD WASTE	0.148	0.000	15,523	30	15,553	15,705	30	15,735	15,889	30	15,919
OTHER ORGANICS	0.165	0.007	17,335	765	18,100	17,538	774	18,312	17,744	783	18,527
food waste	0.045	0.000	4,738	0	4,738	4,794	0	4,794	4,850	0	4,850
tires & rubber	0.005	0.001	506	76	582	512	77	589	518	78	596
wood waste	0.067	0.002	7,075	242	7,317	7,158	245	7,402	7,242	247	7,489
crop residue	0.000	0.000	0	0	0	0	0	0	0	0	0
manure	0.000	0.000	0	0	0	0	0	0	0	0	0
textiles & leather	0.005	0.003	506	281	787	512	284	796	518	288	806
other	0.043	0.002	4,509	166	4,676	4,562	168	4,730	4,616	170	4,786
OTHER WASTE	0.039	0.057	4,091	5,978	10,070	4,139	6,048	10,187	4,188	6,119	10,307
inert solids	0.039	0.057	4,058	5,978	10,036	4,105	6,048	10,153	4,153	6,119	10,272
HHW & containers	0.000	0.000	34	0	34	34	0	34	35	0	35
						0	0		0	0	
SPECIAL WASTE	0.002	0.000	221	0	221	224	0	224	227	0	227
ash	0.000	0.000	0	0	0	0	0	0	0	0	0
sewage sludge	0.000	0.000	0	0	0	0	0	0	0	0	0
industrial sludge	0.000	0.000	0	0	0	0	0	0	0	0	0
asbestos	0.001	0.000	137	0	137	138	0	138	140	0	140
auto shredder waste	0.000	0.000	0	0	0	0	0	0	0	0	0
auto bodies	0.000	0.000	0	0	0	0	0	0	0	0	0
other	0.001	0.000	85	13	98	86	13	99	87	14	100
Totals	0.891	0.109	93,781	11,457	105,238	94,878	11,591	106,469	95,990	11,727	107,717

TABLE I-6 (CONTINUED)

	initial disposal rate	initial diversion rate	1999 disposed amount	1999 diverted amount	1999 generation	2000 disposed amount	2000 diverted amount	2000 generation	2001 disposed amount	2001 diverted amount	2001 generation
PAPER	0.372	0.029	40,575	3,177	43,752	41,052	3,214	44,266	41,321	3,235	44,556
corrugated containers	0.107	0.006	11,665	702	12,366	11,802	710	12,511	11,879	714	12,593
mixed paper	0.120	0.000	13,050	13	13,064	13,204	13	13,217	13,290	14	13,304
newspaper	0.054	0.021	5,927	2,268	8,195	5,997	2,294	8,291	6,036	2,309	8,34[illegible]
high grade ledger	0.049	0.002	5,340	194	5,534	5,402	196	5,599	5,438	198	5,63[illegible]
other	0.042	0.000	4,593	0	4,593	4,647	0	4,647	4,678	0	4,678
PLASTIC	0.072	0.000	7,895	19	7,914	7,988	19	8,007	8,040	20	8,06[illegible]
HDPE	0.007	0.000	808	0	808	818	0	818	823	0	82[illegible]
PET	0.002	0.000	201	18	219	204	18	222	205	18	223
film	0.030	0.000	3,271	0	3,271	3,309	0	3,309	3,331	0	3,331
Other	0.033	0.000	3,614	1	3,616	3,657	1	3,658	3,681	1	3,68[illegible]
GLASS	0.053	0.012	5,806	1,311	7,117	5,875	1,326	7,201	5,913	1,335	7,248
refillable containers	0.000	0.000	2	10	12	2	10	12	2	10	12
CA redemption glass	0.005	0.011	524	1,154	1,679	530	1,168	1,698	534	1,176	1,71[illegible]
other recyclable	0.037	0.001	4,074	147	4,220	4,122	148	4,270	4,149	149	4,29[illegible]
other non-recyclable	0.011	0.000	1,206	0	1,206	1,220	0	1,220	1,228	0	1,22[illegible]
METAL	0.040	0.003	4,346	345	4,691	4,397	349	4,746	4,426	351	4,77[illegible]
aluminum cans	0.004	0.001	457	138	595	462	140	602	465	141	60[illegible]
bi-metal	0.000	0.000	0	0	0	0	0	0	0	0	[illegible]
ferrous metal & cans	0.027	0.002	2,935	175	3,111	2,970	177	3,147	2,989	179	3,168
non-ferrous metals	0.005	0.000	498	6	503	503	6	509	507	6	51[illegible]
white goods	0.001	0.000	70	25	95	71	26	96	71	26	9[illegible]
other	0.004	0.000	386	0	386	391	0	391	393	0	39[illegible]
YARD WASTE	0.148	0.000	16,075	31	16,106	16,264	31	16,295	16,371	31	16,40[illegible]
OTHER ORGANICS	0.165	0.007	17,952	792	18,744	18,163	801	18,964	18,282	806	19,08[illegible]
food waste	0.045	0.000	4,907	0	4,907	4,964	0	4,964	4,997	0	4,997
tires & rubber	0.005	0.001	524	78	603	530	79	610	534	80	614
wood waste	0.067	0.002	7,327	250	7,577	7,413	253	7,666	7,461	255	7,71[illegible]
crop residue	0.000	0.000	0	0	0	0	0	0	0	0	[illegible]
manure	0.000	0.000	0	0	0	0	0	0	0	0	0
textiles & leather	0.005	0.003	524	291	815	530	294	825	534	296	830
other	0.043	0.002	4,670	172	4,842	4,725	174	4,899	4,756	175	4,93[illegible]
OTHER WASTE	0.039	0.057	4,237	6,191	10,428	4,287	6,264	10,550	4,315	6,305	10,62[illegible]
inert solids	0.039	0.057	4,202	6,191	10,393	4,251	6,264	10,515	4,279	6,305	10,584
HHW & containers	0.000	0.000	35	0	35	35	0	35	36	0	3[illegible]
										0	
SPECIAL WASTE	0.002	0.000	229	0	229	232	0	232	234	0	234
ash	0.000	0.000	0	0	0	0	0	0	0	0	0
sewage sludge	0.000	0.000	0	0	0	0	0	0	0	0	[illegible]
industrial sludge	0.000	0.000	0	0	0	0	0	0	0	0	[illegible]
asbestos	0.001	0.000	142	0	142	143	0	143	144	0	14[illegible]
auto shredder waste	0.000	0.000	0	0	0	0	0	0	0	0	0
auto bodies	0.000	0.000	0	0	0	0	0	0	0	0	[illegible]
other	0.001	0.000	88	14	102	89	14	103	89	14	10[illegible]
Totals	0.891	0.109	97,116	11,865	108,981	98,257	12,004	110,261	98,901	12,083	110,98[illegible]

TABLE I-6 (CONTINUED)

	initial disposal rate	initial diversion rate	2002 disposed amount	2002 diverted amount	2002 generation	2003 disposed amount	2003 diverted amount	2003 generation	2004 disposed amount	2004 diverted amount	2004 generation
PAPER	0.372	0.029	41,592	3,256	44,848	41,866	3,278	45,144	42,142	3,299	45,441
corrugated containers	0.107	0.006	11,957	719	12,676	12,036	724	12,759	12,115	729	12,844
mixed paper	0.120	0.000	13,378	14	13,391	13,466	14	13,479	13,554	14	13,568
newspaper	0.054	0.021	6,076	2,324	8,400	6,116	2,340	8,456	6,156	2,355	8,511
high grade ledger	0.049	0.002	5,473	199	5,673	5,509	200	5,710	5,546	202	5,747
other	0.042	0.000	4,708	0	4,708	4,739	0	4,739	4,771	0	4,771
PLASTIC	0.072	0.000	8,093	20	8,113	8,146	20	8,166	8,200	20	8,220
HDPE	0.007	0.000	829	0	829	834	0	834	840	0	840
PET	0.002	0.000	206	18	225	208	19	226	209	19	228
film	0.030	0.000	3,353	0	3,353	3,375	0	3,375	3,397	0	3,397
Other	0.033	0.000	3,705	1	3,706	3,729	1	3,731	3,754	1	3,755
GLASS	0.053	0.012	5,952	1,343	7,296	5,991	1,352	7,344	6,031	1,361	7,392
refillable containers	0.000	0.000	2	10	12	2	10	12	2	10	12
CA redemption glass	0.005	0.011	537	1,183	1,721	541	1,191	1,732	545	1,199	1,744
other recyclable	0.037	0.001	4,176	150	4,326	4,203	151	4,355	4,231	152	4,383
other non-recyclable	0.011	0.000	1,236	0	1,236	1,244	0	1,244	1,253	0	1,253
METAL	0.040	0.003	4,455	353	4,808	4,484	356	4,840	4,514	358	4,872
aluminum cans	0.004	0.001	468	142	610	471	143	614	475	144	618
bi-metal	0.000	0.000	0	0	0	0	0	0	0	0	0
ferrous metal & cans	0.027	0.002	3,009	180	3,189	3,029	181	3,210	3,049	182	3,231
non-ferrous metals	0.005	0.000	510	6	516	513	6	519	517	6	523
white goods	0.001	0.000	72	26	98	72	26	98	73	26	99
other	0.004	0.000	396	0	396	398	0	398	401	0	401
YARD WASTE	0.148	0.000	16,478	31	16,510	16,587	32	16,618	16,696	32	16,728
OTHER ORGANICS	0.165	0.007	18,402	812	19,214	18,523	817	19,340	18,645	822	19,468
food waste	0.045	0.000	5,030	0	5,030	5,063	0	5,063	5,096	0	5,096
tires & rubber	0.005	0.001	537	80	618	541	81	622	545	82	626
wood waste	0.067	0.002	7,510	257	7,767	7,560	258	7,818	7,610	260	7,870
crop residue	0.000	0.000	0	0	0	0	0	0	0	0	0
manure	0.000	0.000	0	0	0	0	0	0	0	0	0
textiles & leather	0.005	0.003	537	298	836	541	300	841	545	302	847
other	0.043	0.002	4,787	176	4,963	4,818	178	4,996	4,850	179	5,029
OTHER WASTE	0.039	0.057	4,343	6,346	10,689	4,372	6,388	10,760	4,400	6,430	10,830
inert solids	0.039	0.057	4,307	6,346	10,653	4,336	6,388	10,724	4,364	6,430	10,794
HHW & containers	0.000	0.000	36	0	36	36	0	36	36	0	36
							0		0	0	
SPECIAL WASTE	0.002	0.000	235	0	235	237	0	237	238	0	238
ash	0.000	0.000	0	0	0	0	0	0	0	0	0
sewage sludge	0.000	0.000	0	0	0	0	0	0	0	0	0
industrial sludge	0.000	0.000	0	0	0	0	0	0	0	0	0
asbestos	0.001	0.000	145	0	145	146	0	146	147	0	147
auto shredder waste	0.000	0.000	0	0	0	0	0	0	0	0	0
auto bodies	0.000	0.000	0	0	0	0	0	0	0	0	0
other	0.001	0.000	90	14	104	91	14	105	91	14	105
Totals	0.891	0.109	99,551	12,162	111,713	100,206	12,242	112,448	100,866	12,323	113,189

TABLE I-6 (CONTINUED)

			2005		
	initial disposal rate	initial diversion rate	disposed amount	diverted amount	generation
PAPER	0.372	0.029	42,420	3,321	45,741
corrugated containers	0.107	0.006	12,195	733	12,928
mixed paper	0.120	0.000	13,644	14	13,658
newspaper	0.054	0.021	6,197	2,371	8,568
high grade ledger	0.049	0.002	5,582	203	5,785
other	0.042	0.000	4,802	0	4,802
PLASTIC	0.072	0.000	8,254	20	8,274
HDPE	0.007	0.000	845	0	845
PET	0.002	0.000	211	19	229
film	0.030	0.000	3,420	0	3,420
Other	0.033	0.000	3,779	1	3,780
GLASS	0.053	0.012	6,070	1,370	7,441
refillable containers	0.000	0.000	2	10	12
CA redemption glass	0.005	0.011	548	1,207	1,755
other recyclable	0.037	0.001	4,259	153	4,412
other non-recyclable	0.011	0.000	1,261	0	1,261
METAL	0.040	0.003	4,544	360	4,904
aluminum cans	0.004	0.001	478	145	622
bi-metal	0.000	0.000	0	0	0
ferrous metal & cans	0.027	0.002	3,069	183	3,252
non-ferrous metals	0.005	0.000	520	6	526
white goods	0.001	0.000	73	27	100
other	0.004	0.000	404	0	404
YARD WASTE	0.148	0.000	16,806	32	16,838
OTHER ORGANICS	0.165	0.007	18,768	828	19,596
food waste	0.045	0.000	5,130	0	5,130
tires & rubber	0.005	0.001	548	82	630
wood waste	0.067	0.002	7,660	262	7,922
crop residue	0.000	0.000	0	0	0
manure	0.000	0.000	0	0	0
textiles & leather	0.005	0.003	548	304	852
other	0.043	0.002	4,882	180	5,062
OTHER WASTE	0.039	0.057	4,429	6,473	10,902
inert solids	0.039	0.057	4,393	6,473	10,865
HHW & containers	0.000	0.000	37	0	37
SPECIAL WASTE	0.002	0.000	240	0	240
ash	0.000	0.000	0	0	0
sewage sludge	0.000	0.000	0	0	0
industrial sludge	0.000	0.000	0	0	0
asbestos	0.001	0.000	148	0	148
auto shredder waste	0.000	0.000	0	0	0
auto bodies	0.000	0.000	0	0	0
other	0.001	0.000	92	14	106
Totals	0.891	0.109	101,532	12,404	113,936

TABLE I-7: WASTE GENERATION PROJECTIONS WITH SRRE

	initial disposal rate	initial diversion rate	1990 disposed amount	1990 diverted amount	1990 generated amount	1991 disposed amount	1991 diverted amount	1991 generation	1992 disposed amount	1992 diverted amount	1992 generation
PAPER	0.372	0.029	37,272	2,918	40,190	37,559	2,940	40,499	37,848	2,963	40,811
corrugated containers	0.107	0.006	10,715	644	11,359	10,797	649	11,447	10,881	654	11,535
mixed paper	0.120	0.000	11,988	12	12,000	12,080	12	12,093	12,173	12	12,186
newspaper	0.054	0.021	5,445	2,083	7,528	5,487	2,099	7,586	5,529	2,115	7,644
high grade ledger	0.049	0.002	4,905	178	5,083	4,943	180	5,122	4,981	181	5,162
other	0.042	0.000	4,219	0	4,219	4,252	0	4,252	4,285	0	4,285
PLASTIC	0.072	0.000	7,252	18	7,270	7,308	18	7,326	7,364	18	7,382
HDPE	0.007	0.000	743	0	743	748	0	748	754	0	754
PET	0.002	0.000	185	17	202	186	17	203	188	17	205
film	0.030	0.000	3,005	0	3,005	3,028	0	3,028	3,051	0	3,051
Other	0.033	0.000	3,320	1	3,321	3,346	1	3,347	3,371	1	3,373
GLASS	0.053	0.012	5,334	1,204	6,538	5,375	1,213	6,588	5,416	1,223	6,639
refillable containers	0.000	0.000	2	9	11	2	9	11	2	9	11
CA redemption glass	0.005	0.011	482	1,060	1,542	485	1,069	1,554	489	1,077	1,566
other recyclable	0.037	0.001	3,742	135	3,877	3,771	136	3,907	3,800	137	3,937
other non-recyclable	0.011	0.000	1,108	0	1,108	1,116	0	1,116	1,125	0	1,125
METAL	0.040	0.003	3,992	317	4,309	4,023	319	4,342	4,054	322	4,375
aluminum cans	0.004	0.001	420	127	547	423	128	551	426	129	555
bi-metal	0.000	0.000	0	0	0	0	0	0	0	0	0
ferrous metal & cans	0.027	0.002	2,696	161	2,858	2,717	162	2,880	2,738	164	2,902
non-ferrous metals	0.005	0.000	457	5	462	461	5	466	464	5	470
white goods	0.001	0.000	64	23	88	65	23	88	65	24	89
other	0.004	0.000	355	0	355	357	0	357	360	0	360
YARD WASTE	0.148	0.000	14,767	28	14,795	14,880	28	14,909	14,995	29	15,023
OTHER ORGANICS	0.165	0.007	16,491	727	17,218	16,618	733	17,351	16,745	739	17,484
food waste	0.045	0.000	4,507	0	4,507	4,542	0	4,542	4,577	0	4,577
tires & rubber	0.005	0.001	482	72	554	485	73	558	489	73	562
wood waste	0.067	0.002	6,730	230	6,960	6,782	232	7,014	6,834	234	7,068
crop residue	0.000	0.000	0	0	0	0	0	0	0	0	0
manure	0.000	0.000	0	0	0	0	0	0	0	0	0
textiles & leather	0.005	0.003	482	267	749	485	269	755	489	271	760
other	0.043	0.002	4,290	158	4,448	4,323	159	4,482	4,356	161	4,517
OTHER WASTE	0.039	0.057	3,892	5,687	9,579	3,922	5,731	9,653	3,952	5,775	9,727
inert solids	0.039	0.057	3,860	5,687	9,547	3,890	5,731	9,620	3,919	5,775	9,694
HHW & containers	0.000	0.000	32	0	32	32	0	32	33	0	33
SPECIAL WASTE	0.002	0.000	211	0	211	212	0	212	214	0	214
ash	0.000	0.000	0	0	0	0	0	0	0	0	0
sewage sludge	0.000	0.000	0	0	0	0	0	0	0	0	0
industrial sludge	0.000	0.000	0	0	0	0	0	0	0	0	0
asbestos	0.001	0.000	130	0	130	131	0	131	132	0	132
auto shredder waste	0.000	0.000	0	0	0	0	0	0	0	0	0
auto bodies	0.000	0.000	0	0	0	0	0	0	0	0	0
other	0.001	0.000	81	13	93	81	13	94	82	13	95
Totals	0.891	0.109	89,210	10,899	100,109	89,897	10,983	100,880	90,589	11,067	101,656

Notes: 1) Percentages in this table may differ from other tables due to rounding.
2) The diversion quantities given for material types in this table are estimates provided for regulatory purposes only and are not considered diversion objectives. Source reduction of individual materials other than yard waste was not calculated.

TABLE I-7 (CONTINUED)

	short term disposal rate	short term diversion rate	1993			1994			1995		
			disposed amount	diverted amount	generation	disposed amount	diverted amount	generation	disposed amount	diverted amount	generation
PAPER	0.305	0.096	31,244	9,882	41,125	31,484	9,958	41,442	31,727	10,035	41,761
corrugated containers	0.076	0.037	7,798	3,826	11,624	7,858	3,855	11,713	7,918	3,885	11,803
mixed paper	0.114	0.005	11,719	561	12,279	11,809	565	12,374	11,900	569	12,469
newspaper	0.032	0.043	3,316	4,387	7,703	3,342	4,421	7,762	3,367	4,455	7,822
high grade ledger	0.040	0.011	4,093	1,108	5,202	4,125	1,117	5,242	4,157	1,125	5,282
other	0.042	0.000	4,318	0	4,318	4,351	0	4,351	4,384	0	4,384
PLASTIC	0.072	0.001	7,374	66	7,439	7,430	66	7,497	7,488	67	7,554
HDPE	0.007	0.000	720	40	760	726	40	766	731	41	772
PET	0.002	0.000	182	25	206	183	25	208	184	25	209
film	0.030	0.000	3,075	0	3,075	3,098	0	3,098	3,122	0	3,122
Other	0.033	0.000	3,397	1	3,399	3,423	1	3,425	3,450	1	3,451
GLASS	0.037	0.028	3,798	2,892	6,690	3,828	2,914	6,741	3,857	2,936	6,793
refillable containers	0.000	0.000	2	9	11	2	9	11	2	9	11
CA redemption glass	0.002	0.013	216	1,362	1,578	218	1,372	1,590	220	1,383	1,602
other recyclable	0.024	0.015	2,446	1,521	3,967	2,465	1,533	3,998	2,484	1,544	4,028
other non-recyclable	0.011	0.000	1,134	0	1,134	1,142	0	1,142	1,151	0	1,151
METAL	0.039	0.004	3,991	418	4,409	4,022	421	4,443	4,053	424	4,477
aluminum cans	0.004	0.002	396	164	559	399	165	564	402	166	568
bi-metal	0.000	0.000	0	0	0	0	0	0	0	0	0
ferrous metal & cans	0.026	0.002	2,699	225	2,924	2,720	227	2,947	2,741	229	2,969
non-ferrous metals	0.005	0.000	468	5	473	471	5	477	475	6	481
white goods	0.001	0.000	66	24	90	67	24	90	67	24	91
other	0.004	0.000	363	0	363	366	0	366	369	0	369
YARD WASTE	0.086	0.061	8,848	6,291	15,139	8,916	6,340	15,256	8,985	6,388	15,373
OTHER ORGANICS	0.127	0.045	13,059	4,560	17,619	13,159	4,595	17,754	13,261	4,631	17,891
food waste	0.045	0.000	4,612	0	4,612	4,648	0	4,648	4,684	0	4,684
tires & rubber	0.005	0.001	493	74	567	497	74	571	500	75	575
wood waste	0.030	0.040	3,071	4,051	7,122	3,095	4,082	7,177	3,119	4,114	7,232
crop residue	0.000	0.000	0	0	0	0	0	0	0	0	0
manure	0.000	0.000	0	0	0	0	0	0	0	0	0
textiles & leather	0.005	0.003	493	273	766	497	276	772	500	278	778
other	0.043	0.002	4,390	162	4,551	4,423	163	4,586	4,457	164	4,622
OTHER WASTE	0.039	0.057	3,982	5,819	9,802	4,013	5,864	9,877	4,044	5,909	9,953
inert solids	0.039	0.057	3,950	5,819	9,769	3,980	5,864	9,844	4,011	5,909	9,920
HHW & containers	0.000	0.000	33	0	33	33	0	33	33	0	33
SPECIAL WASTE	0.002	0.000	216	13	228	217	13	230	219	13	232
ash	0.000	0.000	0	0	0	0	0	0	0	0	0
sewage sludge	0.000	0.000	0	0	0	0	0	0	0	0	0
industrial sludge	0.000	0.000	0	0	0	0	0	0	0	0	0
asbestos	0.001	0.000	133	0	133	134	0	134	135	0	135
auto shredder waste	0.000	0.000	0	0	0	0	0	0	0	0	0
auto bodies	0.000	0.000	0	0	0	0	0	0	0	0	0
other	0.001	0.000	83	13	95	83	13	96	84	13	97
Totals	0.708	0.292	72,512	29,940	102,452	73,070	30,171	103,241	73,633	30,403	104,036

TABLE I-7 (CONTINUED)

	short term disposal rate	short term diversion rate	1996			1997			1998		
			disposed amount	diverted amount	generation	disposed amount	diverted amount	generation	disposed amount	diverted amount	generation
PAPER	0.305	0.096	32,097	10,152	42,249	32,473	10,271	42,743	32,853	10,391	43,244
corrugated containers	0.076	0.037	8,011	3,931	11,941	8,104	3,977	12,081	8,199	4,023	12,223
mixed paper	0.114	0.005	12,039	576	12,615	12,180	583	12,763	12,322	590	12,912
newspaper	0.032	0.043	3,407	4,507	7,913	3,447	4,559	8,006	3,487	4,613	8,100
high grade ledger	0.040	0.011	4,205	1,138	5,344	4,254	1,152	5,406	4,304	1,165	5,470
other	0.042	0.000	4,435	0	4,435	4,487	0	4,487	4,540	0	4,540
PLASTIC	0.072	0.001	7,575	67	7,643	7,664	68	7,732	7,754	69	7,823
HDPE	0.007	0.000	740	41	781	748	41	790	757	42	799
PET	0.002	0.000	187	25	212	189	26	214	191	26	217
film	0.030	0.000	3,159	0	3,159	3,196	0	3,196	3,233	0	3,233
Other	0.033	0.000	3,490	1	3,491	3,531	1	3,532	3,572	1	3,574
GLASS	0.037	0.028	3,902	2,971	6,873	3,948	3,005	6,953	3,994	3,041	7,035
refillable containers	0.000	0.000	2	9	11	2	9	12	2	9	12
CA redemption glass	0.002	0.013	222	1,399	1,621	225	1,415	1,640	227	1,432	1,659
other recyclable	0.024	0.015	2,513	1,562	4,075	2,542	1,581	4,123	2,572	1,599	4,171
other non-recyclable	0.011	0.000	1,165	0	1,165	1,178	0	1,178	1,192	0	1,192
METAL	0.039	0.004	4,100	429	4,530	4,148	434	4,583	4,197	439	4,636
aluminum cans	0.004	0.002	407	168	575	411	170	581	416	172	588
bi-metal	0.000	0.000	0	0	0	0	0	0	0	0	0
ferrous metal & cans	0.026	0.002	2,773	231	3,004	2,805	234	3,039	2,838	237	3,075
non-ferrous metals	0.005	0.000	481	6	486	486	6	492	492	6	498
white goods	0.001	0.000	68	24	92	69	24	93	69	25	94
other	0.004	0.000	373	0	373	377	0	377	382	0	382
YARD WASTE	0.086	0.061	9,090	6,463	15,553	9,196	6,539	15,735	9,304	6,615	15,919
OTHER ORGANICS	0.127	0.045	13,416	4,685	18,100	13,572	4,739	18,312	13,732	4,795	18,527
food waste	0.045	0.000	4,738	0	4,738	4,794	0	4,794	4,850	0	4,850
tires & rubber	0.005	0.001	506	76	582	512	77	589	518	78	596
wood waste	0.030	0.040	3,155	4,162	7,317	3,192	4,210	7,402	3,230	4,260	7,489
crop residue	0.000	0.000	0	0	0	0	0	0	0	0	0
manure	0.000	0.000	0	0	0	0	0	0	0	0	0
textiles & leather	0.005	0.003	506	281	787	512	284	796	518	288	806
other	0.043	0.002	4,509	166	4,676	4,562	168	4,730	4,616	170	4,786
OTHER WASTE	0.039	0.057	4,091	5,978	10,070	4,139	6,048	10,187	4,188	6,119	10,307
inert solids	0.039	0.057	4,058	5,978	10,036	4,105	6,048	10,153	4,153	6,119	10,272
HHW & containers	0.000	0.000	34	0	34	34	0	34	35	0	35
						0	0		0	0	
SPECIAL WASTE	0.002	0.000	221	13	235	224	13	237	227	14	240
ash	0.000	0.000	0	0	0	0	0	0	0	0	0
sewage sludge	0.000	0.000	0	0	0	0	0	0	0	0	0
industrial sludge	0.000	0.000	0	0	0	0	0	0	0	0	0
asbestos	0.001	0.000	137	0	137	138	0	138	140	0	140
auto shredder waste	0.000	0.000	0	0	0	0	0	0	0	0	0
auto bodies	0.000	0.000	0	0	0	0	0	0	0	0	0
other	0.001	0.000	85	13	98	86	13	99	87	14	100
Totals	0.708	0.292	74,493	30,758	105,251	75,364	31,118	106,482	76,248	31,483	107,731

TABLE I-7 (CONTINUED)

	medium term disposal rate	medium term diversion rate	1999 disposed amount	1999 diverted amount	1999 generation	2000 disposed amount	2000 diverted amount	2000 generation	2001 disposed amount	2001 diverted amount	2001 generation
PAPER	0.210	0.191	22,940	20,811	43,752	23,210	21,056	44,266	23,362	21,194	44,556
corrugated containers	0.036	0.078	3,904	8,462	12,366	3,950	8,561	12,511	3,976	8,617	12,593
mixed paper	0.071	0.049	7,775	5,289	13,064	7,866	5,351	13,217	7,918	5,386	13,30[illegible]
newspaper	0.028	0.047	3,067	5,127	8,195	3,104	5,188	8,291	3,124	5,222	8,34[illegible]
high grade ledger	0.033	0.018	3,600	1,933	5,534	3,643	1,956	5,599	3,667	1,969	5,636
other	0.042	0.000	4,593	0	4,593	4,647	0	4,647	4,678	0	4,678
PLASTIC	0.072	0.001	7,839	75	7,914	7,931	76	8,007	7,983	77	8,06[illegible]
HDPE	0.007	0.000	763	46	808	772	46	818	777	47	82[illegible]
PET	0.002	0.000	191	28	219	193	29	222	195	29	223
film	0.030	0.000	3,271	0	3,271	3,309	0	3,309	3,331	0	3,33[illegible]
Other	0.033	0.000	3,614	1	3,616	3,657	1	3,658	3,681	1	3,68[illegible]
GLASS	0.025	0.040	2,754	4,363	7,117	2,786	4,414	7,201	2,805	4,443	7,248
refillable containers	0.000	0.000	2	10	12	2	10	12	2	10	1[illegible]
CA redemption glass	0.000	0.015	12	1,667	1,679	12	1,686	1,698	12	1,697	1,71[illegible]
other recyclable	0.014	0.025	1,534	2,687	4,220	1,552	2,718	4,270	1,562	2,736	4,29[illegible]
other non-recyclable	0.011	0.000	1,206	0	1,206	1,220	0	1,220	1,228	0	1,228
METAL	0.039	0.004	4,219	472	4,691	4,269	477	4,746	4,297	480	4,77[illegible]
aluminum cans	0.004	0.002	405	191	595	409	193	602	412	194	60[illegible]
bi-metal	0.000	0.000	0	0	0	0	0	0	0	0	0
ferrous metal & cans	0.026	0.002	2,860	250	3,111	2,894	253	3,147	2,913	255	3,168
non-ferrous metals	0.005	0.000	498	6	503	503	6	509	507	6	51[illegible]
white goods	0.001	0.000	70	25	95	71	25	96	72	25	9[illegible]
other	0.004	0.000	386	0	386	391	0	391	393	0	393
YARD WASTE	0.027	0.121	2,927	13,179	16,106	2,961	13,334	16,295	2,981	13,421	16,40[illegible]
OTHER ORGANICS	0.108	0.064	11,733	7,011	18,744	11,871	7,093	18,964	11,949	7,140	19,08[illegible]
food waste	0.025	0.020	2,747	2,160	4,907	2,779	2,185	4,964	2,797	2,200	4,997
tires & rubber	0.005	0.001	524	78	603	530	79	610	534	80	61[illegible]
wood waste	0.030	0.040	3,267	4,310	7,577	3,306	4,360	7,666	3,327	4,389	7,71[illegible]
crop residue	0.000	0.000	0	0	0	0	0	0	0	0	[illegible]
manure	0.000	0.000	0	0	0	0	0	0	0	0	0
textiles & leather	0.005	0.003	524	291	815	530	294	825	534	296	83[illegible]
other	0.043	0.002	4,670	172	4,842	4,725	174	4,899	4,756	175	4,93[illegible]
OTHER WASTE	0.039	0.057	4,237	6,191	10,428	4,287	6,264	10,550	4,315	6,305	10,620
inert solids	0.039	0.057	4,202	6,191	10,393	4,251	6,264	10,515	4,279	6,305	10,58[illegible]
HHW & containers	0.000	0.000	35	0	35	35	0	35	36	0	3[illegible]
										0	
SPECIAL WASTE	0.002	0.000	229	14	243	232	14	246	234	14	248
ash	0.000	0.000	0	0	0	0	0	0	0	0	0
sewage sludge	0.000	0.000	0	0	0	0	0	0	0	0	[illegible]
industrial sludge	0.000	0.000	0	0	0	0	0	0	0	0	[illegible]
asbestos	0.001	0.000	142	0	142	143	0	143	144	0	144
auto shredder waste	0.000	0.000	0	0	0	0	0	0	0	0	0
auto bodies	0.000	0.000	0	0	0	0	0	0	0	0	[illegible]
other	0.001	0.000	88	14	102	89	14	103	89	14	10[illegible]
Totals	0.522	0.478	56,879	52,116	108,995	57,547	52,728	110,275	57,924	53,074	110,998

TABLE I-7 (CONTINUED)

	medium term disposal rate	medium term diversion rate	2002			2003			2004		
			disposed amount	diverted amount	generation	disposed amount	diverted amount	generation	disposed amount	diverted amount	generation
PAPER	0.210	0.191	23,516	21,333	44,848	23,670	21,473	45,144	23,826	21,615	45,441
corrugated containers	0.036	0.078	4,002	8,674	12,676	4,028	8,731	12,759	4,055	8,789	12,844
mixed paper	0.071	0.049	7,970	5,421	13,391	8,022	5,457	13,479	8,075	5,493	13,568
newspaper	0.028	0.047	3,144	5,256	8,400	3,165	5,291	8,456	3,186	5,325	8,511
high grade ledger	0.033	0.018	3,691	1,982	5,673	3,715	1,995	5,710	3,739	2,008	5,747
other	0.042	0.000	4,708	0	4,708	4,739	0	4,739	4,771	0	4,771
PLASTIC	0.072	0.001	8,036	77	8,113	8,088	78	8,166	8,142	78	8,220
HDPE	0.007	0.000	782	47	829	787	47	834	792	47	840
PET	0.002	0.000	196	29	225	197	29	226	198	29	228
film	0.030	0.000	3,353	0	3,353	3,375	0	3,375	3,397	0	3,397
Other	0.033	0.000	3,705	1	3,706	3,729	1	3,731	3,754	1	3,755
GLASS	0.025	0.040	2,823	4,472	7,296	2,842	4,502	7,344	2,860	4,531	7,392
refillable containers	0.000	0.000	2	10	12	2	10	12	2	10	12
CA redemption glass	0.000	0.015	12	1,708	1,721	12	1,720	1,732	13	1,731	1,744
other recyclable	0.014	0.025	1,572	2,754	4,326	1,582	2,772	4,355	1,593	2,791	4,383
other non-recyclable	0.011	0.000	1,236	0	1,236	1,244	0	1,244	1,253	0	1,253
METAL	0.039	0.004	4,325	484	4,808	4,353	487	4,840	4,382	490	4,872
aluminum cans	0.004	0.002	415	195	610	418	197	614	420	198	618
bi-metal	0.000	0.000	0	0	0	0	0	0	0	0	0
ferrous metal & cans	0.026	0.002	2,932	257	3,189	2,951	258	3,210	2,971	260	3,231
non-ferrous metals	0.005	0.000	510	6	516	513	6	519	517	6	523
white goods	0.001	0.000	72	26	98	72	26	98	73	26	99
other	0.004	0.000	396	0	396	398	0	398	401	0	401
YARD WASTE	0.027	0.121	3,000	13,509	16,510	3,020	13,598	16,618	3,040	13,688	16,728
OTHER ORGANICS	0.108	0.064	12,027	7,187	19,214	12,106	7,234	19,340	12,186	7,282	19,468
food waste	0.025	0.020	2,816	2,214	5,030	2,834	2,229	5,063	2,853	2,243	5,096
tires & rubber	0.005	0.001	537	80	618	541	81	622	545	82	626
wood waste	0.030	0.040	3,349	4,418	7,767	3,371	4,447	7,818	3,394	4,476	7,870
crop residue	0.000	0.000	0	0	0	0	0	0	0	0	0
manure	0.000	0.000	0	0	0	0	0	0	0	0	0
textiles & leather	0.005	0.003	537	298	836	541	300	841	545	302	847
other	0.043	0.002	4,787	176	4,963	4,818	178	4,996	4,850	179	5,029
OTHER WASTE	0.039	0.057	4,343	6,346	10,689	4,372	6,388	10,760	4,400	6,430	10,830
inert solids	0.039	0.057	4,307	6,346	10,653	4,336	6,388	10,724	4,364	6,430	10,794
HHW & containers	0.000	0.000	36	0	36	36	0	36	36	0	36
							0		0	0	
SPECIAL WASTE	0.002	0.000	235	14	249	237	14	251	238	14	252
ash	0.000	0.000	0	0	0	0	0	0	0	0	0
sewage sludge	0.000	0.000	0	0	0	0	0	0	0	0	0
industrial sludge	0.000	0.000	0	0	0	0	0	0	0	0	0
asbestos	0.001	0.000	145	0	145	146	0	146	147	0	147
auto shredder waste	0.000	0.000	0	0	0	0	0	0	0	0	0
auto bodies	0.000	0.000	0	0	0	0	0	0	0	0	0
other	0.001	0.000	90	14	104	91	14	105	91	14	105
Totals	0.522	0.478	58,305	53,422	111,727	58,688	53,774	112,462	59,075	54,128	113,203

TABLE I-7 (CONTINUED)

	medium term disposal rate	medium term diversion rate	2005 disposed amount	diverted amount	generation
PAPER	0.210	0.191	42,420	21,757	64,177
corrugated containers	0.036	0.078	12,195	8,847	21,042
mixed paper	0.071	0.049	13,644	5,529	19,173
newspaper	0.028	0.047	6,197	5,361	11,557
high grade ledger	0.033	0.018	5,582	2,021	7,604
other	0.042	0.000	4,802	0	4,802
PLASTIC	0.072	0.001	8,254	79	8,333
HDPE	0.007	0.000	845	48	893
PET	0.002	0.000	211	30	240
film	0.030	0.000	3,420	0	3,420
Other	0.033	0.000	3,779	1	3,780
GLASS	0.025	0.040	2,879	4,561	7,441
refillable containers	0.000	0.000	2	10	12
CA redemption glass	0.000	0.015	13	1,742	1,755
other recyclable	0.014	0.025	1,603	2,809	4,412
other non-recyclable	0.011	0.000	1,261	0	1,261
METAL	0.039	0.004	4,411	493	4,904
aluminum cans	0.004	0.002	423	199	622
bi-metal	0.000	0.000	0	0	0
ferrous metal & cans	0.026	0.002	2,990	262	3,252
non-ferrous metals	0.005	0.000	520	6	526
white goods	0.001	0.000	73	26	100
other	0.004	0.000	404	0	404
YARD WASTE	0.027	0.121	3,060	13,778	16,838
OTHER ORGANICS	0.108	0.064	12,266	7,330	19,596
food waste	0.025	0.020	2,872	2,258	5,130
tires & rubber	0.005	0.001	548	82	630
wood waste	0.030	0.040	3,416	4,506	7,922
crop residue	0.000	0.000	0	0	0
manure	0.000	0.000	0	0	0
textiles & leather	0.005	0.003	548	304	852
other	0.043	0.002	4,882	180	5,062
OTHER WASTE	0.039	0.057	4,429	6,473	10,902
inert solids	0.039	0.057	4,393	6,473	10,865
HHW & containers	0.000	0.000	37	0	37
SPECIAL WASTE	0.002	0.000	240	14	254
ash	0.000	0.000	0	0	0
sewage sludge	0.000	0.000	0	0	0
industrial sludge	0.000	0.000	0	0	0
asbestos	0.001	0.000	148	0	148
auto shredder waste	0.000	0.000	0	0	0
auto bodies	0.000	0.000	0	0	0
other	0.001	0.000	92	14	106
Totals	0.522	0.478	59,465	54,485	113,950

TABLE I-8: SYSTEM OF REPORTING

Description of Data	Source of Information
Disposal	
Quantity of refuse disposed by FDC at the Newby Island Landfill Reported by Res., Comm. & Ind. sectors	Foothill Disposal Company (FDC)
Quantity of self-haul waste disposed at the Mountain View Landfill by month	City of Mountain View Utilities Dept.
Composition of disposed residential refuse	Waste Generation Study prepared for City of Sunnyvale (1990)
Composition of disposed self-haul refuse	Visual survey by Cal Recovery Systems Waste Quantity and Composition Analysis for the Cities of Palo Alto, Mountain View and Sunnyvale, CA 1989
Composition of disposed commercial/industrial refuse	Quantitative Field Analysis by: Cal Recovery Systems, Waste Quantity and Composition Analysis for the Cities of Palo Alto, Mountain View, and Sunnyvale, CA 1
Source Reduction Quantities	
High Grade Ledger Diversion rate was projected based on diversion rate determined through interviews in Mountain View	Copy shops and City offices using double-sided photocopiers. Based on 500 sheets/ream and 5.25 lbs./ream.
Concrete and Asphalt	City records for materials reused by City crews
Textiles and Leather (used clothing and rags)	Waste Diversion Study for County of Santa Clara EMCON Associates, May 1991
Other Organics (diapers)	Waste Diversion Study for County of Santa Clara EMCON Associates, May 1991

TABLE I-8: (CONTINUED)

Tires	<u>Waste Diversion Study for County of Santa Clara</u> EMCON Associates, May 1991
<u>Recycling Quantities</u>	
Concrete and Asphalt (Private Contractors)	City of Mountain View County Solid Waste Management Plan apportion by population
Composition of Single Family Curbside Recycling	City records
Composition of Buy-Back recycling	DOC 1990 records projected
Composition of Drop-off recycling	Pacific Rim and FDC
Concrete and Asphalt	City records for materials recycled by City crews.
Composition of Vista Site recycling	City records
Composition of Private Commercial recycling	<u>Waste Diversion Study for County of Santa Clara</u> EMCON Associates, May 1991
Composition of Private Industrial recycling	<u>Waste Diversion Study for County of Santa Clara</u> EMCON Associates, May 1991 and COSWMP
<u>Composting</u>	
Christmas Trees	City of Mountain View. Based on 4700 trees at 12 lbs. each.
Wood Wastes	<u>Waste Diversion Study for County of Santa Clara</u> EMCON Associates, May 1991
<u>Special Waste</u>	
Quantity of Sewage Sludge	Palo Alto Regional Water Pollution Control Plan
Quantity of Domestic Water Treatment Sludge	Santa Clara Valley Water District
Quantity of Asbestos. The county-wide quantity of Asbestos-containing waste was apportioned according to population.	Santa Clara County Hazardous Waste Plan
Quantity of Flood Channel Dredge Spoils	Santa Clara Valley Water District

TABLE I-8: (CONTINUED)

Quantity of steel from auto bodies. Data was reported on a state-wide basis and apportioned according to population.	Automobile shredder and scrap steel dealers
Street Sweepings	City Records
Litter from Highways	CALTRANS

TABLE I-9: DIVERSION ALTERNATIVES

WASTE TYPE	Source Reduction	Recycling	Composting	Transformation
PAPER				
corrugated containers	X	X	(X)	(X)
mixed paper	X	X	(X)	(X)
newspaper	X	X	(X)	(X)
high grade ledger	X	X	(X)	(X)
other	X	X	(X)	(X)
PLASTIC				
HDPE	X	X		(X)
PET	X	X		(X)
film	X	X		(X)
Other	X	(X)		(X)
GLASS				
refillable containers	X	X		
Calif. redemption	X	X		
other recyclable	X	X		
other non-recyclable	X			
METAL				
aluminum cans	X	X		
bi-metal	(X)	(X)		
ferrous metal & cans	X	X		
non-ferrous metals	X	X		
white goods	X	X		
other				
YARD WASTE	X	X	X	(X)
OTHER ORGANICS				
food waste	X	(X)	X	(X)
tires & rubber	X	X		(X)
wood waste	X	X	(X)	(X)
crop residue	(X)	(X)	(X)	(X)
manure	X	(X)	(X)	(X)
textiles & leather	X	(X)		(X)
other	X	(X)	(X)	(X)
OTHER WASTE				
inert solids	X	X		
HHW & containers	X	X		(X)
SPECIAL WASTE				
ash	(X)	(X)		
sewage sludge	(X)	X	(X)	(X)
industrial sludge	(X)	(X)	(X)	(X)
asbestos				
auto shredder waste	(X)			(X)
auto bodies	X	X		
other	X	X	(X)	(X)

(1) A diversion method is considered an alternative if it is practiced currently in the United States. Alternatives are indicated by an "X".
(2) An "X" in parentheses, "(X)", indicates that the alternative is not planned for implementation.
(3) Recycling includes mulching and other soil amendment tehcniques which are not composting.
(4) Some waste types include both materials that are amenable to a diversion method and those which are not. For example, some industrial sludge can only be source reduced or disposed. Other industrial sludge can be recycled, composted, or transformed.

CHAPTER II

LIST OF TABLES
(Following Text)

CHAPTER II
SOURCE REDUCTION

INTRODUCTION

Source reduction precedes waste production and addresses how products are designed, manufactured, and used so as to reduce the quantity of waste produced. Waste which is source reduced under the AB 939 regulations is waste which was not produced, but would have been in the absence of diversion programs implemented to discourage their production. This is a difficult concept to implement and administer.

Wastes can be source reduced by increasing the longevity of a product, by using fewer materials in producing products, or by using fewer products. In other words, the amount of waste produced is a function of how much we consume, and how long each consumed product lasts before it is "used up". All successful source reduction programs either create greater efficiency of material use (less consumption) or increase reuse and repair of used items.

A. GOALS AND OBJECTIVES

A.1. GOALS

As identified in California Assembly Bill 939 (AB939), Source Reduction means "any action which causes a net reduction in the generation of solid waste." Through source reduction, the need to collect wastes for landfilling, burning, composting, or recycling can be reduced. The goals of the source reduction programs are to:

- Reduce use of non-recyclable materials.
- Replace disposable materials and products with reusable materials and products.
- Encourage reuse of packaging and products.
- Reduce the amount of yard waste generated.
- Encourage purchase of repairable products.
- Increase efficiency of use of materials during manufacturing and during product use.

- Offer increased opportunities for local businesses.
- Encourage production of minimally packaged products.

A.2. OBJECTIVES

The objectives of the source reduction programs are to :

- Reduce the total waste stream by 2.0% in the short term.
- Reduce the total waste stream by 4.2% in the medium term.

Note that existing source reduction is estimated to be 1.4% of the total waste stream. The stated objectives include existing source reduction.

A.3. TARGETED WASTE TYPES AND CATEGORIES

Decreases in the generation of waste materials can be accomplished through extending the useful life of affected materials, products, or packaging. Readily decomposable organic waste can also be reduced at its source through more efficient food and landscaping materials management.

The waste materials targeted for reduction, beginning with the materials of the highest priority based on estimated weight of waste to be avoided, are:

- Yard waste, primarily residential.
- Paper, plastic, glass, and metal materials as components of packaging or products manufactured in Mountain View.
- Food waste, including restaurants and grocery stores.

B. EXISTING CONDITIONS

A County-wide diversion study was performed for Santa Clara County (see appendix 3). Data from that study has been supplemented by 3E Engineering or City staff. All information below was gathered by 3E or City staff unless noted otherwise.

Source reduction by existing program is presented in Table II-1. The City of Mountain View is already avoiding an estimated 1394 tons of waste per year, or about 1.4% of the total 1990 waste stream.

The City promotes source reduction regularly. Specific source reduction suggestions have been printed in the recycling newsletter, The View, the Office Recycling packet, other handout materials, the City procurement policy, the City landscape guidelines which include drought tolerant considerations, and in the Conservation Exhibit which is displayed in various locations throughout the City. Currently, the City is also researching quantity based user fees, and promotes source reduction through school curricula.

Data for many private source reduction activities is in the hands of firms who understandably may not be willing to share information, or who do not keep records needed to quantify source reduction. The estimates performed almost certainly underestimate existing source reduction activities.

B.1. RESIDENTIAL ACTIVITIES

Estimates were made for current tons being diverted through the following source reduction activities:

- Diaper services to avoid disposable diapers.
- Clothing donated and resold.
- Grocery bag reuse at the Mountain View Senior Center.

Diaper services were interviewed as part of the County wide-study. Diapers are listed as other organics in the Waste Diversion Study.

Transfers of used goods from one owner to another were included in the tons source reduced only if the goods were donated rather than sold. For example, used clothing sold on consignment was not considered source reduction. The repair and sale of donated clothing which would have been landfilled otherwise was considered source reduction. Clothing was reported in volume and converted to weight at ten pounds per cubic foot. This information was obtained by 3E Engineering and City staff from thrift shops in Mountain View.

Grocery bag reuse tons were estimated based on a conversion factor of 2 ounces per grocery bag times 1200 bags per month reused in 1990.

B.2. GOVERNMENT OPERATIONS

Some source reduction is already occurring on a voluntary basis, primarily two-sided copying and employees using their own mugs rather than single-use disposable cups. City offices are estimated to double side about 50% of their xerographic paper use. Twenty of the existing 25 machines owned by the City are capable of two-sided copying.

Quantity of double-sided was estimated based on City purchase records for xerographic paper and a conversion factor of 5.25 pounds per ream.

B.3. COMMERCIAL AND INDUSTRIAL OPERATIONS

A number of businesses are using material-efficient practices, including copy shops, bars and restaurants, repair shops, thrift shops, and other used merchandise dealers. Estimates were made for current tons avoided through source reduction activities for the following materials:

- Tire reuse and retreading.
- Double-sided copying.
- Reuse of asphalt and concrete by City crews.

The quantity of tires disposed in the landfill can be reduced by the purchase of used or retread tires. A typical re-used tire has about 80 percent of its original tread when it is sold. An industry source estimated that 6000 tons of used tires are purchased each year in California. Mountain View has about 0.28 percent of the State's population. Therefore, about 12.6 tons of used or retread tires are purchased rather than disposed each year.

Most larger copy shops in Mountain View have double-sided capability. Some smaller shops do not. It is estimated that about 50% of the xerographic paper used in the shops interviewed is double-sided. Quantities source reduced are estimated based on copy shop usages and 5.25 pounds per ream.

Concrete and asphalt reuse by City crews occurs when materials dug up are appropriate for reuse, and doing so is convenient. These materials are reused as road base, or surfacing for landfill roads. This is not considered recycling since the materials are not remade into new materials, but reused in an "as is" condition.

B.4. NATIONAL ACTIVITIES

Some examples of source reduction efforts are provided both because they affect the City of Mountain View and because they may provide practical examples of what source reduction programs intend to achieve.

- Some manufacturers offer concentrated versions of products which use less packaging (e.g., frozen juices, concentrated pesticides, concentrated soaps).
- Changes by a manufacturer which led to a 50% reduction in the combined weight of disposable diapers and their package.
- A manufacturer combined bleach with laundry detergent and thereby eliminated the need for separate package of bleach.
- One manufacturer changed the tub of a dishwasher from enameled steel to engineered plastic, which enables the warranty on the dishwasher to be increased because the tub is more durable.
- A new blow-molding tool for HDPE milk bottles reduced their weight 10% while increasing strength.
- Plastic bags bought by a major fast food chain to ship its products to its stores are designed to be reused as garbage bags.
- A large video rental and sales chain trains its sales people to reuse the distinctive plastic bags that tapes are carried in and to ask customers to return tapes in the bags. This results in a savings of about $1 million and over 25 million bags annually.
- Reuse of foam packing pellets.

STATUS OF FUTURE PROGRAMS

There are no plans to decrease or phase out any of the existing programs.

C. DESCRIPTION OF ALTERNATIVES

This section identifies four activity areas to achieve source reduction: education, economic incentives/disincentives, investment in equipment, and regulation. These four approaches are listed below in order of priority for implementation. The education program is listed first because all approaches to source reduction must contain an educational component in order to communicate desired behavior changes to waste generators.

C.1. EDUCATION THROUGH TECHNICAL ASSISTANCE AND/OR PROMOTIONS

Education is the cornerstone of an effective source reduction program. Any other approach, such as incentives, free equipment, or even a regulatory approach, will require supplementary education in order to succeed. Listed below are the various types of educational programs for stimulating source reduction.

WASTE SURVEYS

A waste survey is a systematic accounting of the materials input and product/waste output that identifies procedures with potential for source reduction or recycling. The survey identifies quantities of raw materials used as well as mixed waste quantities and composition. Surveys can be performed by Mountain View City staff, shared Santa Clara County staff, trade groups, or nonprofit organizations. A comprehensive waste survey and implementation oriented follow-up, can be performed for only a limited number of businesses each year. In order to efficiently combine services, waste surveyors visiting business could help identify not only source reduction opportunities, but also recycling and composting opportunities for those wastes that cannot be eliminated through source reduction. More information regarding waste surveys can be found in Appendix 4, "Waste Surveys."

The targeted waste generators will make their biggest reductions (often as a result of simple house-keeping changes) shortly after their survey. However, the process of changing practices in many different types of businesses may take as long as a decade. The tons avoided through waste survey work will not necessarily taper off for many years.

TECHNICAL ASSISTANCE TO ORGANIZATIONS AND BUSINESSES

In addition to providing waste surveys to individual firms or institutions, the general approach of the waste survey can be shared with a much wider audience. The concept of materials management in order to reduce waste and the steps to source reduce and also recycle waste can be communicated through a telephone hot-line, literature, public speaking to various groups, or by trade groups and nonprofit organizations to their own members. Going a step beyond general information, fact sheets can be prepared for certain types of waste generators such as restaurants and bars, printers, specific types of retailers, or office settings. In southeastern Iowa, for example, the Iowa Waste Reduction Center (IWRC) produced a 15 minute video on waste management for automobile dealerships, resulting in 160 on-site reviews. The IWRC also provided a number of on-site reviews for farm equipment manufacturers to reduce solvents, painting wastes, and metal finishing rinse waters.

Another way to assist businesses and institutions in source reduction efforts is to refer them to waste exchange information centers. A waste exchange operation can consist of a computer database to match waste generators with others who can use the unwanted materials from the waste generators, or even a warehouse for storing currently unwanted materials. The State of California Department of Health Services currently operates a waste exchange clearinghouse called the "California Waste Exchange." (Department of Health Services, attn. Robert McCormick, Toxic Substances Control Division, Alternative Technology Section, P.O. Box 942732, Sacramento CA 94234-7320). This state-operated waste exchange produces the "Directory of Industrial Recyclers" and the "California Waste Exchange Newsletter/Catalog." It serves primarily hazardous waste generators.

A new state-wide waste exchange, the "California Materials Exchange and Reuse Program," is being developed by the California Integrated Waste Management Board. More information is available by calling 1-800-553-2962. In the San Francisco Bay Area, Ms. Portia Sinnot has assisted the City and County of San Francisco in researching the need for a local waste exchange. Ms. Sinnot's conclusion is that state-wide waste exchanges will suffice, if expanded, but that technical assistance to achieve source reduction must be offered locally. The various counties in the Bay Area can each become experts regarding source reduction for particular industries, and share their waste survey and source reduction approaches with one another.

Assistance to industrial waste generators should recognize the interest of these waste generators to source reduce hazardous wastes prior to focusing their resources on source reducing nonhazardous solid waste. There are three reasons for industrial waste generators to address hazardous source reduction prior to, or concurrently with, nonhazardous solid waste, as follows:

- The regulatory pressure to change generation and handling practices for hazardous waste is currently greater than for nonhazardous solid waste.
- The costs to store, transport, and dispose of hazardous waste are usually much greater than the costs to store, transport, and dispose of nonhazardous waste.

- The amount of administrative time firms have available to address waste management issues is limited and therefore must be directed to these firms' most pressing waste management issues.

COMPOSTING AT SITE OF GENERATION

A significant percentage of the waste stream in Mountain View is yard waste such as grass clippings, weeds, leaves, or brush. Much of this organic material can be avoided or handled on the same land parcels where it is grown, thereby decreasing collection costs and the costs associated with disposal or centralized composting. Back yard composting offers great promise for diverting tons away from collection systems. Food waste can also be handled by a carefully managed back yard composting system. A small percent of Mountain View residents are already managing their own compost piles. Significant increases in backyard composting will require a thorough education campaign over time.

In Alameda County, the Waste Management Authority is investing $159,000 to establish four backyard composting demonstration sites and offer free workshops to teach residents the ins and outs of managing their own compost piles. These demonstration sites and the accompanying educational workshops can be turned over to the municipalities in which the demonstration sites are located for future operation by the cities.

OTHER ON-SITE YARD WASTE MANAGEMENT TECHNIQUES

There are four additional methods available, other than composting, to reduce the need for yard waste collection, including:

1. Leaving grass clippings on the lawn, rather than collecting and disposing of them. Special mulching mowers are available and some standard mowers accept special blades or discharge chutes that convert them into mulching mowers.
2. Using uncomposted yard wastes as a mulch to spread on the soil surface around the base of trees or bushes, or in flower or vegetable gardens. Such mulch can modify soil temperature and moisture and control weeds and soil erosion.
3. Switching to drought-resistant vegetation in order to reduce the production of foliage.
4. Operation of small chippers to handle brush on-site. Gasoline-powered chipper/shredders can be used on a neighborhood by neighborhood basis. Such a program can substantially reduce the amount of brush requiring curbside collection.

Each of these source reduction opportunities for yard wastes can be implemented by residential and nonresidential yard waste generators if proper education programs are implemented.

SCHOOL PROGRAMS

The school system provides an excellent opportunity to reach residents with educational messages. The implementation of source reduction programs for school wastes and the curriculum to communicate these concepts to students could be tied together through student participation in demonstration programs. The efficiency of school programs can be maximized through cooperative efforts, including:

- The use of materials already produced and tried out elsewhere. For example Minnesota, through its Waste Education Coalition, has developed a K-6 waste education curriculum tailored to Minnesota's needs. These educational materials, along with others from around the country, will help Mountain View efficiently develop its own education program.
- Cooperation among Santa Clara County cities in sharing their materials and approaches.
- Combination of source reduction curricula and student projects with analogous curricula and projects for recycling and composting. As an example, a school program could involve setting up a controlled yard and food waste compost pile on the school grounds to be managed by biology classes.

MODEL BUSINESS PROGRAM

Awards for the source reduction of wastes can offer three benefits in promoting source reduction: recognition of firms that have already been source reducing solid waste through wise material management, an incentive for more firms to catch the eye of the public and be identified with new "environmentally friendly" initiatives, and the ability to reach the public with clear examples of source reduction programs. Some examples of potential award recipients are:

- A dry cleaner could be offered an award for taking back hangers for reuse and for filtering and reusing its dry cleaning solvents.
- A packaging store reusing polystyrene packing peanuts or shredded paper.
- A local copy shop choosing copy machines with user-friendly two-sided copying functions when investing in new machines.

These awards could be publicized with an announcement in local papers, and the firms could be given a certificate or sticker to post in a prominent place for customers to see.

Another approach is to invest in an information campaign to communicate the concept of source reduction to residents. An example is the "Precycle" Campaign launched by the City of Berkeley. A poster and media events were used to suggest to residents that they reduce their waste as a step ahead of recycling their waste.

MODEL PROGRAMS AT CITY OFFICES

There are many source reduction opportunities within office settings, most of which can be implemented by the City of Mountain View. After learning first-hand about source reduction by implementing a program in-house, the City could then publicize its source reduction efforts and assist others in implementing the same programs. For example, a thorough source reduction program for county operations was implemented by Itasca County, Minnesota with the help of the Minnesota Office of Waste Management. The waste materials targeted for source reduction included:

- Office paper reduced through two-sided copying.
- Drinking cups avoided through the use of ceramic mugs.
- Junk mail avoided by writing to direct mail marketers from whom materials had been received.
- Using discarded one-sided copies as scratch paper.
- Buying cleaning solutions and other products in reusable containers.
- Replacing paper towels with hand towels in rest rooms.
- Air filters used in the garage for county vehicles reduced through cleaning rather than replacing of the filters.
- Linking garage sales with "cleanup days". Many cities have several days each year when free collection of household items is offered. In Mountain View, the City could promote garage sales to occur the weekend before these "cleanup days" in order to reduce the disposal of reusable or repairable items. Items not sold but reusable or repairable might be collected by charitable organizations after the garage sale period is over, but prior to collection for disposal.

C.2. ECONOMIC INCENTIVES AND DISINCENTIVES

LOCAL WASTE DISPOSAL FEE MODIFICATIONS

A disposal fee modification would take the form of an increased tipping fee for waste arriving at all landfills servicing the City of Mountain View, or all landfills in Santa Clara County.

Before tipping fees are significantly increased through surcharges, an education program for haulers and waste generators would be needed in order to mitigate rate shock and possible illegal dumping.

Any surcharges at the landfill must not produce revenues in excess of the funding requirements for local solid waste planning and program implementation (AB 939, section 41901). Surcharges must also be linked with the quantity of waste received rather than charging each gate entrant the same surcharge.

QUANTITY-BASED USER FEES

When waste generators pay higher waste hauling costs for greater quantities of waste hauled, there is an incentive to decrease the amount of waste set out for pick-up. As with surcharges at disposal facilities, revenues generated from local hauling fees cannot exceed the funding requirements for local waste planning and program implementation. There are a number of ways to charge customers based on the quantity of waste set-out for pick-up, including:

- Greater cost for larger containers or greater cost for more containers. This may require hauling crews to record the number of bags or cans set out by each household.
- Require the use of city-designated bags with disposal costs built into the bag purchase price. Collection fees are charged to all customers at a fixed rate since the collection truck must stop for collection at least once per week regardless of how much or little waste is produced.
- Weighing the waste set out for pick-up with a scale, in combination with a written or computerized system to log waste quantities set out by individual households.

The first method, charging residents based on the number of containers they set out, is in use many places. The system may involve subscribing for one, two, or three can service, or counting of the number of cans set out by the collection crews. This second approach is more difficult to administer, but better implements the concept of metered service.

Some Bay Area examples are the City of Benicia and the City of Berkeley. In Benicia, the first set-out container costs residents $9.70 for collection service, and the second container of the same size costs $5.00 for service. This offers more incentive to decrease waste quantities set-out at the curb than a system that allows unlimited waste set-outs for the same monthly fee. Another incentive is provided by charging the same or more for each container beyond the first container.

Residents in the City of Berkeley pay the same amount for each additional 32-gallon set-out container. For the City's three hauling districts, households pay an average of $10.60 per month for each 32-gallon container serviced weekly for mixed waste pick-up. Since the program was instituted in 1978, the amount of mixed waste set out for pick-up has declined, although much of this decrease is a result of waste diversion into the City's curbside recycling program (personal communications, Louis Arnold, City of Berkeley, 1/30/91). Steeper rate structures—those that charge relatively higher amounts for each additional set-out container—will offer waste generators greater source reduction incentives than flat rates.

The second method, charging residents by the bag, can be done by selling waste bags for a fee and requiring that mixed waste be set out for pick-up using one of these designated bags. Residents could buy a trash bag bearing the label "For residential solid waste pick-up in the City of Mountain View." The bags could be available at a variety of grocers, hardware stores, and other retailers in the community. For example, using $1.00 as an arbitrary price per bag, a resident who set out one bag of solid waste for collection would be paying $1.00 for that week's garbage disposal, while a resident setting out two bags would be paying $2.00. This system has been used successfully for many years in some communities.

The third system, weighing the waste set-out containers and charging residents by the pound, has never been implemented on a full scale. A pilot project was conducted in Seattle, and a new system is planned for the City of Farmington, Minnesota beginning in April, 1991. In Farmington, the weights of waste set out will not be used to determine hauling bills until January, 1992 after the weighing systems bugs have been worked out. This type of quantity-based pricing for waste hauling offers the most tangible link between waste quantities picked up and the price paid for hauling service, although such systems have not yet had a chance to develop a track record regarding feasibility and cost. A possible side-effect of weight-based hauling fees is switching from a heavy material to a light-weight material, for example switching from glass packaging to plastic packaging. Such a switch may or may not be desirable because of relative harms of different waste materials when recycled, composted, combusted, or landfilled.

Changing from fixed fees for unlimited pickup, or from a system where fees are collected through taxes, can involve a significant change in billing methods as well as an attitude change on the part of the residents. For most cities, there is already a computer database for billing, whether for waste or water, which can be adapted to reflect differences among households. As for resistance among residents regarding the loss of unlimited set-out privileges, working with the press and preparing mailers will help customers understand the reasons for the change. Making sure there are convenient opportunities for customers to reduce and recycle waste is essential, as is enforcing penalties for illegal dumping.

Quantity-based user fees can be a burden for some fixed- or low-income customers. Establishing special rates for low-income citizens, or building "lifeline" components into the rates (such as PG&E has done for gas and electric service) will mitigate the impact. Some residents will reduce their mixed waste hauling service needs substantially through careful buying and recycling. In conjunction with selecting a quantity-based rate system, there is almost certainly a need for a service level smaller than a full can or standard bag size.

LOANS, GRANTS, AND LOAN GUARANTEES

Providing money to private sector or nonprofit parties may allow investment in equipment or educational materials that will result in the source reduction of solid waste. For example, a local convenience store could perform a pilot program to sell reusable drinking cups and encourage customers to wash them and keep them in their cars for refilling. The cost of the drinking cups and the educational campaign for customers could be covered through a small loan, grant, or loan guarantee. The money could also be used by a manufacturer for the following source reduction investments:

- Design changes in products to offer longer product life.
- New production line equipment that reduces production waste.
- New packaging equipment to decrease the amount of packaging materials used per item.
- New packaging line equipment to allow for a redesigned refillable package.

A loan or grant program could be used in conjunction with waste survey and technical assistance programs which would identify opportunities for waste-reducing investments. Such a program would start out small by looking for a few waste generators at a time.

DEPOSITS, REFUNDS, AND REBATES

The source reduction objective of applying a deposit or refund to a product or its packaging is to claim back the product or packaging for reuse. For example, a food retailer might serve food in reusable containers with deposits. These containers would then be returned, washed, and reused.

REDUCED BUSINESS LICENSE FEES

Reduced business operating license fees could be offered to waste generators who perform some type of source reduction function. Examples of applicable programs include employee education programs for in-house source reduction, double-sided copiers, the preparation of a solid waste generation plan, or participation in a source reduction workshop sponsored by the city or county.

C.3. PUBLIC SECTOR INVESTMENT PROGRAMS

WASTE EXCHANGE DATABASE

There are a number of waste generators producing waste materials that could be used by other local parties. The missing ingredient to match these waste generators with the appropriate material reusers is information. By investing in a local waste exchange computer database, these material matches could be made to avoid unnecessary waste. A waste exchange database implemented on a larger scale is preferable, in order to increase the types of materials available and the potential users for these materials.

WASTE EXCHANGE WAREHOUSE

Although a city-level waste exchange database may not be able to achieve the critical mass of participation necessary for success, a waste exchange warehouse with donated waste materials for a specific purpose can work well. This type of source reduction through use of unwanted paints and building materials has been tried successfully in New York City with the New York Materials for the Arts. Similar programs are operating in Boston (RECYCLE, Boston Children's Museum) and in San Diego (the San Diego Materials Bank).

BACK YARD COMPOSTING BINS

Providing free or subsidized composting bins would probably increase backyard composting participation rates. If bins are given out, they should be accompanied by an education program and a place to call with questions, otherwise bins will end up being used as storage containers. If the City of Mountain View decided to provide or subsidize compost bins to residents, some portion of the bin cost should be contributed by the residents receiving the bins. Even a $5.00 or $10.00 contribution by the resident will help to decrease the cost of distributing bins.

SALE OF CLOTH REUSABLE GROCERY BAGS

Reusable cloth grocery bags are a small way residents can reduce waste every time they shop. The City of Mountain View could make canvas grocery bags available for sale in local grocery stores, printed with the City's logo and a few words about source reduction of waste, with or without the name and logo of the grocer.

C.4. REGULATORY PROGRAMS

LOCAL PROCUREMENT POLICIES

City policies or ordinances can be designed to encourage, or require, the following attributes for products or packaging purchased by the City of Mountain View:

- durability
- recyclability
- reusability
- recycled material content

Both product durability and packaging reusability are examples of source reduction.

LAND-USE REQUIREMENTS

Through zoning regulations and the permitting process for new construction, cities have an opportunity to guide their business community toward source reduction opportunities. For example, builders or management firms for planned shopping malls could be required to seek repair shops or used merchandise retailers before being granted a construction permit or a local operating license. Developers are often not supportive of businesses that reuse or repair because of the public perception that they will be unattractive.

SOURCE REDUCTION PLANS

The procedure for producing a source reduction plan is much the same as a waste survey. A plan represents greater detail and a longer commitment over time than a waste survey performed by an outside party. Large waste producers (large in relation to the community wastestream) in the commercial and industrial sectors could be required to develop in-house source reduction plans to target materials from production, packaging, and operational aspects of their businesses.

Given the diversity of business types and the range of wastes they generate, it is difficult to specify what changes in practices could be implemented without a careful analysis of each operation, which is beyond the scope of this SRRE. Businesses could be required to target materials for both source reduction and recycling, and implement programs designed to meet the goals established in this report. The implementing agency would provide a model format for businesses to follow, and would provide limited staff assistance to businesses in the form of plan review.

BANS ON PRODUCTS AND PACKAGING

Where local residents feel strongly about environmental issues related to packaging and no steps are being taken on a state or federal level, some cities have set forth their own packaging requirements. For example, the cities of Minneapolis and St. Paul have passed ordinances requiring all food packaging to be refillable, recyclable, or degradable.

D. EVALUATION OF ALTERNATIVE PROGRAMS

The following criteria were used in evaluating source reduction activities:

1. Cost

   - Estimated cost to the City

   - Estimated cost to the targeted waste generators

2. Educational value

   - Promote resource-efficient behaviors. This includes estimated hazards of the solid waste to be managed.

- Involve generators in resource management decisions.

3. Local economic development potential

4. Track record

   - Estimated ease of implementation and success in avoiding solid waste production, as demonstrated in programs elsewhere.

   - Avoidance of shifting from one waste material to another rather than achieving a net reduction in waste generated.

5. Institutional Barriers

   - Whether or not the City has the administrative resources and political support to implement the program.

6. Conformance with Local Conditions

   - Whether or not the activity is best implemented on a higher level of government than the municipal level.

   - Availability of existing communication channels to distribute "how-to" information to targeted waste generators.

   - Adaptability to changing technical, economic, and social conditions.

   - Consistency with local policies, plans, ordinances.

   - Availability of existing facilities.

7. Time frame

8. Facility expansion or new construction required (because the source reduction activities discussed are primarily educational, they do not require the construction or expansion of solid waste handling facilities.)

Primary criteria used to select the pilot source reduction activities for Mountain View were ability to avoid production of significant tons of waste, educational potential, and conformance with local conditions.

Each source reduction activity is rated in Table II-2. An explanation of the key issues for each activity follows.

D.1. EDUCATION THROUGH TECHNICAL ASSISTANCE AND/OR PROMOTIONS

All of the source reduction activities have in common the need to work cooperatively with other cities and Santa Clara County in order to avoid unnecessary and costly duplication of work. Educational activities to promote source reduction are all appropriate for implementation at the local level, and the cost to the City can be low if planning is shared with others. Significant quantities of solid waste can be diverted over time.

SALE OF CLOTH REUSABLE GROCERY BAGS

Offering canvas grocery bags for sale by local grocers a tangible example of source reduction and highly visible. This source reduction activity is attractive for many of the same reasons that an awards program is attractive, high educational value, fit with local interests, and it can be implemented quickly. Even though this is a desirable source reduction activity, it is already being done by the private sector (Lucky stores in the Bay Area have already made canvas bags available for sale). Local grocers should be encouraged by the City to follow the lead of Lucky.

IN-HOUSE PROGRAMS AT CITY OFFICES

In addressing the high quality paper fraction of the waste stream for source reduction, businesses and institutions in the City are an appropriate target for a source reduction education campaign. The City will be most helpful to others if it has attempted its own in-house source reduction campaign. Although a successful program can require significant attention from assigned City staff, this source reduction approach will both give the City good information about what it can expect from other local waste generators and personally involve City employees at all levels. The personal involvement of all City employees or volunteers can result in greater top-down commitment for other source reduction programs. The educational value and long-term low cost of this source reduction measure make it desirable for implementation.

COMPOSTING AT SITE OF GENERATION

Back yard composting ranks high as a possible source reduction activity for the city because of the potential to avoid significant quantities of waste. Source reduction of green yard wastes is compatible with the brush drop-off, collection, and mulching programs described in more detail in Chapter IV.

OTHER ON-SITE YARD WASTE MANAGEMENT TECHNIQUES

As with back yard composting programs, the tons of waste to be avoided through other at-home yard waste management practices is great. Moreover, the cost for these education programs is relatively small. Information about mulching, planting, chipping, shredding, and drought tolerant landscaping can be disseminated as part of an educational program on backyard composting. Such a campaign should be conducted before the City invests in chippers or shredders for use by residents.

WASTE SURVEYS

Costs associated with waste surveys include the cost to train a waste surveyor and the cost for the auditor to make site visits and write-ups as appropriate. These costs can be minimized by working with Santa Clara County, other cities, state agencies, or other groups. If done efficiently, waste surveys offer significant medium term potential (and beyond) for source reduction for little cost. They can also offer cost-saving ideas to businesses, and help educate City staff in what the local waste stream contains and what can be done to abate and manage this waste stream. For these reasons, waste surveys rank high among possible programs to foster source reduction.

TECHNICAL ASSISTANCE TO ORGANIZATIONS AND BUSINESSES

Technical assistance to organizations and businesses can take the form of waste surveys, or can be the simple sharing of information with targeted business types of similar waste generation characteristics. It is a high priority for the same reasons that waste surveys are a high priority. Where the specialized knowledge is not available locally to offer assistance to a particular business, contact lists of other assistance resources around the state or the nation should be maintained and provided. Technical assistance in the reduction and recycling of nonhazardous waste, for industrial waste generators, should be combined with assistance in minimizing hazardous waste materials.

SCHOOL PROGRAMS

This educational activity to promote source reduction is best addressed through cooperation with other cities and Santa Clara County. The ability to use existing communication channels—the schools—makes curricula and pilot project programs for schools a very high priority. Moreover, the demographic make-up of Santa Clara County and its cities is characterized by many children of school-age and many adult employees of the school system. This fit with local conditions makes school programs desirable for implementation.

MODEL BUSINESS PROGRAMS

Awards programs for source reducers are low-cost to the City, and will take advantage of existing communication channels by presenting information to the local news media and other local information distribution opportunities. Awards programs have a low cost, high educational value, a proven track record, seem to fit with local interests, and can be implemented quickly. Awards programs are therefore among the top priorities for promoting source reduction.

D.2. ECONOMIC INCENTIVES AND DISINCENTIVES

TIPPING FEE INCREASES AND QUANTITY BASED FEES

Increased tipping fees and quantity-based hauling fees are unambiguous messages to waste generators that increasing quantities of waste generated is not in their favor from a hauling and disposal cost perspective. A quantity-based collection pricing scheme can require significant alterations in billing practices. Although these programs are "sticks" rather than "carrots" in terms of motivating waste generators to reduce waste, they remain a high priority because of the fit with local conditions and the no-cost or revenue-producing potential for these programs.

Unfortunately, decreases in waste generation rates as a result of increased collection or disposal fees cannot be easily projected. Responses by waste generators to increased fees depend on a number of factors, including existing recycling options, local mindset, method of instituting increased fees, and assumed elasticities for response to changing prices (personal communications, Lisa Skumatz, Synergic Resource Corporation, Seattle, March 29, 1991). Even after taking into consideration related factors, linking the waste tons avoided with increased collection or disposal fees is subject to uncertainties and background changes in waste generation rates due to fluctuations in economic activity, etc. For these reasons, no tonnage projections have been made regarding results of economic disincentives.

The City is not able to impose surcharges on wastes disposed of at landfills beyond City boundaries. Since the Mountain View landfill is scheduled to close soon, implementation of landfill surcharges is considered administratively infeasible.

LOANS, GRANTS, AND LOAN GUARANTEES

Financial incentives in the form of "carrots" (loans and grants) to source reduce solid waste can offer some creative local source reduction examples for others to mimic, but will be a net cost to the City to implement in the short run. If funds are to be made available to waste generators through grants and/or loans, these funds should be sought from future programs established by the State of California.

DEPOSITS, REFUNDS, AND REBATES

These programs would require an accompanying education campaign. As long as an education campaign would be required, such an educational effort is recommended for implementation ahead of imposition of deposits, refunds, and rebates.

REDUCED BUSINESS LICENSE FEES

Since the business fees in the City are small, changes in fees are likely to result in little or no effect on waste generating behavior.

D.3. PUBLIC SECTOR INVESTMENT PROGRAMS

BACK YARD COMPOSTING BINS

Although yard waste composting is a significant part of a successful source reduction program, the cost of distributing backyard composting bins to residents is high. Before a bin distribution program is undertaken, the City needs more information about which types of bins are easiest to use and most effective for Santa Clara County's weather conditions and waste composition

WASTE EXCHANGE DATABASE

A locally operated waste exchange does not offer great diversion potential and would be less effective compared to participating in a state-wide or County-wide waste exchange. A waste exchange program has been proposed on a County level for household hazardous wastes. An exchange on the County level is likely to be effective.

WASTE EXCHANGE WAREHOUSE

A waste exchange warehouse is likely to be unsuccessful if implemented locally for the same reasons a waste exchange clearinghouse would be unsuccessful (less than critical mass of participants). There may be a role for selected nonprofit groups to establish their own calls for materials; for example, a theater group requesting used furniture, interior walls, paints, and fabrics.

D.4. REGULATORY PROGRAMS

LOCAL ORDINANCES AND BANS ON PRODUCTS AND PACKAGING

The City may affect waste generation through ordinances, for example city-wide bans for certain types of packaging, however, these are less effective than bans on the state of federal level. At present, a product ban would be inconsistent with City policy.

LAND-USE REQUIREMENTS

Land-use requirements can be difficult to implement because mandates for certain types of businesses may not coincide with local markets for these businesses. Rather than requiring particular types of businesses through land-use requirements, the City should work towards creating a demand for these business through its public education efforts.

SOURCE REDUCTION AND RECYCLING PLANNING AND REPORTING REQUIREMENTS

Local businesses should be given an opportunity to work out their own source reduction and recycling programs before being required to do so by the City. Source reduction planning and reporting should only be required if the results of technical assistance and private sector initiative are unsatisfactory.

E. SELECTED PROGRAMS

Eight programs have been selected. These programs are individually small in scale and cost. Together they provide a framework in which source reduction activities become more credible over time. As addressed in the funding component, their diversion cost per ton is favorable when compared with most recycling and composting diversion programs.

One of the major factors affecting the selection of programs is the large commercial and industrial base in Mountain View. In 1990, the businesses in the City were estimated by ABAG to employ approximately 68,000 people; by the year 2005 that figure is projected by ABAG to increase to approximately 79,000 people (an increase of 16%). In contrast, the number of households in the City was about 30,000 in 1990, and is only expected to increase to about 33,000 (10% increase) by the year 2005. While targeting the residential sector for source reduction, particularly reduction of green yard wastes, is important, the City's large number of existing and projected new businesses could offset any residential diversion program successes if they were to produce waste needlessly.

E.1. EDUCATION THROUGH TECHNICAL ASSISTANCE AND/OR PROMOTIONS

The following programs have been selected for implementation to provide source reduction education through technical assistance and/or promotions:

- Source reduction program for City offices. In-house purchasing preferences or prohibitions on certain product types, such as single use plates, napkins, cups, non-refillable containers, and so forth will be considered in this program
- Promote composting and other on-site yard waste management techniques, including drought tolerant landscaping guidelines.
- Awards for exemplary waste reducers in the local business community.
- Information regarding participation in regional or state-wide waste exchanges.
- School curricula, school demonstration programs, and teacher workshops as approved by local school authorities.
- Waste surveys to promote source reduction. These will be coordinated with waste surveys to identify recyclable materials for collection as described in the recycling component.
- Additional technical assistance for local businesses and institutions, in the form of manuals and other how-to information, and on-site assistance for large generators.

E.2. ECONOMIC INCENTIVES AND DISINCENTIVES

The following economic incentives and disincentives have been selected to promote source reduction:

- Quantity-based collection fees for residential customers. This program will be implemented in two phases. In the short-term, mild quantity based rates will be adopted so that generators are aware of the cost of producing more waste. In the medium-term, after diversion has been made convenient for all residents and businesses, the quantity based rate structure will be steepened.

E.3. PUBLIC SECTOR INVESTMENT PROGRAMS

No public sector investment in capital equipment or other tangible source reduction tools is selected at this time. Although development of a locally-operated waste exchange is not a selected program, there can be a role for a small scale program for selected household hazardous wastes, especially cans of paint. This service could ideally be provided by existing nonprofits or private sector operations rather than by the City of Mountain View.

E.4. REGULATORY PROGRAMS

No regulatory programs for source reduction are selected at this time.

E.5. TONS OF WASTE AVOIDED

New source reduction programs for the City of Mountain View will result in avoiding at least 2,002 tons per year by 1995 (about a 608 ton increase over current source reduction of 1394 tons), or about 2.0% of the community's waste stream in that year. Waste avoided through source reduction programs will be at least 4,204 tons per year by the year 2000, or about 4.2% of the waste stream.

Over 80% of the new tons source reduced (about 1,600 tons) are likely to be avoided yard waste generation. Less than 20% of the new tons source reduced (about 400 tons) is likely to be various materials reused in the workplace, or saved through improved business practices. Such improvements are difficult to estimate or achieve on the local level.

These tonnage values are probably less than 50% of the true tons to be avoided, since abatement for a number of the source reduction programs cannot be projected accurately by material type (for example, tons abated due to increased refuse service fees), and are therefore excluded from these projections under current CIWMB regulations.

F. PROGRAM IMPLEMENTATION

F.1. RESPONSIBLE PARTIES

Staffing or contract labor support needs by program are listed in Table II-3. The Solid Waste Division of the Utilities Department will be responsible, overall, for program implementation. Responsible parties are listed by task in Table II-4.

F.2. IMPLEMENTATION TASKS AND SCHEDULE

Implementation schedules for planned programs include the tasks which must be undertaken during program implementation. Schedules for the selected programs are presented in Table II-4.

F.3. COST OF PROGRAMS

Source reduction program implementation dates and costs are presented in Table II-3. Total annual costs for source reduction, once all programs are in place, are estimated to be about $140,000 (1991 dollars). All programs will not be in place until 1996. These cost estimates include a 20% contingency.

G. MONITORING AND EVALUATION

G.1. ANNUAL MONITORING

The approach to measuring the tons avoided through source reduction programs encouraged by the CIWMB is called the "bottom-up" approach. Tons of waste avoided through the individual source reduction programs are summed for all programs. For example, the estimated tons avoided through a back yard composting program are added to the tons avoided through working with a local printer to encourage two-sided copying, and so on.

The top-down approach of measuring waste generation rates city-wide is essential to gauge large changes over time in a community's degree of wastefulness. Although the California Integrated Waste Management Board currently discourages a top-down approach for monitoring source reduction programs because one cannot link particular source reduction activities with material specific reductions, a top-down measurement approach should be implemented anyway. This type of measurement approach may be acceptable to the CIWMB at a later time. It may be the only source reduction measurement methodology which accurately assesses source reduction program success.

In order to account for increases in population and the number of jobs, the City of Mountain View will sum material tonnages going to recycling, composting, burning, and landfilling from residential sources and from nonresidential sources. These tonnages will be used annually to derive two numbers: annual tons of residential waste per capita, and annual tons of nonresidential waste per job. If these numbers decline over time, source reduction activities are succeeding.

Successful source reduction relies on significant changes in the "throw-away" behavior of residents. Since changes in resident and business attitudes towards waste generation will likely precede behavior changes, and tons abated, it is important to know how these attitudes are changing. Therefore, in addition to measuring the results of each source reduction activity, residents' and business' attitudes, level of understanding, and opinions about source reduction should be tracked through annual surveys.

All three methods will be used annually to monitor the effectiveness of source reduction programs.

G.2. REPORTING

All information will be reported annually to the City, or obtained by the City in an annual attitude or behavior survey. Reporting data will be required, and will be a condition of getting a business license or franchise agreement renewal or extension. Mountain View employees will be responsible for performing monitoring functions, including information gathering, compiling, and report writing, unless a regional arrangement for these services is made.

Operators of solid waste disposal facilities will be required to report for Mountain View generated waste:

- Monthly data on total tonnage of material received, marketed, and disposed by material type and origin.
- Any change in tipping fees charged.
- Any special events which would effect tonnages disposed, such as a large demolition job or residential spring cleanup, and their estimated "special event tonnage" over and above normal tonnage.

G.3. REMEDIAL MEASURES

The tonnage diverted by source reduction each year will be compared with the tonnage projected to be diverted that year by source reduction. If program success cannot be determined with an annual assessment of tons avoided, an increased frequency of accounting for tons can be implemented. For example, if yard waste handled by residents on their own property cannot be estimated with an annual survey, this estimation could be done during peak yard waste generation seasons each year. If actual diversion falls short of the projection, the following actions will be taken in the order described:

1. Total tonnage diverted by all programs in that year will be compared with total tonnage projected to be diverted by all programs. If total actual diversion equals or exceeds projected diversion no further action is necessary.
2. Additional educational and informational actions will be taken if it appears that the tonnage shortfall is the result of low participation or awareness.
3. Funding of all solid waste related expenses will be progressively shifted to user fees as necessary to encourage lower generation rates per resident and per job.
4. If educational programs are not successful in decreasing waste generation rates for commercial and industrial waste generators, source reduction plans should be required from all waste generators producing more than a specified threshold per year of solid waste.
5. If necessary, additional programs beyond those described in this document will be investigated, designed, budgeted, and implemented.

TABLE II-1: CURRENT SOURCE REDUCTION BY PROGRAM

Programs	Quantity (tons)	Material Type
Diaper laundering services	158.1	Other Organics
Thrift Shops	267.2	Textiles and Leather
Senior Center Paper Grocery Bag Reuse	0.9	Corrugated Paper
Copy shops and City offices using double - sided photocopiers	18.5	High Grade Ledger
Estimate of reused tires based on interviews with used tire collectors	12.6	Tires
City Crew Reuse	937.0	Inert Solids (concrete and asphalt)
Total Source Reduction:	1,394.3	Tons in 1990

TABLE II-2: RATINGS OF SOURCE REDUCTION ACTIVITIES

Activity	Cost	Educational Value	Diversion Potential	Development Potential	Track Record	Institutional Barriers	Local Conditions	Overall Rating
Education								
Subsidize canvas grocery bags	Med-High	High	Low	Low	High-Low	Med	High	Med
In-hse. source redctn at City offices	Med	High	Low-Med	Low	High-Low	High	High	High
Upstream yard waste mngmt education	Med	High	High	Med	Med-Low	Med	High	High
Awards, commerc/industrl. generators	Med	High	Med-High	Med	Med	Med	High	High
Partic. in regional waste exchange	Med	Low-Med	Med-High	Med	Med	Med-High	Low-High	Med-High
School curric. & student projects	High	High	Low	Low	High	Med-High	High	Med
Technical asst. to biz w/ office space	High	Med-High	High	Med-High	High	Med-High	Med-High	High
Technical asst. to commerc/industrl.	High	Med-High	High	Med-High	High	Med-High	Med-High	High
Incentives/Disincentives								
Surcharge at disposal facilities	High	Med	Med-High	Low	High	Med-High	Med-High	Med-High
Quantity-based hauling fees, residential	Med-High	High	High	Low	High	Med-High	High	High
Loans, Grants, & Loan Guarantees	Low-Med	Low-Med	Low-Med	Med	Med	Low	Low	Med
Deposits, Refunds, & Rebates	Med	Med-High	Med	Low	High	Low	Low	Med
Reduced Business Lic. fees	Med	Med	Low-Med	Low	Low	Low	Low	Low
Providing the Tools								
Back yard compost bins	Low-Med	High	Med-High	Low	High	Med-High	Med	Med
Local waste exchange database	Low	Low	Low	Low	Low	Med	Med	Low
Local waste exchange warehouse	Low	Med	Low	Low	Med	Med	Med	Low
Neighborhood Chipper	Med	Med	Med-High	Low	Med	Low	Med	Med-High
Regulations								
Drought-resistant landscp guidelines	High	Med-High	Low-High	Med	Low	Low	Low	Med
Other local ordinances	High	Med-High	Med-High	Low	Low	Med	High	Med
Land-use requirements	High	Low-High	Med	Med	Low	Low	Med	Med
Source reduction planning requirements	High	Med-High	Med-High	Med	Med	Med	Low	Med
Bans	Med	High	High	Low	Med	Med	Low	Med

Note: A range (e.g. med-high) indicates that the rating changes from the short-term (to 1995) to the medium-term (after 1995).

TABLE II-3: COST ESTIMATES FOR SOURCE REDUCTION PROGRAMS (1)

	Start-up Year	Start-up Costs (2)	Personnel Services (3)	Annualized Start-up Costs(4)	Other Annual Costs(5)	Total Annual Costs(6)
Waste Surveys	1992	50,000	0.10	13,170	8,440	25,932
In-house Source Reduction in City Offices	1992	0	0.12	0	8,630	10,356
Technical Assistance to Businesses	1992	10,000	0.04	2,634	4,660	8,753
Quantity Based User Fees (Mild)	1992	0	0.06	0	3,780	4,536
Drought Resistant Landscape Guidelines	1992	0	0.06	0	4,850	5,820
School Curriculum & Student Projects	1993	10,000	0.18	2,634	16,690	23,189
Awards, Commercial & Industrial Generators	1993	2,000	0.12	527	8,630	10,988
Yard Waste Source Reduction	1994	10,000	0.12	2,634	8,630	13,517
Participation in Regional Waste Exchange	1995	10,000	0.10	2,634	8,440	13,289
Quantity-Based User Fees (Steep)	1995	50,000	0.10	13,170	6,300	23,364

Notes:
(1) Annual Costs in 1991 Dollars.
(2) Start up costs include estimated consultant hours, or equivalent, during program start-up.
(3) On-going personnel services are expressed as staff full-time equivalents (FTEs).
Education and Public Information hours are included.
(4) Start-up costs are amortized over 5 years at 10%.
(5) Other annual costs include staff costs at $63,000 per FTE, service provider fees, and other operating costs.
(6) Total Annual cost includes 20% contingency.
(7) Start-up and operating costs of Waste Surveys assume shared tasks with recycling Clean Route programs.
(8) Quantity based user fee program is dependent on a new billing system; costs not estimated.
Start-up costs assume a rate study and public outreach process will be performed.

TABLE II-4 IMPLEMENTATION SCHEDULE FOR SOURCE REDUCTION PROGRAMS

Program/Task	Supervising Agent/ Implementing Agent	Time Frame
Waste Surveys	UD	1/92-10/92
Select Targets and Methodology	SWD and FDC	1/92
Select Implementing Agents	SWD	4/92
Develop and Implement Waste Surveys	SWD	7/92
Develop and Implement EPI	SWD	7/92
Monitoring and Evaluation	SWD	10/92
In-House Source Reduction at City Offices	UD	1/92-6/92
Draft Work Plan	SWD	1/92
Inter-Departmental Review	All City Departments	3/92
Purchase and Distribute Tools	SWD	5/92
Distribute Education Material	All City Departments	5/92
Monitoring and Evaluation	SWD	6/92
School Curriculum & Student Projects	UD	1/92-4/92
Assess Available Curricula	SWD & Local School District	1/92
Complete Curricula Package	SWD & Local School District	2/92
Teacher Training	Local School District	3/92
Implement Curricula	Local School District	4/92
Technical Assistance to Businesses	UD	1/92-10/92
Select Targets and Methodolgy	SWD	1/92
Select Implementing Agents	SWD	4/92
Develop and Implement Waste Surveys	SWD	7/92
Develop and Implement EPI	SWD	7/92
Monitoring and Evaluation	SWD	10/92
Quantity-Based User Fees (Mild)	UD	1/92-11/92
Assess and Develop Fee Structure	SWD	1/92
Distribute Public Information and Receive Feedback	SWD	5/92
Implement New Fee Structure	City Council	11/92
Drought-Resistant Landscape Guidelines	Utilities Department (UD)	9/92-2/93
EPI	SWD	9/92
Monitoring and Evaluation	SWD	2/93
Awards, Commercial & Industrial Generators	UD	1/93-6/93
Select Implementing Agent	SWD	1/93
Develop/Publicize Selection Criteria	Implementing Committee	6/93
Grant Awards	Implementing Committee	Annually

TABLE II-4 (CONTINUED)

Program/Task	Implementing Agent	Time Frame
On-Site Yard Waste Management Education	UD	1/94-6/94
Evaluate Pilot Program and Develop Work Plan	SWD	1/94
Prepare Educational Materials	SWD	3/94
Distribute or Sell Tools and EPI Materials	SWD	4/94
Monitoring and Evaluation	SWD	6/94
Quantity-Based User Fees (Steep)	UD	1/95-11/95
Assess and Develop Fee Structure	SWD	1/95
Distribute Public Information and Receive Feedback	SWD	5/95
Implement New Fee Structure	City Council	11/95
Participation in Regional Waste Exchange	UD	1/95-1/96
Research Available Programs	SWD	3/95
Publicize and Assess Options	SWD and C/I Sectors	9/95
Participate in Exchange	Private Businesses	1/96

Abbreviations: UD = Mountain View Utilities Department
SWD = Solid Waste Division

CHAPTER III

LIST OF TABLES
(Following Text)

CHAPTER III
RECYCLING COMPONENT

INTRODUCTION

The Recycling Component describes the City of Mountain View's existing and planned recycling efforts, and ways to further develop recycling programs. The chapter is written in accordance with Assembly Bill 939 (AB 939) and the regulations established by the California Integrated Waste Management Board (CIWMB).

Recycling is more than the separation and collection of post-consumer materials. These are only the first steps in a loop; post-consumer materials must also be reprocessed or remanufactured, and only when the materials are reused is the loop complete. Recycling is maturing as a waste management option, with increasingly sophisticated and proven collection and processing equipment, better understood benefits and cost parameters, and the sudden embracing of recycling by the well-capitalized, rapidly-centralizing waste hauling industry. Though commodities prices for secondary materials remain unstable and in some cases very weak, more and more people are accepting the feasibility and importance of recycling, while institutional changes necessary to enable high levels of recycling are proceeding.

Current recycling activities in Mountain View divert some materials from the residential, commercial, and industrial sectors, and other activities are being planned or developed. A high recycling rate can be achieved by maximizing participation in these programs, and by planning and implementing programs that will recover other materials from other sources. New programs will build upon pre-existing programs when possible.

A. GOALS AND OBJECTIVES

A.1. GOALS

The City's recycling program goals are:

- Planning, design, and implementation of new collection, processing, and marketing systems.
- Providing for the maximum feasible conservation of natural resources and energy.

- Protection of public health, safety, and well-being.
- Promotion of recycling activities and centers as community institutions and focal points to foster civic pride and common involvement in a tangible environmental activity.
- Promotion of recycling programs that produce the highest quality materials, in terms of both grades and purity.
- Promotion of recycling programs that involve waste generators in the recycling process.
- Promotion of income opportunities for community groups and low-income residents through collection and sale of secondary materials.
- Promotion of recycling programs that serve as means of achieving broader economic and community development goals.

A.2. OBJECTIVES

The short-term (prior to January 1, 1995) objectives of the Mountain View recycling component are:

- Achieve a recycling rate of at least 17% of the total waste stream.
- Establish a recycled products procurement program by industry within the City.
- Apply for State Recycling Market Development Zone Designation in the first round of the state solicitation.
- Create at least one direct linkage between commercial and industrial generators of secondary materials and local end users each year.
- Implement the monitoring portion of this component by the end of 1992.

The medium-term (prior to January 1, 2000) objectives are to:

- Achieve a recycling rate of at least 28% of the total waste stream.
- Identify one new market each year for materials that currently have weak or non-existent markets, but which are technically recyclable.
- Formally support the establishment of at least one new end-use industrial facility within 30 miles of Mountain View each year.

A.3. TARGETED WASTE TYPES AND CATEGORIES

Targeted waste categories for recycling have been identified from the results of the solid waste generation study and a survey of available markets. The targeted waste types have been selected for their effectiveness in meeting the recycling objectives on the basis of four factors:

1. Weight or volume of the waste type.
2. Hazard created by the waste type, if disposed.
3. Percent content of nonrenewable resources.
4. The marketability of the waste type as a secondary material.

In the residential sector, the following waste materials are targeted for recycling in the short term:

- newspaper
- PET plastic
- glass jars and bottles
- aluminum cans
- tin cans
- white goods
- HDPE plastic
- used motor oil
- telephone books

The following materials may be added in the medium term, as described in the program selection section of this chapter:

- mixed paper
- corrugated cardboard
- polystyrene

In the commercial and industrial sectors, the following waste materials are targeted in the short term:

- high-grade office paper
- corrugated cardboard
- glass
- aluminum cans
- tin cans
- newspaper
- PET and HDPE plastic beverage containers

The following materials may be added in the medium term:

- gypsum board
- mixed paper
- Film or other plastics

In the self-haul sector, the following waste materials are targeted for the short and medium terms:

- white goods
- inert solids (concrete and asphalt)

B. EXISTING CONDITIONS DESCRIPTION

B.1. DESCRIPTION OF EXISTING RECYCLING PROGRAMS

Recycling activities in Mountain View currently include a residential curbside recycling program, apartment and condominium collection service, drop-off recycling centers, office paper recycling collection, commercial recycling programs, household hazardous waste drop-off days, phone book drop-off, Christmas tree collection, and separation of white goods, scrap metal, and tires at the landfill.

Based on existing data, the City is currently recycling about 9,246 tons of material per year. This represents approximately 10% of the total waste generated in the City. (See Table III-1 for diversion tonnages by existing program.)

RESIDENTIAL CURBSIDE RECYCLING

Foothill Disposal Company (935 Terra Bella Ave.) is currently contracted by the City of Mountain View to conduct bi-weekly collection of recyclable products from single family homes. FDC collects newspaper, aluminum and tin cans, plastic (PET) bottles, glass jars and bottles in burlap bags (residents have the option of using self-purchased recycling bins). Used motor oil is also collected. Residents source separate glass jars and bottles into one burlap bag (or bin), aluminum and tin cans and PET bottles into another burlap bag (or bin), and newspapers into brown paper sacks (or bins) or tied with string. Used motor oil is collected in one gallon screw-on top plastic jugs provided by the City.

FDC currently has two "side-loading" recycling trucks for the curbside program. Trucks are driven, and collection performed, by a one-person crew. All materials, other than newspaper, are processed and marketed under contract with the City of Sunnyvale. Newspaper is hauled directly to a broker.

The City promotes residential collection through the following mediums: monthly advertisements in The View, a community newspaper; twice annual newsletter direct-mailed to all single family homes; exhibits and information tables at public events; annual utility bill insert; Cable Television announcements; and, over 350 volunteer Block Leaders who put out reminder signs the day before pickup. The City has emphasized the need to continue on-going publicity in order to attain higher participation rates.

APARTMENT AND CONDOMINIUM COLLECTION

FDC currently conducts collection at about 100 apartment complexes of 15 units or more. Each complex has at least three 100-gallon wheeled carts (one each for newspaper, glass, and cans. FDC will, upon request, provide plastic jugs for used oil collection).

The City of Mountain View promotes this service through intensive personal contact with property managers and owners for program initiation. New service informational flyers were developed in late 1990 to be distributed door to door by the Conservation Corps in 1991. The City has emphasized the necessity of signage at wheeled cart sites and continuous publicity in order to attain higher participation rates.

BUY-BACK RECYCLING PROGRAMS

There are currently five facilities in Mountain View which accept "CA Redemption Value" beverage containers:

■ ENVIPCO/Nob Hill Foods	1350 Grant Rd.
■ Goodwill	2580 California St.
■ 20/20 at Lucky Foods	715 E. El Camino Real
■ MLC Canbank	580 N. Rengstorff Ave.
■ Foothill Disposal Co.	935 Terra Bella Ave.

The City advertises buy-back and drop-off centers in the Mountain View recycling newsletter and in City newspaper (The View). City staff direct members of the public who call to the nearest center.

DROP-OFF RECYCLING PROGRAMS

There are six sites at which Mountain View residents can drop off newspaper. Pacific Rim Recycling Company services five of the sites:

■ Empty lot	California and Showers Streets
■ Century 10	Sterlin and Pear Streets
■ Parkview West	Rengstorff Ave.
■ Safeway	Miramonte and Rose Streets
■ Lucky Foods	715 E. El Camino Real
■ FDC (not operated by Pacific Rim)	

Flattened corrugated cardboard is accepted as a donation at Mountain View Fire Station #1 at Villa and Franklin Streets and at the Mountain View Senior Center. FDC also accepts OCC and Ferrous metal.

Mountain View held a six-week phone book recycling drive (May 15 - June 30, 1991) at four drop-off locations in the City. This phone book recycling drive was co-sponsored by Foothill Disposal Company and Pacific Bell, in cooperation with the County.

OFFICE PAPER RECYCLING COLLECTION

The City has authorized five collectors to make their own arrangements with private businesses. Each private collector is required to submit quarterly weight reports to the City. The following are the only private collectors currently authorized to collect office paper:

■ Arata Western	6565 B Smith Ave. Newark, 94560
■ Foothill Disposal Co.	935 Terra Bella Ave. MV, 94043
■ Northern Cal. Pulp & Paper	2085 Wayne Ave. San Leandro, 94577
■ Paper Recovery of N. Cal.	25670 Nickel Pl. Hayward, 94545
■ Weyerhauser	42305 Albrae St. Fremont, 94538

The City promotes this service by sending informational packets to larger businesses and to businesses that inquire about the service. Efforts have already been made to encourage participation from schools and the El Camino Hospital.

COMMERCIAL RECYCLING

Foothill Disposal Company collects bottles (glass and PET), cans, cardboard, old newspaper, and mixed white and color paper from restaurants, bars, and retail and industrial locations. Foothill is currently the only authorized collector of commercial recyclable materials other than paper.

HOUSEHOLD HAZARDOUS WASTE DROP-OFF

The City, in a collective effort with three neighboring cities, holds household hazardous waste drop-off days three times a year at various locations in Mountain View and neighboring jurisdictions. For more information regarding such events, please consult the Household Hazardous Waste Element, a separate document. Since household hazardous wastes cannot be legally disposed of in Class III landfills to begin with, the collected quantities from this program cannot be counted towards diversion totals.

The City promotes these events by announcements in The View and Mountain View Recycling Newsletters as well as utility bill inserts and Cable Television advertisements. The City plans to participate in a new County coordinated drop-off program in 1992.

ON-SITE LANDFILL COLLECTION

White goods, scrap metal and tires are currently accepted at the public dump. White goods are collected by Valley Recycling. Scrap metal is sold to City Metals of San Jose. Currently, such a small amount of tires are received that they are stockpiled on-site. When a large enough stockpile is accumulated arrangements will be made to have them recycled. For more information on tires, see the Special Waste Component.

CONCRETE AND ASPHALT COLLECTION

City of Mountain View street crews haul concrete and asphalt scraps to recyclers, when convenient. Raisch Products Company operates a concrete and asphalt recovery facility in Sunnyvale. A portion of the materials recycled at the Raisch facility have been apportioned to Mountain View on the basis of population.

CITY POLICIES AND ORDINANCES

City policies currently require:

- Purchase and use of recycled paper in favor of non-recycled, despite the extra cost that such a policy may present. $10,000 (approximately 10% of expenditures for paper products in Fiscal year 1989-90) has been budgeted to support this preference.

- Staff to research the feasibility of purchasing recycled products other than paper and report back to the City Council with specific recommendations.

- Use double-sided copying whenever possible to reduce the amount of paper consumed.

- Minimize the use of nonrecyclable paper.

The City also encourages private purchases of recycled or recyclable products by informing residents and businesses by mailers and advertisements in The View of the availability of the Sierra Club's "Where to Find Recycled Products" guide. The City encourages commercial/industrial recycling awareness and market development by similarly promoting the Santa Clara County Manufacturing Group's "Guide to Commercial Recycling".

The City's existing rate structure for refuse collection and disposal from single-family units permits residents to place an unlimited amount of waste at the curb for a fixed fee. This does not encourage source reduction and recycling.

B.2. QUANTITY OF SOLID WASTE BEING DIVERTED BY EACH PROGRAM

A listing of quantities of solid waste being diverted by each existing program is provided in Table III-1.

B.3. FUTURE STATUS OF EXISTING PROGRAMS

PROGRAMS TO BE DECREASED, PHASED OUT OR CLOSED

There are no plans to decrease, phase out, or close any of the recycling programs existing in Mountain View.

PLANNED RECYCLING PROGRAMS

The following program is in the planning stage:

Recycling Discount: Commercial and industrial generators will be given the option to separate recyclable materials from other garbage and receive a discount on collection of these loads of mixed recyclables. Foothill Disposal is presently meeting with staff to work out details of an agreement to make this possible.

C. EVALUATION OF ALTERNATIVES

C.1. ALTERNATIVES EVALUATION AND SCREENING

DESCRIPTION OF ALTERNATIVE ACTIVITIES

Recycling activities can be grouped into three broad categories:

- collection
- processing
- policies.

A general description for each category follows.

Collection Activities

There are four general types of collection programs:

- drop-off and buy-back centers
- single-family residential curbside collection
- multi-family residential collection
- commercial and industrial collection.

Within each of these types of collection there can be different degrees of separation of materials. The degree of source separation has implications for both the cost of collection and the type of processing required.

Drop-off and Buy-back Activities

Drop-off and buy-back centers are a well-known and common type of residential collection system. Residents separate recyclables from their refuse at home, and deposit newspaper, glass, cans, and other materials into containers located at staffed or unstaffed sites. They may or may not receive payment for these materials. When the containers are full, they are transferred from the site to a processing facility, to a centralized storage location, or directly to end users.

These types of collection systems are generally composed of one or more of the following activities:

- temporary drop-off collection
- mobile drop-off collection
- unstaffed drop-off depots
- staffed drop-off recycling centers
- staffed buy-back recycling centers.

Each type of collection is advantageous under certain conditions, and communities commonly employ more than one activity within the overall program. For example, a community may operate a buy-back recycling center, several unstaffed drop-off depots, and a mobile system to service outlying areas.

Single-Family Curbside Collection Activities

Curbside collection of recyclables from single-family homes is the most effective and visible collection operation in the residential sector. The most common items included in curbside collection programs are newspaper, glass, metal, and beverage containers. Depending upon local waste generation characteristics, home collection programs for these three items can divert 8 - 12% of the waste coming from the homes provided the collection service. If additional materials such as corrugated cardboard, plastic containers, and mixed paper are added to the collection, 20-30% of the waste from the homes serviced can be diverted.

Residential systems can be designed in a number of ways. The key characteristic of these systems is the number of sorting categories required of residents. Three system variations are considered in this document.

Variant 1-Source Separation

In the residential sector, recyclable newspaper, cans, glass, plastic, and other materials are collected separately and transported in multi-compartmentalized vehicles. Source separated materials may be placed in a shared set-out container or truck compartment after separation. For example, bundled cardboard can be set out or transported along with loose mixed paper.

The processing facility would perform minimal sorting. Some manual sorting may be required if source separated materials are set out at the curb in a shared container.

Processing would consist primarily of tasks that will render the materials more marketable, such as baling, flattening, and/or crushing.

Limited truckside sorting, in which some recyclables are sorted by the truck driver by material type or color, is also feasible. The most common truckside "quick sorts" are separating clear glass from colored glass and bulky plastic containers (PET and HDPE milk jugs) from other beverage containers.

The benefits of the truckside sort approach include the following:

- Allows the collection crew to provide immediate feedback to generators who set out contaminated material.
- Allows greater quality control in the sorting process than is possible at a centralized facility.
- Provides for more humanized and interesting work than sorting on a picking line.
- Enables the City to sell quality separated materials to markets without installing an extensive processing system.
- Takes full advantage of locally-available markets by allowing delivery directly from the collection route in some cases.

Disadvantages include:

- Less efficient sorting.
- Lengthier time on routes.

Variant 2- Two Stream Commingled

In this variant, collected materials would not be fully separated at the source, but would be collected in two "streams": paper and containers (all other materials). These commingled materials will then be sorted at the curb by collection staff, and taken to a facility for further simple sorting or processing. The paper stream would consist of newspaper, corrugated cardboard, and mixed paper. The container stream would consist of glass, cans, and various plastic materials. Depending on market conditions, these materials will probably need to be separated by color of glass, tin cans, aluminum cans, different types of plastics, and grade of paper. Cardboard and mixed paper may be left commingled if cardboard prices are not high enough to justify sorting.

Sorting for these materials can be accomplished through a combination of simple mechanical and manual systems. Some sorting can also occur at the curb, as discussed above. Mechanical systems are usually used for separating metals from glass, and for separating tin cans from aluminum. Manual sort systems are better suited for sorting different colors of glass, separating cardboard from mixed paper, and other similar tasks. Manual sorts are usually accomplished through conveyor belt sorting systems with employees stationed along the line to pick off specific types of materials.

Variant 3 - Fully Commingled Mixed Recyclables

In this variant, all materials including newspaper are mixed by residents in one container at the curb, and loaded directly onto the collection truck without being sorted. All sorting takes place at a processing facility.

Recovery of recyclable materials once they are commingled involves a greatly expanded sorting system. This type of system can vary significantly in design. Initial manual sorting may remove larger recyclable items, such as corrugated cardboard and some plastics. Common automated sorts include magnetized belts to remove ferrous metals and trammels (perforated drums) to sort materials by size.

Multi-Family Collection Activities

Smaller apartment buildings (4 units or under) and condominiums that have separate garbage cans for each unit may be easily integrated into a curbside program serving single-family residences.

Larger apartment buildings and condominium complexes that have centralized garbage storage facilities generally require centralized recycling storage and separate or modified collection systems. Perhaps the biggest constraint on apartment and condominium recycling is space for the storage of materials within individual units and for the central containers. In buildings with garbage chutes, finding a suitable, accessible location for recycling containers may be a problem. Fortunately, few or no buildings of this sort exist in Mountain View. In addition, many apartment and condominium managers hesitate to devote valuable parking lot space to recycling bins.

Several different recycling collection systems are now in use in apartment buildings and condominiums. The most common systems are collection of materials placed in wheeled carts with a front loader or residential curbside vehicle. All successful programs deal with individual buildings and complexes on a case-by-case basis, working with the building manager to design the system.

The three sorting category variants discussed above also apply to Multi-Family collection activities.

Commercial and Industrial Collection Activities

There are two basic approaches to the recovery of recyclables from the commercial and industrial sectors:

- Source separating recyclable materials at the point of generation. This separation may be into single materials (e.g. cardboard) or into groups of materials commingled together in a container.
- Sorting of recyclable refuse collected "as is", with minor modifications (for example, cafeteria wastes may be excluded from other wastes).

In the first approach, source separated recyclables are marketed directly to brokers or end users, or taken by the hauler to an intermediate processing facility. In the second approach, mixed refuse is processed at a material recovery facility.

Businesses perform source separation when it is cost-effective. Recycling may lower waste disposal costs by reducing the frequency of garbage collection and volume of waste generated. Firms which generate large, pure quantities of recyclable materials may sell their materials directly to haulers or to end users. As the financial incentives for recycling and the markets for materials improve, many more commercial recycling arrangements will be developed and maintained entirely within the private sector. However, there will continue to be some commercial waste generators, especially small generators, who do not generate sufficient quantities of recyclables to make their own cost-effective arrangements. Recovery through source separation of this waste will require City sponsored programs, including technical assistance and franchised or licensed collection services.

Processing Activities

Historically, private sector material processors have focused their capacity on a targeted group of recyclables, such as scrap metal or waste paper, rather than on a broad cross section of recyclable materials. As pressure has increased on the waste disposal industry to divert more material through recycling, many facilities have integrated material recovery into their operations. These fall into three types of categories:

- Salvage at transfer and disposal facilities.
- Recovery of source separated materials at recycling centers, known as Intermediate Processing Facilities (IPFs).
- Recovery of recyclable materials from the waste stream at Materials Recovery Facilities (MRFs).

Salvage at Solid Waste Facilities

A certain amount of recycling is practiced at many landfills and transfer stations. The types of materials that are commonly reclaimed largely depend upon the availability of markets for the materials. Generally, these materials include: scrap metals, white goods, cardboard, wood waste, furniture, and concrete and asphalt. A strong case can often be made for diverting these generally heavy materials from the waste stream in order to dramatically increase diversion rates on a tonnage basis, even if the markets are not particularly favorable.

Intermediate Processing Facilities (IPFs)

An IPF serves as a transfer and processing point for source separated recyclable materials. Commingled recyclables may be sorted by hand, on conveyors, or in sophisticated process sequences. IPFs may be as simple as a recycling drop-off yard where some sorting, crushing, or baling takes place, or as complicated as a full scale factory for mechanical separation of mixed recyclables. The sorting required at this facility is dependent on the collection program which delivers materials.

Material Recovery Facilities(MRFs)

A MRF serves as a transfer and processing point for mixed wastes which contain recyclable materials. Materials of value are "recovered" from the waste stream rather than processed after source separation. MRFs typically are more complex mechanically than IPFs, although they are not always so. MRFs can often perform intermediate processing of source separated recyclables as well as recovery of valuable materials from the waste stream. That is, a MRF may also be an IPF.

The distinction between an IPF and a MRF is critical from a permitting perspective. IPFs do not require a CIWMB facilities permit since they do not produce a residual requiring landfilling. MRFs require a facilities permit since they always have a residual waste stream.

Policies

The following is a list of policies that the City of Mountain View may implement in order to reach the recycling goals:

- Bans on selected non-recyclable materials.
- Ordinances requiring mandatory participation in recycling programs, or penalizing disposal of recyclable materials.
- City regulations, such as zoning, building code, and city standard specifications, can be revised to promote recycling or procurement of recycled materials. In particular, space planning requirements can address the need for recyclable materials storage on-site.
- Market development policies such as:

    1. Participating in the CIWMB's Recycling Market Development Zone program.
    2. Use of public education and information programs to promote the use of products using recycled materials.
    3. Local procurement ordinances.
    4. Encourage competition among solid waste service providers.

Market development policy issues are described in further detail below.

1. Market Development Zone Program

Senate Bill 1322 (1989) established a Recycling Market Development Zone program for the State of California. With a combination of state and local incentives, Zones act as beacons to industries that use post-consumer materials as the feedstock in their manufacturing processes. The Zone program will provide communities with economic development opportunities such as increased employment, an increased tax base, and a diversified economic base. Zones are places where recycling businesses know they can successfully locate, stay, or expand.

Incentives the City could consider as part of a Market Development Zone program:

- Elimination or reduction of fees for applications, permits, and services.

- Streamlining the permit process.
- Provisions for expanding infrastructure to serve recycling businesses.
- Provisions for increasing the amounts of recycled feedstock available for industry and/or providing industry with a steady supply of consistent quality feedstock.
- Developing inter-industry linkages between businesses.

2. Public Information and Education

Public education efforts in support of market development are discussed in detail in Appendix 5.

3. Procurement Ordinances

Using local procurement ordinances, the City can specify that one or more of the following criteria be considered in the selection of products and packaging: durability, recyclability, reusability, and recycled material content. Additionally, the City could specify that any business or organization holding a contract with the City must have a recycling program in place and provide products or materials according to the above criteria. The City could also adopt purchasing preferences and establish setasides for recycled products or products with an established percentage of recycled material content.

4. Competition Among Solid Waste Service Providers

The waste management industry has often viewed large scale recycling programs as unrealistic and unprofitable. This is understandable when low landfill tipping and transfer fees exist, recycling markets are weak, and institutional inertia discourages innovation. AB 939, however, creates a major incentive for large waste management providers to diversify their operations into recycling services. It also creates opportunities for small businesses previously operating in the margins of the waste management industry.

There is also increased interest from the general public and nonprofit sector to participate in both the decision-making process and the activities of integrated waste management. This could change the traditional relationship of the public and private sectors by calling for more frequent financial review of, and public involvement in, waste management programs.

Waste stream control will be a major issue in coming years. Most franchise agreements between jurisdictions and private service providers do not adequately address issues surrounding control of the waste stream, or do not address them at all. For example, some state that collectors have the right to select a disposal location without regard to cost, while others contain legally ambiguous language regarding the "exclusive nature" of the franchise.

The very short timeline mandated by AB 939 for the planning, design and implementation of programs has not given jurisdictions adequate time to thoroughly evaluate impending changes in their waste management system: many California jurisdictions are signing long-term contracts with service providers for collection, processing, and marketing of recyclables without analyzing whether these agreements are in their best interests. Under these time pressures increased competition and public sector involvement are not always perceived as positive resources for addressing solid waste management issues.

Policies directed at increasing competition, especially in the commercial and industrial sector, may greatly reduce future cost increases for solid waste collection and disposal services. Policies of this nature have created large financial savings in some parts of the United States where solid waste system changes have already occurred. Typically these polices take one or two forms. First, licenses may be required for recycling activities. Any company which meets certain requirements may obtain a license. This is similar to the existing high-grade office paper program. Second, all services not functionally related to garbage collection (that is, new trucks or equipment of a different design is required) may be put out to bid.

EVALUATION OF ALTERNATIVE PROGRAMS

A recycling program is a combination of activities. Programs can be created by combining activities around one of the following principles:

1. Maximizing reasonable source separation.
2. Maximizing collection simplicity.

The following programs have been structured from the activities discussed above:

- Source-separated single family collection
- Two-stream commingled single family collection
- Fully commingled single family collection
- Source-separated multi-family collection

- Two-stream commingled multi-family collection
- Fully commingled multi-family collection
- Drop-off recycling centers
- Buy-back recycling centers
- Mobile buy-back
- Intermediate Processing Facilities (IPFs)
- Materials Recovery Facilities (MRFs)
- Salvage at Solid Waste Facilities
- Separate Commercial/Industrial recyclables collection
- "As is" Commercial/Industrial recyclables collection
- Bans on Non-Recyclable Products
- Mandatory Participation Ordinances
- City Regulation Revisions
- Market Development Policies

As required by CIWMB regulations, the following criteria were used in evaluating these recycling programs:

- Capital and operating costs
- Educational value
- Waste diversion potential
- Environmental impacts
- Flexibility to changing conditions
- Shift in generation patterns
- Facility requirements
- Short and medium term feasibility

- Institutional barriers
- Marketability or availability of end uses of diverted materials
- Local economic development potential.

Descriptions of the criteria are presented in Appendix 6. A summary evaluation of recycling programs utilizing these criteria is presented in Table III-2.

The following evaluation discussion addresses the critical issue of the amount of source separation required of waste generators. Program costs, and flexibility in future years, are affected strongly by the program approach chosen. The discussion progresses from maximum source separation (complex collection, minimal processing) to minimal source separation (simple collection, complex processing).

Maximizing source separation has the following advantages:

- Effectively lowers contamination levels in the collected materials.
- Saves sorting and processing costs.
- Involves the resident more fully in the recycling program.
- Achieves a high level of marketability for materials.

The disadvantages of the source separation approach are:

- Limits number of materials that can be collected.
- May discourage participation by residents unwilling to provide the effort and space needed for segregation.
- Requires that several household separation containers be provided by program sponsors or householders. The number of set-out containers, however, may be significantly less than the number of "sorts" required. For example, bundled newspaper or cardboard may be set out in the same container as loose mixed waste paper.
- Slow collection efficiency because operators must pick up multiple containers.

Advantages of commingling materials to simplify collection include:

- Increases participant convenience.
- Increases program flexibility by accommodating changes to the mix of materials.

- Requires fewer household containers, which may reduce program costs.
- Increases collection efficiency.
- Discourages scavenging

Disadvantages include:

- Requires various levels of intermediate processing capability, depending on the degree of commingling on the truck and the number of materials collected.
- Results in higher levels of unrecyclable material at the processing facility, since less sorting occurs in the household and at the truck.

In any commingled program, contamination is a problem, and needs to be considered. Source separated recycling programs have a purer and more marketable final product than commingled programs. Processing facilities currently find that 15 to 30% of the collected glass containers end up as a mixed-color fraction, primarily due to breakage. Finding markets for mixed-color cullet is a significant problem. Cullet is either disposed of as residue or is sold as an aggregate to the asphalt industry for less than $10 per ton (a fourth of the price paid by container plants for color-separated glass). Furthermore, glasphalt is a final use of the material, precluding future recycling.

When aluminum cans are mixed with other containers, the potential for contamination increases. Broken glass chips often stick to cans or end up inside them. Light plastic containers may remain with the cans during an air separation process. Bi-metal beverage cans can sneak through magnetic separation devices.

Contamination also causes serious safety, production, and quality problems, such as the following:

- Plastics in an aluminum can delacquering furnace upset the delicate thermal balance needed to remove the paint from the cans.
- Lead contained in aluminum cans shipments causes problems with forming the can sheet into cans.
- Aluminum cans processed at MRFs and shipped to smelters are often contaminated with glass, plastic, and dirt. Glass and dirt mixed in with cans do not melt, and are incorporated into the final product, often raising the silicon content above specification.
- Ceramics in loads of glass can not be removed mechanically. Often pieces of broken ceramics are contained in loads of glass, making detection impossible at the glass plant until the contaminated material has gone into the furnace.

Few programs in North America collect totally commingled recyclables. The Rabanco program in Southern Seattle, a pilot program in Los Angeles, and the Cupertino "ungarbage can" program are examples of this approach.

The advantages of this approach include:

- Maximizes recyclable collection efficiency (no separation at the truck).
- Allows use of existing packer trucks.
- Nearly eliminates sorting requirements at the household level.

Disadvantages of the fully commingled recyclables approach include:

- Requires extensive sorting capability at a processing center.
- Increases contamination levels substantially, lowering marketability.
- Severely reduces the involvement of the generator and "education factor" related to waste management and the overall need to reduce waste.

The simplest collection system is the current system of commingling of recyclables and non-recyclables. Collection as is would require all materials to pass through a MRF. This approach is rarely used in the residential sector, although one southern California company is currently investing in such a system.

These four modes of collection each necessitate a different set of practices on the part of generators to prepare materials, a different set of processes to convert materials into commodities, and different program economics. These modes represent a continuum, rather than a static set of practices. In general, the more highly separated materials are at the point of generation, the less costly their processing. It should be noted that the true cost of providing service to the residential sector is difficult to determine with accuracy, since most service providers do not distinguish clearly between the costs of different programs that they provide. Some programs may be subsidized by commercial sector collection, for example. When these "hidden" costs are fully accounted for, the source separated model is in general a less expensive option.

In 1990, for example, the City of Sacramento opted for a three-bin system instead of an automated curbside system for its residential curbside program. The costs of the source-separated program were estimated at $1.19 per household per month, versus $2.17 per household per month for the commingled approach. These calculations included collection and processing costs as well as material revenues. Other curbside recycling program costs (for either existing or proposed programs) in cities throughout the Bay Area reflect similar cost differentials between source separated and commingled approaches: a range of $0.75 to $1.75 per household per month for source separated (with the majority of programs costing less than $1.00), and a range of $1.50 to $4.00 per household per month for commingled.

Processing facilities are an evolving technology, and many improvements in their processing capabilities are likely to be achieved in the next decade. The number of new IPFs and MRFs across the country is expected to double in the next two years alone, with the average size getting 82% larger (MRF Handbook, 1990). The rush to build capital-intensive facilities which may allow little flexibility in future planning and system modifications does not take into account the many developments and improvements that will occur in the coming years. Industrial secondary material users are concerned about absorbing ever-increasing quantities of recycled materials from companies that might not understand the need for high quality materials.

MRFs are highly variable in their size, design, and function, but they share certain qualities: they are expensive to build and operate, with total capital costs per daily input ton of $10,000 to $40,000. The average capital cost per ton of daily capacity for current and planned MRFs is approximately $21,000 (Glenn, *Biocycle*, May, 1990, p. 29) The economies of scale typically assumed for larger facilities are not present in existing MRFs. Facilities designed for 100 tons per day have a capital cost of approximately $18,000 per ton of daily capacity, while the costs of 100+ ton per day facilities are approximately $22,000 (Ibid.) Operating costs, before revenues from sale of materials, and without considering capital costs, are on the order of $20 to $60 per ton (Chertow, 1989).

The potential liabilities of increasing the size and mechanization of facilities include:

- Lack of flexibility to explore non-MRF waste handling options.
- Possible escalation of costs of existing service due to extensive capital investments in sophisticated technology.
- Elimination of involvement of both waste generators and some non-profit or small business parties currently involved in the waste management system.
- Maximizing the value of recyclable materials by separating and preparing them to enter a manufacturing process, known as "high-grading", is rarely a priority in MRF design.
- MRFs are responsive to the public policy goals of recycling, but bear little relationship to the more complex question of decreasing waste generation.
- The financing of MRFs is based on a model of guaranteed flow of materials from local governments. A reduction in the amount of material throughput

results in costly slack time for the facility, and increases the cost per diverted ton.

- As landfill fees and garbage collection costs go up, there will be increasing pressures on waste generators to find alternative haulers of materials who will not charge for the service. This pressure means that the saleable materials going into MRFs will be of diminished quality and value, which will in turn be reflected in depressed operating income from the sale of material. This will either increase the cost of MRF services, or increase the need for flow control.
- Flow control effectively prevents future recycling opportunities for community groups and businesses.

C.2. SELECTION OF RECYCLING PROGRAMS

Based on the evaluation of activities and programs, the following activities with a source separation focus have been selected for implementation in Mountain View.

This selection:

- Avoids major capital expenditures or flow-control commitments during the short-term.
- Probably provides higher revenues per ton than fully commingled or "as is" collection alternatives.
- Minimizes the possibility that collected materials might be downgraded, rejected, or landfilled due to contamination.
- Offers the greatest flexibility to adapt to changing conditions.

RESIDENTIAL SERVICES

Collection

The City of Mountain View has had single family residential curbside collection programs since 1987. The program was expanded to provide service to apartment and condominium complexes in 1991.

Currently, the residential collection program accepts the following materials:

- Newspaper
- Aluminum and Tin Cans or Containers
- PET Bottles
- Glass Jars and Bottles
- Used Motor Oil

HDPE will be added to the residential program in the short-term after market arrangements are made.

Additional collection costs are expected in the short term for an additional collection truck and driver to service multi-family residences. These efforts are projected to divert an additional 2826 tons of materials, which is approximately 2.8% of waste generated in Mountain View.

The City of Mountain View will arrange for the use of another truck for these services. Two desirable options for new trucks are: 1) a modified front-loader with three compartments and the capability to collect wheeled carts; 2) a side-load truck similar to the existing truck but with greater capacity (30-34 cubic yards rather than 23 cubic yards) and greater flexibility in the number of storage compartments.

The truck selection will take into consideration the ability to service restaurants or other high volume commercial generators of the materials collected in the existing residential sector program. Diverted quantities of these materials have not been projected due to limited information on the number of these generators, and their current use of buy-back centers.

In the medium term, Mountain View will add the following materials to the residential program in order to achieve a higher diversion rate, unless commercial and industrial diversion programs are so successful that expansion of residential programs is unnecessary. The addition of these materials can be accelerated if limited landfill capacity proves to be a problem.

- Old Corrugated Cardboard (OCC)
- Mixed Waste Paper (Magazines, Junk Mail, etc.)

The following are the major additional medium-term collection cost items:

- Arrangements for the use of three additional recycling collection trucks, with higher capacity than existing trucks, and additional compartments.
- Modification of existing trucks to accommodate more material types.
- Additional or replacement set-out containers, including wheeled carts for multi-family complexes.
- On-truck compactors and shredders for reducing the volume that HDPE and PET require on board.

Processing

In the short term Mountain View is likely to continue hauling recyclables to the Sunnyvale facility or direct to a broker (newspaper). In the medium term the City will need to shift to a larger and modernized facility unless no new materials are added to the collection system. As described earlier, a facility which processes source-separated recyclables is referred to as an Intermediate Processing Facility (IPF).

The following are the major medium term additional processing cost items associated with an IPF:

- Lease of a local warehouse or other roofed space.
- Approximately 2 full-time laborers for sorting and materials handling.
- A magnetic head horizontal and inclined sorting conveyor (approximate 30 inch width) for separation of materials when required (aluminum cans from tin cans) or when market conditions justify it (PET from HDPE, color sorting of glass, OCC from mixed waste paper).

The IPF utilized may be a Mountain View only facility, or a facility shared with other jurisdictions. IPFs have been distinguished from Materials Recovery Facilities (MRFs) previously in this document on the basis of their dissimilar permitting requirements. Functionally they may be very similar. A Materials Recovery Facility (MRF) can generally provide any processing service that an IPF can. Several such MRFs and IPFs are being planned in northern and central Santa Clara County. The City will choose its residential processing facility during program implementation.

COMMERCIAL/INDUSTRIAL SERVICES

Collection

The following materials will be targeted for Commercial and Industrial collection in the short-term:

- Old Corrugated Cardboard (OCC)
- High Grade and Computer Paper
- Glass, Newspaper, and other "Household Recyclables" from Restaurants
- Any other materials identified in surveys as existing in high concentrations at a limited number of generators (the waste characterization study suggests that several types of plastics may be economically recoverable in Mountain View).

The recommended method of collection in the short-term is collection of fully source separated or minimally commingled materials which require minimal processing, or can be delivered directly to materials brokers (we call these Phase I Commercial/Industrial routes). In the medium term we recommend collection of extensively commingled recyclables with more complex centralized processing (we call these Phase II Commercial/Industrial routes).

In the short-term, routes will be established which collect only a designated material. The collection truck then delivers the material directly to a materials broker, or takes the material to an IPF for minimal processing. The existing cardboard and high-grade paper programs in Mountain View work in this manner. Phase I Commercial/Industrial routes are projected to divert at least 5586 additional tons per year. This amounts to approximately 5.58% of waste generated in Mountain View.

Commercial/Industrial rates for refuse service will be raised as necessary in order to fund diversion programs. This will also create an incentive for businesses to separate materials in-house. Producers of large quantities of moderate or high value recyclables may be able to make their own arrangement for diversion.

Subsidies are necessary, however, in order to provide service to lower volume generators of recyclables, and generators of recyclable materials with low market values. A recent pilot program in San Jose found that a significant subsidy was required for a small generator cardboard collection program (three cubic yard containers). Funds raised through increased refuse rates will be used to subsidize one or more collectors of recyclable materials in the commercial/industrial sector.

Non-franchised collectors will be permitted to participate in this process as in the existing white office paper program, and a competitive selection process will be used to select one or more subsidized service provider(s) for collection of recyclables. Both of these approaches can co-exist with existing services provided by Foothill Disposal since new trucks, containers, and routes, will be required.

The City or its agents will research and interview businesses which are likely producers of the targeted materials. Confidentiality of information will be maintained. A potential operating rule of thumb for identifying generators who produce enough material to make collection cost-effective is: does the business generate enough of any one recyclable material in order to eliminate one weekly refuse pickup? For example, if a business currently has one container emptied three times per week, but can eliminate one pickup per week of refuse by placing high-grade office paper in other containers (wheeled carts, usually), the business should be permitted to have low or no cost collection of the identified recyclable material. If this rule is used, the final determination as to who qualifies for subsidized service will be made by the City's Commercial/Industrial Recycling Coordinator based on a waste survey of the business requesting service.

The economic incentives that are integral to this approach will encourage business owners to innovate in order to reduce costs. For example, some owners will consider using larger bin service even if they need to upgrade their enclosures to provide for larger bins. Others will try to share refuse service with neighboring businesses in order to eliminate one collection per week and qualify for low cost recyclable collection.

The following are the major costs associated with a short-term program of this type:

- New debris boxes, wheeled carts, and front-load containers.
- Two or three new front-load trucks to accommodate the inefficiency of routing the City more than once.
- Two or three additional drivers.
- One additional City staff person, or consulting equivalent, for conducting waste surveys.

Medium term collection would consist of Phase II Commercial/Industrial routes collecting mixed recyclables. One or two additional front-load trucks and drivers are likely to be needed. One of the existing fleet of front-load trucks should be available for recyclables collection as a result of the reduced quantities of refuse being collected due to diversion through Phase I Commercial/Industrial routes.

Phase II Commercial/Industrial routes are estimated to divert at least 6963 additional tons of materials. This amounts to approximately 6.96% of waste generated in Mountain View.

Processing

For short-term Phase I Commercial/Industrial routes processing costs are minimal. Drivers need to visually inspect bins before collecting them in order to ensure that the materials will be acceptable to the recipient of the load. This slows collection down. These route inefficiencies are included in the collection cost estimate.

The following are potential short-term costs associated with processing self-hauled waste:

- Hauling recyclable materials to market.
- Fuel, insurance, etc.

Materials collected in medium-term Phase II Commercial/Industrial routes will require significant processing. In some instances, processing can be avoided if the loss in resale value is less than the costs of processing. For example, mixed paper commingled with cardboard can be sold as mixed paper when cardboard prices are low.

An IPF similar to that described under residential processing would be required for the commercial/industrial sector waste stream in the medium term. Conveyers and related equipment may need to be of heavier construction.

A simple commercial/industrial IPF has been estimated as a Mountain View dedicated facility located in Mountain View. Use of a facility outside of Mountain View on a per ton basis, or other fee basis, is more likely to occur.

As stated previously, IPFs have been distinguished from Materials Recovery Facilities (MRFs) on the basis of their dissimilar permitting requirements. Functionally they may be very similar. A Materials Recovery Facility (MRF) can generally provide any processing service that an IPF can. Several such MRFs and IPFs are being planned in northern and central Santa Clara County. The City will choose its commercial/industrial processing facility during program implementation.

In addition to the primary Commercial/Industrial sector programs described above, a downtown drop-off center will be established for the materials being collected in the City residential recycling program, plus corrugated cardboard. Other materials may be added if collection can be arranged at low or no cost (for example, high grade paper). This downtown center will be conveniently and prominently located so that businesses in the downtown area can drop-off materials easily, and show their commitment to the community recycling effort. The center will be serviced by adding it as a stop on existing or new recycling routes. It will be serviced frequently (possibly every day) in order to ensure that the site and its appearance are a source of pride for the downtown business community.

SELF HAUL-SERVICES

Collection

All existing self-haul programs are selected for continuation in the short-term and medium-term.

The following are targeted materials for diversion from self-hauled waste loads:

- White Goods, appliances, and some other durable goods (identified during program implementation)
- Concrete and Asphalt
- Ferrous and other metals if reasonably salvageable

Current self-haul program collection methods will suffice. Generators simply haul to the Vista Site public dump, or its future replacement, and are directed to dump potentially recyclable materials in specified areas.

POLICIES

- Modify City regulations to support recycling, 1992 & on. Policies to make recycling containers more visible, and to assure space allocations for recycling containers in all site plans, are critical in this regard.
- The City will participate in the Recycling Market Development zone program, and other means of stimulating markets for recyclable materials.

All policies which have an impact on a program will be reviewed during program implementation. Policy revisions will be suggested by staff at that time, as needed to support program implementation. The cost of these reviews and revisions are included in the cost estimates for each program.

C.3. MATERIALS MARKETS

Recycling requires more than the separation and collection materials; viable markets must exist for the recovered materials. This section addresses the existing market conditions relevant to the City of Mountain View, as well as on a broader scale (e.g., regional, statewide, national, and international). The focus is on those materials most often collected through recycling programs, such as various paper grades, plastics, metals, and glass.

In addition, the City of Mountain View is aware of the Recycling Market Development Zones established under SB 1322 and will consider this option in conjunction with other local jurisdictions. Many resources exist which identify local markets for different materials; most of these are in the form of lists compiled by entities such as the California Department of Conservation (DOC) and the California Integrated Waste Management Board (CIWMB).

For these reasons, only highlights are addressed in this section. In addition, the DOC is in the process of preparing a statewide database called *Market Watch* which will be fully operational in approximately 9—12 months, and will include information on markets in California.

Old Newspaper (ONP). Old Newspaper is the main grade of waste paper collected in the residential sector. A number of other ONP markets are available in northern California, including the South Bay. Currently, the amount of ONP that is available nationwide for recycling far exceeds the demand. However, this situation is expected to change. It is estimated that the demand for ONP will almost double by 1995 due to increases in exports of ONP, increases in the paper board market, and other factors.

Because ONP is contaminated with printing inks, it is necessary to de-ink this raw material before it can be recycled for certain uses. The primary reason for excess ONP is the shortage of newsprint facilities that can de-ink the newspaper or reuse it. The de-inking capacity in the United States is expected to increase in the future to meet the anticipated demand and help balance the market.

End uses for ONP include newsprint, insulation, packing, building materials, and animal bedding. Newsprint manufacture is anticipated to be the largest market for ONP and is anticipated to increase significantly through the year 2000. Other end uses are anticipated to increase only marginally.

Current market prices paid for ONP in California range from $25 to $40 per ton. However, the market price for ONP is cyclical due to decreased collection in the winter months, paper mill shutdown for maintenance repair in the summer months, economic conditions, international exchange rates, and other factors. Some local haulers have contracts with Weyerhaeuser Paper Company (Weyerhaeuser) for newspaper.

Old Magazines (OMG). A new market is emerging for OMG; many newspaper recycling mills plan to use OMG in the production of newsprint. This will result in a lower demand--until more newspaper recycling opportunities emerge in the next couple of years--for ONP. OMG is now being used in newspaper recycling mills due to their conversion from a simple wash process to a flotation process of de-inking. The Smurfit Companies have converted to flotation de-inking and can utilize supplies of OMG. The current price paid is $20 per ton; a higher price can be negotiated, based on volume. The main requirement for preparation of the magazines is that they be loose--not bagged or tied with string.

High-Grade Waste Paper. High-grade paper is a general description of various long-fiber grades of paper. High-grade paper includes white ledger, colored ledger, computer paper, and tab cards. These grades are more valuable for recycling because of their strength, and thus command a higher price than other paper grades.

Market prices for high-grade paper are dependent on the price of pulp. Because high-grade wastepaper is often used as a substitute for pulp, high-grade paper prices tend to fall with the price of pulp. The market prices for different paper grades vary independently. However, the market price for higher grades are generally more stable than that paid for lower grades. The higher the degree of separation from the source, the higher the price paid for the paper. High-grade paper can be used in making writing paper, computer paper, napkins, facial tissues, and paper towels. Some local haulers have contracts with Weyerhaeuser for high-grade waste paper.

Paperboard. The Newark Group is a national producer of recycled paperboard made from a variety of paper and paperboard grades. The company produces uncoated boxboard, specialty paperboard, tube stock, coated boxboard, gypsum liner, corrugated medium, and other paperboard. The company has locations throughout the United States; the nearest one to the City of Mountain View is in Stockton.

Mixed Waste Paper. As implied in its name, mixed paper refers to a paper stream containing more than one grade of paper. Mixed paper is defined in AB 939 as a mixture, unsegregated by color or quality, of at least two of the following paper wastes: newspaper, corrugated cardboard, office paper, computer paper, white paper, coated paper stock, or other paper. The housing industry and the value of the U.S. dollar overseas greatly affect the demand for wastepaper. A strong dollar overseas means a decrease in the demand for waste paper. Secondary markets for recovered paper can be found in the U.S and abroad. Mixed paper export has increased significantly and has allowed for growth in mixed paper recycling, particularly in the western United States. Local domestic markets, however, are fairly well saturated. Potential buyers for wastepaper in the Bay Area include: Weyerhaeuser in San Jose and DAI El Papers USA Corporation in Burlingame, but other markets need to be identified in order for recycling of mixed paper to be feasible in the City of Mountain View.

The primary use of waste paper is in the manufacture of combination boxboard which is used to make boxes for shoes, clothing, and dry foods. Other uses for mixed waste paper include the manufacture of roofing felt and construction paper building materials.

Old Corrugated Containers (OCC). The amount of OCC consumed in the U.S. is significant, approximately 15 million tons per year, due to its use in shipping packaging for most consumer products. The quantity of OCC in the waste stream is greater in the commercial sector than in the residential sector. OCC that has been separated properly can be used in the manufacture of new corrugated containers, cereal boxes, pad bases, and wallboard.

The market for OCC in California is very strong; more than one half of the collected OCC in California is used by mills within the state. Current market prices for OCC range from $40 to $65 per ton. Potential buyers for OCC collected in the City of Mountain View are Jefferson Smurfit and Weyerhauser in San Jose and DAI EI Papers USA Corporation in Burlingame. Some local haulers have contracts with Weyerhaeuser for OCC.

Aluminum Cans. Approximately half of the aluminum disposed of in solid waste is in the form of cans. The waste recovery system for aluminum cans is highly successful. Compared to other recyclables, aluminum cans command the greatest price per pound.

Aluminum cans that have been separated can be used by the primary producers and are remelted and made directly into can stock. Aluminum scrap is used primarily by secondary aluminum producers. Current scrap value market prices for aluminum cans range from $0.40 to $0.55 per pound. The addition to the AB 2020 redemption value raises the total market price. Markets for aluminum cans exist in the U.S. and abroad.

Steel Food and Beverage Containers. Tin cans that are used as food containers are actually steel cans with a thin coating of tin. The percentage of tin in steel cans usually totals about 0.25 percent and is worth approximately $3 to $4 per pound. Even this small amount of tin can cause contamination in steelmaking. For this reason, detinning is used to both reclaim valuable tin and improve the quality of the steel scrap, although sometimes the post-consumer steel cans and scrap are used directly as a raw material. Steel can recycling is expanding, due in part to increased participation by steel mills and detinning mills in collecting and purchasing used steel cans. This is despite aggressive efforts by the aluminum can industry to enter the steel-dominated food can market.

The major detinning companies have opened new facilities around the U.S. to accommodate the influx of steel cans and the demand from the steel industry. This has helped decrease transportation distances for recyclers. In the absence of regional detinning facilities, some jurisdictions have found end users for this material in the copper mining industry.

Glass Cullet. Waste glass usage in the U.S. is estimated at 25 to 30 percent of the glass produced. Cullet is primarily traded on the U.S. market, so its market price remains fairly constant. A primary concern for end use markets is the quality of the material. In the glass plant, contaminants can cause damage to equipment or result in poor quality product. One of the problems with curbside collection of commingled glass is that it produces multi-colored shards of glass. Markets for mixed-color cullet are not as stable or lucrative as that for color-sorted containers.

The two primary end uses for recovered waste glass are cullet for new glass and as a raw material for making secondary products, such as glasphalt highway paving material, foamed insulation, and construction material.

Two potential markets for recovered glass in the City of Mountain View are Owens-Brockway (a division of Owens-Illinois Corporation) in Tracy and Circo Recyclers in Newark. Neither charges a processing fee to take the materials. The glass market has become problematic for many recyclers recently due to the increased quality standards being imposed and the request for color-sorted materials. Current market prices for sorted California Redemption Value glass range from $0.03 to $0.05 per pound sometimes with a stipulation that the glass be color-sorted. The addition to the AB 2020 redemption values raises the total market price.

Plastics. Markets for plastics are fairly new, but the EPA predicts that as processing technologies are developed, plastics recycling will grow and new markets will develop.

Polyethylene Teraphthelate (PET). Most soda containers are made out of PET, which is the most recycled of all plastics. Over 160 million pounds of PET bottles were recycled in 1988. Post-consumer PET is prohibited for use in new food containers because of FDA restrictions (although certain developments are underway that may lift this restriction). The primary end use for PET is fiberfill, which is used in pillows, sleeping bags, and ski jacket insulation, among other things. The most desirable market for recycled PET is compounded, extruded, and molded plastic makers.

High-density polyethylene (HDPE) is used in the manufacture of jugs (e.g., milk, cider, distilled water) and bottles (e.g., laundry and dish detergent, motor oil, antifreeze). Although the market for recycled HDPE is growing, because of sanitary restrictions, these items are not recycled back into food packaging. Major potential markets for recycled HDPE are soft drink basecups, plastics lumber, containers, drums, pails, and various types of pipes. One major West Coast processor of HDPE is Partek in Vancouver, Washington, which is adjacent to Portland, Oregon. Partek processes only HDPE Grade 2, and uses it to manufacture new containers. HDPE Grade 2 is used in its natural color for milk, water, and juice jugs and is colored for use in laundry detergent containers, shampoo and conditioner bottles, and antifreeze containers.

Low-density polyethylene (LDPE) is used primarily in the manufacture of various types of film, such as food wrapping. Greater than 1,310 million pounds of it is made into trash bags. It is also used to make piping and to coat wires and cables. It is also used in the manufacture of rigid items, such as food storage containers and flexible lids. LDPE is used in plastic grocery bags, which is one of the fastest growing segments of recycling. Four manufacturers provide most of the grocery sacks in North America and are committed to separating plastic grocery sacks from the waste stream to make them into new products.

Some local markets for LDPE are Bay Polymers in Fremont, RPX Resins in Scotts Valley, and Tech Polymers in Berkeley. Also, Dow Chemical Company and Sealed Air Company have formed a joint venture to recycle LDPE; one of its local plants is in Hayward. At this time, the program is available to Dow and Sealed Air customers only, but expansion of the program is being considered.

Polystyrene. There are various forms of polystyrene, the most familiar being the foamed or expanded polystyrene foam (EPS) commonly referred to as styrofoam. The uses for EPS foam include fast-food single serve cups and trays and packing materials in both rigid, molded form and in loose form or "peanuts," as it is sometimes called. The local market for polystyrene products includes Free-Flow Packaging Corporation in Redwood City and Bay Polymer Corporation in Fremont. Recovered polystyrene can be used in the manufacture of toys, office equipment, insulation, and cassette casings.

Telephone Books. Louisiana Pacific Company in Oroville expects to use a steady supply of telephone books for its particle board manufacture once it has its equipment for that part of the operation in place. The company uses phone books to make up approximately 10 percent of the content of its particle board. The company is presently in the early stages of acquiring the additional equipment necessary to expand its capacity.

Inert Solids. Asphalt and concrete from construction demolition gets landfilled in many areas, although it is often recyclable. Local recyclers are Raisch Products in San Jose, Zanker Road Resource Management in San Jose, and Stevens Creek Quarry, Inc. in Cupertino.

Overseas Markets. Strong markets exist abroad (e.g., Mexico, Saudi Arabia, Pacific Rim nations) for many materials, especially mixed waste paper and newspaper. Numerous brokers on the West Coast represent these markets and are listed in various references.

D. RECYCLING PROGRAM IMPLEMENTATION

D.1. RESPONSIBLE PARTIES

Staffing or contract labor support needs by program are listed in Table III-4. The Solid Waste Division of the Utilities Department will be responsible, overall, for program implementation.

D.2 IMPLEMENTATION TASKS

Implementation schedules for planned programs include the tasks which must be undertaken during program implementation. Schedules for the four new programs are presented in Table III-5.

Implementation details are best decided during program implementation, rather than in this document. Some key principles for implementation of the selected programs, however, are presented here:

- All collection equipment will be capable of servicing as many types of customers as possible. For example, curbside collection trucks may also service small restaurants which produce cans, bottles, and newspaper.

- City sponsored source separated recyclables collection service in the commercial/industrial sector will be offered initially only to those customers who can replace one refuse collection stop with one recyclables collection stop. This will stimulate generators of waste to alter their service arrangements in ways which promote cost-effective collection. This may include sharing refuse containers, increasing the site of enclosures to accommodate less frequent collection of larger bins, and so forth.

- Private sector and citizen involvement in program development will be maximized, with City technical assistance or policy support provided by City staff as needed.

- Processing facility needs will be kept as simple as possible during the short-term planning period. More complex processing arrangements will be implemented as higher diversion percentage objectives are pursued, and source separation diversion techniques become less practical.

- Designing recycling activities and centers as community focal points. Recycling centers and programs can foster civic pride through common involvement in a tangible environmental activity.

D.3. SCHEDULE FOR IMPLEMENTATION

Implementation schedules have been prepared for each selected program. They are presented in Figures III-1 through III-4.

D.4. COST OF PROGRAMS

Costs estimates for individual programs are presented in Table III-4. The funding component of this document discusses funding requirements, costs per ton diverted, and total diversion program costs.

The cost estimates address the following items:

- Fees to contractors for collection of materials, including amortized start-up capital costs.
- Fees to contractors for transportation of materials to processing or transfer facilities.
- Fees to contractors for processing and marketing of collected materials.
- Outreach, education, and promotion, including the development of markets and the support of private sector recycling efforts.
- Administration of the program.

Start up costs are one-time costs to initiate the program. These include:

- Planning costs for activities such as market assessments, waste stream assessments, re-routing collection vehicles, planning any new facilities, and negotiating contracts.
- Initial publicity costs to develop, print, and distribute information.
- Capital costs if additional collection and/or processing equipment is needed.

It is difficult to determine specific costs of programs run entirely in the private sector. It cannot be determined at this point how much of the recyclables stream will be handled through City sponsored programs, and how much will be handled via private arrangements between generators and private processors, brokers, and end users.

E. MONITORING AND EVALUATION

E.1. ANNUAL MONITORING METHODOLOGY

The monitoring program will compare actually diverted tonnage by waste type and program with projected diversion by waste type and program, on an annual basis. For compliance purposes, this comparison will be done on a total diversion program basis. This methodology is chosen because diversion tonnage projections by waste type are not expected to be accurate due to changes in buying patterns, packaging technology, and other factors which cannot be foreseen at present. Although diversion data will be obtained on a program by program and waste type by waste type basis, if possible, compliance will be considered to have occurred in any year if the total diversion tonnage projected for that year is attained.

E.2. ADMINISTRATION AND REPORTING

All information will be reported quarterly to the City. Reporting data will be required, and will be a condition of getting a business license or franchise agreement renewal or extension. Mountain View employees will be responsible for performing monitoring functions, including information gathering, compiling, and report writing, unless a regional arrangement for these services is made.

Franchised or licensed collectors will be required to report:

- Number of collections per day, calculated monthly for each route.
- Average weight of each set-out, calculated monthly for each route.
- Percent of generators to whom service is available who participate.
- On-route and off-route time, calculated monthly for each route.
- Average time required to make a pickup, and average travel time between pickups, for all routes of a type (residential single-family, etc.) combined.

Operators of solid waste processing facilities will be required to report, for Mountain View generated waste:

- Monthly data on total tonnage of material received, marketed, and disposed by material type and origin.
- Monthly data on resale revenues received, by waste type and origin.
- Monthly tipping fees, if any, paid for disposal of residuals.

E.3. CONTINGENCY (REMEDIAL) MEASURES

The tonnage diverted by each program each year will be compared with the tonnage projected to be diverted by that program. If actual diversion falls short of the projection, the following actions will be taken in the order described:

1. Total tonnage diverted by all programs in that year will be compared with total tonnage projected to be diverted by all programs. If total actual diversion equals or exceeds projected diversion no further action is necessary.
2. Additional educational and informational actions will be taken if it appears that the tonnage shortfall is the result of low participation.
3. Additional waste types will be added to the program (will be collected) if participation appears to be adequate.
4. Mandatory participation in the program, or penalties for disposal of recyclable materials included in the program, will be implemented. Public opinion polls in other communities indicate that citizens are willing to accept a mandatory recycling program if it is convenient, equitable to all citizens and extensively promoted. Mandatory programs that are properly designed, promoted, and operated generally achieve higher participation and recovery rates than voluntary programs. Higher participation rates also generate a lower cost per ton recycled.
5. If necessary, additional programs beyond those described in this document will be investigated, designed, budgeted, and implemented.

TABLE III-1: CURRENT RECYCLING BY PROGRAM

Program and Source of Information	Quantity (tons)	Material Type
Single Family Curbside Collection (City records)	1,645.6	Newspaper
	6.0	PET
	472.6	CA Redemption Glass
	70.6	Other Recyclable Glass
	22.7	Aluminum Cans
	53.2	Ferrous Metal & Cans
Buy-Back Centers (Partial DOC 1990 records projected)	10.5	PET
	333.3	CA Redemption Glass
	104.3	Aluminum Cans
Drop-off (Pacific Rim and FDC) (Private Operator records)	437.4	Newspaper
	44.0	OCC
Vista Site (Mountain View Public Dump) Landfill Salvage (City records)	46.5	Ferrous Metal & Cans
	3.4	Non-Ferrous Metals
	18.3	White Goods
Private Commercial (from County-wide diversion study, includes FDC drop-off other than OCC and Newspaper)	12.2	Mixed Paper
	159.9	High Grade Ledger
	599.5	OCC
	61.4	Other Ferrous
	1.9	Non-Ferrous Metals
	5.0	White Goods
	254.5	CA Redemption Glass
	8.8	Refillable Glass Containers
	64.1	Other Recyclable Glass
	59.5	Tires & Rubber
Private Industrial (County-Wide diversion study and COSWMP)	1.2	Other Plastic
	4,750.0	Inert Solids (concrete and asphalt)
Total Recycling:	9,246.4	Tons in 1990

Notes: (1) DOC = Department of Conservation
(2) FDC = Foothill Disposal Company

TABLE III-2: RATINGS OF RECYCLING ACTIVITIES

	Single Family Curbside Collection			Multiple Family Curbside Collection			Commercial/Industrial Collection			
Criteria	Source Separated	2 Stream Commingled	Fully Commingled	Source Separated	2 Stream Commingled	Fully Commingled	Separated Recyclables	"As Is"(1)	Drop-Off Recyling Centers	Buy-Back Recycling Centers
1. Effectiveness in waste diversion	Medium	Med-High	High	Medium	Medium	Med-High	Medium	High	Low-Med	Low-Med
2. Hazards created	Medium	Medium	Medium	Medium	Medium	Medium	High	High	Med-High	Med-High
3. Flexibility	Medium	Medium	Low	Medium	Medium	Low	High	Medium	High	High
4. Consequences	High	High	High	High	High	High	High	High	High	High
5. Feasibility	Medium	Medium	Low	Medium	Medium	Low	High	Medium	High	High
6. Consistency with local plans	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	High	High
7. Facility requirements	Medium	Medium	Low	Medium	Medium	Low	High	Medium	Medium	Medium
8. Institutional barriers	Medium	High	Medium	Medium	Medium	Medium	Medium	Medium	High	High
9. Costs	Low-Med	Low-Med	Low	Low-Med	Low-Med	Low	Med-High	Medium	High	High
10. End uses	High	Med-High	Medium	High	Med-High	Medium	High	High	Med-High	High
11. Involvement of waste generators	High	High	Medium	High	High	Medium	High	High	High	High

(1) "As Is" means fully commingled refuse

TABLE III-2: RATINGS OF RECYCLING ACTIVITIES (cont.)

					Policy Alternatives			
Criteria	Mobile Buy-Back	Intermediate Processing Facilities	Material Recovery Operations	Salvage at Solid Waste Facilities	Revising City Regulations	Products Bans	Manditory Collection	Market Development
1. Effectiveness in waste diversion	Medium	High	High	Low-Med	Medium	Medium	High	Medium
2. Hazards created	High	Medium	Medium	Medium	High	High	High	High
3. Flexibility	High	Medium	Medium	High	Medium	Low	Medium	Low-High
4. Consequences	High	High	High	High	High	High	High	High
5. Feasibility	Medium	Medium	Low	High	Low	Medium	High	High
6. Consistency with local plans	High	Medium	Medium	High	Low	Low	Low	High
7. Facility requirements	Low-Med	Medium	Low	High	Low	High	High	Low-High
8. Institutional Barriers	Medium	Medium	Low-Med	High	Medium	Low	Medium	Med-High
9. Costs	High	Medium	Low-Med	Medium	Low-High	Low-Med	High	Low-Med
10. End uses	High	Medium	Low-Med	Medium	High	High	High	High
11. Involvement of waste generators	High	High	Low	High	High	Medium	High	High

TABLE III-3
RECYCLING PROGRAM DIVERSION PROJECTIONS
CITY OF MOUNTAIN VIEW

Current Recycling	AL	Glass	Other Metal	PET	HDPE	ONP	OCC	Mixed Paper	HG Paper	White Goods	Inert Solids	Tires	Total	% of Total Generation
Residential	127	877	53	17	0	2,083	44	0	0	0	0	0	3,200	3.20
Comm. & Ind.	0	327	63	0	0	0	600	12	160	5	0	60	1,227	1.23
Self-Haul	0	0	50	0	0	0	0	0	0	18	4,750	0	4,818	4.81
TOTAL CURRENT	127	1,204	166	17	0	2,083	644	12	160	23	4,750	60	9,245	9.23
Short-Term Recycling Programs														
Expand MF Residential +	23	543	53	6	39	2,163	0	0	0	0	0	0	2,826	2.82
Phase I Commercial/Industrial	0	1,040	0	0	0	0	3,087	536	923	0	0	0	5,586	5.58
Downtown Drop-off Center	10	30	0	1	0	40	8	0	0	0	0	0	89	0.09
TOTAL SHORT-TERM	33	1,613	53	7	39	2,203	3,095	536	923	0	0	0	8,502	8.49
TOTAL CURRENT & SHORT-TERM	160	2,817	220	24	39	4,286	3,739	548	1,083	23	4,750	60	17,747	17.73
Medium-Term Recycling Programs														
Expand Residential	15	142	11	2	4	425	947	2,168	0	0	0	0	3,713	3.71
Phase II Commercial/Industrial	0	1,040	0	0	0	0	3,087	2,143	692	0	0	0	6,963	6.96
TOTAL MEDIUM-TERM	15	1,182	11	2	4	425	4,034	4,310	692	0	0	0	10,676	10.66
GRAND TOTAL	175	3,999	230	26	42	4,710	7,773	4,858	1,776	23	4,750	60	28,422	28.39

NOTES:
(1) MF diversion assumed equal to SF diversion based on 50/50 ratio of SF to MF residences.
(2) Residential recovery of 15% of HDPE, as a new material, is assumed in the short-term.
(3) New residential materials in the medium-term are mixed waste paper and OCC; 50% recovery is assumed.
(4) Phase I routes are assumed to recover 35% of OCC, and recyclable glass; 7% of mixed waste paper; and 20% of HG paper.
(5) Phase II routes are assumed to recover an additional 35% of OCC and recyclable glass, plus 28% of mixed waste paper and 15% of HG paper.
(6) Since C/I routes are only expected to recover only approximately 35% of mixed waste MRF recovery of additional quantities is feasible.
(7) Total Mountain View Generation = 100,108
(8) Other materials will be commingled with listed materials, but are not projected since it is difficult to determine where waste surveys will find economical diversion opportunities. Plastics are likely to offer some opportunities.

TABLE III-4: COST ESTIMATES FOR PLANNED RECYCLING PROGRAMS (1)

	Start-up Year	Start-up Costs(2)	Staff Services (3)		Annualized Start-up Costs(4)	Other Annual Costs(5)	Total Annual Costs(6)
			EPI	Other			
Expand Multi-Family Residential Services + (8)	1992	100,000	0.25	0.00	26,340	149,950	211,548
Downtown Drop-off Center	1992	3,000	0.02	0.04	790	3,780	5,484
Phase I Commercial/Industrial Routes	1993	442,500	0.25	1.00	116,555	471,590	705,773
Expanded Residential Services	1996	484,000	0.25	0.00	127,486	580,610	849,715
Phase II Commercial/Industrial Routes	1996	501,500	0.25	1.00	132,095	689,970	986,478

Notes: (1) Annual Costs in 1991 Dollars.
(2) Start up costs include estimated consultant hours, or equivalent, during program start-up.
(3) On-going personnel services are expressed as staff full-time equivalents (FTEs).
(4) Trucks and equipment are amortized over 5 years at 10%. Buildings are leased.
(5) Other annual costs include staff costs at $63,000 per FTE, service provider fees, and other operating costs.
(6) Total Annual cost includes 20% contingency.
(7) Use of Intermediate Processing Facilities (IPFs) for these programs is assumed. Cost estimates are based on sorting and marketing requirements for source-separated recyclables, either at Mountain View only or shared facilities.
(8) '+' refers to the addition of HDPE as a collected material to both SF and MF service.

TABLE III-5 IMPLEMENTATION SCHEDULE FOR RECYCLING PROGRAMS

Program/Task	Supervising Agent/ Implementing Agent	Time Frame (1)
Expand Multi-Family Residential Recycling +	Utilities Department	1/92-11/92
Authorize Program	City Council	1/92
Develop Truck Specifications	Solid Waste Division	1/92-3/92
Negotiate with Service Providers	Solid Waste Division	4/92
Approve Contract(s)	City Council	5/92
Purchase/Lease New Truck	Foothill Disposal	6/92-10/92
Publicize Program	Solid Waste Division	11/92 & on
Collect Materials	Foothill Disposal	11/92 & on
Process Materials	Private Contractor(s)	11/92 & on
Market Materials	Private Contractor	11/92 & on
Phase I Commercial/Industrial Routes	Utilities Department	1/92-4/93
Authorize Program	City Council	12/91
Develop Waste Survey Procedures	Solid Waste Division	1/92-8/92
Develop Truck and Set-out Specifications	Solid Waste Division	1/92-8/92
Negotiate with Service Providers	Solid Waste Division	5/92-8/92
Develop Rate Incentive Structure	Solid Waste Division	5/92-8/92
Authorize Rate Changes	City Council	9/92
Approve Contract(s)	City Council	9/92
Purchase Equipment	Private Contractor(s)	10/92-3/93
Publicize the Program	Solid Waste Division	1/93 & on
Collect Materials	Private Contractor(s)	4/93 & on
Process Materials (minimal)	Private Contractor(s)	4/93 & on
Market Materials	Solid Waste Division	4/93 & on
Expand Residential Services	Utilities Department	1/95-4/96
Authorize Program	City Council	12/94
Develop Truck & Set-out Specifications	Solid Waste Division	1/95-8/95
Develop Processing Specifications	Solid Waste Division	1/95-8/95
Negotiate with Service Providers	Solid Waste Division	5/95-8/95
Approve Contract(s)	City Council	9/95
Purchase Equipment	Private Contractor(s)	10/95-3/96
Publicize Program	Solid Waste Division	1/96 & on
Collect Materials	Private Contractor(s)	4/96 & on
Process Materials	Private Contractor(s)	4/96 & on
Market Materials	Solid Waste Division	4/96 & on

TABLE III-5 IMPLEMENTATION SCHEDULE FOR RECYCLING PROGRAMS

Program/Task	Supervising Agent/ Implementing Agent	Time Frame (1)
Phase II Commercial/Industrial Routes	Utilities Department	1/95-4/96
Authorize Program	City Council	12/94
Develop Waste Survey Procedures	Solid Waste Division	1/95-8/95
Develop Truck & Set-out Specifications	Solid Waste Division	1/95-8/95
Develop Processing Specifications	Solid Waste Division	1/95-8/95
Negotiate with Service Providers	Solid Waste Division	5/95-8/95
Develop Rate Incentive Structure	Solid Waste Division	5/95-8/95
Authorize Rate Changes	City Council	9/95
Approve Contract(s)	City Council	9/95
Purchase Equipment	Private Contractor(s)	10/95-3/96
Publicize the Program	Solid Waste Division	1/96 & on
Collect Materials	Private Contractor(s)	4/96 & on
Process Materials	Private Contractor(s)	4/96 & on
Market Materials	Solid Waste Division	4/96 & on
Market Development Zone		See Note (3)
Authorize Programs	City Council	12/91 or sooner
Market Zone Designation Cycle begins with CIWMB Notification to Interested Parties	CIWMB	Time "a"
Draft Market Zone Application	Solid Waste Division	"a + 60 days"
Draft City Regulation Modifications	Solid Waste Division	"a + 60 days"
Review Drafts	Appropriate City Divisions	"a + 90 days"
Finalize Drafts	Solid Waste Division	"a + 120 days"
Approve Market Zone Application	City Council	"a + 150 days"
Approve City Regulation Modifications	City Council	"a + 150 days"
Submit Application to CIWMB	Solid Waste Division	"a + 150 days"
Work Needed to Obtain Final Designation	Solid Waste Division	"a + 9-18 mths"
Promote Program to Business and Public	Solid Waste Division	As Appropriate

TABLE III-5 IMPLEMENTATION SCHEDULE FOR RECYCLING PROGRAMS

Program/Task	Supervising Agent/ Implementing Agent	Time Frame (1)
Downtown Dropoff Center	Utilities Department	1/92-4/92
Develop Site Plan	Solid Waste Division	1/92-3/92
Publicize Program	Solid Waste Division	4/92 & on
Implement Service	Foothill Disposal	4/92 & on
Other Policies		
As part of other programs	Utilities Department	As Appropriate

Notes:

(1) Time Frame for program reflects commencement of detailed planning through commencement of services.

(2) Multi-family services are offered already. The new program shown is expansion of these services and addition of HDPE to single and multi family service.

(3) CIWMB will administer several Market Zone designation application cycles. Schedules are indeterminate at present.

CHAPTER IV

LIST OF TABLES
(Following Text)

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CHAPTER IV
COMPOSTING COMPONENT

INTRODUCTION

This component describes existing and planned composting efforts in Mountain View, and ways in which the City can develop composting programs. Composting goals and objectives are described, new programs are evaluated and selected, and systems for implementation, monitoring, and program evaluation are outlined. The component is written in accordance with Assembly Bill 939 (AB 939) and the regulations promulgated by the California Integrated Waste Management Board (CIWMB).

All wastes which are to be composted under this plan are discussed in this component. This includes wood wastes (brush, pallets, lumber, etc.) which are chipped and screened, initially, with composting of fines perhaps added at a later time. Wood waste recovery has been included in the composting component rather than the recycling component because the capital facilities for recovering wood wastes are the same as those required for pre-processing many compostable materials. Allocating these facility costs between two components would be confusing.

The development of composting programs will play an important role for Mountain View in meeting the diversion mandates of AB 939. The results of the waste disposal characterization analysis indicate that approximately 26% of the City of Mountain View's solid waste consists of wood waste, yard waste, and food waste. Therefore, composting has the potential to become a primary means of managing solid waste.

Local conditions, such as the structure of the City's waste management system, were also examined to determine the potential for composting in Mountain View. The selected composting programs are designed to be compatible with current waste management practices and facilities.

A. GOALS AND OBJECTIVES

A.1. GOALS

In accordance with the scope and intent of AB 939, the goals of Mountain View's composting programs are to:

- Divert the maximum feasible amount of organic waste from landfill and convert it into valuable soil products.

- Ensure that compost products are of the highest standards of consistency and quality.

- Foster private sector involvement in creating and operating compost programs.

- Stimulate and stabilize the market demand for compost products. Encourage residential, commercial, and agricultural use of compost products through public awareness campaigns ("buy organic").

- Develop the most cost-effective operations.

- Develop a collection system designed to provide maximum diversion of organic wastes and tailored to address the needs of generators while offering efficient use of labor and equipment.

- Seek means to increase the public's understanding of biological processes of decomposition and nutrient recycling, and actively encourage participation in organic waste management programs of all kinds. Cooperation of waste generators is essential to the success of source separation programs.

Because of the lack of comparative data for operating large-scale composting programs in the Bay Area, and because of the need to develop programs that are economical, cost-effective, and in keeping with the needs of the City, programs will be phased in over the short- and medium-term planning periods, with early phases considered experimental.

A.2. OBJECTIVE

The objectives in the short-term planning period are as follows:

- Divert 5% by weight of the total waste stream generated in Mountain View.

- Establish City procurement policies for compost products in 1992.

- Modify City standard specifications and other regulations by the end of 1992 to encourage the use of compost materials by City departments and private contractors, and to encourage back yard composting.

The medium-term objectives are as follows:

- Increase the rate of diversion via composting to approximately 17.5% by weight of Mountain View's total waste stream.

- Implement food waste collection and composting systems in 1998. Divert 50% of food waste generated in the City in 1999.

- Through land-use permits, require the use of compost products in landscaping for new construction.

A.3. TARGETED WASTE TYPES AND CATEGORIES

Based on the criteria below, yard waste, wood waste, and food waste are targeted for composting. The targeted waste types have been selected based on weight, volume, and suitability for composting as criteria.

The weight of the waste type, expressed as a percentage of the total weight of the waste stream segment, and of the total waste stream.

The volume of the waste type, expressed as a percentage of the total volume of the waste stream segment, and of the total waste stream.

Whether the waste type can be composted, as determined by the organic matter content, nutrient composition, structural stability, and moisture content.

With a few exceptions, any organic material is a potential candidate for composting. Examples of materials that can be composted are sewage sludge, animal manure, yard waste, crop residues, paper mill sludge, raw Municipal Solid Waste, waste paper, food waste, and various food processing wastes. The most feasible materials are discussed below.

B. EXISTING CONDITIONS

Data in the waste characterization component indicate that yard waste disposed in 1990 amounted to 14,766.4 tons; wood waste, 6,370.2 tons; and food waste, 4,507.3 tons.

Yard Waste, the second largest waste category after mixed paper, is comprised of several different materials: stumps and large branches, brush, leaves, grass, and garden wastes. It is relatively easy and inexpensive to compost, and the material most commonly targeted for diversion. It comprises 25.5% of the residential waste stream, 5.1% of the commercial waste stream, 8.0% of the industrial waste stream, and 38.1% of the self-haul waste stream.

Wood Waste includes pallets, scrap lumber, wooden furniture, toys, bowls, fencing, crates, and miscellaneous construction materials. It comprises 3.1% of Mountain View's commercial sector, 19.5% of the industrial sector, and 14.7% of the self-haul sector.

Food waste comprises an estimated 8.6% of the residential waste stream and 4.6% of the commercial waste stream. Wastes from food can vary widely depending on the particular food product involved. Like yard waste, food wastes are organic in nature and have very low levels of contaminants. This makes them very desirable materials for composting.

Composting activities in the City of Mountain View are difficult to quantify. Only two small programs are operating currently. The diversion of waste types by composting in 1990 is estimated to be approximately 260 tons, as presented in Table IV-1.

Backyard composting by homeowners, and food donation programs, are considered a form of source reduction in the AB 939 regulations, and are addressed in the Source Reduction Component.

Brush is often chipped by public works and parks departments and landscapers and used as mulch. Some activity of this type occurs in Mountain View at present, but records do not exist which can be used to quantify it.

There are presently no local market development activities in the form of government procurement programs, economic development activities, or consumer incentives for compost products.

At the state level, two bills affecting markets for organic wastes were signed into law in 1989. Senate Bill 1322 establishes a comprehensive set of state programs designed to encourage source reduction of waste and market development for recycled materials. A compost market program will require the Department of Transportation (Caltrans) to purchase compost products for their highway landscaping program. In addition, the

Departments of General Services, Forestry and Fire Protection, and Parks and Recreation are directed to identify and evaluate other uses for compost, including erosion control, public land restoration, landscaping, park and recreational maintenance projects, and highway noise barriers. The CIWMB is currently drafting specifications for compost products that will be purchased by state agencies.

Assembly Bill 4, the State Assistance for Recycling Markets Act of 1989, (STAR) requires state and local public agencies to give purchase preferences to compost products, and authorizes local agencies to determine the amount of the preference. It also requires contractors to certify percentages of recycled content in products either sold to the State or bought for the State. The CIWMB will coordinate a testing program for compost and co-compost products based on the final use of the material and applicable state standards and regulations.

C. PROGRAM ALTERNATIVES

C.1. ALTERNATIVES EVALUATION AND SCREENING

DESCRIPTION OF ALTERNATIVE ACTIVITIES

A comprehensive composting program involves many interrelated activities from generation to marketing of the finished material. The activities can be grouped into three broad categories:

Collection

Processing

Policies

Collection

There are two basic options for collection of organic wastes:

- Drop-off sites
- Curbside or "routed" collection

Generators can be requested to deliver their organic wastes (usually yard waste) to a designated drop-off site, although this results in much lower recovery than curbside collection. A permanent collection site for self-hauled waste allows residents, landscapers, and others to drop-off yard waste at their convenience. The city or a contractor would provide the site and disposal services. The public dump operation at the City landfill could serve as a drop-off site on an interim basis (1-6 years additional capacity exists).

There are three main options for setting out yard waste in a routed collection program:

- bags collected commingled with residential refuse, sorted out when the truck is emptied;
- loose in the street, at the curb, collected by a claw apparatus and a dedicated packer truck;
- dedicated rigid containers (typically cans or carts), collected by a dedicated packer truck.

Routed collection can be scheduled in several ways:

- Regularly scheduled curbside collection (e.g., once every week or once every other week schedules);
- Seasonal or special routes, such as neighborhood clean-ups or Christmas tree collection.

These schedule options are described more fully as follows:

Regularly scheduled routed collection can be provided for yard waste just as it is for refuse and other recyclables, and should be provided on the same day. But the frequency of collection for yard waste may depend on the season and supply of material. Selected frequency must take into consideration customer convenience, the available supply of material, and program costs.

Seasonal or special routes involve the provision of collection services in peak yard waste generation seasons, or following special events which generate yard waste (e.g, the Christmas holiday). Success of this approach relies on strong promotion and incentives, and willingness of the community to schedule their activities to coincide with the collection services. This collection method is generally not appropriate for the commercial/industrial sector.

Seasonal or special routes can make use of large collection trailers (approximately 40 cu yd capacity) in a location for a short, scheduled, period of time. When full or when scheduled to be moved to the next location, trailers are emptied at a central site.

Processing

Processing is typically composed of three steps: pre-processing, composting, and post-processing. A number of unit processes are involved in these steps, and are described below.

Materials Handling

Materials handled at the recovery site need to be moved several times between arrival on site and departure for markets. A rubber-tired loader is a basic piece of equipment that is essential for loading vehicles and managing unloading areas, feeding materials into size reduction and screening equipment, and moving materials from one on-site location to another. Conveyors can also be used for moving materials from grinding to screening, elevating screened materials to loading bins or vehicles, and creating stockpiles.

Size Reduction

Mechanical chipping, shredding, or grinding is used to reduce the volume of the incoming material. This increases the surface area of materials, and accelerates the composting process, which in turn decreases the space needed for active composting. Brush and wood waste can be size reduced using the same equipment. Green wastes may require different equipment.

Size reduction of brush and wood waste can be an important and useful element of an organic material diversion program. Small trees, branches, brush, broken pallets, clean used lumber, and other woody waste can be used after size reduction and screening as mulch or wood chips, or, if adequately reduced in size, included in compost piles. It is difficult to compost woody wastes without prior size reduction because the relatively high carbon-to-nitrogen ratio slows the decomposition process to impractical time periods. Shredding of woody wastes can generally be implemented in the short-term with relative ease and a minimum of uncertainty. No major new facilities are needed for the operation.

Suitable grinders, both mobile and stationary, can process approximately 5 to 10 tons/hour. Regular maintenance and unplanned downtime for certain types of grinders can be significant.

Amortized capital costs (excluding labor and other operating costs) generally translate into a cost of approximately $10 to $20/ton for a 10,000 ton/year operation.

Mixing

Mixing assists in bringing materials to the proper moisture level, and uniformly distributes the moisture throughout the material. Yard waste is often mixed with a rubber-tired loader. Materials such as food waste and mixed solid waste are usually mixed in a rotating drum or a container with a moisturizing agent to achieve the optimum moisture content. The materials are then transported to the active composting area.

Composting

Active composting involves close control of pre-processed material to promote rapid biological degradation. Active composting involves controlling two critical parameters: moisture content, and oxygen availability. There are several composting methods which range in their cost and degree of sophistication. The three basic methods are turned windrows, aerated static piles, and in-vessel.

The **turned windrow** method of composting calls for stacking pre-processed wastes into elongated piles known as windrows. The dimensions of the windrows can be adapted to the particular conditions and available equipment, but in general, they are roughly trapezoidal in cross-section and sized to provide insulation, while avoiding compaction of the material. Satisfying these criteria usually results in windrows from 8 to 15 ft wide, and 5 to 10 ft high, and whatever length is convenient to the site.

Aeration is accomplished by agitating or turning the piles using a front-end loader or specially designed turning equipment. The turning frequency depends on many factors, including the nature of the feedstock, its particle size, moisture content, and the desired rate of decomposition. Generally, but not necessarily, the more frequent the turning, the more rapidly the material decomposes. It is extremely important that site managers monitor temperature, moisture, and oxygen content of the piles to ensure that the materials decompose aerobically and rapidly, without the production of offensive odors. This method of composting generally requires between 6 and 18 weeks to finish.

The major advantages of this method are its ability to process large quantities of materials at a cost competitive with other solid waste disposal options, while producing a marketable and useful product. Turned windrow composting can often be accomplished at existing processing facilities, without very large capital expenditures, and within the stipulated time frame. Potential disadvantages that must be managed are the dedication of relatively large land areas to the project, the possible production of offensive odors, the intensive pile management required to maintain favorable conditions, and the formation of leachate.

Turned windrow composting has minimal associated hazards; odors from poor site or process management is the most frequently mentioned concern. Other hazards, such as flow of runoff into surface water, generally can be controlled effectively with simple steps.

This method of composting can accommodate changing economic, technological, and social conditions rapidly and effectively. Turned windrow composting can be implemented in a short time frame, partly since site improvements are usually minor and new facilities usually need not be constructed. This approach supports local source reduction and recycling efforts, and can be effectively developed by existing local institutions. Turned windrow composting is preferred over other methods for composting yard waste.

One common approach is to utilize a front-end loader to form and turn windrows. Alternatively, specialized equipment (e.g., a windrow turner) can be used to turn and aerate piles effectively and rapidly. Rudimentary operations tend to cost \$10 to \$20/ton (amortized capital and operating expenses), while sophisticated operations often cost approximately \$30 to \$40/ton. The cost of many operations nationwide is between these extremes.

The **aerated static pile** or **forced aeration** method of composting is similar to the turned windrow method, except that oxygen is supplied to the windrows through a network of pipes and blowers that either force or draw air through the composting matter, rather than through turning. However, in practice, it is advisable that some mechanical turning of the piles be carried out to promote complete decomposition and avoid anaerobic pockets. The complexity and expense of this method is generally not justified to compost leaves, grass and other yard wastes. It is appropriate, and commonly used, for stabilization of sewage sludge, and is being applied in dedicated mixed MSW composting projects.

Composting of strictly yard waste via the aerated static pile method is rare. Expense and needless complexity render this method generally inapplicable to yard waste. Aerated static piles are more commonly used to compost sewage sludge.

Aerated static pile composting has minimal associated hazards; odors from poor site or process management is the most frequently mentioned concern. Other potential hazards, such as build-up of ammonia gas in indoor facilities, generally can be controlled effectively by adequate ventilation and process monitoring.

The static pile method can accommodate changing economic, technological, and social conditions relatively quickly and effectively, and does not interfere with or impede progress toward the State's waste reduction and recycling goals. A program using this method can be implemented in an intermediate time frame; construction of a new facility is usually needed. Institutional barriers to its development are few.

Given the same feedstock, static and turned windrows produce identical products if both operations are managed correctly.

Typical combined capital and processing costs for a 10,000 ton/year facility are approximately $25 to $50/ton.

In-vessel composting entails the use of fully or partly enclosed vessels in which decomposition takes place under closely monitored conditions. Its relatively high capital and operating cost makes this method appropriate only for the decomposition of highly putrescible feedstocks, or feedstocks that could be the source of offensive odors such as food wastes. This method of composting is capable of producing a high quality end-product, but its expense makes it unattractive as a primary management option for yard wastes.

Advantages of this method include rapid processing, avoidance of weather-related problems and inefficiencies, and more complete process and odor control. High capital costs and potential for system failure render this option not viable unless more than yard and wood wastes are composted and a rapid throughput time is employed. This technology cannot be implemented in the short-term, and is not particularly flexible in response to changing economic, technological, and social circumstances. Construction of a new facility is essential to support program implementation.

This approach may impede progress toward the State's waste reduction and recycling goals, since it cannot be implemented in the short-term. In addition, institutional barriers may be significant, unless the facility is operated privately.

Typical combined capital and processing costs for a 10,000 ton/year facility are approximately $40 to $60/ton.

Curing

A period of slow, relatively uncontrolled, biological decomposition following active composting is often employed to further improve product quality. This period is known as "curing". Curing often takes place in large piles composed of several windrows or batches of compost. In many climates curing piles are placed under a roof in order to stabilize moisture content and to make screening and blending operations easier and more consistent.

Screening and Blending

Following active composting, compost is screened, shredded, or blended with other materials to meet the demands of specific end users. Material are screened to remove rocks, plastic, and other debris, and to size separate larger and smaller materials. A separate shredding process can also be added prior to the screening to further refine the material.

Pre-processed materials which have not been actively composted can be screened and blended with other organic or fertilizer materials to create a suitable soil amendment. These 'blended mulches' may be of equal value in the marketplace to a fully composted product.

Policies

Policies in support of composting activities include the following:

Prohibition on Disposal of Targeted Materials

A City ordinance can be enacted which prohibits disposal of targeted compostable materials. Enforcement of the ordinance, including penalties and publicity concerning penalties, would be required. City sponsored collection service for these materials can be provided, or the private sector can be allowed to compete to offer these services. Ordinances of this type are not uncommon in parts of the United States where landfill capacity is very scarce.

Procurement Preferences

City policies can be established which create a preference for products produced with compost derived from targeted waste types. These policies can state a percent price increase that the City will pay for these materials (for example, "up to 15%"), or can state that certain types of soil amendments must be derived from targeted waste types.

Revised City Regulations

City standard specifications can be modified to encourage or promote composting and the use of compost products. For example, compost products are often at a disadvantage in landscaping design because existing specifications were written to encourage use of uniform imported soil amendments, or equivalent. The burden of proof lies with those proposing "equivalent" materials or methods. Policies can be revised to reduce or eliminate this burden of proof.

Zoning and City code revisions can also be modified to promote composting. Health-related codes are often very restrictive with regard to handling, storage, or transport of "waste" materials. Revision of these codes may increase the feasibility of composting, or participation in composting, by businesses and individuals.

End-use as Landfill Cover

End-use of compost or mulch as landfill cover would conserve landfill life at landfills where this cover material is imported. The City of Mountain View landfill is an import site. The City can, as a policy, encourage the Local Enforcement Agency (County Health Department) to allow compost or mulch to be used in this way.

EVALUATION OF ALTERNATIVE PROGRAMS

Composting programs are combinations of composting activities described above. The following programs were considered for the City of Mountain View:

Christmas tree chipping and mulching

Brush and wood waste chipping and mulching

Yard waste composting

Food waste composting

Wet waste composting

Co-composting sewage sludge and yard waste

These six programs and the four policy activities described previously were evaluated under criteria specified by the CIWMB. The evaluation criteria are described in detail in appendix 6.

The criteria are:

- capital and operating costs
- educational value
- waste diversion potential
- environmental impacts
- flexibility to changing conditions
- shift in generation patterns
- facility requirements

- short and medium term feasibility
- institutional barriers
- marketability or availability of end uses of diverted materials
- local economic development potential.

The evaluation of alternative programs is summarized in Table IV-2. The following discussion addresses the key points covered in the evaluation process. Note that the six programs are not specified exactly for the purposes of evaluation. For example, a routed yard waste collection program could involve any of the three set-out methods described previously. Based on the general evaluation, selected programs are specified in more detail. These details are described under the selected programs section of this chapter.

Residential Services

A drop-off program relies on residents and/or private commercial haulers to transport clean (segregated) yard and wood waste to a designated site. This type of program keeps collection costs low, but generally results in less volume recovered than in a curbside collection program. This is a method typically used in sparsely populated areas, or during a program transition to a routed collection system. If generation density is great enough, as it is in Mountain View, drop-off is compatible with backyard composting programs and routed collections.

Special routed collection is appropriate for wastes generated as a result of a special event, such as Christmas trees. It is generally less appropriate in climates, such as in Mountain View, where seasonal variation in yard waste production is small. Special routes are economical only when equipment can be used for other services when not being used for special routes.

Special routes servicing drop-boxes (mobile drop-off) are generally advantageous only when coupled with seasonal clean-up of brush, or in areas where travel distances to the permanent drop-off are great.

Some disadvantages are:

- Participation will be less than that of a curbside program
- Location of centers might require changes in zoning ordinances

- The center would need to be staffed to prevent unauthorized disposal of unacceptable materials

- Additional equipment will be needed for collection and transportation.

Advantages of curbside collection, over drop-off programs, for yard waste or other compostables include:

- Convenience for residents

- High community profile and awareness

- High participation and recovery rates

- Linkage with mixed waste collection

Regular routed collection of yard waste also has potential problems. These problems need to be addressed carefully in system design. None of the problems is insurmountable.

Bag systems have experienced the following problems:

- Contamination not visible to the collector since it is inside the bag

- Overpacked bags littering the streets, or breaking apart inside the collection truck

- Contamination of the compost product with bag pieces, visible or microscopic

- Lower participation due the requirement that yard waste be bagged

Bag systems are generally much less expensive than other systems since they make use of existing collection equipment. In addition, they are completely compatible with source reduction efforts focused on yard waste.

Systems requiring residents to pile material loose without bags (i.e., vacuum trucks, front-end loader/dump truck, and mechanical claw/packer truck) have experienced the following difficulties:

- Blowing yard waste

- Cars driving over yard waste
- Car exhaust systems starting leaves on fire
- Vehicles parked on top of yard waste (on-street parking regulations are normally required)
- Sewer drains plugging up
- Debris from the street (e.g., sticks, rocks, glass, and oil) contaminating the leaves.

Loose set-out systems have very high collection productivity, and are generally less expensive than rigid container systems due to this high productivity and the avoidance of container costs.

Containerized yard waste set-out, although generally more expensive than bags or loose set-out, does not require any significant behavior change of participants, and allows use of standard existing waste collection vehicles and containers. One way of offsetting the higher costs of containerized collection is to offer service every other week rather than every week.

The inclusion of food wastes in residential programs necessitates the use of a containerized or bagged collection system and a collection frequency of no less than once per week.

Mixed MSW is being processed at several facilities in the U.S. for composting. This processing is part of a system commonly referred to as wet/dry collection. The processing methodology varies among the facilities, but typically involves a series of processes such as size reduction, magnetic separation, air classification, and screening. Although the quality of the compost produced from the wet fraction of mixed MSW is generally not as good as that produced from source separated compostables (e.g., yard waste), this type of program has the advantage of not requiring that the material be source separated.

A wide variety of collection vehicles and schedules are being employed to collect wet and dry waste. The most common vehicle is a semi-automated compactor truck, with a rear-loading bin lifting device. Two trucks run the route: one collects dry mixed recyclables, the other collects wet mixed compostables. Another system makes use of split truck body and split wheeled container to enable both wet and dry materials to be stored in one bin at the curb, and collected by one truck on the route.

It is unlikely that markets for wet MSW compost will be available given the likely production of large quantities of compost and mulch from source separated 'clean materials' such as yard waste, wood waste, and food waste.

Commercial/Industrial Sector Services

Targeted materials can be collected from the commercial/ industrial sector using bag or container set-out methods. Loose collection is not appropriate for businesses due to the unsightliness of the loose materials, and the routing inefficiencies which would eliminate loose system cost advantages.

Most yard waste in the commercial/ industrial sector is self-hauled by landscape contractors. Yard waste which is not self-hauled is placed in front-load containers or debris boxes and collected with mixed refuse. It is possible that special routing and containers for these wastes could be established. This would require waste surveys at the source of generation, rather than at the landfill.

Food wastes comprise a significant portion of the commercial waste stream. If properly managed, co-composting food wastes with yard waste would not introduce serious complications. These wastes have a high moisture and nutrient content which is beneficial. This material will result in a high-quality compost.

The major areas of concern for implementing a food waste collection program in the commercial sector are as follows:

- Space limitations of the waste generator
- Increased restaurant labor costs for segregating food waste
- Need to develop new collection strategies
- Restaurant waste collection will require new routes
- Health regulations.

The material flow for a restaurant engaging in composting and recycling would typically separate food wastes, recyclables, and refuse (non-processibles) into at least three containers. Food wastes would be placed in a specific container for collection. Recyclables, including glass, metal, newspaper, cardboard, and various plastics would also be segregated in various containers, or commingled in one container, depending on the sorting technology available. The remaining materials, such as non-recyclable plastics and used light bulbs, would be collected for disposal.

A major obstacle for implementing a source separation program at restaurants is the limited space available for placing various containers. Most commercial establishments are only designed for one container, and have only limited space. Adding containers may require, at a minimum, the loss of a parking space.

Any restaurant separation system would involve education and training of restaurant managers and their staff. In addition, restaurants that depend largely on customers to bus their refuse would also require an information campaign.

The local health department may place requirements on generators of food wastes participating in the food waste collection program with respect to the on-site storage of food waste.

For these reasons, source separation requirements at restaurants are likely to encounter significant institutional opposition in the short-term.

Collection economics may also be an obstacle. Many restaurants produce relatively small quantities of food waste. If we assume, for example, that the average restaurant generates 150 pounds of food waste per day, it would require over 125 stops in order to fill a commercial refuse vehicle. This may not be feasible in one day because the restaurants may be located all over town.

One way of overcoming this limitation is to incorporate restaurant collection with collection of other commercial food waste generators, such as grocery stores and residences. This would decrease the travel time between collection points, resulting in collection savings.

Another way of overcoming this obstacle is to combine collection of food wastes with refuse collection by means of a bag system. Food waste in bags, however, may have a greater tendency to rupture in the compactor unit than yard wastes.

Co-composting of yard wastes with sewage sludge is practiced in many operations in the U.S. The introduction of sewage sludge complicates the composting operation. Processing technologies, especially those of the pre-processing and active composting stages, require greater refinement than is necessary in a yard waste only operation. Site construction costs would increase, based on the need for more extensive paving, water runoff collection, and a larger buffer zone. Facility permitting would become a more complex process, due to potential environmental and health impacts that are more severe, or more difficult to mitigate, than those for yard waste composting.

Mountain View sewage sludge is not available for co-composting. It is incinerated at the Palo Alto Regional Water Pollution Control Plant. Metals are recovered from the sludge ash.

Self-Haul Services

Self-haul wastes typically contain large percentages of yard waste from landscaping operations. They may also contain large percentages of wood waste from small contractors, especially roofing contractors. Recovery programs directed at these materials are inexpensive since collection costs are borne by the generator. In addition, site operating expenses are low since they may, in many instances, be shared with landfill operations.

C.2. SELECTED PROGRAMS

This section describes the programs selected for collecting, processing, and composting targeted wastes in the City of Mountain View. Diversion estimates are presented in Table IV-3. Preliminary cost estimates are presented in Table IV-4.

The selected programs build upon one another, and make use of pilot testing to ensure that full scale system design is based on practical experiences in the City of Mountain View.

The selected programs are summarized as follows:

1. Christmas tree mulch program, 1991 (continue the existing program).
2. New City Policies to encourage composting and use of compost products, 1992 & on.
3. Bag System Pilot Program, 1993.
4. Wood and brush drop-off and mulching program, 1993 (This could involve seasonal collection of residential brush to maximize drop-off investment).
5. Wood and brush collection and mulching program, 1994. This will involve seasonal collection of residential brush if not implemented earlier, and Phase I Commercial/Industrial routed collection of wood wastes.
6. Collection and composting of yard wastes, 1995. This will involve true composting rather than mulching of collected materials.
7. Food waste collection and composting, 1998.

The following descriptions are provided to clarify the selected programs.

1. Christmas tree mulch program, collection from residential and commercial sectors.

The existing Christmas Tree program will be continued. Foothill Disposal Company collects trees at curbside, which are chipped and used as ground cover and nesting sites at the

Shoreline site. The program collected 4700 trees in 1990. The program will be expanded by targeting both the residential and commercial sector, and by diverting a higher percentage of trees in the residential sector. It is assumed that at least 35% of the trees in the residential sector, and 25% of the trees in the commercial sector can be captured, for an annual amount of at least 40 tons.

Collection will be performed using existing equipment, and will occur for three weeks after Christmas, with trees being placed by the garbage cans at curbside, or by the dumpsters in multi-family complexes.

2. Policies to promote composting, 1992.

These will include revision of City codes, ordinances, and standard specifications to eliminate any barriers to composting in Mountain View, or the use of compost in Mountain View. Procurement preferences for compost products will be established. These revisions will take place as part of implementation of other programs, as appropriate and needed.

3. Bag collection pilot program, 1993.

A bag collection pilot program will be performed in order to determine whether yard and food waste collection in bags is less expensive and as effective as separate routing. The following topics will be addressed:

- Combined collection of bagged yard waste and refuse in packer trucks
- Combined collection of bagged food waste and refuse in packer trucks.
- Bag types and handling procedures which minimize bag rupture.

Major parameters that will guide final selection of the yard waste collection equipment include:

- Ability to incorporate existing personnel and equipment.
- Opportunities for effective citizen participation.
- Efficiency of collection crews and vehicles.
- Effect of separation and collection methods on processing and material quality.
- Capital and annual costs.
- Need for staged implementation to correspond with processing facility development and end use demand.

The focus of this pilot will be assessing collection options, not on achieving diversion. As such, the materials collected may be landfilled. If a site, equipment, and personnel are available, the materials could be shredded and used for landscaping at the Shoreline site (as is done with the existing Christmas tree program).

The pilot program may not actually result in physical testing of bag systems, as described above and in the implementation schedule. If sufficient operational information on bag systems can be obtained from other jurisdictions, the pilot program may be limited to an evaluation of bags versus separate collection without actual bag testing in the City of Mountain View. In short, the pilot program will be performed in full only if data on which to base an informed decision about the use of bags for compost collection is not available from other sources.

4. Drop-off and mulching of yard and wood waste, 1993.

A drop-off facility at the Mountain View public dump will be developed for yard and wood waste from self-haul vehicles. These materials will be mulched and used at Shoreline at Mountain View unless other markets (including free distribution to residents) are available. Based on the need for extensive landscaping at Shoreline, all of the mulch end-product can be used on-site.

Drop-off may occur at the public dump site in order to save costs by sharing a gate house, scale, etc. If this occurs, and the processing site is elsewhere within Shoreline, materials will be transferred to the processing site in a drop-box.

Specific equipment is used to size reduce the wood waste/brush and leaves in a tub grinder or chipper. The type of equipment selected will depend upon the amount and size of material accepted at the facility.

Seasonal collection of residential brush may be implemented at this time to maximize drop-off investment. Large quantities of brush are often generated seasonally when trees and shrubs are trimmed in the spring or fall. If collection services are available at no or minimal additional cost, many residents will time their trimming activities to coincide with collection services.

5. Collection of brush and wood waste, 1994.

Collection routes for clean woody wastes (brush and wood) from the commercial sector will be established. Phase I Commercial/Industrial routes, as described in the Recycling Component, will target waste from large generators who can decrease their garbage collection service by one drop box with a separate drop box for pure loads of compostable waste. These routes may be subsidized by the City.

6. Yard waste collection and composting program, 1995.

Developing a composting program will build upon the yard and wood waste mulching systems established in the short-term.

The frequency of collection will be determined by the results of the bag system pilot, and success of the yard waste source reduction program in the short-term. If combined collection with refuse is determined to be viable, collection will be weekly. Brush may be collected separately less frequently.

If separate collection of yard waste is determined to be the best available technology, bi-weekly collection is recommended. Each household will be provided collection service on their specified garbage collection day, every other week.

Households served initially will be single family residences. Multi-family dwelling units may receive service if sufficient quantities of yard waste are generated, and these quantities are not being self-hauled by landscape contractors. This determination will be made based on waste surveys at the site of generation.

The yard wastes arriving at the composting site would be managed as follows:

a. The vehicle bringing the "fines" from the pre-existing mulching operations would deposit size reduced yard waste directly into newly formed windrows, or deposit them at a receiving location to be put into the windrows by a front-end loader. If a bulking agent is needed to fluff up the pile and increase oxygen availability, some of the "overs" from the processing site could be mixed in with the "fines" as windrows are formed.

b. The windrows, about 8 feet high and 14 feet wide, would be watered by the water truck if necessary to achieve a 50% moisture content.

c. A front loader or windrow turning machine would make a pass through the windrow to mix and further size reduce materials as well as mix in the water and air as necessary for aerobic (in the presence of oxygen) microbial activity.

d. The windrows formed of the yard waste "fines" would be watered by the water truck and mixed up by the loader or windrow turning machine periodically as necessary to foster the composting process.

e. If enough space is available on site, the active phase of rapid microbial activity in the windrows would be followed by a curing phase in which the windrows are pushed into static piles. Before placing the composting material in static piles, it must be more stable and have a reduced demand for oxygen due to slower microbial activity. If there is not enough room on site to form static curing piles, then the material would have to be taken elsewhere for the curing phase. Since the Shoreline site is in need of soil amendments, the curing process could take place on the ground after spreading.

If there are significant size constraints at the composting site, the composting process will need to be sped up in order to finish the composting process quickly enough to make room for additional incoming materials. A windrow turning machine is the only way to do this efficiently. The alternative is to use a front-end loader to lift up the composting material and drop it onto a new pile, mixing in air in the process. A windrow turner will do a much better job of agitating the windrows and speeding up decomposition of the yard waste, thereby decreasing total space required to compost the constant flow of materials. A windrow turner will also save considerable operator time.

Following the completion of the composting process, two optional steps can be added: screening to remove additional foreign objects, and a final grinding to achieve a fine soil-like texture. These steps may be useful in distributing the materials to the general public or commercial markets. They are unlikely to be needed for most soil amendments at Shoreline.

A bag breaking pre-processing operation is necessary only if the site accepts waste in plastic non-biodegradable bags. However, it may be considered a desirable step even if the bags are biodegradable, since opening the bags will speed the decomposition process. Accepting bags of any type also increases the need to screen the finished compost. Non-biodegradable bags will need to be screened out of the finished compost in order to produce an acceptable product for end markets. Biodegradable bags may also need to be screened out of the finished compost as it takes up to 18 months for them to biodegrade; the composting process usually requires less than 9 months to produce a finished compost. The large pieces of the biodegradable bags that remain in the finished compost would need to be screened out. The rejects from the screening process could be landfilled or mixed with incoming waste until they are totally decomposed.

Equipment capable of breaking open bags is available and often used with a trammel screen that separates the waste into compostables and rejects. The bags can also be broken open by hand, but this requires a great deal of labor and time.

7. Food waste collection and composting in 1998-1999.

The City will implement a food waste composting program. The program will focus on combined or commingled bagged collection of food wastes from single-family units, restaurants, and other large generators of food wastes. The best collection system will be determined based on the results of the bag collection pilot study and monitoring of programs elsewhere as they are implemented.

Recovery of food waste from the residential and commercial waste streams is increasingly recognized as a necessary component of an advanced waste management system in approaching the 50% diversion mandate.

Many options for collection exist other than bags. They include cans, wheeled containers, and the Bio-Can which aerates the wastes and reduces odor prior to collection. Several factors will be considered when determining the container system for food waste collection, both for inside and outside storage:

- Type of waste collected
- Convenience
- Odor
- Animal/child proof
- Hygiene
- Size of container (amount of wet waste)
- Frequency of collection
- Collection vehicles

C.3. END USES AND MARKETS

Markets will be identified and established for the end-products from the selected composting program. The market plan will identify the end-products and the quality standards. Quality standards are very important in the marketing of end-products.

Quality constraints associated with compost can include:

- Maturity - material has not fully decomposed;

- Contaminants - presence of sticks, stones, plastic, metals, etc.;
- Low nutrient content - lack of value as fertilizer;
- Heterogeneity - lack of consistent, appropriate particle size;
- Soluble salts and improper pH - can limit use in nursery/potting mixes;
- Unappealing appearance - can limit acceptability.

Compost quality (good appearance, low concentrations of metals and toxic compounds, etc.) will be assured by thorough source separation, careful processing of the feedstock, and regular testing of the end-product. Although a high quality product generally assures more successful marketing, knowledge of the end-users will allow the production of a material of appropriate quality for its intended use. The program will produce composts having different qualities. For example, nurseries demand a very high quality product, while highway departments can utilize a lower quality, less expensive product.

The following are potential end-users of compost products in Santa Clara County:

- local parks and highway departments;
- homeowners;
- greenhouses;
- landscapers;
- farmers and farm suppliers;
- golf courses;
- sod growers;
- cemeteries;
- schools;
- parks;
- public buildings.

Local markets such as homeowners, municipal and county agencies, nurseries, sod farms, and landscaping supply firms are examples of potential end users. It will be necessary to determine how the end-products will be distributed (i.e., bagged and/or bulk) and at what, if any, cost.

It is important to keep in mind that planning should be done from the back end, by targeting particular end-users and then selecting a system capable of producing a material that can meet their specifications.

Initially, the City will use the majority of diverted material for landscaping at the Shoreline site. Size reduced yard waste incorporated into the soil will decompose gradually, and provide many of the same benefits as do green manure or cover crops tilled into the ground in agriculture.

As organic matter decomposes in the soil, nitrogen is immobilized by the decomposing microorganisms and therefore is unavailable for plant growth. This is similar to the situation created when immature composts are applied to soils. The presence of decomposing organic matter in soil has been shown to inhibit plant growth in general, probably due to the acidic by-products created during the process. This effect is short-lived, however, and negative impacts can be avoided with proper management. These would include limiting application rates, adding supplemental nitrogen if necessary, and allowing sufficient time to lapse between landspreading and planting.

As the composting component of the program is developed, the City will target other more demanding markets, including landscapers, parks, construction, firms, and highway departments. Surveys have consistently shown that landscapers are a good potential market for compost; they are interested in using the product and are capable of consuming large quantities. Successful marketing to this group will require that the producer understand issues such as transport and handling needs, and periods of peak demand.
As the parameters of the composting operation are defined and consistent compost materials are produced, the City will actively pursue markets for a wider variety of markets. This may include wood chips, mulch, blended mulch, and several grades of high quality finished compost.

The City will, through procurement preferences and contract requirements, become a market for all such products. The City will encourage residential, commercial, and agricultural use of compost products through public awareness campaigns ("buy organic").

Transformation Markets

The City will consider marketing a portion of the brush and woody fraction of yard waste as boiler fuel. There is currently a strong demand for boiler fuel.

The market for wood chips is driven largely by the forces of demand. There are seven biomass conversion facilities within 100 miles of the Bay Area which absorb most of the urban wood waste produced. The demand is currently not being met: these facilities could handle an estimated 900,000-1,200,000 tons per year of processed wood waste in addition to the roughly 240,000 tons currently received from recovery facilities in the Bay Area. The boiler fuel market will dramatically affect the disposition of wood chips produced in the region. To illustrate, the market price for bone dry wood chips is currently $30-40 per bone-dry ton, an increase of 60% in the past four years. This has caused major shifts in the landscaping industry, which normally derives bark products from lumber mills in Northern California. The majority of by-products from the lumber mills are now going to more lucrative markets at biomass conversion facilities, causing an 80% increase in the price for landscape bark products in the past four years.

It is unlikely that the sale of wood chips as mulch in the landscaping industry could match the price obtainable from sale of the material as boiler fuel. In addition, the market for such end uses is not well developed, and has only limited potential for expansion. Other beneficial end uses for wood chips in agriculture, sludge composting, and land reclamation are not currently viable on a large scale. Given the paucity of other available markets for wood chips, the boiler fuel market will be considered as a means of securing an end use for the material and as an economic support for composting other waste stream components.

Whether or not this option will be developed depends partly on the state's current and future position on applicability of the practice to recycling goals. The extent to which the City of Mountain View expects to meet diversion goals through yard and wood waste management practices is also an important factor. In other words, economics and relative market certainty may support managing a portion of the yard waste in this way, even though tonnages diverted to boiler markets would not be countable towards diversion objectives, at present.

Current CIWMB regulations state that transformation (including the use of wood chips as boiler fuel at biomass conversion facilities) will not count toward diversion goals at all in the short-term. In the medium term, transformation can count for 10% of diversion from total waste generation if the following conditions are met:

- The transformation project uses front-end methods to remove all recyclable materials from the waste stream prior to transformation to the maximum extent feasible.

- The ash or residue generated is routinely tested at least once a month.
- The city or county where the facility is located is effectively implementing all feasible source reduction, recycling, and composting measures.
- The transformation project will not adversely affect public health and the environment.

D. COMPOSTING PROGRAM IMPLEMENTATION

D.1. RESPONSIBLE PARTIES

Implementation of the composting program is the responsibility of the Utility Department through its Solid Waste Division. The Solid Waste Division is responsible for determining program details; awarding collection, processing, and marketing contracts; and working with collection contractors to develop and implement the education and public information necessary for program success.

One issue that will be addressed during implementation is the potential for a regional yard waste composting operation. Such a facility could be more cost-effective than a Mountain View only. A cooperative arrangement among several jurisdictions would result in significant capital cost savings.

D.2. IMPLEMENTATION TASKS

Implementation schedules for planned programs include the tasks which must be undertaken during program implementation. These schedules are provided in Table IV-5. Responsible parties for each task are listed beside the task.

D.3. SCHEDULE FOR IMPLEMENTATION

As stated previously, schedules for implementation have been provided in Table IV-5.

D.4 COST OF PROGRAMS

Cost estimates for each program are provided in Table IV-4. Total program costs, when all programs are implemented, are estimated to be approximately $1.65 million annually. The cost estimates, however, include a 20% contingency which may not be needed, and assume that the resale value of compost products is zero. Market stimulation policies in the short-term may substantially improve program economics in the medium-term.

It is also worth noting that the yard waste collection and composting program scheduled for 1996 amounts to over half of the estimated costs. The cost estimate assumes that separate collection of yard waste will be required. If bagged collection is feasible, program costs should be substantially less.

These estimates do not include land costs. Although the cost of land is a key factor in composting economics, it is also one of the more difficult cost items to assess. Frequently, as part of their planning efforts, cities seek economic analyses of composting as a waste management alternative prior to site selection. In such cases, it is a fairly common practice to perform economic analyses with the qualifier, "excluding land." It should also be noted that in situations where the land will be leased, land cost is an operating rather than an initial cost.

The cost of land is one of the largest expenses in a recovery program. The composting process requires a large tract of land; composting 4000-5500 cubic yards of material requires an acre of land for a four to eight month period, depending upon the technology selected. A survey of land costs in the Bay Area for undeveloped sites zoned as commercial or industrial revealed a range of $3.00-$14.00 per square foot. For a ten acre site, this would be a purchase price of $1,300,000-$6,000,000.

Consequently, the City of Mountain View will devote a portion of the Shoreline site to a composting facility to provide for management of the organic waste stream at a reasonable price.

Site improvement costs include the costs of grading, paving a road to the site, fencing, and electrical power, water, and sewer hook-ups. Access roads for the site must be able to support traffic without causing adverse effects on noise levels, road conditions, or traffic conditions. Adequate drainage on the surface of the site must be planned, and a drainage collection system installed. The surface of the site may be paved to improve vehicle access during wet weather.

If no existing structures can be modified, an office trailer and storage shed would be needed for operations and equipment. These facilities have been assumed to be needed in the cost estimate prepared.

The equipment required for the composting operation includes a tub grinder or shredder for size reduction of materials, a screen to separate larger materials from finer material, and debagging equipment (which can be combined with a screen). Other required equipment includes rubber-tired loaders and transport trucks.

Engineering design and construction supervision costs are included in program cost estimates.

Of operating costs, those for labor often are the largest. Other operating costs include maintenance, fuel, electrical power, water, supplies, on-going engineering and laboratory services, and insurance.

The cost estimates provided include these cost items, plus a contingency of 20% and an administrative cost of 7%. The contingency and administrative percentages are in accordance with City of Mountain View budgeting practices.

E. MONITORING AND EVALUATION

E.1. ANNUAL MONITORING METHODOLOGY

The monitoring program will compare actually diverted tonnage by waste type and program with projected diversion by waste type and program, on an annual basis. For compliance purposes, this comparison will be done on a total diversion program basis. This methodology is chosen because diversion tonnage projections by waste type are not expected to be accurate due to changes in water availability, weather patterns, landscaping standards, technology (plastic pallets rather than wooden pallets), and other factors which cannot be foreseen at present. Although diversion data will be obtained on a program by program and waste type by waste type basis, if possible, compliance will be considered to have occurred in any year if the total diversion tonnage projected for that year is attained.

E.2. ADMINISTRATION AND REPORTING

All information will be reported at least quarterly to the City. Reporting data will be required, and will be a condition of getting a business license or franchise agreement renewal or extension. Mountain View employees will be responsible for performing monitoring functions, including information gathering, compiling, and report writing, unless a regional arrangement (for example, Santa Clara County Solid Waste Staff) for these services is made.

Franchised or licensed collectors will be required to report:

- Number of collections per day, calculated monthly for each route.

- Average weight of each set-out, calculated monthly for each route.
- Percent of generators to whom service is available who participate.
- On-route and off-route time, calculated monthly for each route.
- Average time required to make a pickup, and average travel time between pickups, for all routes of a type (residential single-family, etc.) combined.

Operators of solid waste processing facilities will be required to report, for The City of Mountain View generated waste:

- Monthly data on total tonnage of material received, marketed, and disposed by material type and origin.
- Monthly data on resale revenues received, by waste type and origin.
- Monthly tipping fees, if any, paid for disposal of residuals, or received for materials dropped off.

A visual waste characterization study is recommended during the term of the bag system pilot study in 1992 to determine the relative proportion of yard waste materials. The relative distribution of green waste, brush, and other yard and food wastes will be assessed. This information would inform the design of a recovery program, such as selecting equipment and processing systems, and determining appropriate end uses for finished material.

E.3. CONTINGENCY (REMEDIAL) MEASURES

The tonnage diverted by each program each year will be compared with the tonnage projected to be diverted by that program. If actual diversion falls short of the projection, the following actions will be taken in the order described:

1. Total tonnage diverted by all programs in that year will be compared with total tonnage projected to be diverted by all programs. If total actual diversion equals or exceeds projected diversion no further action is necessary.

2. Additional educational and informational actions will be taken if it appears that the tonnage shortfall is the result of low participation.

3. Additional waste types will be added to the program (will be collected) if participation appears to be adequate.

4. Mandatory participation in the program, or penalties for disposal of recyclable materials included in the program, will be implemented. Public opinion polls in other communities indicate that citizens are willing to accept a mandatory recycling program if it is convenient, equitable to all citizens and extensively promoted. Mandatory programs that are properly designed, promoted, and operated generally achieve higher participation and recovery rates than voluntary programs. Higher participation rates also generate a lower cost per ton recycled.

5. If necessary, additional programs beyond those described in this document will be investigated, designed, budgeted, and implemented.

TABLE IV-1: CURRENT COMPOSTING BY PROGRAM

Program	Quantity T/Y	Waste Type
Private Commercial (County-Wide Study)	230	Wood Waste
Christmas Trees (1) (City records)	28	Yard Waste
Total Composting:	258	

(1) Christmas tree tonnage based on 4700 trees @ 12 pounds per tree.

TABLE IV-2: RATINGS OF COMPOSTING ACTIVITIES

	Alternative Systems						Policy Alternatives			
Criteria	Christmas Trees	Wood Mulch	Yard Waste Compost	Food Waste Compost	Wet Waste Compost	Sludge Compost	Collection Ordinance	City Procurement	Revisions of Regulations	Landfill Cover
1. Effectiveness in waste diversion	Low	Medium	High	Medium	High	Medium	High	Low-High	Low-High	High
2. Hazards created	High	High	Medium	Medium	Medium	Medium	Medium	High	High	High
3. Flexibility	High	High	Medium	High	Medium	Medium	Low	Medium	Low	High
4. Consequences on the waste stream	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium
5. Feasibility	High	High	High	High	High	High	High	High	High	High
6. Consistency with local plans	High	High	High	High	High	High	Low	Medium	Low	High
7. Facility requirements	High	Medium	Low	Low	Low	Low	High	High	High	High
8. Institutional barriers	High	High	High	High	High	Low	High	High	High	Medium
9. Costs	High	High	Low	Low	Low	High	Medium	Medium	Medium	Low
10. End uses or markets	High	High	High	Medium	Low	Medium	Medium	Medium	Medium	High
11. Involvement of waste generators	High	High	High	High	High	Medium	High	Medium	Medium	Low

TABLE IV-3
COMPOSTING PROGRAM DIVERSION PROJECTIONS
CITY OF MOUNTAIN VIEW

Current Composting	Yard Waste (tons)	Wood Waste (tons)	Food Waste (tons)	Total Tons	% of Total Generation
Residential	28	0	0	28	0.03
Comm. & Ind.	0	230	0	230	0.23
Self-Haul	0	0	0	0	0.00
TOTAL CURRENT	28	230	0	258	0.26
Short-Term Composting Programs					
Expand Christmas Tree Program	12	0	0	12	0.01
Wood & Brush Drop-off and Mulching	1,935	1,215	0	3,150	3.15
Wood and Brush Collection and Mulching	2,251	2,514	0	4,765	4.76
TOTAL SHORT-TERM	4,198	3,729	0	7,927	7.92
TOTAL CURRENT & SHORT-TERM	4,226	3,959	0	8,185	8.18
Medium-Term Composting Programs					
Yardwaste Collection and Composting	7,384	0	0	7,384	7.38
Food Waste Collection and Composting	0	0	1,984	1,984	1.98
TOTAL MEDIUM-TERM	7,384	0	1,984	9,367	9.36
GRAND TOTAL	11,610	3,959	1,984	17,552	17.53

NOTES: (1) Christmas tree recovery is estimated at 35% of residential trees, 25% of commercial trees.
(2) Brush Drop-off estimate is based on recovery of 30% of self-haul, and 10% of residential yard waste. Wood recovery is estimated at 90% of self-haul wood waste.
(3) Brush collection recovery is estimated at 20% of residential, commercial, and industrial yard waste, and wood recovery is estimated at 50% of commercial and industrial wood waste.
(4) Yard waste collection and composting recovery is estimated at 50% of residential, commercial, industrial, and self-haul yard waste.
(5) Food Waste Collection recovery is estimated at 50% of residential and commercial food waste.
(6) Total Waste Generation used in this table: 100,108 Tons

TABLE IV-4: COST ESTIMATES FOR PLANNED COMPOSTING PROGRAMS (1)

	Start-up Year	Start-up Costs (2)	Staff Services (3)		Annualized Start-up Costs(4)	Other Annual Costs(5)	Total Annual Costs(6)
			EPI	Other			
Expand Christmas Tree Program	1991	0	0.02	0.03	0	6,200	7,440
Wood and Brush Drop-off and Mulching	1993	150,000	0.10	0.25	39,510	119,650	190,992
Bag Collection Pilot Program	1993	0	0.02	0.10	0	68,560	82,272
Wood and Brush Collection and Mulching	1994	50,000	0.05	0.10	13,170	70,450	100,344
Yardwaste Collection and Composting	1995	385,000	0.10	0.20	101,409	628,900	876,371
Food Waste Collection and Composting	1998	175,000	0.10	0.20	46,095	273,880	383,970

Notes: (1) Annual Costs in 1991 Dollars.

(2) Start up costs include estimated consultant hours, or equivalent, during program start-up.

(3) On-going personnel services are expressed as staff full-time equivalents (FTEs).

(4) Trucks and equipment are amortized over 5 years at 10%. Buildings are leased.

(5) Other annual costs include staff costs at $63,000 per FTE, service provider fees, and other operating costs.

(6) Total Annual cost includes 20% contingency.

(7) Capital and operating costs of Wood and Brush Collection assume shared equipment with other pre-existing programs.

(8) Yard waste collection and composting program cost estimate is based on separate collection of yard waste. A bag system will cost less.

(9) Food waste collection is based on a bag system for residential food waste, and a dedicated truck for commercial food waste.

TABLE IV-5 IMPLEMENTATION SCHEDULE FOR COMPOSTING PROGRAMS

Program/Task	Supervising Agent/ Implementing Agent	Time Frame
Expand Christmas Tree Program	Utilities Department	7/91-1/92
Identify Groups and Locations	Solid Waste Division	7/91-9/91
Publicize Program	Solid Waste Division	10/91-12/91
Collect Materials	Foothill Disposal	12/91-1/92
Process Materials	Shoreline Division	12/91-1/92
Wood and Brush Drop-off and Mulching (3)	Utilities Department	7/92-8/93
Develop Program Specifications	Solid Waste Division	7/92-9/92
Negotiate With Service Providers	Solid Waste Division	10/92-1/93
Approve Contract(s)	City Council	2/93
Purchase Equipment	Private Contractor	3/93-7/93
Publicize Program	Solid Waste Division	5/93-7/93
Prepare and Open the Site	Private Contractor	8/93
Process Materials	Private Contractor	8/93 & on
Use Materials	Shoreline Division	8/93 & on
Bag Collection Pilot Program	Utilities Department	7/92-12/93
Design the Pilot Program	Solid Waste Division	7/92-10/92
Negotiate with Foothill and BFI	Solid Waste Division	11/92-1/93
Purchase and Distribute Bags	Solid Waste or Foothill	2/93-3/93
Publicize the Program	Solid Waste Division	2/93-3/93
Collect Materials	Foothill Disposal	4/93-8/93
Evaluate Data and Make Recommendations	Solid Waste Division	9/93-12/93
Wood and Brush Collection and Mulching	Utilities Department	7/93-10/94
Develop Truck and Set-out Specifications	Solid Waste Division	7/93-9/93
Negotiate with Service Providers	Solid Waste Division	10/93-1/94
Approve Contract(s)	City Council	2/94
Purchase and Distribute Equipment	Private Contractor(s)	3/94-9/94
Publicize Program	Solid Waste Division	7/94-9/94
Collect Materials	Private Contractor	10/94
Process Materials	Private Contractor	10/94 & on
Use Materials	Shoreline Division	10/94 & on

TABLE IV-5 IMPLEMENTATION SCHEDULE FOR COMPOSTING PROGRAMS

Program/Task	Supervising Agent/ Implementing Agent	Time Frame
Yardwaste Collection and Composting	Utilities Department	1/94-6/95
Identify Markets	Solid Waste Division	1/94-3/94
Develop Truck and Set-out Specifications	Solid Waste Division	4/94-6/94
Negotiate with Service Providers	Solid Waste Division	7/94-10/94
Approve Contract(s)	City Council	11/94
Purchase and Distribute Equipment	Private Contractor(s)	12/94-5/95
Publicize Program	Solid Waste Division	3/95-5/95
Collect Materials	Private Contractor	6/95 & on
Process Materials	Private Contractor	6/95 & on
Use Materials	Identified Markets	6/95 & on
Food Waste Collection and Composting	Utilities Department	7/96-1/98
Identify Markets	Solid Waste Division	7/96-9/96
Develop Truck and Set-out Specifications	Solid Waste Division	10/96-1/97
Negotiate with Service Providers	Solid Waste Division	1/97-4/97
Approve Contract(s)	City Council	5/97
Purchase and Distribute Equipment	Private Contractor(s)	6/97-12/97
Publicize Program	Solid Waste Division	9/97-12/97
Collect Materials	Private Contractor	1/98 & on
Process Materials	Private Contractor	1/98 & on
Use Materials	Identified Markets	1/98 & on
Market Redevelopment Zone	Utilities Department	See Note (2)
As in Recycling Component, Table III-5	Solid Waste Division	
Other Policies		
As part of other programs	Utilities Department	As appropriate

Notes:

(1) Time Frame for each program reflects commencement of detailed planning trhough commencement of services.

(2) CIWMB will administer several Market Zone designation application cycles. Schedules are indeterminate at present.

(3) Seasonal (twice/year) collection of residential brush may

CHAPTER V

LIST OF TABLES
(Following Text)

CHAPTER V
SPECIAL WASTE COMPONENT

INTRODUCTION

Prior to passage of AB 939, special wastes were defined as those wastes which may be disposed in non-hazardous (Class III) landfills only if special handling procedures were followed. A complete, clearly defined, list of special wastes did not exist.

In AB 939 and AB 1820, the only special wastes that are specifically named are sewage sludge and asbestos. The CIWMB regulations expand the list to include ash, industrial sludge, auto shredder waste, auto bodies, and wastes specifically conditioned in a solid waste facilities permit. Examples of the last category of waste are dead animals and infected plants.

The CIWMB regulations also refer to special wastes listed in Section 66740 of Title 22 of the California Code of Regulations. In addition to the wastes already mentioned, Section 66740 lists baghouse and scrubber wastes from air pollution control, catalyst from petroleum refining and chemical plant processes, cement kiln dust, tannery sludge, drilling mud from gas and oil wells, refractory from industrial furnaces, kilns and ovens, sand from sandblasting, sand from foundry casting, slag from coal gasification, sulfur dioxide scrubber waste from flue gas emission controls in the combustion of fossil fuels, and tailings from the extraction and processing of ores and minerals.

The special wastes discussed in this component are:

- sewage sludge
- ash
- asbestos
- tires
- white goods
- dead animals
- other special wastes

Most special wastes have not been found in Mountain View in significant quantities. The discussed waste types are not all targeted for diversion; in fact, most special wastes generated in Mountain View are already managed in an appropriate way.

A. GOALS AND OBJECTIVES

A.1. GOALS

The goals of special waste programs are to divert waste from landfills, and to handle wastes that cannot be diverted in a safe, and cost-effective way. In general, the latter goal may include such activities as the dewatering and drying of sludge and the shredding of tires. Special waste programs may also include the channeling of certain wastes to appropriately designed and permitted landfills outside of the city, county, or state.

A.2. OBJECTIVES

The following specific objectives are recommended for the management of Mountain View's special wastes.

1. Maintain current waste management practices for sewage sludge, ash, and asbestos.

2. Strengthen existing programs for the diversion of white goods and dead animals prior to January 1, 1993.

3. Implement City-sponsored programs to promote the local diversion of tires prior to January 1, 1993.

4. Attempt to include other special wastes suitable for composting in composting programs. This includes street sweepings, flood channel dredge spoils, and water treatment sludge.

With the exception of white goods (discussed in the recycling component), none of these activities is projected in this document to divert more than a few tenths of a percent of waste from disposal.

Some of the special wastes suitable for composting are produced in significant tonnages, such as water treatment sludge and flood channel dredge spoils, but they are not counted as "generated wastes" at this time since they may or may not be considered to be "normally disposed of" in municipal landfills.

B. EXISTING CONDITIONS

Generation estimates for the following special wastes are provided in Table V-1. The waste are sometimes considered to be "generated" for the purposes of AB 939, and sometimes are not considered "generated". This determination is made based on CIWMB regulations which state that those wastes which are permitted for landfill disposal or transformation at a facility with a CIWMB facilities permit, and which are normally disposed in landfills, must be counted in calculations in this document. In several cases the interpretation of the regulations may change over time: consequently, current estimates of tonnage have been provided in the interest of thoroughness.

B.1. SEWAGE SLUDGE

Sewage from Mountain View is treated at the Palo Alto Regional Water Pollution Control Plant (PARWPCP) in Palo Alto. The sewage from Palo Alto and Los Altos is also treated at the plant. Mountain View is a co-owner of the plant but does not operate it.

The PARWPCP operates under permits from the Bay Area Air Quality Management District, and the Regional Water Quality Control Board. There is no permit, and none is required, from the California Integrated Waste Management Board (CIWMB).

Sludge generated at the PARWPCP amounts to 18,880 wet tons per year or 5475 dry tons per year. Forty percent of this quantity, or 7550 wet tons per year, is attributable to sources within Mountain View. Since the plant is not permitted by the CIWMB, sewage sludge is not included in the determination of total disposed waste or total diverted waste in this report. According to CIWMB regulations, only wastes disposed in CIWMB-permitted facilities are to be included in the determination of the quantity of disposed waste; and only wastes normally disposed of as of 1990 are to be included in the calculation of diverted waste.

The sludge generated at the PARWPCP is incinerated at an on-site incinerator. Approximately 1100 tons of ash per year are produced and sent to a copper smelter in Arizona. The ash is used as flux at the smelter.

B.2. ASH

No significant sources of ash have been found in Mountain View other than that from the sewage sludge incinerator discussed in section above.

B.3. ASBESTOS

About 130 tons per year of asbestos is estimated to be generated in Mountain View. This estimate is based on County figures reported by the Department of Health Services and pro-rated by population. Asbestos is typically disposed of by covering it with dirt immediately upon placement at the active face, then compacting it in place. The dirt cover prevents airborne contamination from the asbestos during compaction, which is the environmental concern which lead to classification of asbestos as a special waste. The public dump is only permitted to accept non-friable asbestos.

B.4. TIRES

The City of Mountain View landfill accepts tires for disposal for a fee, but stockpiles them at the site rather than burying them. When a sufficient quantity is stockpiled, they will be sold or donated to a tire recycler or burn plant, however, in the future, it may be necessary to pay to have the tires hauled away. This service is advertised in The Mountain View Recycling Newsletter, and The View.

At present, almost all tire wastes generated in Mountain View that are not disposed of at the Mountain View landfill are likely delivered to Oxford Tire Recycling (OTR) of Northern California in Union City. Tires that are suitable for re-use or re-treading are manually separated. The remaining tires are burned in an electric power plant in Westley, California. Estimates of the fraction of tires that are separated for re-use and re-treading vary. A range of 16 percent to 25 percent has been reported. Many of the recovered tires are exported to Mexico, Panama, and elsewhere.

The tire incinerator in Westley is fueled, in part, by tires stored on an adjacent site. That is, the current rate of deliveries to Oxford Tire Recycling is insufficient to fuel the incinerator at its rated capacity. Oxford Tire Recycling is constantly seeking new sources of tires.

Judging by observation of landfills in Santa Clara County and elsewhere, and by observation of practices throughout the Bay Area, tires not disposed in landfills are re-used on vehicles, used in playgrounds, marinas, etc, and illegally dumped.

B.5. WHITE GOODS

A fee of about four to five dollars is charged at the Mountain View Landfill for white goods that are accepted. The white goods are picked up periodically by Valley Recycling for disassembly and recycling. This service is advertised in the Mountain View Recycling Newsletter, and The View.

B.6. AUTOMOBILE BODIES AND AUTO SHREDDER RESIDUE

According to an industry source, about 1.8 million to 2.0 million automobile bodies are shredded in California each year. Typically, an auto body is delivered to the shredding facility after having been stripped of its re-usable parts by an auto dismantler. The typical auto body yields about one ton of steel and 0.3 ton of residue to be disposed. Since the steel is almost never disposed in landfills it is not considered to be a solid waste for the purposes of this report. The residue is treated with a polysilicate compound to immobilize lead and other heavy metals.

There are no automobile shredders in Mountain View.

B.7. DEAD ANIMALS

Dead animals are disposed in landfills when appropriate, and recycled at a Sacramento-based rendering plant in many instances. Tonnages disposed are not available from landfill records. Tonnages diverted are not available at present, either. In addition, the production of dead animals is source reduced in Mountain View through neutering and spaying of pets.

B.8. OTHER SPECIAL WASTES

This category has been used for a group of wastes which are potentially special wastes, although not currently listed in regulations as special wastes. They are worth considering in this document since they may be included in the disposed or diverted waste stream in the future, or require special handling or accounting procedures.

These wastes are: litter, mattresses, street sweepings, water treatment sludge, and flood control channel dredge spoils.

CALTRANS records indicate that they collect approximately 4.2 tons of litter from Highways 101 and 85 in Mountain View annually. This waste is disposed of at the Zanker Road landfill.

Mattresses and box springs are disposed of periodically at the City of Mountain View landfill. They may be reused if properly cleaned and fumigated. They are currently disposed on a day to day basis. A special program was run during the last free dump day. Sixty nine (69) mattresses suitable for recycling were stockpiled during the day, and picked up by a mattress recycler at no charge.

Street sweepings in Mountain View amount to an estimated 1601 tons per year. The sweepings are disposed of at the Newby Island landfill. This material may be suitable for diversion by composting. It may also require special handling procedures as urban runoff regulations become more stringent, and street cleaning procedures are mandated to be performed using "best management practices".

Water treatment sludge and dredge channel spoils were traditionally disposed of in landfills or landspread and sun dried. Since 1984, however, landfill disposal of waste with moisture contents greater than 50% has been restricted or prohibited. Tonnage estimates for these wastes are poor due to the nature of the handling procedures for the materials. At this time they are not considered as "generated wastes" for the purposes of this document. They are potentially divertable by composting, however, and are therefore worth mentioning.

C. EVALUATION OF ALTERNATIVES

Special waste management alternatives are discussed and evaluated according to criteria specified in the CIWMB regulations. The following evaluation discussion is summarized in Table V-2.

C.1. SEWAGE SLUDGE

No new sewage sludge diversion program is appropriate for Mountain View because the sludge is already diverted from the landfill. It is incinerated. To divert sludge from the incinerator would be inconsistent with local plans and policies, and significant institutional barriers could be encountered.

Composting and land application of sludge could be impeded by hazards associated with the presence of heavy metals in the sludge. This problem is probably more severe in the sludge from the Palo Alto Regional Water Quality Control Plant than in average sludge from many sludge from the Palo Alto Regional Water Quality Control Plant than in average sludge from many other areas in California because of the electronics industry character of businesses discharging into the sewer.

From an economic perspective, the existence of an operating incinerator, and the transport distance to lower cost agricultural land, makes incineration the most attractive of the sewage sludge management options.

C.2. ASH

As is explained in the County wide component, ash is currently disposed in an acceptable manner, and there are no apparent feasible diversion alternatives.

C.3. ASBESTOS

The main concerns related to asbestos are that the asbestos be removed from structures and equipment in a safe way and that it be safely disposed. Current disposal practices appear to be adequate and are supervised by the County Health Department and the State.

There are no feasible alternatives for new activities for recycling or substantially reducing the generation of asbestos waste. The use of asbestos in many applications has already been limited by Federal law. Most asbestos that is currently being disposed was put into use several years ago. As the already-installed asbestos is retired from use, the rate of asbestos waste generation will decline. No new programs are needed to accomplish this.

C.4. TIRES

Three tire management alternatives are possible. They are 1) the establishment of a waste tire recycling or transformation facility, 2) the prohibition of the disposal of tires in landfills, and 3) to expand the current practice of separating some of the tires for re-use. The alternatives are not mutually exclusive.

The establishment of a waste tire facility at which tires would be stored for future recycling (as is proposed in Assembly Bill 1843) is an unattractive alternative for Mountain View. First, it is an uncertain alternative. That such a facility could be established in or near Mountain View is unlikely. This alternative would have a negligible impact on Mountain View's waste stream and would be ineffective in diverting tires from landfills because most tires are already diverted from landfilling. Furthermore, existing arrangements with Oxford Tire Recycling may have to be altered if tires were to be sent to a new facility.

Probably the most serious objection to incineration is that it might, in the future, divert waste tires from end uses that might be preferred such as recycling tires into rubberized asphalt or other products. Hazards due to the emission of gaseous combustion products are also a concern to some people.

The second alternative (prohibition of disposal in landfills) could work well as a supplement to the third alternative (re-use of tires). The prohibition of disposal would not preclude the acceptance and stockpiling of small quantities of tires at the landfill. The stockpiled tires would then be delivered to Oxford Tire Recycling or another firm that would recycle or burn them.

It is important that people with only a few tires to dispose have a local site at which the tires are accepted. Tire dealers and other haulers of large quantities of tires can reasonably be prohibited from using the landfill. Assembly Bill 1843 imposes new requirements on facilities which store waste tires; and it is easier to comply with those requirements if only small amounts of tires are stockpiled. A salvage program at the Mountain View landfill should be able to comply with these requirements, and marginally increase the diversion of tires from landfill disposal.

The third alternative (re-use of tires) is already being successfully implemented. No barriers, other than attitudinal preferences for new products, impede the practical implementation of this alternative.

C.5. WHITE GOODS

Two alternative white good diversion activities are: 1) prohibiting the disposal of white goods at landfills (white goods could be accepted for storage at the landfill with subsequent transport to a steel recycler) and 2) salvaging of white goods at the landfill. The two alternatives are not mutually exclusive and, in many respects, are similar. In the first alternative, carriers of white goods would be directed to a special area at the landfill at which the white goods would be stored. In the second alternative, a landfill salvage operator would remove white goods from mixed loads that are deposited at the active face of the fill.

Since most white goods are easily identifiable at the landfill gate, it would be reasonable to direct those goods directly to a white goods storage area. A fee, sufficient to cover the landfills net costs of storing and transporting the goods to a recycler could be charged.

Depositing white goods at the active face should be prohibited because it is inefficient to deposit them there and then to remove them to a storage area. The occasional white good that does get deposited at the face should be salvaged by landfill employees.

The white goods that are stored at the landfill should be processed to the extent that is required by the recycler. This may include the removal of certain components (e.g., capacitors, compressors, etc) and crushing. Non-required processing should be considered in some cases. One such case would be the removal of refrigerants in a manner that prohibits their escape into the atmosphere. Some refrigerants contribute to the destruction of ozone in the upper atmosphere and should, therefore, be controlled.

C.6. AUTOMOBILE BODIES AND AUTO SHREDDER RESIDUE

The metal in automobile bodies is already diverted from disposal and there are no automobile shredders in Mountain View. No new programs are feasible.

C.7. DEAD ANIMALS

The current dead animal management practices of Mountain View cannot be improved in a way that would significantly affect the overall waste diversion rate. A possible improvement in the existing system is to promote source reduction via the spaying and neutering of pets. This activity is already carried out by other agencies in the City.

The importance of these activities could be stressed in education and public information activities that will be carried out by the solid waste office. This activity would pose no hazards. It would be unaffected by expected changing conditions. It would decrease the quantity of dead animals and manure in the waste stream. It could be implemented in the short term. It would require no new facilities. It is consistent with local plans and policies. There are no anticipated institutional barriers. The net cost would be minimal. It would decrease the quantity of animals available for the production of fertilizer, tallow, etc.

C.8. OTHER SPECIAL WASTES

Diversion of litter as a whole is not feasible at this time. Aluminum cans are reportedly salvaged by road crews collecting litter. Special handling procedures are not necessary at this time.

A mattress diversion program is feasible, as evidenced by its success at the last free dump day at the City of Mountain View public dump.

Composting is the only potentially feasible diversion program for the street sweepings, water treatment sludge, and flood channel spoils.

Composting of these wastes may be difficult due to chemical contamination of street sweepings, the alum content of water treatment sludge, and the water content of flood channel spoils. These issues can be addressed through monitoring of material moisture content and chemical composition during any special studies required by regulatory agencies.

The bulk of these wastes are produced by the Santa Clara Valley Water District, not the City of Mountain View. The City has little authority over disposition of these wastes. Diversion programs may be administratively difficult to establish or operate if these wastes are included in waste 'generated' at a later time.

D. PROGRAM SELECTION

D.1. SEWAGE SLUDGE

No new programs are selected. However, the City solid waste staff should remain up to date on developments in the CIWMB's regulations regarding sewage sludge.

D.2. ASH

No new programs are selected.

D.3. ASBESTOS

No new programs are selected.

D.4. TIRES

Prohibition of the disposal of tires at the Mountain View landfill is a selected program. Small quantities (i.e., less than ten tires per load) could be accepted for stockpiling and diversion. Depositing tires at the active face will be prohibited in all cases. Public information for this program will be carried out by the landfill operator - primarily by informing people at the landfill gate of where to deposit their tires or where the tires should be re-routed to.

The City solid waste staff will monitor developments in the field of tire re-use and recycling. They will also encourage the use of used tires or retreads on non-critical use (not police or fire department) City vehicles, and will monitor the status of the tire-fueled power plant in Westley. Significant changes at that facility could require modification of the selected program. No significant changes are anticipated.

D.5. WHITE GOODS

The landfill operator will continue to direct white goods to a separate area for eventual recycling. The City will evaluate the fee charged for depositing white goods to determine if the fees could reasonably pay for the special handling required. No new facilities are required, and public information will be handled by the landfill operator - primarily the gate keeper.

D.6. AUTO SHREDDER RESIDUE

No programs are selected.

D.7. DEAD ANIMALS

The literature produced and distributed through the education and public information activities described in the EPI Component of this document will include a discussion of cooperation with local animal shelters for development and distribution of EPI materials regarding the spaying and neutering of pets as a waste reduction activity. No new facilities are needed.

D.8. OTHER SPECIAL WASTES

The mattress recovery program performed at the last free dumping day at the Mountain View public dump will be made permanent by purchasing, leasing, or otherwise arranging for a storage container to be located at the site. Persons bringing mattresses to the site will pay a disposal fee, but the mattresses will be placed in the container for on-call pickup by a mattress recycler when a sufficient quantity are accumulated.

The compostable other wastes will be considered as feedstocks during design of composting diversion programs. The divertability of these wastes will be considered by the City in its actions relative to production of these wastes, including participation in County-wide or Regional urban run-off investigations. City staff will monitor development of regulations which might affect the status of these materials.

E. PROGRAM IMPLEMENTATION

E.1. RESPONSIBLE PARTIES

The Solid Waste Division of the Utilities Department will be responsible overall for implementation of selected special waste programs. Responsible parties are listed next to each implementation task in Table V-4.

E.2. IMPLEMENTATION TASKS AND SCHEDULE

Implementation schedules, and tasks required to implement programs, are presented in Table V-4.

E.3. PROGRAM COSTS

Estimated program costs are presented in Table V-3. Total annual program costs, after implementation of all programs, are estimated to be approximately $41,000. Although little or no waste diversion may occur in the short-term as a result of these programs, these small expenditures might lead to significant diversion at a later time.

F. PROGRAM MONITORING AND EVALUATION

Monitoring is discussed below for each identified special waste type. No remedial measures are discussed since no diversion tonnages are projected to directly occur as a result of the selected programs.

F.1. SEWAGE SLUDGE

There is no program that needs monitoring. The City solid waste staff should maintain information from the sewage treatment plant on the amount of sludge produced and incinerated annually. The staff should remain alert to sludge management issues and regulations.

F.2. ASH

The City solid waste staff should remain alert to any sources of ash that may require special treatment in a solid waste facilities permit.

F.3. ASBESTOS

The quantity and fate of asbestos generated within the jurisdiction is recorded by the California Department of Health Services. Those records should be collected on an annual basis by the City to assist in the preparation of annual reports.

F.4. TIRES

Records should be maintained by the City solid waste staff of the quantity of tires collected at and hauled from the landfill. The handling of a greater or smaller number of tires, however, does not indicate a greater or lesser degree of success of the recommended program. The objective is to minimize the improper disposal of tires in the City and by the City's residents. This can be evaluated by recording the number of improperly disposed tires that are collected by City and County personnel or by the franchised waste hauler.

Oxford Tire Recycling, and other tire recyclers, will be required to report tonnages of materials they handle as a condition of their City of Mountain View business licenses, if doing so is legally enforceable and will not discourage their business presence in Mountain View.

F.5. WHITE GOODS

The quantity of white goods entering the landfill site and leaving the site for recycling will be recorded. The records will be maintained by the City solid waste staff. This quantity will not necessarily be the total amount of white goods recycled by Mountain View residents dealers. Scrap metal dealers will be contacted annually for information on the amount of white goods they receive from Mountain View.

F.6. DEAD ANIMALS

The recommended program will be monitored by obtaining records from the local animal shelters and veterinarians the number of animals they 'destroy' annually. Any significant reduction in the number is an indication of success.

F.7. OTHER SPECIAL WASTES

Annual data on the quantities of these wastes which are generated will be requested by the City from other agencies and City street sweeping crews. The City will offer to assist those agencies, within the limited resources available, in quantifying these waste quantities and in investigating potential diversion programs.

The City will also work with other agencies, as appropriate, to handle these materials in safe and environmentally acceptable ways.

TABLE V-1: QUANTITY OF SPECIAL WASTES

Waste Type	Counted(1) (tpy)	Not Counted (tpy)
Ash	0	---
Sewage Sludge	---	7,750 (wet)
Industrial Sludge	0	---
Asbestos	130 (4)	
Auto-Shredder Waste	---	1,512
Auto Bodies	---	5,320
Other		
Tires	76.5 (5)	---
Dead Animals	Indeterminate (5)	---
Water Treatment Sludge	---	350 (6)
Flood Channel Dredge Spoils	---	5,100 (6)
Street Sweepings	1,601 (5)	---
Litter Collected by CALTRANS	4	---

(1) "Counted" waste is included in the determination of "generated" waste in this document. Tonnages counted are disposed in landfills other than Newby Island or Mountain View unless noted.

(2) Sludge is not counted as a generated solid waste in accordance with Section 41781 (b)(5) of the California Public Resources Code which is inoperative as of October 1, 1991.

(3) Auto bodies are not counted as generated solid waste because they are normally not disposed in landfills.

(4) Approximate tonnage pending provision of 1990 tonnages by the Department of Health Services.

(5) Tonnage disposed (except Tires transformed) are included in Newby Island and Mountain View Landfill tonnages.

(6) Approximate tonnages based on incomplete records. Not counted at this time due to uncertainty in the estimate. An unknown percentage of these materials historically has been landfilled; the remainder sun dried and used as fill dirt or soil amendment.

TABLE V-2: RATINGS OF SPECIAL WASTE PROGRAMS

	Sludge (1)	Asbestos (2)	Tires				Dead Animals		Other
Criteria			Procurement	Market Development	EPI	Recycling and Transformation	Recycling	Source Reduction	
1. Effectiveness in waste diversion			Low	Low	Low	Low	Low	Low	Low (3)
2. Hazards			Medium	Medium	High	Medium	High	High	Medium
3. Flexibility			High	High	High	Medium	High	High	Low
4. Consequences on the waste stream			High	High	High	Medium	High	High	Low
5. Feasibility			High	High	High	Low-Med	High	High	Medium
6. Consistency with local plans			High	High	High	High	High	High	Medium
7. Facility requirements			High	High	High	Low-High	High	High	Medium
8. Institutional barriers			Medium	Medium	High	Medium	High	High	High
9. Costs			High	High	High	Low	Low	High	Medium
10. End uses or markets			High	High	High	High	High	High	Medium
11. Involvement of waste generators			Medium	Medium	High	Medium	Low	Low	Low
Conclusion	Control Incineration	Continue Disposal	Selected for Evaluation	Selected	Selected	Selected	Selected	Selected	Selected (compostables only)

(1) Alternatives to the current practice are not cost-effective during the planning period.
(2) There are no alternatives to the current practice of disposing asbestos in landfills.
(3) Other waste diversion is generally not counted at present. If counted in the future, large diversion percentages could result.

TABLE V-3: SPECIAL WASTE PROGRAM COSTS

(in 1991 dollars)

Activity	Start-up Year	Start-up Costs	Staff (1)	Annualized Start-up Costs	Other Annual Costs(2)	Total Annual Costs(3)
Compostable Special Wastes	1992	0	0.16	0	20,780	24,936
Tires	1992	0	0.04	0	4,660	5,592
Mattresses	1992	0	0.04	0	2,520	3,024
Dead Animals	1995	0	0.02	0	1,260	1,512

Notes: (1) Staffing requirements are expressed as full-time equivalents (FTEs). Estimate includes Education and Public Information.

(2) Other annual costs include staff costs at $63,000 per FTE and other operating costs.

(3) Total annual cost includes 20% mark-up for contingencies.

TABLE V-4: IMPLEMENTATION SCHEDULE FOR SPECIAL WASTE PROGRAMS

Program/Task	Supervising Agent/ Implementing Agent	Time Frame
Compostable Special Wastes	UD	1/92 & on
Monitor Regulations and Activities Elsewhere	SWD	1/92 & on
Evaluate Tonnages More Accurately	SWD	1/92 & on
Incorporate in Composting Programs, as feasible	SWD	1/92 & on
Tires	UD	1/92-12/92
Evaluate Reuse of Tires on Public Vehicles	SWD	1/92-3/92
Implement Reuse of Tires on Public Vehicles	All City Departments	4/92-8/92
Evaluate and Publicize Results of Evaluation	SWD	9/92-10/92
Develop EPI Materials on Tire Recycling and Transformation	SWD	9/92-11/92
Distribute EPI Materials	SWD	12/92 & on
Mattresses	UD	1/92-5/92
Obtain Storage Equipment at Landfill	SWD	1/92-4/92
Post Signs and Educate Public	SWD	5/92
Dead Animals	UD	1/95-6/95
Coordinate with Local Animal Shelters for Development and Distribution of EPI Materials on Spaying, Neutering and Recycling	SWD	1/95 & on

Abbreviations: UD = Mountain View Utilities Department
SWD = Mountain View Solid Waste Division

CHAPTER VI:

LIST OF TABLES
(Following Text)

CHAPTER VI
EDUCATION AND PUBLIC INFORMATION COMPONENT

INTRODUCTION

Education and public information is one of the most important components of a Source Reduction and Recycling Element. The public needs to be made aware of the importance of managing solid waste. An education and information program must be based on the requirements of the other components. Integrating the components is critical because the overall approach to solid waste management must be balanced in order to meet the needs of the jurisdiction and the requirements of the state.

The ultimate goal of public education is behavior change. Successful implementation of the source reduction, recycling, and composting components depends on the effectiveness of public education and information in changing behavior. To increase and maintain long-range community support and involvement in efforts to reduce waste, recycle and compost, an active and comprehensive public education program should emphasize the following principles:

- **"Know thy population."** Periodic demographic analyses keep the public education program appropriately designed and targeted for Mountain View's population and subpopulations.

- **Target communications.** Preparing and disseminating information to target specific groups is more likely to influence behavioral change than mass media communications. The more personal the message, the more effective it will be.

- **Modeling.** It is important for the City and Mountain View community opinion leaders to set the example for other institutions, businesses and residents to follow. People learn from people. Neighborhood block leaders, co-workers, classroom teachers and business leaders are all effective role models. Using role models in both mass media and grassroots organizing is a cost-effective way to influence behavior.

- **"Feedback is the Breakfast of Champions."** Monitoring and frequent reporting of the progress of source reduction, recycling and composting increases public participation and helps to reinforce these habits over time. Provide specific details about any problems that need correction and give the public credit for progress achieved.

- **Integrate source reduction, recycling and composting into all aspects of community life.** Relate the Source Reduction and Recycling Element objectives to Mountain View's existing positive issues and images. Appeal to public sentiment by making waste reduction a part of Mountain View's positive community identity.

- **Tap existing information exchange networks, rather than create whole new methods for disseminating information.** The most cost-effective means to distribute information is to use the many newsletters, bulletin boards, meeting announcement times, etc. that already exist in Mountian View.

- **Consider timing for the population intended for the information.** For example, point-of-purchase is the most appropriate time to provide information about source reduction. Point-of-disposal is an effective time to provide information about recycling and increased costs in garbage disposal. Some programs are seasonal while others must be implemented in a sequential order.

- **Consistent, repetitive messages and graphic images.** These should be maintained over time to develop a strong program identity and for optimum cost-effectiveness.

- **Practical "how-to" information must be stressed always.** The environmental reasons for source reduction, recycling and composting are secondary.

- **The effectiveness of printed materials is defined by the context in which the public receives them.** We do not want to produce more junk mail. Person to person delivery of materials is the most effective in changing behavior.

- **Trained front line staff.** Front line staff -- truck drivers, recycling center workers, City receptionists -- whoever deals with the public must be well trained to explain how to reduce, reuse, recycle and compost.

A. GOALS AND OBJECTIVES

This component documents current education and public information activities for the City of Mountain View and describes how participation in source reduction, recycling, and composting activities will be stimulated through implementing new education and public information programs and expanding existing ones.

Establishing clear goals and objectives for educational efforts provides an understanding of the program by governmental agencies, residents, and the business community. In addition, monitoring, evaluation, and improvement of public education become easier when the goals and objectives are specified.

Goals for the City of Mountain View include:

- support existing and planned source reduction, recycling, and composting programs and services through education and public information activities;
- increase participation in existing and planned source reduction, recycling, and composting education and public information efforts;
- increase public awareness of environmental and solid waste issues;
- create broad visibility for recycling;
- familiarize consumers with recycling;
- motivate increased participation in available source reduction and recycling programs by all sectors;
- stress the importance to all sectors of buying recycled and composted material.

The following sections describe short- and medium-term objectives for the City of Mountain View's Education and Public Information Component.

A.1. SHORT-TERM OBJECTIVES

- provide information to at least 90% of the residents and business employees in Mountain View regarding the City of Mountain View's waste reduction and recycling programs by 1995;
- create public involvement opportunities through at least one recycling promotional event annually; emphasize "closing the loop" through a "buy recycled" campaign;
- educate the public about the uses of recycled and composted materials through a resource directory revised each year;

- cultivate support by publicizing and encouraging involvement of the business community;

A.2. MEDIUM-TERM OBJECTIVES

Medium-term objectives build upon short-term objectives and will focus upon:

- developing educational materials which coincide with the implementation of new or expanded solid waste services as scheduled by the source reduction, recycling, composting, and special waste components.

B. EXISTING CONDITIONS

B.1. RESIDENTIAL

CITY OF MOUNTAIN VIEW

The City of Mountain View promotes the residential recycling program in the following ways: 1)placing a monthly advertisement in the City-produced community newspaper--The View, 2)producing the twice yearly Mountain View Recycling, a newsletter directly mailed to single family homes, apartments, and condominiums, 3)inserting garbage bill supplements at least once a year, and 4)running cable television announcements. The recently established apartment and condominium collection service was initiated by placing clearly marked signage at the point of collection and distributing doorhanger informational flyers to each unit by the Conservation Corps. These flyers feature English on the front side and Spanish, Vietnamese, and Filipino translations on the reverse side. In addition, Mountain View has a portable recycling display used for special events and also lent out for rotating display at the library, schools, and businesses.

Mountain View also has a volunteer block leader program in which block leaders put out recycling reminder signs the day before curbside collection. They may also talk informally with their neighbors about recycling and distribute the recycling newsletter. Upon recruitment, a block leader is provided with a packet of information that includes guidelines for being an effective block leader, a sample block leader introduction letter, and a supply of Mountain View Recycling.

There are two seasonal recycling events in Mountain View, Christmas tree recycling and phone book recycling. The education and public information efforts for Christmas tree recycling consist of supplying tree retailers with collection information flyers to be distributed to their customers, and informational ads, PSA's, and stories in The View and other local media sources. Phone book recycling is a joint effort between the City, Pacific Bell, Foothill Disposal and Lucky Foodstores. The education and public information efforts consist of Pacific Bell-supplied signage for drop boxes and stores, and new phone books encased in plastic wrap with drop off locations for the old books printed on it. The City of Mountain View advertises the event through The View and other local media sources.

In addition, the City of Mountain View has held meetings with various community and youth groups for educational presentations and to discuss current programs. The City of Mountain View also participated in creating and staffing an educational display at the 1990 County Fair, promoting recycling in general, as well as curbside programs for individual cities.

FOOTHILL DISPOSAL COMPANY

Foothill Disposal assists the City of Mountain View in promoting their residential recycling services by answering numerous recycling questions on a daily basis. The drivers on the recycling collection trucks have educational "tickets," supplied by the City, for problem solving. Foothill Disposal also sponsors field trips to the Norcal Recycling Facilities.

SIERRA CLUB/LOMA PRIETA CHAPTER

The Sierra Club has produced two guides entitled "Where to Recycle in Santa Clara County" and "Buy Recycled." These guides are distributed to Mountain View residents via telephone requests and at special events where Sierra Club has set up a booth. The City of Mountain View also distributes this information to residents who call in requesting information. The Sierra Club has produced a general recycling video that is distributed or lent out to schools, businesses, civic groups and individuals.

BOY SCOUTS OF AMERICA

In February 1991, Boy Scout Troop 80 discontinued their 32 year recycling drive due to market collapse that rendered their drive financially unfeasible. In some residents view, this signified an "end of an era." This program had a tremendous amount of educational value due to its "hands on" nature, where scouts participated in the collection of recyclables from residents' homes.

B.2. COMMERCIAL AND INDUSTRIAL

CITY OF MOUNTAIN VIEW

The City developed an office paper recycling information packet in May, 1991 that is available to businesses. As part of this program, a packet of information on source reduction, recycling, and recycled products procurement was developed and sent to approximately 170 businesses and industries. The kit included a letter of introduction, a "how-to" recycle outline, a list of source reduction tips, a list of city-authorized collectors, a list of local recycled product vendors, and an information request card for the businesses to report on their current recycling efforts and to request additional information.

In addition, the City was one of several communities to cosponsor the "Business Environmental Networks Conference" on April 22, 1991. This one-day conference for the business community addressed a number of issues pertaining to solid waste management.

MOUNTAIN VIEW CHAMBER OF COMMERCE
Mountain View Chamber of Commerce has a monthly newsletter that frequently includes articles on recycling and waste reduction that the City has submitted. In the July 1991 issue, they featured "Five Steps to a Greener Office."

RECYCLED FIBERS
Recycled Fibers, a City-authorized paper collector, has an employee education program as a part of their collection service. Upon initiation of the program, a sales representative meets with the designated recycling coordinator to go over a written recycling proposal prepared by the sales representative. Depending on the size of the company, the sales representative may schedule an employee presentation or rely on the recycling coordinator to provide employee education. Quality control problems are also handled through the recycling coordinator, in which case an employee memo is circulated.

NORTHERN CALIFORNIA PAPER AND PULP
Northern California Paper and Pulp, a City-authorized paper collector, has an employee education program as a part of their collection service. Upon initiation of the program, a sales representative gives employees a recycling presentation and a letter of introduction explaining the "how-to's" and the "why's" of the program. Each employee is also supplied with a desktop box with the recycling "do's and don't" printed on it. In addition, employees receive a monthly recycling report with their paycheck that tracks recycling volume by material.

FOOTHILL DISPOSAL CO.
Foothill Disposal, a City-authorized paper collector, provides the following employee education for their commercial customers. Upon initiation of the program, a memo is sent to all employees that explains how the program works, why they should recycle and its benefits. All additional information and education is the responsibility of the employer, with assistance from Foothill Disposal upon request. In addition, Foothill Disposal has the capability to participate at trade shows and portable displays are available to any of their customers.

WEYERHAUSER

Weyerhauser, a City-authorized paper collector, offers comprehensive employee education and training as a part of the collection service. Their education consists of providing technical assistance and a step-by step recycling manual, and conducting waste audits and employee training seminars. They also provide instructional and promotional signage for their customers and a monthly material recovery report.

PAPER RECOVERY OF NORTHERN CALIFORNIA

Paper Recovery, a City-authorized paper collector, focuses it's educational efforts on providing a designated recycling coordinator at each business with a step-by step informational booklet to guide them in setting up and promoting their recycling program. In addition, they have a video available and will provide limited technical assistance upon request. They also provide the recycling coordinator a detailed material recovery statement each month.

B.3. INSTITUTIONAL AND MUNICIPAL

CITY OF MOUNTAIN VIEW

The City of Mountain View has adopted a recycling policy that gives the Purchasing Manager discretion to give a preference margin to recycled paper products procurement and urges employees to make double-sided copies whenever possible. In fact, in fiscal year 1990-91, purchasing recycled paper products saved the City over $200, compared to the cost of equivilant virgin paper products. This policy has resulted in the following employee education and information: periodic memos issued for problem solving and signs on copy machines reminding employees to copy double-sided.

The City has also implemented an aggressive recycling program with employee education consisting of special training sessions within each department at the program's onset, ongoing reminders in the quarterly employee newsletter, and frequent memo's and bulletins.

There have been recent efforts by the City of Mountain View to introduce solid waste management concepts into the schools through the "In-School Scouting Program." As a part of the program's environmental focus, City recycling personnel have made several presentations to classes on the topic of the solid waste crises and recycling.

BOY SCOUTS OF AMERICA/IN-SCHOOL SCOUTING PROGRAM

Several schools within the Mountain View Elementary School District participated in the "In School Scouting Program." This program, which targets the first through fifth grades, includes an environmental awareness curriculum that emphasizes recycling. As part of this curriculum, the schools take part in a recycling drive, as a fundraiser for the schools.

The following are summaries of recycling activities at a sampling of schools in Mountain View. Due to the large number of schools in Mountian View, it was impossible to include information on all of them.

BENJAMIN BUBB SCHOOL
Benjamin Bubb School, a part of the Mountain View Elementary School District, has an aggressive recycling program that collects materials generated by the school and by families within the school boundaries. The fifth grade classes are responsible for overseeing the program and the fifth grade science framework includes a learning unit on recycling. In addition, every year the fifth grade classes participate in Science Camp, a week of hands-on science projects, of which paper making from recycled fibers is one.

Benjamin Bubb School, grades 3, 4, and 5, also participated in the "In School Scouting Program" during the 1990-91 school year.

EDITH LANDELS SCHOOL
Edith Landels School, grades 3, 4, and 5, participated in the "In School Scouting Program" during the 1990-91 school year.

KENNETH N. SLATER SCHOOL
Kenneth N. Slater School, grades 1-5, participated in the "In School Scouting Program" during the 1990-91 school year. They also started collecting white and colored paper recycling program.

MARIANO CASTRO SCHOOL
Mariano Castro School, grades 1-5, participated in the "In School Scouting Program" during the 1990-91 school year.

WHISMAN SCHOOL DISTRICT
There is no formal recycling program or curriculum on a district-wide basis. Any recycling activities are initiated and carried out by individual administrators and teachers.

CRITTENDEN MIDDLE SCHOOL
Crittenden Middle School has an aluminum recycling program run by the Associated Student Body. In addition, at least one of the fifth grade classes has done a learning unit on recycling in the 1990-91 school year.

GRAHAM MIDDLE SCHOOL
Graham Middle School has a magazine recycling program organized through a student environmental club with assistance from the City's recycling staff, parents, and teachers. This recycling program is a community service and is being promoted with the help of the City through The View, the recycling newsletter, and by PSA's and press releases to local media.

MOUNTAIN VIEW HIGH SCHOOL
Mountain View High Schoold has an environmental club and a recycling program which recycles aluminum, glass, and high grade paper.

C. PROGRAM ALTERNATIVES

To heighten the effectiveness of the various programs, and ensure an efficient use of resources whenever possible, public education and information resources will be targeted to specific audiences. Segmenting the community into various categories of waste generators provides a simple and useful means of directing specific messages.

C.1. GENERAL APPROACHES TO EDUCATION AND PUBLIC INFORMATION

- Create an office of education and public information and/or designate a staff member to be in charge of developing public education and publicity materials. Staffing needs will be sufficient to allow for both work in the office and in the field.

- Create a small community advisory committee to assist in developing and implementing educational programs.

- Develop a comprehensive program that addresses solid waste management in general and AB 939 specifically. The program would be geared to all waste generators.

- Assess the size of the community's non-English speaking or reading populations, in order to tailor education and publicity materials accordingly.

Numerous avenues of communication are available that would allow the transmission of education and public information to the targeted waste generators. Examples are:

- mass mailings (community newsletters), either alone or with utility bills;

- placement of door-knob hangers;
- recognizable theme, logo, and message. The logo should appear on all printed and outdoor advertisements, as well as waste collection vehicles and equipment. Outdoor advertising can be placed on billboards, buses, bus shelters, benches, banners, posters, and litter receptacles;
- use of a celebrity spokesperson or mascot as part of these efforts;
- press coverage of as many promotions, program introductions and effectiveness updates, and other notable events as possible;
- press coverage through news conferences, feature stories, press kits and press releases;
- newspaper articles and inserts;
- local radio and TV campaigns to produce awareness shows or public service messages and outdoor advertising;
- seminars, workshops, and related programs;
- participation in special events (especially if follow-up activities are planned);
- slide shows, videos, and speakers' bureaus available to community groups;
- recycling curriculum and other information distributed to public and private schools;
- cooperation with community service organizations.

C.2. RESIDENTIAL SECTOR

Approaches to consider when developing public education programs for the residential sector include:

Meetings and Forums

- Sponsor city meetings, community forums, and public hearings to present and discuss reduction, reuse, recycling, and composting ideas;

- Appoint citizen advisory boards or task forces to monitor events and report to the public.

Volunteer Networks

- Expand the network of motivated and committed volunteers to help "spread the word." This method has been proven particularly successful in disseminating composting information through gardening clubs and community gardens in what are often called "Master Composter" programs. It is currently used in Mountain View as the 'Block Leader' program.

Exhibitions

- exhibit source reduction, recycling, and composting programs at county fairs, shopping centers, parks, community gardens, and other public sites;

- conduct tours, open houses, and publicity events at recycling centers and waste processing facilities to give the public a better understanding of the issues.

C.3. COMMERCIAL AND INDUSTRIAL SECTOR

The tactics available for reaching the commercial and industrial sectors are generally simpler and more direct. The City can develop materials specific to individual industries or businesses, and disseminate these to the businesses in question via a number of approaches, which may include:

- Conduct mailings to businesses;

- Work with the Chamber of Commerce and other business and professional associations;

- Develop a speakers bureau of educators, industry and technical representatives, and governmental officials to talk to professional organizations, the Chamber of Commerce, major employers, conservation groups, social clubs, and other groups;

- Develop a commercial waste audit kit. Once the audit has been conducted, the City can work with businesses to improve their disposal activities and in doing so will provide direct education and information to these waste generators;

- Work with various unions to encourage members to get involved (i.e., union sanctioned functions or workshops);
- Develop specific programs tailored for the need of individual businesses (i.e., bakeries, dry cleaners);
- Establish programs for specific business parks and centers;
- Prepare employee kits that explain the various programs. These can be passed out by employers;
- Require refuse hauler(s) to do waste audits and contact customers periodically to offer recycling services.

C.4. INSTITUTIONAL SECTOR

The City of Mountain View will need to work in cooperation with the Mountain View school district to develop innovative approaches to educating the youth of the community.

The following approaches can be utilized specifically for schools:

- Sponsor special events in schools;
- Initiate student-run recycling programs at each school;
- Where feasible, establish student-run pilot composting program;
- Expand environmental and waste management awareness in schools by integrating relevant topics into school curricula;
- Target non-English speaking youth through bilingual education programs.
- Conduct waste audits, and upon completion, assist in developing recycling, source reduction, and composting programs;
- Initiate training programs for municipal and county employees to assist in answering questions from residents about existing and anticipated programs as outlined in the SRRE;

- Cooperate with the county and state to develop programs to manage solid waste for agencies located within the community.

D. SPECIFIC APPROACHES BASED ON PROGRAMS

A well-integrated education and public information program is necessary. The initial educational campaign must be followed up by additional information about specific components. The following areas have been identified as needing specific information and educational programs: source reduction, recycling, composting, and special waste.

D.1. SOURCE REDUCTION

The emphasis will be to inform the public that alternatives to many products and uses are available and that these alternatives will reduce the amount of material requiring disposal at the landfill.

To a great extent, source reduction can be accomplished only through legislative means. Requiring manufacturers to reduce the amount of packaging or change the type of packaging must be left up to state and federal governments. One problem that will be difficult to overcome is concern about product safety and integrity. Over the years, there has been product tampering (most noteworthy in the pharmaceutical industry). This has caused manufacturers to adopt tamper-proof packaging which, in some cases, has actually increased the amount of packaging.

A number of educational alternatives are available that will address residential and commercial source reduction. The use of brochures, the media, and public meetings are several avenues that can be used to inform the public. Program possibilities are:

RESIDENTIAL

- Educate residents about the benefits of buying and using cloth shopping bags instead of plastic or paper;
- Explain to residents how they can launch a letter-writing campaign requesting manufacturers and businesses (e.g., fast food outlets) to reduce the amount of packaging materials and/or switch to materials that are more sensitive to the environment;

- Distribute to residents the necessary information so they can write to their elected representatives at both the state and federal levels, requesting that action be taken to reduce the amount and type of packaging materials being used;
- Encourage the use of onsite composting and grass clipping programs through demonstration programs at neighborhood parks, use of Master Gardeners, and/or initiating a Master Composter program, and develop accompanying information to explain the benefits of programs;
- Encourage the use of cloth diapers, in cooperation with a local medical association and diaper services;
- Provide a directory of reuse and repair businesses;
- Provide information on how to remove names from junk mail lists.

COMMERCIAL, INSTITUTIONAL, AND INDUSTRIAL

- Promote source reduction, for example, through trade unions, business and industrial organizations, PTA meetings, and onsite presentations;
- Encourage supermarkets and other large retailers to reduce the use of plastic shopping bags (and other plastic bags) by switching to paper bags and encouraging the use of cloth bags;
- Publicize businesses that reuse and repair materials (e.g., repair stores and thrift stores);
- Develop materials and provide technical assistance to allow "do-it-yourself" waste audits;
- Develop materials and provide technical assistance to encourage the use of onsite composting and grass clipping programs.

D.2. RECYCLING

The emphasis will be to enhance the current and planned recycling programs. The following are recommended approaches:

RESIDENTIAL

- Continue the residential curbside education program. Part of this approach could include a study to determine whether bilingual materials will be needed;
- Include in educational materials information that explains the various enforcement procedures that the City of Mountain View has initiated. Examples include ordinances that prohibit the removal of recyclable materials from curbside by other than a licensed hauler, or destruction of recycling equipment;
- Continue to work with recycling service providers and community groups to publicize the locations and promote the use of buy-back/drop-off collection centers;
- Continue to provide feedback to the public on the success of the recycling programs (i.e., amount of materials recycled/resources saved, and the economics of the programs). Provide feedback through ads in local newspapers and publishing of annual reports.

COMMERCIAL, INSTITUTIONAL, and INDUSTRIAL

- Encourage the Mountain View school district to develop educational programs for grades K-12. Specific programs for the different age groups and/or grade levels would be appropriate. Part of the program would be an actual onsite recycling program. These programs will also be available for use at private schools;
- Develop commercial and industrial recycling education programs;
- Develop pre-planned educational programs for specific businesses (e.g., dry cleaners, bakeries, service stations, etc.);
- Use mailings to businesses giving information about the commercial recycling program;

- Work with the Chamber of Commerce, unions, and other business groups to inform the business community;
- Develop a list of brokers who deal with recyclables and provide access to this list for businesses and industries.

D.3. COMPOSTING

A limited portion of the population understands what compost is or the benefits of using it. The information and education program will consider these approaches:

RESIDENTIAL

- Develop educational materials that address the residential yard waste collection program for leaves, grass clippings, and other vegetative material, with corresponding information on handling;
- Inform the public how they can obtain compost and mulch from the program;
- Work with local garden clubs and Master Gardeners to help promote and educate the public;
- Work with the University of California cooperative extension, or other similar groups, to develop educational materials;
- Provide feedback to the public on the amount of yard waste collected and composted and how this material is used (through publishing of annual reports and reports in local newspapers);
- Educate the public on the benefits of using compost and mulch for home purposes.

COMMERCIAL, INSTITUTIONAL, AND INDUSTRIAL

- Develop information and education materials to support commercial, institutional, and industrial yard, wood, and food waste collection programs when they are implemented.

D.4. SPECIAL WASTES

Special wastes, like infectious wastes, sludge, and ash, are quite specific and would not necessarily require that a separate educational program be developed. General educational materials may be distributed separately, or in combination with other educational documents in the following ways:

RESIDENTIAL

- Develop materials that inform the public how to properly dispose of such things as tires, white goods, auto bodies, mattresses, and certain wood wastes. One approach is to send a separate mailer to all households annually;
- Expand information to explain special clean-up day events. Information must be sent out prior to the actual day of pick-up. The information will include what can be disposed of, the date, and time of day;
- Develop information about the proper procedures to remove and dispose of asbestos. List local firms that are licensed to remove asbestos.
- Coordinate with local animal shelters for the development and distribution of EPI materials regarding the spaying and neutering of pets, and the recycling of dead animals.

COMMERCIAL, INSTITUTIONAL, AND INDUSTRIAL

- Develop materials that inform how to properly dispose of such things as tires, white goods, auto bodies, and certain wood wastes. One approach is to publish a brochure on special wastes and mail it to all industries, institutions, and businesses;
- Develop information for commercial and self-haul generators that will explain about disposing of construction and demolition debris.

E. PROGRAM SELECTION

For optimum public outreach, a comprehensive selection of program alternatives has been developed to support and enhance services and programs presented in the source reduction, recycling, composting and special waste components and the household hazardous waste element. These program alternatives include not only mass media communications and mailings, but education targeted to specific groups and organized one-on-one interpersonal communications.

The format of this section outlines the education and public information program alternatives for each of the targeted groups by component: source reduction, recycling, and composting. Education and public information activities which provide information specifically about household hazardous waste are discussed in the Household Hazardous Waste Element, although several of the programs described in this component also discuss household hazardous waste. The various activities outlined below are to be implemented in the short-term but are ongoing in nature. Once developed and initiated, they will need to be updated on an annual basis.

E.1. RESIDENTIAL SECTOR

GENERAL

- **Ongoing Education and Public Information Programming -** Maintain ongoing education and public information programming with the cooperation of civic, environmental, student and business groups and the local media. Emphasize community pride themes specific to Mountain View to promote the "reduce, reuse, and recycle" ethic and activities. Involve repair, recycling, and composting service providers, schools, community groups and all local radio, television and newspaper media. Ongoing education can include articles, guest editorials or weekly columns in the local media and should use existing avenues of communication, as opposed to creating new ones. Another example of ongoing education is inserting source reduction, recycling, composting and household hazardous waste messages in The View.

- **Printed Materials -** Develop a series of printed materials for existing, expanded or new services to be distributed by the service providers, through the Neighborhood Block Leader Program, at public events, in utility bills, at the recycling centers, community center, schools, public information desks and other appropriate locations for printed information distribution. Design "how-to" materials on each topic with a long-range view, as a part of a planned series, with a consistent graphic design carried throughout. Consistency in graphic design will establish visibility and a high profile for the City's education and public information program and increase its cost-effectiveness. Examples of printed materials could include:

"Shop Smart to Reduce Waste"
"Composting in Mountain View"

- **Neighborhood Block Leader Program** - Expand the existing Neighborhood Block Leader Program by outlining and implementing an aggressive recruitment strategy to enlist new and retain experienced block leaders. Provide information to block leaders on new source reduction, recycling, composting and household hazardous waste programs and activities. Hold regular strategy and appreciation meetings.

- **Resource Conservation Directory** - Produce a Resource Conservation Directory for the City of Mountain View. This directory can include, but is not limited to, a comprehensive list of all businesses and organizations that offer services or products related to source reduction (eg. repair businesses, thrift stores, diaper services), recycling, composting, household hazardous and special waste (eg. paint exchange, mobile drop-off service); consumer information on purchasing products made from recycled material, as well as second-hand, reconditioned, durable and repairable items; "how-to" information, activities, and a reference guide to additional information on source reduction, recycling, composting and household hazardous waste reduction and management.

- **Feedback to Residents** - Provide information to residents on the progress of their diversion efforts. This should be done on a regular basis, perhaps quarterly or bi-annually, through a simple computer program integrated into the solid waste/water billing system. Provide feedback through articles in the local newspapers, and the publishing of annual reports. This feedback can foster an understanding that 50% diversion from the landfill is a goal shared by everyone in Mountain View.

SOURCE REDUCTION

- **Master Composter Program** - In coordination with the Parks and Recreation Department, develop a Master Composter Program for backyard composting and vermicomposting education. Provide printed "how-to" information and workshops at a Mountain View composting demonstration site(s) for further "hands-on" education and technical assistance on methods for backyard composting.

- **Benefits and Methods of Home Use of Yard Trimmings** - Educate residents about the various benefits and methods of home use of yard trimmings. Promote via the Master Composter Program, printed material for composting, and Neighborhood Block Leaders.

- **Quantity-Based Collection Fees** - Notify in advance and educate residents about establishing quantity-based collection fees through articles in the local media, and messages printed on utility bills. Publicize the ongoing waste reduction impacts of charging customers based on the quantity of waste set out for pick-up through the local media and in the solid waste/water bills.

- **Source Reduction Tip of the Month** - Work with the local media in creating "Source Reduction Tip of the Month." This will be a community forum for sharing personal practices and ideas that reduce waste.

RECYCLING

Contingency Measure:

- **Material Expansion** - Notify the public and encourage participation of new materials collected by the curbside recycling service through utility bill notices and "how-to" flyers. Flyers can be directly mailed to each resident or deposited in recycling bins, or placed on doorknobs. Also publicize through the local print and electronic media, and through Neighborhood Block Leaders.

COMPOSTING

- **Christmas Tree Collection** - Publicize and promote the Christmas Tree collection service through the local print and electronic media, the solid waste/water bills, Neighborhood Block Leaders, Master Composters, recycling information displays and schools. Informational flyers should be printed and distributed to residents, at the point of purchase, by local Christmas tree retailers.

- **Yard Material Drop-off Site** - Inform residents about the location(s) and promote the use of the yard material drop-off site(s) through the local print and electronic media, utility bills, Neighborhood Block Leaders, Master Composters, and recycling information displays. Create a media event/photo opportunity of the first load being accepted at the drop-off site.

- **Yard Material Collection Service** - Kick-off the yard material collection service by notifying residents through garbage utility bills, Neighborhood Block Leaders, Master Composters, the local media, and other existing avenues of communication. Kick-off the curbside collection service by providing a "how to" brochure to every household. Prior to the container distribution, cultivate community support and anticipation of the collection's start-up through editorials and articles in the local electronic and print media. Create a media event of the distribution of collection containers by the California Conservation Corps or a local civic/environmental/youth organization.

- **Food Waste Collection** - Notify residents of the food waste collection service by notifying residents through garbage utility bills, Neighborhood Block Leaders, Master Composters, the local media, and other existing avenues of communication. Kick-off the curbside collection service by providing a "how to" brochure with the distribution of yard waste collection containers to every household. Prior to the container distribution, cultivate community support and anticipation of the collection's start-up through editorials and articles in the local electronic and print media. Create a media event of the distribution of collection containers by the California Conservation Corps or a local civic/environmental/youth organization.

SPECIAL WASTE

- **All Special Wastes** - Incorporate special waste information into the Resource Conservation Directory about the importance of vehicle maintenance and the reduced use of automobiles in the reduction of solid waste, the use of tire retreads, and the mattress and white goods recovery programs. Coordinate with local animal shelters for the development and distribution of EPI materials regarding the spaying and neutering of pets, and the recycling of dead animals.

E.2. INSTITUTIONAL SECTOR

The institutions targeted by these programs are public and private schools, and government. All other institutions, such as hospitals, will be addressed in the Commercial/Industrial Sector.

PUBLIC/PRIVATE SCHOOLS

An effective way to teach youths about source reduction, recycling, composting, and household hazardous waste is by integrating these concepts into school curricula as well by incorporating source reduction into school purchasing and classroom activities, and implementing source reduction, recycling, and composting activities into the school's waste handling practices.

Integrating these concepts into the school's curriculum teaches students about the landfill crisis, pollution, energy and resource savings from recycling and the biological process of composting--to name a few. Waste reduction habits are best learned by doing. Therefore, establishing source reduction, recycling and composting systems in the schools give students hands-on experience that demonstrate the ideas and theories they've learned from the curriculum material and confirms its importance as a regular practice to participate in. Finally, educating youth is critical for the long-term success of any program.

It should be noted that the Source Reduction Component also outlines the development of a student curriculum. For all practical purposes, these should be considered the same program.

- **Waste Handling Systems in Schools** - Form an Integrated Waste Management Task Force in each school to plan and implement source reduction, recycling and composting systems in their schools. Provide information and technical assistance. These task forces should be composed of teachers, principals and custodial staff, and students, if appropriate. Organize classroom activities to introduce students to and encourage participation in the source reduction, recycling, and composting practices at school. These activities can include designing and decorating classroom recycling containers, classroom and school bulletin boards, and going on field trips to the landfill and reuse and repair businesses. Special classroom activities can also include community projects such as aiding in the waste handling activities at school, and distributing source reduction, recycling and composting printed materials to the community.

- **Curriculum Resource Packet** - Develop a packet of curriculum materials for grades K-12 that incorporate source reduction, recycling, composting, and household hazardous waste concepts and localize it with facts and features about Mountain View. Distribute to educators at Mountain View public and private schools. Schedule student project "fairs" at each elementary, junior high and high school to address the accomplishments of their school's source reduction, recycling and composting efforts. Fairs can feature exhibits such as paper making, arts and crafts made from recycled materials, composting demonstrations, etc. Timing of school assemblies or fairs should coincide with Earth Day to further enhance the students' understanding and appreciation of their accomplishments.

GOVERNMENT

It is in the City of Mountain View's best interest to serve as a role model for the other institutions as well as for the citizens, businesses, and industries of Mountain View by taking the lead in source reduction, recycling, composting, and hazardous and special wastes management. For this purpose, information will be provided to the administration and staff of all Mountain View government agencies on how to incorporate source reduction, recycling and composting into regular purchasing, working, and waste handling practices.

- **Government Modeling** - To serve as a model for the public, businesses, industry and other institutions, conduct waste audits for all government office and non-office operations and establish in-house diversion goals. Produce written guidelines and provide employee training on new government procurement practices including how to integrate the priorities of source reduction and reuse into purchasing; and integrate recycling, composting, and special waste management into waste handling and procurement practices. Make recycling visible at all government office and non-office location. Provide regular feedback to employees on the progress and success of meeting the in-house waste diversion goals. Work with local media to provide the initial and ongoing promotion of the government agencies' adoption of the "reduce, reuse and recycle" ethic.

E.3. COMMERCIAL AND INDUSTRIAL SECTOR

The activities outlined below will target Mountain View's commercial and industrial sector that consists primarily of the following: 1)offices, 2)restaurants and bars, 3)grocery and other retail stores, 4)construction, demolition, manufacturing, and other industries, and 5)hospitals.

Activities will focus on: 1)source reduction as a regular part of purchasing and work practices, 2)recycling for offices, manufacturers, restaurants, bars, and motels, 3)waste handling for construction and demolition debris.

GENERAL

- **Model Business Program** - Develop a program for identifying and awarding public and professional recognition to successful workplaces who incorporate source reduction into their purchasing and work practices and implement recycling and/or composting systems. Adapt the City's recycling logo for use by these businesses to indicate to the public that these establishments and their customers are helping to achieve the city's source reduction and recycling objectives. This logo may be used in printed material, advertising, window and street signage. Businesses and industries identified as a "Model Business" will serve as models to others on how to incorporate source reduction practices and implement recycling and/or composting systems into daily operations. Work with the Mountain View business groups in developing this program and involve local media in promoting these model businesses and industries.

- **Waste Handling Information Gathering and Distribution -** Use the business license renewal process to gather and distribute information on business waste handling practices that incorporate the reduce, reuse and recycle ethic into their business practices.

SOURCE REDUCTION AND RECYCLING

- **Letter of Introduction/Instructional Booklet -** Expand the commercial recycling program by producing a letter of introduction from the City of Mountain View and an instructional booklet on source reduction, recycling and household hazardous waste management in commercial settings. The instructional booklet should include a "do-it-yourself" waste audit, information on source reduction through purchasing and work habits, setting up recycling systems in office and non-office business settings, switching to low or non-toxic cleansers, paints and solvents, and purchasing recycled paper and other products. Also provide a list of the City's authorized recycling collectors. Distribute these materials to all businesses through the business license renewal process, the material collector(s), and through Mountain View business groups.

- **Technical Assistance -** As part of material collection services, provide technical assistance for conducting waste audits, participating in waste exchanges, and setting up source reduction/recycling systems in office and non-office settings. Also, provide feedback to employees on the amount of materials recycled and how it translates into waste diversion and resource conservation. Notice businesses and promote its availability in the letter of introduction and instructional booklet, and through Mountain View business groups.

- **Waste Products Information Exchange -** Inform businesses and industries about the regional and state waste exchanges through the chamber of commerce and other business groups' newsletters and meetings. Regional Waste Exchanges, such as CalMax, match up waste generators with manufacturers who use the waste products in the manufacturing process.

SPECIAL WASTE PROGRAM

- **Construction/Demolition Debris** - Produce a brief informational brochure/flyer on proper disposal or recycling of construction and demolition debris, and services and information sources on procuring used or recycled construction materials. Provide this information to construction and demolition companies during the business license renewal process.

F. PROGRAM IMPLEMENTATION

F.1. RESPONSIBLE AGENCIES/STAFF REQUIREMENTS

The Education and Public Information Component is to be implemented and administered by the City's Utilities Department, Solid Waste/Recycling Division.

Approximately 1.7 full time equivalents (approximately 3,500 hours per year) of staff or personnel time is estimated to be needed to implement all the education and public information program. This time commitment is not needed initially, and may not fully materialize over time as educational activities on early programs become more routine. It is important to realize, however, that education and public information activities are labor intensive. They also increase diversion tonnages at a relatively low unit cost per ton diverted.

Whenever possible, volunteers will be encouraged to assist in the education and public information outreach programs, with City guidance. Funding of paid personnel will be provided through user fees.

F.2. IMPLEMENTATION SCHEDULE

Implementation tables provided in Chapters II, III, IV, and V indicate when public information and education tasks will commence in orchestration with the expanded and new source reduction, recycling, composting, and special waste services. The implementation schedule for the education and public information programs are presented in Table VI-1, at the end of this component.

F.3. IMPLEMENTATION COSTS

The cost to develop, implement, maintain, monitor, and evaluate the various tasks outlined in this component are included in the source reduction, recycling, composting, and special waste components. These costs include staff or personnel time to implement the selected activities.

G. MONITORING OF PROGRAMS

The Solid Waste Division of the Utilities Department will be responsible for monitoring the success of the programs.

The monitoring necessary to evaluate the various programs can be accomplished by means of one or more of the following approaches:

- surveys conducted to determine awareness and participation levels for the various components;
- number of schools and students exposed to various programs;
- number of businesses taking part in programs;
- number and size of community events and activities;
- number and frequency of media advertising purchased;
- complaints and requests for information received by the office of education and information and/or the contractors providing the various services;
- qualitative feedback from waste generators about the information program;
- the quantity of waste diverted by programs publicized through education and public information activities;
- costs per generator, per ton, or per "impression" for education and public information programs;
- the progress of the overall program toward diversion goals.

G.1. EVALUATION OF PROGRAM EFFECTIVENESS

The Solid Waste Division will be responsible for evaluating the success of the programs. An annual diversion program report, outlining the success of individual tasks, comparisons with neighboring communities, and plans for next year, will be the responsibility of this office.

Evaluation can occur at various stages of the public education and public information process depending on the objective to be measured. The criteria used to evaluate the effectiveness of the education and public information efforts will be determined in advance and will be appropriate to the monitoring methods that have been chosen.

Formative evaluation attempts to identify the strengths and weaknesses of the messages, materials, and educational or informational strategies before one proceeds to full production, distribution or implementation. This is particularly important in the parts of a program that will require significant resources. Paid advertising, for example, can use up a great deal of a budget, and will be evaluated carefully before funds are committed.

Process evaluation assesses the organizational and administrative aspects of a program. Outcome and impact evaluation identify the immediate and longer term effects of efforts on the intended audience.

G.2. MONITORING SHORTFALLS

If the evaluation shows that specific diversion rates are not being achieved for certain programs and/or components, then expanding the education and information programs might be necessary. Methods that will be used include:

- increase the frequency, type, or extent of program monitoring and review to discover the reasons why diversion rates are not achieved;
- revise education and public information efforts to make them more effective based on results of evaluation;
- expand the education and public information programs by adding new components or increasing frequency;
- publicize new or additional incentives for participation in reduction, recycling, or composting programs.

It may be determined that the education and information aspects of the program are not what is preventing the individual programs from reaching their goals. If that is the case, the other programs will be modified accordingly to increase diversion.

G.3. PROGRAM MONITORING AND REPORTING SCHEDULE

The monitoring and reporting schedule is presented in the Implementation Schedule (Table VI-1.) at the end of this component.

G.4. MONITORING AND EVALUATION FUNDING REQUIREMENTS AND REVENUE SOURCES

Monitoring and evaluation costs of the Education and Public Information Component implementation are presented in the Funding Component. Funding for monitoring and evaluation will be borne out of the solid waste services structure and is addressed in more detail in the Funding Component.

TABLE VI-1 IMPLEMENTATION SCHEDULE FOR EDUCATION AND PUBLIC INFORMATION COMPONENT

Program/Task Frame	Supervising Agent/ Implementing Agent	Time
Residential		
Ongoing Education/Public Info.	Utilities Dept.	1/92 & on
Identify communication venues	Solid Waste Div.	1/92 & on
Begin producing articles/messages	Solid Waste Div.	2/92 & on
Printed Materials	Utilities Dept.	1/92-4/94
Award contract	City Managers Offc.	1/92
Produce source reduction materials	Private Industry	2/92-4/92
Distribute source reduction materials	Solid Waste Div.	9/92 & on
Produce composting materials	Private Industry	1/94-4/94
Distribute composting materials	Solid Waste Div.	4/94 & on
Resource Conservation Directory	Utilities Dept.	4/93-4/94
Award contract	City Managers Offc.	4/93
Produce directory	Private Industry	5/93-11/93
Develop directory distribution plan	Solid Waste Div.	1/94-3/94
Distribute directories	Solid Waste Div.	4/94
Neighborhood Block Leader Program	Utilities Dept.	1/92-5/92
Develop information kits	Solid Waste Div.	3/92-5/92
Continue Block Leader recruitment	Solid Waste Div.	5/92 & on
Hold block leader meetings	Solid Waste Div.	5/92 & on
Feedback to Residents on Diversion Efforts	Utilities Dept.	1/92-3/92
Collect data on diversion efforts	Solid Waste Div.	1/92 & on
Publicize progress through bills/media	Solid Waste Div.	3/92 & on
Master Composter	Utilities Dept.	1/94-6/94
Develop program materials/demo. site	Solid Waste Div.	1/94-3/94
Develop composter trainer recruitment	Solid Waste Div.	1/94-4/94
Publicize opening ceremony of sites	Solid Waste Div.	5/94
Composting site opening ceremony	Solid Waste Div.	6/94
Recruit master composters/maint. prog.	Solid Waste Div.	5/94 & on

TABLE VI-1 IMPLEMENTATION SCHEDULE FOR EDUCATION AND PUBLIC INFORMATION COMPONENT (Continued)

Program/Task	Supervising Agent/ Implementing Agent	Time Frame
Quantity Based User Fees	Utilities Dept.	1/92-11/95
Notice public hearing on mild rate structure changes	City Managers Offc.	1/92-11/92
Notice/promote through media/garbage bill insert	Solid Waste Div.	10/92-11/92
Publicize waste reductions impacts	Solid Waste Div.	11/92 & on
Notice public hearing on steep rate structure changes	City Managers Offc.	1/95-11/95
Notice/promote through media/garbage bill insert	Solid Waste Div.	10/95-11/95
Publicize waste reduction impacts	Solid Waste Div.	11/95 & on
Source Reduction Tip of the Month	Utilities Dept.	1/92-3/92
Coordinate with local media	Solid Waste Div.	1/92 & on
Collect initial source reduction tips	Solid Waste Div.	1/92-3/92
Begin printing tip(s) in newspapers	Solid Waste Div.	3/92 & on
Material Expansion of Curbside Service	Utilities Dept.	10/95-1/96
Produce/distribute flyers	Solid Waste Div.	10/95-1/96
Promote through media, bills, etc.	Solid Waste Div.	1/96 & on
Residential Christmas Tree Collection	Utilities Dept.	1/92 & on
Produce tree ornaments/flyers	Solid Waste Div.	Annually
Identify tree retailers	Solid Waste Div.	Annually
Distribute tree ornaments/flyers	Solid Waste Div.	Annually
Promote through media/Block Leader	Solid Waste Div.	Annually
Yard Material Drop Off Sites	Utilities Dept.	1/92-6/92
Prepare educational materials	Solid Waste Div.	1/92-3/92
Plan media event/invite media	Solid Waste Div.	4/92-6/92
Promote services/distribute materials	Solid Waste Div.	6/92 & on
Yard Material Collection (Pilot & Expansion)	Utilities Dept.	1/92-5/92
Prepare educational materials	Solid Waste Div.	1/92-3/92
Notify residents via garbage bills	Solid Waste Div.	4/92-5/92
Plan media event/invite media	Solid Waste Div.	4/92-5/92
Promote services/distribute materials	Solid Waste Div.	5/92 & on

TABLE VI-1 IMPLEMENTATION SCHEDULE FOR EDUCATION AND PUBLIC INFORMATION COMPONENT (Continued)

Program/Task	Supervising Agent/ Implementing Agent	Time Frame
Food Waste Collection	Utilities Dept.	4/96-8/96
Prepare educational materials	Solid Waste Div.	4/96-7/96
Notify residents via garbage bills	Solid Waste Div.	5/96-8/96
Promote services/distribute materials	Solid Waste Div.	5/96 & on
Special Wastes	Utilities Dept.	10/93
Incorporate information into Directory	Solid Waste Dept.	10.93
Institutional		
Curriculum Resource Packet	Utilities Dept.	1/92-4/92
Develop curriculum resource packet	Solid Waste Div.	1/92-4/92
Seminars for Educators	Utilities Dept.	1/92-4/92
Plan seminars	Solid Waste Div.	1/92-3/92
Conduct seminars	Solid Waste Div.	3/92-4/92
Waste Handling Systems in Schools	Utilities Dept.	1/93-9/93
Compile info. on waste mgt. system	Solid Waste Div.	1/93-2/93
Form waste task forces in each school	Solid Waste Div.	2/93-3/93
Provide waste mgt. info. to task forces	Solid Waste Div.	2/93-3/93
Follow-up on task force progress	Solid Waste Div.	4/93-9/93
Schedule classroom activities	Educators	9/93-4/94
Coordinate school fair	Educators/Solid Waste Div.	Annually
Government Modeling	Utilities Dept.	1/92-5/93
Waste audits at City offices	Solid Waste Div.	Annually
Written guidelines for City offices	Solid Waste Div.	3/92-5/92
Provide City employee training	Solid Waste Div.	5/92 & on
Promote City efforts through local media	Solid Waste Div.	5/92 & on
Provide City employees feedback	5/93 & on	

TABLE VI-1 IMPLEMENTATION SCHEDULE FOR EDUCATION AND PUBLIC INFORMATION COMPONENT (Continued)

Program/Task	Supervising Agent/ Implementing Agent	Time Frame
Commercial Industrial		
Model Business Program	Utilities Dept.	1/93-6/93
Develop/maintain model business prog.	Solid Waste Div.	1/93 & on
Adapt recycling logo/develop materials	Solid Waste Div.	2/93-5/93
Promote model business	Solid Waste Div.	6/93 & on
Instructional Booklet	Utilities Dept.	1/92-5/92
Produce instructional booklet	Solid Waste Div.	1/92-5/92
Distribute letter/booklet	Solid Waste Div.	5/92 & on
Technical Assistance	Utilities Dept.	1/92-5/93
Develop EPI for technical assistance	Solid Waste Div.	1/92-4/92
Promote technical assistance	Solid Waste Div.	4/92 & on
Provide feedback to businesses	Solid Waste Div.	5/93 & on
Regional Waste Information Exchange	Utilities Dept.	9/95 & on
Inform businesses of waste exchange	Solid Waste Div.	9/95 & on
Publicize waste exchange	Solid Waste Div.	9/95 & on
Monitoring & Evaluation	Utilities Dept.	12/92 & on
Write SRRE EPI evaluation for 1992	Solid Waste Div.	12/92-1/93
Write SRRE EPI evaluation for 1993	Solid Waste Div.	12/93-1/94
Write SRRE EPI evaluation for 1994	Solid Waste Div.	12/94-1/95
Write SRRE EPI evaluation for 1995	Solid Waste Div.	12/95-1/96
Write SRRE EPI evaluation for 1996	Solid Waste Div.	12/96-1/97
Write SRRE EPI evaluation for 1997	Solid Waste Div.	12/97-1/98
Write SRRE EPI evaluation for 1998	Solid Waste Div.	12/98-1/99
Write SRRE EPI evaluation for 1999	Solid Waste Div.	12/99-1/2000

CHAPTER VII

LIST OF TABLES
(Following Text)

CHAPTER VII
DISPOSAL FACILITY COMPONENT

A. EXISTING FACILITIES

In this document we define solid waste facilities as both disposal facilities and potential diversion facilities. This definition goes beyond the minimum standard specified for this component in the AB 939 regulations (disposal facilities only). We include potential diversion facilities because other components of this element do not describe the existing conditions of possible sites at which new programs may be located.

Waste produced in Mountain View goes to two landfills: franchised waste is disposed of at the Newby Island Landfill in San Jose; self-hauled waste is disposed of at the portion of the Mountain View Landfill referred to as the "Vista Site".

A.1. NEWBY ISLAND

Newby Island is owned and operated by International Disposal Company, a wholly-owned subsidiary of Browning-Ferris Industries (BFI). The landfill is located at the west end of Dixon Landing Road in north San Jose, accessible from the Dixon Landing Road interchange off of Interstate 880.

Facility information required under the 939 regulations for the Newby Island landfill is not provided in this document since the landfill is located outside of Mountain View. The required information should be available in the City of San Jose SRRE.

Mountain View's contract with BFI grants Mountain View the right to dispose of all of its franchised waste until November 1, 1993.

A.2. THE VISTA SITE

The Vista Site, also known as the 150-acre parcel of the Mountain View Landfill, is owned by the City of Mountain View, and operated by Wastech, Inc. The landfill is located between Permanente Creek and Shoreline Boulevard, north of Amphitheatre Parkway and south of the PG&E easement. The Vista site lies south and east of the older closed part of the Mountain View landfill, also known as the "544 Acre Parcel". Information required under AB 939 regulations for this landfill site is provided in Table VII-3 and Appendix 7.

The landfill (both 544 acre and 150 acre parcels) is permitted by the CIWMB under Facilities Permit No.43-AA-0006, and the Regional Water Quality Control Board under Board Order No. 88-027, as amended by Order No. 88-099. The Vista site has a permitted fill area footprint of approximately 84 acres, containing approximately 15,000 cubic yards of remaining permitted disposal capacity. The gross facility size is approximately 100 acres (approximately 50 acres of the 150 acre parcel are separated from the landfill area by Amphitheatre Parkway).

The facility accepts for disposal approximately 25 tons of self-hauled waste and demolition material per day on a 7 day basis. The material is generated in Mountain View.

The currently submitted closure plan for the Vista Site calls for closure to occur in October of 1991. Capacity currently exists until approximately April of 1992. A modification of the plan to allow operations to continue beyond that date is in progress. This modification will extend the capacity two years under slightly modified grading and closure plans to allow for the construction of the Sunnyvale Transfer Facility described below.

A.3. KIRBY CANYON

A 35-year contract with Waste Management, Inc. for the use of the Kirby Canyon Landfill has been signed with the City of Mountain View.

B. CAPACITY NEEDS PROJECTION

B.1. DISPOSAL CAPACITY REQUIRED FOR 15 YEAR PERIOD

Waste generation has been projected for the 15 year period beginning in 1991. Please note that this projection is presented in a format prescribed by regulations (see Tables VII-1 and VII-2).

NEEDS PROJECTION, REGULATORY FORMAT

The projection is based on unit generation factors developed for Mountain View in the Initial Waste Generation Study. The Association of Bay Area Governments (ABAG) was the source of projections for resident and employee population growth in Mountain View.

Additional capacity needs for the 15 year period are projected in accordance with the formula stated in the AB 939 regulations. The year by year projection of additional capacity created by diversion programs is presented in Table VII-2. The year by year projection of capacity needs without new diversion programs is presented in Table VII-1. Please note that the "additional capacity" created by Mountain View, as defined by the CIWMB, is a negative number.

NEEDS PROJECTION, LAY FORMAT

Disposal capacity "needs" are subjective. Secure capacity for durations ranging from 15 years to 50 years is often sought by municipal governments. The secure capacity 'needed' depends on the likelihood that additional capacity, or alternatives to landfilling, will be available at a later time.

We have added the more understandable 'capacity needs' column to the tables, in order to more clearly state what landfill capacity is truly needed. The capacity need is the cumulative total of the disposal capacity Mountain View needs to dispose of their franchised waste and self-haul waste. The capacity need is stated in units of tons. Needs in cubic yards are not projected since long-term landfill disposal arrangements are uncertain, and in-place density at landfills depends on the landfill design and operating procedures. Capacity needs (cumulative) increase more slowly in the scenario where AB 939 requirements are met (Table VII-2).

At present, it would be wise to assume that new landfill capacity will not be available at a later time, and that new technology will not completely eliminate the need for landfilling. It would be prudent, therefore, to secure capacity beyond the mandated 15 year planning period.

Mountain View's capacity arrangement with Newby Island does not allow the City to reap the benefits of diversion programs in the form of additional capacity for future needs beyond the term of the contract. The agreement should be restructured to allow the City to reap the benefits of diversion programs in the form of additional landfill capacity reserved for their wastes.

C. FACILITIES TO MEET CAPACITY REQUIREMENTS

C.1. EXISTING AND FUTURE STATUS OF FACILITIES

DISPOSAL FACILITY SITES

There are no disposal facilities in the city of Mountain View that can accept the projected quantity of waste generated in the city. Mountain View will have to export its waste.

DIVERSION FACILITY SITES

Mountain View has several diversion facility sites. The sites within the City of Mountain View include:

1. The Crittendon Road Site (Ferrari Site) -- the replacement site for the Vista Site public dump. The site also has space which could be used to process concrete, asphalt, wood waste, and possibly yard waste. California Environmental Quality Act (CEQA) review for the reuse of this site as a processing facility in combination with a demolition landfill is complete.

2. The 544-acre site -- the Post-Closure Maintenance Plan for the landfill includes a yard waste composting facility located at this site. CEQA review of the plan has been completed.

3. The use of an industrial building in the city of Mountain View as a processing facility. Building requirements are approximately 15,000 square foot for a basic processing site. Roofed areas for material storage are required. A completely indoor processing facility is probably necessary from a land use perspective. An existing building located at the Crittendon Site might be suitable for this use, if structurally sound.

Diversion facility sites not owned by the City of Mountain View include:

1. Zanker Road Landfill and Recycling Center -- the facility is capable of sorting commingled recyclables collected in clean Front Loader routes and Debris Boxes. The facility may also be capable of processing residentially collected recyclables. The permitting status of the facility, including CEQA review, is presently unclear.

2. City of Sunnyvale Recycling Yard -- materials collected from Mountain View's residential recycling program are processed there. With some capital improvements, residential materials could continue to go to this yard for another three to five years.

3. City of Sunnyvale Materials Recovery and Transfer Station (SMaRT) --still in the proposal stage, this facility could sort and handle a large variety of materials. Separate residential and commercial/industrial sorting lines were envisioned in the most recent conceptual design. CEQA review of the proposed facility has been completed.

4. The Recyclery -- a permitted Materials Recovery Facility (MRF) owned and operated by BFI at the Newby Island Landfill.

C.2. PLANNED EXPANSIONS OR PHASE-OUTS OF FACILITIES

The Vista Site is expected to close within the next few years. The City of Mountain View purchased the Crittendon site (also known as the Ferrari site or the 70-acre Stierlin Road Landfill) adjacent to the Mountain View Landfill. The City has indicated that it intends to use the site as a replacement site for the Vista Site public dump for approximately 5 years. CEQA review of the Ferrari site project and alternative has been completed.

D. RECOMMENDED FACILITY IMPROVEMENT ACTIVITIES

Key facility improvement recommendations are as follows:

- Carefully consider all future collection truck and container purchase decisions for maximum future flexibility in implementing and modifying diversion programs.

- Locate a yard waste processing facility, preferably on the 544-acre site at the Mountain View Landfill.

- Identify a site or several sites on which extensive processing facilities could be constructed in 1995-1996. Continue to pursue regionalization options with other jurisdictions.

- Evaluate the existing building at the Crittendon site for structural integrity, and suitability as an Intermediate Processing Facility.

- Facilitate zoning, permitting, and other land use and City code compliance issues for industries which process recyclable materials, or provide markets for those materials. Require all new developments to provide adequate space in their site plans or building layouts for future diversion activities.

E. FACILITY IMPROVEMENT ACTIVITIES MONITORING

Implementation schedules are provided in other chapters of this document for the recommended diversion programs. Major steps in getting new facilities in place and ready for use are included in those schedules.

Monitoring activity should focus on key milestones in those schedules. It is recommended that, due to their critical character, milestones for specific facility improvement activities be listed on a short list developed by City staff. A brief progress report regarding that short list should be made to the Utility Department Manager at least four times per year.

TABLE VII-1
SOLID WASTE CAPACITY NEEDS EVALUATION FOR THE CITY OF MOUNTAIN VIEW (W/OUT SRRE)

YEAR	GEN	IMPORT	DIVERT	TRANS.	LANDFILL	EXPORT	CUMULATIVE CAP NEED
1990	100,109	0	10,912	77	9,000	80,197	0
1991	100,880	0	10,996	77	9,000	80,884	0
1992	101,656	0	11,081	78	0	90,576	0
1993	102,439	0	11,268	78	0	91,171	15,208
1994	103,228	0	11,355	79	0	91,873	107,160
1995	104,023	0	11,443	79	0	92,581	199,820
1996	105,238	0	11,576	80	0	93,662	293,562
1997	106,469	0	11,712	82	0	94,758	388,402
1998	107,717	0	11,849	83	0	95,868	484,352
1999	108,981	0	11,988	84	0	96,993	581,429
2000	110,261	0	12,129	85	0	98,133	679,647
2001	110,984	0	12,208	86	0	98,776	778,509
2002	111,713	0	12,288	87	0	99,425	878,020
2003	112,448	0	12,369	88	0	109,079	978,187
2004	113,189	0	12,451	88	0	160,738	1,079,013
2005	113,936	0	12,533	89	0	101,403	1,180,505

DIVERSION PERCENTAGE

ASSUMED EACH YEAR

1990 AND 1991	0.11
1992	0.11
1993	0.11
1994	0.11
1995	0.11
1996	0.11
1997	0.11
1998	0.11
1999	0.11

Notes:
(1) EXPORTED WASTE EACH YEAR IS APPROXIMATED AS THE PROJECTED GENERATION QUANTITY REDUCED BY THE INITIAL DIVERSION PERCENTAGE AND THE QUANTITY PROJECTED TO BE LANDFILLED AT THE MOUNTAIN VIEW PUBLIC DUMP.
(2) GROWTH IN GENERATION BASED ON A WEIGHTED AVERAGE OF RESIDENTIAL AND COMMERCIAL SECTOR GROWTH IN 5 YEAR INCREMENTS.
(3) RESIDENTIAL SECTOR WASTE GENERATION PER PERSON IS ASSUMED TO CONTINUE UNCHANGED.
(4) COMMERCIAL/INDUSTRIAL SECTOR WASTE GENERATION PER JOB IS ASSUMED TO REMAIN UNCHANGED.
(5) INDEPENDENT INPUTS ARE TOTAL TONNAGE GENERATED IN 1990, POP/JOB ESTIMATES EACH 5 YEARS, DIVERSION PERCENTAGES (DIVERSION/GENERATION), INITIAL TRANSFORMED TONNAGE, AND SECURE LANDFILL CAPACITY.

TABLE VII-2
SOLID WASTE CAPACITY NEEDS EVALUATION FOR THE CITY OF MOUNTAIN VIEW (WITH SRRE)

YEAR	GEN	IMPORT	DIVERT	TRANS.	LANDFILL	EXPORT	CUMULATIVE CAP NEED
1990	100,109	0	10,912	77	9,000	80,197	0
1991	100,880	0	10,996	77	9,000	80,884	0
1992	101,656	0	12,199	78	0	89,458	0
1993	102,439	0	17,824	78	0	84,615	14,115
1994	103,228	0	25,807	79	0	77,421	91,614
1995	104,023	0	29,439	79	0	74,585	166,277
1996	105,238	0	37,781	80	0	67,458	233,813
1997	106,469	0	50,147	82	0	56,322	290,215
1998	107,717	0	52,243	83	0	55,474	345,769
1999	108,981	0	54,599	84	0	54,381	400,232
2000	110,261	0	55,241	85	0	55,020	455,336
2001	110,984	0	55,603	86	0	55,381	510,801
2002	111,713	0	55,968	87	0	55,745	566,631
2003	112,448	0	56,336	88	0	56,111	622,828
2004	113,189	0	56,708	88	0	56,481	679,396
2005	113,936	0	57,082	89	0	56,854	736,338

DIVERSION PERCENTAGE

ASSUMED EACH YEAR

1990 AND 1991	0.11
1992	0.12
1993	0.17
1994	0.25
1995	0.28
1996	0.36
1997	0.47
1998	0.49
1999	0.50

NOTES:
(1) EXPORTED WASTE EACH YEAR IS APPROXIMATED AS THE PROJECTED GENERATION QUANTITY REDUCED BY THE INITIAL DIVERSION PERCENTAGE AND THE QUANTITY PROJECTED TO BE LANDFILLED AT THE MOUNTAIN VIEW PUBLIC DUMP.
(2) GROWTH IN GENERATION BASED ON A WEIGHTED AVERAGE OF RESIDENTIAL AND COMMERCIAL SECTOR GROWTH IN 5 YEAR INCREMENTS.
(3) RESIDENTIAL SECTOR WASTE GENERATION PER PERSON IS ASSUMED TO CONTINUE UNCHANGED.
(4) COMMERCIAL/INDUSTRIAL SECTOR WASTE GENERATION PER JOB IS ASSUMED TO REMAIN UNCHANGED.
(5) INDEPENDENT INPUTS ARE TOTAL TONNAGE GENERATED IN 1990, POP/JOB ESTIMATES EACH 5 YEARS, DIVERSION PERCENTAGES (DIVERSION/GENERATION), INITIAL TRANSFORMED TONNAGE, AND SECURE LANDFILL CAPACITY.
(6) TRANSFORMATION IS CONSIDERED DISPOSED WASTE UNTIL 1995, WHEN IT CAN BE CONSIDERED DIVERTED. TONNAGE SHOWN IS FROM TIRE TRANSFORMATION.

TABLE VII-3
SOLID WASTE FACILITY DESCRIPTION

Facility Name:	City of Mountain View Vista Site (150 Acre Parcel)
Operator:	Wastech Incorporated
Owner:	City of Mountain View
Permitted Footprint:	Approximately 84 Acres
Permitted Capacity:	Approximately 19 million cubic yards (includes the closed 544 acre parcel)
Remaining Capacity:	Approximately 15,000 Cubic Yards Approximately 0.83 years (10 months) [Two-year expansion request being processed]

CHAPTER VIII

LIST OF TABLES
(Following Text)

CHAPTER VIII
FUNDING COMPONENT

A. INTRODUCTION

AB 939 requires development and implementation of source reduction, recycling, and/or composting programs (referred to here as diversion programs). These programs generally have two features in common:

1. They provide a reduced environmental impact compared to landfilling or transformation of wastes.
2. They cost more in the short term than landfilling or transformation.

These programs will benefit current and future residents of Mountain View by reducing the potential for ground and groundwater contamination and by preserving a scarce resource--landfill space. It is only in the context of these benefits that the additional costs of source reduction, recycling, and composting can be economically justified. The California diversion objectives, 25% by 1995 and 50% by 2000, and the threat of $10,000-per-day fines, make planning and implementation of these programs a practical necessity regardless of the local cost and/or benefit.

Waste collection and waste disposal fees in the entire State of California have been quite inexpensive compared to metropolitan areas around the United States. The tip fee per ton at the landfill or resource recovery facility is the usual measure of waste disposal costs. Table VIII-1 is a sampling of disposal fees from around the country. A sampling of single family service fees is presented in Table VIII-2. The services received for these fees vary tremendously; ranging from refuse service only to integrated services including recycling, composting, and refuse collection services.

The disposal fees in some areas are up to five times those in Santa Clara County (collection costs vary primarily with labor costs, truck types, and distances traveled, and thus are less region-specific). Many of these communities have experienced a "rate shock" effect as disposal costs have doubled and doubled again within the last five years. While adequate landfill space may mitigate these dramatic rate increases in Santa Clara County, it is reasonable to expect rapidly increasing rates for both garbage and diversion programs in the City of Mountain View due to increasing stringent regulations and increased public concern about the environment.

Operational and capital costs have increased. Operational costs have increased primarily due to more stringent regulatory standards. Facility siting and permitting costs have increased dramatically. Capital costs have increased due to the need to construct new facilities or upgrade existing ones. In addition, existing landfill owners are often financially constrained by meeting current financial assurance rules for past disposal practices, including corrective action costs. It is clear that municipalities need to structure waste management charges in a manner that reveals the full costs involved, and provide for an equitable distribution of these costs.

The purpose of this chapter is to aggregate the projected costs of the various diversion programs for each component and to discuss alternative funding mechanisms. Specifically discussed are:

- current funding structures for solid waste management
- funding alternatives
- a selected funding plan
- projected program costs.

Funding mechanisms selected and a summary of the costs are included at the end of this chapter. Appendix 8 contains a discussion of key funding concepts.

It is important to note that programs are often operated at costs which are higher than needed, but are done so because of other considerations, such as educational value. As discussed in the components where program selection is discussed, low cost is not the only criterion. The relative costs per ton for selected programs are presented in Table VIII-3.

B. CURRENT FUNDING STRUCTURE

Mountain View currently utilizes Foothill Disposal Company to provide mandatory solid waste services. The franchise agreement provides an exclusive right to residential, commercial, and industrial wastes. Solid waste is transported to the Newby Island Landfill for disposal.

Mountain View has a separate contract with Browning Ferris Industries for disposal of wastes at Newby Island. Mountain View also separately contracts with Wastech Incorporated for operation of the public dump at the Mountain View Vista site.

Mountain View residential fees for unlimited collection and disposal were $8.16 per month in 1990. These fees include curbside recycling services. Current residential charges compared with other selected cities are presented in Table VIII-2. Commercial rates vary depending on the size of the container and the frequency of service.

Mountain View city staff indicate that the City bills all residential customers, receives payment, and routes payments for services to Foothill Disposal. The franchise fee is 20% of gross revenues. It is segregated in a solid waste enterprise fund.

C. FUNDING ALTERNATIVES

The funding mechanisms discussed below relate to how the public sector can fund public costs of diversion programs and by which private haulers and facility operators can receive pay for their services.

C.1. OPERATING COST FINANCING

Operating costs include all ongoing costs of diversion programs (and existing solid waste services) other than amortized capital costs. These costs include labor, fuel, and lease payments.

Tax Financing

Three commonly used options exist for tax financing of solid waste services. The first of these is property taxes. The advantages of property taxes include easy administration and smooth increases. Property taxes are often used to provide subsidies for user fees, so that these fees can be introduced gradually over time in order to phase in the full cost of solid waste collection and disposal into the user's fees. Property taxes are usually used only for the administrative and promotional costs of recycling, composting, or source reduction programs. However, the operating costs of diversion programs are generally too high to be paid except through explicit charging mechanisms.

It can be argued that using property taxation to fund solid waste management creates inequities in that the costs of the solid waste system are not borne by those who benefit the most. The system may penalize those who generate little waste while subsidizing those who produce a greater share. Moreover, within the property tax system, solid waste must compete with other budgetary items for funding priority. This also has the effect of hiding the true costs of the solid waste system. However, taxes (general funds) are used in many regions as a short term mechanism.

Sales taxes are the second tax financing option. A retail sales tax surcharge can be added at the local level if two-thirds of the voters approve. A hybrid sales tax/user fee concept was implemented in Minnesota in 1989; the State levies a 6% sales tax on the service of garbage collection and returns the collected funds to municipalities to support recycling programs. The primary advantage of such a sales tax is that it targets those who use the service. The primary disadvantage is that it can sometimes be regressive. The potential for sales taxes on services is currently being discussed at the state level in California. Conversation with Devi Eden at the Integrated Waste Management Board indicates that counties currently do not have the ability to impose such taxes.

Special levies based on property valuation, waste generation, or gross sales, are also an option. The advantages to this approach are that referenda are not required and there is the potential to bypass general levy limits. Wisconsin recently imposed a $2,170-per-year flat "recycling fee" on all large businesses and industries "for the privilege of doing business in the state."

User Fees

User fees provide an equitable approach (fee for service) to waste system funding. Fees can be structured to reflect the actual costs of a system, and can be used as behavioral modification incentives (for example, volume-based charges). Billing for services can be public or private. The method currently used by Mountain View is discussed earlier in this chapter. Franchise fees can be used to fund the public sector costs of regulating haulers and monitoring compliance with environmental standards or to support other solid waste management initiatives.

User fees may vary with the quantity of waste collected or disposed, or be a flat fee per user. Variable fees send price signals to consumers which promote rational behavior. They are also less reliable as funding mechanisms since users will tend to shift their behavior away from expensive services, thereby reducing revenue to the service provider. Variable rates are discussed in greater detail in Chapter II.

The flat fee concept may be appropriate for the fixed minimum costs of service. For example, the cost of providing once a week residential collection for at-curb mini-can (20 gallon) service could be charged as a flat service charge, with variable fees related primarily to disposal costs charged for higher levels of service.

Landfill Surcharges

Yet another user fee option is the use of disposal/processing site "tip" fees or surcharges on these tip fees. Tipping fees at facilities are in relation to the service received if they are for:

- Disposal site financial assurance and environmental controls.
- Future landfill siting and planning.
- Educational efforts related to source reduction.
- The operational costs and profit of the facility.
- Household hazardous waste programs.

Tipping fee surcharges may be added by Santa Clara County (as local enforcement agency) for the funding of landfill supervision and could also be used for funding public sector diversion program costs.

Recovery Program Revenues

Recovered material sales generate revenues for Mountain View. Recyclables, such as aluminum, cardboard, compost products, and refuse-derived fuel (mixed paper) can be sold. If private vendors are utilized for recycling and/or composting, they usually retain the product sale revenue as an offset against collection, processing, and/or market costs. Product revenues are not considered adequate, in terms of quantity or reliability, to fund diversion programs. Most recycling programs are net "losers" from a project economics perspective; they offer environmental benefits to justify their net costs.

Secondary materials are commodities and, as such, the sales price varies substantially over relatively short periods of time. The newspaper glut of 1989-90 illustrates the folly of relying on product sales revenues to fund recycling programs. Recycling program costs have been estimated in this document using gross costs of similar programs elsewhere. These gross costs do not include resale revenues. This has been done so that private service providers and the City of Mountain View are not at risk of a funding shortfall if secondary market prices decline.

Waste Importation Fees

AB 939 allows a City or County to assess "special fees of a reasonable amount on the importation of waste from outside the County to publicly owned or privately owned facilities" (AB 939, Part 2, Section 41903). Historically Santa Clara County has not been willing to permit waste importation. Unless adequate long-term capacity exists for the entire County, importation to reduce current expenditures only hastens the day when exportation will be required at great cost.

Other Sources of Income

Other sources of income could include AB 2020 unused redemption funds (if available). California State sources indicate that currently there are no AB 2020 funds available.

C.2. CAPITAL COST FINANCING

Borrowing

Government-issued, tax-exempt bonds ("municipal bonds") are commonly used to capitalize necessary public sector activities such as roads and schools. In general, solid waste facilities are eligible for tax-exempt bonding. However, materials which have economic value are not considered waste and are not eligible. Mixed waste processing or transfer is generally eligible. Yard waste and recycling facilities are in a "gray area". Such tax-exempt bonding is subject to both California State and Federal rules and regulations. Bond Counsel is necessary, and a Bond Advisor prudent, in issuing such bonds.

Private Financing

Contracting out waste management services can reduce the need for capital costs. Although private capital is more expensive than public funding, these expenses can be offset by lower operating costs. Private financing can be flexible, and could reduce or eliminate the public sector's need to raise capital. It also tends to have higher effective financing rates, due to the fact that a private company will expect a return on investment commensurate with the financial risks assumed.

Current-Revenue Capital Financing

Mountain View can fund the initial costs of source reduction, recycling, and composting on a "pay-as-you-go" basis, as opposed to borrowing the money. Although this approach is not feasible for large capital needs, it may be acceptable for some relatively smaller activities, such as yard waste composting. In addition, if capital spending programs can be phased in over several years, this approach could become more practical as each year another capital item could be paid from current funds. Advantages include simplicity and the absence of interest costs. Disadvantages include the difficulty of maintaining the availability of relatively large amounts of liquid capital within budgetary and levy constraints. Another potential difficulty is the equity issue of charging current residents for facilities that may have useful lives of up to 20 years when current residents do not directly benefit from these facilities.

C.3. INSTITUTIONAL FACTORS

Contractually, Mountain View can choose to negotiate a single franchise agreement which includes garbage collection and disposal, recyclables services, and yard waste services. Alternatively, separate franchises may be developed for these new services with one or more service providers.

Another option that Mountain View can consider is disaggregating recyclable material sales revenue from the collection and processing services. This would account for the real cost of collection of recyclables (similar to the system in place for garbage service) without creating the perception that haulers are getting rich from sales revenues. While product sales revenues are not expected to cover collection costs, they could reasonably cover marketing and transport costs after collection, and still provide a net profit.

The net profit from product sales could be allocated in a number of ways. The processor/transferer/broker would get a portion. The hauler could get a portion so that they have incentive to collect more and/or clean products. Also, non-profit groups can be given a role in the operation, (educational or "special event" oriented) and a portion of the net revenues.

This option may encounter significant institutional barriers since it diminishes private sector control over marketing of collected materials and increases the public sector administrative burden.

D. PROJECTED COSTS

Table VIII-4 illustrates the program-by-program costs projected through the year 2000. All costs are in 1991 dollars and include education and public information, and contingency costs. Costs increase in later years due to population, and projected tonnage increases, not due to any inflation of the dollars. Inflation assumptions may vary over time. The cost estimates are provided in this manner in order to allow adjustments to be made over time.

Total gross costs in the short-term are estimated at approximately $2.4 million annually. Total gross costs in the medium term-are estimated to increase by approximately $3.6 million more, for a total cost increase due to these programs of approximately $5.0 million. Current fees paid by the City to contractors for collection, disposal, and diversion programs (curbside recycling) for all wastes generated in Mountain View are estimated to be $5.8 million annually.

On a percentage basis, therefore, funding requirements could increase over current revenue needs by about 41% prior to January 1, 1995, and by about 86% prior to January 1, 2000, as a result of the programs selected in this document. These cost estimates include contingency funds, as discussed in section E.3, below. They also do not include material resale revenues, or avoided collection and disposal costs, in order to provide worst-case estimates for budgeting purposes.

E. SELECTED FUNDING MECHANISMS

Selection of funding mechanisms was based on the following criteria.

E.1. FINANCIAL CRITERIA

- Sufficiency and Stability. The funding mechanism should be stable and sufficient to assure program support as planned.
- Low Cost. The funding should provide the lowest cost possible.
- Use of Private Financing/Equity. Public initiatives should not compete where private parties are willing to provide related services.
- Proven Approach to Financing. Innovative funding ideas can take too long to implement, be unstable, or result in unanticipated administrative burden, and as a result are discussed only as possibilities, not primary funding mechanisms.
- Voter Approval. Voter approval is avoided in primary funding recommendations since approval is uncertain and AB 939 requires implementation of these programs.

- Impact on Debt Capacity. Bonding is avoided generally; selected programs are not capital intensive.
- Administrative Burden. Expensive administrative requirements in the public and private sector are avoided when possible.

E.2. OTHER CRITERIA

- Fairness. Most funds will be raised proportionately to the generation of wastes. Ability to pay is not deemed a significant problem in Mountain View.
- Enforceability. Volume-based charging programs will require the need for enforcement expenditures.
- Behavioral Impacts. Funding incentive systems (such as volume-based charges) intended to discourage waste generation, or to encourage participation in diversion programs, are favored.
- Economic Efficiency. Artificial surcharges or manufactured costs beyond the real cost of services are avoided so as not to create economic inefficiencies; generators should make decisions which result in waste based on the expectation of paying the true cost of waste management -- no more and no less. Artificial costs are also prohibited by AB 939 (Part 2, Section 41901) funding mechanisms.
- Competitive Impacts. Institutional arrangements will not favor one business over another, nor will waste management costs put Santa Clara County businesses at a disadvantage in competing with out-of-County competitors.

E.3. FUNDING MECHANISMS SELECTED

User Fees

There are no public sector, capital intensive, funding requirements as a result of this plan. All funds are proposed to be funded through private sector investment, and where necessary, the use of current revenues for public sector expenditures. If the program causes an additional administrative burden, these additional costs borne by the hauler will be included in the rates charged to generators (that is, the regular garbage or refuse bill).

Recycling collection (processing and marketing) and yard waste composting will be initiated by negotiating franchise agreement(s) and user fees with the existing franchisee or independent recycling companies. These services are to be funded out of a single garbage bill paid by generators.

Mountain View's staffing and administrative costs (monitoring programs, coordinating existing efforts, planning new efforts and so forth) are to be paid for out of increased user fees.

A disposal surcharge applied to franchise waste can also be used as a mechanism for raising funds for replacement of existing landfills when needed. A replacement trust fund based on this funding mechanism is an optional integration program with expenses in the range of $10/ton. It is not addressed as a funding need at this time. Please see Chapter IX and Appendix 8 for a full discussion of this program.

Basis for Funding Estimates

The cost projections used are appropriate for planning purposes. They are based on the experience of similar programs throughout the country, adjusted to local conditions. However, actual bids for service were not solicited and can be quite different depending on local conditions including markets, sunk costs, competition, and other factors related to providing service in the local area.

Contingency Funding

A 20% contingency has been included in the estimated costs. Budgets will assume that the full 120% would need to be funded with the mechanisms described in this chapter. While a 20% contingency may not be needed, it is fiscally prudent to provide for the funding of contingencies.

The cost estimates reflect zero resale revenues for collected materials. The use of a separate resale revenue account creates a contingency fund over and above the 20% contingency, and likely stabilizes future user fees. The cost estimates do not reflect avoided collection or disposal costs. These costs are difficult to estimate. Avoided costs are small until significant levels of diversion are reached.

Avoided costs increase the profitability of service providers unless they are recaptured by the City. Avoided cost calculations will be used during the rate review process in order to offset future rate increases. These cost savings will serve as yet another source of contingency funds.

Overall, substantial contingency funds are built into the cost estimates provided. Actual program costs could be as little as 60% of the cost estimates provided.

E.4. FUNDING TASKS

E.4. FUNDING TASKS

The following tasks need to be accomplished:

1. SRRE and HHWE approval by Mountain View and Santa Clara County.
2. Perform a rate review to determine the arrangements necessary to ensure adequate funding.

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TABLE VIII-1: LANDFILL TIPPING FEES

City	Tip Fee ($/Ton)
Boston	12-60
Dallas	5-10
Detroit	44-48
Los Angeles	10-20
Minneapolis/St. Paul	65-95
New York City	120-160
Philadelphia	70-75
Mountain View, CA	20

TABLE VIII-2: SINGLE-FAMILY REFUSE COLLECTION FEES

City	$/Month
San Francisco, CA	8.49
El Cerrito, CA	9.20
Hayward, CA	9.70
Stockton, CA	12.00
San Diego Area, CA	10.25
Portland, OR	11.15
Snohomish County, WA	13.55
Minneapolis, MN (1)	17.50
Mountain View, CA	8.16

(1) Residents get a $7.00/month discount if they separate recyclables for curbside collection.

(2) All rates are 1990-1991 fiscal year.

TABLE VIII-3: UNIT COSTS OF SRRE DIVERSION PROGRAMS

	Annual Program Cost (a)	Tons Diverted Estimate (b)	Estimated Unit Cost (d) ($/Diverted Ton)
ALL SOURCE REDUCTION PROGRAMS COMBINED	139,744	4,204	33
RECYCLING PROGRAMS			
Expanded Multi-Family Residential Services	211,548	2,826	75
Phase I C/I Routes	705,773	5,586	126
Expanded Residential Services	849,715	3,713	229
Phase II C/I Routes	986,478	6,963	142
Downtown Drop-off Center	5,484	89	62
COMPOSTING PROGRAMS			
Expand Christmas Tree Program	7,440	12	620
Wood and Brush Drop-off and Mulching	190,992	3,150	61
Bag Collection Pilot Program	82,272	(c)	NA
Wood and Brush Collection and Mulching	100,344	4,765	21
Yardwaste Collection and Composting	876,371	7,384	119
Food Waste Collection and Composting	383,970	1,984	194
ALL SPECIAL WASTE PROGRAMS COMBINED	35,064	(c)	NA

Notes:

(a) The program cost is the estimated cost of a program in 1991 dollars and based on 1991 waste generation rates.

(b) Tons diverted based on 1991 waste generation rates.

(c) There is no significant diversion projected for this program at this time.

(d) For relative comparison only. To compare with disposal costs, resale revenues, contingencies, and avoided costs must be subtracted.

TABLE VIII-4: PROJECTED COSTS OF SRRE DIVERSION PROGRAMS SHOWN IN YEAR TO BE INCURRED IN 1991 DOLLARS

	Annual Program Cost(1)	1992 Funding Required(2) 1	1993 Funding Required 2	1994 Funding Required 3	1995 Funding Required 4	1996 Funding Required 5	1997 Funding Required 6	1998 Funding Required 7	1999 Funding Required 8	2000 Funding Required 9
SOURCE REDUCTION PROGRAMS										
Drought Resistant Landscape Guidelines	5,820	0	5,955	6,001	6,048	6,118	6,190	6,262	6,336	6,410
On-site Yard Waste Management	13,517	0	0	13,938	14,045	14,210	14,376	14,544	14,715	14,888
Waste Surveys	25,932	26,333	26,536	26,740	26,946	27,261	27,579	27,903	28,230	28,562
In-House Source Reduction/City Offices	10,356	10,516	10,597	10,679	10,761	10,887	11,014	11,143	11,274	11,406
School Curriculum & Student Projects	23,189	0	23,729	23,911	24,096	24,377	24,662	24,951	25,244	25,541
Participate in Regional Waste Exchange	13,289	0	0	0	13,809	13,970	14,133	14,299	14,467	14,637
Technical Assistance to Businesses	8,753	8,888	8,957	9,026	9,095	9,201	9,309	9,418	9,529	9,641
Awards for Comm. & Ind. Generators	10,988	0	11,244	11,330	11,418	11,551	11,686	11,823	11,962	12,102
Quantity Based User Fees (Mild)	4,356	4,423	4,457	4,492	4,526	4,579	4,633	4,687	4,742	4,798
Quantity Based User Fees (Steep)	23,364	0	0	0	24,277	24,561	24,848	25,140	25,435	25,733
SUBTOTAL:	139,564	50,160	91,475	106,117	145,021	146,714	148,431	150,170	151,933	153,717
RECYCLING PROGRAMS										
Expanded Multi-Family Resid. Services	211,548	214,817	216,472	218,139	219,819	222,386	224,988	227,625	230,296	233,001
Phase I Commercial/Industrial Routes	707,773	718,710	724,246	729,824	735,445	744,035	752,738	761,562	770,498	779,548
Expanded Residential Services	849,715	0	0	0	0	893,249	903,698	914,291	925,020	935,884
Phase II Commercial/Industrial Routes	986,478	0	0	0	0	1,037,019	1,049,150	1,061,448	1,073,903	1,086,516
Downtown Drop-off Center	5,484	5,569	5,612	5,655	5,698	5,765	5,832	5,901	5,970	6,040
SUBTOTAL:	2,760,998	939,096	946,329	953,618	960,962	2,902,455	2,936,406	2,970,826	3,005,687	3,040,989
COMPOSTING PROGRAMS										
Expand Christmas Tree Program	7,440	7,555	7,613	7,672	7,731	7,821	7,913	8,005	8,099	8,194
Wood and Brush Drop-off and Mulching	190,992	0	195,437	196,943	198,459	200,777	203,126	205,507	207,918	210,360
Bag Collection Pilot Program	82,272	41,136	41,136	0	0	0	0	0	0	0
Wood and Brush Collection & Mulching	100,344	0	0	103,470	104,267	105,485	106,719	107,970	109,237	110,520
Yardwaste Collection and Composting	876,371	0	0	0	910,635	921,271	932,048	942,973	954,038	965,243
Food Waste Collection and Composting	383,970	0	0	0	0	0	0	413,151	417,999	422,908
SUBTOTAL:	1,641,389	48,691	244,186	308,085	1,221,092	1,235,355	1,249,805	1,677,605	1,697,291	1,717,226

TABLE VIII-4: PROJECTED COSTS OF SRRE DIVERSION PROGRAMS SHOWN IN YEAR TO BE INCURRED IN 1991 DOLLARS

	Annual Program Cost(1)	1992 Funding Required(2) 1	1993 Funding Required 2	1994 Funding Required 3	1995 Funding Required 4	1996 Funding Required 5	1997 Funding Required 6	1998 Funding Required 7	1999 Funding Required 8	2000 Funding Required 9
SPECIAL WASTE PROGRAMS										
Compostable Special Wastes	24,936	25,321	25,516	25,713	25,911	26,214	26,520	26,831	27,146	27,465
Tires	5,592	5,678	5,722	5,766	5,811	5,879	5,947	6,017	6,088	6,159
Dead Animals	1,512	0	0	0	1,571	1,589	1,608	1,627	1,646	1,665
Mattresses	3,024	3,071	3,094	3,118	3,142	3,179	3,216	3,254	3,292	3,331
SUBTOTAL:	35,064	34,070	34,333	34,597	36,435	36,860	37,292	37,729	38,171	38,620
TOTALS (1991 $)(3):	4,577,015	1,072,018	1,316,323	1,402,418	2,363,510	4,321,385	4,371,933	4,836,331	4,893,082	4,950,552
WASTE GENERATION PROJECTIONS (TONS)	100,109 (1990)	101,656	102,439	103,228	104,023	105,238	106,469	107,717	108,981	110,261

(1) The cost of a program in 1991 $, based on 1991 tonnages. Costs are adjusted according to the relative waste generation projections for each subsequent year.
(2) Funding required adjusted for increase in tonnage generated. Facility costs are amortized over 20 years at 12%.
Other capital costs are amortized over 5 years at 10%. All capital costs have been increased by 15% to include estimated financing expenses.
(3) Total projected costs of SRRE Diversion Programs from 1992 through 2000 = $29,527,552

TABLE VIII-5: SOURCES OF PROGRAM FUNDING

Program	User Fee	Franchise Fee	Landfill Surcharge
SOURCE REDUCTION PROGRAMS			
Drought Resistant Landscape Guidelines	X	X	
Yard Waste Source Reduction	X	X	
Waste Surveys	X	X	
In-house Source Reduction in City Offices	X	X	
School Curriculum & Student Projects	X	X	
Participation in Regional Waste Exchange	X	X	
Technical Assistance to Businesses	X	X	
Awards, Commercial & Industrial Generators	X	X	
Quantity Based User Fees	X	X	
RECYCLING PROGRAMS			
Multi-Family Residential Services	X	X	
Clean-1 Routes	X	X	
Expanded Residential Services	X	X	
Clean-2 Routes	X	X	
Downtown Drop-off	X	X	
COMPOSTING PROGRAMS			
Expanded Christmas Tree Program	X	X	
Policies	X	X	
Wood and Brush Drop-off and Mulching	X	X	
Bag Collection Pilot Program	X	X	
Wood and Brush Collection and Mulching	X	X	
Yard Waste Collection and Composting	X	X	
Food Waste Collection and Composting	X	X	
SPECIAL WASTE PROGRAMS			
Compostable Special Wastes	X	X	
Tires	X	X	
Dead Animals	X	X	

CHAPTER IX

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(Following Text)

FIGURES

CHAPTER IX
INTEGRATION COMPONENT

A. INTEGRATION METHODOLOGY

Individual diversion program advantages and disadvantages have been discussed at length in their respective chapters. Programs, however, must be evaluated in an integrated way in order to ensure that the best possible diversion program selections are made. This chapter discusses four integration methods which support the goals and objectives stated in other Chapters of this document.

A.1. PHYSICAL FACILITIES

First, physical facilities can be constructed or purchased which are not compatible with other physical facilities either in existence now, or which may be purchased in the future. It is important to physically integrate programs in time or between service areas in order to avoid a future dilemma. If equipment is selected now which is not appropriate later, the City would need to either scrap equipment prior to completion of its useful life, implement a new program with substandard equipment, or delay implementing the program altogether.

This issue has been addressed by grouping physical plant purchases, one set which primarily occurs in the short-term, and a second set which primarily occurs in the medium-term. Physical plant improvements in the short-term are focused on collection equipment for source separated recyclables, and minimal processing equipment needed to support source separation collection programs. This minimizes financial risk and maximizes generator involvement in developing diversion programs.

Physical plant improvements in the medium term are focused on processing facilities for centralized separation of commingled recyclables and/or refuse. These improvements will be needed to achieve or exceed the mandated 50% diversion objective.

These are purchase guidelines, not strict rules. Equipment purchases will be made with the intention of supporting all new diversion programs in following years.

A.2. REGIONALIZATION

Some activities, notably source reduction education activities and public information activities, are best conducted on a regional basis. Certain data gathering or annual report functions are also least costly when conducted regionally. Equipment purchase decisions may also benefit greatly by regional discussions, or arrangements for their use.

To maximize the efficiency of such efforts, Mountain View will consider the use of a single service provider in common with other jurisdictions, or by centralizing certain functions in one non-jurisdiction organization.

Mountain View is participating in joint planning discussions with the Cities of Sunnyvale and Palo Alto with regard to long-term landfill capacity needs. Mountain View also participates in the Santa Clara County solid waste planning process through the Technical Advisory Committee (TAC) and the Intergovernmental Council (IGC). Mountain View is considering the use of several MRFs which would also service other jurisdictions.

Creation of an organization that could promote waste diversion and natural resource conservation across jurisdictional boundaries would have certain clear advantages, but has the disadvantage of creating another layer of bureaucracy. Some possible means of creating this integration mechanism are:

1. A non-profit organization supported by a minimum annual payment from each participating jurisdiction, and voluntary contributions. All voluntary contributions would, by charter, need to be spent in the contributing jurisdiction.

2. Expansion of County staff to handle these functions.

A.3. PRICE SIGNALS

Price signals to the public will be integrated with the diversion programs under this plan. In other words, users of refuse services should be charged for those services in ways that support the diversion goals.

Quantity based user fees are one way of sending appropriate price signals. The City will be adopting quantity based fees under this plan. The signals will be mild at first, in order to give generators time to participate in diversion programs or change their buying and disposal habits. The rate structure will be steepened in the medium-term (1995 and later).

Two other mechanisms for providing market price signals to the public are suggested for consideration, but are not chosen under this plan. Both relate to letting consumers know the true costs of landfill disposal. First, disposal costs could be listed separately from refuse collection services on all refuse bills. This is a very inexpensive form of public education.

Second, a replacement cost trust fund could be established. Funds raised by surcharging the disposal fee portion of refuse bills would be set aside in a trust fund to be used only for replacement of the landfill at some future time. This replacement might be another landfill, an advanced technology materials recovery facility, a waste-to-energy plant, or any other disposal options suitable when existing landfill capacity has been consumed.

This trust fund concept is similar to that used in the water and wastewater utility service area. Users of these utility services are charged for both current costs and the likely costs of building a new treatment plant when the current plant useful life has expired. This type of fund is used to ensure high-quality replacement facilities without inordinate rate increases at the time of replacement.

The trust fund charges per ton disposed of could be based on an index which is adjusted every five years or so based on surveyed actual costs of typical replacement facilities in the San Francisco Bay Area, California, or a larger survey area. A sample depletion cost calculation is presented in appendix 8.

A.4. MARKET AND END USE STIMULATION

Stimulation of markets and end uses for reusable and recyclable materials ultimately will increase diversion through all selected programs. In that sense, market stimulation is an integrating mechanism. Market development activities are discussed in greater length in appendix 5.

Some recycling collection services must be subsidized at this time if customers are to participate in them at the very high levels required to comply with AB 939. It is possible that these subsidies can be discontinued in the future if resale values for recyclables increase significantly. Subsidies are distortions of free market price signals. They are necessary for a short period of time in order to stimulate participation in collection activities and to increase the market value of recyclable materials.

Market development activities by the City of Mountain View will, in the short-term, take precedence over attempts to convey accurate price signals to waste generators. At some later time, price signals as an integrating mechanism will take precedence over market development. The transition from market stimulation to 'hands off' interaction with secondary materials markets will be made as barriers to the use of secondary materials are eliminated. This transition cannot be scheduled at present.

B. INTEGRATED DIVERSION PROGRAM PROJECTIONS

Each diversion program has been projected to divert a percentage of the generated waste stream. Integrated program diversion projections have been prepared (see Table IX-1). These projections are planning level estimates only; significant divergence from them on a program by program or material by material basis should be expected as programs develop and the waste stream composition changes over time.

C. PROGRAM IMPLEMENTATION SCHEDULE AND RESPONSIBILITIES

Individual program implementation time requirements are discussed in each Chapter. A summary diversion program implementation schedule has been developed (see Table IX-2 and Figure IX-1).

The CIWMB has specifically required that this document identify the parties responsible for program implementation. Parties responsible for programs overall are listed in the summary implementation schedule (Table IX-2), and individual component program schedules (Tables II-4, III-5, IV-5, and V-4). Parties responsible for tasks within each program implementation schedule are only listed in the schedules provided in each Chapter. It is critical that duties listed in these tables are understood and agreed to by all listed parties prior to program implementation.

D. STAFFING REQUIREMENTS

Success of program implementation depends on several factors. These include:

- adequate funding
- active public involvement
- stable or local markets or end-uses for collected materials
- energetic program administration

The last factor, program administration, is often overlooked in program design. Management and administrative personnel costs are included in each program cost estimate in this document.

Additional labor needs, on a cumulative basis, are summarized in Table IX-3. The table is a summary of all labor needs, including education and public information, presented in Tables II-3, III-4, IV-4, and V-3. Table XI-3 does not simply sum up the labor needs presented in the other tables, but integrates these needs over time. Labor needs for later programs are, in general, met using personnel or positions created in order to service earlier programs. In other words, as programs develop and become simpler to administer, personnel are shifted to the development of new programs.

Some minimum amount of government staff time is necessary for successfully program implementation. Often is assumed that existing staff can assume new duties; or that implementation duties are no greater than were planning duties. It is often politically unpopular to increase government staffing; the emphasis is placed on contract or consultant services which can theoretically be terminated more easily than full-time government staff. Nonetheless, there is some level of increased government staffing required merely to select, monitor, and direct contractors or consultants. Accurately assessing this issue is critical to success of diversion programs.

TABLE IX-3: NEW DIVERSION PROGRAM PERSONNEL NEEDS

YEAR	SOURCE REDUCTION	RECYCLING	COMPOSTING	SPECIAL WASTE	EDUC./ INFO.	ADMIN.	NEW (2)	TOTAL
EXISTING	0.00	0.75	0.00	0.20	0.25	0.25	0.00	1.45
1992	0.50	1.75	0.25	0.40	0.25	0.50	2.20	3.65
1993	0.75	1.75	0.50	0.40	0.50	0.75	1.00	4.65
1994	0.75	1.75	0.75	0.40	0.75	0.75	0.50	5.15
1995	1.00	2.00	1.00	0.50	0.75	1.00	1.10	6.25
1996	1.00	2.00	1.00	0.50	0.75	1.00	0.00	6.25
1997	1.00	2.00	1.00	0.50	0.75	1.00	0.00	6.25
1998	1.00	2.00	1.00	0.50	0.75	1.00	0.00	6.25
1999	1.00	2.00	1.00	0.50	0.75	1.00	0.00	6.25
2000	1.00	2.00	1.00	0.50	0.75	1.00	0.00	6.25

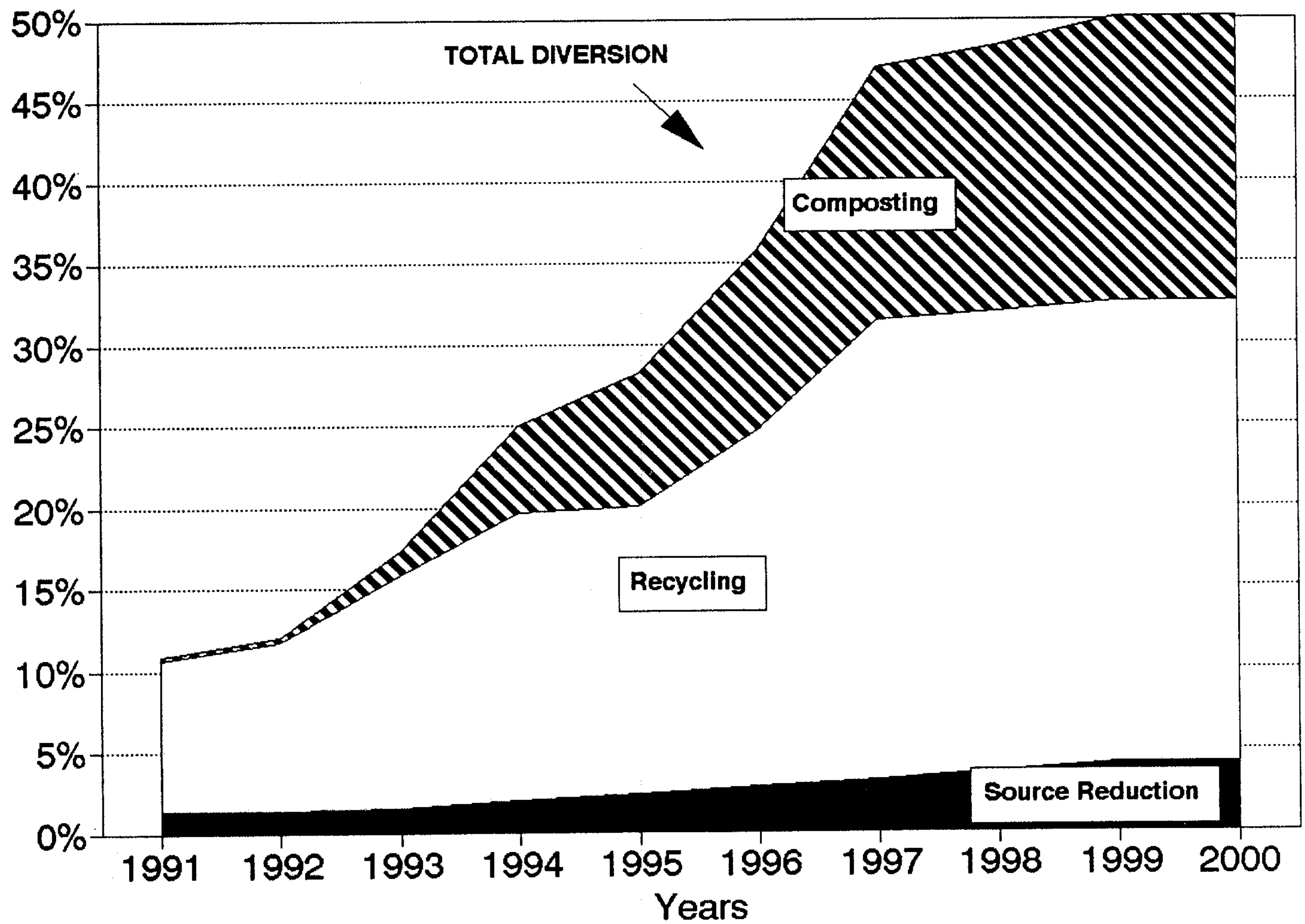
Notes:

(1) Estimates are for on-going personnel services required. They can be provided by permanent staff, temporary staff, or contract staff.

(2) The column labelled 'NEW' shows new personnel needs each year, not cumulative totals as in all other columns.

(3) The table assumes that time needed for most medium term programs is made available from personnel devoted to short-term programs who become available as short-term program start-up needs diminish.

FIGURE IX-2: INTEGRATED DIVERSION PROGRAM PROJECTIONS



APPENDIX 1

ASSOCIATION OF BAY AREA GOVERNMENTS PROJECTIONS 90

MEAN HOUSEHOLD INCOME

(in constant 1988 dollars)

SUBREGIONAL AREA	1980	1985	1990	1995	2000	2005
CAMPBELL**	37,969	42,100	45,200	47,200	50,000	51,700
CUPERTINO**	51,232	57,100	61,100	63,900	67,600	70,500
GILROY**	38,366	43,000	46,400	49,700	54,600	57,900
LOS ALTOS**	66,336	72,700	77,600	82000	87,200	91,000
LOS ALTOS HILLS**	102,332	112,900	120,400	126,100	132,600	138,400
LOS GATOS**	52,643	58,800	63,500	67,000	71,700	74,400
MILPITAS**	42,400	47,800	51,200	53,900	56,900	60,200
MONTE SERENO**	80,174	87,900	94,700	100,300	106,000	111,200
MORGAN HILL**	47,936	53,100	57,000	60,300	63,200	67,100
MOUNTAIN VIEW**	36,774	41,100	43,900	46,200	49,400	51,200
PALO ALTO**	49,015	54,300	59,100	61,600	65,300	67,500
SAN JOSE**	40,466	45,800	49,300	52,500	55,500	57,700
SANTA CLARA**	39,246	43,800	46,800	47,700	50,400	52,600
SARATOGA**	77,038	84,800	91,100	95,700	100,400	105,100
SUNNYVALE**	41,792	46,700	49,600	51,400	54,500	56,600
REMAINDER	45,919	51,400	56,300	60,700	62,500	65,600
SANTA CLARA	43,370	48,600	52,100	54,800	58,000	60,300

* City ** City Sphere of Influence *** Urban Service **** Other Subregional Area

Persons Per Household

SUBREGIONAL AREA	1980	1985	1990	1995	2000	2005
CAMPBELL**	2.40	2.44	2.38	2.31	2.28	2.24
CUPERTINO**	2.75	2.72	2.68	2.66	2.64	2.61
GILROY**	3.18	3.22	3.15	3.09	3.02	3.00
LOS ALTOS**	2.78	2.74	2.68	2.66	2.65	2.62
LOS ALTOS HILLS**	3.03	2.99	2.92	2.84	2.79	2.76
LOS GATOS**	2.52	2.48	2.43	2.38	2.35	2.34
MILPITAS**	3.27	3.23	3.16	3.10	3.05	3.02
MONTE SERENO**	2.83	2.80	2.74	2.70	2.66	2.64
MORGAN HILL**	3.28	3.29	3.20	3.14	3.10	3.07
MOUNTAIN VIEW**	2.13	2.16	2.13	2.12	2.12	2.11
PALO ALTO**	2.37	2.36	2.31	2.25	2.21	2.21
SAN JOSE**	2.93	2.96	2.89	2.84	2.77	2.74
SANTA CLARA**	2.51	2.51	2.42	2.39	2.39	2.38
SARATOGA**	3.09	3.00	2.95	2.91	2.89	2.85
SUNNYVALE**	2.44	2.44	2.36	2.36	2.35	2.34
REMAINDER	3.02	3.00	2.94	2.92	2.89	2.86
SANTA CLARA	2.76	2.78	2.72	2.68	2.65	2.62

* City   ** City Sphere of Influence   *** Urban Service   **** Other Subregional Area

APPENDIX 2

WASTE QUANTITY AND COMPOSITION ANALYSIS

CAL RECOVERY SYSTEMS

MAY 1989

Final Report

WASTE QUANTITY AND COMPOSITION ANALYSIS FOR THE CITIES OF PALO ALTO, MOUNTAIN VIEW, AND SUNNYVALE, CALIFORNIA

Prepared for

Waste Management of North America, Inc.
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May 1989

Recycled Paper

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Section 1

INTRODUCTION

This report presents the results of a waste characterization study to estimate the quantity and composition of some of the wastes generated by the cities of Palo Alto, Mountain View, and Sunnyvale, California.

Work performed in this study was described in the CRS proposal dated September 1988. This report discusses commercial and industrial wastes delivered to the landfills in front loader and roll-off vehicles. The report also discusses wastes delivered to the landfills by the general public and small contractors.

Field work for this study took place at the landfills in Palo Alto, Moutain View, and Sunnyvale.

The study consisted of two main phases. The first phase involved weighing the vehicles delivering the waste to the landfill in the City of Palo Alto during a five-day period. The City of Mountain View provided CRS with information on the quantities of waste delivered to its landfill during the same time period. No weight data were collected from the City of Sunnyvale. This phase of the study also included a vehicle count and visual survey of the contents of public vehicles belonging to the general public and those of small contractors entering the landfills.

The second phase of the work dealt with the collection of representative samples of commercial waste and waste delivered in debris boxes to the landfills in Palo Alto and Mountain View. Samples were collected during a five-day period and sorted into various components.

Section 2

METHODOLOGY

WASTE QUANTITY SURVEY

Quantity information was collected for a one-week period using a different method at each landfill. The City of Mountain View provided weight data recorded at its landfill scalehouse for the week of November 7 through 13. Waste quantities delivered to the Sunnyvale landfill were estimated using a visual survey.

Collection vehicles servicing the City of Palo Alto were weighed on a truck scale located between the gatehouse and the tipping area. The weight survey took place on December 2, and from December 5 through December 8.

WASTE COMPOSITION

Route Selection

The purpose of the sampling study was to provide composition information useful for the analysis and design of resource recovery operations. Samples were selected to provide information representative of primarily commercial and industrial waste generated in the study area.

Information obtained by CRS during previous waste characterization studies in the area was used as a basis for the selection of routes and waste generators. In addition, CRS interviewed the participating collection companies in order to develop a sampling scheme that reflected the commercial and industrial wastes collected by each company.

Sixty-nine vehicles were sampled during the field study. The types and number of vehicles sampled at each location are described in Table 2-1. The data in Table 2-1 are based on information provided by collection company officials. Front-loading vehicles collect waste from dumpsters commonly used by small business and apartment complexes. Therefore, both residential and commercial wastes may be collected by front loaders. All the large electronics firms in the study area serviced by debris boxes have manufacturing capabilities. However, it should also be noted that the debris boxes servicing these facilities also service the offices and lunchrooms.

Waste Sorting

During the ten days of field work, CRS employees diverted pre-selected loads of waste for sampling. Each entire load from a front loader or debris box was discharged in a linear pile near the active face of the landfill, and labeled. A representative sample of waste, weighing an average of 275 lb, was collected from throughout the pile and delivered to a

Table 2-1. Type and Number of Vehicles Sampled

Type of Waste	Mt. View	Palo Alto	Total
Front Loaders Sampled			
Primarily Multi-family	2	2	4
Mixed Residential/Commercial	2	2	4
Primarily Commercial	8	5	13
	12	9	21
Debris Boxes Sampled			
Electronics Firms	18	11	29
Retail	4	2	6
Construction	2	3	5
Landscaping	2	0	2
Stanford University	0	6	6
	26	22	48

sorting table. Each sample was manually sorted into the 19 component categories listed below.

Organic:
- Paper
  - Corrugated
  - Newsprint
  - High grade
  - Mixed paper
- Plastic
  - HDPE
  - PET
  - Film
  - Other plastic
- Yard waste
  - Woody
  - Other plant matter
- Wood
- Other organics

Inorganic:
- Metals
  - Tin cans
  - Other ferrous
  - Non-ferrous
  - Aluminum cans
  - Other aluminum
- Glass
- Other inorganics

Definitions of the waste components are presented in Appendix A.

Care was taken to assure that materials of small size (fines) were not lost during the sampling activity and during the sorting operation. The components were weighed in the field, and the composition of each sample was determined and reported on a wet-weight percentage basis.

Visual Survey

The composition of waste delivered to the Mountain View and Palo Alto landfills by both private citizens and small contractors was surveyed using a visual technique. During the period of December 1 through December 7, 224 vehicles were surveyed at Palo Alto. A total of 300 vehicles were surveyed at Mountain View during the period of November 7 through November 11. An additional 147 vehicles arriving on the weekend of November 12 and 13 were accounted for using the City's public register receipts. All vehicles unloading at the Sunnyvale landfill, including front loaders, rear loaders, debris boxes and those of private citizens were surveyed visually. A total of 783 vehicles were surveyed at Sunnyvale during the week of November 7 through November 13.

Composition information was gathered by surveyors trained by CRS who, upon the arrival of each vehicle, recorded the time, the vehicle type, volume of waste delivered, and an estimation of the volume percentage of each waste component listed below:

Paper

Metals

Plastics

Yard/brush

Glass

Lumber

Household garbage

Dirt/concrete/sheetrock

Other (e.g., carpets, sofas, tires, roofing)

The volume percentage of each component was converted to total volume. The computed volume of each component in each load was multiplied by its respective bulk density to obtain composition based on weight. The average weight percent was then computed for each landfill.

Section 3

RESULTS

PUBLIC VEHICLE COUNTS

Surveys of public vehicle traffic at each landfill site were conducted during November and December 1988. The daily vehicle counts for each of the landfills are given in Tables 3-1, 3-2, and 3-3. The data in the tables show that the City of Palo Alto receives an average of 32 public vehicles per day, the City of Mountain view receives an average of 64 vehicles per day, and the City of Sunnyvale receives an average of 112 vehicles per day.

The average traffic frequency for each of the landfills is presented in Tables 3-4 through 3-6. The information in Table 3-4 shows that peak traffic in Palo Alto takes place between 10:00 a.m. and 11:00 a.m., and between 2:00 p.m. and 3:00 p.m. The data in Table 3-5 indicate that the highest frequency of arrival to the Mountain View landfill takes place between 12:00 noon and 1:00 p.m. Peak traffic into the Sunnyvale landfill occurs between 11:00 a.m. and 12:00 noon.

Excluded from the public vehicle information discussed above for Palo Alto are approximately 150 vehicles that delivered non-contaminated loads of yard waste estimated to be about 370 cubic yards. The number of vehicles fluctuated from 8 to 28 per day.

WASTE QUANTITIES

The quantities of wastes disposed at the Palo Alto landfill were obtained by weighing collection company vehicles entering the disposal site between approximately 6:00 a.m. and 3:00 p.m.. The weight survey was conducted during a 5-day period. The results of the survey are presented in Table 3-7. The data in the table show the amount of waste disposed at the landfill by collection company. The data in Table 3-7 indicate that Palo Alto Sanitation Company (PASCO) disposes an average of 1,364 tons per week and that Peninsula Sanitary Service disposes an average of 300 tons per week. The quantity of waste delivered by collection vehicles on Saturday and Sunday is assumed to be negligible and is represented by zero in the table.

Information on the amount of waste disposed at the landfill in Mountain View was provided by staff from the City. The quantity information is summarized in Table 3-8. The data in the table are presented for each collection company. The summary shows that Specialty Garbage and Refuse Service, Inc. discards an average of 1,980 tons of waste per week and that Foothill Disposal Company disposes an average of about 1,460 tons per week.

The quantities of waste disposed at the Sunnyvale landfill were estimated by means of a visual survey.

Table 3-1. Daily Public Vehicle Counts at Palo Alto's Landfill

(Winter 1988)

		Vehicle			
Date	Day	Truck	Van	Car	Total
12/5	Monday	14	2	3	19
12/6	Tuesday	21	0	2	23
12/7	Wednesday	8	1	2	11
12/1	Thursday	26	2	6	34
12/2	Friday	20	3	5	28
12/3	Saturday	22	6	15	43
12/4	Sunday	40	3	23	66
7 - Day Average		22	2	8	32

Table 3-2. Daily Public Vehicle Counts at Mountain View's Landfill

(Winter 1988)

		Vehicle			
Date	Day	Truck	Van	Car	Total
12/5	Monday	35	8	5	48
12/6	Tuesday	66	9	2	77
12/7	Wednesday	46	7	2	55
12/1	Thursday	31	12	4	47
12/2	Friday	57	10	6	73
12/3	Saturday	88	10	9	107
12/4	Sunday	22	12	6	40
7 - Day Average		49	10	5	64

Table 3-3. Daily Public Vehicle Counts at Sunnyvale's Landfill a)

(Winter 1988)

Date	Day	Vehicle FL RL	Debris Box	Truck	Van	Car	Total
11/7	Monday	3	4	80	6	1	94
11/8	Tuesday	6	16	85	5	3	115
11/9	Wednesday	2	11	79	10	4	106
11/10	Thursday	3	14	87	4	2	110
11/11	Friday	3	6	93	4	3	109
11/12	Saturday	4	0	141	11	12	168
11/13	Sunday	0	0	72	5	4	81
7 - Day Average		3	7	91	6	4	112

a) Also shown are the number of front loaders (FL), rear loaders (RL) and debris boxes that delivered waste to the landfill during the public visual survey.

Table 3-4. Average Hourly Public Vehicle Traffic at Palo Alto's Landfill

Interval Time	Vehicle a) b)			
	Truck	Van	Car	Total
9:00 - 9:59	3	0	1	4
10:00 - 10:59	4	0	1	5
11:00 - 11:59	2	0	1	3
12:00 - 12:59	3	0	1	4
1:00 - 1:59	2	0	1	3
2:00 - 2:59	4	0	1	5
3:00 - 3:59	2	0	1	3
4:00 - 4:59	1	0	1	2

a) Averages have been rounded.
b) Excludes 8 to 28 public vehicles per day delivering non-contaminated yard waste.

Table 3-5. Average Hourly Public Vehicle Traffic at Mountain View's Landfill

Interval Time	Vehicle a)			
	Truck	Van	Car	Total
7:00 - 7:59	5	0	0	5
8:00 - 8:59	5	2	0	7
9:00 - 9:59	3	1	0	4
10:00 - 10:59	6	1	0	7
11:00 - 11:59	7	1	1	9
12:00 - 12:59	8	2	1	11
1:00 - 1:59	7	1	1	9
2:00 - 2:59	5	1	1	7

a) Averages have been rounded.

Table 3-6. Average Hourly Public Vehicle Traffic at Sunnyvale's Landfill

Interval Time	Vehicle a)					
	DB b)	FL/RL c)	Truck	Van	Car	Total
8:00 - 8:59	3	0	9	1	0	13
9:00 - 9:59	2	0	8	0	1	11
10:00 - 10:59	2	1	10	0	1	14
11:00 - 11:59	0	1	14	1	1	17
12:00 - 12:59	0	0	8	0	1	9
1:00 - 1:59	0	0	12	1	0	13
2:00 - 2:59	0	0	11	1	0	12
3:00 - 3:59	0	0	10	1	0	11
4:00 - 4:59	0	0	10	1	0	11

a) Averages have been rounded.
b) DB: debris box.
c) FL/RL: front loader/rear loader.

Table 3-7. Quantities of Waste Delivered to the Palo Alto Landfill (Tons)
December, 1988

Collection Company	Vehicle Type	12/5 Mon	12/6 Tue	12/7 Wed	12/8 Thu	12/2 Fri	12/3 Sat	12/4 Sun	Total
PASCO	Debris Boxes	106	54	115	79	39	0	0	393
	Front Loaders	218	188	199	189	177	0	0	971
	Rear Loaders	0	0	0	0	0	0	0	0
Peninsula	Debris Boxes	13	26	46	38	26	0	0	149
	Front Loaders	47	23	23	22	13	0	0	128
	Rear Loaders	6	5	4	3	5	0	0	23
Total	Debris Boxes	119	80	161	117	65	0	0	542
	Front Loaders	265	211	222	211	190	0	0	1099
	Rear Loaders	6	5	4	3	5	0	0	23
Daily Total		390	296	387	331	260	0	0	1664

Table 3-8. Quantities of Waste Delivered to the Mountain View Landfill (Tons)
November 1988

Collection Company	Vehicle Type	11/7 Mon	11/8 Tue	11/9 Wed	11/10 Thu	11/11 Fri	11/12 Sat	11/13 Sun	Total
Specialty	Debris Boxes	132	129	101	88	95	0	0	545
	Front Loaders	193	146	165	141	156	0	0	801
	Rear Loaders	147	143	116	135	93	0	0	634
Foothill	Debris Boxes	126	86	69	80	98	0	0	459
	Front Loaders	187	152	146	178	150	13	0	826
	Rear Loaders	29	35	33	38	41	0	0	176
Total	Debris Boxes	258	215	170	168	193	0	0	1004
	Front Loaders	380	298	311	319	306	13	0	1627
	Rear Loaders	176	178	149	173	134	0	0	810
		----	----	----	----	----	----	----	------
Daily Total		814	691	630	660	633	13	0	3441

Note: Excludes waste delivered to the Sunnyvale landfill
by Specialty rear loaders, front loaders, and debris boxes.

The total amount of wastes delivered to each of the landfills is summarized in Table 3-9. The information in the table is presented by type of vehicle delivering wastes on a 7-day basis. The data show that the total amount of wastes delivered to all the landfills during the survey was about 6,700 tons per week (7-day basis).

WASTE COMPOSITION

Approximately 10 tons of commercial waste were manually sorted during the sampling period.

In Mountain View, only loads of waste delivered by Foothill Disposal Company and Specialty Garbage and Refuse Service, Inc. were sorted. Material currently delivered by the Los Altos Garbage Company (LAGCO) will be transported directly to Newby Island. In Palo Alto, commercial wastes collected by PASCO and Peninsula Sanitary Service were separated and analyzed. The results of the surveys are summarized in Table 3-10. The data in the table are presented on a wet-weight basis and represent the composition of refuse as it arrives at the landfills.

Visual surveys were carried out to determine the composition of wastes delivered by the general public and small contractors to the Palo Alto and Mountain View landfills. A visual survey was also used to estimate the composition of wastes delivered to the Sunnyvale landfill by the general public, small contractors, front-loaders, rear-loaders, and roll-offs. The results of the visual surveys are presented in Table 3-11. The data in the table show that the major components of this type of waste are yard waste, lumber, dirt, and concrete. These materials represent about 75% to 85% of the waste.

The estimated quantities of waste components delivered to the Palo Alto and Mountain View landfills are presented in Tables 3-12 and 3-13. The data include wastes collected by the following companies: 1) PASCO; 2) Peninsula; 3) Foothill; and 4) Specialty. The data in Table 3-12 show that commercial waste delivered to the Palo Alto landfill contains relatively high concentrations of paper products and yard debris. Similarly, the information in Table 3-13 indicates that some of the major components of the waste delivered to the Mountain View landfill also consist of paper products and yard debris. In addition, this particular waste stream had relatively high concentrations of plastics and glass.

The composition of commercial waste delivered in front-loaders and roll-offs to the landfills in Palo Alto and Mountain View have been compared to that obtained in previous studies. The results of the comparison are given in Tables 3-14 through 3-17. The information presented in Table 3-14 shows that the concentration of corrugated has decreased substantially in loads collected by both PASCO and Peninsula. The information in the table also indicates an increase in the amount of glass.

The data given in Table 3-15 also indicate an overall reduction in the concentration of corrugated in front-loader loads delivered to the landfill in Mountain View. The information in the table also show, although not as conclusively as corrugated, increases in the concentrations of plastics and glass.

Table 3-9. Summary of Quantities of Wastes Delivered to Landfills
(7 - Day Basis)

Vehicle Type	Palo Alto	Mountain View	Sunnyvale a)	TOTAL
Rear Loaders	23	810	21	854
Front Loaders	1099	1627	42	2768
Debris Boxes	542	1004	96	1642
Private/Small Contractors a)	115	410	866	1391
TOTAL	1779	3851	1025	6655

a) Based on visual estimate.

Table 3-10. Average Waste Composition (Weight Percent)

	Mountain View		Palo Alto	
	Front Loaders	Debris Boxes	Front Loaders	Debris Boxes
Corrugated	14.9	22.7	11.1	16.4
Newsprint	9.2	1.8	9.2	3.2
High Grade	9.9	9.3	12.7	8.1
Mixed Paper	20.3	10.7	26.3	14.8
HDPE	0.6	1.5	0.2	0.1
PET	0.2	0.0	0.1	0.0
Plastic Film	5.3	3.0	3.9	3.4
Other Plastic	5.6	3.5	3.4	4.5
Woody Yard	1.5	3.2	0.0	1.0
Other Yard	3.6	4.8	9.4	2.1
Wood	3.1	19.5	2.0	20.1
Other Organic	11.3	2.3	12.8	4.8
Tin Cans	0.9	0.1	0.9	0.7
Other Ferrous	2.4	4.5	0.7	9.6
Non-Ferrous	1.0	0.5	0.2	0.9
Aluminum Cans	0.7	0.2	0.8	0.5
Other Aluminum	0.2	0.1	0.1	0.5
Glass	7.5	8.6	5.9	2.2
Other Inorganic	1.6	3.6	0.2	6.8
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TOTAL	100	100	100	100

Table 3-11. Estimated Waste Composition (Weight Percent)
(based on visual surveys)

Component	Palo Alto a)	Mountain View a)	Sunnyvale b)
Paper	2	3	5
Metals	3	3	3
Plastic	0	0	0
Yard Waste	11	39	21
Glass	0	1	0
Lumber	21	15	9
Household Garbage	8	6	7
Dirt, Concrete, etc.	52	26	52
Other c)	3	7	3
Total	100	100	100

a) Public, small contractors.
b) Public, small contractors, front loaders, rear loaders, and debris boxes.
c) eg: carpets, sofas, tires, roofing, textiles, composite items.

Table 3-12. Estimated Quantities of Waste Components
Delivered to the Palo Alto Landfill by Collection Vehicles
(Tons, 7-day basis)

	PASCO		Peninsula		
	FL	DB	FL	DB	Total
Corrugated	139.8	77.0	5.7	11.9	234.3
Newsprint	93.0	8.5	11.0	8.7	121.2
High-Grade	133.6	26.8	13.6	17.1	191.2
Mixed Paper	216.7	50.0	44.0	30.4	341.1
HDPE	2.5	0.0	0.2	0.3	3.1
PET	0.7	0.0	0.2	0.1	1.0
Plastic Film	30.8	13.9	7.0	4.3	56.1
Other Plastic	30.4	19.4	5.1	5.2	60.1
Woody Yard	0.0	1.7	0.0	3.8	5.4
Other Yard	114.3	0.0	6.0	11.5	131.7
Wood	28.5	91.0	0.0	17.7	137.2
Other Organic	103.6	7.8	21.8	18.5	151.7
Tin Cans	8.0	1.1	1.4	2.6	13.2
Other Ferrous	10.2	50.3	0.0	2.9	63.4
Non-Ferrous	2.3	4.5	0.2	0.4	7.4
Aluminum Cans	5.4	1.2	1.5	1.6	9.6
Other Aluminum	0.6	2.3	0.3	0.2	3.4
Glass	47.7	5.6	10.0	6.5	69.8
Other Inorganic	3.0	31.9	0.0	5.1	40.0
TOTAL	971.0	393.0	128.0	149.0	1641.0

Table 3-13. Estimated Quantities of Waste Components
Delivered to the Mountain View Landfill by Collection Vechiles
(Tons, 7-day basis)

	Foothill		Specialty		Total
	DB	FL	DB	FL	
Corrugated	173.8	125.2	40.8	118.1	457.8
Newsprint	9.8	64.6	8.4	85.2	168.1
High-Grade	38.3	87.4	56.4	74.5	256.5
Mixed Paper	55.0	171.0	51.0	160.0	437.0
HDPE	0.0	4.5	16.8	5.4	26.7
PET	0.0	1.7	0.0	2.2	3.9
Plastic Film	16.2	42.1	13.2	44.2	115.7
Other Plastic	15.2	40.6	20.4	49.9	126.2
Woody Yard	2.0	13.5	33.0	11.3	59.7
Other Yard	9.0	47.0	41.6	12.5	110.1
Wood	61.3	28.3	139.2	22.1	251.0
Other Organic	12.0	90.9	11.0	92.7	206.6
Tin Cans	0.4	10.3	0.9	4.1	15.7
Other Ferrous	33.4	21.6	9.4	16.8	81.1
Non-Ferrous	3.4	12.0	1.5	4.0	20.9
Aluminum Cans	1.7	5.0	0.6	6.7	14.0
Other Aluminum	0.4	0.1	0.5	3.6	4.7
Glass	6.0	57.4	86.7	63.9	214.1
Other Inorganic	21.0	2.7	13.7	23.7	61.2
TOTAL	459.0	826.0	545.0	801.0	2631.0

Table 3-14. Comparison of Composition of Front Loaders
Palo Alto Landfill (Weight Percent)

	Penninsula		PASCO	
Component	Dec 88	Jan 83	Dec 88	Jan 83
Corrugated	4.4	31.2	14.4	33.7
Newsprint	8.6	27.3	9.6	4.7
Mixed Paper	45.1	17.6	36.1	33.7
Total Paper	58.0	76.1	60.0	72.1
Total Plastic	9.8	5.3	6.6	8.5
Total Yard	4.7	2.9	11.8	5.0
Other Organic	17.1	6.5	13.6	8.2
Total Ferrous	1.1	2.8	1.9	2.0
Total Aluminum	1.4	1.2	0.6	0.8
Glass	7.8	4.3	4.9	1.7
Other Inorganic	0.1	0.0	0.5	1.7

Table 3-15. Comparison of Composition of Front Loaders Mountain View Landfill (Weight Percent)

Component	Specialty Garbage Co. Oct 88	Specialty Garbage Co. Jan-Feb 83	Specialty Garbage Co. Oct 82	Foothill Oct 88	Foothill July 79
Corrugated	14.7	32.3	24.8	15.2	23.7
Newsprint	10.6	7.1	9.3	7.8	10.3
Mixed Paper	29.3	21.1	22.3	31.3	18.1
Total Paper	54.7	60.5	56.4	54.3	52.1
Total Plastic	12.7	7.4	10.4	10.8	14.1
Total Yard	3.0	9.1	6.8	7.3	6.7
Other Organic	28.7	12.7	12.0	28.8	8.7
Total Ferrous	2.6	3.3	3.7	3.9	2.9
Total Aluminum	1.3	0.8	1.0	2.1	0.8
Glass	8.0	3.6	5.2	0.6	8.2
Other Inorganic	3.5	2.6	4.5	7.3	6.5

Table 3-16. Comparison of Composition of Debris Box Waste
Palo Alto Landfill

	Hewlett Packard		Hubbard Johnson		Syntex		Tressider		Varian	
	Dec 88	Autumn 82	Dec 88	Autumn 82	Dec 88	Autumn 82	Dec 88	Autumn 82	Dec 88	Autumn 82
Corrugated	18.8	41.9	10.9	17.5	55.6	58.7	7.2	18.1	24.4	18.4
Newsprint	3.9	1.5	0.0	0.0	4.4	1.1	11.9	19.1	3.3	0.9
Mixed Paper	26.5	34.8	1.2	2.0	26.9	15.9	24.6	20.8	36.6	3.0
Total Paper	49.3	78.2	12.1	19.5	86.9	75.5	43.8	37.2	64.3	19.3
Total Plastic	7.1	10.2	0.8	1.1	5.5	16.7	12.0	19.8	8.6	6.8
Total Yard	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	1.7	0.0
Other Organic	34.6	6.5	14.2	73.1	1.6	1.4	20.2	6.7	15.1	31.1
Total Ferrous	5.1	4.5	50.4	2.9	5.3	0.3	8.8	2.9	1.6	20.2
Total Aluminum	0.8	0.1	0.0	0.0	0.0	3.1	3.5	4.7	0.7	0.2
Glass	1.1	0.2	0.0	0.0	0.0	0.7	10.5	7.8	2.1	0.6
Other Inorganic	2.1	0.2	22.6	3.4	0.7	2.1	1.4	0.0	5.9	18.8

Table 3-17. Comparison of Composition of Drop Boxes
Mountain View Landfill

	Advanced Micro				Amdahl			Hewlett Packard					All Specialty	
	October 88		AVG	Summer 83	Oct 88	Autumn 82		Oct. 88			AVG	Autumn 82	Oct 88	Autumn 82
Corrugated	0.9	0.0	0.5	26.9	12.0	3.6	36.8	49.4	22.3	15.3	29.0	80.2	7.5	28.1
Newsprint	0.0	0.0	0.0	0.9	0.0	0.9	2.6	1.3	2.9	6.5	3.6	0.2	1.5	1.6
Mixed Paper	28.9	1.8	15.4	39.3	0.0	19.8	36.1	35.6	20.5	48.0	14.5	8.9	19.7	33.4
Total Paper	29.8	1.8	15.8	67.1	12.0	24.3	75.5	86.3	45.7	69.8	67.3	89.3	28.7	63.1
Total Plastic	27.5	27.5	27.5	23.9	5.4	6.4	11.7	6.3	4.4	8.7	6.4	5.3	9.2	15.4
Total Yard	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.7	0.4
Other Organic	4.7	9.2	6.9	6.8	0.0	68.6	9.9	2.0	48.9	10.7	20.5	1.4	27.6	15.2
Total Ferrous	2.0	0.0	1.0	0.9	0.0	0.1	0.0	3.2	0.5	6.3	3.3	3.4	1.9	0.5
Total Aluminum	0.5	0.0	0.3	0.1	0.0	0.2	1.7	0.3	0.2	1.4	0.6	0.6	0.2	0.8
Glass	35.4	59.6	47.5	1.2	0.0	0.0	1.2	1.5	0.2	3.0	1.6	0.0	15.9	0.5
Other Inorganic	0.0	1.8	0.9	0.0	0.0	0.4	0.0	0.5	0.0	0.2	0.2	0.0	2.8	4.1

The data in Table 3-16 show that the composition of commercial waste delivered to the Palo Alto landfill in drop boxes also has changed since the waste was sampled in 1982. The most noticeable change is in the reduction in the quantity of corrugated. The information in Table 3-17 indicates that the waste delivered in drop-boxes to the Mountain View landfill also has changed since 1982. The major changes are: 1) a sizeable decrease in the concentration of corrugated; and 2) an increase in the quantity of glass.

DISCUSSION

The results are consistent with waste compositions measured in other communities. Note, however, that this study consisted of a single sampling period and, therefore, cannot measure seasonal variations.

The estimates of quantities by component presented in Table 3-13 and Table 3-14 show that there are opportunities for diverting materials from the landfill. Materials such as paper products, plastics, metals, and glass can be separated either manually or mechanically.

Appendix A

PALO ALTO, MOUNTAIN VIEW AND SUNNYAVLE WASTE MATERIAL CATEGORIES: DEFINITIONS

Corrugated

Old Corrugated Cardboard (OCC)/Kraft Paper - Waxed and unwaxed kraft linerboard and containerboard cartons, and shipping boxes with corrugated paper medium. Kraft paper bags (e.g., brown grocery bags) are also included.

Newsprint

Printed and unprinted ground wood newsprint; referred to as #1 news. This category also included some glossy non-recyclable paper typically used in advertisements, unless found separately.

High-Grade Paper

Printing, writing, and computer papers. Includes white ledger, colored ledger, computer printouts, computer tab cards, 3 x 5 index cards, bond, copy machine paper, and envelopes (without windows or gummed labels).

Mixed Paper

All other wood pulp derived products with low or negative recyclable value. Includes glossy or waxed paper, magazines, books, catalogs, paper food containers, absorbent paper products, carbon paper, construction paper and paperboard.

PET Containers

PET beverage containers redeemable under the California bottle bill, AB 2020. These clear plastic bottles usually contain carbonated beverages.

High Density Polyethylene Containers (HDPE)

Includes translucent and opaque HDPE bottles for drinking water, dairy products, bleach, liquid detergents, motor oil, shampoo, and several other household and automotive products.

Film Plastics

Plastic wrapping materials, plastic bags, and flexible film and sheet plastic.

Other Plastics

Includes thermosets and thermoplastics not classified above, such as plastic pipe, electrical components, automotive components, toys, and foamed plastics, such as polyurethane foam and polystyrene (styrofoam).

Yard Waste: Woody

Branches, limbs, tree trunks, and brush.

Yard Waste: Other Plant

Naturally occuring vegetative material from garden, park, and lawn maintenance. Includes lawn clippings, leaves, sod, and wet, loose plant matter.

Wood

Wood and dimensional lumber construction materials from new construction, remodeling, or demolition, including plywood, particleboard, and "masonite." Also includes wood from furniture, tools, and other durable products.

Other Organics

Organic materials not otherwise categorized. Includes food waste, textiles, rubber tires, leather, natural fibers, disposable diapers, and non-sortable organic fines.

Tin Food Cans

All coated and non-coated ferrous food and beverage cans.

Other Ferrous

Ferrous and alloyed scrap metals from any source except food cans. Stainless steel is included in this category.

Non-Ferrous

Metals derived from materials other than iron, except aluminum, such as copper, brass, bronze, lead, zinc, and other metals to which a magnet will not adhere.

Aluminum Cans

All aluminum beverage containers.

Other Aluminum

All aluminum materials that do not appear to be alloyed with other metals, including foil, furniture, house siding, cooking ware, and industrial scrap.

Glass

All glass food and beverage containers plus other glass items such as flat plane glass, light bulb glass, mirrors, and cooking ware.

Other Inorganics

Includes all non-combustible materials not classified above, such as soil, rocks, sand, concrete, and gypsum wallboard.

APPENDIX 3

WASTE DIVERSION STUDY

EMCON ASSOCIATES

MAY 1991

Solid Waste Diversion Characterization

Objective of the Study

In accordance with Title 14, Chapter 9 of the CCR, the objective of the waste diversion characterization is to determine the quantity and types of materials that are currently being diverted from permitted solid waste disposal facilities. The diversion quantities reflect the amount of materials that are generated in the City of Mountain View and diverted from the landfill via source reduction, recycling, and composting. By State law, only those materials normally disposed of at permitted solid waste landfills, representing at least 0.001 percent of the waste stream, count towards diversion. It is essential to document the existing level of waste reduction in order to determine what type of programs need to be implemented to reach state mandated diversion rates of 25 percent by 1995 and 50 percent by 2000.

Waste Diversion Flow Process

The flow of materials diverted from the waste stream is more complex than that for materials destined for disposal at a landfill. This complexity occurs because the various materials must be separated and processed (contaminants removed, material baled) to meet market specifications, and this is often done in facilities dedicated to one type of material. In this process, several processors may be involved between the generator and the end user. For some items, materials are taken directly to the processor from the generator, who remanufactures these materials into recycled products.

Much of the recycling in the City of Mountain View follows a similar path, flowing from the generator to a collector, who may sell the material to a dealer. In turn, the dealer processes the material before it is ultimately sold to an end user; in some cases the dealer also acts as a collector.

Methodology

The solid waste diversion characterization used a multi-prong approach to document the quantity and types of materials that are diverted from disposal in the City in 1990. Waste diversion data were obtained by the following mechanisms: (1) a mail survey of collectors and processors of recyclable materials, utilizing a material flow methodology; (2) a survey of City residential and nonresidential diversion programs; (3) and (3) telephone and fax communications to clarify and supplement, whenever possible, incomplete data collected through the mail survey, as well as to obtain data from additional sources.

Survey of Recyclers. In order to document the quantity and types of materials that were diverted from disposal in the City in 1990, a survey was conducted of recyclers in the area. The mailing list was developed from the following sources:

- San Jose State Center for the Development of Recycling
- Santa Clara Valley Manufacturing Group's "Commercial Recycling Guide"
- Sierra Club's "Where to Recycle in Santa Clara County"
- City of Santa Clara's list of recyclers
- Telephone books

Survey forms were mailed to recyclers to determine quantities of waste diverted by material type in 1990. To promote participation in the survey, recyclers were informed that the information that they provided would be reported in aggregate form only, to ensure confidentiality. Information requested as part of the survey included:

- Business type (e.g., broker, collector, scrap metal dealer, buy-back center, etc.)
- Anticipated percentage increase (or decrease) in recycling tonnage in 1991
- Tonnage of materials collected by type for 1990
- Source of the waste (i.e., residents, commercial businesses, industry, other)
- Purchaser of recyclables (if not end user)

A copy of the survey form is presented in Appendix A. In a number of cases it was necessary to follow up the mailed survey with phone calls to obtain the requested data.

Review of City Programs. Records from collection programs in the City of Mountain View were reviewed to obtain data on the quantities of wastes diverted from the residential waste stream (and a portion of the commercial waste stream.)

Appendix B presents a copy of the survey form used to obtain data on these programs.

Cross Checking. To avoid double counting, the material flow was charted for each waste type. Data obtained from collectors that reported purchasers for a waste type were eliminated from tabulation when those purchasers also reported data for that waste type. This approach allowed material to be counted only once and quantities to be determined with the best available data.

Data Reduction. Waste diversion data collected were tallied on a spreadsheet form; survey results for recyclers were reported in the aggregate, in compliance with the confidentiality agreement between the consultant conducting the study and the survey respondents. The following data were tallied:

- waste generator, i.e., residential or commercial/industrial
- program type, such as curbside, drop-off, buy-back, or other
- quantitative estimates of materials diverted. Recyclers serving several jurisdictions were requested to provide data specific to the City of Mountain View.

Conversion Factors. Survey data reported as volumes were converted to weight using conversion factors from The National Recycling Coalition Measurement Standards and Reporting Guidelines, October 31, 1989, as shown in Appendix C. Source reduction data for diapers was calculated using a conversion factor from a document entitled *Diapers in the Waste Stream*[1]. Based on this study, it is estimated that there are 4,500 single use diapers per ton of garbage.

Landfill operators and recyclers also reported the following average weights of specific materials:

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1 Lehrburger, Carl, *Diapers in the Waste Stream:* A Review of Waste Management and Public Policy Issues, December 1988.

battery	44 lbs
mattress	40 lbs
laser toner cartridge	4 lbs. (empty)

Survey Response Rate

A total of 138 recyclers, brokers, collectors, end users, and operators of transfer stations and landfills were surveyed as part of the City's waste diversion characterization. Of these, 49 responded, for a response rate of 36 percent. A breakdown of the responses by category is as follows:

- 130 recyclers, brokers, collectors and end users were surveyed; 41 replied, for a response rate of 32 percent
- 8 operators of landfills and transfer stations were surveyed and all responded, for a response rate of 100 percent.

The responses to the diversion survey reflect a comprehensive reporting of solid waste transfer station and disposal facility diversion programs. Brokers and collectors, however, are "underreported" because of the unwillingness of some members of the recycling sector to divulge information they consider proprietary. Specifically, metals and some paper grades are underreported in the results because of the noncooperation of brokers and collectors in providing information on diversion of these waste materials.

Caveats Concerning Data. The following should be noted in reviewing the data presented in Tables 1 and 2:

- Where necessary, the data were apportioned based upon the population ratio of those areas for which the data were reported.[2]
- Data for industrial wastes are included in the table with commercial waste data (except where specifically listed) because collectors do not distinguish by source in their records.

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2 Source of the population data was ABAG (Projections '90).

- Apartment recycling is generally not reported separately from residential recycling. However, because of the different type of collection system, a column is provided for separate reporting. One advantage of keeping separate accounting for this material is that a separate public education program is often designed for apartment dwellers, and this accounting would enable tracking of the success of such a program.
- The data for landfill salvaging were placed in the commercial table. The suppliers of the data were not able to separate it out by source because of the nature of the operation.
- Data on glass tonnages from some cities were reported as commingled. According to the Department of Conservation (DOC), as of March 1, commingled glass coming from curbside programs is assumed to contain 60 percent California redemption value glass, whereas commingled glass from a certified redemption center is assumed to contain 75 percent. This percentage is based on a recent survey for DOC and thus used for this study.
- The results for tires show quantities recycled and transformed. Some tires are sent to Mexico to be recapped. Of the quantity of tires sent to transformation, 25 percent are recovered as casings and used tires before being transformed into electricity. Of the 75 percent transformed, 25 percent is recovered as by-products: gypsum, zinc, and steel. Thus, the data reported were apportioned in this manner.

Table 1. RESIDENTIAL DIVERSION QUANTITIES
(Tons, 1990)

	SOURCE REDUCTION	CURBSIDE	APARTMENT RECYCLING	DROP-OFF (a)	BUY-BACK	20/20 CENTERS	COMPOSTING	TOTAL WITHOUT TRANSFORMATION	TRANS-FORMATION	TOTAL WITH TRANSFORMATION
PAPER	0.0	1645.6	0.0	397.7	0.0	0.0	0.0	2043.3	0.0	2043.3
corrugated containers	0.0	0.0	0.0	44.0	0.0	0.0	0.0	44.0	0.0	44.0
newspaper	0.0	1645.6	0.0	353.7	0.0	0.0	0.0	1999.3	0.0	1999.3
high grade ledger paper	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
mixed paper	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
other paper	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PLASTICS	0.0	6.0	0.0	8.0	0.0	0.0	0.0	14.0	0.0	14.0
HDPE containers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PET containers	0.0	6.0	0.0	8.0	0.0	0.0	0.0	14.0	0.0	14.0
film plastics	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
other plastics	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GLASS	0.0	543.2	0.0	220.7	0.0	0.0	0.0	763.8	0.0	763.8
refillable bev. containers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CA Redemption Value	0.0	472.6	0.0	220.7	0.0	0.0	0.0	693.2	0.0	693.2
other recyclable glass	0.0	70.6	0.0	0.0	0.0	0.0	0.0	70.6	0.0	70.6
other non-recyclable glass	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
METALS	0.0	75.9	0.0	156.0	0.0	0.0	0.0	231.9	0.0	231.9
aluminum cans	0.0	22.7	0.0	156.0	0.0	0.0	0.0	178.7	0.0	178.7
bi-metal containers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
tin cans	0.0	53.2	0.0	0.0	0.0	0.0	0.0	53.2	0.0	53.2
other ferrous	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
other aluminum	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
other non-ferrous	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
white goods	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
YARD WASTE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
								0.0		0.0
OTHER ORGANICS	158.1	0.0	0.0	0.0	0.0	0.0	0.0	158.1	0.0	168.1
food waste	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
tires/rubber	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
wood wastes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
agricultural crop residues	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
manure	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
textiles/leather	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
diapers	158.1	0.0	0.0	0.0	0.0	0.0	0.0	158.1	0.0	158.1
other misc. organics	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER WASTES	0.0	0.0	0.0	5.5	0.0	0.0	0.0	5.5	0.0	5.5
inert solids	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
batteries (b)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
oil (b)	0.0	0.0	0.0	5.5	0.0	0.0	0.0	5.5	0.0	5.5
other HHWs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SPECIAL WASTES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ash	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
sewage sludge	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
industrial sludge	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
asbestos	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
auto shredder waste	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
auto bodies	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
mattresses	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
other special waste	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	158.1	2270.7	0.0	787.9	0.0	0.0	0.0	3218.7	0.0	3218.7

(a) Includes 20/20 Centers and non-profit recycling activities.
(b) Considered Household Hazardous Wastes (HHW).

Table 1. RESIDENTIAL DIVERSION QUANTITIES
(Tons, 1990)

	SOURCE REDUCTION	CURBSIDE	APARTMENT RECYCLING	DROP-OFF (a)	BUY-BACK	20/20 CENTERS	COMPOSTING	TOTAL WITHOUT TRANSFORMATION	TRANS-FORMATION	TOTAL WITH TRANSFORMATION
PAPER	0.0	187.2	0.0	0.0	0.0	0.0	0.0	187.2	0.0	187.2
corrugated containers	0.0	8.3	0.0	0.0	0.0	0.0	0.0	8.3	0.0	8.3
newspaper	0.0	173.7	0.0	0.0	0.0	0.0	0.0	173.7	0.0	173.7
high grade ledger paper	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
mixed paper	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
other paper	0.0	5.2	0.0	0.0	0.0	0.0	0.0	5.2	0.0	5.2
PLASTICS	0.0	1.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	1.0
HDPE containers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PET containers	0.0	1.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	1.0
film plastics	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
other plastics	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GLASS	0.0	80.1	0.0	0.0	0.0	0.0	0.0	80.1	0.0	80.1
refillable bev. containers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CA Redemption Value	0.0	69.7	0.0	0.0	0.0	0.0	0.0	69.7	0.0	69.7
other recyclable glass	0.0	10.4	0.0	0.0	0.0	0.0	0.0	10.4	0.0	10.4
other non-recyclable glass	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
METALS	0.0	9.4	0.0	0.0	0.0	0.0	0.0	9.4	0.0	9.4
aluminum cans	0.0	3.2	0.0	0.0	0.0	0.0	0.0	3.2	0.0	3.2
bi-metal containers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
tin cans	0.0	6.2	0.0	0.0	0.0	0.0	0.0	6.2	0.0	6.2
other ferrous	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
other aluminum	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
other non-ferrous	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
white goods	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
YARD WASTE (c)	0.0	4.0	0.0	0.0	0.0	0.0	0.0	4.0	0.0	4.0
								0.0		0.0
OTHER ORGANICS	2.8	0.0	0.0	0.0	0.0	0.0	0.0	2.8	0.0	2.8
food waste	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
tires/rubber	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
wood wastes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
agricultural crop residues	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
manure	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
textiles/leather	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
diapers	2.8	0.0	0.0	0.0	0.0	0.0	0.0	2.8	0.0	2.8
other misc. organics	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER WASTES	0.0	2.2	0.0	0.0	0.0	0.0	0.0	2.2	0.0	2.2
inert solids	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
batteries (b)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
oil (b)	0.0	2.2	0.0	0.0	0.0	0.0	0.0	2.2	0.0	2.2
other HHWs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SPECIAL WASTES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ash	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
sewage sludge	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
industrial sludge	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
asbestos	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
auto shredder waste	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
auto bodies	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
mattresses	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
other special waste	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	2.8	283.9	0.0	0.0	0.0	0.0	0.0	286.7	0.0	286.7

(a) Includes non-profit recycling activities.
(b) Considered Household Hazardous Wastes (HHW).
(c) Green Valley Christmas Tree Recycling

Table 2. COMMERCIAL/INDUSTRIAL DIVERSION QUANTITIES
(Tons, 1990)

	SOURCE REDUCTION	CITY COMMERCIAL	PRIVATE COMMERCIAL (b)	PRIVATE INDUSTRIAL	LANDFILL SALVAGING	COMPOSTING	TOTAL WITHOUT TRANSFORMATION	TRANS-FORMATION	TOTAL WITH TRANSFORMATION
PAPER	0.0	0.0	838.5	0.0	0.0	0.0	838.5	0.0	838.5
corrugated containers	0.0	0.0	599.5	0.0	0.0	0.0	599.5	0.0	599.5
newspaper	0.0	0.0	66.9	0.0	0.0	0.0	66.9	0.0	66.9
high grade ledger paper	0.0	0.0	159.9	0.0	0.0	0.0	159.9	0.0	159.9
mixed paper	0.0	0.0	12.2	0.0	0.0	0.0	12.2	0.0	12.2
other paper	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PLASTICS	0.0	0.0	3.4	1.2	0.0	0.0	4.6	0.0	4.6
HDPE containers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PET containers	0.0	0.0	3.4	0.0	0.0	0.0	3.4	0.0	3.4
film plastics	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
other plastics	0.0	0.0	0.0	1.2	0.0	0.0	1.2	0.0	1.2
GLASS	0.0	0.0	327.4	0.0	0.0	0.0	327.4	0.0	327.4
refillable bev. containers	0.0	0.0	8.8	0.0	0.0	0.0	8.8	0.0	8.8
CA Redemption Value	0.0	0.0	254.5	0.0	0.0	0.0	254.5	0.0	254.5
other recyclable glass	0.0	0.0	64.1	0.0	0.0	0.0	64.1	0.0	64.1
other non-recyclable glass	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
METALS	0.0	0.0	89.1	0.0	68.2	0.0	157.2	0.0	157.2
aluminum cans	0.0	0.0	20.8	0.0	0.0	0.0	20.8	0.0	20.8
bi-metal containers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
tin cans	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
other ferrous (b)	0.0	0.0	61.4	0.0	46.5	0.0	107.9	0.0	107.9
other aluminum	0.0	0.0	0.0	0.0	2.0	0.0	2.0	0.0	2.0
other non-ferrous	0.0	0.0	1.9	0.0	1.4	0.0	3.3	0.0	3.3
white goods	0.0	0.0	5.0	0.0	18.3	0.0	23.2	0.0	23.2
YARD WASTE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER ORGANICS	0.0	0.0	289.5	0.0	0.0	0.0	289.5	76.5	366.0
food waste	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
tires/rubber	0.0	0.0	59.5	0.0	0.0	0.0	59.5	76.5	136.0
wood wastes	0.0	0.0	230.0	0.0	0.0	0.0	230.0	0.0	230.0
agricultural crop residues	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
manure	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
textiles/leather	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
diapers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
other misc. organics	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER WASTES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
inert solids	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
batteries (a)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
oil (a)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
other HHW's	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
SPECIAL WASTES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ash	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
sewage sludge	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
industrial sludge	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
asbestos	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
auto shredder waste	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
auto bodies	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
mattresses	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
other special waste	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	0.0	0.0	1347.8	1.2	68.2	0.0	1617.2	76.5	1693.7

(a) Considered Household Hazardous Wastes (HHW).
(b) Includes a mix of Commercial and Industrial.
(c) Mainly includes mixed metals.

Table 2. COMMERCIAL/INDUSTRIAL DIVERSION QUANTITIES
(Tons, 1990)

	SOURCE REDUCTION	CITY COMMERCIAL	PRIVATE COMMERCIAL	PRIVATE INDUSTRIAL	LANDFILL SALVAGING	COMPOSTING	TOTAL WITHOUT TRANSFORMATION	TRANS-FORMATION	TOTAL WITH TRANSFORMATION
PAPER	0.0	0.0	11.6	0.0	0.0	0.0	11.6	0.0	11.6
corrugated containers	0.0	0.0	3.2	0.0	0.0	0.0	3.2	0.0	3.2
newspaper	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
high grade ledger paper	0.0	0.0	8.4	0.0	0.0	0.0	8.4	0.0	8.4
mixed paper	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
other paper	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PLASTICS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HDPE containers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PET containers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
film plastics	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
other plastics	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GLASS	0.0	0.0	20.5	0.0	0.0	0.0	20.5	0.0	20.5
refillable bev. containers	0.0	0.0	3.5	0.0	0.0	0.0	3.5	0.0	3.5
CA Redemption Value	0.0	0.0	14.0	0.0	0.0	0.0	14.0	0.0	14.0
other recyclable glass	0.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0	3.0
other non-recyclable glass	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
METALS	0.0	0.0	9.4	0.0	467.0	0.0	476.4	0.0	476.4
aluminum cans	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
bi-metal containers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
tin cans	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
other ferrous	0.0	0.0	8.8	0.0	0.0	0.0	8.8	0.0	8.8
other aluminum	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
other non-ferrous	0.0	0.0	0.6	0.0	0.0	0.0	0.6	0.0	0.6
white goods	0.0	0.0	0.0	0.0	467.0	0.0	467.0	0.0	467.0
YARD WASTE	0.0	0.0	80.0	0.0	0.0	0.0	80.0	0.0	80.0
OTHER ORGANICS	0.0	0.0	99.8	0.0	0.0	0.0	99.8	2.3	102.0
food waste	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
tires/rubber	0.0	0.0	1.8	0.0	0.0	0.0	1.8	2.3	4.0
wood wastes	0.0	0.0	98.0	0.0	0.0	0.0	98.0	0.0	98.0
agricultural crop residues	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
manure	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
textiles/leather	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
diapers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
other misc. organics	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER WASTES	0.0	0.0	0.0	0.0	7.2	0.0	7.2	0.0	7.2
inert solids	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
batteries (a)	0.0	0.0	0.0	0.0	7.2	0.0	7.2	0.0	7.2
oil (a)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
other HHW's	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SPECIAL WASTES	0.0	0.0	0.0	0.0	6.4	0.0	6.4	0.0	6.4
ash	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
sewage sludge	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
industrial sludge	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
asbestos	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
auto shredder waste	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
auto bodies	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
mattresses	0.0	0.0	0.0	0.0	6.4	0.0	6.4	0.0	6.4
other special waste	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	0.0	0.0	221.3	0.0	480.6	0.0	701.9	2.3	704.1

(a) Considered Household Hazardous Wastes (HHW).

Appendix A

SURVEY FORM SENT TO RECYCLERS

County of Santa Clara

Department of Planning and Development
Office of Toxics and Solid Waste Management

1735 North First Street, Suite 275
San Jose, California 95112
Toxics (408) 441-1195
Solid Waste (408) 441-1198

January 25, 1991

Recycling Survey

Dear Santa Clara County Recycler:

The County of Santa Clara needs your help in providing information on the amount of solid waste (garbage) being recycled or reduced within the County limits.

As you may already know, under AB 939, a waste management law adopted in 1989, all cities and counties in the State of California are required to document the type and quantity of waste materials that are being generated, diverted, or reduced in any way. The County of Santa Clara and each of its cities must submit this information in a report that describes how the County and the cities will recycle 25 percent of their waste by 1995 and 50 percent by the year 2000. The maximum fine to counties and cities for failure to comply is $10,000 per day.

To help us determine the amount of commercial and industrial wastes currently being recycled or otherwise diverted from landfills in the County, please complete the enclosed survey, copy and complete a Material Report Form on the reverse side for the unincorporated county and cities you serve, and return them in the enclosed envelope by February 8 to the County's consultant, EMCON Associates, 1921 Ringwood Avenue, San Jose, CA 95131-9961.

The information you provide will be kept confidential. Only aggregate information will be reported to the County. Enclosed is a formal Confidentiality Agreement. If you choose to use this agreement, please enclose it with your completed survey.

Thank you very much for your response to this request. If you have questions about the survey, please contact Katherine Dever of EMCON at 408/453-7300. If you have questions about this project, or wish to discuss it further, please call me at 408/441-1198.

Sincerely,

Margaret J. Rands, Solid Waste Program Manager

Enclosures

EMCON ASSOCIATES

COUNTY OF SANTA CLARA RECYCLING SURVEY

to

Recycling Collectors and Brokers
operating within or receiving materials from within
the County of Santa Clara

The information in this survey will be kept confidential and will be used to prepare a report for the County of Santa Clara and the incorporated cities in the County to comply with the California Integrated Waste Management Act of 1989.

COMPANY NAME:______________________________

ADDRESS:______________________________

______________________________TELEPHONE:______________

CONTACT PERSON:______________________TITLE:______________

TYPE OF BUSINESS: (Please check all that apply.)

______Collector/Hauler
______Dealer/Packer
______Convenience Zone Redemption Center
______Buy-Back Center
______Donation Center
______Non-profit Organization
______Commercial Composter
______News Bin Operator
______Broker
______End market/Manufacturer
______Scrap Metal Dealer
______Auto Wrecker
______Asphalt/Concrete Recycler
______Demolition Debris Recycler
______Wood Waste Chipper
______Confidential Paper Service
______Other Commercial Recycler (Specify)______________
______Special Waste Recycler (See listing below; specify)______________

When completed, please return this survey in the enclosed postpaid envelope to:
Katherine Dever, EMCON Associates, 1921 Ringwood Avenue, San Jose, California 95131.
If you have questions regarding this survey, call Ms. Dever at 408/453-7300.

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1. On the following page, please include the TOTAL TONS of MATERIAL COLLECTED, BY TYPE, for a recent twelve month period from an aggregate of accounts WITHIN THE COUNTY OF SANTA CLARA, by unincorporated area and city jurisdiction only, not from other sources.

   Twelve month period used is from____________ to ____________

2a. Anticipated increase in recycling tonnage for 1991:__________% or

2b. Anticipated decrease in recycling tonnage for 1991:__________%

3. Amount of residue:_____% of total amount collected which is not recyclable and is discarded.

Recycling Material Report Form

CITY____________________

Please indicate SOURCE of the material (give % if more than one source) Residents, Commercial Businesses, Industry, or Other.

Materials Collected	Total Tons Received (by City)	Source	Purchaser (if not end user)
PAPER			
Corrugated cardboard			
Mixed paper			
Newspaper			
High grade ledger			
Other paper (specify)			
PLASTICS			
HDPE containers			
PET containers			
Film plastics			
Laser toner cartridges			
Other plastics			
GLASS			
Refillable glass beverage containers			
CA Redemption Value glass			
Other recyclable glass			
METALS			
Aluminum cans			
Bi-metal containers			
Ferrous metals and tin cans			
Non-ferrous metals plus al scrap			
White goods (appliances, etc.)			
YARD WASTE			
Including leaves, grass and prunings			
OTHER ORGANICS			
Food waste			
Tires and rubber products			
Wood waste, incl. pallets			
Agricultural crop residues			
Manure			
Textiles and leather			
INERT SOLIDS			
Rock, concrete, brick			
Sand, soil, or dirt			
SPECIAL WASTES			
Ash			
Industrial sludge			
Auto shredder waste			
Batteries			
Oil			
Other (specify)			

Appendix B
SURVEY FORM FOR CITY PROGRAMS

February 1, 1991

Dear

The Santa Clara County Solid Waste Program needs your help in collecting information on the amount of solid waste (garbage) being recycled, reduced or composted in your city.

This information will be used in preparing the Countywide Solid Waste Diversion Study, which is part of our Countywide AB 939 Implementation Project. This Study will determine the total amount currently diverted from landfill disposal, producing both a countywide total and totals for each jurisdiction (15 cities and the County).

To help us determine the amount of solid waste currently being diverted from landfills in the County and the identity of the purchaser of those materials that are being diverted, please fill out the enclosed tables (instructions are provided) and return them in the enclosed envelope by February 12 to the County's consultant, EMCON Associates, 1921 Ringwood Avenue, San Jose, CA 95131-9961.

The information you provide will be kept confidential. Only aggregate information will be reported to the County. Each city will receive a copy of the completed diversion study.

Thank you very much for your response to this request. If you have questions about the survey, please contact Katherine Dever of EMCON at 408/453-7300.

Sincerely,

Margaret J. Rands, Solid Waste Program Manager

Enclosures

INSTRUCTIONS FOR FILLING OUT TABLES

Enclosed are the following tables:

- Table 1 Residential Diversion Programs (Tons/Year)
- Table 2 Residential Diversion Programs (Purchaser)
- Table 3 Commercial Diversion Programs (Tons/Year)
- Table 4 Commercial Diversion Programs (Purchaser)
- Table 5 Industrial Diversion Programs (Tons/Year)
- Table 6 Industrial Diversion Programs (Purchaser)
- Sample Form 1 Residential Diversion Programs (Tons/Year)
- Sample Form 2 Residential Diversion Programs (Purchaser)

Sample Forms 1 and 2 are provided as examples of the format to use when filling out the tables.

TABLE 1

1.) List all residential diversion programs in your city across the top row.

2.) Report quantities of materials diverted from the residential waste stream through these programs in the corresponding box. Report quantities in tons per year.

3.) Sum the quantity of materials diverted by each program and report a total at the bottom of the column.

4.) Sum the quantity of each material diverted from all the programs and report a total in the last column.

TABLE 2

1.) List all residential diversion programs in your city across the top row.

2.) Report the purchaser of the material that is being diverted from the residential waste stream in the corresponding box. For example, if ABC Aluminum is purchasing aluminum cans from your curbside program, report

ABC Aluminum in the box under the heading "curbside" and in the row "aluminum cans".

TABLES 3, 4, 5 & 6

1.) Fill out Tables 3 and 5 as you did Table 1, except list commercial and industrial diversion programs in your city.

2.) Fill out Tables 4 and 6 as you did Table 2, except list commercial and industrial diversion programs in your city.

Sample Form 1. RESIDENTIAL DIVERSION PROGRAMS
(Tons/Year)

	Curbside	20/20	Apartment Recycler	Other Recycling Drop-off Programs	Composting	Source Reduction Programs	Total
PAPER							
corrugated containers							
newspaper	1000		20	200			1220
high grade ledger paper							
mixed paper							
other paper							
PLASTICS							
HDPE containers							
PET containers		2					2
film plastics							
other plastics							
GLASS							
refillable bev. containers							
CA Redemption Value	300	50	10	100			460
other recyclable glass	300						300
other non-recyclable glass							
METALS							
aluminum cans	50	10	2				62
bi-metal containers							
tin cans	40						40
other ferrous	100						100
other aluminum							
other non-ferrous							
white goods							
YARD WASTE							
leaves, grass					800		800
brush, branches					300		300
OTHER ORGANICS							
food waste						50	50
tires/rubber							
wood wastes							
agricultural crop residues							
manure							
textiles/leather							
diapers							
other misc. organics							
OTHER WASTES							
inert solids							
hazardous waste							
SPECIAL WASTES							
ash							
sewage sludge							
industrial sludge							
asbestos							
auto shredder waste							
auto bodies							
other special waste							
TOTAL	1790	62	32	300	1100	50	3334

Sample Form 2. RESIDENTIAL DIVERSION PROGRAMS
(Purchaser)

	Curbside					
PAPER						
corrugated containers						
newspaper						
high grade ledger paper						
mixed paper						
other paper						
PLASTICS						
HDPE containers						
PET containers						
film plastics						
other plastics						
GLASS						
refillable bev. containers						
CA Redemption Value						
other recyclable glass						
other non-recyclable glass						
METALS						
aluminum cans	ABC aluminum					
bi-metal containers						
tin cans						
other ferrous						
other aluminum						
other non-ferrous						
white goods						
YARD WASTE						
leaves, grass						
brush, branches						
OTHER ORGANICS						
food waste						
tires/rubber						
wood wastes						
agricultural crop residues						
manure						
textiles/leather						
diapers						
other misc. organics						
OTHER WASTES						
inert solids						
hazardous waste						
SPECIAL WASTES						
ash						
sewage sludge						
industrial sludge						
asbestos						
auto shredder waste						
auto bodies						
other special waste						

Table 1. RESIDENTIAL DIVERSION PROGRAMS
(Tons/Year)

							Total
PAPER							
corrugated containers							
newspaper							
high grade ledger paper							
mixed paper							
other paper							
PLASTICS							
HDPE containers							
PET containers							
film plastics							
other plastics							
GLASS							
refillable bev. containers							
CA Redemption Value							
other recyclable glass							
other non-recyclable glass							
METALS							
aluminum cans							
bi-metal containers							
tin cans							
other ferrous							
other aluminum							
other non-ferrous							
white goods							
YARD WASTE							
leaves, grass							
brush, branches							
OTHER ORGANICS							
food waste							
tires/rubber							
wood wastes							
agricultural crop residues							
manure							
textiles/leather							
diapers							
other misc. organics							
OTHER WASTES							
inert solids							
hazardous waste							
SPECIAL WASTES							
ash							
sewage sludge							
industrial sludge							
asbestos							
auto shredder waste							
auto bodies							
other special waste							
TOTAL							

Table 2. RESIDENTIAL DIVERSION PROGRAMS
(Purchaser)

PAPER						
corrugated containers						
newspaper						
high grade ledger paper						
mixed paper						
other paper						
PLASTICS						
HDPE containers						
PET containers						
film plastics						
other plastics						
GLASS						
refillable bev. containers						
CA Redemption Value						
other recyclable glass						
other non-recyclable glass						
METALS						
aluminum cans						
bi-metal containers						
tin cans						
other ferrous						
other aluminum						
other non-ferrous						
white goods						
YARD WASTE						
leaves, grass						
brush, branches						
OTHER ORGANICS						
food waste						
tires/rubber						
wood wastes						
agricultural crop residues						
manure						
textiles/leather						
diapers						
other misc. organics						
OTHER WASTES						
inert solids						
hazardous waste						
SPECIAL WASTES						
ash						
sewage sludge						
industrial sludge						
asbestos						
auto shredder waste						
auto bodies						
other special waste						

Table 3. COMMERCIAL DIVERSION PROGRAMS
(Tons/Year)

							Total
PAPER							
corrugated containers							
newspaper							
high grade ledger paper							
mixed paper							
other paper							
PLASTICS							
HDPE containers							
PET containers							
film plastics							
other plastics							
GLASS							
refillable bev. containers							
CA Redemption Value							
other recyclable glass							
other non-recyclable glass							
METALS							
aluminum cans							
bi-metal containers							
tin cans							
other ferrous							
other aluminum							
other non-ferrous							
white goods							
YARD WASTE							
leaves, grass							
brush, branches							
OTHER ORGANICS							
food waste							
tires/rubber							
wood wastes							
agricultural crop residues							
manure							
textiles/leather							
diapers							
other misc. organics							
OTHER WASTES							
inert solids							
hazardous waste							
SPECIAL WASTES							
ash							
sewage sludge							
industrial sludge							
asbestos							
auto shredder waste							
auto bodies							
other special waste							
TOTAL							

Table 4. COMMERCIAL DIVERSION PROGRAMS
(Purchaser)

PAPER						
corrugated containers						
newspaper						
high grade ledger paper						
mixed paper						
other paper						
PLASTICS						
HDPE containers						
PET containers						
film plastics						
other plastics						
GLASS						
refillable bev. containers						
CA Redemption Value						
other recyclable glass						
other non-recyclable glass						
METALS						
aluminum cans						
bi-metal containers						
tin cans						
other ferrous						
other aluminum						
other non-ferrous						
white goods						
YARD WASTE						
leaves, grass						
brush, branches						
OTHER ORGANICS						
food waste						
tires/rubber						
wood wastes						
agricultural crop residues						
manure						
textiles/leather						
diapers						
other misc. organics						
OTHER WASTES						
inert solids						
hazardous waste						
SPECIAL WASTES						
ash						
sewage sludge						
industrial sludge						
asbestos						
auto shredder waste						
auto bodies						
other special waste						

Table 5. INDUSTRIAL DIVERSION PROGRAMS
(Tons/Year)

							Total
PAPER							
corrugated containers							
newspaper							
high grade ledger paper							
mixed paper							
other paper							
PLASTICS							
HDPE containers							
PET containers							
film plastics							
other plastics							
GLASS							
refillable bev. containers							
CA Redemption Value							
other recyclable glass							
other non-recyclable glass							
METALS							
aluminum cans							
bi-metal containers							
tin cans							
other ferrous							
other aluminum							
other non-ferrous							
white goods							
YARD WASTE							
leaves, grass							
brush, branches							
OTHER ORGANICS							
food waste							
tires/rubber							
wood wastes							
agricultural crop residues							
manure							
textiles/leather							
diapers							
other misc. organics							
OTHER WASTES							
inert solids							
hazardous waste							
SPECIAL WASTES							
ash							
sewage sludge							
industrial sludge							
asbestos							
auto shredder waste							
auto bodies							
other special waste							
TOTAL							

Table 6. INDUSTRIAL DIVERSION PROGRAMS
(Purchaser)

PAPER						
corrugated containers						
newspaper						
high grade ledger paper						
mixed paper						
other paper						
PLASTICS						
HDPE containers						
PET containers						
film plastics						
other plastics						
GLASS						
refillable bev. containers						
CA Redemption Value						
other recyclable glass						
other non-recyclable glass						
METALS						
aluminum cans						
bi-metal containers						
tin cans						
other ferrous						
other aluminum						
other non-ferrous						
white goods						
YARD WASTE						
leaves, grass						
brush, branches						
OTHER ORGANICS						
food waste						
tires/rubber						
wood wastes						
agricultural crop residues						
manure						
textiles/leather						
diapers						
other misc. organics						
OTHER WASTES						
inert solids						
hazardous waste						
SPECIAL WASTES						
ash						
sewage sludge						
industrial sludge						
asbestos						
auto shredder waste						
auto bodies						
other special waste						

Appendix C

CONVERSION FACTORS

National Recycling Coalition Densities for Recyclables

Figure 4: Sample Weight to Volume Conversion Factors for Recyclables

Material	Volume	Weight in Pounds
Newsprint, Loose	one cubic yard	360 - 800
Newsprint,compacted	one cubic yard	720 - 1,000
Newsprint	12" stack	35
Corrugated cardboard, loose	one cubic yard	300
Corrugated cardboard, baled	one cubic yard	1000 - 1200
Glass, whole bottles	one cubic yard	600 - 1,000
Glass, semi crushed	one cubic yard	1,000 - 1,800
Glass, crushed (mechanically)	one cubic yard	800 - 2700
Glass, whole bottles	one full grocery bag	16
Glass, uncrushed to manually broken	55 Gallon Drum	125 - 500
PET soda bottles, whole, loose	one cubic yard	30 - 40
PET soda bottles, whole, loose	gaylord	40 - 53
PET soda bottles, baled	30" x 48" x 60"	500
PET soda bottles, granulated	gaylord*	700 - 750
PET soda bottles, granulated	semi-load	30,000
Film, baled	30" x 42" x 48"	1,100
Film, baled	semi-load	44,000
HPDE (dairy only), whole, loose	one cubic yard	24
HPDE (dairy only), baled	30" x 48 x 60"	500-800
HPDE (mixed), baled	30" x 48 x 60"	600-900
HPDE (mixed), granulated	gaylord	800 - 1,000
HPDE (mixed), granulated	semi-load	42,000
Mixed PET & Dairy, whole, loose	one cubic yard	average 32
Mixed PET, Dairy and other rigid, whole, loose	one cubic yard	average 38
Mixed rigid, no film or Dairy, whole loose	one cubic yard	average 49
Mixed rigid, no film, granulated	gaylord	500 - 1,000
Mixed rigid & film, densified by mixed plastic mold technology	one cubic foot	average 60
Aluminum cans, whole	one cubic yard	50 - 74
Aluminum cans, whole	1 one full kraft paper grocery bag	average 1.5
Aluminum cans	one 55 gal plastic bag	13 - 20

* Gaylord size most commonly used 40" x 48" x 36"

Figure 4: Sample Weight to Volume Conversion Factors for Recyclables

Material	Volume	Weight in Pounds
Ferrous cans, whole	one cubic yard	150
Ferrous cans, flattened	one cubic yard	850
Leaves, uncompacted[8]	one cubic yard	250 - 500
Leaves, compacted	one cubic yard	320 - 450
Leaves, vacuumed	one cubic yard	350
Wood chips	one cubic yard	500
Grass clippings	one cubic yard	400 - 1500
Used Motor Oil	one gallon	7
Tire - Passenger Car	one	12
Tire - Truck	one	60
Food Waste, solid and liquid fats	55 gallon drum	412

VI. Conclusion

"Standard" is defined as "something considered by an authority or by general consent as a basis of comparison; an approved model; a rule or a principle that is used as a basis for judgement ...." [9]

While we believe that the recommendations presented here represent the best possible way of reporting and using data, we realize that complete agreement on every individual point isn't necessary for this work to serve as a "standard." Even where there may be disagreement about the application of a particular term or formula, the difference is made clearer by having a standard against which to contrast the alternative. The NRC offers these definitions, reporting guidelines, and calculation methods in that sense of the term: to serve as a common point of departure.

These concepts will have the best utility if indeed they do achieve widespread adoption, that is, if we all indeed begin to "speak the same language." To accomplish this, your participation is greatly needed to encourage the widespread testing and adoption of the NRC's National Measurement

Standards and Reporting Guidelines. Your reports of experience in applying these concepts in your programs, and your comments and criticism on this document, are invited and will be appreciated, for the preparation of future updates.

VII. Notes

1 "The National Policy on Recycling" was adopted by the National Recycling Coalition at its Fifth Annual Recycling Congress in Seattle Washington, in November of 1986. Copies of this brochure are available from the NRC.

2 At the 1989 Membership Meeting, and in workshops held during the 1989 Congress, consensus could not be reached on these terms because some members expressed the opinion that a definition for integrated waste management must also include a specified hierarchy of priorities for waste management options, whereas others argued that this should be left unspecified. Furthermore, consensus could not be reached in defining the waste management hierarchy, because of lack of agreement regarding the ranking of incineration with energy recovery versus landfilling. These comments were consistent with other comments previously received throughout several drafts of the Standards document. Unchallenged was this portion of the definition:

> "The waste management hierarchy is the prioritization of waste management strategies as follows: 1. Decreasing the generation of waste through source reduction, and 2. Decreasing disposal by maximizing materials recovery. "

3 The Glossary of Recycling Terms and Acronyms, contains more than 300 terms and is available for $5 from Resource Recycling, P.O. Box 10540, Portland, Oregon 97210; 503-227-1319

4 This description is a direct paraphrase of comments provided by the Glass Packaging Institute.

5 This is a direct paraphrase of commentary provided by Resource Integration Systems/Resource Conservation Consultants.

6 A detailed methodology for deriving current recycling rates has been developed by Gilmore Research Group and The Matrix Management Group

APPENDIX 4

WASTE SURVEYS

APPENDIX 4
WASTE SURVEYS

The objectives of a waste survey are to identify the types and quantities of materials being discarded, and then to identify source reduction and/or recycling opportunities for these wastes. Before performing a waste survey, the City or other surveyor should get top management approval from the target firm for both the survey and its follow-up.

GATHERING WASTE GENERATION INFORMATION

The first step in a waste survey is to meet with the people who handle the solid waste and with those responsible for the equipment or procedures from which the waste is generated. These people can help plan and conduct a walk-through. During the walk-through, all the mixed waste and recycling receptacles are visited and discussed to answer the following questions:

- What is the volume of the container?
- How often is the container emptied?
- How full is the container on an average emptying day or hour?
- What kinds of materials are in the container when it is emptied?

Answering these questions offers a glimpse of the quantity and types of waste generated on-site, although the resulting data are subject to error if the survey is performed only once. More reliable data can be generated if the volume of the waste is carefully tracked over time by company personnel. Even better data can be generated if scales are used to weigh the waste. The most rigorous waste surveys involve sorting and weighing the waste by material type (e.g., glass, wood, paper), or function on-site (e.g., Line X steel tailings).

The waste survey offers enough information to target some of the mixed waste materials for reduction or recycling, and to target some of the currently recycled materials for reduction.

IDENTIFYING WASTE REDUCTION AND RECYCLING OPPORTUNITIES

After the waste survey walk-through, there are a number of follow-up steps to reduce the amount of waste generated. The following categories of source reduction measures and recycling opportunities should be brought to the attention of the waste generator:

- Good operating practices.
- Technology changes.
- Input material changes.
- Product changes.
- Recycling opportunities.

Ultimately, the firm surveyed will need to take responsibility for making some changes, although assistance by the beyond the initial survey may be appropriate in many cases.

Good operating practices refer to the human aspect of manufacturing operations. Many of these measures are used in industry largely as efficiency improvements and good management practices. Good operating practices can often be implemented with little cost in all areas of a plant, including production, maintenance operations, and raw material and product storage. Good operating practices include the following:

- Management practices include employee training, incentives and bonuses, and other programs that encourage employees to reduce waste.
- Material handling and inventory practices include programs to reduce loss of input materials due to mishandling, expired shelf life of time-sensitive materials, and improper storage conditions.
- Loss prevention minimizes wastes by avoiding leaks from equipment and spills.
- Waste segregation practices reduce the volume of nonrecyclable wastes by preventing the mixing of waste types.
- Cost accounting practices include programs to allocate waste treatment and disposal costs directly to the departments or groups that generate waste rather than to general company overhead accounts.

Technology changes are oriented toward process and equipment modifications to reduce waste, primarily in a production setting. Technology changes can range from minor changes that can be implemented in a matter of days at low cost, to the replacement of processes involving large capital costs. These changes include the following:

- Equipment, layout, or piping changes.
- Uses of automation.
- Changes in process operating conditions, such as flow rates, residence times, pressures, and temperatures.

Input material changes minimize waste by reducing or eliminating the materials that enter the production process. Also, changes in input materials can avoid the generation of hazardous wastes within the production processes. Input material changes include material purification and material substitution.

Product changes are performed by the manufacturer of a product with the intent of reducing waste resulting from a product's use. Product changes include product substitution, product conservation, and changes in product composition.

Recycling through use and/or reuse involves the return of a waste material to the originating process as a substitute for an virgin input material, or to another process as an input material, either on-site or by some other party.

Historically, waste management has not been a significant cost factor in material process and technology decisions. As disposal rates rise dramatically and firms are encouraged by waste management cost savings to analyze their waste steams, many firms will find that reducing waste not only saves disposal costs, but may save much more through decreased purchasing.

SELECTING AND IMPLEMENTING CHANGES

The following criteria are important in identifying which changes to make:

- Estimated cost.
- Estimated tons or cubic yards of waste to be avoided.
- Estimated savings due to decreased waste hauling.
- Estimated savings due to decreased purchasing requirements.

- Ease of implementation.
- Worker health/safety considerations.

After changes are selected, the firm must map out their planned changes in terms of:

- Volume or weight abatement goals for targeted materials.
- Budget and/or staff time allocation.
- Parties responsible for implementation.
- Methods to measure progress.
- Timing and forum for regular communications in-house.

APPENDIX 5

DEVELOPMENT OF MARKETS FOR DIVERTED MATERIALS

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DEVELOPMENT OF MARKETS FOR DIVERTED MATERIALS

Understanding post-consumer materials markets is critical to the success of a diversion program. Throughout the U.S., business and private citizens are driving market development and demand for recycled products. To be effective, policy options must stimulate private investment so that governments are not left to bear an unsustainable burden.

This appendix discusses the development of markets for two types of diverted materials: recycled materials and yard waste products.

RECYCLED MATERIALS

Assessing Markets

A preliminary market analysis will show what markets are currently available or may be available in the future. National and some regional market information is available in the trade publications (for example, *Recycling Times* includes a markets page for post-consumer materials). It is also important to identify specific local, national, and international buyers with which the City will actually deal. With this information, materials to be recycled can be targeted within the local waste stream.

Each of the recyclable materials has unique characteristics, and market development must be understood in the context of each material. Demand-directed efforts are required for some materials, more stringent market specifications for others, and supply-directed efforts for others. For some materials, all of these factors are important. A market study for specific materials for the entire Highway 80 corridor from the Bay Area to Sacramento would be appropriate.

Local Markets

A strong emphasis should be placed on local recycling and manufacturing, given the lag between environmental consciousness and industrial capacity to recycle. Both the city and the manufacturer benefit when waste is recycled locally. Each stage of production increases the economic benefits of recycling. In addition to decreasing dependence on volatile foreign markets, recycling waste close to home provides jobs, saves waste disposal costs, and increases recycling program revenues. Local markets and end uses can be developed in three primary ways, as described in the following section.

Use Of Secondary Materials By Existing Industries
Standard specifications, permit requirements, and codes governing new construction can be modified to encourage the use of recycled materials. Candidate materials include cellulose fiber insulation manufactured from newsprint, glass fiber insulation manufactured from post-consumer glass, glass cullet as an aggregate for french drains and some paving uses (glasphalt), recycled plastic parking curbs, traffic cones, or park benches, paper products with a minimum recycled content, and rubberized asphalt using crumb rubber from old tires.

Government procurement procedures should initially give a preference to these materials, and to private sector developers who use these materials. Government requirements for use of these materials in all new construction should be phased in, if necessary to stimulate the market, after sufficient experience with the materials is obtained.

The codes which govern site layouts and landscaping may also be used to stimulate secondary material use among existing industry. For example, some cities currently have planning policies which require new supermarkets to set aside space in their site plan for future redemption centers. Foresight during the building permit process can make diversion programs much more successful at a later time.

Encouraging New Industries That Use Secondary Materials
New industries can be encouraged to locate nearby. A good example of this is plastic lumber production from post-consumer HDPE. Manufacturing facilities exist in other parts of the United States, primarily the Midwest and East, but are not yet sited in California. The Recycling Market Development Zone concept could be used to assist in financial startup of this industry.

Long term commitments to deliver collected recyclables to these industries are likely to be necessary in order to encourage them to locate here. Adequate feedstock to achieve economic scale will likely require interjurisdictional cooperation. These issues will need to be dicussed between potential candidates and the City. Consequently, benefits of programs like this are not quantified in this document. It is assumed that their benefits will not become clear until the meduim term planning period.

Influencing Consumer Behavior
Consumer buying preferences change over time and can be directed into more economically and ecologically sound patterns. This approach is also medium-term in nature, and is not

quantified in this document. It is critical, however, to long term success of diversion programs as a whole. A county-wide program of education and, possibly, financial incentives to encourage resource-conscious buying practices can help influence the success of market development efforts.

Locating and Choosing a Buyer

Types of Buyers

There are three general "outlets" for secondary materials: brokers (or dealers), end users, and internal markets.

Brokers purchase materials and sell them to end users. Brokers accumulate materials, guarantee that they meet certain specifications, and then provide them to end users as a "raw" material feedstock. Most end users prefer secondary materials obtained through brokers, because a large quantity of uniform quality product can be guaranteed. Brokers are reliable buyers, as they often purchase materials even when the market is down, stockpiling in anticipation of higher prices. Many brokers will transport materials, and they usually require little processing other than a clean product.

End users are the facilities that actually reprocess or remanufacture the post-consumer materials. For example, a paper mill accepting post-consumer scrap paper is an end user. Selling directly to the end user may result in a better price, but could also require meeting more stringent product specifications (for example, the waste may have to be baled). Many end-users also require the supplier to deliver the materials, which adds costs.

Internal markets such as municipal government agencies not only provide an outlet for some materials, but also promote a recycling "awareness" within the government. Examples might include using tires to build playground equipment.

Contract Vs. Open Market

Secondary materials are usually sold either on the open or "spot" market or through some type of contract arrangement. On the open market, decision makers must locate a buyer each time enough material has been accumulated to be sold. By selling materials in this manner, the community can get the best price for the materials at the time. When the markets are down, however, the community may be faced with low prices or no buyers at all. A contract is an agreement between the community and a broker or end user to deliver a certain amount of material at a certain price for a specified amount of time. A contract helps protect the community from market fluctuations and ensures an outlet for materials. The agreed price, however, may at times be below the actual market price for the material.

When possible, many decision makers choose to develop contracts with buyers, mainly because it reduces the risk of having no outlet for materials. Post-consumer materials markets fluctuate greatly, and many programs are not equipped to handle flat markets (for example, material may have to be stored and then sent to a landfill if no buyers are available).

Cooperative Marketing: An Option For Small Generators
Cooperative marketing involves combining materials and resources from different groups into a larger pool that may be more marketable. Small communities and businesses have traditionally had little success in establishing relationships with secondary materials brokers and end-users, mainly because smaller communities neither have the resources to perform market research nor enough materials to garner the attention of brokers. Combining materials and using a cooperative marketing strategy can bring materials from these communities into the marketplace.

Cooperative marketing can be developed within existing management structures. For example, Mountain View or ABAG may do market research and make arrangements for the collection and delivery of recyclables to a broker. Another option would be for an independent organization to serve as the link between small towns and brokers or end-users. An example of such a group is the New Hampshire Resource Recovery Association, a non-profit organization that serves as a link to secondary materials markets for many of New Hampshire's municipalities.

Aside from regional arrangements, cooperative marketing can take several other forms, including:

- Drop-off centers using a centralized recycling center for marketing.
- Different recycling centers combining materials.
- Recycling centers or communities exchanging marketing ideas and information.

One market development activity could involve the cooperative marketing of old newspaper (ONP) by the recyclers in the City to a single mill, and working out a tolling agreement between the mill and a local newspaper.

Market Factors

The primary factor in marketing is the quality of the recovered material. Quality is defined in recognized written standards and published as material specifications. The more closely a material conforms to the published specification, the easier it is to sell and the higher the price it will command. In periods when market demand is slack, high quality materials will be continuously purchased while lower-quality materials may become unsalable.

Other major influencing factors are the volume and consistency of quality standards of the recovered material that the seller can provide to the marketplace. The intrinsic factors of material quality, volume, and consistency interact with equally important external market factors. Material markets on the West Coast are influenced not only by domestic demand, but also are heavily affected by overseas market developments.

Many factors affect secondary materials markets. The most important variables include:

1. The general condition of both the domestic and global economies.
2. The supply of materials, both virgin and secondary, on the world market.
3. World relationships between geographically competing supply sources, domestic and foreign market production, and generation rates.
4. The capacity of smelters and mills for secondary materials as well as expansion of existing and construction of new secondary materials production facilities.
5. The level of demand and price competition between domestic and export markets.
6. Variations in export freight pricing policies between conference and non-conference shipping lines. (Conference lines are usually more expensive and "set" their prices in a cartel-like fashion.)
7. The direction, rate, and volatility of virgin commodity markets.
8. Currency exchange rates in relation to the U.S. dollar.
9. International trade and tariff policies, regulations, and agreements.
10. Cartel agreements between virgin producers of prime raw materials.

The status of the secondary materials marketplace at one time will be the result of the dynamic interaction of all these factors. The relative importance and degree of impact of each factor changes constantly.

Old Newspaper: A Market Development Example

The recent history of the newspaper market illustrates some of these forces at work. The newspaper glut that developed initially in 1989 was the result of an unanticipated and unplanned series of events. However, the end result is that a new level of demand has been established that will lead to higher recovery rates and probably to higher market value for old newspaper (ONP), perhaps by 1992. In some areas of the country, ONP value has already appreciated substantially. The series of events is instructional and can be summarized as follows:

1. Solid waste management became a highly visible issue in 1986; attention focused on recycling as an alternative to disposal. ONP recycling was a focus in 1988-89.
2. States adopted legislation to encourage or require community-based "recycling", mostly in 1988-89. Recycling meant collection of separated materials.
3. Numerous large curbside and other programs were implemented in 1988-89.
4. Newsprint demand boomed during 1985-87; producers made commitments to new, mostly virgin fiber capacity scheduled to become available in 1989-91.
5. The demand for ONP slowed temporarily in late 1988 when exports dropped. The price for ONP collapsed in the East, and this spread across the United States.
6. Attention became focused on newspaper publishers, with legislative, political, and environmental pressures to save curbside programs from economic distress.
7. Many publishers developed a plan to purchase recycled newsprint.
8. Demand was established for more recycled newsprint. ONP animal bedding programs and other alternative uses for ONP spawned more interest.
9. Several newsprint producers committed capital investment to produce recycled newsprint.
10. This newly established demand for ONP will in turn require increased recovery of ONP in the years ahead.

The key lessons to be learned are as follows:

- Supply can increase much more rapidly than demand in the short term.
- Solid waste management goals can be used as a method to "jump start" new market demand; however, temporary disruption of the existing system can occur.
- Industry will respond as quickly as prudent planning and construction will allow, provided the message is clear and the economic/social benefits are

equally clear to them. Industry needs to be convinced that the public commitment is sustainable so it can justify investments that have long-term pay backs.

- The supply and demand for the material will stabilize at a higher level once these new investments are in place.

The newspaper glut was not a market failure, but a disequilibrium between supply and demand caused by governmental efforts to promote collection of newspaper for environmental rather than economic reasons. The net result of the glut was short-term pain for long-term gain.

An excess supply situation can happen with other materials if collection (supply) begins before market demand. A well-planned program that ties market demand to supply is the preferred approach. Caution must be exercised in assuming revenue from the sale of such materials in a transition period. Obviously, oversupply will bring prices down sharply (but temporarily). Negative prices, that is, paying buyers to take materials (at less than disposal costs), are possible.

Market disequilibriums causing revenue shortfalls can be expected to last one to four years, about the period necessary for the market (demand) to react by planning, permitting, building, and starting commercial operation of new facilities in response to the availability of supply. Of course, if there are dramatic increases in collection there may be no capacity at all, and some separated materials may get landfilled or burned. A balanced approach by government supporting both collection efforts (supply) and market development (demand) is appropriate.

Some market development activities have been suggested which have the potential to "jump start" new markets that are slow in developing. These recommendations will not interfere with basic positive effects (efficiency and innovation) of the free enterprise system, but will accelerate the development of such markets. About three years after the end of sudden increases in the supply of materials (caused by new collection programs coming on line), the markets should reach a state of relative equilibrium. While equilibrium for commodities will not bring a completely stable price, the need for any government-supported market development activities will be eliminated. However, since most markets for recyclable materials are national, market equilibrium is not completely predictable, and some amount of instability should be anticipated.

The "jump start" mechanisms are no longer needed when materials are being captured and recycled in substantial percentage. Market sustenance or growth efforts should be the domain of the private sector after equilibrium has been achieved. Supply (collection) may have to be subsidized indefinitely because of the low value of some recyclables.

Price Trends

Prices for secondary materials are cyclical. They can vary from 40 to 100 percent of value within a six to twelve month time frame. The previous section presented the major market forces that determine secondary materials prices. However, clearly identifiable trends in the pricing cycle can be used to define realistic, median material prices. These median prices are effective tools to project near and long-term potential pricing scenarios for recovery programs.

Secondary material is a demand driven product; scrap is bought, not sold. The pricing of material reflects the greater economic leverage of buyers in relation to sellers. Final consumers of secondary materials, mills and smelters, will buy material at the lowest price to which the market will respond.

Market prices per ton for recycled materials in Northern California in early 1991 were as follows:

Newspaper	$30-40
High Grade Paper	$90
Cardboard	$30
Mixed Paper	$0-5
Aluminum	$2000-2200
Tin	$20-70
Glass	$100-135
PET Plastic	$700-800

Old Newspaper (ONP)

ONP is the most commonly recycled item in residential drop-off and curbside programs. A closed loop end use for ONP is new newsprint; linear uses include insulation, packing, building materials, animal bedding, and kitty litter. AB 1305 (1989) requires that all commercial consumers of newsprint certify to the State that the newsprint they use has a minimum recycled fiber content.

High Grade Paper

High grade paper comprises approximately 25% of all waste paper recovered in the U.S. There are many grades within this category, most of which can be recycled in a closed loop. High grades receive substantial prices on the market, which make the material competitive with virgin inputs in areas where recycled supply is dependable. Market prices depend upon the price of pulp. Since high grade paper is often used as a substitute for pulp, prices tend to fall with the price of pulp, but the market is more stable than for other grades of waste paper. Markets are also expanding with the increasing push for recycled products, especially recycled office paper. All of the large paper dealers in the region deal in at least several grades, the most common being white ledger, colored ledger, and computer printout. The Gaylord plant in Antioch is a local end user.

Old Corrugated Containers (OCC)

OCC comprises over half of the waste for many commercial establishments and manufacturing facilities, and it makes up about 50% of the waste paper recovered in the U.S. End uses for OCC include manufacturing new corrugated containers, cereal boxes, pad bases, and wall board. It can also be shredded and used as animal bedding. Many local paper dealers handle OCC. The Gaylord paper plant in Antioch uses 60% recycled fiber in the manufacture of new corrugated cardboard. OCC has strong domestic and export markets, with demand expected by many industry analysts to outstrip supply within the next five years. Markets are probably sufficiently strong to preclude distinct market development activities. A collapse of the OCC market would seriously affect the success of the selected diversion programs, particularly in the commercial and industrial sector.

Mixed Paper

The housing industry and currency exchange rates greatly affect the demand for waste paper. Export of mixed paper has increased substantially in the past year. The primary use of waste paper is the manufacture of combination boxboard which is used to make boxes for shoes, clothing, and dry foods. Other uses include the manufacture of roofing felt and construction paper building materials. "Supermix," a grade of waste paper containing a higher content of high-grade fibers, is usually exported to East Asia, where it is manually sorted into its constituent grades for recycling.

Magazines are also within this category, through they are considered a separate paper grade. Demand for magazines is weak but growing, as manufacturers of recycled newsprint find that a percentage of magazines in the mix improves the final furbish. Potential buyers in the Bay Area include Jefferson-Smurfit in Oakland and San Jose; Weyerhauser in San Jose; Domtar Corp. in San Leandro (which uses mixed paper for manufacturing the liner for its sheetrock); and DAI El Paper in Burlingame. Demand for mixed paper may grow as demand for OCC outstrips supply and new uses are found for mixed paper to replace kraft fibers. However, contamination levels must be kept to a minimum.

<u>Aluminum Cans (UBC)</u>

Aluminum cans are remelted and made directly into can stock. Aluminum scrap is used primarily by secondary aluminum producers. Current scrap market value ranges from $800 to $1100 per ton. With AB 2020 redemption value, the total market price ranges from $2000 to $2200. Ample markets for aluminum exist both here and abroad.

<u>Steel Food and Beverage Containers</u>

Tin cans that are used as food containers are actually steel cans with a thin coating of tin. The percentage of tin in steel cans is about 25%. Growth in curbside collection of steel cans has been an important element in the expansion of steel can recycling.

<u>Glass Cullet</u>

Waste glass usage in the U.S. is estimated at 25 to 30% of all glass produced. Cullet is primarily traded on the U.S. market, so its market price remains fairly constant. A primary concern for end use markets is the quality of the material. In the glass plant, contamination can cause damage to equipment or result in poor product quality. One of the problems with commingled curbside collection is that it produces multi colored shards of glass. Markets for mixed-color cullet are not as stable or lucrative as those for color-sorted containers.

Two primary end uses for recovered glass are cullet for new glass and as a raw material for making secondary products, such as glasphalt paving material, foamed insulation, and construction material. The glass market has recently been problematic for recyclers due to increased quality standards being imposed and requests for color-sorted materials.

High-Density Polyethylene (HDPE) Plastic
HDPE is used in milk and water jugs, as well as a broad array of containers. HDPE can be recycled into non-food containers and other plastic products, such as recycling bins and garbage cans. Several of the large paper dealers in the region puchase HDPE, though processing occurs in the Midwest and on the East Coast. Some HDPE is also exported to China and other Pacific Rim countries.

The market outlook for HDPE is favorable, as manufacturers of plastic containers and of products sold in them strive to improve the environmental image of plastic. Markets for plastics are fairly new, but as processing technologies are developed, plastics recycling will grow and new markets will develop. Market development may be assisted through purchase preferences. A collapse of the market for this material, as for any of the targeted plastics, would have only a minor effect on diversion rates.

Polystyrene (PS) and Expanded Polystyrene (EPS)
These plastics consist of the same polymer. PS is most commonly used for brittle plastic containers, such as for cottage cheese and yogurt containers. EPS is commonly referred to as Styrofoam, though this is a trade name. Local markets for polystyrene products include Free-Low Packaging Corporation in Redwood City, the National Polystyrene Recycling Corporation plant in Hayward, and Bay Polymer in Fremont. Polystyrene can be used in the manufacture of office equipment, videotape casings, flower pots, toys, insulation, textiles, fiber fill, industrial paints, and carpet yarn.

YARD WASTE

Several different products can result from the processing of yard waste materials. The most logical products for a given community depend on many variables, including characteristics of the yard waste, the degree to which the different components are or can be separated, facility size and processing capabilities, local market conditions, and overall program goals and objectives.

End Uses for Yard Waste Products

The most common products resulting from yard waste processing are described in the following sections.

Boiler fuel
Boiler fuel can be produced from essentially any brushy/woody yard waste through size reduction. Grass clippings and leaves are not desirable components in boiler fuel. However, materials handled as boiler fuel cannot be credited toward recycling goals until after January 1, 1995, and then only in specified circumstances.

Mulch
Mulch (also known as landscape chips) is a material applied to the surface of the soil, most often around the base of plants, to conserve moisture, suppress weeds, moderate soil temperature, or reduce erosion. Reduction of larger woody materials in size, particularly when done with a chipper, results in a relatively acceptable mulch. Size reduction of smaller brushy materials yields a less desirable product that is considered unacceptable by many users. Experience in various communities has shown that if the quality of the chips is good, paying markets are relatively easy to develop.

Bulking Agent For Municipal Sludge Composting
Bulking agents are required in sludge composting to improve porosity, provide structural support, and keep the compost mass from becoming anaerobic. Wood chips and sawdust are the most common bulking agents used in the process. Co-composts made from various mixtures of sludge and yard waste are attractive and versatile materials with many uses. Co-compost mixtures may be used directly or mixed with nutrients and/or bulking agents to

produce a wide variety of soil amendments and mulches. The co-compost can be screened to make products with textures ranging from a rich, fine, soil-like material to a coarse mulch of one to two inch wood chips. Co-compost with the coarse yard waste removed retains a higher proportion of sludge than the screened coarse materials or the non-screened co-compost.

There are two sludge composting operations in the Bay Area: an operation in South San Francisco run by Tillo Products, Inc., and East Bay Municipal Utility District (EBMUD) in Oakland. At present, EBMUD uses only chipped fir bark purchased on the spot market as a bulking agent in their sludge composting, but significant changes in their processing system to start using wood chips from recovery operations are being considered. Other sanitary districts in the area are also considering co-composting projects.

Compost

Compost is produced as a result of biological decomposition of organic materials. Leaves and grass clippings are good compost feedstock materials in that they decompose fairly quickly. Woody materials are very slow to decompose and will remain largely intact through the process. They are, however, sometimes beneficial in the compost process; they serve as a bulking agent which allows for better aeration. The presence of undecomposed wood in finished compost is unacceptable to some users, and removal by screening may be necessary.

Studies and experience have shown that sufficient markets for yard waste compost can consistently be developed provided the quality is suitable. Aesthetic appeal is at least as important as physical and chemical properties. Market development activities are important. Revenue should not be expected during the initial years of production. Once markets have been developed and product awareness has improved, it should be possible to price compost similar to a good quality topsoil.

Size Reduced Yard Waste

This material is produced by size reducing mixed yard waste (as compared to landscape chips which are produced from larger, segregated woody materials). Some states have programs which include application of uncomposted yard waste to agricultural lands. Other states are testing the feasibility of using this material as daily cover at landfills. Reclamation of disturbed lands is another possibility. Direct uses for this type of material are limited to situations where appearance and consistency are not critical. Alternatively, it does appear that there is some potential for marketing this material to parties that would process it into other products. Payment to the party would probably be required.

Quality Parameters For Yard Waste Products

The following table summarizes the range of yard waste products and the quality variations for each:

Yard Waste Products and Quality Variations

Product	End Uses	Grading Parameters
Uncomposted Fines	Soil tilth amendment	Particle size Moisture content pH
Composted Fines	Soil fertility amendment Feedstock for topsoil blend Feedstock for potting mix	N-P-K ratio pH Particle size Moisture content Contamination Metals content Consistency
Chips	Boiler Fuel	Moisture content Btu value Particle size
	Mulch	Particle size Homogeneity Contamination Moisture content Color and texture
	Bulking agent	Moisture content Particle size Contamination
Size reduced yard waste	Landfill cover Landspreading	Contamination

Markets

Public agencies, agriculture, and landscaping industries are often identified as the most appropriate potential markets for compost products. These markets are moderate to large in size, have a need for and experience in managing organic materials, tolerate a relatively wide range of product specifications, and present some potential for producing revenue.

Product specifications and the amount of product variation that can be tolerated vary for different categories of users. For example, use of compost as a component of greenhouse mixes is often cited as a potentially lucrative market. Nursery growers do pay considerable amounts for high quality sphagnum moss peat. However, the growers have very specific needs with respect to density, porosity, pH, and other parameters. Furthermore, consistency of product and availability during peak planting times are critical. It may be unwise to target highly specific and demanding markets during the initial stages of a composting operation because of uncertainties about compost quality and consistency. However, as a better understanding of product characteristics and variability develops, these markets can be pursued.

Initial, less demanding markets might include landscapers, landfills, parks, forestry and highway departments, and agricultural lands. Nonetheless, it is still important that the needs of these users be recognized. For example, surveys have consistently shown that landscapers are a good potential market for compost; they are interested in using the product and are capable of consuming large quantities. Successful marketing to this group will require that the producer understand issues such as transport and handling needs, and periods of peak demand.

A distinction should be made between existing and potential markets. An existing market is one in which a product is now and has historically been both available and in demand. By this definition, compost products, mulch, and other soil amendments derived from yard waste should be considered a potential market.

Every geographic region is unique in the types of related businesses that flourish and the soil use practices that are accepted. For example, an urban area may have a great need for compost within the public agencies and the landscaping industry. A suburban area may have greater needs in the plant growing industries, such as nurseries. The location of the compost operation and economic and population growth of the area will be good indicators of future trends in soil product consumption.

The markets for yard waste by-products are also influenced by the following factors:

- The proximity of potential users to the source of compost/mulch.
- The quality of the compost/mulch.
- The quantity of competing compost/mulch and other soil amendments.

There is variation in how much, if any, revenue can be anticipated from different market sectors. The goals of any marketing effort are to distribute all of the material produced and to maximize net revenues. These two objectives must be balanced against each other. For example, successful marketing to the nursery industry may result in higher revenue per unit of compost sold, but there may not be sufficient demand for all compost produced.

During the initial stages of production it is unlikely that revenues will be generated from the sale of compost or mulch. After an initial period, during which time compost quality can be matched to consumer needs, it should be possible to develop paying markets for the products. However, no known community yard waste collection, processing and marketing system operates with a net profit. Private firms may operate at a profit because tipping fees are normally in place to supplement high production costs and relatively low revenues.

There is currently a strong demand for boiler fuel. A suitable material for this market can be produced from the brush and/or woody portion of yard waste. Whether or not this option should be developed depends largely on the state's position on applicability of the practice to recycling goals. The extent to which Mountain View expects to meet recycling goals through yard and wood waste management practices is also an important factor. In other words, economics and relative market certainty may support managing a portion of the yard waste in this way even though tonnages diverted to boiler markets would not credit towards recycling goals.

Market Structure for Compost and Mulch

In the Bay Area, as with most urban areas of the country, wholesale and retail markets for soil and wood products are somewhat complex. In general, there are producers or processors, retailers, commercial growers, wholesale distributors, and institutional and home users. The following table summarizes the markets for yard waste products:

Markets for Compost and Mulch Products

Fines	Chips
Retailers	
Soil vendors	
Nurseries/greenhouses	
Lawn and garden centers	
Commercial Users	
Nurseries	Landfills
Agriculture	Boiler fuel plants
Gardeners	Bark processors
Landscapers	Landscapers
Construction firms	Land reclamation
Agriculture	
Sod growers	
Gardeners	
Institutional and Home Users	
Caltrans	
Other local & state agencies	
Landfills	
Sewage sludge composting	
Land reclamation projects	
Golf courses	
Parks	

Each market is discussed below.

Producers/Processors

On the producer or processor level, the topsoil market is dominated by a few large businesses that produce compost, fertilizers, and other soil products. There are also many small soil vendors that generate soil by occasional excavations. Some producers/processors blend soil with other materials to meet the specifications of particular customers. In general, most soil products and wood chips in the Bay Area market are produced in the area. An exception is that most peat is produced in Canada and the Northwest and shipped to markets throughout the country.

Retailers

Most compost and mulch is purchased wholesale by retailers from the producers and processors. Retailers often bag the products or blend them with other materials to meet their needs and the needs of their customers. Retailers include businesses such as nurseries, lawn and garden centers, and greenhouses. There are several hundred such specialized businesses in the Bay Area. In addition, businesses such as convenience stores, department stores, and even some drug stores sell bagged topsoil, potting soil, peat moss, mulch, bark, and other soil or landscaping products. The sales volume at each type of outlet is not known.

Commercial Growers

Commercial growers include the agricultural industry, landscapers, nurseries, lawn maintenance businesses, sod growers, and commercial gardeners. Some of these businesses are large consumers of soil products and also retail the products in bulk or in bags to customers. They tend to purchase soil, mulch, and other products wholesale from the producers and processors. Many agricultural businesses are not large consumers of soil products but do consume fertilizers in large volumes. Growers such as vineyards, cash croppers, and bedding plant businesses are more likely to need soil amendment and moisture retention agents. Landscapers and commercial gardeners require an aesthetically pleasing product but also one with qualities such as moisture retention and high organic content.

Commercial agriculture is often ruled out as a potential market for compost products because little, if any revenue can be expected. Commercial farmers have a history of purchasing inputs such as fertilizer, pesticides, and water. The large agricultural firms contacted indicated that they would not be interested in purchasing compost unless a nitrogen shortage became extremely acute and the compost had a beneficial nitrogen value. The fertilizer value of yard waste composts is relatively low, and very high application rates, 5 to 8 tons/acre, would be required to supply the nutrient requirements of most crops.

Although commercial farmers have not traditionally purchased organic matter inputs, there is an important trend toward "low input" agriculture to reduce operating costs, including fertilizer. The National Association of Conservation Districts announced a resolution in

February, 1990, urging the Soil Conservation Service to adopt "beneficial compost and sludge application" as a soil conservation measure and add it to the National Handbook of Conservation Practices. Once a practice is listed in the Handbook, it becomes eligible for cost sharing. Such a step would encourage a much larger number of farmers to become involved with composting and land application. Many growers do not have the equipment necessary to apply large volumes of material.

There are potential agricultural applications for compost on the islands in the Bay-Delta region. Oxidation and erosion is leading to an impending failure of hundreds of miles of weak levees. These levees must be reinforced. An additional problem is that the islands of the Delta have lost a substantial volume of peat soil to erosion and weathering over the years, and the resultant lowering of the ground level has made the area susceptible to flooding. A long term solution to the problem is to raise the ground level by adding organic amendments. A pilot project and full-scale proposal to explore this solution was initiated in the 1970s by the Association of Bay Area Governments, but was later discontinued due to inadequate funding and potential water quality problems from the compost "leachate." The project would have involved barging sewage sludge and organic solid wastes from the Bay Area to the Delta, and co-composting the materials. The finished product was to be used to buttress weak levees and to control island floor subsistence. While such a program is not feasible from a narrow economic analysis, the Delta is of great environmental and economic significance to California, and it must be protected. Funding from the state or other sources for a composting project should be explored.

Institutional and Home Users

Other markets include recreational users (golf courses, parks), institutional users (landfills, land reclamation projects, highway projects), and homeowners. Recreational users such as golf courses are often reluctant to purchase yard waste products due to a concern about workability of the material or the free-flowing capability. Parks, in contrast, are large users of mulches and barks for trails, vegetative plantings, and erosion control. Park operators tend to generate their own mulches and bark from tree maintenance conducted within the parks. Institutional users comprise a large market but one that normally offers a very low price (if any) for soil products. These users will be essential during the early phases of a program before commercial marketing is fruitful.

Homeowners generally purchase soil amendments and landscape materials from retail businesses, but they will readily divert to other sources if available. Some homeowners use compost and mulch generated on their own property by backyard composting, brush chipping, and mulching. Since backyard composting and mulching usually generate small amounts of material, those homeowners may also buy commercial products.

Seasonal Variations in Market Demand

Although yard waste is generated year-round in the Bay Area, the end user demand for soil amendments, mulches, and similar products is greater from spring to autumn. The drought experienced in recent years has kept the demand for such materials fairly consistent in all seasons. Demand fluctuates according to gardening, landscaping, and vegetation planting schedules. Demand for institutional and construction uses is relatively stable.

Competing Products

Municipally produced compost will have to compete in a soil amendment market with several high quality, readily available soil amendments and soil mixes. However, competing high quality products are not always considered obstacles in the marketing of new products. Good examples include the propensity of fast food restaurants to locate on opposite corners of the same intersection, or the "copy-catting" of existing national brands of food and health products by competing manufacturers. Theoretically, a high quality product could increase the overall demand for all soil amendments.

The most important competetive advantage of yard waste compost is certain physical and chemical properties that make it an excellent soil amendment. For example, compost's ability to retain water is superior to many competing products. While yard waste compost is not a direct substitute for fertilizers and fine grade top soil, it is a suitable substitute for certain soil amendments, and can be blended very effectively with other feedstocks to produce a variety of soil blends and mixes.

Some competing materials commonly used by landscapers and gardeners are: bark (mostly pine and cypress) from timber industries, peat, topsoil, manure, and sawdust from mills. These materials are normally sold uncomposted. A few examples of products that have been firmly established in existing markets are detailed below.

Peat

One of the most widely used and highest priced competing products is peat moss. Peat is high priced because of its consistency, light weight, nutrient holding capacity, ability to increase soil porosity, and ability to add moisture retention to soil in gardening and nursery applications. When peat prices have risen, lower priced substitutes have temporarily replaced peat in some markets. However, when peat prices decline, those substitutes are then replaced by peat. Peat is often sold to wholesalers in bulk form by the cubic yard. It is then packaged in bags for sale to the retail market. Peat is frequently blended with topsoil, vermiculite, fertilizers, or other materials to produce a hybrid product for a specific retail need.

Topsoil
Topsoil brokers deal in large volumes of soil amendment products and related materials such as landscape rock. Topsoil is used as top dressing for lawns in new developments, on golf courses or other recreational facilities, and as a soil amendment for agricultural use. Topsoil is most often sold in bulk form by the cubic yard. Brokers typically sell to building contractors, landscapers, or other businesses. Some topsoil is packaged in bags of one or two cubic feet for sale to the public. Topsoil is infrequently blended with other materials such as peat.

Manure
Race tracks, cattle ranches, zoos, and other livestock management facilities produce manure which is frequently sold or given away to distributors. Manure is often anaerobically stabilized by itself, with straw bedding, or with other bulk material to produce an "aged" product that is valuable as a fertilizer and soil amendment. The agriculture industry is a common user of manure, but only because it typically generates manure; the industry does not typically purchase manure. Manure is primarily traded in bulk form. The sale of bagged materials to the public through retail establishments such as lawn and garden centers and nurseries accounts for a small part of the manure market.

Potting soil
Potting soil is a more specialized material than topsoil. It is most often a commercial grade blend of some or all of the following: topsoil, peat, vermiculite or polystyrene pellets, sands and silts, and fertilizer. Potting soils are commonly sterilized to eliminate plant diseases and weed seeds. Potting soil is usually produced by large nurseries or lawn and garden centers. Thus, it is rarely traded wholesale in bulk form. Its typical retail form is in 5 to 40 pound bags. It is used for nursery stock, house plants, and gardening.

Obstacles to Compost Marketing

The manufacturing of any new product faces obstacles, and compost is no exception. The obstacles focused upon here include costs, contamination, and consumer resistance to change. However, experiences with programs throughout the country have shown that marketing or distribution of finished compost poses few problems if the product is aesthetically appealing and the end-user has reasonable assurance that it does not contain harmful substances. In many situations, marketablity of compost has proven to be the least of barriers in developing large scale organic material recovery operations. Inadequate processing capability, inability to obtain suitable facility sites, and limited funding for equipment and labor often prove to be more problematic than material marketing.

Costs

Achieving and maintaining the proper purity, appearance, porosity, texture, consistency, and chemical balance of a commercial quality product requires capital investments ranging from minimal investments for low-technology composting operations to expensive bagging machinery and equipment costs for high quality product operations. A manufacturing process aimed at producing a compost to compete with commercially produced composts would, in most instances, place heavy financial risks on local government budgets.

Contamination

Depending on its origin, yard waste compost may be contaminated by lawn chemicals, lead from paint and auto exhaust, disease organisms, tree spray chemicals, automobile exhaust pollutants, broken glass, metal, rocks, weed seeds, and other foreign material. Contamination limits potential marketability by diminishing the product's quality or increasing the costs of processing.

The utilization of proper monitoring procedures can eliminate or substantially reduce the potential for contamination. Dilution of toxics also occurs in the blending process, when other feedstocks are added to create a finished product.

Consumer Reluctance to Change

Another obstacle is the inertia of end-users against changing products. Essentially, when consumers have already found a product that has worked to their satisfaction, absent a sufficient difference in price, they are likely to be reluctant to change. The reluctance is magnified when there are uncertainties associated with consistent supply and quality of the newly introduced product.

Reluctance to change can be overcome by a variety of marketing strategies. Among the keys to acceptance is the provision of accurate information about the product to consumers through carefully targeted public education.

APPENDIX 6

DESCRIPTION OF EVALUATION CRITERIA

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1. Effectiveness in waste diversion

Low:	Less than 5% of total waste stream diverted.
Medium:	5 to 10% of total waste stream diverted.
High:	More than 10% of total waste stream diverted.

2. Hazards created

Low:	Impacts or hazards are severe or unmitigable.
Medium:	Impacts or hazards are mild or mitigable.
High:	Few or no hazards or nuisances exist, and/or hazards can be adequately contained.

3. Flexibility to changing economic, technical, or social conditions

Low:	Program tied to particular technology, market, or social institution, and little adaptability is possible.
Medium:	Program may be hampered by predictable, moderate changes, and some adaptation is possible with significant program alteration.
High:	Program is flexible, and much adaptability is possible.

4. Consequences on the waste stream

Low:	Waste generation is shifted toward a less recyclable and/or more polluting waste type.
Medium:	No change in waste generation or no change in recyclability or pollution level of waste generation.
High:	Waste generation is shifted toward a more recyclable and/or less polluting waste type.

5. Feasibility in short-term and medium-term

Low:	Program cannot be implemented within the planning period.

Medium: Local conditions and experience with similar programs indicate that program can be implemented by year 2000.
High: Local conditions and experience with similar programs indicate that program can be implemented by 1995.

6. Consistency with local policies, plans, ordinances

Low: Major changes in existing codes and ordinances required prior to program implementation.
Medium: Minor changes in existing codes and ordinances required prior to program implementation.
High: No changes in existing codes and ordinances required prior to program implementation.

7. Facility requirements

Low: Major expansion or new facilities required.
Medium: Moderate expansion of existing facilities required.
High: No significant expansion of existing facilities required.

8. Institutional barriers

Low: Severe institutional barriers, such as waste stream ownership agreements and/or long term franchise contracts.
Medium: Moderate institutional barriers or moderately difficult to overcome.
High: Few or easily overcome institutional barriers.

9. Costs

Low: Cost per ton diverted significantly higher than existing waste management cost per ton.
Medium: Cost per ton diverted higher than existing waste management cost per ton.
High: Cost per ton diverted roughly equal to or less than existing waste management cost per ton.

10. End uses or markets

Low:	Markets are currently nonexistent or unstable.
Medium:	Potential for medium-term development and/or stabilization of markets. Markets exist but are subject to moderate fluctuations and/or are not local.
High:	Existing and potential markets are available, local, and relatively stable.

11. Involvement of waste generators

Low:	Program has no effect on behavior of waste generaors, or tends to obscure the potential commodity value and/or environmental consequences of waste.
Medium:	Waste generators somewhat encouraged to recognize potential commodity value and/or environmental consequences of waste.
High:	Waste generators strongly encouraged to recognize potential commodity value and/or environmental consequences of waste.

APPENDIX 7

MOUNTAIN VIEW LANDFILL RATE STRUCTURE

APPENDIX 7

MOUNTAIN VIEW LANDFILL
RATE STRUCTURE EFFECTIVE JULY 1991

	Residents	NonResidents
Cars	$ 2.00	$ 5.50
Station wagons	$ 4.00	$ 12.00
Other 2-axle vehicle	$ 5.00 per cubic yard	$ 13.75 per cubic yard
Commercial	$ 17.60 per cubic yard	$ 17.60 per cubic yard
3 or more axle vehicles	$ 20.50 per cubic yard	$ 20.50 per cubic yard

SPECIAL WASTES	RESIDENT	NONRESIDENT
Tires to 36"	$2.00 each	$5.50 each
Tires 36" - 45"	$5.00 each	$13.75 each
Tires over 45"	$8.80 each	$25.30 each
Mattresses. Box Springs	$6.05 each	$17.00 each
Stuffed furniture	$6.05 each	$17.00 each
Appliances, Water Heaters	$5.00 each	$13.75 each
Tree Stumps	$1.65 per inch in diameter	$3.85 per inch in diameter

APPENDIX 8

KEY FUNDING CONCEPTS

APPENDIX 8
KEY FUNDING CONCEPTS

There are misconceptions and myths related to the economics and financing of various solid waste management programs which occasionally lead to a misunderstanding of the costs and feasible options available to the public sector. This appendix attempts to clarify these issues and discuss their relevance in a local context. Topics discussed include:

- Advance disposal fees.
- Avoided costs.
- Depletion costs.
- Diversion credits.
- External costs.
- Flow control.
- Inequities hurting recycling economics.
- Landfill contingency funding.
- Life cycle costs.
- Opportunity costs.
- Volume based charges.

ADVANCE DISPOSAL FEES

An advance disposal fee is a charge added to initial product sale to cover disposal costs. Such fees are added to product costs before it is sold to the end user. For instance, a 25¢ per battery fee could be added prior to the initial purchase of a battery by a consumer. The fee would probably be added into the price of each item by the manufacturer; however, if such a fee were levied against a select few product types, it could be a separate line item added to the product purchase price like a sales tax. The idea of such a fee is that particularly toxic or difficult-to-dispose-of items would carry a heavier fee and thus pay for their own disposal instead of being treated like average wastes. (In current disposal methods most waste is charged by volume or tonnage without regard to what the material is. Advance disposal fees also encourage users to use less of particular materials, by increasing their cost.

While this is an attractive idea, there is no way of knowing where a product will be disposed. Therefore, advance disposal fees could only be practically implemented at the State or Federal level, and would require a substantial administrative burden.

California is currently studying this concept. In Wisconsin, a fee of $1.50 is imposed "for each tire on a used car" purchased in that state. In Minnesota, the State Legislature is considering a bill to establish advance disposal fees on the wholesale level on certain packaging materials which are not recycled. In Florida, virgin newsprint carries a 10¢-per-ton tax. In Rhode Island, a new car battery costs $5 extra if the buyer doesn't turn in an old battery.

AVOIDED COSTS

Avoided costs are the overall costs of a waste management system that will be eliminated by the addition of diversion programs. As an example, suppose recycling PET (including separation, collection, processing, transportation to market, less product sale revenue) has a net cost of $50 per ton, and the current landfill program for these materials (including collection, disposal, closure, and post-closure amortization) costs $30 per ton. Then the "avoided cost" is $30 per ton. The overall change in waste management cost is $20 per ton.

Avoided costs are sometimes listed as a revenue. They are not. However, they can in some cases represent real savings between alternative solid waste management programs and current programs. This concept is sometimes used by recycling advocates to justify recycling subsidies.

Avoided costs are variable costs in that they refer to those costs that fluctuate with output (Mulvey, 1989). This means that certain fixed costs will not be eliminated. This is difficult to figure fairly. For instance, in the previous example, the garbage trucks will take fewer trips to the landfill and thus avoid some fuel costs, but can a truck be sold? At the landfill, some tip fee tonnage is avoided; however, the landfill also has certain fixed costs which have to be spread over whatever tonnage comes in. Thus the landfill fee per ton rises.

As an illustration, suppose:

- Total collection and landfilling costs = $75 per ton on 10,000 ton per year. And an audit shows that 50% of these costs can be avoided for each ton diverted.
- The diversion programs in aggregate can divert 50% of all waste from disposal (as the AB 939 year 2000 goal requires) at a net cost of $50 per ton.

- Thus, the eliminated cost of disposal is:
  5,000 tons (diverted) x \$37.50 = \$187,500 per year. This is the avoided cost of disposal.
- Diversion programs cost
  5,000 tons x \$50 per ton = \$250,000 per year.
- Thus, the overall change in waste management costs is a of \$62,500.

In order for this analysis to be fair, all costs should be included for each alternative management option. In the case of landfilling there are questions about whether the externalities, depletion, and adequate closure and post-closure costs are included.

DEPLETION COSTS

Economists often figure depletion costs for the usage of scarce resources, for example, oil being pumped from a well. Landfills can also be viewed as a scarce resource. This is not because of a shortage of land, but because siting and permitting a landfill is becoming difficult. Future landfills will be farther away, more environmentally safeguarded, and have more financial assurance requirements. The size of the depletion cost depends on the alternative management costs, a discount rate, and the number of years of remaining landfill capacity (Mulvey, 1989).

One formulation for this cost (Mulvey, 1989) is: $DC = (C_R - C_L)/(1+r)^n$

Where:

DC	=	the depletion cost
C_R	=	cost of replacement (in current dollars)
C_L	=	cost of landfilling (current facility)
r	=	a discount rate to bring dollars to their current value
n	=	the number of years until the replacement is necessary

For example, suppose:

C_R	=	\$75 per ton (not unreasonable for a newly sited, new generation landfill with substantial transfer costs to this new facility)
C_L	=	\$30 per ton (including disposal, closure, and post-closure)
r	=	5%
n	=	30 years

Then:

$$DC = (75\text{-}30)/(1+.05)^{30} = \$10.41 \text{ per ton.}$$

Thus, the value of the depletion, even with replacement 30 years from now, would be over $10 per ton. The City of Mountain View could add a landfill surcharge on top of fees charged by landfill operators to reflect this cost. The funds generated could be escrowed to provide for future waste disposal capacity and/or used now to offset diversion program cost increases (which would other wise be funded by increased franchise fees). AB 939 (Part 2, Section 41901) allows collection of fees only for "those costs directly related" to the implementation of the programs in this plan. However, increased landfill fees have a substantial effect on reducing waste going into a landfill and may be acceptable as a source reduction program, and thus allowable.

Because of the speculative nature of the assumptions required for this calculation, the value of this depletion is largely dependent on the community's willingness to site alternative facilities, and because this cost will not provide funds for any of the diversion programs, depletion costs are not considered further within the Funding component. Chapter IX of this document describes an innovative application of this concept to fund a public trust which would also improve the relative economics of the proposed diversion programs.

DIVERSION CREDITS

Some communities have attempted to capture the avoided cost of landfilling caused by the implementation of a recycling program through a diversion credit. The diversion credit is simply a contract mechanism between municipality and hauler to return some of the avoided-cost-of-disposal savings caused by the recycling program to the City.

This seems reasonable when the garbage franchise does not include the recycling effort and it is hard to quantify the tonnage that will be diverted. The credit allows payment to be better matched to the actual tonnage of the garbage franchise. However, if the impact of the recycling programs are generally known, the franchise agreement can be negotiated with the reduced tonnage in mind and no credit mechanism is necessary.

The City of Naperville in Illinois uses a formula-based diversion credit to reduce City payments to a private hauler for the labor and variable costs of garbage truck operation. These costs were avoided by the implementation of a recycling effort (Foshay, 1990).

EXTERNAL COSTS

External costs are those costs which are a result of a solid waste project but which are not clearly identified and not paid out of project revenues. For example, separate collection of recyclables can cause traffic congestion on residential streets. On the other hand, an effective source reduction program would cause less traffic congestion as the number of truck routes is reduced.

Other factors often omitted from project economic analysis are:

- The differential damage to the environment of alternative solid waste practices.
- Different energy requirements, and the environmental impacts of energy required (pollution, depletion, and so forth).
- Litter and noise costs for residents near solid waste facilities (landfills, recycling centers, processing facilities).
- Costs of inconvenience to the waste generators (particularly in separating recyclables).

Such costs are by their nature external to the project economics, and very hard to measure. These costs occur, roughly, in all solid waste management practices and are impractical to quantify objectively and are thus not considered further in this document.

FLOW CONTROL

Flow control is the terminology used in the bond industry to indicate that a bond issuer has control over the waste intended to go to a certain facility. Any issuer of debt (public or private) must assure the financial community that the funds for debt service will be available as necessary. When a bond issue relies on project revenues (for example, tip fees at a compost facility) to meet the debt service requirements, they will also have to show that the tonnage of waste arriving (on which the tip fee will be received) is quite certain.

In some states, local jurisdictions have the authority to require a waste hauler to take municipal solid waste to a specific facility. This is legislative flow control, and is usually required by financial people for large debt offerings.

In cases where the cost of the new management option is lower than with the current system, some people refer to an economic flow control. However, this is a misnomer because economics can change rapidly and there is really no "control" at all.

In areas where waste collection is franchised, the jurisdiction can simply acquire flow control through the franchise agreement: this is a contractual flow control. This will be sufficient for the financial industry if the financing terms are tied to the period of the franchise. A five-year franchise agreement would normally lead to a five-year amortization of debt and consequently quite high tip fees. Investors can put substantial pressure on communities (and haulers) to secure longer franchise agreements or separate flow control agreements before building capital intensive facilities.

INEQUITIES HURTING RECYCLING ECONOMICS

Recycling is at an economic disadvantage because of inequities in financing and subsidies of "virgin" materials (extracted raw materials). In financing large resource recovery projects, the public sector has often contributed through public expenditures and risk-minimizing measures designed to make massive private investments attractive and profitable (Solid Waste Report, 1989). In addition, these projects are indirectly subsidized through the use of tax-exempt bonding, and occasionally through capital assistance grants.

The marketing of recycled materials competes with marketing of virgin materials. Tax rules which allow depletion allowances and capital gains tax treatment that the government grants to mining companies and to pulpwood producers but not to salvagers of used material are chief examples (Alexander, 1972) of a tax advantage to produce virgin materials which doesn't apply to recycled materials. Market development activities by local government may be able to offset these inequities.

LANDFILL CONTINGENCY FUNDING

There are three principal sources of future financial need for landfills: closure, postclosure care (twenty years currently required by the EPA), and contingency action(s).

The event of closure is relatively familiar, and funds can be set aside in a timely and effective manner to match the expected future liabilities. Closure takes place as each cell in a landfill is closed, with final closure occurring only when capacity is exhausted.

Postclosure care is more complicated and must be planned for according to current, state-of-the-art or EPA-mandated standards, such as leachate and gas monitoring and collection. Postclosure cannot be anticipated with the same degree of accuracy as can closure costs, and therefore it is more difficult to reserve the appropriate amount of funds.

The most problematic are so-called "contingency" actions. In fact, the word "contingency" is perhaps inappropriate here in its meaning of "possible event." This use gives some the impression that corrective action is not very serious because it may not occur. It is more accurate to think of landfill contingencies in terms of when they will occur. Most garbage has been and is now disposed in unlined areas. Such landfills leak. The difficult part is finding the leak and measuring its size. Understanding that contamination is virtually certain gets rid of some of the uncertainty on contingency action. The "when" of contingency action is directly related to landfill design. Landfills which have yet to detect groundwater problems at their facilities usually are those with no monitoring systems. Once a monitoring system is in place and operating at a landfill constructed without a liner, it is relatively certain that contamination will be found. That is the bad news. The good news is that some of the "unknown" has been taken out of "contingency action."

AB 939 indicates that owners or operators of landfills have "prepared an initial estimate of closure and postclosure maintenance costs," and that "the owner or operator has established a trust fund or equivalent financial arrangement acceptable to the Board (CIWMB)." These funds are to be utilized for closure and postclosure care. It is interesting that AB 939 (46026) requires owners or operators to have an up-to-date postclosure plan "...to maintain the landfill for at least thirty years after closure." Yet, section 43604 (Financial Ability) requires only "...evidence of financial ability for postclosure maintenance at all times equal to the estimated cost of fifteen years of postclosure maintenance." In Mountain View, the Regional Water Quality Control Board requires 30 years for post-closure, the newest City permits (e.g., City of Mountain View Landfill) are for 30 years.

Finally, the future liabilities of landfill leakage will require corrective action. In California, these costs may be financed through the State Solid Waste Disposal Site Cleanup and Maintenance Account in the Solid Waste Management Fund. This account may collect twenty million dollars ($20,000,000) per year, but cannot exceed one hundred million dollars ($100,000,000) in total. The cleaning up of a single small landfill in the State of Minnesota has been estimated to cost ten to fifteen million dollars.

Local government should monitor the financial assurance mechanisms of all landfills within its jurisdiction and scope of responsibility (those landfills which have been the recipients of City of Mountain View solid waste), as the EPA has brought legal action not only against the owners, but also against governments contributing waste to leaking landfills.

LIFE CYCLE COSTS

Some solid waste management alternatives are much more capital intensive than others, yet can be cheaper overall. The concept of life cycle costs is simply that all project costs (and revenues) over the life of a project should be aggregated and discounted to current dollars so that they can be compared on a common basis. Project costs include capital, operations, maintenance, transportation, and residual disposal. Project revenues include any product or energy sales and possibly a salvage value for any facilities or land at the end of the planning period. When salvage value is highly uncertain, it is omitted entirely. The overall figure used for comparison is the total present value of net costs required.

The present value of costs is the approach used in this document to model the cost of the proposed diversion programs. See Table VIII-7.

OPPORTUNITY COSTS

"Opportunity cost" is the label accountants use to identify the cost of missed opportunities in the use of resources. For instance, if a man could earn $50,000 a year but chooses to stay home with his children, his opportunity cost is $50,000 (ignoring tax effects).

In the solid waste context, it is necessary to input the cost of resources used in various programs so that the full cost is shown regardless of existing ownership. For example, in figuring the cost of a secondary materials transfer station, the value of the land must be included even if it is now owned by the jurisdiction.

The opportunity cost of land for landfills is sometimes omitted by publicly owned landfills. It is either not valued or valued at the original acquisition value, not the market value of the land. However, in Mountain View the landfill owners are all private and no doubt include the value of the land in the tip fee passed through to their customers.

VOLUME BASED CHARGES

Volume- (or weight-) based charges for solid waste services are an attempt to encourage waste generators to reduce or recycle by allowing a reduction in garbage service fees corresponding to the reduction in wastes generated. Many communities have found these incentives highly effective in reducing waste volumes.

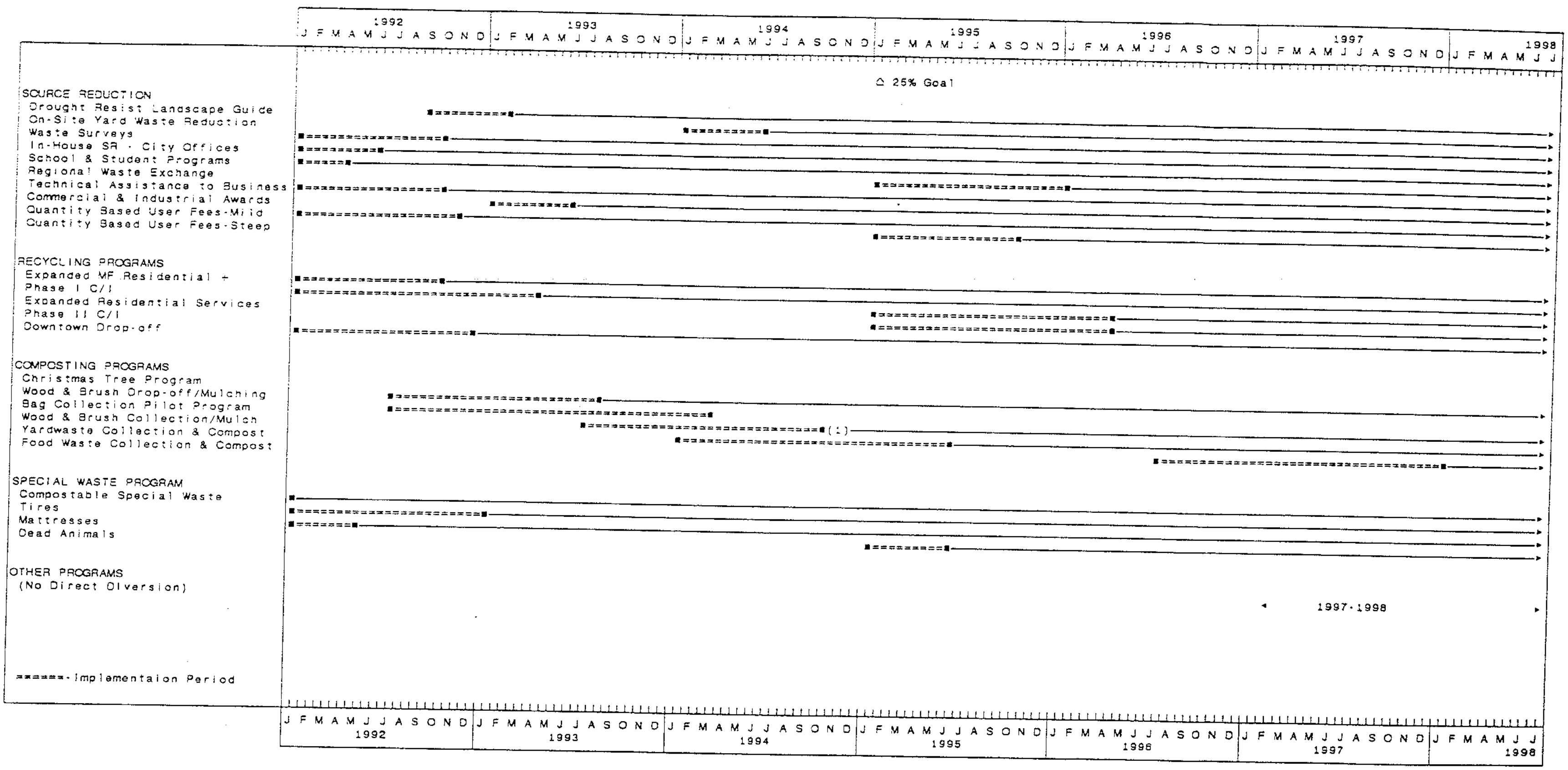
Implementation of volume-based charging programs has taken on many different variations around the country. In most cases the residents are allowed to subscribe for a level of service (one can, two cans, etc.), and they pay for the subscribed service whether they use the full capacity or not. This might better be termed volume-based capacity charges. Some areas provide incentive to individual residents by requiring the use of specially marked garbage bags or ties that the community sells. This approach, which is sometimes referred to as the "metered bag" approach, matches even more closely the amount of waste generated to the payment required. As an example, the City of Grand Rapids, Michigan offers solid waste collection through a prepaid bag per tag system. Tags are sold for $.35 each to the City's 10,000 residents and the city will only pick up refuse designated with a tag. A few communities are going even further by using weight-based rates. This is like the charging structure for water or electric utility usage. Seattle uses a weight-based system because "they would like to have every bit of recycling and waste reduction result in direct savings to the customer" (Skumatz, 1989).

A volume- or weight-based system that requires haulers to keep track of weekly set-out amounts costs more to administer than traditional charging structures. These costs would need to be included in future franchise rate negotiations. However, the metered bag system can actually save haulers administrative burden by eliminating individual billing. Moreover, some haulers like the system because they are able to make fewer stops, since people do not set out a half-filled can or bag (Carlson, 1986).

In poor areas where the variable rate is quite substantial, volume-based charging can contribute to illegal dumping, thus creating enforcement costs and raising questions of fairness to the poor.

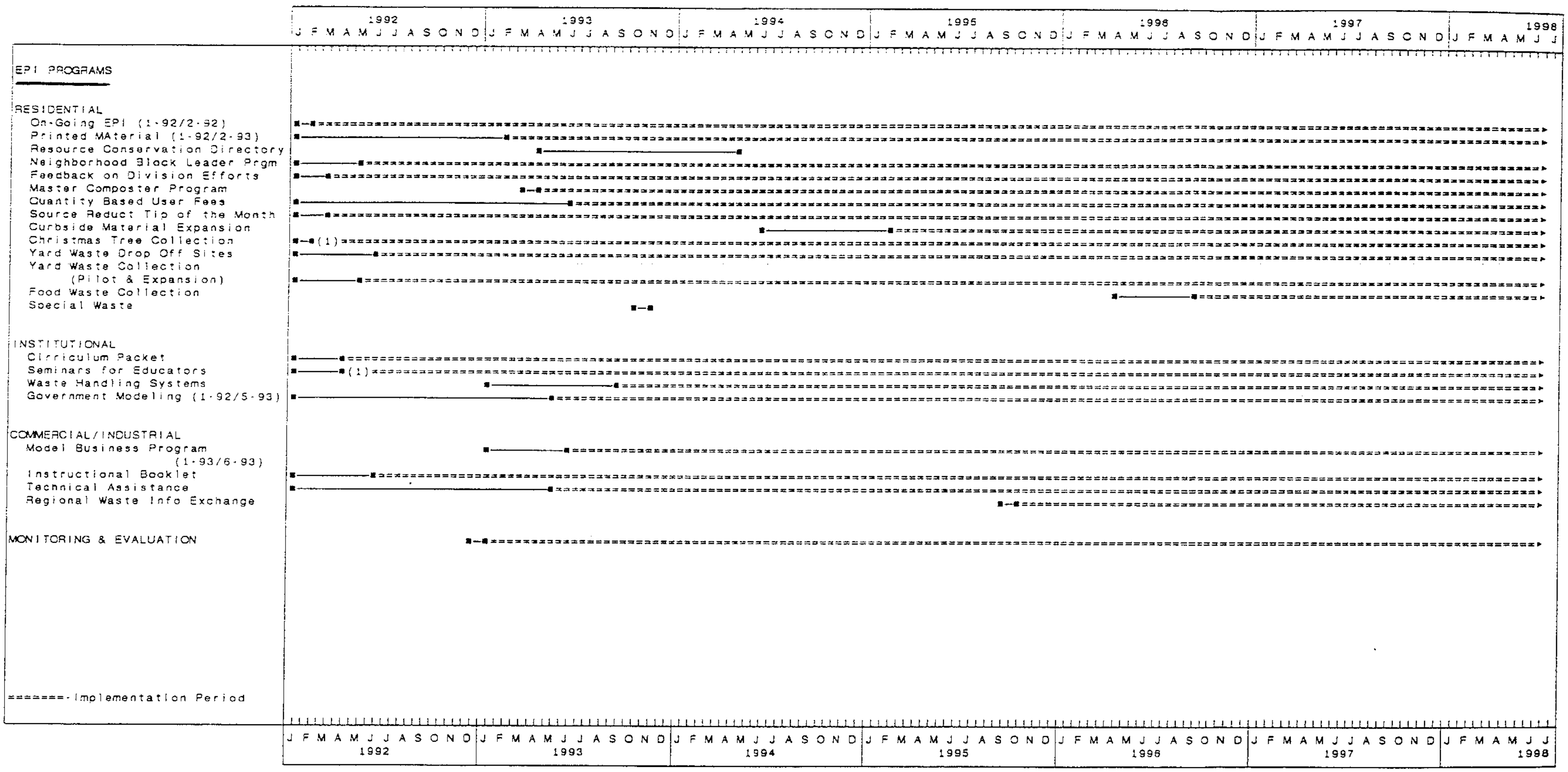
Volume-based charging schemes are typically revenue-neutral. That is they do not raise (or cost) new funds but merely shift the burden among residents. For a further discussion of volume-based charges, see Chapter II.

FIGURE IX-1
PROGRAM IMPLEMENTAION SCHEDULE



1. Seasonal (twice/year) collection of residential brush may be implmented in 1992 to maximize use of the drop-off investment.

FIGURE IX-1(cont.)
EPI IMPLEMENTAION SCHEDULE



1. Annually